Preliminary Stormwater Management Plan

Tudor Road Multi-Family

818 Ne Douglas Street
Section: SE ¼ Sec. 31-48N-31W
Lee's Summit, Missouri

Prepared By:

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PEI #220231
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1.0 Introduction

Phelps Engineering, Inc. (PEI) is pleased to submit this Preliminary Stormwater Management Plan for Tudor Road Multi-Family development located southwest of the intersection of Douglas Street and Tudor Road in the City of Lee's Summit, Jackson County, Missouri. The proposed site is 13.03 acres, and the property is planned to be developed as a multi-family development. The property is bound by Douglas Street to the east, Tudor Road to the north, Commerce Drive to the west, and unplatted land to the south. See Appendix "A" for the project aerial map.

2.0 Existing Conditions and Drainage Computations

The project site is located in the Blue River watershed. The existing site is broken up into two drainage areas. These areas are the north and south watersheds.

The north watershed consists of an area of 3.35 acres in size and is in the northern portion of the site. It is created by existing ridge which divides the site. Water within the north watershed will sheet flow across the site until it reaches Tudor Road. Once within the roadway water is picked up by existing curb inlets and routed away from the site.

The south watershed will consist of an area of 9.68 acres in size and makes up the remainder of the site area. Water within the south watershed sheet flows across the site until it is either picked up an existing area inlet located on the site or sheet flows into Commerce Drive where it is picked up by existing curb inlets within the roadway and routed away from the site. See Appendix "C" for the Existing Conditions Drainage Map.

Soils data for the site watershed was determined using the NRCS Web Soil Survey for Jackson County. There are four different soil types located on the site. This first soil is Arisburg-Urban land complex, 1-5% slopes this soil is classified as Hydrologic Soil Group (HSG) Type "C". The second soil is Sharpsburg-Urban land complex, 2-5% slopes this soil is classified as HSG Type "D". The third soil is Sharpsburg-Urban land complex, 5-9% slopes this soil is classified as HSG Type "D". The final soil is Udarents-Urban land-sampsel complex, 2-5% slopes this soil is classified as HSG Type "D".

The existing onsite land cover type is a combination of grassland in fair condition and woods/grass in good condition. See Appendix "A" of this report for aerial imagery exhibits and Appendix "B" for the NRCS Web Soil Survey.

Lee's Summit follows the "Comprehensive Control" method of mitigating additional runoff from a proposed development. Due to this the allowable release rate for each watershed is as follows. During the 2-year storm event the proposed site may release 0.5 CFS of water per acre. The 10-year event allows 2.0 CFS per acre, and the 100-year event allows 3.0 CFS per acre. Therefore, the allowable release rates for each watershed can be seen in Table 1 below.

Table 1 – Allowable Runoff Conditions

Watershed Area	Curve Number (CN)	Drainage Area (acres)	2-Year Peak Flow (cfs)	10-Year Peak Flow (cfs)	100-Year Peak Flow (cfs)
North	77	3.35	1.68	6.70	10.05
South	77	9.68	4.84	19.36	29.04
Total	**77**	**13.03**	**6.52**	**26.06**	**39.09**

3.0 Proposed Drainage System

The development of the site will result in a shift in the drainage patterns. The north watershed will see a reduction in area, resulting in a proposed area of 0.54 acres. The south watershed will see an increase in area, resulting in a proposed area of 12.49 acres. Water in the north watershed will sheet flow off the site and into Tudor Road, where it will follow the existing drainage patterns. Water within the south watershed will be captured by proposed inlets and will be routed to the proposed detention basin via a private enclosed storm system. Detention has been proposed within the south watershed. This will be provided by an above ground basin as well as some underground chambers. The bottom elevation of these two features will be set at the same elevation and will be connected by a flat pipe. Thus, allowing the two storage areas to work in unison to provide adequate volume for detention. Additional information regarding the basins will be provided in the next section. See Appendix "D" for the proposed drainage map.

Using HydroCAD V10 storm modeling software with SCS Type II 24-hr storm duration, the proposed 2, 10 and 100-year site peak discharges were determined for the site can be found in Table 2 below. See Appendix "D" of this report for the proposed HydroCAD routing model output.

Table 2 – Proposed Runoff Conditions

Watershed Area	Time of Conc. (minutes)	Composite Curve Number (CN)	Drainage Area (acres)	2-Year Peak Flow (cfs)	10-Year Peak Flow (cfs)	100-Year Peak Flow (cfs)
North	6.8	80	0.54	1.54	2.92	4.82
South	11.8	93	12.49	4.83	19.32	28.42
Total	**N/A**	**93**	**13.03**	**6.33**	**20.00**	**33.18**

4.0 Stormwater Detention Requirements

Per City of Lee's Summit Municipal Code detention facilities must comply with the "Comprehensive Control" method of detention found in APWA 5600. This states that the allowable peak runoff rate for a watershed is 0.5 CFS per acre in the 2-year event, 2.0 CFS per acre in the 10-year event, and 3.0 CFS per acre in the 100-year storm event. The allowable release rates for each watershed have already been provided in Table 1 above.

The north watershed will not require detention as the drainage area will be reduced enough that proposed condition meets the allowable release rates without detention. Detention has been proposed within the south watershed. The basin has been designed so that the south watershed and the total site meet the allowable release rates. See Table 3 below for a comparison of the allowable and proposed runoff conditions for each watershed.

Table 3 - Comparison of Release Rates

Watershed	Storm Event	Allowable Release Rate	Proposed Release Rate
North	2-Year	1.68	1.54
	10-Year	6.70	2.92
	100-Year	10.05	4.82
South	2-Year	4.84	4.83
	10-Year	19.36	19.32
	100-Year	29.04	28.42
Total	2-Year	6.52	6.33
	10-Year	26.06	20.00
	100-Year	39.09	33.18

Additional Information regarding the basin design will be provided with the Final Stormwater Management Plan.

5.0 Stormwater Treatment Requirements

The proposed project is subject to the stormwater treatment requirements set forth in the 2012 edition of the APWA MARC Manual of Best Management Practices (BMP) for Stormwater Quality. A pre- and post-development Curve Number (CN) is calculated based off of ground cover and Hydrologic Soil Group (HSG) type for the existing and proposed conditions in order to determine a required Level of Service (LOS) for the site. Stormwater treatment facilities must be provided on site in order to reach the required LOS.

The predevelopment CN is calculated at 77 based off of a land cover type of a combination of grassland in fair condition and woods/grass in good condition, and Hydrologic Soil Group "D".

The post development CN is calculated at 93 based off of a total of 3.67 acres of open space grass area and 9.36 acres of impervious area.

The proposed development increases the CN 16, therefore requiring a level of service of 7.0 in accordance with APWA Best Management Practices for Water Quality and the BMP Manual Addendum #1, dated November 10, 2016.

The proposed development required to provide a minimum water quality level of service of 7.0 is provided with the proposed bio-retention basin and an infiltration trench. With the ponding area available, the bio-retention basin will be able to treat 2.67 acres of water. The infiltration trench will be sized to treat 7.83 acres of water. Bio-retention basins are given a value rating of 8.5, however signage will be provided, which allows an additional 0.25 value points to be used. Therefore, the total value rating provided by the bio-retention basin will be 23.36. The infiltration trench is given a value rating of 9.0, signage will again be provided thus making the value rating 9.25. Therefore, the total value rating provided by the infiltration trench will be 72.43. This results in a proposed Level of Service for the site of 7.35, therefore meeting the requirements set forth in the 2012 APWA MARC BMP Manual. See Level of Service Worksheet 1 & 2 and Stormwater Treatment Plan in Appendix "E" for more details.

6.0 Permitting Requirements

6.1 FEMA/DWR

No FEMA regulatory floodplain exists onsite, and the entire property has been designated as Zone X; per Map Panel 29095C0417G of the Flood Insurance Rate Map dated January 20, 2017. Zone X is defined areas outside the 0.2% annual chance flood plain.

6.2 Stream Buffer

Per APWA 5600, stream buffers are not required for this project as there are no streams on the property with a contributing area over 40 acres.

7.0 Conclusion

This report and attached exhibits complete PEI's Preliminary Stormwater Management Plan for the Tudor Road Multi-Family development located southeast of the intersection of Douglas Street and Tudor Road in the City of Lee's Summit, Jackson County, Missouri. Please feel free to contact PEI at (913) 393-1155 if you require further information or have additional questions.

Sincerely,

PHELPS ENGINEERING, INC.

STATE OF MISSOURI
DOUGLAS EUGENE UBBEN, JR.
NUMBER PE-2011010998
06/23/2022
PROFESSIONAL ENGINEER

Doug E. Ubben, Jr., P.E.

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Kyle Deters, E.I.T.

Enclosures

Appendix A


NE DOUGLAS ST
NW TUDOR RD
NE TUDOR RD
NW PUBLIC RD
NE SLOAN ST
NW MAIN ST

Appendix B

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

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

Custom Soil Resource Report for Jackson County, Missouri

June 20, 2022

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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How Soil Surveys Are Made

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

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

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

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

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

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

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

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

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

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

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

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

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

Soil Map

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

Custom Soil Resource Report
Soil Map

Map Scale: 1:1,970 if printed on A landscape (11" x 8.5") sheet.

N

Meters: 0 25 50 100 150

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N 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: Jackson County, Missouri
Survey Area Data: Version 23, Sep 1, 2021

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

Date(s) aerial images were photographed: Sep 6, 2019—Nov 16, 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
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	10.2	72.6%
10128	Sharpsburg-Urban land complex, 2 to 5 percent slopes	0.1	0.7%
10129	Sharpsburg-Urban land complex, 5 to 9 percent slopes	3.4	24.1%
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	0.4	2.6%
Totals for Area of Interest		**14.1**	**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.

Jackson County, Missouri

10082—Arisburg-Urban land complex, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w7ld
Elevation: 750 to 1,130 feet
Mean annual precipitation: 39 to 45 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Arisburg and similar soils: 61 percent
Urban land: 30 percent
Minor components: 9 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Arisburg

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

Ap - 0 to 6 inches: silt loam
A - 6 to 13 inches: silt loam
Bt - 13 to 19 inches: silty clay loam
Btg - 19 to 56 inches: silty clay loam
BCg - 56 to 79 inches: silty clay loam

Properties and qualities

Slope: 1 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 18 to 30 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.5 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C
Ecological site: R107BY007MO - Loess Upland Prairie
Hydric soil rating: No

Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Sampsel

Percent of map unit: 3 percent
Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Concave
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Hydric soil rating: Yes

Greenton

Percent of map unit: 3 percent
Landform: Hillslopes
Landform position (two-dimensional): Shoulder
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

Sharpsburg

Percent of map unit: 3 percent
Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Linear
Across-slope shape: Linear
Ecological site: R109XY002MO - Loess Upland Prairie
Hydric soil rating: No

10128—Sharpsburg-Urban land complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2ql09
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Sharpsburg and similar soils: 60 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

A - 0 to 17 inches: silt loam
Bt - 17 to 55 inches: silty clay loam
C - 55 to 60 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 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 35 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Very high (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: D
Ecological site: R109XY002MO - Loess Upland Prairie
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

10129—Sharpsburg-Urban land complex, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 2ql0b
Elevation: 1,000 to 1,300 feet
Mean annual precipitation: 33 to 41 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 177 to 220 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Sharpsburg and similar soils: 60 percent
Urban land: 35 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sharpsburg

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Loess

Typical profile

A - 0 to 7 inches: silt loam
Bt - 7 to 48 inches: silty clay loam
C - 48 to 60 inches: silty clay loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Runoff class: Very 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 35 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 11.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: D
Ecological site: R109XY002MO - Loess Upland Prairie
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Ridges
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

10180—Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 1n85h
Elevation: 600 to 900 feet
Mean annual precipitation: 33 to 43 inches
Mean annual air temperature: 50 to 57 degrees F
Frost-free period: 175 to 220 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Udarents and similar soils: 41 percent
Urban land: 39 percent
Sampsel and similar soils: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Udarents

Setting

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Crest
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Mine spoil or earthy fill

Typical profile

C1 - 0 to 5 inches: silt loam
C2 - 5 to 80 inches: silty clay loam

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.14 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None

Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 9.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R107BY002MO - Deep Loess Upland Prairie
Other vegetative classification: Mixed/Transitional (Mixed Native Vegetation)
Hydric soil rating: No

Description of Urban Land

Setting

Landform: Interfluves
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Interfluve
Across-slope shape: Convex

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Description of Sampsel

Setting

Landform: Hillslopes
Landform position (two-dimensional): Footslope
Landform position (three-dimensional): Base slope
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from shale

Typical profile

Ap - 0 to 13 inches: silty clay loam
Bt - 13 to 80 inches: silty clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 0 to 18 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 8.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 2e
Hydrologic Soil Group: C/D
Ecological site: R109XY010MO - Interbedded Sedimentary Upland Savanna
Other vegetative classification: Grass/Prairie (Herbaceous Vegetation)

Hydric soil rating: No

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Appendix C

EXISTING IMPERVIOUS AREA = 0 S.F.

LEGEND

PL	PROPERTY LINE
	LOT LINE
R/W	RIGHT-OF-WAY
	IMPERVIOUS
	OPEN SPACE
	DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION

N

SCALE: 1"=60'

0' 60' 120'

811 Know what's below. Call before you dig.

UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

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Olathe, Kansas 66061
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Fax (913) 393-1066
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PLANNING
ENGINEERING
IMPLEMENTATION

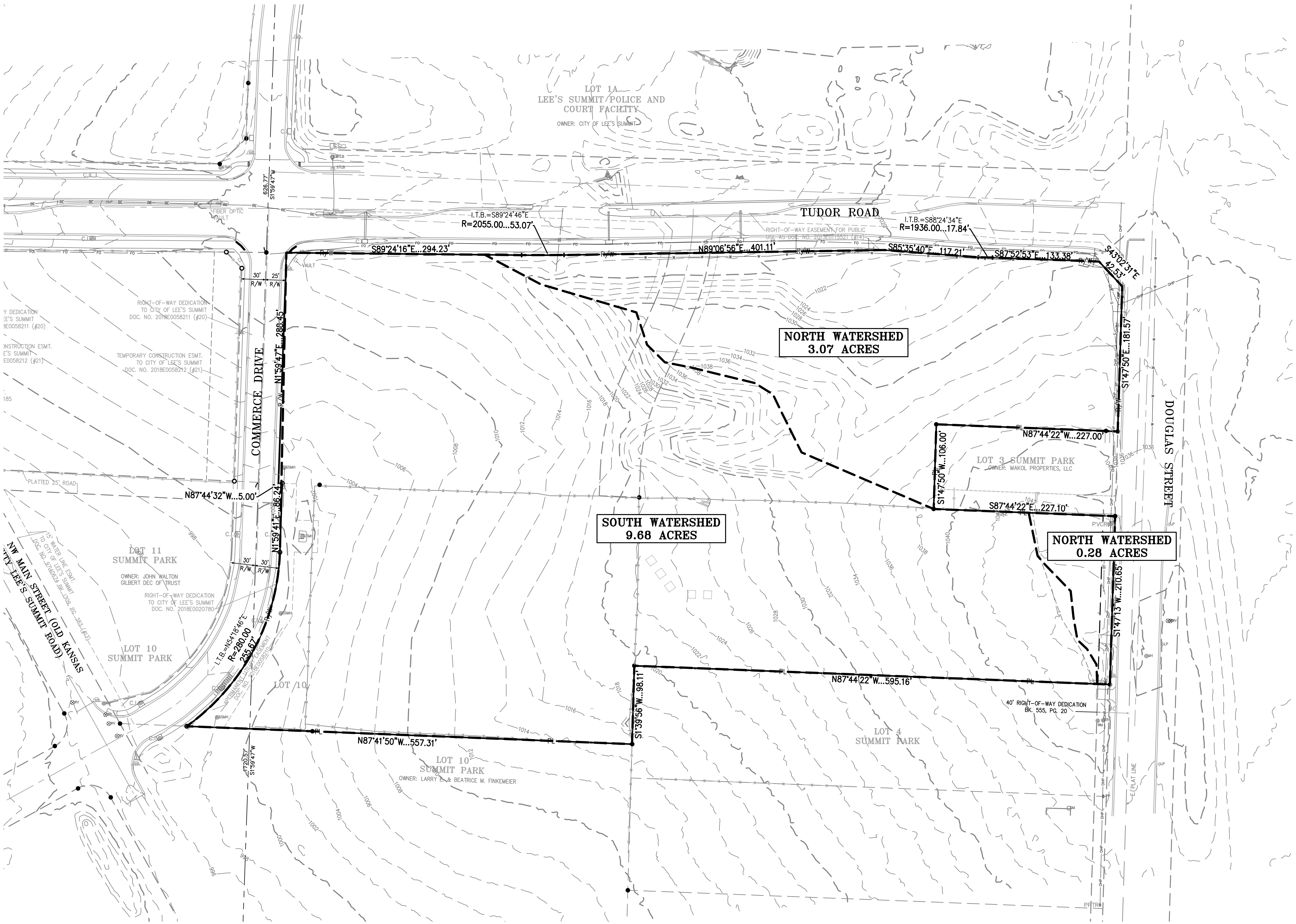
EXISTING CONDITIONS MAP

TUDOR MULTIFAMILY

No.	Date	Revisions:	By	App.

PROJECT NO. 220231
DATE: 06-23-2022 | DRAWN: SJG
CHECKED: DEU | APPROVED: DEU
CERTIFICATE OF AUTHORIZATION
KANSAS
LANDSCAPE ARCHITECTURE - LS-92
ENGINEERING - E-391
CERTIFICATE OF AUTHORIZATION
MISSOURI
LAND SURVEYING - 2007001128
ENGINEERING - 2007002508

SHEET
A1



LEGEND

—PL—	PROPERTY LINE
— — —	LOT LINE
—R/W—	RIGHT-OF-WAY
▬ ▬ ▬	DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION

UTILITY NOTES:
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811 Know what's below. Call before you dig.

N

SCALE: 1"=60'

0' 60' 120'

\\PHELPS-SERVER\Projects\P\220231\Stormwater\Exhibits\Exhibits.dwg Layout: Existing Drainage B1 Jun 23, 2022 - 2:30pm Kyle Deters

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EXISTING DRAINAGE MAP

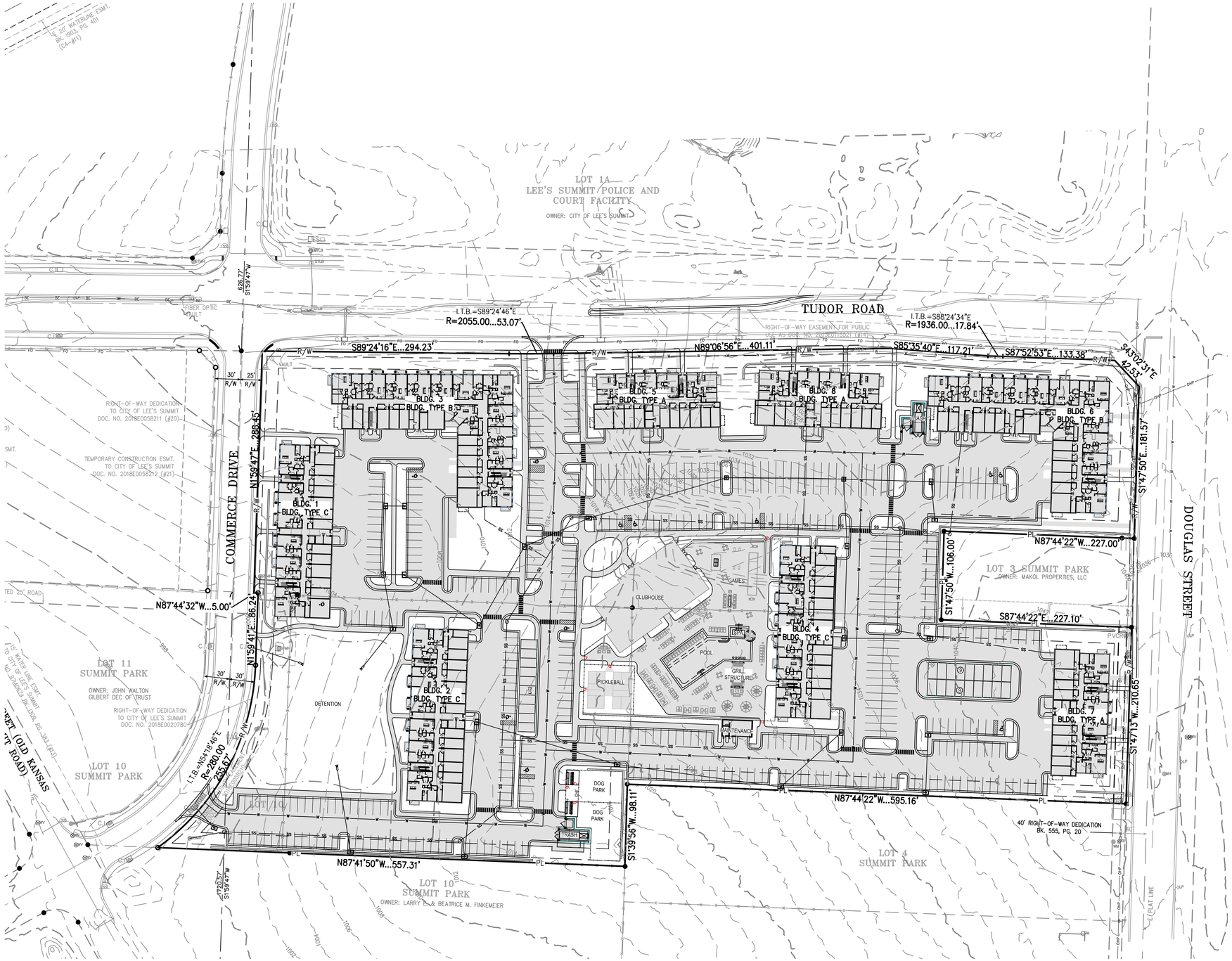
TUDOR MULTIFAMILY

No.	Date	Revisions:	By	App.

PROJECT NO. 220231
DATE: 06-23-2022 | DRAWN: BJG
CHECKED: DEU | APPROVED: DEU
CERTIFICATE OF AUTHORIZATION KANSAS LAND SURVEYING - LS-82 ENGINEERING - E-391
CERTIFICATE OF AUTHORIZATION MISSOURI LAND SURVEYING-2007001128 ENGINEERING-2007005058

SHEET
B1

Appendix D



PROPOSED IMPERVIOUS AREA = 408,011 S.F.

LEGEND

- PL — PROPERTY LINE
- LOT LINE
- R/W — RIGHT-OF-WAY
- IMPERVIOUS
- OPEN SPACE
- DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION

SCALE: 1"=60'
0' 60' 120'

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PROPOSED CONDITIONS MAP

TUDOR MULTIFAMILY

No.	Date	Revisions:	By	App.

PROJECT NO. 220231
DATE 06-23-2022 DRAWN BJC
CHECKED DEU APPROVED DEU
CERTIFICATE OF AUTHORIZATION KANSAS ENGINEERING - LS-82
CERTIFICATE OF AUTHORIZATION MISSOURI LAND SURVEYING-2007001128 ENGINEERING-2007000308

SHEET
A2

NORTH WATERSHED
0.54 ACRES
SOUTH WATERSHED
(ON-SITE TO DETENTION)
11.62 ACRES
SOUTH WATERSHED
(OFF-SITE TO DETENTION)
0.46 ACRES
SOUTH WATERSHED
(BYPASS DETENTION)
0.87 ACRES
TUDOR ROAD
COMMERCE DRIVE
DOUGLAS STREET
NW MAIN STREET (OLD KANSAS - LEE'S SUMMIT ROAD)
LOT 1A
LEE'S SUMMIT POLICE AND
COURT FACILITY
OWNER: CITY OF LEE'S SUMMIT
LOT 11
SUMMIT PARK
LOT 10
SUMMIT PARK
LOT 4
SUMMIT PARK
LOT 3 SUMMIT PARK
OWNER: MAKOL PROPERTIES, LLC
BLDG. 1
BLDG. TYPE C
BLDG. 2
BLDG. TYPE C
BLDG. 3
BLDG. TYPE B
BLDG. 4
BLDG. TYPE C
BLDG. 5
BLDG. TYPE A
BLDG. 6
BLDG. TYPE B
BLDG. 7
BLDG. TYPE A
BLDG. 8
BLDG. TYPE A
CLUBHOUSE
POOL
PICKLEBALL
GRILL STRUCTURE
MAINTENANCE
DOG PARK
TRASH
DETENTION
S89°24'16"E...294.23'
N89°06'56"E...401.11'
S85°35'40"E...117.21'
S87°52'53"E...133.38'
S43°02'31"E 42.53'
S1°47'50"E...181.57'
N87°44'22"W...227.00'
S1°47'50"W...106.00'
S87°44'22"E...227.10'
S1°47'13"W...210.65'
N87°44'22"W...595.16'
S1°39'56"W...98.11'
N87°41'50"W...557.31'
N1°59'47"E...288.45'
N1°59'41"E...86.24'
N87°44'32"W...5.00'
I.T.B.=S89°24'46"E
R=2055.00...53.07'
I.T.B.=S88°24'34"E
R=1936.00...17.84'
40' RIGHT-OF-WAY DEDICATION
BK. 555, PG. 20
LEGEND
PL — PROPERTY LINE
LOT LINE
R/W — RIGHT-OF-WAY
DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION
UTILITY NOTES:
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0' 60' 120'
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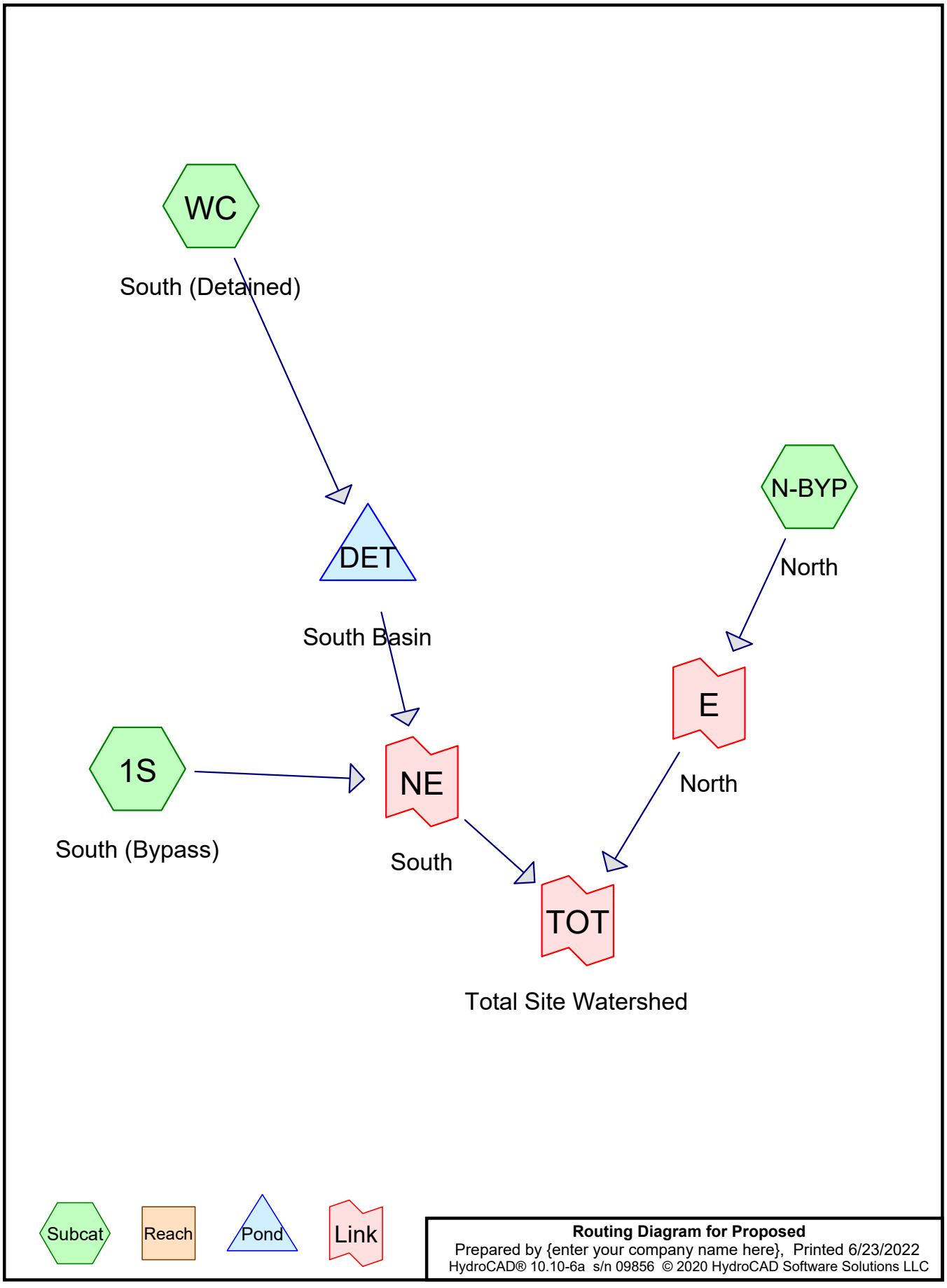
IMPLEMENTATION
PROPOSED DRAINAGE MAP
TUDOR MULTIFAMILY
PROJECT NO. 220231
DATE: 06-23-2022
SHEET
B2



Routing Diagram for Proposed
Prepared by {enter your company name here}, Printed 6/23/2022

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year	Type II 24-hr		Default	24.00	1	3.50	2
2	10-Year	Type II 24-hr		Default	24.00	1	5.30	2
3	100-Year	Type II 24-hr		Default	24.00	1	7.70	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
4.160	80	>75% Grass cover, Good, HSG D (1S, N-BYP, WC)
9.330	98	Paved parking, HSG D (1S, WC)
13.490	**92**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.000	HSG C	
13.490	HSG D	1S, N-BYP, WC
0.000	Other	
13.490		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.000	4.160	0.000	4.160	>75% Grass cover, Good	1S, N-BYP, WC
0.000	0.000	0.000	9.330	0.000	9.330	Paved parking	1S, WC
0.000	**0.000**	**0.000**	**13.490**	**0.000**	**13.490**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: South (Bypass) Runoff Area=0.870 ac 72.41% Impervious Runoff Depth=2.73"
Tc=5.0 min CN=93 Runoff=4.08 cfs 0.198 af

SubcatchmentN-BYP: North Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=1.64"
Tc=6.8 min CN=80 Runoff=1.54 cfs 0.074 af

SubcatchmentWC: South (Detained) Runoff Area=12.080 ac 72.02% Impervious Runoff Depth=2.73"
Tc=11.8 min CN=93 Runoff=45.31 cfs 2.753 af

Pond DET: South Basin Peak Elev=1,003.82' Storage=80,742 cf Inflow=45.31 cfs 2.753 af
Outflow=1.25 cfs 2.591 af

Link E: North Inflow=1.54 cfs 0.074 af
Primary=1.54 cfs 0.074 af

Link NE: South Inflow=4.86 cfs 2.789 af
Primary=4.86 cfs 2.789 af

Link TOT: Total Site Watershed Inflow=6.33 cfs 2.863 af
Primary=6.33 cfs 2.863 af

Total Runoff Area = 13.490 ac Runoff Volume = 3.025 af Average Runoff Depth = 2.69"
30.84% Pervious = 4.160 ac 69.16% Impervious = 9.330 ac

Summary for Subcatchment 1S: South (Bypass)

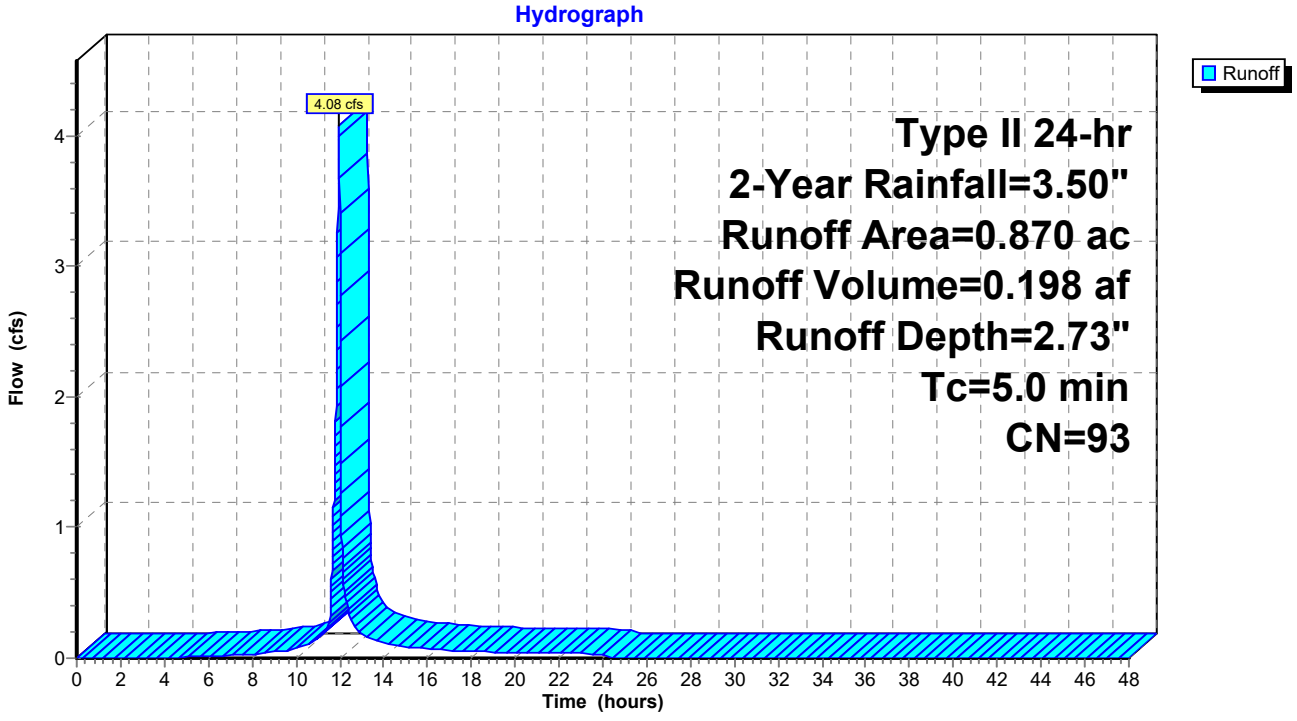
Runoff = 4.08 cfs @ 11.96 hrs, Volume= 0.198 af, Depth= 2.73"
Routed to Link NE : South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.630	98	Paved parking, HSG D
0.240	80	>75% Grass cover, Good, HSG D
0.870	93	Weighted Average
0.240		27.59% Pervious Area
0.630		72.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: South (Bypass)



Hydrograph for Subcatchment 1S: South (Bypass)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.10	0.00	0.00
3.00	0.12	0.00	0.00
3.50	0.14	0.00	0.00
4.00	0.17	0.00	0.00
4.50	0.19	0.00	0.00
5.00	0.22	0.01	0.01
5.50	0.25	0.01	0.01
6.00	0.28	0.02	0.01
6.50	0.31	0.03	0.02
7.00	0.35	0.04	0.02
7.50	0.38	0.05	0.03
8.00	0.42	0.07	0.03
8.50	0.46	0.09	0.04
9.00	0.51	0.12	0.05
9.50	0.57	0.15	0.06
10.00	0.63	0.19	0.07
10.50	0.71	0.24	0.10
11.00	0.82	0.32	0.15
11.50	0.99	0.44	**0.27**
12.00	2.32	1.61	**3.41**
12.50	2.57	1.85	0.30
13.00	2.70	1.97	0.19
13.50	2.80	2.06	0.14
14.00	2.87	2.13	0.11
14.50	2.93	2.19	0.10
15.00	2.99	2.24	0.09
15.50	3.04	2.29	0.08
16.00	3.08	2.33	0.07
16.50	3.12	2.37	0.06
17.00	3.16	2.40	0.06
17.50	3.19	2.44	0.06
18.00	3.22	2.47	0.05
18.50	3.25	2.50	0.05
19.00	3.28	2.52	0.05
19.50	3.31	2.55	0.04
20.00	3.33	2.57	0.04
20.50	3.35	2.59	0.04
21.00	3.38	2.62	0.04
21.50	3.40	2.64	0.04
22.00	3.42	2.66	0.04
22.50	3.44	2.68	0.03
23.00	3.46	2.70	0.03
23.50	3.48	2.72	0.03
24.00	**3.50**	**2.73**	0.03
24.50	3.50	2.73	0.00
25.00	3.50	2.73	0.00
25.50	3.50	2.73	0.00
26.00	3.50	2.73	0.00
26.50	3.50	2.73	0.00
27.00	3.50	2.73	0.00
27.50	3.50	2.73	0.00
28.00	3.50	2.73	0.00
28.50	3.50	2.73	0.00
29.00	3.50	2.73	0.00
29.50	3.50	2.73	0.00
30.00	3.50	2.73	0.00
30.50	3.50	2.73	0.00
31.00	3.50	2.73	0.00
31.50	3.50	2.73	0.00
32.00	3.50	2.73	0.00
32.50	3.50	2.73	0.00
33.00	3.50	2.73	0.00
33.50	3.50	2.73	0.00
34.00	3.50	2.73	0.00
34.50	3.50	2.73	0.00
35.00	3.50	2.73	0.00
35.50	3.50	2.73	0.00
36.00	3.50	2.73	0.00
36.50	3.50	2.73	0.00
37.00	3.50	2.73	0.00
37.50	3.50	2.73	0.00
38.00	3.50	2.73	0.00
38.50	3.50	2.73	0.00
39.00	3.50	2.73	0.00
39.50	3.50	2.73	0.00
40.00	3.50	2.73	0.00
40.50	3.50	2.73	0.00
41.00	3.50	2.73	0.00
41.50	3.50	2.73	0.00
42.00	3.50	2.73	0.00
42.50	3.50	2.73	0.00
43.00	3.50	2.73	0.00
43.50	3.50	2.73	0.00
44.00	3.50	2.73	0.00
44.50	3.50	2.73	0.00
45.00	3.50	2.73	0.00
45.50	3.50	2.73	0.00
46.00	3.50	2.73	0.00
46.50	3.50	2.73	0.00
47.00	3.50	2.73	0.00
47.50	3.50	2.73	0.00
48.00	3.50	2.73	0.00

Summary for Subcatchment N-BYP: North

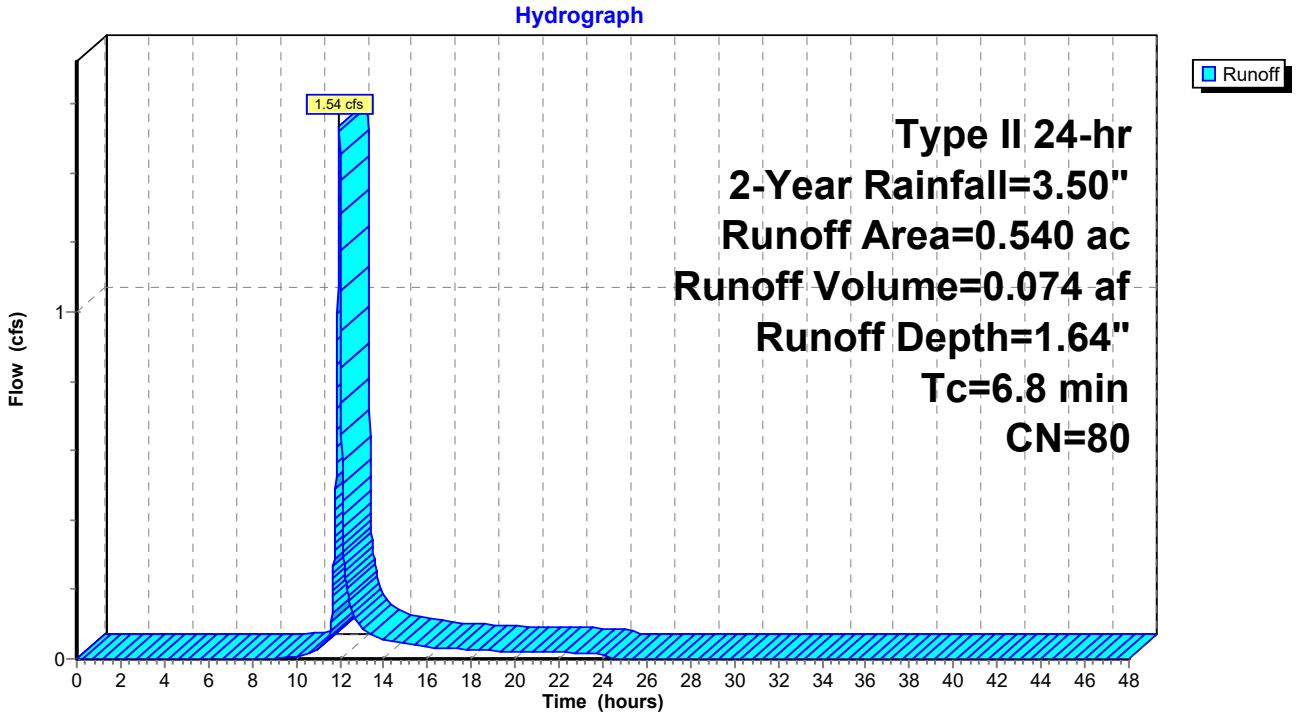
Runoff = 1.54 cfs @ 11.98 hrs, Volume= 0.074 af, Depth= 1.64"
Routed to Link E : North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
0.540	80	>75% Grass cover, Good, HSG D
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8					**Direct Entry,**

Subcatchment N-BYP: North



Hydrograph for Subcatchment N-BYP: North

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.10	0.00	0.00
3.00	0.12	0.00	0.00
3.50	0.14	0.00	0.00
4.00	0.17	0.00	0.00
4.50	0.19	0.00	0.00
5.00	0.22	0.00	0.00
5.50	0.25	0.00	0.00
6.00	0.28	0.00	0.00
6.50	0.31	0.00	0.00
7.00	0.35	0.00	0.00
7.50	0.38	0.00	0.00
8.00	0.42	0.00	0.00
8.50	0.46	0.00	0.00
9.00	0.51	0.00	0.00
9.50	0.57	0.00	0.00
10.00	0.63	0.01	0.01
10.50	0.71	0.02	0.01
11.00	0.82	0.04	0.03
11.50	0.99	0.08	**0.06**
12.00	2.32	0.77	**1.50**
12.50	2.57	0.94	0.15
13.00	2.70	1.03	0.09
13.50	2.80	1.10	0.07
14.00	2.87	1.15	0.05
14.50	2.93	1.20	0.05
15.00	2.99	1.24	0.04
15.50	3.04	1.28	0.04
16.00	3.08	1.31	0.03
16.50	3.12	1.34	0.03
17.00	3.16	1.37	0.03
17.50	3.19	1.39	0.03
18.00	3.22	1.42	0.03
18.50	3.25	1.44	0.03
19.00	3.28	1.47	0.02
19.50	3.31	1.49	0.02
20.00	3.33	1.50	0.02
20.50	3.35	1.52	0.02
21.00	3.38	1.54	0.02
21.50	3.40	1.56	0.02
22.00	3.42	1.57	0.02
22.50	3.44	1.59	0.02
23.00	3.46	1.61	0.02
23.50	3.48	1.62	0.02
24.00	**3.50**	**1.64**	0.02
24.50	3.50	1.64	0.00
25.00	3.50	1.64	0.00
25.50	3.50	1.64	0.00
26.00	3.50	1.64	0.00
26.50	3.50	1.64	0.00
27.00	3.50	1.64	0.00
27.50	3.50	1.64	0.00
28.00	3.50	1.64	0.00
28.50	3.50	1.64	0.00
29.00	3.50	1.64	0.00
29.50	3.50	1.64	0.00
30.00	3.50	1.64	0.00
30.50	3.50	1.64	0.00
31.00	3.50	1.64	0.00
31.50	3.50	1.64	0.00
32.00	3.50	1.64	0.00
32.50	3.50	1.64	0.00
33.00	3.50	1.64	0.00
33.50	3.50	1.64	0.00
34.00	3.50	1.64	0.00
34.50	3.50	1.64	0.00
35.00	3.50	1.64	0.00
35.50	3.50	1.64	0.00
36.00	3.50	1.64	0.00
36.50	3.50	1.64	0.00
37.00	3.50	1.64	0.00
37.50	3.50	1.64	0.00
38.00	3.50	1.64	0.00
38.50	3.50	1.64	0.00
39.00	3.50	1.64	0.00
39.50	3.50	1.64	0.00
40.00	3.50	1.64	0.00
40.50	3.50	1.64	0.00
41.00	3.50	1.64	0.00
41.50	3.50	1.64	0.00
42.00	3.50	1.64	0.00
42.50	3.50	1.64	0.00
43.00	3.50	1.64	0.00
43.50	3.50	1.64	0.00
44.00	3.50	1.64	0.00
44.50	3.50	1.64	0.00
45.00	3.50	1.64	0.00
45.50	3.50	1.64	0.00
46.00	3.50	1.64	0.00
46.50	3.50	1.64	0.00
47.00	3.50	1.64	0.00
47.50	3.50	1.64	0.00
48.00	3.50	1.64	0.00

Summary for Subcatchment WC: South (Detained)

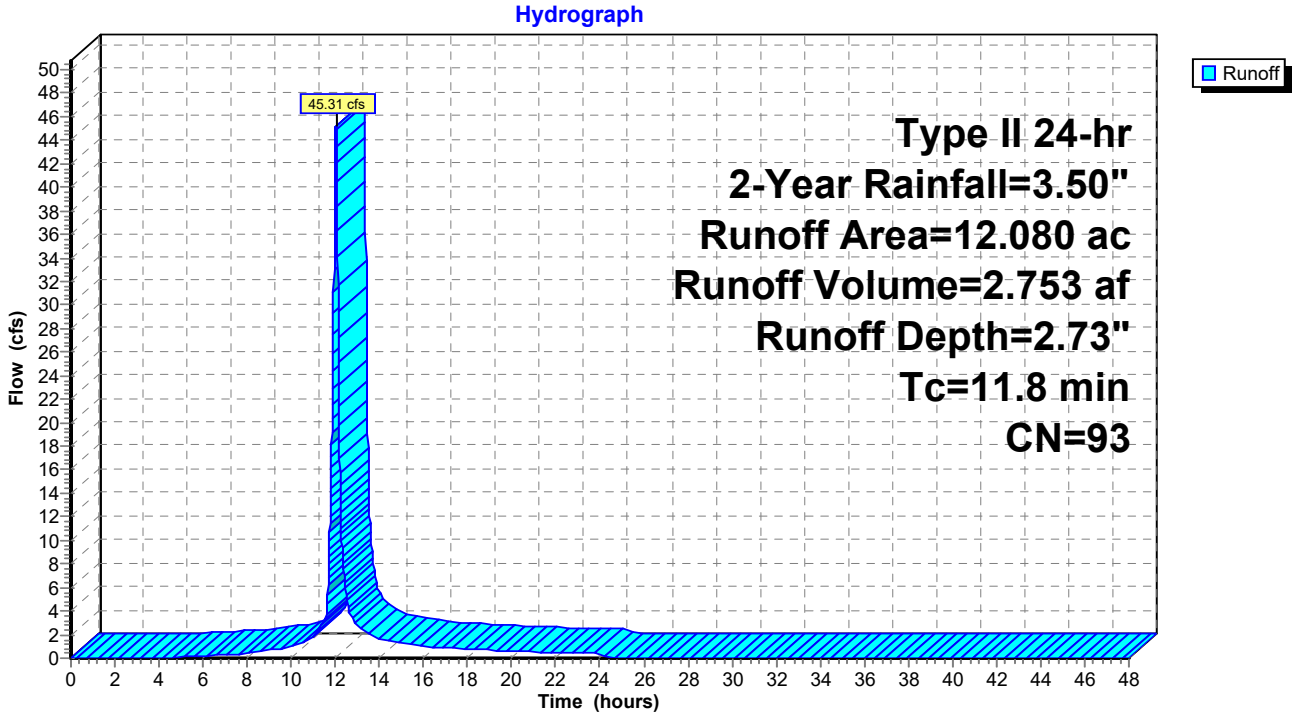
Runoff = 45.31 cfs @ 12.03 hrs, Volume= 2.753 af, Depth= 2.73"
Routed to Pond DET : South Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 2-Year Rainfall=3.50"

Area (ac)	CN	Description
8.700	98	Paved parking, HSG D
3.380	80	>75% Grass cover, Good, HSG D
12.080	93	Weighted Average
3.380		27.98% Pervious Area
8.700		72.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					**Direct Entry,**

Subcatchment WC: South (Detained)



Hydrograph for Subcatchment WC: South (Detained)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.02	0.00	0.00
1.00	0.04	0.00	0.00
1.50	0.06	0.00	0.00
2.00	0.08	0.00	0.00
2.50	0.10	0.00	0.00
3.00	0.12	0.00	0.00
3.50	0.14	0.00	0.00
4.00	0.17	0.00	0.01
4.50	0.19	0.00	0.05
5.00	0.22	0.01	0.09
5.50	0.25	0.01	0.14
6.00	0.28	0.02	0.19
6.50	0.31	0.03	0.24
7.00	0.35	0.04	0.30
7.50	0.38	0.05	0.35
8.00	0.42	0.07	0.41
8.50	0.46	0.09	0.52
9.00	0.51	0.12	0.68
9.50	0.57	0.15	0.78
10.00	0.63	0.19	0.97
10.50	0.71	0.24	1.33
11.00	0.82	0.32	1.94
11.50	0.99	0.44	3.31
12.00	2.32	1.61	**43.45**
12.50	2.57	1.85	**5.35**
13.00	2.70	1.97	2.85
13.50	2.80	2.06	2.11
14.00	2.87	2.13	1.65
14.50	2.93	2.19	1.41
15.00	2.99	2.24	1.27
15.50	3.04	2.29	1.13
16.00	3.08	2.33	0.99
16.50	3.12	2.37	0.91
17.00	3.16	2.40	0.86
17.50	3.19	2.44	0.81
18.00	3.22	2.47	0.76
18.50	3.25	2.50	0.71
19.00	3.28	2.52	0.65
19.50	3.31	2.55	0.60
20.00	3.33	2.57	0.55
20.50	3.35	2.59	0.53
21.00	3.38	2.62	0.52
21.50	3.40	2.64	0.51
22.00	3.42	2.66	0.50
22.50	3.44	2.68	0.49
23.00	3.46	2.70	0.48
23.50	3.48	2.72	0.47
24.00	**3.50**	**2.73**	0.46
24.50	3.50	2.73	0.00
25.00	3.50	2.73	0.00
25.50	3.50	2.73	0.00
26.00	3.50	2.73	0.00
26.50	3.50	2.73	0.00
27.00	3.50	2.73	0.00
27.50	3.50	2.73	0.00
28.00	3.50	2.73	0.00
28.50	3.50	2.73	0.00
29.00	3.50	2.73	0.00
29.50	3.50	2.73	0.00
30.00	3.50	2.73	0.00
30.50	3.50	2.73	0.00
31.00	3.50	2.73	0.00
31.50	3.50	2.73	0.00
32.00	3.50	2.73	0.00
32.50	3.50	2.73	0.00
33.00	3.50	2.73	0.00
33.50	3.50	2.73	0.00
34.00	3.50	2.73	0.00
34.50	3.50	2.73	0.00
35.00	3.50	2.73	0.00
35.50	3.50	2.73	0.00
36.00	3.50	2.73	0.00
36.50	3.50	2.73	0.00
37.00	3.50	2.73	0.00
37.50	3.50	2.73	0.00
38.00	3.50	2.73	0.00
38.50	3.50	2.73	0.00
39.00	3.50	2.73	0.00
39.50	3.50	2.73	0.00
40.00	3.50	2.73	0.00
40.50	3.50	2.73	0.00
41.00	3.50	2.73	0.00
41.50	3.50	2.73	0.00
42.00	3.50	2.73	0.00
42.50	3.50	2.73	0.00
43.00	3.50	2.73	0.00
43.50	3.50	2.73	0.00
44.00	3.50	2.73	0.00
44.50	3.50	2.73	0.00
45.00	3.50	2.73	0.00
45.50	3.50	2.73	0.00
46.00	3.50	2.73	0.00
46.50	3.50	2.73	0.00
47.00	3.50	2.73	0.00
47.50	3.50	2.73	0.00
48.00	3.50	2.73	0.00

Summary for Pond DET: South Basin

Inflow Area = 12.080 ac, 72.02% Impervious, Inflow Depth = 2.73" for 2-Year event
Inflow = 45.31 cfs @ 12.03 hrs, Volume= 2.753 af
Outflow = 1.25 cfs @ 15.10 hrs, Volume= 2.591 af, Atten= 97%, Lag= 184.0 min
Primary = 1.25 cfs @ 15.10 hrs, Volume= 2.591 af
Routed to Link NE : South

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 1,003.82' @ 15.10 hrs Surf.Area= 19,568 sf Storage= 80,742 cf

Plug-Flow detention time= 776.8 min calculated for 2.591 af (94% of inflow)
Center-of-Mass det. time= 743.2 min (1,535.0 - 791.8)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	112,664 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	1,000.00'	47,127 cf	**ADS_StormTech MC-4500 b +Cap @ 6.95' L** x 252 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 6.95'L = 183.9 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 252 Chambers in 10 Rows Cap Storage= 39.5 cf x 2 x 10 rows = 790.0 cf
		159,791 cf	Total Available Storage

