Drainage Report and Design Summary for:

Prepared for:

TSC #4569.900

HERITAGE SECTION 9

Franklin, Indiana

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December 13, 2016

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DRAINAGE NARRATIVE

Site location:

Heritage Section 9 is a 67-lot residential development located at the north end of the previously developed Heritage subdivision. The overall site is located on the west side of CR 350 E, approximately 3,400' south of Earlywood Drive in Franklin, IN.

Terrain and existing drainage condition:

The existing site is a former agricultural property which has sat idle for years and is covered with natural growth. The site slopes generally from the northwest to the southeast.

Adjoining land conditions:

North: Agricultural
South: Heritage residential development
East: Agricultural
West: Agricultural

Overall Master Plan Drainage Design:

The detention design for this section will match that of the previous overall drainage design. The design of overall stormwater release rates and water quality analysis has already been submitted and approved for the Heritage residential development. This information can be found in the drainage report titled "*HERITAGE – SECTION 1*" which is dated July 25, 2003. The overall detention model (ICPR) will be modified to match the proposed conditions for Heritage Section 9.

The main focus of this revised model will be the peak stages of the fully constructed Lake #2. Watershed areas, including onsite and offsite areas, which drain to Lake #1 and Lake #2 will be modified to match the proposed conditions for Heritage Section 9. The following table compares the peak stages in Lake #1 and Lake #2 between the original overall drainage design and the proposed conditions for Section 9:

Peak Stage Comparison for Lake #1 and Lake #2				
	Original Overall Design		Section 9	
Storm Event	Lake #1	Lake #2	Lake #1	Lake #2
10-year	755.05	751.67	752.46	747.08
100-year	757.00	752.97	754.02	749.07

The results of the revised model show that the peak stages of Lake #1 and Lake #2 are below the top of bank. Also, both are lower than the previously submitted and approved (Section 1) peak stages. See Appendix C for more information.

Storm Sewer Design:

The design of the proposed storm sewers (10-year event) for Heritage Section 9 is in compliance with the City of Franklin Subdivision Control Ordinance with regards to "c" values, rainfall intensities, pipe slopes, etc. Previously designed storm sewers in Section 5, Section 6, Section 7 and Section 8 are also included but their design will not be changed. See Appendix D for more information.

Water Quality Design:

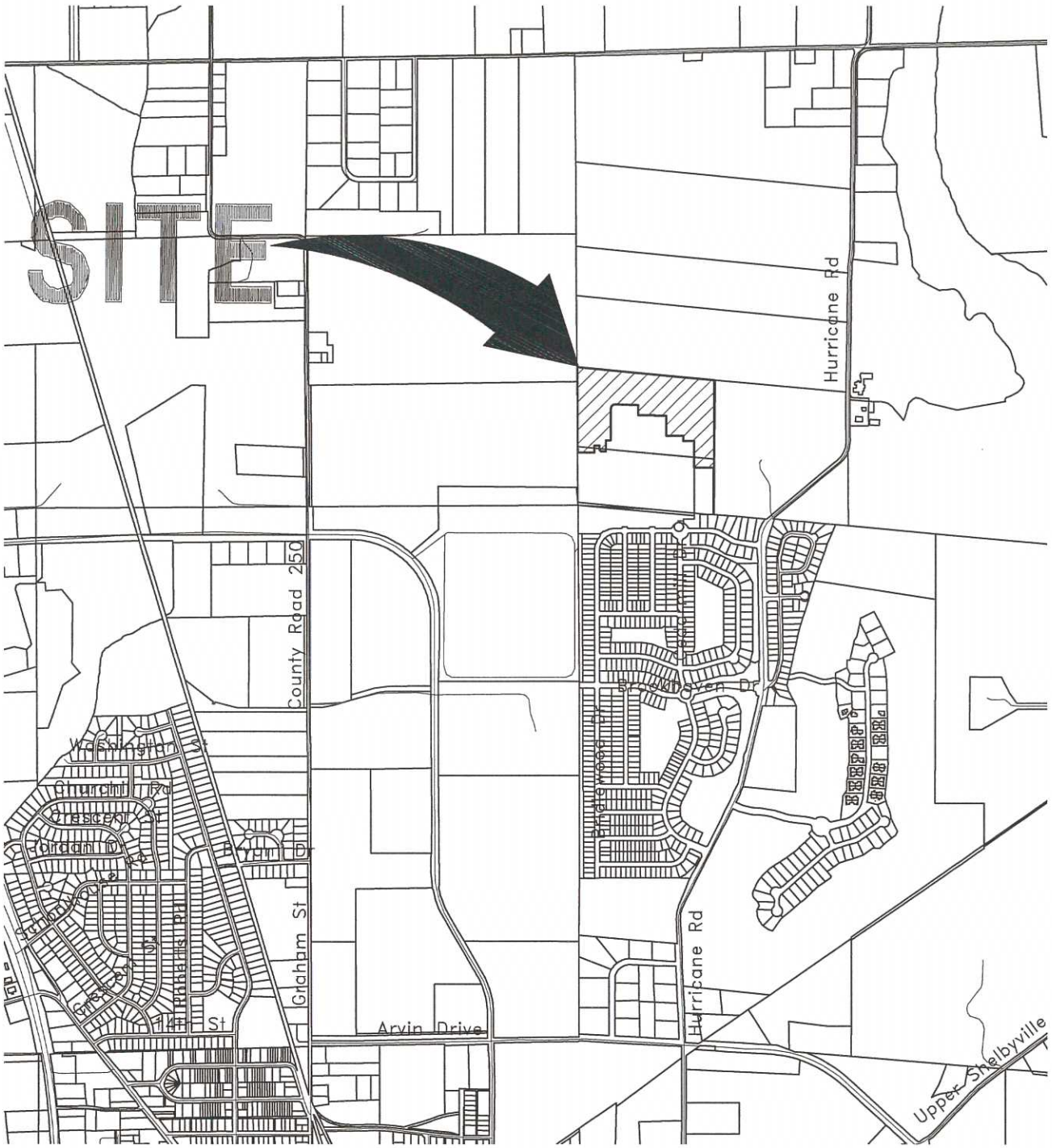
The overall water quality design for the Heritage residential development has been previously submitted and approved. No modifications to this overall design are being proposed at this time. See the Section 1 drainage report for more information.

References:

Design and data methods are based on the following references:

1. HERPICC Stormwater Drainage Manual
2. City of Franklin Subdivision Control Ordinance
3. Federal Emergency Management Agency
4. ICPR v3.10 by Streamline Technologies

SITE MAPS



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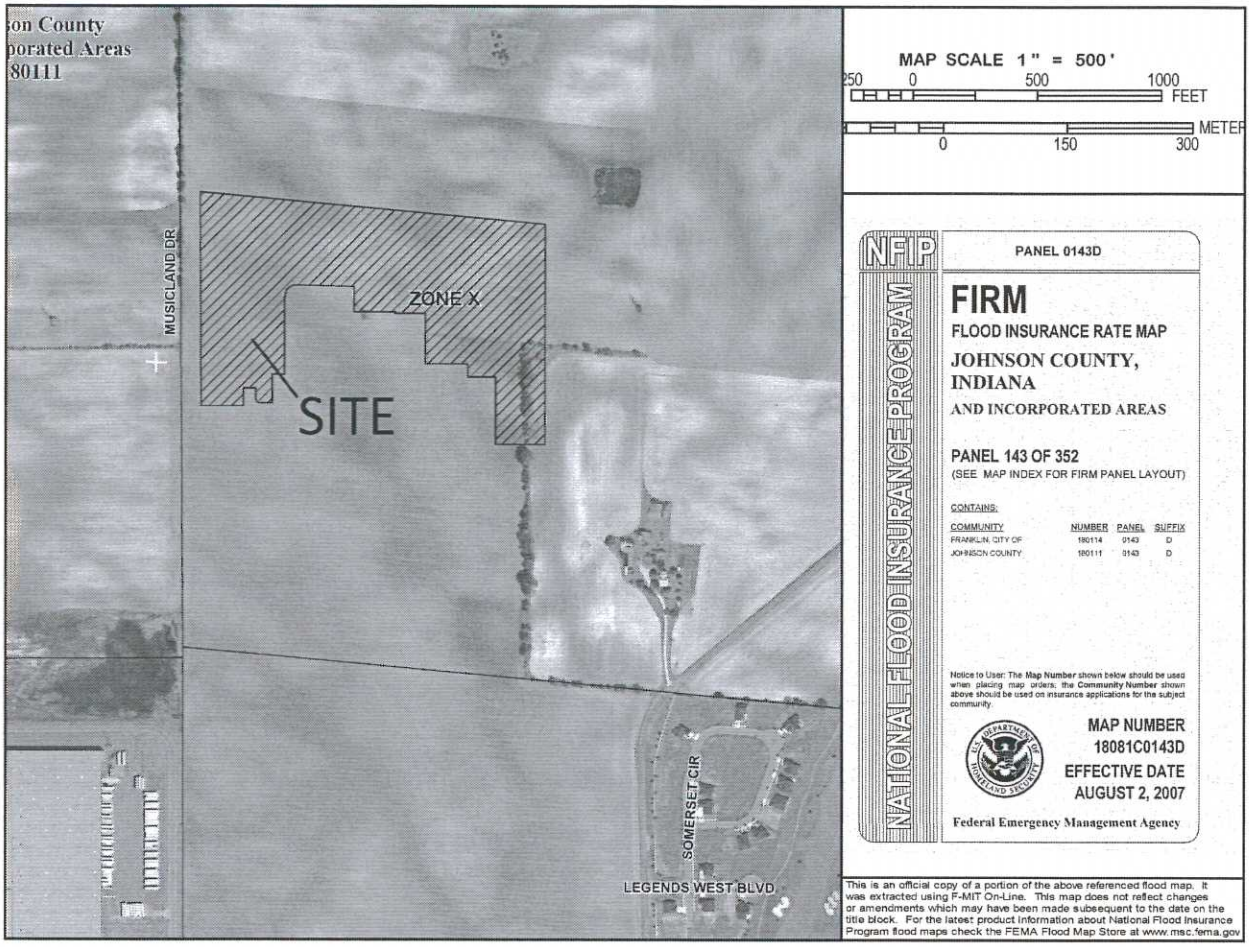
HERITAGE
SECTION 9
VICINITY MAP
FRANKLIN, IN

N

Not to Scale



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HERITAGE
SECTION 9
FIRM MAP
FRANKLIN, IN

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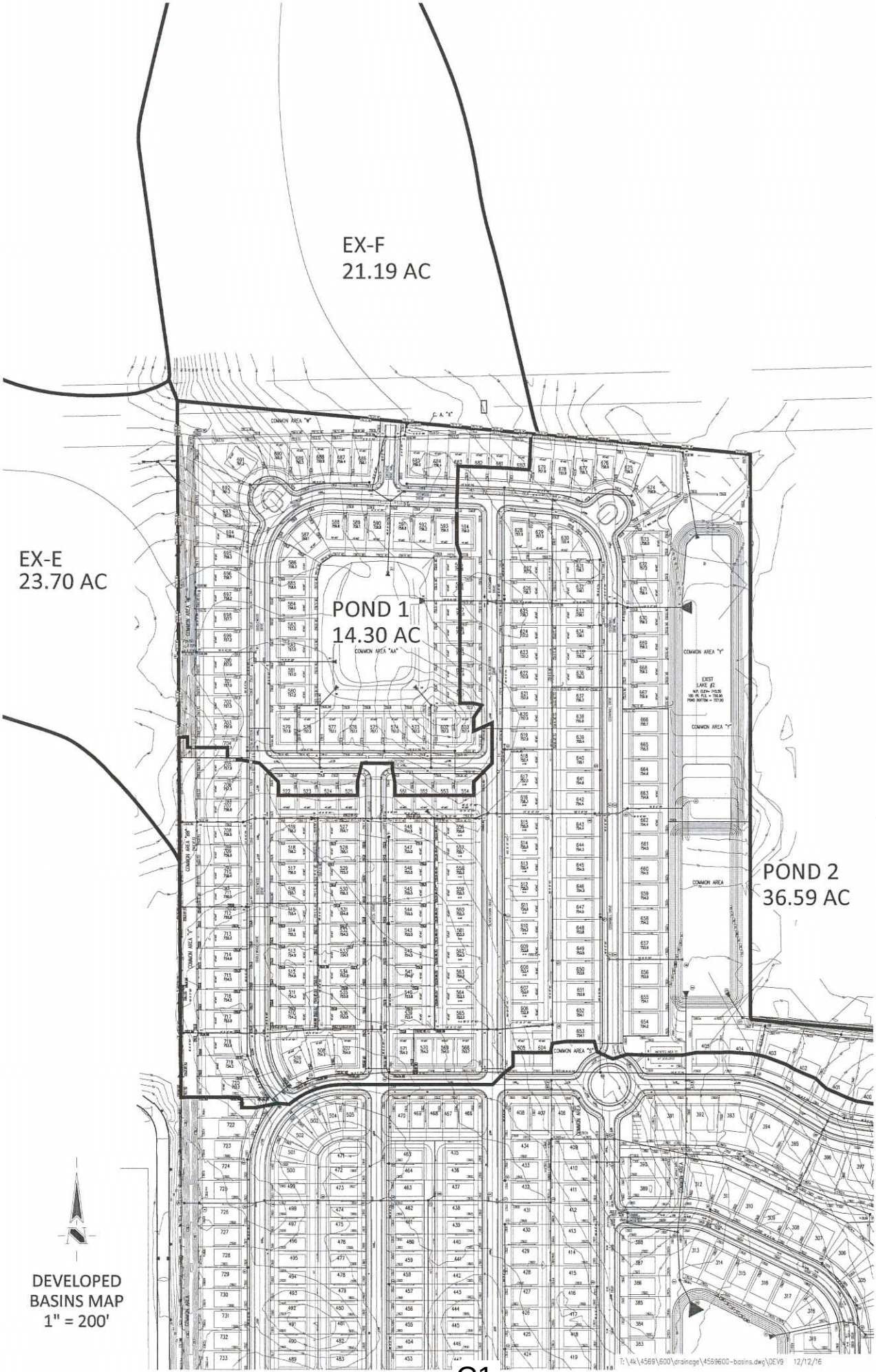
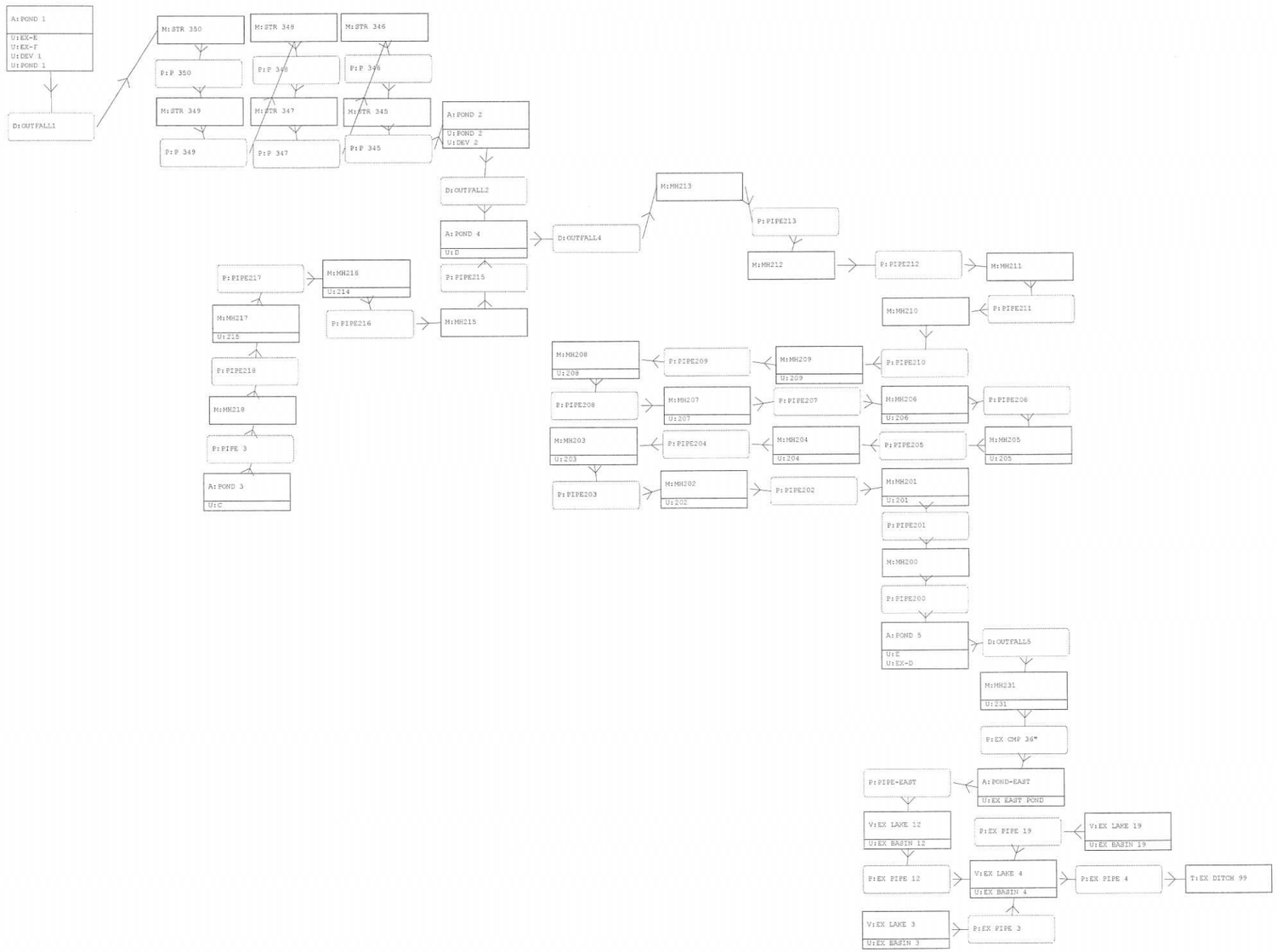
DEVELOPED CONDITIONS


