

# DETENTION CALCULATIONS - NORTH TRIBUTARY POND INTERIM DESIGN

## ALLOWABLE RELEASE RATE CALCULATIONS

### 2-YEAR STORM

#### North Tributary

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	5.9	92.9

Area #	Area (ac)	Area (sq ft)	Proposed Runoff Coefficient	To - Proposed (min)	Rainfall Intensity (in/hr)	Q - Post Development (cfs)	Difference between Pre and Post Development Conditions					
6	389570	89.36	0.4224	10	5.9	205.1	114.6					
Drainage Area to Pond							82.3	0.4158	10	5.9	181.5	
Area Discharging Pond							7.04	0.5	10	5.9	16.6	
Allowed Release =							66.9					

### 10-YEAR STORM

#### Ex. 0x4 Box - 850' South of Bending Oaks Trail

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	8.9	129.4

Area #	Area (ac)	Area (sq ft)	Proposed Runoff Coefficient	To - Proposed (min)	Rainfall Intensity (in/hr)	Q - Post Development (cfs)	Difference between Pre and Post Development Conditions					
6	389570	89.36	0.4224	10	7.1	269.1	138.7					
Drainage Area to Pond							82.3	0.4158	10	7.1	243.1	
Area Discharging Pond							7.04	0.5	10	7.1	26.2	
Allowed Release =							164.4					

### 25-YEAR STORM

#### Ex. 0x4 Box - 850' South of Bending Oaks Trail

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	8.6	144.7

Area #	Area (ac)	Area (sq ft)	Proposed Runoff Coefficient	To - Proposed (min)	Rainfall Intensity (in/hr)	Q - Post Development (cfs)	Difference between Pre and Post Development Conditions					
6	389570	89.36	0.4224	10	8.5	313.4	168.6					
Drainage Area to Pond							82.3	0.4158	10	8.5	284.2	
Area Discharging Pond							7.04	0.5	10	8.5	29.2	
Allowed Release =							116.6					

### 50-YEAR STORM

#### Ex. 0x4 Box - 850' South of Bending Oaks Trail

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	7.5	104.5

Area #	Area (ac)	Area (sq ft)	Proposed Runoff Coefficient	To - Proposed (min)	Rainfall Intensity (in/hr)	Q - Post Development (cfs)	Difference between Pre and Post Development Conditions					
6	389570	89.36	0.4224	10	6.5	339.9	175.5					
Drainage Area to Pond							82.3	0.4158	10	6.5	308.1	
Area Discharging Pond							7.04	0.5	10	6.5	31.7	
Allowed Release =							132.8					

### 100-YEAR STORM

#### Ex. 0x4 Box - 850' South of Bending Oaks Trail

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	8.3	120.0

Area #	Area (ac)	Area (sq ft)	Proposed Runoff Coefficient	To - Proposed (min)	Rainfall Intensity (in/hr)	Q - Post Development (cfs)	Difference between Pre and Post Development Conditions					
6	389570	89.36	0.4224	10	6.8	370.0	180.0					
Drainage Area to Pond							82.3	0.4158	10	6.8	333.9	
Area Discharging Pond							7.04	0.5	10	6.8	31.5	
Allowed Release =							147.9					

## INTERIM CONDITIONS RUNOFF COEFFICIENT CALCULATIONS

Area #	Area (ac)	Area (sq ft)	Existing Runoff Coefficient	To - Existing (min)	Rainfall Intensity (in/hr)	Q - Undeveloped (cfs)
2	2728413	62.55	0.35	20	5.9	92.9

## DETENTION POND RELEASE RATE CALCULATIONS

### Elevation Calculations Based on Actual Release Rate

Event	Actual Release Rate	Storage Requirement	Occurs at Elevation
2-year	40.1	175762	499.81
10-year	77.1	230784	500.58
25-year	84.7	253869	500.89
50-year	112.0	273977	501.17
100-year	128.3	294330	501.42

### Release Rate Calculations Based on Above Table

Stage	Lower	Higher	Wear Length	Discharge	Flow	Allowable	Allowable
497.50	0.00	2.50	0.0	0.0	0.0		
498.00	1.00	2.50	5.3	0.0	0.0		
498.50	2.00	2.50	14.9	0.0	0.0		
499.00	2.50	2.50	24.8	0.0	0.0		
499.50	3.00	2.50	27.3	1.0	21.0	49.4	
500.00	3.50	2.50	35.0	1.0	41.0	77.1	104.4 (27.3)
500.50	4.00	2.50	40.3	1.0	54.5	84.7	116.5 (28.0)
501.00	4.50	2.50	42.1	2.0	67.5	101.8	
501.50	4.77	2.50	44.3	2.2	67.3	101.8	
501.82	4.42	2.50	48.9	2.4	64.0	79.4	128.3 (16.2)
502.00	5.00	2.50	59.0	3.0	60.0	109.3	168.1

