BRIDGEWATER CONSULTING ENGINEERS
CONSULTING STRUCTURAL ENGINEERS

Suite 604 Sentinel House, Peel Street, Eccles, Manchester, M30 0NJ T: +44 (0) 161 789 1592 E: mail@bw-eng.co.uk

CALCULATIONS FOR:

LINTEL REQUIRED FOR PROPOSED WALL OPENING

PROJECT TITLE:

15 SMEDLEY LANE, MANCHESTER

PROJECT NO.:

6223-18

CLIENT:

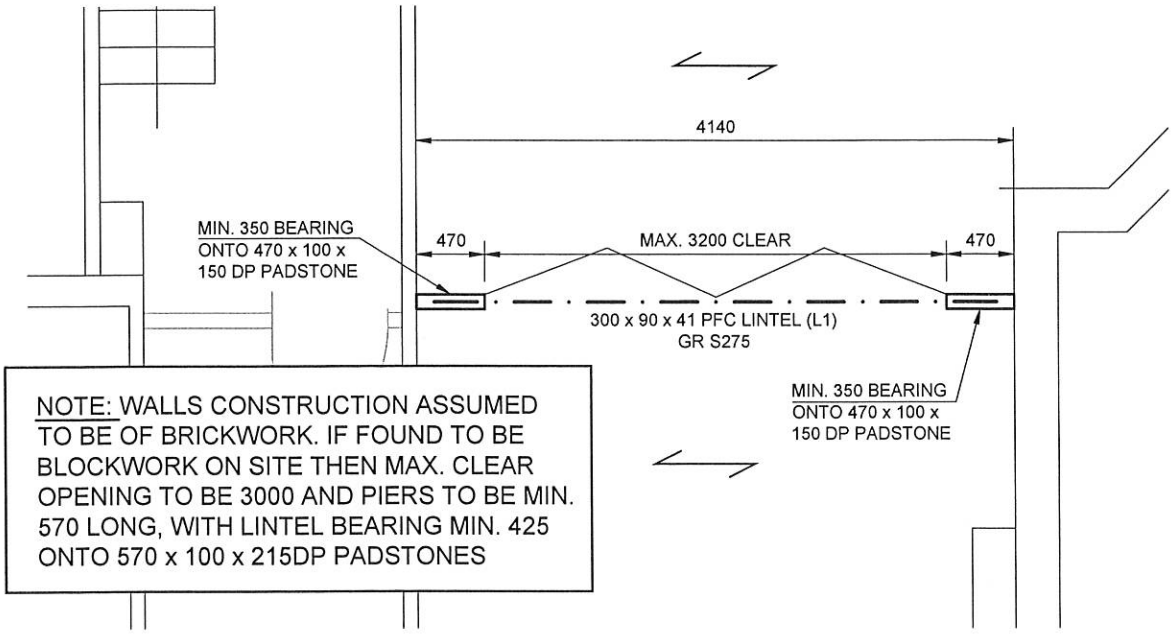
MS. HAYLEY FERN FRASER

15 SMEDLEY LANE,

MANCHESTER.

M8 8UJ

15 SMEDLEY LANE, MANCHESTER	Eng. AC	Drawn. AC	BRIDGEWATER CONSULTING ENGINEERS CONSULTING CIVIL & STRUCTURAL ENGINEERS	The Institution of Structural Engineers
	C'k'd	Date. 07/03/18	Suite 604 Sentinel House, Peel Street, Eccles, Manchester. M30 ONJ T: +44 (0)161 789 1592 E: mail@bw-eng.co.uk	
PART FLOOR PLANs AS PROPOSED	Scale AS SHOWN @ A4			
	WORK TO FIGURED DIMENSIONS ONLY		**No.** 6223 / 18 / SK01	Rev



PART GROUND FLOOR PLAN

SCALE 1:50

DENOTES SPAN OF EXISTING FLOOR JOISTS AT EACH LEVEL

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JOB No.: 6223

SHEET No: NOTES

CALCULATIONS:

OUTPUT

GENERAL NOTES:

1. DO NOT SCALE ANY DRAWING. FOR DISCREPANCIES OR OMISSIONS CONTACT THE ENGINEER PRIOR TO WORK COMMENCING.
2. MATERIALS AND WORKMANSHIP ARE TO COMPLY IN ALL RESPECTS WITH CURRENT BRITISH STANDARD SPECIFICATIONS, BRITISH STANDARD CODE OF PRACTICE, AND BUILDING REGULATIONS.
3. THE CONTRACTOR IS TO CHECK AND VERIFY ALL BUILDING AND SITE DIMENSIONS AND LEVELS BEFORE ORDERING MATERIALS AND WORK COMMENCES.
4. ALL DRAWINGS ARE TO BE READ IN CONJUNCTION WITH ALL RELEVANT SPECIFICATIONS AND DRAWINGS ISSUED BY THE ENGINEER, ARCHITECT AND OTHER SPECIALISTS.
5. THE CONTRACTOR IS TO ENSURE STABILITY AND SUPPORT TO EXISTING STRUCTURE THROUGHOUT THE WORKS. THE DESIGN, INSTALLATION AND MAINTENANCE OF ALL NECESSARY TEMPORARY WORKS IS THE RESPONSIBILITY OF THE CONTRACTOR

STEELWORK NOTES

1. ALL STEELWORK IS TO BE MIN. GRADE S275JR FABRICATED , PRIMED AND INSTALLED IN ACCORDANCE WITH NATIONAL STRUCTURAL STEELWORK SPECIFICATION.
2. ALL HOLLOW SECTION ARE TO BE GRADE S355JR FABRICATED , PRIMED AND INSTALLED IN ACCORDANCE WITH NATIONAL STRUCTURAL STEELWORK SPECIFICATION
3. ALL WELDS TO BE 6mm FULL PROFILE FILLET WELDS U.N.O.
4. ALL BOLTS TO BE BS3692, GRADE 8.8 ORDINARY CARBON STEEL BOLTS (U.S.O). TO BE GALVANISED IF IN EXTERNAL / EXPOSED CONDITIONS.
5. CONNECTIONS NOT DETAILED ARE TO BE DESIGNED BY THE FABRICATOR.
6. FIRE PROTECTION REQUIRED WHERE APPROPRIATE, TO ARCHITECTS DETAILS. STEELWORK TO BE HOT-DIP GALVANISED IF IN EXTERNAL / EXPOSED CONDITIONS.