EX-F
21.19 AC
EX-E
23.70 AC
POND 1
14.30 AC
POND 2
36.59 AC
COMMON AREA "W"
COMMON AREA "AA"
COMMON AREA "Y"
COMMON AREA "S"
COMMON AREA
EXIST LAKE #2
DEVELOPED
BASINS MAP
1" = 200'



Nodes
A Stage/Area
V Stage/Volume
T Time/Stage
M Manhole

Basins
O Overland Flow
U SCS Unit CN
S SBUH CN
Y SCS Unit GA
Z SBUH GA

Links
P Pipe
W Weir
C Channel
D Drop Structure
B Bridge
R Rating Curve
H Breach
E Percolation
F Filter
X Exfil Trench

Name	Simulation	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Inflow cfs	Max Outflow cfs
EX DITCH 99	010YR-01HR	731.65	733.00	0.00	114	4.66	0.00
EX DITCH 99	010YR-02HR	731.80	733.00	0.00	136	19.73	0.00
EX DITCH 99	010YR-03HR	731.88	733.00	0.00	136	41.37	0.00
EX DITCH 99	010YR-06HR	732.10	733.00	0.00	133	50.53	0.00
EX DITCH 99	010YR-12HR	732.62	733.00	0.00	124	50.71	0.00
EX DITCH 99	010YR-24HR	733.00	733.00	0.00	136	54.82	0.00
EX DITCH 99	100YR-01HR	731.65	733.00	0.00	145	31.05	0.00
EX DITCH 99	100YR-02HR	731.80	733.00	0.00	144	55.56	0.00
EX DITCH 99	100YR-03HR	731.95	733.00	0.00	136	70.03	0.00
EX DITCH 99	100YR-06HR	732.10	733.00	0.00	143	74.99	0.00
EX DITCH 99	100YR-12HR	732.63	733.00	0.00	131	74.65	0.00
EX DITCH 99	100YR-24HR	733.00	733.00	0.00	145	77.78	0.00
EX LAKE 12	010YR-01HR	738.67	742.00	0.00	48809	22.77	1.01
EX LAKE 12	010YR-02HR	739.29	742.00	0.00	49065	29.83	8.80
EX LAKE 12	010YR-03HR	739.53	742.00	0.00	49058	35.68	13.47
EX LAKE 12	010YR-06HR	739.76	742.00	0.00	49028	50.61	16.11
EX LAKE 12	010YR-12HR	740.02	742.00	0.00	48872	56.95	18.76
EX LAKE 12	010YR-24HR	740.23	742.00	0.00	48671	55.58	19.82
EX LAKE 12	100YR-01HR	739.63	742.00	0.00	49083	65.09	10.78
EX LAKE 12	100YR-02HR	740.32	742.00	0.00	48784	65.29	20.62
EX LAKE 12	100YR-03HR	740.65	742.00	0.00	48419	70.21	21.94
EX LAKE 12	100YR-06HR	741.23	742.00	0.00	47996	82.07	22.15
EX LAKE 12	100YR-12HR	742.22	742.00	0.00	47975	97.43	22.12
EX LAKE 12	100YR-24HR	742.64	742.00	0.00	47975	100.74	22.12
EX LAKE 19	010YR-01HR	734.74	737.50	0.00	61966	67.08	11.28
EX LAKE 19	010YR-02HR	735.32	737.50	0.00	61898	83.64	22.58
EX LAKE 19	010YR-03HR	735.53	737.50	0.00	61818	94.90	26.53
EX LAKE 19	010YR-06HR	735.89	737.50	0.00	61542	110.51	31.39
EX LAKE 19	010YR-12HR	736.28	737.50	0.00	61253	118.56	34.41
EX LAKE 19	010YR-24HR	736.47	737.50	0.00	61220	112.58	36.35
EX LAKE 19	100YR-01HR	736.23	737.50	0.00	61271	153.15	29.24
EX LAKE 19	100YR-02HR	736.73	737.50	0.00	61236	152.85	38.12
EX LAKE 19	100YR-03HR	737.02	737.50	0.00	61219	163.27	40.38
EX LAKE 19	100YR-06HR	737.55	737.50	0.00	61169	181.39	44.18
EX LAKE 19	100YR-12HR	738.36	737.50	0.00	61034	196.57	47.36
EX LAKE 19	100YR-24HR	738.51	737.50	0.00	61034	179.23	45.32
EX LAKE 3	010YR-01HR	738.23	741.00	0.00	88214	17.27	0.14
EX LAKE 3	010YR-02HR	738.42	741.00	0.00	88164	21.85	0.52
EX LAKE 3	010YR-03HR	738.53	741.00	0.00	88135	25.40	0.59
EX LAKE 3	010YR-06HR	738.72	741.00	0.00	88003	30.01	0.64
EX LAKE 3	010YR-12HR	738.90	741.00	0.00	88003	33.18	0.66
EX LAKE 3	010YR-24HR	739.00	741.00	0.00	88003	31.44	0.65
EX LAKE 3	100YR-01HR	738.57	741.00	0.00	88118	42.62	0.64
EX LAKE 3	100YR-02HR	738.79	741.00	0.00	88003	42.45	0.65
EX LAKE 3	100YR-03HR	738.96	741.00	0.00	88003	46.40	0.65
EX LAKE 3	100YR-06HR	739.25	741.00	0.00	88003	51.38	0.66
EX LAKE 3	100YR-12HR	739.64	741.00	0.00	88003	57.15	0.69
EX LAKE 3	100YR-24HR	739.82	741.00	0.00	88003	51.67	0.69
EX LAKE 4	010YR-01HR	732.63	736.00	0.00	79557	30.17	4.66
EX LAKE 4	010YR-02HR	733.41	736.00	0.00	79788	44.52	19.73
EX LAKE 4	010YR-03HR	733.78	736.00	0.00	79643	52.61	41.37
EX LAKE 4	010YR-06HR	734.02	736.00	0.00	79419	63.30	50.53
EX LAKE 4	010YR-12HR	734.57	736.00	0.00	78186	72.88	50.71
EX LAKE 4	010YR-24HR	734.71	736.00	0.00	78096	79.78	54.82
EX LAKE 4	100YR-01HR	733.50	736.00	0.00	79736	79.30	31.05
EX LAKE 4	100YR-02HR	734.15	736.00	0.00	79006	83.66	55.56
EX LAKE 4	100YR-03HR	734.53	736.00	0.00	77885	90.55	70.03
EX LAKE 4	100YR-06HR	734.66	736.00	0.00	77758	102.79	74.99
EX LAKE 4	100YR-12HR	735.39	736.00	0.00	77688	119.76	74.65
EX LAKE 4	100YR-24HR	735.50	736.00	0.00	77687	125.31	77.78
MH231	010YR-01HR	741.35	746.00	0.00	170	3.17	3.07
MH231	010YR-02HR	741.47	746.00	-0.00	172	3.78	3.67
MH231	010YR-03HR	741.57	746.00	0.00	173	4.26	4.13
MH231	010YR-06HR	741.68	746.00	0.00	174	4.81	4.65
MH231	010YR-12HR	741.74	746.00	-0.00	175	4.97	4.98
MH231	010YR-24HR	741.87	746.00	-0.00	175	5.12	5.03
MH231	100YR-01HR	741.94	746.00	0.00	175	7.58	7.54
MH231	100YR-02HR	741.93	746.00	0.00	175	7.27	7.26
MH231	100YR-03HR	742.08	746.00	0.00	175	7.88	7.87
MH231	100YR-06HR	742.32	746.00	0.00	173	8.54	8.51
MH231	100YR-12HR	742.70	746.00	-0.02	165	8.56	15.81
MH231	100YR-24HR	742.78	746.00	-0.02	162	10.20	15.55
POND 1	010YR-01HR	749.38	756.00	0.00	59898	15.15	0.29
POND 1	010YR-02HR	749.98	756.00	0.00	62196	20.05	0.80
POND 1	010YR-03HR	750.47	756.00	0.00	64148	24.53	1.05

