JPS CONSULTING ENGINEERS, LLC

DRAINAGE REPORT

FOR

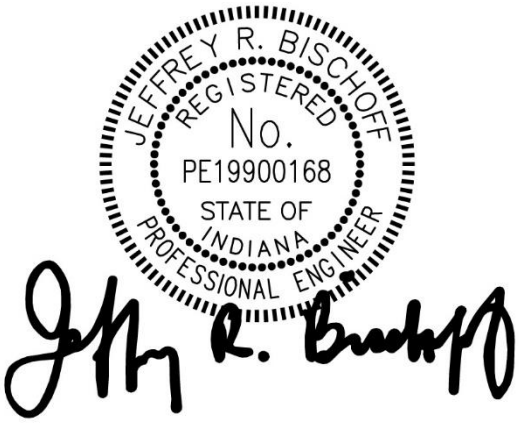
Windrose Health MOB

Prepared by:

JPS Consulting Engineers
9365 Counselors Row, Suite 116
Indianapolis, IN 46240

8 June 2022

Certified by:



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DRAINAGE REPORT

I. Foreword

This project is the expansion of an existing Windrose Health clinic or Medical Office Building (MOB) on a 3.00 acre property. Only half of this property was previously developed. The project includes a one story 13,000 sf expansion with 63 added parking spaces. The construction of this project will likely disturb 1.58 acres of this 3.00 acre property. The design of the stormwater management system for this project is intended to meet the City of Franklin Stormwater Management Ordinance.

II. Site Location

The partially developed site is located at 55 S. Milford Drive, on the east side of Franklin, in Johnson County (refer to Appendix A for maps). The site is bounded by Milford Drive to the west, Jefferson Street to the south, and Thornburg Lane to the north. The property to the east is developed as a Vet Clinic. This site described as Lot 1 in the Stout Minor Plat Subdivision. The nearest major intersection is at King Street and Milford Drive. The site is not within a flood plain.

III. Existing Conditions

This site has relatively flat topography with some slope from north (high) to south (low). The existing MOB drains away from the building into a paved ditch along Milford. There is also a bermed areas along the east property line that runs from north to south. This entire site drains over to the paved ditch along Milford except the northeast corner of the site drains to a storm sewer that runs south along the east property line and the southeast corner of the site also drains to that same sewer. The paved ditch along Milford goes into a series of storm pipes near the intersection of Milford and Williamsburg Lane and then that sewer drains east into the pond. The pond drains to the Ragsdale Open Ditch (south), then to Youngs Creek.

The existing soils of the site are predominantly silty clays and silt loams within the Crosby and Brookston soil complexes and in the C hydrologic soil group, when drained. There is about 3 to 4 inches of topsoil on the site.

In a conversation with the city department of planning and engineering it was determined that this site was part of a prior development that had included a regional stormwater detention pond that was intended to include this developed property for stormwater detention. This pond is located to the south of Jefferson Street and east of Decourey Lane. The entire property drains to that pond. See the attached drainage report for more information (Appendix B).

IV. Stormwater Management

To manage the stormwater created by this development, the intent is to use the existing previously mentioned pond for stormwater detention and then use two underground hydrodynamic separators (BMPs) for post construction stormwater quality.

The existing regional detention pond was designed with a Rational Method runoff coefficient of 0.7 for the developed condition of the land that would be drained to it. After this project our 3 acre property will have a runoff coefficient of 0.63, which will be within the range that this pond was designed for. See Appendix B.

The pre-developed (prior to this project) and the post-developed stormwater runoff calculations are summarized below and are included in Appendix C. These calculations were done using a TR-55 hydrograph method with type II, 24 hour events and rainfall depths determine from the NOAA website.

Rainfall Event	Pre-developed (cfs)	Post-developed (cfs)
2 year	5.56	8.28
10 year	9.99	13.11
100 year	17.28	20.56
TR-55 CN Value	80	88

There aren't many storm sewers on this project, but the ones we have designed are associated with the BMP units. The pipes have been calculated to carry a 10 year storm and the pipe calcs are located in Appendix D.

Of the 3 acre site we are disturbing 1.58 acres with this project and will be directing 1.58 acres of runoff to the two BMPs that we are using for this project. The northeast corner of the site will drain 0.32 acres and the south portion of the project will drain 1.26 acres (Appendix E). Here are the results of the BMP calculations.

BMP	Total Area (ac)	Impervious Area (ac)	Peak WQ Flow Rate (cfs)	Peak 10 year Flow Rate (cfs)	BMP Model
1	0.32	0.23	0.20	0.99	Contech Cascade CS-3
2	1.26	0.68	0.60	2.70	Contech Cascade CS-4

Two Contech Cascades, models CS-3 and CS-4 where chosen. The CS-3 can handle a maximum treatment flow of 1.02 cfs and a maximum online treatment of 2.27 cfs (10 year rate). The CS-4 can handle a maximum treatment flow of 1.80 cfs and a maximum online treatment of 4.03 cfs (data from current Indianapolis Stormwater Quality Unit Selection

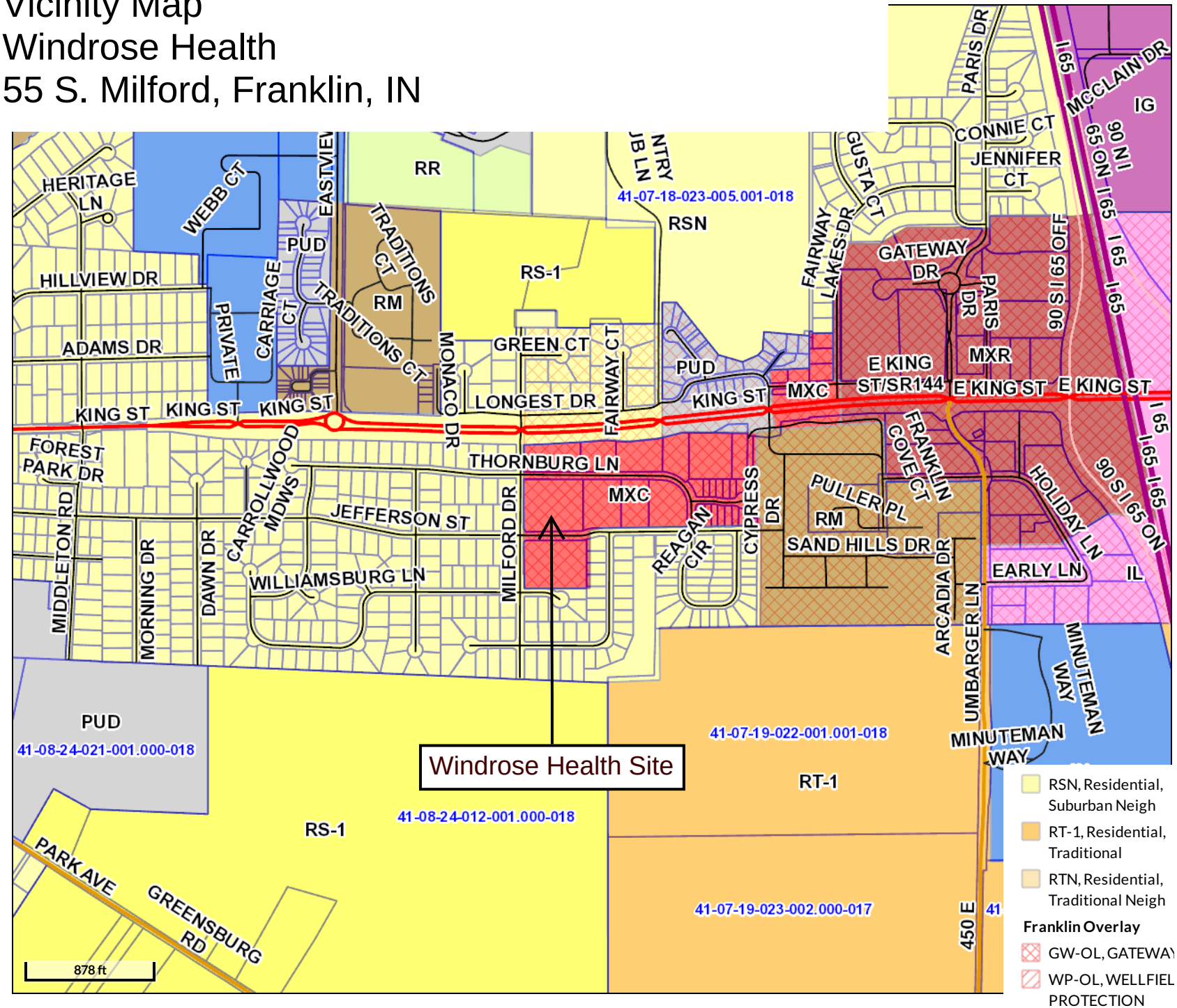
Guide). Our two areas for these need to use an online treatment configuration due to the lack of space, so we will size them based on the 10 year peak flow.

VII. Summary

Of the 3 acre site that is used for an existing medical office building this building addition disturbs 1.58 acres and that same area is treated for water quality through 2 water quality units. The stormwater detention for this site is handled by a previously created pond for this development.

APPENDIX A: MAPS

Vicinity Map
Windrose Health
55 S. Milford, Franklin, IN



Legend

- Parcels

Roads

- ACCESS RAMP
- HIGHWAY
- INTERSTATE
- LOCAL
- MAJOR ARTERIAL
- MAJOR COLLECTOR
- MINOR ARTERIAL
- MINOR COLLECTOR
- PRIVATE ROAD

Franklin Zoning

- A, Agriculture
- IBD, Industrial, Business Dev
- IG, INDUSTRIAL, GENERAL
- IL, Industrial, Light
- IN, Institutional
- MXC, Mixuse-Use, Comm Center
- MXD, Mixuse-Use, Downtown Center
- MXN, Mixuse-Use, Neigh Center
- MXR, Mixuse-Use, Reg Center
- PUD, Planned Unit Development
- RM, Residential, Multi-Family
- RMH, Residential, Manuf Home
- RR, Residential, Rural
- RS-1, Residential, Suburban
- RSN, Residential, Suburban Neigh
- RT-1, Residential, Traditional
- RTN, Residential, Traditional Neigh

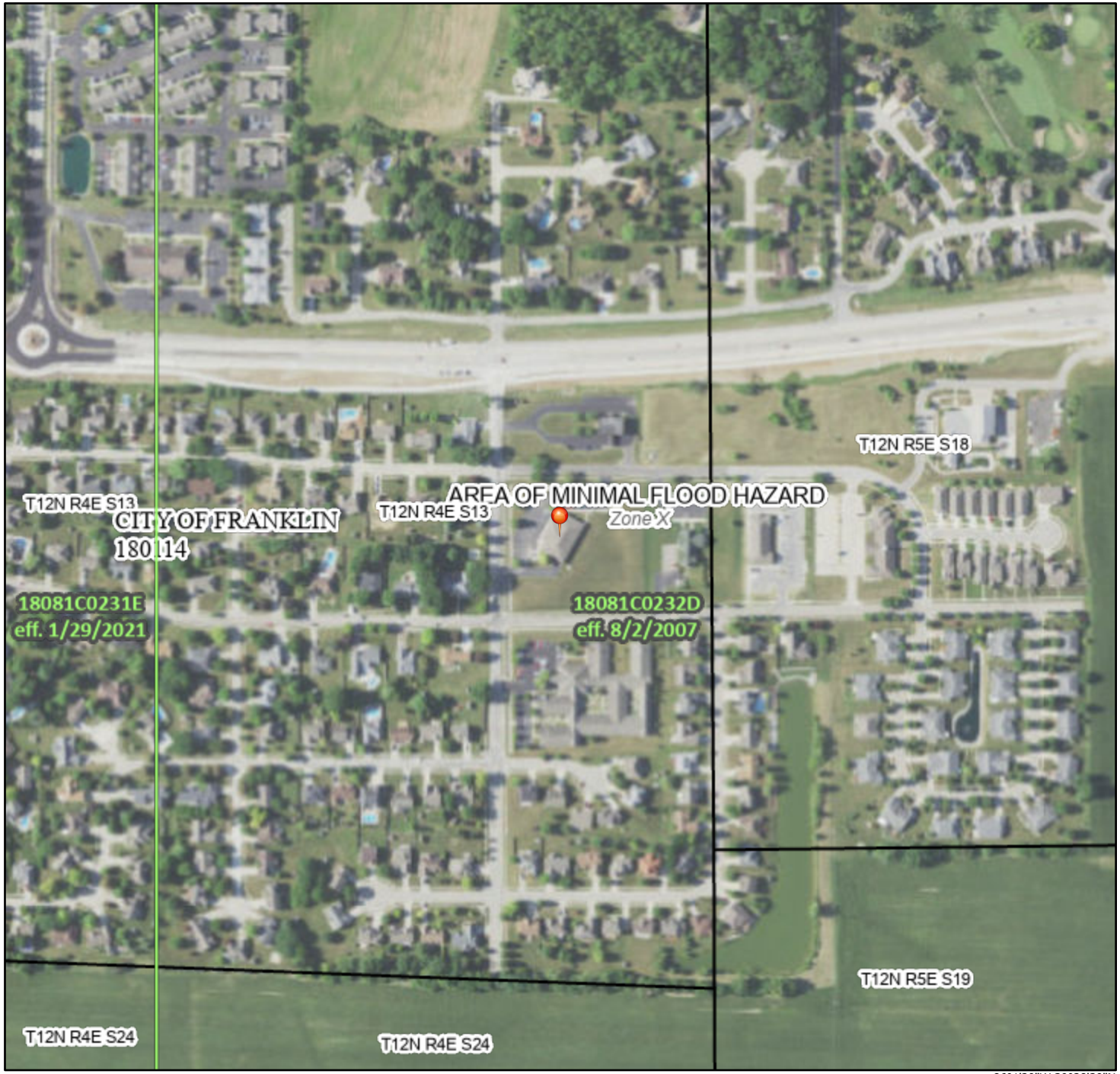
Franklin Overlay

- GW-OL, GATEWAY
- WP-OL, WELLFIEL PROTECTION

National Flood Hazard Layer FIRMette

FEMA

86°1'58"W 39°29'6"N



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

1:6,000

86°1'20"W 39°28'39"N

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

Legend

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

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

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

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

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

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

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

N

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

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

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 12/2/2021 at 9:08 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

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

Map Scale: 1:911 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 10 20 40 60

Feet
0 40 80 160 240

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N WGS84

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Rating Polygons

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Lines

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Soil Rating Points

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

Local Roads

Background

Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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: Johnson County, Indiana
Survey Area Data: Version 29, Sep 8, 2021

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

Date(s) aerial images were photographed: Oct 22, 2020—Nov 12, 2020

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

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	B/D	1.7	53.3%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	C/D	1.5	46.7%
Totals for Area of Interest			**3.1**	**100.0%**

Description

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

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

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

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

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

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

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

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX B: EXISTING DETENTION POND

WINDROSE FRANKLING MOB
21JPSC87
PROPOSED RUNOFF COEFFICIENT CALCULATIONS

STR-1					
Land Use	Area	x	Coefficient	=	CA
Impervious	1.75		0.90		1.58
Grass	1.25		0.25		0.31
	3.00	acres		C_{avg} =	***0.63***

Technical Information Report for

Johnson County Department of Child Services

Project:

Johnson County DCS
1771 Thornburg Lane
Franklin, Indiana 46131

Client:

CKW Land Surveying, Inc.
301 East Jefferson Street
Franklin, Indiana 46131
p. 317-736-0781

Engineer:

Hamilton Designs, LLC
11988 Fishers Crossing Drive, Suite 154
Fishers, Indiana 46038
p. 317-750-6466

Professional Certification:

November 10, 2016

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1.0 Drainage Narrative:

1.1 Introduction

This narrative describes the proposed drainage design for the new Department of Child Services building located along at the northeast corner of Decourcy Lane and Jefferson Street, Franklin, Indiana 46131. The project is more generally located just east of the Mozingo Manor subdivision and is included the Mozingo Manor Second Section and commercial area drainage report. The proposed improvements include a new 6,343 ft^2 office building, its associated parking, and utilities.

