



# HAMDEN SLOUGH NWR DESIGN REPORT ADDENDUM

March 11, 2020

I hereby certify that this report was prepared by me or under my direct supervision and that I am a duly Licensed Professional Engineer under the laws of the State of Minnesota.

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James A. Streifel, P.E. 3/12/2020  
License No. 47359

# Hamden Slough NWR Design Report ADDENDUM

James A. Streifel, P.E.

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## APPENDIX

HydroCAD Model Summary Report for IDF (100-yr Rainfall)

# Hamden Slough NWR Design Report ADDENDUM

James A. Streifel, P.E.

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## I. INTRODUCTION

The purpose of this addendum is to include a revision to the original design report signed on 11-7-2019 and to include additional information requested by FWS Dam Safety review. The revisions to the original design report were to correct some values listed in Tables 2 and 3. The corrected numbers are now shown in red in the revised tables.

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## II. WETLANDS DATA

Homstad Lake:	Full Service Level (FSL) at Elev. 1262.0 71.3 Surface Acres at FSL 238.0 Acre-Feet Capacity at FSL Top of Embankment – 1268.5 (Including topsoil) Maximum Water Storage Elevation – 1265.0; <b>Volume = 557 ac-ft</b> Dam Height – 11’ FWS Classification – Inventory ( <b>Low Hazard</b> )
Hass Wetland:	Full Service Level (FSL) at Elev. 1261.3 12.0 Surface Acres at FSL 33.0 Acre-Feet Capacity at FSL Top of Embankment – 1266.5 (Including topsoil) Maximum Water Storage Elevation – 1264.0; <b>Volume = 50 ac-ft</b> Dam Height – 9’ FWS Classification – Non-Inventory ( <b>Low Hazard</b> )
Hesby Wetland:	Full Service Level (FSL) at Elev. 1258.9 61.0 Surface Acres at FSL 233 Acre-Feet Capacity at FSL Top of Embankment – 1265.5 (Including topsoil) Maximum Water Storage Elevation – 1262.5; <b>Volume = 474 ac-ft</b> Dam Height – 10.5’ FWS Classification – Inventory ( <b>Low Hazard</b> )
Eagle Pond:	Full Service Level (FSL) at Elev. 1253.1 44.0 Surface Acres at FSL 124 Acre-Feet Capacity at FSL Top of Embankment – 1258.5 (Including topsoil) Maximum Water Storage Elevation – 1256.0; <b>Volume = 264 ac-ft</b> Dam Height – 9’ FWS Classification – Inventory ( <b>Low Hazard</b> )
NW Wetland	Full Service Level (FSL) - 1265 11.7 Acres at Elev. 1265 44 Acre-Feet at Elev. 1265 Top of Embankment – 1267.5 (Including topsoil) Spillway Elevation – 1265 Maximum Water Storage Elevation – 1265; <b>Volume = 44 ac-ft</b> Dam Height – 5’ FWS Classification – Non-Inventory ( <b>Low Hazard</b> )

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## III. PRELIMINARY RISK ASSESSMENT

The four referenced wetlands at Hamden Slough NWR are located toward the upper end of Branch 4 of Becker County Ditch No. 15. Flows from separate surface watersheds enter Homstad Lake and the Haas Wetland and both discharge into the Hesby Wetland. Those flows then enter Eagle Pond. Nothing will change beyond what occurs now. In the past 20 plus years, there have been no reports of flooding in the immediate area downstream. It stands to reason that simply replacing the existing structures with new structures having the same capacity will not change any risk assessment from what was determined originally.

Based upon information obtained in the field, land use, LiDAR contour maps, the geography of the site and size of the wetlands, no loss of human life and low economic and/or environmental losses would be expected. The recommended hazard classification for each impoundment is "Low Hazard".

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## IV. REVISED TABLES

BASIN	ITEM	1 YEAR	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
South Wetland	Peak Inflow (cfs)	120	152	217	281	385	476	577
	Peak Elevation	1263.36	1263.42	1263.54	1263.66	1264.17	1264.82	1265.28
	Peak Outflow (cfs)	1.5	2	3	5	8	11	13
Homstad Wetland	Peak Inflow (cfs)	132	199	351	523	831	1122	1456
	Peak Elevation	1261.71	1261.96	1262.47	1263.12	1264.39	1265.65	1266.66
	Primary Outlet	31	48	92	107	119	132	141
	Secondary Outlet	0	0	0	0	0	19	135
	Peak Outflow (cfs)	31	48	92	107	119	151	276
Hass East Wetland	Peak Inflow (cfs)	32	55	109	173	288	398	527
	Peak Elevation	1261.54	1261.72	1262.24	1262.89	1264	1264.93	1265.9
	Peak Outflow (cfs)	18	28	46	60	79	93	105
Hass West Wetland	Peak Inflow (cfs)	19	29	48	63	85	120	167
	Peak Elevation	1261.53	1261.64	1261.89	1262.11	1262.42	1662.63	1263.41
	Primary Outlet	6	10	23	38	61	79	97
	Secondary Outlet	0	0	0	0	0	0	0
	Peak Outflow (cfs)	6	10	23	38	61	79	97
Hesby Wetland	Peak Inflow (cfs)	99	134	209	286	418	540	679
	Peak Elevation	1259.45	1259.67	1260.13	1260.69	1261.6	1262.44	1263.33
	Primary Outlet	21	35	70	73	74	78	80
	Secondary Outlet	0	0	0	0	0	1	41
	Peak Outflow (cfs)	21	35	70	73	74	79	120
Eagle Pond	Peak Inflow (cfs)	64	95	168	250	406	553	725
	Peak Elevation	1253.71	1253.94	1254.53	1255.34	1256.42	1256.94	1257.41
	Primary Outlet	24	40	70	76	82	85	88
	Secondary Outlet	0	0	0	0	11	59	139
	Peak Outflow (cfs)	17	29	58	70	93	144	227

**Table 2. HydroCAD Modeling Results for Existing Conditions (Revised)**

# Hamden Slough NWR Design Report ADDENDUM

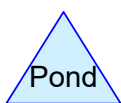
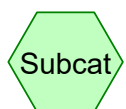
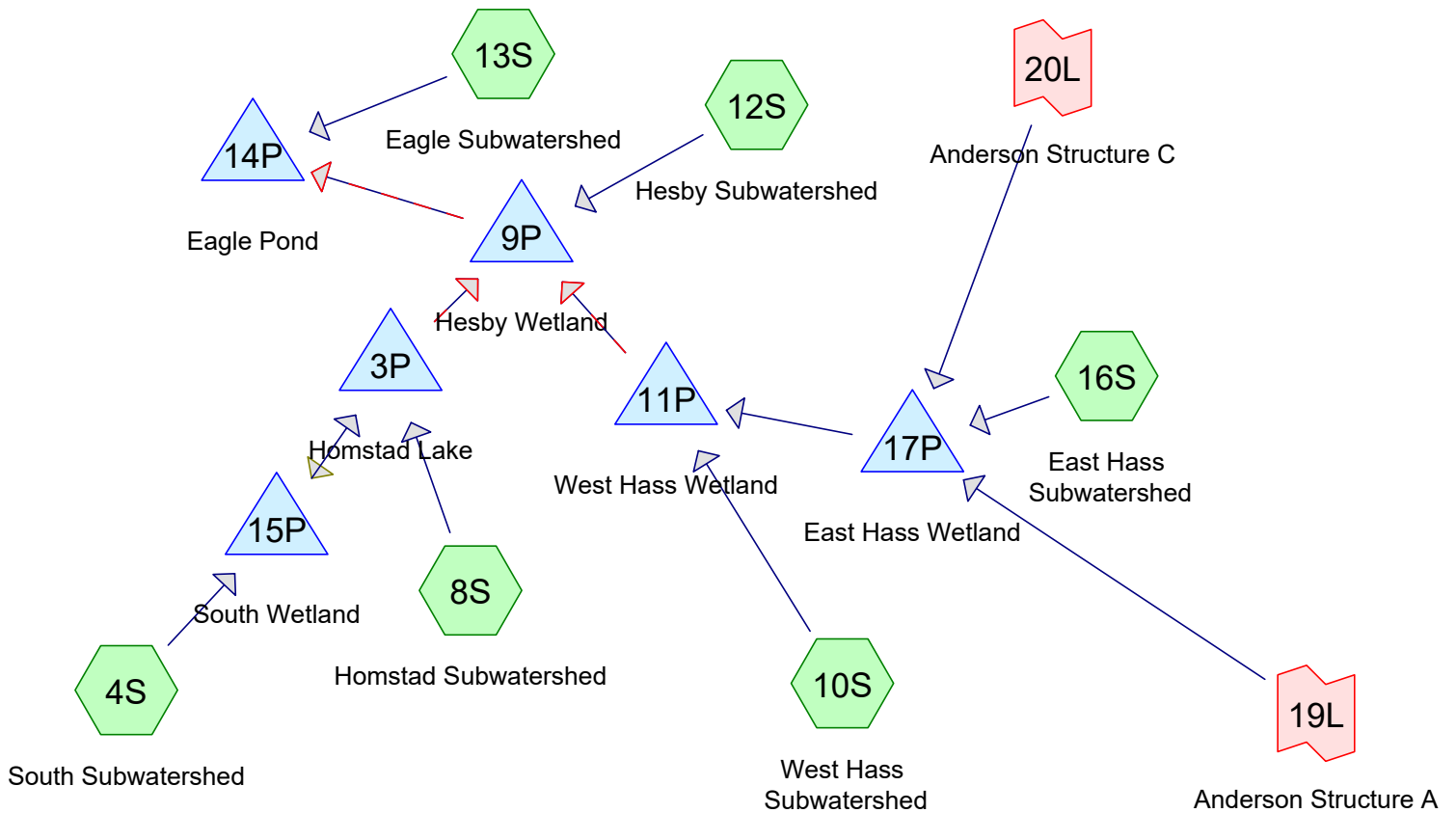
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BASIN	ITEM	1 YEAR	2 YEAR	5 YEAR	10 YEAR	25 YEAR	50 YEAR	100 YEAR
South Wetland	Peak Inflow (cfs)	120	152	217	281	385	476	577
	Peak Elevation	1262.57	1262.75	1263.05	1263.41	1264.16	1264.64	1265
	Peak Outflow (cfs)	2	3	5	6	9	10	12
Homstad Wetland	Peak Inflow (cfs)	131	197	348	518	824	1112	1446
	Peak Elevation	1262.66	1262.88	1263.37	1263.96	1265.32	1266.33	1267.25
	Primary Outlet	25	38	74	93	102	109	115
	Secondary Outlet	0	0	0	0	6	88	217
	Peak Outflow (cfs)	25	38	74	93	108	197	332
Hass East Wetland	Peak Inflow (cfs)	32	55	109	173	288	398	527
	Peak Elevation	1261.55	1261.72	1262.24	1262.89	1264	1264.93	1265.9
	Peak Outflow (cfs)	18	28	46	60	79	92	104
Hass West Wetland	Peak Inflow (cfs)	19	29	48	63	85	120	167
	Peak Elevation	1261.54	1261.65	1261.91	1262.14	1262.47	1262.97	1263.96
	Primary Outlet	5	10	22	36	58	60	62
	Secondary Outlet	0	0	0	0	0	0	0
	Peak Outflow (cfs)	5	10	22	36	58	60	62
Hesby Wetland	Peak Inflow (cfs)	99	134	209	285	417	538	677
	Peak Elevation	1259.41	1259.61	1260.04	1260.76	1261.87	1262.84	1263.72
	Primary Outlet	17	28	55	57	60	61	61
	Secondary Outlet	0	0	0	0	0	8	84
	Peak Outflow (cfs)	16	26	55	57	60	69	145
Eagle Pond	Peak Inflow (cfs)	62	94	167	250	401	545	714
	Peak Elevation	1253.7	1253.93	1254.43	1255.2	1256.31	1256.89	1257.37
	Primary Outlet	21	35	64	68	75	78	80
	Secondary Outlet	0	0	0	0	7	51	133
	Peak Outflow (cfs)	21	34	64	68	82	129	213

**Table 3. HydroCAD Modeling Results for Proposed Conditions (Revised)**

## V. INFLOW DESIGN FLOOD STATEMENT

The Inflow Design Flood (IDF) utilized in the design is a NOAA Atlas 14, 24-hr 100-year rainfall event and SCS Type II 24-hr distribution.





**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
80.000	86	(4S)
3,376.000	73	(8S, 13S)
38.000	61	(10S)
184.000	81	(12S)
250.000	70	(16S)
<b>3,928.000</b>	<b>73</b>	<b>TOTAL AREA</b>

**Summary for Subcatchment 4S: South Subwatershed**

Runoff = 577.47 cfs @ 12.01 hrs, Volume= 32.702 af, Depth= 4.91"

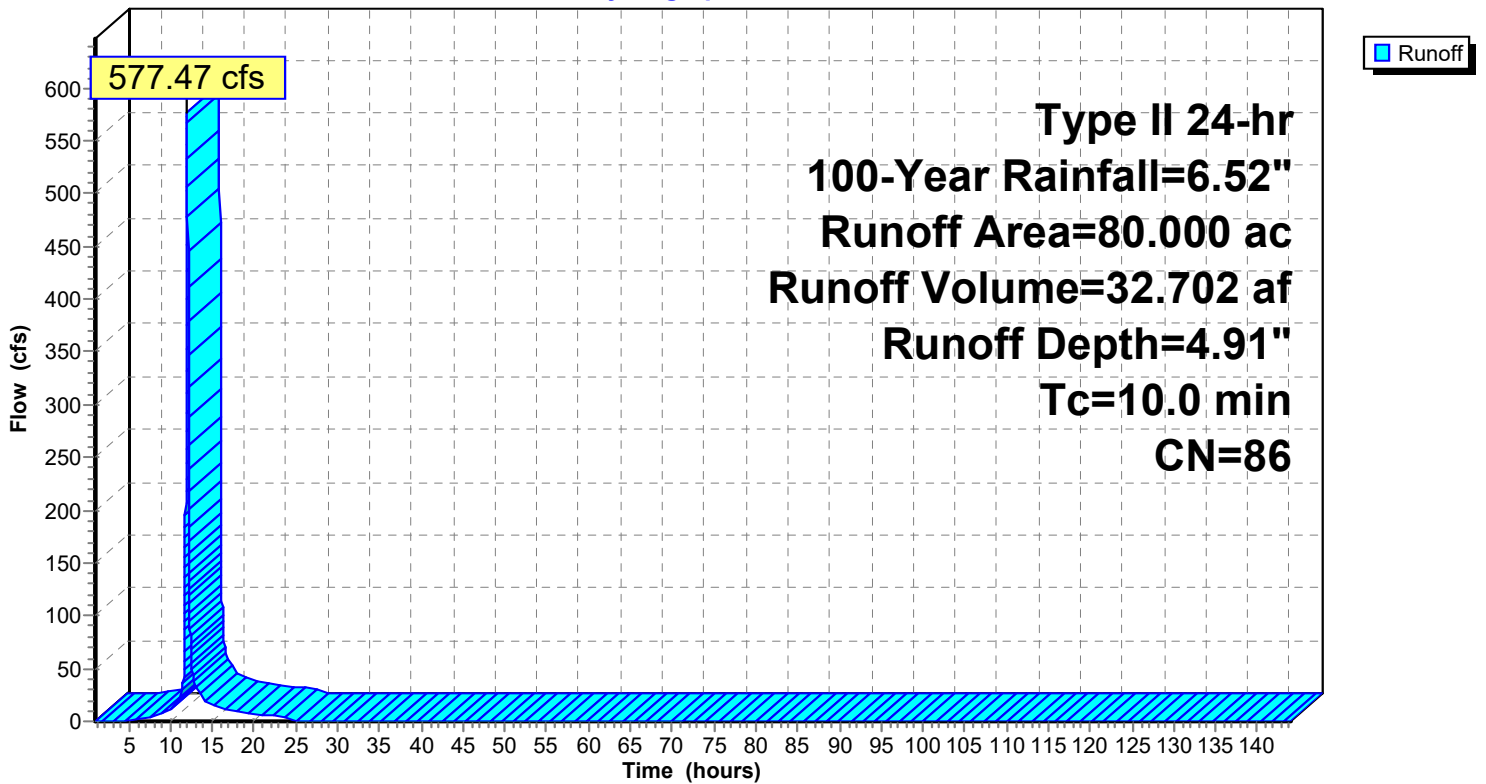
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 80.000	86	
80.000		100.00% Pervious Area

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

**Subcatchment 4S: South Subwatershed**

Hydrograph



## Hydrograph for Subcatchment 4S: South Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	4.91	0.00	121.00	6.52	4.91	0.00
2.00	0.14	0.00	0.00	62.00	6.52	4.91	0.00	122.00	6.52	4.91	0.00
3.00	0.22	0.00	0.00	63.00	6.52	4.91	0.00	123.00	6.52	4.91	0.00
4.00	0.31	0.00	0.00	64.00	6.52	4.91	0.00	124.00	6.52	4.91	0.00
5.00	0.41	0.00	0.66	65.00	6.52	4.91	0.00	125.00	6.52	4.91	0.00
6.00	0.52	0.02	1.74	66.00	6.52	4.91	0.00	126.00	6.52	4.91	0.00
7.00	0.65	0.05	2.97	67.00	6.52	4.91	0.00	127.00	6.52	4.91	0.00
8.00	0.78	0.10	4.30	68.00	6.52	4.91	0.00	128.00	6.52	4.91	0.00
9.00	0.96	0.18	7.48	69.00	6.52	4.91	0.00	129.00	6.52	4.91	0.00
10.00	1.18	0.29	10.98	70.00	6.52	4.91	0.00	130.00	6.52	4.91	0.00
11.00	1.53	0.51	22.62	71.00	6.52	4.91	0.00	131.00	6.52	4.91	0.00
12.00	4.32	2.84	<b>572.08</b>	72.00	6.52	4.91	0.00	132.00	6.52	4.91	0.00
13.00	5.03	3.50	<b>33.85</b>	73.00	6.52	4.91	0.00	133.00	6.52	4.91	0.00
14.00	5.35	3.79	19.80	74.00	6.52	4.91	0.00	134.00	6.52	4.91	0.00
15.00	5.56	4.00	15.41	75.00	6.52	4.91	0.00	135.00	6.52	4.91	0.00
16.00	5.74	4.16	11.98	76.00	6.52	4.91	0.00	136.00	6.52	4.91	0.00
17.00	5.88	4.29	10.41	77.00	6.52	4.91	0.00	137.00	6.52	4.91	0.00
18.00	6.00	4.41	9.18	78.00	6.52	4.91	0.00	138.00	6.52	4.91	0.00
19.00	6.11	4.52	7.95	79.00	6.52	4.91	0.00	139.00	6.52	4.91	0.00
20.00	6.21	4.61	6.71	80.00	6.52	4.91	0.00	140.00	6.52	4.91	0.00
21.00	6.29	4.69	6.31	81.00	6.52	4.91	0.00	141.00	6.52	4.91	0.00
22.00	6.37	4.76	6.06	82.00	6.52	4.91	0.00	142.00	6.52	4.91	0.00
23.00	6.45	4.84	5.82	83.00	6.52	4.91	0.00	143.00	6.52	4.91	0.00
24.00	<b>6.52</b>	<b>4.91</b>	5.57	84.00	6.52	4.91	0.00	144.00	6.52	4.91	0.00
25.00	6.52	4.91	0.00	85.00	6.52	4.91	0.00				
26.00	6.52	4.91	0.00	86.00	6.52	4.91	0.00				
27.00	6.52	4.91	0.00	87.00	6.52	4.91	0.00				
28.00	6.52	4.91	0.00	88.00	6.52	4.91	0.00				
29.00	6.52	4.91	0.00	89.00	6.52	4.91	0.00				
30.00	6.52	4.91	0.00	90.00	6.52	4.91	0.00				
31.00	6.52	4.91	0.00	91.00	6.52	4.91	0.00				
32.00	6.52	4.91	0.00	92.00	6.52	4.91	0.00				
33.00	6.52	4.91	0.00	93.00	6.52	4.91	0.00				
34.00	6.52	4.91	0.00	94.00	6.52	4.91	0.00				
35.00	6.52	4.91	0.00	95.00	6.52	4.91	0.00				
36.00	6.52	4.91	0.00	96.00	6.52	4.91	0.00				
37.00	6.52	4.91	0.00	97.00	6.52	4.91	0.00				
38.00	6.52	4.91	0.00	98.00	6.52	4.91	0.00				
39.00	6.52	4.91	0.00	99.00	6.52	4.91	0.00				
40.00	6.52	4.91	0.00	100.00	6.52	4.91	0.00				
41.00	6.52	4.91	0.00	101.00	6.52	4.91	0.00				
42.00	6.52	4.91	0.00	102.00	6.52	4.91	0.00				
43.00	6.52	4.91	0.00	103.00	6.52	4.91	0.00				
44.00	6.52	4.91	0.00	104.00	6.52	4.91	0.00				
45.00	6.52	4.91	0.00	105.00	6.52	4.91	0.00				
46.00	6.52	4.91	0.00	106.00	6.52	4.91	0.00				
47.00	6.52	4.91	0.00	107.00	6.52	4.91	0.00				
48.00	6.52	4.91	0.00	108.00	6.52	4.91	0.00				
49.00	6.52	4.91	0.00	109.00	6.52	4.91	0.00				
50.00	6.52	4.91	0.00	110.00	6.52	4.91	0.00				
51.00	6.52	4.91	0.00	111.00	6.52	4.91	0.00				
52.00	6.52	4.91	0.00	112.00	6.52	4.91	0.00				
53.00	6.52	4.91	0.00	113.00	6.52	4.91	0.00				
54.00	6.52	4.91	0.00	114.00	6.52	4.91	0.00				
55.00	6.52	4.91	0.00	115.00	6.52	4.91	0.00				
56.00	6.52	4.91	0.00	116.00	6.52	4.91	0.00				
57.00	6.52	4.91	0.00	117.00	6.52	4.91	0.00				
58.00	6.52	4.91	0.00	118.00	6.52	4.91	0.00				
59.00	6.52	4.91	0.00	119.00	6.52	4.91	0.00				
60.00	6.52	4.91	0.00	120.00	6.52	4.91	0.00				

**Summary for Subcatchment 8S: Homstad Subwatershed**

Runoff = 1,446.34 cfs @ 15.28 hrs, Volume= 672.362 af, Depth= 3.52"

