

**CALCULATION PACKAGE:**

**PROPOSED REAR EXTENSION AND  
INTERNAL ALTERATIONS AND MODIFICATIONS:**

**JOB No – DD/2021/260:**



**Existing front elevation**



Existing rear elevation



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## 1. EXISTING/PROPOSED LOADING DATA:

### 1.1. WALL LOADING DATA:

	<u>kN/sqm:</u>	<u>D.L.</u>	<u>L.L.</u>
<u>Dead:</u>			
Existing/Proposed cavity wall:		4.20.	
Existing brick wall 215mm:		5.00.	
Internal brick wall 103mm:		2.50.	
Internal timber studs:		0.50.	
External timber studs:		1.00.	
Light blockwork: 10 kN/cum x 0.3m		3.00.	

### 1.2. EXISTING FLOOR LOADING DATA:

	<u>kN/sqm:</u>	<u>D.L.</u>	<u>L.L.</u>
<u>Dead:</u>			
Boards:	0.10.		
Joists:	0.15.		
Insulation:	0.05.		
Partitions:	0.50.		
Ceiling & services:	0.20.		
<u>Total =</u>	<u>1.00kN/sqm.</u>	<u>1.00.</u>	
<u>Live:</u> Allow 1.50kN/m2 for residential loading case.			<u>1.50.</u>

### 1.3. EXISTING/PROPOSED FLAT ROOF LOADING DATA:

	<u>kN/sqm:</u>	<u>D.L.</u>	<u>L.L.</u>
<u>Dead:</u>			
Tiles:	0.50.		
Battens & felt:	0.05.		
Rafters:	0.10.		
Insulation:	0.05.		
Ceiling & services:	0.30.		
<u>Total =</u>	<u>1.00kN/sqm.</u>	<u>1.00.</u>	
<u>Live:</u> Allow 0.75kN/m2 for snow.			<u>0.75.</u>



**1.4. EXISTING ROOF (SLOPING) LOADING DATA:**

	<u>kN/sqm:</u>	<u>D.L.</u>	<u>L.L.</u>
<u>Dead:</u>			
Tiles:	0.50.		
Battens & felt:	0.05.		
Trusses:	0.10.		
Insulation:	0.05.		
Ceiling & services:	0.30.		
	<u>Total = 1.00kN/sqm.</u>		
	<u>Roof load on plan = 1.00 / Cos 30° = 1.15 kN/sqm.</u>	<b>1.20.</b>	
<u>Live:</u>	Allow 0.75kN/m2 for snow.		<b>0.75.</b>



## 2. STRUCTURAL CALCULATIONS

### 2.1. FLOOR JOISTS:

Span = 3800 mm approximately.

See Tedd's computer calculations:

**Adopt 50 x 200 mm joists @ 400 mm centres – Grade C24.**

### 2.2. FLAT ROOF JOISTS:

Span = 3800 mm approximately.

See Tedd's computer calculations:

**Adopt 50 x 175 mm joists @ 400 mm centres – Grade C24.**

**Double/Triple up joists at the roof light and up to the openings.**

**Bolt multiple timber members together with 12.0 mm diameter bolts @ 450 mm centres staggered.**

### 2.3. 3J-1 TIMBER BEAM SUPPORTING PARAPET WALL:

Span = Approximately

3800 mm

#### Loading

		<u>D.L.</u>	<u>LL.</u>	
Proposed Flat Roof Joists =	$(1.00 + 0.75) \times 0.80 / 2$	0.40	0.30	kN/m
Parapet Wall =	$5.00 \times 0.60$	3.00		kN/m
	Total =	3.40	0.30	kN/m
	Assumed =	<b>3.40</b>	<b>0.30</b>	<b>kN/m</b>

See Tedd's computer calculations:

**Adopt 3/100 x 175 mm JOISTS – GRADE C24.**

Beam reaction =  $(6.90/0.60 + 6.90/0.60)$  kN



## HOME TALES

A large, empty rectangular box with a black border, intended for writing a home tale.

