

Goddard School 2nd Addition Tc Comparison - Major Basins and Ponds

Tc, Shallow Flow = 300'

Basin	Exist.		Prop.		Exist.		Prop.		Exist.		Prop.	
	Q ₂ (cfs)	Q ₂ (cfs)	Q ₅ (cfs)	Q ₅ (cfs)	Q ₁₀ (cfs)	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)
East	15	13	24	16	33	18	41	21	60	26		
North	85	90	135	122	177	148	222	174	319	227		
South	28	30	47	48	62	61	79	76	115	108		

Tc, Shallow Flow = 100'

Basin	Exist.		Prop.		Exist.		Prop.		Exist.		Prop.	
	Q ₂ (cfs)	Q ₂ (cfs)	Q ₅ (cfs)	Q ₅ (cfs)	Q ₁₀ (cfs)	Q ₁₀ (cfs)	Q ₂₅ (cfs)	Q ₂₅ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)	Q ₁₀₀ (cfs)
East	21	13	34	16	46	19	58	21	84	27		
North	107	98	171	128	226	154	282	180	406	236		
South	38	44	63	69	85	90	108	112	158	159		

Ponds

Pond	2-year		5-year		10-year		25-year		100-year	
	300'	100'	300'	100'	300'	100'	300'	100'	300'	100'
	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)	WSE (ft)
4A	1424.7	1424.8	1425.0	1425.1	1425.2	1425.2	1425.3	1425.4	1425.6	1425.8
6A	1423.4	1423.7	1423.8	1424.1	1424.1	1424.3	1424.2	1424.4	1424.6	1424.8
7A	1423.5	1423.6	1424.0	1424.1	1424.4	1424.5	1424.7	1424.8	1425.4	1425.5
7B	1425.9	1426.1	1426.3	1426.5	1426.6	1426.9	1427.0	1427.3	1427.6	1427.9
8A	1425.5	1425.6	1426.0	1426.1	1426.3	1426.5	1426.6	1426.9	1427.3	1427.6
8B	1422.9	1422.9	1423.4	1423.4	1423.7	1423.8	1424.1	1424.2	1424.9	1425.0
8C	-	1425.4	-	1425.8	-	1426.1	-	1426.4	-	1427.1
11A	1423.3	1423.4	1423.8	1423.9	1424.1	1424.2	1424.5	1424.5	1425.0	1425.1
12A	1422.5	1422.6	1423.1	1423.2	1423.5	1423.6	1423.9	1424.0	1424.7	1424.7
N (Exist.)	1420.2	1420.2	1420.5	1420.6	1420.8	1420.9	1421.1	1421.1	1421.5	1421.6
N (Prop.)	1420.5	1420.5	1420.8	1420.8	1421.0	1421.0	1421.2	1421.1	1421.6	1421.5

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Goddard School 2nd Addition Tc Comparison - Drainage Basins

Existing Conditions

Basin	300'	100'	ΔTc (min)	300'	100'	ΔQ_{100} (cfs)
	Tc (min)	Tc (min)		Q_{100} (cfs)	Q_{100} (cfs)	
A	80.6	50.4	-30.2	80	114	34
B	68.6	51.1	-17.5	32	38	6
C	59.2	31.7	-27.5	60	84	24
D	63.8	39.7	-24.1	77	102	25
E	44.2	23.6	-20.6	64	78	14
OS1	55.8	21.6	-34.2	9	13	4
OS2	62.1	42.2	-19.9	90	113	23
OS3	22.8	15	-7.8	4	6	2
OS4	53.9	23.7	-30.2	6	8	2
OS5	57.9	35	-22.9	73	98	25
OS6	32.6	19.5	-13.1	30	37	7

Proposed Conditions

Basin	300'	100'	ΔTc (min)	300'	100'	ΔQ_{100} (cfs)
	Tc (min)	Tc (min)		Q_{100} (cfs)	Q_{100} (cfs)	
1	15	15	0	39	39	0
2	15	15	0	29	29	0
3	15	15	0	21	21	0
4	45.1	20.4	-24.7	34	53	19
5	15	15	0	11	11	0
6	62.8	17.7	-45.1	15	28	13
7	51.1	24.9	-26.2	45	59	14
8A	38.2	28.4	-9.8	103	110	7
8B	44.97	29.03	-15.94	121	99	-22
8C	-	29.92	-	-	36	36
9	41.36	15	-26.36	5	5	0
10A	73.96	32.75	-41.21	58	95	37
10B	72.02	45.56	-26.46	26	35	9
11	50.99	37.58	-13.41	7	9	2
11A	15	15	0	16	16	0
12	25.03	15	-10.03	8	11	3
12A	15	15	0	17	17	0
13	15	15	0	3	3	0
14	30.04	18.93	-11.11	4	5	1
15	59.47	15	-44.47	49	96	47
16	53.9	27.29	-26.61	3	4	1
17	57.91	35.04	-22.87	78	104	26
18	52.63	27.91	-24.72	6	8	2
19	32.6	19.48	-13.12	30	37	7