The total disturbed area for the project is over an acre.

1.2 Zoning Status

The site is zoned MXC, Mix-Use Commercial Center District and GW-OL, Gateway Overlay.

2.0 Existing Conditions:

The existing site is a vacant parcel with open ground coverage. The project site is located within a master planned drainage report for Mazingo Manor Second Section that included additional commercial area. The master planned design provides detention for the site. The site drains to the existing storm sewer network. The existing network further drains to the master planned detention facility.

The project site was master planned with an assumed runoff coefficient of 0.70. The proposed site will have a runoff coefficient of 0.60 which falls within the parameters set forth in the master plan.

3.0 Proposed Conditions:

The proposed project includes the addition of a new 6,343 ft^2 office building, its associated parking, and utilities. The proposed improvements include parking areas graded to proposed storm sewer inlets which eventually drain into the existing storm sewer system, which further drains into the existing, master planned detention facility. Stormwater is released from the detention facility at a controlled rate according to the rates established by the master plan. A comparison of the existing, assumed, and proposed runoff coefficients is listed in the table below.

Table 3.0: Runoff Coefficient Comparison

	Impervious Acres	Total Acres	Runoff Coefficent
Existing	0.00	1.31	0.20
Assumed	-	-	0.70
Proposed	0.79	1.31	0.60

3.1 Storm Sewer Sizing

An underground storm sewer network is proposed to collect runoff from the site and direct it to the existing, master planned storm sewer infrastructure. In order to accomplish this, the site was also divided into several basins for the determination of storm sewer sizing. The peak flow was calculated

with the Rational Method, and the pipes were sized for the 10-year frequency rainfall event. See Appendix D for details.

Per conversations at the City of Franklin Technical Review Meeting, the existing, master planned storm sewer infrastructure was sized to have an excess capacity of 11.37 cfs. Using the Rational Method, it was determined that the proposed site will have a peak runoff of 7.60 cfs during the 100-year storm. The existing storm infrastructure has ample capacity to convey the additional, proposed runoff. See Appendix D for details.

4.0 Summary:

In summary, this report establishes the proposed project meets the master planned requirements for both water quantity and water quality through the existing detention facilities. Due to the proposed improvements no adverse impacts are anticipated.

5.0 Appendix:

A. Site Maps

Map Scale: 1:720 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 10 20 40 60

Feet: 0 35 70 140 210

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 16N 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

Background

- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:15,800.

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

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

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
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: Johnson County, Indiana
Survey Area Data: Version 23, Sep 9, 2015

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

Date(s) aerial images were photographed: Sep 17, 2011—Mar 10, 2012

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

Johnson County, Indiana (IN081)			
Map Unit Symbol	**Map Unit Name**	**Acres in AOI**	**Percent of AOI**
Br	Brookston silty clay loam, 0 to 2 percent slopes	1.4	91.5%
CrA	Crosby silt loam, fine-loamy subsoil, 0 to 2 percent slopes	0.1	8.5%
Totals for Area of Interest		**1.5**	**100.0%**

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was Indiana State Plane East zone 3826 (FIPSZONE 1301). The **horizontal datum** was NAD83. Differences in datum, spheroid, projection or state plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at http://www.ngs.noaa.gov/ or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242** or visit its website at http://www.ngs.noaa.gov/.

Base Map information shown on this FIRM was derived from the Johnson County Computer Services from photography dated 2001 and from USGS digital orthophoto quadrangles dated 1998 or later.

This map reflects more detailed and up-to-date **stream channel configurations** than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report (which contains authoritative hydraulic data) may reflect stream channel distances that differ from what is shown on this map.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

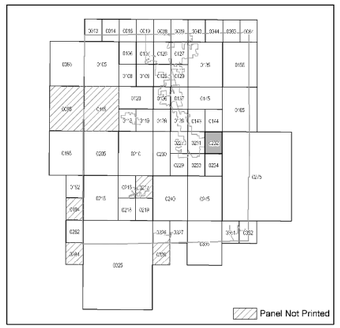
Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

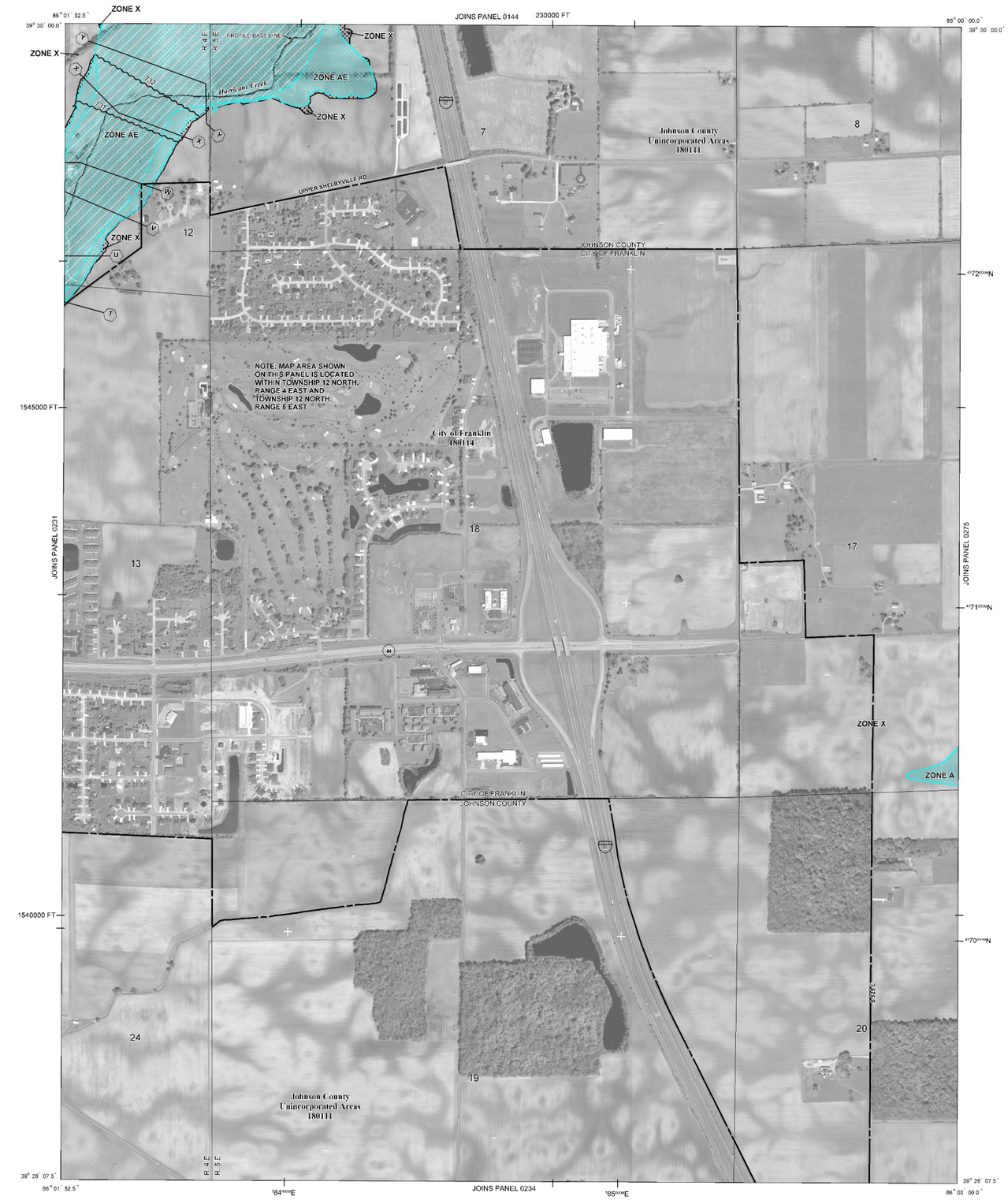
Contact the **FEMA Map Service Center** at 1-800-358-9616 for information on available products associated with this FIRM. Available products may include previously issued Letters of Map Change, a Flood Insurance Study report, and/or digital versions of this map. The FEMA Map Service Center may also be reached by Fax at 1-800-358-9620 and its website at http://msc.fema.gov/.

If you have **questions about this map** or questions concerning the National Flood Insurance Program in general, please call **1-877-FEMA MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip/.

The **profile base lines** depicted on this map represent the hydraulic modeling baselines that match the flood profiles in the FIS report. As a result of improved topographic data, the **profile base line**, in some cases, may deviate significantly from the channel centerline or appear outside the SFHA.

PANEL INDEX





LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard may include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside of the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway Boundary
	Zone D Boundary
	CBRS and OPA boundary
	Boundary Dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 10)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the North American Vertical Datum of 1988

A — A	Cross section line
23 — 23	Transect line
85° 03' 45.0", 41° 24' 22.5"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4987000 M	1000-meter Universal Transverse Mercator grid values, zone 16
2250000 FT	5000-foot grid ticks: Indiana State Plane East Coordinate System, 3826 zone (FIPSZONE 1301) Transverse Mercator
KA0015	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
August 2, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 500'
250 0 500 1000 FEET
150 0 150 300 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0232D

FIRM

FLOOD INSURANCE RATE MAP

JOHNSON COUNTY, INDIANA

AND INCORPORATED AREAS

PANEL 232 OF 352
(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

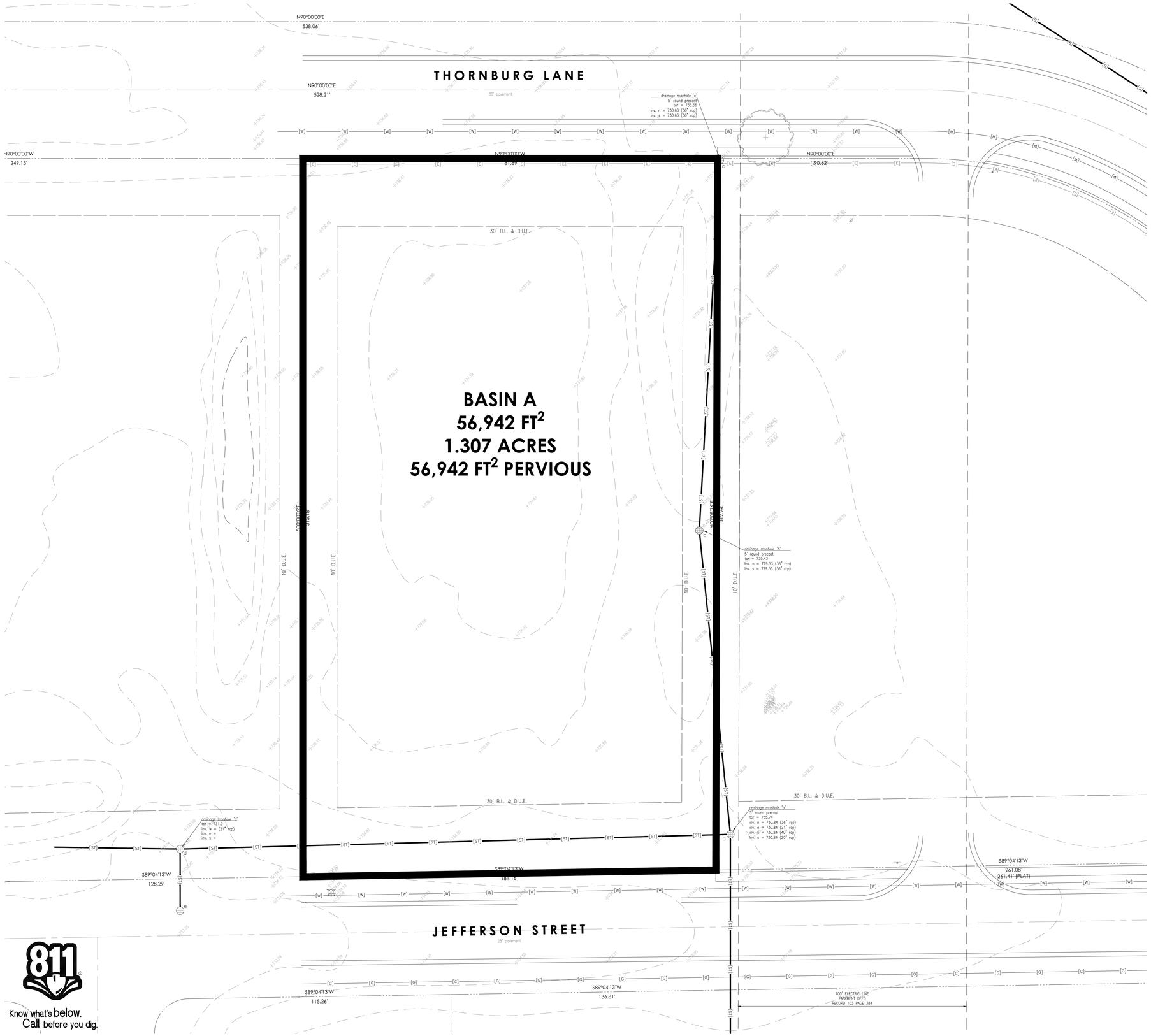
COMMUNITY	NUMBER	PANEL	SUFFIX
FRANKLIN, CITY OF	180114	0232	D
JOHNSON COUNTY	180111	0232	D

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

MAP NUMBER
18081C0232D
EFFECTIVE DATE
AUGUST 2, 2007

Federal Emergency Management Agency

B. Existing Conditions



LEGEND OF EXISTING FEATURES

PROPERTY LINE	BENCHMARK
R/W — RIGHT-OF-WAY LINE	MONUMENT
SETBACK LINE	SECTION CORNER
EASEMENT	TRANSFORMER HVAC
SECTION LINE	ELECTRIC METER ELECTRIC MANHOLE
CENTERLINE	POWER POLE | GUY WIRE
799 — INTERMEDIATE CONTOUR	LIGHT POLE
800 — INDEX CONTOUR	PARKING LOT LIGHTS
[T] — TELEPHONE UNDER GR.	TELEPHONE PEDESTAL TELEPHONE MANHOLE
[OH–T] — TELEPHONE OVERHEAD	FIBER OPTIC PEDESTAL
[FO] — FIBER OPTIC SERVICE	TRAFFIC POLE MANHOLE | STOP LIGHT
[G] — GAS SERVICE	GAS METER GAS VALVE
[E] — POWER UNDERGROUND	STORM MANHOLE SANITARY MANHOLE
[OH–E] — POWER OVERHEAD	STORM INLETS
[W] — WATER SERVICE	STORM ENDSECTION
[S] — SANITARY SEWER	CLEAN-OUT DOWNSPOUT
[ST] — STORM SEWER	FIRE HYDRANTS FIRE VALVE
[NP] — POND NORMAL POOL	WATER METER WATER VALVES
EX. FLOWLINE	POST INDICATOR VALVE FIRE DEPARTMENT CONN.
CHAIN LINK FENCE	SIGNS
FARM FENCE	MAILBOX
WOOD FENCE	ADA PARKING
IRON FENCE | RAILING	PARKING COUNT
BUILDING | STRUCTURE	TREES
EX. BUILDING OVERHEAD	SHRUB
RIM — RIM ELEVATION	
INV. — INVERT ELEVATION	+ 851.25 SPOT GRADE
FFE — FINISHED FLOOR ELEVATION	

Know what's below. Call before you dig.

