Storm Water Management Report

PARKER HILL

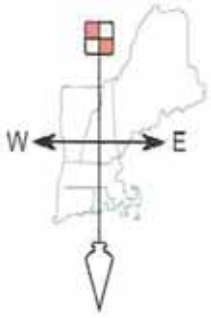
(DEFINITIVE SUBDIVISION)

Project Location:
Tax Map 38-8-A
Parker Street
Newburyport, Ma

Prepared for:
Parker 2 Realty Trust
1 Mason Lane
Salisbury, MA 01952

Date: August 14, 2017
Revised: November 2, 2017

Surveying ◆ Engineering ◆ Land Planning ◆ Permitting ◆ Septic Designs



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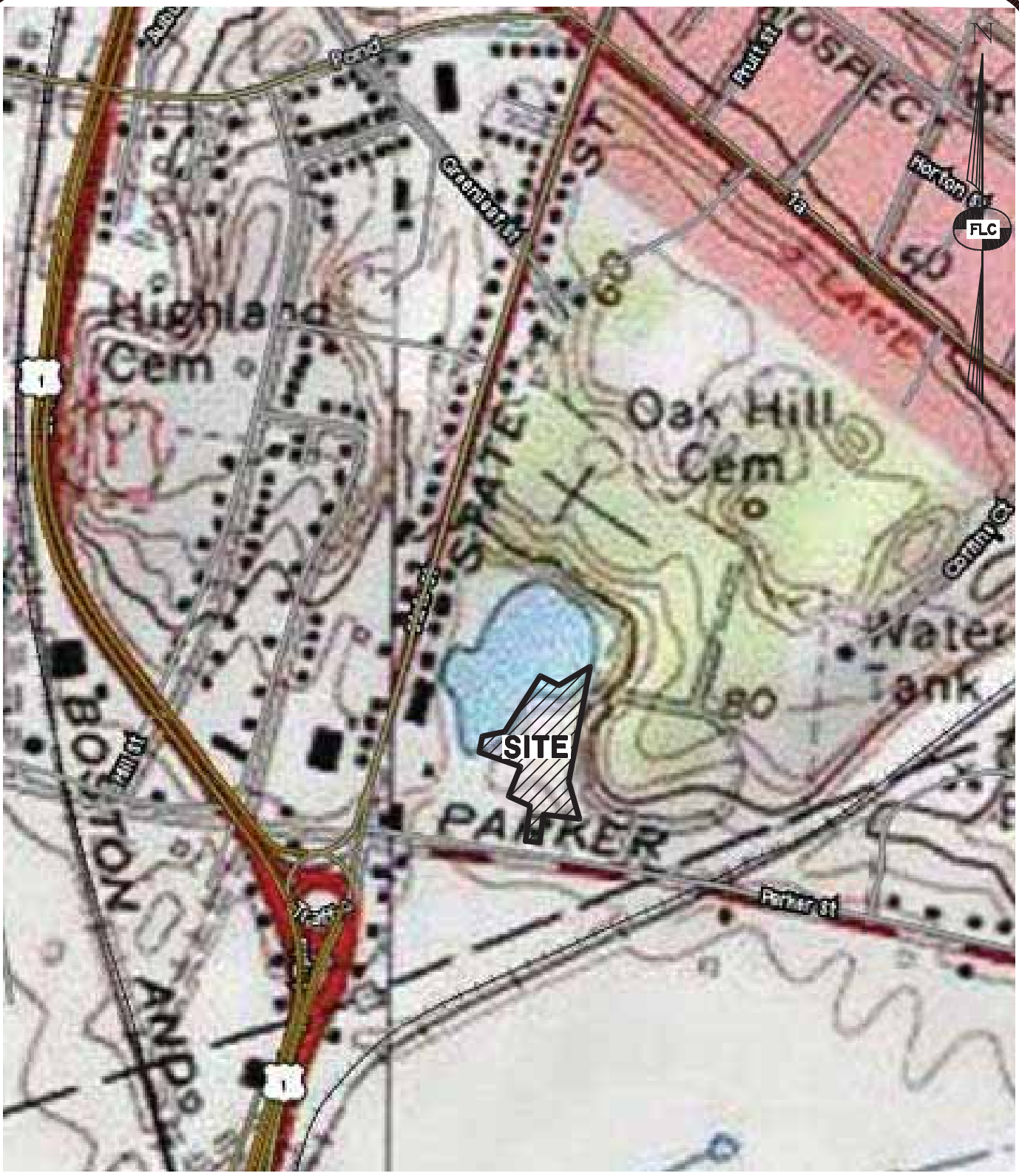

Surveying ⌖ Engineering ⌖ Land Planning ⌖ Permitting ⌖ Septic Designs

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USGS LOCUS PLAN

PARKER HILL

TAX MAP PARCEL 34-8-A - 2 PARKER STREET

NEWBURYPORT, MASSACHUSETTS

SCALE: 1" = 500' AUGUST 14, 2017

FILE: 1486SP00.dwg	PROJ. NO. 1486.00	SHEET NO. 1 OF 1

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STORM WATER MANAGEMENT REPORT
DEFINITIVE SUBDIVISION
PARKER HILL
NEWBURYPORT, MA

Prepared for:
Parker 2 Realty Trust

Date: November 2, 2017

I) INTRODUCTION

The following are storm water drainage calculations for a 23-unit Definitive Subdivision at 2 Parker Street. The project area is bordered by commercial property to the west, a cemetery the north and east, and a gravel parking area and undeveloped land to the south. The site is located on the north side of Parker Street. Access to the project will be provided by a 22 foot wide, 500± foot road. The project is situated on a 2.5± acre parcel known as Lot 8-A on the City of Newburyport Assessor's Map 34. The terrain alteration associated with the proposed development is 1.70± acres.

The purpose of this report is to analyze the qualitative and quantitative impacts of the proposed development. The objective of the proposed storm water management system for this project is to mitigate any increases resulting from the proposed development and to meet the drainage guidelines set forth in the City of Newburyport storm water regulations.

II) SITE DESCRIPTION

The site is currently developed with two, 3 story townhouse style duplexes. the site slopes east to west with the cemetery sitting on high ground east of the site. There is a gentle ridge that divides the property near the rear of the site with the majority of the site sloping toward Parker Street. The rear of the lot sheet flows to an existing 3.5± acre pond north of the site. Based on historic topographic maps, this pond appears to discharge to the large wetland complex south of the site. An assumed outlet was input into the hydraulic model to simulate this assumed hydraulic connection. Approximately one third of the site has been disturbed by the recent construction activity. The majority of the remainder of the lot is wooded with young growth forest/brush. The site receives runoff from the existing cemetery east of the site. There is an existing shallow swale that runs along the site's frontage on Parker Street. Two embedded 24" RCP culverts were installed at the existing access to the property. The swale drains to and existing headwall and 12" HDPE culvert located in the southwest corner of the property. This culvert and the assumed hydraulic connection from the existing pond north of the site, discharge to the existing wetland complex south of the site. This discharge point is identified as Observation Point 1 (OP1) in the attached computations.

Since the initial submission, The City of Newburyport has requested the applicant to construct a 10' wide sidewalk along the properties frontage. This sidewalk will essentially eliminate the existing swale and along the properties frontage and will require the construction of a closed drainage system in this location. The plans have been revised to show this work and the limits of the drainage analysis revised to the Right of Way.

NRCS soil survey maps indicated that the site consists of a variety of soils. Based on the NRCS maps the majority of the site consists of Hydraulic Soil Group "C" and "D" soils.; however, soil explorations have located sand deposits on the west side of the property. These deposits are consistent with the Merrimack Fine Sandy Loam identified on the NRCS maps north and east of the site. This is a HSG "A" soil with a significant depth to seasonal high groundwater which is consistent with the soil explorations. This soil also has a high Ksat value. The ksat value for this soil is greater than 100 µm/sec which equates to 14 in/hr. Applying a factor of safety of two results in a design ksat of 7 in/hr.

III) METHODOLOGY

The quantity of runoff and the conveyance of that flow through the site are determined using the software package HydroCAD r 10.0 by HydroCAD Software Solutions, LLC. HydroCAD is a computer aided design program for modeling storm water hydrology based on the Soil Conservation Service (SCS) TR-20 method combined with standard hydraulics calculations. The peak flow rate and the associated times of concentration were determined using the United States Department of Agriculture's *Urban Hydrology for Small Watersheds* (TR55) per the Massachusetts Stormwater Handbook, Chapter 1. TR55 stipulates that the minimum time of concentration is 0.1 hour or 6 minutes.

Storm water management systems and erosion control outlet protection aprons (riprap aprons) are designed in accordance with the methodology for the "Best Management Practices" (BMP's), as outlined in the Massachusetts Stormwater Handbook, Volume 2, Chapter 2.

IV) DRAINAGE DESIGN

In accordance with the Massachusetts Stormwater Handbook, Standard 2 the two (2), and the ten (10) year frequency storm events have been evaluated, and the City of Newburyport Storm Water Regulations require that the one-hundred (100) year frequency storm event be evaluated. These design storms have therefore been included to compare the pre and post-development peak flow rates for the site (see attached comparison tables).

Pre-Development Drainage Conditions:
As can be seen on the Pre-Development Drainage Plans, the project area drains to the open drainage system in Parker Street and the pond north of the lot. It is assumed that both areas ultimately drain the large wetland complex south of the site (OP1).

Post-Development Drainage Conditions:
As can be seen on the Post-Development Drainage Plans, several catch basins are proposed to capture the runoff form the paved portion of the project and route it to two subsurface retention basins. Two rain gardens are also proposed to treat portions of the development not captured in the closed drainage system. Stormwater treatment will be provided by a combination of deep sump catch basins, ADS Stormtech Isolator Row©, sand filtration, and bioretention basins.

The proposed combined open/closed drainage system is collecting the storm water runoff from the majority of the impervious surfaces on-site and directing it to the proposed LID storm water BMP's on-site. A portion of the proposed roof areas will sheet to the north. Stormwater treatment in these areas will be achieved by the vegetated buffer that will remain undisturbed. The net result is that all new paved areas will receive qualitative treatment and, due to the retention and infiltration capabilities of the subsurface infiltration basins and surface bioretention basins (aka rain gardens), there will be a reduction of peak rates of runoff and runoff volume leaving this site for all storm events.

V) WATER QUALITY CALCULATIONS

Water Quality Volume (WQV) = (P)(Ia)
Water Quality Flow (WQF)= $Q_{0.5}$=qu(A)(WQV)

Where: P= 0.5" of runoff from impervious surfaces
A = Area draining to practice
Ia= Impervious area
qu=Unit Peak Discharge for Type III Storm in csm/in

Conversion from ac-in to Cubic Feet = 43,560 sf/ac x 1 ft./12 in. = 3,630
1 AC. = 0.0015625 mi^2

Rain Garden 1: Total Area = 0.114 Ac, Impervious Area = 0.092 Ac. % Impervious = 80.70%

WQV = (0.5)(0.092)(3,630) = 167 cf

Rain Garden 2: Total Area = 0.190 Ac, Impervious Area = 0.040 Ac. % Impervious = 21.05%

WQV = (0.5)(0.040)(3,630) = 73 cf (NA: Roof runoff only, considered uncontaminated)

Water Quality Swale: Total Area = 1.081 Ac, Imp. Area = 0.082 Ac. % Impervious = 7.59%

WQV = (0.5)(0.082)(3,630) = 149 cf (NA: Roof runoff only, considered uncontaminated)

Stormtech System SC740.1: A = 0.811 Ac, Ia = 0.275 Ac., % I = 33.91%, qu=592 csm/in

WQV = (0.5)(0.275)(3,630) = 499 cf

WQF = (592 csm/in)(0.275 ac.)(0.0015625 mi^2 /ac)(0.5) = 0.13 cfs

Stormtech System SC740.2: A = 0.354 Ac, Ia = 0.254 Ac. % I = 71.75%, qu=752 csm/in

WQV = (0.5)(0.254)(3,630) = 461 cf

WQF = (752 csm/in)(0.254 ac.)(0.0015625 mi^2 /ac)(0.5) = 0.15 cfs

Total Proposed Impervious Area = 0.858 Ac.,
Impervious Area directed to Infiltration BMP's = 0.661 AC
Percent of Impervious Recharge = (0.661/0.858)(100) = 77.04%

VI) SUMMARY

The intent of the storm water management system for this project is to address the qualitative and quantitative aspects of the storm water runoff so that there are no downstream adverse impacts created by the project. There are no increases in storm water runoff resulting from the proposed development.

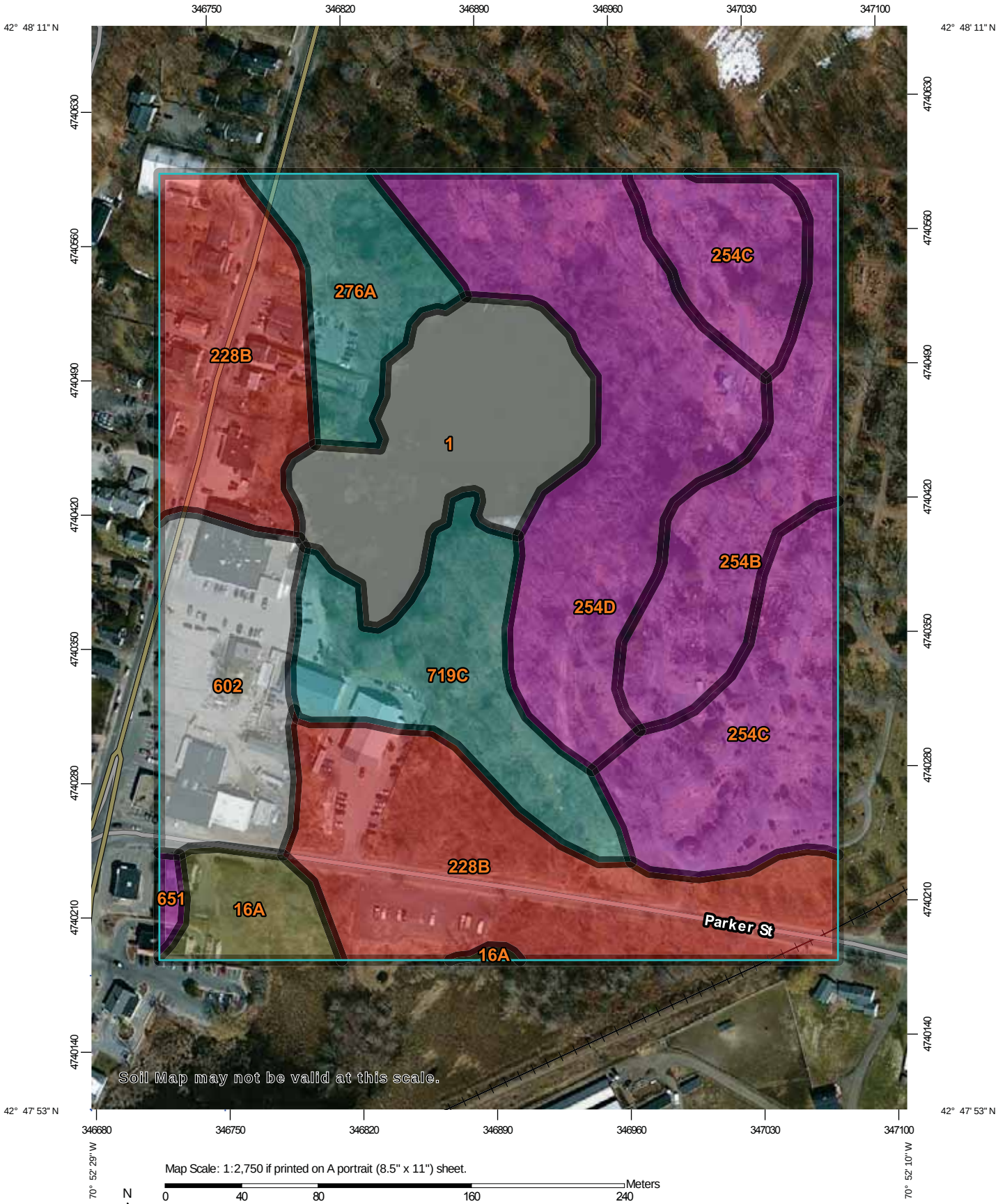
The storm water management design for this project therefore complies with the storm water standards set forth in the City of Newburyport and State of Massachusetts's Stormwater Regulations.

The following tables are a summary of the attached calculations and show a comparison of the peak flow rates at the outlet point for the site. The values presented are based on pre- and post-development conditions.

Table 1: Peak Flow Rates & Volume to Lot 34-6 - OP1 - with Post-Development Retention

STORM FREQUENCY	PRE-DEV. RUNOFF (CFS/AF)	POST-DEV. RUNOFF (CFS/AF)	CHANGE (CFS/AF)
2-YEAR	1.14/0.174	0.91/0.112	-0.23/-0.062
10-YEAR	3.40/0.787	1.93/0.554	-1.47/-0.233
100-YEAR	10.85/4.898	6.15/4.233	-4.70/-0.665

Hydrologic Soil Group—Essex County, Massachusetts, Northern Part
(HINES WAY)



Map Scale: 1:2,750 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 40 80 160 240

Feet: 0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N 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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 12, Sep 14, 2016

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

Date(s) aerial images were photographed: Mar 30, 2011—Apr 8, 2011

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

Hydrologic Soil Group— Summary by Map Unit — Essex County, Massachusetts, Northern Part (MA605)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
1	Water		3.7	10.3%
16A	Scantic silt loam, 0 to 3 percent slopes	C/D	1.1	3.0%
228B	Buxton silt loam, 3 to 8 percent slopes	D	8.6	23.8%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	A	3.0	8.4%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	A	5.0	14.0%
254D	Merrimac fine sandy loam, 15 to 25 percent slopes	A	6.2	17.1%
276A	Ninigret fine sandy loam, 0 to 3 percent slopes	C	2.0	5.6%
602	Urban land		3.0	8.3%
651	Udorthents, smoothed	A	0.1	0.4%
719C	Suffield silt loam, 8 to 15 percent slopes	C	3.3	9.2%
Totals for Area of Interest			**36.1**	**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.

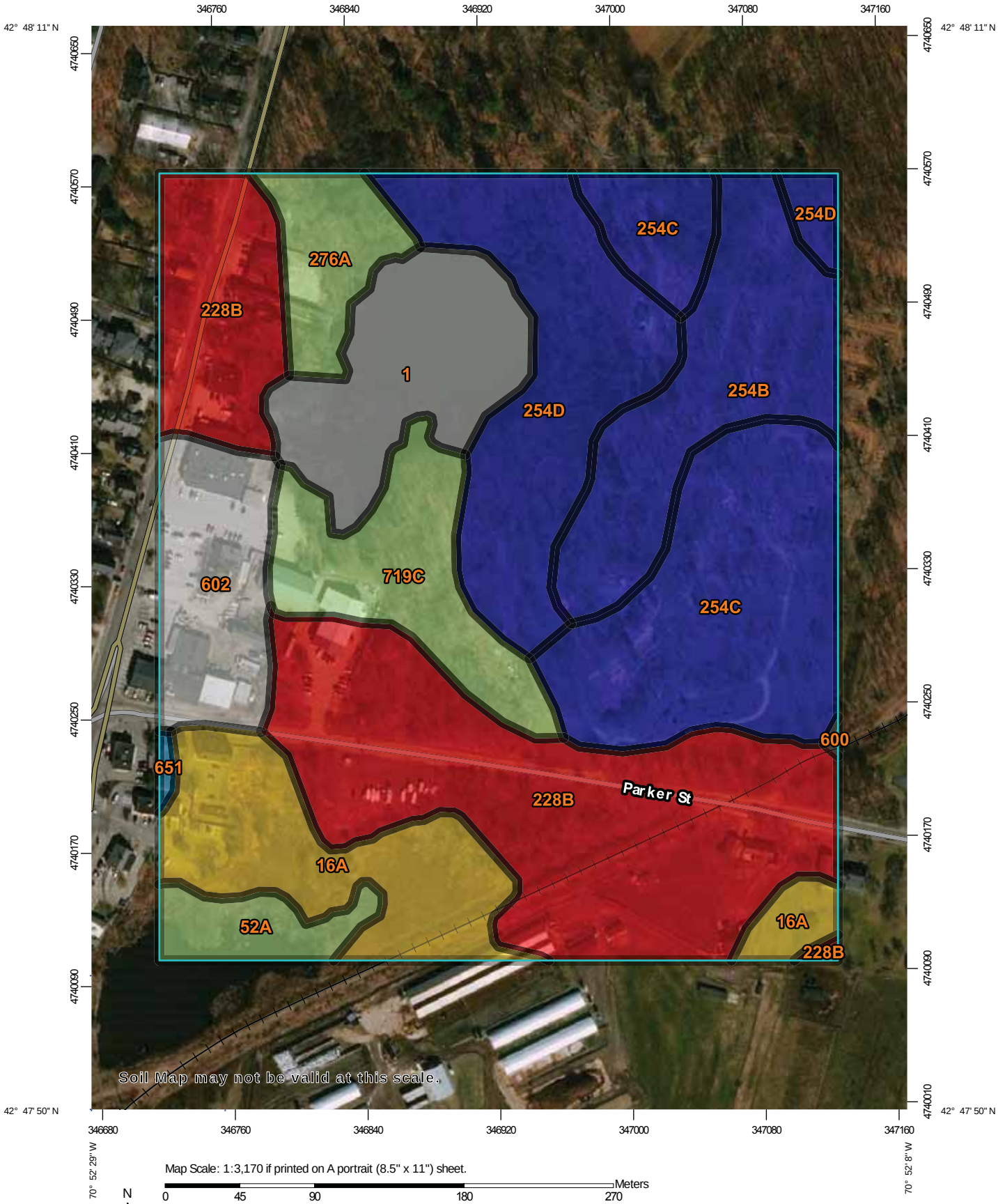
Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Saturated Hydraulic Conductivity (Ksat)—Essex County, Massachusetts, Northern Part
(Parker Hill, Newburyport, Ma)



Map Scale: 1:3,170 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 45 90 180 270

Feet: 0 150 300 600 900

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84

MAP LEGEND

Area of Interest (AOI)

- Area of Interest (AOI)

Soils

Soil Rating Polygons

- <= 2.8200
- > 2.8200 and <= 7.7600
- > 7.7600 and <= 10.0000
- > 10.0000 and <= 70.7800
- > 70.7800 and <= 100.0000
- Not rated or not available

Soil Rating Lines

- <= 2.8200
- > 2.8200 and <= 7.7600
- > 7.7600 and <= 10.0000
- > 10.0000 and <= 70.7800
- > 70.7800 and <= 100.0000
- Not rated or not available

Soil Rating Points

- <= 2.8200
- > 2.8200 and <= 7.7600
- > 7.7600 and <= 10.0000
- > 10.0000 and <= 70.7800
- > 70.7800 and <= 100.0000
- 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.

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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:
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: Essex County, Massachusetts, Northern Part
Survey Area Data: Version 13, Oct 6, 2017

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

Date(s) aerial images were photographed: Dec 31, 2009—Sep 12, 2016

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.

Saturated Hydraulic Conductivity (Ksat)

Map unit symbol	Map unit name	Rating (micrometers per second)	Acres in AOI	Percent of AOI
1	Water		3.7	7.8%
16A	Scantic silt loam, 0 to 3 percent slopes	7.7600	4.6	9.5%
52A	Freetown muck, 0 to 1 percent slopes	10.0000	1.1	2.4%
228B	Buxton silt loam, 3 to 8 percent slopes	2.8200	12.6	26.4%
254B	Merrimac fine sandy loam, 3 to 8 percent slopes	100.0000	4.6	9.7%
254C	Merrimac fine sandy loam, 8 to 15 percent slopes	100.0000	7.3	15.3%
254D	Merrimac fine sandy loam, 15 to 25 percent slopes	100.0000	5.9	12.4%
276A	Ninigret fine sandy loam, 0 to 3 percent slopes	10.0000	1.7	3.5%
600	Pits, gravel		0.0	0.1%
602	Urban land		2.9	6.0%
651	Udorthents, smoothed	70.7800	0.1	0.2%
719C	Suffield silt loam, 8 to 15 percent slopes	9.1700	3.3	6.9%
Totals for Area of Interest			**47.9**	**100.0%**

Description

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

For each soil layer, this attribute is actually recorded as three separate values in the database. A low value and a high value indicate the range of this attribute for the soil component. A "representative" value indicates the expected value of this attribute for the component. For this soil property, only the representative value is used.

The numeric Ksat values have been grouped according to standard Ksat class limits.

Rating Options

Units of Measure: micrometers per second

Aggregation Method: Dominant Component

Component Percent Cutoff: None Specified

Tie-break Rule: Fastest

Interpret Nulls as Zero: No

Layer Options (Horizon Aggregation Method): Depth Range (Weighted Average)

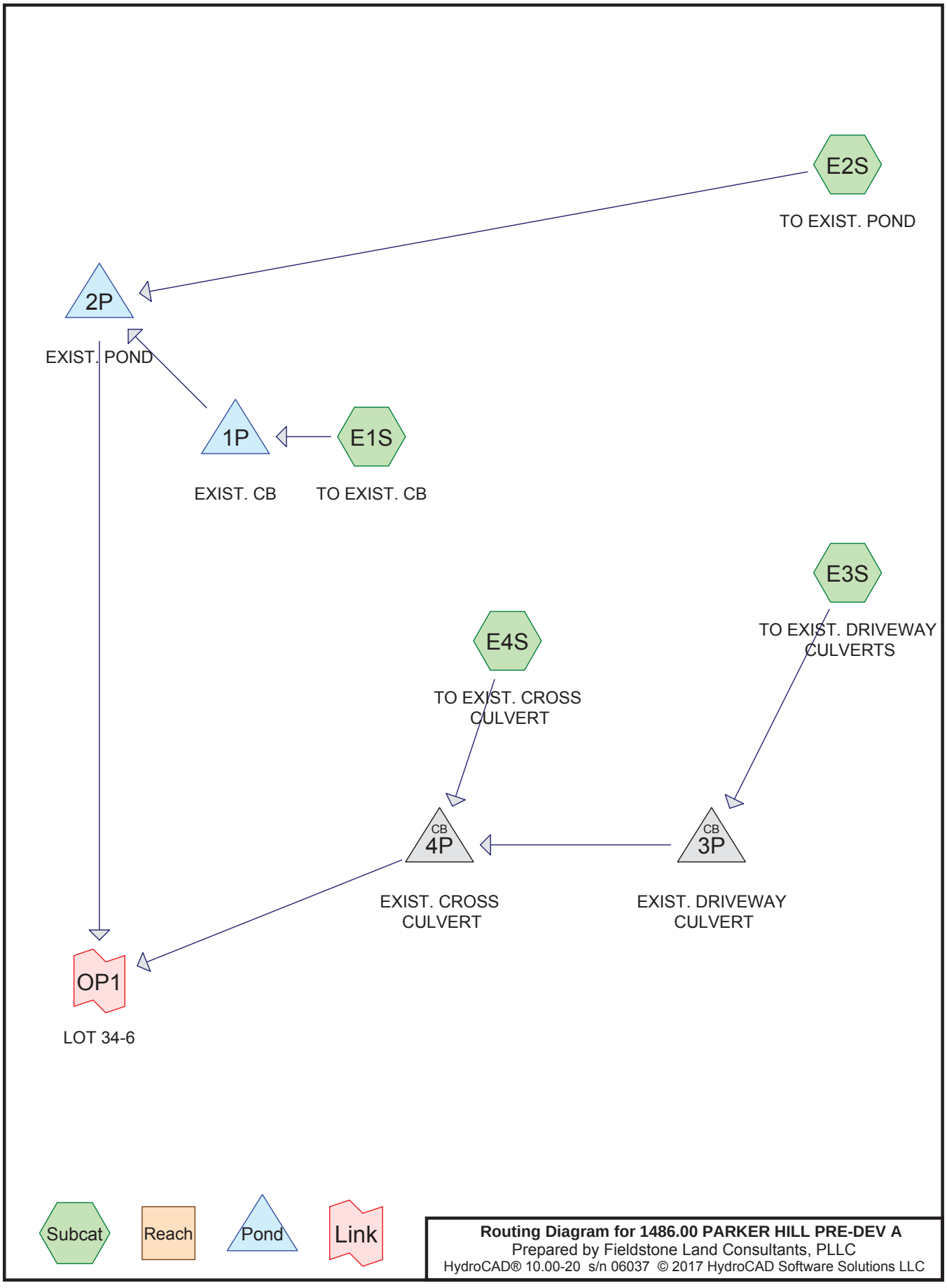
Top Depth: 8

Bottom Depth: 12

Units of Measure: Centimeters

Section 1

Existing Conditions
2, 10, 100 Year Storm Summaries



Routing Diagram for 1486.00 PARKER HILL PRE-DEV A
Prepared by Fieldstone Land Consultants, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
5.356	39	>75% Grass cover, Good, HSG A (E2S, E3S)
1.779	74	>75% Grass cover, Good, HSG C (E1S, E2S, E3S)
0.708	80	>75% Grass cover, Good, HSG D (E2S, E3S, E4S)
0.391	96	Gravel surface, HSG A (E2S, E3S)
0.100	96	Gravel surface, HSG C (E3S)
0.010	96	Gravel surface, HSG D (E4S)
0.100	91	Newly graded area, HSG C (E3S)
0.180	94	Newly graded area, HSG D (E3S, E4S)
0.475	98	Paved parking, HSG A (E2S, E3S)
0.897	98	Paved parking, HSG C (E1S, E2S)
0.644	98	Paved parking, HSG D (E2S, E3S, E4S)
0.076	98	Roofs, HSG D (E3S, E4S)
0.400	94	Urban commercial, 85% imp, HSG C (E2S)
3.650	98	Water Surface, 0% imp, HSG D (E2S)
5.300	30	Woods, Good, HSG A (E2S, E3S)
1.893	70	Woods, Good, HSG C (E1S, E2S, E3S)
0.381	77	Woods, Good, HSG D (E2S, E3S, E4S)
22.340	**62**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
11.522	HSG A	E2S, E3S
0.000	HSG B	
5.169	HSG C	E1S, E2S, E3S
5.649	HSG D	E2S, E3S, E4S
0.000	Other	
22.340		**TOTAL AREA**

Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.185 ac 9.19% Impervious Runoff Depth>1.06"
Flow Length=220' Tc=7.5 min CN=75 Runoff=0.21 cfs 0.016 af

Subcatchment E2S: TO EXIST. POND Runoff Area=19.050 ac 11.71% Impervious Runoff Depth>0.46"
Flow Length=550' Tc=26.5 min CN=62 Runoff=4.27 cfs 0.722 af

Subcatchment E3S: TO EXIST. DRIVEWAY Runoff Area=2.650 ac 3.96% Impervious Runoff Depth>0.49"
Flow Length=955' Tc=24.2 min CN=63 Runoff=0.69 cfs 0.109 af

Subcatchment E4S: TO EXIST. CROSS Runoff Area=0.455 ac 17.58% Impervious Runoff Depth>1.71"
Flow Length=178' Tc=13.5 min CN=85 Runoff=0.72 cfs 0.065 af

Pond 1P: EXIST. CB Inflow=0.21 cfs 0.016 af
Primary=0.21 cfs 0.016 af

Pond 2P: EXIST. POND Peak Elev=25.71' Storage=5.632 af Inflow=4.34 cfs 0.739 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=0.00 cfs 0.000 af

Pond 3P: EXIST. DRIVEWAY CULVERT Peak Elev=19.76' Inflow=0.69 cfs 0.109 af
Outflow=0.69 cfs 0.109 af

Pond 4P: EXIST. CROSS CULVERT Peak Elev=19.63' Inflow=1.14 cfs 0.174 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0190 '/' Outflow=1.14 cfs 0.174 af

Link OP1: LOT 34-6 Inflow=1.14 cfs 0.174 af
Primary=1.14 cfs 0.174 af

Total Runoff Area = 22.340 ac Runoff Volume = 0.912 af Average Runoff Depth = 0.49"
89.11% Pervious = 19.908 ac 10.89% Impervious = 2.432 ac

Summary for Subcatchment E1S: TO EXIST. CB

Runoff = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af, Depth> 1.06"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.068	70	Woods, Good, HSG C
0.185	75	Weighted Average
0.168		90.81% Pervious Area
0.017		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.1	40	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	130	0.0200	6.40	42.41	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 3.0 '/' Top.W=26.50' n= 0.013 Asphalt, smooth
7.5	220	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 4.27 cfs @ 12.50 hrs, Volume= 0.722 af, Depth> 0.46"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
1.500	74	>75% Grass cover, Good, HSG C
1.210	70	Woods, Good, HSG C
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
4.600	39	>75% Grass cover, Good, HSG A
5.000	30	Woods, Good, HSG A
19.050	62	Weighted Average
16.820		88.29% Pervious Area
2.230		11.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

Summary for Subcatchment E3S: TO EXIST. DRIVEWAY CULVERTS

Runoff = 0.69 cfs @ 12.45 hrs, Volume= 0.109 af, Depth> 0.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.025	98	Paved parking, HSG A
0.042	98	Paved parking, HSG D
0.038	98	Roofs, HSG D
0.091	96	Gravel surface, HSG A
0.300	30	Woods, Good, HSG A
0.756	39	>75% Grass cover, Good, HSG A
0.100	96	Gravel surface, HSG C
0.100	91	Newly graded area, HSG C
0.100	94	Newly graded area, HSG D
0.036	77	Woods, Good, HSG D
0.268	80	>75% Grass cover, Good, HSG D
0.179	74	>75% Grass cover, Good, HSG C
0.615	70	Woods, Good, HSG C
2.650	63	Weighted Average
2.545		96.04% Pervious Area
0.105		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.9	335	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	360	0.0450	2.12		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
0.3	110	0.0400	5.91	15.76	**Parabolic Channel,** W=4.00' D=1.00' Area=2.7 sf Perim=4.6' n= 0.035 High grass
24.2	955	Total			

Summary for Subcatchment E4S: TO EXIST. CROSS CULVERT

Runoff = 0.72 cfs @ 12.19 hrs, Volume= 0.065 af, Depth> 1.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.038	98	Roofs, HSG D
0.042	98	Paved parking, HSG D
0.010	96	Gravel surface, HSG D
0.140	80	>75% Grass cover, Good, HSG D
0.145	77	Woods, Good, HSG D
0.080	94	Newly graded area, HSG D
0.455	85	Weighted Average
0.375		82.42% Pervious Area
0.080		17.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	54	0.0244	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.3	124	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	178	Total			

Summary for Pond 1P: EXIST. CB

Inflow Area = 0.185 ac, 9.19% Impervious, Inflow Depth > 1.06" for 2-Year event
Inflow = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af
Primary = 0.21 cfs @ 12.12 hrs, Volume= 0.016 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.235 ac, 11.68% Impervious, Inflow Depth > 0.46" for 2-Year event
Inflow = 4.34 cfs @ 12.50 hrs, Volume= 0.739 af
Outflow = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 690.3 min
Primary = 0.00 cfs @ 24.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 25.71' @ 24.00 hrs Surf.Area= 3.598 ac Storage= 5.632 af (0.739 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 497.3 min (1,420.9 - 923.6)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 24.00 hrs HW=25.71' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Barrel Controls 0.00 cfs @ 0.42 fps)

Summary for Pond 3P: EXIST. DRIVEWAY CULVERT

Inflow Area = 2.650 ac, 3.96% Impervious, Inflow Depth > 0.49" for 2-Year event
Inflow = 0.69 cfs @ 12.45 hrs, Volume= 0.109 af
Outflow = 0.69 cfs @ 12.45 hrs, Volume= 0.109 af, Atten= 0%, Lag= 0.0 min
Primary = 0.69 cfs @ 12.45 hrs, Volume= 0.109 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.76' @ 12.45 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.60'	**24.0" Round Culvert X 2.00 w/ 12.0" inside fill** L= 36.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 18.60' / 18.50' S= 0.0028 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.57 sf
#2	Primary	21.70'	**2.0' long x 40.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=0.69 cfs @ 12.45 hrs HW=19.76' TW=19.61' (Dynamic Tailwater)
├─**1=Culvert** (Barrel Controls 0.69 cfs @ 1.46 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: EXIST. CROSS CULVERT

Inflow Area = 3.105 ac, 5.96% Impervious, Inflow Depth > 0.67" for 2-Year event
Inflow = 1.14 cfs @ 12.34 hrs, Volume= 0.174 af
Outflow = 1.14 cfs @ 12.34 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min
Primary = 1.14 cfs @ 12.34 hrs, Volume= 0.174 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 19.63' @ 12.34 hrs
Flood Elev= 21.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.07'	**12.0" Round Culvert** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.07' / 17.93' S= 0.0190 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.14 cfs @ 12.34 hrs HW=19.63' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.14 cfs @ 2.54 fps)

Summary for Link OP1: LOT 34-6

Inflow Area = 22.340 ac, 10.89% Impervious, Inflow Depth > 0.09" for 2-Year event
Inflow = 1.14 cfs @ 12.34 hrs, Volume= 0.174 af
Primary = 1.14 cfs @ 12.34 hrs, Volume= 0.174 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.185 ac 9.19% Impervious Runoff Depth>2.31"
Flow Length=220' Tc=7.5 min CN=75 Runoff=0.47 cfs 0.036 af

Subcatchment E2S: TO EXIST. POND Runoff Area=19.050 ac 11.71% Impervious Runoff Depth>1.32"
Flow Length=550' Tc=26.5 min CN=62 Runoff=16.20 cfs 2.103 af

Subcatchment E3S: TO EXIST. DRIVEWAY Runoff Area=2.650 ac 3.96% Impervious Runoff Depth>1.39"
Flow Length=955' Tc=24.2 min CN=63 Runoff=2.49 cfs 0.308 af

Subcatchment E4S: TO EXIST. CROSS Runoff Area=0.455 ac 17.58% Impervious Runoff Depth>3.20"
Flow Length=178' Tc=13.5 min CN=85 Runoff=1.34 cfs 0.121 af

Pond 1P: EXIST. CB Inflow=0.47 cfs 0.036 af
Primary=0.47 cfs 0.036 af

Pond 2P: EXIST. POND Peak Elev=25.99' Storage=6.674 af Inflow=16.38 cfs 2.138 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=0.53 cfs 0.358 af

Pond 3P: EXIST. DRIVEWAY CULVERT Peak Elev=20.41' Inflow=2.49 cfs 0.308 af
Outflow=2.49 cfs 0.308 af

Pond 4P: EXIST. CROSS CULVERT Peak Elev=20.38' Inflow=3.40 cfs 0.429 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0190 '/' Outflow=3.40 cfs 0.429 af

Link OP1: LOT 34-6 Inflow=3.40 cfs 0.787 af
Primary=3.40 cfs 0.787 af

Total Runoff Area = 22.340 ac Runoff Volume = 2.567 af Average Runoff Depth = 1.38"
89.11% Pervious = 19.908 ac 10.89% Impervious = 2.432 ac

Summary for Subcatchment E1S: TO EXIST. CB

Runoff = 0.47 cfs @ 12.11 hrs, Volume= 0.036 af, Depth> 2.31"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.068	70	Woods, Good, HSG C
0.185	75	Weighted Average
0.168		90.81% Pervious Area
0.017		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.1	40	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	130	0.0200	6.40	42.41	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 3.0 '/' Top.W=26.50' n= 0.013 Asphalt, smooth
7.5	220	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 16.20 cfs @ 12.41 hrs, Volume= 2.103 af, Depth> 1.32"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
1.500	74	>75% Grass cover, Good, HSG C
1.210	70	Woods, Good, HSG C
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
4.600	39	>75% Grass cover, Good, HSG A
5.000	30	Woods, Good, HSG A
19.050	62	Weighted Average
16.820		88.29% Pervious Area
2.230		11.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

Summary for Subcatchment E3S: TO EXIST. DRIVEWAY CULVERTS

Runoff = 2.49 cfs @ 12.37 hrs, Volume= 0.308 af, Depth> 1.39"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.025	98	Paved parking, HSG A
0.042	98	Paved parking, HSG D
0.038	98	Roofs, HSG D
0.091	96	Gravel surface, HSG A
0.300	30	Woods, Good, HSG A
0.756	39	>75% Grass cover, Good, HSG A
0.100	96	Gravel surface, HSG C
0.100	91	Newly graded area, HSG C
0.100	94	Newly graded area, HSG D
0.036	77	Woods, Good, HSG D
0.268	80	>75% Grass cover, Good, HSG D
0.179	74	>75% Grass cover, Good, HSG C
0.615	70	Woods, Good, HSG C
2.650	63	Weighted Average
2.545		96.04% Pervious Area
0.105		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.9	335	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	360	0.0450	2.12		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
0.3	110	0.0400	5.91	15.76	**Parabolic Channel,** W=4.00' D=1.00' Area=2.7 sf Perim=4.6' n= 0.035 High grass
24.2	955	Total			

Summary for Subcatchment E4S: TO EXIST. CROSS CULVERT

Runoff = 1.34 cfs @ 12.18 hrs, Volume= 0.121 af, Depth> 3.20"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.038	98	Roofs, HSG D
0.042	98	Paved parking, HSG D
0.010	96	Gravel surface, HSG D
0.140	80	>75% Grass cover, Good, HSG D
0.145	77	Woods, Good, HSG D
0.080	94	Newly graded area, HSG D
0.455	85	Weighted Average
0.375		82.42% Pervious Area
0.080		17.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	54	0.0244	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.3	124	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	178	Total			

Summary for Pond 1P: EXIST. CB

Inflow Area = 0.185 ac, 9.19% Impervious, Inflow Depth > 2.31" for 10-Year event
Inflow = 0.47 cfs @ 12.11 hrs, Volume= 0.036 af
Primary = 0.47 cfs @ 12.11 hrs, Volume= 0.036 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.235 ac, 11.68% Impervious, Inflow Depth > 1.33" for 10-Year event
Inflow = 16.38 cfs @ 12.41 hrs, Volume= 2.138 af
Outflow = 0.53 cfs @ 23.67 hrs, Volume= 0.358 af, Atten= 97%, Lag= 675.9 min
Primary = 0.53 cfs @ 23.67 hrs, Volume= 0.358 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 25.99' @ 23.67 hrs Surf.Area= 3.698 ac Storage= 6.674 af (1.781 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 289.6 min (1,175.2 - 885.6)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=0.53 cfs @ 23.67 hrs HW=25.99' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 0.53 cfs @ 1.84 fps)

Summary for Pond 3P: EXIST. DRIVEWAY CULVERT

Inflow Area = 2.650 ac, 3.96% Impervious, Inflow Depth > 1.39" for 10-Year event
Inflow = 2.49 cfs @ 12.37 hrs, Volume= 0.308 af
Outflow = 2.49 cfs @ 12.37 hrs, Volume= 0.308 af, Atten= 0%, Lag= 0.0 min
Primary = 2.49 cfs @ 12.37 hrs, Volume= 0.308 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 20.41' @ 12.32 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.60'	**24.0" Round Culvert X 2.00 w/ 12.0" inside fill** L= 36.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 18.60' / 18.50' S= 0.0028 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.57 sf
#2	Primary	21.70'	**2.0' long x 40.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=2.49 cfs @ 12.37 hrs HW=20.38' TW=20.34' (Dynamic Tailwater)
├─**1=Culvert** (Outlet Controls 2.49 cfs @ 1.13 fps)
└─**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 4P: EXIST. CROSS CULVERT

Inflow Area = 3.105 ac, 5.96% Impervious, Inflow Depth > 1.66" for 10-Year event
Inflow = 3.40 cfs @ 12.31 hrs, Volume= 0.429 af
Outflow = 3.40 cfs @ 12.31 hrs, Volume= 0.429 af, Atten= 0%, Lag= 0.0 min
Primary = 3.40 cfs @ 12.31 hrs, Volume= 0.429 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 20.38' @ 12.31 hrs
Flood Elev= 21.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.07'	**12.0" Round Culvert** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.07' / 17.93' S= 0.0190 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=3.40 cfs @ 12.31 hrs HW=20.38' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 3.40 cfs @ 4.32 fps)

Summary for Link OP1: LOT 34-6

Inflow Area = 22.340 ac, 10.89% Impervious, Inflow Depth > 0.42" for 10-Year event
Inflow = 3.40 cfs @ 12.31 hrs, Volume= 0.787 af
Primary = 3.40 cfs @ 12.31 hrs, Volume= 0.787 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment E1S: TO EXIST. CB Runoff Area=0.185 ac 9.19% Impervious Runoff Depth>5.89"
Flow Length=220' Tc=7.5 min CN=75 Runoff=1.20 cfs 0.091 af

Subcatchment E2S: TO EXIST. POND Runoff Area=19.050 ac 11.71% Impervious Runoff Depth>4.27"
Flow Length=550' Tc=26.5 min CN=62 Runoff=56.97 cfs 6.784 af

Subcatchment E3S: TO EXIST. DRIVEWAY Runoff Area=2.650 ac 3.96% Impervious Runoff Depth>4.40"
Flow Length=955' Tc=24.2 min CN=63 Runoff=8.51 cfs 0.971 af

Subcatchment E4S: TO EXIST. CROSS Runoff Area=0.455 ac 17.58% Impervious Runoff Depth>7.11"
Flow Length=178' Tc=13.5 min CN=85 Runoff=2.88 cfs 0.270 af

Pond 1P: EXIST. CB Inflow=1.20 cfs 0.091 af
Primary=1.20 cfs 0.091 af

Pond 2P: EXIST. POND Peak Elev=26.65' Storage=9.171 af Inflow=57.44 cfs 6.875 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=4.84 cfs 3.657 af

Pond 3P: EXIST. DRIVEWAY CULVERT Peak Elev=27.60' Inflow=8.51 cfs 0.971 af
Outflow=8.51 cfs 0.971 af

Pond 4P: EXIST. CROSS CULVERT Peak Elev=27.60' Inflow=10.53 cfs 1.241 af
12.0" Round Culvert n=0.012 L=60.0' S=0.0190 '/' Outflow=10.53 cfs 1.241 af

Link OP1: LOT 34-6 Inflow=10.85 cfs 4.897 af
Primary=10.85 cfs 4.897 af

Total Runoff Area = 22.340 ac Runoff Volume = 8.116 af Average Runoff Depth = 4.36"
89.11% Pervious = 19.908 ac 10.89% Impervious = 2.432 ac

Summary for Subcatchment E1S: TO EXIST. CB

Runoff = 1.20 cfs @ 12.11 hrs, Volume= 0.091 af, Depth> 5.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.068	70	Woods, Good, HSG C
0.185	75	Weighted Average
0.168		90.81% Pervious Area
0.017		9.19% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.1	50	0.0800	0.12		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.1	40	0.5000	4.95		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.3	130	0.0200	6.40	42.41	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 3.0 '/' Top.W=26.50' n= 0.013 Asphalt, smooth
7.5	220	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 56.97 cfs @ 12.38 hrs, Volume= 6.784 af, Depth> 4.27"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
1.500	74	>75% Grass cover, Good, HSG C
1.210	70	Woods, Good, HSG C
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
4.600	39	>75% Grass cover, Good, HSG A
5.000	30	Woods, Good, HSG A
19.050	62	Weighted Average
16.820		88.29% Pervious Area
2.230		11.71% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

Summary for Subcatchment E3S: TO EXIST. DRIVEWAY CULVERTS

Runoff = 8.51 cfs @ 12.34 hrs, Volume= 0.971 af, Depth> 4.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.025	98	Paved parking, HSG A
0.042	98	Paved parking, HSG D
0.038	98	Roofs, HSG D
0.091	96	Gravel surface, HSG A
0.300	30	Woods, Good, HSG A
0.756	39	>75% Grass cover, Good, HSG A
0.100	96	Gravel surface, HSG C
0.100	91	Newly graded area, HSG C
0.100	94	Newly graded area, HSG D
0.036	77	Woods, Good, HSG D
0.268	80	>75% Grass cover, Good, HSG D
0.179	74	>75% Grass cover, Good, HSG C
0.615	70	Woods, Good, HSG C
2.650	63	Weighted Average
2.545		96.04% Pervious Area
0.105		3.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.9	335	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
2.8	360	0.0450	2.12		**Shallow Concentrated Flow,** Nearly Bare & Untilled Kv= 10.0 fps
0.3	110	0.0400	5.91	15.76	**Parabolic Channel,** W=4.00' D=1.00' Area=2.7 sf Perim=4.6' n= 0.035 High grass
24.2	955	Total			

Summary for Subcatchment E4S: TO EXIST. CROSS CULVERT

Runoff = 2.88 cfs @ 12.18 hrs, Volume= 0.270 af, Depth> 7.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.038	98	Roofs, HSG D
0.042	98	Paved parking, HSG D
0.010	96	Gravel surface, HSG D
0.140	80	>75% Grass cover, Good, HSG D
0.145	77	Woods, Good, HSG D
0.080	94	Newly graded area, HSG D
0.455	85	Weighted Average
0.375		82.42% Pervious Area
0.080		17.58% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
12.2	54	0.0244	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.3	124	0.1000	1.58		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
13.5	178	Total			

Summary for Pond 1P: EXIST. CB

Inflow Area = 0.185 ac, 9.19% Impervious, Inflow Depth > 5.89" for 100-Year event
Inflow = 1.20 cfs @ 12.11 hrs, Volume= 0.091 af
Primary = 1.20 cfs @ 12.11 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond 2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.235 ac, 11.68% Impervious, Inflow Depth > 4.29" for 100-Year event
Inflow = 57.44 cfs @ 12.38 hrs, Volume= 6.875 af
Outflow = 4.84 cfs @ 15.49 hrs, Volume= 3.657 af, Atten= 92%, Lag= 186.7 min
Primary = 4.84 cfs @ 15.49 hrs, Volume= 3.657 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 26.65' @ 15.49 hrs Surf.Area= 3.958 ac Storage= 9.171 af (4.277 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 218.8 min (1,069.9 - 851.2)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=4.84 cfs @ 15.49 hrs HW=26.65' TW=0.00' (Dynamic Tailwater)
└─**1=Culvert** (Inlet Controls 4.84 cfs @ 3.31 fps)

Summary for Pond 3P: EXIST. DRIVEWAY CULVERT

Inflow Area = 2.650 ac, 3.96% Impervious, Inflow Depth > 4.40" for 100-Year event
Inflow = 8.51 cfs @ 12.34 hrs, Volume= 0.971 af
Outflow = 8.51 cfs @ 12.34 hrs, Volume= 0.971 af, Atten= 0%, Lag= 0.0 min
Primary = 8.51 cfs @ 12.34 hrs, Volume= 0.971 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 27.60' @ 12.30 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.60'	**24.0" Round Culvert X 2.00 w/ 12.0" inside fill** L= 36.0' RCP, groove end w/headwall, Ke= 0.200 Inlet / Outlet Invert= 18.60' / 18.50' S= 0.0028 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 1.57 sf
#2	Primary	21.70'	**2.0' long x 40.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

Primary OutFlow Max=8.51 cfs @ 12.34 hrs HW=27.43' TW=27.42' (Dynamic Tailwater)
├─**1=Culvert** (Outlet Controls 1.66 cfs @ 0.53 fps)
└─**2=Broad-Crested Rectangular Weir** (Weir Controls 6.85 cfs @ 0.60 fps)

Summary for Pond 4P: EXIST. CROSS CULVERT

Inflow Area = 3.105 ac, 5.96% Impervious, Inflow Depth > 4.80" for 100-Year event
Inflow = 10.53 cfs @ 12.30 hrs, Volume= 1.241 af
Outflow = 10.53 cfs @ 12.30 hrs, Volume= 1.241 af, Atten= 0%, Lag= 0.0 min
Primary = 10.53 cfs @ 12.30 hrs, Volume= 1.241 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Peak Elev= 27.60' @ 12.30 hrs
Flood Elev= 21.60'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.07'	**12.0" Round Culvert** L= 60.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.07' / 17.93' S= 0.0190 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

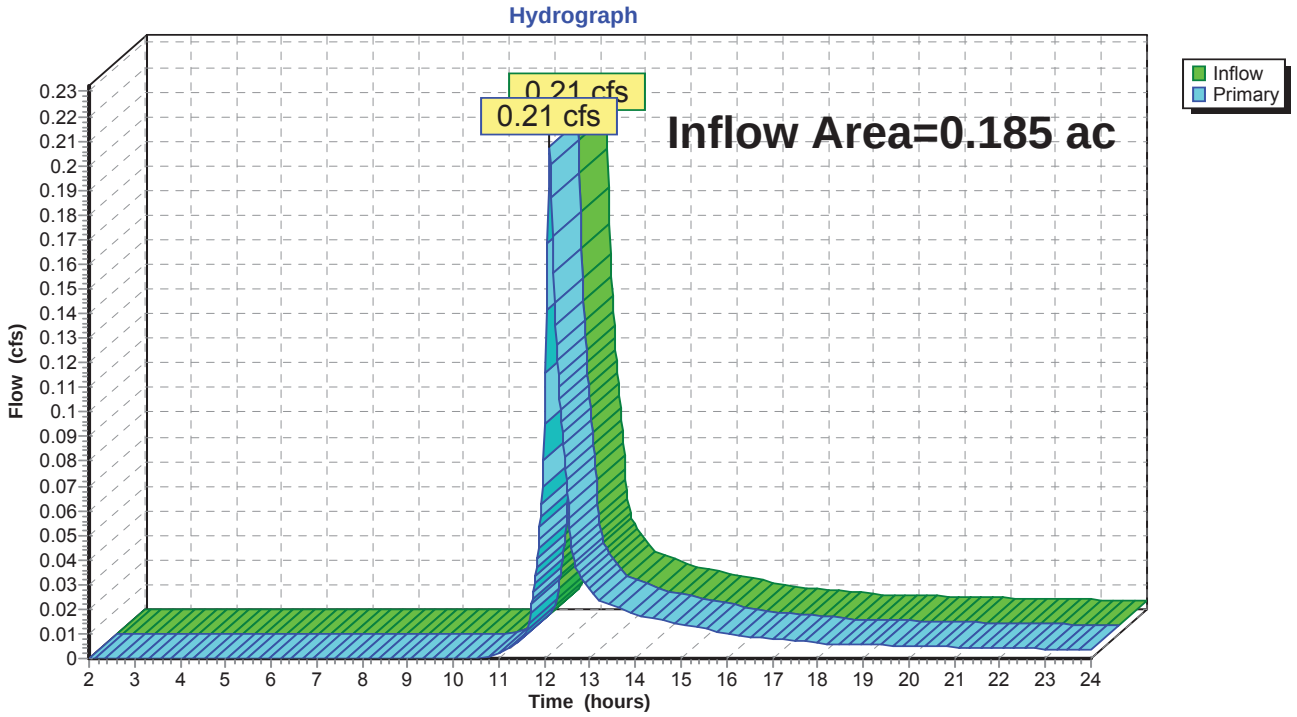
Primary OutFlow Max=10.53 cfs @ 12.30 hrs HW=27.59' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Barrel Controls 10.53 cfs @ 13.41 fps)

Summary for Link OP1: LOT 34-6

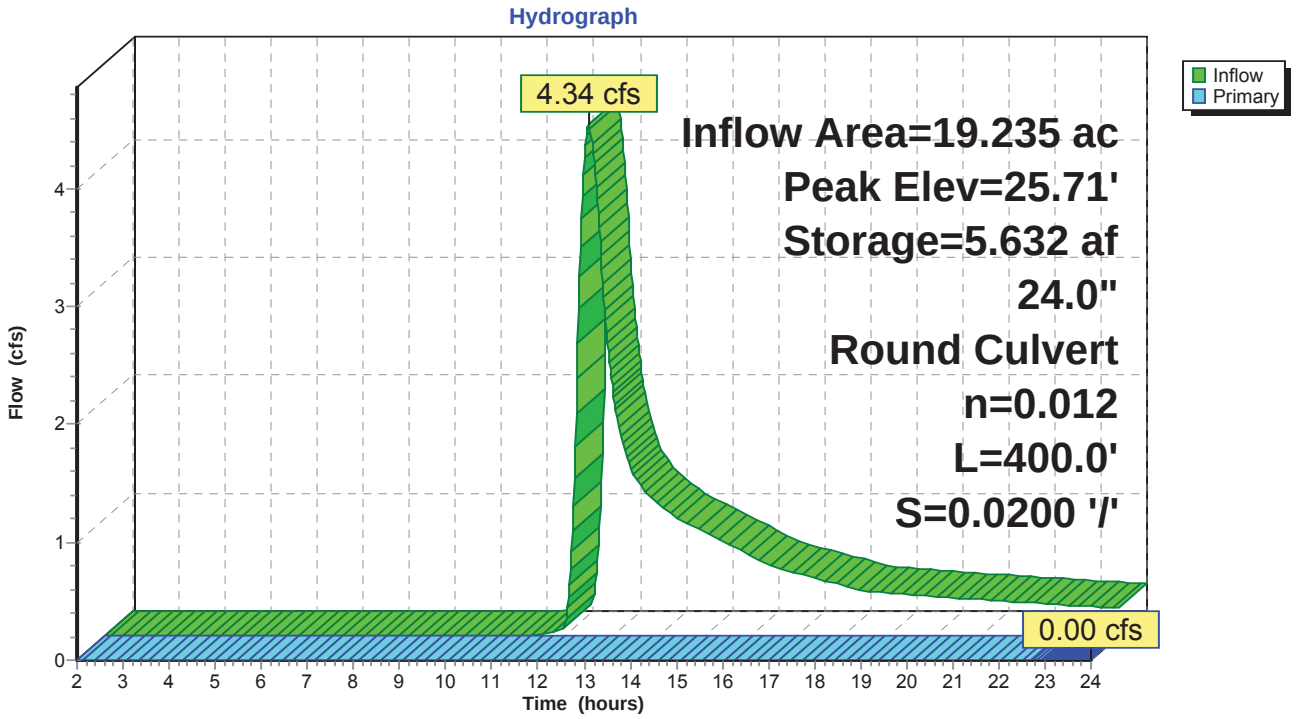
Inflow Area = 22.340 ac, 10.89% Impervious, Inflow Depth > 2.63" for 100-Year event
Inflow = 10.85 cfs @ 12.33 hrs, Volume= 4.897 af
Primary = 10.85 cfs @ 12.33 hrs, Volume= 4.897 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

