Our Ref: TRL/AM/J13124

17th January 2018

Misuma Limited Suite 169 Kinetel Business Centre Theobald Street Elstree Hertfordshire WD6 4PJ

For the attention of Marc Gershon (By email: misumalimited@gmail.com)

Project Name: 78 Malden Road, London, NW5 4DA

A PRELIMINARY INFORMATION

This report forms a Stage 4 (Ground Movement Analysis) of a Basement Impact Assessment for the new proposed basement excavation at this site. Southern Testing have undertaken Stages 1, 2 and 3 in our report (STL ref: J13124). The reader is referred to the Stage 1, 2 and 3 report for further details of the earlier stages of the Basement Impact Assessment process.

This Ground Movement Assessment is in accordance with Camden Council's planning policies for basement excavations. Their policies and requirements are set out in CPG4 'Basements and Lightwells', the Development Policy DP27 'Basements and Lightwells', and the document 'Camden geological, hydrogeological and hydrological study – guidance for subterranean development'.

The purpose of this Ground Movement Analysis is to enable Camden Council and their Engineers/auditors to assess whether any predicted damage to neighbouring properties (No. 76 and No. 80 Malden Road) and infrastructure is acceptable, or can be satisfactorily ameliorated by the developer, as stated in DP27 and CPG4.

B GROUND MOVEMENT ANALYSIS

1 Layout and levels of proposed development

All levels and layouts of the foundations, excavation and existing and proposed buildings have been supplied by the Client's engineers and architects. The existing ground floor of the site is taken as an arbitrary datum level of +0.0mOD. As shown on the architect's plans street level is -0.98mOD, and the existing lower ground floor level (which is also the proposed finished floor level) is -2.795mOD.

The proposed development comprises the excavation of the front courtyard to provide a bicycle storage area serving the house. The storage area will be covered over with a concrete slab following the construction of the basement. Additional construction works are proposed in the rear garden; however, as this does not involve the excavation of a basement, these are not considered in this letter. Based on the Client's engineer's drawings, the formation level of the proposed basement elements (foundations of the slab and retaining wall) is -3.195mOD. The excavation depth is, therefore, about 2.215m.



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It is understood that the basement walls will be formed using reinforced cantilever retaining walls. Limited underpinning will be required along the party boundaries between the subject property and the adjacent 80 Malden Road (to the north) in order to support the access stairs to the front entrance. The proposed basement will be formed outside the existing front elevation of the terraced houses, and so no structural load-bearing walls are proposed to be underpinned. The concrete cover will form a permanent prop to the proposed retaining walls.

The proposed loading of the new foundations have been supplied by the Client's engineers.

Figure A (Appendix A) shows the general arrangement of the existing buildings, along with the proposed basement layout and loadings.

2 Modelling of movements due to vertical stress changes

Following the excavation of a basement, vertical movements are typically modelled as comprising a shortterm (undrained) response, followed by a long-term (drained) response. The excavation and construction of the new basement will result in changes in vertical soil loading, and therefore result in both short and longterm displacements in the underlying soils. The magnitude of the movements is related to the geotechnical properties of the soil profile underlying the site, and the net changes in vertical stress caused by the combination of excavation of the soils to form the basement, and the new basement/foundation loadings. It is assumed that there will be no delay in between the excavation and construction of the basement.

The proposed basement is to be constructed using a method of hit-and-miss techniques and reinforced cantilever retaining walls/underpins. Permanent propping will be provided by a concrete cover over the proposed bicycle storage area.

The predicted vertical ground movements were modelled using the OASYS program PDisp. The PDisp program assumes a linear elastic soil behaviour, and a flexible structure (for the existing and adjacent buildings). It is likely that the stiffness of the structures will not be flexible; rather, it will have a finite value. As a result, the movements will tend to be redistributed or smoothed out when compared to those predicted by PDisp. On this basis, the output from PDisp does not take into account the finite stiffness of the structures. They are, therefore, likely to be conservative: the actual movements affecting the structures would likely be less than those predicted by the PDisp program.

The following ground profile and geotechnical parameters have been assumed for the PDisp analysis:

| Soil Type | Depth to base (mOD) | Bulk Unit Weight (γ _δ) (kN/m³) | Poisson's Ratio (v) | | Undrained Young's Modulus (E _u) (MN/m ²) | | Drained Young's Modulus (E₀) (MN/m²) | |
|---|---------------------------|---|---------------------|---------|--|--------------------|--|--------------------|
| | | | Undrained | Drained | Top of Stratum | Base of Stratum | Top of Stratum | Base of Stratum |
| VOID (no soils present – refer to site levels) | -0.98 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Made Ground | -2.465 | 19 | 0.5 | 0.2 | 5 | 5 | 3.75 | 3.75 |
| London Clay | -40.00 | 20 | 0.5 | 0.2 | 10 | 200 | 7.5 | 150 |



The soil model above is based on the intrusive investigation undertaken in Stage 3 of the BIA. The reader is referred to the exploratory hole logs supplied with our report ref. J13124 for more information.

For the London Clay, the stiffness parameters were derived based on Burland and Kalra (1986)¹ as follows:

- Undrained Young's Modulus $(E_u) = (10+5.2z) (MN/m^2)$
- Drained Young's Modulus $(E_d) = (7.5+3.9z) (MN/m^2)$

Where z (m) is taken from the surface of the London Clay.

The site ground level was taken as an arbitrary value of 0.0mOD (at ground floor level); the rigid base for the analysis was taken as -40.0mOD.

3 Vertical movements from excavation and proposed construction loadings

The Client's Structural Engineers provided drawings detailing the proposed foundation arrangement and loadings for the proposed underpinning/retaining walls works, along with estimates of the new foundation loadings. The provided information was used to estimate the net changes in vertical loadings due to the new foundation loadings, and the unloading caused by the proposed excavation.

The arrangement of the proposed loads is shown in Figure A, Appendix A.

An unload pressure of 39.9 kN/m^2 has been adopted for the basement. A plan showing the general arrangement of the proposed basement and adjacent buildings is presented in Figure A, Appendix A.

78 Malden Road shares a party wall with 76 Malden Road (which is to the south of the subject site), and 80 Malden Road (which is to the north of the subject site). The proposed basement is set back from the boundary between the subject site and 76 Malden Road, and is about 1.2m from the front elevation of the existing building on site. The northern edge of the proposed excavation will run along the boundary between the subject site and 80 Malden Road (adjacent to the access steps up to the front door of 80 Malden Road).

3.1 Short-term (undrained) vertical ground movements

PDisp was used to determine the likely movements arising as a result of the combination of unloading due to the excavation of the basement, and application of the proposed construction loads. The analysis indicated peak undrained movements of about 4mm (heave) occurring in the centre of the main basement area (see Figure U1, Appendix B).

In order to illustrate the likely displacements occurring beneath the neighbouring properties (Nos. 76 and 78 Malden Road), and across the adjacent highway (Malden Road), displacement lines were drawn. Please refer to Figures U1-L1 to U1-L6 (Appendix B). Figure A (Appendix A) shows the locations of the displacement lines. The proposed basement is located outside of the subject property (i.e. it does not underlie the footprint of 78 Malden Road). The displacement lines were drawn to run along the front elevations and party walls of the neighbouring properties.

For 76 Malden Road, the maximum undrained movement of about 0.11mm (heave) occurs beneath the nearest corner to the proposed basement (intersection of Figs U1-L1 and U1-L2), reducing to near zero by about 6m away from the excavation.

¹ Burland J.B. and Kalra J.C. (1986) Queen Elizabeth Conference Centre: geotechnical aspects, Proc. Inst. Civ. Eng., Part 1,80,1479-1503



For 80 Malden Road, the maximum undrained movement of about 0.49mm (heave) occurs beneath the nearest corner to the proposed basement (intersection of Figs U1-L5 and U1-L6), reducing to near zero by about 6m away from the excavation. Movements across the front access stairs (Fig U1-L4) are between 1.2mm (heave) adjacent to the proposed basement, and about 0.22mm (heave) at the northern edge of the stairs.

Undrained movements beneath the adjacent highway (Malden Road) decrease from about 1.25mm at the edge of the excavation, to near zero by about 8m away from the western edge of the excavation (Fig U1-L3).

3.2 Long-term (drained) vertical ground movements

The movements of the ground following construction were also analysed for the total long-term (drained) case. As for the short-term analysis, the long-term analysis was undertaken for the combination of the unloading due to the excavation of the basement and application of the proposed construction loadings. The PDisp assessment indicates peak long-term drained heave movements of 7mm occurring within the centre of the proposed bicycle storage area (Fig V1, Appendix B).

For 76 Malden Road, the maximum drained movement of about 0.22mm (heave) occurs beneath the nearest corner to the proposed basement (intersection of Figs V1-L1 and V1-L2), reducing to near zero by about 12m away from the excavation.

For 80 Malden Road, the maximum drained movement of about 0.84mm (heave) occurs beneath the nearest corner to the proposed basement (intersection of Figs V1-L5 and V1-L6), reducing to near zero by about 12m away from the excavation. Movements across the front access stairs (Fig V1-L4) are between 1.82mm (heave) adjacent to the proposed basement, and about 0.42mm (heave) at the northern edge of the stairs.

Drained movements beneath the adjacent highway (Malden Road) decrease from about 1.82mm at the edge of the excavation, to near zero by about 10m away from the western edge of the excavation (Fig V1-L3).

The long-term movements calculated by PDisp include the short-term movements.

It should be noted that, as discussed below, vertical movements resulting from the net changes in soil loading occur along with other ground movements which are associated with the excavation of the basement and its construction.

4 Movements due to basement excavation and underpin construction

The new foundations will be formed by sequential hit-and-miss methods of underpinning. The reader is referred to the structural engineer's drawings for details on the design and layout of the proposed foundations. The underpinned walls will also form the retaining walls for the proposed basement.

Vertical and horizontal ground movements will be generated at several stages during the construction of the retaining walls, as follows:

- 1. Installation (excavation and casting) of the underpins/retaining walls.
- 2. Excavation in front of the new retaining walls.

It should be noted that ground movements generated from this style of construction are not well documented. Due to the methods by which underpins are installed, it is assumed that the above occur simultaneously (i.e. installation and excavation); therefore, we do not consider these elements separately in our analysis. Movements should be small when underpinning is carried out in a well-controlled manner.



Guidance is given in CIRIA C760 for both high stiffness (propped), and low stiffness (cantilevered) walls. In this instance, we understand that the construction sequence, including the temporary and permanent works design, will ensure that the new retaining walls will be propped throughout the works. CIRIA C760 indicates empirical relationships for the movements produced by the construction, and excavation in front of, a high support stiffness wall as follows:

Movements due to excavation in front of a high support stiffness wall:

- **Peak horizontal movements** will be 0.15% of the total excavation depth, and will occur at the wall. These movements will extend to a distance of four times the excavation depth away from the wall. The magnitude of movements will decrease linearly.
- **Peak vertical movements** will be 0.07% of the total excavation depth, and will occur about half the excavation depth away from the wall. The vertical movements at the wall will be about 0.04% of the excavation depth. There will be no vertical movements at a distance of about 3.5 times the excavation depth away from the wall; the movements decrease in a non-linear fashion.

The OASYS XDisp software was used to undertake the assessment of the vertical and horizontal movements caused by the construction of the basement walls.

As mentioned above, the guidance in CIRIA C760 is based on empirical data. The data is assumed to include any short-term (undrained) element of ground movement that arises due to net changes in vertical stress (i.e. those caused by the excavation unloading, and new loads of the proposed foundations). Furthermore, as the data was collected over a relatively short period following construction, it is unlikely that the data includes any long-term (drained) movements. Therefore, the total ground movements we have calculated comprise two elements:

- 1) Movements predicted by CIRIA C760 (and XDisp). As outlined above, these comprise movements relating to the installation of the retaining wall, and excavation in front of the walls, as well as any short-term movements from net changes in vertical loading.
- 2) Long-term movements caused by the changes in vertical loading (as calculated in PDisp). As noted above, the long-term output from PDisp includes the short-term movements. Therefore, the long-term movements included in the calculation of total ground movements are calculated as the difference between PDisp-calculated long-term movements, and the PDisp-calculated short-term movements (i.e. Figure V1 minus Figure U1).

A summary of the predicted short-term and long-term movements caused by the construction of the basement walls and formation of the new basement is shown in the sections below. For the analysis, we have assumed an excavation depth of 2.215m for the proposed basement (as outlined in the structural engineer's drawings).

Based on the analysis in this section of the BIA, an assessment has been made of the potential damage to the nearby structures (Nos. 76 and 80 Malden Road). The following sections show the estimated damage categories. The general damage categories (after Burland et al) are summarised in the table below:



| Category | Description |
|--------------------|--|
| 0 (Negligible) | Negligible – hairline cracks |
| 1 (Very slight) | Fine cracks that can easily be treated during normal decoration (crack width <1mm) |
| 2 (Slight) | Cracks easily filled, redecoration probably required. Some repointing may be required externally (crack width <5mm). |
| 3 (Moderate) | The cracks require some opening up and can be patched by a mason. Recurrent cracks can be masked by suitable linings. Repointing of external brickwork and possibly a small amount of brickwork to be replaced (crack width 5 to 15mm or a number of cracks > 3mm). |
| 4 (Severe) | Extensive repair work involving breaking-out and replacing sections of walls, especially over doors and windows (crack width 15mm to 25mm but also depends on number of cracks). |
| 5 (Very Severe) | This requires a major repair involving partial or complete re-building (crack width usually >25mm but depends on number of cracks). |

4.1 <u>Short-term</u> movements caused by excavation of basement at No. 78

The tabular output from the XDisp analysis is attached (Figure X1-TAB, Appendix B). The movements at selected points along each line, along with the estimated damage categories, are summarised in the table below:

| | | Approx. horizontal | movements (mm) | Approx. vertica | Maximum | |
|------------------------------------|---------------------|---|---|-------------------------|----------------------------|--------------------|
| Line number | Figure reference | Closest elevation to excavation | Furthest elevation from | Closest elevation to | Furthest elevation from | DAMAGE CATEGORY |
| | | | excavation | excavation | excavation | |
| Line 1 (No. 78/76 party wall) | X1-L1 | 1.15 (resultant movement towards excavation) | 0.00 | 0.84 (settlement) | 0.00 | Negligible (0) |
| Line 2 (No. 76 front elevation) | X1-L2 | 1.15 (resultant movement towards excavation) | 0.09 (resultant movement towards excavation) | 0.84 (settlement) | 0.00 | Negligible (0) |
| Line 5 (No. 80 front elevation) | X1-L5 | 2.95 (resultant movement towards excavation) | 0.70 (resultant movement towards excavation) | 1.48 (settlement) | 0.22 (settlement) | Negligible (0) |
| Line 6 (No. 78/80 party wall) | X1-L6 | 2.95 (resultant movement towards | 0.00 | 1.48 (settlement) | 0.00 | Negligible (0) |

With regards to the adjacent highway (Malden Road), in the short term the vertical displacements are predicted to be about 0.85mm (settlement) at the edge of the proposed basement, reducing to zero by about 9m away from the excavation. The maximum vertical displacements are predicted to be about 1.65mm (settlement), occurring about 1.75m away from the edge of the excavation. Horizontal movements are predicted to be about 3.3mm towards the proposed basement at the edge of the excavation, decreasing to zero by 9m away from the subject site.

