Noventum

PROGRESS BY DESIGN

RAPIDWALL

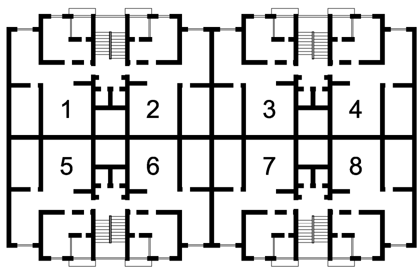
RAPIDWALL® BUILDING SYSTEM

STRUCTURAL CALCULATIONS FOR A MULTI-STOREY APARTMENT BUILDING

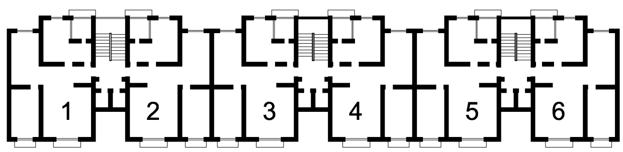
Summary

- “SK1” (attached) highlights the required panel arrangement to achieve 4 suspended living floors and a concrete roof slab.
- This is based upon core filled Rapidwall panel, with 25Mpa fill type, and the apartment basic layout as per Accu Vision drawings L1-2 and L1-4, i.e. 3 double apartment modules side-by -side.
- Note on “SK1” that double panels have been incorporated in selected places
- This system allows for 5 living floors, therefore 30 apartments.
- The system incorporates Rapidwall panels alone, with no other shear resisting elements.
- The opportunity may exist to increase the number of suspended floors to 6, for example, by introducing alternative shear resisting elements such as reinforced block walls or reinforced concrete walls. In this structure, the Rapidwall panels could be used as load bearing wall to support the structure’s axial (vertical) loads in this instance.
- Changing the apartment layout may have some benefits. Preliminary investigations suggest that 32 apartments (3 suspended living floors + concrete roof + apartments at ground floor) may be possible from an 8-unit plan, using Rapidwall alone.

key options

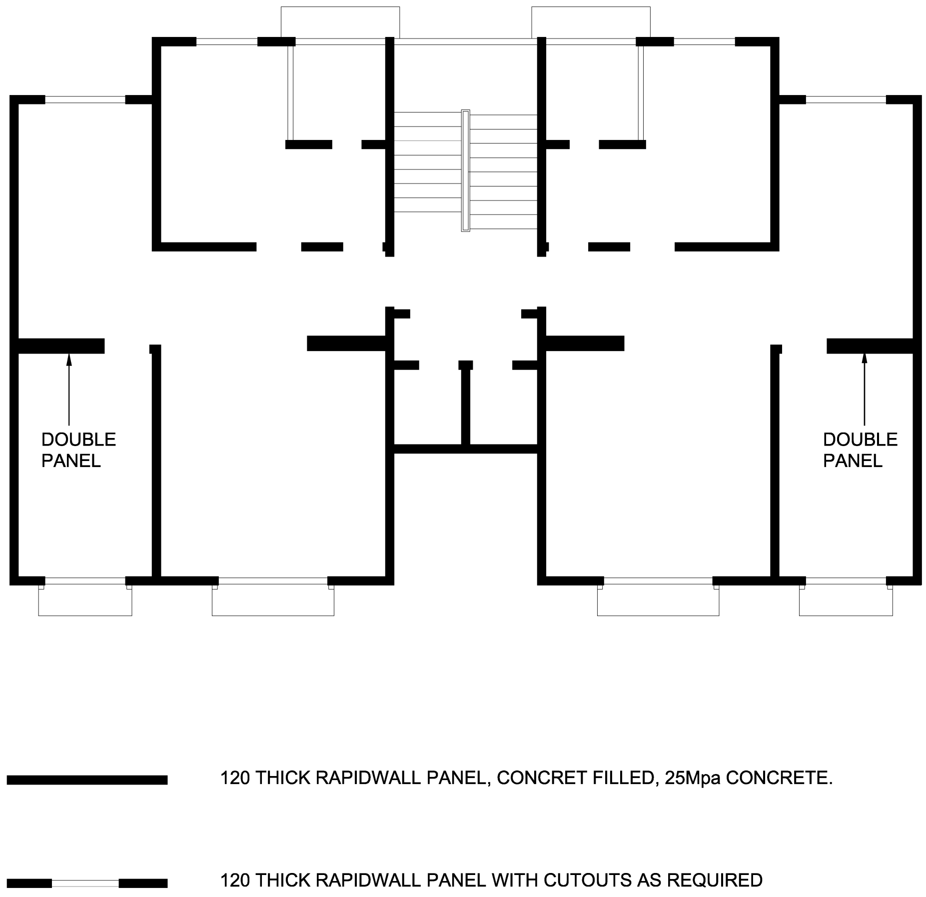


potentially 32 apartments from Rapidwall alone
(12 m high structure)



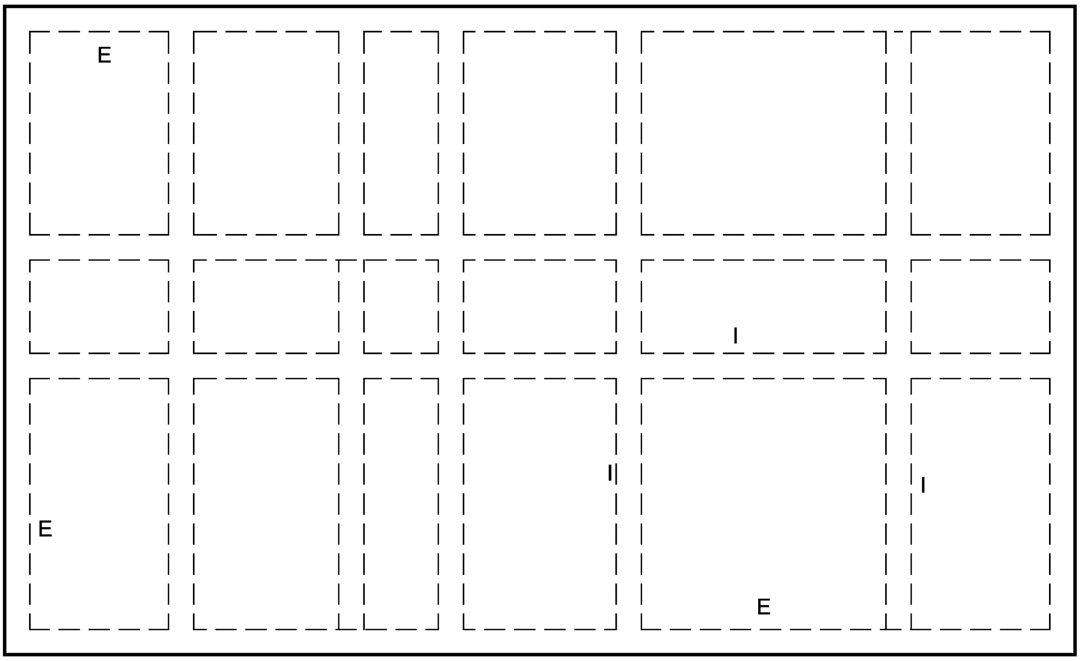
30 apartments from Rapidwall alone
(15 m high structure)

