

---

# GROUND MOVEMENT ANALYSIS REPORT

---

26 Netherhall Gardens  
London NW3 5TL

Client: Atlas Property Company Ltd

Engineer: Sinclair Johnston and Partners

J15344

December 2015



## Document Control

|                                                 |                                                                                                                                 |                    |                           |
|-------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------------------|
| <b>Project title</b>                            | 26 Netherhall Gardens, London, NW3 5TL                                                                                          | <b>Project ref</b> | J15344                    |
| <b>Report prepared by</b>                       | <br>Martin Cooper BEng CEng MICE FGS           |                    |                           |
| <b>Report checked and approved for issue by</b> | <br>Steve Branch BSc MSc CGeol FGS FRGS MEnvSc |                    |                           |
| <b>Issue No</b>                                 | <b>Status</b>                                                                                                                   | <b>Date</b>        | <b>Approved for Issue</b> |
| 1                                               | Final                                                                                                                           | 21 December 2015   |                           |

This report has been issued by the GEA office indicated below. Any enquiries regarding the report should be directed to the office indicated or to Steve Branch in our Herts office.



Hertfordshire

tel 01727 824666

mail@gea-ltd.co.uk



Nottinghamshire

tel 01509 674888

midlands@gea-ltd.co.uk

Geotechnical & Environmental Associates Limited (GEA) disclaims any responsibility to the Client and others in respect of any matters outside the scope of this work. This report has been prepared with reasonable skill, care and diligence within the terms of the contract with the Client and taking account of the manpower, resources, investigation and testing devoted to it in agreement with the Client. This report is confidential to the Client and GEA accepts no responsibility of whatsoever nature to third parties to whom this report or any part thereof is made known, unless formally agreed beforehand. Any such party relies upon the report at their own risk. This report may provide advice based on an interpretation of legislation, guidance notes and codes of practice. GEA does not however provide legal advice and if specific legal advice is required a lawyer should be consulted.

© Geotechnical & Environmental Associates Limited 2015

---

## CONTENTS

|       |                                         |   |
|-------|-----------------------------------------|---|
| 1.0   | INTRODUCTION                            | 1 |
| 1.1   | Proposed Development                    | 1 |
| 1.2   | Limitations                             | 2 |
| 2.0   | THE SITE                                | 2 |
| 2.1   | Site Description                        | 2 |
| 3.0   | GROUND MOVEMENT ANALYSIS                | 2 |
| 3.1   | Construction Methodology                | 2 |
| 4.0   | GROUND MOVEMENTS                        | 3 |
| 4.1   | Model Used                              | 3 |
| 4.1.1 | Piling and Excavation Related Movements | 3 |
| 4.1.2 | Basement Heave Considerations           | 4 |
| 4.2   | Results                                 | 4 |
| 4.2.1 | Piling and Excavation Related Movements | 4 |
| 5.0   | DAMAGE ASSESSMENT                       | 4 |
| 5.1   | Piling and Excavation Related Damage    | 4 |
| 5.2   | Comment                                 | 5 |
| 5.3   | Monitoring of Ground Movements          | 6 |
| 6.0   | CONCLUSIONS                             | 6 |
|       | APPENDICES                              |   |

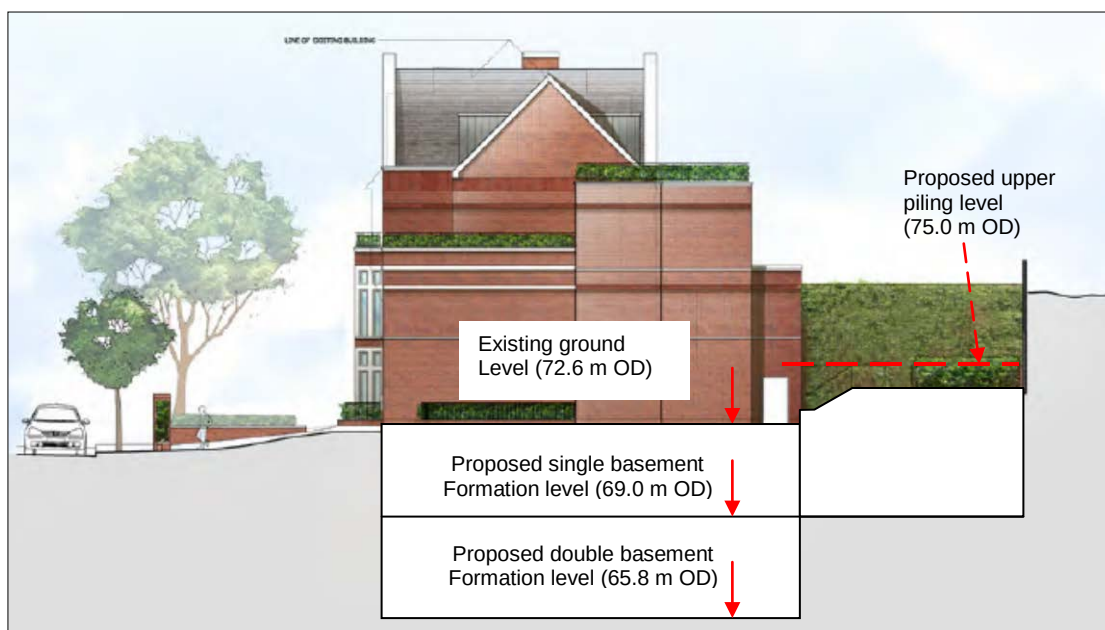
## 1.0 INTRODUCTION

Geotechnical and Environmental Associates (GEA) has been commissioned by Sinclair Johnston and Partners (SJ&P), on behalf of Atlas Property Company Limited, to complete a ground movement assessment for the proposed redevelopment of this site at 26 Netherhall Gardens, London, NW3 5TL, which is to include a part single-storey and part two-storey basement following demolition of the existing building.

A site investigation has been undertaken by Site Analytical Services Limited (SAS) referenced 14/22068 and dated June 2014. Other information sourced from the London Borough of Camden (LBC) planning portal includes Sinclair Johnston structural drawings and Design and Construction Statement along with existing and proposed drawings by Squire and Partners. A Basement Impact Assessment was also undertaken by SAS and is referenced 14/22068-2 dated June 2014.

### 1.1 Proposed Development

It is understood that it is proposed to demolish the existing building and replace it with a new structure which will include a single-storey basement under the southern half of the house and extending almost to the rear boundary and a two-storey basement beneath the northern half of the house only. A section through the proposed building indicating the extent of the proposed basements is shown below.



It is understood that the temporary and permanent excavation support will be provided by a perimeter secant bored pile wall with some internal support provided by contiguous walls. The structural loadings will ultimately be transferred to a raft slab and any net uplift forces will be resisted by the embedded portions of the bored pile wall.

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, northwest London, and in the ward of Frognal and Fitzjohns, approximately 300 m to the north of Finchley Road London Underground station. It fronts onto Netherhall Gardens to the west and is bordered by detached houses to the north and south and by the gardens of the houses on Maresfield Gardens to the east. The site may be additionally located by National Grid Reference 550453, 178498.

A full description of the site and its geographical and environmental settings are included in the site investigation report and within the Basement Impact Assessment (BIA); it is important to note that the site slopes up by some 5 m from front to rear (west to east).

## 3.0 GROUND MOVEMENT ANALYSIS

This analysis has been limited to the assessment of movements arising from the installation of the bored pile walls and the subsequent excavation.

### 3.1 Construction Methodology

It is proposed that the basement box secant bored pile walls will be used to temporarily support the excavation during construction with long term retention provided by composite action of the pile walls and their internal lining walls. Whilst a construction sequence has been outlined by Sinclair Johnston, further consideration of the piling levels and sequencing has been undertaken by GEA to allow the analysis of ground movements to be undertaken.

Initially piling will be undertaken from the upper rear garden level and this piling level has been assumed to be 75.0 m OD. Piles surrounding the deeper basement will then be installed from roughly the existing ground level of 72.6 m OD.

Following completion of the piling, the single-level basement will be excavated to 69.0 m OD with the bored pile walls supported temporarily by steel props and the new lower ground floor slab providing the permanent support. The deeper basement will be excavated 'top-down' so that the lower ground floor slab will provide restraint during the excavation down to the basement formation level of 65.8 m OD.

## 4.0 GROUND MOVEMENTS

An assessment of ground movements surrounding the excavation has been undertaken using the X-Disp computer program licensed from the OASYS suite of geotechnical modelling software from Arup. This program is commonly used within the ground engineering industry and is considered to be an appropriate tool for this analysis. The X-Disp program has been used to predict ground movements likely to arise from the installation of the bored piled walls and then from the subsequent excavation of the basement. For the X-Disp analysis, the soil movement relationships used for the embedded retaining walls are those taken from CIRIA report C580<sup>1</sup>.

For the purpose of these analyses, the corners have been defined by x and y coordinates, with the x-direction having been taken as being perpendicular to Netherhall Gardens whilst the y-direction is parallel to it. Vertical movement is in the z-direction.

The full outputs of all of the stages of the analyses can be provided on request but the output movement contour plots are included within the appendix along with the full results report for the final stages and the damage assessment.

### 4.1 Models Used

The construction sequence and details of the proposed foundations together with details of the adjacent buildings have all been provided by SJ&P.

#### 4.1.1 Piling and Excavation Related Movements

The bored pile walls will be installed from the ground levels noted previously and will support the excavation in the temporary case with the permanent excavation support provided by the piled walls acting compositely with the walls and floors to form a rigid basement box. A formal pile design will be undertaken by the piling contractor in due course, along with the finalization of the excavation sequence and propping design. However, at this stage there is considered to be sufficient detail in the Sinclair Johnston documents to make certain assumptions upon which the ground movements can be based.

The wall is proposed to be a secant bored pile wall. The SJ&P drawings indicate that the piled wall will be propped at pile head level as well as at basement level in both temporary and permanent conditions and on this basis a piled wall of high stiffness in clay is considered an appropriate wall model for the analysis. Pile lengths of 11.1 m and 8.6 m have been adopted representing an embedded pile length of around 4.5 m which is considered reasonable for multi propped walls such as these.

The shape of the basement means that some simplification is required to model it within the X-Disp program. Accordingly the line of the southern piled wall has been simplified to a straight line. In addition the basement is at different levels and as such has been considered as two separate rectangles. The deeper northern basement has been analysed separately to the southern shallower basement and their influences considered separately since each basement 'shields' buildings on the opposite side from the effects of the other.

---

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

#### 4.1.2 Basement Heave Considerations

At this site the loads imposed by the proposed building are to be supported upon a raft that bears within the London Clay. The excavation does, however cause unloading of the London Clay which in turn leads to heave and swelling due to elastic ‘rebound’ following stress relief in the short term and long term swelling due to the recovery of pore water pressures.

It is estimated that the total unloading will be between 70 kN/m<sup>2</sup> and 110 kN/m<sup>2</sup> but that the loading from the new structure will be of a similar order. Whilst there may be some short term heave, after construction the reloading will effectively balance the unloading such that ground movements should be negligible.

### 4.2 Results

#### 4.2.1 Piling and Excavation Related Movements

The X-Disp analysis has been used to estimate the movements behind the walls resulting from pile installation and basement excavation. This includes the settlement of the ground (vertical movement) and the lateral movement of soil behind the wall (horizontal movement). The contour graphs of these movement predictions are appended for the piling phase together with the total movement prediction which has combined the effects of piling and excavation.

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

| Phase of Works                          | Maximum Movement at 71.6 m OD – sensibly average foundation level |                          |
|-----------------------------------------|-------------------------------------------------------------------|--------------------------|
|                                         | Vertical Settlement (mm)                                          | Horizontal Movement (mm) |
| Piling                                  | 5 to 10                                                           | 5 to 10                  |
| Combined Piling and Basement Excavation | 5 to 10                                                           | 15 to 20                 |

The movements set out in the table above are the maximum movements and generally occur immediately or just outside the line of the piled walls; the effects of the excavation reduce with distance away from the piled wall.

## 5.0 DAMAGE ASSESSMENT

In addition to the above assessment of the likely movements that will result from the proposed development, some of the neighbouring structures are considered to be sensitive structures and have been subject to Building Damage Assessments, on the basis of the classification given in Table 2.5 of CIRIA report C580<sup>2</sup>, referred to hereafter as ‘Burland’ damage categories. For this assessment the adjacent properties at Nos 24 / 24A and 28 Netherhall Gardens and the single storey structures beyond the eastern site boundary have been adopted as sensitive structures for prediction of the building damage category.

#### 5.1 Piling and Excavation Related Damage

The predicted movements have been further analysed in respect of the key sensitive structures in the front, side and rear walls of Nos 24 / 24A and 28 Netherhall Gardens and the single

<sup>2</sup> Gaba, A, Simpson, B, Powrie, W and Beadman, D (2003) *Embedded retaining walls – guidance for economic design* CIRIA Report C580.

storey buildings to the rear of the site.

The sensitive structures have been modelled as lines in the analysis and are the lines along which the damage assessment has been undertaken. These critical lines are assumed to be sensitive at their foundation levels which, from the drawings supplied by SJ&P, have been taken as 71.0 m OD for Nos 24 / 24A, 71.6 m OD for No 28 and 77.0 m OD for the single-storey structures to the rear of the property.

The movement predictions above have been assessed against the length and height of the structures from foundation to eaves and the calculated strains compared against the limits defined within the Burland categories of damage. On the basis of these results, the following damage categories have been predicted; calculation sheets and movement contour plots are attached.

| Building Damage Assessment  |                      |                          |
|-----------------------------|----------------------|--------------------------|
| Sensitive Structure         | Elevation            | Category of Damage*      |
| 24 / 24A Netherhall Gardens | Front (Line 1)       | Category 2 (Slight)      |
| 24 / 24A Netherhall Gardens | Side (Line 2)        | Category 0 (Negligible)  |
| 24 / 24A Netherhall Gardens | Rear Side (Line 3)   | Category 0 (Negligible)  |
| 24 / 24A Netherhall Gardens | Rear (Line 4)        | Category 2 (Slight)      |
| 28 Netherhall Gardens       | Front North (Line 5) | Category 1 (Very Slight) |
| 28 Netherhall Gardens       | Front South (Line 6) | Category 2 (Slight)      |
| 28 Netherhall Gardens       | Side (Line 7)        | Category 0 (Negligible)  |
| 28 Netherhall Gardens       | Rear (Line 8)        | Category 2 (Slight)      |
| Rear Structures             | West (Line 9)        | Category 0 (Negligible)  |
| Rear Structures             | North (Line 10)      | Category 0 (Negligible)  |
| Rear Structures             | East North (Line 11) | Category 0 (Negligible)  |
| Rear Structures             | East Mid (Line 12)   | Category 1 (Very Slight) |
| Rear Structures             | East South (Line 13) | Category 0 (Negligible)  |
| Rear Structures             | South (Line 14)      | Category 2 (Slight)      |

\*Refer to Table 2.5 of C580: Classification of visible damage to walls.

The building damage reports for sensitive structures highlighted in the above table predict that the damage to the adjoining and nearby structures would vary from Category 0 (negligible) to Category 2 (slight). A site plan annotated with the above categories is appended for clarity.

## 5.2 Comment

The damage assessments above reflect the critical cases in the phases of construction and to a degree represent a simplification of the construction process and offer worst-case scenarios.

The damage assessments are therefore considered to represent a reasonable estimate of movements at this stage and offer a simple 'global' view of the movement contours around the site. The ground movement analysis will be refined in due course when the pile design has been completed, propping levels and stiffnesses have been defined and the construction finalised. However it is the experience of GEA that the refinement through detailed design will reduce rather than increase predictions of wall movements and it follows that the final damage categories will be no worse than those above.

### 5.3 Monitoring of Ground Movements

The predictions of ground movement based on the ground movement analysis will be checked by monitoring of adjacent buildings.

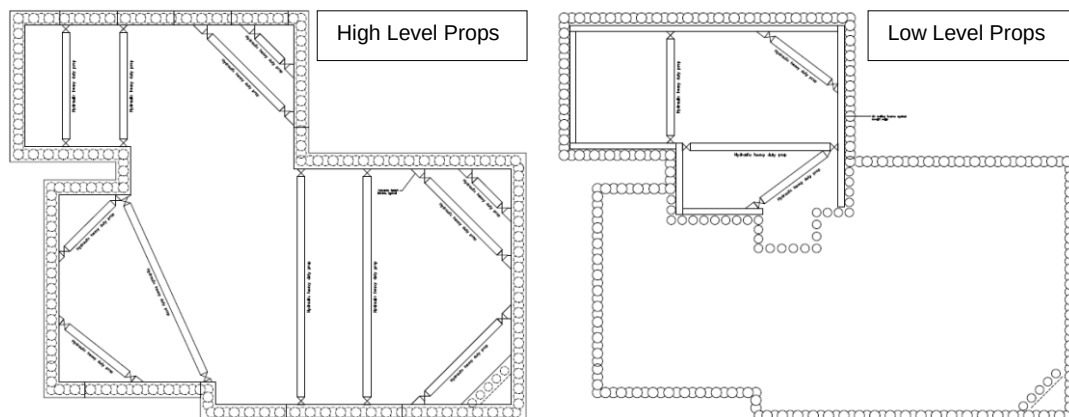
Condition surveys of the above existing structures will be carried out before and after the proposed works will be set out by Sinclair Johnston in a monitoring strategy. This will be subject to discussions and agreements with the owners of the adjacent properties and structures. Contingency measures will also be agreed and will be implemented if movements of the adjacent structures exceed predefined trigger levels.

## 6.0 CONCLUSIONS AND MITIGATION

The analysis has concluded that the predicted damage to the neighbouring properties would, vary between Category 0 'negligible' and Category 2 'slight'. On this basis, the damage that would inevitably occur as a result of such an excavation would generally fall within the acceptable limits, with mitigation measures required for those walls predicted to be Category 1 or higher as set out in Section 3.3 of CPG4 (2015).

The detailed retaining wall design will provide a site specific view of the likely ground movements and will allow refinement of the ground movement analysis. The detailed design will be used to ensure that the predictions of ground movements are within acceptable limits.

The SJ&P drawings, extracts from which are provided below for high level and low level temporary props, indicate that heavy duty hydraulic props will be used. Such props will enable the wall to be preloaded before the excavation of each level will take place. The loads applied to each prop will be matched to those predicted in the wall design so that upon excavation, the soil behind the wall effectively returns to its original stress condition. This should minimise movement behind the walls but will also provide the facility to adjust the prop loads throughout the groundworks in line with the data obtained from the movement monitoring. Further, the props have been located to coincide as far as possible with the location of the walls of the adjacent buildings that lie perpendicular to the proposed basement. These are the walls most sensitive to movement and therefore require the greatest degree of protection.



The piling and subsequent excavation will in practice be separated by a number of weeks during which time the piles will cure, capping beams will be cast and the upper propping installed. This will provide an opportunity for the ground movements 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 wall movement predictions to be reassessed prior to the main excavation taking place so that propping arrangements can be adjusted if required.

This pre-emptive approach to mitigation is considered to provide a robust methodology to minimising predicted ground movements in advance of construction and then monitoring and responding to movements during construction.

## **APPENDICES**

### **SOIL DISPLACEMENT MODEL RESULTS**

#### **X-DISP ANALYSIS**

Movements following underpinning

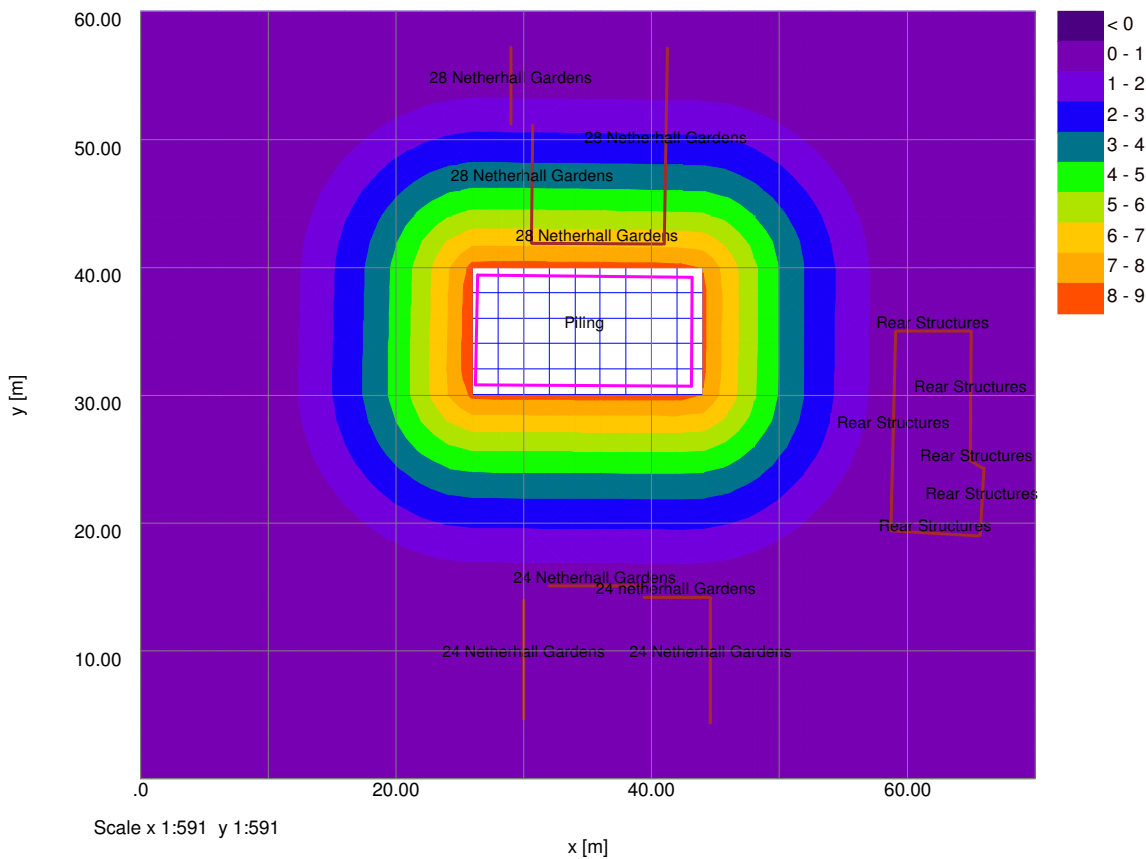
Movements following underpinning and piling

Movements following underpinning, piling and excavation

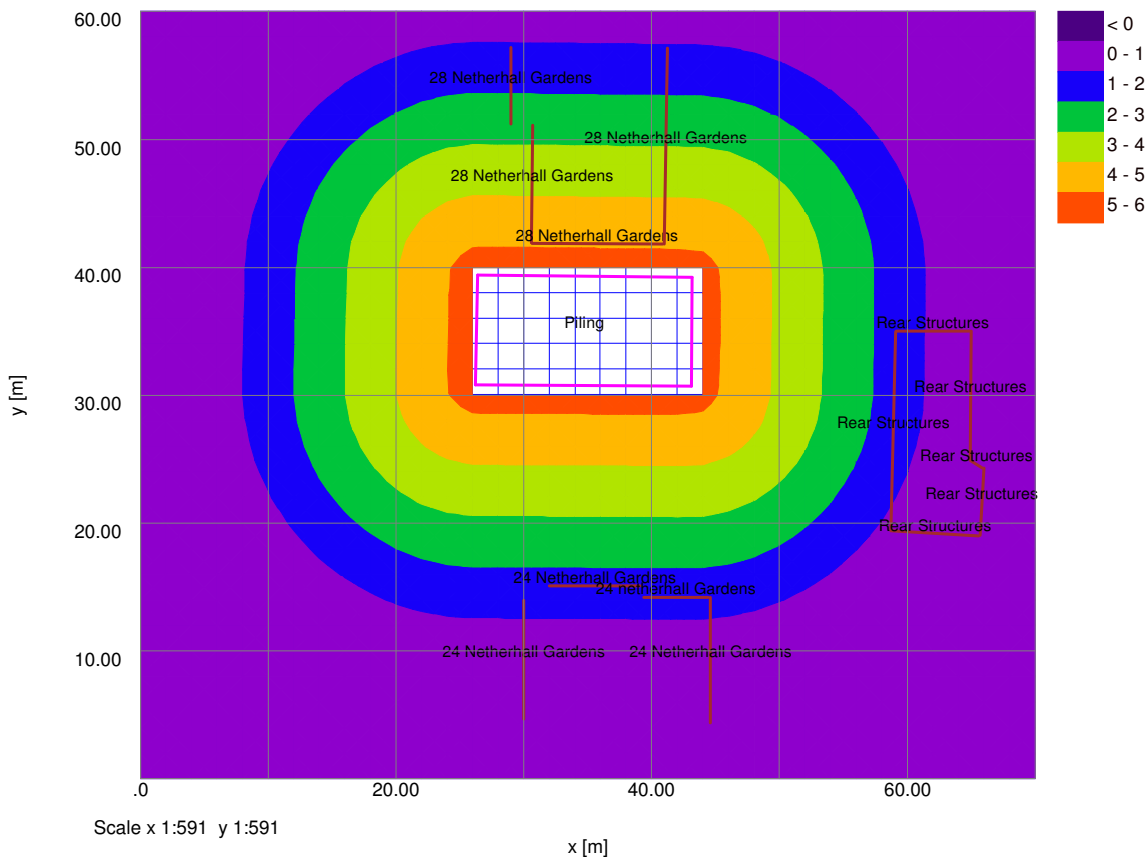
Site Plan

Damage assessment Plan

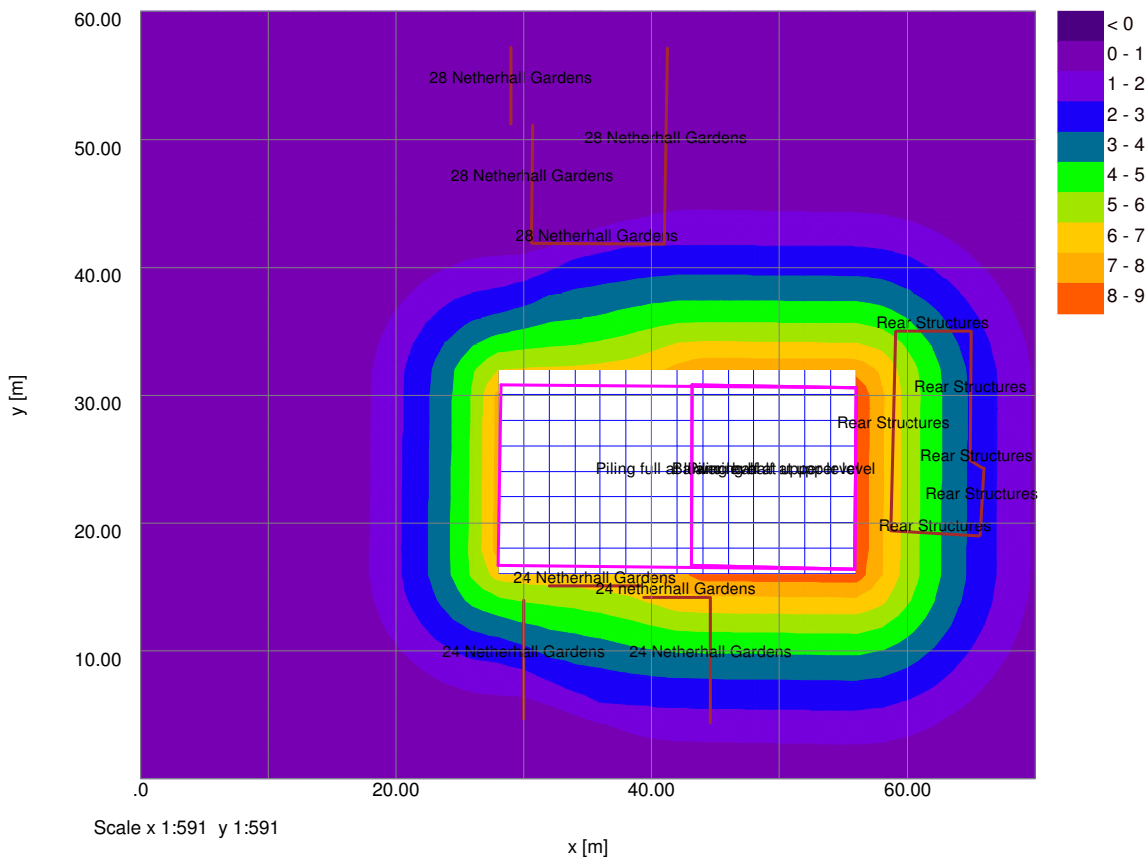
Horizontal Displacement Contours: Grid 1 (level 71.600m) Interval 1mm



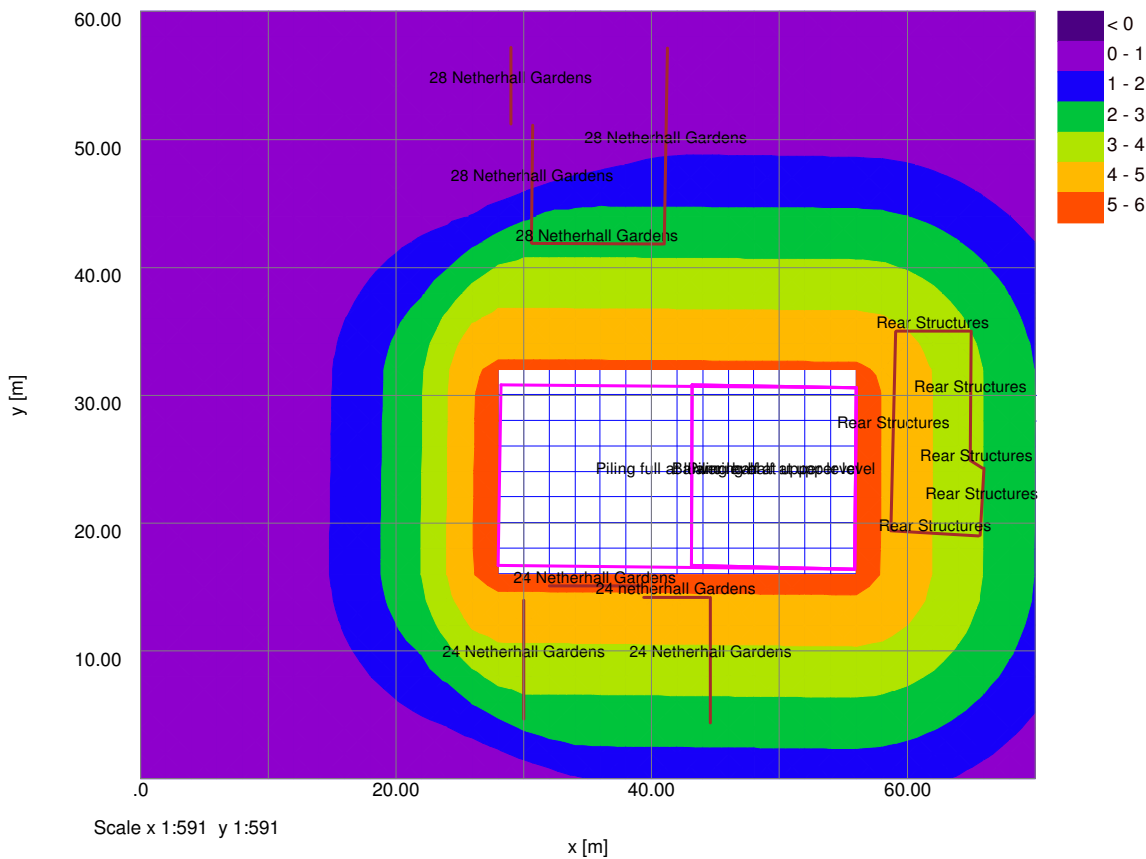
Vertical Settlement Contours: Grid 1 (level 71.600m) (Interval 1mm)



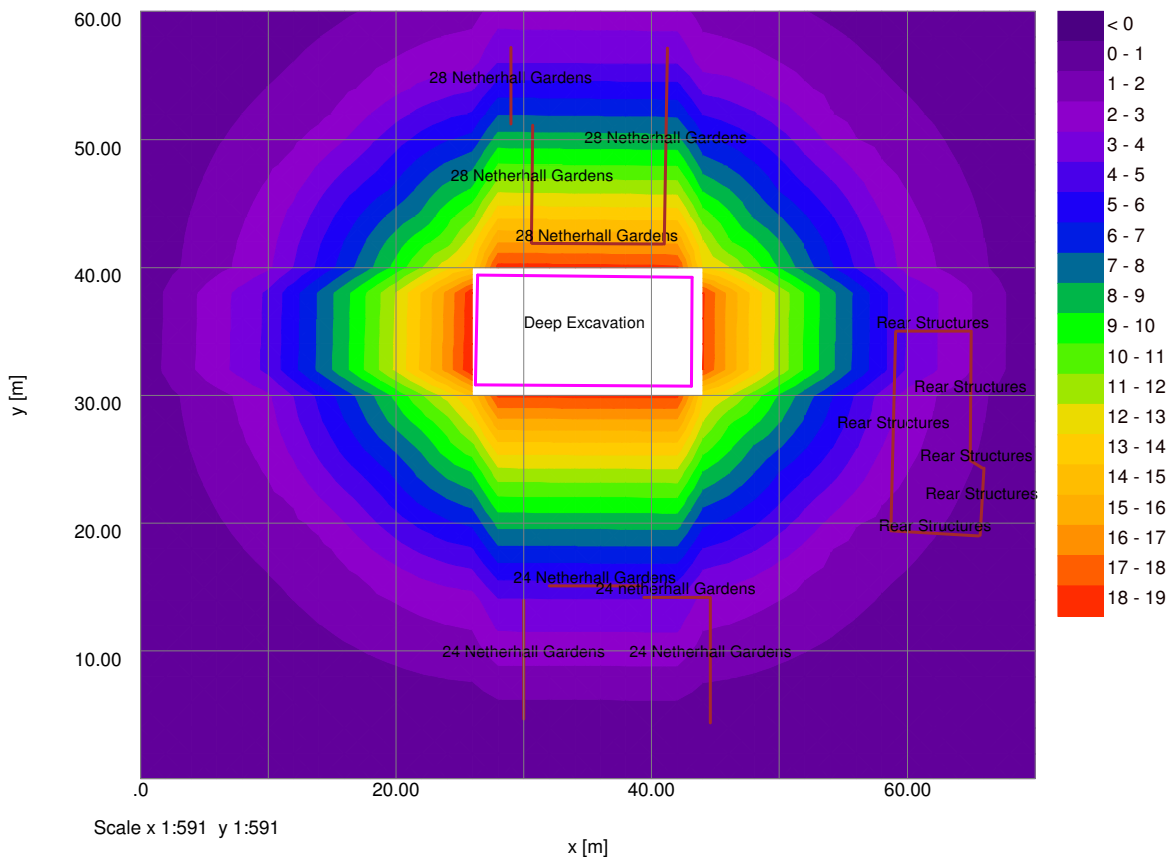
Horizontal Displacement Contours: Grid 1 (level 71.600m) Interval 1mm



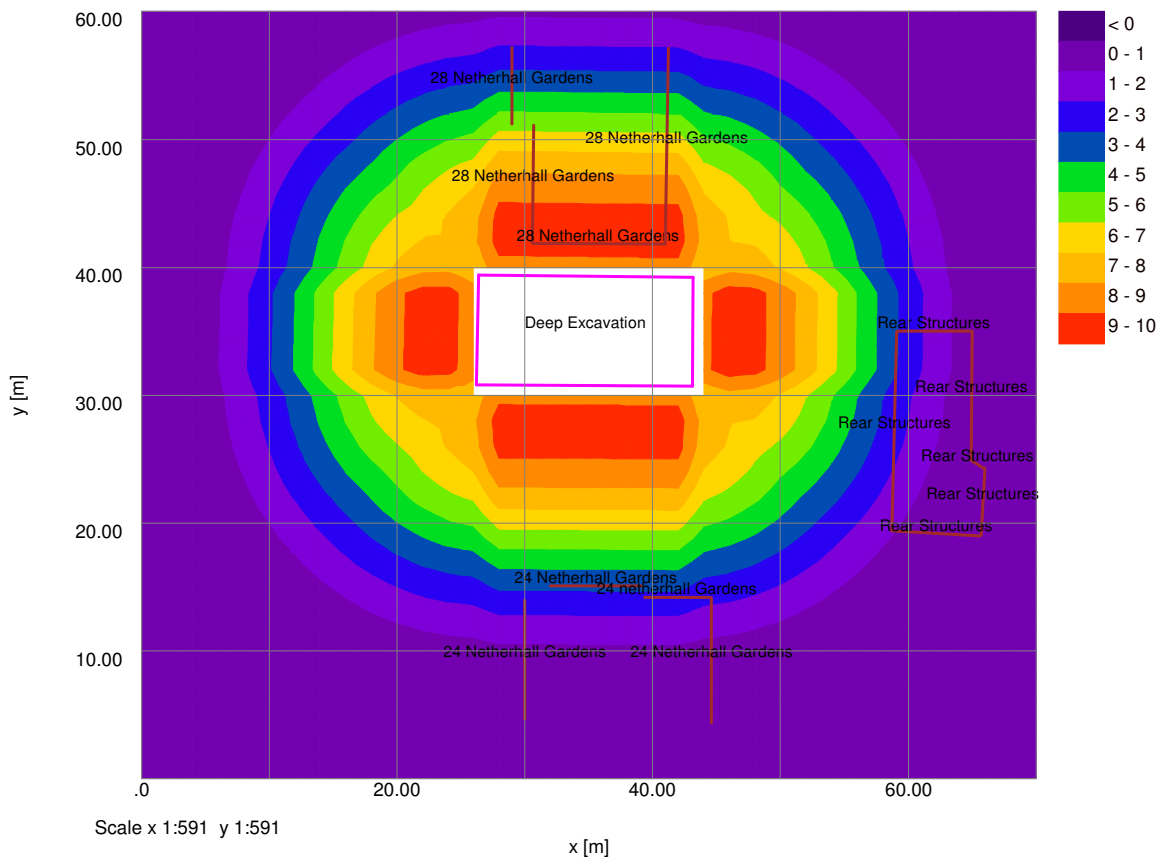
Vertical Settlement Contours: Grid 1 (level 71.600m) (Interval 1mm)



Horizontal Displacement Contours: Grid 1 (level 71.600m) Interval 1mm



Vertical Settlement Contours: Grid 1 (level 71.600m) (Interval 1mm)





GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

**Problem Type**

Problem Type : Tunnelling and Embedded Wall Excavations

**Displacement Data**

| Type | Name    | Direction of extrusion | Point/Line/Line for extrusion |          |          | No. of intervals across extrusion/line | Extrusion depth | No. of intervals along extrusion | Calculate | Surface type for tunnels |
|------|---------|------------------------|-------------------------------|----------|----------|----------------------------------------|-----------------|----------------------------------|-----------|--------------------------|
|      |         |                        | First point                   |          |          | Second point                           |                 |                                  |           |                          |
|      |         |                        | X                             | Y        | Z(level) | X                                      | Y               | Z(level)                         |           |                          |
|      |         |                        | [m]                           | [m]      | [m]      | [m]                                    | [m]             | [m]                              |           |                          |
| Grid | Grid 1  | Global X               | 0.00000                       | 0.00000  | 71.60000 | -                                      | 60.00000        | 71.60000                         | 30        | 70.00000                 |
| Line | Line 1  | -                      | 30.00000                      | 4.70000  | 71.00000 | 30.00000                               | 14.10000        | 71.00000                         | 10        | -                        |
| Line | Line 2  | -                      | 32.00000                      | 15.10000 | 71.00000 | 39.20000                               | 15.10000        | 71.00000                         | 7         | -                        |
| Line | Line 3  | -                      | 39.40000                      | 14.20000 | 71.00000 | 44.50000                               | 14.20000        | 71.00000                         | 6         | -                        |
| Line | Line 4  | -                      | 44.60000                      | 14.20000 | 71.00000 | 44.60000                               | 4.30000         | 71.00000                         | 10        | -                        |
| Line | Line 5  | -                      | 29.00000                      | 57.20000 | 71.60000 | 29.00000                               | 51.10000        | 71.60000                         | 6         | -                        |
| Line | Line 6  | -                      | 30.70000                      | 51.10000 | 71.60000 | 30.60000                               | 41.90000        | 71.60000                         | 9         | -                        |
| Line | Line 7  | -                      | 30.65000                      | 41.90000 | 71.60000 | 40.90000                               | 41.80000        | 71.60000                         | 10        | -                        |
| Line | Line 8  | -                      | 41.00000                      | 41.80000 | 71.60000 | 41.20000                               | 57.20000        | 71.60000                         | 16        | -                        |
| Line | Line 9  | -                      | 58.70000                      | 19.40000 | 77.00000 | 59.10000                               | 35.00000        | 77.00000                         | 16        | -                        |
| Line | Line 10 | -                      | 59.15000                      | 35.00000 | 77.00000 | 64.95000                               | 35.00000        | 77.00000                         | 6         | -                        |
| Line | Line 11 | -                      | 65.00000                      | 35.00000 | 77.00000 | 64.90000                               | 24.90000        | 77.00000                         | 10        | -                        |
| Line | Line 12 | -                      | 64.95000                      | 24.90000 | 77.00000 | 65.95000                               | 24.30000        | 77.00000                         | 2         | -                        |
| Line | Line 13 | -                      | 66.00000                      | 24.30000 | 77.00000 | 65.70000                               | 19.00000        | 77.00000                         | 5         | -                        |
| Line | Line 14 | -                      | 58.75000                      | 19.40000 | 77.00000 | 65.65000                               | 19.00000        | 77.00000                         | 7         | -                        |

**Imported Displacements**

The following data points and displacements were found in the import file Xdisp1 North Piling.csv.

| Line No. | Coordinates |        |        | Displacements |        |        |   |
|----------|-------------|--------|--------|---------------|--------|--------|---|
|          | x [m]       | y [m]  | z [m]  | x [mm]        | y [mm] | z [mm] |   |
| 2601     | 0.0         | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2602     | 2.0000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2603     | 4.0000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2604     | 6.0000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2605     | 8.0000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2606     | 10.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2607     | 12.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2608     | 14.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2609     | 16.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2610     | 18.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2611     | 20.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2612     | 22.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2613     | 24.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2614     | 26.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2615     | 28.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2616     | 30.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2617     | 32.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2618     | 34.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2619     | 36.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2620     | 38.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2621     | 40.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2622     | 42.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2623     | 44.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2624     | 46.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2625     | 48.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2626     | 50.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2627     | 52.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2628     | 54.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2629     | 56.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2630     | 58.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2631     | 60.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2632     | 62.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2633     | 64.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2634     | 66.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2635     | 68.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2636     | 70.000      | 0.0    | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2637     | 0.0         | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2638     | 2.0000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2639     | 4.0000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2640     | 6.0000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2641     | 8.0000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2642     | 10.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2643     | 12.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2644     | 14.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2645     | 16.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2646     | 18.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2647     | 20.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2648     | 22.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2649     | 24.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2650     | 26.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2651     | 28.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2652     | 30.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2653     | 32.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2654     | 34.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2655     | 36.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2656     | 38.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2657     | 40.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2658     | 42.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2659     | 44.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2660     | 46.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2661     | 48.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2662     | 50.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2663     | 52.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2664     | 54.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2665     | 56.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2666     | 58.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2667     | 60.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2668     | 62.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2669     | 64.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2670     | 66.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2671     | 68.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2672     | 70.000      | 2.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2673     | 0.0         | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2674     | 2.0000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2675     | 4.0000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2676     | 6.0000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2677     | 8.0000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2678     | 10.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2679     | 12.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2680     | 14.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2681     | 16.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2682     | 18.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2683     | 20.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2684     | 22.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2685     | 24.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2686     | 26.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2687     | 28.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2688     | 30.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2689     | 32.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2690     | 34.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |
| 2691     | 36.000      | 4.0000 | 71.600 | 0.0           | 0.0    | 0.0    | I |