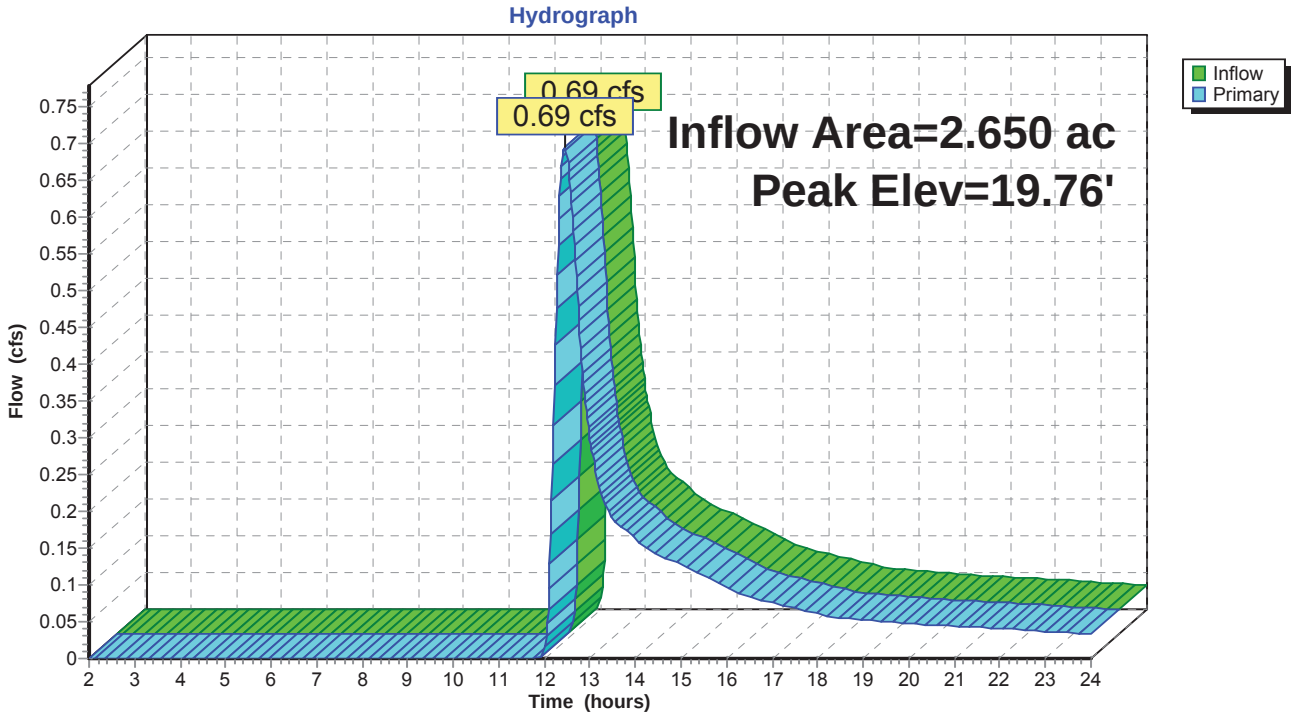
Pond 1P: EXIST. CB



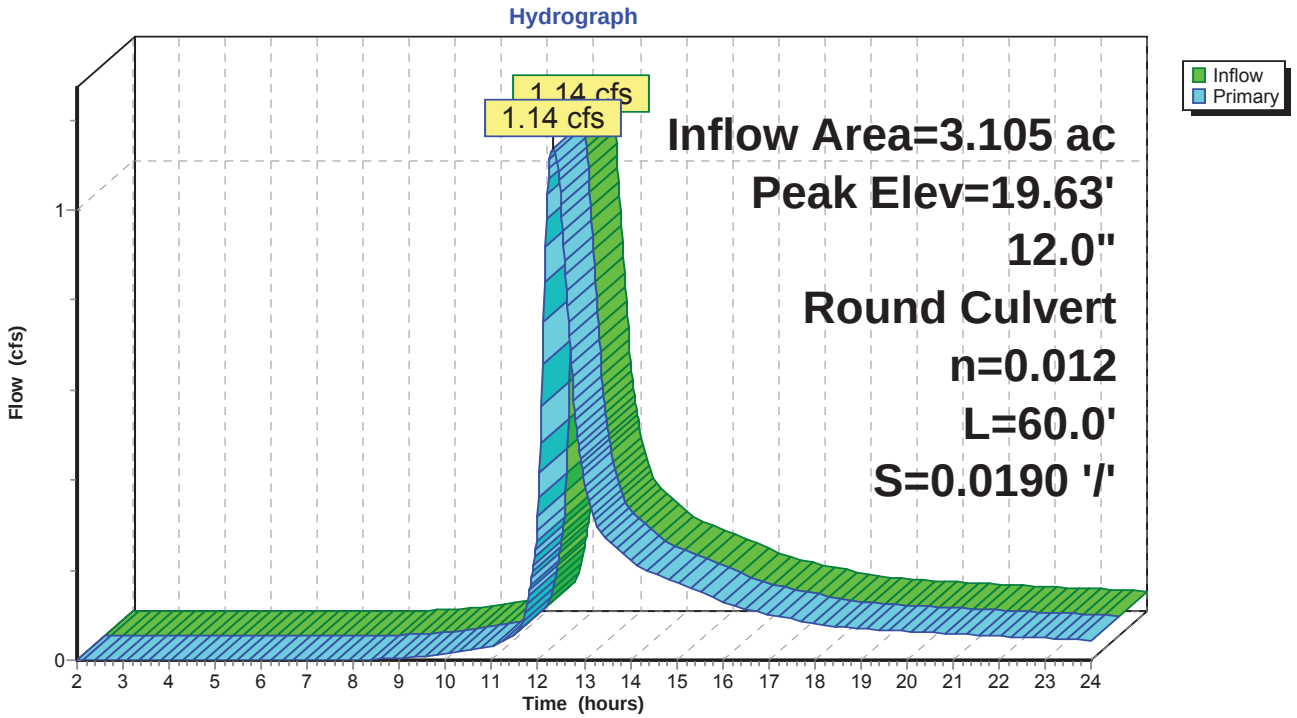
Pond 2P: EXIST. POND



Pond 3P: EXIST. DRIVEWAY CULVERT



Pond 4P: EXIST. CROSS CULVERT



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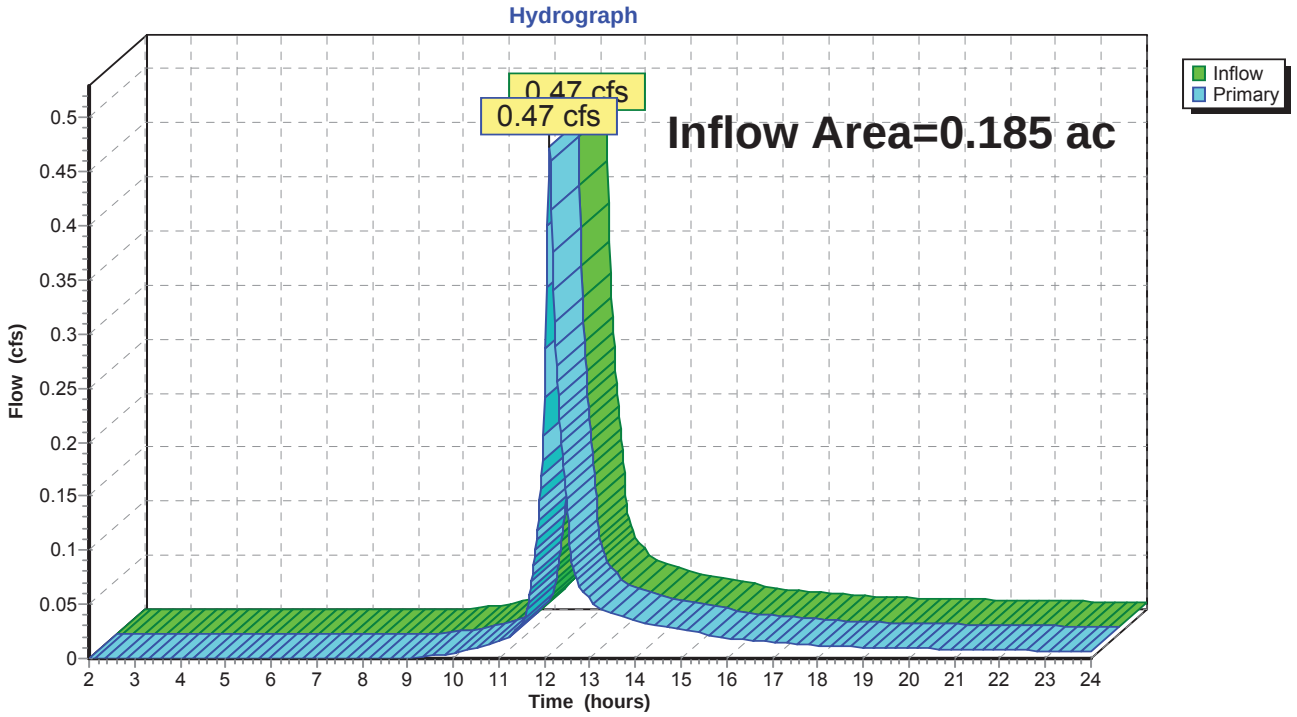

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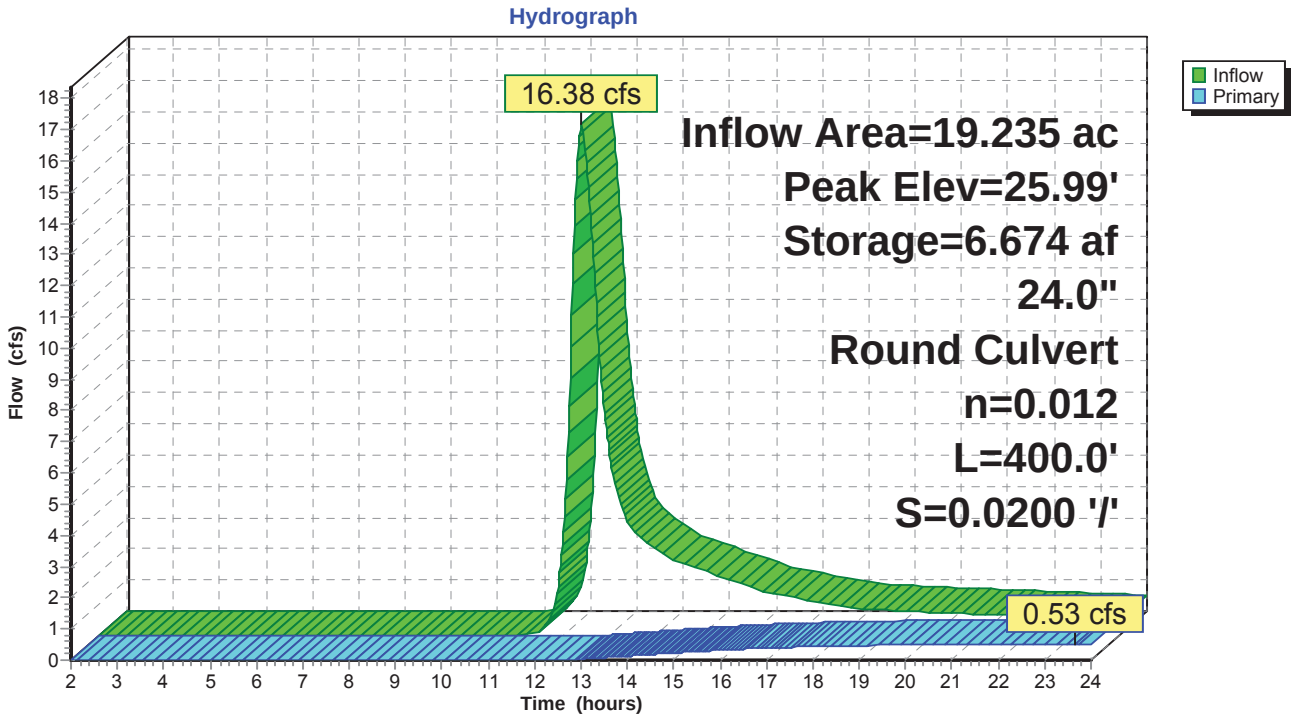

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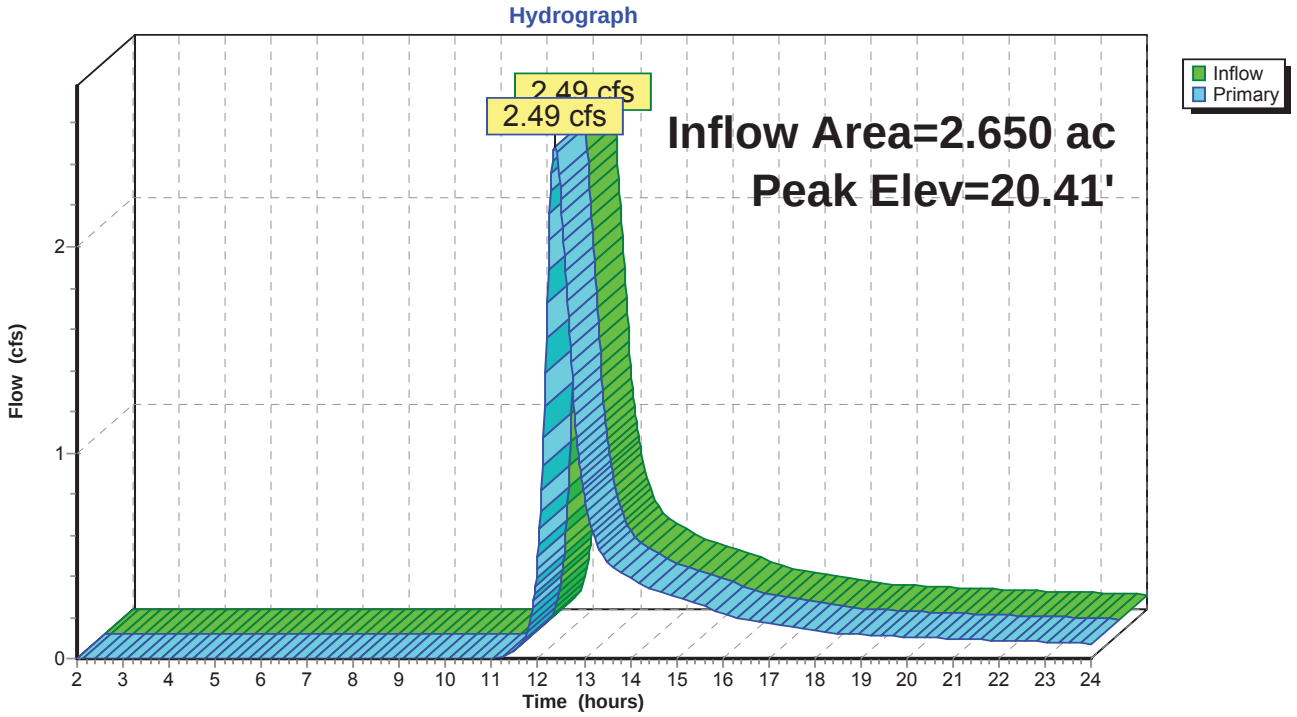

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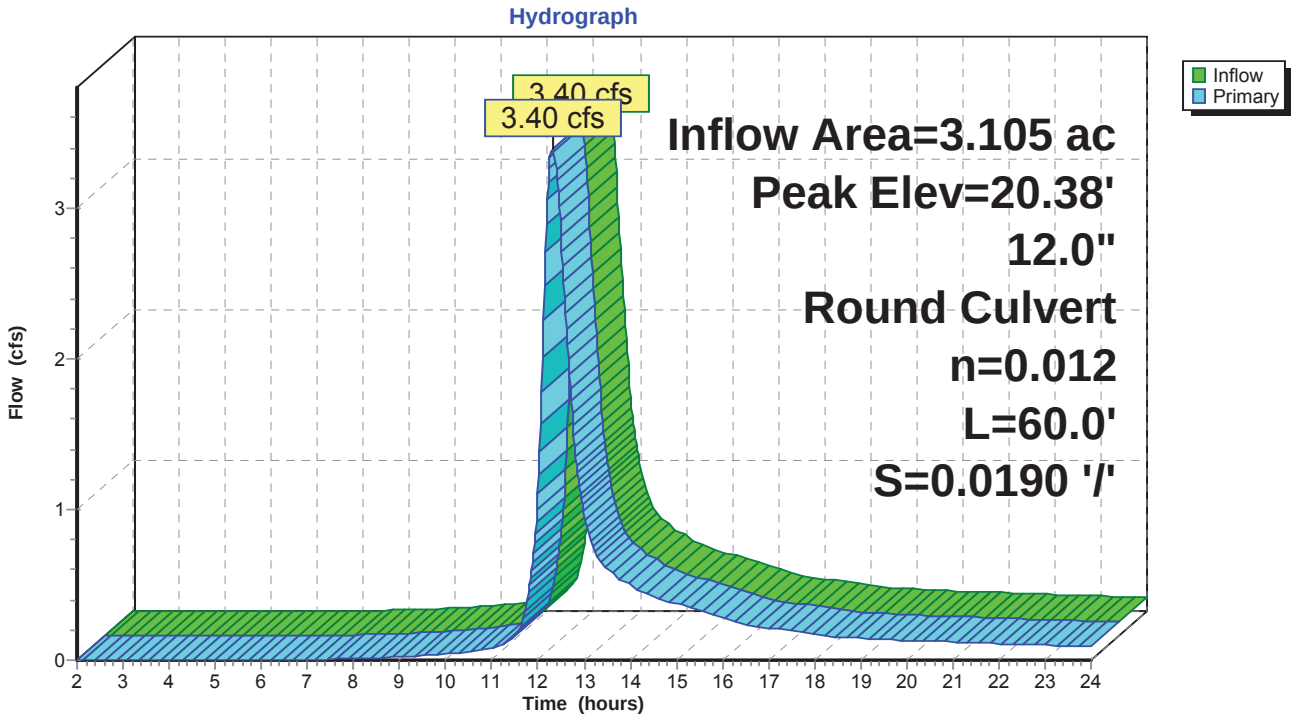

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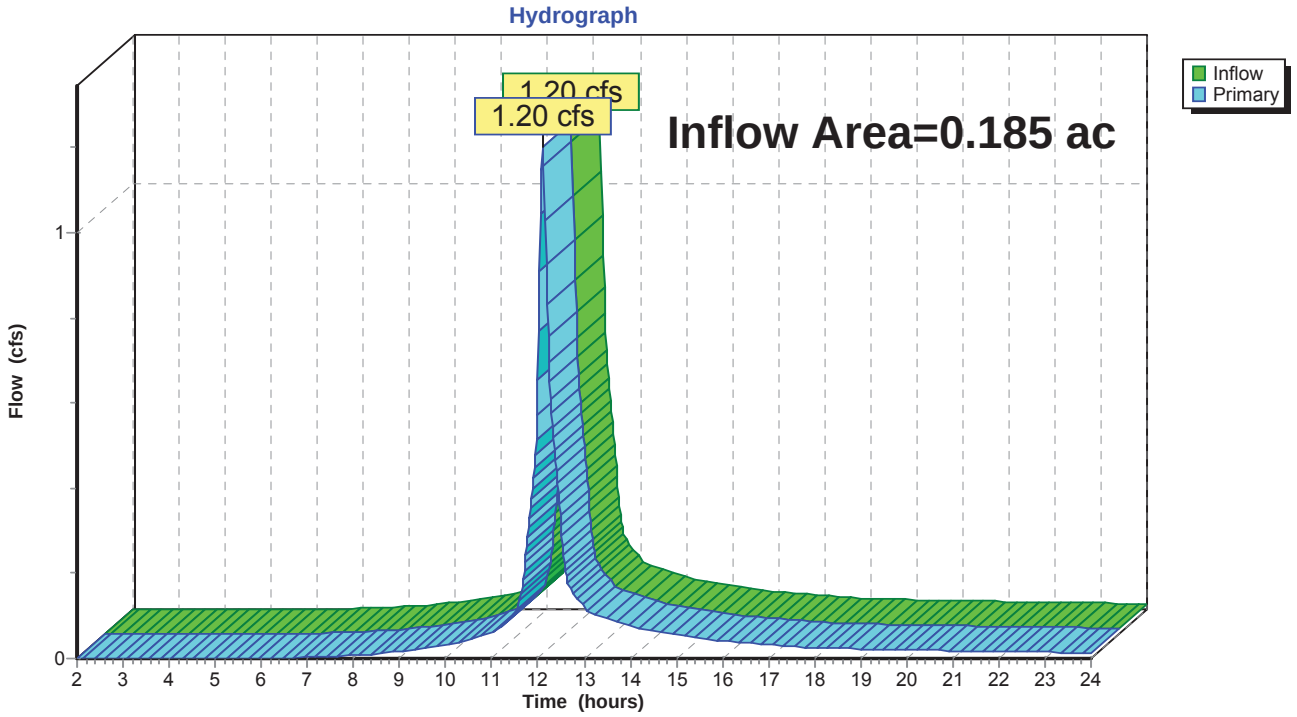

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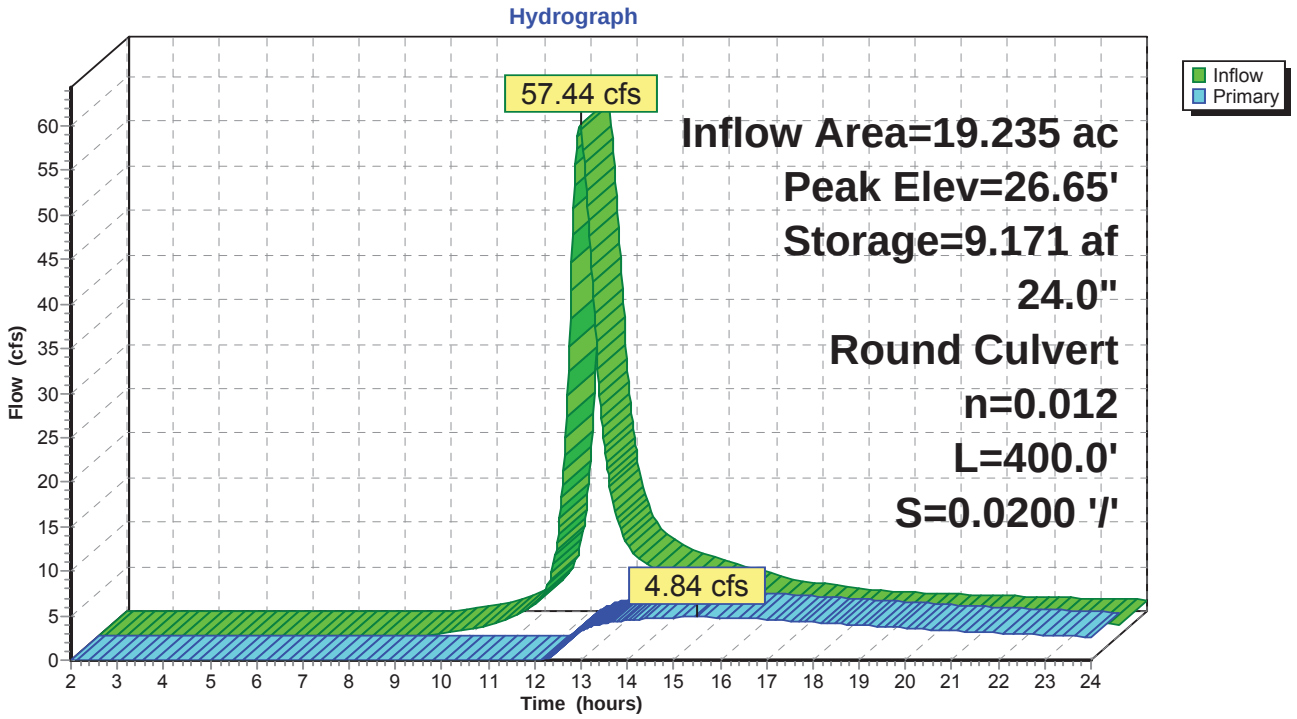
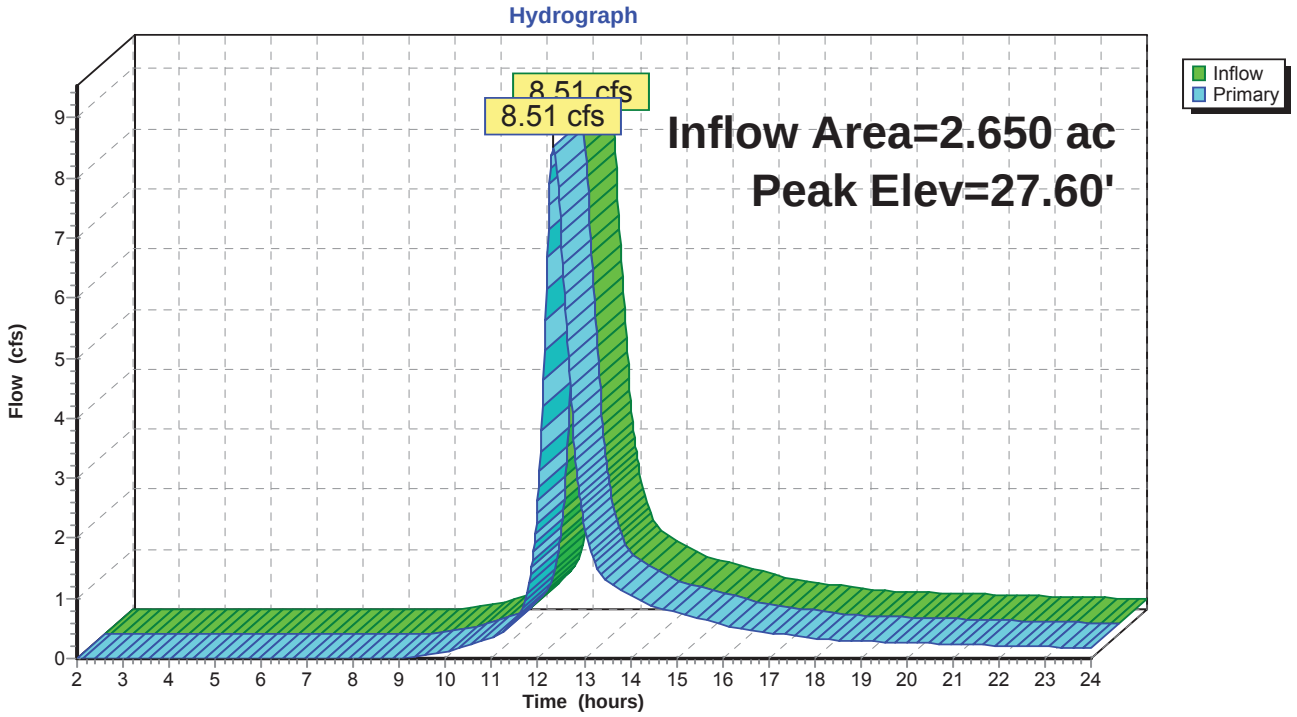
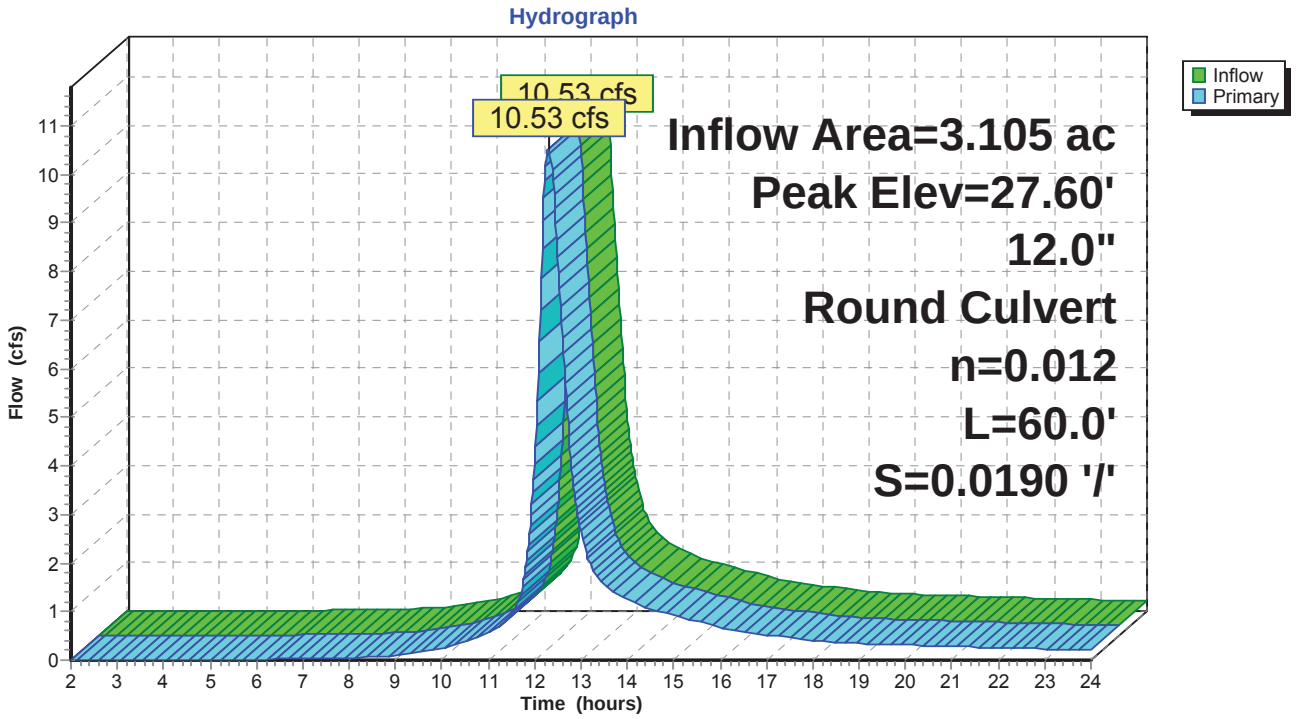


Pond 3P: EXIST. DRIVEWAY CULVERT

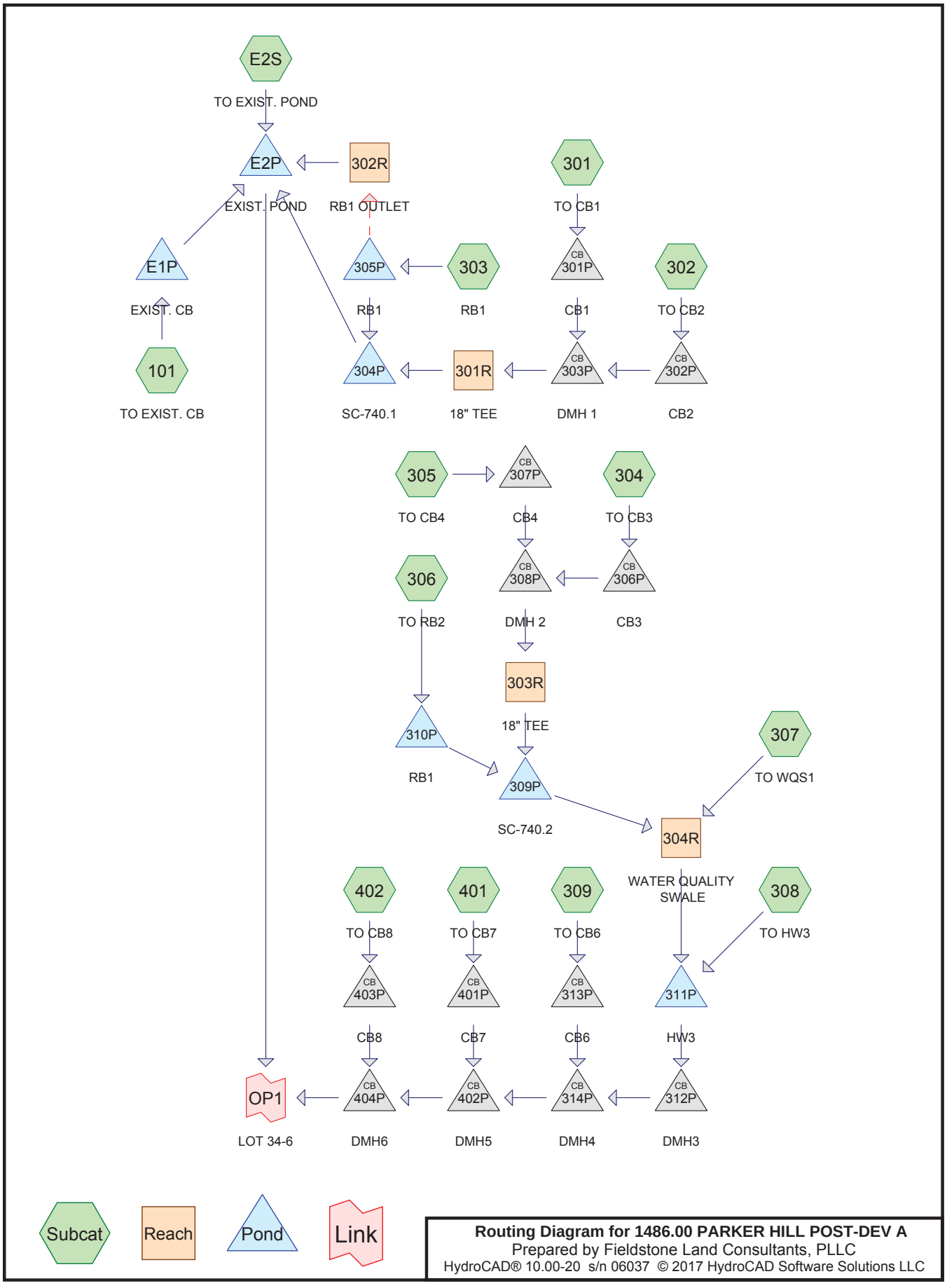


Pond 4P: EXIST. CROSS CULVERT



Section 2

Proposed Conditions
2, 10, 100 Year Storm Summaries



Routing Diagram for 1486.00 PARKER HILL POST-DEV A
Prepared by Fieldstone Land Consultants, PLLC

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.408	39	>75% Grass cover, Good, HSG A (301, 302, 307, 308, E2S)
2.065	74	>75% Grass cover, Good, HSG C (101, 301, 302, 303, 304, 305, 306, 307, 308, E2S)
0.772	80	>75% Grass cover, Good, HSG D (304, 305, 306, 307, 308, 309, 401, 402, E2S)
0.040	73	Brush, Good, HSG D (308)
0.416	96	Gravel surface, HSG A (301, 302, 307, 308, E2S)
0.558	98	Paved parking, HSG A (301, 302, 307, 308, E2S)
1.188	98	Paved parking, HSG C (101, 301, 302, 303, 304, 305, E2S)
0.752	98	Paved parking, HSG D (304, 305, 309, 401, E2S)
0.060	98	Roofs, HSG A (301, 302, 307, E2S)
0.248	98	Roofs, HSG C (101, 301, 302, 303, 304, 305, 306, 307, E2S)
0.144	98	Roofs, HSG D (304, 305, 306, 308, 309, 401, 402)
0.400	94	Urban commercial, 85% imp, HSG C (E2S)
3.650	98	Water Surface, 0% imp, HSG D (E2S)
3.180	30	Woods, Good, HSG A (301, 302, 307, 308, E2S)
1.268	70	Woods, Good, HSG C (101, 307, 308, E2S)
0.291	77	Woods, Good, HSG D (402, E2S)
4.900	32	Woods/grass comb., Good, HSG A (301, 302, E2S)
22.340	**63**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
11.522	HSG A	301, 302, 307, 308, E2S
0.000	HSG B	
5.169	HSG C	101, 301, 302, 303, 304, 305, 306, 307, 308, E2S
5.649	HSG D	304, 305, 306, 307, 308, 309, 401, 402, E2S
0.000	Other	
22.340		**TOTAL AREA**

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
1	301R	26.51	26.50	3.0	0.0033	0.013	18.0	0.0	0.0
2	303R	22.01	22.00	3.0	0.0033	0.013	18.0	0.0	0.0
3	301P	29.80	29.60	5.0	0.0400	0.013	12.0	0.0	0.0
4	302P	28.30	27.30	45.0	0.0222	0.013	12.0	0.0	0.0
5	303P	26.80	26.51	5.0	0.0580	0.013	18.0	0.0	0.0
6	304P	28.83	28.50	55.0	0.0060	0.013	8.0	0.0	0.0
7	306P	22.93	22.65	28.0	0.0100	0.013	12.0	0.0	0.0
8	307P	22.87	22.65	11.0	0.0200	0.013	12.0	0.0	0.0
9	308P	22.15	22.01	9.0	0.0156	0.013	18.0	0.0	0.0
10	311P	21.00	19.60	14.0	0.1000	0.013	12.0	0.0	0.0
11	312P	19.34	18.87	118.0	0.0040	0.013	15.0	0.0	0.0
12	313P	19.14	19.08	6.0	0.0100	0.013	12.0	0.0	0.0
13	314P	18.83	18.76	17.0	0.0041	0.013	15.0	0.0	0.0
14	401P	19.09	18.97	6.0	0.0200	0.013	12.0	0.0	0.0
15	402P	18.72	18.20	130.0	0.0040	0.013	15.0	0.0	0.0
16	403P	19.00	18.78	11.0	0.0200	0.010	8.0	0.0	0.0
17	404P	19.04	17.93	58.0	0.0191	0.012	12.0	0.0	0.0
18	404P	19.30	18.90	48.0	0.0083	0.012	12.0	0.0	0.0
19	E2P	25.70	17.70	400.0	0.0200	0.012	24.0	0.0	0.0

Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: TO EXIST. CB Runoff Area=0.140 ac 15.00% Impervious Runoff Depth>1.18"
Flow Length=150' Tc=3.0 min CN=77 Runoff=0.21 cfs 0.014 af

Subcatchment 301: TO CB1 Runoff Area=0.436 ac 38.30% Impervious Runoff Depth>0.57"
Flow Length=450' Tc=16.8 min CN=65 Runoff=0.16 cfs 0.021 af

Subcatchment 302: TO CB2 Runoff Area=0.375 ac 28.80% Impervious Runoff Depth>0.35"
Flow Length=380' Tc=16.6 min CN=59 Runoff=0.06 cfs 0.011 af

Subcatchment 303: RB1 Runoff Area=0.114 ac 80.70% Impervious Runoff Depth>2.40"
Flow Length=159' Tc=5.7 min CN=93 Runoff=0.31 cfs 0.023 af

Subcatchment 304: TO CB3 Runoff Area=0.184 ac 73.91% Impervious Runoff Depth>2.30"
Flow Length=175' Tc=6.2 min CN=92 Runoff=0.48 cfs 0.035 af

Subcatchment 305: TO CB4 Runoff Area=0.170 ac 69.41% Impervious Runoff Depth>2.21"
Flow Length=165' Tc=4.5 min CN=91 Runoff=0.46 cfs 0.031 af

Subcatchment 306: TO RB2 Runoff Area=0.190 ac 21.05% Impervious Runoff Depth>1.50"
Flow Length=190' Tc=5.6 min CN=82 Runoff=0.34 cfs 0.024 af

Subcatchment 307: TO WQS1 Runoff Area=1.081 ac 7.59% Impervious Runoff Depth>0.23"
Flow Length=570' Tc=21.2 min CN=55 Runoff=0.08 cfs 0.021 af

Subcatchment 308: TO HW3 Runoff Area=0.484 ac 4.96% Impervious Runoff Depth>0.42"
Flow Length=440' Tc=20.4 min CN=61 Runoff=0.10 cfs 0.017 af

Subcatchment 309: TO CB6 Runoff Area=0.128 ac 66.41% Impervious Runoff Depth>2.30"
Flow Length=97' Tc=7.5 min CN=92 Runoff=0.32 cfs 0.025 af

Subcatchment 401: TO CB7 Runoff Area=0.144 ac 54.86% Impervious Runoff Depth>2.12"
Flow Length=150' Tc=7.4 min CN=90 Runoff=0.34 cfs 0.025 af

Subcatchment 402: TO CB8 Runoff Area=0.210 ac 9.05% Impervious Runoff Depth>1.36"
Flow Length=143' Tc=11.5 min CN=80 Runoff=0.28 cfs 0.024 af

Subcatchment E2S: TO EXIST. POND Runoff Area=18.684 ac 12.41% Impervious Runoff Depth>0.42"
Flow Length=550' Tc=26.5 min CN=61 Runoff=3.68 cfs 0.653 af

Reach 301R: 18" TEE Avg. Flow Depth=0.20' Max Vel=1.63 fps Inflow=0.22 cfs 0.032 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=0.22 cfs 0.032 af

Reach 302R: RB1 OUTLET Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=37.0' S=0.0081 '/' Capacity=3.25 cfs Outflow=0.00 cfs 0.000 af

Reach 303R: 18" TEE Avg. Flow Depth=0.40' Max Vel=2.48 fps Inflow=0.93 cfs 0.067 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=0.93 cfs 0.067 af

Reach 304R: WATER QUALITY SWALE Avg. Flow Depth=0.04' Max Vel=0.46 fps Inflow=0.08 cfs 0.021 af
n=0.035 L=100.0' S=0.0080 '/' Capacity=20.52 cfs Outflow=0.08 cfs 0.021 af

Pond 301P: CB1 Peak Elev=30.00' Inflow=0.16 cfs 0.021 af
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=0.16 cfs 0.021 af

Pond 302P: CB2 Peak Elev=28.42' Inflow=0.06 cfs 0.011 af
12.0" Round Culvert n=0.013 L=45.0' S=0.0222 '/' Outflow=0.06 cfs 0.011 af

Pond 303P: DMH 1 Peak Elev=27.00' Inflow=0.22 cfs 0.032 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0580 '/' Outflow=0.22 cfs 0.032 af

Pond 304P: SC-740.1 Peak Elev=26.00' Storage=0 cf Inflow=0.22 cfs 0.032 af
Discarded=0.22 cfs 0.032 af Primary=0.00 cfs 0.000 af Outflow=0.22 cfs 0.032 af

Pond 305P: RB1 Peak Elev=31.81' Storage=323 cf Inflow=0.31 cfs 0.023 af
Discarded=0.05 cfs 0.023 af Primary=0.00 cfs 0.000 af Outflow=0.05 cfs 0.023 af

Pond 306P: CB3 Peak Elev=23.29' Inflow=0.48 cfs 0.035 af
12.0" Round Culvert n=0.013 L=28.0' S=0.0100 '/' Outflow=0.48 cfs 0.035 af

Pond 307P: CB4 Peak Elev=23.21' Inflow=0.46 cfs 0.031 af
12.0" Round Culvert n=0.013 L=11.0' S=0.0200 '/' Outflow=0.46 cfs 0.031 af

Pond 308P: DMH 2 Peak Elev=22.63' Inflow=0.93 cfs 0.067 af
18.0" Round Culvert n=0.013 L=9.0' S=0.0156 '/' Outflow=0.93 cfs 0.067 af

Pond 309P: SC-740.2 Peak Elev=22.09' Storage=461 cf Inflow=0.93 cfs 0.067 af
Discarded=0.29 cfs 0.067 af Primary=0.00 cfs 0.000 af Outflow=0.29 cfs 0.067 af

Pond 310P: RB1 Peak Elev=28.43' Storage=291 cf Inflow=0.34 cfs 0.024 af
Discarded=0.06 cfs 0.024 af Primary=0.00 cfs 0.000 af Outflow=0.06 cfs 0.024 af

Pond 311P: HW3 Peak Elev=21.20' Storage=14 cf Inflow=0.18 cfs 0.038 af
12.0" Round Culvert n=0.013 L=14.0' S=0.1000 '/' Outflow=0.18 cfs 0.038 af

Pond 312P: DMH3 Peak Elev=19.63' Inflow=0.18 cfs 0.038 af
15.0" Round Culvert n=0.013 L=118.0' S=0.0040 '/' Outflow=0.18 cfs 0.038 af

Pond 313P: CB6 Peak Elev=19.62' Inflow=0.32 cfs 0.025 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0100 '/' Outflow=0.32 cfs 0.025 af

Pond 314P: DMH4 Peak Elev=19.58' Inflow=0.33 cfs 0.062 af
15.0" Round Culvert n=0.013 L=17.0' S=0.0041 '/' Outflow=0.33 cfs 0.062 af

Pond 401P: CB7 Peak Elev=19.61' Inflow=0.34 cfs 0.025 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0200 '/' Outflow=0.34 cfs 0.025 af

Pond 402P: DMH5 Peak Elev=19.57' Inflow=0.67 cfs 0.088 af
15.0" Round Culvert n=0.013 L=130.0' S=0.0040 '/' Outflow=0.67 cfs 0.088 af

Pond 403P: CB8 Peak Elev=19.53' Inflow=0.28 cfs 0.024 af
8.0" Round Culvert n=0.010 L=11.0' S=0.0200 '/' Outflow=0.28 cfs 0.024 af

Pond 404P: DMH6 Peak Elev=19.49' Inflow=0.91 cfs 0.112 af
Outflow=0.91 cfs 0.112 af

Pond E1P: EXIST. CB Inflow=0.21 cfs 0.014 af
Primary=0.21 cfs 0.014 af

Pond E2P: EXIST. POND Peak Elev=25.69' Storage=5.560 af Inflow=3.72 cfs 0.667 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=0.00 cfs 0.000 af

Link OP1: LOT 34-6 Inflow=0.91 cfs 0.112 af
Primary=0.91 cfs 0.112 af

Total Runoff Area = 22.340 ac Runoff Volume = 0.923 af Average Runoff Depth = 0.50"
85.27% Pervious = 19.050 ac 14.73% Impervious = 3.290 ac

Summary for Subcatchment 101: TO EXIST. CB

Runoff = 0.21 cfs @ 12.05 hrs, Volume= 0.014 af, Depth> 1.18"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.019	70	Woods, Good, HSG C
0.004	98	Roofs, HSG C
0.140	77	Weighted Average
0.119		85.00% Pervious Area
0.021		15.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.3300	0.31		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	100	0.0200	6.38	18.34	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 20.0 & 3.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
3.0	150	Total			

Summary for Subcatchment 301: TO CB1

Runoff = 0.16 cfs @ 12.29 hrs, Volume= 0.021 af, Depth> 0.57"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.021	98	Roofs, HSG A
0.041	98	Paved parking, HSG A
0.028	98	Roofs, HSG C
0.077	98	Paved parking, HSG C
0.060	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.035	74	>75% Grass cover, Good, HSG C
0.024	96	Gravel surface, HSG A
0.436	65	Weighted Average
0.269		61.70% Pervious Area
0.167		38.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.8	120	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	180	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 0.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.8	450	Total			

Summary for Subcatchment 302: TO CB2

Runoff = 0.06 cfs @ 12.41 hrs, Volume= 0.011 af, Depth> 0.35"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.045	98	Paved parking, HSG A
0.004	98	Roofs, HSG A
0.012	98	Roofs, HSG C
0.047	98	Paved parking, HSG C
0.074	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.027	96	Gravel surface, HSG A
0.016	74	>75% Grass cover, Good, HSG C
0.375	59	Weighted Average
0.267		71.20% Pervious Area
0.108		28.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.7	105	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	125	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 0.0 & 50.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.6	380	Total			

Summary for Subcatchment 303: RB1

Runoff = 0.31 cfs @ 12.08 hrs, Volume= 0.023 af, Depth> 2.40"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.021	98	Roofs, HSG C
0.071	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.114	93	Weighted Average
0.022		19.30% Pervious Area
0.092		80.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	17	0.0120	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
1.0	50	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	54	0.0200	4.50	10.13	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
0.1	20	0.1000	5.71	10.00	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.040 Earth, cobble bottom, clean sides
5.7	159	Total			

Summary for Subcatchment 304: TO CB3

Runoff = 0.48 cfs @ 12.09 hrs, Volume= 0.035 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.040	98	Roofs, HSG C
0.008	98	Roofs, HSG D
0.056	98	Paved parking, HSG C
0.032	98	Paved parking, HSG D
0.008	80	>75% Grass cover, Good, HSG D
0.040	74	>75% Grass cover, Good, HSG C
0.184	92	Weighted Average
0.048		26.09% Pervious Area
0.136		73.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	30	0.0180	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	65	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	80	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth

6.2	175	Total

Summary for Subcatchment 305: TO CB4

Runoff = 0.46 cfs @ 12.07 hrs, Volume= 0.031 af, Depth> 2.21"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.014	98	Roofs, HSG C
0.040	98	Paved parking, HSG C
0.030	98	Roofs, HSG D
0.034	98	Paved parking, HSG D
0.022	80	>75% Grass cover, Good, HSG D
0.030	74	>75% Grass cover, Good, HSG C
0.170	91	Weighted Average
0.052		30.59% Pervious Area
0.118		69.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	20	0.0200	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	70	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	75	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
4.5	165	Total			

Summary for Subcatchment 306: TO RB2

Runoff = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af, Depth> 1.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.010	98	Roofs, HSG C
0.030	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.050	74	>75% Grass cover, Good, HSG C
0.190	82	Weighted Average
0.150		78.95% Pervious Area
0.040		21.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.4	40	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	50	0.0180	2.18	1.64	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.1	20	0.1000	5.14	3.86	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.7	70	0.0100	1.63	1.22	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
5.6	190	Total			

Summary for Subcatchment 307: TO WQS1

Runoff = 0.08 cfs @ 12.57 hrs, Volume= 0.021 af, Depth> 0.23"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG A
0.054	98	Roofs, HSG C
0.011	98	Roofs, HSG A
0.055	96	Gravel surface, HSG A
0.200	30	Woods, Good, HSG A
0.405	39	>75% Grass cover, Good, HSG A
0.034	80	>75% Grass cover, Good, HSG D
0.150	74	>75% Grass cover, Good, HSG C
0.155	70	Woods, Good, HSG C
1.081	55	Weighted Average
0.999		92.41% Pervious Area
0.082		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	320	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	100	0.1000	9.56	47.79	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.035 High grass
21.2	570	Total			

Summary for Subcatchment 308: TO HW3

Runoff = 0.10 cfs @ 12.41 hrs, Volume= 0.017 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.005	98	Paved parking, HSG A
0.019	98	Roofs, HSG D
0.010	96	Gravel surface, HSG A
0.080	30	Woods, Good, HSG A
0.110	39	>75% Grass cover, Good, HSG A
0.100	80	>75% Grass cover, Good, HSG D
0.026	74	>75% Grass cover, Good, HSG C
0.094	70	Woods, Good, HSG C
0.040	73	Brush, Good, HSG D
0.484	61	Weighted Average
0.460		95.04% Pervious Area
0.024		4.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.8	240	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	50	0.0080	2.01	5.52	**Trap/Vee/Rect Channel Flow,** Bot.W=4.00' D=0.50' Z= 3.0 '/' Top.W=7.00' n= 0.035 High grass
20.4	440	Total			

Summary for Subcatchment 309: TO CB6

Runoff = 0.32 cfs @ 12.11 hrs, Volume= 0.025 af, Depth> 2.30"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.066	98	Paved parking, HSG D
0.019	98	Roofs, HSG D
0.043	80	>75% Grass cover, Good, HSG D
0.128	92	Weighted Average
0.043		33.59% Pervious Area
0.085		66.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	37	0.0150	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	30	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	30	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.5	97	Total			

Summary for Subcatchment 401: TO CB7

Runoff = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af, Depth> 2.12"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.060	98	Paved parking, HSG D
0.065	80	>75% Grass cover, Good, HSG D
0.144	90	Weighted Average
0.065		45.14% Pervious Area
0.079		54.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	64	0.0470	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	36	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.4	150	Total			

Summary for Subcatchment 402: TO CB8

Runoff = 0.28 cfs @ 12.16 hrs, Volume= 0.024 af, Depth> 1.36"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.091	77	Woods, Good, HSG D
0.210	80	Weighted Average
0.191		90.95% Pervious Area
0.019		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	43	0.0234	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	100	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	143	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 3.68 cfs @ 12.52 hrs, Volume= 0.653 af, Depth> 0.42"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 2-Year Rainfall=3.15"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
0.065	98	Roofs, HSG C
1.596	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
0.024	98	Roofs, HSG A
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
1.759	39	>75% Grass cover, Good, HSG A
4.700	32	Woods/grass comb., Good, HSG A
2.800	30	Woods, Good, HSG A
18.684	61	Weighted Average
16.365		87.59% Pervious Area
2.319		12.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

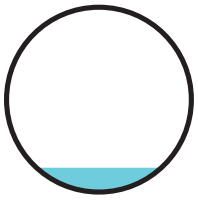
Summary for Reach 301R: 18" TEE

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 0.47" for 2-Year event
Inflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af
Outflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.1 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 1.63 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.83 fps, Avg. Travel Time= 0.1 min

Peak Storage= 0 cf @ 12.31 hrs
Average Depth at Peak Storage= 0.20'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 26.51', Outlet Invert= 26.50'



Summary for Reach 302R: RB1 OUTLET

Inflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 2.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 3.25 cfs

2.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 5.00'
Length= 37.0' Slope= 0.0081 '/'
Inlet Invert= 32.10', Outlet Invert= 31.80'

‡

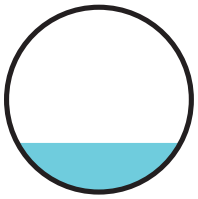
Summary for Reach 303R: 18" TEE

Inflow Area =		0.354 ac, 71.75% Impervious, Inflow Depth > 2.26" for 2-Year event			
Inflow	=	0.93 cfs @	12.08 hrs,	Volume=	0.067 af
Outflow	=	0.93 cfs @	12.08 hrs,	Volume=	0.067 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.48 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.82 fps, Avg. Travel Time= 0.1 min

Peak Storage= 1 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.40'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 22.01', Outlet Invert= 22.00'



Summary for Reach 304R: WATER QUALITY SWALE

Inflow Area = 1.625 ac, 23.14% Impervious, Inflow Depth > 0.16" for 2-Year event
Inflow = 0.08 cfs @ 12.57 hrs, Volume= 0.021 af
Outflow = 0.08 cfs @ 12.61 hrs, Volume= 0.021 af, Atten= 1%, Lag= 2.5 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 0.46 fps, Min. Travel Time= 3.6 min
Avg. Velocity = 0.26 fps, Avg. Travel Time= 6.3 min

Peak Storage= 18 cf @ 12.61 hrs
Average Depth at Peak Storage= 0.04'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 20.52 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0080 '/'
Inlet Invert= 24.80', Outlet Invert= 24.00'

‡

Summary for Pond 301P: CB1

Inflow Area = 0.436 ac, 38.30% Impervious, Inflow Depth > 0.57" for 2-Year event
Inflow = 0.16 cfs @ 12.29 hrs, Volume= 0.021 af
Outflow = 0.16 cfs @ 12.29 hrs, Volume= 0.021 af, Atten= 0%, Lag= 0.0 min
Primary = 0.16 cfs @ 12.29 hrs, Volume= 0.021 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 30.00' @ 12.29 hrs
Flood Elev= 33.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.80' / 29.60' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.16 cfs @ 12.29 hrs HW=30.00' TW=27.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.16 cfs @ 1.50 fps)

Summary for Pond 302P: CB2

Inflow Area = 0.375 ac, 28.80% Impervious, Inflow Depth > 0.35" for 2-Year event
Inflow = 0.06 cfs @ 12.41 hrs, Volume= 0.011 af
Outflow = 0.06 cfs @ 12.41 hrs, Volume= 0.011 af, Atten= 0%, Lag= 0.0 min
Primary = 0.06 cfs @ 12.41 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 28.42' @ 12.41 hrs
Flood Elev= 32.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.30'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.30' / 27.30' S= 0.0222 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.06 cfs @ 12.41 hrs HW=28.42' TW=27.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.06 cfs @ 1.18 fps)

Summary for Pond 303P: DMH 1

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 0.47" for 2-Year event
Inflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af
Outflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.0 min
Primary = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 27.00' @ 12.31 hrs
Flood Elev= 34.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	26.80'	**18.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 26.80' / 26.51' S= 0.0580 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.22 cfs @ 12.31 hrs HW=27.00' TW=26.71' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.22 cfs @ 1.54 fps)

Summary for Pond 304P: SC-740.1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.925 ac, 39.68% Impervious, Inflow Depth > 0.41" for 2-Year event
Inflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af
Outflow = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.22 cfs @ 12.31 hrs, Volume= 0.032 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 26.00' @ 12.31 hrs Surf.Area= 1,530 sf Storage= 0 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (914.7 - 914.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	26.00'	1,406 cf	**25.25'W x 60.58'L x 3.50'H Field A** 5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids
#2A	26.50'	1,838 cf	**ADS_StormTech SC-740 +Cap** x 40 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 8 Chambers
#3	27.00'	514 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,758 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	25	0	0	25
31.00	25	100	100	96
32.00	400	175	275	474
32.50	560	239	514	638

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.00'	**7.000 in/hr Exfiltration over Wetted area from 23.99' - 27.50'** Excluded Wetted area = 0 sf
#2	Primary	28.83'	**8.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.83' / 28.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.25 cfs @ 12.31 hrs HW=26.00' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.25 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=26.00' TW=25.50' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 305P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.114 ac, 80.70% Impervious, Inflow Depth > 2.40" for 2-Year event
Inflow = 0.31 cfs @ 12.08 hrs, Volume= 0.023 af
Outflow = 0.05 cfs @ 12.54 hrs, Volume= 0.023 af, Atten= 83%, Lag= 27.5 min
Discarded = 0.05 cfs @ 12.54 hrs, Volume= 0.023 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 31.81' @ 12.54 hrs Surf.Area= 337 sf Storage= 323 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.0 min (849.4 - 792.4)

Volume	Invert	Avail.Storage	Storage Description
#1	27.20'	632 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.20	170	0.0	0	0	170
27.21	170	25.0	0	0	170
31.19	170	25.0	169	170	354
31.20	170	100.0	2	171	355
32.00	400	100.0	222	393	590
32.50	560	100.0	239	632	754

Device	Routing	Invert	Outlet Devices
#1	Discarded	27.20'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	31.90'	**1.6" W x 1.6" H Vert. Orifice/Grate** C= 0.600
#3	Primary	32.20'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.05 cfs @ 12.54 hrs HW=31.81' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.05 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=27.20' TW=26.00' (Dynamic Tailwater)
├**2=Orifice/Grate** (Controls 0.00 cfs)
└**3=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 306P: CB3

Inflow Area = 0.184 ac, 73.91% Impervious, Inflow Depth > 2.30" for 2-Year event
Inflow = 0.48 cfs @ 12.09 hrs, Volume= 0.035 af
Outflow = 0.48 cfs @ 12.09 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.48 cfs @ 12.09 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.29' @ 12.09 hrs
Flood Elev= 26.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.93'	**12.0" Round Culvert** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.93' / 22.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.48 cfs @ 12.09 hrs HW=23.29' TW=22.63' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.48 cfs @ 2.76 fps)

