

SKEWED CULVERTS

- W1 = WIDTH OF HEADWALL
- W2 = WIDTH OF WINGWALL
- X = LENGTH OF WING
- L = * SLOPE X H2
- $H2 = \frac{(X) 2 \text{SIN} \alpha + [W1 + (W2 - W2 \text{COS} \alpha)]}{* \text{SLOPE}}$

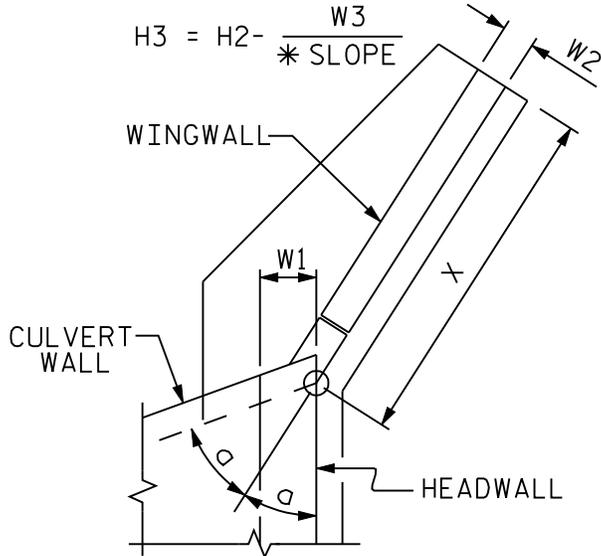
$\alpha = \frac{\text{ANGLE BETWEEN HEADWALL AND CULVERT WALL}}{2}$

$L = 2(X) \text{SIN} \alpha + W1 + (W2 - W2 \text{COS} \alpha)$

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

$W3 = (X) \text{SIN} \alpha + W1 - W2 \text{COS} \alpha$

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



RIGHT ANGLE CULVERTS

- W1 = WIDTH OF HEADWALL
- W2 = WIDTH OF WINGWALL
- X = LENGTH OF WING
- L = * SLOPE X H2
- $H2 = \frac{1.3660254(X) + [W1 + 0.5W2]}{* \text{SLOPE}}$

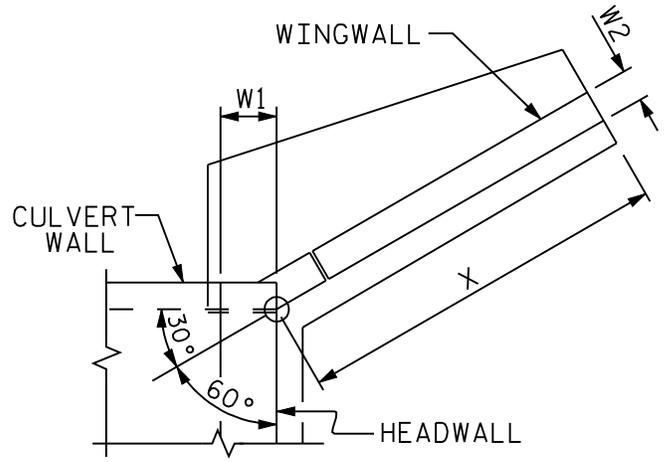
$\alpha = 30^\circ$

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

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

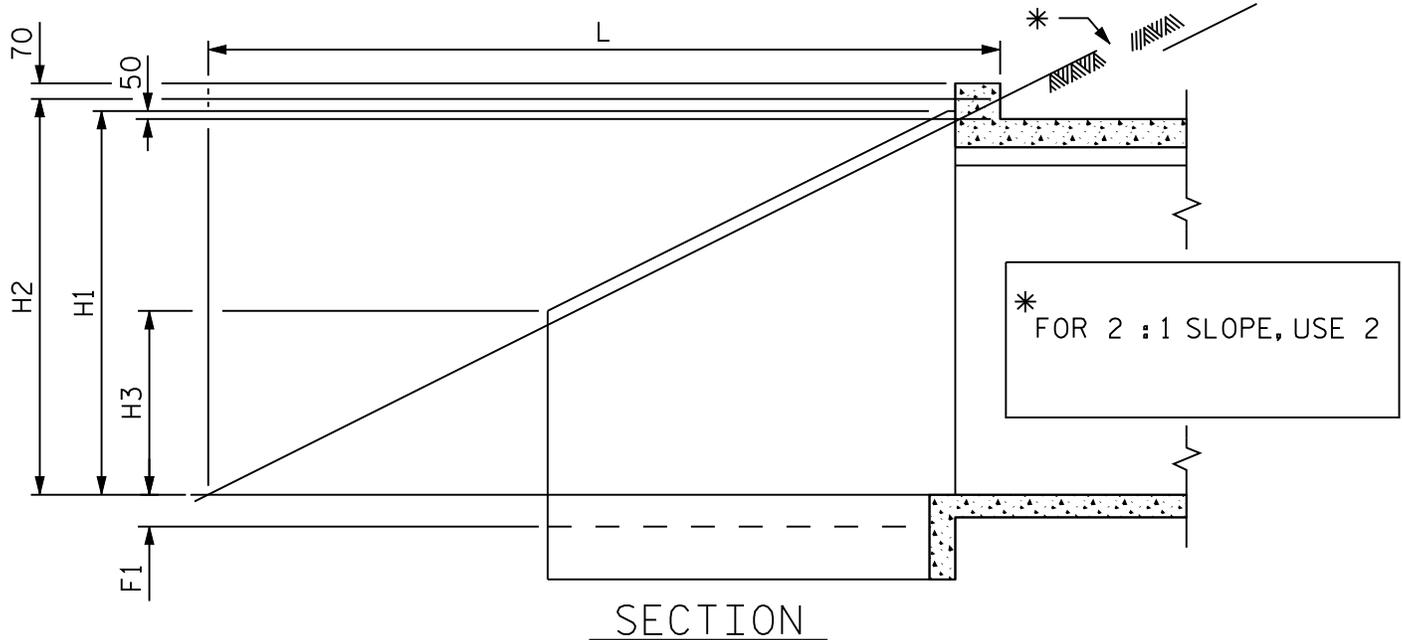
$W3 = (X) \text{COS} \alpha + W1 - W2 \text{SIN} \alpha$

