GROUND MOVEMENT ASSESSMENT REPORT

31 Heath Drive
London
NW3 7SB

Client: Mr Ravi Gupta

Engineer: Crownwell Basements

J15308A

December 2015




GEA Geotechnical & Environmental Associates

Document Control

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1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Crownwell Basements, on behalf of Mr Ravi Gupta, to complete a ground movement assessment for the proposed extension to the existing single level basement beneath No 31 Heath Drive, London NW3 7SB.

A Ground Investigation Report has previously been carried out by Sub Surface South East Ltd (report ref AJP/SE1281, dated 16th April 2015) and the findings of the report have been used in the derivation of parameters for use in this assessment.

The purpose of this assessment has been to assess any effects of the proposed basement construction upon nearby sensitive structures.

1.1 Proposed Development

It is understood that it is proposed to extend the existing single level basement laterally towards the west and south beneath the existing building to a depth of 3.5 m from existing internal ground level.

This report is specific to the proposed development and the advice herein should be reviewed if the development proposals are amended.

1.2 Limitations

The conclusions and recommendations made in this report are limited to those that can be made on the basis of the investigation. The results of the work should be viewed in the context of the range of data sources consulted, the number of locations where the ground was sampled and the number of soil, gas or groundwater samples tested; no liability can be accepted for information in other data sources or conditions not revealed by the sampling or testing. Any comments made on the basis of information obtained from the client or other third parties are given in good faith on the assumption that the information is accurate; no independent validation of such information has been made by GEA.

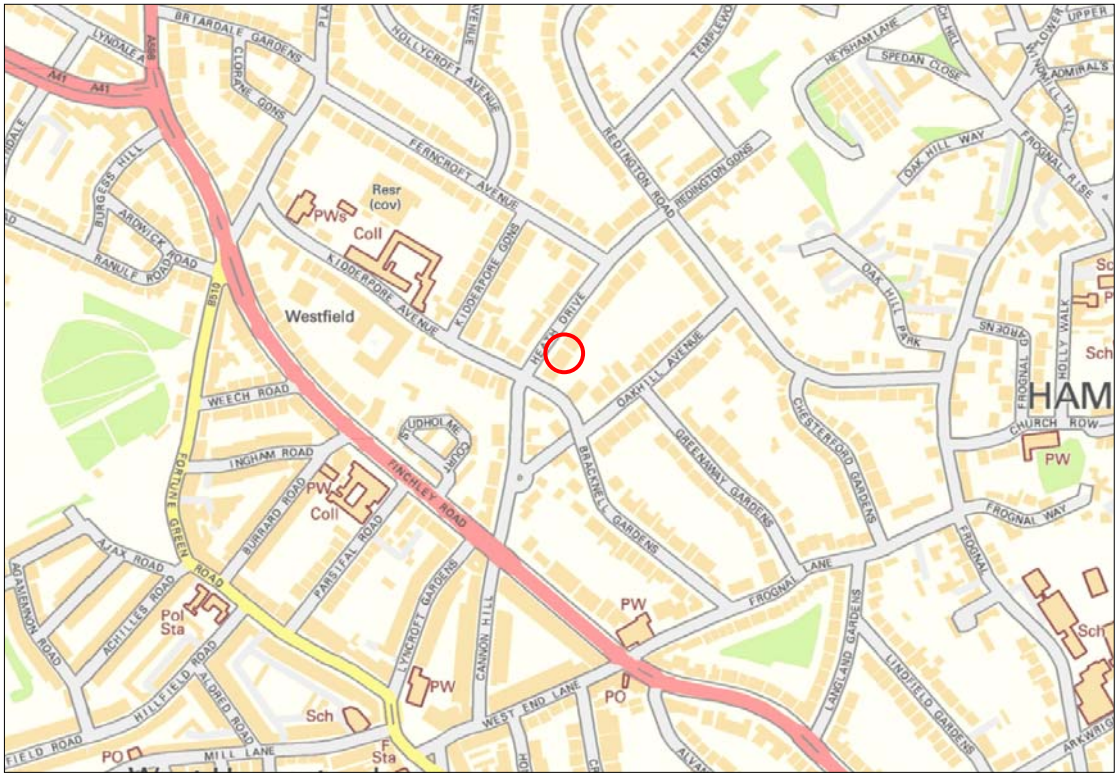
2.0 THE SITE

2.1 Site Description

The site is located in the London Borough of Camden, approximately 800 m west of Hampstead London Underground station and 780 m northwest of Finchley Road & Frognal London Underground station. It fronts onto Heath Drive to the northwest and is bounded by Nos 30 and 32 Heath Drive, three-storey houses located to the northeast and southwest respectively and by the rear gardens of houses fronting onto Bracknell Gardens and Oakhill Avenue to the south. The site may additionally be located by National Grid Reference 525594, 185736, and is shown on the map overleaf.

A site walkover was carried out by an engineer from GEA on 13th November 2015. The site is rectangular in shape and measures approximately 50 m northwest-southeast by 13 m northeast-southwest. It is occupied by the existing three-storey house which occupies roughly half of the area of site. The site slopes downward to the northwest and is known to have a partial single level basement beneath part of the front of the house, which extends to a depth of roughly 2.5 m below existing internal floor level. The house is connected to its neighbour

at No 32 Heath Drive. There is an access route from the front garden to the rear garden along the northeastern boundary of the house, adjacent No 30 Heath Drive. The sloping nature of the site necessitates a retaining wall adjacent to No 32 Heath Drive and a series of permanent struts between the retaining wall and No 31 Heath Drive. Signs of movement in the retaining wall in the form of cracks were noted during the walkover.



Left: Access via side of house, Middle: Cracking to adjacent retaining wall, Right: Struts between house and retaining wall

3.0 SUMMARY OF GROUND CONDITIONS

The ground investigation carried out by Sub Surface South East Ltd generally encountered a moderate thickness of made ground overlying the Claygate Member of the London Clay.

The made ground comprised dark and light orange-brown mottled gravelly sandy silty clay and gravelly sand with clinker and fragments of brick, coal and concrete and extended to a depth of 1.9 m below existing basement level. Asbestos fragments were noted within Borehole No M1 from a depth of 0.40 m.

The Claygate Member was found to comprise firm becoming stiff brown and occasional grey mottled silty clay to the full depth of the borehole, of 5.45 m. This stratum was noted as becoming stiff at around 5.0 m depth. No geotechnical testing was carried out as part of the ground investigation.

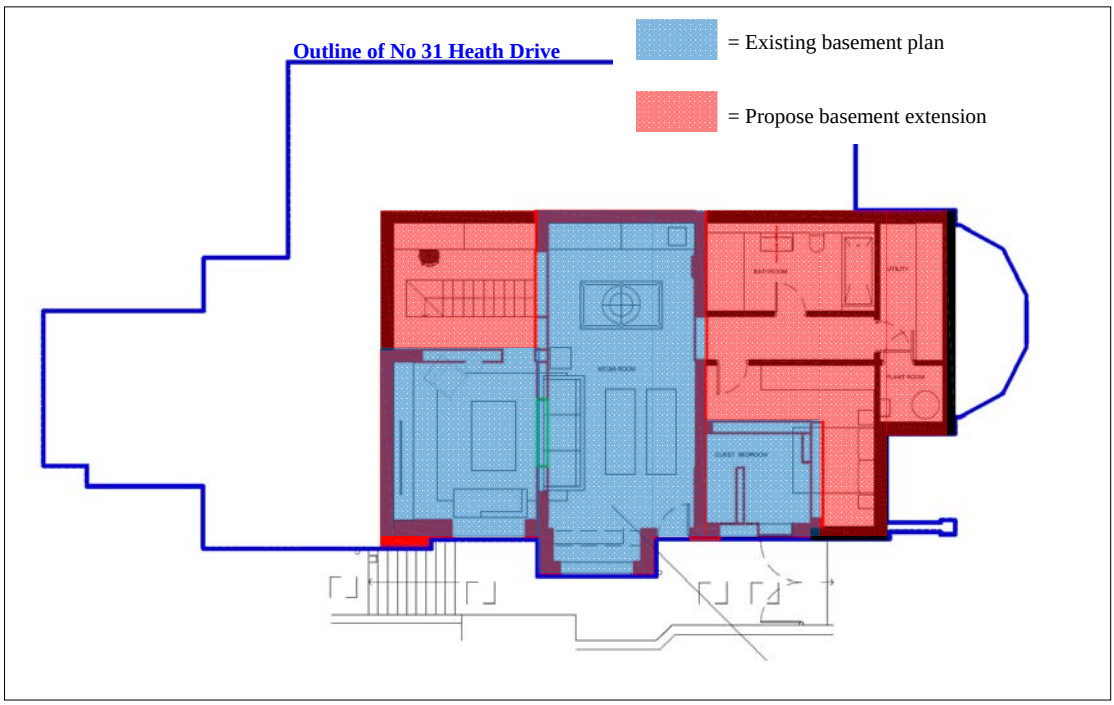
Groundwater was not encountered during the drilling of the boreholes.

A previous investigation has been carried out by GEA approximately 170 m to the east, along Oakhill Avenue. A single cable percussion borehole was advanced to a depth of 15 m at this location and the strength profile of the soils at depth at this location has been used in the assessment at No 31 Heath Drive.

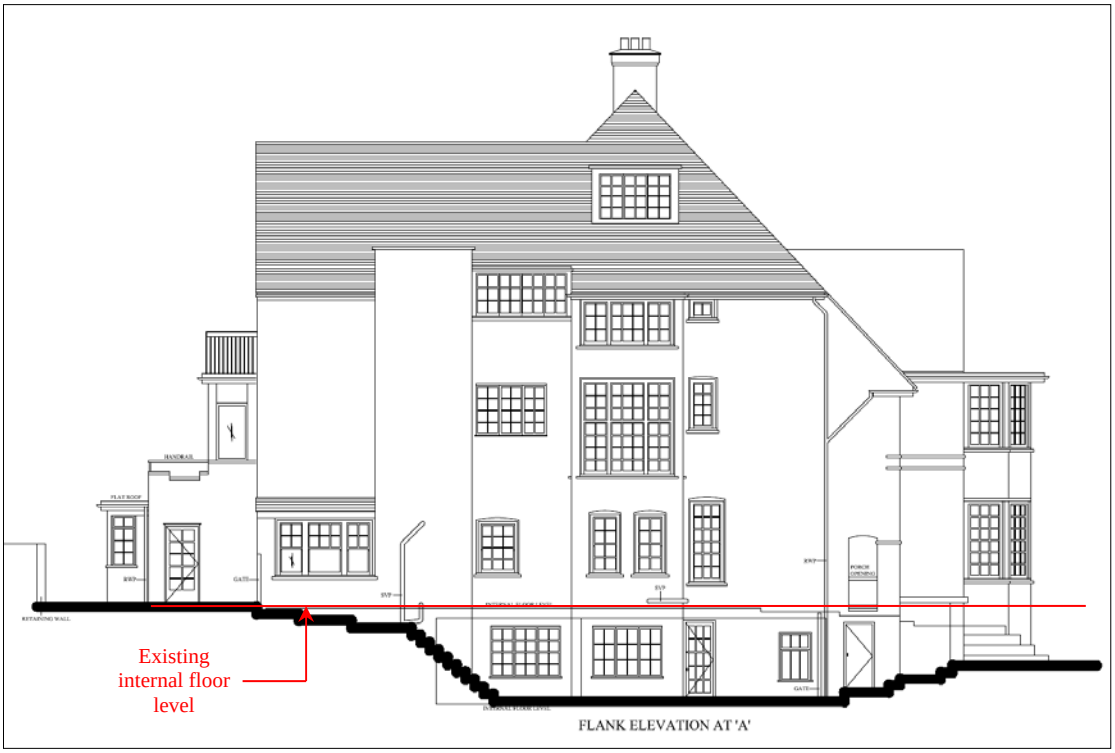
Furthermore, reference to a record of a borehole located 830 m to the south of the site held within the British Geological Survey (BGS) archive indicates the London Clay and clay of the Lambeth Group extends to a depth of around 100 m, although the depth to the base of the London Clay itself is unclear.

4.0 CONSTRUCTION SEQUENCE

The proposed basement layout is shown in the diagram below.



Plan: Existing and proposed basement area



Section: Existing flank wall

For the purposes of the ground movement assessment, the ground level will be taken at existing internal ground level. The proposed basement will be formed by means of traditional underpinning to a depth of 3.50 m below ground level, which, it is assumed, includes the basement floor slab, with all new loadings assumed to be applied at the same depth.

The following sequence of operations has been assumed to enable analysis of the ground movements around the proposed basement both during and after construction.

In general, the sequence of works for basement construction will comprise the following stages.

1. Construct underpinned retaining walls. These are commonly formed in a 'hit and miss' sequence using a trench box excavation, commonly sheet lined, shored and strutted; all temporary shoring and propping to be inspected by a suitably qualified person; and

2. excavate new basement and temporarily retain and strengthen, with sufficient propping and walling beams, the new retaining walls. Construct new ground beams.

The underpins will be adequately laterally propped and sufficiently dowelled together, concrete cast and adequately cured prior to excavation of the basement and removal of the formwork and supports.

The detail of the support provided to adjacent walls is beyond the scope of this report at this stage and the structural engineer will be best placed to agree a methodology with the underpinning contractor once appointed.

When the final excavation depths have been reached the permanent works will be formed, which are likely to comprise reinforced concrete walls with a drained cavity lining the inside of the underpinned walls. Reinforced concrete will be used for floor slabs and it is anticipated

that heave protection will be installed beneath the basement slab. Following this, the floor slab will be constructed at basement depth and the temporary props will be removed.

5.0 GROUND MOVEMENTS

An assessment of ground movements within and surrounding the excavation has been undertaken using the X-Disp and P-Disp computer programs licensed from the OASYS suite of geotechnical modelling software from Arup. These programs are commonly used within the ground engineering industry and are considered to be appropriate tools for this analysis.

The X-Disp program has been used to predict ground movements likely to arise from the construction of the proposed basement. This includes the settlement of the ground (vertical movement) and the lateral movement of soil behind the proposed retaining walls (horizontal movement).

The analysis of potential ground movements within the excavation, as a result of unloading of the underlying soils, has been carried out using the Oasys P-Disp Version 19.3 – Build 12 software package and is based on the assumption that the soils behave elastically, which provides a reasonable approximation to soil behaviour at small strains.

For the purpose of these analyses, the corners have been defined by x and y coordinates, with the x-direction parallel with the orientation northwest-southeast, whilst the y-direction is parallel with the orientation of northeast-southwest. Vertical movement is in the z-direction. Wall lengths of less than 10 m have been modelled as 1 m long structural elements, while greater than 10 m wall lengths have been modelled as 2 m elements to reflect the greater stiffness of the longer walls. The full outputs of all the analyses can be provided on request and samples of the output movement contour plots are included within the appendix.

5.1 Ground Movements – Surrounding the Basement

5.1.1 Model Used

For the X-Disp analysis, the soil movement relationships used for the embedded retaining walls are the default values within CIRIA report C580[1], which were derived from a number of historic case studies.

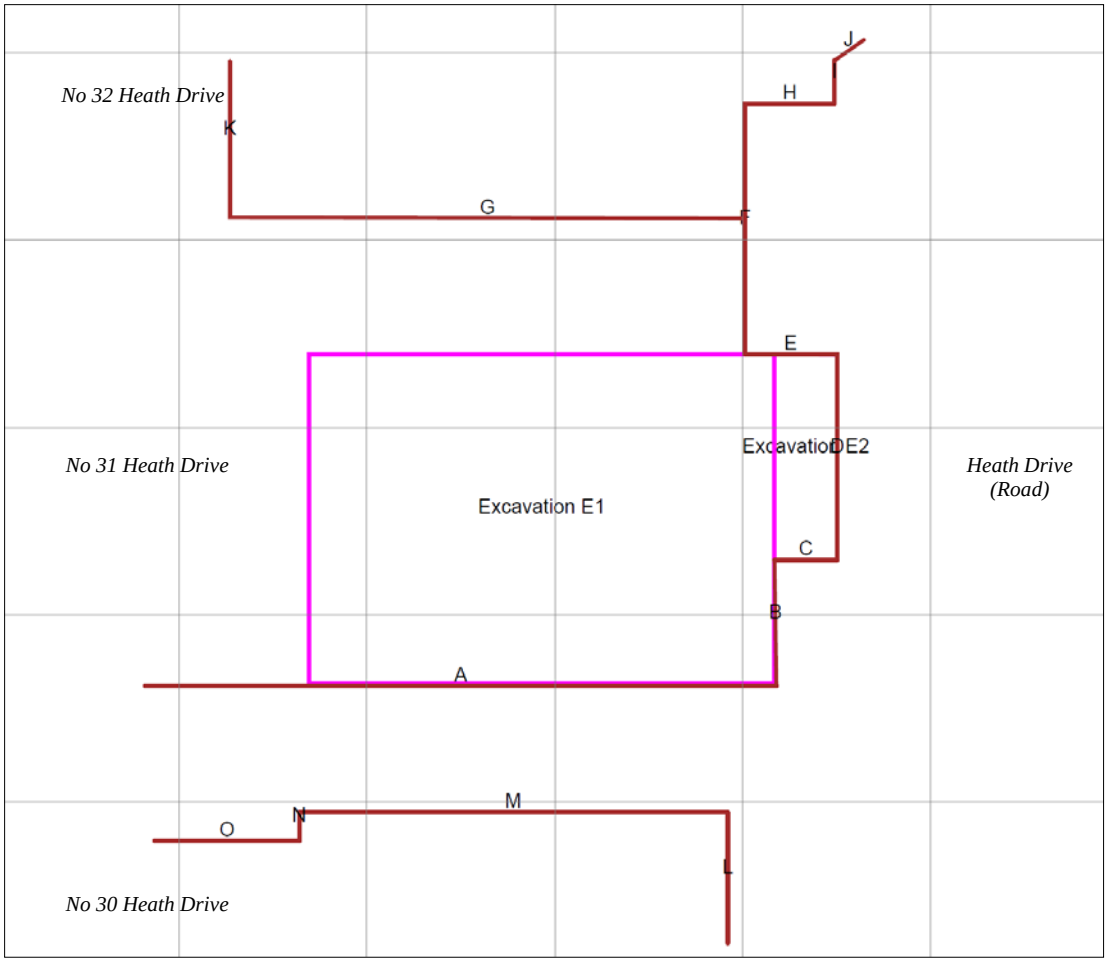
The analysis has adopted the values for ‘installation of a planar diaphragm wall’ to represent the installation of the underpinned and reinforced concrete retaining walls. The ground movement curves for ‘excavations in front of a high stiffness wall in stiff clay’ have been adopted as being considered most appropriate for the proposed excavation and its support at this site.

5.1.2 Results

The predicted movements are based on the worst case of the individually analysed segments of ‘hogging’ and ‘sagging’ and these are summarised in the tables below. It should be noted that the combined effect of segments acting together typically improve the resultant movements and the values below are therefore deemed to be conservative.

[1] Gaba, A, Simpson, B, Powrie, W and Beadman, D (2003) *Embedded retaining walls – guidance for economic design.* CIRIA Report C580.

Displacement Analysis Points:



The heights and basement depths of each of the nearby sensitive structures are summarised in the table below.

Sensitive Structure	Elevation	Depth below ground level of basement / foundations (m)	Height of building above level of basement / foundations
No 31 Heath Drive	A	2.6	10.6
	B	2.6	10.6
	C	1.6	7.6
	D	1.6	7.6
	E	1.6	7.6
No 31/No 32 Front Elevation	F	2.6	10.6
No 32 Heath Drive	G	2.6	10.6
	H	1.6	7.6
	I	1.6	7.6
	J	1.6	7.6
	K	2.6	10.6
No 30 Heath Drive	L	2.6	10.6
	M	2.6	10.6
	N	2.6	10.6

Sensitive Structure	Elevation	Depth below ground level of basement / foundations (m)	Height of building above level of basement / foundations
	O	2.6	10.6

The results are presented below to the degree of accuracy required to allow predicted variations in ground movements around the structure(s) to be illustrated, but may not reflect the anticipated accuracy of the predictions.

Wall Installation Phase:

Sensitive Structure	Elevation	Vertical Movement (Settlement) (mm)	Horizontal Movement (mm)
No 31 Heath Drive	A	2	2
	B	2	2
	C	2	2
	D	2	2
	E	2	2
No 31/No 32 Front Elevation	F	2	2
No 32 Heath Drive	G	1	1
	H	1	1
	I	1	1
	J	1	1
	K	1	1
No 30 Heath Drive	L	1	1
	M	1	1
	N	1	1
	O	1	1

Wall Installation and Excavation Phases Combined:

Sensitive Structure	Elevation	Vertical Movement (Settlement) (mm)	Horizontal Movement (mm)
No 31 Heath Drive	A	4	7
	B	4	7
	C	4	8
	D	4	8
	E	4	8
No 31/No 32 Front Elevation	F	4	8
No 32 Heath Drive	G	3	5
	H	2	3
	I	2	3
	J	1	2
	K	2	2
No 30 Heath Drive	L	3	5
	M	3	5

Sensitive Structure	Elevation	Vertical Movement (Settlement) (mm)	Horizontal Movement (mm)
	N	2	3
	O	2	3

The analysis has indicated that the maximum vertical settlements and horizontal movements that will result from the new retaining wall construction are less than 5 mm. Furthermore, the analysis has indicated that the maximum vertical settlements and horizontal movements that will result from the combined effect of the retaining wall installation and excavation are less than 10 mm.

5.2 Movements within the Excavation (Heave)

5.2.1 Model Used

At this site unloading of the London Clay will take place as a result of the proposed building demolition and subsequent excavation and the reduction in vertical stress in the short term will cause heave to take place. Undrained soil parameters have been used to estimate the potential short term movements, which include the "immediate" or elastic movements as a result of the basement excavation. Drained parameters have been used to provide an estimate of the total long-term movement.

The elastic analysis requires values of soil stiffness at various levels to calculate displacements. Values of stiffness for the soils at this site are readily available from published data and we have used a well-established method to provide our estimates. This relates values of E_u and E', the drained and undrained stiffness respectively, to values of undrained cohesion, as described by Padfield and Sharrock[2] and Butler[3] and more recently by O'Brien and Sharp[4]. Relationships of $E_u = 500\ C_u$ and $E' = 300\ C_u$ for the cohesive soils have been used to obtain values of Young's modulus. More recent published data[5] indicates stiffness values of 750 x Cu for the London Clay and a ratio of E' to Eu of 0.75, and it is considered that the use of the more conservative values provides a sensible approach for this stage in the design. The profile of the underlying Claygate Member has been interpolated from a nearby site investigation carried out by GEA at Oakhill Avenue, roughly 170 m to the east .

At this stage it is assumed that there will be no new net loading applied at basement level.

The proposed excavation will result in a net unloading of around 70 kN/m^2.

A rigid boundary for the analysis has been set within the London Clay and underlying clay of the Lambeth Group at a depth of 100 m below existing internal ground level, where local BGS records indicate that the base of these formations are likely to be present.

5.2.2 Results

The P-Disp analysis indicates that, by the time the basement construction is complete, around 5 mm to 10 mm of heave is likely to have taken place at the centre of the proposed excavation, reducing to less than 5 mm at the edges.

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2 Padfield CJ and Sharrock MJ (1983) *Settlement of structures on clay soils*. CIRIA Special Publication 27

3 Butler FG (1974) *Heavily overconsolidated clays: a state of the art review*. Proc Conf Settlement of Structures, Cambridge, 531-578, Pentech Press, Lond

4 O'Brien AS and Sharp P (2001) *Settlement and heave of overconsolidated clays - a simplified non-linear method.* Part Two, Ground Engineering, Nov 2001, 48-53

5 Burland JB, Standing, JR, and Jardine, FM (2001) *Building response to tunnelling, case studies from construction of the Jubilee Line Extension* CIRIA Special Publication 200

Following completion of the basement construction, roughly an additional 10 mm of heave is likely to occur at the centre of the proposed excavation in the long term.

The results of the P-Disp analysis can be used to indicate the likely impact of the proposed basement construction beyond the site boundaries; about 5 m away from the excavation a total movement up to around 5 mm is predicted, reducing to relatively negligible movements about 10 m away. Movements outside the excavation will be constrained to a certain extent by the presence of the new retaining walls and the estimated movements obtained from the analysis are not likely to occur in practice.

A void or layer of compressible material may need to be incorporated into the design to accommodate these potential long term movements. If a compressible material is used beneath the slab, it will need to be designed to be able to resist the potential uplift forces generated by the ground movements. In this respect potential heave pressures are typically taken to equate to around 30 % of the total unloading pressure.

6.0 DAMAGE ASSESSMENT

In addition to the above assessment of the likely movements that will result from the proposed development, the neighbouring buildings are considered to be sensitive structures, requiring Building Damage Assessments, on the basis of the classification given in Table 2.5 of C580[1].

All structures are shown on the plan in Section 5.1.2.

6.1 Damage to Neighbouring Structures

The movements resulting from the wall installation phase and the combined retaining wall installation and basement excavation phases, have been calculated using the X-Disp modelling software to carry out an assessment of the likely damage to adjacent properties and the results are summarised for the combined wall installation and basement excavation in the table below.

The potential heave movements predicted by P-Disp have not been included in this assessment.

Sensitive Structure	Elevation	Category of Damage*
No 31 Heath Drive	A	Category 0 - Negligible
	B	Category 0 - Negligible
	C	Category 1 – Very Slight
	D	Category 1 – Very Slight
	E	Category 0 - Negligible
No 31/No 32 Front Elevation	F	Category 1 – Very Slight
No 32 Heath Drive	G	Category 0 - Negligible
	H	Category 0 - Negligible
	I	Category 0 - Negligible
	J	Category 0 - Negligible
	K	Category 0 - Negligible
No 30 Heath Drive	L	Category 1 – Very Slight
	M	Category 0 - Negligible

Sensitive Structure	Elevation	Category of Damage*
	N	Category 0 - Negligible
	O	Category 0 - Negligible

**From Table 2.5 of C580[1]: Classification of visible damage to walls.*

The analysis has predicted that the proposed installation of the retaining walls and excavation of the proposed basement may generally result in a building damage for sensitive structures ranging between Category 0 (negligible) and Category 1 (Very Slight), which fall within acceptable limits according to the Camden Planning Guidance.

In addition to the above, there is a wealth of experience with respect to the construction of underpinned retaining walls, that suggests that ground movements should remain typically within the range of 2 mm to 5 mm following completion of the works and provided that they are installed by a reputable and experienced contractor in accordance with the guidelines published by the Association of Specialist Underpinning Contractors[6], which indicates that the predicted movements represent a conservative assessment of the likely movements.

6.2 Monitoring of Ground Movements

The predictions of ground movement based on the ground movement analysis should be checked by monitoring of the adjacent properties and structures. The structures to be monitored during the construction stages should include the neighbouring structures. Condition surveys of the above existing structures should be carried out before and after the proposed works.

The precise monitoring strategy will be developed at a later stage and it will be subject to discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will be implemented if movements of the adjacent structures exceed predefined trigger levels. Both contingency measures and trigger levels will need to be developed within a future monitoring specification for the works.

7.0 CONCLUSIONS

The analysis has concluded that the predicted damage to the neighbouring properties from the construction of the retaining walls and basement excavations would generally fall between Category ‘Negligible’ and ‘Very Slight’, which would fall within the acceptable limits. It is recommended that movement monitoring is carried out on all structures prior to and during the proposed basement construction.

The separate phases of work, including excavation of the proposed basement, will in practice be separated by a number of weeks during which time construction of permanent supports, basement slab and retaining wall curing will take place. This will provide an opportunity for the ground movements during and immediately after retaining wall construction to be measured and the data acquired can be fed back into the design and compared with the predicted values. Such a comparison will allow the ground model to be reviewed and the predicted wall movements to be reassessed prior to the main excavation taking place so that propping arrangements can be adjusted if required.

[6] Haslam S, O’Connor L (2013) *Guidelines on safe and efficient basement construction directly below or near to existing structures* ASUC

APPENDICES

X-DISP ANALYSIS:

Wall Installation E1

Contour Plots of Vertical Movements and Horizontal Movements

Wall Installation and Basement Excavation combined

Contour Plots of Combined Vertical Movements and Horizontal Movements

Tabular Output of Results

Wall Installation E2

Contour Plots of Vertical Movements and Horizontal Movements

Wall Installation and Basement Excavation combined

Contour Plots of Combined Vertical Movements and Horizontal Movements

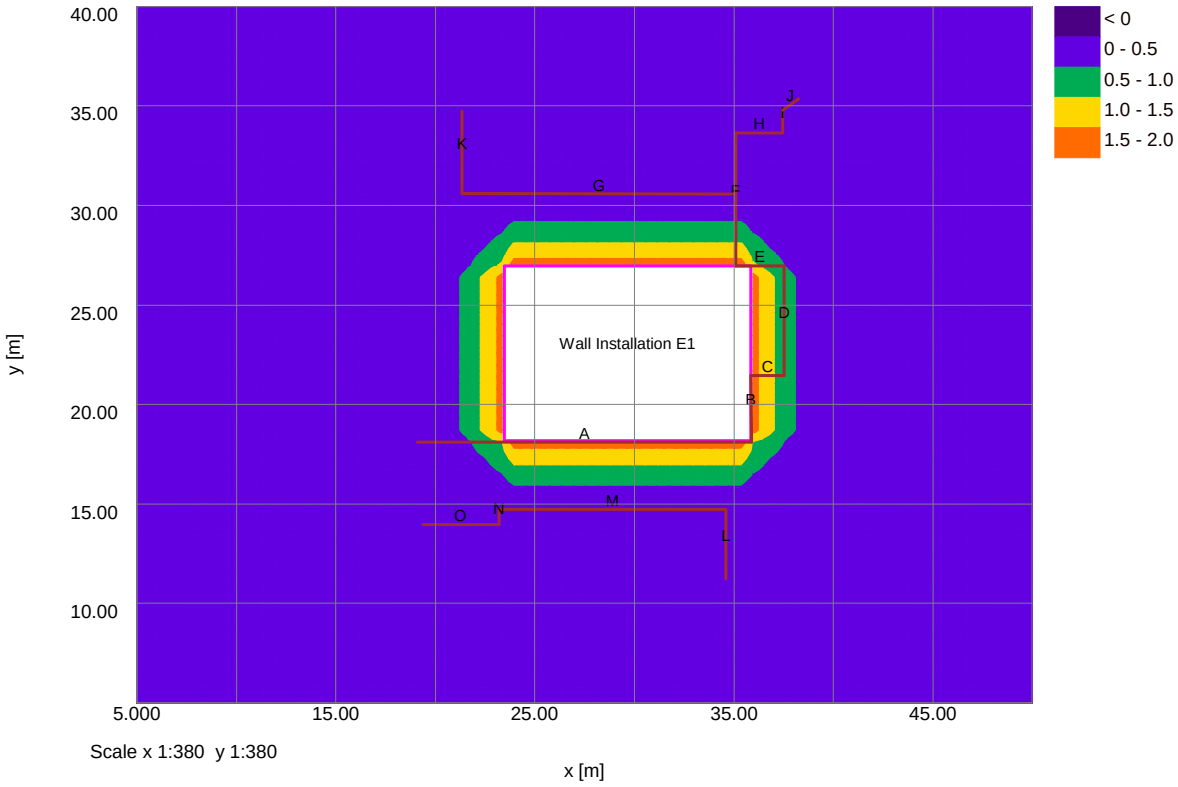
Tabular Output of Results

P-DISP ANALYSIS

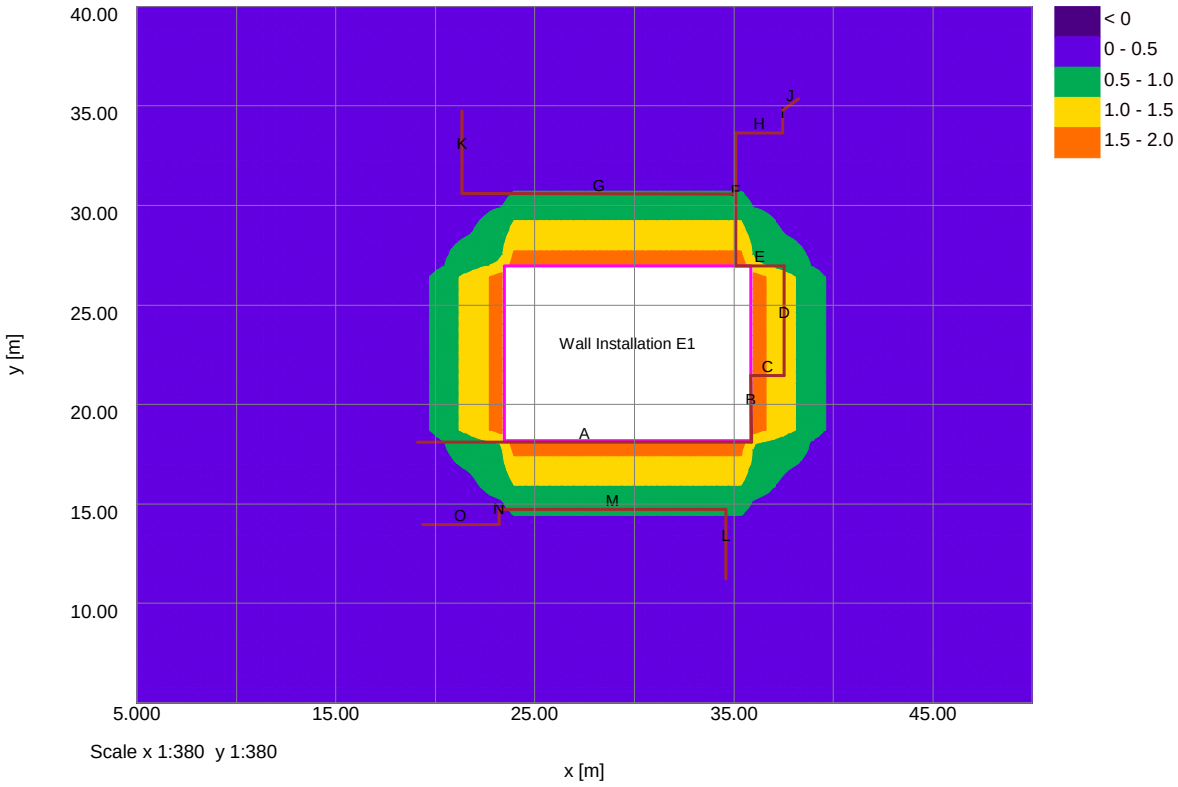
Short Term Movement Contour Plots

Total Movement Contour Plots

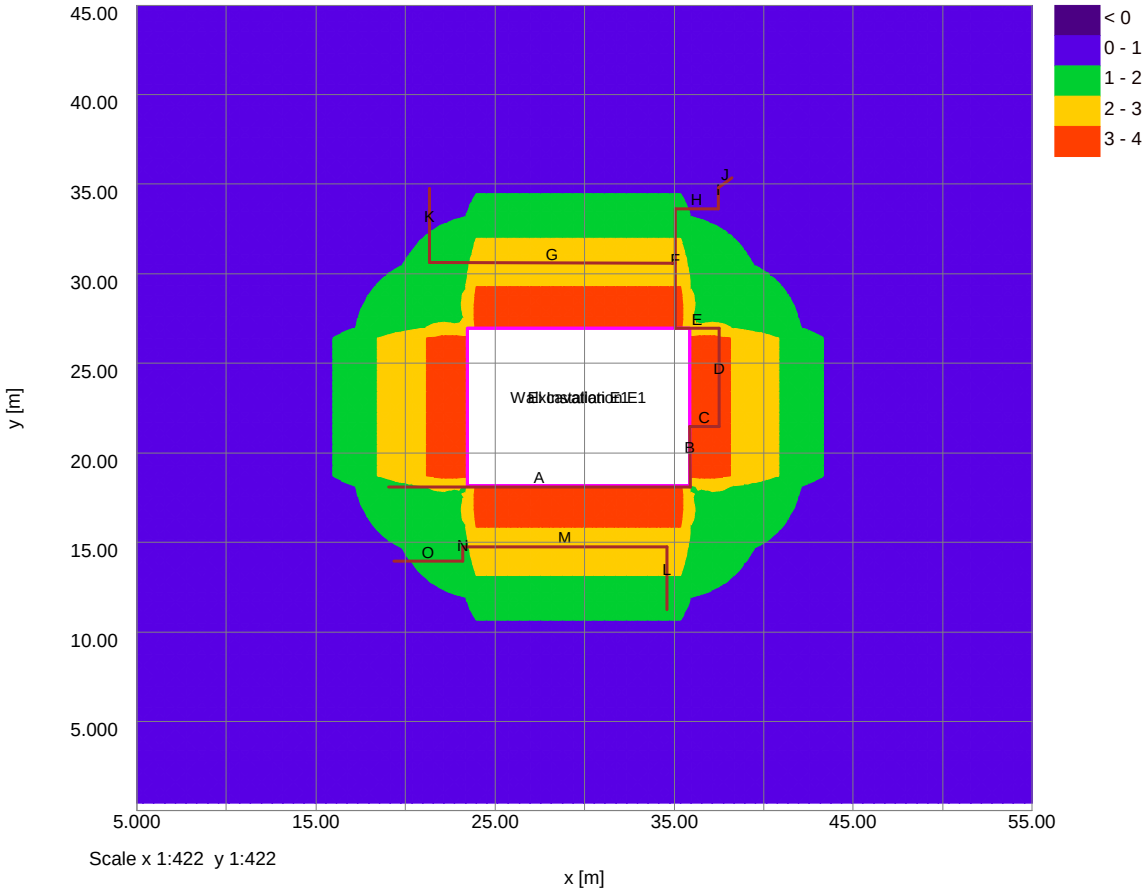
Vertical Settlement Contours: Grid 1 (level 0.000m) (Interval 0.5mm)



Horizontal Displacement Contours: Grid 1 (level 0.000m) Interval 0.5mm

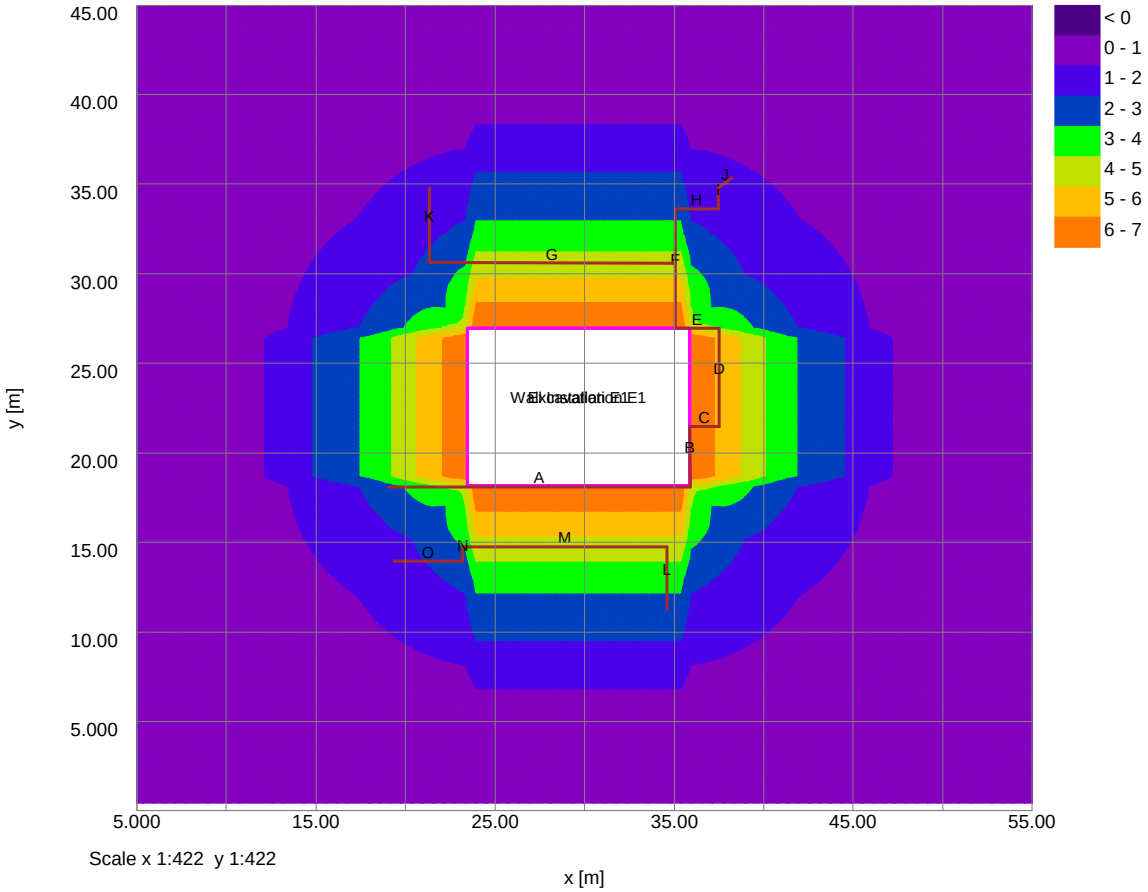


Vertical Settlement Contours: Grid 1 (level 0.000m) (Interval 1mm)



Scale x 1:422 y 1:422

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



Specific Building Damage Results - Horizontal Displacements

Structure: A | Sub-structure:

Dist.	Coordinates				Displacements			
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	19.08000	18.10000	-2.60000	2.6019	0.041679	2.6019	0.041679	
1.8689	20.94889	18.10000	-2.60000	3.4695	0.097104	3.4695	0.097104	
3.7378	22.81778	18.10000	-2.60000	4.2061	0.46570	4.2061	0.46570	
5.6067	24.68667	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
7.4756	26.55556	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
9.3444	28.42444	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
11.213	30.29333	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
13.082	32.16222	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
14.951	34.03111	18.10000	-2.60000	0.0	6.9504	0.0	6.9504	
16.820	35.90000	18.10000	-2.60000	-2.1608	3.0251	-2.1608	3.0251	

Structure: B | Sub-structure:

Dist.	Coordinates				Displacements			
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	35.90000	18.10000	-2.60000	-2.1608	3.0251	3.0569	2.1155	
0.84009	35.88750	18.94000	-2.60000	-6.9734	0.0	0.10376	6.9727	
1.6802	35.87500	19.78000	-2.60000	-6.9823	0.0	0.10389	6.9815	
2.5203	35.86250	20.62000	-2.60000	-6.9911	0.0	0.10402	6.9904	
3.3604	35.85000	21.46000	-2.60000	-7.0000	0.0	0.10416	6.9992	

Structure: C | Sub-structure:

Dist.	Coordinates				Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.85000	21.46000	-1.60000	-7.0000	0.0	-7.0000	0.0
0.83500	36.68500	21.46000	-1.60000	-6.4085	0.0	-6.4085	0.0
1.6700	37.52000	21.46000	-1.60000	-5.8171	0.0	-5.8171	0.0

Structure: D | Sub-structure:

Dist.	Coordinates				Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.52000	21.46000	-1.60000	-5.8171	0.0	0.0	5.8171
0.91833	37.52000	22.37833	-1.60000	-5.8171	0.0	0.0	5.8171
1.8367	37.52000	23.29667	-1.60000	-5.8171	0.0	0.0	5.8171
2.7550	37.52000	24.21500	-1.60000	-5.8171	0.0	0.0	5.8171
3.6733	37.52000	25.13333	-1.60000	-5.8171	0.0	0.0	5.8171
4.5917	37.52000	26.05167	-1.60000	-5.8171	0.0	0.0	5.8171
5.5100	37.52000	26.97000	-1.60000	-3.8974	0.0	0.0	3.8974

Structure: E | Sub-structure:

Dist.	Coordinates				Displacements			
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	37.52000	26.97000	-1.60000	-3.8974	0.0	3.8974	0.0	
0.81333	36.70667	26.97000	-1.60000	-4.2834	0.0	4.2834	0.0	
1.6267	35.89333	26.97000	-1.60000	-4.6694	0.0	4.6694	0.0	
2.4400	35.08000	26.97000	-1.60000	0.0	-7.0000	0.0	7.0000	

Structure: F | Sub-structure:

Dist.	Coordinates					Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	35.08000	26.97000	-2.60000	0.0	-7.0000	-7.0000	0.0	
1.6675	35.08000	28.63750	-2.60000	0.0	-5.8189	-5.8189	0.0	
3.3350	35.08000	30.30500	-2.60000	0.0	-4.6377	-4.6377	0.0	
5.0025	35.08000	31.97250	-2.60000	0.0	-3.4566	-3.4566	0.0	
6.6700	35.08000	33.64000	-2.60000	0.0	-2.7487	-2.7487	0.0	

Structure: G | Sub-structure:

Dist.	Coordinates				Displacements			
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	35.08000	30.58000	-2.60000	0.0	-4.4429	-0.0097007	4.4429	
1.9629	33.11714	30.58429	-2.60000	0.0	-4.4399	-0.0096940	4.4399	
3.9257	31.15429	30.58857	-2.60000	0.0	-4.4368	-0.0096874	4.4368	
5.8886	29.19143	30.59286	-2.60000	0.0	-4.4338	-0.0096808	4.4338	
7.8514	27.22857	30.59714	-2.60000	0.0	-4.4308	-0.0096742	4.4308	
9.8143	25.26571	30.60143	-2.60000	0.0	-4.4277	-0.0096675	4.4277	
11.777	23.30286	30.60571	-2.60000	0.11826	-2.9220	-0.12464	2.9218	
13.740	21.34000	30.61000	-2.60000	1.1215	-1.9346	-1.1257	1.9322	

Structure: H | Sub-structure:

Dist.	Coordinates					Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line	
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]	
0.0	35.08000	33.64000	-1.60000	0.0	-2.7487	0.0	-2.7487	
0.79000	35.87000	33.64000	-1.60000	-0.0055168	-1.8399	-0.0055168	-1.8399	
1.5800	36.66000	33.64000	-1.60000	-0.21192	-1.7451	-0.21192	-1.7451	
2.3700	37.45000	33.64000	-1.60000	-0.38667	-1.6119	-0.38667	-1.6119	

Structure: I | Sub-structure:

Dist.	Coordinates				Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.45000	33.64000	-1.60000	-0.38667	-1.6119	-1.6119	0.38667
0.57500	37.45000	34.21500	-1.60000	-0.33150	-1.5011	-1.5011	0.33150
1.1500	37.45000	34.79000	-1.60000	-0.28332	-1.3848	-1.3848	0.28332

Structure: J | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.45000	34.79000	-1.60000	-0.28332	-1.3848	-1.0400	-0.95719
0.97417	38.24000	35.36000	-1.60000	-0.33062	-1.1606	-0.94722	-0.74776

Structure: K | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	21.34000	30.61000	-2.60000	1.1215	-1.9346	-1.9346	-1.1215
0.83000	21.34000	31.44000	-2.60000	0.85807	-1.8178	-1.8178	-0.85807
1.6600	21.34000	32.27000	-2.60000	0.67655	-1.6994	-1.6994	-0.67655
2.4900	21.34000	33.10000	-2.60000	0.54886	-1.5946	-1.5946	-0.54886
3.3200	21.34000	33.93000	-2.60000	0.44374	-1.4637	-1.4637	-0.44374
4.1500	21.34000	34.76000	-2.60000	0.35619	-1.3150	-1.3150	-0.35619

Structure: L | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	34.61000	11.24000	-2.60000	0.0	2.6512	2.6512	0.0
0.87500	34.61000	12.11500	-2.60000	0.0	2.9794	2.9794	0.0
1.7500	34.61000	12.99000	-2.60000	0.0	3.3308	3.3308	0.0
2.6250	34.61000	13.86500	-2.60000	0.0	3.9506	3.9506	0.0
3.5000	34.61000	14.74000	-2.60000	0.0	4.5704	4.5704	0.0

Structure: M | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	34.61000	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
1.9050	32.70500	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
3.8100	30.80000	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
5.7150	28.89500	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
7.6200	26.99000	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
9.5250	25.08500	14.74000	-2.60000	0.0	4.5704	0.0	-4.5704
11.430	23.18000	14.74000	-2.60000	0.23382	2.9704	-0.23382	-2.9704

Structure: N | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	23.18000	14.74000	-2.60000	0.23382	2.9704	-2.9704	0.23382
0.77000	23.18000	13.97000	-2.60000	0.16916	2.6314	-2.6314	0.16916

Structure: O | Sub-structure:

Dist.	Coordinates			Displacements		
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	23.18000	13.97000	-2.60000	0.16916	2.6314	-0.16916	-2.6314
0.96000	22.22000	13.97000	-2.60000	0.66681	2.2769	-0.66681	-2.2769
1.9200	21.26000	13.97000	-2.60000	0.95376	1.8291	-0.95376	-1.8291
2.8800	20.30000	13.97000	-2.60000	1.0448	1.3931	-1.0448	-1.3931
3.8400	19.34000	13.97000	-2.60000	1.0703	1.0938	-1.0703	-1.0938

Specific Building Damage Results - Vertical Displacements

Structure: A | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	19.08000	18.10000	-2.60000	1.5069
1.8689	20.94889	18.10000	-2.60000	1.9519
3.7378	22.81778	18.10000	-2.60000	2.1079
5.6067	24.68667	18.10000	-2.60000	3.1408
7.4756	26.55556	18.10000	-2.60000	3.1408
9.3444	28.42444	18.10000	-2.60000	3.1408
11.213	30.29333	18.10000	-2.60000	3.1408
13.082	32.16222	18.10000	-2.60000	3.1408
14.951	34.03111	18.10000	-2.60000	3.1408
16.820	35.90000	18.10000	-2.60000	1.6857

Structure: B | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.90000	18.10000	-2.60000	1.6857
0.84009	35.88750	18.94000	-2.60000	3.1288
1.6802	35.87500	19.78000	-2.60000	3.1240
2.5203	35.86250	20.62000	-2.60000	3.1192
3.3604	35.85000	21.46000	-2.60000	3.1142

Structure: C | Sub-structure:

Dist.	Coordinates			Displacements
	x	y	z	z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.85000	21.46000	-1.60000	3.1142
0.83500	36.68500	21.46000	-1.60000	3.2712
1.6700	37.52000	21.46000	-1.60000	3.1730

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

Structure: D | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.52000	21.46000	-1.60000	3.1730
0.91833	37.52000	22.37833	-1.60000	3.1730
1.8367	37.52000	23.29667	-1.60000	3.1730
2.7550	37.52000	24.21500	-1.60000	3.1730
3.6733	37.52000	25.13333	-1.60000	3.1730
4.5917	37.52000	26.05167	-1.60000	3.1730
5.5100	37.52000	26.97000	-1.60000	2.1259

Structure: E | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.52000	26.97000	-1.60000	2.1259
0.81333	36.70667	26.97000	-1.60000	2.1918
1.6267	35.89333	26.97000	-1.60000	2.0978
2.4400	35.08000	26.97000	-1.60000	3.1142

Structure: F | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	26.97000	-2.60000	3.1142
1.6675	35.08000	28.63750	-2.60000	3.1736
3.3350	35.08000	30.30500	-2.60000	2.6492
5.0025	35.08000	31.97250	-2.60000	2.0049
6.6700	35.08000	33.64000	-2.60000	1.3201

Structure: G | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	30.58000	-2.60000	2.5482
1.9629	33.11714	30.58429	-2.60000	2.5466
3.9257	31.15429	30.58857	-2.60000	2.5450
5.8886	29.19143	30.59286	-2.60000	2.5434
7.8514	27.22857	30.59714	-2.60000	2.5418
9.8143	25.26571	30.60143	-2.60000	2.5402
11.777	23.30286	30.60571	-2.60000	1.6779
13.740	21.34000	30.61000	-2.60000	1.2926

Structure: H | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	33.64000	-1.60000	1.3201
0.79000	35.87000	33.64000	-1.60000	0.88363
1.5800	36.66000	33.64000	-1.60000	0.83731
2.3700	37.45000	33.64000	-1.60000	0.77051

Structure: I | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.45000	33.64000	-1.60000	0.77051
0.57500	37.45000	34.21500	-1.60000	0.64128
1.1500	37.45000	34.79000	-1.60000	0.51994

Structure: J | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.45000	34.79000	-1.60000	0.51994
0.97417	38.24000	35.36000	-1.60000	0.36631

Structure: K | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	21.34000	30.61000	-2.60000	1.2926
0.83000	21.34000	31.44000	-2.60000	1.1664
1.6600	21.34000	32.27000	-2.60000	1.0077
2.4900	21.34000	33.10000	-2.60000	0.83496
3.3200	21.34000	33.93000	-2.60000	0.65746
4.1500	21.34000	34.76000	-2.60000	0.49056

Structure: L | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	34.61000	11.24000	-2.60000	1.2168
0.87500	34.61000	12.11500	-2.60000	1.5706
1.7500	34.61000	12.99000	-2.60000	1.9276
2.6250	34.61000	13.86500	-2.60000	2.2861
3.5000	34.61000	14.74000	-2.60000	2.6145

Structure: M | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	34.61000	14.74000	-2.60000	2.6145
1.9050	32.70500	14.74000	-2.60000	2.6145
3.8100	30.80000	14.74000	-2.60000	2.6145
5.7150	28.89500	14.74000	-2.60000	2.6145
7.6200	26.99000	14.74000	-2.60000	2.6145

Dist.	Coordinates x [m]	y [m]	z [m]	Displacements z [mm]
9.5250	25.08500	14.74000	-2.60000	2.6145
11.430	23.18000	14.74000	-2.60000	1.7047

Structure: N | Sub-structure:

Dist.	Coordinates x [m]	y [m]	z [m]	Displacements z [mm]
Vertical Offset 1				
0.0	23.18000	14.74000	-2.60000	1.7047
0.77000	23.18000	13.97000	-2.60000	1.5242

Structure: O | Sub-structure:

Dist.	Coordinates x [m]	y [m]	z [m]	Displacements z [mm]
Vertical Offset 1				
0.0	23.18000	13.97000	-2.60000	1.5242
0.96000	22.22000	13.97000	-2.60000	1.3739
1.9200	21.26000	13.97000	-2.60000	1.1973
2.8800	20.30000	13.97000	-2.60000	1.0063
3.8400	19.34000	13.97000	-2.60000	0.82574

Specific Building Damage Results - All Segments

Structure: A | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	1.8579	None	0.0	0.046423	0.046423	-464.01E-6	-238.03E-6	6010.8	0 (Negligible)
	2	1.8579	2.3789	Hogging	0.0077451	-0.016033	0.0059214	0.0022557	-553.95E-6	32293.	0 (Negligible)
	3	4.2368	5.1076	Sagging	0.010787	-0.060361	0.013476	0.0022557	-553.95E-6	11744.	0 (Negligible)
	4	9.3444	1.8689	None	0.0	0.0	0.0	0.0	0.0	-	0 (Negligible)
	5	11.213	5.6057	Sagging	0.017302	-0.038526	0.012785	0.0011575	779.48E-6	1916.8	0 (Negligible)

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

Structure: B | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	3.3594	Sagging	0.032245	-0.087897	0.026238	0.0035277	-0.0017238	388.05	0 (Negligible)

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

Structure: C | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	1.6690	Sagging	0.0075634	0.070833	0.073357	-707.83E-6	-187.93E-6	2734.0	1 (Very Slight)

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

Structure: D | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	2.7550	None	0.0	0.0	0.0	0.0	0.0	-	0 (Negligible)
	2	2.7550	2.7540	Sagging	0.025320	0.0	0.024495	0.0	0.0011402	644.04	0 (Negligible)

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

Structure: E | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	0.60967	Hogging	0.0	0.047458	0.047458	-474.36E-6	-80.908E-6	1379.4	0 (Negligible)
	2	0.60967	1.8293	Hogging	0.032766	-0.22856	0.049543	0.0057743	-0.0012569	459.84	0 (Negligible)

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

Structure: F | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	6.6690	Sagging	0.0075998	0.063740	0.070418	-707.83E-6	410.49E-6	3979.1	1 (Very Slight)

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

Structure: G | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Segment	Start [m]	Length [m]	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 [m]	Damage Category
0.0	1	0.0	11.160	Sagging	0.0046458	-705.86E-6	0.0051536	58.577E-6	439.33E-6	12398.	0 (Negligible)
	2	11.160	2.5793	Hogging	0.0044071	-0.040193	0.0084349	510.25E-6	439.33E-6	4748.4	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	1.8957	Hogging	0.011750	-0.014863	0.0087688	261.34E-6	552.55E-6	1266.1	0 (Negligible)
	2	1.8957	0.47334	None	0.0	-0.022120	0.0044240	221.25E-6	84.582E-6	5068.5	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	1.1490	Hogging	339.95E-6	0.019755	0.019794	-202.25E-6	224.70E-6	41867.	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	0.97317	None	0.0	0.0095242	0.0095242	-95.233E-6	157.68E-6	-	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	2.7578	Sagging	0.0010423	0.013862	0.014273	-157.65E-6	213.82E-6	18592.	0 (Negligible)
	2	2.7578	1.3912	Hogging	307.60E-6	0.017044	0.017075	-179.06E-6	213.82E-6	47719.	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	1.1464	Hogging	65.285E-6	0.038131	0.038137	-401.51E-6	-407.87E-6	210120.	0 (Negligible)
	2	1.1464	2.3526	Sagging	785.96E-6	0.062965	0.063230	-707.83E-6	-409.41E-6	20167.	1 (Very 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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	5.7150	None	0.0	0.0	0.0	0.0	0.0	-	0 (Negligible)
	2	5.7150	5.7140	Sagging	0.010609	-0.0040899	0.0085381	122.75E-6	477.63E-6	3189.9	0 (Negligible)

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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	0.76900	None	0.0	0.044027	0.044027	-440.08E-6	234.28E-6	-	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	2.6173	Sagging	776.71E-6	-0.032505	0.0065159	518.65E-6	198.95E-6	31533.	0 (Negligible)
	2	2.6173	1.2217	Hogging	180.70E-6	-0.0041227	831.09E-6	94.885E-6	198.95E-6	55647.	0 (Negligible)

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

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

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.017302	-0.060361	779.48E-6	3.1408	0.046423	0.0022557	779.48E-6	32293.	1916.8	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.032245	-0.087897	-0.0017238	3.1288	0.026238	0.0035277	-0.0017238	-	388.05	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0075634	0.070833	-187.93E-6	3.2703	0.073357	-707.83E-6	-187.93E-6	-	2734.0	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.025320	0.0	0.0011402	3.1730	0.024495	0.0	0.0011402	-	644.04	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.032766	-0.22856	-0.0012569	3.1129	0.049543	0.0057743	-0.0012569	459.84		- 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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0075998	0.063740	410.49E-6	3.1718	0.070418	-707.83E-6	410.49E-6	-	3979.1	1 (Very Slight)

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0046458	-0.040193	439.33E-6	2.5482	0.0084349	510.25E-6	439.33E-6	4748.4	12398.	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.011750	-0.022120	552.55E-6	1.3201	0.0087688	261.34E-6	552.55E-6	1266.1		- 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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	339.95E-6	0.019755	224.70E-6	0.77051	0.019794	-202.25E-6	224.70E-6	41867.		- 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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0	0.0095242	157.68E-6	0.51994	0.0095242	-95.233E-6	157.68E-6	-		- 0 (Negligible)

Structure: K | 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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0010423	0.017044	213.82E-6	1.2926	0.017075	-179.06E-6	213.82E-6	47719.	18592.	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	785.96E-6	0.062965	-409.41E-6	2.6141	0.063230	-707.83E-6	-409.41E-6	210120.	20167.	1 (Very 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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.010609	-0.0040899	477.63E-6	2.6145	0.0085381	122.75E-6	477.63E-6	-	3189.9	0 (Negligible)

Structure: N | Sub-structure:

Vertical Offset from Line for Vertical Movement	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0	0.044027	234.28E-6	1.7047	0.044027	-440.08E-6	234.28E-6	-	-	0 (Negligible)

Structure: O | Sub-structure:

Vertical Offset from Line for Vertical Movement	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category
[m]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	776.71E-6	-0.032505	198.95E-6	1.5242	0.0065159	518.65E-6	198.95E-6	55647.	31533.	0 (Negligible)

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
				[m]	[m]			[mm]	[%]	[m]	[m]	
A	Maximum Slope		5	11.213	16.819	Sagging	**779.48E-6**	3.1408	0.012785	-	1916.8	0 (Negligible)
	Maximum Settlement		3	4.2368	9.3444	Sagging	553.95E-6	**3.1408**	0.013476	-	11744.	0 (Negligible)
	Max. Tensile Strain		1	0.0	1.8579	Sagging	238.03E-6	1.9493	**0.046423**	-	6010.8	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	1.8579	4.2368	Hogging	553.95E-6	2.3837	0.0059214	**32293.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		5	11.213	16.819	Sagging	779.48E-6	3.1408	0.012785	-	**1916.8**	0 (Negligible)
B	Maximum Slope		1	0.0	3.3594	Sagging	**0.0017238**	3.1288	0.026238	-	388.05	0 (Negligible)
	Maximum Settlement		1	0.0	3.3594	Sagging	0.0017238	**3.1288**	0.026238	-	388.05	0 (Negligible)
	Max. Tensile Strain		1	0.0	3.3594	Sagging	0.0017238	3.1288	**0.026238**	-	388.05	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	3.3594	Sagging	0.0017238	3.1288	0.026238	-	**388.05**	0 (Negligible)
C	Maximum Slope		1	0.0	1.6690	Sagging	**187.93E-6**	3.2703	0.073357	-	2734.0	1 (Very Slight)
	Maximum Settlement		1	0.0	1.6690	Sagging	187.93E-6	**3.2703**	0.073357	-	2734.0	1 (Very Slight)
	Max. Tensile Strain		1	0.0	1.6690	Sagging	187.93E-6	3.2703	**0.073357**	-	2734.0	1 (Very Slight)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	1.6690	Sagging	187.93E-6	3.2703	0.073357	-	**2734.0**	1 (Very Slight)
D	Maximum Slope		2	2.7550	5.5090	Sagging	**0.0011402**	3.1730	0.024495	-	644.04	0 (Negligible)
	Maximum Settlement		1	0.0	2.7550	Sagging	0.0	**3.1730**	0.0	-	-	0 (Negligible)
	Max. Tensile Strain		2	2.7550	5.5090	Sagging	0.0011402	3.1730	**0.024495**	-	644.04	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		2	2.7550	5.5090	Sagging	0.0011402	3.1730	0.024495	-	**644.04**	0 (Negligible)
E	Maximum Slope		2	0.60967	2.4390	Hogging	**0.0012569**	3.1129	0.049543	459.84	-	0 (Negligible)
	Maximum Settlement		2	0.60967	2.4390	Hogging	0.0012569	**3.1129**	0.049543	459.84	-	0 (Negligible)
	Max. Tensile Strain		2	0.60967	2.4390	Hogging	0.0012569	3.1129	**0.049543**	459.84	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	0.60967	2.4390	Hogging	0.0012569	3.1129	0.049543	**459.84**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
F	Maximum Slope		1	0.0	6.6690	Sagging	**410.49E-6**	3.1718	0.070418	-	3979.1	1 (Very Slight)
	Maximum Settlement		1	0.0	6.6690	Sagging	410.49E-6	**3.1718**	0.070418	-	3979.1	1 (Very Slight)
	Max. Tensile Strain		1	0.0	6.6690	Sagging	410.49E-6	3.1718	**0.070418**	-	3979.1	1 (Very Slight)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	6.6690	Sagging	410.49E-6	3.1718	0.070418	-	**3979.1**	1 (Very Slight)
G	Maximum Slope		1	0.0	11.160	Sagging	**439.33E-6**	2.5482	0.0051536	-	12398.	0 (Negligible)
	Maximum Settlement		1	0.0	11.160	Sagging	439.33E-6	**2.5482**	0.0051536	-	12398.	0 (Negligible)
	Max. Tensile Strain		2	11.160	13.739	Hogging	439.33E-6	1.9492	**0.0084349**	4748.4	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	11.160	13.739	Hogging	439.33E-6	1.9492	0.0084349	**4748.4**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	11.160	Sagging	439.33E-6	2.5482	0.0051536	-	**12398.**	0 (Negligible)
H	Maximum Slope		1	0.0	1.8957	Hogging	**552.55E-6**	1.3201	0.0087688	1266.1	-	0 (Negligible)
	Maximum Settlement		1	0.0	1.8957	Hogging	552.55E-6	**1.3201**	0.0087688	1266.1	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	1.8957	Hogging	552.55E-6	1.3201	**0.0087688**	1266.1	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	1.8957	Hogging	552.55E-6	1.3201	0.0087688	**1266.1**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
I	Maximum Slope		1	0.0	1.1490	Hogging	**224.70E-6**	0.77051	0.019794	41867.	-	0 (Negligible)
	Maximum Settlement		1	0.0	1.1490	Hogging	224.70E-6	**0.77051**	0.019794	41867.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	1.1490	Hogging	224.70E-6	0.77051	**0.019794**	41867.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	1.1490	Hogging	224.70E-6	0.77051	0.019794	**41867.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
J	Maximum Slope		1	0.0	0.97317	Sagging	**157.68E-6**	0.51994	0.0095242	-	-	0 (Negligible)
	Maximum Settlement		1	0.0	0.97317	Sagging	157.68E-6	**0.51994**	0.0095242	-	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	0.97317	Sagging	157.68E-6	0.51994	**0.0095242**	-	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-

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
	Min. Radius of Curvature (Sagging)	-	-	-	-	-	-	-	-	-	-	-
K	Maximum Slope		1	0.0	2.7578	Sagging	**213.82E-6**	1.2926	0.014273	-	18592.	0 (Negligible)
	Maximum Settlement		1	0.0	2.7578	Sagging	213.82E-6	**1.2926**	0.014273	-	18592.	0 (Negligible)
	Max. Tensile Strain		2	2.7578	4.1490	Hogging	213.82E-6	0.77769	**0.017075**	47719.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	2.7578	4.1490	Hogging	213.82E-6	0.77769	0.017075	**47719.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	2.7578	Sagging	213.82E-6	1.2926	0.014273	-	**18592.**	0 (Negligible)
L	Maximum Slope		2	1.1464	3.4990	Sagging	**409.41E-6**	2.6141	0.063230	-	20167.	1 (Very Slight)
	Maximum Settlement		2	1.1464	3.4990	Sagging	409.41E-6	**2.6141**	0.063230	-	20167.	1 (Very Slight)
	Max. Tensile Strain		2	1.1464	3.4990	Sagging	409.41E-6	2.6141	**0.063230**	-	20167.	1 (Very Slight)
	Min. Radius of Curvature (Hogging)		1	0.0	1.1464	Hogging	407.87E-6	1.6813	0.038137	**210120.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		2	1.1464	3.4990	Sagging	409.41E-6	2.6141	0.063230	-	**20167.**	1 (Very Slight)
M	Maximum Slope		2	5.7150	11.429	Sagging	**477.63E-6**	2.6145	0.0085381	-	3189.9	0 (Negligible)
	Maximum Settlement		1	0.0	5.7150	Sagging	0.0	**2.6145**	0.0	-	-	0 (Negligible)
	Max. Tensile Strain		2	5.7150	11.429	Sagging	477.63E-6	2.6145	**0.0085381**	-	3189.9	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		2	5.7150	11.429	Sagging	477.63E-6	2.6145	0.0085381	-	**3189.9**	0 (Negligible)
N	Maximum Slope		1	0.0	0.76900	Sagging	**234.28E-6**	1.7047	0.044027	-	-	0 (Negligible)
	Maximum Settlement		1	0.0	0.76900	Sagging	234.28E-6	**1.7047**	0.044027	-	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	0.76900	Sagging	234.28E-6	1.7047	**0.044027**	-	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
O	Maximum Slope		1	0.0	2.6173	Sagging	**198.95E-6**	1.5242	0.0065159	-	31533.	0 (Negligible)
	Maximum Settlement		1	0.0	2.6173	Sagging	198.95E-6	**1.5242**	0.0065159	-	31533.	0 (Negligible)
	Max. Tensile Strain		1	0.0	2.6173	Sagging	198.95E-6	1.5242	**0.0065159**	-	31533.	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	2.6173	3.8390	Hogging	198.95E-6	1.0586	831.09E-6	**55647.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	2.6173	Sagging	198.95E-6	1.5242	0.0065159	-	**31533.**	0 (Negligible)

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]	[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]	[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]	[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]	[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]	[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]	[m]		[%]	[%]	[%]	

No structures have segments combined.

Structure: G | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: H | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: I | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: J | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: K | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: L | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: M | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: N | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

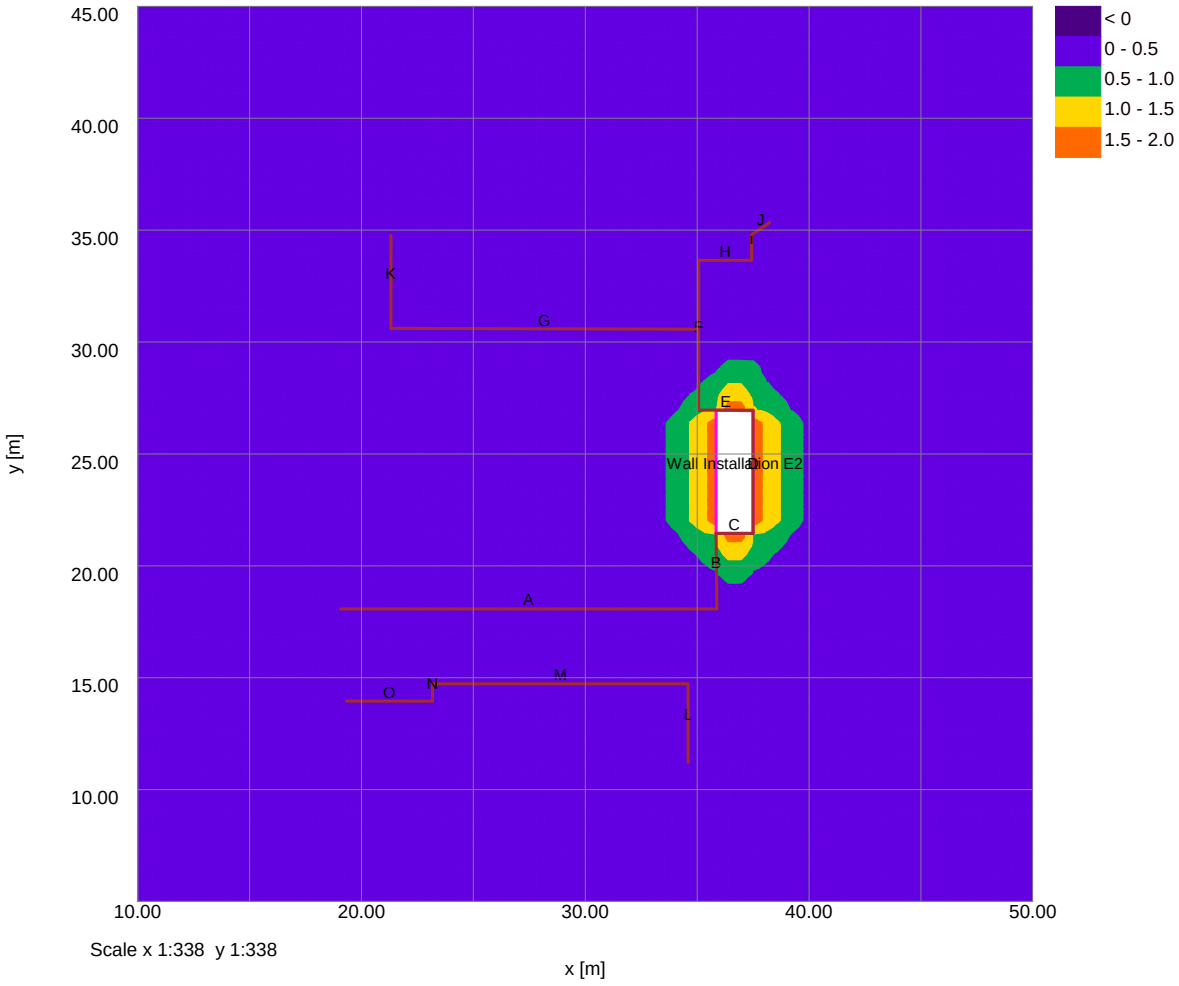
No structures have segments combined.

Structure: O | Sub-structure:

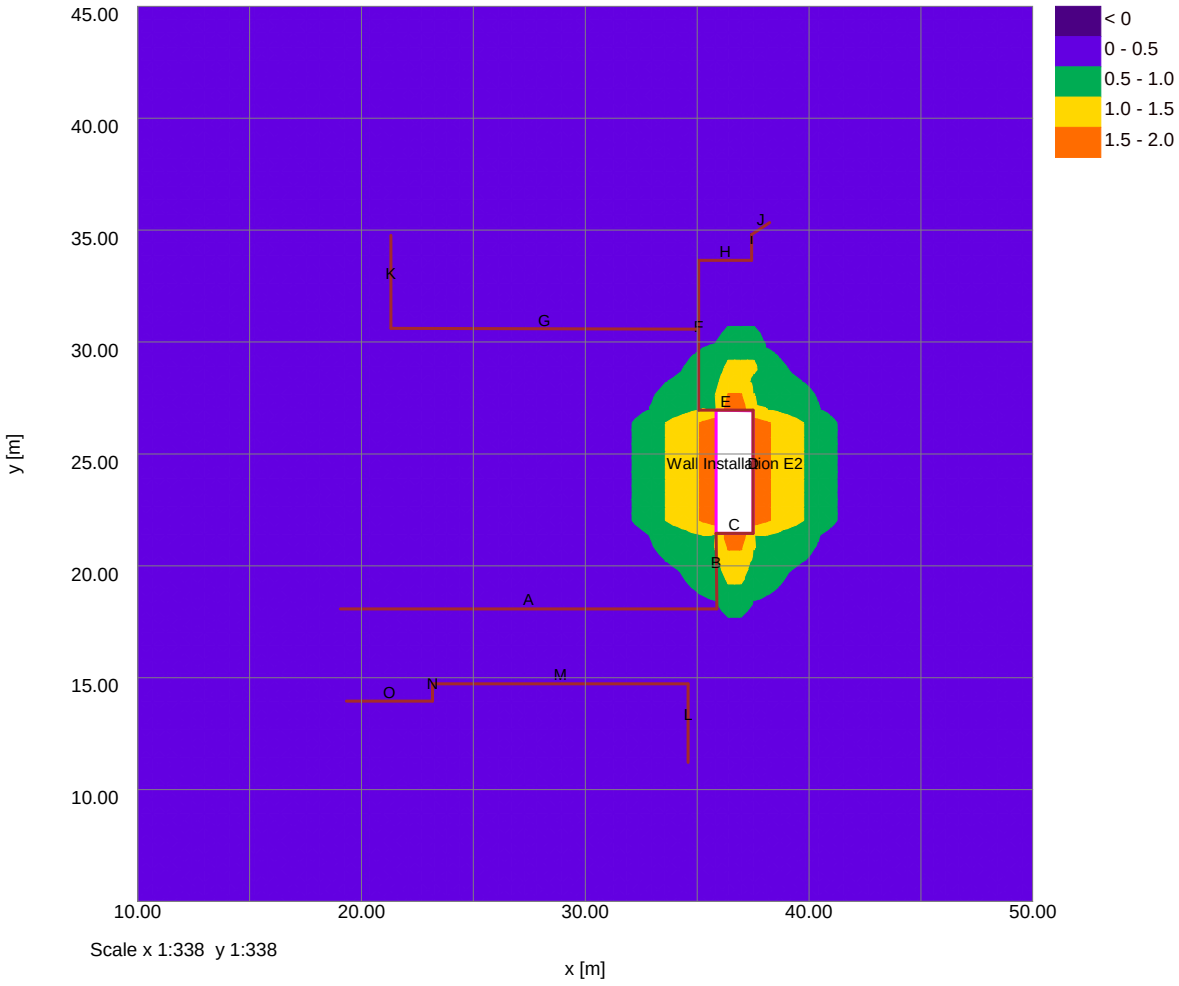
Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection Ratio [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Vertical Settlement Contours: Grid 1 (level 0.000m) (Interval 0.5mm)

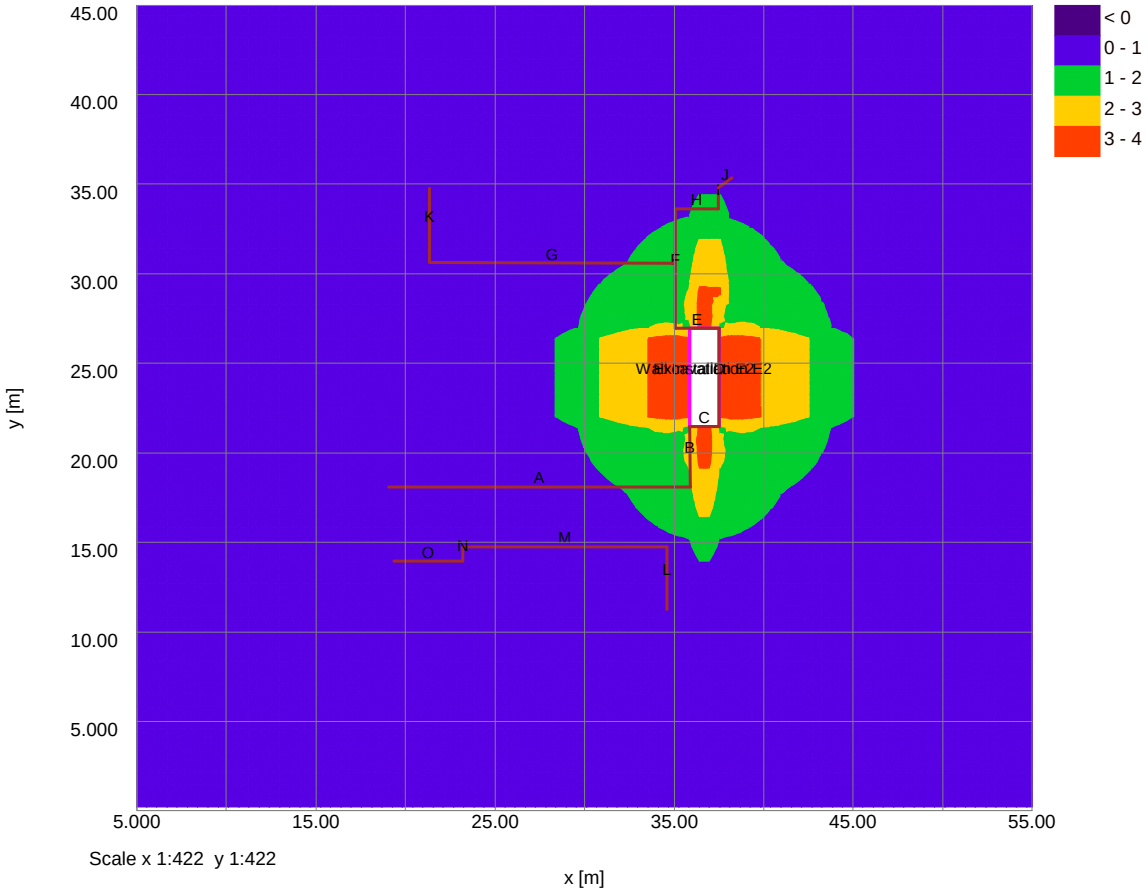


Horizontal Displacement Contours: Grid 1 (level 0.000m) Interval 0.5mm



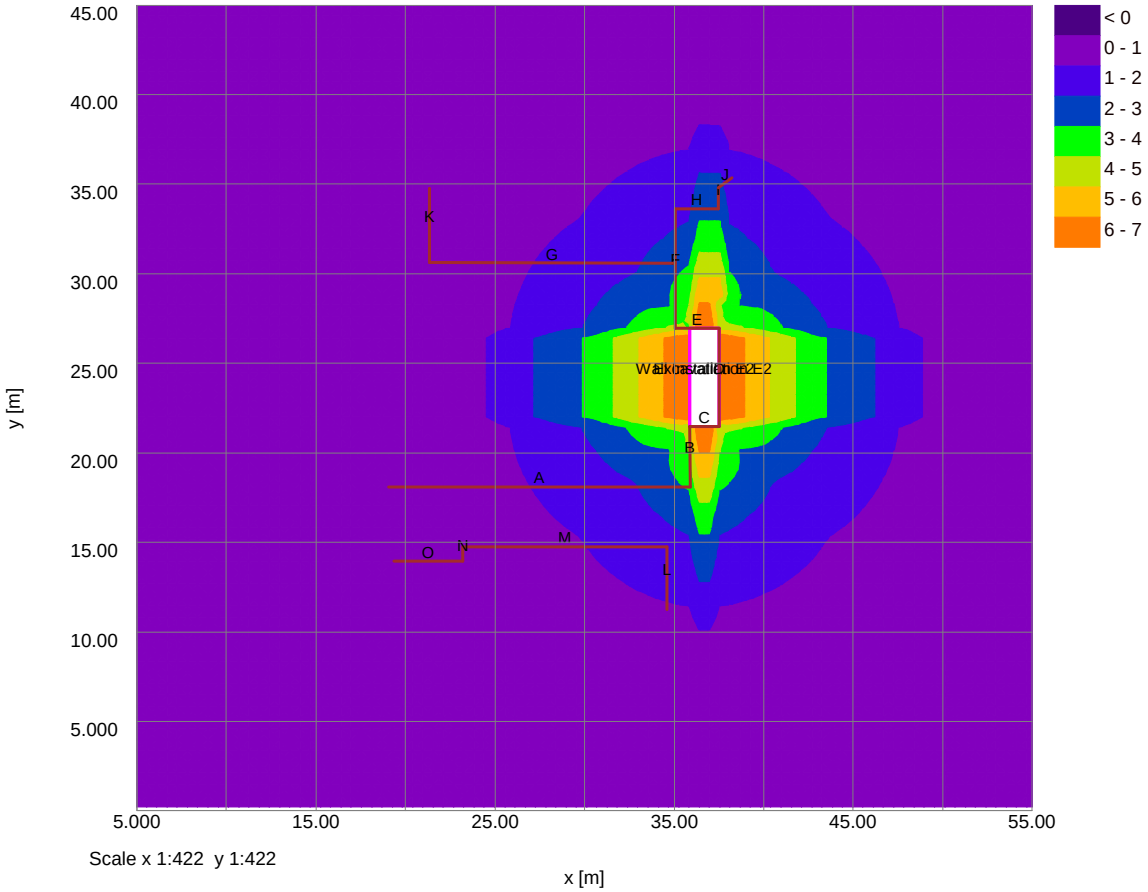
Scale x 1:338 y 1:338

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



Scale x 1:422 y 1:422

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



Specific Building Damage Results - Horizontal Displacements

Structure: A | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	19.08000	18.10000	-2.60000	0.0	0.0	0.0	0.0
1.8689	20.94889	18.10000	-2.60000	0.0	0.0	0.0	0.0
3.7378	22.81778	18.10000	-2.60000	0.12103	0.031204	0.12103	0.031204
5.6067	24.68667	18.10000	-2.60000	0.51023	0.15357	0.51023	0.15357
7.4756	26.55556	18.10000	-2.60000	0.86374	0.31225	0.86374	0.31225
9.3444	28.42444	18.10000	-2.60000	1.1552	0.52272	1.1552	0.52272
11.213	30.29333	18.10000	-2.60000	1.3303	0.80442	1.3303	0.80442
13.082	32.16222	18.10000	-2.60000	1.3069	1.1907	1.3069	1.1907
14.951	34.03111	18.10000	-2.60000	1.1500	2.1243	1.1500	2.1243
16.820	35.90000	18.10000	-2.60000	0.0	4.6200	0.0	4.6200

Structure: B | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.90000	18.10000	-2.60000	0.0	4.6200	4.6195	-0.068742
0.84009	35.88750	18.94000	-2.60000	0.0	5.2150	5.2144	-0.077596
1.6802	35.87500	19.78000	-2.60000	0.0	5.8100	5.8094	-0.086449
2.5203	35.86250	20.62000	-2.60000	0.0	6.4050	6.4043	-0.095302
3.3604	35.85000	21.46000	-2.60000	0.0	4.6900	4.6895	-0.069784

Structure: C | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.85000	21.46000	-1.60000	0.0	4.6900	0.0	4.6900
0.83500	36.68500	21.46000	-1.60000	0.0	7.0000	0.0	7.0000
1.6700	37.52000	21.46000	-1.60000	-4.6900	0.0	-4.6900	0.0

Structure: D | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.52000	21.46000	-1.60000	-4.6900	0.0	0.0	4.6900
0.91833	37.52000	22.37833	-1.60000	-7.0000	0.0	0.0	7.0000
1.8367	37.52000	23.29667	-1.60000	-7.0000	0.0	0.0	7.0000
2.7550	37.52000	24.21500	-1.60000	-7.0000	0.0	0.0	7.0000
3.6733	37.52000	25.13333	-1.60000	-7.0000	0.0	0.0	7.0000
4.5917	37.52000	26.05167	-1.60000	-7.0000	0.0	0.0	7.0000
5.5100	37.52000	26.97000	-1.60000	-0.083657	-6.9853	-6.9853	0.083657

Structure: E | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.52000	26.97000	-1.60000	-0.083657	-6.9853	0.083657	6.9853
0.81333	36.70667	26.97000	-1.60000	-0.083739	-6.9922	0.083739	6.9922
1.6267	35.89333	26.97000	-1.60000	-0.083822	-6.9991	0.083822	6.9991
2.4400	35.08000	26.97000	-1.60000	4.2916	0.0	-4.2916	0.0

Structure: F | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.08000	26.97000	-2.60000	4.2916	0.0	0.0	-4.2916
1.6675	35.08000	28.63750	-2.60000	1.3621	-2.9498	-2.9498	-1.3621
3.3350	35.08000	30.30500	-2.60000	0.63199	-2.7372	-2.7372	-0.63199
5.0025	35.08000	31.97250	-2.60000	0.32717	-2.1256	-2.1256	-0.32717
6.6700	35.08000	33.64000	-2.60000	0.19985	-1.7312	-1.7312	-0.19985

Structure: G | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.08000	30.58000	-2.60000	0.56493	-2.6486	-0.57071	2.6473
1.9629	33.11714	30.58429	-2.60000	1.1987	-1.5853	-1.2021	1.5826
3.9257	31.15429	30.58857	-2.60000	1.2586	-0.96987	-1.2607	0.96712
5.8886	29.19143	30.59286	-2.60000	1.1814	-0.64277	-1.1828	0.64019
7.8514	27.22857	30.59714	-2.60000	0.93156	-0.39192	-0.93241	0.38988
9.8143	25.26571	30.60143	-2.60000	0.59250	-0.20328	-0.59294	0.20199
11.777	23.30286	30.60571	-2.60000	0.20404	-0.059125	-0.20417	0.058679
13.740	21.34000	30.61000	-2.60000	0.0	0.0	0.0	0.0

Structure: H | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	35.08000	33.64000	-1.60000	0.19985	-1.7312	0.19985	-1.7312
0.79000	35.87000	33.64000	-1.60000	-0.0054643	-1.8223	-0.0054643	-1.8223
1.5800	36.66000	33.64000	-1.60000	-0.032875	-2.7451	-0.032875	-2.7451
2.3700	37.45000	33.64000	-1.60000	-0.032833	-2.7415	-0.032833	-2.7415

Structure: I | Sub-structure:

Dist.	Coordinates					Displacements	
	x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]

Dist.	Coordinates x	y	z	Displacements x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
0.0	37.45000	33.64000	-1.60000	-0.032833	-2.7415	-2.7415	0.032833
0.57500	37.45000	34.21500	-1.60000	-0.030251	-2.5260	-2.5260	0.030251
1.1500	37.45000	34.79000	-1.60000	-0.027669	-2.3104	-2.3104	0.027669

Structure: J | Sub-structure:

Dist.	Coordinates x	y	z	Displacements x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	37.45000	34.79000	-1.60000	-0.027669	-2.3104	-1.3743	-1.8574
0.97417	38.24000	35.36000	-1.60000	-0.11676	-1.3639	-0.89272	-1.0377

Structure: K | Sub-structure:

Dist.	Coordinates x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	21.34000	30.61000	-2.60000	0.0	0.0	0.0	0.0
0.83000	21.34000	31.44000	-2.60000	0.0	0.0	0.0	0.0
1.6600	21.34000	32.27000	-2.60000	0.0	0.0	0.0	0.0
2.4900	21.34000	33.10000	-2.60000	0.0	0.0	0.0	0.0
3.3200	21.34000	33.93000	-2.60000	0.0	0.0	0.0	0.0
4.1500	21.34000	34.76000	-2.60000	0.0	0.0	0.0	0.0

Structure: L | Sub-structure:

Dist.	Coordinates x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	34.61000	11.24000	-2.60000	0.10775	0.88807	0.88807	-0.10775
0.87500	34.61000	12.11500	-2.60000	0.14469	1.0905	1.0905	-0.14469
1.7500	34.61000	12.99000	-2.60000	0.18868	1.2888	1.2888	-0.18868
2.6250	34.61000	13.86500	-2.60000	0.24189	1.4816	1.4816	-0.24189
3.5000	34.61000	14.74000	-2.60000	0.30748	1.6663	1.6663	-0.30748

Structure: M | Sub-structure:

Dist.	Coordinates x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	34.61000	14.74000	-2.60000	0.30748	1.6663	-0.30748	-1.6663
1.9050	32.70500	14.74000	-2.60000	0.60172	1.2857	-0.60172	-1.2857
3.8100	30.80000	14.74000	-2.60000	0.66857	0.88966	-0.66857	-0.88966
5.7150	28.89500	14.74000	-2.60000	0.58805	0.56818	-0.58805	-0.56818
7.6200	26.99000	14.74000	-2.60000	0.45564	0.34559	-0.45564	-0.34559
9.5250	25.08500	14.74000	-2.60000	0.22881	0.14284	-0.22881	-0.14284
11.430	23.18000	14.74000	-2.60000	0.0	0.0	0.0	0.0

Structure: N | Sub-structure:

Dist.	Coordinates x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	23.18000	14.74000	-2.60000	0.0	0.0	0.0	0.0
0.77000	23.18000	13.97000	-2.60000	0.0	0.0	0.0	0.0

Structure: O | Sub-structure:

Dist.	Coordinates x	y	z	x	y	Horizontal displacement along the Line	Horizontal displacement perpendicular to Line
[m]	[m]	[m]	[m]	[mm]	[mm]	[mm]	[mm]
0.0	23.18000	13.97000	-2.60000	0.0	0.0	0.0	0.0
0.96000	22.22000	13.97000	-2.60000	0.0	0.0	0.0	0.0
1.9200	21.26000	13.97000	-2.60000	0.0	0.0	0.0	0.0
2.8800	20.30000	13.97000	-2.60000	0.0	0.0	0.0	0.0
3.8400	19.34000	13.97000	-2.60000	0.0	0.0	0.0	0.0

Specific Building Damage Results - Vertical Displacements

Structure: A | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	19.08000	18.10000	-2.60000	0.0
1.8689	20.94889	18.10000	-2.60000	0.0
3.7378	22.81778	18.10000	-2.60000	0.022615
5.6067	24.68667	18.10000	-2.60000	0.070913
7.4756	26.55556	18.10000	-2.60000	0.19621
9.3444	28.42444	18.10000	-2.60000	0.44768
11.213	30.29333	18.10000	-2.60000	0.76844
13.082	32.16222	18.10000	-2.60000	1.0256
14.951	34.03111	18.10000	-2.60000	1.3895
16.820	35.90000	18.10000	-2.60000	2.6401

Structure: B | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.90000	18.10000	-2.60000	2.6401
0.84009	35.88750	18.94000	-2.60000	2.9340
1.6802	35.87500	19.78000	-2.60000	3.1708
2.5203	35.86250	20.62000	-2.60000	3.2713
3.3604	35.85000	21.46000	-2.60000	2.0865

Structure: C | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.85000	21.46000	-1.60000	2.0865
0.83500	36.68500	21.46000	-1.60000	3.1142
1.6700	37.52000	21.46000	-1.60000	2.0865

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

Structure: D | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.52000	21.46000	-1.60000	2.0865
0.91833	37.52000	22.37833	-1.60000	3.1142
1.8367	37.52000	23.29667	-1.60000	3.1142
2.7550	37.52000	24.21500	-1.60000	3.1142
3.6733	37.52000	25.13333	-1.60000	3.1142
4.5917	37.52000	26.05167	-1.60000	3.1142
5.5100	37.52000	26.97000	-1.60000	3.1221

Structure: E | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.52000	26.97000	-1.60000	3.1221
0.81333	36.70667	26.97000	-1.60000	3.1183
1.6267	35.89333	26.97000	-1.60000	3.1144
2.4400	35.08000	26.97000	-1.60000	2.1742

Structure: F | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	26.97000	-2.60000	2.1742
1.6675	35.08000	28.63750	-2.60000	1.7868
3.3350	35.08000	30.30500	-2.60000	1.6068
5.0025	35.08000	31.97250	-2.60000	1.2467
6.6700	35.08000	33.64000	-2.60000	0.83071

Structure: G | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	30.58000	-2.60000	1.5550
1.9629	33.11714	30.58429	-2.60000	1.1524
3.9257	31.15429	30.58857	-2.60000	0.85173
5.8886	29.19143	30.59286	-2.60000	0.54219
7.8514	27.22857	30.59714	-2.60000	0.25504
9.8143	25.26571	30.60143	-2.60000	0.090864
11.777	23.30286	30.60571	-2.60000	0.032601
13.740	21.34000	30.61000	-2.60000	0.0

Structure: H | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	35.08000	33.64000	-1.60000	0.83071
0.79000	35.87000	33.64000	-1.60000	0.87522
1.5800	36.66000	33.64000	-1.60000	1.3164
2.3700	37.45000	33.64000	-1.60000	1.3126

Structure: I | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.45000	33.64000	-1.60000	1.3126
0.57500	37.45000	34.21500	-1.60000	1.0879
1.1500	37.45000	34.79000	-1.60000	0.87909

Structure: J | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	37.45000	34.79000	-1.60000	0.87909
0.97417	38.24000	35.36000	-1.60000	0.44867

Structure: K | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	21.34000	30.61000	-2.60000	0.0
0.83000	21.34000	31.44000	-2.60000	0.0
1.6600	21.34000	32.27000	-2.60000	0.0
2.4900	21.34000	33.10000	-2.60000	0.0
3.3200	21.34000	33.93000	-2.60000	0.0
4.1500	21.34000	34.76000	-2.60000	0.0

Structure: L | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	34.61000	11.24000	-2.60000	0.16756
0.87500	34.61000	12.11500	-2.60000	0.27138
1.7500	34.61000	12.99000	-2.60000	0.41352
2.6250	34.61000	13.86500	-2.60000	0.59003
3.5000	34.61000	14.74000	-2.60000	0.79121

Structure: M | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	34.61000	14.74000	-2.60000	0.79121
1.9050	32.70500	14.74000	-2.60000	0.59218
3.8100	30.80000	14.74000	-2.60000	0.36811
5.7150	28.89500	14.74000	-2.60000	0.18688
7.6200	26.99000	14.74000	-2.60000	0.084347

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
9.5250	25.08500	14.74000	-2.60000	0.037303
11.430	23.18000	14.74000	-2.60000	0.0

Structure: N | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	23.18000	14.74000	-2.60000	0.0
0.77000	23.18000	13.97000	-2.60000	0.0

Structure: O | Sub-structure:

Dist.	Coordinates x	y	z	Displacements z
[m]	[m]	[m]	[m]	[mm]
Vertical Offset 1				
0.0	23.18000	13.97000	-2.60000	0.0
0.96000	22.22000	13.97000	-2.60000	0.0
1.9200	21.26000	13.97000	-2.60000	0.0
2.8800	20.30000	13.97000	-2.60000	0.0
3.8400	19.34000	13.97000	-2.60000	0.0

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	7.4756	9.3434	Hogging	0.0081383	-0.0092377	0.0058347	615.71E-6	-669.55E-6	3224.9	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	3.3594	Sagging	0.031035	0.0021443	0.031141	0.0020454	0.0014131	447.58	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	1.6690	Sagging	0.061297	-0.28067	0.066688	0.0056485	0.0012377	337.11	1 (Very Slight)

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	2.7550	Sagging	0.024868	0.0	0.024058	0.0	-0.0011191	656.49	0 (Negligible)
	2	2.7550	0.0	None	0.0	0.0	0.0	0.0	0.0	-	0 (Negligible)
	3	2.7550	2.7540	Hogging	191.43E-6	-0.25337	0.050674	0.0076648	-8.6646E-6	84495.	1 (Very Slight)

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	0.40657	Sagging	0.0	10.158E-6	10.192E-6	0.0	4.6923E-6	2802.2	0 (Negligible)
	2	0.40657	2.0324	Sagging	0.027483	-0.21501	0.045795	0.0054087	0.0011623	560.65	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	2.8048	Hogging	0.0029960	-0.10000	0.020074	0.0017721	232.73E-6	9107.9	0 (Negligible)
	2	2.8048	3.8642	Sagging	0.0014763	0.027779	0.028579	-366.68E-6	249.43E-6	32072.	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]	
0.0	1	0.0	7.8514	Hogging	986.67E-6	-0.0046068	0.0010811	321.78E-6	205.18E-6	29677.	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category

[m]		[m]	[m]		[%]	[%]	[%]			[m]		
0.0	1	0.0	1.1394	Hogging	0.010578	-0.019084	0.0079449	259.96E-6	-558.53E-6	1027.7		0
												(Negligible)
	2	1.1394	1.2296	Sagging	0.012846	-0.0012399	0.012286	34.699E-6	-558.53E-6	951.78		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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	1.1490	Hogging	688.67E-6	0.037495	0.037575	-374.81E-6	390.77E-6	20671.	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	0.97317	None	0.0	0.049432	0.049432	-494.07E-6	441.62E-6	-	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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	All settlements are less than the Settlement Trough Limit Sensitivity.										

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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	3.4990	Hogging	0.0018733	0.022236	0.022708	-231.25E-6	-229.88E-6	19485.	0
											(Negligible)

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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	1	0.0	2.2626	Sagging	174.05E-6	-0.013559	0.0027136	154.48E-6	117.63E-6	86415.	0
											(Negligible)
	2	2.2626	3.4524	Hogging	551.86E-6	759.24E-6	0.0010164	-69.501E-6	117.63E-6	56767.	0
											(Negligible)

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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	All settlements are less than the Settlement Trough Limit Sensitivity.										

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 Curve	Maximum Gradient of Vertical Displacement Curve	Min. Radius of Curvature	Damage Category
[m]		[m]	[m]		[%]	[%]	[%]			[m]	
0.0	All settlements are less than the Settlement Trough Limit Sensitivity.										

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

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

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0081383	-0.0092377	-669.55E-6	2.6394	0.0058347	615.71E-6	-669.55E-6	3224.9	-	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.031035	0.0021443	0.0014131	3.2700	0.031141	0.0020454	0.0014131	-	447.58	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.061297	-0.28067	0.0012377	3.1073	0.066688	0.0056485	0.0012377	-	337.11	1 (Very Slight)

Vertical Offset from Line for Vertical	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.024868	-0.25337	-0.0011191	3.1221	0.050674	0.0076648	-0.0011191	84495.	656.49	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.024868	-0.25337	-0.0011191	3.1221	0.050674	0.0076648	-0.0011191	84495.	656.49	1 (Very Slight)

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.027483	-0.21501	0.0011623	3.1221	0.045795	0.0054087	0.0011623	-	560.65	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0029960	-0.10000	249.43E-6	2.1742	0.028579	0.0017721	249.43E-6	9107.9	32072.	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	986.67E-6	-0.0046068	205.18E-6	1.5550	0.0010811	321.78E-6	205.18E-6	29677.	-	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.012846	-0.019084	-558.53E-6	1.3164	0.012286	259.96E-6	-558.53E-6	1027.7	951.78	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	688.67E-6	0.037495	390.77E-6	1.3126	0.037575	-374.81E-6	390.77E-6	20671.	-	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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0	0.049432	441.62E-6	0.87909	0.049432	-494.07E-6	441.62E-6	-	-	0 (Negligible)

Structure: K | 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]	[%]	[%]		[mm]	[%]			[m]	[m]	

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	0.0018733	0.022236	-229.88E-6	0.79098	0.022708	-231.25E-6	-229.88E-6	19485.	-	0 (Negligible)

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]	[%]	[%]		[mm]	[%]			[m]	[m]	
0.0	551.86E-6	-0.013559	117.63E-6	0.79121	0.0027136	154.48E-6	117.63E-6	56767.	86415.	0 (Negligible)

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]	[%]	[%]		[mm]	[%]			[m]	[m]	

Structure: O | Sub-structure:

Vertical Offset from Line for Vertical	Deflection Ratio	Average Horizontal Strain	Maximum Slope	Maximum Settlement	Max. Tensile Strain	Maximum Gradient of Horizontal Displacement	Maximum Gradient of Vertical Displacement	Min. Radius of Curvature (Hogging)	Min. Radius of Curvature (Sagging)	Damage Category

Movement Calculations [m]	[%]	[%]	[mm]	Curve [%]	Curve	[m]	[m]