Goddard School 2nd Addition Existing Condition Model Input

← modified per (OW) comment
that sheet flow can only be 100' long

Basin name	Tc (min)	Lag time (min)	Area (acres)	Area (mi ²)	CN	% Impervious	IA	Outfall
A	50.4	30.3	40.11	0.0627	74	0%	0.70	South
B	51.1	30.7	14.81	0.0231	74	0%	0.70	South
C	31.7	19.0	24.94	0.0390	74	0%	0.70	East
D	39.7	23.8	30.98	0.0484	76	7%	0.63	North
E	23.6	14.1	22.44	0.0351	74	0%	0.70	North
OS1	21.6	12.9	3.33	0.0052	76	8%	0.63	North
OS2	42.2	25.3	35.80	0.0559	75	5%	0.66	North
OS3	15.0	9.0	1.13	0.0018	74	0%	0.70	North
OS4	23.7	14.2	2.40	0.0038	74	0%	0.70	South
OS5	35.0	21.0	29.96	0.0468	74	0%	0.70	Reach E
OS6	19.5	11.7	6.55	0.0102	93	68%	0.14	North
			212.46					

Reach Name	Length (ft)	Slope	Manning's n	Shape	Side Slope	Outfall
Reach E	822	0.0097	0.033	Triangle	40	Reach OS2
Reach OS2	909	0.0055	0.033	Triangle	30	North

North Pond Stage/Storage	
Elevation (ft)	Acres
1419.15	3.79
1419.9	3.79
1420	6.71
1421	10.10
1422	13.25

North Pond Outfall Dimensions		
Outlet	Elevation (ft)	Length (ft)
North	1419.19	12
East	1420.30	10

← Added to table because calibration increased water level.

← Calibrated to 25yr storm, 4 pipes open in pond @B, water level part way up Stenhope driveway.

Goddard School 2nd Addition Proposed Condition Model Input

*modified per (CW) comment that
sheet flow can only be 100' long.*

Basin name	Tc (min)	Lag time (min)	Area (acres)	Area (mi ²)	CN	% Impervious	IA	Outfall
1	15.0	9.0	5.77	0.0090	95	89%	0.10	Pond 11A
2	15.0	9.0	4.34	0.0068	95	86%	0.11	North
3	15.0	9.0	3.29	0.0051	87	56%	0.29	Pond 12A
4	20.4	12.2	11.52	0.0180	79	21%	0.52	South
5	15.0	9.0	2.09	0.0033	77	11%	0.61	South
6	17.7	10.6	5.10	0.0080	82	32%	0.44	Pond 6A
7	24.9	15.0	13.37	0.0209	85	45%	0.35	Pond 7B
8A	28.4	17.1	24.78	0.0387	85	47%	0.34	Pond 8A
8B	29.03	17.42	21.23	0.0332	92	74%	0.17	Pond 8B
8C	29.92	17.95	9.83	0.0154	76	10%	0.61	Pond 8C
9	15.00	9.00	1.67	0.0026	74	0%	0.70	South
10A	32.75	19.65	28.39	0.0444	74	0%	0.70	South
10B	45.56	27.34	12.45	0.0195	74	0%	0.70	South
11	37.58	22.55	2.66	0.0042	74	0%	0.70	East
11A	15.00	9.00	2.59	0.0040	86	57%	0.32	Pond 11A
12	15.00	9.00	2.25	0.0035	74	0%	0.70	East
12A	15.00	9.00	2.60	0.0041	87	62%	0.30	Pond 12A
13	15.00	9.00	0.69	0.0011	74	0%	0.70	North
14	18.93	11.36	1.13	0.0018	74	0%	0.70	Pond 8A
15	15.00	9.00	14.50	0.0227	90	66%	0.22	North
16	27.29	16.38	1.18	0.0018	74	0%	0.70	South
17	35.04	21.02	32.03	0.0500	74	0%	0.70	Pond 8A
18	27.91	16.74	2.28	0.0036	74	0%	0.70	Pond 8B
19	19.48	11.69	6.55	0.0102	93	68%	0.14	North
			212.28					

*Basin 8B divided per
CW comment.*

Goddard School 2nd Addition Pond Outfall Dimensions

Pond	Pipe Diam. (in)	FL up	FL down	Length (ft)
4A	24	1423.26	1422.98	93
6A	15	1422.13	1421.84	109
7A	18	1421.08	1420.24	216
7B	24	1423.69	1423.52	117
8A	48 (x2)	1423.76	1423.05	88
	24	1423.05	1422.96	84
8B	48	1420.61	1420.23	93
	48	1421.10	1420.22	93
	24	1420.23	1419.93	88
8C	24	1423.82	1423.70	80
11A	12	1420.86	1420.33	63
	15	1424.25	1420.33	48
12A	12	1419.42	1419.14	57

← added Pond 8C when Basin 8B was divided per CW comment.

