AS-BUILTS STORM REPORT

ADDENDUM 4

Cobey Creek, Phase 1

Mixed Use Development Lee's

Summit, MO

PREPARED FOR

JCM DEVELOPMENT, LLC

PREPARED BY

HG CONSULT, INC.

April 23, 2021

4/23/21

This addendum to the final storm report for Cobey Creek, Phase 1, is prepared for the North Detention Pond for the as-built conditions.

Proposed orifices/risers were designed to handle the WQ, 2, 10, and 100 year events. The table below summarizes the proposed vs. the as-built orifice elevations.

Table 1– Design Water Surface Elevations

Name	Design Elevation	As-Built Elevation
2 – 48" Pipes	964.70	965.40
2 – 2" Orifices (WQ)	964.70	965.35
4 – 1" Orifices (WQ)	965.10	965.75
4 – 21" Orifices (2-Year and 10-Year)	970.30	970.45
2 – 42" Risers (10-Year and 100-Year)	973.00	972.90
165' Emergency Spillway	977.00	977.05

The North Detention Pond was designed with adequate storage volume to discharge the design storm events. The as-built storage volumes closely match the design storage volumes and are summarized below.

Table 2– North Detention Pond Volumes

Elevation	Design Volume (CF)	As-Built Volume (CF)
964.70	0.00	---
965.00	91.14	---
965.66	1078.69	0.00
966.00	1587.43	96.91
967.00	5221.71	2224.13
968.00	11887.61	7480.39
969.00	16284.71	11378.48
970.00	22239.80	17002.99
971.00	34243.52	27237.46
972.00	67231.45	57187.14
973.00	138511.05	124762.26
974.00	218096.48	201239.95
975.00	304146.11	285267.17
976.00	396454.77	376940.76
977.00	495081.75	476368.06
978.00	600087.34	583653.32
979.00	711528.98	698910.02
979.07	---	707297.84

APWA 5608.4 requires a 40-hour extended release of the water quality storm event (1.37"/24-hour rainfall) per Section 8.10 of the BMP Manual. The detention facility was designed with the 1" and 2" orifices to release the water quality event over a 40-hour period. Because the 1" and 2" orifices were constructed 0.65' higher the water quality event was slightly impacted. Below is a summary of those results.

Table 3 – Water Quality

Name	Max WSE (ft)	Max Pond Storage (ac-ft)	Peak Flow (cf/s)	Release Duration (hr)
Design	970.40	1.431	1.42	40.96
As-Built	970.74	1.114	2.72	34.24

As indicated in table the water quality event will discharge through the 21" orifices at a maximum depth of 0.29' (3.5") therefore slightly increasing the discharge for a short amount of time and thus reducing the maximum pond storage and the release duration. Although there is a slight impact the detention pond is able to release the water quality event for 34.24 hours. See water quality hydrographs in Appendix.

Per APWA Section 5608.4 and City of Lee's Summit criteria, the post-development discharge rates from the site shall not exceed those indicated below:

- 50% storm peak rate less than or equal to 0.5 cfs per site acre
- 10% storm peak rate less than or equal to 2.0 cfs per site acre
- 1% storm peak rate less than or equal to 3.0 cfs per site acre

The table below summarizes the allowable, designed, and as-built discharge rates for the North Detention Pond.

Table 4 – North Detention Release Rates

Name	2-Year	10-Year	100-Year
Allowable Discharge (cfs)	66.73	200.16	311.70
Design Discharge (cfs)	65.08	194.74	278.44
As-Built Discharge 9cfs)	85.52	204.93	277.47

The highlighted items above indicate were the allowable flow rates were exceeded in the as-built conditions. The 2-year had a significant increase because the 2-Year WSE = 973.33 and therefore is discharging into the 42" risers. In order to get the 2-Year closer to the allowable we propose adding 0.6' risers to the 42" domes therefore raising the 42" domes to an elevation of 973.50. The additional riser lengths keep the 2-Year below the 42" risers and therefore discharging through 21" orifices. This proposed change has the following flow rates:

Table 5: Proposed North Detention Discharge Values

Name	2-Year	10-Year	100-Year
Allowable Discharge (cfs)	66.73	200.16	311.70
Proposed Discharge (cfs)	68.55	194.57	272.78

By making the aforementioned revision to the risers we exceed the allowable 2-Year by 3% and meet the 10 and 100-Year.

The proposed change increases the proposed 100-Year WSE from 976.50 to 976.82. The new WSE would be within 0.23' of the Spillway. In order to accommodate the 0.5' of freeboard the spillway would need to be raised an additional 4" which appears to be in a very limited section of the spillway based on the as-built information. The subsequent 100-Year WSE with the aforementioned changes is 978.31. The as-built top of dam elevation is very close to 979.00.

Table 6: Subsequent 100 Year Spillway Discharge Values and Elevations

Name	100-Year WSE	Subsequent 100-Year WSE	Spillway Elevation	Top of Dam Elevation
Designed	976.50	977.99	977.00	979.00
Proposed	976.82	978.31	977.32	978.99

In summary we propose adding a 7" extension to the 42" domes (ELEV = 973.50). Additionally we proposed raising the spillway elevation by 0.32' (ELEV = 977.32). By doing so the WQ, 2, 10, 100, and subsequent 100-Year events are within a close tolerance to the allowable. The PondPack results are contained within.

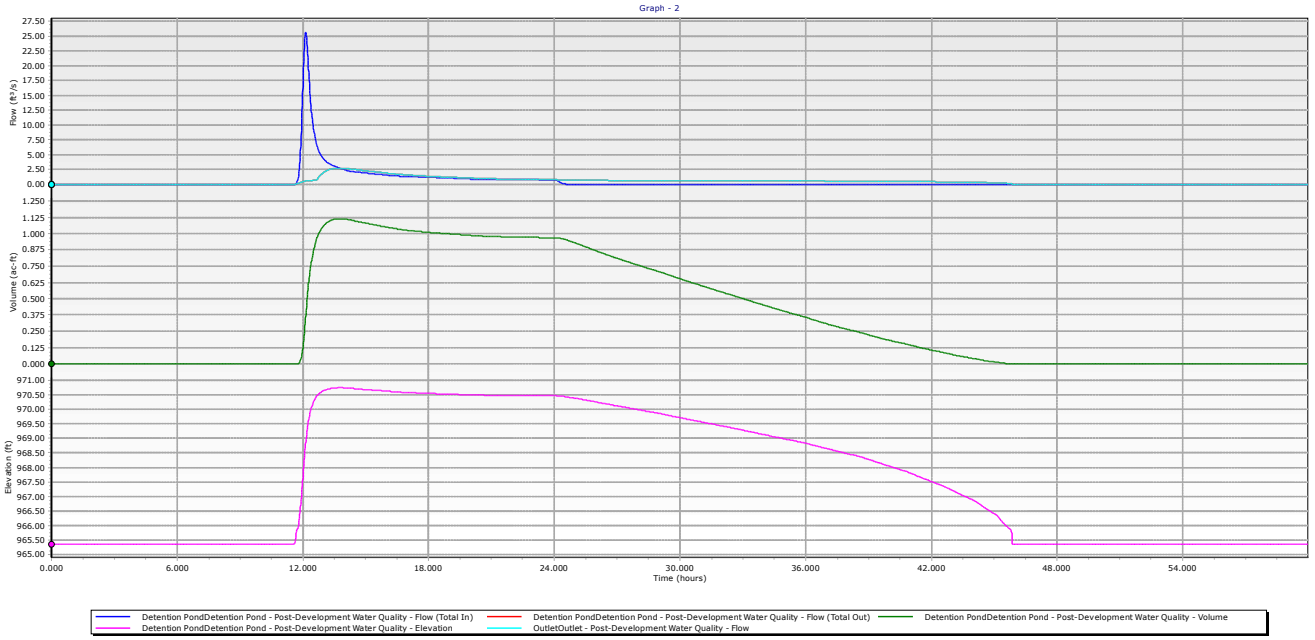
Table 7: Summary of Changes

Name	42" Risers Elevation	Spillway Elevation
As-Built	972.90	977.00
Proposed	973.50	977.32

