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**William Attwell & Associates**

**JOB NO. 2551**

**STRUCTURAL CALCULATIONS**

**FOR**

**VEERA GADDAM / TAISHI LTD**

**AT**

**37 HEATH DRIVE,  
LONDON, NW3 7SD**

Version	Date	Made by	Checked by	Status
1.0	31.05.2024	GA	WCA	Current

This set of calculations is to be read in conjunction with all other current versions (if any).



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- **Concrete frame reactions** p.14

**GABRIELE ANGELINI**  
BEng (Hons) MSc ACIOB

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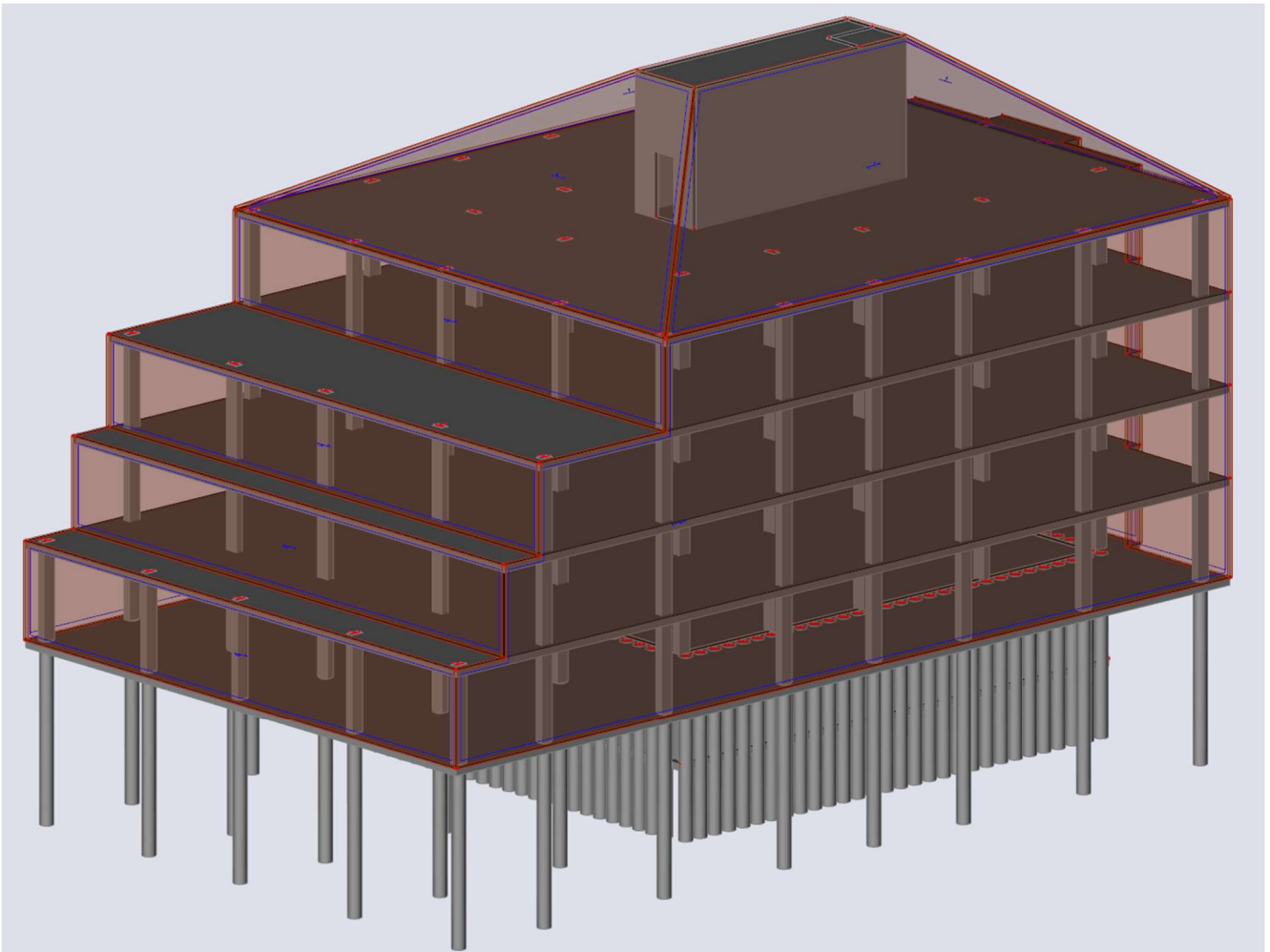
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### Project description

Construction of a five-story residential building, including a one-level basement, is proposed. The building will have a concrete frame with generally 250 mm thick reinforced concrete (RC) slabs supported on concrete columns and a concrete core. The retaining wall along the basement footprint of the building, formed by a contiguous piled wall (designed by others), will support the perimeter columns. The basement is also designed as a raft supported on piles. Stability is provided by a combination of the lift core and columns.