Summary for Pond 307P: CB4

Inflow Area = 0.170 ac, 69.41% Impervious, Inflow Depth > 2.21" for 2-Year event
Inflow = 0.46 cfs @ 12.07 hrs, Volume= 0.031 af
Outflow = 0.46 cfs @ 12.07 hrs, Volume= 0.031 af, Atten= 0%, Lag= 0.0 min
Primary = 0.46 cfs @ 12.07 hrs, Volume= 0.031 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.21' @ 12.07 hrs
Flood Elev= 26.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.87'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.87' / 22.65' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.45 cfs @ 12.07 hrs HW=23.20' TW=22.63' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.45 cfs @ 1.97 fps)

Summary for Pond 308P: DMH 2

Inflow Area = 0.354 ac, 71.75% Impervious, Inflow Depth > 2.26" for 2-Year event
Inflow = 0.93 cfs @ 12.08 hrs, Volume= 0.067 af
Outflow = 0.93 cfs @ 12.08 hrs, Volume= 0.067 af, Atten= 0%, Lag= 0.0 min
Primary = 0.93 cfs @ 12.08 hrs, Volume= 0.067 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 22.63' @ 12.08 hrs
Flood Elev= 26.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.15'	**18.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.15' / 22.01' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.92 cfs @ 12.08 hrs HW=22.63' TW=22.41' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.92 cfs @ 2.81 fps)

Summary for Pond 309P: SC-740.2

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.544 ac, 54.04% Impervious, Inflow Depth > 1.47" for 2-Year event
Inflow = 0.93 cfs @ 12.08 hrs, Volume= 0.067 af
Outflow = 0.29 cfs @ 12.39 hrs, Volume= 0.067 af, Atten= 68%, Lag= 18.5 min
Discarded = 0.29 cfs @ 12.39 hrs, Volume= 0.067 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 22.09' @ 12.39 hrs Surf.Area= 1,709 sf Storage= 461 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.3 min (806.8 - 799.5)

Volume	Invert	Avail.Storage	Storage Description
#1A	21.50'	1,566 cf	**25.25'W x 67.70'L x 3.50'H Field A** 5,983 cf Overall - 2,067 cf Embedded = 3,915 cf x 40.0% Voids
#2A	22.00'	2,067 cf	**ADS_StormTech SC-740 +Cap** x 45 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 9 Chambers
#3	24.50'	144 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
24.50	25	0	0	25
26.00	25	38	38	52
26.50	500	106	144	527

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**7.000 in/hr Exfiltration over Wetted area from 21.49' - 25.00'** Excluded Wetted area = 0 sf
#2	Primary	25.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.29 cfs @ 12.39 hrs HW=22.09' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.29 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=21.50' TW=24.80' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 310P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.190 ac, 21.05% Impervious, Inflow Depth > 1.50" for 2-Year event
Inflow = 0.34 cfs @ 12.09 hrs, Volume= 0.024 af
Outflow = 0.06 cfs @ 11.74 hrs, Volume= 0.024 af, Atten= 84%, Lag= 0.0 min
Discarded = 0.06 cfs @ 11.74 hrs, Volume= 0.024 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 28.43' @ 12.59 hrs Surf.Area= 340 sf Storage= 291 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 34.6 min (870.6 - 836.0)

Volume	Invert	Avail.Storage	Storage Description
#1	25.00'	1,596 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	0	0.0	0	0	0
25.01	340	25.0	0	0	340
28.49	340	25.0	296	296	567
28.50	340	100.0	3	299	568
29.00	580	100.0	227	527	811
30.00	1,650	100.0	1,069	1,596	1,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	29.50'	**3.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.06 cfs @ 11.74 hrs HW=25.01' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.06 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=25.00' TW=21.50' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 311P: HW3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 0.22" for 2-Year event
Inflow = 0.18 cfs @ 12.54 hrs, Volume= 0.038 af
Outflow = 0.18 cfs @ 12.56 hrs, Volume= 0.038 af, Atten= 0%, Lag= 1.3 min
Primary = 0.18 cfs @ 12.56 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.20' @ 12.56 hrs Surf.Area= 130 sf Storage= 14 cf

Plug-Flow detention time= 1.4 min calculated for 0.038 af (100% of inflow)
Center-of-Mass det. time= 1.0 min (952.0 - 951.0)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,517 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	8	0	0
22.00	610	309	309
23.50	1,000	1,208	1,517

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.60' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.17 cfs @ 12.56 hrs HW=21.20' TW=19.63' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.17 cfs @ 1.53 fps)

Summary for Pond 312P: DMH3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 0.22" for 2-Year event
Inflow = 0.18 cfs @ 12.56 hrs, Volume= 0.038 af
Outflow = 0.18 cfs @ 12.56 hrs, Volume= 0.038 af, Atten= 0%, Lag= 0.0 min
Primary = 0.18 cfs @ 12.56 hrs, Volume= 0.038 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.63' @ 12.51 hrs
Flood Elev= 21.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.34'	**15.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.34' / 18.87' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.18 cfs @ 12.56 hrs HW=19.63' TW=19.40' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 0.18 cfs @ 1.23 fps)

Summary for Pond 313P: CB6

Inflow Area = 0.128 ac, 66.41% Impervious, Inflow Depth > 2.30" for 2-Year event
Inflow = 0.32 cfs @ 12.11 hrs, Volume= 0.025 af
Outflow = 0.32 cfs @ 12.11 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.32 cfs @ 12.11 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.62' @ 12.12 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.14'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.14' / 19.08' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.29 cfs @ 12.11 hrs HW=19.61' TW=19.58' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.29 cfs @ 1.16 fps)

Summary for Pond 314P: DMH4

Inflow Area = 2.237 ac, 21.68% Impervious, Inflow Depth > 0.33" for 2-Year event
Inflow = 0.33 cfs @ 12.11 hrs, Volume= 0.062 af
Outflow = 0.33 cfs @ 12.11 hrs, Volume= 0.062 af, Atten= 0%, Lag= 0.0 min
Primary = 0.33 cfs @ 12.11 hrs, Volume= 0.062 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.58' @ 12.11 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.83'	**15.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.83' / 18.76' S= 0.0041 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.33 cfs @ 12.11 hrs HW=19.58' TW=19.56' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.33 cfs @ 0.62 fps)

Summary for Pond 401P: CB7

Inflow Area = 0.144 ac, 54.86% Impervious, Inflow Depth > 2.12" for 2-Year event
Inflow = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af
Outflow = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af, Atten= 0%, Lag= 0.0 min
Primary = 0.34 cfs @ 12.10 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.61' @ 12.11 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.09'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.09' / 18.97' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.34 cfs @ 12.10 hrs HW=19.60' TW=19.56' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.34 cfs @ 1.20 fps)

Summary for Pond 402P: DMH5

Inflow Area = 2.381 ac, 23.69% Impervious, Inflow Depth > 0.44" for 2-Year event
Inflow = 0.67 cfs @ 12.11 hrs, Volume= 0.088 af
Outflow = 0.67 cfs @ 12.11 hrs, Volume= 0.088 af, Atten= 0%, Lag= 0.0 min
Primary = 0.67 cfs @ 12.11 hrs, Volume= 0.088 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.57' @ 12.11 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.72'	**15.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.72' / 18.20' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=0.67 cfs @ 12.11 hrs HW=19.56' TW=19.49' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.67 cfs @ 1.07 fps)

Summary for Pond 403P: CB8

Inflow Area = 0.210 ac, 9.05% Impervious, Inflow Depth > 1.36" for 2-Year event
Inflow = 0.28 cfs @ 12.16 hrs, Volume= 0.024 af
Outflow = 0.28 cfs @ 12.16 hrs, Volume= 0.024 af, Atten= 0%, Lag= 0.0 min
Primary = 0.28 cfs @ 12.16 hrs, Volume= 0.024 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.53' @ 12.14 hrs
Flood Elev= 21.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	**8.0" Round Culvert** L= 11.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.00' / 18.78' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.27 cfs @ 12.16 hrs HW=19.52' TW=19.47' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.27 cfs @ 1.30 fps)

Summary for Pond 404P: DMH6

Inflow Area = 2.591 ac, 22.50% Impervious, Inflow Depth > 0.52" for 2-Year event
Inflow = 0.91 cfs @ 12.12 hrs, Volume= 0.112 af
Outflow = 0.91 cfs @ 12.12 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min
Primary = 0.91 cfs @ 12.12 hrs, Volume= 0.112 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.49' @ 12.12 hrs
Flood Elev= 21.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.04'	**12.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.04' / 17.93' S= 0.0191 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	19.30'	**12.0" Round Culvert** L= 48.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.30' / 18.90' S= 0.0083 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=0.91 cfs @ 12.12 hrs HW=19.49' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.77 cfs @ 2.28 fps)
2=Culvert (Barrel Controls 0.14 cfs @ 2.07 fps)

Summary for Pond E1P: EXIST. CB

Inflow Area = 0.140 ac, 15.00% Impervious, Inflow Depth > 1.18" for 2-Year event
Inflow = 0.21 cfs @ 12.05 hrs, Volume= 0.014 af
Primary = 0.21 cfs @ 12.05 hrs, Volume= 0.014 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond E2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.749 ac, 13.71% Impervious, Inflow Depth > 0.41" for 2-Year event
Inflow = 3.72 cfs @ 12.51 hrs, Volume= 0.667 af
Outflow = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af, Atten= 100%, Lag= 0.0 min
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 25.69' @ 24.00 hrs Surf.Area= 3.591 ac Storage= 5.560 af (0.666 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=25.50' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Controls 0.00 cfs)

Summary for Link OP1: LOT 34-6

Inflow Area = 22.340 ac, 14.73% Impervious, Inflow Depth > 0.06" for 2-Year event
Inflow = 0.91 cfs @ 12.12 hrs, Volume= 0.112 af
Primary = 0.91 cfs @ 12.12 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

Pond 304P: SC-740.1 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

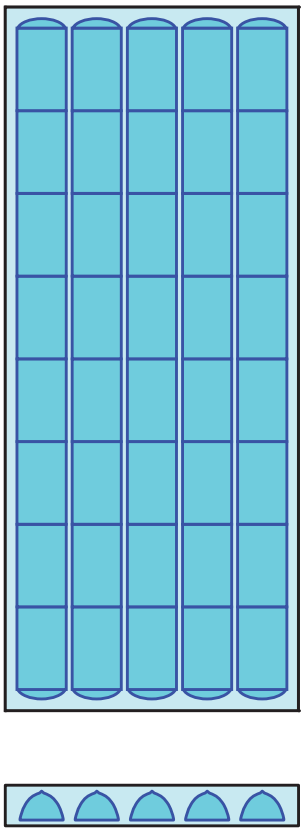
8 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 58.58' Row Length +12.0" End Stone x 2 = 60.58' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

40 Chambers x 45.9 cf = 1,837.6 cf Chamber Storage

5,353.5 cf Field - 1,837.6 cf Chambers = 3,515.9 cf Stone x 40.0% Voids = 1,406.3 cf Stone Storage

Chamber Storage + Stone Storage = 3,243.9 cf = 0.074 af
Overall Storage Efficiency = 60.6%
Overall System Size = 60.58' x 25.25' x 3.50'

40 Chambers
198.3 cy Field
130.2 cy Stone



Pond 309P: SC-740.2 - Chamber Wizard Field A

Chamber Model = ADS_StormTech SC-740 +Cap (ADS StormTech® SC-740 with cap length)
Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf
Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap

51.0" Wide + 6.0" Spacing = 57.0" C-C Row Spacing

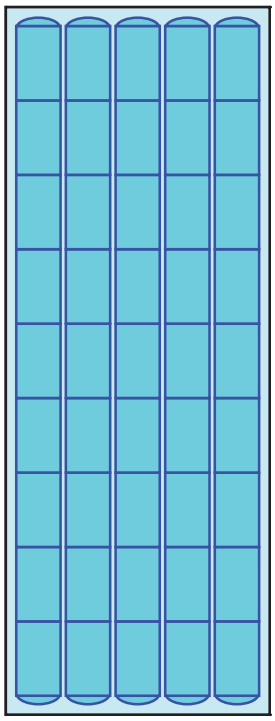
9 Chambers/Row x 7.12' Long +0.81' Cap Length x 2 = 65.70' Row Length +12.0" End Stone x 2 = 67.70' Base Length
5 Rows x 51.0" Wide + 6.0" Spacing x 4 + 12.0" Side Stone x 2 = 25.25' Base Width
6.0" Base + 30.0" Chamber Height + 6.0" Cover = 3.50' Field Height

45 Chambers x 45.9 cf = 2,067.3 cf Chamber Storage

5,982.7 cf Field - 2,067.3 cf Chambers = 3,915.4 cf Stone x 40.0% Voids = 1,566.2 cf Stone Storage

Chamber Storage + Stone Storage = 3,633.5 cf = 0.083 af
Overall Storage Efficiency = 60.7%
Overall System Size = 67.70' x 25.25' x 3.50'

45 Chambers
221.6 cy Field
145.0 cy Stone



Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: TO EXIST. CB Runoff Area=0.140 ac 15.00% Impervious Runoff Depth>2.48"
Flow Length=150' Tc=3.0 min CN=77 Runoff=0.45 cfs 0.029 af

Subcatchment 301: TO CB1 Runoff Area=0.436 ac 38.30% Impervious Runoff Depth>1.53"
Flow Length=450' Tc=16.8 min CN=65 Runoff=0.53 cfs 0.056 af

Subcatchment 302: TO CB2 Runoff Area=0.375 ac 28.80% Impervious Runoff Depth>1.13"
Flow Length=380' Tc=16.6 min CN=59 Runoff=0.31 cfs 0.035 af

Subcatchment 303: RB1 Runoff Area=0.114 ac 80.70% Impervious Runoff Depth>4.03"
Flow Length=159' Tc=5.7 min CN=93 Runoff=0.51 cfs 0.038 af

Subcatchment 304: TO CB3 Runoff Area=0.184 ac 73.91% Impervious Runoff Depth>3.92"
Flow Length=175' Tc=6.2 min CN=92 Runoff=0.80 cfs 0.060 af

Subcatchment 305: TO CB4 Runoff Area=0.170 ac 69.41% Impervious Runoff Depth>3.81"
Flow Length=165' Tc=4.5 min CN=91 Runoff=0.77 cfs 0.054 af

Subcatchment 306: TO RB2 Runoff Area=0.190 ac 21.05% Impervious Runoff Depth>2.92"
Flow Length=190' Tc=5.6 min CN=82 Runoff=0.66 cfs 0.046 af

Subcatchment 307: TO WQS1 Runoff Area=1.081 ac 7.59% Impervious Runoff Depth>0.89"
Flow Length=570' Tc=21.2 min CN=55 Runoff=0.58 cfs 0.080 af

Subcatchment 308: TO HW3 Runoff Area=0.484 ac 4.96% Impervious Runoff Depth>1.26"
Flow Length=440' Tc=20.4 min CN=61 Runoff=0.43 cfs 0.051 af

Subcatchment 309: TO CB6 Runoff Area=0.128 ac 66.41% Impervious Runoff Depth>3.92"
Flow Length=97' Tc=7.5 min CN=92 Runoff=0.53 cfs 0.042 af

Subcatchment 401: TO CB7 Runoff Area=0.144 ac 54.86% Impervious Runoff Depth>3.71"
Flow Length=150' Tc=7.4 min CN=90 Runoff=0.58 cfs 0.045 af

Subcatchment 402: TO CB8 Runoff Area=0.210 ac 9.05% Impervious Runoff Depth>2.74"
Flow Length=143' Tc=11.5 min CN=80 Runoff=0.56 cfs 0.048 af

Subcatchment E2S: TO EXIST. POND Runoff Area=18.684 ac 12.41% Impervious Runoff Depth>1.26"
Flow Length=550' Tc=26.5 min CN=61 Runoff=14.87 cfs 1.959 af

Reach 301R: 18" TEE Avg. Flow Depth=0.38' Max Vel=2.42 fps Inflow=0.85 cfs 0.091 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=0.85 cfs 0.091 af

Reach 302R: RB1 OUTLET Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=37.0' S=0.0081 '/' Capacity=3.25 cfs Outflow=0.00 cfs 0.000 af

Reach 303R: 18" TEE Avg. Flow Depth=0.52' Max Vel=2.87 fps Inflow=1.55 cfs 0.114 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=1.55 cfs 0.114 af

Reach 304R: WATER QUALITY SWALE Avg. Flow Depth=0.14' Max Vel=0.95 fps Inflow=0.58 cfs 0.080 af
n=0.035 L=100.0' S=0.0080 '/' Capacity=20.52 cfs Outflow=0.58 cfs 0.080 af

Pond 301P: CB1 Peak Elev=30.17' Inflow=0.53 cfs 0.056 af
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=0.53 cfs 0.056 af

Pond 302P: CB2 Peak Elev=28.57' Inflow=0.31 cfs 0.035 af
12.0" Round Culvert n=0.013 L=45.0' S=0.0222 '/' Outflow=0.31 cfs 0.035 af

Pond 303P: DMH 1 Peak Elev=27.21' Inflow=0.85 cfs 0.091 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0580 '/' Outflow=0.85 cfs 0.091 af

Pond 304P: SC-740.1 Peak Elev=27.03' Storage=957 cf Inflow=0.94 cfs 0.095 af
Discarded=0.28 cfs 0.095 af Primary=0.00 cfs 0.000 af Outflow=0.28 cfs 0.095 af

Pond 305P: RB1 Peak Elev=32.25' Storage=500 cf Inflow=0.51 cfs 0.038 af
Discarded=0.08 cfs 0.034 af Primary=0.12 cfs 0.004 af Outflow=0.19 cfs 0.038 af

Pond 306P: CB3 Peak Elev=23.41' Inflow=0.80 cfs 0.060 af
12.0" Round Culvert n=0.013 L=28.0' S=0.0100 '/' Outflow=0.80 cfs 0.060 af

Pond 307P: CB4 Peak Elev=23.32' Inflow=0.77 cfs 0.054 af
12.0" Round Culvert n=0.013 L=11.0' S=0.0200 '/' Outflow=0.77 cfs 0.054 af

Pond 308P: DMH 2 Peak Elev=22.80' Inflow=1.55 cfs 0.114 af
18.0" Round Culvert n=0.013 L=9.0' S=0.0156 '/' Outflow=1.55 cfs 0.114 af

Pond 309P: SC-740.2 Peak Elev=22.65' Storage=1,230 cf Inflow=1.55 cfs 0.114 af
Discarded=0.31 cfs 0.114 af Primary=0.00 cfs 0.000 af Outflow=0.31 cfs 0.114 af

Pond 310P: RB1 Peak Elev=29.20' Storage=662 cf Inflow=0.66 cfs 0.046 af
Discarded=0.12 cfs 0.046 af Primary=0.00 cfs 0.000 af Outflow=0.12 cfs 0.046 af

Pond 311P: HW3 Peak Elev=21.51' Storage=83 cf Inflow=1.00 cfs 0.131 af
12.0" Round Culvert n=0.013 L=14.0' S=0.1000 '/' Outflow=0.99 cfs 0.131 af

Pond 312P: DMH3 Peak Elev=20.10' Inflow=0.99 cfs 0.131 af
15.0" Round Culvert n=0.013 L=118.0' S=0.0040 '/' Outflow=0.99 cfs 0.131 af

Pond 313P: CB6 Peak Elev=19.89' Inflow=0.53 cfs 0.042 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0100 '/' Outflow=0.53 cfs 0.042 af

Pond 314P: DMH4 Peak Elev=19.88' Inflow=1.19 cfs 0.173 af
15.0" Round Culvert n=0.013 L=17.0' S=0.0041 '/' Outflow=1.19 cfs 0.173 af

Pond 401P: CB7 Peak Elev=19.86' Inflow=0.58 cfs 0.045 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0200 '/' Outflow=0.58 cfs 0.045 af

Pond 402P: DMH5 Peak Elev=19.83' Inflow=1.42 cfs 0.217 af
15.0" Round Culvert n=0.013 L=130.0' S=0.0040 '/' Outflow=1.43 cfs 0.217 af

Pond 403P: CB8 Peak Elev=19.78' Inflow=0.56 cfs 0.048 af
8.0" Round Culvert n=0.010 L=11.0' S=0.0200 '/' Outflow=0.56 cfs 0.048 af

Pond 404P: DMH6 Peak Elev=19.67' Inflow=1.93 cfs 0.265 af
Outflow=1.93 cfs 0.265 af

Pond E1P: EXIST. CB Inflow=0.45 cfs 0.029 af
Primary=0.45 cfs 0.029 af

Pond E2P: EXIST. POND Peak Elev=25.97' Storage=6.592 af Inflow=14.99 cfs 1.988 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=0.45 cfs 0.289 af

Link OP1: LOT 34-6 Inflow=1.93 cfs 0.554 af
Primary=1.93 cfs 0.554 af

Total Runoff Area = 22.340 ac Runoff Volume = 2.543 af Average Runoff Depth = 1.37"
85.27% Pervious = 19.050 ac 14.73% Impervious = 3.290 ac

Summary for Subcatchment 101: TO EXIST. CB

Runoff = 0.45 cfs @ 12.05 hrs, Volume= 0.029 af, Depth> 2.48"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.019	70	Woods, Good, HSG C
0.004	98	Roofs, HSG C
0.140	77	Weighted Average
0.119		85.00% Pervious Area
0.021		15.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.3300	0.31		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	100	0.0200	6.38	18.34	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 20.0 & 3.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
3.0	150	Total			

Summary for Subcatchment 301: TO CB1

Runoff = 0.53 cfs @ 12.25 hrs, Volume= 0.056 af, Depth> 1.53"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.021	98	Roofs, HSG A
0.041	98	Paved parking, HSG A
0.028	98	Roofs, HSG C
0.077	98	Paved parking, HSG C
0.060	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.035	74	>75% Grass cover, Good, HSG C
0.024	96	Gravel surface, HSG A
0.436	65	Weighted Average
0.269		61.70% Pervious Area
0.167		38.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.8	120	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	180	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 0.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.8	450	Total			

Summary for Subcatchment 302: TO CB2

Runoff = 0.31 cfs @ 12.26 hrs, Volume= 0.035 af, Depth> 1.13"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.045	98	Paved parking, HSG A
0.004	98	Roofs, HSG A
0.012	98	Roofs, HSG C
0.047	98	Paved parking, HSG C
0.074	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.027	96	Gravel surface, HSG A
0.016	74	>75% Grass cover, Good, HSG C
0.375	59	Weighted Average
0.267		71.20% Pervious Area
0.108		28.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.7	105	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	125	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 0.0 & 50.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.6	380	Total			

Summary for Subcatchment 303: RB1

Runoff = 0.51 cfs @ 12.08 hrs, Volume= 0.038 af, Depth> 4.03"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.021	98	Roofs, HSG C
0.071	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.114	93	Weighted Average
0.022		19.30% Pervious Area
0.092		80.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	17	0.0120	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
1.0	50	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	54	0.0200	4.50	10.13	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
0.1	20	0.1000	5.71	10.00	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.040 Earth, cobble bottom, clean sides
5.7	159	Total			

Summary for Subcatchment 304: TO CB3

Runoff = 0.80 cfs @ 12.09 hrs, Volume= 0.060 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.040	98	Roofs, HSG C
0.008	98	Roofs, HSG D
0.056	98	Paved parking, HSG C
0.032	98	Paved parking, HSG D
0.008	80	>75% Grass cover, Good, HSG D
0.040	74	>75% Grass cover, Good, HSG C
0.184	92	Weighted Average
0.048		26.09% Pervious Area
0.136		73.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	30	0.0180	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	65	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	80	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth

6.2 175 Total

Summary for Subcatchment 305: TO CB4

Runoff = 0.77 cfs @ 12.06 hrs, Volume= 0.054 af, Depth> 3.81"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.014	98	Roofs, HSG C
0.040	98	Paved parking, HSG C
0.030	98	Roofs, HSG D
0.034	98	Paved parking, HSG D
0.022	80	>75% Grass cover, Good, HSG D
0.030	74	>75% Grass cover, Good, HSG C
0.170	91	Weighted Average
0.052		30.59% Pervious Area
0.118		69.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	20	0.0200	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	70	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	75	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
4.5	165	Total			

Summary for Subcatchment 306: TO RB2

Runoff = 0.66 cfs @ 12.08 hrs, Volume= 0.046 af, Depth> 2.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.010	98	Roofs, HSG C
0.030	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.050	74	>75% Grass cover, Good, HSG C
0.190	82	Weighted Average
0.150		78.95% Pervious Area
0.040		21.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.4	40	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	50	0.0180	2.18	1.64	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.1	20	0.1000	5.14	3.86	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.7	70	0.0100	1.63	1.22	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
5.6	190	Total			

Summary for Subcatchment 307: TO WQS1

Runoff = 0.58 cfs @ 12.37 hrs, Volume= 0.080 af, Depth> 0.89"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG A
0.054	98	Roofs, HSG C
0.011	98	Roofs, HSG A
0.055	96	Gravel surface, HSG A
0.200	30	Woods, Good, HSG A
0.405	39	>75% Grass cover, Good, HSG A
0.034	80	>75% Grass cover, Good, HSG D
0.150	74	>75% Grass cover, Good, HSG C
0.155	70	Woods, Good, HSG C
1.081	55	Weighted Average
0.999		92.41% Pervious Area
0.082		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	320	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	100	0.1000	9.56	47.79	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.035 High grass
21.2	570	Total			

Summary for Subcatchment 308: TO HW3

Runoff = 0.43 cfs @ 12.32 hrs, Volume= 0.051 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.005	98	Paved parking, HSG A
0.019	98	Roofs, HSG D
0.010	96	Gravel surface, HSG A
0.080	30	Woods, Good, HSG A
0.110	39	>75% Grass cover, Good, HSG A
0.100	80	>75% Grass cover, Good, HSG D
0.026	74	>75% Grass cover, Good, HSG C
0.094	70	Woods, Good, HSG C
0.040	73	Brush, Good, HSG D
0.484	61	Weighted Average
0.460		95.04% Pervious Area
0.024		4.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.8	240	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	50	0.0080	2.01	5.52	**Trap/Vee/Rect Channel Flow,** Bot.W=4.00' D=0.50' Z= 3.0 '/' Top.W=7.00' n= 0.035 High grass
20.4	440	Total			

Summary for Subcatchment 309: TO CB6

Runoff = 0.53 cfs @ 12.10 hrs, Volume= 0.042 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.066	98	Paved parking, HSG D
0.019	98	Roofs, HSG D
0.043	80	>75% Grass cover, Good, HSG D
0.128	92	Weighted Average
0.043		33.59% Pervious Area
0.085		66.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	37	0.0150	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	30	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	30	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.5	97	Total			

Summary for Subcatchment 401: TO CB7

Runoff = 0.58 cfs @ 12.10 hrs, Volume= 0.045 af, Depth> 3.71"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.060	98	Paved parking, HSG D
0.065	80	>75% Grass cover, Good, HSG D
0.144	90	Weighted Average
0.065		45.14% Pervious Area
0.079		54.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	64	0.0470	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	36	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.4	150	Total			

Summary for Subcatchment 402: TO CB8

Runoff = 0.56 cfs @ 12.16 hrs, Volume= 0.048 af, Depth> 2.74"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.091	77	Woods, Good, HSG D
0.210	80	Weighted Average
0.191		90.95% Pervious Area
0.019		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	43	0.0234	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	100	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	143	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 14.87 cfs @ 12.41 hrs, Volume= 1.959 af, Depth> 1.26"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 10-Year Rainfall=4.83"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
0.065	98	Roofs, HSG C
1.596	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
0.024	98	Roofs, HSG A
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
1.759	39	>75% Grass cover, Good, HSG A
4.700	32	Woods/grass comb., Good, HSG A
2.800	30	Woods, Good, HSG A
18.684	61	Weighted Average
16.365		87.59% Pervious Area
2.319		12.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

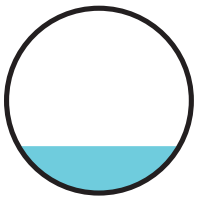
Summary for Reach 301R: 18" TEE

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 1.35" for 10-Year event
Inflow = 0.85 cfs @ 12.25 hrs, Volume= 0.091 af
Outflow = 0.85 cfs @ 12.25 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.42 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.06 fps, Avg. Travel Time= 0.0 min

Peak Storage= 1 cf @ 12.25 hrs
Average Depth at Peak Storage= 0.38'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 26.51', Outlet Invert= 26.50'



Summary for Reach 302R: RB1 OUTLET

Inflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 2.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 3.25 cfs

2.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 5.00'
Length= 37.0' Slope= 0.0081 '/'
Inlet Invert= 32.10', Outlet Invert= 31.80'

‡

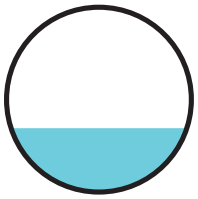
Summary for Reach 303R: 18" TEE

Inflow Area =		0.354 ac, 71.75% Impervious, Inflow Depth >			3.87" for 10-Year event
Inflow	=	1.55 cfs @	12.08 hrs,	Volume=	0.114 af
Outflow	=	1.55 cfs @	12.08 hrs,	Volume=	0.114 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 2.87 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.94 fps, Avg. Travel Time= 0.1 min

Peak Storage= 2 cf @ 12.08 hrs
Average Depth at Peak Storage= 0.52'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 22.01', Outlet Invert= 22.00'



Summary for Reach 304R: WATER QUALITY SWALE

Inflow Area = 1.625 ac, 23.14% Impervious, Inflow Depth > 0.59" for 10-Year event
Inflow = 0.58 cfs @ 12.37 hrs, Volume= 0.080 af
Outflow = 0.58 cfs @ 12.39 hrs, Volume= 0.080 af, Atten= 0%, Lag= 1.3 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 0.95 fps, Min. Travel Time= 1.8 min
Avg. Velocity = 0.41 fps, Avg. Travel Time= 4.1 min

Peak Storage= 61 cf @ 12.39 hrs
Average Depth at Peak Storage= 0.14'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 20.52 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0080 '/'
Inlet Invert= 24.80', Outlet Invert= 24.00'

‡

Summary for Pond 301P: CB1

Inflow Area = 0.436 ac, 38.30% Impervious, Inflow Depth > 1.53" for 10-Year event
Inflow = 0.53 cfs @ 12.25 hrs, Volume= 0.056 af
Outflow = 0.53 cfs @ 12.25 hrs, Volume= 0.056 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.25 hrs, Volume= 0.056 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 30.17' @ 12.25 hrs
Flood Elev= 33.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.80' / 29.60' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.53 cfs @ 12.25 hrs HW=30.16' TW=27.21' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.53 cfs @ 2.06 fps)

Summary for Pond 302P: CB2

Inflow Area = 0.375 ac, 28.80% Impervious, Inflow Depth > 1.13" for 10-Year event
Inflow = 0.31 cfs @ 12.26 hrs, Volume= 0.035 af
Outflow = 0.31 cfs @ 12.26 hrs, Volume= 0.035 af, Atten= 0%, Lag= 0.0 min
Primary = 0.31 cfs @ 12.26 hrs, Volume= 0.035 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 28.57' @ 12.26 hrs
Flood Elev= 32.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.30'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.30' / 27.30' S= 0.0222 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.31 cfs @ 12.26 hrs HW=28.57' TW=27.21' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.31 cfs @ 1.78 fps)

Summary for Pond 303P: DMH 1

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 1.35" for 10-Year event
Inflow = 0.85 cfs @ 12.25 hrs, Volume= 0.091 af
Outflow = 0.85 cfs @ 12.25 hrs, Volume= 0.091 af, Atten= 0%, Lag= 0.0 min
Primary = 0.85 cfs @ 12.25 hrs, Volume= 0.091 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 27.21' @ 12.25 hrs
Flood Elev= 34.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	26.80'	**18.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 26.80' / 26.51' S= 0.0580 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=0.84 cfs @ 12.25 hrs HW=27.21' TW=26.89' (Dynamic Tailwater)
↑**1=Culvert** (Inlet Controls 0.84 cfs @ 2.17 fps)

Summary for Pond 304P: SC-740.1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.925 ac, 39.68% Impervious, Inflow Depth > 1.24" for 10-Year event
Inflow = 0.94 cfs @ 12.28 hrs, Volume= 0.095 af
Outflow = 0.28 cfs @ 12.81 hrs, Volume= 0.095 af, Atten= 70%, Lag= 31.9 min
Discarded = 0.28 cfs @ 12.81 hrs, Volume= 0.095 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 27.03' @ 12.81 hrs Surf.Area= 1,555 sf Storage= 957 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 22.2 min (894.2 - 872.0)

Volume	Invert	Avail.Storage	Storage Description
#1A	26.00'	1,406 cf	**25.25'W x 60.58'L x 3.50'H Field A** 5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids
#2A	26.50'	1,838 cf	**ADS_StormTech SC-740 +Cap** x 40 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 8 Chambers
#3	27.00'	514 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,758 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	25	0	0	25
31.00	25	100	100	96
32.00	400	175	275	474
32.50	560	239	514	638

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.00'	**7.000 in/hr Exfiltration over Wetted area from 23.99' - 27.50'** Excluded Wetted area = 0 sf
#2	Primary	28.83'	**8.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.83' / 28.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.28 cfs @ 12.81 hrs HW=27.03' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.28 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=26.00' TW=25.50' (Dynamic Tailwater)
└**2=Culvert** (Controls 0.00 cfs)

Summary for Pond 305P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.114 ac, 80.70% Impervious, Inflow Depth > 4.03" for 10-Year event
Inflow = 0.51 cfs @ 12.08 hrs, Volume= 0.038 af
Outflow = 0.19 cfs @ 12.32 hrs, Volume= 0.038 af, Atten= 62%, Lag= 14.2 min
Discarded = 0.08 cfs @ 12.32 hrs, Volume= 0.034 af
Primary = 0.12 cfs @ 12.32 hrs, Volume= 0.004 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 32.25' @ 12.32 hrs Surf.Area= 475 sf Storage= 500 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 56.7 min (835.2 - 778.5)

Volume	Invert	Avail.Storage	Storage Description
#1	27.20'	632 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.20	170	0.0	0	0	170
27.21	170	25.0	0	0	170
31.19	170	25.0	169	170	354
31.20	170	100.0	2	171	355
32.00	400	100.0	222	393	590
32.50	560	100.0	239	632	754

Device	Routing	Invert	Outlet Devices
#1	Discarded	27.20'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	31.90'	**1.6" W x 1.6" H Vert. Orifice/Grate** C= 0.600
#3	Primary	32.20'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.08 cfs @ 12.32 hrs HW=32.25' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.08 cfs)

Primary OutFlow Max=0.12 cfs @ 12.32 hrs HW=32.25' TW=26.62' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 0.05 cfs @ 2.53 fps)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.07 cfs @ 0.52 fps)

Summary for Pond 306P: CB3

Inflow Area = 0.184 ac, 73.91% Impervious, Inflow Depth > 3.92" for 10-Year event
Inflow = 0.80 cfs @ 12.09 hrs, Volume= 0.060 af
Outflow = 0.80 cfs @ 12.09 hrs, Volume= 0.060 af, Atten= 0%, Lag= 0.0 min
Primary = 0.80 cfs @ 12.09 hrs, Volume= 0.060 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.41' @ 12.09 hrs
Flood Elev= 26.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.93'	**12.0" Round Culvert** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.93' / 22.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.79 cfs @ 12.09 hrs HW=23.41' TW=22.79' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.79 cfs @ 3.09 fps)

Summary for Pond 307P: CB4

Inflow Area = 0.170 ac, 69.41% Impervious, Inflow Depth > 3.81" for 10-Year event
Inflow = 0.77 cfs @ 12.06 hrs, Volume= 0.054 af
Outflow = 0.77 cfs @ 12.06 hrs, Volume= 0.054 af, Atten= 0%, Lag= 0.0 min
Primary = 0.77 cfs @ 12.06 hrs, Volume= 0.054 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.32' @ 12.06 hrs
Flood Elev= 26.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.87'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.87' / 22.65' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.76 cfs @ 12.06 hrs HW=23.32' TW=22.79' (Dynamic Tailwater)
1=Culvert (Barrel Controls 0.76 cfs @ 3.27 fps)

Summary for Pond 308P: DMH 2

Inflow Area = 0.354 ac, 71.75% Impervious, Inflow Depth > 3.87" for 10-Year event
Inflow = 1.55 cfs @ 12.08 hrs, Volume= 0.114 af
Outflow = 1.55 cfs @ 12.08 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 1.55 cfs @ 12.08 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 22.80' @ 12.08 hrs
Flood Elev= 26.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.15'	**18.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.15' / 22.01' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=1.54 cfs @ 12.08 hrs HW=22.79' TW=22.53' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 1.54 cfs @ 3.14 fps)

Summary for Pond 309P: SC-740.2

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.544 ac, 54.04% Impervious, Inflow Depth > 2.52" for 10-Year event
Inflow = 1.55 cfs @ 12.08 hrs, Volume= 0.114 af
Outflow = 0.31 cfs @ 12.50 hrs, Volume= 0.114 af, Atten= 80%, Lag= 25.6 min
Discarded = 0.31 cfs @ 12.50 hrs, Volume= 0.114 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 22.65' @ 12.50 hrs Surf.Area= 1,709 sf Storage= 1,230 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 21.8 min (806.5 - 784.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	21.50'	1,566 cf	**25.25'W x 67.70'L x 3.50'H Field A** 5,983 cf Overall - 2,067 cf Embedded = 3,915 cf x 40.0% Voids
#2A	22.00'	2,067 cf	**ADS_StormTech SC-740 +Cap** x 45 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 9 Chambers
#3	24.50'	144 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
24.50	25	0	0	25
26.00	25	38	38	52
26.50	500	106	144	527

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**7.000 in/hr Exfiltration over Wetted area from 21.49' - 25.00'** Excluded Wetted area = 0 sf
#2	Primary	25.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.31 cfs @ 12.50 hrs HW=22.65' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.31 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=21.50' TW=24.80' (Dynamic Tailwater)
└**2=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 310P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.190 ac, 21.05% Impervious, Inflow Depth > 2.92" for 10-Year event
Inflow = 0.66 cfs @ 12.08 hrs, Volume= 0.046 af
Outflow = 0.12 cfs @ 12.54 hrs, Volume= 0.046 af, Atten= 81%, Lag= 27.4 min
Discarded = 0.12 cfs @ 12.54 hrs, Volume= 0.046 af
Primary = 0.00 cfs @ 2.00 hrs, Volume= 0.000 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 29.20' @ 12.54 hrs Surf.Area= 754 sf Storage= 662 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 57.6 min (874.4 - 816.8)

Volume	Invert	Avail.Storage	Storage Description
#1	25.00'	1,596 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	0	0.0	0	0	0
25.01	340	25.0	0	0	340
28.49	340	25.0	296	296	567
28.50	340	100.0	3	299	568
29.00	580	100.0	227	527	811
30.00	1,650	100.0	1,069	1,596	1,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	29.50'	**3.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.12 cfs @ 12.54 hrs HW=29.20' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.12 cfs)

Primary OutFlow Max=0.00 cfs @ 2.00 hrs HW=25.00' TW=21.50' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 311P: HW3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 0.74" for 10-Year event
Inflow = 1.00 cfs @ 12.36 hrs, Volume= 0.131 af
Outflow = 0.99 cfs @ 12.39 hrs, Volume= 0.131 af, Atten= 1%, Lag= 1.7 min
Primary = 0.99 cfs @ 12.39 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.51' @ 12.39 hrs Surf.Area= 317 sf Storage= 83 cf

Plug-Flow detention time= 1.4 min calculated for 0.131 af (100% of inflow)
Center-of-Mass det. time= 1.1 min (900.2 - 899.2)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,517 cf	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	8	0	0
22.00	610	309	309
23.50	1,000	1,208	1,517

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.60' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.99 cfs @ 12.39 hrs HW=21.51' TW=20.10' (Dynamic Tailwater)
↑—**1=Culvert** (Inlet Controls 0.99 cfs @ 2.44 fps)

Summary for Pond 312P: DMH3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 0.74" for 10-Year event
Inflow = 0.99 cfs @ 12.39 hrs, Volume= 0.131 af
Outflow = 0.99 cfs @ 12.39 hrs, Volume= 0.131 af, Atten= 0%, Lag= 0.0 min
Primary = 0.99 cfs @ 12.39 hrs, Volume= 0.131 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 20.10' @ 12.36 hrs
Flood Elev= 21.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.34'	**15.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.34' / 18.87' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.00 cfs @ 12.39 hrs HW=20.10' TW=19.86' (Dynamic Tailwater)
↑—**1=Culvert** (Outlet Controls 1.00 cfs @ 1.84 fps)

Summary for Pond 313P: CB6

Inflow Area = 0.128 ac, 66.41% Impervious, Inflow Depth > 3.92" for 10-Year event
Inflow = 0.53 cfs @ 12.10 hrs, Volume= 0.042 af
Outflow = 0.53 cfs @ 12.10 hrs, Volume= 0.042 af, Atten= 0%, Lag= 0.0 min
Primary = 0.53 cfs @ 12.10 hrs, Volume= 0.042 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.89' @ 12.14 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.14'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.14' / 19.08' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.43 cfs @ 12.10 hrs HW=19.87' TW=19.84' (Dynamic Tailwater)
1=Culvert (Outlet Controls 0.43 cfs @ 0.99 fps)

Summary for Pond 314P: DMH4

Inflow Area = 2.237 ac, 21.68% Impervious, Inflow Depth > 0.93" for 10-Year event
Inflow = 1.19 cfs @ 12.36 hrs, Volume= 0.173 af
Outflow = 1.19 cfs @ 12.36 hrs, Volume= 0.173 af, Atten= 0%, Lag= 0.0 min
Primary = 1.19 cfs @ 12.36 hrs, Volume= 0.173 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.88' @ 12.32 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.83'	**15.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.83' / 18.76' S= 0.0041 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.19 cfs @ 12.36 hrs HW=19.87' TW=19.81' (Dynamic Tailwater)
1=Culvert (Outlet Controls 1.19 cfs @ 1.47 fps)

Summary for Pond 401P: CB7

Inflow Area = 0.144 ac, 54.86% Impervious, Inflow Depth > 3.71" for 10-Year event
Inflow = 0.58 cfs @ 12.10 hrs, Volume= 0.045 af
Outflow = 0.58 cfs @ 12.10 hrs, Volume= 0.045 af, Atten= 0%, Lag= 0.0 min
Primary = 0.58 cfs @ 12.10 hrs, Volume= 0.045 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.86' @ 12.13 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.09'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.09' / 18.97' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.57 cfs @ 12.10 hrs HW=19.85' TW=19.81' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 0.57 cfs @ 1.24 fps)

Summary for Pond 402P: DMH5

Inflow Area = 2.381 ac, 23.69% Impervious, Inflow Depth > 1.09" for 10-Year event
Inflow = 1.42 cfs @ 12.33 hrs, Volume= 0.217 af
Outflow = 1.43 cfs @ 12.32 hrs, Volume= 0.217 af, Atten= 0%, Lag= 0.0 min
Primary = 1.43 cfs @ 12.32 hrs, Volume= 0.217 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.83' @ 12.13 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.72'	**15.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.72' / 18.20' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=1.43 cfs @ 12.32 hrs HW=19.82' TW=19.65' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 1.43 cfs @ 1.66 fps)

Summary for Pond 403P: CB8

Inflow Area = 0.210 ac, 9.05% Impervious, Inflow Depth > 2.74" for 10-Year event
Inflow = 0.56 cfs @ 12.16 hrs, Volume= 0.048 af
Outflow = 0.56 cfs @ 12.16 hrs, Volume= 0.048 af, Atten= 0%, Lag= 0.0 min
Primary = 0.56 cfs @ 12.16 hrs, Volume= 0.048 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.78' @ 12.15 hrs
Flood Elev= 21.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	**8.0" Round Culvert** L= 11.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.00' / 18.78' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=0.56 cfs @ 12.16 hrs HW=19.78' TW=19.67' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.56 cfs @ 1.61 fps)

Summary for Pond 404P: DMH6

Inflow Area = 2.591 ac, 22.50% Impervious, Inflow Depth > 1.23" for 10-Year event
Inflow = 1.93 cfs @ 12.15 hrs, Volume= 0.265 af
Outflow = 1.93 cfs @ 12.15 hrs, Volume= 0.265 af, Atten= 0%, Lag= 0.0 min
Primary = 1.93 cfs @ 12.15 hrs, Volume= 0.265 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 19.67' @ 12.15 hrs
Flood Elev= 21.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.04'	**12.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.04' / 17.93' S= 0.0191 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	19.30'	**12.0" Round Culvert** L= 48.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.30' / 18.90' S= 0.0083 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=1.92 cfs @ 12.15 hrs HW=19.67' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.41 cfs @ 2.70 fps)
2=Culvert (Barrel Controls 0.51 cfs @ 2.88 fps)

Summary for Pond E1P: EXIST. CB

Inflow Area = 0.140 ac, 15.00% Impervious, Inflow Depth > 2.48" for 10-Year event
Inflow = 0.45 cfs @ 12.05 hrs, Volume= 0.029 af
Primary = 0.45 cfs @ 12.05 hrs, Volume= 0.029 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond E2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.749 ac, 13.71% Impervious, Inflow Depth > 1.21" for 10-Year event
Inflow = 14.99 cfs @ 12.41 hrs, Volume= 1.988 af
Outflow = 0.45 cfs @ 24.00 hrs, Volume= 0.289 af, Atten= 97%, Lag= 695.2 min
Primary = 0.45 cfs @ 24.00 hrs, Volume= 0.289 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 25.97' @ 24.00 hrs Surf.Area= 3.690 ac Storage= 6.592 af (1.699 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 295.8 min (1,184.3 - 888.5)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

Primary OutFlow Max=0.45 cfs @ 24.00 hrs HW=25.97' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 0.45 cfs @ 1.77 fps)

Summary for Link OP1: LOT 34-6

Inflow Area = 22.340 ac, 14.73% Impervious, Inflow Depth > 0.30" for 10-Year event
Inflow = 1.93 cfs @ 12.15 hrs, Volume= 0.554 af
Primary = 1.93 cfs @ 12.15 hrs, Volume= 0.554 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

Time span=2.00-24.00 hrs, dt=0.02 hrs, 1101 points x 3
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Subcatchment 101: TO EXIST. CB Runoff Area=0.140 ac 15.00% Impervious Runoff Depth>6.14"
Flow Length=150' Tc=3.0 min CN=77 Runoff=1.11 cfs 0.072 af

Subcatchment 301: TO CB1 Runoff Area=0.436 ac 38.30% Impervious Runoff Depth>4.65"
Flow Length=450' Tc=16.8 min CN=65 Runoff=1.72 cfs 0.169 af

Subcatchment 302: TO CB2 Runoff Area=0.375 ac 28.80% Impervious Runoff Depth>3.92"
Flow Length=380' Tc=16.6 min CN=59 Runoff=1.24 cfs 0.122 af

Subcatchment 303: RB1 Runoff Area=0.114 ac 80.70% Impervious Runoff Depth>8.09"
Flow Length=159' Tc=5.7 min CN=93 Runoff=0.99 cfs 0.077 af

Subcatchment 304: TO CB3 Runoff Area=0.184 ac 73.91% Impervious Runoff Depth>7.97"
Flow Length=175' Tc=6.2 min CN=92 Runoff=1.56 cfs 0.122 af

Subcatchment 305: TO CB4 Runoff Area=0.170 ac 69.41% Impervious Runoff Depth>7.85"
Flow Length=165' Tc=4.5 min CN=91 Runoff=1.52 cfs 0.111 af

Subcatchment 306: TO RB2 Runoff Area=0.190 ac 21.05% Impervious Runoff Depth>6.75"
Flow Length=190' Tc=5.6 min CN=82 Runoff=1.48 cfs 0.107 af

Subcatchment 307: TO WQS1 Runoff Area=1.081 ac 7.59% Impervious Runoff Depth>3.43"
Flow Length=570' Tc=21.2 min CN=55 Runoff=2.79 cfs 0.309 af

Subcatchment 308: TO HW3 Runoff Area=0.484 ac 4.96% Impervious Runoff Depth>4.16"
Flow Length=440' Tc=20.4 min CN=61 Runoff=1.57 cfs 0.168 af

Subcatchment 309: TO CB6 Runoff Area=0.128 ac 66.41% Impervious Runoff Depth>7.97"
Flow Length=97' Tc=7.5 min CN=92 Runoff=1.04 cfs 0.085 af

Subcatchment 401: TO CB7 Runoff Area=0.144 ac 54.86% Impervious Runoff Depth>7.72"
Flow Length=150' Tc=7.4 min CN=90 Runoff=1.15 cfs 0.093 af

Subcatchment 402: TO CB8 Runoff Area=0.210 ac 9.05% Impervious Runoff Depth>6.50"
Flow Length=143' Tc=11.5 min CN=80 Runoff=1.31 cfs 0.114 af

Subcatchment E2S: TO EXIST. POND Runoff Area=18.684 ac 12.41% Impervious Runoff Depth>4.15"
Flow Length=550' Tc=26.5 min CN=61 Runoff=54.17 cfs 6.464 af

Reach 301R: 18" TEE Avg. Flow Depth=0.74' Max Vel=3.41 fps Inflow=2.96 cfs 0.291 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=2.96 cfs 0.291 af

Reach 302R: RB1 OUTLET Avg. Flow Depth=0.00' Max Vel=0.00 fps Inflow=0.00 cfs 0.000 af
n=0.035 L=37.0' S=0.0081 '/' Capacity=3.25 cfs Outflow=0.00 cfs 0.000 af

Reach 303R: 18" TEE Avg. Flow Depth=0.75' Max Vel=3.43 fps Inflow=3.04 cfs 0.233 af
18.0" Round Pipe n=0.013 L=3.0' S=0.0033 '/' Capacity=6.06 cfs Outflow=3.04 cfs 0.233 af

Reach 304R: WATER QUALITY SWALE Avg. Flow Depth=0.39' Max Vel=1.76 fps Inflow=3.87 cfs 0.320 af
n=0.035 L=100.0' S=0.0080 '/' Capacity=20.52 cfs Outflow=3.59 cfs 0.319 af

Pond 301P: CB1 Peak Elev=30.54' Inflow=1.72 cfs 0.169 af
12.0" Round Culvert n=0.013 L=5.0' S=0.0400 '/' Outflow=1.72 cfs 0.169 af

Pond 302P: CB2 Peak Elev=28.88' Inflow=1.24 cfs 0.122 af
12.0" Round Culvert n=0.013 L=45.0' S=0.0222 '/' Outflow=1.24 cfs 0.122 af

Pond 303P: DMH 1 Peak Elev=27.66' Inflow=2.96 cfs 0.291 af
18.0" Round Culvert n=0.013 L=5.0' S=0.0580 '/' Outflow=2.96 cfs 0.291 af

Pond 304P: SC-740.1 Peak Elev=31.84' Storage=3,461 cf Inflow=3.45 cfs 0.317 af
Discarded=0.30 cfs 0.234 af Primary=2.17 cfs 0.083 af Outflow=2.46 cfs 0.317 af

Pond 305P: RB1 Peak Elev=32.43' Storage=591 cf Inflow=0.99 cfs 0.077 af
Discarded=0.09 cfs 0.051 af Primary=0.85 cfs 0.025 af Outflow=0.94 cfs 0.077 af

Pond 306P: CB3 Peak Elev=23.65' Inflow=1.56 cfs 0.122 af
12.0" Round Culvert n=0.013 L=28.0' S=0.0100 '/' Outflow=1.56 cfs 0.122 af

Pond 307P: CB4 Peak Elev=23.56' Inflow=1.52 cfs 0.111 af
12.0" Round Culvert n=0.013 L=11.0' S=0.0200 '/' Outflow=1.52 cfs 0.111 af

Pond 308P: DMH 2 Peak Elev=23.11' Inflow=3.04 cfs 0.233 af
18.0" Round Culvert n=0.013 L=9.0' S=0.0156 '/' Outflow=3.04 cfs 0.233 af

Pond 309P: SC-740.2 Peak Elev=25.87' Storage=3,668 cf Inflow=3.26 cfs 0.253 af
Discarded=0.39 cfs 0.242 af Primary=1.24 cfs 0.011 af Outflow=1.63 cfs 0.253 af

Pond 310P: RB1 Peak Elev=29.72' Storage=1,183 cf Inflow=1.48 cfs 0.107 af
Discarded=0.21 cfs 0.087 af Primary=0.72 cfs 0.020 af Outflow=0.93 cfs 0.107 af

Pond 311P: HW3 Peak Elev=23.31' Storage=1,331 cf Inflow=4.97 cfs 0.487 af
12.0" Round Culvert n=0.013 L=14.0' S=0.1000 '/' Outflow=3.93 cfs 0.487 af

Pond 312P: DMH3 Peak Elev=22.25' Inflow=3.93 cfs 0.487 af
15.0" Round Culvert n=0.013 L=118.0' S=0.0040 '/' Outflow=3.93 cfs 0.487 af

Pond 313P: CB6 Peak Elev=21.60' Inflow=1.04 cfs 0.085 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0100 '/' Outflow=1.04 cfs 0.085 af

Pond 314P: DMH4 Peak Elev=21.58' Inflow=4.17 cfs 0.572 af
15.0" Round Culvert n=0.013 L=17.0' S=0.0041 '/' Outflow=4.16 cfs 0.572 af

Pond 401P: CB7 Peak Elev=21.12' Inflow=1.15 cfs 0.093 af
12.0" Round Culvert n=0.013 L=6.0' S=0.0200 '/' Outflow=1.15 cfs 0.093 af

Pond 402P: DMH5 Peak Elev=21.09' Inflow=4.48 cfs 0.665 af
15.0" Round Culvert n=0.013 L=130.0' S=0.0040 '/' Outflow=4.48 cfs 0.665 af

Pond 403P: CB8 Peak Elev=20.83' Inflow=1.31 cfs 0.114 af
8.0" Round Culvert n=0.010 L=11.0' S=0.0200 '/' Outflow=1.31 cfs 0.114 af

Pond 404P: DMH6 Peak Elev=20.22' Inflow=5.44 cfs 0.778 af
Outflow=5.44 cfs 0.778 af

Pond E1P: EXIST. CB Inflow=1.11 cfs 0.072 af
Primary=1.11 cfs 0.072 af

Pond E2P: EXIST. POND Peak Elev=26.61' Storage=9.044 af Inflow=56.63 cfs 6.618 af
24.0" Round Culvert n=0.012 L=400.0' S=0.0200 '/' Outflow=4.55 cfs 3.454 af

Link OP1: LOT 34-6 Inflow=6.15 cfs 4.233 af
Primary=6.15 cfs 4.233 af

Total Runoff Area = 22.340 ac Runoff Volume = 8.012 af Average Runoff Depth = 4.30"
85.27% Pervious = 19.050 ac 14.73% Impervious = 3.290 ac

Summary for Subcatchment 101: TO EXIST. CB

Runoff = 1.11 cfs @ 12.05 hrs, Volume= 0.072 af, Depth> 6.14"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG C
0.100	74	>75% Grass cover, Good, HSG C
0.019	70	Woods, Good, HSG C
0.004	98	Roofs, HSG C
0.140	77	Weighted Average
0.119		85.00% Pervious Area
0.021		15.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
2.7	50	0.3300	0.31		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	100	0.0200	6.38	18.34	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 20.0 & 3.0 '/' Top.W=11.50' n= 0.013 Asphalt, smooth
3.0	150	Total			

Summary for Subcatchment 301: TO CB1

Runoff = 1.72 cfs @ 12.23 hrs, Volume= 0.169 af, Depth> 4.65"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.021	98	Roofs, HSG A
0.041	98	Paved parking, HSG A
0.028	98	Roofs, HSG C
0.077	98	Paved parking, HSG C
0.060	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.035	74	>75% Grass cover, Good, HSG C
0.024	96	Gravel surface, HSG A
0.436	65	Weighted Average
0.269		61.70% Pervious Area
0.167		38.30% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.8	120	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.3	180	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 50.0 & 0.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.8	450	Total			

Summary for Subcatchment 302: TO CB2

Runoff = 1.24 cfs @ 12.24 hrs, Volume= 0.122 af, Depth> 3.92"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.045	98	Paved parking, HSG A
0.004	98	Roofs, HSG A
0.012	98	Roofs, HSG C
0.047	98	Paved parking, HSG C
0.074	39	>75% Grass cover, Good, HSG A
0.050	30	Woods, Good, HSG A
0.100	32	Woods/grass comb., Good, HSG A
0.027	96	Gravel surface, HSG A
0.016	74	>75% Grass cover, Good, HSG C
0.375	59	Weighted Average
0.267		71.20% Pervious Area
0.108		28.80% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
15.7	150	0.1000	0.16		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
0.7	105	0.2500	2.50		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	125	0.0400	8.95	55.95	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 0.0 & 50.0 '/' Top.W=25.00' n= 0.013 Asphalt, smooth
16.6	380	Total			

Summary for Subcatchment 303: RB1

Runoff = 0.99 cfs @ 12.08 hrs, Volume= 0.077 af, Depth> 8.09"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.021	98	Roofs, HSG C
0.071	98	Paved parking, HSG C
0.022	74	>75% Grass cover, Good, HSG C
0.114	93	Weighted Average
0.022		19.30% Pervious Area
0.092		80.70% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.3	17	0.0120	0.07		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
1.0	50	0.0150	0.86		**Shallow Concentrated Flow,** Short Grass Pasture Kv= 7.0 fps
0.1	18	0.0250	3.21		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	54	0.0200	4.50	10.13	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
0.1	20	0.1000	5.71	10.00	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=0.50' Z= 3.0 '/' Top.W=5.00' n= 0.040 Earth, cobble bottom, clean sides
5.7	159	Total			

Summary for Subcatchment 304: TO CB3

Runoff = 1.56 cfs @ 12.09 hrs, Volume= 0.122 af, Depth> 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.040	98	Roofs, HSG C
0.008	98	Roofs, HSG D
0.056	98	Paved parking, HSG C
0.032	98	Paved parking, HSG D
0.008	80	>75% Grass cover, Good, HSG D
0.040	74	>75% Grass cover, Good, HSG C
0.184	92	Weighted Average
0.048		26.09% Pervious Area
0.136		73.91% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.7	30	0.0180	0.09		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	65	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	80	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth

6.2	175	Total

Summary for Subcatchment 305: TO CB4

Runoff = 1.52 cfs @ 12.06 hrs, Volume= 0.111 af, Depth> 7.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.014	98	Roofs, HSG C
0.040	98	Paved parking, HSG C
0.030	98	Roofs, HSG D
0.034	98	Paved parking, HSG D
0.022	80	>75% Grass cover, Good, HSG D
0.030	74	>75% Grass cover, Good, HSG C
0.170	91	Weighted Average
0.052		30.59% Pervious Area
0.118		69.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	20	0.0200	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.3	70	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.2	75	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
4.5	165	Total			

