Preliminary Stormwater Management Plan

Market Street Center

M291 and SW Market Street
Lee's Summit, Missouri

Prepared by:

PLANNING
ENGINEERING
IMPLEMENTATION

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PEI #210639
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TABLE OF CONTENTS

APPENDICES

1. INTRODUCTION

This report is a preliminary stormwater management plan for the proposed Market Street Center development prepared by Phelps Engineering, Inc.

The proposed site is bounded by SW Market Street to the north, Missouri Highway 291 to the east, an existing commercial development to the west, and an existing commercial development to the south. The proposed development is approximately 5.03 acres and consists of 3 commercial buildings and parking lot. The existing site consists of undeveloped open space.

The property lies within Zone X, defined as areas determined to be outside the 0.2% annual chance floodplain, as shown on the flood insurance rate map prepared by the Federal Emergency Management Agency for the City of Lee's Summit, Community No. 290172, Jackson County, Missouri, Map No. 29095C0291G, and dated January 20, 2017.

See the Vicinity Map below.

2. STORMWATER REQUIREMENTS

Stormwater design criteria are in accordance with City of Lee's, Missouri Technical Specifications and Design Criteria.

Stormwater detention and BMPs shall be provided per APWA 5608.4.C.1, comprehensive control measures, as follows:

1. Post-development peak discharge rates from the site shall not exceed those indicated below:

   - 50% storm peak rate less than or equal to 0.5 cfs per site acre
   - 10% storm peak rate less than or equal to 2.0 cfs per site acre
   - 1% storm peak rate less than or equal to 3.0 cfs per site acre

   The calculated allowable release rates are:

   - 50% storm (2-year) - 0.5 cfs x 5.03 acres = 2.51 cfs
   - 10% storm (10-year) - 2.0 cfs x 5.03 acres = 10.06 cfs
   - 1% storm (100-year) - 3.0 cfs x 5.03 acres = 15.09 cfs

2. 40-hour extended detention of runoff from the local 90% mean annual event (1.37"/24-hour rainfall).

3. SITE SOIL CONDITIONS

Soils data for the property was determined using the NRCS Web Soil Survey for Jackson County. The property consists of Arisburg-Urban land complex, Udarents-Urban land-Sampsel complex, Arisburg silt loam, and Sampsel silty clay loam, which designates the site as Type C Hydrologic Soil Group (HSG). The site watershed soil properties and the Existing Drainage Map can be found in Appendix A of this report.

4. EXISTING CONDITIONS

The existing property consists of undeveloped open space. The property surface drains southeasterly to an existing culver which discharges to the MODOT right of way ditch.

There are 3 point discharges from off-site drainage areas that flow onto the site. See the preliminary off-site drainage area map included in Appendix A.

#1 – An existing 48” storm sewer discharges onto the property at the northern end of the site. This discharge point consists of a portion of SW Market Street right of way drainage and a portion of the southern existing Walmart development. The existing Walmart development discharge is detained upstream of the discharge point via an existing detention basin; therefore, discharge from the existing 48” storm sewer tributary is not included in the on-site detention analysis.

#2 – An existing 12” storm sewer discharges onto the property at the western end of the site. This discharge point consists of the existing Firestone development. The existing Firestone development discharge is detained upstream of the discharge point via an existing detention basin; therefore, discharge from the existing 48” storm sewer tributary is not included in the on-site detention analysis.

#3 – An existing 36” storm sewer discharges onto the property at the southwest corner of the site. This discharge point consists of the existing commercial development west of SW Market Street. It is unknown if this area is detained upstream. If there is no existing upstream detention for the 36” storm sewer tributary area, the area shall be included as an off-site discharge source into the detention basin. This information will need to be determined and provided with the Final Stormwater Study.

5. PROPOSED CONDITIONS

The proposed development will capture and route stormwater via a new private underground enclosed storm sewer system. Stormwater runoff will be routed to the proposed detention basin at the southern extent of the site.

The proposed detention basin has a bottom elevation of 995.50 and a top of berm elevation of 1004.00. The basin consists of an outlet control structure with a 1.5” orifice and 36” outlet pipe. The orifice was sized to drawdown the water quality volume, generated by the 5.03 acre site, over 40 hours. See the water quality drawdown calculations in Appendix B. Orifice opens are provided above the water quality volume to detain the 2-year, 10-year, and 100-year events.

The outlet pipe will discharge to the existing MODOT ditch directly east of the southeast corner of the site, matching the existing conditions. The detention basin provides a total available storage of 75,410 cubic feet which equates to approximately 15,000 CF / acre. See Appendix B of this report for Proposed Grading Plan.

6. STORMWATER DETENTION RESULTS

Composite CNs were determined using SCS TR-55 methods. The SCS Type II 24 hour duration storm event was utilized for the stormwater analysis. A minimum time of concentration of 5 minutes was utilized for all drainage areas based on the size of the site. For the preliminary stormwater study, the entire site was assumed to be routed to the detention basin. There is a very small amount of surface runoff along the eastern property line that will bypass the detention basin. This area will be further analyzed with the Final Stormwater Management Study.

The proposed drainage sub-basin characteristics and composite curve numbers are shown in Table 1 below. See Appendix B of this report for the Proposed Drainage Map.

Table 1 – Proposed Runoff Conditions

Drainage Sub-Basin	Open Space (acres)	Impervious (acres)	Total (acres)	Composite CN	Time of Conc. (min)
Detention	2.70	2.33	5.03	85	5.0

Using HydroCAD, the proposed 2-year, 10-year, and 100-year site peak discharge was determined with the proposed detention basin included. The proposed 100-year site peak discharge and allowable release rate is shown in Table 2 below. The proposed detention basin results are shown in Table 3 below.

See Appendix B of this report for proposed HydroCAD calculations.

Table 2 – Proposed Runoff Results

Storm Event	Allowable Release Rate (cfs)	Peak Discharge (cfs)
2-Year	2.51	2.43
10-Year	10.06	9.93
100-Year	15.09	15.00

Table 3 – Proposed Detention Basin Results

Basin	Detention Inflow (cfs)	Detention Outflow (cfs)	Maximum WSEL (ft.)	Maximum Storage (cf)
2-Year	18.57	2.43	999.28	17,711
10-Year	32.63	9.93	1,000.57	29,773
100-Year	51.41	15.00	1,002.03	46,763

7. CONCLUSION

The detention basin results in a proposed peak discharge less than the allowable release rates for the 2-year, 10-year, and 100-year storm events meeting APWA 5608.4.C.1 comprehensive control measures.

The detention basin provides an orifice opening sized to ensure 40-hour extended detention of runoff from the local 90% mean annual event (1.37"/24-hour rainfall) meeting APWA 5608.4.C.1 comprehensive control measures.

The proposed plan meets all City of Lee's Summit stormwater requirements.

This report and attached appendices complete Phelps Engineering Inc.'s submittal of the Preliminary Stormwater Management Plan for Market Street Center. Please feel free to contact PEI at (913) 393-1155 if you require additional information.

Sincerely,

PHELPS ENGINEERING, INC.

Judd D. Claussen, P.E.

Enclosures

APPENDIX A

A. Site Conditions

- NRCS Web Soil Survey
- Existing Drainage Map

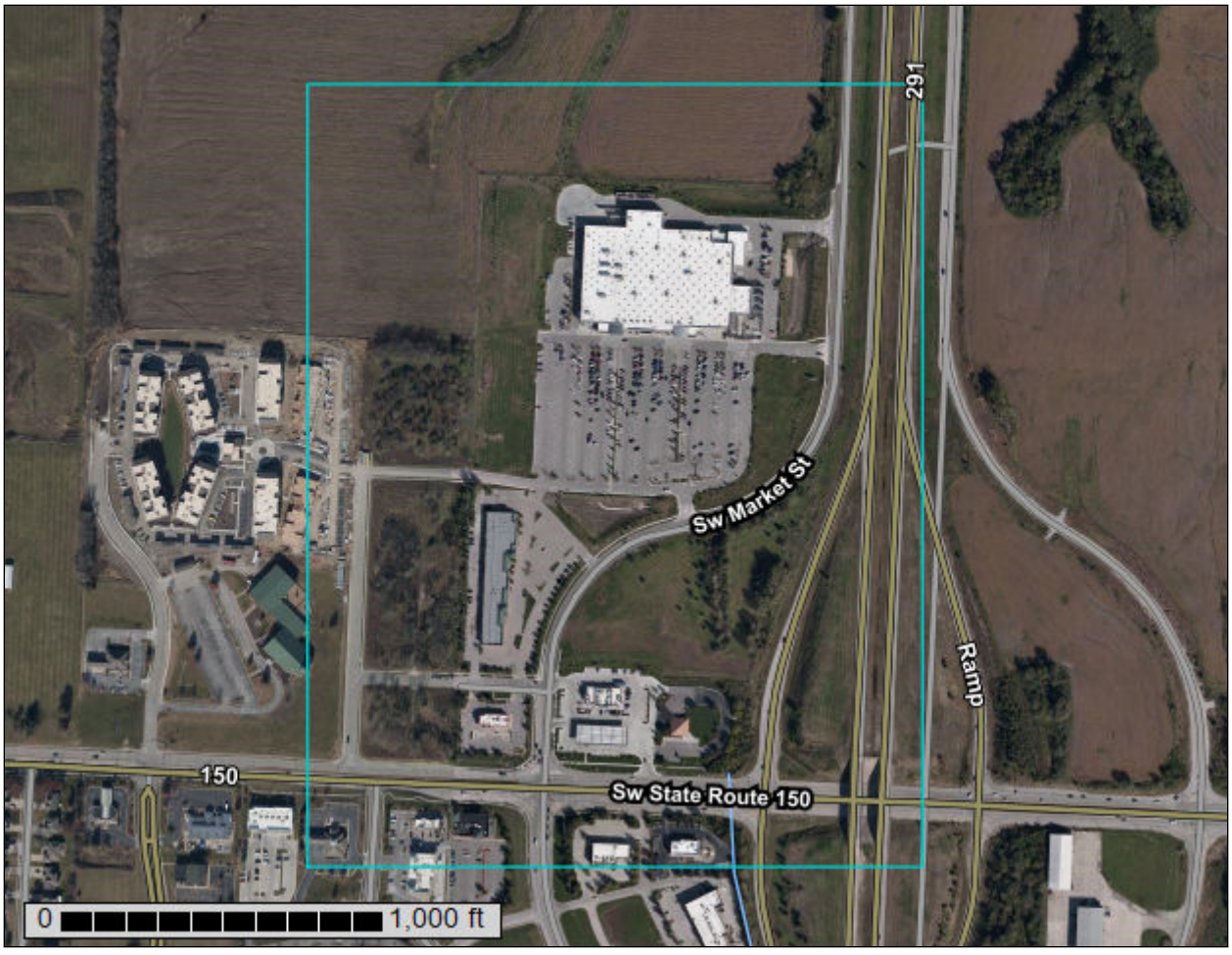
United States Department of Agriculture

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



October 4, 2021

Preface

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

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

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

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

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

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

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Contents

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.

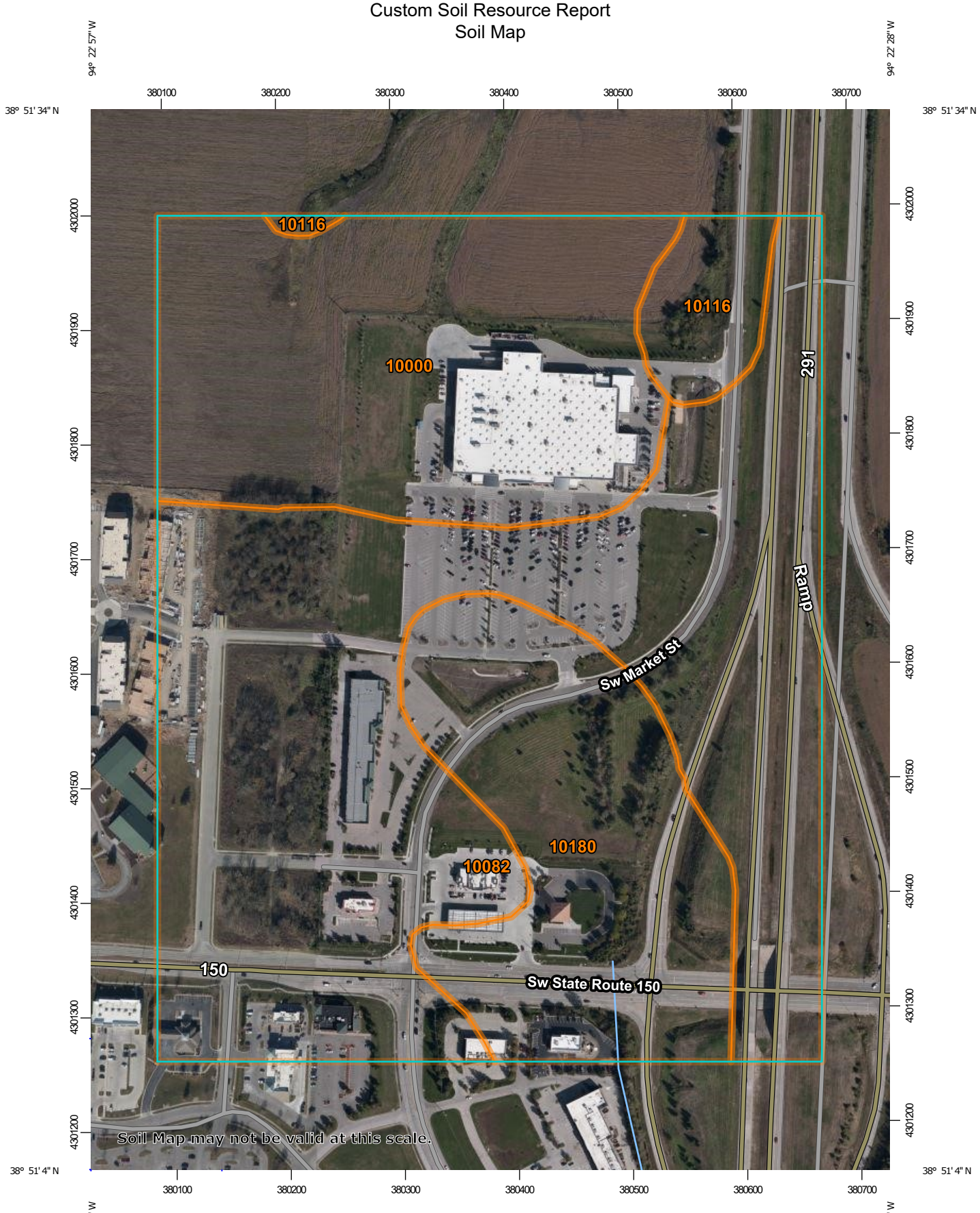
After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and

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: 1:4,510 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 50 100 200 300

Feet
0 200 400 800 1200

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 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
10000	Arisburg silt loam, 1 to 5 percent slopes	27.9	26.2%
10082	Arisburg-Urban land complex, 1 to 5 percent slopes	54.1	50.7%
10116	Sampsel silty clay loam, 2 to 5 percent slopes	4.0	3.7%
10180	Udarents-Urban land-Sampsel complex, 2 to 5 percent slopes	20.7	19.4%
Totals for Area of Interest		**106.7**	**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

10000—Arisburg silt loam, 1 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2w22b
Elevation: 610 to 1,130 feet
Mean annual precipitation: 39 to 43 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: 87 percent
Minor components: 13 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

Minor Components

Sharpsburg

Percent of map unit: 5 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

Greenton

Percent of map unit: 5 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

Haig

Percent of map unit: 3 percent
Landform: Flats
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Convex
Ecological site: R109XY001MO - Claypan Summit Prairie
Hydric soil rating: Yes

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

10116—Sampsel silty clay loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: 2qkzy
Elevation: 600 to 900 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: Prime farmland if drained

Map Unit Composition

Sampsel and similar soils: 95 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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, concave
Parent material: Residuum weathered from shale

Typical profile

Ap - 0 to 11 inches: silty clay loam
Bt - 11 to 80 inches: silty clay

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: 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 8.4 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

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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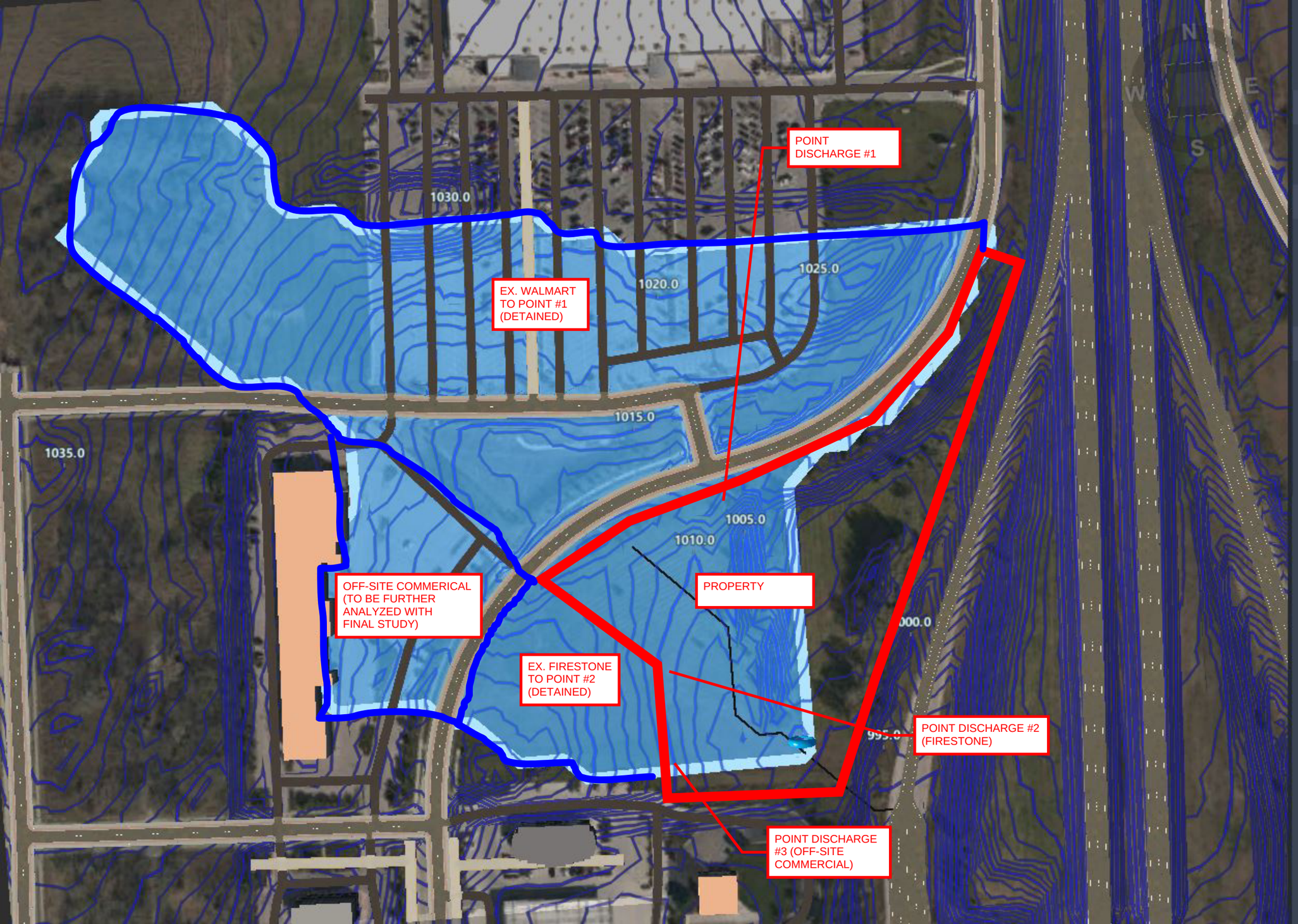