TYPICAL 2-UNIT MODULE
RAPIDWALL LAYOUT



SKETCH 1

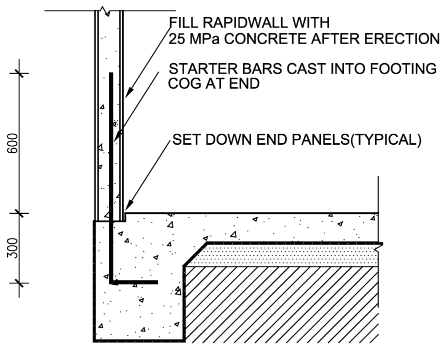
TYPICAL FOOTING:

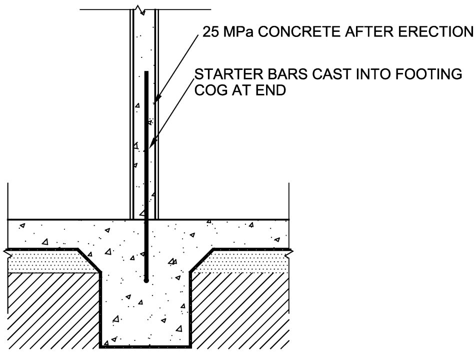


SLAB: 150mm THICK 100kg/m^3 REINFORCEMENT

BEAM (E,I): 400W × 650D (TYPICAL) 200kg/m^3 REINFORCEMENT

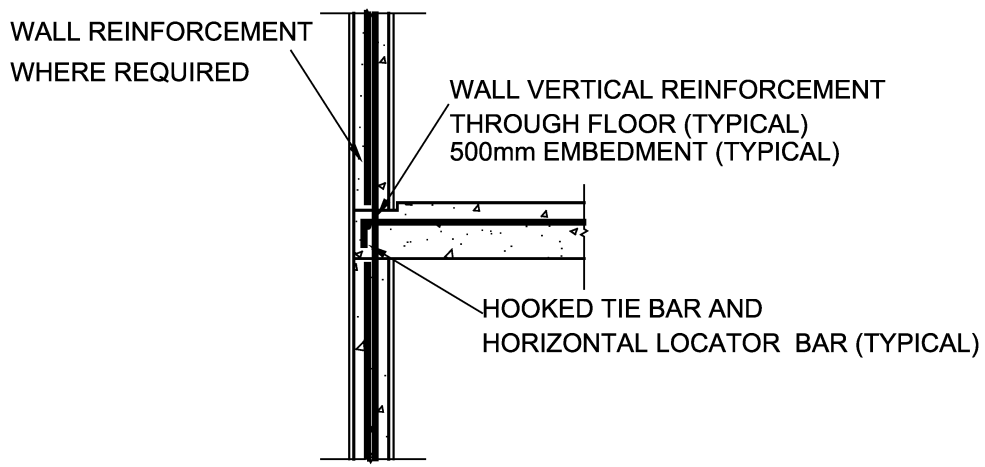
TYPICAL PANEL TO FOOTING CONNECTION DETAILS

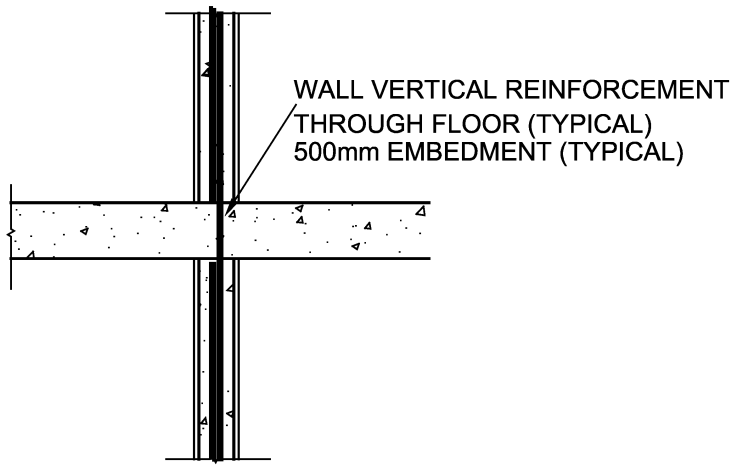




ALL PERIMETER PANELS TO HAVE FULL HEIGHT TENSION REINFORCEMENT
ALLOW 1/N16 BAR TO EVERY SECOND CORE (TYPICAL)

TYPICAL WALL TO SLAB CONNECTION DETAILS



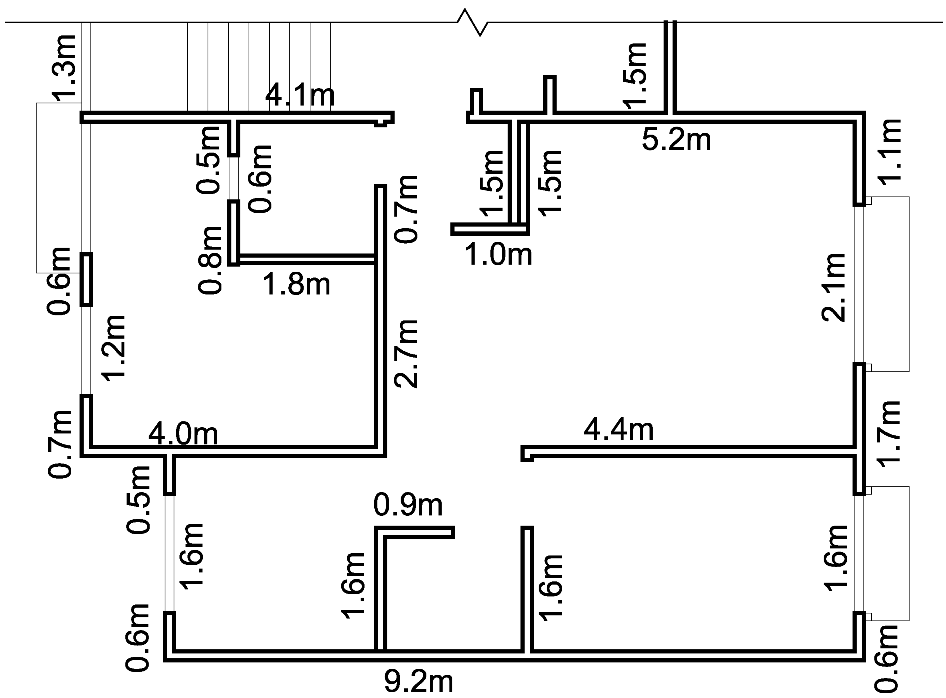


SUPPORTING CALCULATIONS

Building description

- Floor area: two apartment module: 168 $m^2 \times 3$ /per floor = 504 m^2 / floor.
- Length of wall: *-without cutouts: 94.5m / module*
  -with cutouts: 16.8m / module $\times$ 0.5 = 8.4 m (account for cutouts)
- Total wall length: *$[(94.5+8.4) \times 3] - 2 \times 9.2m = 290.3m$ / floor*
- Wall height: *3 metres floor to floor*
- Slabs: *maximum span is 4300 millimetres, the slab thickness is assumed as 150mm with 120 kg/m^3 of reinforcement*
- Self weight: *$2400 \times 0.15m = 3600$ kg / m^2 = 3.6kPa*
- Other dead load : *1 kPa*
- Total dead load: 4.6 *kPa*
- Live load: *Assumed 2kPa*
- From Standard 2800 *(table-1, cl.2-2), private apartments, 20% contributing*

Roof assumed as concrete with full dead load and live load as per a typical apartment floor.



