

SKM	Project Flag Cottage			Project no SKMPD/FC											
	Part of Structure Kitchen Alterations			Page 1	of 5										
	Drawing Ref	Prepared SKM	Date 25/04/2023	Rev N/a	Date N/a										
	Subject														
	Calculation Contents <table><tr><th>Item</th><th>Pages</th></tr><tr><td>Loadings</td><td>1</td></tr><tr><td>Existing Timber Beam Reaction</td><td>1</td></tr><tr><td>Beam 4 Bearings</td><td>1</td></tr><tr><td>Beam 5 Design & Bearings</td><td>1</td></tr></table> Threaded bolts weld tension check: 603mm2 * 2no * p_w = 132660N = 132kN > 14.23kN timber reaction load BS5950 Cl. 6.8.5: p_w = 0.5U_e = 0.5*220N/mm² = 110N/mm²				Item	Pages	Loadings	1	Existing Timber Beam Reaction	1	Beam 4 Bearings	1	Beam 5 Design & Bearings	1	
Item	Pages														
Loadings	1														
Existing Timber Beam Reaction	1														
Beam 4 Bearings	1														
Beam 5 Design & Bearings	1														
	To be read in conjunction with SKMP&D drawings Calculations to be approved by LABC														

SKM	Project Flag Cottage			Project no SKMPD/FC	
	Part of Structure		Design Loadings		Page of 1 1
	Drawing Ref	Prepared SKM	Date 25/04/2023	Rev N/a	Date N/a
	Subject Design Loadings				
BS 6399-1	<u>Roof, timber truss, concrete tiles</u> Dead Load Roof slope (α) 42 Degrees Concrete tiles $0.6/\cos(\alpha)$ 0.807 kN/m^2 Felt & battens $(0.015+0.033)/\cos(\alpha)$ 0.065 kN/m^2 Bracing 0.015 0.015 kN/m^2 Trusses 0.12 0.120 kN/m^2 Insulation $t=200, \gamma=0.2\text{kN/m}^3, t*y$ 0.040 kN/m^2 Plasterboard 13mm 2 layers $t=13*2, \gamma=7.95\text{kN/m}^3, t*y$ 0.207 kN/m^2 Plaster skim 0.05 0.050 kN/m^2 g_k Total Dead Load 1.304 kN/m^2 <u>Roof</u> Imposed Loads: BS 6399 - part 3 Maintenance only assuming no changes in geometry greater than 1m for snow drift Live Loads Maintenance only assuming no changes in geometry greater than 1m 0.750 kN/m^2 <u>External Brickwork Wall</u> Dead Load Outer Masonry leaf (100 thk) $0.1 * 22\text{kN/m}^3$ 2.200 kN/m^2 Inner Masonry leaf (100 thk) $0.1 * 22\text{kN/m}^3$ 2.200 kN/m^2 Insulation 0.12 0.050 kN/m^2 Ties $t=200, \gamma=0.2\text{kN/m}^3, t*y$ 0.100 kN/m^2 Plaster skim 0.05 0.050 kN/m^2 g_k Total Dead Load 4.600 kN/m^2 <u>Timber Floor</u> Dead Load Carpet & Underlay 0.05 0.050 kN/m^2 Chipboard 22mm $t=22, \gamma=6.865\text{kN/m}^3, t*y$ 0.151 kN/m^2 Joists 50x195@400mm c/c $b=50, h=195, s=400, \gamma=6.0\text{kN/m}^3$ 0.146 kN/m^2 Insulation quilt $t=100, \gamma=0.2\text{kN/m}^3, t*y$ 0.020 kN/m^2 Plasterboard 13mm $t=13, \gamma=7.95\text{kN/m}^3, t*y$ 0.103 kN/m^2 Plaster skim 0.05 0.05 kN/m^2 g_k Total Dead Load 0.520 kN/m^2 <u>Floor, Live (1st and roof)</u> Live Load Live 1.5 1.500 kN/m^2 Total Live Load 1.500 kN/m^2				Note