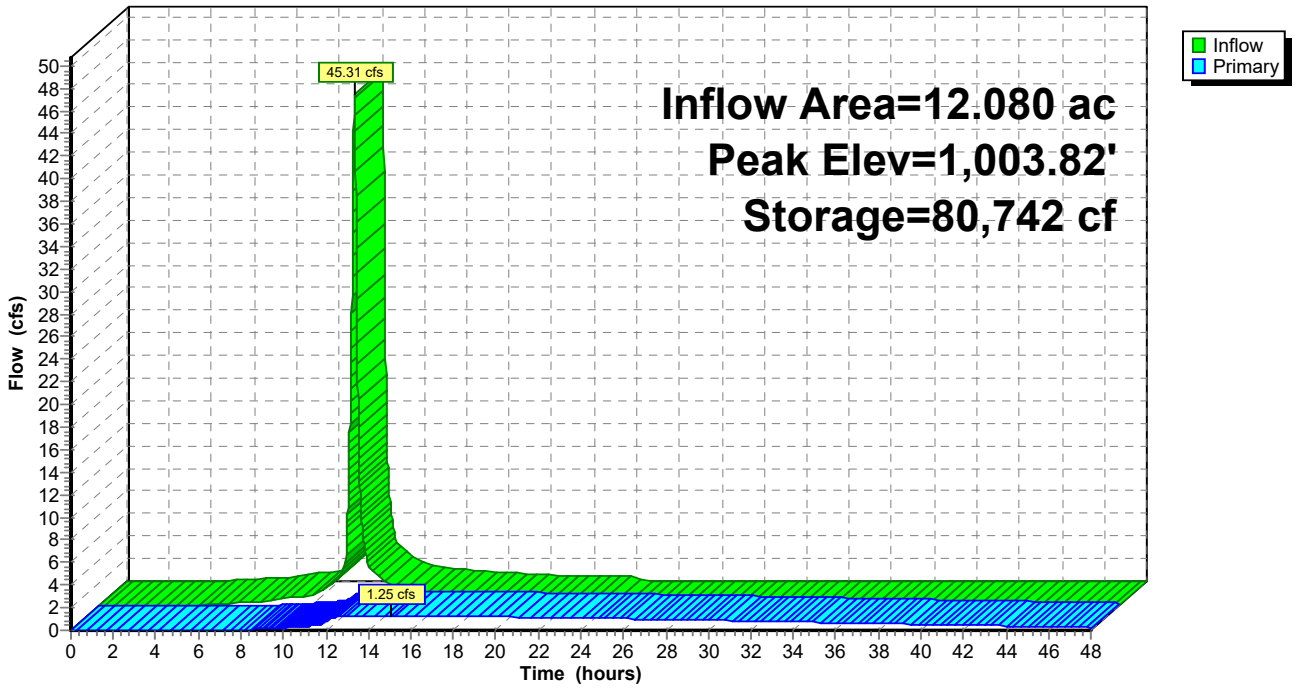
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.00	7,597	0	0
1,001.00	8,758	8,178	8,178
1,002.00	9,996	9,377	17,555
1,003.00	11,311	10,654	28,208
1,004.00	12,694	12,003	40,211
1,005.00	14,135	13,415	53,625
1,006.00	15,633	14,884	68,509
1,007.00	17,189	16,411	84,920
1,008.00	18,802	17,996	102,916
1,008.50	20,191	9,748	112,664

Device	Routing	Invert	Outlet Devices
#1	Primary	996.00'	**16.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 996.00' / 993.10' S= 0.0322 '/' Cc= 0.900 n= 0.013, Flow Area= 1.40 sf
#2	Device 1	1,000.00'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	1,003.85'	**60.0" W x 9.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=1.25 cfs @ 15.10 hrs HW=1,003.82' (Free Discharge)
└**1=Culvert** (Passes 1.25 cfs of 17.98 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.25 cfs @ 9.15 fps)
  └**3=Orifice/Grate** (Controls 0.00 cfs)

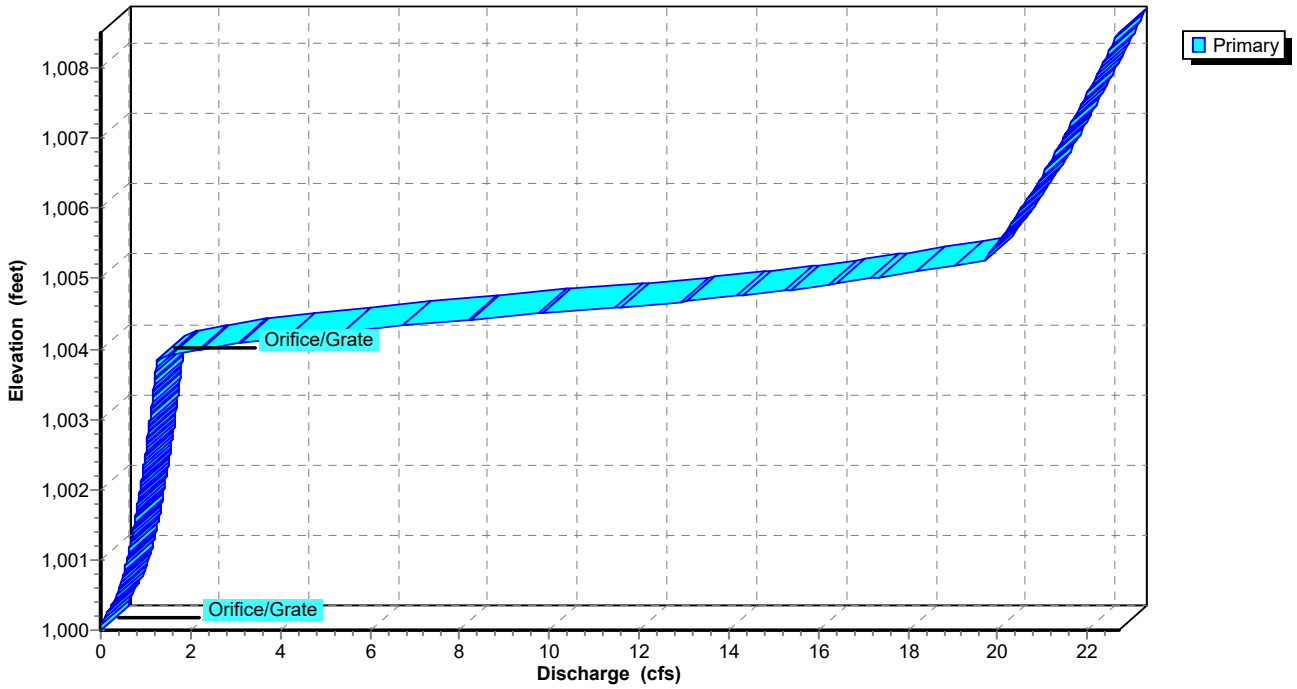
Pond DET: South Basin

Hydrograph

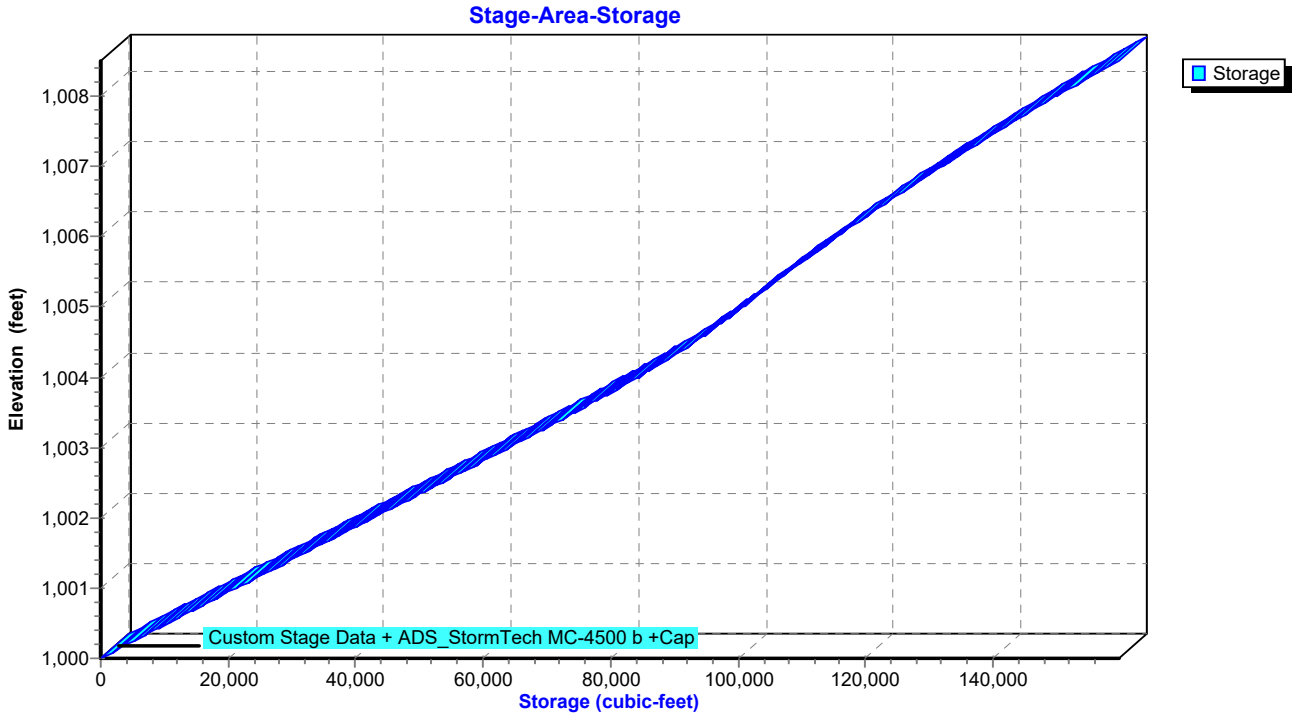


Pond DET: South Basin

Stage-Discharge



Pond DET: South Basin



Hydrograph for Pond DET: South Basin

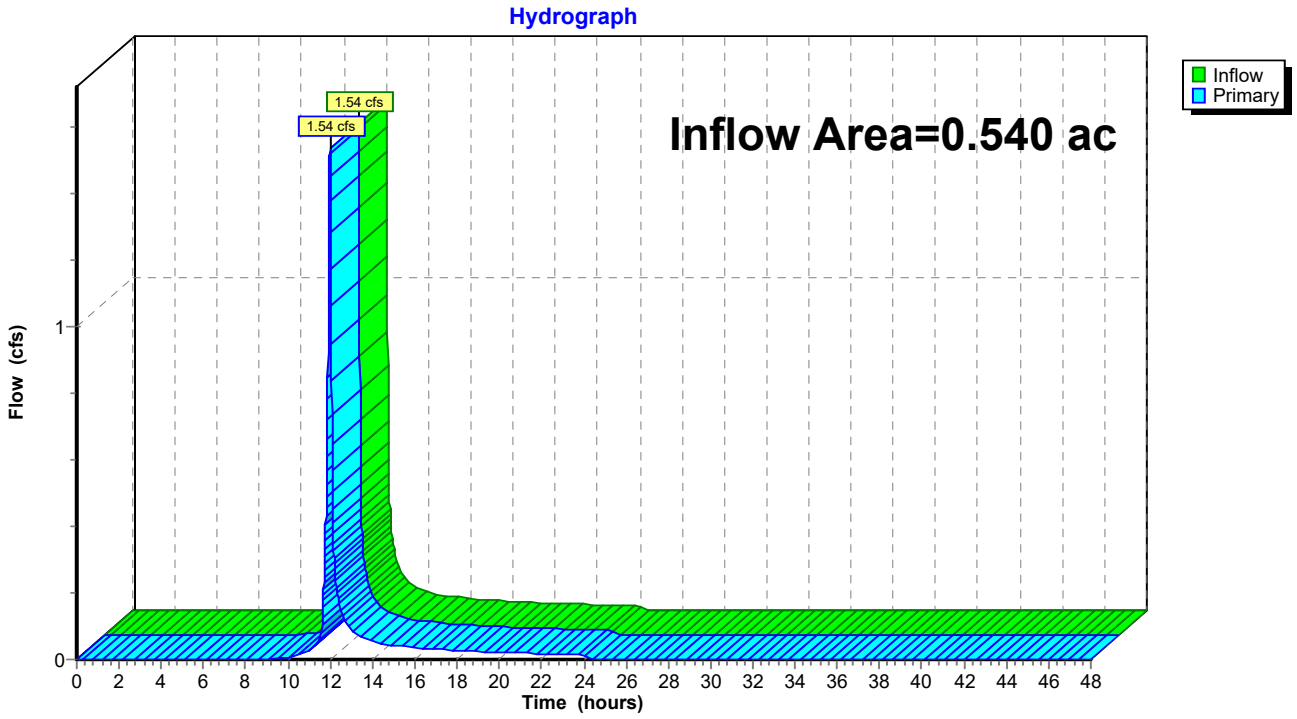
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,000.00	0.00
1.00	0.00	0	1,000.00	0.00
2.00	0.00	0	1,000.00	0.00
3.00	0.00	0	1,000.00	0.00
4.00	0.01	5	1,000.00	0.00
5.00	0.09	192	1,000.01	0.00
6.00	0.19	685	1,000.03	0.01
7.00	0.30	1,515	1,000.07	0.02
8.00	0.41	2,677	1,000.13	0.05
9.00	0.68	4,321	1,000.20	0.10
10.00	0.97	6,641	1,000.31	0.21
11.00	1.94	10,576	1,000.50	0.35
12.00	**43.45**	40,003	1,001.87	0.85
13.00	**2.85**	76,786	1,003.62	1.21
14.00	1.65	80,088	1,003.78	1.24
15.00	1.27	**80,736**	**1,003.82**	**1.25**
16.00	0.99	**80,330**	**1,003.80**	**1.24**
17.00	0.86	79,152	1,003.74	1.23
18.00	0.76	77,641	1,003.66	1.22
19.00	0.65	75,818	1,003.57	1.20
20.00	0.55	73,692	1,003.46	1.18
21.00	0.52	71,371	1,003.35	1.16
22.00	0.50	69,047	1,003.24	1.14
23.00	0.48	66,727	1,003.12	1.12
24.00	0.46	64,411	1,003.01	1.10
25.00	0.00	60,809	1,002.84	1.07
26.00	0.00	57,040	1,002.66	1.03
27.00	0.00	53,403	1,002.49	0.99
28.00	0.00	49,896	1,002.33	0.96
29.00	0.00	46,520	1,002.17	0.92
30.00	0.00	43,274	1,002.02	0.88
31.00	0.00	40,158	1,001.88	0.85
32.00	0.00	37,172	1,001.74	0.81
33.00	0.00	34,315	1,001.60	0.78
34.00	0.00	31,587	1,001.48	0.74
35.00	0.00	28,989	1,001.36	0.70
36.00	0.00	26,520	1,001.24	0.67
37.00	0.00	24,181	1,001.13	0.63
38.00	0.00	21,972	1,001.03	0.60
39.00	0.00	19,892	1,000.93	0.56
40.00	0.00	17,943	1,000.84	0.52
41.00	0.00	16,124	1,000.76	0.49
42.00	0.00	14,436	1,000.68	0.45
43.00	0.00	12,879	1,000.61	0.41
44.00	0.00	11,452	1,000.54	0.38
45.00	0.00	10,156	1,000.48	0.34
46.00	0.00	8,993	1,000.43	0.31
47.00	0.00	7,963	1,000.38	0.27
48.00	0.00	7,067	1,000.33	0.23

Summary for Link E: North

Inflow Area = 0.540 ac, 0.00% Impervious, Inflow Depth = 1.64" for 2-Year event
Inflow = 1.54 cfs @ 11.98 hrs, Volume= 0.074 af
Primary = 1.54 cfs @ 11.98 hrs, Volume= 0.074 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link E: North



Hydrograph for Link E: North

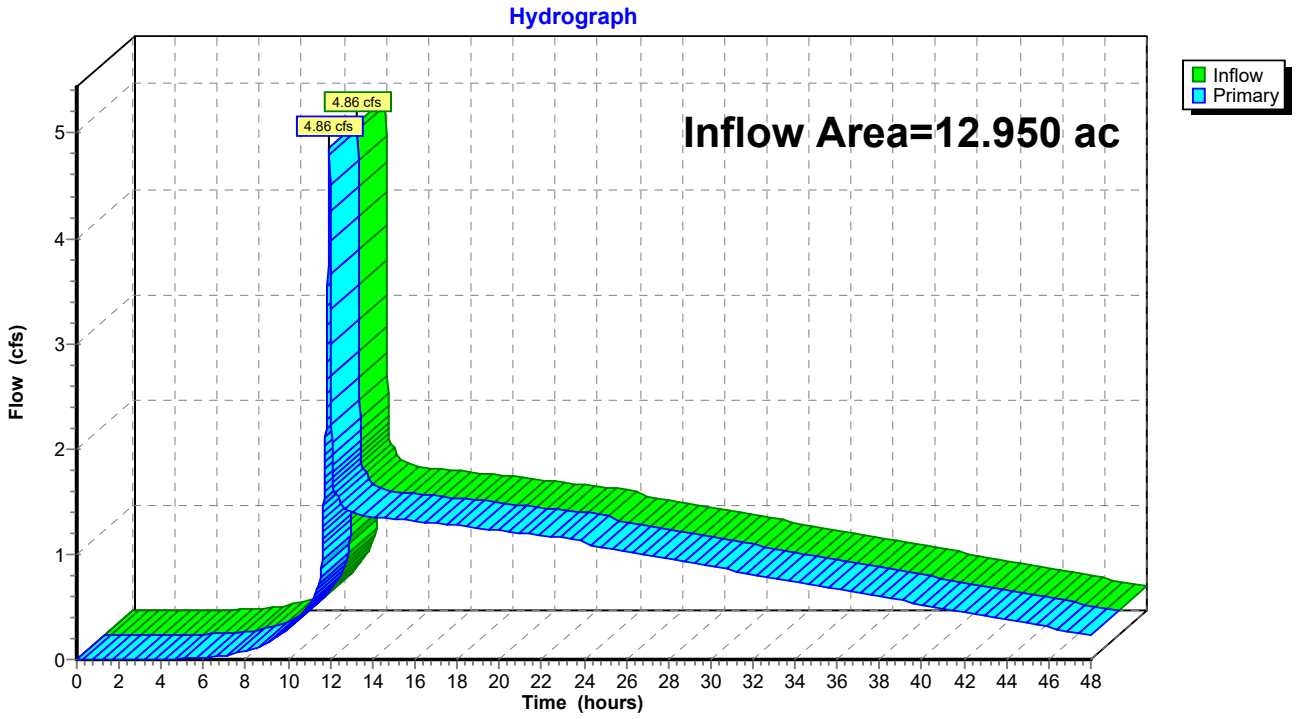
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	0.00	0.00	0.00
0.50	0.00	0.00	0.00	26.50	0.00	0.00	0.00
1.00	0.00	0.00	0.00	27.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	27.50	0.00	0.00	0.00
2.00	0.00	0.00	0.00	28.00	0.00	0.00	0.00
2.50	0.00	0.00	0.00	28.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	29.00	0.00	0.00	0.00
3.50	0.00	0.00	0.00	29.50	0.00	0.00	0.00
4.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	30.50	0.00	0.00	0.00
5.00	0.00	0.00	0.00	31.00	0.00	0.00	0.00
5.50	0.00	0.00	0.00	31.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00
6.50	0.00	0.00	0.00	32.50	0.00	0.00	0.00
7.00	0.00	0.00	0.00	33.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	33.50	0.00	0.00	0.00
8.00	0.00	0.00	0.00	34.00	0.00	0.00	0.00
8.50	0.00	0.00	0.00	34.50	0.00	0.00	0.00
9.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
9.50	0.00	0.00	0.00	35.50	0.00	0.00	0.00
10.00	0.01	0.00	0.01	36.00	0.00	0.00	0.00
10.50	0.01	0.00	0.01	36.50	0.00	0.00	0.00
11.00	0.03	0.00	0.03	37.00	0.00	0.00	0.00
11.50	**0.06**	0.00	**0.06**	37.50	0.00	0.00	0.00
12.00	**1.50**	0.00	**1.50**	38.00	0.00	0.00	0.00
12.50	0.15	0.00	0.15	38.50	0.00	0.00	0.00
13.00	0.09	0.00	0.09	39.00	0.00	0.00	0.00
13.50	0.07	0.00	0.07	39.50	0.00	0.00	0.00
14.00	0.05	0.00	0.05	40.00	0.00	0.00	0.00
14.50	0.05	0.00	0.05	40.50	0.00	0.00	0.00
15.00	0.04	0.00	0.04	41.00	0.00	0.00	0.00
15.50	0.04	0.00	0.04	41.50	0.00	0.00	0.00
16.00	0.03	0.00	0.03	42.00	0.00	0.00	0.00
16.50	0.03	0.00	0.03	42.50	0.00	0.00	0.00
17.00	0.03	0.00	0.03	43.00	0.00	0.00	0.00
17.50	0.03	0.00	0.03	43.50	0.00	0.00	0.00
18.00	0.03	0.00	0.03	44.00	0.00	0.00	0.00
18.50	0.03	0.00	0.03	44.50	0.00	0.00	0.00
19.00	0.02	0.00	0.02	45.00	0.00	0.00	0.00
19.50	0.02	0.00	0.02	45.50	0.00	0.00	0.00
20.00	0.02	0.00	0.02	46.00	0.00	0.00	0.00
20.50	0.02	0.00	0.02	46.50	0.00	0.00	0.00
21.00	0.02	0.00	0.02	47.00	0.00	0.00	0.00
21.50	0.02	0.00	0.02	47.50	0.00	0.00	0.00
22.00	0.02	0.00	0.02	48.00	0.00	0.00	0.00
22.50	0.02	0.00	0.02				
23.00	0.02	0.00	0.02				
23.50	0.02	0.00	0.02				
24.00	0.02	0.00	0.02				
24.50	0.00	0.00	0.00				
25.00	0.00	0.00	0.00				
25.50	0.00	0.00	0.00				

Summary for Link NE: South

Inflow Area = 12.950 ac, 72.05% Impervious, Inflow Depth > 2.58" for 2-Year event
Inflow = 4.86 cfs @ 11.96 hrs, Volume= 2.789 af
Primary = 4.86 cfs @ 11.96 hrs, Volume= 2.789 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link NE: South



Hydrograph for Link NE: South

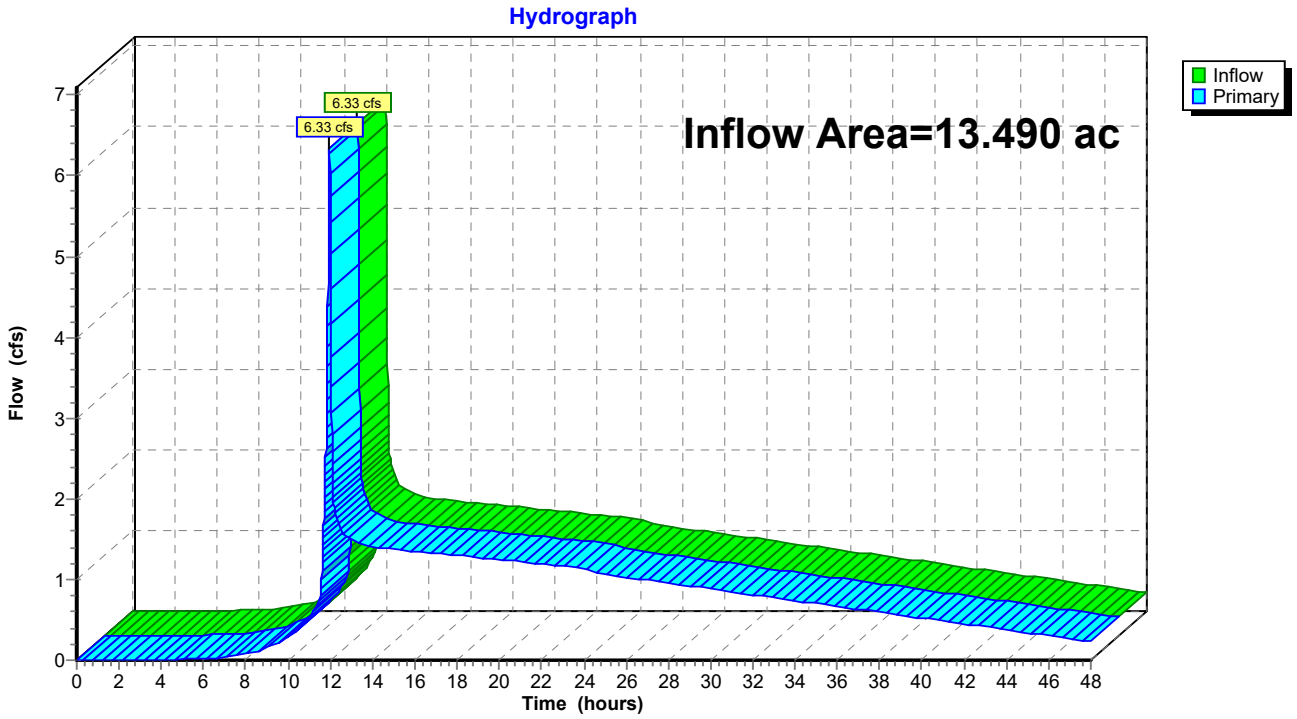
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.03	0.00	1.03
0.50	0.00	0.00	0.00	26.50	1.01	0.00	1.01
1.00	0.00	0.00	0.00	27.00	0.99	0.00	0.99
1.50	0.00	0.00	0.00	27.50	0.97	0.00	0.97
2.00	0.00	0.00	0.00	28.00	0.96	0.00	0.96
2.50	0.00	0.00	0.00	28.50	0.94	0.00	0.94
3.00	0.00	0.00	0.00	29.00	0.92	0.00	0.92
3.50	0.00	0.00	0.00	29.50	0.90	0.00	0.90
4.00	0.00	0.00	0.00	30.00	0.88	0.00	0.88
4.50	0.01	0.00	0.01	30.50	0.87	0.00	0.87
5.00	0.01	0.00	0.01	31.00	0.85	0.00	0.85
5.50	0.02	0.00	0.02	31.50	0.83	0.00	0.83
6.00	0.02	0.00	0.02	32.00	0.81	0.00	0.81
6.50	0.03	0.00	0.03	32.50	0.79	0.00	0.79
7.00	0.04	0.00	0.04	33.00	0.78	0.00	0.78
7.50	0.05	0.00	0.05	33.50	0.76	0.00	0.76
8.00	0.08	0.00	0.08	34.00	0.74	0.00	0.74
8.50	0.11	0.00	0.11	34.50	0.72	0.00	0.72
9.00	0.16	0.00	0.16	35.00	0.70	0.00	0.70
9.50	0.21	0.00	0.21	35.50	0.69	0.00	0.69
10.00	0.28	0.00	0.28	36.00	0.67	0.00	0.67
10.50	0.38	0.00	0.38	36.50	0.65	0.00	0.65
11.00	0.51	0.00	0.51	37.00	0.63	0.00	0.63
11.50	**0.72**	0.00	**0.72**	37.50	0.61	0.00	0.61
12.00	**4.25**	0.00	**4.25**	38.00	0.60	0.00	0.60
12.50	1.48	0.00	1.48	38.50	0.58	0.00	0.58
13.00	1.40	0.00	1.40	39.00	0.56	0.00	0.56
13.50	1.37	0.00	1.37	39.50	0.54	0.00	0.54
14.00	1.35	0.00	1.35	40.00	0.52	0.00	0.52
14.50	1.35	0.00	1.35	40.50	0.51	0.00	0.51
15.00	1.34	0.00	1.34	41.00	0.49	0.00	0.49
15.50	1.33	0.00	1.33	41.50	0.47	0.00	0.47
16.00	1.31	0.00	1.31	42.00	0.45	0.00	0.45
16.50	1.30	0.00	1.30	42.50	0.43	0.00	0.43
17.00	1.29	0.00	1.29	43.00	0.41	0.00	0.41
17.50	1.28	0.00	1.28	43.50	0.40	0.00	0.40
18.00	1.27	0.00	1.27	44.00	0.38	0.00	0.38
18.50	1.26	0.00	1.26	44.50	0.36	0.00	0.36
19.00	1.25	0.00	1.25	45.00	0.34	0.00	0.34
19.50	1.24	0.00	1.24	45.50	0.32	0.00	0.32
20.00	1.22	0.00	1.22	46.00	0.31	0.00	0.31
20.50	1.21	0.00	1.21	46.50	0.29	0.00	0.29
21.00	1.20	0.00	1.20	47.00	0.27	0.00	0.27
21.50	1.19	0.00	1.19	47.50	0.25	0.00	0.25
22.00	1.18	0.00	1.18	48.00	0.23	0.00	0.23
22.50	1.17	0.00	1.17				
23.00	1.16	0.00	1.16				
23.50	1.14	0.00	1.14				
24.00	1.13	0.00	1.13				
24.50	1.08	0.00	1.08				
25.00	1.07	0.00	1.07				
25.50	1.05	0.00	1.05				