For the access stairs to No. 80 Malden Road, the vertical movements are predicted to be about 0.85mm (settlement) at the edge of the excavation, and about 1.65mm (settlement) at the northern edge of the stairs.



Horizontal movements are predicted to decrease from about 3.3mm at edge of the excavation, to about 2.7mm (both towards the excavation) at the northern edge.

4.2 Long-term movements caused by excavation of basement at No. 78

The tabular output from the XDISP analysis is attached (Fig. Q1–TAB, Appendix B). The movements at selected points along each line, along with the estimated damage categories, are summarised in the table below:

| | | Approx. horizontal | movements (mm) | Approx. vertica | Maximum | |
|----------------------|-----------|--------------------|-----------------|-----------------|--------------------|------------|
| Line number | Figure | Closest elevation | Furthest | Closest | Furthest | DAMAGE |
| | reference | to excavation | elevation from | elevation to | elevation from | CATEGORY |
| | | | excavation | excavation | excavation | |
| Line 1 (No. 78/76 | Q1-L1 | 1.15 (resultant | 0.00 | 0.73 | 0.01 (settlement) | Negligible |
| party wall) | | movement | | (settlement) | | (0) |
| | | towards | | | | |
| | | excavation) | | | | |
| Line 2 (No. 76 front | Q1-L2 | 1.15 (resultant | 0.09 (resultant | 0.73 | 0.008 (settlement) | Negligible |
| elevation) | | movement | movement | (settlement) | | (0) |
| | | towards | towards | | | |
| | | excavation) | excavation) | | | |
| Line 5 (No. 80 front | Q1-L5 | 2.95 (resultant | 0.70 (resultant | 1.14 | 0.17 (settlement) | Negligible |
| elevation) | | movement | movement | (settlement) | | (0) |
| | | towards | towards | | | |
| | | excavation) | excavation) | | | |
| Line 6 (No. 78/80 | Q1-L6 | 2.95 (resultant | 0.00 | 1.14 | 0.01 (settlement) | Negligible |
| party wall) | | movement | | (settlement) | | (0) |
| | | towards | | | | |

With regards to the adjacent highway (Malden Road), in the long term the vertical displacements are predicted to be about 0.27mm at the edge of the proposed basement, reducing to zero by about 9m away from the excavation. The maximum vertical displacements are predicted to be about 1.4mm (settlement), occurring about 1.75m away from the edge of the excavation. Horizontal movements are the same as those predicted in the short-term model.

For the access stairs to No. 80 Malden Road, the vertical movements are predicted to be about 0.85mm (settlement) at the edge of the excavation, and about 1.65mm (settlement) at the northern edge of the stairs. Horizontal movements are the same as those for the short-term case.

5 Summary of ground movements

A summary of the estimated damage categories caused by the excavation of the basement at No. 78 Malden Road is shown in the tables below:

End of Construction (short-term condition)

| Building | Estimated Damage Categories |
|----------------|-----------------------------------|
| 76 Malden Road | Negligible (0) |
| 78 Malden Road | Negligible (0) |



| Building | Estimated Damage Categories |
|----------------|-----------------------------------|
| 76 Malden Road | Negligible (0) |
| 78 Malden Road | Negligible (0) |

6 Conclusion

The analysis assumes good quality working practice and that a "robust" level of propping is employed.

A formal monitoring system should be employed during construction in order to observe and monitor ground movements, especially in critical areas such as boundaries and with the neighbouring properties. Monitoring data should be checked against predefined trigger limits to give early indications of any deviating or excessive ground movements.

Yours faithfully,

J N Race MSc CGeol

M Stevensor

M W Stevenson MICE

Thomas Lees MSci MSc CGeol FGS (Signed)

(Countersigned) For and on behalf of Southern Testing Laboratories Limited

(Countersigned)

cc: <u>architect@projectionarchitects.com</u>

Attachments: Appendix A – Drawings, Appendix B – Pdisp & Xdisp Analysis Outputs



APPENDIX A

Drawings



| | | 1 | | | 1 | | | | |
|-------|---|---|-----------------------|----------------------------|----|-----|--|--|--|
| | | 1 | 1 | 1 | I | 1.1 | | | |
| | -5 | 1 | | 1 | 1 | 1 | | | |
| | -10 | -5 | 0 | x 5 | 10 | 15 | | | |
| NB: | Dimensions and loadin | gs based on structural engineer's drawii | ngs. | | | | | | |
| Site: | 78 Malden Road, London, NW5 4DA Fig No: A | | | | | | | | |
| Date: | 17 January 2018 | | General arrangement o | f structures, and proposed | | | | | |
| | Southern Testing | Southern Testing: Keeble House, Stuart Wa ST Consult: Twigden Barns, Brixworth R | basement excavation. | | | | | | |

APPENDIX B

PDisp and XDisp Analysis Outputs

78 Malden Road London, NW5 4DA U1 - undrained vertical movements

30.00

25.00

20.00

15.00



0.00



1

Fig U1













78 Malden Road London, NW5 4DA V1 - drained vertical movements

30.00

25.00

20.00

15.00

10.00

5.000

.0

-5.000

-10.00

-15.00

Scale x 1:255 y 1:255 Contour Interval: 1mm

[ш] Х



5.000

X [m]

Fig V1

-5.000

15.00

























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London NW5 4DA

X1 - short term movements

| Job No. | Sheet No. | Rev. | | |
|----------------|---------------------|---------|--|--|
| J13124 | | | | |
| Drg. Ref. | | | | |
| Made by TRL | Date 11-Jan-2018 | Checked | | |

Utility Strain Calculation Options

Neglect beneficial contribution of axial strains : No

Specific Building Damage Results - Horizontal Displacements

| Structure: Party Wall (78/76) Sub-structure: Sub 1 | | | | | | | | |
|--|---------|---------|----------|----------|----------|----------|---|---|
| Dist. Coordinates | | | | | | Dis | splacements | |
| | | x | У | z | x | У | Horizontal displacement along the | Horizontal displacement perpendicular |
| | [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | [mm] |
| | 0.0 | 0.20000 | 13,15000 | -0.98000 | 1.1266 | 0.24299 | -0.24299 | 1.1266 |
| | 0.54792 | 0.20000 | 12.60208 | -0.98000 | 0.87880 | 0.35688 | -0.35688 | 0.87880 |
| | 1.0958 | 0.20000 | 12.05417 | -0.98000 | 0.66966 | 0.43624 | -0.43624 | 0.66966 |
| | 1.6438 | 0.20000 | 11.50625 | -0.98000 | 0.50107 | 0.48280 | -0.48280 | 0.50107 |
| | 2.1917 | 0.20000 | 10.95833 | -0.98000 | 0.40233 | 0.53521 | -0.53521 | 0.40233 |
| | 2.7396 | 0.20000 | 10.41042 | -0.98000 | 0.32484 | 0.55654 | -0.55654 | 0.32484 |
| | 3.2875 | 0.20000 | 9.86250 | -0.98000 | 0.26072 | 0.54965 | -0.54965 | 0.26072 |
| | 3.8354 | 0.20000 | 9.31458 | -0.98000 | 0.20724 | 0.52059 | -0.52059 | 0.20724 |
| | 4.3833 | 0.20000 | 8.76667 | -0.98000 | 0.16221 | 0.47409 | -0.47409 | 0.16221 |
| | 4.9313 | 0.20000 | 8.21875 | -0.98000 | 0.12393 | 0.41374 | -0.41374 | 0.12393 |
| | 5.4792 | 0.20000 | 7.67083 | -0.98000 | 0.091070 | 0.34230 | -0.34230 | 0.091070 |
| | 6.0271 | 0.20000 | 7.12292 | -0.98000 | 0.062621 | 0.26188 | -0.26188 | 0.062621 |
| | 6.5750 | 0.20000 | 6.57500 | -0.98000 | 0.037788 | 0.17413 | -0.17413 | 0.037788 |
| | 7.1229 | 0.20000 | 6.02708 | -0.98000 | 0.015947 | 0.080318 | -0.080318 | 0.015947 |
| | 7.6708 | 0.20000 | 5.47917 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 8.2188 | 0.20000 | 4.93125 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 8.7667 | 0.20000 | 4.38333 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 9.3146 | 0.20000 | 3.83542 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 9.8625 | 0.20000 | 3.28750 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 10.410 | 0.20000 | 2.73958 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 10.958 | 0.20000 | 2.19167 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 11.506 | 0.20000 | 1.64375 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 12.054 | 0.20000 | 1.09583 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 12.602 | 0.20000 | 0.54792 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 |
| | 12 150 | 0 20000 | 0 00000 | -0 99000 | 0.0 | 0.0 | 0.0 | 0.0 |

Structure: No 76 Front Elevation | Sub-structure: Sub 2

| Dist. | ist. Coordinates | | | Displacements | | | | | |
|---------|------------------|----------|----------|---------------|-----------|---|---|--|--|
| | x | У | z | x | У | Horizontal displacement along the | Horizontal displacement perpendicular | | |
| | | | | | | Line | to Line | | |
| [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | [mm] | | |
| 0.0 | 0.20000 | 13.15000 | -0.98000 | 1.1266 | 0.24299 | -1.1266 | -0.24299 | | |
| 0.52727 | -0.32727 | 13.15000 | -0.98000 | 1.0934 | 0.18751 | -1.0934 | -0.18751 | | |
| 1.0545 | -0.85455 | 13.15000 | -0.98000 | 1.0337 | 0.14689 | -1.0337 | -0.14689 | | |
| 1.5818 | -1.38182 | 13.15000 | -0.98000 | 0.95654 | 0.11595 | -0.95654 | -0.11595 | | |
| 2.1091 | -1.90909 | 13.15000 | -0.98000 | 0.86754 | 0.091646 | -0.86754 | -0.091646 | | |
| 2.6364 | -2.43636 | 13.15000 | -0.98000 | 0.77008 | 0.072063 | -0.77008 | -0.072063 | | |
| 3.1636 | -2.96364 | 13.15000 | -0.98000 | 0.66640 | 0.055960 | -0.66640 | -0.055960 | | |
| 3.6909 | -3.49091 | 13.15000 | -0.98000 | 0.55801 | 0.042490 | -0.55801 | -0.042490 | | |
| 4.2182 | -4.01818 | 13.15000 | -0.98000 | 0.44597 | 0.031060 | -0.44597 | -0.031060 | | |
| 4.7455 | -4.54545 | 13.15000 | -0.98000 | 0.33104 | 0.021241 | -0.33104 | -0.021241 | | |
| 5.2727 | -5.07273 | 13.15000 | -0.98000 | 0.21380 | 0.012717 | -0.21380 | -0.012717 | | |
| 5.8000 | -5.60000 | 13.15000 | -0.98000 | 0.094679 | 0.0052482 | -0.094679 | -0.0052482 | | |
| | | | | | | | | | |

Structure: No 80 Front Elevation | Sub-structure: Sub 3

| | Dist. | Co | ordinates | 3 | Displacements | | | | | |
|---|------------|----------------|-----------------|-----------------|---------------|----------------|---|---|--|--|
| | | x | У | z | x | У | Horizontal displacement along the | Horizontal displacement perpendicular | | |
| | | | | | | | Line | to Line | | |
| | [m] 0.0 | [m] 6.00000 | [m] 13.15000 | [m] -0.98000 | [mm] 0.0 | [mm] 2.9850 | [mm] 0.0 | [mm] 2.9850 | | |
|) | 0.52727 | 6.52727 | 13.15000 | -0.98000 | -0.32899 | 1.4328 | -0.32899 | 1.4328 | | |
| | 1.0545 | 7.05455 | 13.15000 | -0.98000 | -0.69072 | 0.75385 | -0.69072 | 0.75385 | | |
| | 1.5818 | 7.58182 | 13.15000 | -0.98000 | -0.97695 | 0.49691 | -0.97695 | 0.49691 | | |
| | 2.1091 | 8.10909 | 13.15000 | -0.98000 | -1.0995 | 0.35491 | -1.0995 | 0.35491 | | |
| | 2.6364 | 8.63636 | 13.15000 | -0.98000 | -1.1291 | 0.26453 | -1.1291 | 0.26453 | | |
| | 3.1636 | 9.16364 | 13.15000 | -0.98000 | -1.1072 | 0.20281 | -1.1072 | 0.20281 | | |
| | 3.6909 | 9.69091 | 13.15000 | -0.98000 | -1.0544 | 0.15827 | -1.0544 | 0.15827 | | |
| | 4.2182 | 10.21818 | 13.15000 | -0.98000 | -0.98195 | 0.12473 | -0.98195 | 0.12473 | | |
| | 4.7455 | 10.74545 | 13.15000 | -0.98000 | -0.89619 | 0.098611 | -0.89619 | 0.098611 | | |
| | 5.2727 | 11.27273 | 13.15000 | -0.98000 | -0.80108 | 0.077720 | -0.80108 | 0.077720 | | |
| | 5 9000 | 11 90000 | 12 15000 | -0 09000 | -0 60014 | 0 060642 | -0 69914 | 0 060642 | | |

