

Claymore Design & Build Ltd

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44 DOWNSHIRE HILL, NW3 date: 28 DEC 15.

<u>EXISTING LOADS</u>		SEE DRAWING 53025-1.
ON SPINE WALL WORST CASE - PER METRE		
A)	<u>DEAD LOADS:</u>	
-	ROOFS - BOTH SIDES	
-	CEILING 2ND FLOOR	
-	" 1ST FLOOR ENS.	
-	FLOORS BOTH SIDES 2ND, 1ST + GRND.	
-	WALL SELF LOAD.	
<u>GARDEN FLOOR</u>		
WALL	$1 \times 0.25\text{m} \times 2.3\text{m} = 0.575\text{m}^3 \times 20.8\text{kN/m}^3 = 12\text{kN}$	
<u>GROUND FLOOR</u>		
FLOOR	HALLSIDE $= 1 \times 0.82\text{m} = 0.82\text{m}^2 \times 0.5\text{kN/m}^2 = 0.41\text{kN}$	
"	RECEPSIDE $= 1 \times 2.77\text{m} = 2.77\text{m}^2 \times 0.5\text{kN/m}^2 = 1.39\text{kN}$	
WALL	$1 \times 0.25\text{m} \times 3.03\text{m} = 0.76\text{m}^3 \times 20.8\text{kN/m}^3 = 15.8\text{kN}$	
<u>FIRST FLOOR</u>		
FLOOR	HALLSIDE $= 1 \times 0.82\text{m} = 0.82\text{m}^2 \times 0.5\text{kN/m}^2 = 0.41\text{kN}$	
"	BEDSIDE = NO DEAD LOADS - JOISTS FRONT TO BACK	
CEILING	ENSUITE $= 1 \times 0.82 = 0.82\text{m}^2 \times 0.4\text{kN/m}^2 = 0.33\text{kN}$	
WALL	$1 \times 0.25\text{m} \times 2.91\text{m} = 0.73\text{m}^3 \times 20.8\text{kN/m}^3 = 15.18\text{kN}$	
<u>SECOND FLOOR</u>		
FLOOR	BEDSIDE = NO DEAD LOADS - JOISTS FRONT TO BACK	
ROOF	ENS. SIDE $= 1 \times 1 = 1\text{m}^2 \times 1.4\text{kN/m}^2 = 1.4\text{kN}$	
WALL	$1 \times 0.25\text{m} \times 4.37\text{m} = 1.1\text{m}^3 \times 20.8\text{kN/m}^3 = 22.88\text{kN}$	
+ PARAPET.		
CEILING	BED $= 1 \times 2.7\text{m} = 2.7\text{m}^2 \times 0.4\text{kN/m}^2 = 1.08\text{kN}$	
ROOF	BED $= 1 \times 1.55\text{m} = 1.55\text{m}^2 \times 1.4\text{kN/m}^2 = 2.17\text{kN}$	
<u>TOTAL DEADLOAD/m RUN</u>		<u>$= 73.05\text{kN}$</u>

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CONT: EXISTING LOADS ON SPINEWALL		
B)	<u>LIVE LOADS /m RUN</u>	
ROOF:		
ROOF	SNOW = $1 \times 1.5m = 1.5m^2 \times 0.7kNm^2$	= 1.05kN
SECOND FLOOR		
ROOF	SIDE-SNOW = $1 \times 1m = 1m^2 \times 0.7kNm^2$	= 0.7kN
FLOOR	$1.0 \times 2.7 = 2.7m^2 \times 1.5kN$	= 4.05kN
FIRST FLOOR		
FLOOR	HALL/ENS = $1 \times 0.82m = 0.82m^2 \times 1.5kNm^2$	= 1.23kN
"	BED = $1 \times 2.77m = 2.77m^2 \times 1.5kNm^2$	= 4.16kN
GROUND FLOOR		
FLOOR	HALL = $1 \times 0.82m = 0.82m^2 \times 1.5kNm^2$	= 1.23kN
"	RECEP = $1 \times 2.77m = 2.77m^2 \times 1.5kNm^2$	= 4.16kN
TOTAL LIVE LOADS /m RUN		= 16.58kN
B/F DEAD LOADS (INCLUDING FOOTING)		= 73.05kN
		<u>89.63kN</u>
TOTAL LIVE & DEAD LOADS /m RUN ON EXISTING FOOTING 0.5m WIDE		<u>90kN/m</u>
		= 180kN/m ² .
C)	MAXIMUM SOIL BEARING CAPACITY FROM INSPECTION 1995 FOUND TO BE MOIST CLAY, WELL COMPACTED + LITTLE SAND FROM TABLES = 15000kg/m ²	
∴ MAX BEARING CAPACITY OF SOIL UNDER EXISTING FOOTING $0.5m \times 1m = 0.5m^2$ FOR UNIFORMLY DISTRIBUTED LOAD =		
		$0.5m^2 \times 150kN = 75kN/m$
CURRENT LOADING 90kN/m		
∴ EXISTING FOOTING INADEQUATE.		