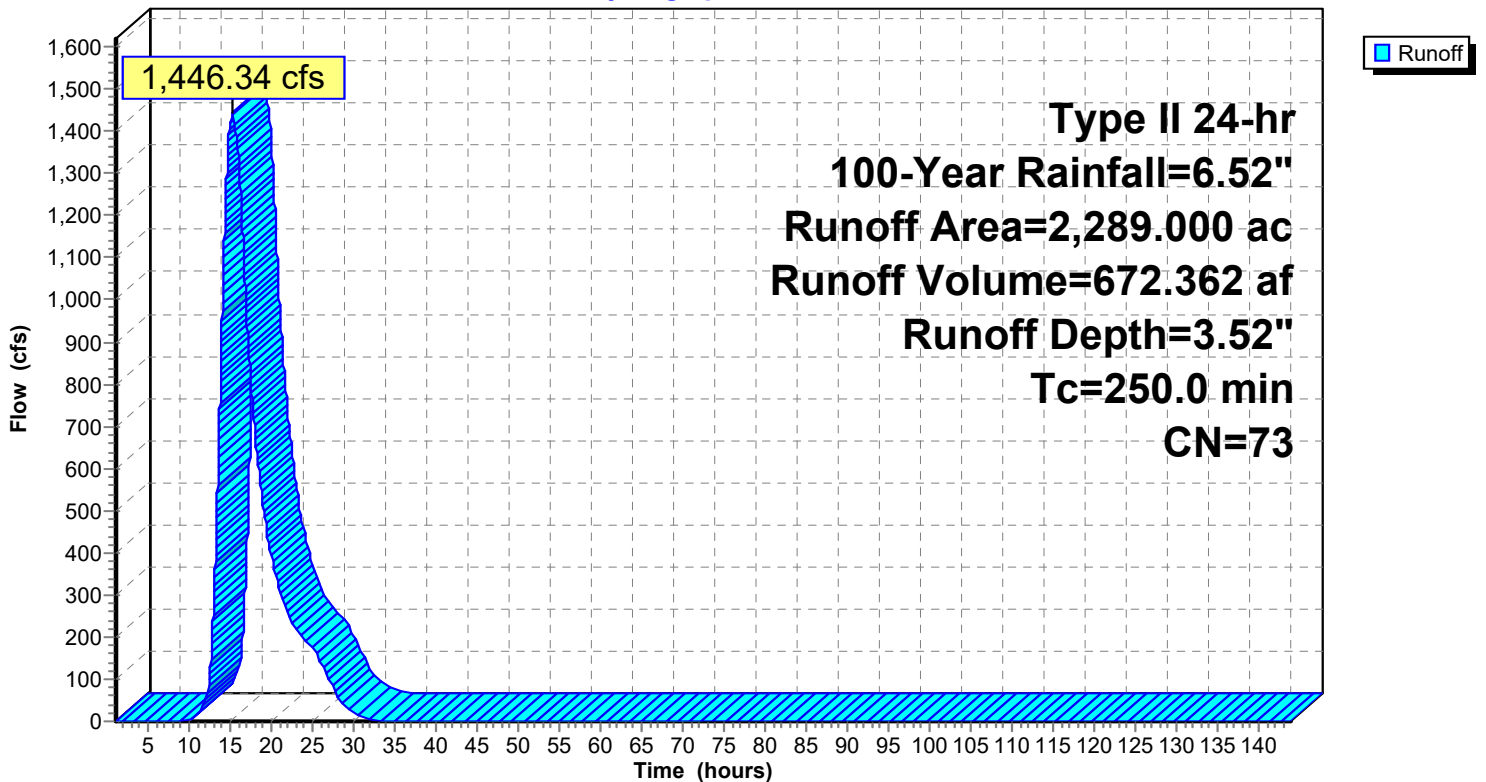
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 2,289.000	73	
2,289.000		100.00% Pervious Area

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

**Subcatchment 8S: Homstad Subwatershed**

Hydrograph



## Hydrograph for Subcatchment 8S: Homstad Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	3.52	0.00	121.00	6.52	3.52	0.00
2.00	0.14	0.00	0.00	62.00	6.52	3.52	0.00	122.00	6.52	3.52	0.00
3.00	0.22	0.00	0.00	63.00	6.52	3.52	0.00	123.00	6.52	3.52	0.00
4.00	0.31	0.00	0.00	64.00	6.52	3.52	0.00	124.00	6.52	3.52	0.00
5.00	0.41	0.00	0.00	65.00	6.52	3.52	0.00	125.00	6.52	3.52	0.00
6.00	0.52	0.00	0.00	66.00	6.52	3.52	0.00	126.00	6.52	3.52	0.00
7.00	0.65	0.00	0.00	67.00	6.52	3.52	0.00	127.00	6.52	3.52	0.00
8.00	0.78	0.00	0.00	68.00	6.52	3.52	0.00	128.00	6.52	3.52	0.00
9.00	0.96	0.01	0.26	69.00	6.52	3.52	0.00	129.00	6.52	3.52	0.00
10.00	1.18	0.05	3.31	70.00	6.52	3.52	0.00	130.00	6.52	3.52	0.00
11.00	1.53	0.14	16.27	71.00	6.52	3.52	0.00	131.00	6.52	3.52	0.00
12.00	4.32	1.76	55.44	72.00	6.52	3.52	0.00	132.00	6.52	3.52	0.00
13.00	5.03	2.31	322.92	73.00	6.52	3.52	0.00	133.00	6.52	3.52	0.00
14.00	5.35	2.56	1,009.08	74.00	6.52	3.52	0.00	134.00	6.52	3.52	0.00
15.00	5.56	2.73	<b>1,427.29</b>	75.00	6.52	3.52	0.00	135.00	6.52	3.52	0.00
16.00	5.74	2.87	<b>1,306.99</b>	76.00	6.52	3.52	0.00	136.00	6.52	3.52	0.00
17.00	5.88	2.99	930.22	77.00	6.52	3.52	0.00	137.00	6.52	3.52	0.00
18.00	6.00	3.09	669.84	78.00	6.52	3.52	0.00	138.00	6.52	3.52	0.00
19.00	6.11	3.18	498.72	79.00	6.52	3.52	0.00	139.00	6.52	3.52	0.00
20.00	6.21	3.26	385.42	80.00	6.52	3.52	0.00	140.00	6.52	3.52	0.00
21.00	6.29	3.33	309.28	81.00	6.52	3.52	0.00	141.00	6.52	3.52	0.00
22.00	6.37	3.40	255.19	82.00	6.52	3.52	0.00	142.00	6.52	3.52	0.00
23.00	6.45	3.46	216.00	83.00	6.52	3.52	0.00	143.00	6.52	3.52	0.00
24.00	<b>6.52</b>	<b>3.52</b>	189.59	84.00	6.52	3.52	0.00	144.00	6.52	3.52	0.00
25.00	6.52	3.52	169.81	85.00	6.52	3.52	0.00				
26.00	6.52	3.52	140.89	86.00	6.52	3.52	0.00				
27.00	6.52	3.52	99.56	87.00	6.52	3.52	0.00				
28.00	6.52	3.52	59.59	88.00	6.52	3.52	0.00				
29.00	6.52	3.52	32.60	89.00	6.52	3.52	0.00				
30.00	6.52	3.52	17.94	90.00	6.52	3.52	0.00				
31.00	6.52	3.52	9.87	91.00	6.52	3.52	0.00				
32.00	6.52	3.52	5.37	92.00	6.52	3.52	0.00				
33.00	6.52	3.52	2.88	93.00	6.52	3.52	0.00				
34.00	6.52	3.52	1.51	94.00	6.52	3.52	0.00				
35.00	6.52	3.52	0.75	95.00	6.52	3.52	0.00				
36.00	6.52	3.52	0.33	96.00	6.52	3.52	0.00				
37.00	6.52	3.52	0.10	97.00	6.52	3.52	0.00				
38.00	6.52	3.52	0.01	98.00	6.52	3.52	0.00				
39.00	6.52	3.52	0.00	99.00	6.52	3.52	0.00				
40.00	6.52	3.52	0.00	100.00	6.52	3.52	0.00				
41.00	6.52	3.52	0.00	101.00	6.52	3.52	0.00				
42.00	6.52	3.52	0.00	102.00	6.52	3.52	0.00				
43.00	6.52	3.52	0.00	103.00	6.52	3.52	0.00				
44.00	6.52	3.52	0.00	104.00	6.52	3.52	0.00				
45.00	6.52	3.52	0.00	105.00	6.52	3.52	0.00				
46.00	6.52	3.52	0.00	106.00	6.52	3.52	0.00				
47.00	6.52	3.52	0.00	107.00	6.52	3.52	0.00				
48.00	6.52	3.52	0.00	108.00	6.52	3.52	0.00				
49.00	6.52	3.52	0.00	109.00	6.52	3.52	0.00				
50.00	6.52	3.52	0.00	110.00	6.52	3.52	0.00				
51.00	6.52	3.52	0.00	111.00	6.52	3.52	0.00				
52.00	6.52	3.52	0.00	112.00	6.52	3.52	0.00				
53.00	6.52	3.52	0.00	113.00	6.52	3.52	0.00				
54.00	6.52	3.52	0.00	114.00	6.52	3.52	0.00				
55.00	6.52	3.52	0.00	115.00	6.52	3.52	0.00				
56.00	6.52	3.52	0.00	116.00	6.52	3.52	0.00				
57.00	6.52	3.52	0.00	117.00	6.52	3.52	0.00				
58.00	6.52	3.52	0.00	118.00	6.52	3.52	0.00				
59.00	6.52	3.52	0.00	119.00	6.52	3.52	0.00				
60.00	6.52	3.52	0.00	120.00	6.52	3.52	0.00				

**Summary for Subcatchment 10S: West Hass Subwatershed**

Runoff = 142.37 cfs @ 12.01 hrs, Volume= 7.477 af, Depth= 2.36"

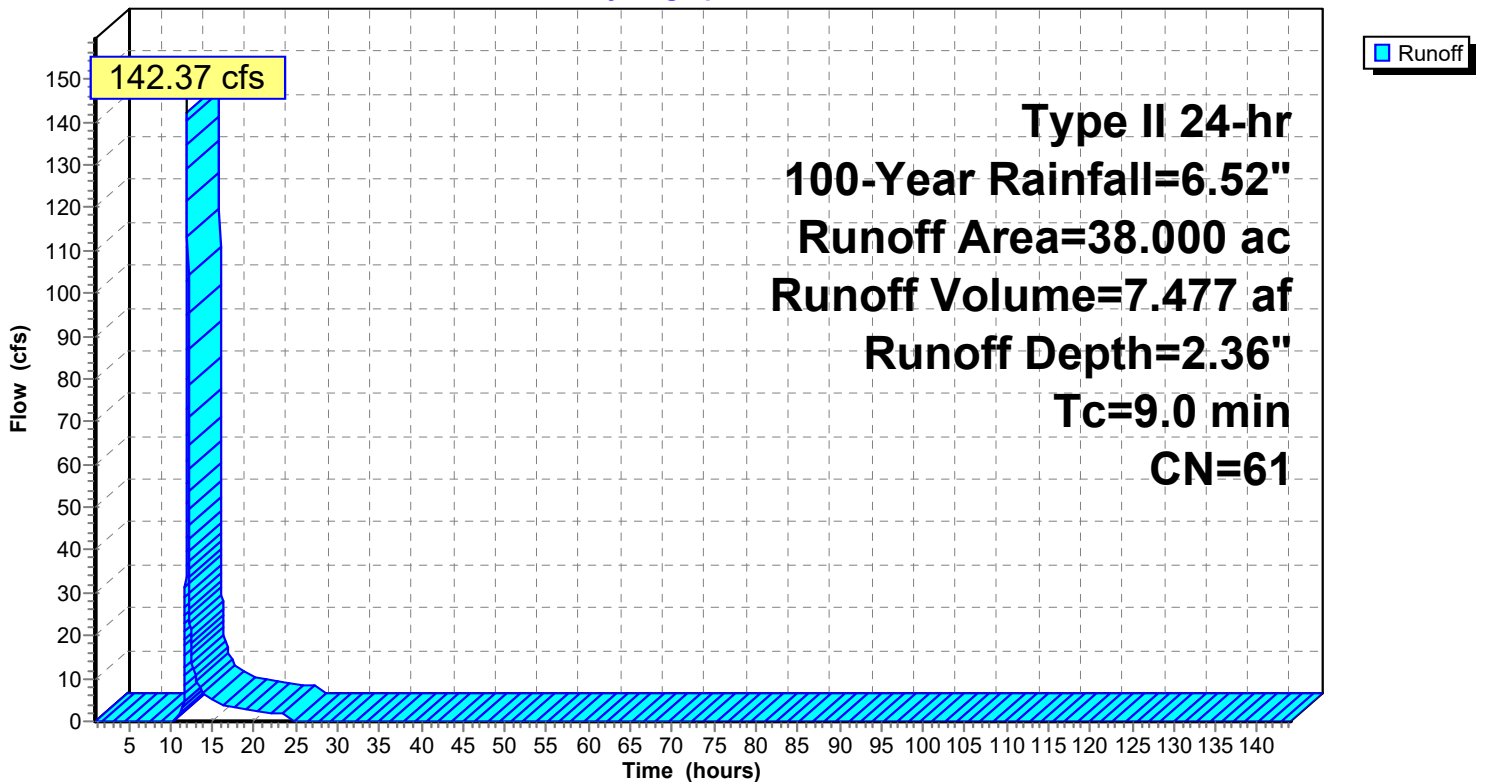
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 38.000	61	
38.000		100.00% Pervious Area

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

**Subcatchment 10S: West Hass Subwatershed**

Hydrograph



## Hydrograph for Subcatchment 10S: West Hass Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	2.36	0.00	121.00	6.52	2.36	0.00
2.00	0.14	0.00	0.00	62.00	6.52	2.36	0.00	122.00	6.52	2.36	0.00
3.00	0.22	0.00	0.00	63.00	6.52	2.36	0.00	123.00	6.52	2.36	0.00
4.00	0.31	0.00	0.00	64.00	6.52	2.36	0.00	124.00	6.52	2.36	0.00
5.00	0.41	0.00	0.00	65.00	6.52	2.36	0.00	125.00	6.52	2.36	0.00
6.00	0.52	0.00	0.00	66.00	6.52	2.36	0.00	126.00	6.52	2.36	0.00
7.00	0.65	0.00	0.00	67.00	6.52	2.36	0.00	127.00	6.52	2.36	0.00
8.00	0.78	0.00	0.00	68.00	6.52	2.36	0.00	128.00	6.52	2.36	0.00
9.00	0.96	0.00	0.00	69.00	6.52	2.36	0.00	129.00	6.52	2.36	0.00
10.00	1.18	0.00	0.00	70.00	6.52	2.36	0.00	130.00	6.52	2.36	0.00
11.00	1.53	0.01	0.95	71.00	6.52	2.36	0.00	131.00	6.52	2.36	0.00
12.00	4.32	0.98	<b>140.68</b>	72.00	6.52	2.36	0.00	132.00	6.52	2.36	0.00
13.00	5.03	1.39	<b>10.19</b>	73.00	6.52	2.36	0.00	133.00	6.52	2.36	0.00
14.00	5.35	1.58	6.20	74.00	6.52	2.36	0.00	134.00	6.52	2.36	0.00
15.00	5.56	1.72	4.95	75.00	6.52	2.36	0.00	135.00	6.52	2.36	0.00
16.00	5.74	1.83	3.90	76.00	6.52	2.36	0.00	136.00	6.52	2.36	0.00
17.00	5.88	1.93	3.44	77.00	6.52	2.36	0.00	137.00	6.52	2.36	0.00
18.00	6.00	2.01	3.06	78.00	6.52	2.36	0.00	138.00	6.52	2.36	0.00
19.00	6.11	2.08	2.67	79.00	6.52	2.36	0.00	139.00	6.52	2.36	0.00
20.00	6.21	2.15	2.27	80.00	6.52	2.36	0.00	140.00	6.52	2.36	0.00
21.00	6.29	2.20	2.15	81.00	6.52	2.36	0.00	141.00	6.52	2.36	0.00
22.00	6.37	2.26	2.08	82.00	6.52	2.36	0.00	142.00	6.52	2.36	0.00
23.00	6.45	2.31	2.00	83.00	6.52	2.36	0.00	143.00	6.52	2.36	0.00
24.00	<b>6.52</b>	<b>2.36</b>	1.93	84.00	6.52	2.36	0.00	144.00	6.52	2.36	0.00
25.00	6.52	2.36	0.00	85.00	6.52	2.36	0.00				
26.00	6.52	2.36	0.00	86.00	6.52	2.36	0.00				
27.00	6.52	2.36	0.00	87.00	6.52	2.36	0.00				
28.00	6.52	2.36	0.00	88.00	6.52	2.36	0.00				
29.00	6.52	2.36	0.00	89.00	6.52	2.36	0.00				
30.00	6.52	2.36	0.00	90.00	6.52	2.36	0.00				
31.00	6.52	2.36	0.00	91.00	6.52	2.36	0.00				
32.00	6.52	2.36	0.00	92.00	6.52	2.36	0.00				
33.00	6.52	2.36	0.00	93.00	6.52	2.36	0.00				
34.00	6.52	2.36	0.00	94.00	6.52	2.36	0.00				
35.00	6.52	2.36	0.00	95.00	6.52	2.36	0.00				
36.00	6.52	2.36	0.00	96.00	6.52	2.36	0.00				
37.00	6.52	2.36	0.00	97.00	6.52	2.36	0.00				
38.00	6.52	2.36	0.00	98.00	6.52	2.36	0.00				
39.00	6.52	2.36	0.00	99.00	6.52	2.36	0.00				
40.00	6.52	2.36	0.00	100.00	6.52	2.36	0.00				
41.00	6.52	2.36	0.00	101.00	6.52	2.36	0.00				
42.00	6.52	2.36	0.00	102.00	6.52	2.36	0.00				
43.00	6.52	2.36	0.00	103.00	6.52	2.36	0.00				
44.00	6.52	2.36	0.00	104.00	6.52	2.36	0.00				
45.00	6.52	2.36	0.00	105.00	6.52	2.36	0.00				
46.00	6.52	2.36	0.00	106.00	6.52	2.36	0.00				
47.00	6.52	2.36	0.00	107.00	6.52	2.36	0.00				
48.00	6.52	2.36	0.00	108.00	6.52	2.36	0.00				
49.00	6.52	2.36	0.00	109.00	6.52	2.36	0.00				
50.00	6.52	2.36	0.00	110.00	6.52	2.36	0.00				
51.00	6.52	2.36	0.00	111.00	6.52	2.36	0.00				
52.00	6.52	2.36	0.00	112.00	6.52	2.36	0.00				
53.00	6.52	2.36	0.00	113.00	6.52	2.36	0.00				
54.00	6.52	2.36	0.00	114.00	6.52	2.36	0.00				
55.00	6.52	2.36	0.00	115.00	6.52	2.36	0.00				
56.00	6.52	2.36	0.00	116.00	6.52	2.36	0.00				
57.00	6.52	2.36	0.00	117.00	6.52	2.36	0.00				
58.00	6.52	2.36	0.00	118.00	6.52	2.36	0.00				
59.00	6.52	2.36	0.00	119.00	6.52	2.36	0.00				
60.00	6.52	2.36	0.00	120.00	6.52	2.36	0.00				

**Summary for Subcatchment 12S: Hesby Subwatershed**

Runoff = 652.95 cfs @ 12.28 hrs, Volume= 66.861 af, Depth= 4.36"

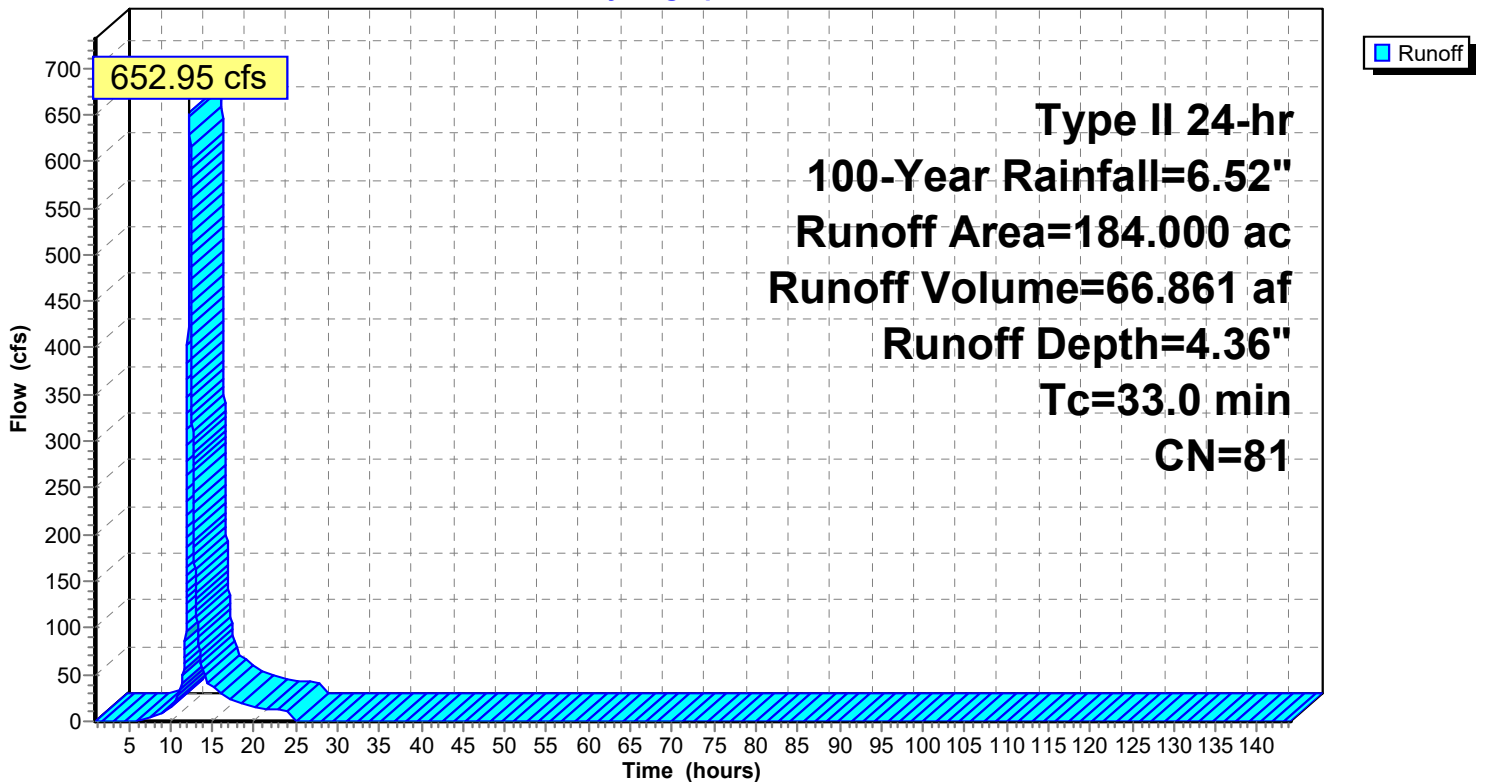
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 184.000	81	
184.000		100.00% Pervious Area