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

REVISION BLOCK

MICHAEL THOMPSON
REGISTERED
No. 11011309
STATE OF INDIANA
PROFESSIONAL ENGINEER

Michael Thompson

DATE
September 15, 2016

DRAWN BY: AMT
CHECKED BY: MAT

HAMILTON DESIGNS
A LIMITED LIABILITY COMPANY
11988 Fishers Crossing Drive, Suite 154
Fishers, Indiana 46038
P. (317) 750-6466
www.hamilton-designs.com

CONSTRUCTION PLANS FOR:
JOHNSON COUNTY DCS
1784 East Jefferson Street
Franklin, Indiana 46131

CKW LAND SURVEYING, INC.
301 East Jefferson Street
Franklin, Indiana 46131

PROJECT NO.
2016-203

DATE
09/15/2016

SCALE
1" = 20'

SHEET NAME
EXISTING BASIN MAP

SHEET NO.
B-1

HAMILTON
DESIGNS

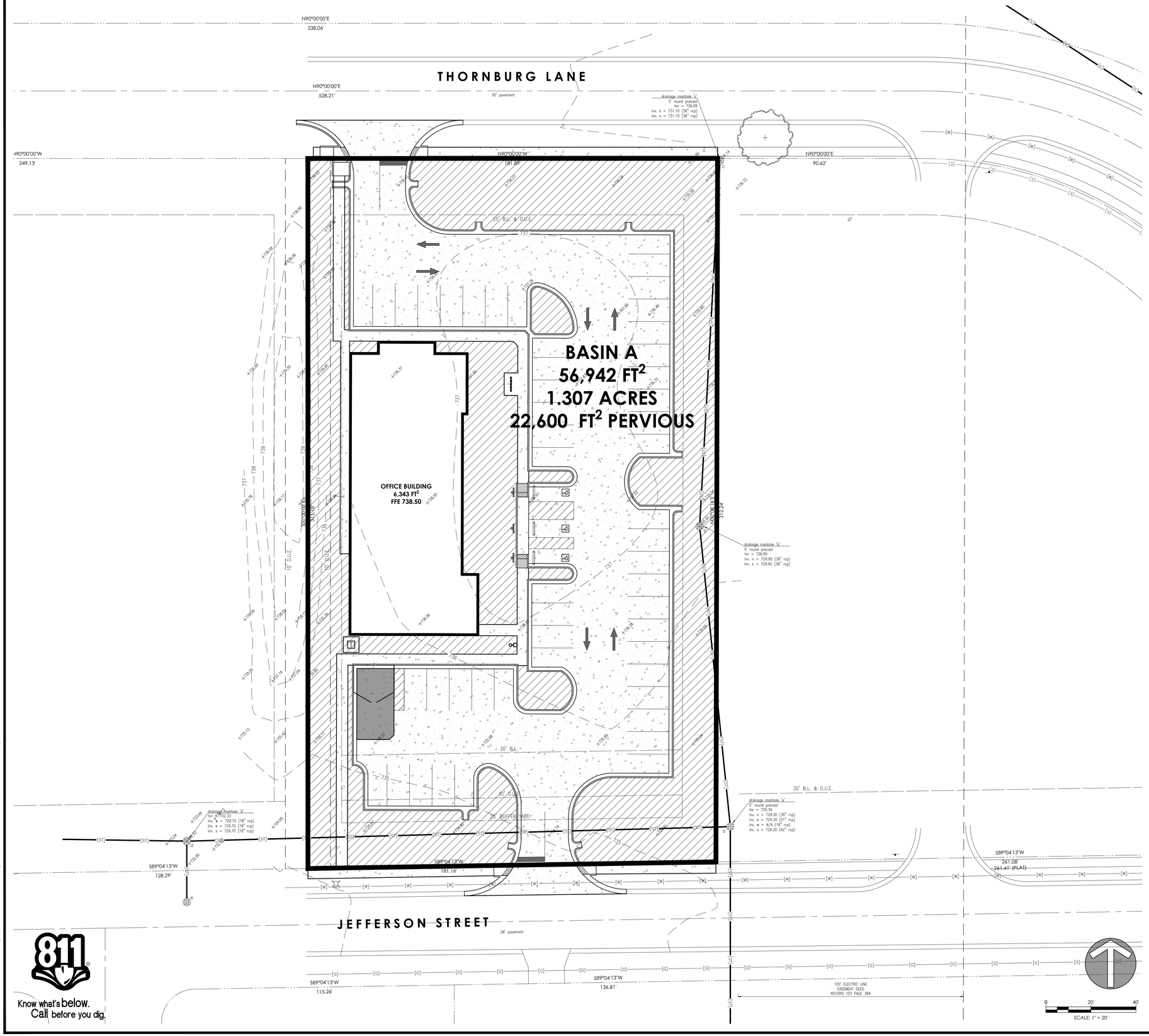
Hamilton Designs Project No.:	2016-203		
Project Name:	Johson County DCS	By:	AMT
Description:	Existing Conditions - Composite C Computation	Date	9/14/2016

Rational Method runoff coefficients

All watertight roof surfaces	.....	0.90
Pavement	.....	0.85
Gravel	.....	0.85
Slightly perivous soil (with turf)	.....	0.20

	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
A	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	0	0	56,942	56,942	1.307	**0.20**

C. Proposed Conditions



LEGEND OF EXISTING FEATURES

PROPERTY LINE	BENCHMARK
RIGHT-OF-WAY LINE	MONUMENT
SETBACK LINE	SECTION CORNER
EASEMENT	TRANSFORMER HVAC
SECTION LINE	ELECTRIC METER ELECTRIC MANHOLE
CENTERLINE	POWER POLE | GUY WIRE
799 INTERMEDIATE CONTOUR	LIGHT POLE
800 INDEX CONTOUR	PARKING LOT LIGHTS
[T] TELEPHONE UNDER GR.	TELEPHONE PEDESTAL TELEPHONE MANHOLE
[OH-T] TELEPHONE OVERHEAD	FIBER OPTIC PEDESTAL
[FO] FIBER OPTIC SERVICE	TRAFFIC POLE MANHOLE | STOP LIGHT
[G] GAS SERVICE	GAS METER GAS VALVE
[E] POWER UNDERGROUND	STORM MANHOLE SANITARY MANHOLE
[OH-E] POWER OVERHEAD	STORM INLETS
[W] WATER SERVICE	STORM ENDSECTION
[S] SANITARY SEWER	CLEAN-OUT DOWNSPOUT
[ST] STORM SEWER	FIRE HYDRANTS FIRE VALVE
[NP] POND NORMAL POOL	WATER METER WATER VALVES
EX. FLOWLINE	POST INDICATOR VALVE FIRE DEPARTMENT CONN.
CHAIN LINK FENCE	SIGNS
FARM FENCE	MAILBOX
WOOD FENCE	ADA PARKING
IRON FENCE | RAILING	PARKING COUNT
BUILDING | STRUCTURE	TREES
EX. BUILDING OVERHEAD	SHRUB
RIM RIM ELEVATION	
INV. INVERT ELEVATION	SPOT GRADE
FFE FINISHED FLOOR ELEVATION	

Know what's below. Call before you dig.

REVISION BLOCK

MICHAEL THOMPSON — REGISTERED — No. 11011309 — STATE OF INDIANA — PROFESSIONAL ENGINEER

Michael Thompson

DATE: November 10, 2016

DRAWN BY: WAD | CHECKED BY: MAT

HAMILTON DESIGNS
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www.hamilton-designs.com

CONSTRUCTION PLANS FOR:
JOHNSON COUNTY DCS
1711 Thornburg Lane
Franklin, Indiana 46131

CKW LAND SURVEYING, INC.
301 East Jefferson Street
Franklin, Indiana 46131

PROJECT NO.: 2016-203

DATE: 11/10/2016

SCALE: 1" = 20'

SHEET NAME: **PROPOSED BASIN MAP**

SHEET NO.: C-1

p:\2016\203 - ckw land surveying - johnson county dcs\drainage\proposed condition\proposed basin map.dwg

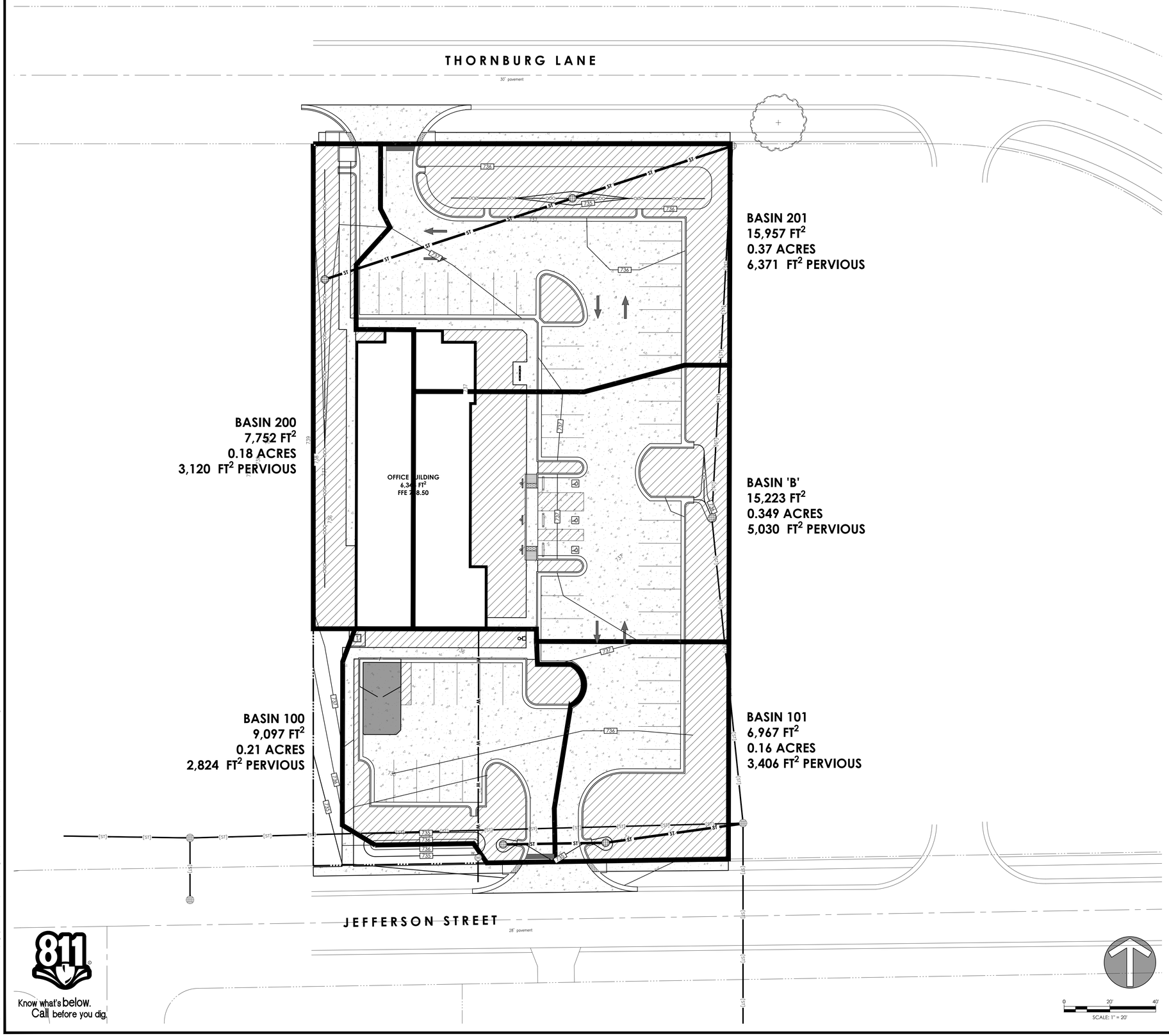
Hamilton Designs Project No.:	2016-203		
Project Name:	Johson County DCS	By:	WAD
Description:	Proposed Conditions - Composite C Computation	Date	11/10/2016

Rational Method runoff coefficients

All watertight roof surfaces	…….	0.90
Pavement	…….	0.85
Gravel	…….	0.85
Slightly perivous soil (with turf)	…….	0.20

	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
A	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	6,343	27,999	0	22,600	56,942	1.307	**0.60**

D. Proposed Sewer Calculations



LEGEND OF EXISTING FEATURES

- PROPERTY LINE
- RIGHT-OF-WAY LINE
- SETBACK LINE
- EASEMENT
- SECTION LINE
- CENTERLINE
- 799 INTERMEDIATE CONTOUR
- 800 INDEX CONTOUR
- [T] TELEPHONE UNDER GR.
- [OH-T] TELEPHONE OVERHEAD
- [FO] FIBER OPTIC SERVICE
- [G] GAS SERVICE
- [E] POWER UNDERGROUND
- [OH-E] POWER OVERHEAD
- [W] WATER SERVICE
- [S] SANITARY SEWER
- [ST] STORM SEWER
- [NP] POND NORMAL POOL
- EX. FLOWLINE
- CHAIN LINK FENCE
- FARM FENCE
- WOOD FENCE
- IRON FENCE | RAILING
- BUILDING | STRUCTURE
- EX. BUILDING OVERHEAD
- RIM RIM ELEVATION
- INV. INVERT ELEVATION
- FFE FINISHED FLOOR ELEVATION
- BENCHMARK
- MONUMENT
- SECTION CORNER
- T HC TRANSFORMER HVAC
- E M E ELECTRIC METER ELECTRIC MANHOLE
- POWER POLE | GUY WIRE
- LIGHT POLE
- PARKING LOT LIGHTS
- TELEPHONE PEDESTAL TELEPHONE MANHOLE
- FIBER OPTIC PEDESTAL
- TRAFFIC POLE MANHOLE | STOP LIGHT
- G M G GAS METER GAS VALVE
- ST S STORM MANHOLE SANITARY MANHOLE
- STORM INLETS
- C.O. D.S. CLEAN-OUT DOWNSPOUT
- FIRE HYDRANTS FIRE VALVE
- W M W W WATER METER WATER VALVES
- POST INDICATOR VALVE FIRE DEPARTMENT CONN.
- SIGNS
- MAILBOX
- ADA PARKING
- 24 PARKING COUNT
- TREES
- SHRUB
- + 801.25 SPOT GRADE

GRADING PLAN LEGEND

- ST STORM SEWER
- SSD SUBSURFACE DRAIN
- SWALE | FLOWLINE
- NP POND (NORMAL POOL)
- 799 INTERMEDIATE CONTOUR
- 800 INDEX CONTOUR
- 800.00 ME MATCH EXISTING
- 800.00 PAVEMENT SPOT GRADE
- 800.4 GROUND SPOT GRADE
- 800.00 / 800.50 TOP OF CURB / BOTTOM OF CURB
- 800.00 TW / 800.50 BW TOP OF WALL / BOTTOM OF WALL
- RIM RIM ELEVATION
- INV. INVERT ELEVATION
- FFE FINISHED FLOOR ELEVATION
- ST STORM MANHOLE
- STORM INLETS
- STORM ENDSECTION
- C.O. CLEAN-OUT
- D.S. DOWNSPOUT

Know what's below. Call before you dig.