Summary for Subcatchment 306: TO RB2

Runoff = 1.48 cfs @ 12.08 hrs, Volume= 0.107 af, Depth> 6.75"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.010	98	Roofs, HSG C
0.030	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.050	74	>75% Grass cover, Good, HSG C
0.190	82	Weighted Average
0.150		78.95% Pervious Area
0.040		21.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
4.0	10	0.0050	0.04		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.4	40	0.0100	1.50		**Shallow Concentrated Flow,** Grassed Waterway Kv= 15.0 fps
0.4	50	0.0180	2.18	1.64	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.1	20	0.1000	5.14	3.86	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
0.7	70	0.0100	1.63	1.22	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.50' Z= 3.0 '/' Top.W=3.00' n= 0.035 High grass
5.6	190	Total			

Summary for Subcatchment 307: TO WQS1

Runoff = 2.79 cfs @ 12.31 hrs, Volume= 0.309 af, Depth> 3.43"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.017	98	Paved parking, HSG A
0.054	98	Roofs, HSG C
0.011	98	Roofs, HSG A
0.055	96	Gravel surface, HSG A
0.200	30	Woods, Good, HSG A
0.405	39	>75% Grass cover, Good, HSG A
0.034	80	>75% Grass cover, Good, HSG D
0.150	74	>75% Grass cover, Good, HSG C
0.155	70	Woods, Good, HSG C
1.081	55	Weighted Average
0.999		92.41% Pervious Area
0.082		7.59% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	320	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.2	100	0.1000	9.56	47.79	**Trap/Vee/Rect Channel Flow,** Bot.W=2.00' D=1.00' Z= 3.0 '/' Top.W=8.00' n= 0.035 High grass
21.2	570	Total			

Summary for Subcatchment 308: TO HW3

Runoff = 1.57 cfs @ 12.29 hrs, Volume= 0.168 af, Depth> 4.16"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.005	98	Paved parking, HSG A
0.019	98	Roofs, HSG D
0.010	96	Gravel surface, HSG A
0.080	30	Woods, Good, HSG A
0.110	39	>75% Grass cover, Good, HSG A
0.100	80	>75% Grass cover, Good, HSG D
0.026	74	>75% Grass cover, Good, HSG C
0.094	70	Woods, Good, HSG C
0.040	73	Brush, Good, HSG D
0.484	61	Weighted Average
0.460		95.04% Pervious Area
0.024		4.96% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
17.2	150	0.0800	0.15		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
2.8	240	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
0.4	50	0.0080	2.01	5.52	**Trap/Vee/Rect Channel Flow,** Bot.W=4.00' D=0.50' Z= 3.0 '/' Top.W=7.00' n= 0.035 High grass
20.4	440	Total			

Summary for Subcatchment 309: TO CB6

Runoff = 1.04 cfs @ 12.10 hrs, Volume= 0.085 af, Depth> 7.97"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.066	98	Paved parking, HSG D
0.019	98	Roofs, HSG D
0.043	80	>75% Grass cover, Good, HSG D
0.128	92	Weighted Average
0.043		33.59% Pervious Area
0.085		66.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.3	37	0.0150	0.08		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	30	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	30	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 0.0 & 50.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.5	97	Total			

Summary for Subcatchment 401: TO CB7

Runoff = 1.15 cfs @ 12.10 hrs, Volume= 0.093 af, Depth> 7.72"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.060	98	Paved parking, HSG D
0.065	80	>75% Grass cover, Good, HSG D
0.144	90	Weighted Average
0.065		45.14% Pervious Area
0.079		54.86% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
7.2	64	0.0470	0.15		**Sheet Flow,** Grass: Dense n= 0.240 P2= 3.15"
0.1	36	0.0420	4.16		**Shallow Concentrated Flow,** Paved Kv= 20.3 fps
0.1	50	0.0420	6.53	14.68	**Trap/Vee/Rect Channel Flow,** Bot.W=0.00' D=0.30' Z= 50.0 & 0.0 '/' Top.W=15.00' n= 0.013 Asphalt, smooth
7.4	150	Total			

Summary for Subcatchment 402: TO CB8

Runoff = 1.31 cfs @ 12.16 hrs, Volume= 0.114 af, Depth> 6.50"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.019	98	Roofs, HSG D
0.100	80	>75% Grass cover, Good, HSG D
0.091	77	Woods, Good, HSG D
0.210	80	Weighted Average
0.191		90.95% Pervious Area
0.019		9.05% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.3	43	0.0234	0.07		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
1.2	100	0.0800	1.41		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
11.5	143	Total			

Summary for Subcatchment E2S: TO EXIST. POND

Runoff = 54.17 cfs @ 12.38 hrs, Volume= 6.464 af, Depth> 4.15"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs
Type III 24-hr 100-Year Rainfall=8.94"

Area (ac)	CN	Description
0.400	94	Urban commercial, 85% imp, HSG C
3.650	98	Water Surface, 0% imp, HSG D
0.560	98	Paved parking, HSG D
0.300	80	>75% Grass cover, Good, HSG D
0.200	77	Woods, Good, HSG D
0.880	98	Paved parking, HSG C
0.065	98	Roofs, HSG C
1.596	74	>75% Grass cover, Good, HSG C
1.000	70	Woods, Good, HSG C
0.024	98	Roofs, HSG A
0.450	98	Paved parking, HSG A
0.300	96	Gravel surface, HSG A
1.759	39	>75% Grass cover, Good, HSG A
4.700	32	Woods/grass comb., Good, HSG A
2.800	30	Woods, Good, HSG A
18.684	61	Weighted Average
16.365		87.59% Pervious Area
2.319		12.41% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
22.7	150	0.0400	0.11		**Sheet Flow,** Woods: Light underbrush n= 0.400 P2= 3.15"
3.8	400	0.1200	1.73		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps
26.5	550	Total			

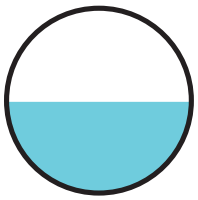
Summary for Reach 301R: 18" TEE

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 4.31" for 100-Year event
Inflow = 2.96 cfs @ 12.23 hrs, Volume= 0.291 af
Outflow = 2.96 cfs @ 12.23 hrs, Volume= 0.291 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.41 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.38 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 12.23 hrs
Average Depth at Peak Storage= 0.74'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 26.51', Outlet Invert= 26.50'



Summary for Reach 302R: RB1 OUTLET

Inflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af
Outflow	=	0.00 cfs @	2.00 hrs,	Volume=	0.000 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 0.00 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 0.00 fps, Avg. Travel Time= 0.0 min

Peak Storage= 0 cf @ 2.00 hrs
Average Depth at Peak Storage= 0.00'
Bank-Full Depth= 0.50' Flow Area= 1.8 sf, Capacity= 3.25 cfs

2.00' x 0.50' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 5.00'
Length= 37.0' Slope= 0.0081 '/'
Inlet Invert= 32.10', Outlet Invert= 31.80'

‡

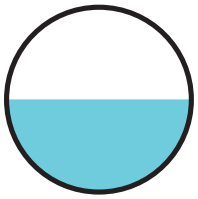
Summary for Reach 303R: 18" TEE

Inflow Area =		0.354 ac, 71.75% Impervious, Inflow Depth > 7.91" for 100-Year event			
Inflow	=	3.04 cfs @	12.07 hrs,	Volume=	0.233 af
Outflow	=	3.04 cfs @	12.07 hrs,	Volume=	0.233 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 3.43 fps, Min. Travel Time= 0.0 min
Avg. Velocity = 1.15 fps, Avg. Travel Time= 0.0 min

Peak Storage= 3 cf @ 12.07 hrs
Average Depth at Peak Storage= 0.75'
Bank-Full Depth= 1.50' Flow Area= 1.8 sf, Capacity= 6.06 cfs

18.0" Round Pipe
n= 0.013 Corrugated PE, smooth interior
Length= 3.0' Slope= 0.0033 '/'
Inlet Invert= 22.01', Outlet Invert= 22.00'



Summary for Reach 304R: WATER QUALITY SWALE

Inflow Area = 1.625 ac, 23.14% Impervious, Inflow Depth > 2.36" for 100-Year event
Inflow = 3.87 cfs @ 12.38 hrs, Volume= 0.320 af
Outflow = 3.59 cfs @ 12.40 hrs, Volume= 0.319 af, Atten= 7%, Lag= 1.1 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Max. Velocity= 1.76 fps, Min. Travel Time= 0.9 min
Avg. Velocity = 0.61 fps, Avg. Travel Time= 2.7 min

Peak Storage= 204 cf @ 12.40 hrs
Average Depth at Peak Storage= 0.39'
Bank-Full Depth= 1.00' Flow Area= 7.0 sf, Capacity= 20.52 cfs

4.00' x 1.00' deep channel, n= 0.035 High grass
Side Slope Z-value= 3.0 '/' Top Width= 10.00'
Length= 100.0' Slope= 0.0080 '/'
Inlet Invert= 24.80', Outlet Invert= 24.00'

‡

Summary for Pond 301P: CB1

Inflow Area = 0.436 ac, 38.30% Impervious, Inflow Depth > 4.65" for 100-Year event
Inflow = 1.72 cfs @ 12.23 hrs, Volume= 0.169 af
Outflow = 1.72 cfs @ 12.23 hrs, Volume= 0.169 af, Atten= 0%, Lag= 0.0 min
Primary = 1.72 cfs @ 12.23 hrs, Volume= 0.169 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 30.54' @ 12.23 hrs
Flood Elev= 33.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	29.80'	**12.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 29.80' / 29.60' S= 0.0400 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.72 cfs @ 12.23 hrs HW=30.53' TW=27.66' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.72 cfs @ 3.88 fps)

Summary for Pond 302P: CB2

Inflow Area = 0.375 ac, 28.80% Impervious, Inflow Depth > 3.92" for 100-Year event
Inflow = 1.24 cfs @ 12.24 hrs, Volume= 0.122 af
Outflow = 1.24 cfs @ 12.24 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.24 cfs @ 12.24 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 28.88' @ 12.24 hrs
Flood Elev= 32.65'

Device	Routing	Invert	Outlet Devices
#1	Primary	28.30'	**12.0" Round Culvert** L= 45.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.30' / 27.30' S= 0.0222 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.24 cfs @ 12.24 hrs HW=28.88' TW=27.66' (Dynamic Tailwater)
1=Culvert (Inlet Controls 1.24 cfs @ 2.60 fps)

Summary for Pond 303P: DMH 1

Inflow Area = 0.811 ac, 33.91% Impervious, Inflow Depth > 4.31" for 100-Year event
Inflow = 2.96 cfs @ 12.23 hrs, Volume= 0.291 af
Outflow = 2.96 cfs @ 12.23 hrs, Volume= 0.291 af, Atten= 0%, Lag= 0.0 min
Primary = 2.96 cfs @ 12.23 hrs, Volume= 0.291 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 27.66' @ 12.23 hrs
Flood Elev= 34.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	26.80'	**18.0" Round Culvert** L= 5.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 26.80' / 26.51' S= 0.0580 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=2.96 cfs @ 12.23 hrs HW=27.66' TW=27.25' (Dynamic Tailwater)
↑**1=Culvert** (Outlet Controls 2.96 cfs @ 4.07 fps)

Summary for Pond 304P: SC-740.1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.925 ac, 39.68% Impervious, Inflow Depth > 4.11" for 100-Year event
Inflow = 3.45 cfs @ 12.21 hrs, Volume= 0.317 af
Outflow = 2.46 cfs @ 12.40 hrs, Volume= 0.317 af, Atten= 29%, Lag= 11.4 min
Discarded = 0.30 cfs @ 12.14 hrs, Volume= 0.234 af
Primary = 2.17 cfs @ 12.40 hrs, Volume= 0.083 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 31.84' @ 12.40 hrs Surf.Area= 1,837 sf Storage= 3,461 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 71.0 min (905.8 - 834.7)

Volume	Invert	Avail.Storage	Storage Description
#1A	26.00'	1,406 cf	**25.25'W x 60.58'L x 3.50'H Field A** 5,353 cf Overall - 1,838 cf Embedded = 3,516 cf x 40.0% Voids
#2A	26.50'	1,838 cf	**ADS_StormTech SC-740 +Cap** x 40 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 8 Chambers
#3	27.00'	514 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,758 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.00	25	0	0	25
31.00	25	100	100	96
32.00	400	175	275	474
32.50	560	239	514	638

Device	Routing	Invert	Outlet Devices
#1	Discarded	26.00'	**7.000 in/hr Exfiltration over Wetted area from 23.99' - 27.50'** Excluded Wetted area = 0 sf
#2	Primary	28.83'	**8.0" Round Culvert** L= 55.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 28.83' / 28.50' S= 0.0060 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.35 sf

Discarded OutFlow Max=0.30 cfs @ 12.14 hrs HW=27.54' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.30 cfs)

Primary OutFlow Max=2.17 cfs @ 12.40 hrs HW=31.84' TW=26.00' (Dynamic Tailwater)
└**2=Culvert** (Barrel Controls 2.17 cfs @ 6.20 fps)

Summary for Pond 305P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.114 ac, 80.70% Impervious, Inflow Depth > 8.09" for 100-Year event
Inflow = 0.99 cfs @ 12.08 hrs, Volume= 0.077 af
Outflow = 0.94 cfs @ 12.11 hrs, Volume= 0.077 af, Atten= 5%, Lag= 1.6 min
Discarded = 0.09 cfs @ 12.11 hrs, Volume= 0.051 af
Primary = 0.85 cfs @ 12.11 hrs, Volume= 0.025 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 32.43' @ 12.11 hrs Surf.Area= 535 sf Storage= 591 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 47.7 min (809.6 - 761.9)

Volume	Invert	Avail.Storage	Storage Description
#1	27.20'	632 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
27.20	170	0.0	0	0	170
27.21	170	25.0	0	0	170
31.19	170	25.0	169	170	354
31.20	170	100.0	2	171	355
32.00	400	100.0	222	393	590
32.50	560	100.0	239	632	754

Device	Routing	Invert	Outlet Devices
#1	Discarded	27.20'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	31.90'	**1.6" W x 1.6" H Vert. Orifice/Grate** C= 0.600
#3	Primary	32.20'	**3.0' long x 3.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 Coef. (English) 2.44 2.58 2.68 2.67 2.65 2.64 2.64 2.68 2.68 2.72 2.81 2.92 2.97 3.07 3.32

Discarded OutFlow Max=0.09 cfs @ 12.11 hrs HW=32.43' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.09 cfs)

Primary OutFlow Max=0.85 cfs @ 12.11 hrs HW=32.43' TW=27.26' (Dynamic Tailwater)
├**2=Orifice/Grate** (Orifice Controls 0.06 cfs @ 3.26 fps)
└**3=Broad-Crested Rectangular Weir** (Weir Controls 0.79 cfs @ 1.17 fps)

Summary for Pond 306P: CB3

Inflow Area = 0.184 ac, 73.91% Impervious, Inflow Depth > 7.97" for 100-Year event
Inflow = 1.56 cfs @ 12.09 hrs, Volume= 0.122 af
Outflow = 1.56 cfs @ 12.09 hrs, Volume= 0.122 af, Atten= 0%, Lag= 0.0 min
Primary = 1.56 cfs @ 12.09 hrs, Volume= 0.122 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.65' @ 12.09 hrs
Flood Elev= 26.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.93'	**12.0" Round Culvert** L= 28.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.93' / 22.65' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.55 cfs @ 12.09 hrs HW=23.65' TW=23.10' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.55 cfs @ 3.57 fps)

Summary for Pond 307P: CB4

Inflow Area = 0.170 ac, 69.41% Impervious, Inflow Depth > 7.85" for 100-Year event
Inflow = 1.52 cfs @ 12.06 hrs, Volume= 0.111 af
Outflow = 1.52 cfs @ 12.06 hrs, Volume= 0.111 af, Atten= 0%, Lag= 0.0 min
Primary = 1.52 cfs @ 12.06 hrs, Volume= 0.111 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.56' @ 12.06 hrs
Flood Elev= 26.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.87'	**12.0" Round Culvert** L= 11.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.87' / 22.65' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.51 cfs @ 12.06 hrs HW=23.56' TW=23.10' (Dynamic Tailwater)
1=Culvert (Barrel Controls 1.51 cfs @ 3.70 fps)

Summary for Pond 308P: DMH 2

Inflow Area = 0.354 ac, 71.75% Impervious, Inflow Depth > 7.91" for 100-Year event
Inflow = 3.04 cfs @ 12.07 hrs, Volume= 0.233 af
Outflow = 3.04 cfs @ 12.07 hrs, Volume= 0.233 af, Atten= 0%, Lag= 0.0 min
Primary = 3.04 cfs @ 12.07 hrs, Volume= 0.233 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.11' @ 12.07 hrs
Flood Elev= 26.80'

Device	Routing	Invert	Outlet Devices
#1	Primary	22.15'	**18.0" Round Culvert** L= 9.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 22.15' / 22.01' S= 0.0156 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.77 sf

Primary OutFlow Max=3.02 cfs @ 12.07 hrs HW=23.10' TW=22.76' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 3.02 cfs @ 3.64 fps)

Summary for Pond 309P: SC-740.2

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.544 ac, 54.04% Impervious, Inflow Depth > 5.58" for 100-Year event
Inflow = 3.26 cfs @ 12.10 hrs, Volume= 0.253 af
Outflow = 1.63 cfs @ 12.39 hrs, Volume= 0.253 af, Atten= 50%, Lag= 17.1 min
Discarded = 0.39 cfs @ 12.38 hrs, Volume= 0.242 af
Primary = 1.24 cfs @ 12.39 hrs, Volume= 0.011 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 25.87' @ 12.39 hrs Surf.Area= 1,734 sf Storage= 3,668 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 67.2 min (831.8 - 764.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	21.50'	1,566 cf	**25.25'W x 67.70'L x 3.50'H Field A** 5,983 cf Overall - 2,067 cf Embedded = 3,915 cf x 40.0% Voids
#2A	22.00'	2,067 cf	**ADS_StormTech SC-740 +Cap** x 45 Inside #1 Effective Size= 44.6"W x 30.0"H => 6.45 sf x 7.12'L = 45.9 cf Overall Size= 51.0"W x 30.0"H x 7.56'L with 0.44' Overlap 5 Rows of 9 Chambers
#3	24.50'	144 cf	**Custom Stage Data (Conic)**Listed below (Recalc)
		3,777 cf	Total Available Storage

Storage Group A created with Chamber Wizard

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
24.50	25	0	0	25
26.00	25	38	38	52
26.50	500	106	144	527

Device	Routing	Invert	Outlet Devices
#1	Discarded	21.50'	**7.000 in/hr Exfiltration over Wetted area from 21.49' - 25.00'** Excluded Wetted area = 0 sf
#2	Primary	25.00'	**8.0" Vert. Orifice/Grate** C= 0.600

Discarded OutFlow Max=0.39 cfs @ 12.38 hrs HW=25.83' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.39 cfs)

Primary OutFlow Max=1.10 cfs @ 12.39 hrs HW=25.76' TW=25.18' (Dynamic Tailwater)
└**2=Orifice/Grate** (Orifice Controls 1.10 cfs @ 3.16 fps)

Summary for Pond 310P: RB1

ksat > 100 µm/sec = 14 in/hr; Apply FS = 2 => ksat=7 in/hr

Inflow Area = 0.190 ac, 21.05% Impervious, Inflow Depth > 6.75" for 100-Year event
Inflow = 1.48 cfs @ 12.08 hrs, Volume= 0.107 af
Outflow = 0.93 cfs @ 12.18 hrs, Volume= 0.107 af, Atten= 37%, Lag= 5.7 min
Discarded = 0.21 cfs @ 12.18 hrs, Volume= 0.087 af
Primary = 0.72 cfs @ 12.18 hrs, Volume= 0.020 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 29.72' @ 12.18 hrs Surf.Area= 1,294 sf Storage= 1,183 cf

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 53.2 min (846.4 - 793.2)

Volume	Invert	Avail.Storage	Storage Description
#1	25.00'	1,596 cf	**Custom Stage Data (Conic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
25.00	0	0.0	0	0	0
25.01	340	25.0	0	0	340
28.49	340	25.0	296	296	567
28.50	340	100.0	3	299	568
29.00	580	100.0	227	527	811
30.00	1,650	100.0	1,069	1,596	1,887

Device	Routing	Invert	Outlet Devices
#1	Discarded	25.00'	**7.000 in/hr Exfiltration over Surface area**
#2	Primary	29.50'	**3.0' long x 5.0' breadth Broad-Crested Rectangular Weir** Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.34 2.50 2.70 2.68 2.68 2.66 2.65 2.65 2.65 2.65 2.67 2.66 2.68 2.70 2.74 2.79 2.88

Discarded OutFlow Max=0.21 cfs @ 12.18 hrs HW=29.72' (Free Discharge)
└**1=Exfiltration** (Exfiltration Controls 0.21 cfs)

Primary OutFlow Max=0.72 cfs @ 12.18 hrs HW=29.72' TW=23.77' (Dynamic Tailwater)
└**2=Broad-Crested Rectangular Weir** (Weir Controls 0.72 cfs @ 1.10 fps)

Summary for Pond 311P: HW3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 2.77" for 100-Year event
Inflow = 4.97 cfs @ 12.40 hrs, Volume= 0.487 af
Outflow = 3.93 cfs @ 12.53 hrs, Volume= 0.487 af, Atten= 21%, Lag= 8.0 min
Primary = 3.93 cfs @ 12.53 hrs, Volume= 0.487 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 23.31' @ 12.49 hrs Surf.Area= 951 sf Storage= 1,331 cf

Plug-Flow detention time= 2.4 min calculated for 0.487 af (100% of inflow)
Center-of-Mass det. time= 2.2 min (858.2 - 855.9)

Volume	Invert	Avail.Storage	Storage Description
#1	21.00'	1,517 cf	**Custom Stage Data (Prismatic)**Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)
21.00	8	0	0
22.00	610	309	309
23.50	1,000	1,208	1,517

Device	Routing	Invert	Outlet Devices
#1	Primary	21.00'	**12.0" Round Culvert** L= 14.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 21.00' / 19.60' S= 0.1000 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=3.96 cfs @ 12.53 hrs HW=23.27' TW=22.18' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.96 cfs @ 5.04 fps)

Summary for Pond 312P: DMH3

Inflow Area = 2.109 ac, 18.97% Impervious, Inflow Depth > 2.77" for 100-Year event
Inflow = 3.93 cfs @ 12.53 hrs, Volume= 0.487 af
Outflow = 3.93 cfs @ 12.53 hrs, Volume= 0.487 af, Atten= 0%, Lag= 0.0 min
Primary = 3.93 cfs @ 12.53 hrs, Volume= 0.487 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 22.25' @ 12.47 hrs
Flood Elev= 21.84'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.34'	**15.0" Round Culvert** L= 118.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.34' / 18.87' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=3.94 cfs @ 12.53 hrs HW=22.18' TW=21.50' (Dynamic Tailwater)
1=Culvert (Outlet Controls 3.94 cfs @ 3.21 fps)

Summary for Pond 313P: CB6

Inflow Area = 0.128 ac, 66.41% Impervious, Inflow Depth > 7.97" for 100-Year event
Inflow = 1.04 cfs @ 12.10 hrs, Volume= 0.085 af
Outflow = 1.04 cfs @ 12.10 hrs, Volume= 0.085 af, Atten= 0%, Lag= 0.0 min
Primary = 1.04 cfs @ 12.10 hrs, Volume= 0.085 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.60' @ 12.44 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.14'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.14' / 19.08' S= 0.0100 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=0.57 cfs @ 12.10 hrs HW=21.21' TW=21.19' (Dynamic Tailwater)
1=Culvert (Inlet Controls 0.57 cfs @ 0.73 fps)

Summary for Pond 314P: DMH4

Inflow Area = 2.237 ac, 21.68% Impervious, Inflow Depth > 3.07" for 100-Year event
Inflow = 4.17 cfs @ 12.49 hrs, Volume= 0.572 af
Outflow = 4.16 cfs @ 12.49 hrs, Volume= 0.572 af, Atten= 0%, Lag= 0.0 min
Primary = 4.16 cfs @ 12.49 hrs, Volume= 0.572 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.58' @ 12.45 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.83'	**15.0" Round Culvert** L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.83' / 18.76' S= 0.0041 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.16 cfs @ 12.49 hrs HW=21.56' TW=21.06' (Dynamic Tailwater)
1=Culvert (Inlet Controls 4.16 cfs @ 3.39 fps)

Summary for Pond 401P: CB7

Inflow Area = 0.144 ac, 54.86% Impervious, Inflow Depth > 7.72" for 100-Year event
Inflow = 1.15 cfs @ 12.10 hrs, Volume= 0.093 af
Outflow = 1.15 cfs @ 12.10 hrs, Volume= 0.093 af, Atten= 0%, Lag= 0.0 min
Primary = 1.15 cfs @ 12.10 hrs, Volume= 0.093 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.12' @ 12.15 hrs
Flood Elev= 22.10'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.09'	**12.0" Round Culvert** L= 6.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.09' / 18.97' S= 0.0200 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 0.79 sf

Primary OutFlow Max=1.17 cfs @ 12.10 hrs HW=21.04' TW=20.94' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.17 cfs @ 1.49 fps)

Summary for Pond 402P: DMH5

Inflow Area = 2.381 ac, 23.69% Impervious, Inflow Depth > 3.35" for 100-Year event
Inflow = 4.48 cfs @ 12.45 hrs, Volume= 0.665 af
Outflow = 4.48 cfs @ 12.46 hrs, Volume= 0.665 af, Atten= 0%, Lag= 0.1 min
Primary = 4.48 cfs @ 12.46 hrs, Volume= 0.665 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 21.09' @ 12.43 hrs
Flood Elev= 21.90'

Device	Routing	Invert	Outlet Devices
#1	Primary	18.72'	**15.0" Round Culvert** L= 130.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 18.72' / 18.20' S= 0.0040 '/' Cc= 0.900 n= 0.013 Corrugated PE, smooth interior, Flow Area= 1.23 sf

Primary OutFlow Max=4.48 cfs @ 12.46 hrs HW=21.09' TW=20.15' (Dynamic Tailwater)
└**1=Culvert** (Outlet Controls 4.48 cfs @ 3.65 fps)

Summary for Pond 403P: CB8

Inflow Area = 0.210 ac, 9.05% Impervious, Inflow Depth > 6.50" for 100-Year event
Inflow = 1.31 cfs @ 12.16 hrs, Volume= 0.114 af
Outflow = 1.31 cfs @ 12.16 hrs, Volume= 0.114 af, Atten= 0%, Lag= 0.0 min
Primary = 1.31 cfs @ 12.16 hrs, Volume= 0.114 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 20.83' @ 12.16 hrs
Flood Elev= 21.00'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.00'	**8.0" Round Culvert** L= 11.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.00' / 18.78' S= 0.0200 '/' Cc= 0.900 n= 0.010 PVC, smooth interior, Flow Area= 0.35 sf

Primary OutFlow Max=1.31 cfs @ 12.16 hrs HW=20.83' TW=20.22' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 1.31 cfs @ 3.75 fps)

Summary for Pond 404P: DMH6

Inflow Area = 2.591 ac, 22.50% Impervious, Inflow Depth > 3.60" for 100-Year event
Inflow = 5.44 cfs @ 12.14 hrs, Volume= 0.778 af
Outflow = 5.44 cfs @ 12.14 hrs, Volume= 0.778 af, Atten= 0%, Lag= 0.0 min
Primary = 5.44 cfs @ 12.14 hrs, Volume= 0.778 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Peak Elev= 20.22' @ 12.14 hrs
Flood Elev= 21.50'

Device	Routing	Invert	Outlet Devices
#1	Primary	19.04'	**12.0" Round Culvert** L= 58.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.04' / 17.93' S= 0.0191 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf
#2	Primary	19.30'	**12.0" Round Culvert** L= 48.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 19.30' / 18.90' S= 0.0083 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 0.79 sf

Primary OutFlow Max=5.44 cfs @ 12.14 hrs HW=20.22' TW=0.00' (Dynamic Tailwater)
1=Culvert (Inlet Controls 3.12 cfs @ 3.98 fps)
2=Culvert (Barrel Controls 2.32 cfs @ 4.01 fps)

Summary for Pond E1P: EXIST. CB

Inflow Area = 0.140 ac, 15.00% Impervious, Inflow Depth > 6.14" for 100-Year event
Inflow = 1.11 cfs @ 12.05 hrs, Volume= 0.072 af
Primary = 1.11 cfs @ 12.05 hrs, Volume= 0.072 af, Atten= 0%, Lag= 0.0 min

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3

Summary for Pond E2P: EXIST. POND

OUTLET ASSUMED

Inflow Area = 19.749 ac, 13.71% Impervious, Inflow Depth > 4.02" for 100-Year event
Inflow = 56.63 cfs @ 12.38 hrs, Volume= 6.618 af
Outflow = 4.55 cfs @ 15.57 hrs, Volume= 3.454 af, Atten= 92%, Lag= 191.2 min
Primary = 4.55 cfs @ 15.57 hrs, Volume= 3.454 af

Routing by Dyn-Stor-Ind method, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs / 3
Starting Elev= 25.50' Surf.Area= 3.525 ac Storage= 4.894 af
Peak Elev= 26.61' @ 15.57 hrs Surf.Area= 3.945 ac Storage= 9.044 af (4.151 af above start)

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
Center-of-Mass det. time= 220.3 min (1,072.3 - 852.0)

Volume	Invert	Avail.Storage	Storage Description
#1	24.00'	24.900 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
24.00	3.000	0.000	0.000
26.00	3.700	6.700	6.700
28.00	4.500	8.200	14.900
30.00	5.500	10.000	24.900

Device	Routing	Invert	Outlet Devices
#1	Primary	25.70'	**24.0" Round Culvert** L= 400.0' RCP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 25.70' / 17.70' S= 0.0200 '/' Cc= 0.900 n= 0.012 Concrete pipe, finished, Flow Area= 3.14 sf

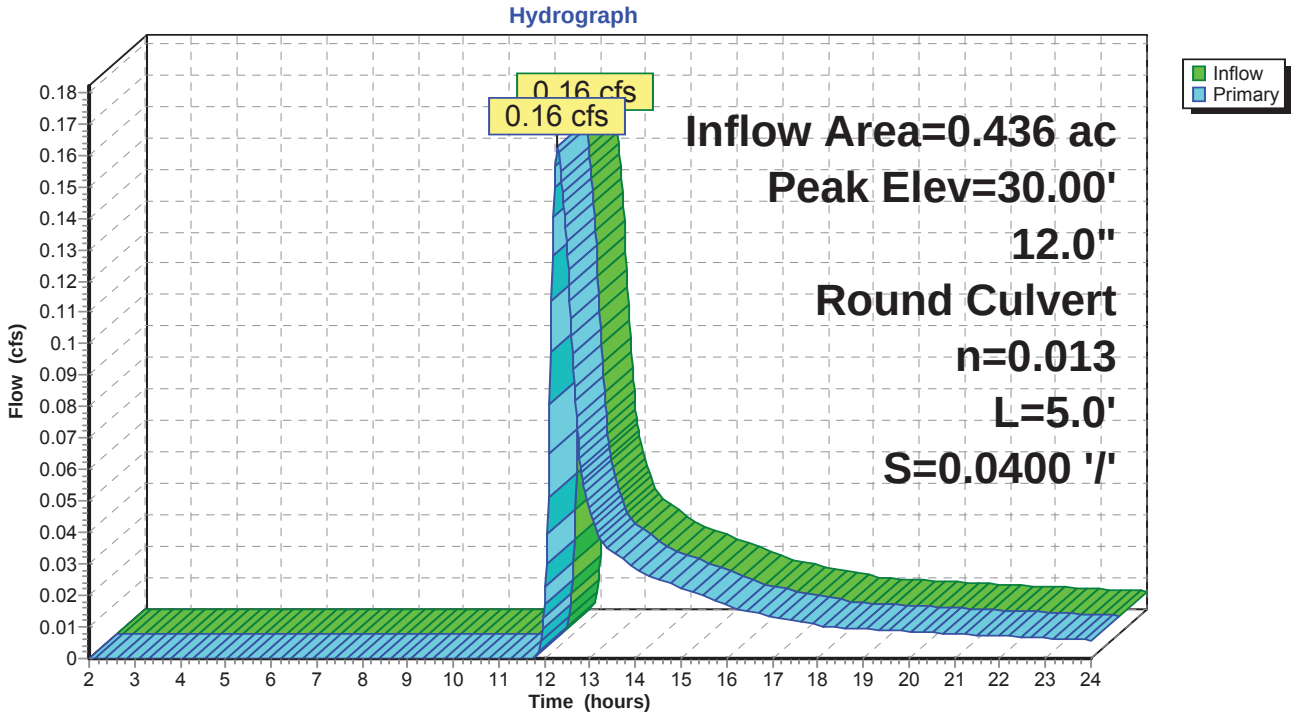
Primary OutFlow Max=4.55 cfs @ 15.57 hrs HW=26.61' TW=0.00' (Dynamic Tailwater)
└**1=Culvert** (Inlet Controls 4.55 cfs @ 3.25 fps)

Summary for Link OP1: LOT 34-6

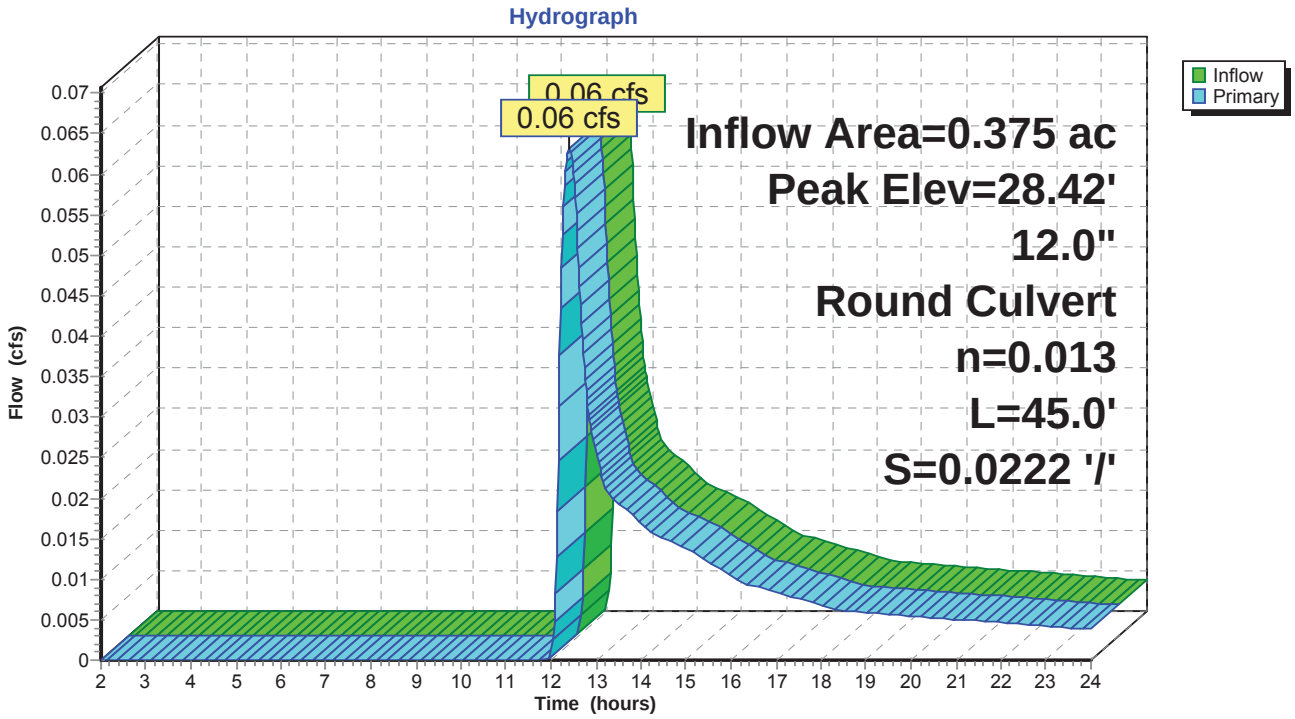
Inflow Area = 22.340 ac, 14.73% Impervious, Inflow Depth > 2.27" for 100-Year event
Inflow = 6.15 cfs @ 12.66 hrs, Volume= 4.233 af
Primary = 6.15 cfs @ 12.66 hrs, Volume= 4.233 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 2.00-24.00 hrs, dt= 0.02 hrs

