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AS-BUILT STORMWATER DETENTION ANALYSIS, BASIN "B"
PREPARED BY: BAX ENGINEERING

GRANT INDUSTRIAL PARK – CITY OF O'FALLON (PHOENIX METALS)
BAX PROJECT NO. 01-11691B
December 24, 2015

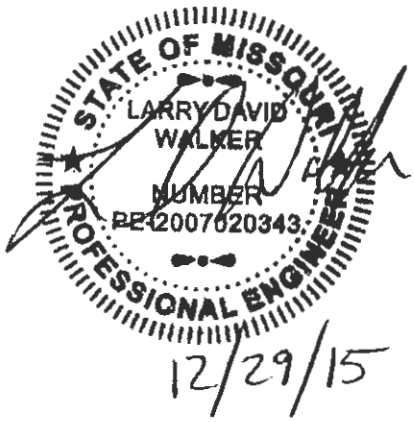
INTRODUCTION:

The tract of land lies south of Highway P and west of Hoff Road. The overall tract is approximately 29.98 acres and is being developed into Grant Industrial Park and currently consists of an office and warehouse building known as Phoenix Metals. This drainage area is all within the Peruque Creek watershed.

Two dry detention basins are proposed for this site to provide the required detention. Both basins have been designed in accordance with the City of O'Fallon design criteria for stormwater management. Detention Basin A will proportion the runoff from watershed's #3 & #4 to rates that are less than or equal to existing conditions. Detention Basin B will proportion the runoff from Watershed #1 to rates that are less than or equal to existing conditions.

As requested by the City of O'Fallon Public Works Department, this report will provide an As-Built analysis of Basin "B". The analysis of the basin will be for the 2- year, 15-year, 25 year and 100 year, 20 minute design storms and have been checked for safe passage of the 100 year, 20 minute design storm under low-flow blocked conditions.

All information and calculations within this report is based on As-Built information.



GENERAL SITE AND RUNOFF CALCULATIONS:

The pre-developed and post-developed P.I. factors used in the analysis are:

	20 minute storm 2 year	20 minute storm 15 year	20 minute storm 25 year	20 minute storm 100 year
Imperviousness				
Un-developed - 5%	1.15	1.87	2.31	2.95
Commercial - 100%	2.39	3.85	4.75	6.08

PREDEVELOPED RUNOFF:

The Predeveloped runoff rate is the peak runoff rate the site produced under existing conditions including any additional offsite areas tributary to the site. This calculation is the total runoff to the Ultimate discharge point in the northwestern corner of the site under the predevelopment conditions.

2 year-20 minute storm:

Land Use	Area	x	PI Factor	=	Runoff
Onsite greenspace	7.30 ac	x	1.15 cfs/ac	=	8.39 cfs
Onsite pavement	0.05 ac	x	2.39 cfs/ac	=	0.12 cfs
			Total	=	8.51 cfs

2 year-20 minute storm: 8.51 cfs
15 year-20 minute storm: 13.84 cfs
25 year-20 minute storm: 16.75 cfs
100 year-20 minute storm: 21.84 cfs

POSTDEVELOPED RUNOFF:

The Postdeveloped runoff rate is the peak runoff rate the site produced under proposed conditions including any additional offsite areas tributary to the site. This calculation is the total runoff to the Ultimate discharge point in the northwestern corner of the site under the postdevelopment conditions.

2 year-20 minute storm:

Land Use	Area	x	PI Factor	=	Runoff
Onsite greenspace	4.33 ac	x	1.15 cfs/ac	=	4.98 cfs
Onsite pavement/building	2.90 ac	x	2.39 cfs/ac	=	6.93 cfs
			Total	=	11.91 cfs

2 year-20 minute storm: 11.91 cfs
15 year-20 minute storm: 19.26 cfs
25 year-20 minute storm: 23.78 cfs
100 year-20 minute storm: 30.41 cfs

REQUIRED ATTENUATION:

The required Attenuation is the additional runoff from the development of the site that must be detained in the basin. This is calculated by subtracting the Predeveloped Runoff Rate produced by the site from the Postdeveloped Runoff Rate produced by the site.

DESIGN STORM	POSTDEVELOPED RUNOFF	-	PREDEVELOPED RUNOFF	=	REQUIRED ATTENUATION
2 year	11.91 cfs	-	8.51 cfs	=	3.40 cfs
15 year	19.26 cfs	-	13.84 cfs	=	5.42 cfs
25 year	23.78 cfs	-	16.75 cfs	=	7.03 cfs
100 year	30.41 cfs	-	21.84 cfs	=	8.57 cfs

2 year-20 minute storm: 3.40 cfs
15 year-20 minute storm: 5.42 cfs
25 year-20 minute storm: 7.03 cfs
100 year-20 minute storm: 8.57 cfs

TIME OF CONCENTRATION:

The time of concentration flow path for the detention basin begins just offsite from the northeastern corner of the site and travels overland approximately 580 feet to the basin. Time of concentration is estimated as follows:

tcL L=580'
Elevation Difference = 6'
tcL (overland) = 6 minutes: see Figure 1 Appendix A

BASIN PEAK INFLOWS:

Inflows to the basin have been estimated from the drainage area map included in the construction plans. The basin inflow includes areas onsite and offsite tributary to the basin.

2 year-20 minute storm:

Land Use	Area	x	PI Factor	=	Runoff
Onsite greenspace	2.70 ac	x	1.15 cfs/ac	=	3.11 cfs
Onsite pavement/building	2.83 ac	x	2.39 cfs/ac	=	6.76 cfs
			Total	=	9.87 cfs

2 year-20 minute storm:	9.87 cfs
15 year-20 minute storm:	15.94 cfs
25 year-20 minute storm:	19.68 cfs
100 year-20 minute storm:	25.17 cfs

DIRECT RUNOFF:

The Direct Runoff has been estimated from the drainage area map included in the construction plans. Areas that runoff the site, bypassing the detention basin, are included in the Direct Runoff calculation.

2 year-20 minute storm:

Land Use	Area	x	PI Factor	=	Runoff
Onsite greenspace	1.63 ac	x	1.15 cfs/ac	=	1.87 cfs
Onsite pavement/building	0.07 ac	x	2.39 cfs/ac	=	0.17 cfs
			Total	=	2.04 cfs

2 year-20 minute storm:	2.04 cfs
15 year-20 minute storm:	3.32 cfs
25 year-20 minute storm:	4.10 cfs
100 year-20 minute storm:	5.23 cfs

PERMITTED RELEASE RATE:

The Permitted Release Rate for the Basin is determined by subtracting the Required Attenuation from the Basin Inflow as shown below. By subtracting the Required Attenuation from the Basin Inflow the quantity to be detained in the basin will result in no increase in runoff from the site.

DESIGN STORM	BASIN INFLOW	-	REQUIRED ATTENUATION	=	PERMITTED RELEASE
2 year	9.87 cfs	-	3.40 cfs	=	6.47 cfs
15 year	15.94 cfs	-	5.42 cfs	=	10.52 cfs
25 year	19.68 cfs	-	7.03 cfs	=	12.65 cfs
100 year	25.17 cfs	-	8.57 cfs	=	16.60 cfs

OUTFALL STRUCTURE DESIGN:

The outfall structure proposed to control the flow in the Basin will consist of a 60" Standpipe with a grate top. The structure body shall have a 1.25' wide by 0.80' high Low Flow Slot cut into the structure with a flow line of 555.98'. There will also be a 1.00' wide by 0.75' high Upper Flow Slot cut into the structure with a flow line of 558.90'. The top shall be at a 560.78' elevation. 134.31' of 30" reinforced concrete pipe will serve as the outfall pipe, having an upper flow line of 553.73' and lower flow line of 549.19'.

STORM ROUTING CALCULATIONS AND RESULTS:

A computer program, PONDPACK V.8i, was used in routing the 2, 15, 25 and 100 year-20 minute design storm through the Basin. As found in the routing calculations, the results are as follows:

20 MIN STORM	PEAK INFLOW	ALLOWABLE RELEASE RATE	CALCULATED RELEASE RATE	PEAK ELEVATION
2 year	9.87 cfs	6.47 cfs	6.46 cfs	558.18 ft
15 year	15.94 cfs	10.52 cfs	7.84 cfs	558.98 ft
25 year	19.68 cfs	12.65 cfs	9.30 cfs	559.37 ft
100 year	25.17 cfs	16.60 cfs	11.73 cfs	559.86 ft
100 year low flow blocked	25.17 cfs	---	24.50 cfs	561.43 ft

TOTAL RUNOFF:

The total runoff is the combination of the Direct Runoff and the Basin Outflow to compare to the predeveloped model to ensure detention standards are met.