Summary for Link TOT: Total Site Watershed

Inflow Area = 13.490 ac, 69.16% Impervious, Inflow Depth > 2.55" for 2-Year event
Inflow = 6.33 cfs @ 11.97 hrs, Volume= 2.863 af
Primary = 6.33 cfs @ 11.97 hrs, Volume= 2.863 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link TOT: Total Site Watershed



Hydrograph for Link TOT: Total Site Watershed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.03	0.00	1.03
0.50	0.00	0.00	0.00	26.50	1.01	0.00	1.01
1.00	0.00	0.00	0.00	27.00	0.99	0.00	0.99
1.50	0.00	0.00	0.00	27.50	0.97	0.00	0.97
2.00	0.00	0.00	0.00	28.00	0.96	0.00	0.96
2.50	0.00	0.00	0.00	28.50	0.94	0.00	0.94
3.00	0.00	0.00	0.00	29.00	0.92	0.00	0.92
3.50	0.00	0.00	0.00	29.50	0.90	0.00	0.90
4.00	0.00	0.00	0.00	30.00	0.88	0.00	0.88
4.50	0.01	0.00	0.01	30.50	0.87	0.00	0.87
5.00	0.01	0.00	0.01	31.00	0.85	0.00	0.85
5.50	0.02	0.00	0.02	31.50	0.83	0.00	0.83
6.00	0.02	0.00	0.02	32.00	0.81	0.00	0.81
6.50	0.03	0.00	0.03	32.50	0.79	0.00	0.79
7.00	0.04	0.00	0.04	33.00	0.78	0.00	0.78
7.50	0.05	0.00	0.05	33.50	0.76	0.00	0.76
8.00	0.08	0.00	0.08	34.00	0.74	0.00	0.74
8.50	0.11	0.00	0.11	34.50	0.72	0.00	0.72
9.00	0.16	0.00	0.16	35.00	0.70	0.00	0.70
9.50	0.21	0.00	0.21	35.50	0.69	0.00	0.69
10.00	0.29	0.00	0.29	36.00	0.67	0.00	0.67
10.50	0.39	0.00	0.39	36.50	0.65	0.00	0.65
11.00	0.53	0.00	0.53	37.00	0.63	0.00	0.63
11.50	**0.77**	0.00	**0.77**	37.50	0.61	0.00	0.61
12.00	**5.76**	0.00	**5.76**	38.00	0.60	0.00	0.60
12.50	1.62	0.00	1.62	38.50	0.58	0.00	0.58
13.00	1.49	0.00	1.49	39.00	0.56	0.00	0.56
13.50	1.44	0.00	1.44	39.50	0.54	0.00	0.54
14.00	1.41	0.00	1.41	40.00	0.52	0.00	0.52
14.50	1.39	0.00	1.39	40.50	0.51	0.00	0.51
15.00	1.38	0.00	1.38	41.00	0.49	0.00	0.49
15.50	1.36	0.00	1.36	41.50	0.47	0.00	0.47
16.00	1.35	0.00	1.35	42.00	0.45	0.00	0.45
16.50	1.34	0.00	1.34	42.50	0.43	0.00	0.43
17.00	1.32	0.00	1.32	43.00	0.41	0.00	0.41
17.50	1.31	0.00	1.31	43.50	0.40	0.00	0.40
18.00	1.30	0.00	1.30	44.00	0.38	0.00	0.38
18.50	1.29	0.00	1.29	44.50	0.36	0.00	0.36
19.00	1.27	0.00	1.27	45.00	0.34	0.00	0.34
19.50	1.26	0.00	1.26	45.50	0.32	0.00	0.32
20.00	1.24	0.00	1.24	46.00	0.31	0.00	0.31
20.50	1.23	0.00	1.23	46.50	0.29	0.00	0.29
21.00	1.22	0.00	1.22	47.00	0.27	0.00	0.27
21.50	1.21	0.00	1.21	47.50	0.25	0.00	0.25
22.00	1.20	0.00	1.20	48.00	0.23	0.00	0.23
22.50	1.18	0.00	1.18				
23.00	1.17	0.00	1.17				
23.50	1.16	0.00	1.16				
24.00	1.15	0.00	1.15				
24.50	1.08	0.00	1.08				
25.00	1.07	0.00	1.07				
25.50	1.05	0.00	1.05				

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: South (Bypass) Runoff Area=0.870 ac 72.41% Impervious Runoff Depth=4.49"
Tc=5.0 min CN=93 Runoff=6.48 cfs 0.326 af

SubcatchmentN-BYP: North Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=3.16"
Tc=6.8 min CN=80 Runoff=2.92 cfs 0.142 af

SubcatchmentWC: South (Detained) Runoff Area=12.080 ac 72.02% Impervious Runoff Depth=4.49"
Tc=11.8 min CN=93 Runoff=72.27 cfs 4.523 af

Pond DET: South Basin Peak Elev=1,005.17' Storage=103,128 cf Inflow=72.27 cfs 4.523 af
Outflow=18.86 cfs 4.309 af

Link E: North Inflow=2.92 cfs 0.142 af
Primary=2.92 cfs 0.142 af

Link NE: South Inflow=19.59 cfs 4.635 af
Primary=19.59 cfs 4.635 af

Link TOT: Total Site Watershed Inflow=20.00 cfs 4.777 af
Primary=20.00 cfs 4.777 af

Total Runoff Area = 13.490 ac Runoff Volume = 4.990 af Average Runoff Depth = 4.44"
30.84% Pervious = 4.160 ac 69.16% Impervious = 9.330 ac

Summary for Subcatchment 1S: South (Bypass)

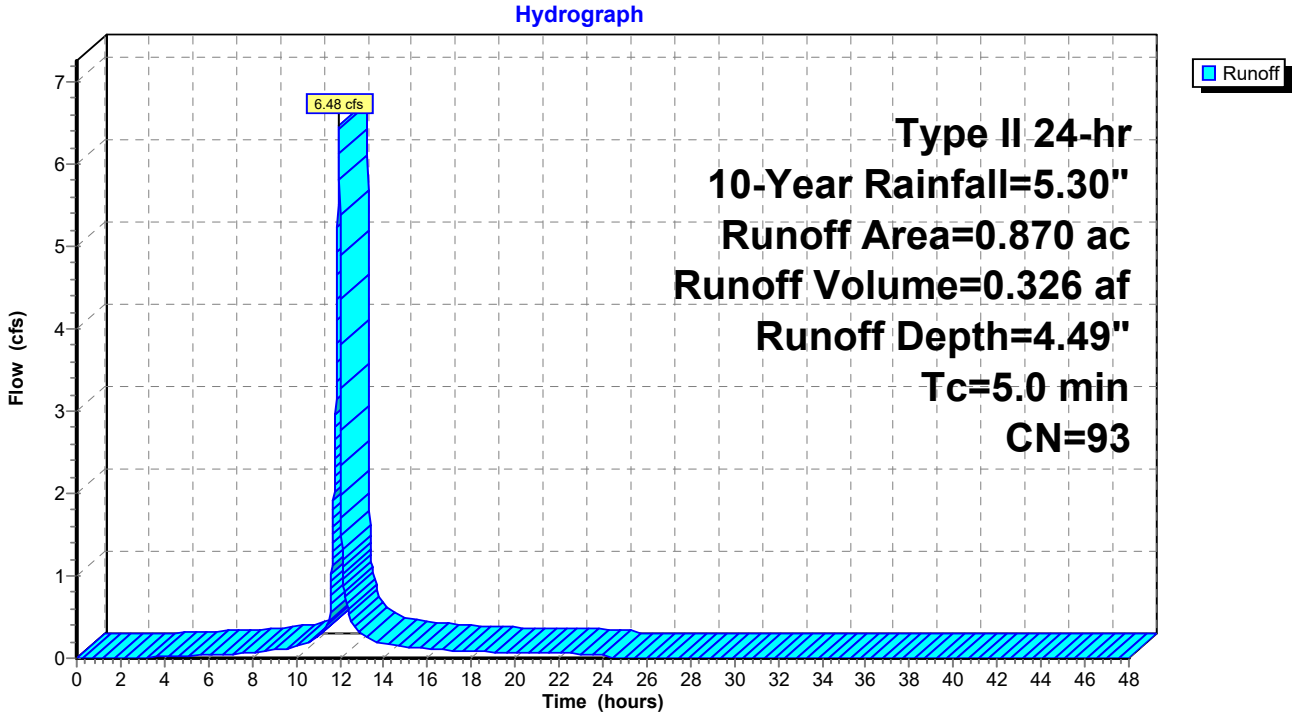
Runoff = 6.48 cfs @ 11.96 hrs, Volume= 0.326 af, Depth= 4.49"
Routed to Link NE : South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.630	98	Paved parking, HSG D
0.240	80	>75% Grass cover, Good, HSG D
0.870	93	Weighted Average
0.240		27.59% Pervious Area
0.630		72.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: South (Bypass)



Hydrograph for Subcatchment 1S: South (Bypass)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.12	0.00	0.00
2.50	0.15	0.00	0.00
3.00	0.18	0.00	0.00
3.50	0.22	0.01	0.01
4.00	0.25	0.01	0.01
4.50	0.29	0.02	0.02
5.00	0.33	0.04	0.03
5.50	0.38	0.05	0.03
6.00	0.42	0.07	0.04
6.50	0.47	0.10	0.04
7.00	0.52	0.12	0.05
7.50	0.58	0.16	0.06
8.00	0.64	0.19	0.06
8.50	0.70	0.23	0.08
9.00	0.78	0.29	0.10
9.50	0.86	0.35	0.11
10.00	0.96	0.42	0.14
10.50	1.08	0.51	0.19
11.00	1.25	0.65	0.27
11.50	1.50	0.87	**0.45**
12.00	3.51	2.75	**5.38**
12.50	3.90	3.12	0.47
13.00	4.09	3.31	0.29
13.50	4.23	3.45	0.22
14.00	4.35	3.56	0.18
14.50	4.44	3.65	0.15
15.00	4.52	3.73	0.14
15.50	4.60	3.80	0.12
16.00	4.66	3.87	0.11
16.50	4.72	3.93	0.10
17.00	4.78	3.98	0.09
17.50	4.83	4.03	0.09
18.00	4.88	4.08	0.08
18.50	4.93	4.13	0.08
19.00	4.97	4.17	0.07
19.50	5.01	4.21	0.07
20.00	5.05	4.24	0.06
20.50	5.08	4.28	0.06
21.00	5.11	4.31	0.06
21.50	5.15	4.34	0.06
22.00	5.18	4.37	0.06
22.50	5.21	4.40	0.05
23.00	5.24	4.43	0.05
23.50	5.27	4.46	0.05
24.00	**5.30**	**4.49**	0.05
24.50	5.30	4.49	0.00
25.00	5.30	4.49	0.00
25.50	5.30	4.49	0.00
26.00	5.30	4.49	0.00
26.50	5.30	4.49	0.00
27.00	5.30	4.49	0.00
27.50	5.30	4.49	0.00
28.00	5.30	4.49	0.00
28.50	5.30	4.49	0.00
29.00	5.30	4.49	0.00
29.50	5.30	4.49	0.00
30.00	5.30	4.49	0.00
30.50	5.30	4.49	0.00
31.00	5.30	4.49	0.00
31.50	5.30	4.49	0.00
32.00	5.30	4.49	0.00
32.50	5.30	4.49	0.00
33.00	5.30	4.49	0.00
33.50	5.30	4.49	0.00
34.00	5.30	4.49	0.00
34.50	5.30	4.49	0.00
35.00	5.30	4.49	0.00
35.50	5.30	4.49	0.00
36.00	5.30	4.49	0.00
36.50	5.30	4.49	0.00
37.00	5.30	4.49	0.00
37.50	5.30	4.49	0.00
38.00	5.30	4.49	0.00
38.50	5.30	4.49	0.00
39.00	5.30	4.49	0.00
39.50	5.30	4.49	0.00
40.00	5.30	4.49	0.00
40.50	5.30	4.49	0.00
41.00	5.30	4.49	0.00
41.50	5.30	4.49	0.00
42.00	5.30	4.49	0.00
42.50	5.30	4.49	0.00
43.00	5.30	4.49	0.00
43.50	5.30	4.49	0.00
44.00	5.30	4.49	0.00
44.50	5.30	4.49	0.00
45.00	5.30	4.49	0.00
45.50	5.30	4.49	0.00
46.00	5.30	4.49	0.00
46.50	5.30	4.49	0.00
47.00	5.30	4.49	0.00
47.50	5.30	4.49	0.00
48.00	5.30	4.49	0.00

Summary for Subcatchment N-BYP: North

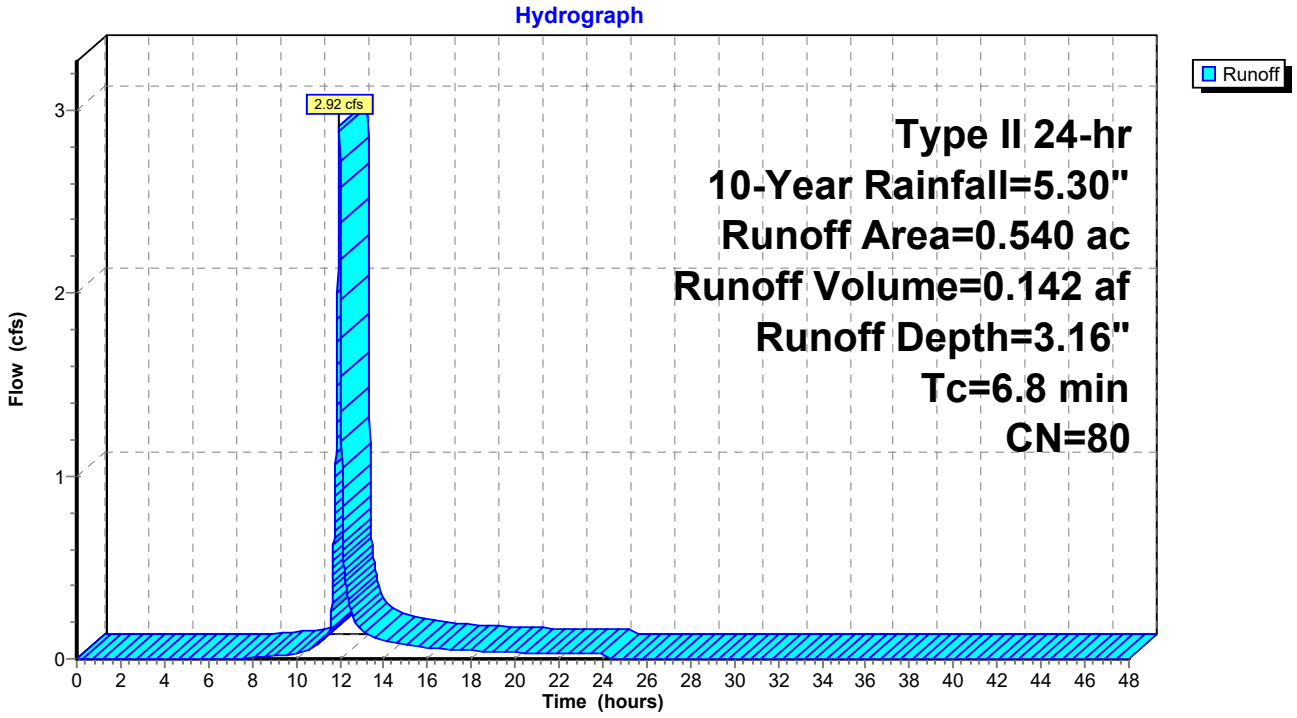
Runoff = 2.92 cfs @ 11.98 hrs, Volume= 0.142 af, Depth= 3.16"
Routed to Link E : North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
0.540	80	>75% Grass cover, Good, HSG D
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8					**Direct Entry,**

Subcatchment N-BYP: North



Hydrograph for Subcatchment N-BYP: North

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.12	0.00	0.00
2.50	0.15	0.00	0.00
3.00	0.18	0.00	0.00
3.50	0.22	0.00	0.00
4.00	0.25	0.00	0.00
4.50	0.29	0.00	0.00
5.00	0.33	0.00	0.00
5.50	0.38	0.00	0.00
6.00	0.42	0.00	0.00
6.50	0.47	0.00	0.00
7.00	0.52	0.00	0.00
7.50	0.58	0.00	0.00
8.00	0.64	0.01	0.01
8.50	0.70	0.01	0.01
9.00	0.78	0.03	0.02
9.50	0.86	0.05	0.02
10.00	0.96	0.07	0.03
10.50	1.08	0.11	0.05
11.00	1.25	0.17	0.08
11.50	1.50	0.29	**0.15**
12.00	3.51	1.65	**2.83**
12.50	3.90	1.96	0.26
13.00	4.09	2.12	0.16
13.50	4.23	2.24	0.12
14.00	4.35	2.33	0.10
14.50	4.44	2.41	0.08
15.00	4.52	2.48	0.08
15.50	4.60	2.55	0.07
16.00	4.66	2.60	0.06
16.50	4.72	2.65	0.05
17.00	4.78	2.70	0.05
17.50	4.83	2.75	0.05
18.00	4.88	2.79	0.05
18.50	4.93	2.83	0.04
19.00	4.97	2.87	0.04
19.50	5.01	2.90	0.04
20.00	5.05	2.93	0.03
20.50	5.08	2.96	0.03
21.00	5.11	2.99	0.03
21.50	5.15	3.02	0.03
22.00	5.18	3.05	0.03
22.50	5.21	3.08	0.03
23.00	5.24	3.10	0.03
23.50	5.27	3.13	0.03
24.00	**5.30**	**3.16**	0.03
24.50	5.30	3.16	0.00
25.00	5.30	3.16	0.00
25.50	5.30	3.16	0.00
26.00	5.30	3.16	0.00
26.50	5.30	3.16	0.00
27.00	5.30	3.16	0.00
27.50	5.30	3.16	0.00
28.00	5.30	3.16	0.00
28.50	5.30	3.16	0.00
29.00	5.30	3.16	0.00
29.50	5.30	3.16	0.00
30.00	5.30	3.16	0.00
30.50	5.30	3.16	0.00
31.00	5.30	3.16	0.00
31.50	5.30	3.16	0.00
32.00	5.30	3.16	0.00
32.50	5.30	3.16	0.00
33.00	5.30	3.16	0.00
33.50	5.30	3.16	0.00
34.00	5.30	3.16	0.00
34.50	5.30	3.16	0.00
35.00	5.30	3.16	0.00
35.50	5.30	3.16	0.00
36.00	5.30	3.16	0.00
36.50	5.30	3.16	0.00
37.00	5.30	3.16	0.00
37.50	5.30	3.16	0.00
38.00	5.30	3.16	0.00
38.50	5.30	3.16	0.00
39.00	5.30	3.16	0.00
39.50	5.30	3.16	0.00
40.00	5.30	3.16	0.00
40.50	5.30	3.16	0.00
41.00	5.30	3.16	0.00
41.50	5.30	3.16	0.00
42.00	5.30	3.16	0.00
42.50	5.30	3.16	0.00
43.00	5.30	3.16	0.00
43.50	5.30	3.16	0.00
44.00	5.30	3.16	0.00
44.50	5.30	3.16	0.00
45.00	5.30	3.16	0.00
45.50	5.30	3.16	0.00
46.00	5.30	3.16	0.00
46.50	5.30	3.16	0.00
47.00	5.30	3.16	0.00
47.50	5.30	3.16	0.00
48.00	5.30	3.16	0.00

Summary for Subcatchment WC: South (Detained)

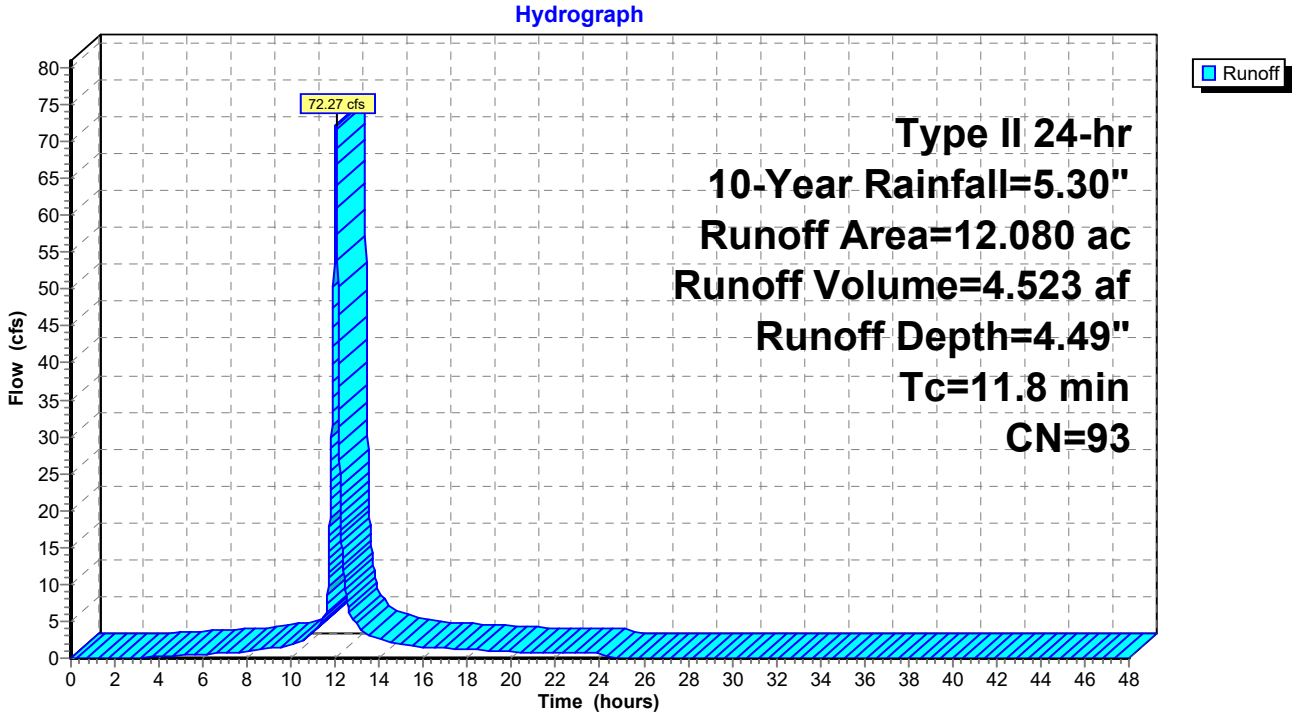
Runoff = 72.27 cfs @ 12.03 hrs, Volume= 4.523 af, Depth= 4.49"
Routed to Pond DET : South Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 10-Year Rainfall=5.30"

Area (ac)	CN	Description
8.700	98	Paved parking, HSG D
3.380	80	>75% Grass cover, Good, HSG D
12.080	93	Weighted Average
3.380		27.98% Pervious Area
8.700		72.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					**Direct Entry,**

Subcatchment WC: South (Detained)



Hydrograph for Subcatchment WC: South (Detained)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.03	0.00	0.00
1.00	0.06	0.00	0.00
1.50	0.09	0.00	0.00
2.00	0.12	0.00	0.00
2.50	0.15	0.00	0.00
3.00	0.18	0.00	0.04
3.50	0.22	0.01	0.11
4.00	0.25	0.01	0.18
4.50	0.29	0.02	0.25
5.00	0.33	0.04	0.33
5.50	0.38	0.05	0.42
6.00	0.42	0.07	0.50
6.50	0.47	0.10	0.59
7.00	0.52	0.12	0.68
7.50	0.58	0.16	0.77
8.00	0.64	0.19	0.86
8.50	0.70	0.23	1.06
9.00	0.78	0.29	1.34
9.50	0.86	0.35	1.50
10.00	0.96	0.42	1.81
10.50	1.08	0.51	2.43
11.00	1.25	0.65	3.44
11.50	1.50	0.87	5.68
12.00	3.51	2.75	**69.58**
12.50	3.90	3.12	**8.35**
13.00	4.09	3.31	4.43
13.50	4.23	3.45	3.28
14.00	4.35	3.56	2.56
14.50	4.44	3.65	2.19
15.00	4.52	3.73	1.97
15.50	4.60	3.80	1.75
16.00	4.66	3.87	1.53
16.50	4.72	3.93	1.40
17.00	4.78	3.98	1.33
17.50	4.83	4.03	1.25
18.00	4.88	4.08	1.17
18.50	4.93	4.13	1.09
19.00	4.97	4.17	1.01
19.50	5.01	4.21	0.93
20.00	5.05	4.24	0.85
20.50	5.08	4.28	0.81
21.00	5.11	4.31	0.80
21.50	5.15	4.34	0.78
22.00	5.18	4.37	0.77
22.50	5.21	4.40	0.75
23.00	5.24	4.43	0.74
23.50	5.27	4.46	0.72
24.00	**5.30**	**4.49**	0.70
24.50	5.30	4.49	0.00
25.00	5.30	4.49	0.00
25.50	5.30	4.49	0.00
26.00	5.30	4.49	0.00
26.50	5.30	4.49	0.00
27.00	5.30	4.49	0.00
27.50	5.30	4.49	0.00
28.00	5.30	4.49	0.00
28.50	5.30	4.49	0.00
29.00	5.30	4.49	0.00
29.50	5.30	4.49	0.00
30.00	5.30	4.49	0.00
30.50	5.30	4.49	0.00
31.00	5.30	4.49	0.00
31.50	5.30	4.49	0.00
32.00	5.30	4.49	0.00
32.50	5.30	4.49	0.00
33.00	5.30	4.49	0.00
33.50	5.30	4.49	0.00
34.00	5.30	4.49	0.00
34.50	5.30	4.49	0.00
35.00	5.30	4.49	0.00
35.50	5.30	4.49	0.00
36.00	5.30	4.49	0.00
36.50	5.30	4.49	0.00
37.00	5.30	4.49	0.00
37.50	5.30	4.49	0.00
38.00	5.30	4.49	0.00
38.50	5.30	4.49	0.00
39.00	5.30	4.49	0.00
39.50	5.30	4.49	0.00
40.00	5.30	4.49	0.00
40.50	5.30	4.49	0.00
41.00	5.30	4.49	0.00
41.50	5.30	4.49	0.00
42.00	5.30	4.49	0.00
42.50	5.30	4.49	0.00
43.00	5.30	4.49	0.00
43.50	5.30	4.49	0.00
44.00	5.30	4.49	0.00
44.50	5.30	4.49	0.00
45.00	5.30	4.49	0.00
45.50	5.30	4.49	0.00
46.00	5.30	4.49	0.00
46.50	5.30	4.49	0.00
47.00	5.30	4.49	0.00
47.50	5.30	4.49	0.00
48.00	5.30	4.49	0.00