WALL LENGTHS IN TYPICAL UNIT

Loading calculation:

- Total length of wall with no cutouts (⇑ wall direction) in each floor:

  $18.2 \times 2 \times 3 = 109.2m$

- Total length of wall with cutouts (⇔ wall direction) in each floor:

  $29.7 \times 2 \times 3 - 2 \times 9.2 = 159.8m$,

- Rapidwall® thickness: *120mm*

- For multi-storey building construction the cores will be in filled with 25MPa structural grade concrete.

- Therefore, the self-weight is:

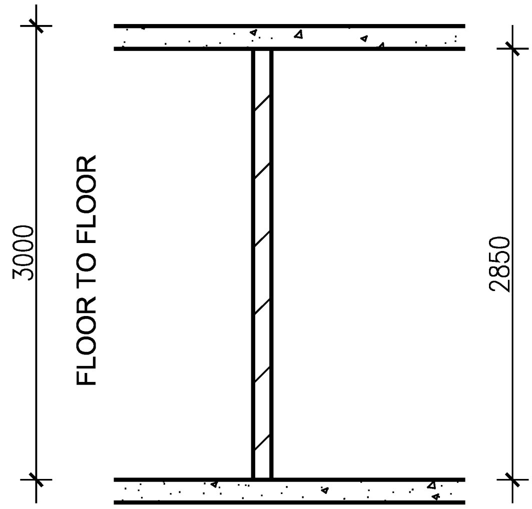
  $24kN/m^3 \times 0.12m$ *(wall thickness)* $\times 2.85m$*(wall height)* $= 8.2kN/m$.

- For 290.3m of Rapidwall® per floor

  Total wall mass contributing to each floor is 2383kN.

  <u>To be included in earthquake mass analyses with slab loads.</u>

- Typical floor to floor height.



Earthquake design:

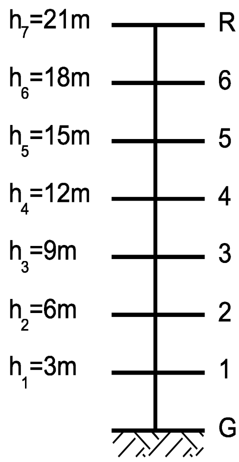
- Building importance: *Group 2 (cl.1-5)*
- Regular in elevation with each storey identical: *no weak storey (cl. 11-6.2)*
- Load bearing wall system: *(cl. 1-7)*
- The base shear force: *V = CW (EQ. - 2-1)*

  C = ABI / R, (EQ. 2-2)

  B/R is min 0.09.
- Base acceleration, A: (for BAM): *High relative hazard, A = 0.30*
- Building response, B: *(cl .4.3)*

  $B = 2.5(T_o / T)^{2/3} \leq 2.5$ *(EQ. 2-3)*

- Where for load bearing walls: $T = 0.05\ H^{3/4}$ (EQ. 2-6)
  $H = 21m$,
  $T = 0.490s$



- For soil type III: *Medium stiffness clays and medium compacted sand & gravel*

  $T_o = 0.70$

- For soil type IV: *Soft and wet deposits*
  $V_s < 175m/s$

  $T_o = 1.00$.

- Importance factor I: *1.0 for group 2, (cl. 2.4.6)*

- Behavior factor R: *5 (for vertical load bearing structural panels, or reinforced concrete) (cl. 2.4.7)*

- For either soil type, 'B'is limited to 2.5 (ref, EQ2-3)

  $B/R = 2.5/\ 5$
  $= 0.5\ > 0.09$, *OK.*

  Therefore, $C = 0.30 \times (2.5) \times (1.0)\ /\ 5$
  $= 0.15$

- The structural weight is: $W = \sum G + 0.2Q$, *for each slab,*

  $W = 7[(504)\times(4.6kPa)+(504)\times(0.2)\times 2]$
  $= 17640kN$,

- Wall self-weight: 2383×7 *(floors)*
  $= 16{,}680\ kN$

- Total structural weight: $=34{,}320\ kN$

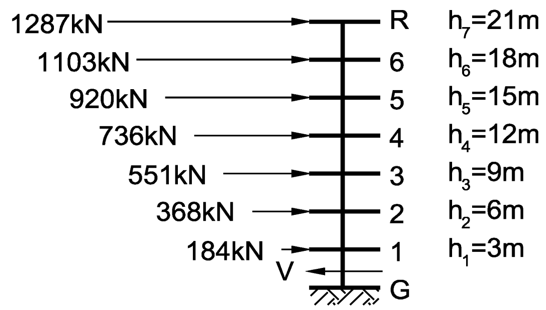
- Therefore base shear V: $= CW$

$= 0.15 \times 34320$
$= 5148kN.$

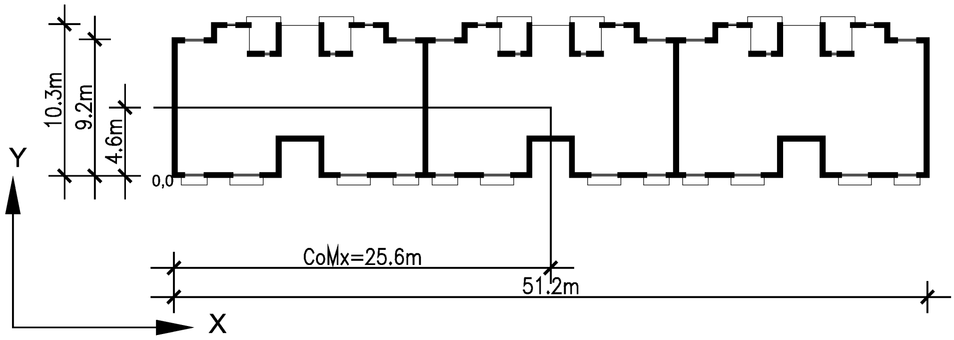
Vertical distribution of base shear force:, (cl. 2.4.9)

$F_i = (V-F_t)\, W_i\, h_i / \sum W_i h_i$ (*EQ. 2.7*)