20 MIN STORM	DIRECT RUNOFF	+	BASIN OUTFLOW	=	TOTAL RUNOFF	PREDEVELOPED RUNOFF
2 year	2.04 cfs	+	6.46 cfs	=	8.50 cfs	8.51 cfs ✓
15 year	3.32 cfs	+	7.84 cfs	=	11.16 cfs	13.84 cfs ✓
25 year	4.10 cfs		9.30 cfs		13.40 cfs	16.75 cfs ✓
100 year	5.23 cfs		11.73 cfs		16.96 cfs	21.84 cfs ✓

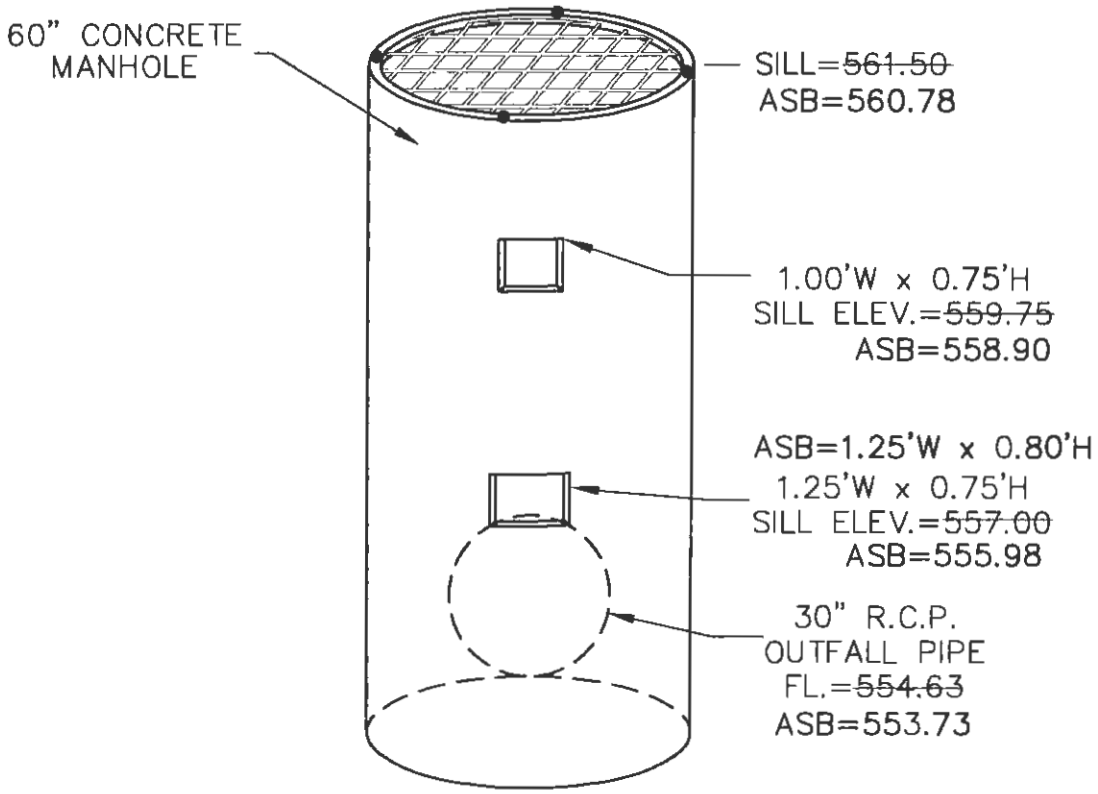
SUMMARY:

2 Year, 20 Minute H.W.	558.18 ft
15 Year, 20 Minute H.W.	558.98 ft
25 Year, 20 Minute H.W.	559.37 ft
100 Year, 20 Minute H.W	559.86 ft
100 Year, 20 Minute Low Flow Blocked	561.43 ft
Structure	60" Standpipe w/grate top
Low Flow Slot	1.25'W x 0.80'H opening
Elevation	555.98 ft
Upper Flow Slot	1.00'W x 0.75'H opening
Elevation	558.90 ft
Top of Dam	563.20
Freeboard for 100 Year	3.34 ft
Freeboard for 100 Year with low flow blocked	1.77 ft

APPENDIX A

STRUCTURE DETAIL

MISC. FIGURES



OVERFLOW STRUCTURE DETAIL (BASIN B)

NOT TO SCALE

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Grant Industrial Park
Project: Phoenix Metals
Date: 12/24/15 Project No: 01-1169B
Designer: LDW Checked: _____

TIME OF CONCENTRATION FOR SMALL DRAINAGE BASINS

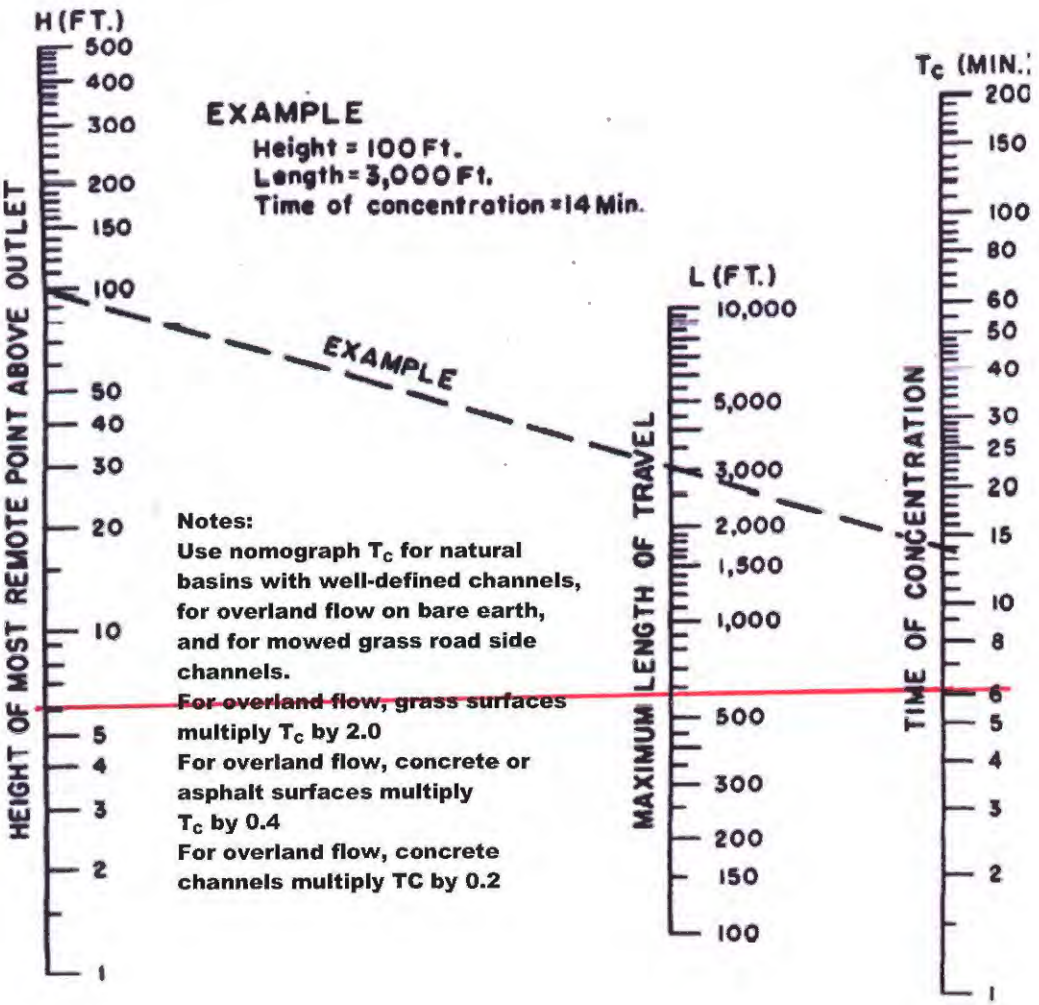

FIGURE 1

Δ Height = 6 ft.
Length = 580 ft.
T_c = 6 min.

APPENDIX B

POND 10

2 year, 15 year, 25 year & 100 Year

Routing Calculations

Table of Contents

Grant Industrial Park

Subsection: Master Network Summary

Catchments Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (min)	Peak Flow (ft^3/s)
Hyd Queue 10	Watershed - 2	0	11,844.000	6.00	9.87
Hyd Queue 10	Watershed - 15	0	19,129.000	6.00	15.94
Hyd Queue 10	Watershed - 25	0	23,616.000	6.00	19.68
Hyd Queue 10	Watershed - 100	0	30,204.000	6.00	25.17

Node Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (min)	Peak Flow (ft^3/s)
Out 10	Watershed - 2	0	11,844.000	22.00	6.46
Out 10	Watershed - 15	0	19,129.000	23.00	7.84
Out 10	Watershed - 25	0	23,616.000	23.00	9.30
Out 10	Watershed - 100	0	30,204.000	23.00	11.73

Pond Summary

Label	Scenario	Return Event (years)	Hydrograph Volume (ft^3)	Time to Peak (min)	Peak Flow (ft^3/s)	Maximum Water Surface Elevation (ft)	Maximum Pond Storage (ft^3)
BASIN B (IN)	Watershed - 2	0	11,844.000	6.00	9.87	(N/A)	(N/A)
BASIN B (OUT)	Watershed - 2	0	11,844.000	22.00	6.46	558.18	4,624.000
BASIN B (IN)	Watershed - 15	0	19,129.000	6.00	15.94	(N/A)	(N/A)
BASIN B (OUT)	Watershed - 15	0	19,129.000	23.00	7.84	558.98	10,275.000
BASIN B (IN)	Watershed - 25	0	23,616.000	6.00	19.68	(N/A)	(N/A)
BASIN B (OUT)	Watershed - 25	0	23,616.000	23.00	9.30	559.37	13,777.000
BASIN B (IN)	Watershed - 100	0	30,204.000	6.00	25.17	(N/A)	(N/A)
BASIN B (OUT)	Watershed - 100	0	30,204.000	23.00	11.73	559.86	18,669.000

Grant Industrial Park

Subsection: Read Hydrograph
Label: Hyd Queue 10

Return Event: 2 years
Storm Event:

Peak Discharge	9.87 ft³/s
Time to Peak	13.00 min
Hydrograph Volume	11,844.000 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.00	0.00	1.65	3.29	4.94	6.58
5.00	8.22	9.87	9.87	9.87	9.87
10.00	9.87	9.87	9.87	9.87	9.87
15.00	9.87	9.87	9.87	9.87	9.87
20.00	9.87	8.22	6.58	4.94	3.29
25.00	1.65	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	0.00	0.00
55.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Read Hydrograph
Label: Hyd Queue 10

Return Event: 15 years
Storm Event:

Peak Discharge	15.94 ft³/s
Time to Peak	13.00 min
Hydrograph Volume	19,128.956 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.00	0.00	2.67	5.31	7.97	10.63
5.00	13.28	15.94	15.94	15.94	15.94
10.00	15.94	15.94	15.94	15.94	15.94
15.00	15.94	15.94	15.94	15.94	15.94
20.00	15.94	13.28	10.63	7.97	5.31
25.00	2.66	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	0.00	0.00
55.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Subsection: Read Hydrograph
Label: Hyd Queue 10

Return Event: 25 years
Storm Event:

Peak Discharge	19.68 ft³/s
Time to Peak	13.00 min
Hydrograph Volume	23,616.000 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.00	0.00	3.28	6.56	9.84	13.12
5.00	16.40	19.68	19.68	19.68	19.68
10.00	19.68	19.68	19.68	19.68	19.68
15.00	19.68	19.68	19.68	19.68	19.68
20.00	19.68	16.40	13.12	9.84	6.56
25.00	3.28	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	0.00	0.00
55.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Grant Industrial Park

Subsection: Read Hydrograph
Label: Hyd Queue 10

Return Event: 100 years
Storm Event:

Peak Discharge	25.17 ft³/s
Time to Peak	13.00 min
Hydrograph Volume	30,204.000 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.00	0.00	4.20	8.39	12.59	16.78
5.00	20.97	25.17	25.17	25.17	25.17
10.00	25.17	25.17	25.17	25.17	25.17
15.00	25.17	25.17	25.17	25.17	25.17
20.00	25.17	20.97	16.78	12.59	8.39
25.00	4.20	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	0.00	0.00
55.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Grant Industrial Park

Subsection: Elevation-Area Volume Curve
Label: BASIN B

Return Event: 2 years
Storm Event:

Elevation (ft)	Planimeter (ft^2)	Area (ft^2)	A1+A2+sqr (A1*A2) (ft^2)	Volume (ft^3)	Volume (Total) (ft^3)
555.98	0.0	0.000	0.000	0.000	0.000
556.00	0.0	3.000	3.000	0.000	0.000
557.00	0.0	1,469.000	1,538.385	513.000	513.000
558.00	0.0	5,130.000	9,344.172	3,115.000	3,628.000
559.00	0.0	8,612.000	20,388.771	6,796.000	10,424.000
560.00	0.0	10,908.000	29,212.249	9,737.000	20,161.000
561.00	0.0	12,852.000	35,600.170	11,867.000	32,028.000
562.00	0.0	14,865.000	41,538.902	13,846.000	45,874.000
563.00	0.0	16,951.000	47,689.771	15,897.000	61,771.000

Pond Volume Equations
* Incremental volume computed by the Conic Method for Reservoir Volumes.

Volume = (1/3) * (EL2 - El1) * (Area1 + Area2 + sqr(Area1 * Area2))

where:	EL1, EL2	Lower and upper elevations of the increment
	Area1, Area2	Areas computed for EL1, EL2, respectively
	Volume	Incremental volume between EL1 and EL2

Grant Industrial Park

Subsection: Outlet Input Data
Label: OS B

Return Event: 2 years
Storm Event:

Requested Pond Water Surface Elevations	
Minimum (Headwater)	555.98 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	563.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Rectangular Weir	W0	Forward	C0	555.98	556.78
Orifice-Area	O1	Forward	C0	559.65	563.00
Rectangular Weir	W1	Forward	C0	558.90	559.65
Stand Pipe	R0	Forward	C0	560.78	563.00
Orifice-Area	O0	Forward	C0	556.78	563.00
Culvert-Circular	C0	Forward	TW	553.73	563.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	30.0 in
Length	134.31 ft
Length (Computed Barrel)	134.39 ft
Slope (Computed)	0.034 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.009
Kr	0.500
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.078
T2 ratio (HW/D)	1.180
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	556.43 ft	T1 Flow	27.16 ft^3/s
T2 Elevation	556.68 ft	T2 Flow	31.05 ft^3/s

Structure ID: W0 Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	555.98 ft
Weir Length	1.25 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: O0 Structure Type: Orifice-Area	
Number of Openings	1
Elevation	555.98 ft
Orifice Area	1.0 ft²
Top Elevation	556.78 ft
Datum Elevation	556.38 ft
Orifice Coefficient	0.600

Structure ID: R0 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	560.78 ft
Diameter	60.0 in
Orifice Area	19.6 ft²
Orifice Coefficient	0.600
Weir Length	15.71 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Structure ID: W1 Structure Type: Rectangular Weir	
Number of Openings	1
Elevation	558.90 ft
Weir Length	1.00 ft
Weir Coefficient	3.00 (ft^0.5)/s

Structure ID: O1 Structure Type: Orifice-Area	
Number of Openings	1
Elevation	558.90 ft

Structure ID: O1 Structure Type: Orifice-Area	
Orifice Area	0.8 ft²
Top Elevation	559.65 ft
Datum Elevation	559.28 ft
Orifice Coefficient	0.600

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	40
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Subsection: Composite Rating Curve
Label: OS B

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
555.98	0.00	(N/A)	0.00
556.08	0.12	(N/A)	0.00
556.18	0.34	(N/A)	0.00
556.28	0.62	(N/A)	0.00
556.38	0.95	(N/A)	0.00
556.48	1.33	(N/A)	0.00
556.58	1.74	(N/A)	0.00
556.68	2.20	(N/A)	0.00
556.78	3.04	(N/A)	0.00
556.88	3.40	(N/A)	0.00
556.98	3.73	(N/A)	0.00
557.08	4.02	(N/A)	0.00
557.18	4.30	(N/A)	0.00
557.28	4.57	(N/A)	0.00
557.38	4.81	(N/A)	0.00
557.48	5.05	(N/A)	0.00
557.58	5.27	(N/A)	0.00
557.68	5.49	(N/A)	0.00
557.78	5.70	(N/A)	0.00
557.88	5.89	(N/A)	0.00
557.98	6.09	(N/A)	0.00
558.08	6.28	(N/A)	0.00
558.18	6.46	(N/A)	0.00
558.28	6.64	(N/A)	0.00
558.38	6.81	(N/A)	0.00
558.48	6.97	(N/A)	0.00
558.58	7.14	(N/A)	0.00
558.68	7.30	(N/A)	0.00
558.78	7.46	(N/A)	0.00
558.88	7.61	(N/A)	0.00
558.90	7.64	(N/A)	0.00
558.98	7.83	(N/A)	0.00
559.08	8.14	(N/A)	0.00
559.18	8.50	(N/A)	0.00
559.28	8.90	(N/A)	0.00
559.38	9.33	(N/A)	0.00
559.48	9.80	(N/A)	0.00
559.58	10.30	(N/A)	0.00
559.68	11.03	(N/A)	0.00
559.78	11.44	(N/A)	0.00
559.88	11.80	(N/A)	0.00
559.98	12.15	(N/A)	0.00
560.08	12.49	(N/A)	0.00

Grant Industrial Park

Subsection: Composite Rating Curve
Label: OS B

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
560.18	12.80	(N/A)	0.00
560.28	13.11	(N/A)	0.00
560.38	13.43	(N/A)	0.00
560.48	13.71	(N/A)	0.00
560.58	13.97	(N/A)	0.00
560.68	14.27	(N/A)	0.00
560.78	14.53	(N/A)	0.00
560.88	16.27	(N/A)	0.00
560.98	19.23	(N/A)	0.00
561.08	23.02	(N/A)	0.00
561.18	27.29	(N/A)	0.00
561.28	31.92	(N/A)	0.00
561.38	36.93	(N/A)	0.00
561.48	42.20	(N/A)	0.00
561.58	47.73	(N/A)	0.00
561.68	53.43	(N/A)	0.00
561.78	58.56	(N/A)	0.00
561.88	63.50	(N/A)	0.00
561.98	67.88	(N/A)	0.00
562.08	71.07	(N/A)	0.00
562.18	71.72	(N/A)	0.00
562.28	72.25	(N/A)	0.00
562.38	72.78	(N/A)	0.00
562.48	73.29	(N/A)	0.00
562.58	73.81	(N/A)	0.00
562.68	74.33	(N/A)	0.00
562.78	74.83	(N/A)	0.00
562.88	75.34	(N/A)	0.00
562.98	75.84	(N/A)	0.00
563.00	75.94	(N/A)	0.00

Contributing Structures

(no Q: W0,O1,W1,R0,O0,C0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
W0,C0 (no Q: O1,W1,R0,O0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)

Subsection: Composite Rating Curve
Label: OS B

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Contributing Structures
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
O0,C0 (no Q: W0,O1,W1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
W1,O0,C0 (no Q: W0,O1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,O0,C0 (no Q: W0,W1,R0)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)

Subsection: Composite Rating Curve
Label: OS B

Return Event: 2 years
Storm Event:

Composite Outflow Summary

Contributing Structures
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
O1,R0,O0,C0 (no Q: W0,W1)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)
R0,C0 (no Q: W0,O1,W1,O0)

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 2 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.98 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.00 min

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
555.98	0.00	0.000	0.000	0.00	0.00	0.00
556.08	0.12	0.894	21.713	0.00	0.12	0.15
556.18	0.34	5.217	69.210	0.00	0.34	0.51
556.28	0.62	15.629	143.491	0.00	0.62	1.14
556.38	0.95	34.808	244.558	0.00	0.95	2.11
556.48	1.33	65.433	372.408	0.00	1.33	3.51
556.58	1.74	110.183	527.044	0.00	1.74	5.42
556.68	2.20	171.735	708.464	0.00	2.20	7.92
556.78	3.04	252.768	916.668	0.00	3.04	11.47
556.88	3.40	355.961	1,151.657	0.00	3.40	15.27
556.98	3.73	483.993	1,413.431	0.00	3.73	19.86
557.08	4.02	638.692	1,680.283	0.00	4.02	25.31
557.18	4.30	820.738	1,964.342	0.00	4.30	31.66
557.28	4.57	1,032.299	2,270.575	0.00	4.57	38.98
557.38	4.81	1,275.592	2,598.981	0.00	4.81	47.33
557.48	5.05	1,552.835	2,949.560	0.00	5.05	56.81
557.58	5.27	1,866.243	3,322.311	0.00	5.27	67.48
557.68	5.49	2,218.036	3,717.237	0.00	5.49	79.42
557.78	5.70	2,610.430	4,134.335	0.00	5.70	92.71
557.88	5.89	3,045.642	4,573.606	0.00	5.89	107.41
557.98	6.09	3,525.890	5,035.050	0.00	6.09	123.62
558.08	6.28	4,047.723	5,375.553	0.00	6.28	141.20
558.18	6.46	4,600.954	5,690.567	0.00	6.46	159.82
558.28	6.64	5,186.135	6,014.551	0.00	6.64	179.51
558.38	6.81	5,804.163	6,347.503	0.00	6.81	200.28
558.48	6.97	6,455.935	6,689.425	0.00	6.97	222.17
558.58	7.14	7,142.347	7,040.315	0.00	7.14	245.22
558.68	7.30	7,864.297	7,400.175	0.00	7.30	269.44
558.78	7.46	8,622.681	7,769.004	0.00	7.46	294.88

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 2 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	25/t + O (ft^3/s)
558.88	7.61	9,418.397	8,146.803	0.00	7.61	321.56
558.90	7.64	9,582.099	8,223.439	0.00	7.64	327.04
558.98	7.83	10,252.341	8,533.570	0.00	7.83	349.57
559.08	8.14	11,119.693	8,785.707	0.00	8.14	378.79
559.18	8.50	12,009.219	9,005.280	0.00	8.50	408.81
559.28	8.90	12,920.839	9,227.563	0.00	8.90	439.59
559.38	9.33	13,854.822	9,452.556	0.00	9.33	471.16
559.48	9.80	14,811.441	9,680.259	0.00	9.80	503.51
559.58	10.30	15,790.965	9,910.672	0.00	10.30	536.66
559.68	11.03	16,793.665	10,143.795	0.00	11.03	570.82
559.78	11.44	17,819.814	10,379.628	0.00	11.44	605.43
559.88	11.80	18,869.681	10,618.171	0.00	11.80	640.79
559.98	12.15	19,943.538	10,859.424	0.00	12.15	676.93
560.08	12.49	21,039.832	11,057.657	0.00	12.49	713.81
560.18	12.80	22,155.010	11,246.162	0.00	12.80	751.30
560.28	13.11	23,289.117	11,436.260	0.00	13.11	789.41
560.38	13.43	24,442.315	11,627.952	0.00	13.43	828.17
560.48	13.71	25,614.761	11,821.237	0.00	13.71	867.53
560.58	13.97	26,806.615	12,016.115	0.00	13.97	907.52
560.68	14.27	28,018.037	12,212.586	0.00	14.27	948.20
560.78	14.53	29,249.185	12,410.650	0.00	14.53	989.50
560.88	16.27	30,500.220	12,610.308	0.00	16.27	1,032.94
560.98	19.23	31,771.300	12,811.559	0.00	19.23	1,078.27
561.08	23.02	33,062.315	13,007.653	0.00	23.02	1,125.09
561.18	27.29	34,372.863	13,203.536	0.00	27.29	1,173.05
561.28	31.92	35,703.072	13,400.884	0.00	31.92	1,222.03
561.38	36.93	37,053.088	13,599.695	0.00	36.93	1,272.03
561.48	42.20	38,423.059	13,799.970	0.00	42.20	1,322.97
561.58	47.73	39,813.131	14,001.710	0.00	47.73	1,374.84
561.68	53.43	41,223.450	14,204.913	0.00	53.43	1,427.54
561.78	58.56	42,654.162	14,409.580	0.00	58.56	1,480.36
561.88	63.50	44,105.415	14,615.711	0.00	63.50	1,533.68
561.98	67.88	45,577.353	14,823.305	0.00	67.88	1,587.12
562.08	71.07	47,069.904	15,026.842	0.00	71.07	1,640.07
562.18	71.72	48,582.754	15,230.376	0.00	71.72	1,691.14
562.28	72.25	50,116.025	15,435.279	0.00	72.25	1,742.79
562.38	72.78	51,669.855	15,641.551	0.00	72.78	1,795.11
562.48	73.29	53,244.381	15,849.193	0.00	73.29	1,848.10
562.58	73.81	54,839.739	16,058.204	0.00	73.81	1,901.81
562.68	74.33	56,456.067	16,268.584	0.00	74.33	1,956.20
562.78	74.83	58,093.502	16,480.333	0.00	74.83	2,011.28
562.88	75.34	59,752.179	16,693.451	0.00	75.34	2,067.08
562.98	75.84	61,432.237	16,907.938	0.00	75.84	2,123.58

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 2 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
563.00	75.94	61,770.827	16,951.000	0.00	75.94	2,134.97

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 15 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.98 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.00 min

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
555.98	0.00	0.000	0.000	0.00	0.00	0.00
556.08	0.12	0.894	21.713	0.00	0.12	0.15
556.18	0.34	5.217	69.210	0.00	0.34	0.51
556.28	0.62	15.629	143.491	0.00	0.62	1.14
556.38	0.95	34.808	244.558	0.00	0.95	2.11
556.48	1.33	65.433	372.408	0.00	1.33	3.51
556.58	1.74	110.183	527.044	0.00	1.74	5.42
556.68	2.20	171.735	708.464	0.00	2.20	7.92
556.78	3.04	252.768	916.668	0.00	3.04	11.47
556.88	3.40	355.961	1,151.657	0.00	3.40	15.27
556.98	3.73	483.993	1,413.431	0.00	3.73	19.86
557.08	4.02	638.692	1,680.283	0.00	4.02	25.31
557.18	4.30	820.738	1,964.342	0.00	4.30	31.66
557.28	4.57	1,032.299	2,270.575	0.00	4.57	38.98
557.38	4.81	1,275.592	2,598.981	0.00	4.81	47.33
557.48	5.05	1,552.835	2,949.560	0.00	5.05	56.81
557.58	5.27	1,866.243	3,322.311	0.00	5.27	67.48
557.68	5.49	2,218.036	3,717.237	0.00	5.49	79.42
557.78	5.70	2,610.430	4,134.335	0.00	5.70	92.71
557.88	5.89	3,045.642	4,573.606	0.00	5.89	107.41
557.98	6.09	3,525.890	5,035.050	0.00	6.09	123.62
558.08	6.28	4,047.723	5,375.553	0.00	6.28	141.20
558.18	6.46	4,600.954	5,690.567	0.00	6.46	159.82
558.28	6.64	5,186.135	6,014.551	0.00	6.64	179.51
558.38	6.81	5,804.163	6,347.503	0.00	6.81	200.28
558.48	6.97	6,455.935	6,689.425	0.00	6.97	222.17
558.58	7.14	7,142.347	7,040.315	0.00	7.14	245.22
558.68	7.30	7,864.297	7,400.175	0.00	7.30	269.44
558.78	7.46	8,622.681	7,769.004	0.00	7.46	294.88