Structure: Party Wall (78/80) | Sub-structure: Sub 4

| Diet | | "oordinat | | Displacements | | | | | |
|----------|----------|------------|-------------|---------------|-----------|--------------|-----------------|--|--|
| Disc. | ` | | - | | | Uspiacements | , Nonisentel | | |
| | ~ | Ŷ | 2 | * | Ŷ | digplagement | dignlagement | | |
| | | | | | | along the | nerpendicular | | |
| | | | | | | along the | perpendicular | | |
| [m] | [m] | [m] | [m] | [| [mm] | [mm] | [mm] | | |
| | 6 00000 | 12 15000 | _0 99000 | 0.0 | 2 9950 | _2 9950 | [[[[]] | | |
| 0 54792 | 6 00000 | 12 60209 | -0.98000 | 0.0 | 2.5050 | -2.5050 | 0.0 | | |
| 1.0958 | 6.00000 | 12.05417 | -0.98000 | 0.0 | 2.5741 | -2.5741 | 0.0 | | |
| 1.6438 | 6.00000 | 11.50625 | -0.98000 | 0.0 | 2.3686 | -2.3686 | 0.0 | | |
| 2.1917 | 6.00000 | 10.95833 | -0.98000 | 0.0 | 2.1631 | -2.1631 | 0.0 | | |
| 2.7396 | 6.00000 | 10.41042 | -0.98000 | 0.0 | 1,9577 | -1.9577 | 0.0 | | |
| 3.2875 | 6.00000 | 9.86250 | -0.98000 | 0.0 | 1.7522 | -1.7522 | 0.0 | | |
| 3.8354 | 6.00000 | 9.31458 | -0.98000 | 0.0 | 1.5467 | -1.5467 | 0.0 | | |
| 4.3833 | 6.00000 | 8.76667 | -0.98000 | 0.0 | 1.3412 | -1.3412 | 0.0 | | |
| 4.9313 | 6.00000 | 8.21875 | -0.98000 | 0.0 | 1.1358 | -1.1358 | 0.0 | | |
| 5.4792 | 6.00000 | 7.67083 | -0.98000 | 0.0 | 0.93031 | -0.93031 | 0.0 | | |
| 6.0271 | 6.00000 | 7.12292 | -0.98000 | 0.0 | 0.72484 | -0.72484 | 0.0 | | |
| 6.5750 | 6.00000 | 6.57500 | -0.98000 | 0.0 | 0.51937 | -0.51937 | 0.0 | | |
| 7.1229 | 6.00000 | 6.02708 | -0.98000 | 0.0 | 0.31391 | -0.31391 | 0.0 | | |
| 7.6708 | 6.00000 | 5.47917 | -0.98000 | 0.0 | 0.10844 | -0.10844 | 0.0 | | |
| 8.2188 | 6.00000 | 4.93125 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 8.7667 | 6.00000 | 4.38333 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 9.3146 | 6.00000 | 3.83542 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 9.8625 | 6.00000 | 3.28750 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 10.410 | 6.00000 | 2.73958 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 10.958 | 6.00000 | 2.19167 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 11.506 | 6.00000 | 1.64375 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 12.054 | 6.00000 | 1.09583 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| 12.602 | 6.00000 | 0.54/92 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | | |
| Specific | Building | Damage R | esults - Ve | ertical | Displacer | nents | | | |
| Structu | re: Part | y Wall (7) | 3/76) Si | ub-st: | ructure: | Sub 1 | | | |
| 2180. | × | v | Z 2 | 7 | proprace | | | | |
| [m] | [m] | [m] | [m] | [m | n] | | | | |
| Vertical | l Offset | 1 | | | | | | | |
| 0.0 | 0.20000 | 13.15000 | -0.98000 | 0.8 | 4112 | | | | |
| 0.54792 | 0.20000 | 12.60208 | -0.98000 | 0.7 | 4493 | | | | |
| 1.0958 | 0.20000 | 12.05417 | -0.98000 | 0.6 | 4308 | | | | |
| 1.6438 | 0.20000 | 11.50625 | -0.98000 | 0.5 | 3932 | | | | |
| 2.1917 | 0.20000 | 10.95833 | -0.98000 | 0.4 | 7144 | | | | |
| 2.7396 | 0.20000 | 10.41042 | -0.98000 | 0.3 | 9430 | | | | |

Fig X1-TAB

SOUTHERN TESTING LABORATORIES

| Job No. | Sheet No. | Rev. |
|----------------|---------------------|---------|
| J13124 | | |
| Drg. Ref. | | |
| Made by TRL | Date 11-Jan-2018 | Checked |
| | | |

London NW5 4DA

78 Malden Road

X1 - short term movements

| Diet | Coordinate | | Dignlagements | | | | | | | |
|----------------------------|--------------------------------|-----------------|-------------------------------|-----------------------|-------------------------|---------------------|-------------------------|-----------------------------|------------------------|--------------------|
| [m] [r | t y | z | Z | | | | | | | |
| | | | | | | | | | | |
| 3.2875 0.20 | 0000 9.86250 0000 9.31458 | -0.98000 | 0.31189 0.23257 | | | | | | | |
| 4.3833 0.20 | 0000 8.76667 0000 8.21875 | -0.98000 | 0.16299 0.10755 | | | | | | | |
| 5.4792 0.20 | 0000 7.67083 0000 7.12292 | -0.98000 | 0.067969 0.043010 | | | | | | | |
| 6.5750 0.20 7.1229 0.20 | 0000 6.57500 0000 6.02708 | -0.98000 | 0.028333 0.016367 | | | | | | | |
| 7.6708 0.20 | 0000 5.47917 0000 4.93125 | -0.98000 | 0.0 | | | | | | | |
| 8.7667 0.20 | 0000 4.38333 0000 3.83542 | -0.98000 | 0.0 | | | | | | | |
| 9.8625 0.20 | 0000 3.28750 0000 2.73958 | -0.98000 | 0.0 | | | | | | | |
| 10.958 0.20 | 0000 2.19167 0000 1.64375 | -0.98000 | 0.0 | | | | | | | |
| 12.054 0.20 | 0000 1.09583 | -0.98000 | 0.0 | | | | | | | |
| 13.150 0.20 | 0.0000 0.00000 | -0.98000 | 0.0 | | | | | | | |
| Structure: 1 | No 76 Front E | levation | Sub-structure: Sub | 2 | | | | | | |
| Dist. | Coordinat | es | Displacements | | | | | | | |
| 2 [m] [r | c y n] [m] | z [m] | z [mm] | | | | | | | |
| Vertical Of | set 1 | | | | | | | | | |
| 0.0 0.1 | 20000 13.1500 | 0 -0.98000 | 0.84112 | | | | | | | |
| 1.0545 -0.8 | 35455 13.1500 88182 13.1500 | 0 -0.98000 | 0.63128 | | | | | | | |
| 2.1091 -1.9 | 0909 13.1500 | 0 -0.98000 | 0.38708 | | | | | | | |
| 3.1636 -2.9 | 6364 13.1500 9091 13.1500 | 0 -0.98000 | 0.18997 | | | | | | | |
| 4.2182 -4.0 | 1818 13.1500 | 0 -0.98000 | 0.075189 | | | | | | | |
| 5.2727 -5.0 | 07273 13.1500 50000 13 1500 | 0 -0.98000 | 0.030357 | | | | | | | |
| | | | | | | | | | | |
| Structure: 1 | No 80 Front E | levation | Sub-structure: Sub | 3 | | | | | | |
| Dist. | Coordinate v | es z | Displacements z | | | | | | | |
| [m] [r | - y n] [m] | [m] | [mm] | | | | | | | |
| Vertical Of | set 1 | 0 _0 00000 | 1 4991 | | | | | | | |
| 0.52727 6. | 52727 13.1500 | 0 -0.98000 | 0.89689 | | | | | | | |
| 1.5818 7. | 58182 13.1500 | 0 -0.98000 | 0.88029 | | | | | | | |
| 2.6364 8.0 | 53636 13.1500 6264 12 1500 | 0 -0.98000 | 0.86318 | | | | | | | |
| 3.6909 9.6 | 59091 13.1500 | 0 -0.98000 | 0.66875 | | | | | | | |
| 4.7455 10. | 74545 13.1500 | 0 -0.98000 | 0.42341 | | | | | | | |
| 5.8000 11.8 | 30000 13.1500 | 0 -0.98000 | 0.21550 | | | | | | | |
| Structure: | Party Wall /" | 8/801 0. | h-structure: Out / | | | | | | | |
| Diet | Coordinate | 6/60) Su | Displacements | | | | | | | |
| Jist. | y y | z | z | | | | | | | |
| | nj [m] | [m] | [mm] | | | | | | | |
| Vertical Off 0.0 6.00 | set 1 | -0.98000 | 1.4881 | | | | | | | |
| 1.0958 6.00 | 0000 12.60208 | -0.98000 | 1.5887 | | | | | | | |
| 1.6438 6.00 | 0000 11.50625 0000 10.95833 | -0.98000 | 1.4701 1.2880 | | | | | | | |
| 3.2875 6.00 | 0000 10.41042 0000 9.86250 | -0.98000 | 0.84900 | | | | | | | |
| 3.8354 6.00 | 0000 9.31458 0000 8.76667 | -0.98000 | 0.63675 | | | | | | | |
| 4.9313 6.00 | 0000 8.21875 0000 7.67083 | -0.98000 | 0.18661 | | | | | | | |
| 6.0271 6.00 | 0000 7.12292 0000 6.57500 | -0.98000 | 0.11182 0.068003 | | | | | | | |
| 7.1229 6.00 | 0000 6.02708 0000 5.47917 | -0.98000 | 0.043291 0.020530 | | | | | | | |
| 8.2188 6.00 | 0000 4.93125 0000 4.38333 | -0.98000 | 0.0 | | | | | | | |
| 9.3146 6.00 | 0000 3.83542 0000 3.28750 | -0.98000 | 0.0 | | | | | | | |
| 10.410 6.00 | 0000 2.73958 0000 2.19167 | -0.98000 | 0.0 | | | | | | | |
| 11.506 6.00 | 0000 1.64375 0000 1.09583 | -0.98000 | 0.0 | | | | | | | |
| 12.602 6.00 | 0000 0.54792 0.0000 0.00000 | -0.98000 | 0.0 | | | | | | | |
| | | | | | | | | | | |
| Specific Buil | ding Damage R | esults - All | Segments | | | | | | | |
| Structure: 1 | arty Wall (7 | 8/76) Su | b-structure: Sub 1 | | | | | | | |
| Vertical Of | set Segm | ent S | tart Length Curvat | ure Deflectio | on Average | Max | Max Gradient | Max Gradient | Min | Damage |
| from Line i Vertical | or | | | Ratio | Horizonta Strain | l Tensile Strain | of Horizontal | of Vertical Displacement | Radius of Curvature | Category |
| Movement Calculation | ns | | | | | | Displacement Curve | Curve | | |
| [m] 0.0 | | 1 | [m] [m] 0.0 0.77633 Saggin | [%] g 213.56F | [%] -6 -0.01893 | [%] 2 0.0037884 | 1 207.90E-6 | 185.92E-6 | [m] 45485 | n |
| | | 2 0 | 77633 1.6456 Hogain | g 0.00147 | 05 -0.009370 | 9 0.0020630 |) 144.87E-6 | 189.39E-6 | 19875 | (Negligible) |
| | | 3 2 | .4220 0.65204 Saggin | g 238.59E | -6 -0.001251 | 2 287.21E-6 | 5 38.932E-6 | 150.40E-6 | 72261. | (Negligible) |
| | | 4 3 | .0740 1.8572 Hoggin | g 780.65E | -6 0.007462 | 3 0.0075352 | 2 -130.37E-6 | 150.40E-6 | 19862. | (Negligible) |
| Tensile hor: | izontal strain | ns are +ve | , compressive horizo | ntal strains | are -ve. | | | | | (Negligible) |
| | | | | | | | | | | |
| Structure: 1 | No 76 Front E | levation | Sub-structure: Sub | 2 | | | | | | |
| Vertical Off from Line | set Segm or | ent St | art Length Curvatur | a Deflection Ratio | Average Horizontal ? | Max Ma Tensile | ax Gradient Ma of of | x Gradient Vertical Rad | Min lius of | Damage Category |
| Vertical Movement | | | | | Strain | Strain H | Horizontal Di | splacement Curve | rvature | |
| Calculation | ıs | r | m] [m] | F % 1 | 16.1 | 16.1 | Curve | curve | [| |
| 0.0 | | 1 | 0.0 1.4455 Sagging | 0.0011201 | 0.010384 | 0.010546 | -146.26E-6 | 235.04E-6 | 10793. | 0 |
| | | 2 1. | 4455 2.2454 Hogging | 0.0017132 | 0.018637 | 0.018830 | -212.45E-6 | 235.04E-6 | (N | egiigible) 0 |
| Tensile hor: | izontal strai | ns are +ve | , compressive horizo | ntal strains | are -ve. | | | | (Ne | eyiigiblê) |
| Structure: ' | IO 80 Front P | levation | Sub-structure: Cub | 3 | | | | | | |
| Vertical of | so ou front E. | revation | ant Longth Committee | o Dofloati | 10000000 | Mar | lay Oradiant . | ay Gradient | Min | Damage |
| from Line | lor segmi | ent St | art bengin Curvatur | Ratio | Horizontal | Tensile | of o | f Vertical Ra | adius of | Category |
| Vertical | | | | | Strain | strain | Horizontal D | isplacement Cu | irvature | |

