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44 DOWNSHIRE HILL. NW3 date: 22 MARCH 16.

EXISTING LOADS

ON SPINE WALL. WORST CASE. -PER METRE.

SEE DRAWING 53025-1.

A) DEAD LOADS:

- 1 ROOFS - BOTH SIDES
- CEILING 2ND FLOOR
  " 1ST FLOOR ENS.
- FLOORS BOTH SIDES 2ND, 1ST + GRND.
- WALL SELF LOAD.

GARDEN FLOOR

WALL $1 \times 0.25m \times 2.3m = 0.575m^3 \times 20.8 kN/m^3 = 12 kN$

GROUND FLOOR

FLOOR HALLSIDE $= 1 \times 0.82m = 0.82m^2 \times 0.5 kN/m^2 = 0.41 kN$
" RECEPSIDE $= 1 \times 2.77m = 2.77m^2 \times 0.5 kN/m^2 = 1.39 kN$
WALL $1 \times 0.25m \times 3.03m = 0.76m^3 \times 20.8 kN/m^3 = 15.8 kN$

FIRST FLOOR

FLOOR HALLSIDE $= 1 \times 0.82m = 0.82m^2 \times 0.5 kN/m^2 = 0.41 kN$
" BEDSIDE = NO DEAD LOADS - JOISTS FRONT TO BACK
CEILING ENSUITE $= 1 \times 0.82 = 0.82m^2 \times 0.4 kN/m^2 = 0.33 kN$
WALL $1 \times 0.25m \times 2.9m = 0.73m^3 \times 20.8 kN/m^3 = 15.18 kN$

SECOND FLOOR

FLOOR BEDSIDE = NO DEAD LOADS - JOISTS FRONT TO BACK
ROOF ENS. SIDE $= 1 \times 1 = 1m^2 \times 1.4 kN/m^2 = 1.4 kN$
WALL $1 \times 0.25m \times 4.37m = 1.1m^3 \times 20.8 kN/m^3 = 22.88 kN$
+PARAPET.
CEILING BED $= 1 \times 2.7m = 2.7m^2 \times 0.4 kN/m^2 = 1.08 kN$
ROOF BED $= 1 \times 1.55m = 1.55m^2 \times 1.4 kN/m^2 = 2.17 kN$

TOTAL DEADLOAD/m RUN = 73.05 kN.

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CONT: EXISTING LOADS ON SPINE WALL

B) LIVE LOADS / m RUN.

ROOF:

ROOF SNOW = 1·0 x 1·5m = 1·5m² x 0·7kN/m² = 1·05kN

SECOND FLOOR:

ROOF SIDE-SNOW = 1 x 1m = 1m² x 0·7kN/m² = 0·7kN
FLOOR 1 x 2·7 = 2·7m² x 1·5kN/m² = 4·05kN

FIRST FLOOR:

FLOOR HALL/ENS = 1 x 0·82m = 0·82m² x 1·5kN/m² = 1·23kN
" BED = 1 x 2·77m = 2·77m² x 1·5kN/m² = 4·16kN

GROUND FLOOR:

FLOOR HALL = 1 x 0·82m = 0·82m² x 1·5kN/m² = 1·23kN
" RECEP = 1 x 2·77m = 2·77m² x 1·5kN/m² = 4·16kN

TOTAL LIVE LOADS / m RUN = 16·58kN

B/F DEAD LOADS (INCLUDING FOOTING) = 73·05kN

89·63kN

TOTAL LIVE + DEAD LOADS / m RUN ON EXISTING FOOTING 0·5m WIDE ≙ 90kN/m

= 180 kN/m²

C) 1. MAXIMUM SOIL BEARING CAPACITY FROM SAMPLE PITS FEB 16 JUST UNDER EXISTING SHALLOW FOOTINGS AT 300mm DEPTH.

2. FOUND TO BE MOIST PLASTIC SURFACE CLAYS, WELL COMPACTED WITH SMALL % GRIT. FROM CIVIL ENGINEER TABLES = 15000 kg/m² = 150kN/m²

3. ∴ MAXIMUM BEARING CAPACITY OF EXISTING SHALLOW SUB-SURFACE SOILS UNDER EXISTING FOOTING 0·5m x 1m = 0·5m² FOR U.D.L = 0·5 m² x 150kN = 75kN/m

CURRENT LOADING 90kN/m

∴ EXISTING FOOTING INADEQUATE.