Watershed

Watershed 2

Watersheds › **Watershed 2**

Type

Manual Style

Watershed/Blue

Geometry

Area	*737866.06* sq.ft.
Channel Length	*442.59* '
Channel Slope	*1.55* %
Elevations (High/Low)	*1011.89'/1005.05'*

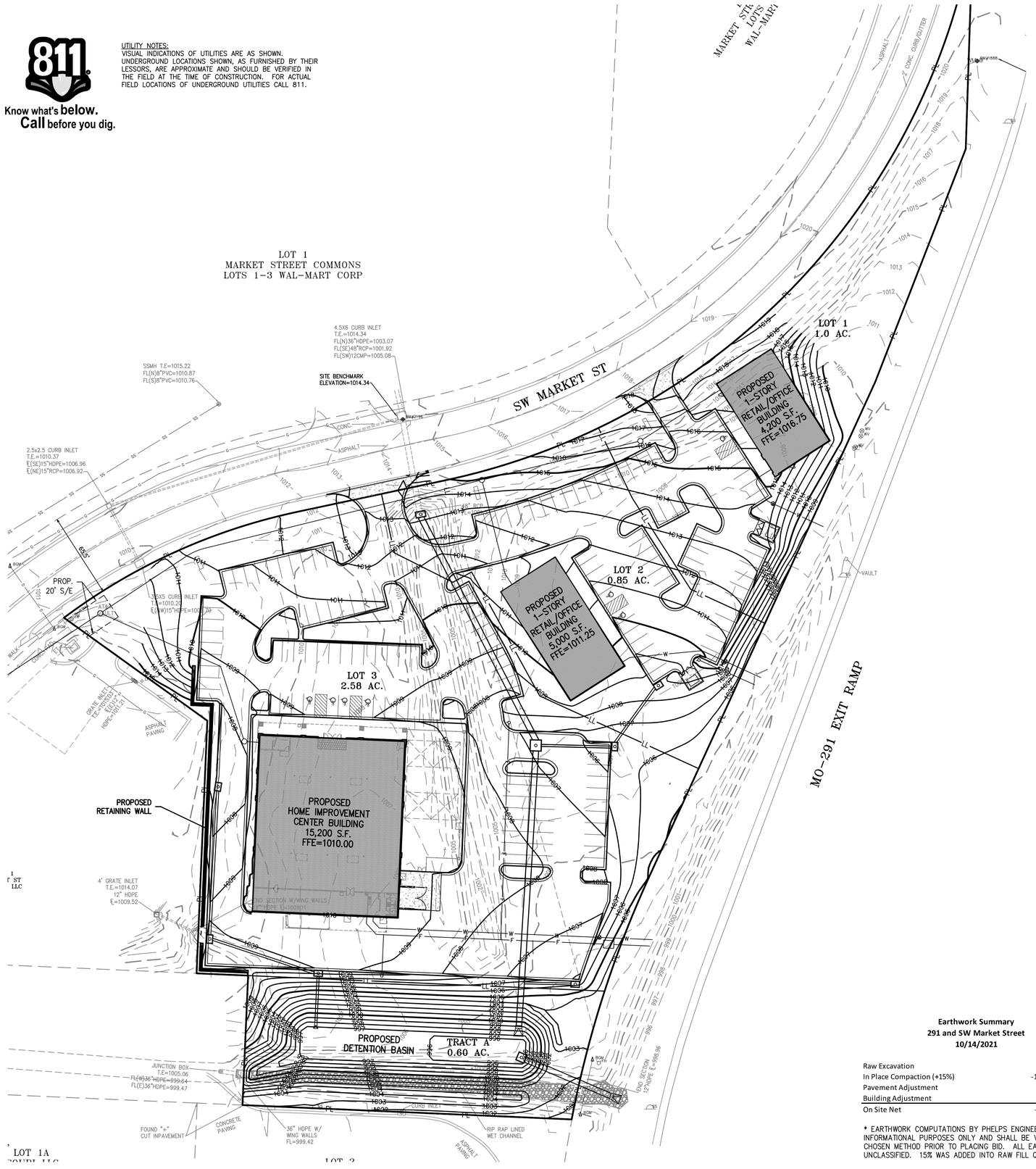
Hydrology Data

Hydrology Method	User Defined
Peak Flow (AEP)	
1/10	0.0 cfs
1/50	0.0 cfs
1/100	0.0 cfs

APPENDIX B

B. Detention & BMPs

- Proposed Grading Plan
- WQV 40 Hour Drawdown Calculation
- Proposed HydroCAD Model



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.

SITE GRADING NOTES:

1. CONTOURS AND ELEVATIONS: Existing and proposed contours are shown on plans at one foot (1') contour intervals, unless otherwise noted, proposed contours and elevations shown represent approximate finish grade. Contractor shall hold down subgrades to allow for pavement and sub-base thicknesses.
2. If the contractor does not accept existing topography as shown on the plans, without exception, he shall have made at his expense, a topographic survey by a registered land surveyor and submit it to the owner for review.
3. CLEARING AND GRUBBING: Prior to beginning preparation of subgrade, all areas under pavements or building shall be stripped of all topsoil, vegetation, large rock fragments (greater than 6 inches in any dimension) and any other deleterious material. The actual stripping depth should be based on visual examination during construction and the results of proof-rolling operations. The root systems of all trees (not designated to remain) shall be removed in their entirety. Stripping materials shall not be incorporated into structural fills.
4. TOPSOIL STRIPPING: Prior to the start of site grading, the contractor shall strip all topsoil from areas to be graded, and stockpiled at a location on or adjacent to the site as directed by the owner. At completion of grading operations and related construction, the contractor will be responsible for redistribution of topsoil over all areas disturbed by the construction activities. Topsoil shall be placed to a minimum depth of six inches (6") and in accordance with specifications for landscaping. At that time, and prior to the installation of landscaping or irrigation, all topsoil graded areas shall be visually inspected and accepted by the owner and ITL.
5. Contractor shall adjust and/or cut existing pavement as necessary to assure a smooth fit and continuous grade. Contractor shall assure positive drainage away from buildings for all natural and paved areas.
6. SUBGRADE PREPARATION: Prior to placement of new fill material, the existing subgrade shall be proofrolled and approved under the direction of the Geotechnical Engineer or his representative.
7. PROOFROLLING: Subsequent to completion of stripping and over-excavation, all building and pavement areas to receive engineered fill should be systematically proof-rolled using a tandem axle dump truck loaded to approximately 20,000 pounds per axle. Also, any finished subgrade areas to receive paving shall be proof-rolled within 48 hours of paving. Unsuitable soils that are detected and that can not be recompacted should be over-excavated and replaced with controlled structural fill.
8. EARTHWORK:

   A) GEOTECHNICAL: All earthwork shall conform to the recommendations of the Geotechnical report. Said report and its recommendations are herein incorporated into the project requirements by reference. Prior to beginning construction, the contractor shall obtain a copy of and become familiar with the geotechnical report. Unless specifically noted on the plans, the recommendations in the geotechnical report are hereby incorporated into the project requirements and specifications.

   B) SURFACE WATER: Surface water shall be intercepted and diverted during the placement of fill.

   C) FILLS: All fills shall be considered controlled or structural fill and shall be free of vegetation, organic matter, topsoil and debris. In areas where the thickness of the engineered fill is greater than five, feet building and pavement construction should not commence until so authorized by the on-site geotechnical engineer to allow for consolidation.

   D) BUILDING SUBGRADE: As specified in the Geotechnical Engineering Report, the upper section of building subgrade shall consist of Low Volume Change (LVC) material defined as approved, compacted granular fill or low to moderate plasticity cohesive soil materials stabilized with Class C Flyash. Granular fill shall consist of compacted granular materials with a maximum particle size of two (2) inches or less, such as limestone screenings. Refer to geotechnical report for complete requirements.

   E) EXISTING SLOPES: Where fill material is to be placed on existing slopes greater than 5:1 (horizontal to vertical), existing slope shall be benched providing a minimum vertical face of twelve inches (12"). The benches should be cut wide enough to accommodate the compaction equipment. Fill material shall be placed and compacted in horizontal lifts not exceeding nine inches (9") (loose lift measurement), unless otherwise approved by the Geotechnical Engineer.

   F) COMPACTION REQUIREMENTS: The upper 9 inches of pavement subgrade areas shall be compacted to a minimum density of ninety five percent (95%) of the material's maximum dry density as determined by ASTM D698 (standard proctor compaction). The moisture content at the time of placement and compaction shall within a range of 0% below to 4% above optimum moisture content as defined by the standard proctor compaction procedure. The moisture contents shall be maintained within this range until completion of the work. Where compaction of earth fill by a large roller is impractical or undesirable, the earth fill shall be hand compacted with small vibrating rollers or mechanical tampers.
9. All cut or fill slopes shall be 3:1 or flatter. All asphalt parking areas shall be a minimum of 1% slope but not more than 5% slope unless otherwise noted. All pavements within ADA parking areas shall not exceed 2% total slope. All grades around building shall be held down 6" from finish floor and slope away another 6" in 10 feet. Contractor shall notify engineer prior to final subgrade construction of any areas not within this slope requirement.
10. TESTING AND INSPECTION: Owner's Independent Testing Laboratory (ITL) shall make tests of earthwork during construction and observe the placement of fills and other work performed on this project to verify that work has been completed in accordance with Geotechnical Engineering Report, Project Specifications and within industry standards. The ITL will be selected by the owner and the cost of testing will be the owner's responsibility.
11. CLASSIFICATION: All excavation shall be considered unclassified. No separate or additional payments shall be made for rock excavation.
12. PERMANENT RESTORATION: All areas disturbed by earthwork operations shall be sodded, unless shown otherwise by the landscaping plan or erosion control plan.
13. UTILITIES: The contractor is specifically cautioned that the location and/or elevation of existing utilities as shown on these plans is based on records of the various utility companies, and where possible, measurements taken in the field. The information is not to be relied on as being exact or complete. The contractor must call the appropriate utility companies at least 48 hours before any excavation to request exact field location of utilities. It shall be the responsibility of the contractor to relocate all existing utilities which conflict with the proposed improvements shown on the plans.
14. LAND DISTURBANCE: The contractor shall adhere to all terms & conditions as outlined in the EPA or applicable state N.P.D.E.S. permit for storm water discharge associated with construction activities. Refer to project S.W.P.P.P. requirements.

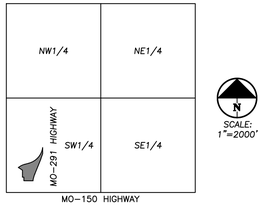
FLOOD NOTE:

THIS PROPERTY LIES WITHIN ZONE X, DEFINED AS AREAS DETERMINED TO BE OUTSIDE THE 0.2% ANNUAL CHANCE FLOODPLAIN, AS SHOWN ON THE FLOOD INSURANCE RATE MAP PREPARED BY THE FEDERAL EMERGENCY MANAGEMENT AGENCY FOR THE CITY OF LEE'S SUMMIT, COMMUNITY NO. 290174, JACKSON COUNTY, MISSOURI, MAP NO. 29095C0436G, AND DATED JANUARY 20, 2017.

BENCHMARK:

VERTICAL DATUM = NAVD88 BASED ON GPS OBSERVATION USING MODOT VRS

1. FOUND "□" CUT IN CONCRETE SIDEWALK AT SOUTHWEST CORNER OF ADJACENT PROPERTY.
   ELEVATION = 987.14
2. SET "□" CUT IN SOUTHWEST CORNER OF BACK OF CURB IN ADJACENT PARKING LOT TO THE NORTH AT NORTHWEST CORNER OF SURVEYED PROPERTY.
   ELEVATION = 990.19



VICINITY MAP
SEC. 29-47-31

SCALE: 1"=2000'

Earthwork Summary
291 and SW Market Street
10/14/2021

Raw Excavation	4,764 Cu. Yds.	
In Place Compaction (+15%)	-18,463 Cu. Yds.	
Pavement Adjustment	2,379 Cu. Yds.	(assume 10" of additional excavation)
Building Adjustment	1,807 Cu. Yds.	(assume 24" of additional excavation)
On Site Net	-9,512 Cu. Yds.	

* EARTHWORK COMPUTATIONS BY PHELPS ENGINEERING, INC. ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY AND SHALL BE VERIFIED BY CONTRACTORS BY THEIR CHOSEN METHOD PRIOR TO PLACING BID. ALL EARTHWORK SHALL BE CONSIDERED UNCLASSIFIED. 15% WAS ADDED INTO RAW FILL QUANTITY TO ACCOUNT FOR SHRINKAGE.

LEGEND

- PL — PROPERTY LINE
- LL — LOT LINE
- R/W — RIGHT-OF-WAY
- 2' CURB & GUTTER
- 920 — EXISTING CONTOURS
- 920 — PROPOSED CONTOURS
- PROPOSED SPOT ELEVATION
- XXX.XX TW

LG	LIP OF GUTTER
TC	TOP OF CURB
SW	SIDEWALK
ME	MATCH EXISTING
HP	HIGH POINT
LP	LOW POINT
P	TOP OF PAVEMENT
TE	TOP OF STRUCTURE
GR	GROUND ELEVATION
BS	BOTTOM OF STEPS
TS	TOP OF STEPS
BW	BOTTOM OF WALL
TW	TOP OF WALL

- EXISTING STORM SEWER
- PROPOSED STORM PIPE
- PROPOSED WET CURB & GUTTER
- PROPOSED DRY CURB & GUTTER
- PROPOSED RETAINING WALL

SCALE: 1"=40'
0' 40' 80'

PHELPS ENGINEERING, INC.
1270 N. Winchester
Olathe, Kansas 66061
(913) 393-1155
Fax (913) 393-1066
www.phelpsengineering.com

PLANNING
ENGINEERING
IMPLEMENTATION

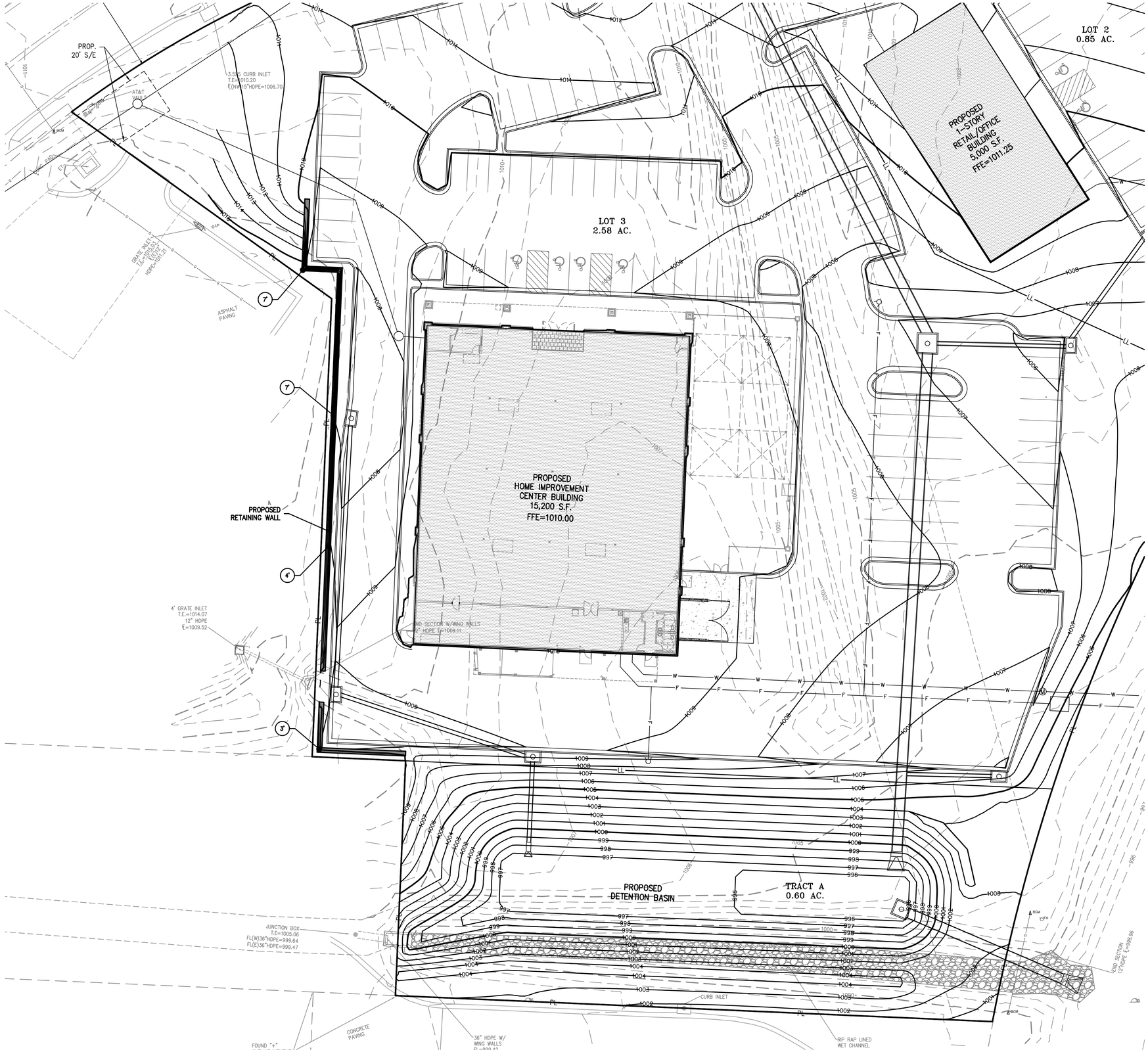
GRADING PLAN
MARKET STREET CENTER
M291 AND SW MARKET STREET
CITY OF LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

No.	Revisions:	Date	By	App.

