

**CHADWYCK SILT BASIN**

Calculate Sediment Storage Required

- A) Avg. Slope = 2%
- B) Avg. Length of Slope = 313 linear feet
- C) Drainage Area = 130 acres
- D) Soil Type = Loss Soil (MNFORD) Hydraulic Type C & (WINFIELD) Hydraulic Type D
- E) Wet Basin
- F) Estimated Life = 1 year (min. allowed)

Lowest inflow elevation into basin = 526.33 Ft.  
 Volume @ 526.33 Ft = 233,370 cu. Ft.  
 Sediment Volume / Year =  $\frac{0.55 \text{ ac. ft.} \times 43560 \text{ sq. ft./ac.}}{23,958 \text{ cu. ft./yr.}}$   
 233,370 cu. ft. / 23,958 cu. ft./yr. = 9.7 yr.  
**10 years to impede flow**

LS = 0.28 (SOIL LOSS RATIO - Table B-6)  
 DR = 0.40 (DELIVERY RATIO - Table B-7)  
 SY = 0.038 (SEDIMENT YIELD - Table B-8)

SS (SEDIMENT STORAGE) = (LS)(DR)(SY)(DRAINAGE AREA)(LIFE)  
 = (0.28)(0.40)(0.038)(130)(10)  
 = 0.55

**SEDIMENT STORAGE (REQUIRED) = 0.55 AC-FT**

**TABLE B-7  
SEDIMENT DELIVERY RATIO**

Drainage Area Acres	Gross Erosion Delivered to Sediment Basin
0-1	1.00
1-5	.70
5-15	.60
15-60	.50
60-250	.40
greater than 250	.30

**TABLE B-8  
SEDIMENT YIELD**

Soil Type	Dry Pools					Wet Pools				
	Delivery Ratio					Delivery Ratio				
	0.30	0.40	0.50	0.60	0.70	0.30	0.40	0.50	0.60	0.70
Loss Soils	0.020	0.027	0.034	0.041	0.048	0.028	0.038	0.047	0.056	0.066
Other Soils	0.015	0.020	0.026	0.031	0.036	0.021	0.028	0.035	0.042	0.049

**Combined Spillway Capacities**

Spillways for the basin shall consist of a mechanical spillway or an emergency spillway or a combination of the two. These must have capacities that can safely pass any base flow plus the runoff from a design frequency storm. All base flow must pass through the mechanical spillway.

At sites where the value of property downstream from the basin warrants, the peak runoff from a storm of greater frequency than that shown in the table on page B-28 must be used.

CHADWYCK DETENTION

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---INITIAL CONDITIONS---  
 Elevation = 535.00 Ft  
 Outflow = 0.00 cfs  
 Storage = 691.596 cu-ft

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GIVEN POND DATA			INTERMEDIATE ROUTING COMPUTATIONS	
ELEVATION (ft)	OUTFLOW (cfs)	STORAGE (cu-ft)	25/T (cfs)	25/T + 0 (cfs)
534.00	0.0	606.770	20225.6	20225.6
534.20	0.0	623.152	20771.7	20771.7
534.40	0.0	639.623	21327.4	21327.4
534.60	0.0	656.182	21892.7	21892.7
534.80	0.0	674.040	22468.0	22468.0
535.00	0.0	691.596	23053.2	23053.2
535.20	7.2	709.452	23648.4	23648.4
535.40	20.5	727.611	24253.6	24253.6
535.60	37.6	746.068	24868.9	24868.9
535.80	58.0	764.840	25494.6	25494.6
536.00	81.0	783.921	26130.6	26130.6
536.20	106.5	803.207	26776.9	26776.9
536.40	134.2	822.995	27433.1	27433.1
536.60	162.9	842.979	28099.3	28099.3
536.80	195.6	863.279	28775.8	28775.8
537.00	260.0	883.878	29462.6	29462.6
537.20	284.8	904.793	30159.7	30159.7
537.40	307.6	926.018	30867.2	30867.2
537.60	328.9	947.553	31585.0	31585.0
537.80	348.8	969.409	32313.6	32313.6
538.00	367.7	991.585	33052.8	33052.8
538.20	385.7	1,014.083	33803.0	33803.0
538.40	402.8	1,037.008	34574.9	34574.9
538.60	419.2	1,060.358	35365.2	35365.2
538.80	435.1	1,085.159	36171.7	36171.7
539.00	450.3	1,109.996	36996.8	36996.8

