



GEA LIMITED (GEOTECHNICAL & ENV ASSOC)

Rear of 159-163 King's Cross Road, London WC1X 9BN
Wall Installation and Excavation Combined Issue 4

Job No.	Sheet No.	Rev.
J16180		
Drg. Ref.		
Made by	Date 07-Mar-2017	Checked

Vertical Offset 1
0.0 50.30000 26.50000 -1.46000 4.2212
0.80351 50.22500 25.70000 -1.46000 4.4653
1.6070 50.15000 24.90000 -1.46000 4.5611
2.4185 50.07500 24.10000 -1.46000 4.5332
3.2140 50.00000 23.30000 -1.46000 4.4122

Structure: AG | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 50.00000 23.30000 -0.50000 4.4122
1.9046 51.88889 23.05556 -0.50000 4.0146
3.8093 53.77778 22.81111 -0.50000 3.4936
5.7139 55.66667 22.56667 -0.50000 2.9696
7.6186 57.55556 22.32222 -0.50000 2.3589
9.5232 59.44444 22.07778 -0.50000 1.7334
11.428 61.33333 21.83333 -0.50000 1.1640
13.332 63.22222 21.58889 -0.50000 0.67852
15.237 65.11111 21.34444 -0.50000 0.25891
17.142 67.00000 21.10000 -0.50000 0.0

Structure: AH | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 59.00000 20.70000 -0.50000 1.6177
0.90554 58.10000 20.80000 -0.50000 1.8787
1.8111 57.20000 20.90000 -0.50000 2.1413
2.7166 56.30000 21.00000 -0.50000 2.3977
3.6222 55.40000 21.10000 -0.50000 2.6647
4.5277 54.50000 21.20000 -0.50000 2.9363
5.4332 53.60000 21.30000 -0.50000 3.1948
6.3388 52.70000 21.40000 -0.50000 3.4329

Structure: AI | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 52.70000 21.40000 -0.50000 3.4329
0.97015 52.56000 20.44000 -0.50000 3.1603
1.9403 52.42000 19.48000 -0.50000 2.8497
2.9105 52.28000 18.52000 -0.50000 2.5178
3.8806 52.14000 17.56000 -0.50000 2.1798
4.8508 52.00000 16.60000 -0.50000 1.8480

Structure: AJ | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 52.00000 16.60000 -0.50000 1.8480
0.99641 51.01111 16.72222 -0.50000 1.9569
1.9928 50.02222 16.84444 -0.50000 2.0342
2.9892 49.03333 16.96667 -0.50000 2.0754
3.9857 48.04444 17.08889 -0.50000 2.6190
4.9821 47.05556 17.21111 -0.50000 2.6132
5.9785 46.06667 17.33333 -0.50000 2.6141
6.9749 45.07778 17.45556 -0.50000 2.6195
7.9713 44.08889 17.57778 -0.50000 2.6231
8.9677 43.10000 17.70000 -0.50000 2.6269

Structure: AK | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 43.10000 17.70000 -0.50000 2.6269
0.98995 43.24000 18.68000 -0.50000 3.2069
1.9799 43.38000 19.66000 -0.50000 3.8228
2.9698 43.52000 20.64000 -0.50000 4.4471
3.9598 43.66000 21.62000 -0.50000 5.0471
4.9497 43.80000 22.60000 -0.50000 5.5779

Structure: AL | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 43.80000 22.60000 -0.50000 5.5779
0.94763 42.86000 22.72000 -0.50000 5.6398
1.8953 41.92000 22.84000 -0.50000 5.7182
2.8429 40.98000 22.96000 -0.50000 5.8128
3.7905 40.04000 23.08000 -0.50000 5.9216
4.7381 39.10000 23.20000 -0.50000 6.0411

Structure: AM | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1
0.0 39.10000 23.20000 -0.50000 6.0411
0.90247 39.03333 22.30000 -0.50000 5.4596
1.8049 38.96667 21.40000 -0.50000 4.8255
2.7074 38.90000 20.50000 -0.50000 4.1772

Structure: AN | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]

Vertical Offset 1



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Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
0.0	38.90000	20.50000	-0.50000	4.1772
0.83442	38.07500	20.62500	-0.50000	4.2358
1.6688	37.25000	20.75000	-0.50000	4.2931
2.5032	36.42500	20.87500	-0.50000	4.3461
3.3377	35.60000	21.00000	-0.50000	3.7729

Structure: AO | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.60000	21.00000	-0.50000	3.7729
0.83931	35.70000	21.83333	-0.50000	4.3333
1.6786	35.80000	22.66667	-0.50000	4.9000
2.5179	35.90000	23.50000	-0.50000	5.4496

Structure: AP | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.90000	23.50000	-0.50000	5.4496
0.89107	35.02000	23.64000	-0.50000	5.9080
1.7821	34.14000	23.78000	-0.50000	5.7259
2.6732	33.26000	23.92000	-0.50000	5.5043
3.5643	32.38000	24.06000	-0.50000	5.2523
4.4553	31.50000	24.20000	-0.50000	4.4806

Structure: AQ | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	31.50000	24.20000	-0.50000	4.4806
0.98995	31.36000	23.22000	-0.50000	3.9078
1.9799	31.22000	22.24000	-0.50000	3.3613
2.9698	31.08000	21.26000	-0.50000	2.8296
3.9598	30.94000	20.28000	-0.50000	2.3346
4.9497	30.80000	19.30000	-0.50000	1.8906

Structure: AR | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.60000	12.40000	-0.50000	0.28271
0.94130	35.72222	13.33333	-0.50000	0.51082
1.8826	35.84444	14.26667	-0.50000	0.76308
2.8239	35.96667	15.20000	-0.50000	1.0873
3.7652	36.08889	16.13333	-0.50000	1.4553
4.7065	36.21111	17.06667	-0.50000	1.8836
5.6478	36.33333	18.00000	-0.50000	2.3846
6.5891	36.45556	18.93333	-0.50000	2.9611
7.5304	36.57778	19.86667	-0.50000	3.6063
8.4717	36.70000	20.80000	-0.50000	4.3037

Structure: AS | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	44.70000	9.30000	-0.50000	0.0
0.90683	44.81111	10.20000	-0.50000	0.052628
1.8137	44.92222	11.10000	-0.50000	0.27148
2.7205	45.03333	12.00000	-0.50000	0.49031
3.6273	45.14444	12.90000	-0.50000	0.72996
4.5342	45.25556	13.80000	-0.50000	1.0062
5.4410	45.36667	14.70000	-0.50000	1.3298
6.3478	45.47778	15.60000	-0.50000	1.7066
7.2547	45.58889	16.50000	-0.50000	2.1370
8.1615	45.70000	17.40000	-0.50000	2.6285

Structure: AT | Sub-structure: Sub #

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	54.50000	10.00000	-0.50000	0.015524
1.8461	54.71667	11.83333	-0.50000	0.35466
3.6922	54.93333	13.66667	-0.50000	0.73892
5.5383	55.15000	15.50000	-0.50000	1.1684
7.3844	55.36667	17.33333	-0.50000	1.6391
9.2305	55.58333	19.16667	-0.50000	2.1132
11.077	55.80000	21.00000	-0.50000	2.5289

Structure: AU | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	33.10000	38.60000	-2.00000	7.2961
0.88891	32.21250	38.65000	-2.00000	7.1565
1.7778	31.32500	38.70000	-2.00000	6.7541
2.6667	30.43750	38.75000	-2.00000	6.1723
3.5556	29.55000	38.80000	-2.00000	5.5251
4.4445	28.66250	38.85000	-2.00000	4.8443
5.3334	27.77500	38.90000	-2.00000	4.1684
6.2224	26.88750	38.95000	-2.00000	3.5050
7.1113	26.00000	39.00000	-2.00000	2.8727

Structure: AV | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				

Dist.

Coordinates

Displacements

x

y

z

[m]

[m]

[mm]

0.026.0000039.00000-2.000002.8727

0.9219525.9400038.08000-2.000002.8692

1.843925.8800037.16000-2.000002.8658

2.765925.8200036.24000-2.000002.8623

3.687825.7600035.32000-2.000002.8589

4.609825.7000034.40000-2.000002.8555

5.531725.6400033.48000-2.000002.8521

6.453725.5800032.56000-2.000002.1229

7.375625.5200031.64000-2.000002.9297

8.297625.4600030.72000-2.000001.9131

9.219525.4000029.80000-2.000001.7797

Structure: AW | Sub-structure:

Dist.

Coordinates

Displacements

x

y

z

[m]

[m]

[mm]

Vertical Offset 1

0.025.4000029.80000-2.000001.7797

1.886927.2833329.68333-2.000002.7235

3.773929.1666729.56667-2.000003.7125

5.660831.0500029.45000-2.000005.6793

7.547832.9333329.33333-2.000007.1818

9.434734.8166729.21667-2.000007.7709

11.32236.7000029.10000-2.000006.3708

Specific Building Damage Results - All Segments

Structure: A | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

3.3990

Hogging

0.0029763

0.047882

0.048383

-515.16E-6

-362.76E-6

14135.

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: B | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

3.0990

Sagging

335.83E-6

-0.012586

0.0025245

206.95E-6

-160.85E-6

69575.

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: C | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

3.2976

Hogging

0.0014779

0.066080

0.066321

-745.72E-6

-595.22E-6

13131.

1 (Very Slight)

2

3.2976

1.3025

Sagging

226.41E-6

0.048140

0.048169

-629.81E-6

-595.22E-6

55670.

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: D | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

1.3181

Hogging

0.0036865

-0.014706

0.0036797

189.46E-6

362.66E-6

4314.1

0 (Negligible)

2

1.3181

1.9632

Sagging

0.017228

0.0069651

0.020445

-123.63E-6

0.0010102

3765.8

0 (Negligible)

3

3.2812

1.5940

Hogging

0.011073

-0.0083800

0.0080019

144.55E-6

0.0010102

5919.8

0 (Negligible)

4

4.8752

0.52473

Hogging

0.0

-0.011476

0.0022951

114.77E-6

339.34E-6

4216.7

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: E | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

2.4990

Sagging

0.0013159

-0.0058172

0.0014001

85.129E-6

-338.44E-6

14198.

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: F | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]

0.0

1

0.0

0.40113

Sagging

0.0

0.013347

0.013347

-133.45E-6

490.90E-6

41903.

0 (Negligible)

2

0.40113

8.9984

Hogging

0.0047001

0.030947

0.033014

-419.83E-6

490.90E-6

14423.

0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: G | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations

Segment

Start

Length

Curvature

Deflection Ratio

Average Horizontal Strain

Max. Tensile Strain

Maximum Gradient of Horizontal Displacement Curve

Maximum Gradient of Vertical Displacement Curve

Min. Radius of Curvature

Damage Category

[m]

[m]

[m]

[%]

[%]

[%]

[m]



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Made by	Date 07-Mar-2017	Checked

Vertical Offset from Line for Vertical Movement	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
0.0	1	0.0	3.0000	Hogging	86.371E-6	-613.24E-6	132.57E-6	-49.005E-6	41.003E-6	316360.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: H Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.90662	1.8002	Hogging	438.44E-6	0.029052	0.029092	-316.66E-6	-70.084E-6	39519.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: I Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	2.7003	Hogging	362.83E-6	0.011259	0.011308	-174.20E-6	54.672E-6	74444.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: J Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	13.450	Sagging	0.0018626	-0.0040738	0.0010651	100.23E-6	86.649E-6	49099.	0 (Negligible)
	2	13.450	6.0491	Hogging	148.82E-6	-0.0047012	943.96E-6	94.060E-6	86.649E-6	198650.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: K Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	2.5412	Sagging	0.0096821	-0.013063	0.0070639	358.22E-6	-633.90E-6	1935.7	0 (Negligible)
	2	2.5412	1.4730	Hogging	0.0014133	-0.055815	0.011193	668.44E-6	-576.62E-6	12029.	0 (Negligible)
	3	4.0141	3.4266	Sagging	0.013390	-0.027361	0.0099058	668.44E-6	-576.62E-6	4056.7	0 (Negligible)
	4	7.4408	1.4582	Hogging	99.152E-6	-0.0037539	752.99E-6	67.070E-6	108.30E-6	155660.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: L Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	6.7766	Hogging	0.0048074	0.068779	0.071612	-939.07E-6	-595.91E-6	13727.	1 (Very Slight)
	2	6.7766	0.42240	Sagging	0.0	0.093752	0.093752	-936.64E-6	-595.91E-6	123000.	2 (Slight)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: M Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	5.8138	Hogging	0.0033799	0.054899	0.056453	-802.16E-6	-496.50E-6	17248.	1 (Very Slight)
	2	5.8138	1.4859	Sagging	480.27E-6	0.078785	0.078899	-802.16E-6	-496.50E-6	31493.	2 (Slight)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: N Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	6.0990	Hogging	0.0018946	0.038123	0.038852	-632.21E-6	334.46E-6	12489.	0 (Negligible)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: O Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
[m] 0.0	1	0.0	4.5990	Sagging	0.0089511	0.10484	0.11712	-0.0012289	-601.53E-6	2682.4	2 (Slight)
Tensile horizontal strains are +ve, compressive horizontal strains are -ve.											
Structure: P Sub-structure: Sub #											
Vertical Offset from Line for Vertical Movement	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category



GEA LIMITED
(GEOTECHNICAL & ENV ASSOC)

Rear of 159-163 King's Cross Road, London WC1X 9BN
Wall Installation and Excavation Combined Issue 4

Job No.	Sheet No.	Rev.
J16180		
Drg. Ref.		
Made by	Date 07-Mar-2017	Checked

Calculations							Curve	Curve		
[m] 0.0	1	[m] 0.0	[m] 1.9268	Hogging	[%] 330.43E-6	[%] 0.059243	[%] 0.059343	-607.68E-6	-341.91E-6	[m] 68339.1 (Very Slight)
	2	1.9268	1.2874	Sagging	546.31E-6	0.053365	0.053584	-546.14E-6	-341.91E-6	22553.1 (Very Slight)
	3	3.2141	2.4849	Hogging	0.011659	-0.13342	0.027500	0.0041117	-735.62E-6	1332.1 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: Q | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 4.5990	Sagging	[%] 0.011029	[%] 0.065472	[%] 0.080665	-743.67E-6	-460.07E-6	[m] 2495.2	2 (Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: R | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 0.48898	None	[%] 0.0	[%] -0.011910	[%] 0.0023819	119.11E-6	-478.92E-6	[m] 3705.9	0 (Negligible)
	2	0.48898	1.6884	Hogging	0.014410	-0.0082501	0.011736	119.11E-6	-0.0013996	4148.5	0 (Negligible)
	3	2.1774	2.6641	Sagging	0.019756	0.029613	0.049756	-472.17E-6	-0.0013996	2782.0	0 (Negligible)
	4	4.8416	2.5682	Hogging	0.027615	-0.17424	0.038203	0.0039857	-0.0013304	562.66	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: S | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 7.3583	Sagging	[%] 388.00E-6	[%] -0.0055033	[%] 0.0011167	63.398E-6	-11.934E-6	[m] 242620.	0 (Negligible)
	2	7.3583	0.56855	Hogging	297.58E-6	-0.0045601	928.15E-6	46.798E-6	11.016E-6	3.4224E+6	0 (Negligible)
	3	7.9268	1.7607	None	0.0	-0.0046796	935.95E-6	-55.267E-6	15.731E-6	342600.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: T | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 2.5281	Sagging	[%] 0.0010397	[%] -0.043172	[%] 0.0086543	894.85E-6	-93.966E-6	[m] 20038.	0 (Negligible)
	2	2.5281	3.2548	Hogging	0.0020700	-0.10292	0.020619	0.0011383	-115.92E-6	29079.	0 (Negligible)
	3	5.7829	6.3168	Sagging	0.0090031	-917.11E-6	0.0089006	0.0011383	-282.96E-6	10857.	0 (Negligible)
	4	12.100	6.6373	Hogging	0.0084180	0.0050523	0.010671	-78.910E-6	-578.74E-6	10589.	0 (Negligible)
	5	18.737	4.8604	Sagging	0.014298	0.0042591	0.015864	-117.74E-6	-578.74E-6	9117.9	0 (Negligible)
	6	23.597	10.163	Hogging	963.65E-6	0.010169	0.010980	-167.31E-6	218.65E-6	40573.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: U | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 1.9720	[m] 7.8870	Hogging	[%] 0.0048454	[%] 0.032027	[%] 0.035304	-320.17E-6	-370.92E-6	[m] 10350.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: V | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 1.0341	Hogging	[%] 77.181E-6	[%] 0.033385	[%] 0.033394	-447.94E-6	-383.70E-6	[m] 70690.	0 (Negligible)
	2	1.0341	2.6049	Sagging	653.78E-6	0.055499	0.055886	-600.80E-6	-383.70E-6	38449.1 (Very Slight)	1

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: W | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 1.1392	Sagging	[%] 33.906E-6	[%] 0.011336	[%] 0.011344	-113.35E-6	150.04E-6	[m] 415160.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: X | Sub-structure:

Vertical Offset from Line for	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of	Maximum Gradient of	Min. Radius of	Damage Category
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GEA LIMITED (GEOTECHNICAL & ENV ASSOC)

Rear of 159-163 King's Cross Road, London WC1X 9BN
Wall Installation and Excavation Combined Issue 4

Job No.	Sheet No.	Rev.
J16180		
Drg. Ref.		
Made by	Date 07-Mar-2017	Checked

Vertical Movement Calculations				Strain	Strain	Horizontal Displacement	Vertical Displacement	Curvature					
						Curve	Curve						
	[m]	[m]		[%]	[%]			[m]					
	0.0												
	1	4.8600	1.7333	Hogging	0.017371								
					[%]	0.030927	0.037757	-318.53E-6	-872.41E-6	3843.1	0		
	2	6.5934	1.8267	Sagging	0.0050739			0.041158	0.042816	-462.19E-6	-872.41E-6	16628.	(Negligible)
	3	8.4201	1.2990	Hogging	806.80E-6			0.045575	0.045669	-462.19E-6	-448.15E-6	20861.	(Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: Y | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 3.6141	Hogging	[%] 949.33E-6	[%] 0.046837	[%] 0.047188	-483.46E-6	-545.30E-6	[m] 25577.	0 (Negligible)
		2 3.6141	0.024928	None	0.0	0.048369	0.048369	-483.46E-6	-545.30E-6	4.1155E+6	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: Z | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 5.7481	[m] 3.8311	Hogging	[%] 0.0014764	[%] 0.030510	[%] 0.031016	-305.01E-6	-303.27E-6	[m] 18277.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AA | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 3.6610	Hogging	[%] 0.0023745	[%] 0.046377	[%] 0.047267	-471.56E-6	-497.68E-6	[m] 18096.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AB | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 8.5163	[m] 0.42783	Sagging	[%] 0.0	[%] 0.014228	[%] 0.014228	-152.02E-6	-197.23E-6	[m] 25016.	0 (Negligible)
		2 8.9441	0.51743	Sagging	0.0	0.014228	0.014228	-142.26E-6	-193.27E-6	20684.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AC | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 5.0794	Hogging	[%] 609.84E-6	[%] 0.013059	[%] 0.013659	-168.54E-6	-233.40E-6	[m] 93673.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AD | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 3.4564	Hogging	[%] 865.17E-6	[%] 0.038003	[%] 0.038500	-402.70E-6	-398.82E-6	[m] 34502.	0 (Negligible)
		2 3.4564	4.4065	Sagging	0.0023469	0.045340	0.048193	-500.66E-6	-398.82E-6	13958.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AE | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 3.3051	Sagging	[%] 968.85E-6	[%] -0.0066310	[%] 0.0017859	118.56E-6	100.12E-6	[m] 36760.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AF | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 1 0.0	[m] 3.2130	Sagging	[%] 0.0075864	[%] -0.003714	[%] 0.017187	0.0046769	-305.23E-6	[m] 4127.4	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AG | Sub-structure:

Vertical Offset from Line for	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of	Maximum Gradient of	Min. Radius of	Damage Category
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Rear of 159-163 King's Cross Road, London WC1X 9BN
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Vertical Movement Calculations							Strain	Strain	Horizontal Displacement Curve	Vertical Displacement Curve	Curvature
	[m]	[m]	[m]	[%]	[%]	[%]					[m]
	0.0										
	1	0.0	8.0923	Sagging	0.0015069	-0.016692	0.0033587	944.00E-6	328.31E-6	23647.	0
	2	8.0923	7.1448	Hogging	0.0018338	0.023023	0.025296	-298.55E-6	328.31E-6	26481.	0
										(Negligible)	(Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AH | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		[m] 0.0	[m] 0.82876	Sagging	[%] 0.0	[%] 0.021492	[%] 0.021492	-214.88E-6	-288.17E-6	224530.	0 (Negligible)
	1	0.82876	0.99413	Hogging	12.322E-6	0.018653	0.018653	-214.88E-6	-290.00E-6	2.4312E+6	0 (Negligible)
	3	1.8229	1.9259	Hogging	309.79E-6	0.013359	0.013384	-143.75E-6	-299.89E-6	166750.	0 (Negligible)
	4	3.7488	2.5890	Sagging	662.90E-6	-0.0031223	737.18E-6	150.80E-6	-299.89E-6	36727.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AI | Sub-structure: Sub #

[illegible]

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AJ | Sub-structure: Sub #

Vertical Offset from Line Form Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category	
		[m]	[m]		[%]	[%]	[%]			[m]		
	0.0	1	0.0	1.2425	Sagging	499.58E-6	-0.014783	0.0029706	181.18E-6	-109.27E-6	30393.	(Negligible)
		2	1.2425	2.1609	Hogging	0.0075680	-0.017194	0.0059131	209.77E-6	-545.62E-6	9468.9	(Negligible)
		3	4.0333	2.5495	Sagging	0.0096096	-768.34E-6	0.0092667	64.335E-6	-545.62E-6	6740.3	(Negligible)
		4	9.9528	1.4967	Sagging	38.477E-6	0.0044089	0.0044137	-45.485E-6	-5.5039E-6	238960.	(Negligible)
		5	7.4495	0.79571	Hogging	5.4494E-6	0.0040799	0.0040801	-42.543E-6	-3.8327E-6	3.3699E+6	(Negligible)
		6	8.2453	0.72146	None	0.0	0.0037474	0.0037474	-37.473E-6	-3.8327E-6	1.2764E+6	(Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AK | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0		1	0.0	2.1928 Hogging	917.62E-6	0.064757	0.064841	-650.11E-6	-630.99E-6	[m] 23704.1	1 (Very Slight)
		2	2.1928	2.7559 Sagging	0.0018558	0.064117	0.064540	-641.93E-6	-630.99E-6	12210.1	1 (Very Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AL | Sub-structure: Sub #

	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
Vertical Offset from Line for Vertical Movement Calculations		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	4.7371	Hogging	948.54E-6	0.0027757	0.0030249	-65.367E-6	-126.14E-6	54363.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AM | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	2.7064	Sagging	0.0014679	0.074333	0.074662	-743.46E-6	717.80E-6	13108.	1 (Very Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AN | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	3.3367	Sagging	0.014087	-0.010764	0.011085	208.78E-6	687.07E-6	889.99	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: A0 | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
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Made by	Date 07-Mar-2017	Checked

Calculations						Curve	Curve	
[m] 0.0	1	[m] 0.0	[m] 0.86915	Hogging	[%] 24.626E-6	[%] 0.072485	[%] 0.072485	[m] 58107.1 (Very Slight)
	2	0.86915	1.6478	Sagging	506.87E-6	0.074782	0.074851	30636.1 (Very Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AP | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 4.4543	Sagging	[%] 0.014898	[%] -0.053258	[%] 0.013862	917.13E-6	866.23E-6	[m] 1002.5	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AQ | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 4.9487	Hogging	[%] 0.0019544	[%] 0.042235	[%] 0.042635	-524.72E-6	578.44E-6	[m] 17977.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AR | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 8.4707	Hogging	[%] 0.0074632	[%] 0.065745	[%] 0.068339	-794.48E-6	-740.36E-6	[m] 12142.	1 (Very Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AS | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 1.8137	[m] 6.3468	Hogging	[%] 0.0045319	[%] 0.046960	[%] 0.048147	-613.34E-6	-541.59E-6	[m] 13122.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AT | Sub-structure: Sub #

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 1.8461	[m] 5.4030	Hogging	[%] 792.08E-6	[%] 0.015823	[%] 0.016000	-191.78E-6	-254.91E-6	[m] 75494.	0 (Negligible)
	2	7.2491	3.8264	Sagging	781.32E-6	0.0062049	0.0064509	-191.78E-6	-256.76E-6	46211.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AU | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 4.43049	Sagging	[%] 0.0097649	[%] 0.12676	[%] 0.13869	-0.0014145	765.06E-6	[m] 2792.5	2 (Slight)
	2	4.5849	2.5253	Hogging	940.14E-6	0.10145	0.10184	-0.0010820	759.55E-6	22146.	2 (Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AV | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 3.6879	Hogging	[%] 0.0	[%] 11.371E-6	[%] 11.909E-6	0.0	3.7760E-6	[m] 51.727E+6	0 (Negligible)
	2	3.6879	2.4055	Sagging	0.014021	-0.0039675	0.011730	170.31E-6	791.04E-6	4179.3	0 (Negligible)
	3	6.0934	2.0993	Hogging	0.0096375	-0.028050	0.0081113	334.01E-6	791.04E-6	5942.8	0 (Negligible)
	4	8.1927	1.0258	Sagging	164.30E-6	-0.020248	0.0040506	268.93E-6	144.64E-6	46339.	0 (Negligible)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Structure: AW | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m] 0.0	1	[m] 0.0	[m] 0.43048	None	[%] 0.0	[%] 0.049902	[%] 0.049902	-498.77E-6	-499.93E-6	[m] 93852.	0 (Negligible)
	2	0.43048	5.3678	Hogging	0.0055312	0.037302	0.041868	-498.77E-6	-0.0011142	9337.1	0 (Negligible)
	3	5.7983	5.5224	Sagging	0.032351	0.038267	0.081895	-710.19E-6	-0.0011142	1690.6	2 (Slight)

Tensile horizontal strains are +ve, compressive horizontal strains are -ve.

Specific Building Damage Results - Critical Values for All Segments within Each Sub-Structure



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Vertical Offset from Line for Vertical Movement	Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature	Damage Category
Structure: A Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0029763	[%] 0.047882	-362.76E-6	[mm] 1.3407	[%] 0.048383	-515.16E-6	-362.76E-6	[m] 14135.	[m] -	0 (Negligible)	
Structure: B Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 335.83E-6	[%] -0.012586	-160.85E-6	[mm] 1.8155	[%] 0.0025245	206.95E-6	-160.85E-6	[m] -	[m] 60575.0	0 (Negligible)	
Structure: C Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0014779	[%] 0.066080	-595.22E-6	[mm] 4.4250	[%] 0.066321	-745.72E-6	-595.22E-6	[m] 13131.	[m] 55670.1	1 (Very Slight)	
Structure: D Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.017228	[%] -0.014706	0.0010102	[mm] 4.4256	[%] 0.020445	189.46E-6	0.0010102	[m] 4216.7	[m] 3765.80	0 (Negligible)	
Structure: E Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0013159	[%] -0.0058172	-338.44E-6	[mm] 3.0592	[%] 0.0014001	85.129E-6	-338.44E-6	[m] -	[m] 14198.0	0 (Negligible)	
Structure: F Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0047801	[%] 0.030947	490.90E-6	[mm] 3.0594	[%] 0.033014	-419.83E-6	490.90E-6	[m] 14423.	[m] 41903.0	0 (Negligible)	
Structure: G Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 86.371E-6	[%] -613.24E-6	41.003E-6	[mm] 0.24315	[%] 132.57E-6	-49.005E-6	41.003E-6	[m] 316360.	[m] -	0 (Negligible)	
Structure: H Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 438.44E-6	[%] 0.029052	-70.084E-6	[mm] 0.22254	[%] 0.029092	-316.66E-6	-70.084E-6	[m] 39519.	[m] -	0 (Negligible)	
Structure: I Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 362.83E-6	[%] 0.011259	54.672E-6	[mm] 0.22261	[%] 0.011308	-174.20E-6	54.672E-6	[m] 74444.	[m] -	0 (Negligible)	
Structure: J Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0018626	[%] -0.0047012	86.649E-6	[mm] 0.55511	[%] 0.0010651	100.23E-6	86.649E-6	[m] 198650.	[m] 49099.0	0 (Negligible)	
Structure: K Sub-structure:											
Vertical Offset from	Deflection Ratio	Average Horizontal	Maximum Slope	Maximum Settlement	Max. Tensile	Maximum Gradient of	Maximum Gradient of	Min. Radius of	Min. Radius of	Damage Category	



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Line for Vertical Movement Calculations	Strain			Strain		Horizontal Displacement Curve	Vertical Displacement Curve	Curvature (Hogging)		Curvature (Sagging)	
[m] 0.0	[%] 0.013390	[%] -0.055815	[mm] -633.90E-6	[mm] 3.9779	[%] 0.011193	668.44E-6	-633.90E-6	[m] 12029.	[m] 1935.7	0 (Negligible)	
Structure: L Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0048074	[%] 0.093752	[mm] -595.91E-6	[mm] 3.9981	[%] 0.093752	-939.07E-6	-595.91E-6	[m] 13727.	[m] 123000.	2 (Slight)	
Structure: M Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0033799	[%] 0.078785	[mm] -496.50E-6	[mm] 3.5704	[%] 0.078899	-802.16E-6	-496.50E-6	[m] 17248.	[m] 31493.	2 (Slight)	
Structure: N Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0018946	[%] 0.038123	[mm] 334.46E-6	[mm] 2.0749	[%] 0.038852	-632.21E-6	334.46E-6	[m] 12489.	[m] -	0 (Negligible)	
Structure: O Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0089511	[%] 0.10484	[mm] -601.53E-6	[mm] 5.8644	[%] 0.11712	-0.0012289	-601.53E-6	[m] -	[m] 2682.4	2 (Slight)	
Structure: P Sub-structure: Sub #											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.011659	[%] -0.13342	[mm] -735.62E-6	[mm] 4.1956	[%] 0.059343	0.0041117	-735.62E-6	[m] 1332.1	[m] 22553.	1 (Very Slight)	
Structure: Q Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.011029	[%] 0.065472	[mm] -460.07E-6	[mm] 4.7526	[%] 0.080665	-743.67E-6	-460.07E-6	[m] -	[m] 2495.2	2 (Slight)	
Structure: R Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.027615	[%] -0.17424	[mm] -0.0013996	[mm] 7.2172	[%] 0.049756	0.0039857	-0.0013996	[m] 562.66	[m] 2782.0	0 (Negligible)	
Structure: S Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 388.00E-6	[%] -0.005033	[mm] 15.731E-6	[mm] 0.13870	[%] 0.001167	63.398E-6	15.731E-6	[m] 3.4224E+6	[m] 242620.	0 (Negligible)	
Structure: T Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.014298	[%] -0.10292	[mm] -578.74E-6	[mm] 3.1144	[%] 0.020619	0.0011383	-578.74E-6	[m] 10589.	[m] 9117.9	0 (Negligible)	
Structure: U Sub-structure:											
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
[m] 0.0	[%] 0.0048454	[%] 0.032027	[mm] -370.92E-6	[mm] 1.8595	[%] 0.035304	-320.17E-6	-370.92E-6	[m] 18350.	[m] -	0 (Negligible)	



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Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 653.78E-6	Average Horizontal Strain [%] 0.055499	Maximum Slope -383.70E-6	Maximum Settlement [mm] 3.2030	Max. Tensile Strain [%] 0.055886	Maximum Gradient of Horizontal Displacement Curve -600.80E-6	Maximum Gradient of Vertical Displacement Curve -383.70E-6	Min. Radius of Curvature (Hogging) [m] 70690.	Min. Radius of Curvature (Sagging) [m] 38449.	Damage Category 1 (Very Slight)
Structure: V Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 33.986E-6	Average Horizontal Strain [%] 0.011336	Maximum Slope 150.04E-6	Maximum Settlement [mm] 3.2034	Max. Tensile Strain [%] 0.011344	Maximum Gradient of Horizontal Displacement Curve -113.35E-6	Maximum Gradient of Vertical Displacement Curve 150.04E-6	Min. Radius of Curvature (Hogging) [m] -	Min. Radius of Curvature (Sagging) [m] 415160.	Damage Category 0 (Negligible)
Structure: W Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 0.017371	Average Horizontal Strain [%] 0.045575	Maximum Slope -872.41E-6	Maximum Settlement [mm] 2.3160	Max. Tensile Strain [%] 0.045669	Maximum Gradient of Horizontal Displacement Curve -462.19E-6	Maximum Gradient of Vertical Displacement Curve -872.41E-6	Min. Radius of Curvature (Hogging) [m] 3843.1	Min. Radius of Curvature (Sagging) [m] 10628.	Damage Category 0 (Negligible)
Structure: X Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 949.33E-6	Average Horizontal Strain [%] 0.048369	Maximum Slope -545.30E-6	Maximum Settlement [mm] 4.2254	Max. Tensile Strain [%] 0.048369	Maximum Gradient of Horizontal Displacement Curve -483.46E-6	Maximum Gradient of Vertical Displacement Curve -545.30E-6	Min. Radius of Curvature (Hogging) [m] 25577.	Min. Radius of Curvature (Sagging) [m] -	Damage Category 0 (Negligible)
Structure: Y Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 0.0014764	Average Horizontal Strain [%] 0.030510	Maximum Slope -303.27E-6	Maximum Settlement [mm] 1.1949	Max. Tensile Strain [%] 0.031016	Maximum Gradient of Horizontal Displacement Curve -305.01E-6	Maximum Gradient of Vertical Displacement Curve -303.27E-6	Min. Radius of Curvature (Hogging) [m] 18277.	Min. Radius of Curvature (Sagging) [m] -	Damage Category 0 (Negligible)
Structure: Z Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 0.0023745	Average Horizontal Strain [%] 0.046377	Maximum Slope -497.68E-6	Maximum Settlement [mm] 2.7640	Max. Tensile Strain [%] 0.047267	Maximum Gradient of Horizontal Displacement Curve -471.56E-6	Maximum Gradient of Vertical Displacement Curve -497.68E-6	Min. Radius of Curvature (Hogging) [m] 18096.	Min. Radius of Curvature (Sagging) [m] -	Damage Category 0 (Negligible)
Structure: AA Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 0.0	Average Horizontal Strain [%] 0.014228	Maximum Slope -197.23E-6	Maximum Settlement [mm] 0.40148	Max. Tensile Strain [%] 0.014228	Maximum Gradient of Horizontal Displacement Curve -152.02E-6	Maximum Gradient of Vertical Displacement Curve -197.23E-6	Min. Radius of Curvature (Hogging) [m] -	Min. Radius of Curvature (Sagging) [m] 20684.	Damage Category 0 (Negligible)
Structure: AB Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 609.84E-6	Average Horizontal Strain [%] 0.013059	Maximum Slope -233.40E-6	Maximum Settlement [mm] 1.5001	Max. Tensile Strain [%] 0.013659	Maximum Gradient of Horizontal Displacement Curve -168.54E-6	Maximum Gradient of Vertical Displacement Curve -233.40E-6	Min. Radius of Curvature (Hogging) [m] 93673.	Min. Radius of Curvature (Sagging) [m] -	Damage Category 0 (Negligible)
Structure: AC Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 0.0023469	Average Horizontal Strain [%] 0.045340	Maximum Slope -398.82E-6	Maximum Settlement [mm] 4.2984	Max. Tensile Strain [%] 0.048193	Maximum Gradient of Horizontal Displacement Curve -500.66E-6	Maximum Gradient of Vertical Displacement Curve -398.82E-6	Min. Radius of Curvature (Hogging) [m] 34502.	Min. Radius of Curvature (Sagging) [m] 13058.	Damage Category 0 (Negligible)
Structure: AD Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%] 968.85E-6	Average Horizontal Strain [%] -0.0086310	Maximum Slope 100.12E-6	Maximum Settlement [mm] 1.5004	Max. Tensile Strain [%] 0.0017859	Maximum Gradient of Horizontal Displacement Curve 118.56E-6	Maximum Gradient of Vertical Displacement Curve 100.12E-6	Min. Radius of Curvature (Hogging) [m] -	Min. Radius of Curvature (Sagging) [m] 36760.	Damage Category 0 (Negligible)
Structure: AE Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations [m] 0.0	Deflection Ratio [%]	Average Horizontal Strain [%]	Maximum Slope	Maximum Settlement [mm]	Max. Tensile Strain [%]	Maximum Gradient of	Maximum Gradient of	Min. Radius of	Min. Radius of	Damage Category
Structure: AF Sub-structure:										



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Line for Vertical Movement Calculations	Strain			Strain		Horizontal Displacement Curve	Vertical Displacement Curve	Curvature (Hogging)	Curvature (Sagging)	
[m] 0.0	[%] 0.0075864	[%] -0.083714	-305.23E-6	[mm] 4.5605	[%] 0.017187	0.0046769	-305.23E-6	[m] -	[m] 4127.4	0 (Negligible)
Structure: AG Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.0018338	[%] 0.023023	328.31E-6	[mm] 4.4122	[%] 0.025296	944.00E-6	328.31E-6	[m] 26481.	[m] 23647.	0 (Negligible)
Structure: AH Sub-structure:										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 662.90E-6	[%] 0.021492	-299.89E-6	[mm] 3.4326	[%] 0.021492	-214.88E-6	-299.89E-6	[m] 166750.	[m] 36727.	0 (Negligible)
Structure: AI Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.0010914	[%] 0.028715	348.31E-6	[mm] 3.4329	[%] 0.028721	-291.80E-6	348.31E-6	[m] 101550.	[m] 22247.	0 (Negligible)
Structure: AJ Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.0096096	[%] -0.017194	-545.62E-6	[mm] 2.6269	[%] 0.0092667	209.77E-6	-545.62E-6	[m] 9468.9	[m] 6740.3	0 (Negligible)
Structure: AK Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.0018558	[%] 0.064757	-630.99E-6	[mm] 5.5773	[%] 0.064841	-650.11E-6	-630.99E-6	[m] 23704.	[m] 12210.	1 (Very Slight)
Structure: AL Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 948.54E-6	[%] 0.0027757	-126.14E-6	[mm] 6.0410	[%] 0.0030249	-65.367E-6	-126.14E-6	[m] 54363.	[m] -	0 (Negligible)
Structure: AM Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.0014679	[%] 0.074333	717.80E-6	[mm] 6.0411	[%] 0.074662	-743.46E-6	717.80E-6	[m] -	[m] 13108.	1 (Very Slight)
Structure: AN Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.014087	[%] -0.010764	687.07E-6	[mm] 4.3455	[%] 0.011085	208.78E-6	687.07E-6	[m] -	[m] 889.99	0 (Negligible)
Structure: AO Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 506.87E-6	[%] 0.074782	-674.70E-6	[mm] 5.4489	[%] 0.074851	-755.25E-6	-674.70E-6	[m] 58107.	[m] 30636.	1 (Very Slight)
Structure: AP Sub-structure: Sub #										
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m] 0.0	[%] 0.014898	[%] -0.053258	866.23E-6	[mm] 5.9061	[%] 0.013862	917.13E-6	866.23E-6	[m] -	[m] 1002.5	0 (Negligible)



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Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.0019544	0.042235	578.44E-6	4.4806	0.042635	-524.72E-6	578.44E-6	17977.		- 0 (Negligible)		
Structure: AR Sub-structure: Sub #												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.0074632	0.065745	-740.36E-6	4.3030	0.068339	-794.48E-6	-740.36E-6	12142.		- 1 (Very Slight)		
Structure: AS Sub-structure: Sub #												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.0045319	0.046960	-541.59E-6	2.6279	0.048147	-613.34E-6	-541.59E-6	13122.		- 0 (Negligible)		
Structure: AT Sub-structure: Sub #												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	792.08E-6	0.015823	-256.76E-6	2.5287	0.016000	-191.78E-6	-256.76E-6	75494.	46211.0	0 (Negligible)		
Structure: AU Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.0097649	0.12676	765.06E-6	7.2961	0.13869	-0.0014145	765.06E-6	22146.	2792.5	2 (Slight)		
Structure: AV Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.014021	-0.020850	791.04E-6	2.8727	0.011730	334.01E-6	791.04E-6	5942.8	4179.3	0 (Negligible)		
Structure: AW Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category		
0.0	0.032351	0.049902	-0.0011142	7.7676	0.081895	-710.19E-6	-0.0011142	9337.1	1690.6	2 (Slight)		
Specific Building Damage Results - Critical Segments within Each Structure												
Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
A	Maximum Slope			1	0.0	3.3990 Hogging	362.76E-6	1.3407	0.048383	14135.		- 0 (Negligible)
	Maximum Settlement			1	0.0	3.3990 Hogging	362.76E-6	1.3407	0.048383	14135.		- 0 (Negligible)
	Max. Tensile Strain			1	0.0	3.3990 Hogging	362.76E-6	1.3407	0.048383	14135.		- 0 (Negligible)
	Min. Radius of Curvature (Hogging)			1	0.0	3.3990 Hogging	362.76E-6	1.3407	0.048383	14135.		- 0 (Negligible)
	Min. Radius of Curvature (Sagging)			-	-	-	-	-	-	-	-	
B	Maximum Slope			1	0.0	3.0990 Sagging	160.85E-6	1.8155	0.0025245	-	60575.0	0 (Negligible)
	Maximum Settlement			1	0.0	3.0990 Sagging	160.85E-6	1.8155	0.0025245	-	60575.0	0 (Negligible)
	Max. Tensile Strain			1	0.0	3.0990 Sagging	160.85E-6	1.8155	0.0025245	-	60575.0	0 (Negligible)
	Min. Radius of Curvature (Hogging)			-	-	-	-	-	-	-	-	
	Min. Radius of Curvature (Sagging)			1	0.0	3.0990 Sagging	160.85E-6	1.8155	0.0025245	-	60575.0	0 (Negligible)
C	Maximum Slope			1	0.0	3.2976 Hogging	595.22E-6	3.6595	0.066321	13131.		- 1 (Very Slight)
	Maximum Settlement			2	3.2976	4.6001 Sagging	595.22E-6	4.4250	0.048169	-	55670.0	0 (Negligible)
	Max. Tensile Strain			1	0.0	3.2976 Hogging	595.22E-6	3.6595	0.066321	13131.		- 1 (Very Slight)
	Min. Radius of Curvature (Hogging)			1	0.0	3.2976 Hogging	595.22E-6	3.6595	0.066321	13131.		- 1 (Very Slight)
	Min. Radius of Curvature (Sagging)			2	3.2976	4.6001 Sagging	595.22E-6	4.4250	0.048169	-	55670.0	0 (Negligible)



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Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
D	Maximum Slope		2	1.3181	3.2812	Sagging	0.0010102	-	4.0195	0.020445	4314.1	- 0 (Negligible)
	Maximum Settlement		1	0.0	1.3181	Hogging	362.66E-6	4.4256	0.0036797		3765.8	0 (Negligible)
	Max. Tensile Strain		2	1.3181	3.2812	Sagging	0.0010102	4.0195	0.020445		3765.8	0 (Negligible)
	Min. Radius of Curvature (Hogging)		4	4.8752	5.3999	Hogging	339.34E-6	2.4632	0.0022951	4216.7	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		2	1.3181	3.2812	Sagging	0.0010102	4.0195	0.020445		3765.8	0 (Negligible)
E	Maximum Slope		1	0.0	2.4990	Sagging	338.44E-6	3.0592	0.0014001	-	14198.0	0 (Negligible)
	Maximum Settlement		1	0.0	2.4990	Sagging	338.44E-6	3.0592	0.0014001	-	14198.0	0 (Negligible)
	Max. Tensile Strain		1	0.0	2.4990	Sagging	338.44E-6	3.0592	0.0014001	-	14198.0	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	2.4990	Sagging	338.44E-6	3.0592	0.0014001	-	14198.0	0 (Negligible)
F	Maximum Slope		1	0.0	0.40113	Sagging	490.90E-6	3.0594	0.013347	-	41903.0	0 (Negligible)
	Maximum Settlement		1	0.0	0.40113	Sagging	490.90E-6	3.0594	0.013347	-	41903.0	0 (Negligible)
	Max. Tensile Strain		2	0.40113	9.2995	Hogging	490.90E-6	2.8625	0.033014	14423.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	0.40113	9.2995	Hogging	490.90E-6	2.8625	0.033014	14423.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	0.40113	Sagging	490.90E-6	3.0594	0.013347	-	41903.0	0 (Negligible)
G	Maximum Slope		1	0.0	3.0000	Hogging	41.003E-6	0.24315	132.57E-6	316360.	-	0 (Negligible)
	Maximum Settlement		1	0.0	3.0000	Hogging	41.003E-6	0.24315	132.57E-6	316360.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	3.0000	Hogging	41.003E-6	0.24315	132.57E-6	316360.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	3.0000	Hogging	41.003E-6	0.24315	132.57E-6	316360.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
H	Maximum Slope		1	0.90062	2.7009	Hogging	70.084E-6	0.22254	0.029092	39519.	-	0 (Negligible)
	Maximum Settlement		1	0.90062	2.7009	Hogging	70.084E-6	0.22254	0.029092	39519.	-	0 (Negligible)
	Max. Tensile Strain		1	0.90062	2.7009	Hogging	70.084E-6	0.22254	0.029092	39519.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.90062	2.7009	Hogging	70.084E-6	0.22254	0.029092	39519.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
I	Maximum Slope		1	0.0	2.7003	Hogging	54.672E-6	0.22261	0.011308	74444.	-	0 (Negligible)
	Maximum Settlement		1	0.0	2.7003	Hogging	54.672E-6	0.22261	0.011308	74444.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	2.7003	Hogging	54.672E-6	0.22261	0.011308	74444.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	2.7003	Hogging	54.672E-6	0.22261	0.011308	74444.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
J	Maximum Slope		1	0.0	13.450	Sagging	86.649E-6	0.55511	0.0010651	-	49099.0	0 (Negligible)
	Maximum Settlement		1	0.0	13.450	Sagging	86.649E-6	0.55511	0.0010651	-	49099.0	0 (Negligible)
	Max. Tensile Strain		1	0.0	13.450	Sagging	86.649E-6	0.55511	0.0010651	-	49099.0	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	13.450	19.499	Hogging	86.649E-6	0.36937	943.96E-6	198650.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	13.450	Sagging	86.649E-6	0.55511	0.0010651	-	49099.0	0 (Negligible)
K	Maximum Slope		1	0.0	2.5412	Sagging	633.90E-6	3.1171	0.0070639	-	1935.7	0 (Negligible)
	Maximum Settlement		3	4.0141	7.4408	Sagging	576.62E-6	3.9779	0.0099058	-	4056.7	0 (Negligible)
	Max. Tensile Strain		2	2.5412	4.0141	Hogging	576.62E-6	3.4423	0.011193	12029.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	2.5412	4.0141	Hogging	576.62E-6	3.4423	0.011193	12029.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	2.5412	Sagging	633.90E-6	3.1171	0.0070639	-	1935.7	0 (Negligible)
L	Maximum Slope		1	0.0	6.7766	Hogging	595.91E-6	3.7461	0.071612	13727.	-	1 (Very Slight)
	Maximum Settlement		2	6.7766	7.1990	Sagging	595.91E-6	3.9981	0.093752	-	123000.2	2 (Slight)
	Max. Tensile Strain		2	6.7766	7.1990	Sagging	595.91E-6	3.9981	0.093752	-	123000.2	2 (Slight)
	Min. Radius of Curvature (Hogging)		1	0.0	6.7766	Hogging	595.91E-6	3.7461	0.071612	13727.	-	1 (Very Slight)
	Min. Radius of Curvature (Sagging)		2	6.7766	7.1990	Sagging	595.91E-6	3.9981	0.093752	-	123000.2	2 (Slight)
M	Maximum Slope		1	0.0	5.8138	Hogging	496.50E-6	2.8507	0.056453	17248.	-	1 (Very Slight)
	Maximum Settlement		2	5.8138	7.2997	Sagging	496.50E-6	3.5704	0.078899	-	31493.2	2 (Slight)
	Max. Tensile Strain		2	5.8138	7.2997	Sagging	496.50E-6	3.5704	0.078899	-	31493.2	2 (Slight)
	Min. Radius of Curvature (Hogging)		1	0.0	5.8138	Hogging	496.50E-6	2.8507	0.056453	17248.	-	1 (Very Slight)
	Min. Radius of Curvature (Sagging)		2	5.8138	7.2997	Sagging	496.50E-6	3.5704	0.078899	-	31493.2	2 (Slight)
N	Maximum Slope		1	0.0	6.0990	Hogging	334.46E-6	2.0749	0.038852	12489.	-	0 (Negligible)
	Maximum Settlement		1	0.0	6.0990	Hogging	334.46E-6	2.0749	0.038852	12489.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	6.0990	Hogging	334.46E-6	2.0749	0.038852	12489.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	6.0990	Hogging	334.46E-6	2.0749	0.038852	12489.	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
O	Maximum Slope		1	0.0	4.5990	Sagging	601.53E-6	5.8644	0.11712	-	2682.4	2 (Slight)
	Maximum Settlement		1	0.0	4.5990	Sagging	601.53E-6	5.8644	0.11712	-	2682.4	2 (Slight)
	Max. Tensile Strain		1	0.0	4.5990	Sagging	601.53E-6	5.8644	0.11712	-	2682.4	2 (Slight)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-



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Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category	
P	Curvature (Hogging)			-	-	-							
	Min. Radius of Curvature (Sagging)		1	0.0	4.5990	Sagging	601.53E-6	5.8644	0.11712	-	2682.4	2	(Slight)
	Maximum Slope	Sub #	3	3.2141	5.6990	Hogging	735.62E-6	4.1956	0.027500	1332.1	-	0	(Negligible)
	Maximum Settlement	Sub #	3	3.2141	5.6990	Hogging	735.62E-6	4.1956	0.027500	1332.1	-	0	(Negligible)
	Max. Tensile Strain	Sub #	1	0.0	1.9268	Hogging	341.91E-6	2.7038	0.059343	68339.	-	1	(Very Slight)
Q	Min. Radius of Curvature (Hogging)	Sub #	3	3.2141	5.6990	Hogging	735.62E-6	4.1956	0.027500	1332.1	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)	Sub #	2	1.9268	3.2141	Sagging	341.91E-6	3.1344	0.053584	-	22553.	1	(Very Slight)
	Maximum Slope		1	0.0	4.5990	Sagging	460.07E-6	4.7526	0.080665	-	2495.2	2	(Slight)
	Maximum Settlement		1	0.0	4.5990	Sagging	460.07E-6	4.7526	0.080665	-	2495.2	2	(Slight)
	Max. Tensile Strain		1	0.0	4.5990	Sagging	460.07E-6	4.7526	0.080665	-	2495.2	2	(Slight)
R	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-		
	Min. Radius of Curvature (Sagging)		1	0.0	4.5990	Sagging	460.07E-6	4.7526	0.080665	-	2495.2	2	(Slight)
	Maximum Slope		2	0.48898	2.1774	Hogging	0.0013996	4.4126	0.011736	4140.5	-	0	(Negligible)
	Maximum Settlement		4	4.8416	7.4098	Hogging	0.0013304	7.2172	0.038203	562.66	-	0	(Negligible)
	Max. Tensile Strain		3	2.1774	4.8416	Sagging	0.0013996	5.7907	0.049756	-	2782.0	0	(Negligible)
S	Min. Radius of Curvature (Hogging)		4	4.8416	7.4098	Hogging	0.0013304	7.2172	0.038203	562.66	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		3	2.1774	4.8416	Sagging	0.0013996	5.7907	0.049756	-	2782.0	0	(Negligible)
	Maximum Slope		3	7.9268	9.6875	Sagging	15.731E-6	0.11516	935.95E-6	-	342600.	0	(Negligible)
	Maximum Settlement		1	0.0	7.3583	Sagging	11.934E-6	0.13870	0.0011167	-	242620.	0	(Negligible)
	Max. Tensile Strain		1	0.0	7.3583	Sagging	11.934E-6	0.13870	0.0011167	-	242620.	0	(Negligible)
T	Min. Radius of Curvature (Hogging)		2	7.3583	7.9268	Hogging	11.016E-6	0.11383	928.15E-6	3.4224E+6	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	7.3583	Sagging	11.934E-6	0.13870	0.0011167	-	242620.	0	(Negligible)
	Maximum Slope		4	12.100	18.737	Hogging	578.74E-6	2.4212	0.010671	10589.	-	0	(Negligible)
	Maximum Settlement		3	5.7829	12.100	Sagging	282.96E-6	3.1144	0.0089006	-	10857.	0	(Negligible)
	Max. Tensile Strain		2	2.5281	5.7829	Hogging	115.92E-6	2.5338	0.020619	29079.	-	0	(Negligible)
U	Min. Radius of Curvature (Hogging)		4	12.100	18.737	Hogging	578.74E-6	2.4212	0.010671	10589.	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		5	18.737	23.597	Sagging	578.74E-6	2.6114	0.015864	-	9117.9	0	(Negligible)
	Maximum Slope		1	1.9720	9.8590	Hogging	370.92E-6	1.8595	0.035304	18350.	-	0	(Negligible)
	Maximum Settlement		1	1.9720	9.8590	Hogging	370.92E-6	1.8595	0.035304	18350.	-	0	(Negligible)
	Max. Tensile Strain		1	1.9720	9.8590	Hogging	370.92E-6	1.8595	0.035304	18350.	-	0	(Negligible)
V	Min. Radius of Curvature (Hogging)		1	1.9720	9.8590	Hogging	370.92E-6	1.8595	0.035304	18350.	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-		
	Maximum Slope		1	0.0	1.0341	Hogging	383.70E-6	2.2501	0.033394	70690.	-	0	(Negligible)
	Maximum Settlement		2	1.0341	3.6391	Sagging	383.70E-6	3.2030	0.055886	-	38449.	1	(Very Slight)
	Max. Tensile Strain		2	1.0341	3.6391	Sagging	383.70E-6	3.2030	0.055886	-	38449.	1	(Very Slight)
W	Min. Radius of Curvature (Hogging)		1	0.0	1.0341	Hogging	383.70E-6	2.2501	0.033394	70690.	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		2	1.0341	3.6391	Sagging	383.70E-6	3.2030	0.055886	-	38449.	1	(Very Slight)
	Maximum Slope		1	0.0	1.1392	Sagging	150.04E-6	3.2034	0.011344	-	415160.	0	(Negligible)
	Maximum Settlement		1	0.0	1.1392	Sagging	150.04E-6	3.2034	0.011344	-	415160.	0	(Negligible)
	Max. Tensile Strain		1	0.0	1.1392	Sagging	150.04E-6	3.2034	0.011344	-	415160.	0	(Negligible)
X	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-		
	Min. Radius of Curvature (Sagging)		1	0.0	1.1392	Sagging	150.04E-6	3.2034	0.011344	-	415160.	0	(Negligible)
	Maximum Slope		1	4.8600	6.5934	Hogging	872.41E-6	0.96487	0.037757	3843.1	-	0	(Negligible)
	Maximum Settlement		3	8.4201	9.7191	Hogging	448.15E-6	2.3160	0.045669	20861.	-	0	(Negligible)
	Max. Tensile Strain		3	8.4201	9.7191	Hogging	448.15E-6	2.3160	0.045669	20861.	-	0	(Negligible)
Y	Min. Radius of Curvature (Hogging)		1	4.8600	6.5934	Hogging	872.41E-6	0.96487	0.037757	3843.1	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		2	6.5934	8.4201	Sagging	872.41E-6	1.7476	0.042816	-	10628.	0	(Negligible)
	Maximum Slope		1	0.0	3.6141	Hogging	545.30E-6	4.2118	0.047188	25577.	-	0	(Negligible)
	Maximum Settlement		2	3.6141	3.6391	Sagging	545.30E-6	4.2254	0.048369	-	4.1155E+6	0	(Negligible)
	Max. Tensile Strain		2	3.6141	3.6391	Sagging	545.30E-6	4.2254	0.048369	-	4.1155E+6	0	(Negligible)
Z	Min. Radius of Curvature (Hogging)		1	0.0	3.6141	Hogging	545.30E-6	4.2118	0.047188	25577.	-	0	(Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-		
	Maximum Slope		1	5.7481	9.5792	Hogging	303.27E-6	1.1949	0.031016	18277.	-	0	(Negligible)
	Maximum Settlement		1	5.7481	9.5792	Hogging	303.27E-6	1.1949	0.031016	18277.	-	0	(Negligible)
	Max. Tensile Strain		1	5.7481	9.5792	Hogging	303.27E-6	1.1949	0.031016	18277.	-	0	(Negligible)
AA	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-		
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-		
AA	Maximum Slope		1	0.0	3.6610	Hogging	497.68E-6	2.7640	0.047267	18096.	-	0	(Negligible)



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Job No.	Sheet No.	Rev.
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Drg. Ref.		
Made by	Date 07-Mar-2017	Checked

Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
AB	Maximum Settlement		1	0.0	3.6610	Hogging	497.68E-6	2.7640	0.047267	18096.	- 0 (Negligible)	
	Max. Tensile Strain		1	0.0	3.6610	Hogging	497.68E-6	2.7640	0.047267	18096.	- 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		1	0.0	3.6610	Hogging	497.68E-6	2.7640	0.047267	18096.	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	
	Maximum Slope		1	8.5163	8.9441	Sagging	197.23E-6	0.30147	0.014228	-	25016. 0 (Negligible)	
	Maximum Settlement		2	8.9441	9.4616	Sagging	193.27E-6	0.40148	0.014228	-	20684. 0 (Negligible)	
	Max. Tensile Strain		1	8.5163	8.9441	Sagging	197.23E-6	0.30147	0.014228	-	25016. 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	
	Min. Radius of Curvature (Sagging)		2	8.9441	9.4616	Sagging	193.27E-6	0.40148	0.014228	-	20684. 0 (Negligible)	
	AC	Maximum Slope		1	0.0	5.0794	Hogging	233.40E-6	1.5001	0.013659	93673.	- 0 (Negligible)
Maximum Settlement			1	0.0	5.0794	Hogging	233.40E-6	1.5001	0.013659	93673.	- 0 (Negligible)	
Max. Tensile Strain			1	0.0	5.0794	Hogging	233.40E-6	1.5001	0.013659	93673.	- 0 (Negligible)	
Min. Radius of Curvature (Hogging)			1	0.0	5.0794	Hogging	233.40E-6	1.5001	0.013659	93673.	- 0 (Negligible)	
Min. Radius of Curvature (Sagging)			-	-	-	-	-	-	-	-	-	
AD	Maximum Slope		1	0.0	3.4564	Hogging	398.82E-6	2.7911	0.038500	34502.	- 0 (Negligible)	
	Maximum Settlement		2	3.4564	7.8628	Sagging	398.82E-6	4.2984	0.048193	-	13058. 0 (Negligible)	
	Max. Tensile Strain		2	3.4564	7.8628	Sagging	398.82E-6	4.2984	0.048193	-	13058. 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		1	0.0	3.4564	Hogging	398.82E-6	2.7911	0.038500	34502.	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)		2	3.4564	7.8628	Sagging	398.82E-6	4.2984	0.048193	-	13058. 0 (Negligible)	
AE	Maximum Slope		1	0.0	3.3051	Sagging	100.12E-6	1.5004	0.0017859	-	36760. 0 (Negligible)	
	Maximum Settlement		1	0.0	3.3051	Sagging	100.12E-6	1.5004	0.0017859	-	36760. 0 (Negligible)	
	Max. Tensile Strain		1	0.0	3.3051	Sagging	100.12E-6	1.5004	0.0017859	-	36760. 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	
	Min. Radius of Curvature (Sagging)		1	0.0	3.3051	Sagging	100.12E-6	1.5004	0.0017859	-	36760. 0 (Negligible)	
AF	Maximum Slope		1	0.0	3.2130	Sagging	305.23E-6	4.5605	0.017187	-	4127.4 0 (Negligible)	
	Maximum Settlement		1	0.0	3.2130	Sagging	305.23E-6	4.5605	0.017187	-	4127.4 0 (Negligible)	
	Max. Tensile Strain		1	0.0	3.2130	Sagging	305.23E-6	4.5605	0.017187	-	4127.4 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	
	Min. Radius of Curvature (Sagging)		1	0.0	3.2130	Sagging	305.23E-6	4.5605	0.017187	-	4127.4 0 (Negligible)	
AG	Maximum Slope		1	0.0	8.0923	Sagging	328.31E-6	4.4122	0.0033587	-	23647. 0 (Negligible)	
	Maximum Settlement		1	0.0	8.0923	Sagging	328.31E-6	4.4122	0.0033587	-	23647. 0 (Negligible)	
	Max. Tensile Strain		2	8.0923	15.237	Hogging	328.31E-6	2.2033	0.025296	26481.	- 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		2	8.0923	15.237	Hogging	328.31E-6	2.2033	0.025296	26481.	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)		1	0.0	8.0923	Sagging	328.31E-6	4.4122	0.0033587	-	23647. 0 (Negligible)	
AH	Maximum Slope		3	1.8229	3.7488	Hogging	299.89E-6	2.7027	0.013384	166750.	- 0 (Negligible)	
	Maximum Settlement		4	3.7488	6.3378	Sagging	299.89E-6	3.4326	737.18E-6	-	36727. 0 (Negligible)	
	Max. Tensile Strain		1	0.0	0.82876	Sagging	288.17E-6	1.8566	0.021492	-	224530. 0 (Negligible)	
	Min. Radius of Curvature (Hogging)		3	1.8229	3.7488	Hogging	299.89E-6	2.7027	0.013384	166750.	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)		4	3.7488	6.3378	Sagging	299.89E-6	3.4326	737.18E-6	-	36727. 0 (Negligible)	
AI	Maximum Slope	Sub #	1	0.0	3.5776	Sagging	348.31E-6	3.4329	0.019910	-	22247. 0 (Negligible)	
	Maximum Settlement	Sub #	1	0.0	3.5776	Sagging	348.31E-6	3.4329	0.019910	-	22247. 0 (Negligible)	
	Max. Tensile Strain	Sub #	2	3.5776	4.8498	Hogging	348.31E-6	2.2854	0.028721	101550.	- 0 (Negligible)	
	Min. Radius of Curvature (Hogging)	Sub #	2	3.5776	4.8498	Hogging	348.31E-6	2.2854	0.028721	101550.	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	3.5776	Sagging	348.31E-6	3.4329	0.019910	-	22247. 0 (Negligible)	
AJ	Maximum Slope	Sub #	2	1.2425	3.4033	Hogging	545.62E-6	2.3013	0.0059131	9468.9	- 0 (Negligible)	
	Maximum Settlement	Sub #	6	8.2453	8.9667	Sagging	3.8327E-6	2.6269	0.0037474	-	1.2764E+6 0 (Negligible)	
	Max. Tensile Strain	Sub #	3	3.4033	5.9528	Sagging	545.62E-6	2.6190	0.0092667	-	6740.3 0 (Negligible)	
	Min. Radius of Curvature (Hogging)	Sub #	2	1.2425	3.4033	Hogging	545.62E-6	2.3013	0.0059131	9468.9	- 0 (Negligible)	
	Min. Radius of Curvature (Sagging)	Sub #	3	3.4033	5.9528	Sagging	545.62E-6	2.6190	0.0092667	-	6740.3 0 (Negligible)	
AK	Maximum Slope	Sub #	1	0.0	2.1928	Hogging	630.99E-6	3.9565	0.064841	23704.	- 1 (Very Slight)	
	Maximum Settlement	Sub #	2	2.1928	4.9487	Sagging	630.99E-6	5.5773	0.064540	-	12210. 1 (Very Slight)	
	Max. Tensile Strain	Sub #	1	0.0	2.1928	Hogging	630.99E-6	3.9565	0.064841	23704.	- 1 (Very Slight)	
	Min. Radius of Curvature (Hogging)	Sub #	1	0.0	2.1928	Hogging	630.99E-6	3.9565	0.064841	23704.	- 1 (Very Slight)	
	Min. Radius of Curvature (Sagging)	Sub #	2	2.1928	4.9487	Sagging	630.99E-6	5.5773	0.064540	-	12210. 1 (Very Slight)	
AL	Maximum Slope	Sub #	1	0.0	4.7371	Hogging	126.14E-6	6.0410	0.0030249	54363.	- 0 (Negligible)	
	Maximum Settlement	Sub #	1	0.0	4.7371	Hogging	126.14E-6	6.0410	0.0030249	54363.	- 0 (Negligible)	
	Max. Tensile Strain	Sub #	1	0.0	4.7371	Hogging	126.14E-6	6.0410	0.0030249	54363.	- 0 (Negligible)	
	Min. Radius of Curvature	Sub #	1	0.0	4.7371	Hogging	126.14E-6	6.0410	0.0030249	54363.	- 0 (Negligible)	



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Drg. Ref.		
Made by	Date 07-Mar-2017	Checked

Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
AM	(Hogging)											
	Min. Radius of Curvature (Sagging)											
	Maximum Slope	Sub #	1	0.0	2.7064	Sagging	717.80E-6	6.0411	0.074662	-	13108.1	1 (Very Slight)
	Maximum Settlement	Sub #	1	0.0	2.7064	Sagging	717.80E-6	6.0411	0.074662	-	13108.1	1 (Very Slight)
	Max. Tensile Strain	Sub #	1	0.0	2.7064	Sagging	717.80E-6	6.0411	0.074662	-	13108.1	1 (Very Slight)
AN	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	2.7064	Sagging	717.80E-6	6.0411	0.074662	-	13108.1	1 (Very Slight)
	Maximum Slope	Sub #	1	0.0	3.3367	Sagging	687.07E-6	4.3455	0.011085	-	889.99	0 (Negligible)
	Maximum Settlement	Sub #	1	0.0	3.3367	Sagging	687.07E-6	4.3455	0.011085	-	889.99	0 (Negligible)
	Max. Tensile Strain	Sub #	1	0.0	3.3367	Sagging	687.07E-6	4.3455	0.011085	-	889.99	0 (Negligible)
AO	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	3.3367	Sagging	687.07E-6	4.3455	0.011085	-	889.99	0 (Negligible)
	Maximum Slope	Sub #	1	0.0	0.86915	Hogging	674.70E-6	4.3534	0.072485	58107.	-	1 (Very Slight)
	Maximum Settlement	Sub #	2	0.86915	2.5169	Sagging	674.70E-6	5.4489	0.074851	-	30636.1	1 (Very Slight)
	Max. Tensile Strain	Sub #	2	0.86915	2.5169	Sagging	674.70E-6	5.4489	0.074851	-	30636.1	1 (Very Slight)
AP	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	0.86915	Hogging	674.70E-6	4.3534	0.072485	58107.	-	1 (Very Slight)
	Maximum Slope	Sub #	1	0.0	4.4543	Sagging	866.23E-6	5.9061	0.013862	-	1002.5	0 (Negligible)
	Maximum Settlement	Sub #	1	0.0	4.4543	Sagging	866.23E-6	5.9061	0.013862	-	1002.5	0 (Negligible)
	Max. Tensile Strain	Sub #	1	0.0	4.4543	Sagging	866.23E-6	5.9061	0.013862	-	1002.5	0 (Negligible)
AQ	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	4.4543	Sagging	866.23E-6	5.9061	0.013862	-	1002.5	0 (Negligible)
	Maximum Slope	Sub #	1	0.0	4.9487	Hogging	578.44E-6	4.4806	0.042635	17977.	-	0 (Negligible)
	Maximum Settlement	Sub #	1	0.0	4.9487	Hogging	578.44E-6	4.4806	0.042635	17977.	-	0 (Negligible)
	Max. Tensile Strain	Sub #	1	0.0	4.9487	Hogging	578.44E-6	4.4806	0.042635	17977.	-	0 (Negligible)
AR	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	4.9487	Hogging	578.44E-6	4.4806	0.042635	17977.	-	0 (Negligible)
	Maximum Slope	Sub #	1	0.0	8.4707	Hogging	740.36E-6	4.3030	0.068339	12142.	-	1 (Very Slight)
	Maximum Settlement	Sub #	1	0.0	8.4707	Hogging	740.36E-6	4.3030	0.068339	12142.	-	1 (Very Slight)
	Max. Tensile Strain	Sub #	1	0.0	8.4707	Hogging	740.36E-6	4.3030	0.068339	12142.	-	1 (Very Slight)
AS	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	0.0	8.4707	Hogging	740.36E-6	4.3030	0.068339	12142.	-	1 (Very Slight)
	Maximum Slope	Sub #	1	1.8137	8.1605	Hogging	541.59E-6	2.6279	0.048147	13122.	-	0 (Negligible)
	Maximum Settlement	Sub #	1	1.8137	8.1605	Hogging	541.59E-6	2.6279	0.048147	13122.	-	0 (Negligible)
	Max. Tensile Strain	Sub #	1	1.8137	8.1605	Hogging	541.59E-6	2.6279	0.048147	13122.	-	0 (Negligible)
AT	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	1.8137	8.1605	Hogging	541.59E-6	2.6279	0.048147	13122.	-	0 (Negligible)
	Maximum Slope	Sub #	2	7.2491	11.076	Sagging	256.76E-6	2.5287	0.0064509	-	46211.0	0 (Negligible)
	Maximum Settlement	Sub #	2	7.2491	11.076	Sagging	256.76E-6	2.5287	0.0064509	-	46211.0	0 (Negligible)
	Max. Tensile Strain	Sub #	1	1.8461	7.2491	Hogging	254.91E-6	1.6046	0.016000	75494.	-	0 (Negligible)
AU	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	1	1.8461	7.2491	Hogging	254.91E-6	1.6046	0.016000	75494.	-	0 (Negligible)
	Maximum Slope	Sub #	2	7.2491	11.076	Sagging	256.76E-6	2.5287	0.0064509	-	46211.0	0 (Negligible)
	Maximum Settlement	Sub #	1	0.0	4.5849	Sagging	765.06E-6	7.2961	0.13869	-	2792.5	2 (Slight)
	Max. Tensile Strain	Sub #	1	0.0	4.5849	Sagging	765.06E-6	7.2961	0.13869	-	2792.5	2 (Slight)
AV	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	2	4.5849	7.1103	Hogging	759.55E-6	4.7376	0.10184	22146.	-	2 (Slight)
	Maximum Slope	Sub #	1	0.0	4.5849	Sagging	765.06E-6	7.2961	0.13869	-	2792.5	2 (Slight)
	Maximum Settlement	Sub #	2	3.6879	6.0934	Sagging	791.04E-6	2.8589	0.011730	-	4179.3	0 (Negligible)
	Max. Tensile Strain	Sub #	1	0.0	3.6879	Hogging	3.7760E-6	2.8727	11.909E-6	51.727E+6	-	0 (Negligible)
AW	Min. Radius of Curvature (Hogging)											
	Min. Radius of Curvature (Sagging)	Sub #	3	6.0934	8.1927	Hogging	791.04E-6	2.4078	0.0081113	5942.8	-	0 (Negligible)
	Maximum Slope	Sub #	2	3.6879	6.0934	Sagging	791.04E-6	2.8589	0.011730	-	4179.3	0 (Negligible)
	Maximum Settlement	Sub #	2	0.43048	5.7983	Hogging	0.0011142	5.2325	0.041868	9337.1	-	0 (Negligible)
	Max. Tensile Strain	Sub #	3	5.7983	11.321	Sagging	0.0011142	7.7676	0.081895	-	1690.6	2 (Slight)



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Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start	End	Curvature	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
Specific Building Damage Results - All Combined Segments												
Structure: A Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: B Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: C Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: D Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: E Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: F Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: G Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: H Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: I Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: J Sub-structure:												
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain					Damage Category
[m]		[m]	[m]		[%]	[%]			[%]			
No structures have segments combined.												
Structure: K Sub-structure:												
Vertical	Combined	Start	Length	Curvature	Deflection	Average	Max.					Damage Category



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Offset from Line for Vertical Movement Calculations	Segment			Ratio	Horizontal Strain	Tensile Strain		
[m]	[m]	[m]		[%]	[%]	[%]		
No structures have segments combined.								
Structure: L Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: M Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: N Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: O Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: P Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: Q Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: R Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: S Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: T Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: U Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	



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Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
No structures have segments combined.									
Structure: V Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: W Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: X Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: Y Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: Z Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AA Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AB Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AC Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AD Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AE Sub-structure:									
Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
[m]	[m]	[m]			[%]	[%]	[%]		
No structures have segments combined.									
Structure: AF Sub-structure:									
Vertical	Combined	Start	Length	Curvature	Deflection	Average	Max.	Damage	Category



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Offset from Line for Vertical Movement Calculations	Segment			Ratio	Horizontal Strain	Tensile Strain		
[m]	[m]	[m]		[%]	[%]	[%]		
No structures have segments combined.								
Structure: AG Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AH Sub-structure:								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AI Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AJ Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AK Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AL Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AM Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AN Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AO Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	
No structures have segments combined.								
Structure: AP Sub-structure: Sub #								
Offset from Line for Vertical Movement Calculations	Segment	Combined Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]	



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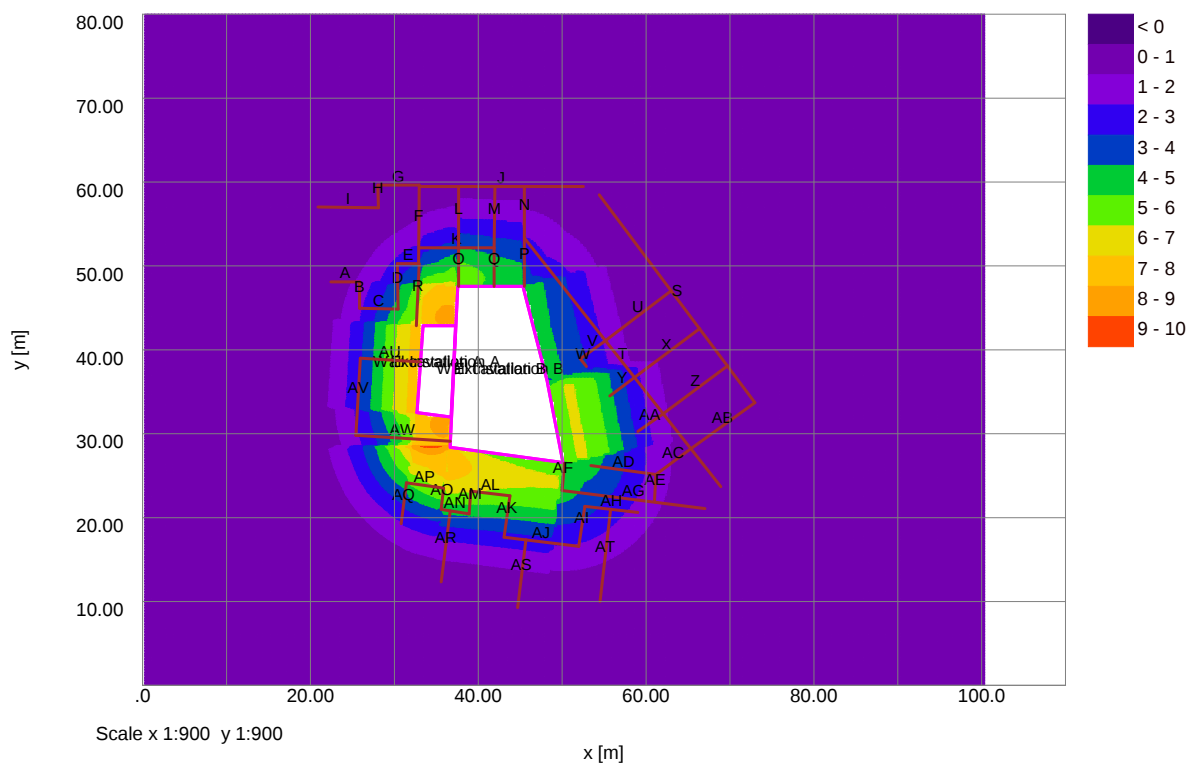
Rear of 159-163 King's Cross Road, London WC1X 9BN
Wall Installation and Excavation Combined Issue 4

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J16180		
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Made by	Date 07-Mar-2017	Checked

Vertical Offset from Line for Vertical Movement Calculations	Combined Segment	Start	Length	Curvature	Deflection Ratio	Average Horizontal Strain	Max. Tensile Strain	Damage	Category
No structures have segments combined.									
Structure: AQ Sub-structure: Sub #									
No structures have segments combined.									
Structure: AR Sub-structure: Sub #									
No structures have segments combined.									
Structure: AS Sub-structure: Sub #									
No structures have segments combined.									
Structure: AT Sub-structure: Sub #									
No structures have segments combined.									
Structure: AU Sub-structure:									
No structures have segments combined.									
Structure: AV Sub-structure:									
No structures have segments combined.									
Structure: AW Sub-structure:									
No structures have segments combined.									

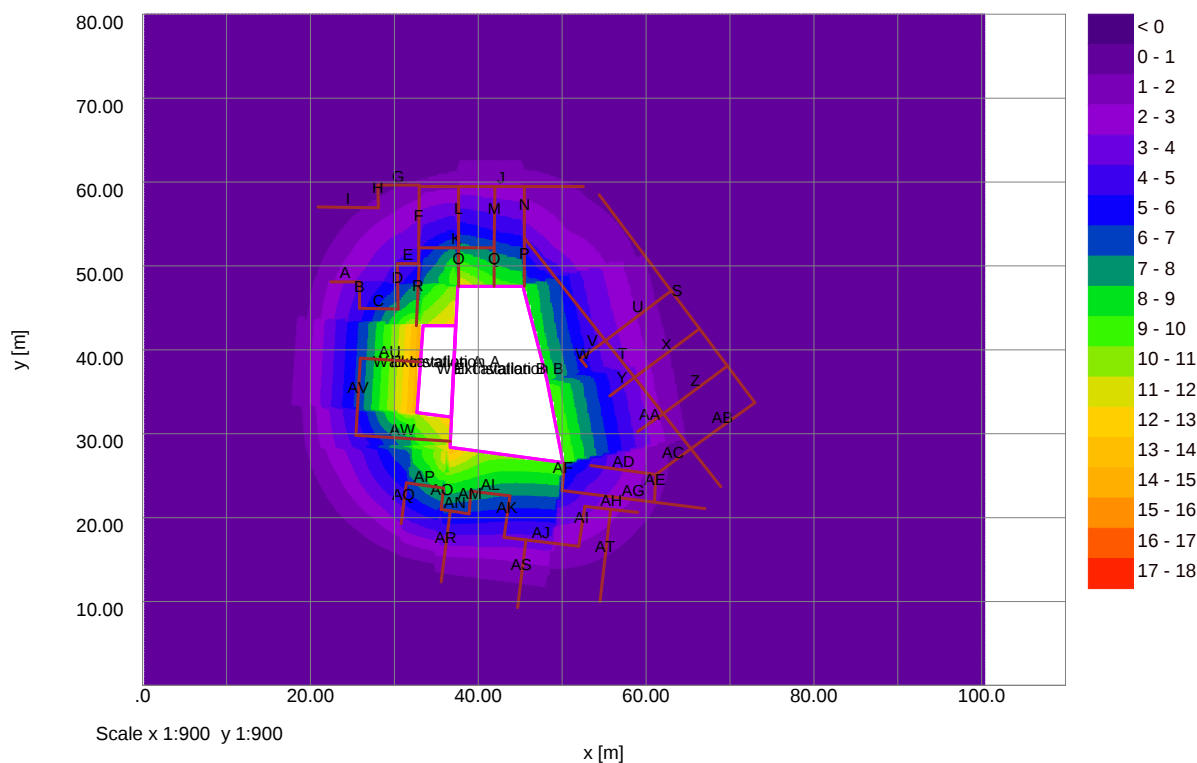
Job No.	Sheet No.	Rev.
J16180		
Drg. Ref.		
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	07-Mar-2017	

Vertical Settlement Contours: Grid 1 (level 0.000m) (Interval 1mm)

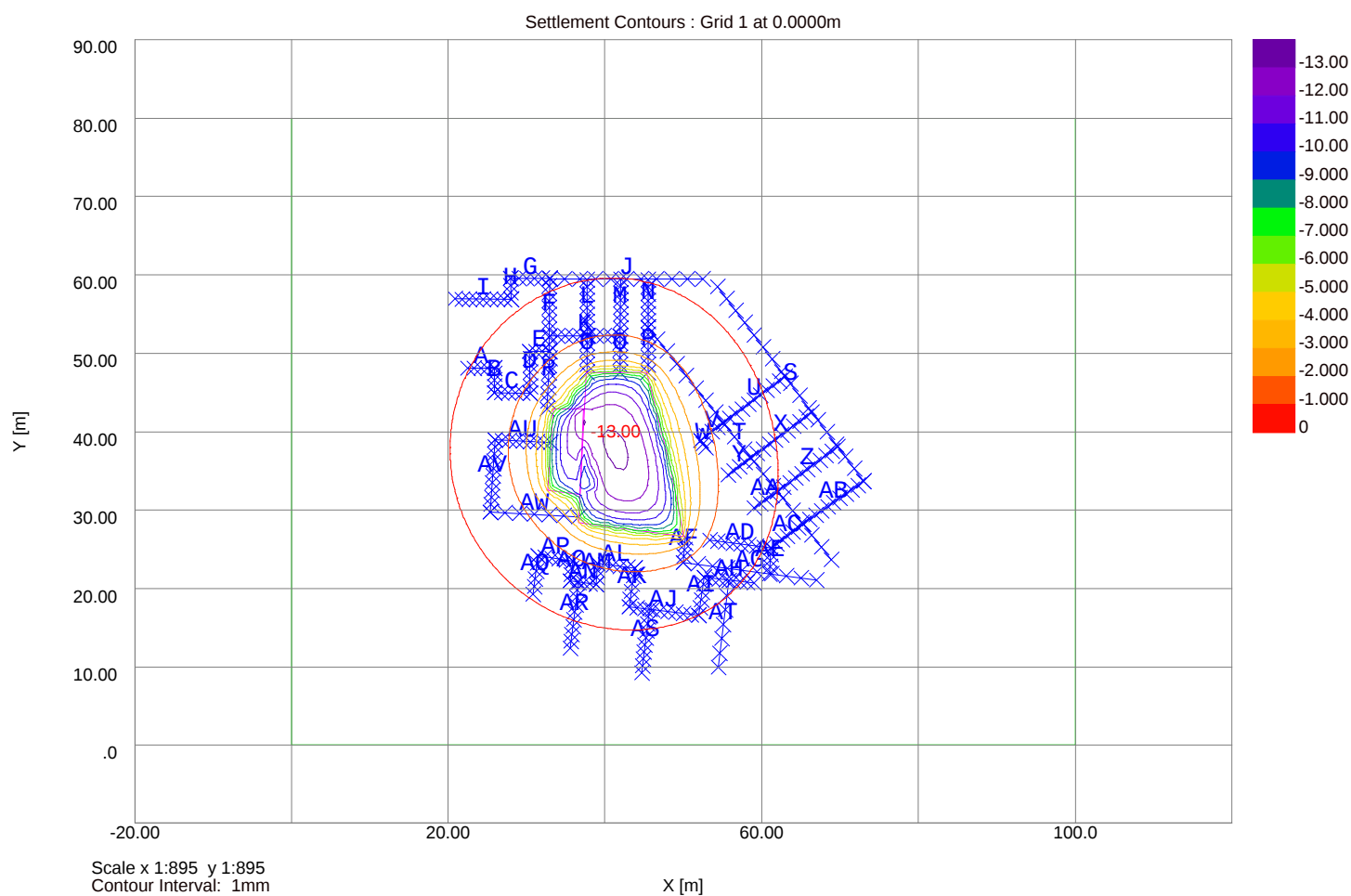


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	07-Mar-2017	

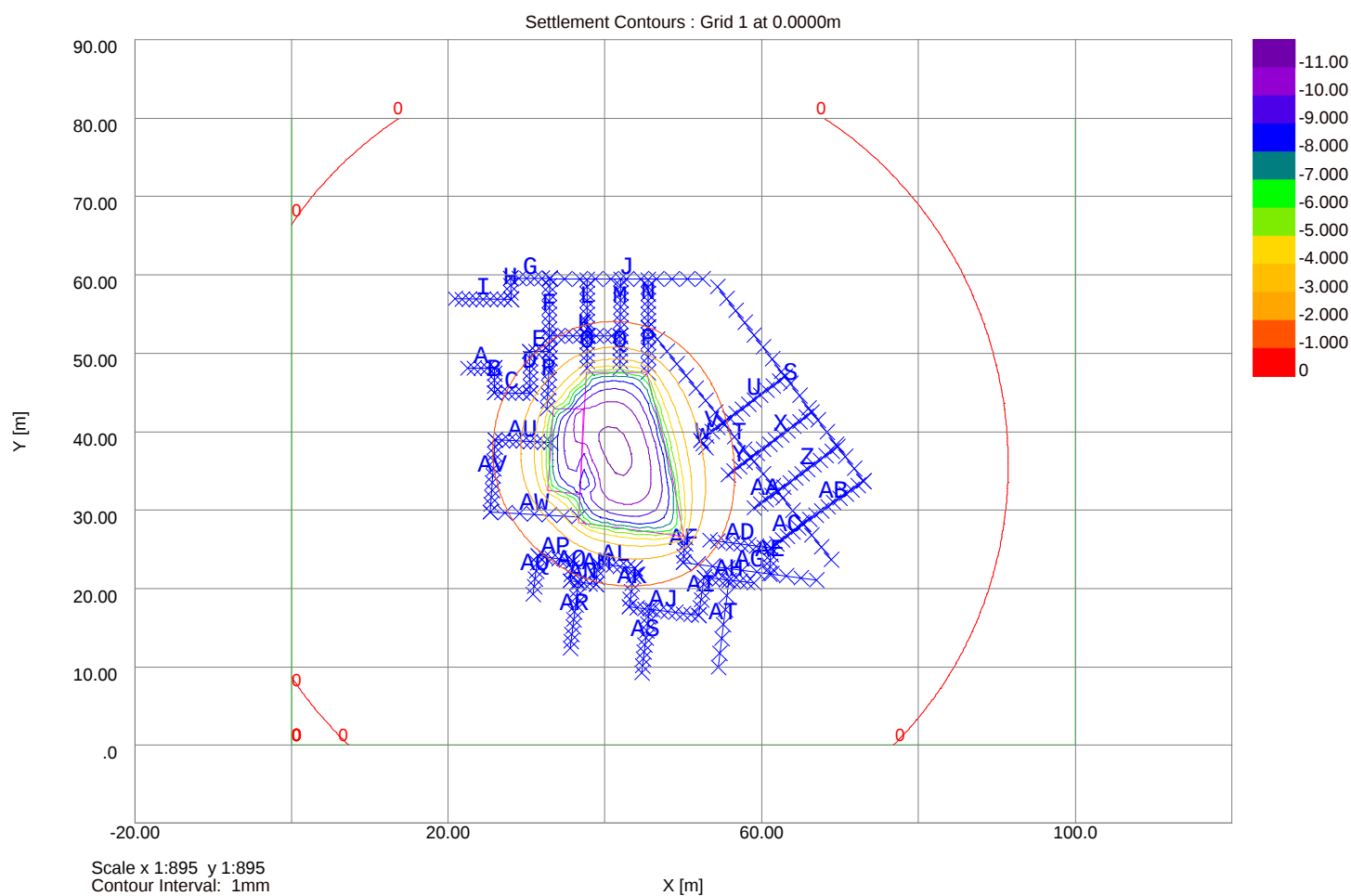
Horizontal Displacement Contours: Grid 1 (level 0.000m) Interval 1mm



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Made by	Date	Checked



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Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	Q

Input parameters:

Wall Length, L =	4.60	m
Wall Height, H =	3.65	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	1.26
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	1.70	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

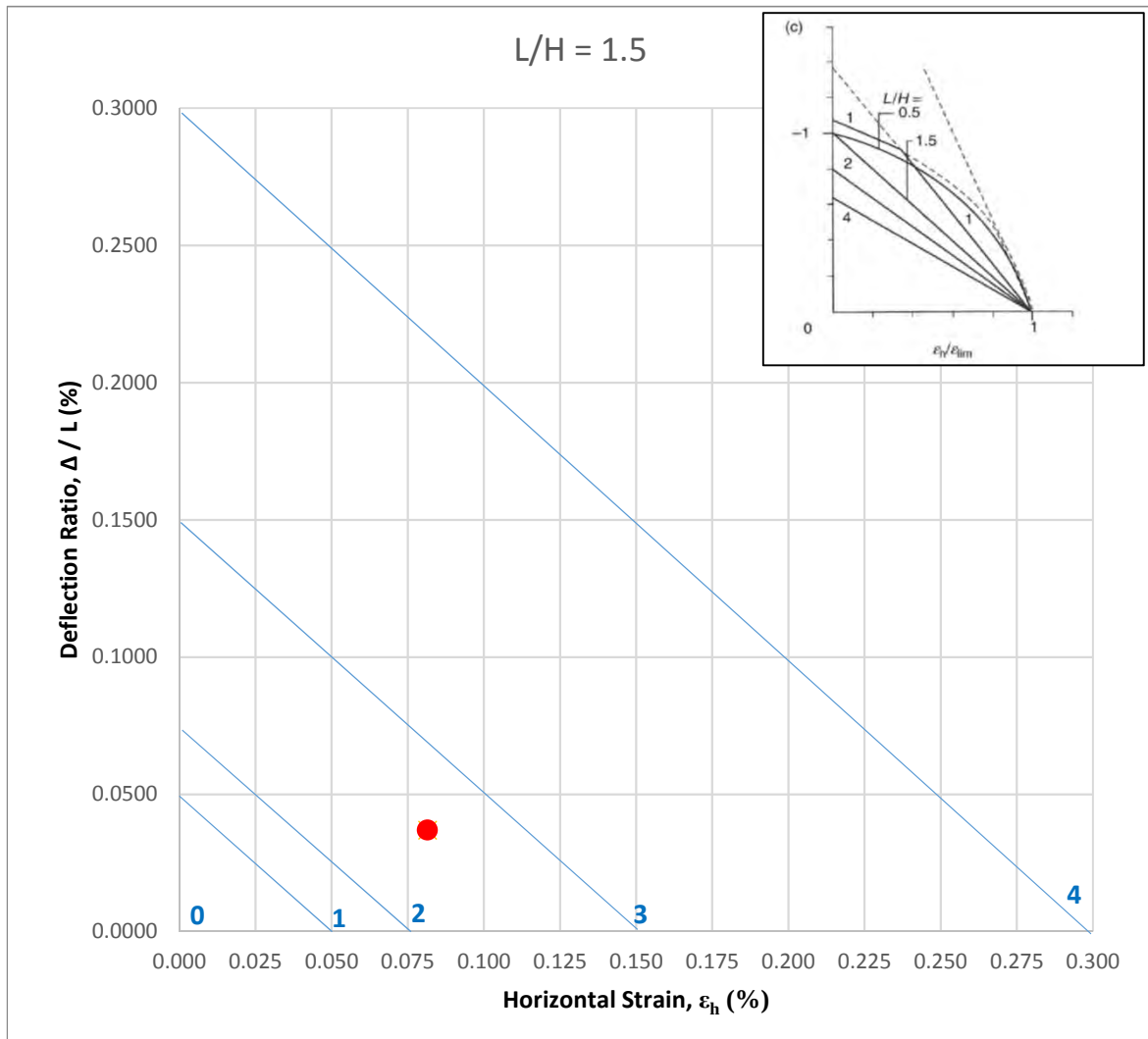
Change in vertical movement, Δ =	1.70	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

Change in horizontal movement, δ_h =	3.75	mm
---	------	----

Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 2 - SLIGHT
----------------------------	---------------------



Wall Length, L = 4.6 m
Wall Height, H = 3.7 m
Change in horizontal movement, δ_h = 3.75 mm
Change in vertical movement, Δ = 1.70 mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

$$\epsilon_h = 0.0815$$

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

$$= 0.0370$$

Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	O

Input parameters:

Wall Length, L =	4.60	m
Wall Height, H =	3.68	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	1.25
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	1.30	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

Change in vertical movement, Δ =	1.30	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

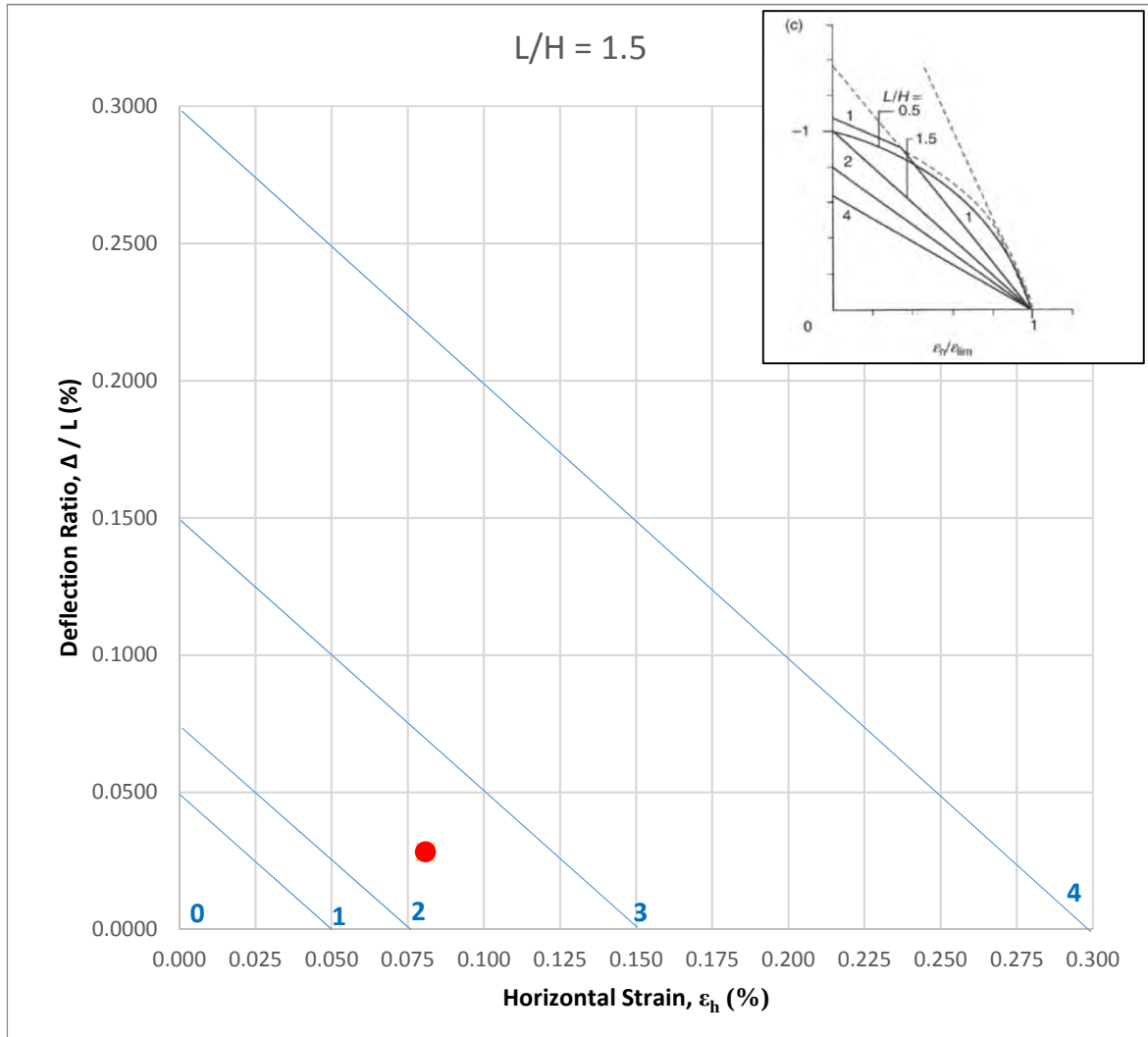
Change in horizontal movement, δ_h =	3.72	mm
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Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 2 - SLIGHT
----------------------------	---------------------

Project Number J16180
Revision 4.0
Wall Reference O

L / H = 1.25



Wall Length, L = 4.6 m
Wall Height, H = 3.7 m
Change in horizontal movement, δ_h = 3.72 mm
Change in vertical movement, Δ = 1.30 mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

ϵ_h = 0.0809

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

= 0.0283

Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	M

Input parameters:

Wall Length, L =	7.30	m
Wall Height, H =	9.50	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	0.77
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	0.26	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

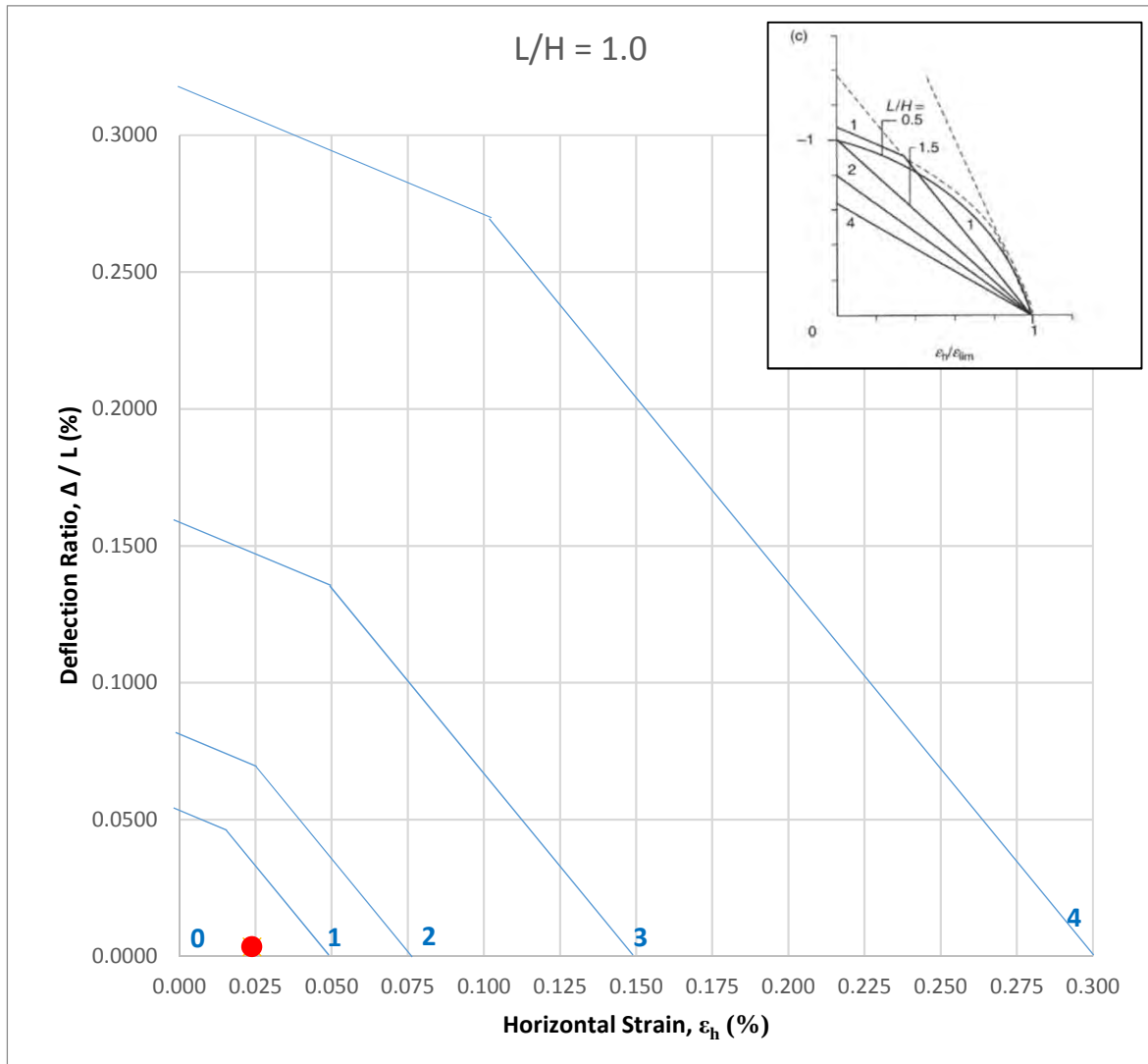
Change in vertical movement, Δ =	0.26	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

Change in horizontal movement, δ_h =	1.74	mm
---	------	----

Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 0 - NEGLIGIBLE
----------------------------	-------------------------



Wall Length, $L = 7.3$ m
Wall Height, $H = 9.5$ m
Change in horizontal movement, $\delta_h = 1.74$ mm
Change in vertical movement, $\Delta = 0.26$ mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

$$\epsilon_h = 0.0238$$

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

$$= 0.0036$$

Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	L

Input parameters:

Wall Length, L =	7.20	m
Wall Height, H =	8.50	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	0.85
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	0.20	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

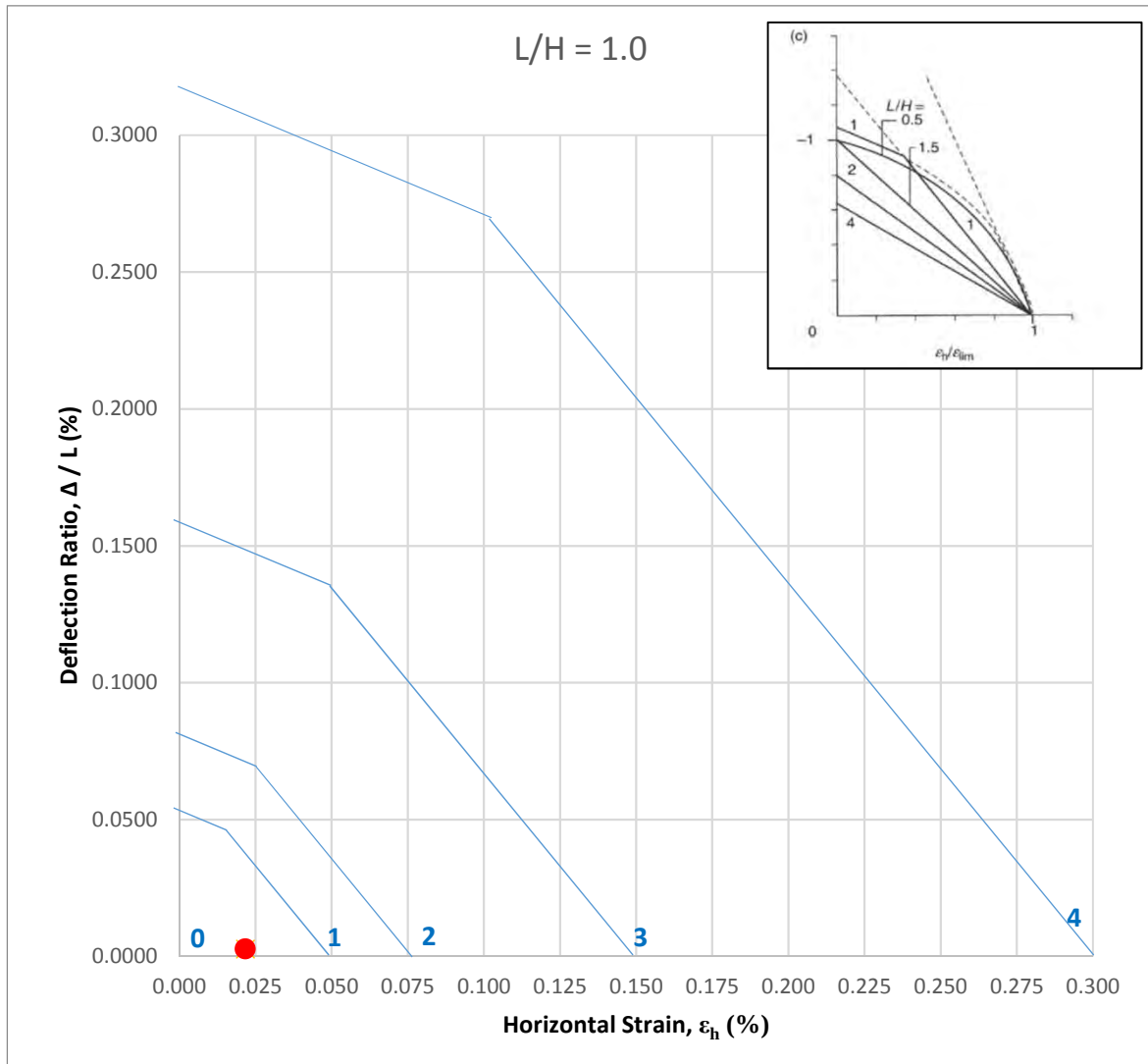
Change in vertical movement, Δ =	0.20	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

Change in horizontal movement, δ_h =	1.56	mm
---	------	----

Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 0 - NEGLIGIBLE
----------------------------	-------------------------



Wall Length, L = 7.2 m
Wall Height, H = 8.5 m
Change in horizontal movement, δ_h = 1.56 mm
Change in vertical movement, Δ = 0.20 mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

$$\epsilon_h = 0.0217$$

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

$$= 0.0028$$

Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	AW

Input parameters:

Wall Length, L =	11.30	m
Wall Height, H =	4.60	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	2.46
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	1.50	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

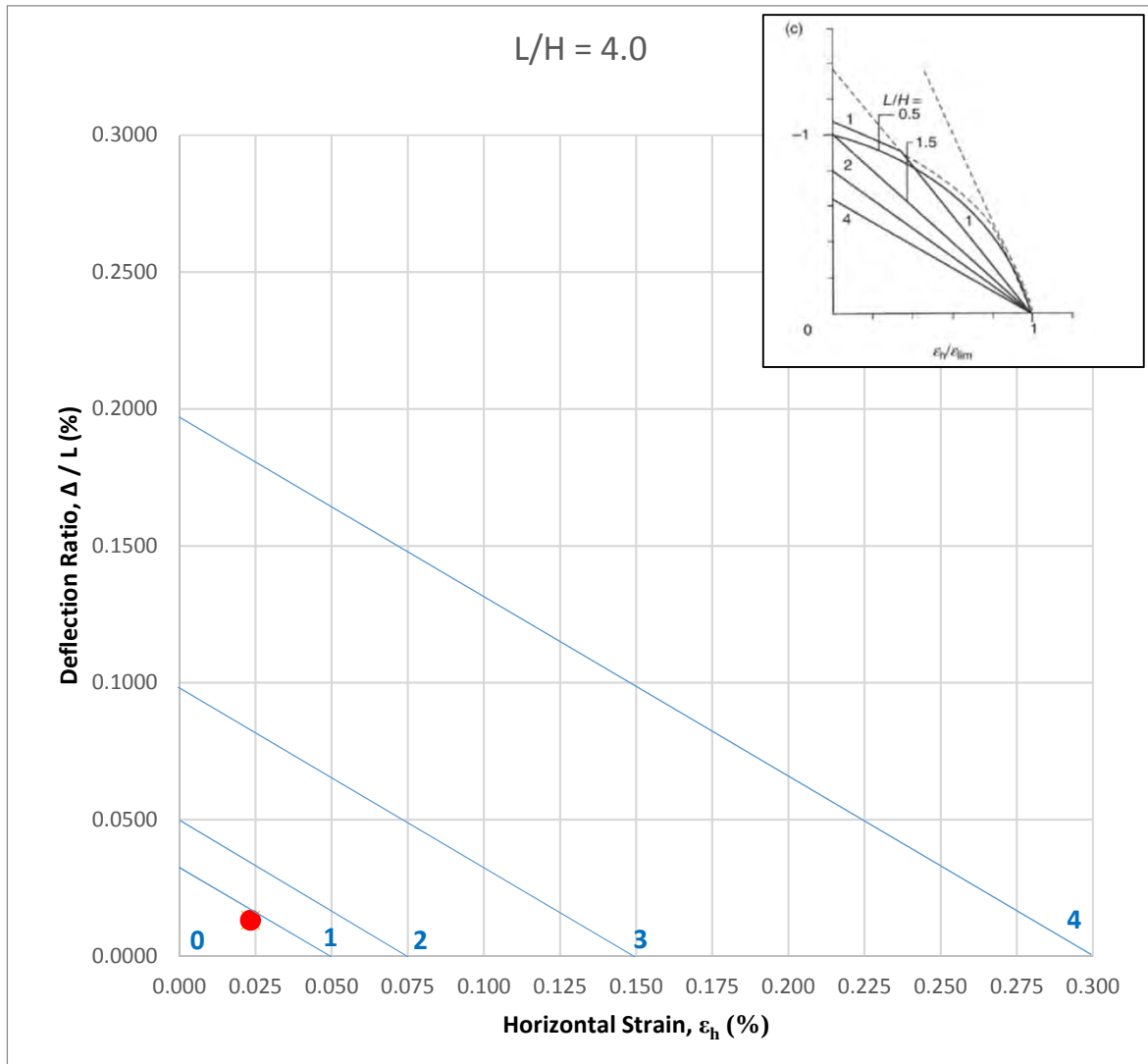
Change in vertical movement, Δ =	1.50	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

Change in horizontal movement, δ_h =	2.64	mm
---	------	----

Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 0 - NEGLIGIBLE
----------------------------	-------------------------



Wall Length, L = 11.3 m
Wall Height, H = 4.6 m
Change in horizontal movement, δ_h = 2.64 mm
Change in vertical movement, Δ = 1.50 mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

$$\epsilon_h = 0.0234$$

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

$$= 0.0133$$

Ground Movement Assessment Summary



Project Number	J16180
Issue	4.0
Wall Reference	AU

Input parameters:

Wall Length, L =	7.10	m
Wall Height, H =	4.60	m

Proposed basement depth =	4.40	m
---------------------------	------	---

L / H =	1.54
---------	------

Vertical Displacement Behind Wall Prediction:

Differential total heave =	2.40	mm
Predicted from P-Disp		

Total settlement =	0.00	mm
--------------------	------	----

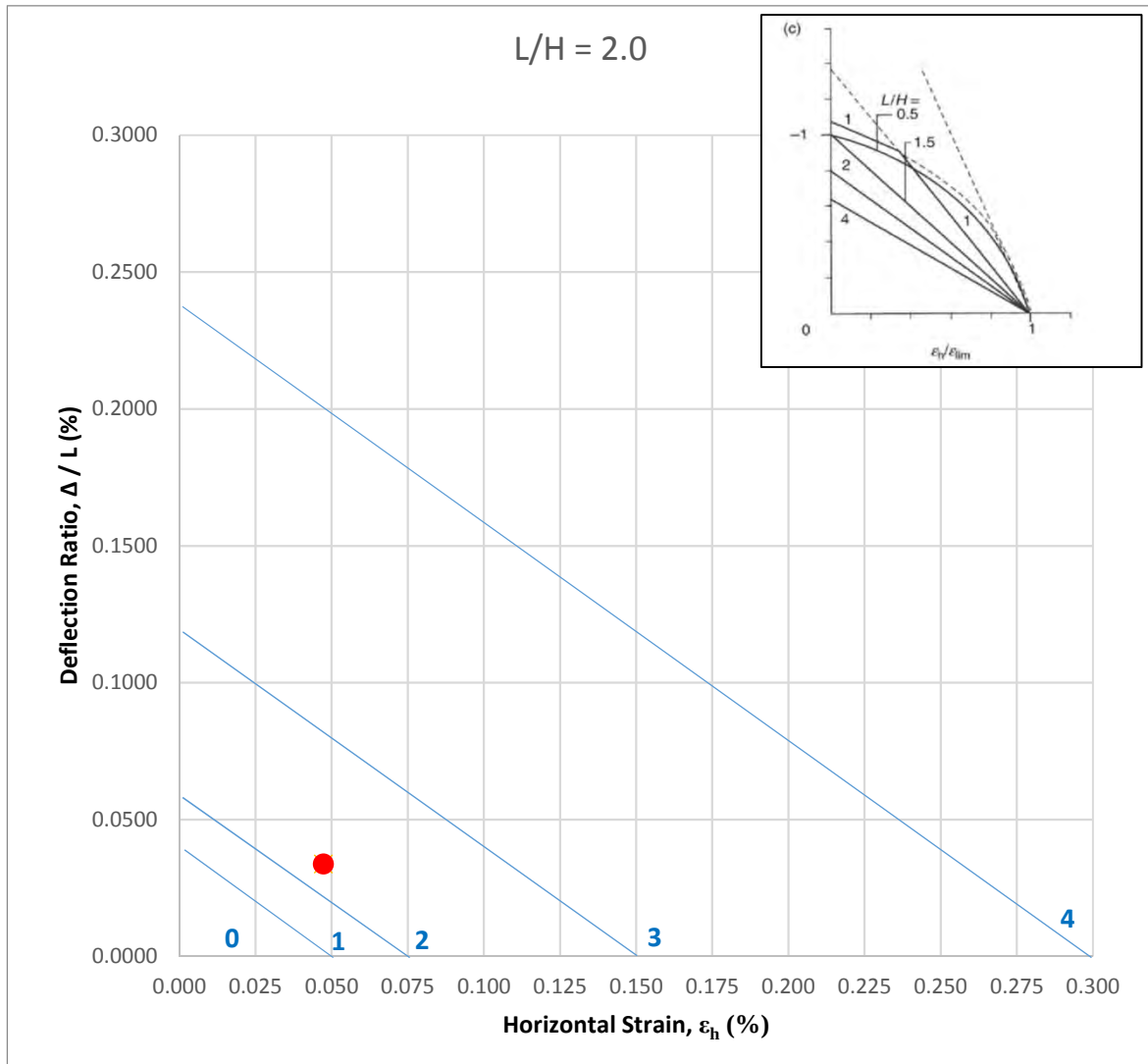
Change in vertical movement, Δ =	2.40	mm
---	------	----

Horizontal Displacement Behind Wall Prediction:

Change in horizontal movement, δ_h =	3.36	mm
---	------	----

Predicted from CIRIA C580 (Fig 2.11a) assuming excavation in front of a wall in stiff clay and based on 5 mm horizontal movement at wall

Building Damage Category =	CATEGORY 2 - SLIGHT
----------------------------	---------------------



Wall Length, L = 7.1 m
Wall Height, H = 4.6 m
Change in horizontal movement, δ_h = 3.36 mm
Change in vertical movement, Δ = 2.40 mm

Horizontal Strain:

$$\text{Horizontal Strain, } \epsilon_h = \frac{\delta_h \times 100}{L \times 1000}$$

$$\epsilon_h = 0.0473$$

Deflection Ratio:

$$\text{Deflection Ratio} = \frac{\Delta \times 100}{L \times 1000}$$

$$= 0.0338$$

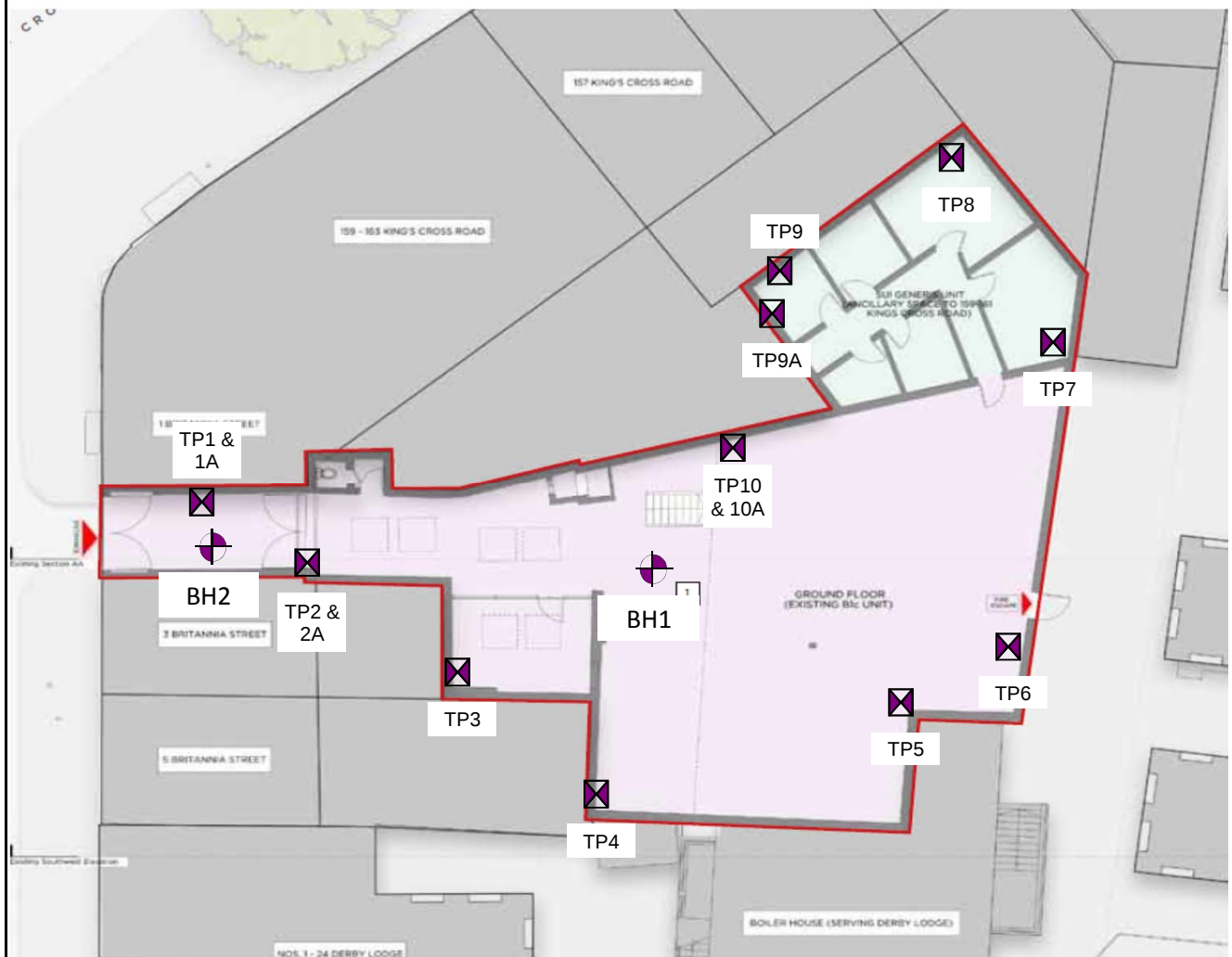
Site	Rear of 159-163 King's Cross Road, London WC1X 9BN
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Client	Balcap RE
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Engineer Parmarbrook

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Geotechnical & Environmental Associates (GEA) is an engineer-led and client-focused independent specialist providing a complete range of geotechnical and contaminated land investigation, analytical and consultancy services to the property and construction industries.

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