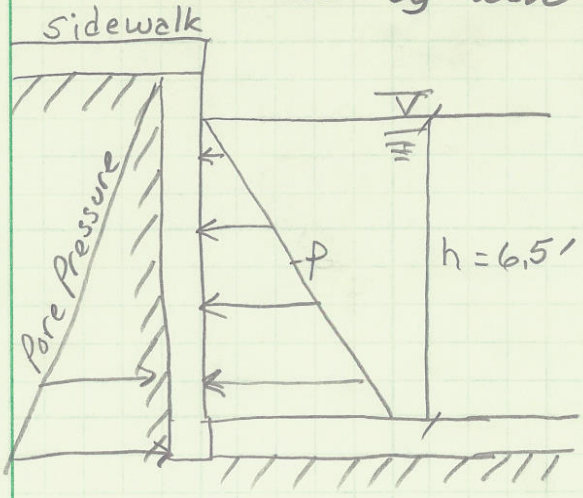
Assumptions: No EARTHQUAKES; the Pressures @ the bottom of the Pool Equal pressures @ the top of the water caused by wave action.



$\gamma = 62.4\ \#/ft^3$

$p = \gamma h$

Consider 1 ft^2 vertical section above pool bottom

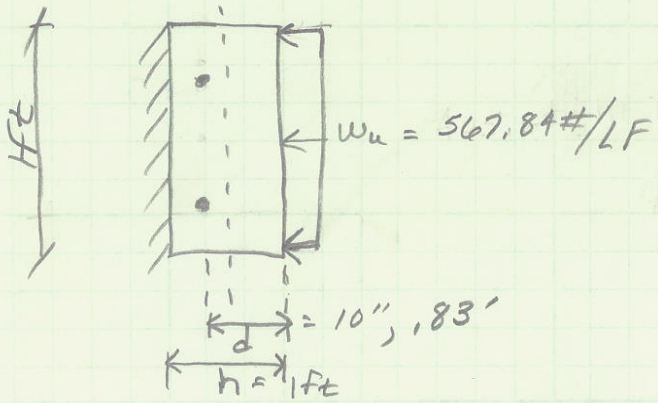
$p = 62.4\ \#/ft^3 \times 6.5'$

$p = 405.6\ \#/ft^2$

Consider a section of pool sidewall 1ft high as a rectangular beam.

$f'_c = 4{,}000$ psi $\phi = .9$

$f_y = 60{,}000$ psi



$U = 1.4(D + F)$ (fluids) Eqn 9-1 ACI

$A_s = \rho b d$ (Area of steel)

$b = 1$ ft

$\rho = \frac{.85 f'_c}{f_y}\left(1 - \sqrt{1 - \frac{2 R_n}{.85 f'_c}}\right)$

$R_n = \frac{M_u}{\phi b d^2}$

$M_u = \frac{w_u L^2}{8}$

$W_u = 1.4(405.6\#) = 567.84\#/LF$

$M_u = \frac{.567 k/LF (1)^2}{8} = 0.175$ ft-k

$R_n = \frac{.175 \times 10^3 \times 12 in/ft}{.9(12)(12)^2} = 0.069$

$\rho = \frac{(0.85)(4{,}000)}{(60{,}000)}\left(1 - \sqrt{1 - \frac{2(.069}{.85(4000)}}\right) = 1.15 \times 10^{-6}$

however, $\rho_{min} = \boxed{0.0033}$

$A_s = 0.0033(12)(10) = = 0.396 in^2$

#6 bar $= 0.44 in^2$ or (2) #4 bar $= 0.40 in^2$

#6 bar @ 12" O.C. or #4 bar @ 6" O.C.

Check #6 bar

$\rho = \frac{A_s}{bd} = \frac{.44}{(12)(10)} = 0.00367$ ρ_{min}

$\rho < 0.0181$ (ρ_{max})

$$a = \frac{A_s f_y}{0.85 f'_c b} = \frac{(.44)(60{,}000)}{(.85)(4{,}000)(12")} = 0.647 in$$

$$\phi M_n = \phi A_s f_y \left(d - \frac{a}{2}\right) = (0.9)(.44)(60)\left(10 - \frac{.647}{2}\right)$$

$$= 229.9 in\text{-}k = 19.15 ft\text{-}k > 0.75 ft\text{-}k$$

OK ✓

Check #4 bar

$$\rho = \frac{A_s}{bd} = \frac{.40}{(12)(10)} = 0.0033 = \rho_{min}$$

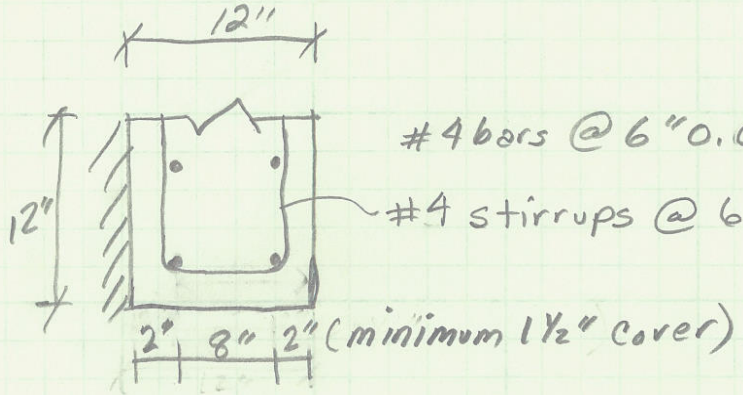
$$\rho < 0.0181 (\rho_{max})$$

$$a = \frac{A_s f_y}{.85 f'_c b} = \frac{(.4)(60{,}000)}{(.85)(4{,}000)12"} = 0.588 in$$

$$\phi M_n = (0.9)(.4)(60)\left(10 - \frac{.588}{2}\right) = 209.6 in\text{-}k = 17.5 ft\text{-}k$$

$$> .75 ft\text{-}k$$

OK ✓



This is assuming worst case senerio, soil behind side wall provides NO support. The steel on pool side is required for soil pressures after a rain when pool is being cleaned & is empty.