47 PLATT'S LANE

For

Mr Gert-Jan Breukink

BUILDING DAMAGE ASSESSMENT REPORT

April 2024

Prepared by Articlus Limited

Client Name: Mr Gert-Jan Breukink
Project Name: 47 Platt's Lane, London, NW3 7NL
Project No: 15670
Document No: EWGCE-15670-XX-R-BDA-001

Quality Assurance – Approval Status

This document has been prepared and checked in accordance with Articlus internal management procedures.

Issue	Date	Prepared by:	Checked by:	Approved by:
1	15/04/2024	AK	AR	AR

Comments:

Issue 1 – First issue.

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1. Introduction

Articlus has been instructed by UPP on behalf of Mr Gert-Jan Breukink to prepare building damage assessment (BDA) report for the proposed development at 47 Platt's Lane, London.

1.1 Study Aims and Objectives

This report aims to give a degree of certainty to the asset owner and the developer to understand the predicted ground movements and magnitude of potential impact at the location of the assets.

This ground movement assessment has included the following assets in the assessment:

- Key Facades of 45 Platt's Lane.
- Key Facades of 49 Platt's Lane.

1.2 Limitations

This report is based upon information obtained from third party sources. The third-party data has been accepted at face value and has not been independently verified. Articlus can therefore give no warranty, representation, or assurance as to the accuracy or completeness of such information.

This report has been prepared for the sole internal use and reliance of the Client, Mr Gert-Jan Breukink, and shall not be relied upon by other parties without the express written authority of Articlus. If an unauthorised third party comes into possession of this report, then they rely on it at their own risk.

2. Site Location and Description

2.1 Site Location

The site is located at street address of 47 Platt's Lane, London NW3 7NL with a grid reference of 525276, 186151. The site has an approximate area of 0.03ha. Figure 1 presents the current site layout.

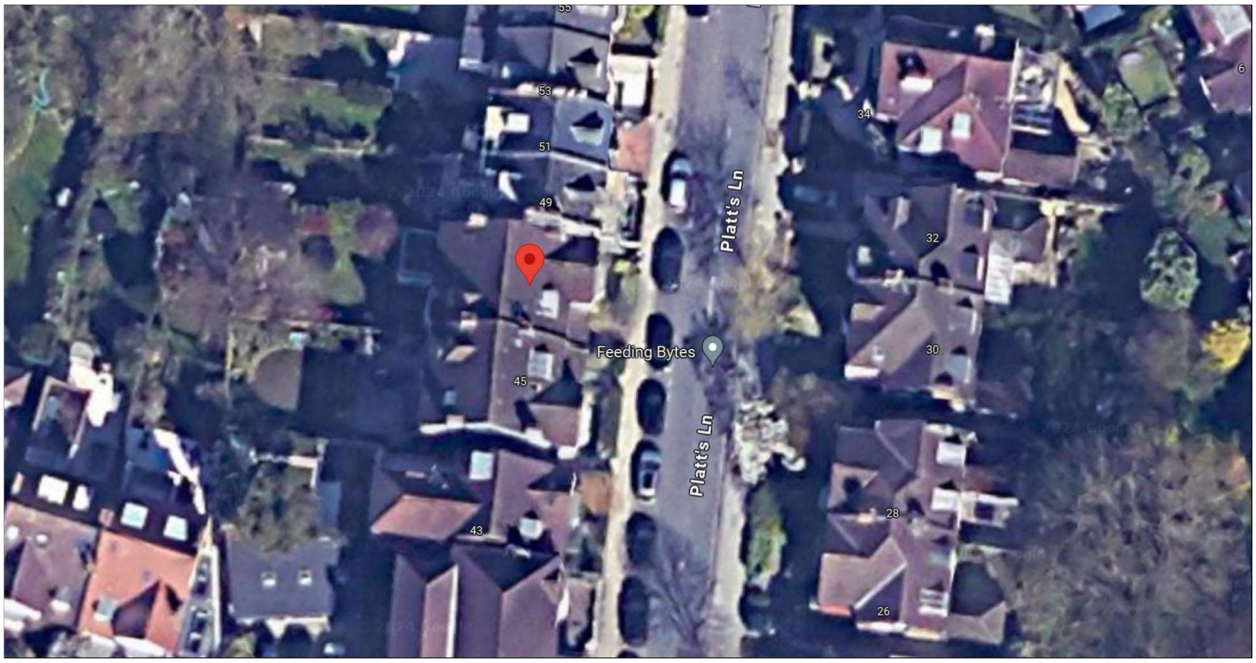

Figure 1: Current site layout (courtesy of google map)

2.2 Current Site and Surrounding Land Uses

The site is currently occupied by a double-storey Victorian semi-detached house with a partial basement (as shown in Figure 1).

The site surrounding is predominantly consisting of residential buildings.

2.3 Proposed Development

The proposed to construct a light well to front of the existing house by extending existing basement.

The new building structure will be as follows:

- A hit and miss sequence of underpinning to form light well/extension of existing basement.
- A 350mm thick raft foundation to support wall loading.

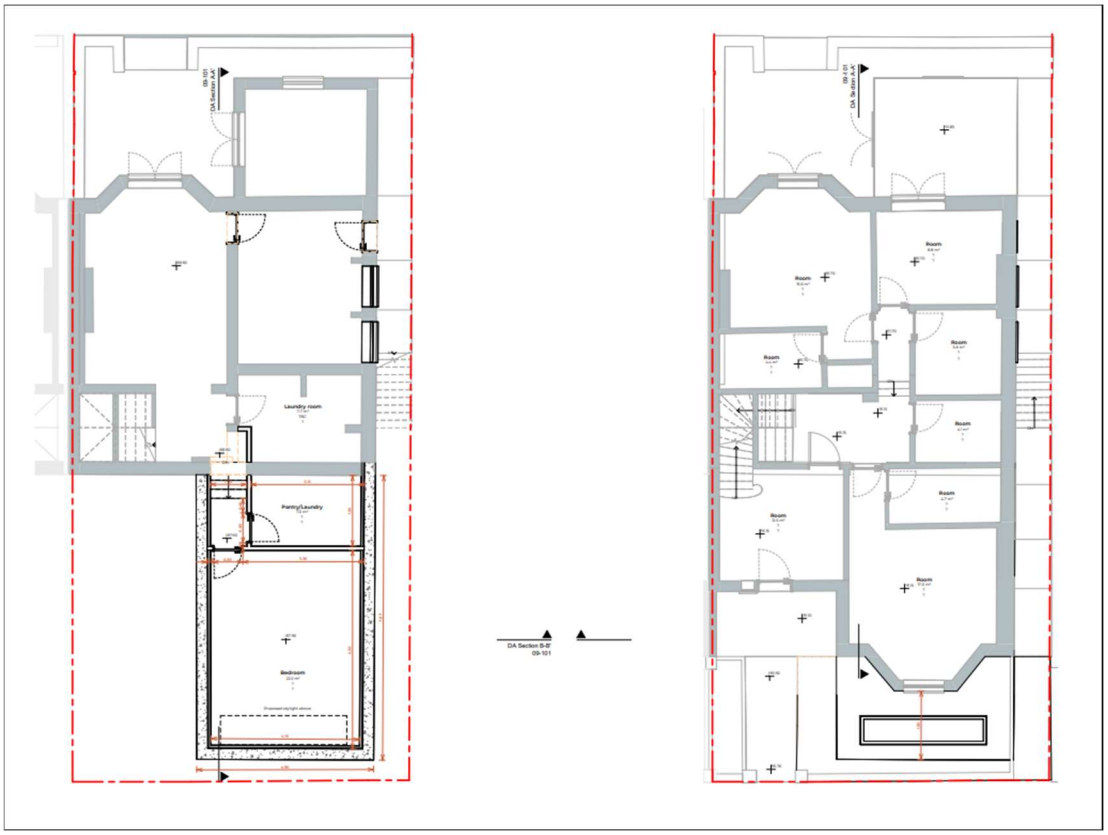

Figure 2: Proposed lightwell/basement extension plan (extract from UPP drawing)