Where V	*= base shear force*
Ft	*= additional lateral force*
	= 0.07TV (EQ. 2.8)
But as T	$= 0.49s < 0.7s$
F_t	$= 0$
For each floor,	
W_i	$= 17640 / 7$
	=2520kN (slabs) + 2383kN (walls)
	= 4900 kN
$\sum W_i h_i$	$= 4900 \times (3+6+9+12+15+18+21)$
	= 411600 kNm
Therefore F_1	$= 5148 \times (4900 \times 3)/411600$
	= 183.9 kN
F_2	$= 5148 \times (4900 \times 6)/411600$
	= 367.7 kN
F_3	$= 5148 \times (4900 \times 9)/411600 = 551kN$
F_4	$= 5148 \times (4900 \times 12)/411600$
	= 736kN
F_5	$= 5148 \times (4900 \times 15)/411600$
	= 920kN
F_6	$= 5148 \times (4900 \times 18)/411600$
	= 1103kN
F_7	$= 5148 \times (4900 \times 21)/411600$
	= 1287kN



Center of mass:



- Structure is symmetric about Y-axis,
- Center distance of mass in X- direction = ½ L_x = 25.6m,
- In Y direction the mass of the slab marginally biased to the top, but walls marginally biased closer to the origin.
- Net effect is that center of mass may be considered to act at

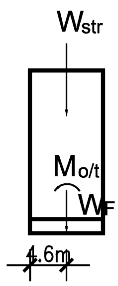
$$\tfrac{1}{2} Ly = \tfrac{1}{2} \times 9.2 = 4.6m.$$

- Center of mass is at (25.6m, 4.6m), floors are identical, so applicable to whole structure.

- Structural stability:

Consider overturning about weak axis.

Structural weight, $W_{str} = 34320kN$



Footing weight: $= [5kPa\ (self\text{-}weight) + 0.2(2kPa\ live\ load)] \times 504m^2\ (floor\ area)$

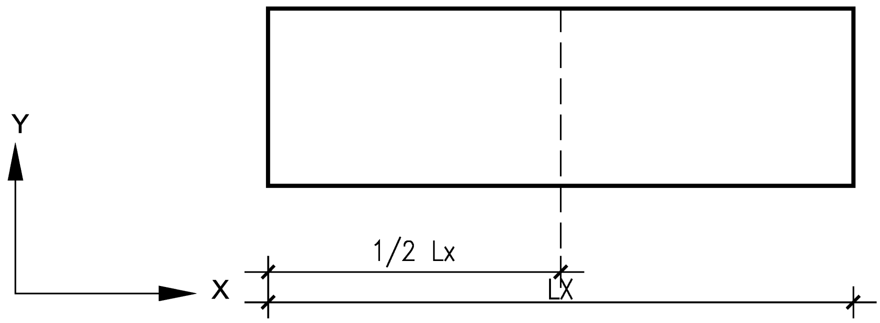
$= 2720kN$

Restoring moment $M_r = (34320+2720) \times (4.6m)$
$= 170384kNm$

From vertical shear distribution
$M_{o/t} = 1287 \times 21 + 1103 \times 18 + 920 \times 15 + 736 \times 12 + 551 \times 9 + 368 \times 6 + 184 \times 3$
$= 77232kNm$

$M_r / M_{o/t} = 2.21 > 1.75$ *OK. (cl 2.4.12)*

Center of shear:

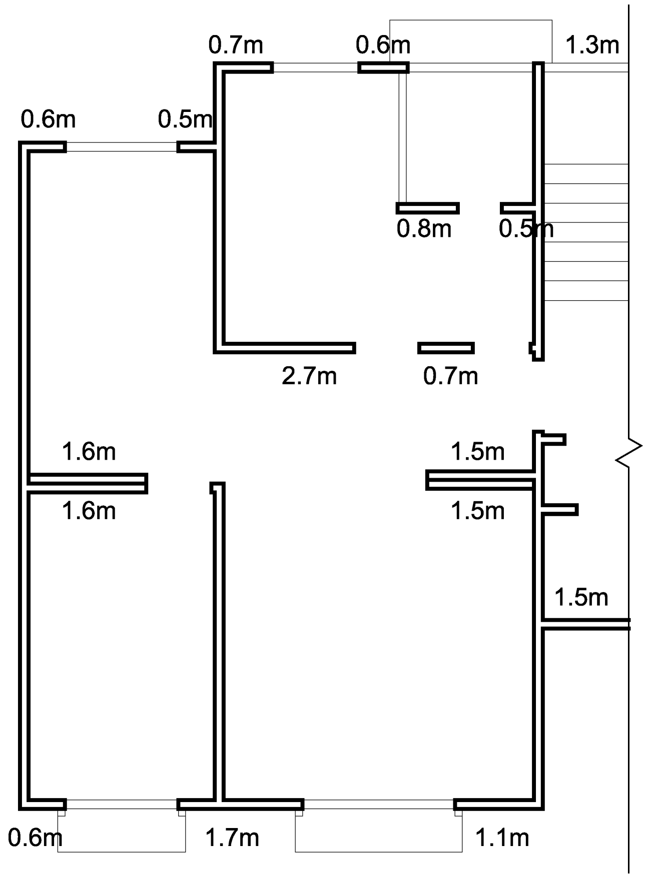


As per center of mass calculations, the center of shear in X-direction is half the structural length in this direction, as the structure is symmetric.

Therefore $C_oS_x = 25.6m$

IN-Y DIRECTION

FROM ORIGIN	SUM OF LENGTH
10.2m	1.3m
9.1m	1.1m
8.3m	1.3m
6.3m	5.0m
4.3m	4.6m
2.5m	1.5m
0.06m	3.4m
	TOTAL 18.2m



Each wall has the same height, thickness and fill. Therefore each wall will have the same relative stiffness on a per meter basis.

Shear center can therefore be found from:

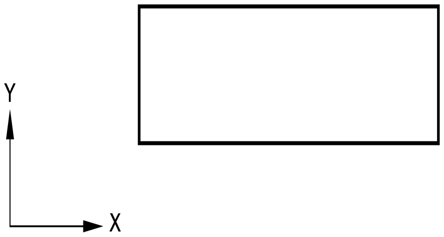
C_oS_y $= \sum K_iY_i / \sum K_i$
$= [1.3(10.2) + 1.1(9.1) + 1.3(8.3) + 5(6.3) + 4.6(4.3) + 1.5(2.5) + 3.4(0.06)] / 18.2$
$= 4.9m$

Center of shear is at (25.6m, 4.9m).