Name	Simulation	Max Stage ft	Warning Stage ft	Max Delta Stage ft	Max Surf Area ft2	Max Inflow cfs	Max Outflow cfs
POND 1	010YR-06HR	751.27	756.00	0.00	67312	31.55	1.34
POND 1	010YR-12HR	752.03	756.00	0.00	70348	38.44	1.58
POND 1	010YR-24HR	752.46	756.00	0.00	72108	42.82	1.69
POND 1	100YR-01HR	750.06	756.00	0.00	62540	47.21	0.85
POND 1	100YR-02HR	751.12	756.00	0.00	66677	46.61	1.29
POND 1	100YR-03HR	751.93	756.00	0.00	69934	52.77	1.55
POND 1	100YR-06HR	753.13	756.00	0.00	74917	64.15	3.26
POND 1	100YR-12HR	753.84	756.00	0.00	77935	80.13	6.55
POND 1	100YR-24HR	754.02	756.00	0.00	78713	84.01	7.51
POND 2	010YR-01HR	745.95	753.00	0.00	132052	46.88	0.82
POND 2	010YR-02HR	746.34	753.00	0.00	135776	58.59	2.41
POND 2	010YR-03HR	746.55	753.00	0.00	137852	66.71	3.45
POND 2	010YR-06HR	746.80	753.00	0.00	140277	77.76	5.10
POND 2	010YR-12HR	746.96	753.00	0.00	141760	84.24	5.62
POND 2	010YR-24HR	747.08	753.00	0.00	142895	81.09	5.85
POND 2	100YR-01HR	746.52	753.00	0.00	137515	107.26	3.23
POND 2	100YR-02HR	746.96	753.00	0.00	141718	106.96	5.88
POND 2	100YR-03HR	747.20	753.00	0.00	144143	115.57	6.82
POND 2	100YR-06HR	747.58	753.00	0.00	147905	128.02	7.47
POND 2	100YR-12HR	748.47	753.00	0.00	156772	139.72	7.31
POND 2	100YR-24HR	749.07	753.00	0.00	162704	129.49	7.14
POND 3	010YR-01HR	745.70	749.50	0.00	55666	42.69	1.74
POND 3	010YR-02HR	745.96	749.50	0.00	56898	53.49	3.09
POND 3	010YR-03HR	746.08	749.50	0.00	57463	61.11	3.82
POND 3	010YR-06HR	746.23	749.50	0.00	58185	69.19	4.72
POND 3	010YR-12HR	746.49	749.50	0.00	59418	70.50	5.68
POND 3	010YR-24HR	746.84	749.50	0.00	61088	58.09	6.26
POND 3	100YR-01HR	746.51	749.50	0.00	59533	101.59	6.40
POND 3	100YR-02HR	746.61	749.50	0.00	59992	99.97	6.58
POND 3	100YR-03HR	746.74	749.50	0.00	60631	106.52	7.02
POND 3	100YR-06HR	747.14	749.50	0.00	62605	113.75	7.29
POND 3	100YR-12HR	748.04	749.50	0.00	67279	116.59	6.64
POND 3	100YR-24HR	748.68	749.50	0.00	70639	91.98	6.18
POND 4	010YR-01HR	744.73	750.00	0.00	139051	94.60	1.48
POND 4	010YR-02HR	745.17	750.00	0.00	141922	118.22	3.22
POND 4	010YR-03HR	745.47	750.00	0.00	143896	133.85	4.70
POND 4	010YR-06HR	746.00	750.00	0.00	147303	150.09	5.75
POND 4	010YR-12HR	746.48	750.00	0.00	150606	155.99	6.00
POND 4	010YR-24HR	746.83	750.00	0.00	152990	133.89	6.02
POND 4	100YR-01HR	745.64	750.00	0.00	144963	216.42	5.10
POND 4	100YR-02HR	746.09	750.00	0.00	147961	213.76	5.89
POND 4	100YR-03HR	746.46	750.00	0.00	150502	227.34	5.96
POND 4	100YR-06HR	747.12	750.00	0.00	155065	243.70	5.86
POND 4	100YR-12HR	748.05	750.00	0.00	161499	255.27	5.34
POND 4	100YR-24HR	748.68	750.00	0.00	165938	211.53	5.17
POND 5	010YR-01HR	741.74	748.00	0.00	161452	154.74	1.27
POND 5	010YR-02HR	742.43	748.00	0.00	165938	191.48	1.81
POND 5	010YR-03HR	742.93	748.00	0.00	169339	219.88	2.12
POND 5	010YR-06HR	743.79	748.00	0.00	175124	250.38	2.57
POND 5	010YR-12HR	744.78	748.00	0.00	182023	263.98	3.02
POND 5	010YR-24HR	745.61	748.00	0.00	188002	236.55	3.36
POND 5	100YR-01HR	743.13	748.00	0.00	170667	356.14	2.23
POND 5	100YR-02HR	743.80	748.00	0.00	175173	351.11	2.58
POND 5	100YR-03HR	744.42	748.00	0.00	179482	377.96	2.86
POND 5	100YR-06HR	745.35	748.00	0.00	186113	409.81	3.26
POND 5	100YR-12HR	746.63	748.00	0.00	195299	435.40	4.59
POND 5	100YR-24HR	746.97	748.00	0.00	197802	374.96	10.12
POND-EAST	010YR-01HR	741.11	743.00	-0.00	350	5.29	5.25
POND-EAST	010YR-02HR	741.26	743.00	0.00	357	6.42	6.36
POND-EAST	010YR-03HR	741.40	743.00	0.00	359	7.43	7.37
POND-EAST	010YR-06HR	741.46	743.00	-0.00	352	8.69	14.34
POND-EAST	010YR-12HR	741.62	743.00	-0.00	339	10.01	14.35
POND-EAST	010YR-24HR	741.72	743.00	-0.00	332	9.73	9.69
POND-EAST	100YR-01HR	741.85	743.00	0.01	342	12.56	14.36
POND-EAST	100YR-02HR	741.84	743.00	0.01	341	12.43	14.37
POND-EAST	100YR-03HR	742.00	743.00	0.01	353	13.58	14.37
POND-EAST	100YR-06HR	742.23	743.00	0.01	378	14.93	14.81
POND-EAST	100YR-12HR	742.68	743.00	0.01	420	22.56	16.54
POND-EAST	100YR-24HR	742.77	743.00	-0.01	404	22.01	18.82

Peak Stages during 100-year storm event

CONTENTS FROM HERITAGE
SECTION 1 DRAINAGE REPORT

Name	Group	Simulation	Max Time Stage hrs	Stage ft	Stage ft	Stage ft	Max Surf Area ft2	Max Time Inflow hrs	Max Inflow cfs	Max Time Outflow hrs	Max Outflow cfs
MH215	DEV	100YR-24HR	24.11	748.835	748.600	0.0082	120	12.02	5.831	11.96	5.131
MH216	DEV	100YR-24HR	24.12	748.831	750.000	0.0061	121	12.75	2.851	12.57	2.904
MH231	DEV	100YR-24HR	22.82	742.924	746.000	-0.0244	160	24.01	16.401	22.83	16.641
POND 1	DEV	100YR-24HR	12.96	756.996	757.000	0.0043	91458	12.07	183.972	13.30	44.110
POND 2	DEV	100YR-24HR	16.92	752.971	753.000	0.0021	187056	12.03	205.645	16.61	18.497
POND 3	DEV	100YR-24HR	24.23	748.833	750.000	0.0025	53362	12.03	82.090	12.75	2.851
POND 4	DEV	100YR-24HR	23.65	749.967	750.000	0.0022	159526	12.05	206.443	23.24	12.322
POND 5	DEV	100YR-24HR	24.04	747.247 *	748.000	0.0033	199763	12.05	386.852	24.04	16.340 *
POND-EAST	DEV	100YR-24HR	13.43	742.785	743.000	0.0119	406	12.00	21.986	22.82	19.887
EX DITCH 99	DEV	10YR-01HR	1.00	731.575	733.000	0.0010	100	1.00	2.822	0.00	0.000
EX LAKE 12	DEV	10YR-01HR	1.00	738.627	742.000	0.0014	48759	0.80	22.789	1.00	1.011
EX LAKE 19	DEV	10YR-01HR	1.00	734.746	737.500	0.0030	61966	0.80	67.078	1.00	11.296
EX LAKE 3	DEV	10YR-01HR	1.00	738.231	741.000	0.0005	88214	0.78	17.265	1.00	0.144
EX LAKE 4	DEV	10YR-01HR	1.00	732.419	736.000	0.0011	79585	1.00	30.181	1.00	2.822
MH200	DEV	10YR-01HR	0.80	742.684	748.600	0.0047	574	0.79	25.866	0.80	25.836
MH201	DEV	10YR-01HR	0.80	743.007	747.600	0.0049	985	0.79	26.087	0.79	25.866
MH202	DEV	10YR-01HR	0.79	743.340	749.200	0.0040	1216	0.76	21.485	0.79	21.133
MH203	DEV	10YR-01HR	0.79	743.567	749.800	0.0047	826	0.78	20.940	0.76	20.695
MH204	DEV	10YR-01HR	0.79	743.665	746.600	0.0050	595	0.76	16.178	0.79	16.169
MH205	DEV	10YR-01HR	0.80	743.786	746.800	0.0050	851	0.78	12.661	0.82	12.927
MH206	DEV	10YR-01HR	0.80	743.899	747.000	0.0050	641	0.76	12.267	0.79	11.801
MH207	DEV	10YR-01HR	0.79	744.015	748.190	-0.0039	275	0.80	10.865	0.76	11.477
MH208	DEV	10YR-01HR	0.79	744.088	748.190	0.0037	268	0.79	10.732	0.80	10.108
MH209	DEV	10YR-01HR	0.78	744.157	747.300	0.0030	416	0.76	9.252	0.79	9.971
MH210	DEV	10YR-01HR	0.78	744.294	748.250	-0.0045	344	0.76	7.895	0.77	7.634
MH211	DEV	10YR-01HR	0.78	744.391	748.250	0.0029	184	0.76	5.750	0.79	5.953
MH212	DEV	10YR-01HR	0.78	744.472	748.500	0.0036	292	0.86	4.345	0.92	4.679
MH213	DEV	10YR-01HR	0.78	744.631	750.000	0.0021	360	0.85	4.274	0.86	4.345
MH214	DEV	10YR-01HR	0.75	745.252	748.600	0.0030	248	0.74	4.749	0.75	4.740
MH215	DEV	10YR-01HR	0.75	745.281	748.600	-0.0046	259	0.73	2.934	0.75	2.921
MH216	DEV	10YR-01HR	0.76	745.318	750.000	0.0033	264	1.00	1.327	1.00	1.356
MH231	DEV	10YR-01HR	0.63	741.351	746.000	0.0041	170	0.60	3.166	0.61	3.070
POND 1	DEV	10YR-01HR	1.00	752.479	757.000	0.0031	71785	0.87	69.345	1.00	4.727
POND 2	DEV	10YR-01HR	1.00	748.095	753.000	0.0009	147452	0.62	104.557	1.00	0.581
POND 3	DEV	10YR-01HR	1.00	745.917	750.000	0.0016	38854	0.63	38.099	1.00	1.327
POND 4	DEV	10YR-01HR	1.00	744.779	750.000	0.0016	127056	0.65	96.084	1.00	0.961
POND 5	DEV	10YR-01HR	1.00	741.752	748.000	0.0025	161529	0.68	155.593	1.00	1.241
POND-EAST	DEV	10YR-01HR	0.67	741.107	743.000	-0.0047	350	0.66	5.291	0.67	5.253
EX DITCH 99	DEV	10YR-02HR	2.00	731.650	733.000	0.0013	142	2.00	17.031	0.00	0.000
EX LAKE 12	DEV	10YR-02HR	2.00	739.292	742.000	0.0016	49066	1.26	29.847	2.00	8.801
EX LAKE 19	DEV	10YR-02HR	1.86	735.325	737.500	0.0028	61898	1.28	83.640	2.00	22.581
EX LAKE 3	DEV	10YR-02HR	2.00	738.415	741.000	0.0005	88164	1.27	21.848	2.00	0.523
EX LAKE 4	DEV	10YR-02HR	2.00	733.298	736.000	0.0031	79779	2.00	44.537	2.00	17.031
MH200	DEV	10YR-02HR	1.28	742.920	748.600	0.0047	570	1.27	31.909	1.28	31.832
MH201	DEV	10YR-02HR	1.27	743.276	747.600	0.0038	967	1.28	32.013	1.27	31.909
MH202	DEV	10YR-02HR	1.27	743.639	749.200	0.0041	1184	1.24	26.756	1.28	25.987
MH203	DEV	10YR-02HR	1.27	743.881	749.800	0.0043	800	1.28	25.568	1.24	25.871
MH204	DEV	10YR-02HR	1.26	743.984	746.600	0.0045	563	1.24	20.496	1.28	19.699
MH205	DEV	10YR-02HR	1.27	744.107	746.800	0.0050	808	1.28	15.304	1.24	15.912
MH206	DEV	10YR-02HR	1.27	744.213	747.000	0.0050	616	1.24	15.473	1.28	14.280
MH207	DEV	10YR-02HR	1.27	744.310	748.190	-0.0046	268	1.20	13.961	1.24	14.587
MH208	DEV	10YR-02HR	1.27	744.380	748.190	0.0046	261	1.24	13.232	1.28	12.936
MH209	DEV	10YR-02HR	1.27	744.444	747.300	0.0040	405	1.28	11.376	1.24	12.078
MH210	DEV	10YR-02HR	1.27	744.561	748.250	0.0049	338	1.24	9.586	1.28	9.506
MH211	DEV	10YR-02HR	1.27	744.645	748.250	0.0032	183	1.28	6.816	1.24	7.149

Previous peak stages for POND 1 and POND 2

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==== Basins ====
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Name: 201 Node: MH201 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 20.00
Area(ac): 2.900 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 202 Node: MH202 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 6.00
Area(ac): 1.000 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 203 Node: MH203 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 17.00
Area(ac): 3.000 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 204 Node: MH204 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 16.00
Area(ac): 2.100 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 205 Node: MH205 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 15.00
Area(ac): 0.600 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 206 Node: MH206 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 6.00
Area(ac): 1.000 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 207 Node: MH207 Status: Onsite

Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 13.00
Area(ac): 0.600 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 208 Node: MH208 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 13.00
Area(ac): 0.600 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 209 Node: MH209 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 20.00
Area(ac): 0.900 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 214 Node: MH216 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 19.00
Area(ac): 1.000 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 215 Node: MH217 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 16.00
Area(ac): 1.100 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: 231 Node: MH231 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 10.00
Area(ac): 1.300 Time Shift(hrs): 0.00
Curve Number: 84.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: C Node: POND 3 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 12.00
Area(ac): 18.600 Time Shift(hrs): 0.00

Curve Number: 82.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: D Node: POND 4 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 14.00
Area(ac): 40.100 Time Shift(hrs): 0.00
Curve Number: 83.50 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: DEV 1 Node: POND 1 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 40.00
Area(ac): 9.310 Time Shift(hrs): 0.00
Curve Number: 81.90 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: DEV 2 Node: POND 2 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 21.00
Area(ac): 7.980 Time Shift(hrs): 0.00
Curve Number: 81.90 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: E Node: POND 5 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 17.00
Area(ac): 63.800 Time Shift(hrs): 0.00
Curve Number: 82.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX BASIN 12 Node: EX LAKE 12 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256 Peaking Factor: 256.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 20.00
Area(ac): 39.530 Time Shift(hrs): 0.00
Curve Number: 74.40 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX BASIN 19 Node: EX LAKE 19 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 26.00
Area(ac): 50.050 Time Shift(hrs): 0.00
Curve Number: 82.70 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX BASIN 3 | Node: EX LAKE 3 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 22.00
Area(ac): 14.280 | Time Shift(hrs): 0.00
Curve Number: 79.50 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX BASIN 4 | Node: EX LAKE 4 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh256 | Peaking Factor: 256.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 23.00
Area(ac): 27.150 | Time Shift(hrs): 0.00
Curve Number: 82.20 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX EAST POND | Node: POND-EAST | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 20.00
Area(ac): 1.800 | Time Shift(hrs): 0.00
Curve Number: 84.00 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX-D | Node: POND 5 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 11.00
Area(ac): 9.000 | Time Shift(hrs): 0.00
Curve Number: 87.50 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX-E | Node: POND 1 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 55.00
Area(ac): 23.700 | Time Shift(hrs): 0.00
Curve Number: 63.60 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: EX-F | Node: POND 1 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 42.00
Area(ac): 21.190 | Time Shift(hrs): 0.00
Curve Number: 62.30 | Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: POND 1 | Node: POND 1 | Status: Onsite
Group: DEV | Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 | Peaking Factor: 484.0
Rainfall File: Scsii-24 | Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 | Time of Conc(min): 15.00

Area(ac): 4.990 Time Shift(hrs): 0.00
Curve Number: 83.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