**2.4. BEAM B1/B2:**

Span = Approximately 5800 mm

<u>Loading</u>		<u>D.L.</u>	<u>L.L.</u>	
Existing Floor Joists =	$(1.00 + 1.50) \times 3.50 / 2$	1.75	2.63	kN/m
Proposed Flat Roof Joists =	$(1.00 + 0.75) \times 3.80 / 2$	1.90	1.43	kN/m
Existing Roof Rafters =	$(1.20 + 0.75) \times 4.70 / 2$	2.82	1.76	kN/m
External Brick Wall (-30% Voids) =	$5.00 \times 3.10$	10.85		kN/m
	Total =	17.32	5.81	kN/m
	Assumed =	<b>17.40</b>	<b>5.90</b>	<b>kN/m</b>

Reaction from Beam B3 @2900mm = **31.90**      **0.00**      **kN**Reaction from 3I Timber Beam @2900mm = **6.90**      **0.60**      **kN**

See Tedd's computer calculations:

**Adopt 305 x 305 UC97 – GRADE S275.**Beam reaction =  $(72.60/17.40 + 72.60/17.40)$  kN

Ultimate Reaction for Column C1/C2 = 129.50kN

**2.5. BEAM B3:**

Span = Approximately 3200 mm

<u>Loading</u>		<u>D.L.</u>	<u>L.L.</u>	
External Brick Wall =	$5.00 \times 3.90$	19.50		kN/m
	Total =	19.50	0.00	kN/m
	Assumed =	<b>19.50</b>	<b>0.00</b>	<b>kN/m</b>

See Tedd's computer calculations:

**Adopt 203 x 203 UC46 – GRADE S275.**Beam reaction =  $(31.90 + 31.90)$  kN

Ultimate Reaction for Connection Detail = 44.70 kN

Ultimate Moment for Connection Detail = 35.80 kNm

Beam reactions =  $31.90 + 0.00 = 31.90$  kNExisting brickwork stress = 0.42 N/mm<sup>2</sup>Padstone length =  $31.90 \times 1000 / 100 \times 0.42 = 760$  mm**Adopt 800 x 100 x 225 mm DEEP CONCRETE PAD STONE ON ONE SIDE.**



## 2.6. BEAM B4:

Span = Approximately	4300 mm			
<b>Loading</b>		<b>D.L.</b>	<b>L.L.</b>	
Proposed Flat Roof Joists =	$(1.00 + 0.75) \times 3.70 / 2$	1.85	1.39	kN/m
Proposed Cavity Wall =	$4.20 \times 1.00$	4.20		kN/m
	Total =	6.05	1.39	kN/m
	Assumed =	<b>6.10</b>	<b>1.40</b>	<b>kN/m</b>
Reaction from 3J Timber Beam @2300mm =		<b>6.90</b>	<b>0.60</b>	<b>kN</b>

See Tedd's computer calculations:

**Adopt 203 x 203 UC46 – GRADE S275.**

Beam reaction =  $(17.30/3.30 + 17.80/3.30)$  kN

**By inspection adopt 300 x 270 x 25.0 mm THICK STEEL SPREADER PLATE ON BOTH SIDES.**

## 2.7. COLUMN C1/C2:

Ultimate reaction for Column C1/C2 = 129.50 kN.

Moment =  $129.50 \times 0.05$  + allow 10% sway moment = 19.50 kNm

See Tedd's computer calculations:

**Adopt 203 x 203 UC46 COLUMN – GRADE S275.**

## 2.8. FOUNDATIONS NEAR TREES:

Tree Type: Black Poplar Tree

Measured height of tree: approximately 13 metres

Distance from tree to foundation: 14.00 metres

See Tedd's computer calculations:

**Required Foundation Depth = 2.50 metres**



**3. TEKLA TEDDS CALCULATIONS**