The following preliminary analysis has been carried out for ground movement analysis purposes only.

Scia engineering software has been used for the analysis and design of the structure.



3D view of the model



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## Loading

### Roof

#### Dead Load

Clay tiles	0.50
Insulation	0.05
Vapour control layer	0.05
18mm plywood/osb	0.15
Timber rafters	0.25
Ceiling & services	0.15
<b>Total (on slope)</b>	<b><u>1.20 KN/m<sup>2</sup></u></b>
<b>Live Load</b>	<b><u>0.60 KN/m<sup>2</sup></u></b>



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## Upper levels

Dead Load (excluding SW of slab)

Finishes	0.10
60mm cement screed	1.20
3mm acoustic membrane	0.10
Insulation	0.05
12.5mm ceiling/services	0.30
<b>Total</b>	<b><u>1.75 KN/m<sup>2</sup></u></b>
<b>Live load + Partitions</b>	<b><u>2.00 KN/m<sup>2</sup></u></b>
<b>Live load (communal)</b>	<b><u>3.00 KN/m<sup>2</sup></u></b>

## Basement level

Dead Load (excluding SW of slab)

Finishes	0.20
60mm cement screed	1.20
Insulation	0.05
12.5mm ceiling/services	0.30
<b>Total</b>	<b><u>1.75 KN/m<sup>2</sup></u></b>
<b>Live load + Partitions</b>	<b><u>3.00 KN/m<sup>2</sup></u></b>



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### Basement level (storage / plant room)

Dead Load (excluding SW of slab)

Finishes	0.20
60mm cement screed	1.20
Insulation	0.05
12.5mm ceiling/services	0.30
<b>Total</b>	<b><u>1.75 KN/m2</u></b>
<b>Live load</b>	<b><u>7.50 / 3.00 KN/m2</u></b>

### External walls

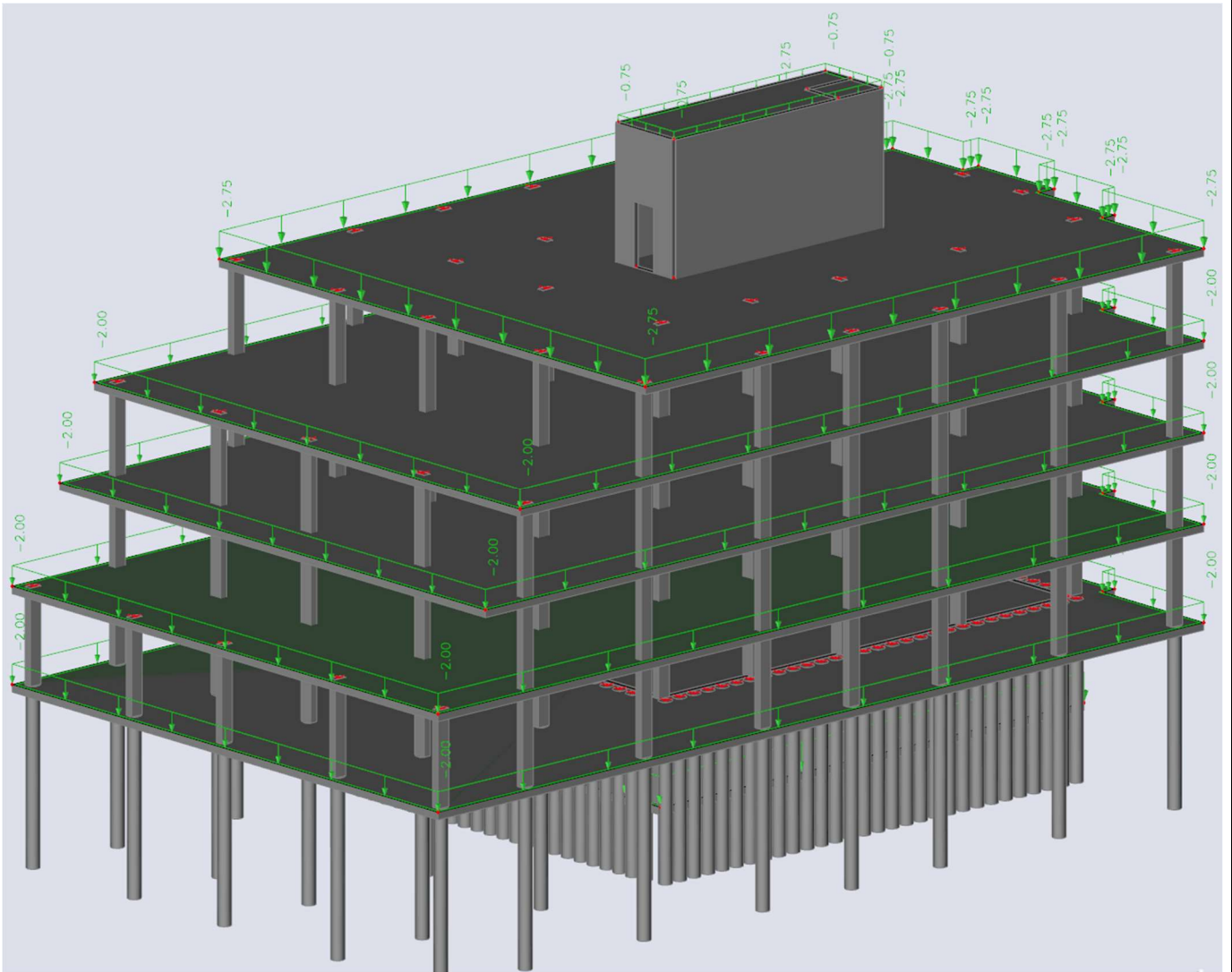
Dead Load	Brickwork	2.10
	Cladding frame system	0.25
	Insulation	0.05
	12.5 cement board/vapour layer	0.20
	2No 12.5 Gypsum plasterboard	0.15
	<b>Total</b>	<b><u>2.75 kN/m2</u></b>
	<b>H = 3.25m</b>	<b><u>9.00 kN/m</u></b>



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## Applied live load

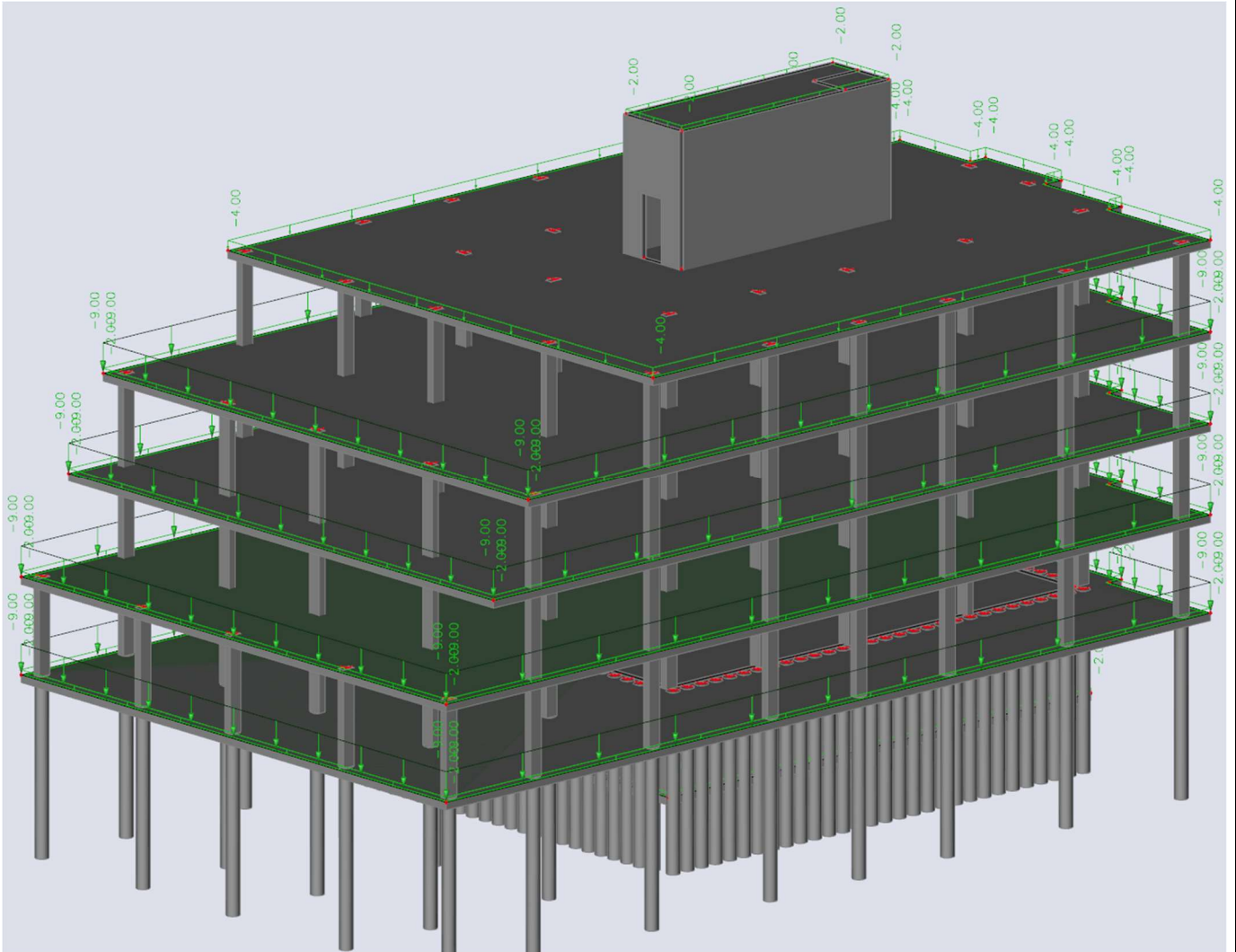




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## Applied dead load



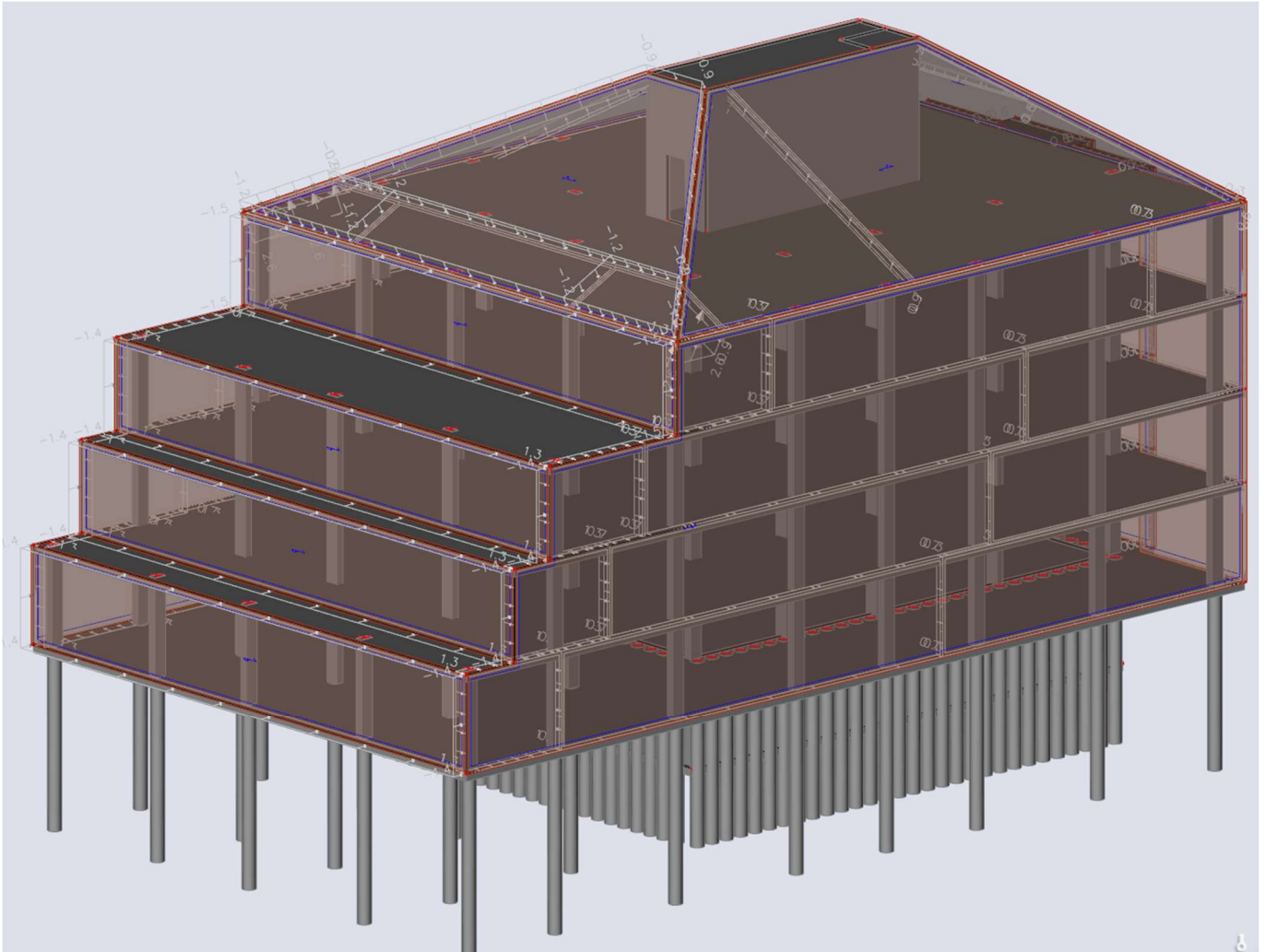




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## Applied wind load





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### 1. 3D wind generator data