The upstream pipes were analyzed to determine if the increased 10-Year WSE had an effect on the HGL in pipe systems 1 and 12. The 10-Year WSE elevation was used as the tailwater condition. The tailwater increased from 974.53 to 974.91 for the 10-Year event. Pipe system 1 has an invert into north pond of 973.12. Because the tailwater is only 1.79 deep inside the 60" diameter pipe (pipe HGL is above tailwater) the pipe system remains inlet controlled and therefore the HGL is not affected. The invert elevation into the pond for pipe system 12 is 971.10 therefore has a tailwater depth of 3.81. Because the tailwater depth is higher than the HGL in a free outfall condition the system is outlet controlled. Therefore the HGL changes by 0.38' at the outfall (12-A) and dissipates to "no-change" three structures upstream (structure 12-D – 245' upstream). In summary the increased 10-Year WSE had no-effect on system 1 and had minimal effect on system 12. System 12 continues to contain the HGL within the pipe.

Appendix

WATER QUALITY EVENT EXTENDED RELEASE


Graph - 2
Flow (ft^3/s)
Volume (ac-ft)
Elevation (ft)
Time (hours)
0.000
6.000
12.000
18.000
24.000
30.000
36.000
42.000
48.000
54.000
Detention PondDetention Pond - Post-Development Water Quality - Flow (Total In)
Detention PondDetention Pond - Post-Development Water Quality - Elevation
Detention PondDetention Pond - Post-Development Water Quality - Flow (Total Out)
OutletOutlet - Post-Development Water Quality - Flow
Detention PondDetention Pond - Post-Development Water Quality - Volume

PONDPACK OUTPUT

COBEY CREEK - 2, 10, 100 YEAR (AS-BUILTS)

Project Summary	
Title	COBEY CREEK
Engineer	Matthew Castor
Company	Hg Consult, Inc
Date	4/6/2021

Notes

Table of Contents

COBEY CREEK - 2, 10, 100 YEAR (AS-BUILTS)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
P3	Post-Development 2 year	2	13.945	12.090	169.63
P3	Post-Development 10 year	10	25.862	12.090	314.25
P3	Post-Development 100 year	100	42.704	12.090	511.44
P1	Post-Development 2 year	2	1.756	11.980	29.29
P1	Post-Development 10 year	10	3.215	11.970	52.87
P1	Post-Development 100 year	100	5.265	11.970	84.76
P2	Post-Development 2 year	2	0.097	11.950	1.73
P2	Post-Development 10 year	10	0.184	11.940	3.27
P2	Post-Development 100 year	100	0.309	11.940	5.40
P4	Post-Development 2 year	2	0.654	11.990	10.77
P4	Post-Development 10 year	10	1.228	11.990	20.01
P4	Post-Development 100 year	100	2.044	11.970	32.66

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
O-3	Post-Development 2 year	2	13.945	12.410	68.55
O-3	Post-Development 10 year	10	25.862	12.290	194.57
O-3	Post-Development 100 year	100	42.704	12.320	272.78
O-1	Post-Development 2 year	2	1.756	11.980	29.29
O-1	Post-Development 10 year	10	3.215	11.970	52.87
O-1	Post-Development 100 year	100	5.265	11.970	84.76
O-2	Post-Development 2 year	2	0.097	11.950	1.73
O-2	Post-Development 10 year	10	0.184	11.940	3.27

COBEY CREEK - 2, 10, 100 YEAR (AS-BUILTS)

Subsection: Master Network Summary

Node Summary

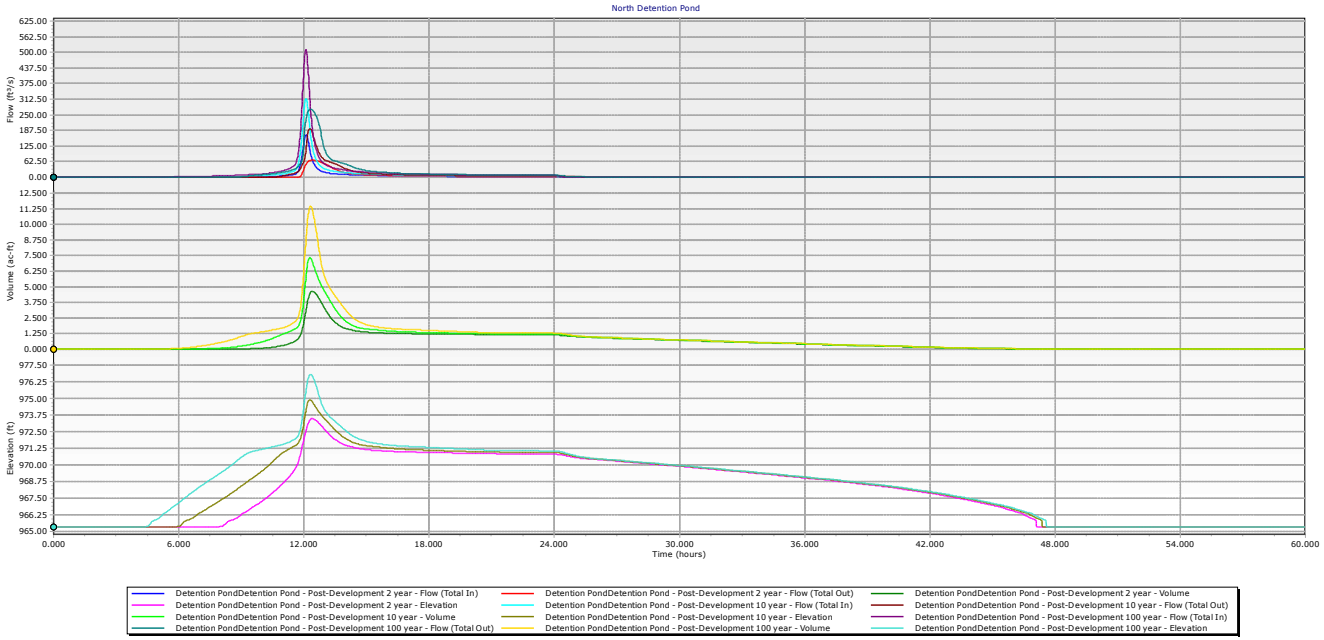
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)
O-2	Post-Development 100 year	100	0.309	11.940	5.40
O-4	Post-Development 2 year	2	0.654	11.990	10.77
O-4	Post-Development 10 year	10	1.228	11.990	20.01
O-4	Post-Development 100 year	100	2.044	11.970	32.66