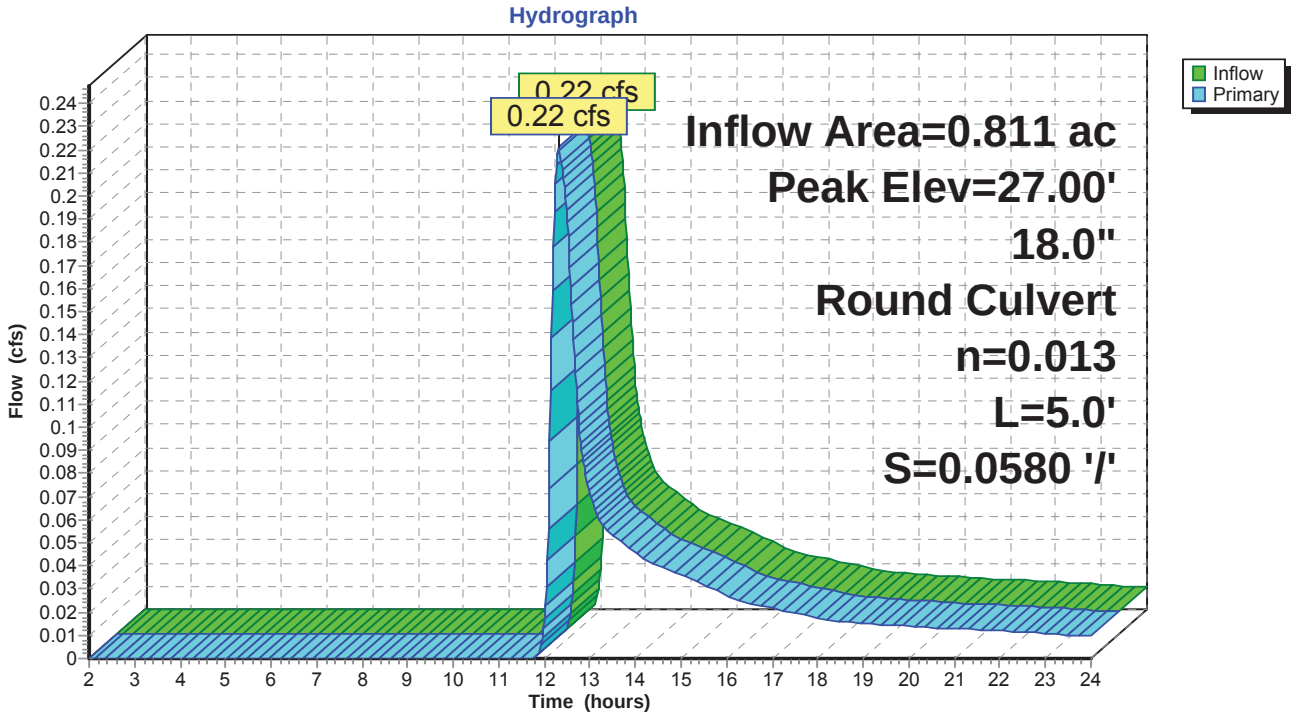
Pond 301P: CB1



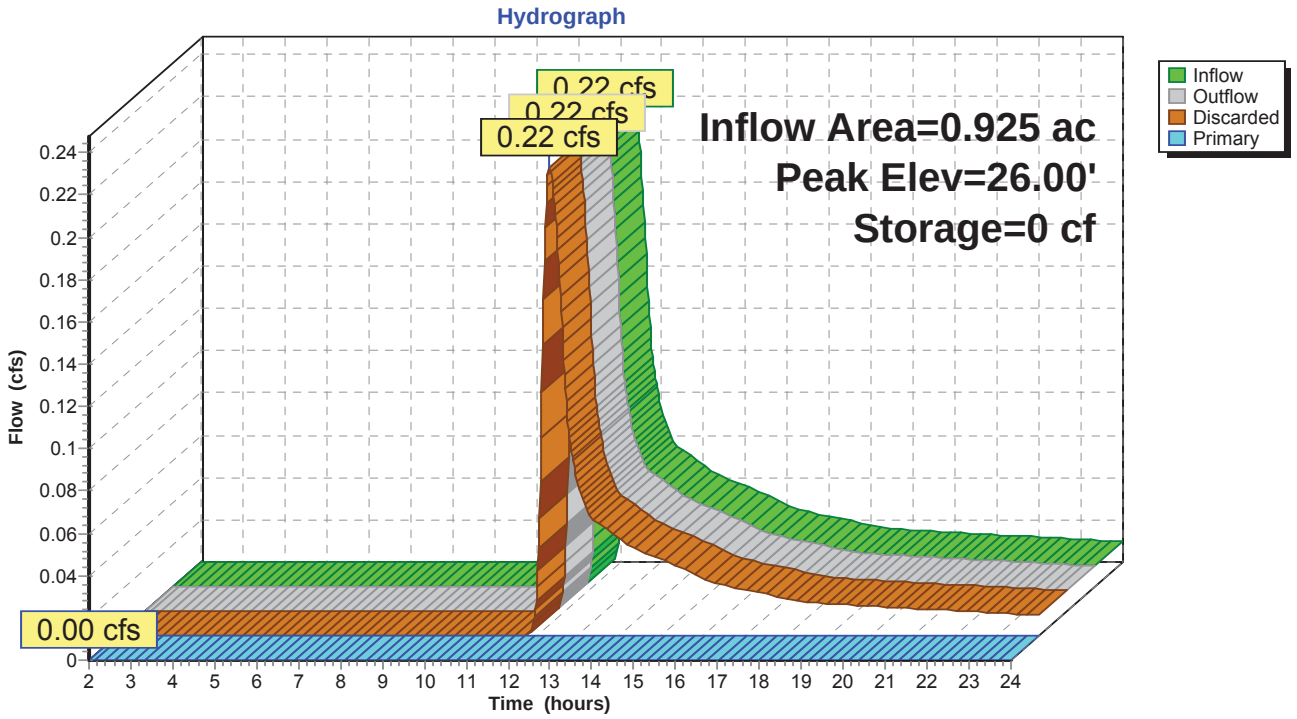
Pond 302P: CB2



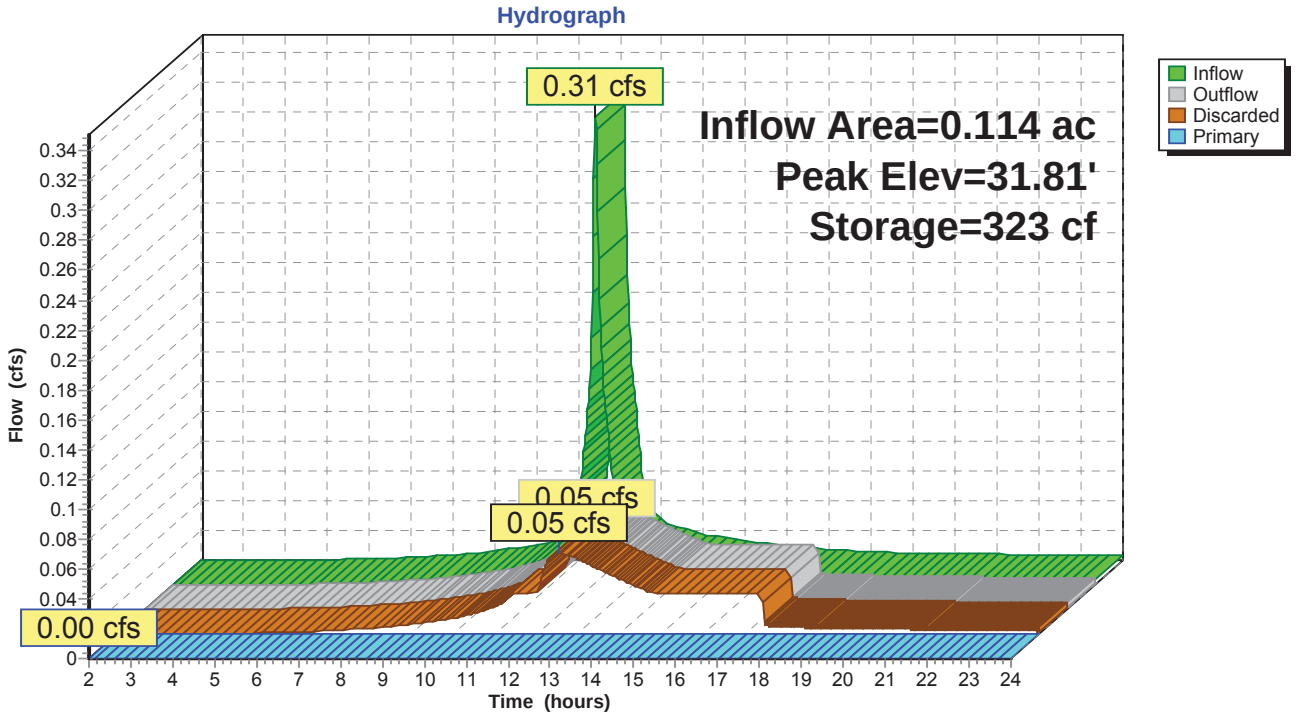
Pond 303P: DMH 1



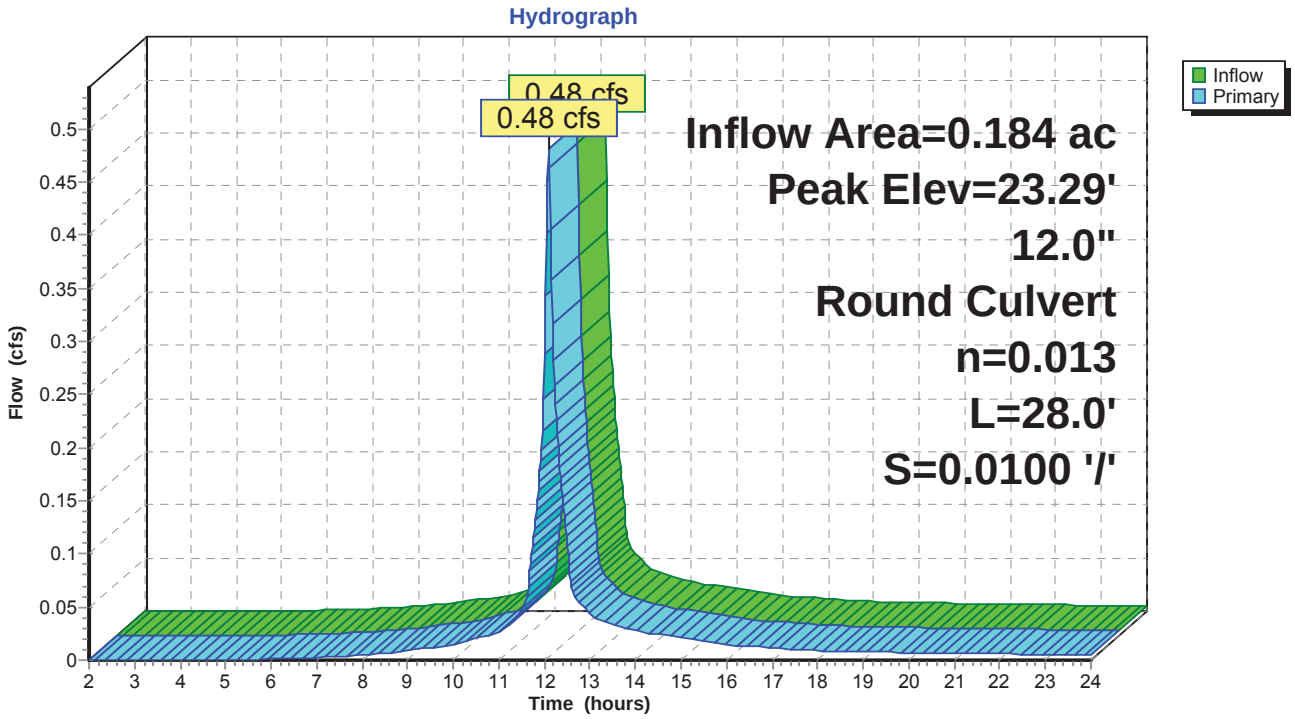
Pond 304P: SC-740.1



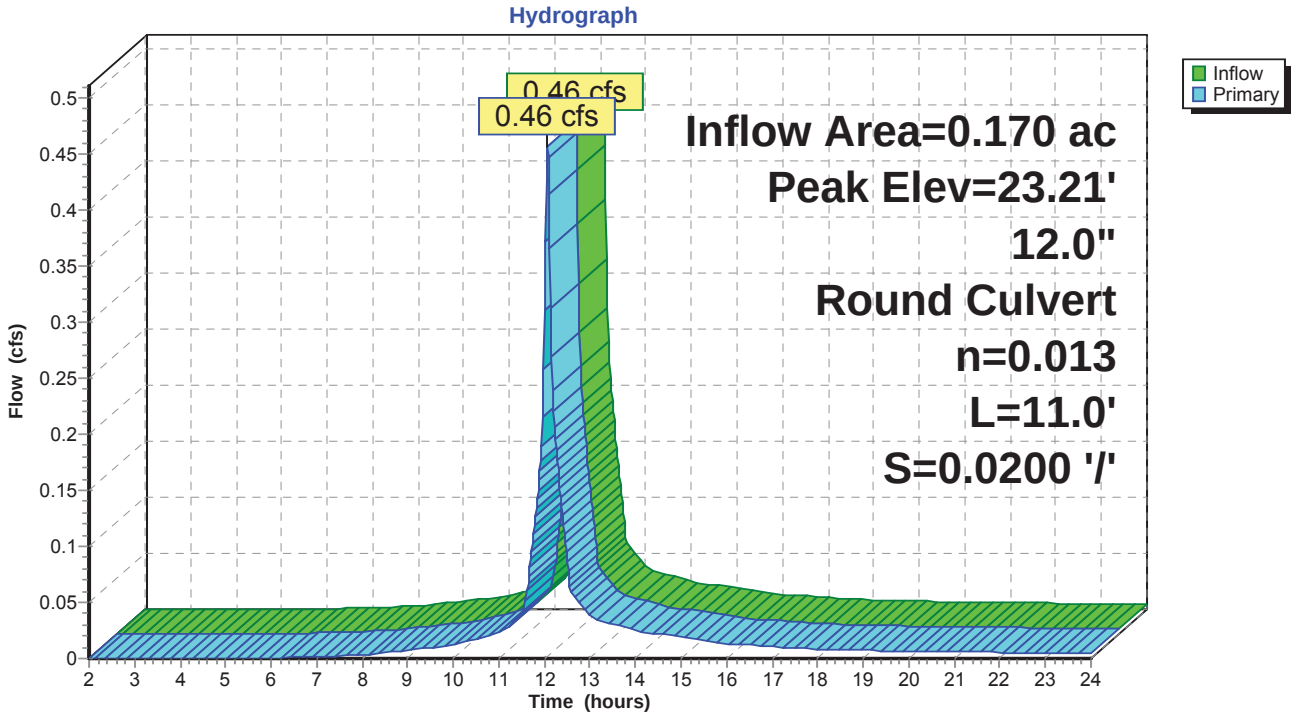
Pond 305P: RB1



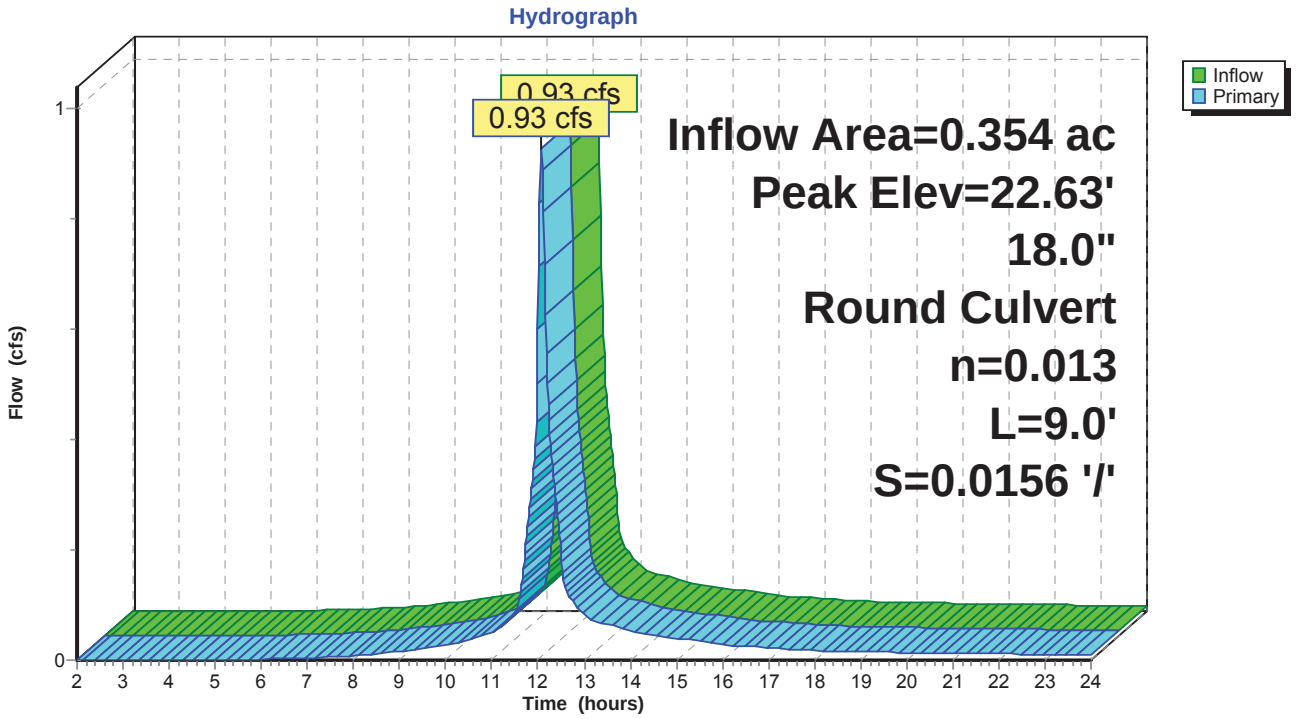
Pond 306P: CB3



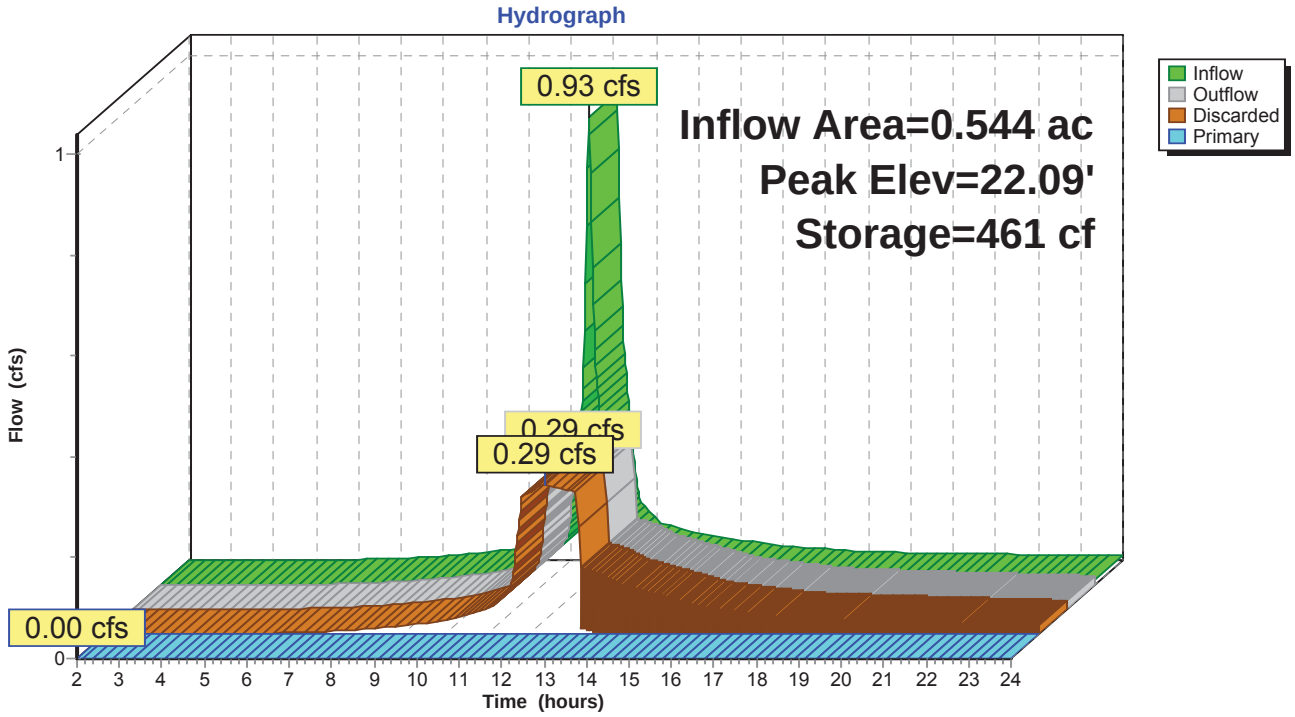
Pond 307P: CB4



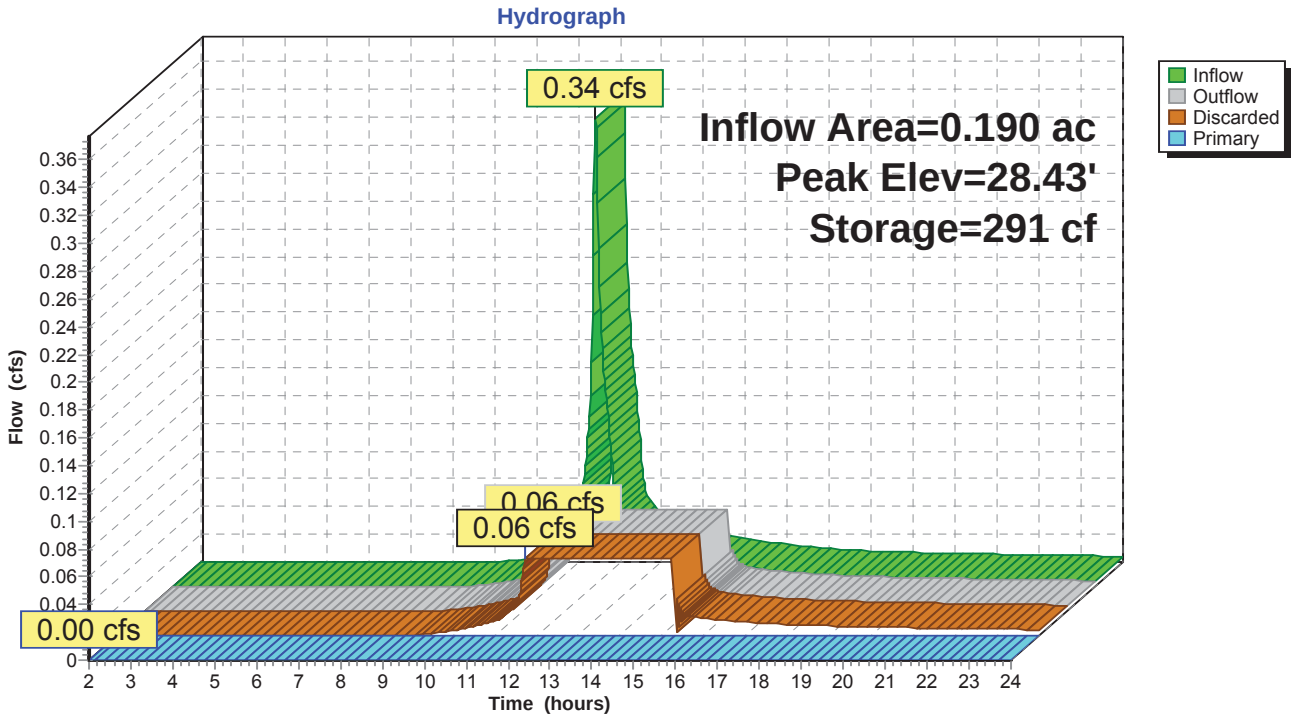
Pond 308P: DMH 2



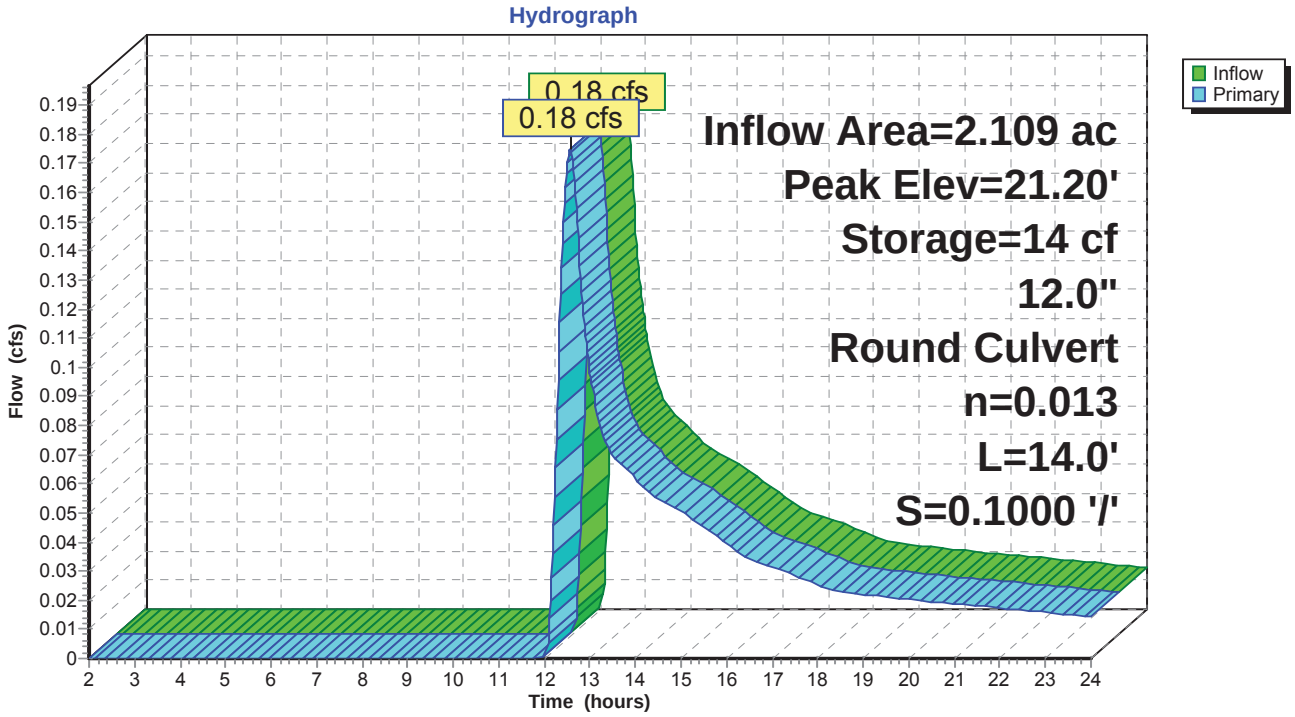
Pond 309P: SC-740.2



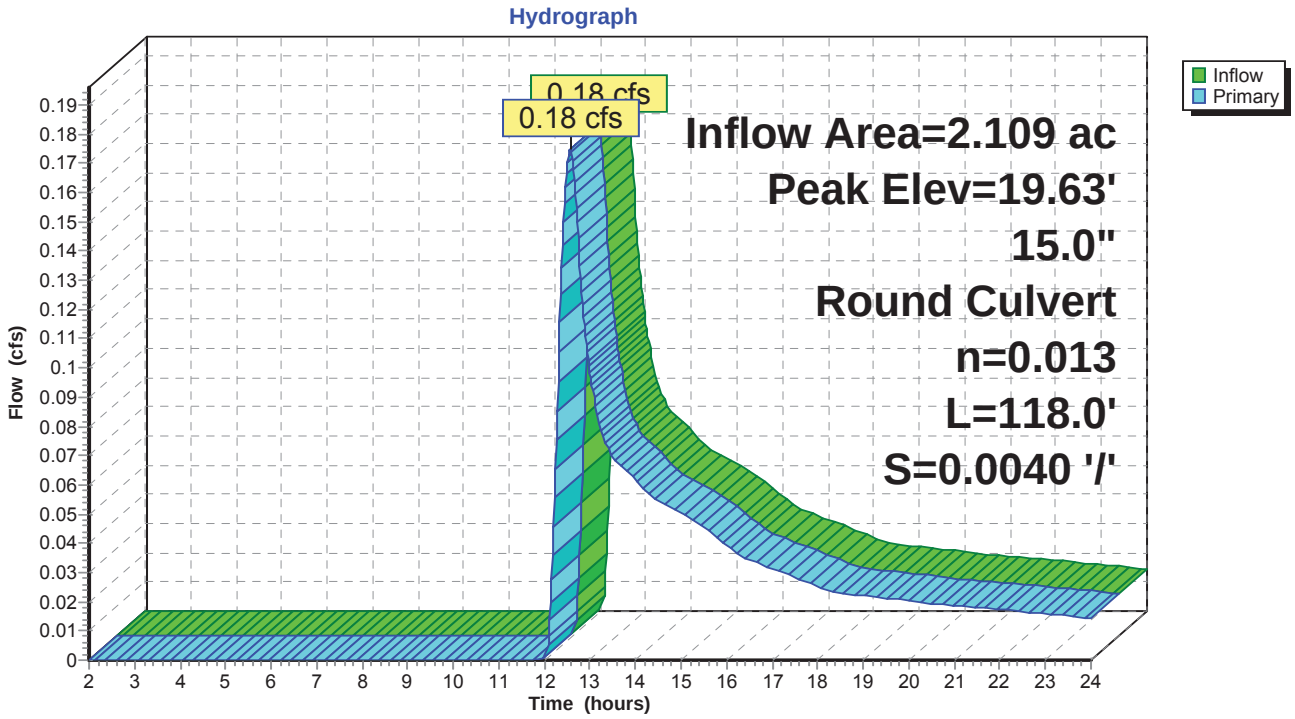
Pond 310P: RB1



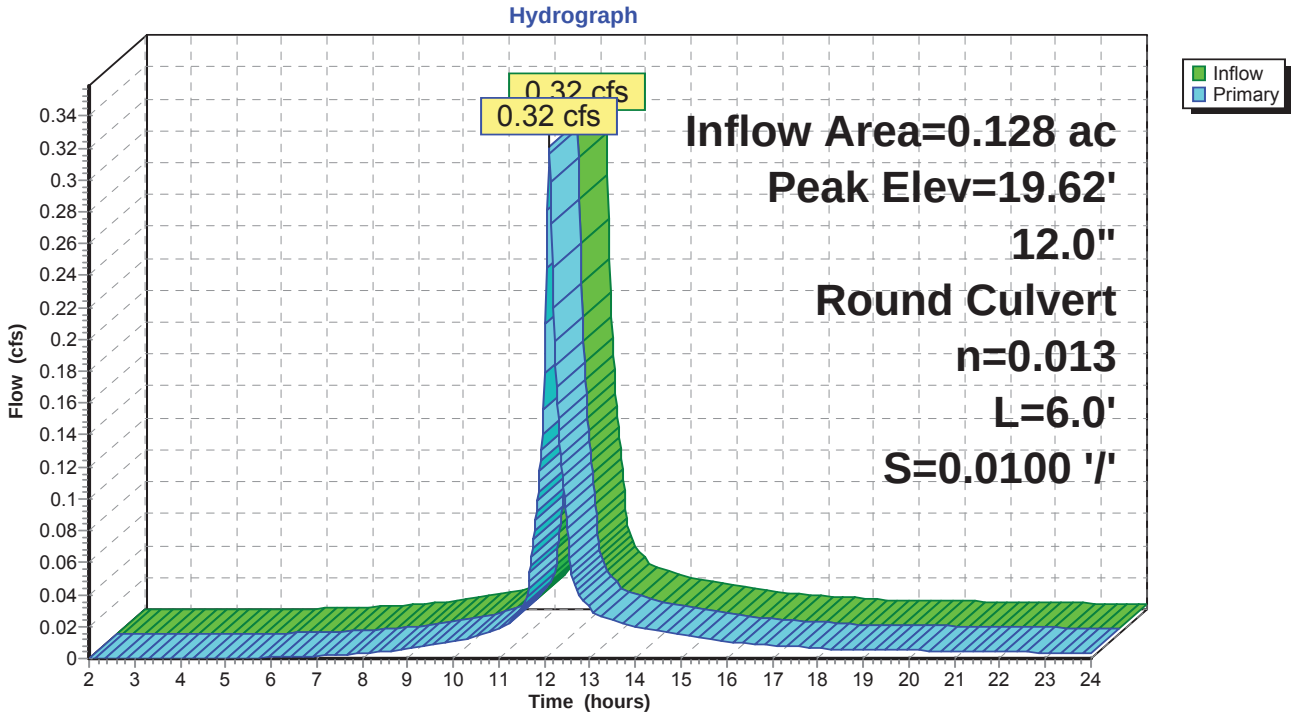
Pond 311P: HW3



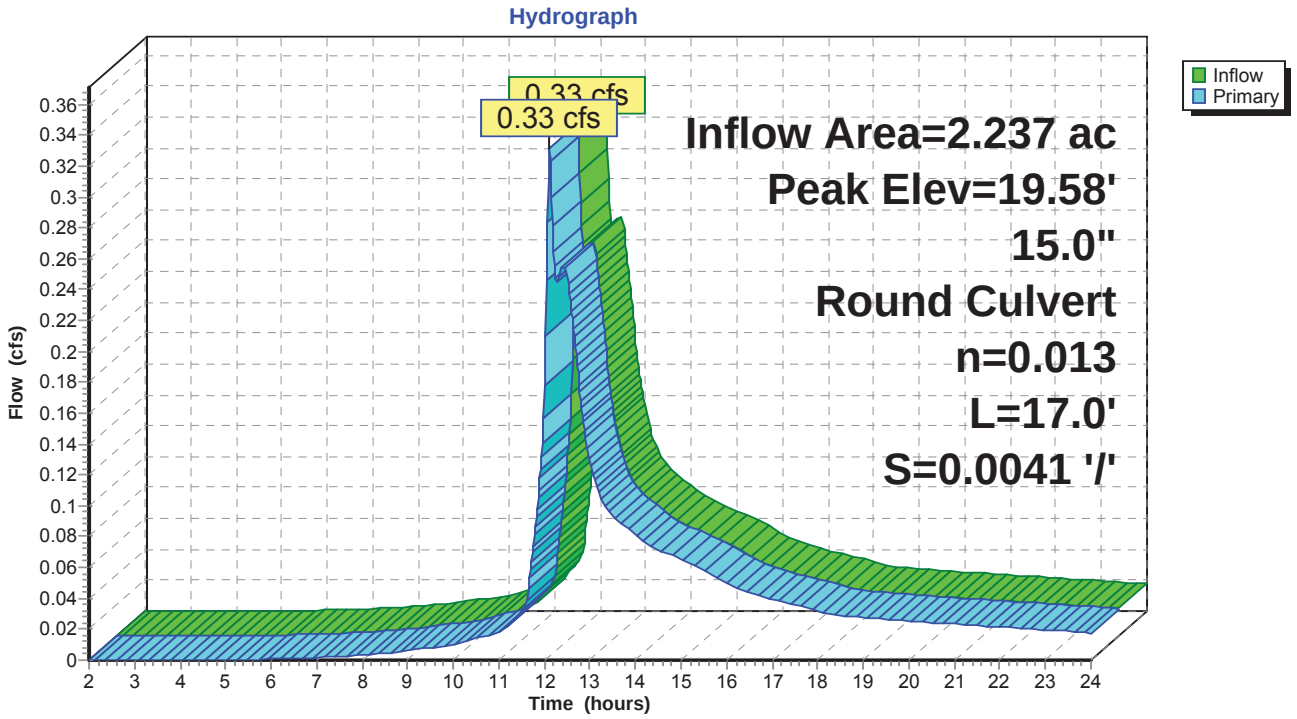
Pond 312P: DMH3



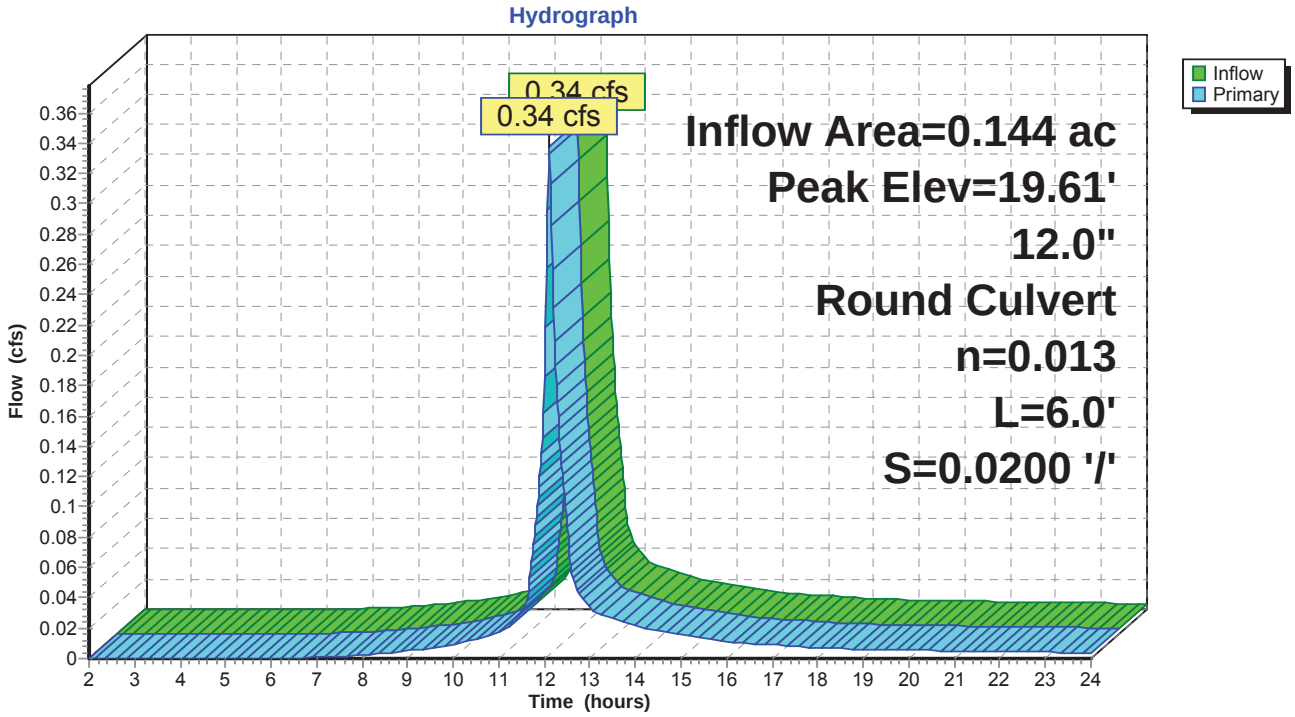
Pond 313P: CB6



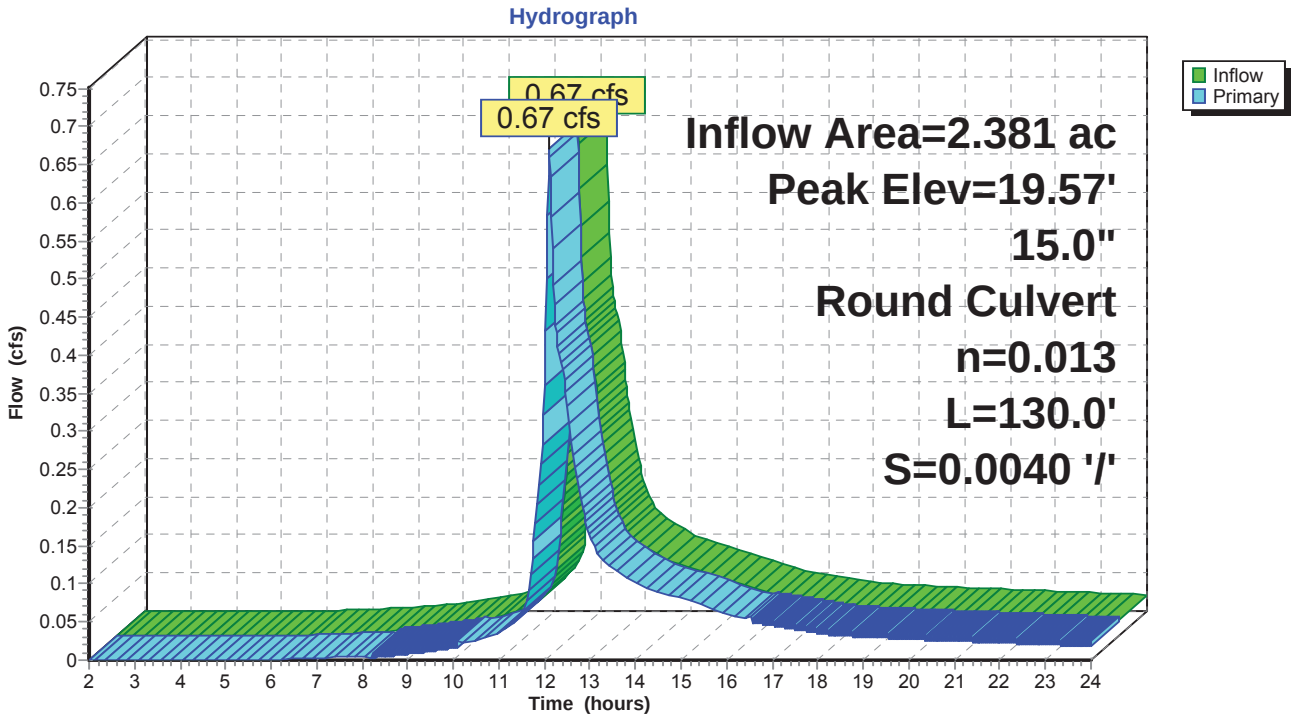
Pond 314P: DMH4



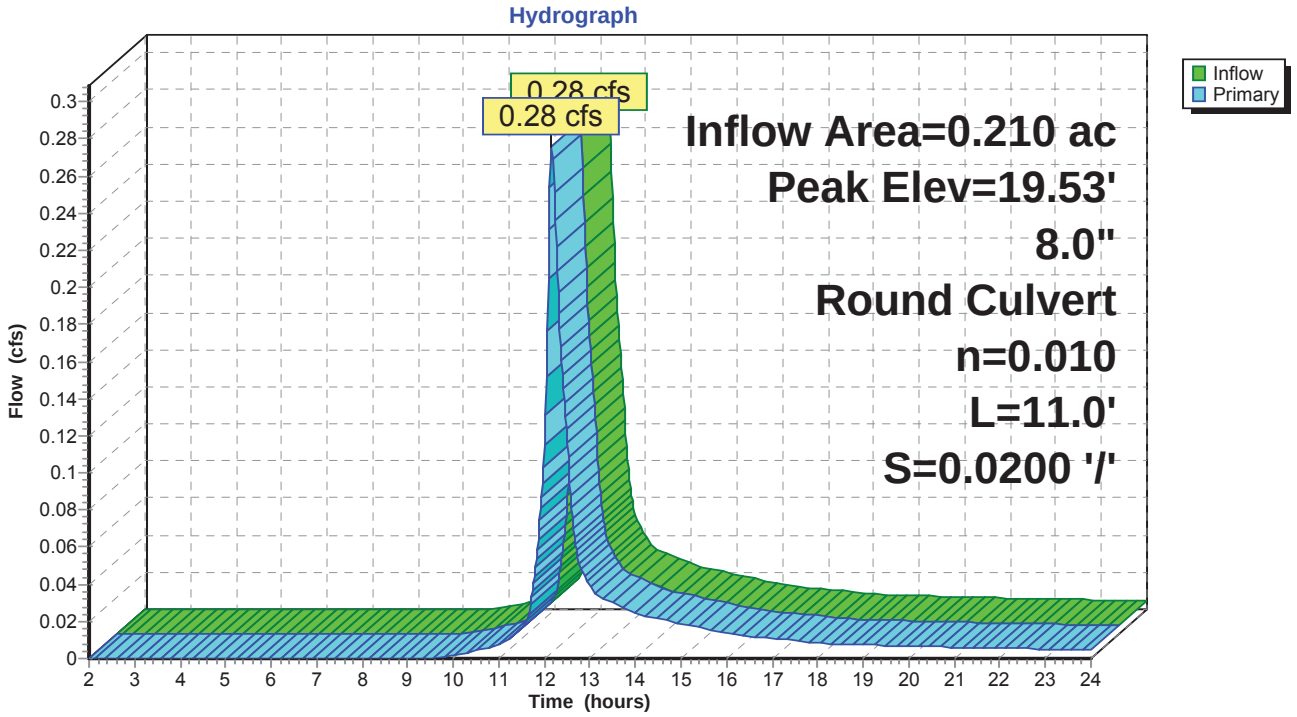
Pond 401P: CB7



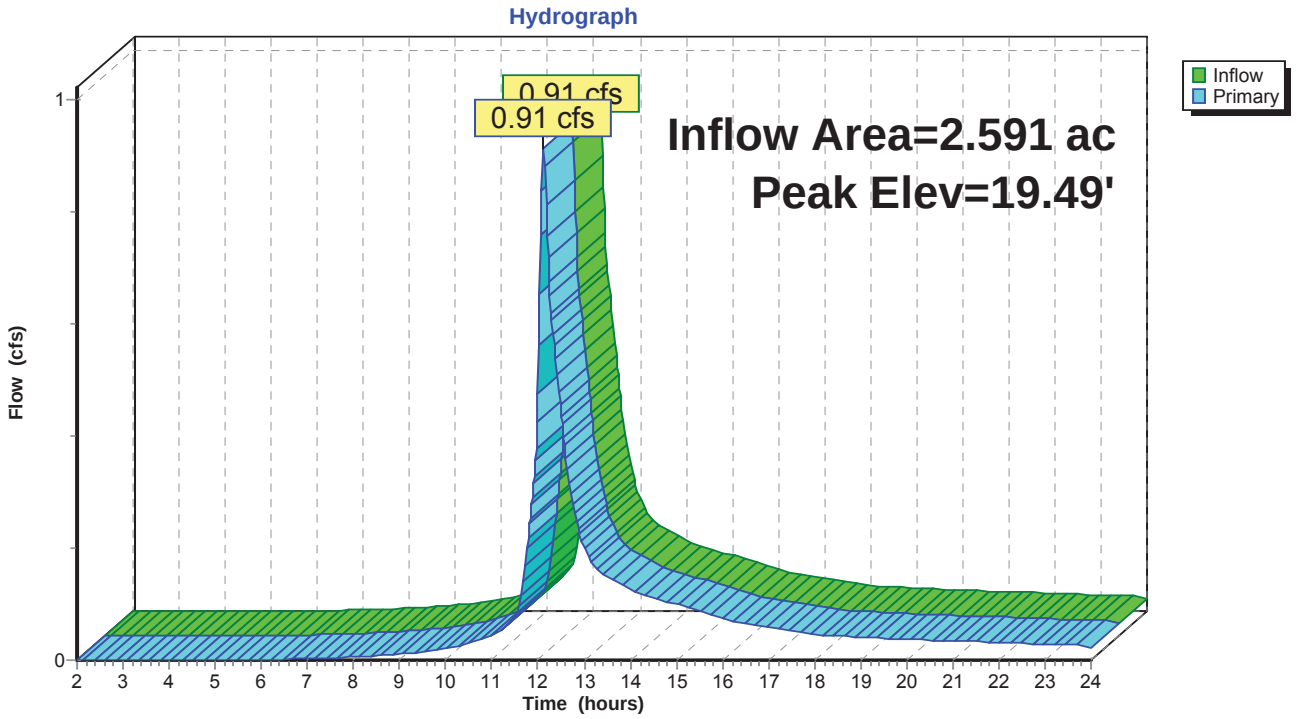
Pond 402P: DMH5



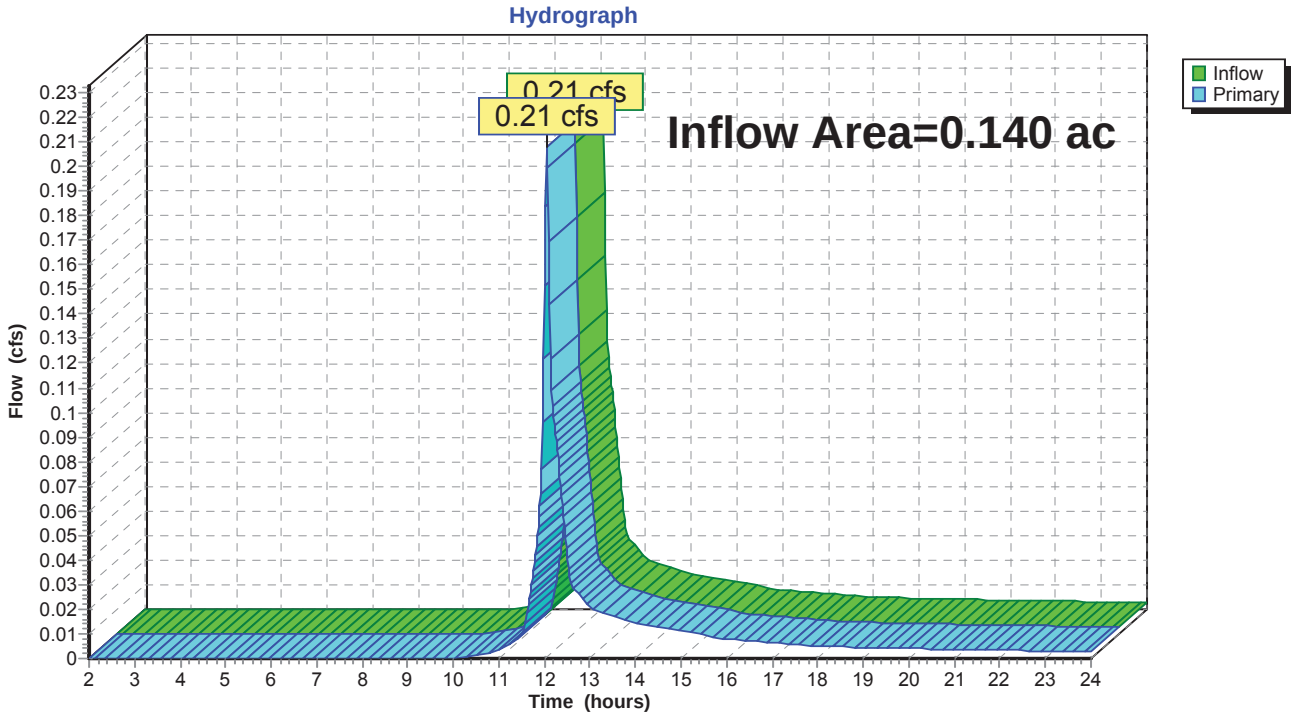
Pond 403P: CB8



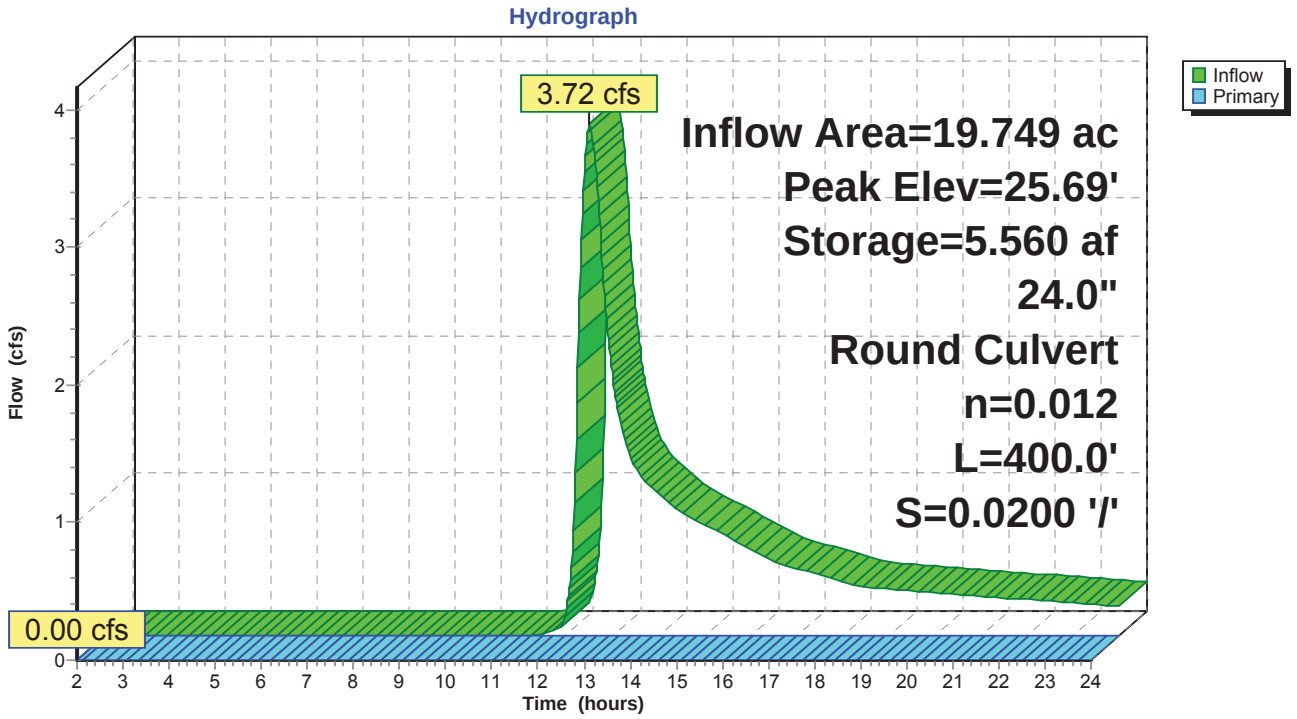
Pond 404P: DMH6



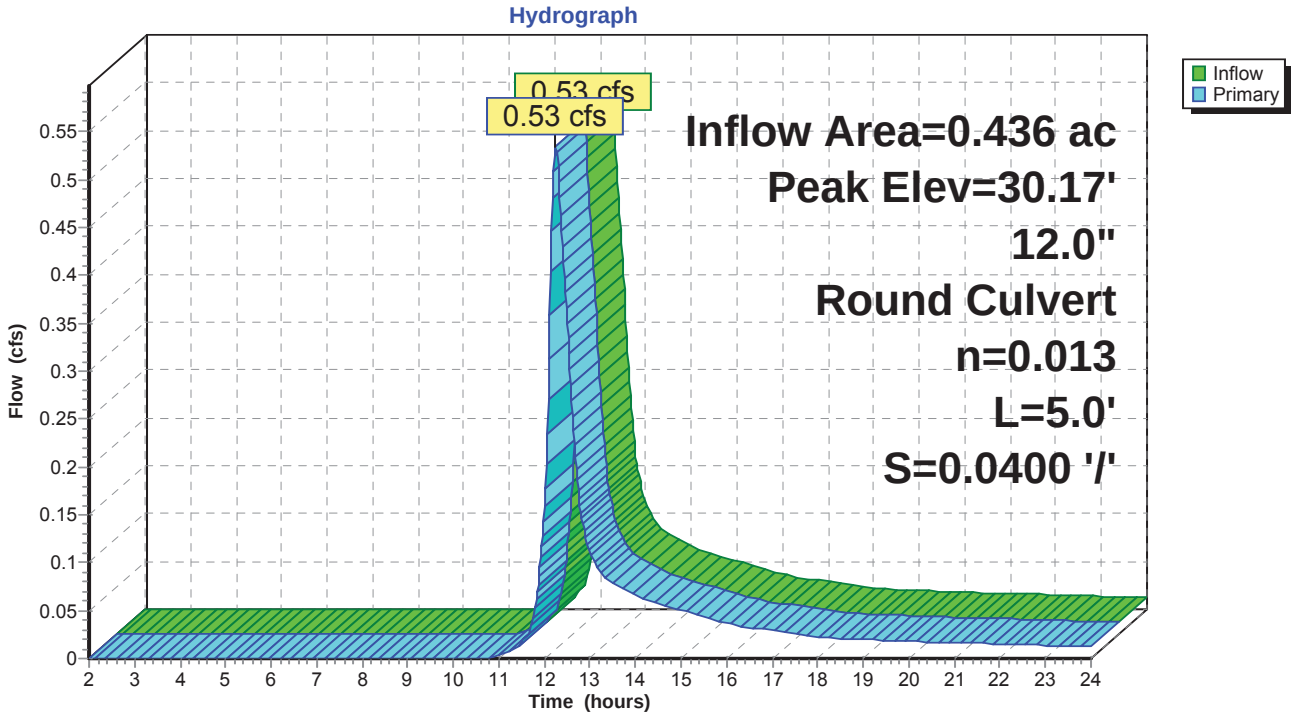
Pond E1P: EXIST. CB



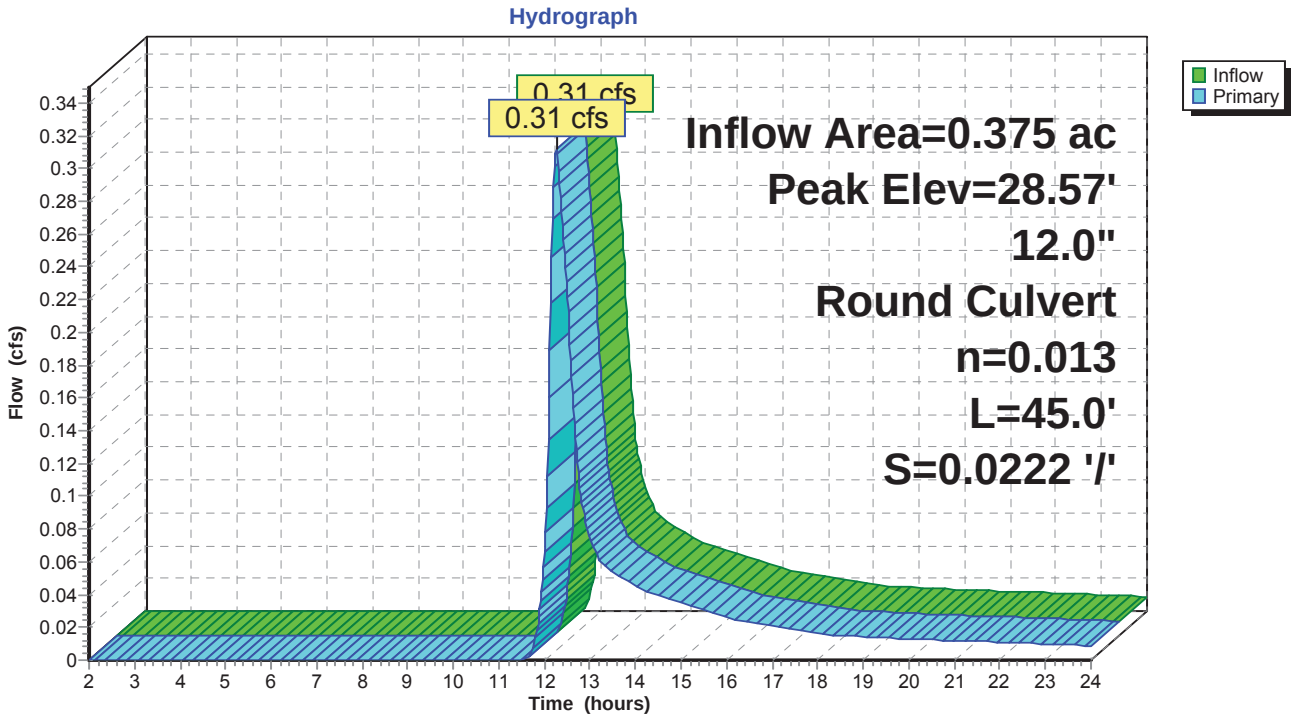
Pond E2P: EXIST. POND



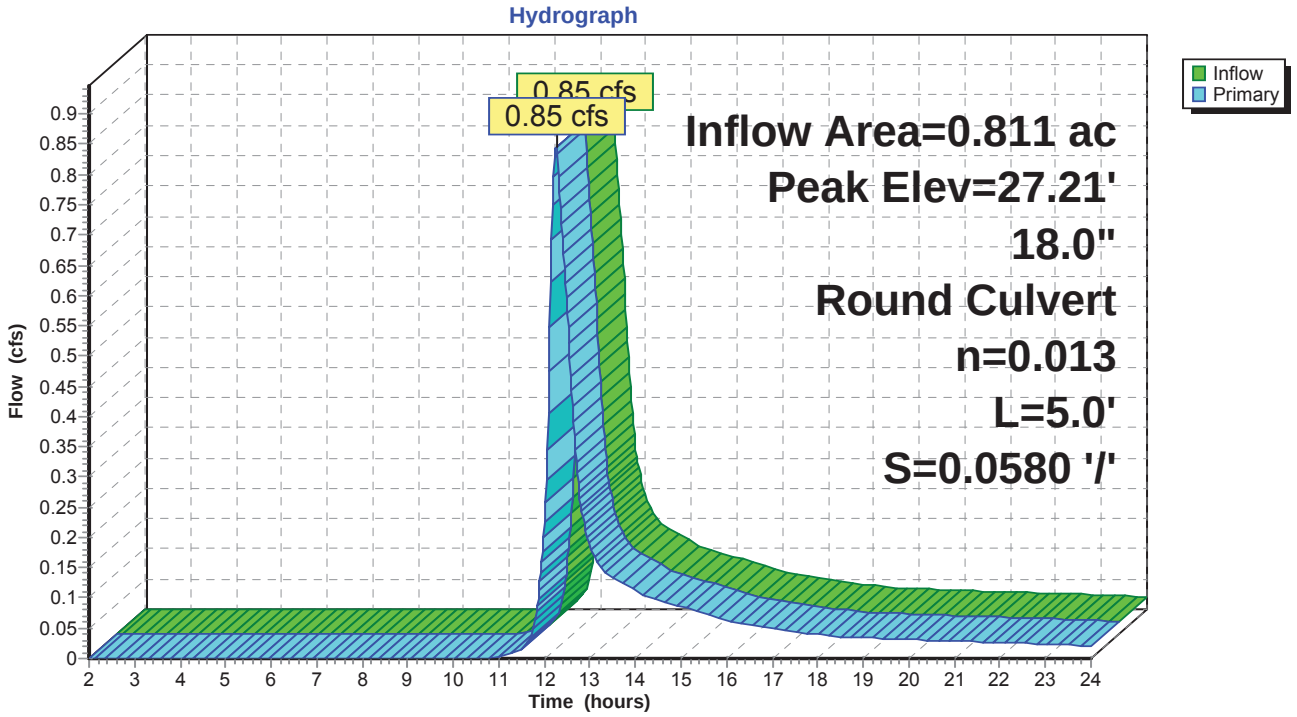
Pond 301P: CB1



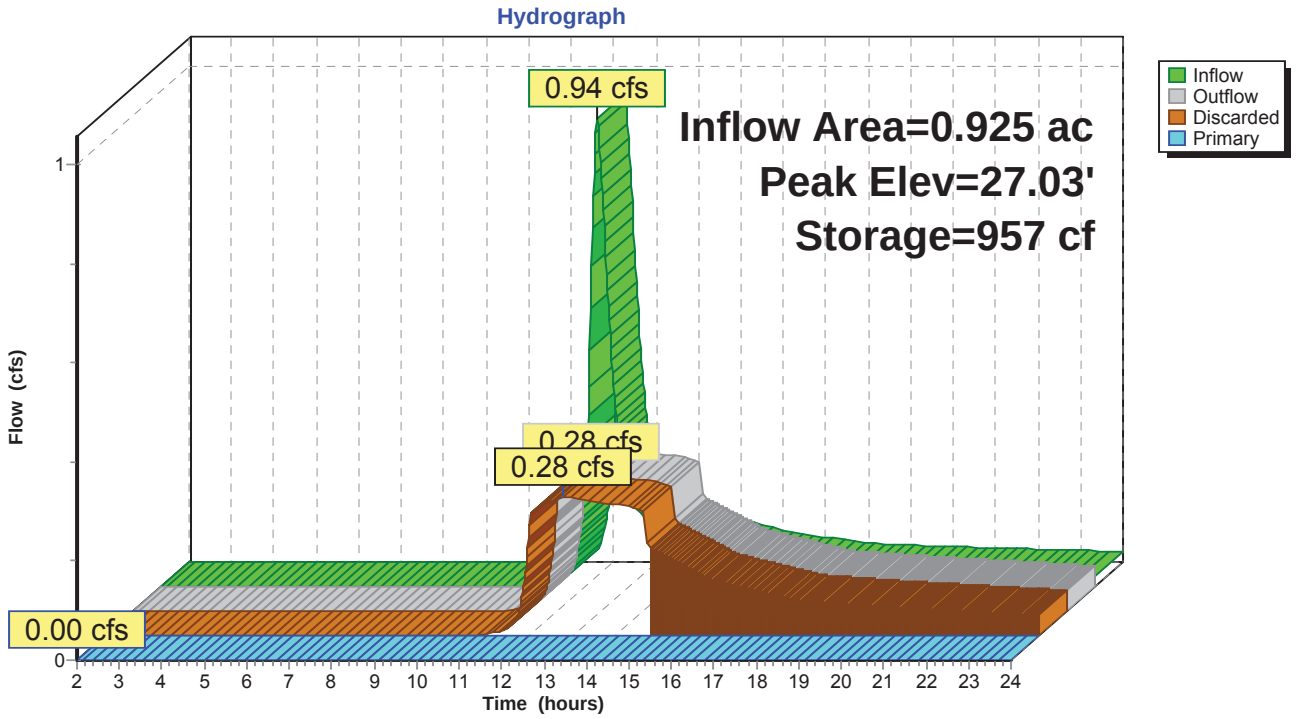
Pond 302P: CB2



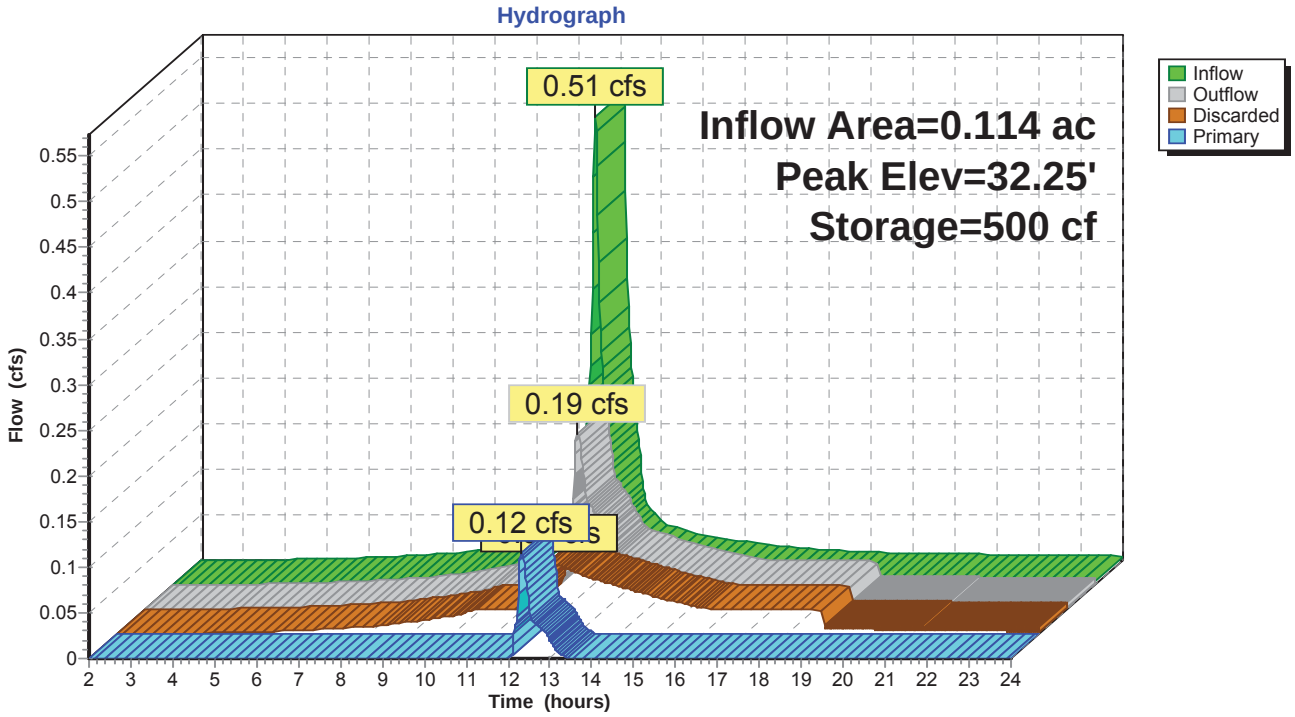
Pond 303P: DMH 1



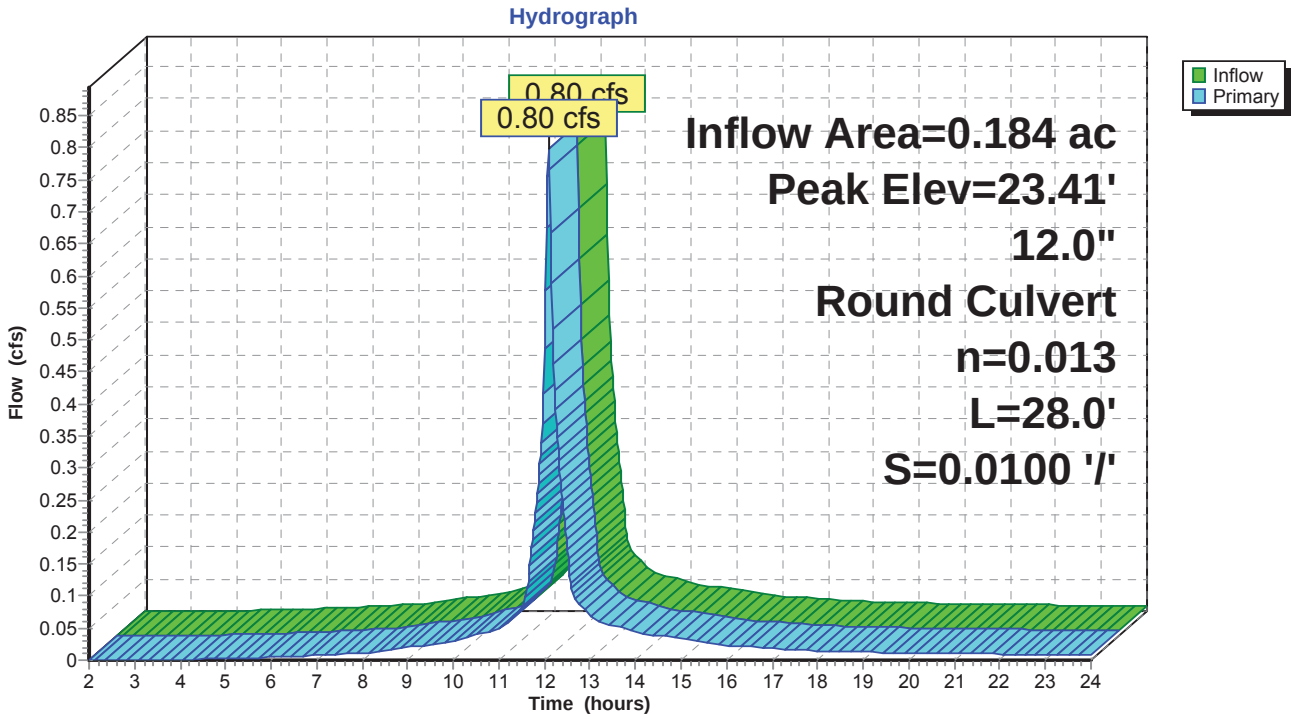
Pond 304P: SC-740.1



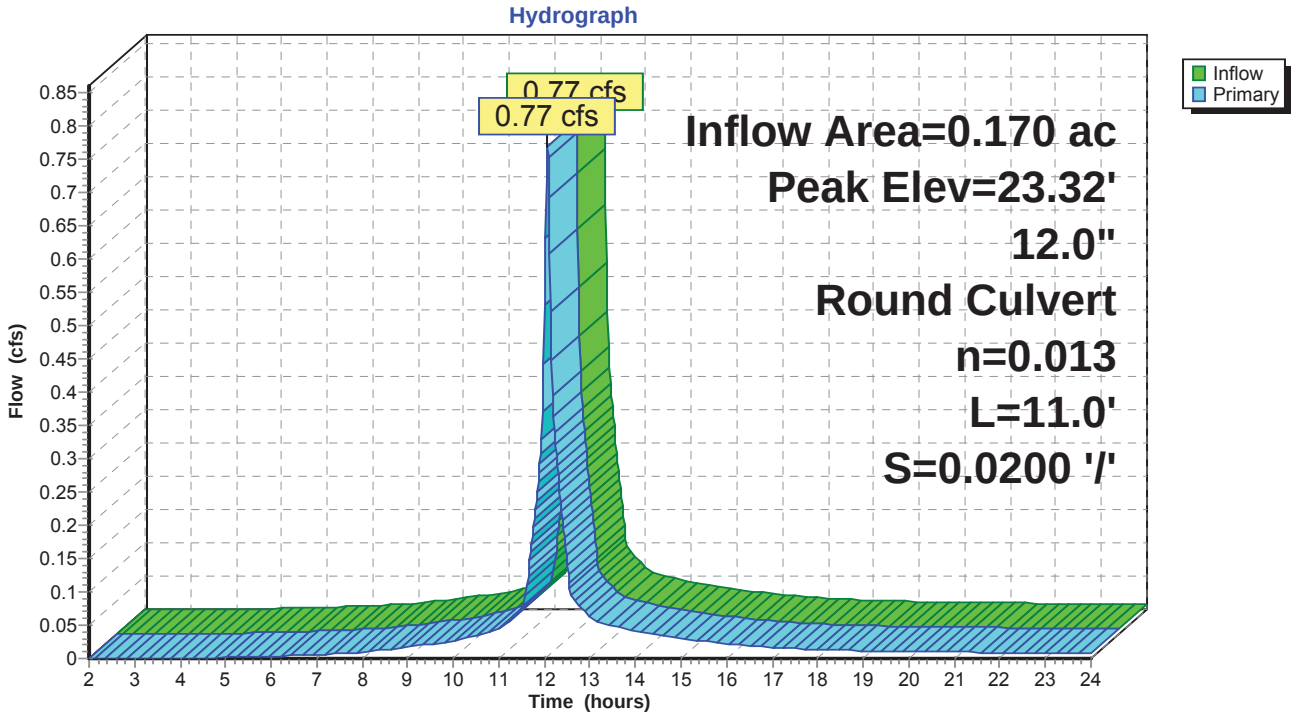
Pond 305P: RB1



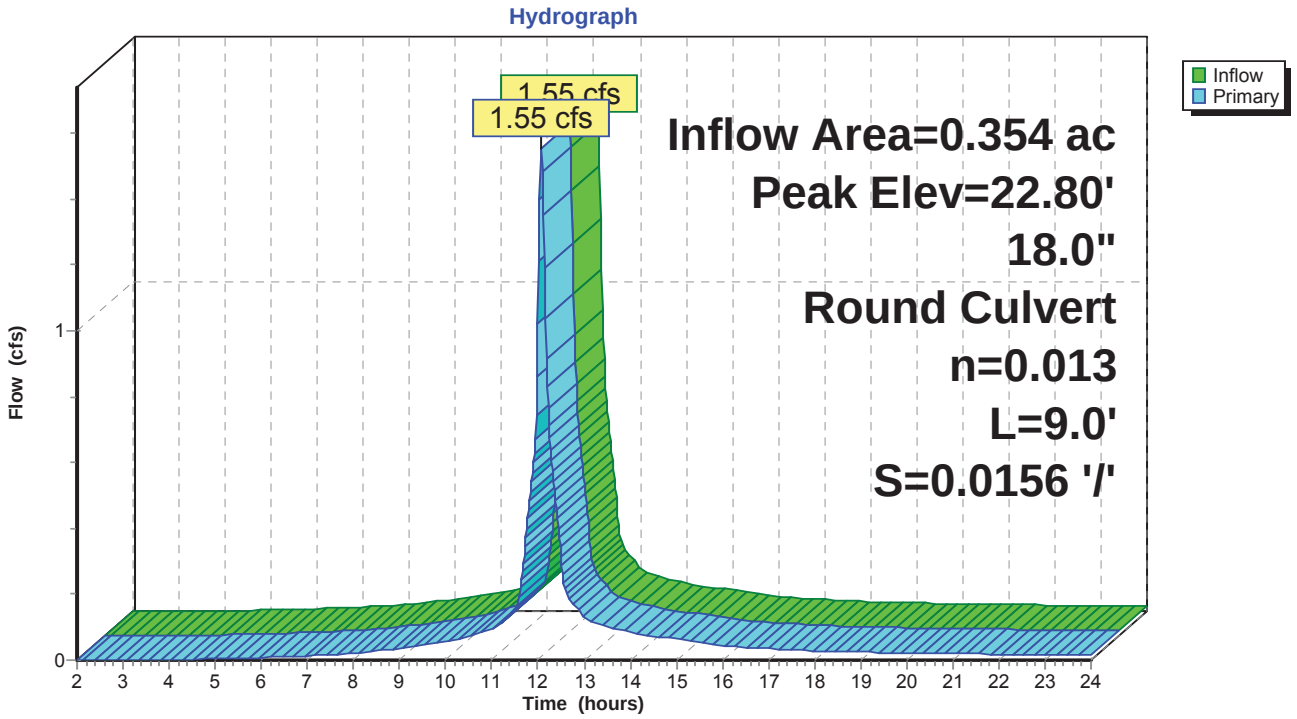
Pond 306P: CB3



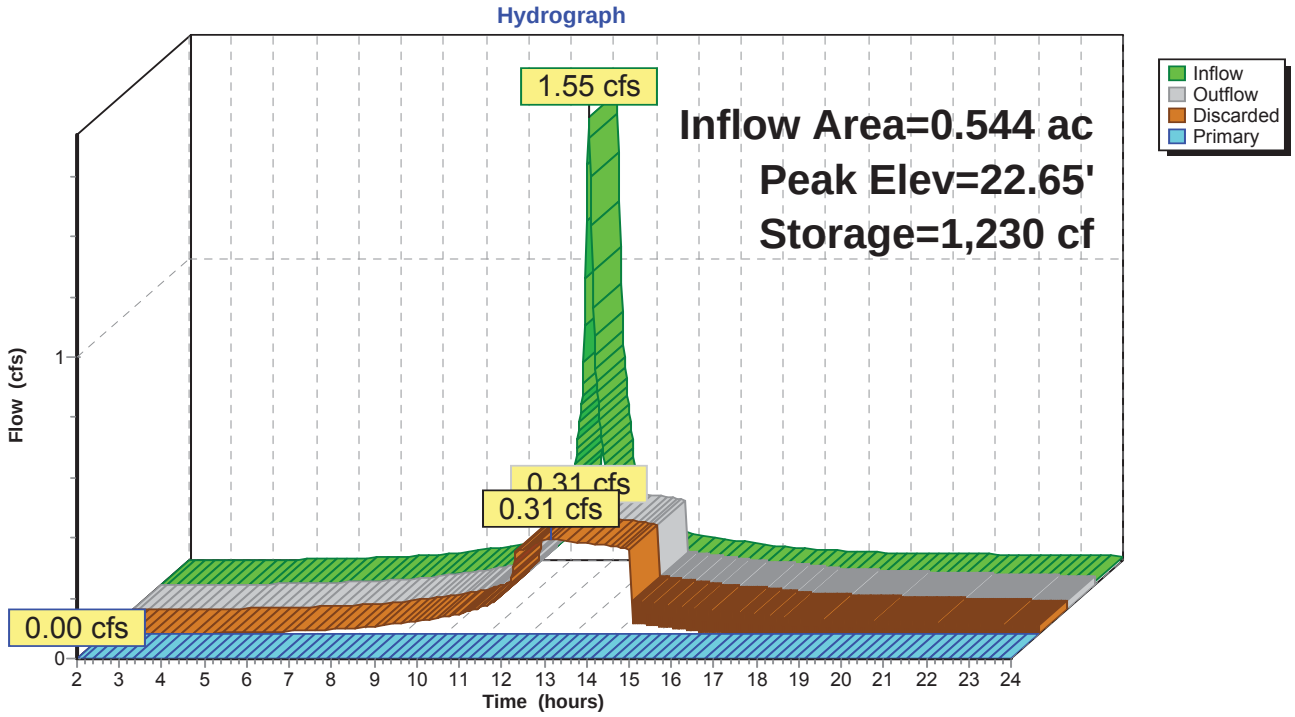
Pond 307P: CB4



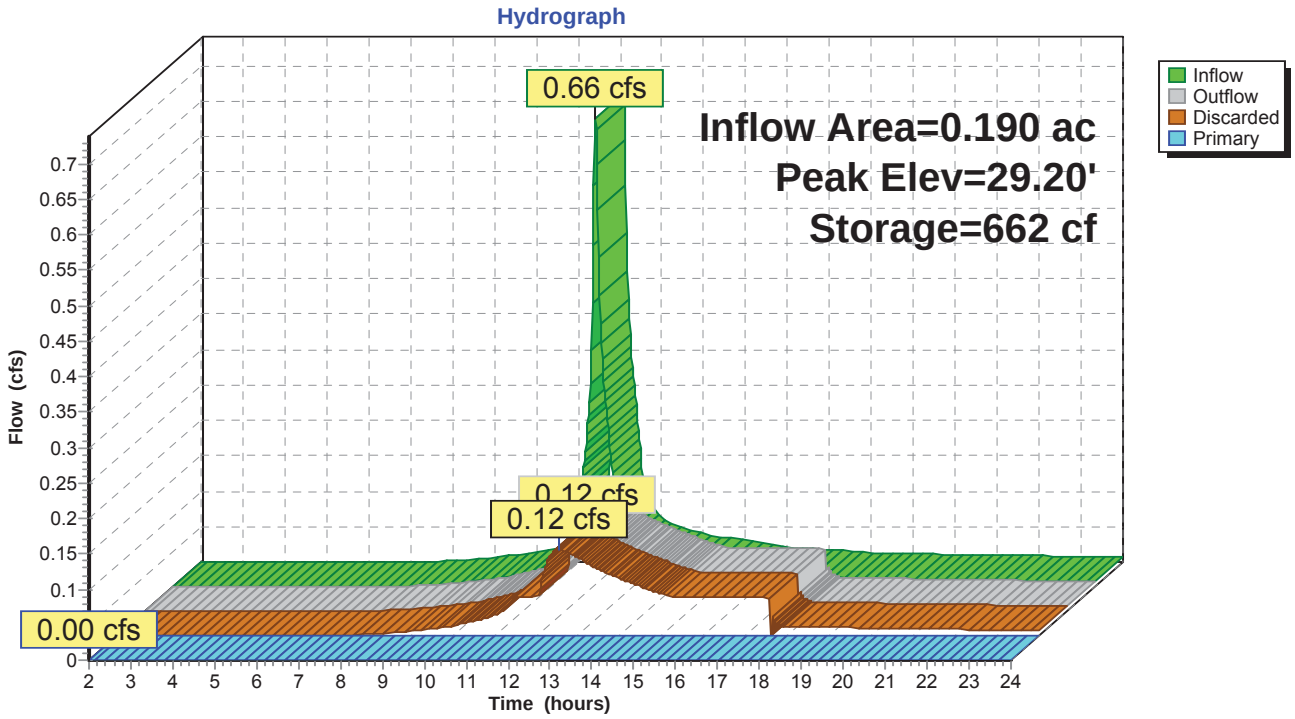
Pond 308P: DMH 2



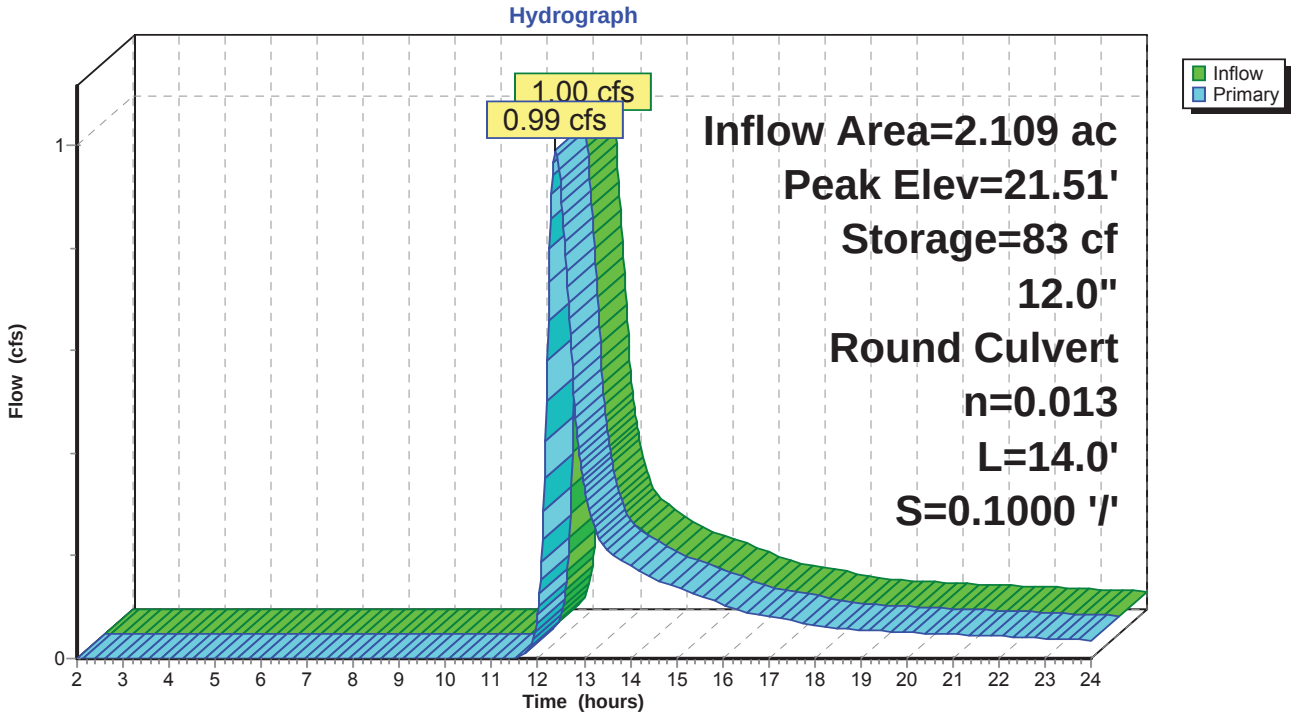
Pond 309P: SC-740.2



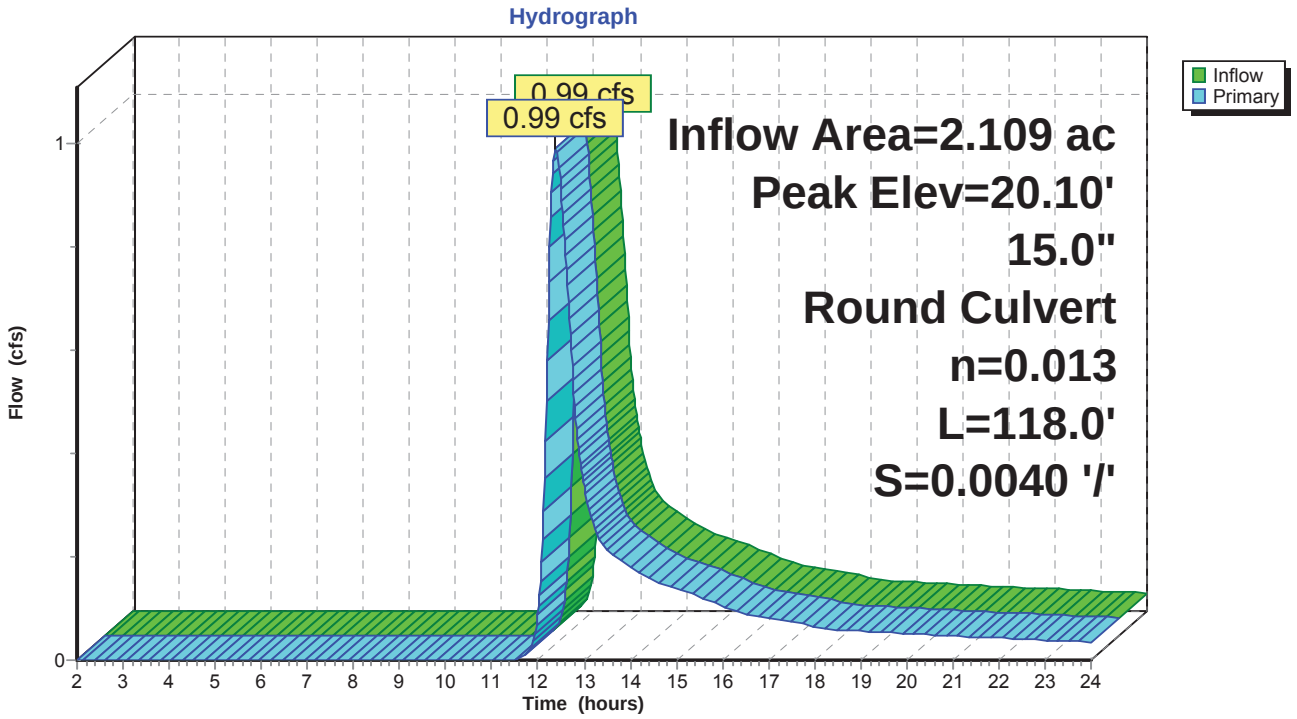
Pond 310P: RB1



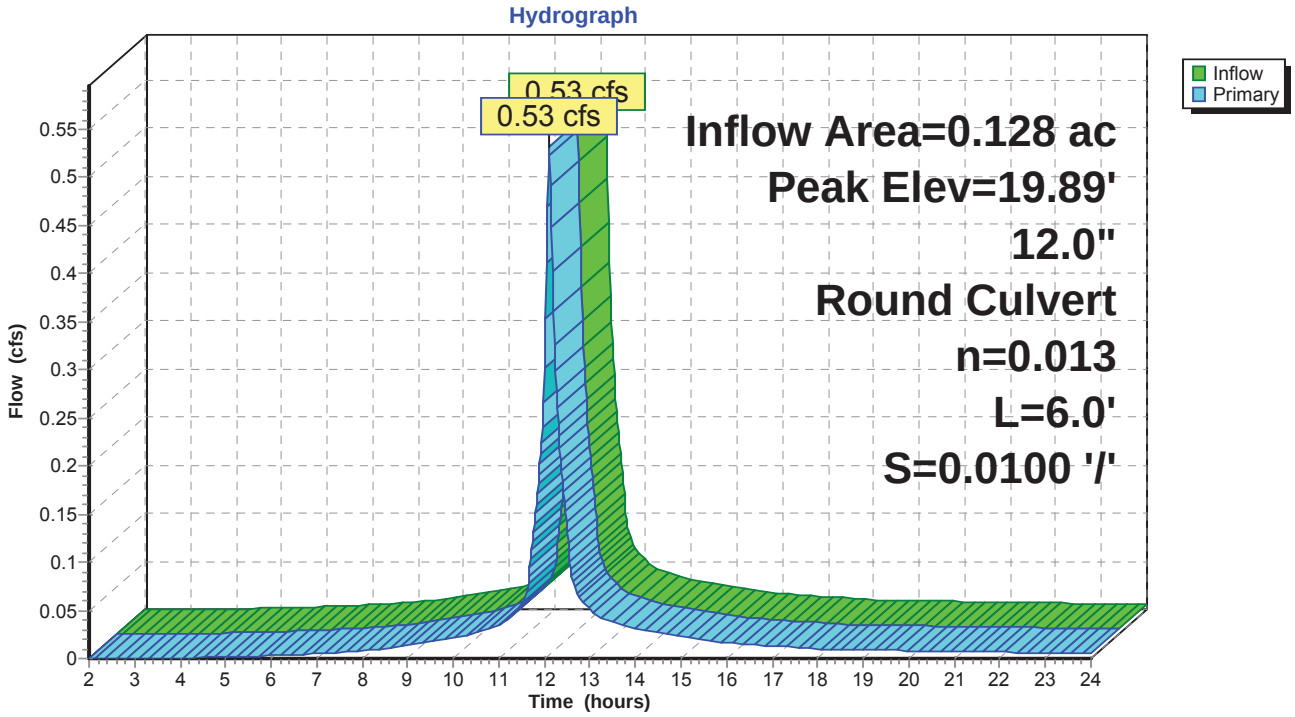
Pond 311P: HW3



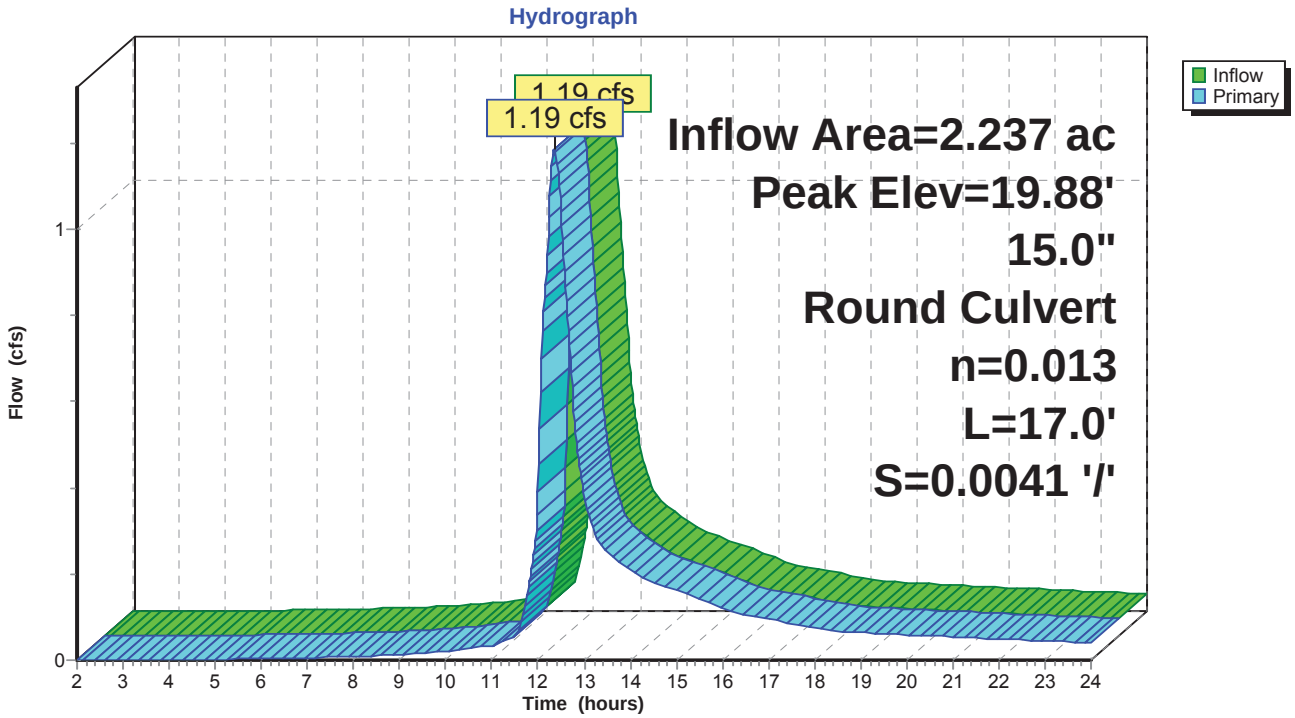
Pond 312P: DMH3



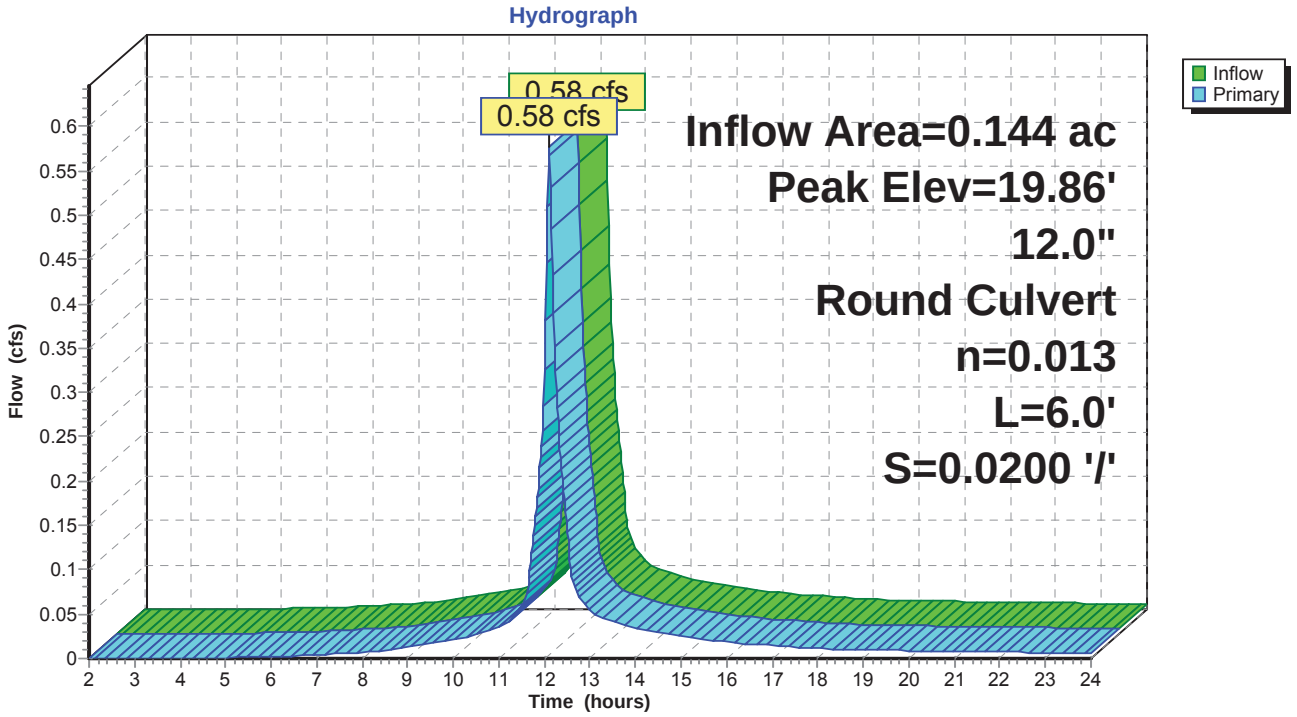
Pond 313P: CB6



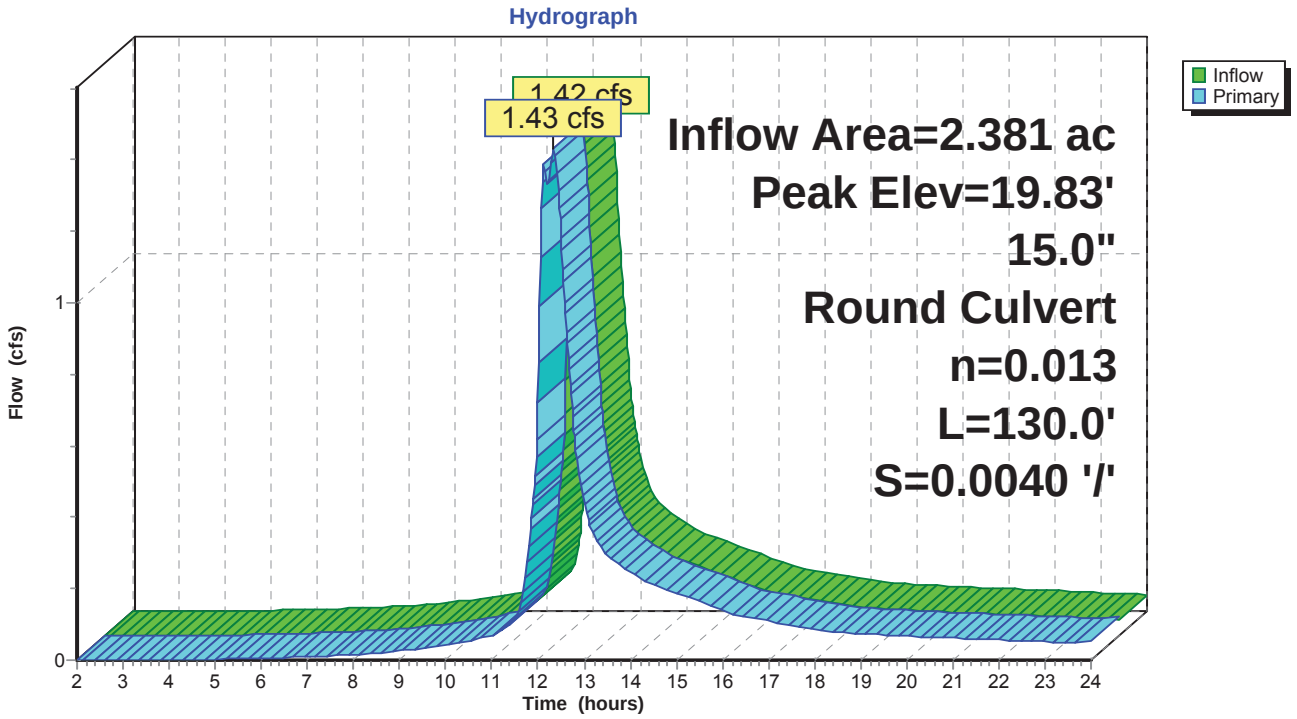
Pond 314P: DMH4



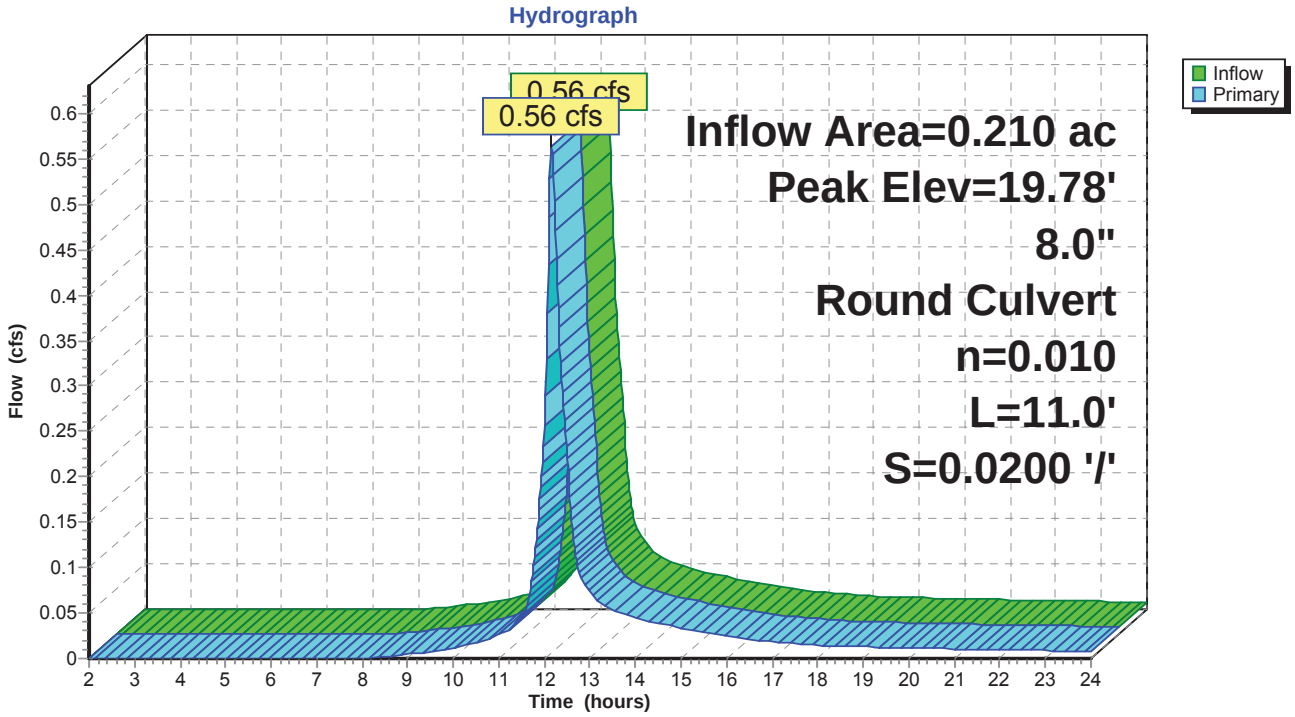
Pond 401P: CB7



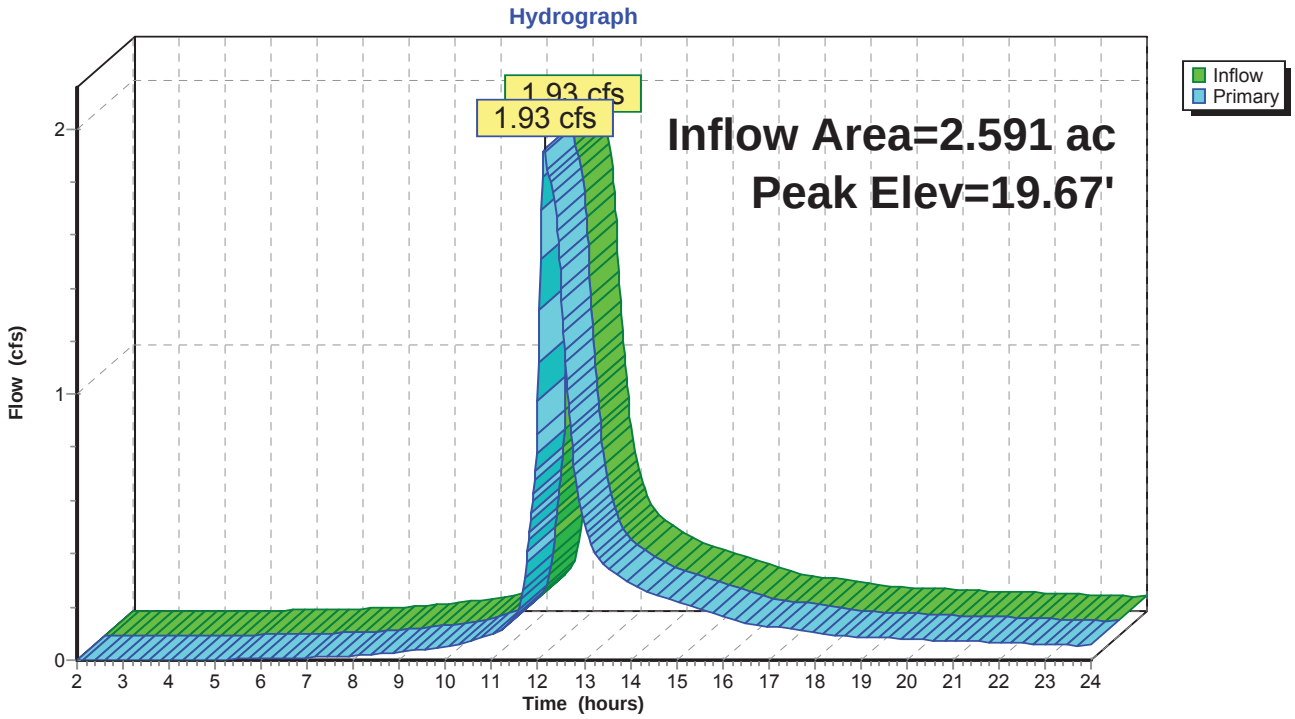
Pond 402P: DMH5



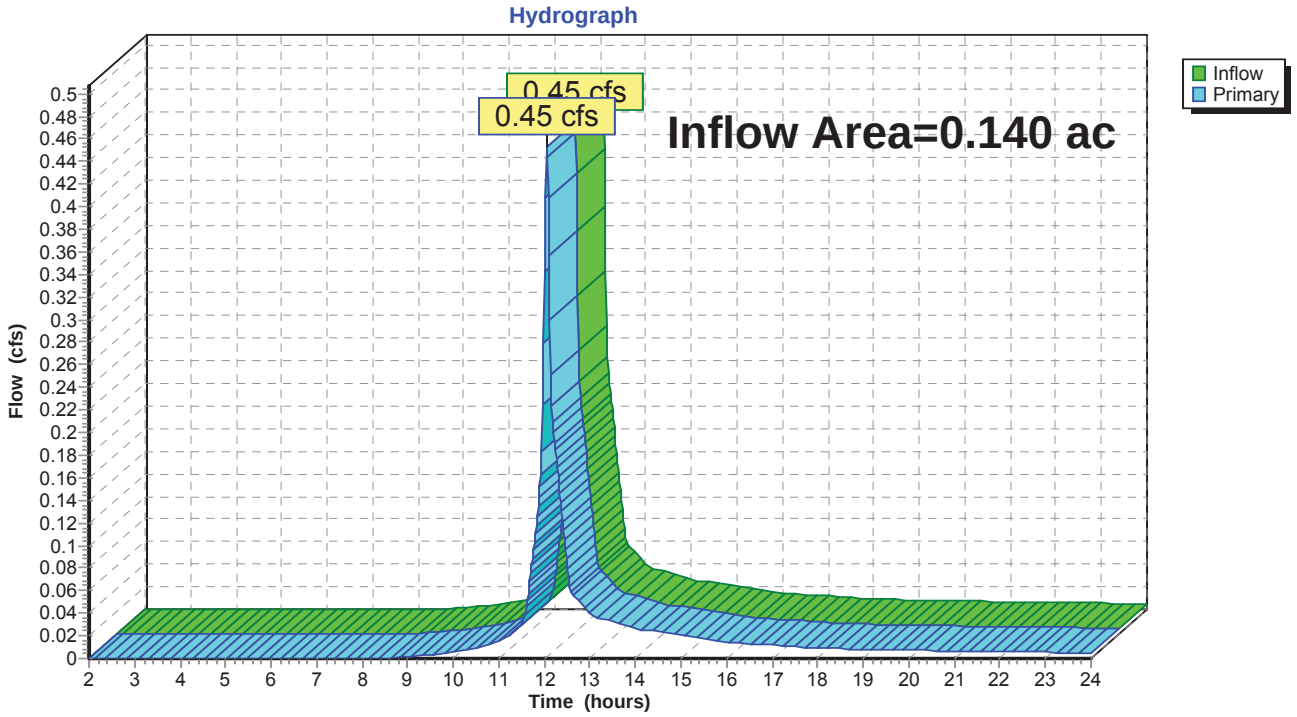
Pond 403P: CB8



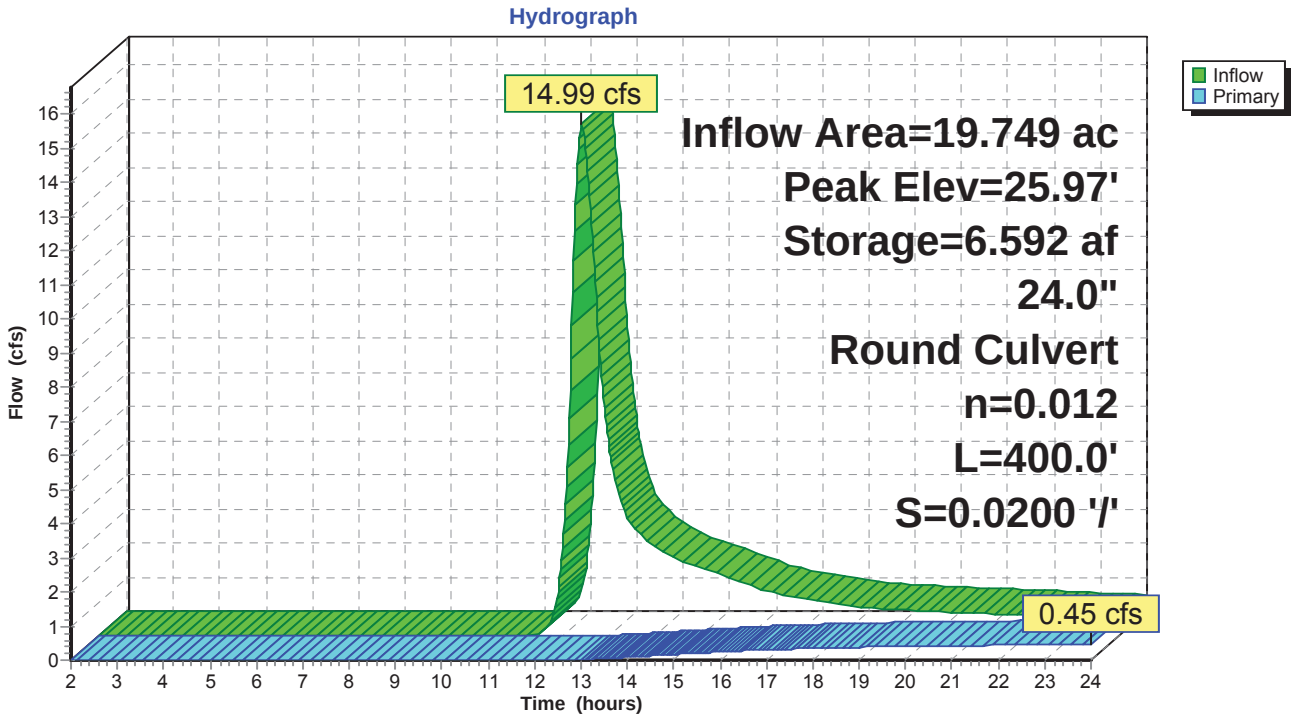
Pond 404P: DMH6



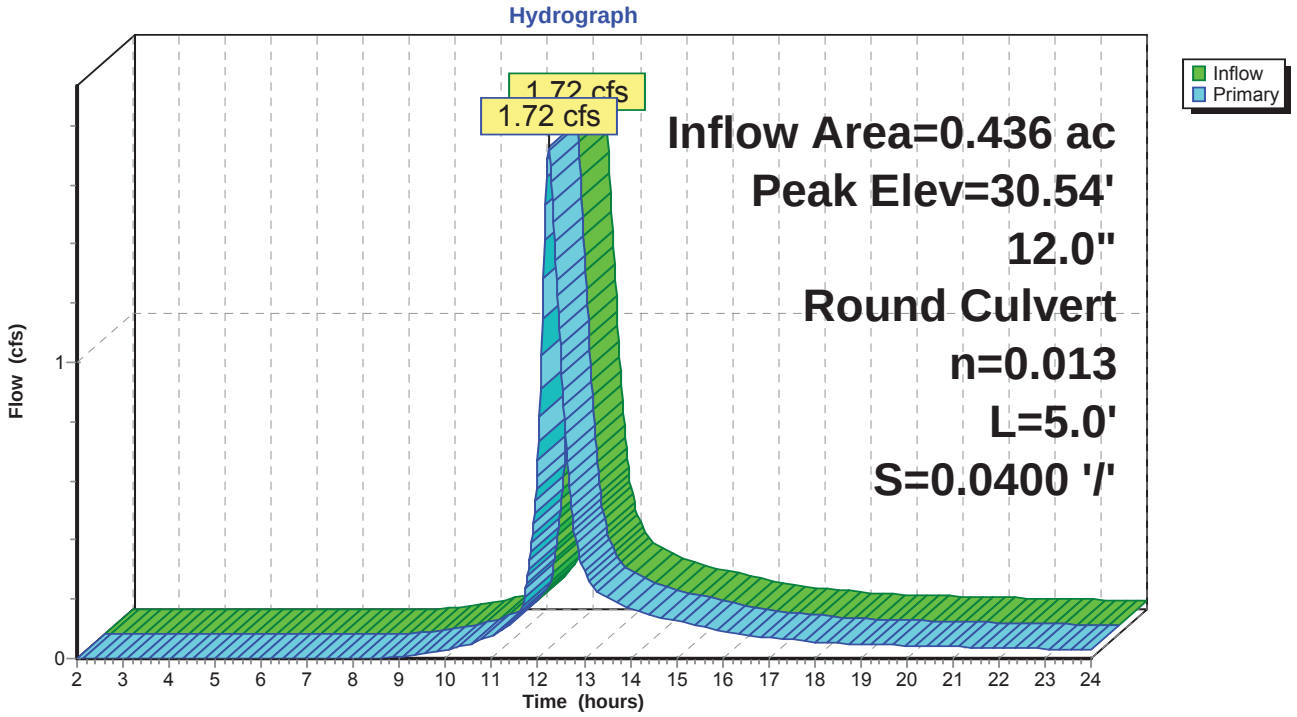
Pond E1P: EXIST. CB



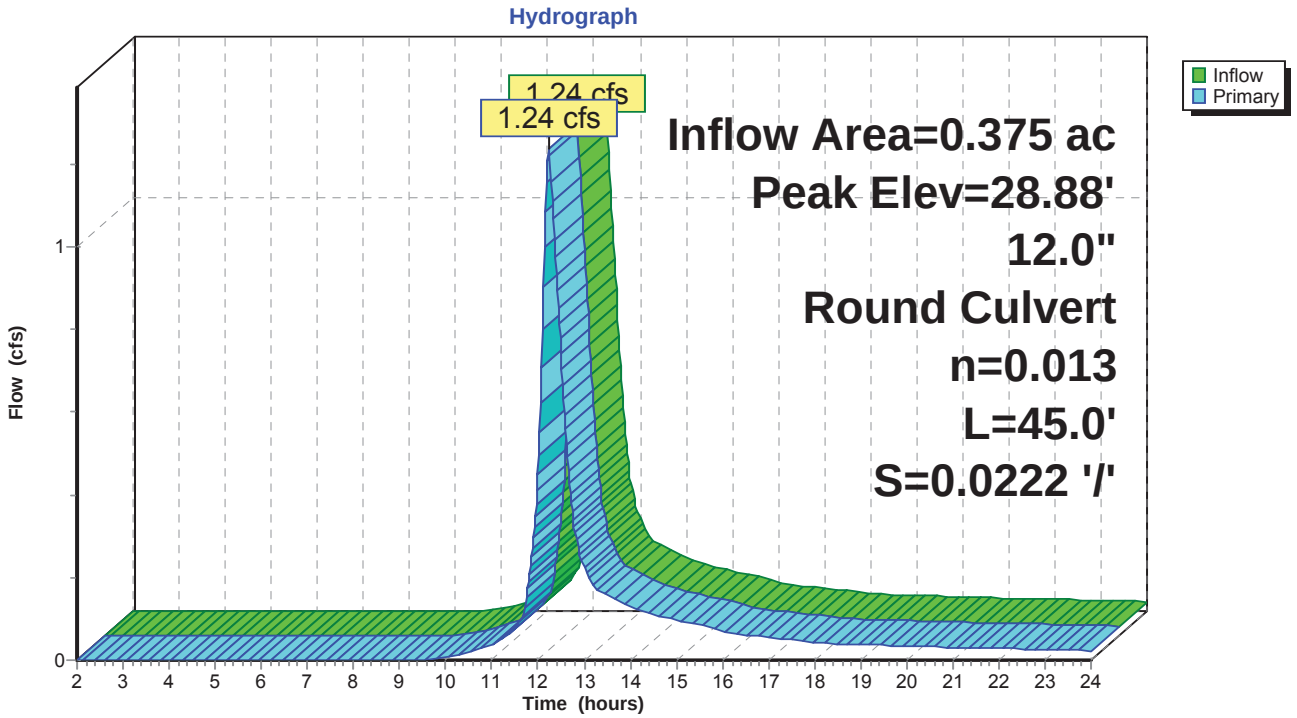
Pond E2P: EXIST. POND



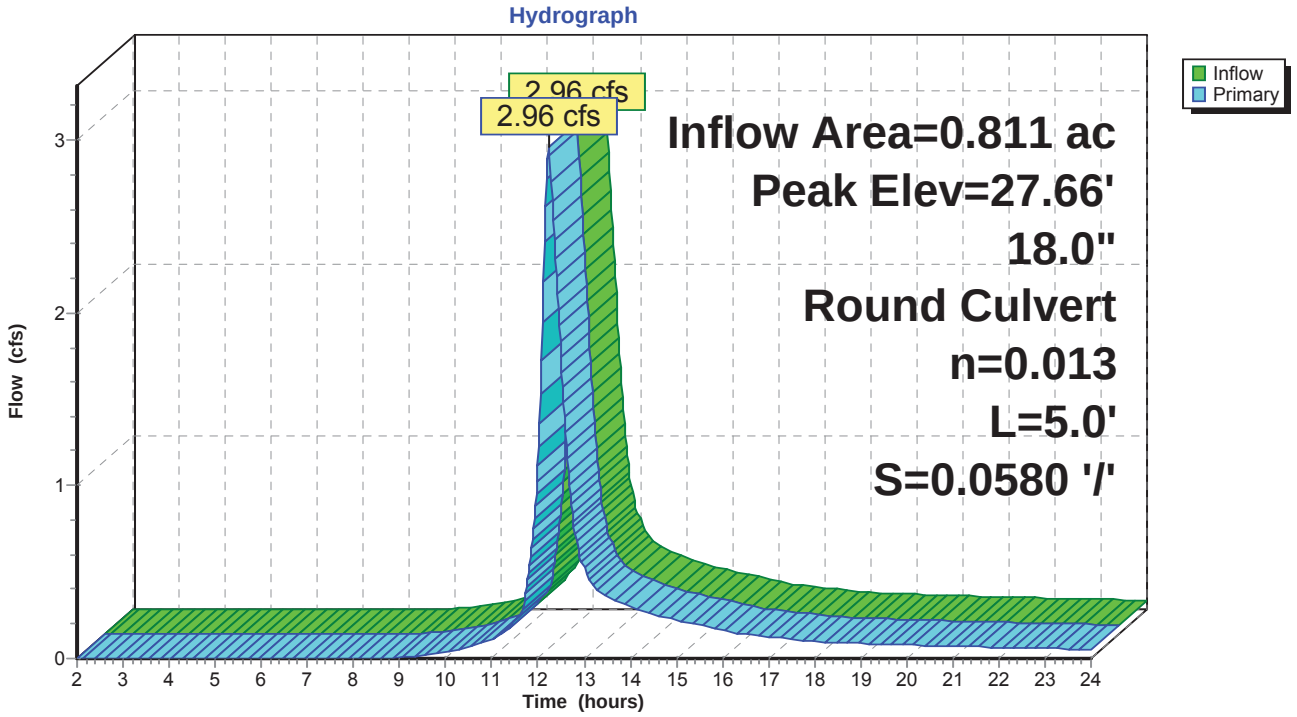
Pond 301P: CB1



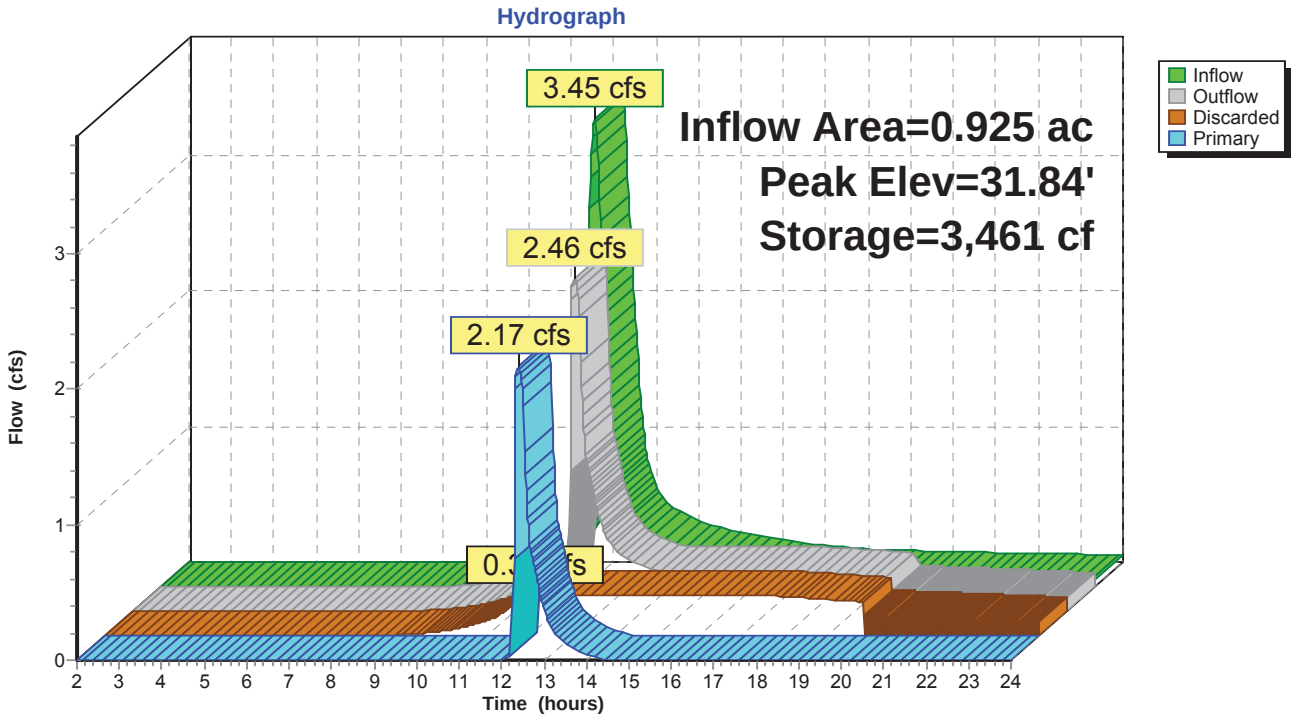
Pond 302P: CB2



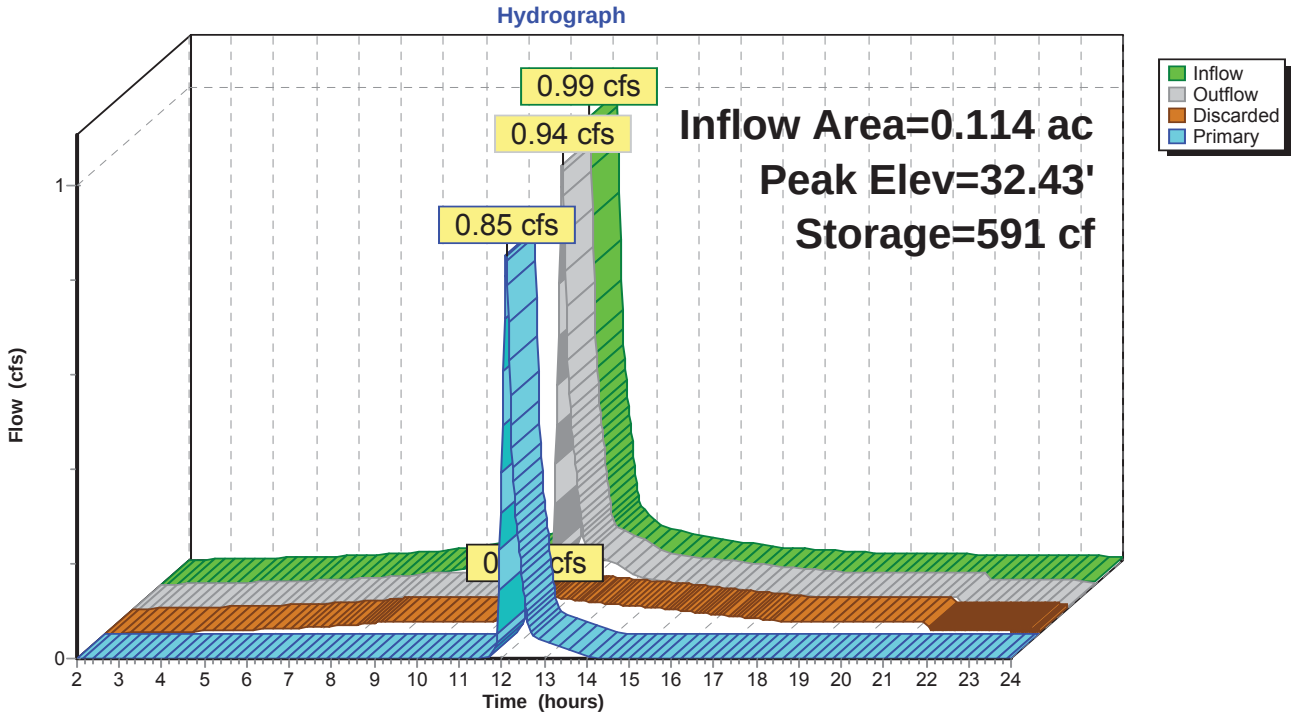
Pond 303P: DMH 1



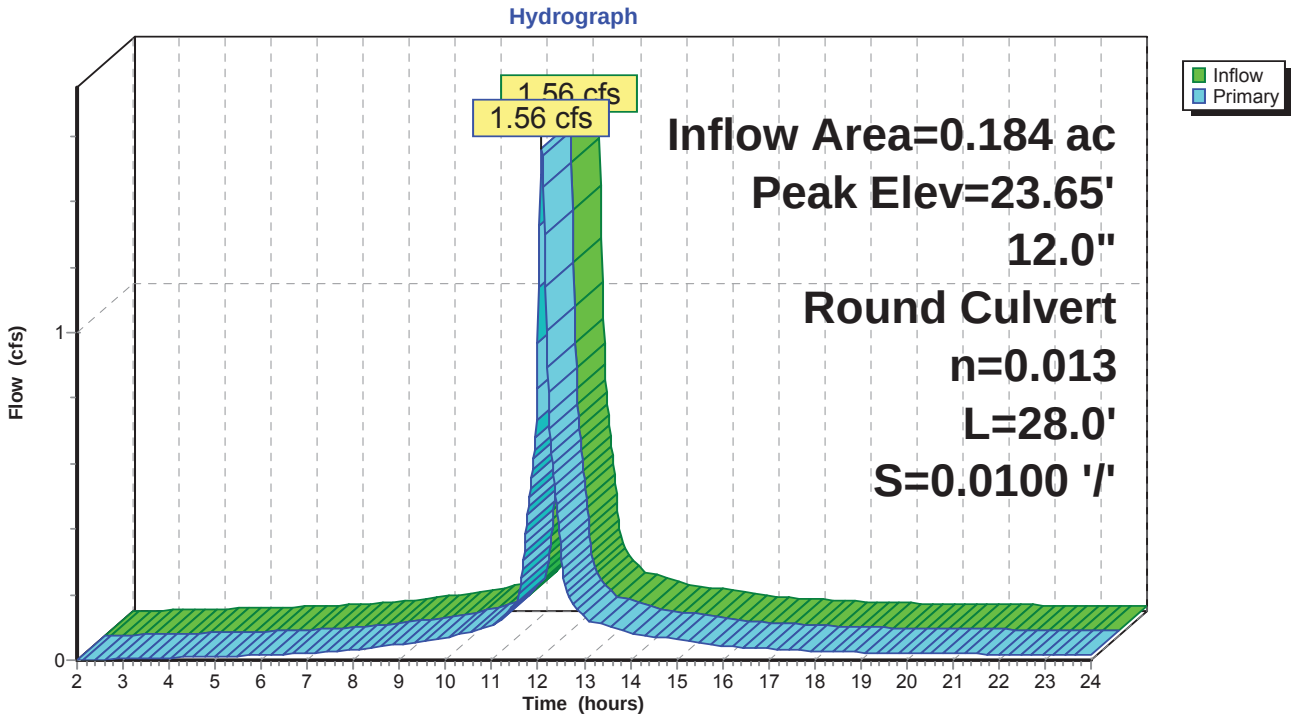
Pond 304P: SC-740.1



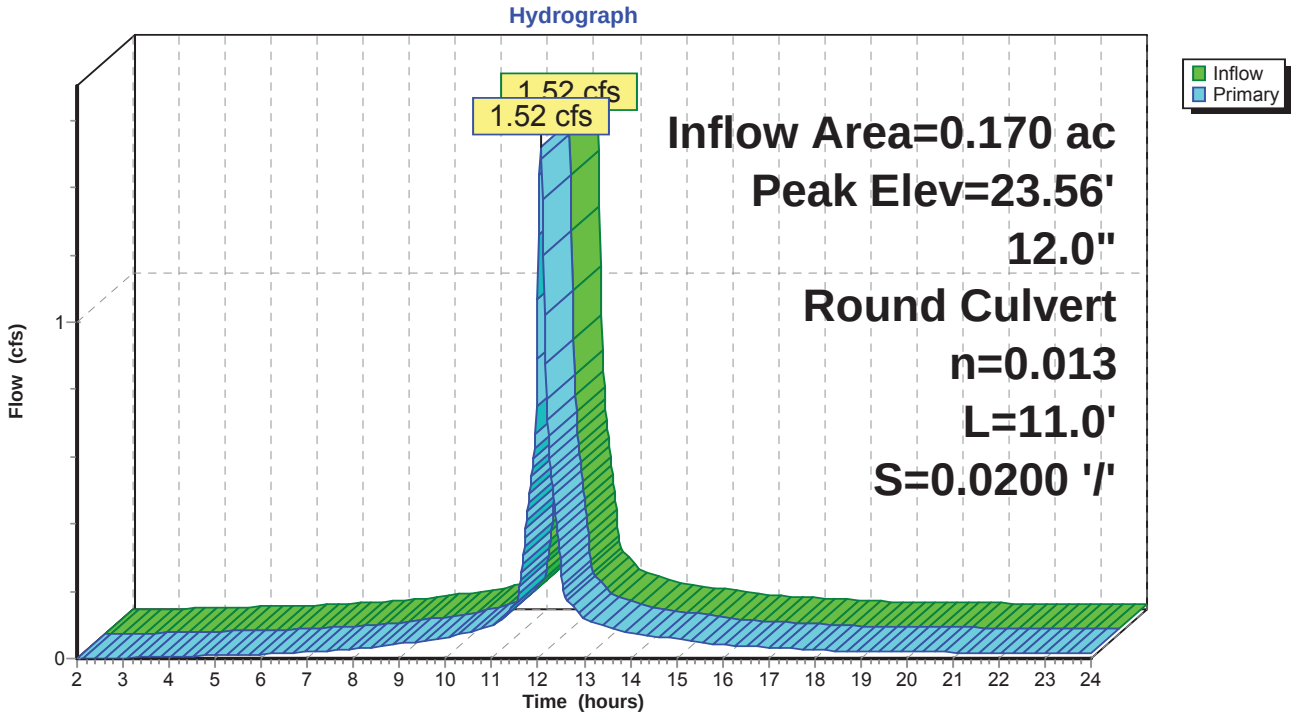
Pond 305P: RB1



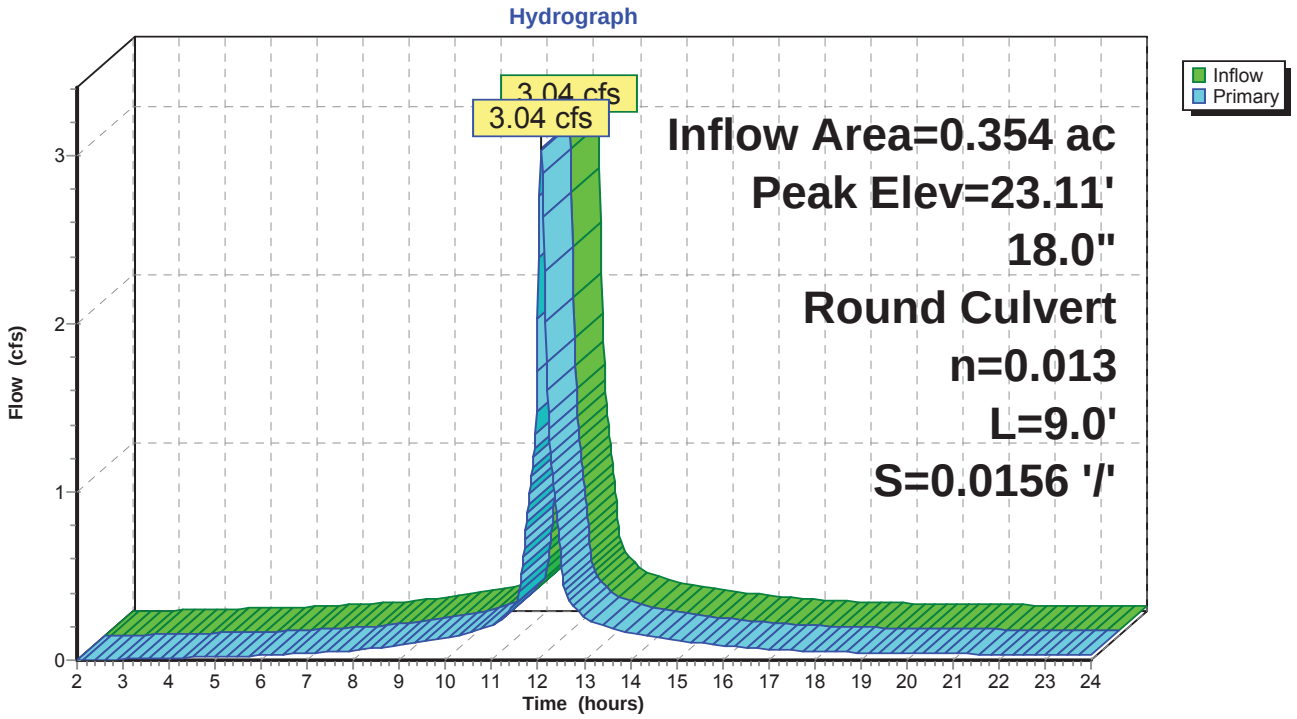
Pond 306P: CB3



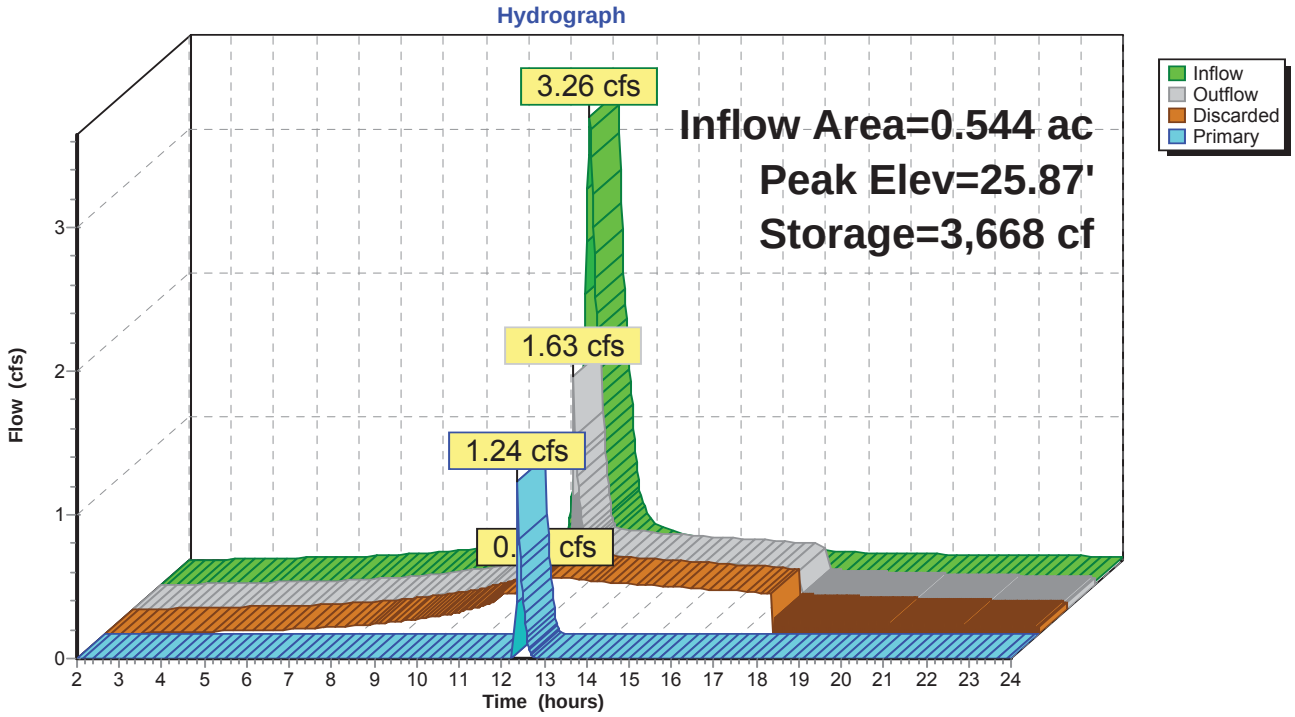
Pond 307P: CB4



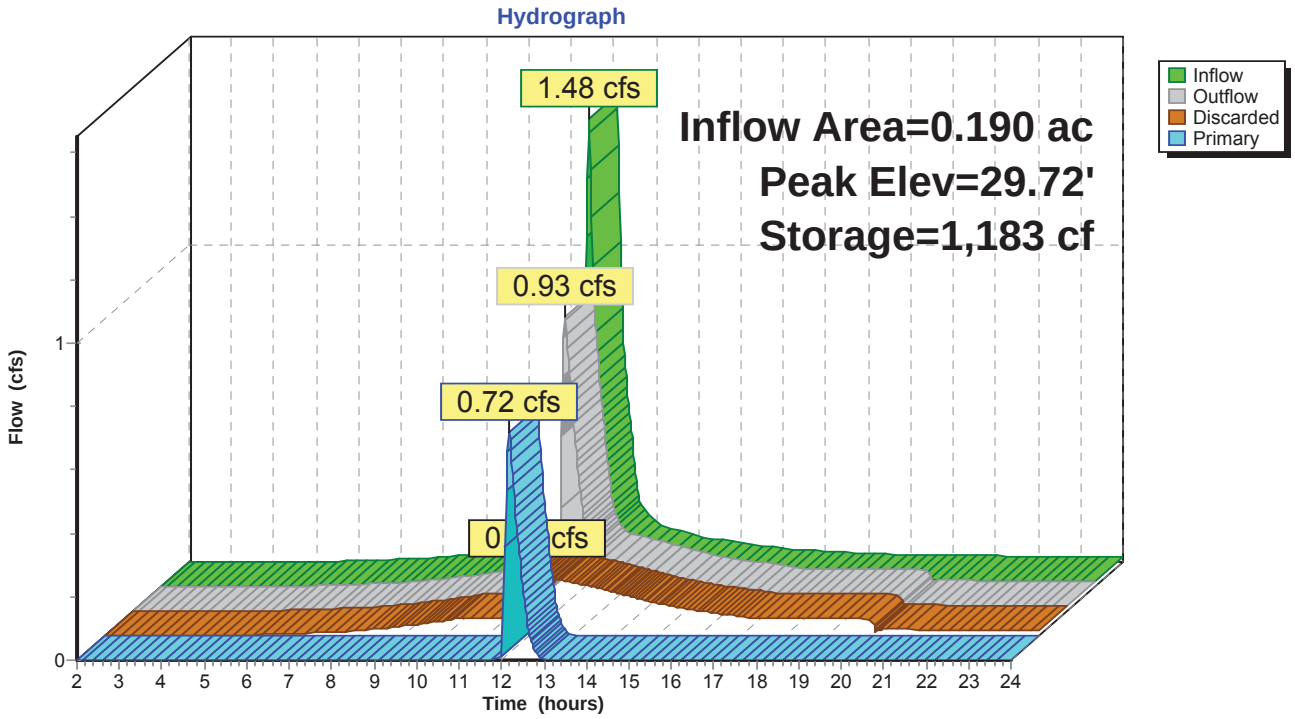
Pond 308P: DMH 2



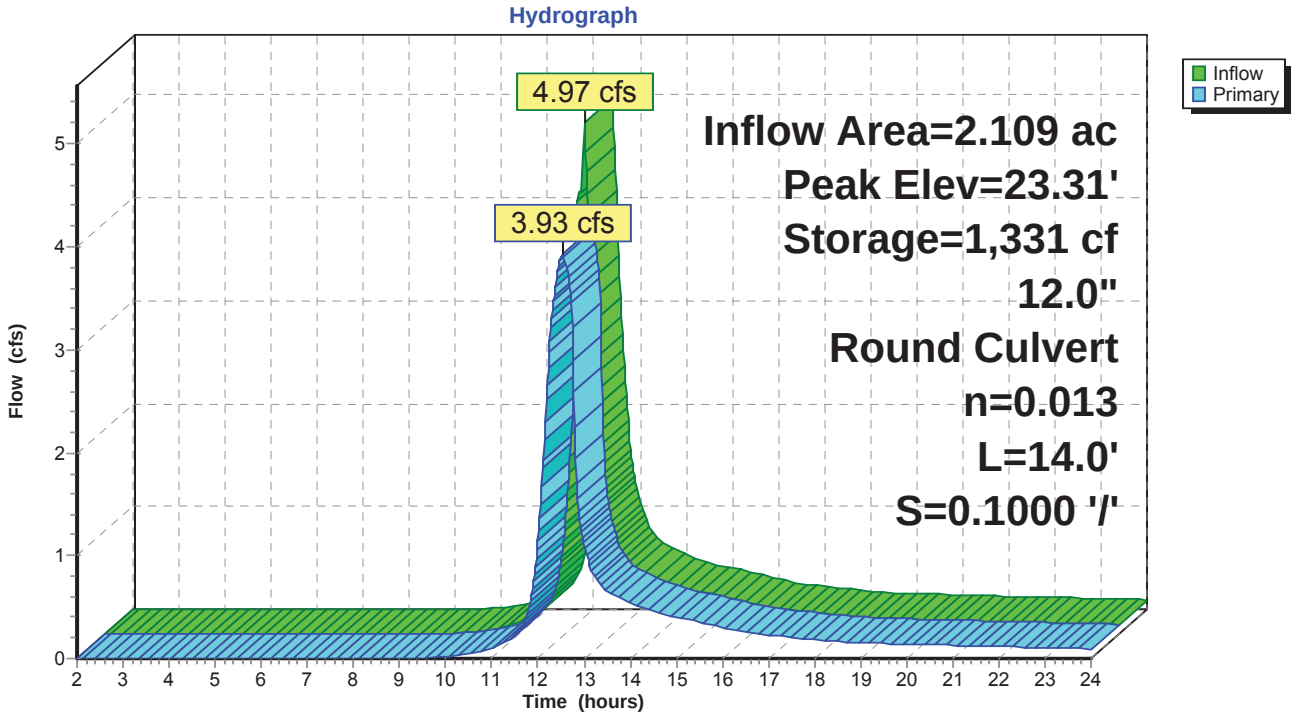
Pond 309P: SC-740.2



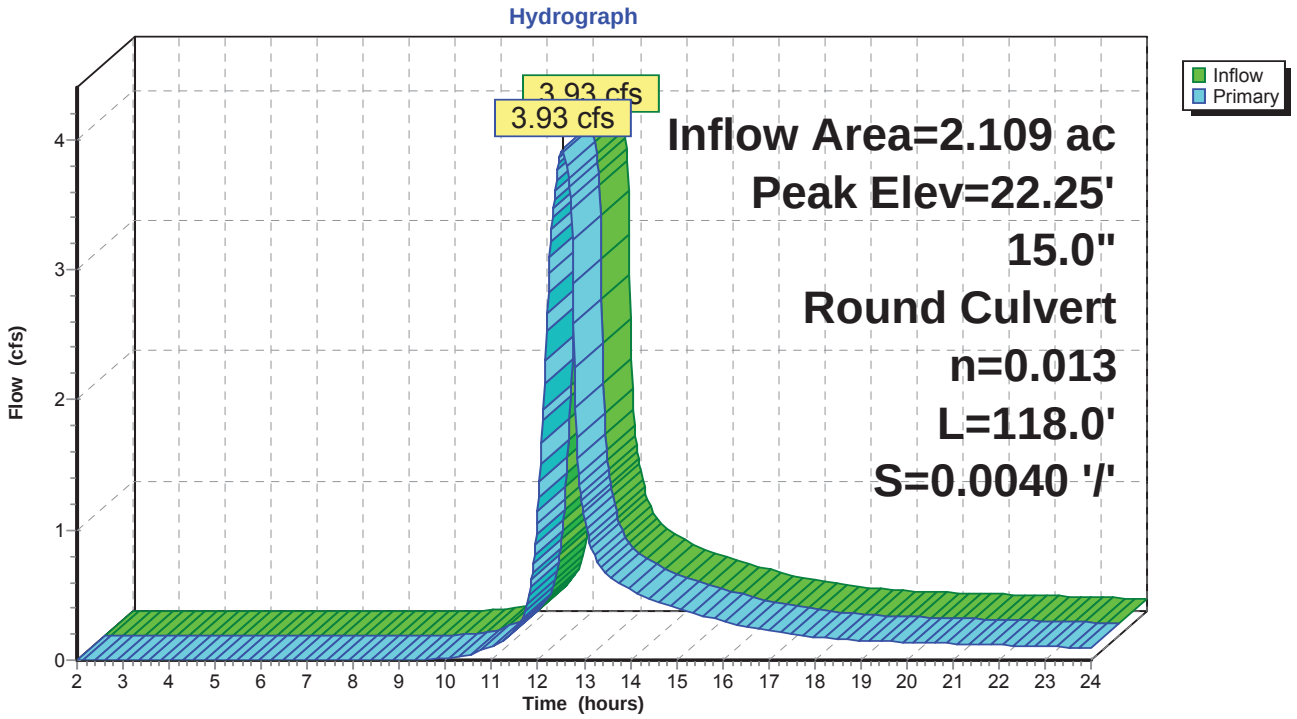
Pond 310P: RB1



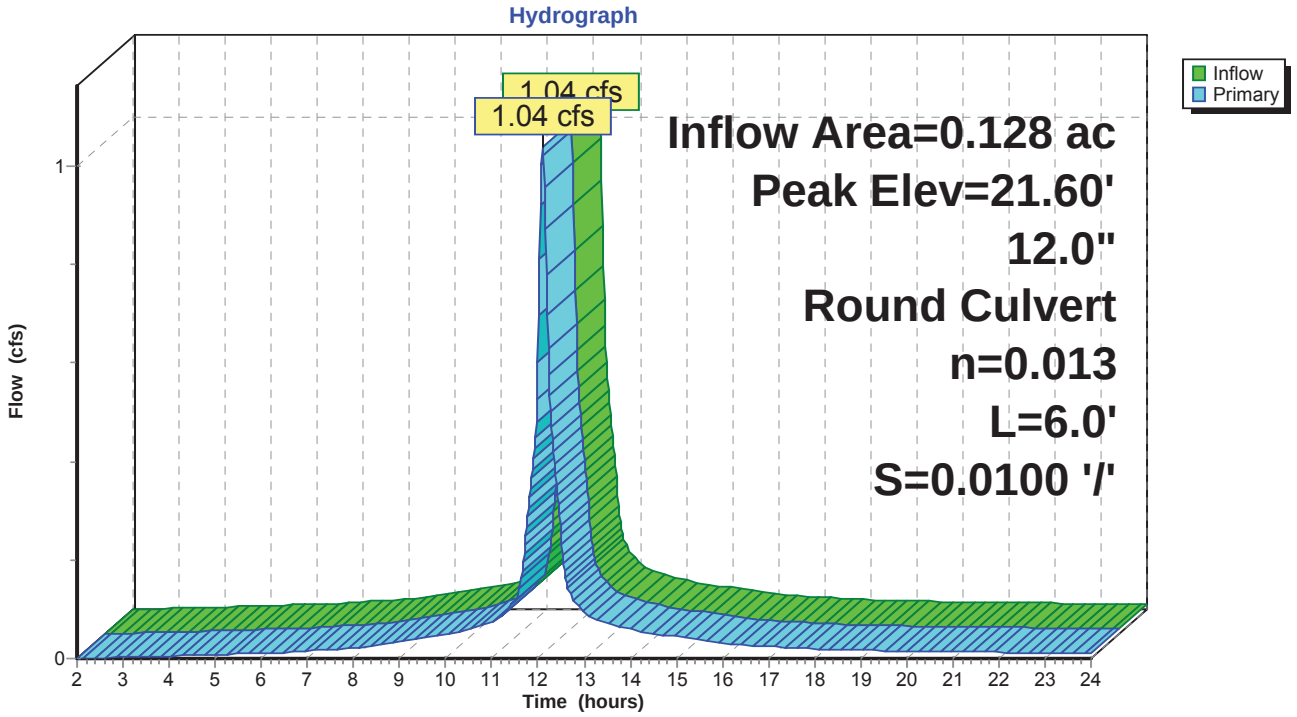
Pond 311P: HW3



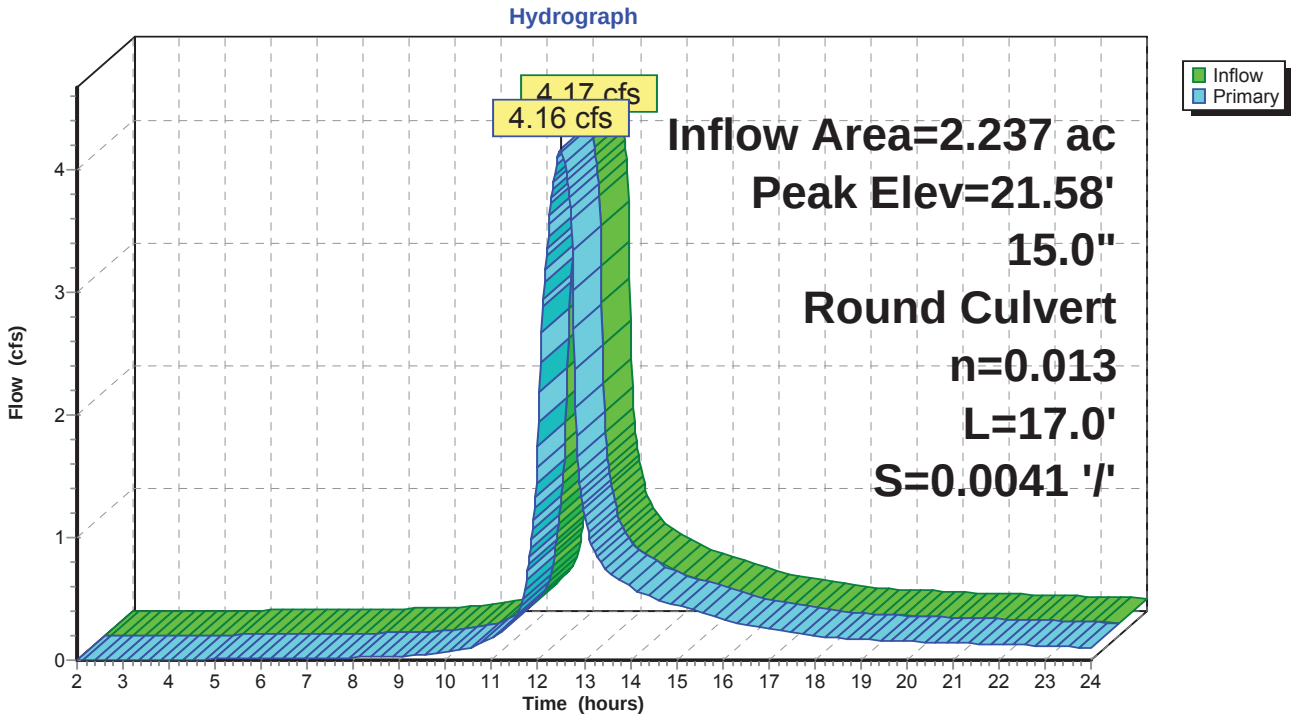
Pond 312P: DMH3



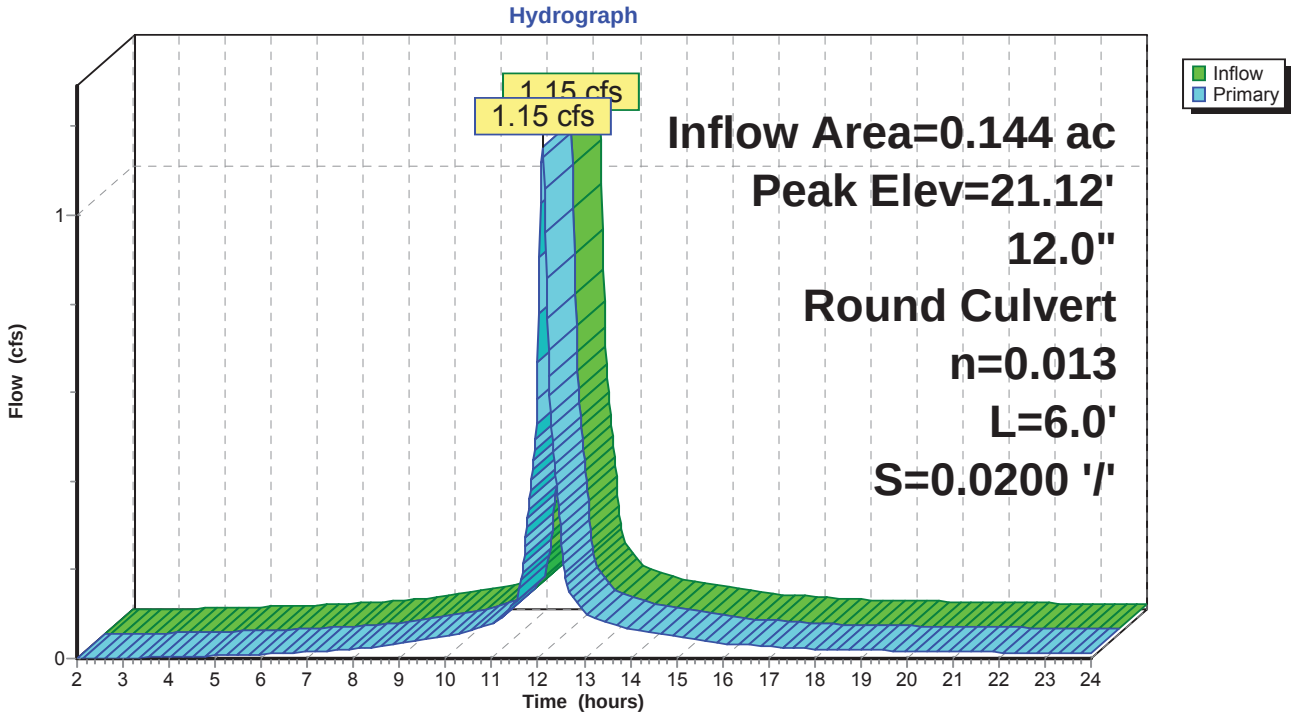
Pond 313P: CB6



Pond 314P: DMH4



Pond 401P: CB7



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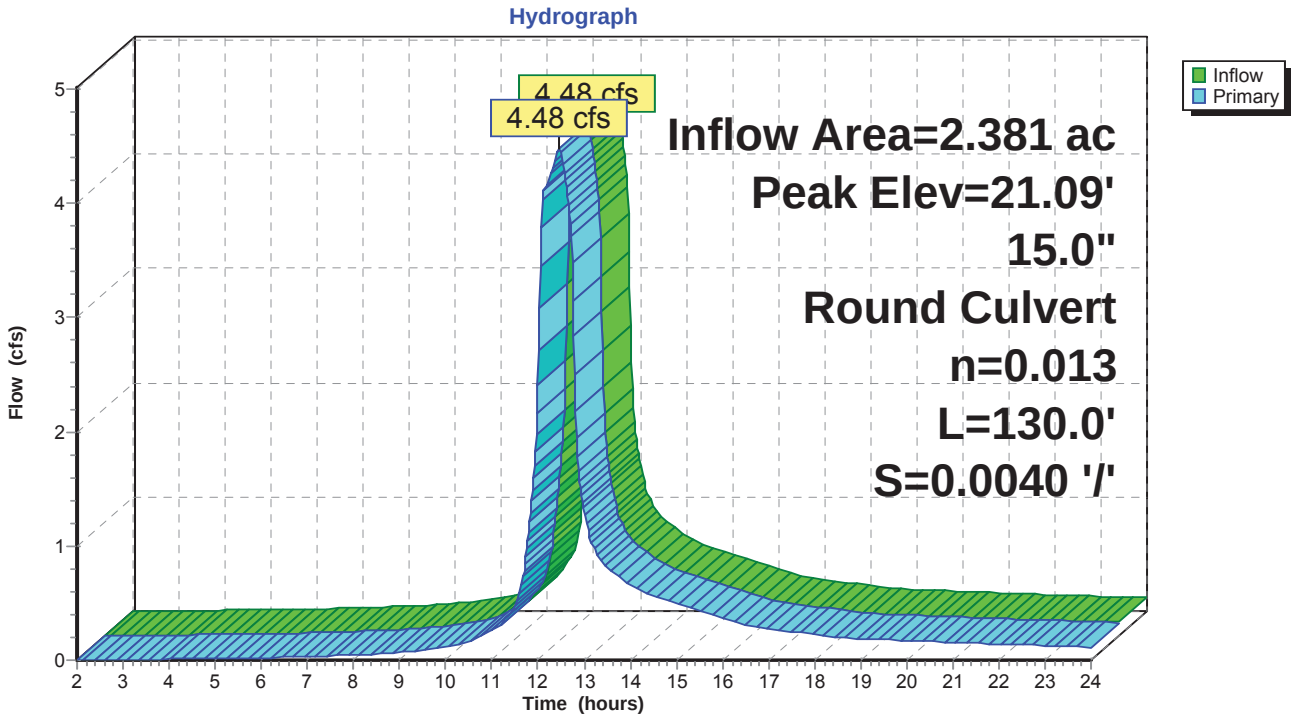

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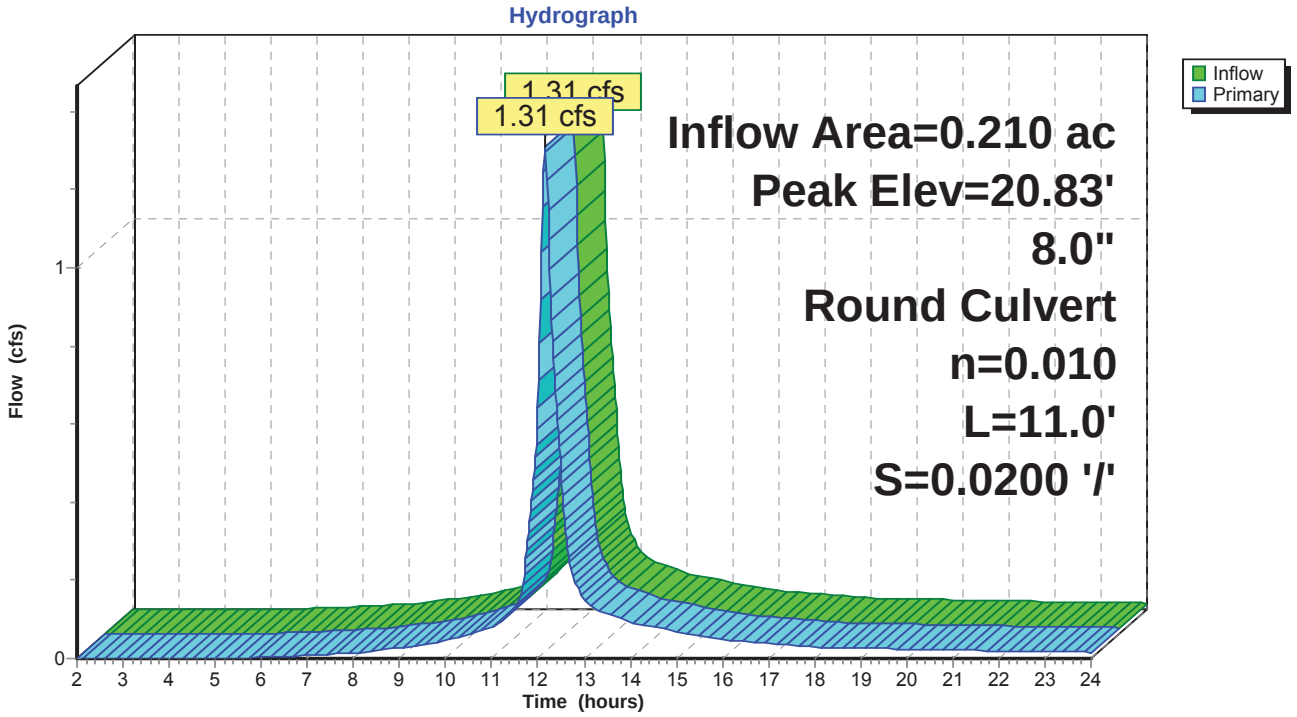

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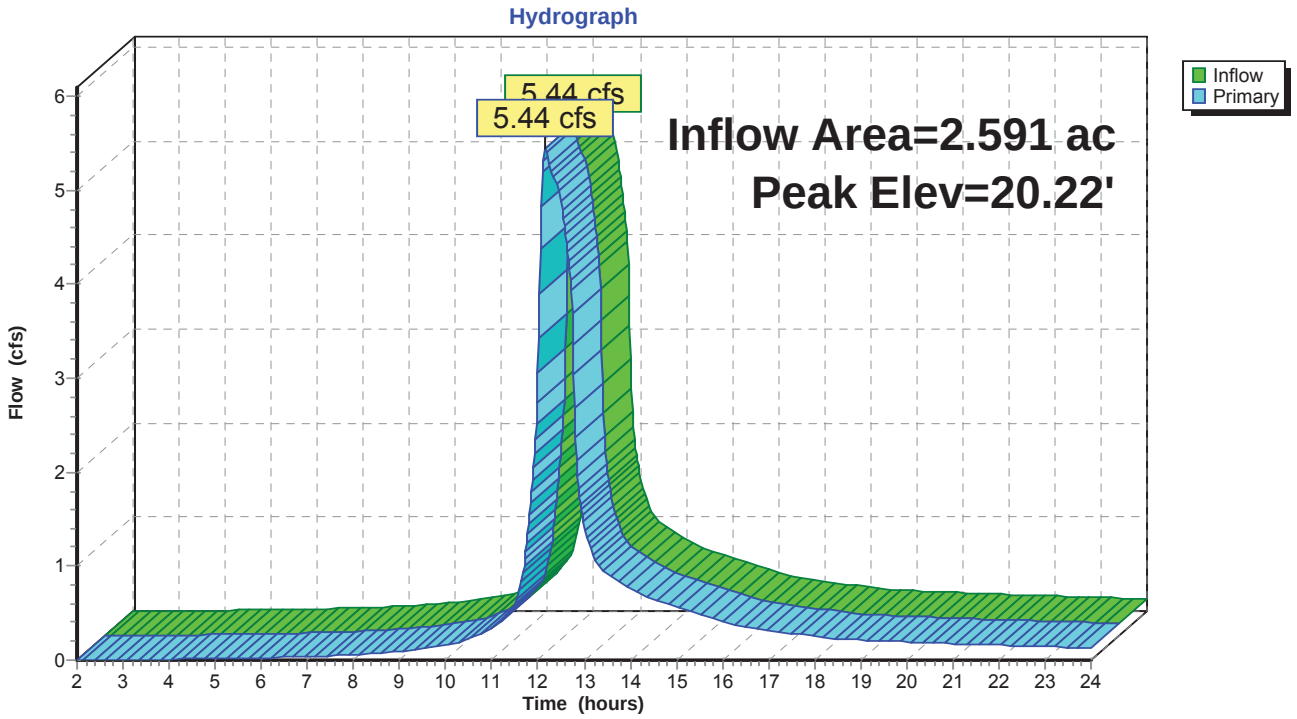
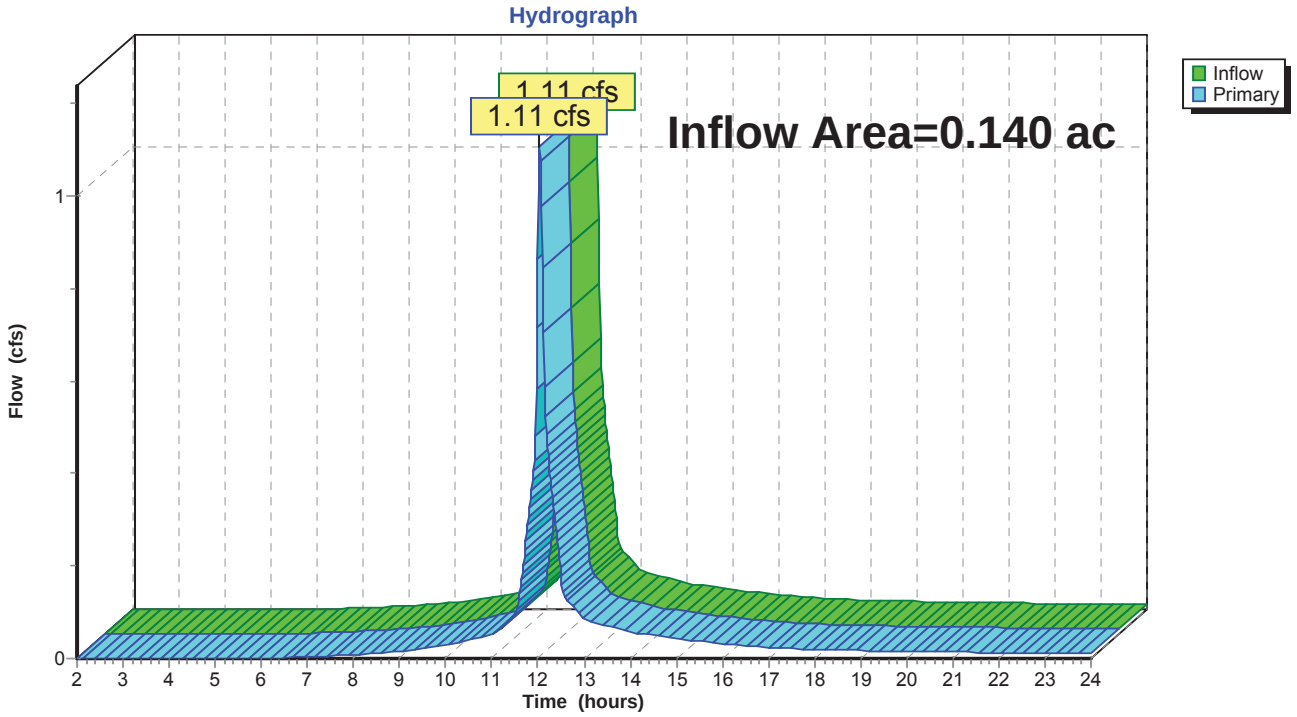
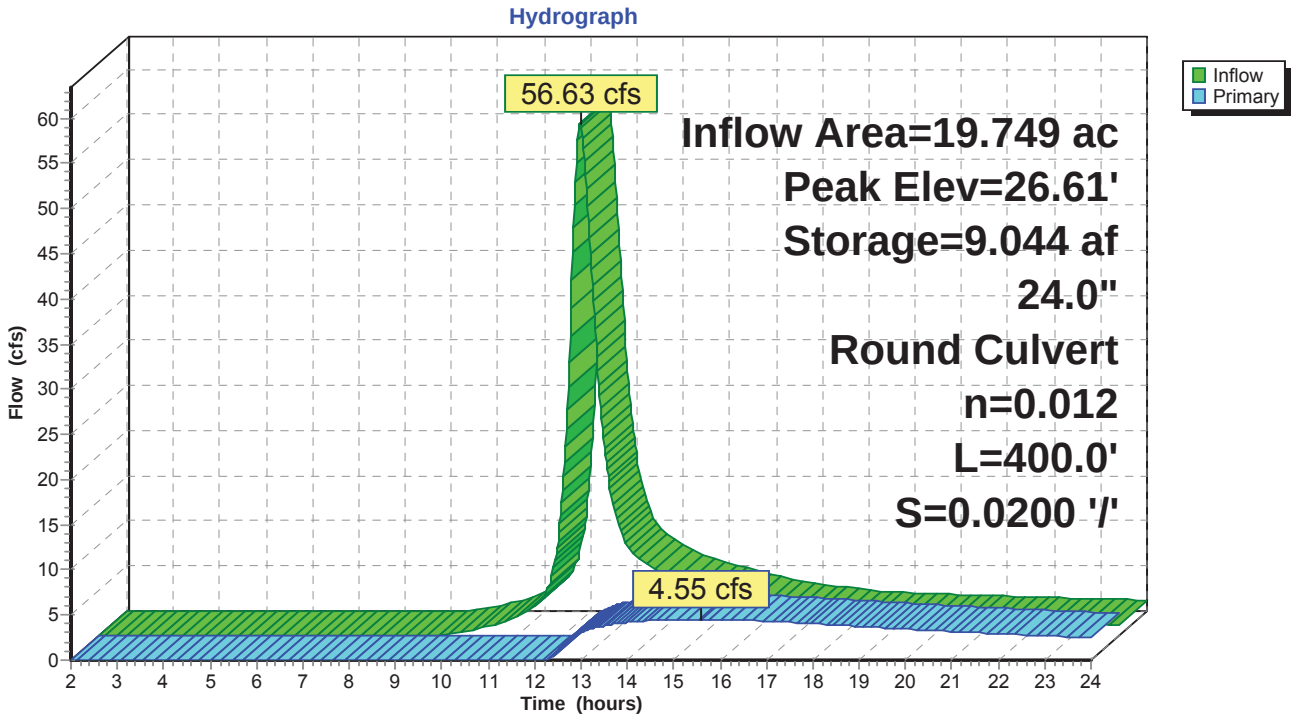


Pond E1P: EXIST. CB



Pond E2P: EXIST. POND



Section 3.1

Treatment Train TSS Calculations

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Rain Garden 1 (RG1, Node 305P)

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Sediment Forebay	0.25	1.00	0.25	0.75
Bioretention Area	0.90	0.75	0.68	0.08
	0.00	0.08	0.00	0.08
	0.00	0.08	0.00	0.08
	0.00	0.08	0.00	0.08

Total TSS Removal = 93%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Parker Hill
Prepared By: NRC
Date: 11/2/2017

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Rain Garden 2 (RG2, Node 310P)

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Grass Channel	0.50	1.00	0.50	0.50
Bioretention Area	0.90	0.50	0.45	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05
	0.00	0.05	0.00	0.05

Total TSS Removal = 95%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Parker Hill
Prepared By: NRC
Date: 11/2/2017

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Infiltration Basin SC-740.1 (Node 304P)

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
ISOLATOR ROW	0.80	0.75	0.60	0.15
Subsurface Infiltration Structure	0.80	0.15	0.12	0.03
	0.00	0.03	0.00	0.03
	0.00	0.03	0.00	0.03

Total TSS Removal = 97%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Parker Hill
Prepared By: NRC
Date: 11/2/2017

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Infiltration Basin SC-740.2 (Node 309P)

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Deep Sump and Hooded Catch Basin	0.25	1.00	0.25	0.75
ISOLATOR ROW	0.80	0.75	0.60	0.15
Subsurface Infiltration Structure	0.80	0.15	0.12	0.03
	0.00	0.03	0.00	0.03
	0.00	0.03	0.00	0.03

Total TSS Removal = 97%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Parker Hill
Prepared By: NRC
Date: 11/2/2017

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed
1. From MassDEP Stormwater Handbook Vol. 1

INSTRUCTIONS:
1. In BMP Column, click on Blue Cell to Activate Drop Down Menu
2. Select BMP from Drop Down Menu
3. After BMP is selected, TSS Removal and other Columns are automatically completed.

Version 1, Automated: Mar. 4, 2008

Location: Water Quality Swale 1 (Node 304R)

TSS Removal Calculation Worksheet

B BMP[1]	C TSS Removal Rate[1]	D Starting TSS Load*	E Amount Removed (C*D)	F Remaining Load (D-E)
Grass Channel	0.50	1.00	0.50	0.50
Water Quality Swale - Dry	0.70	0.50	0.35	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15
	0.00	0.15	0.00	0.15

Total TSS Removal = 85%

Separate Form Needs to be Completed for Each Outlet or BMP Train

Project: Parker Hill
Prepared By: NRC
Date: 11/2/2017

*Equals remaining load from previous BMP (E) which enters the BMP

Non-automated TSS Calculation Sheet must be used if Proprietary BMP Proposed

