REQUIRED TREATMENT VOLUME CALCULATION & RECOVERY TIME CALCULATIONS

Dry Detention System "Western Pond"

Contributing Area = 1.212 Acres

Required Treatment Volume Calculations:

Impervious Area = 0.626 ac. (0.95)
Gravel Area = 0.034 (0.85)
Grassed/Landscaped Areas = 0.553 ac. (0.25)

Runoff Coefficient = $\frac{(0.626\ ac.*0.95)+(0.034*0.85)+(0.553\ ac.*0.25)}{1.212\ ac.} = 0.63$

$$Treatment\ Volume\ (1\ in\ x\ Runoff\ Coefficeint\ ) = \frac{0.63(1.212\ ac)(1\ in)(43{,}560 ft^2/ac)}{12 in/ft} = 2771.72\ ft^3$$

$$Treatment\ Volume\ (0.5\ in) = \frac{0.50\ (1.212\ ac.)(1\ in)(43560\frac{ft^2}{ac})}{12\ in/ft} = 2199.78\ ft^3$$

$$2771.72\ ft^3 > 2199.78\ ft^3$$

Treatment Volume Required = 2771.72 ft^3 = 0.064 ac. ft.

"Western Pond" Stage Storage		
Elevation	Area (ac)	Volume (Total)(ac.ft)
18.00	0.019	0.000
19.00	0.039	0.028
20.00	0.068	0.081

Height of Treatment Volume in Pond (between elevations 19.00 and 20.00):

$$= 19.00 + (20.00 - 19.00)\left[\frac{(0.064\ ac.ft - 0.028\ ac.ft)}{(0.081\ ac.ft - 0.028\ ac.ft)}\right] = 19.68$$

Required Recovery Time Calculations

Depth to Drawdown = 19.68 – 18.00 = 1.68 ft * 1 ft / 12 in = 20.16 in

Design Infiltration Rate = 7.7 in/hr

Recovery Time = $\frac{20.16\ in}{7.7\ \frac{in}{hr}}$ = 2.62 hrs (< 72 hrs)

2431 HARTFORD HWY
DOTHAN, AL 36305
WWW.NORTHSTARENGINEERING.COM
OFFICE: (334)673.9895
FAX: (334) 673.1846

Dry Detention System "Southern Pond"

Contributing Area = 0.364 Acres

Required Treatment Volume Calculations:

Impervious Area = 0.286 ac. (0.95)
Grassed/Landscaped Areas = 0.078 ac. (0.25)

Runoff Coefficient = $\frac{(0.286\ ac.*0.95)+(0.078\ ac.*0.25)}{0.364\ ac.} = 0.80$

$$Treatment\ Volume\ (1\ in\ x\ Runoff\ Coefficeint\ ) = \frac{0.80(0.364\ ac)(1\ in)(43{,}560 ft^2/ac)}{12 in/ft} = 1057.06\ ft^3$$

$$Treatment\ Volume\ (0.5\ in) = \frac{0.50\ (0.364\ ac.)(1\ in)(43560\frac{ft^2}{ac})}{12\ in/ft} = 660.66\ ft^3$$

$1057.06\ ft^3 > 660.66\ ft^3$

Treatment Volume Required = 1,057.06 ft^3 = 0.024 ac. ft.

"Southern Pond" Stage Storage		
Elevation	Area (ac)	Volume (Total)(ac.ft)
19.33	0.000	0.000
20.00	0.015	0.003
21.00	0.038	0.029
21.75	0.050	0.062

Height of Treatment Volume in Pond (between elevations 28.00 and 29.00):

$= 20.00 + (21.00 - 20.00)\left[\frac{(0.024\ ac.ft-0.003\ ac.ft)}{(0.029\ ac.ft-0.003\ ac.ft)}\right] = 20.81$

Required Recovery Time Calculations

Depth to Drawdown = 20.96 – 20.00 = 0.81 ft * 1 ft / 12 in = 9.72 in

Design Infiltration Rate = 7.7 in/hr

Recovery Time = $\frac{9.72\ in}{7.7\ \frac{in}{hr}}$ = 1.26 hrs (< 72 hrs)