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534.60	0.0	656.182	21892.7	21892.7
534.80	0.0	674.040	22468.0	22468.0
535.00	0.0	691.596	23053.2	23053.2
535.20	7.2	709.452	23648.4	23648.4
535.40	20.5	727.611	24253.6	24253.6
535.60	37.6	746.068	24868.9	24868.9
535.80	58.0	764.840	25494.6	25494.6
536.00	81.0	783.921	26130.6	26130.6
536.20	106.5	803.207	26776.9	26776.9
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Time Increment (Δt) = 1.0 Hr.

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INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hr)	INFLOW (cfs)	11+12 (cfs)	25/T - 0 (cfs)	25/T + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
1.0	212.92	425.8	23053.2	23053.2	0.00	535.00
2.0	212.92	425.8	23479.0	23479.0	5.09	535.14
3.0	212.92	425.8	23976.0	23976.0	12.34	535.28
4.0	212.92	425.8	24553.6	24553.6	21.69	535.41
5.0	212.92	425.8	24615.6	24615.6	31.46	535.53
6.0	212.92	425.8	24958.6	24958.6	41.89	535.64
7.0	212.92	425.8	25279.1	25279.1	52.69	535.75
8.0	212.92	425.8	25578.9	25578.9	63.32	535.85
9.0	212.92	425.8	25856.6	25856.6	73.76	535.94
10.0	212.92	425.8	26115.1	26115.1	83.69	536.02
11.0	212.92	425.8	26353.9	26353.9	93.50	536.10
12.0	212.92	425.8	26578.6	26578.6	102.57	536.17
13.0	212.92	425.8	26790.5	26790.5	111.24	536.23
14.0	212.92	425.8	26984.9	26984.9	119.48	536.29
15.0	212.92	425.8	27166.6	27166.6	127.05	536.35
16.0	212.92	425.8	27329.4	27329.4	134.00	536.41
17.0	212.92	425.8	27488.8	27488.8	140.73	536.44
18.0	212.92	425.8	27649.7	27649.7	146.89	536.49
19.0	212.92	425.8	27799.7	27799.7	152.53	536.52
20.0	212.92	425.8	27942.1	27942.1	157.68	536.56
21.0	0.00	212.9	27798.4	28015.1	153.31	536.53
22.0	0.00	0.0	27426.0	27708.4	140.22	536.44
23.0	0.00	0.0	27170.9	27488.8	128.56	536.36
24.0	0.00	0.0	26934.5	27170.9	118.14	536.28
25.0	0.00	0.0	26717.4	26934.5	108.57	536.21
26.0	0.00	0.0	26517.0	26717.4	100.20	536.15
27.0	0.00	0.0	26331.8	26517.0	92.59	536.09
28.0	0.00	0.0	26169.7	26331.8	85.56	536.04
29.0	0.00	0.0	26002.3	26169.7	79.22	535.98
30.0	0.00	0.0	25854.9	26002.3	73.69	535.94
31.0	0.00	0.0	25717.8	25854.9	68.55	535.89
32.0	0.00	0.0	25590.3	25717.8	63.76	535.85