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development 2 year	2	13.945	12.090	169.63	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 2 year	2	13.945	12.410	68.55	973.47	4.636
Detention Pond (IN)	Post-Development 10 year	10	25.862	12.090	314.25	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 10 year	10	25.862	12.290	194.57	974.91	7.336
Detention Pond (IN)	Post-Development 100 year	100	42.704	12.090	511.44	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	42.704	12.320	272.78	976.82	11.475

COBEY CREEK - 2, 10, 100 YEAR (AS-BUILTS)

Index


North Detention Pond
Flow (ft³/s)
625.00
562.50
500.00
437.50
375.00
312.50
250.00
187.50
125.00
62.50
0.00
Volume (ac-ft)
12.500
11.250
10.000
8.750
7.500
6.250
5.000
3.750
2.500
1.250
0.000
Elevation (ft)
977.50
976.25
975.00
973.75
972.50
971.25
970.00
968.75
967.50
966.25
965.00
0.000
6.000
12.000
18.000
24.000
30.000
36.000
42.000
48.000
54.000
60.000
Time (hours)
Detention PondDetention Pond - Post-Development 2 year - Flow (Total In)
Detention PondDetention Pond - Post-Development 2 year - Elevation
Detention PondDetention Pond - Post-Development 10 year - Volume
Detention PondDetention Pond - Post-Development 100 year - Flow (Total Out)
Detention PondDetention Pond - Post-Development 2 year - Flow (Total Out)
Detention PondDetention Pond - Post-Development 10 year - Flow (Total In)
Detention PondDetention Pond - Post-Development 10 year - Elevation
Detention PondDetention Pond - Post-Development 100 year - Volume
Detention PondDetention Pond - Post-Development 2 year - Volume
Detention PondDetention Pond - Post-Development 10 year - Flow (Total Out)
Detention PondDetention Pond - Post-Development 100 year - Flow (Total In)
Detention PondDetention Pond - Post-Development 100 year - Elevation

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Element Details			
Label	Composite Outlet Structure - 1	Notes	

Headwater Range			
Headwater Type	Use Pond for Headwater Range	Maximum (Headwater)	979.07 ft
Pond	Detention Pond	Increment (Headwater)	0.50 ft
Minimum (Headwater)	965.35 ft		

SpotElevation (ft)

Tailwater Setup			
Tailwater Type	Free Outfall		

Tailwater Tolerances			
Maximum Iterations	30	Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft	Flow Tolerance (Minimum)	0.001 ft³/s
Headwater Tolerance (Maximum)	0.50 ft	Flow Tolerance (Maximum)	10.000 ft³/s
Tailwater Tolerance (Minimum)	0.01 ft		

Outlet Structure			
Outlet Structure Type	Culvert	Culvert Type	Circular

Outlet Structure (IDs and Direction)			
Outlet ID	Culvert - 1	Downstream ID	Tailwater
Flow Direction	Forward Flow Only	Notes	

Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

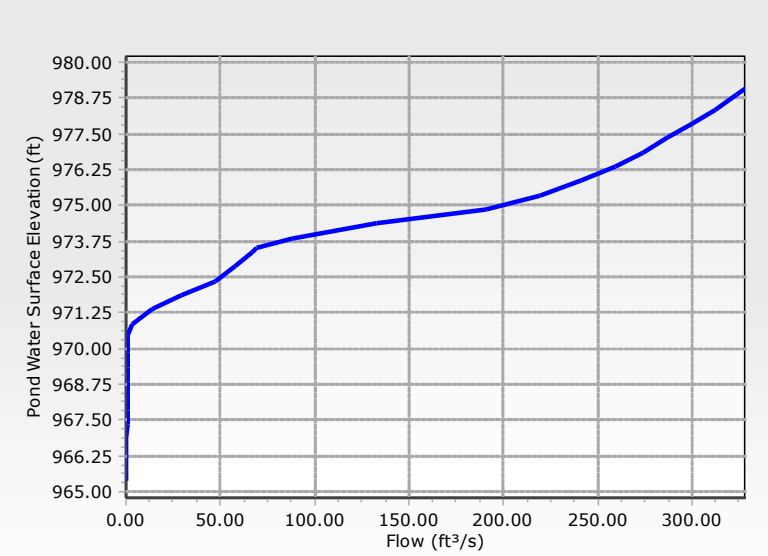
Culvert Data			
Number of Barrels	2	Downstream Invert	964.80 ft
Length	102.32 ft	Diameter	48.0 in
Upstream Invert	965.35 ft		

Unsubmerged->Submerged			
Specify Transitions	False	Compute Inlet Control Only	False

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Culvert Coefficients			
Inlet Description	Concrete - Groove end projecting	C	0.0317
Chart	Chart 1	Y	0.6900
Nomograph	Nomograph 3	Manning's n	0.011
Equation Form	Form 1	Ke	0.200
K	0.0045	Kr	0.000
M	2.0000	Slope Correction Factor	-0.500

Culvert (Advanced)			
Convergence Tolerance	0.00 ft	Specify Number of Backwater Sections	False



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 133.88 ft³/s
Upstream ID = Orifice - 2, Riser - 2, Orifice - 1, Riser - 1, Copy of Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 133.88 ft³/s
Upstream ID = Orifice - 2, Riser - 2, Orifice - 1, Riser - 1, Copy of Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	Free Outfall
965.75	0.12	965.45	Free Outfall	Free Outfall
965.85	0.16	965.46	Free Outfall	Free Outfall
966.35	0.30	965.50	Free Outfall	Free Outfall
966.85	0.37	965.52	Free Outfall	Free Outfall
967.35	0.42	965.53	Free Outfall	Free Outfall
967.85	0.48	965.55	Free Outfall	Free Outfall
968.35	0.52	965.55	Free Outfall	Free Outfall
968.85	0.58	965.57	Free Outfall	Free Outfall
969.35	0.62	965.57	Free Outfall	Free Outfall
969.85	0.65	965.58	Free Outfall	Free Outfall
970.35	0.68	965.59	Free Outfall	Free Outfall
970.45	0.69	965.59	Free Outfall	Free Outfall
970.85	3.49	965.89	Free Outfall	Free Outfall
971.35	13.73	966.43	Free Outfall	Free Outfall
971.85	29.54	966.96	Free Outfall	Free Outfall
972.35	47.56	967.43	Free Outfall	Free Outfall
972.85	57.90	967.66	Free Outfall	Free Outfall
973.35	66.57	967.84	Free Outfall	Free Outfall
973.50	69.03	967.90	Free Outfall	Free Outfall
973.85	87.98	968.27	Free Outfall	Free Outfall
974.35	133.02	969.06	Free Outfall	Free Outfall
974.85	191.12	970.02	Free Outfall	Free Outfall
975.35	219.54	970.52	Free Outfall	Free Outfall
975.85	241.18	971.02	Free Outfall	Free Outfall
976.35	259.30	971.47	Free Outfall	Free Outfall
976.85	273.70	971.86	Free Outfall	Free Outfall
977.35	287.15	972.24	Free Outfall	Free Outfall
977.85	299.93	972.61	Free Outfall	Free Outfall
978.35	312.04	972.99	Free Outfall	Free Outfall
978.85	323.63	973.36	Free Outfall	Free Outfall
979.07	328.45	973.51	Free Outfall	Free Outfall