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

**Subcatchment 12S: Hesby Subwatershed**

Hydrograph





## Hydrograph for Subcatchment 12S: Hesby Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	4.36	0.00	121.00	6.52	4.36	0.00
2.00	0.14	0.00	0.00	62.00	6.52	4.36	0.00	122.00	6.52	4.36	0.00
3.00	0.22	0.00	0.00	63.00	6.52	4.36	0.00	123.00	6.52	4.36	0.00
4.00	0.31	0.00	0.00	64.00	6.52	4.36	0.00	124.00	6.52	4.36	0.00
5.00	0.41	0.00	0.00	65.00	6.52	4.36	0.00	125.00	6.52	4.36	0.00
6.00	0.52	0.00	0.13	66.00	6.52	4.36	0.00	126.00	6.52	4.36	0.00
7.00	0.65	0.01	2.05	67.00	6.52	4.36	0.00	127.00	6.52	4.36	0.00
8.00	0.78	0.04	4.53	68.00	6.52	4.36	0.00	128.00	6.52	4.36	0.00
9.00	0.96	0.08	8.74	69.00	6.52	4.36	0.00	129.00	6.52	4.36	0.00
10.00	1.18	0.17	14.63	70.00	6.52	4.36	0.00	130.00	6.52	4.36	0.00
11.00	1.53	0.33	30.12	71.00	6.52	4.36	0.00	131.00	6.52	4.36	0.00
12.00	4.32	2.40	<b>279.37</b>	72.00	6.52	4.36	0.00	132.00	6.52	4.36	0.00
13.00	5.03	3.01	<b>135.94</b>	73.00	6.52	4.36	0.00	133.00	6.52	4.36	0.00
14.00	5.35	3.29	51.93	74.00	6.52	4.36	0.00	134.00	6.52	4.36	0.00
15.00	5.56	3.49	36.61	75.00	6.52	4.36	0.00	135.00	6.52	4.36	0.00
16.00	5.74	3.65	29.01	76.00	6.52	4.36	0.00	136.00	6.52	4.36	0.00
17.00	5.88	3.77	23.93	77.00	6.52	4.36	0.00	137.00	6.52	4.36	0.00
18.00	6.00	3.89	21.23	78.00	6.52	4.36	0.00	138.00	6.52	4.36	0.00
19.00	6.11	3.99	18.51	79.00	6.52	4.36	0.00	139.00	6.52	4.36	0.00
20.00	6.21	4.07	15.80	80.00	6.52	4.36	0.00	140.00	6.52	4.36	0.00
21.00	6.29	4.15	14.17	81.00	6.52	4.36	0.00	141.00	6.52	4.36	0.00
22.00	6.37	4.22	13.60	82.00	6.52	4.36	0.00	142.00	6.52	4.36	0.00
23.00	6.45	4.29	13.08	83.00	6.52	4.36	0.00	143.00	6.52	4.36	0.00
24.00	<b>6.52</b>	<b>4.36</b>	12.54	84.00	6.52	4.36	0.00	144.00	6.52	4.36	0.00
25.00	6.52	4.36	0.57	85.00	6.52	4.36	0.00				
26.00	6.52	4.36	0.00	86.00	6.52	4.36	0.00				
27.00	6.52	4.36	0.00	87.00	6.52	4.36	0.00				
28.00	6.52	4.36	0.00	88.00	6.52	4.36	0.00				
29.00	6.52	4.36	0.00	89.00	6.52	4.36	0.00				
30.00	6.52	4.36	0.00	90.00	6.52	4.36	0.00				
31.00	6.52	4.36	0.00	91.00	6.52	4.36	0.00				
32.00	6.52	4.36	0.00	92.00	6.52	4.36	0.00				
33.00	6.52	4.36	0.00	93.00	6.52	4.36	0.00				
34.00	6.52	4.36	0.00	94.00	6.52	4.36	0.00				
35.00	6.52	4.36	0.00	95.00	6.52	4.36	0.00				
36.00	6.52	4.36	0.00	96.00	6.52	4.36	0.00				
37.00	6.52	4.36	0.00	97.00	6.52	4.36	0.00				
38.00	6.52	4.36	0.00	98.00	6.52	4.36	0.00				
39.00	6.52	4.36	0.00	99.00	6.52	4.36	0.00				
40.00	6.52	4.36	0.00	100.00	6.52	4.36	0.00				
41.00	6.52	4.36	0.00	101.00	6.52	4.36	0.00				
42.00	6.52	4.36	0.00	102.00	6.52	4.36	0.00				
43.00	6.52	4.36	0.00	103.00	6.52	4.36	0.00				
44.00	6.52	4.36	0.00	104.00	6.52	4.36	0.00				
45.00	6.52	4.36	0.00	105.00	6.52	4.36	0.00				
46.00	6.52	4.36	0.00	106.00	6.52	4.36	0.00				
47.00	6.52	4.36	0.00	107.00	6.52	4.36	0.00				
48.00	6.52	4.36	0.00	108.00	6.52	4.36	0.00				
49.00	6.52	4.36	0.00	109.00	6.52	4.36	0.00				
50.00	6.52	4.36	0.00	110.00	6.52	4.36	0.00				
51.00	6.52	4.36	0.00	111.00	6.52	4.36	0.00				
52.00	6.52	4.36	0.00	112.00	6.52	4.36	0.00				
53.00	6.52	4.36	0.00	113.00	6.52	4.36	0.00				
54.00	6.52	4.36	0.00	114.00	6.52	4.36	0.00				
55.00	6.52	4.36	0.00	115.00	6.52	4.36	0.00				
56.00	6.52	4.36	0.00	116.00	6.52	4.36	0.00				
57.00	6.52	4.36	0.00	117.00	6.52	4.36	0.00				
58.00	6.52	4.36	0.00	118.00	6.52	4.36	0.00				
59.00	6.52	4.36	0.00	119.00	6.52	4.36	0.00				
60.00	6.52	4.36	0.00	120.00	6.52	4.36	0.00				

**Summary for Subcatchment 13S: Eagle Subwatershed**

Runoff = 664.14 cfs @ 15.08 hrs, Volume= 319.291 af, Depth= 3.52"

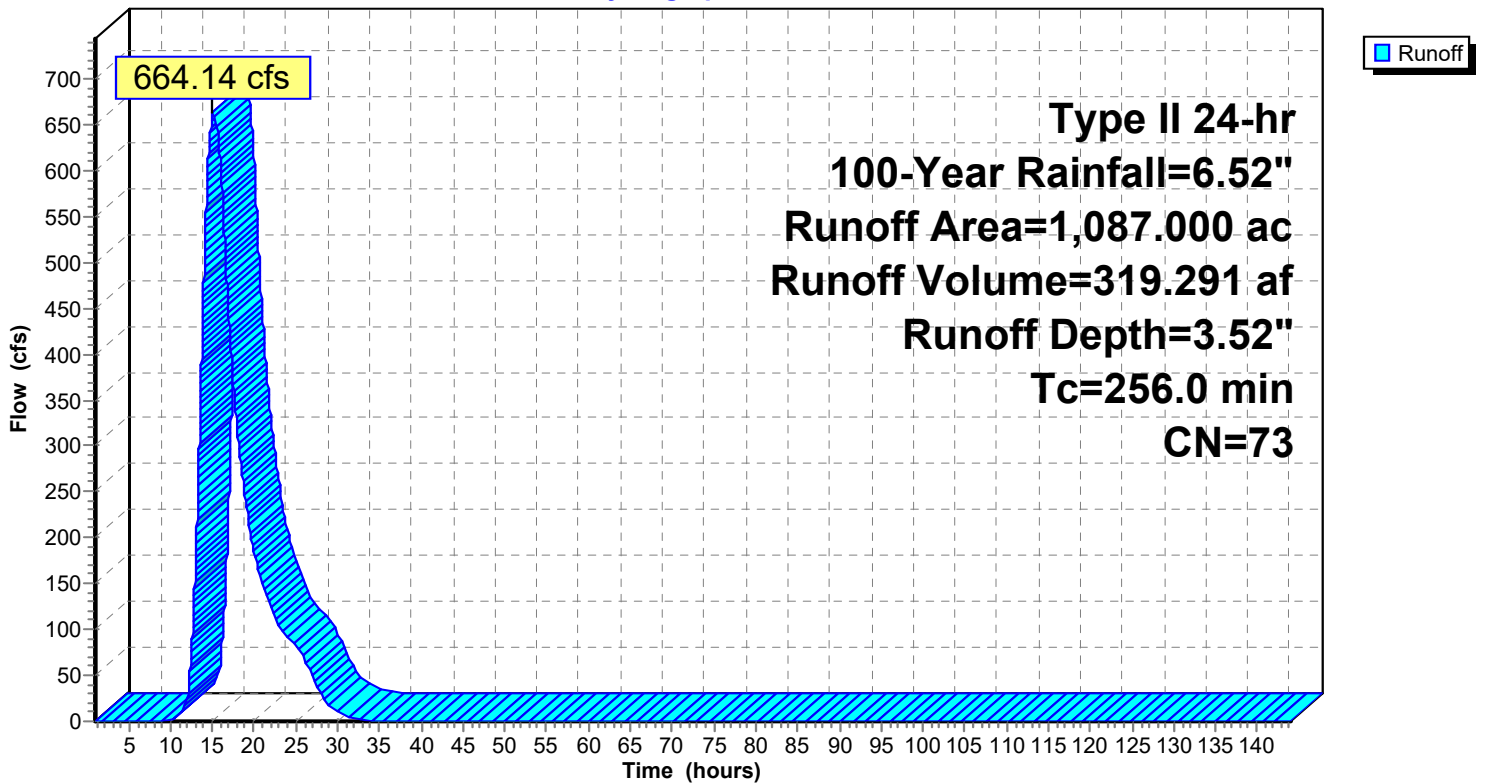
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 1,087.000	73	
1,087.000		100.00% Pervious Area

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

**Subcatchment 13S: Eagle Subwatershed**

Hydrograph



## Hydrograph for Subcatchment 13S: Eagle Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	3.52	0.00	121.00	6.52	3.52	0.00
2.00	0.14	0.00	0.00	62.00	6.52	3.52	0.00	122.00	6.52	3.52	0.00
3.00	0.22	0.00	0.00	63.00	6.52	3.52	0.00	123.00	6.52	3.52	0.00
4.00	0.31	0.00	0.00	64.00	6.52	3.52	0.00	124.00	6.52	3.52	0.00
5.00	0.41	0.00	0.00	65.00	6.52	3.52	0.00	125.00	6.52	3.52	0.00
6.00	0.52	0.00	0.00	66.00	6.52	3.52	0.00	126.00	6.52	3.52	0.00
7.00	0.65	0.00	0.00	67.00	6.52	3.52	0.00	127.00	6.52	3.52	0.00
8.00	0.78	0.00	0.00	68.00	6.52	3.52	0.00	128.00	6.52	3.52	0.00
9.00	0.96	0.01	0.11	69.00	6.52	3.52	0.00	129.00	6.52	3.52	0.00
10.00	1.18	0.05	1.49	70.00	6.52	3.52	0.00	130.00	6.52	3.52	0.00
11.00	1.53	0.14	7.25	71.00	6.52	3.52	0.00	131.00	6.52	3.52	0.00
12.00	4.32	1.76	25.57	72.00	6.52	3.52	0.00	132.00	6.52	3.52	0.00
13.00	5.03	2.31	170.09	73.00	6.52	3.52	0.00	133.00	6.52	3.52	0.00
14.00	5.35	2.56	486.92	74.00	6.52	3.52	0.00	134.00	6.52	3.52	0.00
15.00	5.56	2.73	<b>658.85</b>	75.00	6.52	3.52	0.00	135.00	6.52	3.52	0.00
16.00	5.74	2.87	<b>601.87</b>	76.00	6.52	3.52	0.00	136.00	6.52	3.52	0.00
17.00	5.88	2.99	436.54	77.00	6.52	3.52	0.00	137.00	6.52	3.52	0.00
18.00	6.00	3.09	318.03	78.00	6.52	3.52	0.00	138.00	6.52	3.52	0.00
19.00	6.11	3.18	238.83	79.00	6.52	3.52	0.00	139.00	6.52	3.52	0.00
20.00	6.21	3.26	185.69	80.00	6.52	3.52	0.00	140.00	6.52	3.52	0.00
21.00	6.29	3.33	149.04	81.00	6.52	3.52	0.00	141.00	6.52	3.52	0.00
22.00	6.37	3.40	123.17	82.00	6.52	3.52	0.00	142.00	6.52	3.52	0.00
23.00	6.45	3.46	104.27	83.00	6.52	3.52	0.00	143.00	6.52	3.52	0.00
24.00	<b>6.52</b>	<b>3.52</b>	91.27	84.00	6.52	3.52	0.00	144.00	6.52	3.52	0.00
25.00	6.52	3.52	81.73	85.00	6.52	3.52	0.00				
26.00	6.52	3.52	68.39	86.00	6.52	3.52	0.00				
27.00	6.52	3.52	48.98	87.00	6.52	3.52	0.00				
28.00	6.52	3.52	29.99	88.00	6.52	3.52	0.00				
29.00	6.52	3.52	16.61	89.00	6.52	3.52	0.00				
30.00	6.52	3.52	9.33	90.00	6.52	3.52	0.00				
31.00	6.52	3.52	5.19	91.00	6.52	3.52	0.00				
32.00	6.52	3.52	2.87	92.00	6.52	3.52	0.00				
33.00	6.52	3.52	1.55	93.00	6.52	3.52	0.00				
34.00	6.52	3.52	0.84	94.00	6.52	3.52	0.00				
35.00	6.52	3.52	0.43	95.00	6.52	3.52	0.00				
36.00	6.52	3.52	0.20	96.00	6.52	3.52	0.00				
37.00	6.52	3.52	0.07	97.00	6.52	3.52	0.00				
38.00	6.52	3.52	0.01	98.00	6.52	3.52	0.00				
39.00	6.52	3.52	0.00	99.00	6.52	3.52	0.00				
40.00	6.52	3.52	0.00	100.00	6.52	3.52	0.00				
41.00	6.52	3.52	0.00	101.00	6.52	3.52	0.00				
42.00	6.52	3.52	0.00	102.00	6.52	3.52	0.00				
43.00	6.52	3.52	0.00	103.00	6.52	3.52	0.00				
44.00	6.52	3.52	0.00	104.00	6.52	3.52	0.00				
45.00	6.52	3.52	0.00	105.00	6.52	3.52	0.00				
46.00	6.52	3.52	0.00	106.00	6.52	3.52	0.00				
47.00	6.52	3.52	0.00	107.00	6.52	3.52	0.00				
48.00	6.52	3.52	0.00	108.00	6.52	3.52	0.00				
49.00	6.52	3.52	0.00	109.00	6.52	3.52	0.00				
50.00	6.52	3.52	0.00	110.00	6.52	3.52	0.00				
51.00	6.52	3.52	0.00	111.00	6.52	3.52	0.00				
52.00	6.52	3.52	0.00	112.00	6.52	3.52	0.00				
53.00	6.52	3.52	0.00	113.00	6.52	3.52	0.00				
54.00	6.52	3.52	0.00	114.00	6.52	3.52	0.00				
55.00	6.52	3.52	0.00	115.00	6.52	3.52	0.00				
56.00	6.52	3.52	0.00	116.00	6.52	3.52	0.00				
57.00	6.52	3.52	0.00	117.00	6.52	3.52	0.00				
58.00	6.52	3.52	0.00	118.00	6.52	3.52	0.00				
59.00	6.52	3.52	0.00	119.00	6.52	3.52	0.00				
60.00	6.52	3.52	0.00	120.00	6.52	3.52	0.00				

**Summary for Subcatchment 16S: East Hass Subwatershed**

Runoff = 525.93 cfs @ 12.45 hrs, Volume= 67.154 af, Depth= 3.22"

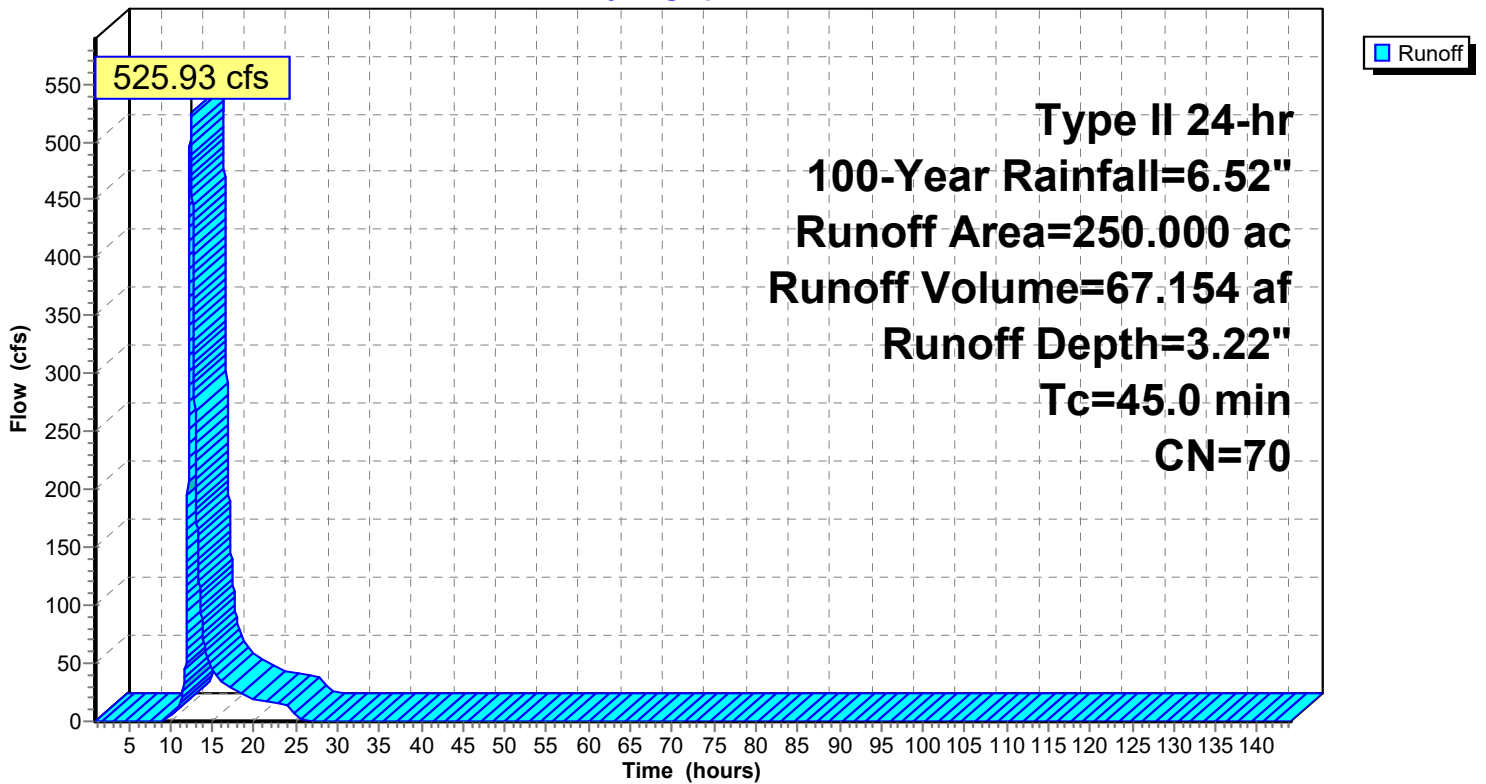
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Type II 24-hr 100-Year Rainfall=6.52"

Area (ac)	CN	Description
* 250.000	70	
250.000		100.00% Pervious Area

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

**Subcatchment 16S: East Hass Subwatershed**

Hydrograph



## Hydrograph for Subcatchment 16S: East Hass Subwatershed

Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)	Time (hours)	Precip. (inches)	Excess (inches)	Runoff (cfs)
1.00	0.07	0.00	0.00	61.00	6.52	3.22	0.00	121.00	6.52	3.22	0.00
2.00	0.14	0.00	0.00	62.00	6.52	3.22	0.00	122.00	6.52	3.22	0.00
3.00	0.22	0.00	0.00	63.00	6.52	3.22	0.00	123.00	6.52	3.22	0.00
4.00	0.31	0.00	0.00	64.00	6.52	3.22	0.00	124.00	6.52	3.22	0.00
5.00	0.41	0.00	0.00	65.00	6.52	3.22	0.00	125.00	6.52	3.22	0.00
6.00	0.52	0.00	0.00	66.00	6.52	3.22	0.00	126.00	6.52	3.22	0.00
7.00	0.65	0.00	0.00	67.00	6.52	3.22	0.00	127.00	6.52	3.22	0.00
8.00	0.78	0.00	0.00	68.00	6.52	3.22	0.00	128.00	6.52	3.22	0.00
9.00	0.96	0.00	0.19	69.00	6.52	3.22	0.00	129.00	6.52	3.22	0.00
10.00	1.18	0.02	3.94	70.00	6.52	3.22	0.00	130.00	6.52	3.22	0.00
11.00	1.53	0.09	13.84	71.00	6.52	3.22	0.00	131.00	6.52	3.22	0.00
12.00	4.32	1.55	<b>130.60</b>	72.00	6.52	3.22	0.00	132.00	6.52	3.22	0.00
13.00	5.03	2.06	<b>221.83</b>	73.00	6.52	3.22	0.00	133.00	6.52	3.22	0.00
14.00	5.35	2.30	70.48	74.00	6.52	3.22	0.00	134.00	6.52	3.22	0.00
15.00	5.56	2.46	44.62	75.00	6.52	3.22	0.00	135.00	6.52	3.22	0.00
16.00	5.74	2.60	35.50	76.00	6.52	3.22	0.00	136.00	6.52	3.22	0.00
17.00	5.88	2.71	28.87	77.00	6.52	3.22	0.00	137.00	6.52	3.22	0.00
18.00	6.00	2.81	25.60	78.00	6.52	3.22	0.00	138.00	6.52	3.22	0.00
19.00	6.11	2.90	22.51	79.00	6.52	3.22	0.00	139.00	6.52	3.22	0.00
20.00	6.21	2.97	19.35	80.00	6.52	3.22	0.00	140.00	6.52	3.22	0.00
21.00	6.29	3.04	17.07	81.00	6.52	3.22	0.00	141.00	6.52	3.22	0.00
22.00	6.37	3.10	16.36	82.00	6.52	3.22	0.00	142.00	6.52	3.22	0.00
23.00	6.45	3.16	15.75	83.00	6.52	3.22	0.00	143.00	6.52	3.22	0.00
24.00	<b>6.52</b>	<b>3.22</b>	15.14	84.00	6.52	3.22	0.00	144.00	6.52	3.22	0.00
25.00	6.52	3.22	2.26	85.00	6.52	3.22	0.00				
26.00	6.52	3.22	0.07	86.00	6.52	3.22	0.00				
27.00	6.52	3.22	0.00	87.00	6.52	3.22	0.00				
28.00	6.52	3.22	0.00	88.00	6.52	3.22	0.00				
29.00	6.52	3.22	0.00	89.00	6.52	3.22	0.00				
30.00	6.52	3.22	0.00	90.00	6.52	3.22	0.00				
31.00	6.52	3.22	0.00	91.00	6.52	3.22	0.00				
32.00	6.52	3.22	0.00	92.00	6.52	3.22	0.00				
33.00	6.52	3.22	0.00	93.00	6.52	3.22	0.00				
34.00	6.52	3.22	0.00	94.00	6.52	3.22	0.00				
35.00	6.52	3.22	0.00	95.00	6.52	3.22	0.00				
36.00	6.52	3.22	0.00	96.00	6.52	3.22	0.00				
37.00	6.52	3.22	0.00	97.00	6.52	3.22	0.00				
38.00	6.52	3.22	0.00	98.00	6.52	3.22	0.00				
39.00	6.52	3.22	0.00	99.00	6.52	3.22	0.00				
40.00	6.52	3.22	0.00	100.00	6.52	3.22	0.00				
41.00	6.52	3.22	0.00	101.00	6.52	3.22	0.00				
42.00	6.52	3.22	0.00	102.00	6.52	3.22	0.00				
43.00	6.52	3.22	0.00	103.00	6.52	3.22	0.00				
44.00	6.52	3.22	0.00	104.00	6.52	3.22	0.00				
45.00	6.52	3.22	0.00	105.00	6.52	3.22	0.00				
46.00	6.52	3.22	0.00	106.00	6.52	3.22	0.00				
47.00	6.52	3.22	0.00	107.00	6.52	3.22	0.00				
48.00	6.52	3.22	0.00	108.00	6.52	3.22	0.00				
49.00	6.52	3.22	0.00	109.00	6.52	3.22	0.00				
50.00	6.52	3.22	0.00	110.00	6.52	3.22	0.00				
51.00	6.52	3.22	0.00	111.00	6.52	3.22	0.00				
52.00	6.52	3.22	0.00	112.00	6.52	3.22	0.00				
53.00	6.52	3.22	0.00	113.00	6.52	3.22	0.00				
54.00	6.52	3.22	0.00	114.00	6.52	3.22	0.00				
55.00	6.52	3.22	0.00	115.00	6.52	3.22	0.00				
56.00	6.52	3.22	0.00	116.00	6.52	3.22	0.00				
57.00	6.52	3.22	0.00	117.00	6.52	3.22	0.00				
58.00	6.52	3.22	0.00	118.00	6.52	3.22	0.00				
59.00	6.52	3.22	0.00	119.00	6.52	3.22	0.00				
60.00	6.52	3.22	0.00	120.00	6.52	3.22	0.00				

### Summary for Pond 3P: Homstad Lake

Inflow = 1,446.34 cfs @ 15.28 hrs, Volume= 727.866 af  
 Outflow = 347.00 cfs @ 20.04 hrs, Volume= 703.616 af, Atten= 76%, Lag= 286.0 min  
 Primary = 115.15 cfs @ 17.93 hrs, Volume= 471.612 af  
 Secondary = 217.32 cfs @ 20.48 hrs, Volume= 201.194 af  
 Tertiary = 20.13 cfs @ 19.38 hrs, Volume= 30.810 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,262.00' Surf.Area= 73.000 ac Storage= 310.005 af  
 Peak Elev= 1,267.25' @ 20.48 hrs Surf.Area= 83.085 ac Storage= 735.855 af (425.850 af above start)

