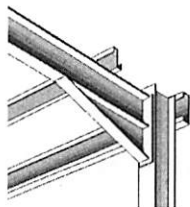


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T:01775 769 563
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Mr & Mrs Lane

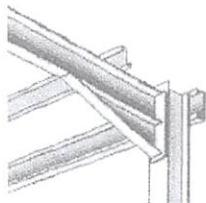
Extensions and Alterations
Mill House
Fleet Bank
Fleet
Spalding .

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By	Skidd
Ckd.	
Date	Oct , 2019

Structural Calculations Index

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1. Loadings	1
2. Structural Layout –Existing House	2
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4. Post & Pad Designs	6
5. Steel Connections	7

Note: Dimensions are for Structural Calculations only.



MR & MRS LANE.

EXTENSIONS &
ALTERATION TO

DWELLING

MILL HOUSE

FLEET BANK

FLEET, SPALDING

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By	SK
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LOADINGS

kN/sqm

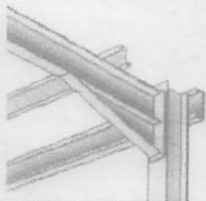
Roof	<u>DEAD LOAD</u>	
	Slates	0.60
	BATTENS & INS	0.05
	Rafters	0.20
	plaster bd	0.15
		<u>1.0 kN/m² slope = 1.35 kN/m² on plan</u>
	<u>IMPOSED</u>	0.6 kN/m²
	<u>Services</u>	<u>0.10</u>

FIRST FLOOR : DEAD = 0.8 kN/sqm — timber
IMPOSED — 1.50 + partitions
= 2.0 kN/sqm

WALLS : (a) EXISTING 225mm = 4.0 kN/sqm on Elev.
(b) NEW CAVITY = 3.5 kN/sqm on Elev.

ie FOR BEAM DESIGN (a) = 4 * 4 = 16 kN/m (fixed)
(b) = 3.5 * 4 = 14 kN/m (fixed)

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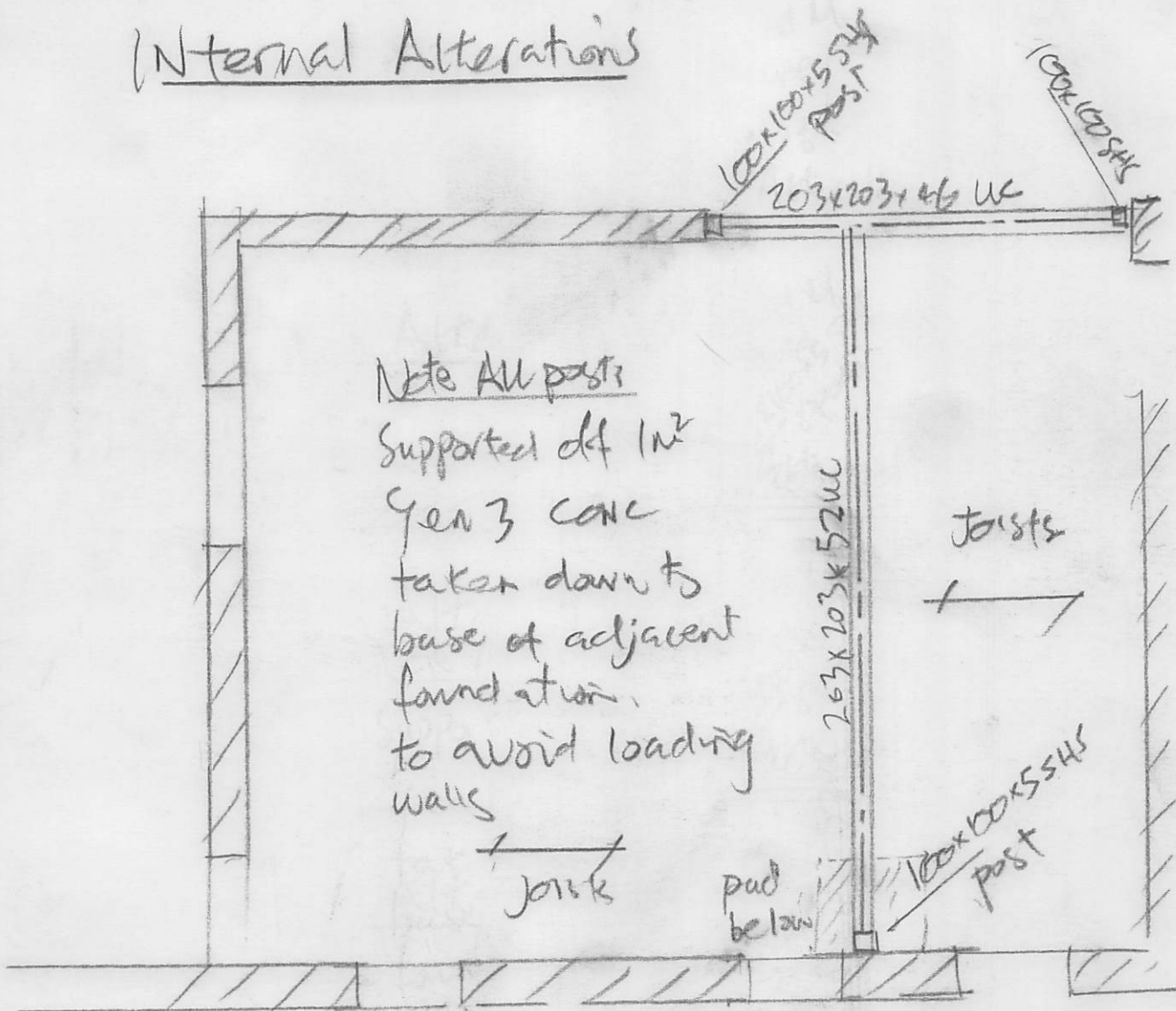
E: enquiries@southlincsconsulting.com

Idty No.
DESCRIPTION

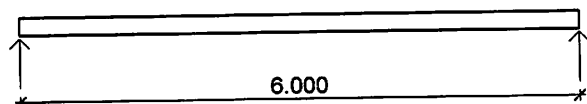
Mr & Mrs
Lane
Mill House -
Internal Alterations

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Ckd.	
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Internal Alterations

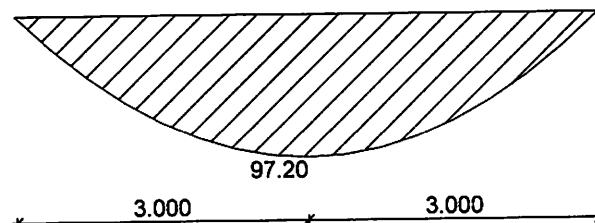


FOR PAD DETAIL + STEEL CONN
See pgs 6 & 7.

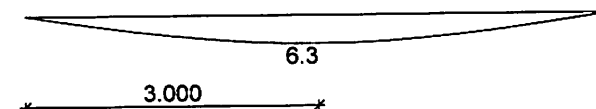


Final stage

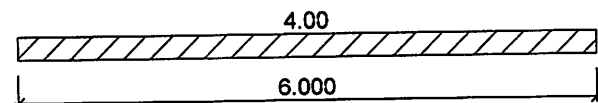
Reactions	Left kN	Right kN
1.4 x Dead + 1.6 x Imposed	64.80	64.80
Unfactored dead	12.00	12.00
Unfactored imposed	30.00	30.00



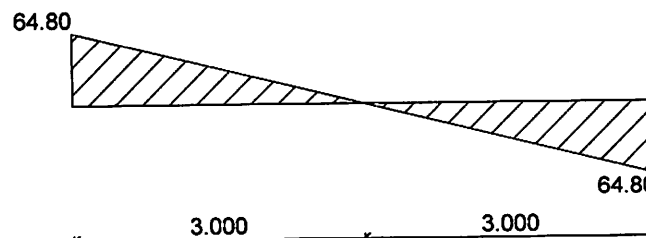
Bending moment: kN.m.
Final stage
Combination = 1.4 x Dead + 1.6 x Imposed



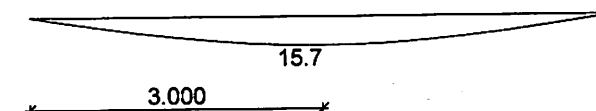
Deflected form: mm.
Final stage
Combination = Unfactored dead



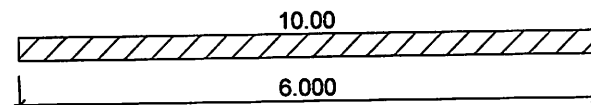
Loading diagram: kN/m; kN; kN.m.
Final stage
Load case = Dead



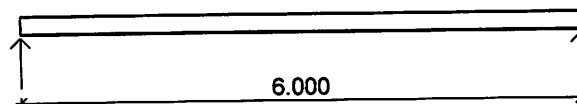
Shear force: kN.
Final stage
Combination = 1.4 x Dead + 1.6 x Imposed