1. From MassDEP Stormwater Handbook Vol. 1

Section 3.2

Test Pit Data

FIELDSTONE
LAND CONSULTANTS, PLLC
Surveying ◆ Engineering
Land Planning ◆ Septic Designs
206 Elm Street, Milford, NH 03055 - Phone: 603-672-5456 - Fax: 603-413-5456
www.FieldstoneLandConsultants.com

TEST PIT DATA
PARKER HILL
PARCEL 34-8-A
2 PARKER STREET
NEWBURYPORT, MA

9/28/17
Test Pit # 1
0-6"– 10YR 3/3 Dark Brown loam
6-22"- 2.5Y 4/4 Olive Brown, silt loam, blocky, firm
22-70"- 2.5Y 4/4 Olive Brown, clay-silt loam, blocky very firm
ESHWT = 24" Observed Water = None Ledge/Boulders = None Roots =24"

9/28/17
Test Pit # 2
0-10"– 10YR 3/3 Dark Brown loam
10-18"- 10YR 4/6 Dark Yellowish Brown, silt loam, massive, friable
18-33"- 2.5Y 4/3 Olive Brown, clay-silt loam, blocky, firm
33-70"- 2.5Y 4/4 Olive Brown, clay-silt loam, blocky, very firm
ESHWT = 24" Observed Water = None Ledge/Boulders = None Roots =28"

9/28/17
Test Pit # 3
0-10"– 10YR 3/3 Dark Brown loam
10-36"- 2.5Y 6/6 Olive Yellow fine sand, single grain, loose
36-156"- 2.5Y 7/3 Pale Yellow fine sand, single grain, loose
ESHWT = >156" Observed Water = None Ledge/Boulders = None Roots =120"

9/28/17
Test Pit # 4
0-12"– 10YR 3/3 Dark Brown loam
12-42"- 2.5Y 6/6 Olive Yellow fine sand, single grain, loose
42-140"- 2.5Y 7/3 Pale Yellow fine sand, single grain, loose
ESHWT = >140" Observed Water = None Ledge/Boulders = None Roots =120"

1486.00

9/28/17
Test Pit # 5
0-10”– 10YR 3/3 Dark Brown loam
10-30”- 2.5Y 5/6 Light Olive Brown fine sand, massive, friable
30-55”- 2.5Y 6/6 Olive Yellow fine sand, single grain, loose
55-120”- 2.5Y 7/3 Pale Yellow fine sand, single grain, loose
ESHWT = >120” **Observed Water = None** **Ledge/Boulders = None** **Roots =120”**

9/28/17
Test Pit # 6
0-10”– 10YR 3/3 Dark Brown loam
10-30”- 10YR 5/6 Yellowish Brown med-coarse sand, single grain, loose
30-130”- 2.5Y 6/6 Olive Yellow med-coarse sand, single grain, loose
ESHWT = >130” **Observed Water = None** **Ledge/Boulders = None** **Roots =96”**

9/28/17
Test Pit # 7
0-10”– 10YR 3/3 Dark Brown loam
10-28”- 10YR 5/6 Yellowish Brown med-coarse sand, single grain, loose
28-120”- 2.5Y 6/6 Olive Yellow med-coarse sand, single grain, loose
ESHWT = >120” **Observed Water = None** **Ledge/Boulders = None** **Roots =96”**

9/28/17
Test Pit # 8
0-10”– 10YR 3/3 Dark Brown loam
10-70”- 2.5Y 4/4 Olive Brown, clay-silt loam, blocky very firm
ESHWT = 24”* (Perched) **Observed Water = None** **Ledge/Boulders = None** **Roots =24”**

9/28/17
Test Pit # 9
0-10”– 10YR 3/3 Dark Brown loam
10-70”- 2.5Y 4/4 Olive Brown, clay-silt loam, blocky very firm
ESHWT = 24”* (Perched) **Observed Water = None** **Ledge/Boulders = None** **Roots =26”**

9/28/17
Test Pit # 10
0-12"– 10YR 3/3 Dark Brown loam
12-30"- 10YR 5/6 Yellowish Brown fine-med sand, single grain, loose
30-60"- 2.5Y 6/6 Olive Yellow fine sand, single grain, loose
60-130"- 2.5Y 6/4 Light Olive Brown gravelly med-coarse sand, single grain, loose
ESHWT = >130" **Observed Water = None** **Ledge/Boulders = None** **Roots =96"**

9/28/17
Test Pit # 11
0-10"– 10YR 3/3 Dark Brown loam
10-48"- 2.5Y 4/4 Olive Brown, clay-silt loam, blocky very firm
ESHWT = 24"* (Perched) **Observed Water = None** **Ledge/Boulders = None** **Roots =20"**

Test pits conducted by:

Christopher A. Guida, CSS, CWS
Massachusetts Soil Evaluator #SE13488
NH Certified Soil Scientist #091

Section 3.3

Water Quality Flow Calculation
Support Documentation

Massachusetts Department of Environmental Protection Wetlands Program

Standard Method to Convert Required Water Quality Volume to a Discharge Rate for Sizing Flow Based Manufactured Proprietary Stormwater Treatment Practices

Effective October 15, 2013, computations following the standardized method must be submitted with a Wetlands Notice of Intent (NOI) when a proprietary manufactured stormwater treatment device sized using a flow rate is proposed in connection with work proposed in a wetland resource area or associated buffer zone. The computational method will primarily affect the sizing of the proprietary manufactured stormwater treatment separators, and not other types of stormwater treatment practices that are volume based (such as extended detention basins) or proprietary stormwater treatment filters sized using the Water Quality Volume (WQV).

Stormwater Standard No. 4 requires structural stormwater management practices to be sized to capture the required WQV in accordance with the Massachusetts Stormwater Handbook (310 CMR 10.05(6)(k)(4) and 314 CMR 9.06(6)(a)(4)) . Stormwater Standard No. 4 requires that the full WQV be captured and treated to remove 80% of the Total Suspended Solid (TSS) load.

Since manufactured proprietary stormwater separators are sized using discharge rates and not volume, MassDEP is requiring the standardized method described below be used to convert the required WQV to a discharge rate (Q). No other methods are allowed to convert the WQV to the Q rate. This will ensure that flow rate based manufactured proprietary stormwater treatment practices are sized consistently from manufacturer to manufacturer. This section contains the following: caveats for method use, method description, examples of how to use the method, and documentation describing how the method was derived. This method will be incorporated into the Massachusetts Stormwater Handbook.

The following caveats apply to use of the method:

- Device sized using the Q rate must only be used as pretreatment practice.
- Device sized using this method shall be designed to be "offline", unless approved otherwise through written reciprocity granted by MassDEP to a final certification pursuant to the Technology Acceptance Reciprocity Partnership (TARP). This means the device must be sized at a minimum to fully treat the Q rate without any overflow, by-pass, surcharge of runoff, or scouring of sediments or oils previously trapped or entrained in the device.
- The computations described below must be provided in the Stormwater Report accompanying Wetlands Notice of Intent or application for 401 Water Quality Certification.