PROJECT NO. 2106.39
DATE: 10-14-21 DRAWN:MRR
CHECKED: DAF APPROVED: JDC
CERTIFICATE OF AUTHORIZATION
KANSAS ENGINEERING - LS-92
MISSOURI ENGINEERING - E-391
CERTIFICATE OF AUTHORIZATION
LAND SURVEYING-2007001128
ENGINEERING-2007003228

SHEET
C2

\\PHELPS-SERVER\Projects\P\2106.39\dwg\Site Plans\GRADING.dwg Layout:1 Oct 15, 2021 - 3:57pm Daniel Finn



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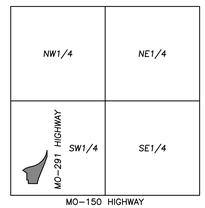

VICINITY MAP
SEC. 29-47-31

LEGEND

PL	PROPERTY LINE
LL	LOT LINE
R/W	RIGHT-OF-WAY
	2' CURB & GUTTER
920 / 918	EXISTING CONTOURS
920 / 918	PROPOSED CONTOURS
XXX.XX TW	PROPOSED SPOT ELEVATION
	EXISTING STORM SEWER
	PROPOSED STORM PIPE
	PROPOSED WET CURB & GUTTER
	PROPOSED DRY CURB & GUTTER
	PROPOSED RETAINING WALL

LG	LIP OF GUTTER
TC	TOP OF CURB
SW	SIDEWALK
ME	MATCH EXISTING
HP	HIGH POINT
LP	LOW POINT
P	TOP OF PAVEMENT
TE	TOP OF STRUCTURE
GR	GROUND ELEVATION
BS	BOTTOM OF STEPS
TS	TOP OF STEPS
BW	BOTTOM OF WALL
TW	TOP OF WALL

N

SCALE: 1"=20'
0' 20' 40'

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PLANNING
ENGINEERING
IMPLEMENTATION

ENLARGED GRADING PLAN

MARKET STREET CENTER
M291 AND SW MARKET STREET
CITY OF LEE'S SUMMIT, JACKSON COUNTY, MISSOURI

Revisions:	Date	No.	By	App.

PROJECT NO. 210639
DATE: 10-14-21 DRAWN:MRR
CHECKED: DAF APPROVED: JDC
CERTIFICATE OF AUTHORIZATION
KANSAS ENGINEERING - LS-82
MISSOURI ENGINEERING - E-391
CERTIFICATE OF AUTHORIZATION
LAND SURVEYING-2007001128
ENGINEERING-2007003208

SHEET
C2.1

Design Procedure Form: WQV 40 Hour Drawdown Calculations
Main Worksheet

Designer: DAF
ecked By: JDC
Company: Phelps Engineering, Inc
Date: 10/14/2021
Project: 291 and Market Street
Location: Lee's Summit MO

I. Basin Water Quality Volume

Step 1) Tributary area to EDW, A_T (ac) — A_T (ac) = 5.03

Step 2) Calculate WQv using methodology in Section 6 — WQv (ac-ft) = 0.27; WQv (cf) = 11,679

IIa. Water Quality Outlet Type

Step 1) Set water quality outlet type: — Outlet Type = 1
Type 1 = single orifice
Type 2 = perforated riser or plate
Type 3 = v-notch weir

Vb. Water Quality Pool Outlet, Single Orifice

Step 1) Depth of water quality volume above permanent pool, Z_{WQ} (ft) — Z_{WQ} (ft) = 3

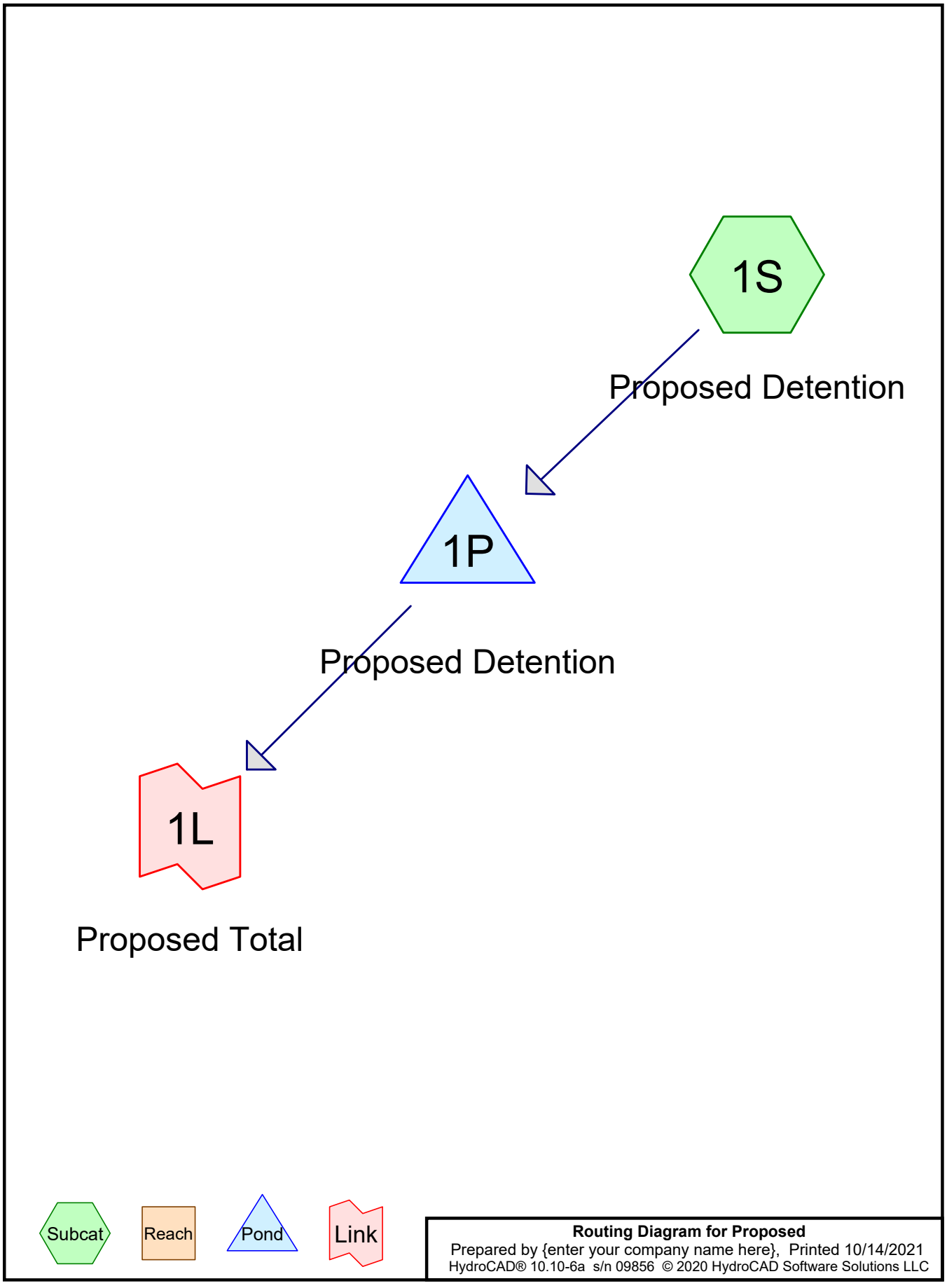
Step 2) Average head of water quality volume over invert of orifice, H_{WQ} (ft)
$H_{WQ} = 0.5 * Z_{WQ}$ — H_{WQ} (ft) = 1.5

Step 3) Average water quality outflow rate, Q_{WQ} (cfs)
$Q_{WQ} = (WQv * 43{,}560)/(40 * 3{,}600)$ — Q_{WQ} (cfs) = 0.08

Step 4) Set value of orifice discharge coefficient, C_o
$C_o = 0.66$ when thickness of riser/weir plate is = or < orifice diameter
$C_o = 0.80$ when thickness of riser/weir plate is > orifice diameter — C_o = 0.66

Step 5) Water quality outlet orifice diameter (minimum of 4 inches), D_o (in)
$D_o = 12 * 2 * (Q_{WQ}/(C_o * \pi * (2 * g * H)^{0.5}))^{0.5}$ — D_o (in) = 1.51
(If orifice diameter < 4 inches, use outlet type 2 or 3) — 1.5"

Step 6) To size outlet orifice for EDW with an irregular stage-volume relationship, use the Single Orifice Worksheet



Routing Diagram for Proposed
Prepared by {enter your company name here}, Printed 10/14/2021

Rainfall Events Listing (selected events)

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

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.700	74	>75% Grass cover, Good, HSG C (1S)
2.330	98	Paved parking, HSG C (1S)
5.030	**85**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
5.030	HSG C	1S
0.000	HSG D	
0.000	Other	
5.030		**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	2.700	0.000	0.000	2.700	>75% Grass cover, Good	1S
0.000	0.000	2.330	0.000	0.000	2.330	Paved parking	1S
0.000	**0.000**	**5.030**	**0.000**	**0.000**	**5.030**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	995.50	995.00	50.0	0.0100	0.013	0.0	36.0	0.0

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: Proposed Detention Runoff Area=5.030 ac 46.32% Impervious Runoff Depth=3.65"
Tc=5.0 min CN=85 Runoff=32.63 cfs 1.528 af

Pond 1P: Proposed Detention Peak Elev=1,000.57' Storage=29,773 cf Inflow=32.63 cfs 1.528 af
Outflow=9.93 cfs 1.425 af

Link 1L: Proposed Total Inflow=9.93 cfs 1.425 af
Primary=9.93 cfs 1.425 af

Total Runoff Area = 5.030 ac Runoff Volume = 1.528 af Average Runoff Depth = 3.65"
53.68% Pervious = 2.700 ac 46.32% Impervious = 2.330 ac

Summary for Subcatchment 1S: Proposed Detention

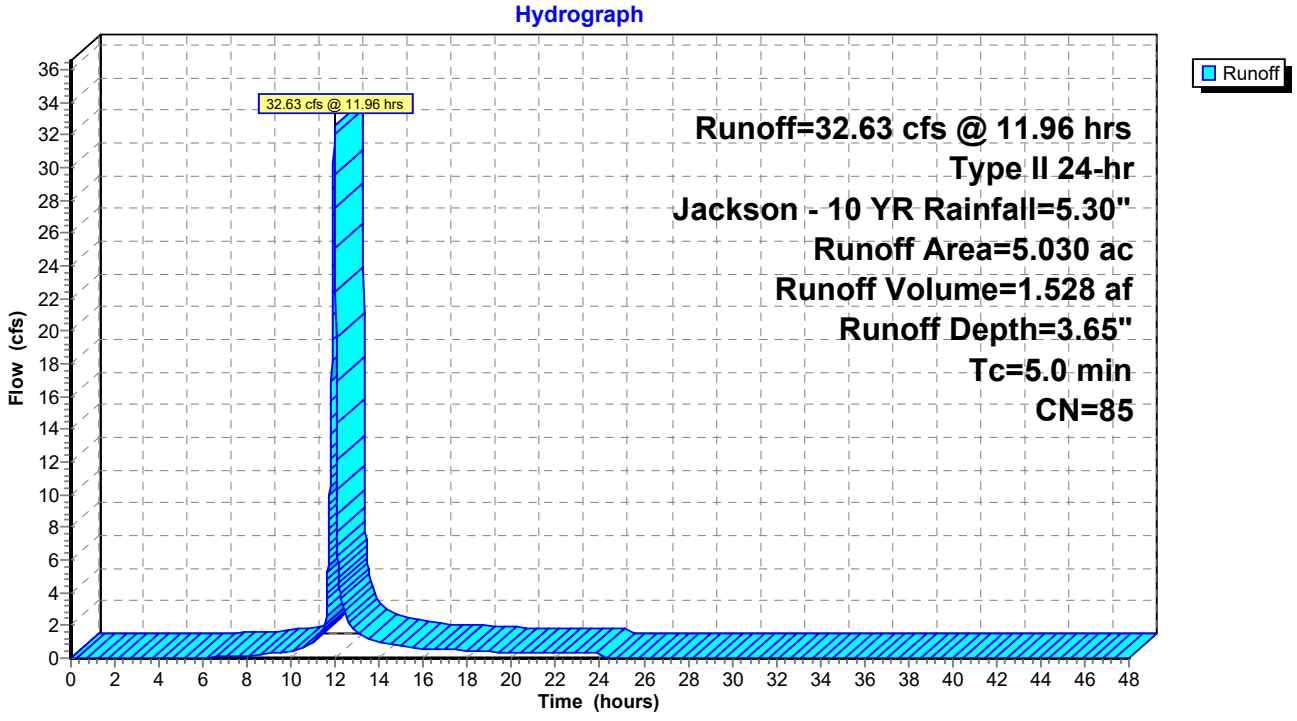
Runoff = 32.63 cfs @ 11.96 hrs, Volume= 1.528 af, Depth= 3.65"
Routed to Pond 1P : Proposed Detention

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 Jackson - 10 YR Rainfall=5.30"

Area (ac)	CN	Description
2.700	74	>75% Grass cover, Good, HSG C
2.330	98	Paved parking, HSG C
5.030	85	Weighted Average
2.700		53.68% Pervious Area
2.330		46.32% Impervious Area

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

Subcatchment 1S: Proposed Detention



Hydrograph for Subcatchment 1S: Proposed Detention

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	0.01
6.00	0.42	0.00	0.03
6.50	0.47	0.01	0.06
7.00	0.52	0.02	0.09
7.50	0.58	0.03	0.12
8.00	0.64	0.04	0.15
8.50	0.70	0.06	0.21
9.00	0.78	0.08	0.29
9.50	0.86	0.11	0.34
10.00	0.96	0.16	0.46
10.50	1.08	0.21	0.66
11.00	1.25	0.30	1.02
11.50	1.50	0.45	**1.88**
12.00	3.51	2.03	**27.50**
12.50	3.90	2.36	2.50
13.00	4.09	2.54	1.57
13.50	4.23	2.67	1.19
14.00	4.35	2.77	0.94
14.50	4.44	2.85	0.83
15.00	4.52	2.93	0.75
15.50	4.60	3.00	0.66
16.00	4.66	3.06	0.58
16.50	4.72	3.11	0.54
17.00	4.78	3.16	0.51
17.50	4.83	3.21	0.48
18.00	4.88	3.26	0.45
18.50	4.93	3.30	0.42
19.00	4.97	3.34	0.39
19.50	5.01	3.38	0.36
20.00	5.05	3.41	0.33
20.50	5.08	3.44	0.32
21.00	5.11	3.47	0.31
21.50	5.15	3.50	0.31
22.00	5.18	3.53	0.30
22.50	5.21	3.56	0.29
23.00	5.24	3.59	0.29
23.50	5.27	3.62	0.28
24.00	**5.30**	**3.65**	0.28
24.50	5.30	3.65	0.00
25.00	5.30	3.65	0.00
25.50	5.30	3.65	0.00
26.00	5.30	3.65	0.00
26.50	5.30	3.65	0.00
27.00	5.30	3.65	0.00
27.50	5.30	3.65	0.00
28.00	5.30	3.65	0.00
28.50	5.30	3.65	0.00
29.00	5.30	3.65	0.00
29.50	5.30	3.65	0.00
30.00	5.30	3.65	0.00
30.50	5.30	3.65	0.00
31.00	5.30	3.65	0.00
31.50	5.30	3.65	0.00
32.00	5.30	3.65	0.00
32.50	5.30	3.65	0.00
33.00	5.30	3.65	0.00
33.50	5.30	3.65	0.00
34.00	5.30	3.65	0.00
34.50	5.30	3.65	0.00
35.00	5.30	3.65	0.00
35.50	5.30	3.65	0.00
36.00	5.30	3.65	0.00
36.50	5.30	3.65	0.00
37.00	5.30	3.65	0.00
37.50	5.30	3.65	0.00
38.00	5.30	3.65	0.00
38.50	5.30	3.65	0.00
39.00	5.30	3.65	0.00
39.50	5.30	3.65	0.00
40.00	5.30	3.65	0.00
40.50	5.30	3.65	0.00
41.00	5.30	3.65	0.00
41.50	5.30	3.65	0.00
42.00	5.30	3.65	0.00
42.50	5.30	3.65	0.00
43.00	5.30	3.65	0.00
43.50	5.30	3.65	0.00
44.00	5.30	3.65	0.00
44.50	5.30	3.65	0.00
45.00	5.30	3.65	0.00
45.50	5.30	3.65	0.00
46.00	5.30	3.65	0.00
46.50	5.30	3.65	0.00
47.00	5.30	3.65	0.00
47.50	5.30	3.65	0.00
48.00	5.30	3.65	0.00

Summary for Pond 1P: Proposed Detention

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth = 3.65" for Jackson - 10 YR event
Inflow = 32.63 cfs @ 11.96 hrs, Volume= 1.528 af
Outflow = 9.93 cfs @ 12.07 hrs, Volume= 1.425 af, Atten= 70%, Lag= 6.8 min
Primary = 9.93 cfs @ 12.07 hrs, Volume= 1.425 af
Routed to Link 1L : Proposed Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 1,000.57' @ 12.07 hrs Surf.Area= 10,429 sf Storage= 29,773 cf

Plug-Flow detention time= 258.8 min calculated for 1.425 af (93% of inflow)
Center-of-Mass det. time= 221.8 min (1,023.1 - 801.3)

