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Our Ref: GS/25071

STRUCTURAL CALCULATIONS

ON:	52 High Street, Steyning, BN44 3RD
FOR:	Clearbridge Ltd
DATE:	July 2025
PREPARED BY:	G Salama M.Sc.
CHECKED BY:	J Bray B.Eng (Hons.)



It is a requirement of the Client to check their roles and responsibilities in accordance with CDM 2015 and the Building Safety Act 2022.
N.B. PGA is NOT a Principal Designer as defined therein.

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DESIGNER RISK ASSESSMENT

Project Title **52 Highland Street, Steyning, BN44 3RD**	**Project No.** 25071	**Sheet No.** DRA01
	Engineer: GS	Checked by: JB
Client Clearbridge Ltd	Date: Jul' 2025	Date: Jul' 2025

The following specific risks have been identified:

Ref	Risk	Action
1	Heavy Beams	Mechanical aids should be employed when installing beams. Structural Engineer to be consulted if required. Safe access is to be provided for delivery of large beams at all times.
2	Temporary Works	The contractor is to provide all necessary temporary propping & temporary works to safely undertake the work and maintain structural stability. The contractor is to be aware that the property may be occupied during construction and temporary works loading to consider this.
3	Confirmation of Structural Layout	The assumptions made within the calculations and drawing should be confirmed on site, prior to commencement of works. Any differences should be discussed with Structural Engineer, in order to check calculations.
4	Asbestos	Any suspected Asbestos containing materials likely to be disturbed by the works should be tested and removed by specialist contractors in accordance with HSE guidance. Do not start work if it is suspected that asbestos may be present until a demolition/refurbishment survey has been carried out.
5	Services	Appropriate checks are to be completed by contractor prior to commencement of work to ensure no services are in the local vicinity of the works. Excavators are not to be used near suspected buried services. The electricity and other services supply must be turned off before drilling into walls.
6	Demolition	Contractor to take all measures to control noise and dust. Prevent dust by using wet cutting and vacuum extraction on tools; use a vacuum cleaner rather than sweeping; use a suitable, well-fitting mask.

Notes:
1. The works are to be carried out by an experienced competent contractor capable of managing general construction hazards.
2. The following list is limited to specific risks associated with the structural design and is to be read in conjunction with other relevant designer risk assessments.
3. The following list is not necessarily exhaustive and the contractor should carry out their own assessment of potential risks.
4. Comment is made in the Risk Assessment for future demolition and use of the building as a work place only if it is considered to be out of the ordinary.
5. The Client, designers and contractor shall be mindful of their Health and Safety obligations under the CDM (2015) Regulations.

Check list: (Delete if not applicable or considered a general site risk)

Temp. stability / propping	Access	Risks to General Public	Asbestos	Confined spaces	Future maintenance
Hidden / buried services	Material handling	Hot works	Working at height	COSHH	Dismantling / demolition