#### Code references

National annex	Standard EN
Base code	EN 1991-1-4:2005-04
Correction sheets / Addenda	EN 1991-1-4:2005/AC:2010-01

#### Wind pressure according to EC1

V <sub>b,0</sub> - basic wind velocity [m/s]	26.200
ρ <sub>o</sub> - air density [kg/m <sup>3</sup> ]	1.3
c <sub>dir</sub> - directional factor	1
c <sub>season</sub> - season factor	1
c <sub>o</sub> - orography factor	1
1/p - life period of the building [year]	50.00
c <sub>prob</sub> - probability factor	1
K - shape factor	0.2
n - exponent	0.5
terrain category	0
K <sub>r</sub> - terrain factor	0.156036
z <sub>0</sub> - roughness length [m]	0.003
z <sub>min</sub> - minimal height [m]	1.000
k <sub>l</sub> - turbulence factor	1
Type of the structure	Vertical walls or rectangular buildings (EC1-1-4, 7.2.2)
Reference level of terrain [m]	0.000
Correlation between zones D and E	x

#### Wind data

Name	Type	Roof type	Roof overhangs	Swap outer surface
WD1	Wall			x
WD2	Wall			x
WD3	Wall			x
WD4	Wall			x
WD5	Wall			x
WD6	Wall			x
WD7	Wall			x
WD8	Wall			x
WD9	Wall			x
WD10	Wall			x
WD11	Wall			x
WD12	Roof	Monopitch	No	x
WD13	Roof	Monopitch	No	x
WD14	Roof	Monopitch	No	x
WD15	Roof	Monopitch	No	x

Name	Load direction	+Cpi	-Cpi	Region	Zones	+Cpe	-Cpe				
WD1	0	0.2000	-0.3000	1	A	-1.2000	-1.2000				
				2	B	-0.8000	-0.8000				
				3	C	-0.5000	-0.5000				
				4	A	-1.2000	-1.2000				
				5	B	-0.8000	-0.8000				
				6	C	-0.5000	-0.5000				
				7	A	-1.2000	-1.2000				
				8	B	-0.8000	-0.8000				
				9	C	-0.5000	-0.5000				
				10	A	-1.2000	-1.2000				
				11	B	-0.8000	-0.8000				
				12	C	-0.5000	-0.5000				
WD1	90	0.2000	-0.3000	1	D	0.7789	0.7789				
				2	D	0.7789	0.7789				
				3	D	0.7789	0.7789				
				4	D	0.7789	0.7789				
				WD1	180	0.2000	-0.3000	1	A	-1.2000	-1.2000
								2	B	-0.8000	-0.8000
								3	C	-0.5000	-0.5000
								4	A	-1.2000	-1.2000
								5	B	-0.8000	-0.8000
								6	C	-0.5000	-0.5000
								7	A	-1.2000	-1.2000
								8	B	-0.8000	-0.8000
9	C	-0.5000	-0.5000								
10	A	-1.2000	-1.2000								
11	B	-0.8000	-0.8000								
12	C	-0.5000	-0.5000								
WD1	270	0.2000	-0.3000	1	E	-0.4579	-0.4579				
				2	E	-0.4579	-0.4579				
				3	E	-0.4579	-0.4579				
				4	E	-0.4579	-0.4579				
WD2	0	0.2000	-0.3000	1	D	0.7000	0.7000				