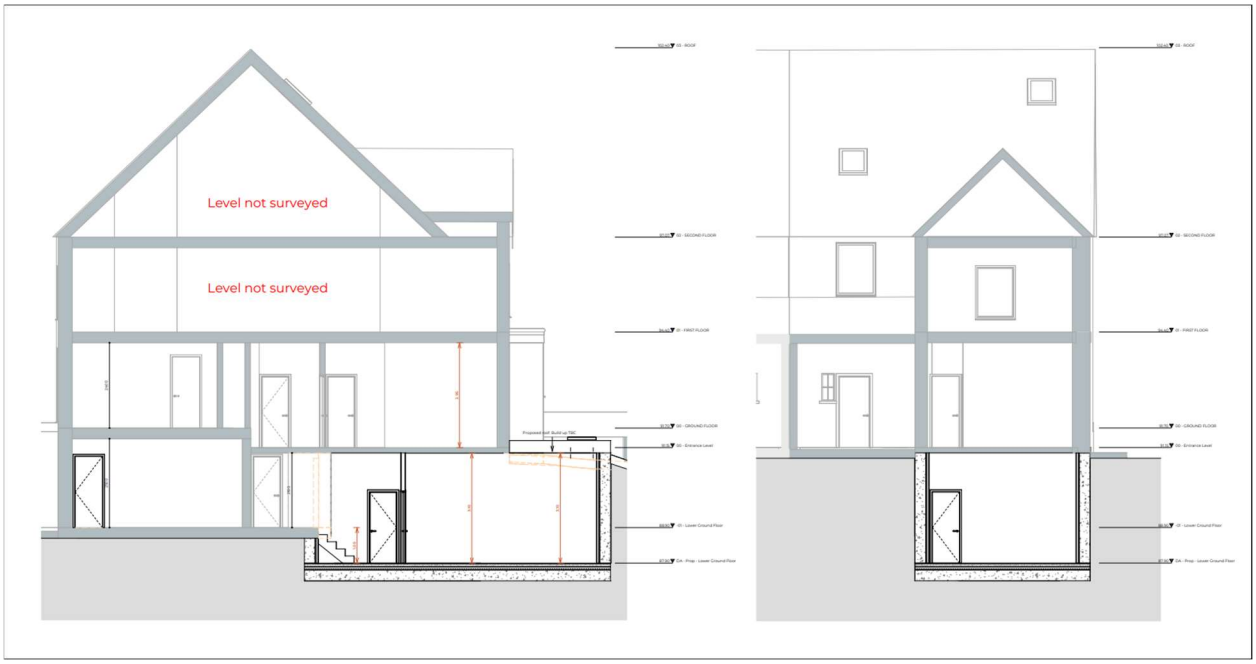

Figure 3: Proposed section (extract from UPP drawing)

3. Third Party Assets

The following neighbouring building has been included in this assessment.

- 45 Platt's Lane.
- 49 Platt's Lane.

The third-party assets are shown in Figure 4.

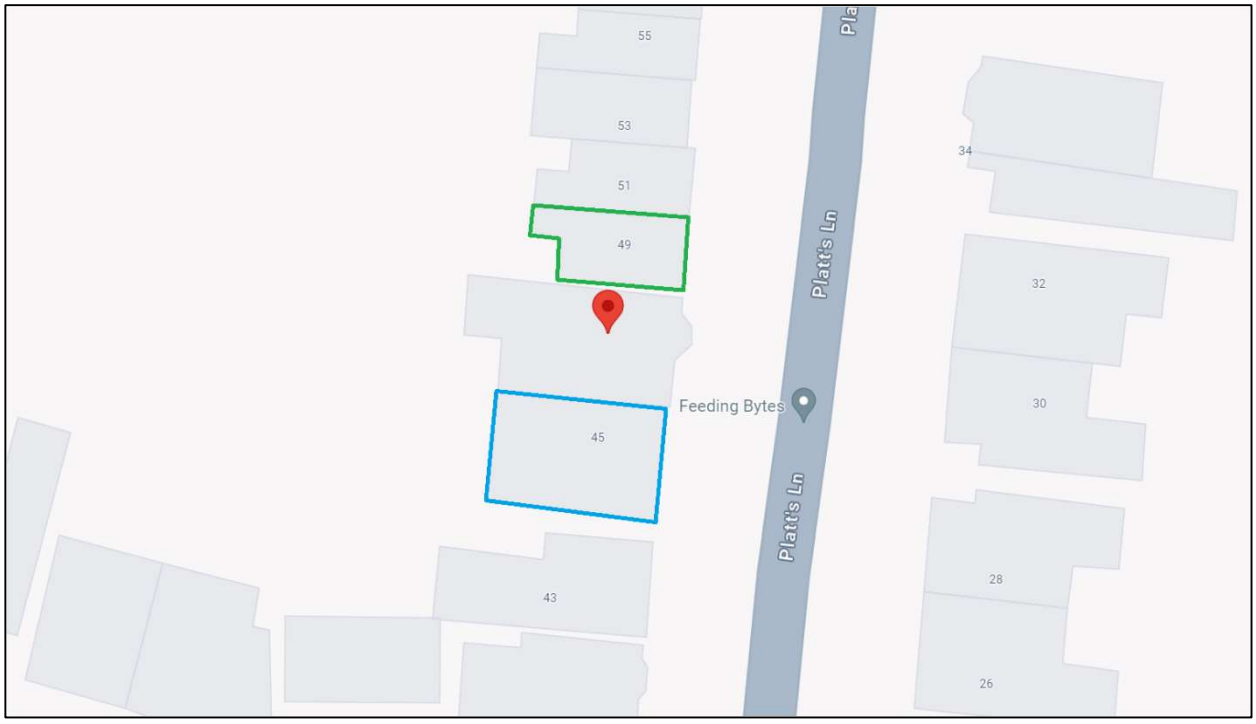

Figure 4: Adjacent building included in this BDA

3.1 Building Damage Assessment (BDA)

A building damage assessment has been undertaken to assess the potential impact of the proposed development on the adjacent 45 & 49 Platt's Lane buildings, due to the following key construction stages:

- Underpinning of existing building
- Excavation to Basement
- Long-term structural loading

The overall aim of this study is to evaluate the potential impact of the proposed redevelopment on the neighbouring building. The building damage assessment has been undertaken in accordance with the Burland (2001) assessment criteria presented in CIRIA C760.

The damage criteria limiting tensile strain, description of the damage categories and associated approximate crack

widths are presented in Figure 5. According to the various London borough councils, the acceptable damage categories are "0 Negligible" to "2 Slight" and are highlighted in Figure 5.