REVISION BLOCK

MICHAEL THOMPSON — REGISTERED — No. 11011309 — STATE OF INDIANA — PROFESSIONAL ENGINEER

Michael Thompson

DATE: November 10, 2016

DRAWN BY: MAT | CHECKED BY: MAT

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CKW LAND SURVEYING, INC.
301 East Jefferson Street
Franklin, Indiana 46131

PROJECT NO. 2016-203

DATE 11/10/2016

SCALE 1" = 20'

SHEET NAME **STORM SEWER BASINS MAP**

SHEET NO. D-1

g:\2016\203 - ckw land surveying - johnson county dcs\drainage\proposed conditions\d-1, proposed storm basins map.dwg

Hamilton Designs Project No.:	2016-203		
Project Name:	Johnson County DCS	By:	WAD
Description:	**Composite C Computation**	Date	11/10/2016
	Proposed Conditions		

Rational Method runoff coefficients

All watertight roof surfaces	.....	0.90
Pavement	.....	0.90
Gravel	.....	0.85
Slightly perivous soil (with turf)	.....	0.20

100	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	6,273	0	2,824	9,097	0.21	**0.68**

101	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	3,561	0	3,406	6,967	0.16	**0.56**

200	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	4,632	0	3,120	7,752	0.18	**0.62**

201	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	9,586	0	6,371	15,957	0.37	**0.62**

B'	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	10,193	0	5,030	15,223	0.35	**0.67**

Total Site	All watertight surfaces	Pavement	Gravel	Pervious soil / turf	Total	Total	Composite C
	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(ft^2)	(acres)	(ft^2)
	0	34,245	0	20,751	54,996	1.26	**0.64**

Hamilton Designs Project No.: 2016-203
Project Name: Johnson County DCS
Description: Proposed Conditions - Storm Sewer Sizing Worksheet

By: WAD
Date 11/10/2016

Design Storm Frequency = 10-year
Manning's n = 0.013

STRUCTURE		LENGTH	DRAINAGE AREA "A"		RUNOFF COEFFICIENT "C"	"A" x "C"		FLOW TIME		RAINFALL INTENSITY	TOTAL RUNOFF	PIPE DIAMETER	SLOPE OF SEWER	FULL CAPACITY	VELOCITY		RIM ELEVATION		INVERT ELEVATION		COVER	
			Increment	Total				To Upper End	In Section						Flowing Full	Design Flow	U/S Structure	D/S Structure	U/S Structure	D/S Structure	U/S Structure	D/S Structure
U/S	D/S	(ft)	(acres)	(acres)		Increment	Total	(min)	(min)	(in/hr)	(cfs)	(ft)	%	(cfs)	(ft/s)	(ft/s)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)
100	101	59	0.21	0.21	0.68	0.14	0.14	5.00	0.39	6.98	0.99	1.00	0.30	1.96	2.49	-	734.50	734.50	732.30	732.12	1.04	1.21
101	'A'	36	0.16	0.37	0.56	0.09	0.23	5.39	0.19	6.83	1.58	1.00	0.50	2.53	3.22	-	734.50	735.56	732.02	731.84	1.31	2.55
200	201	114	0.18	0.18	0.62	0.11	0.11	5.00	0.59	6.98	0.77	1.00	0.50	2.53	3.22	-	735.00	734.50	732.70	732.13	1.13	1.20
201	'C'	74	0.37	0.54	0.62	0.23	0.34	5.59	0.38	6.76	2.28	1.00	0.50	2.53	3.22	-	734.50	735.74	732.03	731.66	1.30	2.91

Hamilton Designs Project No.:	2016-203	By:	WAD
Project Name:	Johnson County DCS	Date	11/10/2016
Description:	Rational Runoff Method		

Rational Runoff Method, Q = CiA

C = composite C
i = rainfall intesity, inches per hour
A = area, acres
Q = runoff peak flow rate, cubic feet per second

	Rainfall Event	Composite C	Time of Concentration	Rainfall Intensity	Area	Peak Runoff Rate
Total Site	2-Year	0.60	5	4.75	1.307	3.73
	10-Year	0.60	5	6.98	1.307	5.48
	100-Year	0.60	5	9.69	1.307	7.60

E. Master Planned Drainage Report

HYDROLOGIC REPORT FOR

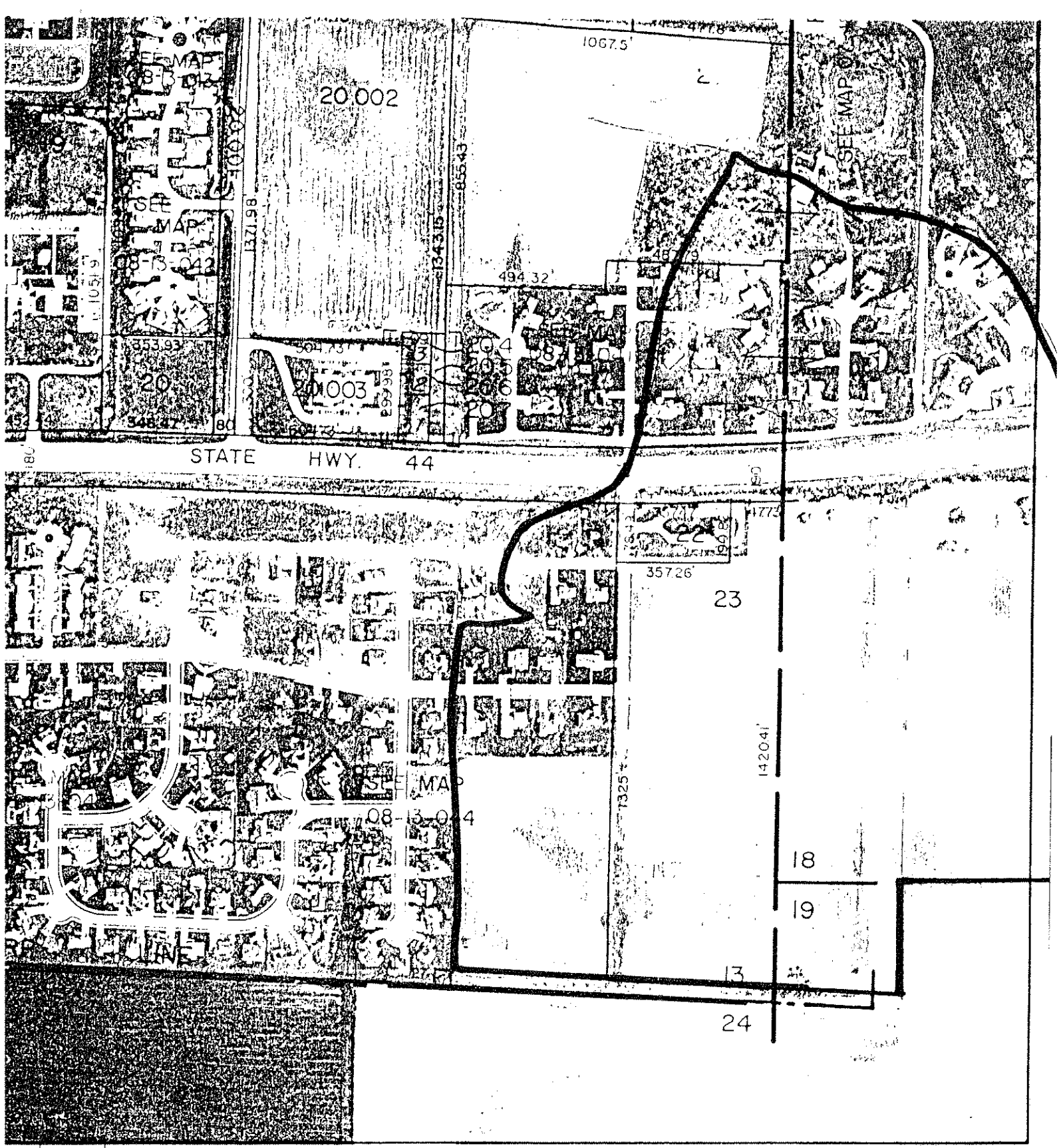
MOZINGO MANOR SECOND SECT

AND COMMERCIAL AREA

FRANKLIN, IND.

BY

MAJOR LAND SURVEYING INC.
435 E. MAIN STREET
GREENWOOD, IND.



AI BOOK	PAGE
C	607A-B

N

400' 0 400' 800'

DATE : JUNE, 1986
APRIL, 1993

MAP NUMBER		
AREA	SEC	BLOCK
08	13	

DRAINAGE REPORT

Mozingo Manor, Second Section and commercial area is located on the East side of Franklin, South of State Road No. 44.

Currently the site, being approximately 69 acres, is in agricultural use. This watershed area includes part of Mozingo Manor, First Section, an existing bank and a residential area North of State Road 44, totaling approximately 94 acres.

It is proposed to construct a residential subdivision on approximately seven acres. The remaining area is to be developed into a commercial area. It is unclear at this time how this area will be developed, therefore these calculations are an approximate guess at this proposed site.

For the sake of these calculations, it was assumed that this future area of development would have a higher runoff coefficient and that the time of concentration will be shorter.

With these assumptions made, I also assumed a detention area having approximately 848,025 cubic feet of storage. From this detention area, a 24" concrete pipe at a minimum slope would outlet to the creek South of this site. The results indicate a reduction in the post development runoff to well below the pre-developed 10-year storm discharge rate.

The determination of the run-off co-efficient was assumed. Pre and Post discharge rates are shown below as well as a maximum outflow from the detention area during a 100-year storm.

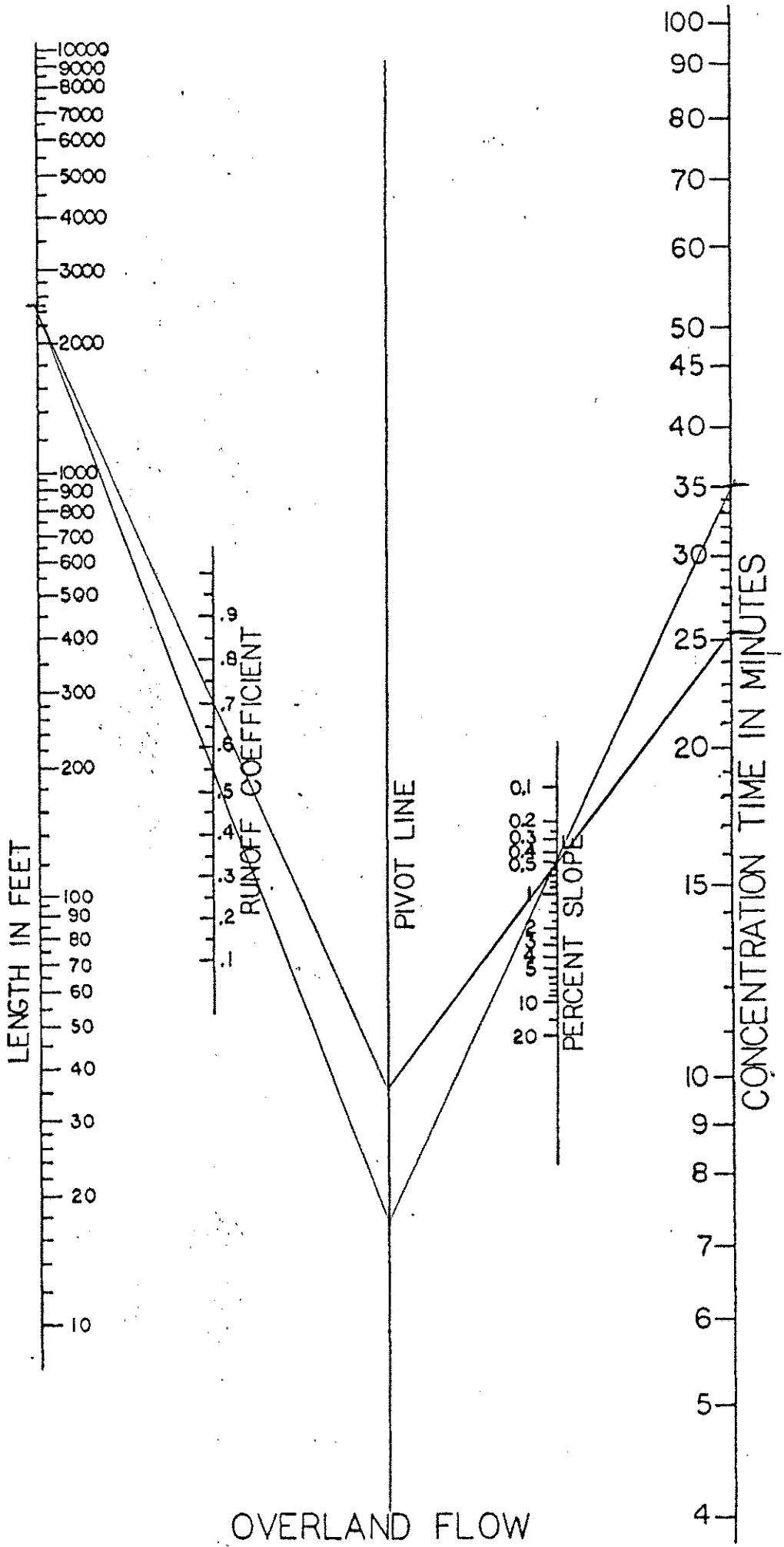
SUMMARY

STORM EVENT	PRE-DEVELOPED DISCHARGE(CFS)	POST-DEVELOPED DISCHARGE(CFS)
10-year	160.64	265.33
100-year	193.85	324.31

POST DEVELOPED FLOW FROM DETENTION

100-Year - 18 cfs

375'X375'X6'=


LENGTH IN FEET
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
900
800
700
600
500
400
300
200
100
90
80
70
60
50
40
30
20
10
RUNOFF COEFFICIENT
.9
.8
.7
.6
.5
.4
.3
.2
.1
PIVOT LINE
PERCENT SLOPE
0.1
0.2
0.3
0.4
0.5
1
2
5
10
20
CONCENTRATION TIME IN MINUTES
100
90
80
70
60
50
45
40
35
30
25
20
15
10
9
8
7
6
5
4
OVERLAND FLOW

HYDROLOGIC REPORT

EXISTING AREA.....
.....
.....