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Name	Load direction	+Cpi	-Cpi	Region	Zones	+Cpe	-Cpe
WD3	90	0.2000	-0.3000	1	A	-1.2000	-1.2000
				2	B	-0.8000	-0.8000
				3	C	-0.5000	-0.5000
	180	0.2000	-0.3000	1	E	-0.3000	-0.3000
				2	A	-1.2000	-1.2000
				3	B	-0.8000	-0.8000
	270	0.2000	-0.3000	1	A	-1.2000	-1.2000
				2	B	-0.8000	-0.8000
				3	C	-0.5000	-0.5000
WD4	0	0.2000	-0.3000	1	D	0.7000	0.7000
				2	A	-1.2000	-1.2000
				3	B	-0.8000	-0.8000
	90	0.2000	-0.3000	1	C	-0.5000	-0.5000
				2	E	-0.3000	-0.3000
				3	A	-1.2000	-1.2000
	180	0.2000	-0.3000	1	A	-1.2000	-1.2000
				2	B	-0.8000	-0.8000
				3	C	-0.5000	-0.5000
270	0.2000	-0.3000	1	D	0.7000	0.7000	
			2	A	-1.2000	-1.2000	
			3	B	-0.8000	-0.8000	
WD5	0	0.2000	-0.3000	1	C	-0.5000	-0.5000
				2	E	-0.3000	-0.3000
				3	A	-1.2000	-1.2000
	90	0.2000	-0.3000	1	A	-1.2000	-1.2000
				2	B	-0.8000	-0.8000
				3	C	-0.5000	-0.5000
	180	0.2000	-0.3000	1	E	-0.4217	-0.4217
				2	A	-1.2000	-1.2000
				3	B	-0.8000	-0.8000
270	0.2000	-0.3000	1	A	-1.2000	-1.2000	
			2	B	-0.8000	-0.8000	
			3	C	-0.5000	-0.5000	
WD6	0	0.2000	-0.3000	1	D	0.7609	0.7609
				2	A	-1.2000	-1.2000
				3	B	-0.8000	-0.8000
				4	C	-0.5000	-0.5000
				5	E	-0.3000	-0.3000
				6	A	-1.2000	-1.2000
				7	B	-0.8000	-0.8000
				8	C	-0.5000	-0.5000
				9	E	-0.3000	-0.3000
				10	A	-1.2000	-1.2000
				11	B	-0.8000	-0.8000
				12	C	-0.5000	-0.5000
	90	0.2000	-0.3000	1	D	0.7609	0.7609
				2	A	-1.2000	-1.2000
				3	B	-0.8000	-0.8000
				4	C	-0.5000	-0.5000
				5	E	-0.3000	-0.3000
				6	A	-1.2000	-1.2000
				7	B	-0.8000	-0.8000
				8	C	-0.5000	-0.5000
				9	E	-0.3000	-0.3000
				10	A	-1.2000	-1.2000
				11	B	-0.8000	-0.8000
				180	0.2000	-0.3000	1
	2	E	-0.4579				-0.4579
	3	A	-1.2000				-1.2000
	4	B	-0.8000				-0.8000
	5	C	-0.5000				-0.5000
	6	E	-0.4579				-0.4579
	7	A	-1.2000				-1.2000
	8	B	-0.8000				-0.8000
	9	C	-0.5000				-0.5000
	10	E	-0.4579				-0.4579
	11	A	-1.2000				-1.2000
	270	0.2000	-0.3000				1
				2	C	-0.5000	-0.5000
3				E	-0.4579	-0.4579	
4				A	-1.2000	-1.2000	
5				B	-0.8000	-0.8000	
6				C	-0.5000	-0.5000	
7				E	-0.4579	-0.4579	
8				A	-1.2000	-1.2000	
9				B	-0.8000	-0.8000	
10				C	-0.5000	-0.5000	
11				E	-0.4579	-0.4579	
WD7				0	0.2000	-0.3000	1
	2	D	0.7789				0.7789
	3	D	0.7789				0.7789
	4	D	0.7789				0.7789
	90	0.2000	-0.3000	1	E	-0.3708	-0.3708
				2	E	-0.3798	-0.3798
				3	E	-0.3873	-0.3873
				4	E	-0.4217	-0.4217
	180	0.2000	-0.3000	1	A	-1.2000	-1.2000
				2	A	-1.2000	-1.2000
				3	A	-1.2000	-1.2000
				4	A	-1.2000	-1.2000
270	0.2000	-0.3000	1	D	0.7354	0.7354	
			2	D	0.7399	0.7399	
			3	D	0.7436	0.7436	
			4	D	0.7609	0.7609	
270	0.2000	-0.3000	1	A	-1.2000	-1.2000	
			2	A	-1.2000	-1.2000	



