Continuous Grade

A kerb-opening inlet located on a continuous grade functions as a falling head weir, the efficiency of which is affected by cross slope, longitudinal slope, total gutter flow, and weir length. The interception capacity of the inlet depends primarily on the flow depth at the kerb and the kerb-opening geometry. If the kerb opening can be depressed several inches below the gutter elevation, the interception capacity of the inlet can be increased. This can be done as part of a continuous gutter depression or as a local depression at the inlet. kerb inlets with grates are subject to clogging and the allowable design capacity should never be more than 50% - 60 % of the capacity calculated by the following formula (Various storm drainage grate manufacturers have published capacity charts based on actual testing under various conditions. These references should be obtained and compared to the theoretical capacities calculated via the formulae contained herein):

$$\mathbf{Q = 0.0015\ d\ L\ (10.76g\ d)^{1/2}} \qquad \textbf{(Eq. A3-9)}$$

or

$$\mathbf{Q = .093L\ \{1.87\ i^{0.579}\ [35.29Q_o\ /\ (s\ /\ n)^{1/2}]^{0.563}\}} \qquad \textbf{(Eq. A3-10)}$$

Assuming a gutter of wedge shaped cross-section, where:

Qo = flow in the gutter in cubic metres per second
I = pavement or gutter cross-slope, m/m
S = hydraulic gradient of gutter, m/m
N = Manning's coefficient of roughness of pavement or gutter
Q = discharge into inlets in cubic metres per second
L = length of inlet opening in metres
D = depth of flow in gutter in metres

Sump Locations

kerb-opening inlets in sump locations operate as weirs up to a depth equal to the opening height. At depths above 1.4 times the opening height, the inlet operates as an orifice, and between these depths, a transition from weir to orifice flow occurs. The weir flow equation for a depressed kerb-opening inlet is expressed as:

$$\mathbf{Q_i = 0.065\ (3.28L + 5.904W)(3.28d)^{1.5}} \qquad \textbf{(Eq. A3-11)}$$

where:

Q_i = interception capacity of a depressed kerb-opening inlet operating as a weir and located at a sump, in m^3/sec
L = length of kerb-opening, in m
W = lateral width of depression, in m
D = depth of flow at kerb, measured from the normal cross slope, in metres

Equation A3-11 is applicable for flow depths less than or equal to the kerb-opening height plus the depth of the depression. This limitation is expressed mathematically as: