

Appendix 7B-4

RIPRAP DESIGN WORK SHEET
FOR STANDARD VDOT RIPRAP SIZES ONLY

CHANNEL DATA

Q = _____(cfs) P = _____(ft.) n = _____
S_o = _____(ft/ft) R = _____(ft.)
d_n = _____(ft.) V_n = _____(fps)
A = _____(ft.²) Side Slope = _____ :1

DETERMINE RIPRAP SIZE

φ = 42° Side Slope = _____ :1 θ = _____°

$$K_1 = [1 - (\sin^2 \theta / \sin^2 \phi)]^{0.5}$$

$$K_1 = [1 - (\sin^2 \text{_____}^\circ / \sin^2 42^\circ)]^{0.5} = \text{_____}$$

For Specific Gravity = 2.65 and Stability Factor = 1.2

$$D_{50} = 0.001 \cdot V_a^3 / (d_{avg}^{0.5} \cdot K_1^{1.5})$$

$$D_{50} = 0.001 \cdot \text{_____}^3 / (\text{_____}^{0.5} \cdot \text{_____}^{1.5})$$

D₅₀ Computed = _____

Note: All VDOT standard riprap (Class AI through Type II) is assumed to have a φ of approximately 42° and a Specific Gravity of 2.65. Therefore, the Computed D₅₀ should be adjusted by the Stability Correction Factor (C_{SF}) (if any) to derive a Final D₅₀. The VDOT standard class of riprap with the next higher D₅₀ should be specified.

Correction Factor For Stability Factor (SF) other than 1.2 (Default = 1.0)

$$C_{SF} = (SF / 1.2)^{1.5} = (\text{_____} / 1.2)^{1.5} = \text{_____}$$

$$\text{Final } D_{50} = C_{SF} \cdot \text{Computed } D_{50} = \text{_____} \cdot \text{_____} = \text{_____}$$

RIPRAP RECOMMENDATION: VDOT (Class) (Type) _____

Thickness (T) = _____" (2 • D₅₀ MSD minimum)

Source: VDOT