Summary for Pond DET: South Basin

Inflow Area = 12.080 ac, 72.02% Impervious, Inflow Depth = 4.49" for 10-Year event
Inflow = 72.27 cfs @ 12.03 hrs, Volume= 4.523 af
Outflow = 18.86 cfs @ 12.25 hrs, Volume= 4.309 af, Atten= 74%, Lag= 13.6 min
Primary = 18.86 cfs @ 12.25 hrs, Volume= 4.309 af
Routed to Link NE : South

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 1,005.17' @ 12.25 hrs Surf.Area= 14,395 sf Storage= 103,128 cf

Plug-Flow detention time= 537.3 min calculated for 4.309 af (95% of inflow)
Center-of-Mass det. time= 509.2 min (1,287.7 - 778.5)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	112,664 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	1,000.00'	47,127 cf	**ADS_StormTech MC-4500 b +Cap @ 6.95' L** x 252 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 6.95'L = 183.9 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 252 Chambers in 10 Rows Cap Storage= 39.5 cf x 2 x 10 rows = 790.0 cf
		159,791 cf	Total Available Storage

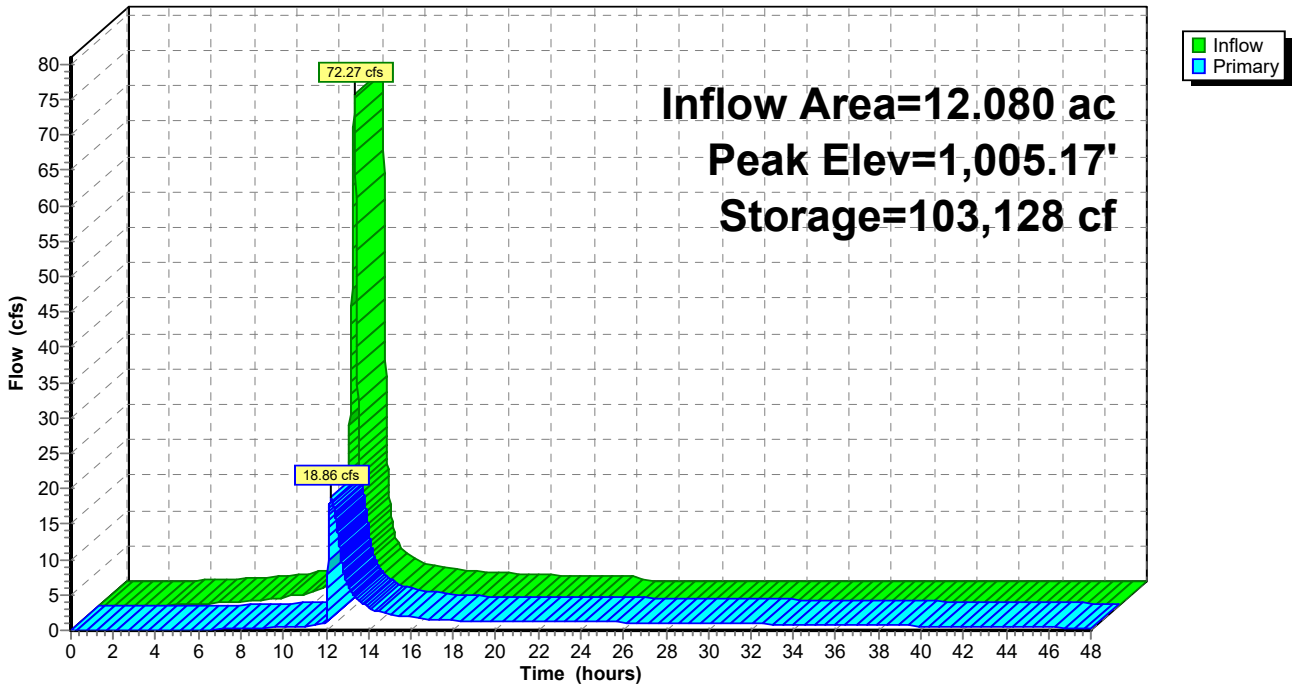
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.00	7,597	0	0
1,001.00	8,758	8,178	8,178
1,002.00	9,996	9,377	17,555
1,003.00	11,311	10,654	28,208
1,004.00	12,694	12,003	40,211
1,005.00	14,135	13,415	53,625
1,006.00	15,633	14,884	68,509
1,007.00	17,189	16,411	84,920
1,008.00	18,802	17,996	102,916
1,008.50	20,191	9,748	112,664

Device	Routing	Invert	Outlet Devices
#1	Primary	996.00'	**16.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 996.00' / 993.10' S= 0.0322 '/' Cc= 0.900 n= 0.013, Flow Area= 1.40 sf
#2	Device 1	1,000.00'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	1,003.85'	**60.0" W x 9.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=18.86 cfs @ 12.25 hrs HW=1,005.17' (Free Discharge)
└**1=Culvert** (Passes 18.86 cfs of 19.60 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.46 cfs @ 10.72 fps)
  └**3=Orifice/Grate** (Orifice Controls 17.40 cfs @ 4.64 fps)

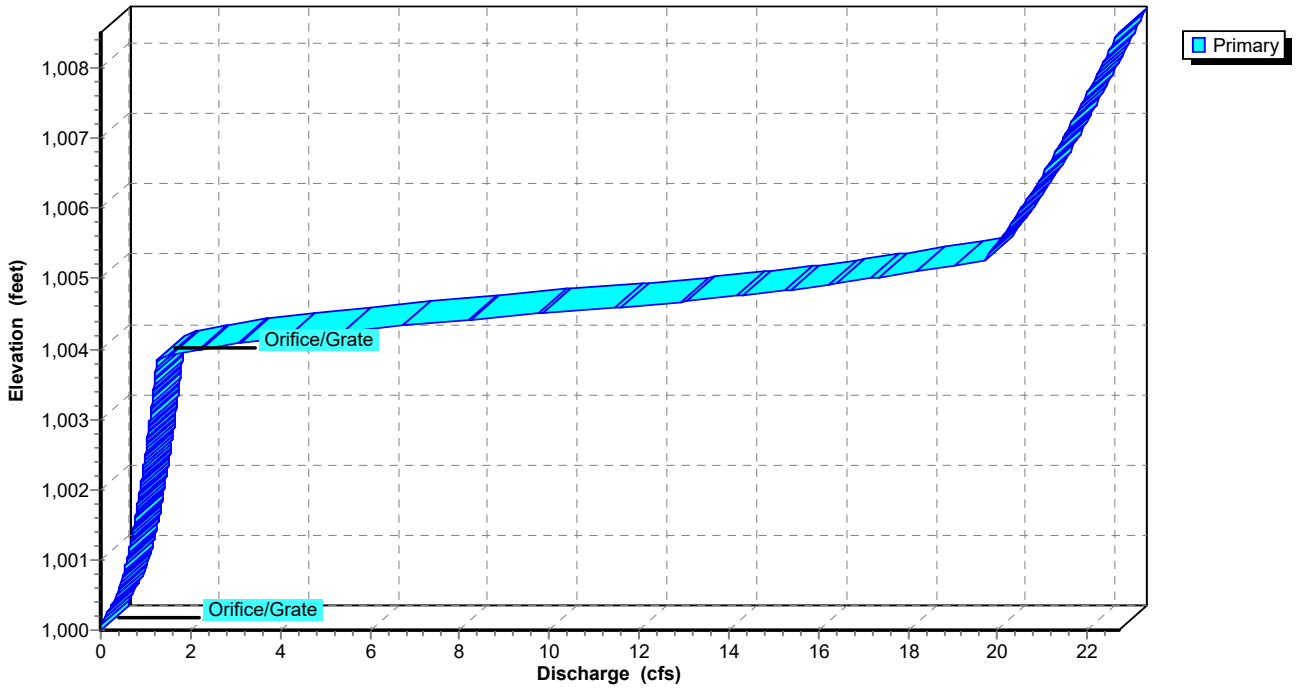
Pond DET: South Basin

Hydrograph

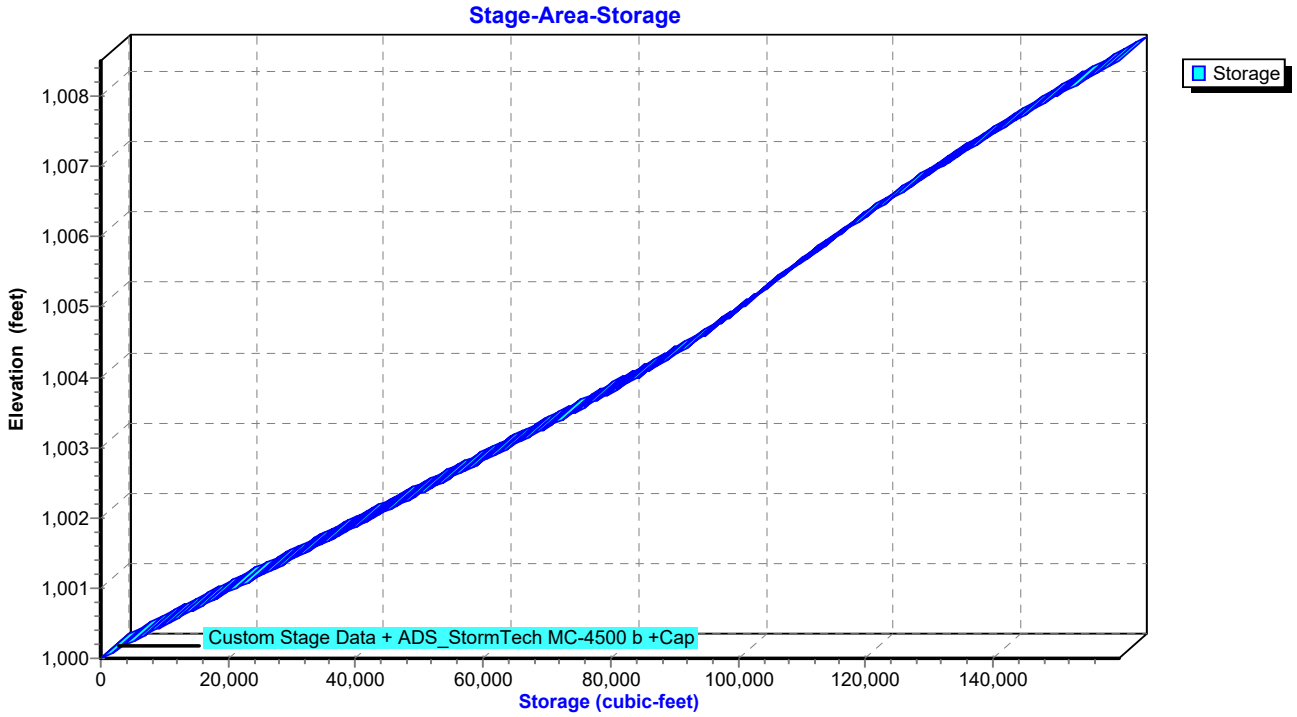


Pond DET: South Basin

Stage-Discharge



Pond DET: South Basin



Hydrograph for Pond DET: South Basin

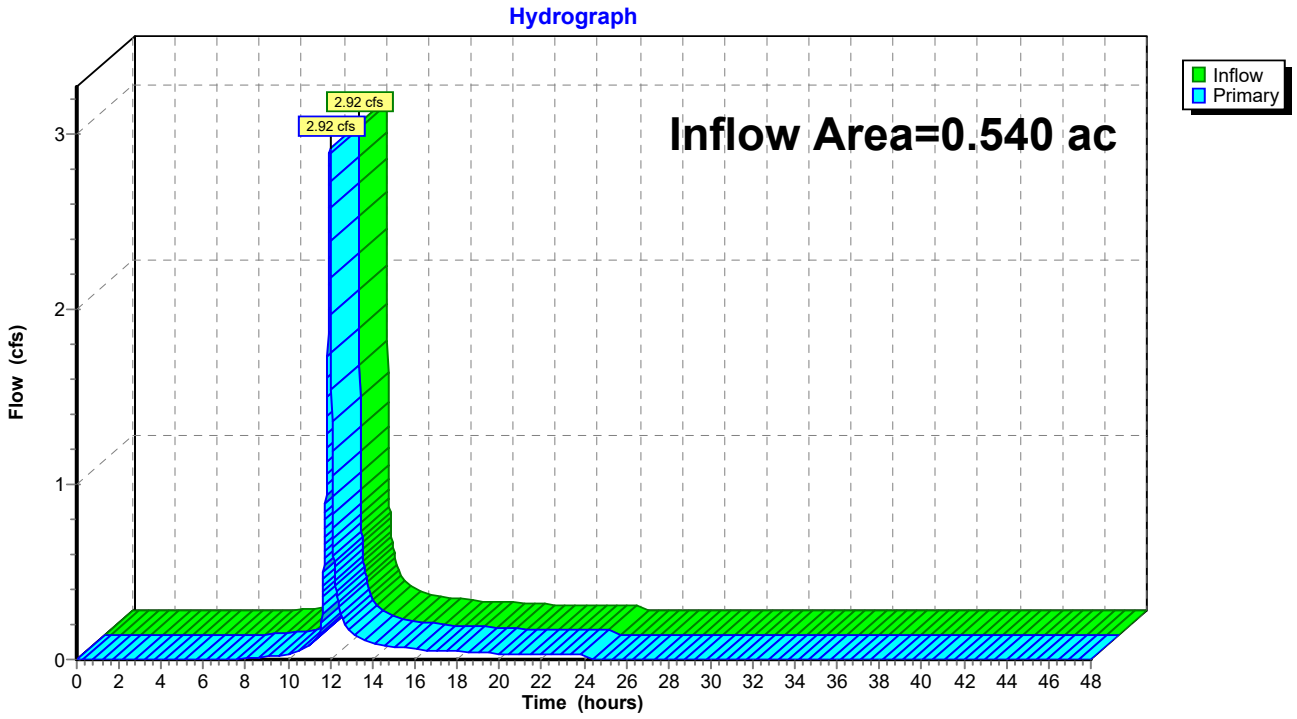
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,000.00	0.00
1.00	0.00	0	1,000.00	0.00
2.00	0.00	0	1,000.00	0.00
3.00	0.04	24	1,000.00	0.00
4.00	0.18	420	1,000.02	0.00
5.00	0.33	1,308	1,000.06	0.01
6.00	0.50	2,720	1,000.13	0.05
7.00	0.68	4,577	1,000.22	0.12
8.00	0.86	6,768	1,000.32	0.22
9.00	1.34	9,655	1,000.46	0.33
10.00	1.81	13,784	1,000.65	0.44
11.00	3.44	20,930	1,000.98	0.58
12.00	**69.58**	**69,976**	**1,003.28**	**1.15**
13.00	**4.43**	**90,381**	**1,004.33**	**6.67**
14.00	2.56	86,097	1,004.10	3.26
15.00	1.97	84,409	1,004.01	2.28
16.00	1.53	83,381	1,003.95	1.82
17.00	1.33	82,561	1,003.91	1.50
18.00	1.17	81,905	1,003.88	1.36
19.00	1.01	81,181	1,003.84	1.25
20.00	0.85	80,050	1,003.78	1.24
21.00	0.80	78,548	1,003.70	1.23
22.00	0.77	76,972	1,003.63	1.21
23.00	0.74	75,334	1,003.54	1.20
24.00	0.70	73,637	1,003.46	1.18
25.00	0.00	69,891	1,003.28	1.15
26.00	0.00	65,818	1,003.08	1.11
27.00	0.00	61,880	1,002.89	1.08
28.00	0.00	58,074	1,002.71	1.04
29.00	0.00	54,400	1,002.54	1.00
30.00	0.00	50,857	1,002.37	0.97
31.00	0.00	47,445	1,002.21	0.93
32.00	0.00	44,163	1,002.06	0.89
33.00	0.00	41,011	1,001.91	0.86
34.00	0.00	37,988	1,001.77	0.82
35.00	0.00	35,095	1,001.64	0.79
36.00	0.00	32,331	1,001.51	0.75
37.00	0.00	29,697	1,001.39	0.71
38.00	0.00	27,193	1,001.27	0.68
39.00	0.00	24,818	1,001.16	0.64
40.00	0.00	22,572	1,001.06	0.61
41.00	0.00	20,457	1,000.96	0.57
42.00	0.00	18,472	1,000.87	0.53
43.00	0.00	16,617	1,000.78	0.50
44.00	0.00	14,892	1,000.70	0.46
45.00	0.00	13,298	1,000.63	0.42
46.00	0.00	11,835	1,000.56	0.39
47.00	0.00	10,503	1,000.50	0.35
48.00	0.00	9,303	1,000.44	0.32

Summary for Link E: North

Inflow Area = 0.540 ac, 0.00% Impervious, Inflow Depth = 3.16" for 10-Year event
Inflow = 2.92 cfs @ 11.98 hrs, Volume= 0.142 af
Primary = 2.92 cfs @ 11.98 hrs, Volume= 0.142 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link E: North



Hydrograph for Link E: North

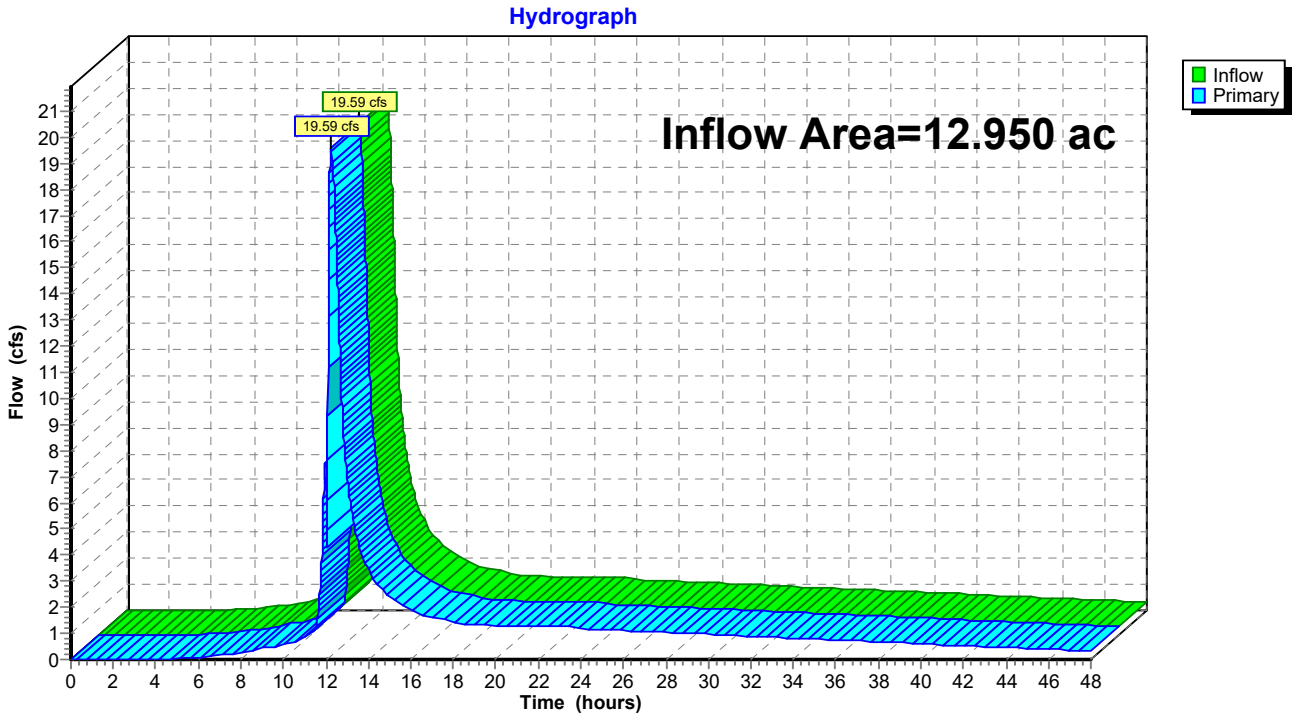
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	0.00	0.00	0.00
0.50	0.00	0.00	0.00	26.50	0.00	0.00	0.00
1.00	0.00	0.00	0.00	27.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	27.50	0.00	0.00	0.00
2.00	0.00	0.00	0.00	28.00	0.00	0.00	0.00
2.50	0.00	0.00	0.00	28.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	29.00	0.00	0.00	0.00
3.50	0.00	0.00	0.00	29.50	0.00	0.00	0.00
4.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	30.50	0.00	0.00	0.00
5.00	0.00	0.00	0.00	31.00	0.00	0.00	0.00
5.50	0.00	0.00	0.00	31.50	0.00	0.00	0.00
6.00	0.00	0.00	0.00	32.00	0.00	0.00	0.00
6.50	0.00	0.00	0.00	32.50	0.00	0.00	0.00
7.00	0.00	0.00	0.00	33.00	0.00	0.00	0.00
7.50	0.00	0.00	0.00	33.50	0.00	0.00	0.00
8.00	0.01	0.00	0.01	34.00	0.00	0.00	0.00
8.50	0.01	0.00	0.01	34.50	0.00	0.00	0.00
9.00	0.02	0.00	0.02	35.00	0.00	0.00	0.00
9.50	0.02	0.00	0.02	35.50	0.00	0.00	0.00
10.00	0.03	0.00	0.03	36.00	0.00	0.00	0.00
10.50	0.05	0.00	0.05	36.50	0.00	0.00	0.00
11.00	0.08	0.00	0.08	37.00	0.00	0.00	0.00
11.50	**0.15**	0.00	**0.15**	37.50	0.00	0.00	0.00
12.00	**2.83**	0.00	**2.83**	38.00	0.00	0.00	0.00
12.50	0.26	0.00	0.26	38.50	0.00	0.00	0.00
13.00	0.16	0.00	0.16	39.00	0.00	0.00	0.00
13.50	0.12	0.00	0.12	39.50	0.00	0.00	0.00
14.00	0.10	0.00	0.10	40.00	0.00	0.00	0.00
14.50	0.08	0.00	0.08	40.50	0.00	0.00	0.00
15.00	0.08	0.00	0.08	41.00	0.00	0.00	0.00
15.50	0.07	0.00	0.07	41.50	0.00	0.00	0.00
16.00	0.06	0.00	0.06	42.00	0.00	0.00	0.00
16.50	0.05	0.00	0.05	42.50	0.00	0.00	0.00
17.00	0.05	0.00	0.05	43.00	0.00	0.00	0.00
17.50	0.05	0.00	0.05	43.50	0.00	0.00	0.00
18.00	0.05	0.00	0.05	44.00	0.00	0.00	0.00
18.50	0.04	0.00	0.04	44.50	0.00	0.00	0.00
19.00	0.04	0.00	0.04	45.00	0.00	0.00	0.00
19.50	0.04	0.00	0.04	45.50	0.00	0.00	0.00
20.00	0.03	0.00	0.03	46.00	0.00	0.00	0.00
20.50	0.03	0.00	0.03	46.50	0.00	0.00	0.00
21.00	0.03	0.00	0.03	47.00	0.00	0.00	0.00
21.50	0.03	0.00	0.03	47.50	0.00	0.00	0.00
22.00	0.03	0.00	0.03	48.00	0.00	0.00	0.00
22.50	0.03	0.00	0.03				
23.00	0.03	0.00	0.03				
23.50	0.03	0.00	0.03				
24.00	0.03	0.00	0.03				
24.50	0.00	0.00	0.00				
25.00	0.00	0.00	0.00				
25.50	0.00	0.00	0.00				

Summary for Link NE: South

Inflow Area = 12.950 ac, 72.05% Impervious, Inflow Depth > 4.29" for 10-Year event
Inflow = 19.59 cfs @ 12.25 hrs, Volume= 4.635 af
Primary = 19.59 cfs @ 12.25 hrs, Volume= 4.635 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link NE: South



