

Rock Chute Design Data

(Version 4.01 - 04/23/03, Based on Design of Rock Chutes by Robinson, Rice, Kadavy, ASAE, 1998)

Project: Spillway protection
Designer: Jim Villa
Date: 8/4/2008

County: Woodbury
Checked by: _____
Date: _____

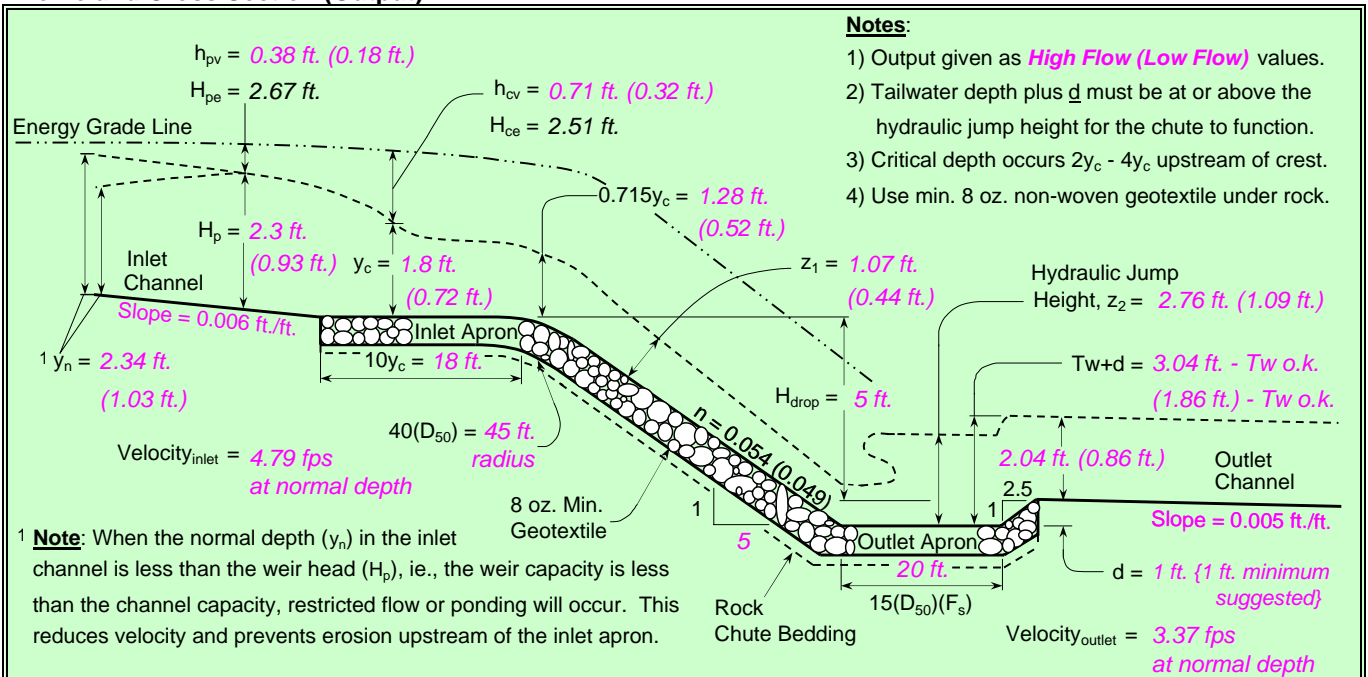
Input Channel Geometry

Inlet Channel	Chute	Outlet Channel
Bw = 20.0 ft.	Bw = 20.0 ft.	Bw = 40.0 ft.
Side slopes = 4.0 (m:1)	Factor of safety = 1.20 (F _s)	Side slopes = 4.0 (m:1)
n-value = 0.035	Side slopes = 4.0 (m:1) → 2.0:1 max.	n-value = 0.045
Bed slope = 0.0060 ft./ft.	Bed slope (5:1) = 0.200 ft./ft. → 2.5:1 max.	Bed slope = 0.0050 ft./ft.
Freeboard = 0.5 ft.	Outlet apron depth, d = 1.0 ft.	Base flow = 0.0 cfs

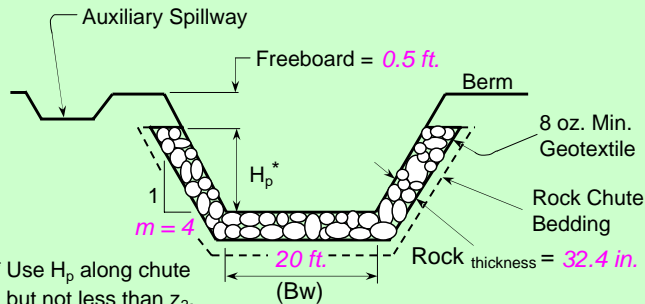
Design Storm Data (Table 2, NHCP, NRCS Grade Stabilization Structure No. 410)

Drainage area = 450.0 acres	Rainfall = ○ 0 - 3 in. ● 3 - 5 in. ○ 5+ in.	Note: The total required capacity is routed through the chute (principal spillway) or in combination with an auxiliary spillway.
Apron elev. --- Inlet = 105.0 ft. --- Outlet = 99.0 ft. --- (H _{drop} = 5 ft.)		Input tailwater (Tw):
Chute capacity = Q5-year	Minimum capacity (based on a 5-year, 24-hour storm with a 3 - 5 inch rainfall)	Tw (ft.) = Program 0.20
Total capacity = Q10-year		Tw (ft.) = Program
Q _{high} = 330.0 cfs	High flow storm through chute	
Q _{low} = 75.0 cfs	Low flow storm through chute	

Profile and Cross Section (Output)



Profile Along Centerline of Chute



q _t = 13.65 cfs/ft.	Equivalent unit discharge
F _s = 1.20	Factor of safety (multiplier)
z ₁ = 1.07 ft.	Normal depth in chute
n-value = 0.054	Manning's roughness coefficient
D ₅₀ (F _s) = 16.2 in. (309 lbs. - 50% round / 50% angular)	
2(D ₅₀)(F _s) = 32.4 in.	Rock chute thickness
Tw + d = 3.04 ft.	Tailwater above outlet apron
z ₂ = 2.76 ft.	Hydraulic jump height
*** The outlet will function adequately	

High Flow Storm Information