Torsional moment: (cl. 2.4.11)

Mi $= \sum_{j=i}(e_{ij} + e_{aj})\, F_j$ (EQ. 2.9)

- For earthquake from the Y-direction, the static eccentricity, $e_{ij} = 0$,
- For earthquake from X-direction, the static eccentricity = 0.3m



Accidental eccentricity e_a $= 0.05D$
$= 0.05 \times (10.3)$
$= 0.5m$

Therefore at its base, moment for earthquake from X-direction

M $= (0.3+0.5) \times 5148$ *(shear force)*
$= 4118 kNm$

For 'static' base shear force alone, ignoring torsion, force in wall panels per meter is

X-direction; 5148/109.2=47.1kN/m
Y-direction: 5148/159.8=32.2kN/m.

Rapidwall has published base shear capacity of 28.5kN/m.

Therefore the number of floors must be reduced.

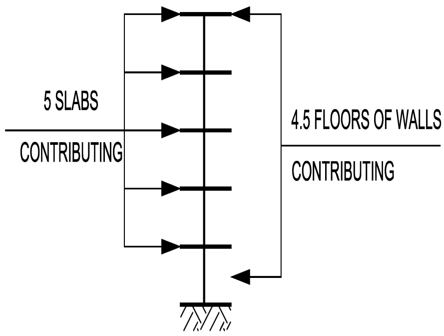
(For 6 living storeys + concrete roof, ultimate shear force is greater than possible by rapidwall alone).

Determine max number of storeys possible without introducing other shear resisting elements.

- Consider 4 living floors

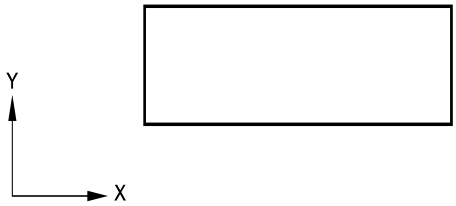
Structure period: $T = 0.05H^{3/4}$
Where, $H = 15m$,
Therefore, $T = 0.38s$

Therefore, *'B' still limited to 2.5,*
'C' unchanged as 0.15



Now W $= 5 \times 2520$ *kN(shear)*$+4.5 \times 2383$*kN(walls)*
$= 23{,}324$*kN*

V $= 0.15 \times (23324)$
$= 3{,}499$*kN*



Center of mass and shear center same as previously.

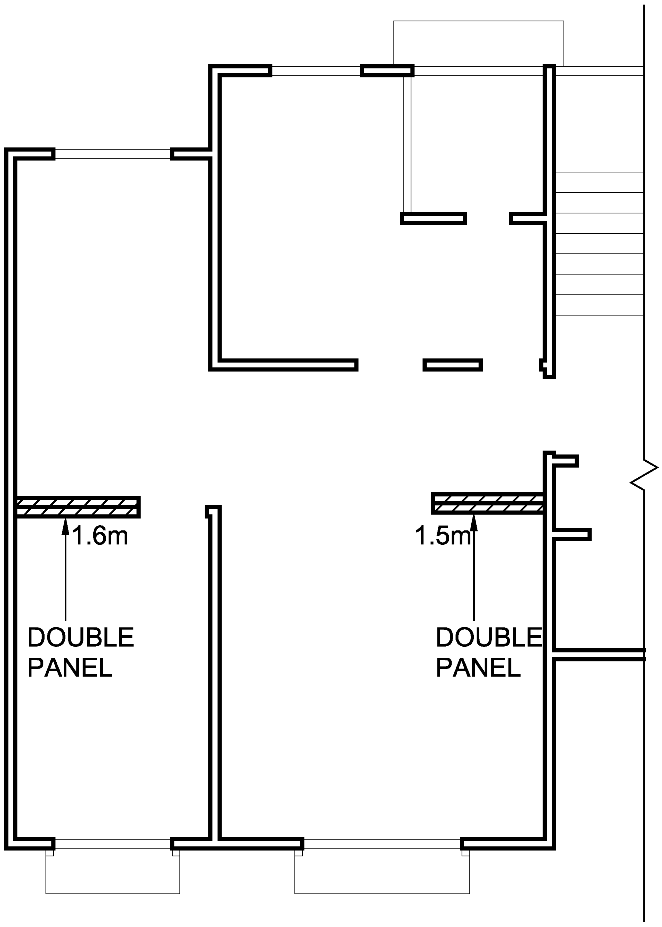
As currently noted, length of resisting wall for

X-direction $= 109.2$*m,*
Y-direction $= 159.8$*m,*

Therefore $3499/159.8$
$= 21.9$*kN/m* < 28.5*kN/m (the published ultimate shear capacity of Rapidwall)- OK.*

$3499/109.2$
$= 32.0$*kN/m* > 28.5*kN/m,* **(X–direction, exceeds the published ultimate shear capacity of Rapidwall**).

<u>In this example it will therefore be necessary to increase the length of structural walling in the X- direction.</u>



For this case double panels have been proposed in the positions shown above (side by side). Inclusion of these extra walls would increase the wall length, reduce the shear stress and reduce the static eccentricity.

- *Additional wall* *(1.5+1.6)*
  =3.1m. per apartment

- *Now* 3.1×6
  = 18.6m per floor.

- *Therefore, the shear load in X- direction is*

  3499/(109.2+18.6)
  = 27.4kN/m < 28.5kN/m. OK.

- *The shear center in Y- direction:*

  C_oS_y *= [1.3(10.2)+1.1(9.1)+1.3(8.3)*
  +5(6.3)+7.7(4.3)+1.5(2.5)+3.4(0.06)]/21.3
  =4.8m

- *Static eccentricity in this direction is*

  4.8-4.6

  =0.2m

Torsional Moment Effects:

Each direction is considered separately, the static base shear-force taken by walls in the direction (as previously shown), while the torsional effects are taken by the walls in the orthogonal direction.

For earthquake force in the X-direction, at base level,

- *Eccentricity* $= 0.2m(static) + 0.05\times(10.2)(accidental)$

  $= 0.7m$

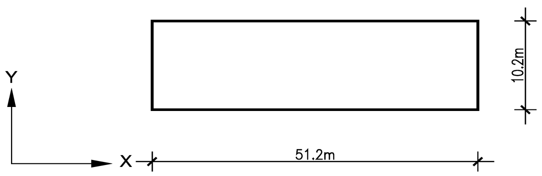
M $= 0.7\times3499$

$= 2499kNm$ *(to be resisted by Y-direction wall)*

For earthquake force in Y – direction, as base level,

- *Eccentricity* $=0m + 0.05\times(51.2)$

  $=2.56m$



M $= 2.56\times(3499)$

$=8957kNm$ *(X-direction walls can take this)*

Thus, for the X-direction earthquake force, the static base-shear is resisted by the X-direction (parallel walls) and the torsion component resisted by Y-direction (orthogonal walls).

For the Y-direction earthquake force, static base-shear and torsion effects are resisted by Y-direction parallel walls. Slab elements remain plane.

(Refer supporting spreadsheets analysis of distribution of torsion)

For four suspended slab floors, shear resistance of structure is OK.

