Drainage Design Report

for

Franklin Animal Clinic

Franklin, Indiana

Prepared for:
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425 West South Street, Suite 100
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DRAINAGE DESIGN REPORT FOR FRANKLIN ANIMAL CLINIC

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APPENDICIES

1.0 Introduction

This report addresses Stormwater Management systems associated The Franklin Animal Clinic development located at 2990 North Morton Street in Franklin, Indiana. This report is a supplement to the May 2006 *Animal House Drainage Report* by *Steven B Williams.* The on-site stormwater system design is regulated by the City of Franklin and is subject to design requirements of the 2005 *City of Franklin Subdivision Control Ordinance*.

2.0 Detailed Site Narrative

2.1 General Description

The 2.94-acre project parcel is on the west side of North Morton Street at the International Drive and North Morton Street intersection. The site is currently operating as an animal care clinic and contains an existing building, asphalt drives, and asphalt parking lot.

This project will include an expansion to the building and parking facilities, as well as utility service lines including storm water systems.

Existing zoning designations on the site and adjacent properties are as follows:

Existing Site: MXC: Mixed Use – Community Center
North: MXC: Mixed Use – Community Center
South: MXC: Mixed Use – Community Center
East: IG: Industrial - General
West: MXC: Mixed Use – Community Center

The proposed stormwater system, design, construction, and management will address current Franklin requirements per the 2005 *City of Franklin Subdivision Control Ordinance.*

This report describes both the pre and post construction stormwater systems including design calculations for a new storm sewer pipe network, detained stormwater runoff, and post development stormwater quality BMPs.

2.2 Existing Conditions

The 2.94-acre project parcel has an existing building and asphalt parking lot. Storm runoff is divided into 3 distinct areas within the site:

- The **Existing Undeveloped** area includes approximately the south half of the site. It is essentially a grass field that sheet drains east to the right-of-way ditch along US Highway 31.
- The **Existing Detained Area North** includes the building, a small portion of the

parking lot, and the grass area north and west of the building. This area drains to a swale on the north side of the building that serves as detention. The outlet of the swale is controlled by a 12” RCP culvert with 4" orifice running under the sidewalk along US Highway 31.

- The **Existing Detained Area South** includes the majority of the parking lot and the grass area immediately south of the parking lot. This area drains to a swale on the south side of the parking lot that serves as detention. The outlet of the swale is controlled by a 12” RCP culvert with 4" orifice running under the sidewalk along US Highway 31.

This site is within the **HO Canary Legal Drain** watershed. When site storm water discharges, it discharges to the R/W of US 31, and the travels easterly, eventually to the Canary Open Ditch.

For more information on the existing conditions refer to Appendix A. For more detailed information on the existing on-site detention see Appendix E.

SOILS

According to the USDA web soil survey website, hydrologic soil **groups B and C** are present in the project limits. Refer to Figure 2.2.1 for the soil map and classification. Refer to Appendix A for the existing conditions watershed limits and the drainage calculations.

Figure 2.2.1 Soils Map

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
UbaA	Urban land-Brookston complex, 0 to 2 percent slopes	0.0	0.4%
UcfA	Urban land-Crosby silt loam complex, fine-loamy subsoil, 0 to 2 percent slopes	0.1	2.6%
YbvA	Brookston silty clay loam-Urban land complex, 0 to 2 percent slopes	0.8	24.4%
YclA	Crosby silt loam, fine-loamy subsoil-Urban land complex, 0 to 2 percent slopes	2.3	72.6%
Totals for Area of Interest		**3.2**	**100.0%**

Based on the Flood Insurance Rate Map Number 18081C0139E, the project area of the site is located within Zone X, which is the area determined to be outside of the 0.2% annual chance of floodplain. Refer to figure 2.2.2.

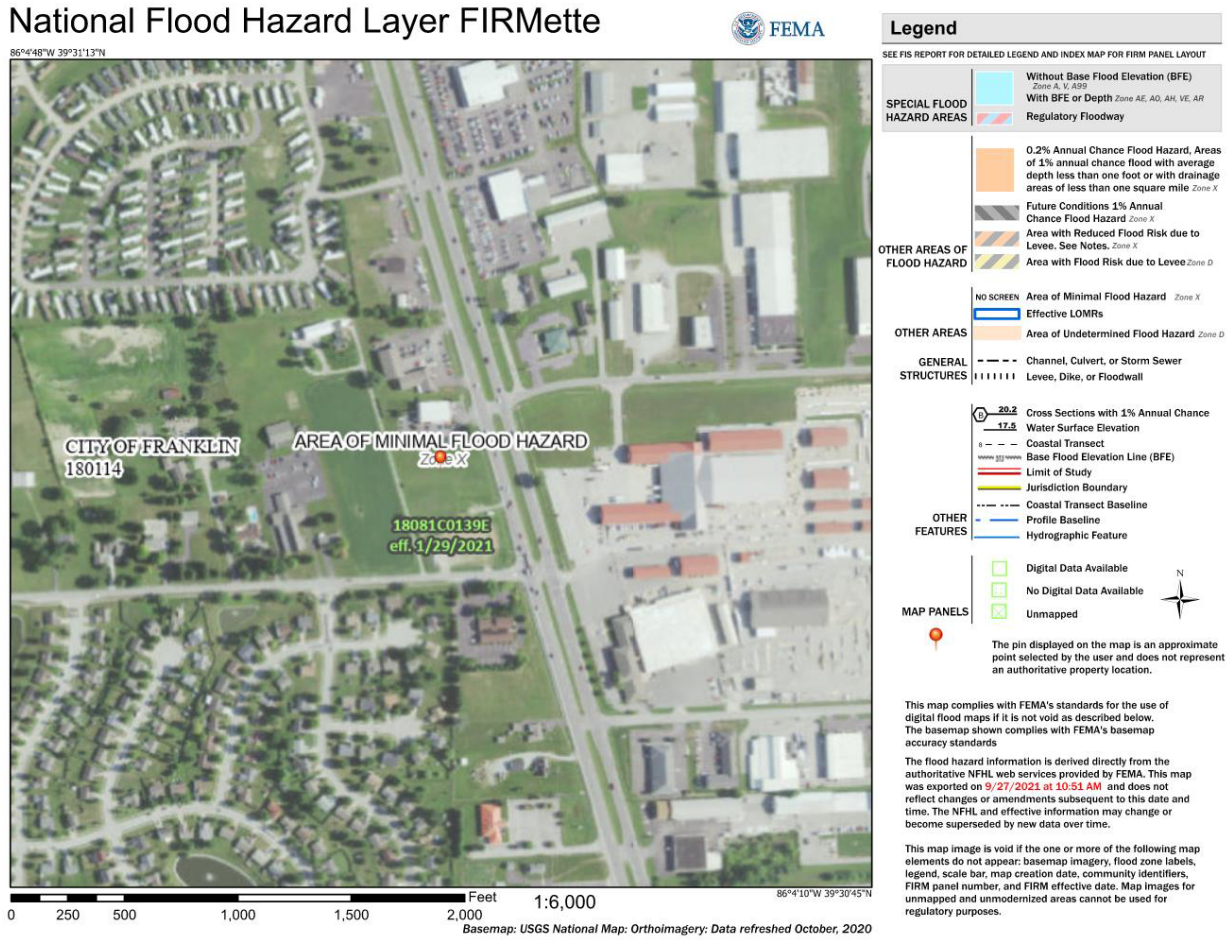


Figure 2.2.2 Flood Insurance Rate Map (FIRM)

2.3 Proposed Conditions

The proposed project will include an expansion to the building and parking facilities, as well as utility service lines including storm water systems. Storm runoff is divided into 3 distinct areas within the site:

- The **Proposed Drainage Area** includes the majority of the site. It contains the building addition, the area of pavement south of the building addition, and the parking expansion. Drainage in this area is collected in a dry detention pond. The outlet of the pond is regulated by a control structure using a 6-inch orifice and a weir wall, and it discharges to the right-of-way ditch along US Highway 31.
- The **Drainage Area North** includes the existing building, a small portion of the

parking lot, and the grass area north and west of the building. This area has been reduced from the existing condition by *0.09 acres*, including an impervious area reduction of 0.05 acres. This area drains to a swale on the north side of the building that serves as detention. The outlet of the swale is controlled by a 12" RCP culvert with 4" orifice running under the sidewalk along US Highway 31.

- The **Drainage Area South** includes the majority of the parking lot and the grass area immediately south of the parking lot. This area accounts for 1.19 acres of impervious area and 0.67 acres of pervious area. This area drains to a swale on the south side of the parking lot that serves as detention. The outlet of the swale is controlled by a 12" RCP culvert with 4" orifice that discharges along US Highway 31.

See Appendix B for more information regarding the proposed conditions.

3.0 Hydrologic Methods

The method used to generate watershed runoff and establish the peak flows that meet Franklin requirements is the SCS unit hydrograph method. Factors used with this method are watershed basin areas, the weighted curve number (CN), and the times of concentration (Tc). Weighted curve number and TC calculations are as follows:

- Existing and Proposed TC and CN calculations for basins with weighted curve numbers and/or TC numbers greater than 5 minutes are provided in the HydroCAD 10.10-4b model reports.

The Rational Method is used to size storm sewer pipes and structures that convey storm water to the outlet nodes at the detention basin or project outlet. Storm Sewer Calculations can be found in **Appendix C**. The factors used in these calculations include the storm sewer basins area, (A), the runoff coefficient, (C), and the rainfall intensity for 10 and 100-year Storm, (i). The IDF table from the NOAA Atlas 14 was used in determining the maximum runoff generated. The runoff coefficient, C, is determined by the location of the site and surface conditions: pervious and impervious areas.

3.1 Rainfall Distribution

The SCS Type-II Rainfall Distribution was used to calculate the storm water runoff for both the existing and proposed conditions for the site.

3.2 Software

HydroCAD 10.10-4b, a hydraulic modeling program, is used to determine the peak flows and volumes using the SCS Unit Hydrograph Method. HydroCAD generates an individual hydrograph for each basin. The hydrographs are then added to generate

runoff flows for ponds or to specific points of interest.

Hydraflow Storm Sewers Extension for AutoCAD Civil 3D has been used to size all onsite storm pipes for the 10-year event peak flows. Hydraflow utilizes a graphical pipe network containing pipe data, inlet characteristics, watershed areas, and rainfall information. The calculations are based on the rational method. Factors involved include runoff coefficient (C), time of concentration (Tc) and Area (A).

See **Appendix C** for storm Sewer Calculations.

4.0 Existing Drainage Analysis

The existing drainage analysis is based on existing conditions at the project site. Due to the presence of hydrologic soil groups B and C, curve numbers (CN) 61 and 74 were used, respectively, in pervious cover areas, and CN 98 in impervious paved areas. Based on these CN values a weighted curve Number is calculated by HydroCAD and shown in model reports located in **Appendix A**. Time of Concentration (Tc) and Curve Number (CN) calculations are included with the HydroCAD reports.

Refer to **Appendix A** for a breakdown of existing conditions watersheds and calculations. The purpose of the existing conditions drainage model is to accommodate a comparison between existing and proposed conditions. Table 4.1 below is a summary of the HydroCAD pre-construction calculation results illustrating existing discharge rates.

Table 4.1. Existing Drainage Analysis Summary

	2yr	10yr	100yr
Detained Area North and South	-	0.95 cfs*	1.45 cfs*
Existing Undeveloped	1.43 cfs	3.02 cfs	5.92 cfs

**Values obtained from previously approved May 2006 Report. See Appendix E for more information*

Per the design requirements of the *2005 City of Franklin Subdivision Control Ordinance* the allowed release rates for the proposed condition are as follows in Table 4.2:

Table 4.2. Allowed Release Rates

	10yr	100yr
Proposed Detained Area	1.43 cfs	3.02 cfs

5.0 Proposed Drainage Analysis and Detention System

The proposed drainage analysis is based on post development site conditions described earlier in this report. The new dry detention pond is included in the model.

Like the existing conditions drainage calculations, Time of Concentration (Tc) and Curve Number (CN) calculations are included with the HydroCAD reports. See **Appendix B** for a breakdown of the proposed watersheds and calculations. Table 5.1 is a summary the HydroCAD model calculations.

Table 5.1. Proposed Release Rates

	10yr	100yr
Detained Area North and South	0.95 cfs*	1.42 cfs*
Proposed Detained Area	1.42 cfs	2.96cfs

**Values obtained from May 2006 report. Values will be reduced since contributing watersheds have been reduced. See Appendix E for more information*

A dry detention pond achieves the required release rates from the overall site. A control structure (Structure 700A) at the pond outlet restricts stormwater release rates that reach the existing roadside swale. A 6-inch diameter orifice will be set at elevation 768.07 and an overflow weir will be set at elevation 771.13 within the outlet structure.

Table 5.2. Spillway Analysis

Peak Det. Elevation 100yr	Peak 100-year Inflow
771.35	12.92 cfs

Based on the 100-year storm water surface elevation of **771.35** in the dry detention pond, the emergency spillway elevation has been set at **772.14**. Thus, the detention volume is adequate. Refer to **Appendix B** for more information on the detention system.

Peak 100-year inflow into the detention system is 12.92 cfs. Thus, the spillway must be able to handle the following flow rate:

12.92 cfs * 1.25 = **16.15 cfs**

Refer to **Appendix E** for detention and spillway calculations for situations in which detained storm water elevations exceeds the 100-year storm water surface elevation.

6.0 Water Quality

Water quality will be achieved via use of a stone filter berm between the pond inlet and outlet. Water entering the pond will stage up behind the berm until it can flow around the end. The berm will detain a volume of 452 cubic feet, which is 15% of the volume released during the 1.25 inch 24-hour water quality storm event. Refer to Appendix B for the proposed berm configuration, and Appendix F for Water Quality calculations.

The dry detention area is to remain free of debris and animal feces.

7.0 Comparison of Pre- and Post-Development Peak Discharge

All post development storm sewer flow from this site will drain to the existing right-of-way ditch along US Highway 31.

Table 6.1. Existing and Proposed Storm Runoff Discharge Rate Comparison

Release Rates to 72-Inch CMP			
Rainfall Event	Existing Conditions (cfs)	**Allowed (csf)**	**Proposed Conditions (cfs)**
10-yr	3.02	**1.43**	**1.42**
100-yr	5.92	**3.02**	**2.96**

8.0 Conclusions

The proposed release rates are below the allowed release rates. Therefore, the downstream system can be deemed adequate for proposed flows. In conclusion, the proposed project will not have adverse effects to downstream storm systems or water quality.

Appendix A

Existing Drainage Exhibit and Calculations

O:\2021\210092\20000\Calcs\Engr\Detention\Prelim\1st Submittal\CAD\Existing Stormwater Basin Exhibit.dwg, October 7, 2021 7:38 AM, ALEX STEPHENS, © P

HERMAN A. BRIGGEMAN CREDIT TRUST PROPERTY (INSTR. # 2004-003657)

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "FECO"

WEST 290.4' (D) S 87°31'30" W 292.47' (M)

ZBS FRANKLIN REAL ESTATE, LLC PROPERTY (INSTR. # 2017-020940) PARCEL 1:

TWO-STORY MASONRY BUILDING (7,245.5 SQ. FT.) FF. ELEV. = 773.23

UTILITY EASEMENT & RIGHT-OF-WAY (INSTR. 2007011167)

SOUTHEAST 150.0' (D) S 16°05'49" E 150.00' (M)

NORTH 150.0' (D) N 16°05'49" W 150.00' (M)

0.23 ACRES ± (9,959.9 SQ. FT.)

EAST 290.4' (D) N 87°31'30" E 292.47' (M)

EAST 290.40' (D)

ZBS FRANKLIN REAL ESTATE, LLC PROPERTY (INSTR. # 2017-020940)

N 13°38'23" W 35.04' (D) N 16°05'49" W 35.04' (M)

0.23 ACRES ± (9,959.9 SQ. FT.)

WEST 290.40' (D) S 87°31'30" W 292.47' (M)

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "SEA GROUP" POINT OF BEGINNING: INSTR. # 2017-020940, PARCEL 2 DEED EXCEPT INSTR. # 2018-000657

SANITARY MANHOLE TC = 772.79 INV 8" PVC N = 763.74 INV 8" PVC S = 763.69

15' SANITARY SEWER EASEMENT (DR. 256, PG. 839)

NORTH 300.0' (D) N 16°05'49" W 300.00' (M)

N 16°05'49" W 264.96' (M)

30' INGRESS/EGRESS EASEMENT (INSTR. 2007011167)

GRAVEL DRIVEWAY

MARCIA PAULINE JAMES & ROBERT JOHN JAMES PROPERTY (INSTR. # 2005-010396)

ZBS FRANKLIN REAL ESTATE II, LLC PROPERTY (INSTR. # 2018-000657)

1.73 ACRES ± (75,313.0 SQ. FT.)

SOUTHEAST 300' (D) S 16°05'49" E 300.00' (M)

S 16°05'49" E 264.96' (M)

US HIGHWAY 31 (SOUTHBOUND)

US HIGHWAY 31 (NORTHBOUND)

5/8-INCH DIAMETER REBAR (FOUND)

FIRST FINANCIAL BANK

FIRST FINANCIAL BANK

EXISTING DETAINED AREA NORTH: 0.56 AC
GROUP B PERVIOUS: 0.22 AC
GROUP C PERVIOUS: 0.07 AC
IMPERVIOUS: 0.26 AC

12" RCP CULVERT FOR SWALE OUTLET CONTROL IE = 769.90

EXISTING DETAINED AREA SOUTH: 0.50 AC
GROUP B PERVIOUS: 0.08 AC
GROUP C PERVIOUS: 0.08 AC
IMPERVIOUS: 0.34 AC

12" RCP CULVERT FOR SWALE OUTLET CONTROL IE = 770.05

SOUTHEAST 38.04' (D) S 16°05'49" E 38.04' (M)

5/8-INCH DIAMETER

EXISTING UNDEVELOPED: 1.47 AC
GROUP C PERVIOUS: 1.41 AC
IMPERVIOUS: 0.05 AC

0 30 60 120
15 45 90
SCALE: 1"=60'

EXHIBIT LEGEND

BASIN LINE

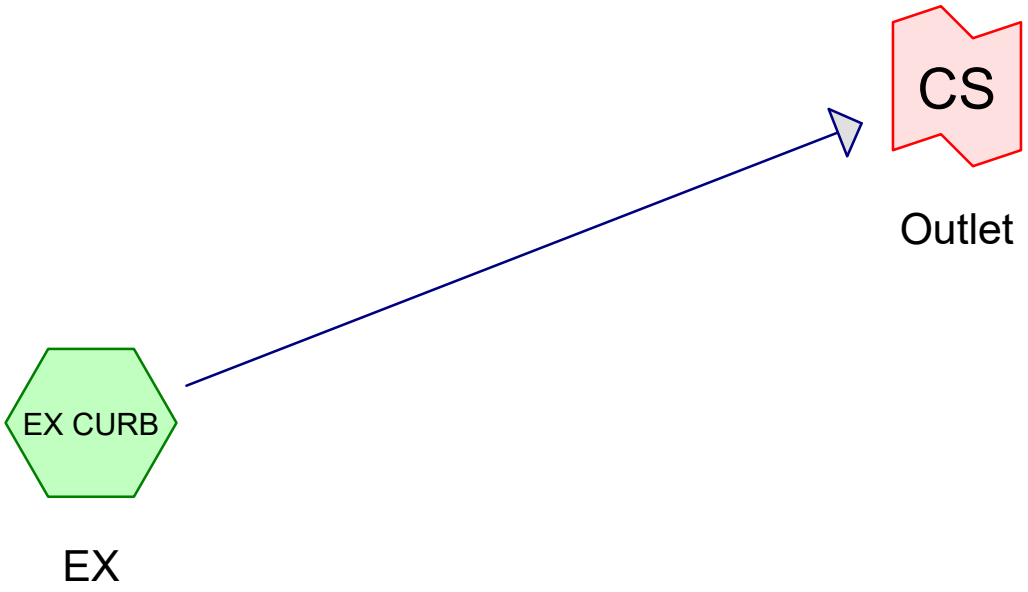
TIME OF CONCENTRATION

TITLE: EXISTING CONDITIONS BASIN MAP	PROJECT: FRANKLIN ANIMAL CLINIC OWNER: FRANKLIN ANIMAL CLINIC 2990 NORTH MORTON STREET FRANKLIN, INDIANA	Cripe Solutions by Design Since 1937	3939 PRIORITY WAY SOUTH DRIVE, SUITE 200 INDIANAPOLIS, INDIANA 46240 (317) 844-6777 www.cripe.biz ● ARCHITECTURE + INTERIORS ● CIVIL ENGINEERING ● SURVEY +3D LASER SCANNING ● ENERGY + FACILITIES ● EQUIPMENT PLANNING ● REAL ESTATE SERVICES	SCALE: 1" = 60' PROJECT NO: 210092-20000 Date: 10-06-2021	SHEET No. 1 of 1