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 133.88 ft³/s
Upstream ID = Orifice - 2, Riser - 2, Orifice - 1, Riser - 1, Copy of Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.01	(N/A)	0.00
0.00	0.01	(N/A)	0.00
0.00	0.02	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.06	(N/A)	0.00
0.00	0.01	(N/A)	0.00
0.00	0.01	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.01	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.01	(N/A)	0.00

Message
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .023ft Dcr= .068ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .026ft Dcr= .079ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .037ft Dcr= .109ft CRIT.DEPTH Hev= .00ft

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 133.88 ft³/s
Upstream ID = Orifice - 2, Riser - 2, Orifice - 1, Riser - 1, Copy of Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Message
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
CRIT.DEPTH CONTROL Vh= .056ft Dcr= .167ft CRIT.DEPTH Hev= .00ft
FLOW PRECEDENCE SET TO UPSTREAM CONTROLLING STRUCTURE
CRIT.DEPTH CONTROL Vh= .129ft Dcr= .379ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .265ft Dcr= .760ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .403ft Dcr= 1.125ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .530ft Dcr= 1.440ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .597ft Dcr= 1.595ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .650ft Dcr= 1.715ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .665ft Dcr= 1.748ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .777ft Dcr= 1.984ft CRIT.DEPTH Hev= .00ft

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Culvert - 1 (Culvert-Circular)

Mannings open channel maximum capacity: 133.88 ft³/s
Upstream ID = Orifice - 2, Riser - 2, Orifice - 1, Riser - 1, Copy of Orifice - 1
Downstream ID = Tailwater (Pond Outfall)

Message
CRIT.DEPTH CONTROL Vh= 1.043ft Dcr= 2.463ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= 1.424ft Dcr= 2.964ft CRIT.DEPTH Hev= .00ft
INLET CONTROL... Submerged: HW =5.17
INLET CONTROL... Submerged: HW =5.67
INLET CONTROL... Submerged: HW =6.12
INLET CONTROL... Submerged: HW =6.51
INLET CONTROL... Submerged: HW =6.89
INLET CONTROL... Submerged: HW =7.26
INLET CONTROL... Submerged: HW =7.64
INLET CONTROL... Submerged: HW =8.01
INLET CONTROL... Submerged: HW =8.16

Outlet Structure	
Outlet Structure Type	Orifice

Outlet Structure (IDs and Direction)			
Outlet ID	Orifice - 1	Downstream ID	Culvert - 1
Flow Direction	Forward Flow Only	Notes	

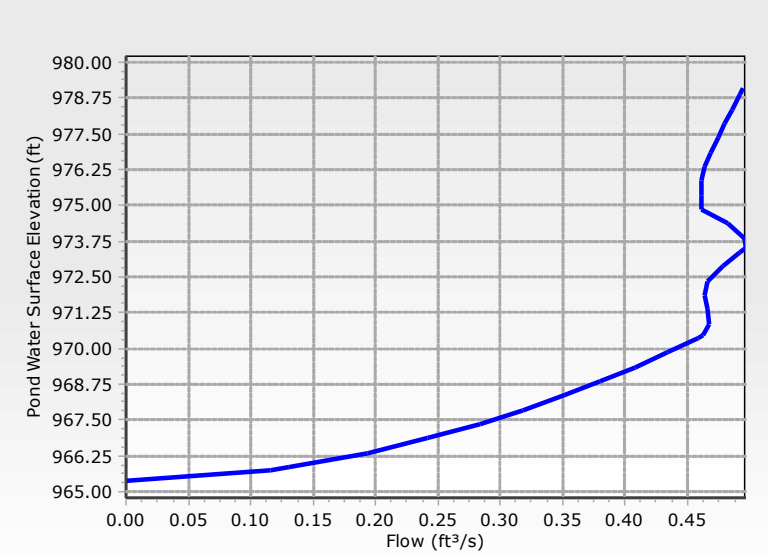
Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

Outlet Structure (Orifice)			
Orifice	Circular Orifice	Orifice Coefficient	0.600
Number of Openings	2	Orifice Diameter	2.0 in

Outlet Structure (Common)

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Outlet Structure (Common)	
Elevation	965.35 ft



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	0.00
965.75	0.12	965.75	965.45	965.45
965.85	0.13	965.85	965.46	965.46
966.35	0.19	966.35	965.50	965.50
966.85	0.24	966.85	965.52	965.52
967.35	0.28	967.35	965.53	965.53
967.85	0.32	967.85	965.55	965.55
968.35	0.35	968.35	965.55	965.55
968.85	0.38	968.85	965.57	965.57
969.35	0.41	969.35	965.57	965.57
969.85	0.43	969.85	965.58	965.58
970.35	0.46	970.35	965.58	965.59

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
970.45	0.46	970.45	965.59	965.59
970.85	0.47	970.85	965.88	965.89
971.35	0.47	971.35	966.43	966.43
971.85	0.46	971.85	966.96	966.96
972.35	0.47	972.35	967.43	967.43
972.85	0.48	972.85	967.66	967.66
973.35	0.49	973.35	967.84	967.84
973.50	0.50	973.50	967.90	967.90
973.85	0.50	973.85	968.27	968.27
974.35	0.48	974.35	969.06	969.06
974.85	0.46	974.85	970.02	970.02
975.35	0.46	975.35	970.52	970.52
975.85	0.46	975.85	971.02	971.02
976.35	0.46	976.35	971.47	971.47
976.85	0.47	976.85	971.86	971.86
977.35	0.47	977.35	972.24	972.24
977.85	0.48	977.85	972.61	972.61
978.35	0.49	978.35	972.99	972.99
978.85	0.49	978.85	973.36	973.36
979.07	0.50	979.07	973.51	973.51

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Message
WS below an invert; no flow.
H =.30
H =.39
H =.85
H =1.33
H =1.82
H =2.30
H =2.80
H =3.28
H =3.78
H =4.27
H =4.77
H =4.86
H =4.97
H =4.92
H =4.89
H =4.92
H =5.19
H =5.51
H =5.60
H =5.58
H =5.29

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message
H =4.83
H =4.83
H =4.83
H =4.88
H =4.99
H =5.11
H =5.24
H =5.36
H =5.49
H =5.56

Outlet Structure	
Outlet Structure Type	Riser

Outlet Structure (IDs and Direction)			
Outlet ID	Riser - 1	Downstream ID	Culvert - 1
Flow Direction	Forward Flow Only	Notes	