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D). ACTUAL EXAMPLE LOADS ON SPINE WALL SECTIONS. SEE DRAWING 5302 5-2

D1. THESE ARE APPROXIMATE LOADS FROM SITE OBSERVATIONS OF SPINE WALL CRACKING INTO SECTIONS + ACTING AS INDEPENDENT COLUMNS.

D2. ALSO ASSUMES FOOTING NOT UNIFORMLY DISTRIBUTING LOADS.

D3. LOCATION OF DOOR OPENINGS IN SPINE WALL TAKEN INTO ACCONT.

E). CONSIDER - COLUMN PANEL A.

FOOTING BEARING AREA = 1.13 m × 0.5 m = 0.57 m².

LOADING ON PANEL A (WORST CASE).

LIVE = 16.58 kN × 1.35 m = 22.38 kN.

DEAD LOADS (FROM PREVIOUS)

WALL 1m RUN = 1 × 0.25 × 12.6 m = 3.15 m³ × 20.8 kN/m³ = 65.52 kN/m
(TOTAL HEIGHT)

GROUND FLOOR
FLOOR HALL = 0.41 kN
" RECEP = 1.39 kN
FIRST FLOOR
FLOOR HALL = 0.41 kN
CEILING ENS = 0.33 kN.
SECOND FLOOR
ROOF ENS = 1.4 kN
CEILING BED = 1.08 kN
ROOF BED = 2.17 kN

TOTAL DEAD LOADS = 7.19 kN + 65.52 kN/m.

72.71 kN/m.

TOTAL DEADLOADS ON PANEL A FOOTING = 72.71 kN × 1.35 m

= 98.16 kN

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ACTUAL SPINE WALL SECTION LOADS

E-CONT: PANEL A.

TOTAL LIVE + DEAD LOADS ON PANEL A = 22.38kN + 98.16kN
FOOTING AREA 0.57m²
= 120.54kN.

∴ LOADING/m² = 120.54kN / 0.57m²

= 211kN/m².

GIVEN THE MAXIMUM BEARING CAPACITY OF THE SHALLOW SUB-SURFACE SOILS ARE 150kN/m² THE EXISTING FOOTINGS ARE INADEQUATE

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

FOOTING BEARING AREA = 1.56m × 0.5m = 0.78m²

LOADING ON PANEL B (WORST CASE)

LIVE = 16.58kN/m × 2.05m = 33.99kN

DEAD LOADS FOR FLOORS/CEILING/ROOFS (AS PER PANEL A) = 7.19kN/m

WALL TOTAL HEIGHT/m RUN (AS PER PANEL A) = 65.52kN/m.

TOTAL DEADLOADS = 72.71kN/m.

TOTAL DEAD LOADS ON PANEL B FOOTING
= 72.71kN/m × 2.05m
= 149.06kN.

TOTAL LIVE + DEADLOADS ON PANEL B FOOTING = 149.06 + 33.99kN
= 183.05kN.

IGNORING REAR WALL AS WALL HAS DETACHED FROM SPINE WALL
∴ LOADING/m² = 183.05 / 0.78m² = 234kN/m².

AGAIN LOADS ON SUBSOIL UNDER PANEL B ARE EXCESSIVE.

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G) SPINE WALL REPLACEMENT FOOTING — SEE DRAWING 53025-2

ASSUME:

G1. NEW FOOTING HAS LINEAR INTEGRITY
∴ LOADS ARE U.D.L.

G2. NEW FOOTING DEPTH 1 METRE BELOW ORIGINAL FOOTING BASE.
∴ NEW FOOTING DEPTH APPROX. 1.3m BELOW F.F.L.

G3. TEST PIT DUG UNDER EXISTING REAR WALL TO 1.3m AT PIN LOCATION 1A FOUND WELL COMPACTED STIFF CLAYS AT DEPTH. FROM CIVIL ENGINEER TABLES, MAX SAFE BEARING CAPACITY MEDIUM CLAY = 25,000 kg/m²
USE ~~SAFE BEARING CAPACITY~~ = 200kN/m²

SPINE WALL LOADS /m RUN
LIVE LOADS DIRECTLY ABOVE = 16.58 kN/m
DEAD LOADS DIRECTLY ABOVE = 73.84 kN/m
ADD 50% TRANSFERRED LIVE + DEAD LOADS AROUND HALL DOOR = 8.29 + 36.42 = 44.71 kN/m
SELF LOAD NEW FOOTING 1 x 1 x 0.9m = 21.0 kN/m

TOTAL LIVE + DEAD LOADS / m RUN (ADJACENT HALL DOOR) = 156.13 kN/m.

USE SAFE BEARING CAPACITY = 200 kN/m²

∴ MINIMUM FOOTING WIDTH REQUIRED
= 156.13 / 200 kN
= 78cm.

∴ MAKE FOOTING WIDTH = 800 mm.

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H) FRONT WALL REPLACEMENT FOOTINGS.

ASSUME: SEE DRAWING 53025-3

H1. ASSUMPTIONS AS PER SPINE WALL.

N2. REAR WALL SIMILAR - SLIGHTLY THINNER - ASSUME SAME.

FRONT WALL LOADS/m RUN.

DEAD LOADS/m RUN

GARDEN FLOOR

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

GROUND FLOOR

FLOOR $1 \times 0.9 = 0.9m^2 \times 0.5kN/m^2$ = 0.45kN.

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

FIRST FLOOR.

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

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

SECOND FLOOR.

FLOOR $1 \times 2.15m = 2.15m^2 \times 0.5kN/m^2$ = 1.08kN.

ROOF $1 \times 2.15m = 2.15m^2 \times 1.4kN/m^2$ = 3.0kN.

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

PARAPET

WALL $1 \times .28 \times 1.3 = 0.36m^3 \times 20.8kN/m^3$ = 7.49kN.

TOTAL DEAD LOADS/m. = 114.8kN/m.

LIVE LOADS/m RUN

GROUND FLOOR.

FLOOR $0.9m^2 \times 1.5kN/m^2 = 1.35kN$

FIRST FLOOR

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

SECOND FLOOR.

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

ROOF

SNOW $2.15m^2 \times 0.7kN/m^2 = 1.5kN$

TOTAL LIVE LOADS/m = 9.3kN/m.

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H) Cont: FRONT WALL REPLACEMENT FOOTINGS.

LOADS/m.

DEAD LOADS	=	114.8 kN
LIVE LOADS	=	9.3 kN
(1m x 1m x 1m) FOOTING SELF LOAD	=	24.0 kN.
WIDTH OF FOOTING 1M.		
∴ TOTAL LOADS/m RUN.	=	148.1 kN.

USE SAFE BEARING CAPACITY 200 kN/m²
∴ MINIMUM FOOTING WIDTH FRONT + REAR = 75cm.
REPLACEMENT FOOTINGS O.K. = 900 > 1000 mm. ✓

NOTES:

1) MATERIALS & LOADINGS.
1.1 R/CONCRETE = 24 kN/m³.
1.2 TIMBER JOIST FLOOR + PLASTER CEILING = 0.5 kNm²
1.3 TIMBER & PLASTER CEILING = 0.4 kNm²
1.4 SLATE ROOF 30° SLOPE = 1.4 kNm².
1.5 SNOW LOADS = 0.7 kNm².
1.6 MASONRY WALL = 20.8 kN/m³
1.7 DOMESTIC FLOOR LIVE LOAD = 1.5 kNm².
1.8 SELF LOAD NEW FOOTING 1 m³/m RUN = 24 kN.

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44 DOWNSHIRE HILL, NW3 1NU. date: 28 DEC 15.

I) CENTRE CROSS SPINE WALL REPLACEMENT FOOTINGS — SEE DRAWING 53025-3

I. ASSUME CONDITIONS AS PER SPINE WALL.

DEAD LOADS/m Run

GARDEN FLOOR
WALL 1 x 0.305m x 2.39m = 0.73m³ x 20.8kN/m³ = 15.18kN

GROUND FLOOR
FLOOR 1 x (0.75m + 0.3m) = 1.225m² x 0.5kN/m² = 0.62kN.
WALL 1 x 2.95m = 2.95m² x 1kN/m² (STUD) = 2.95kN.

FIRST FLOOR.
FLOOR 1 x (2.08m + 2.05m) = 4.13m² x 0.5kN/m² = 3.48kN.
WALL 1 x 2.95m = 2.95m² x 1kN/m² (STUD) = 2.95kN.

SECOND FLOOR
FLOOR 1 x (2.15 + 2.12) = 4.27m² x 0.5kN/m² = 2.21kN
WALL 1 x 2.34m = 2.34m² x 1kN/m² = 2.34kN
ROOF 1 x (2.15 + 2.12) = 4.27m² x 1.4kN/m² = 5.98kN.

TOTAL DEAD LOADS/m = 34.71kN

LIVE LOADS m/Run.

GROUND FLOOR
FLOOR 1.225m² x 1.5kN/m² = 1.84kN

FIRST FLOOR
FLOOR 4.13m² x 1.5kN/m² = 6.2kN

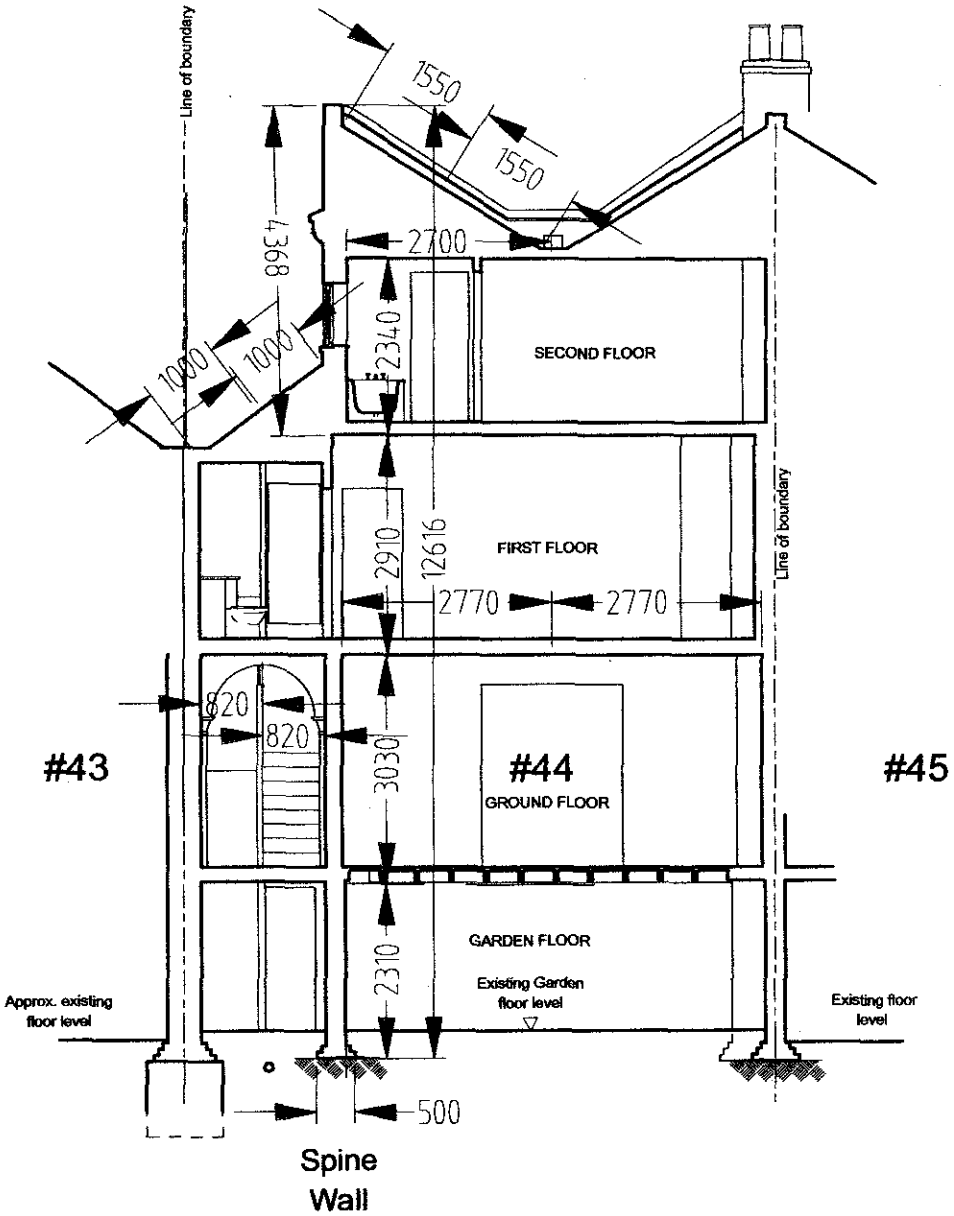
SECOND FLOOR & ROOF
FLOOR 4.27m² x 1.5kN/m² = 6.4kN
SNOW 4.27m² x 0.7kN/m² = 3.0kN.

TOTAL LIVE LOADS/m = 17.44kN.

