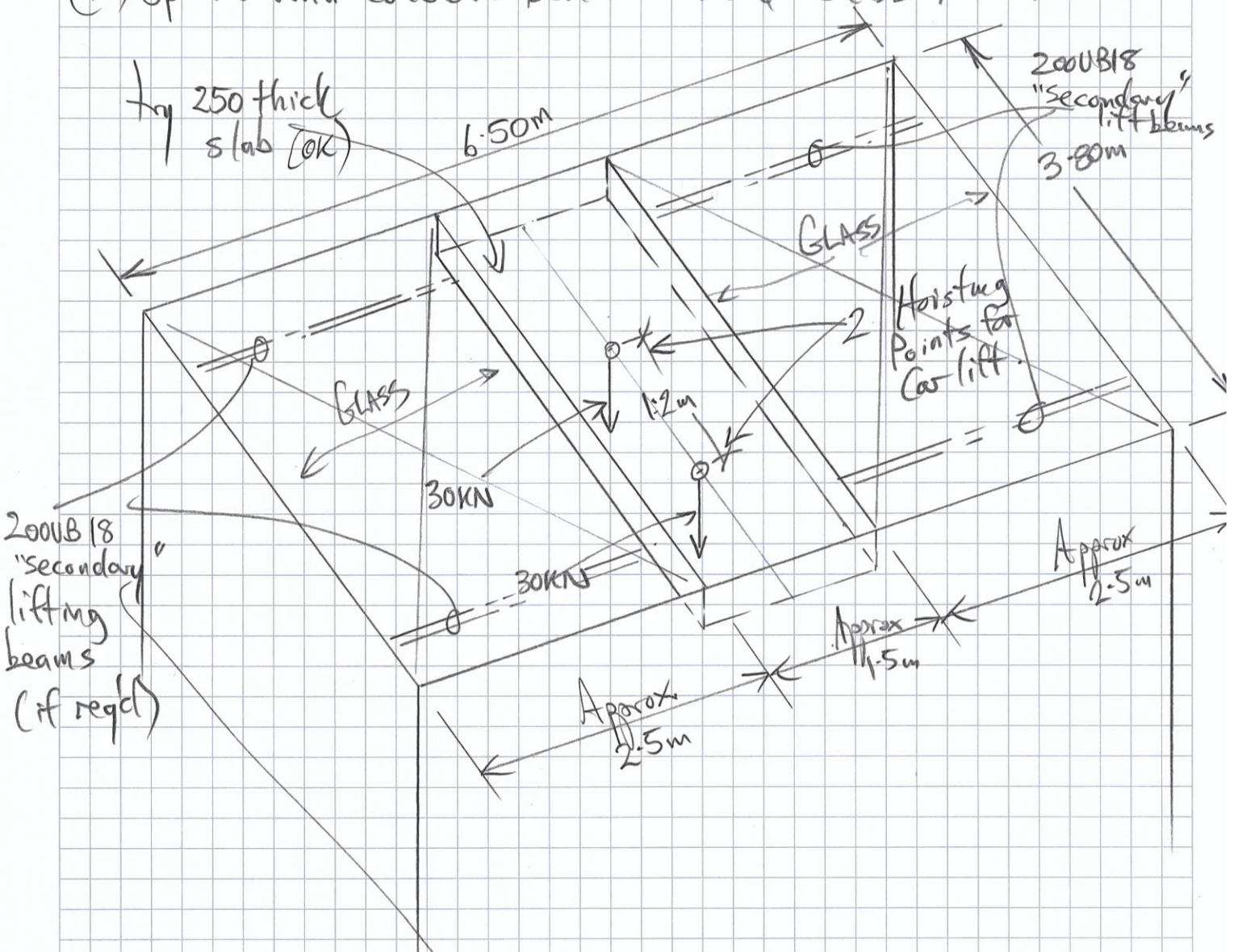
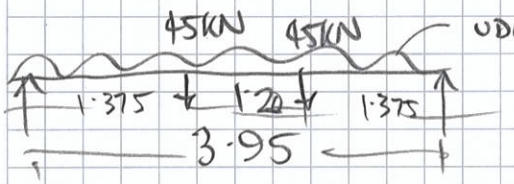
* Prelims for "Car-lift" at front of property:

(A) Option with Concrete Band Beam & Glass Roof:



$W_{ULT} \sim 0.25 \times 24 \times 1.25 + (3 \times 1.5) = 12\,KN/m \times 1.5 = 18\,KN/m$

$P_{ULT} = (30 \times 1.5) \rightarrow 2\text{-off} = 45KN\ (2\text{-off})$



$M_{ULT} = \frac{18 \times 3.95^2}{8} + 45 \times 1.375$

$= 97KNm$

$A_{st} = \frac{97 \times 34}{0.215}$

$= 1533\,mm^2 \rightarrow$ N16-150

* Check deflⁿ of concrete → $I_g = \frac{1}{12} \times 1500 \times 250^3$
$= 1.95 \times 10^9$

$F_t = 0.62\sqrt{f'_c}$ (using 40MPa)
$= 3.92$MPa.

$\therefore M_c = F_t \cdot \frac{I_g}{y_t} = 3.92 \times \frac{1.95 \times 10^9}{125}$
$= 61$KNm

& $M_{applied}$ → $M_{①(DL)} = \frac{(6 \times 1.5) \times 3.95^2}{8} = 18$KNm

$M_{②(LL)} = \frac{(3 \times 1.5) \times 3.95^2}{8} = 9$KNm

$M_{car\ lift} = 30 \times 1.375 = 41$KNm

DL + Car lift = 59KNm (less than M_c)!

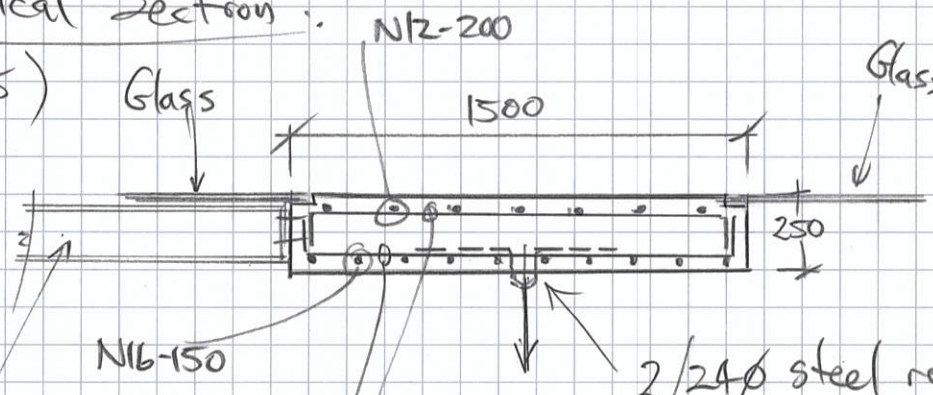
→ use I_{gross}

$\delta_{sw} = \frac{5 \times 9 \times (4000)^4}{384 \times 32000 \times 1.95 \times 10^9}$
$= 0.5$mm

$\delta_{car\ lift\ (60KN)} = \frac{7 \times 60000 \times (4000)^3}{384 \times 32000 \times 1.95 \times 10^9}$
$= 1.2$mm

∴ 250 deep x 1500 wide concrete band with N16-150 Btm is fine.

Typical Section: (1:25)



$F'_c = 40$MPa.

2/240 steel rods cast in with 3.0 tonne SWL cap each.

200UB18 (secondary lifting beams) (beyond)

Cross-Bars (use N12-200)