Technical Supplement
Drainage Calculations

FOR
The Preserve at Abbyville
And
Abbyville Commons

LOCATED IN
NORFOLK, MASSACHUSETTS

PREPARED FOR
Abbyville Development, LLC
and
Abbyville Residential, LLC
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Wrentham, Massachusetts 02093

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DATE:
August 30, 2017

Table of Contents

Appendix A	-	Storm-water Narrative including Revised Table 2
Appendix B	-	Hydro-cad Analysis Basin A - 2, 10, 25 50 and 100 yr storm summary
Appendix C	-	Hydro-cad Analysis Basin 2 - 2, 10, 25 50 and 100 yr storm summary
Appendix D	-	Hydro-cad Analysis Basin 3 - 2, 10, 25 50 and 100 yr storm summary

Note: Revised Grading and Utility Plans, Revised Roadway Profiles, and Revised Watershed Plans are being sent as separate documents. These documents reflect the additional units as well as the elimination of sediment fore-bay "A" and the revisions to Pond 1 and the associated stormwater piping.

APPENDIX A

BACKGROUND:

Abbyville Development, LLC and Abbyville Residential, LLC. is hereby submitting an application to the Town of Norfolk Zoning Board of Appeals, under two Comprehensive Permit Applications.
A portion of the overall site was previously used for textile manufacturing, which has been abandoned and the building demolished. A second portion of the site was mined for gravel, while the remainder is wooded.
The previous site use created some downstream impacts, which have been analyzed separately. The following analysis will demonstrate a reduction of impact to the Northern side and no impact on the Southern side (area of previous impact).

DRAINAGE CALCULATIONS

United Consultants, Inc. has performed an hydrological analysis for the applicant of the project. This report reviews the hydrological impacts of the proposed development. The entire site (composed of Abbyville Commons and The Preserve at Abbyville) is being considered as one parcel, since the drainage collection and discharge are dependent on one another. Pre-construction calculations were not performed since no additional discharges are being proposed – these calculations demonstrate this site's ability to collect all the stormwater, process and discharge it to the ground. The post-construction characteristics of the property were analyzed to verify compliance with the MA DEP Stormwater Management Policy, for site development. The proposed drainage system will contain and control all analyzed storms.

To mitigate any potential adverse impacts due to site work, a stormwater management system (SWM) has been incorporated into the site design. The system will consist of four Forebays which will handle excess sediment, which will be removed periodically, each followed by Detention/Infiltration Ponds handling all analyzed stormwater events, per Town of Norfolk requirements.

In April, 2008, DEP adopted a new Stormwater Management Policy to address the non-point pollution discharges. The Policy prescribes specific stormwater management standards for the development of projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance is achieved through the implementation of "Best Management Practices" (BMP's) in the design.
United Consultants, Inc. has incorporated BMP's in the proposed SWM for the applicant of the project. Components that have been included are:

- Deep Sup Hooded Catch Basins (DSHCB)
- Forebays – sediment capture
- Detention/Infiltration Ponds – infiltration basin

System Performance

As demonstrated below, these components, in combination will effectively mitigate post-construction rate of runoff and pollutant loading of stormwater runoff from the site. The system is projected to:

- Exceed the minimum pollutant (TSS) removal rate of 80%.
- Attenuate peak discharges, while maintaining them within the system.
- Prevent downstream flooding.

Two, ten, twenty five, fifty and one hundred year storm events were reviewed. The tables below list the rainfall intensities used for each storm event.

Table 1 - Intensities

Storm Event	*24 Hour Rainfall*
2 year event	*3.20 inches*
10 year event	*4.80 inches*
25 year event	*5.50 inches*
50 year event	*6.20 inches*
100 year event	*6.80 inches*

Table 2 – Discharge Analysis

	Sediment forebay 1	*Detention/Infiltration Pond 1*
	outlet inv=175.50	outlet inv=175.50
2 yr event	peak elev=175.30	peak elev=172.00
10 yr event	peak elev=176.25	peak elev=172.89
25 yr event	peak elev=176.64	peak elev=173.89
50 yr event	peak elev=176.76	peak elev=174.99
100 yr event	peak elev=176.83	peak elev=175.74
	Sediment forebay 2	*Detention/Infiltration Pond 2*
	outlet inv=173.00	outlet inv=173.50
2 yr event	peak elev=168.55	peak elev=170.00
10 yr event	peak elev=171.04	peak elev=170.00
25 yr event	peak elev=172.19	peak elev=170.15
50 yr event	peak elev=173.20	peak elev=170.50
100 yr event	peak elev=173.50	peak elev=172.17
	Sediment forebay 3	*Detention/Infiltration Pond 3*
	outlet inv=167.00	outlet inv=171.65
2 yr event	peak elev=167.01	peak elev=165.50
10 yr event	peak elev=167.77	peak elev=167.36
25 yr event	peak elev=168.49	peak elev=168.48
50 yr event	peak elev=169.48	peak elev=169.46
100 yr event	peak elev=170.21	peak elev=170.21

For all analyzed storm events the Detention/Infiltration Ponds will discard in excess of the required, therefore storm discharges will be contained in the site.

DEP STORMWATER STANDARDS

Standard Number 1 – No untreated stormwater *– No new stormwater conveyances may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth* - ***Not Applicable*** – This project does not have discharges to wetland resource areas.

Standard Number 2 – Post development peak discharge rates *– Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates* – The stormwater management **design complies with this standard**, as outlined in the drainage calculations.

Standard Number 3 – Recharge to Ground *– Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to maximum extent practicable* – The developed portion of the site is designed to infiltrate within the Detention/Infiltration Pond- **design complies with this standard.**

Standard Number 4 – Total Suspended Solids (TSS) removal *– For new development, stormwater management systems must be designed to remove 80% of the annual load of Total Suspended Solids* – The combination of DSHCB's, Sediment forebays and an Infiltrating/Detention Ponds provides adequate removal – **design complies with this standard.**

Standard Number 5 – Higher potential pollutant loads *– Stormwater discharges from Land Uses with Higher Potential Pollutant Loads require the use of specific stormwater management BMP's.* – A Stormwater Pollution Prevention Plan (SWPPP) will be required and submitted prior to construction, as required under the NPDES program.

Standard Number 6 – Critical Areas *– Stormwater discharges to Critical Areas must utilize certain stormwater management BMP's approved for Critical Areas* – This project does not have discharges to critical Areas – **Not Applicable.**

Standard Number 7 *– Redevelopment of previously developed sites must meet the Stormwater Management Standards to the maximum extent practicable.* – **design complies with this standard.**

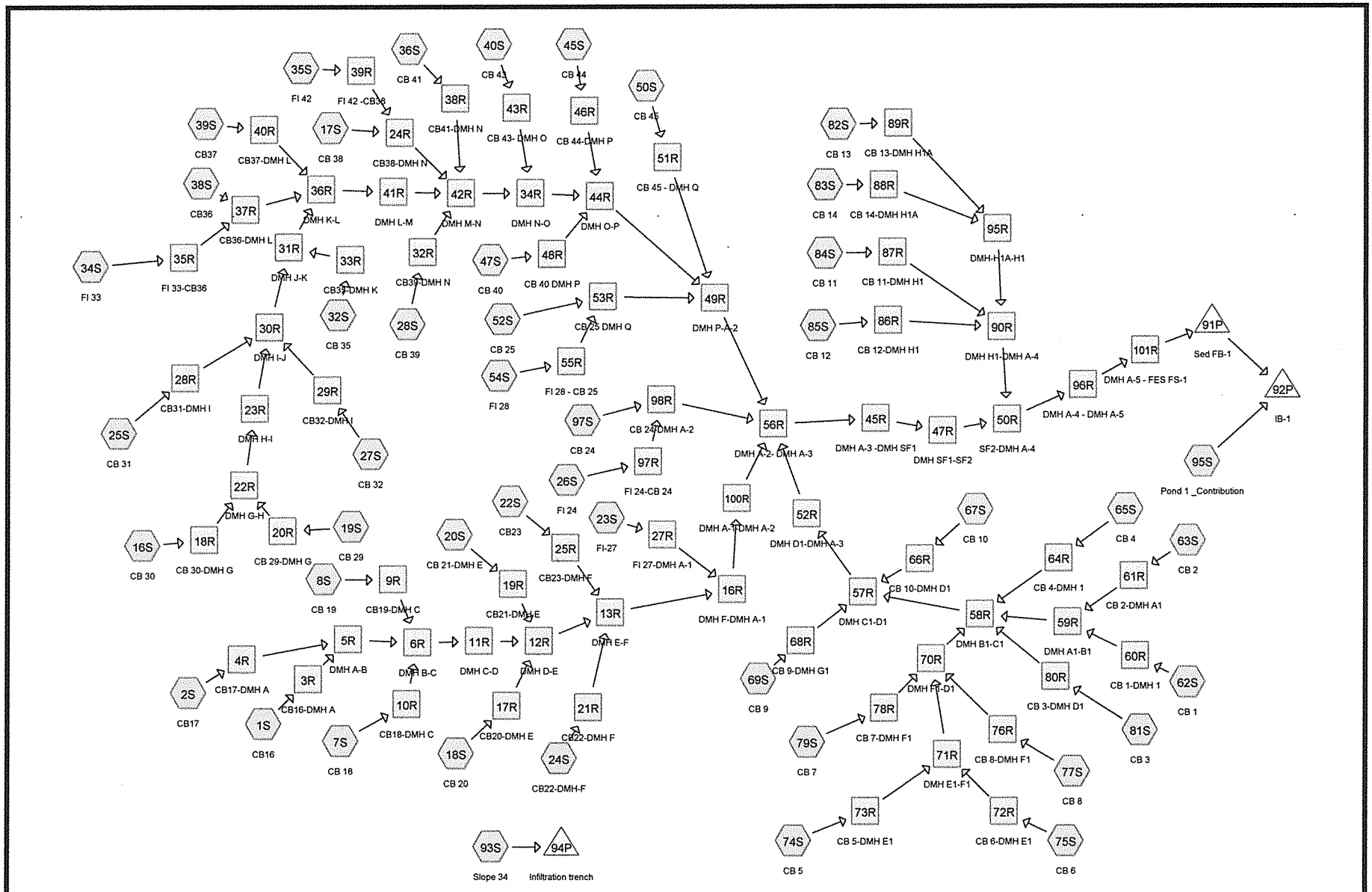
Standard Number 8 – Erosion and Sediment Controls *– Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities* – Erosion controls for the project proposes disturbance of greater than one acre of land and requires filing a Notice of Intent (NOI) with EPA and a Stormwater Pollution Prevention Plan (SWPPP). –

Erosion controls are provided in the drawings and a SWPPP will be filed prior to construction. – **Design complies with standard.**

Standard Number 9 – Operations & Maintenance Plan – *A Long Term Operations & Maintenance Plan shall be developed and implemented to ensure that stormwater management systems function as designed* – A Long Term Operations & Maintenance Plan is attached – **Complies with this standard.**

Standard Number 10 – Illicit Discharges – *All illicit discharges to the stormwater management system are prohibited* – The property developer is charged with preparing and submitting an Illicit Discharge Compliance Statement, verifying that no illicit discharges exist on the site, prior to start of construction. **Complies with standard.**

APPENDIX B



Routing Diagram for LS-Apartments (prop Cond)-BasinA

Prepared by CAQ Engineering Associates, Inc., Printed 8/30/2017

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
2.550	46	2 acre lots, 12% imp, HSG A (62S)
19.922	39	>75% Grass cover, Good, HSG A (1S, 2S, 7S, 8S, 16S, 17S, 19S, 20S, 23S, 24S, 25S, 26S, 27S, 32S, 34S, 35S, 36S, 38S, 39S, 40S, 45S, 52S, 54S, 62S, 63S, 65S, 67S, 69S, 74S, 75S, 77S, 79S, 81S, 82S, 83S, 84S, 85S, 93S, 95S, 97S)
0.430	98	Paved parking, HSG A (16S, 97S)
5.318	98	Paved roads w/curbs & sewers, HSG A (1S, 2S, 7S, 8S, 17S, 18S, 19S, 20S, 22S, 23S, 24S, 25S, 27S, 28S, 32S, 34S, 35S, 36S, 38S, 39S, 40S, 45S, 47S, 50S, 52S, 62S, 63S, 65S, 67S, 69S, 74S, 75S, 77S, 79S, 81S, 82S, 83S, 84S, 85S)
1.916	98	Roofs, HSG A (26S, 54S, 93S, 95S)
0.386	98	Water Surface, HSG A (95S)
30.522	**55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
30.522	HSG A	1S, 2S, 7S, 8S, 16S, 17S, 18S, 19S, 20S, 22S, 23S, 24S, 25S, 26S, 27S, 28S, 32S, 34S, 35S, 36S, 38S, 39S, 40S, 45S, 47S, 50S, 52S, 54S, 62S, 63S, 65S, 67S, 69S, 74S, 75S, 77S, 79S, 81S, 82S, 83S, 84S, 85S, 93S, 95S, 97S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
30.522		**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	3R	224.00	223.60	19.0	0.0211	0.013	12.0	0.0	0.0
2	4R	224.00	223.60	29.0	0.0138	0.013	12.0	0.0	0.0
3	5R	223.50	220.10	80.0	0.0425	0.013	12.0	0.0	0.0
4	6R	220.00	211.10	206.0	0.0432	0.013	12.0	0.0	0.0
5	9R	211.24	211.10	14.0	0.0100	0.013	12.0	0.0	0.0
6	10R	211.24	211.10	5.0	0.0280	0.013	12.0	0.0	0.0
7	11R	211.00	207.10	70.0	0.0557	0.013	12.0	0.0	0.0
8	12R	207.00	203.10	82.0	0.0476	0.013	12.0	0.0	0.0
9	13R	203.00	194.50	170.0	0.0500	0.013	12.0	0.0	0.0
10	16R	194.40	189.20	160.0	0.0325	0.013	12.0	0.0	0.0
11	17R	204.06	203.10	24.0	0.0400	0.013	12.0	0.0	0.0
12	18R	214.79	214.60	16.0	0.0119	0.013	12.0	0.0	0.0
13	19R	204.26	203.10	29.0	0.0400	0.013	12.0	0.0	0.0
14	20R	214.79	214.60	19.0	0.0100	0.013	12.0	0.0	0.0
15	21R	195.80	195.52	5.0	0.0560	0.013	12.0	0.0	0.0
16	22R	214.50	212.64	70.0	0.0266	0.013	12.0	0.0	0.0
17	23R	212.54	205.89	250.0	0.0266	0.013	15.0	0.0	0.0
18	24R	192.84	192.42	42.0	0.0100	0.013	12.0	0.0	0.0
19	25R	195.80	195.52	14.0	0.0200	0.013	12.0	0.0	0.0
20	27R	189.84	189.10	36.0	0.0206	0.013	12.0	0.0	0.0
21	28R	206.04	205.89	7.5	0.0200	0.013	12.0	0.0	0.0
22	29R	206.04	205.89	15.0	0.0100	0.013	12.0	0.0	0.0
23	30R	205.79	203.34	98.0	0.0250	0.013	15.0	0.0	0.0
24	31R	203.27	200.90	117.0	0.0203	0.013	15.0	0.0	0.0
25	32R	192.79	192.42	37.0	0.0100	0.013	12.0	0.0	0.0
26	33R	201.10	200.90	20.0	0.0100	0.013	12.0	0.0	0.0
27	34R	191.92	184.66	363.0	0.0200	0.013	18.0	0.0	0.0
28	35R	200.05	199.90	15.0	0.0100	0.013	12.0	0.0	0.0
29	36R	200.80	199.68	56.0	0.0200	0.013	15.0	0.0	0.0
30	37R	199.80	199.68	22.0	0.0055	0.013	12.0	0.0	0.0
31	38R	192.45	192.42	3.0	0.0100	0.013	12.0	0.0	0.0
32	39R	193.14	192.94	20.0	0.0100	0.013	12.0	0.0	0.0
33	40R	199.88	199.68	30.0	0.0067	0.013	12.0	0.0	0.0
34	41R	199.58	195.16	226.0	0.0196	0.013	15.0	0.0	0.0
35	42R	195.06	192.42	132.0	0.0200	0.013	18.0	0.0	0.0
36	43R	185.33	185.16	17.0	0.0100	0.013	12.0	0.0	0.0
37	44R	184.16	183.60	37.0	0.0151	0.013	24.0	0.0	0.0
38	45R	181.57	180.50	124.0	0.0086	0.013	30.0	0.0	0.0
39	46R	184.67	184.50	17.0	0.0100	0.013	12.0	0.0	0.0
40	47R	180.40	179.75	76.0	0.0086	0.013	30.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
41	48R	184.54	184.50	4.0	0.0100	0.013	12.0	0.0	0.0
42	49R	183.50	183.18	48.0	0.0067	0.013	24.0	0.0	0.0
43	50R	179.65	179.41	28.0	0.0086	0.013	30.0	0.0	0.0
44	51R	184.41	184.25	16.0	0.0100	0.013	12.0	0.0	0.0
45	52R	185.88	185.73	15.0	0.0100	0.013	24.0	0.0	0.0
46	53R	184.79	184.25	27.0	0.0200	0.013	12.0	0.0	0.0
47	55R	185.29	184.89	23.0	0.0174	0.013	12.0	0.0	0.0
48	56R	182.68	181.67	151.0	0.0067	0.013	30.0	0.0	0.0
49	57R	187.13	185.98	135.0	0.0085	0.013	18.0	0.0	0.0
50	58R	190.61	187.23	337.0	0.0100	0.013	18.0	0.0	0.0
51	59R	192.20	191.10	110.0	0.0100	0.013	12.0	0.0	0.0
52	60R	192.44	192.30	14.0	0.0100	0.013	12.0	0.0	0.0
53	61R	192.44	192.30	8.0	0.0175	0.013	12.0	0.0	0.0
54	64R	188.20	187.63	57.0	0.0100	0.013	12.0	0.0	0.0
55	66R	186.56	186.48	7.0	0.0114	0.013	12.0	0.0	0.0
56	68R	186.56	186.48	8.0	0.0100	0.013	12.0	0.0	0.0
57	70R	187.90	187.50	60.0	0.0067	0.013	15.0	0.0	0.0
58	71R	190.53	188.29	114.0	0.0196	0.013	12.0	0.0	0.0
59	72R	190.77	190.63	5.0	0.0280	0.013	12.0	0.0	0.0
60	73R	190.77	190.63	14.0	0.0100	0.013	12.0	0.0	0.0
61	76R	188.52	188.29	11.0	0.0209	0.013	12.0	0.0	0.0
62	78R	188.52	188.29	34.0	0.0068	0.013	12.0	0.0	0.0
63	80R	188.25	187.63	62.0	0.0100	0.013	12.0	0.0	0.0
64	86R	183.08	182.90	18.0	0.0100	0.013	12.0	0.0	0.0
65	87R	183.28	182.90	41.0	0.0093	0.013	12.0	0.0	0.0
66	88R	183.46	183.29	17.0	0.0100	0.013	12.0	0.0	0.0
67	89R	183.35	183.29	6.0	0.0100	0.013	12.0	0.0	0.0
68	90R	182.80	182.71	9.0	0.0100	0.013	12.0	0.0	0.0
69	95R	183.19	182.90	29.0	0.0100	0.013	12.0	0.0	0.0
70	96R	179.31	178.31	100.0	0.0100	0.013	30.0	0.0	0.0
71	97R	184.39	184.22	25.0	0.0068	0.013	12.0	0.0	0.0
72	98R	184.29	184.09	30.0	0.0067	0.013	12.0	0.0	0.0
73	100R	189.10	184.09	113.0	0.0443	0.013	12.0	0.0	0.0
74	101R	178.21	177.84	37.0	0.0100	0.013	30.0	0.0	0.0

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 91P: Sed FB-1 Peak Elev=175.30' Storage=0.221 af Inflow=8.38 cfs 0.911 af
Discarded=1.79 cfs 0.911 af Primary=0.00 cfs 0.000 af Outflow=1.79 cfs 0.911 af

Pond 92P: IB-1 Peak Elev=172.00' Storage=0.000 af Inflow=0.27 cfs 0.062 af
Discarded=0.27 cfs 0.062 af Primary=0.00 cfs 0.000 af Outflow=0.27 cfs 0.062 af

Pond 94P: Infiltration trench Peak Elev=195.00' Storage=0.000 af Inflow=0.01 cfs 0.003 af
Outflow=0.01 cfs 0.003 af

Summary for Pond 91P: Sed FB-1

Inflow Area =	24.900 ac, 29.91% Impervious, Inflow Depth = 0.44" for 2 YR event				
Inflow =	8.38 cfs @	12.15 hrs,	Volume=	0.911 af	
Outflow =	1.79 cfs @	12.74 hrs,	Volume=	0.911 af,	Atten= 79%, Lag= 35.5 min
Discarded =	1.79 cfs @	12.74 hrs,	Volume=	0.911 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 175.30' @ 12.74 hrs Surf.Area= 0.089 ac Storage= 0.221 af