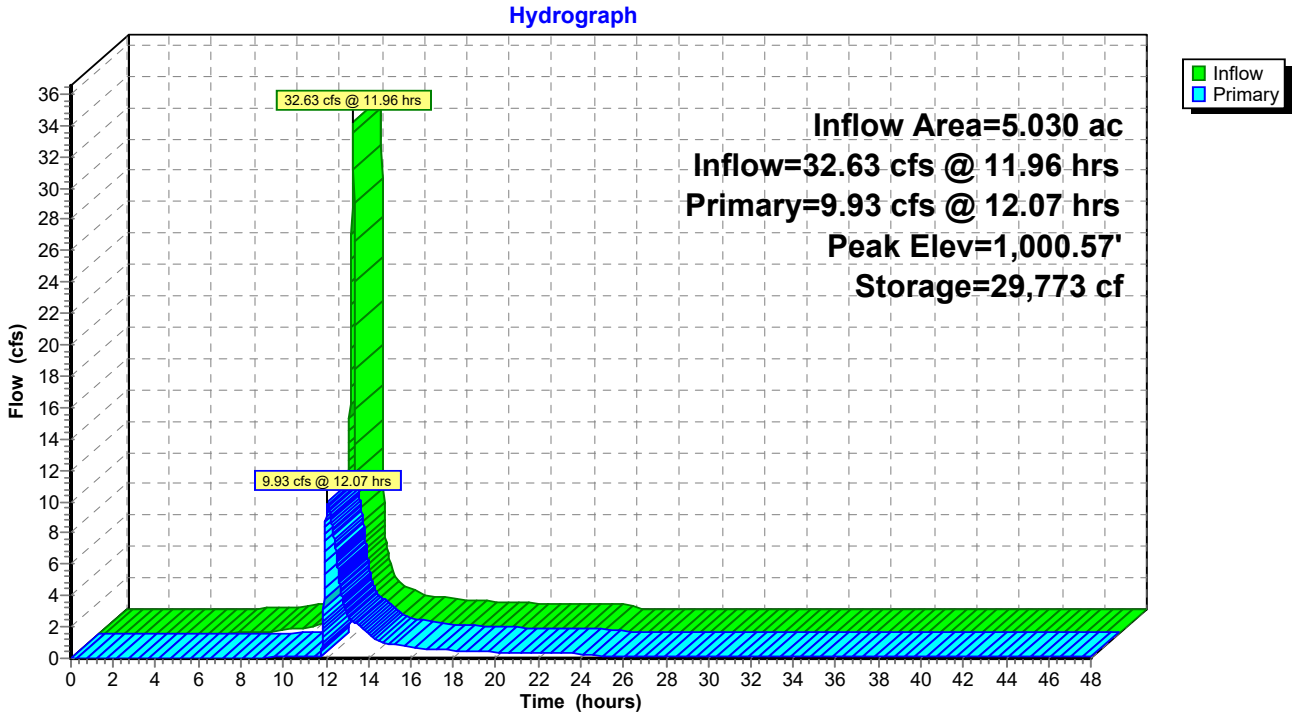
Volume	Invert	Avail.Storage	Storage Description
#1	995.50'	75,410 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.50	100	0	0
996.00	1,400	375	375
997.00	4,400	2,900	3,275
1,004.00	16,210	72,135	75,410

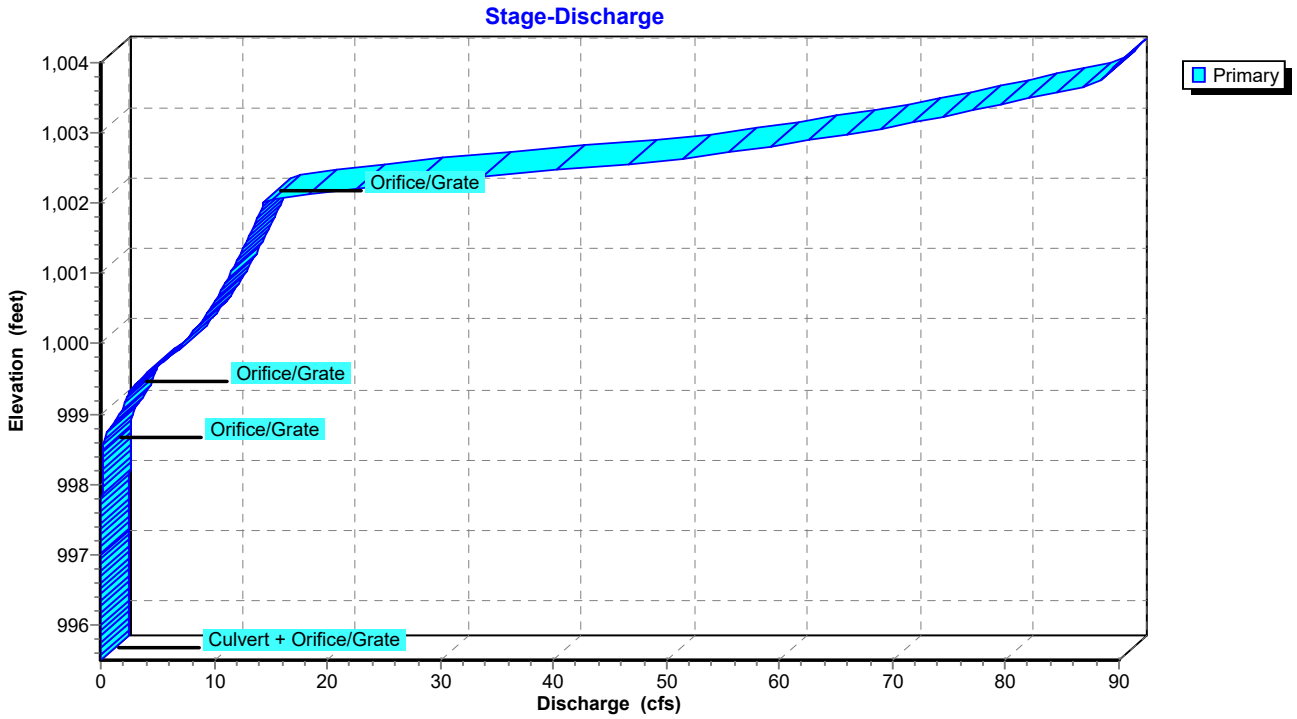
Device	Routing	Invert	Outlet Devices
#1	Primary	995.50'	**36.0" Round Culvert** L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 995.50' / 995.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	995.50'	**1.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	998.50'	**16.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	999.30'	**27.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	1,002.00'	**288.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=9.93 cfs @ 12.07 hrs HW=1,000.57' (Free Discharge)
└**1=Culvert** (Passes 9.93 cfs of 64.34 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.13 cfs @ 10.78 fps)
  ├**3=Orifice/Grate** (Orifice Controls 4.33 cfs @ 6.50 fps)
  ├**4=Orifice/Grate** (Orifice Controls 5.47 cfs @ 4.86 fps)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

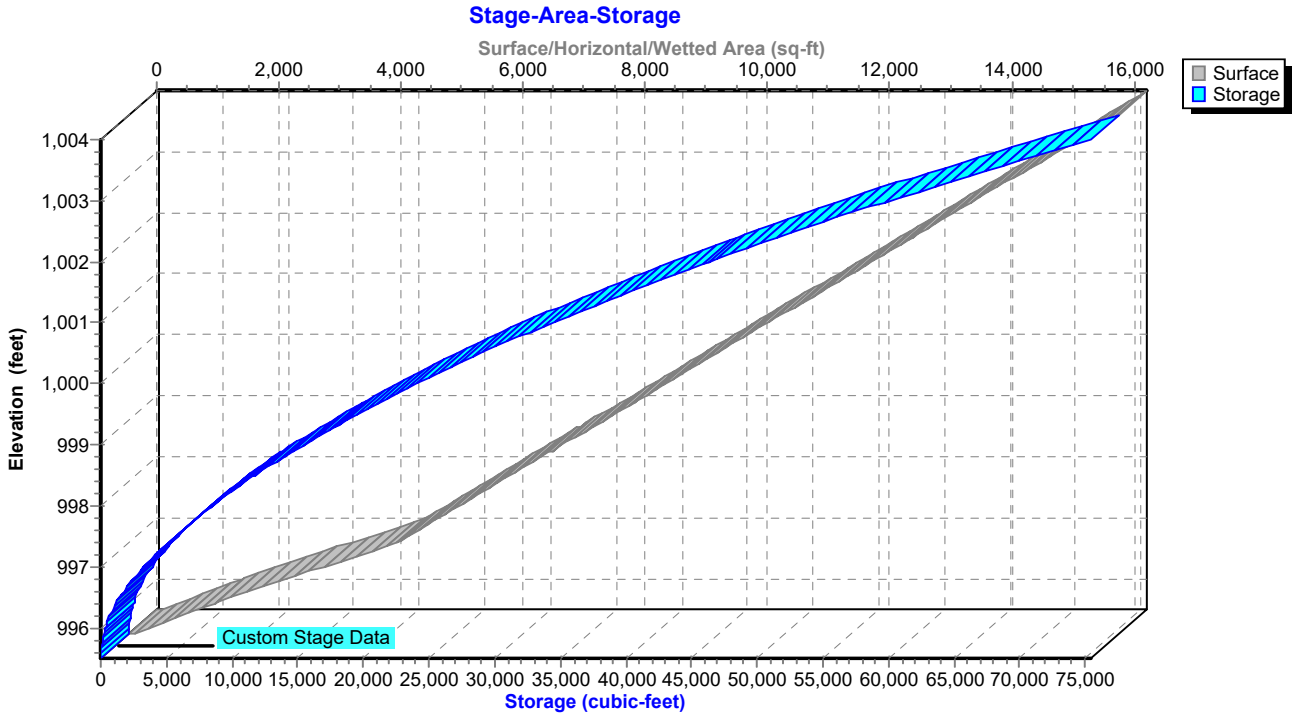
Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Hydrograph for Pond 1P: Proposed Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	995.50	0.00
1.00	0.00	0	995.50	0.00
2.00	0.00	0	995.50	0.00
3.00	0.00	0	995.50	0.00
4.00	0.00	0	995.50	0.00
5.00	0.00	0	995.50	0.00
6.00	0.03	29	995.61	0.01
7.00	0.09	163	995.82	0.03
8.00	0.15	453	996.05	0.04
9.00	0.29	1,044	996.35	0.05
10.00	0.46	2,106	996.70	0.06
11.00	**1.02**	4,339	997.23	0.08
12.00	**27.50**	**27,546**	**1,000.36**	**9.04**
13.00	1.57	**18,658**	**999.40**	**2.90**
14.00	0.94	15,315	998.98	1.55
15.00	0.75	14,147	998.83	0.92
16.00	0.58	13,668	998.76	0.69
17.00	0.51	13,383	998.73	0.57
18.00	0.45	13,203	998.70	0.50
19.00	0.39	13,040	998.68	0.43
20.00	0.33	12,880	998.66	0.37
21.00	0.31	12,771	998.64	0.33
22.00	0.30	12,709	998.63	0.32
23.00	0.29	12,661	998.63	0.30
24.00	0.28	12,617	998.62	0.29
25.00	0.00	11,982	998.53	0.13
26.00	0.00	11,591	998.47	0.10
27.00	0.00	11,230	998.42	0.10
28.00	0.00	10,872	998.37	0.10
29.00	0.00	10,517	998.31	0.10
30.00	0.00	10,166	998.26	0.10
31.00	0.00	9,818	998.21	0.10
32.00	0.00	9,474	998.15	0.10
33.00	0.00	9,133	998.10	0.09
34.00	0.00	8,796	998.05	0.09
35.00	0.00	8,463	997.99	0.09
36.00	0.00	8,134	997.94	0.09
37.00	0.00	7,808	997.88	0.09
38.00	0.00	7,486	997.83	0.09
39.00	0.00	7,168	997.77	0.09
40.00	0.00	6,854	997.72	0.09
41.00	0.00	6,544	997.66	0.09
42.00	0.00	6,238	997.60	0.08
43.00	0.00	5,936	997.55	0.08
44.00	0.00	5,638	997.49	0.08
45.00	0.00	5,345	997.43	0.08
46.00	0.00	5,056	997.38	0.08
47.00	0.00	4,772	997.32	0.08
48.00	0.00	4,492	997.26	0.08

Stage-Discharge for Pond 1P: Proposed Detention

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
995.50	0.00	998.10	0.09	1,000.70	10.41	1,003.30	76.56
995.55	0.00	998.15	0.10	1,000.75	10.59	1,003.35	78.07
995.60	0.01	998.20	0.10	1,000.80	10.77	1,003.40	79.55
995.65	0.02	998.25	0.10	1,000.85	10.95	1,003.45	81.00
995.70	0.02	998.30	0.10	1,000.90	11.13	1,003.50	82.42
995.75	0.03	998.35	0.10	1,000.95	11.30	1,003.55	83.81
995.80	0.03	998.40	0.10	1,001.00	11.46	1,003.60	85.17
995.85	0.03	998.45	0.10	1,001.05	11.63	1,003.65	86.51
995.90	0.03	998.50	0.10	1,001.10	11.79	1,003.70	87.83
995.95	0.04	998.55	0.15	1,001.15	11.96	1,003.75	88.43
996.00	0.04	998.60	0.24	1,001.20	12.11	1,003.80	88.75
996.05	0.04	998.65	0.35	1,001.25	12.27	1,003.85	89.08
996.10	0.04	998.70	0.49	1,001.30	12.43	1,003.90	89.40
996.15	0.05	998.75	0.64	1,001.35	12.58	1,003.95	89.73
996.20	0.05	998.80	0.81	1,001.40	12.73	1,004.00	**90.05**
996.25	0.05	998.85	0.99	1,001.45	12.88		
996.30	0.05	998.90	1.19	1,001.50	13.02		
996.35	0.05	998.95	1.40	1,001.55	13.17		
996.40	0.05	999.00	1.62	1,001.60	13.31		
996.45	0.06	999.05	1.81	1,001.65	13.46		
996.50	0.06	999.10	1.96	1,001.70	13.60		
996.55	0.06	999.15	2.11	1,001.75	13.74		
996.60	0.06	999.20	2.24	1,001.80	13.87		
996.65	0.06	999.25	2.36	1,001.85	14.01		
996.70	0.06	999.30	2.47	1,001.90	14.14		
996.75	0.06	999.35	2.66	1,001.95	14.28		
996.80	0.07	999.40	2.92	1,002.00	14.41		
996.85	0.07	999.45	3.21	1,002.05	15.40		
996.90	0.07	999.50	3.53	1,002.10	17.11		
996.95	0.07	999.55	3.88	1,002.15	19.28		
997.00	0.07	999.60	4.25	1,002.20	21.82		
997.05	0.07	999.65	4.65	1,002.25	24.68		
997.10	0.07	999.70	5.07	1,002.30	27.84		
997.15	0.07	999.75	5.50	1,002.35	31.26		
997.20	0.08	999.80	5.96	1,002.40	34.92		
997.25	0.08	999.85	6.35	1,002.45	38.81		
997.30	0.08	999.90	6.69	1,002.50	42.91		
997.35	0.08	999.95	7.00	1,002.55	46.35		
997.40	0.08	1,000.00	7.29	1,002.60	49.28		
997.45	0.08	1,000.05	7.57	1,002.65	51.93		
997.50	0.08	1,000.10	7.83	1,002.70	54.38		
997.55	0.08	1,000.15	8.08	1,002.75	56.67		
997.60	0.08	1,000.20	8.33	1,002.80	58.85		
997.65	0.09	1,000.25	8.56	1,002.85	60.92		
997.70	0.09	1,000.30	8.79	1,002.90	62.90		
997.75	0.09	1,000.35	9.01	1,002.95	64.80		
997.80	0.09	1,000.40	9.23	1,003.00	66.64		
997.85	0.09	1,000.45	9.43	1,003.05	68.41		
997.90	0.09	1,000.50	9.64	1,003.10	70.14		
997.95	0.09	1,000.55	9.84	1,003.15	71.81		
998.00	0.09	1,000.60	10.03	1,003.20	73.43		
998.05	0.09	1,000.65	10.22	1,003.25	75.02		

Stage-Area-Storage for Pond 1P: Proposed Detention

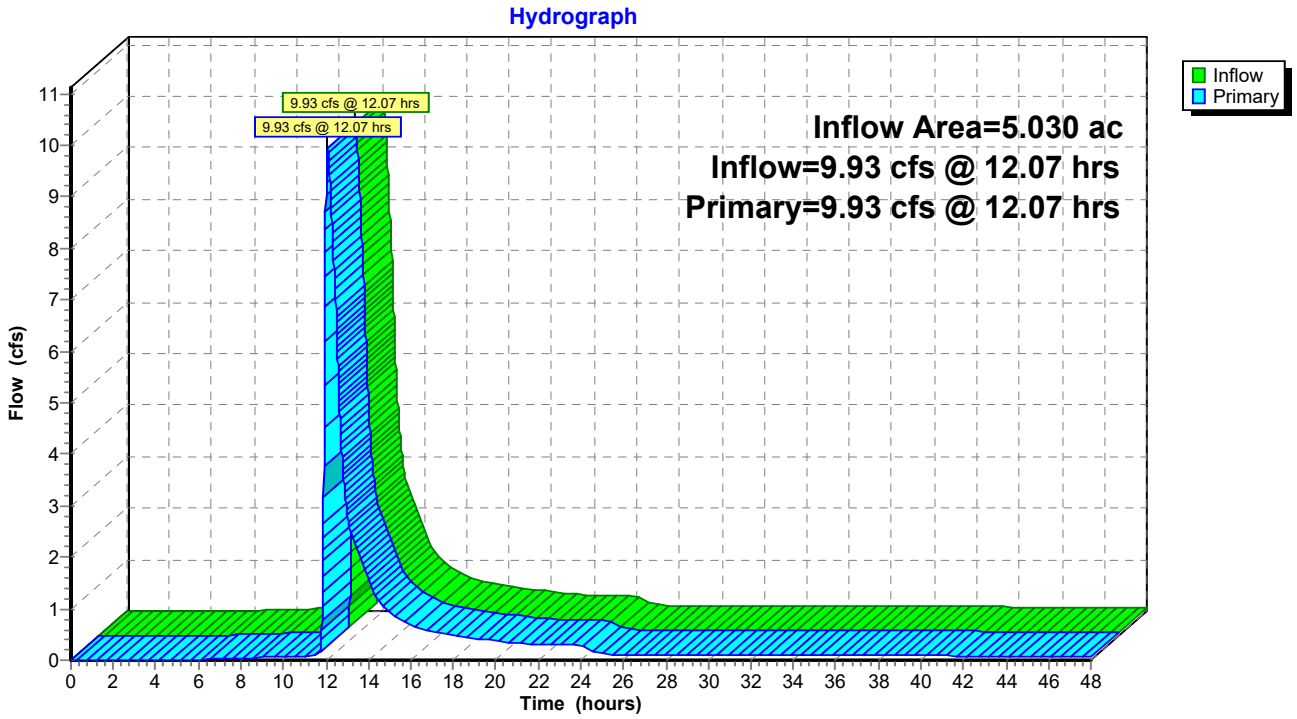
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
995.50	100	0
995.60	360	23
995.70	620	72
995.80	880	147
995.90	1,140	248
996.00	1,400	375
996.10	1,700	530
996.20	2,000	715
996.30	2,300	930
996.40	2,600	1,175
996.50	2,900	1,450
996.60	3,200	1,755
996.70	3,500	2,090
996.80	3,800	2,455
996.90	4,100	2,850
997.00	4,400	3,275
997.10	4,569	3,723
997.20	4,737	4,189
997.30	4,906	4,671
997.40	5,075	5,170
997.50	5,244	5,686
997.60	5,412	6,219
997.70	5,581	6,768
997.80	5,750	7,335
997.90	5,918	7,918
998.00	6,087	8,519
998.10	6,256	9,136
998.20	6,425	9,770
998.30	6,593	10,421
998.40	6,762	11,088
998.50	6,931	11,773
998.60	7,099	12,475
998.70	7,268	13,193
998.80	7,437	13,928
998.90	7,606	14,680
999.00	7,774	15,449
999.10	7,943	16,235
999.20	8,112	17,038
999.30	8,280	17,857
999.40	8,449	18,694
999.50	8,618	19,547
999.60	8,787	20,418
999.70	8,955	21,305
999.80	9,124	22,209
999.90	9,293	23,129
1,000.00	9,461	24,067
1,000.10	9,630	25,022
1,000.20	9,799	25,993
1,000.30	9,968	26,981
1,000.40	10,136	27,987
1,000.50	10,305	29,009
1,000.60	10,474	30,048
1,000.70	10,642	31,103
1,000.80	10,811	32,176
1,000.90	10,980	33,266
1,001.00	11,149	34,372
1,001.10	11,317	35,495
1,001.20	11,486	36,636
1,001.30	11,655	37,793
1,001.40	11,823	38,967
1,001.50	11,992	40,157
1,001.60	12,161	41,365
1,001.70	12,330	42,589
1,001.80	12,498	43,831
1,001.90	12,667	45,089
1,002.00	12,836	46,364
1,002.10	13,004	47,656
1,002.20	13,173	48,965
1,002.30	13,342	50,291
1,002.40	13,511	51,634
1,002.50	13,679	52,993
1,002.60	13,848	54,369
1,002.70	14,017	55,763
1,002.80	14,185	57,173
1,002.90	14,354	58,600
1,003.00	14,523	60,044
1,003.10	14,692	61,504
1,003.20	14,860	62,982
1,003.30	15,029	64,476
1,003.40	15,198	65,988
1,003.50	15,366	67,516
1,003.60	15,535	69,061
1,003.70	15,704	70,623
1,003.80	15,873	72,202
1,003.90	16,041	73,797
1,004.00	**16,210**	**75,410**