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 15 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
558.88	7.61	9,418.397	8,146.803	0.00	7.61	321.56
558.90	7.64	9,582.099	8,223.439	0.00	7.64	327.04
558.98	7.83	10,252.341	8,533.570	0.00	7.83	349.57
559.08	8.14	11,119.693	8,785.707	0.00	8.14	378.79
559.18	8.50	12,009.219	9,005.280	0.00	8.50	408.81
559.28	8.90	12,920.839	9,227.563	0.00	8.90	439.59
559.38	9.33	13,854.822	9,452.556	0.00	9.33	471.16
559.48	9.80	14,811.441	9,680.259	0.00	9.80	503.51
559.58	10.30	15,790.965	9,910.672	0.00	10.30	536.66
559.68	11.03	16,793.665	10,143.795	0.00	11.03	570.82
559.78	11.44	17,819.814	10,379.628	0.00	11.44	605.43
559.88	11.80	18,869.681	10,618.171	0.00	11.80	640.79
559.98	12.15	19,943.538	10,859.424	0.00	12.15	676.93
560.08	12.49	21,039.832	11,057.657	0.00	12.49	713.81
560.18	12.80	22,155.010	11,246.162	0.00	12.80	751.30
560.28	13.11	23,289.117	11,436.260	0.00	13.11	789.41
560.38	13.43	24,442.315	11,627.952	0.00	13.43	828.17
560.48	13.71	25,614.761	11,821.237	0.00	13.71	867.53
560.58	13.97	26,806.615	12,016.115	0.00	13.97	907.52
560.68	14.27	28,018.037	12,212.586	0.00	14.27	948.20
560.78	14.53	29,249.185	12,410.650	0.00	14.53	989.50
560.88	16.27	30,500.220	12,610.308	0.00	16.27	1,032.94
560.98	19.23	31,771.300	12,811.559	0.00	19.23	1,078.27
561.08	23.02	33,062.315	13,007.653	0.00	23.02	1,125.09
561.18	27.28	34,372.863	13,203.536	0.00	27.28	1,173.05
561.28	31.92	35,703.072	13,400.884	0.00	31.92	1,222.03
561.38	36.93	37,053.088	13,599.695	0.00	36.93	1,272.03
561.48	42.20	38,423.059	13,799.970	0.00	42.20	1,322.97
561.58	47.73	39,813.131	14,001.710	0.00	47.73	1,374.84
561.68	53.43	41,223.450	14,204.913	0.00	53.43	1,427.54
561.78	58.56	42,654.162	14,409.580	0.00	58.56	1,480.36
561.88	63.50	44,105.415	14,615.711	0.00	63.50	1,533.68
561.98	67.88	45,577.353	14,823.305	0.00	67.88	1,587.12
562.08	71.07	47,069.904	15,026.842	0.00	71.07	1,640.07
562.18	71.72	48,582.754	15,230.376	0.00	71.72	1,691.14
562.28	72.25	50,116.025	15,435.279	0.00	72.25	1,742.79
562.38	72.78	51,669.855	15,641.551	0.00	72.78	1,795.11
562.48	73.29	53,244.381	15,849.193	0.00	73.29	1,848.10
562.58	73.81	54,839.739	16,058.204	0.00	73.81	1,901.81
562.68	74.33	56,456.067	16,268.584	0.00	74.33	1,956.20
562.78	74.83	58,093.502	16,480.333	0.00	74.83	2,011.28
562.88	75.34	59,752.179	16,693.451	0.00	75.34	2,067.08
562.98	75.84	61,432.237	16,907.938	0.00	75.84	2,123.58

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 15 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
563.00	75.94	61,770.827	16,951.000	0.00	75.94	2,134.97

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 25 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.98 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.00 min

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
555.98	0.00	0.000	0.000	0.00	0.00	0.00
556.08	0.12	0.894	21.713	0.00	0.12	0.15
556.18	0.34	5.217	69.210	0.00	0.34	0.51
556.28	0.62	15.629	143.491	0.00	0.62	1.14
556.38	0.95	34.808	244.558	0.00	0.95	2.11
556.48	1.33	65.433	372.408	0.00	1.33	3.51
556.58	1.74	110.183	527.044	0.00	1.74	5.42
556.68	2.20	171.735	708.464	0.00	2.20	7.92
556.78	3.04	252.768	916.668	0.00	3.04	11.47
556.88	3.40	355.961	1,151.657	0.00	3.40	15.27
556.98	3.73	483.993	1,413.431	0.00	3.73	19.86
557.08	4.02	638.692	1,680.283	0.00	4.02	25.31
557.18	4.30	820.738	1,964.342	0.00	4.30	31.66
557.28	4.57	1,032.299	2,270.575	0.00	4.57	38.98
557.38	4.81	1,275.592	2,598.981	0.00	4.81	47.33
557.48	5.05	1,552.835	2,949.560	0.00	5.05	56.81
557.58	5.27	1,866.243	3,322.311	0.00	5.27	67.48
557.68	5.49	2,218.036	3,717.237	0.00	5.49	79.42
557.78	5.70	2,610.430	4,134.335	0.00	5.70	92.71
557.88	5.89	3,045.642	4,573.606	0.00	5.89	107.41
557.98	6.09	3,525.890	5,035.050	0.00	6.09	123.62
558.08	6.28	4,047.723	5,375.553	0.00	6.28	141.20
558.18	6.46	4,600.954	5,690.567	0.00	6.46	159.82
558.28	6.64	5,186.135	6,014.551	0.00	6.64	179.51
558.38	6.81	5,804.163	6,347.503	0.00	6.81	200.28
558.48	6.97	6,455.935	6,689.425	0.00	6.97	222.17
558.58	7.14	7,142.347	7,040.315	0.00	7.14	245.22
558.68	7.30	7,864.297	7,400.175	0.00	7.30	269.44
558.78	7.46	8,622.681	7,769.004	0.00	7.46	294.88

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 25 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
558.88	7.61	9,418.397	8,146.803	0.00	7.61	321.56
558.90	7.64	9,582.099	8,223.439	0.00	7.64	327.04
558.98	7.83	10,252.341	8,533.570	0.00	7.83	349.57
559.08	8.14	11,119.693	8,785.707	0.00	8.14	378.79
559.18	8.50	12,009.219	9,005.280	0.00	8.50	408.81
559.28	8.90	12,920.839	9,227.563	0.00	8.90	439.59
559.38	9.33	13,854.822	9,452.556	0.00	9.33	471.16
559.48	9.80	14,811.441	9,680.259	0.00	9.80	503.51
559.58	10.30	15,790.965	9,910.672	0.00	10.30	536.66
559.68	11.03	16,793.665	10,143.795	0.00	11.03	570.82
559.78	11.44	17,819.814	10,379.628	0.00	11.44	605.43
559.88	11.80	18,869.681	10,618.171	0.00	11.80	640.79
559.98	12.15	19,943.538	10,859.424	0.00	12.15	676.93
560.08	12.49	21,039.832	11,057.657	0.00	12.49	713.81
560.18	12.80	22,155.010	11,246.162	0.00	12.80	751.30
560.28	13.11	23,289.117	11,436.260	0.00	13.11	789.41
560.38	13.43	24,442.315	11,627.952	0.00	13.43	828.17
560.48	13.71	25,614.761	11,821.237	0.00	13.71	867.53
560.58	13.97	26,806.615	12,016.115	0.00	13.97	907.52
560.68	14.27	28,018.037	12,212.586	0.00	14.27	948.20
560.78	14.53	29,249.185	12,410.650	0.00	14.53	989.50
560.88	16.27	30,500.220	12,610.308	0.00	16.27	1,032.94
560.98	19.23	31,771.300	12,811.559	0.00	19.23	1,078.27
561.08	23.02	33,062.315	13,007.653	0.00	23.02	1,125.09
561.18	27.28	34,372.863	13,203.536	0.00	27.28	1,173.05
561.28	31.92	35,703.072	13,400.884	0.00	31.92	1,222.03
561.38	36.93	37,053.088	13,599.695	0.00	36.93	1,272.03
561.48	42.20	38,423.059	13,799.970	0.00	42.20	1,322.97
561.58	47.73	39,813.131	14,001.710	0.00	47.73	1,374.84
561.68	53.43	41,223.450	14,204.913	0.00	53.43	1,427.54
561.78	58.56	42,654.162	14,409.580	0.00	58.56	1,480.36
561.88	63.50	44,105.415	14,615.711	0.00	63.50	1,533.68
561.98	67.88	45,577.353	14,823.305	0.00	67.88	1,587.12
562.08	71.07	47,069.904	15,026.842	0.00	71.07	1,640.07
562.18	71.72	48,582.754	15,230.376	0.00	71.72	1,691.14
562.28	72.25	50,116.025	15,435.279	0.00	72.25	1,742.79
562.38	72.78	51,669.855	15,641.551	0.00	72.78	1,795.11
562.48	73.29	53,244.381	15,849.193	0.00	73.29	1,848.10
562.58	73.81	54,839.739	16,058.204	0.00	73.81	1,901.81
562.68	74.33	56,456.067	16,268.584	0.00	74.33	1,956.20
562.78	74.83	58,093.502	16,480.333	0.00	74.83	2,011.28
562.88	75.34	59,752.179	16,693.451	0.00	75.34	2,067.08
562.98	75.84	61,432.237	16,907.938	0.00	75.84	2,123.58

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
563.00	75.94	61,770.827	16,951.000	0.00	75.94	2,134.97

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	555.98 ft
Volume (Initial)	0.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.00 min

