



Owner	<b>GWF</b>	Computed By	<b>Leroy Kashka</b>	Date	<b>05/16/08</b>
Plant	<b>Henrietta</b>	Checked By		Date	
Project #	<b>160129</b>			Page	<b>#REF!</b>

**POST-CONSTRUCTION RETENTION POND DESIGN**

The pond shall be designed to provide storage for a 100-year, 10 day storm. Calculate the volume of runoff for the 2 yr. - 24 hr., 5 yr. - 24 hr., 25 yr. - 24 hr. and a 100 yr. - 24 hr. storms and compare to the volume of storage available.

**Compute Runoff Coefficient:**

	C	Area (ac)	Product A*C
paved	0.95	2.03	1.93
aggregate	0.75	6.05	4.88
pond	1.00	1.82	1.82
Total Area		9.90	acres
Wt C		0.87	

**Volume Required :**

Sources: Kings County, CA Department of Public Works Improvement Standards, and Technical Paper No. 40, Rainfall Frequency Atlas of the United States, US Department of Commerce Weather Bureau, 1961.

Volume of Runoff to be Contained:  $V_{req} \text{ (ft}^3\text{)} = C A R$  (Based on Kings County Public Works)  
 Design for 10 yr - 10 day storm (4 in.), Check for 100 yr - 10 day storm (6 in.)

C = Runoff Coef. 0.87  
 A = Drainage Area (ft<sup>2</sup>) 431,244.00  
 R = Rainfall (ft) for 10 yr, 10 day 0.33  
 R = Rainfall (ft) for 100 yr, 10 day 0.50

Vrunoff (10 yr - 10 day )= 142,310 ft<sup>3</sup>  
 Vrunoff (100 yr - 10 day )= 215,622 ft<sup>3</sup>

Volume of Runoff for the 5, 10, 25, and 100 yr storms

Storm	Rainfall (in)	Volume (ft <sup>3</sup> )	x 2*
5 yr, 24 hr	1.3	46,718.10	93,436.20
10 yr, 24 hr	1.5	53,905.50	107,811.00
25 yr, 24 hr	1.9	68,189.30	136,378.60
100 yr, 24 hr	2.3	82,655.10	165,310.20

\* indicates the volume of runoff in the event of 2 storms back to back

**Calculate Volume of Pond :**

Contour Elevation	Area of Contour (ac)	Average Area Volume (ft <sup>3</sup> )	Cumm. Avg Volume (ft <sup>3</sup> )
222.5	1.82	39,340	222,278
222	1.78	38,404	182,938
221.5	1.74	37,477	144,534
221	1.70	36,559	107,057
220.5	1.66	35,650	70,498
220	1.62	34,848	34,848
219.5	1.58	0	0

Required top of basin elevation = Water surface elevation for 10 yr -10 day storm + 1 ft.

Water surface elevation for 10 yr - 10 day storm event = 221.47 ft.

Required top of basin elevation = 222.47 ft.

Actual top of basin is approximately 221.5 ft. due to natural topography

Basin shall hold 100 yr. - 10 day event without overflowing

Water surface elevation for 100 yr. - 10 day event = 222.425 ft.

Top of Basin Elevation	222.50	Depth	Freeboard
Water Elevation for 10 yr. - 10 day storm	221.47 ft.	1.97 ft.	1.03 ft.
Water Elevation for 100 yr. - 10 day storm	222.425 ft.	2.925 ft	0.075 ft.
Water Elevation for 2 - 25 Yr, 24 Hr. Storms	221.1 ft.	1.6 ft.	1.4 ft.
Water Elevation for 2 - 100 Yr, 24 Hr. Storms	221.73 ft.	2.23 ft.	0.77 ft.