



Pipeline Infrastructure. Solved.™

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PROJECT: Lot Improvements  
N2 Retaining Wall  
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SUBJECT: Mina ft Geosynthetic Soil Reinforcement calculations

STEP 1

Approved  
Tammy Greenlee 1/12/17

PEAK Friction angle  $\phi = 30^\circ$  for well graded stone  
Cohesion  $c' = 0$  psf  
Bulk unit weight = 100 pcf  
Slope factor of safety = 1.5  
Slope height,  $H = 7 \text{ blocks} \times 30'' = 4' \text{ exposed fence} = 13.5'$   
Uniform surcharge pressure,  $q = 250$  psf (conservative)  
Slope angle,  $\beta = 90^\circ$   
Geogrid properties, Miragrid 5XT = 2234 lb/ft (LTDs)

STEP 2 Calculate factored friction angle  $\phi'_f$

$$\phi'_f = \tan^{-1} \left\{ \frac{\tan \phi}{FS} \right\}$$
$$= \tan^{-1} \left\{ \frac{\tan 30}{1.5} \right\}$$

$$\phi'_f = 27.5^\circ$$

STEP 3 Calculate equivalent slope height,  $H'$

$$H' = H + \frac{q}{\gamma}$$
$$= 13.5' + \frac{250 \text{ psf}}{100 \text{ pcf}}$$

$$H' = 16.0 \text{ ft}$$

STEP 4 Determine force coefficient  $K$  from Chart 1 using  $\beta = 90^\circ$  and  $\phi'_f = 27.5^\circ$

$$K = 0.40$$

STEP 5 Determine total horizontal force  $P$  that must be resisted by miragrid reinforcement layers

$$P = \left(\frac{1}{2}\right)(K)(\gamma)(H')^2$$
$$= (0.5)(0.40)(100)(16.0^2)$$

$$P = 5,120 \text{ lb/ft}$$