

**RURAL EXAMPLE**20 FT PAVEMENT WIDTH  
(DESIGN SOFTWARE - 1 LANE AT 10 FT)

$$V_D = 50 \text{ MPH} \quad R = 1000 \text{ FT}$$

$$W_n = 10 \text{ FT} \quad rg = 0.50$$

$$E = 7.6 \text{ (7.6\% PER 802.40)}$$

$$U = u + R - \sqrt{R^2 - L^2}$$

$$U = 8.0 + 1000 - \sqrt{(1000)^2 - (20)^2}$$

$$U = 8.20002$$

$$F_A = \sqrt{R^2 + A(2L + A)} - R$$

$$F_A = \sqrt{(1000)^2 + 4[2(20) + 4]} - 1000$$

$$F_A = .087996$$

$$Z = (V_D / \sqrt{R})$$

$$Z = (50 / \sqrt{1000})$$

$$Z = 1.58$$

$$W_C = N(U + C) + F_A + Z$$

$$W_C = 2(8.20002 + 2) + 0.087996 + 1.58$$

$$W_C = 22.0680$$

$$w = W_C - 2W_n = 22.0680 - 2(10) = 2.1$$

( $R < 2865$  &  $w > 2$  THEREFORE WIDENING IS REQUIRED)

$$L_r = [E n_s (W_n + w/2) / rg] b_w$$

$$L_r = [7.6(1)(10 + 2.1/2) / 0.50] 1$$

$$L_r = 7.6 (11.05) / 0.50$$

$$L_r = 167.96$$

**RURAL EXAMPLE**72 FT PAVEMENT WIDTH  
(DESIGN SOFTWARE - 3 LANES AT 12 FT)

$$V_D = 40 \text{ MPH} \quad R = 500 \text{ FT}$$

$$W_n = 12 \text{ FT} \quad rg = 0.58$$

$$E = 8.0 \text{ (8\% PER PAGE 802.38)}$$

$$U = u + R - \sqrt{R^2 - L^2}$$

$$U = 8.0 + 500 - \sqrt{(500)^2 - (20)^2}$$

$$U = 8.4002$$

$$F_A = \sqrt{R^2 + A(2L + A)} - R$$

$$F_A = \sqrt{(500)^2 + 4[2(20) + 4]} - 500$$

$$F_A = .1760$$

$$Z = (V_D / \sqrt{R})$$

$$Z = (40 / \sqrt{500})$$

$$Z = 1.7885$$

$$W_C = 2(U + C) + F_A + Z$$

$$W_C = 2(8.4002 + 3.0) + .1760 + 1.7885$$

$$W_C = 24.7651$$

$$w = W_C - 2W_n = 24.7651 - 2(12) = 0.7651(0.8)$$

FOR 72' PAVEMENT WIDTH

$$w = 3(0.8) = 2.4$$

(R &lt; 881 &amp; w &gt; 2 THEREFORE WIDENING IS REQUIRED)

$$L_r = [E n_s (W_n + w/3) / rg] b_w$$

$$L_r = [8 (3) (12 + 2.4/3) / 0.58] 0.6667$$

$$L_r = (307.2 / 0.58) 0.6667$$

$$L_r = 353.1211$$

OR

$$L_r = M[E(W_n + w/N) / rg]$$

$$L_r = 2 [8(12 + 4.5/3) / 0.58]$$

$$L_r = 2 (102.4 / 0.58)$$

$$L_r = 353.1034$$

**URBAN EXAMPLES**24 FT PAVEMENT WIDTH  
(DESIGN SOFTWARE - 1 LANE AT 12 FT)

$$V_D = 40 \text{ MPH} \quad R = 600 \text{ FT}$$

$$W_n = 12 \text{ FT} \quad rg = 0.58$$

$$E = 4.0 \text{ (4\% PER PAGE 802.29)}$$

$$L_r = (W_n n_s E / rg) b_w$$

$$L_r = [12(1)(4) / 0.58] 1.00$$

$$L_r = (48 / 0.58)$$

$$L_r = 82.7586$$

66 FT PAVEMENT WIDTH  
(DESIGN SOFTWARE - 3 LANES AT 11 FT)

$$V_D = 40 \text{ MPH} \quad R = 600 \text{ FT}$$

$$W_n = 11 \text{ FT} \quad rg = 0.58$$

$$E = 4.0 \text{ (4\% PER PAGE 802.29)}$$

$$L_r = b_w (W_n n_s E / rg)$$

$$L_r = 0.6667 [11(3)(4) / 0.58]$$

$$L_r = 0.6667 (132 / 0.58)$$

$$L_r = 151.7317$$

OR

$$L_r = M (E W_n / rg)$$

$$L_r = 2 [4(11) / 0.58]$$

$$L_r = 2 (44 / 0.58)$$

$$L_r = 151.7241$$



ROAD AND BRIDGE STANDARDS

**CALCULATED TC-5.01 EXAMPLES**SPECIFICATION  
REFERENCE

SHEET 1 OF 1

REVISION DATE

802.22

VIRGINIA DEPARTMENT OF TRANSPORTATION