Plug-Flow detention time= 3,108.5 min calculated for 393.611 af (54% of inflow)  
 Center-of-Mass det. time= 1,455.6 min ( 2,819.8 - 1,364.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,255.30'	993.905 af	<b>Homstad (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,255.30	0.000	0.000	0.000
1,256.00	1.300	0.455	0.455
1,257.00	21.700	11.500	11.955
1,258.00	50.100	35.900	47.855
1,259.00	61.100	55.600	103.455
1,260.00	68.200	64.650	168.105
1,261.00	71.300	69.750	237.855
1,262.00	73.000	72.150	310.005
1,263.00	84.800	78.900	388.905
1,264.00	86.600	85.700	474.605
1,265.00	77.800	82.200	556.805
1,266.00	79.400	78.600	635.405
1,267.00	80.800	80.100	715.505
1,268.00	90.000	85.400	800.905
1,270.00	103.000	193.000	993.905

Device	Routing	Invert	Outlet Devices
#1	Primary	1,255.50'	<b>42.0" Round Culvert</b> L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,255.50' / 1,255.50' S= 0.0000 '/ Cc= 0.900 n= 0.012 Steel, smooth, Flow Area= 9.62 sf
#2	Device 1	1,262.00'	<b>14.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 5.0' Crest Height
#3	Secondary	1,265.00'	<b>30' E.S. at 1265.0</b> Head (feet) 0.00 0.43 0.57 0.73 0.90 1.00 1.50 1.75 2.00 3.00 Disch. (cfs) 0.000 8.000 15.000 24.000 38.000 46.000 110.000 150.000 190.000 300.000
#4	Tertiary	1,260.10'	<b>24.0" Round Culvert - Reverse</b> L= 75.0' CMP, projecting, no headwall, Ke= 0.900 Inlet / Outlet Invert= 1,259.30' / 1,260.10' S= -0.0107 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 3.14 sf
#5	Device 4	1,262.00'	<b>3.5' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

**Primary OutFlow** Max=115.11 cfs @ 17.93 hrs HW=1,266.86' TW=1,260.69' (Dynamic Tailwater)

↳ **1=Culvert** (Inlet Controls 115.11 cfs @ 11.96 fps)

↳ **2=Sharp-Crested Rectangular Weir** (Passes 115.11 cfs of 511.08 cfs potential flow)

**Secondary OutFlow** Max=217.32 cfs @ 20.48 hrs HW=1,267.25' TW=1,261.74' (Dynamic Tailwater)

↳ **3=30' E.S. at 1265.0** (Custom Controls 217.32 cfs)

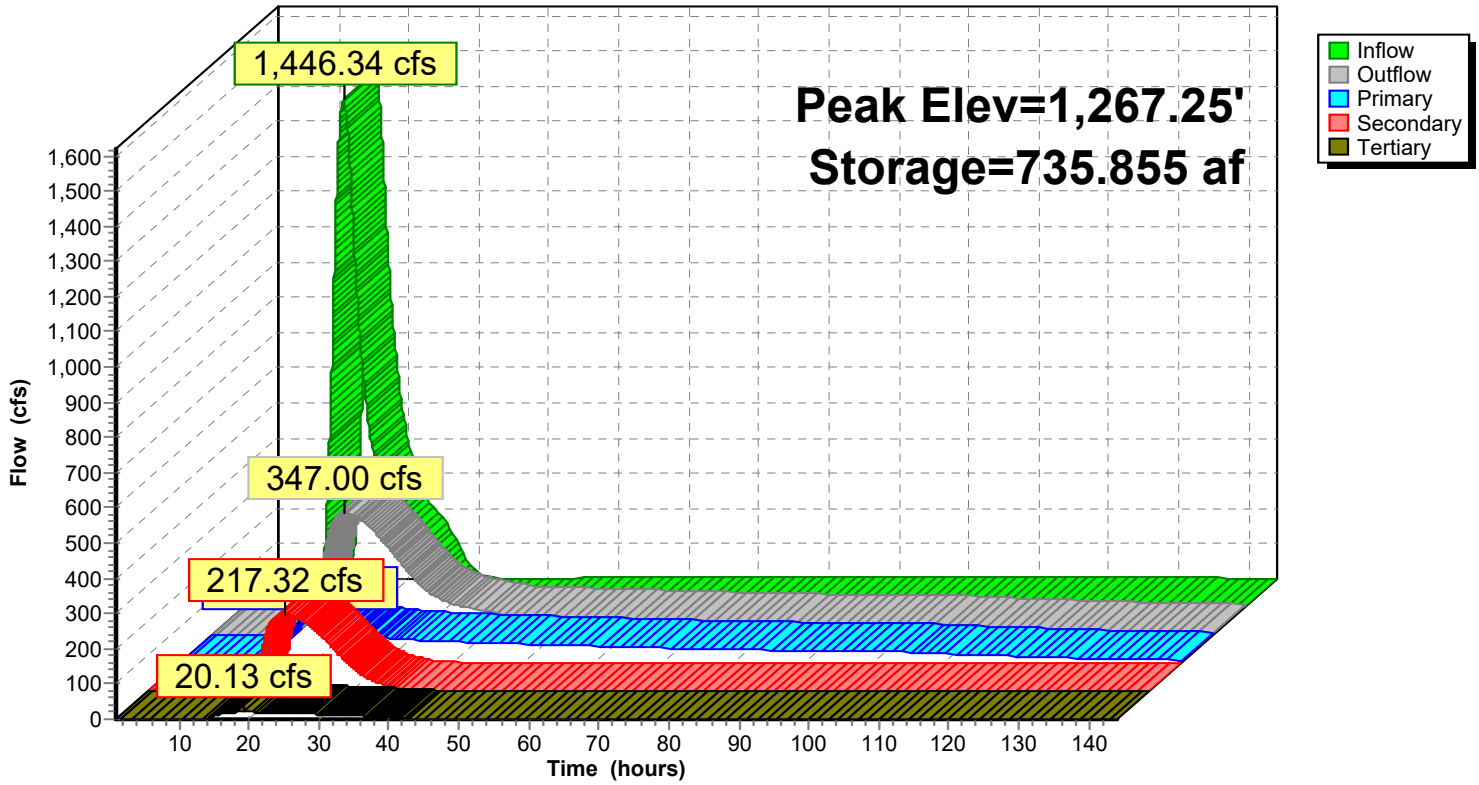
**Tertiary OutFlow** Max=20.13 cfs @ 19.38 hrs HW=1,267.20' TW=1,263.78' (Dynamic Tailwater)

↳ **4=Culvert - Reverse** (Outlet Controls 20.13 cfs @ 6.41 fps)

↳ **5=Sharp-Crested Rectangular Weir** (Passes 20.13 cfs of 87.42 cfs potential flow)

**Pond 3P: Homstad Lake**

**Hydrograph**



## Hydrograph for Pond 3P: Homstad Lake

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
1.00	0.00	310.005	1,262.00	0.00	0.00	0.00	0.00
6.00	0.01	310.005	1,262.00	0.00	0.00	0.00	0.00
11.00	<b>17.05</b>	310.903	1,262.01	0.06	0.06	0.00	0.00
16.00	<b>1,306.99</b>	<b>584.061</b>	<b>1,265.35</b>	<b>127.71</b>	<b>106.00</b>	<b>6.49</b>	<b>15.22</b>
21.00	309.28	<b>735.123</b>	<b>1,267.24</b>	<b>342.74</b>	<b>106.65</b>	<b>216.33</b>	<b>19.76</b>
26.00	140.89	696.451	1,266.76	253.87	84.82	152.19	16.85
31.00	9.87	639.969	1,266.06	136.74	70.46	53.35	12.92
36.00	0.33	597.263	1,265.52	85.20	63.94	12.36	8.89
41.00	0.00	566.400	1,265.12	66.51	60.00	2.29	4.21
46.00	4.38	542.449	1,264.82	56.77	56.77	0.00	0.00
51.00	6.35	521.885	1,264.56	53.72	53.72	0.00	0.00
56.00	7.33	503.160	1,264.34	50.72	50.72	0.00	0.00
61.00	7.89	485.946	1,264.13	47.90	47.90	0.00	0.00
66.00	8.18	470.035	1,263.95	45.22	45.22	0.00	0.00
71.00	8.30	455.292	1,263.78	42.66	42.66	0.00	0.00
76.00	8.31	441.598	1,263.62	40.28	40.28	0.00	0.00
81.00	8.23	428.824	1,263.47	38.15	38.15	0.00	0.00
86.00	8.08	416.801	1,263.33	36.42	36.42	0.00	0.00
91.00	7.89	405.355	1,263.19	35.00	35.00	0.00	0.00
96.00	7.67	394.360	1,263.06	33.81	33.81	0.00	0.00
101.00	7.44	383.728	1,262.94	32.77	32.77	0.00	0.00
106.00	7.19	373.538	1,262.82	30.16	30.16	0.00	0.00
111.00	6.82	364.933	1,262.71	25.75	25.75	0.00	0.00
116.00	6.32	357.741	1,262.62	22.27	22.27	0.00	0.00
121.00	5.52	351.759	1,262.55	18.64	18.64	0.00	0.00
126.00	4.40	346.762	1,262.48	15.51	15.51	0.00	0.00
131.00	3.57	342.536	1,262.43	12.98	12.98	0.00	0.00
136.00	2.94	338.948	1,262.38	10.95	10.95	0.00	0.00
141.00	2.45	335.884	1,262.34	9.30	9.30	0.00	0.00



## Stage-Discharge for Pond 3P: Homstad Lake

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Tertiary (cfs)
1,255.30	0.00	0.00	0.00	0.00	1,264.30	124.17	107.65	0.00	16.52
1,255.45	0.00	0.00	0.00	0.00	1,264.45	126.19	109.14	0.00	17.05
1,255.60	0.00	0.00	0.00	0.00	1,264.60	128.16	110.60	0.00	17.56
1,255.75	0.00	0.00	0.00	0.00	1,264.75	130.11	112.05	0.00	18.06
1,255.90	0.00	0.00	0.00	0.00	1,264.90	132.02	113.47	0.00	18.55
1,256.05	0.00	0.00	0.00	0.00	1,265.05	134.84	114.88	0.93	19.02
1,256.20	0.00	0.00	0.00	0.00	1,265.20	139.48	116.28	3.72	19.49
1,256.35	0.00	0.00	0.00	0.00	1,265.35	144.10	117.65	6.51	19.94
1,256.50	0.00	0.00	0.00	0.00	1,265.50	150.89	119.01	11.50	20.38
1,256.65	0.00	0.00	0.00	0.00	1,265.65	160.67	120.36	19.50	20.81
1,256.80	0.00	0.00	0.00	0.00	1,265.80	172.69	121.69	29.76	21.23
1,256.95	0.00	0.00	0.00	0.00	1,265.95	186.65	123.00	42.00	21.65
1,257.10	0.00	0.00	0.00	0.00	1,266.10	205.16	124.30	58.80	22.06
1,257.25	0.00	0.00	0.00	0.00	1,266.25	226.05	125.59	78.00	22.46
1,257.40	0.00	0.00	0.00	0.00	1,266.40	246.92	126.87	97.20	22.85
1,257.55	0.00	0.00	0.00	0.00	1,266.55	269.37	128.13	118.00	23.24
1,257.70	0.00	0.00	0.00	0.00	1,266.70	295.00	129.38	142.00	23.62
1,257.85	0.00	0.00	0.00	0.00	1,266.85	320.61	130.62	166.00	23.99
1,258.00	0.00	0.00	0.00	0.00	1,267.00	346.20	131.84	190.00	24.36
1,258.15	0.00	0.00	0.00	0.00	1,267.15	364.28	133.06	206.50	24.72
1,258.30	0.00	0.00	0.00	0.00	1,267.30	382.34	134.26	223.00	25.08
1,258.45	0.00	0.00	0.00	0.00	1,267.45	400.39	135.46	239.50	25.43
1,258.60	0.00	0.00	0.00	0.00	1,267.60	418.42	136.64	256.00	25.78
1,258.75	0.00	0.00	0.00	0.00	1,267.75	436.43	137.81	272.50	26.12
1,258.90	0.00	0.00	0.00	0.00	1,267.90	454.44	138.98	<b>289.00</b>	26.46
1,259.05	0.00	0.00	0.00	0.00	1,268.05	466.92	140.13	<b>300.00</b>	26.79
1,259.20	0.00	0.00	0.00	0.00	1,268.20	468.40	141.27	300.00	27.12
1,259.35	0.00	0.00	0.00	0.00	1,268.35	469.86	142.41	300.00	27.45
1,259.50	0.00	0.00	0.00	0.00	1,268.50	471.31	143.53	300.00	27.77
1,259.65	0.00	0.00	0.00	0.00	1,268.65	472.74	144.65	300.00	28.09
1,259.80	0.00	0.00	0.00	0.00	1,268.80	474.16	145.76	300.00	28.40
1,259.95	0.00	0.00	0.00	0.00	1,268.95	475.58	146.86	300.00	28.72
1,260.10	0.00	0.00	0.00	0.00	1,269.10	476.98	147.95	300.00	29.02
1,260.25	0.00	0.00	0.00	0.00	1,269.25	478.37	149.04	300.00	29.33
1,260.40	0.00	0.00	0.00	0.00	1,269.40	479.74	150.11	300.00	29.63
1,260.55	0.00	0.00	0.00	0.00	1,269.55	481.11	151.18	300.00	29.93
1,260.70	0.00	0.00	0.00	0.00	1,269.70	482.47	152.24	300.00	30.23
1,260.85	0.00	0.00	0.00	0.00	1,269.85	483.81	153.29	300.00	30.52
1,261.00	0.00	0.00	0.00	0.00	1,270.00	<b>485.15</b>	<b>154.34</b>	300.00	<b>30.81</b>
1,261.15	0.00	0.00	0.00	0.00					
1,261.30	0.00	0.00	0.00	0.00					
1,261.45	0.00	0.00	0.00	0.00					
1,261.60	0.00	0.00	0.00	0.00					
1,261.75	0.00	0.00	0.00	0.00					
1,261.90	0.00	0.00	0.00	0.00					
1,262.05	0.64	0.51	0.00	0.13					
1,262.20	5.11	4.10	0.00	1.01					
1,262.35	11.84	9.51	0.00	2.32					
1,262.50	20.20	16.27	0.00	3.93					
1,262.65	29.92	24.15	0.00	5.77					
1,262.80	40.83	33.02	0.00	7.82					
1,262.95	52.81	42.79	0.00	10.02					
1,263.10	64.81	53.38	0.00	11.42					
1,263.25	76.94	64.76	0.00	12.18					
1,263.40	89.75	76.86	0.00	12.89					
1,263.55	103.22	89.66	0.00	13.56					
1,263.70	115.70	101.49	0.00	14.20					
1,263.85	117.88	103.07	0.00	14.82					
1,264.00	120.02	104.62	0.00	15.40					
1,264.15	122.12	106.15	0.00	15.97					

## Stage-Area-Storage for Pond 3P: Homstad Lake

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,255.30	0.000	0.000	1,264.30	83.960	500.189
1,255.45	0.279	0.021	1,264.45	82.640	512.684
1,255.60	0.557	0.084	1,264.60	81.320	524.981
1,255.75	0.836	0.188	1,264.75	80.000	537.080
1,255.90	1.114	0.334	1,264.90	78.680	548.981
1,256.05	2.320	0.545	1,265.05	77.880	560.697
1,256.20	5.380	1.123	1,265.20	78.120	572.397
1,256.35	8.440	2.159	1,265.35	78.360	584.133
1,256.50	11.500	3.655	1,265.50	78.600	595.905
1,256.65	14.560	5.609	1,265.65	78.840	607.713
1,256.80	17.620	8.023	1,265.80	79.080	619.557
1,256.95	20.680	10.896	1,265.95	79.320	631.437
1,257.10	24.540	14.267	1,266.10	79.540	643.352
1,257.25	28.800	18.268	1,266.25	79.750	655.299
1,257.40	33.060	22.907	1,266.40	79.960	667.277
1,257.55	37.320	28.185	1,266.55	80.170	679.287
1,257.70	41.580	34.103	1,266.70	80.380	691.328
1,257.85	45.840	40.659	1,266.85	80.590	703.401
1,258.00	50.100	47.855	1,267.00	80.800	715.505
1,258.15	51.750	55.494	1,267.15	82.180	727.728
1,258.30	53.400	63.380	1,267.30	83.560	740.159
1,258.45	55.050	71.514	1,267.45	84.940	752.797
1,258.60	56.700	79.895	1,267.60	86.320	765.641
1,258.75	58.350	88.524	1,267.75	87.700	778.692
1,258.90	60.000	97.400	1,267.90	89.080	791.951
1,259.05	61.455	106.519	1,268.05	90.325	805.413
1,259.20	62.520	115.817	1,268.20	91.300	819.035
1,259.35	63.585	125.275	1,268.35	92.275	832.803
1,259.50	64.650	134.893	1,268.50	93.250	846.717
1,259.65	65.715	144.670	1,268.65	94.225	860.778
1,259.80	66.780	154.607	1,268.80	95.200	874.985
1,259.95	67.845	164.704	1,268.95	96.175	889.338
1,260.10	68.510	174.940	1,269.10	97.150	903.837
1,260.25	68.975	185.252	1,269.25	98.125	918.483
1,260.40	69.440	195.633	1,269.40	99.100	933.275
1,260.55	69.905	206.084	1,269.55	100.075	948.213
1,260.70	70.370	216.605	1,269.70	101.050	963.298
1,260.85	70.835	227.195	1,269.85	102.025	978.528
1,261.00	71.300	237.855	1,270.00	<b>103.000</b>	<b>993.905</b>
1,261.15	71.555	248.569			
1,261.30	71.810	259.321			
1,261.45	72.065	270.112			
1,261.60	72.320	280.941			
1,261.75	72.575	291.808			
1,261.90	72.830	302.713			
1,262.05	73.590	313.670			
1,262.20	75.360	324.841			
1,262.35	77.130	336.278			
1,262.50	78.900	347.980			
1,262.65	80.670	359.948			
1,262.80	82.440	372.181			
1,262.95	84.210	384.680			
1,263.10	84.980	397.394			
1,263.25	85.250	410.161			
1,263.40	85.520	422.969			
1,263.55	85.790	435.817			
1,263.70	86.060	448.706			
1,263.85	86.330	461.635			
1,264.00	86.600	474.605			
1,264.15	85.280	487.496			

**Summary for Pond 9P: Hesby Wetland**

Inflow = 676.67 cfs @ 12.28 hrs, Volume= 941.862 af  
 Outflow = 145.11 cfs @ 30.71 hrs, Volume= 814.410 af, Atten= 79%, Lag= 1,105.7 min  
 Primary = 60.90 cfs @ 32.41 hrs, Volume= 639.499 af  
 Secondary = 84.27 cfs @ 30.68 hrs, Volume= 174.911 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,258.90' Surf.Area= 60.900 ac Storage= 232.650 af  
 Peak Elev= 1,263.74' @ 30.68 hrs Surf.Area= 78.422 ac Storage= 566.544 af (333.894 af above start)

Plug-Flow detention time= 3,799.0 min calculated for 581.719 af (62% of inflow)  
 Center-of-Mass det. time= 1,423.4 min ( 4,302.1 - 2,878.7 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,250.90'	586.760 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,250.90	0.000	0.000	0.000
1,251.90	1.500	0.750	0.750
1,252.90	2.500	2.000	2.750
1,253.90	12.000	7.250	10.000
1,254.90	33.200	22.600	32.600
1,255.90	44.900	39.050	71.650
1,256.90	51.300	48.100	119.750
1,257.90	56.800	54.050	173.800
1,258.90	60.900	58.850	232.650
1,259.90	64.600	62.750	295.400
1,260.90	67.700	66.150	361.550
1,261.90	70.500	69.100	430.650
1,262.90	73.200	71.850	502.500
1,264.00	80.000	84.260	586.760

Device	Routing	Invert	Outlet Devices
#1	Primary	1,253.40'	<b>30.0" Round Culvert</b> L= 72.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,253.40' / 1,253.40' S= 0.0000 '/ Cc= 0.900 n= 0.012 Steel, smooth, Flow Area= 4.91 sf
#2	Device 1	1,258.90'	<b>14.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 5.0' Crest Height
#3	Secondary	1,262.40'	<b>30' E.S. Crest at 1262.4</b> Head (feet) 0.00 0.43 0.57 0.70 0.80 0.90 1.00 1.10 1.20 1.30 1.40 1.50 Disch. (cfs) 0.000 8.000 15.000 23.000 29.000 38.000 46.000 57.000 67.000 78.000 92.000 110.000

**Primary OutFlow** Max=60.90 cfs @ 32.41 hrs HW=1,263.72' TW=1,257.08' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 60.90 cfs @ 12.41 fps)

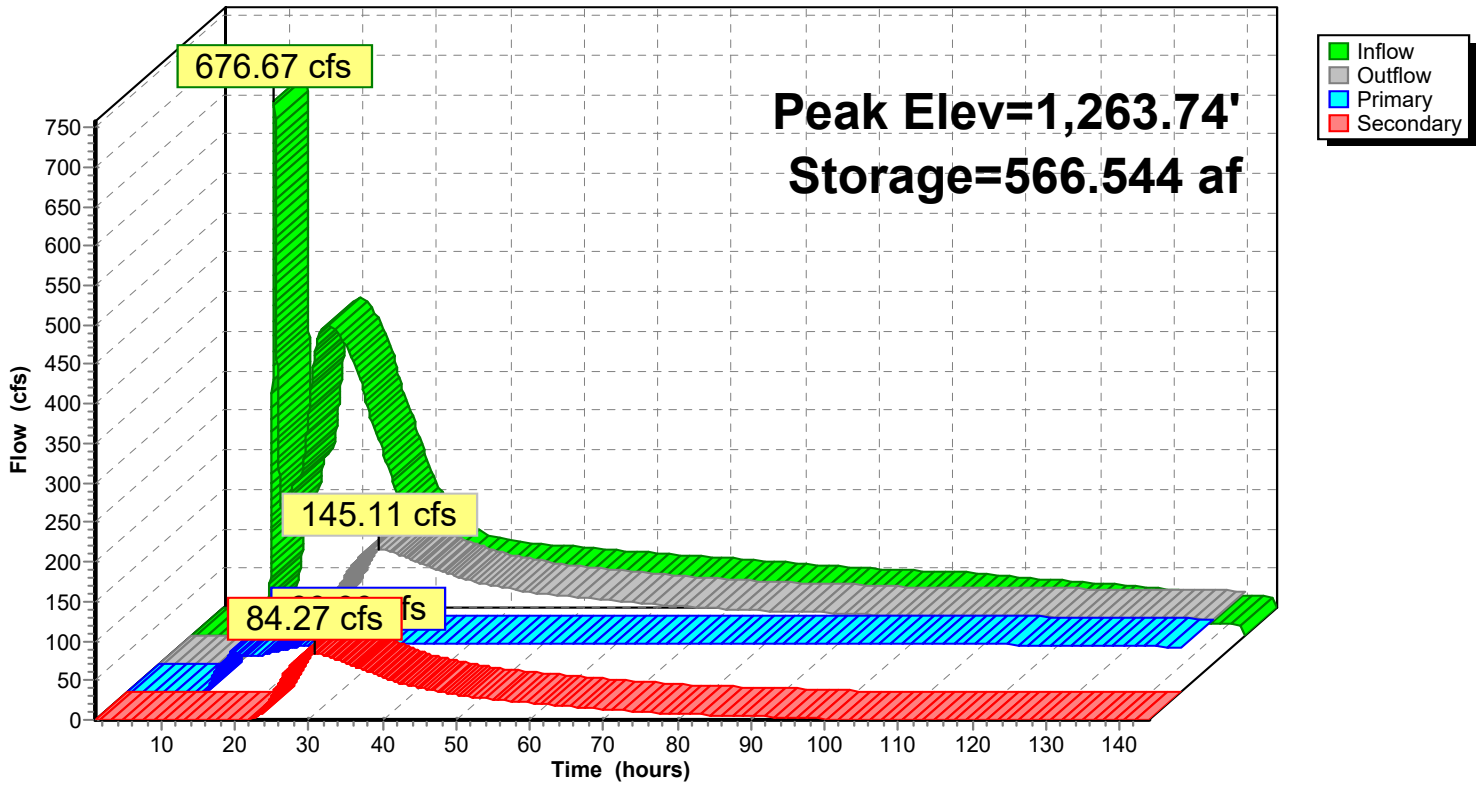
↑2=Sharp-Crested Rectangular Weir (Passes 60.90 cfs of 504.60 cfs potential flow)