Hydrograph for Link NE: South

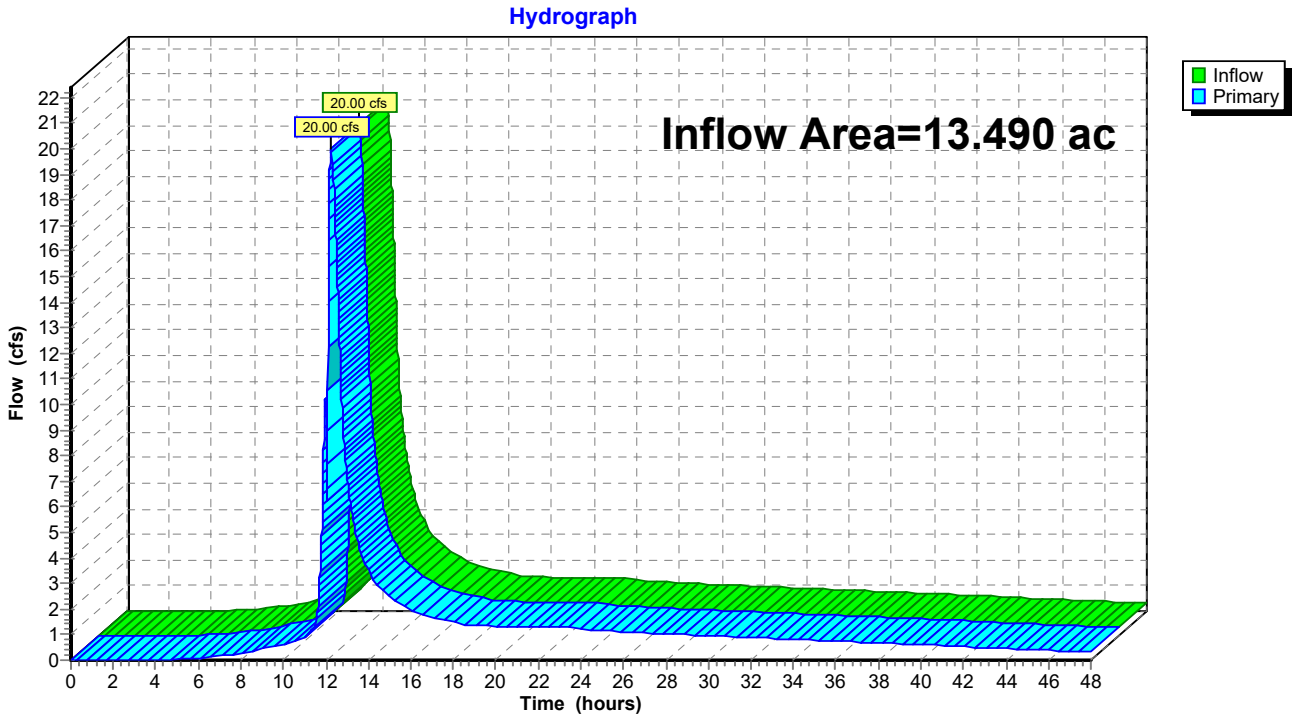
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.11	0.00	1.11
0.50	0.00	0.00	0.00	26.50	1.09	0.00	1.09
1.00	0.00	0.00	0.00	27.00	1.08	0.00	1.08
1.50	0.00	0.00	0.00	27.50	1.06	0.00	1.06
2.00	0.00	0.00	0.00	28.00	1.04	0.00	1.04
2.50	0.00	0.00	0.00	28.50	1.02	0.00	1.02
3.00	0.00	0.00	0.00	29.00	1.00	0.00	1.00
3.50	0.01	0.00	0.01	29.50	0.98	0.00	0.98
4.00	0.02	0.00	0.02	30.00	0.97	0.00	0.97
4.50	0.03	0.00	0.03	30.50	0.95	0.00	0.95
5.00	0.04	0.00	0.04	31.00	0.93	0.00	0.93
5.50	0.06	0.00	0.06	31.50	0.91	0.00	0.91
6.00	0.09	0.00	0.09	32.00	0.89	0.00	0.89
6.50	0.12	0.00	0.12	32.50	0.88	0.00	0.88
7.00	0.17	0.00	0.17	33.00	0.86	0.00	0.86
7.50	0.22	0.00	0.22	33.50	0.84	0.00	0.84
8.00	0.28	0.00	0.28	34.00	0.82	0.00	0.82
8.50	0.35	0.00	0.35	34.50	0.80	0.00	0.80
9.00	0.43	0.00	0.43	35.00	0.79	0.00	0.79
9.50	0.49	0.00	0.49	35.50	0.77	0.00	0.77
10.00	0.57	0.00	0.57	36.00	0.75	0.00	0.75
10.50	0.68	0.00	0.68	36.50	0.73	0.00	0.73
11.00	0.84	0.00	0.84	37.00	0.71	0.00	0.71
11.50	1.14	0.00	1.14	37.50	0.70	0.00	0.70
12.00	**6.53**	0.00	**6.53**	38.00	0.68	0.00	0.68
12.50	**15.75**	0.00	**15.75**	38.50	0.66	0.00	0.66
13.00	6.96	0.00	6.96	39.00	0.64	0.00	0.64
13.50	4.55	0.00	4.55	39.50	0.62	0.00	0.62
14.00	3.43	0.00	3.43	40.00	0.61	0.00	0.61
14.50	2.80	0.00	2.80	40.50	0.59	0.00	0.59
15.00	2.41	0.00	2.41	41.00	0.57	0.00	0.57
15.50	2.16	0.00	2.16	41.50	0.55	0.00	0.55
16.00	1.93	0.00	1.93	42.00	0.53	0.00	0.53
16.50	1.73	0.00	1.73	42.50	0.52	0.00	0.52
17.00	1.59	0.00	1.59	43.00	0.50	0.00	0.50
17.50	1.52	0.00	1.52	43.50	0.48	0.00	0.48
18.00	1.44	0.00	1.44	44.00	0.46	0.00	0.46
18.50	1.36	0.00	1.36	44.50	0.44	0.00	0.44
19.00	1.32	0.00	1.32	45.00	0.42	0.00	0.42
19.50	1.31	0.00	1.31	45.50	0.41	0.00	0.41
20.00	1.30	0.00	1.30	46.00	0.39	0.00	0.39
20.50	1.29	0.00	1.29	46.50	0.37	0.00	0.37
21.00	1.28	0.00	1.28	47.00	0.35	0.00	0.35
21.50	1.28	0.00	1.28	47.50	0.33	0.00	0.33
22.00	1.27	0.00	1.27	48.00	0.32	0.00	0.32
22.50	1.26	0.00	1.26				
23.00	1.25	0.00	1.25				
23.50	1.24	0.00	1.24				
24.00	1.23	0.00	1.23				
24.50	1.17	0.00	1.17				
25.00	1.15	0.00	1.15				
25.50	1.13	0.00	1.13				

Summary for Link TOT: Total Site Watershed

Inflow Area = 13.490 ac, 69.16% Impervious, Inflow Depth > 4.25" for 10-Year event
Inflow = 20.00 cfs @ 12.25 hrs, Volume= 4.777 af
Primary = 20.00 cfs @ 12.25 hrs, Volume= 4.777 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link TOT: Total Site Watershed



Hydrograph for Link TOT: Total Site Watershed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.11	0.00	1.11
0.50	0.00	0.00	0.00	26.50	1.09	0.00	1.09
1.00	0.00	0.00	0.00	27.00	1.08	0.00	1.08
1.50	0.00	0.00	0.00	27.50	1.06	0.00	1.06
2.00	0.00	0.00	0.00	28.00	1.04	0.00	1.04
2.50	0.00	0.00	0.00	28.50	1.02	0.00	1.02
3.00	0.00	0.00	0.00	29.00	1.00	0.00	1.00
3.50	0.01	0.00	0.01	29.50	0.98	0.00	0.98
4.00	0.02	0.00	0.02	30.00	0.97	0.00	0.97
4.50	0.03	0.00	0.03	30.50	0.95	0.00	0.95
5.00	0.04	0.00	0.04	31.00	0.93	0.00	0.93
5.50	0.06	0.00	0.06	31.50	0.91	0.00	0.91
6.00	0.09	0.00	0.09	32.00	0.89	0.00	0.89
6.50	0.12	0.00	0.12	32.50	0.88	0.00	0.88
7.00	0.17	0.00	0.17	33.00	0.86	0.00	0.86
7.50	0.22	0.00	0.22	33.50	0.84	0.00	0.84
8.00	0.29	0.00	0.29	34.00	0.82	0.00	0.82
8.50	0.36	0.00	0.36	34.50	0.80	0.00	0.80
9.00	0.44	0.00	0.44	35.00	0.79	0.00	0.79
9.50	0.51	0.00	0.51	35.50	0.77	0.00	0.77
10.00	0.60	0.00	0.60	36.00	0.75	0.00	0.75
10.50	0.73	0.00	0.73	36.50	0.73	0.00	0.73
11.00	0.92	0.00	0.92	37.00	0.71	0.00	0.71
11.50	1.29	0.00	1.29	37.50	0.70	0.00	0.70
12.00	**9.36**	0.00	**9.36**	38.00	0.68	0.00	0.68
12.50	**16.01**	0.00	**16.01**	38.50	0.66	0.00	0.66
13.00	7.12	0.00	7.12	39.00	0.64	0.00	0.64
13.50	4.67	0.00	4.67	39.50	0.62	0.00	0.62
14.00	3.53	0.00	3.53	40.00	0.61	0.00	0.61
14.50	2.88	0.00	2.88	40.50	0.59	0.00	0.59
15.00	2.49	0.00	2.49	41.00	0.57	0.00	0.57
15.50	2.23	0.00	2.23	41.50	0.55	0.00	0.55
16.00	1.99	0.00	1.99	42.00	0.53	0.00	0.53
16.50	1.78	0.00	1.78	42.50	0.52	0.00	0.52
17.00	1.64	0.00	1.64	43.00	0.50	0.00	0.50
17.50	1.57	0.00	1.57	43.50	0.48	0.00	0.48
18.00	1.49	0.00	1.49	44.00	0.46	0.00	0.46
18.50	1.41	0.00	1.41	44.50	0.44	0.00	0.44
19.00	1.36	0.00	1.36	45.00	0.42	0.00	0.42
19.50	1.35	0.00	1.35	45.50	0.41	0.00	0.41
20.00	1.33	0.00	1.33	46.00	0.39	0.00	0.39
20.50	1.33	0.00	1.33	46.50	0.37	0.00	0.37
21.00	1.32	0.00	1.32	47.00	0.35	0.00	0.35
21.50	1.31	0.00	1.31	47.50	0.33	0.00	0.33
22.00	1.30	0.00	1.30	48.00	0.32	0.00	0.32
22.50	1.29	0.00	1.29				
23.00	1.28	0.00	1.28				
23.50	1.27	0.00	1.27				
24.00	1.26	0.00	1.26				
24.50	1.17	0.00	1.17				
25.00	1.15	0.00	1.15				
25.50	1.13	0.00	1.13				

Time span=0.00-48.00 hrs, dt=0.01 hrs, 4801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: South (Bypass) Runoff Area=0.870 ac 72.41% Impervious Runoff Depth=6.87"
Tc=5.0 min CN=93 Runoff=9.64 cfs 0.498 af

SubcatchmentN-BYP: North Runoff Area=0.540 ac 0.00% Impervious Runoff Depth=5.34"
Tc=6.8 min CN=80 Runoff=4.82 cfs 0.240 af

SubcatchmentWC: South (Detained) Runoff Area=12.080 ac 72.02% Impervious Runoff Depth=6.87"
Tc=11.8 min CN=93 Runoff=107.74 cfs 6.911 af

Pond DET: South Basin Peak Elev=1,008.20' Storage=153,878 cf Inflow=107.74 cfs 6.911 af
Outflow=22.46 cfs 6.655 af

Link E: North Inflow=4.82 cfs 0.240 af
Primary=4.82 cfs 0.240 af

Link NE: South Inflow=28.42 cfs 7.152 af
Primary=28.42 cfs 7.152 af

Link TOT: Total Site Watershed Inflow=33.18 cfs 7.393 af
Primary=33.18 cfs 7.393 af

Total Runoff Area = 13.490 ac Runoff Volume = 7.649 af Average Runoff Depth = 6.80"
30.84% Pervious = 4.160 ac 69.16% Impervious = 9.330 ac

Summary for Subcatchment 1S: South (Bypass)

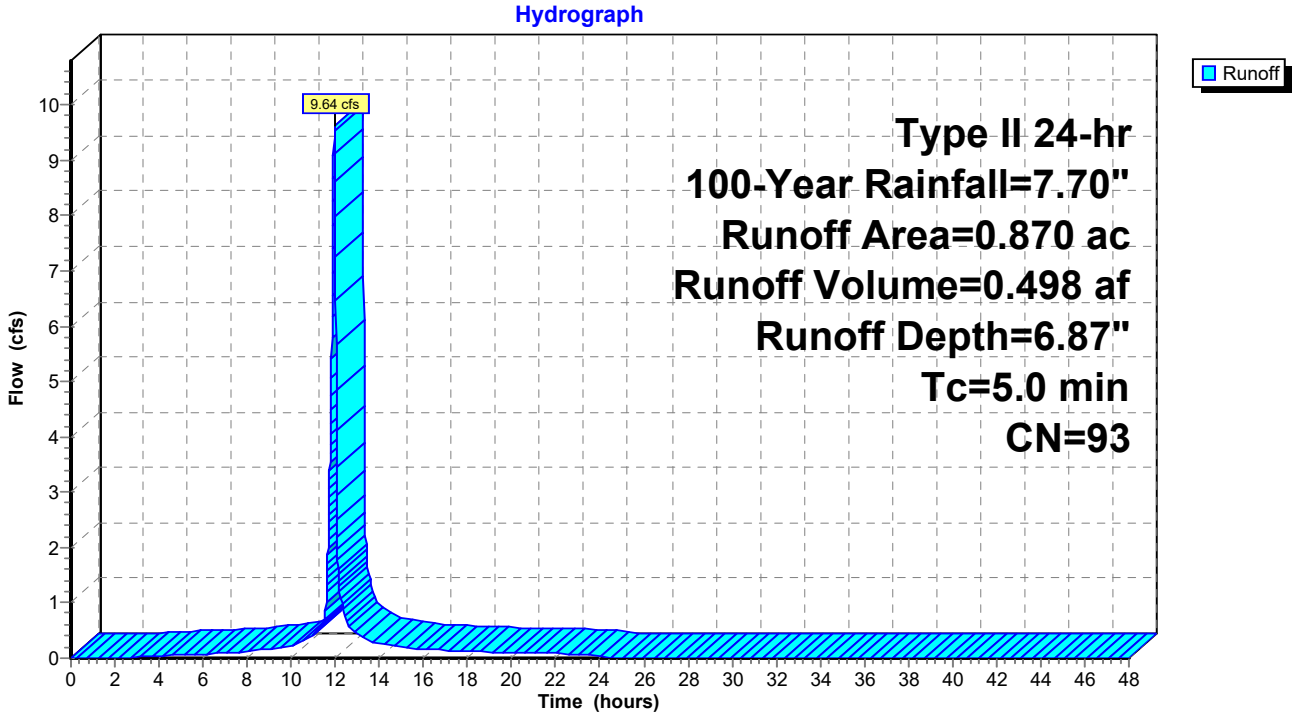
Runoff = 9.64 cfs @ 11.96 hrs, Volume= 0.498 af, Depth= 6.87"
Routed to Link NE : South

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.630	98	Paved parking, HSG D
0.240	80	>75% Grass cover, Good, HSG D
0.870	93	Weighted Average
0.240		27.59% Pervious Area
0.630		72.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					**Direct Entry,**

Subcatchment 1S: South (Bypass)



Hydrograph for Subcatchment 1S: South (Bypass)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.17	0.00	0.00
2.50	0.22	0.01	0.01
3.00	0.27	0.02	0.02
3.50	0.32	0.03	0.03
4.00	0.37	0.05	0.04
4.50	0.43	0.07	0.05
5.00	0.49	0.10	0.05
5.50	0.55	0.14	0.06
6.00	0.62	0.18	0.07
6.50	0.69	0.22	0.08
7.00	0.76	0.27	0.09
7.50	0.84	0.33	0.10
8.00	0.92	0.39	0.11
8.50	1.02	0.46	0.14
9.00	1.13	0.56	0.17
9.50	1.26	0.66	0.18
10.00	1.39	0.77	0.22
10.50	1.57	0.93	0.30
11.00	1.81	1.14	0.42
11.50	2.18	1.48	**0.70**
12.00	5.11	4.30	**7.98**
12.50	5.66	4.85	0.70
13.00	5.94	5.13	0.43
13.50	6.15	5.33	0.33
14.00	6.31	5.49	0.26
14.50	6.45	5.63	0.23
15.00	6.57	5.75	0.20
15.50	6.68	5.86	0.18
16.00	6.78	5.95	0.16
16.50	6.86	6.03	0.15
17.00	6.94	6.12	0.14
17.50	7.02	6.19	0.13
18.00	7.09	6.26	0.12
18.50	7.16	6.33	0.11
19.00	7.22	6.39	0.11
19.50	7.28	6.45	0.10
20.00	7.33	6.50	0.09
20.50	7.38	6.55	0.09
21.00	7.43	6.60	0.08
21.50	7.48	6.64	0.08
22.00	7.52	6.69	0.08
22.50	7.57	6.73	0.08
23.00	7.61	6.78	0.08
23.50	7.66	6.82	0.08
24.00	**7.70**	**6.87**	0.07
24.50	7.70	6.87	0.00
25.00	7.70	6.87	0.00
25.50	7.70	6.87	0.00
26.00	7.70	6.87	0.00
26.50	7.70	6.87	0.00
27.00	7.70	6.87	0.00
27.50	7.70	6.87	0.00
28.00	7.70	6.87	0.00
28.50	7.70	6.87	0.00
29.00	7.70	6.87	0.00
29.50	7.70	6.87	0.00
30.00	7.70	6.87	0.00
30.50	7.70	6.87	0.00
31.00	7.70	6.87	0.00
31.50	7.70	6.87	0.00
32.00	7.70	6.87	0.00
32.50	7.70	6.87	0.00
33.00	7.70	6.87	0.00
33.50	7.70	6.87	0.00
34.00	7.70	6.87	0.00
34.50	7.70	6.87	0.00
35.00	7.70	6.87	0.00
35.50	7.70	6.87	0.00
36.00	7.70	6.87	0.00
36.50	7.70	6.87	0.00
37.00	7.70	6.87	0.00
37.50	7.70	6.87	0.00
38.00	7.70	6.87	0.00
38.50	7.70	6.87	0.00
39.00	7.70	6.87	0.00
39.50	7.70	6.87	0.00
40.00	7.70	6.87	0.00
40.50	7.70	6.87	0.00
41.00	7.70	6.87	0.00
41.50	7.70	6.87	0.00
42.00	7.70	6.87	0.00
42.50	7.70	6.87	0.00
43.00	7.70	6.87	0.00
43.50	7.70	6.87	0.00
44.00	7.70	6.87	0.00
44.50	7.70	6.87	0.00
45.00	7.70	6.87	0.00
45.50	7.70	6.87	0.00
46.00	7.70	6.87	0.00
46.50	7.70	6.87	0.00
47.00	7.70	6.87	0.00
47.50	7.70	6.87	0.00
48.00	7.70	6.87	0.00

Summary for Subcatchment N-BYP: North

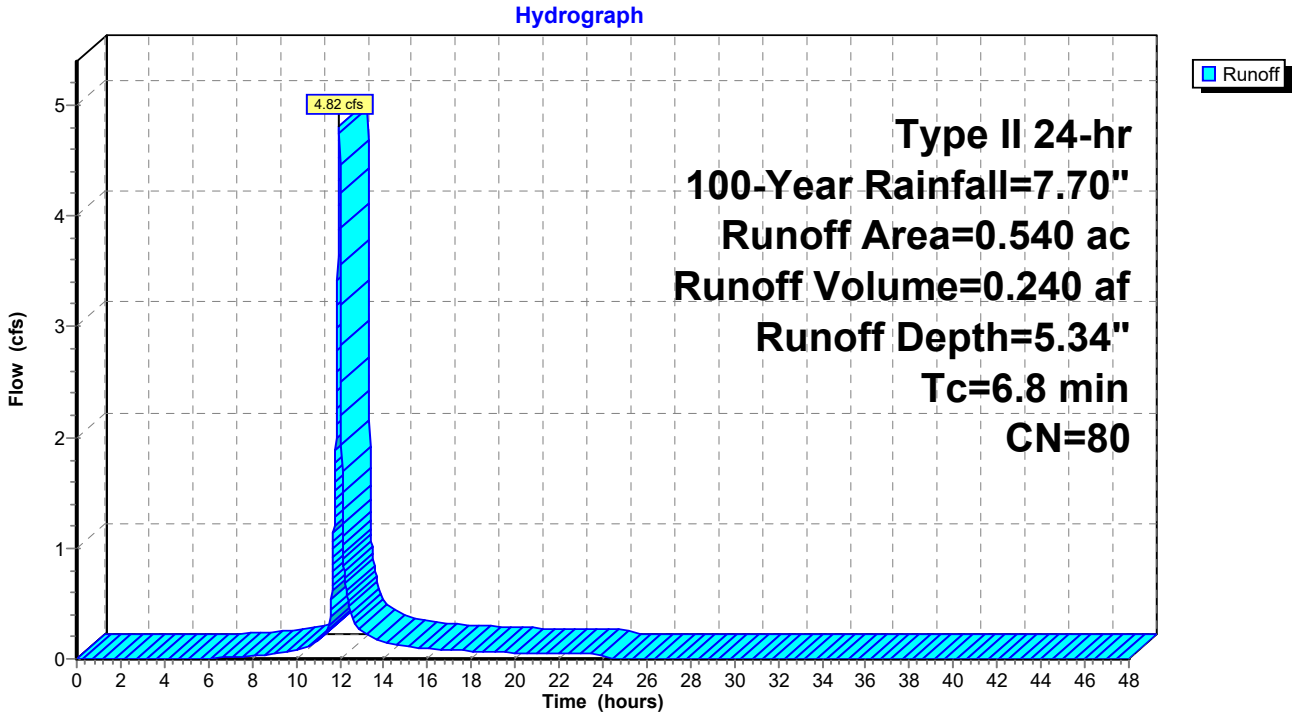
Runoff = 4.82 cfs @ 11.98 hrs, Volume= 0.240 af, Depth= 5.34"
Routed to Link E : North

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
0.540	80	>75% Grass cover, Good, HSG D
0.540		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.8					**Direct Entry,**

Subcatchment N-BYP: North



Hydrograph for Subcatchment N-BYP: North

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.17	0.00	0.00
2.50	0.22	0.00	0.00
3.00	0.27	0.00	0.00
3.50	0.32	0.00	0.00
4.00	0.37	0.00	0.00
4.50	0.43	0.00	0.00
5.00	0.49	0.00	0.00
5.50	0.55	0.00	0.00
6.00	0.62	0.01	0.01
6.50	0.69	0.01	0.01
7.00	0.76	0.02	0.01
7.50	0.84	0.04	0.02
8.00	0.92	0.06	0.02
8.50	1.02	0.09	0.03
9.00	1.13	0.13	0.05
9.50	1.26	0.18	0.05
10.00	1.39	0.24	0.07
10.50	1.57	0.32	0.10
11.00	1.81	0.45	0.16
11.50	2.18	0.67	**0.29**
12.00	5.11	2.98	**4.65**
12.50	5.66	3.48	0.41
13.00	5.94	3.73	0.25
13.50	6.15	3.92	0.19
14.00	6.31	4.07	0.15
14.50	6.45	4.19	0.13
15.00	6.57	4.30	0.12
15.50	6.68	4.40	0.10
16.00	6.78	4.49	0.09
16.50	6.86	4.57	0.08
17.00	6.94	4.64	0.08
17.50	7.02	4.71	0.08
18.00	7.09	4.78	0.07
18.50	7.16	4.84	0.07
19.00	7.22	4.90	0.06
19.50	7.28	4.95	0.06
20.00	7.33	5.00	0.05
20.50	7.38	5.05	0.05
21.00	7.43	5.09	0.05
21.50	7.48	5.14	0.05
22.00	7.52	5.18	0.05
22.50	7.57	5.22	0.05
23.00	7.61	5.26	0.05
23.50	7.66	5.30	0.04
24.00	**7.70**	**5.34**	0.04
24.50	7.70	5.34	0.00
25.00	7.70	5.34	0.00
25.50	7.70	5.34	0.00
26.00	7.70	5.34	0.00
26.50	7.70	5.34	0.00
27.00	7.70	5.34	0.00
27.50	7.70	5.34	0.00
28.00	7.70	5.34	0.00
28.50	7.70	5.34	0.00
29.00	7.70	5.34	0.00
29.50	7.70	5.34	0.00
30.00	7.70	5.34	0.00
30.50	7.70	5.34	0.00
31.00	7.70	5.34	0.00
31.50	7.70	5.34	0.00
32.00	7.70	5.34	0.00
32.50	7.70	5.34	0.00
33.00	7.70	5.34	0.00
33.50	7.70	5.34	0.00
34.00	7.70	5.34	0.00
34.50	7.70	5.34	0.00
35.00	7.70	5.34	0.00
35.50	7.70	5.34	0.00
36.00	7.70	5.34	0.00
36.50	7.70	5.34	0.00
37.00	7.70	5.34	0.00
37.50	7.70	5.34	0.00
38.00	7.70	5.34	0.00
38.50	7.70	5.34	0.00
39.00	7.70	5.34	0.00
39.50	7.70	5.34	0.00
40.00	7.70	5.34	0.00
40.50	7.70	5.34	0.00
41.00	7.70	5.34	0.00
41.50	7.70	5.34	0.00
42.00	7.70	5.34	0.00
42.50	7.70	5.34	0.00
43.00	7.70	5.34	0.00
43.50	7.70	5.34	0.00
44.00	7.70	5.34	0.00
44.50	7.70	5.34	0.00
45.00	7.70	5.34	0.00
45.50	7.70	5.34	0.00
46.00	7.70	5.34	0.00
46.50	7.70	5.34	0.00
47.00	7.70	5.34	0.00
47.50	7.70	5.34	0.00
48.00	7.70	5.34	0.00

Summary for Subcatchment WC: South (Detained)

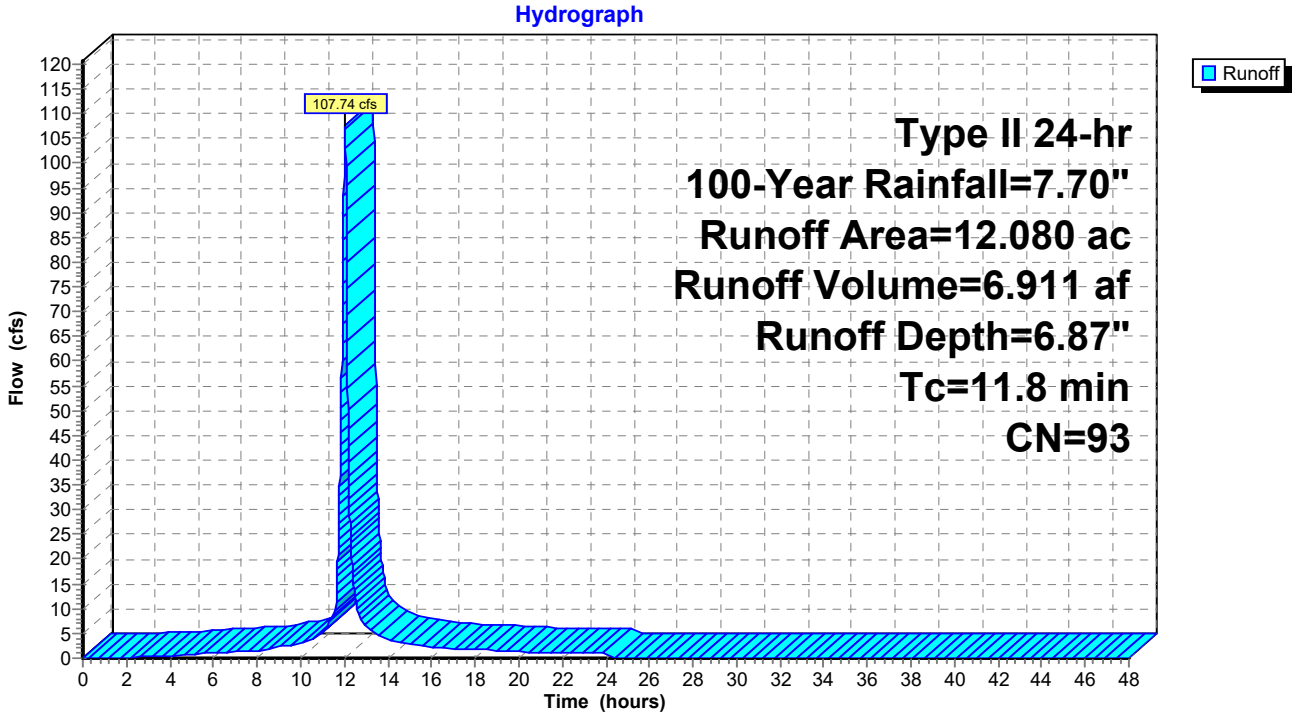
Runoff = 107.74 cfs @ 12.03 hrs, Volume= 6.911 af, Depth= 6.87"
Routed to Pond DET : South Basin

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Type II 24-hr 100-Year Rainfall=7.70"

Area (ac)	CN	Description
8.700	98	Paved parking, HSG D
3.380	80	>75% Grass cover, Good, HSG D
12.080	93	Weighted Average
3.380		27.98% Pervious Area
8.700		72.02% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.8					**Direct Entry,**