**GEA LIMITED**  
**(GEOTECHNICAL & ENV ASSOC) J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |        |        | Displacements |          |        |   |
|----------|-------------|--------|--------|---------------|----------|--------|---|
|          | x [m]       | y [m]  | z [m]  | x [mm]        | y [mm]   | z [mm] |   |
| 2692     | 38.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2693     | 40.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2694     | 42.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2695     | 44.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2696     | 46.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2697     | 48.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2698     | 50.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2699     | 52.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2700     | 54.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2701     | 56.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2702     | 58.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2703     | 60.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2704     | 62.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2705     | 64.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2706     | 66.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2707     | 68.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2708     | 70.000      | 4.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2709     | 0.0         | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2710     | 2.0000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2711     | 4.0000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2712     | 6.0000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2713     | 8.0000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2714     | 10.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2715     | 12.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2716     | 14.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2717     | 16.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2718     | 18.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2719     | 20.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2720     | 22.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2721     | 24.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2722     | 26.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2723     | 28.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2724     | 30.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2725     | 32.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2726     | 34.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2727     | 36.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2728     | 38.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2729     | 40.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2730     | 42.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2731     | 44.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2732     | 46.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2733     | 48.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2734     | 50.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2735     | 52.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2736     | 54.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2737     | 56.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2738     | 58.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2739     | 60.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2740     | 62.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2741     | 64.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2742     | 66.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2743     | 68.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2744     | 70.000      | 6.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2745     | 0.0         | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2746     | 2.0000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2747     | 4.0000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2748     | 6.0000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2749     | 8.0000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2750     | 10.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2751     | 12.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2752     | 14.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2753     | 16.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2754     | 18.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2755     | 20.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2756     | 22.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2757     | 24.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2758     | 26.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2759     | 28.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2760     | 30.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2761     | 32.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2762     | 34.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2763     | 36.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2764     | 38.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2765     | 40.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2766     | 42.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2767     | 44.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2768     | 46.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2769     | 48.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2770     | 50.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2771     | 52.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2772     | 54.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2773     | 56.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2774     | 58.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2775     | 60.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2776     | 62.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2777     | 64.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2778     | 66.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2779     | 68.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2780     | 70.000      | 8.0000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2781     | 0.0         | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2782     | 2.0000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2783     | 4.0000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2784     | 6.0000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2785     | 8.0000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2786     | 10.000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2787     | 12.000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2788     | 14.000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2789     | 16.000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2790     | 18.000      | 10.000 | 71.600 | 0.0           | 0.0      | 0.0    | I |
| 2791     | 20.000      | 10.000 | 71.600 | 0.0           | 0.12391  |        | I |
| 2792     | 22.000      | 10.000 | 71.600 | 0.0           | 0.24505  |        | I |
| 2793     | 24.000      | 10.000 | 71.600 | 0.0           | 0.32099  |        | I |
| 2794     | 26.000      | 10.000 | 71.600 | 0.0           | 0.34976  |        | I |
| 2795     | 28.000      | 10.000 | 71.600 | 0.0           | 0.35275  |        | I |
| 2796     | 30.000      | 10.000 | 71.600 | 0.0           | 0.35571  |        | I |
| 2797     | 32.000      | 10.000 | 71.600 | 0.0           | 0.35867  |        | I |
| 2798     | 34.000      | 10.000 | 71.600 | 0.0           | 0.36163  |        | I |
| 2799     | 36.000      | 10.000 | 71.600 | 0.0           | 0.36459  |        | I |
| 2800     | 38.000      | 10.000 | 71.600 | 0.0           | 0.36755  |        | I |
| 2801     | 40.000      | 10.000 | 71.600 | 0.0           | 0.37050  |        | I |
| 2802     | 42.000      | 10.000 | 71.600 | 0.0           | 0.37346  |        | I |
| 2803     | 44.000      | 10.000 | 71.600 | 0.0           | 0.37011  |        | I |
| 2804     | 46.000      | 10.000 | 71.600 | 0.0           | 0.32446  |        | I |
| 2805     | 48.000      | 10.000 | 71.600 | 0.0           | 0.23199  |        | I |
| 2806     | 50.000      | 10.000 | 71.600 | 0.0           | 0.095071 |        | I |
| 2807     | 52.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2808     | 54.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2809     | 56.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2810     | 58.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2811     | 60.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2812     | 62.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2813     | 64.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2814     | 66.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2815     | 68.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2816     | 70.000      | 10.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2817     | 0.0         | 12.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2818     | 2.0000      | 12.000 | 71.600 | 0.0           | 0.0      |        | I |
| 2819     | 4.0000      | 12.000 | 71.600 | 0.0           | 0.0      |        | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |         |        | Displacements |          |          |   |
|----------|-------------|---------|--------|---------------|----------|----------|---|
|          | x [m]       | y [m]   | z [m]  | x [mm]        | y [mm]   | z [mm]   |   |
| 2820     | 6.0000      | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2821     | 8.0000      | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2822     | 10.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2823     | 12.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2824     | 14.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2825     | 16.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.20280  | I |
| 2826     | 18.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.42238  | I |
| 2827     | 20.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.60101  | I |
| 2828     | 22.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.73414  | I |
| 2829     | 24.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.81793  | I |
| 2830     | 26.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.84973  | I |
| 2831     | 28.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.85274  | I |
| 2832     | 30.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.85570  | I |
| 2833     | 32.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.85866  | I |
| 2834     | 34.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.86162  | I |
| 2835     | 36.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.86458  | I |
| 2836     | 38.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.86754  | I |
| 2837     | 40.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.87050  | I |
| 2838     | 42.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.87345  | I |
| 2839     | 44.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.86959  | I |
| 2840     | 46.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.81912  | I |
| 2841     | 48.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.71717  | I |
| 2842     | 50.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.56690  | I |
| 2843     | 52.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.37252  | I |
| 2844     | 54.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.13878  | I |
| 2845     | 56.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2846     | 58.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2847     | 60.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2848     | 62.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2849     | 64.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2850     | 66.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2851     | 68.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2852     | 70.0000     | 12.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2853     | 0.0         | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2854     | 2.0000      | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2855     | 4.0000      | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2856     | 6.0000      | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2857     | 8.0000      | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2858     | 10.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2859     | 12.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.050682 | I |
| 2860     | 14.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.35538  | I |
| 2861     | 16.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.63650  | I |
| 2862     | 18.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.87640  | I |
| 2863     | 20.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.0731   | I |
| 2864     | 22.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.2207   | I |
| 2865     | 24.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3141   | I |
| 2866     | 26.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3497   | I |
| 2867     | 28.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3527   | I |
| 2868     | 30.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3557   | I |
| 2869     | 32.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3587   | I |
| 2870     | 34.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3616   | I |
| 2871     | 36.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3646   | I |
| 2872     | 38.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3675   | I |
| 2873     | 40.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3705   | I |
| 2874     | 42.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3734   | I |
| 2875     | 44.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3689   | I |
| 2876     | 46.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.3125   | I |
| 2877     | 48.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.1590   | I |
| 2878     | 50.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 1.0327   | I |
| 2879     | 52.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.81912  | I |
| 2880     | 54.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.56440  | I |
| 2881     | 56.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.27447  | I |
| 2882     | 58.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2883     | 60.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2884     | 62.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2885     | 64.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2886     | 66.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2887     | 68.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2888     | 70.0000     | 14.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2889     | 0.0         | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2890     | 2.0000      | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2891     | 4.0000      | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2892     | 6.0000      | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2893     | 8.0000      | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2894     | 10.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.064337 | I |
| 2895     | 12.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.42238  | I |
| 2896     | 14.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.75495  | I |
| 2897     | 16.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 1.0564   | I |
| 2898     | 18.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 1.3200   | I |
| 2899     | 20.0000     | 16.0000 | 71.600 | 0.082678      | 0.19736  | 1.5385   | I |
| 2900     | 22.0000     | 16.0000 | 71.600 | 0.12166       | 0.42870  | 1.7039   | I |
| 2901     | 24.0000     | 16.0000 | 71.600 | 0.087223      | 0.58677  | 1.8093   | I |
| 2902     | 26.0000     | 16.0000 | 71.600 | 0.0087795     | 0.64968  | 1.8497   | I |
| 2903     | 28.0000     | 16.0000 | 71.600 | 0.0038700     | 0.65403  | 1.8527   | I |
| 2904     | 30.0000     | 16.0000 | 71.600 | 0.0038945     | 0.65818  | 1.8557   | I |
| 2905     | 32.0000     | 16.0000 | 71.600 | 0.0039191     | 0.66233  | 1.8586   | I |
| 2906     | 34.0000     | 16.0000 | 71.600 | 0.0039437     | 0.66648  | 1.8616   | I |
| 2907     | 36.0000     | 16.0000 | 71.600 | 0.0039682     | 0.67063  | 1.8646   | I |
| 2908     | 38.0000     | 16.0000 | 71.600 | 0.0039928     | 0.67479  | 1.8675   | I |
| 2909     | 40.0000     | 16.0000 | 71.600 | 0.0040174     | 0.67894  | 1.8705   | I |
| 2910     | 42.0000     | 16.0000 | 71.600 | 0.0040420     | 0.68309  | 1.8734   | I |
| 2911     | 44.0000     | 16.0000 | 71.600 | -0.041288     | 0.67438  | 1.8681   | I |
| 2912     | 46.0000     | 16.0000 | 71.600 | -0.11341      | 0.57489  | 1.8042   | I |
| 2913     | 48.0000     | 16.0000 | 71.600 | -0.12867      | 0.38602  | 1.6762   | I |
| 2914     | 50.0000     | 16.0000 | 71.600 | -0.062179     | 0.13247  | 1.4903   | I |
| 2915     | 52.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 1.2539   | I |
| 2916     | 54.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.97493  | I |
| 2917     | 56.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.66060  | I |
| 2918     | 58.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.31729  | I |
| 2919     | 60.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2920     | 62.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2921     | 64.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2922     | 66.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2923     | 68.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2924     | 70.0000     | 16.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2925     | 0.0         | 18.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2926     | 2.0000      | 18.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2927     | 4.0000      | 18.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2928     | 6.0000      | 18.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2929     | 8.0000      | 18.0000 | 71.600 | 0.0           | 0.0      | 0.0      | I |
| 2930     | 10.0000     | 18.0000 | 71.600 | 0.0           | 0.0      | 0.38836  | I |
| 2931     | 12.0000     | 18.0000 | 71.600 | 0.0           | 0.0      | 0.77062  | I |
| 2932     | 14.0000     | 18.0000 | 71.600 | 0.0           | 0.0      | 1.1293   | I |
| 2933     | 16.0000     | 18.0000 | 71.600 | 0.063094      | 0.079176 | 1.4582   | I |
| 2934     | 18.0000     | 18.0000 | 71.600 | 0.27493       | 0.42916  | 1.7497   | I |
| 2935     | 20.0000     | 18.0000 | 71.600 | 0.37203       | 0.76807  | 1.9944   | I |
| 2936     | 22.0000     | 18.0000 | 71.600 | 0.34948       | 1.0651   | 2.1821   | I |
| 2937     | 24.0000     | 18.0000 | 71.600 | 0.21955       | 1.2774   | 2.3031   | I |
| 2938     | 26.0000     | 18.0000 | 71.600 | 0.021314      | 1.3641   | 2.3496   | I |
| 2939     | 28.0000     | 18.0000 | 71.600 | 0.0080995     | 1.3688   | 2.3527   | I |
| 2940     | 30.0000     | 18.0000 | 71.600 | 0.0081253     | 1.3732   | 2.3557   | I |
| 2941     | 32.0000     | 18.0000 | 71.600 | 0.0081510     | 1.3775   | 2.3586   | I |
| 2942     | 34.0000     | 18.0000 | 71.600 | 0.0081768     | 1.3819   | 2.3616   | I |
| 2943     | 36.0000     | 18.0000 | 71.600 | 0.0082026     | 1.3862   | 2.3646   | I |
| 2944     | 38.0000     | 18.0000 | 71.600 | 0.0082284     | 1.3906   | 2.3675   | I |
| 2945     | 40.0000     | 18.0000 | 71.600 | 0.0082542     | 1.3950   | 2.3705   | I |
| 2946     | 42.0000     | 18.0000 | 71.600 | 0.0082800     | 1.3993   | 2.3734   | I |
| 2947     | 44.0000     | 18.0000 | 71.600 | -0.098252     | 1.3864   | 2.3670   | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |          |          | Displacements |           |           |   |
|----------|-------------|----------|----------|---------------|-----------|-----------|---|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm] | z<br>[mm] |   |
| 2948     | 46.000      | 18.000   | 71.600   | -0.28536      | 1.2497    | 2.2933    | I |
| 2949     | 48.000      | 18.000   | 71.600   | -0.38529      | 0.99860   | 2.1469    | I |
| 2950     | 50.000      | 18.000   | 71.600   | -0.36855      | 0.67835   | 1.9367    | I |
| 2951     | 52.000      | 18.000   | 71.600   | -0.23093      | 0.32953   | 1.6730    | I |
| 2952     | 54.000      | 18.000   | 71.600   | 0.0           | 0.0       | 1.3660    | I |
| 2953     | 56.000      | 18.000   | 71.600   | 0.0           | 0.0       | 1.0244    | I |
| 2954     | 58.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.65549   | I |
| 2955     | 60.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.26500   | I |
| 2956     | 62.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2957     | 64.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2958     | 66.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2959     | 68.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2960     | 70.000      | 18.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2961     | 0.0         | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2962     | 2.0000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2963     | 4.0000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2964     | 6.0000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2965     | 8.0000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.25921   | I |
| 2966     | 10.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.68251   | I |
| 2967     | 12.000      | 20.000   | 71.600   | 0.0           | 0.0       | 1.0899    | I |
| 2968     | 14.000      | 20.000   | 71.600   | 0.095167      | 0.084246  | 1.4766    | I |
| 2969     | 16.000      | 20.000   | 71.600   | 0.43314       | 0.45862   | 1.8362    | I |
| 2970     | 18.000      | 20.000   | 71.600   | 0.65857       | 0.86739   | 2.1599    | I |
| 2971     | 20.000      | 20.000   | 71.600   | 0.74339       | 1.2949    | 2.4367    | I |
| 2972     | 22.000      | 20.000   | 71.600   | 0.66023       | 1.6977    | 2.6530    | I |
| 2973     | 24.000      | 20.000   | 71.600   | 0.40806       | 2.0032    | 2.7946    | I |
| 2974     | 26.000      | 20.000   | 71.600   | 0.039489      | 2.1324    | 2.8495    | I |
| 2975     | 28.000      | 20.000   | 71.600   | 0.012650      | 2.1379    | 2.8527    | I |
| 2976     | 30.000      | 20.000   | 71.600   | 0.012679      | 2.1427    | 2.8557    | I |
| 2977     | 32.000      | 20.000   | 71.600   | 0.012707      | 2.1475    | 2.8586    | I |
| 2978     | 34.000      | 20.000   | 71.600   | 0.012735      | 2.1523    | 2.8616    | I |
| 2979     | 36.000      | 20.000   | 71.600   | 0.012764      | 2.1571    | 2.8645    | I |
| 2980     | 38.000      | 20.000   | 71.600   | 0.012792      | 2.1619    | 2.8675    | I |
| 2981     | 40.000      | 20.000   | 71.600   | 0.012821      | 2.1667    | 2.8705    | I |
| 2982     | 42.000      | 20.000   | 71.600   | 0.012849      | 2.1715    | 2.8734    | I |
| 2983     | 44.000      | 20.000   | 71.600   | -0.18094      | 2.1512    | 2.8656    | I |
| 2984     | 46.000      | 20.000   | 71.600   | -0.52808      | 1.9484    | 2.7785    | I |
| 2985     | 48.000      | 20.000   | 71.600   | -0.72942      | 1.5928    | 2.6078    | I |
| 2986     | 50.000      | 20.000   | 71.600   | -0.75326      | 1.1681    | 2.3670    | I |
| 2987     | 52.000      | 20.000   | 71.600   | -0.61485      | 0.73920   | 2.0706    | I |
| 2988     | 54.000      | 20.000   | 71.600   | -0.34553      | 0.33919   | 1.7315    | I |
| 2989     | 56.000      | 20.000   | 71.600   | 0.0           | 0.0       | 1.3600    | I |
| 2990     | 58.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.96402   | I |
| 2991     | 60.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.54938   | I |
| 2992     | 62.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.12034   | I |
| 2993     | 64.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2994     | 66.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2995     | 68.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2996     | 70.000      | 20.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2997     | 0.0         | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2998     | 2.0000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 2999     | 4.0000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3000     | 6.0000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.041597  | I |
| 3001     | 8.0000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.49604   | I |
| 3002     | 10.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.94104   | I |
| 3003     | 12.000      | 22.000   | 71.600   | 0.0           | 0.0       | 1.3736    | I |
| 3004     | 14.000      | 22.000   | 71.600   | 0.45840       | 0.33065   | 1.7893    | I |
| 3005     | 16.000      | 22.000   | 71.600   | 0.84874       | 0.73224   | 2.1821    | I |
| 3006     | 18.000      | 22.000   | 71.600   | 1.1267        | 1.2092    | 2.5429    | I |
| 3007     | 20.000      | 22.000   | 71.600   | 1.2370        | 1.7558    | 2.8588    | I |
| 3008     | 22.000      | 22.000   | 71.600   | 1.1079        | 2.3214    | 3.1123    | I |
| 3009     | 24.000      | 22.000   | 71.600   | 0.69692       | 2.7877    | 3.2823    | I |
| 3010     | 26.000      | 22.000   | 71.600   | 0.068085      | 2.9958    | 3.3494    | I |
| 3011     | 28.000      | 22.000   | 71.600   | 0.017766      | 3.0025    | 3.3527    | I |
| 3012     | 30.000      | 22.000   | 71.600   | 0.017799      | 3.0080    | 3.3557    | I |
| 3013     | 32.000      | 22.000   | 71.600   | 0.017831      | 3.0135    | 3.3586    | I |
| 3014     | 34.000      | 22.000   | 71.600   | 0.017864      | 3.0190    | 3.3616    | I |
| 3015     | 36.000      | 22.000   | 71.600   | 0.017896      | 3.0245    | 3.3645    | I |
| 3016     | 38.000      | 22.000   | 71.600   | 0.017929      | 3.0300    | 3.3675    | I |
| 3017     | 40.000      | 22.000   | 71.600   | 0.017962      | 3.0355    | 3.3705    | I |
| 3018     | 42.000      | 22.000   | 71.600   | 0.017994      | 3.0410    | 3.3734    | I |
| 3019     | 44.000      | 22.000   | 71.600   | -0.31100      | 3.0064    | 3.3634    | I |
| 3020     | 46.000      | 22.000   | 71.600   | -0.89441      | 2.6832    | 3.2573    | I |
| 3021     | 48.000      | 22.000   | 71.600   | -1.2130       | 2.1537    | 3.0538    | I |
| 3022     | 50.000      | 22.000   | 71.600   | -1.2500       | 1.5760    | 2.7740    | I |
| 3023     | 52.000      | 22.000   | 71.600   | -1.0697       | 1.0456    | 2.4385    | I |
| 3024     | 54.000      | 22.000   | 71.600   | -0.74350      | 0.59343   | 2.0634    | I |
| 3025     | 56.000      | 22.000   | 71.600   | -0.31867      | 0.21492   | 1.6601    | I |
| 3026     | 58.000      | 22.000   | 71.600   | 0.0           | 0.0       | 1.2365    | I |
| 3027     | 60.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.79803   | I |
| 3028     | 62.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.34844   | I |
| 3029     | 64.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3030     | 66.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3031     | 68.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3032     | 70.000      | 22.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3033     | 0.0         | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3034     | 2.0000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3035     | 4.0000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3036     | 6.0000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.22154   | I |
| 3037     | 8.0000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.69279   | I |
| 3038     | 10.000      | 24.000   | 71.600   | 0.0           | 0.0       | 1.1577    | I |
| 3039     | 12.000      | 24.000   | 71.600   | 0.28841       | 0.13811   | 1.6139    | I |
| 3040     | 14.000      | 24.000   | 71.600   | 0.82448       | 0.45955   | 2.0582    | I |
| 3041     | 16.000      | 24.000   | 71.600   | 1.3028        | 0.86853   | 2.4853    | I |
| 3042     | 18.000      | 24.000   | 71.600   | 1.6884        | 1.4001    | 2.8868    | I |
| 3043     | 20.000      | 24.000   | 71.600   | 1.8961        | 2.0795    | 3.2495    | I |
| 3044     | 22.000      | 24.000   | 71.600   | 1.7777        | 2.8781    | 3.5519    | I |
| 3045     | 24.000      | 24.000   | 71.600   | 1.1737        | 3.6279    | 3.7632    | I |
| 3046     | 26.000      | 24.000   | 71.600   | 0.11750       | 3.9950    | 3.8493    | I |
| 3047     | 28.000      | 24.000   | 71.600   | 0.023693      | 4.0041    | 3.8527    | I |
| 3048     | 30.000      | 24.000   | 71.600   | 0.023731      | 4.0105    | 3.8557    | I |
| 3049     | 32.000      | 24.000   | 71.600   | 0.023769      | 4.0169    | 3.8586    | I |
| 3050     | 34.000      | 24.000   | 71.600   | 0.023807      | 4.0234    | 3.8616    | I |
| 3051     | 36.000      | 24.000   | 71.600   | 0.023845      | 4.0298    | 3.8645    | I |
| 3052     | 38.000      | 24.000   | 71.600   | 0.023883      | 4.0362    | 3.8675    | I |
| 3053     | 40.000      | 24.000   | 71.600   | 0.023921      | 4.0427    | 3.8704    | I |
| 3054     | 42.000      | 24.000   | 71.600   | 0.023959      | 4.0491    | 3.8734    | I |
| 3055     | 44.000      | 24.000   | 71.600   | -0.53518      | 3.9841    | 3.8600    | I |
| 3056     | 46.000      | 24.000   | 71.600   | -1.4827       | 3.4256    | 3.7248    | I |
| 3057     | 48.000      | 24.000   | 71.600   | -1.9085       | 2.6096    | 3.4748    | I |
| 3058     | 50.000      | 24.000   | 71.600   | -1.8869       | 1.8322    | 3.1456    | I |
| 3059     | 52.000      | 24.000   | 71.600   | -1.5956       | 1.2012    | 2.7650    | I |
| 3060     | 54.000      | 24.000   | 71.600   | -1.1645       | 0.71577   | 2.3514    | I |
| 3061     | 56.000      | 24.000   | 71.600   | -0.65925      | 0.34240   | 1.9160    | I |
| 3062     | 58.000      | 24.000   | 71.600   | -0.10196      | 0.045846  | 1.4657    | I |
| 3063     | 60.000      | 24.000   | 71.600   | 0.0           | 0.0       | 1.0051    | I |
| 3064     | 62.000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.53689   | I |
| 3065     | 64.000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.063084  | I |
| 3066     | 66.000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3067     | 68.000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3068     | 70.000      | 24.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3069     | 0.0         | 26.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3070     | 2.0000      | 26.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3071     | 4.0000      | 26.000   | 71.600   | 0.0           | 0.0       | 0.0       | I |
| 3072     | 6.0000      | 26.000   | 71.600   | 0.0           | 0.0       | 0.35938   | I |
| 3073     | 8.0000      | 26.000   | 71.600   | 0.0           | 0.0       | 0.84442   | I |
| 3074     | 10.000      | 26.000   | 71.600   | 0.0           | 0.0       | 1.3260    | I |
| 3075     | 12.000      | 26.000   | 71.600   | 0.55312       | 0.18697   | 1.8027    | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |          |          | Displacements |            |           |   |
|----------|-------------|----------|----------|---------------|------------|-----------|---|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm]  | z<br>[mm] |   |
| 3076     | 14.000      | 26.000   | 71.600   | 1.1646        | 0.45820    | 2.2724    | I |
| 3077     | 16.000      | 26.000   | 71.600   | 1.7596        | 0.82803    | 2.7318    | I |
| 3078     | 18.000      | 26.000   | 71.600   | 2.3138        | 1.3544     | 3.1746    | I |
| 3079     | 20.000      | 26.000   | 71.600   | 2.7342        | 2.1168     | 3.5898    | I |
| 3080     | 22.000      | 26.000   | 71.600   | 2.7860        | 3.1840     | 3.9555    | I |
| 3081     | 24.000      | 26.000   | 71.600   | 2.0315        | 4.4323     | 4.2300    | I |
| 3082     | 26.000      | 26.000   | 71.600   | 0.21542       | 5.1700     | 4.3490    | I |
| 3083     | 28.000      | 26.000   | 71.600   | 0.030674      | 5.1839     | 4.3527    | I |
| 3084     | 30.000      | 26.000   | 71.600   | 0.030719      | 5.1915     | 4.3556    | I |
| 3085     | 32.000      | 26.000   | 71.600   | 0.030764      | 5.1991     | 4.3586    | I |
| 3086     | 34.000      | 26.000   | 71.600   | 0.030809      | 5.2067     | 4.3616    | I |
| 3087     | 36.000      | 26.000   | 71.600   | 0.030854      | 5.2143     | 4.3645    | I |
| 3088     | 38.000      | 26.000   | 71.600   | 0.030899      | 5.2220     | 4.3675    | I |
| 3089     | 40.000      | 26.000   | 71.600   | 0.030944      | 5.2296     | 4.3704    | I |
| 3090     | 42.000      | 26.000   | 71.600   | 0.030990      | 5.2372     | 4.3734    | I |
| 3091     | 44.000      | 26.000   | 71.600   | -0.97544      | 5.0939     | 4.3537    | I |
| 3092     | 46.000      | 26.000   | 71.600   | -2.4827       | 4.0237     | 4.1693    | I |
| 3093     | 48.000      | 26.000   | 71.600   | -2.8895       | 2.7716     | 3.8526    | I |
| 3094     | 50.000      | 26.000   | 71.600   | -2.6530       | 1.8071     | 3.4628    | I |
| 3095     | 52.000      | 26.000   | 71.600   | -2.1557       | 1.1384     | 3.0338    | I |
| 3096     | 54.000      | 26.000   | 71.600   | -1.5730       | 0.67827    | 2.5825    | I |
| 3097     | 56.000      | 26.000   | 71.600   | -0.96636      | 0.35208    | 2.1176    | I |
| 3098     | 58.000      | 26.000   | 71.600   | -0.34517      | 0.10888    | 1.6441    | I |
| 3099     | 60.000      | 26.000   | 71.600   | 0.0           | 0.0        | 1.1647    | I |
| 3100     | 62.000      | 26.000   | 71.600   | 0.0           | 0.0        | 0.68109   | I |
| 3101     | 64.000      | 26.000   | 71.600   | 0.0           | 0.0        | 0.19451   | I |
| 3102     | 66.000      | 26.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3103     | 68.000      | 26.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3104     | 70.000      | 26.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3105     | 0.0         | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3106     | 2.0000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3107     | 4.0000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3108     | 6.0000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.45172   | I |
| 3109     | 8.0000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.94647   | I |
| 3110     | 10.000      | 28.000   | 71.600   | 0.074370      | 0.012854   | 1.4400    | I |
| 3111     | 12.000      | 28.000   | 71.600   | 0.75049       | 0.14798    | 1.9316    | I |
| 3112     | 14.000      | 28.000   | 71.600   | 1.4321        | 0.32867    | 2.4207    | I |
| 3113     | 16.000      | 28.000   | 71.600   | 2.1449        | 0.58880    | 2.9057    | I |
| 3114     | 18.000      | 28.000   | 71.600   | 2.8962        | 0.98896    | 3.3838    | I |
| 3115     | 20.000      | 28.000   | 71.600   | 3.6425        | 1.6450     | 3.8493    | I |
| 3116     | 22.000      | 28.000   | 71.600   | 4.1769        | 2.7846     | 4.2881    | I |
| 3117     | 24.000      | 28.000   | 71.600   | 3.7161        | 4.7296     | 4.6598    | I |
| 3118     | 26.000      | 28.000   | 71.600   | 0.46809       | 6.5532     | 4.8482    | I |
| 3119     | 28.000      | 28.000   | 71.600   | 0.038955      | 6.5833     | 4.8527    | I |
| 3120     | 30.000      | 28.000   | 71.600   | 0.039008      | 6.5924     | 4.8556    | I |
| 3121     | 32.000      | 28.000   | 71.600   | 0.039061      | 6.6014     | 4.8586    | I |
| 3122     | 34.000      | 28.000   | 71.600   | 0.039115      | 6.6104     | 4.8616    | I |
| 3123     | 36.000      | 28.000   | 71.600   | 0.039168      | 6.6195     | 4.8645    | I |
| 3124     | 38.000      | 28.000   | 71.600   | 0.039222      | 6.6285     | 4.8675    | I |
| 3125     | 40.000      | 28.000   | 71.600   | 0.039276      | 6.6376     | 4.8704    | I |
| 3126     | 42.000      | 28.000   | 71.600   | 0.039329      | 6.6466     | 4.8734    | I |
| 3127     | 44.000      | 28.000   | 71.600   | -2.0682       | 6.2047     | 4.8385    | I |
| 3128     | 46.000      | 28.000   | 71.600   | -4.1964       | 3.9070     | 4.5594    | I |
| 3129     | 48.000      | 28.000   | 71.600   | -4.1031       | 2.2609     | 4.1513    | I |
| 3130     | 50.000      | 28.000   | 71.600   | -3.4236       | 1.3397     | 3.6976    | I |
| 3131     | 52.000      | 28.000   | 71.600   | -2.6508       | 0.80418    | 3.2249    | I |
| 3132     | 54.000      | 28.000   | 71.600   | -1.9043       | 0.47171    | 2.7426    | I |
| 3133     | 56.000      | 28.000   | 71.600   | -1.2003       | 0.25123    | 2.2551    | I |
| 3134     | 58.000      | 28.000   | 71.600   | -0.52170      | 0.094536   | 1.7643    | I |
| 3135     | 60.000      | 28.000   | 71.600   | 0.0           | 0.0        | 1.2714    | I |
| 3136     | 62.000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.77703   | I |
| 3137     | 64.000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.28158   | I |
| 3138     | 66.000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3139     | 68.000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3140     | 70.000      | 28.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3141     | 0.0         | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3142     | 2.0000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3143     | 4.0000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3144     | 6.0000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.49604   | I |
| 3145     | 8.0000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.99561   | I |
| 3146     | 10.000      | 30.000   | 71.600   | 0.15286       | 0.0075488  | 1.4951    | I |
| 3147     | 12.000      | 30.000   | 71.600   | 0.85208       | 0.048004   | 1.9944    | I |
| 3148     | 14.000      | 30.000   | 71.600   | 1.5747        | 0.10326    | 2.4935    | I |
| 3149     | 16.000      | 30.000   | 71.600   | 2.3605        | 0.18513    | 2.9922    | I |
| 3150     | 18.000      | 30.000   | 71.600   | 3.2473        | 0.31681    | 3.4903    | I |
| 3151     | 20.000      | 30.000   | 71.600   | 4.2668        | 0.55056    | 3.9872    | I |
| 3152     | 22.000      | 30.000   | 71.600   | 5.4234        | 1.0330     | 4.4811    | I |
| 3153     | 24.000      | 30.000   | 71.600   | 6.5142        | 2.3688     | 4.9648    | I |
| 3154     | 26.000      | 30.000   | 71.600   | 1.9917        | 7.9668     | 5.3438    | I |
| 3155     | 28.000      | 30.000   | 71.600   | 0.048779      | 8.2437     | 5.3527    | I |
| 3156     | 30.000      | 30.000   | 71.600   | 0.048842      | 8.2544     | 5.3556    | I |
| 3157     | 32.000      | 30.000   | 71.600   | 0.048906      | 8.2651     | 5.3586    | I |
| 3158     | 34.000      | 30.000   | 71.600   | 0.048969      | 8.2758     | 5.3615    | I |
| 3159     | 36.000      | 30.000   | 71.600   | 0.049032      | 8.2865     | 5.3645    | I |
| 3160     | 38.000      | 30.000   | 71.600   | 0.049096      | 8.2972     | 5.3675    | I |
| 3161     | 40.000      | 30.000   | 71.600   | 0.049159      | 8.3079     | 5.3704    | I |
| 3162     | 42.000      | 30.000   | 71.600   | 0.049223      | 8.3187     | 5.3734    | I |
| 3163     | 44.000      | 30.000   | 71.600   | -6.2610       | 4.8697     | 5.2650    | I |
| 3164     | 46.000      | 30.000   | 71.600   | -6.2572       | 1.5104     | 4.8042    | I |
| 3165     | 48.000      | 30.000   | 71.600   | -5.0307       | 0.71867    | 4.3126    | I |
| 3166     | 50.000      | 30.000   | 71.600   | -3.39054      | 0.39620    | 3.8161    | I |
| 3167     | 52.000      | 30.000   | 71.600   | -2.9298       | 0.23043    | 3.3181    | I |
| 3168     | 54.000      | 30.000   | 71.600   | -2.0799       | 0.13357    | 2.8194    | I |
| 3169     | 56.000      | 30.000   | 71.600   | -1.3193       | 0.071589   | 2.3203    | I |
| 3170     | 58.000      | 30.000   | 71.600   | -0.60873      | 0.028598   | 1.8209    | I |
| 3171     | 60.000      | 30.000   | 71.600   | 0.0           | 0.0        | 1.3214    | I |
| 3172     | 62.000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.82176   | I |
| 3173     | 64.000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.32207   | I |
| 3174     | 66.000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3175     | 68.000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3176     | 70.000      | 30.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3177     | 0.0         | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3178     | 2.0000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3179     | 4.0000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3180     | 6.0000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.49439   | I |
| 3181     | 8.0000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.99426   | I |
| 3182     | 10.000      | 32.000   | 71.600   | 0.15168       | -0.0035274 | 1.4941    | I |
| 3183     | 12.000      | 32.000   | 71.600   | 0.85265       | -0.019829  | 1.9940    | I |
| 3184     | 14.000      | 32.000   | 71.600   | 1.5782        | -0.036703  | 2.4939    | I |
| 3185     | 16.000      | 32.000   | 71.600   | 2.3697        | -0.055108  | 2.9937    | I |
| 3186     | 18.000      | 32.000   | 71.600   | 3.2683        | -0.076006  | 3.4936    | I |
| 3187     | 20.000      | 32.000   | 71.600   | 4.3153        | -0.10036   | 3.9934    | I |
| 3188     | 22.000      | 32.000   | 71.600   | 5.5521        | -0.12912   | 4.4933    | I |
| 3189     | 24.000      | 32.000   | 71.600   | 7.0200        | -0.16326   | 4.9932    | I |
| 3190     | 26.000      | 32.000   | 71.600   | 8.7602        | -0.20372   | 5.4930    | I |
| 3191     | 28.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3192     | 30.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3193     | 32.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3194     | 34.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3195     | 36.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3196     | 38.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3197     | 40.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3198     | 42.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3199     | 44.000      | 32.000   | 71.600   | -8.1576       | 0.095972   | 5.3288    | I |
| 3200     | 46.000      | 32.000   | 71.600   | -6.5108       | 0.076598   | 4.8289    | I |
| 3201     | 48.000      | 32.000   | 71.600   | -5.1229       | 0.060270   | 4.3289    | I |
| 3202     | 50.000      | 32.000   | 71.600   | -3.9526       | 0.046501   | 3.8289    | I |
| 3203     | 52.000      | 32.000   | 71.600   | -2.9586       | 0.034807   | 3.3290    | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |          |          | Displacements |            |           |   |
|----------|-------------|----------|----------|---------------|------------|-----------|---|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm]  | z<br>[mm] |   |
| 3204     | 54.000      | 32.000   | 71.600   | -2.0995       | 0.024700   | 2.8290    | I |
| 3205     | 56.000      | 32.000   | 71.600   | -1.3340       | 0.015694   | 2.3290    | I |
| 3206     | 58.000      | 32.000   | 71.600   | -0.62084      | 0.0073039  | 1.8291    | I |
| 3207     | 60.000      | 32.000   | 71.600   | 0.0           | 0.0        | 1.3291    | I |
| 3208     | 62.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.82915   | I |
| 3209     | 64.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.32918   | I |
| 3210     | 66.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3211     | 68.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3212     | 70.000      | 32.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3213     | 0.0         | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3214     | 2.0000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3215     | 4.0000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3216     | 6.0000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.48277   | I |
| 3217     | 8.0000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.98263   | I |
| 3218     | 10.000      | 34.000   | 71.600   | 0.13534       | -0.0031474 | 1.4825    | I |
| 3219     | 12.000      | 34.000   | 71.600   | 0.83623       | -0.019447  | 1.9824    | I |
| 3220     | 14.000      | 34.000   | 71.600   | 1.5608        | -0.036297  | 2.4822    | I |
| 3221     | 16.000      | 34.000   | 71.600   | 2.3502        | -0.054656  | 2.9821    | I |
| 3222     | 18.000      | 34.000   | 71.600   | 3.2458        | -0.075485  | 3.4820    | I |
| 3223     | 20.000      | 34.000   | 71.600   | 4.2890        | -0.099744  | 3.9818    | I |
| 3224     | 22.000      | 34.000   | 71.600   | 5.5209        | -0.12839   | 4.4817    | I |
| 3225     | 24.000      | 34.000   | 71.600   | 6.9829        | -0.16239   | 4.9815    | I |
| 3226     | 26.000      | 34.000   | 71.600   | 8.7163        | -0.20270   | 5.4814    | I |
| 3227     | 28.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3228     | 30.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3229     | 32.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3230     | 34.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3231     | 36.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3232     | 38.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3233     | 40.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3234     | 42.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3235     | 44.000      | 34.000   | 71.600   | -8.1787       | 0.096220   | 5.3347    | I |
| 3236     | 46.000      | 34.000   | 71.600   | -6.5286       | 0.076807   | 4.8348    | I |
| 3237     | 48.000      | 34.000   | 71.600   | -5.1379       | 0.060446   | 4.3348    | I |
| 3238     | 50.000      | 34.000   | 71.600   | -3.9653       | 0.046650   | 3.8348    | I |
| 3239     | 52.000      | 34.000   | 71.600   | -2.9694       | 0.034934   | 3.3349    | I |
| 3240     | 54.000      | 34.000   | 71.600   | -2.1090       | 0.024811   | 2.8349    | I |
| 3241     | 56.000      | 34.000   | 71.600   | -1.3426       | 0.015796   | 2.3349    | I |
| 3242     | 58.000      | 34.000   | 71.600   | -0.62908      | 0.0074010  | 1.8350    | I |
| 3243     | 60.000      | 34.000   | 71.600   | 0.0           | 0.0        | 1.3350    | I |
| 3244     | 62.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.83503   | I |
| 3245     | 64.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.33507   | I |
| 3246     | 66.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3247     | 68.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3248     | 70.000      | 34.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3249     | 0.0         | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3250     | 2.0000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3251     | 4.0000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3252     | 6.0000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.47114   | I |
| 3253     | 8.0000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.97101   | I |
| 3254     | 10.000      | 36.000   | 71.600   | 0.11899       | -0.0027672 | 1.4709    | I |
| 3255     | 12.000      | 36.000   | 71.600   | 0.81982       | -0.019066  | 1.9707    | I |
| 3256     | 14.000      | 36.000   | 71.600   | 1.5433        | -0.035891  | 2.4706    | I |
| 3257     | 16.000      | 36.000   | 71.600   | 2.3308        | -0.054204  | 2.9705    | I |
| 3258     | 18.000      | 36.000   | 71.600   | 3.2235        | -0.074965  | 3.4703    | I |
| 3259     | 20.000      | 36.000   | 71.600   | 4.2627        | -0.099133  | 3.9702    | I |
| 3260     | 22.000      | 36.000   | 71.600   | 5.4898        | -0.12767   | 4.4701    | I |
| 3261     | 24.000      | 36.000   | 71.600   | 6.9460        | -0.16153   | 4.9699    | I |
| 3262     | 26.000      | 36.000   | 71.600   | 8.6726        | -0.20169   | 5.4698    | I |
| 3263     | 28.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3264     | 30.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3265     | 32.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3266     | 34.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3267     | 36.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3268     | 38.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3269     | 40.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3270     | 42.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3271     | 44.000      | 36.000   | 71.600   | -8.1998       | 0.096468   | 5.3406    | I |
| 3272     | 46.000      | 36.000   | 71.600   | -6.5464       | 0.077017   | 4.8406    | I |
| 3273     | 48.000      | 36.000   | 71.600   | -5.1529       | 0.060622   | 4.3407    | I |
| 3274     | 50.000      | 36.000   | 71.600   | -3.9780       | 0.046800   | 3.8407    | I |
| 3275     | 52.000      | 36.000   | 71.600   | -2.9803       | 0.035062   | 3.3407    | I |
| 3276     | 54.000      | 36.000   | 71.600   | -2.1185       | 0.024923   | 2.8408    | I |
| 3277     | 56.000      | 36.000   | 71.600   | -1.3513       | 0.015897   | 2.3408    | I |
| 3278     | 58.000      | 36.000   | 71.600   | -0.63733      | 0.0074980  | 1.8408    | I |
| 3279     | 60.000      | 36.000   | 71.600   | 0.0           | 0.0        | 1.3409    | I |
| 3280     | 62.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.84091   | I |
| 3281     | 64.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.34095   | I |
| 3282     | 66.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3283     | 68.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3284     | 70.000      | 36.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3285     | 0.0         | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3286     | 2.0000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3287     | 4.0000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3288     | 6.0000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.45952   | I |
| 3289     | 8.0000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.95938   | I |
| 3290     | 10.000      | 38.000   | 71.600   | 0.10263       | -0.0023867 | 1.4592    | I |
| 3291     | 12.000      | 38.000   | 71.600   | 0.80343       | -0.018684  | 1.9591    | I |
| 3292     | 14.000      | 38.000   | 71.600   | 1.5259        | -0.035487  | 2.4590    | I |
| 3293     | 16.000      | 38.000   | 71.600   | 2.3114        | -0.053754  | 2.9588    | I |
| 3294     | 18.000      | 38.000   | 71.600   | 3.2012        | -0.074447  | 3.4587    | I |
| 3295     | 20.000      | 38.000   | 71.600   | 4.2366        | -0.098525  | 3.9586    | I |
| 3296     | 22.000      | 38.000   | 71.600   | 5.4588        | -0.12695   | 4.4584    | I |
| 3297     | 24.000      | 38.000   | 71.600   | 6.9092        | -0.16068   | 4.9583    | I |
| 3298     | 26.000      | 38.000   | 71.600   | 8.6291        | -0.20068   | 5.4582    | I |
| 3299     | 28.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3300     | 30.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3301     | 32.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3302     | 34.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3303     | 36.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3304     | 38.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3305     | 40.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3306     | 42.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3307     | 44.000      | 38.000   | 71.600   | -8.2210       | 0.096717   | 5.3465    | I |
| 3308     | 46.000      | 38.000   | 71.600   | -6.5643       | 0.077227   | 4.8465    | I |
| 3309     | 48.000      | 38.000   | 71.600   | -5.1679       | 0.060799   | 4.3466    | I |
| 3310     | 50.000      | 38.000   | 71.600   | -3.9907       | 0.046949   | 3.8466    | I |
| 3311     | 52.000      | 38.000   | 71.600   | -2.9911       | 0.035190   | 3.3466    | I |
| 3312     | 54.000      | 38.000   | 71.600   | -2.1280       | 0.025035   | 2.8467    | I |
| 3313     | 56.000      | 38.000   | 71.600   | -1.3599       | 0.015999   | 2.3467    | I |
| 3314     | 58.000      | 38.000   | 71.600   | -0.64558      | 0.0075950  | 1.8467    | I |
| 3315     | 60.000      | 38.000   | 71.600   | 0.0           | 0.0        | 1.3468    | I |
| 3316     | 62.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.84680   | I |
| 3317     | 64.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.34683   | I |
| 3318     | 66.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3319     | 68.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3320     | 70.000      | 38.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3321     | 0.0         | 40.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3322     | 2.0000      | 40.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3323     | 4.0000      | 40.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3324     | 6.0000      | 40.000   | 71.600   | 0.0           | 0.0        | 0.44779   | I |
| 3325     | 8.0000      | 40.000   | 71.600   | 0.0           | 0.0        | 0.94756   | I |
| 3326     | 10.000      | 40.000   | 71.600   | 0.085712      | -0.0031358 | 1.4473    | I |
| 3327     | 12.000      | 40.000   | 71.600   | 0.78572       | -0.032738  | 1.9469    | I |
| 3328     | 14.000      | 40.000   | 71.600   | 1.5058        | -0.072860  | 2.4464    | I |
| 3329     | 16.000      | 40.000   | 71.600   | 2.2864        | -0.13191   | 2.9457    | I |
| 3330     | 18.000      | 40.000   | 71.600   | 3.1672        | -0.22623   | 3.4447    | I |
| 3331     | 20.000      | 40.000   | 71.600   | 4.1845        | -0.39230   | 3.9430    | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |        |        | Displacements |            |         |   |
|----------|-------------|--------|--------|---------------|------------|---------|---|
|          | x [m]       | y [m]  | z [m]  | x [mm]        | y [mm]     | z [mm]  |   |
| 3332     | 22.000      | 40.000 | 71.600 | 5.3613        | -0.73109   | 4.4398  | I |
| 3333     | 24.000      | 40.000 | 71.600 | 6.6231        | -1.6558    | 4.9315  | I |
| 3334     | 26.000      | 40.000 | 71.600 | 4.6071        | -6.9106    | 5.3697  | I |
| 3335     | 28.000      | 40.000 | 71.600 | -0.099976     | -8.3980    | 5.3952  | I |
| 3336     | 30.000      | 40.000 | 71.600 | -0.099717     | -8.3763    | 5.3893  | I |
| 3337     | 32.000      | 40.000 | 71.600 | -0.099459     | -8.3545    | 5.3833  | I |
| 3338     | 34.000      | 40.000 | 71.600 | -0.099201     | -8.3329    | 5.3774  | I |
| 3339     | 36.000      | 40.000 | 71.600 | -0.098943     | -8.3112    | 5.3714  | I |
| 3340     | 38.000      | 40.000 | 71.600 | -0.098686     | -8.2896    | 5.3655  | I |
| 3341     | 40.000      | 40.000 | 71.600 | -0.098429     | -8.2681    | 5.3595  | I |
| 3342     | 42.000      | 40.000 | 71.600 | -0.098173     | -8.2466    | 5.3536  | I |
| 3343     | 44.000      | 40.000 | 71.600 | -5.6141       | -5.6141    | 5.2672  | I |
| 3344     | 46.000      | 40.000 | 71.600 | -6.2407       | -1.7831    | 4.8220  | I |
| 3345     | 48.000      | 40.000 | 71.600 | -5.0650       | -0.84416   | 4.3334  | I |
| 3346     | 50.000      | 40.000 | 71.600 | -3.9458       | -0.46421   | 3.8383  | I |
| 3347     | 52.000      | 40.000 | 71.600 | -2.9686       | -0.26987   | 3.3409  | I |
| 3348     | 54.000      | 40.000 | 71.600 | -2.1158       | -0.15672   | 2.8426  | I |
| 3349     | 56.000      | 40.000 | 71.600 | -1.3530       | -0.084565  | 2.3438  | I |
| 3350     | 58.000      | 40.000 | 71.600 | -0.64170      | -0.034686  | 1.8446  | I |
| 3351     | 60.000      | 40.000 | 71.600 | 0.0           | 0.0        | 1.3452  | I |
| 3352     | 62.000      | 40.000 | 71.600 | 0.0           | 0.0        | 0.84575 | I |
| 3353     | 64.000      | 40.000 | 71.600 | 0.0           | 0.0        | 0.34616 | I |
| 3354     | 66.000      | 40.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3355     | 68.000      | 40.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3356     | 70.000      | 40.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3357     | 0.0         | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3358     | 2.0000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3359     | 4.0000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3360     | 6.0000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.40875 | I |
| 3361     | 8.0000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.90430 | I |
| 3362     | 10.000      | 42.000 | 71.600 | 0.017163      | -0.0027209 | 1.3988  | I |
| 3363     | 12.000      | 42.000 | 71.600 | 0.69760       | -0.12596   | 1.8918  | I |
| 3364     | 14.000      | 42.000 | 71.600 | 1.3828        | -0.28994   | 2.3826  | I |
| 3365     | 16.000      | 42.000 | 71.600 | 2.1013        | -0.52532   | 2.8700  | I |
| 3366     | 18.000      | 42.000 | 71.600 | 2.8666        | -0.88727   | 3.3517  | I |
| 3367     | 20.000      | 42.000 | 71.600 | 3.6504        | -1.4830    | 3.8230  | I |
| 3368     | 22.000      | 42.000 | 71.600 | 4.2879        | -2.5338    | 4.2723  | I |
| 3369     | 24.000      | 42.000 | 71.600 | 4.0907        | -4.4316    | 4.6654  | I |
| 3370     | 26.000      | 42.000 | 71.600 | 1.0196        | -6.6272    | 4.8924  | I |
| 3371     | 28.000      | 42.000 | 71.600 | -0.079925     | -6.7137    | 4.8953  | I |
| 3372     | 30.000      | 42.000 | 71.600 | -0.079707     | -6.6954    | 4.8893  | I |
| 3373     | 32.000      | 42.000 | 71.600 | -0.079488     | -6.6770    | 4.8834  | I |
| 3374     | 34.000      | 42.000 | 71.600 | -0.079270     | -6.6587    | 4.8774  | I |
| 3375     | 36.000      | 42.000 | 71.600 | -0.079053     | -6.6404    | 4.8715  | I |
| 3376     | 38.000      | 42.000 | 71.600 | -0.078836     | -6.6222    | 4.8655  | I |
| 3377     | 40.000      | 42.000 | 71.600 | -0.078619     | -6.6040    | 4.8596  | I |
| 3378     | 42.000      | 42.000 | 71.600 | -0.078403     | -6.5859    | 4.8536  | I |
| 3379     | 44.000      | 42.000 | 71.600 | -1.7831       | -6.2407    | 4.8220  | I |
| 3380     | 46.000      | 42.000 | 71.600 | -4.0555       | -4.0555    | 4.5601  | I |
| 3381     | 48.000      | 42.000 | 71.600 | -4.0662       | -2.3719    | 4.1608  | I |
| 3382     | 50.000      | 42.000 | 71.600 | -3.4260       | -1.4107    | 3.7115  | I |
| 3383     | 52.000      | 42.000 | 71.600 | -2.6678       | -0.84884   | 3.2413  | I |
| 3384     | 54.000      | 42.000 | 71.600 | -1.9268       | -0.49954   | 2.7607  | I |
| 3385     | 56.000      | 42.000 | 71.600 | -1.2253       | -0.26803   | 2.2743  | I |
| 3386     | 58.000      | 42.000 | 71.600 | -0.54851      | -0.10377   | 1.7844  | I |
| 3387     | 60.000      | 42.000 | 71.600 | 0.0           | 0.0        | 1.2921  | I |
| 3388     | 62.000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.79816 | I |
| 3389     | 64.000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.30310 | I |
| 3390     | 66.000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3391     | 68.000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3392     | 70.000      | 42.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3393     | 0.0         | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3394     | 2.0000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3395     | 4.0000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3396     | 6.0000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.32195 | I |
| 3397     | 8.0000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.80843 | I |
| 3398     | 10.000      | 44.000 | 71.600 | 0.0           | 0.0        | 1.2918  | I |
| 3399     | 12.000      | 44.000 | 71.600 | 0.51365       | -0.16408   | 1.7708  | I |
| 3400     | 14.000      | 44.000 | 71.600 | 1.1341        | -0.42071   | 2.2436  | I |
| 3401     | 16.000      | 44.000 | 71.600 | 1.7429        | -0.77091   | 2.7070  | I |
| 3402     | 18.000      | 44.000 | 71.600 | 2.3225        | -1.2718    | 3.1557  | I |
| 3403     | 20.000      | 44.000 | 71.600 | 2.7914        | -2.0063    | 3.5796  | I |
| 3404     | 22.000      | 44.000 | 71.600 | 2.9293        | -3.0624    | 3.9586  | I |
| 3405     | 24.000      | 44.000 | 71.600 | 2.2815        | -4.3729    | 4.2529  | I |
| 3406     | 26.000      | 44.000 | 71.600 | 0.45871       | -5.2752    | 4.3957  | I |
| 3407     | 28.000      | 44.000 | 71.600 | -0.063022     | -5.2938    | 4.3953  | I |
| 3408     | 30.000      | 44.000 | 71.600 | -0.062838     | -5.2784    | 4.3894  | I |
| 3409     | 32.000      | 44.000 | 71.600 | -0.062654     | -5.2629    | 4.3834  | I |
| 3410     | 34.000      | 44.000 | 71.600 | -0.062470     | -5.2475    | 4.3775  | I |
| 3411     | 36.000      | 44.000 | 71.600 | -0.062287     | -5.2321    | 4.3715  | I |
| 3412     | 38.000      | 44.000 | 71.600 | -0.062104     | -5.2168    | 4.3656  | I |
| 3413     | 40.000      | 44.000 | 71.600 | -0.061922     | -5.2014    | 4.3596  | I |
| 3414     | 42.000      | 44.000 | 71.600 | 0.061740      | -5.1861    | 4.3537  | I |
| 3415     | 44.000      | 44.000 | 71.600 | -0.84416      | -5.0650    | 4.3334  | I |
| 3416     | 46.000      | 44.000 | 71.600 | -2.3719       | -4.0662    | 4.1608  | I |
| 3417     | 48.000      | 44.000 | 71.600 | -2.8318       | -2.8318    | 3.8529  | I |
| 3418     | 50.000      | 44.000 | 71.600 | -2.6323       | -1.8581    | 3.4691  | I |
| 3419     | 52.000      | 44.000 | 71.600 | -2.1554       | -1.1757    | 3.0440  | I |
| 3420     | 54.000      | 44.000 | 71.600 | -1.5834       | -0.70372   | 2.5953  | I |
| 3421     | 56.000      | 44.000 | 71.600 | -0.98280      | -0.36855   | 2.1324  | I |
| 3422     | 58.000      | 44.000 | 71.600 | -0.36584      | -0.11865   | 1.6603  | I |
| 3423     | 60.000      | 44.000 | 71.600 | 0.0           | 0.0        | 1.1819  | I |
| 3424     | 62.000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.69923 | I |
| 3425     | 64.000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.21333 | I |
| 3426     | 66.000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3427     | 68.000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3428     | 70.000      | 44.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3429     | 0.0         | 46.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3430     | 2.0000      | 46.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3431     | 4.0000      | 46.000 | 71.600 | 0.0           | 0.0        | 0.0     | I |
| 3432     | 6.0000      | 46.000 | 71.600 | 0.0           | 0.0        | 0.18973 | I |
| 3433     | 8.0000      | 46.000 | 71.600 | 0.0           | 0.0        | 0.66303 | I |
| 3434     | 10.000      | 46.000 | 71.600 | 0.0           | 0.0        | 1.1304  | I |
| 3435     | 12.000      | 46.000 | 71.600 | 0.26006       | -0.11920   | 1.5899  | I |
| 3436     | 14.000      | 46.000 | 71.600 | 0.80818       | -0.43016   | 2.0382  | I |
| 3437     | 16.000      | 46.000 | 71.600 | 1.3035        | -0.82720   | 2.4706  | I |
| 3438     | 18.000      | 46.000 | 71.600 | 1.7151        | -1.3476    | 2.8793  | I |
| 3439     | 20.000      | 46.000 | 71.600 | 1.9619        | -2.0231    | 3.2516  | I |
| 3440     | 22.000      | 46.000 | 71.600 | 1.8930        | -2.8394    | 3.5669  | I |
| 3441     | 24.000      | 46.000 | 71.600 | 1.3255        | -3.6453    | 3.7943  | I |
| 3442     | 26.000      | 46.000 | 71.600 | 0.24808       | -4.0933    | 3.8970  | I |
| 3443     | 28.000      | 46.000 | 71.600 | -0.048774     | -4.0970    | 3.8954  | I |
| 3444     | 30.000      | 46.000 | 71.600 | -0.048618     | -4.0839    | 3.8894  | I |
| 3445     | 32.000      | 46.000 | 71.600 | -0.048463     | -4.0709    | 3.8835  | I |
| 3446     | 34.000      | 46.000 | 71.600 | -0.048308     | -4.0579    | 3.8775  | I |
| 3447     | 36.000      | 46.000 | 71.600 | -0.048153     | -4.0449    | 3.8715  | I |
| 3448     | 38.000      | 46.000 | 71.600 | -0.047999     | -4.0319    | 3.8656  | I |
| 3449     | 40.000      | 46.000 | 71.600 | -0.047845     | -4.0190    | 3.8596  | I |
| 3450     | 42.000      | 46.000 | 71.600 | -0.047691     | -4.0060    | 3.8537  | I |
| 3451     | 44.000      | 46.000 | 71.600 | -0.46421      | -3.9458    | 3.8383  | I |
| 3452     | 46.000      | 46.000 | 71.600 | -1.4107       | -3.4260    | 3.7115  | I |
| 3453     | 48.000      | 46.000 | 71.600 | -1.8581       | -2.6323    | 3.4691  | I |
| 3454     | 50.000      | 46.000 | 71.600 | -1.8601       | -1.8601    | 3.1458  | I |
| 3455     | 52.000      | 46.000 | 71.600 | -1.5863       | -1.2258    | 2.7697  | I |
| 3456     | 54.000      | 46.000 | 71.600 | -1.1667       | -0.73457   | 2.3594  | I |
| 3457     | 56.000      | 46.000 | 71.600 | -0.66909      | -0.35546   | 1.9265  | I |
| 3458     | 58.000      | 46.000 | 71.600 | -0.11745      | -0.053965  | 1.4781  | I |
| 3459     | 60.000      | 46.000 | 71.600 | 0.0           | 0.0        | 1.0190  | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |        |        | Displacements |           |          |   |
|----------|-------------|--------|--------|---------------|-----------|----------|---|
|          | x [m]       | y [m]  | z [m]  | x [mm]        | y [mm]    | z [mm]   |   |
| 3460     | 62.000      | 46.000 | 71.600 | 0.0           | 0.0       | 0.55200  | I |
| 3461     | 64.000      | 46.000 | 71.600 | 0.0           | 0.0       | 0.079168 | I |
| 3462     | 66.000      | 46.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3463     | 68.000      | 46.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3464     | 70.000      | 46.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3465     | 0.0         | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3466     | 2.0000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3467     | 4.0000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3468     | 6.0000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.015337 | I |
| 3469     | 8.0000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.47235  | I |
| 3470     | 10.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.92048  | I |
| 3471     | 12.000      | 48.000 | 71.600 | 0.0           | 0.0       | 1.3569   | I |
| 3472     | 14.000      | 48.000 | 71.600 | 0.45070       | -0.31258  | 1.7774   | I |
| 3473     | 16.000      | 48.000 | 71.600 | 0.85729       | -0.70891  | 2.1762   | I |
| 3474     | 18.000      | 48.000 | 71.600 | 1.1566        | -1.1842   | 2.5446   | I |
| 3475     | 20.000      | 48.000 | 71.600 | 1.2931        | -1.7376   | 2.8700   | I |
| 3476     | 22.000      | 48.000 | 71.600 | 1.1895        | -2.3250   | 3.1349   | I |
| 3477     | 24.000      | 48.000 | 71.600 | 0.78982       | -2.8302   | 3.3178   | I |
| 3478     | 26.000      | 48.000 | 71.600 | 0.14340       | -3.0831   | 3.3977   | I |
| 3479     | 28.000      | 48.000 | 71.600 | -0.036690     | -3.0819   | 3.3954   | I |
| 3480     | 30.000      | 48.000 | 71.600 | -0.036557     | -3.0708   | 3.3894   | I |
| 3481     | 32.000      | 48.000 | 71.600 | -0.036424     | -3.0597   | 3.3835   | I |
| 3482     | 34.000      | 48.000 | 71.600 | -0.036292     | -3.0485   | 3.3775   | I |
| 3483     | 36.000      | 48.000 | 71.600 | -0.036160     | -3.0374   | 3.3716   | I |
| 3484     | 38.000      | 48.000 | 71.600 | -0.036028     | -3.0264   | 3.3656   | I |
| 3485     | 40.000      | 48.000 | 71.600 | -0.035896     | -3.0153   | 3.3597   | I |
| 3486     | 42.000      | 48.000 | 71.600 | -0.035765     | -3.0043   | 3.3537   | I |
| 3487     | 44.000      | 48.000 | 71.600 | -0.26987      | -2.9686   | 3.3409   | I |
| 3488     | 46.000      | 48.000 | 71.600 | -0.84884      | -2.6678   | 3.2413   | I |
| 3489     | 48.000      | 48.000 | 71.600 | -1.1757       | -2.1554   | 3.0440   | I |
| 3490     | 50.000      | 48.000 | 71.600 | -1.2258       | -1.5863   | 2.7697   | I |
| 3491     | 52.000      | 48.000 | 71.600 | -1.0579       | -1.0579   | 2.4387   | I |
| 3492     | 54.000      | 48.000 | 71.600 | -0.74162      | -0.60428  | 2.0672   | I |
| 3493     | 56.000      | 48.000 | 71.600 | -0.32434      | -0.22298  | 1.6667   | I |
| 3494     | 58.000      | 48.000 | 71.600 | 0.0           | 0.0       | 1.2454   | I |
| 3495     | 60.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.80869  | I |
| 3496     | 62.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.36059  | I |
| 3497     | 64.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3498     | 66.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3499     | 68.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3500     | 70.000      | 48.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3501     | 0.0         | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3502     | 2.0000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3503     | 4.0000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3504     | 6.0000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3505     | 8.0000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.24128  | I |
| 3506     | 10.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.66815  | I |
| 3507     | 12.000      | 50.000 | 71.600 | 0.0           | 0.0       | 1.0798   | I |
| 3508     | 14.000      | 50.000 | 71.600 | 0.091362      | -0.078100 | 1.4717   | I |
| 3509     | 16.000      | 50.000 | 71.600 | 0.44311       | -0.45163  | 1.8375   | I |
| 3510     | 18.000      | 50.000 | 71.600 | 0.68430       | -0.86353  | 2.1688   | I |
| 3511     | 20.000      | 50.000 | 71.600 | 0.78542       | -1.3008   | 2.4544   | I |
| 3512     | 22.000      | 50.000 | 71.600 | 0.71490       | -1.7223   | 2.6808   | I |
| 3513     | 24.000      | 50.000 | 71.600 | 0.46504       | -2.0539   | 2.8329   | I |
| 3514     | 26.000      | 50.000 | 71.600 | 0.083407      | -2.2103   | 2.8981   | I |
| 3515     | 28.000      | 50.000 | 71.600 | -0.026277     | -2.2073   | 2.8954   | I |
| 3516     | 30.000      | 50.000 | 71.600 | -0.026162     | -2.1976   | 2.8895   | I |
| 3517     | 32.000      | 50.000 | 71.600 | -0.026046     | -2.1879   | 2.8835   | I |
| 3518     | 34.000      | 50.000 | 71.600 | -0.025930     | -2.1782   | 2.8776   | I |
| 3519     | 36.000      | 50.000 | 71.600 | -0.025815     | -2.1685   | 2.8716   | I |
| 3520     | 38.000      | 50.000 | 71.600 | -0.025700     | -2.1588   | 2.8657   | I |
| 3521     | 40.000      | 50.000 | 71.600 | -0.025585     | -2.1491   | 2.8597   | I |
| 3522     | 42.000      | 50.000 | 71.600 | -0.025470     | -2.1395   | 2.8538   | I |
| 3523     | 44.000      | 50.000 | 71.600 | -0.15672      | -2.1158   | 2.8426   | I |
| 3524     | 46.000      | 50.000 | 71.600 | -0.49954      | -1.9268   | 2.7607   | I |
| 3525     | 48.000      | 50.000 | 71.600 | -0.70372      | -1.5834   | 2.5953   | I |
| 3526     | 50.000      | 50.000 | 71.600 | -0.73457      | -1.1667   | 2.3594   | I |
| 3527     | 52.000      | 50.000 | 71.600 | -0.60428      | -0.74162  | 2.0672   | I |
| 3528     | 54.000      | 50.000 | 71.600 | -0.34254      | -0.34254  | 1.7316   | I |
| 3529     | 56.000      | 50.000 | 71.600 | 0.0           | 0.0       | 1.3631   | I |
| 3530     | 58.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.96961  | I |
| 3531     | 60.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.55700  | I |
| 3532     | 62.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.12967  | I |
| 3533     | 64.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3534     | 66.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3535     | 68.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3536     | 70.000      | 50.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3537     | 0.0         | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3538     | 2.0000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3539     | 4.0000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3540     | 6.0000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3541     | 8.0000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3542     | 10.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.37965  | I |
| 3543     | 12.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.76643  | I |
| 3544     | 14.000      | 52.000 | 71.600 | 0.0           | 0.0       | 1.1304   | I |
| 3545     | 16.000      | 52.000 | 71.600 | 0.071024      | -0.086048 | 1.4656   | I |
| 3546     | 18.000      | 52.000 | 71.600 | 0.29397       | -0.44096  | 1.7642   | I |
| 3547     | 20.000      | 52.000 | 71.600 | 0.40095       | -0.78937  | 2.0169   | I |
| 3548     | 22.000      | 52.000 | 71.600 | 0.38443       | -1.1009   | 2.2135   | I |
| 3549     | 24.000      | 52.000 | 71.600 | 0.25356       | -1.3312   | 2.3434   | I |
| 3550     | 26.000      | 52.000 | 71.600 | 0.045572      | -1.4355   | 2.3984   | I |
| 3551     | 28.000      | 52.000 | 71.600 | -0.017045     | -1.4318   | 2.3955   | I |
| 3552     | 30.000      | 52.000 | 71.600 | -0.016940     | -1.4230   | 2.3895   | I |
| 3553     | 32.000      | 52.000 | 71.600 | -0.016836     | -1.4142   | 2.3836   | I |
| 3554     | 34.000      | 52.000 | 71.600 | -0.016731     | -1.4054   | 2.3776   | I |
| 3555     | 36.000      | 52.000 | 71.600 | -0.016626     | -1.3966   | 2.3717   | I |
| 3556     | 38.000      | 52.000 | 71.600 | -0.016522     | -1.3879   | 2.3657   | I |
| 3557     | 40.000      | 52.000 | 71.600 | -0.016418     | -1.3791   | 2.3598   | I |
| 3558     | 42.000      | 52.000 | 71.600 | -0.016314     | -1.3703   | 2.3538   | I |
| 3559     | 44.000      | 52.000 | 71.600 | -0.084565     | -1.3530   | 2.3438   | I |
| 3560     | 46.000      | 52.000 | 71.600 | -0.26803      | -1.2253   | 2.2743   | I |
| 3561     | 48.000      | 52.000 | 71.600 | -0.36855      | -0.98280  | 2.1324   | I |
| 3562     | 50.000      | 52.000 | 71.600 | -0.35546      | -0.66909  | 1.9265   | I |
| 3563     | 52.000      | 52.000 | 71.600 | -0.22298      | -0.32434  | 1.6667   | I |
| 3564     | 54.000      | 52.000 | 71.600 | 0.0           | 0.0       | 1.3631   | I |
| 3565     | 56.000      | 52.000 | 71.600 | 0.0           | 0.0       | 1.0245   | I |
| 3566     | 58.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.65817  | I |
| 3567     | 60.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.26985  | I |
| 3568     | 62.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3569     | 64.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3570     | 66.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3571     | 68.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3572     | 70.000      | 52.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3573     | 0.0         | 54.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3574     | 2.0000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3575     | 4.0000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3576     | 6.0000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3577     | 8.0000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.0      | I |
| 3578     | 10.000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.060692 | I |
| 3579     | 12.000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.42335  | I |
| 3580     | 14.000      | 54.000 | 71.600 | 0.0           | 0.0       | 0.76121  | I |
| 3581     | 16.000      | 54.000 | 71.600 | 0.0           | 0.0       | 1.0687   | I |
| 3582     | 18.000      | 54.000 | 71.600 | 0.0           | 0.0       | 1.3390   | I |
| 3583     | 20.000      | 54.000 | 71.600 | 0.10069       | -0.22970  | 1.5647   | I |
| 3584     | 22.000      | 54.000 | 71.600 | 0.14229       | -0.47215  | 1.7378   | I |
| 3585     | 24.000      | 54.000 | 71.600 | 0.10570       | -0.64301  | 1.8510   | I |
| 3586     | 26.000      | 54.000 | 71.600 | 0.019677      | -0.71823  | 1.8986   | I |
| 3587     | 28.000      | 54.000 | 71.600 | -0.0085005    | -0.71404  | 1.8955   | I |