**Secondary OutFlow** Max=84.27 cfs @ 30.68 hrs HW=1,263.74' TW=1,257.12' (Dynamic Tailwater)

↑3=30' E.S. Crest at 1262.4 (Custom Controls 84.27 cfs)

### Pond 9P: Hesby Wetland

#### Hydrograph



## Hydrograph for Pond 9P: Hesby Wetland

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	232.650	1,258.90	0.00	0.00	0.00
6.00	0.13	232.651	1,258.90	0.00	0.00	0.00
11.00	<b>30.83</b>	236.189	1,258.96	0.64	0.64	0.00
16.00	<b>203.47</b>	309.405	1,260.12	48.33	48.33	0.00
21.00	382.98	433.671	1,261.94	50.55	50.55	0.00
26.00	260.21	<b>540.870</b>	<b>1,263.41</b>	<b>106.33</b>	58.90	<b>47.43</b>
31.00	139.03	<b>566.466</b>	<b>1,263.74</b>	<b>144.99</b>	<b>60.86</b>	<b>84.13</b>
36.00	96.05	556.154	1,263.61	129.05	<b>60.78</b>	68.27
41.00	84.28	543.339	1,263.45	111.54	60.56	50.98
46.00	79.10	533.444	1,263.32	99.75	60.51	39.23
51.00	75.52	526.041	1,263.22	91.09	60.53	30.56
56.00	71.82	520.030	1,263.14	85.77	60.54	25.22
61.00	68.41	514.497	1,263.06	81.22	60.52	20.70
66.00	65.15	509.415	1,262.99	77.00	60.52	16.48
71.00	61.72	504.584	1,262.93	73.50	60.58	12.92
76.00	58.07	499.647	1,262.86	70.18	60.63	9.55
81.00	54.55	494.468	1,262.79	67.93	60.67	7.26
86.00	51.56	488.618	1,262.71	66.38	60.62	5.76
91.00	48.98	482.299	1,262.62	64.66	60.52	4.14
96.00	46.72	475.707	1,262.53	62.88	60.44	2.44
101.00	44.72	468.979	1,262.44	61.10	60.40	0.71
106.00	41.37	461.946	1,262.34	60.37	60.37	0.00
111.00	36.88	453.135	1,262.22	60.22	60.22	0.00
116.00	33.43	442.818	1,262.07	59.96	59.96	0.00
121.00	29.83	431.192	1,261.91	59.60	59.60	0.00
126.00	26.66	418.321	1,261.72	59.15	59.15	0.00
131.00	21.72	403.894	1,261.52	58.58	58.58	0.00
136.00	17.73	387.989	1,261.29	57.90	57.90	0.00
141.00	14.51	370.808	1,261.04	57.12	57.12	0.00

## Stage-Discharge for Pond 9P: Hesby Wetland

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
1,250.90	0.00	0.00	0.00	1,259.90	46.23	46.23	0.00
1,251.05	0.00	0.00	0.00	1,260.05	54.92	54.92	0.00
1,251.20	0.00	0.00	0.00	1,260.20	55.68	55.68	0.00
1,251.35	0.00	0.00	0.00	1,260.35	56.43	56.43	0.00
1,251.50	0.00	0.00	0.00	1,260.50	57.17	57.17	0.00
1,251.65	0.00	0.00	0.00	1,260.65	57.89	57.89	0.00
1,251.80	0.00	0.00	0.00	1,260.80	58.61	58.61	0.00
1,251.95	0.00	0.00	0.00	1,260.95	59.32	59.32	0.00
1,252.10	0.00	0.00	0.00	1,261.10	60.03	60.03	0.00
1,252.25	0.00	0.00	0.00	1,261.25	60.72	60.72	0.00
1,252.40	0.00	0.00	0.00	1,261.40	61.41	61.41	0.00
1,252.55	0.00	0.00	0.00	1,261.55	62.09	62.09	0.00
1,252.70	0.00	0.00	0.00	1,261.70	62.76	62.76	0.00
1,252.85	0.00	0.00	0.00	1,261.85	63.42	63.42	0.00
1,253.00	0.00	0.00	0.00	1,262.00	64.08	64.08	0.00
1,253.15	0.00	0.00	0.00	1,262.15	64.73	64.73	0.00
1,253.30	0.00	0.00	0.00	1,262.30	65.37	65.37	0.00
1,253.45	0.00	0.00	0.00	1,262.45	66.94	66.01	0.93
1,253.60	0.00	0.00	0.00	1,262.60	70.36	66.64	3.72
1,253.75	0.00	0.00	0.00	1,262.75	73.78	67.27	6.51
1,253.90	0.00	0.00	0.00	1,262.90	79.39	67.89	11.50
1,254.05	0.00	0.00	0.00	1,263.05	88.43	68.50	19.92
1,254.20	0.00	0.00	0.00	1,263.20	98.11	69.11	29.00
1,254.35	0.00	0.00	0.00	1,263.35	111.71	69.71	42.00
1,254.50	0.00	0.00	0.00	1,263.50	127.31	70.31	57.00
1,254.65	0.00	0.00	0.00	1,263.65	143.41	70.91	72.50
1,254.80	0.00	0.00	0.00	1,263.80	163.49	71.49	<b>92.00</b>
1,254.95	0.00	0.00	0.00	1,263.95	<b>182.08</b>	<b>72.08</b>	<b>110.00</b>
1,255.10	0.00	0.00	0.00				
1,255.25	0.00	0.00	0.00				
1,255.40	0.00	0.00	0.00				
1,255.55	0.00	0.00	0.00				
1,255.70	0.00	0.00	0.00				
1,255.85	0.00	0.00	0.00				
1,256.00	0.00	0.00	0.00				
1,256.15	0.00	0.00	0.00				
1,256.30	0.00	0.00	0.00				
1,256.45	0.00	0.00	0.00				
1,256.60	0.00	0.00	0.00				
1,256.75	0.00	0.00	0.00				
1,256.90	0.00	0.00	0.00				
1,257.05	0.00	0.00	0.00				
1,257.20	0.00	0.00	0.00				
1,257.35	0.00	0.00	0.00				
1,257.50	0.00	0.00	0.00				
1,257.65	0.00	0.00	0.00				
1,257.80	0.00	0.00	0.00				
1,257.95	0.00	0.00	0.00				
1,258.10	0.00	0.00	0.00				
1,258.25	0.00	0.00	0.00				
1,258.40	0.00	0.00	0.00				
1,258.55	0.00	0.00	0.00				
1,258.70	0.00	0.00	0.00				
1,258.85	0.00	0.00	0.00				
1,259.00	1.45	1.45	0.00				
1,259.15	5.74	5.74	0.00				
1,259.30	11.63	11.63	0.00				
1,259.45	18.78	18.78	0.00				
1,259.60	27.00	27.00	0.00				
1,259.75	36.18	36.18	0.00				

**Stage-Area-Storage for Pond 9P: Hesby Wetland**

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,250.90	0.000	0.000	1,259.90	64.600	295.400
1,251.05	0.225	0.017	1,260.05	65.065	305.125
1,251.20	0.450	0.067	1,260.20	65.530	314.919
1,251.35	0.675	0.152	1,260.35	65.995	324.784
1,251.50	0.900	0.270	1,260.50	66.460	334.718
1,251.65	1.125	0.422	1,260.65	66.925	344.722
1,251.80	1.350	0.608	1,260.80	67.390	354.796
1,251.95	1.550	0.826	1,260.95	67.840	364.938
1,252.10	1.700	1.070	1,261.10	68.260	375.146
1,252.25	1.850	1.336	1,261.25	68.680	385.416
1,252.40	2.000	1.625	1,261.40	69.100	395.750
1,252.55	2.150	1.936	1,261.55	69.520	406.147
1,252.70	2.300	2.270	1,261.70	69.940	416.606
1,252.85	2.450	2.626	1,261.85	70.360	427.129
1,253.00	3.450	3.047	1,262.00	70.770	437.713
1,253.15	4.875	3.672	1,262.15	71.175	448.359
1,253.30	6.300	4.510	1,262.30	71.580	459.066
1,253.45	7.725	5.562	1,262.45	71.985	469.833
1,253.60	9.150	6.828	1,262.60	72.390	480.662
1,253.75	10.575	8.307	1,262.75	72.795	491.550
1,253.90	12.000	10.000	1,262.90	73.200	502.500
1,254.05	15.180	12.039	1,263.05	74.127	513.550
1,254.20	18.360	14.554	1,263.20	75.055	524.738
1,254.35	21.540	17.547	1,263.35	75.982	536.066
1,254.50	24.720	21.016	1,263.50	76.909	547.533
1,254.65	27.900	24.962	1,263.65	77.836	559.139
1,254.80	31.080	29.386	1,263.80	78.764	570.884
1,254.95	33.785	34.275	1,263.95	<b>79.691</b>	<b>582.768</b>
1,255.10	35.540	39.474			
1,255.25	37.295	44.937			
1,255.40	39.050	50.662			
1,255.55	40.805	56.652			
1,255.70	42.560	62.904			
1,255.85	44.315	69.420			
1,256.00	45.540	76.172			
1,256.15	46.500	83.075			
1,256.30	47.460	90.122			
1,256.45	48.420	97.313			
1,256.60	49.380	104.648			
1,256.75	50.340	112.127			
1,256.90	51.300	119.750			
1,257.05	52.125	127.507			
1,257.20	52.950	135.387			
1,257.35	53.775	143.392			
1,257.50	54.600	151.520			
1,257.65	55.425	159.772			
1,257.80	56.250	168.148			
1,257.95	57.005	176.645			
1,258.10	57.620	185.242			
1,258.25	58.235	193.931			
1,258.40	58.850	202.712			
1,258.55	59.465	211.586			
1,258.70	60.080	220.552			
1,258.85	60.695	229.610			
1,259.00	61.270	238.758			
1,259.15	61.825	247.991			
1,259.30	62.380	257.306			
1,259.45	62.935	266.705			
1,259.60	63.490	276.187			
1,259.75	64.045	285.752			

### Summary for Pond 11P: West Hass Wetland

Inflow Area = 1,351.000 ac, 8.44% Impervious, Inflow Depth > 1.81" for 100-Year event  
 Inflow = 167.29 cfs @ 12.01 hrs, Volume= 204.075 af  
 Outflow = 61.98 cfs @ 15.88 hrs, Volume= 202.206 af, Atten= 63%, Lag= 231.9 min  
 Primary = 61.98 cfs @ 15.88 hrs, Volume= 202.206 af  
 Secondary = 0.00 cfs @ 1.00 hrs, Volume= 0.000 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,261.30' Surf.Area= 8.300 ac Storage= 25.550 af  
 Peak Elev= 1,263.96' @ 33.61 hrs Surf.Area= 9.997 ac Storage= 49.881 af (24.331 af above start)

Plug-Flow detention time= 1,529.0 min calculated for 176.656 af (87% of inflow)  
 Center-of-Mass det. time= 515.4 min ( 3,559.2 - 3,043.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,255.30'	83.045 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,255.30	0.000	0.000	0.000
1,256.30	0.200	0.100	0.100
1,257.30	1.300	0.750	0.850
1,258.30	5.500	3.400	4.250
1,259.30	6.800	6.150	10.400
1,260.30	7.600	7.200	17.600
1,261.30	8.300	7.950	25.550
1,262.30	8.900	8.600	34.150
1,263.30	9.600	9.250	43.400
1,264.30	10.200	9.900	53.300
1,265.30	10.700	10.450	63.750
1,267.00	12.000	19.295	83.045

Device	Routing	Invert	Outlet Devices
#1	Primary	1,257.30'	<b>36.0" Round Culvert</b> L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,257.30' / 1,257.30' S= 0.0000 '/ Cc= 0.900 n= 0.012 Steel, smooth, Flow Area= 7.07 sf
#2	Device 1	1,261.30'	<b>14.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 4.0' Crest Height
#3	Secondary	1,264.30'	<b>30' E.S.</b> Head (feet) 0.00 0.50 1.00 1.50 2.00 Disch. (cfs) 0.000 10.000 38.000 88.000 160.000

**Primary OutFlow** Max=61.96 cfs @ 15.88 hrs HW=1,263.41' TW=1,260.09' (Dynamic Tailwater)

↑1=Culvert (Inlet Controls 61.96 cfs @ 8.77 fps)

↑2=Sharp-Crested Rectangular Weir (Passes 61.96 cfs of 144.49 cfs potential flow)

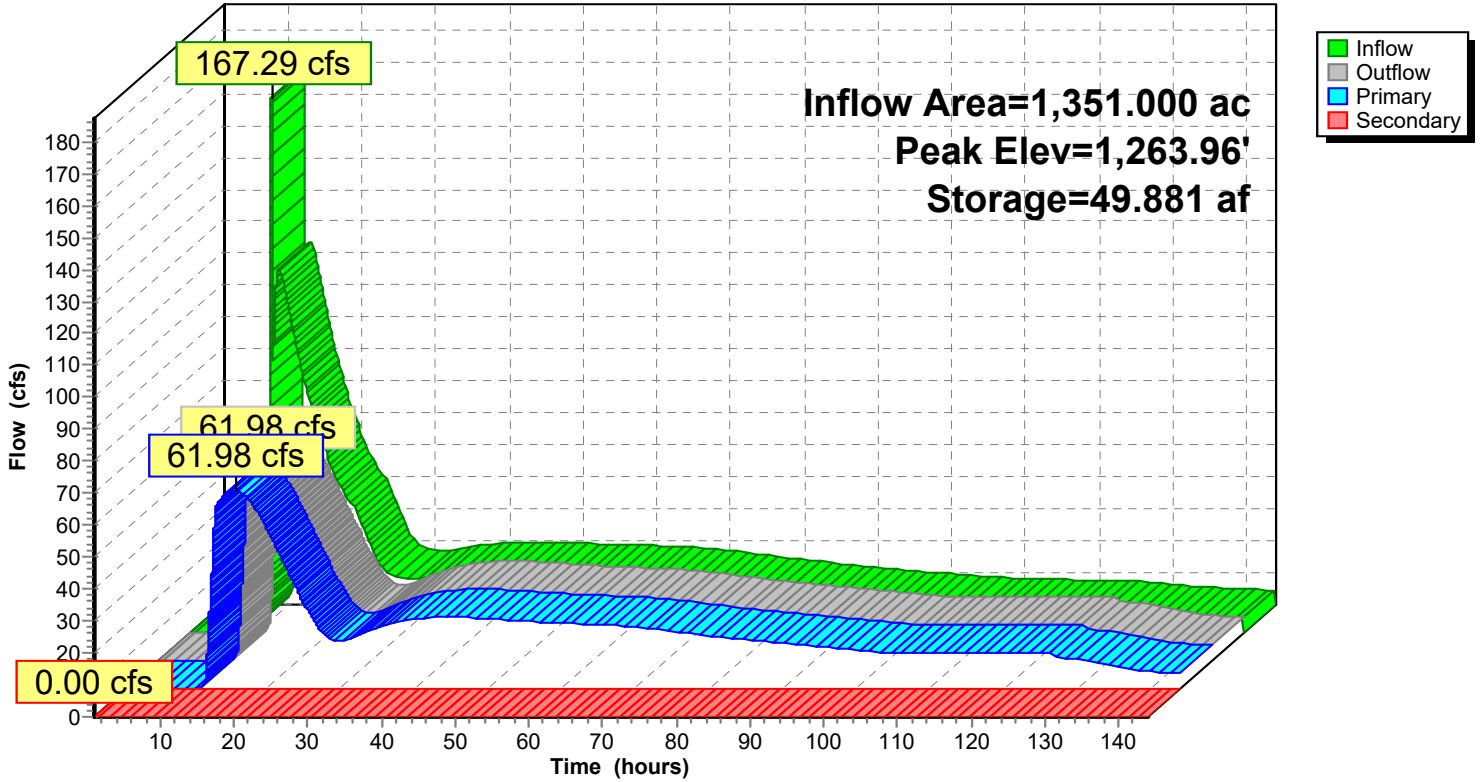
**Secondary OutFlow** Max=0.00 cfs @ 1.00 hrs HW=1,261.30' TW=1,258.90' (Dynamic Tailwater)

↑3=30' E.S. ( Controls 0.00 cfs)



### Pond 11P: West Hass Wetland

#### Hydrograph



## Hydrograph for Pond 11P: West Hass Wetland

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	25.550	1,261.30	0.00	0.00	<b>0.00</b>
6.00	0.00	25.550	1,261.30	0.00	0.00	0.00
11.00	<b>8.89</b>	26.039	1,261.36	<b>0.65</b>	<b>0.65</b>	0.00
16.00	<b>83.07</b>	44.643	1,263.43	<b>61.97</b>	<b>61.97</b>	0.00
21.00	47.63	47.803	1,263.75	45.83	45.83	0.00
26.00	23.82	49.030	1,263.88	23.20	23.20	0.00
31.00	16.89	<b>49.703</b>	<b>1,263.94</b>	15.21	15.21	0.00
36.00	18.49	<b>49.750</b>	<b>1,263.95</b>	19.74	19.74	0.00
41.00	19.38	48.900	1,263.86	21.99	21.99	0.00
46.00	19.44	47.743	1,263.75	22.33	22.33	0.00
51.00	19.13	46.582	1,263.63	21.81	21.81	0.00
56.00	18.74	45.544	1,263.52	21.10	21.10	0.00
61.00	18.37	44.615	1,263.43	20.51	20.51	0.00
66.00	17.91	43.756	1,263.34	19.93	19.93	0.00
71.00	16.68	42.848	1,263.24	19.06	19.06	0.00
76.00	15.24	41.819	1,263.13	17.79	17.79	0.00
81.00	13.82	40.761	1,263.02	16.40	16.40	0.00
86.00	12.53	39.689	1,262.91	15.14	15.14	0.00
91.00	11.36	38.607	1,262.79	13.97	13.97	0.00
96.00	10.36	37.542	1,262.68	12.91	12.91	0.00
101.00	9.47	36.503	1,262.56	11.95	11.95	0.00
106.00	8.69	35.483	1,262.45	11.21	11.21	0.00
111.00	8.23	34.365	1,262.32	11.13	11.13	0.00
116.00	7.87	33.085	1,262.18	11.16	11.16	0.00
121.00	7.52	31.648	1,262.02	11.19	11.19	0.00
126.00	7.21	30.063	1,261.83	11.16	11.16	0.00
131.00	6.15	28.763	1,261.68	8.74	8.74	0.00
136.00	5.27	27.891	1,261.58	6.78	6.78	0.00
141.00	4.72	27.512	1,261.53	5.21	5.21	0.00

## Stage-Discharge for Pond 11P: West Hass Wetland

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
1,255.30	0.00	0.00	0.00	1,264.30	79.09	79.09	0.00
1,255.45	0.00	0.00	0.00	1,264.45	83.18	80.18	3.00
1,255.60	0.00	0.00	0.00	1,264.60	87.26	81.26	6.00
1,255.75	0.00	0.00	0.00	1,264.75	91.32	82.32	9.00
1,255.90	0.00	0.00	0.00	1,264.90	98.97	83.37	15.60
1,256.05	0.00	0.00	0.00	1,265.05	108.40	84.40	24.00
1,256.20	0.00	0.00	0.00	1,265.20	117.83	85.43	32.40
1,256.35	0.00	0.00	0.00	1,265.35	129.44	86.44	43.00
1,256.50	0.00	0.00	0.00	1,265.50	145.44	87.44	58.00
1,256.65	0.00	0.00	0.00	1,265.65	161.43	88.43	73.00
1,256.80	0.00	0.00	0.00	1,265.80	177.40	89.40	88.00
1,256.95	0.00	0.00	0.00	1,265.95	199.97	90.37	109.60
1,257.10	0.00	0.00	0.00	1,266.10	222.53	91.33	131.20
1,257.25	0.00	0.00	0.00	1,266.25	245.07	92.27	<b>152.80</b>
1,257.40	0.00	0.00	0.00	1,266.40	253.21	93.21	<b>160.00</b>
1,257.55	0.00	0.00	0.00	1,266.55	254.14	94.14	160.00
1,257.70	0.00	0.00	0.00	1,266.70	255.05	95.05	160.00
1,257.85	0.00	0.00	0.00	1,266.85	255.96	95.96	160.00
1,258.00	0.00	0.00	0.00	1,267.00	<b>256.87</b>	<b>96.87</b>	160.00
1,258.15	0.00	0.00	0.00				
1,258.30	0.00	0.00	0.00				
1,258.45	0.00	0.00	0.00				
1,258.60	0.00	0.00	0.00				
1,258.75	0.00	0.00	0.00				
1,258.90	0.00	0.00	0.00				
1,259.05	0.00	0.00	0.00				
1,259.20	0.00	0.00	0.00				
1,259.35	0.00	0.00	0.00				
1,259.50	0.00	0.00	0.00				
1,259.65	0.00	0.00	0.00				
1,259.80	0.00	0.00	0.00				
1,259.95	0.00	0.00	0.00				
1,260.10	0.00	0.00	0.00				
1,260.25	0.00	0.00	0.00				
1,260.40	0.00	0.00	0.00				
1,260.55	0.00	0.00	0.00				
1,260.70	0.00	0.00	0.00				
1,260.85	0.00	0.00	0.00				
1,261.00	0.00	0.00	0.00				
1,261.15	0.00	0.00	0.00				
1,261.30	0.00	0.00	0.00				
1,261.45	2.67	2.67	0.00				
1,261.60	7.56	7.56	0.00				
1,261.75	13.92	13.92	0.00				
1,261.90	21.48	21.48	0.00				
1,262.05	30.09	30.09	0.00				
1,262.20	39.65	39.65	0.00				
1,262.35	50.08	50.08	0.00				
1,262.50	61.32	61.32	0.00				
1,262.65	63.57	63.57	0.00				
1,262.80	65.57	65.57	0.00				
1,262.95	67.51	67.51	0.00				
1,263.10	69.39	69.39	0.00				
1,263.25	70.99	70.99	0.00				
1,263.40	72.20	72.20	0.00				
1,263.55	73.39	73.39	0.00				
1,263.70	74.57	74.57	0.00				
1,263.85	75.72	75.72	0.00				
1,264.00	76.86	76.86	0.00				
1,264.15	77.98	77.98	0.00				