Deflected form: mm.
Final stage
Combination = Unfactored imposed



Loading diagram: kN/m; kN; kN.m.
Final stage
Load case = Imposed



Final stage
Combination = 1.4 x Dead + 1.6 x Imposed

Beam fully restrained

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Sheet : 3

Project : 19-0336

File : existing house

Title : Mr & Mrs Lane
Internal Beam Kitchen --Diner
6m --203x203x52 kg/m UC

Designed : sk

Checked :

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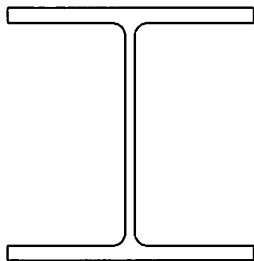
Project : 19-0336

File : existing house

Title : Mr & Mrs Lane
Internal Beam Kitchen --Diner
6m --203x203x52 kg/m UC

Designed : sk

Checked :



Beam - existing - Simple construction
203x203x52UC S355
Bending about x-x axis

Ply=12.5 mm. Py= 355 N/mm².

Summary of results.	Unity	Verdict	Comment
---------------------	-------	---------	---------

Final stage

1.4 x Dead + 1.6 x Imposed

Capacity

0.48 -- Passed --

LT Buckling

-- N/A --

Unfactored dead

Deflection

0.38 -- Passed --

Unfactored imposed

Deflection

0.94 -- Passed --

Overall

-- Passed --

Detailed calculations.

Final stage.

Combination - 1.4 x Dead + 1.6 x Imposed

Section classification

3.5 and Table 11

Epsilon = 0.880

Class = Compact

B/T=8.2 d/t=20.4

Sx = 567 cm³.

Shear capacity

Fv = 64.80 kN.

Pv = 0.6 Py.Av

= 346.97 kN.

Unity = Fv/Pv = 0.19 pass

Moment capacity with low shear

M = 97.20 kN.m.

Mc = Sx.Py

= 201.43 kN.m.

Unity = M/Mc = 0.48 pass

Combination - Unfactored dead

Applied deflection limit Span/360

= 16.7 mm.

Maximum deflection

= 6.3 mm. @ 3.000 m.

Unity = 0.38 pass

Combination - Unfactored imposed

\\Sle-drive\quiksoft\PROJECTS\19-0336\existing house.QB

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Sheet : 5

Project : 19-0336

File : existing house

Title : Mr & Mrs Lane
Internal Beam Kitchen --Diner
6m --203x203x52 kg/m UC

Designed : sk

Checked :

Applied deflection limit Span/360
= 16.7 mm.

Maximum deflection
= 15.7 mm. @ 3.000 m.

Unity = 0.94 pass

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Sheet : 6

Title : MILL HOUSE
FLEET BANK
FLEET; SPALDING

Designed : sk

Checked :



→ Post.

Input

Section = 100x100x5.0HF-SHS $P_y = 275 \text{ N/mm}^2$
 $F = 75.00 \text{ kN}$ Compression
 $M_x = 5.00 \text{ kN.m}$
 $M_y = 2.00 \text{ kN.m}$
 $m_x = 1.00$ See 4.8.3.3.4 and Table 26
 $m_y = 1.00$ Ditto
 $m_{yx} = 1.00$ Ditto

Combined buckling resistance 4.8.3.3.3(c)

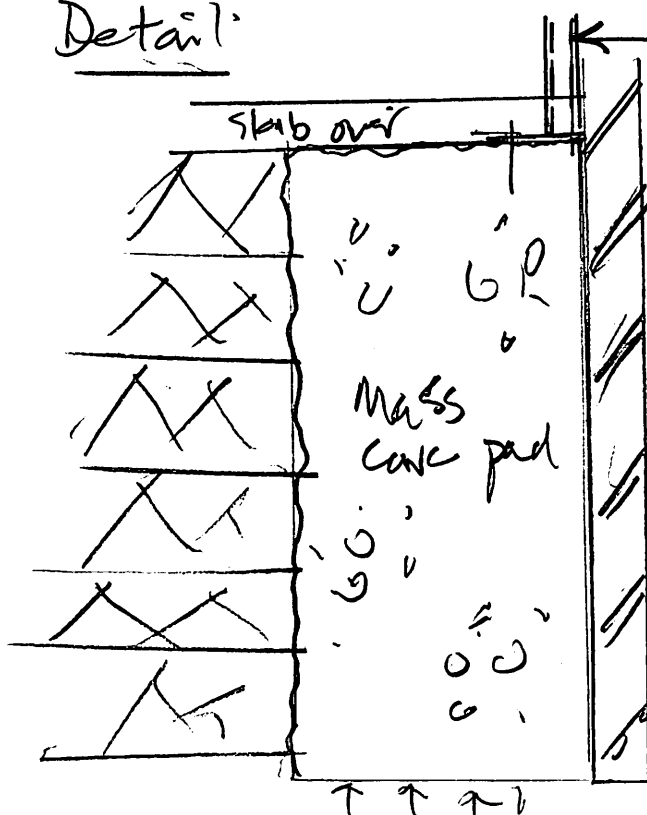
$$\frac{F_c}{P_{cx}} + \frac{m_x M_x}{M_{cx}} \left| 1 + 0.5 \frac{F_c}{P_{cx}} \right| + 0.5 \frac{m_{yx} M_y}{M_{cy}} = 0.55 < 1.0 \therefore \text{post satisfactory}$$

Lateral torsional buckling check not required 4.3.6.1

$$\frac{F_c}{P_{cy}} + 0.5 \frac{m_{LT} M_{LT}}{M_{cx}} + \frac{m_y M_y}{M_{cy}} \left| 1 + 0.5 \frac{F_c}{P_{cx}} \right| = 0.39$$

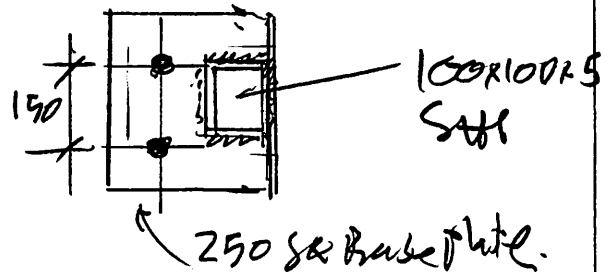
$$\frac{m_x M_x (1 + 0.5 F_c / P_{cx})}{M_{cx} (1 - F_c / P_{cx})} + \frac{m_y M_y (1 + 0.5 F_c / P_{cy})}{M_{cy} (1 - F_c / P_{cy})} = 0.39$$

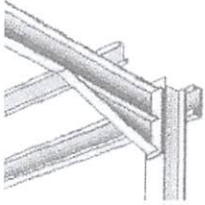
∴ USE 100x100x5 SHS post

Detail

100x100x5 SHS post
+ offset 10mm
Baseplate resin fixed
to mass conc pad

PLAN 2M12 Rein.





Mr & Mrs Lane.

Internal Structural

Meds.

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PAD SIZES : BASED ON SILT BEARING
STRAID 100 kN/sqm

(i) Basement Ends

$$\text{Jut of 2m core full} = 48 \text{ kN/sqm}$$

$$\text{Reaction from Post} = \underline{42 \text{ kN/sqm}}$$

$$\underline{90 \text{ kN/sqm}}$$

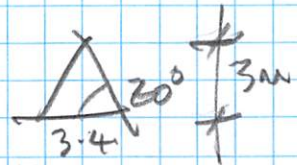
$$< 100 \text{ kN/sqm}$$

< Satisfactory

(ii) Other end — 2/ posts. —

$$\text{Reaction} = 42/2 + \text{Wall above}$$

4 x Area A

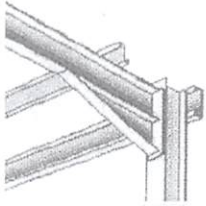


$$= 21 + 20 = 41 \text{ kN} \downarrow$$

$$\therefore \text{Area of Pad} = \frac{41}{12} + 24 \times 3 = 48 \text{ kN/sqm}$$

∴ ok

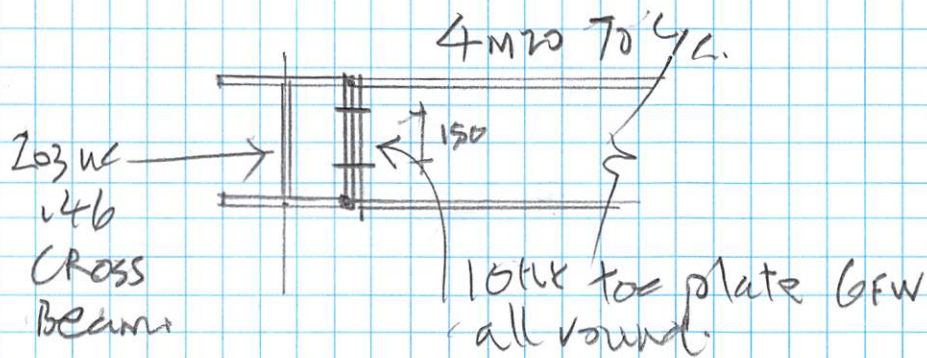
USE 1m sq PADS ON EACH POST



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Date	Oct 2019.

STEEL CONNECTIONS. ! Ref pag 2.

① Beam - Beam CONNECTION



② Beam Post - CONNECTION