Return Freq 2 years

INFLOW HYDROGRAPH		ROUTING COMPUTATIONS				
TIME (hr)	INFLOW (cfs)	11+12 (cfs)	25/T - 0 (cfs)	25/T + 0 (cfs)	OUTFLOW (cfs)	ELEVATION (ft)
1.0	270.05	540.1	23053.2	23053.2	0.00	535.00
2.0	270.05	540.1	23593.3	23593.3	6.46	535.18
3.0	270.05	540.1	24098.1	24098.1	17.20	535.35
4.0	270.05	540.1	24566.4	24566.4	30.02	535.51
5.0	270.05	540.1	25018.4	25018.4	43.91	535.66
6.0	270.05	540.1	25442.1	25442.1	58.21	535.80
7.0	270.05	540.1	25836.2	25836.2	72.99	535.93
8.0	270.05	540.1	26201.8	26201.8	87.25	536.05
9.0	270.05	540.1	26539.6	26539.6	101.13	536.16
10.0	270.05	540.1	26850.9	26850.9	114.45	536.26
11.0	270.05	540.1	27136.8	27136.8	127.09	536.35
12.0	270.05	540.1	27399.2	27399.2	138.89	536.43
13.0	270.05	540.1	27639.3	27639.3	150.08	536.51
14.0	270.05	540.1	27858.6	27858.6	160.32	536.58
15.0	270.05	540.1	28058.7	28058.7	169.97	536.64
16.0	270.05	540.1	28241.0	28241.0	178.93	536.69
17.0	270.05	540.1	28406.9	28406.9	187.08	536.75
18.0	270.05	540.1	28558.0	28558.0	194.51	536.79
19.0	270.05	540.1	28698.2	28698.2	201.46	536.83
20.0	270.05	540.1	28829.5	28829.5	217.37	536.87
21.0	0.00	270.1	28654.3	28654.3	203.25	536.82
22.0	0.00	0.0	28291.3	28291.3	181.40	536.71
23.0	0.00	0.0	27961.0	27961.0	165.16	536.61
24.0	0.00	0.0	27659.0	27659.0	151.00	536.51
25.0	0.00	0.0	27382.8	27382.8	138.11	536.43
26.0	0.00	0.0	27129.3	27129.3	126.73	536.35
27.0	0.00	0.0	26896.4	26896.4	116.46	536.27
28.0	0.00	0.0	26682.3	26682.3	107.82	536.20
29.0	0.00	0.0	26484.6	26484.6	99.87	536.14
30.0	0.00	0.0	26301.9	26301.9	91.36	536.08
31.0	0.00	0.0	26133.0	26133.0	84.43	536.03
32.0	0.00	0.0	25976.5	25976.5	78.26	535.98

Return Freq 5 years

**SUMMARY OF ROUTING COMPUTATIONS**

Starting Pond V.S. Elevation = 535.00 Ft

Summary of Peak Outflow and Peak Elevation  
 Peak Inflow = 212.92 cfs  
 Peak Outflow = 157.68 cfs  
 Peak Elevation = 536.56 Ft

**Summary of Approximate Peak Storage**

Initial Storage = 691.596 cu-ft  
 Peak Storage From Storm = 147.203 cu-ft  
 Total Storage in Pond = 838.799 cu-ft

**SUMMARY OF ROUTING COMPUTATIONS**

Starting Pond V.S. Elevation = 535.00 Ft

Summary of Peak Outflow and Peak Elevation  
 Peak Inflow = 270.05 cfs  
 Peak Outflow = 217.37 cfs  
 Peak Elevation = 536.87 Ft

**Summary of Approximate Peak Storage**

Initial Storage = 691.596 cu-ft  
 Peak Storage From Storm = 178.645 cu-ft  
 Total Storage in Pond = 870.241 cu-ft

**TABLE B-6  
SOIL LOSS RATIO (LS)  
PERCENT SLOPE (S)**

LENGTH (ft)	0.2	0.3	0.4	0.5	1.0	2.0	3.0	4.0	5.0	6.0	8.0	10.0	12.0	14.0	16.0	18.0	20.0	25.0	30.0	40.0	50.0	60.0
20'	.05	.05	.06	.06	.08	.12	.18	.21	.24	.30	.44	.61	.81	1.0	1.2	1.6	1.8	2.6	3.5	5.5	8	10
40'	.06	.07	.07	.08	.10	.15	.22	.28	.34	.43	.63	.87	1.2	1.4	1.8	2.2	2.6	3.5	5.0	8	1	