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JOB No.: 6223
SHEET No: 01

CALCULATIONS: | OUTPUT

15 SMEDLEY LANE, MANCHESTER

LINTELS REQUIRED FOR PROPOSED WALL OPENING

LOADINGS:

		DEAD LOAD	FACTORED (x1.4)	LIVE LOAD	FACTORED (x1.6)
ROOF:	- TILES - RAFTERS - FELT & BATTENS - INSULATION - PLASTERBOARD & SKIM - SERVICES (ADJUSTED FOR 30° PITCH)	1.13 kN/m²	1.58 kN/m²	0.60 kN/m²	0.96 kN/m²
INTERNAL WALLS:	- 100 BRICK - 2 NO. PLASTER	2.89 kN/m²	4.05 kN/m²		

LINTEL L1 — L = 3.4m

- TOTAL HEIGHT OF WALL OVER = 6.5m (APPROX.)
- SPAN BETWEEN PURLINS = 6.8m (APPROX.)

LOAD ON LINTEL:

- ROOF: $(1.58 + 0.96) \times 6.8 / 2$ = 8.6 kN/m
- WALL OVER: 4.05×6.5 = 26.3 kN/m
- LINTEL SUT: SAY 0.3×1.4 = 0.4 kN/m

Σ 35.3 kN/m

$R = 35.3 \times 3.4 / 2$ = 60 kN

$M = 35.3 \times 3.4^2 / 8$ = 51 kNm

S_x REQ'D = 186 cm³ (S275)

1 No. 300 x 90 x 41 PFC — S_x = 568 cm³, I = 7220 cm⁴

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JOB No.: 6223

SHEET No: 02

CALCULATIONS:

OUTPUT

DEFLECTION CHECK

$$\delta = \frac{5 \times 23.5 \times 3400^4}{384 \times 210 \times 7220 \times 10^4} = 2.7\text{mm} < 4/360 \therefore \text{OK}$$

BUCKLING CHECK

$L_E = 1.4 \times 3.4 + 0.305 \times 2 = 5.2\text{m}$

From BLUE Book, $m_b = 53.9\text{kNm}$ For 6m

$$m_b/_{m_{LT}} = 53.9/_{0.925} = 58.3\text{kNm} > 51\text{kNm}$$

$\therefore$ OK

BEARING CHECK

$R = 60\text{kN}$

- LENGTH OF WALL = 4.14m
- CLEAR OPENING = 3m TO 3.2m
- PIERS REMAINING EACH SIDE:

$$4.14 - 3.2/2 = 470\text{mm}$$
$$4.14 - 3/2 = 570\text{mm}$$

CHECK FULL LENGTH PADSTONE:

$$f = 60000/570 \times 100 = 1.05\text{N/mm}^2 \therefore \text{ACCEPTABLE FOR BLOCKWORK}$$

$$f = 60000/470 \times 100 = 1.28\text{N/mm}^2 < 1.66\text{N/mm}^2$$

$\therefore$ OK FOR BRICKWORK BUT NOT BLOCKWORK

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JOB No.: 6223
SHEET No: 03

CALCULATIONS: | OUTPUT

ADOPT:- 300 x 90 x 41 PFC (S275) LINTEL

LINTEL L2 L = 1.2m (1000 CLEAR)

- TOTAL HEIGHT OF WALL OVER = 9.45 (APPROX.)

LINTEL POSITIONED DIRECTLY BENEATH LEFT HAND PIER AT BASEMENT LEVEL

LOAD ON LINTEL:

ROOF: (1.58+0.96) x 6.8/2	=	8.6kN/m
WALL OVER: 4.05 x 9.45	=	38.3kN/m
LINTELSUT: SAY 0.2 x 1.4	=	0.3kN/m
DL FROM LINTEL L1: 60/1.2	=	50kN/m
	Σ	97.2kN/m

R = 97.2 x 1.2/2 = 58.3kN

M = 97.2 x 1.2²/8 = 17.5kNm Sx REQ'D = 64cm³ (S275)

TRY 100 x 100 x 6.3 SHS Sx = 80.9cm³
I = 336cm⁴

DEFLECTION CHECK

$$\delta = \frac{5 \times 64.8 \times 1200^4}{384 \times 210 \times 336 \times 10^4} = 2.5mm < 4/360 \therefore OK$$

BEARING CHECK R = 58.3kN

f = 58300/600x100 = 0.97N/mm² ∴ OK FOR BLOCK WORK

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JOB No.: 6223

SHEET No: 04

CALCULATIONS:

OUTPUT

$f = 58300 / 440 \times 100 = 1.33 N/mm^2$ ∴ OK

FOR BRICKWORK

ADOPT:- 100x100x6.3 SHS (S355) LINTEL

PADSTONES & BEARINGS AS PER

SKETCH 6223/18/SK01