Plug-Flow detention time= 46.6 min calculated for 0.909 af (100% of inflow)
Center-of-Mass det. time= 46.6 min (919.4 - 872.8)

Volume	Invert	Avail.Storage	Storage Description
#1	171.50'	0.287 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
171.50	0.000	0.000	0.000
172.00	0.041	0.010	0.010
174.00	0.068	0.109	0.119
176.00	0.100	0.168	0.287

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	171.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.79 cfs @ 12.74 hrs HW=175.30' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.79 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=171.50' TW=172.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 92P: IB-1

Inflow Area =	27.567 ac, 29.79% Impervious, Inflow Depth = 0.03" for 2 YR event				
Inflow =	0.27 cfs @	12.56 hrs,	Volume=	0.062 af	
Outflow =	0.27 cfs @	12.56 hrs,	Volume=	0.062 af,	Atten= 0%, Lag= 0.0 min
Discarded =	0.27 cfs @	12.56 hrs,	Volume=	0.062 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 172.00' @ 0.00 hrs Surf.Area= 0.235 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 0.0 min (962.7 - 962.7)

Volume	Invert	Avail.Storage	Storage Description
#1	172.00'	1.258 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
172.00	0.235	0.000	0.000
174.00	0.313	0.548	0.548
176.00	0.397	0.710	1.258

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	172.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 12.56 hrs HW=172.00' (Free Discharge)
└**2=Exfiltration** (Passes 0.00 cfs of 4.74 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.00' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 94P: Infiltration trench

Inflow Area = 2.955 ac, 4.91% Impervious, Inflow Depth = 0.01" for 2 YR event
Inflow = 0.01 cfs @ 21.56 hrs, Volume= 0.003 af
Outflow = 0.01 cfs @ 21.56 hrs, Volume= 0.003 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.01 cfs @ 21.56 hrs, Volume= 0.003 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 195.00' @ 0.00 hrs Surf.Area= 0.031 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (1,213.6 - 1,213.6)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	0.031 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.093 af Overall x 33.0% Voids

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
195.00	0.031	0.000	0.000
198.00	0.031	0.093	0.093

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**20.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 130.00'

Discarded OutFlow Max=0.00 cfs @ 21.56 hrs HW=195.00' (Free Discharge)
└**1=Exfiltration** (Passes 0.00 cfs of 0.63 cfs potential flow)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 91P: Sed FB-1 Peak Elev=176.25' Storage=0.287 af Inflow=18.64 cfs 2.285 af
Discarded=2.02 cfs 1.597 af Primary=17.39 cfs 0.688 af Outflow=19.41 cfs 2.285 af

Pond 92P: IB-1 Peak Elev=172.89' Storage=0.225 af Inflow=18.37 cfs 0.897 af
Discarded=5.44 cfs 0.897 af Primary=0.00 cfs 0.000 af Outflow=5.44 cfs 0.897 af

Pond 94P: Infiltration trench Peak Elev=195.00' Storage=0.000 af Inflow=0.22 cfs 0.065 af
Outflow=0.22 cfs 0.065 af

Summary for Pond 91P: Sed FB-1

Inflow Area =	24.900 ac, 29.91% Impervious, Inflow Depth = 1.10" for 10 YR event				
Inflow =	18.64 cfs @	12.15 hrs,	Volume=	2.285 af	
Outflow =	19.41 cfs @	12.21 hrs,	Volume=	2.285 af,	Atten= 0%, Lag= 3.7 min
Discarded =	2.02 cfs @	12.20 hrs,	Volume=	1.597 af	
Primary =	17.39 cfs @	12.21 hrs,	Volume=	0.688 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 176.25' @ 12.21 hrs Surf.Area= 0.100 ac Storage= 0.287 af

Plug-Flow detention time= 46.3 min calculated for 2.281 af (100% of inflow)
Center-of-Mass det. time= 46.3 min (914.8 - 868.5)

Volume	Invert	Avail.Storage	Storage Description
#1	171.50'	0.287 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
171.50	0.000	0.000	0.000
172.00	0.041	0.010	0.010
174.00	0.068	0.109	0.119
176.00	0.100	0.168	0.287

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	171.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.02 cfs @ 12.20 hrs HW=176.24' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.02 cfs)

Primary OutFlow Max=16.06 cfs @ 12.21 hrs HW=176.21' TW=172.14' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 16.06 cfs @ 2.26 fps)

Summary for Pond 92P: IB-1

Inflow Area =	27.567 ac, 29.79% Impervious, Inflow Depth = 0.39" for 10 YR event				
Inflow =	18.37 cfs @	12.21 hrs,	Volume=	0.897 af	
Outflow =	5.44 cfs @	12.72 hrs,	Volume=	0.897 af,	Atten= 70%, Lag= 30.5 min
Discarded =	5.44 cfs @	12.72 hrs,	Volume=	0.897 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 172.89' @ 12.72 hrs Surf.Area= 0.270 ac Storage= 0.225 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 15.8 min (816.5 - 800.8)

Volume	Invert	Avail.Storage	Storage Description
#1	172.00'	1.258 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
172.00	0.235	0.000	0.000
174.00	0.313	0.548	0.548
176.00	0.397	0.710	1.258

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	172.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=5.44 cfs @ 12.72 hrs HW=172.89' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 5.44 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.00' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 94P: Infiltration trench

Inflow Area = 2.955 ac, 4.91% Impervious, Inflow Depth = 0.26" for 10 YR event
Inflow = 0.22 cfs @ 12.45 hrs, Volume= 0.065 af
Outflow = 0.22 cfs @ 12.45 hrs, Volume= 0.065 af, Atten= 0%, Lag= 0.0 min
Discarded = 0.22 cfs @ 12.45 hrs, Volume= 0.065 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 195.00' @ 0.00 hrs Surf.Area= 0.031 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (986.5 - 986.5)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	0.031 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.093 af Overall x 33.0% Voids

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
195.00	0.031	0.000	0.000
198.00	0.031	0.093	0.093

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**20.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 130.00'

Discarded OutFlow Max=0.00 cfs @ 12.45 hrs HW=195.00' (Free Discharge)
└**1=Exfiltration** (Passes 0.00 cfs of 0.63 cfs potential flow)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 91P: Sed FB-1 Peak Elev=176.64' Storage=0.287 af Inflow=24.81 cfs 3.037 af
Discarded=2.02 cfs 1.810 af Primary=32.45 cfs 1.227 af Outflow=34.47 cfs 3.037 af

Pond 92P: IB-1 Peak Elev=173.89' Storage=0.513 af Inflow=33.63 cfs 1.518 af
Discarded=6.22 cfs 1.518 af Primary=0.00 cfs 0.000 af Outflow=6.22 cfs 1.518 af

Pond 94P: Infiltration trench Peak Elev=195.00' Storage=0.000 af Inflow=0.56 cfs 0.112 af
Outflow=0.56 cfs 0.112 af

Summary for Pond 91P: Sed FB-1

Inflow Area =	24.900 ac, 29.91% Impervious, Inflow Depth = 1.46" for 25 YR event				
Inflow =	24.81 cfs @	12.15 hrs,	Volume=	3.037 af	
Outflow =	34.47 cfs @	12.15 hrs,	Volume=	3.037 af,	Atten= 0%, Lag= 0.2 min
Discarded =	2.02 cfs @	12.15 hrs,	Volume=	1.810 af	
Primary =	32.45 cfs @	12.15 hrs,	Volume=	1.227 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 176.64' @ 12.15 hrs Surf.Area= 0.100 ac Storage= 0.287 af

Plug-Flow detention time= 42.3 min calculated for 3.032 af (100% of inflow)
Center-of-Mass det. time= 42.3 min (906.6 - 864.3)

Volume	Invert	Avail.Storage	Storage Description
#1	171.50'	0.287 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
171.50	0.000	0.000	0.000
172.00	0.041	0.010	0.010
174.00	0.068	0.109	0.119
176.00	0.100	0.168	0.287

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	171.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.02 cfs @ 12.15 hrs HW=176.64' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.02 cfs)

Primary OutFlow Max=31.25 cfs @ 12.15 hrs HW=176.61' TW=172.30' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 31.25 cfs @ 2.82 fps)

Summary for Pond 92P: IB-1

Inflow Area =	27.567 ac, 29.79% Impervious, Inflow Depth = 0.66" for 25 YR event				
Inflow =	33.63 cfs @	12.15 hrs,	Volume=	1.518 af	
Outflow =	6.22 cfs @	12.91 hrs,	Volume=	1.518 af,	Atten= 81%, Lag= 45.2 min
Discarded =	6.22 cfs @	12.91 hrs,	Volume=	1.518 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 173.89' @ 12.91 hrs Surf.Area= 0.309 ac Storage= 0.513 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 35.7 min (833.5 - 797.8)

Volume	Invert	Avail.Storage	Storage Description
#1	172.00'	1.258 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
172.00	0.235	0.000	0.000
174.00	0.313	0.548	0.548
176.00	0.397	0.710	1.258

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	172.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=6.22 cfs @ 12.91 hrs HW=173.89' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 6.22 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.00' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 94P: Infiltration trench

Inflow Area = 2.955 ac, 4.91% Impervious, Inflow Depth = 0.45" for 25 YR event
Inflow = 0.56 cfs @ 12.37 hrs, Volume= 0.112 af
Outflow = 0.56 cfs @ 12.37 hrs, Volume= 0.112 af, Atten= 0%, Lag= 0.1 min
Discarded = 0.56 cfs @ 12.37 hrs, Volume= 0.112 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 195.00' @ 12.36 hrs Surf.Area= 0.031 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (954.1 - 954.1)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	0.031 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.093 af Overall x 33.0% Voids

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
195.00	0.031	0.000	0.000
198.00	0.031	0.093	0.093

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**20.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 130.00'

Discarded OutFlow Max=0.63 cfs @ 12.37 hrs HW=195.00' (Free Discharge)
└**1=Exfiltration** (Controls 0.63 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 91P: Sed FB-1 Peak Elev=176.73' Storage=0.287 af Inflow=31.94 cfs 3.860 af
Discarded=2.02 cfs 1.998 af Primary=36.22 cfs 1.861 af Outflow=38.23 cfs 3.860 af

Pond 92P: IB-1 Peak Elev=174.99' Storage=0.877 af Inflow=38.59 cfs 2.243 af
Discarded=7.15 cfs 2.246 af Primary=0.00 cfs 0.000 af Outflow=7.15 cfs 2.246 af