Load Distribution to Building Frame

Short Direction – walls take static shears and torsion induced shear

Location: ground to first   Center of Stiffiness: 25.6m   Load: 3499kN   Design Eccentricity: 2.56m

position, X (m)	relative stiffness	shear force (static) (kN)	relative displacement A	relative force (for same displacement) B	ration A to B	moment about top	force due to torsion (kN)	total force (kN)	total force (kN/m)
0.06	9.2	201.44	1.00	1.00	1.00	0.06	-53.6	201.4	21.9
2.7	8.4	183.93	0.90	1.10	0.82	2.21	-43.9	183.9	21.9
5.5	2.8	61.31	0.79	3.29	0.24	1.32	-12.8	61.3	21.9
7.1	9.3	203.63	0.72	0.99	0.73	5.20	-39.3	203.6	21.9
10	9.3	203.63	0.61	0.99	0.62	6.18	-33.1	203.6	21.9
11.6	2.8	61.31	0.55	3.29	0.17	1.94	-8.9	61.3	21.9
14.4	8.4	183.93	0.44	1.10	0.40	5.78	-21.5	183.9	21.9
17.05	9.2	201.44	0.34	1.00	0.34	5.73	18.0	201.4	21.9
19.8	8.4	183.93	0.23	1.10	0.21	4.13	-11.2	183.9	21.9
22.6	2.8	61.31	0.12	3.29	0.04	0.82	-1.9	61.3	21.9
24.2	9.3	203.63	0.06	0.99	0.06	1.38	-3.1	203.6	21.9
27.1	9.3	203.63	-0.06	0.99	-0.06	-1.56	3.1	206.7	22.2
28.7	2.8	61.31	-0.12	3.29	-0.04	-1.04	1.9	63.3	22.6
31.5	8.4	183.93	-0.23	1.10	-0.21	-6.59	11.2	195.1	23.2
34.15	9.2	201.44	-0.33	1.00	-0.33	-11.36	17.8	219.3	23.8
36.9	8.4	183.93	-0.44	1.10	-0.40	-14.83	21.5	205.5	24.5
39.7	2.8	61.31	-0.55	3.29	-0.17	-6.64	9.0	70.3	25.1
41.3	9.3	203.63	-0.61	0.99	-0.62	-25.55	33.1	236.8	25.5
44.2	9.3	203.63	-0.73	0.99	-0.73	-32.41	39.3	242.9	26.1
45.8	2.8	61.31	-0.79	3.29	-0.24	-10.98	12.8	74.2	26.5
48.6	8.4	183.93	-0.90	1.10	-0.82	-39.82	43.9	227.8	27.1
51.2	9.2	201.44	-1.00	1.00	-1.00	-51.15	53.5	255.0	27.7
sum	**159.8**	**3499**				**-167.20**	**0.00**		

Force top frame: -53.57kN

Load Distribution to Building Frame

Torsion induced load in short direction walls from long direction earthquake

Location: ground to first   Center of Stiffness: 25.6m   Load: 3499kN   Design Eccentricity: 0.7 m

position, X (m)	relative stiffness	shear force (static) (kN)	relative displacement A	relative force (for same displacement) B	ration A to B	moment about top	force due to torsion (kN)	total force (kN/m)
0.06	9.2	0.00	1.00	1.00	1.00	0.06	-14.6	-1.6
2.7	8.4	0.00	0.90	1.10	0.82	2.21	-12.0	-1.4
5.5	2.8	0.00	0.79	3.29	0.24	1.32	-3.5	-1.3
7.1	9.3	0.00	0.72	0.99	0.73	5.20	-10.7	-1.2
10	9.3	0.00	0.61	0.99	0.62	6.18	-9.1	-1.0
11.6	2.8	0.00	0.55	3.29	0.17	1.94	-2.4	-0.9
14.4	8.4	0.00	0.44	1.10	0.40	5.78	-5.9	-0.7
17.05	9.2	0.00	0.34	1.00	0.34	5.73	-4.9	-0.5
19.8	8.4	0.00	0.23	1.10	0.21	4.13	-3.1	-0.4
22.6	2.8	0.00	0.12	3.29	0.04	0.82	-0.5	-0.2
24.2	9.3	0.00	0.06	0.99	0.06	1.38	-0.8	-0.1
27.1	9.3	0.00	-0.06	0.99	-0.06	-1.56	0.8	0.1
28.7	2.8	0.00	-0.12	3.29	-0.04	-1.04	0.5	0.2
31.5	8.4	0.00	-0.23	1.10	-0.21	-6.59	3.1	0.4
34.15	9.2	0.00	-0.33	1.00	-0.33	-11.36	4.9	0.5
36.9	8.4	0.00	-0.44	1.10	-0.40	-14.83	5.9	0.7
39.7	2.8	0.00	-0.55	3.29	-0.17	-6.64	2.4	0.9
41.3	9.3	0.00	-0.61	0.99	-0.62	-25.56	9.1	1.0
44.2	9.3	0.00	-0.73	0.99	-0.73	-32.42	10.7	1.2
45.8	2.8	0.00	-0.79	3.29	-0.24	-10.99	3.5	1.3
48.6	8.4	0.00	-0.90	1.10	-0.82	-39.83	12.0	1.4
51.2	9.2	0.00	-1.00	1.00	-1.00	-51.16	14.6	1.6
sum	**159.8**	**0**				**-167.25**	**0.00**	

Force top frame: -14.64kN

For four suspended floors plus a reinforced concrete roof:

- New vertical shear forces (floor forces)

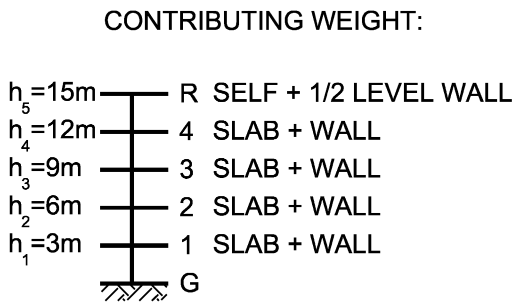
T $= 0.05H^{3/4}$
$= 0.38$

F_t $= 0$

W_{slab} $= 2520kN/floor,$

W_{wall} $= 2383kN/floor,$

W_{s+w} $=4903kN/floor$



Therefore,

- *Each floor weight,* $W_1=W_2=W_3=W_4= 4903kN$
- *Roof weight* W_{roof} $= 3712kN$

$\sum W_i h_i$ $=4903\times(3+6+9+12) +3412\times15$
$= 202762kNm,$

Therefore,

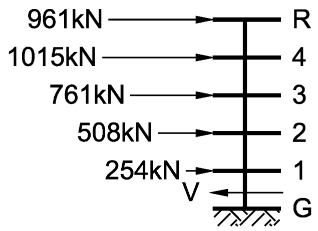
F_1 $= 3499\times (4903\times 3)/202762$
$= 254kN,$