**GEA LIMITED**  
**(GEOTECHNICAL & ENV ASSOC)** **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |          |          | Displacements |            |           |   |
|----------|-------------|----------|----------|---------------|------------|-----------|---|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm]  | z<br>[mm] |   |
| 3588     | 30.000      | 54.000   | 71.600   | -0.0084009    | -0.70568   | 1.8895    | I |
| 3589     | 32.000      | 54.000   | 71.600   | -0.0083014    | -0.69732   | 1.8836    | I |
| 3590     | 34.000      | 54.000   | 71.600   | -0.0082019    | -0.68896   | 1.8776    | I |
| 3591     | 36.000      | 54.000   | 71.600   | -0.0081024    | -0.68060   | 1.8717    | I |
| 3592     | 38.000      | 54.000   | 71.600   | -0.0080029    | -0.67225   | 1.8657    | I |
| 3593     | 40.000      | 54.000   | 71.600   | -0.0079035    | -0.66389   | 1.8598    | I |
| 3594     | 42.000      | 54.000   | 71.600   | -0.0078041    | -0.65554   | 1.8538    | I |
| 3595     | 44.000      | 54.000   | 71.600   | -0.034686     | -0.64170   | 1.8446    | I |
| 3596     | 46.000      | 54.000   | 71.600   | -0.10377      | -0.54851   | 1.7844    | I |
| 3597     | 48.000      | 54.000   | 71.600   | -0.11865      | -0.36584   | 1.6603    | I |
| 3598     | 50.000      | 54.000   | 71.600   | -0.053965     | -0.11745   | 1.4781    | I |
| 3599     | 52.000      | 54.000   | 71.600   | 0.0           | 0.0        | 1.2454    | I |
| 3600     | 54.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.96961   | I |
| 3601     | 56.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.65817   | I |
| 3602     | 58.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.31741   | I |
| 3603     | 60.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3604     | 62.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3605     | 64.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3606     | 66.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3607     | 68.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3608     | 70.000      | 54.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3609     | 0.0         | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3610     | 2.0000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3611     | 4.0000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3612     | 6.0000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3613     | 8.0000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3614     | 10.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3615     | 12.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.056140  | I |
| 3616     | 14.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.36999   | I |
| 3617     | 16.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.65281   | I |
| 3618     | 18.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.89892   | I |
| 3619     | 20.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.1022    | I |
| 3620     | 22.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.2567    | I |
| 3621     | 24.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3569    | I |
| 3622     | 26.000      | 56.000   | 71.600   | 418.60E-6     | -0.017372  | 1.3988    | I |
| 3623     | 28.000      | 56.000   | 71.600   | -151.94E-6    | -0.012763  | 1.3955    | I |
| 3624     | 30.000      | 56.000   | 71.600   | -51.749E-6    | -0.0043469 | 1.3896    | I |
| 3625     | 32.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3836    | I |
| 3626     | 34.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3777    | I |
| 3627     | 36.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3717    | I |
| 3628     | 38.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3658    | I |
| 3629     | 40.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3598    | I |
| 3630     | 42.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3539    | I |
| 3631     | 44.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.3452    | I |
| 3632     | 46.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.2921    | I |
| 3633     | 48.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.1819    | I |
| 3634     | 50.000      | 56.000   | 71.600   | 0.0           | 0.0        | 1.0190    | I |
| 3635     | 52.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.80869   | I |
| 3636     | 54.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.55700   | I |
| 3637     | 56.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.26985   | I |
| 3638     | 58.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3639     | 60.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3640     | 62.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3641     | 64.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3642     | 66.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3643     | 68.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3644     | 70.000      | 56.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3645     | 0.0         | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3646     | 2.0000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3647     | 4.0000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3648     | 6.0000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3649     | 8.0000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3650     | 10.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3651     | 12.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3652     | 14.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3653     | 16.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.22248   | I |
| 3654     | 18.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.44779   | I |
| 3655     | 20.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.63243   | I |
| 3656     | 22.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.77166   | I |
| 3657     | 24.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.86145   | I |
| 3658     | 26.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.89892   | I |
| 3659     | 28.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.89557   | I |
| 3660     | 30.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.88962   | I |
| 3661     | 32.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.88366   | I |
| 3662     | 34.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.87771   | I |
| 3663     | 36.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.87176   | I |
| 3664     | 38.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.86581   | I |
| 3665     | 40.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.85986   | I |
| 3666     | 42.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.85390   | I |
| 3667     | 44.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.84575   | I |
| 3668     | 46.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.79816   | I |
| 3669     | 48.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.69923   | I |
| 3670     | 50.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.55200   | I |
| 3671     | 52.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.36059   | I |
| 3672     | 54.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.12967   | I |
| 3673     | 56.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3674     | 58.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3675     | 60.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3676     | 62.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3677     | 64.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3678     | 66.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3679     | 68.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3680     | 70.000      | 58.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3681     | 0.0         | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3682     | 2.0000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3683     | 4.0000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3684     | 6.0000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3685     | 8.0000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3686     | 10.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3687     | 12.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3688     | 14.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3689     | 16.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3690     | 18.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3691     | 20.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.15718   | I |
| 3692     | 22.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.28383   | I |
| 3693     | 24.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.36517   | I |
| 3694     | 26.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.39903   | I |
| 3695     | 28.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.39560   | I |
| 3696     | 30.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.38965   | I |
| 3697     | 32.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.38370   | I |
| 3698     | 34.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.37775   | I |
| 3699     | 36.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.37180   | I |
| 3700     | 38.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.36584   | I |
| 3701     | 40.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.35989   | I |
| 3702     | 42.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.35394   | I |
| 3703     | 44.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.34616   | I |
| 3704     | 46.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.30310   | I |
| 3705     | 48.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.21333   | I |
| 3706     | 50.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.079168  | I |
| 3707     | 52.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3708     | 54.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3709     | 56.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3710     | 58.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3711     | 60.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3712     | 62.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3713     | 64.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3714     | 66.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |
| 3715     | 68.000      | 60.000   | 71.600   | 0.0           | 0.0        | 0.0       | I |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line No. | Coordinates |          |          | Displacements |           |           |       |
|----------|-------------|----------|----------|---------------|-----------|-----------|-------|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm] | z<br>[mm] |       |
| 3716     | 70.000      | 60.000   | 71.600   | 0.0           | 0.0       | 0.0       | 1     |
| 3717     | 30.000      | 4.7000   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3718     | 30.000      | 5.6400   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3719     | 30.000      | 6.5800   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3720     | 30.000      | 7.5200   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3721     | 30.000      | 8.4600   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3722     | 30.000      | 9.4000   | 71.000   | 0.0           | 0.0       | 0.20571   | 1.2,6 |
| 3723     | 30.000      | 10.340   | 71.000   | 0.0           | 0.0       | 0.44071   | 1.2,6 |
| 3724     | 30.000      | 11.280   | 71.000   | 0.0           | 0.0       | 0.67571   | 1.2,6 |
| 3725     | 30.000      | 12.220   | 71.000   | 0.0           | 0.0       | 0.91070   | 1.2,6 |
| 3726     | 30.000      | 13.160   | 71.000   | 0.0           | 0.0       | 1.1457    | 1.2,6 |
| 3727     | 30.000      | 14.100   | 71.000   | 0.0           | 0.0       | 1.3807    | 1.2,6 |
| 3728     | 32.000      | 15.100   | 71.000   | 0.0020553     | 0.34734   | 1.6336    | 1.2,6 |
| 3729     | 33.029      | 15.100   | 71.000   | 0.0020679     | 0.34947   | 1.6352    | 1.2,6 |
| 3730     | 34.057      | 15.100   | 71.000   | 0.0020805     | 0.35160   | 1.6367    | 1.2,6 |
| 3731     | 35.086      | 15.100   | 71.000   | 0.0020931     | 0.35373   | 1.6382    | 1.2,6 |
| 3732     | 36.114      | 15.100   | 71.000   | 0.0021057     | 0.35586   | 1.6397    | 1.2,6 |
| 3733     | 37.143      | 15.100   | 71.000   | 0.0021183     | 0.35799   | 1.6413    | 1.2,6 |
| 3734     | 38.171      | 15.100   | 71.000   | 0.0021309     | 0.36012   | 1.6428    | 1.2,6 |
| 3735     | 39.200      | 15.100   | 71.000   | 0.0021435     | 0.36225   | 1.6443    | 1.2,6 |
| 3736     | 39.400      | 14.200   | 71.000   | 276.70E-6     | 0.046762  | 1.4196    | 1.2,6 |
| 3737     | 40.250      | 14.200   | 71.000   | 287.20E-6     | 0.048536  | 1.4209    | 1.2,6 |
| 3738     | 41.100      | 14.200   | 71.000   | 297.70E-6     | 0.050311  | 1.4221    | 1.2,6 |
| 3739     | 41.950      | 14.200   | 71.000   | 308.20E-6     | 0.052085  | 1.4234    | 1.2,6 |
| 3740     | 42.800      | 14.200   | 71.000   | 318.70E-6     | 0.053860  | 1.4246    | 1.2,6 |
| 3741     | 43.650      | 14.200   | 71.000   | -0.0017041    | 0.051124  | 1.4227    | 1.2,6 |
| 3742     | 44.500      | 14.200   | 71.000   | -0.0028289    | 0.033341  | 1.4102    | 1.2,6 |
| 3743     | 44.600      | 14.200   | 71.000   | -0.0027495    | 0.030244  | 1.4080    | 1.2,6 |
| 3744     | 44.600      | 13.210   | 71.000   | 0.0           | 0.0       | 1.1614    | 1.2,6 |
| 3745     | 44.600      | 12.220   | 71.000   | 0.0           | 0.0       | 0.91481   | 1.2,6 |
| 3746     | 44.600      | 11.230   | 71.000   | 0.0           | 0.0       | 0.66808   | 1.2,6 |
| 3747     | 44.600      | 10.240   | 71.000   | 0.0           | 0.0       | 0.42127   | 1.2,6 |
| 3748     | 44.600      | 9.2500   | 71.000   | 0.0           | 0.0       | 0.17440   | 1.2,6 |
| 3749     | 44.600      | 8.2600   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3750     | 44.600      | 7.2700   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3751     | 44.600      | 6.2800   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3752     | 44.600      | 5.2900   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3753     | 44.600      | 4.3000   | 71.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3754     | 29.000      | 57.200   | 71.600   | 0.0           | 0.0       | 1.0926    | 1.2,6 |
| 3755     | 29.000      | 56.183   | 71.600   | 0.0           | 0.0       | 1.3467    | 1.2,6 |
| 3756     | 29.000      | 55.167   | 71.600   | -0.0035886    | -0.30145  | 1.6009    | 1.2,6 |
| 3757     | 29.000      | 54.151   | 71.600   | -0.0078240    | -0.65721  | 1.8550    | 1.2,6 |
| 3758     | 29.000      | 53.133   | 71.600   | -0.012100     | -1.0164   | 2.1092    | 1.2,6 |
| 3759     | 29.000      | 52.117   | 71.600   | -0.016480     | -1.3843   | 2.3633    | 1.2,6 |
| 3760     | 29.000      | 51.100   | 71.600   | -0.021031     | -1.7666   | 2.6175    | 1.2,6 |
| 3761     | 30.700      | 51.100   | 71.600   | -0.020938     | -1.7588   | 2.6124    | 1.2,6 |
| 3762     | 30.689      | 50.078   | 71.600   | -0.025745     | -2.1625   | 2.8680    | 1.2,6 |
| 3763     | 30.678      | 49.056   | 71.600   | -0.030852     | -2.5916   | 3.1236    | 1.2,6 |
| 3764     | 30.667      | 48.033   | 71.600   | -0.036327     | -3.0515   | 3.3791    | 1.2,6 |
| 3765     | 30.656      | 47.011   | 71.600   | -0.042235     | -3.5477   | 3.6347    | 1.2,6 |
| 3766     | 30.644      | 45.989   | 71.600   | -0.048641     | -4.0858   | 3.8903    | 1.2,6 |
| 3767     | 30.633      | 44.967   | 71.600   | -0.055611     | -4.6713   | 4.1458    | 1.2,6 |
| 3768     | 30.622      | 43.944   | 71.600   | -0.063211     | -5.3097   | 4.4014    | 1.2,6 |
| 3769     | 30.611      | 42.922   | 71.600   | -0.071506     | -6.0065   | 4.6570    | 1.2,6 |
| 3770     | 30.600      | 41.900   | 71.600   | -0.080562     | -6.7672   | 4.9125    | 1.2,6 |
| 3771     | 30.650      | 41.900   | 71.600   | -0.080557     | -6.7668   | 4.9124    | 1.2,6 |
| 3772     | 31.675      | 41.890   | 71.600   | -0.080536     | -6.7651   | 4.9118    | 1.2,6 |
| 3773     | 32.700      | 41.880   | 71.600   | -0.080516     | -6.7633   | 4.9113    | 1.2,6 |
| 3774     | 33.725      | 41.870   | 71.600   | -0.080496     | -6.7616   | 4.9107    | 1.2,6 |
| 3775     | 34.750      | 41.860   | 71.600   | -0.080475     | -6.7599   | 4.9102    | 1.2,6 |
| 3776     | 35.775      | 41.850   | 71.600   | -0.080455     | -6.7582   | 4.9096    | 1.2,6 |
| 3777     | 36.800      | 41.840   | 71.600   | -0.080435     | -6.7565   | 4.9091    | 1.2,6 |
| 3778     | 37.825      | 41.830   | 71.600   | -0.080414     | -6.7548   | 4.9085    | 1.2,6 |
| 3779     | 38.850      | 41.820   | 71.600   | -0.080394     | -6.7531   | 4.9080    | 1.2,6 |
| 3780     | 39.875      | 41.810   | 71.600   | -0.080374     | -6.7514   | 4.9074    | 1.2,6 |
| 3781     | 40.900      | 41.800   | 71.600   | -0.080353     | -6.7497   | 4.9069    | 1.2,6 |
| 3782     | 41.000      | 41.800   | 71.600   | -0.080342     | -6.7487   | 4.9066    | 1.2,6 |
| 3783     | 41.013      | 42.763   | 71.600   | -0.071810     | -6.0321   | 4.6659    | 1.2,6 |
| 3784     | 41.025      | 43.725   | 71.600   | -0.063956     | -5.3723   | 4.4253    | 1.2,6 |
| 3785     | 41.038      | 44.688   | 71.600   | -0.056723     | -4.7647   | 4.1847    | 1.2,6 |
| 3786     | 41.050      | 45.650   | 71.600   | -0.050058     | -4.2048   | 3.9440    | 1.2,6 |
| 3787     | 41.063      | 46.612   | 71.600   | -0.043905     | -3.6880   | 3.7034    | 1.2,6 |
| 3788     | 41.075      | 47.575   | 71.600   | -0.038209     | -3.2096   | 3.4627    | 1.2,6 |
| 3789     | 41.087      | 48.538   | 71.600   | -0.032916     | -2.7649   | 3.2221    | 1.2,6 |
| 3790     | 41.100      | 49.500   | 71.600   | -0.027971     | -2.3496   | 2.9814    | 1.2,6 |
| 3791     | 41.112      | 50.462   | 71.600   | -0.023319     | -1.9588   | 2.7408    | 1.2,6 |
| 3792     | 41.125      | 51.425   | 71.600   | -0.018905     | -1.5880   | 2.5001    | 1.2,6 |
| 3793     | 41.138      | 52.388   | 71.600   | -0.014674     | -1.2326   | 2.2595    | 1.2,6 |
| 3794     | 41.150      | 53.350   | 71.600   | -0.010571     | -0.88800  | 2.0189    | 1.2,6 |
| 3795     | 41.163      | 54.313   | 71.600   | -0.0065425    | -0.54957  | 1.7782    | 1.2,6 |
| 3796     | 41.175      | 55.275   | 71.600   | -0.0025323    | -0.21271  | 1.5376    | 1.2,6 |
| 3797     | 41.188      | 56.237   | 71.600   | 0.0           | 0.0       | 1.2969    | 1.2,6 |
| 3798     | 41.200      | 57.200   | 71.600   | 0.0           | 0.0       | 1.0563    | 1.2,6 |
| 3799     | 58.700      | 19.400   | 77.000   | 0.0           | 0.0       | 0.73434   | 1.2,6 |
| 3800     | 58.725      | 20.375   | 77.000   | 0.0           | 0.0       | 0.86794   | 1.2,6 |
| 3801     | 58.750      | 21.350   | 77.000   | 0.0           | 0.0       | 0.99242   | 1.2,6 |
| 3802     | 58.775      | 22.325   | 77.000   | 0.0           | 0.0       | 1.1070    | 1.2,6 |
| 3803     | 58.800      | 23.300   | 77.000   | 0.0           | 0.0       | 1.2109    | 1.2,6 |
| 3804     | 58.825      | 24.275   | 77.000   | 0.0           | 0.0       | 1.3033    | 1.2,6 |
| 3805     | 58.850      | 25.250   | 77.000   | 0.0           | 0.0       | 1.3834    | 1.2,6 |
| 3806     | 58.875      | 26.225   | 77.000   | -0.087097     | 0.024707  | 1.4506    | 1.2,6 |
| 3807     | 58.900      | 27.200   | 77.000   | -0.16202      | 0.035891  | 1.5042    | 1.2,6 |
| 3808     | 58.925      | 28.175   | 77.000   | -0.21858      | 0.034876  | 1.5437    | 1.2,6 |
| 3809     | 58.950      | 29.150   | 77.000   | -0.25503      | 0.024940  | 1.5686    | 1.2,6 |
| 3810     | 58.975      | 30.125   | 77.000   | -0.27015      | 0.0097851 | 1.5786    | 1.2,6 |
| 3811     | 59.000      | 31.100   | 77.000   | -0.26724      | 0.0031440 | 1.5765    | 1.2,6 |
| 3812     | 59.025      | 32.075   | 77.000   | -0.26250      | 0.0030882 | 1.5731    | 1.2,6 |
| 3813     | 59.050      | 33.050   | 77.000   | -0.25776      | 0.0030324 | 1.5697    | 1.2,6 |
| 3814     | 59.075      | 34.025   | 77.000   | -0.25302      | 0.0029767 | 1.5663    | 1.2,6 |
| 3815     | 59.100      | 35.000   | 77.000   | -0.24828      | 0.0029209 | 1.5629    | 1.2,6 |
| 3816     | 59.150      | 35.000   | 77.000   | -0.23075      | 0.0027147 | 1.5504    | 1.2,6 |
| 3817     | 60.117      | 35.000   | 77.000   | 0.0           | 0.0       | 1.3088    | 1.2,6 |
| 3818     | 61.083      | 35.000   | 77.000   | 0.0           | 0.0       | 1.0671    | 1.2,6 |
| 3819     | 62.050      | 35.000   | 77.000   | 0.0           | 0.0       | 0.82547   | 1.2,6 |
| 3820     | 63.017      | 35.000   | 77.000   | 0.0           | 0.0       | 0.58382   | 1.2,6 |
| 3821     | 63.983      | 35.000   | 77.000   | 0.0           | 0.0       | 0.34217   | 1.2,6 |
| 3822     | 64.950      | 35.000   | 77.000   | 0.0           | 0.0       | 0.10052   | 1.2,6 |
| 3823     | 65.000      | 35.000   | 77.000   | 0.0           | 0.0       | 0.088025  | 1.2,6 |
| 3824     | 64.990      | 33.990   | 77.000   | 0.0           | 0.0       | 0.087554  | 1.2,6 |
| 3825     | 64.980      | 32.980   | 77.000   | 0.0           | 0.0       | 0.087084  | 1.2,6 |
| 3826     | 64.970      | 31.970   | 77.000   | 0.0           | 0.0       | 0.086613  | 1.2,6 |
| 3827     | 64.960      | 30.960   | 77.000   | 0.0           | 0.0       | 0.086143  | 1.2,6 |
| 3828     | 64.950      | 29.950   | 77.000   | 0.0           | 0.0       | 0.084283  | 1.2,6 |
| 3829     | 64.940      | 28.940   | 77.000   | 0.0           | 0.0       | 0.072300  | 1.2,6 |
| 3830     | 64.930      | 27.930   | 77.000   | 0.0           | 0.0       | 0.048740  | 1.2,6 |
| 3831     | 64.920      | 26.920   | 77.000   | 0.0           | 0.0       | 0.013751  | 1.2,6 |
| 3832     | 64.910      | 25.910   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3833     | 64.900      | 24.900   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3834     | 64.950      | 24.900   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3835     | 65.450      | 24.600   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3836     | 65.950      | 24.300   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3837     | 66.000      | 24.300   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3838     | 65.940      | 23.240   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3839     | 65.880      | 22.180   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3840     | 65.820      | 21.120   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3841     | 65.760      | 20.060   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3842     | 65.700      | 19.000   | 77.000   | 0.0           | 0.0       | 0.0       | 1.2,6 |
| 3843     | 58.750      | 19.400   | 77.000   | 0.0           | 0.0       | 0.72421   | 1.2,6 |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |
|               |                     |         |

| Line No. | Coordinates |          |          | Displacements |           |           |
|----------|-------------|----------|----------|---------------|-----------|-----------|
|          | x<br>[m]    | y<br>[m] | z<br>[m] | x<br>[mm]     | y<br>[mm] | z<br>[mm] |
| 3844     | 59.736      | 19.343   | 77.000   | 0.0           | 0.0       | 0.51430   |
| 3845     | 60.721      | 19.286   | 77.000   | 0.0           | 0.0       | 0.30119   |
| 3846     | 61.707      | 19.229   | 77.000   | 0.0           | 0.0       | 0.085230  |
| 3847     | 62.693      | 19.171   | 77.000   | 0.0           | 0.0       | 0.0       |
| 3848     | 63.679      | 19.114   | 77.000   | 0.0           | 0.0       | 0.0       |
| 3849     | 64.664      | 19.057   | 77.000   | 0.0           | 0.0       | 0.0       |
| 3850     | 65.650      | 19.000   | 77.000   | 0.0           | 0.0       | 0.0       |

1 - Data point coincident with displacement data. Its displacement has been added to those calculated by Xdisp.  
2 - Data point coincident with horizontal movement calculation point for a specific building. Its displacement has been added before performing building damage calculations.  
6 - Data point coincident with vertical movement calculation point for a specific building. Its displacement has been added before performing building damage calculations.

## Vertical Ground Movement Curves

**Curve Name:** Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b))  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Settlement / wall depth or max. excavation depth (z) (%)]  
[0.000,0.000,0.039] [0.100,0.000,0.049] [0.200,0.000,0.056] [0.300,0.000,0.062] [0.400,0.000,0.067] [0.500,0.000,0.070] [0.600,0.000,0.072] [0.700,0.000,0.073] [0.800,0.000,0.073] [0.900,0.000,0.072] [1.000,0.000,0.070] [1.100,0.000,0.068] [1.200,0.000,0.065] [1.300,0.000,0.061] [1.400,0.000,0.058] [1.500,0.000,0.054] [1.600,0.000,0.050] [1.700,0.000,0.046] [1.800,0.000,0.042] [1.900,0.000,0.038] [2.000,0.000,0.034] [2.100,0.000,0.030] [2.200,0.000,0.027] [2.300,0.000,0.023] [2.400,0.000,0.020] [2.500,0.000,0.017] [2.600,0.000,0.014] [2.700,0.000,0.012] [2.800,0.000,0.010] [2.900,0.000,0.008] [3.000,0.000,0.007] [3.100,0.000,0.005] [3.200,0.000,0.004] [3.300,0.000,0.004] [3.400,0.000,0.003] [3.500,0.000,0.002] [3.600,0.000,0.002] [3.700,0.000,0.002] [3.800,0.000,0.001] [3.900,0.000,0.001] [4.000,0.000,0.000]  
**Curve Fitting Method:** Polynomial  
**x Order:** 4  
**y Order:** 0  
**Polynomial:** z = -2.6455E-3x<sup>4</sup> + 2.8495E-2x<sup>3</sup> - 1.0051E-1x<sup>2</sup> + 1.0569E-1x + 3.8990E-2  
**Coeff. of Determination:** 9.9991E-1

## Horizontal Ground Movement Curves

**Curve Name:** Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a))  
**Coordinates:** [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Horizontal movement / wall depth or max. excavation depth (z) (%)]  
[0.000,0.000,0.150] [4.000,0.000,0.000]  
**Curve Fitting Method:** Polynomial  
**x Order:** 1  
**y Order:** 0  
**Polynomial:** z = -3.75E-2x + 1.50E-1  
**Coeff. of Determination:** 1.00

## Polygonal Excavations

**Excavation Name:** Deep Excavation  
**Surface level [m]:** 72.600  
**Contribution:** Positive  
**Enabled:** Yes  
**Surface movement curves which are selected are applied between surface and [m]:** 65.800

| Corner | x<br>[m] | y<br>[m] | Base Level<br>[m] | Stiffened | Previous Side |        | Next Side |     |
|--------|----------|----------|-------------------|-----------|---------------|--------|-----------|-----|
|        |          |          |                   |           | d             | p1     | p2*       | d   |
| 1      | 26.200   | 30.800   | 65.800            | Yes       | 0.0           | 67.000 | 25.000    | 0.0 |
| 2      | 26.400   | 39.400   | 65.800            | Yes       | 0.0           | 67.000 | 25.000    | 0.0 |
| 3      | 43.200   | 39.200   | 65.800            | Yes       | 0.0           | 67.000 | 25.000    | 0.0 |
| 4      | 43.100   | 30.700   | 65.800            | Yes       | 0.0           | 67.000 | 25.000    | 0.0 |

| Side | Corner 1 |          | Corner 2 |          | Ground Movement Curve                                                             |                                                                                   |
|------|----------|----------|----------|----------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|      | x<br>[m] | y<br>[m] | x<br>[m] | y<br>[m] | Vertical                                                                          | Horizontal                                                                        |
| 1    | 26.200   | 30.800   | 26.400   | 39.400   | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 2    | 26.400   | 39.400   | 43.200   | 39.200   | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 3    | 43.200   | 39.200   | 43.100   | 30.700   | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 4    | 43.100   | 30.700   | 26.200   | 30.800   | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |

## Damage Category Strains

| Name                  | 0 (Negligible)  | 1 (Very Slight) | 2 (Slight)   | 3 (Moderate) |
|-----------------------|-----------------|-----------------|--------------|--------------|
|                       | to              | to              | to           | to           |
| Burland Strain Limits | 1 (Very Slight) | 2 (Slight)      | 3 (Moderate) | 4 (Severe)   |
|                       | 0.0             | 500.00E-6       | 750.00E-6    | 0.0015000    |

## Specific Structures - Geometry

| Structure Name               | Sub-Structure Name | Displacement Line | Start Distance Along Line | End Distance Along Line | Vertical Offsets from Line for Vertical Movement Calculations | Vertical Displacement Along Limit Sensitivity | Damage Category Strains | Poisson's Ratio | E/G    |
|------------------------------|--------------------|-------------------|---------------------------|-------------------------|---------------------------------------------------------------|-----------------------------------------------|-------------------------|-----------------|--------|
|                              |                    |                   |                           |                         |                                                               |                                               |                         |                 |        |
| 24 Netherhall Gardens        | Front              | Line 1            | 0.00000                   | 9.30000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 24 Netherhall Gardens        | Side               | Line 2            | 0.00000                   | 7.10000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 24 Netherhall Gardens        | Rear Side          | Line 3            | 0.00000                   | 5.00000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 24 Netherhall Gardens        | Rear               | Line 4            | 0.00000                   | 9.80000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 28 Netherhall Gardens        | Front North        | Line 5            | 0.00000                   | 6.00000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 28 Netherhall Gardens        | Front South        | Line 6            | 0.00000                   | 9.15000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 28 Netherhall Gardens        | Side               | Line 7            | 0.00000                   | 10.20000                | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| 28 Netherhall Gardens        | Rear               | Line 8            | 0.00000                   | 15.30000                | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures West         |                    | Line 9            | 0.00000                   | 15.55000                | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures North        |                    | Line 10           | 0.00000                   | 5.70000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures East - North |                    | Line 11           | 0.00000                   | 10.00000                | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures East - Mid   |                    | Line 12           | 0.00000                   | 1.10000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures East - South |                    | Line 13           | 0.00000                   | 5.25000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |
| Rear Structures South        |                    | Line 14           | 0.00000                   | 6.85000                 | 0.0                                                           | 0.10000                                       | Burland Strain Limits   | 0.20000         | 2.6000 |

## Specific Structures - Bending Parameters

| Structure Name | Sub-Structure Name | Height | Default Properties | Hogging            |                     | Sagging            |                     |
|----------------|--------------------|--------|--------------------|--------------------|---------------------|--------------------|---------------------|
|                |                    |        |                    | 2nd Moment of Area | Distance of Bending | 2nd Moment of Area | Distance of Bending |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.   | Sheet No.   | Rev.    |
|-----------|-------------|---------|
|           |             |         |
| Drg. Ref. |             |         |
|           |             |         |
| Made by   | Date        | Checked |
| MC        | 15-Dec-2015 |         |

|                              |             |            | (per unit width)  | Strain from N.A. | from Edge of Beam in Tension | (per unit width)  | Strain from N.A. | from Edge of Beam in Tension |
|------------------------------|-------------|------------|-------------------|------------------|------------------------------|-------------------|------------------|------------------------------|
| 24 Netherhall Gardens        | Front       | [m]        | [m <sup>3</sup> ] | [m]              | [m]                          | [m <sup>3</sup> ] | [m]              | [m]                          |
| 24 Netherhall Gardens        | Side        | 11.000 Yes | 443.67            | 11.000           | 11.000                       | 110.92            | 5.5000           | 5.5000                       |
| 24 Netherhall Gardens        | Rear Side   | 11.000 Yes | 443.67            | 11.000           | 11.000                       | 110.92            | 5.5000           | 5.5000                       |
| 24 Netherhall Gardens        | Rear        | 11.000 Yes | 443.67            | 11.000           | 11.000                       | 110.92            | 5.5000           | 5.5000                       |
| 28 Netherhall Gardens        | Front North | 11.000 Yes | 443.67            | 11.000           | 11.000                       | 110.92            | 5.5000           | 5.5000                       |
| 28 Netherhall Gardens        | Front South | 9.0000 Yes | 243.00            | 9.0000           | 9.0000                       | 60.750            | 4.5000           | 4.5000                       |
| 28 Netherhall Gardens        | Side        | 9.0000 Yes | 243.00            | 9.0000           | 9.0000                       | 60.750            | 4.5000           | 4.5000                       |
| 28 Netherhall Gardens        | Rear        | 9.0000 Yes | 243.00            | 9.0000           | 9.0000                       | 60.750            | 4.5000           | 4.5000                       |
| Rear Structures West         |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |
| Rear Structures North        |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |
| Rear Structures East - North |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |
| Rear Structures East - Mid   |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |
| Rear Structures East - South |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |
| Rear Structures South        |             | 4.0000 Yes | 21.333            | 4.0000           | 4.0000                       | 5.3333            | 2.0000           | 2.0000                       |

## Building Segment Combinations

| Structure Name                        | Sub-Structure Name | Vertical Offset from Line for Vertical Movement Calculations | Segment Start | Length | Curvature | Combined Segment |
|---------------------------------------|--------------------|--------------------------------------------------------------|---------------|--------|-----------|------------------|
|                                       |                    | [m]                                                          | [m]           | [m]    |           |                  |
| No structures have segments combined. |                    |                                                              |               |        |           |                  |

## Warnings

- 1 If an embedded wall excavation is assigned a 'surface' ground movement curve and if the 'allow movement calculation to level' option is checked for the excavation then displacements induced by it are calculated for points at the surface, and points below the surface to the level specified. Others are ignored. An example of such a combination, for which displacements will not be calculated is Excavation XP1/Side 1/Line 9/Vertical. This is an example only. There are 47 others.

## Displacement and Strain Results

| Type/No. |        | Coordinates |         |          | Displacements |      |      |                                        |                                               |     | Angle of Line to x Axis |
|----------|--------|-------------|---------|----------|---------------|------|------|----------------------------------------|-----------------------------------------------|-----|-------------------------|
| Name     | Dist.  | x           | y       | z        | x             | y    | z    | Horizontal displacement along the Line | Horizontal displacement perpendicular to Line |     |                         |
|          | [m]    | [m]         | [m]     | [m]      | [mm]          | [mm] | [mm] | [mm]                                   | [mm]                                          | [°] |                         |
| Grid 1   | Grid 1 | 0.00000     | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 2.00000     | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 4.00000     | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 6.00000     | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 8.00000     | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 10.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 12.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 14.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 16.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 18.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 20.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 22.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 24.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 26.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 28.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 30.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 32.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 34.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 36.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 38.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 40.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 42.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 44.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 46.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 48.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 50.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 52.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 54.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 56.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 58.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 60.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 62.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 64.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 66.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 68.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 70.00000    | 0.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 0.00000     | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 2.00000     | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 4.00000     | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 6.00000     | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 8.00000     | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 10.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 12.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 14.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 16.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 18.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 20.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 22.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 24.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 26.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 28.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 30.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 32.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 34.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 36.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 38.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 40.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 42.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 44.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 46.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 48.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 50.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 52.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 54.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 56.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 58.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 60.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 62.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 64.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 66.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 68.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 70.00000    | 2.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 0.00000     | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 2.00000     | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 4.00000     | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 6.00000     | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 8.00000     | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 10.00000    | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |
|          |        | 12.00000    | 4.00000 | 71.60000 | 0.0           | 0.0  | 0.0  | -                                      | -                                             | -   | *                       |