Category of damage	Description of typical damage (ease of repair is underlined)	Approximate crack width (mm)	Limiting tensile strain, ε_{lim} (%)
0 Negligible	Hairline cracks of less than about 0.1 mm are classed as negligible	<0.1	0.0 to 0.05
1 Very slight	**Fine cracks that can easily be treated during normal decoration.** Perhaps isolated slight fracture in building. Cracks in external brickwork visible on inspection	<1	0.05 to 0.075
2 Slight	**Cracks easily filled. Redecoration probably required.** Several slight fractures showing inside of building. Cracks are visible externally and **some repointing may be required externally** to ensure weathertightness. Doors and windows may stick slightly.	<5	0.075 to 0.15
3 Moderate	**The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable lining. Repointing of external brickwork and possibly a small amount of brickwork to be replaced.** Doors and windows sticking. Service pipes may fracture. Weathertightness often impaired.	5 to 15 or a number of cracks >3	0.15 to 0.3
4 Severe	**Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows.** Windows and frames distorted, floor sloping noticeably. Walls leaning or bulging noticeably, some loss of bearing in beams. Services pipes disrupted.	15 to 25, but also depends on number of cracks	>0.3
5 Very severe	**This requires a major repair, involving partial or complete rebuilding.** Beams lose bearings, walls lean badly and require shoring. Windows broken with distortion. Danger of instability.	Usually >25, but depends on numbers of cracks	

Notes
1 In assessing the degree of damage, account must be taken of its location in the building or structure.
2 Crack width is only one aspect of damage and should not be used on its own as a direct measure of it.

Figure 5: Damage category classification – CIRIA C760 Table 6.4: Classification of visible damage to walls (after Burland et al., 1977, Boscardin and Cording, 1989 and Burland, 2001)

4. Ground Model and Parameters

4.1 Ground Model and Geotechnical Parameters

Ground model and geotechnical parameters have been evaluated based on the information from the nearby site and borehole logs available from BGS archives.

A summary of ground condition and geotechnical parameters used in design are presented in Table 1.

Table 1: Ground model and geotechnical parameters summary

Stratum	Thickness (m)	Undrained Young's Modulus (MN/m²)	Drained Young's Modulus (MN/m²)	Drained Poisson's Ratio
Made Ground	1.5	-	5.0	0.2
Downwash Deposits	2.0	14	11.2	0.2
Claygate Member	>3.0	17.5	14.0	0.2

Notes:

- The undrained stiffness for cohesive strata has been obtained by correlation with the undrained shear strength for the anticipated range of strain in the respective analytical models. The drained stiffness for cohesive strata has been taken as 80% of the undrained stiffness, following principles of elasticity theory (assuming a Poisson's Ratio of 0.2).
- The Made Ground stiffness has been assumed based on experience in the area and the conditions observed in the site-specific ground investigation.
- The Clay stiffness profiles indicated are based on the relationship Eu=350Cu corresponding to strain levels associated with unloading due to excavation/ demolition and subsequent loading on raft foundation.

4.2 Groundwater

No water strikes were noted during drilling of the borehole. The results from a return visit of the groundwater monitoring installation shows groundwater encountered at 3.5m bgl. Therefore, it should be assumed that a perched water table may be present at site.

5. Loading Information

To represent the phasing of proposed development, the loading has been provided in terms of underpinning loading during deepening of existing foundations, excavation loading (removal of soil) and proposed development loading (new building loading, which has been applied to corresponding stages in the modelling.

The underpinning loading during deepening of foundation to create new basement has been considered considering additional weight of concrete. Excavation loading has been considered equivalent to removal of 4m of soil to achieve required basement level. The loading for the new built has been considered as maximum 100kPa at the underpinning location and approximately 56kPa in the general area.

6. Assessment Methodology

6.1 Pdisp Modelling Methodology

A series of greenfield ground movement analyses have been carried out, using the commercial software Oasys Pdisp, to evaluate the short and long-term movements induced by the proposed construction works. The construction scheme comprises the underpinning of the existing foundation to enable basement excavation, excavation to the proposed formation level and the construction of the proposed structure. The analyses have been undertaken assuming undrained and drained conditions for the cohesive strata, in order to evaluate the short and long-term effects, respectively. Excavation stage has been modelled as upwards uniform surface loads at the formation level.

Pdisp calculates the displacements and changes in vertical stress in a linear elastic soil medium, which arise from uniform normal or tangential pressures applied on a specific level. The analysis has been carried out using the Boussinesq (1885) method. This method calculates the stress distribution assuming a uniform isotropic material with a constant user-defined Poisson's ratio.

The following analyses have been carried out:

- **Model 1 –** Pdisp Underpinning Short Term (ST) conditions.
- **Model 2 –** Pdisp Underpinning and Excavation ST conditions.
- **Model 3 –** Pdisp Underpinning + Excavation + Proposed Building Loading Long Term (LT) conditions.

6.2 Xdisp Modelling Methodology

A building potential damage assessment has been carried out using Oasys Xdisp. The software calculates the "local" greenfield ground movements induced by the embedded wall installation and excavation in addition to the imported global movements from Pdisp models. The software uses the Burland strain criteria (2001) to evaluate the building damage category of each façade of the building. The Burland building damage assessment criteria are presented in Section 3.1.

The building damage assessment uses the work described in Burland et al (2001) and Gaba et al (2003). In this approach the façades of the buildings are represented by simple linear elastic beam with E/G of 2.6 for a Poisson ratio of 0.3, whose foundations are assumed to follow the "greenfield" soil movements at ground surface. The height of the buildings is also an input for the assessment and has been derived based on the visual assessment from google maps and site visit.

Although, this stage of assessment is relatively detailed, the assumptions made are moderately conservative. Consequently, the categories of damage derived in this level of assessment are only potential degrees of damage. The actual damage should be less than the predicted due to the inherent stiffness of the structures and their foundations, which tend to redistribute and reduce both the deflection ratio and the horizontal strains.

The following combined analyses have been carried out in Xdisp in order to simulate the ground movements occurring following existing building demolition, basement excavation and subsequent structural loading in short- and long-term conditions.

- **Model 4 –** Xdisp Underpinning ST – model based on results from Model 1.
- **Model 5 –** Xdisp Underpinning and Excavation ST – model based on results from Model 2.
- **Model 6 –** Xdisp Combined Loading LT – model based on results from Model 3.

7. Results

7.1 Potential Building Damage Assessment

The view of the potential building damage assessment model is shown in Figure 6. The simplified shape of four façades of 45 & 49 Platt's Lane buildings have been modelled. The potential building damage category for each façade is summarised in Table 2 to Table 4.

It is worth noting that the assessment carried out involves a number of conservative assumptions in terms of greenfield movements and no allowance for structural stiffness and therefore the anticipated ground movements are likely to be of smaller magnitude.

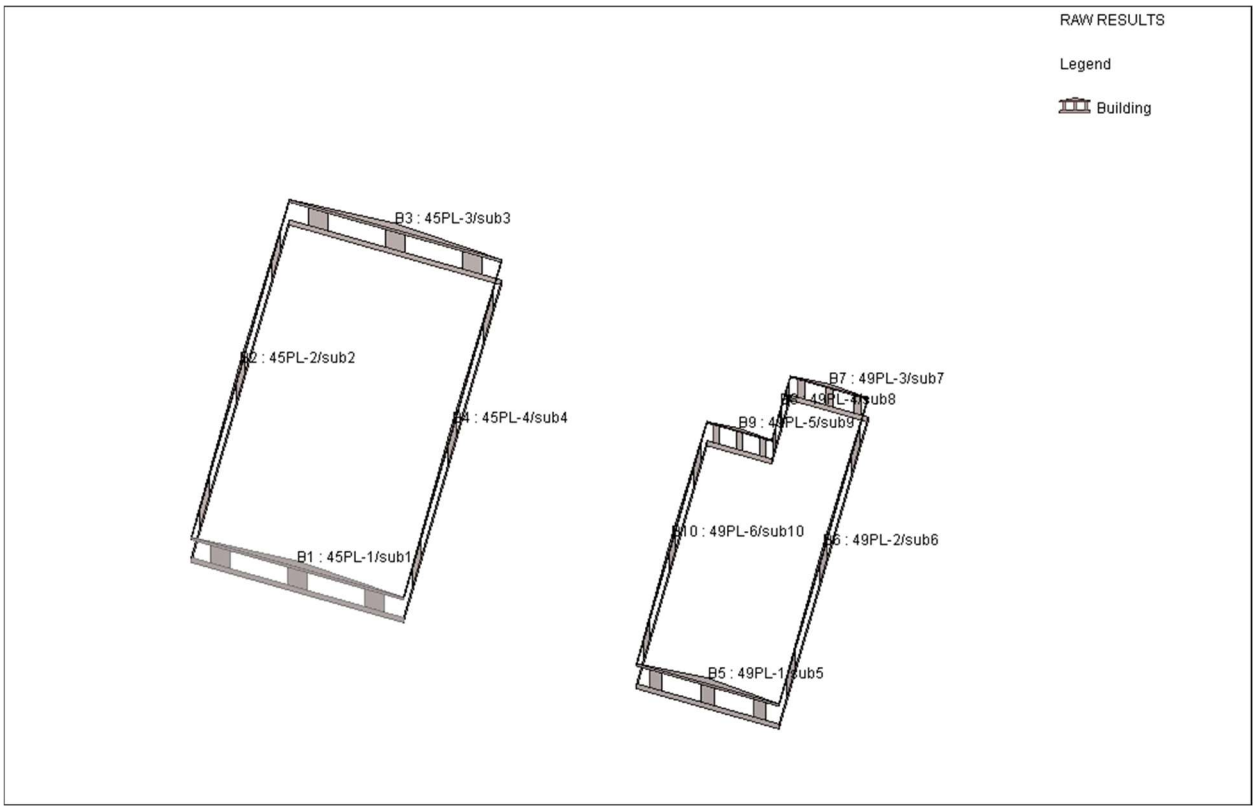

Figure 6: Potential building damage assessment model view

Table 2: Building damage assessment results summary [Model 4]

Building ID	Façade ID	Damage category	Maximum vertical displacement [1] [mm]	Max tensile strain [%]
45 Platt's Lane	45PL-1	0 (Negligible)	<1	0.002
	45PL-2	0 (Negligible)	<1	0.00
	45PL-3	0 (Negligible)	<1	0.00

Building ID	Façade ID	Damage category	Maximum vertical displacement [1] [mm]	Max tensile strain [%]
	45PL-4	0 (Negligible)	<1	0.002
49 Platt's Lane	49PL-1	0 (Negligible)	<1	0.005
	49PL-2	0 (Negligible)	<1	0.0005
	49PL-3	0 (Negligible)	<1	0.00
	49PL-4	0 (Negligible)	<1	0.00
	49PL-5	0 (Negligible)	<1	0.00
	49PL-6	0 (Negligible)	1.2	0.004

Table 3: Building damage assessment results summary [Model 5]

Building ID	Façade ID	Damage category	Maximum vertical displacement [mm]	Max tensile strain [%]
45 Platt's Lane	45PL-1	0 (Negligible)	1.0	0.004
	45PL-2	0 (Negligible)	<1	0.00
	45PL-3	0 (Negligible)	<1	0.00
	45PL-4	0 (Negligible)	1.1	0.003
49 Platt's Lane	49PL-1	0 (Negligible)	2.3	0.01
	49PL-2	0 (Negligible)	<1	0.001
	49PL-3	0 (Negligible)	<1	0.00
	49PL-4	0 (Negligible)	<1	0.004
	49PL-5	0 (Negligible)	<1	0.00
	49PL-6	0 (Negligible)	2.6	0.01

Table 4: Building damage assessment results summary [Model 6]

Building ID	Façade ID	Damage category	Maximum vertical displacement [1] [mm]	Max tensile strain [%]
45 Platt's Lane	45PL-1	0 (Negligible)	-3.8	0.014
	45PL-2	0 (Negligible)	<1	0.001

Building ID	Façade ID	Damage category	Maximum vertical displacement [1] [mm]	Max tensile strain [%]
	45PL-3	0 (Negligible)	<1	0.001
	45PL-4	0 (Negligible)	-3.9	0.01
49 Platt's Lane	49PL-1	0 (Negligible)	-8.3	0.03
	49PL-2	0 (Negligible)	-1.8	0.004
	49PL-3	0 (Negligible)	-1.0	0.0002
	49PL-4	0 (Negligible)	-1.6	0.001
	49PL-5	0 (Negligible)	-2.2	0.00
	49PL-6	0 (Negligible)	-8.4	0.03

Notes:

- +ve displacement is heave.
- -ve displacement is settlement.

8. Conclusions

Articlus Limited has been instructed by UPP on behalf of Mr Gert-Jan Breukink to undertake a ground movement assessment (GMA) to evaluate the potential impacts of the proposed development on the adjacent buildings. This report aims to provide a degree of certainty to the asset owners and the developer in relation to the ground movement and the magnitude of potential impact induced by construction, at the location of these assets.

Ground model and geotechnical parameters have been evaluated based on the experience in the proximity of proposed development and using BGS borehole archives.

Some of the information and conclusions presented in this report are based on information provided by others. Articlus has endeavoured to assess all information provided to them but makes no guarantees or warranties as to the accuracy or completeness of this information.

A combination of analyses has been carried out, using the commercial software Oasys Xdisp and Oasys Pdisp, in order to evaluate the greenfield ground movements due to underpinning, excavation for the proposed basement construction and the long-term loading from the proposed structure.

The results from the GMA analyses are presented in Table 2 to Table 4 for adjacent buildings at 45 & 49 Platt's Lane. The predicted potential damage to the adjacent building has been predicted to be Category 0 Negligible.

The resulting damage categories predicted as part of this GMA are within the allowable limits adopted for such assessments and industry wide practice. It is noted that the predicted ground movements, the associated wall tensile strains and level of damage categorisation are considered to be conservative, in view of the relatively cautious data assumptions and greenfield nature of the assessment undertaken.

The GMA has been supplemented by a project-specific monitoring regime and Action Plan, which delineate lines of responsibility, trigger levels in accordance with the ground movements predicted as part of this study and appropriate mitigation measures (if required). The assessment presented herein is dependent and reliant on the works being undertaken by an experienced contractor, high quality workmanship and appropriate supervision of construction means and methods by experienced personnel.

It is recommended that this report is reviewed and understood in full by the project team and relevant stakeholders. Where significant changes are made to items such as construction sequencing and scheme design the engineer should thoroughly review the discrepancy and evaluate any potential impacts on ground movement and building damage.

It is critical that the permanent and temporary works designs are carried out in a coordinated manner between performance specified elements and substructure contractors, with the aim to ensure that such design elements are in alignment with the assumptions/findings of the GMA and overall design intent.

9. References

1. Articlus, ground investigation report, June 2023
2. British Geological Survey borehole archives.
3. CIRIA R143 (1995) The Standard Penetration Test (SPT): Methods and Use.
4. CIRIA C760 (2017) Guidance on embedded retaining wall design.
5. Jardine, RJ et al. (1986) Studies of the influence of non-linear stress strain characteristics in soil structure interaction. Geotechnique, Vol 36, No 3, pp377-396.
6. Oasys Pdisp user manual.
7. Oasys Xdisp user manual.

APPENDICES

A. Xdisp Tabular Output

Specific Building Damage Results - Critical Segments within Each Building

Stage: Ref.	Stage: Name	Specific Building: Ref.	Specific Building: Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage Category
0	Base Model	0	45PL-1	Max Slope	sub1	1	0.0	5.1250	None	131.71E-6	0.49499	0.0015833	-	-	0 (Negligible)
				Max Settlement	sub1	1	0.0	5.1250	None	131.71E-6	0.49499	0.0015833	-	-	0 (Negligible)
				Max Tensile Strain	sub1	1	0.0	5.1250	None	131.71E-6	0.49499	0.0015833	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	45PL-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	45PL-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	45PL-4	Max Slope	sub4	1	2.0308	6.6781	None	59.484E-6	0.32196	414.38E-6	-	-	0 (Negligible)
				Max Settlement	sub4	2	6.6781	13.200	None	59.484E-6	0.50906	0.0014719	-	-	0 (Negligible)
				Max Tensile Strain	sub4	2	6.6781	13.200	None	59.484E-6	0.50906	0.0014719	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-1	Max Slope	sub5	1	0.0	5.5000	None	374.39E-6	1.1747	0.0053356	-	-	0 (Negligible)
				Max Settlement	sub5	1	0.0	5.5000	None	374.39E-6	1.1747	0.0053356	-	-	0 (Negligible)
				Max Tensile Strain	sub5	1	0.0	5.5000	None	374.39E-6	1.1747	0.0053356	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-2	Max Slope	sub6	1	0.0	7.4852	None	19.995E-6	0.19620	515.74E-6	-	-	0 (Negligible)
				Max Settlement	sub6	1	0.0	7.4852	None	19.995E-6	0.19620	515.74E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub6	1	0.0	7.4852	None	19.995E-6	0.19620	515.74E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	49PL-4	Max Slope	sub8	1	1.2500	2.5000	None	36.600E-6	0.16229	35.763E-9	-	-	0 (Negligible)
				Max Settlement	sub8	1	1.2500	2.5000	None	36.600E-6	0.16229	35.763E-9	-	-	0 (Negligible)
				Max Tensile Strain	sub8	1	1.2500	2.5000	None	36.600E-6	0.16229	35.763E-9	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-5	Max Slope	sub9	1	0.0	2.5000	None	35.725E-6	0.25090	13.268E-6	-	-	0 (Negligible)
				Max Settlement	sub9	1	0.0	2.5000	None	35.725E-6	0.25090	13.268E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub9	1	0.0	2.5000	None	35.725E-6	0.25090	13.268E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-6	Max Slope	sub10	1	0.0	3.5332	None	216.88E-6	0.72657	0.0016432	-	-	0 (Negligible)
				Max Settlement	sub10	2	3.5332	9.5000	None	216.88E-6	1.1982	0.0045127	-	-	0 (Negligible)
				Max Tensile Strain	sub10	2	3.5332	9.5000	None	216.88E-6	1.1982	0.0045127	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-

Short-term Underpinning Stage

Specific Building Damage Results - Critical Segments within Each Building

Stage: Ref.	Stage: Name	Specific Building: Ref.	Specific Building: Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage Category
0	Base Model	0	45PL-1	Max Slope	sub1	1	0.0	6.1500	None	284.32E-6	1.0736	0.0039124	-	-	0 (Negligible)
				Max Settlement	sub1	1	0.0	6.1500	None	284.32E-6	1.0736	0.0039124	-	-	0 (Negligible)
				Max Tensile Strain	sub1	1	0.0	6.1500	None	284.32E-6	1.0736	0.0039124	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	45PL-2	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	45PL-3	All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
				All vertical displacements are less than the limit sensitivity.											
		0	45PL-4	Max Slope	sub4	1	1.0154	7.5834	None	132.09E-6	0.74777	0.0014911	-	-	0 (Negligible)
				Max Settlement	sub4	2	7.5834	13.200	None	132.09E-6	1.1235	0.0033627	-	-	0 (Negligible)
				Max Tensile Strain	sub4	2	7.5834	13.200	None	132.09E-6	1.1235	0.0033627	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-1	Max Slope	sub5	1	0.0	5.5000	None	679.92E-6	2.3778	0.0094426	-	-	0 (Negligible)
				Max Settlement	sub5	1	0.0	5.5000	None	679.92E-6	2.3778	0.0094426	-	-	0 (Negligible)
				Max Tensile Strain	sub5	1	0.0	5.5000	None	679.92E-6	2.3778	0.0094426	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-2	Max Slope	sub6	1	0.0	6.8999	None	44.903E-6	0.42589	0.0011836	-	-	0 (Negligible)
				Max Settlement	sub6	1	0.0	6.8999	None	44.903E-6	0.42589	0.0011836	-	-	0 (Negligible)
				Max Tensile Strain	sub6	1	0.0	6.8999	None	44.903E-6	0.42589	0.0011836	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-3	Max Slope	sub7	1	2.0000	3.0000	None	28.065E-6	0.14843	35.763E-9	-	-	0 (Negligible)
				Max Settlement	sub7	1	2.0000	3.0000	None	28.065E-6	0.14843	35.763E-9	-	-	0 (Negligible)
				Max Tensile Strain	sub7	1	2.0000	3.0000	None	28.065E-6	0.14843	35.763E-9	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-4	Max Slope	sub8	1	0.0	2.5000	None	72.444E-6	0.30982	373.76E-6	-	-	0 (Negligible)
				Max Settlement	sub8	1	0.0	2.5000	None	72.444E-6	0.30982	373.76E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub8	1	0.0	2.5000	None	72.444E-6	0.30982	373.76E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-5	Max Slope	sub9	1	0.0	2.5000	None	63.230E-6	0.46730	11.337E-6	-	-	0 (Negligible)
				Max Settlement	sub9	1	0.0	2.5000	None	63.230E-6	0.46730	11.337E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub9	1	0.0	2.5000	None	63.230E-6	0.46730	11.337E-6	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-6	Max Slope	sub10	1	0.0	4.8744	None	411.95E-6	1.6604	0.0031191	-	-	0 (Negligible)
				Max Settlement	sub10	2	4.8744	9.5000	None	411.95E-6	2.5774	0.0099229	-	-	0 (Negligible)
				Max Tensile Strain	sub10	2	4.8744	9.5000	None	411.95E-6	2.5774	0.0099229	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-