Summary for Link 1L: Proposed Total

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth > 3.40" for Jackson - 10 YR event
Inflow = 9.93 cfs @ 12.07 hrs, Volume= 1.425 af
Primary = 9.93 cfs @ 12.07 hrs, Volume= 1.425 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

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	0.10	0.00	0.10
0.50	0.00	0.00	0.00	26.50	0.10	0.00	0.10
1.00	0.00	0.00	0.00	27.00	0.10	0.00	0.10
1.50	0.00	0.00	0.00	27.50	0.10	0.00	0.10
2.00	0.00	0.00	0.00	28.00	0.10	0.00	0.10
2.50	0.00	0.00	0.00	28.50	0.10	0.00	0.10
3.00	0.00	0.00	0.00	29.00	0.10	0.00	0.10
3.50	0.00	0.00	0.00	29.50	0.10	0.00	0.10
4.00	0.00	0.00	0.00	30.00	0.10	0.00	0.10
4.50	0.00	0.00	0.00	30.50	0.10	0.00	0.10
5.00	0.00	0.00	0.00	31.00	0.10	0.00	0.10
5.50	0.00	0.00	0.00	31.50	0.10	0.00	0.10
6.00	0.01	0.00	0.01	32.00	0.10	0.00	0.10
6.50	0.02	0.00	0.02	32.50	0.09	0.00	0.09
7.00	0.03	0.00	0.03	33.00	0.09	0.00	0.09
7.50	0.04	0.00	0.04	33.50	0.09	0.00	0.09
8.00	0.04	0.00	0.04	34.00	0.09	0.00	0.09
8.50	0.05	0.00	0.05	34.50	0.09	0.00	0.09
9.00	0.05	0.00	0.05	35.00	0.09	0.00	0.09
9.50	0.06	0.00	0.06	35.50	0.09	0.00	0.09
10.00	0.06	0.00	0.06	36.00	0.09	0.00	0.09
10.50	0.07	0.00	0.07	36.50	0.09	0.00	0.09
11.00	0.08	0.00	0.08	37.00	0.09	0.00	0.09
11.50	0.09	0.00	0.09	37.50	0.09	0.00	0.09
12.00	**9.04**	0.00	**9.04**	38.00	0.09	0.00	0.09
12.50	**6.55**	0.00	**6.55**	38.50	0.09	0.00	0.09
13.00	2.90	0.00	2.90	39.00	0.09	0.00	0.09
13.50	2.13	0.00	2.13	39.50	0.09	0.00	0.09
14.00	1.55	0.00	1.55	40.00	0.09	0.00	0.09
14.50	1.12	0.00	1.12	40.50	0.09	0.00	0.09
15.00	0.92	0.00	0.92	41.00	0.09	0.00	0.09
15.50	0.79	0.00	0.79	41.50	0.08	0.00	0.08
16.00	0.69	0.00	0.69	42.00	0.08	0.00	0.08
16.50	0.62	0.00	0.62	42.50	0.08	0.00	0.08
17.00	0.57	0.00	0.57	43.00	0.08	0.00	0.08
17.50	0.53	0.00	0.53	43.50	0.08	0.00	0.08
18.00	0.50	0.00	0.50	44.00	0.08	0.00	0.08
18.50	0.47	0.00	0.47	44.50	0.08	0.00	0.08
19.00	0.43	0.00	0.43	45.00	0.08	0.00	0.08
19.50	0.40	0.00	0.40	45.50	0.08	0.00	0.08
20.00	0.37	0.00	0.37	46.00	0.08	0.00	0.08
20.50	0.35	0.00	0.35	46.50	0.08	0.00	0.08
21.00	0.33	0.00	0.33	47.00	0.08	0.00	0.08
21.50	0.32	0.00	0.32	47.50	0.08	0.00	0.08
22.00	0.32	0.00	0.32	48.00	0.08	0.00	0.08
22.50	0.31	0.00	0.31				
23.00	0.30	0.00	0.30				
23.50	0.29	0.00	0.29				
24.00	0.29	0.00	0.29				
24.50	0.18	0.00	0.18				
25.00	0.13	0.00	0.13				
25.50	0.10	0.00	0.10				

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: Proposed Detention Runoff Area=5.030 ac 46.32% Impervious Runoff Depth=5.92"
Tc=5.0 min CN=85 Runoff=51.41 cfs 2.483 af

Pond 1P: Proposed Detention Peak Elev=1,002.03' Storage=46,763 cf Inflow=51.41 cfs 2.483 af
Outflow=15.00 cfs 2.378 af

Link 1L: Proposed Total Inflow=15.00 cfs 2.378 af
Primary=15.00 cfs 2.378 af

Total Runoff Area = 5.030 ac Runoff Volume = 2.483 af Average Runoff Depth = 5.92"
53.68% Pervious = 2.700 ac 46.32% Impervious = 2.330 ac

Summary for Subcatchment 1S: Proposed Detention

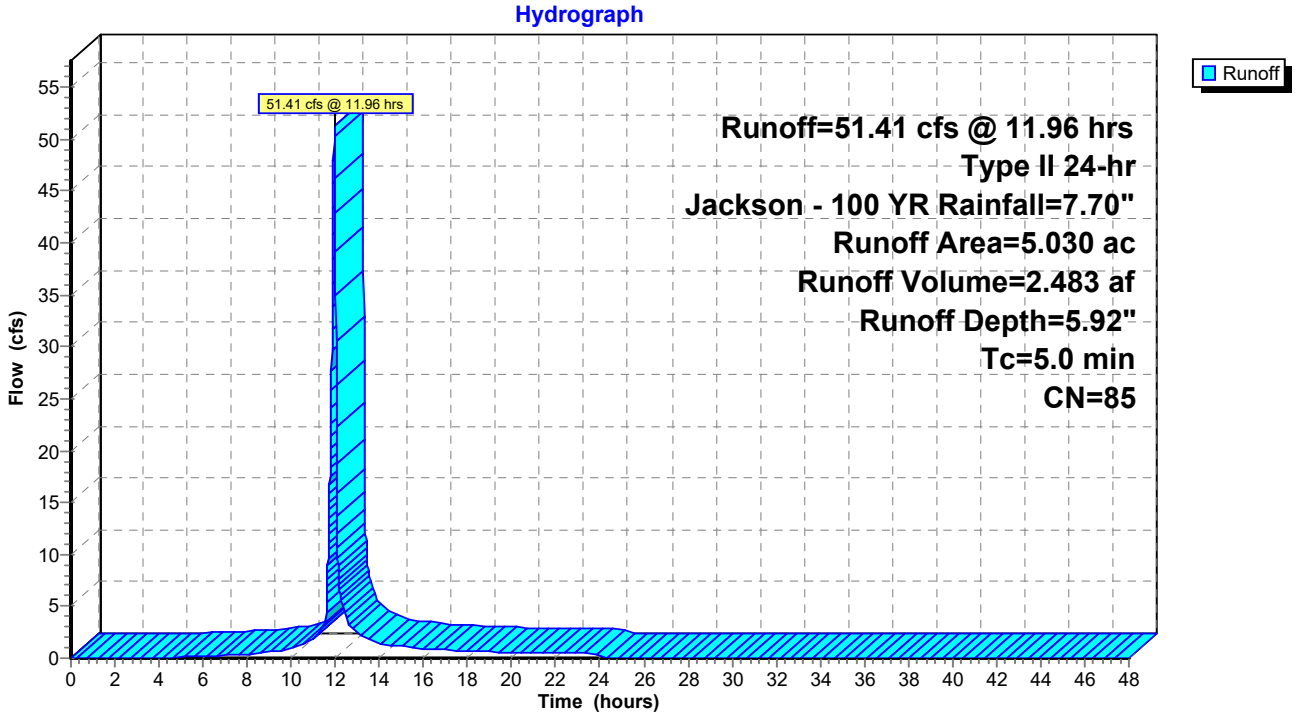
Runoff = 51.41 cfs @ 11.96 hrs, Volume= 2.483 af, Depth= 5.92"
Routed to Pond 1P : Proposed Detention

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 Jackson - 100 YR Rainfall=7.70"

Area (ac)	CN	Description
2.700	74	>75% Grass cover, Good, HSG C
2.330	98	Paved parking, HSG C
5.030	85	Weighted Average
2.700		53.68% Pervious Area
2.330		46.32% Impervious Area

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

Subcatchment 1S: Proposed Detention



Hydrograph for Subcatchment 1S: Proposed Detention

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	0.01
4.50	0.43	0.00	0.04
5.00	0.49	0.01	0.08
5.50	0.55	0.02	0.12
6.00	0.62	0.03	0.16
6.50	0.69	0.05	0.21
7.00	0.76	0.08	0.26
7.50	0.84	0.11	0.31
8.00	0.92	0.14	0.36
8.50	1.02	0.18	0.48
9.00	1.13	0.24	0.62
9.50	1.26	0.31	0.69
10.00	1.39	0.39	0.90
10.50	1.57	0.50	1.26
11.00	1.81	0.66	1.86
11.50	2.18	0.93	**3.29**
12.00	5.11	3.47	**42.96**
12.50	5.66	3.98	3.83
13.00	5.94	4.25	2.39
13.50	6.15	4.45	1.81
14.00	6.31	4.60	1.43
14.50	6.45	4.73	1.26
15.00	6.57	4.84	1.13
15.50	6.68	4.95	1.01
16.00	6.78	5.04	0.88
16.50	6.86	5.12	0.82
17.00	6.94	5.20	0.77
17.50	7.02	5.27	0.73
18.00	7.09	5.34	0.68
18.50	7.16	5.40	0.63
19.00	7.22	5.46	0.59
19.50	7.28	5.52	0.54
20.00	7.33	5.57	0.49
20.50	7.38	5.62	0.48
21.00	7.43	5.66	0.47
21.50	7.48	5.71	0.46
22.00	7.52	5.75	0.45
22.50	7.57	5.80	0.44
23.00	7.61	5.84	0.43
23.50	7.66	5.88	0.42
24.00	**7.70**	**5.92**	0.41
24.50	7.70	5.92	0.00
25.00	7.70	5.92	0.00
25.50	7.70	5.92	0.00
26.00	7.70	5.92	0.00
26.50	7.70	5.92	0.00
27.00	7.70	5.92	0.00
27.50	7.70	5.92	0.00
28.00	7.70	5.92	0.00
28.50	7.70	5.92	0.00
29.00	7.70	5.92	0.00
29.50	7.70	5.92	0.00
30.00	7.70	5.92	0.00
30.50	7.70	5.92	0.00
31.00	7.70	5.92	0.00
31.50	7.70	5.92	0.00
32.00	7.70	5.92	0.00
32.50	7.70	5.92	0.00
33.00	7.70	5.92	0.00
33.50	7.70	5.92	0.00
34.00	7.70	5.92	0.00
34.50	7.70	5.92	0.00
35.00	7.70	5.92	0.00
35.50	7.70	5.92	0.00
36.00	7.70	5.92	0.00
36.50	7.70	5.92	0.00
37.00	7.70	5.92	0.00
37.50	7.70	5.92	0.00
38.00	7.70	5.92	0.00
38.50	7.70	5.92	0.00
39.00	7.70	5.92	0.00
39.50	7.70	5.92	0.00
40.00	7.70	5.92	0.00
40.50	7.70	5.92	0.00
41.00	7.70	5.92	0.00
41.50	7.70	5.92	0.00
42.00	7.70	5.92	0.00
42.50	7.70	5.92	0.00
43.00	7.70	5.92	0.00
43.50	7.70	5.92	0.00
44.00	7.70	5.92	0.00
44.50	7.70	5.92	0.00
45.00	7.70	5.92	0.00
45.50	7.70	5.92	0.00
46.00	7.70	5.92	0.00
46.50	7.70	5.92	0.00
47.00	7.70	5.92	0.00
47.50	7.70	5.92	0.00
48.00	7.70	5.92	0.00

Summary for Pond 1P: Proposed Detention

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth = 5.92" for Jackson - 100 YR event
Inflow = 51.41 cfs @ 11.96 hrs, Volume= 2.483 af
Outflow = 15.00 cfs @ 12.07 hrs, Volume= 2.378 af, Atten= 71%, Lag= 7.0 min
Primary = 15.00 cfs @ 12.07 hrs, Volume= 2.378 af
Routed to Link 1L : Proposed Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 1,002.03' @ 12.07 hrs Surf.Area= 12,888 sf Storage= 46,763 cf

Plug-Flow detention time= 180.7 min calculated for 2.378 af (96% of inflow)
Center-of-Mass det. time= 155.6 min (943.2 - 787.6)

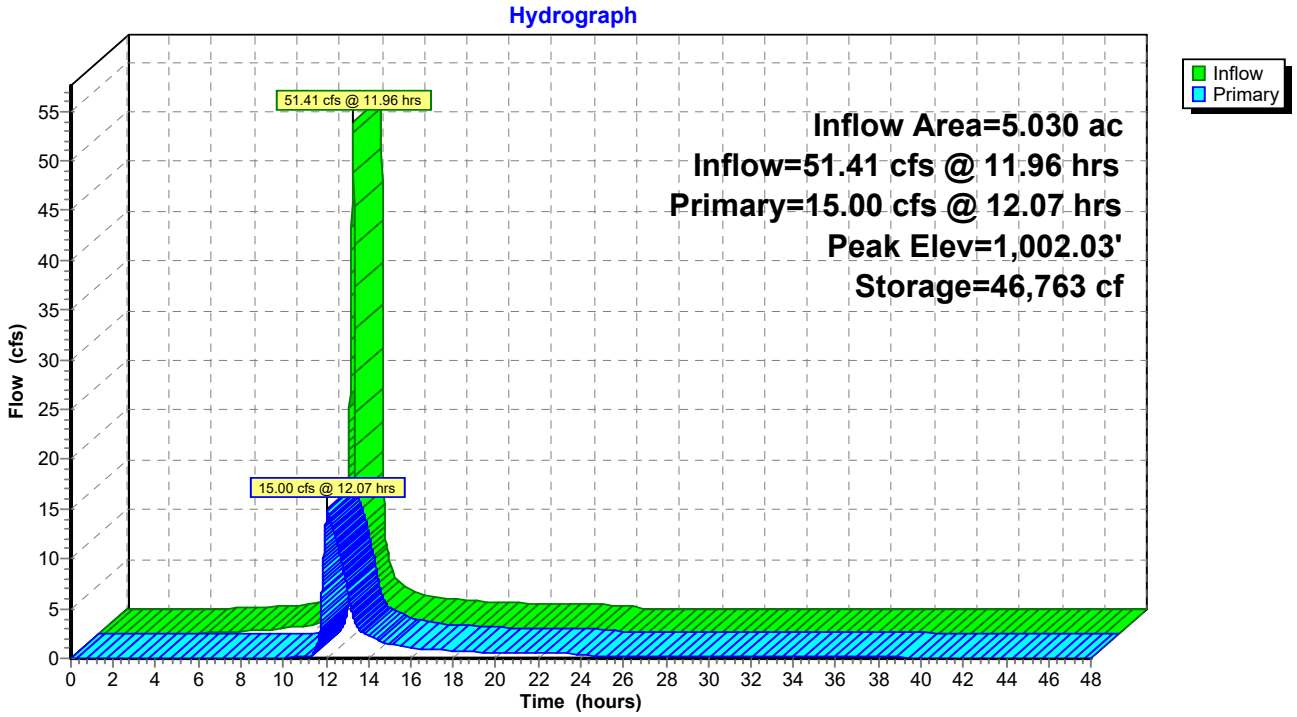
Volume	Invert	Avail.Storage	Storage Description
#1	995.50'	75,410 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.50	100	0	0
996.00	1,400	375	375
997.00	4,400	2,900	3,275
1,004.00	16,210	72,135	75,410

