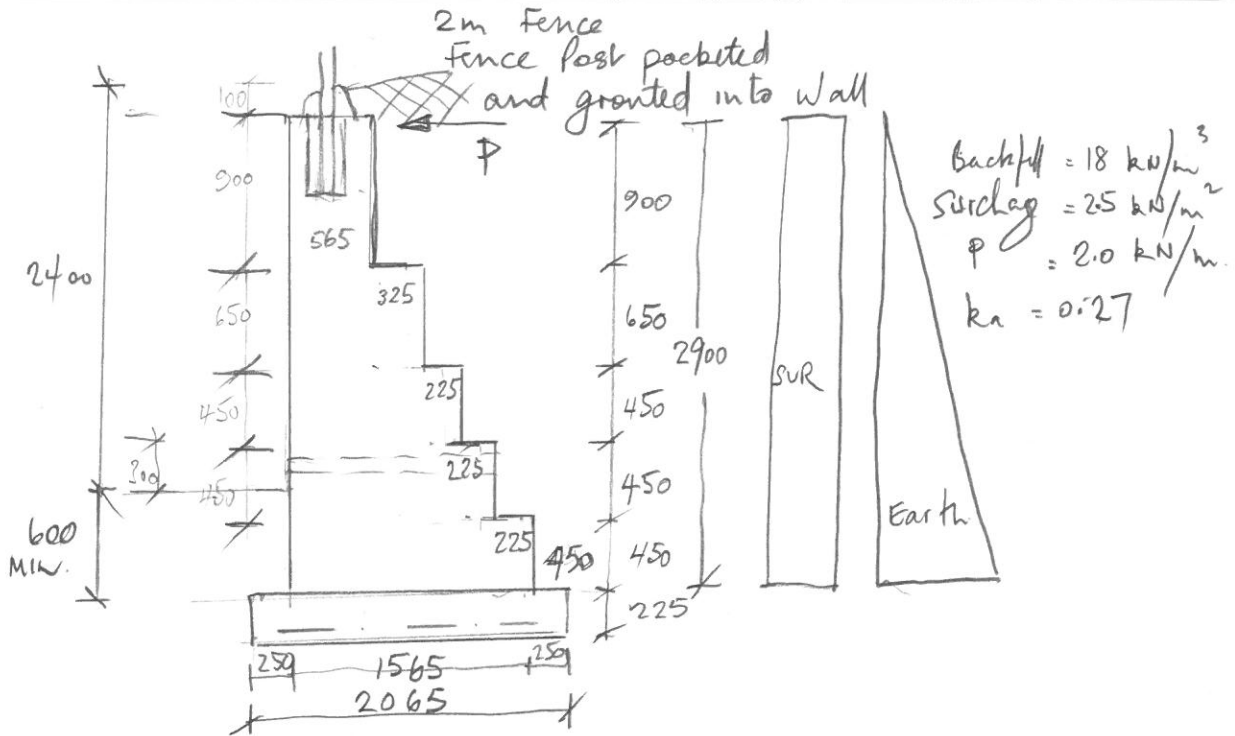


PROJECT :	HARRON HOMES CRICH SITE	Job No. 39466	Date Nov 2017
SUBJECT :	MASONRY RETAINING WALL 2.4 MAX RETAINED HEIGHT	Prepared JMS	Checked MPL



ESTIMATED SECTION

The top 2000 section of wall remains same as that of 1600 mm masonry wall. ∴ Check bottom section only.

$$\text{Soil} = 18 \times 0.27 \times 2.9^2 / 2 = 20.44 \text{ kN/m}$$

$$\text{Surcharge} = 2.5 \times 0.27 \times 2.9 = \frac{1.96}{22.40} \text{ kN/m}$$

$$\text{Overturning Moment} = \left( \frac{20.44 \times 2.9^3}{3} \right) + \left( \frac{1.96 \times 2.9^2}{2} \right) + (2.0 \times 2.9) = 31.24 \text{ kNm}$$

DESIGN OF STEM

width of wall at base = 1565 mm

Middle Third =  $1565 / 6 = 261 \text{ mm}$  to ensure no tension.