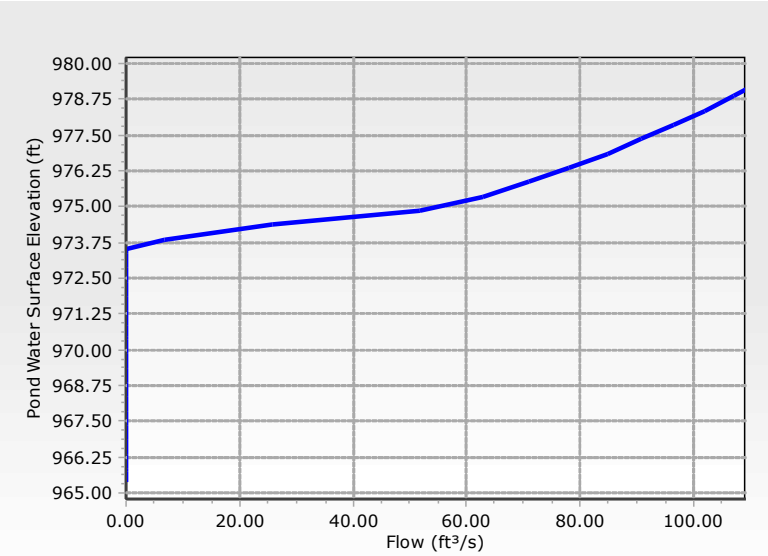
Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

Outlet Structure (Riser)			
Riser	Stand Pipe	Transition Elevation	0.00 ft
Diameter	42.0 in	Transition Height	0.00 ft
Weir Coefficient	3.00 (ft^0.5)/s	K Reverse	1.000
Orifice Coefficient	0.600		

Outlet Structure (Common)	
Elevation	973.50 ft

Outlet Structure (Riser, Advanced)			
Use Orifice Depth to Crest?	True	Use Submerged Weir Equation?	False

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	0.00
965.75	0.00	0.00	0.00	965.45
965.85	0.00	0.00	0.00	965.46
966.35	0.00	0.00	0.00	965.50
966.85	0.00	0.00	0.00	965.52
967.35	0.00	0.00	0.00	965.53
967.85	0.00	0.00	0.00	965.55
968.35	0.00	0.00	0.00	965.55
968.85	0.00	0.00	0.00	965.57
969.35	0.00	0.00	0.00	965.57
969.85	0.00	0.00	0.00	965.58
970.35	0.00	0.00	0.00	965.59
970.45	0.00	0.00	0.00	965.59
970.85	0.00	0.00	0.00	965.89
971.35	0.00	0.00	0.00	966.43
971.85	0.00	0.00	0.00	966.96

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)	Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
972.35	0.00	0.00	0.00	967.43	0.00	0.00	(N/A)	0.00
972.85	0.00	0.00	0.00	967.66	0.00	0.00	(N/A)	0.00
973.35	0.00	0.00	0.00	967.84	0.00	0.00	(N/A)	0.00
973.50	0.00	0.00	0.00	967.90	0.00	0.00	(N/A)	0.00
973.85	6.83	973.85	Free Outfall	968.27	0.00	0.00	(N/A)	0.00
974.35	25.85	974.35	Free Outfall	969.06	0.00	0.00	(N/A)	0.00
974.85	51.74	974.85	Free Outfall	970.02	0.00	0.00	(N/A)	0.00
975.35	62.98	975.35	Free Outfall	970.52	0.00	0.00	(N/A)	0.00
975.85	70.99	975.85	Free Outfall	971.02	0.00	0.00	(N/A)	0.00
976.35	78.17	976.35	Free Outfall	971.47	0.00	0.00	(N/A)	0.00
976.85	84.76	976.85	Free Outfall	971.86	0.00	0.00	(N/A)	0.00
977.35	90.86	977.35	Free Outfall	972.24	0.00	0.00	(N/A)	0.00
977.85	96.58	977.85	Free Outfall	972.61	0.00	0.00	(N/A)	0.00
978.35	101.98	978.35	Free Outfall	972.99	0.00	0.00	(N/A)	0.00
978.85	107.11	978.85	Free Outfall	973.36	0.00	0.00	(N/A)	0.00
979.07	109.29	979.07	973.51	973.51	0.00	0.00	(N/A)	0.00

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Weir: H =0.35ft
Weir: H =0.85ft
Weir: H =1.35ft
Orifice: H =1.85; Riser orifice equation controlling.

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 1 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message
Orifice: H =2.35; Riser orifice equation controlling.
Orifice: H =2.85; Riser orifice equation controlling.
Orifice: H =3.35; Riser orifice equation controlling.
Orifice: H =3.85; Riser orifice equation controlling.
Orifice: H =4.35; Riser orifice equation controlling.
Orifice: H =4.85; Riser orifice equation controlling.
Orifice: H =5.35; Riser orifice equation controlling.
FULLY CHARGED RISER: Orifice Equation Control to Crest; H=5.57

Outlet Structure	
Outlet Structure Type	Riser

Outlet Structure (IDs and Direction)			
Outlet ID	Riser - 2	Downstream ID	Culvert - 1
Flow Direction	Forward Flow Only	Notes	

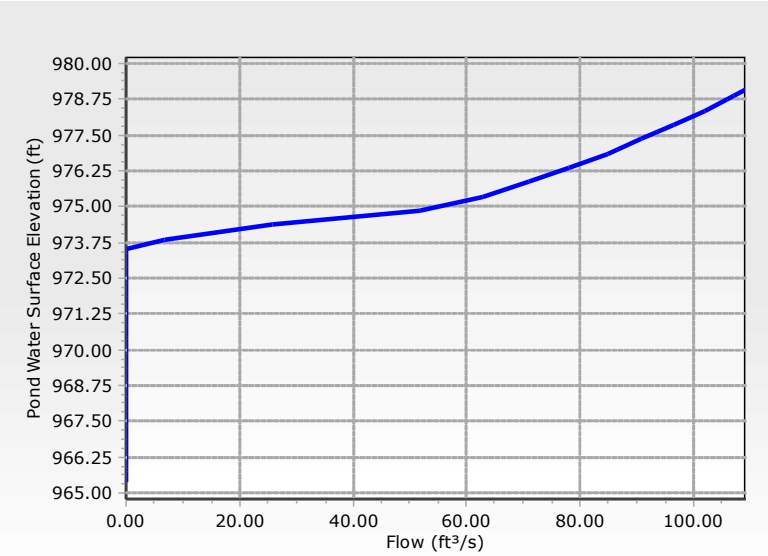
Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

Outlet Structure (Riser)			
Riser	Stand Pipe	Transition Elevation	0.00 ft
Diameter	42.0 in	Transition Height	0.00 ft
Weir Coefficient	3.00 (ft^0.5)/s	K Reverse	1.000
Orifice Coefficient	0.600		

Outlet Structure (Common)	
Elevation	973.50 ft

Outlet Structure (Riser, Advanced)			
Use Orifice Depth to Crest?	True	Use Submerged Weir Equation?	False