Hyd. No. 1

Hydrograph type = D-RATIONAL
Storm frequency = 10 yr

Peak discharge = 160.64 cfs
Time interval = 1 min

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)	
0.08	0.92	0.10	1.10	0.12	1.29	0.13	1.47
0.15	1.65	0.17	1.84	0.18	2.02	0.20	2.20
0.22	2.39	0.23	2.57	0.25	2.75	0.27	2.94
0.28	3.12	0.30	3.30	0.32	3.49	0.33	3.67
0.35	3.86	0.37	4.04	0.38	4.22	0.40	4.41
0.42	4.59	0.43	4.77	0.45	4.96	0.47	5.14
0.48	5.32	0.50	5.51	0.52	5.69	0.53	5.87
0.55	6.06	0.57	6.24	0.58	6.43	0.60	6.61
0.62	6.79	0.63	6.98	0.65	7.16	0.67	7.34
0.68	7.53	0.70	7.71	0.72	7.89	0.73	8.08
0.75	8.26	0.77	8.44	0.78	8.63	0.80	8.81
0.82	9.00	0.83	9.18	0.85	9.36	0.87	9.55
0.88	9.73	0.90	9.91	0.92	10.10	0.93	10.28
0.95	10.46	0.97	10.65	0.98	10.83	1.00	11.02
1.02	11.20	1.03	11.38	1.05	11.57	1.07	11.75
1.08	11.93	1.10	12.12	1.12	12.30	1.13	12.48
1.15	12.67	1.17	12.85	1.18	13.22	1.20	13.59
1.22	13.95	1.23	14.32	1.25	14.69	1.27	15.05
1.28	15.42	1.30	15.79	1.32	16.16	1.33	16.52
1.35	16.89	1.37	17.26	1.38	17.62	1.40	17.99
1.42	18.36	1.43	18.73	1.45	19.09	1.47	19.46
1.48	19.83	1.50	20.19	1.52	20.56	1.53	20.93
1.55	21.30	1.57	21.66	1.58	22.03	1.60	22.40
1.62	22.76	1.63	23.13	1.65	23.50	1.67	23.87
1.68	24.23	1.70	24.60	1.72	24.97	1.73	25.34
1.75	25.70	1.77	26.44	1.78	27.17	1.80	27.91
1.82	28.64	1.83	29.37	1.85	30.11	1.87	30.84
1.88	31.58	1.90	32.31	1.92	33.05	1.93	33.78
1.95	34.51	1.97	35.25	1.98	35.98	2.00	36.72

HYDROLOGIC REPORT

EXISTING AREA.....
.....
.....

Hyd. No. 2

Hydrograph type = D-RATIONAL
Storm frequency = 100 yr

Peak discharge = 193.85 cfs
Time interval = 1 min

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)	
0.08	1.11	0.10	1.33	0.12	1.55	0.13	1.77
0.15	1.99	0.17	2.22	0.18	2.44	0.20	2.66
0.22	2.88	0.23	3.10	0.25	3.32	0.27	3.54
0.28	3.77	0.30	3.99	0.32	4.21	0.33	4.43
0.35	4.65	0.37	4.87	0.38	5.10	0.40	5.32
0.42	5.54	0.43	5.76	0.45	5.98	0.47	6.20
0.48	6.42	0.50	6.65	0.52	6.87	0.53	7.09
0.55	7.31	0.57	7.53	0.58	7.75	0.60	7.98
0.62	8.20	0.63	8.42	0.65	8.64	0.67	8.86
0.68	9.08	0.70	9.30	0.72	9.53	0.73	9.75
0.75	9.97	0.77	10.19	0.78	10.41	0.80	10.63
0.82	10.86	0.83	11.08	0.85	11.30	0.87	11.52
0.88	11.74	0.90	11.96	0.92	12.18	0.93	12.41
0.95	12.63	0.97	12.85	0.98	13.07	1.00	13.29
1.02	13.51	1.03	13.74	1.05	13.96	1.07	14.18
1.08	14.40	1.10	14.62	1.12	14.84	1.13	15.06
1.15	15.29	1.17	15.51	1.18	15.95	1.20	16.39
1.22	16.84	1.23	17.28	1.25	17.72	1.27	18.17
1.28	18.61	1.30	19.05	1.32	19.50	1.33	19.94
1.35	20.38	1.37	20.82	1.38	21.27	1.40	21.71
1.42	22.15	1.43	22.60	1.45	23.04	1.47	23.48
1.48	23.93	1.50	24.37	1.52	24.81	1.53	25.26
1.55	25.70	1.57	26.14	1.58	26.58	1.60	27.03
1.62	27.47	1.63	27.91	1.65	28.36	1.67	28.80
1.68	29.24	1.70	29.69	1.72	30.13	1.73	30.57
1.75	31.02	1.77	31.90	1.78	32.79	1.80	33.67
1.82	34.56	1.83	35.45	1.85	36.33	1.87	37.22
1.88	38.10	1.90	38.99	1.92	39.88	1.93	40.76
1.95	41.65	1.97	42.54	1.98	43.42	2.00	44.31

HYDROLOGIC REPORT

PROPOSED AREA.....
.....
.....

Hyd. No. 7

Hydrograph type = D-RATIONAL
Storm frequency = 10 yr

Peak discharge = 265.33 cfs
Time interval = 1 min

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)	
0.02	0.42	0.03	0.85	0.05	1.27	0.07	1.70
0.08	2.12	0.10	2.55	0.12	2.97	0.13	3.40
0.15	3.82	0.17	4.25	0.18	4.67	0.20	5.09
0.22	5.52	0.23	5.94	0.25	6.37	0.27	6.79
0.28	7.22	0.30	7.64	0.32	8.07	0.33	8.49
0.35	8.92	0.37	9.34	0.38	9.76	0.40	10.19
0.42	10.61	0.43	11.04	0.45	11.46	0.47	11.89
0.48	12.31	0.50	12.74	0.52	13.16	0.53	13.59
0.55	14.01	0.57	14.43	0.58	14.86	0.60	15.28
0.62	15.71	0.63	16.13	0.65	16.56	0.67	16.98
0.68	17.41	0.70	17.83	0.72	18.25	0.73	18.68
0.75	19.10	0.77	19.53	0.78	19.95	0.80	20.38
0.82	20.80	0.83	21.23	0.85	22.08	0.87	22.92
0.88	23.77	0.90	24.62	0.92	25.47	0.93	26.32
0.95	27.17	0.97	28.02	0.98	28.87	1.00	29.72
1.02	30.57	1.03	31.42	1.05	32.26	1.07	33.11
1.08	33.96	1.10	34.81	1.12	35.66	1.13	36.51
1.15	37.36	1.17	38.21	1.18	39.06	1.20	39.91
1.22	40.76	1.23	41.60	1.25	42.45	1.27	44.15
1.28	45.85	1.30	47.55	1.32	49.25	1.33	50.94
1.35	52.64	1.37	54.34	1.38	56.04	1.40	57.74
1.42	59.43	1.43	61.13	1.45	62.83	1.47	64.53
1.48	66.23	1.50	67.93	1.52	69.62	1.53	71.32
1.55	73.02	1.57	74.72	1.58	76.42	1.60	78.11
1.62	79.81	1.63	81.51	1.65	83.21	1.67	84.91
1.68	92.12	1.70	99.34	1.72	106.56	1.73	113.77
1.75	120.99	1.77	128.21	1.78	135.43	1.80	142.64
1.82	149.86	1.83	157.08	1.85	164.29	1.87	171.51
1.88	178.73	1.90	185.95	1.92	193.16	1.93	200.38

HYDROLOGIC REPORT

PROPOSED AREA.....
.....
.....

Hyd. No. 8

Hydrograph type = D-RATIONAL
Storm frequency = 100 yr

Peak discharge = 324.31 cfs
Time interval = 1 min

HYDROGRAPH DISCHARGE TABLE

TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)		TIME--OUTFLOW (hrs cfs)	
0.02	0.52	0.03	1.04	0.05	1.56	0.07	2.08
0.08	2.59	0.10	3.11	0.12	3.63	0.13	4.15
0.15	4.67	0.17	5.19	0.18	5.71	0.20	6.23
0.22	6.75	0.23	7.26	0.25	7.78	0.27	8.30
0.28	8.82	0.30	9.34	0.32	9.86	0.33	10.38
0.35	10.90	0.37	11.42	0.38	11.93	0.40	12.45
0.42	12.97	0.43	13.49	0.45	14.01	0.47	14.53
0.48	15.05	0.50	15.57	0.52	16.09	0.53	16.60
0.55	17.12	0.57	17.64	0.58	18.16	0.60	18.68
0.62	19.20	0.63	19.72	0.65	20.24	0.67	20.76
0.68	21.27	0.70	21.79	0.72	22.31	0.73	22.83
0.75	23.35	0.77	23.87	0.78	24.39	0.80	24.91
0.82	25.43	0.83	25.95	0.85	26.98	0.87	28.02
0.88	29.06	0.90	30.10	0.92	31.13	0.93	32.17
0.95	33.21	0.97	34.25	0.98	35.29	1.00	36.32
1.02	37.36	1.03	38.40	1.05	39.44	1.07	40.47
1.08	41.51	1.10	42.55	1.12	43.59	1.13	44.63
1.15	45.66	1.17	46.70	1.18	47.74	1.20	48.78
1.22	49.81	1.23	50.85	1.25	51.89	1.27	53.97
1.28	56.04	1.30	58.12	1.32	60.19	1.33	62.27
1.35	64.34	1.37	66.42	1.38	68.50	1.40	70.57
1.42	72.65	1.43	74.72	1.45	76.80	1.47	78.87
1.48	80.95	1.50	83.02	1.52	85.10	1.53	87.18
1.55	89.25	1.57	91.33	1.58	93.40	1.60	95.48
1.62	97.55	1.63	99.63	1.65	101.70	1.67	103.78
1.68	112.60	1.70	121.42	1.72	130.24	1.73	139.07
1.75	147.89	1.77	156.71	1.78	165.53	1.80	174.35
1.82	183.17	1.83	191.99	1.85	200.82	1.87	209.64
1.88	218.46	1.90	227.28	1.92	236.10	1.93	244.92

HYDROLOGICAL REPORT

HYD. No. 10

Hydrograph type = RESERVOIR ROUTE
Storm frequency = 100 yr
Inflow hyd. no. = 8

Peak discharge = 17.99 cfs
Time interval = 1 min
Reservoir no. = 1

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
0.02	0.52	1.04	-14.16	0.52	7.34
0.03	1.04	1.56	-14.68	0.00	7.34
0.05	1.56	2.08	-14.68	0.00	7.34
0.07	2.08	2.59	-14.68	0.00	7.34
0.08	2.59	3.11	-14.68	0.00	7.34
0.10	3.11	3.63	-14.68	0.00	7.34
0.12	3.63	4.15	-14.68	0.00	7.34
0.13	4.15	4.67	-14.68	0.00	7.34
0.15	4.67	5.19	-14.68	0.00	7.34

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HYDROGRAPH DISCHARGE TABLE Cont'd

TIME hrs	INFLOW (i) cfs	INFLOW (j) cfs	2S/dt-O (i) cfs	2S/dt+O (j) cfs	OUTFLOW cfs
11.90	0.00	0.00	12836.93	12863.86	13.46
11.92	0.00	0.00	12810.03	12836.93	13.45
11.93	0.00	0.00	12783.14	12810.03	13.44
11.95	0.00	0.00	12756.27	12783.14	13.43
11.97	0.00	0.00	12729.43	12756.27	13.42
11.98	0.00	0.00	12702.60	12729.43	13.41
12.00	0.00	0.00	12675.79	12702.60	13.41

Maximum outflow (cfs) = 17.99
Maximum storage (cu ft) = 848025
Maximum elevation (ft) = 729.93

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APPENDIX C: PRE AND POST STORMWATER RUNOFF CALCULATIONS

NOAA Atlas 14, Volume 2, Version 3
Location name: Franklin, Indiana, USA*
Latitude: 39.4813°, Longitude: -86.0275°
Elevation: 736.17 ft**
* source: ESRI Maps
** source: USGS

POINT PRECIPITATION FREQUENCY ESTIMATES

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

NOAA, National Weather Service, Silver Spring, Maryland

PF_tabular | PF_graphical | Maps_&_aerials

PF tabular

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)[1]