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D).	ACTUAL EXAMPLE LOADS ON SPIKE WALL SECTIONS.	SEE DRAWING 530 25-2
D1.	THESE ARE APPROXIMATE LOADS FROM SITE OBSERVATIONS OF SPIKE WALL CRACKING INTO SECTIONS + ACTING AS INDEPENDENT COLUMNS.	
D2.	ALSO ASSUMES FOOTING NOT UNIFORMLY DISTRIBUTING LOADS.	
D3.	LOCATION OF DOOR OPENINGS IN SPIKE WALL TAKEN INTO ACCOUNT.	
E).	CONSIDER - COLUMN PANEL A	
	FOOTING BEARING AREA = $1.13m \times 0.5m$	
		$= 0.57m^2$
	LOADING ON PANEL A (WORST CASE).	
	LIVE = $16.58kN \times 1.35m$	$= 22.38kN$
	DEAD LOADS (FROM PREVIOUS)	
	WALL $1m/RUN = 1 \times 0.25 \times 12.6m = 3.15m^3 \times 20.8kN/m^3 = 65.52kN/m$	
	(TOTAL HEIGHT)	
	GROUND FLOOR	
	FLOOR HALL = $0.41kN$	
	" RECP = $1.39kN$	
	FIRST FLOOR	
	FLOOR HALL = $0.41kN$	
	CEILING ENS = $0.33kN$	
	SECOND FLOOR	
	ROOF ENS = $1.4kN$	
	CEILING BED = $1.08kN$	
	ROOF BED = $2.17kN$	
	TOTAL DEAD LOADS = $7.19kN + 65.52kN/m$	
		$72.71kN/m$
	TOTAL DEAD LOADS ON PANEL A	
	FOOTING = $72.71kN \times 1.35m$	
		$= 98.16kN$

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ACTUAL SPINE WALL SECTION LOADS

E-CONT: PANEL A

TOTAL LIVE + DEAD LOADS

$$\text{ON PANEL A} = 22.38 \text{ kN} + 98.16 \text{ kN}$$

$$\text{FOOTING AREA } 0.57 \text{ m}^2$$

$$= 120.54 \text{ kN}$$

$$\therefore \text{LOADING/m}^2 = 120.54 \text{ kN} / 0.57 \text{ m}^2$$

$$= 211 \text{ kN/m}^2$$

GIVEN SAFE BEARING CAPACITY
IS 150 kN/m^2 . THE LOADS
ON THE SUBSOIL UNDER
PANEL A ARE EXCESSIVE

F) CONSIDER COLUMN/PANEL B SEE DRAWING
53025-2

$$\text{FOOTING BEARING AREA} = 1.56 \text{ m} \times 0.5 \text{ m} = 0.78 \text{ m}^2$$

LOADING ON PANEL B (WORST CASE)

$$\text{LIVE} = 16.58 \text{ kN/m} \times 2.05 \text{ m} = 33.99 \text{ kN}$$

DEAD LOADS FOR FLOORS/CEILING/ROOFS
(AS PER PANEL A)

$$= 7.19 \text{ kN/m}$$

$$\text{WALL TOTAL HEIGHT/m RUN (AS PER PANEL A)} = 65.52 \text{ kN/m}$$

$$\text{TOTAL DEAD LOADS} = 72.71 \text{ kN/m}$$

TOTAL DEAD LOADS ON PANEL B FOOTING

$$= 72.71 \text{ kN/m} \times 2.05 \text{ m}$$

$$= 149.06 \text{ kN}$$

TOTAL LIVE + DEAD LOADS ON

$$\text{PANEL B FOOTING} = 149.06 + 33.99 \text{ kN}$$

$$= 183.05 \text{ kN}$$

IGNORING REAR WALL AS WALL HAS
DETACHED FROM SPINE WALL

$$\therefore \text{LOADING/m}^2 = 183.05 / 0.78 \text{ m}^2 = 234 \text{ kN/m}^2$$

AGAIN LOADS ON SUBSOIL UNDER

PANEL B ARE EXCESSIVE.