Events for Subcatchment EX CURB: EX

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year 6 hour	2.05	0.75	0.036	0.31
2-Year 12 hour	2.44	1.05	0.057	0.50
2-Year 24 hour	2.92	1.43	0.088	0.76
10-Year 6 hour	3.03	2.27	0.095	0.83
10-Year 12 hour	3.53	2.66	0.131	1.14
10-Year 24 hour	4.09	3.02	0.175	1.52
100-Year 6 hour	4.77	5.76	0.233	2.02
100-Year 12 hour	5.36	**5.92**	0.285	2.48
100-Year 24 hour	**5.89**	5.83	**0.334**	**2.90**

10yr POST = 2yr PRE = **1.43cfs**
100yr POST = 10yr PRE = **3.02cfs**



Subcat Reach Pond Link

Routing Diagram for Existing Conditions
Prepared by Cripe, Printed 10/6/2021
HydroCAD® 10.10-4b s/n 11639 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year 24 hour	Type II 24-hr		Default	24.00	1	2.92	2
2	10-Year 24 hour	Type II 24-hr		Default	24.00	1	4.09	2
3	100-Year 12 hour	Type II 12-hr		Default	12.00	1	5.36	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.330	61	>75% Grass cover, Good, HSG B (EX CURB)
1.000	74	>75% Grass cover, Good, HSG C (EX CURB)
0.050	98	Paved parking, HSG B (EX CURB)
1.380	**72**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.380	HSG B	EX CURB
1.000	HSG C	EX CURB
0.000	HSG D	
0.000	Other	
1.380		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.330	1.000	0.000	0.000	1.330	>75% Grass cover, Good	EX CURB
0.000	0.050	0.000	0.000	0.000	0.050	Paved parking	EX CURB
0.000	**0.380**	**1.000**	**0.000**	**0.000**	**1.380**	**TOTAL AREA**	

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment EX CURB: EX Runoff Area=1.380 ac 3.62% Impervious Runoff Depth=0.76"
Flow Length=386' Tc=11.6 min CN=72 Runoff=1.43 cfs 0.088 af

Link CS: Outlet Inflow=1.43 cfs 0.088 af
Primary=1.43 cfs 0.088 af

Total Runoff Area = 1.380 ac Runoff Volume = 0.088 af Average Runoff Depth = 0.76"
96.38% Pervious = 1.330 ac 3.62% Impervious = 0.050 ac

Summary for Subcatchment EX CURB: EX

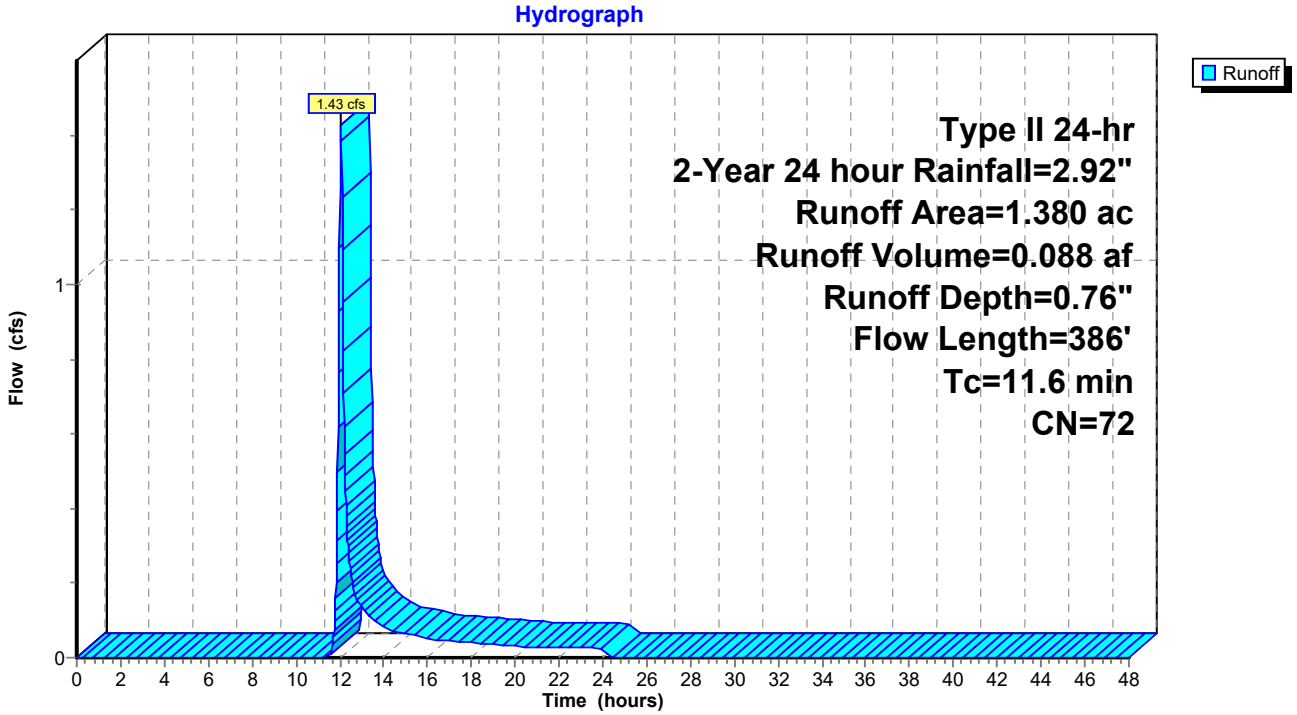
Runoff = 1.43 cfs @ 12.05 hrs, Volume= 0.088 af, Depth= 0.76"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-Year 24 hour Rainfall=2.92"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG B
1.000	74	>75% Grass cover, Good, HSG C
0.330	61	>75% Grass cover, Good, HSG B
1.380	72	Weighted Average
1.330		96.38% Pervious Area
0.050		3.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0500	0.22		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.66"
4.2	286	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
11.6	386	Total			

Subcatchment EX CURB: EX



Hydrograph for Subcatchment EX CURB: EX

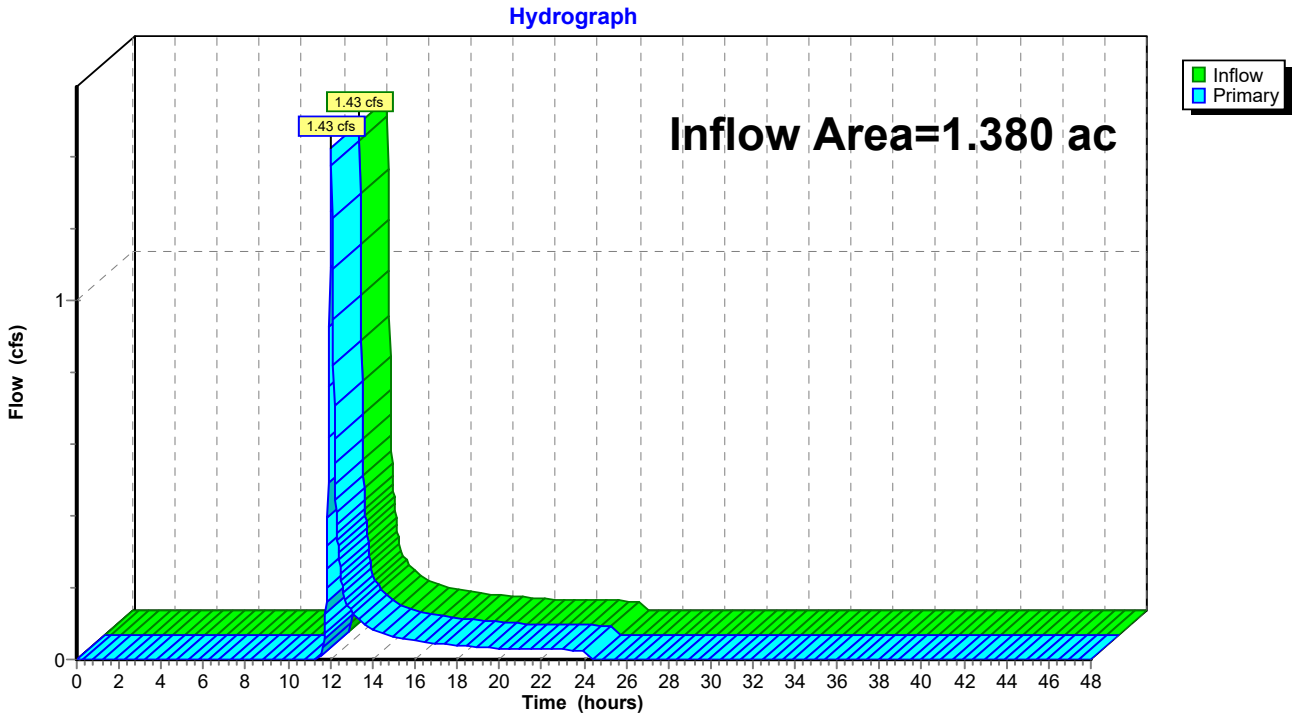
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.03	0.00	0.00
2.00	0.06	0.00	0.00
3.00	0.10	0.00	0.00
4.00	0.14	0.00	0.00
5.00	0.18	0.00	0.00
6.00	0.23	0.00	0.00
7.00	0.29	0.00	0.00
8.00	0.35	0.00	0.00
9.00	0.43	0.00	0.00
10.00	0.53	0.00	0.00
11.00	0.69	0.00	0.00
12.00	1.94	0.27	**1.25**
13.00	2.25	0.41	**0.13**
14.00	2.39	0.47	0.08
15.00	2.49	0.52	0.07
16.00	2.57	0.57	0.05
17.00	2.63	0.60	0.05
18.00	2.69	0.63	0.04
19.00	2.74	0.66	0.04
20.00	2.78	0.68	0.03
21.00	2.82	0.70	0.03
22.00	2.85	0.72	0.03
23.00	2.89	0.74	0.03
24.00	**2.92**	**0.76**	0.03
25.00	2.92	0.76	0.00
26.00	2.92	0.76	0.00
27.00	2.92	0.76	0.00
28.00	2.92	0.76	0.00
29.00	2.92	0.76	0.00
30.00	2.92	0.76	0.00
31.00	2.92	0.76	0.00
32.00	2.92	0.76	0.00
33.00	2.92	0.76	0.00
34.00	2.92	0.76	0.00
35.00	2.92	0.76	0.00
36.00	2.92	0.76	0.00
37.00	2.92	0.76	0.00
38.00	2.92	0.76	0.00
39.00	2.92	0.76	0.00
40.00	2.92	0.76	0.00
41.00	2.92	0.76	0.00
42.00	2.92	0.76	0.00
43.00	2.92	0.76	0.00
44.00	2.92	0.76	0.00
45.00	2.92	0.76	0.00
46.00	2.92	0.76	0.00
47.00	2.92	0.76	0.00
48.00	2.92	0.76	0.00

Summary for Link CS: Outlet

Inflow Area = 1.380 ac, 3.62% Impervious, Inflow Depth = 0.76" for 2-Year 24 hour event
Inflow = 1.43 cfs @ 12.05 hrs, Volume= 0.088 af
Primary = 1.43 cfs @ 12.05 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link CS: Outlet



Hydrograph for Link CS: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
1.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
7.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
9.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
11.00	0.00	0.00	0.00
12.00	**1.25**	0.00	**1.25**
13.00	**0.13**	0.00	**0.13**
14.00	0.08	0.00	0.08
15.00	0.07	0.00	0.07
16.00	0.05	0.00	0.05
17.00	0.05	0.00	0.05
18.00	0.04	0.00	0.04
19.00	0.04	0.00	0.04
20.00	0.03	0.00	0.03
21.00	0.03	0.00	0.03
22.00	0.03	0.00	0.03
23.00	0.03	0.00	0.03
24.00	0.03	0.00	0.03
25.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
27.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
29.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
31.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
33.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
37.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
39.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
41.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
43.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
47.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

SubcatchmentEX CURB: EX Runoff Area=1.380 ac 3.62% Impervious Runoff Depth=1.52"
Flow Length=386' Tc=11.6 min CN=72 Runoff=3.02 cfs 0.175 af

Link CS: Outlet Inflow=3.02 cfs 0.175 af
Primary=3.02 cfs 0.175 af

Total Runoff Area = 1.380 ac Runoff Volume = 0.175 af Average Runoff Depth = 1.52"
96.38% Pervious = 1.330 ac 3.62% Impervious = 0.050 ac

Summary for Subcatchment EX CURB: EX

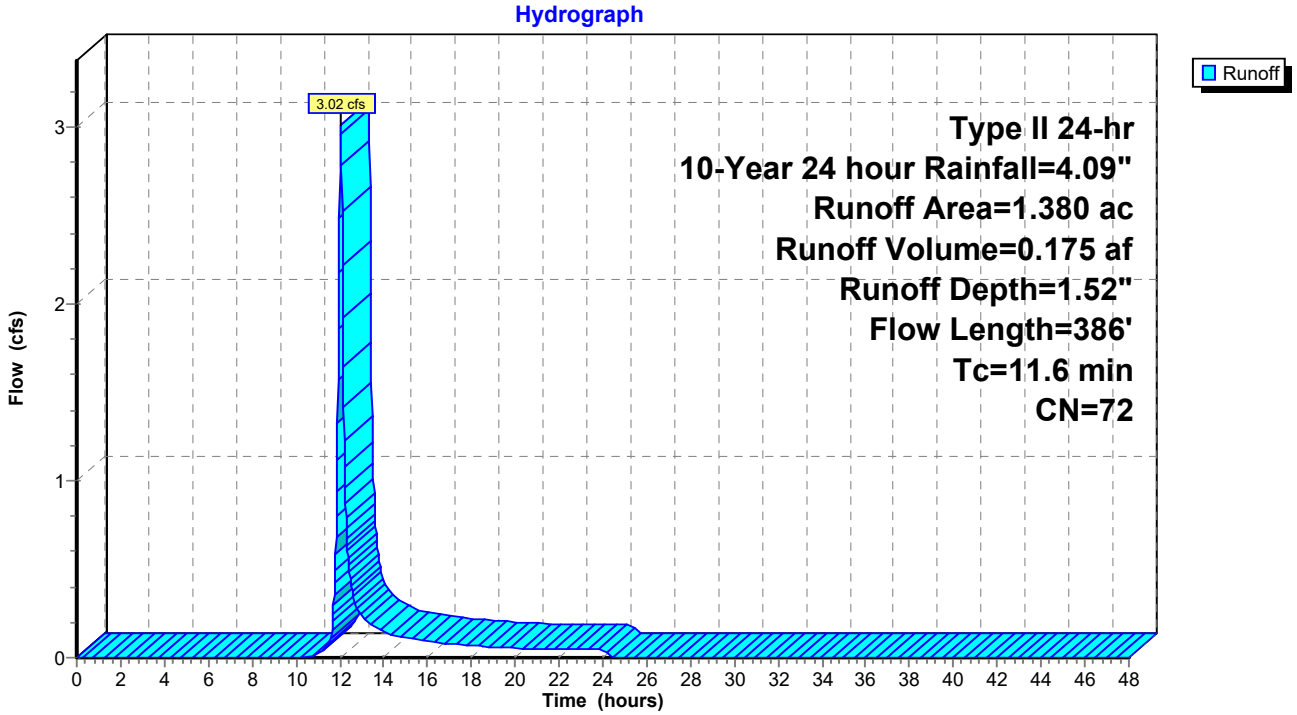
Runoff = 3.02 cfs @ 12.04 hrs, Volume= 0.175 af, Depth= 1.52"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-Year 24 hour Rainfall=4.09"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG B
1.000	74	>75% Grass cover, Good, HSG C
0.330	61	>75% Grass cover, Good, HSG B
1.380	72	Weighted Average
1.330		96.38% Pervious Area
0.050		3.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0500	0.22		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.66"
4.2	286	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
11.6	386	Total			

Subcatchment EX CURB: EX



Hydrograph for Subcatchment EX CURB: EX

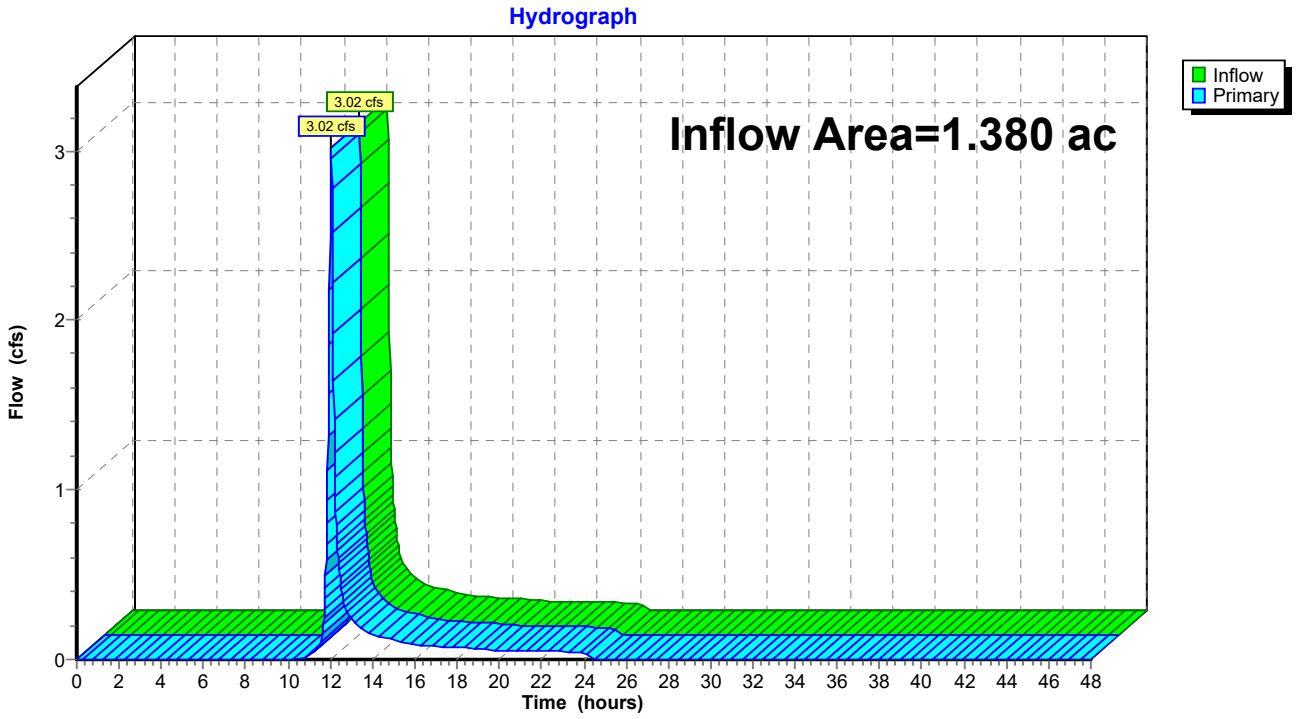
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.04	0.00	0.00
2.00	0.09	0.00	0.00
3.00	0.14	0.00	0.00
4.00	0.20	0.00	0.00
5.00	0.26	0.00	0.00
6.00	0.33	0.00	0.00
7.00	0.40	0.00	0.00
8.00	0.49	0.00	0.00
9.00	0.60	0.00	0.00
10.00	0.74	0.00	0.00
11.00	0.96	0.01	0.02
12.00	2.71	0.64	**2.76**
13.00	3.16	0.90	**0.24**
14.00	3.35	1.03	0.15
15.00	3.49	1.11	0.12
16.00	3.60	1.19	0.09
17.00	3.69	1.25	0.08
18.00	3.77	1.30	0.07
19.00	3.84	1.35	0.06
20.00	3.89	1.39	0.05
21.00	3.95	1.42	0.05
22.00	4.00	1.46	0.05
23.00	4.04	1.49	0.05
24.00	**4.09**	**1.52**	0.04
25.00	4.09	1.52	0.00
26.00	4.09	1.52	0.00
27.00	4.09	1.52	0.00
28.00	4.09	1.52	0.00
29.00	4.09	1.52	0.00
30.00	4.09	1.52	0.00
31.00	4.09	1.52	0.00
32.00	4.09	1.52	0.00
33.00	4.09	1.52	0.00
34.00	4.09	1.52	0.00
35.00	4.09	1.52	0.00
36.00	4.09	1.52	0.00
37.00	4.09	1.52	0.00
38.00	4.09	1.52	0.00
39.00	4.09	1.52	0.00
40.00	4.09	1.52	0.00
41.00	4.09	1.52	0.00
42.00	4.09	1.52	0.00
43.00	4.09	1.52	0.00
44.00	4.09	1.52	0.00
45.00	4.09	1.52	0.00
46.00	4.09	1.52	0.00
47.00	4.09	1.52	0.00
48.00	4.09	1.52	0.00