Short-term Underpinning + Excavation Stage

Specific Building Damage Results - Critical Segments within Each Building

Stage: Ref.	Stage: Name	Specific Building: Ref.	Specific Building: Name	Parameter	Critical Sub-Building	Critical Segment	Start [m]	End [m]	Curvature	Max Slope	Max Settlement [mm]	Max Tensile Strain [%]	Min Radius of Curvature (Hogging) [m]	Min Radius of Curvature (Sagging) [m]	Damage Category
0	Base Model	0	45PL-1	Max Slope	sub1	1	0.0	8.2000	None	**875.47E-6**	3.8028	0.014212	-	-	0 (Negligible)
				Max Settlement	sub1	1	0.0	8.2000	None	875.47E-6	**3.8028**	0.014212	-	-	0 (Negligible)
				Max Tensile Strain	sub1	1	0.0	8.2000	None	875.47E-6	3.8028	**0.014212**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	45PL-2	Max Slope	sub2	1	0.0	9.5710	None	**38.143E-6**	0.59116	996.67E-6	-	-	0 (Negligible)
				Max Settlement	sub2	1	0.0	9.5710	None	38.143E-6	**0.59116**	996.67E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub2	1	0.0	9.5710	None	38.143E-6	0.59116	**996.67E-6**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	45PL-3	Max Slope	sub3	1	0.0	8.2000	None	**80.513E-6**	0.78739	798.40E-6	-	-	0 (Negligible)
				Max Settlement	sub3	1	0.0	8.2000	None	80.513E-6	**0.78739**	798.40E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub3	1	0.0	8.2000	None	80.513E-6	0.78739	**798.40E-6**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	45PL-4	Max Slope	sub4	1	0.0	6.5099	None	**403.16E-6**	2.6069	0.0044680	-	-	0 (Negligible)
				Max Settlement	sub4	2	6.5099	13.200	None	403.16E-6	**3.8882**	0.0098803	-	-	0 (Negligible)
				Max Tensile Strain	sub4	2	6.5099	13.200	None	403.16E-6	3.8882	**0.0098803**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-1	Max Slope	sub5	1	0.0	5.5000	Hogging	**0.0025017**	8.3265	0.028938	889.23	-	0 (Negligible)
				Max Settlement	sub5	1	0.0	5.5000	Hogging	0.0025017	**8.3265**	0.028938	889.23	-	0 (Negligible)
				Max Tensile Strain	sub5	1	0.0	5.5000	Hogging	0.0025017	8.3265	**0.028938**	889.23	-	0 (Negligible)
				Min Radius of Curvature (Hogging)	sub5	1	0.0	5.5000	Hogging	0.0025017	8.3265	0.028938	**889.23**	-	0 (Negligible)
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-2	Max Slope	sub6	1	0.0	7.8070	None	**143.61E-6**	1.7974	0.0036833	-	-	0 (Negligible)
				Max Settlement	sub6	1	0.0	7.8070	None	143.61E-6	**1.7974**	0.0036833	-	-	0 (Negligible)
				Max Tensile Strain	sub6	1	0.0	7.8070	None	143.61E-6	1.7974	**0.0036833**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-3	Max Slope	sub7	1	0.0	3.0000	None	**112.14E-6**	0.98105	207.60E-6	-	-	0 (Negligible)
				Max Settlement	sub7	1	0.0	3.0000	None	112.14E-6	**0.98105**	207.60E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub7	1	0.0	3.0000	None	112.14E-6	0.98105	**207.60E-6**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-4	Max Slope	sub8	1	0.0	2.5000	None	**261.94E-6**	1.5716	0.0012182	-	-	0 (Negligible)
				Max Settlement	sub8	1	0.0	2.5000	None	261.94E-6	**1.5716**	0.0012182	-	-	0 (Negligible)
				Max Tensile Strain	sub8	1	0.0	2.5000	None	261.94E-6	1.5716	**0.0012182**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-5	Max Slope	sub9	1	0.0	2.5000	None	**249.93E-6**	2.1945	36.871E-6	-	-	0 (Negligible)
				Max Settlement	sub9	1	0.0	2.5000	None	249.93E-6	**2.1945**	36.871E-6	-	-	0 (Negligible)
				Max Tensile Strain	sub9	1	0.0	2.5000	None	249.93E-6	2.1945	**36.871E-6**	-	-	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)		-	-	-	-	-	-	-	-	-	-
		0	49PL-6	Max Slope	sub10	1	0.0	3.4281	None	**0.0014895**	5.3240	0.011059	-	-	0 (Negligible)
				Max Settlement	sub10	2	3.4281	9.5000	Sagging	0.0014895	**8.4116**	0.030341	-	3086.4	0 (Negligible)
				Max Tensile Strain	sub10	2	3.4281	9.5000	Sagging	0.0014895	8.4116	**0.030341**	-	3086.4	0 (Negligible)
				Min Radius of Curvature (Hogging)		-	-	-	-	-	-	-	-	-	-
				Min Radius of Curvature (Sagging)	sub10	2	3.4281	9.5000	Sagging	0.0014895	8.4116	0.030341	-	**3086.4**	0 (Negligible)

Long term Underpinning + Excavation + Loading Stage

B. Pdisp Tabular Output

Results : Immediate : Displacement Data : Lines

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	45PL-1	-8.20000	2.60000	0.00000	0.49499	-0.18750	0.0	0.0	0.0
1	45PL-1	-9.22500	2.60000	0.00000	0.35998	-0.18750	0.0	0.0	0.0
1	45PL-1	-10.25000	2.60000	0.00000	0.26362	-0.18750	0.0	0.0	0.0
1	45PL-1	-11.27500	2.60000	0.00000	0.19291	-0.18750	0.0	0.0	0.0
1	45PL-1	-12.30000	2.60000	0.00000	0.14010	-0.18750	0.0	0.0	0.0
1	45PL-1	-13.32500	2.60000	0.00000	0.10024	-0.18750	0.0	0.0	0.0
1	45PL-1	-14.35000	2.60000	0.00000	0.06994	-0.18750	0.0	0.0	0.0
1	45PL-1	-15.37500	2.60000	0.00000	0.04685	-0.18750	0.0	0.0	0.0
1	45PL-1	-16.40000	2.60000	0.00000	0.02925	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	2.60000	0.00000	0.02925	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	3.61538	0.00000	0.03012	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	4.63077	0.00000	0.03000	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	5.64615	0.00000	0.02889	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	6.66154	0.00000	0.02685	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	7.67692	0.00000	0.02402	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	8.69231	0.00000	0.02054	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	9.70769	0.00000	0.01660	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	10.72308	0.00000	0.01240	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	11.73846	0.00000	0.00813	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	12.75385	0.00000	0.00394	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	13.76923	0.00000	-0.00003	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	14.78462	0.00000	-0.00368	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	15.80000	0.00000	-0.00695	-0.18750	0.0	0.0	0.0
3	45PL-3	-16.40000	15.80000	0.00000	-0.00695	-0.18750	0.0	0.0	0.0
3	45PL-3	-15.37500	15.80000	0.00000	-0.00257	-0.18750	0.0	0.0	0.0
3	45PL-3	-14.35000	15.80000	0.00000	0.00277	-0.18750	0.0	0.0	0.0
3	45PL-3	-13.32500	15.80000	0.00000	0.00913	-0.18750	0.0	0.0	0.0
3	45PL-3	-12.30000	15.80000	0.00000	0.01655	-0.18750	0.0	0.0	0.0
3	45PL-3	-11.27500	15.80000	0.00000	0.02504	-0.18750	0.0	0.0	0.0
3	45PL-3	-10.25000	15.80000	0.00000	0.03448	-0.18750	0.0	0.0	0.0
3	45PL-3	-9.22500	15.80000	0.00000	0.04467	-0.18750	0.0	0.0	0.0
3	45PL-3	-8.20000	15.80000	0.00000	0.05525	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	15.80000	0.00000	0.05525	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	14.78462	0.00000	0.07763	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	13.76923	0.00000	0.10548	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	12.75385	0.00000	0.13976	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	11.73846	0.00000	0.18136	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	10.72308	0.00000	0.23072	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	9.70769	0.00000	0.28712	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	8.69231	0.00000	0.34752	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	7.67692	0.00000	0.40587	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	6.66154	0.00000	0.45478	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	5.64615	0.00000	0.48911	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	4.63077	0.00000	0.50719	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	3.61538	0.00000	0.50913	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	2.60000	0.00000	0.49499	-0.18750	0.0	0.0	0.0
5	49PL-1	0.80000	2.60000	0.00000	1.17470	-0.18750	0.0	0.0	0.0
5	49PL-1	1.90000	2.60000	0.00000	0.76287	-0.18750	0.0	0.0	0.0
5	49PL-1	3.00000	2.60000	0.00000	0.52760	-0.18750	0.0	0.0	0.0
5	49PL-1	4.10000	2.60000	0.00000	0.37403	-0.18750	0.0	0.0	0.0
5	49PL-1	5.20000	2.60000	0.00000	0.26765	-0.18750	0.0	0.0	0.0
5	49PL-1	6.30000	2.60000	0.00000	0.19143	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	2.60000	0.00000	0.19143	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	3.60000	0.00000	0.19623	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	4.60000	0.00000	0.19569	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	5.60000	0.00000	0.18986	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	6.60000	0.00000	0.17914	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	7.60000	0.00000	0.16431	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	8.60000	0.00000	0.14649	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	9.60000	0.00000	0.12694	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	10.60000	0.00000	0.10695	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	11.60000	0.00000	0.08756	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	12.60000	0.00000	0.06954	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	13.60000	0.00000	0.05334	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	14.60000	0.00000	0.03916	-0.18750	0.0	0.0	0.0
7	49PL-3	6.30000	14.60000	0.00000	0.03916	-0.18750	0.0	0.0	0.0
7	49PL-3	5.30000	14.60000	0.00000	0.05186	-0.18750	0.0	0.0	0.0
7	49PL-3	4.30000	14.60000	0.00000	0.06586	-0.18750	0.0	0.0	0.0
7	49PL-3	3.30000	14.60000	0.00000	0.08075	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	14.60000	0.00000	0.08075	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	13.35000	0.00000	0.11654	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	12.10000	0.00000	0.16229	-0.18750	0.0	0.0	0.0
9	49PL-5	3.30000	12.10000	0.00000	0.16229	-0.18750	0.0	0.0	0.0
9	49PL-5	2.05000	12.10000	0.00000	0.20624	-0.18750	0.0	0.0	0.0
9	49PL-5	0.80000	12.10000	0.00000	0.25090	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	12.10000	0.00000	0.25090	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	10.51667	0.00000	0.40036	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	8.93333	0.00000	0.64708	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	7.35000	0.00000	0.99047	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	5.76667	0.00000	1.15835	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	4.18333	0.00000	1.19849	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	2.60000	0.00000	1.17470	-0.18750	0.0	0.0	0.0