F_2 $= 3499\times (4903\times6)/202762$
$= 508kN,$

F_3 $= 3499\times(4903\times9)/202762$
$=761kN$

F_4 $= 3499\times (4903\times 12)/202762$
$= 1015kN$

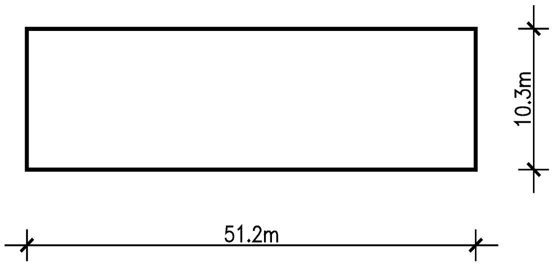
F_r $= 3499\times (3712\times 15)/202762$
$= 961kN$



- **The structure Over-turning moment:**

$M_{o/t}$ $= 3(254)+6(508)+9(761)+12(1015)+15(961)$
$= 37254kNm.$

- **Check for tension at perimeter:**



$M_{o/t}$ $= 37254kNm$

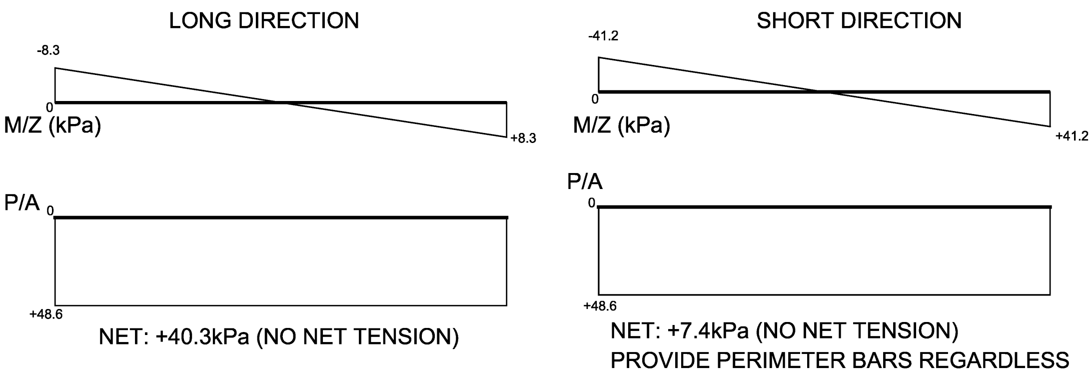
Z_{long} $= 10.3(51.2^2)/6$
$=4500m^3$

Z_{short} $= 51.2(10.3^2)/6$
$=905m^3$

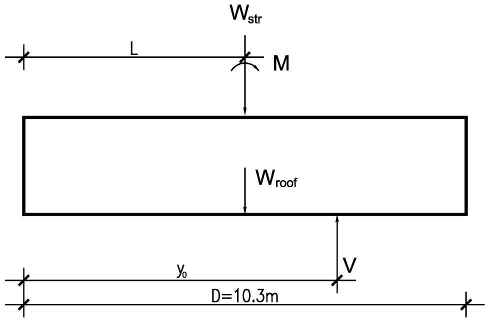
Structural weight $= 5\times4903$
$=24515kN$

Assuming loading is uniformly distributed, which is reasonable given wall layout.

Area= 504m^2



Stability / tension of structure:



For the load combination for earthquake design of: *G (dead) + 0.2Q(live)*

- *Structural weight* = *24515kN*

- *Footing weight* = *2720kN, (as previous, page10)*

- *Total weight* = *24515+2720*
  = *27235kN*
  =*V*

  `M =*37254kNm (from short direction force)*

  y_0 $=(W \times L-M)/V$
  $=[27235(10.3/2)-37254]/27235$
  $=3.78m$

  D/3 =*3.43m, OK.*
  (The resultant reaction is within middle third).

Bearing:

Structure is assumed to be founded upon sandy soil foundation materials. The soil heave would thus be minor, with the large wall stiffness resisting heave regardless. Footings, typically of the deep raft type, are to be proportioned primarily to limit bearing stresses on the soil.

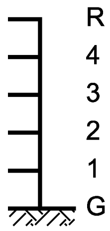
- *Take maximum soil bearing capacity, q* = *150kPa*

Total structure weight under footing is G (dead) + 0.5Q(live).
Therefore,

- *G+0.5Q* $=4.6+0.5\times 2$
  $= 5.6kPa/m^2$

- *Total structure* $\times 6$ *slabs (including ground floor)* $\times 504m^2$
  $= 16935m^2$,

- *Add wall self-weight* $= 2383kN$/per level $\times 5$ levels
  $=11915kN$,



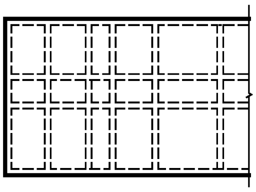
- *Total* $= 16935 + 11915$
  $= 28850kN$

- Foundation pressure = 28850/ (10.3m×51.2m)
  = 55kPa < 150kPa. OK.

Select stiffened raft (typical),

Beams: use 4 in long direction of the building, and other under main walls in short direction of the building, beam to be used 650D (typical), (200kg/m^3)

Slab thickness: 150mm, (100kg/m3 reinforcement)



Check axial strength:

Between “ground to first floor” walls

Peak loading (per meter): 3.5m design width,

- *G* $= 0.15(24)+1kPa(superimposed)$
  $= 4.6kPa$
- *Q* $= 2kPa$

$1.2G + 1.5Q$
$= 8.52kPa$ *(ultimate)*

$1.2G + 1.5(0.7Q)$
$= 7.62kPa$ *(with live load reaction)*

$7.62Kpa \times 3.5m$
$= 26.7kN/m \times 5$ *slabs*
$= 133.4kN/m$

- *Wall self-weight:*

  $0.12 \times 24kN/m \times 2.85m \times 4.5$ *levels*
  $= 36.9kN/m \times 1.2$ *(ultimate design factor)*
  $= 44.3kN/m$

- *N** $= 133.4 + 44.3$
  $= 177.7kN/m$ *(ultimate state)*

For wall as pin-ended, with design eccentricity of 20mm,

- *Rapidwall capacity (with 25Mpa fill)*
  = 225kN/m. OK.

Alternate Layout – preliminary investigation

- *Wall length in each direction:*

  $L\uparrow$*: 29.7m (8) – 2 (9.2)*
  = 219.2m
  $L\rightarrow$*: 18.2 (8) – 3.4 (4)*
  = 132m

- *Weight of walls:* $(219.2+132) \times (8.2)$
  = 2880kN/floor

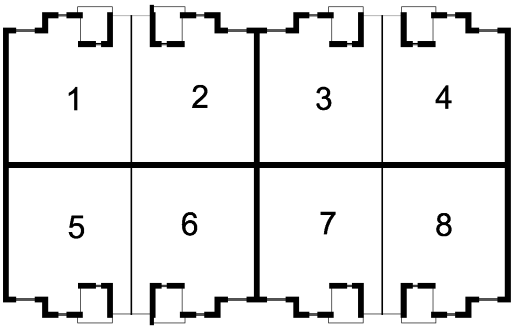
- W_{floors} $= 168m^2 \times 4$
  $= 672m^2 \times 5kPa$
  = 3360kN/floor

- *Total:* *2880 + 3360*
  = 6240kN/floor.