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AA DOWNSHIRE HILL, NW3NU. date: 28 DEC 15.

G) SPINE WALL REPLACEMENT FOOTING

ASSUME:

SEE DRAWING

G1. NEW FOOTING HAS LINEAR INTEGRITY 53025-2.

∴ LOADS ARE UNIFORMLY DISTRIBUTED.

G2. ASSUME NOMINAL FOOTING DEPTH 1M. TOP SET BELOW ORIGINAL WALL BASE.

G3. ASSUME SAFE BEARING CAPACITY SUBSOIL $15,000 \text{ kN/m}^2$

SPINE WALL LOADS/m RUN

LIVE LOADS = 16.58 kN/m .

DEAD LOADS = 73.84 kN/m .

NEW FOOTING SELF LOAD = 24.0 kN/m

(ASSUME $1\text{m} \times 1\text{m} \times 1\text{m}$)

TOTAL LIVE + DEAD LOADS/m RUN = 114.42 kN/m .

SAFE BEARING CAPACITY = 150 kN/m^2 .

∴ MINIMUM FOOTING WIDTH

$$= 114.42 \text{ kN} / 150 \text{ kN}$$

$$= 770 \text{ mm}$$

∴ MINIMUM FOOTING WIDTH

$$= 800 \text{ mm} \checkmark$$

FOR 80cm WIDE CONCRETE = 19.2 kN/m

TOTAL LOADS = 108.62 kN/m .

∴ FOOTING MINIMUM

$$= 108.62 / 150 = 730 \text{ mm}$$

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H.) FRONT WALL REPLACEMENT FOOTINGS.

ASSUME:

SEE DRAWING

H1. ASSUMPTIONS AS PER SPINE WALL.

53025-3.

H2. REAR WALL SIMILAR - SLIGHTLY THINNER - ASSUME SAME.

FRONT WALL LOADS/m RUN.

DEAD LOADS/m RUN.

GARDEN FLOOR

$$\text{WALL } 1 \times 0.57\text{m} \times 2.39\text{m} = 1.36\text{m}^3 \times 20.8\text{kN/m}^3 = 28.29\text{kN}$$

GROUND FLOOR

$$\text{FLOOR } 1 \times 0.9 = 0.9\text{m}^2 \times 0.5\text{kN/m}^2 = 0.45\text{kN}$$

$$\text{WALL } 1 \times 0.47 \times 2.95\text{m} = 1.39\text{m}^3 \times 20.8\text{kN/m}^3 = 28.9\text{kN}$$

FIRST FLOOR.

$$\text{FLOOR } 1 \times 2.14\text{m} = 2.14\text{m}^2 \times 0.5\text{kN/m}^2 = 1.07\text{kN}$$

$$\text{WALL } 1 \times 0.43\text{m} \times 2.95\text{m} = 1.27\text{m}^3 \times 20.8\text{kN/m}^3 = 26.42\text{kN}$$

SECOND FLOOR.

$$\text{FLOOR } 1 \times 2.15\text{m} = 2.15\text{m}^2 \times 0.5\text{kN/m}^2 = 1.08\text{kN}$$

$$\text{ROOF } 1 \times 2.15\text{m} = 2.15\text{m}^2 \times 1.4\text{kN/m}^2 = 3.0\text{kN}$$

$$\text{WALL } 1 \times 0.37\text{m} \times 2.34\text{m} = 0.87\text{m}^3 \times 20.8\text{kN/m}^3 = 18.1\text{kN}$$

PARAPET

$$\text{WALL } 1 \times 0.28 \times 1.3 = 0.36\text{m}^3 \times 20.8\text{kN/m}^3 = 7.49\text{kN}$$

$$\text{TOTAL DEAD LOADS/m.} = 114.8\text{kN/m}$$

LIVE LOADS/m RUN.

GROUND FLOOR.

$$\text{FLOOR } 0.19\text{m}^2 \times 1.5\text{kN/m}^2 = 1.35\text{kN}$$

FIRST FLOOR

$$\text{FLOOR } 2.14\text{m}^2 \times 1.5\text{kN/m}^2 = 3.21\text{kN}$$

SECOND FLOOR.

$$\text{FLOOR } 2.15\text{m}^2 \times 1.5\text{kN/m}^2 = 3.23\text{kN}$$

ROOF

$$\text{SKYLINE } 2.15\text{m}^2 \times 0.7\text{kN/m}^2 = 1.5\text{kN}$$

$$\text{TOTAL LIVE LOADS/m} = 9.3\text{kN/m}$$

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H) Cont: FRONT WALL REPLACEMENT FOOTINGS.