**GEA LIMITED**  
**(GEOTECHNICAL & ENV ASSOC) J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |          |            | Displacements |           |           | Angle of Line to x Axis |                         |
|----------|----------|-------------|----------|------------|---------------|-----------|-----------|-------------------------|-------------------------|
| Name     | Dist.    | x           | y        | z          | x             | y         | z         | Horizontal displacement | Horizontal displacement |
|          | 14.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 16.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 18.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 20.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 22.00000 | 4.00000     | 71.60000 | 0.0026702  | 0.017039      | 0.0072327 | 0.018410  | -                       | *                       |
|          | 24.00000 | 4.00000     | 71.60000 | 0.0061461  | 0.074870      | 0.018410  | 0.018410  | -                       | *                       |
|          | 26.00000 | 4.00000     | 71.60000 | 739.95E-6  | 0.099154      | 0.022798  | 0.022798  | -                       | *                       |
|          | 28.00000 | 4.00000     | 71.60000 | 912.23E-6  | 0.15417       | 0.035196  | 0.035196  | -                       | *                       |
|          | 30.00000 | 4.00000     | 71.60000 | 938.49E-6  | 0.15860       | 0.035961  | 0.035961  | -                       | *                       |
|          | 32.00000 | 4.00000     | 71.60000 | 964.75E-6  | 0.16304       | 0.036721  | 0.036721  | -                       | *                       |
|          | 34.00000 | 4.00000     | 71.60000 | 991.01E-6  | 0.16748       | 0.037478  | 0.037478  | -                       | *                       |
|          | 36.00000 | 4.00000     | 71.60000 | 0.0010173  | 0.17192       | 0.038231  | 0.038231  | -                       | *                       |
|          | 38.00000 | 4.00000     | 71.60000 | 0.0010435  | 0.17636       | 0.038980  | 0.038980  | -                       | *                       |
|          | 40.00000 | 4.00000     | 71.60000 | 0.0010698  | 0.18079       | 0.039724  | 0.039724  | -                       | *                       |
|          | 42.00000 | 4.00000     | 71.60000 | 0.0010960  | 0.18523       | 0.040465  | 0.040465  | -                       | *                       |
|          | 44.00000 | 4.00000     | 71.60000 | -0.0040588 | 0.12041       | 0.026436  | 0.026436  | -                       | *                       |
|          | 46.00000 | 4.00000     | 71.60000 | -0.0089788 | 0.082667      | 0.019854  | 0.019854  | -                       | *                       |
|          | 48.00000 | 4.00000     | 71.60000 | -0.0023094 | 0.012584      | 0.0063265 | 0.0063265 | -                       | *                       |
|          | 50.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 52.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 54.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 56.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 58.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 60.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 62.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 64.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 66.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 68.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 70.00000 | 4.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 0.00000  | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 2.00000  | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 4.00000  | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 6.00000  | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 8.00000  | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 10.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 12.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 14.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 16.00000 | 6.00000     | 71.60000 | 0.031865   | 0.077475      | 0.019442  | 0.019442  | -                       | *                       |
|          | 18.00000 | 6.00000     | 71.60000 | 0.075774   | 0.22917       | 0.043367  | 0.043367  | -                       | *                       |
|          | 20.00000 | 6.00000     | 71.60000 | 0.091103   | 0.36441       | 0.058627  | 0.058627  | -                       | *                       |
|          | 22.00000 | 6.00000     | 71.60000 | 0.080533   | 0.47553       | 0.071277  | 0.071277  | -                       | *                       |
|          | 24.00000 | 6.00000     | 71.60000 | 0.049223   | 0.55487       | 0.079341  | 0.079341  | -                       | *                       |
|          | 26.00000 | 6.00000     | 71.60000 | 0.0048042  | 0.59572       | 0.083804  | 0.083804  | -                       | *                       |
|          | 28.00000 | 6.00000     | 71.60000 | 0.0053499  | 0.90414       | 0.12700   | 0.12700   | -                       | *                       |
|          | 30.00000 | 6.00000     | 71.60000 | 0.0053762  | 0.90858       | 0.12744   | 0.12744   | -                       | *                       |
|          | 32.00000 | 6.00000     | 71.60000 | 0.0054025  | 0.91302       | 0.12788   | 0.12788   | -                       | *                       |
|          | 34.00000 | 6.00000     | 71.60000 | 0.0054287  | 0.91745       | 0.12832   | 0.12832   | -                       | *                       |
|          | 36.00000 | 6.00000     | 71.60000 | 0.0054550  | 0.92189       | 0.12876   | 0.12876   | -                       | *                       |
|          | 38.00000 | 6.00000     | 71.60000 | 0.0054812  | 0.92633       | 0.12920   | 0.12920   | -                       | *                       |
|          | 40.00000 | 6.00000     | 71.60000 | 0.0055075  | 0.93077       | 0.12964   | 0.12964   | -                       | *                       |
|          | 42.00000 | 6.00000     | 71.60000 | 0.0055338  | 0.93520       | 0.13008   | 0.13008   | -                       | *                       |
|          | 44.00000 | 6.00000     | 71.60000 | -0.022453  | 0.61621       | 0.085865  | 0.085865  | -                       | *                       |
|          | 46.00000 | 6.00000     | 71.60000 | -0.065691  | 0.55950       | 0.079945  | 0.079945  | -                       | *                       |
|          | 48.00000 | 6.00000     | 71.60000 | -0.092441  | 0.46598       | 0.070519  | 0.070519  | -                       | *                       |
|          | 50.00000 | 6.00000     | 71.60000 | -0.095817  | 0.34300       | 0.057457  | 0.057457  | -                       | *                       |
|          | 52.00000 | 6.00000     | 71.60000 | -0.071524  | 0.19850       | 0.039292  | 0.039292  | -                       | *                       |
|          | 54.00000 | 6.00000     | 71.60000 | -0.017725  | 0.040165      | 0.012154  | 0.012154  | -                       | *                       |
|          | 56.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 58.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 60.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 62.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 64.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 66.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 68.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 70.00000 | 6.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 0.00000  | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 2.00000  | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 4.00000  | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 6.00000  | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 8.00000  | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 10.00000 | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 12.00000 | 8.00000     | 71.60000 | 0.036756   | 0.059017      | 0.016642  | 0.016642  | -                       | *                       |
|          | 14.00000 | 8.00000     | 71.60000 | 0.13284    | 0.24825       | 0.047523  | 0.047523  | -                       | *                       |
|          | 16.00000 | 8.00000     | 71.60000 | 0.19562    | 0.43727       | 0.068980  | 0.068980  | -                       | *                       |
|          | 18.00000 | 8.00000     | 71.60000 | 0.22269    | 0.61919       | 0.087540  | 0.087540  | -                       | *                       |
|          | 20.00000 | 8.00000     | 71.60000 | 0.21358    | 0.78543       | 0.10552   | 0.10552   | -                       | *                       |
|          | 22.00000 | 8.00000     | 71.60000 | 0.17061    | 0.92619       | 0.12234   | 0.12234   | -                       | *                       |
|          | 24.00000 | 8.00000     | 71.60000 | 0.099523   | 1.0314        | 0.13593   | 0.13593   | -                       | *                       |
|          | 26.00000 | 8.00000     | 71.60000 | 0.0095793  | 1.0920        | 0.14402   | 0.14402   | -                       | *                       |
|          | 28.00000 | 8.00000     | 71.60000 | 0.0097877  | 1.6541        | 0.21829   | 0.21829   | -                       | *                       |
|          | 30.00000 | 8.00000     | 71.60000 | 0.0098139  | 1.6586        | 0.21902   | 0.21902   | -                       | *                       |
|          | 32.00000 | 8.00000     | 71.60000 | 0.0098402  | 1.6630        | 0.21975   | 0.21975   | -                       | *                       |
|          | 34.00000 | 8.00000     | 71.60000 | 0.0098664  | 1.6674        | 0.22049   | 0.22049   | -                       | *                       |
|          | 36.00000 | 8.00000     | 71.60000 | 0.0098927  | 1.6719        | 0.22123   | 0.22123   | -                       | *                       |
|          | 38.00000 | 8.00000     | 71.60000 | 0.0099190  | 1.6763        | 0.22198   | 0.22198   | -                       | *                       |
|          | 40.00000 | 8.00000     | 71.60000 | 0.0099452  | 1.6807        | 0.22272   | 0.22272   | -                       | *                       |
|          | 42.00000 | 8.00000     | 71.60000 | 0.0099715  | 1.6852        | 0.22347   | 0.22347   | -                       | *                       |
|          | 44.00000 | 8.00000     | 71.60000 | -0.044039  | 1.1108        | 0.14731   | 0.14731   | -                       | *                       |
|          | 46.00000 | 8.00000     | 71.60000 | -0.13175   | 1.0313        | 0.13652   | 0.13652   | -                       | *                       |
|          | 48.00000 | 8.00000     | 71.60000 | -0.19635   | 0.90960       | 0.12077   | 0.12077   | -                       | *                       |
|          | 50.00000 | 8.00000     | 71.60000 | -0.22966   | 0.75554       | 0.10257   | 0.10257   | -                       | *                       |
|          | 52.00000 | 8.00000     | 71.60000 | -0.22719   | 0.57947       | 0.083799  | 0.083799  | -                       | *                       |
|          | 54.00000 | 8.00000     | 71.60000 | -0.18777   | 0.39105       | 0.064394  | 0.064394  | -                       | *                       |
|          | 56.00000 | 8.00000     | 71.60000 | -0.11277   | 0.19844       | 0.040893  | 0.040893  | -                       | *                       |
|          | 58.00000 | 8.00000     | 71.60000 | -0.0052333 | 0.0079729     | 0.0051521 | 0.0051521 | -                       | *                       |
|          | 60.00000 | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 62.00000 | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 64.00000 | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |
|          | 66.00000 | 8.00000     | 71.60000 | 0.0        | 0.0           | 0.0       | 0.0       | -                       | *                       |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |       | Coordinates |          |          | Displacements |          |          | Angle of Line to x Axis |                         |
|----------|-------|-------------|----------|----------|---------------|----------|----------|-------------------------|-------------------------|
| Name     | Dist. | x           | y        | z        | x             | y        | z        | Horizontal displacement | Horizontal displacement |
|          |       | 8.00000     | 12.00000 | 71.60000 | 0.13507       | 0.13952  | 0.035309 | -                       | -                       |
|          |       | 10.00000    | 12.00000 | 71.60000 | 0.29942       | 0.34747  | 0.064654 | -                       | -                       |
|          |       | 12.00000    | 12.00000 | 71.60000 | 0.43346       | 0.57388  | 0.093154 | -                       | -                       |
|          |       | 14.00000    | 12.00000 | 71.60000 | 0.52978       | 0.81638  | 0.13183  | -                       | -                       |
|          |       | 16.00000    | 12.00000 | 71.60000 | 0.58052       | 1.0700   | 0.38747  | -                       | -                       |
|          |       | 18.00000    | 12.00000 | 71.60000 | 0.57846       | 1.3262   | 0.67215  | -                       | -                       |
|          |       | 20.00000    | 12.00000 | 71.60000 | 0.51864       | 1.5726   | 0.92179  | -                       | -                       |
|          |       | 22.00000    | 12.00000 | 71.60000 | 0.40058       | 1.7931   | 1.1227   | -                       | -                       |
|          |       | 24.00000    | 12.00000 | 71.60000 | 0.23045       | 1.9693   | 1.2609   | -                       | -                       |
|          |       | 26.00000    | 12.00000 | 71.60000 | 0.022167      | 2.0831   | 1.3251   | -                       | -                       |
|          |       | 28.00000    | 12.00000 | 71.60000 | 0.018663      | 3.1541   | 1.5737   | -                       | -                       |
|          |       | 30.00000    | 12.00000 | 71.60000 | 0.018689      | 3.1585   | 1.5790   | -                       | -                       |
|          |       | 32.00000    | 12.00000 | 71.60000 | 0.018716      | 3.1629   | 1.5844   | -                       | -                       |
|          |       | 34.00000    | 12.00000 | 71.60000 | 0.018742      | 3.1674   | 1.5898   | -                       | -                       |
|          |       | 36.00000    | 12.00000 | 71.60000 | 0.018768      | 3.1718   | 1.5952   | -                       | -                       |
|          |       | 38.00000    | 12.00000 | 71.60000 | 0.018794      | 3.1763   | 1.6006   | -                       | -                       |
|          |       | 40.00000    | 12.00000 | 71.60000 | 0.018821      | 3.1807   | 1.6060   | -                       | -                       |
|          |       | 42.00000    | 12.00000 | 71.60000 | 0.018847      | 3.1851   | 1.6114   | -                       | -                       |
|          |       | 44.00000    | 12.00000 | 71.60000 | -0.10080      | 2.0945   | 1.3542   | -                       | -                       |
|          |       | 46.00000    | 12.00000 | 71.60000 | -0.30281      | 1.9526   | 1.2610   | -                       | -                       |
|          |       | 48.00000    | 12.00000 | 71.60000 | -0.45959      | 1.7540   | 1.0963   | -                       | -                       |
|          |       | 50.00000    | 12.00000 | 71.60000 | -0.55987      | 1.5173   | 0.87328  | -                       | -                       |
|          |       | 52.00000    | 12.00000 | 71.60000 | -0.60014      | 1.2610   | 0.60625  | -                       | -                       |
|          |       | 54.00000    | 12.00000 | 71.60000 | -0.58298      | 1.0002   | 0.30868  | -                       | -                       |
|          |       | 56.00000    | 12.00000 | 71.60000 | -0.51466      | 0.74606  | 0.12010  | -                       | -                       |
|          |       | 58.00000    | 12.00000 | 71.60000 | -0.40308      | 0.50588  | 0.084521 | -                       | -                       |
|          |       | 60.00000    | 12.00000 | 71.60000 | -0.25625      | 0.28354  | 0.056947 | -                       | -                       |
|          |       | 62.00000    | 12.00000 | 71.60000 | -0.082430     | 0.081557 | 0.024068 | -                       | -                       |
|          |       | 64.00000    | 12.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 66.00000    | 12.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 68.00000    | 12.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 70.00000    | 12.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 0.00000     | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 2.00000     | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 4.00000     | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 6.00000     | 14.00000 | 71.60000 | 0.13649       | 0.11352  | 0.033235 | -                       | -                       |
|          |       | 8.00000     | 14.00000 | 71.60000 | 0.33490       | 0.30914  | 0.063862 | -                       | -                       |
|          |       | 10.00000    | 14.00000 | 71.60000 | 0.50402       | 0.52269  | 0.094068 | -                       | -                       |
|          |       | 12.00000    | 14.00000 | 71.60000 | 0.64898       | 0.76781  | 0.19232  | -                       | -                       |
|          |       | 14.00000    | 14.00000 | 71.60000 | 0.75305       | 1.0370   | 0.57216  | -                       | -                       |
|          |       | 16.00000    | 14.00000 | 71.60000 | 0.80526       | 1.3263   | 0.94417  | -                       | -                       |
|          |       | 18.00000    | 14.00000 | 71.60000 | 0.79428       | 1.6273   | 1.2967   | -                       | -                       |
|          |       | 20.00000    | 14.00000 | 71.60000 | 0.71062       | 1.9255   | 1.6130   | -                       | -                       |
|          |       | 22.00000    | 14.00000 | 71.60000 | 0.55010       | 2.2004   | 1.8732   | -                       | -                       |
|          |       | 24.00000    | 14.00000 | 71.60000 | 0.31777       | 2.4266   | 2.0576   | -                       | -                       |
|          |       | 26.00000    | 14.00000 | 71.60000 | 0.030699      | 2.5787   | 2.1492   | -                       | -                       |
|          |       | 28.00000    | 14.00000 | 71.60000 | 0.023101      | 3.9040   | 2.5651   | -                       | -                       |
|          |       | 30.00000    | 14.00000 | 71.60000 | 0.023127      | 3.9085   | 2.5714   | -                       | -                       |
|          |       | 32.00000    | 14.00000 | 71.60000 | 0.023153      | 3.9129   | 2.5778   | -                       | -                       |
|          |       | 34.00000    | 14.00000 | 71.60000 | 0.023180      | 3.9173   | 2.5842   | -                       | -                       |
|          |       | 36.00000    | 14.00000 | 71.60000 | 0.023206      | 3.9218   | 2.5906   | -                       | -                       |
|          |       | 38.00000    | 14.00000 | 71.60000 | 0.023232      | 3.9262   | 2.5970   | -                       | -                       |
|          |       | 40.00000    | 14.00000 | 71.60000 | 0.023258      | 3.9307   | 2.6034   | -                       | -                       |
|          |       | 42.00000    | 14.00000 | 71.60000 | 0.023285      | 3.9351   | 2.6098   | -                       | -                       |
|          |       | 44.00000    | 14.00000 | 71.60000 | -0.13917      | 2.5823   | 2.1794   | -                       | -                       |
|          |       | 46.00000    | 14.00000 | 71.60000 | -0.41611      | 2.3962   | 2.0507   | -                       | -                       |
|          |       | 48.00000    | 14.00000 | 71.60000 | -0.62900      | 2.1437   | 1.8335   | -                       | -                       |
|          |       | 50.00000    | 14.00000 | 71.60000 | -0.76507      | 1.8517   | 1.5465   | -                       | -                       |
|          |       | 52.00000    | 14.00000 | 71.60000 | -0.82322      | 1.5447   | 1.2105   | -                       | -                       |
|          |       | 54.00000    | 14.00000 | 71.60000 | -0.81039      | 1.2416   | 0.84480  | -                       | -                       |
|          |       | 56.00000    | 14.00000 | 71.60000 | -0.73750      | 0.95475  | 0.46493  | -                       | -                       |
|          |       | 58.00000    | 14.00000 | 71.60000 | -0.61633      | 0.69078  | 0.12572  | -                       | -                       |
|          |       | 60.00000    | 14.00000 | 71.60000 | -0.46354      | 0.45806  | 0.084715 | -                       | -                       |
|          |       | 62.00000    | 14.00000 | 71.60000 | -0.28759      | 0.25411  | 0.057332 | -                       | -                       |
|          |       | 64.00000    | 14.00000 | 71.60000 | -0.069191     | 0.055287 | 0.019810 | -                       | -                       |
|          |       | 66.00000    | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 68.00000    | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 70.00000    | 14.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 0.00000     | 16.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 2.00000     | 16.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       | -                       |
|          |       | 4.00000     | 16.00000 | 71.60000 | 0.086330      | 0.057553 | 0.022402 | -                       | -                       |
|          |       | 6.00000     | 16.00000 | 71.60000 | 0.34200       | 0.25058  | 0.061612 | -                       | -                       |
|          |       | 8.00000     | 16.00000 | 71.60000 | 0.55865       | 0.45428  | 0.093223 | -                       | -                       |
|          |       | 10.00000    | 16.00000 | 71.60000 | 0.72915       | 0.66614  | 0.20431  | -                       | -                       |
|          |       | 12.00000    | 16.00000 | 71.60000 | 0.87176       | 0.90860  | 0.63975  | -                       | -                       |
|          |       | 14.00000    | 16.00000 | 71.60000 | 0.99070       | 1.2018   | 1.0889   | -                       | -                       |
|          |       | 16.00000    | 16.00000 | 71.60000 | 1.0525        | 1.5271   | 1.5392   | -                       | -                       |
|          |       | 18.00000    | 16.00000 | 71.60000 | 1.0402        | 1.8774   | 1.9743   | -                       | -                       |
|          |       | 20.00000    | 16.00000 | 71.60000 | 1.0198        | 2.4344   | 2.3717   | -                       | -                       |
|          |       | 22.00000    | 16.00000 | 71.60000 | 0.85387       | 3.0089   | 2.7055   | -                       | -                       |
|          |       | 24.00000    | 16.00000 | 71.60000 | 0.51407       | 3.4583   | 2.9489   | -                       | -                       |
|          |       | 26.00000    | 16.00000 | 71.60000 | 0.050307      | 3.7227   | 3.0784   | -                       | -                       |
|          |       | 28.00000    | 16.00000 | 71.60000 | 0.031409      | 5.3080   | 3.7161   | -                       | -                       |
|          |       | 30.00000    | 16.00000 | 71.60000 | 0.031459      | 5.3166   | 3.7233   | -                       | -                       |
|          |       | 32.00000    | 16.00000 | 71.60000 | 0.031510      | 5.3252   | 3.7305   | -                       | -                       |
|          |       | 34.00000    | 16.00000 | 71.60000 | 0.031561      | 5.3338   | 3.7377   | -                       | -                       |
|          |       | 36.00000    | 16.00000 | 71.60000 | 0.031612      | 5.3424   | 3.7450   | -                       | -                       |
|          |       | 38.00000    | 16.00000 | 71.60000 | 0.031663      | 5.3510   | 3.7522   | -                       | -                       |
|          |       | 40.00000    | 16.00000 | 71.60000 | 0.031713      | 5.3596   | 3.7595   | -                       | -                       |
|          |       | 42.00000    | 16.00000 | 71.60000 | 0.031764      | 5.3682   | 3.7667   | -                       | -                       |
|          |       | 44.00000    | 16.00000 | 71.60000 | -0.22899      | 3.7402   | 3.1064   | -                       | -                       |
|          |       | 46.00000    | 16.00000 | 71.60000 | -0.67007      | 3.3966   | 2.9304   | -                       | -                       |
|          |       | 48.00000    | 16.00000 | 71.60000 | -0.96191      | 2.8857   | 2.6470   | -                       | -                       |
|          |       | 50.00000    | 16.00000 | 71.60000 | -1.0664       | 2.2718   | 2.2818   | -                       | -                       |
|          |       | 52.00000    | 16.00000 | 71.60000 | -1.0740       | 1.7739   | 1.8623   | -                       | -                       |
|          |       | 54.00000    | 16.00000 | 71.60000 | -1.0572       | 1.4258   | 1.4139   | -                       | -                       |
|          |       | 56.00000    | 16.00000 | 71.60000 | -0.97171      | 1.1073   | 0.95739  | -                       | -                       |
|          |       | 58.00000    | 16.00000 | 71.60000 | -0.84554      | 0.83419  | 0.50956  | -                       | -                       |
|          |       | 60.00000    | 16.00000 | 71.60000 | -0.70481      | 0.61306  | 0.12667  | -                       | -                       |
|          |       | 62.00000    | 16.00000 | 71.60000 | -0.51153      | 0.39786  | 0.084800 | -                       | -                       |
|          |       | 64.00000    | 16.00000 | 71.60000 | -0.27353      | 0.19239  | 0.052969 | -                       | -                       |
|          |       | 66.00000    | 16.00000 | 71.60000 | 0.0           | 0.0      | 0.0      | -                       |                         |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |       | Coordinates |          |          | Displacements |           |           | Angle of Line           |                         |           |
|----------|-------|-------------|----------|----------|---------------|-----------|-----------|-------------------------|-------------------------|-----------|
| Name     | Dist. | x           | y        | z        | x             | y         | z         | Horizontal displacement | Horizontal displacement | to x Axis |
|          |       | 2.00000     | 20.00000 | 71.60000 | 0.13624       | 0.060801  | 0.029987  | -                       | -                       | *         |
|          |       | 4.00000     | 20.00000 | 71.60000 | 0.47597       | 0.23155   | 0.073464  | -                       | -                       | *         |
|          |       | 6.00000     | 20.00000 | 71.60000 | 0.78633       | 0.42041   | 0.11697   | -                       | -                       | *         |
|          |       | 8.00000     | 20.00000 | 71.60000 | 1.0596        | 0.62880   | 0.45204   | -                       | -                       | *         |
|          |       | 10.00000    | 20.00000 | 71.60000 | 1.2860        | 0.85734   | 0.99841   | -                       | -                       | *         |
|          |       | 12.00000    | 20.00000 | 71.60000 | 1.4527        | 1.1049    | 1.5750    | -                       | -                       | *         |
|          |       | 14.00000    | 20.00000 | 71.60000 | 1.6394        | 1.4513    | 2.1623    | -                       | -                       | *         |
|          |       | 16.00000    | 20.00000 | 71.60000 | 2.0339        | 2.1536    | 2.7626    | -                       | -                       | *         |
|          |       | 18.00000    | 20.00000 | 71.60000 | 2.2866        | 3.0117    | 3.3844    | -                       | -                       | *         |
|          |       | 20.00000    | 20.00000 | 71.60000 | 2.2674        | 3.9496    | 3.9697    | -                       | -                       | *         |
|          |       | 22.00000    | 20.00000 | 71.60000 | 1.9023        | 4.8916    | 4.4814    | -                       | -                       | *         |
|          |       | 24.00000    | 20.00000 | 71.60000 | 1.1604        | 5.6967    | 4.8789    | -                       | -                       | *         |
|          |       | 26.00000    | 20.00000 | 71.60000 | 0.11463       | 6.1899    | 5.1222    | -                       | -                       | *         |
|          |       | 28.00000    | 20.00000 | 71.60000 | 0.049064      | 8.2918    | 6.3016    | -                       | -                       | *         |
|          |       | 30.00000    | 20.00000 | 71.60000 | 0.049119      | 8.3011    | 6.3093    | -                       | -                       | *         |
|          |       | 32.00000    | 20.00000 | 71.60000 | 0.049173      | 8.3103    | 6.3170    | -                       | -                       | *         |
|          |       | 34.00000    | 20.00000 | 71.60000 | 0.049228      | 8.3195    | 6.3248    | -                       | -                       | *         |
|          |       | 36.00000    | 20.00000 | 71.60000 | 0.049283      | 8.3288    | 6.3325    | -                       | -                       | *         |
|          |       | 38.00000    | 20.00000 | 71.60000 | 0.049337      | 8.3380    | 6.3402    | -                       | -                       | *         |
|          |       | 40.00000    | 20.00000 | 71.60000 | 0.049392      | 8.3473    | 6.3479    | -                       | -                       | *         |
|          |       | 42.00000    | 20.00000 | 71.60000 | 0.049447      | 8.3565    | 6.3556    | -                       | -                       | *         |
|          |       | 44.00000    | 20.00000 | 71.60000 | -0.51819      | 6.1607    | 5.1270    | -                       | -                       | *         |
|          |       | 46.00000    | 20.00000 | 71.60000 | -1.4965       | 5.5217    | 4.8178    | -                       | -                       | *         |
|          |       | 48.00000    | 20.00000 | 71.60000 | -2.1196       | 4.6286    | 4.3674    | -                       | -                       | *         |
|          |       | 50.00000    | 20.00000 | 71.60000 | -2.3586       | 3.6576    | 3.8173    | -                       | -                       | *         |
|          |       | 52.00000    | 20.00000 | 71.60000 | -2.2704       | 2.7296    | 3.2077    | -                       | -                       | *         |
|          |       | 54.00000    | 20.00000 | 71.60000 | -1.9597       | 1.9237    | 2.5875    | -                       | -                       | *         |
|          |       | 56.00000    | 20.00000 | 71.60000 | -1.5787       | 1.3094    | 1.9995    | -                       | -                       | *         |
|          |       | 58.00000    | 20.00000 | 71.60000 | -1.4539       | 1.0441    | 1.4036    | -                       | -                       | *         |
|          |       | 60.00000    | 20.00000 | 71.60000 | -1.2579       | 0.79642   | 0.82820   | -                       | -                       | *         |
|          |       | 62.00000    | 20.00000 | 71.60000 | -1.0058       | 0.56940   | 0.28843   | -                       | -                       | *         |
|          |       | 64.00000    | 20.00000 | 71.60000 | -0.70951      | 0.36324   | 0.10320   | -                       | -                       | *         |
|          |       | 66.00000    | 20.00000 | 71.60000 | -0.37849      | 0.17685   | 0.062981  | -                       | -                       | *         |
|          |       | 68.00000    | 20.00000 | 71.60000 | -0.019852     | 0.0085308 | 0.0078408 | -                       | -                       | *         |
|          |       | 70.00000    | 20.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |       | 0.00000     | 22.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |       | 2.00000     | 22.00000 | 71.60000 | 0.29828       | 0.10847   | 0.052324  | -                       | -                       | *         |
|          |       | 4.00000     | 22.00000 | 71.60000 | 0.66861       | 0.26503   | 0.093868  | -                       | -                       | *         |
|          |       | 6.00000     | 22.00000 | 71.60000 | 1.0137        | 0.44159   | 0.19678   | -                       | -                       | *         |
|          |       | 8.00000     | 22.00000 | 71.60000 | 1.3259        | 0.64110   | 0.76249   | -                       | -                       | *         |
|          |       | 10.00000    | 22.00000 | 71.60000 | 1.5951        | 0.86648   | 1.3803    | -                       | -                       | *         |
|          |       | 12.00000    | 22.00000 | 71.60000 | 1.8071        | 1.1199    | 2.0415    | -                       | -                       | *         |
|          |       | 14.00000    | 22.00000 | 71.60000 | 2.4010        | 1.7319    | 2.7209    | -                       | -                       | *         |
|          |       | 16.00000    | 22.00000 | 71.60000 | 2.8249        | 2.4372    | 3.3791    | -                       | -                       | *         |
|          |       | 18.00000    | 22.00000 | 71.60000 | 3.0856        | 3.3114    | 4.0293    | -                       | -                       | *         |
|          |       | 20.00000    | 22.00000 | 71.60000 | 3.1323        | 4.4458    | 4.7054    | -                       | -                       | *         |
|          |       | 22.00000    | 22.00000 | 71.60000 | 2.7133        | 5.6849    | 5.3090    | -                       | -                       | *         |
|          |       | 24.00000    | 22.00000 | 71.60000 | 1.7060        | 6.8240    | 5.7957    | -                       | -                       | *         |
|          |       | 26.00000    | 22.00000 | 71.60000 | 0.17140       | 7.5414    | 6.1178    | -                       | -                       | *         |
|          |       | 28.00000    | 22.00000 | 71.60000 | 0.058618      | 9.9065    | 7.5577    | -                       | -                       | *         |
|          |       | 30.00000    | 22.00000 | 71.60000 | 0.058677      | 9.9164    | 7.5647    | -                       | -                       | *         |
|          |       | 32.00000    | 22.00000 | 71.60000 | 0.058736      | 9.9263    | 7.5717    | -                       | -                       | *         |
|          |       | 34.00000    | 22.00000 | 71.60000 | 0.058794      | 9.9362    | 7.5787    | -                       | -                       | *         |
|          |       | 36.00000    | 22.00000 | 71.60000 | 0.058853      | 9.9462    | 7.5856    | -                       | -                       | *         |
|          |       | 38.00000    | 22.00000 | 71.60000 | 0.058912      | 9.9561    | 7.5926    | -                       | -                       | *         |
|          |       | 40.00000    | 22.00000 | 71.60000 | 0.058971      | 9.9661    | 7.5996    | -                       | -                       | *         |
|          |       | 42.00000    | 22.00000 | 71.60000 | 0.059030      | 9.9760    | 7.6065    | -                       | -                       | *         |
|          |       | 44.00000    | 22.00000 | 71.60000 | -0.77217      | 7.4643    | 6.0961    | -                       | -                       | *         |
|          |       | 46.00000    | 22.00000 | 71.60000 | -2.1779       | 6.5336    | 5.7014    | -                       | -                       | *         |
|          |       | 48.00000    | 22.00000 | 71.60000 | -2.9837       | 5.2975    | 5.1592    | -                       | -                       | *         |
|          |       | 50.00000    | 22.00000 | 71.60000 | -3.2184       | 4.0580    | 4.5171    | -                       | -                       | *         |
|          |       | 52.00000    | 22.00000 | 71.60000 | -3.0726       | 3.0035    | 3.8420    | -                       | -                       | *         |
|          |       | 54.00000    | 22.00000 | 71.60000 | -2.7944       | 2.2304    | 3.2127    | -                       | -                       | *         |
|          |       | 56.00000    | 22.00000 | 71.60000 | -2.2923       | 1.5460    | 2.5302    | -                       | -                       | *         |
|          |       | 58.00000    | 22.00000 | 71.60000 | -1.8017       | 1.0520    | 1.8423    | -                       | -                       | *         |
|          |       | 60.00000    | 22.00000 | 71.60000 | -1.5593       | 0.80269   | 1.1848    | -                       | -                       | *         |
|          |       | 62.00000    | 22.00000 | 71.60000 | -1.2641       | 0.58189   | 0.57795   | -                       | -                       | *         |
|          |       | 64.00000    | 22.00000 | 71.60000 | -0.92920      | 0.38680   | 0.13405   | -                       | -                       | *         |
|          |       | 66.00000    | 22.00000 | 71.60000 | -0.56398      | 0.21426   | 0.082076  | -                       | -                       | *         |
|          |       | 68.00000    | 22.00000 | 71.60000 | -0.17529      | 0.061247  | 0.035834  | -                       | -                       | *         |
|          |       | 70.00000    | 22.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |       | 0.00000     | 24.00000 | 71.60000 | 0.028922      | 0.0075064 | 0.0095903 | -                       | -                       | *         |
|          |       | 2.00000     | 24.00000 | 71.60000 | 0.44659       | 0.12549   | 0.068386  | -                       | -                       | *         |
|          |       | 4.00000     | 24.00000 | 71.60000 | 0.84915       | 0.26010   | 0.11527   | -                       | -                       | *         |
|          |       | 6.00000     | 24.00000 | 71.60000 | 1.2320        | 0.41474   | 0.42075   | -                       | -                       | *         |
|          |       | 8.00000     | 24.00000 | 71.60000 | 1.5887        | 0.59359   | 1.0418    | -                       | -                       | *         |
|          |       | 10.00000    | 24.00000 | 71.60000 | 1.9099        | 0.80169   | 1.7315    | -                       | -                       | *         |
|          |       | 12.00000    | 24.00000 | 71.60000 | 2.4703        | 1.1830    | 2.4780    | -                       | -                       | *         |
|          |       | 14.00000    | 24.00000 | 71.60000 | 3.2086        | 1.7884    | 3.2511    | -                       | -                       | *         |
|          |       | 16.00000    | 24.00000 | 71.60000 | 3.7885        | 2.5256    | 4.0042    | -                       | -                       | *         |
|          |       | 18.00000    | 24.00000 | 71.60000 | 4.1297        | 3.4246    | 4.6776    | -                       | -                       | *         |
|          |       | 20.00000    | 24.00000 | 71.60000 | 4.2031        | 4.6098    | 5.3092    | -                       | -                       | *         |
|          |       | 22.00000    | 24.00000 | 71.60000 | 3.8470        | 6.2285    | 5.9902    | -                       | -                       | *         |
|          |       | 24.00000    | 24.00000 | 71.60000 | 2.5571        | 7.9037    | 6.5634    | -                       | -                       | *         |
|          |       | 26.00000    | 24.00000 | 71.60000 | 0.26538       | 9.0230    | 6.9803    | -                       | -                       | *         |
|          |       | 28.00000    | 24.00000 | 71.60000 | 0.068982      | 11.658    | 8.6166    | -                       | -                       | *         |
|          |       | 30.00000    | 24.00000 | 71.60000 | 0.069046      | 11.669    | 8.6220    | -                       | -                       | *         |
|          |       | 32.00000    | 24.00000 | 71.60000 | 0.069111      | 11.680    | 8.6273    | -                       | -                       | *         |
|          |       | 34.00000    | 24.00000 | 71.60000 | 0.069175      | 11.691    | 8.6327    | -                       | -                       | *         |
|          |       | 36.00000    | 24.00000 | 71.60000 | 0.069239      | 11.701    | 8.6380    | -                       | -                       | *         |
|          |       | 38.00000    | 24.00000 | 71.60000 | 0.069304      | 11.712    | 8.6433    | -                       | -                       | *         |
|          |       | 40.00000    | 24.00000 | 71.60000 | 0.069368      | 11.723    | 8.6486    | -                       | -                       | *         |
|          |       | 42.00000    | 24.00000 | 71.60000 | 0.069433      | 11.734    | 8.6538    | -                       | -                       | *         |
|          |       | 44.00000    | 24.00000 | 71.60000 | -1.1893       | 8.8540    | 6.9176    | -                       | -                       | *         |
|          |       | 46.00000    | 24.00000 | 71.60000 | -3.2065       | 7.4081    | 6.4281    | -                       | -                       | *         |
|          |       | 48.00000    | 24.00000 | 71.60000 | -4.1396       | 5.6603    | 5.8029    | -                       | -                       | *         |
|          |       | 50.00000    | 24.00000 | 71.60000 | -4.2850       | 4.1608    | 5.1263    | -                       | -                       | *         |
|          |       | 52.00000    | 24.00000 | 71.60000 | -             |           |           |                         |                         |           |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |           |                                  | Displacements |   |                         | Angle of Line           |  |
|----------|----------|-------------|-----------|----------------------------------|---------------|---|-------------------------|-------------------------|--|
| Name     | Dist.    | x           | y         | z                                | x             | y | z                       | to x Axis               |  |
|          |          |             |           |                                  |               |   | Horizontal displacement | Horizontal displacement |  |
| 68.00000 | 26.00000 | 71.60000    | -0.43420  | 0.081957                         | 0.067333      | - | -                       | *                       |  |
| 70.00000 | 26.00000 | 71.60000    | 0.0       | 0.0                              | 0.0           | - | -                       | *                       |  |
| 0.00000  | 28.00000 | 71.60000    | 0.20150   | 0.021534                         | 0.038788      | - | -                       | *                       |  |
| 2.00000  | 28.00000 | 71.60000    | 0.66965   | 0.077480                         | 0.090599      | - | -                       | *                       |  |
| 4.00000  | 28.00000 | 71.60000    | 1.1327    | 0.14287                          | 0.15511       | - | -                       | *                       |  |
| 6.00000  | 28.00000 | 71.60000    | 1.5892    | 0.22028                          | 0.23385       | - | -                       | *                       |  |
| 8.00000  | 28.00000 | 71.60000    | 2.0364    | 0.31330                          | 1.4468        | - | -                       | *                       |  |
| 10.00000 | 28.00000 | 71.60000    | 2.5452    | 0.43992                          | 2.2572        | - | -                       | *                       |  |
| 12.00000 | 28.00000 | 71.60000    | 3.6370    | 0.71715                          | 3.1513        | - | -                       | *                       |  |
| 14.00000 | 28.00000 | 71.60000    | 4.7052    | 1.0799                           | 4.0940        | - | -                       | *                       |  |
| 16.00000 | 28.00000 | 71.60000    | 5.7573    | 1.5804                           | 5.0294        | - | -                       | *                       |  |
| 18.00000 | 28.00000 | 71.60000    | 6.7641    | 2.3097                           | 5.8811        | - | -                       | *                       |  |
| 20.00000 | 28.00000 | 71.60000    | 7.6011    | 3.4328                           | 6.5530        | - | -                       | *                       |  |
| 22.00000 | 28.00000 | 71.60000    | 7.8623    | 5.2415                           | 6.9318        | - | -                       | *                       |  |
| 24.00000 | 28.00000 | 71.60000    | 6.5797    | 8.3742                           | 7.1724        | - | -                       | *                       |  |
| 26.00000 | 28.00000 | 71.60000    | 0.89090   | 12.473                           | 7.8226        | - | -                       | *                       |  |
| 28.00000 | 28.00000 | 71.60000    | 0.093119  | 15.737                           | 9.4308        | - | -                       | *                       |  |
| 30.00000 | 28.00000 | 71.60000    | 0.093199  | 15.751                           | 9.4294        | - | -                       | *                       |  |
| 32.00000 | 28.00000 | 71.60000    | 0.093279  | 15.764                           | 9.4279        | - | -                       | *                       |  |
| 34.00000 | 28.00000 | 71.60000    | 0.093358  | 15.778                           | 9.4264        | - | -                       | *                       |  |
| 36.00000 | 28.00000 | 71.60000    | 0.093438  | 15.791                           | 9.4249        | - | -                       | *                       |  |
| 38.00000 | 28.00000 | 71.60000    | 0.093518  | 15.805                           | 9.4234        | - | -                       | *                       |  |
| 40.00000 | 28.00000 | 71.60000    | 0.093598  | 15.818                           | 9.4218        | - | -                       | *                       |  |
| 42.00000 | 28.00000 | 71.60000    | 0.093678  | 15.832                           | 9.4202        | - | -                       | *                       |  |
| 44.00000 | 28.00000 | 71.60000    | -3.8019   | 11.406                           | 7.5991        | - | -                       | *                       |  |
| 46.00000 | 28.00000 | 71.60000    | -7.4587   | 6.9443                           | 7.0562        | - | -                       | *                       |  |
| 48.00000 | 28.00000 | 71.60000    | -8.1107   | 4.4692                           | 6.9384        | - | -                       | *                       |  |
| 50.00000 | 28.00000 | 71.60000    | -7.5223   | 2.9435                           | 6.4383        | - | -                       | *                       |  |
| 52.00000 | 28.00000 | 71.60000    | -6.5691   | 1.9929                           | 5.6798        | - | -                       | *                       |  |
| 54.00000 | 28.00000 | 71.60000    | -5.5156   | 1.3662                           | 4.7742        | - | -                       | *                       |  |
| 56.00000 | 28.00000 | 71.60000    | -4.4379   | 0.92886                          | 3.8132        | - | -                       | *                       |  |
| 58.00000 | 28.00000 | 71.60000    | -3.3467   | 0.60645                          | 2.8679        | - | -                       | *                       |  |
| 60.00000 | 28.00000 | 71.60000    | -2.3883   | 0.38157                          | 1.9882        | - | -                       | *                       |  |
| 62.00000 | 28.00000 | 71.60000    | -1.9356   | 0.27651                          | 1.2023        | - | -                       | *                       |  |
| 64.00000 | 28.00000 | 71.60000    | -1.4718   | 0.19014                          | 0.51683       | - | -                       | *                       |  |
| 66.00000 | 28.00000 | 71.60000    | -1.0000   | 0.11790                          | 0.13128       | - | -                       | *                       |  |
| 68.00000 | 28.00000 | 71.60000    | -0.52231  | 0.056636                         | 0.076395      | - | -                       | *                       |  |
| 70.00000 | 28.00000 | 71.60000    | -0.040109 | 0.0040258                        | 0.011927      | - | -                       | *                       |  |
| 0.00000  | 30.00000 | 71.60000    | 0.24111   | 0.0073622                        | 0.044402      | - | -                       | *                       |  |
| 2.00000  | 30.00000 | 71.60000    | 0.72840   | 0.024079                         | 0.096843      | - | -                       | *                       |  |
| 4.00000  | 30.00000 | 71.60000    | 1.2146    | 0.043768                         | 0.16752       | - | -                       | *                       |  |
| 6.00000  | 30.00000 | 71.60000    | 1.6992    | 0.067296                         | 0.80370       | - | -                       | *                       |  |
| 8.00000  | 30.00000 | 71.60000    | 2.1819    | 0.095908                         | 1.5428        | - | -                       | *                       |  |
| 10.00000 | 30.00000 | 71.60000    | 2.8147    | 0.13900                          | 2.3899        | - | -                       | *                       |  |
| 12.00000 | 30.00000 | 71.60000    | 3.9898    | 0.22478                          | 3.3324        | - | -                       | *                       |  |
| 14.00000 | 30.00000 | 71.60000    | 5.1821    | 0.33981                          | 4.3361        | - | -                       | *                       |  |
| 16.00000 | 30.00000 | 71.60000    | 6.4275    | 0.50412                          | 5.3457        | - | -                       | *                       |  |
| 18.00000 | 30.00000 | 71.60000    | 7.7559    | 0.75667                          | 6.2839        | - | -                       | *                       |  |
| 20.00000 | 30.00000 | 71.60000    | 9.1793    | 1.1844                           | 7.0511        | - | -                       | *                       |  |
| 22.00000 | 30.00000 | 71.60000    | 10.641    | 2.0268                           | 7.5220        | - | -                       | *                       |  |
| 24.00000 | 30.00000 | 71.60000    | 11.629    | 4.2288                           | 7.5290        | - | -                       | *                       |  |
| 26.00000 | 30.00000 | 71.60000    | 3.4598    | 13.839                           | 7.4404        | - | -                       | *                       |  |
| 28.00000 | 30.00000 | 71.60000    | 0.10738   | 18.148                           | 8.7492        | - | -                       | *                       |  |
| 30.00000 | 30.00000 | 71.60000    | 0.10747   | 18.163                           | 8.7422        | - | -                       | *                       |  |
| 32.00000 | 30.00000 | 71.60000    | 0.10756   | 18.178                           | 8.7353        | - | -                       | *                       |  |
| 34.00000 | 30.00000 | 71.60000    | 0.10765   | 18.193                           | 8.7282        | - | -                       | *                       |  |
| 36.00000 | 30.00000 | 71.60000    | 0.10774   | 18.208                           | 8.7212        | - | -                       | *                       |  |
| 38.00000 | 30.00000 | 71.60000    | 0.10783   | 18.223                           | 8.7141        | - | -                       | *                       |  |
| 40.00000 | 30.00000 | 71.60000    | 0.10792   | 18.238                           | 8.7070        | - | -                       | *                       |  |
| 42.00000 | 30.00000 | 71.60000    | 0.10801   | 18.254                           | 8.6998        | - | -                       | *                       |  |
| 44.00000 | 30.00000 | 71.60000    | -10.355   | 8.0537                           | 7.2143        | - | -                       | *                       |  |
| 46.00000 | 30.00000 | 71.60000    | -11.753   | 2.8368                           | 7.6963        | - | -                       | *                       |  |
| 48.00000 | 30.00000 | 71.60000    | -10.342   | 1.4775                           | 7.5011        | - | -                       | *                       |  |
| 50.00000 | 30.00000 | 71.60000    | -8.8339   | 0.89620                          | 6.9017        | - | -                       | *                       |  |
| 52.00000 | 30.00000 | 71.60000    | -7.4164   | 0.58331                          | 6.0486        | - | -                       | *                       |  |
| 54.00000 | 30.00000 | 71.60000    | -6.0996   | 0.39172                          | 5.0597        | - | -                       | *                       |  |
| 56.00000 | 30.00000 | 71.60000    | -4.8596   | 0.26370                          | 4.0289        | - | -                       | *                       |  |
| 58.00000 | 30.00000 | 71.60000    | -3.6622   | 0.17205                          | 3.0272        | - | -                       | *                       |  |
| 60.00000 | 30.00000 | 71.60000    | -2.5620   | 0.10612                          | 2.1036        | - | -                       | *                       |  |
| 62.00000 | 30.00000 | 71.60000    | -2.0675   | 0.076575                         | 1.2852        | - | -                       | *                       |  |
| 64.00000 | 30.00000 | 71.60000    | -1.5709   | 0.052613                         | 0.57722       | - | -                       | *                       |  |
| 66.00000 | 30.00000 | 71.60000    | -1.0726   | 0.032787                         | 0.14074       | - | -                       | *                       |  |
| 68.00000 | 30.00000 | 71.60000    | -0.57319  | 0.016114                         | 0.081808      | - | -                       | *                       |  |
| 70.00000 | 30.00000 | 71.60000    | -0.072860 | 0.0018960                        | 0.018162      | - | -                       | *                       |  |
| 0.00000  | 32.00000 | 71.60000    | 0.36709   | -0.0085371                       | 0.067747      | - | -                       | *                       |  |
| 2.00000  | 32.00000 | 71.60000    | 1.1167    | -0.025970                        | 0.14851       | - | -                       | *                       |  |
| 4.00000  | 32.00000 | 71.60000    | 1.8663    | -0.043402                        | 0.25713       | - | -                       | *                       |  |
| 6.00000  | 32.00000 | 71.60000    | 2.6159    | -0.060834                        | 0.96727       | - | -                       | *                       |  |
| 8.00000  | 32.00000 | 71.60000    | 3.3655    | -0.078267                        | 1.8370        | - | -                       | *                       |  |
| 10.00000 | 32.00000 | 71.60000    | 4.2667    | -0.099227                        | 2.8755        | - | -                       | *                       |  |
| 12.00000 | 32.00000 | 71.60000    | 5.7173    | -0.13296                         | 4.0653        | - | -                       | *                       |  |
| 14.00000 | 32.00000 | 71.60000    | 7.1925    | -0.16727                         | 5.3566        | - | -                       | *                       |  |
| 16.00000 | 32.00000 | 71.60000    | 8.7335    | -0.20310                         | 6.6672        | - | -                       | *                       |  |
| 18.00000 | 32.00000 | 71.60000    | 10.382    | -0.24144                         | 7.8828        | - | -                       | *                       |  |
| 20.00000 | 32.00000 | 71.60000    | 12.178    | -0.28322                         | 8.8566        | - | -                       | *                       |  |
| 22.00000 | 32.00000 | 71.60000    | 14.165    | -0.32941                         | 9.4099        | - | -                       | *                       |  |
| 24.00000 | 32.00000 | 71.60000    | 16.382    | -0.38098                         | 9.3314        | - | -                       | *                       |  |
| 26.00000 | 32.00000 | 71.60000    | 18.872    | -0.43888                         | 8.3776        | - | -                       | *                       |  |
| 28.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 30.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 32.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 34.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 36.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 38.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 40.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 42.00000 | 32.00000 | 71.60000    |           | Point lies within an excavation. |               | - | -                       | *                       |  |
| 44.00000 | 32.00000 | 71.60000    | -18.025   | 0.21206                          | 8.8037        | - | -                       | *                       |  |
| 46.00000 | 32.00000 | 71.60000    | -15.628   | 0.18386                          | 9.4412        | - | -                       | *                       |  |
| 48.00000 | 32.00000 | 71.60000    | -13.491   | 0.15871                          | 9.2867        | - | -                       | *                       |  |
| 50.00000 | 32.00000 | 71.60000    | -11.570   | 0.13612                          | 8.5732        | - | -                       | *                       |  |
| 52.00000 | 32.00000 | 71.60000    | -9.8266   | 0.11561                          | 7.5013        | - | -                       | *                       |  |
| 54.00000 | 32.00000 | 71.60000    | -8.2176   | 0.096677                         | 6.2396        | - | -                       | *                       |  |
| 56.00000 | 32.00000 | 71.60000    | -6.7022   | 0.078850                         | 4.9241        | - | -                       | *                       |  |
| 58.00000 | 32.00000 | 71.60000    | -5.2391   | 0.061637                         | 3.6585        | - | -                       | *                       |  |
| 60.00000 | 32.00000 | 71.60000    | -3.8684   | 0.045511                         | 2.5145        | - | -                       | *                       |  |
| 62.00000 | 32.00000 | 71.60000    | -3.1185   | 0.036688                         | 1.5311        | - | -                       | *                       |  |
| 64.00000 | 32.00000 | 71.60000    | -2.3686   | 0.0278                           |               |   |                         |                         |  |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |          |            | Displacements |   |   | Angle of Line                    |                            |           |
|----------|----------|-------------|----------|------------|---------------|---|---|----------------------------------|----------------------------|-----------|
| Name     | Dist.    | x           | y        | z          | x             | y | z | Horizontal<br>displacement       | Horizontal<br>displacement | to x Axis |
| 62.00000 | 34.00000 | 71.60000    | -3.1273  | 0.036792   | 1.5417        | - | - | -                                | *                          |           |
| 64.00000 | 34.00000 | 71.60000    | -2.3774  | 0.027970   | 0.72404       | - | - | -                                | *                          |           |
| 66.00000 | 34.00000 | 71.60000    | -1.6275  | 0.019148   | 0.21399       | - | - | -                                | *                          |           |
| 68.00000 | 34.00000 | 71.60000    | -0.87764 | 0.010325   | 0.12439       | - | - | -                                | *                          |           |
| 70.00000 | 34.00000 | 71.60000    | -0.12775 | 0.0015029  | 0.030555      | - | - | -                                | *                          |           |
| 0.00000  | 36.00000 | 71.60000    | 0.33223  | -0.0077263 | 0.062945      | - | - | -                                | *                          |           |
| 2.00000  | 36.00000 | 71.60000    | 1.0818   | -0.025159  | 0.14488       | - | - | -                                | *                          |           |
| 4.00000  | 36.00000 | 71.60000    | 1.8314   | -0.042591  | 0.25020       | - | - | -                                | *                          |           |
| 6.00000  | 36.00000 | 71.60000    | 2.5810   | -0.060024  | 0.93081       | - | - | -                                | *                          |           |
| 8.00000  | 36.00000 | 71.60000    | 3.3306   | -0.077456  | 1.7928        | - | - | -                                | *                          |           |
| 10.00000 | 36.00000 | 71.60000    | 4.1992   | -0.097656  | 2.8236        | - | - | -                                | *                          |           |
| 12.00000 | 36.00000 | 71.60000    | 5.6496   | -0.13139   | 4.0073        | - | - | -                                | *                          |           |
| 14.00000 | 36.00000 | 71.60000    | 7.1227   | -0.16564   | 5.2954        | - | - | -                                | *                          |           |
| 16.00000 | 36.00000 | 71.60000    | 8.6598   | -0.20139   | 6.6073        | - | - | -                                | *                          |           |
| 18.00000 | 36.00000 | 71.60000    | 10.302   | -0.23958   | 7.8303        | - | - | -                                | *                          |           |
| 20.00000 | 36.00000 | 71.60000    | 12.091   | -0.28118   | 8.8192        | - | - | -                                | *                          |           |
| 22.00000 | 36.00000 | 71.60000    | 14.068   | -0.32715   | 9.3964        | - | - | -                                | *                          |           |
| 24.00000 | 36.00000 | 71.60000    | 16.273   | -0.37845   | 9.3524        | - | - | -                                | *                          |           |
| 26.00000 | 36.00000 | 71.60000    | 18.750   | -0.43604   | 8.4452        | - | - | -                                | *                          |           |
| 28.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 30.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 32.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 34.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 36.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 38.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 40.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 42.00000 | 36.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 44.00000 | 36.00000 | 71.60000    | -18.085  | 0.21276    | 8.7771        | - | - | -                                | *                          |           |
| 46.00000 | 36.00000 | 71.60000    | -15.682  | 0.18449    | 9.4363        | - | - | -                                | *                          |           |
| 48.00000 | 36.00000 | 71.60000    | -13.538  | 0.15927    | 9.2976        | - | - | -                                | *                          |           |
| 50.00000 | 36.00000 | 71.60000    | -11.613  | 0.13663    | 8.5948        | - | - | -                                | *                          |           |
| 52.00000 | 36.00000 | 71.60000    | -9.8659  | 0.11607    | 7.5293        | - | - | -                                | *                          |           |
| 54.00000 | 36.00000 | 71.60000    | -8.2542  | 0.097108   | 6.2704        | - | - | -                                | *                          |           |
| 56.00000 | 36.00000 | 71.60000    | -6.7371  | 0.079260   | 4.9548        | - | - | -                                | *                          |           |
| 58.00000 | 36.00000 | 71.60000    | -5.2733  | 0.062039   | 3.6871        | - | - | -                                | *                          |           |
| 60.00000 | 36.00000 | 71.60000    | -3.8861  | 0.045718   | 2.5396        | - | - | -                                | *                          |           |
| 62.00000 | 36.00000 | 71.60000    | -3.1362  | 0.036896   | 1.5523        | - | - | -                                | *                          |           |
| 64.00000 | 36.00000 | 71.60000    | -2.3863  | 0.028074   | 0.73275       | - | - | -                                | *                          |           |
| 66.00000 | 36.00000 | 71.60000    | -1.6364  | 0.019251   | 0.21541       | - | - | -                                | *                          |           |
| 68.00000 | 36.00000 | 71.60000    | -0.88647 | 0.010429   | 0.12526       | - | - | -                                | *                          |           |
| 70.00000 | 36.00000 | 71.60000    | -0.13657 | 0.0016067  | 0.032122      | - | - | -                                | *                          |           |
| 0.00000  | 38.00000 | 71.60000    | 0.31480  | -0.0073209 | 0.060474      | - | - | -                                | *                          |           |
| 2.00000  | 38.00000 | 71.60000    | 1.0644   | -0.024753  | 0.14308       | - | - | -                                | *                          |           |
| 4.00000  | 38.00000 | 71.60000    | 1.8140   | -0.042186  | 0.24682       | - | - | -                                | *                          |           |
| 6.00000  | 38.00000 | 71.60000    | 2.5636   | -0.059618  | 0.91271       | - | - | -                                | *                          |           |
| 8.00000  | 38.00000 | 71.60000    | 3.3132   | -0.077051  | 1.7708        | - | - | -                                | *                          |           |
| 10.00000 | 38.00000 | 71.60000    | 4.1654   | -0.096870  | 2.7978        | - | - | -                                | *                          |           |
| 12.00000 | 38.00000 | 71.60000    | 5.6158   | -0.13060   | 3.9783        | - | - | -                                | *                          |           |
| 14.00000 | 38.00000 | 71.60000    | 7.0879   | -0.16483   | 5.2648        | - | - | -                                | *                          |           |
| 16.00000 | 38.00000 | 71.60000    | 8.6230   | -0.20053   | 6.5773        | - | - | -                                | *                          |           |
| 18.00000 | 38.00000 | 71.60000    | 10.262   | -0.23866   | 7.8039        | - | - | -                                | *                          |           |
| 20.00000 | 38.00000 | 71.60000    | 12.047   | -0.28017   | 8.8001        | - | - | -                                | *                          |           |
| 22.00000 | 38.00000 | 71.60000    | 14.019   | -0.32603   | 9.3892        | - | - | -                                | *                          |           |
| 24.00000 | 38.00000 | 71.60000    | 16.219   | -0.37719   | 9.3623        | - | - | -                                | *                          |           |
| 26.00000 | 38.00000 | 71.60000    | 18.689   | -0.43462   | 8.4781        | - | - | -                                | *                          |           |
| 28.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 30.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 32.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 34.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 36.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 38.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 40.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 42.00000 | 38.00000 | 71.60000    |          |            |               |   |   | Point lies within an excavation. | *                          |           |
| 44.00000 | 38.00000 | 71.60000    | -18.115  | 0.21312    | 8.7636        | - | - | -                                | *                          |           |
| 46.00000 | 38.00000 | 71.60000    | -15.708  | 0.18480    | 9.4336        | - | - | -                                | *                          |           |
| 48.00000 | 38.00000 | 71.60000    | -13.562  | 0.15956    | 9.3029        | - | - | -                                | *                          |           |
| 50.00000 | 38.00000 | 71.60000    | -11.635  | 0.13688    | 8.6055        | - | - | -                                | *                          |           |
| 52.00000 | 38.00000 | 71.60000    | -9.8856  | 0.11630    | 7.5433        | - | - | -                                | *                          |           |
| 54.00000 | 38.00000 | 71.60000    | -8.2725  | 0.097324   | 6.2858        | - | - | -                                | *                          |           |
| 56.00000 | 38.00000 | 71.60000    | -6.7546  | 0.079465   | 4.9702        | - | - | -                                | *                          |           |
| 58.00000 | 38.00000 | 71.60000    | -5.2903  | 0.062239   | 3.7014        | - | - | -                                | *                          |           |
| 60.00000 | 38.00000 | 71.60000    | -3.8949  | 0.045822   | 2.5522        | - | - | -                                | *                          |           |
| 62.00000 | 38.00000 | 71.60000    | -3.1450  | 0.037000   | 1.5629        | - | - | -                                | *                          |           |
| 64.00000 | 38.00000 | 71.60000    | -2.3951  | 0.028177   | 0.74148       | - | - | -                                | *                          |           |
| 66.00000 | 38.00000 | 71.60000    | -1.6452  | 0.019355   | 0.21684       | - | - | -                                | *                          |           |
| 68.00000 | 38.00000 | 71.60000    | -0.89529 | 0.010533   | 0.12613       | - | - | -                                | *                          |           |
| 70.00000 | 38.00000 | 71.60000    | -0.14539 | 0.0017105  | 0.033672      | - | - | -                                | *                          |           |
| 0.00000  | 40.00000 | 71.60000    | 0.29736  | -0.0069155 | 0.057954      | - | - | -                                | *                          |           |
| 2.00000  | 40.00000 | 71.60000    | 0.70363  | -0.017302  | 0.094967      | - | - | -                                | *                          |           |
| 4.00000  | 40.00000 | 71.60000    | 1.2065   | -0.032316  | 0.16353       | - | - | -                                | *                          |           |
| 6.00000  | 40.00000 | 71.60000    | 1.7082   | -0.050242  | 0.74758       | - | - | -                                | *                          |           |
| 8.00000  | 40.00000 | 71.60000    | 2.2086   | -0.072018  | 1.4845        | - | - | -                                | *                          |           |
| 10.00000 | 40.00000 | 71.60000    | 2.7926   | -0.10217   | 2.3337        | - | - | -                                | *                          |           |
| 12.00000 | 40.00000 | 71.60000    | 3.9881   | -0.16617   | 3.2843        | - | - | -                                | *                          |           |
| 14.00000 | 40.00000 | 71.60000    | 5.1994   | -0.25158   | 4.3040        | - | - | -                                | *                          |           |
| 16.00000 | 40.00000 | 71.60000    | 6.4643   | -0.37294   | 5.3379        | - | - | -                                | *                          |           |
| 18.00000 | 40.00000 | 71.60000    | 7.8170   | -0.55836   | 6.3092        | - | - | -                                | *                          |           |
| 20.00000 | 40.00000 | 71.60000    | 9.2813   | -0.87012   | 7.1180        | - | - | -                                | *                          |           |
| 22.00000 | 40.00000 | 71.60000    | 10.842   | -1.4784    | 7.6394        | - | - | -                                | *                          |           |
| 24.00000 | 40.00000 | 71.60000    | 12.240   | -3.0599    | 7.7111        | - | - | -                                | *                          |           |
| 26.00000 | 40.00000 | 71.60000    | 7.5953   | -11.393    | 7.1812        | - | - | -                                | *                          |           |
| 28.00000 | 40.00000 | 71.60000    | -0.21863 | -18.365    | 8.6456        | - | - | -                                | *                          |           |
| 30.00000 | 40.00000 | 71.60000    | -0.21827 | -18.334    | 8.6606        | - | - | -                                | *                          |           |
| 32.00000 | 40.00000 | 71.60000    | -0.21790 | -18.304    | 8.6754        | - | - | -                                | *                          |           |
| 34.00000 | 40.00000 | 71.60000    | -0.21754 | -18.273    | 8.6900        | - | - | -                                | *                          |           |
| 36.00000 | 40.00000 | 71.60000    | -0.21717 | -18.243    | 8.7045        | - | - | -                                | *                          |           |
| 38.00000 | 40.00000 | 71.60000    | -0.21681 | -18.212    | 8.7188        | - | - | -                                | *                          |           |
| 40.00000 | 40.00000 | 71.60000    | -0.21645 | -18.182    | 8.7330        | - | - | -                                | *                          |           |
| 42.00000 | 40.00000 | 71.60000    | -0.21609 | -18.151    | 8.7470        | - | - | -                                | *                          |           |
| 44.00000 | 40.00000 | 71.60000    | -9.0884  | -9.0884    | 7.1101        | - | - | -                                | *                          |           |
| 46.00000 | 40.00000 | 71.60000    | -11.559  | -3.3025    | 7.6286        | - | - | -                                | *                          |           |
| 48.00000 | 40.00000 | 71.60000    | -10.284  | -1.7140    | 7.4653        | - | - | -                                | *                          |           |
| 50.00000 | 40.00000 | 71.60000    | -8.8132  | -1.0369    | 6.8897        | - | - | -                                | *</                        |           |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |           |            | Displacements |   |   | Angle of<br>Line<br>to x Axis |                            |
|----------|----------|-------------|-----------|------------|---------------|---|---|-------------------------------|----------------------------|
| Name     | Dist.    | x           | y         | z          | x             | y | z | Horizontal<br>displacement    | Horizontal<br>displacement |
| 56.00000 | 42.00000 | 71.60000    | -4.4317   | -0.96943   | 3.8310        | - | - | -                             | *                          |
| 58.00000 | 42.00000 | 71.60000    | -3.3526   | -0.63428   | 2.8917        | - | - | -                             | *                          |
| 60.00000 | 42.00000 | 71.60000    | -2.3761   | -0.39602   | 2.0146        | - | - | -                             | *                          |
| 62.00000 | 42.00000 | 71.60000    | -1.9310   | -0.28760   | 1.2288        | - | - | -                             | *                          |
| 64.00000 | 42.00000 | 71.60000    | -1.4742   | -0.19845   | 0.54188       | - | - | -                             | *                          |
| 66.00000 | 42.00000 | 71.60000    | -1.0090   | -0.12391   | 0.13297       | - | - | -                             | *                          |
| 68.00000 | 42.00000 | 71.60000    | -0.53742  | -0.060676  | 0.077661      | - | - | -                             | *                          |
| 70.00000 | 42.00000 | 71.60000    | -0.061130 | -0.0063867 | 0.015893      | - | - | -                             | *                          |
| 0.00000  | 44.00000 | 71.60000    | 0.095116  | -0.016573  | 0.022159      | - | - | -                             | *                          |
| 2.00000  | 44.00000 | 71.60000    | 0.55645   | -0.10490   | 0.078947      | - | - | -                             | *                          |
| 4.00000  | 44.00000 | 71.60000    | 1.0083    | -0.20707   | 0.13528       | - | - | -                             | *                          |
| 6.00000  | 44.00000 | 71.60000    | 1.4478    | -0.32646   | 0.56285       | - | - | -                             | *                          |
| 8.00000  | 44.00000 | 71.60000    | 1.8703    | -0.46758   | 1.2365        | - | - | -                             | *                          |
| 10.00000 | 44.00000 | 71.60000    | 2.2695    | -0.63657   | 1.9987        | - | - | -                             | *                          |
| 12.00000 | 44.00000 | 71.60000    | 3.1487    | -1.0058    | 2.8373        | - | - | -                             | *                          |
| 14.00000 | 44.00000 | 71.60000    | 4.0846    | -1.5152    | 3.7198        | - | - | -                             | *                          |
| 16.00000 | 44.00000 | 71.60000    | 4.9308    | -2.1809    | 4.5934        | - | - | -                             | *                          |
| 18.00000 | 44.00000 | 71.60000    | 5.6204    | -3.0779    | 5.3874        | - | - | -                             | *                          |
| 20.00000 | 44.00000 | 71.60000    | 5.9828    | -4.3002    | 6.0169        | - | - | -                             | *                          |
| 22.00000 | 44.00000 | 71.60000    | 5.6545    | -5.9115    | 6.4017        | - | - | -                             | *                          |
| 24.00000 | 44.00000 | 71.60000    | 4.4415    | -8.5129    | 7.0566        | - | - | -                             | *                          |
| 26.00000 | 44.00000 | 71.60000    | 0.93632   | -10.768    | 7.6175        | - | - | -                             | *                          |
| 28.00000 | 44.00000 | 71.60000    | -0.16382  | -13.761    | 9.3441        | - | - | -                             | *                          |
| 30.00000 | 44.00000 | 71.60000    | -0.16353  | -13.737    | 9.3394        | - | - | -                             | *                          |
| 32.00000 | 44.00000 | 71.60000    | -0.16324  | -13.712    | 9.3346        | - | - | -                             | *                          |
| 34.00000 | 44.00000 | 71.60000    | -0.16295  | -13.688    | 9.3297        | - | - | -                             | *                          |
| 36.00000 | 44.00000 | 71.60000    | -0.16266  | -13.664    | 9.3247        | - | - | -                             | *                          |
| 38.00000 | 44.00000 | 71.60000    | -0.16237  | -13.639    | 9.3196        | - | - | -                             | *                          |
| 40.00000 | 44.00000 | 71.60000    | -0.16209  | -13.615    | 9.3145        | - | - | -                             | *                          |
| 42.00000 | 44.00000 | 71.60000    | -0.16180  | -13.591    | 9.3093        | - | - | -                             | *                          |
| 44.00000 | 44.00000 | 71.60000    | -1.7210   | -10.326    | 7.4907        | - | - | -                             | *                          |
| 46.00000 | 44.00000 | 71.60000    | -4.6551   | -7.9802    | 6.9175        | - | - | -                             | *                          |
| 48.00000 | 44.00000 | 71.60000    | -5.5521   | -5.5521    | 6.2474        | - | - | -                             | *                          |
| 50.00000 | 44.00000 | 71.60000    | -5.7230   | -4.0398    | 5.7985        | - | - | -                             | *                          |
| 52.00000 | 44.00000 | 71.60000    | -5.3185   | -2.9010    | 5.1429        | - | - | -                             | *                          |
| 54.00000 | 44.00000 | 71.60000    | -4.6244   | -2.0553    | 4.3430        | - | - | -                             | *                          |
| 56.00000 | 44.00000 | 71.60000    | -3.7848   | -1.4193    | 3.4791        | - | - | -                             | *                          |
| 58.00000 | 44.00000 | 71.60000    | -2.8557   | -0.92616   | 2.6171        | - | - | -                             | *                          |
| 60.00000 | 44.00000 | 71.60000    | -2.1299   | -0.60855   | 1.8046        | - | - | -                             | *                          |
| 62.00000 | 44.00000 | 71.60000    | -1.7377   | -0.44366   | 1.0699        | - | - | -                             | *                          |
| 64.00000 | 44.00000 | 71.60000    | -1.3226   | -0.30522   | 0.42042       | - | - | -                             | *                          |
| 66.00000 | 44.00000 | 71.60000    | -0.89103  | -0.18758   | 0.11802       | - | - | -                             | *                          |
| 68.00000 | 44.00000 | 71.60000    | -0.44713  | -0.086542  | 0.068475      | - | - | -                             | *                          |
| 70.00000 | 44.00000 | 71.60000    | 0.0       | 0.0        | 0.0           | - | - | -                             | *                          |
| 0.00000  | 46.00000 | 71.60000    | 0.0       | 0.0        | 0.0           | - | - | -                             | *                          |
| 2.00000  | 46.00000 | 71.60000    | 0.43178   | -0.11679   | 0.067438      | - | - | -                             | *                          |
| 4.00000  | 46.00000 | 71.60000    | 0.85179   | -0.25097   | 0.11503       | - | - | -                             | *                          |
| 6.00000  | 46.00000 | 71.60000    | 1.2527    | -0.40530   | 0.38808       | - | - | -                             | *                          |
| 8.00000  | 46.00000 | 71.60000    | 1.6284    | -0.58409   | 1.0121        | - | - | -                             | *                          |
| 10.00000 | 46.00000 | 71.60000    | 1.9696    | -0.79265   | 1.7089        | - | - | -                             | *                          |
| 12.00000 | 46.00000 | 71.60000    | 2.5231    | -1.1564    | 2.4682        | - | - | -                             | *                          |
| 14.00000 | 46.00000 | 71.60000    | 3.2967    | -1.7547    | 3.2604        | - | - | -                             | *                          |
| 16.00000 | 46.00000 | 71.60000    | 3.9188    | -2.4869    | 4.0385        | - | - | -                             | *                          |
| 18.00000 | 46.00000 | 71.60000    | 4.3123    | -3.3883    | 4.7413        | - | - | -                             | *                          |
| 20.00000 | 46.00000 | 71.60000    | 4.3314    | -4.4667    | 5.2998        | - | - | -                             | *                          |
| 22.00000 | 46.00000 | 71.60000    | 4.0674    | -6.1011    | 5.9963        | - | - | -                             | *                          |
| 24.00000 | 46.00000 | 71.60000    | 2.8623    | -7.8714    | 6.5959        | - | - | -                             | *                          |
| 26.00000 | 46.00000 | 71.60000    | 0.55480   | -9.1541    | 7.0481        | - | - | -                             | *                          |
| 28.00000 | 46.00000 | 71.60000    | -0.14065  | -11.814    | 8.6926        | - | - | -                             | *                          |
| 30.00000 | 46.00000 | 71.60000    | -0.14039  | -11.792    | 8.6822        | - | - | -                             | *                          |
| 32.00000 | 46.00000 | 71.60000    | -0.14013  | -11.771    | 8.6717        | - | - | -                             | *                          |
| 34.00000 | 46.00000 | 71.60000    | -0.13986  | -11.749    | 8.6611        | - | - | -                             | *                          |
| 36.00000 | 46.00000 | 71.60000    | -0.13960  | -11.727    | 8.6505        | - | - | -                             | *                          |
| 38.00000 | 46.00000 | 71.60000    | -0.13934  | -11.705    | 8.6399        | - | - | -                             | *                          |
| 40.00000 | 46.00000 | 71.60000    | -0.13908  | -11.683    | 8.6292        | - | - | -                             | *                          |
| 42.00000 | 46.00000 | 71.60000    | -0.13882  | -11.661    | 8.6184        | - | - | -                             | *                          |
| 44.00000 | 46.00000 | 71.60000    | -1.0414   | -8.8521    | 6.9141        | - | - | -                             | *                          |
| 46.00000 | 46.00000 | 71.60000    | -3.0771   | -7.4729    | 6.4374        | - | - | -                             | *                          |
| 48.00000 | 46.00000 | 71.60000    | -4.0607   | -5.7527    | 5.8208        | - | - | -                             | *                          |
| 50.00000 | 46.00000 | 71.60000    | -4.2035   | -4.2035    | 5.1098        | - | - | -                             | *                          |
| 52.00000 | 46.00000 | 71.60000    | -4.0915   | -3.1617    | 4.5100        | - | - | -                             | *                          |
| 54.00000 | 46.00000 | 71.60000    | -3.6675   | -2.3092    | 3.8026        | - | - | -                             | *                          |
| 56.00000 | 46.00000 | 71.60000    | -3.0330   | -1.6113    | 3.0336        | - | - | -                             | *                          |
| 58.00000 | 46.00000 | 71.60000    | -2.2528   | -1.0351    | 2.2601        | - | - | -                             | *                          |
| 60.00000 | 46.00000 | 71.60000    | -1.8432   | -0.74605   | 1.5246        | - | - | -                             | *                          |
| 62.00000 | 46.00000 | 71.60000    | -1.5057   | -0.54461   | 0.85238       | - | - | -                             | *                          |
| 64.00000 | 46.00000 | 71.60000    | -1.1353   | -0.37116   | 0.24957       | - | - | -                             | *                          |
| 66.00000 | 46.00000 | 71.60000    | -0.74053  | -0.22086   | 0.10055       | - | - | -                             | *                          |
| 68.00000 | 46.00000 | 71.60000    | -0.32728  | -0.089739  | 0.055538      | - | - | -                             | *                          |
| 70.00000 | 46.00000 | 71.60000    | 0.0       | 0.0        | 0.0           | - | - | -                             | *                          |
| 0.00000  | 48.00000 | 71.60000    | 0.0       | 0.0        | 0.0           | - | - | -                             | *                          |
| 2.00000  | 48.00000 | 71.60000    | 0.28389   | -0.10006   | 0.050946      | - | - | -                             | *                          |
| 4.00000  | 48.00000 | 71.60000    | 0.67122   | -0.25770   | 0.094307      | - | - | -                             | *                          |
| 6.00000  | 48.00000 | 71.60000    | 1.0337    | -0.43579   | 0.17111       | - | - | -                             | *                          |
| 8.00000  | 48.00000 | 71.60000    | 1.3640    | -0.63752   | 0.74063       | - | - | -                             | *                          |
| 10.00000 | 48.00000 | 71.60000    | 1.6518    | -0.86618   | 1.3659        | - | - | -                             | *                          |
| 12.00000 | 48.00000 | 71.60000    | 1.8830    | -1.1246    | 2.0395        | - | - | -                             | *                          |
| 14.00000 | 48.00000 | 71.60000    | 2.4887    | -1.7260    | 2.7366        | - | - | -                             | *                          |
| 16.00000 | 48.00000 | 71.60000    | 2.9479    | -2.4377    | 3.4176        | - | - | -                             | *                          |
| 18.00000 | 48.00000 | 71.60000    | 3.1646    | -3.2399    | 4.0318        | - | - | -                             | *                          |
| 20.00000 | 48.00000 | 71.60000    | 3.2534    | -4.3718    | 4.7172        | - | - | -                             | *                          |
| 22.00000 | 48.00000 | 71.60000    | 2.8895    | -5.6477    | 5.3429        | - | - | -                             | *                          |
| 24.00000 | 48.00000 | 71.60000    | 1.9150    | -6.8619    | 5.8573        | - | - | -                             | *                          |
| 26.00000 | 48.00000 | 71.60000    | 0.35710   | -7.6776    | 6.2119        | - | - | -                             | *                          |
| 28.00000 | 48.00000 | 71.60000    | -0.11964  | -10.050    | 7.6580        | - | - | -                             | *                          |
| 30.00000 | 48.00000 | 71.60000    | -0.11940  | -10.029    | 7.6441        | - | - | -                             | *                          |
| 32.00000 | 48.00000 | 71.60000    | -0.11916  | -10.009    | 7.6302        | - | - | -                             | *                          |
| 34.00000 | 48.00000 | 71.60000    | -0.11892  | -9.9893    | 7.6162        | - | - | -                             | *                          |
| 36.00000 | 48.00000 | 71.60000    | -0.11868  | -9.9693    | 7.6022        | - | - | -                             | *                          |
| 38.00000 | 48.00000 | 71.60000    | -0.11844  | -9.9493    | 7.5882        | - | - | -                             | *                          |
| 40.00000 | 48.00000 | 71.60000    | -0.11821  | -9.9293    | 7.5742        | - | - | -                             | *                          |
| 42.00000 | 48.000.  |             |           |            |               |   |   |                               |                            |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |            |            | Displacements |   |   | Angle of Line           |                         |           |
|----------|----------|-------------|------------|------------|---------------|---|---|-------------------------|-------------------------|-----------|
| Name     | Dist.    | x           | y          | z          | x             | y | z | Horizontal displacement | Horizontal displacement | to x Axis |
| 50.00000 | 50.00000 | 71.60000    | -2.3240    | -3.6910    | 3.8162        | - | - | -                       | *                       |           |
| 52.00000 | 50.00000 | 71.60000    | -2.2532    | -2.7653    | 3.2122        | - | - | -                       | *                       |           |
| 54.00000 | 50.00000 | 71.60000    | -1.9320    | -1.9320    | 2.5824        | - | - | -                       | *                       |           |
| 56.00000 | 50.00000 | 71.60000    | -1.5452    | -1.3037    | 1.9946        | - | - | -                       | *                       |           |
| 58.00000 | 50.00000 | 71.60000    | -1.4282    | -1.0422    | 1.4053        | - | - | -                       | *                       |           |
| 60.00000 | 50.00000 | 71.60000    | -1.2399    | -0.79709   | 0.83443       | - | - | -                       | *                       |           |
| 62.00000 | 50.00000 | 71.60000    | -0.99525   | -0.57174   | 0.29736       | - | - | -                       | *                       |           |
| 64.00000 | 50.00000 | 71.60000    | -0.70616   | -0.36666   | 0.10302       | - | - | -                       | *                       |           |
| 66.00000 | 50.00000 | 71.60000    | -0.38199   | -0.18094   | 0.063220      | - | - | -                       | *                       |           |
| 68.00000 | 50.00000 | 71.60000    | -0.029921  | -0.013030  | 0.0098733     | - | - | -                       | *                       |           |
| 70.00000 | 50.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 0.00000  | 52.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 52.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 52.00000 | 71.60000    | 0.27763    | -0.15617   | 0.051970      | - | - | -                       | *                       |           |
| 6.00000  | 52.00000 | 71.60000    | 0.57335    | -0.35413   | 0.088320      | - | - | -                       | *                       |           |
| 8.00000  | 52.00000 | 71.60000    | 0.82988    | -0.56828   | 0.13754       | - | - | -                       | *                       |           |
| 10.00000 | 52.00000 | 71.60000    | 1.0383     | -0.79769   | 0.59975       | - | - | -                       | *                       |           |
| 12.00000 | 52.00000 | 71.60000    | 1.1878     | -1.0393    | 1.1074        | - | - | -                       | *                       |           |
| 14.00000 | 52.00000 | 71.60000    | 1.2665     | -1.2869    | 1.6224        | - | - | -                       | *                       |           |
| 16.00000 | 52.00000 | 71.60000    | 1.4205     | -1.7210    | 2.1662        | - | - | -                       | *                       |           |
| 18.00000 | 52.00000 | 71.60000    | 1.6546     | -2.4819    | 2.7070        | - | - | -                       | *                       |           |
| 20.00000 | 52.00000 | 71.60000    | 1.6616     | -3.2714    | 3.2133        | - | - | -                       | *                       |           |
| 22.00000 | 52.00000 | 71.60000    | 1.4071     | -4.0294    | 3.6527        | - | - | -                       | *                       |           |
| 24.00000 | 52.00000 | 71.60000    | 0.88800    | -4.6620    | 3.9903        | - | - | -                       | *                       |           |
| 26.00000 | 52.00000 | 71.60000    | 0.16069    | -5.0617    | 4.1931        | - | - | -                       | *                       |           |
| 28.00000 | 52.00000 | 71.60000    | -0.082138  | -6.8996    | 5.0979        | - | - | -                       | *                       |           |
| 30.00000 | 52.00000 | 71.60000    | -0.081927  | -6.8819    | 5.0823        | - | - | -                       | *                       |           |
| 32.00000 | 52.00000 | 71.60000    | -0.081716  | -6.8641    | 5.0667        | - | - | -                       | *                       |           |
| 34.00000 | 52.00000 | 71.60000    | -0.081505  | -6.8464    | 5.0511        | - | - | -                       | *                       |           |
| 36.00000 | 52.00000 | 71.60000    | -0.081294  | -6.8287    | 5.0355        | - | - | -                       | *                       |           |
| 38.00000 | 52.00000 | 71.60000    | -0.081084  | -6.8110    | 5.0199        | - | - | -                       | *                       |           |
| 40.00000 | 52.00000 | 71.60000    | -0.080873  | -6.7933    | 5.0043        | - | - | -                       | *                       |           |
| 42.00000 | 52.00000 | 71.60000    | -0.080662  | -6.7756    | 4.9887        | - | - | -                       | *                       |           |
| 44.00000 | 52.00000 | 71.60000    | -0.30619   | -4.8991    | 4.0697        | - | - | -                       | *                       |           |
| 46.00000 | 52.00000 | 71.60000    | -0.97522   | -4.4581    | 3.8438        | - | - | -                       | *                       |           |
| 48.00000 | 52.00000 | 71.60000    | -1.4284    | -3.8091    | 3.4908        | - | - | -                       | *                       |           |
| 50.00000 | 52.00000 | 71.60000    | -1.6227    | -3.0545    | 3.0437        | - | - | -                       | *                       |           |
| 52.00000 | 52.00000 | 71.60000    | -1.5670    | -2.2792    | 2.5367        | - | - | -                       | *                       |           |
| 54.00000 | 52.00000 | 71.60000    | -1.3167    | -1.5605    | 2.0009        | - | - | -                       | *                       |           |
| 56.00000 | 52.00000 | 71.60000    | -1.2125    | -1.2125    | 1.4621        | - | - | -                       | *                       |           |
| 58.00000 | 52.00000 | 71.60000    | -1.1109    | -0.96078   | 0.95359       | - | - | -                       | *                       |           |
| 60.00000 | 52.00000 | 71.60000    | -0.95486   | -0.72751   | 0.45886       | - | - | -                       | *                       |           |
| 62.00000 | 52.00000 | 71.60000    | -0.74328   | -0.50606   | 0.11897       | - | - | -                       | *                       |           |
| 64.00000 | 52.00000 | 71.60000    | -0.48610   | -0.29914   | 0.077118      | - | - | -                       | *                       |           |
| 66.00000 | 52.00000 | 71.60000    | -0.19165   | -0.10760   | 0.039764      | - | - | -                       | *                       |           |
| 68.00000 | 52.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 70.00000 | 52.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 0.00000  | 54.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 54.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 54.00000 | 71.60000    | 0.080177   | -0.052258  | 0.021243      | - | - | -                       | *                       |           |
| 6.00000  | 54.00000 | 71.60000    | 0.34998    | -0.25048   | 0.062958      | - | - | -                       | *                       |           |
| 8.00000  | 54.00000 | 71.60000    | 0.58025    | -0.46041   | 0.095904      | - | - | -                       | *                       |           |
| 10.00000 | 54.00000 | 71.60000    | 0.76355    | -0.67975   | 0.20535       | - | - | -                       | *                       |           |
| 12.00000 | 54.00000 | 71.60000    | 0.89173    | -0.90412   | 0.64271       | - | - | -                       | *                       |           |
| 14.00000 | 54.00000 | 71.60000    | 1.0105     | -1.1897    | 1.0972        | - | - | -                       | *                       |           |
| 16.00000 | 54.00000 | 71.60000    | 1.0812     | -1.5179    | 1.5575        | - | - | -                       | *                       |           |
| 18.00000 | 54.00000 | 71.60000    | 1.0783     | -1.8743    | 2.0053        | - | - | -                       | *                       |           |
| 20.00000 | 54.00000 | 71.60000    | 1.0845     | -2.4740    | 2.4182        | - | - | -                       | *                       |           |
| 22.00000 | 54.00000 | 71.60000    | 0.92657    | -3.0745    | 2.7696        | - | - | -                       | *                       |           |
| 24.00000 | 54.00000 | 71.60000    | 0.58447    | -3.5555    | 3.0318        | - | - | -                       | *                       |           |
| 26.00000 | 54.00000 | 71.60000    | 0.10555    | -3.8525    | 3.1799        | - | - | -                       | *                       |           |
| 28.00000 | 54.00000 | 71.60000    | -0.064666  | -5.4320    | 3.8209        | - | - | -                       | *                       |           |
| 30.00000 | 54.00000 | 71.60000    | -0.064460  | -5.4147    | 3.8062        | - | - | -                       | *                       |           |
| 32.00000 | 54.00000 | 71.60000    | -0.064254  | -5.3974    | 3.7916        | - | - | -                       | *                       |           |
| 34.00000 | 54.00000 | 71.60000    | -0.064049  | -5.3801    | 3.7770        | - | - | -                       | *                       |           |
| 36.00000 | 54.00000 | 71.60000    | -0.063843  | -5.3628    | 3.7624        | - | - | -                       | *                       |           |
| 38.00000 | 54.00000 | 71.60000    | -0.063637  | -5.3455    | 3.7479        | - | - | -                       | *                       |           |
| 40.00000 | 54.00000 | 71.60000    | -0.063431  | -5.3282    | 3.7333        | - | - | -                       | *                       |           |
| 42.00000 | 54.00000 | 71.60000    | -0.063226  | -5.3110    | 3.7188        | - | - | -                       | *                       |           |
| 44.00000 | 54.00000 | 71.60000    | -0.20028   | -3.7051    | 3.0684        | - | - | -                       | *                       |           |
| 46.00000 | 54.00000 | 71.60000    | -0.63862   | -3.3755    | 2.9008        | - | - | -                       | *                       |           |
| 48.00000 | 54.00000 | 71.60000    | -0.93306   | -2.8769    | 2.6253        | - | - | -                       | *                       |           |
| 50.00000 | 54.00000 | 71.60000    | -1.0438    | -2.2719    | 2.2671        | - | - | -                       | *                       |           |
| 52.00000 | 54.00000 | 71.60000    | -1.0646    | -1.7904    | 1.8534        | - | - | -                       | *                       |           |
| 54.00000 | 54.00000 | 71.60000    | -1.0522    | -1.4420    | 1.4095        | - | - | -                       | *                       |           |
| 56.00000 | 54.00000 | 71.60000    | -0.97037   | -1.1220    | 0.95654       | - | - | -                       | *                       |           |
| 58.00000 | 54.00000 | 71.60000    | -0.83558   | -0.83558   | 0.50871       | - | - | -                       | *                       |           |
| 60.00000 | 54.00000 | 71.60000    | -0.69194   | -0.60957   | 0.12514       | - | - | -                       | *                       |           |
| 62.00000 | 54.00000 | 71.60000    | -0.50457   | -0.39722   | 0.083968      | - | - | -                       | *                       |           |
| 64.00000 | 54.00000 | 71.60000    | -0.27261   | -0.19397   | 0.052754      | - | - | -                       | *                       |           |
| 66.00000 | 54.00000 | 71.60000    | -0.0030143 | -0.0019566 | 0.0039189     | - | - | -                       | *                       |           |
| 68.00000 | 54.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 70.00000 | 54.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 0.00000  | 56.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 56.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 56.00000 | 71.60000    | 0.0        | 0.0        | 0.0           | - | - | -                       | *                       |           |
| 6.00000  | 56.00000 | 71.60000    | 0.13854    | -0.11274   | 0.033702      | - | - | -                       | *                       |           |
| 8.00000  | 56.00000 | 71.60000    | 0.34919    | -0.31503   | 0.066000      | - | - | -                       | *                       |           |
| 10.00000 | 56.00000 | 71.60000    | 0.51554    | -0.52183   | 0.095035      | - | - | -                       | *                       |           |
| 12.00000 | 56.00000 | 71.60000    | 0.66135    | -0.76239   | 0.19867       | - | - | -                       | *                       |           |
| 14.00000 | 56.00000 | 71.60000    | 0.77211    | -1.0336    | 0.58558       | - | - | -                       | *                       |           |
| 16.00000 | 56.00000 | 71.60000    | 0.83142    | -1.3271    | 0.96668       | - | - | -                       | *                       |           |
| 18.00000 | 56.00000 | 71.60000    | 0.82726    | -1.6348    | 1.3304        | - | - | -                       | *                       |           |
| 20.00000 | 56.00000 | 71.60000    | 0.74907    | -1.9429    | 1.6599        | - | - | -                       | *                       |           |
| 22.00000 | 56.00000 | 71.60000    | 0.59124    | -2.2306    | 1.9348        | - | - | -                       | *                       |           |
| 24.00000 | 56.00000 | 71.60000    | 0.35738    | -2.4719    | 2.1342        | - | - | -                       | *                       |           |
| 26.00000 | 56.00000 | 71.60000    | 0.064028   | -2.6572    | 2.2402        | - | - | -                       | *                       |           |
| 28.00000 | 56.00000 | 71.60000    | -0.047390  | -3.9808    | 2.6577        | - | - | -                       | *                       |           |
| 30.00000 | 56.00000 | 71.60000    | -0.047184  | -3.9634    | 2.6448        | - | - | -                       | *                       |           |
| 32.00000 | 56.00000 | 71.60000    | -0.047026  | -3.9502    | 2.6318        | - | - | -                       | *                       |           |
| 34.00000 | 56.00000 | 71.60000    | -0.046919  | -3.9412    | 2.6189        | - | - | -                       | *                       |           |
|          |          |             |            |            |               |   |   |                         |                         |           |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |         | Coordinates |          |          | Displacements |           |           | Angle of<br>Line<br>to x Axis |                            |
|----------|---------|-------------|----------|----------|---------------|-----------|-----------|-------------------------------|----------------------------|
| Name     | Dist.   | x           | y        | z        | x             | y         | z         | Horizontal<br>displacement    | Horizontal<br>displacement |
|          |         | 44.00000    | 58.00000 | 71.60000 | -0.088664     | -2.0836   | 1.3203    | -                             | -                          |
|          |         | 46.00000    | 58.00000 | 71.60000 | -0.28992      | -1.9466   | 1.2322    | -                             | -                          |
|          |         | 48.00000    | 58.00000 | 71.60000 | -0.44737      | -1.7522   | 1.0729    | -                             | -                          |
|          |         | 50.00000    | 58.00000 | 71.60000 | -0.54932      | -1.5187   | 0.85497   | -                             | -                          |
|          |         | 52.00000    | 58.00000 | 71.60000 | -0.59182      | -1.2644   | 0.59253   | -                             | -                          |
|          |         | 54.00000    | 58.00000 | 71.60000 | -0.57702      | -1.0044   | 0.29891   | -                             | -                          |
|          |         | 56.00000    | 58.00000 | 71.60000 | -0.51088      | -0.75036  | 0.12010   | -                             | -                          |
|          |         | 58.00000    | 58.00000 | 71.60000 | -0.40111      | -0.50951  | 0.084791  | -                             | -                          |
|          |         | 60.00000    | 58.00000 | 71.60000 | -0.25561      | -0.28604  | 0.057231  | -                             | -                          |
|          |         | 62.00000    | 58.00000 | 71.60000 | -0.081668     | -0.081668 | 0.023698  | -                             | -                          |
|          |         | 64.00000    | 58.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 66.00000    | 58.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 68.00000    | 58.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 70.00000    | 58.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 0.00000     | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 2.00000     | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 4.00000     | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 6.00000     | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 8.00000     | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 10.00000    | 60.00000 | 71.60000 | 0.10641       | -0.1337   | 0.032525  | -                             | -                          |
|          |         | 12.00000    | 60.00000 | 71.60000 | 0.23869       | -0.34146  | 0.061389  | -                             | -                          |
|          |         | 14.00000    | 60.00000 | 71.60000 | 0.33722       | -0.56022  | 0.085988  | -                             | -                          |
|          |         | 16.00000    | 60.00000 | 71.60000 | 0.39627       | -0.78492  | 0.11456   | -                             | -                          |
|          |         | 18.00000    | 60.00000 | 71.60000 | 0.41099       | -1.0079   | 0.14958   | -                             | -                          |
|          |         | 20.00000    | 60.00000 | 71.60000 | 0.37863       | -1.2187   | 0.34621   | -                             | -                          |
|          |         | 22.00000    | 60.00000 | 71.60000 | -0.30001      | -1.4046   | 0.51181   | -                             | -                          |
|          |         | 24.00000    | 60.00000 | 71.60000 | 0.18075       | -1.5515   | 0.62541   | -                             | -                          |
|          |         | 26.00000    | 60.00000 | 71.60000 | 0.031963      | -1.6461   | 0.67913   | -                             | -                          |
|          |         | 28.00000    | 60.00000 | 71.60000 | -0.029384     | -2.4682   | 0.81465   | -                             | -                          |
|          |         | 30.00000    | 60.00000 | 71.60000 | -0.029277     | -2.4593   | 0.80565   | -                             | -                          |
|          |         | 32.00000    | 60.00000 | 71.60000 | 0.029171      | -2.4504   | 0.79666   | -                             | -                          |
|          |         | 34.00000    | 60.00000 | 71.60000 | -0.029065     | -2.4414   | 0.78770   | -                             | -                          |
|          |         | 36.00000    | 60.00000 | 71.60000 | -0.028959     | -2.4325   | 0.77876   | -                             | -                          |
|          |         | 38.00000    | 60.00000 | 71.60000 | -0.028852     | -2.4236   | 0.76984   | -                             | -                          |
|          |         | 40.00000    | 60.00000 | 71.60000 | -0.028746     | -2.4147   | 0.76094   | -                             | -                          |
|          |         | 42.00000    | 60.00000 | 71.60000 | 0.028640      | -2.4057   | 0.75206   | -                             | -                          |
|          |         | 44.00000    | 60.00000 | 71.60000 | -0.061126     | -1.5893   | 0.60810   | -                             | -                          |
|          |         | 46.00000    | 60.00000 | 71.60000 | -0.20005      | -1.4861   | 0.54379   | -                             | -                          |
|          |         | 48.00000    | 60.00000 | 71.60000 | -0.30775      | -1.3336   | 0.42214   | -                             | -                          |
|          |         | 50.00000    | 60.00000 | 71.60000 | -0.37433      | -1.1450   | 0.25103   | -                             | -                          |
|          |         | 52.00000    | 60.00000 | 71.60000 | -0.39514      | -0.93396  | 0.13556   | -                             | -                          |
|          |         | 54.00000    | 60.00000 | 71.60000 | -0.36999      | -0.71258  | 0.10395   | -                             | -                          |
|          |         | 56.00000    | 60.00000 | 71.60000 | -0.30193      | -0.49064  | 0.077839  | -                             | -                          |
|          |         | 58.00000    | 60.00000 | 71.60000 | -0.19584      | -0.27523  | 0.053260  | -                             | -                          |
|          |         | 60.00000    | 60.00000 | 71.60000 | -0.057305     | -0.070949 | 0.020236  | -                             | -                          |
|          |         | 62.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 64.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 66.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 68.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
|          |         | 70.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                             | -                          |
| Line 1   | Line 1  | 30.00000    | 4.70000  | 71.00000 | 0.0024917     | 0.42110   | 0.074831  | -0.42110                      | -0.0024917                 |
|          | 0.94000 | 30.00000    | 5.64000  | 71.00000 | 0.0045774     | 0.77358   | 0.11404   | -0.77358                      | -0.0045774                 |
|          | 1.8800  | 30.00000    | 6.58000  | 71.00000 | 0.0066631     | 1.1261    | 0.14947   | -1.1261                       | -0.0066631                 |
|          | 2.8200  | 30.00000    | 7.52000  | 71.00000 | 0.0087489     | 1.4786    | 0.19177   | -1.4786                       | -0.0087489                 |
|          | 3.7600  | 30.00000    | 8.46000  | 71.00000 | 0.010835      | 1.8310    | 0.25003   | -1.8310                       | -0.010835                  |
|          | 4.7000  | 30.00000    | 9.40000  | 71.00000 | 0.012920      | 2.1835    | 0.53748   | -2.1835                       | -0.012920                  |
|          | 5.6400  | 30.00000    | 10.34000 | 71.00000 | 0.015006      | 2.5360    | 0.88360   | -2.5360                       | -0.015006                  |
|          | 6.5800  | 30.00000    | 11.28000 | 71.00000 | 0.017092      | 2.8885    | 1.2635    | -2.8885                       | -0.017092                  |
|          | 7.5200  | 30.00000    | 12.22000 | 71.00000 | 0.019177      | 3.2410    | 1.6799    | -3.2410                       | -0.019177                  |
|          | 8.4600  | 30.00000    | 13.16000 | 71.00000 | 0.021263      | 3.5935    | 2.1340    | -3.5935                       | -0.021263                  |
|          | 9.4000  | 30.00000    | 14.10000 | 71.00000 | 0.023349      | 3.9460    | 2.6255    | -3.9460                       | -0.023349                  |
| Line 2   | Line 2  | 32.00000    | 15.10000 | 71.00000 | 0.027649      | 4.6727    | 3.1940    | 0.027649                      | 4.6727                     |
|          | 1.0286  | 33.02857    | 15.10000 | 71.00000 | 0.027675      | 4.6772    | 3.1975    | 0.027675                      | 4.6772                     |
|          | 2.0571  | 34.05714    | 15.10000 | 71.00000 | 0.027702      | 4.6816    | 3.2010    | 0.027702                      | 4.6816                     |
|          | 3.0857  | 35.08571    | 15.10000 | 71.00000 | 0.027728      | 4.6860    | 3.2046    | 0.027728                      | 4.6860                     |
|          | 4.1143  | 36.11429    | 15.10000 | 71.00000 | 0.027754      | 4.6904    | 3.2081    | 0.027754                      | 4.6904                     |
|          | 5.1429  | 37.14286    | 15.10000 | 71.00000 | 0.027780      | 4.6948    | 3.2117    | 0.027780                      | 4.6948                     |
|          | 6.1714  | 38.17143    | 15.10000 | 71.00000 | 0.027806      | 4.6992    | 3.2152    | 0.027806                      | 4.6992                     |
|          | 7.2000  | 39.20000    | 15.10000 | 71.00000 | 0.027832      | 4.7036    | 3.2187    | 0.027832                      | 4.7036                     |
| Line 3   | Line 3  | 39.40000    | 14.20000 | 71.00000 | 0.023971      | 4.0511    | 2.7103    | 0.023971                      | 4.0511                     |
|          | 0.85000 | 40.25000    | 14.20000 | 71.00000 | 0.023993      | 4.0548    | 2.7131    | 0.023993                      | 4.0548                     |
|          | 1.7000  | 41.10000    | 14.20000 | 71.00000 | 0.024014      | 4.0584    | 2.7158    | 0.024014                      | 4.0584                     |
|          | 2.5500  | 41.95000    | 14.20000 | 71.00000 | 0.024036      | 4.0621    | 2.7186    | 0.024036                      | 4.0621                     |
|          | 3.4000  | 42.80000    | 14.20000 | 71.00000 | 0.024058      | 4.0657    | 2.7214    | 0.024058                      | 4.0657                     |
|          | 4.2500  | 43.65000    | 14.20000 | 71.00000 | -0.090220     | 2.7066    | -0.090220 | 2.7066                        | -0.090220                  |
|          | 5.1000  | 44.50000    | 14.20000 | 71.00000 | -0.22266      | 2.6242    | -0.22266  | 2.6242                        | -0.22266                   |
| Line 4   | Line 4  | 44.60000    | 14.20000 | 71.00000 | -0.23749      | 2.6124    | -2.6124   | -2.6124                       | 270.00                     |
|          | 0.99000 | 44.60000    | 13.21000 | 71.00000 | -0.20135      | 2.3477    | 1.8157    | -2.3477                       | -0.20135                   |
|          | 1.9800  | 44.60000    | 12.22000 | 71.00000 | -0.17140      | 2.1116    | 1.4189    | -2.1116                       | -0.17140                   |
|          | 2.9700  | 44.60000    | 11.23000 | 71.00000 | -0.14438      | 1.8741    | 1.0486    | -1.8741                       | -0.14438                   |
|          | 3.9600  | 44.60000    | 10.24000 | 71.00000 | -0.11990      | 1.6354    | 0.70415   | -1.6354                       | -0.11990                   |
|          | 4.9500  | 44.60000    | 9.25000  | 71.00000 | -0.097603     | 1.3957    | 0.38349   | -1.3957                       | -0.097603                  |
|          | 5.9400  | 44.60000    | 8.26000  | 71.00000 | -0.077218     | 1.1552    | 0.15585   | -1.1552                       | -0.077218                  |
|          | 6.9300  | 44.60000    | 7.27000  | 71.00000 | -0.058508     | 0.91390   | 0.11857   | -0.91390                      | -0.058508                  |
|          | 7.9200  | 44.60000    | 6.28000  | 71.00000 | -0.041276     | 0.67198   | 0.091322  | -0.67198                      | -0.041276                  |
|          | 8.9100  | 44.60000    | 5.29000  | 71.00000 | -0.025353     | 0.42949   | 0.066909  | -0.42949                      | -0.025353                  |
|          | 9.9000  | 44.60000    | 4.30000  | 71.00000 | -0.010596     | 0.18650   | 0.036817  | -0.18650                      | -0.010596                  |
| Line 5   | Line 5  | 29.00000    | 57.20000 | 71.00000 | -0.041829     | -3.5136   | 2.0280    | 3.5136                        | -0.041829                  |
|          | 1.0167  | 29.00000    | 56.18333 | 71.00000 | -0.046367     | -3.8948   | 2.5522    | 3.8948                        | -0.046367                  |
|          | 2.0333  | 29.00000    | 55.16667 | 71.00000 | -0.054494     | -4.5775   | 3.1181    | 4.5775                        | -0.054494                  |
|          | 3.0500  | 29.00000    | 54.15000 | 71.00000 | -0.063267     | -5.3144   | 3.7217    | 5.3144                        | -0.063267                  |
|          | 4.0667  | 29.00000    | 53.13333 | 71.00000 | -0.072081     | -6.0548   | 4.3564    | 6.0548                        | -0.072081                  |
|          | 5.0833  | 29.00000    | 52.11667 | 71.00000 | -0.080999     |           |           |                               |                            |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. | Coordinates |          |          | Displacements |          |          |          | Angle of Line           |                         |           |
|----------|-------------|----------|----------|---------------|----------|----------|----------|-------------------------|-------------------------|-----------|
| Name     | Dist.       | x        | y        | z             | x        | y        | z        | Horizontal displacement | Horizontal displacement | to x Axis |
|          | 8.7779      | 58.92500 | 28.17500 | 77.00000      | -2.8651  | 0.45715  | 2.4670   | 0.38356                 | 2.8759                  | 88.531 *  |
|          | 9.7532      | 58.95000 | 29.15000 | 77.00000      | -3.0014  | 0.29351  | 2.5316   | 0.21648                 | 3.0079                  | 88.531 *  |
|          | 10.729      | 58.97500 | 30.12500 | 77.00000      | -3.0939  | 0.11206  | 2.5698   | 0.032721                | 3.0957                  | 88.531 *  |
|          | 11.704      | 59.00000 | 31.10000 | 77.00000      | -4.5066  | 0.053019 | 3.0620   | -0.062515               | 4.5065                  | 88.531 *  |
|          | 12.679      | 59.02500 | 32.07500 | 77.00000      | -4.4968  | 0.052904 | 3.0543   | -0.062379               | 4.4967                  | 88.531 *  |
|          | 13.654      | 59.05000 | 33.05000 | 77.00000      | -4.4870  | 0.052788 | 3.0466   | -0.062243               | 4.4869                  | 88.531 *  |
|          | 14.630      | 59.07500 | 34.02500 | 77.00000      | -4.4772  | 0.052673 | 3.0388   | -0.062106               | 4.4771                  | 88.531 *  |
|          | 15.605      | 59.10000 | 35.00000 | 77.00000      | -4.4674  | 0.052557 | 3.0311   | -0.061970               | 4.4672                  | 88.531 *  |
| Line 10  | Line 10     | 59.15000 | 35.00000 | 77.00000      | -4.4311  | 0.052131 | 3.0026   | -4.4311                 | 0.052131                | 0.0 *     |
|          | 0.96667     | 60.11667 | 35.00000 | 77.00000      | -3.8379  | 0.045152 | 2.4712   | -3.8379                 | 0.045152                | 0.0 *     |
|          | 1.9333      | 61.08333 | 35.00000 | 77.00000      | -3.4754  | 0.040888 | 1.9779   | -3.4754                 | 0.040888                | 0.0 *     |
|          | 2.9000      | 62.05000 | 35.00000 | 77.00000      | -3.1130  | 0.036623 | 1.5245   | -3.1130                 | 0.036623                | 0.0 *     |
|          | 3.8667      | 63.01667 | 35.00000 | 77.00000      | -2.7505  | 0.032359 | 1.1107   | -2.7505                 | 0.032359                | 0.0 *     |
|          | 4.8333      | 63.98333 | 35.00000 | 77.00000      | -2.3881  | 0.028095 | 0.73457  | -2.3881                 | 0.028095                | 0.0 *     |
|          | 5.8000      | 64.95000 | 35.00000 | 77.00000      | -2.0256  | 0.023831 | 0.39239  | -2.0256                 | 0.023831                | 0.0 *     |
| Line 11  | Line 11     | 65.00000 | 35.00000 | 77.00000      | -2.0069  | 0.023611 | 0.37552  | -0.0037401              | -2.0070                 | 269.43 *  |
|          | 1.0100      | 64.99000 | 33.99000 | 77.00000      | -2.0062  | 0.023602 | 0.37488  | -0.0037388              | -2.0063                 | 269.43 *  |
|          | 2.0201      | 64.98000 | 32.98000 | 77.00000      | -2.0055  | 0.023594 | 0.37425  | -0.0037375              | -2.0056                 | 269.43 *  |
|          | 3.0301      | 64.97000 | 31.97000 | 77.00000      | -2.0048  | 0.023586 | 0.37362  | -0.0037362              | -2.0049                 | 269.43 *  |
|          | 4.0402      | 64.96000 | 30.96000 | 77.00000      | -2.0041  | 0.023577 | 0.37298  | -0.0037348              | -2.0042                 | 269.43 *  |
|          | 5.0502      | 64.95000 | 29.95000 | 77.00000      | -1.3329  | 0.045750 | 0.27499  | -0.032552               | -1.3332                 | 269.43 *  |
|          | 6.0603      | 64.94000 | 28.94000 | 77.00000      | -1.2977  | 0.10457  | 0.25746  | -0.091721               | -1.2986                 | 269.43 *  |
|          | 7.0703      | 64.93000 | 27.93000 | 77.00000      | -1.2493  | 0.15853  | 0.22603  | -0.14615                | -1.2509                 | 269.43 *  |
|          | 8.0804      | 64.92000 | 26.92000 | 77.00000      | -1.1891  | 0.20600  | 0.18122  | -0.19422                | -1.1911                 | 269.43 *  |
|          | 9.0904      | 64.91000 | 25.91000 | 77.00000      | -1.1184  | 0.24563  | 0.15619  | -0.23455                | -1.1208                 | 269.43 *  |
|          | 10.100      | 64.90000 | 24.90000 | 77.00000      | -1.0387  | 0.27635  | 0.14395  | -0.26605                | -1.0414                 | 269.43 *  |
| Line 12  | Line 12     | 64.95000 | 24.90000 | 77.00000      | -1.0282  | 0.27294  | 0.14199  | -1.0221                 | -0.29497                | 329.04 *  |
|          | 0.58310     | 65.45000 | 24.60000 | 77.00000      | -0.89879 | 0.24531  | 0.12107  | -0.89692                | -0.25207                | 329.04 *  |
|          | 1.1662      | 65.95000 | 24.30000 | 77.00000      | -0.77033 | 0.21576  | 0.10391  | -0.77156                | -0.21132                | 329.04 *  |
| Line 13  | Line 13     | 66.00000 | 24.30000 | 77.00000      | -0.75982 | 0.21238  | 0.10262  | -0.16909                | -0.77071                | 266.76 *  |
|          | 1.0617      | 65.94000 | 23.24000 | 77.00000      | -0.68471 | 0.22364  | 0.094638 | -0.18459                | -0.69625                | 266.76 *  |
|          | 2.1234      | 65.88000 | 22.18000 | 77.00000      | -0.60296 | 0.22551  | 0.086235 | -0.19108                | -0.61474                | 266.76 *  |
|          | 3.1851      | 65.82000 | 21.12000 | 77.00000      | -0.51613 | 0.21763  | 0.077476 | -0.18811                | -0.52760                | 266.76 *  |
|          | 4.2468      | 65.76000 | 20.06000 | 77.00000      | -0.42558 | 0.19983  | 0.068246 | -0.17546                | -0.43620                | 266.76 *  |
|          | 5.3085      | 65.70000 | 19.00000 | 77.00000      | -0.33260 | 0.17219  | 0.058190 | -0.15312                | -0.34180                | 266.76 *  |
| Line 14  | Line 14     | 64.75000 | 19.40000 | 77.00000      | -1.2927  | 0.83336  | 1.0592   | -1.3445                 | 0.85698                 | 356.68 *  |
|          | 0.98737     | 59.73571 | 19.34286 | 77.00000      | -1.1893  | 0.81191  | 0.77791  | -1.2343                 | 0.74172                 | 356.68 *  |
|          | 1.9747      | 60.72143 | 19.28571 | 77.00000      | -1.0728  | 0.69493  | 0.50614  | -1.1113                 | 0.63168                 | 356.68 *  |
|          | 2.9621      | 61.70714 | 19.22857 | 77.00000      | -0.94483 | 0.58250  | 0.24402  | -0.97696                | 0.52684                 | 356.68 *  |
|          | 3.9495      | 62.69286 | 19.17143 | 77.00000      | -0.80656 | 0.47458  | 0.12390  | -0.83267                | 0.42711                 | 356.68 *  |
|          | 4.9368      | 63.67857 | 19.11429 | 77.00000      | -0.65914 | 0.37110  | 0.098041 | -0.67951                | 0.33233                 | 356.68 *  |
|          | 5.9242      | 64.66429 | 19.05714 | 77.00000      | -0.50358 | 0.27189  | 0.077929 | -0.51847                | 0.24229                 | 356.68 *  |
|          | 6.9116      | 65.65000 | 19.00000 | 77.00000      | -0.34076 | 0.17680  | 0.059169 | -0.35042                | 0.15678                 | 356.68 *  |