Name: POND 2 Node: POND 2 Status: Onsite
Group: DEV Type: SCS Unit Hydrograph CN

Unit Hydrograph: Uh484 Peaking Factor: 484.0
Rainfall File: Scsii-24 Storm Duration(hrs): 0.00
Rainfall Amount(in): 0.000 Time of Conc(min): 28.00
Area(ac): 28.610 Time Shift(hrs): 0.00
Curve Number: 83.00 Max Allowable Q(cfs): 999999.000
DCIA(%): 0.00

==========
==== Nodes ==========
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Name: EX DITCH 99 Base Flow(cfs): 0.000 Init Stage(ft): 731.500
Group: DEV Warn Stage(ft): 733.000
Type: Time/Stage

Time(hrs)	Stage(ft)
0.00	731.500
20.00	733.000

Name: EX LAKE 12 Base Flow(cfs): 0.000 Init Stage(ft): 738.000
Group: DEV Warn Stage(ft): 742.000
Type: Stage/Volume

Stage(ft)	Volume(af)
738.000	0.0000
739.000	1.1000
740.000	2.2000
741.000	3.3000
742.000	4.4000

Name: EX LAKE 19 Base Flow(cfs): 0.000 Init Stage(ft): 733.500
Group: DEV Warn Stage(ft): 737.500
Type: Stage/Volume

Stage(ft)	Volume(af)
733.500	0.0000
734.500	1.4000
735.500	2.8000
736.500	4.2000
737.500	5.6000

Name: EX LAKE 3 Base Flow(cfs): 0.000 Init Stage(ft): 738.000
Group: DEV Warn Stage(ft): 741.000
Type: Stage/Volume

Stage(ft)	Volume(af)
738.000	0.0000
739.000	2.0200
740.000	4.0400
741.000	6.0600

Name: EX LAKE 4 Base Flow(cfs): 0.000 Init Stage(ft): 732.000
Group: DEV Warn Stage(ft): 736.000
Type: Stage/Volume

Stage(ft)	Volume(af)
732.000	0.0000
733.000	1.7800
734.000	3.5600
735.000	5.3400
736.000	7.1200

Name: MH200 Base Flow(cfs): 0.000 Init Stage(ft): 740.670
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 748.600
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH201 Base Flow(cfs): 0.000 Init Stage(ft): 740.830
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 747.600
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH202 Base Flow(cfs): 0.000 Init Stage(ft): 741.100
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.200
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH203 Base Flow(cfs): 0.000 Init Stage(ft): 741.380
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.800
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH204 Base Flow(cfs): 0.000 Init Stage(ft): 741.480
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 746.600
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
746.800	0.0110
747.000	0.0430
747.200	0.5760
747.400	0.7160
747.600	0.8640
747.700	1.0130

Name: MH205 Base Flow(cfs): 0.000 Init Stage(ft): 741.670
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 746.800
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
747.000	0.0040
747.200	0.0150
747.400	0.0340
747.600	0.0550
747.700	0.0650

Name: MH206 Base Flow(cfs): 0.000 Init Stage(ft): 741.910
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 747.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)
747.200	0.0040
747.400	0.0140
747.600	0.0310
747.800	0.0760

Name: MH207 Base Flow(cfs): 0.000 Init Stage(ft): 742.350
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 748.190
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH208 Base Flow(cfs): 0.000 Init Stage(ft): 742.400
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 748.190
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH209 Base Flow(cfs): 0.000 Init Stage(ft): 742.710
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 747.160
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH210 Base Flow(cfs): 0.000 Init Stage(ft): 742.920
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.650
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH211 Base Flow(cfs): 0.000 Init Stage(ft): 743.080
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 750.100
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH212 Base Flow(cfs): 0.000 Init Stage(ft): 743.170
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.710
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH213 Base Flow(cfs): 0.000 Init Stage(ft): 743.280
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.710
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH215 Base Flow(cfs): 0.000 Init Stage(ft): 744.090
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH216 Base Flow(cfs): 0.000 Init Stage(ft): 744.200
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 748.910
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH217 Base Flow(cfs): 0.000 Init Stage(ft): 744.230
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 748.910
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH218 Base Flow(cfs): 0.000 Init Stage(ft): 744.940
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 749.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: MH231 Base Flow(cfs): 0.000 Init Stage(ft): 740.560
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 746.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: POND 1 Base Flow(cfs): 0.000 Init Stage(ft): 749.000
Group: DEV Warn Stage(ft): 756.000
Type: Stage/Area

Stage(ft)	Area(ac)
749.000	1.3420
750.000	1.4300
751.000	1.5200
752.000	1.6120
753.000	1.7070
754.000	1.8050
755.000	1.9050

Name: POND 2 Base Flow(cfs): 0.000 Init Stage(ft): 745.500
Group: DEV Warn Stage(ft): 753.000
Type: Stage/Area

Stage(ft)	Area(ac)
745.500	2.9300
746.000	3.0400
747.000	3.2600
748.000	3.4900
749.000	3.7200
750.000	3.9500
751.000	4.1900
752.000	4.4200

Name: POND 3 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Warn Stage(ft): 749.500

Type: Stage/Area

Stage(ft)	Area(ac)
745.000	1.2000
746.000	1.3100
747.000	1.4200
748.000	1.5400
749.000	1.6600
750.000	1.7800
750.500	1.8400

Name: POND 4 Base Flow(cfs): 0.000 Init Stage(ft): 744.000
Group: DEV Warn Stage(ft): 750.000
Type: Stage/Area

Stage(ft)	Area(ac)
744.000	3.0800
745.000	3.2300
746.000	3.3800
747.000	3.5400
748.000	3.7000
749.000	3.8600
750.000	4.0200
751.000	4.1800
751.300	4.2300

Name: POND 5 Base Flow(cfs): 0.000 Init Stage(ft): 740.600
Group: DEV Warn Stage(ft): 748.000
Type: Stage/Area

Stage(ft)	Area(ac)
740.500	3.5300
742.000	3.7400
744.000	4.0500
748.000	4.7100

Name: POND-EAST Base Flow(cfs): 0.000 Init Stage(ft): 740.000
Group: DEV Warn Stage(ft): 743.000
Type: Stage/Area

Stage(ft)	Area(ac)
740.000	0.0020
741.000	0.0040
742.000	0.0060
743.000	0.0090

Name: STR 345 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: STR 346 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: STR 347 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000

Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: STR 348 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: STR 349 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

Name: STR 350 Base Flow(cfs): 0.000 Init Stage(ft): 745.000
Group: DEV Plunge Factor: 1.00 Warn Stage(ft): 753.000
Type: Manhole, Flat Floor

Stage(ft)	Area(ac)

==== Pipes ====

Name: EX CMP 36" From Node: MH231 Length(ft): 42.00
Group: DEV To Node: POND-EAST Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	740.560	739.960
Manning's N:	0.022000	0.022000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Name: EX PIPE 12 From Node: EX LAKE 12 Length(ft): 850.00
Group: DEV To Node: EX LAKE 4 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 1.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	738.300	732.000
Manning's N:	0.022000	0.022000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Name: EX PIPE 19 | From Node: EX LAKE 19 | Length(ft): 400.00
Group: DEV | To Node: EX LAKE 4 | Count: 2
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 1.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	733.500	732.000
Manning's N:	0.022000	0.022000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Name: EX PIPE 3 | From Node: EX LAKE 3 | Length(ft): 700.00
Group: DEV | To Node: EX LAKE 4 | Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 1.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	8.00	8.00
Rise(in):	8.00	8.00
Invert(ft):	738.000	732.000
Manning's N:	0.022000	0.022000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Name: EX PIPE 4 | From Node: EX LAKE 4 | Length(ft): 50.00
Group: DEV | To Node: EX DITCH 99 | Count: 2
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 1.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	732.000	731.500
Manning's N:	0.022000	0.022000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Downstream FHWA Inlet Edge Description:
Circular CMP: Projecting

Name: P 345 | From Node: STR 345 | Length(ft): 130.00
Group: DEV | To Node: POND 2 | Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	27.00	27.00
Rise(in):	27.00	27.00
Invert(ft):	746.250	745.500
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	P 346	From Node:	STR 346	Length(ft): 25.00
Group:	DEV	To Node:	STR 345	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	27.00	27.00		Entrance Loss Coef: 0.50
Rise(in):	27.00	27.00		Exit Loss Coef: 0.00
Invert(ft):	746.400	746.250		Bend Loss Coef: 0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	P 347	From Node:	STR 347	Length(ft): 28.00
Group:	DEV	To Node:	STR 346	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	27.00	27.00		Entrance Loss Coef: 0.50
Rise(in):	27.00	27.00		Exit Loss Coef: 0.00
Invert(ft):	746.550	746.400		Bend Loss Coef: 0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	P 348	From Node:	STR 348	Length(ft): 131.00
Group:	DEV	To Node:	STR 347	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	24.00	24.00		Entrance Loss Coef: 0.50
Rise(in):	24.00	24.00		Exit Loss Coef: 0.00
Invert(ft):	747.500	746.750		Bend Loss Coef: 0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	P 349	From Node:	STR 349	Length(ft): 131.00
Group:	DEV	To Node:	STR 348	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic

Geometry:	Circular	Circular	Flow:	Both
Span(in):	24.00	24.00	Entrance Loss Coef:	0.50
Rise(in):	24.00	24.00	Exit Loss Coef:	0.00
Invert(ft):	747.950	747.500	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: P 350 From Node: STR 350 Length(ft): 29.00
Group: DEV To Node: STR 349 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Flow:	Both
Span(in):	24.00	24.00	Entrance Loss Coef:	0.50
Rise(in):	24.00	24.00	Exit Loss Coef:	0.00
Invert(ft):	748.050	747.950	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE 3 From Node: POND 3 Length(ft): 40.00
Group: DEV To Node: MH218 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Flow:	Both
Span(in):	21.00	21.00	Entrance Loss Coef:	0.50
Rise(in):	21.00	21.00	Exit Loss Coef:	0.00
Invert(ft):	745.000	744.940	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE-EAST From Node: POND-EAST Length(ft): 130.00
Group: DEV To Node: EX LAKE 12 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic

	UPSTREAM	DOWNSTREAM		
Geometry:	Circular	Circular	Flow:	Both
Span(in):	21.00	21.00	Entrance Loss Coef:	0.50
Rise(in):	21.00	21.00	Exit Loss Coef:	0.00
Invert(ft):	739.900	738.600	Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000	Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000	Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000	Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE200 From Node: MH200 Length(ft): 68.00
Group: DEV To Node: POND 5 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.33
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	48.00	48.00
Rise(in):	48.00	48.00
Invert(ft):	740.670	740.600
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE201 From Node: MH201 Length(ft): 163.00
Group: DEV To Node: MH200 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	48.00	48.00
Rise(in):	48.00	48.00
Invert(ft):	740.830	740.670
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE202 From Node: MH202 Length(ft): 275.00
Group: DEV To Node: MH201 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	48.00	48.00
Rise(in):	48.00	48.00
Invert(ft):	741.100	740.830
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE203 From Node: MH203 Length(ft): 280.00
Group: DEV To Node: MH202 Count: 1
Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.70
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	48.00	48.00
Rise(in):	48.00	48.00
Invert(ft):	741.380	741.100
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE204	From Node:	MH204	Length(ft): 92.00
Group:	DEV	To Node:	MH203	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	42.00	42.00		Entrance Loss Coef: 0.50
Rise(in):	42.00	42.00		Exit Loss Coef: 0.00
Invert(ft):	741.480	741.380		Bend Loss Coef: 0.15
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE205	From Node:	MH205	Length(ft): 192.00
Group:	DEV	To Node:	MH204	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	42.00	42.00		Entrance Loss Coef: 0.50
Rise(in):	42.00	42.00		Exit Loss Coef: 0.00
Invert(ft):	741.670	741.480		Bend Loss Coef: 0.33
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE206	From Node:	MH206	Length(ft): 239.00
Group:	DEV	To Node:	MH205	Count: 1
				Friction Equation: Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm: Automatic
Geometry:	Circular	Circular		Flow: Both
Span(in):	42.00	42.00		Entrance Loss Coef: 0.50
Rise(in):	42.00	42.00		Exit Loss Coef: 0.00
Invert(ft):	741.910	741.670		Bend Loss Coef: 0.70
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec: Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec: Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE207	From Node:	MH207	Length(ft): 77.00
Group:	DEV	To Node:	MH206	Count: 1
				Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	742.350	742.210
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE208 From Node: MH208 Length(ft): 32.00
Group: DEV To Node: MH207 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	742.400	742.350
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE209 From Node: MH209 Length(ft): 72.00
Group: DEV To Node: MH208 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	36.00	36.00
Rise(in):	36.00	36.00
Invert(ft):	742.710	742.400
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE210 From Node: MH210 Length(ft): 211.00
Group: DEV To Node: MH209 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	742.920	742.710
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.70
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:

Circular Concrete: Square edge w/ headwall

Name:	PIPE211	From Node:	MH211	Length(ft):	107.00
Group:	DEV	To Node:	MH210	Count:	1
				Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Automatic
Geometry:	Circular	Circular		Flow:	Both
Span(in):	27.00	27.00		Entrance Loss Coef:	0.50
Rise(in):	27.00	27.00		Exit Loss Coef:	0.00
Invert(ft):	743.080	742.920		Bend Loss Coef:	0.70
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE212	From Node:	MH212	Length(ft):	31.00
Group:	DEV	To Node:	MH211	Count:	1
				Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Automatic
Geometry:	Circular	Circular		Flow:	Both
Span(in):	24.00	24.00		Entrance Loss Coef:	0.50
Rise(in):	24.00	24.00		Exit Loss Coef:	0.00
Invert(ft):	743.170	743.080		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE213	From Node:	MH213	Length(ft):	28.00
Group:	DEV	To Node:	MH212	Count:	1
				Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Automatic
Geometry:	Circular	Circular		Flow:	Both
Span(in):	21.00	21.00		Entrance Loss Coef:	0.50
Rise(in):	21.00	21.00		Exit Loss Coef:	0.00
Invert(ft):	743.280	743.170		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dn
Bot Clip(in):	0.000	0.000		Stabilizer Option:	None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name:	PIPE215	From Node:	MH215	Length(ft):	90.00
Group:	DEV	To Node:	POND 4	Count:	1
				Friction Equation:	Average Conveyance
	UPSTREAM	DOWNSTREAM		Solution Algorithm:	Automatic
Geometry:	Circular	Circular		Flow:	Both
Span(in):	30.00	30.00		Entrance Loss Coef:	0.50
Rise(in):	30.00	30.00		Exit Loss Coef:	0.00
Invert(ft):	744.090	744.000		Bend Loss Coef:	0.00
Manning's N:	0.013000	0.013000		Outlet Ctrl Spec:	Use dc or tw
Top Clip(in):	0.000	0.000		Inlet Ctrl Spec:	Use dn

