

# Philo Rideg Farm Wastewater System

## 2766 Mt. Philo Road, Charlotte, Vermont

### Site: Mound Disposal Trench - South End

Calculation Method: Darcy's Law

$$Q = KiA \times 7.48$$

where Q = Design Flow, or Hydrogeologic Site Capacity  
or Q/ft = Design Flow per Linear Foot

i = Hydraulic Gradient

A = L x h = Cross Sectional Area, Sq. Ft.

7.48 = Conversion from Cu. Ft. to Gallons

#### Assigned

Parameter	Value	Units	Notes:
K	20	ft/day	Value for Very Fine Sandy Loam
i	0.133	ft/ft	Hydraulic Gradient (Slope of Limiting Conditions)
A	1	Ft	Calculate using Linear Loading Rate
Des Q	7.80	gpd/lf	Design Flow - One 10' wide bed at 2 GPD/SF

Solve for: h = height of induced groundwater mound (IGWM)  
h = 0.39 Ft

#### Trench 1 Calculate Trench Bottom Elevations to Provide 3.0 feet of Unsaturated Thickness Below Trench Bottoms.

Trench No.	Gallons per Day Q/ft	Highest Lim. Cond. Elev. Ft	Add Induced GW Mound, Ft.	Elev. SHGWT Plus IGWM, Ft.	Trench Bottom Elev. Calcs.			Unsat. Thickness Below Trench including Induced Mound, Ft.	Comment
					Inv. Elev.	Below Inv.	Bottom Elev.		
West Edge	0	340.8083	0.00	340.8	344.6	0.75	343.85	3.04	Okay, 3.0' or Greater
	1.95	340.54	0.10	340.6	344.6	0.75	343.85	3.21	Okay, 3.0' or Greater
Middle	3.90	340.28	0.20	340.5	344.6	0.75	343.85	3.38	Okay, 3.0' or Greater
	5.85	340.01	0.29	340.3	344.6	0.75	343.85	3.55	Okay, 3.0' or Greater
East Edge	7.80	339.74	0.39	340.1	344.6	0.75	343.85	3.72	Okay, 3.0' or Greater

#### Check on Predicted Freeboard at Toe of Mound Below Trench

K	20	ft/day	Value for Very Fine Sandy Loam
i	0.133	ft/ft	Hydraulic Gradient (Slope of Limiting Conditions)
A	1	Ft	Calculate using Linear Loading Rate
Des Q	7.80	gpd/lf	Design Flow - One 10' wide bed at 2 GPD/SF

Solve for: h = height of induced groundwater mound (IGWM)  
h = 0.39 Ft

Elev. Toe., Ft.	(B) Depth to SHGWT, Ft.	Lim. Cond. at Toe. Elev., Ft.	(D) Add Induced GW Mound, (ft.)	Elev. SHGWT Plus IGWM, Ft.	Predicted Freeboard (Col B - Col D), Ft.	Comment
337.5	1.25	336.25	0.39	336.6	0.86	Okay, 0.5' or Greater

#### Check on Predicted Freeboard 25' downgradient of Toe of Mound

K	20	ft/day	Value for Very Fine Sandy Loam
i	0.133	ft/ft	Hydraulic Gradient (Slope of Limiting Conditions)
A	1	Ft	Calculate using Linear Loading Rate
Des Q	7.80	gpd/lf	Design Flow - One 8' wide bed at 1 GPD/SF

Solve for: 25 height of induced groundwater mound (IGWM)  
h = 0.39 Ft

Elev. Toe., Ft.	(B) Depth to SHGWT, Ft.	Lim. Cond. at Toe. Elev., Ft.	(D) Add Induced GW Mound, (ft.)	Elev. SHGWT Plus IGWM, Ft.	Predicted Freeboard (Col B - Col D), Ft.	Comment
333.3	1.33	331.97	0.39	332.4	0.94	Okay, 0.5' or Greater