\* Result includes imported displacement(s).

## Specific Building Damage Results - Horizontal Displacements

Structure: 24 Netherhall Gardens | Sub-structure: Front

| 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]                                          |
| 0.0     | 30.00000    | 4.70000  | 71.00000 | 0.0024917     | 0.42110 | 0.42110                                       |
| 0.94000 | 30.00000    | 5.64000  | 71.00000 | 0.0045774     | 0.77358 | -0.0045774 d                                  |
| 1.8800  | 30.00000    | 6.58000  | 71.00000 | 0.0066631     | 1.1261  | -0.0066631 d                                  |
| 2.8200  | 30.00000    | 7.52000  | 71.00000 | 0.0087489     | 1.4786  | -0.0087489 d                                  |
| 3.7600  | 30.00000    | 8.46000  | 71.00000 | 0.010835      | 1.8310  | -0.010835 d                                   |
| 4.7000  | 30.00000    | 9.40000  | 71.00000 | 0.012920      | 2.1835  | -0.012920 d                                   |
| 5.6400  | 30.00000    | 10.34000 | 71.00000 | 0.015006      | 2.5360  | -0.015006 d                                   |
| 6.5800  | 30.00000    | 11.28000 | 71.00000 | 0.017092      | 2.8885  | -0.017092 d                                   |
| 7.5200  | 30.00000    | 12.22000 | 71.00000 | 0.019177      | 3.2410  | -0.019177 d                                   |
| 8.4600  | 30.00000    | 13.16000 | 71.00000 | 0.021263      | 3.5935  | -0.021263 d                                   |
| 9.4000  | 30.00000    | 14.10000 | 71.00000 | 0.023349      | 3.9460  | -0.023349 d                                   |

d - Displacements include imported displacements.

Structure: 24 Netherhall Gardens | Sub-structure: Side

| 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]                                          |
| 0.0    | 32.00000    | 15.10000 | 71.00000 | 0.027649      | 4.6727 | 4.6727 d                                      |
| 1.0286 | 33.02857    | 15.10000 | 71.00000 | 0.027675      | 4.6772 | 4.6772 d                                      |
| 2.0571 | 34.05714    | 15.10000 | 71.00000 | 0.027702      | 4.6816 | 4.6816 d                                      |
| 3.0857 | 35.08571    | 15.10000 | 71.00000 | 0.027728      | 4.6860 | 4.6860 d                                      |
| 4.1143 | 36.11429    | 15.10000 | 71.00000 | 0.027754      | 4.6904 | 4.6904 d                                      |
| 5.1429 | 37.14286    | 15.10000 | 71.00000 | 0.027780      | 4.6948 | 4.6948 d                                      |
| 6.1714 | 38.17143    | 15.10000 | 71.00000 | 0.027806      | 4.6992 | 4.6992 d                                      |
| 7.2000 | 39.20000    | 15.10000 | 71.00000 | 0.027832      | 4.7036 | 4.7036 d                                      |

d - Displacements include imported displacements.

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| 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]                                          |
| 0.0     | 39.40000    | 14.20000 | 71.00000 | 0.023971      | 4.0511 | 4.0511 d                                      |
| 0.85000 | 40.25000    | 14.20000 | 71.00000 | 0.023993      | 4.0548 | 4.0548 d                                      |
| 1.7000  | 41.10000    | 14.20000 | 71.00000 | 0.024014      | 4.0584 | 4.0584 d                                      |
| 2.5500  | 41.95000    | 14.20000 | 71.00000 | 0.024036      | 4.0621 | 4.0621 d                                      |
| 3.4000  | 42.80000    | 14.20000 | 71.00000 | 0.024058      | 4.0657 | 4.0657 d                                      |
| 4.2500  | 43.65000    | 14.20000 | 71.00000 | -0.090220     | 2.7066 | 2.7066 d                                      |
| 5.1000  | 44.50000    | 14.20000 | 71.00000 | -0.22266      | 2.6242 | 2.6242 d                                      |

d - Displacements include imported displacements.

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| 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]                                          |
| 0.0     | 44.60000    | 14.20000 | 71.00000 | -0.23749      | 2.6124  | -2.6124                                       |
| 0.99000 | 44.60000    | 13.21000 | 71.00000 | -0.20135      | 2.3477  | -0.20135 d                                    |
| 1.9800  | 44.60000    | 12.22000 | 71.00000 | -0.17140      | 2.1116  | -0.17140 d                                    |
| 2.9700  | 44.60000    | 11.23000 | 71.00000 | -0.14438      | 1.8741  | -0.14438 d                                    |
| 3.9600  | 44.60000    | 10.24000 | 71.00000 | -0.11990      | 1.6354  | -0.11990 d                                    |
| 4.9500  | 44.60000    | 9.25000  | 71.00000 | -0.097603     | 1.3957  | -0.097603 d                                   |
| 5.9400  | 44.60000    | 8.26000  | 71.00000 | -0.077218     | 1.1552  | -0.077218 d                                   |
| 6.9300  | 44.60000    | 7.27000  | 71.00000 | -0.058508     | 0.91390 | -0.058508 d                                   |
| 7.9200  | 44.60000    | 6.28000  | 71.00000 | -0.041276     | 0.67198 | -0.041276 d                                   |
| 8.9100  | 44.60000    | 5.29000  | 71.00000 | -0.025353     | 0.42949 | -0.025353 d                                   |
| 9.9000  | 44.60000    | 4.30000  | 71.00000 | -0.010596     | 0.18650 | -0.010596 d                                   |

d - Displacements include imported displacements.

Structure: 28 Netherhall Gardens | Sub-structure: Front North

| 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]                                          |
| 0.0   | 29.00000    | 57.20000 | 71.60000 | -0.041829     | -3.5136 | -3.5136                                       |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Northern Deep Basement**  
**Combined Piling and Excavation**

</



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Dist.                                             | Coordinates |          |          | Displacements                     |                                       |
|---------------------------------------------------|-------------|----------|----------|-----------------------------------|---------------------------------------|
|                                                   | x           | y        | z        | x                                 | y                                     |
|                                                   |             |          |          | Horizontal displacement along the | Horizontal displacement perpendicular |
| 5.0502                                            | 64.95000    | 29.95000 | 77.00000 | -1.3329                           | 0.045750                              |
| 6.0603                                            | 64.94000    | 28.94000 | 77.00000 | -1.2977                           | 0.10457                               |
| 7.0703                                            | 64.93000    | 27.93000 | 77.00000 | -1.2493                           | 0.15853                               |
| 8.0804                                            | 64.92000    | 26.92000 | 77.00000 | -1.1891                           | 0.20600                               |
| 9.0904                                            | 64.91000    | 25.91000 | 77.00000 | -1.1184                           | 0.24563                               |
| 10.100                                            | 64.90000    | 24.90000 | 77.00000 | -1.0387                           | 0.27635                               |
| d - Displacements include imported displacements. |             |          |          |                                   |                                       |

Structure: Rear Structures | Sub-structure: East - Mid

| Dist.                                             | Coordinates |          |          | Displacements                     |                                       |
|---------------------------------------------------|-------------|----------|----------|-----------------------------------|---------------------------------------|
|                                                   | x           | y        | z        | x                                 | y                                     |
|                                                   |             |          |          | Horizontal displacement along the | Horizontal displacement perpendicular |
|                                                   |             |          |          | Line                              | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]                              | [mm]                                  |
| 0.0                                               | 64.95000    | 24.90000 | 77.00000 | -1.0282                           | 0.27294                               |
| 0.58310                                           | 65.45000    | 24.60000 | 77.00000 | -0.89879                          | 0.24531                               |
| 1.1662                                            | 65.95000    | 24.30000 | 77.00000 | -0.77033                          | 0.21576                               |
| d - Displacements include imported displacements. |             |          |          |                                   |                                       |

Structure: Rear Structures | Sub-structure: East - South

| Dist.                                             | Coordinates |          |          | Displacements                     |                                       |
|---------------------------------------------------|-------------|----------|----------|-----------------------------------|---------------------------------------|
|                                                   | x           | y        | z        | x                                 | y                                     |
|                                                   |             |          |          | Horizontal displacement along the | Horizontal displacement perpendicular |
|                                                   |             |          |          | Line                              | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]                              | [mm]                                  |
| 0.0                                               | 66.00000    | 24.30000 | 77.00000 | -0.75992                          | 0.21238                               |
| 1.0617                                            | 65.94000    | 23.80000 | 77.00000 | -0.68471                          | 0.22364                               |
| 2.1234                                            | 65.88000    | 22.18000 | 77.00000 | -0.60296                          | 0.22551                               |
| 3.1851                                            | 65.82000    | 21.12000 | 77.00000 | -0.51613                          | 0.21763                               |
| 4.2468                                            | 65.76000    | 20.06000 | 77.00000 | -0.42558                          | 0.19983                               |
| 5.3085                                            | 65.70000    | 19.00000 | 77.00000 | -0.33260                          | 0.17219                               |
| d - Displacements include imported displacements. |             |          |          |                                   |                                       |

Structure: Rear Structures | Sub-structure: South

| Dist.                                             | Coordinates |          |          | Displacements                     |                                       |
|---------------------------------------------------|-------------|----------|----------|-----------------------------------|---------------------------------------|
|                                                   | x           | y        | z        | x                                 | y                                     |
|                                                   |             |          |          | Horizontal displacement along the | Horizontal displacement perpendicular |
|                                                   |             |          |          | Line                              | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]                              | [mm]                                  |
| 0.0                                               | 58.75000    | 19.40000 | 77.00000 | -1.2927                           | 0.93336                               |
| 0.98737                                           | 59.73571    | 19.34286 | 77.00000 | -1.1893                           | 0.81191                               |
| 1.9747                                            | 60.72143    | 19.28571 | 77.00000 | -1.0728                           | 0.69493                               |
| 2.9621                                            | 61.70714    | 19.22857 | 77.00000 | -0.94483                          | 0.58250                               |
| 3.9495                                            | 62.69286    | 19.17143 | 77.00000 | -0.80656                          | 0.47458                               |
| 4.9368                                            | 63.67857    | 19.11429 | 77.00000 | -0.65914                          | 0.37110                               |
| 5.9242                                            | 64.66429    | 19.05714 | 77.00000 | -0.50358                          | 0.27189                               |
| 6.9116                                            | 65.65000    | 19.00000 | 77.00000 | -0.34076                          | 0.17680                               |
| d - Displacements include imported displacements. |             |          |          |                                   |                                       |

## Specific Building Damage Results - Vertical Displacements

Structure: 24 Netherhall Gardens | Sub-structure: Front

| Dist.                                             | Coordinates |          |          | Displacements |      |
|---------------------------------------------------|-------------|----------|----------|---------------|------|
|                                                   | x           | y        | z        | x             | y    |
|                                                   | [m]         | [m]      | [m]      | [m]           | [mm] |
| Vertical Offset 1                                 |             |          |          |               |      |
| 0.0                                               | 30.00000    | 4.70000  | 71.00000 | 0.074831      | d    |
| 0.94000                                           | 30.00000    | 5.64000  | 71.00000 | 0.111404      | d    |
| 1.8800                                            | 30.00000    | 6.58000  | 71.00000 | 0.14947       | d    |
| 2.8200                                            | 30.00000    | 7.52000  | 71.00000 | 0.19177       | d    |
| 3.7600                                            | 30.00000    | 8.46000  | 71.00000 | 0.25003       | d    |
| 4.7000                                            | 30.00000    | 9.40000  | 71.00000 | 0.37488       | d    |
| 5.6400                                            | 30.00000    | 10.34000 | 71.00000 | 0.88360       | d    |
| 6.5800                                            | 30.00000    | 11.28000 | 71.00000 | 1.2635        | d    |
| 7.5200                                            | 30.00000    | 12.22000 | 71.00000 | 1.6799        | d    |
| 8.4600                                            | 30.00000    | 13.16000 | 71.00000 | 2.1340        | d    |
| 9.4000                                            | 30.00000    | 14.10000 | 71.00000 | 2.6255        | d    |
| d - Displacements include imported displacements. |             |          |          |               |      |

Structure: 24 Netherhall Gardens | Sub-structure: Side

| Dist.                                             | Coordinates |          |          | Displacements |      |
|---------------------------------------------------|-------------|----------|----------|---------------|------|
|                                                   | x           | y        | z        | x             | y    |
|                                                   | [m]         | [m]      | [m]      | [m]           | [mm] |
| Vertical Offset 1                                 |             |          |          |               |      |
| 0.0                                               | 32.00000    | 15.10000 | 71.00000 | 3.1940        | d    |
| 1.0286                                            | 33.02857    | 15.10000 | 71.00000 | 3.1975        | d    |
| 2.0571                                            | 34.05714    | 15.10000 | 71.00000 | 3.2010        | d    |
| 3.0857                                            | 35.08571    | 15.10000 | 71.00000 | 3.2046        | d    |
| 4.1143                                            | 36.11429    | 15.10000 | 71.00000 | 3.2081        | d    |
| 5.1429                                            | 37.14286    | 15.10000 | 71.00000 | 3.2117        | d    |
| 6.1714                                            | 38.17143    | 15.10000 | 71.00000 | 3.2152        | d    |
| 7.2000                                            | 39.20000    | 15.10000 | 71.00000 | 3.2187        | d    |
| d - Displacements include imported displacements. |             |          |          |               |      |

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| Dist.                                             | Coordinates |          |          | Displacements |      |
|---------------------------------------------------|-------------|----------|----------|---------------|------|
|                                                   | x           | y        | z        | x             | y    |
|                                                   | [m]         | [m]      | [m]      | [m]           | [mm] |
| Vertical Offset 1                                 |             |          |          |               |      |
| 0.0                                               | 39.40000    | 14.20000 | 71.00000 | 2.7103        | d    |
| 0.85000                                           | 40.25000    | 14.20000 | 71.00000 | 2.7131        | d    |
| 1.7000                                            | 41.10000    | 14.20000 | 71.00000 | 2.7158        | d    |
| 2.5500                                            | 41.95000    | 14.20000 | 71.00000 | 2.7186        | d    |
| 3.4000                                            | 42.80000    | 14.20000 | 71.00000 | 2.7214        | d    |
| 4.2500                                            | 43.65000    | 14.20000 | 71.00000 | 2.806         | d    |
| 5.1000                                            | 44.50000    | 14.20000 | 71.00000 | 2.2439        | d    |
| d - Displacements include imported displacements. |             |          |          |               |      |

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| Dist.                                             | Coordinates |          |          | Displacements |      |
|---------------------------------------------------|-------------|----------|----------|---------------|------|
|                                                   | x           | y        | z        | x             | y    |
|                                                   | [m]         | [m]      | [m]      | [m]           | [mm] |
| Vertical Offset 1                                 |             |          |          |               |      |
| 0.0                                               | 44.60000    | 14.20000 | 71.00000 | 2.2384        | d    |
| 0.99000                                           | 44.60000    | 13.21000 | 71.00000 | 1.8157        | d    |
| 1.9800                                            | 44.60000    | 12.22000 | 71.00000 | 1.4189        | d    |
| 2.9700                                            | 44.60000    | 11.23000 | 71.00000 | 1.0486        | d    |
| 3.9600                                            | 44.60000    | 10.24000 | 71.00000 | 0.70415       | d    |
| 4.9500                                            | 44.60000    | 9.25000  | 71.00000 | 0.38349       | d    |
| 5.9400                                            | 44.60000    | 8.26000  | 71.00000 | 0.15585       | d    |
| 6.9300                                            | 44.60000    | 7.27000  | 71.00000 | 0.11857       | d    |
| 7.9200                                            | 44.60000    | 6.28000  | 71.00000 | 0.091322      | d    |
| 8.9100                                            | 44.60000    | 5.29000  | 71.00000 | 0.066909      | d    |
| 9.9000                                            | 44.60000    | 4.30000  | 71.00000 | 0.036817      | d    |
| d - Displacements include imported displacements. |             |          |          |               |      |

Printed 15-Dec-2015 Page 24  
Time 12:46



GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Dist.                                             | Coordinates |          | Displacements |           |
|---------------------------------------------------|-------------|----------|---------------|-----------|
| [m]                                               | x<br>[m]    | y<br>[m] | z<br>[m]      | z<br>[mm] |
| 3.0301                                            | 64.97000    | 31.97000 | 77.00000      | 0.37362 d |
| 4.0402                                            | 64.96000    | 30.96000 | 77.00000      | 0.37298 d |
| 5.0502                                            | 64.95000    | 29.95000 | 77.00000      | 0.27499 d |
| 6.0603                                            | 64.94000    | 28.94000 | 77.00000      | 0.25746 d |
| 7.0703                                            | 64.93000    | 27.93000 | 77.00000      | 0.22603 d |
| 8.0804                                            | 64.92000    | 26.92000 | 77.00000      | 0.18122 d |
| 9.0904                                            | 64.91000    | 25.91000 | 77.00000      | 0.15619 d |
| 10.100                                            | 64.90000    | 24.90000 | 77.00000      | 0.14395 d |
| d - Displacements include imported displacements. |             |          |               |           |

Structure: Rear Structures | Sub-structure: East - Mid

| Dist.                                             | Coordinates |          | Displacements |           |
|---------------------------------------------------|-------------|----------|---------------|-----------|
| [m]                                               | x<br>[m]    | y<br>[m] | z<br>[m]      | z<br>[mm] |
| Vertical Offset 1                                 |             |          |               |           |
| 0.0                                               | 64.95000    | 24.90000 | 77.00000      | 0.14199 d |
| 0.58310                                           | 65.45000    | 24.60000 | 77.00000      | 0.12107 d |
| 1.1662                                            | 65.95000    | 24.30000 | 77.00000      | 0.10391 d |
| d - Displacements include imported displacements. |             |          |               |           |

Structure: Rear Structures | Sub-structure: East - South

| Dist.                                             | Coordinates |          | Displacements |            |
|---------------------------------------------------|-------------|----------|---------------|------------|
| [m]                                               | x<br>[m]    | y<br>[m] | z<br>[m]      | z<br>[mm]  |
| Vertical Offset 1                                 |             |          |               |            |
| 0.0                                               | 66.00000    | 24.30000 | 77.00000      | 0.10262 d  |
| 1.0617                                            | 65.94000    | 23.24000 | 77.00000      | 0.094638 d |
| 2.1234                                            | 65.88000    | 22.18000 | 77.00000      | 0.086235 d |
| 3.1851                                            | 65.82000    | 21.12000 | 77.00000      | 0.077476 d |
| 4.2468                                            | 65.76000    | 20.06000 | 77.00000      | 0.068246 d |
| 5.3085                                            | 65.70000    | 19.00000 | 77.00000      | 0.058190 d |
| d - Displacements include imported displacements. |             |          |               |            |

Structure: Rear Structures | Sub-structure: South

| Dist.                                             | Coordinates |          | Displacements |            |
|---------------------------------------------------|-------------|----------|---------------|------------|
| [m]                                               | x<br>[m]    | y<br>[m] | z<br>[m]      | z<br>[mm]  |
| Vertical Offset 1                                 |             |          |               |            |
| 0.0                                               | 58.75000    | 19.40000 | 77.00000      | 1.0592 d   |
| 0.98737                                           | 59.73571    | 19.34286 | 77.00000      | 0.77791 d  |
| 1.9747                                            | 60.72143    | 19.28571 | 77.00000      | 0.50614 d  |
| 2.9621                                            | 61.70714    | 19.22857 | 77.00000      | 0.24402 d  |
| 3.9495                                            | 62.69286    | 19.17143 | 77.00000      | 0.12390 d  |
| 4.9368                                            | 63.67857    | 19.11429 | 77.00000      | 0.098041 d |
| 5.9242                                            | 64.66429    | 19.05714 | 77.00000      | 0.077929 d |
| 6.9116                                            | 65.65000    | 19.00000 | 77.00000      | 0.059169 d |
| d - Displacements include imported displacements. |             |          |               |            |

Specific Building Damage Results - All Segments

Structure: 24 Netherhall Gardens | Sub-structure: Front

| 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]<br>0.0                                                   |         | [m]   | [m]     |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                        |
|                                                              |         | 1     | 0.94000 | 0.13840   | None             | 0.0                       | 0.037499            | 0.037499                                          | -374.85E-6                                      | -41.699E-6               | 790170. (Negligible) 0 |
|                                                              |         | 2     | 1.0784  | 8.2216    | Hogging          | 0.0081362                 | 0.037499            | 0.042015                                          | -374.85E-6                                      | -522.65E-6               | 6721.9 (Negligible) 0  |

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

Structure: 24 Netherhall Gardens | Sub-structure: Side

| 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]<br>0.0                                                   |         | [m]   | [m]     |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                          |
|                                                              |         | 1     | 0.0     | 0.17815   | Hogging          | 0.0                       | 2.5379E-6           | 2.5392E-6                                         | 0.0                                             | -3.4379E-6               | 6.1126E+9 (Negligible) 0 |
|                                                              |         | 2     | 0.17815 | 6.7897    | Hogging          | 0.0                       | 2.5378E-6           | 2.6107E-6                                         | 0.0                                             | -3.4446E-6               | 675.95E+6 (Negligible) 0 |
|                                                              |         | 3     | 6.9679  | 0.13210   | None             | 0.0                       | 2.5378E-6           | 2.5392E-6                                         | 0.0                                             | -3.4446E-6               | 7.8974E+9 (Negligible) 0 |

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

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                          |
|                                                              |         | 1     | 0.0    | 1.7000    | Hogging          | 0.0                       | 2.5483E-6           | 2.5392E-6                                         | 0.0                                             | -3.2474E-6               | 288.60E+6 (Negligible) 0 |
|                                                              |         | 2     | 1.7000 | 1.9867    | Sagging          | 0.0063887                 | -0.0019377          | 0.0056664                                         | 134.46E-6                                       | 518.64E-6                | 6317.2 (Negligible) 0    |
|                                                              |         | 3     | 3.6867 | 1.3133    | Hogging          | 0.011538                  | -0.014665           | 0.0086358                                         | 155.83E-6                                       | 518.64E-6                | 1139.3 (Negligible) 0    |

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

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                       |
|                                                              |         | 1     | 0.0    | 6.9300    | Hogging          | 0.0049027                 | 0.024510            | 0.026827                                          | -267.32E-6                                      | 426.86E-6                | 8153.8 (Negligible) 0 |

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

Structure: 28 Netherhall Gardens | Sub-structure: Front North

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                         |
|                                                              |         | 1     | 0.0    | 6.0000    | Hogging          | 0.0021738                 | 0.066311            | 0.067206                                          | -750.34E-6                                      | -657.68E-6               | 24232.1 (Very Slight) 0 |

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

Structure: 28 Netherhall Gardens | Sub-structure: Front South



GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 9.1500 | Sagging   | 0.010145            | 0.091830                        | 0.10437                   | -0.0011180                                                    | -656.84E-6                                                  | 5293.9                         | 2<br>(Slight)      |

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

Structure: 28 Netherhall Gardens | Sub-structure: Side

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length  | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|---------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]     |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 9.7232  | Sagging   |                     | 0.0                             | 0.0                       | 0.0                                                           | 0.0                                                         | 418.96E+6                      | 0<br>(Negligible)  |
|                                                                          | 2       | 9.7232 | 0.47678 | None      |                     | 0.0                             | 0.0                       | 0.0                                                           | 0.0                                                         | 4.4059E+9                      | 0<br>(Negligible)  |

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

Structure: 28 Netherhall Gardens | Sub-structure: Rear

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 9.2829 | Sagging   | 0.010246            | 0.091675                        | 0.10445                   | -0.0011183                                                    | 658.98E-6                                                   | 5429.6                         | 2<br>(Slight)      |
|                                                                          | 2       | 9.2829 | 6.0171 | Hogging   | 0.0022464           | 0.066089                        | 0.067212                  | -759.64E-6                                                    | 658.98E-6                                                   | 22469.1                        | 1 (Very Slight)    |

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

Structure: Rear Structures | Sub-structure: West

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category          |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|-----------------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                             |
|                                                                          | 1       | 0.0    | 8.9795 | Sagging   | 0.0016459           | -0.0062027                      | 0.0013092                 | 171.33E-6                                                     | -201.27E-6                                                  | 39028.                         | 0<br>(Negligible)           |
|                                                                          | 2       | 8.9795 | 2.1504 | Hogging   | 0.0068338           | -0.016531                       | 0.0053625                 | 188.44E-6                                                     | -504.70E-6                                                  | 9969.3                         | 0<br>(Negligible)           |
|                                                                          | 3       | 11.130 | 2.5246 | Sagging   | 0.0089466           | -0.0022092                      | 0.0073413                 | 97.655E-6                                                     | -504.70E-6                                                  | 6977.4                         | 0<br>(Negligible)           |
|                                                                          | 4       | 13.654 | 1.8956 | Hogging   |                     | 0.0                             | 13.957E-6                 | 14.055E-6                                                     | 0.0                                                         | 7.9304E-6                      | 134.73E+6<br>0 (Negligible) |

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

Structure: Rear Structures | Sub-structure: North

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 5.7000 | Hogging   | 0.0029407           | 0.041543                        | 0.044395                  | -613.28E-6                                                    | 549.46E-6                                                   | 23776.                         | 0<br>(Negligible)  |

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

Structure: Rear Structures | Sub-structure: East - North

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length  | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category        |
|--------------------------------------------------------------------------|---------|--------|---------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|---------------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]     |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                           |
|                                                                          | 1       | 0.0    | 2.0201  | Hogging   |                     | 0.0                             | 0.0                       | 0.0                                                           | 0.0                                                         | 0.0                            | 9.2992E+9<br>(Negligible) |
|                                                                          | 2       | 2.0201 | 2.7241  | Sagging   | 0.0018369           | -737.24E-6                      | 0.0014053                 | 28.531E-6                                                     | 97.020E-6                                                   | 35776.                         | 0<br>(Negligible)         |
|                                                                          | 3       | 4.7442 | 1.9756  | Hogging   | 960.35E-6           | -0.0052360                      | 0.0011864                 | 58.584E-6                                                     | 97.020E-6                                                   | 82389.                         | 0<br>(Negligible)         |
|                                                                          | 4       | 6.7198 | 0.69896 | Sagging   | 328.54E-6           | -0.0050747                      | 0.0010324                 | 53.892E-6                                                     | 44.361E-6                                                   | 196870.                        | 0<br>(Negligible)         |
|                                                                          | 5       | 7.4188 | 2.5812  | Hogging   | 487.20E-6           | -0.0038812                      | 824.08E-6                 | 47.589E-6                                                     | 44.361E-6                                                   | 68258.                         | 0<br>(Negligible)         |

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

Structure: Rear Structures | Sub-structure: East - Mid

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 1.1000 | Hogging   | 159.32E-6           | 0.021484                        | 0.021518                  | -214.93E-6                                                    | 35.873E-6                                                   | 85227.                         | 0<br>(Negligible)  |

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

Structure: Rear Structures | Sub-structure: East - South

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 0.0    | None      |                     | 0.0                             | 0.0                       | 14.592E-6                                                     | 7.5220E-6                                                   | 2.6045E+6                      | 0<br>(Negligible)  |

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

Structure: Rear Structures | Sub-structure: South

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 3.9495 | Hogging   | 0.0028713           | 0.012960                        | 0.015012                  | -155.09E-6                                                    | 284.83E-6                                                   | 10096.                         | 0<br>(Negligible)  |

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

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



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Vertical Offset from Line for Vertical Movement               | Segment          | Start Length              | Curvature     | Deflection Ratio   | Average Horizontal Strain | Max. Tensile Strain                               | Maximum Gradient of Horizontal Displacement Curve | Maximum Gradient of Vertical Displacement Curve | Min. Radius of Curvature (Hogging) | Min. Radius of Curvature (Sagging) | Damage Category |
|---------------------------------------------------------------|------------------|---------------------------|---------------|--------------------|---------------------------|---------------------------------------------------|---------------------------------------------------|-------------------------------------------------|------------------------------------|------------------------------------|-----------------|
| Structure: 24 Netherhall Gardens   Sub-structure: Front       |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0081362        | 0.037499                  | -522.65E-6    | 2.5732             | 0.042015                  | -374.85E-6                                        | -522.65E-6                                        | 6721.9                                          |                                    | - 0                                | (Negligible)    |
| Structure: 24 Netherhall Gardens   Sub-structure: Side        |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0              | 2.5379E-6                 | -3.4446E-6    | 3.2184             | 2.6107E-6                 | 0.0                                               | -3.4446E-6                                        | 675.95E+6                                       |                                    | - 0                                | (Negligible)    |
| Structure: 24 netherhall Gardens   Sub-structure: Rear Side   |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.011538         | -0.014665                 | 518.64E-6     | 2.7213             | 0.0086358                 | 155.83E-6                                         | 518.64E-6                                         | 1139.3                                          | 6317.2                             | 0                                  | (Negligible)    |
| Structure: 24 Netherhall Gardens   Sub-structure: Rear        |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0049027        | 0.024510                  | 426.86E-6     | 2.2384             | 0.026827                  | -267.32E-6                                        | 426.86E-6                                         | 8153.8                                          |                                    | - 0                                | (Negligible)    |
| Structure: 28 Netherhall Gardens   Sub-structure: Front North |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0021738        | 0.066311                  | -657.68E-6    | 5.6170             | 0.067206                  | -750.34E-6                                        | -657.68E-6                                        | 24232.                                          |                                    | - 1                                | (Very Slight)   |
| Structure: 28 Netherhall Gardens   Sub-structure: Front South |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.010145         | 0.091830                  | -656.84E-6    | 9.4618             | 0.10437                   | -0.0011180                                        | -656.84E-6                                        |                                                 | 5293.9                             | 2                                  | (Slight)        |
| Structure: 28 Netherhall Gardens   Sub-structure: Side        |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0              | 0.0                       | 0.0           | 9.4002             | 0.0                       | 0.0                                               | 0.0                                               |                                                 | - 418.96E+6                        | 0                                  | (Negligible)    |
| Structure: 28 Netherhall Gardens   Sub-structure: Rear        |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.010246         | 0.091675                  | 658.98E-6     | 9.4642             | 0.10445                   | -0.0011183                                        | 658.98E-6                                         | 22469.                                          | 5429.6                             | 2                                  | (Slight)        |
| Structure: Rear Structures   Sub-structure: West              |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0089466        | -0.016531                 | -504.70E-6    | 3.0619             | 0.0073413                 | 188.44E-6                                         | -504.70E-6                                        | 9969.3                                          | 6977.4                             | 0                                  | (Negligible)    |
| Structure: Rear Structures   Sub-structure: North             |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0029407        | 0.041543                  | 549.46E-6     | 3.0026             | 0.044395                  | -613.28E-6                                        | 549.46E-6                                         | 23776.                                          |                                    | - 0                                | (Negligible)    |
| Structure: Rear Structures   Sub-structure: East - North      |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |
| Calculations                                                  | [m]              | [%]                       | [%]           | [mm]               | [%]                       |                                                   |                                                   | [m]                                             | [m]                                |                                    |                 |
| 0.0                                                           | 0.0018369        | -0.0052360                | 97.020E-6     | 0.37552            | 0.0014053                 | 58.584E-6                                         | 97.020E-6                                         | 68258.                                          | 35776.                             | 0                                  | (Negligible)    |
| Structure: Rear Structures   Sub-structure: East - Mid        |                  |                           |               |                    |                           |                                                   |                                                   |                                                 |                                    |                                    |                 |
| Vertical Offset from Line for Vertical Movement               | 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                    |                 |



| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Line for Vertical Movement Calculations | Strain    |          | Strain    |         | Horizontal Displacement Curve | Vertical Displacement Curve | Curvature (Hogging) | Curvature (Sagging)     |
|-----------------------------------------|-----------|----------|-----------|---------|-------------------------------|-----------------------------|---------------------|-------------------------|
|                                         | [m]       | [%]      | [mm]      | [%]     |                               |                             | [m]                 | [m]                     |
| 0.0                                     | 159.32E-6 | 0.021484 | 35.873E-6 | 0.14199 | 0.021518                      | -214.93E-6                  | 35.873E-6           | 85227. - 0 (Negligible) |

Structure: Rear Structures | Sub-structure: East - South

| 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]<br>0.0                                                   | [%]<br>0.0       | [%]<br>0.0                | 7.5220E-6     | [mm]<br>0.10262    | [%]<br>0.0          | 14.592E-6                                         | 7.5220E-6                                       | [m]<br>-                           | [m]<br>-                           | - 0 (Negligible) |

Structure: Rear Structures | Sub-structure: South

| 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]<br>0.0                                                   | [%]<br>0.0028713 | [%]<br>0.012960           | 284.83E-6     | [mm]<br>1.0592     | [%]<br>0.015012     | -155.09E-6                                        | 284.83E-6                                       | [m]<br>10096.                      | [m]<br>-                           | - 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 |
|-----------------------|------------------------------------|------------------------|------------------|-----------------|---------------|-----------|---------------|--------------------|---------------------|------------------------------------|------------------------------------|-----------------|
| 24 Netherhall Gardens | Maximum Slope                      | Front                  |                  | [m]<br>2 1.0784 | [m]<br>9.3000 | Hogging   | 522.65E-6     | [mm]<br>2.5732     | [%]<br>0.042015     | [m]<br>6721.9                      | [m]<br>-                           | 0 (Negligible)  |
|                       | Maximum Settlement                 | Side                   |                  | 3 6.9679        | 7.1000        | Sagging   | 3.4446E-6     | 3.2184             | 2.5392E-6           | -                                  | 7.8974E+9                          | 0 (Negligible)  |
|                       | Max. Tensile Strain                | Front                  |                  | 2 1.0784        | 9.3000        | Hogging   | 522.65E-6     | 2.5732             | 0.042015            | 6721.9                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Hogging) | Front                  |                  | 2 1.0784        | 9.3000        | Hogging   | 522.65E-6     | 2.5732             | 0.042015            | 6721.9                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Sagging) |                        |                  | -               | -             | -         | -             | -                  | -                   | -                                  | -                                  | -               |
| 24 netherhall Gardens | Maximum Slope                      | Rear Side              |                  | 2 1.7000        | 3.6867        | Sagging   | 518.64E-6     | 2.7213             | 0.0056664           | -                                  | 6317.2                             | 0 (Negligible)  |
|                       | Maximum Settlement                 | Rear Side              |                  | 2 1.7000        | 3.6867        | Sagging   | 518.64E-6     | 2.7213             | 0.0056664           | -                                  | 6317.2                             | 0 (Negligible)  |
|                       | Max. Tensile Strain                | Rear Side              |                  | 3 3.6867        | 5.0000        | Hogging   | 518.64E-6     | 2.5727             | 0.0086358           | 1139.3                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Hogging) | Rear Side              |                  | 3 3.6867        | 5.0000        | Hogging   | 518.64E-6     | 2.5727             | 0.0086358           | 1139.3                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Sagging) | Rear Side              |                  | 2 1.7000        | 3.6867        | Sagging   | 518.64E-6     | 2.7213             | 0.0056664           | -                                  | 6317.2                             | 0 (Negligible)  |
| 28 Netherhall Gardens | Maximum Slope                      | Rear                   |                  | 1 0.0           | 9.2829        | Sagging   | 658.98E-6     | 9.4642             | 0.10445             | -                                  | 5429.6                             | 2 (Slight)      |
|                       | Maximum Settlement                 | Rear                   |                  | 1 0.0           | 9.2829        | Sagging   | 658.98E-6     | 9.4642             | 0.10445             | -                                  | 5429.6                             | 2 (Slight)      |
|                       | Max. Tensile Strain                | Rear                   |                  | 1 0.0           | 9.2829        | Sagging   | 658.98E-6     | 9.4642             | 0.10445             | -                                  | 5429.6                             | 2 (Slight)      |
|                       | Min. Radius of Curvature (Hogging) | Rear                   |                  | 2 9.2829        | 15.300        | Hogging   | 658.98E-6     | 5.5993             | 0.067212            | 22469.                             | -                                  | 1 (Very Slight) |
|                       | Min. Radius of Curvature (Sagging) | Front South            |                  | 1 0.0           | 9.1500        | Sagging   | 656.84E-6     | 9.4618             | 0.10437             | -                                  | 5293.9                             | 2 (Slight)      |
| Rear Structures       | Maximum Slope                      | North                  |                  | 1 0.0           | 5.7000        | Hogging   | 549.46E-6     | 3.0026             | 0.044395            | 23776.                             | -                                  | 0 (Negligible)  |
|                       | Maximum Settlement                 | West                   |                  | 3 11.130        | 13.654        | Sagging   | 504.70E-6     | 3.0619             | 0.0073413           | -                                  | 6977.4                             | 0 (Negligible)  |
|                       | Max. Tensile Strain                | North                  |                  | 1 0.0           | 5.7000        | Hogging   | 549.46E-6     | 3.0026             | 0.044395            | 23776.                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Hogging) | West                   |                  | 2 8.9795        | 11.130        | Hogging   | 504.70E-6     | 2.7724             | 0.0053625           | 9969.3                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Sagging) | West                   |                  | 3 11.130        | 13.654        | Sagging   | 504.70E-6     | 3.0619             | 0.0073413           | -                                  | 6977.4                             | 0 (Negligible)  |

Specific Building Damage Results - All Combined Segments

Structure: 24 Netherhall Gardens | Sub-structure: Front

| Vertical Offset from Line for Vertical Movement Calculations | Combined Segment | Start Length | Curvature | Deflection Ratio | Average Horizontal Strain | Max. Tensile Strain | Damage Category |
|--------------------------------------------------------------|------------------|--------------|-----------|------------------|---------------------------|---------------------|-----------------|
| [m]<br>No structures have segments combined.                 |                  | [m]<br>[m]   |           | [%]<br>[%]       | [%]<br>[%]                | [%]<br>[%]          |                 |

Structure: 24 Netherhall Gardens | Sub-structure: Side

| Vertical Offset from Line for Vertical Movement Calculations | Combined Segment | Start Length | Curvature | Deflection Ratio | Average Horizontal Strain | Max. Tensile Strain | Damage Category |
|--------------------------------------------------------------|------------------|--------------|-----------|------------------|---------------------------|---------------------|-----------------|
| [m]<br>No structures have segments combined.                 |                  | [m]<br>[m]   |           | [%]<br>[%]       | [%]<br>[%]                | [%]<br>[%]          |                 |

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| Vertical Offset from Line for Vertical Movement Calculations | Combined Segment | Start Length | Curvature | Deflection Ratio | Average Horizontal Strain | Max. Tensile Strain | Damage Category |
|--------------------------------------------------------------|------------------|--------------|-----------|------------------|---------------------------|---------------------|-----------------|
| [m]<br>No structures have segments combined.                 |                  | [m]<br>[m]   |           | [%]<br>[%]       | [%]<br>[%]                | [%]<br>[%]          |                 |

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| 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]<br>[m]   |           | [%]<br>[%]       | [%]<br>[%]                | [%]<br>[%]          |                 |



GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

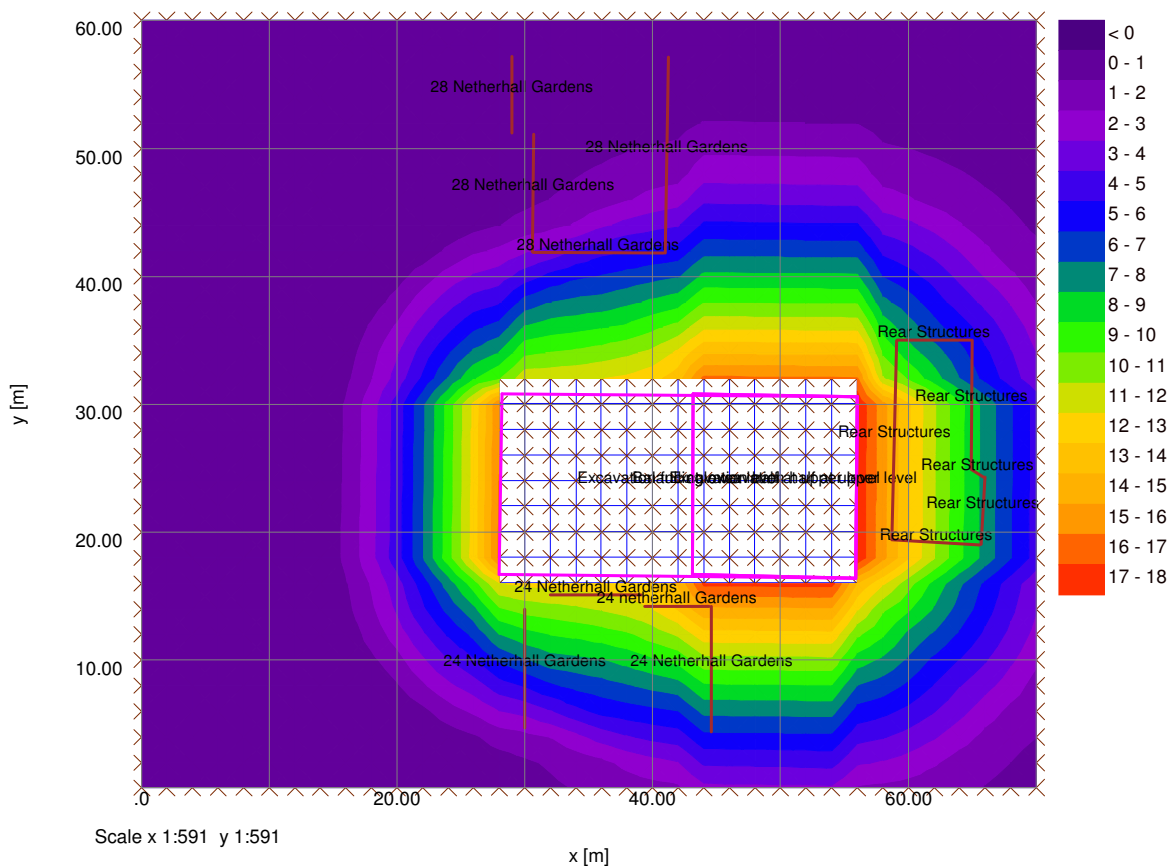
26 Netherhall Gardens  
Northern Deep Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

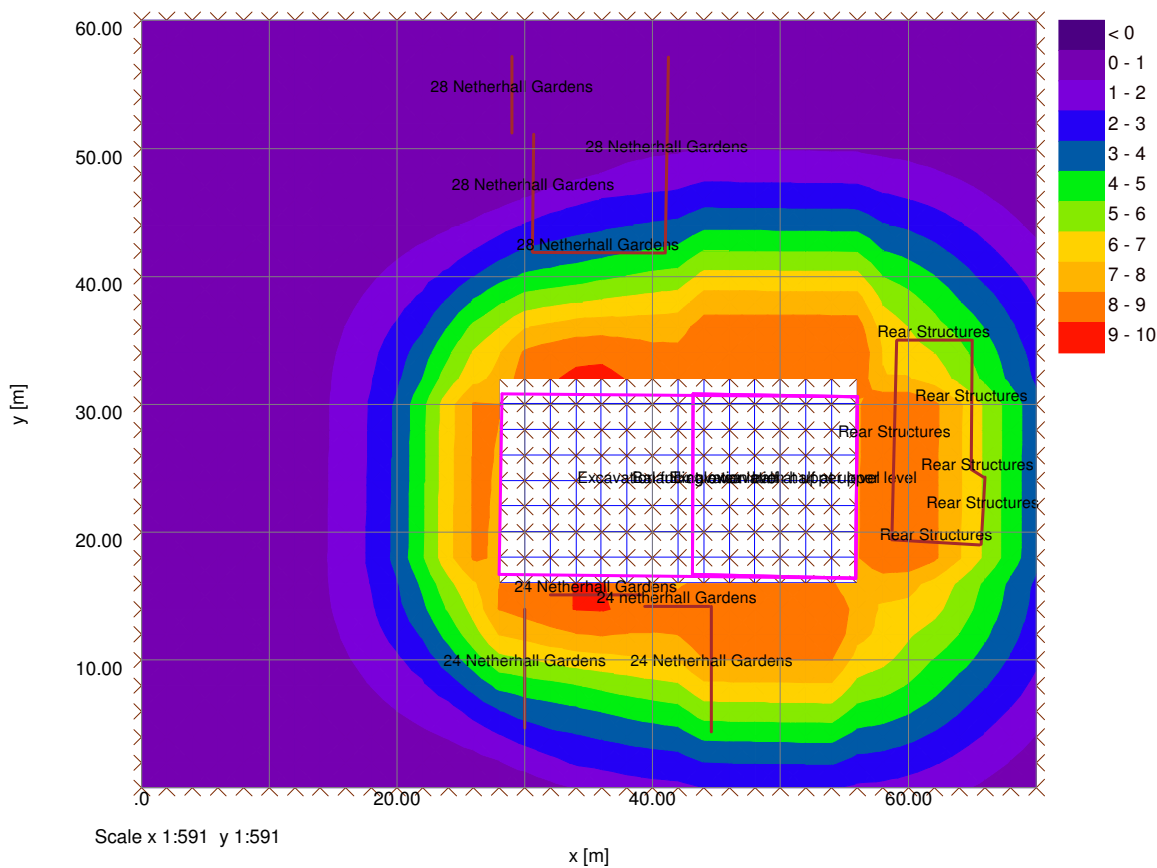
| Vertical<br>Offset from<br>Line for<br>Vertical<br>Movement<br>Calculations | Combined<br>Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Damage Category |
|-----------------------------------------------------------------------------|---------------------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|-----------------|
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Front North               |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Front South               |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Side                      |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Rear                      |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: West                            |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: North                           |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - North                    |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - Mid                      |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - South                    |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: South                           |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |

| Job No.   | Sheet No.   | Rev.    |
|-----------|-------------|---------|
|           |             |         |
| Drg. Ref. |             |         |
|           |             |         |
| Made by   | Date        | Checked |
| MC        | 15-Dec-2015 |         |

Horizontal Displacement Contours: Grid 1 (level 71.600m) Interval 1mm



Vertical Settlement Contours: Grid 1 (level 71.600m) (Interval 1mm)





# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

## Problem Type

Problem Type : Tunnelling and Embedded Wall Excavations

## Displacement Data

| Type | Name    | Direction of extrusion | Point/Line/Line for extrusion |          |           | No. of intervals across extrusion/line | Extrusion depth | No. of intervals along extrusion | Calculate | Surface type for tunnels |
|------|---------|------------------------|-------------------------------|----------|-----------|----------------------------------------|-----------------|----------------------------------|-----------|--------------------------|
|      |         |                        | First point                   |          |           | Second point                           |                 |                                  |           |                          |
|      |         |                        | X                             | Y        | Z (level) | X                                      | Y               | Z (level)                        |           |                          |
|      |         |                        | [m]                           | [m]      | [m]       | [m]                                    | [m]             | [m]                              |           |                          |
| Grid | Grid 1  | Global X               | 0.00000                       | 0.00000  | 71.60000  | -                                      | 60.00000        | 71.60000                         | 30        | 70.00000                 |
| Line | Line 1  | -                      | 30.00000                      | 4.70000  | 71.00000  | 30.00000                               | 14.10000        | 71.00000                         | 10        | -                        |
| Line | Line 2  | -                      | 32.00000                      | 15.10000 | 71.00000  | 39.20000                               | 15.10000        | 71.00000                         | 7         | -                        |
| Line | Line 3  | -                      | 39.40000                      | 14.20000 | 71.00000  | 44.50000                               | 14.20000        | 71.00000                         | 6         | -                        |
| Line | Line 4  | -                      | 44.60000                      | 14.20000 | 71.00000  | 44.60000                               | 4.30000         | 71.00000                         | 10        | -                        |
| Line | Line 5  | -                      | 29.00000                      | 57.20000 | 71.60000  | 29.00000                               | 51.10000        | 71.60000                         | 6         | -                        |
| Line | Line 6  | -                      | 30.70000                      | 51.10000 | 71.60000  | 30.60000                               | 41.90000        | 71.60000                         | 9         | -                        |
| Line | Line 7  | -                      | 30.65000                      | 41.90000 | 71.60000  | 40.90000                               | 41.80000        | 71.60000                         | 10        | -                        |
| Line | Line 8  | -                      | 41.00000                      | 41.80000 | 71.60000  | 41.20000                               | 57.20000        | 71.60000                         | 16        | -                        |
| Line | Line 9  | -                      | 58.70000                      | 19.40000 | 77.00000  | 59.10000                               | 35.00000        | 77.00000                         | 16        | -                        |
| Line | Line 10 | -                      | 59.15000                      | 35.00000 | 77.00000  | 64.95000                               | 35.00000        | 77.00000                         | 6         | -                        |
| Line | Line 11 | -                      | 65.00000                      | 35.00000 | 77.00000  | 64.90000                               | 24.90000        | 77.00000                         | 10        | -                        |
| Line | Line 12 | -                      | 64.95000                      | 24.90000 | 77.00000  | 65.95000                               | 24.30000        | 77.00000                         | 2         | -                        |
| Line | Line 13 | -                      | 66.00000                      | 24.30000 | 77.00000  | 65.70000                               | 19.00000        | 77.00000                         | 5         | -                        |
| Line | Line 14 | -                      | 58.75000                      | 19.40000 | 77.00000  | 65.65000                               | 19.00000        | 77.00000                         | 7         | -                        |

## Vertical Ground Movement Curves

Curve Name: Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b))  
Coordinates: [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Settlement / wall depth or max. excavation depth (z) (%)]  
[0.000,0.000,0.039][0.100,0.000,0.049][0.200,0.000,0.056][0.300,0.000,0.062][0.400,0.000,0.067][0.500,0.000,0.070][0.600,0.000,0.072][0.700,0.000,0.073][0.800,0.000,0.073][0.900,0.000,0.072][1.000,0.000,0.070][1.100,0.000,0.068][1.200,0.000,0.065][1.300,0.000,0.061][1.400,0.000,0.058][1.500,0.000,0.054][1.600,0.000,0.050][1.700,0.000,0.046][1.800,0.000,0.042][1.900,0.000,0.038][2.000,0.000,0.034][2.100,0.000,0.030][2.200,0.000,0.027][2.300,0.000,0.023][2.400,0.000,0.020][2.500,0.000,0.017][2.600,0.000,0.014][2.700,0.000,0.012][2.800,0.000,0.010][2.900,0.000,0.008][3.000,0.000,0.007][3.100,0.000,0.005][3.200,0.000,0.004][3.300,0.000,0.004][3.400,0.000,0.003][3.500,0.000,0.002][3.600,0.000,0.002][3.700,0.000,0.002][3.800,0.000,0.001][3.900,0.000,0.001][4.000,0.000,0.000]  
Curve Fitting: Polynomial  
Method:  
x Order: 4  
y Order: 0  
Polynomial:  $z = -2.6455E-3x^4 + 2.8495E-2x^3 - 1.0051E-1x^2 + 1.0569E-1x + 3.8990E-2$   
Coeff. of: 9.9991E-1  
Determination:

## Horizontal Ground Movement Curves

Curve Name: Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a))  
Coordinates: [Distance from wall / wall depth or max. excavation depth (x), Depth / wall depth or max. excavation depth (y), Horizontal movement / wall depth or max. excavation depth (z) (%)]  
[0.000,0.000,0.150][4.000,0.000,0.000]  
Curve Fitting: Polynomial  
Method:  
x Order: 1  
y Order: 0  
Polynomial:  $z = -3.75E-2x + 1.50E-1$   
Coeff. of: 1.00  
Determination:

## Polygonal Excavations

Excavation Name: Excavation full at lower level  
Surface level [m]: 72.600  
Contribution: Positive  
Enabled: Yes  
Surface movement curves which are selected are applied between surface and [m]: 69.000

| Corner | x      | y      | Base Level | Stiffened | Previous Side |        |        | Next Side |        |        |
|--------|--------|--------|------------|-----------|---------------|--------|--------|-----------|--------|--------|
|        | [m]    | [m]    | [m]        |           | d             | pl     | p2*    | d         | pl     | p2*    |
| 1      | 28.000 | 16.700 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 2      | 28.200 | 30.800 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 3      | 56.000 | 30.600 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 4      | 55.900 | 16.400 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |

| Side | Corner 1 |        | Corner 2 |        | Vertical                                                                          |                                                                                   | Ground Movement Curve                                                             |                                                                                   | Horizontal                                                                        |                                                                                   |
|------|----------|--------|----------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|      | x        | y      | x        | y      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|      | [m]      | [m]    | [m]      | [m]    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| 1    | 28.000   | 16.700 | 28.200   | 30.800 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 2    | 28.200   | 30.800 | 56.000   | 30.600 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 3    | 56.000   | 30.600 | 55.900   | 16.400 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 4    | 55.900   | 16.400 | 28.000   | 16.700 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |

Excavation Name: Excavation half at upper level  
Surface level [m]: 75.000  
Contribution: Positive  
Enabled: Yes  
Surface movement curves which are selected are applied between surface and [m]: 69.000

| Corner | x      | y      | Base Level | Stiffened | Previous Side |        |        | Next Side |        |        |
|--------|--------|--------|------------|-----------|---------------|--------|--------|-----------|--------|--------|
|        | [m]    | [m]    | [m]        |           | d             | pl     | p2*    | d         | pl     | p2*    |
| 1      | 43.100 | 16.700 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 2      | 43.200 | 30.800 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 3      | 56.000 | 30.600 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |
| 4      | 55.900 | 16.400 | 69.000     | Yes       | 0.0           | 67.000 | 25.000 | 0.0       | 67.000 | 25.000 |

| Side | Corner 1 |        | Corner 2 |        | Vertical                                                                          |                                                                                   | Ground Movement Curve                                                             |                                                                                   | Horizontal                                                                        |                                                                                   |
|------|----------|--------|----------|--------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------|
|      | x        | y      | x        | y      |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
|      | [m]      | [m]    | [m]      | [m]    |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |                                                                                   |
| 1    | 43.100   | 16.700 | 43.200   | 30.800 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 2    | 43.200   | 30.800 | 56.000   | 30.600 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |
| 3    | 56.000   | 30.600 | 55.900   | 16.400 | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(b)) | Excavation in front of high stiffness wall in stiff clay (CIRIA 580 Fig. 2.11(a)) |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Side | Corner 1 |          | Corner 2 |          | Vertical                                                                                                           | Ground Movement Curve                                                                                               | Horizontal |
|------|----------|----------|----------|----------|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------|------------|
|      | x<br>[m] | y<br>[m] | x<br>[m] | y<br>[m] |                                                                                                                    |                                                                                                                     |            |
| 4    | 55.900   | 16.400   | 43.100   | 16.700   | (CIRIA 580 Fig. 2.11(b)<br>Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(b)) | (CIRIA 580 Fig. 2.11(a))<br>Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(a)) |            |

Excavation Name: Balancing excavation half at upper level  
Surface level [m]: 72.600  
Contribution: Negative  
Enabled: Yes  
Surface movement curves which are  
selected are applied between  
surface and [m]: 69.000

| Corner | x      | y      | Base<br>Level<br>[m] | Stiffened | Previous Side<br>d<br>[m] | pl<br>[%] | p2*<br>[%] | d<br>[m] | pl<br>[%] | p2*<br>[%] |
|--------|--------|--------|----------------------|-----------|---------------------------|-----------|------------|----------|-----------|------------|
| 1      | 43.100 | 16.700 | 69.000               | Yes       | 0.0                       | 67.000    | 25.000     | 0.0      | 67.000    | 25.000     |
| 2      | 43.200 | 30.800 | 69.000               | Yes       | 0.0                       | 67.000    | 25.000     | 0.0      | 67.000    | 25.000     |
| 3      | 56.000 | 30.600 | 69.000               | Yes       | 0.0                       | 67.000    | 25.000     | 0.0      | 67.000    | 25.000     |
| 4      | 55.900 | 16.400 | 69.000               | Yes       | 0.0                       | 67.000    | 25.000     | 0.0      | 67.000    | 25.000     |

| Side | Corner 1 |          | Corner 2 |          | Vertical                                                                                | Ground Movement Curve                                                                   | Horizontal |
|------|----------|----------|----------|----------|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------|------------|
|      | x<br>[m] | y<br>[m] | x<br>[m] | y<br>[m] |                                                                                         |                                                                                         |            |
| 1    | 43.100   | 16.700   | 43.200   | 30.800   | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(b)) | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(a)) |            |
| 2    | 43.200   | 30.800   | 56.000   | 30.600   | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(b)) | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(a)) |            |
| 3    | 56.000   | 30.600   | 55.900   | 16.400   | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(b)) | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(a)) |            |
| 4    | 55.900   | 16.400   | 43.100   | 16.700   | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(b)) | Excavation in front of high<br>stiffness wall in stiff clay<br>(CIRIA 580 Fig. 2.11(a)) |            |

## Damage Category Strains

| Name                  | 0 (Negligible)  | 1 (Very Slight) | 2 (Slight)   | 3 (Moderate) |
|-----------------------|-----------------|-----------------|--------------|--------------|
|                       |                 | to              | to           |              |
| Burland Strain Limits | 1 (Very Slight) | 2 (Slight)      | 3 (Moderate) | 4 (Severe)   |
|                       | 0.0             | 500.00E-6       | 750.00E-6    | 0.0015000    |

## Specific Structures - Geometry

| Structure Name               | Sub-Structure Name | Displacement Line | Start Distance Along Line | End Distance Along Line | Vertical Offsets from Line for Vertical Movement Calculations | Vertical Displacement Limit Sensitivity | Damage Category Strains | Poisson's Ratio | E/G     |
|------------------------------|--------------------|-------------------|---------------------------|-------------------------|---------------------------------------------------------------|-----------------------------------------|-------------------------|-----------------|---------|
|                              |                    |                   | [m]                       | [m]                     |                                                               | [mm]                                    |                         |                 |         |
| 24 Netherhall Gardens        | Front              | Line 1            | 0.00000                   | 9.30000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 24 Netherhall Gardens        | Side               | Line 2            | 0.00000                   | 7.10000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 24 netherhall Gardens        | Rear Side          | Line 3            | 0.00000                   | 5.00000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 24 Netherhall Gardens        | Rear               | Line 4            | 0.00000                   | 9.80000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 28 Netherhall Gardens        | Front North        | Line 5            | 0.00000                   | 6.00000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 28 Netherhall Gardens        | Front South        | Line 6            | 0.00000                   | 9.15000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 28 Netherhall Gardens        | Side               | Line 7            | 0.00000                   | 10.20000                | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| 28 Netherhall Gardens        | Rear               | Line 8            | 0.00000                   | 15.30000                | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures West         | West               | Line 9            | 0.00000                   | 15.55000                | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures North        | North              | Line 10           | 0.00000                   | 5.70000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures East - North | East - North       | Line 11           | 0.00000                   | 10.00000                | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures East - Mid   | East - Mid         | Line 12           | 0.00000                   | 1.10000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures East - South | East - South       | Line 13           | 0.00000                   | 5.25000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |
| Rear Structures South        | South              | Line 14           | 0.00000                   | 6.85000                 | 0.0                                                           | 0.10000                                 | Burland Strain Limits   | 0.20000         | 2.60000 |

## Specific Structures - Bending Parameters

| Structure Name               | Sub-Structure<br>Name | Height | Default<br>Properties | Hogging                                      |                                               |                                                           | Sagging                                      |                                               |                                                           |
|------------------------------|-----------------------|--------|-----------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|----------------------------------------------|-----------------------------------------------|-----------------------------------------------------------|
|                              |                       |        |                       | 2nd Moment<br>of Area<br>(per unit<br>width) | Distance<br>of Bending<br>Strain<br>from N.A. | Distance<br>of N.A.<br>from Edge<br>of Beam in<br>Tension | 2nd Moment<br>of Area<br>(per unit<br>width) | Distance<br>of Bending<br>Strain<br>from N.A. | Distance<br>of N.A.<br>from Edge<br>of Beam in<br>Tension |
| 24 Netherhall<br>Gardens     | Front                 | 11.000 | Yes                   | 443.67                                       | 11.000                                        | 11.000                                                    | 110.92                                       | 5.5000                                        | 5.5000                                                    |
| 24 Netherhall<br>Gardens     | Side                  | 11.000 | Yes                   | 443.67                                       | 11.000                                        | 11.000                                                    | 110.92                                       | 5.5000                                        | 5.5000                                                    |
| 24 netherhall<br>Gardens     | Rear Side             | 11.000 | Yes                   | 443.67                                       | 11.000                                        | 11.000                                                    | 110.92                                       | 5.5000                                        | 5.5000                                                    |
| 24 Netherhall<br>Gardens     | Rear                  | 11.000 | Yes                   | 443.67                                       | 11.000                                        | 11.000                                                    | 110.92                                       | 5.5000                                        | 5.5000                                                    |
| 28 Netherhall<br>Gardens     | Front North           | 11.000 | Yes                   | 443.67                                       | 11.000                                        | 11.000                                                    | 110.92                                       | 5.5000                                        | 5.5000                                                    |
| 28 Netherhall<br>Gardens     | Front South           | 9.0000 | Yes                   | 243.00                                       | 9.0000                                        | 9.0000                                                    | 60.750                                       | 4.5000                                        | 4.5000                                                    |
| 28 Netherhall<br>Gardens     | Side                  | 9.0000 | Yes                   | 243.00                                       | 9.0000                                        | 9.0000                                                    | 60.750                                       | 4.5000                                        | 4.5000                                                    |
| 28 Netherhall<br>Gardens     | Rear                  | 9.0000 | Yes                   | 243.00                                       | 9.0000                                        | 9.0000                                                    | 60.750                                       | 4.5000                                        | 4.5000                                                    |
| Rear Structures West         | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |
| Rear Structures North        | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |
| Rear Structures East - North | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |
| Rear Structures East - Mid   | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |
| Rear Structures East - South | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |
| Rear Structures South        | 4.0000                | Yes    | 21.333                | 4.0000                                       | 4.0000                                        | 5.3333                                                    | 2.0000                                       | 2.0000                                        | 2.0000                                                    |

## Building Segment Combinations

| Structure Name                        | Sub-Structure<br>Name | Vertical<br>Offset from<br>Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Combined<br>Segment |
|---------------------------------------|-----------------------|-----------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|
|                                       |                       |                                                                             |         | [m]   | [m]    | [m]       |                     |
| No structures have segments combined. |                       |                                                                             |         |       |        |           |                     |

## Warnings

- Multiple excavations have been specified. The displacements resulting from these excavations are calculated by summing the displacements resulting from each individual excavation. No account has been taken of the interactions between excavations (e.g. overlapping zones of influence or 'shielding' of one excavation by another).
- Embedded Wall Excavation PE1 : Excavation full at lower level intersects PE2 : Excavation half at upper level, and PE3 : Balancing excavation half at upper level.
- Embedded Wall Excavation PE2 : Excavation half at upper level intersects PE1 : Excavation full at lower level.
- Embedded Wall Excavation PE3 : Balancing excavation half at upper level intersects



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Structure Name | Sub-Structure Name | Vertical Offset from Line for Vertical | Segment | Start | Length | Curvature | Combined Segment |
|----------------|--------------------|----------------------------------------|---------|-------|--------|-----------|------------------|
|----------------|--------------------|----------------------------------------|---------|-------|--------|-----------|------------------|

PE1 : Excavation full at lower level.  
5 If an embedded wall excavation is assigned a 'surface' ground movement curve and if the 'allow movement calculation to level' option is checked for the excavation then displacements induced by it are calculated for points at the surface, and points below the surface to the level specified. Others are ignored. An example of such a combination, for which displacements will not be calculated is Excavation XPI/Side 1/Line 9/Vertical. This is an example only. There are 143 others.

## Displacement and Strain Results

| Type/No. |        | Coordinates |         |          | Displacements |          |           | Angle of Line to x Axis                |                                               |
|----------|--------|-------------|---------|----------|---------------|----------|-----------|----------------------------------------|-----------------------------------------------|
| Name     | Dist.  | x           | y       | z        | x             | y        | z         | Horizontal displacement along the Line | Horizontal displacement perpendicular to Line |
|          | [m]    | [m]         | [m]     | [m]      | [mm]          | [mm]     | [mm]      | [mm]                                   | [mm]                                          |
| Grid 1   | Grid 1 | 0.00000     | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 2.00000     | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 4.00000     | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 6.00000     | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 8.00000     | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 10.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 12.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 14.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 16.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 18.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 20.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 22.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 24.00000    | 0.00000 | 71.60000 | 0.0           | 0.0      | 0.0069096 | -                                      | -                                             |
|          |        | 26.00000    | 0.00000 | 71.60000 | 0.013318      | 0.013007 | 0.10157   | -                                      | -                                             |
|          |        | 28.00000    | 0.00000 | 71.60000 | 0.19406       | 0.21462  | 0.17076   | -                                      | -                                             |
|          |        | 30.00000    | 0.00000 | 71.60000 | 0.34331       | 0.43766  | 0.39756   | -                                      | -                                             |
|          |        | 32.00000    | 0.00000 | 71.60000 | 0.45195       | 0.67996  | 0.73102   | -                                      | -                                             |
|          |        | 34.00000    | 0.00000 | 71.60000 | 0.50995       | 0.93585  | 1.0450    | -                                      | -                                             |
|          |        | 36.00000    | 0.00000 | 71.60000 | 0.50798       | 1.1948   | 1.3323    | -                                      | -                                             |
|          |        | 38.00000    | 0.00000 | 71.60000 | 0.43997       | 1.4407   | 1.5789    | -                                      | -                                             |
|          |        | 40.00000    | 0.00000 | 71.60000 | 0.30668       | 1.6521   | 1.7136    | -                                      | -                                             |
|          |        | 42.00000    | 0.00000 | 71.60000 | 0.11893       | 1.8055   | 1.7646    | -                                      | -                                             |
|          |        | 44.00000    | 0.00000 | 71.60000 | 0.064368      | 2.7464   | 1.9851    | -                                      | -                                             |
|          |        | 46.00000    | 0.00000 | 71.60000 | 0.064780      | 2.7639   | 1.9999    | -                                      | -                                             |
|          |        | 48.00000    | 0.00000 | 71.60000 | 0.065192      | 2.7815   | 2.0147    | -                                      | -                                             |
|          |        | 50.00000    | 0.00000 | 71.60000 | 0.065603      | 2.7991   | 2.0296    | -                                      | -                                             |
|          |        | 52.00000    | 0.00000 | 71.60000 | 0.066156      | 2.8227   | 2.0447    | -                                      | -                                             |
|          |        | 54.00000    | 0.00000 | 71.60000 | 0.066956      | 2.8568   | 2.0598    | -                                      | -                                             |
|          |        | 56.00000    | 0.00000 | 71.60000 | -0.011636     | 1.9082   | 1.8420    | -                                      | -                                             |
|          |        | 58.00000    | 0.00000 | 71.60000 | -0.22440      | 1.7525   | 1.7737    | -                                      | -                                             |
|          |        | 60.00000    | 0.00000 | 71.60000 | -0.39114      | 1.5645   | 1.6208    | -                                      | -                                             |
|          |        | 62.00000    | 0.00000 | 71.60000 | -0.49520      | 1.3314   | 1.3992    | -                                      | -                                             |
|          |        | 64.00000    | 0.00000 | 71.60000 | -0.53164      | 1.0764   | 1.1275    | -                                      | -                                             |
|          |        | 66.00000    | 0.00000 | 71.60000 | -0.50423      | 0.81875  | 0.8290    | -                                      | -                                             |
|          |        | 68.00000    | 0.00000 | 71.60000 | -0.42168      | 0.57153  | 0.49732   | -                                      | -                                             |
|          |        | 70.00000    | 0.00000 | 71.60000 | -0.29430      | 0.34231  | 0.15450   | -                                      | -                                             |
|          |        | 0.00000     | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 2.00000     | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 4.00000     | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 6.00000     | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 8.00000     | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 10.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 12.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 14.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 16.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 18.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 20.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.11603   | -                                      | -                                             |
|          |        | 22.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.33066   | -                                      | -                                             |
|          |        | 24.00000    | 2.00000 | 71.60000 | 0.0           | 0.0      | 0.49137   | -                                      | -                                             |
|          |        | 26.00000    | 2.00000 | 71.60000 | 0.21368       | 0.18369  | 0.63582   | -                                      | -                                             |
|          |        | 28.00000    | 2.00000 | 71.60000 | 0.39755       | 0.38702  | 0.92921   | -                                      | -                                             |
|          |        | 30.00000    | 2.00000 | 71.60000 | 0.56017       | 0.62858  | 1.3231    | -                                      | -                                             |
|          |        | 32.00000    | 2.00000 | 71.60000 | 0.67903       | 0.89925  | 1.7148    | -                                      | -                                             |
|          |        | 34.00000    | 2.00000 | 71.60000 | 0.73987       | 1.1952   | 2.1007    | -                                      | -                                             |
|          |        | 36.00000    | 2.00000 | 71.60000 | 0.75494       | 1.5630   | 2.2472    | -                                      | -                                             |
|          |        | 38.00000    | 2.00000 | 71.60000 | 0.73771       | 2.1263   | 2.3784    | -                                      | -                                             |
|          |        | 40.00000    | 2.00000 | 71.60000 | 0.54724       | 2.5950   | 2.4976    | -                                      | -                                             |
|          |        | 42.00000    | 2.00000 | 71.60000 | 0.21774       | 2.9098   | 2.5853    | -                                      | -                                             |
|          |        | 44.00000    | 2.00000 | 71.60000 | 0.096967      | 3.1373   | 2.9784    | -                                      | -                                             |
|          |        | 46.00000    | 2.00000 | 71.60000 | 0.097764      | 4.1713   | 2.9976    | -                                      | -                                             |
|          |        | 48.00000    | 2.00000 | 71.60000 | 0.098561      | 4.2053   | 3.0169    | -                                      | -                                             |
|          |        | 50.00000    | 2.00000 | 71.60000 | 0.099358      | 4.2393   | 3.0363    | -                                      | -                                             |
|          |        | 52.00000    | 2.00000 | 71.60000 | 0.10016       | 4.2733   | 3.0558    | -                                      | -                                             |
|          |        | 54.00000    | 2.00000 | 71.60000 | 0.10095       | 4.3073   | 3.0754    | -                                      | -                                             |
|          |        | 56.00000    | 2.00000 | 71.60000 | -0.021537     | 3.1014   | 2.6829    | -                                      | -                                             |
|          |        | 58.00000    | 2.00000 | 71.60000 | -0.41951      | 2.8767   | 2.5812    | -                                      | -                                             |
|          |        | 60.00000    | 2.00000 | 71.60000 | -0.70266      | 2.4679   | 2.3710    | -                                      | -                                             |
|          |        | 62.00000    | 2.00000 | 71.60000 | -0.81955      | 1.9347   | 2.0765    | -                                      | -                                             |
|          |        | 64.00000    | 2.00000 | 71.60000 | -0.75538      | 1.3429   | 1.7254    | -                                      | -                                             |
|          |        | 66.00000    | 2.00000 | 71.60000 | -0.72945      | 1.0400   | 1.3433    | -                                      | -                                             |
|          |        | 68.00000    | 2.00000 | 71.60000 | -0.63858      | 0.75996  | 0.94987   | -                                      | -                                             |
|          |        | 70.00000    | 2.00000 | 71.60000 | -0.50030      | 0.51095  | 0.55569   | -                                      | -                                             |
|          |        | 0.00000     | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 2.00000     | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 4.00000     | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 6.00000     | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 8.00000     | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 10.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 12.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 14.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 16.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 18.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.25888   | -                                      | -                                             |
|          |        | 20.00000    | 4.00000 | 71.60000 | 0.0           | 0.0      | 0.54758   | -                                      | -                                             |
|          |        | 22.00000    | 4.00000 | 71.60000 | 0.032648      | 0.069106 | 0.80403   | -                                      | -                                             |
|          |        | 24.00000    | 4.00000 | 71.60000 | 0.25485       | 0.35510  | 1.0454    | -                                      | -                                             |
|          |        | 26.00000    | 4.00000 | 71.60000 | 0.49365       | 0.70270  | 1.3815    | -                                      | -                                             |
|          |        | 28.00000    | 4.00000 | 71.60000 | 0.64542       | 1.2461   | 1.8895    | -                                      | -                                             |
|          |        | 30.00000    | 4.00000 | 71.60000 | 0.79061       | 1.4842   | 2.3371    | -                                      | -                                             |
|          |        | 32.00000    | 4.00000 | 71.60000 | 0.92865       | 1.7943   | 2.7245    | -                                      | -                                             |
|          |        | 34.00000    | 4.00000 | 71.60000 | 1.1835        | 2.3969   | 2.8912    | -                                      | -                                             |
|          |        | 36.00000    | 4.00000 | 71.60000 | 1.3252        | 3.1278   | 3.0858    | -                                      | -                                             |
|          |        | 38.00000    | 4.00000 | 71.60000 | 1.1770        | 3.6977   | 3.2609    | -                                      | -                                             |
|          |        | 40.00000    | 4.00000 | 71.60000 | 0.83077       | 4.1715   | 3.4283    | -                                      | -                                             |
|          |        | 42.00000    | 4.00000 | 71.60000 | 0.32376       | 4.4553   | 3.5565    | -                                      | -                                             |
|          |        | 44.00000    | 4.00000 | 71.60000 | 0.12322       | 5.7090   | 4.1557    | -                                      | -                                             |
|          |        | 46.00000    | 4.00000 | 71.60000 | 0.12340       | 5.7253   | 4.1775    | -                                      | -                                             |
|          |        | 48.00000    | 4.00000 | 71.60000 | 0.12359       | 5.7417   | 4.1994    | -                                      | -                                             |
|          |        | 50.00000    | 4.00000 | 71.60000 | 0.12378       | 5.7582   | 4.2213    | -                                      | -                                             |
|          |        | 52.00000    | 4.00000 | 71.60000 | 0.12396       | 5.7747   | 4.2432    | -                                      | -                                             |
|          |        | 54.00000    | 4.00000 | 71.60000 | 0.12415       | 5.7912   | 4.2651    | -                                      | -                                             |
|          |        | 56.00000    | 4.00000 | 71.60000 | -0.034826     | 4.3184   | 3.6375    | -                                      | -                                             |
|          |        | 58.00000    | 4.00000 | 71.60000 | -0.67860      | 4.0070   | 3.4882    | -                                      | -                                             |
|          |        | 60.00000    | 4.00000 | 71.60000 | -1.1430       | 3.4568   | 3.2037    | -                                      | -                                             |
|          |        | 62.00000    | 4.00000 | 71.60000 | -1.3626       | 2.7699   | 2.8186    | -                                      | -                                             |
|          |        | 64.00000    | 4.00000 | 71.60000 | -1.3336       | 2.0416   | 2.3703    | -                                      | -                                             |
|          |        | 66.00000    | 4.00000 | 71.60000 | -1.0868       | 1.3343   | 1.8935    | -                                      | -                                             |
|          |        | 68.00000    | 4.00000 | 71.60000 | -0.86602      | 0.88749  | 1.4153    | -                                      | -                                             |
|          |        | 70.00000    | 4.00000 | 71.60000 | -0.75246      | 0.66174  | 0.96006   | -                                      | -                                             |
|          |        | 0.00000     | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 2.00000     | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 4.00000     | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 6.00000     | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 8.00000     | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 10.00000    | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 12.00000    | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 14.00000    | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.0       | -                                      | -                                             |
|          |        | 16.00000    | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.28059   | -                                      | -                                             |
|          |        | 18.00000    | 6.00000 | 71.60000 | 0.0           | 0.0      | 0.63863   | -                                      | -                                             |
|          |        | 20.00000    | 6.00000 | 71.60000 | 0.12435       | 0.16632  | 0.99109   | -                                      | -                                             |
|          |        | 22.00000    | 6.00000 | 71.60000 | 0.39388       | 0.61916  | 1.3083    | -                                      | -                                             |
|          |        | 24.00000    | 6.00000 | 71.60000 | 0.80081       | 1.3238   | 1.6315    | -                                      | -                                             |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |           |          | Displacements |   |   | Angle of Line           |                         |           |
|----------|----------|-------------|-----------|----------|---------------|---|---|-------------------------|-------------------------|-----------|
| Name     | Dist.    | x           | y         | z        | x             | y | z | Horizontal displacement | Horizontal displacement | to x Axis |
| 26.00000 | 6.00000  | 71.60000    | 0.95341   | 1.9336   | 2.2821        | - | - | -                       | *                       |           |
| 28.00000 | 6.00000  | 71.60000    | 0.92828   | 2.8036   | 2.9282        | - | - | -                       | *                       |           |
| 30.00000 | 6.00000  | 71.60000    | 1.1010    | 3.0582   | 3.3838        | - | - | -                       | *                       |           |
| 32.00000 | 6.00000  | 71.60000    | 1.4705    | 3.5885   | 3.5511        | - | - | -                       | *                       |           |
| 34.00000 | 6.00000  | 71.60000    | 1.8094    | 4.3091   | 3.7736        | - | - | -                       | *                       |           |
| 36.00000 | 6.00000  | 71.60000    | 1.8261    | 4.9412   | 4.0164        | - | - | -                       | *                       |           |
| 38.00000 | 6.00000  | 71.60000    | 1.4830    | 5.3019   | 4.2644        | - | - | -                       | *                       |           |
| 40.00000 | 6.00000  | 71.60000    | 1.0104    | 5.6606   | 4.4785        | - | - | -                       | *                       |           |
| 42.00000 | 6.00000  | 71.60000    | 0.40292   | 5.9541   | 4.6430        | - | - | -                       | *                       |           |
| 44.00000 | 6.00000  | 71.60000    | 0.14040   | 7.2290   | 5.4619        | - | - | -                       | *                       |           |
| 46.00000 | 6.00000  | 71.60000    | 0.14063   | 7.2471   | 5.4829        | - | - | -                       | *                       |           |
| 48.00000 | 6.00000  | 71.60000    | 0.14085   | 7.2652   | 5.5038        | - | - | -                       | *                       |           |
| 50.00000 | 6.00000  | 71.60000    | 0.14108   | 7.2833   | 5.5246        | - | - | -                       | *                       |           |
| 52.00000 | 6.00000  | 71.60000    | 0.14130   | 7.3015   | 5.5453        | - | - | -                       | *                       |           |
| 54.00000 | 6.00000  | 71.60000    | 0.14153   | 7.3197   | 5.5658        | - | - | -                       | *                       |           |
| 56.00000 | 6.00000  | 71.60000    | -0.053798 | 5.5950   | 4.6630        | - | - | -                       | *                       |           |
| 58.00000 | 6.00000  | 71.60000    | -1.0400   | 5.1506   | 4.4495        | - | - | -                       | *                       |           |
| 60.00000 | 6.00000  | 71.60000    | -1.7287   | 4.3849   | 4.0752        | - | - | -                       | *                       |           |
| 62.00000 | 6.00000  | 71.60000    | -2.0415   | 3.4805   | 3.5868        | - | - | -                       | *                       |           |
| 64.00000 | 6.00000  | 71.60000    | -2.0120   | 2.5833   | 3.0315        | - | - | -                       | *                       |           |
| 66.00000 | 6.00000  | 71.60000    | -1.7190   | 1.7701   | 2.4513        | - | - | -                       | *                       |           |
| 68.00000 | 6.00000  | 71.60000    | -1.3225   | 1.1367   | 1.9081        | - | - | -                       | *                       |           |
| 70.00000 | 6.00000  | 71.60000    | -1.0360   | 0.76411  | 1.3668        | - | - | -                       | *                       |           |
| 0.00000  | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 6.00000  | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 8.00000  | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 10.00000 | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 12.00000 | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 14.00000 | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.17924       | - | - | -                       | *                       |           |
| 16.00000 | 8.00000  | 71.60000    | 0.0       | 0.0      | 0.59451       | - | - | -                       | *                       |           |
| 18.00000 | 8.00000  | 71.60000    | 0.16562   | 0.14409  | 1.0182        | - | - | -                       | *                       |           |
| 20.00000 | 8.00000  | 71.60000    | 0.59199   | 0.64378  | 1.4127        | - | - | -                       | *                       |           |
| 22.00000 | 8.00000  | 71.60000    | 1.1471    | 1.4147   | 1.8482        | - | - | -                       | *                       |           |
| 24.00000 | 8.00000  | 71.60000    | 1.5269    | 2.2371   | 2.5117        | - | - | -                       | *                       |           |
| 26.00000 | 8.00000  | 71.60000    | 1.5239    | 3.1059   | 3.3134        | - | - | -                       | *                       |           |
| 28.00000 | 8.00000  | 71.60000    | 1.2327    | 4.3453   | 4.2347        | - | - | -                       | *                       |           |
| 30.00000 | 8.00000  | 71.60000    | 1.6762    | 4.7613   | 4.4852        | - | - | -                       | *                       |           |
| 32.00000 | 8.00000  | 71.60000    | 2.1989    | 5.3833   | 4.7127        | - | - | -                       | *                       |           |
| 34.00000 | 8.00000  | 71.60000    | 2.2816    | 5.8507   | 4.9324        | - | - | -                       | *                       |           |
| 36.00000 | 8.00000  | 71.60000    | 2.0800    | 6.2238   | 5.2164        | - | - | -                       | *                       |           |
| 38.00000 | 8.00000  | 71.60000    | 1.7610    | 6.6761   | 5.4686        | - | - | -                       | *                       |           |
| 40.00000 | 8.00000  | 71.60000    | 1.2488    | 7.1488   | 5.6722        | - | - | -                       | *                       |           |
| 42.00000 | 8.00000  | 71.60000    | 0.51724   | 7.5439   | 5.8410        | - | - | -                       | *                       |           |
| 44.00000 | 8.00000  | 71.60000    | 0.15936   | 8.8509   | 6.7895        | - | - | -                       | *                       |           |
| 46.00000 | 8.00000  | 71.60000    | 0.15961   | 8.8708   | 6.8052        | - | - | -                       | *                       |           |
| 48.00000 | 8.00000  | 71.60000    | 0.15987   | 8.8908   | 6.8207        | - | - | -                       | *                       |           |
| 50.00000 | 8.00000  | 71.60000    | 0.16013   | 8.9107   | 6.8361        | - | - | -                       | *                       |           |
| 52.00000 | 8.00000  | 71.60000    | 0.16038   | 8.9307   | 6.8512        | - | - | -                       | *                       |           |
| 54.00000 | 8.00000  | 71.60000    | 0.16064   | 8.9507   | 6.8661        | - | - | -                       | *                       |           |
| 56.00000 | 8.00000  | 71.60000    | -0.083008 | 6.9727   | 5.6870        | - | - | -                       | *                       |           |
| 58.00000 | 8.00000  | 71.60000    | -1.5770   | 6.3078   | 5.3905        | - | - | -                       | *                       |           |
| 60.00000 | 8.00000  | 71.60000    | -2.5381   | 5.2001   | 4.9151        | - | - | -                       | *                       |           |
| 62.00000 | 8.00000  | 71.60000    | -2.8999   | 3.9934   | 4.3195        | - | - | -                       | *                       |           |
| 64.00000 | 8.00000  | 71.60000    | -2.7973   | 2.9009   | 3.6581        | - | - | -                       | *                       |           |
| 66.00000 | 8.00000  | 71.60000    | -2.5350   | 2.1084   | 3.0506        | - | - | -                       | *                       |           |
| 68.00000 | 8.00000  | 71.60000    | -2.0413   | 1.4171   | 2.4038        | - | - | -                       | *                       |           |
| 70.00000 | 8.00000  | 71.60000    | -1.3737   | 0.81836  | 1.7661        | - | - | -                       | *                       |           |
| 0.00000  | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 6.00000  | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 8.00000  | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 10.00000 | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 12.00000 | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 14.00000 | 10.00000 | 71.60000    | 0.0       | 0.0      | 0.41984       | - | - | -                       | *                       |           |
| 16.00000 | 10.00000 | 71.60000    | 0.11942   | 0.066674 | 0.88770       | - | - | -                       | *                       |           |
| 18.00000 | 10.00000 | 71.60000    | 0.64892   | 0.43478  | 1.3539        | - | - | -                       | *                       |           |
| 20.00000 | 10.00000 | 71.60000    | 1.2538    | 1.0500   | 1.8417        | - | - | -                       | *                       |           |
| 22.00000 | 10.00000 | 71.60000    | 2.0347    | 1.9502   | 2.4276        | - | - | -                       | *                       |           |
| 24.00000 | 10.00000 | 71.60000    | 2.4673    | 3.0778   | 3.4521        | - | - | -                       | *                       |           |
| 26.00000 | 10.00000 | 71.60000    | 2.2876    | 4.2237   | 4.4603        | - | - | -                       | *                       |           |
| 28.00000 | 10.00000 | 71.60000    | 1.5476    | 5.9265   | 5.6248        | - | - | -                       | *                       |           |
| 30.00000 | 10.00000 | 71.60000    | 2.3816    | 6.4720   | 5.8878        | - | - | -                       | *                       |           |
| 32.00000 | 10.00000 | 71.60000    | 2.8357    | 6.9784   | 6.1638        | - | - | -                       | *                       |           |
| 34.00000 | 10.00000 | 71.60000    | 2.6652    | 7.2396   | 6.4339        | - | - | -                       | *                       |           |
| 36.00000 | 10.00000 | 71.60000    | 2.4001    | 7.5483   | 6.5872        | - | - | -                       | *                       |           |
| 38.00000 | 10.00000 | 71.60000    | 2.1261    | 8.0732   | 6.7635        | - | - | -                       | *                       |           |
| 40.00000 | 10.00000 | 71.60000    | 1.5946    | 8.6955   | 6.9001        | - | - | -                       | *                       |           |
| 42.00000 | 10.00000 | 71.60000    | 0.69226   | 9.2556   | 7.0349        | - | - | -                       | *                       |           |
| 44.00000 | 10.00000 | 71.60000    | 0.18020   | 10.617   | 7.9702        | - | - | -                       | *                       |           |
| 46.00000 | 10.00000 | 71.60000    | 0.18048   | 10.639   | 7.9777        | - | - | -                       | *                       |           |
| 48.00000 | 10.00000 | 71.60000    | 0.18076   | 10.661   | 7.9850        | - | - | -                       | *                       |           |
| 50.00000 | 10.00000 | 71.60000    | 0.18104   | 10.682   | 7.9922        | - | - | -                       | *                       |           |
| 52.00000 | 10.00000 | 71.60000    | 0.18132   | 10.704   | 7.9991        | - | - | -                       | *                       |           |
| 54.00000 | 10.00000 | 71.60000    | 0.18160   | 10.726   | 8.0057        | - | - | -                       | *                       |           |
| 56.00000 | 10.00000 | 71.60000    | -0.13269  | 8.4919   | 6.6043        | - | - | -                       | *                       |           |
| 58.00000 | 10.00000 | 71.60000    | -2.4346   | 7.4198   | 6.2042        | - | - | -                       | *                       |           |
| 60.00000 | 10.00000 | 71.60000    | -3.6850   | 5.7522   | 5.6278        | - | - | -                       | *                       |           |
| 62.00000 | 10.00000 | 71.60000    | -3.9668   | 4.1618   | 4.9380        | - | - | -                       | *                       |           |
| 64.00000 | 10.00000 | 71.60000    | -3.8883   | 3.0722   | 4.3398        | - | - | -                       | *                       |           |
| 66.00000 | 10.00000 | 71.60000    | -3.4525   | 2.1877   | 3.6310        | - | - | -                       | *                       |           |
| 68.00000 | 10.00000 | 71.60000    | -2.7947   | 1.4782   | 2.8761        | - | - | -                       | *                       |           |
| 70.00000 | 10.00000 | 71.60000    | -1.9957   | 0.90585  | 2.1384        | - | - | -                       | *                       |           |
| 0.00000  | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 2.00000  | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 4.00000  | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 6.00000  | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 8.00000  | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 10.00000 | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.0           | - | - | -                       | *                       |           |
| 12.00000 | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.13099       | - | - | -                       | *                       |           |
| 14.00000 | 12.00000 | 71.60000    | 0.0       | 0.0      | 0.60803       | - | - | -                       | *                       |           |
| 16.00000 | 12.00000 | 71.60000    | 0.31405   | 0.12300  | 1.1226        | - | - | -                       | *                       |           |
| 18.0     |          |             |           |          |               |   |   |                         |                         |           |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. | Coordinates |          |          | Displacements |                                  |   | Angle of Line           |                         |
|----------|-------------|----------|----------|---------------|----------------------------------|---|-------------------------|-------------------------|
| Name     | Dist.       | x        | y        | z             | x                                | y | z                       | to x Axis               |
|          |             |          |          |               |                                  |   | Horizontal displacement | Horizontal displacement |
| 20.00000 | 14.00000    | 71.60000 | 2.9761   | 0.96498       | 2.6865                           | - | -                       | -                       |
| 22.00000 | 14.00000    | 71.60000 | 4.4096   | 1.7737        | 3.7693                           | - | -                       | -                       |
| 24.00000 | 14.00000    | 71.60000 | 5.4924   | 3.1087        | 5.0972                           | - | -                       | -                       |
| 26.00000 | 14.00000    | 71.60000 | 5.4223   | 5.4359        | 6.3193                           | - | -                       | -                       |
| 28.00000 | 14.00000    | 71.60000 | 2.5258   | 9.5236        | 8.0358                           | - | -                       | -                       |
| 30.00000 | 14.00000    | 71.60000 | 3.3910   | 9.7917        | 8.3789                           | - | -                       | -                       |
| 32.00000 | 14.00000    | 71.60000 | 3.5404   | 9.9738        | 8.7648                           | - | -                       | -                       |
| 34.00000 | 14.00000    | 71.60000 | 3.5520   | 10.185        | 9.0337                           | - | -                       | -                       |
| 36.00000 | 14.00000    | 71.60000 | 3.5334   | 10.490        | 9.0685                           | - | -                       | -                       |
| 38.00000 | 14.00000    | 71.60000 | 3.3821   | 10.945        | 8.8609                           | - | -                       | -                       |
| 40.00000 | 14.00000    | 71.60000 | 2.8527   | 11.629        | 8.5011                           | - | -                       | -                       |
| 42.00000 | 14.00000    | 71.60000 | 1.6092   | 12.960        | 8.4195                           | - | -                       | -                       |
| 44.00000 | 14.00000    | 71.60000 | 0.22798  | 14.749        | 8.9808                           | - | -                       | -                       |
| 46.00000 | 14.00000    | 71.60000 | 0.22829  | 14.775        | 8.9700                           | - | -                       | -                       |
| 48.00000 | 14.00000    | 71.60000 | 0.22860  | 14.801        | 8.9592                           | - | -                       | -                       |
| 50.00000 | 14.00000    | 71.60000 | 0.22891  | 14.827        | 8.9484                           | - | -                       | -                       |
| 52.00000 | 14.00000    | 71.60000 | 0.22921  | 14.853        | 8.9376                           | - | -                       | -                       |
| 54.00000 | 14.00000    | 71.60000 | 0.22952  | 14.879        | 8.9267                           | - | -                       | -                       |
| 56.00000 | 14.00000    | 71.60000 | -0.50365 | 12.087        | 7.5283                           | - | -                       | -                       |
| 58.00000 | 14.00000    | 71.60000 | -6.7011  | 7.6584        | 6.8665                           | - | -                       | -                       |
| 60.00000 | 14.00000    | 71.60000 | -7.8825  | 6.6141        | 6.7314                           | - | -                       | -                       |
| 62.00000 | 14.00000    | 71.60000 | -7.3532  | 2.8931        | 6.2503                           | - | -                       | -                       |
| 64.00000 | 14.00000    | 71.60000 | -6.3541  | 1.8827        | 5.4804                           | - | -                       | -                       |
| 66.00000 | 14.00000    | 71.60000 | -5.2476  | 1.2470        | 4.5618                           | - | -                       | -                       |
| 68.00000 | 14.00000    | 71.60000 | -4.1299  | 0.81915       | 3.6059                           | - | -                       | -                       |
| 70.00000 | 14.00000    | 71.60000 | -3.0155  | 0.51327       | 2.6931                           | - | -                       | -                       |
| 0.00000  | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 2.00000  | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 4.00000  | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 6.00000  | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 8.00000  | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 10.00000 | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 12.00000 | 16.00000    | 71.60000 | 0.0      | 0.0           | 0.29617                          | - | -                       | -                       |
| 14.00000 | 16.00000    | 71.60000 | 0.093796 | 0.0046898     | 0.81435                          | - | -                       | -                       |
| 16.00000 | 16.00000    | 71.60000 | 0.89108  | 0.051980      | 1.3722                           | - | -                       | -                       |
| 18.00000 | 16.00000    | 71.60000 | 2.0802   | 0.14562       | 2.0321                           | - | -                       | -                       |
| 20.00000 | 16.00000    | 71.60000 | 3.5449   | 0.29749       | 2.9249                           | - | -                       | -                       |
| 22.00000 | 16.00000    | 71.60000 | 5.3917   | 0.56895       | 4.1898                           | - | -                       | -                       |
| 24.00000 | 16.00000    | 71.60000 | 7.3543   | 1.1188        | 5.6986                           | - | -                       | -                       |
| 26.00000 | 16.00000    | 71.60000 | 9.1327   | 2.6677        | 6.8586                           | - | -                       | -                       |
| 28.00000 | 16.00000    | 71.60000 | 2.8121   | 11.569        | 7.9909                           | - | -                       | -                       |
| 30.00000 | 16.00000    | 71.60000 | 3.6898   | 11.662        | 8.3541                           | - | -                       | -                       |
| 32.00000 | 16.00000    | 71.60000 | 3.8078   | 11.732        | 8.7626                           | - | -                       | -                       |
| 34.00000 | 16.00000    | 71.60000 | 3.9033   | 11.817        | 9.0291                           | - | -                       | -                       |
| 36.00000 | 16.00000    | 71.60000 | 4.0209   | 11.938        | 9.3006                           | - | -                       | -                       |
| 38.00000 | 16.00000    | 71.60000 | 4.1201   | 12.130        | 8.7578                           | - | -                       | -                       |
| 40.00000 | 16.00000    | 71.60000 | 4.1164   | 12.510        | 8.3113                           | - | -                       | -                       |
| 42.00000 | 16.00000    | 71.60000 | 3.4163   | 13.731        | 7.8681                           | - | -                       | -                       |
| 44.00000 | 16.00000    | 71.60000 | 0.25515  | 17.199        | 8.2379                           | - | -                       | -                       |
| 46.00000 | 16.00000    | 71.60000 | 0.25546  | 17.228        | 8.2204                           | - | -                       | -                       |
| 48.00000 | 16.00000    | 71.60000 | 0.25578  | 17.256        | 8.2030                           | - | -                       | -                       |
| 50.00000 | 16.00000    | 71.60000 | 0.25609  | 17.284        | 8.1857                           | - | -                       | -                       |
| 52.00000 | 16.00000    | 71.60000 | 0.25640  | 17.313        | 8.1687                           | - | -                       | -                       |
| 54.00000 | 16.00000    | 71.60000 | 0.25671  | 17.341        | 8.1518                           | - | -                       | -                       |
| 56.00000 | 16.00000    | 71.60000 | -3.3731  | 13.492        | 7.0750                           | - | -                       | -                       |
| 58.00000 | 16.00000    | 71.60000 | -11.942  | 2.2747        | 7.4190                           | - | -                       | -                       |
| 60.00000 | 16.00000    | 71.60000 | -10.321  | 1.0070        | 7.2953                           | - | -                       | -                       |
| 62.00000 | 16.00000    | 71.60000 | -8.6717  | 0.56864       | 6.6985                           | - | -                       | -                       |
| 64.00000 | 16.00000    | 71.60000 | -7.1609  | 0.35362       | 5.8225                           | - | -                       | -                       |
| 66.00000 | 16.00000    | 71.60000 | -5.7815  | 0.22897       | 4.8146                           | - | -                       | -                       |
| 68.00000 | 16.00000    | 71.60000 | -4.5019  | 0.14882       | 3.7872                           | - | -                       | -                       |
| 70.00000 | 16.00000    | 71.60000 | -3.2843  | 0.093171      | 2.8197                           | - | -                       | -                       |
| 0.00000  | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 2.00000  | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 4.00000  | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 6.00000  | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 8.00000  | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 10.00000 | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 12.00000 | 18.00000    | 71.60000 | 0.0      | 0.0           | 0.29579                          | - | -                       | -                       |
| 14.00000 | 18.00000    | 71.60000 | 0.14360  | -0.0020369    | 0.82437                          | - | -                       | -                       |
| 16.00000 | 18.00000    | 71.60000 | 1.2045   | -0.017085     | 1.4142                           | - | -                       | -                       |
| 18.00000 | 18.00000    | 71.60000 | 2.6639   | -0.037786     | 2.1632                           | - | -                       | -                       |
| 20.00000 | 18.00000    | 71.60000 | 4.5238   | -0.061797     | 3.2766                           | - | -                       | -                       |
| 22.00000 | 18.00000    | 71.60000 | 6.9345   | -0.090673     | 4.8617                           | - | -                       | -                       |
| 24.00000 | 18.00000    | 71.60000 | 9.5492   | -0.12244      | 6.7087                           | - | -                       | -                       |
| 26.00000 | 18.00000    | 71.60000 | 12.437   | -0.15808      | 8.1016                           | - | -                       | -                       |
| 28.00000 | 18.00000    | 71.60000 | 16.155   | -0.20203      | 7.9053                           | - | -                       | -                       |
| 30.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 32.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 34.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 36.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 38.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 40.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 42.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 44.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 46.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 48.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 50.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 52.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 54.00000 | 18.00000    | 71.60000 |          |               | Point lies within an excavation. | - | -                       | -                       |
| 56.00000 | 18.00000    | 71.60000 | -17.780  | 0.12521       | 7.9097                           | - | -                       | -                       |
| 58.00000 | 18.00000    | 71.60000 | -15.270  | 0.10754       | 8.8638                           | - | -                       | -                       |
| 60.00000 | 18.00000    | 71.60000 | -13.038  | 0.091815      | 8.8451                           | - | -                       | -                       |
| 62.00000 | 18.00000    | 71.60000 | -11.041  | 0.077751      | 8.1609                           | - | -                       | -                       |
| 64.00000 | 18.00000    | 71.60000 | -9.2368  | 0.065048      | 7.0714                           | - | -                       | -                       |
| 66.00000 | 18.00000    | 71.60000 | -7.5843  | 0.053410      | 5.7898                           | - | -                       | -                       |
| 68.00000 | 18.00000    | 71.60000 | -6.0409  | 0.042542      | 4.4823                           | - | -                       | -                       |
| 70.00000 | 18.00000    | 71.60000 | -4.5646  | 0.032145      | 3.2681                           | - | -                       | -                       |
| 0.00000  | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 2.00000  | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 4.00000  | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 6.00000  | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 8.00000  | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 10.00000 | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.0                              | - | -                       | -                       |
| 12.00000 | 20.00000    | 71.60000 | 0.0      | 0.0           | 0.28870                          | - | -                       | -                       |
| 14.00000 | 20.00000    | 71.60000 | 0.13296  | -0.0018860    | 0.81566                          | - | -                       | -                       |
| 16.00000 | 20.00000    | 71.60000 | 1.1839   | -0.016793     | 1.4054                           | - | -                       | -                       |
| 18.00000 | 20.00000    | 71.60000 | 2.6429   | -0.037488     | 2.1506                           | - | -                       | -                       |
| 20.00000 | 20.00000    | 71.60000 | 4.4961   | -0.061441     | 3.2589                           | - | -                       | -                       |
| 22.00000 |             |          |          |               |                                  |   |                         |                         |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |          |            | Displacements                    |   |   | Angle of Line           |                                   |
|----------|----------|-------------|----------|------------|----------------------------------|---|---|-------------------------|-----------------------------------|
| Name     | Dist.    | x           | y        | z          | x                                | y | z | Horizontal displacement | Horizontal displacement to x Axis |
| 14.00000 | 22.00000 | 71.60000    | 0.12233  | -0.0017351 | 0.80691                          | - | - | -                       | *                                 |
| 16.00000 | 22.00000 | 71.60000    | 1.1634   | -0.016502  | 1.3965                           | - | - | -                       | *                                 |
| 18.00000 | 22.00000 | 71.60000    | 2.6219   | -0.037190  | 2.1380                           | - | - | -                       | *                                 |
| 20.00000 | 22.00000 | 71.60000    | 4.4683   | -0.061086  | 3.2413                           | - | - | -                       | *                                 |
| 22.00000 | 22.00000 | 71.60000    | 6.8743   | -0.089894  | 4.8160                           | - | - | -                       | *                                 |
| 24.00000 | 22.00000 | 71.60000    | 9.4822   | -0.12157   | 6.6693                           | - | - | -                       | *                                 |
| 26.00000 | 22.00000 | 71.60000    | 12.361   | -0.15708   | 8.0921                           | - | - | -                       | *                                 |
| 28.00000 | 22.00000 | 71.60000    | 16.059   | -0.20082   | 7.9419                           | - | - | -                       | *                                 |
| 30.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 32.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 34.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 36.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 38.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 40.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 42.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 44.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 46.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 48.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 50.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 52.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 54.00000 | 22.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 56.00000 | 22.00000 | 71.60000    | -17.818  | 0.12548    | 7.8877                           | - | - | -                       | *                                 |
| 58.00000 | 22.00000 | 71.60000    | -15.304  | 0.10777    | 8.8579                           | - | - | -                       | *                                 |
| 60.00000 | 22.00000 | 71.60000    | -13.067  | 0.092024   | 8.8507                           | - | - | -                       | *                                 |
| 62.00000 | 22.00000 | 71.60000    | -11.067  | 0.077938   | 8.1739                           | - | - | -                       | *                                 |
| 64.00000 | 22.00000 | 71.60000    | -9.2611  | 0.065219   | 7.0885                           | - | - | -                       | *                                 |
| 66.00000 | 22.00000 | 71.60000    | -7.6067  | 0.053568   | 5.8083                           | - | - | -                       | *                                 |
| 68.00000 | 22.00000 | 71.60000    | -6.0621  | 0.042691   | 4.5003                           | - | - | -                       | *                                 |
| 70.00000 | 22.00000 | 71.60000    | -4.5851  | 0.032290   | 3.2842                           | - | - | -                       | *                                 |
| 0.00000  | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 2.00000  | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 4.00000  | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 6.00000  | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 8.00000  | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 10.00000 | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 12.00000 | 24.00000 | 71.60000    | 0.0      | 0.0        | 0.27452                          | - | - | -                       | *                                 |
| 14.00000 | 24.00000 | 71.60000    | 0.11169  | -0.0015843 | 0.79813                          | - | - | -                       | *                                 |
| 16.00000 | 24.00000 | 71.60000    | 1.1428   | -0.016210  | 1.3877                           | - | - | -                       | *                                 |
| 18.00000 | 24.00000 | 71.60000    | 2.6009   | -0.036892  | 2.1255                           | - | - | -                       | *                                 |
| 20.00000 | 24.00000 | 71.60000    | 4.4407   | -0.060731  | 3.2237                           | - | - | -                       | *                                 |
| 22.00000 | 24.00000 | 71.60000    | 6.8442   | -0.089505  | 4.7932                           | - | - | -                       | *                                 |
| 24.00000 | 24.00000 | 71.60000    | 9.4488   | -0.12113   | 6.6495                           | - | - | -                       | *                                 |
| 26.00000 | 24.00000 | 71.60000    | 12.323   | -0.15658   | 8.0869                           | - | - | -                       | *                                 |
| 28.00000 | 24.00000 | 71.60000    | 16.011   | -0.20021   | 7.9595                           | - | - | -                       | *                                 |
| 30.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 32.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 34.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 36.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 38.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 40.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 42.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 44.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 46.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 48.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 50.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 52.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 54.00000 | 24.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 56.00000 | 24.00000 | 71.60000    | -17.837  | 0.12561    | 7.8766                           | - | - | -                       | *                                 |
| 58.00000 | 24.00000 | 71.60000    | -15.320  | 0.10789    | 8.8549                           | - | - | -                       | *                                 |
| 60.00000 | 24.00000 | 71.60000    | -13.082  | 0.092129   | 8.8534                           | - | - | -                       | *                                 |
| 62.00000 | 24.00000 | 71.60000    | -11.081  | 0.078033   | 8.1804                           | - | - | -                       | *                                 |
| 64.00000 | 24.00000 | 71.60000    | -9.2732  | 0.065304   | 7.0970                           | - | - | -                       | *                                 |
| 66.00000 | 24.00000 | 71.60000    | -7.6179  | 0.053647   | 5.8176                           | - | - | -                       | *                                 |
| 68.00000 | 24.00000 | 71.60000    | -6.0727  | 0.042765   | 4.5093                           | - | - | -                       | *                                 |
| 70.00000 | 24.00000 | 71.60000    | -4.5954  | 0.032362   | 3.2922                           | - | - | -                       | *                                 |
| 0.00000  | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 2.00000  | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 4.00000  | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 6.00000  | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 8.00000  | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 10.00000 | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 12.00000 | 26.00000 | 71.60000    | 0.0      | 0.0        | 0.26743                          | - | - | -                       | *                                 |
| 14.00000 | 26.00000 | 71.60000    | 0.10105  | -0.0014334 | 0.78930                          | - | - | -                       | *                                 |
| 16.00000 | 26.00000 | 71.60000    | 1.1223   | -0.015919  | 1.3789                           | - | - | -                       | *                                 |
| 18.00000 | 26.00000 | 71.60000    | 2.5800   | -0.036595  | 2.1130                           | - | - | -                       | *                                 |
| 20.00000 | 26.00000 | 71.60000    | 4.4130   | -0.060376  | 3.2061                           | - | - | -                       | *                                 |
| 22.00000 | 26.00000 | 71.60000    | 6.8142   | -0.089117  | 4.7703                           | - | - | -                       | *                                 |
| 24.00000 | 26.00000 | 71.60000    | 9.4155   | -0.12070   | 6.6295                           | - | - | -                       | *                                 |
| 26.00000 | 26.00000 | 71.60000    | 12.286   | -0.15609   | 8.0816                           | - | - | -                       | *                                 |
| 28.00000 | 26.00000 | 71.60000    | 15.963   | -0.19960   | 7.9767                           | - | - | -                       | *                                 |
| 30.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 32.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 34.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 36.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 38.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 40.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 42.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 44.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 46.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 48.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 50.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 52.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 54.00000 | 26.00000 | 71.60000    |          |            | Point lies within an excavation. |   |   |                         | *                                 |
| 56.00000 | 26.00000 | 71.60000    | -17.855  | 0.12574    | 7.8654                           | - | - | -                       | *                                 |
| 58.00000 | 26.00000 | 71.60000    | -15.337  | 0.10801    | 8.8518                           | - | - | -                       | *                                 |
| 60.00000 | 26.00000 | 71.60000    | -13.097  | 0.092233   | 8.8561                           | - | - | -                       | *                                 |
| 62.00000 | 26.00000 | 71.60000    | -11.094  | 0.078127   | 8.1868                           | - | - | -                       | *                                 |
| 64.00000 | 26.00000 | 71.60000    | -9.2853  | 0.065390   | 7.1056                           | - | - | -                       | *                                 |
| 66.00000 | 26.00000 | 71.60000    | -7.6291  | 0.053726   | 5.8269                           | - | - | -                       | *                                 |
| 68.00000 | 26.00000 | 71.60000    | -6.0833  | 0.042840   | 4.5183                           | - | - | -                       | *                                 |
| 70.00000 | 26.00000 | 71.60000    | -4.6057  | 0.032434   | 3.3003                           | - | - | -                       | *                                 |
| 0.00000  | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 2.00000  | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 4.00000  | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 6.00000  | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 8.00000  | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 10.00000 | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.0                              | - | - | -                       | *                                 |
| 12.00000 | 28.00000 | 71.60000    | 0.0      | 0.0        | 0.26034                          | - | - | -                       | *                                 |
| 14.00000 | 28.00000 | 71.60000    | 0.090419 | -0.0012825 | 0.78043                          | - | - | -                       | *                                 |
| 16.00000 | 28.00000 | 71.60000    | 1.1017   | -0.015627  | 1.3702                           | - | - | -                       | *                                 |
|          |          |             |          |            |                                  |   |   |                         |                                   |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. | Coordinates |          |          | Displacements |          |            | Angle of                         |                            |                            |                   |
|----------|-------------|----------|----------|---------------|----------|------------|----------------------------------|----------------------------|----------------------------|-------------------|
| Name     | Dist.       | x        | y        | z             | x        | y          | z                                | Horizontal<br>dispalcement | Horizontal<br>displacement | Line<br>to x Axis |
|          |             | 8.00000  | 30.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 10.00000 | 30.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 12.00000 | 30.00000 | 71.60000      | 0.0      | 0.0        | 0.25324                          | -                          | -                          | *                 |
|          |             | 14.00000 | 30.00000 | 71.60000      | 0.079782 | -0.0011317 | 0.77151                          | -                          | -                          | *                 |
|          |             | 16.00000 | 30.00000 | 71.60000      | 1.0811   | -0.015335  | 1.3615                           | -                          | -                          | *                 |
|          |             | 18.00000 | 30.00000 | 71.60000      | 2.5381   | -0.036001  | 2.0882                           | -                          | -                          | *                 |
|          |             | 20.00000 | 30.00000 | 71.60000      | 4.3577   | -0.059668  | 3.1712                           | -                          | -                          | *                 |
|          |             | 22.00000 | 30.00000 | 71.60000      | 6.7543   | -0.088343  | 4.7246                           | -                          | -                          | *                 |
|          |             | 24.00000 | 30.00000 | 71.60000      | 9.3489   | -0.11983   | 6.5894                           | -                          | -                          | *                 |
|          |             | 26.00000 | 30.00000 | 71.60000      | 12.210   | -0.15510   | 8.0702                           | -                          | -                          | *                 |
|          |             | 28.00000 | 30.00000 | 71.60000      | 15.868   | -0.19839   | 8.0098                           | -                          | -                          | *                 |
|          |             | 30.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 32.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 34.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 36.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 38.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 40.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 42.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 44.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 46.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 48.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 50.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 52.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 54.00000 | 30.00000 | 71.60000      |          |            | Point lies within an excavation. |                            |                            | *                 |
|          |             | 56.00000 | 30.00000 | 71.60000      | -17.893  | 0.12601    | 7.8428                           | -                          | -                          | *                 |
|          |             | 58.00000 | 30.00000 | 71.60000      | -15.370  | 0.10824    | 8.8455                           | -                          | -                          | *                 |
|          |             | 60.00000 | 30.00000 | 71.60000      | -13.127  | 0.092443   | 8.8614                           | -                          | -                          | *                 |
|          |             | 62.00000 | 30.00000 | 71.60000      | -11.121  | 0.078315   | 8.1997                           | -                          | -                          | *                 |
|          |             | 64.00000 | 30.00000 | 71.60000      | -9.3097  | 0.065561   | 7.1226                           | -                          | -                          | *                 |
|          |             | 66.00000 | 30.00000 | 71.60000      | -7.6516  | 0.053884   | 5.8455                           | -                          | -                          | *                 |
|          |             | 68.00000 | 30.00000 | 71.60000      | -6.1045  | 0.042989   | 4.5363                           | -                          | -                          | *                 |
|          |             | 70.00000 | 30.00000 | 71.60000      | -4.6262  | 0.032579   | 3.3164                           | -                          | -                          | *                 |
|          |             | 0.00000  | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 2.00000  | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 4.00000  | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 6.00000  | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 8.00000  | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 10.00000 | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 12.00000 | 32.00000 | 71.60000      | 0.0      | 0.0        | 0.23890                          | -                          | -                          | *                 |
|          |             | 14.00000 | 32.00000 | 71.60000      | 0.036635 | -0.0030959 | 0.74658                          | -                          | -                          | *                 |
|          |             | 16.00000 | 32.00000 | 71.60000      | 0.74747  | -0.073522  | 1.3035                           | -                          | -                          | *                 |
|          |             | 18.00000 | 32.00000 | 71.60000      | 1.9208   | -0.22598   | 1.9403                           | -                          | -                          | *                 |
|          |             | 20.00000 | 32.00000 | 71.60000      | 3.3155   | -0.46730   | 2.7967                           | -                          | -                          | *                 |
|          |             | 22.00000 | 32.00000 | 71.60000      | 5.0781   | -0.88985   | 4.0025                           | -                          | -                          | *                 |
|          |             | 24.00000 | 32.00000 | 71.60000      | 6.8595   | -1.6994    | 5.4918                           | -                          | -                          | *                 |
|          |             | 26.00000 | 32.00000 | 71.60000      | 8.1205   | -3.6441    | 6.6830                           | -                          | -                          | *                 |
|          |             | 28.00000 | 32.00000 | 71.60000      | 4.0485   | -9.0744    | 7.2818                           | -                          | -                          | *                 |
|          |             | 30.00000 | 32.00000 | 71.60000      | 3.3877   | -11.122    | 8.4879                           | -                          | -                          | *                 |
|          |             | 32.00000 | 32.00000 | 71.60000      | 3.5396   | -11.177    | 8.9000                           | -                          | -                          | *                 |
|          |             | 34.00000 | 32.00000 | 71.60000      | 3.6173   | -11.254    | 9.1830                           | -                          | -                          | *                 |
|          |             | 36.00000 | 32.00000 | 71.60000      | 3.7085   | -11.385    | 9.2110                           | -                          | -                          | *                 |
|          |             | 38.00000 | 32.00000 | 71.60000      | 3.7585   | -11.622    | 8.9698                           | -                          | -                          | *                 |
|          |             | 40.00000 | 32.00000 | 71.60000      | 3.6314   | -12.110    | 8.5525                           | -                          | -                          | *                 |
|          |             | 42.00000 | 32.00000 | 71.60000      | 2.5471   | -13.326    | 8.1232                           | -                          | -                          | *                 |
|          |             | 44.00000 | 32.00000 | 71.60000      | -0.16320 | -16.210    | 8.6058                           | -                          | -                          | *                 |
|          |             | 46.00000 | 32.00000 | 71.60000      | -0.16306 | -16.192    | 8.6151                           | -                          | -                          | *                 |
|          |             | 48.00000 | 32.00000 | 71.60000      | -0.16293 | -16.173    | 8.6244                           | -                          | -                          | *                 |
|          |             | 50.00000 | 32.00000 | 71.60000      | -0.16279 | -16.155    | 8.6337                           | -                          | -                          | *                 |
|          |             | 52.00000 | 32.00000 | 71.60000      | -0.16265 | -16.137    | 8.6431                           | -                          | -                          | *                 |
|          |             | 54.00000 | 32.00000 | 71.60000      | -0.16251 | -16.119    | 8.6525                           | -                          | -                          | *                 |
|          |             | 56.00000 | 32.00000 | 71.60000      | -0.16237 | -16.101    | 8.6620                           | -                          | -                          | *                 |
|          |             | 58.00000 | 32.00000 | 71.60000      | -9.1063  | -6.3744    | 7.0547                           | -                          | -                          | *                 |
|          |             | 60.00000 | 32.00000 | 71.60000      | -9.3357  | -3.2675    | 7.0488                           | -                          | -                          | *                 |
|          |             | 62.00000 | 32.00000 | 71.60000      | -8.2087  | -1.9154    | 6.5433                           | -                          | -                          | *                 |
|          |             | 64.00000 | 32.00000 | 71.60000      | -6.9128  | -1.2097    | 5.7344                           | -                          | -                          | *                 |
|          |             | 66.00000 | 32.00000 | 71.60000      | -5.6434  | -0.79008   | 4.7727                           | -                          | -                          | *                 |
|          |             | 68.00000 | 32.00000 | 71.60000      | -4.4287  | -0.51668   | 3.7743                           | -                          | -                          | *                 |
|          |             | 70.00000 | 32.00000 | 71.60000      | -3.2536  | -0.32536   | 2.8233                           | -                          | -                          | *                 |
|          |             | 0.00000  | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 2.00000  | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 4.00000  | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 6.00000  | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 8.00000  | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 10.00000 | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.0                              | -                          | -                          | *                 |
|          |             | 12.00000 | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.17174                          | -                          | -                          | *                 |
|          |             | 14.00000 | 34.00000 | 71.60000      | 0.0      | 0.0        | 0.66098                          | -                          | -                          | *                 |
|          |             | 16.00000 | 34.00000 | 71.60000      | 0.50036  | -0.13124   | 1.2009                           | -                          | -                          | *                 |
|          |             | 18.00000 | 34.00000 | 71.60000      | 1.5503   | -0.48638   | 1.7812                           | -                          | -                          | *                 |
|          |             | 20.00000 | 34.00000 | 71.60000      | 2.6778   | -1.0103    | 2.5239                           | -                          | -                          | *                 |
|          |             | 22.00000 | 34.00000 | 71.60000      | 4.0157   | -1.8523    | 3.5266                           | -                          | -                          | *                 |
|          |             | 24.00000 | 34.00000 | 71.60000      | 4.9717   | -3.1564    | 4.8297                           | -                          | -                          | *                 |
|          |             | 26.00000 | 34.00000 | 71.60000      | 4.9260   | -5.2532    | 6.0762                           | -                          | -                          | *                 |
|          |             | 28.00000 | 34.00000 | 71.60000      | 2.7140   | -7.5687    | 6.9421                           | -                          | -                          | *                 |
|          |             | 30.00000 | 34.00000 | 71.60000      | 3.0958   | -9.3050    | 8.1516                           | -                          | -                          | *                 |
|          |             | 32.00000 | 34.00000 | 71.60000      | 3.2957   | -9.4836    | 8.5138                           | -                          | -                          | *                 |
|          |             | 34.00000 | 34.00000 | 71.60000      | 3.2817   | -9.6721    | 8.7795                           | -                          | -                          | *                 |
|          |             | 36.00000 | 34.00000 | 71.60000      | 3.2288   | -9.9564    | 8.8272                           | -                          | -                          | *                 |
|          |             | 38.00000 | 34.00000 | 71.60000      | 3.0302   | -10.381    | 8.6428                           | -                          | -                          | *                 |
|          |             | 40.00000 | 34.00000 | 71.60000      | 2.4583   | -10.983    | 8.3071                           | -                          | -                          | *                 |
|          |             | 42.00000 | 34.00000 | 71.60000      | 1.3238   | -12.141    | 8.2688                           | -                          | -                          | *                 |
|          |             | 44.00000 | 34.00000 | 71.60000      | -0.14573 | -13.878    | 8.9126                           | -                          | -                          | *                 |
|          |             | 46.00000 | 34.00000 | 71.60000      | -0.14560 | -13.861    | 8.9174                           | -                          | -                          | *                 |
|          |             | 48.00000 | 34.00000 | 71.60000      | -0.14546 | -13.844    | 8.9222                           | -                          | -                          | *                 |
|          |             | 50.00000 | 34.00000 | 71.60000      | -0.14533 | -13.827    | 8.9270                           | -                          | -                          | *                 |
|          |             | 52.00000 | 34.00000 | 71.60000      | -0.14519 | -13.811    | 8.9318                           | -                          | -                          | *                 |
|          |             | 54.00000 | 34.00000 | 71.60000      | -0.14506 | -13.794    | 8.9365                           | -                          | -                          | *                 |
|          |             | 56.00000 | 34.00000 | 71.60000      | -0.14492 | -13.777    | 8.9412                           | -                          | -                          | *                 |
|          |             | 58.00000 | 34.00000 | 71.60000      | -5.0032  | -8.5054    | 6.9461                           | -                          | -                          | *                 |
|          |             | 60.00000 | 34.00000 | 71.60000      | -6.4429  | -5.4764    | 6.4227                           | -                          | -                          | *                 |
|          |             | 62.00000 | 34.00000 | 71.60000      | -6.4868  | -3.6758    | 5.9975                           | -                          | -                          | *                 |
|          |             | 64.00000 | 34.00000 | 71.60000      | -5.8240  | -2.4752    | 5.2909                           | -                          | -                          | *                 |
|          |             | 66.00000 | 34.00000 | 71.60000      | -4.9128  | -1.        |                                  |                            |                            |                   |

