

CHECK SHEET PILING + PASSIVE RESISTANCE

Soil Values:

$$\gamma = 125 \text{ PCF}$$

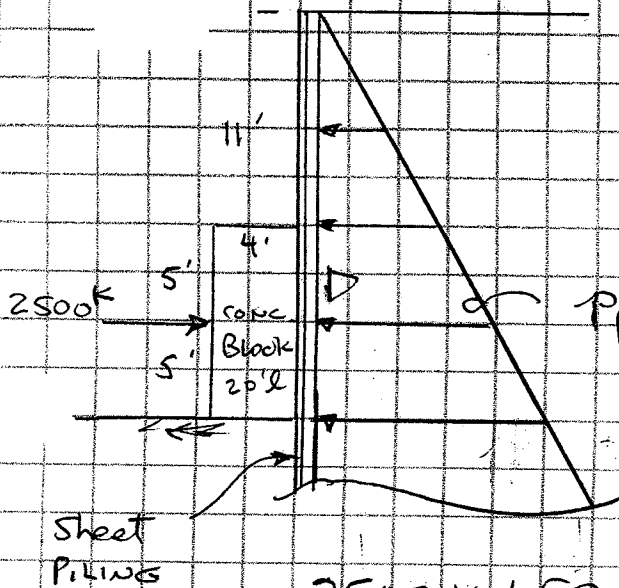
$$C = 0$$

$$\phi = 32^\circ$$

$$K_a = 0.278$$

$$K_p = 5.775$$

THESE SOIL VALUES WERE USED IN SHEETING DESIGN FOR THIS SAME PROJECT.



SEE ATTACHED SHEET FOR CALC. OF COULOMB EARTH PRESSURE COEFFICIENTS, K_a + K_p

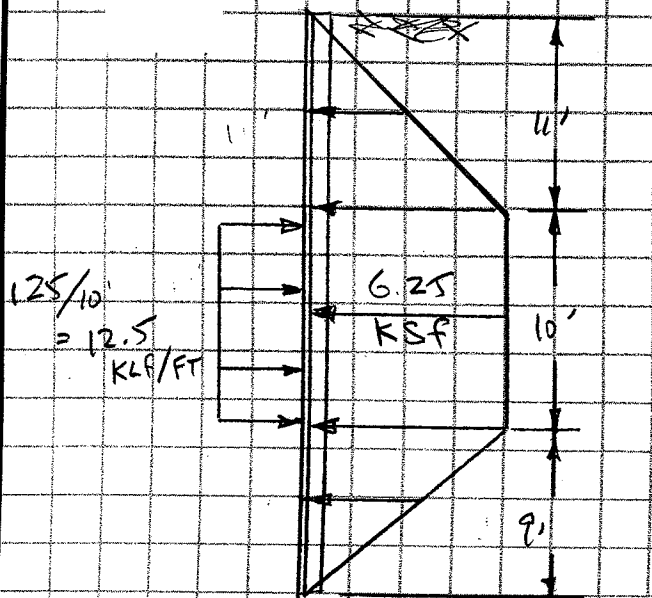
$$P_p = .125 \times 5.775 \times D = 0.722 D \text{ PSF/LF}$$

$$2500 \times 1.50 = \frac{1}{2} 0.722 D^2 \times 20' l$$

$$3750 = 7.22 D^2 \quad \therefore D = 22.8' \text{ MIN.}$$

CHECK SHEET PILING WITH TRAPEZOIDAL PRESSURE DISTRIBUTION

USE 30' SHEET LENGTH. ASSUME MAX PRESSURE @ CONC. BLOCK.



$$P_{P_{TOTAL}} \leq 2500^K \div 20' = 125 \text{ KLF}$$

$$125K = \left(\left(\frac{11+9}{2} \right) + 10 \right) \times P$$

$$\therefore P = 6.25 \text{ KSF/FT OF WALL}$$

ACTIVE AND PASSIVE EARTH PRESSURE COEFFICIENTS - COULOMB THEORY, VERTICAL WALL

REFERENCE: *PILE BUCK STEEL SHEET PILING DESIGN MANUAL*, 1987, PAGE 20, EQ. 4a & 4b

ANGLE OF INTERNAL FRICTION = $\phi := 32 \cdot \text{deg}$ -----> $\phi = 0.559 \text{ rad}$

ANGLE OF WALL FRICTION = $\delta := \frac{\phi}{2} \quad \delta = 16.0 \text{ deg}$ -----> $\delta = 0.279 \text{ rad}$