Resultant of vert & horiz to remain in middle third

$$\text{Equivalent } P_e = \frac{31.24 \times 3.9}{2.9} = 32.3 \text{ kN/m}$$

Taking Moment About Middle of Wall,  $c = \frac{32.3 \times 0.817 \times 10^3}{1.565 \times 1800 \times 9.81 \times 2.9} = 0.93 > 0.261 \text{ m}$

PROJECT: HARRON HOMES CRICH SITE	Job No. 39466	Date Nov 2017
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Design of wall for A  $0.05 \text{ N/m}^2$  PERMISSIBLE STRESS  
 " " stem,  $P_t = \frac{m}{z} - \frac{w}{A}$

for  $t = 0.05 \times 10^3 = \frac{31.24 \times 6}{1.0 \times t} - \frac{1800 \times 9.81 \times 2.9 \times t}{1000 \times t \times 1.0}$

Therefore,  $(50 + 51.2)t^2 = 187.44$ , and  $t = \sqrt{\frac{187.44}{101.2}} = 1.36 \text{ m}$

∴ A 1565 mm overall thickness is OK

Shear stress at Bottom of Wall =  $\frac{22.4 \times 10^3}{1565 \times 1000} = 0.0143 \text{ N/m}^2$

DESIGN OF BASE

Base is 225 mm thick

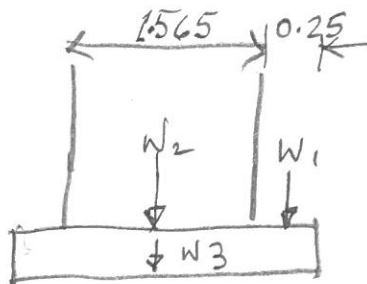
$225 + 2900 = 3125$

Soil =  $18 \times 0.27 \times \frac{3.125^2}{2} = 23.70 \text{ kN/m}$

Surcharge =  $2.5 \times 0.27 \times 3.125 = 2.11 \text{ kN/m}$

Overturning  $M_{nt} = (23.70 \times \frac{3.125^2}{3}) + (2.11 \times \frac{3.125^2}{2}) + (2 \times 3.125)$   
 $= 38.53 \text{ kN/m}$

Equivalent  $P_a = \frac{38.53 \times 3}{3.125} = 36.99 \text{ kN/m}$



DESIGN BASE



ACTUAL BASE

PROJECT: HARRON HOMES. CRICH SITE	Job No. 39466	Date Nov 2017
SUBJECT: MASONRY RETAINING WALL 2.4 MAX RETAINED HEIGHT	Prepared JMS	Checked MPR

$$W_1 = 18 \times 2.9 \times 0.25 = 13.05$$

$$W_2 = 18 \times 2.9 \times 1.565 = 81.69$$

$$W_3 = 24 \times 0.225 \times 2.065 = 11.15$$

$$\frac{105.89}{2.065} \text{ kN/m}$$

Taking Moment about A, neglect passive pressure

$$105.89e = 38.53 \times \frac{3.125}{3} - (8.6 \times 1.032)$$

$$\therefore e = \frac{40.135 - 8.875}{105.89} = 0.295 \text{ m} \quad \therefore \text{Resultant is in middle } \frac{1}{3}$$

$$\begin{aligned} \text{Maximum Bending Pressure} &= \frac{W}{A} + \frac{W_e}{Z} = \frac{105.89}{2.065} + \frac{105.89 \times 0.295 \times 6}{2.065^2} \\ &= 51.28 + 43.95 = 95.23 \text{ kN/m}^2 \end{aligned}$$

FoS Sliding

Base onto natural ground,  $\mu = 0.6$

$$\text{FoS} = \frac{105.89}{36.99} \times 0.6 = 1.71 \quad \therefore \text{OK}$$

ignores passive & outer leaf + wider base.

$\frac{1.565 \times 7.82}{2} = \frac{1290}{1032}$

Facing brickwork/stone to architects details. Facing to be tied back to blockwork with wall ties at 450mm vertical centres and 900mm horizontal centres.

Boundary screen fence or handrail to architects details.

Maximum allowable gradient 1 in 6.

235 Square

Two courses of SBF35W60 Bed Joint Reinforcement to front and rear of fence post pocket. Bed joint Reinforcement to run continuous along length of wall.

Backfill behind wall with free draining granular backfill.

64mm square U.P.V.C rainwater pipe built into wall at 2.0m centres as weepholes.

Concrete foundation blocks minimum density 1800 kg/m<sup>3</sup>.

1 Layer A393 mesh with 50mm cover, increased to 100mm if the option as Note 2 (c) is used.

NATURAL GROUND SBC 100kN/m<sup>2</sup>

RETAINING UP TO 2.4m