Fig X1-TAB



SOUTHERN TESTING LABORATORIES

| 78 Malden Road | |
|-----------------|--|
| l ondon NW5 4DA | |

X1 - short term movements

| Job No. | Sheet No. | Rev. |
|-----------|-------------|---------|
| J13124 | | |
| Drg. Ref. | | |
| Nade by | Date | Checked |
| RL | 11-Jan-2018 | |

| [m] | | | [m] [m] | | [%] | [%] | [%] | Curve | | [m] | | |
|--|---|--|--|---|--|--|--|---|---|---|--|---|
| 0.0 | | 1 | 0.0 1.581 | 6 Hogging | 0.024578 | 8 -0.061762 | 0.019753 | 686.52E-6 | 0.0011219 | 484.52 | (Negligible | D) |
| | | 2 | 4.2349 1 665 | 1 Hogging | 922 120 4 | 6 0 017004 | 0.017969 | -193 298-F | 232.98E-6 | 4934.1 | (Negligible |) D |
| horizo | ontal strai | ins are · | ve, compress | ive horizont | al strain: | s are -ve. | 0.017900 | -193.292-0 | 232.246-0 | 14909. | (Negligible |) |
| | | | | | | | | | | | | |
| ture: Par | ty Wall (" | 78/80) | Sub-structur | e: Sub 4 | | | | a | | M / | B | |
| n Line for Frical Nertical | t Segn | nent | Start Lengt | h Curvature | Ratio | n Average Horizontal Strain | Max Max Tensile Strain Ho Dis | Gradient M of o rizontal D | ax Gradient f Vertical isplacement Curve | Min Radius of Curvature | Damage Category | |
| [m] | | | [m] [m] | | [%] | [%] | [%] | Curve | | [m] | | |
| 0.0 | | 1 | 0.0 3.006 | 8 Sagging | 0.0096899 | 9 0.037500 | 0.040401 - | 374.86E-6 | 408.06E-6 | 2003.1 | 0 (Negligible) | |
| le horizo | ntal strai | 2 | 3.0068 3.020 | 3 Hogging | 0.004132 | 7 0.037500 | 0.038126 - | 374.86E-6 | 408.06E-6 | 7986.3 | 0 (Negligible) | |
| iie noiizo | iitai stiai | ina are | ve, compress | ive norizone | ai sciain, | s are -ve. | | | | | | |
| ific Buildin | g Damage I | Results - | Critical Values | for All Segme | nts within | Each Sub-Stru | cture | | | | | |
| | | | 7. h h | and the second | | | | | | | | |
| rtical D | eflection | Average | Sub-structur | e: Sub I | Max | Max Gradient | Max Gradien | + Min | Min | Damage Cal | egory | |
| et from ne for rtical vement | Ratio | Horizoni Strain | al | Settlement | Tensile Strain | of Horizontal Displacement Curve | of Vertical Displacemen Curve | Radius of Curvature (Hogging) | Radius of Curvature (Sagging) | Damage Ca | Legol y | |
| [m] 0.0 | [%] 0.0014705 | [%] -0.018 | 932 189.39E-6 | [mm] 0.84112 | [%] 0.0075352 | 207.90E-6 | 189.39E- | [m] 6 19862. | [m] 45485. 0 | (Negligib) | le) | |
| ture: No | 76 Front H | Elevation | n Sub-struc | ture: Sub 2 | | | | | | | | |
| ertical D | eflection | Average | Max Slope | Max | Max 1 | Max Gradient | Max Gradient | Min | Min | Damage Cate | egory | |
| et from ne for rtical vement | Ratio | Horizon Strain | :al 1 | Settlement | Tensile Strain I | of Horizontal Displacement Curve | of Vertical Displacement Curve | Radius of Curvature (Hogging) | Radius of Curvature (Sagging) | | | |
| n] .0 | [%] 0.0017132 | [%] 0.018 | 537 235.04E-6 | [mm] 0.84112 | [%] 0.018830 | -212.45E-6 | 235.04E-6 | [m] 13513. | [m] 10793. 0 | (Negligible | e) | |
| ure: No | 80 Front H | Elevation | n Sub-struc | ture: Sub 3 | | | | | | | | |
| ertical D | Peflection | Average | Max Slope | Max | Max 1 | Max Gradient | Max Gradient | Min Radius of | Min Radius of | Damage Cate | egory | |
| ne for | Racio | Strain | 1 | Secciement | Strain | Horizontal | Displacement | Curvature (Hogging) | Curvature (Sagging) | | | |
| tigal | | | | | | propracement | Curve | (nogging) | (pagging) | | | |
| tical ement lations | | | | | | Curve | | | | | | |
| tical ement lations m] .0 | [%] 0.024578 | [%] -0.061 | 762 0.0011219 | [mm] 1.4881 | [%] 0.019753 | Curve | 0.0011219 | [m] 484.52 | [m] 4934.1 0 | (Negligible | e) | |
| rtical vement ulations [m] 0.0 | [%] 0.024578 | [%] -0.061 | 762 0.0011219 | [mm] 1.4881 | [%] 0.019753 | Curve 686.52E-6 | 0.0011219 | [m] 484.52 | [m] 4934.1 0 | (Negligible | e) | |
| rement lations m] 0 eture: Par | [%] 0.024578 ty Wall (7 Deflection | [%] -0.061 78/80) Average | 762 0.0011219 Sub-structur | [mm] 1.4881 e: Sub 4 Max | [%] 0.019753 Max 7 | Curve 686.52E-6 Max Gradient | 0.0011219 Max Gradient | [m] 484.52 Min | [m] 4934.1 0 Min | (Negligible | e) | |
| rtical vement ulations [m] 0.0 cture: Par rtical D et from ne for | [%] 0.024578 ty Wall (7 Deflection Ratio | [%] -0.061 78/80) Average Horizont Strain | 762 0.0011219 Sub-structur Max Slope al | [mm] 1.4881 e: Sub 4 Max Settlement | [%] 0.019753 Max P Tensile Strain | Curve 686.52E-6 Max Gradient of Horizontal | 0.0011219 Max Gradient of Vertical Displacement | [m] 484.52 Min Radius of Curvature | [m] 4934.1 0 Min Radius of Curvature | (Negligible Damage Cate | e) egory | |
| cical mment ations 1] 0 cure: Par cical D c from a for cical mment | [%] 0.024578 ty Wall (7 Deflection Ratio | [%] -0.061' 78/80) Average Horizont Strain | 762 0.0011219 Sub-structur Max Slope cal | [mm] 1.4881 e: Sub 4 Max Settlement | [%] 0.019753 Max M Tensile Strain I | Curve 686.52E-6 Max Gradient of Horizontal Displacement Curve | 0.0011219 Max Gradient of Vertical Displacement Curve | [m] 484.52 Min Radius of Curvature (Hogging) | [m] 4934.1 0 Min Radius of Curvature (Sagging) | (Negligible Damage Cate | e) egory | |
| cical mment lations a] .0 cure: Par cical D c from a for cical mment lations a] | [%] 0.024578 ty Wall (7 Ratio | [%] -0.061 78/80) Average Horizon Strain | Sub-structur Max Slope al | [mm] 1.4881 e: Sub 4 Max Settlement | [%] 0.019753 Max 1 Tensile Strain I | Curve 686.52E-6 Max Gradient of Horizontal Displacement Curve | 0.0011219 Max Gradient of Vertical Displacement Curve | [m] 484.52 Min Radius of Curvature (Hogging) | [m] 4934.1 0 Min Radius of Curvature (Sagging) | (Negligible | e) egory | |
| tical ement lations a] .0 ture: Par tical D t from a for tical sment lations a] .0 | [%] 0.024578 ty Wall (7 Peflection Ratio [%] 0.0096899 | [%] -0.061' 78/80) Average Horizons Strain [%] 0.037! | 762 0.0011219 Sub-structur Max Slope cal | [mm] 1.4881 e: Sub 4 Max Settlement [mm] 1.6080 | [%] 0.019753 Max P Tensile Strain I [%] 0.040401 | Curve 686.52E-6 Max Gradient of Horizontal Displacement Curve -374.86E-6 | 0.0011219 Max Gradient of Vertical Displacement Curve 408.06E-6 | [m] 484.52 Min Radius of Curvature (Hogging) [m] 7986.3 | [m] 4934.1 0 Min Radius of Curvature (Sagging) [m] 2003.1 0 | (Negligible Damage Cate (Negligible | e) agory e) | |
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| rtical vement ulations [m] 0.0 cture: Par rtical D et from refor rtical D et from refor rtical D me for rtical D wement ulations (m) 0.0 cture Name y Wall 76) 0 Front ation y Wall 80) | <pre>[%] 0.024578 0.024578 (%] closed and an an</pre> | [%] -0.0617 78/80) Average Horizoni Strain (%] 0.0379 Results - meter (%) Results - meter (%) Constraint (%) | AC2 0.0011219 Sub-structur Max Slope al Sub-structur Critical Segme Critical Segme Sub-structur Sub 1 Sub 1 Sub 1 Sub 1 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 3 Sub 3 Sub 3 Sub 3 Sub 4 Sub 4 Sub 4 | [mm] 1.4881 e: Sub 4 Max Settlement [mm] 1.6080 nts within Eac Critical re Segment 2 2 1 4 4 4 1 1 2 2 1 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 | [%] 0.019753 Max 1 Tensile 1 Strain 1 0.040401 1 th Structure 1 0.040401 1 th Structure 3 0.017633 0.01 0.07603 0.01 0.010 0.01 0.0114455 0.01 0.02 0.02 0.03 0.04 0.04 0.01 0.01 0.02 0.02 0.03 | Curve 686.52E-6 Max Gradient of Horizontal -374.86E-6 End Curve -374.86E-6 End Curve [m] 2.4220 Hoggi 0.77633 Saggi 1.4255 Saggi 1.4455 Saggi 1.4455 Saggi 1.5816 Hoggi 1.5816 Hoggi 3.0068 Saggi 3.0068 Saggi | 0.0011219 Max Gradient of Vertical Displacement Curve 408.06E-6 | [m] 484.52 Min Radius of Curvatus of Curvatus of Settleme (Rogging) [m] 7986.3 (Rogging) [m] 7986.3 Settleme -6 0.841 -6 0.841 -6 0.344 -6 0.344 -7 | [m] 4934.1 0 Min Radius of Curvature (sagging) [m] 2003.1 0 [m] 2003.1 0 [m] 2003.1 0 [m] 2003.1 0 [%] 47 0.0020630 [2 0.0037884 00 0.0075352 [2 0.0037884 [2 0.010546 [2 0.010546 [3 0.019753 [2 0.010546 [3 0.019753 [3 0.019753 [1 0.019753] [1 0.019753 [1 0.019753 [1 0.019753] | (Negligible Damage Cate (Negligible Min Reduvator (Negligible) (Negligible (Negligible) (Negligibl | <pre>e) min radius of rad</pre> | Damage Category (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) |
| <pre>trical vement ulations [m]0 sture: Par trical p trical p trical p ific Buildin f(n) f(n) f(n) f(n) f(n) f(n) f(n) f(n</pre> | <pre>[%] 0.024578 0.024578 (%] closed and a set of the set of the</pre> | [%] -0.0617 78/80) Average Horizoni Strain 0.0379 Results - meter lement sile lus of re ilement sile lus of re ilement sile lise of re re re re re re re re re re re re re | AC2 0.0011219 Sub-structur Max Slope al Sub Structur Sub 1 Sub 1 Sub 1 Sub 1 Sub 1 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 3 Sub 3 Sub 3 Sub 3 Sub 3 Sub 4 Sub 4 Sub 4 Sub 4 | [mm] 1.4881 e: Sub 4 Max Settlement [mm] 1.6080 nts within Eac Critical re Segment 2 1 4 4 4 4 4 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 1 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 | [%] 0.019753 Max 1 Tensile 1 Strain 1 0.040401 1 th Structure 1 start 1 0.77633 0.0 0.77633 0.0 0.0740 3.0740 3.0740 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 | Curve 686.52E-6 Max Gradient of Horizontal 105placement Curve -374.86E-6 max End Curve End Curve (m) 2.4220 Hoggi 0.77633 Saggi 1.4255 Saggi 1.4455 Saggi 1.4455 Saggi 1.5816 Hoggi 1.5816 Saggi 3.0068 Saggi 3.0068 Saggi 3.0068 Saggi 3.0068 Saggi 3.0068 Saggi 3.0068 Saggi 3.0068 Saggi | 0.0011219 Max Gradient of Vertical Displacement Curve 408.06E-6 ture Max Slo ng 189.39E ng 185.92E ng 150.40E ng 150.40E ng 235.04E ng 235.04E ng 235.04E ng 235.04E ng 0.00112 ng 0.00112 ng 0.00112 ng 0.00112 ng 408.06E | [m] 484.52 Min Radius of Curvature (Hogging) [m] 7986.3 (Hogging) [m] 7986.3 (Hogging) [m] 7986.3 (Hogging) (Hogging) (Hogging) 6 0.841 -7 -6 0.841 -6 0.841 -6 0.841 -6 0.841 -6 0.841 -6 0.841 -6 0.841 -7 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 -8 | [m] 4934.1 0 Min Radius of Curvature (sagging) [m] 2003.1 0 m Max strain 47 0.0020630 12 0.0075352 00 0.0075352 00 0.0075352 00 0.0075352 12 0.010546 12 0.010546 12 0.010546 12 0.010546 12 0.010546 12 0.010546 12 0.010546 13 0.019753 81 0.019753 | (Negligible Damage Cate (Negligible Min Radius of Curvature (Hogging) [m] 19862. 2 19862. 3 - 1 19862. 4 - 1 19862. 5 - 1 19862. 5 - 1 19862. 5 - 1 19863. 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - 5 - | <pre>e) min Radius of Curvature (sagging) [m] - 0 45485.0 - 0 45485.0 10793.0 10793.0 10793.0 10793.0 0 10793.0 0 - 0 10793.0 0 - 0 45485.0 0 10793.0 0 2003.10 2003.10 2003.10</pre> | Damage Category (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) |
| <pre>trical vement ulations [m]0 sture: Par trical D trical D trical D from from from from from from from from</pre> | <pre>[%] 0.024578 (%) colored colored</pre> | [%] -0.0617 78/80) Average Horizoni Strain 0.0379 Results - meter e e e e e e e e e e e e e e e e e e | ACC 0.0011219 Sub-structur Max Slope al Sub 1 Sub 1 Sub 1 Sub 1 Sub 1 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 2 Sub 3 Sub 3 Sub 3 Sub 3 Sub 3 Sub 3 Sub 3 Sub 4 Sub 4 | [mm] 1.4881 e: Sub 4 Max Settlement [mm] 1.6080 nts within Eac Critical re Segment 2 1 4 4 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 2 2 1 1 1 1 1 2 2 1 1 1 1 2 2 1 1 1 1 1 1 1 1 1 1 1 1 1 | [%] 0.019753 Max 1 Tensile 1 Strain 1 0.040401 1 th Structure 1 start 1 0.77633 0.0 0.77633 0.0 0.0740 3.0740 3.0740 0.0 0.0 0.0 | Curve 686.52E-6 Max Gradient of Havizontal Displacement Curve -374.86E-6 End Curva End Curva 1.4220 Hoggi 1.4220 Hoggi 1.4313 Hoggi 1.4455 Saggi 1.4455 Saggi 1.5816 Hoggi 1.5816 Hoggi 1.5817 Hoggi 1.5917 Hogg | 0.0011219 Max Gradient of Vertical Displacement Curve 408.06E-6 ture Max Slo ng 189.39E ng 185.92E ng 150.40E ng 150.40E ng 235.04E ng 235.04E ng 235.04E ng 235.04E ng 0.00112 ng 0.00112 ng 0.00112 ng 0.00112 ng 0.00112 ng 408.06E ng 408.06E ng 408.06E | [m] 484.52 Min Radius of Curvature (Hogging) [m] 7986.3 (Hogging) [m] 7986.3 (Hogging) | [m] 4934.1 0 Min Radiug of Curvature (sagging) [m] 2003.1 0 m Max nt Tensile Strain 47 0.0020630 12 0.0075352 00 0.0075352 00 0.0075352 12 0.0037884 12 0.010546 12 0.010546 12 0.010546 12 0.010546 13 0.019753 81 0.0197 | (Negligible Damage Cate (Negligible Min Redivus of Curvature of Curvature of 19862. 19862. 19862. 19862. 19862. 19862. 19862. 19863. 19863. 19863. 19863. 19863. 19863. 19863. 19863. | <pre>e) min Radius of Curvature (Sagging) [m] - 0 45485.0 - 0 45485.0 10793.0 10793.0 10793.0 10793.0 10793.0 10793.0 - 0 10793.0 0 - 0 10793.0 0 2003.1 0 2003.1 0 2003.1 0 2003.1 0 2003.1 0</pre> | Damage Category (Negligible) |













Oasys

SOUTHERN TESTING LABORATORIES

| 78 | Ma | den | Ro | ad | | |
|-----|-----|------|----|----|---|--|
| Lor | ndo | n NV | ٧5 | 4D | A | |

Q1 - long term movements

| Job No. | Sheet No. | Rev. | | |
|----------------|---------------------|---------|--|--|
| J13124 | | | | |
| Drg. Ref. | L. | | | |
| Made by TRL | Date 11-Jan-2018 | Checked | | |

Utility Strain Calculation Options

Neglect beneficial contribution of axial strains : No

Specific Building Damage Results - Horizontal Displacements

| Structu | Structure: Party Wall (78/76) Sub-structure: Sub 1 | | | | | | | | | | |
|----------|--|------------|------------|-----------|----------|---|---|---|--|--|--|
| Dist. | (| Coordinate | es | | Dis | splacements | | | | | |
| | x | У | z | x | У | Horizontal displacement along the | Horizontal displacement perpendicular | | | | |
| [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | to Line | | | | |
| 0.0 | 0 20000 | 12 15000 | _0 99000 | 1 1 2 6 6 | 0 24200 | _0 24299 | 1 1266 | a | | | |
| 0 54792 | 0.20000 | 12 60209 | -0.98000 | 0 97990 | 0.24299 | -0.25699 | 0 97990 | d | | | |
| 1.0958 | 0.20000 | 12.05417 | -0.98000 | 0.66966 | 0.43624 | -0.43624 | 0.66966 | d | | | |
| 1.6438 | 0.20000 | 11.50625 | -0.98000 | 0.50107 | 0.48280 | -0.48280 | 0.50107 | d | | | |
| 2.1917 | 0.20000 | 10.95833 | -0.98000 | 0.40233 | 0.53521 | -0.53521 | 0.40233 | d | | | |
| 2.7396 | 0.20000 | 10,41042 | -0.98000 | 0.32484 | 0.55654 | -0.55654 | 0.32484 | d | | | |
| 3.2875 | 0.20000 | 9.86250 | -0.98000 | 0.26072 | 0.54965 | -0.54965 | 0.26072 | d | | | |
| 3.8354 | 0.20000 | 9.31458 | -0.98000 | 0.20724 | 0.52059 | -0.52059 | 0.20724 | d | | | |
| 4.3833 | 0.20000 | 8.76667 | -0.98000 | 0.16221 | 0.47409 | -0.47409 | 0.16221 | d | | | |
| 4.9313 | 0.20000 | 8.21875 | -0.98000 | 0.12393 | 0.41374 | -0.41374 | 0.12393 | d | | | |
| 5.4792 | 0.20000 | 7.67083 | -0.98000 | 0.091100 | 0.34230 | -0.34230 | 0.091100 | d | | | |
| 6.0271 | 0.20000 | 7.12292 | -0.98000 | 0.062600 | 0.26188 | -0.26188 | 0.062600 | d | | | |
| 6.5750 | 0.20000 | 6.57500 | -0.98000 | 0.037800 | 0.17413 | -0.17413 | 0.037800 | d | | | |
| 7.1229 | 0.20000 | 6.02708 | -0.98000 | 0.015900 | 0.080300 | -0.080300 | 0.015900 | d | | | |
| 7.6708 | 0.20000 | 5.47917 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 8.2188 | 0.20000 | 4.93125 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 8.7667 | 0.20000 | 4.38333 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 9.3146 | 0.20000 | 3.83542 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 9.8625 | 0.20000 | 3.28750 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 10.410 | 0.20000 | 2.73958 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 10.958 | 0.20000 | 2.19167 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 11.506 | 0.20000 | 1.64375 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 12.054 | 0.20000 | 1.09583 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 12.602 | 0.20000 | 0.54792 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| 13.150 | 0.20000 | 0.00000 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | |
| d - Disp | placement | ts include | e imported | displace | ements. | | | | | | |

Structure: No 76 Front Elevation | Sub-structure: Sub 2

| Dist. | t. Coordinates Displacements | | | | | | | |
|----------|------------------------------|-----------|----------|-----------|------------|----------------|---------------|---|
| | x | У | z | x | У | Horizontal | Horizontal | |
| | | | | | | displacement | displacement | |
| | | | | | | along the | perpendicular | |
| | | | | | | Line | to Line | |
| [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | [mm] | |
| 0.0 | 0.20000 | 13.15000 | -0.98000 | 1.1266 | 0.24299 | -1.1266 | -0.24299 | d |
| 0.52727 | -0.32727 | 13.15000 | -0.98000 | 1.0934 | 0.18751 | -1.0934 | -0.18751 | d |
| 1.0545 | -0.85455 | 13.15000 | -0.98000 | 1.0337 | 0.14689 | -1.0337 | -0.14689 | d |
| 1.5818 | -1.38182 | 13.15000 | -0.98000 | 0.95654 | 0.11595 | -0.95654 | -0.11595 | d |
| 2.1091 | -1.90909 | 13.15000 | -0.98000 | 0.86754 | 0.091600 | -0.86754 | -0.091600 | d |
| 2.6364 | -2.43636 | 13.15000 | -0.98000 | 0.77008 | 0.072100 | -0.77008 | -0.072100 | d |
| 3.1636 | -2.96364 | 13.15000 | -0.98000 | 0.66640 | 0.056000 | -0.66640 | -0.056000 | d |
| 3.6909 | -3.49091 | 13.15000 | -0.98000 | 0.55801 | 0.042500 | -0.55801 | -0.042500 | d |
| 4.2182 | -4.01818 | 13.15000 | -0.98000 | 0.44597 | 0.031100 | -0.44597 | -0.031100 | d |
| 4.7455 | -4.54545 | 13.15000 | -0.98000 | 0.33104 | 0.021200 | -0.33104 | -0.021200 | d |
| 5.2727 | -5.07273 | 13.15000 | -0.98000 | 0.21380 | 0.012700 | -0.21380 | -0.012700 | d |
| 5.8000 | -5.60000 | 13.15000 | -0.98000 | 0.094700 | 0.0052500 | -0.094700 | -0.0052500 | d |
| d - Disp | lacements | s include | imported | displacer | ments. | | | |
| | | | | | | | | |
| | | | | | | | | |
| Structur | re: No 80 | Front Ele | evation | Sub-struc | cture: Sub | 3 | | |
| Diet | | | _ | | Die | nlegements | | |
| Disc. | | Jorumace. | - | | | Ugri sentel | Heni sentel | |
| | * | Ŷ | 2 | * | Ŷ | dignlegement . | Horizontal | |
| | | | | | | displacement (| inspiacement | |
| | | | | | | along the p | perpendicular | |
| | | | | | | Line | to Line | |
| [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | [mm] | |
| 0.0 | 6.00000 | 13.15000 | -0.98000 | 0.0 | 2.9850 | 0.0 | 2.9850 0 | 1 |
| 0.52727 | 6.52727 | 13.15000 | -0.98000 | -0.32899 | 1.4328 | -0.32899 | 1.4328 0 | 1 |
| 1.0545 | 7.05455 | 13.15000 | -0.98000 | -0.69072 | 0.75385 | -0.69072 | 0.75385 0 | d |
| 1.5818 | 7.58182 | 13.15000 | -0.98000 | -0.97694 | U.49691 | -0.97694 | U.49691 d | 1 |

| | 1.5818 | 7.58182 | 13.15000 | -0.98000 | -0.97694 | 0.49691 | -0.97694 | 0.49691 d |
|---|----------|-----------|-----------|----------|-----------|----------|----------|------------|
| | 2.1091 | 8.10909 | 13.15000 | -0.98000 | -1.0995 | 0.35491 | -1.0995 | 0.35491 d |
| | 2.6364 | 8.63636 | 13.15000 | -0.98000 | -1.1291 | 0.26453 | -1.1291 | 0.26453 d |
| | 3.1636 | 9.16364 | 13.15000 | -0.98000 | -1.1072 | 0.20281 | -1.1072 | 0.20281 d |
| | 3.6909 | 9.69091 | 13.15000 | -0.98000 | -1.0544 | 0.15827 | -1.0544 | 0.15827 d |
| | 4.2182 | 10.21818 | 13.15000 | -0.98000 | -0.98195 | 0.12473 | -0.98195 | 0.12473 d |
| | 4.7455 | 10.74545 | 13.15000 | -0.98000 | -0.89619 | 0.098600 | -0.89619 | 0.098600 d |
| | 5.2727 | 11.27273 | 13.15000 | -0.98000 | -0.80108 | 0.077700 | -0.80108 | 0.077700 d |
| | 5.8000 | 11.80000 | 13.15000 | -0.98000 | -0.69914 | 0.060600 | -0.69914 | 0.060600 d |
| ŝ | d - Disp | lacements | s include | imported | displacer | ments. | | |

| Structu | re: Part | y Wall (78 | ructure: | Sub 4 | | | | | | | | |
|------------|----------|------------|------------|--------------|----------|---------------|---------------|---|--|--|--|--|
| Dist. | | Coordinate | es | | | Displacements | | | | | | |
| | x | У | z | x | У | Horizontal | Horizontal | | | | | |
| | | | | | | displacement | displacement | | | | | |
| | | | | | | along the | perpendicular | | | | | |
| | | | | | | Line | to Line | | | | | |
| [m] | [m] | [m] | [m] | [mm] | [mm] | [mm] | [mm] | | | | | |
| 0.0 | 6.00000 | 13.15000 | -0.98000 | 0.0 | 2.9850 | -2.9850 | 0.0 | d | | | | |
| 0.54792 | 6.00000 | 12.60208 | -0.98000 | 0.0 | 2.7795 | -2.7795 | 0.0 | d | | | | |
| 1.0958 | 6.00000 | 12.05417 | -0.98000 | 0.0 | 2.5741 | -2.5741 | 0.0 | d | | | | |
| 1.6438 | 6.00000 | 11.50625 | -0.98000 | 0.0 | 2.3686 | -2.3686 | 0.0 | d | | | | |
| 2.1917 | 6.00000 | 10.95833 | -0.98000 | 0.0 | 2.1631 | -2.1631 | 0.0 | d | | | | |
| 2.7396 | 6.00000 | 10.41042 | -0.98000 | 0.0 | 1.9577 | -1.9577 | 0.0 | d | | | | |
| 3.2875 | 6.00000 | 9.86250 | -0.98000 | 0.0 | 1.7522 | -1.7522 | 0.0 | d | | | | |
| 3.8354 | 6.00000 | 9.31458 | -0.98000 | 0.0 | 1.5467 | -1.5467 | 0.0 | d | | | | |
| 4.3833 | 6.00000 | 8.76667 | -0.98000 | 0.0 | 1.3413 | -1.3413 | 0.0 | d | | | | |
| 4.9313 | 6.00000 | 8.21875 | -0.98000 | 0.0 | 1.1358 | -1.1358 | 0.0 | d | | | | |
| 5.4792 | 6.00000 | 7.67083 | -0.98000 | 0.0 | 0.93031 | -0.93031 | 0.0 | d | | | | |
| 6.0271 | 6.00000 | 7.12292 | -0.98000 | 0.0 | 0.72484 | -0.72484 | 0.0 | d | | | | |
| 6.5750 | 6.00000 | 6.57500 | -0.98000 | 0.0 | 0.51938 | -0.51938 | 0.0 | d | | | | |
| 7.1229 | 6.00000 | 6.02708 | -0.98000 | 0.0 | 0.31391 | -0.31391 | 0.0 | d | | | | |
| 7.6708 | 6.00000 | 5.47917 | -0.98000 | 0.0 | 0.10844 | -0.10844 | 0.0 | d | | | | |
| 8.2188 | 6.00000 | 4.93125 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | | |
| 8.7667 | 6.00000 | 4.38333 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | | |
| 9.3146 | 6.00000 | 3.83542 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | | |
| 9.8625 | 6.00000 | 3.28750 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | d | | | | |
| 10.410 | 6.00000 | 2.73958 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | a | | | | |
| 10.958 | 6.00000 | 2.19167 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | a | | | | |
| 11.506 | 6.00000 | 1.64375 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | a | | | | |
| 12.054 | 6.00000 | 1.09583 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | a | | | | |
| 12.602 | 6.00000 | 0.54792 | -0.98000 | 0.0 | 0.0 | 0.0 | 0.0 | a | | | | |
| 13.150 | 6.00000 | 0.00000 | -0.98000 | 0.0 a aia | 0.0 | 0.0 | 0.0 | a | | | | |
| u - Dist | pracemen | us inciuu | a ruborced | i uisj | pracemen | L8. | | | | | | |
| | | | | | | | | | | | | |
| Constille | D | D | | | D: | | | | | | | |
| Specific | Bununiy | Damaye K | esuns - ve | lucai | Displace | nems | | | | | | |
| | | | | | | | | | | | | |
| Chanadhara | no: Dowb | . Well (7) | 2/76) 0 | .h. at. | | Culo 1 | | | | | | |
| Structu | re. Part | y Wali (70 | 5/70/ 50 | m-sc. | Lucture. | Sub I | | | | | | |
| Dist. | | Coordinate | es | | Displa | cements | | | | | | |
| | x | У | z | 1 | z | | | | | | | |
| [m] | [m] | [m] | [m] | [1 | nm] | | | | | | | |

| [m] | [m] | [m] | [m] | [mm] | |
|----------|----------|----------|----------|-----------|---|
| Vertical | L Offset | 1 | | | |
| 0.0 | 0.20000 | 13.15000 | -0.98000 | 0.73034 0 | d |
| 0.54792 | 0.20000 | 12.60208 | -0.98000 | 0.64469 | đ |
| | | | | | |

Printed 11-Jan-2018

Fig Q1-TAB

Time 14:59

SOUTHERN TESTING LABORATORIES

| Job No. | Sheet No. | Rev. |
|----------------|---------------------|---------|
| J13124 | | |
| Drg. Ref. | | |
| Made by TRL | Date 11-Jan-2018 | Checked |

