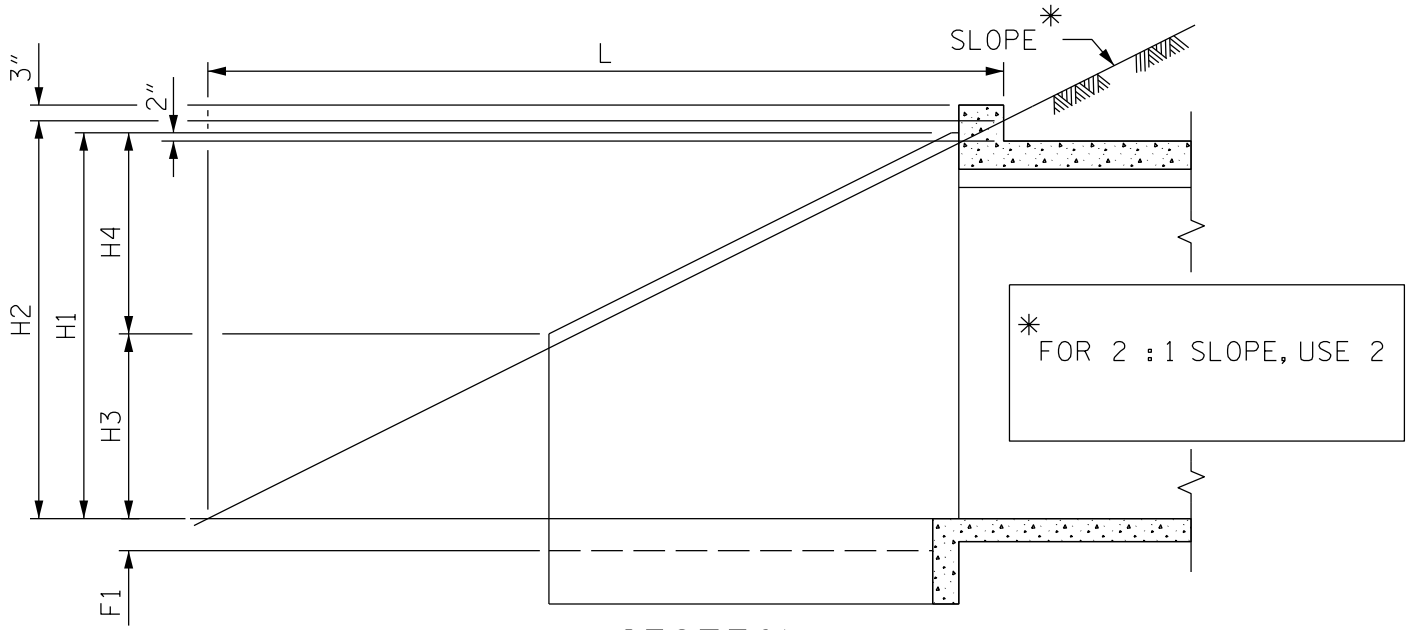


SECTION

SKEWED CULVERTS

W1 = WIDTH OF HEADWAL
W2 = WIDTH OF WINGWALL
X = LENGTH OF WING
L = (SLOPE)(H2)

$$H2 = \frac{(X)\,2SIN\alpha + [W1 + (W2 - W2COS\alpha)]}{SLOPE}$$

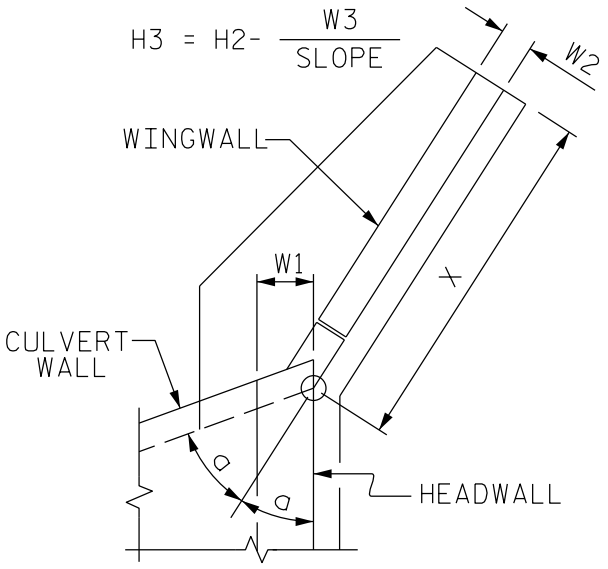
$$\alpha = \frac{\text{ANGLE BETWEEN HEADWALL AND CULVERT WALL}}{2}$$

$$L = 2(X)\,SIN\alpha + W1 + (W2 - W2COS\alpha)$$

$$X = \frac{L - [W1 + (W2 - W2COS\alpha)]}{2SIN\alpha}$$

$$W3 = (X)\,SIN\alpha + W1 - W2COS\alpha$$

$$H3 = H2 - \frac{W3}{SLOPE}$$



PART-PLAN

RIGHT ANGLE CULVERTS

W1 = WIDTH OF HEADWAL
W2 = WIDTH OF WINGWALL
X = LENGTH OF WING
L = (SLOPE)(H2)

$$H2 = \frac{1.3660254\,(X) + [W1 + 0.5W2]}{SLOPE}$$

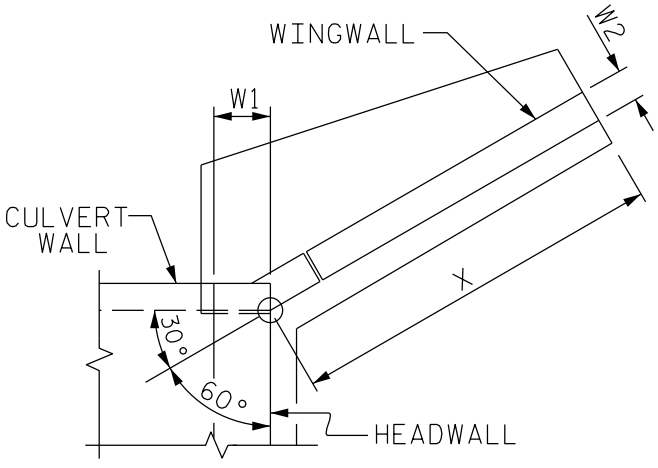
$\alpha = 30°$

$$X = \frac{L - [W1 + (W2 - W2SIN\alpha)]}{SIN\alpha + COS\alpha}$$

$$X = \frac{L - [W1 + 0.5W2]}{1.3660254}$$

$$W3 = (X)\,COS\alpha + W1 - W2SIN\alpha$$

$$H3 = H2 - \frac{W3}{SLOPE}$$



PART-PLAN

TURNED BACK WING LAYOUT FORMULAS FOR CULVERTS

FIGURE 9 – 13