Specific Building Damage Results - Critical Segments within Each Structure

Structure Name	Parameter	Critical Sub-Structure	Critical Segment	Start [m]	End [m]	Curvature	Maximum Slope	Maximum Settlement [mm]	Max. Tensile Strain [%]	Min. Radius of Curvature (Hogging) [m]	Min. Radius of Curvature (Sagging) [m]	Damage Category
A	Maximum Slope		1	7.4756	16.819	Hogging	**669.55E-6**	2.6394	0.0058347	3224.9	-	0 (Negligible)
	Maximum Settlement		1	7.4756	16.819	Hogging	669.55E-6	**2.6394**	0.0058347	3224.9	-	0 (Negligible)
	Max. Tensile Strain		1	7.4756	16.819	Hogging	669.55E-6	2.6394	**0.0058347**	3224.9	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	7.4756	16.819	Hogging	669.55E-6	2.6394	0.0058347	**3224.9**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
B	Maximum Slope		1	0.0	3.3594	Sagging	**0.0014131**	3.2700	0.031141	-	447.58	0 (Negligible)
	Maximum Settlement		1	0.0	3.3594	Sagging	0.0014131	**3.2700**	0.031141	-	447.58	0 (Negligible)
	Max. Tensile Strain		1	0.0	3.3594	Sagging	0.0014131	3.2700	**0.031141**	-	447.58	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	3.3594	Sagging	0.0014131	3.2700	0.031141	-	**447.58**	0 (Negligible)
C	Maximum Slope		1	0.0	1.6690	Sagging	**0.0012377**	3.1073	0.066688	-	337.11	1 (Very Slight)
	Maximum Settlement		1	0.0	1.6690	Sagging	0.0012377	**3.1073**	0.066688	-	337.11	1 (Very Slight)
	Max. Tensile Strain		1	0.0	1.6690	Sagging	0.0012377	3.1073	**0.066688**	-	337.11	1 (Very Slight)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		1	0.0	1.6690	Sagging	0.0012377	3.1073	0.066688	-	**337.11**	1 (Very Slight)
D	Maximum Slope		1	0.0	2.7550	Sagging	**0.0011191**	3.1142	0.024058	-	656.49	0 (Negligible)
	Maximum Settlement		3	2.7550	5.5090	Hogging	8.6646E-6	**3.1221**	0.050674	84495.	-	1 (Very Slight)
	Max. Tensile Strain		3	2.7550	5.5090	Hogging	8.6646E-6	3.1221	**0.050674**	84495.	-	1 (Very Slight)
	Min. Radius of Curvature (Hogging)		3	2.7550	5.5090	Hogging	8.6646E-6	3.1221	0.050674	**84495.**	-	1 (Very Slight)
	Min. Radius of Curvature (Sagging)		1	0.0	2.7550	Sagging	0.0011191	3.1142	0.024058	-	**656.49**	0 (Negligible)
E	Maximum Slope		2	0.40657	2.4390	Sagging	**0.0011623**	3.1202	0.045795	-	560.65	0 (Negligible)
	Maximum Settlement		1	0.0	0.40657	Sagging	4.6923E-6	**3.1221**	10.192E-6	-	2802.2	0 (Negligible)
	Max. Tensile Strain		2	0.40657	2.4390	Sagging	0.0011623	3.1202	**0.045795**	-	560.65	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		2	0.40657	2.4390	Sagging	0.0011623	3.1202	0.045795	-	**560.65**	0 (Negligible)
F	Maximum Slope		2	2.8048	6.6690	Sagging	**249.43E-6**	1.6641	0.028579	-	32072.	0 (Negligible)
	Maximum Settlement		1	0.0	2.8048	Hogging	232.73E-6	**2.1742**	0.020074	9107.9	-	0 (Negligible)
	Max. Tensile Strain		2	2.8048	6.6690	Sagging	249.43E-6	1.6641	**0.028579**	-	32072.	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	2.8048	Hogging	232.73E-6	2.1742	0.020074	**9107.9**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		2	2.8048	6.6690	Sagging	249.43E-6	1.6641	0.028579	-	**32072.**	0 (Negligible)
G	Maximum Slope		1	0.0	7.8514	Hogging	**205.18E-6**	1.5550	0.0010811	29677.	-	0 (Negligible)
	Maximum Settlement		1	0.0	7.8514	Hogging	205.18E-6	**1.5550**	0.0010811	29677.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	7.8514	Hogging	205.18E-6	1.5550	**0.0010811**	29677.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	7.8514	Hogging	205.18E-6	1.5550	0.0010811	**29677.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
H	Maximum Slope		1	0.0	1.1394	Hogging	**558.53E-6**	1.0703	0.0079449	1027.7	-	0 (Negligible)
	Maximum Settlement		2	1.1394	2.3690	Sagging	558.53E-6	**1.3164**	0.012286	-	951.78	0 (Negligible)
	Max. Tensile Strain		2	1.1394	2.3690	Sagging	558.53E-6	1.3164	**0.012286**	-	951.78	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	1.1394	Hogging	558.53E-6	1.0703	0.0079449	**1027.7**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		2	1.1394	2.3690	Sagging	558.53E-6	1.3164	0.012286	-	**951.78**	0 (Negligible)
I	Maximum Slope		1	0.0	1.1490	Hogging	**390.77E-6**	1.3126	0.037575	20671.	-	0 (Negligible)
	Maximum Settlement		1	0.0	1.1490	Hogging	390.77E-6	**1.3126**	0.037575	20671.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	1.1490	Hogging	390.77E-6	1.3126	**0.037575**	20671.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	1.1490	Hogging	390.77E-6	1.3126	0.037575	**20671.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
J	Maximum Slope		1	0.0	0.97317	Sagging	**441.62E-6**	0.87909	0.049432	-	-	0 (Negligible)
	Maximum Settlement		1	0.0	0.97317	Sagging	441.62E-6	**0.87909**	0.049432	-	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	0.97317	Sagging	441.62E-6	0.87909	**0.049432**	-	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
	Min. Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
K	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
L	Maximum Slope		1	0.0	3.4990	Hogging	**229.88E-6**	0.79098	0.022708	19485.	-	0 (Negligible)
	Maximum Settlement		1	0.0	3.4990	Hogging	229.88E-6	**0.79098**	0.022708	19485.	-	0 (Negligible)
	Max. Tensile Strain		1	0.0	3.4990	Hogging	229.88E-6	0.79098	**0.022708**	19485.	-	0 (Negligible)
	Min. Radius of Curvature (Hogging)		1	0.0	3.4990	Hogging	229.88E-6	0.79098	0.022708	**19485.**	-	0 (Negligible)
	Min. Radius of Curvature		-	-	-	-	-	-	-	-	-	-

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
	(Sagging)											
M	Maximum Slope		1	0.0	2.2626	Sagging	**117.63E-6**	0.79121	0.0027136	-	86415.	0 (Negligible)
	Maximum Settlement		1	0.0	2.2626	Sagging	117.63E-6	**0.79121**	0.0027136	-	86415.	0 (Negligible)
	Max. Tensile Strain		1	0.0	2.2626	Sagging	117.63E-6	0.79121	**0.0027136**	-	86415.	0 (Negligible)
	Min. Radius of Curvature (Hogging)		2	2.2626	5.7150	Hogging	117.63E-6	0.55012	0.0010164	**56767.**	-	0 (Negligible)
	Min. Radius of Curvature (Sagging)		1	0.0	2.2626	Sagging	117.63E-6	0.79121	0.0027136	-	**86415.**	0 (Negligible)
N	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
O	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											
	All settlements are less than the Settlement Trough Limit Sensitivity.											

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 [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: K | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: L | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: M | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

No structures have segments combined.

Structure: N | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

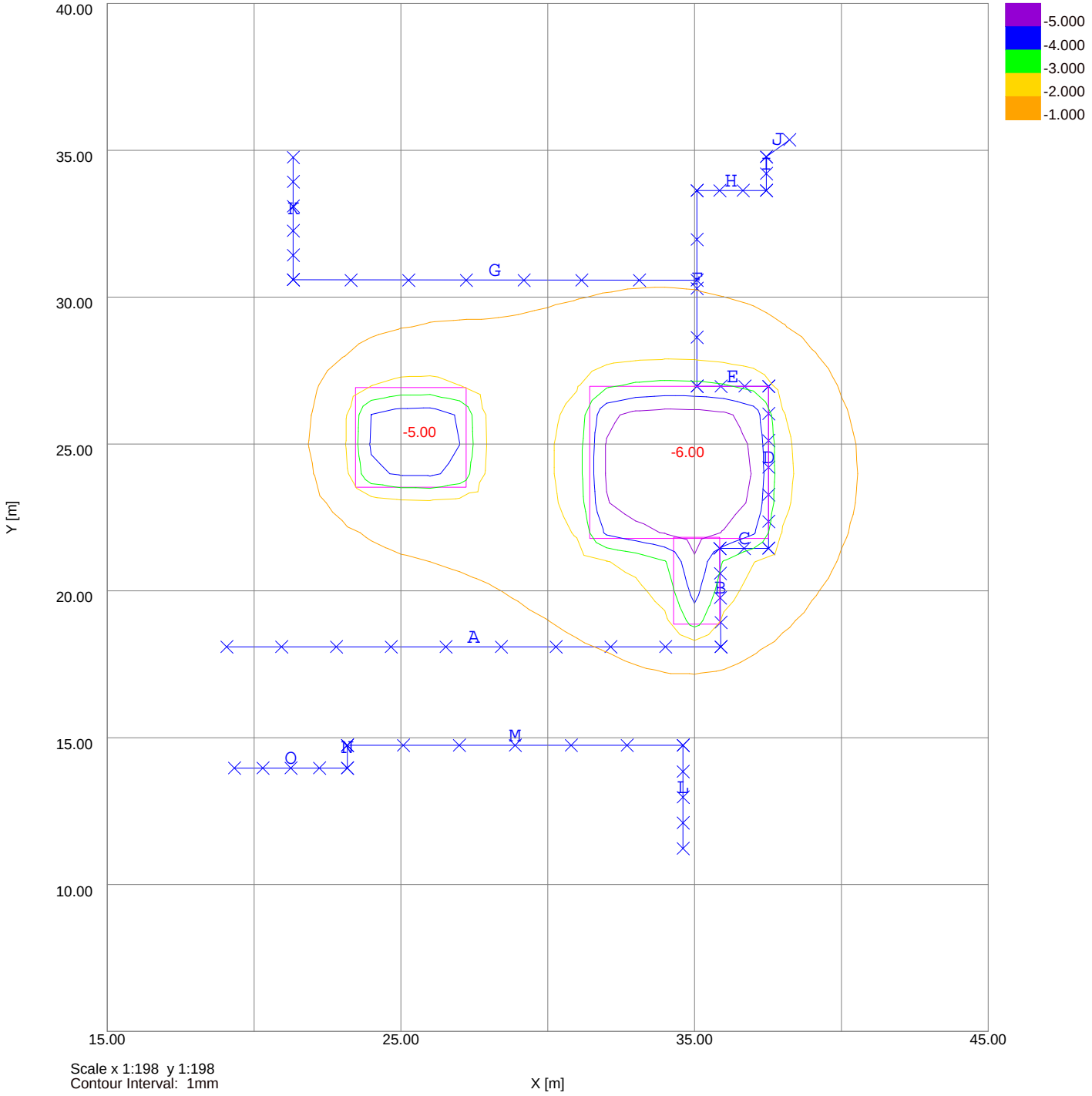
No structures have segments combined.

Structure: O | Sub-structure:

Vertical Offset from Line for Vertical Movement Calculations [m]	Combined Segment [m]	Start [m]	Length [m]	Curvature Ratio [%]	Deflection [%]	Average Horizontal Strain [%]	Max. Tensile Strain [%]	Damage Category

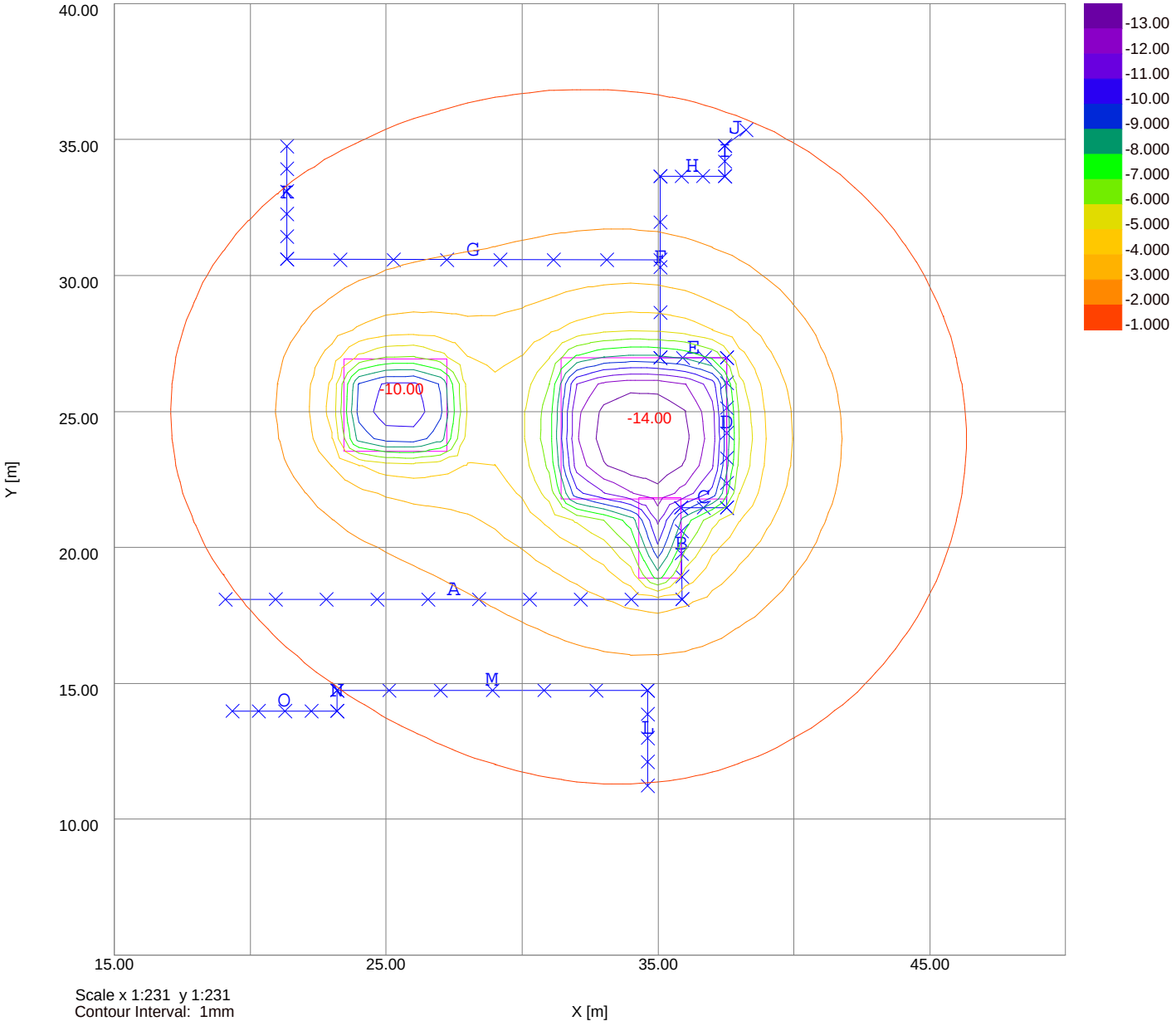
No structures have segments combined.

Settlement Contours : Grid 1 at 0.0000m



Scale x 1:198 y 1:198
Contour Interval: 1mm

Settlement Contours : Grid 1 at 0.0000m



Scale x 1:231 y 1:231
Contour Interval: 1mm

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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