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 2 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	0.00
965.75	0.00	0.00	0.00	965.45
965.85	0.00	0.00	0.00	965.46
966.35	0.00	0.00	0.00	965.50
966.85	0.00	0.00	0.00	965.52
967.35	0.00	0.00	0.00	965.53
967.85	0.00	0.00	0.00	965.55
968.35	0.00	0.00	0.00	965.55
968.85	0.00	0.00	0.00	965.57
969.35	0.00	0.00	0.00	965.57
969.85	0.00	0.00	0.00	965.58
970.35	0.00	0.00	0.00	965.59
970.45	0.00	0.00	0.00	965.59
970.85	0.00	0.00	0.00	965.89
971.35	0.00	0.00	0.00	966.43
971.85	0.00	0.00	0.00	966.96

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 2 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
972.35	0.00	0.00	0.00	967.43
972.85	0.00	0.00	0.00	967.66
973.35	0.00	0.00	0.00	967.84
973.50	0.00	0.00	0.00	967.90
973.85	6.83	973.85	Free Outfall	968.27
974.35	25.85	974.35	Free Outfall	969.06
974.85	51.74	974.85	Free Outfall	970.02
975.35	62.98	975.35	Free Outfall	970.52
975.85	70.99	975.85	Free Outfall	971.02
976.35	78.17	976.35	Free Outfall	971.47
976.85	84.76	976.85	Free Outfall	971.86
977.35	90.86	977.35	Free Outfall	972.24
977.85	96.58	977.85	Free Outfall	972.61
978.35	101.98	978.35	Free Outfall	972.99
978.85	107.11	978.85	Free Outfall	973.36
979.07	109.29	979.07	973.51	973.51

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 2 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
Weir: H =0.35ft
Weir: H =0.85ft
Weir: H =1.35ft
Orifice: H =1.85; Riser orifice equation controlling.

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Riser - 2 (Stand Pipe)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message
Orifice: H =2.35; Riser orifice equation controlling.
Orifice: H =2.85; Riser orifice equation controlling.
Orifice: H =3.35; Riser orifice equation controlling.
Orifice: H =3.85; Riser orifice equation controlling.
Orifice: H =4.35; Riser orifice equation controlling.
Orifice: H =4.85; Riser orifice equation controlling.
Orifice: H =5.35; Riser orifice equation controlling.
FULLY CHARGED RISER: Orifice Equation Control to Crest; H=5.57

Outlet Structure	
Outlet Structure Type	Orifice

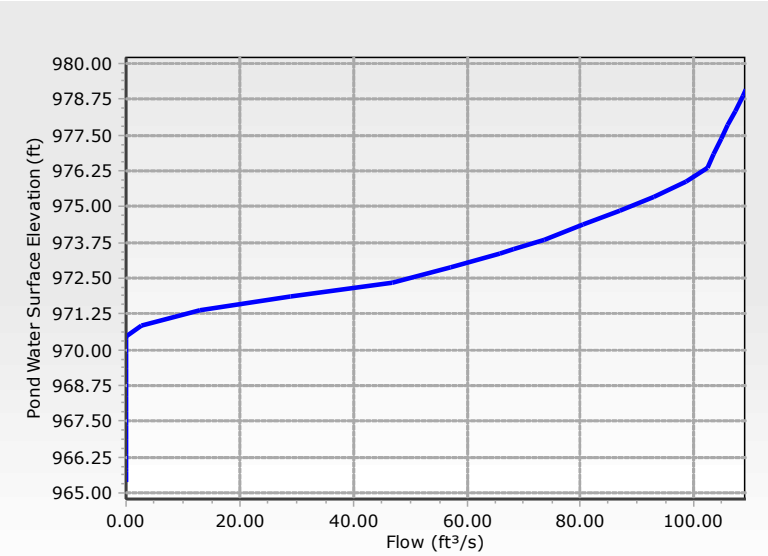
Outlet Structure (IDs and Direction)			
Outlet ID	Orifice - 2	Downstream ID	Culvert - 1
Flow Direction	Forward Flow Only	Notes	

Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

Outlet Structure (Orifice)			
Orifice	Circular Orifice	Orifice Coefficient	0.600
Number of Openings	4	Orifice Diameter	21.0 in

Outlet Structure (Common)	
Elevation	970.45 ft

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	0.00
965.75	0.00	0.00	0.00	965.45
965.85	0.00	0.00	0.00	965.46
966.35	0.00	0.00	0.00	965.50
966.85	0.00	0.00	0.00	965.52
967.35	0.00	0.00	0.00	965.53
967.85	0.00	0.00	0.00	965.55
968.35	0.00	0.00	0.00	965.55
968.85	0.00	0.00	0.00	965.57
969.35	0.00	0.00	0.00	965.57
969.85	0.00	0.00	0.00	965.58
970.35	0.00	0.00	0.00	965.59
970.45	0.00	0.00	0.00	965.59
970.85	2.79	970.85	Free Outfall	965.89
971.35	13.03	971.35	Free Outfall	966.43
971.85	28.85	971.85	Free Outfall	966.96

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
972.35	46.88	972.35	Free Outfall	967.43
972.85	57.18	972.85	Free Outfall	967.66
973.35	65.90	973.35	Free Outfall	967.84
973.50	68.29	973.50	Free Outfall	967.90
973.85	73.58	973.85	Free Outfall	968.27
974.35	80.54	974.35	Free Outfall	969.06
974.85	86.94	974.85	Free Outfall	970.02
975.35	92.90	975.35	970.52	970.52
975.85	98.50	975.85	971.02	971.02
976.35	102.26	976.35	971.47	971.47
976.85	103.46	976.85	971.86	971.86
977.35	104.71	977.35	972.24	972.24
977.85	105.95	977.85	972.61	972.61
978.35	107.25	978.35	972.99	972.99
978.85	108.55	978.85	973.36	973.36
979.07	109.15	979.07	973.51	973.51

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft³/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Message
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
WS below an invert; no flow.
CRIT.DEPTH CONTROL Vh= .103ft Dcr= .297ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .243ft Dcr= .656ft CRIT.DEPTH Hev= .00ft
CRIT.DEPTH CONTROL Vh= .407ft Dcr= .994ft CRIT.DEPTH Hev= .00ft
H =1.03
H =1.53
H =2.03
H =2.18
H =2.53
H =3.03
H =3.53

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Orifice - 2 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message
H =4.03
H =4.53
H =4.88
H =4.99
H =5.11
H =5.24
H =5.36
H =5.49
H =5.56