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JOB TITLE

**52 Highland Street,
Steyning,
BN44 3RD**

STANDARD DATA SHEET 1	Date July 2025	Job No 25071	Data Sheet No 01
LOCATION	UNFACTORED LOADS	FACTOR γf	FACTORED LOADS
SLOPING ROOFS (Measured on Plan)			
Tiles	0.60 kN/m²	1.4	0.84 kN/m²
Battens and Felt	0.10 kN/m²	1.4	0.14 kN/m²
Rafters	0.10 kN/m²	1.4	0.14 kN/m²
Live Load	0.75 kN/m²(max)	1.6	1.20 kN/m²
Total	1.55 kN/m²		2.32 kN/m²
FLAT ROOFS			
Chippings and Felt	0.32 kN/m²	1.4	0.45 kN/m²
Boards, Joists and Firrings	0.32 kN/m²	1.4	0.45 kN/m²
Soffit and Insulation	0.16 kN/m²	1.4	0.22 kN/m²
Live Load	0.75 kN/m²	1.6	1.20 kN/m²
Total	1.55 kN/m²		2.32 kN/m²
ROOF SPACE			
Joists and Insulation	0.10 kN/m²	1.4	0.14 kN/m²
Soffit	0.15 kN/m²	1.4	0.21 kN/m²
Live Load	0.25 kN/m²	1.6	0.40 kN/m²
Total	0.50 kN/m²		0.75 kN/m²
TIMBER FLOORS			
Boards and Joists	0.35 kN/m²	1.4	0.49 kN/m²
Soffit	0.15 kN/m²	1.4	0.21 kN/m²
Live Load (Domestic)	1.50 kN/m²	1.6	2.40 kN/m²
Total	2.00 kN/m²		3.10 kN/m²
TIMBER STUD WALLS			
Internal			
Studding	0.10 kN/m²	1.4	0.14 kN/m²
Plasterboard and set x 2	0.30 kN/m²	1.4	0.42 kN/m²
	0.40 kN/m²		0.56 kN/m²
Internal			
Studding	0.10 kN/m²	1.4	0.14 kN/m²
Lath and plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	0.60 kN/m²		0.84 kN/m²
External			
Studding	0.10 kN/m²	1.4	0.14 kN/m²
Plasterboard	0.15 kN/m²	1.4	0.21 kN/m²
Battens, Felt and Insulation	0.10 kN/m²	1.4	0.14 kN/m²
Tiles	0.60 kN/m²	1.4	0.84 kN/m²
	0.95 kN/m²		1.33 kN/m²

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JOB TITLE

52 Highland Street,
Steyning,
BN44 3RD

STANDARD DATA SHEET 2	Date July 2025	Job No 25071	Data Sheet No 02
LOCATION	UNFACTORED LOADS	FACTOR γf	FACTORED LOADS
MASONRY WALLS			
100 Lightweight (aircrete) Block			
Block	1.00 kN/m²	1.4	1.40 kN/m²
Plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	1.50 kN/m²		2.10 kN/m²
100 Medium Dense Block (3.6N)			
Block	1.50 kN/m²	1.4	2.10 kN/m²
Plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	2.00 kN/m²		2.80 kN/m²
100 Dense Block (>7.3N)			
Block	2.00 kN/m²	1.4	2.80 kN/m²
Plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	2.50 kN/m²		3.50 kN/m²
215 Block Party Wall			
Block	3.20 kN/m²	1.4	4.50 kN/m²
Plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	3.70 kN/m²		5.20 kN/m²
215 Brick Party Wall			
Brick	4.50 kN/m²	1.4	6.30 kN/m²
Plaster x 2	0.50 kN/m²	1.4	0.70 kN/m²
	5.00 kN/m²		7.00 kN/m²
300 Cavity Wall			
Brick	2.25 kN/m²	1.4	3.15 kN/m²
Block	1.50 kN/m²	1.4	2.10 kN/m²
Plaster	0.25 kN/m²	1.4	0.35 kN/m²
	4.00 kN/m²		5.60 kN/m²

CODES OF PRACTICE USED IN DESIGNS

CONCRETE	BS 8110
STEELWORK	BS 5950
MASONRY	BS 5628
TIMBER	BS 5268
LOADING FOR BUILDINGS	BS 6399 OR CP3 CHV PT2

Refer to Data Sheet 3 for standard construction notes.

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JOB TITLE			
52 Highland Street, Steyning, BN44 3RD			
STANDARD DATA SHEET 3	Date July 2025	Job No 25071	Data Sheet No 03

CONSTRUCTION NOTES:

1) All loadings are standard loadings. Confirmation of existing materials and weights to be undertaken by others on site.
2) Calculations prepared in accordance with Architect's drawings.
3) No works should be undertaken on site until Building Regulations Approval has been granted.
4) The builder and owner are reminded that works on or adjacent to a party wall or boundary will be subject to the Party Wall etc. Act 1996 and approval from the adjoining owner must be sought 2 months prior to commencing works. Further information can be provided by this Company if required.
5) All dimensions to be taken on site and not scaled from the drawings or sketches. All details and dimensions relating to subcontractors or suppliers work must be checked and agreed between the subcontractor or supplier and the general contractor.
6) The drawings, details and sketches to be read in conjunction with all relevant Architects' and Engineers' drawings and specifications.
7) Works to comply with current Codes of Practice, British Standards and Building Regulations.
8) Contractor to expose structure to confirm span directions, support locations and details, footings etc. and to verify that all assumptions made by the Engineer are correct prior to ordering any materials or carrying out any works on site.
9) Steelwork to have two coats of red oxide primer generally and to have two further coats of bitumen paint where supported at external walls unless indicated otherwise.
10) All internal steelwork to be clad to comply with minimum fire resistance according to table B4 in Building Regulation Approved Documents B1 or B2.
11) Where timbers are bolted together the bolt holes are to be drilled no more than 2mm diameter larger than bolt diameter. Holes to be at right angles to line of timbers. The bolts are to be tightened until local crushing is apparent around the 51mm square plate washers. If timbers are not touching then timber packers are to be installed full depth of the joists/rafters to make up the gap.
12) Bearing of all new foundations to be 1000mm below external ground or to level of base of foundations to main building, whichever is deeper, unless indicated otherwise on drawings.
    Foundation details may have to be altered if ground conditions prove to be different from those assumed in the calculations, i.e. poorer ground conditions, obstructions or existing structures.
    Footings may be required to go deeper if trees are, or recently have been, in close proximity to the building.
    All foundations to be confirmed on site by the Building Control Officer.
13) All underpinning works to be checked and approved by the Local Authority Building Control Officer and to be carried out in accordance with our specification for underpinning.

The works are to be carried out in accordance with the Construction, Design and Management Regulations 2015. The Client and contractors should ensure they comply with their duties as set out in the regulations. Refer to HSC document Managing Health and Safety in Construction (CDM 2015), Approved Code of Practice for further details.

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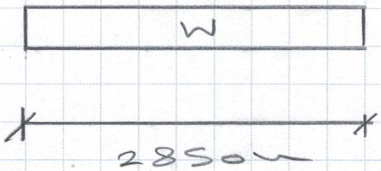
Job Title: 52 High street Steyning

Designed by	Checked by	Date	Job no.	Sheet no.
GS	JB	June 25	25071	4

B1

span 2850



Loading

Floor load

(0.5+1.5) * 2/2 = 0.5 kN 1.5 kN

Wall load

1 x 2.5 = 2.5 kN/m

Roof load

(0.80+0.45) * 10 * 2 = 4 kN 3.15 kN

Roof space

(0.25+0.25) * 10/2 = 1.25 kN 1.25 kN

Total = 8.25 kN 6.5 kN

ULS = 14.75 kN

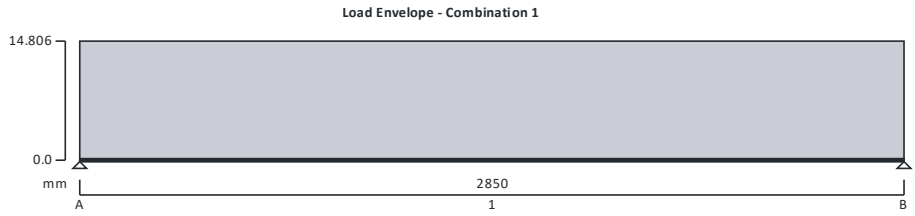
Designed for 200x200 D50 to allow for notches.