78 Malden Road London NW5 4DA

Q1 - long term movements

| Dist. | (| Coordinate | s | Displac | cements | | | | | | | |
|--|--|---|--|--|---|---|---|---|--|---|---|---|
| [m] | x [m] | y [m] | z [m] | z [mm] | | | | | | | | |
| 1.0958 | 0.20000 | 12.05417 | -0.98000 | 0.55340 d | | | | | | | | |
| 1.6438 | 0.20000 | 11.50625 | -0.98000 | 0.45959 d | | | | | | | | |
| 2.7396 | 0.20000 | 10.41042 | -0.98000 | 0.33165 d | | | | | | | | |
| 3.8354 | 0.20000 | 9.31458 | -0.98000 | 0.18311 d | | | | | | | | |
| 4.9313 | 0.20000 | 8.21875 | -0.98000 | 0.068054 d | | | | | | | | |
| 6.0271 | 0.20000 | 7.67083 | -0.98000 | 0.032500 d | | | | | | | | |
| 6.5750 | 0.20000 | 6.57500 | -0.98000 | -618.00E-6 d -0.0098400 d | | | | | | | | |
| 7.6708 | 0.20000 | 5.47917 4.93125 | -0.98000 | -0.023880 d | | | | | | | | |
| 8.7667 9.3146 | 0.20000 | 4.38333 3.83542 | -0.98000 | -0.019957 d -0.018319 d | | | | | | | | |
| 9.8625 | 0.20000 | 3.28750 2.73958 | -0.98000 | -0.016859 d -0.015551 d | | | | | | | | |
| 10.958 | 0.20000 | 2.19167 1.64375 | -0.98000 | -0.014378 d -0.013321 d | | | | | | | | |
| 12.054 12.602 | 0.20000 | 1.09583 | -0.98000 | -0.012367 d -0.011503 d | | | | | | | | |
| 13.150 d - Disp | 0.20000 placement | 0.00000 ts include | -0.98000 imported | -0.010719 d displacement | ts. | | | | | | | |
| | | | | | | | | | | | | |
| Structu | re: No 7 | 6 Front El | evation | Sub-structu | re: Sub 2 | | | | | | | |
| Dist. | x | Coordinate y | z | Displaz | acements | | | | | | | |
| [m] | [m] | [m] | [m] | [mm] | | | | | | | | |
| Vertical 0.0 | 0.2000 | 1 0 13.15000 | -0.98000 | 0.73034 | 4 | | | | | | | |
| 0.52727 | -0.3272 | 7 13.15000 | -0.98000 | 0.65506 | 4 | | | | | | | |
| 1.5818 | -1.3818 | 2 13.15000 | -0.98000 | 0.44072 0 | - - - | | | | | | | |
| 2.6364 | -2.4363 | 5 13.15000 5 13.15000 | -0.98000 | 0.22915 0 | 1 | | | | | | | |
| 3.6909 | -3.4909 | 1 13.15000 | -0.98000 | 0.082897 | 1 | | | | | | | |
| 4.7455 | -4.5454 | 5 13.15000 | -0.98000 | 0.015500 | 1 | | | | | | | |
| 5.8000 | -5.6000 | 0 13.15000 | -0.98000 | -0.0081800 d | 1 | | | | | | | |
| u - Diar | pracemen | ca include | imporceu | dispiacement | | | | | | | | |
| Structu | re: No 8 | 0 Front El | evation | Sub-structur | re: Sub 3 | | | | | | | |
| Dist. | | Coordinate | s | Displace | ements | | | | | | | |
| [m] | x [m] | y [m] | z [m] | z [mm] | | | | | | | | |
| Vertical | l Offset | 1 | | | | | | | | | | |
| 0.0 | 6.0000 | 0 13.15000 7 13.15000 | -0.98000 -0.98000 | 1.1410 d 0.62237 d | | | | | | | | |
| 1.0545 | 7.0545 | 5 13.15000 2 13.15000 | -0.98000 -0.98000 | 0.58436 d 0.70954 d | | | | | | | | |
| 2.1091 2.6364 | 8.1090 | 9 13.15000 6 13.15000 | -0.98000 -0.98000 | 0.76497 d 0.75022 d | | | | | | | | |
| 3.1636 3.6909 | 9.1636 | 4 13.15000 1 13.15000 | -0.98000 | 0.68541 d 0.58926 d | | | | | | | | |
| 4.2182 | 10.2181 | B 13.15000 5 13.15000 | -0.98000 | 0.47795 d 0.36475 d | | | | | | | | |
| 5.2727 | 11.2727 | 3 13.15000 0 13.15000 | -0.98000 | 0.25990 d 0.17059 d | | | | | | | | |
| d - Disp | placemen | ts include | imported | displacement | ts. | | | | | | | |
| | | | | | | | | | | | | |
| Structu | re: Part | y Wall (78 | /80) Su | b-structure: | Sub 4 | | | | | | | |
| Structur | re: Part | y Wall (78 Coordinate | /80) Su | b-structure: Displac | Sub 4 | | | | | | | |
| Structus Dist. | re: Part: (x [m] | y Wall (78 Coordinate Y | 8/80) Su s [m] | b-structure: Displac z [mm] | Sub 4 | | | | | | | |
| Dist. [m] | re: Part | y Wall (78 Coordinate y [m] | 8/80) Su 95 [m] | b-structure: Displac z [mm] | Sub 4 | | | | | | | |
| Dist. [m] Vertical 0.0 0 54792 | re: Party x [m] 1 Offset 6.00000 | y Wall (78 Coordinate y [m] 1 13.15000 12.60208 | 8/80) Su ss [m] -0.98000 -0.98000 | b-structure: Displac [mm] 1.1410 d | Sub 4 | | | | | | | |
| Structum Dist. [m] Vertical 0.0 0.54792 1.0958 | re: Party m [m] 1 Offset 6.00000 6.00000 6.00000 | <pre>y Wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11 50625</pre> | <pre>//80) Su //80 //85 //85 //85 //85 //85 //85 //85</pre> | b-structure: Displa [mm] 1.1410 d 1.3551 d 1.3978 d 1.2324 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.00 0.54792 1.0958 1.6438 2.1917 | re: Part: x [m] 1 Offset 6.00000 6.00000 6.00000 6.00000 6.00000 | y Wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.4105 | 8/80) Su 55 2 [m] -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 | b-structure: Displa [mm] 1.1410 d 1.3551 d 1.3978 d 1.3213 d 1.1689 d 0.0750 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 | re: Part: | y Wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 0.21460 | 8/80) Su 5 5 5 6 7 7 7 8 7 7 8 8 7 8 8 8 8 8 8 8 8 8 8 8 8 8 | b-structure: Displac [mm] 1.1410 d 1.3551 d 1.3978 d 1.3213 d 1.1689 d 0.97520 d 0.76784 d 0.76784 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 | re: Part: [m] 1 Offset 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 | y Wall (78 Coordinate y [m] 1 1.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.31458 8.76667 | z/80) Su z [m] -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 | b-structure: Displa (z [mm] 1.1410 d 1.3551 d 1.3978 d 1.3213 d 1.3213 d 0.9752 d 0.97526 d 0.56816 d 0.39166 d 0.39166 d | Sub 4 | | | | | | | |
| Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 2.5075 3.854 | re: Part: x [m] 1 Offset 6.000000 6.000000 6.000000 6.0000000000 | y Wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 0.95833 10.41042 9.86250 9.31458 8.76667 8.21875 7.67083 7.67083 | 2/80) Su 2 [m] -0.98000 -0.980 | b-structure: Displa (z [mm] 1.1410 d 1.3551 d 1.3978 d 0.97520 d 0.75726 d 0.356816 d 0.24825 d 0.14230 d | Sub 4 cements | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.6438 2.1917 2.7396 3.2875 3.8354 4.3335 4.9313 5.4792 6.0271 6.5750 9.0000 9.000000 9.000000 9.000000 9.000000 9.000000 9.000000 9.000000 9.000000 9.0000000 9.0000000 9.0000000 9.0000000 9.00000000 9.00000000 9.0000000000 | re: Part: x [m] 1 0ffset 6.000000 6.000000 6.000000 6.0000000 6.0000000000 | y Wall (78 Coordinate y [m] 1 1.3.15000 12.60208 10.41042 9.86250 9.31458 8.76667 8.21875 7.67083 7.12292 6.57500 2.757500 2.75750 2.75750 2.75750 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.757500 2.7575000 2.7575000 2.7575000 2.7575000 2.7575000 2.7575000 2.7575000 2.7575000 2.757500000 2.75750000000000000000000000000000000000 | 2/80) Su ss z [m] -0.98000 -0 | b-structure: Displa (z [mm] 1.1410 d 1.3551 d 1.3978 d 0.37520 d 0.76784 d 0.56616 d 0.39166 d 0.24225 d 0.14230 d 0.072828 d 0.03300 d | Sub 4 | | | | | | | |
| Dist. [m] vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 6.2750 7.1229 7.6708 | re: Part: x [m] 1 Offset 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 | y Wall (78 2007dinate y [m] 1. 1. 1. 1. 1. 2.05417 1. 2.05417 1. 2.05417 1. 2.05417 1. 2.05417 1. 2.05457 1. 2.205 1. 2.2057 1. 2.57500 1. | J/80) Su z [m] -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 -0.98000 | b-structure: 2 [m] 1.1410 d 1.3551 d 1.3551 d 1.3578 d 1.3213 d 0.97520 d 0.97520 d 0.97520 d 0.356816 d 0.24825 d 0.14230 d 0.072828 d 0.03550 d 0.03550 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7667 | re: Part: | y Wall (75 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.31458 8.76667 8.21875 7.67083 7.12292 5.47917 4.93125 4.38335 | J/80) Su z [m] -0.98000 -0.98000 | b-structure: Displa (z [m] 1.1410 d 1.3551 d 1.3578 d 1.3578 d 1.3578 d 0.97520 d 0.97520 d 0.97520 d 0.97520 d 0.03566 d 0.24825 d 0.012500 d 0.03550 d 0.022828 d 0.022835 d | Sub 4 | | | | | | | |
| Structum Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 6.0771 7.7396 8.2188 8.2188 8.2188 8.7667 9.3146 9.8625 1.6408 | re: Part: | y Wall (78 2007dinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.31458 8.76667 8.21875 7.67083 7.12292 6.57500 6.02708 8.21875 7.4.9313 3.287500 3.287500 3.287500 3.287500 3.287500 3.287500 | I/S0) Su as 2 [m] -0.98000 -0.980000 -0.98000 >0. | b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3578 d 1.3978 d 0.37784 d 0.76784 d 0.76784 d 0.76784 d 0.76784 d 0.76784 d 0.37166 d 0.24825 d 0.012500 d 0.012500 d 0.022835 d -0.022483 d -0.022483 d -0.022483 d 0.024883 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.8354 4.3833 4.9313 5.4792 6.0271 6.5750 7.6708 8.2188 8.2189 7.6708 8.2188 8.2187 5.7670 8.2188 8.2187 5.7670 8.2188 2.1897 5.7670 8.2188 2.1897 5.7670 8.2188 2.1897 5.7670 8.2188 2.1917 1.6757 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 8.2185 1.6767 5.7670 5.2175 1.6767 5.7507 7.7296 5.7507 7.7296 5.7507 7.7296 5.7507 7.7296 5.7507 7.7296 5.7507 7.7296 5.7507 7.7296 5.7507 7.7297 5.7570 7.7297 5.7570 7.7297 5.7570 7.7297 5.76708 5.7670 5.77000 5.77000 5.77000 5.77000 5.77000 5.77000 5.77000 5.770000 5.7700000000000000000000000000000000000 | re: Part: | y wall (75 Coordinate y [m] 1 1. 1. 1. 1. 1. 1. 1. 2.05417 1. 0.95833 10.41042 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 6.57500 6.57500 6.22708 5.47917 4.93125 4.383342 3.28750 2.23958 2.24958 2.43958 2.24958 2.24958 2.43958 2.24958 2.43958 2.43958 2.24958 2.495688 2.49568 2.495 | 1/80) Su z [m] -0.98000 -0.98000 -0.980000 -0.98000 < | b-structure: Displac [mm] 1.1410 d 1.3551 d 1.3551 d 1.3978 d 1.3978 d 0.97520 d 0.97520 d 0.97520 d 0.97520 d 0.072828 d 0.033500 d 0.012500 d 0.024894 d 0.012500 d 0.017107 d 0.017107 d 0.017107 d | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 00.054792 1.0058 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.39313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7667 9.3146 9.8625 10.410 10.9588 1.1506 12.0551 10.9588 11.506 12.0551 12.0551 12.0551 12.0551 12.0551 12.0551 12.0551 13.05511 13.05511 13.05511 13.05511 13 | re: Part: x [m] 1 Offset 6.000000 6.00000000 6.000000 6.000000 6.00000 6.000 | y Wall (75 Coordinate y [m] 1 1. 1. 1. 1. 1. 1. 1. 2.05417 1. 0.95833 10.41042 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 0.95833 10.41042 9.86250 0.4585 1. 4.38333 3.88542 3.28750 2.73958 2.219167 1.64355 1.09583 2.19167 1.64355 1.09583 2.09587 1.09583 2.19167 1.64355 1.09583 2.09587 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.19167 1.09583 2.28750 2.4375 2.4 | J/80) J sz [m] -0.98000 -0.98000 -0.980000 -0.980000 <td>b-structure: Displa(z [mm] 1.1410 d 1.3551 d 1.3258 d 1.3278 d 1.3278 d 1.3278 d 1.3278 d 0.77620 d 0.77620 d 0.77624 d 0.77624 d 0.77624 d 0.33166 d 0.24825 d 0.012500 d 0.012500 d 0.022835 d 0.022835 d 0.022835 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.013577 d</td> <td>Sub 4</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> | b-structure: Displa (z [mm] 1.1410 d 1.3551 d 1.3258 d 1.3278 d 1.3278 d 1.3278 d 1.3278 d 0.77620 d 0.77620 d 0.77624 d 0.77624 d 0.77624 d 0.33166 d 0.24825 d 0.012500 d 0.012500 d 0.022835 d 0.022835 d 0.022835 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.017107 d 0.013577 d | Sub 4 | | | | | | | |
| Structur [m] Vertical (m] Vertical 00.54792 1.0958 2.1917 2.7396 3.2875 3.8354 4.3833 4.39313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7667 9.8625 10.410 0.98425 10.9588 1.506 1.205 1 | re: Part: x [m] 1 Offset 6.000000 6.000000 6.0000000 6.000000 6.00000 6.0000 | y wall (75 Coordinate y [m] 1 1. 1. 1. 1. 1. 1. 1. 2.05417 1. 0.95833 10.41042 9.86250 0.95845 8.76667 8.21875 7.67083 7.12292 6.57500 6.02708 5.47917 1.09583 3.88542 3.28750 2.73958 2.19167 1.09583 3.28750 2.19167 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19567 1.09583 3.28750 2.19577 1.09583 3.28750 2.19577 1.09583 3.28750 2.19577 1.095855 1.095855 1.0958555 1.0958555 1.09585555 1.09585 | 1/80) Su z [m] -0.98000 -0.98000 -0.980000 -0.98000 < | b-structure: Displa (z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3251 d 1.3273 d 1.3273 d 1.3273 d 1.3273 d 0.75744 d 0.75744 d 0.75744 d 0.75744 d 0.35166 d 0.24825 d 0.012500 d 0.012500 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.012507 d 0.022835 d 0.012507 d 0.012507 d 0.012507 d 0.012357 d 0.012367 d 0.01 | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 00.054792 1.0958 2.1917 2.7396 3.2875 3.8354 4.3833 4.39313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7667 9.8426 10.9585 10.410 0.9346 0.2875 0.410 0.2875 0.2875 0.2875 0.410 0.2875 0.2875 0.2875 0.2815 0.2915 0.2 | re: Part: (m] 1 offset 6 00010 6 00010 6 00010 6 00000 6 000000 6 0000000 6 0000000 6 000000 6 0000000000 | y wall (78 Coordinate y [m] 1 1.3.15000 12.05417 1.15002 12.05417 1.15002 1.2.05417 1.15002 1.2.05417 1.2.05425 1.9.9042 1.9.9042 1.9.9042 1.9.9142 1 | 1/80) Su z [m] -0.98000 -0.98000 | b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3251 d 1.3278 d 0.4581 d 0.5916 d 0.5916 d 0.5916 d 0.24825 d 0.012506 d 0.024894 d 0.022855 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.012500 d 0.022835 d 0.012507 d 0.012507 d 0.012507 d 0.012507 d 0.012367 d 0.012167 d 0.012167 d 0.012167 d 0.012167 d 0.012164 d 0.012 | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7395 3.4354 4.9313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7679 9.1658 1.95760 8.2188 1.95760 1.2054 0.11506 1.2054 0.11506 1.2054 0.11506 1.2054 0.11506 1.2054 1. | re: Part: (m] 1 offset 6 00010 6 00010 6 00000 6 000000 6 0 | y wall (78 Coordinate y [m] 1 1.3.15000 12.6547 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95632 10.95633 10.95632 10.95633 10.95633 10.95633 10.95633 10.95633 10.95633 10.95633 10.95633 10.95633 10.95633 10.95635 10.95633 10.95633 10.95635 10.95655 10.955555 10.95555 10.955555 10.9555555 10.9555555 10.9555555 10.9555555555 | (x00) Su rg r -0.98000 -0.98000 -0.980000 -0.98000 <t< td=""><td>b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3213 d 1.3213 d 1.1680 d 0.97520 d 0.97520 d 0.75616 d 0.24825 d 0.012500 d 0.024894 d 0.0224894 d 0.0224894 d 0.0224894 d 0.022489 d 0.022489 d 0.012500 d 0.024894 d 0.012500 d 0.012507 d 0.012107 d 0.01357 d 0.012364 d 0.01357 d 0.012364 d 0</td><td>Sub 4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<> | b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3213 d 1.3213 d 1.1680 d 0.97520 d 0.97520 d 0.75616 d 0.24825 d 0.012500 d 0.024894 d 0.0224894 d 0.0224894 d 0.0224894 d 0.022489 d 0.022489 d 0.012500 d 0.024894 d 0.012500 d 0.012507 d 0.012107 d 0.01357 d 0.012364 d 0.01357 d 0.012364 d 0 | Sub 4 | | | | | | | |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7395 3.4354 4.9313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7679 9.1658 1.5760 4.2188 1.506 0.410 0.0410 0.0410 0.0410 0.0410 0.0410 0.0557 0.010 0.0557 0.0558 0.05788 0.05788 0.05788 0.05788 0.05788 0.0578 | re: Part: | y wall (78 Coordinate y [m] 1 1. 1. 1. 1. 1. 1. 1. 2.05417 1. 0.95632 1. 4.205417 1. 0.95632 1. 4.62008 8.76667 8.21875 7.67083 7.12292 6.57500 6.02708 5.47917 4.93125 4.38333 3.6347917 1.64375 1.09563 2.19167 1.64375 1.09563 0.30582 0.000000 the include Damage Rev 2.0517 2.05417 2.05617 2.05417 2.05 | (200) Su 2 [m] -0.98000 -0.98000 <t< td=""><td>b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3251 d 1.3251 d 1.3278 d 0.7784 d 0.7784 d 0.7784 d 0.56616 d 0.39166 d 0.24825 d 0.012500 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.012507 d 0.022835 d 0.012507 d 0.012507 d 0.012507 d 0.012367 d 0.01236</td><td>Sub 4</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<> | b-structure: Displac z [mm] 1.1410 d 1.3551 d 1.3551 d 1.3251 d 1.3251 d 1.3278 d 0.7784 d 0.7784 d 0.7784 d 0.56616 d 0.39166 d 0.24825 d 0.012500 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.022835 d 0.012507 d 0.022835 d 0.012507 d 0.012507 d 0.012507 d 0.012367 d 0.01236 | Sub 4 | | | | | | | |