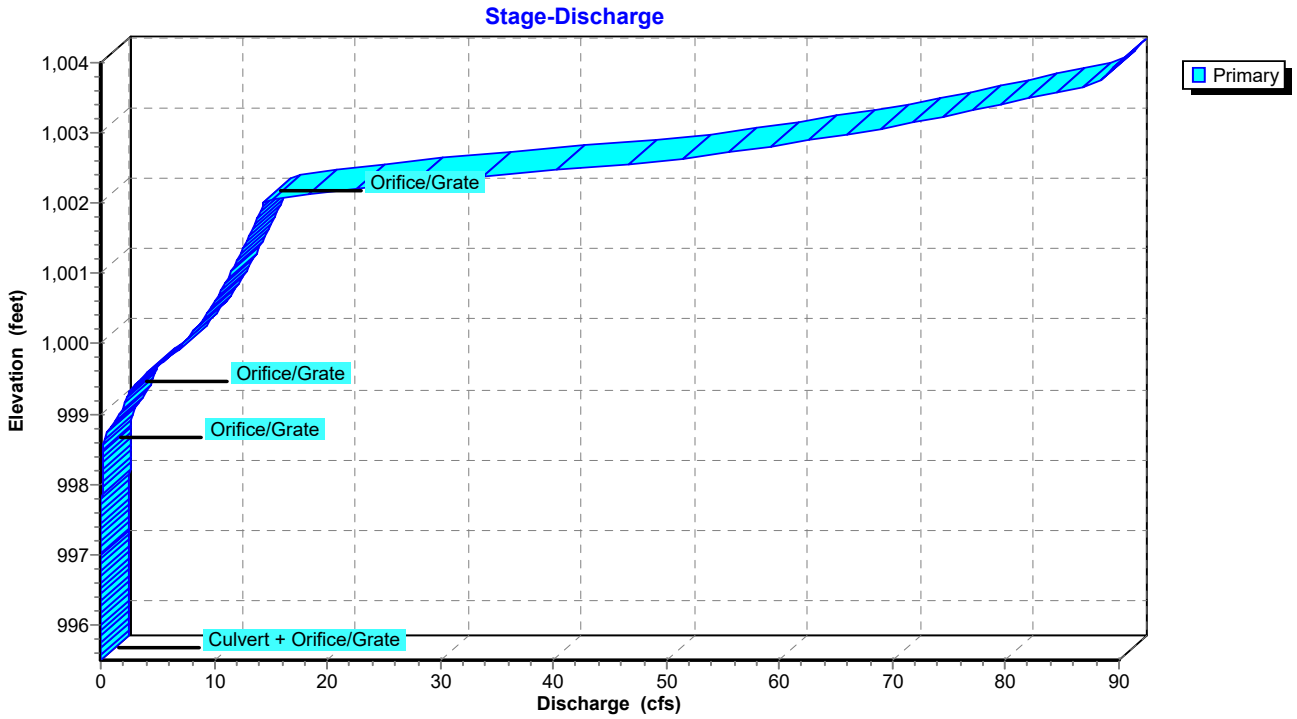
Device	Routing	Invert	Outlet Devices
#1	Primary	995.50'	**36.0" Round Culvert** L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 995.50' / 995.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	995.50'	**1.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	998.50'	**16.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	999.30'	**27.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	1,002.00'	**288.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=14.89 cfs @ 12.07 hrs HW=1,002.03' (Free Discharge)
└**1=Culvert** (Passes 14.89 cfs of 76.33 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.15 cfs @ 12.25 fps)
  ├**3=Orifice/Grate** (Orifice Controls 5.81 cfs @ 8.72 fps)
  ├**4=Orifice/Grate** (Orifice Controls 8.53 cfs @ 7.58 fps)
  └**5=Orifice/Grate** (Orifice Controls 0.40 cfs @ 0.56 fps)

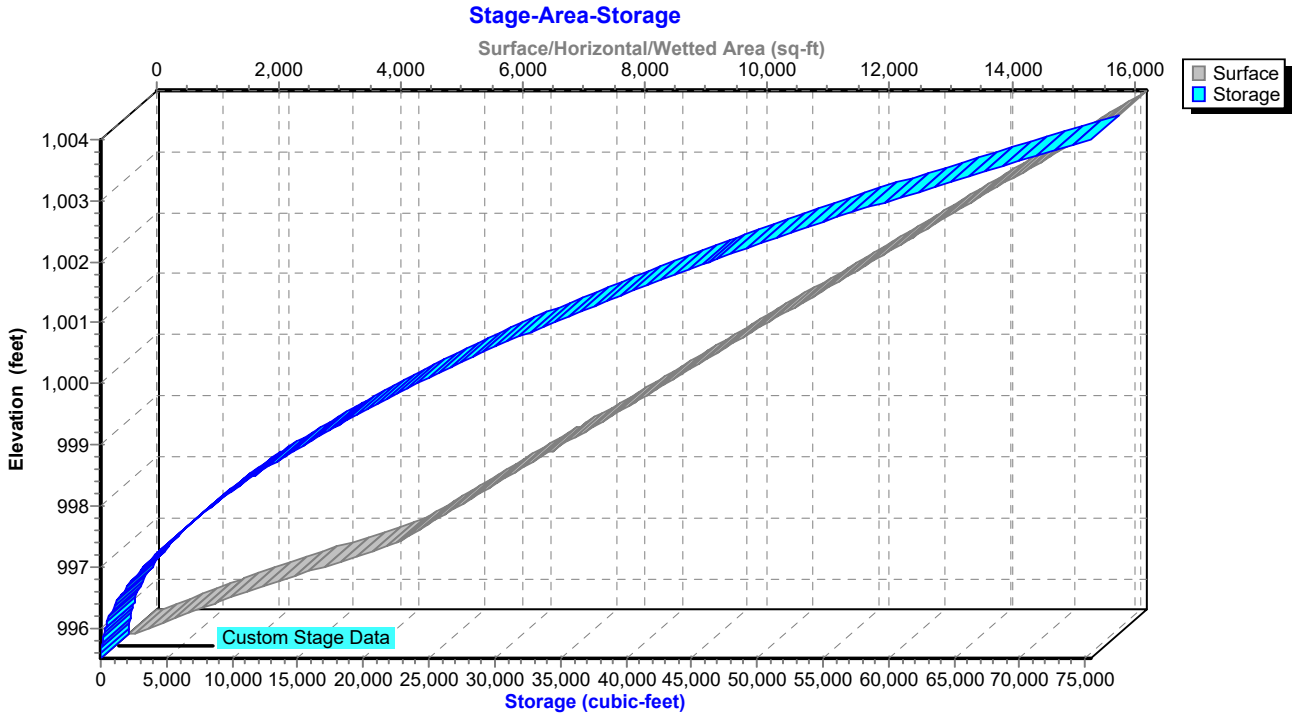
Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Hydrograph for Pond 1P: Proposed Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	995.50	0.00
1.00	0.00	0	995.50	0.00
2.00	0.00	0	995.50	0.00
3.00	0.00	0	995.50	0.00
4.00	0.01	1	995.50	0.00
5.00	0.08	101	995.74	0.02
6.00	0.16	413	996.03	0.04
7.00	0.26	1,005	996.33	0.05
8.00	0.36	1,914	996.65	0.06
9.00	0.62	3,406	997.03	0.07
10.00	0.90	5,743	997.51	0.08
11.00	**1.86**	10,125	998.25	0.10
12.00	**42.96**	**43,120**	**1,001.74**	**13.71**
13.00	2.39	**23,741**	**999.97**	**7.08**
14.00	1.43	17,227	999.22	2.29
15.00	1.13	15,141	998.96	1.45
16.00	0.88	14,383	998.86	1.04
17.00	0.77	13,997	998.81	0.84
18.00	0.68	13,767	998.78	0.74
19.00	0.59	13,559	998.75	0.64
20.00	0.49	13,352	998.72	0.55
21.00	0.47	13,202	998.70	0.50
22.00	0.45	13,129	998.69	0.47
23.00	0.43	13,075	998.68	0.45
24.00	0.41	13,025	998.68	0.43
25.00	0.00	12,154	998.55	0.16
26.00	0.00	11,709	998.49	0.10
27.00	0.00	11,347	998.44	0.10
28.00	0.00	10,988	998.39	0.10
29.00	0.00	10,632	998.33	0.10
30.00	0.00	10,280	998.28	0.10
31.00	0.00	9,931	998.23	0.10
32.00	0.00	9,586	998.17	0.10
33.00	0.00	9,244	998.12	0.09
34.00	0.00	8,906	998.06	0.09
35.00	0.00	8,572	998.01	0.09
36.00	0.00	8,241	997.95	0.09
37.00	0.00	7,914	997.90	0.09
38.00	0.00	7,590	997.84	0.09
39.00	0.00	7,271	997.79	0.09
40.00	0.00	6,956	997.73	0.09
41.00	0.00	6,644	997.68	0.09
42.00	0.00	6,337	997.62	0.08
43.00	0.00	6,034	997.57	0.08
44.00	0.00	5,735	997.51	0.08
45.00	0.00	5,440	997.45	0.08
46.00	0.00	5,150	997.40	0.08
47.00	0.00	4,864	997.34	0.08
48.00	0.00	4,583	997.28	0.08

Stage-Discharge for Pond 1P: Proposed Detention

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
995.50	0.00	998.10	0.09	1,000.70	10.41	1,003.30	76.56
995.55	0.00	998.15	0.10	1,000.75	10.59	1,003.35	78.07
995.60	0.01	998.20	0.10	1,000.80	10.77	1,003.40	79.55
995.65	0.02	998.25	0.10	1,000.85	10.95	1,003.45	81.00
995.70	0.02	998.30	0.10	1,000.90	11.13	1,003.50	82.42
995.75	0.03	998.35	0.10	1,000.95	11.30	1,003.55	83.81
995.80	0.03	998.40	0.10	1,001.00	11.46	1,003.60	85.17
995.85	0.03	998.45	0.10	1,001.05	11.63	1,003.65	86.51
995.90	0.03	998.50	0.10	1,001.10	11.79	1,003.70	87.83
995.95	0.04	998.55	0.15	1,001.15	11.96	1,003.75	88.43
996.00	0.04	998.60	0.24	1,001.20	12.11	1,003.80	88.75
996.05	0.04	998.65	0.35	1,001.25	12.27	1,003.85	89.08
996.10	0.04	998.70	0.49	1,001.30	12.43	1,003.90	89.40
996.15	0.05	998.75	0.64	1,001.35	12.58	1,003.95	89.73
996.20	0.05	998.80	0.81	1,001.40	12.73	1,004.00	**90.05**
996.25	0.05	998.85	0.99	1,001.45	12.88		
996.30	0.05	998.90	1.19	1,001.50	13.02		
996.35	0.05	998.95	1.40	1,001.55	13.17		
996.40	0.05	999.00	1.62	1,001.60	13.31		
996.45	0.06	999.05	1.81	1,001.65	13.46		
996.50	0.06	999.10	1.96	1,001.70	13.60		
996.55	0.06	999.15	2.11	1,001.75	13.74		
996.60	0.06	999.20	2.24	1,001.80	13.87		
996.65	0.06	999.25	2.36	1,001.85	14.01		
996.70	0.06	999.30	2.47	1,001.90	14.14		
996.75	0.06	999.35	2.66	1,001.95	14.28		
996.80	0.07	999.40	2.92	1,002.00	14.41		
996.85	0.07	999.45	3.21	1,002.05	15.40		
996.90	0.07	999.50	3.53	1,002.10	17.11		
996.95	0.07	999.55	3.88	1,002.15	19.28		
997.00	0.07	999.60	4.25	1,002.20	21.82		
997.05	0.07	999.65	4.65	1,002.25	24.68		
997.10	0.07	999.70	5.07	1,002.30	27.84		
997.15	0.07	999.75	5.50	1,002.35	31.26		
997.20	0.08	999.80	5.96	1,002.40	34.92		
997.25	0.08	999.85	6.35	1,002.45	38.81		
997.30	0.08	999.90	6.69	1,002.50	42.91		
997.35	0.08	999.95	7.00	1,002.55	46.35		
997.40	0.08	1,000.00	7.29	1,002.60	49.28		
997.45	0.08	1,000.05	7.57	1,002.65	51.93		
997.50	0.08	1,000.10	7.83	1,002.70	54.38		
997.55	0.08	1,000.15	8.08	1,002.75	56.67		
997.60	0.08	1,000.20	8.33	1,002.80	58.85		
997.65	0.09	1,000.25	8.56	1,002.85	60.92		
997.70	0.09	1,000.30	8.79	1,002.90	62.90		
997.75	0.09	1,000.35	9.01	1,002.95	64.80		
997.80	0.09	1,000.40	9.23	1,003.00	66.64		
997.85	0.09	1,000.45	9.43	1,003.05	68.41		
997.90	0.09	1,000.50	9.64	1,003.10	70.14		
997.95	0.09	1,000.55	9.84	1,003.15	71.81		
998.00	0.09	1,000.60	10.03	1,003.20	73.43		
998.05	0.09	1,000.65	10.22	1,003.25	75.02		

Stage-Area-Storage for Pond 1P: Proposed Detention

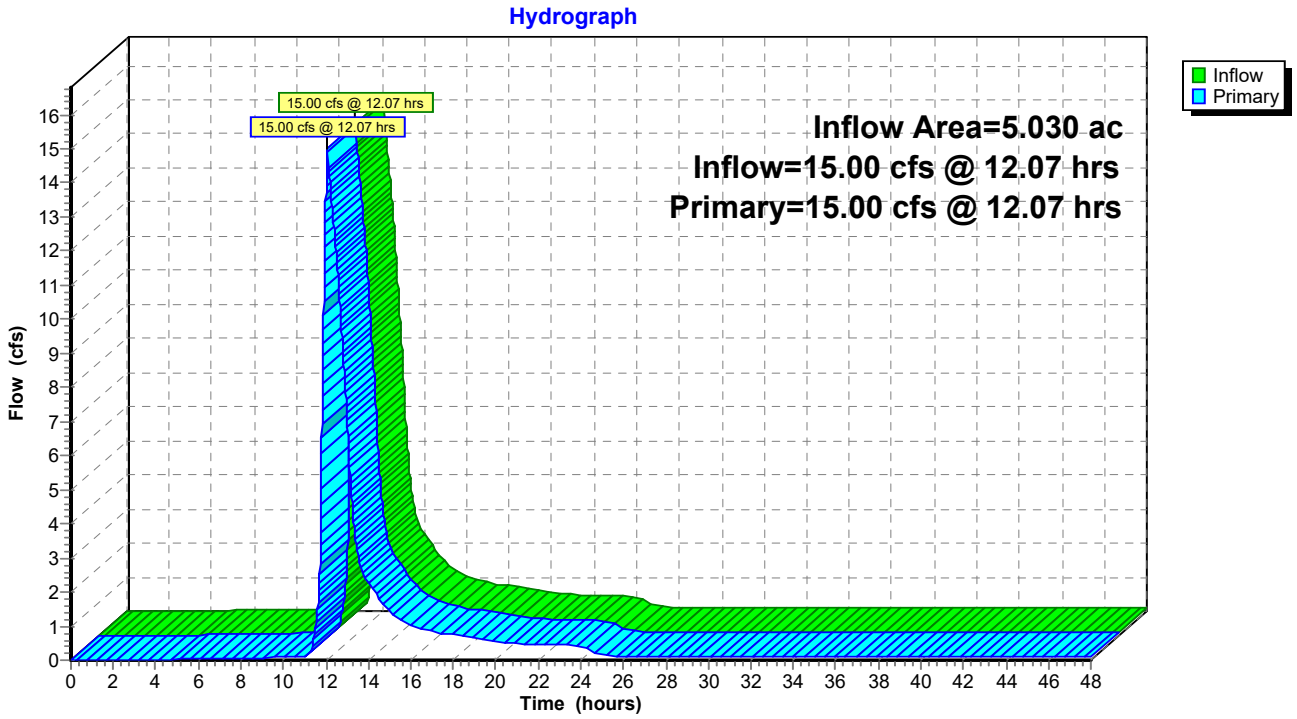
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
995.50	100	0
995.60	360	23
995.70	620	72
995.80	880	147
995.90	1,140	248
996.00	1,400	375
996.10	1,700	530
996.20	2,000	715
996.30	2,300	930
996.40	2,600	1,175
996.50	2,900	1,450
996.60	3,200	1,755
996.70	3,500	2,090
996.80	3,800	2,455
996.90	4,100	2,850
997.00	4,400	3,275
997.10	4,569	3,723
997.20	4,737	4,189
997.30	4,906	4,671
997.40	5,075	5,170
997.50	5,244	5,686
997.60	5,412	6,219
997.70	5,581	6,768
997.80	5,750	7,335
997.90	5,918	7,918
998.00	6,087	8,519
998.10	6,256	9,136
998.20	6,425	9,770
998.30	6,593	10,421
998.40	6,762	11,088
998.50	6,931	11,773
998.60	7,099	12,475
998.70	7,268	13,193
998.80	7,437	13,928
998.90	7,606	14,680
999.00	7,774	15,449
999.10	7,943	16,235
999.20	8,112	17,038
999.30	8,280	17,857
999.40	8,449	18,694
999.50	8,618	19,547
999.60	8,787	20,418
999.70	8,955	21,305
999.80	9,124	22,209
999.90	9,293	23,129
1,000.00	9,461	24,067
1,000.10	9,630	25,022
1,000.20	9,799	25,993
1,000.30	9,968	26,981
1,000.40	10,136	27,987
1,000.50	10,305	29,009
1,000.60	10,474	30,048
1,000.70	10,642	31,103
1,000.80	10,811	32,176
1,000.90	10,980	33,266
1,001.00	11,149	34,372
1,001.10	11,317	35,495
1,001.20	11,486	36,636
1,001.30	11,655	37,793
1,001.40	11,823	38,967
1,001.50	11,992	40,157
1,001.60	12,161	41,365
1,001.70	12,330	42,589
1,001.80	12,498	43,831
1,001.90	12,667	45,089
1,002.00	12,836	46,364
1,002.10	13,004	47,656
1,002.20	13,173	48,965
1,002.30	13,342	50,291
1,002.40	13,511	51,634
1,002.50	13,679	52,993
1,002.60	13,848	54,369
1,002.70	14,017	55,763
1,002.80	14,185	57,173
1,002.90	14,354	58,600
1,003.00	14,523	60,044
1,003.10	14,692	61,504
1,003.20	14,860	62,982
1,003.30	15,029	64,476
1,003.40	15,198	65,988
1,003.50	15,366	67,516
1,003.60	15,535	69,061
1,003.70	15,704	70,623
1,003.80	15,873	72,202
1,003.90	16,041	73,797
1,004.00	**16,210**	**75,410**