Bot Clip(in): 0.000 0.000 Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE216 From Node: MH216 Length(ft): 106.00
Group: DEV To Node: MH215 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	744.200	744.090
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.00
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE217 From Node: MH217 Length(ft): 28.00
Group: DEV To Node: MH216 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	30.00	30.00
Rise(in):	30.00	30.00
Invert(ft):	744.230	744.200
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.16
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Name: PIPE218 From Node: MH218 Length(ft): 150.00
Group: DEV To Node: MH217 Count: 1
Friction Equation: Average Conveyance

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	21.00	21.00
Rise(in):	21.00	21.00
Invert(ft):	744.940	744.720
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.50
Exit Loss Coef: 0.00
Bend Loss Coef: 0.28
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Stabilizer Option: None

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

==========
==== Drop Structures ==========
==========

Name: OUTFALL1 From Node: POND 1 Length(ft): 150.00
Group: DEV To Node: STR 350 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	24.00	24.00
Rise(in):	24.00	24.00
Invert(ft):	748.500	748.050
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.500
Exit Loss Coef: 0.500
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 3 for Drop Structure OUTFALL1 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Vertical: Mavis Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 6.00 Invert(ft): 749.000
Rise(in): 6.00 Control Elev(ft): 749.000

*** Weir 2 of 3 for Drop Structure OUTFALL1 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Vertical: Mavis Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 15.00 Invert(ft): 752.500
Rise(in): 15.00 Control Elev(ft): 752.500

*** Weir 3 of 3 for Drop Structure OUTFALL1 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Horizontal Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Rectangular Orifice Disc Coef: 0.600

Span(in): 24.00 Invert(ft): 754.300
Rise(in): 24.00 Control Elev(ft): 754.300

Name: OUTFALL2 From Node: POND 2 Length(ft): 750.00
Group: DEV To Node: POND 4 Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	27.00	42.00
Rise(in):	27.00	42.00
Invert(ft):	745.200	744.000
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.500
Exit Loss Coef: 0.500
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 2 for Drop Structure OUTFALL2 ***

TABLE

Count: 1 Bottom Clip(in): 0.000
Type: Vertical: Mavis Top Clip(in): 0.000
Flow: Both Weir Disc Coef: 3.200
Geometry: Circular Orifice Disc Coef: 0.600

Span(in): 18.00 Invert(ft): 745.500
Rise(in): 18.00 Control Elev(ft): 745.500

*** Weir 2 of 2 for Drop Structure OUTFALL2 ***

TABLE

Count: 1
Type: Horizontal
Flow: Both
Geometry: Circular
Span(in): 24.00
Rise(in): 24.00
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 751.400
Control Elev(ft): 751.400

Name: OUTFALL4
Group: DEV
From Node: POND 4
To Node: MH213
Length(ft): 160.00
Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	18.00	18.00
Rise(in):	18.00	18.00
Invert(ft):	743.910	743.280
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 2 for Drop Structure OUTFALL4 ***

TABLE

Count: 1
Type: Vertical: Mavis
Flow: Both
Geometry: Circular
Span(in): 15.00
Rise(in): 15.00
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 744.000
Control Elev(ft): 744.000

*** Weir 2 of 2 for Drop Structure OUTFALL4 ***

TABLE

Count: 1
Type: Horizontal
Flow: Both
Geometry: Circular
Span(in): 24.00
Rise(in): 24.00
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 749.350
Control Elev(ft): 749.350

Name: OUTFALL5
Group: DEV
From Node: POND 5
To Node: MH231
Length(ft): 70.00
Count: 1

	UPSTREAM	DOWNSTREAM
Geometry:	Circular	Circular
Span(in):	24.00	24.00
Rise(in):	24.00	24.00
Invert(ft):	740.600	740.560
Manning's N:	0.013000	0.013000
Top Clip(in):	0.000	0.000
Bot Clip(in):	0.000	0.000

Friction Equation: Average Conveyance
Solution Algorithm: Automatic
Flow: Both
Entrance Loss Coef: 0.000
Exit Loss Coef: 0.000
Outlet Ctrl Spec: Use dc or tw
Inlet Ctrl Spec: Use dn
Solution Incs: 10

Upstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

Downstream FHWA Inlet Edge Description:
Circular Concrete: Square edge w/ headwall

*** Weir 1 of 2 for Drop Structure OUTFALL5 ***

TABLE

Count: 1
Type: Vertical: Mavis
Flow: Both
Geometry: Circular
Span(in): 8.00
Rise(in): 8.00
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 740.600
Control Elev(ft): 740.600

*** Weir 2 of 2 for Drop Structure OUTFALL5 ***

TABLE

Count: 1
Type: Horizontal
Flow: Both
Geometry: Circular
Span(in): 24.00
Rise(in): 24.00
Bottom Clip(in): 0.000
Top Clip(in): 0.000
Weir Disc Coef: 3.200
Orifice Disc Coef: 0.600
Invert(ft): 746.500
Control Elev(ft): 746.500

==========
==== Hydrology Simulations ====
==========

Name: 010YR-01HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-01HR.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Scsii-24
Rainfall Amount(in): 2.00

Time(hrs)	Print Inc(min)
1.000	1.00

Name: 010YR-02HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-02HR.R32

Override Defaults: Yes
Storm Duration(hrs): 2.00
Rainfall File: Scsii-24
Rainfall Amount(in): 2.40

Time(hrs)	Print Inc(min)
2.000	1.00

Name: 010YR-03HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-03HR.R32

Override Defaults: Yes
Storm Duration(hrs): 3.00
Rainfall File: Scsii-24
Rainfall Amount(in): 2.70

Time(hrs)	Print Inc(min)
3.000	1.00

Name: 010YR-06HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-06HR.R32

Override Defaults: Yes
Storm Duration(hrs): 6.00
Rainfall File: Scsii-24
Rainfall Amount(in): 3.20

Time(hrs)	Print Inc(min)
6.000	1.00

Name: 010YR-12HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-12HR.R32

Override Defaults: Yes
Storm Duration(hrs): 12.00
Rainfall File: Scsii-24
Rainfall Amount(in): 3.75

Time(hrs)	Print Inc(min)
12.000	1.00

Name: 010YR-24HR
Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-24HR.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00

Rainfall File: Scsii-24
Rainfall Amount(in): 4.25

Time(hrs)	Print Inc(min)
30.000	1.00

Name: 100YR-01HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-01HR.R32

Override Defaults: Yes
Storm Duration(hrs): 1.00
Rainfall File: Scsii-24
Rainfall Amount(in): 3.10

Time(hrs)	Print Inc(min)
1.000	1.00

Name: 100YR-02HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-02HR.R32

Override Defaults: Yes
Storm Duration(hrs): 2.00
Rainfall File: Scsii-24
Rainfall Amount(in): 3.35

Time(hrs)	Print Inc(min)
2.000	1.00

Name: 100YR-03HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-03HR.R32

Override Defaults: Yes
Storm Duration(hrs): 3.00
Rainfall File: Scsii-24
Rainfall Amount(in): 3.70

Time(hrs)	Print Inc(min)
3.000	1.00

Name: 100YR-06HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-06HR.R32

Override Defaults: Yes
Storm Duration(hrs): 6.00
Rainfall File: Scsii-24
Rainfall Amount(in): 4.35

Time(hrs)	Print Inc(min)
6.000	1.00

Name: 100YR-12HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-12HR.R32

Override Defaults: Yes
Storm Duration(hrs): 12.00
Rainfall File: Scsii-24
Rainfall Amount(in): 5.25

Time(hrs)	Print Inc(min)
12.000	1.00

Name: 100YR-24HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-24HR.R32

Override Defaults: Yes
Storm Duration(hrs): 24.00
Rainfall File: Scsii-24
Rainfall Amount(in): 5.90

Time(hrs)	Print Inc(min)
30.000	1.00

```
================================================================================
==== Routing Simulations ======================================================
================================================================================

        Name: 010YR-01HR          Hydrology Sim: 010YR-01HR
    Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-01HR.I32

     Execute: Yes         Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 2.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           5.000

Group           Run
--------------- -----
DEV             Yes

--------------------------------------------------------------------------------
        Name: 010YR-02HR          Hydrology Sim: 010YR-02HR
    Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-02HR.I32

     Execute: Yes         Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 4.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
4.000           5.000

Group           Run
--------------- -----
DEV             Yes

--------------------------------------------------------------------------------
        Name: 010YR-03HR          Hydrology Sim: 010YR-03HR
    Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-03HR.I32

     Execute: Yes         Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
   Time Step Optimizer: 10.000
       Start Time(hrs): 0.000                   End Time(hrs): 5.00
    Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
       Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
5.000           5.000

Group           Run
--------------- -----
DEV             Yes

--------------------------------------------------------------------------------
        Name: 010YR-06HR          Hydrology Sim: 010YR-06HR
    Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-06HR.I32

     Execute: Yes         Restart: No           Patch: No
 Alternative: No

       Max Delta Z(ft): 1.00                   Delta Z Factor: 0.00500
```

```
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 8.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
8.000           5.000

Group           Run
--------------- -----
DEV             Yes


-------------------------------------------------------------------------------------------------
         Name: 010YR-12HR          Hydrology Sim: 010YR-12HR
     Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-12HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 15.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
15.000          5.000

Group           Run
--------------- -----
DEV             Yes


-------------------------------------------------------------------------------------------------
         Name: 010YR-24HR          Hydrology Sim: 010YR-24HR
     Filename: T:\4k\4569\900\drainage\ICPR-8\010YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 30.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.000

Group           Run
--------------- -----
DEV             Yes


-------------------------------------------------------------------------------------------------
         Name: 100YR-01HR          Hydrology Sim: 100YR-01HR
     Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-01HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                    Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 2.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
2.000           5.000

Group           Run
```

DEV	Yes

Name: 100YR-02HR Hydrology Sim: 100YR-02HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-02HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 4.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
4.000	5.000

Group	Run
DEV	Yes

Name: 100YR-03HR Hydrology Sim: 100YR-03HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-03HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 6.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
6.000	5.000

Group	Run
DEV	Yes

Name: 100YR-06HR Hydrology Sim: 100YR-06HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-06HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500
Time Step Optimizer: 10.000
Start Time(hrs): 0.000 End Time(hrs): 8.00
Min Calc Time(sec): 0.5000 Max Calc Time(sec): 60.0000
Boundary Stages: Boundary Flows:

Time(hrs)	Print Inc(min)
8.000	5.000

Group	Run
DEV	Yes

Name: 100YR-12HR Hydrology Sim: 100YR-12HR
Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-12HR.I32

Execute: Yes Restart: No Patch: No
Alternative: No

Max Delta Z(ft): 1.00 Delta Z Factor: 0.00500

```
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 15.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
15.000          5.000

Group           Run
--------------- -----
DEV             Yes
```

```
         Name: 100YR-24HR          Hydrology Sim: 100YR-24HR
     Filename: T:\4k\4569\900\drainage\ICPR-8\100YR-24HR.I32

      Execute: Yes         Restart: No            Patch: No
  Alternative: No

       Max Delta Z(ft): 1.00                     Delta Z Factor: 0.00500
    Time Step Optimizer: 10.000
        Start Time(hrs): 0.000                  End Time(hrs): 30.00
     Min Calc Time(sec): 0.5000              Max Calc Time(sec): 60.0000
        Boundary Stages:                        Boundary Flows:


Time(hrs)       Print Inc(min)
--------------- ---------------
30.000          5.000

Group           Run
--------------- -----
DEV             Yes
```

PROJECT:	Heritage
JOB #:	4569.900
DATE:	12/13/16

Curve Number Calculations

	CN Values	
	B	C
Pond =	98	98
1/4 ac. Lot =	75	83
Grass =	61	74
Newly Graded =	86	91

Site: 50% B, 50% C

BASIN	Area (ac)	Area (ac) Pond	Lot	Grass	Nwly Grad	-	Weighted CN
Section 9							
LAKE 1	9.31	1.44	7.87	0.00	0.00		81.9
LAKE 2	7.98	1.20	6.78	0.00	0.00		81.9

Contents from Heritage
Section 1 Drainage Report

PROPOSED BASINS

Onsite

Basin	Soil Group % B	Soil Group % C	Cover Type & condition	Percent of this cover	CN B	CN C	Weighted
A	50%	50%	Residential, <1/8 & 1/4 Ac.	100%	75	90	82.5
B	47%	53%	Residential, <1/8 & 1/4 Ac.	100%	75	90	83.0
C	40%	60%	Residential, <1/8 & 1/4 Ac.	100%	75	90	84.0
D	50%	50%	Residential, <1/8 & 1/4 Ac.	100%	75	90	82.5
E	60%	40%	Residential, <1/8 & 1/4 Ac.	100%	75	90	81.0

Offsite

Basin	Soil Group % B	Soil Group % C	Cover Type & condition	Percent of this cover	CN B	CN C	Weighted
EX-D	70%	30%	Pasture, Good	100%	61	74	64.9
EX-E	80%	20%	Pasture, Good	100%	61	74	63.6
EX-F	90%	10%	Pasture, Good	100%	61	74	62.3

Use these CN values for
Section 9 ICPR model

Time of Concentration Worksheet
Based on TR-55

PROJECT: Heritage
JOB #: 4569.900 *12/13/16*

Typical values for Manning's n			
Overland Flow		Channel Flow	
short grass	0.15	grass	0.03
farm, > 20% cover	0.17	concrete	0.015
dense grass	0.24	rip-rap	0.035
pavement	0.011		

2 year, 24 hour rainfall = 2.64 inches
minimum T_c = 5.00 minutes

T:\4k\4569\900\drainage\[4569.900-ST.xlsx]Time of Conc

Basin	Overland flow seg. 1				Overland flow seg. 2				Shallow Concentrated Flow					Channel Flow								T_c
name	Length (ft)	S %	n	T_t (min)	Length (ft)	S %	n	T_t (min)	Length (ft)	S %	Paved/Un (P or U)	Vel. (ft/s)	T_t (min)	Length (ft)	a (s.f.)	Pw (ft)	r (ft)	S %	n	Vel. (ft/s)	T_t (min)	(min)
SEC 9																						
EX-E	100	1.00	0.17	16					2092	0.40	U	1.02	34	883						3.00	5	55
EX-F	100	1.00	0.17	16					1850	0.51	U	1.15	27									42
DEV 1	100	0.70	0.24	24					617	0.50	U	1.14	9									33
DEV 2	100	2.70	0.24	14					181	0.76	U	1.41	2	883						3.00	5	21

Emergency Spillway Calculations:

Based on the Subdivision Control Ordinance for the City of Franklin an emergency spillway path must be provided for Lake 1. This path must be able to discharge stormwater at a rate of 1.25 times the peak inflow rate to Lake 1, or 80.24 x 1.25 = 100.3 cfs.