LOADS/m.

DEAD LOADS = 114.8 kN

LIVE LOADS = 9.3 kN

FOOTING SELF LOAD = 24.0 kN.

WIDTH OF FOOTING 1M.

2. TOTAL LOADS/m RUN. = 148.1 kN.

SAFE BEARING CAPACITY 150 kN/m²

3. MINIMUM FOOTING
WIDTH FRONT + REAR
WALLS OK. = 1000 mm. ✓

NOTES:

1) MATERIALS & LOADINGS.

1.1 R/CONCRETE = 24 kN/m³.

1.2 TIMBER JOIST FLOOR + PLASTER CEILING = 0.5 kN/m²

1.3 Timber & Plaster ceiling = 0.4 kN/m²

1.4 SLATE ROOF 30° SLOPE = 1.4 kN/m².

1.5 SNOW LOADS = 0.7 kN/m².

1.6 MASONRY WALL = 20.8 kN/m³

1.7 DOMESTIC FLOOR LIVE LOAD = 1.5 kN/m².

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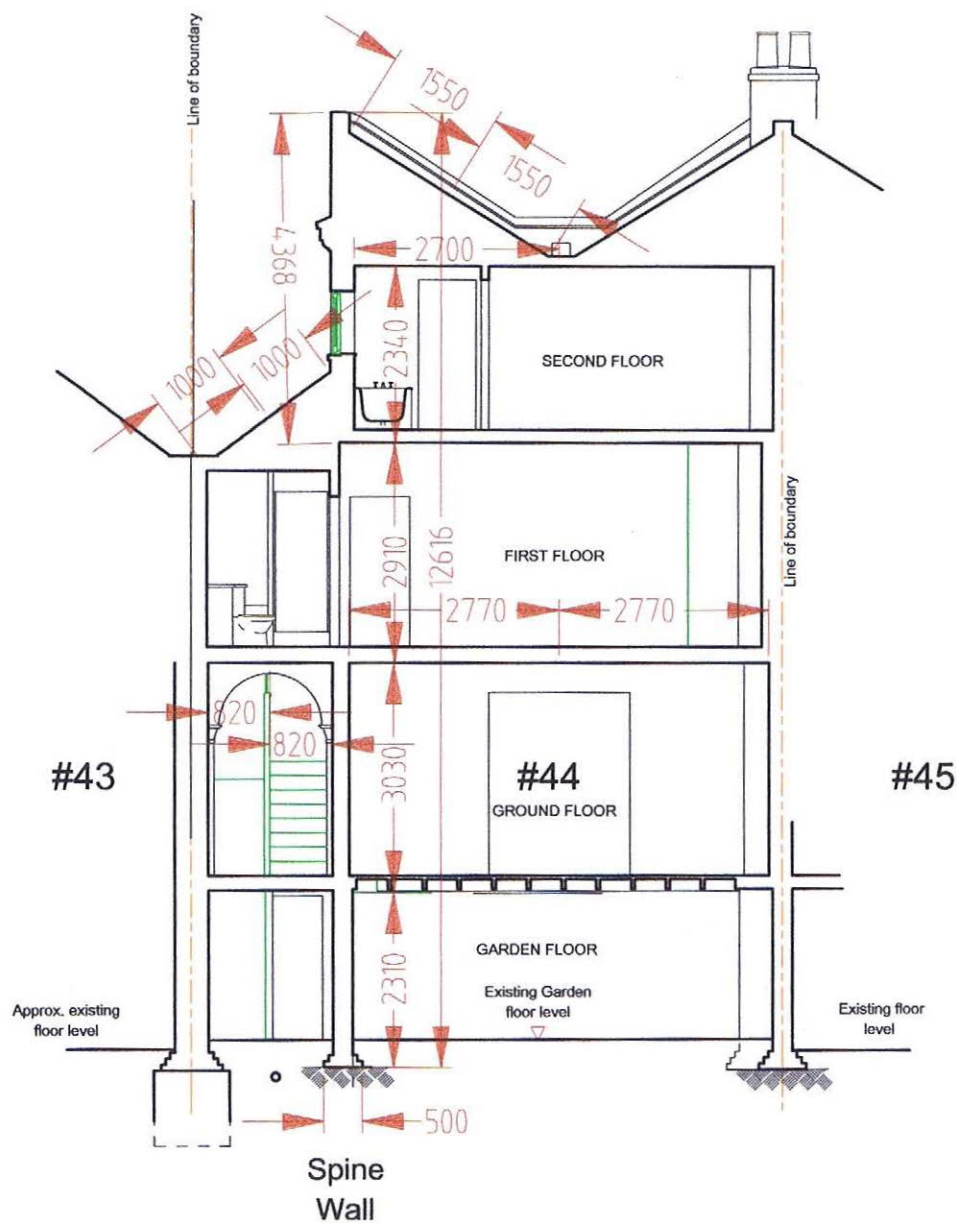
4A DOWNSHIRE HILL, NW3 INU. date: 28 DEC 15.