Outlet Structure	
Outlet Structure Type	Orifice

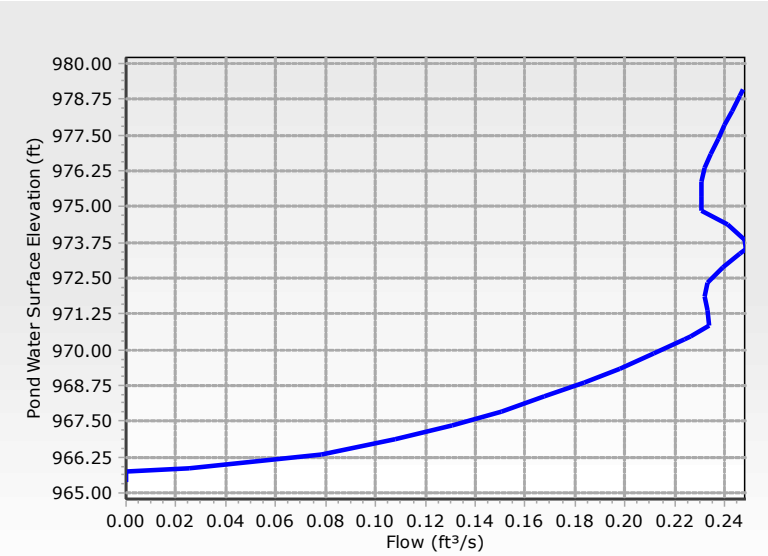
Outlet Structure (IDs and Direction)			
Outlet ID	Copy of Orifice - 1	Downstream ID	Culvert - 1
Flow Direction	Forward Flow Only	Notes	

Outlet Structure (Advanced)			
Elevation (On)	0.00 ft	Elevation (Off)	0.00 ft

Outlet Structure (Orifice)			
Orifice	Circular Orifice	Orifice Coefficient	0.600
Number of Openings	4	Orifice Diameter	1.0 in

Outlet Structure (Common)	
Elevation	965.75 ft

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1



RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Copy of Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft³/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
965.35	0.00	0.00	0.00	0.00
965.75	0.00	0.00	0.00	965.45
965.85	0.03	965.85	Free Outfall	965.46
966.35	0.08	966.35	Free Outfall	965.50
966.85	0.11	966.85	Free Outfall	965.52
967.35	0.13	967.35	Free Outfall	965.53
967.85	0.15	967.85	Free Outfall	965.55
968.35	0.17	968.35	Free Outfall	965.55
968.85	0.18	968.85	Free Outfall	965.57
969.35	0.20	969.35	Free Outfall	965.57
969.85	0.21	969.85	Free Outfall	965.58
970.35	0.22	970.35	Free Outfall	965.59
970.45	0.23	970.45	Free Outfall	965.59
970.85	0.23	970.85	965.88	965.89
971.35	0.23	971.35	966.43	966.43
971.85	0.23	971.85	966.96	966.96

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Copy of Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Water Surface Elevation (ft)	Device Flow (ft^3/s)	(into) Headwater Hydraulic Grade Line (ft)	Converge Downstream Hydraulic Grade Line (ft)	Next Downstream Hydraulic Grade Line (ft)
972.35	0.23	972.35	967.43	967.43
972.85	0.24	972.85	967.66	967.66
973.35	0.25	973.35	967.84	967.84
973.50	0.25	973.50	967.90	967.90
973.85	0.25	973.85	968.27	968.27
974.35	0.24	974.35	969.06	969.06
974.85	0.23	974.85	970.02	970.02
975.35	0.23	975.35	970.52	970.52
975.85	0.23	975.85	971.02	971.02
976.35	0.23	976.35	971.47	971.47
976.85	0.23	976.85	971.86	971.86
977.35	0.24	977.35	972.24	972.24
977.85	0.24	977.85	972.61	972.61
978.35	0.24	978.35	972.99	972.99
978.85	0.25	978.85	973.36	973.36
979.07	0.25	979.07	973.51	973.51

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00
0.00	0.00	(N/A)	0.00

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Copy of Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Downstream Hydraulic Grade Line Error (ft)	Convergence Error (ft^3/s)	Downstream Channel Tailwater (ft)	Tailwater Error (ft)	Message
0.00	0.00	(N/A)	0.00	WS below an invert; no flow.
0.00	0.00	(N/A)	0.00	WS below an invert; no flow.
0.00	0.00	(N/A)	0.00	H =.06
0.00	0.00	(N/A)	0.00	H =.56
0.00	0.00	(N/A)	0.00	H =1.06
0.00	0.00	(N/A)	0.00	H =1.56
0.00	0.00	(N/A)	0.00	H =2.06
0.00	0.00	(N/A)	0.00	H =2.56
0.00	0.00	(N/A)	0.00	H =3.06
0.00	0.00	(N/A)	0.00	H =3.56
0.00	0.00	(N/A)	0.00	H =4.06
0.00	0.00	(N/A)	0.00	H =4.56
0.00	0.00	(N/A)	0.00	H =4.66
0.00	0.00	(N/A)	0.00	H =4.97
0.00	0.00	(N/A)	0.00	H =4.92
0.00	0.00	(N/A)	0.00	H =4.89
0.00	0.00	(N/A)	0.00	H =4.92
0.00	0.00	(N/A)	0.00	H =5.19
0.00	0.00	(N/A)	0.00	H =5.51
0.00	0.00	(N/A)	0.00	H =5.60
0.00	0.00	(N/A)	0.00	H =5.58
0.00	0.00	(N/A)	0.00	H =5.29
0.00	0.00	(N/A)	0.00	H =4.83
0.00	0.00	(N/A)	0.00	H =4.83
0.00	0.00	(N/A)	0.00	H =4.83
0.00	0.00	(N/A)	0.00	H =4.88

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

RATING TABLE FOR ONE OUTLET TYPE
Structure ID = Copy of Orifice - 1 (Orifice-Circular)

Upstream ID = (Pond Water Surface)
Downstream ID = Culvert - 1 (Culvert-Circular)

Message
H =4.99
H =5.11
H =5.24
H =5.36
H =5.49
H =5.56

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Composite Rating Table
Tailwater Elevation = Free Outfall (Composite Outlet Structure - 1)

Water Surface Elevation (ft)	Flow (ft³/s)	Tailwater Elevation (ft)	Convergence Error (ft)
965.35	0.00	(N/A)	0.00
965.75	0.12	(N/A)	0.00
965.85	0.16	(N/A)	0.00
966.35	0.27	(N/A)	0.00
966.85	0.35	(N/A)	0.00
967.35	0.41	(N/A)	0.00
967.85	0.47	(N/A)	0.00
968.35	0.52	(N/A)	0.00
968.85	0.56	(N/A)	0.00
969.35	0.61	(N/A)	0.00
969.85	0.65	(N/A)	0.00
970.35	0.68	(N/A)	0.00
970.45	0.69	(N/A)	0.00
970.85	3.49	(N/A)	0.00
971.35	13.73	(N/A)	0.00
971.85	29.54	(N/A)	0.00
972.35	47.56	(N/A)	0.00
972.85	57.90	(N/A)	0.00
973.35	66.57	(N/A)	0.00
973.50	69.03	(N/A)	0.00
973.85	87.98	(N/A)	0.00
974.35	132.96	(N/A)	0.00
974.85	191.12	(N/A)	0.00
975.35	219.55	(N/A)	0.00
975.85	241.17	(N/A)	0.00
976.35	259.30	(N/A)	0.00
976.85	273.68	(N/A)	0.00
977.35	287.14	(N/A)	0.00
977.85	299.84	(N/A)	0.00
978.35	311.94	(N/A)	0.00
978.85	323.50	(N/A)	0.00
979.07	328.46	(N/A)	0.00