Goddard School 2nd Addition Pond Stage-Storage Curves

Pond 4A

Elevation (ft)	Acres
1422.95	0
1423.26	0
1424	0.158
1425	0.94
1426	2.50
1427	4.63

Pond 6A

Elevation (ft)	Acres
1421.8	0
1422.13	0
1423	0.09
1424	0.43
1425	1.03
1426	1.45

Pond 7A

Elevation (ft)	Acres
1420.20	0
1421.08	0
1422	0.06
1423	0.32
1424	0.73
1425	1.00

Pond 7B

Elevation (ft)	Acres
1423.50	0
1423.69	0
1424	0.02
1425	0.25
1426	0.54
1427	0.76
1428	1.04

Pond 8A

Elevation (ft)	Acres
1422.90	0
1423.05	0
1424	0.09
1425	0.41
1426	1.00
1427	1.33
1427.5	1.47

Pond 8B

Elevation (ft)	Acres
1419.90	0
1420.23	0
1421	0.52
1422	1.91
1423	2.67
1424	3.11
1424.5	3.29

Pond 8C

Elevation (ft)	Acres
1423.7	0
1423.82	0
1424	0.013
1425	0.1
1426	0.3
1427	0.63

← added
Pond 8C
When Basin
8B was
divided per
CAW comment.

Pond 11A

Elevation (ft)	Acres
1420.33	0
1420.86	0
1421	0.00542
1422	0.384
1423	0.86
1424	1.15
1425	1.28
1426	1.37
1427	1.49

Pond 12A

Elevation (ft)	Acres
1419.14	0
1419.42	0
1420	0.076
1421	0.49
1422	0.85
1423	1.26
1424	1.52
1425	1.81
1426	2.44

North Pond

Elevation (ft)	Acres
1419.15	3.56
1419.19	3.56
1420	5.74
1421	6.83
1422	8.07

← added because calibration
increased water level.

Goddard School 2nd Addition Existing Conditions Drainage Summary

Basin	2 year Q (cfs)	5 year Q (cfs)	10 year Q (cfs)	25 year Q (cfs)	100 year Q (cfs)
A	27	45	61	78	114
B	9	15	21	26	38
C	21	34	46	58	84
D	28	44	58	72	102
E	19	31	42	53	78
OS1	4	6	8	9	13
OS2	30	48	63	79	113
OS3	1	2	3	4	6
OS4	2	3	5	6	8
OS5	24	40	53	67	98
OS6	16	21	25	29	37
East	21	34	46	58	84
North	107	171	226	282	406
South	38	63	85	108	158

Goddard School 2nd Addition Proposed Conditions Drainage Summary

Basin	2 year Q (cfs)	5 year Q (cfs)	10 year Q (cfs)	25 year Q (cfs)	100 year Q (cfs)
1	17	22	26	30	39
2	13	17	20	23	29
3	9	12	14	16	21
4	18	26	32	39	53
5	3	5	7	8	11
6	10	14	18	21	28
7	23	32	38	45	59
8A	44	59	71	83	110
8B	44	57	67	77.3	99
8C	10	16	21	25.4	36
9	2	3	4	6	5
10A	24	39	52	65	95
10B	8	14	19	24	35
11A	7	9	11	13	16
11	2	3	5	6	9
12A	7	9	11	13	17
12	3	4	6	7	11
13	1	1	2	2	3
14	1	2	3	3	5
15	41	54	64	74	96
16	1	2	2	3	4
17	26	42	57	72	104
18	2	3	4	5	8
19	16	21	25	29	37
East	13	16	19	21	27
North	98	128	154	180	236
South	44	69	90	112	159

Goddard School 2nd Addition Pond Water Surface Elevation Summary

Existing	2 year WSE (ft)	5 year WSE (ft)	10 year WSE (ft)	25 year WSE (ft)	100 year WSE (ft)
North Pond	1420.2	1420.6	1420.9	1421.1	1421.6

Proposed	2 year WSE (ft)	5 year WSE (ft)	10 year WSE (ft)	25 year WSE (ft)	100 year WSE (ft)
Pond 4A	1424.8	1425.1	1425.2	1425.4	1425.8
Pond 6A	1423.7	1424.1	1424.3	1424.4	1424.8
Pond 7A	1423.6	1424.1	1424.5	1424.8	1425.5
Pond 7B	1426.1	1426.5	1426.9	1427.3	1427.9
Pond 8A	1425.6	1426.1	1426.5	1426.9	1427.6
Pond 8B	1422.9	1423.4	1423.8	1424.2	1425.0
Pond 8C	1425.4	1425.8	1426.1	1426.4	1427.1
Pond 11A	1423.4	1423.9	1424.2	1424.5	1425.1
Pond 12A	1422.6	1423.2	1423.6	1424.0	1424.7
North Pond	1420.5	1420.8	1421.0	1421.1	1421.5