Summary for Link 1L: Proposed Total

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth > 5.67" for Jackson - 100 YR event
Inflow = 15.00 cfs @ 12.07 hrs, Volume= 2.378 af
Primary = 15.00 cfs @ 12.07 hrs, Volume= 2.378 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.50	0.00	0.00	0.00
1.00	0.00	0.00	0.00
1.50	0.00	0.00	0.00
2.00	0.00	0.00	0.00
2.50	0.00	0.00	0.00
3.00	0.00	0.00	0.00
3.50	0.00	0.00	0.00
4.00	0.00	0.00	0.00
4.50	0.01	0.00	0.01
5.00	0.02	0.00	0.02
5.50	0.03	0.00	0.03
6.00	0.04	0.00	0.04
6.50	0.05	0.00	0.05
7.00	0.05	0.00	0.05
7.50	0.06	0.00	0.06
8.00	0.06	0.00	0.06
8.50	0.07	0.00	0.07
9.00	0.07	0.00	0.07
9.50	0.08	0.00	0.08
10.00	0.08	0.00	0.08
10.50	0.09	0.00	0.09
11.00	0.10	0.00	0.10
11.50	0.91	0.00	0.91
12.00	**13.71**	0.00	**13.71**
12.50	**11.85**	0.00	**11.85**
13.00	7.08	0.00	7.08
13.50	3.15	0.00	3.15
14.00	2.29	0.00	2.29
14.50	1.83	0.00	1.83
15.00	1.45	0.00	1.45
15.50	1.20	0.00	1.20
16.00	1.04	0.00	1.04
16.50	0.92	0.00	0.92
17.00	0.84	0.00	0.84
17.50	0.79	0.00	0.79
18.00	0.74	0.00	0.74
18.50	0.69	0.00	0.69
19.00	0.64	0.00	0.64
19.50	0.60	0.00	0.60
20.00	0.55	0.00	0.55
20.50	0.52	0.00	0.52
21.00	0.50	0.00	0.50
21.50	0.48	0.00	0.48
22.00	0.47	0.00	0.47
22.50	0.46	0.00	0.46
23.00	0.45	0.00	0.45
23.50	0.44	0.00	0.44
24.00	0.43	0.00	0.43
24.50	0.26	0.00	0.26
25.00	0.16	0.00	0.16
25.50	0.12	0.00	0.12
26.00	0.10	0.00	0.10
26.50	0.10	0.00	0.10
27.00	0.10	0.00	0.10
27.50	0.10	0.00	0.10
28.00	0.10	0.00	0.10
28.50	0.10	0.00	0.10
29.00	0.10	0.00	0.10
29.50	0.10	0.00	0.10
30.00	0.10	0.00	0.10
30.50	0.10	0.00	0.10
31.00	0.10	0.00	0.10
31.50	0.10	0.00	0.10
32.00	0.10	0.00	0.10
32.50	0.09	0.00	0.09
33.00	0.09	0.00	0.09
33.50	0.09	0.00	0.09
34.00	0.09	0.00	0.09
34.50	0.09	0.00	0.09
35.00	0.09	0.00	0.09
35.50	0.09	0.00	0.09
36.00	0.09	0.00	0.09
36.50	0.09	0.00	0.09
37.00	0.09	0.00	0.09
37.50	0.09	0.00	0.09
38.00	0.09	0.00	0.09
38.50	0.09	0.00	0.09
39.00	0.09	0.00	0.09
39.50	0.09	0.00	0.09
40.00	0.09	0.00	0.09
40.50	0.09	0.00	0.09
41.00	0.09	0.00	0.09
41.50	0.09	0.00	0.09
42.00	0.08	0.00	0.08
42.50	0.08	0.00	0.08
43.00	0.08	0.00	0.08
43.50	0.08	0.00	0.08
44.00	0.08	0.00	0.08
44.50	0.08	0.00	0.08
45.00	0.08	0.00	0.08
45.50	0.08	0.00	0.08
46.00	0.08	0.00	0.08
46.50	0.08	0.00	0.08
47.00	0.08	0.00	0.08
47.50	0.08	0.00	0.08
48.00	0.08	0.00	0.08

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: Proposed Detention Runoff Area=5.030 ac 46.32% Impervious Runoff Depth=2.02"
Tc=5.0 min CN=85 Runoff=18.57 cfs 0.845 af

Pond 1P: Proposed Detention Peak Elev=999.28' Storage=17,711 cf Inflow=18.57 cfs 0.845 af
Outflow=2.43 cfs 0.745 af

Link 1L: Proposed Total Inflow=2.43 cfs 0.745 af
Primary=2.43 cfs 0.745 af

Total Runoff Area = 5.030 ac Runoff Volume = 0.845 af Average Runoff Depth = 2.02"
53.68% Pervious = 2.700 ac 46.32% Impervious = 2.330 ac

Summary for Subcatchment 1S: Proposed Detention

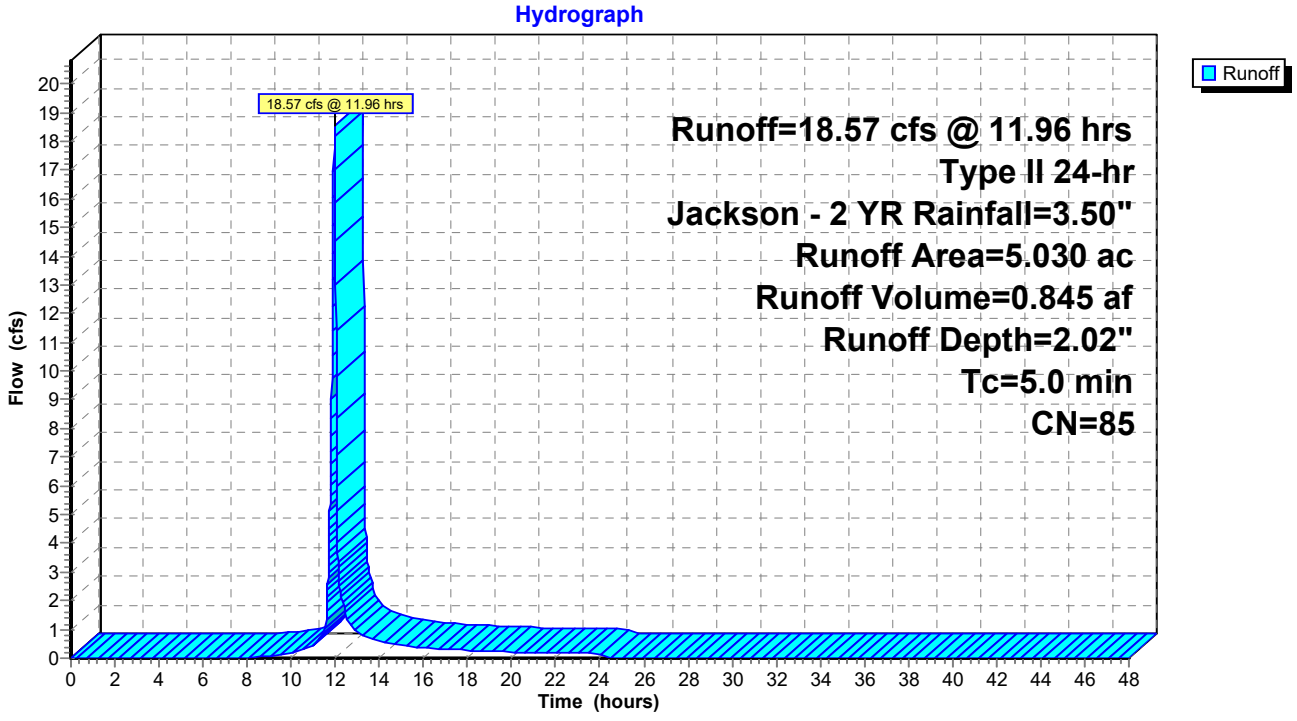
Runoff = 18.57 cfs @ 11.96 hrs, Volume= 0.845 af, Depth= 2.02"
Routed to Pond 1P : Proposed Detention

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 Jackson - 2 YR Rainfall=3.50"

Area (ac)	CN	Description
2.700	74	>75% Grass cover, Good, HSG C
2.330	98	Paved parking, HSG C
5.030	85	Weighted Average
2.700		53.68% Pervious Area
2.330		46.32% Impervious Area

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

Subcatchment 1S: Proposed Detention



Hydrograph for Subcatchment 1S: Proposed Detention

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	0.01
8.00	0.42	0.00	0.03
8.50	0.46	0.01	0.05
9.00	0.51	0.01	0.08
9.50	0.57	0.02	0.11
10.00	0.63	0.04	0.17
10.50	0.71	0.06	0.27
11.00	0.82	0.10	0.45
11.50	0.99	0.17	**0.89**
12.00	2.32	1.04	**15.87**
12.50	2.57	1.24	1.49
13.00	2.70	1.34	0.94
13.50	2.80	1.42	0.72
14.00	2.87	1.48	0.57
14.50	2.93	1.53	0.50
15.00	2.99	1.58	0.45
15.50	3.04	1.62	0.40
16.00	3.08	1.66	0.35
16.50	3.12	1.69	0.33
17.00	3.16	1.72	0.31
17.50	3.19	1.75	0.29
18.00	3.22	1.78	0.28
18.50	3.25	1.80	0.26
19.00	3.28	1.83	0.24
19.50	3.31	1.85	0.22
20.00	3.33	1.87	0.20
20.50	3.35	1.89	0.20
21.00	3.38	1.91	0.19
21.50	3.40	1.93	0.19
22.00	3.42	1.95	0.19
22.50	3.44	1.96	0.18
23.00	3.46	1.98	0.18
23.50	3.48	2.00	0.17
24.00	**3.50**	**2.02**	0.17
24.50	3.50	2.02	0.00
25.00	3.50	2.02	0.00
25.50	3.50	2.02	0.00
26.00	3.50	2.02	0.00
26.50	3.50	2.02	0.00
27.00	3.50	2.02	0.00
27.50	3.50	2.02	0.00
28.00	3.50	2.02	0.00
28.50	3.50	2.02	0.00
29.00	3.50	2.02	0.00
29.50	3.50	2.02	0.00
30.00	3.50	2.02	0.00
30.50	3.50	2.02	0.00
31.00	3.50	2.02	0.00
31.50	3.50	2.02	0.00
32.00	3.50	2.02	0.00
32.50	3.50	2.02	0.00
33.00	3.50	2.02	0.00
33.50	3.50	2.02	0.00
34.00	3.50	2.02	0.00
34.50	3.50	2.02	0.00
35.00	3.50	2.02	0.00
35.50	3.50	2.02	0.00
36.00	3.50	2.02	0.00
36.50	3.50	2.02	0.00
37.00	3.50	2.02	0.00
37.50	3.50	2.02	0.00
38.00	3.50	2.02	0.00
38.50	3.50	2.02	0.00
39.00	3.50	2.02	0.00
39.50	3.50	2.02	0.00
40.00	3.50	2.02	0.00
40.50	3.50	2.02	0.00
41.00	3.50	2.02	0.00
41.50	3.50	2.02	0.00
42.00	3.50	2.02	0.00
42.50	3.50	2.02	0.00
43.00	3.50	2.02	0.00
43.50	3.50	2.02	0.00
44.00	3.50	2.02	0.00
44.50	3.50	2.02	0.00
45.00	3.50	2.02	0.00
45.50	3.50	2.02	0.00
46.00	3.50	2.02	0.00
46.50	3.50	2.02	0.00
47.00	3.50	2.02	0.00
47.50	3.50	2.02	0.00
48.00	3.50	2.02	0.00

Summary for Pond 1P: Proposed Detention

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth = 2.02" for Jackson - 2 YR event
Inflow = 18.57 cfs @ 11.96 hrs, Volume= 0.845 af
Outflow = 2.43 cfs @ 12.21 hrs, Volume= 0.745 af, Atten= 87%, Lag= 14.7 min
Primary = 2.43 cfs @ 12.21 hrs, Volume= 0.745 af
Routed to Link 1L : Proposed Total

Routing by Stor-Ind method, Time Span= 0.00-48.00 hrs, dt= 0.01 hrs
Peak Elev= 999.28' @ 12.21 hrs Surf.Area= 8,251 sf Storage= 17,711 cf

Plug-Flow detention time= 441.4 min calculated for 0.745 af (88% of inflow)
Center-of-Mass det. time= 383.2 min (1,201.3 - 818.1)

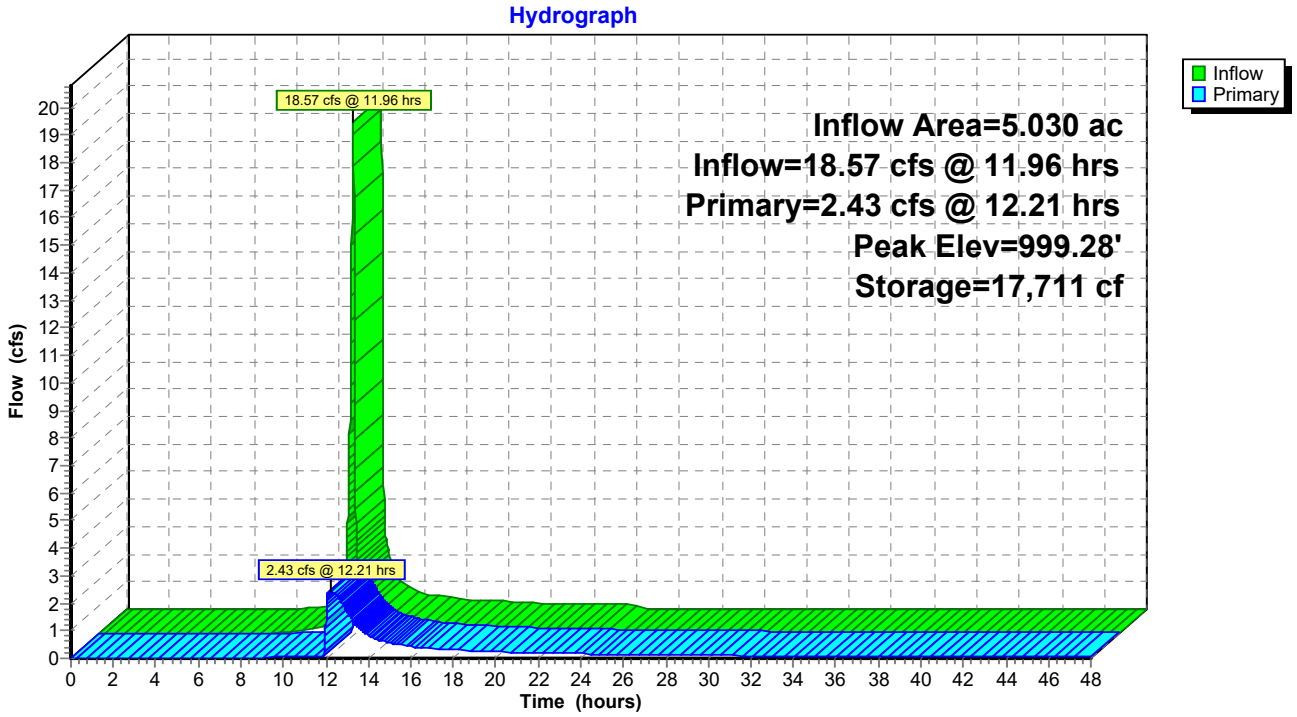
Volume	Invert	Avail.Storage	Storage Description
#1	995.50'	75,410 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
995.50	100	0	0
996.00	1,400	375	375
997.00	4,400	2,900	3,275
1,004.00	16,210	72,135	75,410

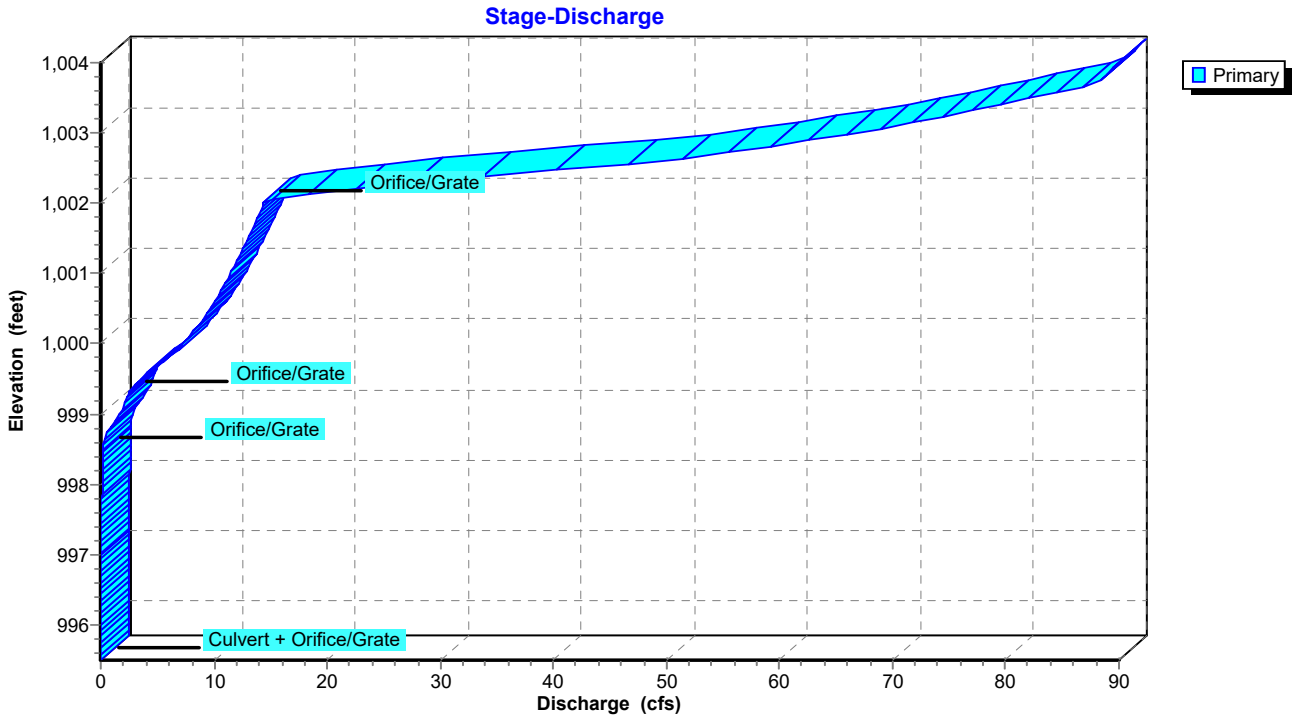
Device	Routing	Invert	Outlet Devices
#1	Primary	995.50'	**36.0" Round Culvert** L= 50.0' RCP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 995.50' / 995.00' S= 0.0100 '/' Cc= 0.900 n= 0.013, Flow Area= 7.07 sf
#2	Device 1	995.50'	**1.5" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	998.50'	**16.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#4	Device 1	999.30'	**27.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#5	Device 1	1,002.00'	**288.0" W x 6.0" H Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads

Primary OutFlow Max=2.43 cfs @ 12.21 hrs HW=999.28' (Free Discharge)
└**1=Culvert** (Passes 2.43 cfs of 49.75 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 0.11 cfs @ 9.29 fps)
  ├**3=Orifice/Grate** (Orifice Controls 2.32 cfs @ 3.48 fps)
  ├**4=Orifice/Grate** (Controls 0.00 cfs)
  └**5=Orifice/Grate** (Controls 0.00 cfs)