Contributing Structures
(no Q: Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1)
Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1,Copy of Orifice - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Composite Rating Table
Tailwater Elevation = Free Outfall (Composite Outlet Structure - 1)

Contributing Structures
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Orifice - 2,Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

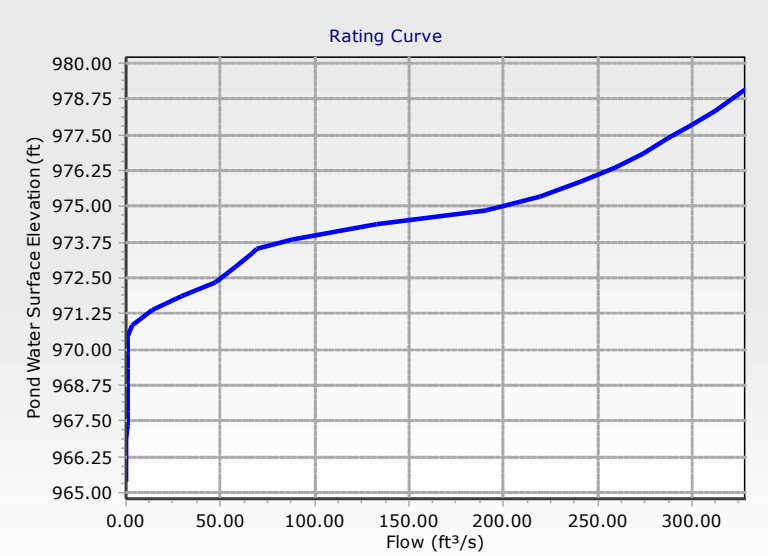
Composite Rating Table
Tailwater Elevation = Free Outfall (Composite Outlet Structure - 1)

Contributing Structures
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Orifice - 1,Copy of Orifice - 1,Culvert - 1 (no Q: Riser - 2,Riser - 1)
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1

Composite Outlet Structure Detailed Report: Composite Outlet Structure - 1

Composite Rating Table
Tailwater Elevation = Free Outfall (Composite Outlet Structure - 1)

Contributing Structures
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1
Orifice - 2,Riser - 2,Orifice - 1,Riser - 1,Copy of Orifice - 1,Culvert - 1



PONDPACK SPILLWAY OUTPUT

COBEY CREEK - SPILLWAY (AS-BUILTS)

Project Summary	
Title	COBEY CREEK
Engineer	Matthew Castor
Company	Hg Consult, Inc
Date	4/6/2021

Notes

Table of Contents

COBEY CREEK - SPILLWAY (AS-BUILTS)

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
P1	Post-Development 100 year	100	5.265	11.970	84.76
P2	Post-Development 100 year	100	0.309	11.940	5.40
P3	Post-Development 100 year	100	42.704	12.090	511.44
P4	Post-Development 100 year	100	2.044	11.970	32.66

Node Summary

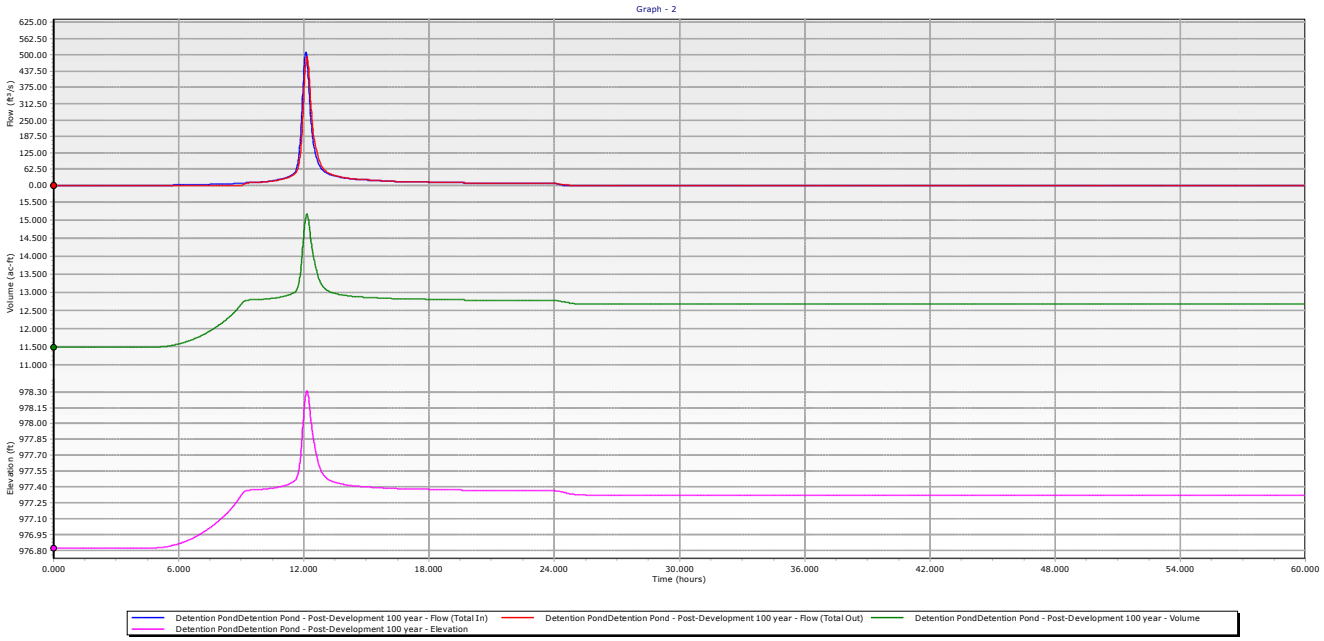
Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)
O-1	Post-Development 100 year	100	5.265	11.970	84.76
O-2	Post-Development 100 year	100	0.309	11.940	5.40
O-3	Post-Development 100 year	100	41.512	12.140	493.13
O-4	Post-Development 100 year	100	2.044	11.970	32.66

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ac-ft)	Time to Peak (hours)	Peak Flow (ft³/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ac-ft)
Detention Pond (IN)	Post-Development 100 year	100	42.704	12.090	511.44	(N/A)	(N/A)
Detention Pond (OUT)	Post-Development 100 year	100	41.512	12.140	493.13	978.31	15.173

COBEY CREEK - SPILLWAY (AS-BUILTS)

Index


Graph - 2
Flow (ft^3/s)
625.00
562.50
500.00
437.50
375.00
312.50
250.00
187.50
125.00
62.50
0.00
Volume (ac-ft)
15.500
15.000
14.500
14.000
13.500
13.000
12.500
12.000
11.500
11.000
Elevation (ft)
978.30
978.15
978.00
977.85
977.70
977.55
977.40
977.25
977.10
976.95
976.80
0.000
6.000
12.000
18.000
24.000
30.000
36.000
42.000
48.000
54.000
60.000
Time (hours)
Detention PondDetention Pond - Post-Development 100 year - Flow (Total In)
Detention PondDetention Pond - Post-Development 100 year - Flow (Total Out)
Detention PondDetention Pond - Post-Development 100 year - Volume
Detention PondDetention Pond - Post-Development 100 year - Elevation