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| Structur Dist. [m] Verticai 0.0 0.54792 1.0558 1.6438 2.1917 2.7396 3.2875 3.3333 5.4792 6.0271 6.5750 7.6708 8.2188 8.7677 9.3146 9.8425 10.4100 d - Disj Structur Vertical from L | re: Part: (m] 1 offset 6.000000 6.000000 6.0000000 6.000000 6.00000 | y wall (78 Coordinate y [m] 1 1. 1. 1. 1. 1. 1. 1. 1. 1. | (x00) Su z [m] -0.98000 -0.98000 | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3513 d 0.97520 d 0.35616 d 0.35166 d 0.47282 d 0.032500 d 0.012428 d 0.032500 d 0.022535 d 0.022535 d 0.012688 d 0.01268 d 0.0126 d 0.0126 d 0.0126 d 0.01268 | Sub 4 cements ts. Sub 1 Curvatur | e Deflection Ratio | Average Horizonta | Max 1 Tensil | Max Gradi(e of | ent Max Gradie of Vertica | nt Min 1 Radius (| Damage |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3033 4.3033 4.3033 4.3033 4.3033 4.3035 4.3035 4.3035 4.3055 3.2875 3.8254 4.3055 3.2875 3.8254 4.3055 3.8255 0.410 0.0,588 1.5056 2.054 2.054 1.2054 2.054 1.2054 2.055 2.054 | re: Part: (m] 1 Offset 6.000000 6.0000000 6.000000 6.000000 6.00000 | <pre>y wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.8250 9.827500 9.827500 9.827500 9.827500 9.827500 9.82750000</pre> | 1/80) Su 2 [m] -0.98000 -0.98000 <td>b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3578 d 1.369 d 0.75784 d 0.39166 d 0.39166 d 0.39166 d 0.39166 d 0.39166 d 0.024825 d 0.024825 d 0.024825 d 0.024825 d 0.024825 d 0.024828 d 0.02488 d 0.022535 d 0.014570 d 0.012464 d 0.012364 d 0.014570 d 0.012464 d 0.01470 d 0.0140 d 0.0140 d 0.0140 d 0.0140 d</td> <td>Sub 4 cements ts. Sub 1 Curvatur</td> <td>e Deflection Ratio</td> <td>Average Horizonta Strain</td> <td>Max 1 Tensil Strain</td> <td>Max Gradi e of Horizonta Displaceme</td> <td>ent Max Gradie of Vertics 11 Displaceme nt Curve</td> <td>nt Min 11 Radius d nt Curvatuu</td> <td>Damage f Category re</td> | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3578 d 1.369 d 0.75784 d 0.39166 d 0.39166 d 0.39166 d 0.39166 d 0.39166 d 0.024825 d 0.024825 d 0.024825 d 0.024825 d 0.024825 d 0.024828 d 0.02488 d 0.022535 d 0.014570 d 0.012464 d 0.012364 d 0.014570 d 0.012464 d 0.01470 d 0.0140 d 0.0140 d 0.0140 d 0.0140 d | Sub 4 cements ts. Sub 1 Curvatur | e Deflection Ratio | Average Horizonta Strain | Max 1 Tensil Strain | Max Gradi e of Horizonta Displaceme | ent Max Gradie of Vertics 11 Displaceme nt Curve | nt Min 11 Radius d nt Curvatuu | Damage f Category re |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3933 5.02717 7.6708 8.2188 5.750 7.1229 7.6708 8.2188 8.7677 9.3146 9.8625 10.410 10.058 11.506 2.054 12.054 12.054 13.150 d - Disp Specific Structur Vertical from L. | re: Part: (m] 1 offset 6.000000 6.0000000 6.000000 6.000000 6.00000 6.00000 | <pre>y wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.855000 9.855000 9.855000 9.855000 9.855000 9.855000 9.85500000000000000000000000000000000000</pre> | 1/80) Su -0.98000 -0.98000 | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3578 d 1.3578 d 1.3578 d 1.1689 d 0.75784 d 0.39166 d 0.39166 d 0.39166 d 0.24825 d 0.014230 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.022838 d 0.01264 d 0.013570 d 0.013570 d 0.013570 d 0.013576 d 0.013264 d 0.012364 d 0.012364 d 0.011470 d 1.01264 d 0.011470 d 1.01264 d 0.011470 d 1.01264 d 1.011470 d 1.01264 d 1.011470 d 1.01264 d 1.011470 d 1.01264 d 1.011470 d 1. | Sub 4 cements ts. Sub 1 Curvatur | e Deflection Ratio | Average Horizonta Strain | Max 1 Tensil Strain | Max Gradi e of Horizont Displacem Curve | ent Max Gradic of Vertics 11 Displaceme nt Curve | nt Min 11 Radius 11 Curvatur 11 | Damage f Category re |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.3833 4.39313 5.4792 7.6708 8.2786 7.6708 8.2786 9.8625 10.410 10.958 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 1.506 2.054 2.15 | re: Part: (m] 1 offset 6.000000 6.000000 6.0000000 6.000000 6.00000 | <pre>y wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.86250 9.87500 6.02708 5.47917 4.93125 4.9333 3.83542 2.73958 2.19167 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.00000 5.47917 1.64375 1.05833 0.54792 0.5479</pre> | 1/80) Su 2 [m] -0.98000 -0.98000 | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 0.75784 d 0.39166 d 0.39166 d 0.39166 d 0.012430 d 0.012430 d 0.012430 d 0.012430 d 0.012430 d 0.012400 d 0.022435 d 0.022435 d 0.012688 d 0.012688 d 0.012688 d 0.012688 d 0.012688 d 0.012688 d 0.01268 | Sub 4 cements ts. Sub 1 Curvatur 5 Sagging | Te Deflection Ratio [%] 217.53E-6 | Average Horisonta Strain [%] -0.01884 | Max 1 Tensil Strain [%] 8 0.00377 | Max Gradi e of Horizont Displacem Curve 17 207.901 | ant Max Gradi of Vertics Displaceme ent Curve | nt Min 11 Radius nt Curvatur [m] 6 4670/ | Damage f Category fe |
| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.3833 4.3931 3.43792 7.6708 8.2188 8.7677 9.3146 9.8625 10.410 0.0588 11.506 2.054 11.506 2.054 2.054 11.506 Structur Vertical for Vertical for 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | re: Part: (m] 1 offset 6.000000 6.000000 6.000000 6.000000 6.000000 | <pre>y wall (78 Coordinate y [m] 1 1.1.5000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.31458 8.21697 7.61292 6.57500 6.02708 5.47917 4.93125 4.38333 3.83542 3.28750 2.73958 2.19167 1.64375 1.05833 0.54792 0.00000 bainclude Damage Rev y Wall (75 Segme</pre> | 1/80) Su a z [m] -0.98000 -0.98000 -0.98000 <tr< td=""><td>b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3513 d 0.7684 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.35166 d 0.24825 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.02235 d 0.022482 d 0.022482 d 0.022483 d 0.012684 d 0.012684 d 0.012684 d 0.012664 d 0.012666 d 0</td><td>Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging</td><td>Te Deflection Ratio [%] 217.53E-6 0.0014316</td><td>Average Horisonta Strain [%] -0.01884 -0.009583</td><td>Max 1 Tensil Strain 8 0.00377 7 0.00209</td><td>Max Gradi e of Horizonta Displacem Curve 17 207.901 20 144.875</td><td>ant Max Gradi of Vertics al Displaceme ont Curve 2-6 166.655 2-6 171.225</td><td>nt Min 11 Redius nt Curvatur 1-6 4670: 1-6 2108:</td><td>f Category ee . (Negligile) . (Negligile)</td></tr<> | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3513 d 0.7684 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.35166 d 0.24825 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.14230 d 0.02235 d 0.022482 d 0.022482 d 0.022483 d 0.012684 d 0.012684 d 0.012684 d 0.012664 d 0.012666 d 0 | Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging | Te Deflection Ratio [%] 217.53E-6 0.0014316 | Average Horisonta Strain [%] -0.01884 -0.009583 | Max 1 Tensil Strain 8 0.00377 7 0.00209 | Max Gradi e of Horizonta Displacem Curve 17 207.901 20 144.875 | ant Max Gradi of Vertics al Displaceme ont Curve 2-6 166.655 2-6 171.225 | nt Min 11 Redius nt Curvatur 1-6 4670: 1-6 2108: | f Category ee . (Negligile) . (Negligile) |
| Structur Dist. [m] Vertical 0.00 0.054792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 7.6708 8.2188 8.7677 9.3146 9.8625 10.410 0.058 81.506 2.054 1.506 2.054 1.506 Structur Vertical from Calcular Compositione Composi | re: Part: x [m] 1 offset 6.000000 6.000000 6.0000000 6.000000 6.000 | <pre>y wall (78 Coordinate y [m] 1 1.1.5000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.855000 9.855000 9.855000 9.855000 9.855000 9.855000 9.855000 9.85500000000000000000000000000000000000</pre> | 1/80) Su a z [m] -0.98000 -0.98000 -0.98000 <tr< td=""><td>b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3513 d 1.1689 d 0.76784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.33166 d 0.24825 d 0.14230 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.018688 d 0.018688 d 0.018688 d 0.018688 d 0.013579 d 0.018688 d 0.013579 d 0.013577 d 0.013577 d 0.013578 d 0.013477 d 0.013477 d 1.01264 d 0.013477 d 0.013477 d 0.011470 d 0.01264 d 0.01264 d 0.011470 d 0.01264 d 0.011470 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01276 d 0.01477 d 1.5762 d 0.01477 d 1.5762 d 0.00 0.79125 d 79125 1.5563 .3476 0.8003</td><td>Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging 3 Sagging</td><td>Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6</td><td>Average Horizonta Strain [%] -0.01884 -0.009583 -0.001265</td><td>Max 1 Tensil Strain 8 0.00377 7 0.00209 1 303.66E</td><td>Max Gradii e Horizonta Displaceme 17 207.901 20 144.871 -6 38.9321</td><td>ent Max Gradi of Verico 1 Displaceme ent Curve 2-6 166.655 2-6 171.222 2-6 137.538</td><td>nt Min 1 Radius nt Curvatus 6 4670. 6 21086 6 58901</td><td>f Category e (Negligile) (Negligile) (Negligile) (Negligile)</td></tr<> | b-structure: Displac 2 [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.3513 d 1.1689 d 0.76784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.33166 d 0.24825 d 0.14230 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.024835 d 0.018688 d 0.018688 d 0.018688 d 0.018688 d 0.013579 d 0.018688 d 0.013579 d 0.013577 d 0.013577 d 0.013578 d 0.013477 d 0.013477 d 1.01264 d 0.013477 d 0.013477 d 0.011470 d 0.01264 d 0.01264 d 0.011470 d 0.01264 d 0.011470 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01264 d 0.01276 d 0.01477 d 1.5762 d 0.01477 d 1.5762 d 0.00 0.79125 d 79125 1.5563 .3476 0.8003 | Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging 3 Sagging | Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 | Average Horizonta Strain [%] -0.01884 -0.009583 -0.001265 | Max 1 Tensil Strain 8 0.00377 7 0.00209 1 303.66E | Max Gradii e Horizonta Displaceme 17 207.901 20 144.871 -6 38.9321 | ent Max Gradi of Verico 1 Displaceme ent Curve 2-6 166.655 2-6 171.222 2-6 137.538 | nt Min 1 Radius nt Curvatus 6 4670. 6 21086 6 58901 | f Category e (Negligile) (Negligile) (Negligile) (Negligile) |
| Structur Dist. [m] Vertical 0.0 0.054792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 7.6708 8.2188 8.7667 9.3146 9.8625 10.410 0.0588 11.506 2.054 11.506 2.054 11.506 2.054 Structur Vertical from 1: Vertical form 2: Nover Calcular Mover Calcular 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0. | re: Part: x [m] 1 offset 6.000000 6.0000000 6.000000 6.000000 6.000 | <pre>y wall (78 Coordinate y [m] 1 1.1.5000 12.60208 12.05417 11.50625 10.95833 10.41042 9.86250 9.31458 8.76667 8.21875 7.67032 8.21875 7.67032 8.21875 7.67032 8.21875 4.38333 3.83542 3.28750 2.73958 2.19167 1.64375 1.05583 0.54792 0.00000 ts includes</pre> | 1/80) Su 2 [m] -0.98000 -0.98000 <td>b-structure: Displac [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.369 d 0.76784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.33166 d 0.24825 d 0.14230 d 0.027120 d 0.027120 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.024895 d 0.027120 d 0.014570 d 0.014570 d 0.013577 d 0.013577 d 0.013577 d 0.013578 d 0.013477 d displacement b-structure: tart Length [m] [m] 0.0 0.79122 79125 1.5556 .3476 0.80032 .1479 1.2255</td> <td>Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging 3 Sagging 4 Hogging</td> <td>Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 422.06E-6</td> <td>Average Horisonta Strain [%] -0.01884 -0.009583 -0.001265 0.006258</td> <td>Max 1 Tensil Strain 8 0.00377 7 0.00209 1 303.66E 1 0.00628</td> <td>Max Gradid Horizonta Displaceme 17 207.901 20 144.871 -6 38.9321 43 -110.131</td> <td>ent Max Gradi of Vertics 11 Displaceme ent Curve 2-6 166.655 2-6 171.225 2-6 137.538 2-6 137.538</td> <td>nt Min 1 Radius o 1 Curvatur 1-6 4670- 1-6 21080 1-6 58901 1-6 58901</td> <td>Damage of Category ee ((Negligible) ((Negligible) ((Negligible) ((Negligible)</td> | b-structure: Displac [mm] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.3551 d 1.369 d 0.76784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.7784 d 0.33166 d 0.24825 d 0.14230 d 0.027120 d 0.027120 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.027120 d 0.024895 d 0.024895 d 0.027120 d 0.014570 d 0.014570 d 0.013577 d 0.013577 d 0.013577 d 0.013578 d 0.013477 d displacement b-structure: tart Length [m] [m] 0.0 0.79122 79125 1.5556 .3476 0.80032 .1479 1.2255 | Sub 4 cements ts. Sub 1 Curvatur 5 Sagging 3 Hogging 3 Sagging 4 Hogging | Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 422.06E-6 | Average Horisonta Strain [%] -0.01884 -0.009583 -0.001265 0.006258 | Max 1 Tensil Strain 8 0.00377 7 0.00209 1 303.66E 1 0.00628 | Max Gradid Horizonta Displaceme 17 207.901 20 144.871 -6 38.9321 43 -110.131 | ent Max Gradi of Vertics 11 Displaceme ent Curve 2-6 166.655 2-6 171.225 2-6 137.538 2-6 137.538 | nt Min 1 Radius o 1 Curvatur 1-6 4670- 1-6 21080 1-6 58901 1-6 58901 | Damage of Category ee ((Negligible) ((Negligible) ((Negligible) ((Negligible) |
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| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2875 3.8354 4.3833 4.9313 5.4792 6.0271 6.5279 7.6708 8.2188 8.7667 9.3146 9.8625 10.410 0.058 11.506 2.188 7.6708 8.2188 8.2188 8.2188 8.2184 7.6708 9.3146 9.3145 0.412 0.0558 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 2.054 11.506 0.0058 11.506 2.054 11.506 0.0558 | re: Part: | <pre>y wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95025 10.95025 10.95025 10.95025 10.95025 10.95025 10.95025 10.95025 10.95025 10.95025 10.9503 2.7358 2.19167 1.05533 0.54792 0.00000 cs include Damage Re Segme tal strair 5 Front El Segme</pre> | 1/80) Su sr [m] -0.98000 -0.98000 <td>b-structure: Displac [m] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.1689 d 0.7678 d 0.7784 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01270 d</td> <td>Sub 4 cements Sub 1 Curvatur 5 Sagging 3 Hogging 4 Hogging e horizont ce: Sub 2 Survature</td> <td>Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 422.06E-6 422.06E-6 al strains a Deflection Ratio H</td> <td>Average Horisonta Strain [%] -0.01884 -0.009583 -0.001265 0.001265 0.006258 re -ve. Average risontal 'Strain</td> <td>Max 1 Tensil Strain [%] 8 0.00377 7 0.00209 1 303.66E 1 0.00628 1 0.00628 Max Tensile Strain</td> <td>Max Gradie e of Horizonta Displacement Curve 17 207.901 20 144.871 -6 38.9321 43 -110.131 Max Gradient of Horizontal Displacement Curve</td> <td>ent Max Gradie of Vertical Displacement Curve Control 101 Curve Control 101 Control 101 Control 101 Control 101 Curve Control 101 Curve Cu</td> <td>nt Min 1 Radius o nt Curvature (m) 4670. (m) 4670. (m) 4670. (m) 4670. (m) 890. (m) 800.(m) 800. (m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m)</td> <td>Damage Category (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) Damage Category</td> | b-structure: Displac [m] 1.1410 d 1.3551 d 1.3551 d 1.3551 d 1.1689 d 0.7678 d 0.7784 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01250 d 0.01270 d | Sub 4 cements Sub 1 Curvatur 5 Sagging 3 Hogging 4 Hogging e horizont ce: Sub 2 Survature | Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 422.06E-6 422.06E-6 al strains a Deflection Ratio H | Average Horisonta Strain [%] -0.01884 -0.009583 -0.001265 0.001265 0.006258 re -ve. Average risontal 'Strain | Max 1 Tensil Strain [%] 8 0.00377 7 0.00209 1 303.66E 1 0.00628 1 0.00628 Max Tensile Strain | Max Gradie e of Horizonta Displacement Curve 17 207.901 20 144.871 -6 38.9321 43 -110.131 Max Gradient of Horizontal Displacement Curve | ent Max Gradie of Vertical Displacement Curve Control 101 Curve Control 101 Control 101 Control 101 Control 101 Curve Control 101 Curve Cu | nt Min 1 Radius o nt Curvature (m) 4670. (m) 4670. (m) 4670. (m) 4670. (m) 890. (m) 800.(m) 800. (m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m) 800.(m) | Damage Category (Negligible) (Negligible) (Negligible) (Negligible) (Negligible) Damage Category |
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| Structur Dist. [m] Vertical 0.0 0.54792 1.0958 1.6438 2.1917 2.7396 3.2854 2.3333 4.9313 5.4792 6.0271 6.5750 7.1229 7.6708 8.2188 8.7677 9.3146 9.6220 0.71229 7.6708 8.2188 8.7677 9.3146 1.2054 | re: Part: x [m] l Offset 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 6.00000 c.00000 c.00 | <pre>y wall (78 Coordinate y [m] 1 13.15000 12.60208 12.05417 11.50625 10.95632 10.41050 9.31458 8.76667 8.21875 7.67083 7.12292 6.57500 6.02708 5.47917 4.93125 4.38334 3.83346 2.73958 5.47917 1.64375 1.09563 0.54792 0.000000 ts include Damage Re y Wall (76 Segme tal strair 5 Front El Segme</pre> | 1/80) Su 2 [m] -0.98000 -0.98000 -0.98000 | b-structure: Displac [m] 1.1410 d 1.3551 d 1.3551 d 1.1689 d 0.97520 d 0.97520 d 0.97520 d 0.072828 d 0.024893 d 0.0224894 d 0.0224894 d 0.0224894 d 0.0224894 d 0.0224894 d 0.0224894 d 0.012500 d 0.0224894 d 0.012500 d 0.0224894 d 0.012500 d 0.0224894 d 0.012500 d 0.012500 d 0.012500 d 0.012507 d 0.012507 d 0.012507 d 0.012507 d 0.012507 d 0.012507 d 0.01470 d displacement b-structure: tart Length (m] (m] (m] 0.0 0.7912 79125 1.5567 .3476 0.80033 .1479 1.2359 , compressive Sub-structure m] (m] (m] 0.0 1.5524 3 | Sub 4 cements cements sts. Sub 1 Curvatur Sagging Hogging Hogging Curvature Sagging | Te Deflection Ratio [%] 217.53E-6 0.0014316 282.00E-6 422.06E-6 422.06E-6 422.06E-6 al strains a Deflection Ratio E [%] 0.0013452 945.07E-6 | Average Horisonta Strain -0.01884 -0.009583 -0.001255 0.006258 :e -ve. Verage risontal strain [%] 0.010676 0.018274 | Max 1 Tensil Strain 8 [%] 8 0.00377 7 0.00209 1 0.00628 Max Tensile Strain [%] 0.010885 0.0108351 | Max Gradie Horizonta Displaceme Curve 17 207.901 20 144.871 -6 38.9321 43 -110.131 Max Gradient of Horizontal Displacement Curve -146.265-6 -205.535-6 | ant Max Gradia of Vertics 1) Displacement Curve 2-6 166.655 2-6 171.222 3-6 137.533 3-6 137.533 Max Gradient of Vertical Displacement Curve 213.612-6 213.612-6 | nt Min Radius of Curvatuu 6 4670. 6 21080 6 2351 Min Radius of Curvature [m] 9189.6 14226. | Damage of Category ee (Negligible) (Negligible) (Negligible) Damage Category Negligible) 0 |