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



TURNED BACK WING LAYOUT FORMULAS FOR CULVERTS

FIGURE 9 - 12



SKEWED CULVERTS

- W1 = WIDTH OF HEADWALL
- W2 = WIDTH OF WINGWALL
- X = LENGTH OF WING
- L = * SLOPE X H2
- $H2 = \frac{(X) 2 \text{SIN} \alpha + [W1 + (W2 - W2 \text{COS} \alpha)]}{* \text{SLOPE}}$

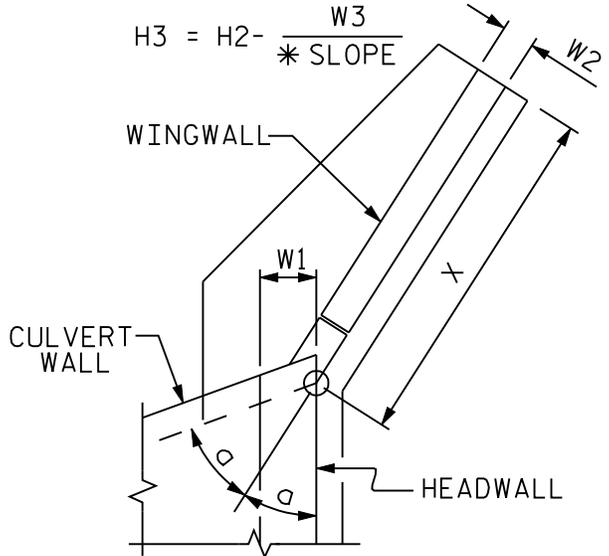
$\alpha = \frac{\text{ANGLE BETWEEN HEADWALL AND CULVERT WALL}}{2}$

$L = 2(X) \text{SIN} \alpha + W1 + (W2 - W2 \text{COS} \alpha)$

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

$W3 = (X) \text{SIN} \alpha + W1 - W2 \text{COS} \alpha$

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



RIGHT ANGLE CULVERTS

- W1 = WIDTH OF HEADWALL
- W2 = WIDTH OF WINGWALL
- X = LENGTH OF WING
- L = * SLOPE X H2
- $H2 = \frac{1.3660254(X) + [W1 + 0.5W2]}{* \text{SLOPE}}$

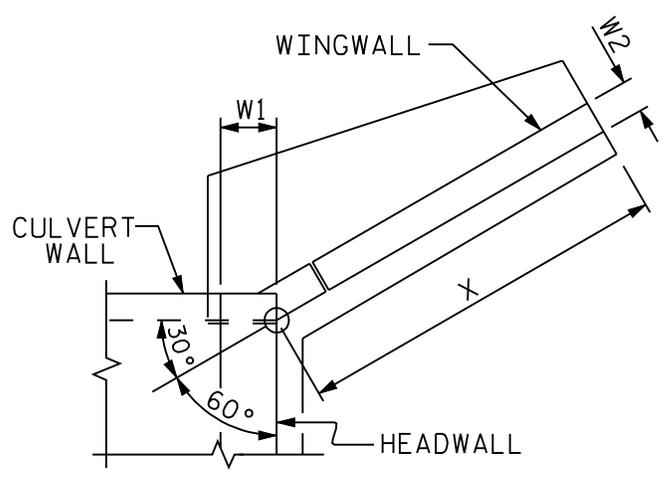
$\alpha = 30^\circ$

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

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

$W3 = (X) \text{COS} \alpha + W1 - W2 \text{SIN} \alpha$

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



TURNED BACK WING LAYOUT FORMULAS FOR CULVERTS

FIGURE 9 - 12 M