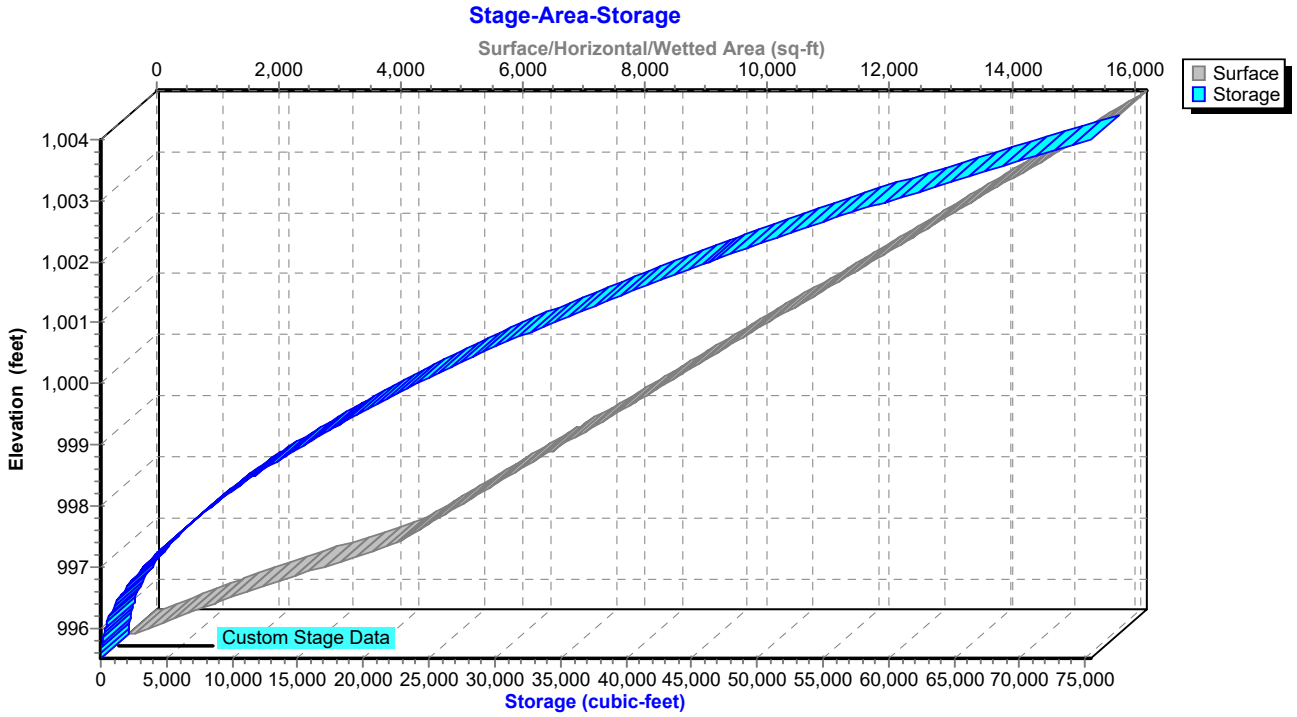
Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Pond 1P: Proposed Detention



Hydrograph for Pond 1P: Proposed Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	995.50	0.00
1.00	0.00	0	995.50	0.00
2.00	0.00	0	995.50	0.00
3.00	0.00	0	995.50	0.00
4.00	0.00	0	995.50	0.00
5.00	0.00	0	995.50	0.00
6.00	0.00	0	995.50	0.00
7.00	0.00	0	995.50	0.00
8.00	0.03	25	995.60	0.01
9.00	0.08	139	995.79	0.03
10.00	0.17	445	996.05	0.04
11.00	**0.45**	1,292	996.44	0.06
12.00	**15.87**	**15,032**	**998.95**	**1.39**
13.00	0.94	**15,657**	**999.03**	**1.71**
14.00	0.57	13,986	998.81	0.84
15.00	0.45	13,371	998.72	0.56
16.00	0.35	13,042	998.68	0.43
17.00	0.31	12,831	998.65	0.35
18.00	0.28	12,698	998.63	0.31
19.00	0.24	12,570	998.61	0.27
20.00	0.20	12,442	998.60	0.24
21.00	0.19	12,347	998.58	0.21
22.00	0.19	12,298	998.57	0.20
23.00	0.18	12,264	998.57	0.19
24.00	0.17	12,236	998.57	0.18
25.00	0.00	11,787	998.50	0.10
26.00	0.00	11,424	998.45	0.10
27.00	0.00	11,064	998.40	0.10
28.00	0.00	10,707	998.34	0.10
29.00	0.00	10,354	998.29	0.10
30.00	0.00	10,005	998.24	0.10
31.00	0.00	9,659	998.18	0.10
32.00	0.00	9,316	998.13	0.09
33.00	0.00	8,977	998.07	0.09
34.00	0.00	8,642	998.02	0.09
35.00	0.00	8,310	997.97	0.09
36.00	0.00	7,983	997.91	0.09
37.00	0.00	7,659	997.86	0.09
38.00	0.00	7,338	997.80	0.09
39.00	0.00	7,022	997.74	0.09
40.00	0.00	6,710	997.69	0.09
41.00	0.00	6,402	997.63	0.09
42.00	0.00	6,098	997.58	0.08
43.00	0.00	5,798	997.52	0.08
44.00	0.00	5,502	997.46	0.08
45.00	0.00	5,211	997.41	0.08
46.00	0.00	4,924	997.35	0.08
47.00	0.00	4,642	997.29	0.08
48.00	0.00	4,365	997.24	0.08

Stage-Discharge for Pond 1P: Proposed Detention

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
995.50	0.00	998.10	0.09	1,000.70	10.41	1,003.30	76.56
995.55	0.00	998.15	0.10	1,000.75	10.59	1,003.35	78.07
995.60	0.01	998.20	0.10	1,000.80	10.77	1,003.40	79.55
995.65	0.02	998.25	0.10	1,000.85	10.95	1,003.45	81.00
995.70	0.02	998.30	0.10	1,000.90	11.13	1,003.50	82.42
995.75	0.03	998.35	0.10	1,000.95	11.30	1,003.55	83.81
995.80	0.03	998.40	0.10	1,001.00	11.46	1,003.60	85.17
995.85	0.03	998.45	0.10	1,001.05	11.63	1,003.65	86.51
995.90	0.03	998.50	0.10	1,001.10	11.79	1,003.70	87.83
995.95	0.04	998.55	0.15	1,001.15	11.96	1,003.75	88.43
996.00	0.04	998.60	0.24	1,001.20	12.11	1,003.80	88.75
996.05	0.04	998.65	0.35	1,001.25	12.27	1,003.85	89.08
996.10	0.04	998.70	0.49	1,001.30	12.43	1,003.90	89.40
996.15	0.05	998.75	0.64	1,001.35	12.58	1,003.95	89.73
996.20	0.05	998.80	0.81	1,001.40	12.73	1,004.00	**90.05**
996.25	0.05	998.85	0.99	1,001.45	12.88		
996.30	0.05	998.90	1.19	1,001.50	13.02		
996.35	0.05	998.95	1.40	1,001.55	13.17		
996.40	0.05	999.00	1.62	1,001.60	13.31		
996.45	0.06	999.05	1.81	1,001.65	13.46		
996.50	0.06	999.10	1.96	1,001.70	13.60		
996.55	0.06	999.15	2.11	1,001.75	13.74		
996.60	0.06	999.20	2.24	1,001.80	13.87		
996.65	0.06	999.25	2.36	1,001.85	14.01		
996.70	0.06	999.30	2.47	1,001.90	14.14		
996.75	0.06	999.35	2.66	1,001.95	14.28		
996.80	0.07	999.40	2.92	1,002.00	14.41		
996.85	0.07	999.45	3.21	1,002.05	15.40		
996.90	0.07	999.50	3.53	1,002.10	17.11		
996.95	0.07	999.55	3.88	1,002.15	19.28		
997.00	0.07	999.60	4.25	1,002.20	21.82		
997.05	0.07	999.65	4.65	1,002.25	24.68		
997.10	0.07	999.70	5.07	1,002.30	27.84		
997.15	0.07	999.75	5.50	1,002.35	31.26		
997.20	0.08	999.80	5.96	1,002.40	34.92		
997.25	0.08	999.85	6.35	1,002.45	38.81		
997.30	0.08	999.90	6.69	1,002.50	42.91		
997.35	0.08	999.95	7.00	1,002.55	46.35		
997.40	0.08	1,000.00	7.29	1,002.60	49.28		
997.45	0.08	1,000.05	7.57	1,002.65	51.93		
997.50	0.08	1,000.10	7.83	1,002.70	54.38		
997.55	0.08	1,000.15	8.08	1,002.75	56.67		
997.60	0.08	1,000.20	8.33	1,002.80	58.85		
997.65	0.09	1,000.25	8.56	1,002.85	60.92		
997.70	0.09	1,000.30	8.79	1,002.90	62.90		
997.75	0.09	1,000.35	9.01	1,002.95	64.80		
997.80	0.09	1,000.40	9.23	1,003.00	66.64		
997.85	0.09	1,000.45	9.43	1,003.05	68.41		
997.90	0.09	1,000.50	9.64	1,003.10	70.14		
997.95	0.09	1,000.55	9.84	1,003.15	71.81		
998.00	0.09	1,000.60	10.03	1,003.20	73.43		
998.05	0.09	1,000.65	10.22	1,003.25	75.02		

Stage-Area-Storage for Pond 1P: Proposed Detention

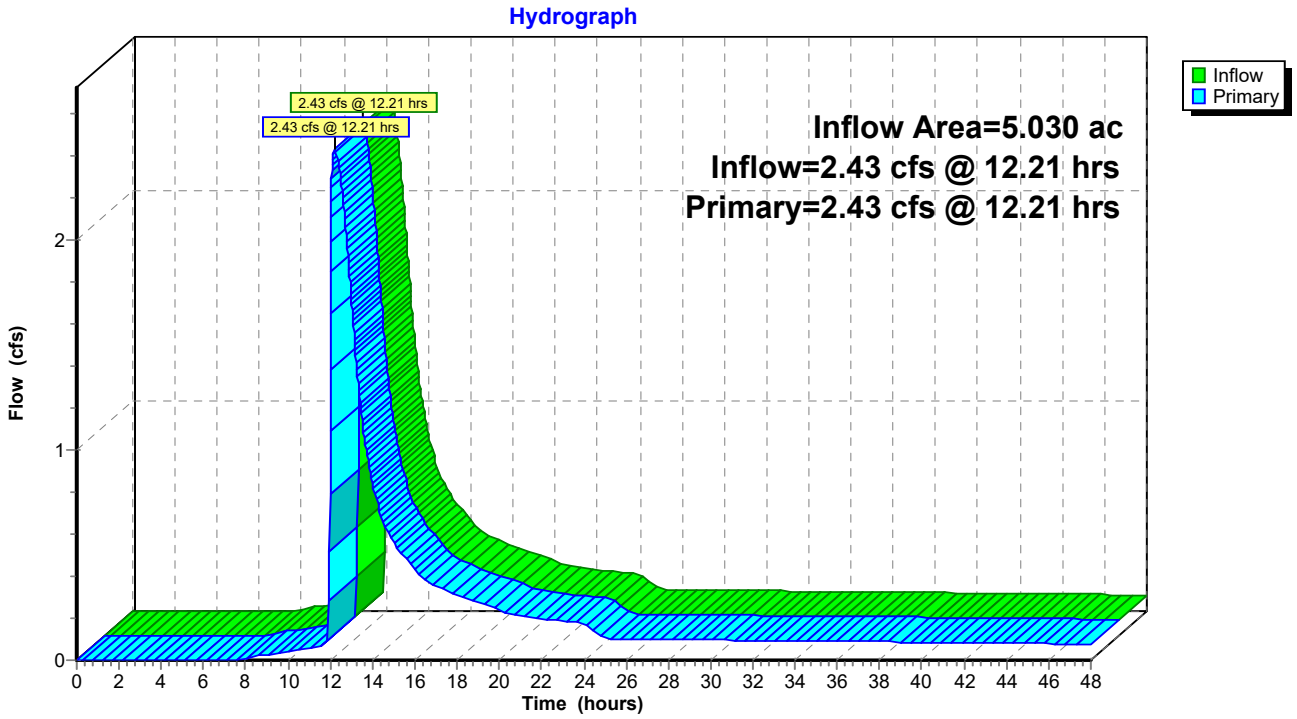
Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
995.50	100	0
995.60	360	23
995.70	620	72
995.80	880	147
995.90	1,140	248
996.00	1,400	375
996.10	1,700	530
996.20	2,000	715
996.30	2,300	930
996.40	2,600	1,175
996.50	2,900	1,450
996.60	3,200	1,755
996.70	3,500	2,090
996.80	3,800	2,455
996.90	4,100	2,850
997.00	4,400	3,275
997.10	4,569	3,723
997.20	4,737	4,189
997.30	4,906	4,671
997.40	5,075	5,170
997.50	5,244	5,686
997.60	5,412	6,219
997.70	5,581	6,768
997.80	5,750	7,335
997.90	5,918	7,918
998.00	6,087	8,519
998.10	6,256	9,136
998.20	6,425	9,770
998.30	6,593	10,421
998.40	6,762	11,088
998.50	6,931	11,773
998.60	7,099	12,475
998.70	7,268	13,193
998.80	7,437	13,928
998.90	7,606	14,680
999.00	7,774	15,449
999.10	7,943	16,235
999.20	8,112	17,038
999.30	8,280	17,857
999.40	8,449	18,694
999.50	8,618	19,547
999.60	8,787	20,418
999.70	8,955	21,305
999.80	9,124	22,209
999.90	9,293	23,129
1,000.00	9,461	24,067
1,000.10	9,630	25,022
1,000.20	9,799	25,993
1,000.30	9,968	26,981
1,000.40	10,136	27,987
1,000.50	10,305	29,009
1,000.60	10,474	30,048
1,000.70	10,642	31,103
1,000.80	10,811	32,176
1,000.90	10,980	33,266
1,001.00	11,149	34,372
1,001.10	11,317	35,495
1,001.20	11,486	36,636
1,001.30	11,655	37,793
1,001.40	11,823	38,967
1,001.50	11,992	40,157
1,001.60	12,161	41,365
1,001.70	12,330	42,589
1,001.80	12,498	43,831
1,001.90	12,667	45,089
1,002.00	12,836	46,364
1,002.10	13,004	47,656
1,002.20	13,173	48,965
1,002.30	13,342	50,291
1,002.40	13,511	51,634
1,002.50	13,679	52,993
1,002.60	13,848	54,369
1,002.70	14,017	55,763
1,002.80	14,185	57,173
1,002.90	14,354	58,600
1,003.00	14,523	60,044
1,003.10	14,692	61,504
1,003.20	14,860	62,982
1,003.30	15,029	64,476
1,003.40	15,198	65,988
1,003.50	15,366	67,516
1,003.60	15,535	69,061
1,003.70	15,704	70,623
1,003.80	15,873	72,202
1,003.90	16,041	73,797
1,004.00	**16,210**	**75,410**

Summary for Link 1L: Proposed Total

Inflow Area = 5.030 ac, 46.32% Impervious, Inflow Depth > 1.78" for Jackson - 2 YR event
Inflow = 2.43 cfs @ 12.21 hrs, Volume= 0.745 af
Primary = 2.43 cfs @ 12.21 hrs, Volume= 0.745 af, Atten= 0%, Lag= 0.0 min

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

Link 1L: Proposed Total



Hydrograph for Link 1L: Proposed Total

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	0.10	0.00	0.10
0.50	0.00	0.00	0.00	26.50	0.10	0.00	0.10
1.00	0.00	0.00	0.00	27.00	0.10	0.00	0.10
1.50	0.00	0.00	0.00	27.50	0.10	0.00	0.10
2.00	0.00	0.00	0.00	28.00	0.10	0.00	0.10
2.50	0.00	0.00	0.00	28.50	0.10	0.00	0.10
3.00	0.00	0.00	0.00	29.00	0.10	0.00	0.10
3.50	0.00	0.00	0.00	29.50	0.10	0.00	0.10
4.00	0.00	0.00	0.00	30.00	0.10	0.00	0.10
4.50	0.00	0.00	0.00	30.50	0.10	0.00	0.10
5.00	0.00	0.00	0.00	31.00	0.10	0.00	0.10
5.50	0.00	0.00	0.00	31.50	0.10	0.00	0.10
6.00	0.00	0.00	0.00	32.00	0.09	0.00	0.09
6.50	0.00	0.00	0.00	32.50	0.09	0.00	0.09
7.00	0.00	0.00	0.00	33.00	0.09	0.00	0.09
7.50	0.00	0.00	0.00	33.50	0.09	0.00	0.09
8.00	0.01	0.00	0.01	34.00	0.09	0.00	0.09
8.50	0.02	0.00	0.02	34.50	0.09	0.00	0.09
9.00	0.03	0.00	0.03	35.00	0.09	0.00	0.09
9.50	0.03	0.00	0.03	35.50	0.09	0.00	0.09
10.00	0.04	0.00	0.04	36.00	0.09	0.00	0.09
10.50	0.05	0.00	0.05	36.50	0.09	0.00	0.09
11.00	0.06	0.00	0.06	37.00	0.09	0.00	0.09
11.50	0.06	0.00	0.06	37.50	0.09	0.00	0.09
12.00	**1.39**	0.00	**1.39**	38.00	0.09	0.00	0.09
12.50	**2.30**	0.00	**2.30**	38.50	0.09	0.00	0.09
13.00	1.71	0.00	1.71	39.00	0.09	0.00	0.09
13.50	1.15	0.00	1.15	39.50	0.09	0.00	0.09
14.00	0.84	0.00	0.84	40.00	0.09	0.00	0.09
14.50	0.66	0.00	0.66	40.50	0.09	0.00	0.09
15.00	0.56	0.00	0.56	41.00	0.09	0.00	0.09
15.50	0.49	0.00	0.49	41.50	0.08	0.00	0.08
16.00	0.43	0.00	0.43	42.00	0.08	0.00	0.08
16.50	0.39	0.00	0.39	42.50	0.08	0.00	0.08
17.00	0.35	0.00	0.35	43.00	0.08	0.00	0.08
17.50	0.33	0.00	0.33	43.50	0.08	0.00	0.08
18.00	0.31	0.00	0.31	44.00	0.08	0.00	0.08
18.50	0.29	0.00	0.29	44.50	0.08	0.00	0.08
19.00	0.27	0.00	0.27	45.00	0.08	0.00	0.08
19.50	0.26	0.00	0.26	45.50	0.08	0.00	0.08
20.00	0.24	0.00	0.24	46.00	0.08	0.00	0.08
20.50	0.22	0.00	0.22	46.50	0.08	0.00	0.08
21.00	0.21	0.00	0.21	47.00	0.08	0.00	0.08
21.50	0.20	0.00	0.20	47.50	0.08	0.00	0.08
22.00	0.20	0.00	0.20	48.00	0.08	0.00	0.08
22.50	0.19	0.00	0.19				
23.00	0.19	0.00	0.19				
23.50	0.18	0.00	0.18				
24.00	0.18	0.00	0.18				
24.50	0.14	0.00	0.14				
25.00	0.10	0.00	0.10				
25.50	0.10	0.00	0.10				

TABLE OF CONTENTS