TOTAL LOADS :=
DIRECT DEAD LOADS = 34.71kN
TRANSFERRED DEAD LOADS OVER ADJ ARCH = 34.71kN
DIRECT LIVE LOADS = 17.44kN
TRANSFERRED LIVE LOADS FROM ADJ ARCH = 17.44kN
SELF LOAD NEW FOOTING = 19.2kN
FOR 800mm WIDE ∴ TOTAL LOADS/m RUN = 123.5kN
FOOTING LOADS/m² = 71.35/0.8 = 154.4kN/m²

USE SAFE BEARING CAPACITY 200kN/m²
∴ FOOTING OK. = 800mm WIDE.

END.



SECTION C - C - SPINE WALL DIMENSIONS FOR LOADS

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1:100 2 Jan16 53025-1

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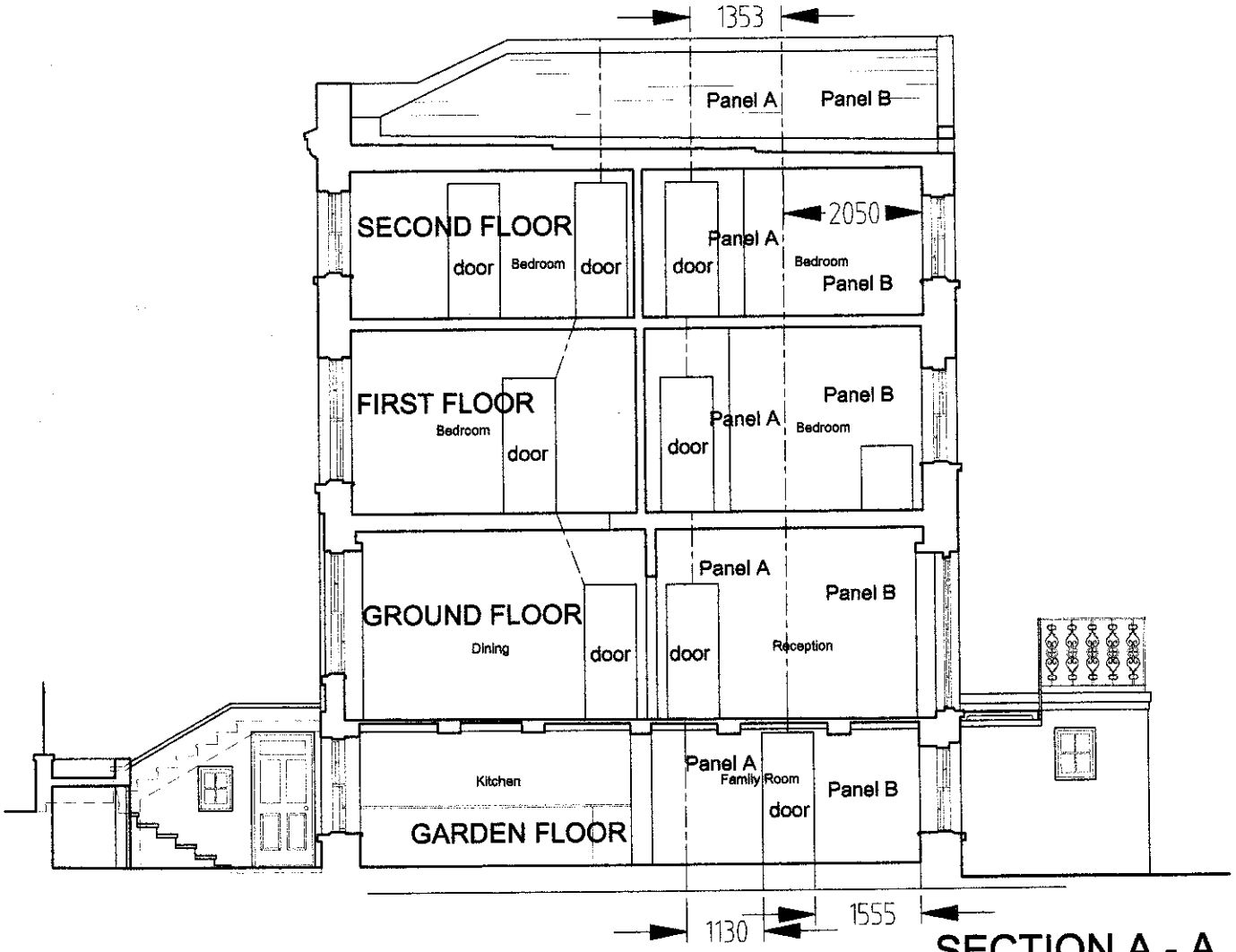