Orifice flow: $Q = C * A * \sqrt{2 * g * h}$

where:
- Q = allowable flow rate, cfs
- C = orifice discharge coefficient = 0.62
- A = open area of inlet, ft^2
- g = force of gravity: 32.2 ft/sec^2

Weir flow: $Q = 2/3 * C * \sqrt{2 * g} * L * h^{3/2}$

where:
- Q = allowable flow rate, cfs
- C = orifice discharge coefficient = 0.62
- g = force of gravity: 32.2 ft/sec^2
- L = length of perimeter of weir, ft

The main spillway path will be between Lots 573-602. Here, a 20' flat area is located at the center of the 30' gap between pads. However, other sideyards will also discharge stormwater under emergency conditions. If storm water reaches an elevation of 756.87 then it will discharge through three locations. They are between Lots 573-602, 596-597, and 577-578. See the following page for more detailed calculations at these three locations.

Assuming the FFE for each lot will be 8" above the pad elevation the freeboard at each location would be:

Location	Pad Elev.	FFE	Freeboard
Lots 573-602	757.0	757.67	0.8'
Lots 596-597	757.0	757.67	0.8'
Lots 577-578	757.1	757.77	0.9'

At each location there is adequate freeboard.

Emergency Spillway WSE = 756.87

Lot 573-602
Emergency Overflow Weir

Given: h =	0.770	ft
b =	20.00	ft
Side slope =	5.56	:1
A =	18.70	sq. ft
L =	28.70	
c =	0.600	
Then:		
Q_orifice =	79.00	cfs
Q_weir =	62.25	cfs

Sideyard Elev = 756.10

Lot 596-597
Emergency Overflow Weir

Given: h =	0.570	ft
b =	0.00	ft
Side slope =	16.67	:1
A =	5.42	sq. ft
L =	19.04	
c =	0.600	
Then:		
Q_orifice =	19.69	cfs
Q_weir =	26.30	cfs

Sideyard Elev = 756.30

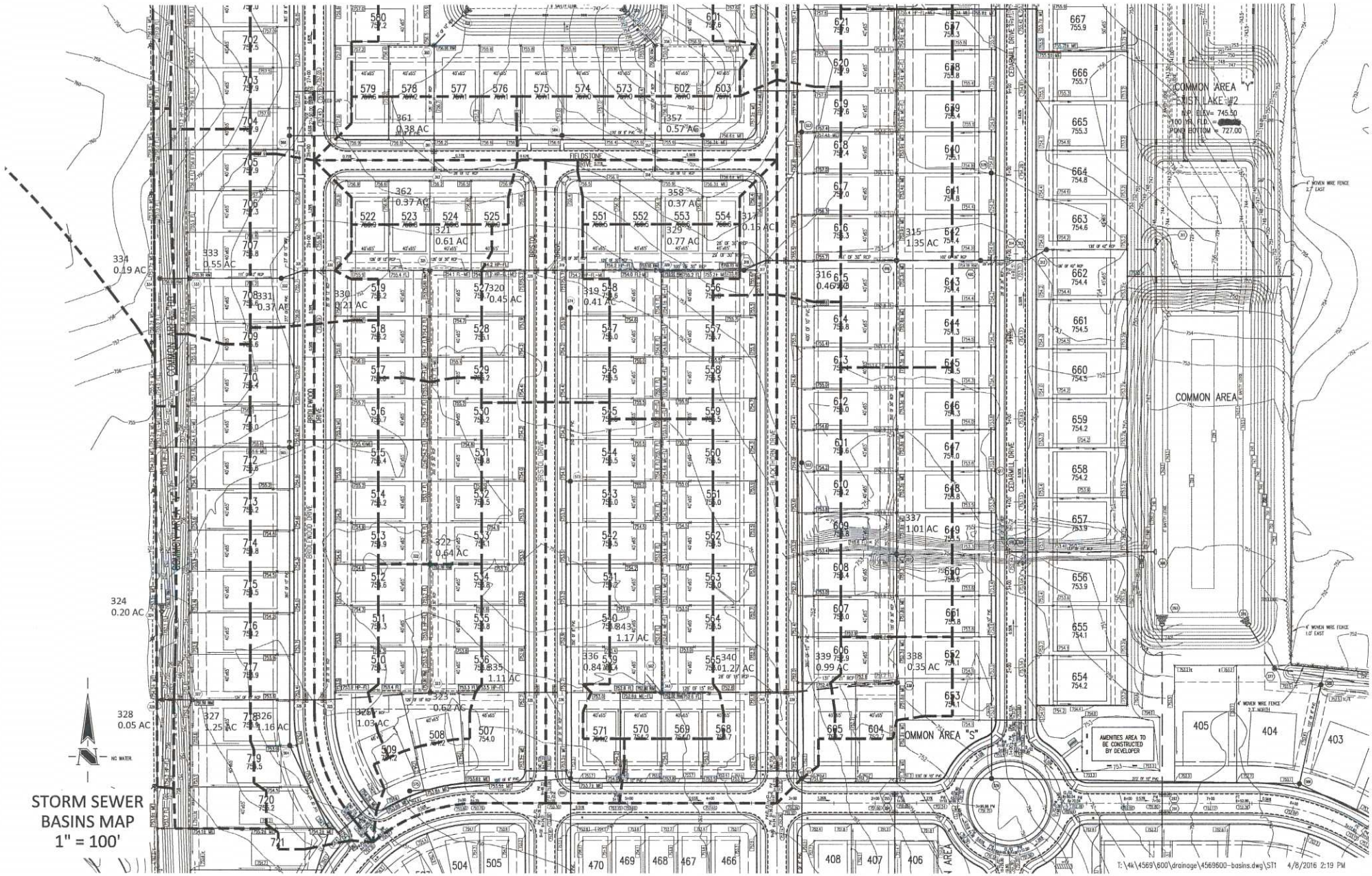
Lot 577-578
Emergency Overflow Weir

Given: h =	0.470	ft
b =	0.00	ft
Side slope =	14.29	:1
A =	3.16	sq. ft
L =	13.47	
c =	0.600	
Then:		
Q_orifice =	10.42	cfs
Q_weir =	13.93	cfs

Sideyard Elev = 756.40

Q_orifice (sum) = 109.10
Q_weir (sum) = 102.47

STORM SEWER DESIGN


STORM SEWER
BASINS MAP
1" = 100'
COMMON AREA
FIRST LAKE #2
COMMON AREA
COMMON AREA "S"
AMENITIES AREA TO BE CONSTRUCTED BY DEVELOPER
FIELDSTONE DRIVE
BRIDLEWOOD DRIVE
CEDARMILL DRIVE
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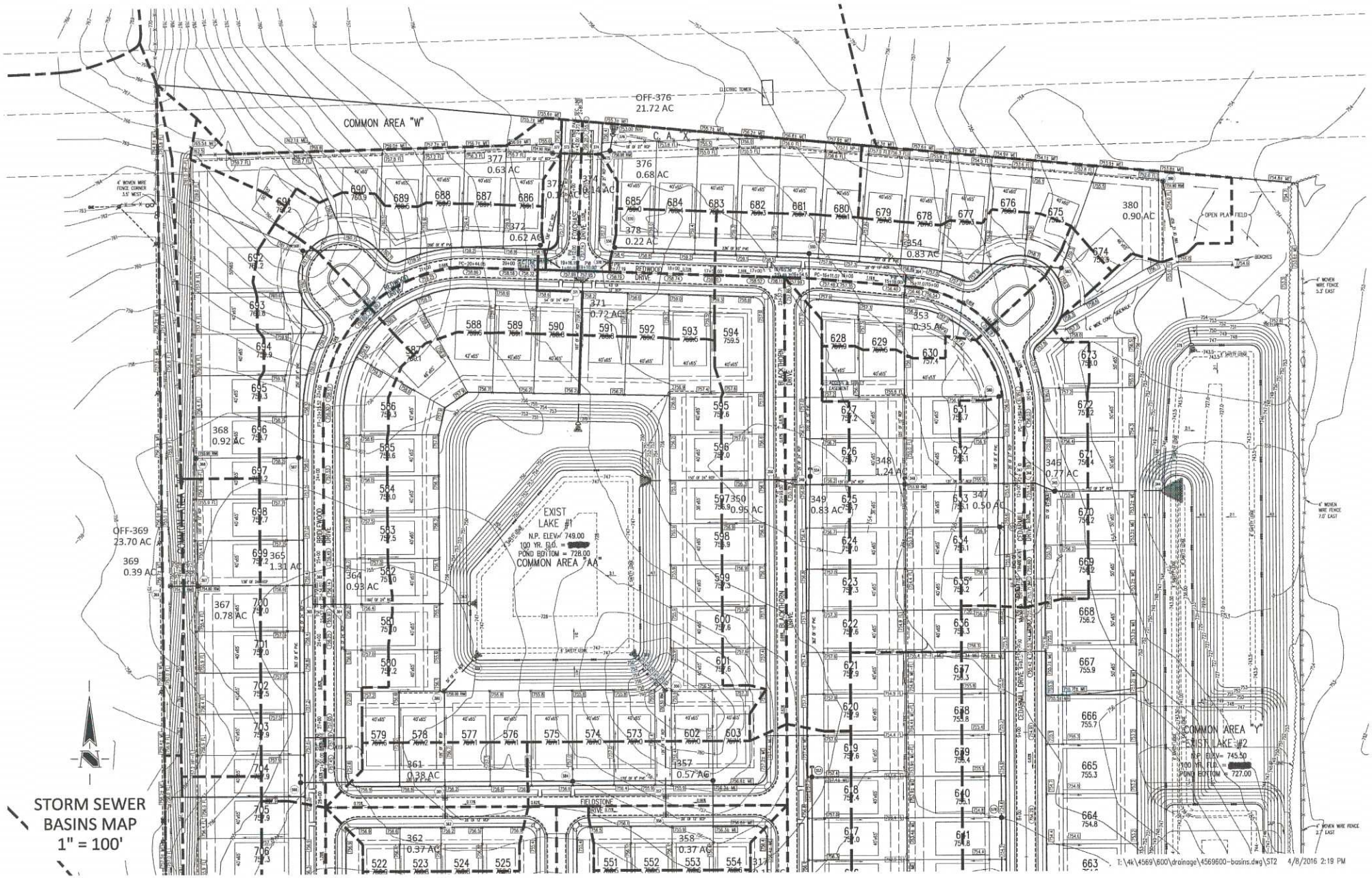
D1



STORM SEWER
BASINS MAP
1" = 100'

D2

STORM SEWER DESIGN CALCULATIONS
-RATIONAL METHOD-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Rational

STRUCTURE		BASINS							COMPOSITE BASINS				TRAVEL
FROM	TO	BASIN #	c	A (acres)	c*A	Tc (min)	I (in/hr)	Q (cfs)	SUM (c*A)	Tc (min)	I (in/hr)	Q (cfs)	TIME (min)
343	340	343	0.40	1.17	0.47	17	4.27	2.00	0.47	17	4.27	2.00	0.70
340	339	340	0.60	1.27	0.76	19	4.02	3.07	1.23	19	4.02	4.95	0.16
339	338	339	0.60	0.99	0.59	19	4.02	2.39	1.82	19	4.02	7.34	0.73
338	337	338	0.40	0.35	0.14	15	4.55	0.64	1.96	20	3.91	7.69	0.86
337	315	337	0.40	1.01	0.40	18	4.14	1.67	2.37	21	3.81	9.02	1.97
336	335	336	0.60	0.84	0.50	17	4.27	2.15	0.50	17	4.27	2.15	0.16
335	323	335	0.60	1.11	0.67	17	4.27	2.84	1.17	17	4.27	4.99	0.70
334	333	334	0.20	0.19	0.04	5	6.98	0.27	0.04	5	6.98	0.27	0.20
333	332	333	0.40	0.55	0.22	18	4.14	0.91	0.26	18	4.14	1.07	0.62
332	331	332	0.00	0.00	0.00	0	9.93	0.00	0.26	19	4.02	1.04	0.15
331	330	331	0.60	0.37	0.22	14	4.71	1.04	0.48	19	4.02	1.93	0.16
330	321	330	0.60	0.21	0.13	15	4.55	0.57	0.61	19	4.02	2.44	0.70
324	328	324	0.20	0.20	0.04	5	6.98	0.28	0.04	5	6.98	0.28	0.58
328	327	328	0.20	0.05	0.01	5	6.98	0.07	0.05	6	6.61	0.33	0.20
327	326	327	0.40	1.25	0.50	19	4.02	2.01	0.55	19	4.02	2.21	0.74
326	325	326	0.60	1.16	0.70	19	4.02	2.80	1.25	20	3.91	4.88	0.16
325	323	325	0.60	1.03	0.62	19	4.02	2.49	1.86	20	3.91	7.30	0.70
323	322	323	0.40	0.62	0.25	15	4.55	1.13	3.28	21	3.81	12.50	0.86
322	321	322	0.40	0.64	0.26	16	4.40	1.13	3.54	22	3.71	13.13	1.97
321	320	321	0.40	0.61	0.24	15	4.55	1.11	4.39	24	3.53	15.50	0.70
320	319	320	0.60	0.45	0.27	16	4.40	1.19	4.66	24	3.53	16.45	0.16
319	329	319	0.60	0.41	0.25	16	4.40	1.08	4.90	25	3.45	16.91	0.70
329	318	329	0.40	0.77	0.31	15	4.55	1.40	5.21	25	3.45	17.98	0.56

STORM SEWER DESIGN CALCULATIONS
-RATIONAL METHOD-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Rational