Short-term Underpinning Stage

Results : Immediate : Displacement Data : Lines

Ref.	Name	x	y	z	δz	Stress: Calc. Level	Stress: Vertical	Stress: Sum Princ.	Vert. Strain
		[m]	[m]	[mOD]	[mm]	[mOD]	[kN/m²]	[kN/m²]	[μ]
1	45PL-1	-8.20000	2.60000	0.00000	-1.07357	-0.18750	0.0	0.0	0.0
1	45PL-1	-9.22500	2.60000	0.00000	-0.78214	-0.18750	0.0	0.0	0.0
1	45PL-1	-10.25000	2.60000	0.00000	-0.57161	-0.18750	0.0	0.0	0.0
1	45PL-1	-11.27500	2.60000	0.00000	-0.41642	-0.18750	0.0	0.0	0.0
1	45PL-1	-12.30000	2.60000	0.00000	-0.30044	-0.18750	0.0	0.0	0.0
1	45PL-1	-13.32500	2.60000	0.00000	-0.21299	-0.18750	0.0	0.0	0.0
1	45PL-1	-14.35000	2.60000	0.00000	-0.14670	-0.18750	0.0	0.0	0.0
1	45PL-1	-15.37500	2.60000	0.00000	-0.09633	-0.18750	0.0	0.0	0.0
1	45PL-1	-16.40000	2.60000	0.00000	-0.05809	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	2.60000	0.00000	-0.05809	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	3.61538	0.00000	-0.06015	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	4.63077	0.00000	-0.05987	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	5.64615	0.00000	-0.05724	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	6.66154	0.00000	-0.05247	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	7.67692	0.00000	-0.04588	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	8.69231	0.00000	-0.03789	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	9.70769	0.00000	-0.02898	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	10.72308	0.00000	-0.01961	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	11.73846	0.00000	-0.01020	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	12.75385	0.00000	-0.00113	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	13.76923	0.00000	0.00735	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	14.78462	0.00000	0.01503	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	15.80000	0.00000	0.02180	-0.18750	0.0	0.0	0.0
3	45PL-3	-16.40000	15.80000	0.00000	0.02180	-0.18750	0.0	0.0	0.0
3	45PL-3	-15.37500	15.80000	0.00000	0.01323	-0.18750	0.0	0.0	0.0
3	45PL-3	-14.35000	15.80000	0.00000	0.00280	-0.18750	0.0	0.0	0.0
3	45PL-3	-13.32500	15.80000	0.00000	-0.00960	-0.18750	0.0	0.0	0.0
3	45PL-3	-12.30000	15.80000	0.00000	-0.02403	-0.18750	0.0	0.0	0.0
3	45PL-3	-11.27500	15.80000	0.00000	-0.04042	-0.18750	0.0	0.0	0.0
3	45PL-3	-10.25000	15.80000	0.00000	-0.05852	-0.18750	0.0	0.0	0.0
3	45PL-3	-9.22500	15.80000	0.00000	-0.07792	-0.18750	0.0	0.0	0.0
3	45PL-3	-8.20000	15.80000	0.00000	-0.09792	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	15.80000	0.00000	-0.09792	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	14.78462	0.00000	-0.14213	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	13.76923	0.00000	-0.19715	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	12.75385	0.00000	-0.26485	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	11.73846	0.00000	-0.34697	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	10.72308	0.00000	-0.44473	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	9.70769	0.00000	-0.55812	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	8.69231	0.00000	-0.68493	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	7.67692	0.00000	-0.81905	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	6.66154	0.00000	-0.94821	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	5.64615	0.00000	-1.05380	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	4.63077	0.00000	-1.11642	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	3.61538	0.00000	-1.12349	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	2.60000	0.00000	-1.07357	-0.18750	0.0	0.0	0.0
5	49PL-1	0.80000	2.60000	0.00000	-2.37781	-0.18750	0.0	0.0	0.0
5	49PL-1	1.90000	2.60000	0.00000	-1.62990	-0.18750	0.0	0.0	0.0
5	49PL-1	3.00000	2.60000	0.00000	-1.14309	-0.18750	0.0	0.0	0.0
5	49PL-1	4.10000	2.60000	0.00000	-0.81269	-0.18750	0.0	0.0	0.0
5	49PL-1	5.20000	2.60000	0.00000	-0.58043	-0.18750	0.0	0.0	0.0
5	49PL-1	6.30000	2.60000	0.00000	-0.41318	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	2.60000	0.00000	-0.41318	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	3.60000	0.00000	-0.42595	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	4.60000	0.00000	-0.42451	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	5.60000	0.00000	-0.40903	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	6.60000	0.00000	-0.38132	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	7.60000	0.00000	-0.34441	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	8.60000	0.00000	-0.30182	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	9.60000	0.00000	-0.25692	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	10.60000	0.00000	-0.21248	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	11.60000	0.00000	-0.17052	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	12.60000	0.00000	-0.13230	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	13.60000	0.00000	-0.09847	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	14.60000	0.00000	-0.06923	-0.18750	0.0	0.0	0.0
7	49PL-3	6.30000	14.60000	0.00000	-0.06923	-0.18750	0.0	0.0	0.0
7	49PL-3	5.30000	14.60000	0.00000	-0.09370	-0.18750	0.0	0.0	0.0
7	49PL-3	4.30000	14.60000	0.00000	-0.12037	-0.18750	0.0	0.0	0.0
7	49PL-3	3.30000	14.60000	0.00000	-0.14843	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	14.60000	0.00000	-0.14843	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	13.35000	0.00000	-0.21927	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	12.10000	0.00000	-0.30982	-0.18750	0.0	0.0	0.0
9	49PL-5	3.30000	12.10000	0.00000	-0.30982	-0.18750	0.0	0.0	0.0
9	49PL-5	2.05000	12.10000	0.00000	-0.38886	-0.18750	0.0	0.0	0.0
9	49PL-5	0.80000	12.10000	0.00000	-0.46730	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	12.10000	0.00000	-0.46730	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	10.51667	0.00000	-0.72895	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	8.93333	0.00000	-1.10001	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	7.35000	0.00000	-1.60916	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	5.76667	0.00000	-2.26141	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	4.18333	0.00000	-2.57845	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	2.60000	0.00000	-2.37781	-0.18750	0.0	0.0	0.0