## DETENTION STORAGE REQUIREMENTS

Storm Duration	Inflow Duration	Area (AC.)	Future "C"	Future "R"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	82.35	0.42	1.00	34.24	5.90	181.5	108877	24069	84808	1.95	40.1
20	30	82.35	0.42	1.00	34.24	3.50	113.5	160233	36103	124130	2.85	40.1
30	40	82.35	0.42	1.00	34.24	2.60	89.0	203573	46138	159335	3.66	40.1
40	50	82.35	0.42	1.00	34.24	2.00	69.0	213845	60172	153472	3.52	40.1
50	60	82.35	0.42	1.00	34.24	1.50	51.0	233242	72207	164035	3.77	40.1
60	70	82.35	0.42	1.00	34.24	1.00	34.24	234167	84241	149946	3.44	40.1
70	80	82.35	0.42	1.00	34.24	0.75	25.68	258339	96276	162563	3.73	40.1
80	90	82.35	0.42	1.00	34.24	0.50	17.12	279351	108310	171071	3.93	40.1
90	100	82.35	0.42	1.00	34.24	0.30	10.26	299816	120345	175471	4.03	40.1
100	110	82.35	0.42	1.00	34.24	0.20	6.84	309141	132378	178762	4.03	40.1

Storm Duration	Inflow Duration	Area (AC.)	Future "C"	Future "R"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	82.35	0.42	1.00	34.24	7.10	243.1	145854	45205	99568	2.25	77.1
20	30	82.35	0.42	1.00	34.24	4.00	113.5	242405	69429	172976	3.97	77.1
30	40	82.35	0.42	1.00	34.24	2.60	69.0	256816	92571	203244	4.67	77.1
40	50	82.35	0.42	1.00	34.24	1.80	51.0	329684	116714	212970	4.89	77.1
50	60	82.35	0.42	1.00	34.24	1.30	34.24	359498	139857	220541	5.07	77.1
60	70	82.35	0.42	1.00	34.24	1.00	34.24	369770	162000	207770	4.77	77.1
70	80	82.35	0.42	1.00	34.24	0.75	25.68	402638	185143	217485	4.99	77.1
80	90	82.35	0.42	1.00	34.24	0.50	17.12	427289	206286	218004	5.03	77.1
90	100	82.35	0.42	1.00	34.24	0.30	10.26	452212	231428	230784	5.30	77.1
100	110	82.35	0.42	1.00	34.24	0.20	6.84	472463	254571	217912	5.00	77.1

Storm Duration	Inflow Duration	Area (AC.)	Future "C"	Future "R"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	82.35	0.42	1.00	34.24	8.30	284.2	170905	56838	119667	2.81	94.7
20	30	82.35	0.42	1.00	34.24	4.50	144.0	271164	85257	189907	4.27	94.7
30	40	82.35	0.42	1.00	34.24	3.00	92.0	339955	113676	228279	5.17	94.7
40	50	82.35	0.42	1.00	34.24	2.00	61.0	407289	142095	238891	5.42	94.7
50	60	82.35	0.42	1.00	34.24	1.50	51.0	410855	178314	240341	5.52	94.7
60	70	82.35	0.42	1.00	34.24	1.00	34.24	431358	195934	232464	5.34	94.7
70	80	82.35	0.42	1.00	34.24	0.75	25.68	474636	227353	247186	5.67	94.7
80	90	82.35	0.42	1.00	34.24	0.50	17.12	499460	255772	253689	5.82	94.7
90	100	82.35	0.42	1.00	34.24	0.30	10.26	539168	284191	251975	5.78	94.7
100	110	82.35	0.42	1.00	34.24	0.20	6.84	554654	312610	242044	5.68	94.7

Storm Duration	Inflow Duration	Area (AC.)	Future "C"	Future "R"	Future "CA"	Rainfall Intensity	Inflow (cfs)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (cubic ft.)	Volume (acre-ft.)	Outflow (cfs)
10	20	82.35	0.42	1.00	34.24	9.80	325.5	201310	77010	124399	2.85	128.3
20	30	82.35	0.42	1.00	34.24	5.00	161.0	341010	115514	225495	5.18	128.3
30	40	82.35	0.42	1.00	34.24	3.50	113.5	425235	154019	271216	6.23	128.3
40	50	82.35	0.42	1.00	34.24	2.50	80.0	476562	192524	284068	6.52	128.3
50	60	82.35	0.42	1.00	34.24	1.80	51.0	513599	231029	282540	6.49	128.3
60	70	82.35	0.42	1.00	34.24	1.30	34.24	554554	266534	285121	6.55	128.3
70	80	82.35	0.42	1.00	34.24	1.00	34.24	585577	308039	281538	6.46	128.3
80	90	82.35	0.42	1.00	34.24	0.75	25.68	640934	345543	284330	6.76	128.3
90	100	82.35	0.42	1.00	34.24	0.50	17.12	688585	385048	280537	6.44	128.3
100	110	82.35	0.42	1.00	34.24	0.30	10.26	698454	423563	274901	6.31	128.3
110	120	82.35	0.42	1.00	34.24	0.20	6.84	723105	462950	261047	5.99	128.3

← MAXIMUM STORAGE REQUIRED

