Subject: Reinforcement Schedule WBR 25028

PRPO20251253

Project Parameters:
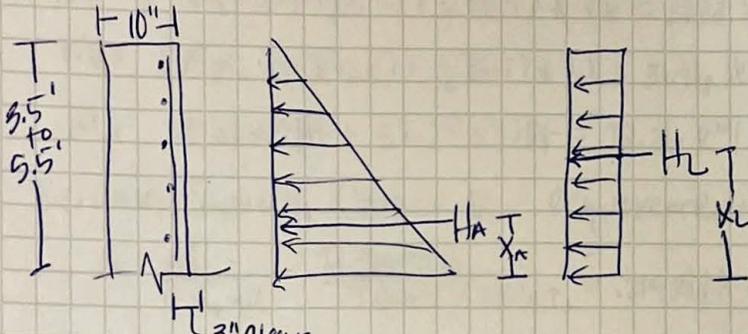
Assume: 2' Surcharge

$H = 1.6$ (lateral earth pressure per ASCE 7-16)

$f'c = 4500\ psi$
$f_y = 60,000\ psi$ (Grade 60)

$d = 10'' - 3'' = 7''$ assume $\phi = .9$ assume $jd = 0.875d$

3" Clear Cover

[3.5ft Wall or a Span Wall]

$M_{D} = \frac{1}{2}(65 \times 3.5)(3.5) \times 1.3 (3.5) \times 1.6 = 743.16\ lbs = 8.92\ k^{in}$

$M_{D} = (65 \times 2) \times 3.5 \times \frac{1}{2}(3.5) \times 1.6 = 1274\ lbs = 15.29\ k^{in}$

$M_{u} = 8.92 + 15.29 = 24.21\ k^{in}$

Bending Capacity (vertical Bar requirement)

$A_s = \frac{M_u}{\phi f_y jd} = \frac{24.19 k^{in}}{.9(60 ksi)(0.875)(7)} = .073\ in^2/ft$ of wall section

$a = \frac{A_s f_y}{.085 f'c bw} = \frac{(.073 in^2)(60 ksi)}{.085 (4.5 ksi)(12'')} = .954''$ $\checkmark j = 7'' - \frac{(.954/2)}{7''} = .931$

$A_s = \frac{24.19 k^{in}}{.9(60 ksi)(.931)(7)} = .069\ in^2/ft \Rightarrow \boxed{.07\ in^2/ft}$ of wall section

$a = \frac{(.069 in^2)(60 ksi)}{.085(4.5k)(12'')} = \boxed{.902}$ $\checkmark j = 7'' - \frac{(.902/2)}{7''} = .936$

$\therefore jd = (.936)d \checkmark OK$

#4 @ 1'-6" $\Rightarrow .2 (\frac{12}{18}) = \boxed{.13 > .07\ okay}$

$A_s\ Min = .0002\ \checkmark\ \underline{OK}$

Confirm ϕ in tension $\Rightarrow \phi = .9$ $\beta = 0.85 - \frac{0.05(f'c - 4000)}{1000} = \frac{.085(4500 - 4000)}{1000} = .825$

$c = \frac{a}{\beta} = \frac{.9}{.825} = 1.09''$ $\varepsilon_t = 0.003 \left(\frac{d_t - c}{c}\right) = 0.003 \left(\frac{7'' - 1.09''}{1.09''}\right) =$

$.016 > .005$ $\therefore \phi = .9$

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Proj. No. _____
Proj. Name: PASCO
Computed by: MAE
Checked by: _____
Sheet ___2___ of _____

Subject: _____Reinforcement Schedule (Con't)_____

5.5' Wall

$$M_n = \frac{1}{2}(65\text{psi} \times 5.5)(5.5) + \frac{1}{3}(5.5) \times 1.4 = 2883.83 \text{ #s/ft} = 34.61 \text{ k}^{in}/\text{ft}$$

$$M_b = (65\text{psi} \times 2')(5.5) + \frac{1}{2}(5.5) \times 1.6 = 31.46 \text{ #s/ft} = 37.75 \text{ k}^{in}/\text{ft}$$

$$M_u = 34.61 \text{ k}^{in}/\text{ft} + 37.75 \text{ k}^{in}/\text{ft} = 72.36 \text{ k}^{in}/\text{ft}$$

Bending Capacity (Vertical Bar Requirement)

$$A_s = \frac{M_u}{\phi f_y jd} = \frac{72.36 \text{ k}^{in}/\text{ft}}{.9(60\text{ksi})(.875)(7)} = .219 \text{ in}^2/\text{ft of wall}$$

$$a = \frac{A_s f'_y}{0.085(4.5\text{ksi})(12)} = \frac{.219 \text{ in}^2/\text{ft}(60 \text{ KSi})}{0.085(4.5 \text{ KSi})(12")} = 2.86" \qquad j = \frac{7-(2.86/2)}{7} = .796$$
$$\quad (f'c)(bw)$$

$$A_s = \frac{M_u}{\phi f_y jd} = \frac{72.36 \text{ k}^{in}/\text{ft}}{.9(60\text{KSi})(.796)(7)} = .240 \text{ in}^2/\text{ft}$$

$$a = \frac{A_s f'_y}{0.085 f'c bw} = \frac{.240 \text{ in}^2/\text{ft}(60\text{ksi})}{0.085(4.5\text{ksi})(12")} = 3.14" \qquad j = \frac{7"-(3.14"/2)}{7"} = .776$$

$$A_s = \frac{M_u}{\phi f_y fd} = \frac{72.63 \text{ k}^{in}/\text{ft}}{.9(60\text{ksi})(.776)(7)} = .247 \text{ in}^2/\text{ft of wall}$$

$$a = \frac{A_s f'_y}{0.085 f'c bw} = \frac{(.247 \text{ in}^2/\text{ft})(60\text{ksi})}{0.085(4.5)(12)} = 3.23" \qquad j = \frac{7"-(3.23"/2)}{7"} = .769$$

$$A_s = \frac{M_u}{\phi f'_y jd} = \frac{72.63 \text{ k}^{in}/\text{ft}}{.9(60\text{ksi})(.769)(7)} = \boxed{.249 \text{ in}^2/\text{ft of wall}} = \boxed{.25 \text{ in}^2/\text{ft}}$$

$$a = \frac{A_s f'_y}{0.085 f'c bw} = \frac{.25 \text{ in}^2/\text{ft}}{0.085(4.5\text{psi})(12")} = \boxed{3.25"} \qquad j = \frac{7"-(3.25"/2)}{7"} = .768 ✓$$

Vertical Bar Requirement $\Rightarrow$ .25 in^2/ft

#4 @ max 8" = .2$(12/8)$ = .3 in^2/ft OK