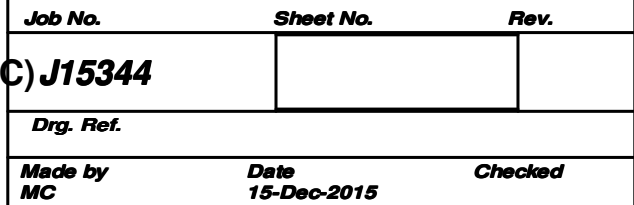


# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |       | Coordinates |          |          | Displacements |           |          | Angle of                   |                            |                   |
|----------|-------|-------------|----------|----------|---------------|-----------|----------|----------------------------|----------------------------|-------------------|
| Name     | Dist. | x           | y        | z        | x             | y         | z        | Horizontal<br>displacement | Horizontal<br>displacement | Line<br>to x Axis |
|          |       | 2.00000     | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 4.00000     | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 6.00000     | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 8.00000     | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 10.00000    | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 12.00000    | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 14.00000    | 38.00000 | 71.60000 | 0.0           | 0.0       | 0.31974  | -                          | -                          | *                 |
|          |       | 16.00000    | 38.00000 | 71.60000 | 0.042226      | -0.024920 | 0.76946  | -                          | -                          | *                 |
|          |       | 18.00000    | 38.00000 | 71.60000 | 0.43790       | -0.30911  | 1.2291   | -                          | -                          | *                 |
|          |       | 20.00000    | 38.00000 | 71.60000 | 1.0349        | -0.90871  | 1.6871   | -                          | -                          | *                 |
|          |       | 22.00000    | 38.00000 | 71.60000 | 1.7511        | -1.7526   | 2.2277   | -                          | -                          | *                 |
|          |       | 24.00000    | 38.00000 | 71.60000 | 2.2013        | -2.8025   | 3.1415   | -                          | -                          | *                 |
|          |       | 26.00000    | 38.00000 | 71.60000 | 2.1215        | -3.8614   | 4.1049   | -                          | -                          | *                 |
|          |       | 28.00000    | 38.00000 | 71.60000 | 1.5043        | -4.5986   | 4.8481   | -                          | -                          | *                 |
|          |       | 30.00000    | 38.00000 | 71.60000 | 2.0728        | -5.9878   | 5.4800   | -                          | -                          | *                 |
|          |       | 32.00000    | 38.00000 | 71.60000 | 2.5625        | -6.4960   | 5.7186   | -                          | -                          | *                 |
|          |       | 34.00000    | 38.00000 | 71.60000 | 2.4797        | -6.7824   | 5.9594   | -                          | -                          | *                 |
|          |       | 36.00000    | 38.00000 | 71.60000 | 2.2046        | -7.0420   | 6.1055   | -                          | -                          | *                 |
|          |       | 38.00000    | 38.00000 | 71.60000 | 1.9284        | -7.5088   | 6.2818   | -                          | -                          | *                 |
|          |       | 40.00000    | 38.00000 | 71.60000 | 1.4207        | -8.0532   | 6.4169   | -                          | -                          | *                 |
|          |       | 42.00000    | 38.00000 | 71.60000 | 0.59380       | -8.5361   | 6.5391   | -                          | -                          | *                 |
|          |       | 44.00000    | 38.00000 | 71.60000 | -0.11495      | -9.9227   | 7.5193   | -                          | -                          | *                 |
|          |       | 46.00000    | 38.00000 | 71.60000 | -0.11483      | -9.9086   | 7.5126   | -                          | -                          | *                 |
|          |       | 48.00000    | 38.00000 | 71.60000 | -0.11471      | -9.8945   | 7.5059   | -                          | -                          | *                 |
|          |       | 50.00000    | 38.00000 | 71.60000 | -0.11458      | -9.8804   | 7.4991   | -                          | -                          | *                 |
|          |       | 52.00000    | 38.00000 | 71.60000 | -0.11446      | -9.8664   | 7.4921   | -                          | -                          | *                 |
|          |       | 54.00000    | 38.00000 | 71.60000 | -0.11434      | -9.8523   | 7.4851   | -                          | -                          | *                 |
|          |       | 56.00000    | 38.00000 | 71.60000 | -0.11422      | -9.8383   | 7.4780   | -                          | -                          | *                 |
|          |       | 58.00000    | 38.00000 | 71.60000 | -1.8931       | -7.0045   | 5.8918   | -                          | -                          | *                 |
|          |       | 60.00000    | 38.00000 | 71.60000 | -3.0561       | -5.6538   | 5.3678   | -                          | -                          | *                 |
|          |       | 62.00000    | 38.00000 | 71.60000 | -3.4424       | -4.2457   | 4.7210   | -                          | -                          | *                 |
|          |       | 64.00000    | 38.00000 | 71.60000 | -3.3276       | -3.0781   | 4.0370   | -                          | -                          | *                 |
|          |       | 66.00000    | 38.00000 | 71.60000 | -3.0138       | -2.2302   | 3.3850   | -                          | -                          | *                 |
|          |       | 68.00000    | 38.00000 | 71.60000 | -2.4590       | -1.5164   | 2.6842   | -                          | -                          | *                 |
|          |       | 70.00000    | 38.00000 | 71.60000 | -1.7375       | -0.91837  | 1.9934   | -                          | -                          | *                 |
|          |       | 0.00000     | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 2.00000     | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 4.00000     | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 6.00000     | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 8.00000     | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 10.00000    | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 12.00000    | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 14.00000    | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.070047 | -                          | -                          | *                 |
|          |       | 16.00000    | 40.00000 | 71.60000 | 0.0           | 0.0       | 0.47999  | -                          | -                          | *                 |
|          |       | 18.00000    | 40.00000 | 71.60000 | 0.095338      | -0.085991 | 0.88808  | -                          | -                          | *                 |
|          |       | 20.00000    | 40.00000 | 71.60000 | 0.40094       | -0.44984  | 1.2707   | -                          | -                          | *                 |
|          |       | 22.00000    | 40.00000 | 71.60000 | 0.90754       | -1.1602   | 1.6702   | -                          | -                          | *                 |
|          |       | 24.00000    | 40.00000 | 71.60000 | 1.3190        | -1.9920   | 2.2274   | -                          | -                          | *                 |
|          |       | 26.00000    | 40.00000 | 71.60000 | 1.3885        | -2.7568   | 2.9944   | -                          | -                          | *                 |
|          |       | 28.00000    | 40.00000 | 71.60000 | 1.1594        | -3.2883   | 3.6632   | -                          | -                          | *                 |
|          |       | 30.00000    | 40.00000 | 71.60000 | 1.4045        | -4.2615   | 4.1478   | -                          | -                          | *                 |
|          |       | 32.00000    | 40.00000 | 71.60000 | 1.9554        | -4.8808   | 4.3481   | -                          | -                          | *                 |
|          |       | 34.00000    | 40.00000 | 71.60000 | 2.1209        | -5.3887   | 4.5275   | -                          | -                          | *                 |
|          |       | 36.00000    | 40.00000 | 71.60000 | 1.9337        | -5.7342   | 4.7802   | -                          | -                          | *                 |
|          |       | 38.00000    | 40.00000 | 71.60000 | 1.6192        | -6.1284   | 5.0163   | -                          | -                          | *                 |
|          |       | 40.00000    | 40.00000 | 71.60000 | 1.1339        | -6.5382   | 5.2080   | -                          | -                          | *                 |
|          |       | 42.00000    | 40.00000 | 71.60000 | 0.45664       | -6.8784   | 5.3600   | -                          | -                          | *                 |
|          |       | 44.00000    | 40.00000 | 71.60000 | -0.10147      | -8.2155   | 6.3119   | -                          | -                          | *                 |
|          |       | 46.00000    | 40.00000 | 71.60000 | -0.10136      | -8.2026   | 6.3004   | -                          | -                          | *                 |
|          |       | 48.00000    | 40.00000 | 71.60000 | -0.10125      | -8.1898   | 6.2888   | -                          | -                          | *                 |
|          |       | 50.00000    | 40.00000 | 71.60000 | -0.10114      | -8.1769   | 6.2771   | -                          | -                          | *                 |
|          |       | 52.00000    | 40.00000 | 71.60000 | -0.10103      | -8.1641   | 6.2653   | -                          | -                          | *                 |
|          |       | 54.00000    | 40.00000 | 71.60000 | -0.10093      | -8.1513   | 6.2535   | -                          | -                          | *                 |
|          |       | 56.00000    | 40.00000 | 71.60000 | -0.10082      | -8.1385   | 6.2416   | -                          | -                          | *                 |
|          |       | 58.00000    | 40.00000 | 71.60000 | -1.2411       | -5.8334   | 4.9893   | -                          | -                          | *                 |
|          |       | 60.00000    | 40.00000 | 71.60000 | -2.0943       | -4.9216   | 4.5679   | -                          | -                          | *                 |
|          |       | 62.00000    | 40.00000 | 71.60000 | -2.4702       | -3.8700   | 4.0241   | -                          | -                          | *                 |
|          |       | 64.00000    | 40.00000 | 71.60000 | -2.4371       | -2.8636   | 3.4099   | -                          | -                          | *                 |
|          |       | 66.00000    | 40.00000 | 71.60000 | -2.1349       | -2.0068   | 2.7833   | -                          | -                          | *                 |
|          |       | 68.00000    | 40.00000 | 71.60000 | -1.7092       | -1.3389   | 2.1895   | -                          | -                          | *                 |
|          |       | 70.00000    | 40.00000 | 71.60000 | -1.2050       | -0.80905  | 1.5990   | -                          | -                          | *                 |
|          |       | 0.00000     | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 2.00000     | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 4.00000     | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 6.00000     | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 8.00000     | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 10.00000    | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 12.00000    | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 14.00000    | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.0      | -                          | -                          | *                 |
|          |       | 16.00000    | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.15965  | -                          | -                          | *                 |
|          |       | 18.00000    | 42.00000 | 71.60000 | 0.0           | 0.0       | 0.51285  | -                          | -                          | *                 |
|          |       | 20.00000    | 42.00000 | 71.60000 | 0.061303      | -0.083731 | 0.84891  | -                          | -                          | *                 |
|          |       | 22.00000    | 42.00000 | 71.60000 | 0.18444       | -0.32761  | 1.1481   | -                          | -                          | *                 |
|          |       | 24.00000    | 42.00000 | 71.60000 | 0.62468       | -1.0023   | 1.4368   | -                          | -                          | *                 |
|          |       | 26.00000    | 42.00000 | 71.60000 | 0.83054       | -1.5894   | 2.0115   | -                          | -                          | *                 |
|          |       | 28.00000    | 42.00000 | 71.60000 | 0.84699       | -2.0012   | 2.5592   | -                          | -                          | *                 |
|          |       | 30.00000    | 42.00000 | 71.60000 | 0.97637       | -2.6276   | 3.1144   | -                          | -                          | *                 |
|          |       | 32.00000    | 42.00000 | 71.60000 | 1.2340        | -3.0245   | 3.2778   | -                          | -                          | *                 |
|          |       | 34.00000    | 42.00000 | 71.60000 | 1.6017        | -3.7327   | 3.4736   | -                          | -                          | *                 |
|          |       | 36.00000    | 42.00000 | 71.60000 | 1.6475        | -4.3393   | 3.6735   | -                          | -                          | *                 |
|          |       | 38.00000    | 42.00000 | 71.60000 | 1.3912        | -4.7699   | 3.8915   | -                          | -                          | *                 |
|          |       | 40.00000    | 42.00000 | 71.60000 | 0.94184       | -5.0761   | 4.0842   | -                          | -                          | *                 |
|          |       | 42.00000    | 42.00000 | 71.60000 | 0.37328       | -5.3253   | 4.2294   | -                          | -                          | *                 |
|          |       | 44.00000    | 42.00000 | 71.60000 | -0.089172     | -6.6324   | 5.0140   | -                          | -                          | *                 |
|          |       | 46.00000    | 42.00000 | 71.60000 | -0.089077     | -6.6207   | 4.9996   | -                          | -                          | *                 |
|          |       | 48.00000    | 42.00000 | 71.60000 | -0.088982     | -6.6090   | 4.9853   | -                          | -                          | *                 |
|          |       | 50.00000    | 42.00000 | 71.60000 | -0.088888     | -6.5973   | 4.9709   | -                          | -                          | *                 |
|          |       | 52.00000    | 42.00000 | 71.60000 | -0.088793     | -6.5856   | 4.9564   | -                          | -                          | *                 |
|          |       | 54.00000    | 42.00000 | 71.60000 | -0.088699     | -6.5739   | 4.9419   | -                          | -                          | *                 |
|          |       | 56.00000    | 42.00000 | 71.60000 | -0.088605     | -6.5623   | 4.9274   | -                          | -                          | *                 |
|          |       | 58          |          |          |               |           |          |                            |                            |                   |



---

Program Xdisp Version 19.3.1.35 Copyright © Oasys 1997-2015
Page 9

C:\Users\MartinCooper.GEA\Desktop\Jobs\J15... \Xdisp1 South Piling and Excavation.xdd
Printed 15-Dec-2015
Time 15:20



**GEA LIMITED**  
**(GEOTECHNICAL & ENV ASSOC) J15344**

**26 Netherhall Gardens**  
**Southern Shallow Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. |          | Coordinates |          |            | Displacements |          |     | Angle of Line to x Axis |                         |
|----------|----------|-------------|----------|------------|---------------|----------|-----|-------------------------|-------------------------|
| Name     | Dist.    | x           | y        | z          | x             | y        | z   | Horizontal displacement | Horizontal displacement |
|          | 62.00000 | 52.00000    | 71.60000 | -0.11068   | -0.39476      | 0.060930 | -   | -                       | *                       |
|          | 64.00000 | 52.00000    | 71.60000 | -0.090544  | -0.24221      | 0.043977 | -   | -                       | *                       |
|          | 66.00000 | 52.00000    | 71.60000 | -0.034915  | -0.074719     | 0.018632 | -   | -                       | *                       |
|          | 68.00000 | 52.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 70.00000 | 52.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 0.00000  | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 2.00000  | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 4.00000  | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 6.00000  | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 8.00000  | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 10.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 12.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 14.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 16.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 18.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 20.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 22.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 24.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 26.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 28.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 30.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 32.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 34.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 36.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 38.00000 | 54.00000    | 71.60000 | 0.011333   | -0.050561     | 0.013396 | -   | -                       | *                       |
|          | 40.00000 | 54.00000    | 71.60000 | 0.018843   | -0.13661      | 0.028136 | -   | -                       | *                       |
|          | 42.00000 | 54.00000    | 71.60000 | 0.0097113  | -0.18775      | 0.035764 | -   | -                       | *                       |
|          | 44.00000 | 54.00000    | 71.60000 | -0.0046303 | -0.29634      | 0.055981 | -   | -                       | *                       |
|          | 46.00000 | 54.00000    | 71.60000 | -0.0044472 | -0.28462      | 0.054331 | -   | -                       | *                       |
|          | 48.00000 | 54.00000    | 71.60000 | -0.0042642 | -0.27291      | 0.052657 | -   | -                       | *                       |
|          | 50.00000 | 54.00000    | 71.60000 | -0.0040811 | -0.26119      | 0.050957 | -   | -                       | *                       |
|          | 52.00000 | 54.00000    | 71.60000 | -0.0038980 | -0.24948      | 0.049231 | -   | -                       | *                       |
|          | 54.00000 | 54.00000    | 71.60000 | -0.0037150 | -0.23776      | 0.047479 | -   | -                       | *                       |
|          | 56.00000 | 54.00000    | 71.60000 | -0.0035319 | -0.22604      | 0.045700 | -   | -                       | *                       |
|          | 58.00000 | 54.00000    | 71.60000 | -0.0107994 | -0.12629      | 0.026616 | -   | -                       | *                       |
|          | 60.00000 | 54.00000    | 71.60000 | -0.010514  | -0.061505     | 0.015486 | -   | -                       | *                       |
|          | 62.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 64.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 66.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 68.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 70.00000 | 54.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 0.00000  | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 2.00000  | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 4.00000  | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 6.00000  | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 8.00000  | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 10.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 12.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 14.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 16.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 18.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 20.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 22.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 24.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 26.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 28.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 30.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 32.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 34.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 36.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 38.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 40.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 42.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 44.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 46.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 48.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 50.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 52.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 54.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 56.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 58.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 60.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 62.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 64.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 66.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 68.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 70.00000 | 56.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 0.00000  | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 2.00000  | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 4.00000  | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 6.00000  | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 8.00000  | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 10.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 12.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 14.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 16.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 18.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 20.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 22.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 24.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 26.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 28.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 30.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 32.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 34.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 36.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 38.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 40.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 42.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 44.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 46.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 48.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 50.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 52.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 54.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 56.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 58.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 60.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 62.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 64.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 66.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -   | -                       | *                       |
|          | 68.00000 | 58.00000    | 71.60000 | 0.0        | 0.0           | 0.0      | -</ |                         |                         |

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |
|               |                     |         |

| Type/No. |         | Coordinates |          |          | Displacements |           |           | Angle of Line to x Axis |                         |           |
|----------|---------|-------------|----------|----------|---------------|-----------|-----------|-------------------------|-------------------------|-----------|
| Name     | Dist.   | x           | y        | z        | x             | y         | z         | Horizontal displacement | Horizontal displacement | to x Axis |
|          |         | 56.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 58.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 60.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 62.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 64.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 66.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 68.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
|          |         | 70.00000    | 60.00000 | 71.60000 | 0.0           | 0.0       | 0.0       | -                       | -                       | *         |
| Line 1   | Line 1  | 30.00000    | 4.70000  | 71.00000 | 0.89487       | 2.0407    | 2.7045    | 2.0407                  | -0.89487                | 90.000 *  |
|          | 0.94000 | 30.00000    | 5.64000  | 71.00000 | 1.0423        | 2.7779    | 3.2222    | 2.7779                  | -1.0423                 | 90.000 *  |
|          | 1.8800  | 30.00000    | 6.58000  | 71.00000 | 1.1981        | 3.5084    | 3.5670    | 3.5084                  | -1.1981                 | 90.000 *  |
|          | 2.8200  | 30.00000    | 7.52000  | 71.00000 | 1.5083        | 4.3396    | 4.1891    | 4.3396                  | -1.5083                 | 90.000 *  |
|          | 3.7600  | 30.00000    | 8.46000  | 71.00000 | 1.8382        | 5.1608    | 4.7862    | 5.1608                  | -1.8382                 | 90.000 *  |
|          | 4.7000  | 30.00000    | 9.40000  | 71.00000 | 2.1704        | 5.9653    | 5.4453    | 5.9653                  | -2.1704                 | 90.000 *  |
|          | 5.6400  | 30.00000    | 10.34000 | 71.00000 | 2.5002        | 6.7574    | 6.1423    | 6.7574                  | -2.5002                 | 90.000 *  |
|          | 6.5800  | 30.00000    | 11.28000 | 71.00000 | 2.7760        | 7.5234    | 6.8308    | 7.5234                  | -2.7760                 | 90.000 *  |
|          | 7.5200  | 30.00000    | 12.22000 | 71.00000 | 3.0079        | 8.2857    | 7.4761    | 8.2857                  | -3.0079                 | 90.000 *  |
|          | 8.4600  | 30.00000    | 13.16000 | 71.00000 | 3.2213        | 9.0679    | 8.0252    | 9.0679                  | -3.2213                 | 90.000 *  |
|          | 9.4000  | 30.00000    | 14.10000 | 71.00000 | 3.4097        | 9.8798    | 8.4097    | 9.8798                  | -3.4097                 | 90.000 *  |
| Line 2   | Line 2  | 32.00000    | 15.10000 | 71.00000 | 3.6998        | 10.908    | 8.9506    | 3.6998                  | 10.908                  | 0.0 *     |
|          | 1.0286  | 33.02857    | 15.10000 | 71.00000 | 3.7294        | 10.980    | 9.1142    | 3.7294                  | 10.980                  | 0.0 *     |
|          | 2.0571  | 34.05714    | 15.10000 | 71.00000 | 3.7655        | 11.065    | 9.2202    | 3.7655                  | 11.065                  | 0.0 *     |
|          | 3.0857  | 35.08571    | 15.10000 | 71.00000 | 3.8017        | 11.168    | 9.2566    | 3.8017                  | 11.168                  | 0.0 *     |
|          | 4.1143  | 36.11429    | 15.10000 | 71.00000 | 3.8304        | 11.296    | 9.2190    | 3.8304                  | 11.296                  | 0.0 *     |
|          | 5.1429  | 37.14286    | 15.10000 | 71.00000 | 3.8405        | 11.459    | 9.1110    | 3.8405                  | 11.459                  | 0.0 *     |
|          | 6.1714  | 38.17143    | 15.10000 | 71.00000 | 3.8147        | 11.773    | 8.9434    | 3.8147                  | 11.673                  | 0.0 *     |
|          | 7.2000  | 39.20000    | 15.10000 | 71.00000 | 3.7205        | 11.964    | 8.7339    | 3.7205                  | 11.964                  | 0.0 *     |
| Line 3   | Line 3  | 39.40000    | 14.20000 | 71.00000 | 3.1868        | 11.531    | 8.6549    | 3.1868                  | 11.531                  | 0.0 *     |
|          | 0.85000 | 40.25000    | 14.20000 | 71.00000 | 2.8596        | 11.875    | 8.4859    | 2.8596                  | 11.875                  | 0.0 *     |
|          | 1.7000  | 41.10000    | 14.20000 | 71.00000 | 2.4518        | 12.404    | 8.4113    | 2.4518                  | 12.404                  | 0.0 *     |
|          | 2.5500  | 41.95000    | 14.20000 | 71.00000 | 1.7631        | 13.088    | 8.1420    | 1.7631                  | 13.088                  | 0.0 *     |
|          | 3.4000  | 42.80000    | 14.20000 | 71.00000 | 0.60587       | 13.686    | 8.4656    | 0.60587                 | 13.686                  | 0.0 *     |
|          | 4.2500  | 43.65000    | 14.20000 | 71.00000 | 0.23054       | 14.977    | 8.9561    | 0.23054                 | 14.977                  | 0.0 *     |
|          | 5.1000  | 44.50000    | 14.20000 | 71.00000 | 0.23067       | 14.988    | 8.9512    | 0.23067                 | 14.988                  | 0.0 *     |
| Line 4   | Line 4  | 44.60000    | 14.20000 | 71.00000 | 0.23069       | 14.989    | 8.9506    | -14.989                 | 0.23069                 | 270.00 *  |
|          | 0.9000  | 44.50000    | 13.21000 | 71.00000 | 0.13865       | 13.2196   | 8.9560    | 13.865                  | 0.000                   | 270.00 *  |
|          | 1.9800  | 44.60000    | 12.22000 | 71.00000 | 0.20576       | 12.804    | 8.8443    | -12.804                 | 0.20576                 | 270.00 *  |
|          | 2.9700  | 44.60000    | 11.23000 | 71.00000 | 0.19409       | 11.800    | 8.5324    | -11.800                 | 0.19409                 | 270.00 *  |
|          | 3.9600  | 44.60000    | 10.24000 | 71.00000 | 0.18292       | 10.847    | 8.0942    | -10.847                 | 0.18292                 | 270.00 *  |
|          | 4.9500  | 44.60000    | 9.25000  | 71.00000 | 0.17224       | 9.9414    | 7.5606    | -9.9414                 | 0.17224                 | 270.00 *  |
|          | 5.9400  | 44.60000    | 8.26000  | 71.00000 | 0.16204       | 9.0775    | 6.16204   | -9.0775                 | 0.16204                 | 270.00 *  |
|          | 6.9300  | 44.60000    | 7.27000  | 71.00000 | 0.15203       | 8.2502    | 6.3175    | -8.2502                 | 0.15203                 | 270.00 *  |
|          | 7.9200  | 44.60000    | 6.28000  | 71.00000 | 0.14302       | 7.4545    | 5.6560    | -7.4545                 | 0.14302                 | 270.00 *  |
|          | 8.9100  | 44.60000    | 5.29000  | 71.00000 | 0.13417       | 6.6851    | 4.9950    | -6.6851                 | 0.13417                 | 270.00 *  |
|          | 9.9000  | 44.60000    | 4.30000  | 71.00000 | 0.12574       | 5.9371    | 4.3515    | -5.9371                 | 0.12574                 | 270.00 *  |
| Line 5   | Line 5  | 29.00000    | 57.20000 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 1.0167  | 29.00000    | 56.18333 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 2.0333  | 29.00000    | 55.16667 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 3.0500  | 29.00000    | 54.15000 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 4.0667  | 29.00000    | 53.13333 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 5.0833  | 29.00000    | 52.11667 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
|          | 6.1000  | 29.00000    | 51.10000 | 71.60000 | 0.0           | 0.0       | 0.0       | 0.0                     | 0.0                     | 270.00 *  |
| Line 6   | Line 6  | 30.70000    | 51.10000 | 71.60000 | 0.017153      | -0.027857 | 0.0093707 | 0.027669                | 0.017455                | 269.38 *  |
|          | 1.0223  | 30.68889    | 50.07778 | 71.60000 | 0.11220       | -0.17289  | 0.036344  | 0.17166                 | 0.11407                 | 269.38 *  |
|          | 2.0446  | 30.67778    | 49.05556 | 71.60000 | 0.21108       | -0.30772  | 0.054611  | 0.30541                 | 0.21441                 | 269.38 *  |
|          | 3.0668  | 30.66667    | 48.03333 | 71.60000 | 0.31362       | -0.43123  | 0.043331  | 0.42779                 | 0.31829                 | 269.38 *  |
|          | 4.0891  | 30.65556    | 47.01111 | 71.60000 | 0.41955       | -0.54218  | 0.07040   | 0.53218                 | 0.42542                 | 269.38 *  |
|          | 5.1114  | 30.64444    | 45.98889 | 71.60000 | 0.52842       | -0.63925  | 1.1850    | 0.63347                 | 0.53534                 | 269.38 *  |
|          | 6.1337  | 30.63333    | 44.96667 | 71.60000 | 0.63900       | -0.80209  | 1.6831    | 0.79510                 | 0.64768                 | 269.38 *  |
|          | 7.1560  | 30.62222    | 43.94444 | 71.60000 | 0.74880       | -1.2504   | 2.2119    | 1.2422                  | 0.76235                 | 269.38 *  |
|          | 8.1783  | 30.61111    | 42.92222 | 71.60000 | 0.87967       | -1.9709   | 2.7455    | 1.9613                  | 0.90104                 | 269.38 *  |
|          | 9.2005  | 30.60000    | 41.90000 | 71.60000 | 1.0276        | -2.7749   | 3.2229    | 2.7635                  | 1.0577                  | 269.38 *  |
| Line 7   | Line 7  | 30.65000    | 41.90000 | 71.60000 | 1.0304        | -2.7807   | 3.2262    | 1.0574                  | -2.7705                 | 359.44 *  |
|          | 1.0250  | 31.67500    | 41.89000 | 71.60000 | 1.2060        | -3.0328   | 3.3033    | 1.2355                  | -3.0209                 | 359.44 *  |
|          | 2.0501  | 32.70000    | 41.88000 | 71.60000 | 1.4137        | -3.3673   | 3.3928    | 1.4465                  | -3.3534                 | 359.44 *  |
|          | 3.0751  | 33.72500    | 41.87000 | 71.60000 | 1.6033        | -3.7521   | 3.5043    | 1.6398                  | -3.7363                 | 359.44 *  |
|          | 4.1002  | 34.75000    | 41.86000 | 71.60000 | 1.6816        | -4.0837   | 3.6079    | 1.7213                  | -4.0671                 | 359.44 *  |
|          | 5.1252  | 35.77500    | 41.85000 | 71.60000 | 1.6905        | -4.4028   | 3.7220    | 1.7333                  | -4.3861                 | 359.44 *  |
|          | 6.1503  | 36.80000    | 41.84000 | 71.60000 | 1.6197        | -4.6861   | 3.8421    | 1.6653                  | -4.6701                 | 359.44 *  |
|          | 7.1753  | 37.82500    | 41.83000 | 71.60000 | 1.4413        | -4.8562   | 3.9606    | 1.4886                  | -4.8419                 | 359.44 *  |
|          | 8.2004  | 38.85000    | 41.82000 | 71.60000 | 1.2320        | -5.0280   | 4.0724    | 1.2810                  | -5.0157                 | 359.44 *  |
|          | 9.2254  | 39.87500    | 41.81000 | 71.60000 | 0.98897       | -5.1941   | 4.1740    | 1.0396                  | -5.1833                 | 359.44 *  |
|          | 10.2500 | 40.90000    | 41.80000 | 71.60000 | 0.71201       | -5.3465   | 4.2633    | 0.76413                 | -5.3393                 | 359.44 *  |
| Line 8   | Line 8  | 41.00000    | 41.80000 | 71.60000 | 0.68319       | -5.3595   | 4.2708    | -5.3502                 | -0.75273                | 89.256 *  |
|          | 0.96258 | 41.01250    | 42.76250 | 71.60000 | 0.62716       | -4.6536   | 3.7679    | -4.6451                 | -0.68753                | 89.256 *  |
|          | 1.9252  | 41.02500    | 43.72500 | 71.60000 | 0.56994       | -3.9277   | 3.2928    | -3.9200                 | -0.62090                | 89.256 *  |
|          | 2.8877  | 41.03750    | 44.68750 | 71.60000 | 0.48007       | -3.2479   | 2.8387    | -3.2414                 | -0.60256                | 89.256 *  |
|          | 3.8503  | 41.05000    | 45.65000 | 71.60000 | 0.38093       | -2.6311   | 2.4066    | -2.6259                 | -0.41507                | 89.256 *  |
|          | 4.8129  | 41.06250    | 46.61250 | 71.60000 | 0.28212       | -2.0870   | 2.0134    | -2.0832                 | -0.30920                | 89.256 *  |
|          | 5.7755  | 41.07500    | 47.57500 | 71.60000 | 0.18255       | -1.6779   | 1.6468    | -1.6750                 | -0.23432                | 89.256 *  |
|          | 6.7381  | 41.08750    | 48.53750 | 71.60000 | 0.17355       | -1.4572   | 1.2986    | -1.4548                 | -0.19245                | 89.256 *  |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Type/No. | Coordinates |          |          | Displacements |         |          | Angle of Line to x Axis |                         |                         |          |
|----------|-------------|----------|----------|---------------|---------|----------|-------------------------|-------------------------|-------------------------|----------|
| Name     | Dist.       | x        | y        | z             | x       | y        | z                       | Horizontal displacement | Horizontal displacement |          |
|          | 6.9116      | 65.65000 | 19.00000 | 77.00000      | -7.8701 | 0.055423 | 6.0246                  | -7.8601                 | -0.40014                | 356.68 * |

\* Result includes imported displacement(s).

\* Result includes imported displacement(s).

## Specific Building Damage Results - Horizontal Displacements

Structure: 24 Netherhall Gardens | Sub-structure: Front

| Dist.   | Coordinates |          |          | Displacements |        |              |               |
|---------|-------------|----------|----------|---------------|--------|--------------|---------------|
|         | x           | y        | z        | x             | y      | Horizontal   | Horizontal    |
|         |             |          |          |               |        | displacement | displacement  |
|         |             |          |          |               |        | along the    | perpendicular |
| Line    | to Line     |          |          |               |        |              |               |
| [m]     | [m]         | [m]      | [m]      | [mm]          | [mm]   | [mm]         | [mm]          |
| 0.0     | 30.00000    | 4.70000  | 71.00000 | 0.89487       | 2.0407 | 2.0407       | -0.89487 d    |
| 0.94000 | 30.00000    | 5.64000  | 71.00000 | 1.0423        | 2.7779 | 2.7779       | -1.0423 d     |
| 1.8800  | 30.00000    | 6.58000  | 71.00000 | 1.1981        | 3.5084 | 3.5084       | -1.1981 d     |
| 2.8200  | 30.00000    | 7.52000  | 71.00000 | 1.5083        | 4.3396 | 4.3396       | -1.5083 d     |
| 3.7600  | 30.00000    | 8.46000  | 71.00000 | 1.8382        | 5.1608 | 5.1608       | -1.8382 d     |
| 4.7000  | 30.00000    | 9.40000  | 71.00000 | 2.1704        | 5.9653 | 5.9653       | -2.1704 d     |
| 5.6400  | 30.00000    | 10.34000 | 71.00000 | 2.5002        | 6.7574 | 6.7574       | -2.5002 d     |
| 6.5800  | 30.00000    | 11.28000 | 71.00000 | 2.7760        | 7.5234 | 7.5234       | -2.7760 d     |
| 7.5200  | 30.00000    | 12.22000 | 71.00000 | 3.0079        | 8.2857 | 8.2857       | -3.0079 d     |
| 8.4600  | 30.00000    | 13.16000 | 71.00000 | 3.2213        | 9.0679 | 9.0679       | -3.2213 d     |
| 9.4000  | 30.00000    | 14.10000 | 71.00000 | 3.4097        | 9.8798 | 9.8798       | -3.4097 d     |

d = Displacements include imported displacements.

d - Displacements include imported displacements.

Structure: 24 Netherhall Gardens | Sub-structure: Side

| Dist.                                             | Coordinates |          | Displacements |        |        |                                   |                                          |
|---------------------------------------------------|-------------|----------|---------------|--------|--------|-----------------------------------|------------------------------------------|
|                                                   | x           | y        | z             | x      | y      | Horizontal                        |                                          |
|                                                   |             |          |               |        |        | displacement<br>along the<br>line | displacement<br>perpendicular<br>to line |
| [m]                                               | [m]         | [m]      | [m]           | [mm]   | [mm]   | [mm]                              |                                          |
| 0.0                                               | 32.00000    | 15.10000 | 71.00000      | 3.6998 | 10.909 | 3.6998                            |                                          |
| 1.0286                                            | 33.02857    | 15.10000 | 71.00000      | 3.7294 | 10.980 | 3.7294                            |                                          |
| 2.0571                                            | 34.05714    | 15.10000 | 71.00000      | 3.7655 | 11.065 | 3.7655                            |                                          |
| 3.0857                                            | 35.08571    | 15.10000 | 71.00000      | 3.8017 | 11.168 | 3.8017                            |                                          |
| 4.1143                                            | 36.11429    | 15.10000 | 71.00000      | 3.8304 | 11.296 | 3.8304                            |                                          |
| 5.1429                                            | 37.14286    | 15.10000 | 71.00000      | 3.8405 | 11.459 | 3.8405                            |                                          |
| 6.1714                                            | 38.17143    | 15.10000 | 71.00000      | 3.8147 | 11.673 | 3.8147                            |                                          |
| 7.2000                                            | 39.20000    | 15.10000 | 71.00000      | 3.7205 | 11.964 | 3.7205                            |                                          |
| d = Displacements include imported displacements. |             |          |               |        |        |                                   |                                          |

d - Displacements include imported displacements.

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| Dist.   | Coordinates |          |          | Displacements |        |                                   |                                          |
|---------|-------------|----------|----------|---------------|--------|-----------------------------------|------------------------------------------|
|         | x           | y        | z        | x             | y      | Horizontal                        | Horizontal                               |
|         |             |          |          |               |        | displacement<br>along the<br>Line | displacement<br>perpendicular<br>to Line |
| [m]     | [m]         | [m]      | [m]      | [mm]          | [mm]   | [mm]                              | [mm]                                     |
| 0.0     | 39.40000    | 14.20000 | 71.00000 | 3.1868        | 11.531 | 3.1868                            | 11.531 d                                 |
| 0.85000 | 40.25000    | 14.20000 | 71.00000 | 2.8596        | 11.875 | 2.8596                            | 11.875 d                                 |
| 1.7000  | 41.10000    | 14.20000 | 71.00000 | 2.4518        | 12.404 | 2.4518                            | 12.404 d                                 |
| 2.5500  | 41.95000    | 14.20000 | 71.00000 | 1.7631        | 13.088 | 1.7631                            | 13.088 d                                 |
| 3.4000  | 42.80000    | 14.20000 | 71.00000 | 0.60587       | 13.686 | 0.60587                           | 13.686 d                                 |
| 4.2500  | 43.65000    | 14.20000 | 71.00000 | 0.23054       | 14.977 | 0.23054                           | 14.977 d                                 |
| 5.1000  | 44.50000    | 14.20000 | 71.00000 | 0.23067       | 14.988 | 0.23067                           | 14.988 d                                 |

d - Displacements include imported displacements.

d - Displacements include imported displacements.

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| Dist.                                             | Coordinates |          |          | Displacements |        |              |               |  |
|---------------------------------------------------|-------------|----------|----------|---------------|--------|--------------|---------------|--|
|                                                   | x           | y        | z        | x             | y      | Horizontal   | Horizontal    |  |
|                                                   |             |          |          |               |        | displacement | displacement  |  |
|                                                   |             |          |          |               |        | along the    | perpendicular |  |
|                                                   |             |          |          |               |        | Line         | to Line       |  |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]   | [mm]         | [mm]          |  |
| 0.0                                               | 44.60000    | 14.20000 | 71.00000 | 0.23069       | 14.989 | -14.989      | 0.23069 d     |  |
| 0.99000                                           | 44.60000    | 13.21000 | 71.00000 | 0.21796       | 13.865 | -13.865      | 0.21796 d     |  |
| 1.98000                                           | 44.60000    | 12.22000 | 71.00000 | 0.20576       | 12.804 | -12.804      | 0.20576 d     |  |
| 2.9700                                            | 44.60000    | 11.23000 | 71.00000 | 0.19409       | 11.800 | -11.800      | 0.19409 d     |  |
| 3.9600                                            | 44.60000    | 10.24000 | 71.00000 | 0.18292       | 10.847 | -10.847      | 0.18292 d     |  |
| 4.9500                                            | 44.60000    | 9.25000  | 71.00000 | 0.17224       | 9.9414 | -9.9414      | 0.17224 d     |  |
| 5.9400                                            | 44.60000    | 8.26000  | 71.00000 | 0.16204       | 9.0775 | -9.0775      | 0.16204 d     |  |
| 6.9300                                            | 44.60000    | 7.27000  | 71.00000 | 0.15230       | 8.2502 | -8.2502      | 0.15230 d     |  |
| 7.9200                                            | 44.60000    | 6.28000  | 71.00000 | 0.14302       | 7.4545 | -7.4545      | 0.14302 d     |  |
| 8.9100                                            | 44.60000    | 5.29000  | 71.00000 | 0.13417       | 6.6851 | -6.6851      | 0.13417 d     |  |
| 9.9000                                            | 44.60000    | 4.30000  | 71.00000 | 0.12574       | 5.9371 | -5.9371      | 0.12574 d     |  |
| d - Displacements include imported displacements. |             |          |          |               |        |              |               |  |

d - Displacements include imported displacements.

Structure: 28 Netherhall Gardens | Sub-structure: Front North

| Dist.                                             | Coordinates |          |          | Displacements |      |              |               |
|---------------------------------------------------|-------------|----------|----------|---------------|------|--------------|---------------|
|                                                   | x           | y        | z        | x             | y    | Horizontal   | Horizontal    |
|                                                   |             |          |          |               |      | displacement | displacement  |
|                                                   |             |          |          |               |      | along the    | perpendicular |
|                                                   |             |          |          |               | Line | to Line      |               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm] | [mm]         | [mm]          |
| 0.0                                               | 29.00000    | 57.20000 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 1.0167                                            | 29.00000    | 56.18333 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 2.0333                                            | 29.00000    | 55.16667 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 3.0500                                            | 29.00000    | 54.15000 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 4.0667                                            | 29.00000    | 53.13333 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 5.0833                                            | 29.00000    | 52.11667 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| 6.1000                                            | 29.00000    | 51.10000 | 71.60000 | 0.0           | 0.0  | 0.0          | 0.0 d         |
| d - Displacements include imported displacements. |             |          |          |               |      |              |               |

d - Displacements include imported displacements.

Structure: 28 Netherhall Gardens | Sub-structure: Front South

| Dist.  | Coordinates |          |          | Displacements |           |              |               |
|--------|-------------|----------|----------|---------------|-----------|--------------|---------------|
|        | x           | y        | z        | x             | y         | Horizontal   | Horizontal    |
|        |             |          |          |               |           | displacement | displacement  |
|        |             |          |          |               |           | along the    | perpendicular |
|        |             |          |          |               |           | Line         | to Line       |
| [m]    | [m]         | [m]      | [m]      | [mm]          | [mm]      | [mm]         | [mm]          |
| 0.0    | 30.70000    | 51.10000 | 71.60000 | 0.017153      | -0.027857 | 0.027669     | 0.017455 d    |
| 1.0223 | 30.68889    | 50.07778 | 71.60000 | 0.11220       | -0.17289  | 0.17166      | 0.11407 d     |
| 2.0446 | 30.67778    | 49.05556 | 71.60000 | 0.21108       | -0.30772  | 0.30541      | 0.21441 d     |
| 3.0668 | 30.66667    | 48.03333 | 71.60000 | 0.31362       | -0.43123  | 0.42779      | 0.31829 d     |
| 4.0891 | 30.65556    | 47.01111 | 71.60000 | 0.41955       | -0.54218  | 0.53759      | 0.42542 d     |
| 5.1114 | 30.64444    | 45.98889 | 71.60000 | 0.52842       | -0.63925  | 0.63347      | 0.53534 d     |
| 6.1337 | 30.63333    | 44.96667 | 71.60000 | 0.63900       | -0.80209  | 0.79510      | 0.64768 d     |
| 7.1560 | 30.62222    | 43.94444 | 71.60000 | 0.74880       | -1.2504   | 1.2422       | 0.76235 d     |
| 8.1783 | 30.61111    | 42.92222 | 71.60000 | 0.87967       | -1.9709   | 1.9613       | 0.90104 d     |
| 9.2005 | 30.60000    | 41.90000 | 71.60000 | 1.0276        | -2.7749   | 2.7635       | 1.0577 d      |

d = Displacements include imported displacements.

d - Displacements include imported displacements.