SECTION A - A - SPINE WALL

FRACTURED WALL PANELS

44 Downshire Hill, London NW3 1NU

1:100 2 Jan16 53025-2

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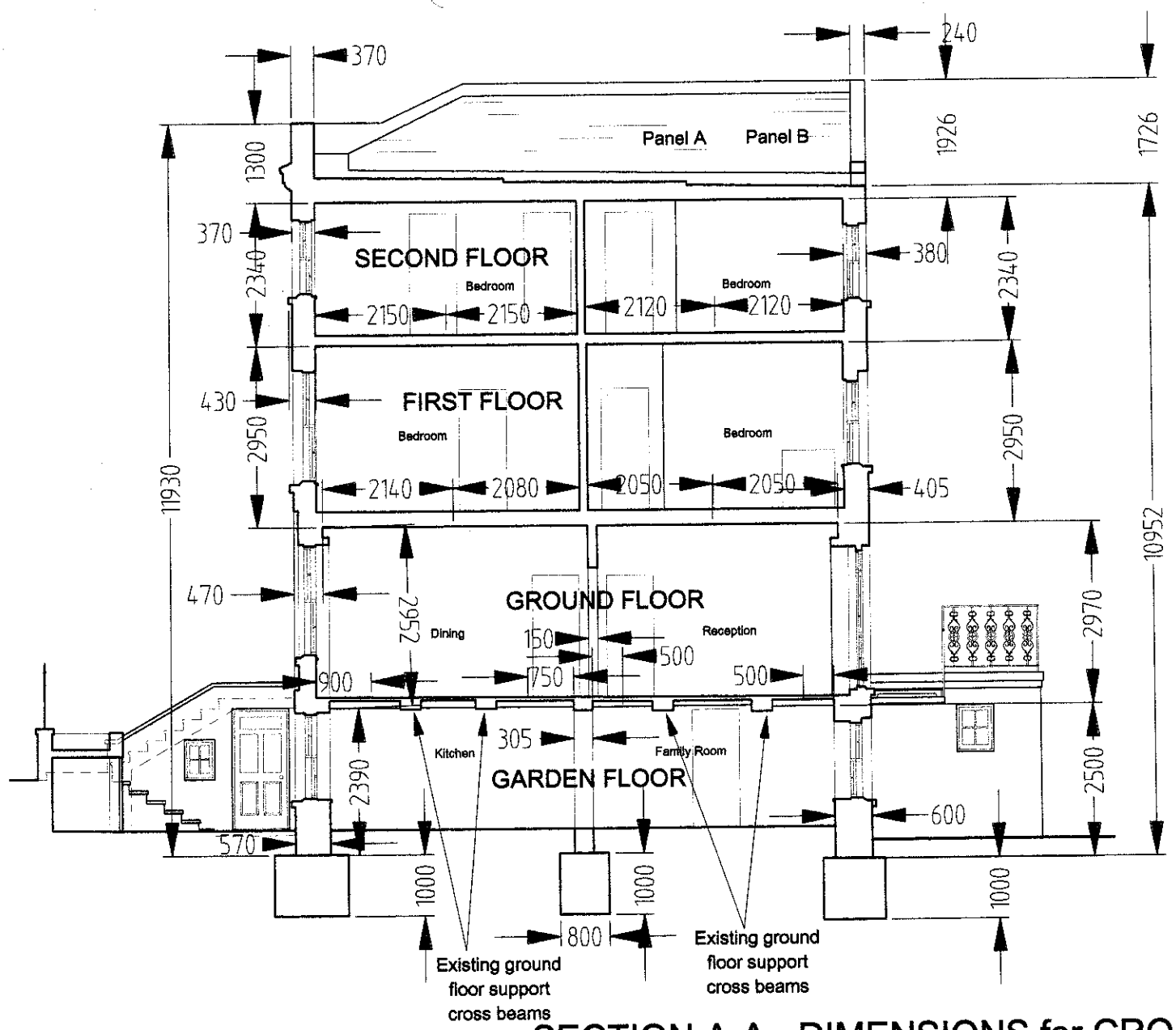

SECTION A-A - DIMENSIONS for CROSS WALL LOADS

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