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	**0.372** (0.333-0.421)	**0.444** (0.396-0.501)	**0.532** (0.472-0.600)	**0.601** (0.532-0.677)	**0.691** (0.608-0.780)	**0.762** (0.666-0.861)	**0.831** (0.719-0.941)	**0.904** (0.774-1.03)	**1.00** (0.843-1.15)	**1.07** (0.890-1.24)
10-min	**0.579** (0.517-0.654)	**0.693** (0.618-0.782)	**0.826** (0.734-0.932)	**0.927** (0.822-1.05)	**1.06** (0.930-1.19)	**1.16** (1.01-1.31)	**1.25** (1.08-1.42)	**1.35** (1.16-1.53)	**1.47** (1.24-1.68)	**1.56** (1.30-1.80)
15-min	**0.709** (0.634-0.802)	**0.847** (0.755-0.956)	**1.01** (0.902-1.14)	**1.14** (1.01-1.29)	**1.31** (1.15-1.47)	**1.43** (1.25-1.62)	**1.55** (1.34-1.76)	**1.68** (1.44-1.91)	**1.84** (1.55-2.10)	**1.95** (1.62-2.25)
30-min	**0.939** (0.839-1.06)	**1.13** (1.01-1.28)	**1.39** (1.24-1.57)	**1.59** (1.40-1.79)	**1.84** (1.62-2.08)	**2.04** (1.79-2.31)	**2.24** (1.94-2.54)	**2.45** (2.10-2.79)	**2.72** (2.29-3.11)	**2.92** (2.43-3.37)
60-min	**1.15** (1.02-1.30)	**1.39** (1.24-1.57)	**1.74** (1.55-1.97)	**2.02** (1.79-2.27)	**2.39** (2.11-2.70)	**2.69** (2.35-3.04)	**3.00** (2.60-3.40)	**3.32** (2.85-3.78)	**3.76** (3.17-4.31)	**4.11** (3.41-4.74)
2-hr	**1.34** (1.20-1.52)	**1.62** (1.45-1.84)	**2.04** (1.81-2.31)	**2.37** (2.10-2.68)	**2.85** (2.50-3.21)	**3.23** (2.81-3.64)	**3.64** (3.13-4.11)	**4.07** (3.45-4.60)	**4.67** (3.89-5.32)	**5.16** (4.22-5.93)
3-hr	**1.42** (1.27-1.61)	**1.72** (1.53-1.95)	**2.17** (1.93-2.46)	**2.53** (2.24-2.86)	**3.04** (2.67-3.43)	**3.47** (3.01-3.92)	**3.93** (3.36-4.45)	**4.41** (3.72-5.01)	**5.10** (4.21-5.83)	**5.66** (4.58-6.52)
6-hr	**1.70** (1.51-1.94)	**2.05** (1.83-2.35)	**2.59** (2.30-2.95)	**3.03** (2.67-3.45)	**3.66** (3.20-4.16)	**4.19** (3.63-4.75)	**4.76** (4.06-5.40)	**5.37** (4.51-6.12)	**6.26** (5.12-7.14)	**6.98** (5.60-8.02)
12-hr	**2.03** (1.82-2.30)	**2.44** (2.19-2.77)	**3.04** (2.72-3.44)	**3.53** (3.14-3.98)	**4.21** (3.71-4.73)	**4.77** (4.17-5.35)	**5.36** (4.63-6.02)	**5.98** (5.09-6.74)	**6.86** (5.72-7.78)	**7.56** (6.21-8.64)
24-hr	**2.43** (2.25-2.65)	**2.92** (2.69-3.18)	**3.57** (3.29-3.89)	**4.09** (3.76-4.45)	**4.78** (4.38-5.20)	**5.33** (4.86-5.81)	**5.89** (5.35-6.42)	**6.46** (5.83-7.05)	**7.24** (6.47-7.92)	**7.84** (6.96-8.72)
2-day	**2.85** (2.63-3.09)	**3.41** (3.15-3.69)	**4.16** (3.84-4.50)	**4.74** (4.37-5.13)	**5.52** (5.06-5.98)	**6.13** (5.60-6.65)	**6.75** (6.14-7.33)	**7.38** (6.67-8.03)	**8.22** (7.38-8.97)	**8.87** (7.91-9.72)
3-day	**3.06** (2.84-3.29)	**3.65** (3.40-3.92)	**4.43** (4.12-4.76)	**5.03** (4.67-5.40)	**5.84** (5.40-6.27)	**6.47** (5.97-6.95)	**7.11** (6.53-7.65)	**7.76** (7.09-8.35)	**8.62** (7.84-9.30)	**9.29** (8.39-10.0)
4-day	**3.26** (3.06-3.49)	**3.89** (3.65-4.15)	**4.69** (4.39-5.01)	**5.32** (4.97-5.67)	**6.16** (5.74-6.56)	**6.81** (6.34-7.25)	**7.47** (6.93-7.96)	**8.14** (7.52-8.68)	**9.03** (8.30-9.63)	**9.71** (8.88-10.4)
7-day	**3.87** (3.61-4.14)	**4.60** (4.30-4.92)	**5.52** (5.15-5.90)	**6.25** (5.82-6.68)	**7.23** (6.73-7.73)	**8.02** (7.43-8.56)	**8.81** (8.14-9.41)	**9.61** (8.86-10.3)	**10.7** (9.81-11.5)	**11.5** (10.5-12.4)
10-day	**4.41** (4.14-4.72)	**5.24** (4.92-5.60)	**6.27** (5.88-6.70)	**7.08** (6.63-7.56)	**8.18** (7.64-8.72)	**9.05** (8.43-9.64)	**9.92** (9.22-10.6)	**10.8** (10.0-11.5)	**12.0** (11.0-12.8)	**12.9** (11.8-13.8)
20-day	**6.05** (5.70-6.44)	**7.16** (6.74-7.61)	**8.44** (7.94-8.98)	**9.44** (8.87-10.0)	**10.8** (10.1-11.4)	**11.8** (11.0-12.5)	**12.8** (11.9-13.6)	**13.8** (12.8-14.6)	**15.1** (14.0-16.0)	**16.1** (14.8-17.1)
30-day	**7.45** (7.03-7.89)	**8.77** (8.28-9.29)	**10.2** (9.62-10.8)	**11.3** (10.7-12.0)	**12.8** (12.0-13.5)	**13.9** (13.0-14.7)	**14.9** (14.0-15.8)	**16.0** (14.9-17.0)	**17.4** (16.1-18.5)	**18.4** (17.0-19.6)
45-day	**9.45** (8.91-10.0)	**11.1** (10.5-11.7)	**12.8** (12.1-13.5)	**14.1** (13.3-14.9)	**15.8** (14.8-16.7)	**17.0** (16.0-18.0)	**18.2** (17.1-19.3)	**19.4** (18.1-20.5)	**20.8** (19.4-22.1)	**21.9** (20.3-23.3)
60-day	**11.3** (10.7-12.0)	**13.2** (12.5-14.0)	**15.2** (14.3-16.1)	**16.6** (15.7-17.6)	**18.6** (17.5-19.6)	**20.0** (18.8-21.2)	**21.3** (20.0-22.6)	**22.7** (21.2-24.0)	**24.3** (22.7-25.8)	**25.5** (23.8-27.1)

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

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

Please refer to NOAA Atlas 14 document for more information.

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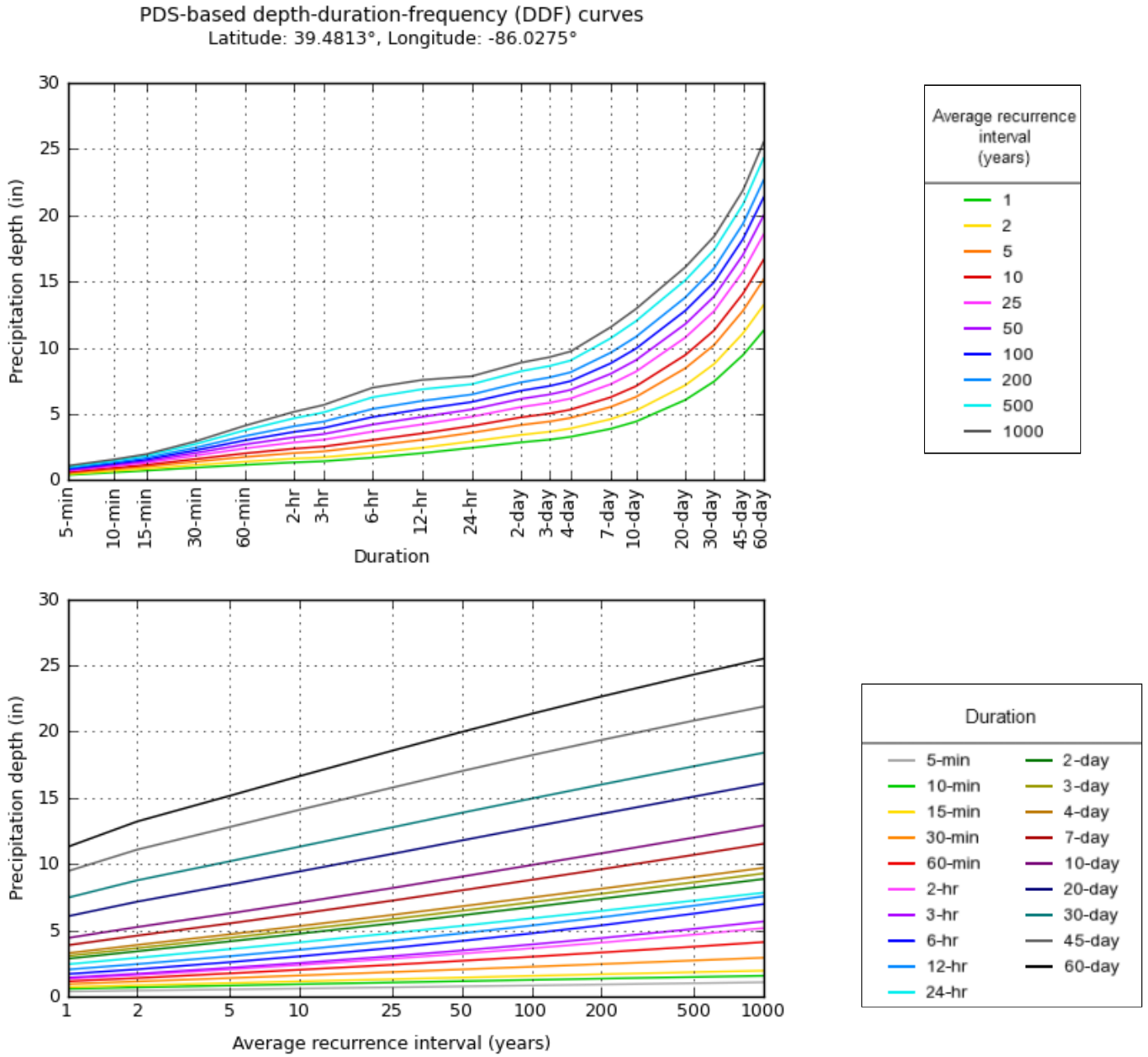
PF graphical



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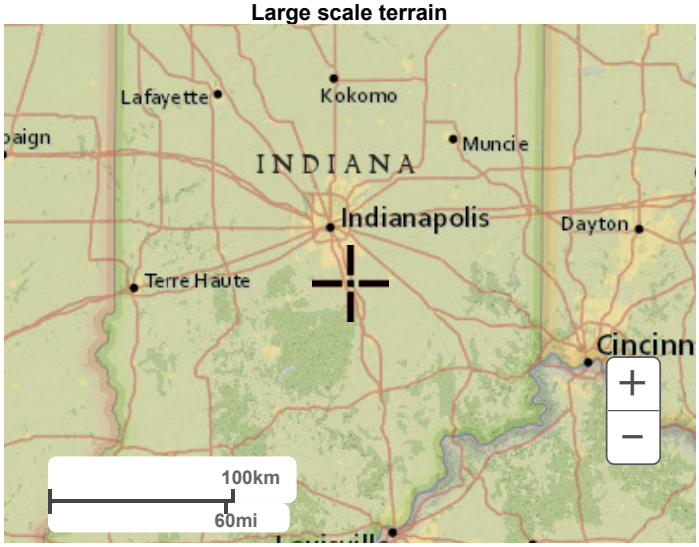
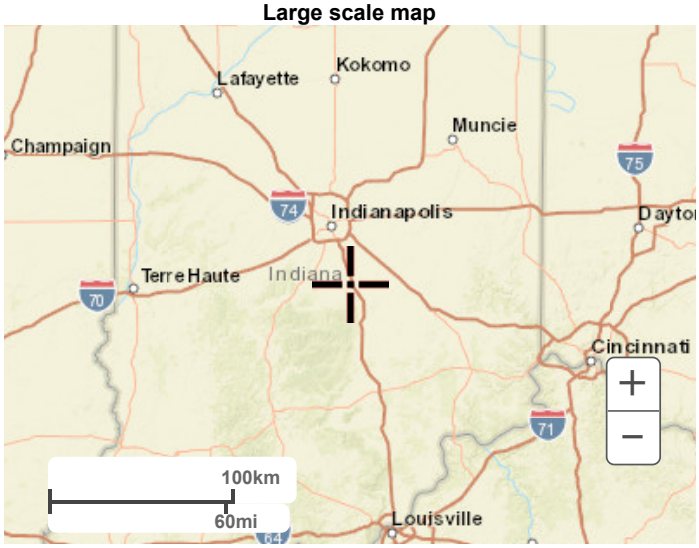
Maps & aerials

Small scale terrain

Large scale terrain



Large scale map



Large scale aerial

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US Department of Commerce
National Oceanic and Atmospheric Administration
National Weather Service
National Water Center
1325 East West Highway
Silver Spring, MD 20910
Questions?: HDSC.Questions@noaa.gov

Disclaimer

Pre and Post Site Runoff.ppc

Project Summary	
Title	
Engineer	
Company	JPS Consulting Engineers
Date	5/20/2022

Notes

Table of Contents

Pre and Post Site Runoff.ppc

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Existing Site Basin	Pre-Developed 2yr	2	0.297	11.930	5.56
Existing Site Basin	Pre-Developed 10yr	10	0.528	11.920	9.99
Existing Site Basin	Pre-Developed 100yr	100	0.920	11.920	17.28
Proposed Site Basin	Post-Developed 2yr	2	0.440	11.920	8.28
Proposed Site Basin	Post-Developed 10yr	10	0.706	11.920	13.11
Proposed Site Basin	Post-Developed 100yr	100	1.133	11.920	20.56

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
Pre-Developed Flow	Pre-Developed 2yr	2	0.297	11.930	5.56
Pre-Developed Flow	Pre-Developed 10yr	10	0.528	11.920	9.99
Pre-Developed Flow	Pre-Developed 100yr	100	0.920	11.920	17.28
Post-Developed Flow	Post-Developed 2yr	2	0.440	11.920	8.28
Post-Developed Flow	Post-Developed 10yr	10	0.706	11.920	13.11
Post-Developed Flow	Post-Developed 100yr	100	1.133	11.920	20.56

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 2yr

Return Event: 2 years
Storm Event: 2year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	85.00 ft
Manning's n	0.016
Slope	0.030 ft/ft
2 Year 24 Hour Depth	2.9 in
Average Velocity	1.11 ft/s
Segment Time of Concentration	0.021 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	60.00 ft
Is Paved?	False
Slope	0.020 ft/ft
Average Velocity	2.28 ft/s
Segment Time of Concentration	0.007 hours

Segment #3: TR-55 Channel Flow	
Flow Area	6.0 ft²
Hydraulic Length	270.00 ft
Manning's n	0.018
Slope	0.003 ft/ft
Wetted Perimeter	6.47 ft
Average Velocity	4.31 ft/s
Segment Time of Concentration	0.017 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 2yr

Return Event: 2 years
Storm Event: 2year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 10yr

Return Event: 10 years
Storm Event: 10year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	85.00 ft
Manning's n	0.016
Slope	0.030 ft/ft
2 Year 24 Hour Depth	2.9 in
Average Velocity	1.11 ft/s
Segment Time of Concentration	0.021 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	60.00 ft
Is Paved?	False
Slope	0.020 ft/ft
Average Velocity	2.28 ft/s
Segment Time of Concentration	0.007 hours

Segment #3: TR-55 Channel Flow	
Flow Area	6.0 ft²
Hydraulic Length	270.00 ft
Manning's n	0.018
Slope	0.003 ft/ft
Wetted Perimeter	6.47 ft
Average Velocity	4.31 ft/s
Segment Time of Concentration	0.017 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 10yr

Return Event: 10 years
Storm Event: 10year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 100yr

Return Event: 100 years
Storm Event: 100year

Time of Concentration Results

Segment #1: TR-55 Sheet Flow	
Hydraulic Length	85.00 ft
Manning's n	0.016
Slope	0.030 ft/ft
2 Year 24 Hour Depth	2.9 in
Average Velocity	1.11 ft/s
Segment Time of Concentration	0.021 hours

Segment #2: TR-55 Shallow Concentrated Flow	
Hydraulic Length	60.00 ft
Is Paved?	False
Slope	0.020 ft/ft
Average Velocity	2.28 ft/s
Segment Time of Concentration	0.007 hours

Segment #3: TR-55 Channel Flow	
Flow Area	6.0 ft²
Hydraulic Length	270.00 ft
Manning's n	0.018
Slope	0.003 ft/ft
Wetted Perimeter	6.47 ft
Average Velocity	4.31 ft/s
Segment Time of Concentration	0.017 hours

Time of Concentration (Composite)	
Time of Concentration (Composite)	0.083 hours

Pre and Post Site Runoff.ppc

Subsection: Time of Concentration Calculations
Label: Existing Site Basin
Scenario: Pre-Developed 100yr

Return Event: 100 years
Storm Event: 100year

==== SCS Channel Flow

Tc = R = Qa / Wp
V = (1.49 * (R**(2/3)) * (Sf**-0.5)) / n

(Lf / V) / 3600

Where:
R= Hydraulic radius
Aq= Flow area, square feet
Wp= Wetted perimeter, feet
V= Velocity, ft/sec
Sf= Slope, ft/ft
n= Manning's n
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Shallow Concentration Flow