ANGLE OF SLOPE BEHIND WALL = $\beta_a := 0 \cdot \text{deg}$

ANGLE OF SLOPE IN FRONT OF WALL = $\beta_p := 0 \cdot \text{deg}$

ACTIVE EARTH PRESSURE COEFFICIENT = K_a

$$K_a := \frac{\cos(\phi \cdot \text{rad})^2}{\cos(\delta \cdot \text{rad}) \cdot \left(1 + \sqrt{\frac{\sin(\phi \cdot \text{rad} + \delta \cdot \text{rad}) \cdot \sin(\phi \cdot \text{rad} - \beta_a \cdot \text{rad})}{\cos(\delta \cdot \text{rad}) \cdot \cos(\beta_a \cdot \text{rad})}} \right)^2} \quad K_a = 0.278$$

PASSIVE EARTH PRESSURE COEFFICIENT = K_p

$$K_p := \frac{\cos(\phi \cdot \text{rad})^2}{\cos(\delta \cdot \text{rad}) \cdot \left(1 - \sqrt{\frac{\sin(\phi \cdot \text{rad} + \delta \cdot \text{rad}) \cdot \sin(\phi \cdot \text{rad} + \beta_p \cdot \text{rad})}{\cos(\delta \cdot \text{rad}) \cdot \cos(\beta_p \cdot \text{rad})}} \right)^2} \quad K_p = 5.775$$

DOUBLE THICKNESS
PZ 27 SHEET PILE WALL
21'W w/ 30'L SHEETS
A572, $F_y = 50 \text{ KSI}$

⊕
JACK RAMS
2EA.