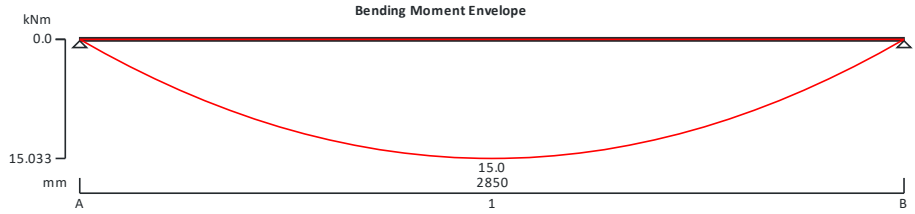
Provide 256x250 D50

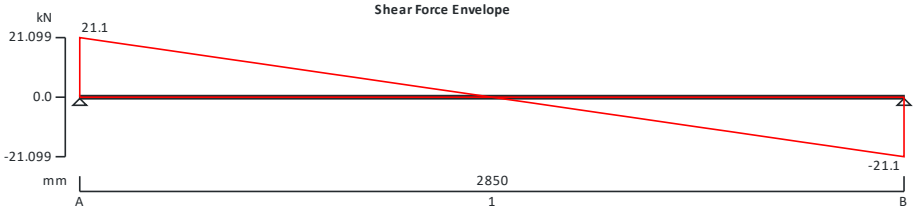
PHILIP GOACHER ASSOCIATES Park House, 122a Newland Road Worthing, West Sussex	Project 52 High Street, Stening			Job no. 25071	
	Calcs for B1			Start page no./Revision 5	
	Calcs by GS	Calcs date 04/07/2025	Checked by JB	Checked date	Approved by	Approved date

TIMBER BEAM ANALYSIS & DESIGN TO BS5268-2:2002

TEDDS calculation version 1.7.03







Applied loading

Beam loads

Dead self weight of beam × 1
Dead full UDL 8.250 kN/m
Imposed full UDL 6.250 kN/m

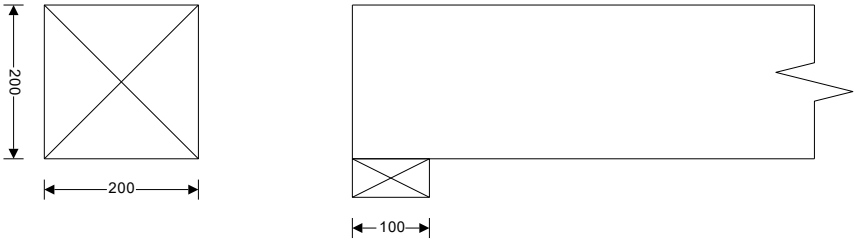
Load combinations

Load combination 1	Support A	Dead × 1.00
		Imposed × 1.00
	Span 1	Dead × 1.00
		Imposed × 1.00
	Support B	Dead × 1.00
		Imposed × 1.00

Analysis results

Maximum moment	M_{max} = **15.033** kNm	M_{min} = **0.000** kNm
Design moment	M = max(abs(M_{max}),abs(M_{min})) = **15.033** kNm	
Maximum shear	F_{max} = **21.099** kN	F_{min} = **-21.099** kN
Design shear	F = max(abs(F_{max}),abs(F_{min})) = **21.099** kN	
Total load on beam	W_{tot} = **42.197** kN	

Reactions at support A	R_{A_max} = **21.099** kN	R_{A_min} = **21.099** kN
Unfactored dead load reaction at support A	R_{A_Dead} = **12.192** kN	
Unfactored imposed load reaction at support A	$R_{A_Imposed}$ = **8.906** kN	
Reactions at support B	R_{B_max} = **21.099** kN	R_{B_min} = **21.099** kN
Unfactored dead load reaction at support B	R_{B_Dead} = **12.192** kN	
Unfactored imposed load reaction at support B	$R_{B_Imposed}$ = **8.906** kN	



200 x 200 = minimum required.
250 x 250 to be specified to allow forming of notches and holes.