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
555.98	0.00	0.000	0.000	0.00	0.00	0.00
556.08	0.12	0.894	21.713	0.00	0.12	0.15
556.18	0.34	5.217	69.210	0.00	0.34	0.51
556.28	0.62	15.629	143.491	0.00	0.62	1.14
556.38	0.95	34.808	244.558	0.00	0.95	2.11
556.48	1.33	65.433	372.408	0.00	1.33	3.51
556.58	1.74	110.183	527.044	0.00	1.74	5.42
556.68	2.20	171.735	708.464	0.00	2.20	7.92
556.78	3.04	252.768	916.668	0.00	3.04	11.47
556.88	3.40	355.961	1,151.657	0.00	3.40	15.27
556.98	3.73	483.993	1,413.431	0.00	3.73	19.86
557.08	4.02	638.692	1,680.283	0.00	4.02	25.31
557.18	4.30	820.738	1,964.342	0.00	4.30	31.66
557.28	4.57	1,032.299	2,270.575	0.00	4.57	38.98
557.38	4.81	1,275.592	2,598.981	0.00	4.81	47.33
557.48	5.05	1,552.835	2,949.560	0.00	5.05	56.81
557.58	5.27	1,866.243	3,322.311	0.00	5.27	67.48
557.68	5.49	2,218.036	3,717.237	0.00	5.49	79.42
557.78	5.70	2,610.430	4,134.335	0.00	5.70	92.71
557.88	5.89	3,045.642	4,573.606	0.00	5.89	107.41
557.98	6.09	3,525.890	5,035.050	0.00	6.09	123.62
558.08	6.28	4,047.723	5,375.553	0.00	6.28	141.20
558.18	6.46	4,600.954	5,690.567	0.00	6.46	159.82
558.28	6.64	5,186.135	6,014.551	0.00	6.64	179.51
558.38	6.81	5,804.163	6,347.503	0.00	6.81	200.28
558.48	6.97	6,455.935	6,689.425	0.00	6.97	222.17
558.58	7.14	7,142.347	7,040.315	0.00	7.14	245.22
558.68	7.30	7,864.297	7,400.175	0.00	7.30	269.44
558.78	7.46	8,622.681	7,769.004	0.00	7.46	294.88

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
558.88	7.61	9,418.397	8,146.803	0.00	7.61	321.56
558.90	7.64	9,582.099	8,223.439	0.00	7.64	327.04
558.98	7.83	10,252.341	8,533.570	0.00	7.83	349.57
559.08	8.14	11,119.693	8,785.707	0.00	8.14	378.79
559.18	8.50	12,009.219	9,005.280	0.00	8.50	408.81
559.28	8.90	12,920.839	9,227.563	0.00	8.90	439.59
559.38	9.33	13,854.822	9,452.556	0.00	9.33	471.16
559.48	9.80	14,811.441	9,680.259	0.00	9.80	503.51
559.58	10.30	15,790.965	9,910.672	0.00	10.30	536.66
559.68	11.03	16,793.665	10,143.795	0.00	11.03	570.82
559.78	11.44	17,819.814	10,379.628	0.00	11.44	605.43
559.88	11.80	18,869.681	10,618.171	0.00	11.80	640.79
559.98	12.15	19,943.538	10,859.424	0.00	12.15	676.93
560.08	12.49	21,039.832	11,057.657	0.00	12.49	713.81
560.18	12.80	22,155.010	11,246.162	0.00	12.80	751.30
560.28	13.11	23,289.117	11,436.260	0.00	13.11	789.41
560.38	13.43	24,442.315	11,627.952	0.00	13.43	828.17
560.48	13.71	25,614.761	11,821.237	0.00	13.71	867.53
560.58	13.97	26,806.615	12,016.115	0.00	13.97	907.52
560.68	14.27	28,018.037	12,212.586	0.00	14.27	948.20
560.78	14.53	29,249.185	12,410.650	0.00	14.53	989.50
560.88	16.27	30,500.220	12,610.308	0.00	16.27	1,032.94
560.98	19.23	31,771.300	12,811.559	0.00	19.23	1,078.27
561.08	23.02	33,062.315	13,007.653	0.00	23.02	1,125.09
561.18	27.28	34,372.863	13,203.536	0.00	27.28	1,173.05
561.28	31.92	35,703.072	13,400.884	0.00	31.92	1,222.03
561.38	36.93	37,053.088	13,599.695	0.00	36.93	1,272.03
561.48	42.20	38,423.059	13,799.970	0.00	42.20	1,322.97
561.58	47.73	39,813.131	14,001.710	0.00	47.73	1,374.84
561.68	53.43	41,223.450	14,204.913	0.00	53.43	1,427.54
561.78	58.56	42,654.162	14,409.580	0.00	58.56	1,480.36
561.88	63.50	44,105.415	14,615.711	0.00	63.50	1,533.68
561.98	67.88	45,577.353	14,823.305	0.00	67.88	1,587.12
562.08	71.07	47,069.904	15,026.842	0.00	71.07	1,640.07
562.18	71.72	48,582.754	15,230.376	0.00	71.72	1,691.14
562.28	72.25	50,116.025	15,435.279	0.00	72.25	1,742.79
562.38	72.78	51,669.855	15,641.551	0.00	72.78	1,795.11
562.48	73.29	53,244.381	15,849.193	0.00	73.29	1,848.10
562.58	73.81	54,839.739	16,058.204	0.00	73.81	1,901.81
562.68	74.33	56,456.067	16,268.584	0.00	74.33	1,956.20
562.78	74.83	58,093.502	16,480.333	0.00	74.83	2,011.28
562.88	75.34	59,752.179	16,693.451	0.00	75.34	2,067.08
562.98	75.84	61,432.237	16,907.938	0.00	75.84	2,123.58

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
563.00	75.94	61,770.827	16,951.000	0.00	75.94	2,134.97

Summary for Hydrograph Addition at 'BASIN B'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	11,844.000	6.00	9.87
Flow (In)	BASIN B	11,844.000	6.00	9.87

Summary for Hydrograph Addition at 'BASIN B'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	19,128.956	6.00	15.94
Flow (In)	BASIN B	19,128.956	6.00	15.94

Summary for Hydrograph Addition at 'BASIN B'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	23,616.000	6.00	19.68
Flow (In)	BASIN B	23,616.000	6.00	19.68

Summary for Hydrograph Addition at 'BASIN B'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	30,204.000	6.00	25.17
Flow (In)	BASIN B	30,204.000	6.00	25.17

Grant Industrial Park

Index

APPENDIX C

POND 10

100 Year Low Flow Blocked

Routing Calculations

Table of Contents

Grant Industrial Park

Subsection: Read Hydrograph
Label: Hyd Queue 10

Return Event: 100 years
Storm Event:

Peak Discharge	25.17 ft³/s
Time to Peak	13.00 min
Hydrograph Volume	30,204.000 ft³

HYDROGRAPH ORDINATES (ft³/s)
Output Time Increment = 1.00 min
Time on left represents time for first value in each row.

Time (min)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)	Flow (ft³/s)
0.00	0.00	4.20	8.39	12.59	16.78
5.00	20.97	25.17	25.17	25.17	25.17
10.00	25.17	25.17	25.17	25.17	25.17
15.00	25.17	25.17	25.17	25.17	25.17
20.00	25.17	20.97	16.78	12.59	8.39
25.00	4.20	0.00	0.00	0.00	0.00
30.00	0.00	0.00	0.00	0.00	0.00
35.00	0.00	0.00	0.00	0.00	0.00
40.00	0.00	0.00	0.00	0.00	0.00
45.00	0.00	0.00	0.00	0.00	0.00
50.00	0.00	0.00	0.00	0.00	0.00
55.00	0.00	0.00	0.00	0.00	0.00
60.00	0.00	(N/A)	(N/A)	(N/A)	(N/A)

Requested Pond Water Surface Elevations	
Minimum (Headwater)	555.98 ft
Increment (Headwater)	0.10 ft
Maximum (Headwater)	563.00 ft

Outlet Connectivity

Structure Type	Outlet ID	Direction	Outfall	E1 (ft)	E2 (ft)
Stand Pipe	R0	Forward	C0	560.78	563.00
Culvert-Circular	C0	Forward	TW	553.73	563.00
Tailwater Settings	Tailwater			(N/A)	(N/A)

Structure ID: C0 Structure Type: Culvert-Circular	
Number of Barrels	1
Diameter	30.0 in
Length	134.31 ft
Length (Computed Barrel)	134.39 ft
Slope (Computed)	0.034 ft/ft

Outlet Control Data	
Manning's n	0.013
Ke	0.200
Kb	0.009
Kr	0.500
Convergence Tolerance	0.00 ft

Inlet Control Data	
Equation Form	Form 1
K	0.0045
M	2.0000
C	0.0317
Y	0.6900
T1 ratio (HW/D)	1.078
T2 ratio (HW/D)	1.180
Slope Correction Factor	-0.500

Use unsubmerged inlet control 0 equation below T1 elevation.
Use submerged inlet control 0 equation above T2 elevation

In transition zone between unsubmerged and submerged inlet control,
interpolate between flows at T1 & T2...