Subcatchment WC: South (Detained)



Hydrograph for Subcatchment WC: South (Detained)

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.50	0.04	0.00	0.00
1.00	0.08	0.00	0.00
1.50	0.12	0.00	0.00
2.00	0.17	0.00	0.01
2.50	0.22	0.01	0.14
3.00	0.27	0.02	0.26
3.50	0.32	0.03	0.38
4.00	0.37	0.05	0.49
4.50	0.43	0.07	0.61
5.00	0.49	0.10	0.73
5.50	0.55	0.14	0.86
6.00	0.62	0.18	1.00
6.50	0.69	0.22	1.13
7.00	0.76	0.27	1.26
7.50	0.84	0.33	1.39
8.00	0.92	0.39	1.51
8.50	1.02	0.46	1.83
9.00	1.13	0.56	2.27
9.50	1.26	0.66	2.48
10.00	1.39	0.77	2.96
10.50	1.57	0.93	3.90
11.00	1.81	1.14	5.43
11.50	2.18	1.48	8.83
12.00	5.11	4.30	**103.94**
12.50	5.66	4.85	**12.32**
13.00	5.94	5.13	6.53
13.50	6.15	5.33	4.82
14.00	6.31	5.49	3.77
14.50	6.45	5.63	3.22
15.00	6.57	5.75	2.90
15.50	6.68	5.86	2.58
16.00	6.78	5.95	2.25
16.50	6.86	6.03	2.06
17.00	6.94	6.12	1.95
17.50	7.02	6.19	1.83
18.00	7.09	6.26	1.72
18.50	7.16	6.33	1.60
19.00	7.22	6.39	1.48
19.50	7.28	6.45	1.37
20.00	7.33	6.50	1.25
20.50	7.38	6.55	1.19
21.00	7.43	6.60	1.17
21.50	7.48	6.64	1.15
22.00	7.52	6.69	1.12
22.50	7.57	6.73	1.10
23.00	7.61	6.78	1.08
23.50	7.66	6.82	1.05
24.00	**7.70**	**6.87**	1.03
24.50	7.70	6.87	0.01
25.00	7.70	6.87	0.00
25.50	7.70	6.87	0.00
26.00	7.70	6.87	0.00
26.50	7.70	6.87	0.00
27.00	7.70	6.87	0.00
27.50	7.70	6.87	0.00
28.00	7.70	6.87	0.00
28.50	7.70	6.87	0.00
29.00	7.70	6.87	0.00
29.50	7.70	6.87	0.00
30.00	7.70	6.87	0.00
30.50	7.70	6.87	0.00
31.00	7.70	6.87	0.00
31.50	7.70	6.87	0.00
32.00	7.70	6.87	0.00
32.50	7.70	6.87	0.00
33.00	7.70	6.87	0.00
33.50	7.70	6.87	0.00
34.00	7.70	6.87	0.00
34.50	7.70	6.87	0.00
35.00	7.70	6.87	0.00
35.50	7.70	6.87	0.00
36.00	7.70	6.87	0.00
36.50	7.70	6.87	0.00
37.00	7.70	6.87	0.00
37.50	7.70	6.87	0.00
38.00	7.70	6.87	0.00
38.50	7.70	6.87	0.00
39.00	7.70	6.87	0.00
39.50	7.70	6.87	0.00
40.00	7.70	6.87	0.00
40.50	7.70	6.87	0.00
41.00	7.70	6.87	0.00
41.50	7.70	6.87	0.00
42.00	7.70	6.87	0.00
42.50	7.70	6.87	0.00
43.00	7.70	6.87	0.00
43.50	7.70	6.87	0.00
44.00	7.70	6.87	0.00
44.50	7.70	6.87	0.00
45.00	7.70	6.87	0.00
45.50	7.70	6.87	0.00
46.00	7.70	6.87	0.00
46.50	7.70	6.87	0.00
47.00	7.70	6.87	0.00
47.50	7.70	6.87	0.00
48.00	7.70	6.87	0.00

Summary for Pond DET: South Basin

Inflow Area = 12.080 ac, 72.02% Impervious, Inflow Depth = 6.87" for 100-Year event
Inflow = 107.74 cfs @ 12.03 hrs, Volume= 6.911 af
Outflow = 22.46 cfs @ 12.30 hrs, Volume= 6.655 af, Atten= 79%, Lag= 16.2 min
Primary = 22.46 cfs @ 12.30 hrs, Volume= 6.655 af
Routed to Link NE : South

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 1,008.20' @ 12.30 hrs Surf.Area= 19,371 sf Storage= 153,878 cf

Plug-Flow detention time= 392.1 min calculated for 6.653 af (96% of inflow)
Center-of-Mass det. time= 369.5 min (1,137.5 - 768.0)

Volume	Invert	Avail.Storage	Storage Description
#1	1,000.00'	112,664 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)
#2	1,000.00'	47,127 cf	**ADS_StormTech MC-4500 b +Cap @ 6.95' L** x 252 Effective Size= 90.4"W x 60.0"H => 26.46 sf x 6.95'L = 183.9 cf Overall Size= 100.0"W x 60.0"H x 4.33'L with 0.31' Overlap 252 Chambers in 10 Rows Cap Storage= 39.5 cf x 2 x 10 rows = 790.0 cf
		159,791 cf	Total Available Storage

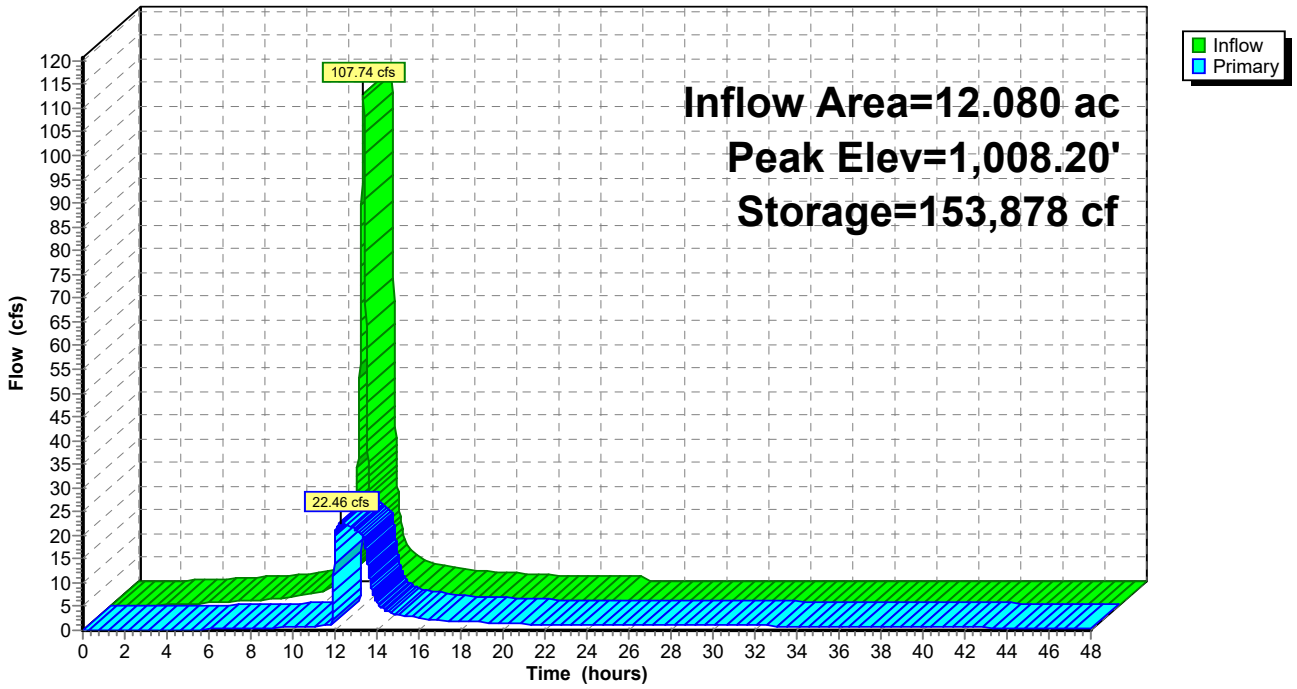
Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
1,000.00	7,597	0	0
1,001.00	8,758	8,178	8,178
1,002.00	9,996	9,377	17,555
1,003.00	11,311	10,654	28,208
1,004.00	12,694	12,003	40,211
1,005.00	14,135	13,415	53,625
1,006.00	15,633	14,884	68,509
1,007.00	17,189	16,411	84,920
1,008.00	18,802	17,996	102,916
1,008.50	20,191	9,748	112,664

Device	Routing	Invert	Outlet Devices
#1	Primary	996.00'	**16.0" Round Culvert** L= 90.0' Ke= 0.500 Inlet / Outlet Invert= 996.00' / 993.10' S= 0.0322 '/' Cc= 0.900 n= 0.013, Flow Area= 1.40 sf
#2	Device 1	1,000.00'	**5.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	1,003.85'	**60.0" W x 9.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=22.46 cfs @ 12.30 hrs HW=1,008.20' (Free Discharge)
└**1=Culvert** (Barrel Controls 22.46 cfs @ 16.09 fps)
└**2=Orifice/Grate** (Passes < 1.86 cfs potential flow)
└**3=Orifice/Grate** (Passes < 35.99 cfs potential flow)

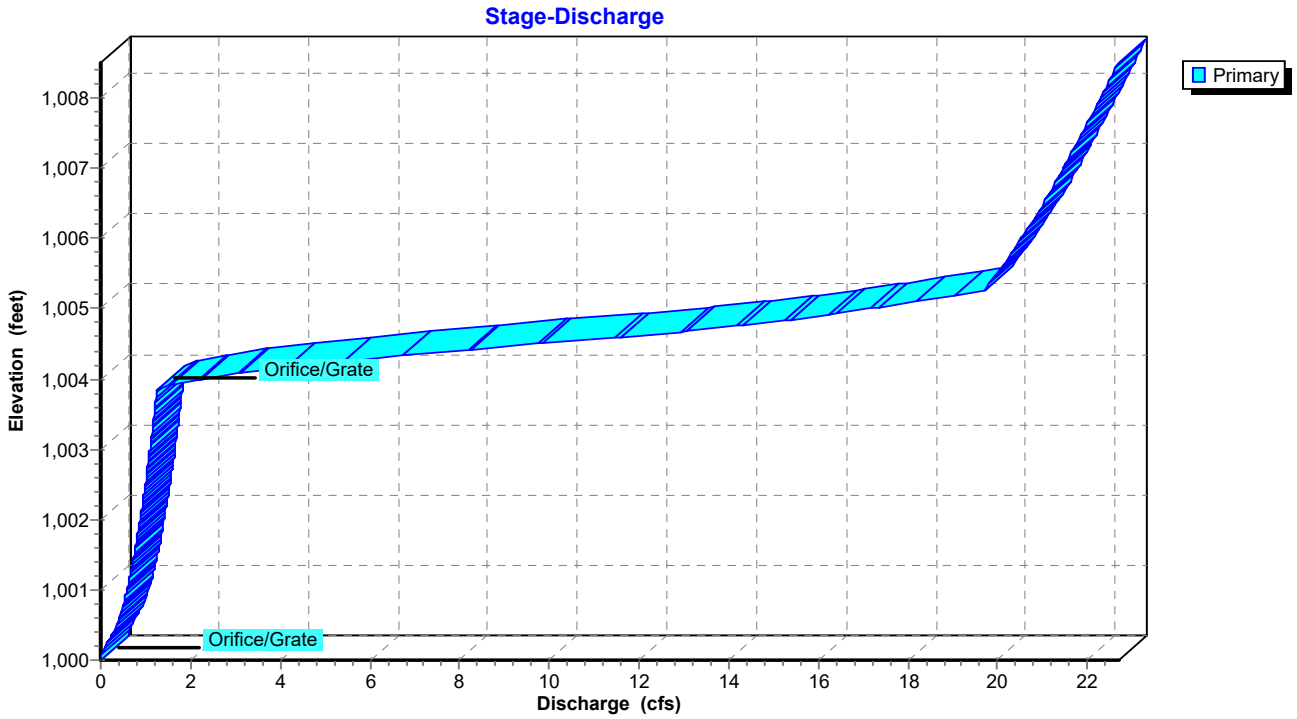
Pond DET: South Basin

Hydrograph

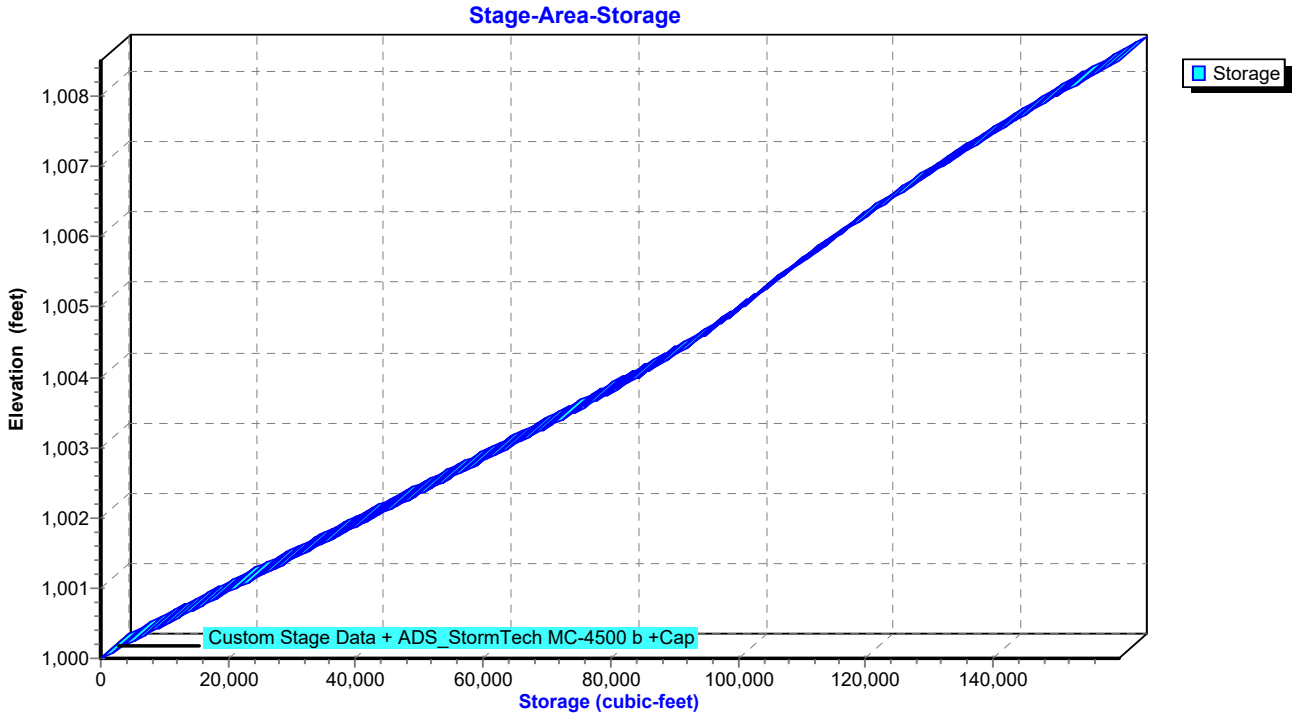


Pond DET: South Basin

Stage-Discharge



Pond DET: South Basin



Hydrograph for Pond DET: South Basin

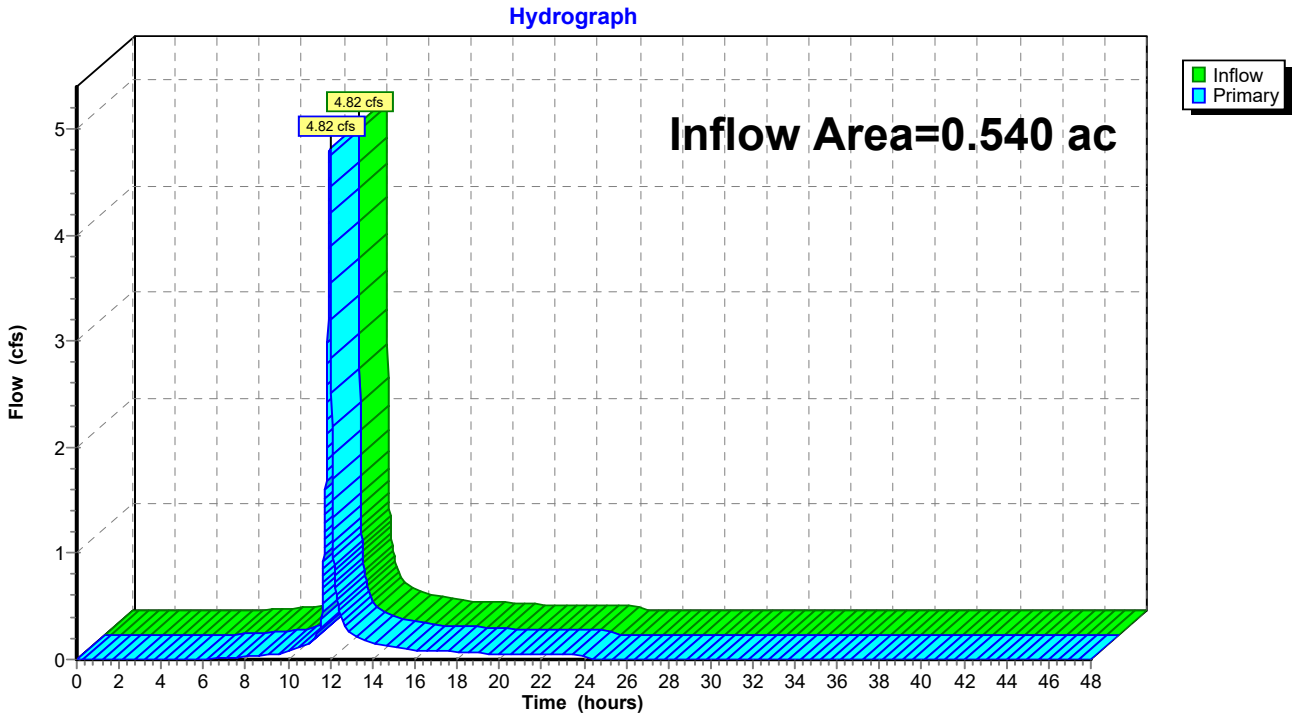
Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	1,000.00	0.00
1.00	0.00	0	1,000.00	0.00
2.00	0.01	2	1,000.00	0.00
3.00	0.26	482	1,000.02	0.01
4.00	0.49	1,788	1,000.08	0.02
5.00	0.73	3,799	1,000.18	0.08
6.00	1.00	6,416	1,000.30	0.20
7.00	1.26	9,523	1,000.45	0.32
8.00	1.51	13,174	1,000.62	0.42
9.00	2.27	18,115	1,000.85	0.53
10.00	2.96	25,129	1,001.18	0.65
11.00	5.43	36,895	1,001.72	0.81
12.00	**103.94**	**108,541**	**1,005.54**	**20.02**
13.00	**6.53**	**125,469**	**1,006.61**	**21.13**
14.00	3.77	89,643	1,004.29	6.01
15.00	2.90	86,183	1,004.10	3.31
16.00	2.25	84,948	1,004.03	2.58
17.00	1.95	84,089	1,003.99	2.12
18.00	1.72	83,498	1,003.96	1.87
19.00	1.48	82,932	1,003.93	1.64
20.00	1.25	82,332	1,003.90	1.45
21.00	1.17	81,686	1,003.86	1.31
22.00	1.12	81,242	1,003.84	1.25
23.00	1.08	80,709	1,003.81	1.25
24.00	1.03	80,029	1,003.78	1.24
25.00	0.00	76,289	1,003.59	1.21
26.00	0.00	72,010	1,003.38	1.17
27.00	0.00	67,869	1,003.18	1.13
28.00	0.00	63,862	1,002.99	1.09
29.00	0.00	59,989	1,002.80	1.06
30.00	0.00	56,249	1,002.63	1.02
31.00	0.00	52,639	1,002.46	0.98
32.00	0.00	49,161	1,002.29	0.95
33.00	0.00	45,813	1,002.14	0.91
34.00	0.00	42,595	1,001.99	0.88
35.00	0.00	39,506	1,001.84	0.84
36.00	0.00	36,548	1,001.71	0.80
37.00	0.00	33,718	1,001.58	0.77
38.00	0.00	31,018	1,001.45	0.73
39.00	0.00	28,448	1,001.33	0.70
40.00	0.00	26,007	1,001.22	0.66
41.00	0.00	23,696	1,001.11	0.62
42.00	0.00	21,515	1,001.01	0.59
43.00	0.00	19,463	1,000.91	0.55
44.00	0.00	17,542	1,000.83	0.52
45.00	0.00	15,751	1,000.74	0.48
46.00	0.00	14,091	1,000.66	0.44
47.00	0.00	12,561	1,000.59	0.41
48.00	0.00	11,163	1,000.53	0.37

Summary for Link E: North

Inflow Area = 0.540 ac, 0.00% Impervious, Inflow Depth = 5.34" for 100-Year event
Inflow = 4.82 cfs @ 11.98 hrs, Volume= 0.240 af
Primary = 4.82 cfs @ 11.98 hrs, Volume= 0.240 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link E: North



Hydrograph for Link E: North

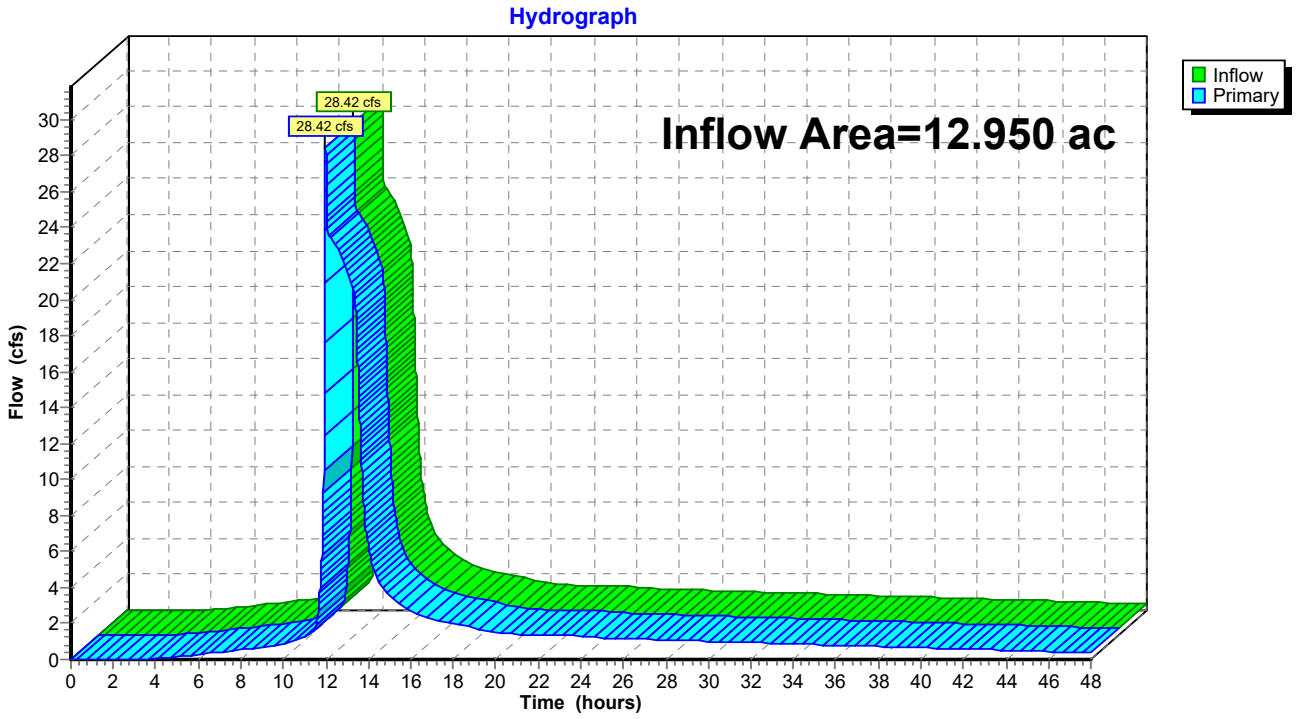
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	0.00	0.00	0.00
0.50	0.00	0.00	0.00	26.50	0.00	0.00	0.00
1.00	0.00	0.00	0.00	27.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00	27.50	0.00	0.00	0.00
2.00	0.00	0.00	0.00	28.00	0.00	0.00	0.00
2.50	0.00	0.00	0.00	28.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00	29.00	0.00	0.00	0.00
3.50	0.00	0.00	0.00	29.50	0.00	0.00	0.00
4.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
4.50	0.00	0.00	0.00	30.50	0.00	0.00	0.00
5.00	0.00	0.00	0.00	31.00	0.00	0.00	0.00
5.50	0.00	0.00	0.00	31.50	0.00	0.00	0.00
6.00	0.01	0.00	0.01	32.00	0.00	0.00	0.00
6.50	0.01	0.00	0.01	32.50	0.00	0.00	0.00
7.00	0.01	0.00	0.01	33.00	0.00	0.00	0.00
7.50	0.02	0.00	0.02	33.50	0.00	0.00	0.00
8.00	0.02	0.00	0.02	34.00	0.00	0.00	0.00
8.50	0.03	0.00	0.03	34.50	0.00	0.00	0.00
9.00	0.05	0.00	0.05	35.00	0.00	0.00	0.00
9.50	0.05	0.00	0.05	35.50	0.00	0.00	0.00
10.00	0.07	0.00	0.07	36.00	0.00	0.00	0.00
10.50	0.10	0.00	0.10	36.50	0.00	0.00	0.00
11.00	0.16	0.00	0.16	37.00	0.00	0.00	0.00
11.50	**0.29**	0.00	**0.29**	37.50	0.00	0.00	0.00
12.00	**4.65**	0.00	**4.65**	38.00	0.00	0.00	0.00
12.50	0.41	0.00	0.41	38.50	0.00	0.00	0.00
13.00	0.25	0.00	0.25	39.00	0.00	0.00	0.00
13.50	0.19	0.00	0.19	39.50	0.00	0.00	0.00
14.00	0.15	0.00	0.15	40.00	0.00	0.00	0.00
14.50	0.13	0.00	0.13	40.50	0.00	0.00	0.00
15.00	0.12	0.00	0.12	41.00	0.00	0.00	0.00
15.50	0.10	0.00	0.10	41.50	0.00	0.00	0.00
16.00	0.09	0.00	0.09	42.00	0.00	0.00	0.00
16.50	0.08	0.00	0.08	42.50	0.00	0.00	0.00
17.00	0.08	0.00	0.08	43.00	0.00	0.00	0.00
17.50	0.08	0.00	0.08	43.50	0.00	0.00	0.00
18.00	0.07	0.00	0.07	44.00	0.00	0.00	0.00
18.50	0.07	0.00	0.07	44.50	0.00	0.00	0.00
19.00	0.06	0.00	0.06	45.00	0.00	0.00	0.00
19.50	0.06	0.00	0.06	45.50	0.00	0.00	0.00
20.00	0.05	0.00	0.05	46.00	0.00	0.00	0.00
20.50	0.05	0.00	0.05	46.50	0.00	0.00	0.00
21.00	0.05	0.00	0.05	47.00	0.00	0.00	0.00
21.50	0.05	0.00	0.05	47.50	0.00	0.00	0.00
22.00	0.05	0.00	0.05	48.00	0.00	0.00	0.00
22.50	0.05	0.00	0.05				
23.00	0.05	0.00	0.05				
23.50	0.04	0.00	0.04				
24.00	0.04	0.00	0.04				
24.50	0.00	0.00	0.00				
25.00	0.00	0.00	0.00				
25.50	0.00	0.00	0.00				