For shear capacity 28.5kN/m, in $\Leftrightarrow$ direction:

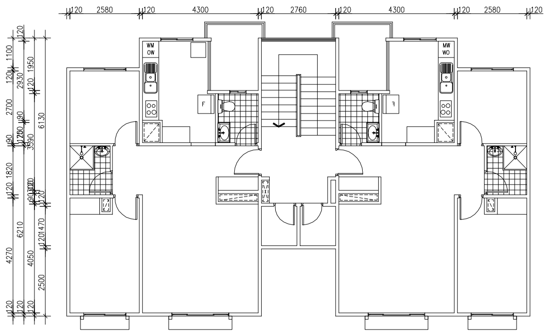
X/132
=28.5 KN/m, thus
X = 3760kN.

3760/0.15(c)
= 25080kN / 6240kN
= 4.02

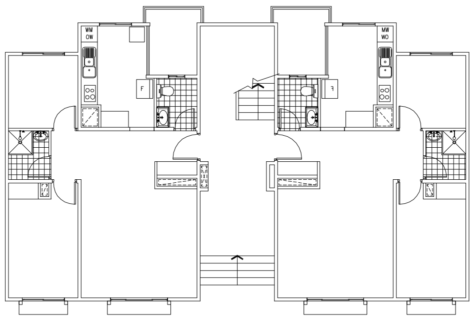


Therefore, 32 apartments are obtained from 4 suspended floors (three living floors + roof) and the structure is only 12m high.

PANELS DRAWN IN ACCORDANCE WITH CAD FILE REFERENCED IN THE TITLE BLOCK



FIRST
FLOOR



GROUND
FLOOR

ISSUE	DATE	DESCRIPTION
A	07/11/04	FOR CLIENT REVIEW

Do not scale off the drawing. Check all dimensions on site.

PROJECT:
Rapidwall Sample
Apartment Block
2 Storey Structure

FOR:
Ehya Sanaye Khorasan
Rapidwall Iran

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ABN 12 074 996 580 ACN 074 996 580

TITLE: RAPIDWALL LAYOUT Floor Plans			DATE: 07/11/2004
			ISSUE: A
JOB No. 0414	DRAWN BY: B.C.	SHEET No. L1-2	
SCALE: 1:100	CHECKED BY: I.V.		

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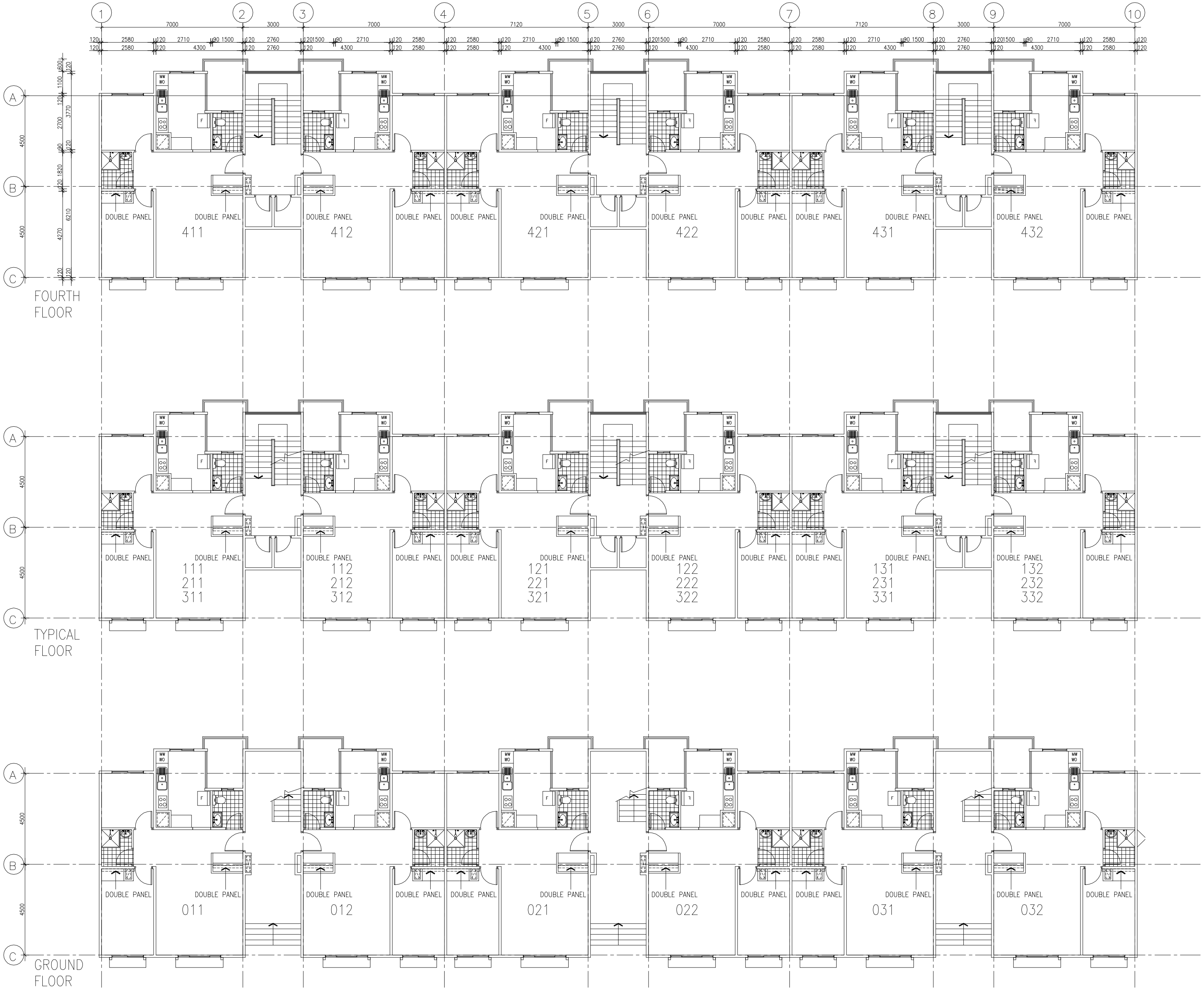

ISSUE	DATE	DESCRIPTION
A	07/11/04	FOR CLIENT REVIEW

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PROJECT:
Rapidwall Test Building
Ground Floor + 4 storeys
Configuration

FOR:
Ehya Sanaye Khorasan
Rapidwall Iran

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TITLE: RAPIDWALL LAYOUT Floor Plans	DATE: 07/11/2004
	ISSUE: A
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SCALE: 1:100	CHECKED BY: I.V.
SHEET No.	L1-4