Short-term Underpinning + Excavation Stage

Results : Immediate : Displacement Data : Lines

Ref.	Name	x [m]	y [m]	z [mOD]	δz [mm]	Stress: Calc. Level [mOD]	Stress: Vertical [kN/m²]	Stress: Sum Princ. [kN/m²]	Vert. Strain [μ]
1	45PL-1	-8.20000	2.60000	0.00000	3.80282	-0.18750	0.0	0.0	0.0
1	45PL-1	-9.22500	2.60000	0.00000	2.90546	-0.18750	0.0	0.0	0.0
1	45PL-1	-10.25000	2.60000	0.00000	2.25794	-0.18750	0.0	0.0	0.0
1	45PL-1	-11.27500	2.60000	0.00000	1.77528	-0.18750	0.0	0.0	0.0
1	45PL-1	-12.30000	2.60000	0.00000	1.40751	-0.18750	0.0	0.0	0.0
1	45PL-1	-13.32500	2.60000	0.00000	1.12288	-0.18750	0.0	0.0	0.0
1	45PL-1	-14.35000	2.60000	0.00000	0.90003	-0.18750	0.0	0.0	0.0
1	45PL-1	-15.37500	2.60000	0.00000	0.72402	-0.18750	0.0	0.0	0.0
1	45PL-1	-16.40000	2.60000	0.00000	0.58405	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	2.60000	0.00000	0.58405	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	3.61538	0.00000	0.59121	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	4.63077	0.00000	0.59022	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	5.64615	0.00000	0.58111	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	6.66154	0.00000	0.56436	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	7.67692	0.00000	0.54078	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	8.69231	0.00000	0.51149	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	9.70769	0.00000	0.47781	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	10.72308	0.00000	0.44112	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	11.73846	0.00000	0.40279	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	12.75385	0.00000	0.36406	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	13.76923	0.00000	0.32598	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	14.78462	0.00000	0.28940	-0.18750	0.0	0.0	0.0
2	45PL-2	-16.40000	15.80000	0.00000	0.25492	-0.18750	0.0	0.0	0.0
3	45PL-3	-16.40000	15.80000	0.00000	0.25492	-0.18750	0.0	0.0	0.0
3	45PL-3	-15.37500	15.80000	0.00000	0.30013	-0.18750	0.0	0.0	0.0
3	45PL-3	-14.35000	15.80000	0.00000	0.35170	-0.18750	0.0	0.0	0.0
3	45PL-3	-13.32500	15.80000	0.00000	0.40998	-0.18750	0.0	0.0	0.0
3	45PL-3	-12.30000	15.80000	0.00000	0.47504	-0.18750	0.0	0.0	0.0
3	45PL-3	-11.27500	15.80000	0.00000	0.54659	-0.18750	0.0	0.0	0.0
3	45PL-3	-10.25000	15.80000	0.00000	0.62374	-0.18750	0.0	0.0	0.0
3	45PL-3	-9.22500	15.80000	0.00000	0.70486	-0.18750	0.0	0.0	0.0
3	45PL-3	-8.20000	15.80000	0.00000	0.78739	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	15.80000	0.00000	0.78739	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	14.78462	0.00000	0.95774	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	13.76923	0.00000	1.16373	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	12.75385	0.00000	1.41142	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	11.73846	0.00000	1.70626	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	10.72308	0.00000	2.05057	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	9.70769	0.00000	2.43848	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	8.69231	0.00000	2.84784	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	7.67692	0.00000	3.23571	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	6.66154	0.00000	3.55206	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	5.64615	0.00000	3.76680	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	4.63077	0.00000	3.87666	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	3.61538	0.00000	3.88831	-0.18750	0.0	0.0	0.0
4	45PL-4	-8.20000	2.60000	0.00000	3.80282	-0.18750	0.0	0.0	0.0
5	49PL-1	0.80000	2.60000	0.00000	8.32649	-0.18750	0.0	0.0	0.0
5	49PL-1	1.90000	2.60000	0.00000	5.57466	-0.18750	0.0	0.0	0.0
5	49PL-1	3.00000	2.60000	0.00000	4.01871	-0.18750	0.0	0.0	0.0
5	49PL-1	4.10000	2.60000	0.00000	2.99926	-0.18750	0.0	0.0	0.0
5	49PL-1	5.20000	2.60000	0.00000	2.28519	-0.18750	0.0	0.0	0.0
5	49PL-1	6.30000	2.60000	0.00000	1.76510	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	2.60000	0.00000	1.76510	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	3.60000	0.00000	1.79750	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	4.60000	0.00000	1.79388	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	5.60000	0.00000	1.75442	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	6.60000	0.00000	1.68138	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	7.60000	0.00000	1.57934	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	8.60000	0.00000	1.45509	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	9.60000	0.00000	1.31694	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	10.60000	0.00000	1.17333	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	11.60000	0.00000	1.03157	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	12.60000	0.00000	0.89706	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	13.60000	0.00000	0.77319	-0.18750	0.0	0.0	0.0
6	49PL-2	6.30000	14.60000	0.00000	0.66169	-0.18750	0.0	0.0	0.0
7	49PL-3	6.30000	14.60000	0.00000	0.66169	-0.18750	0.0	0.0	0.0
7	49PL-3	5.30000	14.60000	0.00000	0.76151	-0.18750	0.0	0.0	0.0
7	49PL-3	4.30000	14.60000	0.00000	0.86890	-0.18750	0.0	0.0	0.0
7	49PL-3	3.30000	14.60000	0.00000	0.98105	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	14.60000	0.00000	0.98105	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	13.35000	0.00000	1.24421	-0.18750	0.0	0.0	0.0
8	49PL-4	3.30000	12.10000	0.00000	1.57164	-0.18750	0.0	0.0	0.0
9	49PL-5	3.30000	12.10000	0.00000	1.57164	-0.18750	0.0	0.0	0.0
9	49PL-5	2.05000	12.10000	0.00000	1.88211	-0.18750	0.0	0.0	0.0
9	49PL-5	0.80000	12.10000	0.00000	2.19453	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	12.10000	0.00000	2.19453	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	10.51667	0.00000	3.22753	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	8.93333	0.00000	4.93464	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	7.35000	0.00000	7.29293	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	5.76667	0.00000	8.25726	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	4.18333	0.00000	8.41272	-0.18750	0.0	0.0	0.0
10	49PL-6	0.80000	2.60000	0.00000	8.32649	-0.18750	0.0	0.0	0.0

Long term Underpinning + Excavation + Loading Stage

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