

Sizing Worksheet - PT-4 Vegetated Filter Strip

Designer: Project Proponent: Date: Project: Location:	
Type of Vegetation: (describe)	_____
Outflow Collection: (Check type used or describe "Other")	☐ Grass Channel / Swale ☐ Street Gutter ☐ Storm Drain ☐ Underdrain Used ☐ Other _____ _____
Step 1: Calculate the design flow	
1-1. Enter Project area (acres), $A_{project}$ If this BMP captures runoff from a portion of the project area, enter the tributary area	$A_{project} =$ _____ acres
1-2. Enter impervious fraction, Imp (e.g. 60% = 0.60)	$Imp =$ _____
1-3. Determine pervious runoff coefficient using Table C-1, C_p	$C_p =$ _____
1-4. Calculate runoff coefficient, $C = 0.95 * imp + C_p (1 - imp)$	$C =$ _____
1-5. Enter design rainfall intensity (in/hr), i	$i =$ _____ in/hr
1-6. Calculate water quality design flow (cfs), $SQDF = C i A_{project}$	$SQDF =$ _____ cfs
Step 2: Calculate the minimum width	
2-1. Enter the stormwater quality design flow (cfs), $SQDF$	$SQDF =$ _____ cfs
2-2. Enter the minimum linear unit application rate (0.005 cfs/ft), $q_{a,min}$	$q_{a,min} =$ _____ cfs/ft
2-3. Calculate the minimum width of filter strip (ft), W_{min}	$W_{min} =$ _____ ft
Step 3: Calculate the design flow depth	
3-1. Enter filter strip longitudinal slope, s (ft/ft)	$s =$ _____ ft/ft
3-2. Enter Manning roughness coefficient (0.25-0.30), n_{wq}	$n_{wq} =$ _____

3-3. Enter width of impervious surface contributing area (perpendicular to flow), W (ft)	$W =$	ft
Step 3: Calculate the design flow depth		
3-4. Calculate average depth of water using Manning equation (inches), $d_f = 12 * [SQDF * n_{wq} / 1.49 W_{trib} s^{0.5}]^{0.6}$	$d_f =$	inches
3-5. If $d_f > 1"$ (0.083 ft), go back step 3-1 and decrease the slope		
3-6. If the slope cannot be changed due to construction constraints, go to step 3-3 and increase the width perpendicular to flow.		
Step 4: Calculate the design velocity		
4-1. Enter depth of water (ft), $d_{f,ft} = d_f / 12$	$d_f =$	ft
4-2. Enter width of strip (ft), W	$W =$	ft
4-3. Calculate design flow velocity (ft/s), $V_{wq} = SQDF / (d_{f,ft} W)$	$V_{wq} =$	ft/s
4-4. If the $V_{wq} > 1$ ft/s, go back to step 3-1 and decrease the slope.		
Step 5: Calculate the length of the filter strip		
5-1. Enter desired residence time (minimum 7 minutes), t	$t =$	min
5-2. Enter design flow velocity (ft/s), V_{wq}	$V_{wq} =$	ft/s
5-3. Calculate length of the filter strip (ft), $L = 60 t V_{wq}$	$L =$	ft
5-4. If $L < 4$ ft, go to step 3-1 and increase the slope		