

# Broad-crested Weir Coefficients

Bridge Link roadway overtopping can be represented as a Broad-crested weir with the following coefficient attributes based on the FHWA Design Manual.

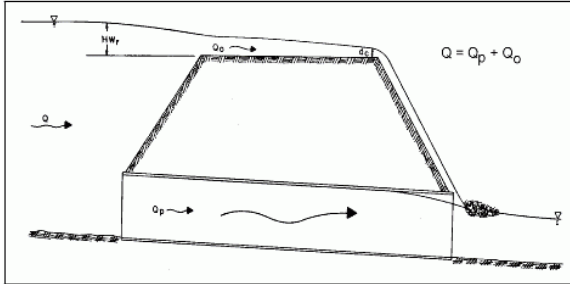


Figure 1: Roadway overtopping

Roadway overtopping will begin when the headwater rises to the elevation of the roadway (Figure 1). The overtopping will usually occur at the low point of a sag vertical curve on the roadway. The flow will be similar to flow over a broad crested weir. Flow coefficients for flow overtopping roadway embankments are found in HDS No. 1, Hydraulics of Bridge Waterways, as well as in documentation of HY-7, the Bridge Waterways Analysis Model. Curves from the Bridge Waterways Analysis Model reference are shown in Figure 2 below. Figure 2-A is for deep overtopping, Figure 2-B is for shallow overtopping, and Figure 2-C is a correction factor for downstream submergence. The equation below defines the flow across the roadway.

$$Q_o = C_d L H W_r^{1.5}$$

Where:

$Q_o$  = the overtopping flow rate in  $m^3/s$  ( $ft^3/s$ )

$C_d$  = the overtopping discharge coefficient (for use in SI units, see note below)

$L$  = the length of the roadway crest, in m or ft

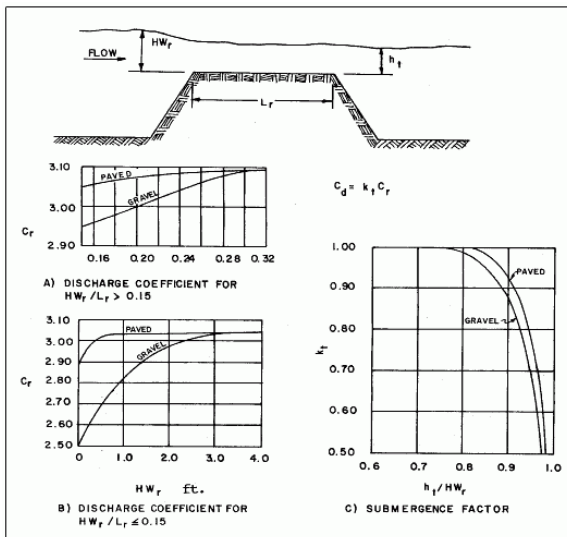
$H W_r$  = the upstream depth, measured from the roadway crest to the water surface upstream of the weir drawdown, in m or ft.



$C_d$  is determined from Figure 2, and other English unit research must be corrected by a factor of 0.552 [ $C_d$  (SI) = 0.552 ( $C_d$  English)]

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*Figure 2 - English Discharge Coefficients for Roadway Overtopping*

Other Bridge Link Data is discussed on the [Bridge Link](#) Help topic section.