## Stage-Area-Storage for Pond 11P: West Hass Wetland

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,255.30	0.000	0.000	1,264.30	10.200	53.300
1,255.45	0.030	0.002	1,264.45	10.275	54.836
1,255.60	0.060	0.009	1,264.60	10.350	56.382
1,255.75	0.090	0.020	1,264.75	10.425	57.941
1,255.90	0.120	0.036	1,264.90	10.500	59.510
1,256.05	0.150	0.056	1,265.05	10.575	61.091
1,256.20	0.180	0.081	1,265.20	10.650	62.683
1,256.35	0.255	0.111	1,265.35	10.738	64.286
1,256.50	0.420	0.162	1,265.50	10.853	65.905
1,256.65	0.585	0.237	1,265.65	10.968	67.542
1,256.80	0.750	0.337	1,265.80	11.082	69.196
1,256.95	0.915	0.462	1,265.95	11.197	70.867
1,257.10	1.080	0.612	1,266.10	11.312	72.555
1,257.25	1.245	0.786	1,266.25	11.426	74.260
1,257.40	1.720	1.001	1,266.40	11.541	75.983
1,257.55	2.350	1.306	1,266.55	11.656	77.722
1,257.70	2.980	1.706	1,266.70	11.771	79.479
1,257.85	3.610	2.200	1,266.85	11.885	81.254
1,258.00	4.240	2.789	1,267.00	<b>12.000</b>	<b>83.045</b>
1,258.15	4.870	3.472			
1,258.30	5.500	4.250			
1,258.45	5.695	5.090			
1,258.60	5.890	5.958			
1,258.75	6.085	6.857			
1,258.90	6.280	7.784			
1,259.05	6.475	8.741			
1,259.20	6.670	9.727			
1,259.35	6.840	10.741			
1,259.50	6.960	11.776			
1,259.65	7.080	12.829			
1,259.80	7.200	13.900			
1,259.95	7.320	14.989			
1,260.10	7.440	16.096			
1,260.25	7.560	17.221			
1,260.40	7.670	18.363			
1,260.55	7.775	19.522			
1,260.70	7.880	20.696			
1,260.85	7.985	21.886			
1,261.00	8.090	23.092			
1,261.15	8.195	24.313			
1,261.30	8.300	25.550			
1,261.45	8.390	26.802			
1,261.60	8.480	28.067			
1,261.75	8.570	29.346			
1,261.90	8.660	30.638			
1,262.05	8.750	31.944			
1,262.20	8.840	33.263			
1,262.35	8.935	34.596			
1,262.50	9.040	35.944			
1,262.65	9.145	37.308			
1,262.80	9.250	38.687			
1,262.95	9.355	40.083			
1,263.10	9.460	41.494			
1,263.25	9.565	42.921			
1,263.40	9.660	44.363			
1,263.55	9.750	45.819			
1,263.70	9.840	47.288			
1,263.85	9.930	48.771			
1,264.00	10.020	50.267			
1,264.15	10.110	51.777			

**Summary for Pond 14P: Eagle Pond**

Inflow = 713.58 cfs @ 15.08 hrs, Volume= 1,133.654 af  
 Outflow = 213.15 cfs @ 20.56 hrs, Volume= 1,038.401 af, Atten= 70%, Lag= 328.7 min  
 Primary = 80.37 cfs @ 20.56 hrs, Volume= 797.207 af  
 Secondary = 132.78 cfs @ 20.56 hrs, Volume= 241.194 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,253.10' Surf.Area= 43.500 ac Storage= 123.650 af  
 Peak Elev= 1,257.37' @ 20.56 hrs Surf.Area= 58.656 ac Storage= 340.134 af (216.484 af above start)

Plug-Flow detention time= 1,976.6 min calculated for 914.687 af (81% of inflow)  
 Center-of-Mass det. time= 657.4 min ( 4,044.4 - 3,387.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,246.10'	383.700 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)
Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,246.10	0.000	0.000	0.000
1,248.10	0.200	0.200	0.200
1,249.10	5.300	2.750	2.950
1,250.10	22.600	13.950	16.900
1,251.10	33.700	28.150	45.050
1,252.10	40.000	36.850	81.900
1,253.10	43.500	41.750	123.650
1,254.10	46.500	45.000	168.650
1,255.10	50.200	48.350	217.000
1,256.10	53.300	51.750	268.750
1,257.10	57.700	55.500	324.250
1,258.10	61.200	59.450	383.700

Device	Routing	Invert	Outlet Devices
#1	Primary	1,248.10'	<b>33.0" Round Culvert</b> L= 60.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,248.10' / 1,248.10' S= 0.0000 '/ Cc= 0.900 n= 0.012 Steel, smooth, Flow Area= 5.94 sf
#2	Device 1	1,253.10'	<b>14.0' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s) 5.0' Crest Height
#3	Secondary	1,256.10'	<b>50' E.S. at 1256.1</b> Head (feet) 0.00 0.41 0.54 0.70 0.80 0.90 1.00 1.20 1.40 Disch. (cfs) 0.000 14.000 25.000 42.000 52.000 68.000 83.000 120.000 155.000

**Primary OutFlow** Max=80.37 cfs @ 20.56 hrs HW=1,257.37' (Free Discharge)

↑1=Culvert (Inlet Controls 80.37 cfs @ 13.53 fps)

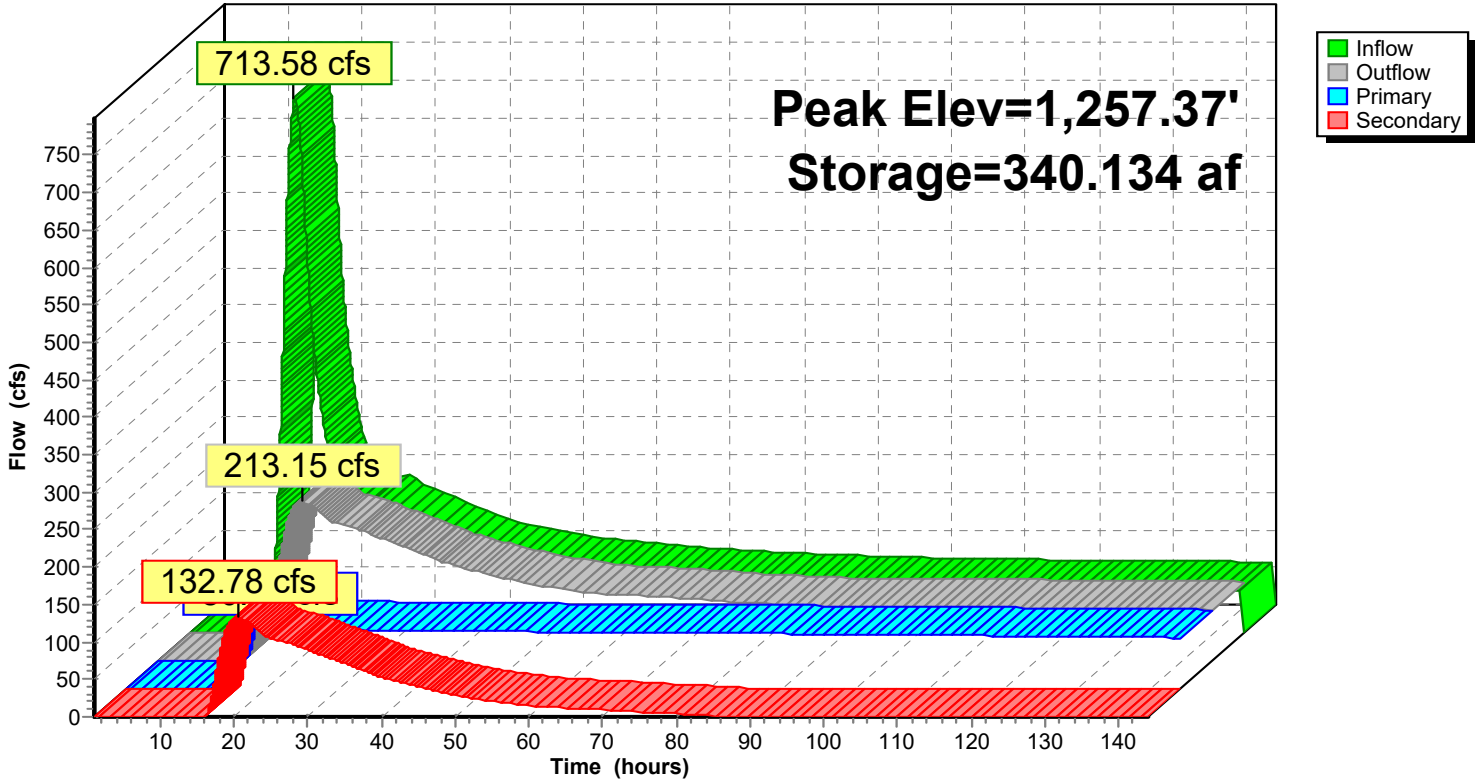
↑2=Sharp-Crested Rectangular Weir (Passes 80.37 cfs of 419.38 cfs potential flow)

**Secondary OutFlow** Max=132.78 cfs @ 20.56 hrs HW=1,257.37' (Free Discharge)

↑3=50' E.S. at 1256.1 (Custom Controls 132.78 cfs)

Pond 14P: Eagle Pond

Hydrograph



## Hydrograph for Pond 14P: Eagle Pond

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Outflow (cfs)	Primary (cfs)	Secondary (cfs)
1.00	0.00	123.650	1,253.10	0.00	0.00	0.00
6.00	0.00	123.650	1,253.10	0.00	0.00	0.00
11.00	<b>7.88</b>	124.062	1,253.11	0.04	0.04	0.00
16.00	<b>650.21</b>	<b>260.439</b>	<b>1,255.94</b>	<b>72.74</b>	<b>72.74</b>	<b>0.00</b>
21.00	199.58	<b>339.899</b>	<b>1,257.37</b>	<b>212.43</b>	<b>80.35</b>	<b>132.07</b>
26.00	174.72	330.258	1,257.20	181.69	79.51	102.18
31.00	150.18	325.013	1,257.11	164.48	79.04	85.44
36.00	129.25	318.445	1,257.00	146.29	78.45	67.84
41.00	111.54	311.700	1,256.88	127.89	77.83	50.06
46.00	99.75	304.893	1,256.76	114.94	77.19	37.75
51.00	91.09	299.186	1,256.66	103.58	76.65	26.93
56.00	85.77	294.575	1,256.58	95.71	76.20	19.51
61.00	81.22	290.816	1,256.51	89.74	75.84	13.90
66.00	77.00	286.967	1,256.44	86.97	75.46	11.51
71.00	73.50	282.721	1,256.36	83.89	75.04	8.85
76.00	70.18	278.396	1,256.28	80.73	74.60	6.13
81.00	67.93	274.126	1,256.20	77.59	74.17	3.43
86.00	66.38	270.401	1,256.13	74.84	73.78	1.05
91.00	64.66	266.960	1,256.07	73.42	73.42	0.00
96.00	62.88	263.055	1,255.99	73.01	73.01	0.00
101.00	61.10	258.597	1,255.91	72.54	72.54	0.00
106.00	60.37	253.743	1,255.82	72.02	72.02	0.00
111.00	60.22	249.010	1,255.73	71.50	71.50	0.00
116.00	59.96	244.403	1,255.64	70.99	70.99	0.00
121.00	59.60	239.877	1,255.55	70.49	70.49	0.00
126.00	59.15	235.392	1,255.46	69.98	69.98	0.00
131.00	58.58	230.909	1,255.37	69.46	69.46	0.00
136.00	57.90	226.382	1,255.29	68.94	68.94	0.00
141.00	57.12	221.775	1,255.19	68.40	68.40	0.00

## Stage-Discharge for Pond 14P: Eagle Pond

Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)	Elevation (feet)	Discharge (cfs)	Primary (cfs)	Secondary (cfs)
1,246.10	0.00	0.00	0.00	1,255.10	67.83	67.83	0.00
1,246.25	0.00	0.00	0.00	1,255.25	68.73	68.73	0.00
1,246.40	0.00	0.00	0.00	1,255.40	69.61	69.61	0.00
1,246.55	0.00	0.00	0.00	1,255.55	70.49	70.49	0.00
1,246.70	0.00	0.00	0.00	1,255.70	71.35	71.35	0.00
1,246.85	0.00	0.00	0.00	1,255.85	72.21	72.21	0.00
1,247.00	0.00	0.00	0.00	1,256.00	73.05	73.05	0.00
1,247.15	0.00	0.00	0.00	1,256.15	75.60	73.89	1.71
1,247.30	0.00	0.00	0.00	1,256.30	81.54	74.71	6.83
1,247.45	0.00	0.00	0.00	1,256.45	87.48	75.53	11.95
1,247.60	0.00	0.00	0.00	1,256.60	97.95	76.34	21.62
1,247.75	0.00	0.00	0.00	1,256.75	113.83	77.14	36.69
1,247.90	0.00	0.00	0.00	1,256.90	129.93	77.93	52.00
1,248.05	0.00	0.00	0.00	1,257.05	154.21	78.71	75.50
1,248.20	0.00	0.00	0.00	1,257.20	180.99	79.49	101.50
1,248.35	0.00	0.00	0.00	1,257.35	209.01	80.26	128.75
1,248.50	0.00	0.00	0.00	1,257.50	236.02	81.02	<b>155.00</b>
1,248.65	0.00	0.00	0.00	1,257.65	236.77	81.77	155.00
1,248.80	0.00	0.00	0.00	1,257.80	237.52	82.52	155.00
1,248.95	0.00	0.00	0.00	1,257.95	238.26	83.26	155.00
1,249.10	0.00	0.00	0.00	1,258.10	<b>238.99</b>	<b>83.99</b>	155.00
1,249.25	0.00	0.00	0.00				
1,249.40	0.00	0.00	0.00				
1,249.55	0.00	0.00	0.00				
1,249.70	0.00	0.00	0.00				
1,249.85	0.00	0.00	0.00				
1,250.00	0.00	0.00	0.00				
1,250.15	0.00	0.00	0.00				
1,250.30	0.00	0.00	0.00				
1,250.45	0.00	0.00	0.00				
1,250.60	0.00	0.00	0.00				
1,250.75	0.00	0.00	0.00				
1,250.90	0.00	0.00	0.00				
1,251.05	0.00	0.00	0.00				
1,251.20	0.00	0.00	0.00				
1,251.35	0.00	0.00	0.00				
1,251.50	0.00	0.00	0.00				
1,251.65	0.00	0.00	0.00				
1,251.80	0.00	0.00	0.00				
1,251.95	0.00	0.00	0.00				
1,252.10	0.00	0.00	0.00				
1,252.25	0.00	0.00	0.00				
1,252.40	0.00	0.00	0.00				
1,252.55	0.00	0.00	0.00				
1,252.70	0.00	0.00	0.00				
1,252.85	0.00	0.00	0.00				
1,253.00	0.00	0.00	0.00				
1,253.15	0.51	0.51	0.00				
1,253.30	4.10	4.10	0.00				
1,253.45	9.51	9.51	0.00				
1,253.60	16.27	16.27	0.00				
1,253.75	24.15	24.15	0.00				
1,253.90	33.02	33.02	0.00				
1,254.05	42.79	42.79	0.00				
1,254.20	53.38	53.38	0.00				
1,254.35	63.14	63.14	0.00				
1,254.50	64.11	64.11	0.00				
1,254.65	65.06	65.06	0.00				
1,254.80	65.99	65.99	0.00				
1,254.95	66.92	66.92	0.00				



## Stage-Area-Storage for Pond 14P: Eagle Pond

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,246.10	0.000	0.000	1,255.10	50.200	217.000
1,246.25	0.015	0.001	1,255.25	50.665	224.565
1,246.40	0.030	0.004	1,255.40	51.130	232.199
1,246.55	0.045	0.010	1,255.55	51.595	239.904
1,246.70	0.060	0.018	1,255.70	52.060	247.678
1,246.85	0.075	0.028	1,255.85	52.525	255.522
1,247.00	0.090	0.041	1,256.00	52.990	263.436
1,247.15	0.105	0.055	1,256.15	53.520	271.420
1,247.30	0.120	0.072	1,256.30	54.180	279.498
1,247.45	0.135	0.091	1,256.45	54.840	287.674
1,247.60	0.150	0.112	1,256.60	55.500	295.950
1,247.75	0.165	0.136	1,256.75	56.160	304.325
1,247.90	0.180	0.162	1,256.90	56.820	312.798
1,248.05	0.195	0.190	1,257.05	57.480	321.371
1,248.20	0.710	0.245	1,257.20	58.050	330.037
1,248.35	1.475	0.409	1,257.35	58.575	338.784
1,248.50	2.240	0.688	1,257.50	59.100	347.610
1,248.65	3.005	1.081	1,257.65	59.625	356.514
1,248.80	3.770	1.590	1,257.80	60.150	365.498
1,248.95	4.535	2.212	1,257.95	60.675	374.559
1,249.10	5.300	2.950	1,258.10	<b>61.200</b>	<b>383.700</b>
1,249.25	7.895	3.940			
1,249.40	10.490	5.318			
1,249.55	13.085	7.087			
1,249.70	15.680	9.244			
1,249.85	18.275	11.791			
1,250.00	20.870	14.727			
1,250.15	23.155	18.044			
1,250.30	24.820	21.642			
1,250.45	26.485	25.490			
1,250.60	28.150	29.587			
1,250.75	29.815	33.935			
1,250.90	31.480	38.532			
1,251.05	33.145	43.379			
1,251.20	34.330	48.451			
1,251.35	35.275	53.672			
1,251.50	36.220	59.034			
1,251.65	37.165	64.538			
1,251.80	38.110	70.184			
1,251.95	39.055	75.971			
1,252.10	40.000	81.900			
1,252.25	40.525	87.939			
1,252.40	41.050	94.057			
1,252.55	41.575	100.254			
1,252.70	42.100	106.530			
1,252.85	42.625	112.884			
1,253.00	43.150	119.318			
1,253.15	43.650	125.829			
1,253.30	44.100	132.410			
1,253.45	44.550	139.059			
1,253.60	45.000	145.775			
1,253.75	45.450	152.559			
1,253.90	45.900	159.410			
1,254.05	46.350	166.329			
1,254.20	46.870	173.318			
1,254.35	47.425	180.391			
1,254.50	47.980	187.546			
1,254.65	48.535	194.785			
1,254.80	49.090	202.107			
1,254.95	49.645	209.512			

**Summary for Pond 15P: South Wetland**

Inflow = 577.47 cfs @ 12.01 hrs, Volume= 63.512 af  
 Outflow = 11.56 cfs @ 12.56 hrs, Volume= 55.506 af, Atten= 98%, Lag= 33.2 min  
 Primary = 11.56 cfs @ 12.56 hrs, Volume= 55.506 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,262.00' Surf.Area= 17.670 ac Storage= 28.292 af  
 Peak Elev= 1,264.99' @ 42.96 hrs Surf.Area= 22.779 ac Storage= 89.765 af (61.473 af above start)

Plug-Flow detention time= 5,859.1 min calculated for 27.215 af (43% of inflow)  
 Center-of-Mass det. time= 3,985.5 min ( 5,147.5 - 1,162.0 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,259.60'	216.765 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,259.60	0.000	0.000	0.000
1,260.10	8.500	2.125	2.125
1,261.10	14.700	11.600	13.725
1,262.10	18.000	16.350	30.075
1,263.10	20.100	19.050	49.125
1,264.10	21.600	20.850	69.975
1,264.60	22.200	10.950	80.925
1,266.50	25.000	44.840	125.765
1,270.00	27.000	91.000	216.765

Device	Routing	Invert	Outlet Devices
#1	Primary	1,260.10'	<b>24.0" Round Culvert</b> L= 75.0' CMP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 1,260.10' / 1,259.30' S= 0.0107 '/' Cc= 0.900 n= 0.024, Flow Area= 3.14 sf
#2	Device 1	1,262.00'	<b>3.5' long Sharp-Crested Rectangular Weir</b> 2 End Contraction(s)

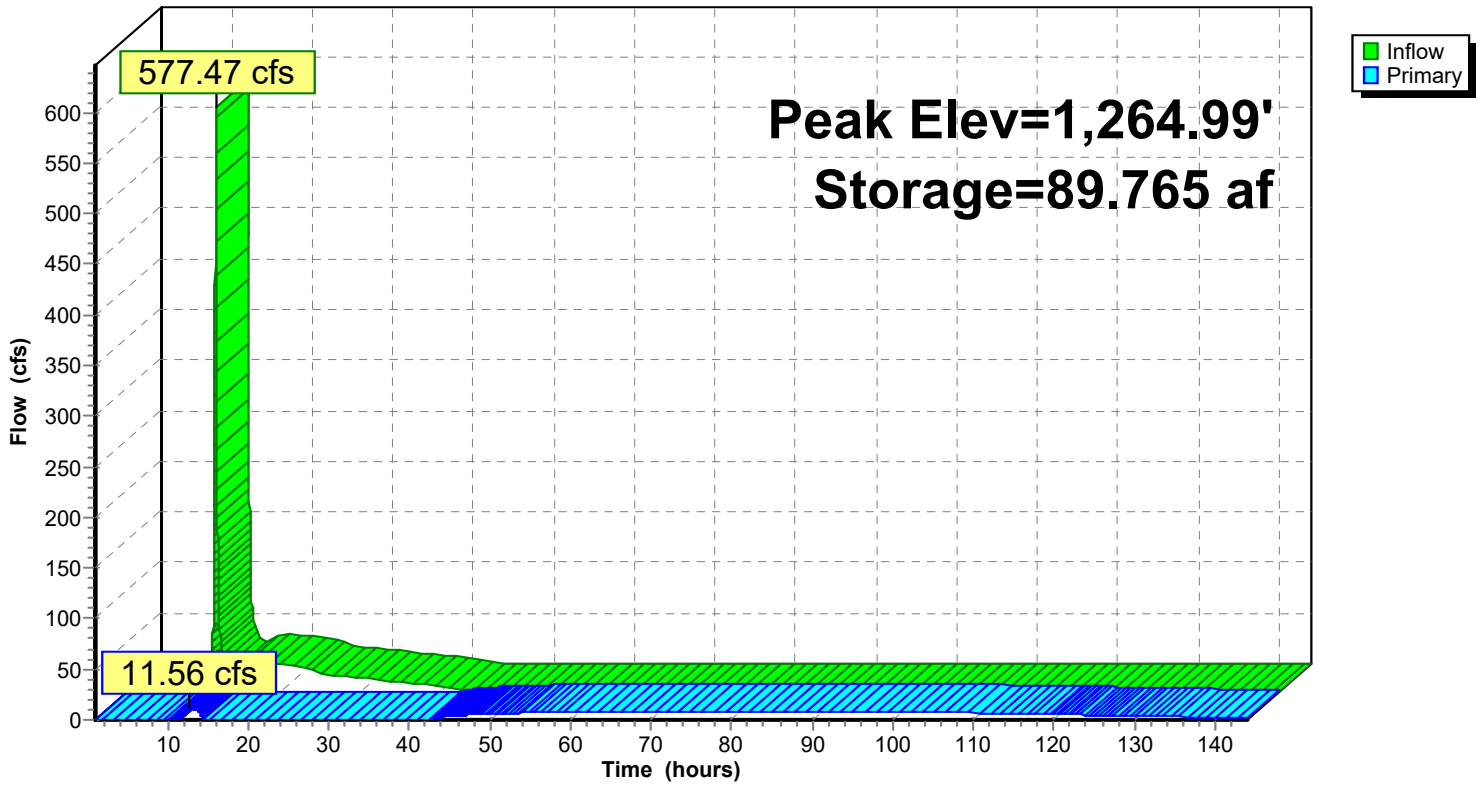
**Primary OutFlow** Max=11.55 cfs @ 12.56 hrs HW=1,263.09' TW=1,262.11' (Dynamic Tailwater)

1=Culvert (Outlet Controls 11.55 cfs @ 3.68 fps)

2=Sharp-Crested Rectangular Weir (Passes 11.55 cfs of 12.13 cfs potential flow)