SKM	Project Flag Cottage			Project no SKMPD/29TC	
	Part of Structure Existing Timber Beam			Page 1	of 1
	Drawing Ref	Prepared SKM	Date 25/04/2023	Rev N/a	Date N/a
	Subject Existing Timber Beam Bearing Reaction				
	<u>Beam Arrangement</u> Span (clear span+50mm each end) L 3.90 m Horizontal distance to adjacent support a 3.10 m Horizontal distance to adjacent support b 1.30 m Loaded width supported on beam $c=(a+b)/2$ 2.20 m <u>Calculate Live Load Shear</u> BS 6399 Table 1 Live Load Intensity for Residential dwellings d 0.75 kN/m ² Unfactored Working UDL to Beam $e = d \times c$ 1.65 kN/m BS 5950 Table 2 Live Load factor for steel design (γ_f) 1.60 Factored ULS Live Load UDL to Beam W 2.64 kN/m ULS Live Reaction (WL/2) 5.15 kN <u>Calculate Dead Load Shear</u> BS 6399 Table 1 Floor Dead Load Intensity f 0.00 kN/m ² Unfactored Working UDL to Beam $f \times c$ 0.00 kN/m 0.00 kN/m Roof Structure Dead Load Intensity g 1.30 kN/m ² Unfactored Working UDL to Beam $g \times c$ 2.86 kN/m 2.86 kN/m Unfactored Beam Self Weight: 0.25x0.2x10 0.5 kN/m 0.5 kN/m Masonry Wall/Partition (assumed along full span) Density 0 kN/m ³ Height 2.4 m Thickness 0.15 m Masonry Wall/Partition (UDL) 0 kN/m 0 kN/m Unfactored Dead Load UDL to Beam 3.36 kN/m 3.36 kN/m BS 5950 Table 2 Dead Load factor for steel design (γ_f) 1.40 Factored ULS Dead Load UDL to Beam W 4.70 kN/m ULS Dead Reaction (WL/2) 9.17 kN UDL ULS Reaction (applied shear F_v) 14.32 kN Total ULS Shear 14.32 kN				Note

SKM	Project Flag Cottage			Project no	
	Part of Structure Kitchen Alterations			FC	
	Drawing Ref			Prepared	Date
			SKM	25/04/2023	
	Subject Beam 4 Bearings				
BS5628 Table 2 Cl. 19.1.3 Cl.23.3 Cl.30	<u>Bearing Design (retained pier)</u>				Note
	ULS bearing reaction = 14.32 kN				
	Masonry compressive strength: p _o 5 N/mm ²				M4 mortar class
	Characteristic comp. strength of masonry (Table 2a) 2.5 N/mm ²				
	*Enhancement for standard brick width wall (x1.15) 1 (1.0 for non-standard)				
	Partial safety factor for material. gamma _m 3.5 Normal construction				
	Local bearing stress enhancement 1				
	*Bearing Type 1: 1.25 (no edge distance) or 1.5 1				
	Masonry bearing stress taken as 0.71 N/mm ²				0.71 N/mm ²
	* No enhancement for existing/as built masonry (i.e. use value of 1.0)				
Provide 250 mm x 150 mm = 37500 mm ²					
Capacity 37500 mm ² x 0.71 N/mm ² = 26.79 kN					
(Applied Bearing stress = 0.38 N/mm ²)				Bearing ok	
<u>Bearing Design (reaction to Beam 5)</u>					
2.6m span/2 * 23kg/m = 0.3kN					
Proportion of timber beam reaction: (0.2m/2.6m span)x14.32kN = 1.1kN					
Total reaaction load applied to Beam 5 = 0.3 + 1.1 = 1.4kN SLS					
See angle cleat detail					
Notes					
All masonry / blockwork returns to be constructed on suitable foundations.					
Suitability of existing foundations to be approved on site by BCO.					
Calculations to be approved by Local Authority prior to construction.					
Construction to be carried out by competent builder with appropriate temporary works.					

SKM	Project Flag Cottage			Project no FC	
	Part of Structure Kitchen Alterations			Page 1 of 1	
	Drawing Ref	Prepared SKM	Date 25/04/2023	Rev N/a	Date N/a
	Subject Beam 5 Bearing				
BS5628 Table 2 Cl. 19.1.3 Cl.23.3 Cl.30	Bearing Design ULS bearing reaction = 5.00 kN Masonry compressive strength: p_o 5 N/mm ² Characteristic comp. strength of masonry (Table 2a) 2.5 N/mm ² <i>*Enhancement for standard brick width wall (x1.15)</i> 1 (1.0 for non-standard) Partial safety factor for material. γ_m 3.5 Normal construction <i>Local bearing stress enhancement</i> <i>*Bearing Type 1: 1.25 (no edge distance) or 1.5</i> 1 Masonry bearing stress taken as 0.71 N/mm ² <i>* No enhancement for existing/as built masonry (i.e. use value of 1.0)</i> Provide 300 mm x 100 mm = 30000 mm ² Capacity 30000 mm ² x 0.71 N/mm ² = 21.43 kN <i>(Applied Bearing stress = 0.17 N/mm²)</i> Steel Bearing Plate Thickness Design Length 300 mm Width (B) 100 mm Thickness (D) 6 mm Z = BD ² /6 600.00 mm ³ Beam Width 150 mm Cantilever length 75 mm UDL = w = Applied bearing stress x plate width (B) 16.67 N/mm ULS Moment = 1.5*(w*L*L/2) 70312.50 Nmm Stress = M/Z 117.19 N/mm² ok, less than 355N/mm allowable				Note Generous M4 mortar class 0.71 N/mm ² Bearing ok
	Bending Check: 5kN * 2.2m span / 4 = 3kNm < Mb = 45.4kNm for Le=3.0m				
	Notes All masonry / blockwork returns to be constructed on suitable foundations. Suitability of existing foundations to be approved on site by BCO. Calculations to be approved by Local Authority prior to construction. Construction to be carried out by competent builder with appropriate temporary works.				