Summary for Link CS: Outlet

Inflow Area = 1.380 ac, 3.62% Impervious, Inflow Depth = 1.52" for 10-Year 24 hour event
Inflow = 3.02 cfs @ 12.04 hrs, Volume= 0.175 af
Primary = 3.02 cfs @ 12.04 hrs, Volume= 0.175 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link CS: Outlet



Hydrograph for Link CS: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
1.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
5.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00
7.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00
9.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00
11.00	0.02	0.00	0.02
12.00	**2.76**	0.00	**2.76**
13.00	**0.24**	0.00	**0.24**
14.00	0.15	0.00	0.15
15.00	0.12	0.00	0.12
16.00	0.09	0.00	0.09
17.00	0.08	0.00	0.08
18.00	0.07	0.00	0.07
19.00	0.06	0.00	0.06
20.00	0.05	0.00	0.05
21.00	0.05	0.00	0.05
22.00	0.05	0.00	0.05
23.00	0.05	0.00	0.05
24.00	0.04	0.00	0.04
25.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
27.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
29.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
31.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
33.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
37.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
39.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
41.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
43.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
47.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00

Time span=0.00-48.00 hrs, dt=0.02 hrs, 2401 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

SubcatchmentEX CURB: EX Runoff Area=1.380 ac 3.62% Impervious Runoff Depth=2.48"
Flow Length=386' Tc=11.6 min CN=72 Runoff=5.92 cfs 0.285 af

Link CS: Outlet Inflow=5.92 cfs 0.285 af
Primary=5.92 cfs 0.285 af

Total Runoff Area = 1.380 ac Runoff Volume = 0.285 af Average Runoff Depth = 2.48"
96.38% Pervious = 1.330 ac 3.62% Impervious = 0.050 ac

Summary for Subcatchment EX CURB: EX

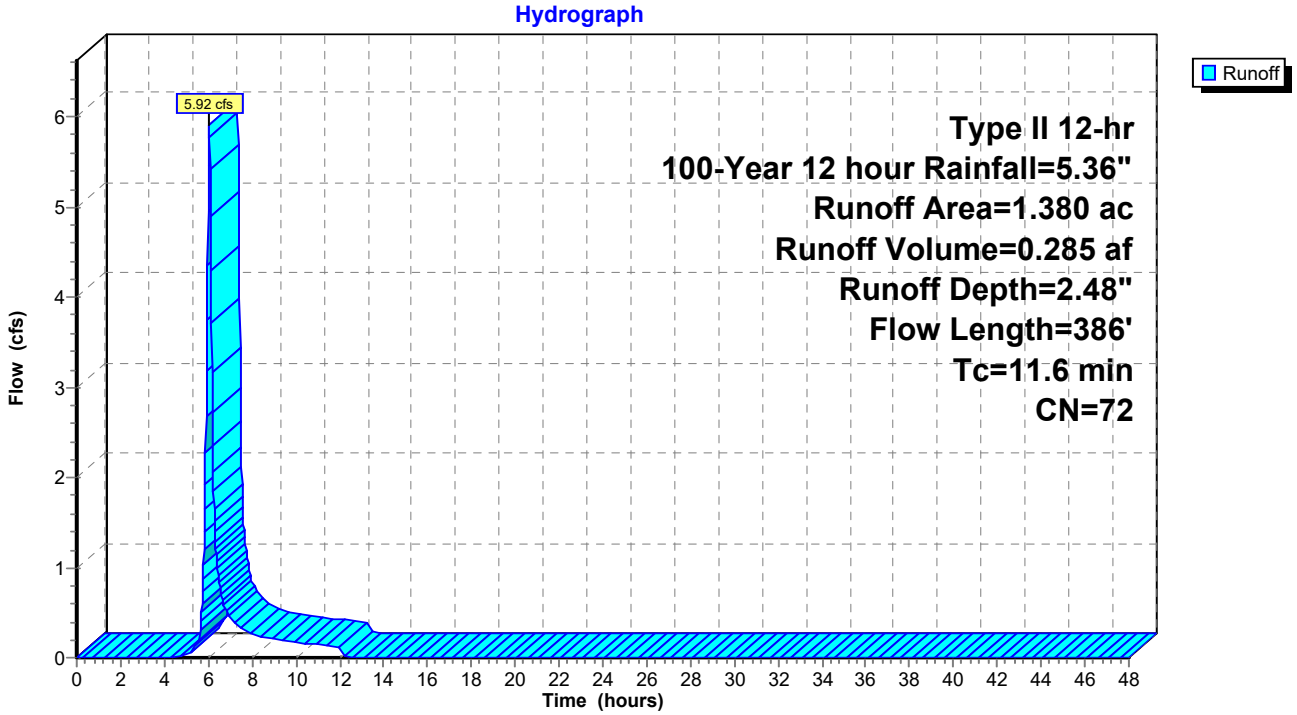
Runoff = 5.92 cfs @ 6.04 hrs, Volume= 0.285 af, Depth= 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs
Type II 12-hr 100-Year 12 hour Rainfall=5.36"

Area (ac)	CN	Description
0.050	98	Paved parking, HSG B
1.000	74	>75% Grass cover, Good, HSG C
0.330	61	>75% Grass cover, Good, HSG B
1.380	72	Weighted Average
1.330		96.38% Pervious Area
0.050		3.62% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.4	100	0.0500	0.22		**Sheet Flow, Sheet Flow** Grass: Short n= 0.150 P2= 2.66"
4.2	286	0.0050	1.14		**Shallow Concentrated Flow, Shallow Conc** Unpaved Kv= 16.1 fps
11.6	386	Total			

Subcatchment EX CURB: EX



Hydrograph for Subcatchment EX CURB: EX

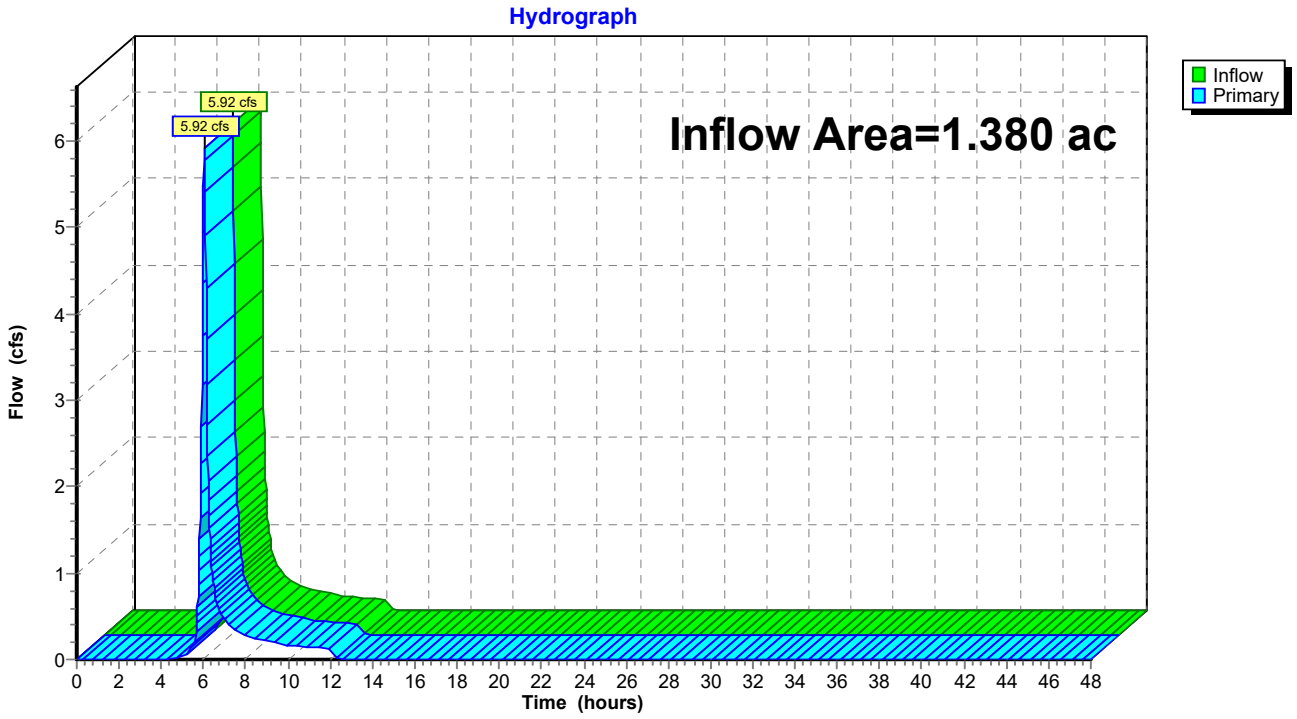
Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
1.00	0.12	0.00	0.00
2.00	0.25	0.00	0.00
3.00	0.43	0.00	0.00
4.00	0.64	0.00	0.00
5.00	0.99	0.01	0.04
6.00	3.72	1.26	**5.47**
7.00	4.41	1.75	**0.45**
8.00	4.72	1.98	0.27
9.00	4.93	2.14	0.21
10.00	5.10	2.27	0.17
11.00	5.24	2.38	0.15
12.00	**5.36**	**2.48**	0.13
13.00	5.36	2.48	0.00
14.00	5.36	2.48	0.00
15.00	5.36	2.48	0.00
16.00	5.36	2.48	0.00
17.00	5.36	2.48	0.00
18.00	5.36	2.48	0.00
19.00	5.36	2.48	0.00
20.00	5.36	2.48	0.00
21.00	5.36	2.48	0.00
22.00	5.36	2.48	0.00
23.00	5.36	2.48	0.00
24.00	5.36	2.48	0.00
25.00	5.36	2.48	0.00
26.00	5.36	2.48	0.00
27.00	5.36	2.48	0.00
28.00	5.36	2.48	0.00
29.00	5.36	2.48	0.00
30.00	5.36	2.48	0.00
31.00	5.36	2.48	0.00
32.00	5.36	2.48	0.00
33.00	5.36	2.48	0.00
34.00	5.36	2.48	0.00
35.00	5.36	2.48	0.00
36.00	5.36	2.48	0.00
37.00	5.36	2.48	0.00
38.00	5.36	2.48	0.00
39.00	5.36	2.48	0.00
40.00	5.36	2.48	0.00
41.00	5.36	2.48	0.00
42.00	5.36	2.48	0.00
43.00	5.36	2.48	0.00
44.00	5.36	2.48	0.00
45.00	5.36	2.48	0.00
46.00	5.36	2.48	0.00
47.00	5.36	2.48	0.00
48.00	5.36	2.48	0.00

Summary for Link CS: Outlet

Inflow Area = 1.380 ac, 3.62% Impervious, Inflow Depth = 2.48" for 100-Year 12 hour event
Inflow = 5.92 cfs @ 6.04 hrs, Volume= 0.285 af
Primary = 5.92 cfs @ 6.04 hrs, Volume= 0.285 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-48.00 hrs, dt= 0.02 hrs

Link CS: Outlet



Hydrograph for Link CS: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
1.00	0.00	0.00	0.00
2.00	0.00	0.00	0.00
3.00	0.00	0.00	0.00
4.00	0.00	0.00	0.00
5.00	0.04	0.00	0.04
6.00	**5.47**	0.00	**5.47**
7.00	**0.45**	0.00	**0.45**
8.00	0.27	0.00	0.27
9.00	0.21	0.00	0.21
10.00	0.17	0.00	0.17
11.00	0.15	0.00	0.15
12.00	0.13	0.00	0.13
13.00	0.00	0.00	0.00
14.00	0.00	0.00	0.00
15.00	0.00	0.00	0.00
16.00	0.00	0.00	0.00
17.00	0.00	0.00	0.00
18.00	0.00	0.00	0.00
19.00	0.00	0.00	0.00
20.00	0.00	0.00	0.00
21.00	0.00	0.00	0.00
22.00	0.00	0.00	0.00
23.00	0.00	0.00	0.00
24.00	0.00	0.00	0.00
25.00	0.00	0.00	0.00
26.00	0.00	0.00	0.00
27.00	0.00	0.00	0.00
28.00	0.00	0.00	0.00
29.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00
31.00	0.00	0.00	0.00
32.00	0.00	0.00	0.00
33.00	0.00	0.00	0.00
34.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00
36.00	0.00	0.00	0.00
37.00	0.00	0.00	0.00
38.00	0.00	0.00	0.00
39.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00
41.00	0.00	0.00	0.00
42.00	0.00	0.00	0.00
43.00	0.00	0.00	0.00
44.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00
46.00	0.00	0.00	0.00
47.00	0.00	0.00	0.00
48.00	0.00	0.00	0.00

Events for Subcatchment EX CURB: EX

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year 24 hour	2.92	1.43	0.088	0.76
10-Year 24 hour	4.09	3.02	0.175	1.52
100-Year 12 hour	**5.36**	**5.92**	**0.285**	**2.48**

Events for Link CS: Outlet

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-Year 24 hour	1.43	1.43	**0.00**
10-Year 24 hour	3.02	3.02	0.00
100-Year 12 hour	**5.92**	**5.92**	0.00

Existing Conditions
Prepared by Cripe
HydroCAD® 10.10-4b s/n 11639 © 2020 HydroCAD Software Solutions LLC

TABLE OF CONTENTS

Appendix B

Proposed Drainage Exhibit and Calculations

O:\2021\210092\20000\Calcs\Engr\Detention\Prelim\3rd Submittal\CAD\Proposed Stormwater Basin Exhibit.dwg, July 1, 2022 4:05 AM, STEV PIERRE, © Paul I.

HERMAN A. BRIGGEMAN CREDIT TRUST PROPERTY (INSTR. # 2004-003657)

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "FECO" POINT OF BEGINNING: INSTR. # 2017-020940, PARCEL 1

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "FECO"

ZBS FRANKLIN REAL ESTATE, LLC PROPERTY (INSTR. # 2017-020940)
EXISTING SF = 7,245.55
PROPOSED SF = 11,970.00
TOTAL SF = 19,215.55
FFE = 773.23
TWO-STORY MASONRY BUILDING (7,245.5 SQ. FT.)
FF. ELEV. = 773.23

DRAINAGE AREA NORTH: 0.47 AC
GROUP B PERVIOUS: 0.19 AC
GROUP C PERVIOUS: 0.06 AC
IMPERVIOUS: 0.21 AC

WEST 290.4' (D)
S 87°31'30" W 292.47' (M)

UTILITY EASEMENT & RIGHT-OF-WAY (INSTR. # 2001-001827)

NORTH 150' (D)
N 16°05'49" W 150.00' (M)

ADDED PER INDIANA AMERICAN WATER PLANS DATED 5-18-06

SOUTH 150' (D)
S 16°05'49" E 150.00' (M)

UNDISTURBED DRAINAGE PATTERN

0.23 ACRES ±
(9,959.9 SQ. FT.)

EAST 290.4' (D)
N 87°31'30" E 292.47' (M)

ZBS FRANKLIN REAL ESTATE, LLC PROPERTY (INSTR. # 2017-020940)

DRAINAGE AREA SOUTH: 0.34 AC
GROUP B PERVIOUS: 0.06 AC
GROUP C PERVIOUS: 0.06 AC
IMPERVIOUS: 0.22 AC

SOUTHEAST 38.04' (D)
S 16°05'49" E 38.04' (M)

N 13°38'23" W 35.04' (D)
N 16°05'49" W 35.04' (M)

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "SEA GROUP" POINT OF BEGINNING: INSTR. # 2017-020940, PARCEL 2 DEED EXCEPT INSTR. # 2018-000657

WEST 290.40' (D)
S 87°31'30" W 292.47' (M)

5/8-INCH DIAMETER REBAR W/ CAP STAMPED "SEA GROUP"

ADDED PER INDIANA AMERICAN WATER PLANS DATED 5-18-06

PROPOSED DRAINAGE AREA: 1.86 AC
GROUP B PERVIOUS: 0.2 AC
GROUP C PERVIOUS: 0.47 AC
IMPERVIOUS: 1.19 AC

SANITARY MANHOLE
TC = 772.79
INV 8" PVC N = 763.74
INV 8" PVC S = 763.69

FUTURE PARKING EXPANSION

ZBS FRANKLIN REAL ESTATE II, LLC PROPERTY (INSTR. # 2018-000657)
1.73 ACRES ±
(75,313.0 SQ. FT.)