T1 Elevation	556.43 ft	T1 Flow	27.16 ft^3/s
T2 Elevation	556.68 ft	T2 Flow	31.05 ft^3/s

Structure ID: R0 Structure Type: Stand Pipe	
Number of Openings	1
Elevation	560.78 ft
Diameter	60.0 in
Orifice Area	19.6 ft²
Orifice Coefficient	0.600
Weir Length	15.71 ft
Weir Coefficient	3.00 (ft^0.5)/s
K Reverse	1.000
Manning's n	0.000
Kev, Charged Riser	0.000
Weir Submergence	False
Orifice H to crest	False

Structure ID: TW Structure Type: TW Setup, DS Channel	
Tailwater Type	Free Outfall

Convergence Tolerances	
Maximum Iterations	40
Tailwater Tolerance (Minimum)	0.01 ft
Tailwater Tolerance (Maximum)	0.50 ft
Headwater Tolerance (Minimum)	0.01 ft
Headwater Tolerance (Maximum)	0.50 ft
Flow Tolerance (Minimum)	0.001 ft³/s
Flow Tolerance (Maximum)	10.000 ft³/s

Subsection: Composite Rating Curve
Label: LFB

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
555.98	0.00	(N/A)	0.00
556.08	0.00	(N/A)	0.00
556.18	0.00	(N/A)	0.00
556.28	0.00	(N/A)	0.00
556.38	0.00	(N/A)	0.00
556.48	0.00	(N/A)	0.00
556.58	0.00	(N/A)	0.00
556.68	0.00	(N/A)	0.00
556.78	0.00	(N/A)	0.00
556.88	0.00	(N/A)	0.00
556.98	0.00	(N/A)	0.00
557.08	0.00	(N/A)	0.00
557.18	0.00	(N/A)	0.00
557.28	0.00	(N/A)	0.00
557.38	0.00	(N/A)	0.00
557.48	0.00	(N/A)	0.00
557.58	0.00	(N/A)	0.00
557.68	0.00	(N/A)	0.00
557.78	0.00	(N/A)	0.00
557.88	0.00	(N/A)	0.00
557.98	0.00	(N/A)	0.00
558.08	0.00	(N/A)	0.00
558.18	0.00	(N/A)	0.00
558.28	0.00	(N/A)	0.00
558.38	0.00	(N/A)	0.00
558.48	0.00	(N/A)	0.00
558.58	0.00	(N/A)	0.00
558.68	0.00	(N/A)	0.00
558.78	0.00	(N/A)	0.00
558.88	0.00	(N/A)	0.00
558.98	0.00	(N/A)	0.00
559.08	0.00	(N/A)	0.00
559.18	0.00	(N/A)	0.00
559.28	0.00	(N/A)	0.00
559.38	0.00	(N/A)	0.00
559.48	0.00	(N/A)	0.00
559.58	0.00	(N/A)	0.00
559.68	0.00	(N/A)	0.00
559.78	0.00	(N/A)	0.00
559.88	0.00	(N/A)	0.00
559.98	0.00	(N/A)	0.00
560.08	0.00	(N/A)	0.00
560.18	0.00	(N/A)	0.00

Subsection: Composite Rating Curve
Label: LFB

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Water Surface Elevation (ft)	Flow (ft^3/s)	Tailwater Elevation (ft)	Convergence Error (ft)
560.28	0.00	(N/A)	0.00
560.38	0.00	(N/A)	0.00
560.48	0.00	(N/A)	0.00
560.58	0.00	(N/A)	0.00
560.68	0.00	(N/A)	0.00
560.78	0.00	(N/A)	0.00
560.88	1.49	(N/A)	0.00
560.98	4.21	(N/A)	0.00
561.08	7.74	(N/A)	0.00
561.18	11.92	(N/A)	0.00
561.28	16.66	(N/A)	0.00
561.38	21.91	(N/A)	0.00
561.48	27.59	(N/A)	0.00
561.58	33.71	(N/A)	0.00
561.68	40.23	(N/A)	0.00
561.78	47.12	(N/A)	0.00
561.88	54.36	(N/A)	0.00
561.98	61.94	(N/A)	0.00
562.08	69.84	(N/A)	0.00
562.18	71.72	(N/A)	0.00
562.28	72.25	(N/A)	0.00
562.38	72.78	(N/A)	0.00
562.48	73.29	(N/A)	0.00
562.58	73.81	(N/A)	0.00
562.68	74.33	(N/A)	0.00
562.78	74.83	(N/A)	0.00
562.88	75.34	(N/A)	0.00
562.98	75.84	(N/A)	0.00
563.00	75.94	(N/A)	0.00

Contributing Structures
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)

Grant Industrial Park

Subsection: Composite Rating Curve
Label: LFB

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
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(no Q: R0,C0)
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(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
(no Q: R0,C0)
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0

Subsection: Composite Rating Curve
Label: LFB

Return Event: 100 years
Storm Event:

Composite Outflow Summary

Contributing Structures
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0
R0,C0

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 100 years
Storm Event:

Infiltration	
Infiltration Method (Computed)	No Infiltration

Initial Conditions	
Elevation (Water Surface, Initial)	560.78 ft
Volume (Initial)	29,249.000 ft³
Flow (Initial Outlet)	0.00 ft³/s
Flow (Initial Infiltration)	0.00 ft³/s
Flow (Initial, Total)	0.00 ft³/s
Time Increment	1.00 min

Elevation (ft)	Outflow (ft³/s)	Storage (ft³)	Area (ft²)	Infiltration (ft³/s)	Flow (Total) (ft³/s)	2S/t + O (ft³/s)
555.98	0.00	0.000	0.000	0.00	0.00	0.00
556.08	0.00	0.894	21.713	0.00	0.00	0.03
556.18	0.00	5.217	69.210	0.00	0.00	0.17
556.28	0.00	15.629	143.491	0.00	0.00	0.52
556.38	0.00	34.808	244.558	0.00	0.00	1.16
556.48	0.00	65.433	372.408	0.00	0.00	2.18
556.58	0.00	110.183	527.044	0.00	0.00	3.67
556.68	0.00	171.735	708.464	0.00	0.00	5.72
556.78	0.00	252.768	916.668	0.00	0.00	8.43
556.88	0.00	355.961	1,151.657	0.00	0.00	11.87
556.98	0.00	483.993	1,413.431	0.00	0.00	16.13
557.08	0.00	638.692	1,680.283	0.00	0.00	21.29
557.18	0.00	820.738	1,964.342	0.00	0.00	27.36
557.28	0.00	1,032.299	2,270.575	0.00	0.00	34.41
557.38	0.00	1,275.592	2,598.981	0.00	0.00	42.52
557.48	0.00	1,552.835	2,949.560	0.00	0.00	51.76
557.58	0.00	1,866.243	3,322.311	0.00	0.00	62.21
557.68	0.00	2,218.036	3,717.237	0.00	0.00	73.93
557.78	0.00	2,610.430	4,134.335	0.00	0.00	87.01
557.88	0.00	3,045.642	4,573.606	0.00	0.00	101.52
557.98	0.00	3,525.890	5,035.050	0.00	0.00	117.53
558.08	0.00	4,047.723	5,375.553	0.00	0.00	134.92
558.18	0.00	4,600.954	5,690.567	0.00	0.00	153.37
558.28	0.00	5,186.135	6,014.551	0.00	0.00	172.87
558.38	0.00	5,804.163	6,347.503	0.00	0.00	193.47
558.48	0.00	6,455.935	6,689.425	0.00	0.00	215.20
558.58	0.00	7,142.347	7,040.315	0.00	0.00	238.08
558.68	0.00	7,864.297	7,400.175	0.00	0.00	262.14
558.78	0.00	8,622.681	7,769.004	0.00	0.00	287.42

Grant Industrial Park

Subsection: Elevation-Volume-Flow Table (Pond)
Label: BASIN B

Return Event: 100 years
Storm Event:

Elevation (ft)	Outflow (ft^3/s)	Storage (ft^3)	Area (ft^2)	Infiltration (ft^3/s)	Flow (Total) (ft^3/s)	2S/t + O (ft^3/s)
558.88	0.00	9,418.397	8,146.803	0.00	0.00	313.95
558.98	0.00	10,252.341	8,533.570	0.00	0.00	341.74
559.08	0.00	11,119.693	8,785.707	0.00	0.00	370.66
559.18	0.00	12,009.219	9,005.280	0.00	0.00	400.31
559.28	0.00	12,920.839	9,227.563	0.00	0.00	430.69
559.38	0.00	13,854.822	9,452.556	0.00	0.00	461.83
559.48	0.00	14,811.441	9,680.259	0.00	0.00	493.71
559.58	0.00	15,790.965	9,910.672	0.00	0.00	526.37
559.68	0.00	16,793.665	10,143.795	0.00	0.00	559.79
559.78	0.00	17,819.814	10,379.628	0.00	0.00	593.99
559.88	0.00	18,869.681	10,618.171	0.00	0.00	628.99
559.98	0.00	19,943.538	10,859.424	0.00	0.00	664.78
560.08	0.00	21,039.832	11,057.657	0.00	0.00	701.33
560.18	0.00	22,155.010	11,246.162	0.00	0.00	738.50
560.28	0.00	23,289.117	11,436.260	0.00	0.00	776.30
560.38	0.00	24,442.315	11,627.952	0.00	0.00	814.74
560.48	0.00	25,614.761	11,821.237	0.00	0.00	853.83
560.58	0.00	26,806.615	12,016.115	0.00	0.00	893.55
560.68	0.00	28,018.037	12,212.586	0.00	0.00	933.93
560.78	0.00	29,249.185	12,410.650	0.00	0.00	974.97
560.88	1.49	30,500.220	12,610.308	0.00	1.49	1,018.16
560.98	4.21	31,771.300	12,811.559	0.00	4.21	1,063.26
561.08	7.74	33,062.315	13,007.653	0.00	7.74	1,109.82
561.18	11.92	34,372.863	13,203.536	0.00	11.92	1,157.68
561.28	16.66	35,703.072	13,400.884	0.00	16.66	1,206.76
561.38	21.91	37,053.088	13,599.695	0.00	21.91	1,257.01
561.48	27.59	38,423.059	13,799.970	0.00	27.59	1,308.36
561.58	33.71	39,813.131	14,001.710	0.00	33.71	1,360.81
561.68	40.23	41,223.450	14,204.913	0.00	40.23	1,414.35
561.78	47.12	42,654.162	14,409.580	0.00	47.12	1,468.93
561.88	54.36	44,105.415	14,615.711	0.00	54.36	1,524.54
561.98	61.94	45,577.353	14,823.305	0.00	61.94	1,581.19
562.08	69.84	47,069.904	15,026.842	0.00	69.84	1,638.84
562.18	71.72	48,582.754	15,230.376	0.00	71.72	1,691.14
562.28	72.25	50,116.025	15,435.279	0.00	72.25	1,742.79
562.38	72.78	51,669.855	15,641.551	0.00	72.78	1,795.11
562.48	73.29	53,244.381	15,849.193	0.00	73.29	1,848.10
562.58	73.81	54,839.739	16,058.204	0.00	73.81	1,901.81
562.68	74.33	56,456.067	16,268.584	0.00	74.33	1,956.20
562.78	74.83	58,093.502	16,480.333	0.00	74.83	2,011.28
562.88	75.34	59,752.179	16,693.451	0.00	75.34	2,067.08
562.98	75.84	61,432.237	16,907.938	0.00	75.84	2,123.58
563.00	75.94	61,770.827	16,951.000	0.00	75.94	2,134.97