Pond 94P: Infiltration trench Peak Elev=196.05' Storage=0.011 af Inflow=1.04 cfs 0.169 af
Outflow=0.64 cfs 0.169 af

Summary for Pond 91P: Sed FB-1

Inflow Area =	24.900 ac, 29.91% Impervious, Inflow Depth = 1.86" for 50 YR event				
Inflow =	31.94 cfs @	12.15 hrs,	Volume=	3.860 af	
Outflow =	38.23 cfs @	12.20 hrs,	Volume=	3.860 af,	Atten= 0%, Lag= 3.0 min
Discarded =	2.02 cfs @	12.10 hrs,	Volume=	1.998 af	
Primary =	36.22 cfs @	12.20 hrs,	Volume=	1.861 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 176.73' @ 12.20 hrs Surf.Area= 0.100 ac Storage= 0.287 af

Plug-Flow detention time= 38.8 min calculated for 3.854 af (100% of inflow)
Center-of-Mass det. time= 38.8 min (899.0 - 860.3)

Volume	Invert	Avail.Storage	Storage Description
#1	171.50'	0.287 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
171.50	0.000	0.000	0.000
172.00	0.041	0.010	0.010
174.00	0.068	0.109	0.119
176.00	0.100	0.168	0.287

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	171.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.02 cfs @ 12.10 hrs HW=176.73' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.02 cfs)

Primary OutFlow Max=36.22 cfs @ 12.20 hrs HW=176.73' TW=173.12' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 36.22 cfs @ 2.95 fps)

Summary for Pond 92P: IB-1

Inflow Area =	27.567 ac, 29.79% Impervious, Inflow Depth = 0.98" for 50 YR event				
Inflow =	38.59 cfs @	12.20 hrs,	Volume=	2.243 af	
Outflow =	7.15 cfs @	13.05 hrs,	Volume=	2.246 af,	Atten= 81%, Lag= 51.4 min
Discarded =	7.15 cfs @	13.05 hrs,	Volume=	2.246 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 174.99' @ 13.05 hrs Surf.Area= 0.354 ac Storage= 0.877 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 57.4 min (855.0 - 797.6)

Volume	Invert	Avail.Storage	Storage Description
#1	172.00'	1.258 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
172.00	0.235	0.000	0.000
174.00	0.313	0.548	0.548
176.00	0.397	0.710	1.258

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	172.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=7.15 cfs @ 13.05 hrs HW=174.98' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 7.15 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=172.00' (Free Discharge)
└**1=Orifice/Grate** (Controls 0.00 cfs)

Summary for Pond 94P: Infiltration trench

Inflow Area =	2.955 ac,	4.91% Impervious,	Inflow Depth =	0.69" for 50 YR event
Inflow =	1.04 cfs @	12.20 hrs, Volume=	0.169 af	
Outflow =	0.64 cfs @	12.56 hrs, Volume=	0.169 af,	Atten= 39%, Lag= 21.6 min
Discarded =	0.64 cfs @	12.56 hrs, Volume=	0.169 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 196.05' @ 12.56 hrs Surf.Area= 0.031 ac Storage= 0.011 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 2.8 min (935.6 - 932.8)

Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	0.031 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.093 af Overall x 33.0% Voids

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
195.00	0.031	0.000	0.000
198.00	0.031	0.093	0.093

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**20.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 130.00'

Discarded OutFlow Max=0.64 cfs @ 12.56 hrs HW=196.05' (Free Discharge)
└**1=Exfiltration** (Controls 0.64 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 91P: Sed FB-1 Peak Elev=176.83' Storage=0.287 af Inflow=37.41 cfs 4.613 af
Discarded=2.02 cfs 2.143 af Primary=40.64 cfs 2.471 af Outflow=42.66 cfs 4.613 af

Pond 92P: IB-1 Peak Elev=175.74' Storage=1.157 af Inflow=42.92 cfs 2.935 af
Discarded=7.79 cfs 2.804 af Primary=3.13 cfs 0.132 af Outflow=10.91 cfs 2.936 af

Pond 94P: Infiltration trench Peak Elev=197.91' Storage=0.030 af Inflow=1.69 cfs 0.225 af
Outflow=0.65 cfs 0.226 af

Summary for Pond 91P: Sed FB-1

Inflow Area =	24.900 ac, 29.91% Impervious, Inflow Depth = 2.22" for 100 YR event				
Inflow =	37.41 cfs @	12.15 hrs,	Volume=	4.613 af	
Outflow =	42.66 cfs @	12.15 hrs,	Volume=	4.613 af,	Atten= 0%, Lag= 0.0 min
Discarded =	2.02 cfs @	12.05 hrs,	Volume=	2.143 af	
Primary =	40.64 cfs @	12.15 hrs,	Volume=	2.471 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 176.83' @ 12.15 hrs Surf.Area= 0.100 ac Storage= 0.287 af

Plug-Flow detention time= 36.1 min calculated for 4.607 af (100% of inflow)
Center-of-Mass det. time= 36.1 min (893.1 - 857.1)

Volume	Invert	Avail.Storage	Storage Description
#1	171.50'	0.287 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
171.50	0.000	0.000	0.000
172.00	0.041	0.010	0.010
174.00	0.068	0.109	0.119
176.00	0.100	0.168	0.287

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**10.0' long x 6.0' 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) 2.37 2.51 2.70 2.68 2.68 2.67 2.65 2.65 2.65 2.65 2.66 2.66 2.67 2.69 2.72 2.76 2.83
#2	Discarded	171.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.02 cfs @ 12.05 hrs HW=176.56' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.02 cfs)

Primary OutFlow Max=40.60 cfs @ 12.15 hrs HW=176.83' TW=173.15' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 40.60 cfs @ 3.06 fps)

Summary for Pond 92P: IB-1

Inflow Area =	27.567 ac, 29.79% Impervious, Inflow Depth = 1.28" for 100 YR event				
Inflow =	42.92 cfs @	12.15 hrs,	Volume=	2.935 af	
Outflow =	10.91 cfs @	12.89 hrs,	Volume=	2.936 af,	Atten= 75%, Lag= 44.4 min
Discarded =	7.79 cfs @	12.89 hrs,	Volume=	2.804 af	
Primary =	3.13 cfs @	12.89 hrs,	Volume=	0.132 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 175.74' @ 12.89 hrs Surf.Area= 0.386 ac Storage= 1.157 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)

Center-of-Mass det. time= 67.5 min (866.0 - 798.5)

Volume	Invert	Avail.Storage	Storage Description
#1	172.00'	1.258 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
172.00	0.235	0.000	0.000
174.00	0.313	0.548	0.548
176.00	0.397	0.710	1.258

Device	Routing	Invert	Outlet Devices
#1	Primary	175.50'	**24.0" x 24.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Discarded	172.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=7.79 cfs @ 12.89 hrs HW=175.74' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 7.79 cfs)

Primary OutFlow Max=3.11 cfs @ 12.89 hrs HW=175.74' (Free Discharge)
└**1=Orifice/Grate** (Weir Controls 3.11 cfs @ 1.61 fps)

Summary for Pond 94P: Infiltration trench

Inflow Area = 2.955 ac, 4.91% Impervious, Inflow Depth = 0.91" for 100 YR event
Inflow = 1.69 cfs @ 12.18 hrs, Volume= 0.225 af
Outflow = 0.65 cfs @ 12.65 hrs, Volume= 0.226 af, Atten= 61%, Lag= 28.3 min
Discarded = 0.65 cfs @ 12.65 hrs, Volume= 0.226 af

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 197.91' @ 12.65 hrs Surf.Area= 0.031 ac Storage= 0.030 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 10.3 min (929.7 - 919.4)

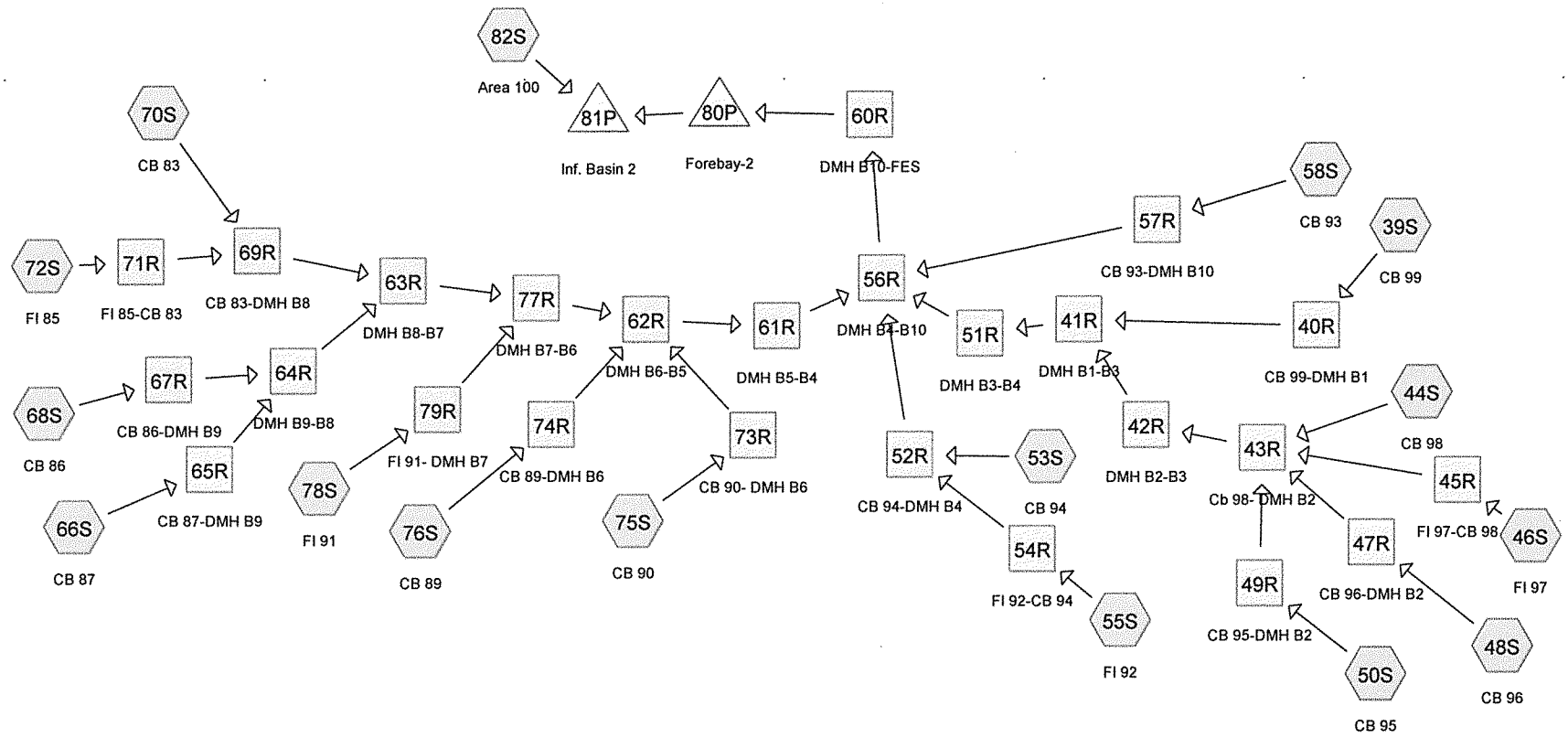
Volume	Invert	Avail.Storage	Storage Description
#1	195.00'	0.031 af	**Custom Stage Data (Prismatic)** Listed below (Recalc) 0.093 af Overall x 33.0% Voids