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Name	Load direction	+Cpi	-Cpi	Region	Zones	+Cpe	-Cpe
WD8	0	0.2000	-0.3000	3	A	-1.2000	-1.2000
				4	A	-1.2000	-1.2000
				1	E	-0.7000	-0.7000
				2	E	-0.7000	-0.7000
	90	0.2000	-0.3000	3	E	-0.7000	-0.7000
				4	E	-0.7000	-0.7000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
	180	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	D	0.8000	0.8000
				2	D	0.8000	0.8000
	270	0.2000	-0.3000	3	D	0.8000	0.8000
				4	D	0.8000	0.8000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
WD9	0	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	E	-0.7000	-0.7000
				2	E	-0.7000	-0.7000
	90	0.2000	-0.3000	3	E	-0.7000	-0.7000
				4	E	-0.7000	-0.7000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
	180	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	D	0.8000	0.8000
				2	D	0.8000	0.8000
	270	0.2000	-0.3000	3	D	0.8000	0.8000
				4	D	0.8000	0.8000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
WD10	0	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	E	-0.7000	-0.7000
				2	E	-0.7000	-0.7000
	90	0.2000	-0.3000	3	E	-0.7000	-0.7000
				4	E	-0.7000	-0.7000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
	180	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	D	0.8000	0.8000
				2	D	0.8000	0.8000
	270	0.2000	-0.3000	3	D	0.8000	0.8000
				4	D	0.8000	0.8000
				1	C	-0.5000	-0.5000
				2	C	-0.5000	-0.5000
WD11	0	0.2000	-0.3000	3	C	-0.5000	-0.5000
				4	C	-0.5000	-0.5000
				1	E	-0.3708	-0.3708
				2	E	-0.3798	-0.3798
	90	0.2000	-0.3000	3	E	-0.3873	-0.3873
				4	E	-0.4217	-0.4217
				1	A	-1.2000	-1.2000
				2	A	-1.2000	-1.2000
	180	0.2000	-0.3000	3	A	-1.2000	-1.2000
				4	A	-1.2000	-1.2000
				5	B	-0.8000	-0.8000
				1	D	0.7354	0.7354
	270	0.2000	-0.3000	2	D	0.7399	0.7399
				3	D	0.7436	0.7436
				4	D	0.7609	0.7609
				1	A	-1.2000	-1.2000
WD12	0	0.2000	-0.3000	2	A	-1.2000	-1.2000
				3	A	-1.2000	-1.2000
				4	A	-1.2000	-1.2000
				5	B	-0.8000	-0.8000
				1	Fup	-2.1440	-2.1440
90	0.2000	-0.3000	2	H	-0.9707	-0.9707	
			3	I	-0.7853	-0.7853	
			1	F2	-1.3053	-1.3053	
			2	G	-0.8733	-0.8733	
			3	H	-0.8147	-0.8147	
180	0.2000	-0.3000	1	Fup	-2.1440	-2.1440	
			2	H	-0.9707	-0.9707	
			3	I	-0.7853	-0.7853	