I)	CENTRE CROSS SPINE WALL REPLACEMENT FOOTINGS.	SEE DRAWING 53025-3
II.	ASSUME CONDITIONS AS PER SPINE WALL	
	<u>DEAD LOADS/m Run</u>	
	GARDEN FLOOR	
WALL	$1 \times 3.05 \text{ m} \times 2.39 \text{ m} = 0.73 \text{ m}^3 \times 20.8 \text{ kN/m}^3 = 15.18 \text{ kN}$	
	GROUND FLOOR	
FLOOR	$1 \times (0.75 \text{ m} + 0.5 \text{ m}) = 1.25 \text{ m}^2 \times 0.5 \text{ kN/m}^2 = 0.62 \text{ kN}$	
WALL	$1 \times 2.95 \text{ m} = 2.95 \text{ m}^2 \times 1 \text{ kN/m}^2 (\text{STUD}) = 2.95 \text{ kN}$	
	FIRST FLOOR	
FLOOR	$1 \times (2.08 \text{ m} + 2.05 \text{ m}) = 4.13 \text{ m}^2 \times 0.5 \text{ kN/m}^2 = 3.48 \text{ kN}$	
WALL	$1 \times 2.95 \text{ m} = 2.95 \text{ m}^2 \times 1 \text{ kN/m}^2 (\text{STUD}) = 2.95 \text{ kN}$	
	SECOND FLOOR	
FLOOR	$1 \times (2.15 + 2.12) = 4.27 \text{ m}^2 \times 0.5 \text{ kN/m}^2 = 2.21 \text{ kN}$	
WALL	$1 \times 2.34 \text{ m} = 2.34 \text{ m}^2 \times 1 \text{ kN/m}^2 = 2.34 \text{ kN}$	
ROOF	$1 \times (2.15 + 2.12) = 4.27 \text{ m}^2 \times 1.4 \text{ kN/m}^2 = 5.98 \text{ kN}$	
	<u>TOTAL DEAD LOADS/m</u>	<u>$= 34.71 \text{ kN}$</u>
	<u>LIVE LOADS m/Run.</u>	
	GROUND FLOOR	
FLOOR	$1.25 \text{ m}^2 \times 1.5 \text{ kN/m}^2 = 1.84 \text{ kN}$	
	FIRST FLOOR	
FLOOR	$4.13 \text{ m}^2 \times 1.5 \text{ kN/m}^2 = 6.2 \text{ kN}$	
	SECOND FLOOR & ROOF	
FLOOR	$4.27 \text{ m}^2 \times 1.5 \text{ kN/m}^2 = 6.4 \text{ kN}$	
SNOW	$4.27 \text{ m}^2 \times 0.7 \text{ kN/m}^2 = 3.0 \text{ kN}$	
	<u>TOTAL LIVE LOADS/m</u>	<u>$= 17.44 \text{ kN}$</u>
	<u>LOADS/m.</u>	
	DEAD LOADS =	34.71 kN
	LIVE LOADS =	17.44 kN
	FOOTING SELF LOAD =	19.2 kN
	FOR 800mm WIDE FOOTING	
	<u>$\therefore$ TOTAL LOADS/m RUN.</u>	<u>$= 71.35 \text{ kN/m}$</u>
	<u>LOADS/m²</u>	<u>$= 71.35 / 0.8 = 90 \text{ kN/m}^2$</u>

SAFE BEARING CAPACITY 150 kN/m^2

$\therefore$ FOOTING OK. = 800mm WIDE.

END.



SECTION C - C - SPINE WALL DIMENSIONS FOR LOADS

44 Downshire Hill, London NW3 1NU
1:100 2 Jan16 53025-1



SECTION A - A - SPINE WALL
FRACTURED WALL PANELS
 44 Downshire Hill, London NW3 1NU
 1:100 2 Jan16 53025-2