Summary for Hydrograph Addition at 'BASIN B'

Upstream Link	Upstream Node
<Catchment to Outflow Node>	Hyd Queue 10

Node Inflows

Inflow Type	Element	Volume (ft^3)	Time to Peak (min)	Flow (Peak) (ft^3/s)
Flow (From)	Hyd Queue 10	30,204.000	6.00	25.17
Flow (In)	BASIN B	30,204.000	6.00	25.17


THIS SHEET FOR DRAINAGE PURPOSES ONLY. NOT TO BE USED FOR CONSTRUCTION.
POST DRAINAGE AREA MAP
EXHIBIT 2
POST DRAINAGE AREA MAP
GRANT INDUSTRIAL PARK
01-11691B
12-29-15
GRAPHIC SCALE
(IN FEET)
1 inch = 40 ft.
ENGINEERING
PLANNING
SURVEYING
221 Point West Blvd.
St. Charles, MO 63301
636-928-5552
FAX 928-1718
HOFF ROAD
40' WIDE
N55°59'24"E 192.40'
S82°30'36"E 118.01'
N00°32'14"W 132.19'
N89°27'46"E 330.48'
S89°48'12"W 185.61'
N01°30'18"E 247.55'
WATER QUALITY "C"
TIME OF CONCENTRATION
8' C.L. FENCE
35' REAR SETBACK
SOIL MIX AREA
WATER QUALITY "B"
EXISTING
DETENTION
BASIN B
BASIN Q=12.63cfs
BASIN INFLOW
2.70 ac. @ 1.87
2.83 ac. @ 3.85
Q = 15.95c.f.s.
8' X 50' RIP RAP
DIRECT RUNOFF
1.63 ac. @ 1.87
0.07 ac. @ 3.85
Q = 3.32 c.f.s.
20' WIDE EASEMENT
CUIVRE RIVER ELECTRIC COOPERATIVE
(APPROXIMATE LOCATION - DESCRIPTION VAGUE)
793/336
EX. RIP-RAP
EX. BASIN B
2YR./20MIN. HW=559.54 558.18
15YR./20MIN. HW=560.35 558.98
25YR./20MIN. HW=560.78 559.37
100YR./20MIN. HW=561.35 559.86
100YR./20MIN.(L.F.B.) HW=562.30 561.43
SKID CANOPY
PROPOSED BUILDING
FF 579.00
OFFICE
AREA
FF 579.00
OVERHEAD DOOR (TYP)
DOOR (TYP)
30' FRONT SETBACK
GRANT INDUSTRIAL DRIVE
4"W. WHITE PAINT STRIPE 1' OFF E.O.P.
4"W. YELLOW PAINT STRIPE @ STRIPE
4"W. WHITE PAINT STRIPE 6' OFF E.O.P.
HOFF ROAD 40' WIDE
NOTE: EXISTING BASIN WILL BE RESTORED
TO THE APPROVED DESIGN PRIOR TO THE
FINAL OCCUPANCY PERMIT BEING ISSUED.
EX. BASIN A
2YR./20MIN. HW=569.08
15YR./20MIN. HW=570.05
25YR./20MIN. HW=570.55
100YR./20MIN. HW=571.22
100YR./20MIN.(L.F.B.) HW=572.27
WATER QUALITY "A"
EXISTING
DETENTION
BASIN A
BASIN Q=11.91cfs
Q=9.25 cfs
SANITARY MH
21" FLARED END
UNDERGROUND UTILITIES HAVE BEEN PLOTTED FROM AVAILABLE INFORMATION AND THEREFORE THEIR LOCATIONS SHALL BE CONSIDERED APPROXIMATE ONLY. THE VERIFICATION OF THE LOCATION OF ALL UNDERGROUND UTILITIES, EITHER SHOWN OR NOT SHOWN ON THESE PLANS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR, AND SHALL BE LOCATED PRIOR TO ANY GRADING OR CONSTRUCTION OF THE IMPROVEMENTS.
STATE OF MISSOURI
LARRY DAVID WALKER
NUMBER PE-2007020343
PROFESSIONAL ENGINEER
12/29/15
Larry D. Walker
Civil Engineer
2007020343
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Surveying Authority No. 000144
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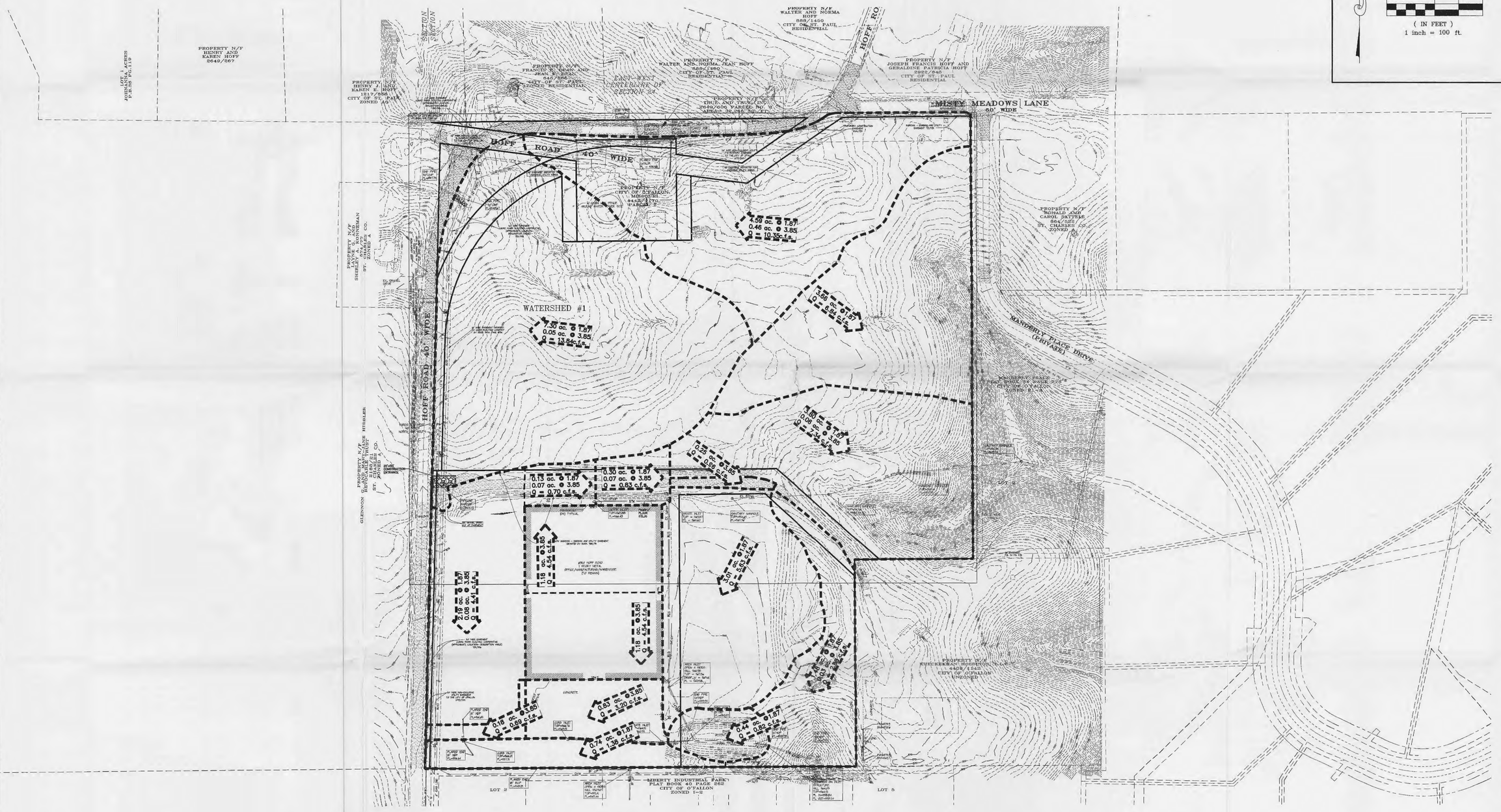
EXISTING DRAINAGE AREA MAP

EXHIBIT 1
EXISTING DRAINAGE AREA MAP
GRANT INDUSTRIAL PARK
01-11691B
12-29-15

GRAPHIC SCALE
100 0 50 100
(IN FEET)
1 inch = 100 ft.

BAX
ENGINEERING
PLANNING
SURVEYING
221 Point West Blvd.
St. Charles, MO 63301
636-926-5552
FAX 926-1718



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Larry D. Walker
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