JOB: _____

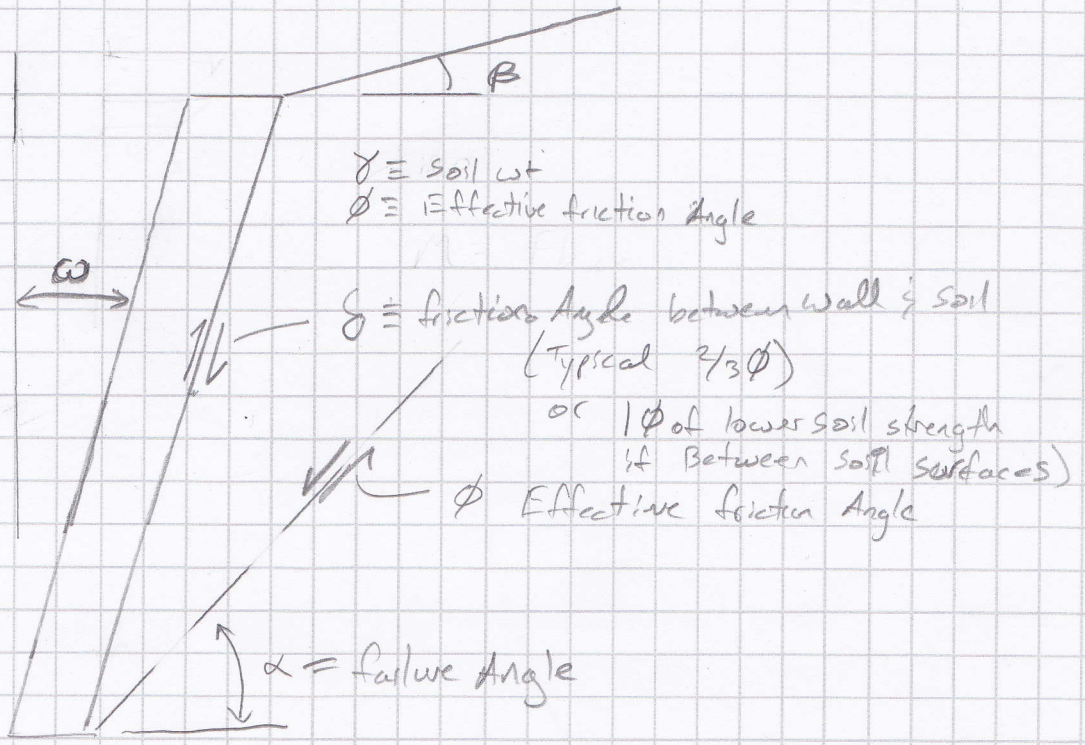
SHEET NO.: _____ OF _____

CALCULATED BY: _____ DATE: _____

CHECKED BY: _____ DATE: _____

SCALE: _____

Coulomb



$$K_a = \frac{\cos^2(\phi + \omega)}{\cos^2(\omega) \times \cos(\omega - \delta)\left[1 + \sqrt{\frac{\sin(\phi + \delta)\sin(\phi - \beta)}{\cos(\omega - \delta)\cos(\omega - \beta)}}\right]^2}$$

$$\tan(\alpha - \phi) = \frac{-\tan(\phi - \beta) + \sqrt{\tan(\phi - \beta)\left[\tan(\phi - \beta) + \cot(\phi - \omega)\right]\left[1 + \tan(\delta - \omega)\cot(\phi + \omega)\right]}}{1 + \tan(\delta - \omega)\left[\tan(\phi - \beta) + \cot(\phi - \omega)\right]}$$

Rankine Failure angle for $\beta = 0$, $\delta = 0$, & $\omega = 0$

$$\alpha = 45 + \phi/2$$