Tc = Unpaved surface:
V = 16.1345 * (Sf**0.5)

Paved Surface:
V = 20.3282 * (Sf**0.5)

(Lf / V) / 3600

Where:
V= Velocity, ft/sec
Sf= Slope, ft/ft
Tc= Time of concentration, hours
Lf= Flow length, feet

==== SCS TR-55 Sheet Flow

Tc = (0.007 * ((n * Lf)**0.8)) / ((P**0.5) * (Sf**0.4))

Where:
Tc= Time of concentration, hours
n= Manning's n
Lf= Flow length, feet
P= 2yr, 24hr Rain depth, inches
Sf= Slope, %

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 2yr

Return Event: 2 years
Storm Event: 2year

Storm Event	2year
Return Event	2 years
Duration	24.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	5.57 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.930 hours
Flow (Peak Interpolated Output)	5.56 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.2 in
Runoff Volume (Pervious)	0.298 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.297 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 2yr

Return Event: 2 years
Storm Event: 2year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 10yr

Return Event: 10 years
Storm Event: 10year

Storm Event	10year
Return Event	10 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	10.02 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.920 hours
Flow (Peak Interpolated Output)	9.99 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.1 in
Runoff Volume (Pervious)	0.529 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.528 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 10yr

Return Event: 10 years
Storm Event: 10year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 100yr

Return Event: 100 years
Storm Event: 100year

Storm Event	100year
Return Event	100 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	17.31 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.920 hours
Flow (Peak Interpolated Output)	17.28 ft³/s

Drainage Area	
SCS CN (Composite)	80.000
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	2.5 in
Maximum Retention (Pervious, 20 percent)	0.5 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	3.7 in
Runoff Volume (Pervious)	0.921 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.920 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Existing Site Basin
Scenario: Pre-Developed 100yr

Return Event: 100 years
Storm Event: 100year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 2yr

Return Event: 2 years
Storm Event: 2year

Storm Event	2year
Return Event	2 years
Duration	24.000 hours
Depth	2.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	8.30 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.920 hours
Flow (Peak Interpolated Output)	8.28 ft³/s

Drainage Area	
SCS CN (Composite)	88.160
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	1.3 in
Maximum Retention (Pervious, 20 percent)	0.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.8 in
Runoff Volume (Pervious)	0.440 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.440 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 2yr

Return Event: 2 years
Storm Event: 2year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 10yr

Return Event: 10 years
Storm Event: 10year

Storm Event	10year
Return Event	10 years
Duration	24.000 hours
Depth	4.1 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	13.13 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.920 hours
Flow (Peak Interpolated Output)	13.11 ft³/s

Drainage Area	
SCS CN (Composite)	88.160
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	1.3 in
Maximum Retention (Pervious, 20 percent)	0.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.8 in
Runoff Volume (Pervious)	0.707 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.706 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 10yr

Return Event: 10 years
Storm Event: 10year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 100yr

Return Event: 100 years
Storm Event: 100year

Storm Event	100year
Return Event	100 years
Duration	24.000 hours
Depth	5.9 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	3.000 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	11.922 hours
Flow (Peak, Computed)	20.58 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	11.920 hours
Flow (Peak Interpolated Output)	20.56 ft³/s

Drainage Area	
SCS CN (Composite)	88.160
Area (User Defined)	3.000 acres
Maximum Retention (Pervious)	1.3 in
Maximum Retention (Pervious, 20 percent)	0.3 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	4.5 in
Runoff Volume (Pervious)	1.134 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	1.133 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	40.79 ft³/s
Unit peak time, Tp	0.056 hours
Unit receding limb, Tr	0.222 hours

Pre and Post Site Runoff.ppc

Subsection: Unit Hydrograph Summary
Label: Proposed Site Basin
Scenario: Post-Developed 100yr

Return Event: 100 years
Storm Event: 100year

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.278 hours

APPENDIX D: PIPE CALCULATIONS

MyReport

Line No.	Line ID	DnStm Ln No	Drng Area (ac)	Flow Rate (cfs)	HGL Dn (ft)	HGL Up (ft)	Inlet ID	Inlet Time (min)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Vel Ave (ft/s)	Line Length (ft)	Line Size (in)	Line Slope (%)	n-val Pipe	Line Rise (in)	Runoff Coeff (C)	Tc (min)	
1		Outfall	0.00	1.56	732.07	732.53 j	STR-1	0.0	0.00	731.50	732.00	3.53	32	12	1.56	0.013	12	0.00	7.0	
2		1	0.15	1.58	732.82	732.88	STR-2	5.0	7.24	732.02	732.20	2.57	38	12	0.47	0.013	12	0.78	6.7	
3		2	0.08	0.57	733.02	733.04	STR-3	5.0	7.24	732.20	732.49	1.07	59	12	0.49	0.013	12	0.55	5.3	
4		3	0.04	0.26	733.07	733.19	BLDG-1	5.0	7.24	732.59	732.85	1.58	54	6	0.48	0.013	6	0.90	5.0	
5		2	0.04	0.26	733.03	733.27	BLDG-2	5.0	7.24	732.60	733.00	1.93	68	6	0.59	0.013	6	0.90	5.0	

Project File: NORTH DETENTION.stm | Number of lines: 5 | Date: 06-08-2022

NOTES: Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83 -- Return period = 10 Yrs. ; i Inlet control; ** Critical depth

MyReport

Line No.	Line ID	DnStm Ln No	Drng Area (ac)	Energy Loss (ft)	Flow Rate (cfs)	HGL Dn (ft)	HGL Up (ft)	Inlet ID	Inlet Time (min)	i Inlet (in/hr)	Invert Dn (ft)	Invert Up (ft)	Vel Ave (ft/s)	Line Length (ft)	Line Size (in)	Line Slope (%)	n-val Pipe	Line Rise (in)	Runoff Coeff (C)	Tc (min)
1	BMP TO OUTFALL	Outfall	0.00	0.106	5.01	731.45	731.50	BMP	0.0	0.00	730.55	730.60	4.52	10	18	0.50	0.013	18	0.00	5.0
2	ES-1 TO BMP	1	1.26	0.022	5.02	731.87	731.89	ES-1	5.0	7.24	730.62	730.65	3.19	10	18	0.30	0.013	18	0.55	5.0

Project File: SOUTH BMP.stm | Number of lines: 2 | Date: 05-23-2022

NOTES: Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83 -- Return period = 10 Yrs. ; i Inlet control; ** Critical depth

APPENDIX E: STORMWATER QUALITY BMP CALCULATIONS

Project Summary	
Title	
Engineer	
Company	JPS Consulting Engineers
Date	6/8/2022

Notes

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Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
BMP-1 Impervious	15 min	0	0.003	0.110	0.20
BMP-1 Impervious	30 min	0	0.003	0.150	0.12
BMP-1 Impervious	45 min	0	0.003	0.190	0.09
BMP-1 Impervious	10yr 15m	10	0.018	0.090	1.41
BMP-1 Impervious	10yr 30m	10	0.026	0.110	1.37
BMP-1 Impervious	10yr 1 hr	10	0.034	0.140	1.08
BMP-1 Impervious	10yr 2 hr	10	0.041	0.190	0.72
BMP-1 Pervious	15 min	0	0.000	0.000	0.00
BMP-1 Pervious	30 min	0	0.000	0.000	0.00
BMP-1 Pervious	45 min	0	0.000	0.000	0.00
BMP-1 Pervious	10yr 15m	10	0.000	0.240	0.02
BMP-1 Pervious	10yr 30m	10	0.001	0.230	0.05
BMP-1 Pervious	10yr 1 hr	10	0.003	0.330	0.06
BMP-1 Pervious	10yr 2 hr	10	0.004	0.530	0.05
BMP-2 Impervious	15 min	0	0.008	0.110	0.60
BMP-2 Impervious	30 min	0	0.008	0.150	0.37
BMP-2 Impervious	45 min	0	0.008	0.190	0.27
BMP-2 Impervious	10yr 15m	10	0.052	0.090	4.17
BMP-2 Impervious	10yr 30m	10	0.077	0.110	4.06
BMP-2 Impervious	10yr 1 hr	10	0.101	0.140	3.19
BMP-2 Impervious	10yr 2 hr	10	0.121	0.190	2.12
BMP-2 Pervious	15 min	0	0.000	0.000	0.00
BMP-2 Pervious	30 min	0	0.000	0.000	0.00
BMP-2 Pervious	45 min	0	0.000	0.000	0.00
BMP-2 Pervious	10yr 15m	10	0.002	0.240	0.16
BMP-2 Pervious	10yr 30m	10	0.009	0.230	0.32
BMP-2 Pervious	10yr 1 hr	10	0.017	0.330	0.37
BMP-2 Pervious	10yr 2 hr	10	0.026	0.530	0.29
BMP-1 Total	15 min	0	0.000	0.250	0.02
BMP-1 Total	30 min	0	0.000	0.470	0.01
BMP-1 Total	45 min	0	0.000	0.680	0.01
BMP-1 Total	10yr 15m	10	0.012	0.120	0.87
BMP-1 Total	10yr 30m	10	0.022	0.150	0.99
BMP-1 Total	10yr 1 hr	10	0.031	0.210	0.83
BMP-1 Total	10yr 2 hr	10	0.040	0.310	0.57
BMP-2 Total	15 min	0	0.000	0.000	0.00
BMP-2 Total	30 min	0	0.000	0.000	0.00
BMP-2 Total	45 min	0	0.000	0.000	0.00
BMP-2 Total	10yr 15m	10	0.032	0.130	2.14
BMP-2 Total	10yr 30m	10	0.063	0.170	2.70
BMP-2 Total	10yr 1 hr	10	0.096	0.230	2.40
BMP-2 Total	10yr 2 hr	10	0.126	0.360	1.68

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)

Subsection: Master Network Summary

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
BMP-1 Flow	15 min	0	0.003	0.110	0.20
BMP-1 Flow	30 min	0	0.003	0.150	0.12
BMP-1 Flow	45 min	0	0.003	0.190	0.09
BMP-1 Flow	10yr 15m	10	0.018	0.090	1.41
BMP-1 Flow	10yr 30m	10	0.026	0.110	1.37
BMP-1 Flow	10yr 1 hr	10	0.034	0.140	1.08
BMP-1 Flow	10yr 2 hr	10	0.041	0.190	0.72
BMP-1 Pervious	15 min	0	0.000	0.000	0.00
BMP-1 Pervious	30 min	0	0.000	0.000	0.00
BMP-1 Pervious	45 min	0	0.000	0.000	0.00
BMP-1 Pervious	10yr 15m	10	0.000	0.240	0.02
BMP-1 Pervious	10yr 30m	10	0.001	0.230	0.05
BMP-1 Pervious	10yr 1 hr	10	0.003	0.330	0.06
BMP-1 Pervious	10yr 2 hr	10	0.004	0.530	0.05
BMP-2 Flow	15 min	0	0.008	0.110	0.60
BMP-2 Flow	30 min	0	0.008	0.150	0.37
BMP-2 Flow	45 min	0	0.008	0.190	0.27
BMP-2 Flow	10yr 15m	10	0.052	0.090	4.17
BMP-2 Flow	10yr 30m	10	0.077	0.110	4.06
BMP-2 Flow	10yr 1 hr	10	0.101	0.140	3.19
BMP-2 Flow	10yr 2 hr	10	0.121	0.190	2.12
BMP-2 Pervious	15 min	0	0.000	0.000	0.00
BMP-2 Pervious	30 min	0	0.000	0.000	0.00
BMP-2 Pervious	45 min	0	0.000	0.000	0.00
BMP-2 Pervious	10yr 15m	10	0.002	0.240	0.16
BMP-2 Pervious	10yr 30m	10	0.009	0.230	0.32
BMP-2 Pervious	10yr 1 hr	10	0.017	0.330	0.37
BMP-2 Pervious	10yr 2 hr	10	0.026	0.530	0.29
BMP-1 Total Flow	15 min	0	0.000	0.250	0.02
BMP-1 Total Flow	30 min	0	0.000	0.470	0.01
BMP-1 Total Flow	45 min	0	0.000	0.680	0.01
BMP-1 Total Flow	10yr 15m	10	0.012	0.120	0.87
BMP-1 Total Flow	10yr 30m	10	0.022	0.150	0.99
BMP-1 Total Flow	10yr 1 hr	10	0.031	0.210	0.83
BMP-1 Total Flow	10yr 2 hr	10	0.040	0.310	0.57
BMP-2 Total Flow	15 min	0	0.000	0.000	0.00
BMP-2 Total Flow	30 min	0	0.000	0.000	0.00
BMP-2 Total Flow	45 min	0	0.000	0.000	0.00
BMP-2 Total Flow	10yr 15m	10	0.032	0.130	2.14
BMP-2 Total Flow	10yr 30m	10	0.063	0.170	2.70
BMP-2 Total Flow	10yr 1 hr	10	0.096	0.230	2.40
BMP-2 Total Flow	10yr 2 hr	10	0.126	0.360	1.68

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil C	98.000	0.230	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.090	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	0.320	(N/A)	(N/A)	91.250

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-1 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
Impervious Areas - Paved parking lots, roofs, driveways, Streets and roads - Soil C	98.000	0.680	0.0	0.0	98.000
Open space (Lawns,parks etc.) - Good condition; grass cover > 75% - Soil C	74.000	0.580	0.0	0.0	74.000
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	1.260	(N/A)	(N/A)	86.952

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Runoff CN-Area
Label: BMP-2 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Runoff Curve Number Data

