

10.3.1 Orifices
For a single orifice as illustrated in Figure 10-1 (a), orifice flow can be determined using Equation 10-1.

Equation 10-1

$$Q = C_o A_o (2gH_o)^{0.5}$$

Where:
Q = Orifice flow rate (cfs)
C_o = Discharge coefficient 0.40 – 0.60
A_o = Area of orifice (ft²)
H_o = Effective head on the orifice measured from the centroid of the opening (ft)
g = Gravitational acceleration = 32.2 ft/s².

Equation 10-1

Q=Co*Ao(2*g*Ho)^.5

Flow through multiple orifices (see Figure 10-1 (c)) can be computed by summing the flow through individual orifices. For multiple orifices of the same size and under the influence of the same effective head, the total flow can be determined by multiplying the discharge for a single orifice by the number of openings.

Perforated Pipe Basin A1							
Pipe Height (ft) =		1.5					
Co =	0.5	Co =	0.5	Co =	0.5	Co =	0.5
D (ft) =	0.25	D (ft) =	0.25	D (ft) =	0.25	D (ft) =	0.25
Ao (ft) =	0.049063	Ao (ft) =	0.049063	Ao (ft) =	0.0490625	Ao (ft) =	0.0490625
Centorid Elevation (ft) =	0.75	Centorid Elevation (ft) =	0.625	Centorid Elevation (ft) =	0.5	Centorid Elevation (ft) =	0.375
H (ft)=	0.75	H (ft)=	0.875	H (ft) =	1	H (ft) =	1.125
g =	32.2	g =	32.2	g =	32.2	g =	32.2
Q (cfs) =		Q (cfs) =	0.18	Q (cfs)=	0.20	Q (cfs) =	0.21
n =	3	n =	3	n =	3	n =	3
Q =	0.51	Q (cfs) =	0.55	Q (cfs) =	0.59	Q (cfs) =	0.63

Co = Discharge coefficient
D=Diameter of orifice
Ao= Area of orifice
n= number of holes per row
H= Head

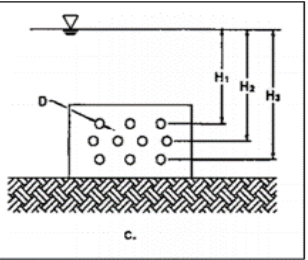


Table 9 - Water Quality	
Storage Volume Provided (cuft)	184286
Storage Volume Required (cuft)	166578
1/2 Required Volume	83289
Water Surface Elevation	602.5
Water Quality Depth	1.5
Average Flow Rate (cfs)	2.28

Table 10 - Water Quality Perforated Pipe Summary	
Water Quality Volume =	184286.00
Required Water Quality Volume =	166578.00
1/2 of Required Water Quality Volume =	83289.00
Volume Discharged in 12 Hours =	98535.136
Volume Remaining after 12 Hours =	85750.86
Half or more required volume retained after 12 Hours?	YES
Total Time for Water Quality Volume to drain =	22.44

Total Discharge (cuft per sec) = 2.28

Total Discharge (cuft per hour) = 8211.26