FLOW UNDER TEMPORARY BARRIER WALLS

This is a guideline, not a standard; the standards are in the Drainage Manual. Situations exist where this guideline may not apply. The engineer in responsible charge should determine the most appropriate design technique for a particular situation.

The following equations can be used to predict the flow through the slots under temporary barrier walls (Index 415). These equations, based on a study by the University of South Florida, are documented in a report titled "*Hydraulic Performance of Structures for Bridge Drainage*," March 1997; WPI no. 05010747; contract no. B-A034. Contact the FDOT Research Center at 850-488-8572 to obtain a copy.

Sump conditions: $Q = a_1y + a_2y^2 + a_3y^3$

Slot Length (refer to Index 415)		Applicable range of depth of flow (y)		a_1		a_2		a_3	
mm	in	m	ft	SI	English	SI	English	SI	English
150	6	0 - 0.180	0 - 0.6	0.041	0.44	0.11	0.35	-0.57	-0.57
790	31	0 - 0.070	0 - 0.23	0.196	2.11	-5.03	-16.51	83.0*	83.0
790	31	0.070 - 0.180	0.23 - 0.6	0.415	4.47	-1.97	-6.47	4.43	4.43

* A typographical error exists in the original report which shows this value to be 3.0 instead of 83.0.

Flow past the Slot: $Q = b_1 + b_2y$

Slot Length (refer to Index 415)		Applicable range of depth of flow (y)		b_1		b_2	
mm	in	m	ft	SI	English	SI	English
150	6	0.013 - 0.163	0.042 - 0.54	-4.5×10^{-4}	-0.016	0.0375	0.404
790	31	0 - 0.10	0 - 0.33	0.0	0.0	.114	1.23

1. y = depth of flow at the edge of the barrier wall.
2. In English units, use y in feet to find Q in cubic feet per second.
3. In SI units, use y in meters to find Q in cubic meters per second.

These equations can be used as part of the calculation of spread next to temporary barrier walls. For barrier walls placed on a longitudinal grade, an approach to calculating spread, which is similar to the approach used for curb inlets, is summarized as follows.

1. Determine the flow approaching the slot.
2. Assume normal depth of flow at the slot and use the modified Mannings formula for shallow channel flow to determine the spread and associated depth of flow (y) at the edge of the barrier wall.
3. Using the depth of flow (y) at the edge of the barrier wall, determine the flow through the slot using the appropriate equation.
4. Subtract the flow through the slot from the flow approaching the slot to determine the flow bypassing the slot.
5. Add the bypass flow to the surface runoff for the next slot.
6. Repeat steps one through five for the length of barrier wall or until equilibrium is reached.

For sag vertical curves, a more complicated approach is likely. Several items change with changing depth (y) values. As the depth of ponding increases, the length of roadway draining directly (not including the bypass from approach grades) to the ponded area increases, as does the number of slots that operate in sumped condition.