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
195.00	0.031	0.000	0.000
198.00	0.031	0.093	0.093

Device	Routing	Invert	Outlet Devices
#1	Discarded	195.00'	**20.000 in/hr Exfiltration over Surface area** Conductivity to Groundwater Elevation = 130.00'

Discarded OutFlow Max=0.65 cfs @ 12.65 hrs HW=197.91' (Free Discharge)
└**1=Exfiltration** (Controls 0.65 cfs)

APPENDIX C



Routing Diagram for LS-Basin 2

Prepared by CAQ Engineering Associates, Inc., Printed 8/30/2017

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
7.748	39	>75% Grass cover, Good, HSG A (39S, 44S, 46S, 48S, 50S, 53S, 55S, 58S, 66S, 68S, 70S, 72S, 75S, 76S, 78S, 82S)
1.201	98	Paved roads w/curbs & sewers, HSG A (39S, 44S, 48S, 50S, 53S, 58S, 66S, 68S, 70S, 75S, 76S)
1.974	98	Roofs, HSG A (46S, 48S, 50S, 55S, 66S, 72S, 75S, 76S, 78S, 82S)
0.129	98	Water Surface, HSG A (82S)
11.052	**57**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
11.052	HSG A	39S, 44S, 46S, 48S, 50S, 53S, 55S, 58S, 66S, 68S, 70S, 72S, 75S, 76S, 78S, 82S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
11.052		**TOTAL AREA**

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 80P: Forebay-2 Peak Elev=168.55' Storage=0.052 af Inflow=2.76 cfs 0.333 af
Discarded=1.12 cfs 0.333 af Primary=0.00 cfs 0.000 af Outflow=1.12 cfs 0.333 af

Pond 81P: Inf. Basin 2 Peak Elev=170.00' Storage=0.000 af Inflow=0.08 cfs 0.026 af
Discarded=0.08 cfs 0.026 af Primary=0.00 cfs 0.000 af Outflow=0.08 cfs 0.026 af

Summary for Pond 80P: Forebay-2

Inflow Area =	8.994 ac, 32.10% Impervious, Inflow Depth = 0.44" for 2 YR event				
Inflow =	2.76 cfs @	12.12 hrs,	Volume=	0.333 af	
Outflow =	1.12 cfs @	12.54 hrs,	Volume=	0.333 af,	Atten= 60%, Lag= 25.3 min
Discarded =	1.12 cfs @	12.54 hrs,	Volume=	0.333 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 168.55' @ 12.54 hrs Surf.Area= 0.055 ac Storage= 0.052 af

Plug-Flow detention time= 13.7 min calculated for 0.332 af (100% of inflow)
Center-of-Mass det. time= 13.7 min (902.5 - 888.8)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	0.503 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
167.00	0.000	0.000	0.000
168.00	0.048	0.024	0.024
170.00	0.075	0.123	0.147
172.00	0.109	0.184	0.331
173.50	0.120	0.172	0.503

Device	Routing	Invert	Outlet Devices
#1	Primary	173.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	167.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.12 cfs @ 12.54 hrs HW=168.54' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=170.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 81P: Inf. Basin 2

Inflow Area =	11.052 ac, 29.90% Impervious, Inflow Depth = 0.03" for 2 YR event				
Inflow =	0.08 cfs @	12.35 hrs,	Volume=	0.026 af	
Outflow =	0.08 cfs @	12.35 hrs,	Volume=	0.026 af,	Atten= 0%, Lag= 0.0 min
Discarded =	0.08 cfs @	12.35 hrs,	Volume=	0.026 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.00' @ 0.00 hrs Surf.Area= 0.052 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.0 min (991.1 - 991.1)

Volume	Invert	Avail.Storage	Storage Description
#1	170.00'	0.512 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
170.00	0.052	0.000	0.000
172.00	0.089	0.141	0.141
174.00	0.282	0.371	0.512

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	170.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.00 cfs @ 12.35 hrs HW=170.00' (Free Discharge)
└─**2=Exfiltration** (Passes 0.00 cfs of 1.05 cfs potential flow)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=170.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 80P: Forebay-2 Peak Elev=171.04' Storage=0.234 af Inflow=7.35 cfs 0.866 af
Discarded=1.87 cfs 0.866 af Primary=0.00 cfs 0.000 af Outflow=1.87 cfs 0.866 af

Pond 81P: Inf. Basin 2 Peak Elev=170.00' Storage=0.000 af Inflow=1.13 cfs 0.114 af
Discarded=1.05 cfs 0.114 af Primary=0.00 cfs 0.000 af Outflow=1.05 cfs 0.114 af

Summary for Pond 80P: Forebay-2

Inflow Area =	8.994 ac, 32.10% Impervious, Inflow Depth = 1.15" for 10 YR event				
Inflow =	7.35 cfs @	12.12 hrs,	Volume=	0.866 af	
Outflow =	1.87 cfs @	12.83 hrs,	Volume=	0.866 af,	Atten= 75%, Lag= 42.9 min
Discarded =	1.87 cfs @	12.83 hrs,	Volume=	0.866 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 171.04' @ 12.83 hrs Surf.Area= 0.093 ac Storage= 0.234 af

Plug-Flow detention time= 50.9 min calculated for 0.864 af (100% of inflow)
Center-of-Mass det. time= 50.8 min (920.8 - 869.9)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	0.503 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
167.00	0.000	0.000	0.000
168.00	0.048	0.024	0.024
170.00	0.075	0.123	0.147
172.00	0.109	0.184	0.331
173.50	0.120	0.172	0.503

Device	Routing	Invert	Outlet Devices
#1	Primary	173.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	167.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.87 cfs @ 12.83 hrs HW=171.04' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.87 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=170.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 81P: Inf. Basin 2

Inflow Area =	11.052 ac, 29.90% Impervious, Inflow Depth = 0.12" for 10 YR event				
Inflow =	1.13 cfs @	12.04 hrs,	Volume=	0.114 af	
Outflow =	1.05 cfs @	12.04 hrs,	Volume=	0.114 af,	Atten= 7%, Lag= 0.5 min
Discarded =	1.05 cfs @	12.04 hrs,	Volume=	0.114 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.00' @ 12.05 hrs Surf.Area= 0.052 ac Storage= 0.000 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 0.6 min (910.0 - 909.4)

Volume	Invert	Avail.Storage	Storage Description
#1	170.00'	0.512 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
170.00	0.052	0.000	0.000
172.00	0.089	0.141	0.141
174.00	0.282	0.371	0.512

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	170.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.05 cfs @ 12.04 hrs HW=170.00' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.05 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=170.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 80P: Forebay-2 Peak Elev=172.19' Storage=0.351 af Inflow=9.95 cfs 1.153 af
Discarded=2.23 cfs 1.153 af Primary=0.00 cfs 0.000 af Outflow=2.23 cfs 1.153 af

Pond 81P: Inf. Basin 2 Peak Elev=170.15' Storage=0.008 af Inflow=2.03 cfs 0.167 af
Discarded=1.10 cfs 0.167 af Primary=0.00 cfs 0.000 af Outflow=1.10 cfs 0.167 af

Summary for Pond 80P: Forebay-2

Inflow Area =	8.994 ac, 32.10% Impervious, Inflow Depth = 1.54" for 25 YR event				
Inflow =	9.95 cfs @	12.12 hrs,	Volume=	1.153 af	
Outflow =	2.23 cfs @	12.93 hrs,	Volume=	1.153 af,	Atten= 78%, Lag= 48.3 min
Discarded =	2.23 cfs @	12.93 hrs,	Volume=	1.153 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 172.19' @ 12.93 hrs Surf.Area= 0.110 ac Storage= 0.351 af

Plug-Flow detention time= 68.1 min calculated for 1.152 af (100% of inflow)
Center-of-Mass det. time= 68.0 min (931.3 - 863.3)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	0.503 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
167.00	0.000	0.000	0.000
168.00	0.048	0.024	0.024
170.00	0.075	0.123	0.147
172.00	0.109	0.184	0.331
173.50	0.120	0.172	0.503

Device	Routing	Invert	Outlet Devices
#1	Primary	173.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	167.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.23 cfs @ 12.93 hrs HW=172.19' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=167.00' TW=170.00' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Summary for Pond 81P: Inf. Basin 2

Inflow Area =	11.052 ac, 29.90% Impervious, Inflow Depth = 0.18" for 25 YR event				
Inflow =	2.03 cfs @	12.02 hrs,	Volume=	0.167 af	
Outflow =	1.10 cfs @	12.20 hrs,	Volume=	0.167 af,	Atten= 46%, Lag= 10.9 min
Discarded =	1.10 cfs @	12.20 hrs,	Volume=	0.167 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.15' @ 12.20 hrs Surf.Area= 0.055 ac Storage= 0.008 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 1.6 min (895.3 - 893.6)

Volume	Invert	Avail.Storage	Storage Description
#1	170.00'	0.512 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
170.00	0.052	0.000	0.000
172.00	0.089	0.141	0.141
174.00	0.282	0.371	0.512

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	170.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.10 cfs @ 12.20 hrs HW=170.15' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.10 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=170.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 80P: Forebay-2 Peak Elev=173.20' Storage=0.467 af Inflow=12.84 cfs 1.466 af
Discarded=2.38 cfs 1.418 af Primary=1.37 cfs 0.048 af Outflow=3.74 cfs 1.466 af

Pond 81P: Inf. Basin 2 Peak Elev=170.50' Storage=0.028 af Inflow=3.04 cfs 0.274 af
Discarded=1.23 cfs 0.275 af Primary=0.00 cfs 0.000 af Outflow=1.23 cfs 0.275 af