- MassDEP reserves ability to revise this method in the future as may be needed to reflect documented increases to precipitation intensity (Douglas 2011), updates to design intensity storms currently being considered by the National Weather Service or Northeast Climate Center (NECC)[1] to Technical Paper 40 (upon which this methodology is based), NRCS revisions to the WinTR55/TR20 methods,[2] or changes to the National Pollution Discharge Elimination System (NPDES) permits issued by EPA for Massachusetts.

[1] On web, see precipitation intensities at http://precip.net

[2] On web, See MA-NRCS description at: http://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs144p2_013763.pdf

METHOD

1. Determine if the WQV is the first ½-inch or 1-inch of runoff. If WQV is the first ½ -inch, go to STEP 2. If WQV is the first 1-inch of runoff, go to STEP 7.

FOR FIRST ½ INCH RUNOFF WQV

2. Use Curve Number (CN) 98 to represent the runoff potential for impervious surfaces (see Method Derivation section below for explanation regarding how CN 98 was obtained).

   Only use impervious surfaces for these computations. Runoff from pervious surfaces should not be included in the WQV computations for the Q rate. The WQV required by the Massachusetts Wetlands Protection (310 CMR 10.05(6)(k)(4)) and 401 Water Quality Certification (314 CMR 9.06(6)(a)(4)) regulations for Stormwater Standard No. 4 is based only on impervious surfaces.

3. Compute the time of concentration (tc) using the methods described in TR-55 1986, Chapter 3.

4. Refer to Figure 1, Ia/P Curve = 0.058

5. Determine unit peak discharge using Figure 1 or 2. Figure 2 is in tabular form so is preferred. Using the tc determined in STEP 3, read the unit peak discharge (qu) from Figure 1 or Table in Figure 2. qu is expressed in the following units: cfs/mi²/watershed inches (csm/in).

6. Compute Q rate using the following equation:

$$Q_{0.5} = (qu)(A)(WQV)$$

Where:

$Q_{0.5}$ = flow rate associated with first ½ -inch of runoff

qu = the unit peak discharge, in csm/in.

A = impervious surface drainage area (in square miles)

WQV = water quality volume in watershed inches (½ -inch in this case)

See Example 1, page 8 applying use of the method to convert first ½ -inch WQV to minimum $Q_{0.5}$ rate.

Figure 1: For First ½-inch Runoff, Ia/P Curve = 0.058, Relationship Between Unit Peak Discharge and Time of Concentration for NRCS Type III Storm Distribution.

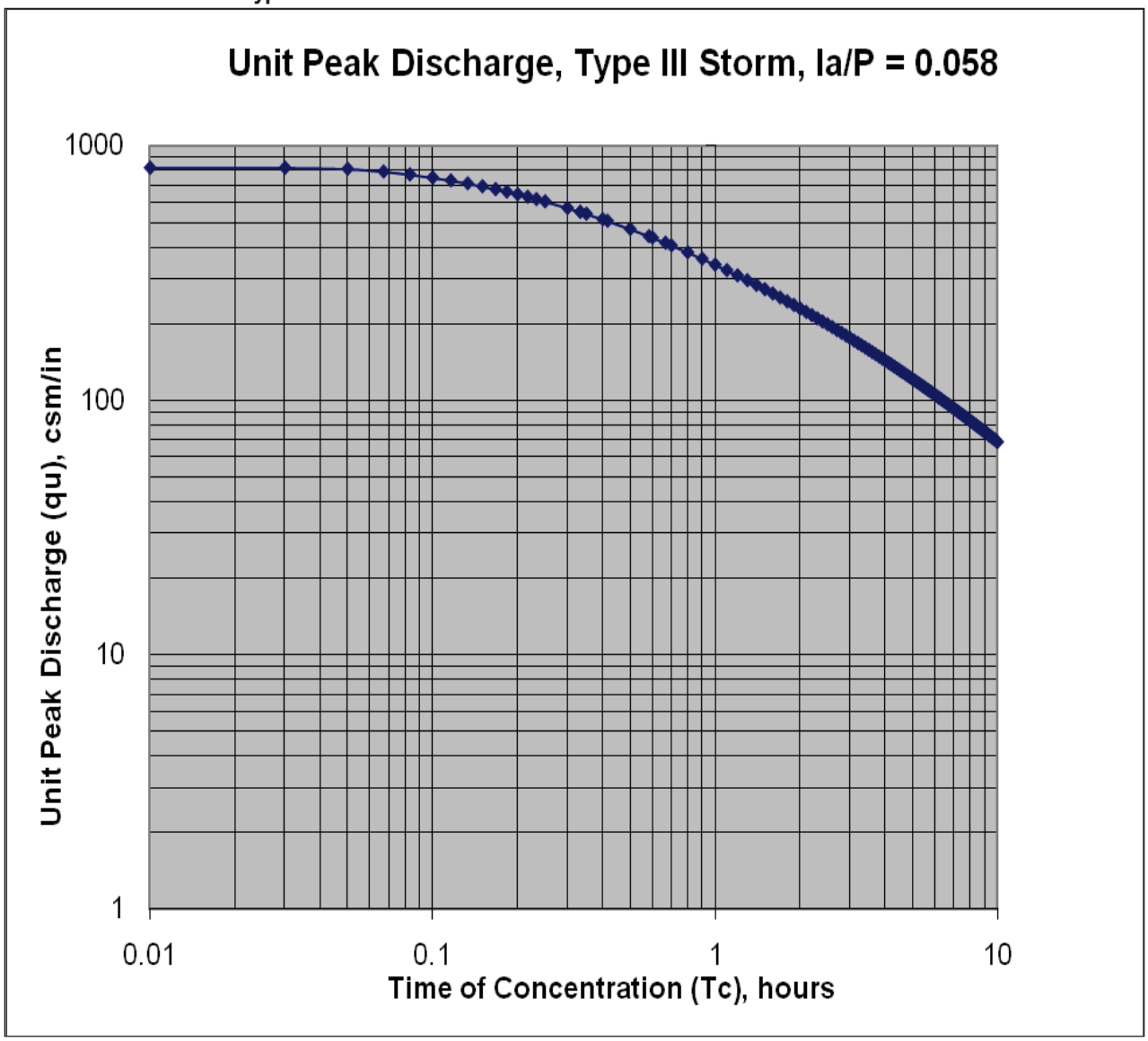


Figure 2: For First ½-inch of Runoff, Table of qu values for Ia/P Curve = 0.0.058, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)
0.01	821
0.03	821
0.05	813
0.067	794
0.083	773
0.1	752
0.116	733
0.133	713
0.15	694
0.167	677
0.183	662
0.2	646
0.217	632
0.233	619
0.25	606
0.3	572
0.333	552
0.35	542
0.4	516
0.416	508
0.5	472
0.583	443
0.6	437
0.667	417
0.7	408
0.8	383
0.9	361
1	342
1.1	325
1.2	311
1.3	297
1.4	285
1.5	274
1.6	264
1.7	254

Tc (Hours)	qu (csm/in)
1.8	246
1.9	238
2	230
2.1	223
2.2	217
2.3	211
2.4	205
2.5	200
2.6	194
2.7	190
2.8	185
2.9	181
3	176
3.1	173
3.2	169
3.3	165
3.4	162
3.5	158
3.6	155
3.7	152
3.8	149
3.9	147
4	144
4.1	141
4.2	139
4.3	136
4.4	134
4.5	132
4.6	130
4.7	128
4.8	126
4.9	124
5	122
5.1	120
5.2	118

Tc (Hours)	qu (csm/in)
5.3	116
5.4	115
5.5	113
5.6	112
5.7	110
5.8	109
5.9	107
6	106
6.1	104
6.2	103
6.3	102
6.4	100
6.5	99
6.6	98
6.7	97
6.8	96
6.9	94
7	93
7.1	92
7.2	91
7.3	90
7.4	89
7.5	88
7.6	87
7.7	86
7.8	85
7.9	84
8	84
8.1	83
8.2	82
8.3	81
8.4	80
8.5	79
8.6	79
8.7	78

Tc (Hours)	qu (csm/in)
8.8	77
8.9	76
9	76
9.1	75
9.2	74
9.3	74
9.4	73
9.5	72
9.6	72
9.7	71
9.8	70
9.9	70
10	69

Figure 2: For First ½-inch of Runoff, Table of qu values for Ia/P Curve = 0.0.058, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)
0.01	821
0.03	821
0.05	813
0.067	794
0.083	773
0.1	752
0.116	733
0.133	713
0.15	694
0.167	677
0.183	662
0.2	646
0.217	632
0.233	619
0.25	606
0.3	572
0.333	552
0.35	542
0.4	516
0.416	508
0.5	472
0.583	443
0.6	437
0.667	417
0.7	408
0.8	383
0.9	361
1	342
1.1	325
1.2	311
1.3	297
1.4	285
1.5	274
1.6	264
1.7	254

Tc (Hours)	qu (csm/in)
1.8	246
1.9	238
2	230
2.1	223
2.2	217
2.3	211
2.4	205
2.5	200
2.6	194
2.7	190
2.8	185
2.9	181
3	176
3.1	173
3.2	169
3.3	165
3.4	162
3.5	158
3.6	155
3.7	152
3.8	149
3.9	147
4	144
4.1	141
4.2	139
4.3	136
4.4	134
4.5	132
4.6	130
4.7	128
4.8	126
4.9	124
5	122
5.1	120
5.2	118

Tc (Hours)	qu (csm/in)
5.3	116
5.4	115
5.5	113
5.6	112
5.7	110
5.8	109
5.9	107
6	106
6.1	104
6.2	103
6.3	102
6.4	100
6.5	99
6.6	98
6.7	97
6.8	96
6.9	94
7	93
7.1	92
7.2	91
7.3	90
7.4	89
7.5	88
7.6	87
7.7	86
7.8	85
7.9	84
8	84
8.1	83
8.2	82
8.3	81
8.4	80
8.5	79
8.6	79
8.7	78

Tc (Hours)	qu (csm/in)
8.8	77
8.9	76
9	76
9.1	75
9.2	74
9.3	74
9.4	73
9.5	72
9.6	72
9.7	71
9.8	70
9.9	70
10	69

Figure 2: For First ½-inch of Runoff, Table of qu values for Ia/P Curve = 0.0.058, listed by tc, for Type III Storm Distribution

Tc (Hours)	qu (csm/in)
0.01	821
0.03	821
0.05	813
0.067	794
0.083	773
0.1	752
0.116	733
0.133	713
0.15	694
0.167	677
0.183	662
0.2	646
0.217	632
0.233	619
0.25	606
0.3	572
0.333	552
0.35	542
0.4	516
0.416	508
0.5	472
0.583	443
0.6	437
0.667	417
0.7	408
0.8	383
0.9	361
1	342
1.1	325
1.2	311
1.3	297
1.4	285
1.5	274
1.6	264
1.7	254

Tc (Hours)	qu (csm/in)
1.8	246
1.9	238
2	230
2.1	223
2.2	217
2.3	211
2.4	205
2.5	200
2.6	194
2.7	190
2.8	185
2.9	181
3	176
3.1	173
3.2	169
3.3	165
3.4	162
3.5	158
3.6	155
3.7	152
3.8	149
3.9	147
4	144
4.1	141
4.2	139
4.3	136
4.4	134
4.5	132
4.6	130
4.7	128
4.8	126
4.9	124
5	122
5.1	120
5.2	118

Tc (Hours)	qu (csm/in)
5.3	116
5.4	115
5.5	113
5.6	112
5.7	110
5.8	109
5.9	107
6	106
6.1	104
6.2	103
6.3	102
6.4	100
6.5	99
6.6	98
6.7	97
6.8	96
6.9	94
7	93
7.1	92
7.2	91
7.3	90
7.4	89
7.5	88
7.6	87
7.7	86
7.8	85
7.9	84
8	84
8.1	83
8.2	82
8.3	81
8.4	80
8.5	79
8.6	79
8.7	78

Tc (Hours)	qu (csm/in)
8.8	77
8.9	76
9	76
9.1	75
9.2	74
9.3	74
9.4	73
9.5	72
9.6	72
9.7	71
9.8	70
9.9	70
10	69

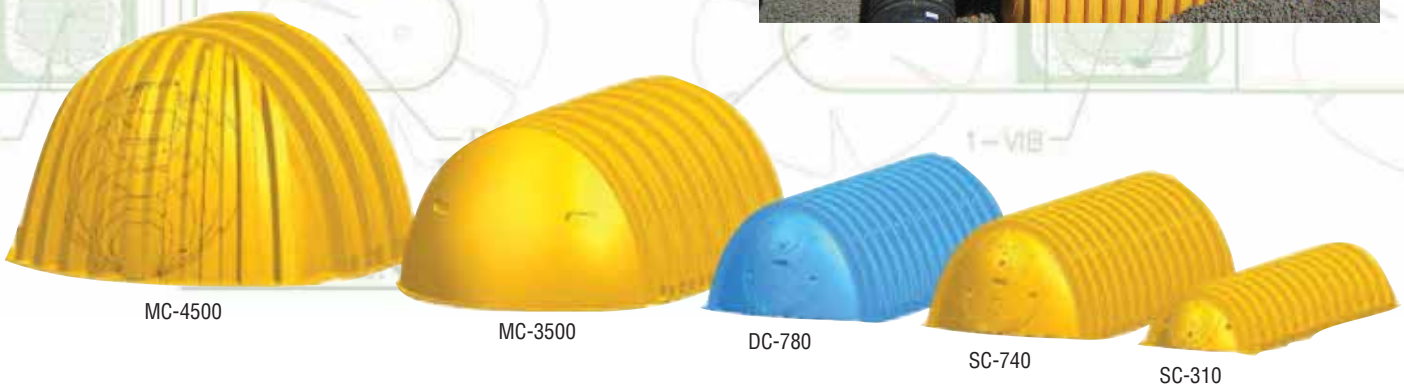
Section 3.4

Stormtech Isolator Row
TARP Tier II Testing Data

StormTech® and Green Infrastructure

Key Benefits of StormTech

- Volumetric Reduction of Stormwater Through Infiltration
- Stormwater Quality Through Patented Isolator™ Row (TSS, TP and TPH removal)
- Reduction of Thermal Impacts
- Proven, Third Party Verified Performance
- Easily Constructed, Inspected and Maintained
- Meets ASTM product standard
- Designed to ASTM & AASHTO specifications



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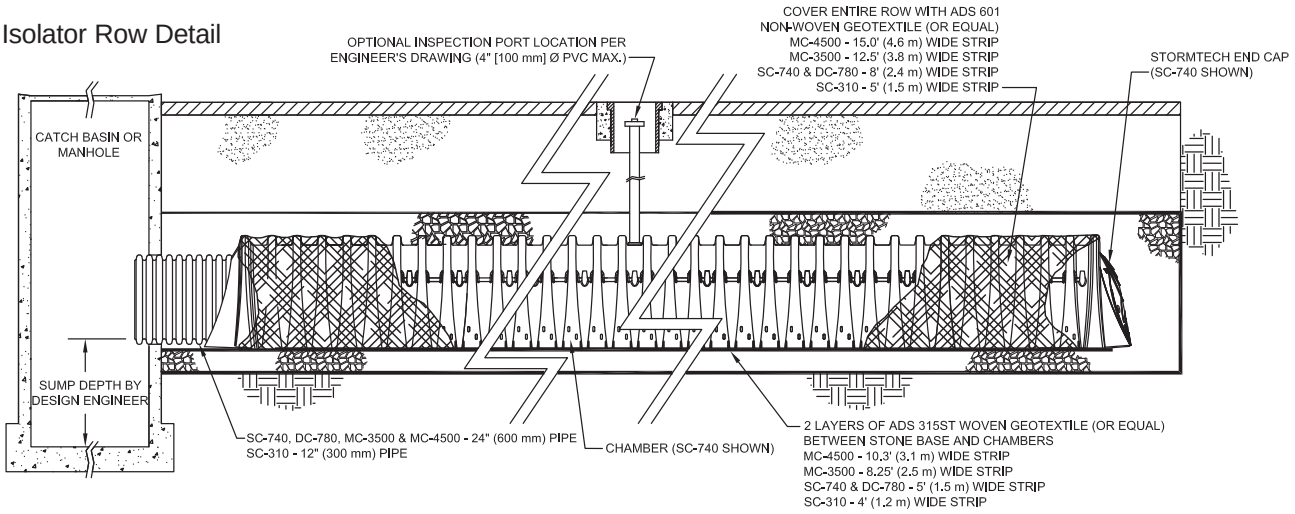
MADE IN THE U.S.A.