STRUCTURE		BASINS							COMPOSITE BASINS				TRAVEL
FROM	TO	BASIN #	c	A (acres)	c*A	Tc (min)	I (in/hr)	Q (cfs)	SUM (c*A)	Tc (min)	I (in/hr)	Q (cfs)	TIME (min)
318	317	318	0.00	0.00	0.00	0	9.93	0.00	5.21	26	3.37	17.57	0.16
317	316	317	0.60	0.16	0.10	14	4.71	0.45	5.31	26	3.37	17.89	0.16
316	315	316	0.60	0.46	0.28	15	4.55	1.26	5.58	26	3.37	18.82	0.73
315	400	315	0.40	1.35	0.54	18	4.14	2.24	8.49	27	3.30	27.99	0.57
400	314	400	0.00	0.00	0.00	0	9.93	0.00	8.49	27	3.30	27.99	0.16
314	313	314	0.65	0.78	0.51	18	4.14	2.10	9.00	28	3.22	29.02	0.16
313	312	313	0.65	0.79	0.51	17	4.27	2.19	9.51	28	3.22	30.67	0.14
312	311	312	0.00	0.00	0.00	0	9.93	0.00	9.51	28	3.22	30.67	0.72
310	309	310	0.65	0.78	0.51	17	4.27	2.16	0.51	17	4.27	2.16	0.16
309	308	309	0.70	0.79	0.55	17	4.27	2.36	1.06	17	4.27	4.53	0.85
362	361	362	0.65	0.37	0.24	14	4.71	1.13	0.24	14	4.71	1.13	0.16
361	360	361	0.65	0.38	0.25	14	4.71	1.16	0.49	15	4.55	2.22	0.70
360	359	360	0.00	0.00	0.00	0	9.93	0.00	0.49	15	4.55	2.22	0.28
358	357	358	0.65	0.37	0.24	14	4.71	1.13	0.24	14	4.71	1.13	0.16
357	356	357	0.65	0.57	0.37	15	4.55	1.69	0.61	15	4.55	2.78	0.70
356	355	356	0.00	0.00	0.00	0	9.93	0.00	0.61	16	4.40	2.69	0.28
351	350	351	0.00	0.00	0.00	0	9.93	0.00	0.00	0	9.93	0.00	0.83
350	349	350	0.60	0.95	0.57	16	4.40	2.51	0.57	16	4.40	2.51	0.16
349	348	349	0.60	0.83	0.50	17	4.27	2.13	1.07	17	4.27	4.56	0.73
348	347	348	0.40	1.24	0.50	15	4.55	2.26	2.27	17	4.27	9.70	0.73
347	346	347	0.60	0.50	0.30	15	4.55	1.36	2.57	18	4.14	10.66	0.16
346	345	346	0.60	0.77	0.46	16	4.40	2.03	3.03	18	4.14	12.57	0.14

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STORM SEWER DESIGN CALCULATIONS
-RATIONAL METHOD-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Rational

STRUCTURE		BASINS							COMPOSITE BASINS				TRAVEL
FROM	TO	BASIN #	c	A (acres)	c*A	Tc (min)	I (in/hr)	Q (cfs)	SUM (c*A)	Tc (min)	I (in/hr)	Q (cfs)	TIME (min)
345	344	345	0.00	0.00	0.00	0	9.93	0.00	3.03	18	4.14	12.57	0.72
354	353	354	0.60	0.83	0.50	16	4.40	2.19	0.50	16	4.40	2.19	0.16
353	348	353	0.60	0.35	0.21	14	4.71	0.99	0.71	16	4.40	3.12	1.25
OFF-369	369	OFF-369	0.20	23.70	4.74	42	2.50	11.84	4.74	42	2.50	11.84	0.00
368	367	368	0.35	0.92	0.32	19	4.02	1.30	0.32	19	4.02	1.30	0.86
369	367	369	0.20	0.39	0.08	7	6.28	0.49	4.82	42	2.50	12.04	0.18
367	366	367	0.35	0.78	0.27	16	4.40	1.20	5.41	42	2.50	13.52	0.77
366	365	366	0.60	0.84	0.50	18	4.14	2.09	5.92	42	2.50	14.78	0.13
365	364	365	0.60	0.47	0.28	15	4.55	1.28	6.20	43	2.46	15.25	0.16
364	363	364	0.60	0.93	0.56	17	4.27	2.38	6.76	43	2.46	16.62	0.89
OFF-376	376	OFF-376	0.20	21.72	4.34	39	2.62	11.39	4.34	39	2.62	11.39	0.00
376	375	376	0.35	0.68	0.24	18	4.14	0.99	4.58	39	2.62	12.01	0.10
375	374	375	0.00	0.00	0.00	0	9.93	0.00	4.58	39	2.62	12.01	0.12
374	373	374	0.65	0.14	0.09	9	5.72	0.52	4.67	39	2.62	12.25	0.16
373	372	373	0.65	0.14	0.09	9	5.72	0.52	4.98	40	2.58	12.86	0.72
372	371	372	0.60	0.62	0.37	17	4.27	1.59	5.36	40	2.58	13.81	0.30
371	370	371	0.60	0.72	0.43	16	4.40	1.90	5.92	41	2.54	15.03	0.94
377	373	377	0.35	0.63	0.22	17	4.27	0.94	0.22	17	4.27	0.94	0.12
378	371	378	0.60	0.22	0.13	15	4.55	0.60	0.13	15	4.55	0.60	0.24

STORM SEWER DESIGN CALCULATIONS
-RATIONAL METHOD-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Rational

STRUCTURE		BASINS							COMPOSITE BASINS				TRAVEL
FROM	TO	BASIN #	c	A (acres)	c*A	Tc (min)	I (in/hr)	Q (cfs)	SUM (c*A)	Tc (min)	I (in/hr)	Q (cfs)	TIME (min)
380	379	380	0.35	0.90	0.32	16	4.40	1.39	0.32	16	4.40	1.39	1.11

STORM SEWER DESIGN CALCULATIONS
-PIPE DESIGN-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

n = 0.012 T:\4k\4569\600\drainage\[45699600-ST.xlsx]Pipe Design

STRUCTURE		DESIGN				CAP.							
FROM	TO	Q (cfs)	L (ft)	DIA. (in)	SLOPE %	Q (cfs)	VEL. (ft/s)	RIM ELEV. UP	RIM ELEV. DOWN	INVERT ELEV. UP	INVERT ELEV. DOWN	COVER (ft) UP	COVER (ft) DOWN
343	340	2.00	126	15	0.36	4.21	3.43	752.00	751.64	748.55	748.10	2.01	2.11
340	339	4.95	28	18	0.54	8.38	4.74	751.64	751.64	747.90	747.75	2.03	2.18
339	338	7.34	131	21	0.27	8.94	3.72	751.64	751.60	747.55	747.20	2.11	2.42
338	337	7.69	155	30	0.10	14.16	2.88	751.60	751.30	746.77	746.61	2.04	1.89
337	315	9.02	355	30	0.11	14.78	3.01	751.30	752.30	746.61	746.22	1.90	3.29
336	335	2.15	28	12	0.36	2.32	2.96	752.44	752.44	749.06	748.96	2.21	2.31
335	323	4.99	126	18	0.24	5.59	3.16	752.44	752.90	748.56	748.26	2.17	2.93
334	333	0.27	36	12	0.97	3.81	4.85	756.00	755.30	752.45	752.10	2.38	2.03
333	332	1.07	111	12	0.36	2.32	2.96	755.30	755.89	752.10	751.70	2.03	3.02
332	331	1.04	27	12	0.36	2.32	2.96	755.89	755.45	751.70	751.60	3.02	2.68
331	330	1.93	28	12	0.71	3.26	4.15	755.45	755.45	751.60	751.40	2.68	2.88
330	321	2.44	126	12	0.72	3.28	4.18	755.45	753.60	751.40	750.50	2.88	1.93
324	328	0.28	105	12	0.91	3.69	4.70		753.10	750.30	749.34		2.59
328	327	0.33	36	12	0.29	2.08	2.65	753.10	751.50	749.34	749.24	2.59	1.09
327	326	2.21	134	15	0.23	3.34	2.72	751.50	753.20	749.04	748.74	1.02	3.03
326	325	4.88	28	18	0.36	6.85	3.87	753.20	753.20	748.74	748.64	2.75	2.85
325	323	7.30	126	24	0.15	9.52	3.03	753.20	752.90	748.64	748.45	2.31	2.20
323	322	12.50	155	30	0.15	17.26	3.52	752.90	752.70	748.25	748.02	1.86	1.89
322	321	13.13	355	30	0.15	17.26	3.52	752.70	753.60	748.02	747.49	1.89	3.32
321	320	15.50	126	30	0.15	17.26	3.52	753.60	753.46	747.49	747.30	3.32	3.37
320	319	16.45	28	30	0.20	19.93	4.06	753.46	753.46	747.30	747.24	3.37	3.42
319	329	16.91	126	30	0.20	19.93	4.06	753.46	753.50	747.24	746.99	3.43	3.72
329	318	17.98	100	30	0.20	19.93	4.06	753.50	755.73	746.99	746.79	3.72	6.15

STORM SEWER DESIGN CALCULATIONS
-PIPE DESIGN-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

n = 0.012 T:\4k\4569\600\drainage\[45699600-ST.xlsx]Pipe Design

STRUCTURE		DESIGN				CAP.		RIM ELEV.		INVERT ELEV.		COVER (ft)	
FROM	TO	Q (cfs)	L (ft)	DIA. (in)	SLOPE %	Q (cfs)	VEL. (ft/s)	UP	DOWN	UP	DOWN	UP	DOWN
318	317	17.57	29	30	0.20	19.93	4.06	755.73	755.33	746.79	746.73	6.15	5.81
317	316	17.89	28	30	0.20	19.93	4.06	755.33	755.33	746.73	746.67	5.81	5.86
316	315	18.82	131	30	0.20	19.93	4.06	755.33	752.30	746.67	746.41	5.87	3.10
315	400	27.99	102	36	0.34	42.25	5.98	752.30	752.30	746.22	745.87	2.75	3.09
400	314	27.99	29	36	0.24	35.49	5.02	752.30	753.08	745.87	745.80	3.10	3.95
314	313	29.02	28	36	0.29	39.02	5.52	753.08	753.08	745.80	745.72	3.95	4.03
313	312	30.67	26	42	0.15	42.33	4.40	753.08	753.83	745.72	745.68	3.49	4.27
312	311	30.67	130	42	0.14	40.89	4.25	753.83		745.68	745.50	4.28	
310	309	2.16	28	12	0.50	2.74	3.48	752.20	752.20	748.07	747.93	2.96	3.10
309	308	4.53	153	15	1.46	8.48	6.91	752.20		747.73	745.50	3.03	
362	361	1.13	28	12	0.71	3.26	4.15	755.96	755.96	752.50	752.30	2.29	2.49
361	360	2.22	126	12	0.79	3.44	4.38	755.96	756.00	752.30	751.30	2.49	3.53
360	359	2.22	51	12	4.51	8.22	10.46	756.00		751.30	749.00	3.53	
358	357	1.13	28	12	0.71	3.26	4.15	755.59	755.59	752.20	752.00	2.22	2.42
357	356	2.78	126	12	0.79	3.44	4.38	755.59	755.50	752.00	751.00	2.42	3.33
356	355	2.69	50	12	4.00	7.74	9.86	755.50		751.00	749.00	3.33	
351	350	8.09	150	24	0.30	13.46	4.28	754.30	755.85	748.50	748.05	3.55	5.55
350	349	10.60	29	24	0.33	14.12	4.49	755.85	755.85	748.05	747.95	5.55	5.65
349	348	12.65	131	24	0.34	14.33	4.56	755.85	753.30	747.95	747.50	5.65	3.55
348	347	17.79	131	24	0.57	18.55	5.91	753.30	755.18	747.50	746.75	3.55	6.18
347	346	18.75	28	27	0.55	24.95	6.27	755.18	755.18	746.55	746.40	6.11	6.26
346	345	20.66	25	27	0.60	26.06	6.55	755.18	755.54	746.40	746.25	6.26	6.77

STORM SEWER DESIGN CALCULATIONS
-PIPE DESIGN-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

n = 0.012 T:\4k\4569\600\drainage\[45699600-ST.xlsx]Pipe Design

STRUCTURE		DESIGN				CAP.		RIM ELEV.		INVERT ELEV.		COVER (ft)	
FROM	TO	Q (cfs)	L (ft)	DIA. (in)	SLOPE %	Q (cfs)	VEL. (ft/s)	UP	DOWN	UP	DOWN	UP	DOWN
345	344	20.66	130	27	0.58	25.62	6.44	755.54		746.25	745.50	6.77	
354	353	2.19	28	12	0.71	3.26	4.15	756.45	756.45	753.00	752.80	2.28	2.48
353	348	3.12	225	15	1.20	7.69	6.26	756.45	753.30	752.60	749.90	2.41	1.96
OFF-369	369	11.84											
368	367	1.30	155	12	0.84	3.55	4.52	755.90	754.80	752.70	751.40	2.03	2.23
369	367	12.04	33	21	0.49	12.05	5.01	754.30	754.80	750.75	750.59	1.57	2.23
367	366	13.52	139	24	0.32	13.90	4.42	754.80	756.18	750.39	749.95	2.16	3.98
366	365	14.78	23	24	0.42	15.93	5.07	756.18	755.94	749.95	749.85	3.98	3.84
365	364	15.25	28	24	0.41	15.73	5.01	755.94	755.94	749.85	749.74	3.84	3.95
364	363	16.62	160	24	0.46	16.67	5.31	755.94		749.74	749.00	3.95	
OFF-376	376	11.39											
376	375	12.01	18	21	4.44	36.27	15.08		756.00	753.00	752.20		1.82
375	374	12.01	21	21	5.24	39.40	16.38	756.00	756.32	752.20	751.10	1.82	3.24
374	373	12.25	28	21	0.93	16.60	6.90	756.32	756.32	751.10	750.84	3.24	3.50
373	372	12.86	130	21	0.59	13.22	5.50	756.32	758.30	750.84	750.07	3.50	6.25
372	371	13.81	54	24	0.35	14.54	4.63	758.30	757.99	749.87	749.68	6.18	6.06
371	370	15.03	169	24	0.40	15.54	4.95	757.99		749.68	749.00	6.06	
377	373	0.94	21	12	0.46	2.62	3.34	754.90	756.32	751.70	751.60	2.03	3.55
378	371	0.60	43	12	0.93	3.73	4.75	758.23	757.99	754.70	754.30	2.36	2.52