SOUTHEAST 300' (D)
S 16°05'49" E 300.00' (M)

264.96' (M)

US HIGHWAY 31 (SOUTHBOUND)

S HIGHWAY 31 (NORTHBOUND)

STONE FILTER BERM

MARCIA PAULINE JAMES & ROBERT JOHN JAMES PROPERTY (INSTR. # 2005-010396)

NORTH 300' (D)
N 16°05'49" W 300.00' (M)

30' INGRESS & EGRESS EASEMENT (INSTR. # 2011167)

UNDISTURBED DRAINAGE PATTERN

GRAVEL DRIVEWAY

292.47' S 87°31'30" W

5/8-INCH DIAMETER REBAR (FOUND)

FIRST FINANCIAL BANK

FIRST FINANCIAL BANK

0 30 60 120
15 45 90
SCALE: 1"=60'

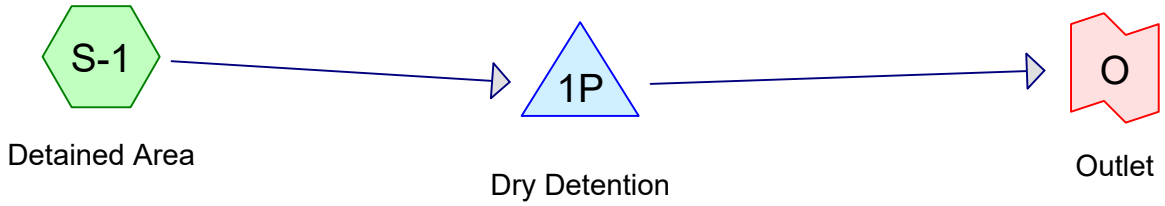
EXHIBIT LEGEND

BASIN LINE

TITLE: PROPOSED CONDITIONS BASIN MAP	PROJECT: FRANKLIN ANIMAL CLINIC OWNER: FRANKLIN ANIMAL CLINIC, 2990 NORTH MORTON STREET, FRANKLIN, INDIANA	Cripe® Solutions by Design Since 1937	3939 PRIORITY WAY SOUTH DRIVE, SUITE 200 INDIANAPOLIS, INDIANA 46240 (317) 844-6777 www.cripe.biz	● ARCHITECTURE + INTERIORS ● CIVIL ENGINEERING ● SURVEY +3D LASER SCANNING ● ENERGY + FACILITIES ● EQUIPMENT PLANNING ● REAL ESTATE SERVICES	SCALE: 1" = 60' PROJECT NO: 210092-20000 Date: 07-01-2022	SHEET No. 1 of 1

Events for Pond 1P: Dry Detention

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-Year 6 hour	4.24	1.18	769.87	2,492
2-Year 12 hour	4.58	1.21	769.96	2,902
2-Year 24 hour	4.93	1.24	770.05	3,315
10-Year 6 hour	7.34	1.39	770.48	5,475
10-Year 12 hour	7.51	1.41	770.54	5,826
10-Year 24 hour	7.59	1.42	770.58	6,033
100-Year 6 hour	**12.92**	**2.96**	**771.35**	**10,864**
100-Year 12 hour	12.44	2.78	771.33	10,733
100-Year 24 hour	11.66	2.27	771.27	10,300



Subcat Reach Pond Link

Routing Diagram for Proposed Conditions
Prepared by Cripe, Printed 11/4/2021
HydroCAD® 10.10-4b s/n 11639 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing (selected events)

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Year 24 hour	Type II 24-hr		Default	24.00	1	2.92	2
2	10-Year 24 hour	Type II 24-hr		Default	24.00	1	4.09	2
3	100-Year 6 hour	Type II 6-hr		Default	6.00	1	4.77	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.050	61	>75% Grass cover, Good, HSG B (S-1)
0.470	74	>75% Grass cover, Good, HSG C (S-1)
1.190	98	Paved parking, HSG C (S-1)
1.710	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.050	HSG B	S-1
1.660	HSG C	S-1
0.000	HSG D	
0.000	Other	
1.710		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.050	0.470	0.000	0.000	0.520	>75% Grass cover, Good	S-1
0.000	0.000	1.190	0.000	0.000	1.190	Paved parking	S-1
0.000	**0.050**	**1.660**	**0.000**	**0.000**	**1.710**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)
1	1P	768.07	768.00	45.0	0.0016	0.012	0.0	15.0	0.0

Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S-1: Detained Area Runoff Area=1.710 ac 69.59% Impervious Runoff Depth=1.91"
Tc=10.0 min CN=90 Runoff=4.93 cfs 0.272 af

Pond 1P: Dry Detention Peak Elev=770.05' Storage=3,315 cf Inflow=4.93 cfs 0.272 af
Outflow=1.24 cfs 0.272 af

Link O: Outlet Inflow=1.24 cfs 0.272 af
Primary=1.24 cfs 0.272 af

Total Runoff Area = 1.710 ac Runoff Volume = 0.272 af Average Runoff Depth = 1.91"
30.41% Pervious = 0.520 ac 69.59% Impervious = 1.190 ac

Summary for Subcatchment S-1: Detained Area

Runoff = 4.93 cfs @ 12.01 hrs, Volume= 0.272 af, Depth= 1.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type II 24-hr 2-Year 24 hour Rainfall=2.92"

Area (ac)	CN	Description
0.470	74	>75% Grass cover, Good, HSG C
0.050	61	>75% Grass cover, Good, HSG B
1.190	98	Paved parking, HSG C
1.710	90	Weighted Average
0.520		30.41% Pervious Area
1.190		69.59% Impervious Area

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

Hydrograph for Subcatchment S-1: Detained Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.40	0.01	0.00	0.00
0.80	0.02	0.00	0.00
1.20	0.04	0.00	0.00
1.60	0.05	0.00	0.00
2.00	0.06	0.00	0.00
2.40	0.08	0.00	0.00
2.80	0.09	0.00	0.00
3.20	0.11	0.00	0.00
3.60	0.12	0.00	0.00
4.00	0.14	0.00	0.00
4.40	0.16	0.00	0.00
4.80	0.17	0.00	0.00
5.20	0.19	0.00	0.00
5.60	0.21	0.00	0.00
6.00	0.23	0.00	0.00
6.40	0.26	0.00	0.00
6.80	0.28	0.00	0.01
7.20	0.30	0.01	0.01
7.60	0.33	0.01	0.02
8.00	0.35	0.01	0.02
8.40	0.38	0.02	0.03
8.80	0.41	0.03	0.04
9.20	0.45	0.04	0.05
9.60	0.49	0.05	0.05
10.00	0.53	0.07	0.07
10.40	0.58	0.09	0.10
10.80	0.65	0.12	0.13
11.20	0.73	0.16	0.20
11.60	0.90	0.25	0.37
12.00	1.94	1.04	**4.88**
12.40	2.12	1.19	**0.65**
12.80	2.22	1.28	0.35
13.20	2.29	1.34	0.26
13.60	2.35	1.39	0.22
14.00	2.39	1.44	0.18
14.40	2.44	1.47	0.16
14.80	2.47	1.51	0.15
15.20	2.51	1.54	0.13
15.60	2.54	1.57	0.12
16.00	2.57	1.59	0.11
16.40	2.60	1.62	0.10
16.80	2.62	1.64	0.10
17.20	2.64	1.66	0.09
17.60	2.67	1.68	0.09
18.00	2.69	1.70	0.08
18.40	2.71	1.72	0.08
18.80	2.73	1.74	0.07
19.20	2.75	1.75	0.07
19.60	2.76	1.77	0.07
20.00	2.78	1.78	0.06
20.40	2.79	1.80	0.06
20.80	2.81	1.81	0.06
21.20	2.82	1.82	0.06
21.60	2.84	1.84	0.06
22.00	2.85	1.85	0.06
22.40	2.87	1.86	0.05
22.80	2.88	1.87	0.05
23.20	2.89	1.89	0.05
23.60	2.91	1.90	0.05
24.00	**2.92**	**1.91**	0.05
24.40	2.92	1.91	0.00
24.80	2.92	1.91	0.00
25.20	2.92	1.91	0.00
25.60	2.92	1.91	0.00
26.00	2.92	1.91	0.00
26.40	2.92	1.91	0.00
26.80	2.92	1.91	0.00
27.20	2.92	1.91	0.00
27.60	2.92	1.91	0.00
28.00	2.92	1.91	0.00
28.40	2.92	1.91	0.00
28.80	2.92	1.91	0.00
29.20	2.92	1.91	0.00
29.60	2.92	1.91	0.00
30.00	2.92	1.91	0.00

Summary for Pond 1P: Dry Detention

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 1.91" for 2-Year 24 hour event
Inflow = 4.93 cfs @ 12.01 hrs, Volume= 0.272 af
Outflow = 1.24 cfs @ 12.22 hrs, Volume= 0.272 af, Atten= 75%, Lag= 12.3 min
Primary = 1.24 cfs @ 12.22 hrs, Volume= 0.272 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Peak Elev= 770.05' @ 12.22 hrs Surf.Area= 4,706 sf Storage= 3,315 cf

Plug-Flow detention time= 16.6 min calculated for 0.272 af (100% of inflow)
Center-of-Mass det. time= 16.6 min (827.7 - 811.1)

Volume	Invert	Avail.Storage	Storage Description
#1	768.07'	15,759 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
768.07	0	0.0	0	0	0
768.50	254	113.0	36	36	1,016
769.00	1,183	270.0	331	367	5,802
769.50	2,592	429.0	921	1,288	14,648
770.00	4,619	510.0	1,779	3,067	20,706
771.00	6,392	368.0	5,482	8,548	30,637
772.00	8,062	400.0	7,211	15,759	32,630

Device	Routing	Invert	Outlet Devices
#1	Primary	768.07'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 768.07' / 768.00' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	768.07'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	771.13'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.24 cfs @ 12.22 hrs HW=770.05' (Free Discharge)
└**1=Culvert** (Passes 1.24 cfs of 5.70 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.24 cfs @ 6.34 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Hydrograph for Pond 1P: Dry Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	768.07	0.00
1.00	0.00	0	768.07	0.00
2.00	0.00	0	768.07	0.00
3.00	0.00	0	768.07	0.00
4.00	0.00	0	768.07	0.00
5.00	0.00	0	768.07	0.00
6.00	0.00	0	768.08	0.00
7.00	0.01	0	768.14	0.01
8.00	0.02	0	768.16	0.02
9.00	0.04	1	768.20	0.04
10.00	0.07	2	768.24	0.07
11.00	0.16	7	768.32	0.16
12.00	**4.88**	**1,807**	**769.68**	**1.10**
13.00	**0.30**	**1,481**	**769.57**	**1.06**
14.00	0.18	9	768.34	0.18
15.00	0.14	6	768.31	0.14
16.00	0.11	4	768.28	0.11
17.00	0.09	4	768.27	0.09
18.00	0.08	3	768.26	0.08
19.00	0.07	3	768.24	0.07
20.00	0.06	2	768.23	0.06
21.00	0.06	2	768.23	0.06
22.00	0.06	2	768.23	0.06
23.00	0.05	2	768.22	0.05
24.00	0.05	2	768.22	0.05
25.00	0.00	0	768.07	0.00
26.00	0.00	0	768.07	0.00
27.00	0.00	0	768.07	0.00
28.00	0.00	0	768.07	0.00
29.00	0.00	0	768.07	0.00
30.00	0.00	0	768.07	0.00

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

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
768.07	0	0
768.12	3	0
768.17	14	0
768.22	31	2
768.27	55	4
768.32	86	7
768.37	124	12
768.42	168	20
768.47	220	29
768.52	278	42
768.57	343	57
768.62	415	76
768.67	493	99
768.72	579	126
768.77	671	157
768.82	770	193
768.87	876	234
768.92	989	281
768.97	1,108	333
769.02	1,229	391
769.07	1,347	456
769.12	1,471	526
769.17	1,601	603
769.22	1,736	686
769.27	1,876	777
769.32	2,022	874
769.37	2,173	979
769.42	2,330	1,092
769.47	2,492	1,212
769.52	2,662	1,341
769.57	2,841	1,478
769.62	3,025	1,625
769.67	3,216	1,781
769.72	3,412	1,947
769.77	3,614	2,122
769.82	3,822	2,308
769.87	4,036	2,505
769.92	4,256	2,712
769.97	4,481	2,930
770.02	4,652	3,160
770.07	4,734	3,394
770.12	4,817	3,633
770.17	4,900	3,876
770.22	4,984	4,123
770.27	5,069	4,374
770.32	5,155	4,630
770.37	5,242	4,890
770.42	5,329	5,154
770.47	5,417	5,423
770.52	5,505	5,696
770.57	5,594	5,973
770.62	5,684	6,255
770.67	5,775	6,542
770.72	5,867	6,833
770.77	5,959	7,128
770.82	6,052	7,429
770.87	6,145	7,733
770.92	6,240	8,043
770.97	6,335	8,357
771.02	6,424	8,677
771.07	6,503	9,000
771.12	6,582	9,327
771.17	6,662	9,658
771.22	6,743	9,993
771.27	6,824	10,332
771.32	6,905	10,675
771.37	6,987	11,023
771.42	7,070	11,374
771.47	7,153	11,730
771.52	7,236	12,089
771.57	7,320	12,453
771.62	7,405	12,821
771.67	7,489	13,194
771.72	7,575	13,570
771.77	7,661	13,951
771.82	7,747	14,336
771.87	7,834	14,726
771.92	7,921	15,120
771.97	**8,009**	**15,518**

Summary for Link O: Outlet

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 1.91" for 2-Year 24 hour event
Inflow = 1.24 cfs @ 12.22 hrs, Volume= 0.272 af
Primary = 1.24 cfs @ 12.22 hrs, Volume= 0.272 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Hydrograph for Link O: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.40	0.00	0.00	0.00
0.80	0.00	0.00	0.00
1.20	0.00	0.00	0.00
1.60	0.00	0.00	0.00
2.00	0.00	0.00	0.00
2.40	0.00	0.00	0.00
2.80	0.00	0.00	0.00
3.20	0.00	0.00	0.00
3.60	0.00	0.00	0.00
4.00	0.00	0.00	0.00
4.40	0.00	0.00	0.00
4.80	0.00	0.00	0.00
5.20	0.00	0.00	0.00
5.60	0.00	0.00	0.00
6.00	0.00	0.00	0.00
6.40	0.00	0.00	0.00
6.80	0.01	0.00	0.01
7.20	0.01	0.00	0.01
7.60	0.02	0.00	0.02
8.00	0.02	0.00	0.02
8.40	0.03	0.00	0.03
8.80	0.04	0.00	0.04
9.20	0.05	0.00	0.05
9.60	0.05	0.00	0.05
10.00	0.07	0.00	0.07
10.40	0.09	0.00	0.09
10.80	0.13	0.00	0.13
11.20	0.19	0.00	0.19
11.60	0.33	0.00	0.33
12.00	**1.10**	0.00	**1.10**
12.40	**1.23**	0.00	**1.23**
12.80	1.13	0.00	1.13
13.20	0.96	0.00	0.96
13.60	0.60	0.00	0.60
14.00	0.18	0.00	0.18
14.40	0.16	0.00	0.16
14.80	0.15	0.00	0.15
15.20	0.13	0.00	0.13
15.60	0.12	0.00	0.12
16.00	0.11	0.00	0.11
16.40	0.10	0.00	0.10
16.80	0.10	0.00	0.10
17.20	0.09	0.00	0.09
17.60	0.09	0.00	0.09
18.00	0.08	0.00	0.08
18.40	0.08	0.00	0.08
18.80	0.07	0.00	0.07
19.20	0.07	0.00	0.07
19.60	0.07	0.00	0.07
20.00	0.06	0.00	0.06
20.40	0.06	0.00	0.06
20.80	0.06	0.00	0.06
21.20	0.06	0.00	0.06
21.60	0.06	0.00	0.06
22.00	0.06	0.00	0.06
22.40	0.05	0.00	0.05
22.80	0.05	0.00	0.05
23.20	0.05	0.00	0.05
23.60	0.05	0.00	0.05
24.00	0.05	0.00	0.05
24.40	0.00	0.00	0.00
24.80	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.60	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.80	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.60	0.00	0.00	0.00
28.00	0.00	0.00	0.00
28.40	0.00	0.00	0.00
28.80	0.00	0.00	0.00
29.20	0.00	0.00	0.00
29.60	0.00	0.00	0.00
30.00	0.00	0.00	0.00

Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S-1: Detained Area Runoff Area=1.710 ac 69.59% Impervious Runoff Depth=3.00"
Tc=10.0 min CN=90 Runoff=7.59 cfs 0.428 af

Pond 1P: Dry Detention Peak Elev=770.58' Storage=6,033 cf Inflow=7.59 cfs 0.428 af
Outflow=1.42 cfs 0.428 af

Link O: Outlet Inflow=1.42 cfs 0.428 af
Primary=1.42 cfs 0.428 af

Total Runoff Area = 1.710 ac Runoff Volume = 0.428 af Average Runoff Depth = 3.00"
30.41% Pervious = 0.520 ac 69.59% Impervious = 1.190 ac

Summary for Subcatchment S-1: Detained Area

Runoff = 7.59 cfs @ 12.01 hrs, Volume= 0.428 af, Depth= 3.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type II 24-hr 10-Year 24 hour Rainfall=4.09"

Area (ac)	CN	Description
0.470	74	>75% Grass cover, Good, HSG C
0.050	61	>75% Grass cover, Good, HSG B
1.190	98	Paved parking, HSG C
1.710	90	Weighted Average
0.520		30.41% Pervious Area
1.190		69.59% Impervious Area

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

Hydrograph for Subcatchment S-1: Detained Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.40	0.02	0.00	0.00
0.80	0.03	0.00	0.00
1.20	0.05	0.00	0.00
1.60	0.07	0.00	0.00
2.00	0.09	0.00	0.00
2.40	0.11	0.00	0.00
2.80	0.13	0.00	0.00
3.20	0.15	0.00	0.00
3.60	0.17	0.00	0.00
4.00	0.20	0.00	0.00
4.40	0.22	0.00	0.00
4.80	0.24	0.00	0.00
5.20	0.27	0.00	0.01
5.60	0.30	0.00	0.01
6.00	0.33	0.01	0.02
6.40	0.36	0.01	0.02
6.80	0.39	0.02	0.03
7.20	0.42	0.03	0.04
7.60	0.46	0.04	0.04
8.00	0.49	0.05	0.05
8.40	0.53	0.07	0.06
8.80	0.58	0.09	0.08
9.20	0.63	0.11	0.10
9.60	0.68	0.13	0.11
10.00	0.74	0.16	0.14
10.40	0.81	0.21	0.18
10.80	0.91	0.26	0.24
11.20	1.03	0.34	0.35
11.60	1.25	0.50	0.63
12.00	2.71	1.72	**7.52**
12.40	2.97	1.95	**0.98**
12.80	3.10	2.08	0.52
13.20	3.21	2.17	0.39
13.60	3.29	2.25	0.32
14.00	3.35	2.31	0.26
14.40	3.41	2.37	0.23
14.80	3.47	2.42	0.21
15.20	3.51	2.46	0.20
15.60	3.56	2.50	0.18
16.00	3.60	2.54	0.16
16.40	3.64	2.58	0.15
16.80	3.67	2.61	0.14
17.20	3.70	2.64	0.14
17.60	3.74	2.67	0.13
18.00	3.77	2.70	0.12
18.40	3.80	2.73	0.12
18.80	3.82	2.75	0.11
19.20	3.85	2.78	0.10
19.60	3.87	2.80	0.10
20.00	3.89	2.82	0.09
20.40	3.91	2.84	0.09
20.80	3.94	2.86	0.08
21.20	3.96	2.88	0.08
21.60	3.98	2.90	0.08
22.00	4.00	2.92	0.08
22.40	4.02	2.93	0.08
22.80	4.03	2.95	0.08
23.20	4.05	2.97	0.08
23.60	4.07	2.99	0.08
24.00	**4.09**	**3.00**	0.07
24.40	4.09	3.00	0.00
24.80	4.09	3.00	0.00
25.20	4.09	3.00	0.00
25.60	4.09	3.00	0.00
26.00	4.09	3.00	0.00
26.40	4.09	3.00	0.00
26.80	4.09	3.00	0.00
27.20	4.09	3.00	0.00
27.60	4.09	3.00	0.00
28.00	4.09	3.00	0.00
28.40	4.09	3.00	0.00
28.80	4.09	3.00	0.00
29.20	4.09	3.00	0.00
29.60	4.09	3.00	0.00
30.00	4.09	3.00	0.00

Summary for Pond 1P: Dry Detention

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 3.00" for 10-Year 24 hour event
Inflow = 7.59 cfs @ 12.01 hrs, Volume= 0.428 af
Outflow = 1.42 cfs @ 12.27 hrs, Volume= 0.428 af, Atten= 81%, Lag= 15.7 min
Primary = 1.42 cfs @ 12.27 hrs, Volume= 0.428 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Peak Elev= 770.58' @ 12.27 hrs Surf.Area= 5,613 sf Storage= 6,033 cf

Plug-Flow detention time= 28.5 min calculated for 0.428 af (100% of inflow)
Center-of-Mass det. time= 28.4 min (826.8 - 798.3)

Volume	Invert	Avail.Storage	Storage Description
#1	768.07'	15,759 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
768.07	0	0.0	0	0	0
768.50	254	113.0	36	36	1,016
769.00	1,183	270.0	331	367	5,802
769.50	2,592	429.0	921	1,288	14,648
770.00	4,619	510.0	1,779	3,067	20,706
771.00	6,392	368.0	5,482	8,548	30,637
772.00	8,062	400.0	7,211	15,759	32,630

