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), $SQDF= CiA_{project}$	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), $L = 60tV_{wq}$	L =	ft
5-4. If *L* < 4 ft, go to step 3-1 and increase the slope		