STORM SEWER DESIGN CALCULATIONS
-PIPE DESIGN-

PROJECT:	*Heritage*	*STORM:*	*10 Year*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*
DATE:	*4/8/16*	*SHEET NO.:*	

n = 0.012 T:\4k\4569\600\drainage\[45699600-ST.xlsx]Pipe Design

STRUCTURE		DESIGN				CAP.						
FROM	TO	Q (cfs)	L (ft)	DIA. (in)	SLOPE %	Q (cfs)	VEL. (ft/s)	RIM ELEV. UP	RIM ELEV. DOWN	INVERT ELEV. UP	INVERT ELEV. DOWN	COVER (ft) UP	COVER (ft) DOWN
380	379	1.39	199	12	1.61	4.91	6.25	751.90		748.70	745.50	2.03	

Time of Concentration Worksheet
Based on TR-55

PROJECT: Heritage
JOB #: 4569.600 *4/8/16*

Typical values for Manning's n			
Overland Flow		Channel Flow	
short grass	0.15	grass	0.03
farm, > 20% cover	0.17	concrete	0.015
dense grass	0.24	rip-rap	0.035
pavement	0.011		

2 year, 24 hour rainfall = 2.64 inches
minimum T_c = 5.00 minutes

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Time of Conc

Basin name	Overland flow seg. 1 Length (ft)	S %	n	T_t (min)	Overland flow seg. 2 Length (ft)	S %	n	T_t (min)	Shallow Concentrated Flow Length (ft)	S %	Paved/Un (P or U)	Vel. (ft/s)	T_t (min)	Channel Flow Length (ft)	a (s.f.)	Pw (ft)	r (ft)	S %	n	Vel. (ft/s)	T_t (min)	T_c (min)
309	60	1.00	0.24	14					260	0.50	P	1.44	3									17
310	60	1.00	0.24	14					260	0.50	P	1.44	3									17
313	60	1.00	0.24	14					355	0.82	P	1.84	3									17
314	70	1.00	0.24	16					300	1.00	P	2.03	2									18
315	60	1.00	0.24	14					355	0.82	U	1.46	4									18
316	60	1.00	0.24	14					215	1.43	P	2.43	1									15
317	60	1.00	0.24	14					45	1.43	P	2.43	0									14
319	60	1.00	0.24	14					190	0.50	P	1.44	2									16
320	60	1.00	0.24	14					190	0.50	P	1.44	2									16
321	60	1.00	0.24	14					105	1.00	U	1.61	1									15
322	60	1.00	0.24	14					200	1.00	U	1.61	2									16
323	60	1.00	0.24	14					100	1.00	U	1.61	1									15
324	20	33	0.24	1					355	1.00	U	1.61	4									5
325	60	1.00	0.24	14					460	0.58	P	1.55	5									19
326	60	1.00	0.24	14					460	0.58	P	1.55	5									19
327	70	1.00	0.24	16					355	1.00	U	1.61	4									19
328	20	33	0.24	1					105	1.00	U	1.61	1									5
329	60	1.00	0.24	14					155	1.00	U	1.61	2									15
330	60	1.00	0.24	14					75	0.50	P	1.44	1									15
331	60	1.00	0.24	14					100	1.38	P	2.39	1									14
333	75	1.00	0.24	16					155	1.00	U	1.61	2									18
334	20	33	0.24	1					200	1.00	U	1.61	2									5
335	60	1.00	0.24	14					305	0.51	P	1.45	4									17
336	60	1.00	0.24	14					305	0.51	P	1.45	4									17
337	70	1.00	0.24	16					230	1.00	U	1.61	2									18
338	60	1.00	0.24	14					80	1.00	U	1.61	1									15
339	60	1.00	0.24	14					465	0.80	U	1.44	5									19
340	60	1.00	0.24	14					460	0.80	U	1.44	5									19
343	60	1.00	0.24	14					305	1.00	U	1.61	3									17
346	60	1.00	0.24	14					260	1.20	P	2.23	2									16
347	60	1.00	0.24	14					100	0.50	P	1.44	1									15
348	60	1.00	0.24	14					150	1.00	U	1.61	2									15
349	60	1.00	0.24	14					250	0.50	P	1.44	3									17
350	60	1.00	0.24	14					200	0.50	P	1.44	2									16
353	60	1.00	0.24	14					60	0.93	P	1.96	1									14
354	60	1.00	0.24	14					200	0.66	P	1.65	2									16
357	60	1.00	0.24	14					115	0.50	P	1.44	1									15
358	60	1.00	0.24	14					55	0.50	P	1.44	1									14
361	60	1.00	0.24	14					50	0.50	P	1.44	1									14
362	60	1.00	0.24	14					50	0.50	P	1.44	1									14
364	60	1.00	0.24	14					320	0.64	P	1.63	3									17
365	60	1.00	0.24	14					180	0.80	P	1.82	2									15
366	60	1.00	0.24	14					430	0.64	P	1.63	4									18
367	60	1.00	0.24	14					200	1.00	U	1.61	2									16
368	70	1.00	0.24	16					310	1.00	U	1.61	3									19
369	20	33.00	0.24	1					520	1.00	U	1.61	5									7
371	60	1.00	0.24	14					210	0.50	P	1.44	2									16
372	60	1.00	0.24	14					260	0.50	P	1.44	3									17
373	30	1.00	0.24	8					100	1.24	P	2.26	1									9
374	30	1.00	0.24	8					100	1.24	P	2.26	1									9
376	70	1.00	0.24	16					260	1.00	U	1.61	3									18
377	60	1.00	0.24	14					280	1.00	U	1.61	3									17
378	60	1.00	0.24	14					100	0.50	P	1.44	1									15
380	60	1.00	0.24	14					260	1.00	U	1.61	3									16
OFF-369	100	1.00	0.17	16					1640	0.51	U	1.15	24	375						3.00	2	42
OFF-376	100	1.00	0.17	16					1294	0.40	U	1.02	21	418						3.00	2	39

PONDING DEPTH CALCULATIONS

Curb Inlet Ponding Depth:

Curb inlets must be checked for capacity to insure that the depth of storm water ponding is not excessive during the 10 year storm event. The limiting flow conditions must be established between orifice flow and weir flow. Note: Per the drainage ordinance the inlet grates are assumed to be 50% clogged.

Orifice flow: $Q = C * A * \sqrt{2 * g * h}$

where:
- Q = allowable flow rate, cfs
- C = orifice discharge coefficient = 0.62
- A = open area of inlet, ft^2
- g = force of gravity: 32.2 ft/sec^2

Weir flow: $Q = 2/3 * C * \sqrt{2 * g} * L * h^{3/2}$

where:
- Q = allowable flow rate, cfs
- C = orifice discharge coefficient = 0.62
- g = force of gravity: 32.2 ft/sec^2
- L = length of perimeter of weir, ft

The specified curb inlet is the Neenah 3501-TR/TL which has an open area of 1.4 ft^2 and a perimeter length of 4.6 ft. If double curb inlets are specified then the open area would be 2.8 ft^2 and the perimeter length would be 6.78 ft.

Note: Per the drainage ordinance the inlet grates are assumed to be 50% clogged so the open areas would be half of what was previously listed.

Gutter Spread & Ponding Depth Calculations

$$Q = \frac{0.56}{N} * Z * D^{8/3} * S^{1/2}, \quad \textit{Modified Manning's Equation}$$

Q =	Flow =	--	cfs	
N =	Roughness =	0.0160	(asphalt)	
Z =	1/Transverse Slope =	48.00	ft/ft	
T =	Transverse Slope =	0.02083	ft/ft	
S =	Longtudinal Slope =	--	ft/ft	
D =	Depth =	--	ft	

Project: Heritage
Job #: 4569.600
Date: 04/29/16
BY: GMM

* Double Inlets

		Gutter Spread								Ponding Depth					
	Street	Q, cfs			Spread,ft			Open		Above	Above	Spread, ft		Open	
Inlet	Width, ft	Total	Left	Right	Left	Right	Comb.	Lane	Status	Inlet	Pvmt	Inlet	Comb.	Lane	Status
316	28	1.26	0.63	0.63	5.53	6.70	12.02'	15.98'	> 12' OK	0.19	0.14	6.68	8.88'	19.12'	> 12' OK
317		0.45	0.34	0.11	5.32	2.87				0.10	0.05	2.19			
319	28	1.08	0.27	0.81	3.30	7.37	14.80'	13.20'	> 12' OK	0.17	0.12	5.83	12.19'	15.81'	> 12' OK
320		1.19	0.83	0.36	7.43	3.68				0.18	0.13	6.36			
325 *	28	2.49	1.99	0.50	10.07	6.17	20.35'	7.65'	< 12', XX	0.23	0.18	8.66	18.24'	9.76'	< 12', XX
326 *		2.80	0.70	2.10	7.00	10.28				0.25	0.20	9.57			
330	28	0.57	0.29	0.29	4.13	4.88	10.86'	17.14'	> 12' OK	0.11	0.06	2.98	8.62'	19.38'	> 12' OK
331		1.04	0.26	0.78	4.68	5.98				0.17	0.12	5.63			
335 *	28	2.84	1.14	1.71	8.31	9.75	19.52'	8.48'	< 12', XX	0.25	0.20	9.69	17.34'	10.66'	< 12', XX
336 *		2.15	1.72	0.43	9.77	5.77				0.21	0.16	7.64			
339 *	28	2.39	1.91	0.48	9.34	6.01	18.27'	9.73'	< 12', XX	0.22	0.17	8.37	18.69'	9.31'	< 12', XX
340 *		3.07	1.38	1.69	8.93	8.92				0.27	0.22	10.32			
346 *	28	2.03	1.32	0.71	7.55	7.04	14.47'	13.53'	> 12' OK	0.20	0.15	7.28	14.48'	13.52'	> 12' OK
347		1.36	0.68	0.68	6.92	5.89				0.20	0.15	7.20			
349 *	28	2.13	0.85	1.28	6.79	8.26	16.48'	11.52'	< 12', XX	0.21	0.16	7.56	16.29'	11.71'	< 12', XX
350 *		2.51	1.26	1.26	8.22	7.87				0.23	0.18	8.73			
353	28	0.99	0.49	0.49	5.59	5.23	13.17'	14.83'	> 12' OK	0.16	0.11	5.34	13.11'	14.89'	> 12' OK
354 *		2.19	1.10	1.10	7.08	7.58				0.21	0.16	7.77			
357	28	1.69	0.84	0.84	7.02	6.69	13.19'	14.81'	> 12' OK	0.23	0.18	8.84	14.92'	13.08'	> 12' OK
358		1.13	0.68	0.45	6.18	5.55				0.18	0.13	6.07			
361	28	1.16	0.58	0.58	6.05	6.02	12.05'	15.95'	> 12' OK	0.18	0.13	6.23	12.30'	15.70'	> 12' OK
362		1.13	0.57	0.57	5.98	6.01				0.18	0.13	6.07			
364 *	28	2.38	1.55	0.83	8.22	6.83	14.55'	13.45'	> 12' OK	0.22	0.17	8.35	11.86'	16.14'	> 12' OK
365 *		1.28	0.51	0.77	5.69	6.32				0.12	0.07	3.51			
373	28	0.52	0.52	0.00	5.38	0.00	10.77'	17.23'	> 12' OK	0.11	0.06	2.65	5.30'	22.70'	> 12' OK
374		0.52	0.00	0.52	0.00	5.38				0.11	0.06	2.65			
371 *	28	1.78	0.89	0.89	7.15	7.23	16.05'	11.95'	< 12', XX	0.18	0.13	6.45	12.00'	16.00'	> 12' OK
372 *		1.51	1.51	0.00	8.82	0.00				0.17	0.12	5.54			

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4/29/2016 3:23 PM

Inlet Capacity
- Proposed Basins -

PROJECT:	*Heritage*	*DATE:*	*4/29/2016*
JOB #:	*4569.600*	*COMPUTED BY:*	*GMM*

T:\4k\4569\600\drainage\[45699600-ST.xlsx]Inlets

Casting Type			Area (ft^2)	Perimeter (ft)	Comments
Neenah	R-3286-8V		0.7	4.4	Curb Inlet
Neenah	R-3501-TR/TL		1.4	4.6	Roll Curb Inlet
Neenah	R-4342		2.0	6.0	Curb Inlet
Neenah	R-3433		1.5	8.0	Paved Area Inlet

Cw = 3.3 C_w = Coefficient of weir flow

Cd = 0.6 Cd = Coefficient of orifice flow

L = Weir length (ft)

A = Open area (ft^2)

H = Head (ft)

$Q_{weir} = C_w L H^{1.5}$

$Q_{orifice} = C_d A (2gh)^{0.5}$

C_w source: *Neenah Foundary Co.*

* 50% clogged

Inlet	Casting Type	Q (ft^3/sec)	Area (ft^2)	Perimeter (lf)		H_{weir} (ft)	$H_{orifice}$ (ft)
343	R-4342	2.00	1.00	3.00		0.34	0.17
315	R-4342	2.24	1.00	3.00		0.37	0.22
321	R-4342	1.11	1.00	3.00		0.23	0.05
322	R-4342	1.13	1.00	3.00		0.23	0.05
323	R-4342	1.13	1.00	3.00		0.24	0.05
327	R-4342	2.01	1.00	3.00		0.35	0.17
328	R-4342	0.07	1.00	3.00		0.04	0.00
329	R-4342	1.40	1.00	3.00		0.27	0.08
333	R-4342	0.91	1.00	3.00		0.20	0.04
334	R-4342	0.27	1.00	3.00		0.09	0.00
337	R-4342	1.67	1.00	3.00		0.31	0.12
338	R-4342	0.64	1.00	3.00		0.16	0.02
348	R-4342	2.26	1.00	3.00		0.37	0.22
356	R-4342	0.00	1.00	3.00		0.00	0.00
360	R-4342	0.00	1.00	3.00		0.00	0.00
367	R-4342	1.20	1.00	3.00		0.25	0.06
368	R-4342	1.30	1.00	3.00		0.26	0.07
369	R-4342	0.49	1.00	3.00		0.13	0.01
377	R-4342	0.96	1.00	3.00		0.21	0.04
380	R-4342	1.39	1.00	3.00		0.27	0.08