Device	Routing	Invert	Outlet Devices
#1	Primary	768.07'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 768.07' / 768.00' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	768.07'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	771.13'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=1.42 cfs @ 12.27 hrs HW=770.58' (Free Discharge)
└**1=Culvert** (Passes 1.42 cfs of 7.34 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.42 cfs @ 7.24 fps)
  └**3=Sharp-Crested Rectangular Weir** (Controls 0.00 cfs)

Hydrograph for Pond 1P: Dry Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	768.07	0.00
1.00	0.00	0	768.07	0.00
2.00	0.00	0	768.07	0.00
3.00	0.00	0	768.07	0.00
4.00	0.00	0	768.07	0.00
5.00	0.00	0	768.12	0.00
6.00	0.02	0	768.16	0.02
7.00	0.03	1	768.19	0.03
8.00	0.05	2	768.22	0.05
9.00	0.09	3	768.27	0.09
10.00	0.14	6	768.31	0.14
11.00	0.29	18	768.41	0.28
12.00	**7.52**	**3,319**	**770.05**	**1.24**
13.00	**0.45**	**4,290**	**770.25**	**1.31**
14.00	0.26	1,245	769.48	1.02
15.00	0.20	11	768.36	0.21
16.00	0.16	8	768.32	0.16
17.00	0.14	6	768.31	0.14
18.00	0.12	5	768.29	0.12
19.00	0.11	4	768.28	0.11
20.00	0.09	3	768.26	0.09
21.00	0.08	3	768.26	0.08
22.00	0.08	3	768.25	0.08
23.00	0.08	3	768.25	0.08
24.00	0.07	3	768.25	0.07
25.00	0.00	0	768.07	0.00
26.00	0.00	0	768.07	0.00
27.00	0.00	0	768.07	0.00
28.00	0.00	0	768.07	0.00
29.00	0.00	0	768.07	0.00
30.00	0.00	0	768.07	0.00

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

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
768.07	0	0
768.12	3	0
768.17	14	0
768.22	31	2
768.27	55	4
768.32	86	7
768.37	124	12
768.42	168	20
768.47	220	29
768.52	278	42
768.57	343	57
768.62	415	76
768.67	493	99
768.72	579	126
768.77	671	157
768.82	770	193
768.87	876	234
768.92	989	281
768.97	1,108	333
769.02	1,229	391
769.07	1,347	456
769.12	1,471	526
769.17	1,601	603
769.22	1,736	686
769.27	1,876	777
769.32	2,022	874
769.37	2,173	979
769.42	2,330	1,092
769.47	2,492	1,212
769.52	2,662	1,341
769.57	2,841	1,478
769.62	3,025	1,625
769.67	3,216	1,781
769.72	3,412	1,947
769.77	3,614	2,122
769.82	3,822	2,308
769.87	4,036	2,505
769.92	4,256	2,712
769.97	4,481	2,930
770.02	4,652	3,160
770.07	4,734	3,394
770.12	4,817	3,633
770.17	4,900	3,876
770.22	4,984	4,123
770.27	5,069	4,374
770.32	5,155	4,630
770.37	5,242	4,890
770.42	5,329	5,154
770.47	5,417	5,423
770.52	5,505	5,696
770.57	5,594	5,973
770.62	5,684	6,255
770.67	5,775	6,542
770.72	5,867	6,833
770.77	5,959	7,128
770.82	6,052	7,429
770.87	6,145	7,733
770.92	6,240	8,043
770.97	6,335	8,357
771.02	6,424	8,677
771.07	6,503	9,000
771.12	6,582	9,327
771.17	6,662	9,658
771.22	6,743	9,993
771.27	6,824	10,332
771.32	6,905	10,675
771.37	6,987	11,023
771.42	7,070	11,374
771.47	7,153	11,730
771.52	7,236	12,089
771.57	7,320	12,453
771.62	7,405	12,821
771.67	7,489	13,194
771.72	7,575	13,570
771.77	7,661	13,951
771.82	7,747	14,336
771.87	7,834	14,726
771.92	7,921	15,120
771.97	**8,009**	**15,518**

Summary for Link O: Outlet

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 3.00" for 10-Year 24 hour event
Inflow = 1.42 cfs @ 12.27 hrs, Volume= 0.428 af
Primary = 1.42 cfs @ 12.27 hrs, Volume= 0.428 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Hydrograph for Link O: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00
0.40	0.00	0.00	0.00
0.80	0.00	0.00	0.00
1.20	0.00	0.00	0.00
1.60	0.00	0.00	0.00
2.00	0.00	0.00	0.00
2.40	0.00	0.00	0.00
2.80	0.00	0.00	0.00
3.20	0.00	0.00	0.00
3.60	0.00	0.00	0.00
4.00	0.00	0.00	0.00
4.40	0.00	0.00	0.00
4.80	0.00	0.00	0.00
5.20	0.01	0.00	0.01
5.60	0.01	0.00	0.01
6.00	0.02	0.00	0.02
6.40	0.02	0.00	0.02
6.80	0.03	0.00	0.03
7.20	0.04	0.00	0.04
7.60	0.04	0.00	0.04
8.00	0.05	0.00	0.05
8.40	0.06	0.00	0.06
8.80	0.08	0.00	0.08
9.20	0.10	0.00	0.10
9.60	0.11	0.00	0.11
10.00	0.14	0.00	0.14
10.40	0.18	0.00	0.18
10.80	0.24	0.00	0.24
11.20	0.34	0.00	0.34
11.60	0.52	0.00	0.52
12.00	**1.24**	0.00	**1.24**
12.40	**1.41**	0.00	**1.41**
12.80	1.35	0.00	1.35
13.20	1.27	0.00	1.27
13.60	1.17	0.00	1.17
14.00	1.02	0.00	1.02
14.40	0.74	0.00	0.74
14.80	0.22	0.00	0.22
15.20	0.20	0.00	0.20
15.60	0.18	0.00	0.18
16.00	0.16	0.00	0.16
16.40	0.15	0.00	0.15
16.80	0.14	0.00	0.14
17.20	0.14	0.00	0.14
17.60	0.13	0.00	0.13
18.00	0.12	0.00	0.12
18.40	0.12	0.00	0.12
18.80	0.11	0.00	0.11
19.20	0.10	0.00	0.10
19.60	0.10	0.00	0.10
20.00	0.09	0.00	0.09
20.40	0.09	0.00	0.09
20.80	0.08	0.00	0.08
21.20	0.08	0.00	0.08
21.60	0.08	0.00	0.08
22.00	0.08	0.00	0.08
22.40	0.08	0.00	0.08
22.80	0.08	0.00	0.08
23.20	0.08	0.00	0.08
23.60	0.08	0.00	0.08
24.00	0.07	0.00	0.07
24.40	0.00	0.00	0.00
24.80	0.00	0.00	0.00
25.20	0.00	0.00	0.00
25.60	0.00	0.00	0.00
26.00	0.00	0.00	0.00
26.40	0.00	0.00	0.00
26.80	0.00	0.00	0.00
27.20	0.00	0.00	0.00
27.60	0.00	0.00	0.00
28.00	0.00	0.00	0.00
28.40	0.00	0.00	0.00
28.80	0.00	0.00	0.00
29.20	0.00	0.00	0.00
29.60	0.00	0.00	0.00
30.00	0.00	0.00	0.00

Time span=0.00-30.00 hrs, dt=0.02 hrs, 1501 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S-1: Detained Area Runoff Area=1.710 ac 69.59% Impervious Runoff Depth=3.65"
Tc=10.0 min CN=90 Runoff=12.92 cfs 0.521 af

Pond 1P: Dry Detention Peak Elev=771.35' Storage=10,864 cf Inflow=12.92 cfs 0.521 af
Outflow=2.96 cfs 0.521 af

Link O: Outlet Inflow=2.96 cfs 0.521 af
Primary=2.96 cfs 0.521 af

Total Runoff Area = 1.710 ac Runoff Volume = 0.521 af Average Runoff Depth = 3.65"
30.41% Pervious = 0.520 ac 69.59% Impervious = 1.190 ac

Summary for Subcatchment S-1: Detained Area

Runoff = 12.92 cfs @ 3.01 hrs, Volume= 0.521 af, Depth= 3.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Type II 6-hr 100-Year 6 hour Rainfall=4.77"

Area (ac)	CN	Description
0.470	74	>75% Grass cover, Good, HSG C
0.050	61	>75% Grass cover, Good, HSG B
1.190	98	Paved parking, HSG C
1.710	90	Weighted Average
0.520		30.41% Pervious Area
1.190		69.59% Impervious Area

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

Hydrograph for Subcatchment S-1: Detained Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00
0.40	0.09	0.00	0.00
0.80	0.18	0.00	0.00
1.20	0.29	0.00	0.02
1.60	0.42	0.03	0.13
2.00	0.59	0.09	0.29
2.40	0.84	0.22	0.59
2.80	1.92	1.02	**4.07**
3.20	3.72	2.66	**3.60**
3.60	4.03	2.94	1.11
4.00	4.22	3.13	0.76
4.40	4.37	3.27	0.60
4.80	4.49	3.39	0.49
5.20	4.59	3.48	0.41
5.60	4.69	3.57	0.38
6.00	**4.77**	**3.65**	0.35
6.40	4.77	3.65	0.00
6.80	4.77	3.65	0.00
7.20	4.77	3.65	0.00
7.60	4.77	3.65	0.00
8.00	4.77	3.65	0.00
8.40	4.77	3.65	0.00
8.80	4.77	3.65	0.00
9.20	4.77	3.65	0.00
9.60	4.77	3.65	0.00
10.00	4.77	3.65	0.00
10.40	4.77	3.65	0.00
10.80	4.77	3.65	0.00
11.20	4.77	3.65	0.00
11.60	4.77	3.65	0.00
12.00	4.77	3.65	0.00
12.40	4.77	3.65	0.00
12.80	4.77	3.65	0.00
13.20	4.77	3.65	0.00
13.60	4.77	3.65	0.00
14.00	4.77	3.65	0.00
14.40	4.77	3.65	0.00
14.80	4.77	3.65	0.00
15.20	4.77	3.65	0.00
15.60	4.77	3.65	0.00
16.00	4.77	3.65	0.00
16.40	4.77	3.65	0.00
16.80	4.77	3.65	0.00
17.20	4.77	3.65	0.00
17.60	4.77	3.65	0.00
18.00	4.77	3.65	0.00
18.40	4.77	3.65	0.00
18.80	4.77	3.65	0.00
19.20	4.77	3.65	0.00
19.60	4.77	3.65	0.00
20.00	4.77	3.65	0.00
20.40	4.77	3.65	0.00
20.80	4.77	3.65	0.00
21.20	4.77	3.65	0.00
21.60	4.77	3.65	0.00
22.00	4.77	3.65	0.00
22.40	4.77	3.65	0.00
22.80	4.77	3.65	0.00
23.20	4.77	3.65	0.00
23.60	4.77	3.65	0.00
24.00	4.77	3.65	0.00
24.40	4.77	3.65	0.00
24.80	4.77	3.65	0.00
25.20	4.77	3.65	0.00
25.60	4.77	3.65	0.00
26.00	4.77	3.65	0.00
26.40	4.77	3.65	0.00
26.80	4.77	3.65	0.00
27.20	4.77	3.65	0.00
27.60	4.77	3.65	0.00
28.00	4.77	3.65	0.00
28.40	4.77	3.65	0.00
28.80	4.77	3.65	0.00
29.20	4.77	3.65	0.00
29.60	4.77	3.65	0.00
30.00	4.77	3.65	0.00

Summary for Pond 1P: Dry Detention

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 3.65" for 100-Year 6 hour event
Inflow = 12.92 cfs @ 3.01 hrs, Volume= 0.521 af
Outflow = 2.96 cfs @ 3.23 hrs, Volume= 0.521 af, Atten= 77%, Lag= 13.2 min
Primary = 2.96 cfs @ 3.23 hrs, Volume= 0.521 af

Routing by Stor-Ind method, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs
Peak Elev= 771.35' @ 3.23 hrs Surf.Area= 6,950 sf Storage= 10,864 cf

Plug-Flow detention time= 59.7 min calculated for 0.520 af (100% of inflow)
Center-of-Mass det. time= 59.7 min (259.3 - 199.7)

Volume	Invert	Avail.Storage	Storage Description
#1	768.07'	15,759 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
768.07	0	0.0	0	0	0
768.50	254	113.0	36	36	1,016
769.00	1,183	270.0	331	367	5,802
769.50	2,592	429.0	921	1,288	14,648
770.00	4,619	510.0	1,779	3,067	20,706
771.00	6,392	368.0	5,482	8,548	30,637
772.00	8,062	400.0	7,211	15,759	32,630

Device	Routing	Invert	Outlet Devices
#1	Primary	768.07'	**15.0" Round Culvert** L= 45.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 768.07' / 768.00' S= 0.0016 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.23 sf
#2	Device 1	768.07'	**6.0" Vert. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#3	Device 1	771.13'	**4.0' long Sharp-Crested Rectangular Weir** 2 End Contraction(s)

Primary OutFlow Max=2.95 cfs @ 3.23 hrs HW=771.35' (Free Discharge)
└**1=Culvert** (Passes 2.95 cfs of 9.22 cfs potential flow)
  ├**2=Orifice/Grate** (Orifice Controls 1.64 cfs @ 8.38 fps)
  └**3=Sharp-Crested Rectangular Weir** (Weir Controls 1.31 cfs @ 1.52 fps)

Hydrograph for Pond 1P: Dry Detention

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	768.07	0.00
1.00	0.00	0	768.07	0.00
2.00	0.29	18	768.41	0.28
3.00	**12.79**	**6,100**	**770.59**	**1.43**
4.00	**0.76**	**8,840**	**771.05**	**1.56**
5.00	0.45	5,584	770.50	1.40
6.00	0.35	2,355	769.83	1.16
7.00	0.00	0	768.07	0.00
8.00	0.00	0	768.07	0.00
9.00	0.00	0	768.07	0.00
10.00	0.00	0	768.07	0.00
11.00	0.00	0	768.07	0.00
12.00	0.00	0	768.07	0.00
13.00	0.00	0	768.07	0.00
14.00	0.00	0	768.07	0.00
15.00	0.00	0	768.07	0.00
16.00	0.00	0	768.07	0.00
17.00	0.00	0	768.07	0.00
18.00	0.00	0	768.07	0.00
19.00	0.00	0	768.07	0.00
20.00	0.00	0	768.07	0.00
21.00	0.00	0	768.07	0.00
22.00	0.00	0	768.07	0.00
23.00	0.00	0	768.07	0.00
24.00	0.00	0	768.07	0.00
25.00	0.00	0	768.07	0.00
26.00	0.00	0	768.07	0.00
27.00	0.00	0	768.07	0.00
28.00	0.00	0	768.07	0.00
29.00	0.00	0	768.07	0.00
30.00	0.00	0	768.07	0.00

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

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
768.07	0	0
768.12	3	0
768.17	14	0
768.22	31	2
768.27	55	4
768.32	86	7
768.37	124	12
768.42	168	20
768.47	220	29
768.52	278	42
768.57	343	57
768.62	415	76
768.67	493	99
768.72	579	126
768.77	671	157
768.82	770	193
768.87	876	234
768.92	989	281
768.97	1,108	333
769.02	1,229	391
769.07	1,347	456
769.12	1,471	526
769.17	1,601	603
769.22	1,736	686
769.27	1,876	777
769.32	2,022	874
769.37	2,173	979
769.42	2,330	1,092
769.47	2,492	1,212
769.52	2,662	1,341
769.57	2,841	1,478
769.62	3,025	1,625
769.67	3,216	1,781
769.72	3,412	1,947
769.77	3,614	2,122
769.82	3,822	2,308
769.87	4,036	2,505
769.92	4,256	2,712
769.97	4,481	2,930
770.02	4,652	3,160
770.07	4,734	3,394
770.12	4,817	3,633
770.17	4,900	3,876
770.22	4,984	4,123
770.27	5,069	4,374
770.32	5,155	4,630
770.37	5,242	4,890
770.42	5,329	5,154
770.47	5,417	5,423
770.52	5,505	5,696
770.57	5,594	5,973
770.62	5,684	6,255
770.67	5,775	6,542
770.72	5,867	6,833
770.77	5,959	7,128
770.82	6,052	7,429
770.87	6,145	7,733
770.92	6,240	8,043
770.97	6,335	8,357
771.02	6,424	8,677
771.07	6,503	9,000
771.12	6,582	9,327
771.17	6,662	9,658
771.22	6,743	9,993
771.27	6,824	10,332
771.32	6,905	10,675
771.37	6,987	11,023
771.42	7,070	11,374
771.47	7,153	11,730
771.52	7,236	12,089
771.57	7,320	12,453
771.62	7,405	12,821
771.67	7,489	13,194
771.72	7,575	13,570
771.77	7,661	13,951
771.82	7,747	14,336
771.87	7,834	14,726
771.92	7,921	15,120
771.97	**8,009**	**15,518**

Summary for Link O: Outlet

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 3.65" for 100-Year 6 hour event
Inflow = 2.96 cfs @ 3.23 hrs, Volume= 0.521 af
Primary = 2.96 cfs @ 3.23 hrs, Volume= 0.521 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-30.00 hrs, dt= 0.02 hrs

Hydrograph for Link O: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	20.40	0.00	0.00	0.00
0.40	0.00	0.00	0.00	20.80	0.00	0.00	0.00
0.80	0.00	0.00	0.00	21.20	0.00	0.00	0.00
1.20	0.02	0.00	0.02	21.60	0.00	0.00	0.00
1.60	0.12	0.00	0.12	22.00	0.00	0.00	0.00
2.00	0.28	0.00	0.28	22.40	0.00	0.00	0.00
2.40	0.51	0.00	0.51	22.80	0.00	0.00	0.00
2.80	1.00	0.00	1.00	23.20	0.00	0.00	0.00
3.20	**2.91**	0.00	**2.91**	23.60	0.00	0.00	0.00
3.60	**1.89**	0.00	**1.89**	24.00	0.00	0.00	0.00
4.00	1.56	0.00	1.56	24.40	0.00	0.00	0.00
4.40	1.50	0.00	1.50	24.80	0.00	0.00	0.00
4.80	1.43	0.00	1.43	25.20	0.00	0.00	0.00
5.20	1.35	0.00	1.35	25.60	0.00	0.00	0.00
5.60	1.26	0.00	1.26	26.00	0.00	0.00	0.00
6.00	1.16	0.00	1.16	26.40	0.00	0.00	0.00
6.40	0.97	0.00	0.97	26.80	0.00	0.00	0.00
6.80	0.00	0.00	0.00	27.20	0.00	0.00	0.00
7.20	0.00	0.00	0.00	27.60	0.00	0.00	0.00
7.60	0.00	0.00	0.00	28.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	28.40	0.00	0.00	0.00
8.40	0.00	0.00	0.00	28.80	0.00	0.00	0.00
8.80	0.00	0.00	0.00	29.20	0.00	0.00	0.00
9.20	0.00	0.00	0.00	29.60	0.00	0.00	0.00
9.60	0.00	0.00	0.00	30.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00				
10.40	0.00	0.00	0.00				
10.80	0.00	0.00	0.00				
11.20	0.00	0.00	0.00				
11.60	0.00	0.00	0.00				
12.00	0.00	0.00	0.00				
12.40	0.00	0.00	0.00				
12.80	0.00	0.00	0.00				
13.20	0.00	0.00	0.00				
13.60	0.00	0.00	0.00				
14.00	0.00	0.00	0.00				
14.40	0.00	0.00	0.00				
14.80	0.00	0.00	0.00				
15.20	0.00	0.00	0.00				
15.60	0.00	0.00	0.00				
16.00	0.00	0.00	0.00				
16.40	0.00	0.00	0.00				
16.80	0.00	0.00	0.00				
17.20	0.00	0.00	0.00				
17.60	0.00	0.00	0.00				
18.00	0.00	0.00	0.00				
18.40	0.00	0.00	0.00				
18.80	0.00	0.00	0.00				
19.20	0.00	0.00	0.00				
19.60	0.00	0.00	0.00				
20.00	0.00	0.00	0.00				