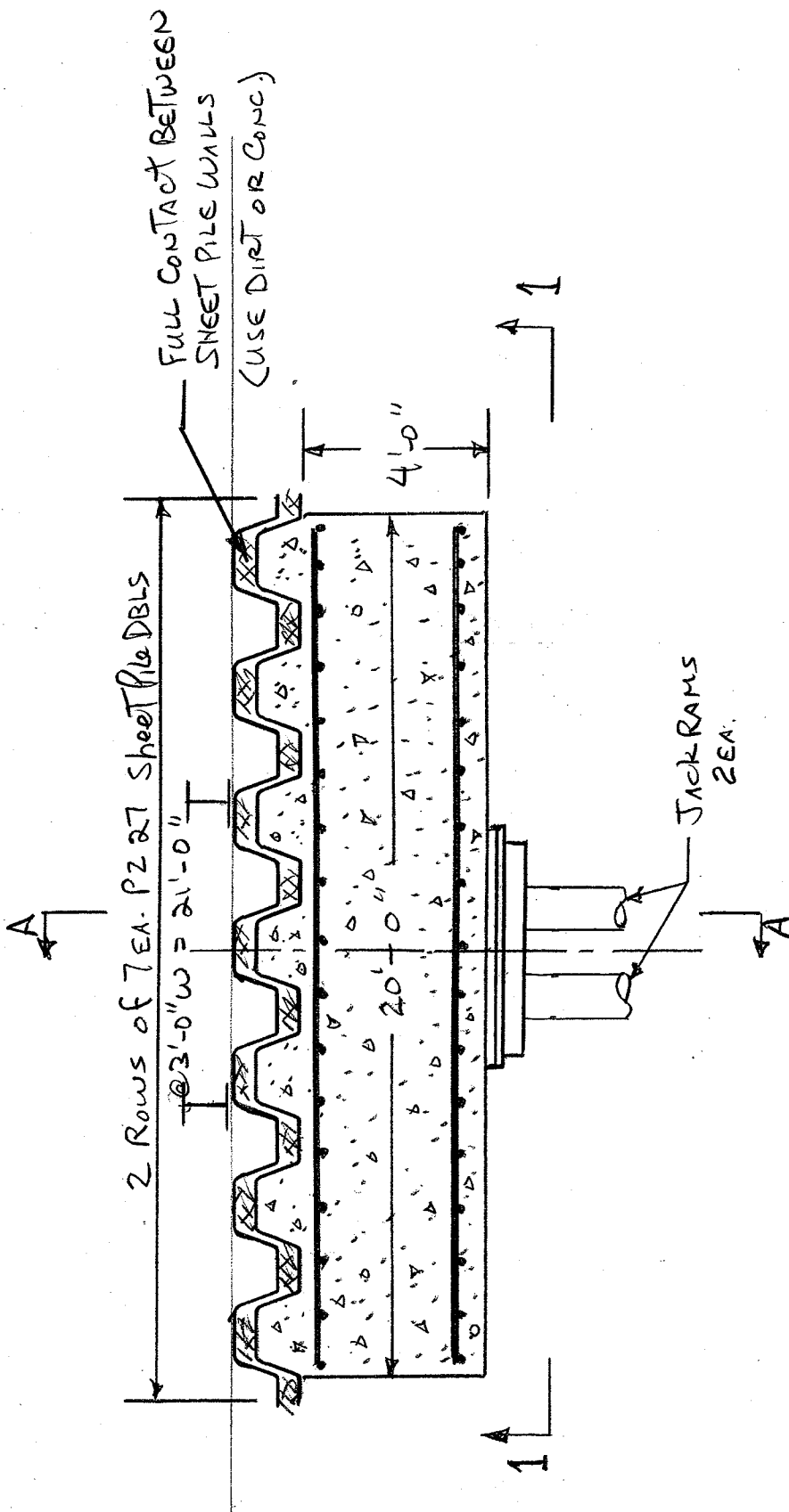
CONC SLAB

REINFORCED CONCRETE
REACTION BLOCK
4'x10'x20'L
 $F'_c = 4000 \text{ PSI}$

2" MIN. CLEARANCE BETWEEN
REBARS + FACES OF CONCRETE

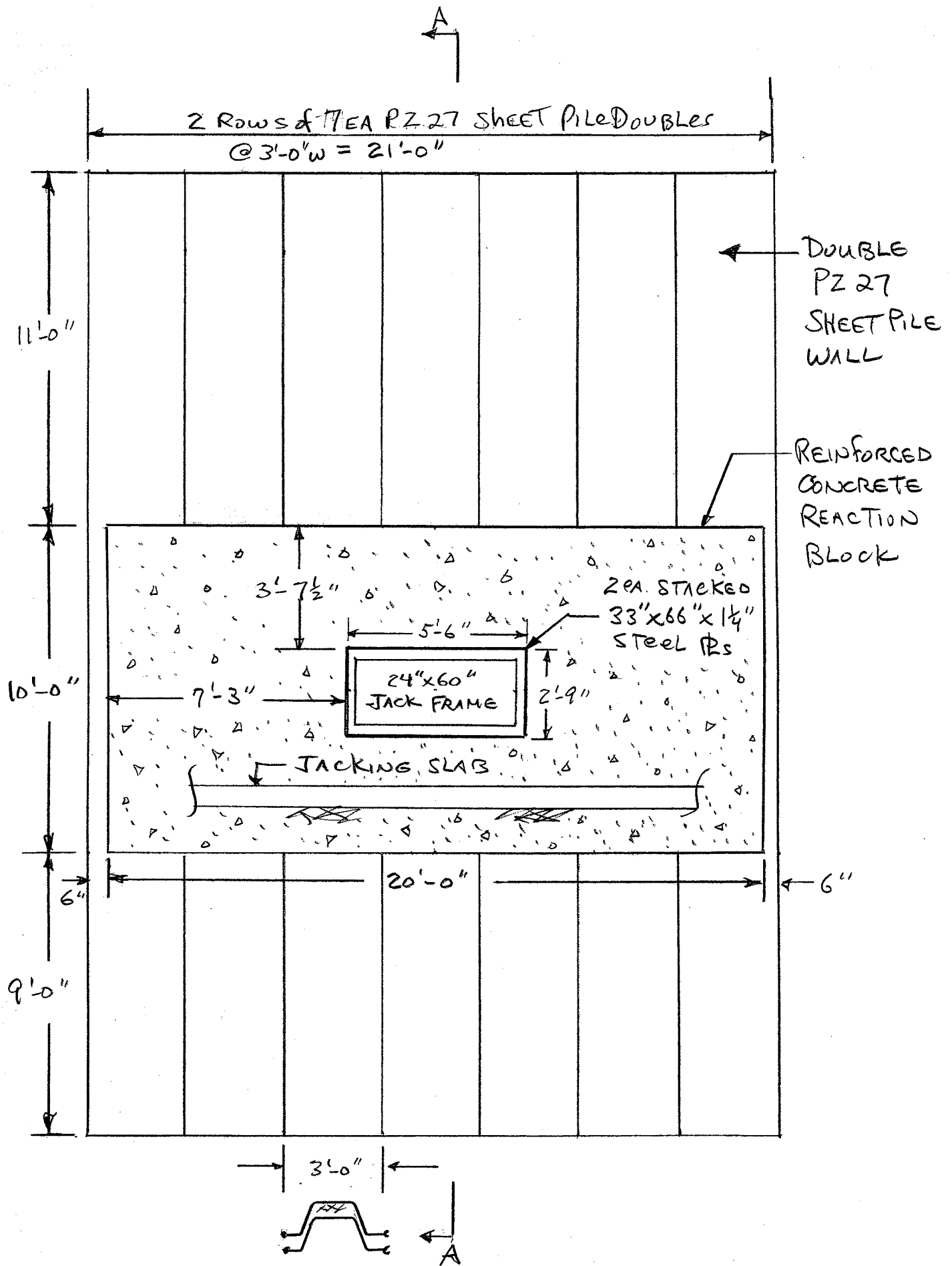
SECTION A-A

$\frac{1}{4}" = 1'-0"$



4" = 1'-0"

PLAN



ELEVATION 1-1

1/4" = 1'-0"