Timber section details

Breadth of sections	b = **200** mm
Depth of sections	h = **200** mm
Number of sections in member	N = **1**
Overall breadth of member	b_b = N × b = **200** mm
Timber strength class	**D50**

Member details

Service class of timber	**1**
Load duration	**Long term**
Length of span	L_{s1} = **2850** mm
Length of bearing	L_b = **100** mm

Section properties

Cross sectional area of member	A = N × b × h = **40000** mm^2
Section modulus	Z_x = N × b × h^2 / 6 = **1333333** mm^3
	Z_y = h × (N × b)^2 / 6 = **1333333** mm^3
Second moment of area	I_x = N × b × h^3 / 12 = **133333333** mm^4
	I_y = h × (N × b)^3 / 12 = **133333333** mm^4
Radius of gyration	i_x = √(I_x / A) = **57.7** mm
	i_y = √(I_y / A) = **57.7** mm

Modification factors

Duration of loading - Table 17	K_3 = **1.00**
Bearing stress - Table 18	K_4 = **1.00**
Total depth of member - cl.2.10.6	K_7 = (300 mm / h)$^{0.11}$ = **1.05**
Load sharing - cl.2.9	K_8 = **1.00**

Lateral support - cl.2.10.8

No lateral support	
Permissible depth-to-breadth ratio - Table 19	**2.00**
Actual depth-to-breadth ratio	h / (N × b) = **1.00**

PASS - Lateral support is adequate

Compression perpendicular to grain

Permissible bearing stress (no wane)	σ_{c_adm} = σ_{cp1} × K_3 × K_4 × K_8 = **4.500** N/mm^2

Applied bearing stress

$\sigma_{c_a} = R_{A_max} / (N \times b \times L_b) =$ **1.055** N/mm^2

$\sigma_{c_a} / \sigma_{c_adm} =$ **0.234**

PASS - Applied compressive stress is less than permissible compressive stress at bearing

Bending parallel to grain

Permissible bending stress

$\sigma_{m_adm} = \sigma_m \times K_3 \times K_7 \times K_8 =$ **16.730** N/mm^2

Applied bending stress

$\sigma_{m_a} = M / Z_x =$ **11.275** N/mm^2

$\sigma_{m_a} / \sigma_{m_adm} =$ **0.674**

PASS - Applied bending stress is less than permissible bending stress

Shear parallel to grain

Permissible shear stress

$\tau_{adm} = \tau \times K_3 \times K_8 =$ **2.200** N/mm^2

Applied shear stress

$\tau_a = 3 \times F / (2 \times A) =$ **0.791** N/mm^2

$\tau_a / \tau_{adm} =$ **0.360**

PASS - Applied shear stress is less than permissible shear stress

Deflection

Modulus of elasticity for deflection

$E = E_{min} =$ **12600** N/mm^2

Permissible deflection

$\delta_{adm} = \min(0.551 \text{ in}, 0.003 \times L_{s1}) =$ **8.550** mm

Bending deflection

$\delta_{b_s1} =$ **7.571** mm

Shear deflection

$\delta_{v_s1} =$ **0.573** mm

Total deflection

$\delta_a = \delta_{b_s1} + \delta_{v_s1} =$ **8.144** mm

$\delta_a / \delta_{adm} =$ **0.952**

PASS - Total deflection is less than permissible deflection

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Job Title: 52 High street Steyning

Designed by	Checked by	Date	Job no.	Sheet no.
GS	SG	July 25	25071	8

Mortise & tenon connection

$R = 21\ kN$

D50 $\Rightarrow \tau_g = 2.2\ N/mm^2$

Permissible shear stress

$\tau_{adm} = \tau_g \times k_3 = 2.2 \times 1 = 2.2$

200 x ~~150~~

Max. shear = 21 kN

Max. shear stress $= \dfrac{3 \times 21 \times 10^3}{2 \times 200 \times 150} = 1.05 < 2.2$ OK

Try 150x150

Max shear stress $= \dfrac{3 \times 21 \times 10^3}{2 \times 150 \times 150} = 1.4 < 2.2$ OK

Try 100x100

Max shear stress $= \dfrac{3 \times 21 \times 10^3}{2 \times 150 \times 120} = 1.75 < 2.2$ OK

Min tenon 150 deep x 120 wide