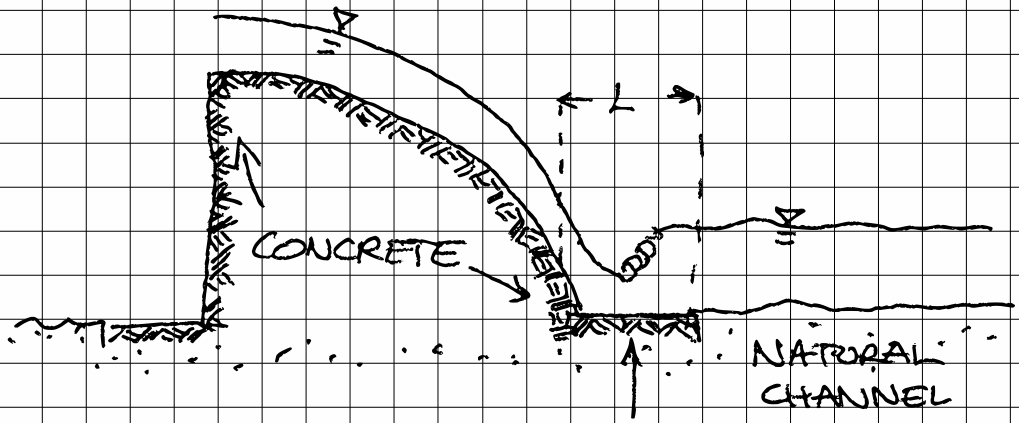
26 SEP 2022

Stilling Basins

Used to create/fix hydraulic jump in a known location to dissipate excess energy and prevent damage from supercritical flows

Spillway (typical)



WANT TO FIX JUMP ON THIS "APRON" CALLED STILLING BASIN

CHANNEL ROUGHNESS

CHANNEL ROUGHNESS IMPACTS JUMP;

AS ROUGHNESS INCREASES, y_2 DECREASES,

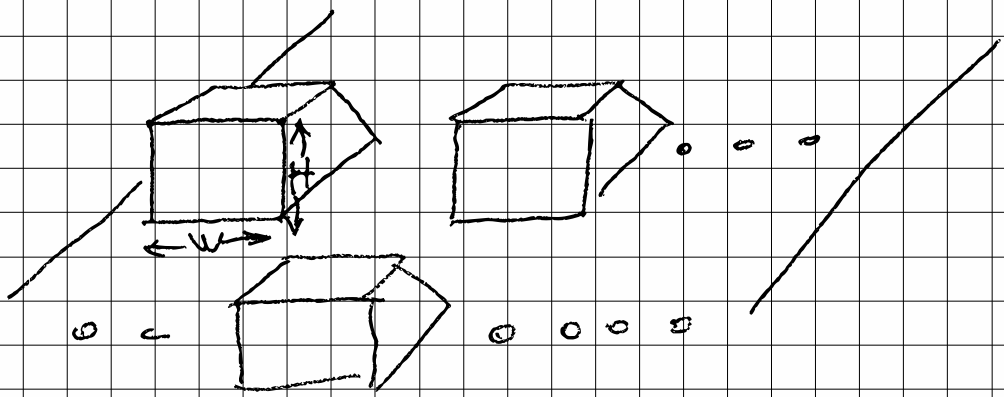
L DECREASES

BAFFLE BLOCKS - STABILIZE JUMPS

$$M_1 - M_2 = \frac{F_{DRAG}}{\gamma g}$$

$$F_{DRAG} = \frac{C_D \gamma A_p V_1^2}{2}$$

A_p = PROJECTED AREA OF BLOCKS FACING UPSTREAM FOR ALL BLOCKS



SUPPOSE 1 BLOCK IS $4 \times 4 = 16\ ft^2$

TOTAL 50 BLOCKS,

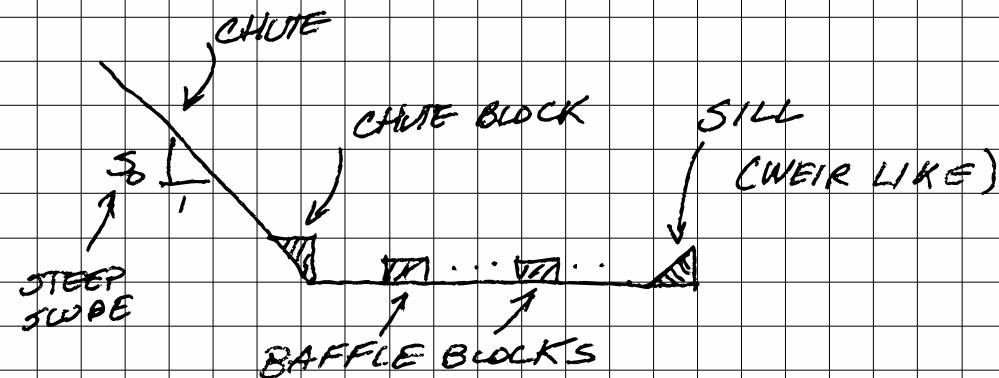
THEN $A_p = 50(16)\ ft^2$

C_D = DRAG COEFFICIENT

– LOOK UP FOR VARIOUS GEOMETRIES

STILLING BASINS ARE COMBINATIONS OF BAFFLE BLOCKS, CHUTE BLOCKS, SILLS WITH CONCRETE LINER & WALLS

– CAN ALSO USE "NATURAL" ROCKS



ENERGY DISSIPATION AFTER SUPERCRITICAL SPILLWAY

USBR Types - Figs 3.11 - 3.13

TYPICALLY KNOW

Q_{DESIGN}, B, y_1, V_1, # BLOCKS

$A_p \longrightarrow y_2$

IF KNOW y_1 & y_2, Q, B $\Rightarrow$ FIND #BLOCKS

FOR A GIVEN CASE NEED A_p/BLOCK