Soil/Surface Description	CN	Area (acres)	C (%)	UC (%)	Adjusted CN
COMPOSITE AREA & WEIGHTED CN --->	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.111 hours
Flow (Peak, Computed)	0.20 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.110 hours
Flow (Peak Interpolated Output)	0.20 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.003 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.003 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.155 hours
Flow (Peak, Computed)	0.12 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.150 hours
Flow (Peak Interpolated Output)	0.12 ft^3/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.003 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.003 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.188 hours
Flow (Peak, Computed)	0.09 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.190 hours
Flow (Peak Interpolated Output)	0.09 ft^3/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.003 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.003 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.144 hours
Flow (Peak, Computed)	1.08 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.140 hours
Flow (Peak Interpolated Output)	1.08 ft^3/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.79 in
Runoff Volume (Pervious)	0.034 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.034 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.100 hours
Flow (Peak, Computed)	1.41 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.090 hours
Flow (Peak Interpolated Output)	1.41 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.92 in
Runoff Volume (Pervious)	0.018 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.018 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.188 hours
Flow (Peak, Computed)	0.72 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.190 hours
Flow (Peak Interpolated Output)	0.72 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.14 in
Runoff Volume (Pervious)	0.041 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.041 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.230 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.111 hours
Flow (Peak, Computed)	1.38 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.110 hours
Flow (Peak Interpolated Output)	1.37 ft^3/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.230 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.36 in
Runoff Volume (Pervious)	0.026 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.026 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	3.14 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Impervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.332 hours
Flow (Peak, Computed)	0.06 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.330 hours
Flow (Peak Interpolated Output)	0.06 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.36 in
Runoff Volume (Pervious)	0.003 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.003 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.243 hours
Flow (Peak, Computed)	0.02 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.240 hours
Flow (Peak Interpolated Output)	0.02 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.05 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.531 hours
Flow (Peak, Computed)	0.05 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.530 hours
Flow (Peak Interpolated Output)	0.05 ft^3/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.53 in
Runoff Volume (Pervious)	0.004 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.004 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.090 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.232 hours
Flow (Peak, Computed)	0.05 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.230 hours
Flow (Peak Interpolated Output)	0.05 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.090 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.18 in
Runoff Volume (Pervious)	0.001 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.001 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	1.23 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Pervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.255 hours
Flow (Peak, Computed)	0.02 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.250 hours
Flow (Peak Interpolated Output)	0.02 ft^3/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.01 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.465 hours
Flow (Peak, Computed)	0.01 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.470 hours
Flow (Peak Interpolated Output)	0.01 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.01 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.686 hours
Flow (Peak, Computed)	0.01 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.680 hours
Flow (Peak Interpolated Output)	0.01 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.01 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.210 hours
Flow (Peak, Computed)	0.83 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.210 hours
Flow (Peak Interpolated Output)	0.83 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.18 in
Runoff Volume (Pervious)	0.031 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.031 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.122 hours
Flow (Peak, Computed)	0.87 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.120 hours
Flow (Peak Interpolated Output)	0.87 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.46 in
Runoff Volume (Pervious)	0.012 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.012 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.310 hours
Flow (Peak, Computed)	0.57 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.310 hours
Flow (Peak Interpolated Output)	0.57 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.49 in
Runoff Volume (Pervious)	0.040 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.040 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.320 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.155 hours
Flow (Peak, Computed)	0.99 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.150 hours
Flow (Peak Interpolated Output)	0.99 ft³/s

Drainage Area	
SCS CN (Composite)	91.000
Area (User Defined)	0.320 acres
Maximum Retention (Pervious)	0.99 in
Maximum Retention (Pervious, 20 percent)	0.20 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.81 in
Runoff Volume (Pervious)	0.022 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.022 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	4.37 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-1 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.111 hours
Flow (Peak, Computed)	0.60 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.110 hours
Flow (Peak Interpolated Output)	0.60 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.008 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.008 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.155 hours
Flow (Peak, Computed)	0.37 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.150 hours
Flow (Peak Interpolated Output)	0.37 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.008 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.008 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.188 hours
Flow (Peak, Computed)	0.27 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.190 hours
Flow (Peak Interpolated Output)	0.27 ft^3/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.14 in
Runoff Volume (Pervious)	0.008 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.008 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.144 hours
Flow (Peak, Computed)	3.20 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.140 hours
Flow (Peak Interpolated Output)	3.19 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.79 in
Runoff Volume (Pervious)	0.101 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.101 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.100 hours
Flow (Peak, Computed)	4.17 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.090 hours
Flow (Peak Interpolated Output)	4.17 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.92 in
Runoff Volume (Pervious)	0.052 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.052 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.188 hours
Flow (Peak, Computed)	2.13 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.190 hours
Flow (Peak Interpolated Output)	2.12 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	2.14 in
Runoff Volume (Pervious)	0.121 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.121 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.680 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.111 hours
Flow (Peak, Computed)	4.07 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.110 hours
Flow (Peak Interpolated Output)	4.06 ft³/s

Drainage Area	
SCS CN (Composite)	98.000
Area (User Defined)	0.680 acres
Maximum Retention (Pervious)	0.20 in
Maximum Retention (Pervious, 20 percent)	0.04 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.36 in
Runoff Volume (Pervious)	0.077 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.077 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	9.28 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Impervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.332 hours
Flow (Peak, Computed)	0.37 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.330 hours
Flow (Peak Interpolated Output)	0.37 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.36 in
Runoff Volume (Pervious)	0.017 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.017 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.243 hours
Flow (Peak, Computed)	0.16 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.240 hours
Flow (Peak Interpolated Output)	0.16 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.05 in
Runoff Volume (Pervious)	0.002 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.002 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.531 hours
Flow (Peak, Computed)	0.29 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.530 hours
Flow (Peak Interpolated Output)	0.29 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.53 in
Runoff Volume (Pervious)	0.026 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.026 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	0.580 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.232 hours
Flow (Peak, Computed)	0.32 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.230 hours
Flow (Peak Interpolated Output)	0.32 ft³/s

Drainage Area	
SCS CN (Composite)	74.000
Area (User Defined)	0.580 acres
Maximum Retention (Pervious)	3.51 in
Maximum Retention (Pervious, 20 percent)	0.70 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.18 in
Runoff Volume (Pervious)	0.009 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.009 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	7.92 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Pervious
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

Storm Event	Water Quality 1Q Huff 15m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 15 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 15m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

Storm Event	Water Quality 1Q Huff 30m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 30 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 30m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

Storm Event	Water Quality 1Q Huff 45m
Return Event	0 years
Duration	24.000 hours
Depth	0.30 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.000 hours
Flow (Peak, Computed)	0.00 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.000 hours
Flow (Peak Interpolated Output)	0.00 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.00 in
Runoff Volume (Pervious)	0.000 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.000 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 45 min

Return Event: 0 years
Storm Event: Water Quality 1Q Huff 45m

SCS Unit Hydrograph Parameters	
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Storm Event	10yr 1hr
Return Event	10 years
Duration	24.000 hours
Depth	2.01 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.232 hours
Flow (Peak, Computed)	2.41 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.230 hours
Flow (Peak Interpolated Output)	2.40 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.92 in
Runoff Volume (Pervious)	0.096 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.096 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 1 hr

Return Event: 10 years
Storm Event: 10yr 1hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Storm Event	10yr 15m
Return Event	10 years
Duration	24.000 hours
Depth	1.14 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.133 hours
Flow (Peak, Computed)	2.14 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.130 hours
Flow (Peak Interpolated Output)	2.14 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.30 in
Runoff Volume (Pervious)	0.032 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.032 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 15m

Return Event: 10 years
Storm Event: 10yr 15m

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Storm Event	10yr 2hr
Return Event	10 years
Duration	24.000 hours
Depth	2.36 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.354 hours
Flow (Peak, Computed)	1.69 ft^3/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.360 hours
Flow (Peak Interpolated Output)	1.68 ft^3/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	1.20 in
Runoff Volume (Pervious)	0.126 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.126 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft^3/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 2 hr

Return Event: 10 years
Storm Event: 10yr 2hr

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

Storm Event	10yr 30m
Return Event	10 years
Duration	24.000 hours
Depth	1.59 in
Time of Concentration (Composite)	0.083 hours
Area (User Defined)	1.260 acres

Computational Time Increment	0.011 hours
Time to Peak (Computed)	0.166 hours
Flow (Peak, Computed)	2.70 ft³/s
Output Increment	0.010 hours
Time to Flow (Peak Interpolated Output)	0.170 hours
Flow (Peak Interpolated Output)	2.70 ft³/s

Drainage Area	
SCS CN (Composite)	87.000
Area (User Defined)	1.260 acres
Maximum Retention (Pervious)	1.49 in
Maximum Retention (Pervious, 20 percent)	0.30 in

Cumulative Runoff	
Cumulative Runoff Depth (Pervious)	0.60 in
Runoff Volume (Pervious)	0.063 ac-ft

Hydrograph Volume (Area under Hydrograph curve)	
Volume	0.063 ac-ft

SCS Unit Hydrograph Parameters	
Time of Concentration (Composite)	0.083 hours
Computational Time Increment	0.011 hours
Unit Hydrograph Shape Factor	483.432
K Factor	0.749
Receding/Rising, Tr/Tp	1.670
Unit peak, qp	17.20 ft³/s
Unit peak time, Tp	0.055 hours
Unit receding limb, Tr	0.221 hours
Total unit time, Tb	0.277 hours

Subsection: Unit Hydrograph Summary
Label: BMP-2 Total
Scenario: 10yr 30m

Return Event: 10 years
Storm Event: 10yr 30m

City of Indianapolis Stormwater Quality Unit (SQU) Selection Guide

(Check : https://www.indy.gov/activity/public-works-specifications-and-manuals for current Selection Guide)

Performance Matrix for Manufactured SQUs that are approved for use as post-construction water quality units in the City of Indianapolis and in compliance with the Stormwater Design and Construction Specifications Manual

Rate Based SQUs - Table 1

Manufactured SQU	SQU System Model	Max Treatment Flow (cfs)	Max 10-yr On-Line Flow Rate (cfs)	Cleanout Depth (Inches)
SciClone	SC-3	0.39	0.78	9
	SC-4	0.70	1.4	9
	SC-5	1.09	2.18	9
	SC-6	1.57	3.14	9
	SC-7	2.14	4.28	9
	SC-8	2.80	5.6	9
	SC-9	3.54	7.08	9
	SC-10	4.37	8.74	9
	SC-11	5.29	10.58	9
	SC-12	6.30	12.6	9
CDS Technologies	CDS-3	0.52	1.04	9
	CDS-4	0.93	1.86	9
	CDS-5	1.5	3.00	9
	CDS-6	2.1	4.2	9
	CDS-7	2.8	5.60	9
	CDS-8	3.7	7.4	9
	CDS-10	5.8	11.6	9
	CDS-12	8.4	16.8	9
DVS	DVS-36C	0.56	1.12	9
	DVS-48C	1.00	2.00	9
	DVS-60C	1.56	3.12	9
	DVS-72C	2.25	4.50	9
	DVS-84C	3.06	6.12	9
	DVS-96C	4.00	8.00	9
	DVS-120C	6.25	12.50	9
	DVS-144C	9.00	18.00	9
Hydro International Downstream Defender	4-ft	1.12	2.95	9
	6-ft	2.52	6.63	12
	8-ft	4.49	11.81	15
	10-ft	7.00	18.40	18
	12 ft	10.08	26.51	21

City of Indianapolis Stormwater Quality Unit (SQU) Selection Guide

Manufactured SQU	SQU System Model	Max Treatment Flow (cfs)	Max 10-yr On-Line Flow Rate (cfs)	Cleanout Depth (Inches)
Hydro International First Defense High Capacity	3-ft	0.85	1.84	9
	4-ft	1.5	3.24	9
	5-ft	2.35	5.08	9
	6-ft	3.38	7.30	9
	7-ft	4.60	9.94	9
	8-ft	6.00	12.96	9
HydroStorm by Hydroworks, LLC	HS-3	0.50	1.00	6
	HS-4	0.88	1.76	6
	HS-5	1.37	2.74	6
	HS-6	1.98	3.96	6
	HS-7	2.69	5.38	6
	HS-8	3.52	7.04	6
	HS-9	4.45	8.9	6
	HS-10	5.49	10.98	6
	HS-11	6.65	13.3	6
	HS-12	7.91	15.82	6
AquaShield Aqua-Swirl Xcelerator[1]	XC-2	0.57	1.16	6
	XC-3	1.13	2.30	6
	XC-4	1.86	3.79	6
	XC-5	2.78	5.66	6
	XC-6	3.88	7.90	6
	XC-7	5.17	10.52	6
	XC-8	6.64	13.51	6
	XC-9	8.29	16.87	6
	XC-10	10.13	20.62	6
	XC-11	12.15	24.73	6
	XC-12	14.35	29.20	6
	XC-13	15.53	31.60	6
Contech Cascade Separator	CS-3	1.02	2.27	9
	CS-4	1.80	4.03	9
	CS-5	2.81	6.29	9
	CS-6	4.05	9.07	9
	CS-8	7.20	16.1	9
	CS-10	11.3	25.3	9
	CS-12	16.2	36.3	9

City of Indianapolis Stormwater Quality Unit (SQU) Selection Guide

Manufactured SQU	SQU System Model	Max Treatment Flow (cfs)	Max 10-yr On-Line Flow Rate (cfs)	Cleanout Depth (Inches)
Oldcastle NSBB-HVT	2-4	0.62	2.57	6
	3-6	1.4	5.80	6
	3-8	1.87	7.75	6
	4-8	2.49	10.31	6
	5-10	3.89	16.11	6
	6-12	5.6	23.19	6
	6-13.75	6.42	26.59	6
	7-14	7.62	31.56	6
	7-15	8.17	33.84	6
	8-14	8.71	36.08	6
	8-16	9.96	41.25	6
	9-18	12.6	52.19	6
	10-17	13.22	54.76	6
	10-20	15.56	64.45	6
	12-21	19.6	81.18	6
	12-24	22.4	92.78	6
AquaShield Aqua Swirl Concentrator	AS-2	0.36	0.73	7
	AS-3	0.71	1.44	7
	AS-4	1.18	2.39	7
	AS-5	1.46	2.96	7
	AS-6	2.11	4.28	7
	AS-7	2.87	5.82	7
	AS-8	3.74	7.59	7
	AS-9	4.73	9.59	7
	AS-10	5.84	11.84	7
	AS-11	7.07	14.34	7
	AS-12	8.42	17.08	7
	AS-13	9.87	20.02	7
ADS Barracuda	S3	0.70	1.40	10
	S4	1.25	2.50	10
	S5	1.95	3.90	10
	S6	2.80	5.60	10
	S8	5.00	10.00	10
	S10	7.80	15.60	10
BioClean Debris Separating Baffle Box (DSBB)	2-4	0.70	1.53	6
	2.5-5	1.10	2.40	6
	3-6	1.59	3.47	6
	4-6	2.11	4.60	6
	4-8	2.82	6.15	6
	5-10	4.40	9.60	6
	6-12	6.34	13.83	6

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BioClean Debris Separating Baffle Box (DSBB)	7-14	8.63	18.83	6
	8-14	9.86	21.51	6
	8-16	11.27	24.59	6
	9-18	14.27	31.13	6
	10-18	15.85	34.58	6
	10-20	17.61	38.42	6
	10-22	19.37	42.26	6
	11-22	21.31	46.49	6
	11-24	23.25	50.73	6
	12-24	25.36	55.33	6
Bio Clean SciCloneX	SCX-4	1.82	3.68	12
	SCX-6	4.09	8.26	12
	SCX-8	7.27	14.69	12
	SCX-10	11.36	22.95	12
	SCX-12	16.35	33.03	12
Hydro International First Defense Optimum	3-ft	1.02	2.30	9
	4-ft	1.81	4.07	9
	5-ft	2.83	6.37	9
	6-ft	4.07	9.16	9
	7-ft	5.53	12.44	9
	8-ft	7.23	16.27	9
	10-ft	11.33	25.49	9

Stormwater Quality Unit Configuration Policy

Multiple Inlet Configurations:

Stormwater Quality Units (SQU) may not be installed on-line or off-line with multiple inlets unless the SQU has been tested and approved by NJCAT/NJDEP using the exact multiple inlet configuration proposed. Multiple inlet configurations include more than one pipe providing inflow directly to the SQU or a combination of inflow pipe and an open grate casting on the SQU.

On-line and Off-line Configurations

SQUs are generally tested in the laboratory with the inlet and outlet pipe 180 degrees apart. Inlet – outlet configurations different than those verified and certified by NJCAT/NJDEP may reduce the performance of the SQU in removing or retaining the desired pollutant without testing to verify performance.