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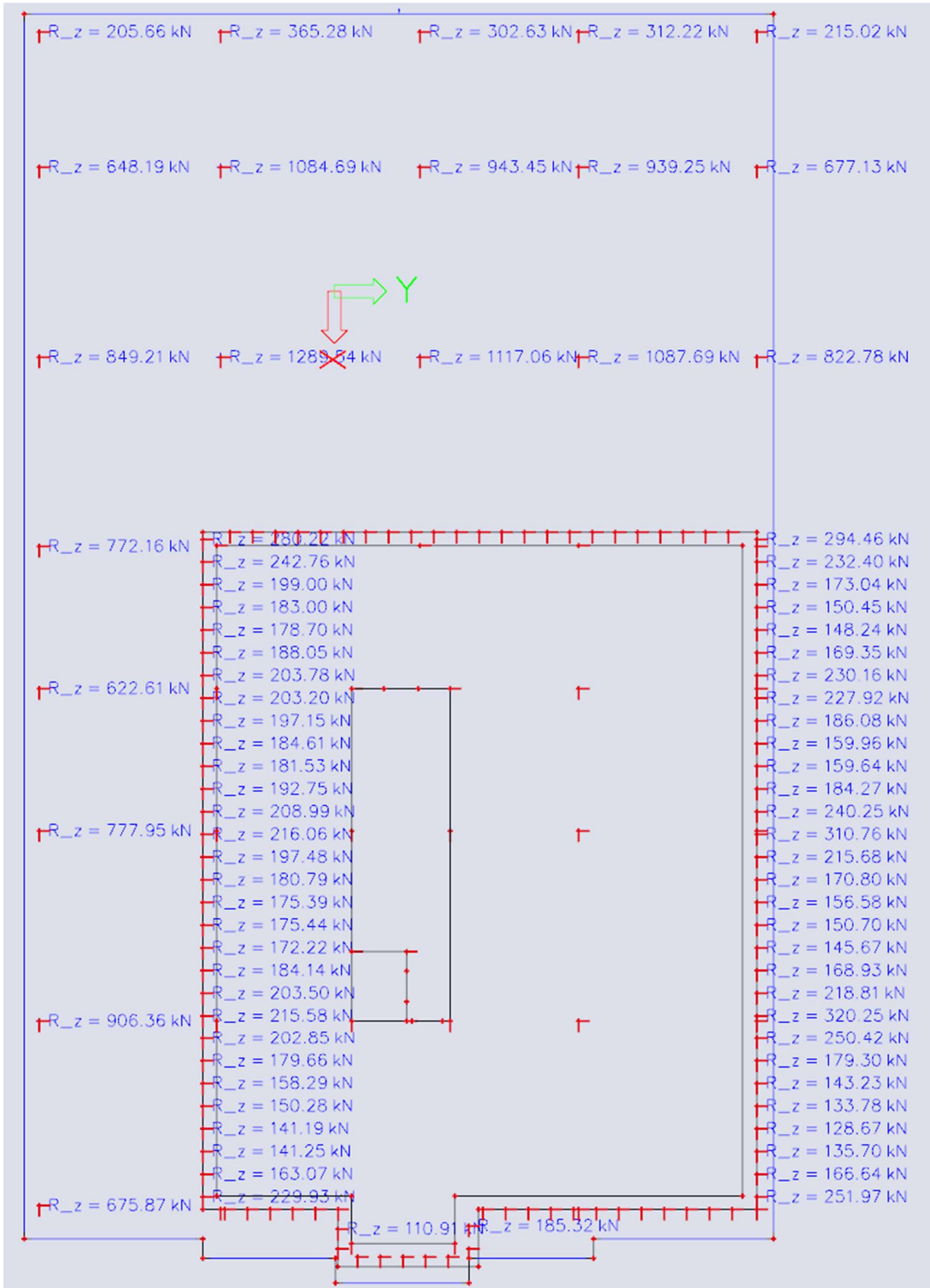
Name	Load direction	+Cpi	-Cpi	Region	Zones	+Cpe	-Cpe
WD13	270	0.2000	-0.3000	1	F1	0.6267	-0.5587
				2	F2	0.6267	-0.5587
				3	G	0.6267	-0.5440
				4	H	0.3707	-0.2147
	0	0.2000	-0.3000	1	F1	0.5797	-0.5963
				2	F2	0.5797	-0.5963
				3	G	0.5797	-0.5722
				4	H	0.3519	-0.2241
	90	0.2000	-0.3000	1	Fup	-2.1722	-2.1722
				2	H	-0.9519	-0.9519
				3	I	-0.7759	-0.7759
	180	0.2000	-0.3000	1	G	-0.9203	-0.9203
2				H	-0.8241	-0.8241	
270	0.2000	-0.3000	1	Fup	-2.1722	-2.1722	
			2	H	-0.9519	-0.9519	
			3	I	-0.7759	-0.7759	
WD14	0	0.2000	-0.3000	1	Fup	-2.1500	-2.1500
				2	H	-0.9667	-0.9667
				3	I	-0.7833	-0.7833
	90	0.2000	-0.3000	1	F1	0.6167	-0.5667
				2	F2	0.6167	-0.5667
				3	G	0.6167	-0.5500
				4	H	0.3667	-0.2167
	180	0.2000	-0.3000	1	Fup	-2.1500	-2.1500
				2	H	-0.9667	-0.9667
				3	I	-0.7833	-0.7833
	270	0.2000	-0.3000	1	F1	-1.3333	-1.3333
				2	G	-0.8833	-0.8833
3				H	-0.8167	-0.8167	
WD15	0	0.2000	-0.3000	1	G	-0.6396	-0.6396
				2	H	-0.7465	-0.7465
				3	Fup	-1.7792	-1.7792
	90	0.2000	-0.3000	1	Fup	-1.7792	-1.7792
				2	H	-1.0000	-1.0000
				3	I	-0.8535	-0.8535
	180	0.2000	-0.3000	1	F1	0.7000	-0.2327
				2	F2	0.7000	-0.2327
				3	G	0.7000	-0.2327
				4	H	0.5069	-0.0931
	270	0.2000	-0.3000	1	Fup	-1.7792	-1.7792
				2	H	-1.0000	-1.0000
3				I	-0.8535	-0.8535	



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for				TAISHI LTD		Sheet no./rev.		14	
Calc. by	Date	Chk'd by	Date	App'd by	Date				
GA	31/05/2024	WCA	31/05/2024	WCA	31/05/2024				

### Post analysis pile reactions (SLS-Car)





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Project			Job Ref.		
37 Heath Drive London, NW3 7SD			2551		
for			Sheet no./rev.		
TAISHI LTD			15		
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GA	31/05/2024	WCA	31/05/2024	WCA	31/05/2024

