

CHANNEL STABILITY ANALYSIS WORKSHEET

Landowner/Operator _____
 County _____ CD _____ Farm/Tract No. _____
 Prepared By _____ Date _____
 Checked By _____ Date _____
 Approved By _____ Date _____
 Job Approval Class _____

CHANNEL CHARACTERISTICS

Bottom Width (b) = _____ ft XS Area (A) = _____ ft²
 Depth (d) = _____ ft Discharge (Q) = _____ ft³/sec
 Side Slope (z) = _____ Velocity (V) = $\frac{Q}{A}$ = _____ ft/sec

ALLOWABLE VELOCITY APPROACH
 (Reference TR25 Ch 6; NEH Part 654, Ch8)
 Use Figure 6-2 of TR or Figure 8-4 of NEH

D₇₅ = _____ mm PI = _____ Side Slope Correction (B) = _____
 Sediment Transport Class = _____ Depth Correction (D) = _____
 Water Surface Width (W) = _____ ft Frequency Correction (F) = _____
 Radius of Curvature (Rc) = _____ ft Density Correction (Ce) = _____
 Alignment Correction (A) = $\frac{Rc}{W}$ = _____

Cohesive Soils *apply corrections as needed

Straight: V = (Basic Velocity Chart Value)(D)(F)(Ce)
 = _____ x _____ x _____ x _____ = _____ ft/ sec

Curve: V = (Basic Velocity Chart Value)(D)(F)(Ce)(A)
 = _____ x _____ x _____ x _____ x _____ = _____ ft/ sec

Non-Cohesive Soils *apply corrections as needed

Straight: V = (Basic Velocity Chart Value)(B)(D)(Ce) = _____ x _____ x _____ = _____ ft/ sec

Curve: V = (Basic Vel. Chart Value)(B)(D)(Ce)(A) = _____ x _____ x _____ x _____ = _____ ft/ sec

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ALLOWABLE SHEAR STRESS/ TRACTIVE STRESS APPROACH (Reference NEH Part 654, Ch8; TR25 Ch 6)

$D_{75} =$ _____ in Manning's (n) = _____
Depth (d) = _____ ft Bottom width (b) = _____ ft
Energy Slope (S_e) = _____ Side Slope (z) = $\frac{b}{d} =$ _____

Applicable for $0.25 < D_{75} < 5$ inches

Soil Roughness (n_t) = $\frac{D_{75}^{1/6}}{39} =$ _____

Reference Stress (τ_∞) = $\gamma_w d S_e \left(\frac{n_t}{n}\right)^2 =$ _____ lb/ft²

Using Figure 8-5, (Value of $\frac{\tau_b}{\tau_\infty}$) = _____

Actual Bed Stress (τ_b) = $\tau_\infty \left(\frac{\tau_b}{\tau_\infty}\right) =$ _____ lb/ft²

Radius of Curvature (R_c) = _____ ft

Ratio ($\frac{R_c}{b}$) = _____

Using Figure 8-8, (Value of $\frac{\tau_{bc}}{\tau_b}$) = _____

Actual Bed Stress, at curve, (τ_{bc}) = $\tau_b \left(\frac{\tau_{bc}}{\tau_b}\right) =$ _____ lb/ft²

Using Figure 8-6, (Value of $\frac{\tau_s}{\tau_\infty}$) = _____

Actual Side Stress (τ_s) = $\tau_\infty \left(\frac{\tau_s}{\tau_\infty}\right) =$ _____ lb/ft²

Using Figure 8-8, (Value of $\frac{\tau_{sc}}{\tau_s}$) = _____

Actual Side Stress, at curve, (τ_{sc}) = $\tau_s \left(\frac{\tau_{sc}}{\tau_s} \right) =$ _____ lb/ft^2

Allowable Bed Stress (τ_{Lb}) = $0.4D_{75} =$ _____ lb/ft^2

Using Figure 8-14, Angle of Repose (*Value of Φ_R*) = _____ °,
for _____ Angular/ Rounded

Using Figure 8-15, Tractive Force Coefficient (*Value of K*) = _____

Allowable Side Stress (τ_{Ls}) = $\tau_{Lb}K =$ _____ lb/ft^2

Check Actual vs. Allowable

$\tau_b =$ _____ & $\tau_{bc} =$ _____ < $\tau_{Lb} =$ _____ lb/ft^2

$\tau_s =$ _____ < $\tau_{Ls} =$ _____ < $\tau_{sc} =$ _____ lb/ft^2

Applicable for $D_{75} < 0.25$ inches

$D_{75} =$ _____ mm

Allowable Bed Stress, Using Figure 8-16

Clear Water (τ_{Lb}) = _____ lb/ft^2

Low Content, $\leq 0.2\%$ Fines, (τ_{Lb}) = _____ lb/ft^2

High Content, 0.2 – 2% Fines, (τ_{Lb}) = _____ lb/ft^2

Allowable Side Stress (τ_{Ls}) = $\tau_{Lb}K =$ _____ lb/ft^2