StormTech and Stormwater Quality

StormTech's patented Isolator™ Row is a row of chambers wrapped in a geotextile which filters the stormwater trapping pollutants in the row. The Isolator Row provides a way to inspect and maintain the system.

Isolator Row Detail



Note: For many applications, the non-woven geotextile over the DC-780, MC-3500 and MC-4500 Isolator Row chambers can be eliminated or substituted with the AASHTO Class 1 woven geotextile. Contact your StormTech representative for assistance.

Isolator Row Field Verification Testing at the University of New Hampshire Stormwater Center

- Field testing (TARP tier II protocol) of the Isolator Row has been ongoing since December 2006.
- Removal efficiencies for TSS have improved as the filter cake has built up on the bottom fabric of the Isolator Row.
- Current data shows a TSS removal efficiency which exceeds 80%.

Removal Efficiency Results:

- Total Suspended Solids = 80%
- Phosphorous = 49%
- Total Petroleum Hydrocarbons = 90%
- Zinc = 53%

This system achieves a removal efficiency of 80% for TSS which meets most municipal recommended levels for water quality treatment.

Inspection and Maintenance

The Isolator Row can be inspected through the upstream manhole or optional inspection port.

Maintenance is easily accomplished with the JetVac process.

The frequency of inspection and maintenance varies by location. Contact StormTech for assistance with inspection and maintenance scheduling.

Section 3.5

Stormwater Inspection & Maintenance Manual

Parker Hill Definitive Subdivision
Hines Way, Newburyport, Massachusetts
Storm Water Management System
Inspection and Maintenance Manual

Introduction

The operation and maintenance of a storm water management system and its individual components is as critical to system performance as the design. Without proper maintenance, best management practices (BMPs) are likely to become functionally impaired or to fail, providing reduced or no treatment of storm water. Proper operation and maintenance will ensure that the storm water system and individual BMPs will remain effective at removing pollutants as designed and meeting Newburyport's water quality objectives. Proper maintenance will:

- Maintain the volume of storm water treated over the long term;
- Sustain the pollutant removal efficiency of the BMP;
- Reduce the risk of re-suspending sediment and other pollutants captured by the BMP;
- Prevent structural deterioration of the BMP and minimize the need for expensive repairs;
- Decrease the potential for failure of the BMP.

The Massachusetts Department of Environmental Protection (MassDEP) Stormwater Handbook requires that the long term maintenance of storm water practices, and stipulates the establishment of a mechanism to provide for ongoing inspections and maintenance.

In accordance with Massachusetts Department of Environmental Protection Stormwater Handbook the mechanism for providing long-term maintenance practices for this development are as follows:

Responsible Maintenance Party:

Owner: Parker 2 Realty Trust
c/o Ed Hill, Trustee
1 Mason Lane
Salisbury, MA 01952

Report Information:

- Mr. Ed Hill of Parker 2 Realty Trust or his assigns will be the individual responsible for implementing the required reporting, inspection, and maintenance activities identified in the I & M manual.
- Mr. Ed Hill of Parker 2 Realty Trust or his assigns will maintain all record keeping required by the I & M manual. Any transfer of responsibility for I & M activities or transfer in ownership shall be documented to the City of Newburyport DPW in writing.

- Inspection and maintenance reports shall be completed after each inspection. Copies of the report forms to be completed by the inspector are attached at the end of this manual, including:
    - Inspection checklist to be used during each inspection;
    - Inspection and maintenance logs to document each inspection and maintenance activity;

Maintenance Recommendations for Best Management Practices:

The following recommendations are to be used as a guide for the inspection and maintenance of the permanent erosion and sediment control measures.

Subsurface Infiltration Basin

See manufacturers Operation & Maintenance Manual (attached).

Bio Retention Basin and/or Rain Garden

- Basins should be inspected monthly during growing season and following any rainfall event exceeding 2.5 inches in a 24 hour period, with maintenance or rehabilitation conducted as warranted by such inspection.
- Inspect and remove trash monthly during growing season.
- Inspect, repair and remove debris (other than trash) annually in spring.
- Replace mulch annually in the spring.
- Remove dead vegetation annually in spring or fall.
- Replace dead vegetation annually in spring.

Water Quality Swales

- Inspect swales at least semi-annually.
- Remove accumulated sediment from swales when the sediment exceeds the height of the grass in the swale.
- Repair any damage in the swales as a result of erosion immediately after the inspection to restore the treatment function and prevent further damage to the swales.
- Dispose of sediments and other wastes in conformance with applicable local, state and federal regulations

Drainage Catch Basins

- Inspect basins at least semi-annually.
- Vacuum the sediment basins when the sediment reaches one-half the depth from the bottom of the catch basin to the invert of the outlet pipe.
- Repair damaged basin grates immediately after the inspection.
- Repair pavement damage around the basins immediately after the inspection to prevent further damage to the structure or paved area.
- Dispose of sediments and other wastes in conformance with applicable local, state and federal regulations.

Outlet Protection - Riprap Aprons

- Inspect the outlet protection annually for damage and deterioration. Repair damages immediately.
- Remove debris from apron area.

Inspection Checklist / Maintenance Logs

The inspection checklist and maintenance logs following this report shall be used as a guide for the inspection reporting for this project.

Exhibit Plan

A plan identifying the stormwater practices that to be inspected as part of this I & M program to be prepared prior to construction.

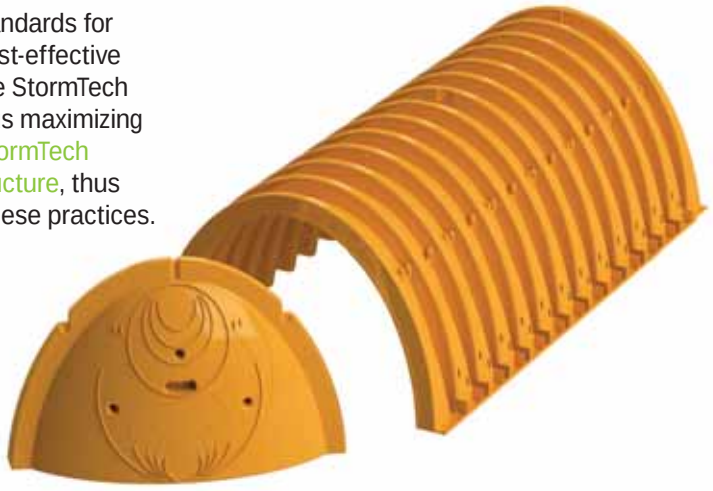
Inspection Checklist

- ☐ Surface & Grate at Each Drainage Catch Basin
- ☐ Drainage Catch Basin Sumps
- ☐ Riprap Aprons at Headwall Outlets
- ☐ Water Quality Swales
- ☐ Sediment Forebays and Stormwater Basins
- ☐ Rain Gardens
- ☐ Spillways
- ☐ Headwall Inlets and Outlets
- ☐ Subsurface Infiltration Basin
- ☐

Inspection and Maintenance Log					
	BMP	Inspection Date	Inspected By	Maintenance Required?	Maintenance Performed
1				❑Yes ❑No	
2				❑Yes ❑No	
3				❑Yes ❑No	
4				❑Yes ❑No	
5				❑Yes ❑No	
6				❑Yes ❑No	
7				❑Yes ❑No	
8				❑Yes ❑No	
9				❑Yes ❑No	

STORMTECH SC-740 CHAMBER

Designed to meet the most stringent industry performance standards for superior structural integrity while providing designers with a cost-effective method to save valuable land and protect water resources. The StormTech system is designed primarily to be used under parking lots, thus maximizing land usage for private (commercial) and public applications. StormTech chambers can also be used in conjunction with Green Infrastructure, thus enhancing the performance and extending the service life of these practices.



STORMTECH SC-740 CHAMBER
(not to scale)

Nominal Chamber Specifications

Size (L x W x H)
85.4" x 51" x 30"
2,170 mm x 1,295 mm x 762 mm

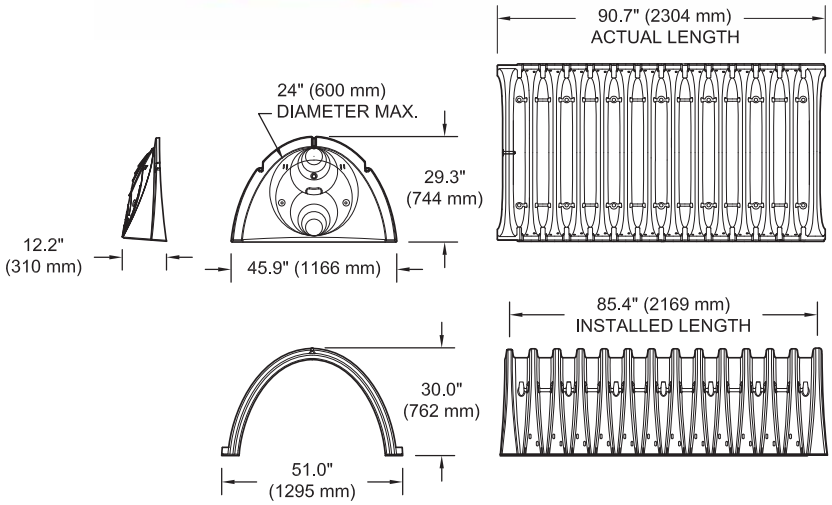
Chamber Storage
45.9 ft³ (1.30 m³)

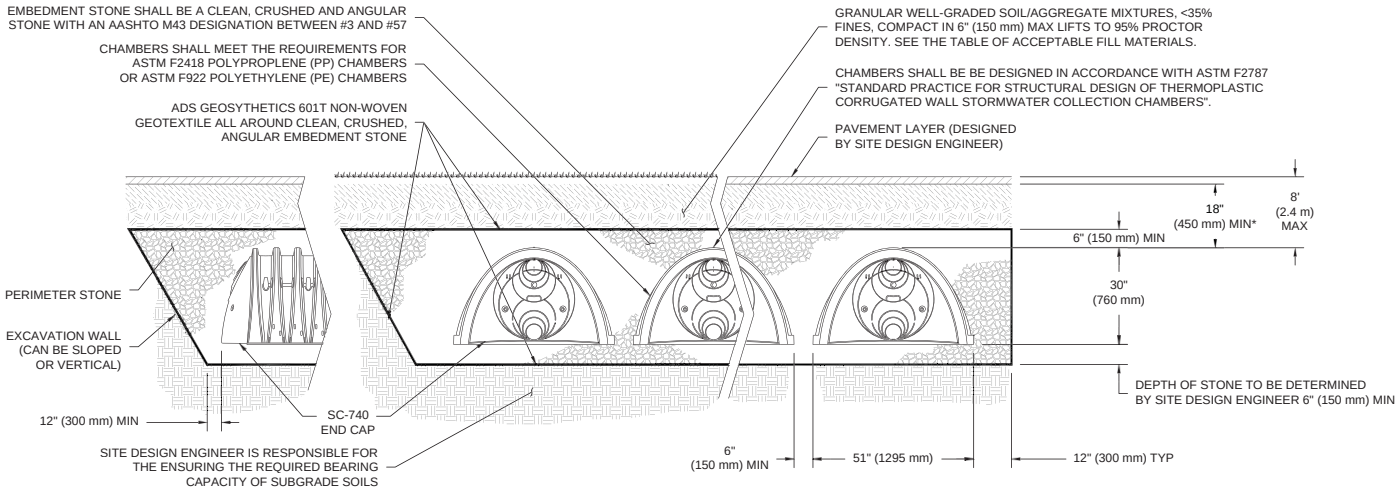
Min. Installed Storage*
74.9 ft³ (2.12 m³)

Weight
74.0 lbs (33.6 kg)

Shipping
30 chambers/pallet
60 end caps/pallet
12 pallets/truck

*Assumes 6" (150 mm) stone above, below and between chambers and 40% stone porosity.





*MINIMUM COVER TO BOTTOM OF FLEXIBLE PAVEMENT. FOR UNPAVED INSTALLATIONS WHERE RUTTING FROM VEHICLES MAY OCCUR, INCREASE COVER TO 24" (600 mm).

SC-740 CUMULATIVE STORAGE VOLUMES PER CHAMBER

Assumes 40% Stone Porosity. Calculations are Based Upon a 6" (150 mm) Stone Base Under Chambers.

Depth of Water in System Inches (mm)		Cumulative Chamber Storage ft³ (m³)	Total System Cumulative Storage ft³ (m³)
42 (1067)		45.90 (1.300)	74.90 (2.121)
41 (1041)		45.90 (1.300)	73.77 (2.089)
40 (1016)	Stone	45.90 (1.300)	72.64 (2.057)
39 (991)	Cover	45.90 (1.300)	71.52 (2.025)
38 (965)		45.90 (1.300)	70.39 (1.993)
37 (940)		45.90 (1.300)	69.26 (1.961)
36 (914)		45.90 (1.300)	68.14 (1.929)
35 (889)		45.85 (1.298)	66.98 (1.897)
34 (864)		45.69 (1.294)	65.75 (1.862)
33 (838)		45.41 (1.286)	64.46 (1.825)
32 (813)		44.81 (1.269)	62.97 (1.783)
31 (787)		44.01 (1.246)	61.36 (1.737)
30 (762)		43.06 (1.219)	59.66 (1.689)
29 (737)		41.98 (1.189)	57.89 (1.639)
28 (711)		40.80 (1.155)	56.05 (1.587)
27 (686)		39.54 (1.120)	54.17 (1.534)
26 (660)		38.18 (1.081)	52.23 (1.479)
25 (635)		36.74 (1.040)	50.23 (1.422)
24 (610)		35.22 (0.977)	48.19 (1.365)
23 (584)		33.64 (0.953)	46.11 (1.306)
22 (559)		31.99 (0.906)	44.00 (1.246)
21 (533)		30.29 (0.858)	1.85 (1.185)
20 (508)		28.54 (0.808)	39.67 (1.123)
19 (483)		26.74 (0.757)	37.47 (1.061)
18 (457)		24.89 (0.705)	35.23 (0.997)
17 (432)		23.00 (0.651)	32.96 (0.939)
16 (406)		21.06 (0.596)	30.68 (0.869)
15 (381)		19.09 (0.541)	28.36 (0.803)
14 (356)		17.08 (0.484)	26.03 (0.737)
13 (330)		15.04 (0.426)	23.68 (0.670)
12 (305)		12.97 (0.367)	21.31 (0.608)
11 (279)		10.87 (0.309)	18.92 (0.535)
10 (254)		8.74 (0.247)	16.51 (0.468)
9 (229)		6.58 (0.186)	14.09 (0.399)
8 (203)		4.41 (0.125)	11.66 (0.330)
7 (178)		2.21 (0.063)	9.21 (0.264)
6 (152)		0 (0)	6.76 (0.191)
5 (127)		0 (0)	5.63 (0.160)
4 (102)	Stone	0 (0)	4.51 (0.128)
3 (76)	Foundation	0 (0)	3.38 (0.096)
2 (51)		0 (0)	2.25 (0.064)
1 (25)		0 (0)	1.13 (0.032)

Note: Add 1.13 ft³ (0.032 m³) of storage for each additional inch (25 mm) of stone foundation.

STORAGE VOLUME PER CHAMBER FT³ (M³)

	Bare Chamber Storage ft³ (m³)	Chamber and Stone Foundation Depth in. (mm)		
		6 (150)	12 (300)	18 (450)
SC-740 Chamber	45.9 (1.3)	74.9 (2.1)	81.7 (2.3)	88.4 (2.5)

Note: Assumes 6" (150 mm) stone above chambers, 6" (150 mm) row spacing and 40% stone porosity.

AMOUNT OF STONE PER CHAMBER

ENGLISH TONS (yds³)	Stone Foundation Depth		
	6"	12"	16"
SC-740	3.8 (2.8)	4.6 (3.3)	5.5 (3.9)
METRIC KILOGRAMS (m³)	**150 mm**	**300 mm**	**450 mm**
SC-740	3,450 (2.1)	4,170 (2.5)	4,490 (3.0)

Note: Assumes 6" (150 mm) of stone above and between chambers.

VOLUME EXCAVATION PER CHAMBER YD³ (M³)

	Stone Foundation Depth		
	6 (150)	12 (300)	18 (450)
SC-740	5.5 (4.2)	6.2 (4.7)	6.8 (5.2)

Note: Assumes 6" (150 mm) of row separation and 18" (450 mm) of cover. The volume of excavation will vary as depth of cover increases.

Working on a project?
Visit us at www.stormtech.com
and utilize the StormTech Design Tool

For more information on the StormTech SC-740 Chamber and other ADS products, please contact our Customer Service Representatives at 1-800-821-6710

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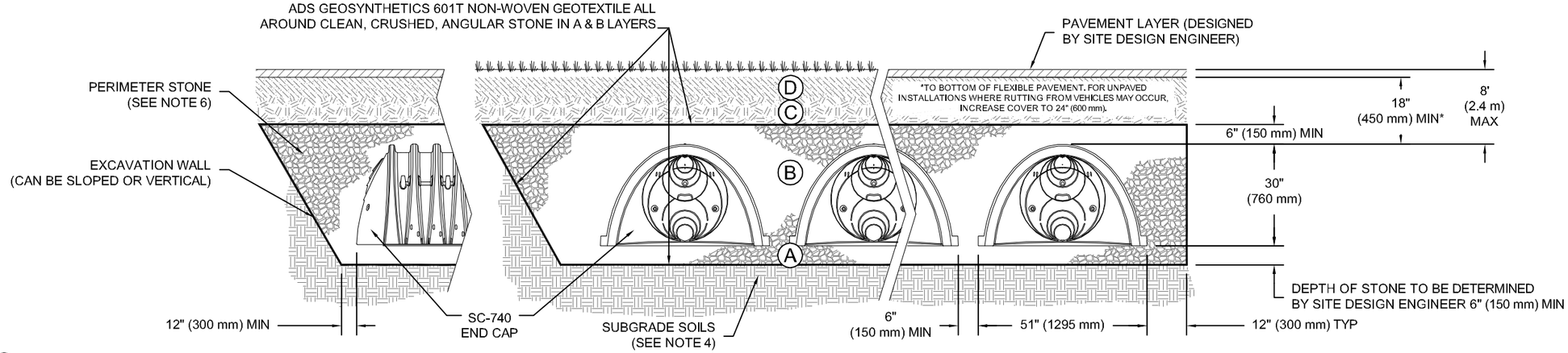
ACCEPTABLE FILL MATERIALS: STORMTECH SC-740 CHAMBER SYSTEMS

MATERIAL LOCATION		DESCRIPTION	AASHTO MATERIAL CLASSIFICATIONS	COMPACTION / DENSITY REQUIREMENT
D	**FINAL FILL:** FILL MATERIAL FOR LAYER 'D' STARTS FROM THE TOP OF THE 'C' LAYER TO THE BOTTOM OF FLEXIBLE PAVEMENT OR UNPAVED FINISHED GRADE ABOVE. NOTE THAT PAVEMENT SUBBASE MAY BE PART OF THE 'D' LAYER	ANY SOIL/ROCK MATERIALS, NATIVE SOILS, OR PER ENGINEER'S PLANS. CHECK PLANS FOR PAVEMENT SUBGRADE REQUIREMENTS.	N/A	PREPARE PER SITE DESIGN ENGINEER'S PLANS. PAVED INSTALLATIONS MAY HAVE STRINGENT MATERIAL AND PREPARATION REQUIREMENTS.
C	**INITIAL FILL:** FILL MATERIAL FOR LAYER 'C' STARTS FROM THE TOP OF THE EMBEDMENT STONE ('B' LAYER) TO 18" (450 mm) ABOVE THE TOP OF THE CHAMBER. NOTE THAT PAVEMENT SUBBASE MAY BE A PART OF THE 'C' LAYER.	GRANULAR WELL-GRADED SOIL/AGGREGATE MIXTURES, <35% FINES OR PROCESSED AGGREGATE. MOST PAVEMENT SUBBASE MATERIALS CAN BE USED IN LIEU OF THIS LAYER.	AASHTO M145[1] A-1, A-2-4, A-3 OR AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57, 6, 67, 68, 7, 78, 8, 89, 9, 10	BEGIN COMPACTIONS AFTER 12" (300 mm) OF MATERIAL OVER THE CHAMBERS IS REACHED. COMPACT ADDITIONAL LAYERS IN 6" (150 mm) MAX LIFTS TO A MIN. 95% PROCTOR DENSITY FOR WELL GRADED MATERIAL AND 95% RELATIVE DENSITY FOR PROCESSED AGGREGATE MATERIALS. ROLLER GROSS VEHICLE WEIGHT NOT TO EXCEED 12,000 lbs (53 kN). DYNAMIC FORCE NOT TO EXCEED 20,000 lbs (89 kN).
B	**EMBEDMENT STONE:** FILL SURROUNDING THE CHAMBERS FROM THE FOUNDATION STONE ('A' LAYER) TO THE 'C' LAYER ABOVE.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	NO COMPACTION REQUIRED.
A	**FOUNDATION STONE:** FILL BELOW CHAMBERS FROM THE SUBGRADE UP TO THE FOOT (BOTTOM) OF THE CHAMBER.	CLEAN, CRUSHED, ANGULAR STONE	AASHTO M43[1] 3, 357, 4, 467, 5, 56, 57	PLATE COMPACT OR ROLL TO ACHIEVE A FLAT SURFACE. [2 3]

PLEASE NOTE:
1. THE LISTED AASHTO DESIGNATIONS ARE FOR GRADATIONS ONLY. THE STONE MUST ALSO BE CLEAN, CRUSHED, ANGULAR. FOR EXAMPLE, A SPECIFICATION FOR #4 STONE WOULD STATE: "CLEAN, CRUSHED, ANGULAR NO. 4 (AASHTO M43) STONE".
2. STORMTECH COMPACTION REQUIREMENTS ARE MET FOR 'A' LOCATION MATERIALS WHEN PLACED AND COMPACTED IN 6" (150 mm) (MAX) LIFTS USING TWO FULL COVERAGES WITH A VIBRATORY COMPACTOR.
3. WHERE INFILTRATION SURFACES MAY BE COMPROMISED BY COMPACTION, FOR STANDARD DESIGN LOAD CONDITIONS, A FLAT SURFACE MAY BE ACHIEVED BY RAKING OR DRAGGING WITHOUT COMPACTION EQUIPMENT. FOR SPECIAL LOAD DESIGNS, CONTACT STORMTECH FOR COMPACTION REQUIREMENTS.



NOTES:

1. SC-740 CHAMBERS SHALL CONFORM TO THE REQUIREMENTS OF ASTM F2418 "STANDARD SPECIFICATION FOR POLYPROPYLENE (PP) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS", OR ASTM F2922 "STANDARD SPECIFICATION FOR POLYETHYLENE (PE) CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
2. SC-740 CHAMBERS SHALL BE DESIGNED IN ACCORDANCE WITH ASTM F2787 "STANDARD PRACTICE FOR STRUCTURAL DESIGN OF THERMOPLASTIC CORRUGATED WALL STORMWATER COLLECTION CHAMBERS".
3. "ACCEPTABLE FILL MATERIALS" TABLE ABOVE PROVIDES MATERIAL LOCATIONS, DESCRIPTIONS, GRADATIONS, AND COMPACTION REQUIREMENTS FOR FOUNDATION, EMBEDMENT, AND FILL MATERIALS.
4. THE SITE DESIGN ENGINEER IS RESPONSIBLE FOR ASSESSING THE BEARING RESISTANCE (ALLOWABLE BEARING CAPACITY) OF THE SUBGRADE SOILS AND THE DEPTH OF FOUNDATION STONE WITH CONSIDERATION FOR THE RANGE OF EXPECTED SOIL MOISTURE CONDITIONS.
5. PERIMETER STONE MUST BE EXTENDED HORIZONTALLY TO THE EXCAVATION WALL FOR BOTH VERTICAL AND SLOPED EXCAVATION WALLS.
6. ONCE LAYER 'C' IS PLACED, ANY SOIL/MATERIAL CAN BE PLACED IN LAYER 'D' UP TO THE FINISHED GRADE. MOST PAVEMENT SUBBASE SOILS CAN BE USED TO REPLACE THE MATERIAL REQUIREMENTS OF LAYER 'C' OR 'D' AT THE SITE DESIGN ENGINEER'S DISCRETION.

SC-740
STANDARD CROSS SECTION

DATE: 11/18/14 | DRAWN: JLM | PROJECT #: | CHECKED: JLM

REV	DRW	CHK	DESCRIPTION
01/19/16	JLM	JLM	UPDATE

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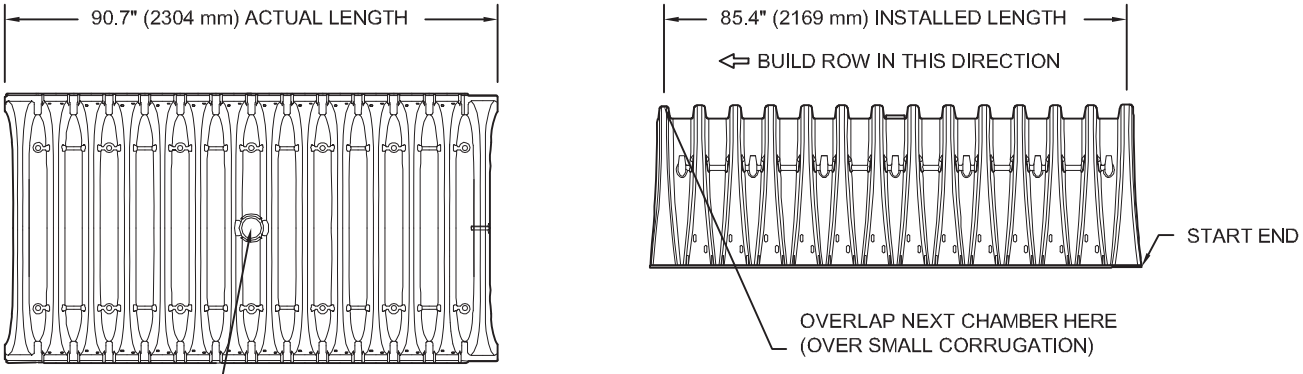
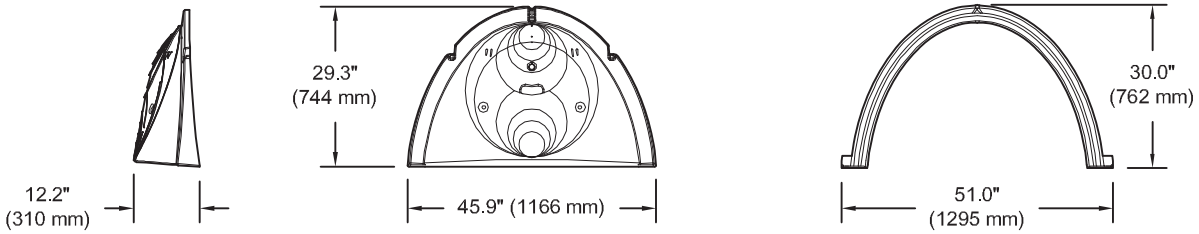
HILLIARD, OH 43026
1-800-733-7473

SC-740 TECHNICAL SPECIFICATION

NTS

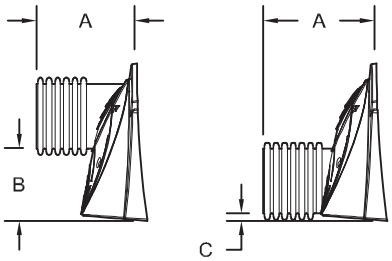




NOMINAL CHAMBER SPECIFICATIONS

SIZE (W X H X INSTALLED LENGTH)	51.0" X 30.0" X 85.4"	(1295 mm X 762 mm X 2169 mm)
CHAMBER STORAGE	45.9 CUBIC FEET	(1.30 m³)
MINIMUM INSTALLED STORAGE*	74.9 CUBIC FEET	(2.12 m³)
WEIGHT	75.0 lbs.	(33.6 kg)

*ASSUMES 6" (152 mm) STONE ABOVE, BELOW, AND BETWEEN CHAMBERS



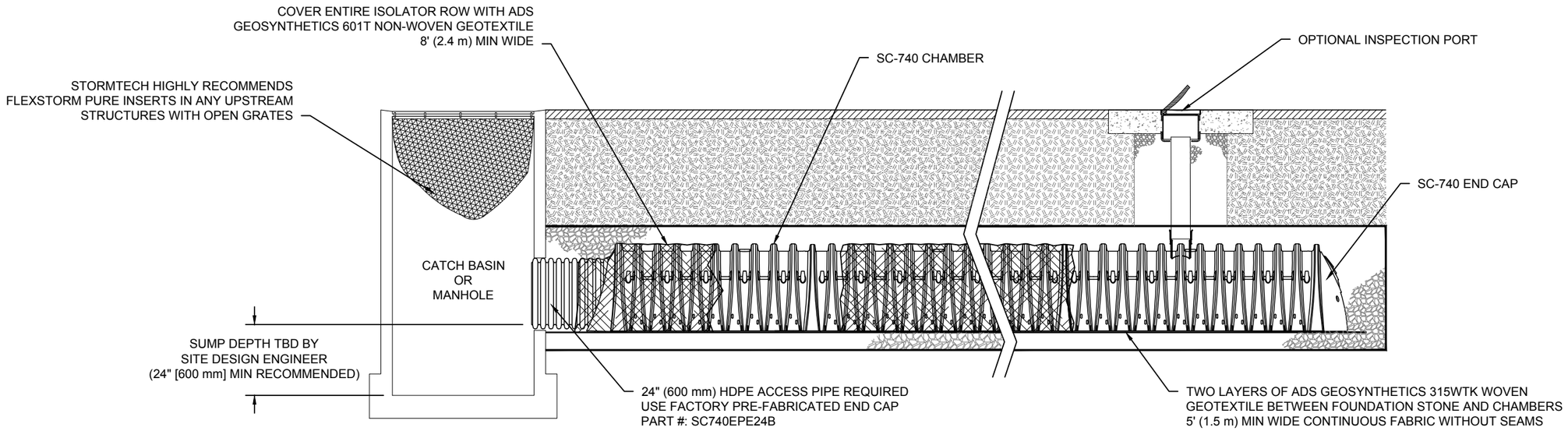
STUBS AT BOTTOM OF END CAP FOR PART NUMBERS ENDING WITH "B"
STUBS AT TOP OF END CAP FOR PART NUMBERS ENDING WITH "T"

PART #	STUB	A	B	C
SC740EPE06T / SC740EPE06TPC	6" (150 mm)	10.9" (277 mm)	18.5" (470 mm)	—
SC740EPE06B / SC740EPE06BPC			—	0.5" (13 mm)
SC740EPE08T /SC740EPE08TPC	8" (200 mm)	12.2" (310 mm)	16.5" (419 mm)	—
SC740EPE08B / SC740EPE08BPC			—	0.6" (15 mm)
SC740EPE10T / SC740EPE10TPC	10" (250 mm)	13.4" (340 mm)	14.5" (368 mm)	—
SC740EPE10B / SC740EPE10BPC			—	0.7" (18 mm)
SC740EPE12T / SC740EPE12TPC	12" (300 mm)	14.7" (373 mm)	12.5" (318 mm)	—
SC740EPE12B / SC740EPE12BPC			—	1.2" (30 mm)
SC740EPE15T / SC740EPE15TPC	15" (375 mm)	18.4" (467 mm)	9.0" (229 mm)	—
SC740EPE15B / SC740EPE15BPC			—	1.3" (33 mm)
SC740EPE18T / SC740EPE18TPC	18" (450 mm)	19.7" (500 mm)	5.0" (127 mm)	—
SC740EPE18B / SC740EPE18BPC			—	1.6" (41 mm)
SC740EPE24B*	24" (600 mm)	18.5" (470 mm)	—	0.1" (3 mm)

ALL STUBS, EXCEPT FOR THE SC740EPE24B ARE PLACED AT BOTTOM OF END CAP SUCH THAT THE OUTSIDE DIAMETER OF THE STUB IS FLUSH WITH THE BOTTOM OF THE END CAP. FOR ADDITIONAL INFORMATION CONTACT STORMTECH AT 1-888-892-2694.

* FOR THE SC740EPE24B THE 24" (600 mm) STUB LIES BELOW THE BOTTOM OF THE END CAP APPROXIMATELY 1.75" (44 mm). BACKFILL MATERIAL SHOULD BE REMOVED FROM BELOW THE N-12 STUB SO THAT THE FITTING SITS LEVEL.

NOTE: ALL DIMENSIONS ARE NOMINAL



SC-740 ISOLATOR ROW DETAIL
NTS

INSPECTION & MAINTENANCE

STEP 1) INSPECT ISOLATOR ROW FOR SEDIMENT
- A. INSPECTION PORTS (IF PRESENT)
  - A.1. REMOVE/OPEN LID ON NYLOPLAST INLINE DRAIN
  - A.2. REMOVE AND CLEAN FLEXSTORM FILTER IF INSTALLED
  - A.3. USING A FLASHLIGHT AND STADIA ROD, MEASURE DEPTH OF SEDIMENT AND RECORD ON MAINTENANCE LOG
  - A.4. LOWER A CAMERA INTO ISOLATOR ROW FOR VISUAL INSPECTION OF SEDIMENT LEVELS (OPTIONAL)
  - A.5. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.
- B. ALL ISOLATOR ROWS
  - B.1. REMOVE COVER FROM STRUCTURE AT UPSTREAM END OF ISOLATOR ROW
  - B.2. USING A FLASHLIGHT, INSPECT DOWN THE ISOLATOR ROW THROUGH OUTLET PIPE
    - i) MIRRORS ON POLES OR CAMERAS MAY BE USED TO AVOID A CONFINED SPACE ENTRY
    - ii) FOLLOW OSHA REGULATIONS FOR CONFINED SPACE ENTRY IF ENTERING MANHOLE
  - B.3. IF SEDIMENT IS AT, OR ABOVE, 3" (80 mm) PROCEED TO STEP 2. IF NOT, PROCEED TO STEP 3.

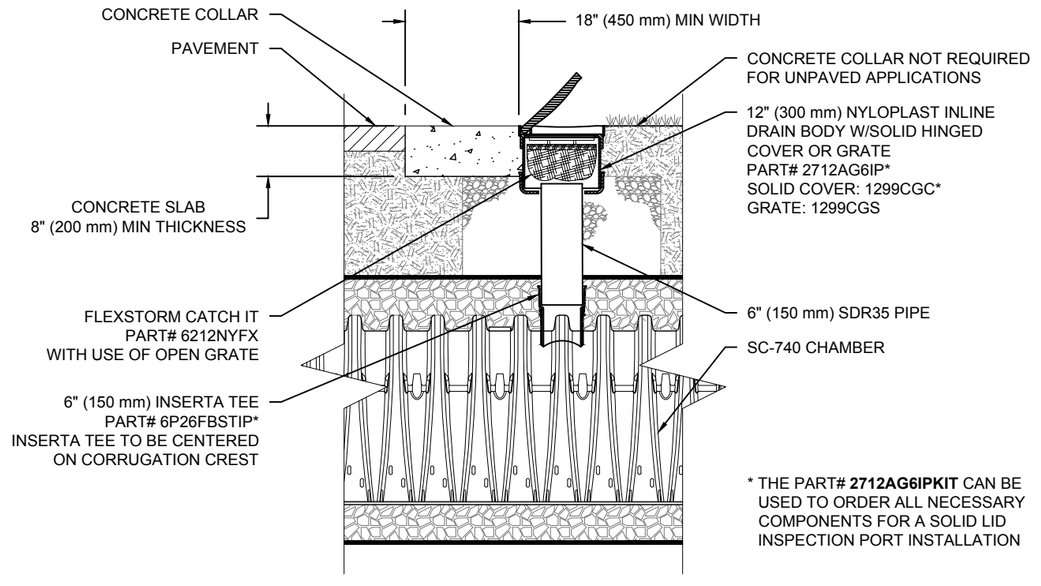
STEP 2) CLEAN OUT ISOLATOR ROW USING THE JETVAC PROCESS
- A. A FIXED CULVERT CLEANING NOZZLE WITH REAR FACING SPREAD OF 45" (1.1 m) OR MORE IS PREFERRED
- B. APPLY MULTIPLE PASSES OF JETVAC UNTIL BACKFLUSH WATER IS CLEAN
- C. VACUUM STRUCTURE SUMP AS REQUIRED

STEP 3) REPLACE ALL COVERS, GRATES, FILTERS, AND LIDS; RECORD OBSERVATIONS AND ACTIONS.

STEP 4) INSPECT AND CLEAN BASINS AND MANHOLES UPSTREAM OF THE STORMTECH SYSTEM.

NOTES

1. INSPECT EVERY 6 MONTHS DURING THE FIRST YEAR OF OPERATION. ADJUST THE INSPECTION INTERVAL BASED ON PREVIOUS OBSERVATIONS OF SEDIMENT ACCUMULATION AND HIGH WATER ELEVATIONS.
2. CONDUCT JETTING AND VACTORING ANNUALLY OR WHEN INSPECTION SHOWS THAT MAINTENANCE IS NECESSARY.



SC-740 6" INSPECTION PORT DETAIL
NTS

ISOLATOR ROW DETAILS
SC-740

DATE: 03/08/17 | DRAWN: JLM | CHECKED:
PROJECT #:

REV	DRW	CHK	DESCRIPTION

StormTech
Detention • Retention • Water Quality
70 INWOOD ROAD, SUITE 3 | ROCKY HILL | CT | 06067
860-529-8188 | 888-892-2694 | WWW.STORMTECH.COM

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ADVANCED DRAINAGE SYSTEMS, INC.
4640 TRUEMAN BLVD
HILLIARD, OH 43026
1-800-733-7473

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Isolator® Row O&M Manual


SC-740


MC-3500


MC-4500

THE MOST **ADVANCED** NAME IN WATER MANAGEMENT SOLUTIONS™

ADS

THE ISOLATOR® ROW

INTRODUCTION

An important component of any Stormwater Pollution Prevention Plan is inspection and maintenance. The StormTech Isolator Row is a technique to inexpensively enhance Total Suspended Solids (TSS) removal and provide easy access for inspection and maintenance.

THE ISOLATOR ROW

The Isolator Row is a row of StormTech chambers, either SC-160LP, SC-310, SC-310-3, SC-740, DC-780, MC-3500 or MC-4500 models, that is surrounded with filter fabric and connected to a closely located manhole for easy access. The fabric-wrapped chambers provide for settling and filtration of sediment as storm water rises in the Isolator Row and ultimately passes through the filter fabric. The open bottom chambers and perforated sidewalls (SC-310, SC- 310-3 and SC-740 models) allow storm water to flow both vertically and horizontally out of the chambers. Sediments are captured in the Isolator Row protecting the storage areas of the adjacent stone and chambers from sediment accumulation.

Two different fabrics are used for the Isolator Row. A woven geotextile fabric is placed between the stone and the Isolator Row chambers. The tough geotextile provides a media for storm water filtration and provides a durable surface for maintenance operations. It is also designed to prevent scour of the underlying stone and remain intact during high pressure jetting. A non-woven fabric is placed over the chambers to provide a filter media for flows passing through the perforations in the sidewall of the chamber. The non-woven fabric is not required over the SC-160LP, DC-780, MC-3500 or MC-4500 models as these chambers do not have perforated side walls.

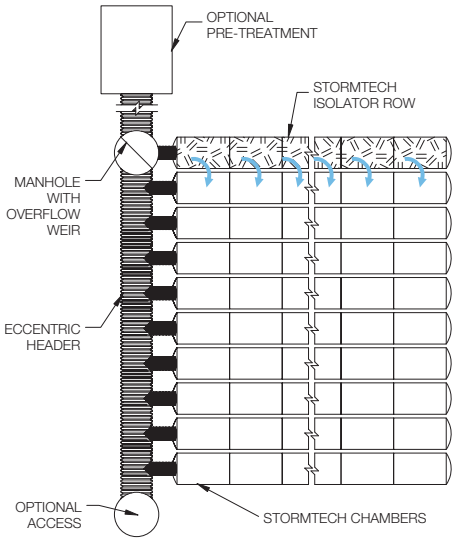
The Isolator Row is typically designed to capture the “first flush” and offers the versatility to be sized on a volume basis or flow rate basis. An upstream manhole not only provides access to the Isolator Row but typically includes a high flow weir such that storm water flowrates or volumes that exceed the capacity of the Isolator Row overtop the over flow weir and discharge through a manifold to the other chambers.

The Isolator Row may also be part of a treatment train. By treating storm water prior to entry into the chamber system, the service life can be extended and pollutants such as hydrocarbons can be captured. Pre-treatment best management practices can be as simple as deep sump catch basins, oil-water separators or can be innovative storm water treatment devices. The design of the treatment train and selection of pretreatment devices by the design engineer is often driven by regulatory requirements. Whether pretreatment is used or not, the Isolator Row is recommended by StormTech as an effective means to minimize maintenance requirements and maintenance costs.

Note: See the StormTech Design Manual for detailed information on designing inlets for a StormTech system, including the Isolator Row.

Looking down the Isolator Row from the manhole opening, woven geotextile is shown between the chamber and stone base.

StormTech Isolator Row with Overflow Spillway (not to scale)



ISOLATOR ROW INSPECTION/MAINTENANCE

INSPECTION

The frequency of inspection and maintenance varies by location. A routine inspection schedule needs to be established for each individual location based upon site specific variables. The type of land use (i.e. industrial, commercial, residential), anticipated pollutant load, percent imperviousness, climate, etc. all play a critical role in determining the actual frequency of inspection and maintenance practices.

At a minimum, StormTech recommends annual inspections. Initially, the Isolator Row should be inspected every 6 months for the first year of operation. For subsequent years, the inspection should be adjusted based upon previous observation of sediment deposition.

The Isolator Row incorporates a combination of standard manhole(s) and strategically located inspection ports (as needed). The inspection ports allow for easy access to the system from the surface, eliminating the need to perform a confined space entry for inspection purposes.

If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the Isolator Row, clean-out should be performed.

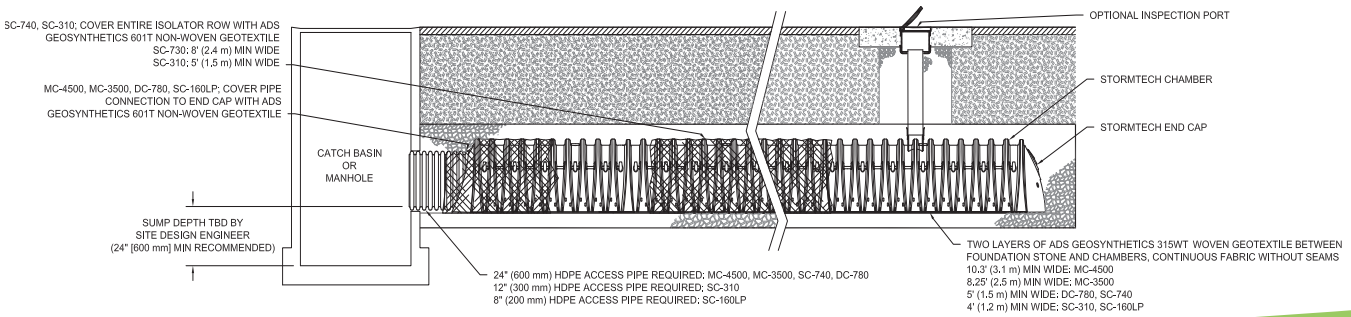
MAINTENANCE

The Isolator Row was designed to reduce the cost of periodic maintenance. By "isolating" sediments to just one row, costs are dramatically reduced by eliminating the need to clean out each row of the entire storage bed. If inspection indicates the potential need for maintenance, access is provided via a manhole(s) located on the end(s) of the row for cleanout. If entry into the manhole is required, please follow local and OSHA rules for a confined space entries.

Maintenance is accomplished with the JetVac process. The JetVac process utilizes a high pressure water nozzle to propel itself down the Isolator Row while scouring and suspending sediments. As the nozzle is retrieved, the captured pollutants are flushed back into the manhole for vacuuming. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles. Selection of an appropriate JetVac nozzle will improve maintenance efficiency. Fixed nozzles designed for culverts or large diameter pipe cleaning are preferable. Rear facing jets with an effective spread of at least 45" are best. Most JetVac reels have 400 feet of hose allowing maintenance of an Isolator Row up to 50 chambers long. **The JetVac process shall only be performed on StormTech Isolator Rows that have AASHTO class 1 woven geotextile (as specified by StormTech) over their angular base stone.**

StormTech Isolator Row (not to scale)

Note: Non-woven fabric is only required over the inlet pipe connection into the end cap for SC-160LP, DC-780, MC-3500 and MC-4500 chamber models and is not required over the entire Isolator Row.



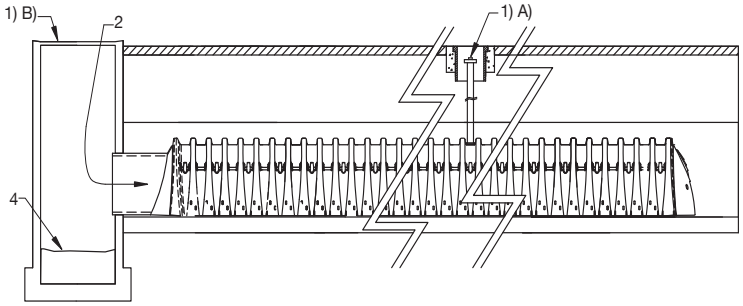
ISOLATOR ROW STEP BY STEP MAINTENANCE PROCEDURES

STEP 1
Inspect Isolator Row for sediment.
- A) Inspection ports (if present)
  - i. Remove lid from floor box frame
  - ii. Remove cap from inspection riser
  - iii. Using a flashlight and stadia rod,measure depth of sediment and record results on maintenance log.
  - iv. If sediment is at or above 3 inch depth, proceed to Step 2. If not, proceed to Step 3.
- B) All Isolator Rows
  - i. Remove cover from manhole at upstream end of Isolator Row
  - ii. Using a flashlight, inspect down Isolator Row through outlet pipe
    1. Mirrors on poles or cameras may be used to avoid a confined space entry
    2. Follow OSHA regulations for confined space entry if entering manhole
  - iii. If sediment is at or above the lower row of sidewall holes (approximately 3 inches), proceed to Step 2. If not, proceed to Step 3.

STEP 2
Clean out Isolator Row using the JetVac process.
- A) A fixed floor cleaning nozzle with rear facing nozzle spread of 45 inches or more is preferable
- B) Apply multiple passes of JetVac until backflush water is clean
- C) Vacuum manhole sump as required

STEP 3
Replace all caps, lids and covers, record observations and actions.

STEP 4
Inspect & clean catch basins and manholes upstream of the StormTech system.



SAMPLE MAINTENANCE LOG

Date	Stadia Rod Readings		Sediment Depth (1)–(2)	Observations/Actions	Inspector
	Fixed point to chamber bottom (1)	Fixed point to top of sediment (2)			
3/15/11	6.3 ft	none		New installation. Fixed point is CI frame at grade	DJM
9/24/11		6.2	0.1 ft	Some grit felt	SM
6/20/13		5.8	0.5 ft	Mucky feel, debris visible in manhole and in Isolator Row, maintenance due	NV
7/7/13	6.3 ft		0	System jetted and vacuumed	DJM

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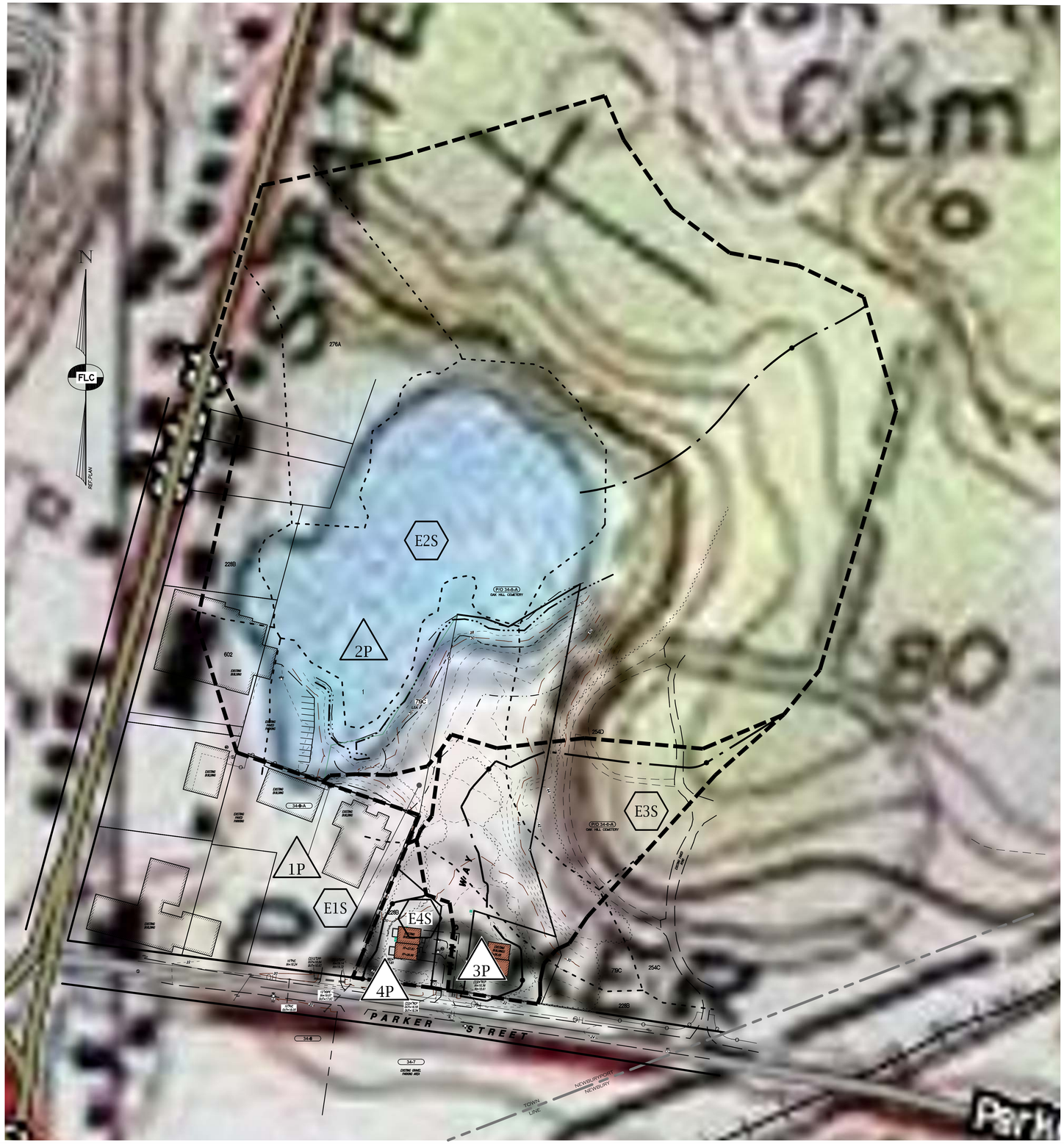
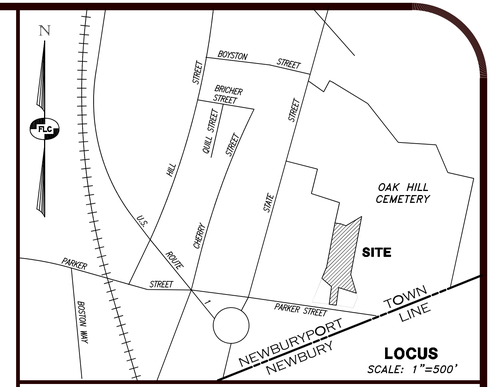
Drainage Plans





DRAINAGE SYMBOLS:

- 1P — POND OR PIPE
- E1S — SUBCATCHMENT
- R2 — REACH
- OP1 — OBSERVATION POINTS
- WATERSHED BOUNDARY
- TIME OF CONCENTRATION

NRCS SOILS LEGEND:
SOURCE: USDA NRCS WEB SOIL SURVEY

- SOIL BOUNDARY
- 276A — NINIGRET FINE SANDY LOAM, 0 TO 3% SLOPES
- 228B — BUXTON SILTY LOAM, 0 TO 3% SLOPES
- 254C — MERRIMACK FINE SANDY LOAM, 8 TO 15% SLOPES
- 254D — MERRIMACK FINE SANDY LOAM, 15 TO 25% SLOPES
- 719C — SUFFIELD SILTY LOAM, 8 TO 15% SLOPES
- 602 — URBAN LAND

GRAPHIC SCALES

80' 40' 0 80' 160' 240'

IMPERIAL: 1"=80'

REV.	DATE	DESCRIPTION	C/O	DR	CK
A	10/20/17	DRAINAGE AREA LIMITS	CON	NRC	CEB

PRE-DEVELOPMENT DRAINAGE AREA PLAN

PARKER HILL
DEFINITIVE SUBDIVISION

PHASE 1

TAX MAP PARCEL 34-8-A - 2 PARKER STREET

NEWBURYPORT, MASSACHUSETTS

PREPARED FOR AND LAND OF:

PARKER 2 REALTY TRUST

160 BRIDGE ROAD, SALISBURY, MA 01952

SCALE: 1" = 80' AUGUST 14, 2017

Surveying ⌖ **E**ngineering ⌖ **L**and **P**lanning ⌖ **P**ermitting ⌖ **S**eptic **D**esigns

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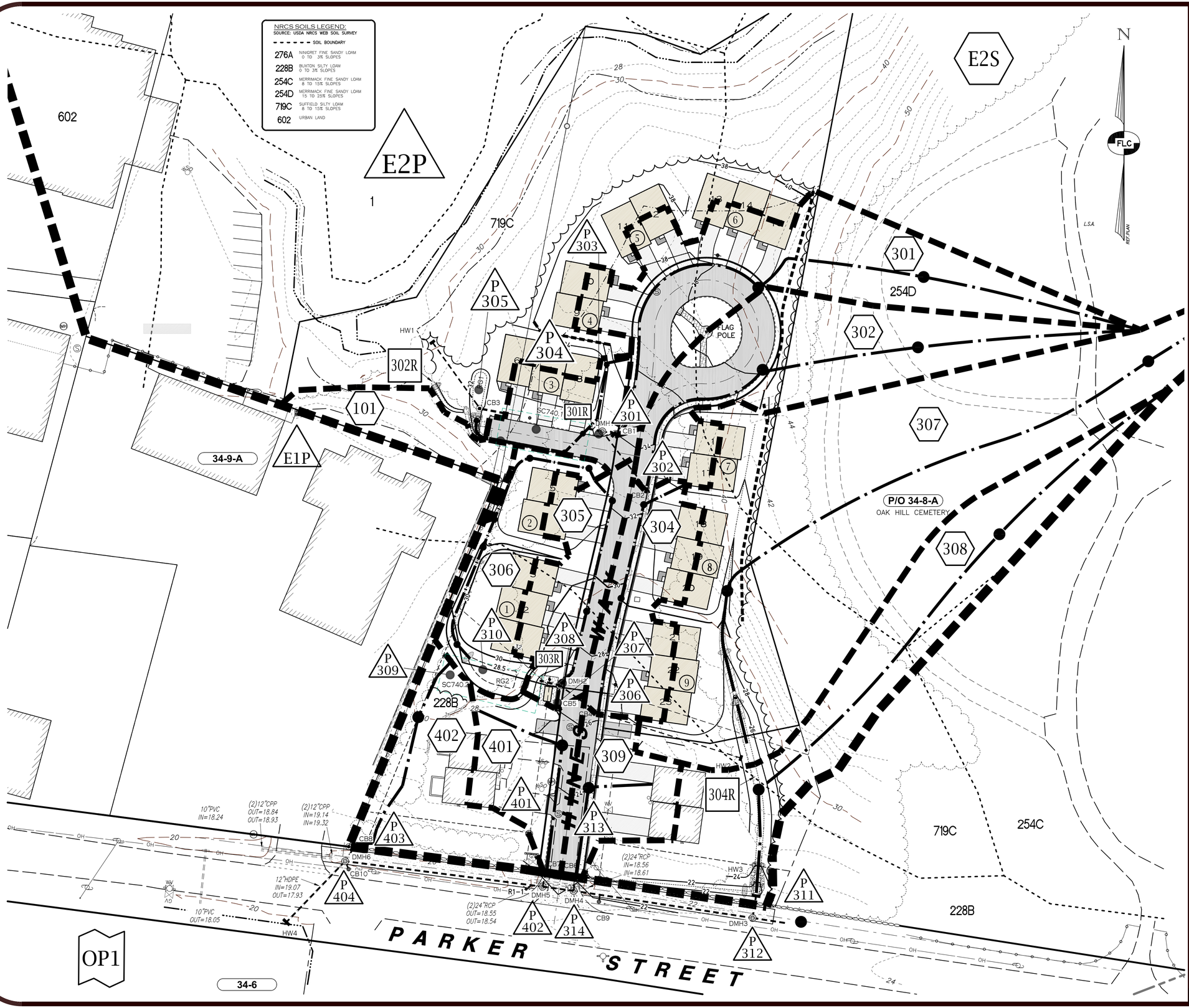

B	10/20/17	DRAINAGE AREA LIMITS		NRC	CEB
A	4/26/17	M. WEST WETLANDS LOCATION, SETBACK & BUFFER		XXX	XXX
	DATE	DESCRIPTION	C/O	DR	CK

POST-DEVELOPMENT DRAINAGE AREA PLAN

PARKER HILL DEFINITIVE SUBDIVISION

TAX MAP PARCEL 34-8-A - 2 PARKER STREET
NEWBURYPORT, MASSACHUSETTS

PREPARED FOR AND LAND OF:

PARKER 2 REALTY TRUST
160 BRIDGE ROAD, SALISBURY, MA 01952

SCALE: 1" = 30' AUGUST 14, 2017

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