Summary for Pond 80P: Forebay-2

Inflow Area =	8.994 ac, 32.10% Impervious, Inflow Depth = 1.96" for 50 YR event				
Inflow =	12.84 cfs @	12.13 hrs,	Volume=	1.466 af	
Outflow =	3.74 cfs @	12.73 hrs,	Volume=	1.466 af,	Atten= 71%, Lag= 36.2 min
Discarded =	2.38 cfs @	12.73 hrs,	Volume=	1.418 af	
Primary =	1.37 cfs @	12.73 hrs,	Volume=	0.048 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 173.20' @ 12.73 hrs Surf.Area= 0.118 ac Storage= 0.467 af

Plug-Flow detention time= 81.9 min calculated for 1.464 af (100% of inflow)
Center-of-Mass det. time= 81.8 min (939.4 - 857.6)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	0.503 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
167.00	0.000	0.000	0.000
168.00	0.048	0.024	0.024
170.00	0.075	0.123	0.147
172.00	0.109	0.184	0.331
173.50	0.120	0.172	0.503

Device	Routing	Invert	Outlet Devices
#1	Primary	173.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	167.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.38 cfs @ 12.73 hrs HW=173.20' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.38 cfs)

Primary OutFlow Max=1.36 cfs @ 12.73 hrs HW=173.20' TW=170.39' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 1.36 cfs @ 0.67 fps)

Summary for Pond 81P: Inf. Basin 2

Inflow Area =	11.052 ac, 29.90% Impervious, Inflow Depth = 0.30" for 50 YR event				
Inflow =	3.04 cfs @	12.02 hrs,	Volume=	0.274 af	
Outflow =	1.23 cfs @	12.95 hrs,	Volume=	0.275 af,	Atten= 59%, Lag= 56.2 min
Discarded =	1.23 cfs @	12.95 hrs,	Volume=	0.275 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.50' @ 12.95 hrs Surf.Area= 0.061 ac Storage= 0.028 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 7.0 min (869.6 - 862.6)

Volume	Invert	Avail.Storage	Storage Description
#1	170.00'	0.512 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
170.00	0.052	0.000	0.000
172.00	0.089	0.141	0.141
174.00	0.282	0.371	0.512

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	170.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.23 cfs @ 12.95 hrs HW=170.50' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 1.23 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=170.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 80P: Forebay-2 Peak Elev=173.50' Storage=0.503 af Inflow=15.60 cfs 1.751 af
Discarded=2.42 cfs 1.551 af Primary=5.35 cfs 0.201 af Outflow=7.77 cfs 1.751 af

Pond 81P: Inf. Basin 2 Peak Elev=172.17' Storage=0.157 af Inflow=6.02 cfs 0.482 af
Discarded=2.12 cfs 0.484 af Primary=0.00 cfs 0.000 af Outflow=2.12 cfs 0.484 af

Summary for Pond 80P: Forebay-2

Inflow Area =	8.994 ac, 32.10% Impervious, Inflow Depth = 2.34" for 100 YR event				
Inflow =	15.60 cfs @	12.13 hrs,	Volume=	1.751 af	
Outflow =	7.77 cfs @	12.52 hrs,	Volume=	1.751 af,	Atten= 50%, Lag= 23.3 min
Discarded =	2.42 cfs @	12.52 hrs,	Volume=	1.551 af	
Primary =	5.35 cfs @	12.52 hrs,	Volume=	0.201 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 173.50' @ 12.52 hrs Surf.Area= 0.120 ac Storage= 0.503 af

Plug-Flow detention time= 78.3 min calculated for 1.749 af (100% of inflow)
Center-of-Mass det. time= 78.2 min (931.6 - 853.4)

Volume	Invert	Avail.Storage	Storage Description
#1	167.00'	0.503 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
167.00	0.000	0.000	0.000
168.00	0.048	0.024	0.024
170.00	0.075	0.123	0.147
172.00	0.109	0.184	0.331
173.50	0.120	0.172	0.503

Device	Routing	Invert	Outlet Devices
#1	Primary	173.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	167.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.42 cfs @ 12.52 hrs HW=173.50' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 2.42 cfs)

Primary OutFlow Max=5.26 cfs @ 12.52 hrs HW=173.50' TW=171.34' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 5.26 cfs @ 1.06 fps)

Summary for Pond 81P: Inf. Basin 2

Inflow Area =	11.052 ac, 29.90% Impervious, Inflow Depth = 0.52" for 100 YR event				
Inflow =	6.02 cfs @	12.51 hrs,	Volume=	0.482 af	
Outflow =	2.12 cfs @	12.93 hrs,	Volume=	0.484 af,	Atten= 65%, Lag= 25.1 min
Discarded =	2.12 cfs @	12.93 hrs,	Volume=	0.484 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 172.17' @ 12.93 hrs Surf.Area= 0.105 ac Storage= 0.157 af

Plug-Flow detention time= (not calculated: outflow precedes inflow)
Center-of-Mass det. time= 29.8 min (857.5 - 827.7)

Volume	Invert	Avail.Storage	Storage Description
#1	170.00'	0.512 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

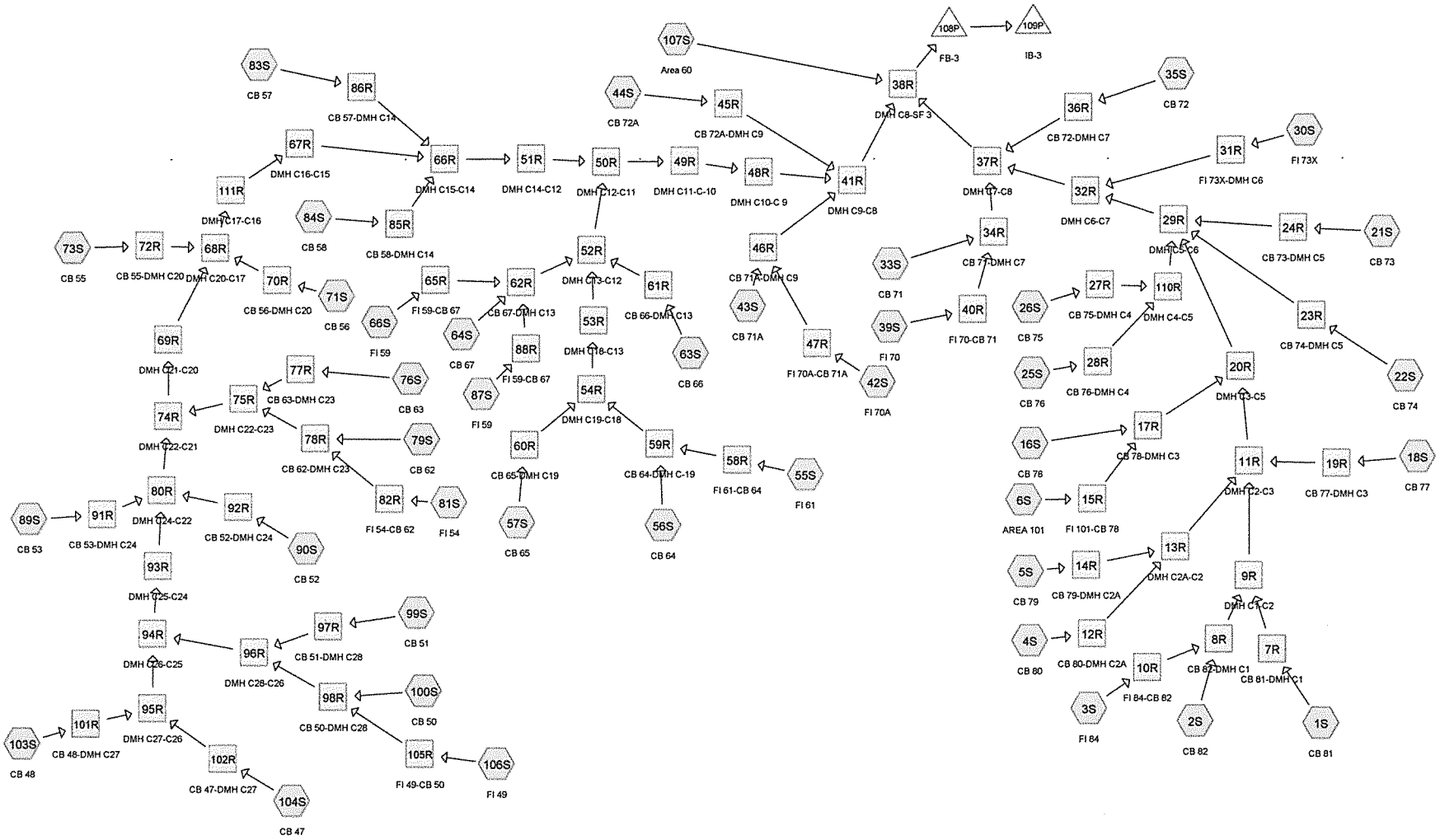
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
170.00	0.052	0.000	0.000
172.00	0.089	0.141	0.141
174.00	0.282	0.371	0.512

Device	Routing	Invert	Outlet Devices
#1	Primary	173.50'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	170.00'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.12 cfs @ 12.93 hrs HW=172.17' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 2.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=170.00' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