Events for Subcatchment S-1: Detained Area

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
2-Year 24 hour	2.92	4.93	0.272	1.91
10-Year 24 hour	4.09	7.59	0.428	3.00
100-Year 6 hour	**4.77**	**12.92**	**0.521**	**3.65**

Events for Pond 1P: Dry Detention

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
2-Year 24 hour	4.93	1.24	770.05	3,315
10-Year 24 hour	7.59	1.42	770.58	6,033
100-Year 6 hour	**12.92**	**2.96**	**771.35**	**10,864**

Events for Link O: Outlet

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
2-Year 24 hour	1.24	1.24	**0.00**
10-Year 24 hour	1.42	1.42	0.00
100-Year 6 hour	**2.96**	**2.96**	0.00

Proposed Conditions
Prepared by Cripe
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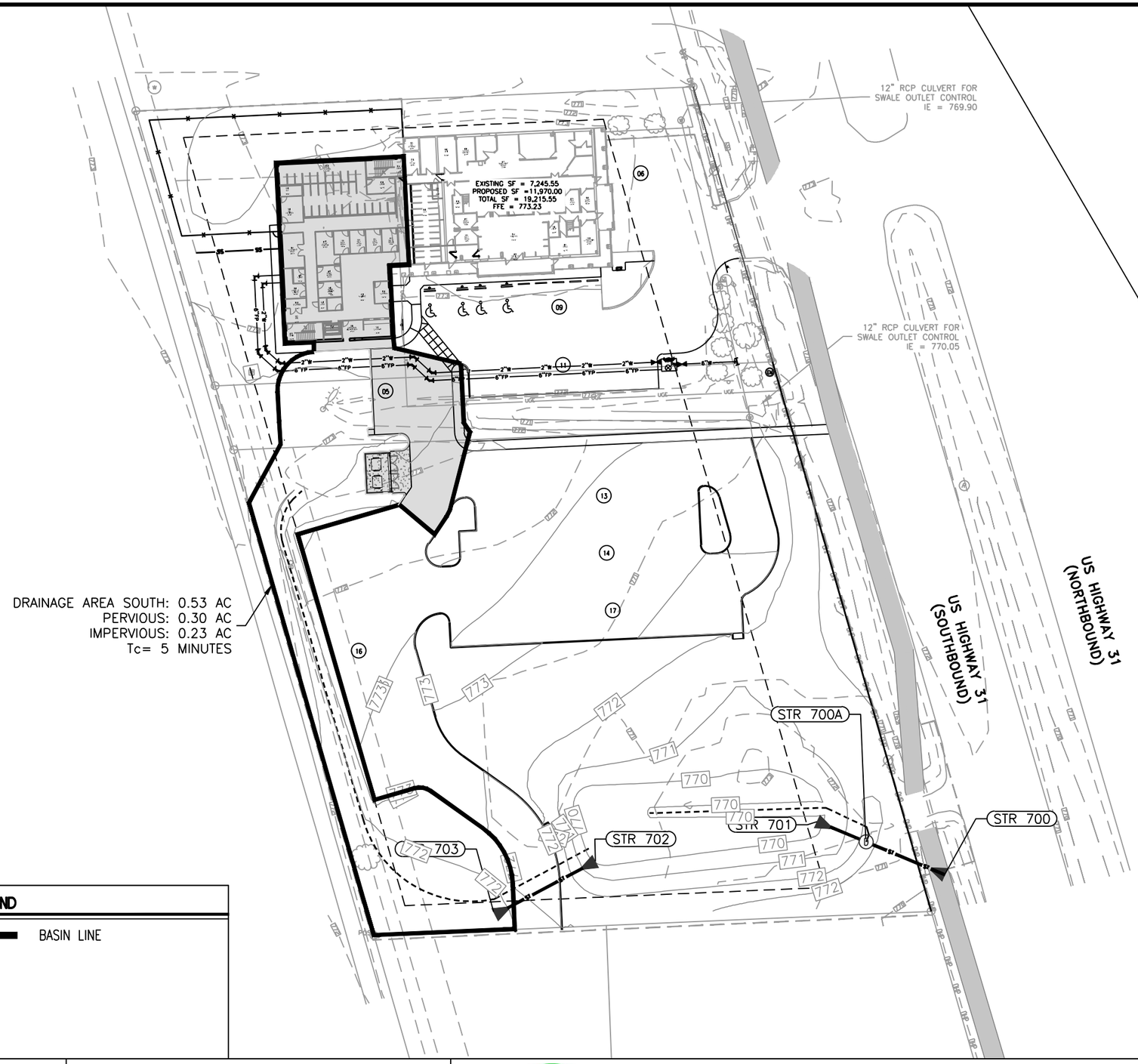
Appendix C

Storm Sewer Basins Exhibit and Calculations

O:\2021\210092\20000\Calcs\Engr\Storm\Prelim\3rd Submittal\CAD Exhibits\Storm Sewer Basin.dwg, July 1, 2022 5:04 AM, STEV PIERRE, © Paul I. Cripe, Inc.



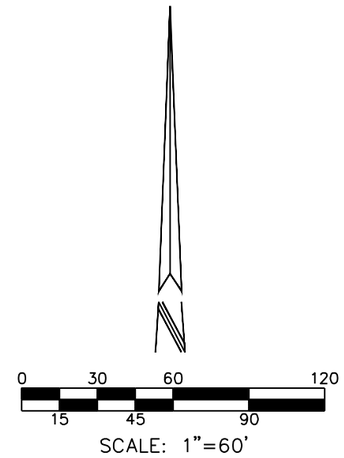


EXHIBIT LEGEND

BASIN LINE

TITLE: PROPOSED STORM BASIN MAP	PROJECT: FRANKLIN ANIMAL CLINIC OWNER: FRANKLIN ANIMAL CLINIC 2990 NORTH MORTON STREET FRANKLIN, INDIANA	Cripe Solutions by Design Since 1937	3939 PRIORITY WAY SOUTH DRIVE, SUITE 200 INDIANAPOLIS, INDIANA 46240 (317) 844-6777 www.cripe.biz ● ARCHITECTURE + INTERIORS ● CIVIL ENGINEERING ● SURVEY +3D LASER SCANNING ● ENERGY + FACILITIES ● EQUIPMENT PLANNING ● REAL ESTATE SERVICES	SCALE: 1" = 60' PROJECT NO: 210092-20000 Date: 00-06-2022	SHEET No. 1 of 1

Hydraflow Storm Sewers Extension for Autodesk® Civil 3D® Plan

Project File: Proposed.stm	Number of lines: 1	Date: 7/1/2022

Storm Sewer Tabulation

10yr calculations str 702 - str 703

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	60.000	0.53	0.53	0.50	0.27	0.27	5.0	5.0	7.2	1.92	1.95	2.83	12	0.30	769.90	770.08	770.71	770.88	0.00	0.00	

Project File: Proposed.stm

Number of lines: 1

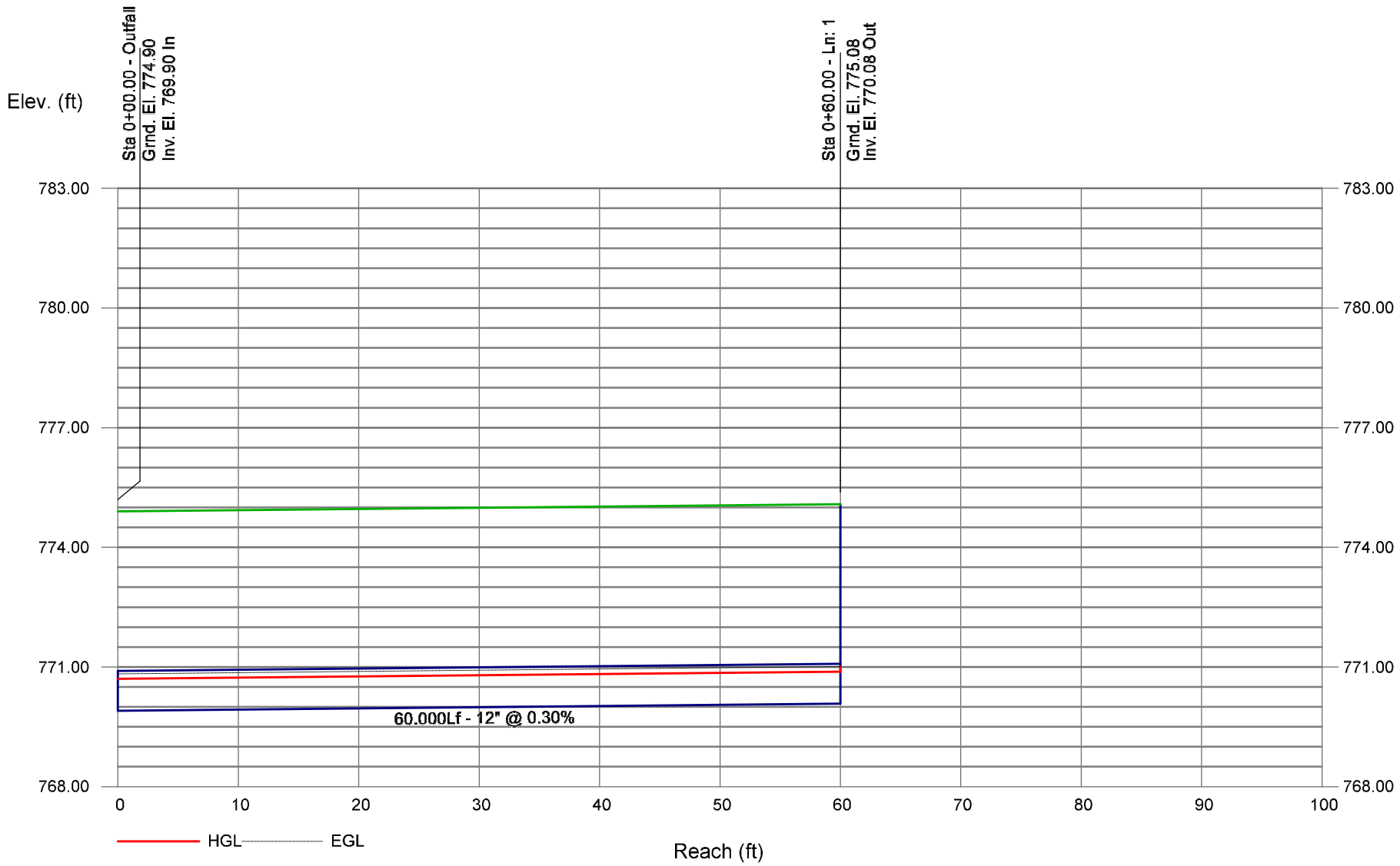
Run Date: 7/1/2022

NOTES:Intensity = 88.24 / (Inlet time + 15.50) ^ 0.83; Return period =Yrs. 10 ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Proposed.stm

10yr profile
str 702 - str 703



Storm Sewer Tabulation 100yr Calculations str 702 - str 703

Station		Len	Drng Area		Rnoff coeff	Area x C		Tc		Rain (I)	Total flow	Cap full	Vel	Pipe		Invert Elev		HGL Elev		Grnd / Rim Elev		Line ID
Line	To Line	(ft)	Incr (ac)	Total (ac)	(C)	Incr	Total	Inlet (min)	Syst (min)	(in/hr)	(cfs)	(cfs)	(ft/s)	Size (in)	Slope (%)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	Dn (ft)	Up (ft)	
1	End	60.000	0.53	0.53	0.50	0.27	0.27	5.0	5.0	9.8	2.61	1.95	3.32	12	0.30	769.90	770.08	770.90	771.22	0.00	0.00	

Project File: Proposed.stm

Number of lines: 1

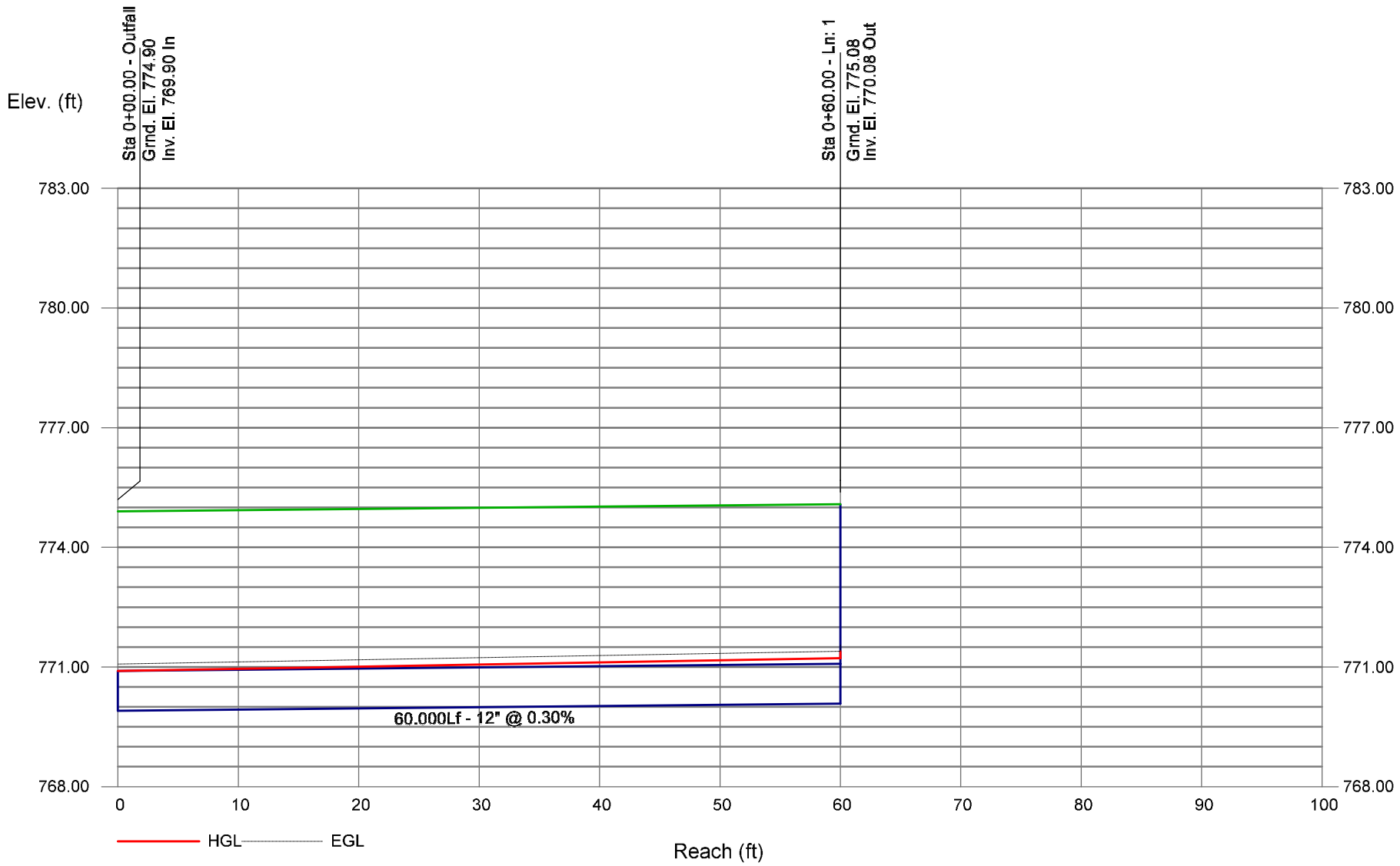
Run Date: 7/1/2022

NOTES:Intensity = 127.16 / (Inlet time + 17.80) ^ 0.82; Return period =Yrs. 100 ; c = cir e = ellip b = box

Storm Sewer Profile

Proj. file: Proposed.stm

100yr profile
str 702 - str 703



Appendix D

Spillway Calculations

Weir Report

Hydraflow Express Extension for Autodesk® Civil 3D® by Autodesk, Inc. Thursday, Nov 4 2021

Franklin Animal Clinic Emergency Spillway

Trapezoidal Weir

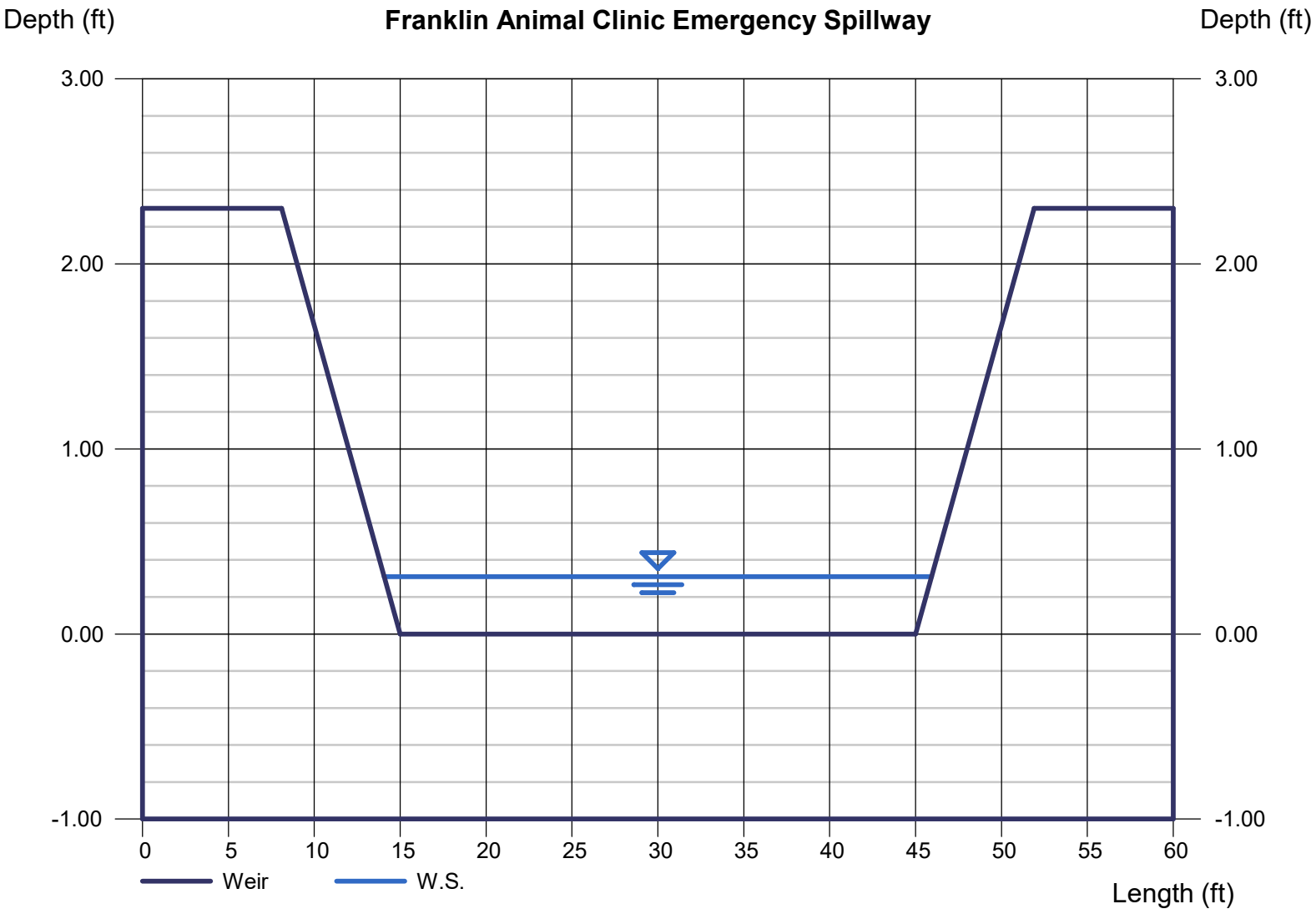
Crest	= Sharp
Bottom Length (ft)	= 30.00
Total Depth (ft)	= 2.30
Side Slope (z:1)	= 3.00

Calculations

Weir Coeff. Cw	= 3.10
Compute by:	Known Q
Known Q (cfs)	= 16.15

Highlighted

Depth (ft)	= 0.31
Q (cfs)	= 16.15
Area (sqft)	= 9.59
Velocity (ft/s)	= 1.68
Top Width (ft)	= 31.86



Appendix E

Animal House Drainage Report, May 2006

ANIMAL HOUSE
DRAINAGE REPORT
MAY 17, 2006

Existing Conditions:

A = 1.2 Acres D = 300' C = .3 S = .5% T = 25 min.