Pond 15P: South Wetland

Hydrograph



## Hydrograph for Pond 15P: South Wetland

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	28.292	1,262.00	0.00	121.00	0.00	43.004	1,262.79	5.52
3.00	0.00	28.292	1,262.00	0.00	123.00	0.00	42.134	1,262.75	5.03
5.00	0.66	28.310	1,262.00	0.00	125.00	0.00	41.338	1,262.70	4.60
7.00	2.97	28.600	1,262.02	0.03	127.00	0.00	40.610	1,262.67	4.22
9.00	7.48	29.356	1,262.06	0.17	129.00	0.00	39.941	1,262.63	3.88
11.00	<b>22.62</b>	31.325	1,262.17	<b>0.78</b>	131.00	0.00	39.326	1,262.60	3.57
13.00	<b>33.85</b>	50.076	1,263.15	<b>11.20</b>	133.00	0.00	38.758	1,262.57	3.30
15.00	24.80	53.037	1,263.29	0.00	135.00	0.00	38.233	1,262.54	3.05
17.00	28.76	57.522	1,263.51	0.00	137.00	0.00	37.747	1,262.52	2.83
19.00	28.05	62.268	1,263.74	0.00	139.00	0.00	37.296	1,262.49	2.63
21.00	26.07	66.717	1,263.95	0.00	141.00	0.00	36.876	1,262.47	2.45
23.00	24.53	70.906	1,264.14	0.00	143.00	0.00	36.486	1,262.45	2.28
25.00	17.46	74.438	1,264.31	0.00					
27.00	16.18	77.223	1,264.43	0.00					
29.00	14.61	79.772	1,264.55	0.00					
31.00	12.92	82.047	1,264.65	0.00					
33.00	11.30	84.049	1,264.74	0.00					
35.00	9.70	85.785	1,264.82	0.00					
37.00	8.07	87.255	1,264.88	0.00					
39.00	6.31	88.447	1,264.94	0.00					
41.00	4.21	<b>89.325</b>	<b>1,264.97</b>	0.00					
43.00	0.00	<b>89.764</b>	<b>1,264.99</b>	0.61					
45.00	0.00	89.337	1,264.97	3.70					
47.00	0.00	88.618	1,264.94	4.92					
49.00	0.00	87.734	1,264.90	5.74					
51.00	0.00	86.734	1,264.86	6.35					
53.00	0.00	85.645	1,264.81	6.81					
55.00	0.00	84.487	1,264.76	7.18					
57.00	0.00	83.276	1,264.71	7.47					
59.00	0.00	82.020	1,264.65	7.71					
61.00	0.00	80.731	1,264.59	7.89					
63.00	0.00	79.415	1,264.53	8.03					
65.00	0.00	78.078	1,264.47	8.14					
67.00	0.00	76.727	1,264.41	8.21					
69.00	0.00	75.364	1,264.35	8.27					
71.00	0.00	73.994	1,264.29	8.30					
73.00	0.00	72.620	1,264.22	8.32					
75.00	0.00	71.245	1,264.16	8.32					
77.00	0.00	69.871	1,264.10	8.30					
79.00	0.00	68.501	1,264.03	8.27					
81.00	0.00	67.137	1,263.97	8.23					
83.00	0.00	65.781	1,263.90	8.18					
85.00	0.00	64.435	1,263.84	8.12					
87.00	0.00	63.099	1,263.78	8.05					
89.00	0.00	61.775	1,263.72	7.97					
91.00	0.00	60.464	1,263.65	7.89					
93.00	0.00	59.167	1,263.59	7.80					
95.00	0.00	57.885	1,263.53	7.72					
97.00	0.00	56.617	1,263.47	7.62					
99.00	0.00	55.364	1,263.41	7.53					
101.00	0.00	54.128	1,263.35	7.44					
103.00	0.00	52.906	1,263.29	7.35					
105.00	0.00	51.699	1,263.23	7.25					
107.00	0.00	50.510	1,263.17	7.13					
109.00	0.00	49.344	1,263.11	6.99					
111.00	0.00	48.203	1,263.05	6.82					
113.00	0.00	47.091	1,263.00	6.63					
115.00	0.00	46.012	1,262.94	6.43					
117.00	0.00	44.967	1,262.89	6.21					
119.00	0.00	43.959	1,262.84	5.98					

## Stage-Discharge for Pond 15P: South Wetland

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,259.60	0.00	1,263.20	12.76	1,266.80	25.52
1,259.66	0.00	1,263.26	13.07	1,266.86	25.68
1,259.72	0.00	1,263.32	13.38	1,266.92	25.83
1,259.78	0.00	1,263.38	13.68	1,266.98	25.99
1,259.84	0.00	1,263.44	13.98	1,267.04	26.15
1,259.90	0.00	1,263.50	14.26	1,267.10	26.30
1,259.96	0.00	1,263.56	14.55	1,267.16	26.46
1,260.02	0.00	1,263.62	14.82	1,267.22	26.61
1,260.08	0.00	1,263.68	15.10	1,267.28	26.76
1,260.14	0.00	1,263.74	15.36	1,267.34	26.91
1,260.20	0.00	1,263.80	15.63	1,267.40	27.06
1,260.26	0.00	1,263.86	15.88	1,267.46	27.21
1,260.32	0.00	1,263.92	16.14	1,267.52	27.36
1,260.38	0.00	1,263.98	16.39	1,267.58	27.51
1,260.44	0.00	1,264.04	16.63	1,267.64	27.66
1,260.50	0.00	1,264.10	16.88	1,267.70	27.81
1,260.56	0.00	1,264.16	17.12	1,267.76	27.95
1,260.62	0.00	1,264.22	17.35	1,267.82	28.10
1,260.68	0.00	1,264.28	17.59	1,267.88	28.24
1,260.74	0.00	1,264.34	17.82	1,267.94	28.39
1,260.80	0.00	1,264.40	18.04	1,268.00	28.53
1,260.86	0.00	1,264.46	18.27	1,268.06	28.67
1,260.92	0.00	1,264.52	18.49	1,268.12	28.81
1,260.98	0.00	1,264.58	18.71	1,268.18	28.95
1,261.04	0.00	1,264.64	18.92	1,268.24	29.09
1,261.10	0.00	1,264.70	19.14	1,268.30	29.23
1,261.16	0.00	1,264.76	19.35	1,268.36	29.37
1,261.22	0.00	1,264.82	19.56	1,268.42	29.51
1,261.28	0.00	1,264.88	19.76	1,268.48	29.65
1,261.34	0.00	1,264.94	19.97	1,268.54	29.78
1,261.40	0.00	1,265.00	20.17	1,268.60	29.92
1,261.46	0.00	1,265.06	20.37	1,268.66	30.06
1,261.52	0.00	1,265.12	20.57	1,268.72	30.19
1,261.58	0.00	1,265.18	20.77	1,268.78	30.33
1,261.64	0.00	1,265.24	20.96	1,268.84	30.46
1,261.70	0.00	1,265.30	21.16	1,268.90	30.59
1,261.76	0.00	1,265.36	21.35	1,268.96	30.73
1,261.82	0.00	1,265.42	21.54	1,269.02	30.86
1,261.88	0.00	1,265.48	21.73	1,269.08	30.99
1,261.94	0.00	1,265.54	21.91	1,269.14	31.12
1,262.00	0.00	1,265.60	22.10	1,269.20	31.25
1,262.06	0.17	1,265.66	22.28	1,269.26	31.38
1,262.12	0.47	1,265.72	22.46	1,269.32	31.51
1,262.18	0.87	1,265.78	22.64	1,269.38	31.64
1,262.24	1.33	1,265.84	22.82	1,269.44	31.77
1,262.30	1.85	1,265.90	23.00	1,269.50	31.90
1,262.36	2.42	1,265.96	23.18	1,269.56	32.02
1,262.42	3.04	1,266.02	23.35	1,269.62	32.15
1,262.48	3.70	1,266.08	23.53	1,269.68	32.28
1,262.54	4.40	1,266.14	23.70	1,269.74	32.40
1,262.60	5.14	1,266.20	23.87	1,269.80	32.53
1,262.66	5.91	1,266.26	24.04	1,269.86	32.65
1,262.72	6.70	1,266.32	24.21	1,269.92	32.78
1,262.78	7.53	1,266.38	24.37	1,269.98	<b>32.90</b>
1,262.84	8.39	1,266.44	24.54		
1,262.90	9.27	1,266.50	24.71		
1,262.96	10.17	1,266.56	24.87		
1,263.02	11.10	1,266.62	25.03		
1,263.08	12.05	1,266.68	25.20		
1,263.14	12.44	1,266.74	25.36		

## Stage-Area-Storage for Pond 15P: South Wetland

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,259.60	0.000	0.000	1,263.20	20.250	51.142	1,266.80	25.171	133.291
1,259.66	1.020	0.031	1,263.26	20.340	52.360	1,266.86	25.206	134.802
1,259.72	2.040	0.122	1,263.32	20.430	53.583	1,266.92	25.240	136.315
1,259.78	3.060	0.275	1,263.38	20.520	54.812	1,266.98	25.274	137.831
1,259.84	4.080	0.490	1,263.44	20.610	56.046	1,267.04	25.309	139.348
1,259.90	5.100	0.765	1,263.50	20.700	57.285	1,267.10	25.343	140.868
1,259.96	6.120	1.102	1,263.56	20.790	58.530	1,267.16	25.377	142.389
1,260.02	7.140	1.499	1,263.62	20.880	59.780	1,267.22	25.411	143.913
1,260.08	8.160	1.958	1,263.68	20.970	61.035	1,267.28	25.446	145.439
1,260.14	8.748	2.470	1,263.74	21.060	62.296	1,267.34	25.480	146.967
1,260.20	9.120	3.006	1,263.80	21.150	63.563	1,267.40	25.514	148.496
1,260.26	9.492	3.564	1,263.86	21.240	64.834	1,267.46	25.549	150.028
1,260.32	9.864	4.145	1,263.92	21.330	66.111	1,267.52	25.583	151.562
1,260.38	10.236	4.748	1,263.98	21.420	67.394	1,267.58	25.617	153.098
1,260.44	10.608	5.373	1,264.04	21.510	68.682	1,267.64	25.651	154.636
1,260.50	10.980	6.021	1,264.10	21.600	69.975	1,267.70	25.686	156.176
1,260.56	11.352	6.691	1,264.16	21.672	71.273	1,267.76	25.720	157.719
1,260.62	11.724	7.383	1,264.22	21.744	72.576	1,267.82	25.754	159.263
1,260.68	12.096	8.098	1,264.28	21.816	73.882	1,267.88	25.789	160.809
1,260.74	12.468	8.835	1,264.34	21.888	75.194	1,267.94	25.823	162.357
1,260.80	12.840	9.594	1,264.40	21.960	76.509	1,268.00	25.857	163.908
1,260.86	13.212	10.376	1,264.46	22.032	77.829	1,268.06	25.891	165.460
1,260.92	13.584	11.179	1,264.52	22.104	79.153	1,268.12	25.926	167.015
1,260.98	13.956	12.006	1,264.58	22.176	80.481	1,268.18	25.960	168.571
1,261.04	14.328	12.854	1,264.64	22.259	81.814	1,268.24	25.994	170.130
1,261.10	14.700	13.725	1,264.70	22.347	83.152	1,268.30	26.029	171.691
1,261.16	14.898	14.613	1,264.76	22.436	84.496	1,268.36	26.063	173.253
1,261.22	15.096	15.513	1,264.82	22.524	85.845	1,268.42	26.097	174.818
1,261.28	15.294	16.424	1,264.88	22.613	87.199	1,268.48	26.131	176.385
1,261.34	15.492	17.348	1,264.94	22.701	88.558	1,268.54	26.166	177.954
1,261.40	15.690	18.283	1,265.00	22.789	89.923	1,268.60	26.200	179.525
1,261.46	15.888	19.231	1,265.06	22.878	91.293	1,268.66	26.234	181.098
1,261.52	16.086	20.190	1,265.12	22.966	92.668	1,268.72	26.269	182.673
1,261.58	16.284	21.161	1,265.18	23.055	94.049	1,268.78	26.303	184.250
1,261.64	16.482	22.144	1,265.24	23.143	95.435	1,268.84	26.337	185.829
1,261.70	16.680	23.139	1,265.30	23.232	96.826	1,268.90	26.371	187.411
1,261.76	16.878	24.146	1,265.36	23.320	98.223	1,268.96	26.406	188.994
1,261.82	17.076	25.164	1,265.42	23.408	99.624	1,269.02	26.440	190.579
1,261.88	17.274	26.195	1,265.48	23.497	101.032	1,269.08	26.474	192.167
1,261.94	17.472	27.237	1,265.54	23.585	102.444	1,269.14	26.509	193.756
1,262.00	17.670	28.292	1,265.60	23.674	103.862	1,269.20	26.543	195.348
1,262.06	17.868	29.358	1,265.66	23.762	105.285	1,269.26	26.577	196.941
1,262.12	18.042	30.435	1,265.72	23.851	106.713	1,269.32	26.611	198.537
1,262.18	18.168	31.522	1,265.78	23.939	108.147	1,269.38	26.646	200.135
1,262.24	18.294	32.616	1,265.84	24.027	109.586	1,269.44	26.680	201.735
1,262.30	18.420	33.717	1,265.90	24.116	111.030	1,269.50	26.714	203.336
1,262.36	18.546	34.826	1,265.96	24.204	112.480	1,269.56	26.749	204.940
1,262.42	18.672	35.943	1,266.02	24.293	113.935	1,269.62	26.783	206.546
1,262.48	18.798	37.067	1,266.08	24.381	115.395	1,269.68	26.817	208.154
1,262.54	18.924	38.198	1,266.14	24.469	116.860	1,269.74	26.851	209.764
1,262.60	19.050	39.337	1,266.20	24.558	118.331	1,269.80	26.886	211.376
1,262.66	19.176	40.484	1,266.26	24.646	119.807	1,269.86	26.920	212.991
1,262.72	19.302	41.639	1,266.32	24.735	121.289	1,269.92	26.954	214.607
1,262.78	19.428	42.801	1,266.38	24.823	122.776	1,269.98	<b>26.989</b>	<b>216.225</b>
1,262.84	19.554	43.970	1,266.44	24.912	124.268			
1,262.90	19.680	45.147	1,266.50	25.000	125.765			
1,262.96	19.806	46.332	1,266.56	25.034	127.266			
1,263.02	19.932	47.524	1,266.62	25.069	128.769			
1,263.08	20.058	48.723	1,266.68	25.103	130.274			
1,263.14	20.160	49.930	1,266.74	25.137	131.781			

**Summary for Pond 17P: East Hass Wetland**

Inflow Area = 1,313.000 ac, 8.68% Impervious, Inflow Depth > 1.80" for 100-Year event  
 Inflow = 526.79 cfs @ 12.45 hrs, Volume= 197.475 af  
 Outflow = 104.45 cfs @ 13.20 hrs, Volume= 196.601 af, Atten= 80%, Lag= 45.3 min  
 Primary = 104.45 cfs @ 13.20 hrs, Volume= 196.601 af

Routing by Sim-Route method w/Net Flows, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs  
 Starting Elev= 1,261.30' Surf.Area= 3.700 ac Storage= 6.750 af  
 Peak Elev= 1,265.90' @ 13.61 hrs Surf.Area= 9.664 ac Storage= 35.583 af (28.833 af above start)

Plug-Flow detention time= 618.0 min calculated for 189.851 af (96% of inflow)  
 Center-of-Mass det. time= 322.6 min ( 3,127.2 - 2,804.6 )

Volume	Invert	Avail.Storage	Storage Description
#1	1,257.30'	47.355 af	<b>Custom Stage Data (Prismatic)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (acres)	Inc.Store (acre-feet)	Cum.Store (acre-feet)
1,257.30	0.000	0.000	0.000
1,258.30	0.100	0.050	0.050
1,259.30	1.900	1.000	1.050
1,260.30	2.900	2.400	3.450
1,261.30	3.700	3.300	6.750
1,262.30	4.500	4.100	10.850
1,263.30	5.500	5.000	15.850
1,264.30	7.100	6.300	22.150
1,265.30	8.700	7.900	30.050
1,266.30	10.300	9.500	39.550
1,267.00	12.000	7.805	47.355

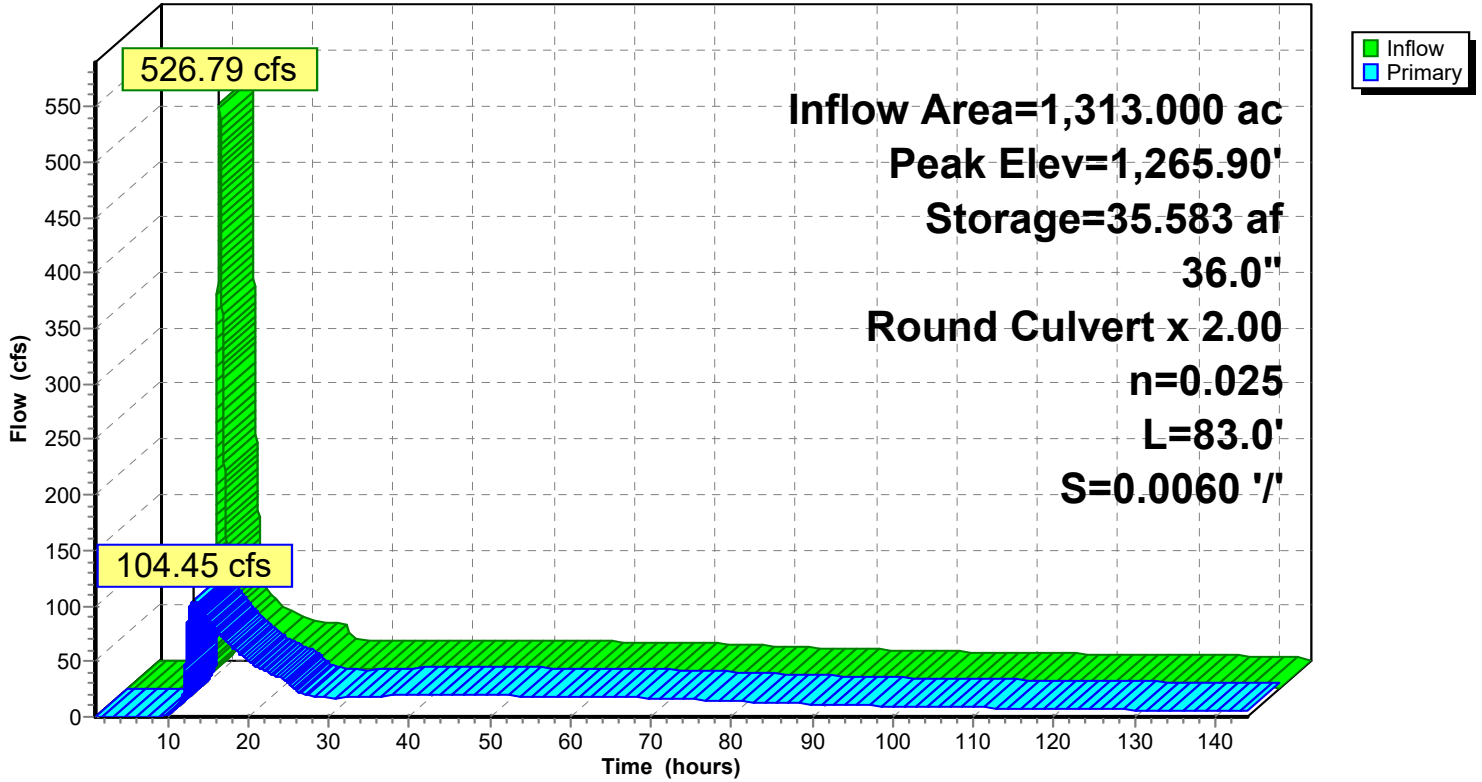
Device	Routing	Invert	Outlet Devices
#1	Primary	1,258.30'	<b>36.0" Round Culvert X 2.00</b> L= 83.0' CMP, mitered to conform to fill, Ke= 0.700 Inlet / Outlet Invert= 1,258.30' / 1,257.80' S= 0.0060 '/ Cc= 0.900 n= 0.025 Corrugated metal, Flow Area= 7.07 sf

**Primary OutFlow** Max=104.36 cfs @ 13.20 hrs HW=1,265.82' TW=1,262.49' (Dynamic Tailwater)

↑**1=Culvert** (Outlet Controls 104.36 cfs @ 7.38 fps)

Pond 17P: East Hass Wetland

Hydrograph





## Hydrograph for Pond 17P: East Hass Wetland

Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Storage (acre-feet)	Elevation (feet)	Primary (cfs)
1.00	0.00	6.750	1,261.30	0.00	121.00	5.72	9.677	1,262.03	7.52
3.00	0.00	6.750	1,261.30	0.00	123.00	5.54	9.374	1,261.96	7.41
5.00	0.00	6.750	1,261.30	0.00	125.00	5.37	9.063	1,261.89	7.28
7.00	0.00	6.750	1,261.30	0.00	127.00	5.21	8.754	1,261.81	6.93
9.00	0.19	6.751	1,261.30	0.23	129.00	5.05	8.494	1,261.75	6.48
11.00	<b>13.85</b>	7.058	1,261.38	7.93	131.00	4.89	8.272	1,261.69	6.15
13.00	<b>223.62</b>	<b>33.302</b>	<b>1,265.66</b>	<b>103.69</b>	133.00	4.74	8.080	1,261.65	5.80
15.00	57.96	<b>32.767</b>	<b>1,265.60</b>	<b>88.78</b>	135.00	4.60	7.920	1,261.61	5.47
17.00	46.26	28.260	1,265.09	70.55	137.00	4.48	7.797	1,261.57	5.08
19.00	40.22	24.958	1,264.68	56.45	139.00	4.48	7.719	1,261.55	4.85
21.00	35.19	22.746	1,264.38	45.48	141.00	4.48	7.670	1,261.54	4.72
23.00	34.22	21.642	1,264.23	37.78	143.00	4.48	7.639	1,261.53	4.63
25.00	20.80	21.055	1,264.14	30.30					
27.00	18.39	20.137	1,264.01	20.30					
29.00	18.26	20.097	1,264.00	17.38					
31.00	18.14	20.297	1,264.03	16.89					
33.00	18.04	20.452	1,264.05	17.48					
35.00	17.95	20.478	1,264.06	18.18					
37.00	17.88	20.385	1,264.04	18.76					
39.00	17.81	20.198	1,264.02	19.17					
41.00	17.73	19.947	1,263.98	19.38					
43.00	17.66	19.659	1,263.93	19.48					
45.00	17.58	19.350	1,263.89	19.47					
47.00	17.50	19.036	1,263.84	19.40					
49.00	17.43	18.725	1,263.79	19.28					
51.00	17.37	18.427	1,263.74	19.13					
53.00	17.31	18.143	1,263.69	18.97					
55.00	17.24	17.876	1,263.65	18.81					
57.00	17.18	17.623	1,263.61	18.67					
59.00	17.09	17.383	1,263.57	18.51					
61.00	17.01	17.153	1,263.53	18.37					
63.00	16.87	16.932	1,263.49	18.19					
65.00	16.70	16.715	1,263.45	18.00					
67.00	16.37	16.500	1,263.42	17.76					
69.00	15.72	16.259	1,263.37	17.23					
71.00	15.09	16.002	1,263.33	16.68					
73.00	14.48	15.737	1,263.28	16.09					
75.00	13.90	15.469	1,263.23	15.53					
77.00	13.34	15.201	1,263.18	14.96					
79.00	12.77	14.934	1,263.13	14.39					
81.00	12.23	14.670	1,263.08	13.82					
83.00	11.71	14.407	1,263.03	13.30					
85.00	11.21	14.147	1,262.98	12.77					
87.00	10.73	13.889	1,262.93	12.30					
89.00	10.27	13.633	1,262.88	11.81					
91.00	9.85	13.380	1,262.83	11.36					
93.00	9.47	13.134	1,262.78	10.95					
95.00	9.11	12.892	1,262.73	10.56					
97.00	8.76	12.655	1,262.68	10.18					
99.00	8.43	12.422	1,262.64	9.83					
101.00	8.10	12.195	1,262.59	9.47					
103.00	7.80	11.970	1,262.54	9.14					
105.00	7.50	11.751	1,262.50	8.82					
107.00	7.21	11.528	1,262.45	8.59					
109.00	6.94	11.297	1,262.40	8.37					
111.00	6.72	11.054	1,262.35	8.23					
113.00	6.50	10.799	1,262.29	8.10					
115.00	6.30	10.532	1,262.23	7.93					
117.00	6.10	10.256	1,262.17	7.80					
119.00	5.91	9.972	1,262.10	7.66					

