

Calculations

Project:	30 Newton Road	Rev	0
Element:	Underpinning 2210-CALS-04	Sheet:	2XA4
Calculations By:	Kapilan M	Checked By:	Kapilan M
Date:	15/07/2024	Date:	15/07/2024

BASIC LOADS

Timber Floor

Dead Loads

Boards	=	0.10 kN/m ²
50 x 200mm Joists	=	0.12 kN/m ²
Insulations	=	0.06 kN/m ²
Ceiling Boards	=	0.13 kN/m ²
Total	=	0.41 kN/m²

Live Load

Domestic floor live load	=	1.50 kN/m²
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Dormer Flat Roof

Dead Loads

Felting	=	0.40 kN/m ²
Boards	=	0.10 kN/m ²
Firings	=	0.05 kN/m ²
Joists	=	0.08 kN/m ²
Insulation	=	0.06 kN/m ²
Ceiling	=	0.13 kN/m ²
Total	=	0.82 kN/m²

Live Load

Access and maintain	=	0.75 kN/m²
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Dormer Walls

Tiles	=	0.62 kN/m ²
Battens	=	0.06 kN/m ²
Sarking Felt	=	0.02 kN/m ²
Studs	=	0.07 kN/m ²
Insulation	=	0.18 kN/m ²
Plaster Board	=	0.20 kN/m ²
Total	=	1.15 kN/m²

Masonry Walls

100mm Block	=	1.40 kN/m ²
102.5mm Brick	=	2.25 kN/m ²
9" Brick Wall	=	4.40 kN/m ²
Brick-Block Cavity	=	5.00 kN/m ²
Brick-Brick Cavity	=	5.00 kN/m ²

Note: All walls include plaster to both sides.

Internal Stud Walls

Studs	=	0.07 kN/m ²
Plaster Board	=	0.30 kN/m ²
Total	=	0.37 kN/m²

Pitched Roof with insulation

Dead Load

Tiles	=	0.62 kN/m ²
Battens	=	0.06 kN/m ²
Liner	=	0.02 kN/m ²
Rafters	=	0.07 kN/m ²
Insulation	=	0.04 kN/m ²
Plaster Board	=	0.20 kN/m ²
Total on slope	=	1.01 kN/m²

Live Load (on plan)

Access and maintain	=	0.75 kN/m²
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Dead Load on Plan = **1.32** = 1.01/0.77

Roof pitch = 40°

Pitched Roof without insulation

Total on slope = **0.77 kN/m²**

Roof pitch = 40°

Dead Load on Plan = **1.01** = 0.77/0.77

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Load on wall at foundation level

Dead Load

Existing wall below ground	$5 \times 1.1 =$	5.50 kN/m
Existing wall above ground level (including raseded section)	$5 \times 7.5 =$	37.50 kN/m
Proposed first floor	$0.5 \times 3.2 \times 0.5 =$	0.80 kN/m
Pitched roof and ceiling	$(1.01 + 0.41) \times 3.2 \times 0.5 =$	2.27 kN/m
Neighbour's pitched roof	$(1.01 + 0.41) \times 2.1 \times 0.5 =$	1.49 kN/m
Total	$SUM() =$	47.56 kN/m

Live Load

Proposed first floor	$1.5 \times 3.2 \times 0.5 =$	2.40 kN/m
Pitched roof and ceiling	$(0.75 + 0.3) \times 3.2 \times 0.5 =$	1.68 kN/m
Neighbour's pitched roof	$(0.75 + 0.3) \times 2.1 \times 0.5 =$	1.10 kN/m
Total	$SUM() =$	5.18 kN/m

Foundation Width

Total load at foundation level	$47.56 + 5.18 =$	52.75 kN/m
Try 600 wide 400 deep underpinning block bearing pressure	$52.75 / 0.6 =$	87.91 kN/m ²
Self weeight of concrete block	$24 \times 0.4 =$	9.60 kN/m ²
	$=$	97.51 kN/m²

Bearing preassure is under 100 kN/m² and acceptable.