$I_2 = 2.25$	CA = 1.1 Acre @ .3 =	.33
$I_{10} = 3.45$	0.1 Acre @ .9 =	.09
$Q_2 = .42\ (2.25) = .95$ cfs		.42
$Q_{10} = .42\ (3.45) = 1.45$ cfs		

Future Conditions:

$I_{10} = 3.45$	CA = 0.6 Acre @ .9 =	.54
$I_{100} = 5.00$	0.6 Acre @ .3 =	.18
		.72

$Q_{10} = .72\ (3.45) = 2.48$ cfs
$Q_{100} = .72\ (5) = 3.6$ cfs

Qstore 100/10 = 3.6 - 1.45 = 2.15 cfs
Qstore 10/2 = 2.48 - .95 = 1.53 cfs

Limit Outfalls to .475 cfs each for 2 year and
.725 each for 10 year.

Use 4" Orifice in each 12"RCP

Peak Storage Required = .14 acre feet or .07 acre feet in each ditch = 3050 cf.

Provided = 300' x 2.5 x 20 x .5 x .5 = 3750 cf.

Prepared by:

Steven B. Williams

STEVEN B. WILLIAMS
REGISTERED
No.
17207
STATE OF
INDIANA

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 1.21 cfs
Storm frequency	= 100 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Reservoir name	= 2 DITCHES
Max. Elevation	= 773.28 ft	Max. Storage	= 5,997 cuft

Storage Indication method used.

Outflow hydrograph volume = 17,368 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
648	0.17	771.23	0.15	-----	-----	-----	-----	-----	-----	-----	-----	0.15
720	3.46	772.13	0.80	-----	-----	-----	-----	-----	-----	-----	-----	0.80
792	0.43	773.02	1.13	-----	-----	-----	-----	-----	-----	-----	-----	1.13
864	0.24	772.18	0.83	-----	-----	-----	-----	-----	-----	-----	-----	0.83
936	0.18	771.35	0.31	-----	-----	-----	-----	-----	-----	-----	-----	0.31
1008	0.14	771.23	0.15	-----	-----	-----	-----	-----	-----	-----	-----	0.15
1080	0.12	771.22	0.13	-----	-----	-----	-----	-----	-----	-----	-----	0.13

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	2.75	6	732	11,416	---	-----	-----	EXIST
2	SCS Runoff	4.28	6	726	17,368	---	-----	-----	FUTURE
3	Reservoir	1.21	6	756	17,368	2	773.28	5,997	DETENTION

Proj. file: ANIMAL.gpw | Return Period: 100 yr | Run date: 05-17-2006

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.95 cfs
Storm frequency	= 10 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Reservoir name	= 2 DITCHES
Max. Elevation	= 772.51 ft	Max. Storage	= 2,842 cuft

Storage Indication method used.

Outflow hydrograph volume = 9,895 cuft

Hydrograph Discharge Table

Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
720	1.93	771.73	0.60	-----	-----	-----	-----	-----	-----	-----	-----	0.60
792	0.27	772.12	0.80	-----	-----	-----	-----	-----	-----	-----	-----	0.80
864	0.15	771.29	0.23	-----	-----	-----	-----	-----	-----	-----	-----	0.23
936	0.11	771.21	0.12	-----	-----	-----	-----	-----	-----	-----	-----	0.12

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	1.25	6	732	5,471	---	-----	-----	EXIST
2	SCS Runoff	2.43	6	726	9,895	---	-----	-----	FUTURE
3	Reservoir	0.95	6	750	9,895	2	772.51	2,842	DETENTION

Proj. file: ANIMAL.gpw | Return Period: 10 yr | Run date: 05-17-2006

Hydrograph Report

Hydraflow Hydrographs by Intelisolve

Hyd. No. 3

DETENTION

Hydrograph type	= Reservoir	Peak discharge	= 0.65 cfs
Storm frequency	= 2 yrs	Time interval	= 6 min
Inflow hyd. No.	= 2	Reservoir name	= 2 DITCHES
Max. Elevation	= 771.82 ft	Max. Storage	= 1,002 cuft

Storage Indication method used.

Outflow hydrograph volume = 4,800 cuft

Hydrograph Discharge Table

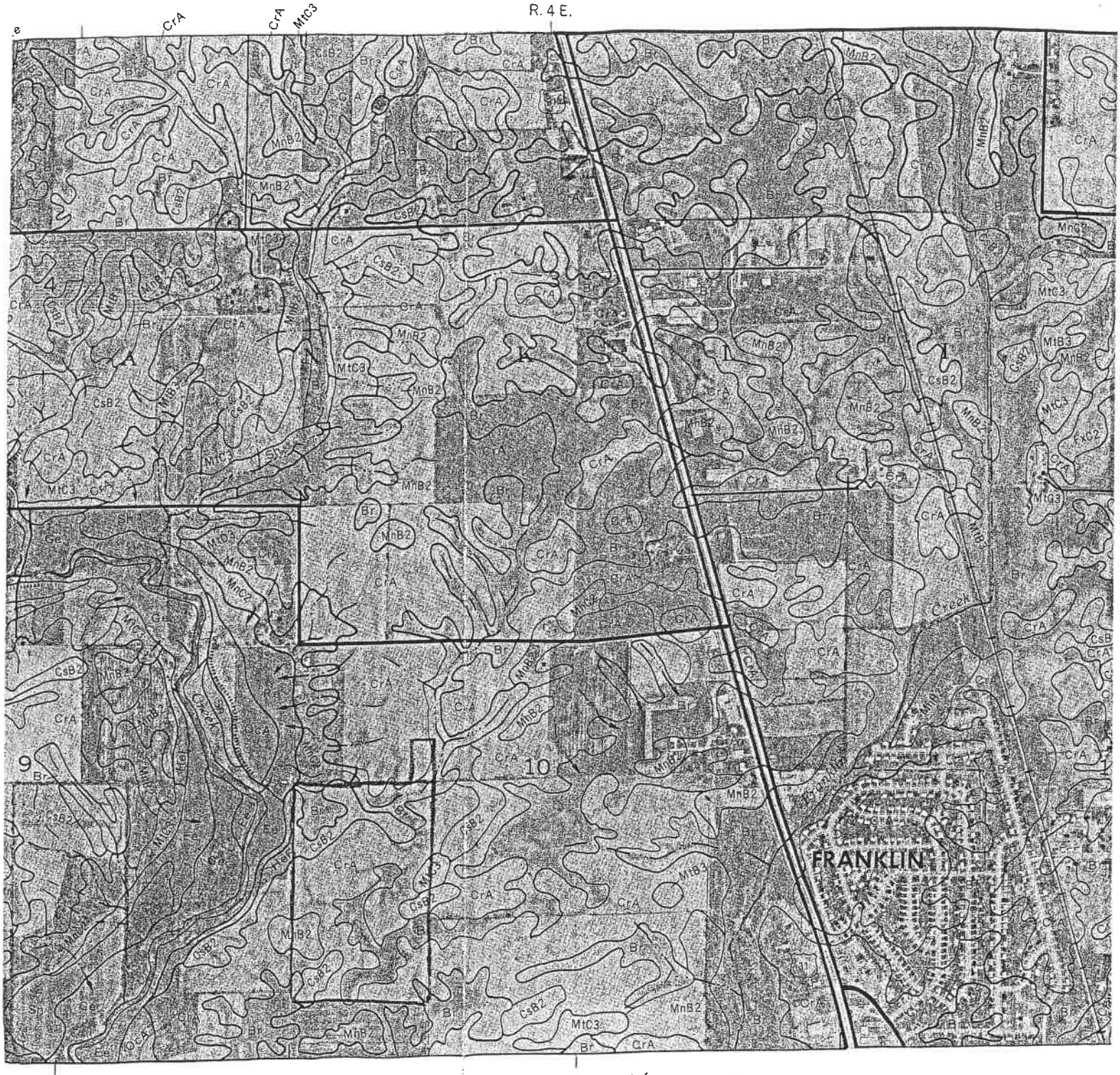
Time (min)	Inflow cfs	Elevation ft	Clv A cfs	Clv B cfs	Clv C cfs	Clv D cfs	Wr A cfs	Wr B cfs	Wr C cfs	Wr D cfs	Exfil cfs	Outflow cfs
720	0.87	771.41	0.37	-----	-----	-----	-----	-----	-----	-----	-----	0.37
792	0.14	771.37	0.33	-----	-----	-----	-----	-----	-----	-----	-----	0.33
864	0.08	771.19	0.09	-----	-----	-----	-----	-----	-----	-----	-----	0.09
936	0.06	771.17	0.07	-----	-----	-----	-----	-----	-----	-----	-----	0.07

...End

Hydrograph Summary Report

Hyd. No.	Hydrograph type (origin)	Peak flow (cfs)	Time interval (min)	Time to peak (min)	Volume (cuft)	Inflow hyd(s)	Maximum elevation (ft)	Maximum storage (cuft)	Hydrograph description
1	SCS Runoff	0.36	6	732	1,963	---	-----	-----	EXIST
2	SCS Runoff	1.15	6	732	4,800	---	-----	-----	FUTURE
3	Reservoir	0.65	6	744	4,800	2	771.82	1,002	DETENTION

Proj. file: ANIMAL.gpw | Return Period: 2 yr | Run date: 05-17-2006



1/2 Crosby
1/2 Brookston
Meadow = 65
Imp = 98

EXIST. = 68
Future = 82

Project ANIMAL Hosp. Detention Facility Design Return Period 100 yrs.

Designer SBW Release Rate Return Period 10 yrs.

Watershed Area 1.2 acres

Time of Concentration (undeveloped watershed) 25 minutes

Rainfall Intensity (i_U) 3.45 inches/hr

Undeveloped Runoff Coefficient (C_U) .42

Undeveloped Runoff Rate ($O = C_U i_U A_U$) 1.45 cfs

Developed Runoff Coefficient (C_D) .72

Storm Duration t_d (hrs)	Rainfall Intensity i_d (inches/hr)	Inflow Rate $I(t_d)$ $(C_D i_d A_D)$ (cfs) $CA = .72$	Outflow Rate O $(C_U i_U A_U)$ (cfs)	Storage Rate $I(t_d)-O$ (cfs)	Required Storage $\left[I(t_d)-O\right]\frac{t_d}{12}$ (acre-ft)
0.17	7.0	5.04	.725	4.3	.06
0.33	5.5	3.96		3.2	.09
0.50	4.5	3.24		2.5	.10
0.67	3.9	2.81		2.1	.12
0.83	3.4	2.45		1.7	.12
1.0	3.0	2.16		1.4	.12
1.5	2.5	1.80		1.1	.14 ← PK
2.0	2.0	1.44		0.7	.12
3.0	1.5	1.08		.35	.09
4.0	1.3	.94		.20	.07
5.0	1.0				
6.0	0.9				
7.0	0.75				
8.0	0.68				
9.0	0.62				
10.0	0.57				
11.0	0.52				
12.0	0.48				

Figure 6.2 Computation Sheet for Detention Storage Calculations Using the Rational Method

FIGURE 5

FLOW FOR CIRCULAR PIPE FLOWING FULL
BASED ON MANNING'S EQUATION n=0.013

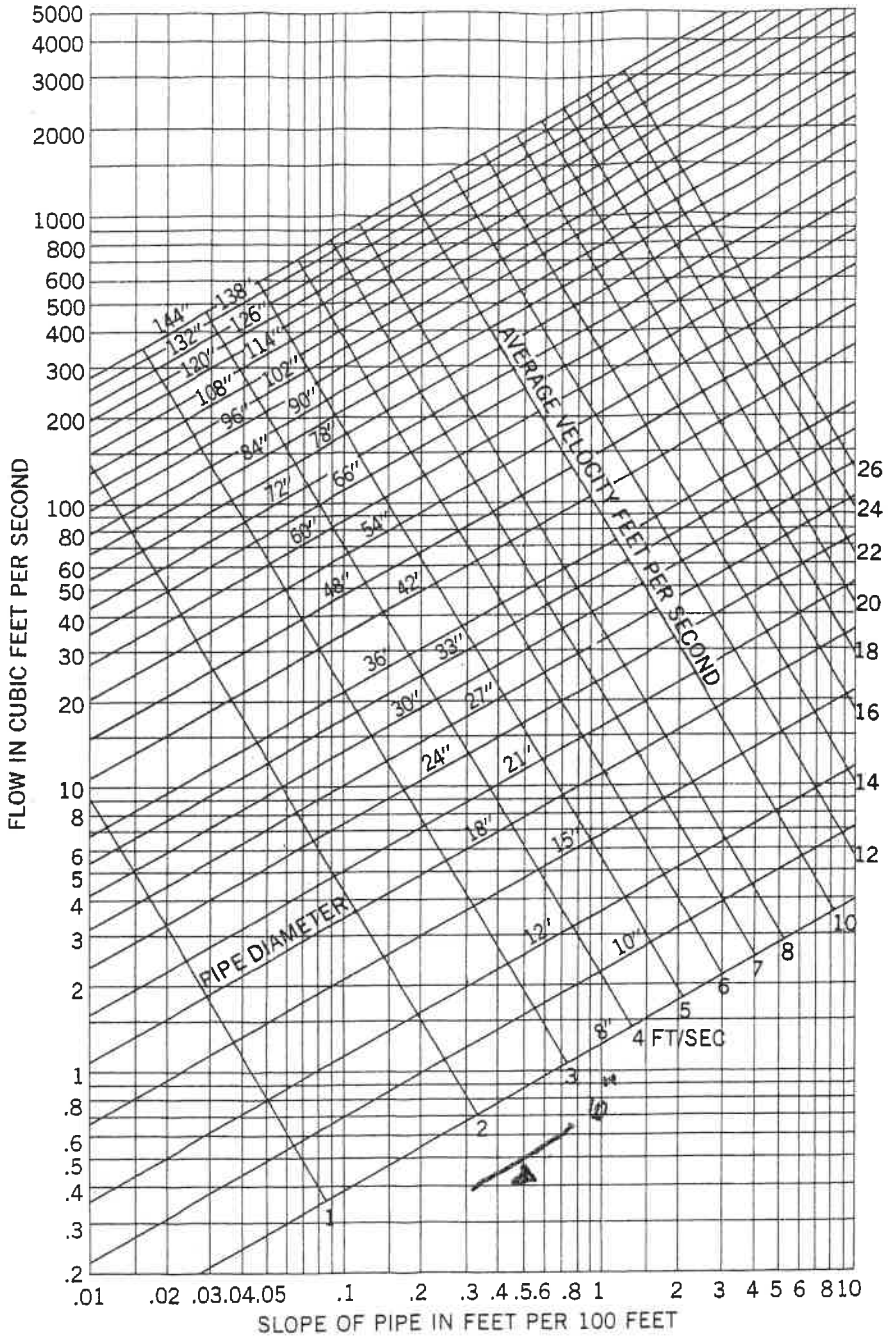
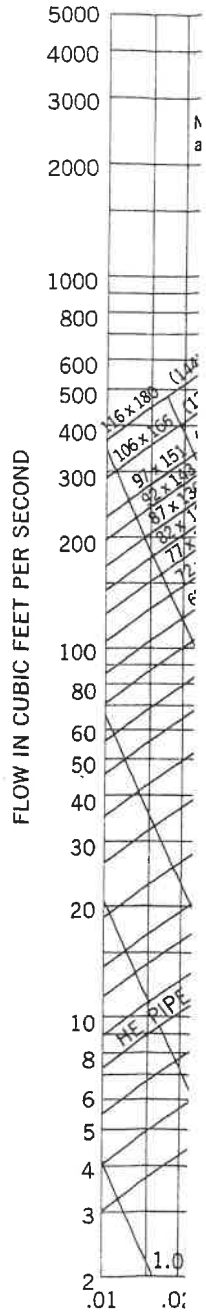


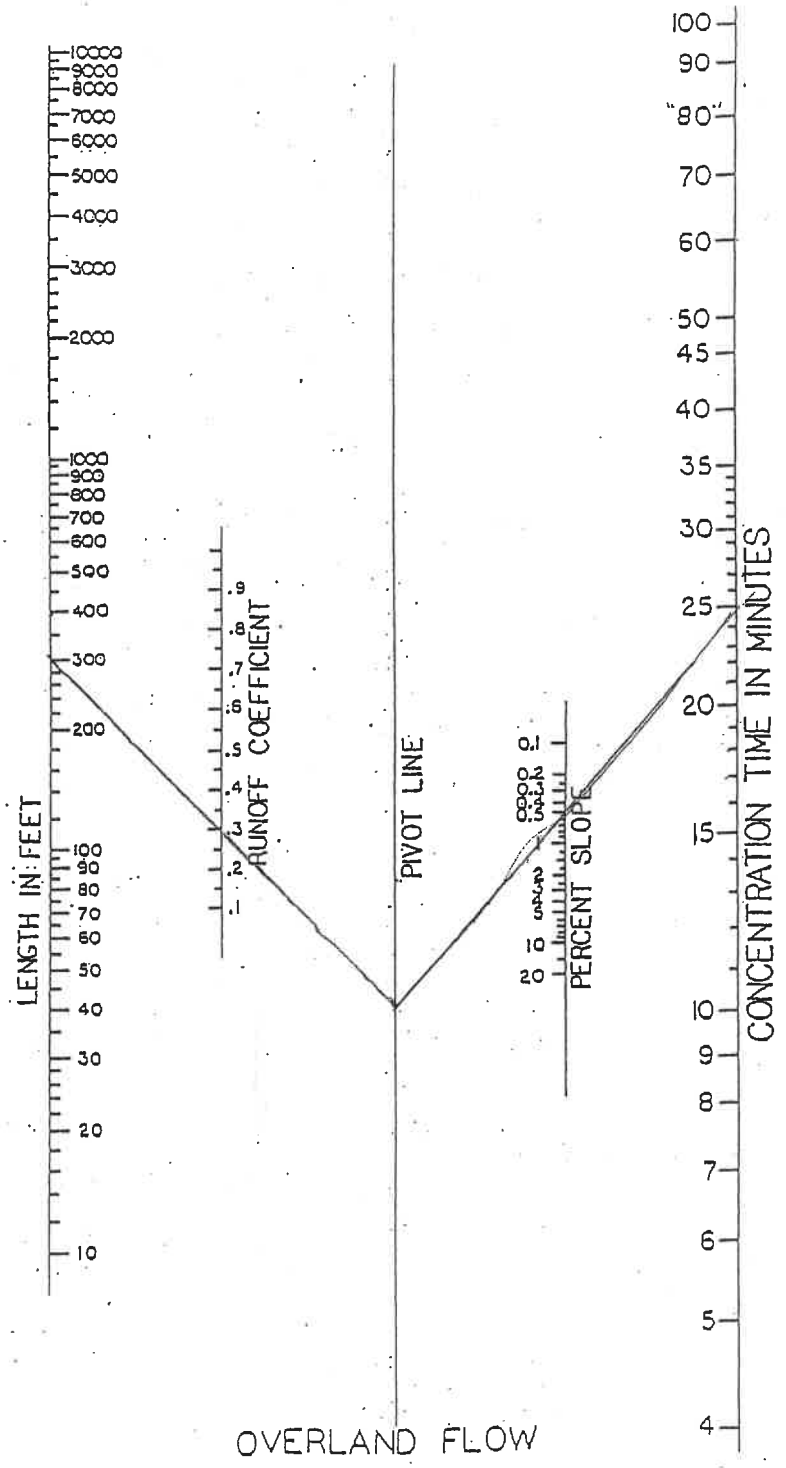
FIGURE 6

FLOW



OVERLAND FLOW AND RUN-OFF COEFFICIENT

FIGURE 5.3



RAINFALL INTENSITY VALUES

Indianapolis, Indiana

Duration (Minutes)	2 Year	5 Year	10 Year	25 Year	50 Year	100 Year
5	4.50	5.50	6.30	7.30	8.00	8.50
6	4.30	5.30	6.00	7.00	7.70	8.20
7	4.10	5.10	5.75	6.75	7.40	7.90
8	3.90	4.90	5.50	6.50	7.10	7.60
9	3.70	4.70	5.25	6.25	6.80	7.30
10	3.50	4.50	5.00	6.00	6.50	7.00
15	2.90	3.70	4.40	5.10	5.60	6.10
20	2.50	3.30	3.80	4.50	5.00	5.50
25	2.25	2.95	3.45	4.05	4.50	5.00
30	2.00	2.60	3.10	3.60	4.00	4.50
40	1.65	2.25	2.60	3.10	3.50	3.90
50	1.45	2.00	2.30	2.75	3.10	3.40
60	1.25	1.75	2.10	2.50	2.70	3.00
120	0.78	1.10	1.30	1.60	1.70	2.00
180	0.58	0.80	1.00	1.20	1.30	1.50
240	0.47	0.65	0.80	0.95	1.10	1.30