APPENDIX D



Subcat Reach Pond Link

Routing Diagram for LS-Basin 3

Prepared by CAQ Engineering Associates, Inc., Printed 8/30/2017

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Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
19.561	39	>75% Grass cover, Good, HSG A (1S, 2S, 3S, 4S, 5S, 6S, 16S, 18S, 21S, 22S, 25S, 26S, 30S, 33S, 35S, 39S, 42S, 43S, 44S, 55S, 56S, 57S, 63S, 64S, 66S, 71S, 73S, 76S, 79S, 81S, 83S, 84S, 87S, 89S, 90S, 99S, 100S, 103S, 104S, 106S, 107S)
3.612	98	Paved roads w/curbs & sewers, HSG A (1S, 2S, 4S, 5S, 16S, 18S, 21S, 22S, 25S, 26S, 33S, 35S, 39S, 42S, 43S, 44S, 55S, 56S, 57S, 63S, 64S, 71S, 73S, 76S, 79S, 83S, 84S, 89S, 90S, 99S, 100S, 103S, 104S)
3.212	98	Roofs, HSG A (3S, 6S, 18S, 22S, 30S, 39S, 42S, 55S, 66S, 73S, 81S, 87S, 89S, 103S, 106S, 107S)
0.507	98	Water Surface, HSG A (107S)
26.892	**55**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
26.892	HSG A	1S, 2S, 3S, 4S, 5S, 6S, 16S, 18S, 21S, 22S, 25S, 26S, 30S, 33S, 35S, 39S, 42S, 43S, 44S, 55S, 56S, 57S, 63S, 64S, 66S, 71S, 73S, 76S, 79S, 81S, 83S, 84S, 87S, 89S, 90S, 99S, 100S, 103S, 104S, 106S, 107S
0.000	HSG B	
0.000	HSG C	
0.000	HSG D	
0.000	Other	
26.892		**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	7R	178.07	177.94	13.0	0.0100	0.013	12.0	0.0	0.0
2	8R	178.07	177.94	7.0	0.0186	0.013	12.0	0.0	0.0
3	9R	177.84	177.50	34.0	0.0100	0.013	12.0	0.0	0.0
4	10R	178.37	178.17	20.0	0.0100	0.013	12.0	0.0	0.0
5	11R	177.40	175.34	206.0	0.0100	0.013	15.0	0.0	0.0
6	12R	177.82	177.78	4.0	0.0100	0.013	12.0	0.0	0.0
7	13R	177.68	177.50	18.0	0.0100	0.013	12.0	0.0	0.0
8	14R	177.90	177.78	12.0	0.0100	0.013	12.0	0.0	0.0
9	15R	175.68	175.52	16.0	0.0100	0.013	12.0	0.0	0.0
10	17R	175.42	175.34	8.0	0.0100	0.013	12.0	0.0	0.0
11	19R	175.46	175.34	12.0	0.0100	0.013	12.0	0.0	0.0
12	20R	175.09	174.54	55.0	0.0100	0.013	15.0	0.0	0.0
13	23R	175.24	174.81	43.0	0.0100	0.013	12.0	0.0	0.0
14	24R	175.13	174.81	32.0	0.0100	0.013	12.0	0.0	0.0
15	27R	175.27	175.21	6.0	0.0100	0.013	12.0	0.0	0.0
16	28R	175.36	175.21	15.0	0.0100	0.013	12.0	0.0	0.0
17	29R	174.31	173.26	105.0	0.0100	0.013	18.0	0.0	0.0
18	31R	174.16	173.76	40.0	0.0100	0.013	12.0	0.0	0.0
19	32R	173.16	171.89	127.0	0.0100	0.013	18.0	0.0	0.0
20	34R	172.53	172.39	7.0	0.0200	0.013	12.0	0.0	0.0
21	36R	172.53	172.39	14.0	0.0100	0.013	12.0	0.0	0.0
22	37R	171.39	170.40	99.0	0.0100	0.013	24.0	0.0	0.0
23	38R	171.50	170.40	170.0	0.0065	0.013	30.0	0.0	0.0
24	40R	173.03	172.53	50.0	0.0100	0.013	15.0	0.0	0.0
25	41R	172.36	170.40	98.0	0.0200	0.013	24.0	0.0	0.0
26	45R	173.58	173.46	12.0	0.0100	0.013	12.0	0.0	0.0
27	46R	173.58	173.46	3.0	0.0400	0.013	12.0	0.0	0.0
28	47R	174.12	173.68	25.0	0.0176	0.013	12.0	0.0	0.0
29	48R	173.35	172.46	74.0	0.0120	0.013	24.0	0.0	0.0
30	49R	174.52	173.45	107.0	0.0100	0.013	24.0	0.0	0.0
31	50R	175.14	174.62	52.0	0.0100	0.013	24.0	0.0	0.0
32	51R	175.86	175.64	22.0	0.0100	0.013	18.0	0.0	0.0
33	52R	176.13	175.89	24.0	0.0100	0.013	15.0	0.0	0.0
34	53R	176.75	176.38	37.0	0.0100	0.013	12.0	0.0	0.0
35	54R	177.27	176.85	42.0	0.0100	0.013	12.0	0.0	0.0
36	58R	177.66	177.56	10.0	0.0100	0.013	12.0	0.0	0.0
37	59R	177.46	177.37	5.0	0.0180	0.013	12.0	0.0	0.0
38	60R	177.46	177.37	9.0	0.0100	0.013	12.0	0.0	0.0
39	61R	176.45	176.38	2.0	0.0350	0.013	12.0	0.0	0.0
40	62R	176.45	176.38	7.0	0.0100	0.013	12.0	0.0	0.0

Pipe Listing (all nodes) (continued)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Diam/Width (inches)	Height (inches)	Inside-Fill (inches)
41	65R	176.70	176.55	15.0	0.0100	0.013	12.0	0.0	0.0
42	66R	177.35	175.96	139.0	0.0100	0.013	18.0	0.0	0.0
43	67R	178.23	177.45	78.0	0.0100	0.013	18.0	0.0	0.0
44	68R	180.14	179.21	83.0	0.0112	0.013	18.0	0.0	0.0
45	69R	181.94	180.39	62.0	0.0250	0.013	15.0	0.0	0.0
46	70R	180.77	180.64	4.0	0.0325	0.013	12.0	0.0	0.0
47	72R	180.77	180.64	13.0	0.0100	0.013	12.0	0.0	0.0
48	74R	184.32	182.04	76.0	0.0300	0.013	15.0	0.0	0.0
49	75R	184.81	184.67	14.0	0.0100	0.013	12.0	0.0	0.0
50	77R	184.95	184.91	2.0	0.0200	0.013	12.0	0.0	0.0
51	78R	185.04	184.91	13.0	0.0100	0.013	12.0	0.0	0.0
52	80R	185.54	184.57	29.0	0.0334	0.013	15.0	0.0	0.0
53	82R	185.29	185.14	15.0	0.0100	0.013	12.0	0.0	0.0
54	85R	176.59	176.46	8.0	0.0162	0.013	12.0	0.0	0.0
55	86R	176.59	176.46	13.0	0.0100	0.013	12.0	0.0	0.0
56	88R	177.20	177.00	15.0	0.0133	0.013	12.0	0.0	0.0
57	91R	185.76	185.64	12.0	0.0100	0.013	12.0	0.0	0.0
58	92R	185.76	185.64	6.0	0.0200	0.013	12.0	0.0	0.0
59	93R	186.50	185.64	32.0	0.0269	0.013	12.0	0.0	0.0
60	94R	189.38	186.60	111.0	0.0250	0.013	12.0	0.0	0.0
61	95R	190.38	189.48	36.0	0.0250	0.013	12.0	0.0	0.0
62	96R	190.11	189.48	21.0	0.0300	0.013	12.0	0.0	0.0
63	97R	190.31	190.21	2.0	0.0500	0.013	12.0	0.0	0.0
64	98R	190.31	190.21	10.0	0.0100	0.013	12.0	0.0	0.0
65	101R	190.62	190.48	14.0	0.0100	0.013	12.0	0.0	0.0
66	102R	190.62	190.48	6.0	0.0233	0.013	12.0	0.0	0.0
67	105R	190.56	190.41	15.0	0.0100	0.013	12.0	0.0	0.0
68	110R	175.11	174.81	30.0	0.0100	0.013	12.0	0.0	0.0
69	111R	179.11	178.33	78.0	0.0100	0.013	18.0	0.0	0.0

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 108P: FB-3 Peak Elev=167.01' Storage=0.096 af Inflow=5.16 cfs 0.717 af
Discarded=1.78 cfs 0.717 af Primary=0.01 cfs 0.000 af Outflow=1.78 cfs 0.717 af

Pond 109P: IB-3 Peak Elev=165.50' Storage=0.000 af Inflow=0.01 cfs 0.000 af
Discarded=0.01 cfs 0.000 af Primary=0.00 cfs 0.000 af Outflow=0.01 cfs 0.000 af

Summary for Pond 108P: FB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.32" for 2 YR event				
Inflow =	5.16 cfs @	12.14 hrs,	Volume=	0.717 af	
Outflow =	1.78 cfs @	12.63 hrs,	Volume=	0.717 af,	Atten= 65%, Lag= 29.1 min
Discarded =	1.78 cfs @	12.63 hrs,	Volume=	0.717 af	
Primary =	0.01 cfs @	12.63 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 167.01' @ 12.63 hrs Surf.Area= 0.088 ac Storage= 0.096 af

Plug-Flow detention time= 14.8 min calculated for 0.716 af (100% of inflow)
Center-of-Mass det. time= 14.8 min (932.8 - 918.0)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	0.193 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.069	0.017	0.017
168.00	0.107	0.176	0.193

Device	Routing	Invert	Outlet Devices
#1	Primary	167.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=1.78 cfs @ 12.63 hrs HW=167.01' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 1.78 cfs)

Primary OutFlow Max=0.01 cfs @ 12.63 hrs HW=167.01' TW=165.50' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 0.01 cfs @ 0.11 fps)

Summary for Pond 109P: IB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.00" for 2 YR event				
Inflow =	0.01 cfs @	12.63 hrs,	Volume=	0.000 af	
Outflow =	0.01 cfs @	12.63 hrs,	Volume=	0.000 af,	Atten= 0%, Lag= 0.0 min
Discarded =	0.01 cfs @	12.63 hrs,	Volume=	0.000 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 165.50' @ 12.63 hrs Surf.Area= 0.000 ac Storage= 0.000 af

Plug-Flow detention time= 0.0 min calculated for 0.000 af (100% of inflow)
Center-of-Mass det. time= 0.0 min (757.6 - 757.6)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	1.945 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.148	0.037	0.037
168.00	0.202	0.350	0.387
170.00	0.419	0.621	1.008
172.00	0.518	0.937	1.945

Device	Routing	Invert	Outlet Devices
#1	Primary	171.65'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=0.01 cfs @ 12.63 hrs HW=165.50' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 0.01 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=165.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 108P: FB-3 Peak Elev=167.77' Storage=0.169 af Inflow=14.28 cfs 2.127 af
Discarded=2.07 cfs 1.399 af Primary=10.16 cfs 0.728 af Outflow=12.23 cfs 2.127 af

Pond 109P: IB-3 Peak Elev=167.36' Storage=0.263 af Inflow=10.16 cfs 0.728 af
Discarded=3.72 cfs 0.728 af Primary=0.00 cfs 0.000 af Outflow=3.72 cfs 0.728 af

Summary for Pond 108P: FB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.95" for 10 YR event				
Inflow =	14.28 cfs @	12.16 hrs,	Volume=	2.127 af	
Outflow =	12.23 cfs @	12.30 hrs,	Volume=	2.127 af,	Atten= 14%, Lag= 8.4 min
Discarded =	2.07 cfs @	12.30 hrs,	Volume=	1.399 af	
Primary =	10.16 cfs @	12.30 hrs,	Volume=	0.728 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 167.77' @ 12.30 hrs Surf.Area= 0.103 ac Storage= 0.169 af