## Stage-Discharge for Pond 17P: East Hass Wetland

Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)	Elevation (feet)	Primary (cfs)
1,257.30	0.00	1,259.70	0.00	1,262.10	52.79	1,264.50	102.40	1,266.90	135.46
1,257.34	0.00	1,259.74	0.00	1,262.14	54.14	1,264.54	103.03	1,266.94	135.94
1,257.38	0.00	1,259.78	0.00	1,262.18	55.39	1,264.58	103.67	1,266.98	<b>136.42</b>
1,257.42	0.00	1,259.82	0.00	1,262.22	56.48	1,264.62	104.30		
1,257.46	0.00	1,259.86	0.00	1,262.26	57.34	1,264.66	104.92		
1,257.50	0.00	1,259.90	0.00	1,262.30	57.24	1,264.70	105.55		
1,257.54	0.00	1,259.94	0.00	1,262.34	58.37	1,264.74	106.17		
1,257.58	0.00	1,259.98	0.00	1,262.38	59.49	1,264.78	106.78		
1,257.62	0.00	1,260.02	0.00	1,262.42	60.58	1,264.82	107.39		
1,257.66	0.00	1,260.06	0.00	1,262.46	61.65	1,264.86	108.00		
1,257.70	0.00	1,260.10	0.00	1,262.50	62.70	1,264.90	108.61		
1,257.74	0.00	1,260.14	0.00	1,262.54	63.74	1,264.94	109.21		
1,257.78	0.00	1,260.18	0.00	1,262.58	64.76	1,264.98	109.81		
1,257.82	0.00	1,260.22	0.00	1,262.62	65.76	1,265.02	110.40		
1,257.86	0.00	1,260.26	0.00	1,262.66	66.75	1,265.06	110.99		
1,257.90	0.00	1,260.30	0.00	1,262.70	67.73	1,265.10	111.58		
1,257.94	0.00	1,260.34	0.00	1,262.74	68.69	1,265.14	112.17		
1,257.98	0.00	1,260.38	0.00	1,262.78	69.64	1,265.18	112.75		
1,258.02	0.00	1,260.42	0.00	1,262.82	70.57	1,265.22	113.33		
1,258.06	0.00	1,260.46	0.00	1,262.86	71.49	1,265.26	113.91		
1,258.10	0.00	1,260.50	0.00	1,262.90	72.40	1,265.30	114.48		
1,258.14	0.00	1,260.54	0.00	1,262.94	73.30	1,265.34	115.05		
1,258.18	0.00	1,260.58	0.00	1,262.98	74.19	1,265.38	115.62		
1,258.22	0.00	1,260.62	0.00	1,263.02	75.07	1,265.42	116.19		
1,258.26	0.00	1,260.66	0.00	1,263.06	75.94	1,265.46	116.75		
1,258.30	0.00	1,260.70	0.00	1,263.10	76.80	1,265.50	117.31		
1,258.34	0.00	1,260.74	0.00	1,263.14	77.65	1,265.54	117.87		
1,258.38	0.00	1,260.78	0.00	1,263.18	78.48	1,265.58	118.42		
1,258.42	0.00	1,260.82	0.00	1,263.22	79.32	1,265.62	118.97		
1,258.46	0.00	1,260.86	0.00	1,263.26	80.14	1,265.66	119.52		
1,258.50	0.00	1,260.90	0.00	1,263.30	80.95	1,265.70	120.07		
1,258.54	0.00	1,260.94	0.00	1,263.34	81.76	1,265.74	120.61		
1,258.58	0.00	1,260.98	0.00	1,263.38	82.55	1,265.78	121.16		
1,258.62	0.00	1,261.02	0.00	1,263.42	83.34	1,265.82	121.70		
1,258.66	0.00	1,261.06	0.00	1,263.46	84.13	1,265.86	122.23		
1,258.70	0.00	1,261.10	0.00	1,263.50	84.90	1,265.90	122.77		
1,258.74	0.00	1,261.14	0.00	1,263.54	85.67	1,265.94	123.30		
1,258.78	0.00	1,261.18	0.00	1,263.58	86.43	1,265.98	123.83		
1,258.82	0.00	1,261.22	0.00	1,263.62	87.19	1,266.02	124.36		
1,258.86	0.00	1,261.26	0.00	1,263.66	87.93	1,266.06	124.88		
1,258.90	0.00	1,261.30	0.00	1,263.70	88.68	1,266.10	125.41		
1,258.94	0.00	1,261.34	9.99	1,263.74	89.41	1,266.14	125.93		
1,258.98	0.00	1,261.38	14.33	1,263.78	90.14	1,266.18	126.45		
1,259.02	0.00	1,261.42	17.78	1,263.82	90.87	1,266.22	126.97		
1,259.06	0.00	1,261.46	20.80	1,263.86	91.59	1,266.26	127.48		
1,259.10	0.00	1,261.50	23.54	1,263.90	92.30	1,266.30	127.99		
1,259.14	0.00	1,261.54	26.10	1,263.94	93.01	1,266.34	128.51		
1,259.18	0.00	1,261.58	28.51	1,263.98	93.71	1,266.38	129.01		
1,259.22	0.00	1,261.62	30.81	1,264.02	94.40	1,266.42	129.52		
1,259.26	0.00	1,261.66	33.01	1,264.06	95.10	1,266.46	130.03		
1,259.30	0.00	1,261.70	35.14	1,264.10	95.78	1,266.50	130.53		
1,259.34	0.00	1,261.74	37.19	1,264.14	96.46	1,266.54	131.03		
1,259.38	0.00	1,261.78	39.18	1,264.18	97.14	1,266.58	131.53		
1,259.42	0.00	1,261.82	41.10	1,264.22	97.81	1,266.62	132.03		
1,259.46	0.00	1,261.86	42.96	1,264.26	98.48	1,266.66	132.52		
1,259.50	0.00	1,261.90	44.77	1,264.30	99.14	1,266.70	133.02		
1,259.54	0.00	1,261.94	46.51	1,264.34	99.80	1,266.74	133.51		
1,259.58	0.00	1,261.98	48.19	1,264.38	100.46	1,266.78	134.00		
1,259.62	0.00	1,262.02	49.80	1,264.42	101.11	1,266.82	134.49		
1,259.66	0.00	1,262.06	51.33	1,264.46	101.75	1,266.86	134.97		

## Stage-Area-Storage for Pond 17P: East Hass Wetland

Elevation (feet)	Surface (acres)	Storage (acre-feet)	Elevation (feet)	Surface (acres)	Storage (acre-feet)
1,257.30	0.000	0.000	1,263.30	5.500	15.850
1,257.40	0.010	0.000	1,263.40	5.660	16.408
1,257.50	0.020	0.002	1,263.50	5.820	16.982
1,257.60	0.030	0.004	1,263.60	5.980	17.572
1,257.70	0.040	0.008	1,263.70	6.140	18.178
1,257.80	0.050	0.012	1,263.80	6.300	18.800
1,257.90	0.060	0.018	1,263.90	6.460	19.438
1,258.00	0.070	0.025	1,264.00	6.620	20.092
1,258.10	0.080	0.032	1,264.10	6.780	20.762
1,258.20	0.090	0.041	1,264.20	6.940	21.448
1,258.30	0.100	0.050	1,264.30	7.100	22.150
1,258.40	0.280	0.069	1,264.40	7.260	22.868
1,258.50	0.460	0.106	1,264.50	7.420	23.602
1,258.60	0.640	0.161	1,264.60	7.580	24.352
1,258.70	0.820	0.234	1,264.70	7.740	25.118
1,258.80	1.000	0.325	1,264.80	7.900	25.900
1,258.90	1.180	0.434	1,264.90	8.060	26.698
1,259.00	1.360	0.561	1,265.00	8.220	27.512
1,259.10	1.540	0.706	1,265.10	8.380	28.342
1,259.20	1.720	0.869	1,265.20	8.540	29.188
1,259.30	1.900	1.050	1,265.30	8.700	30.050
1,259.40	2.000	1.245	1,265.40	8.860	30.928
1,259.50	2.100	1.450	1,265.50	9.020	31.822
1,259.60	2.200	1.665	1,265.60	9.180	32.732
1,259.70	2.300	1.890	1,265.70	9.340	33.658
1,259.80	2.400	2.125	1,265.80	9.500	34.600
1,259.90	2.500	2.370	1,265.90	9.660	35.558
1,260.00	2.600	2.625	1,266.00	9.820	36.532
1,260.10	2.700	2.890	1,266.10	9.980	37.522
1,260.20	2.800	3.165	1,266.20	10.140	38.528
1,260.30	2.900	3.450	1,266.30	10.300	39.550
1,260.40	2.980	3.744	1,266.40	10.543	40.592
1,260.50	3.060	4.046	1,266.50	10.786	41.659
1,260.60	3.140	4.356	1,266.60	11.029	42.749
1,260.70	3.220	4.674	1,266.70	11.271	43.864
1,260.80	3.300	5.000	1,266.80	11.514	45.004
1,260.90	3.380	5.334	1,266.90	11.757	46.167
1,261.00	3.460	5.676	1,267.00	<b>12.000</b>	<b>47.355</b>
1,261.10	3.540	6.026			
1,261.20	3.620	6.384			
1,261.30	3.700	6.750			
1,261.40	3.780	7.124			
1,261.50	3.860	7.506			
1,261.60	3.940	7.896			
1,261.70	4.020	8.294			
1,261.80	4.100	8.700			
1,261.90	4.180	9.114			
1,262.00	4.260	9.536			
1,262.10	4.340	9.966			
1,262.20	4.420	10.404			
1,262.30	4.500	10.850			
1,262.40	4.600	11.305			
1,262.50	4.700	11.770			
1,262.60	4.800	12.245			
1,262.70	4.900	12.730			
1,262.80	5.000	13.225			
1,262.90	5.100	13.730			
1,263.00	5.200	14.245			
1,263.10	5.300	14.770			
1,263.20	5.400	15.305			

### Summary for Link 19L: Anderson Structure A

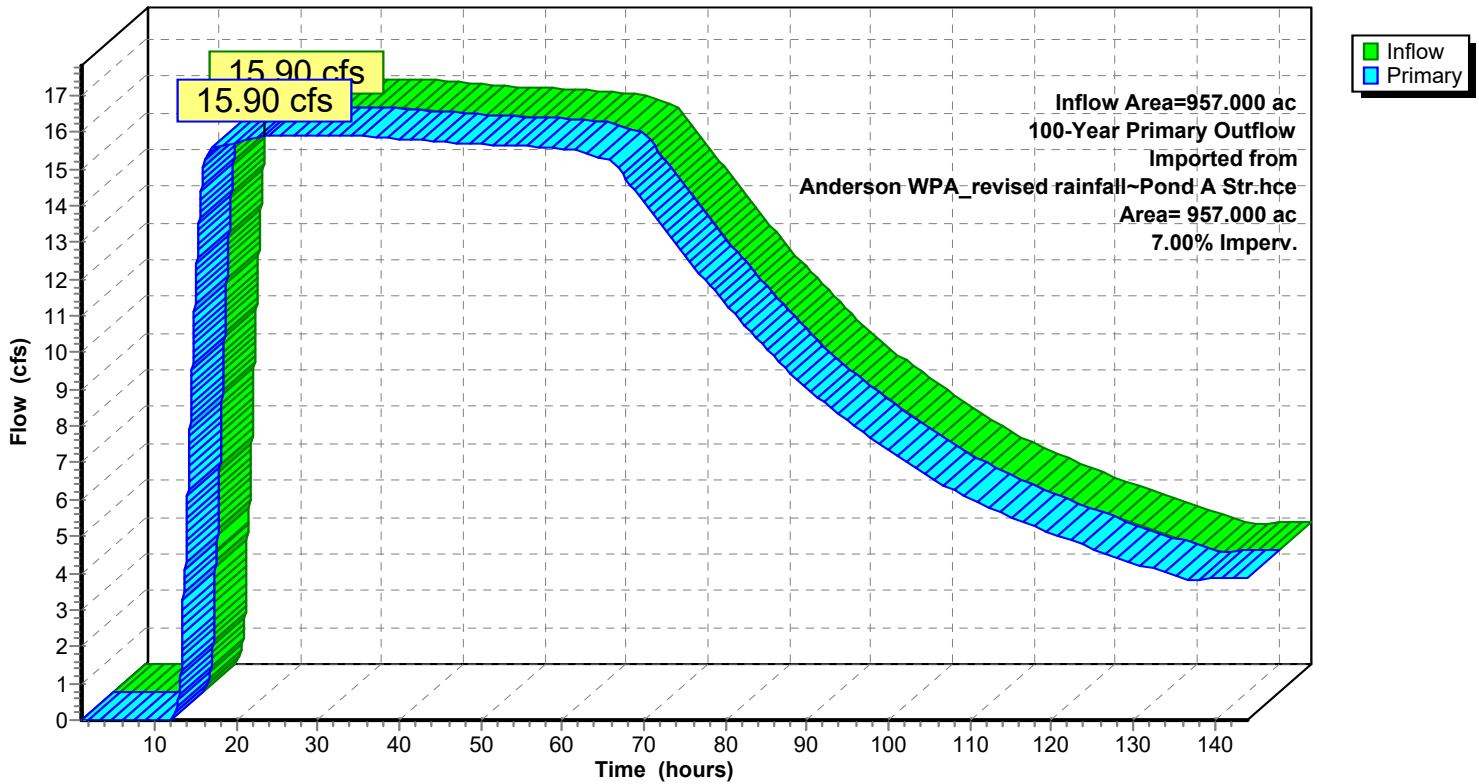
Inflow Area = 957.000 ac, 7.00% Impervious, Inflow Depth > 1.45" for 100-Year event  
Inflow = 15.90 cfs @ 23.49 hrs, Volume= 116.001 af  
Primary = 15.90 cfs @ 23.50 hrs, Volume= 115.998 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

100-Year Primary Outflow Imported from Anderson WPA\_revised rainfall~Pond A Str.hce

### Link 19L: Anderson Structure A

Hydrograph



## Hydrograph for Link 19L: Anderson Structure A

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.00	0.00	121.00	4.99	0.00	5.00
3.00	0.00	0.00	0.00	123.00	4.83	0.00	4.83
5.00	0.00	0.00	0.00	125.00	4.67	0.00	4.67
7.00	0.00	0.00	0.00	127.00	4.51	0.00	4.51
9.00	0.00	0.00	0.00	129.00	4.36	0.00	4.36
11.00	0.00	0.00	0.00	131.00	4.21	0.00	4.21
13.00	0.70	0.00	0.68	133.00	4.07	0.00	4.07
15.00	11.83	0.00	11.78	135.00	3.93	0.00	3.93
17.00	15.55	0.00	15.55	137.00	3.83	0.00	3.83
19.00	15.67	0.00	15.67	139.00	3.84	0.00	3.84
21.00	15.78	0.00	15.78	141.00	3.85	0.00	3.85
23.00	15.88	0.00	15.88	143.00	3.86	0.00	3.86
25.00	15.90	0.00	15.90				
27.00	15.90	0.00	15.90				
29.00	15.90	0.00	15.90				
31.00	15.90	0.00	15.90				
33.00	15.90	0.00	15.90				
35.00	15.90	0.00	15.90				
37.00	15.87	0.00	15.87				
39.00	15.83	0.00	15.83				
41.00	15.80	0.00	15.80				
43.00	15.77	0.00	15.77				
45.00	15.73	0.00	15.73				
47.00	15.70	0.00	15.70				
49.00	15.68	0.00	15.68				
51.00	15.66	0.00	15.66				
53.00	15.64	0.00	15.64				
55.00	15.62	0.00	15.62				
57.00	15.59	0.00	15.59				
59.00	15.55	0.00	15.55				
61.00	15.51	0.00	15.51				
63.00	15.41	0.00	15.41				
65.00	15.28	0.00	15.28				
67.00	14.99	0.00	14.99				
69.00	14.37	0.00	14.37				
71.00	13.77	0.00	13.77				
73.00	13.20	0.00	13.20				
75.00	12.65	0.00	12.65				
77.00	12.11	0.00	12.12				
79.00	11.58	0.00	11.58				
81.00	11.07	0.00	11.07				
83.00	10.57	0.00	10.58				
85.00	10.10	0.00	10.11				
87.00	9.65	0.00	9.65				
89.00	9.22	0.00	9.22				
91.00	8.82	0.00	8.82				
93.00	8.47	0.00	8.47				
95.00	8.14	0.00	8.14				
97.00	7.81	0.00	7.81				
99.00	7.50	0.00	7.50				
101.00	7.20	0.00	7.20				
103.00	6.91	0.00	6.91				
105.00	6.63	0.00	6.64				
107.00	6.37	0.00	6.37				
109.00	6.11	0.00	6.11				
111.00	5.91	0.00	5.91				
113.00	5.72	0.00	5.72				
115.00	5.53	0.00	5.53				
117.00	5.34	0.00	5.34				
119.00	5.17	0.00	5.17				

### Summary for Link 20L: Anderson Structure C

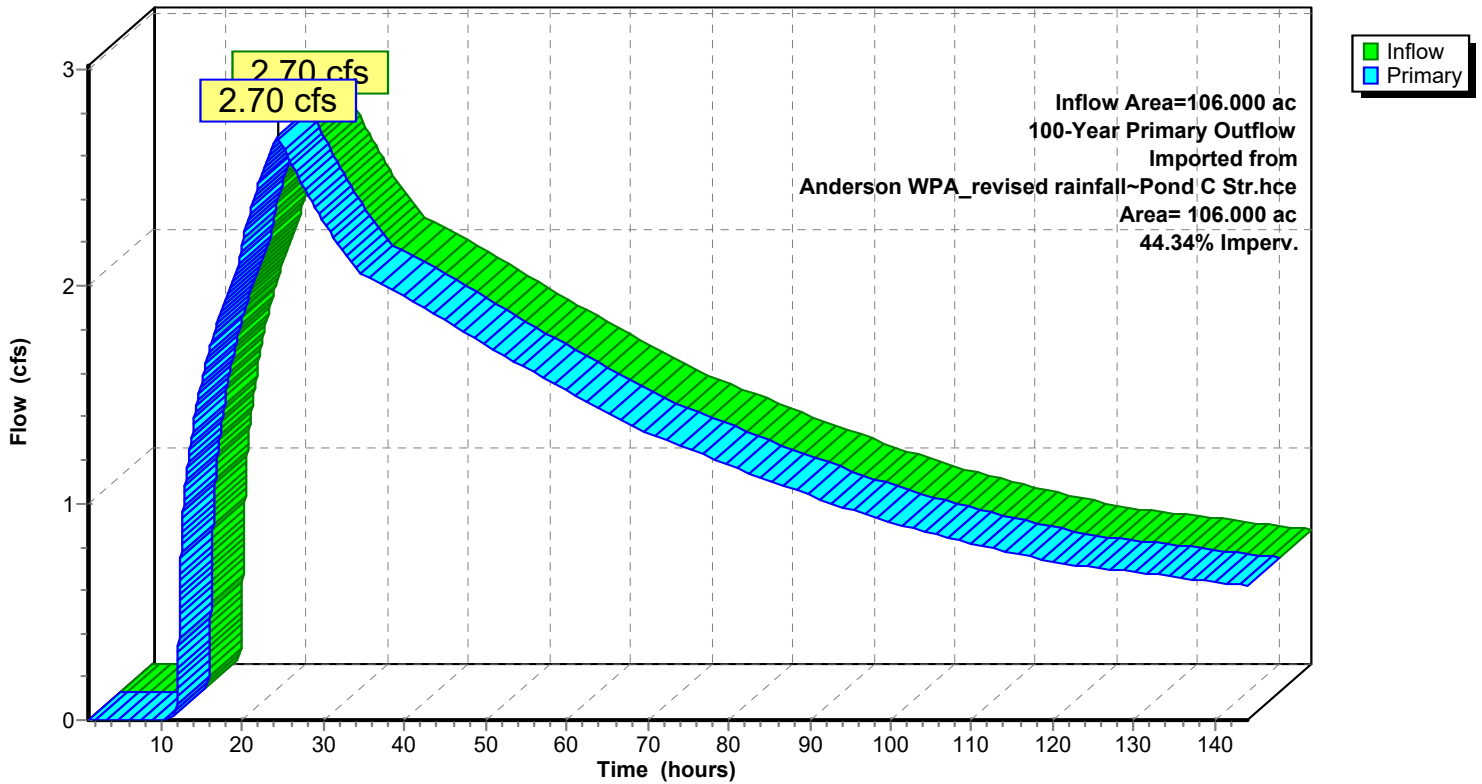
Inflow Area = 106.000 ac, 44.34% Impervious, Inflow Depth > 1.62" for 100-Year event  
Inflow = 2.70 cfs @ 24.28 hrs, Volume= 14.328 af  
Primary = 2.70 cfs @ 24.29 hrs, Volume= 14.328 af, Atten= 0%, Lag= 0.6 min

Primary outflow = Inflow, Time Span= 1.00-144.00 hrs, dt= 0.01 hrs

100-Year Primary Outflow Imported from Anderson WPA\_revised rainfall~Pond C Str.hce

### Link 20L: Anderson Structure C

Hydrograph



## Hydrograph for Link 20L: Anderson Structure C

Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)	Time (hours)	Inflow (cfs)	Elevation (feet)	Primary (cfs)
1.00	0.00	0.00	0.00	121.00	0.72	0.00	0.72
3.00	0.00	0.00	0.00	123.00	0.71	0.00	0.71
5.00	0.00	0.00	0.00	125.00	0.70	0.00	0.70
7.00	0.00	0.00	0.00	127.00	0.70	0.00	0.70
9.00	0.00	0.00	0.00	129.00	0.69	0.00	0.69
11.00	0.01	0.00	0.01	131.00	0.68	0.00	0.68
13.00	1.11	0.00	1.10	133.00	0.67	0.00	0.67
15.00	1.57	0.00	1.56	135.00	0.66	0.00	0.66
17.00	1.84	0.00	1.84	137.00	0.65	0.00	0.65
19.00	2.04	0.00	2.04	139.00	0.64	0.00	0.64
21.00	2.35	0.00	2.35	141.00	0.63	0.00	0.63
23.00	<b>2.59</b>	0.00	<b>2.58</b>	143.00	0.63	0.00	0.63
25.00	<b>2.65</b>	0.00	<b>2.65</b>				
27.00	2.49	0.00	2.49				
29.00	2.36	0.00	2.36				
31.00	2.24	0.00	2.24				
33.00	2.13	0.00	2.14				
35.00	2.05	0.00	2.05				
37.00	2.01	0.00	2.01				
39.00	1.97	0.00	1.97				
41.00	1.93	0.00	1.93				
43.00	1.89	0.00	1.89				
45.00	1.84	0.00	1.85				
47.00	1.80	0.00	1.80				
49.00	1.76	0.00	1.76				
51.00	1.71	0.00	1.71				
53.00	1.67	0.00	1.67				
55.00	1.62	0.00	1.62				
57.00	1.58	0.00	1.58				
59.00	1.54	0.00	1.54				
61.00	1.50	0.00	1.50				
63.00	1.46	0.00	1.46				
65.00	1.42	0.00	1.42				
67.00	1.38	0.00	1.38				
69.00	1.34	0.00	1.34				
71.00	1.31	0.00	1.31				
73.00	1.28	0.00	1.28				
75.00	1.25	0.00	1.25				
77.00	1.22	0.00	1.22				
79.00	1.19	0.00	1.19				
81.00	1.16	0.00	1.16				
83.00	1.13	0.00	1.13				
85.00	1.10	0.00	1.11				
87.00	1.08	0.00	1.08				
89.00	1.05	0.00	1.05				
91.00	1.02	0.00	1.02				
93.00	1.00	0.00	1.00				
95.00	0.97	0.00	0.97				
97.00	0.95	0.00	0.95				
99.00	0.92	0.00	0.92				
101.00	0.90	0.00	0.90				
103.00	0.88	0.00	0.88				
105.00	0.86	0.00	0.86				
107.00	0.84	0.00	0.84				
109.00	0.82	0.00	0.82				
111.00	0.81	0.00	0.81				
113.00	0.79	0.00	0.79				
115.00	0.77	0.00	0.77				
117.00	0.76	0.00	0.76				
119.00	0.74	0.00	0.74				