For Additional Values See Referenced Publications

Values taken from graph prepared by U.S. Department of Commerce Weather Bureau based on recorded rainfalls from 1903 to 1951
See Technical Paper No. 25, Page 14, or Indiana State Highway Commission Hydraulic Design of Drainage Culverts, Page 35

Appendix F

Water Quality Calculations

Water Quality
Prepared by Cripe
HydroCAD® 10.10-4b s/n 11639 © 2020 HydroCAD Software Solutions LLC

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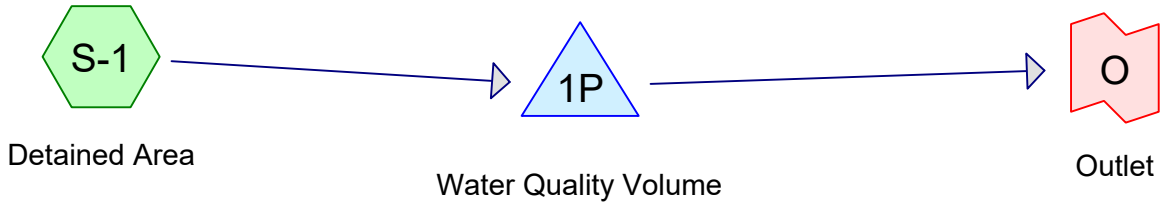

Subcat Reach Pond Link

Routing Diagram for Water Quality
Prepared by Cripe, Printed 11/2/2021
HydroCAD® 10.10-4b s/n 11639 © 2020 HydroCAD Software Solutions LLC

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	24 hour 1-1/4 Inch	Type II 24-hr		Default	24.00	1	1.25	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.050	61	>75% Grass cover, Good, HSG B (S-1)
0.470	74	>75% Grass cover, Good, HSG C (S-1)
1.190	98	Paved parking, HSG C (S-1)
1.710	**90**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.050	HSG B	S-1
1.660	HSG C	S-1
0.000	HSG D	
0.000	Other	
1.710		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.050	0.470	0.000	0.000	0.520	>75% Grass cover, Good	S-1
0.000	0.000	1.190	0.000	0.000	1.190	Paved parking	S-1
0.000	**0.050**	**1.660**	**0.000**	**0.000**	**1.710**	**TOTAL AREA**	

Time span=0.00-40.00 hrs, dt=0.02 hrs, 2001 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind method - Pond routing by Stor-Ind method

Subcatchment S-1: Detained Area Runoff Area=1.710 ac 69.59% Impervious Runoff Depth=0.49"
Tc=10.0 min CN=90 Runoff=1.29 cfs 0.070 af

Pond 1P: Water Quality Volume Peak Elev=769.68' Storage=628 cf Inflow=1.29 cfs 0.070 af
Outflow=1.26 cfs 0.060 af

Link O: Outlet Inflow=1.26 cfs 0.060 af
Primary=1.26 cfs 0.060 af

Total Runoff Area = 1.710 ac Runoff Volume = 0.070 af Average Runoff Depth = 0.49"
30.41% Pervious = 0.520 ac 69.59% Impervious = 1.190 ac

Summary for Subcatchment S-1: Detained Area

Runoff = 1.29 cfs @ 12.02 hrs, Volume= 0.070 af, Depth= 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Type II 24-hr 24 hour 1-1/4 Inch Rainfall=1.25"

Area (ac)	CN	Description
0.470	74	>75% Grass cover, Good, HSG C
0.050	61	>75% Grass cover, Good, HSG B
1.190	98	Paved parking, HSG C
1.710	90	Weighted Average
0.520		30.41% Pervious Area
1.190		69.59% Impervious Area

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

Hydrograph for Subcatchment S-1: Detained Area

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
0.00	0.00	0.00	0.00	20.40	1.20	0.46	0.02
0.40	0.01	0.00	0.00	20.80	1.20	0.46	0.02
0.80	0.01	0.00	0.00	21.20	1.21	0.46	0.02
1.20	0.02	0.00	0.00	21.60	1.22	0.47	0.02
1.60	0.02	0.00	0.00	22.00	1.22	0.47	0.02
2.00	0.03	0.00	0.00	22.40	1.23	0.48	0.02
2.40	0.03	0.00	0.00	22.80	1.23	0.48	0.02
2.80	0.04	0.00	0.00	23.20	1.24	0.49	0.02
3.20	0.05	0.00	0.00	23.60	1.24	0.49	0.02
3.60	0.05	0.00	0.00	24.00	**1.25**	**0.49**	0.02
4.00	0.06	0.00	0.00	24.40	1.25	0.49	0.00
4.40	0.07	0.00	0.00	24.80	1.25	0.49	0.00
4.80	0.07	0.00	0.00	25.20	1.25	0.49	0.00
5.20	0.08	0.00	0.00	25.60	1.25	0.49	0.00
5.60	0.09	0.00	0.00	26.00	1.25	0.49	0.00
6.00	0.10	0.00	0.00	26.40	1.25	0.49	0.00
6.40	0.11	0.00	0.00	26.80	1.25	0.49	0.00
6.80	0.12	0.00	0.00	27.20	1.25	0.49	0.00
7.20	0.13	0.00	0.00	27.60	1.25	0.49	0.00
7.60	0.14	0.00	0.00	28.00	1.25	0.49	0.00
8.00	0.15	0.00	0.00	28.40	1.25	0.49	0.00
8.40	0.16	0.00	0.00	28.80	1.25	0.49	0.00
8.80	0.18	0.00	0.00	29.20	1.25	0.49	0.00
9.20	0.19	0.00	0.00	29.60	1.25	0.49	0.00
9.60	0.21	0.00	0.00	30.00	1.25	0.49	0.00
10.00	0.23	0.00	0.00	30.40	1.25	0.49	0.00
10.40	0.25	0.00	0.00	30.80	1.25	0.49	0.00
10.80	0.28	0.00	0.01	31.20	1.25	0.49	0.00
11.20	0.31	0.01	0.02	31.60	1.25	0.49	0.00
11.60	0.38	0.02	0.05	32.00	1.25	0.49	0.00
12.00	0.83	0.21	**1.26**	32.40	1.25	0.49	0.00
12.40	0.91	0.26	**0.20**	32.80	1.25	0.49	0.00
12.80	0.95	0.29	0.11	33.20	1.25	0.49	0.00
13.20	0.98	0.31	0.08	33.60	1.25	0.49	0.00
13.60	1.00	0.32	0.07	34.00	1.25	0.49	0.00
14.00	1.03	0.34	0.06	34.40	1.25	0.49	0.00
14.40	1.04	0.35	0.05	34.80	1.25	0.49	0.00
14.80	1.06	0.36	0.05	35.20	1.25	0.49	0.00
15.20	1.07	0.37	0.04	35.60	1.25	0.49	0.00
15.60	1.09	0.38	0.04	36.00	1.25	0.49	0.00
16.00	1.10	0.39	0.04	36.40	1.25	0.49	0.00
16.40	1.11	0.40	0.03	36.80	1.25	0.49	0.00
16.80	1.12	0.40	0.03	37.20	1.25	0.49	0.00
17.20	1.13	0.41	0.03	37.60	1.25	0.49	0.00
17.60	1.14	0.42	0.03	38.00	1.25	0.49	0.00
18.00	1.15	0.42	0.03	38.40	1.25	0.49	0.00
18.40	1.16	0.43	0.03	38.80	1.25	0.49	0.00
18.80	1.17	0.44	0.02	39.20	1.25	0.49	0.00
19.20	1.18	0.44	0.02	39.60	1.25	0.49	0.00
19.60	1.18	0.45	0.02	40.00	1.25	0.49	0.00
20.00	1.19	0.45	0.02				

Summary for Pond 1P: Water Quality Volume

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 0.49" for 24 hour 1-1/4 Inch event
Inflow = 1.29 cfs @ 12.02 hrs, Volume= 0.070 af
Outflow = 1.26 cfs @ 12.05 hrs, Volume= 0.060 af, Atten= 2%, Lag= 1.4 min
Primary = 1.26 cfs @ 12.05 hrs, Volume= 0.060 af

Routing by Stor-Ind method, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs
Peak Elev= 769.68' @ 12.05 hrs Surf.Area= 991 sf Storage= 628 cf

Plug-Flow detention time= 107.0 min calculated for 0.060 af (85% of inflow)
Center-of-Mass det. time= 38.2 min (888.2 - 850.0)

Volume	Invert	Avail.Storage	Storage Description
#1	768.47'	946 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
768.47	0	0.0	0	0	0
768.50	56	32.0	1	1	81
769.00	424	116.0	106	106	1,071
769.50	991	199.0	344	450	3,154
770.00	991	199.0	496	946	3,253

Device	Routing	Invert	Outlet Devices
#1	Primary	769.50'	**Custom Weir/Orifice, Cv= 2.62 (C= 3.28)** Head (feet) 0.00 0.50 1.00 Width (feet) 0.00 35.00 42.00

Primary OutFlow Max=1.24 cfs @ 12.05 hrs HW=769.68' (Free Discharge)
↑—**1=Custom Weir/Orifice** (Weir Controls 1.24 cfs @ 1.11 fps)

Hydrograph for Pond 1P: Water Quality Volume

Time (hours)	Inflow (cfs)	Storage (cubic-feet)	Elevation (feet)	Primary (cfs)
0.00	0.00	0	768.47	0.00
1.00	0.00	0	768.47	0.00
2.00	0.00	0	768.47	0.00
3.00	0.00	0	768.47	0.00
4.00	0.00	0	768.47	0.00
5.00	0.00	0	768.47	0.00
6.00	0.00	0	768.47	0.00
7.00	0.00	0	768.47	0.00
8.00	0.00	0	768.47	0.00
9.00	0.00	0	768.47	0.00
10.00	0.00	0	768.47	0.00
11.00	0.01	18	768.68	0.00
12.00	**1.26**	**608**	**769.66**	**0.94**
13.00	**0.09**	**515**	**769.56**	**0.10**
14.00	0.06	501	769.55	0.06
15.00	0.05	497	769.55	0.05
16.00	0.04	493	769.54	0.04
17.00	0.03	490	769.54	0.03
18.00	0.03	487	769.54	0.03
19.00	0.02	485	769.54	0.02
20.00	0.02	483	769.53	0.02
21.00	0.02	482	769.53	0.02
22.00	0.02	481	769.53	0.02
23.00	0.02	481	769.53	0.02
24.00	0.02	480	769.53	0.02
25.00	0.00	461	769.51	0.00
26.00	0.00	456	769.51	0.00
27.00	0.00	455	769.51	0.00
28.00	0.00	455	769.50	0.00
29.00	0.00	454	769.50	0.00
30.00	0.00	454	769.50	0.00
31.00	0.00	453	769.50	0.00
32.00	0.00	453	769.50	0.00
33.00	0.00	452	769.50	0.00
34.00	0.00	452	769.50	0.00
35.00	0.00	452	769.50	0.00
36.00	0.00	452	769.50	0.00
37.00	0.00	451	769.50	0.00
38.00	0.00	451	769.50	0.00
39.00	0.00	451	769.50	0.00
40.00	0.00	451	769.50	0.00

Stage-Area-Storage for Pond 1P: Water Quality Volume

Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)	Elevation (feet)	Surface (sq-ft)	Storage (cubic-feet)
768.47	0	0	769.49	**977**	440
768.49	25	0	769.51	**991**	460
768.51	60	1	769.53	991	480
768.53	68	2	769.55	991	500
768.55	77	4	769.57	991	519
768.57	87	6	769.59	991	539
768.59	97	7	769.61	991	559
768.61	107	9	769.63	991	579
768.63	119	12	769.65	991	599
768.65	130	14	769.67	991	619
768.67	143	17	769.69	991	638
768.69	155	20	769.71	991	658
768.71	169	23	769.73	991	678
768.73	183	27	769.75	991	698
768.75	197	30	769.77	991	718
768.77	212	34	769.79	991	738
768.79	228	39	769.81	991	757
768.81	244	44	769.83	991	777
768.83	260	49	769.85	991	797
768.85	278	54	769.87	991	817
768.87	295	60	769.89	991	837
768.89	314	66	769.91	991	856
768.91	332	72	769.93	991	876
768.93	352	79	769.95	991	896
768.95	372	86	769.97	991	916
768.97	392	94	769.99	991	**936**
768.99	413	102	770.01	991	**946**
769.01	433	111	770.03	991	946
769.03	451	119	770.05	991	946
769.05	470	129	770.07	991	946
769.07	489	138	770.09	991	946
769.09	509	148	770.11	991	946
769.11	528	159	770.13	991	946
769.13	549	169	770.15	991	946
769.15	569	180	770.17	991	946
769.17	590	192	770.19	991	946
769.19	612	204	770.21	991	946
769.21	633	217	770.23	991	946
769.23	655	229	770.25	991	946
769.25	678	243	770.27	991	946
769.27	701	257	770.29	991	946
769.29	724	271	770.31	991	946
769.31	748	285	770.33	991	946
769.33	772	301	770.35	991	946
769.35	796	316	770.37	991	946
769.37	821	333	770.39	991	946
769.39	846	349	770.41	991	946
769.41	871	366	770.43	991	946
769.43	897	384	770.45	991	946
769.45	924	402	770.47	991	946
769.47	950	421	770.49	991	946

Summary for Link O: Outlet

Inflow Area = 1.710 ac, 69.59% Impervious, Inflow Depth = 0.42" for 24 hour 1-1/4 Inch event
Inflow = 1.26 cfs @ 12.05 hrs, Volume= 0.060 af
Primary = 1.26 cfs @ 12.05 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-40.00 hrs, dt= 0.02 hrs

Hydrograph for Link O: Outlet

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
0.00	0.00	**0.00**	0.00	20.40	0.02	0.00	0.02
0.40	0.00	0.00	0.00	20.80	0.02	0.00	0.02
0.80	0.00	0.00	0.00	21.20	0.02	0.00	0.02
1.20	0.00	0.00	0.00	21.60	0.02	0.00	0.02
1.60	0.00	0.00	0.00	22.00	0.02	0.00	0.02
2.00	0.00	0.00	0.00	22.40	0.02	0.00	0.02
2.40	0.00	0.00	0.00	22.80	0.02	0.00	0.02
2.80	0.00	0.00	0.00	23.20	0.02	0.00	0.02
3.20	0.00	0.00	0.00	23.60	0.02	0.00	0.02
3.60	0.00	0.00	0.00	24.00	0.02	0.00	0.02
4.00	0.00	0.00	0.00	24.40	0.01	0.00	0.01
4.40	0.00	0.00	0.00	24.80	0.00	0.00	0.00
4.80	0.00	0.00	0.00	25.20	0.00	0.00	0.00
5.20	0.00	0.00	0.00	25.60	0.00	0.00	0.00
5.60	0.00	0.00	0.00	26.00	0.00	0.00	0.00
6.00	0.00	0.00	0.00	26.40	0.00	0.00	0.00
6.40	0.00	0.00	0.00	26.80	0.00	0.00	0.00
6.80	0.00	0.00	0.00	27.20	0.00	0.00	0.00
7.20	0.00	0.00	0.00	27.60	0.00	0.00	0.00
7.60	0.00	0.00	0.00	28.00	0.00	0.00	0.00
8.00	0.00	0.00	0.00	28.40	0.00	0.00	0.00
8.40	0.00	0.00	0.00	28.80	0.00	0.00	0.00
8.80	0.00	0.00	0.00	29.20	0.00	0.00	0.00
9.20	0.00	0.00	0.00	29.60	0.00	0.00	0.00
9.60	0.00	0.00	0.00	30.00	0.00	0.00	0.00
10.00	0.00	0.00	0.00	30.40	0.00	0.00	0.00
10.40	0.00	0.00	0.00	30.80	0.00	0.00	0.00
10.80	0.00	0.00	0.00	31.20	0.00	0.00	0.00
11.20	0.00	0.00	0.00	31.60	0.00	0.00	0.00
11.60	0.00	0.00	0.00	32.00	0.00	0.00	0.00
12.00	**0.94**	0.00	**0.94**	32.40	0.00	0.00	0.00
12.40	**0.22**	0.00	**0.22**	32.80	0.00	0.00	0.00
12.80	0.11	0.00	0.11	33.20	0.00	0.00	0.00
13.20	0.09	0.00	0.09	33.60	0.00	0.00	0.00
13.60	0.07	0.00	0.07	34.00	0.00	0.00	0.00
14.00	0.06	0.00	0.06	34.40	0.00	0.00	0.00
14.40	0.05	0.00	0.05	34.80	0.00	0.00	0.00
14.80	0.05	0.00	0.05	35.20	0.00	0.00	0.00
15.20	0.04	0.00	0.04	35.60	0.00	0.00	0.00
15.60	0.04	0.00	0.04	36.00	0.00	0.00	0.00
16.00	0.04	0.00	0.04	36.40	0.00	0.00	0.00
16.40	0.03	0.00	0.03	36.80	0.00	0.00	0.00
16.80	0.03	0.00	0.03	37.20	0.00	0.00	0.00
17.20	0.03	0.00	0.03	37.60	0.00	0.00	0.00
17.60	0.03	0.00	0.03	38.00	0.00	0.00	0.00
18.00	0.03	0.00	0.03	38.40	0.00	0.00	0.00
18.40	0.03	0.00	0.03	38.80	0.00	0.00	0.00
18.80	0.03	0.00	0.03	39.20	0.00	0.00	0.00
19.20	0.02	0.00	0.02	39.60	0.00	0.00	0.00
19.60	0.02	0.00	0.02	40.00	0.00	0.00	0.00
20.00	0.02	0.00	0.02				

Events for Subcatchment S-1: Detained Area

Event	Rainfall (inches)	Runoff (cfs)	Volume (acre-feet)	Depth (inches)
24 hour 1-1/4 Inch	**1.25**	**1.29**	**0.070**	**0.49**

Events for Pond 1P: Water Quality Volume

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)	Storage (cubic-feet)
24 hour 1-1/4 Inch	**1.29**	**1.26**	**769.68**	**628**

Events for Link O: Outlet

Event	Inflow (cfs)	Primary (cfs)	Elevation (feet)
24 hour 1-1/4 Inch	**1.26**	**1.26**	**0.00**

References:

2019 Revised Storm Water Standards Design and Construction Specifications Manual
http://www.indy.gov/eGov/City/DPW/Business/Specs/Pages/UpdatedStormWaterManual.aspx

Soil map and Classification
http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm

Flood Insurance Rate Map
https://msc.fema.gov/portal/search?AddressQuery=hamilton%20county%2C%20indiana?AddressQuery=hamilton%20county%2C%20indiana#searchresultsanchor