Summary for Link NE: South

Inflow Area = 12.950 ac, 72.05% Impervious, Inflow Depth > 6.63" for 100-Year event
Inflow = 28.42 cfs @ 11.99 hrs, Volume= 7.152 af
Primary = 28.42 cfs @ 11.99 hrs, Volume= 7.152 af, Atten= 0%, Lag= 0.0 min
Routed to Link TOT : Total Site Watershed

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link NE: South



Hydrograph for Link NE: South

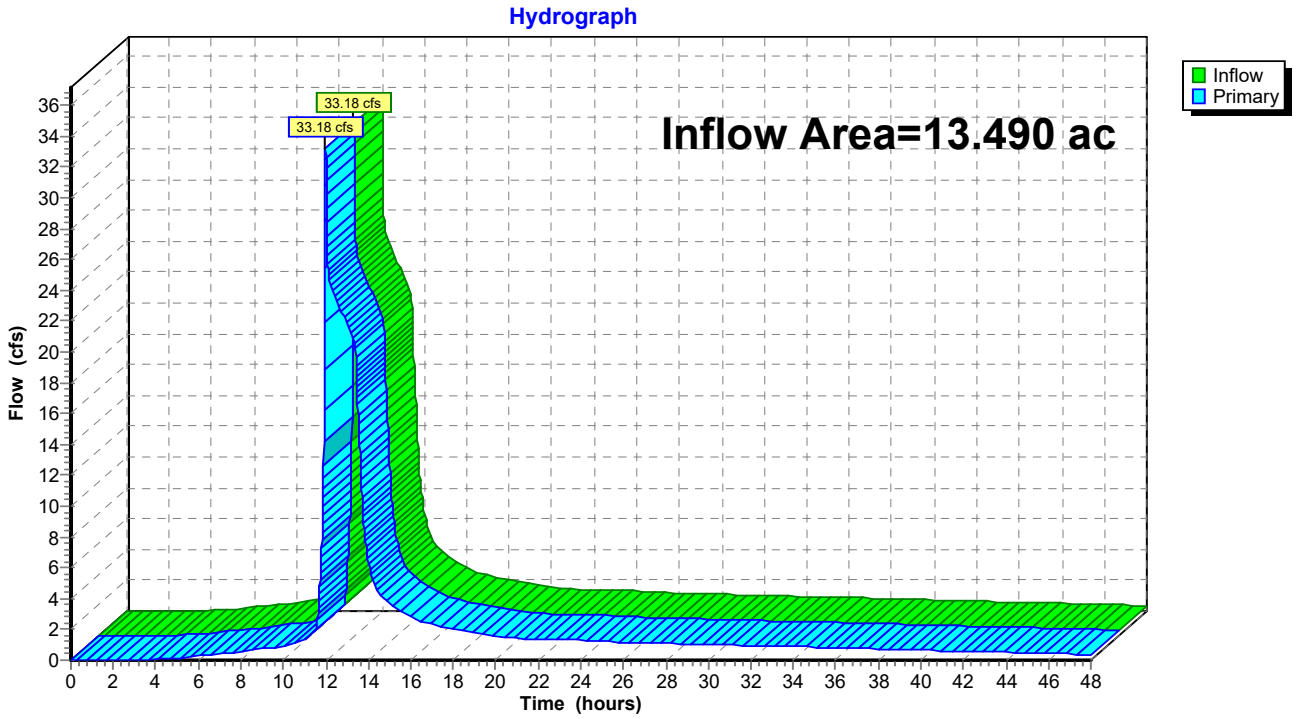
Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.17	0.00	1.17
0.50	0.00	0.00	0.00	26.50	1.15	0.00	1.15
1.00	0.00	0.00	0.00	27.00	1.13	0.00	1.13
1.50	0.00	0.00	0.00	27.50	1.11	0.00	1.11
2.00	0.00	0.00	0.00	28.00	1.09	0.00	1.09
2.50	0.01	0.00	0.01	28.50	1.08	0.00	1.08
3.00	0.03	0.00	0.03	29.00	1.06	0.00	1.06
3.50	0.04	0.00	0.04	29.50	1.04	0.00	1.04
4.00	0.06	0.00	0.06	30.00	1.02	0.00	1.02
4.50	0.09	0.00	0.09	30.50	1.00	0.00	1.00
5.00	0.14	0.00	0.14	31.00	0.98	0.00	0.98
5.50	0.20	0.00	0.20	31.50	0.97	0.00	0.97
6.00	0.27	0.00	0.27	32.00	0.95	0.00	0.95
6.50	0.35	0.00	0.35	32.50	0.93	0.00	0.93
7.00	0.41	0.00	0.41	33.00	0.91	0.00	0.91
7.50	0.48	0.00	0.48	33.50	0.89	0.00	0.89
8.00	0.53	0.00	0.53	34.00	0.88	0.00	0.88
8.50	0.61	0.00	0.61	34.50	0.86	0.00	0.86
9.00	0.70	0.00	0.70	35.00	0.84	0.00	0.84
9.50	0.77	0.00	0.77	35.50	0.82	0.00	0.82
10.00	0.87	0.00	0.87	36.00	0.80	0.00	0.80
10.50	1.01	0.00	1.01	36.50	0.79	0.00	0.79
11.00	1.23	0.00	1.23	37.00	0.77	0.00	0.77
11.50	**1.63**	0.00	**1.63**	37.50	0.75	0.00	0.75
12.00	**28.00**	0.00	**28.00**	38.00	0.73	0.00	0.73
12.50	22.97	0.00	22.97	38.50	0.71	0.00	0.71
13.00	21.56	0.00	21.56	39.00	0.70	0.00	0.70
13.50	16.58	0.00	16.58	39.50	0.68	0.00	0.68
14.00	6.26	0.00	6.26	40.00	0.66	0.00	0.66
14.50	4.23	0.00	4.23	40.50	0.64	0.00	0.64
15.00	3.52	0.00	3.52	41.00	0.62	0.00	0.62
15.50	3.09	0.00	3.09	41.50	0.61	0.00	0.61
16.00	2.74	0.00	2.74	42.00	0.59	0.00	0.59
16.50	2.43	0.00	2.43	42.50	0.57	0.00	0.57
17.00	2.26	0.00	2.26	43.00	0.55	0.00	0.55
17.50	2.12	0.00	2.12	43.50	0.53	0.00	0.53
18.00	2.00	0.00	2.00	44.00	0.52	0.00	0.52
18.50	1.87	0.00	1.87	44.50	0.50	0.00	0.50
19.00	1.74	0.00	1.74	45.00	0.48	0.00	0.48
19.50	1.62	0.00	1.62	45.50	0.46	0.00	0.46
20.00	1.54	0.00	1.54	46.00	0.44	0.00	0.44
20.50	1.46	0.00	1.46	46.50	0.42	0.00	0.42
21.00	1.40	0.00	1.40	47.00	0.41	0.00	0.41
21.50	1.35	0.00	1.35	47.50	0.39	0.00	0.39
22.00	1.33	0.00	1.33	48.00	0.37	0.00	0.37
22.50	1.33	0.00	1.33				
23.00	1.32	0.00	1.32				
23.50	1.32	0.00	1.32				
24.00	1.31	0.00	1.31				
24.50	1.23	0.00	1.23				
25.00	1.21	0.00	1.21				
25.50	1.19	0.00	1.19				

Summary for Link TOT: Total Site Watershed

Inflow Area = 13.490 ac, 69.16% Impervious, Inflow Depth > 6.58" for 100-Year event
Inflow = 33.18 cfs @ 11.99 hrs, Volume= 7.393 af
Primary = 33.18 cfs @ 11.99 hrs, Volume= 7.393 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs

Link TOT: Total Site Watershed



Hydrograph for Link TOT: Total Site Watershed

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	26.00	1.17	0.00	1.17
0.50	0.00	0.00	0.00	26.50	1.15	0.00	1.15
1.00	0.00	0.00	0.00	27.00	1.13	0.00	1.13
1.50	0.00	0.00	0.00	27.50	1.11	0.00	1.11
2.00	0.00	0.00	0.00	28.00	1.09	0.00	1.09
2.50	0.01	0.00	0.01	28.50	1.08	0.00	1.08
3.00	0.03	0.00	0.03	29.00	1.06	0.00	1.06
3.50	0.04	0.00	0.04	29.50	1.04	0.00	1.04
4.00	0.06	0.00	0.06	30.00	1.02	0.00	1.02
4.50	0.09	0.00	0.09	30.50	1.00	0.00	1.00
5.00	0.14	0.00	0.14	31.00	0.98	0.00	0.98
5.50	0.20	0.00	0.20	31.50	0.97	0.00	0.97
6.00	0.28	0.00	0.28	32.00	0.95	0.00	0.95
6.50	0.36	0.00	0.36	32.50	0.93	0.00	0.93
7.00	0.43	0.00	0.43	33.00	0.91	0.00	0.91
7.50	0.49	0.00	0.49	33.50	0.89	0.00	0.89
8.00	0.56	0.00	0.56	34.00	0.88	0.00	0.88
8.50	0.64	0.00	0.64	34.50	0.86	0.00	0.86
9.00	0.74	0.00	0.74	35.00	0.84	0.00	0.84
9.50	0.82	0.00	0.82	35.50	0.82	0.00	0.82
10.00	0.94	0.00	0.94	36.00	0.80	0.00	0.80
10.50	1.12	0.00	1.12	36.50	0.79	0.00	0.79
11.00	1.38	0.00	1.38	37.00	0.77	0.00	0.77
11.50	**1.92**	0.00	**1.92**	37.50	0.75	0.00	0.75
12.00	**32.65**	0.00	**32.65**	38.00	0.73	0.00	0.73
12.50	23.38	0.00	23.38	38.50	0.71	0.00	0.71
13.00	21.81	0.00	21.81	39.00	0.70	0.00	0.70
13.50	16.77	0.00	16.77	39.50	0.68	0.00	0.68
14.00	6.41	0.00	6.41	40.00	0.66	0.00	0.66
14.50	4.36	0.00	4.36	40.50	0.64	0.00	0.64
15.00	3.64	0.00	3.64	41.00	0.62	0.00	0.62
15.50	3.20	0.00	3.20	41.50	0.61	0.00	0.61
16.00	2.83	0.00	2.83	42.00	0.59	0.00	0.59
16.50	2.52	0.00	2.52	42.50	0.57	0.00	0.57
17.00	2.34	0.00	2.34	43.00	0.55	0.00	0.55
17.50	2.20	0.00	2.20	43.50	0.53	0.00	0.53
18.00	2.07	0.00	2.07	44.00	0.52	0.00	0.52
18.50	1.93	0.00	1.93	44.50	0.50	0.00	0.50
19.00	1.81	0.00	1.81	45.00	0.48	0.00	0.48
19.50	1.68	0.00	1.68	45.50	0.46	0.00	0.46
20.00	1.59	0.00	1.59	46.00	0.44	0.00	0.44
20.50	1.51	0.00	1.51	46.50	0.42	0.00	0.42
21.00	1.45	0.00	1.45	47.00	0.41	0.00	0.41
21.50	1.39	0.00	1.39	47.50	0.39	0.00	0.39
22.00	1.38	0.00	1.38	48.00	0.37	0.00	0.37
22.50	1.37	0.00	1.37				
23.00	1.37	0.00	1.37				
23.50	1.36	0.00	1.36				
24.00	1.36	0.00	1.36				
24.50	1.23	0.00	1.23				
25.00	1.21	0.00	1.21				
25.50	1.19	0.00	1.19				

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13 Pond DET: South Basin
17 Link E: North
19 Link NE: South
21 Link TOT: Total Site Watershed

10-Year Event
23 Node Listing
24 Subcat 1S: South (Bypass)
26 Subcat N-BYP: North
28 Subcat WC: South (Detained)
30 Pond DET: South Basin
34 Link E: North
36 Link NE: South
38 Link TOT: Total Site Watershed

100-Year Event
40 Node Listing
41 Subcat 1S: South (Bypass)
43 Subcat N-BYP: North
45 Subcat WC: South (Detained)
47 Pond DET: South Basin
51 Link E: North
53 Link NE: South
55 Link TOT: Total Site Watershed

Appendix E

WORKSHEET 1: REQUIRED LEVEL OF SERVICE - UNDEVELOPED SITE

Project:	**Lee's Summit Apartments**	**By:**	**KAD**	**Date:**	**6/20/2022**
Location:	**Lee's Summit, MO**	**Checked:**	**DEU**	**Date:**	**6/20/2022**

1. Runoff Curve Number

A. Predevelopment CN

Cover Description	Soil HSG	CN	Area (ac.)	Product of CN x Area
Grassland (Fair)	D	84	2.92	245.28
Grassland (Fair)	C	79	3.51	277.29
Wood/Grassland (Good)	D	79	0.31	24.49
Wood/Grassland (Good)	C	72	6.29	452.88
		Totals:	13.03	999.94

Area-Weighted CN = total product/total area = 77 (Round)

B. Postdevelopment CN

Cover Description	Soil HSG[1]	CN	Area (ac.)	Product of CN x Area
Impervious Area	D	98	9.37	918.26
Open Space	D	80	3.66	292.8
		Totals:	13.03	1211.06

[1] Postdevelopment CN is one HSG higher for all cover types except preserved vegetation, absent documentation showing how postdevelopment soil structure will be preserved.

Area-Weighted CN = total product/total area = 93 (Round)

C. Level of Service (LOS) Calculation

Predevelopment CN:	77
Postdevelopment CN:	93
Difference:	16
LOS Required:	7
Total Value Rating (VR):	91.21

WORKSHEET 2: DEVELOP MITGATION PACKAGE(S) THAT MEETS REQUIRED LOS

Project:	**Lee's Summit Apartments**	**By:**	**KAD**	**Date:**	**6/20/2022**
Location:	**Lee's Summit, MO**	**Checked:**	**DEU**	**Date:**	**6/20/2022**
Sheet:	**1 of 1**				

1. Required LOS (from Table 1 or 1A or Worksheet 1 or 1A, as appropriate): **7**

Note: Various BMPs may alter CN of proposed development, and LS; recalculate both if applicable.

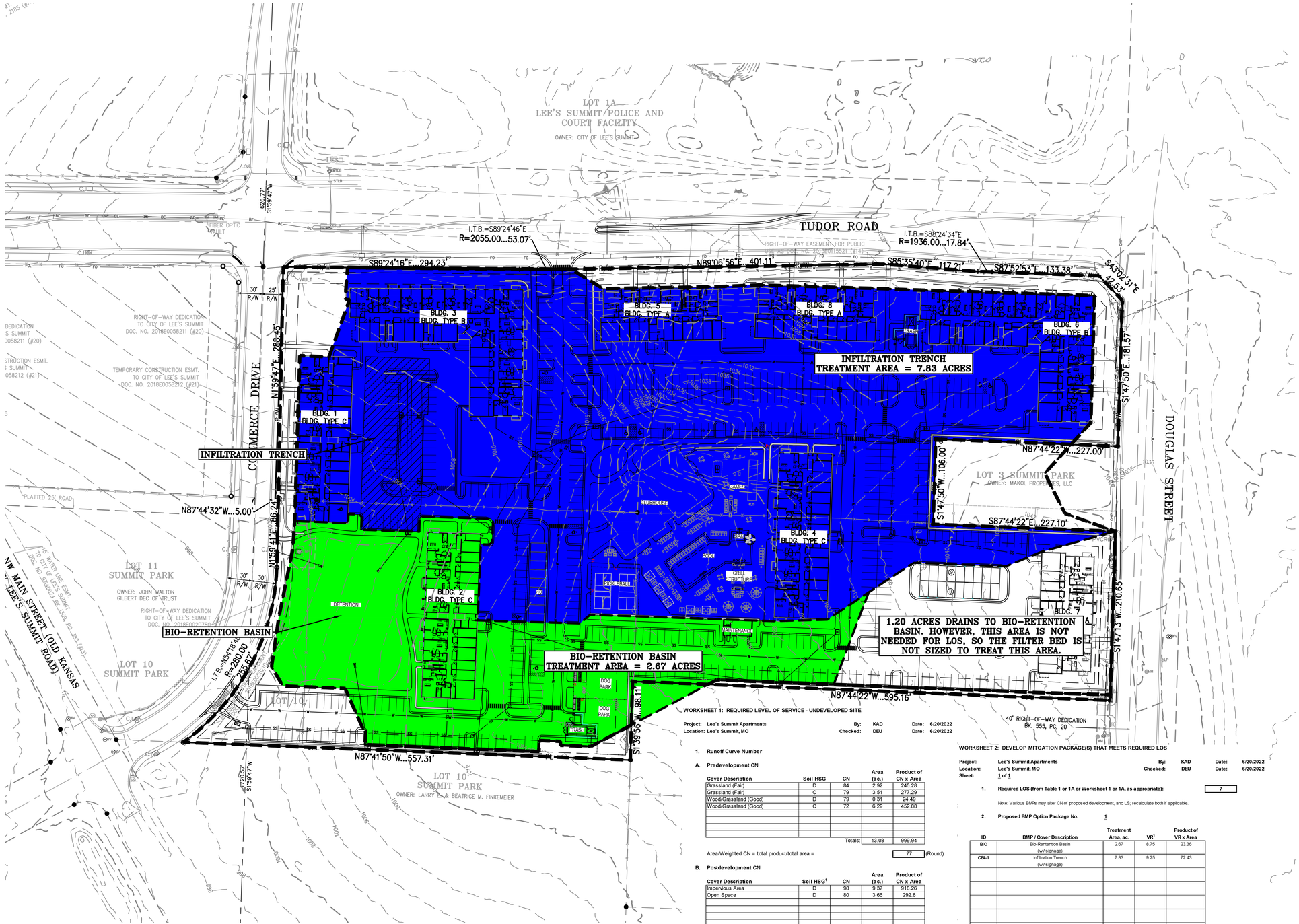
2. Proposed BMP Option Package No. **1**

ID	BMP / Cover Description	Treatment Area, ac.	VR[1]	Product of VR x Area
BIO	Bio-Rentention Basin (w/ signage)	2.67	8.75	23.36
CBI-1	Infiltration Trench (w/ signage)	7.83	9.25	72.43
Total[2]:		10.5	**Total VR:**	95.79
			Proposed LOS:	**7.35** = total product/total area

[1] VR calculated for final BMP only in Treatment Train.

[2] Total treatment area cannot exceed 100 percent of the actual site area.

2) Meets required LOS (Yes/No)? **Yes** (If No, or if additional options are being tested, move to next sheet.)



WORKSHEET 1: REQUIRED LEVEL OF SERVICE - UNDEVELOPED SITE

Project: Lee's Summit Apartments — **By:** KAD — **Date:** 6/20/2022
Location: Lee's Summit, MO — **Checked:** DEU — **Date:** 6/20/2022

1. **Runoff Curve Number**

A. **Predevelopment CN**

Cover Description	Soil HSG	CN	Area (ac.)	Product of CN x Area
Grassland (Fair)	D	84	2.92	245.28
Grassland (Fair)	C	79	3.51	277.29
Wood/Grassland (Good)	D	79	0.31	24.49
Wood/Grassland (Good)	C	72	6.29	452.88
Totals:			13.03	999.94

Area-Weighted CN = total product/total area = 77 (Round)

B. **Postdevelopment CN**

Cover Description	Soil HSG[1]	CN	Area (ac.)	Product of CN x Area
Impervious Area	D	98	9.37	918.26
Open Space	D	80	3.66	292.8
Totals:			13.03	1211.06

[1] Postdevelopment CN is one HSG higher for all cover types except preserved vegetation, absent documentation showing how postdevelopment soil structure will be preserved.

Area-Weighted CN = total product/total area = 93 (Round)

C. **Level of Service (LOS) Calculation**

Predevelopment CN:	77
Postdevelopment CN:	93
Difference:	16
LOS Required:	7
Total Value Rating (VR):	91.21

WORKSHEET 2: DEVELOP MITGATION PACKAGE(S) THAT MEETS REQUIRED LOS

Project: Lee's Summit Apartments — **By:** KAD — **Date:** 6/20/2022
Location: Lee's Summit, MO — **Checked:** DEU — **Date:** 6/20/2022
Sheet: 1 of 1

1. **Required LOS (from Table 1 or 1A or Worksheet 1 or 1A, as appropriate):** 7

Note: Various BMPs may alter CN of proposed development, and LS; recalculate both if applicable.

2. **Proposed BMP Option Package No.** 1

ID	BMP / Cover Description	Treatment Area, ac.	VR[1]	Product of VR x Area
BIO	Bio-Retention Basin (w/ signage)	2.67	8.75	23.36
CBI-1	Infiltration Trench (w/ signage)	7.83	9.25	72.43
Total[2]:		10.5	Total VR:	95.79
			Proposed LOS:	7.35 = total product/total area

[1] VR calculated for final BMP only in Treatment Train.
[2] Total treatment area cannot exceed 100 percent of the actual site area.

2) **Meets required LOS (Yes/No)?** Yes (If No, or if additional options are being tested, move to next sheet.)

LEGEND

- PL — PROPERTY LINE
- LOT LINE
- R/W — RIGHT-OF-WAY
- DRAINAGE BOUNDARY FOR LOS VALUE RATING CALCULATION

N

SCALE: 1"=60'
0' 60' 120'

UTILITY NOTES:
VISUAL INDICATIONS OF UTILITIES ARE AS SHOWN. UNDERGROUND LOCATIONS SHOWN, AS FURNISHED BY THEIR LESSORS, ARE APPROXIMATE AND SHOULD BE VERIFIED IN THE FIELD AT THE TIME OF CONSTRUCTION. FOR ACTUAL FIELD LOCATIONS OF UNDERGROUND UTILITIES CALL 811.

811 Know what's below. Call before you dig.

\\PHELPS-SERVER\Projects\P\220231\Stormwater\Exhibits\Exhibits.dwg Layout:TREATMENT PLAN A3 Jun 23, 2022 - 2:27pm Kyle Peters

PHELPS ENGINEERING, INC.
1270 N. Winchester
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IMPLEMENTATION

PROPOSED DRAINAGE MAP
TUDOR MULTIFAMILY

No.	Date	Revisions:	By	App.

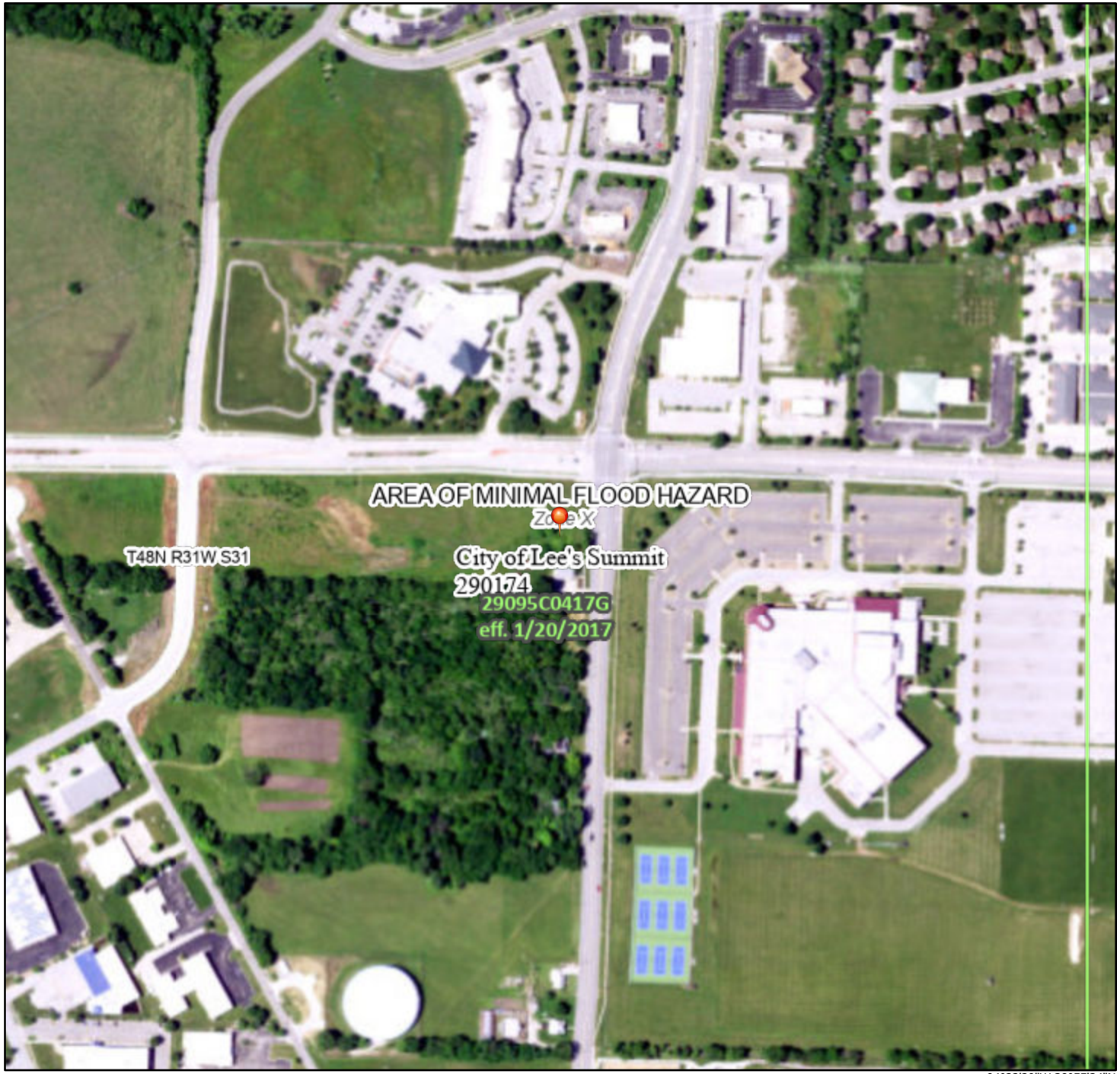
PROJECT NO. 220231
DATE: 06-23-2022 DRAWN: BJC
CHECKED: DEU APPROVED: DEU
CERTIFICATE OF AUTHORIZATION KANSAS LAND SURVEYING – LS-82 ENGINEERING – E-391
CERTIFICATE OF AUTHORIZATION MISSOURI LAND SURVEYING-2007001128 ENGINEERING-2007003208

SHEET
A3

Appendix F

National Flood Hazard Layer FIRMette

94°23'7"W 38°56'2"N



94°22'29"W 38°55'34"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 6/23/2022 at 12:47 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.