Structure: 28 Netherhall Gardens | Sub-structure: Side

| Dist.  | Coordinates |          |          | Displacements |         |              |               |
|--------|-------------|----------|----------|---------------|---------|--------------|---------------|
|        | x           | y        | z        | x             | y       | Horizontal   | Horizontal    |
|        |             |          |          |               |         | displacement | displacement  |
|        |             |          |          |               |         | along the    | perpendicular |
|        |             |          |          |               |         | Line         | to Line       |
| [m]    | [m]         | [m]      | [m]      | [mm]          | [mm]    | [mm]         | [mm]          |
| 0.0    | 30.65000    | 41.90000 | 71.60000 | 1.0304        | -2.7807 | 1.0574       | -2.7705 d     |
| 1.0250 | 31.67500    | 41.89000 | 71.60000 | 1.2060        | -3.0328 | 1.2355       | -3.0209 d     |
| 2.0501 | 32.70000    | 41.88000 | 71.60000 | 1.4137        | -3.3673 | 1.4465       | -3.3534 d     |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
**Southern Shallow Basement**  
**Combined Piling and Excavation**

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Dist.                                             | Coordinates |          |          | Displacements |         |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|---------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y       |                                       |
|                                                   |             |          |          |               |         | Horizontal displacement along the     |
|                                                   |             |          |          |               |         | Horizontal displacement perpendicular |
| 3.0751                                            | 33.72500    | 41.87000 | 71.60000 | 1.6033        | -3.7521 | 1.6398                                |
| 4.1002                                            | 34.75000    | 41.86000 | 71.60000 | 1.6816        | -4.0837 | 1.7213                                |
| 5.1252                                            | 35.77500    | 41.85000 | 71.60000 | 1.6905        | -4.4028 | 1.7333                                |
| 6.1503                                            | 36.80000    | 41.84000 | 71.60000 | 1.6197        | -4.6861 | 1.6653                                |
| 7.1753                                            | 37.82500    | 41.83000 | 71.60000 | 1.4413        | -4.8562 | 1.4886                                |
| 8.2004                                            | 38.85000    | 41.82000 | 71.60000 | 1.2320        | -5.0280 | 1.2810                                |
| 9.2254                                            | 39.87500    | 41.81000 | 71.60000 | 0.98897       | -5.1941 | 1.0396                                |
| 10.250                                            | 40.90000    | 41.80000 | 71.60000 | 0.71201       | -5.3465 | 0.76413                               |
| d - Displacements include imported displacements. |             |          |          |               |         |                                       |

Structure: 28 Netherhall Gardens | Sub-structure: Rear

| Dist.                                             | Coordinates |          |          | Displacements |           |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|-----------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y         |                                       |
|                                                   |             |          |          |               |           | Horizontal displacement along the     |
|                                                   |             |          |          |               |           | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |           | Line                                  |
|                                                   |             |          |          |               |           | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]      | [mm]                                  |
| 0.0                                               | 41.00000    | 41.80000 | 71.60000 | 0.68319       | -5.3595   | -5.3502                               |
| 0.96258                                           | 41.01250    | 42.76250 | 71.60000 | 0.62716       | -4.6536   | -4.6451                               |
| 1.9252                                            | 41.02500    | 43.72500 | 71.60000 | 0.56994       | -3.9277   | -3.9200                               |
| 2.8877                                            | 41.03750    | 44.68750 | 71.60000 | 0.48007       | -3.2479   | -3.2414                               |
| 3.8503                                            | 41.05000    | 45.65000 | 71.60000 | 0.38093       | -2.6311   | -2.6259                               |
| 4.8129                                            | 41.06250    | 46.61250 | 71.60000 | 0.28212       | -2.0870   | -2.0832                               |
| 5.7755                                            | 41.07500    | 47.57500 | 71.60000 | 0.21255       | -1.6779   | -1.6750                               |
| 6.7381                                            | 41.08750    | 48.53750 | 71.60000 | 0.17355       | -1.4572   | -1.4548                               |
| 7.7006                                            | 41.10000    | 49.50000 | 71.60000 | 0.13860       | -1.2342   | -1.2323                               |
| 8.6632                                            | 41.11250    | 50.46250 | 71.60000 | 0.10716       | -1.0094   | -1.0079                               |
| 9.6258                                            | 41.12500    | 51.42500 | 71.60000 | 0.078770      | -0.78296  | -0.78187                              |
| 10.588                                            | 41.13750    | 52.38750 | 71.60000 | 0.053040      | -0.55515  | -0.55442                              |
| 11.551                                            | 41.15000    | 53.35000 | 71.60000 | 0.029652      | -0.32617  | -0.32576                              |
| 12.514                                            | 41.16250    | 54.31250 | 71.60000 | 0.0083334     | -0.096167 | -0.096051                             |
| 13.476                                            | 41.17500    | 55.27500 | 71.60000 | 0.0           | 0.0       | 0.0                                   |
| 14.439                                            | 41.18750    | 56.23750 | 71.60000 | 0.0           | 0.0       | 0.0                                   |
| 15.401                                            | 41.20000    | 57.20000 | 71.60000 | 0.0           | 0.0       | 0.0                                   |
| d - Displacements include imported displacements. |             |          |          |               |           |                                       |

Structure: Rear Structures | Sub-structure: West

| Dist.                                             | Coordinates |          |          | Displacements |         |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|---------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y       |                                       |
|                                                   |             |          |          |               |         | Horizontal displacement along the     |
|                                                   |             |          |          |               |         | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |         | Line                                  |
|                                                   |             |          |          |               |         | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]    | [mm]                                  |
| 0.0                                               | 58.70000    | 19.40000 | 77.00000 | -14.471       | 0.10191 | -0.26905                              |
| 0.97532                                           | 58.72500    | 20.37500 | 77.00000 | -14.450       | 0.10176 | -0.26866                              |
| 1.9506                                            | 58.75000    | 21.35000 | 77.00000 | -14.429       | 0.10162 | -0.26828                              |
| 2.9260                                            | 58.77500    | 22.32500 | 77.00000 | -14.409       | 0.10147 | -0.26790                              |
| 3.9013                                            | 58.80000    | 23.30000 | 77.00000 | -14.388       | 0.10133 | -0.26752                              |
| 4.8766                                            | 58.82500    | 24.27500 | 77.00000 | -14.368       | 0.10118 | -0.26714                              |
| 5.8519                                            | 58.85000    | 25.25000 | 77.00000 | -14.347       | 0.10104 | -0.26676                              |
| 6.8272                                            | 58.87500    | 26.22500 | 77.00000 | -14.327       | 0.10089 | -0.26638                              |
| 7.8026                                            | 58.90000    | 27.20000 | 77.00000 | -14.307       | 0.10075 | -0.26600                              |
| 8.7779                                            | 58.92500    | 28.17500 | 77.00000 | -14.286       | 0.10061 | -0.26562                              |
| 9.7532                                            | 58.95000    | 29.15000 | 77.00000 | -14.266       | 0.10046 | -0.26524                              |
| 10.729                                            | 58.97500    | 30.12500 | 77.00000 | -14.245       | 0.10032 | -0.26486                              |
| 11.704                                            | 59.00000    | 31.10000 | 77.00000 | -11.149       | -1.8581 | -2.1433                               |
| 12.679                                            | 59.02500    | 32.07500 | 77.00000 | -9.4420       | -4.6040 | -4.8445                               |
| 13.654                                            | 59.05000    | 33.05000 | 77.00000 | -7.5138       | -6.0356 | -6.2263                               |
| 14.630                                            | 59.07500    | 34.02500 | 77.00000 | -5.6053       | -6.6889 | -6.8406                               |
| 15.605                                            | 59.10000    | 35.00000 | 77.00000 | -4.9109       | -6.9703 | -7.0939                               |
| d - Displacements include imported displacements. |             |          |          |               |         |                                       |

Structure: Rear Structures | Sub-structure: North

| Dist.                                             | Coordinates |          |          | Displacements |         |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|---------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y       |                                       |
|                                                   |             |          |          |               |         | Horizontal displacement along the     |
|                                                   |             |          |          |               |         | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |         | Line                                  |
|                                                   |             |          |          |               |         | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]    | [mm]                                  |
| 0.0                                               | 59.15000    | 35.00000 | 77.00000 | -4.9431       | -6.9047 | -4.9431                               |
| 0.96667                                           | 60.11667    | 35.00000 | 77.00000 | -5.3385       | -5.7059 | -5.3385                               |
| 1.9333                                            | 61.08333    | 35.00000 | 77.00000 | -5.5292       | -4.7860 | -5.5292                               |
| 2.9000                                            | 62.05000    | 35.00000 | 77.00000 | -5.5654       | -4.0476 | -5.5654                               |
| 3.8667                                            | 63.01667    | 35.00000 | 77.00000 | -5.4332       | -3.4071 | -5.4332                               |
| 4.8333                                            | 63.98333    | 35.00000 | 77.00000 | -5.1875       | -2.8591 | -5.1875                               |
| 5.8000                                            | 64.95000    | 35.00000 | 77.00000 | -4.8656       | -2.3921 | -4.8656                               |
| d - Displacements include imported displacements. |             |          |          |               |         |                                       |

Structure: Rear Structures | Sub-structure: East - North

| Dist.                                             | Coordinates |          |          | Displacements |          |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|----------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y        |                                       |
|                                                   |             |          |          |               |          | Horizontal displacement along the     |
|                                                   |             |          |          |               |          | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |          | Line                                  |
|                                                   |             |          |          |               |          | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]     | [mm]                                  |
| 0.0                                               | 65.00000    | 35.00000 | 77.00000 | -4.8474       | -2.3699  | 2.4177                                |
| 1.0100                                            | 64.99000    | 33.99000 | 77.00000 | -5.3982       | -2.0356  | 2.0889                                |
| 2.0201                                            | 64.98000    | 32.98000 | 77.00000 | -5.8970       | -1.5629  | 1.6212                                |
| 3.0301                                            | 64.97000    | 31.97000 | 77.00000 | -6.3042       | -0.96285 | 1.0252                                |
| 4.0402                                            | 64.96000    | 30.96000 | 77.00000 | -6.5818       | -0.26445 | 0.32960                               |
| 5.0502                                            | 64.95000    | 29.95000 | 77.00000 | -8.5053       | 0.059896 | 0.024313                              |
| 6.0603                                            | 64.94000    | 28.94000 | 77.00000 | -8.5077       | 0.059913 | 0.024320                              |
| 7.0703                                            | 64.93000    | 27.93000 | 77.00000 | -8.5101       | 0.059930 | 0.024327                              |
| 8.0804                                            | 64.92000    | 26.92000 | 77.00000 | -8.5125       | 0.059947 | 0.024334                              |
| 9.0904                                            | 64.91000    | 25.91000 | 77.00000 | -8.5149       | 0.059964 | 0.024341                              |
| 10.100                                            | 64.90000    | 24.90000 | 77.00000 | -8.5173       | 0.059981 | 0.024347                              |
| d - Displacements include imported displacements. |             |          |          |               |          |                                       |

Structure: Rear Structures | Sub-structure: East - Mid

| Dist.                                             | Coordinates |          |          | Displacements |          |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|----------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y        |                                       |
|                                                   |             |          |          |               |          | Horizontal displacement along the     |
|                                                   |             |          |          |               |          | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |          | Line                                  |
|                                                   |             |          |          |               |          | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]     | [mm]                                  |
| 0.0                                               | 64.95000    | 24.90000 | 77.00000 | -8.4758       | 0.059689 | -7.2986                               |
| 0.58310                                           | 65.45000    | 24.60000 | 77.00000 | -6.9438       | 0.056787 | -6.9439                               |
| 1.1662                                            | 65.95000    | 24.30000 | 77.00000 | -7.6595       | 0.053940 | -6.5957                               |
| d - Displacements include imported displacements. |             |          |          |               |          |                                       |

Structure: Rear Structures | Sub-structure: East - South

| Dist.                                             | Coordinates |          |          | Displacements |          |                                       |
|---------------------------------------------------|-------------|----------|----------|---------------|----------|---------------------------------------|
|                                                   | x           | y        | z        | x             | y        |                                       |
|                                                   |             |          |          |               |          | Horizontal displacement along the     |
|                                                   |             |          |          |               |          | Horizontal displacement perpendicular |
|                                                   |             |          |          |               |          | Line                                  |
|                                                   |             |          |          |               |          | to Line                               |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]     | [mm]                                  |
| 0.0                                               | 66.00000    | 24.30000 | 77.00000 | -7.6196       | 0.053659 | 0.37704                               |
| 1.0617                                            | 65.94000    | 23.24000 | 77.00000 | -7.6615       | 0.053954 | 0.37911                               |
| 2.1234                                            | 65.88000    | 22.18000 | 77.00000 | -7.7035       | 0.054250 | 0.38118                               |
| 3.1851                                            | 65.82000    | 21.12000 | 77.00000 | -7.7455       | 0.054546 | 0.38327                               |
| 4.2468                                            | 65.76000    | 20.06000 | 77.00000 | -7.7876       | 0.054842 | 0.38535                               |
| 5.3085                                            | 65.70000    | 19.00000 | 77.00000 | -7.8298       | 0.055140 | 0.38744                               |
| d - Displacements include imported displacements. |             |          |          |               |          |                                       |

Structure: Rear Structures | Sub-structure: South



26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Dist.                                             | Coordinates |          |          | Displacements |          |                                        |
|---------------------------------------------------|-------------|----------|----------|---------------|----------|----------------------------------------|
|                                                   | x           | y        | z        | x             | y        | Horizontal displacement along the line |
|                                                   |             |          |          |               |          | Horizontal displacement perpendicular  |
| Dist.                                             | x           | y        | z        | x             | y        | Displacements                          |
|                                                   |             |          |          |               |          | Horizontal displacement along the line |
|                                                   |             |          |          |               |          | Horizontal displacement perpendicular  |
|                                                   |             |          |          |               |          | Line to Line                           |
|                                                   |             |          |          |               |          | [mm]                                   |
| [m]                                               | [m]         | [m]      | [m]      | [mm]          | [mm]     | [mm]                                   |
| 0.0                                               | 58.75000    | 19.40000 | 77.00000 | -14.414       | 0.10151  | -14.396                                |
| 0.98737                                           | 59.73571    | 19.34286 | 77.00000 | -13.328       | 0.093862 | -13.311                                |
| 1.9747                                            | 60.72143    | 19.28571 | 77.00000 | -12.302       | 0.086630 | -12.286                                |
| 2.9621                                            | 61.70714    | 19.22857 | 77.00000 | -11.328       | 0.079776 | -11.314                                |
| 3.9495                                            | 62.69286    | 19.17143 | 77.00000 | -10.403       | 0.073264 | -10.390                                |
| 4.9368                                            | 63.67857    | 19.11429 | 77.00000 | -9.5222       | 0.067058 | -9.5102                                |
| 5.9242                                            | 64.66429    | 19.05714 | 77.00000 | -8.6795       | 0.061123 | -8.6684                                |
| 6.9116                                            | 65.65000    | 19.00000 | 77.00000 | -7.8701       | 0.055423 | -7.8601                                |
| d - Displacements include imported displacements. |             |          |          |               |          |                                        |

Specific Building Damage Results - Vertical Displacements

Structure: 24 Netherhall Gardens | Sub-structure: Front

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

| Vertical Offset 1                                 |          |          |          |          |
|---------------------------------------------------|----------|----------|----------|----------|
| 0.0                                               | 30.00000 | 4.70000  | 71.00000 | 2.7045 d |
| 0.94000                                           | 30.00000 | 5.64000  | 71.00000 | 3.2222 d |
| 1.8800                                            | 30.00000 | 6.58000  | 71.00000 | 3.6670 d |
| 2.8200                                            | 30.00000 | 7.52000  | 71.00000 | 4.1891 d |
| 3.7600                                            | 30.00000 | 8.46000  | 71.00000 | 4.7862 d |
| 4.7000                                            | 30.00000 | 9.40000  | 71.00000 | 5.4453 d |
| 5.6400                                            | 30.00000 | 10.34000 | 71.00000 | 6.1423 d |
| 6.5800                                            | 30.00000 | 11.28000 | 71.00000 | 6.8308 d |
| 7.5200                                            | 30.00000 | 12.22000 | 71.00000 | 7.4761 d |
| 8.4600                                            | 30.00000 | 13.16000 | 71.00000 | 8.0252 d |
| 9.4000                                            | 30.00000 | 14.10000 | 71.00000 | 8.4097 d |
| d - Displacements include imported displacements. |          |          |          |          |

Structure: 24 Netherhall Gardens | Sub-structure: Side

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

| Vertical Offset 1                                 |          |          |          |          |
|---------------------------------------------------|----------|----------|----------|----------|
| 0.0                                               | 32.00000 | 15.10000 | 71.00000 | 8.9506 d |
| 1.0286                                            | 33.02857 | 15.10000 | 71.00000 | 9.1142 d |
| 2.0571                                            | 34.05714 | 15.10000 | 71.00000 | 9.2202 d |
| 3.0857                                            | 35.08571 | 15.10000 | 71.00000 | 9.2566 d |
| 4.1143                                            | 36.11429 | 15.10000 | 71.00000 | 9.2190 d |
| 5.1429                                            | 37.14286 | 15.10000 | 71.00000 | 9.1110 d |
| 6.1714                                            | 38.17143 | 15.10000 | 71.00000 | 8.9434 d |
| 7.2000                                            | 39.20000 | 15.10000 | 71.00000 | 8.7339 d |
| d - Displacements include imported displacements. |          |          |          |          |

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

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

| Vertical Offset 1                                 |          |          |          |          |
|---------------------------------------------------|----------|----------|----------|----------|
| 0.0                                               | 39.40000 | 14.20000 | 71.00000 | 8.6549 d |
| 0.85000                                           | 40.25000 | 14.20000 | 71.00000 | 8.4859 d |
| 1.7000                                            | 41.10000 | 14.20000 | 71.00000 | 8.4113 d |
| 2.5500                                            | 41.95000 | 14.20000 | 71.00000 | 8.4120 d |
| 3.4000                                            | 42.80000 | 14.20000 | 71.00000 | 8.4656 d |
| 4.2500                                            | 43.65000 | 14.20000 | 71.00000 | 8.9561 d |
| 5.1000                                            | 44.50000 | 14.20000 | 71.00000 | 8.9512 d |
| d - Displacements include imported displacements. |          |          |          |          |

Structure: 24 Netherhall Gardens | Sub-structure: Rear

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

| Vertical Offset 1                                 |          |          |          |          |
|---------------------------------------------------|----------|----------|----------|----------|
| 0.0                                               | 44.60000 | 14.20000 | 71.00000 | 8.9506 d |
| 0.99000                                           | 44.60000 | 13.21000 | 71.00000 | 8.9960 d |
| 1.9800                                            | 44.60000 | 12.22000 | 71.00000 | 8.8443 d |
| 2.9700                                            | 44.60000 | 11.23000 | 71.00000 | 8.5324 d |
| 3.9600                                            | 44.60000 | 10.24000 | 71.00000 | 8.0942 d |
| 4.9500                                            | 44.60000 | 9.25000  | 71.00000 | 7.5606 d |
| 5.9400                                            | 44.60000 | 8.26000  | 71.00000 | 6.9599 d |
| 6.9300                                            | 44.60000 | 7.27000  | 71.00000 | 6.3175 d |
| 7.9200                                            | 44.60000 | 6.28000  | 71.00000 | 5.6560 d |
| 8.9100                                            | 44.60000 | 5.29000  | 71.00000 | 4.9950 d |
| 9.9000                                            | 44.60000 | 4.30000  | 71.00000 | 4.3515 d |
| d - Displacements include imported displacements. |          |          |          |          |

Structure: 28 Netherhall Gardens | Sub-structure: Front North

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

| Vertical Offset 1                                 |          |          |          |       |
|---------------------------------------------------|----------|----------|----------|-------|
| 0.0                                               | 29.00000 | 57.20000 | 71.60000 | 0.0 d |
| 1.0167                                            | 29.00000 | 56.18333 | 71.60000 | 0.0 d |
| 2.0333                                            | 29.00000 | 55.16667 | 71.60000 | 0.0 d |
| 3.0500                                            | 29.00000 | 54.15000 | 71.60000 | 0.0 d |
| 4.0667                                            | 29.00000 | 53.13333 | 71.60000 | 0.0 d |
| 5.0833                                            | 29.00000 | 52.11667 | 71.60000 | 0.0 d |
| 6.1000                                            | 29.00000 | 51.10000 | 71.60000 | 0.0 d |
| d - Displacements include imported displacements. |          |          |          |       |

Structure: 28 Netherhall Gardens | Sub-structure: Front South

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

| Vertical Offset 1                                 |          |          |          |             |
|---------------------------------------------------|----------|----------|----------|-------------|
| 0.0                                               | 30.70000 | 51.10000 | 71.60000 | 0.0093707 d |
| 1.0223                                            | 30.68889 | 50.07778 | 71.60000 | 0.036344 d  |
| 2.0446                                            | 30.67778 | 49.05556 | 71.60000 | 0.054611 d  |
| 3.0668                                            | 30.66667 | 48.03333 | 71.60000 | 0.24331 d   |
| 4.0891                                            | 30.65556 | 47.01111 | 71.60000 | 0.70740 d   |
| 5.1114                                            | 30.64444 | 45.98889 | 71.60000 | 1.1850 d    |
| 6.1337                                            | 30.63333 | 44.96667 | 71.60000 | 1.6831 d    |
| 7.1560                                            | 30.62222 | 43.94444 | 71.60000 | 2.2119 d    |
| 8.1783                                            | 30.61111 | 42.92222 | 71.60000 | 2.7455 d    |
| 9.2005                                            | 30.60000 | 41.90000 | 71.60000 | 3.2229 d    |
| d - Displacements include imported displacements. |          |          |          |             |

Structure: 28 Netherhall Gardens | Sub-structure: Side

| Dist. | Coordinates |   |   | Displacements |
|-------|-------------|---|---|---------------|
|       | x           | y | z | z             |



GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

|                                                          | [m]         | [m]      | [m]           | [m]      | [mm] |
|----------------------------------------------------------|-------------|----------|---------------|----------|------|
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 30.65000    | 41.90000 | 71.60000      | 3.2262   | d    |
| 1.0250                                                   | 31.67500    | 41.89000 | 71.60000      | 3.3033   | d    |
| 2.0501                                                   | 32.70000    | 41.88000 | 71.60000      | 3.3928   | d    |
| 3.0751                                                   | 33.72500    | 41.87000 | 71.60000      | 3.5043   | d    |
| 4.1002                                                   | 34.75000    | 41.86000 | 71.60000      | 3.6079   | d    |
| 5.1252                                                   | 35.77500    | 41.85000 | 71.60000      | 3.7220   | d    |
| 6.1503                                                   | 36.80000    | 41.84000 | 71.60000      | 3.8421   | d    |
| 7.1753                                                   | 37.82500    | 41.83000 | 71.60000      | 3.9606   | d    |
| 8.2004                                                   | 38.85000    | 41.82000 | 71.60000      | 4.0724   | d    |
| 9.2254                                                   | 39.87500    | 41.81000 | 71.60000      | 4.1740   | d    |
| 10.250                                                   | 40.90000    | 41.80000 | 71.60000      | 4.2633   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: 28 Netherhall Gardens   Sub-structure: Rear   |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 41.00000    | 41.80000 | 71.60000      | 4.2708   | d    |
| 0.96258                                                  | 41.01250    | 42.76250 | 71.60000      | 3.7679   | d    |
| 1.9252                                                   | 41.02500    | 43.72500 | 71.60000      | 3.2928   | d    |
| 2.8877                                                   | 41.03750    | 44.68750 | 71.60000      | 2.8387   | d    |
| 3.8503                                                   | 41.05000    | 45.65000 | 71.60000      | 2.4066   | d    |
| 4.8129                                                   | 41.06250    | 46.61250 | 71.60000      | 2.0134   | d    |
| 5.7755                                                   | 41.07500    | 47.57500 | 71.60000      | 1.6468   | d    |
| 6.7381                                                   | 41.08750    | 48.53750 | 71.60000      | 1.2986   | d    |
| 7.7006                                                   | 41.10000    | 49.50000 | 71.60000      | 0.98561  | d    |
| 8.6632                                                   | 41.11250    | 50.46250 | 71.60000      | 0.69427  | d    |
| 9.6258                                                   | 41.12500    | 51.42500 | 71.60000      | 0.41961  | d    |
| 10.588                                                   | 41.13750    | 52.38750 | 71.60000      | 0.15503  | d    |
| 11.551                                                   | 41.15000    | 53.35000 | 71.60000      | 0.053016 | d    |
| 12.514                                                   | 41.16250    | 54.31250 | 71.60000      | 0.021531 | d    |
| 13.476                                                   | 41.17500    | 55.27500 | 71.60000      | 0.0      | d    |
| 14.439                                                   | 41.18750    | 56.23750 | 71.60000      | 0.0      | d    |
| 15.401                                                   | 41.20000    | 57.20000 | 71.60000      | 0.0      | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: West         |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 58.70000    | 19.40000 | 77.00000      | 8.9507   | d    |
| 0.97532                                                  | 58.72500    | 20.37500 | 77.00000      | 8.9516   | d    |
| 1.9506                                                   | 58.75000    | 21.35000 | 77.00000      | 8.9524   | d    |
| 2.9260                                                   | 58.77500    | 22.32500 | 77.00000      | 8.9531   | d    |
| 3.9013                                                   | 58.80000    | 23.30000 | 77.00000      | 8.9537   | d    |
| 4.8766                                                   | 58.82500    | 24.27500 | 77.00000      | 8.9543   | d    |
| 5.8519                                                   | 58.85000    | 25.25000 | 77.00000      | 8.9548   | d    |
| 6.8272                                                   | 58.87500    | 26.22500 | 77.00000      | 8.9552   | d    |
| 7.8026                                                   | 58.90000    | 27.20000 | 77.00000      | 8.9556   | d    |
| 8.7779                                                   | 58.92500    | 28.17500 | 77.00000      | 8.9559   | d    |
| 9.7532                                                   | 58.95000    | 29.15000 | 77.00000      | 8.9561   | d    |
| 10.729                                                   | 58.97500    | 30.12500 | 77.00000      | 8.9563   | d    |
| 11.704                                                   | 59.00000    | 31.10000 | 77.00000      | 7.4152   | d    |
| 12.679                                                   | 59.02500    | 32.07500 | 77.00000      | 7.1101   | d    |
| 13.654                                                   | 59.05000    | 33.05000 | 77.00000      | 6.8035   | d    |
| 14.630                                                   | 59.07500    | 34.02500 | 77.00000      | 6.6099   | d    |
| 15.605                                                   | 59.10000    | 35.00000 | 77.00000      | 6.4901   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: North        |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 59.15000    | 35.00000 | 77.00000      | 6.4737   | d    |
| 0.96667                                                  | 60.11667    | 35.00000 | 77.00000      | 6.1437   | d    |
| 1.9333                                                   | 61.08333    | 35.00000 | 77.00000      | 5.8975   | d    |
| 2.9000                                                   | 62.05000    | 35.00000 | 77.00000      | 5.6606   | d    |
| 3.8667                                                   | 63.01667    | 35.00000 | 77.00000      | 5.3639   | d    |
| 4.8333                                                   | 63.98333    | 35.00000 | 77.00000      | 5.0196   | d    |
| 5.8000                                                   | 64.95000    | 35.00000 | 77.00000      | 4.6403   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: East - North |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 65.00000    | 35.00000 | 77.00000      | 4.6200   | d    |
| 1.0100                                                   | 64.99000    | 33.99000 | 77.00000      | 4.8792   | d    |
| 2.0201                                                   | 64.98000    | 32.98000 | 77.00000      | 5.1032   | d    |
| 3.0301                                                   | 64.97000    | 31.97000 | 77.00000      | 5.2848   | d    |
| 4.0402                                                   | 64.96000    | 30.96000 | 77.00000      | 5.4168   | d    |
| 5.0502                                                   | 64.95000    | 29.95000 | 77.00000      | 6.5293   | d    |
| 6.0603                                                   | 64.94000    | 28.94000 | 77.00000      | 6.5311   | d    |
| 7.0703                                                   | 64.93000    | 27.93000 | 77.00000      | 6.5330   | d    |
| 8.0804                                                   | 64.92000    | 26.92000 | 77.00000      | 6.5348   | d    |
| 9.0904                                                   | 64.91000    | 25.91000 | 77.00000      | 6.5367   | d    |
| 10.100                                                   | 64.90000    | 24.90000 | 77.00000      | 6.5385   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: East - Mid   |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 64.95000    | 24.90000 | 77.00000      | 6.5065   | d    |
| 0.58310                                                  | 65.45000    | 24.60000 | 77.00000      | 6.1813   | d    |
| 1.1662                                                   | 65.95000    | 24.30000 | 77.00000      | 5.8519   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: East - South |             |          |               |          |      |
| Dist.                                                    | Coordinates |          | Displacements |          |      |
|                                                          | x           | y        | z             | z        |      |
|                                                          | [m]         | [m]      | [m]           | [mm]     |      |
| Vertical Offset 1                                        |             |          |               |          |      |
| 0.0                                                      | 66.00000    | 24.30000 | 77.00000      | 5.8190   | d    |
| 1.0617                                                   | 65.94000    | 23.24000 | 77.00000      | 5.8536   | d    |
| 2.1234                                                   | 65.88000    | 22.18000 | 77.00000      | 5.8882   | d    |
| 3.1851                                                   | 65.82000    | 21.12000 | 77.00000      | 5.9228   | d    |
| 4.2468                                                   | 65.76000    | 20.06000 | 77.00000      | 5.9573   | d    |
| 5.3085                                                   | 65.70000    | 19.00000 | 77.00000      | 5.9918   | d    |
| d - Displacements include imported displacements.        |             |          |               |          |      |
| Structure: Rear Structures   Sub-structure: South        |             |          |               |          |      |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |
|               |                     |         |

| Dist. | Coordinates |          |          | Displacements |
|-------|-------------|----------|----------|---------------|
| [m]   | x<br>[m]    | y<br>[m] | z<br>[m] | z<br>[mm]     |

| Dist. | Coordinates |          |          | Displacements |
|-------|-------------|----------|----------|---------------|
| [m]   | x<br>[m]    | y<br>[m] | z<br>[m] | z<br>[mm]     |

Vertical Offset 1  
0.0 58.75000 19.40000 77.00000 8.9529 d  
0.98737 59.73571 19.34286 77.00000 8.8934 d  
1.9747 60.72143 19.28571 77.00000 8.6632 d  
2.9621 61.70714 19.22857 77.00000 8.2959 d  
3.9495 62.69286 19.17143 77.00000 7.8219 d  
4.9368 63.67857 19.11429 77.00000 7.2691 d  
5.9242 64.66429 19.05714 77.00000 6.6626 d  
6.9116 65.65000 19.00000 77.00000 6.0246 d  
d - Displacements include imported displacements.

## Specific Building Damage Results - All Segments

Structure: 24 Netherhall Gardens | Sub-structure: Front

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 1.3866 | Sagging   | 0.0016910           | 0.078198                        | 0.078524                  | -783.70E-6                                                    | -550.39E-6                                                  | 8007.2                         | 2<br>(Slight)      |
|                                                                          | 2       | 1.3866 | 4.1160 | Hogging   | 0.0036960           | 0.085438                        | 0.086492                  | -883.50E-6                                                    | -740.78E-6                                                  | 12286.                         | 2<br>(Slight)      |
|                                                                          | 3       | 5.5026 | 3.7974 | Sagging   | 0.0052170           | 0.082999                        | 0.085688                  | -863.00E-6                                                    | -740.78E-6                                                  | 4606.1                         | 2<br>(Slight)      |

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

Structure: 24 Netherhall Gardens | Sub-structure: Side

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 7.1000 | Sagging   | 0.0055095           | 421.23E-6                       | 0.0053642                 | 91.610E-6                                                     | 203.65E-6                                                   | 14696.                         | 0<br>(Negligible)  |

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

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 3.6127 | Hogging   | 0.0058709           | -0.074040                       | 0.015189                  | 0.0013633                                                     | -577.31E-6                                                  | 4676.2                         | 0<br>(Negligible)  |
|                                                                          | 2       | 3.6127 | 1.3873 | Sagging   | 0.014336            | -0.020276                       | 0.010647                  | 441.76E-6                                                     | -577.31E-6                                                  | 959.83                         | 0<br>(Negligible)  |

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

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 7.9153 | Sagging   | 0.010297            | 0.095142                        | 0.10520                   | -0.0011337                                                    | 667.68E-6                                                   | 4764.5                         | 2<br>(Slight)      |
|                                                                          | 2       | 7.9153 | 1.8847 | Hogging   | 437.43E-6           | 0.076701                        | 0.076759                  | -803.15E-6                                                    | 667.68E-6                                                   | 43396.                         | 2<br>(Slight)      |

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

Structure: 28 Netherhall Gardens | Sub-structure: Front North

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
| All settlements are less than the Settlement Trough Limit Sensitivity.   |         |       |        |           |                     |                                 |                           |                                                               |                                                             |                                |                    |

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

Structure: 28 Netherhall Gardens | Sub-structure: Front South

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 3.0668 | 3.9137 | Hogging   | 0.0010016           | 0.018850                        | 0.019181                  | -437.20E-6                                                    | -517.08E-6                                                  | 5691.2                         | 0<br>(Negligible)  |
|                                                                          | 2       | 6.9806 | 2.1694 | Sagging   | 0.0013308           | 0.071833                        | 0.072319                  | -784.17E-6                                                    | -521.54E-6                                                  | 14391.1                        | 1 (Very Slight)    |

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

Structure: 28 Netherhall Gardens | Sub-structure: Side

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start  | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|--------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]    | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0    | 5.9935 | Hogging   | 629.83E-6           | 0.010316                        | 0.010630                  | -205.84E-6                                                    | -117.14E-6                                                  | 71367.                         | 0<br>(Negligible)  |
|                                                                          | 2       | 5.9935 | 4.2065 | Sagging   | 483.73E-6           | -0.021349                       | 0.0042779                 | 268.80E-6                                                     | -117.14E-6                                                  | 79316.                         | 0<br>(Negligible)  |

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

Structure: 28 Netherhall Gardens | Sub-structure: Rear

| Vertical Offset<br>from Line for<br>Vertical<br>Movement<br>Calculations | Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature | Damage<br>Category |
|--------------------------------------------------------------------------|---------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|--------------------------------|--------------------|
| [m]<br>0.0                                                               |         | [m]   | [m]    |           | [%]                 | [%]                             | [%]                       |                                                               |                                                             | [m]                            |                    |
|                                                                          | 1       | 0.0   | 10.588 | Hogging   | 0.0036451           | 0.045293                        | 0.048323                  | -752.75E-6                                                    | 522.06E-6                                                   | 9138.7                         | 0<br>(Negligible)  |

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

Structure: Rear Structures | Sub-structure: West

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| 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]<br>0.0                                                   |         | [m]    | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0    | 11.376 | Sagging   | 0.0084532        | -0.010927                 | 0.0027388           | 0.0019297                                         | 0.0015831                                       | 2072.6                   | 0 (Negligible)  |
|                                                              | 2       | 11.376 | 4.1739 | Hogging   | 0.0097113        | -0.13339                  | 0.027191            | 0.0027772                                         | 0.0015831                                       | 2826.5                   | 0 (Negligible)  |

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

Structure: Rear Structures | Sub-structure: North

| 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]<br>0.0                                                   |         | [m]    | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0    | 2.1400 | Hogging   | 0.0021793        | -0.027749                 | 0.0056868           | 409.16E-6                                         | 341.51E-6                                       | 9121.1                   | 0 (Negligible)  |
|                                                              | 2       | 2.1400 | 3.5600 | Sagging   | 0.0023341        | 0.017922                  | 0.020579            | -332.80E-6                                        | 392.26E-6                                       | 19505.                   | 0 (Negligible)  |

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

Structure: Rear Structures | Sub-structure: East - North

| 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]<br>0.0                                                   |         | [m]    | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0    | 2.1899 | Sagging   | 0.0010109        | -0.040947                 | 0.0082075           | 590.42E-6                                         | -256.69E-6                                      | 24081.                   | 0 (Negligible)  |
|                                                              | 2       | 2.1899 | 2.2468 | Hogging   | 0.013686         | -0.058362                 | 0.014154            | 689.17E-6                                         | -0.0011017                                      | 4863.6                   | 0 (Negligible)  |
|                                                              | 3       | 4.4366 | 4.2419 | Sagging   | 0.013496         | -0.0043715                | 0.012719            | 302.34E-6                                         | -0.0011017                                      | 3298.4                   | 0 (Negligible)  |
|                                                              | 4       | 8.6786 | 1.3214 | Hogging   | 0.0              | 0.0                       | 0.0                 | 0.0                                               | -1.8308E-6                                      | 790.11E+6                | 0 (Negligible)  |

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

Structure: Rear Structures | Sub-structure: East - Mid

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0   | 1.1000 | Sagging   | 178.44E-6        | 0.060313                  | 0.060387            | -608.08E-6                                        | 564.54E-6                                       | 76124.1                  | 1 (Very Slight) |

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

Structure: Rear Structures | Sub-structure: East - South

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0   | 5.2500 | Sagging   | 1.3566E-6        | 195.96E-6                 | 197.88E-6           | -1.9670E-6                                        | -32.595E-6                                      | 36.246E+6                | 0 (Negligible)  |

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

Structure: Rear Structures | Sub-structure: South

| 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]<br>0.0                                                   |         | [m]   | [m]    |           | [%]              | [%]                       | [%]                 |                                                   |                                                 | [m]                      |                 |
|                                                              | 1       | 0.0   | 6.8500 | Sagging   | 0.0086247        | 0.094673                  | 0.10764             | -0.0010968                                        | 645.57E-6                                       | 5458.7                   | 2 (Slight)      |

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

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

Structure: 24 Netherhall Gardens | Sub-structure: Front

| 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]<br>0.0                                                   | [%]              | [%]                       |               | [mm]               | [%]                 |                                                   |                                                 | [m]                                | [m]                                |                 |
|                                                              | 0.0052170        | 0.005438                  | -740.78E-6    | 8.3688             | 0.086492            | -883.50E-6                                        | -740.78E-6                                      | 12286.                             | 4606.1                             | 2 (Slight)      |

Structure: 24 Netherhall Gardens | Sub-structure: Side

| 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]<br>0.0                                                   | [%]              | [%]                       |               | [mm]               | [%]                 |                                                   |                                                 | [m]                                | [m]                                |                 |
|                                                              | 0.0055095        | 421.23E-6                 | 203.65E-6     | 9.2565             | 0.0053642           | 91.610E-6                                         | 203.65E-6                                       | -                                  | 14696.0                            | 0 (Negligible)  |

Structure: 24 netherhall Gardens | Sub-structure: Rear Side

| 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]<br>0.0                                                   | [%]              | [%]                       |               | [mm]               | [%]                 |                                                   |                                                 | [m]                                | [m]                                |                 |
|                                                              | 0.014336         | -0.074040                 | -577.31E-6    | 8.9561             | 0.015189            | 0.0013633                                         | -577.31E-6                                      | 4676.2                             | 959.83                             | 0 (Negligible)  |

Structure: 24 Netherhall Gardens | Sub-structure: Rear

| 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]<br>0.0                                                   | [%]              | [%]                       |               | [mm]               | [%]                 |                                                   |                                                 | [m]                                | [m]                                |                 |
|                                                              | 0.010297         | 0.095142                  | 667.68E-6     | 8.9946             | 0.10520             | -0.0011337                                        | 667.68E-6                                       | 43396.                             | 4764.5                             | 2 (Slight)      |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) J15344

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
|               |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Vertical<br>Offset from<br>Line for<br>Vertical<br>Movement<br>Calculations | Deflection<br>Ratio                | Average<br>Horizontal<br>Strain | Maximum<br>Slope          | Maximum<br>Settlement | Max.<br>Tensile<br>Strain | Maximum<br>Gradient of<br>Horizontal<br>Displacement<br>Curve | Maximum<br>Gradient of<br>Vertical<br>Displacement<br>Curve | Min.<br>Radius of<br>Curvature<br>(Hogging) | Min.<br>Radius of<br>Curvature<br>(Sagging) | Damage Category                             |                 |
|-----------------------------------------------------------------------------|------------------------------------|---------------------------------|---------------------------|-----------------------|---------------------------|---------------------------------------------------------------|-------------------------------------------------------------|---------------------------------------------|---------------------------------------------|---------------------------------------------|-----------------|
| Structure: 28 Netherhall Gardens   Sub-structure: Front North               |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0013308                          | 0.071833                        | -521.54E-6                | 3.1993                | 0.072319                  | -784.17E-6                                                    | -521.54E-6                                                  | 5691.2                                      | 14391.1                                     | 1 (Very Slight)                             |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Front South               |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0013308                          | 0.071833                        | -521.54E-6                | 3.1993                | 0.072319                  | -784.17E-6                                                    | -521.54E-6                                                  | 5691.2                                      | 14391.1                                     | 1 (Very Slight)                             |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Side                      |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 629.83E-6                          | -0.021349                       | -117.14E-6                | 4.2589                | 0.010630                  | 268.80E-6                                                     | -117.14E-6                                                  | 71367.                                      | 79316.0                                     | 0 (Negligible)                              |                 |
| Structure: 28 Netherhall Gardens   Sub-structure: Rear                      |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0036451                          | 0.045293                        | 522.06E-6                 | 4.2708                | 0.048323                  | -752.75E-6                                                    | 522.06E-6                                                   | 9138.7                                      | -0                                          | 0 (Negligible)                              |                 |
| Structure: Rear Structures   Sub-structure: West                            |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0097113                          | -0.13339                        | 0.0015831                 | 8.9563                | 0.027191                  | 0.0027772                                                     | 0.0015831                                                   | 2826.5                                      | 2072.6                                      | 0 (Negligible)                              |                 |
| Structure: Rear Structures   Sub-structure: North                           |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0023341                          | -0.027749                       | 392.26E-6                 | 6.4737                | 0.020579                  | 409.16E-6                                                     | 392.26E-6                                                   | 9121.1                                      | 19505.0                                     | 0 (Negligible)                              |                 |
| Structure: Rear Structures   Sub-structure: East - North                    |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.013686                           | -0.058362                       | -0.0011017                | 6.5384                | 0.014154                  | 689.17E-6                                                     | -0.0011017                                                  | 4863.6                                      | 3298.4                                      | 0 (Negligible)                              |                 |
| Structure: Rear Structures   Sub-structure: East - Mid                      |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 178.44E-6                          | 0.060313                        | 564.54E-6                 | 6.5065                | 0.060387                  | -608.08E-6                                                    | 564.54E-6                                                   | -                                           | 76124.1                                     | 1 (Very Slight)                             |                 |
| Structure: Rear Structures   Sub-structure: East - South                    |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 1.3566E-6                          | 195.96E-6                       | -32.595E-6                | 5.9899                | 197.88E-6                 | -1.9670E-6                                                    | -32.595E-6                                                  | -                                           | 36.246E+6                                   | 0 (Negligible)                              |                 |
| Structure: Rear Structures   Sub-structure: South                           |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| 0.0                                                                         | 0.0086247                          | 0.094673                        | 645.57E-6                 | 8.9529                | 0.10764                   | -0.0010968                                                    | 645.57E-6                                                   | -                                           | 5458.7                                      | 2 (Slight)                                  |                 |
| Specific Building Damage Results - Critical Segments within Each Structure  |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
| Structure Name                                                              | Parameter                          | Critical<br>Sub-Structure       | Critical Start<br>Segment | End                   | Curvature                 | Maximum<br>Slope                                              | Maximum<br>Settlement                                       | Max.<br>Tensile<br>Strain                   | Min.<br>Radius of<br>Curvature<br>(Hogging) | Min.<br>Radius of<br>Curvature<br>(Sagging) | Damage Category |
| 24 Netherhall<br>Gardens                                                    | Maximum Slope                      | Front                           |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
|                                                                             |                                    |                                 |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
|                                                                             | Maximum Settlement                 | Side                            |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
|                                                                             | Max. Tensile Strain                | Rear                            |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |
|                                                                             | Min. Radius of Curvature (Hogging) | Front                           |                           |                       |                           |                                                               |                                                             |                                             |                                             |                                             |                 |



# GEA LIMITED (GEOTECHNICAL & ENV ASSOC) **J15344**

**26 Netherhall Gardens**  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Structure Name        | Parameter                          | Critical Sub-Structure | Critical Segment | Start | End    | Curvature      | Maximum Slope | Maximum Settlement | Max. Tensile Strain | Min. Radius of Curvature (Hogging) | Min. Radius of Curvature (Sagging) | Damage Category |
|-----------------------|------------------------------------|------------------------|------------------|-------|--------|----------------|---------------|--------------------|---------------------|------------------------------------|------------------------------------|-----------------|
| 24 netherhall Gardens | Min. Radius of Curvature (Sagging) | Front                  |                  | 3     | 5.5026 | 9.3000 Sagging | 740.78E-6     | 8.3688             | 0.085688            | -                                  | 4606.1                             | 2 (Slight)      |
|                       | Maximum Slope                      | Rear Side              |                  | 1     | 0.0    | 3.6127 Hogging | 577.31E-6     | 8.6549             | 0.015189            | 4676.2                             | -                                  | 0 (Negligible)  |
|                       | Maximum Settlement                 | Rear Side              |                  | 2     | 3.6127 | 5.0000 Sagging | 577.31E-6     | 8.9561             | 0.010647            | -                                  | 959.83                             | 0 (Negligible)  |
|                       | Max. Tensile Strain                | Rear Side              |                  | 1     | 0.0    | 3.6127 Hogging | 577.31E-6     | 8.6549             | 0.015189            | 4676.2                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Hogging) | Rear Side              |                  | 1     | 0.0    | 3.6127 Hogging | 577.31E-6     | 8.6549             | 0.015189            | 4676.2                             | -                                  | 0 (Negligible)  |
| 28 Netherhall Gardens | Min. Radius of Curvature (Sagging) | Rear Side              |                  | 2     | 3.6127 | 5.0000 Sagging | 577.31E-6     | 8.9561             | 0.010647            | -                                  | 959.83                             | 0 (Negligible)  |
|                       | Maximum Slope                      | Rear                   |                  | 1     | 0.0    | 10.588 Hogging | 522.06E-6     | 4.2708             | 0.048323            | 9138.7                             | -                                  | 0 (Negligible)  |
|                       | Maximum Settlement                 | Rear                   |                  | 1     | 0.0    | 10.588 Hogging | 522.06E-6     | 4.2708             | 0.048323            | 9138.7                             | -                                  | 0 (Negligible)  |
|                       | Max. Tensile Strain                | Front South            |                  | 2     | 6.9806 | 9.1500 Sagging | 521.54E-6     | 3.1993             | 0.072319            | -                                  | 14391.1                            | (Very Slight)   |
|                       | Min. Radius of Curvature (Hogging) | Front South            |                  | 1     | 3.0668 | 6.9806 Hogging | 517.08E-6     | 2.1212             | 0.019181            | 5691.2                             | -                                  | 0 (Negligible)  |
| Rear Structures       | Min. Radius of Curvature (Sagging) | Front South            |                  | 2     | 6.9806 | 9.1500 Sagging | 521.54E-6     | 3.1993             | 0.072319            | -                                  | 14391.1                            | (Very Slight)   |
|                       | Maximum Slope                      | West                   |                  | 1     | 0.0    | 11.376 Sagging | 0.0015831     | 8.9563             | 0.0027388           | -                                  | 2072.6                             | 0 (Negligible)  |
|                       | Maximum Settlement                 | West                   |                  | 1     | 0.0    | 11.376 Sagging | 0.0015831     | 8.9563             | 0.0027388           | -                                  | 2072.6                             | 0 (Negligible)  |
|                       | Max. Tensile Strain                | South                  |                  | 1     | 0.0    | 6.8500 Sagging | 645.57E-6     | 8.9529             | 0.10764             | -                                  | 5458.7                             | 2 (Slight)      |
|                       | Min. Radius of Curvature (Hogging) | West                   |                  | 2     | 11.376 | 15.550 Hogging | 0.0015831     | 7.9330             | 0.027191            | 2826.5                             | -                                  | 0 (Negligible)  |
|                       | Min. Radius of Curvature (Sagging) | West                   |                  | 1     | 0.0    | 11.376 Sagging | 0.0015831     | 8.9563             | 0.0027388           | -                                  | 2072.6                             | 0 (Negligible)  |
|                       |                                    |                        |                  |       |        |                |               |                    |                     |                                    |                                    |                 |

## Specific Building Damage Results - All Combined Segments

Structure: 24 Netherhall Gardens | Sub-structure: Front

| 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: 24 Netherhall Gardens | Sub-structure: Side

| 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: 24 netherhall Gardens | Sub-structure: Rear Side

| 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: 24 Netherhall Gardens | Sub-structure: Rear

| 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: 28 Netherhall Gardens | Sub-structure: Front North

| 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: 28 Netherhall Gardens | Sub-structure: Front South

| 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: 28 Netherhall Gardens | Sub-structure: Side

| 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: 28 Netherhall Gardens | Sub-structure: Rear

| 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]   |        |           | [%]              | [%]                       | [%]                 |                 |



GEA LIMITED  
(GEOTECHNICAL & ENV ASSOC) **J15344**

26 Netherhall Gardens  
Southern Shallow Basement  
Combined Piling and Excavation

| Job No.       | Sheet No.           | Rev.    |
|---------------|---------------------|---------|
|               |                     |         |
| Drg. Ref.     |                     |         |
| Made by<br>MC | Date<br>15-Dec-2015 | Checked |

| Vertical<br>Offset from<br>Line for<br>Vertical<br>Movement<br>Calculations | Combined<br>Segment | Start | Length | Curvature | Deflection<br>Ratio | Average<br>Horizontal<br>Strain | Max.<br>Tensile<br>Strain | Damage Category |
|-----------------------------------------------------------------------------|---------------------|-------|--------|-----------|---------------------|---------------------------------|---------------------------|-----------------|
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: West                            |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: North                           |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - North                    |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - Mid                      |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: East - South                    |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |
| Structure: Rear Structures   Sub-structure: South                           |                     |       |        |           |                     |                                 |                           |                 |
| No structures have segments combined.                                       |                     |       |        |           |                     |                                 |                           |                 |



Geotechnical &  
Environmental  
Associates

Widbury Barn  
Widbury Hill  
Ware  
Herts SG12 7QE

## Ground Movement Analysis Site Plan

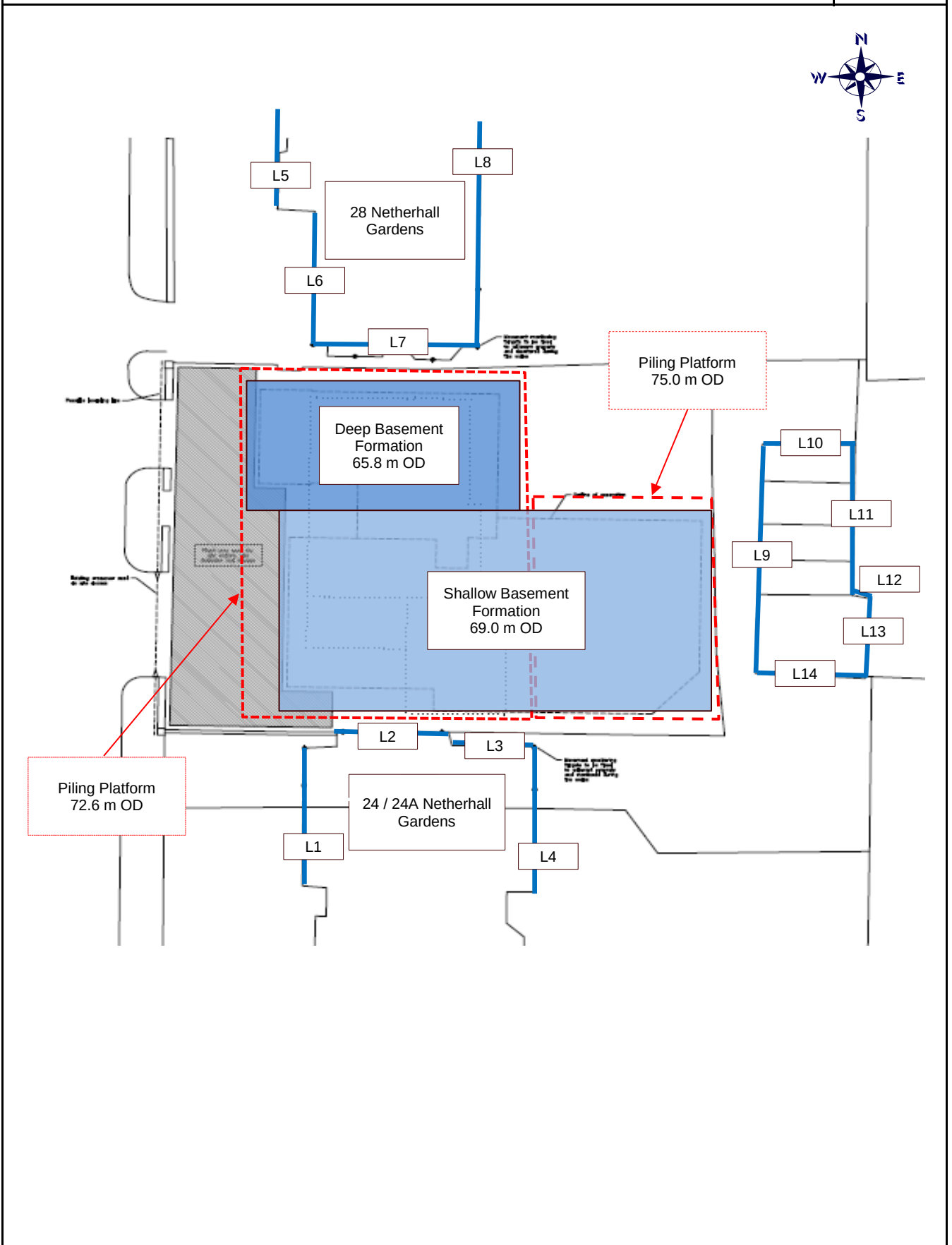
**Site** 26 Netherhall Gardens, London, NW3 5TL

**Client** Atlas Property Company Limited

**Engineer** Sinclair Johnston

**Job Number**  
J15344

**Sheet**  
1 / 1





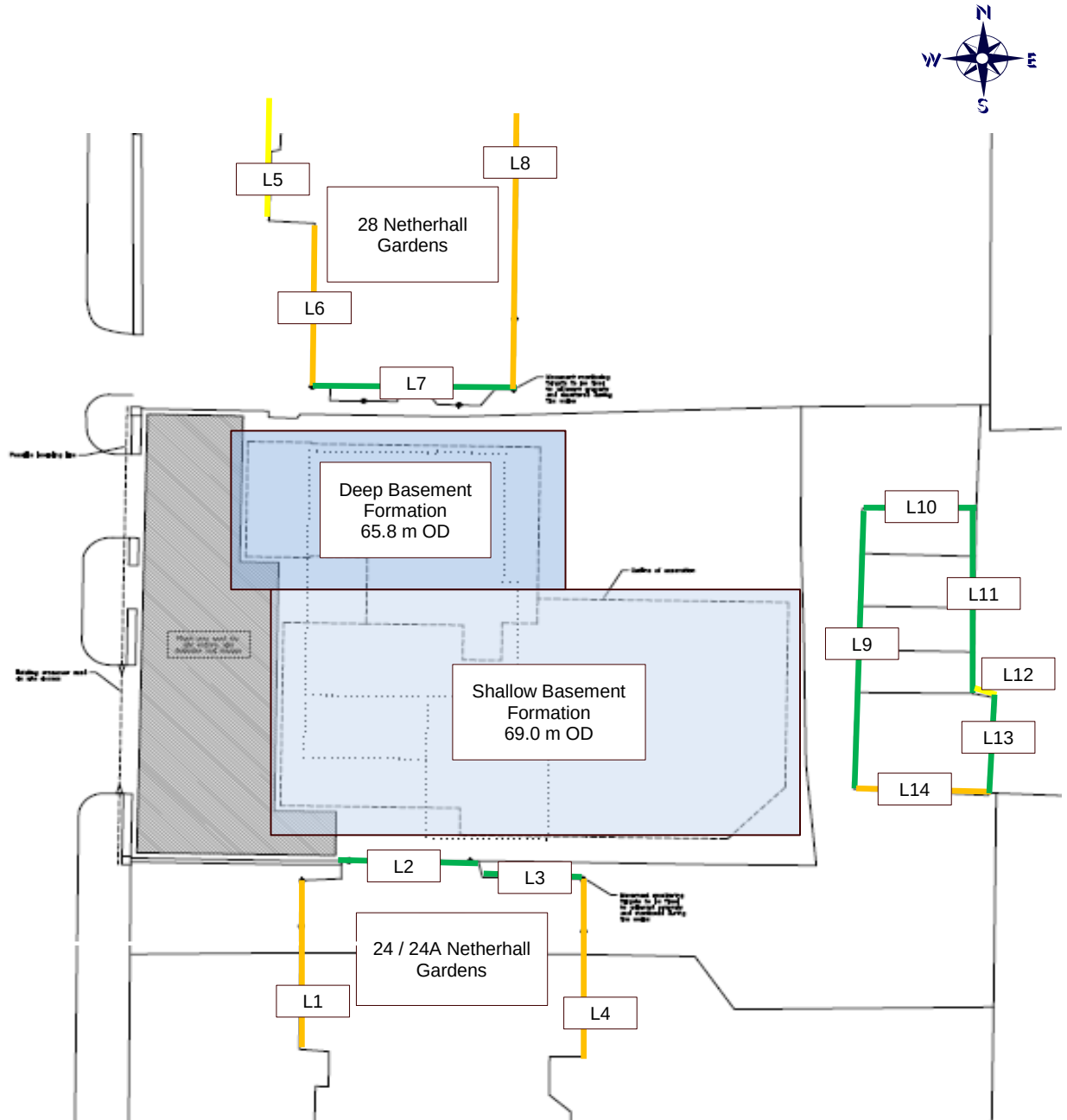
Site 26 Netherhall Gardens, London, NW3 5TL

Client Atlas Property Company Limited

Engineer Sinclair Johnston

Job Number  
J15344

Sheet  
1 / 1



**Burland Damage  
Category**

- Category 2 Slight
- Category 1 Very Slight
- Category 0 Negligible

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.

We have offices at

Widbury Barn  
Widbury Hill  
Ware  
Hertfordshire  
SG12 7QE  
tel 01727 824666  
mail@gea-ltd.co.uk

Church Farm  
Gotham Road  
Kingston on Soar  
Notts  
NG11 0DE  
tel 01509 674888  
midlands@gea-ltd.co.uk

Enquiries can also be made on-line at

[www.gea-ltd.co.uk](http://www.gea-ltd.co.uk)

where information can be found on all of the services that we offer.