Plug-Flow detention time= 18.6 min calculated for 2.124 af (100% of inflow)
Center-of-Mass det. time= 18.6 min (910.3 - 891.7)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	0.193 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.069	0.017	0.017
168.00	0.107	0.176	0.193

Device	Routing	Invert	Outlet Devices
#1	Primary	167.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.07 cfs @ 12.30 hrs HW=167.77' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 2.07 cfs)

Primary OutFlow Max=10.15 cfs @ 12.30 hrs HW=167.77' TW=166.32' (Dynamic Tailwater)
└─**1=Broad-Crested Rectangular Weir** (Weir Controls 10.15 cfs @ 1.32 fps)

Summary for Pond 109P: IB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.32" for 10 YR event				
Inflow =	10.16 cfs @	12.30 hrs,	Volume=	0.728 af	
Outflow =	3.72 cfs @	12.89 hrs,	Volume=	0.728 af,	Atten= 63%, Lag= 35.3 min
Discarded =	3.72 cfs @	12.89 hrs,	Volume=	0.728 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 167.36' @ 12.89 hrs Surf.Area= 0.185 ac Storage= 0.263 af

Plug-Flow detention time= 33.1 min calculated for 0.727 af (100% of inflow)
Center-of-Mass det. time= 33.0 min (805.9 - 772.9)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	1.945 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.148	0.037	0.037
168.00	0.202	0.350	0.387
170.00	0.419	0.621	1.008
172.00	0.518	0.937	1.945

Device	Routing	Invert	Outlet Devices
#1	Primary	171.65'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=3.72 cfs @ 12.89 hrs HW=167.36' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 3.72 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=165.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 108P: FB-3 Peak Elev=168.49' Storage=0.193 af Inflow=20.53 cfs 2.916 af
Discarded=2.16 cfs 1.648 af Primary=18.09 cfs 1.269 af Outflow=20.25 cfs 2.916 af

Pond 109P: IB-3 Peak Elev=168.48' Storage=0.496 af Inflow=18.09 cfs 1.269 af
Discarded=5.12 cfs 1.269 af Primary=0.00 cfs 0.000 af Outflow=5.12 cfs 1.269 af

Summary for Pond 108P: FB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 1.30" for 25 YR event				
Inflow =	20.53 cfs @	12.16 hrs,	Volume=	2.916 af	
Outflow =	20.25 cfs @	12.21 hrs,	Volume=	2.916 af,	Atten= 1%, Lag= 3.0 min
Discarded =	2.16 cfs @	12.20 hrs,	Volume=	1.648 af	
Primary =	18.09 cfs @	12.21 hrs,	Volume=	1.269 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 168.49' @ 12.90 hrs Surf.Area= 0.107 ac Storage= 0.193 af

Plug-Flow detention time= 19.3 min calculated for 2.912 af (100% of inflow)
Center-of-Mass det. time= 19.3 min (902.5 - 883.2)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	0.193 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.069	0.017	0.017
168.00	0.107	0.176	0.193

Device	Routing	Invert	Outlet Devices
#1	Primary	167.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.16 cfs @ 12.20 hrs HW=168.12' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.16 cfs)

Primary OutFlow Max=17.44 cfs @ 12.21 hrs HW=168.11' TW=166.47' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 17.44 cfs @ 1.58 fps)

Summary for Pond 109P: IB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.57" for 25 YR event				
Inflow =	18.09 cfs @	12.21 hrs,	Volume=	1.269 af	
Outflow =	5.12 cfs @	12.91 hrs,	Volume=	1.269 af,	Atten= 72%, Lag= 42.0 min
Discarded =	5.12 cfs @	12.91 hrs,	Volume=	1.269 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 168.48' @ 12.91 hrs Surf.Area= 0.254 ac Storage= 0.496 af

Plug-Flow detention time= 52.3 min calculated for 1.267 af (100% of inflow)
Center-of-Mass det. time= 52.3 min (835.8 - 783.6)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	1.945 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.148	0.037	0.037
168.00	0.202	0.350	0.387
170.00	0.419	0.621	1.008
172.00	0.518	0.937	1.945

Device	Routing	Invert	Outlet Devices
#1	Primary	171.65'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=5.12 cfs @ 12.91 hrs HW=168.48' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 5.12 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=165.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 108P: FB-3 Peak Elev=169.48' Storage=0.193 af Inflow=27.86 cfs 3.787 af
Discarded=2.16 cfs 1.853 af Primary=31.25 cfs 1.934 af Outflow=33.41 cfs 3.787 af

Pond 109P: IB-3 Peak Elev=169.46' Storage=0.796 af Inflow=31.25 cfs 1.934 af
Discarded=7.26 cfs 1.934 af Primary=0.00 cfs 0.000 af Outflow=7.26 cfs 1.934 af

Summary for Pond 108P: FB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 1.69" for 50 YR event				
Inflow =	27.86 cfs @	12.17 hrs,	Volume=	3.787 af	
Outflow =	33.41 cfs @	12.15 hrs,	Volume=	3.787 af,	Atten= 0%, Lag= 0.0 min
Discarded =	2.16 cfs @	12.15 hrs,	Volume=	1.853 af	
Primary =	31.25 cfs @	12.15 hrs,	Volume=	1.934 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 169.48' @ 12.95 hrs Surf.Area= 0.107 ac Storage= 0.193 af

Plug-Flow detention time= 18.5 min calculated for 3.782 af (100% of inflow)
Center-of-Mass det. time= 18.5 min (894.7 - 876.2)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	0.193 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.069	0.017	0.017
168.00	0.107	0.176	0.193

Device	Routing	Invert	Outlet Devices
#1	Primary	167.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.16 cfs @ 12.15 hrs HW=168.63' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.16 cfs)

Primary OutFlow Max=29.94 cfs @ 12.15 hrs HW=168.59' TW=166.64' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 29.94 cfs @ 1.89 fps)

Summary for Pond 109P: IB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 0.86" for 50 YR event				
Inflow =	31.25 cfs @	12.15 hrs,	Volume=	1.934 af	
Outflow =	7.26 cfs @	12.92 hrs,	Volume=	1.934 af,	Atten= 77%, Lag= 46.0 min
Discarded =	7.26 cfs @	12.92 hrs,	Volume=	1.934 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 169.46' @ 12.92 hrs Surf.Area= 0.360 ac Storage= 0.796 af

Plug-Flow detention time= 62.5 min calculated for 1.931 af (100% of inflow)
Center-of-Mass det. time= 62.4 min (850.3 - 787.9)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	1.945 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.148	0.037	0.037
168.00	0.202	0.350	0.387
170.00	0.419	0.621	1.008
172.00	0.518	0.937	1.945

Device	Routing	Invert	Outlet Devices
#1	Primary	171.65'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=7.26 cfs @ 12.92 hrs HW=169.45' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 7.26 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=165.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)

Time span=0.00-36.00 hrs, dt=0.05 hrs, 721 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

Pond 108P: FB-3 Peak Elev=170.21' Storage=0.193 af Inflow=33.73 cfs 4.589 af
Discarded=2.16 cfs 2.012 af Primary=31.56 cfs 2.577 af Outflow=33.72 cfs 4.589 af

Pond 109P: IB-3 Peak Elev=170.21' Storage=1.096 af Inflow=31.56 cfs 2.577 af
Discarded=8.66 cfs 2.577 af Primary=0.00 cfs 0.000 af Outflow=8.66 cfs 2.577 af

Summary for Pond 108P: FB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 2.05" for 100 YR event				
Inflow =	33.73 cfs @	12.17 hrs,	Volume=	4.589 af	
Outflow =	33.72 cfs @	12.19 hrs,	Volume=	4.589 af,	Atten= 0%, Lag= 1.5 min
Discarded =	2.16 cfs @	12.10 hrs,	Volume=	2.012 af	
Primary =	31.56 cfs @	12.19 hrs,	Volume=	2.577 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.21' @ 13.00 hrs Surf.Area= 0.107 ac Storage= 0.193 af

Plug-Flow detention time= 17.9 min calculated for 4.582 af (100% of inflow)
Center-of-Mass det. time= 17.9 min (889.0 - 871.2)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	0.193 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.069	0.017	0.017
168.00	0.107	0.176	0.193

Device	Routing	Invert	Outlet Devices
#1	Primary	167.00'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=2.16 cfs @ 12.10 hrs HW=168.55' (Free Discharge)
└**2=Exfiltration** (Exfiltration Controls 2.16 cfs)

Primary OutFlow Max=28.31 cfs @ 12.19 hrs HW=168.64' TW=167.66' (Dynamic Tailwater)
└**1=Broad-Crested Rectangular Weir** (Weir Controls 28.31 cfs @ 1.72 fps)

Summary for Pond 109P: IB-3

Inflow Area =	26.892 ac, 27.26% Impervious, Inflow Depth = 1.15" for 100 YR event				
Inflow =	31.56 cfs @	12.19 hrs,	Volume=	2.577 af	
Outflow =	8.66 cfs @	12.96 hrs,	Volume=	2.577 af,	Atten= 73%, Lag= 46.2 min
Discarded =	8.66 cfs @	12.96 hrs,	Volume=	2.577 af	
Primary =	0.00 cfs @	0.00 hrs,	Volume=	0.000 af	

Routing by Dyn-Stor-Ind method, Time Span= 0.00-36.00 hrs, dt= 0.05 hrs
Peak Elev= 170.21' @ 12.96 hrs Surf.Area= 0.429 ac Storage= 1.096 af

Plug-Flow detention time= 70.5 min calculated for 2.573 af (100% of inflow)
Center-of-Mass det. time= 70.4 min (861.0 - 790.6)

Volume	Invert	Avail.Storage	Storage Description
#1	165.50'	1.945 af	**Custom Stage Data (Prismatic)** Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
165.50	0.000	0.000	0.000
166.00	0.148	0.037	0.037
168.00	0.202	0.350	0.387
170.00	0.419	0.621	1.008
172.00	0.518	0.937	1.945

Device	Routing	Invert	Outlet Devices
#1	Primary	171.65'	**10.0' long Broad-Crested Rectangular Weir** Head (feet) 3.00 Coef. (English) 1.50
#2	Discarded	165.50'	**20.000 in/hr Exfiltration over Surface area**

Discarded OutFlow Max=8.66 cfs @ 12.96 hrs HW=170.21' (Free Discharge)
└─**2=Exfiltration** (Exfiltration Controls 8.66 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=165.50' (Free Discharge)
└─**1=Broad-Crested Rectangular Weir** (Controls 0.00 cfs)