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Fig Q1-TAB

| \cap | 7 0 4 4 4 | . 5 | SOUT | HER | N TES | STING | | L | Job No. | | | Sheet No. | F | lev. |
|---------------------------------------|---|------------------------------------|-------------------------|-------------------------|----------------------------------|--------------------------------------|---|----------------------------------|------------------------------|-------------------------|----------------------------|-----------|------|--------|
| Ul | isys | Ĺ | .ABO | RAT | ORIE | S | | | J13 : | 124 | | | | |
| 78 Malden | Road | | | | | | | F | Drg. Re | əf. | | | | |
| London N Q1 - long | W5 4DA term mover | nents | | | | | | F | Made by | , | Da | te | Cheo | cked |
| Vertical Offse | et Segment | Start Length | Curvature | Deflection | Average | Max Max | Gradient Max | Gradient | Min | Damage | 11. | -Jan-2018 | | |
| from Line for Vertical Movement | r | | | Ratio | Horizontal Strain | Tensile Strain Hor Disp | of of V rizontal Disp placement O | Vertical placement Curve | Radius of Curvature | Category | | | | |
| Tensile horizo | ontal strains are | +ve, compressiv | ve horizont | al strains | are -ve. | | | | | | | | | |
| Structure: No Vertical Offse | 80 Front Elevati | on Sub-struct | ure: Sub 3 Curvature | Deflection | Average | Max Max | c Gradient Max | x Gradient | : Min | Damage | | | | |
| from Line for Vertical Movement | r | | | Ratio | Horizontal Strain | Tensile Strain Ho Dis | of of prizontal Dis | Vertical splacement Curve | Radius of Curvature | Category | | | | |
| Calculations [m] 0.0 | | [m] [m] 1 0.0 1.5506 | Hogging | [%] 0.023764 | [%] -0.061911 | [%] 0.019325 | Curve 686.52E-6 | 984.16E-6 | [m] 5 495.87 | | 0 | | | |
| | | 2 1.5506 2.8040 | Sagging | 0.0051941 | 8.4986E-6 | 0.0051532 | 543.14E-6 - | -237.53E-6 | 5 4287.0 | (Negligible |) 0) | | | |
| Tensile horizo | ontal strains are | 3 4.3546 1.4454 +ve, compressiv | Hogging ve horizont | 836.86E-6 al strains | 0.018031 are -ve. | 0.018092 - | -193.29E-6 | 214.66E-6 | 5 16029. | (Negligible | 0 | | | |
| Structure: Par | rty Wall (78/80) | Sub-structure | : Sub 4 | | | | | | | | | | | |
| Vertical Offse from Line for | et Segment r | Start Length | Curvature | Deflectior Ratio | Average Horizontal | Max Max Tensile | Gradient Max of of V | Gradient Vertical | Min Radius of | Damage Category | | | | |
| Vertical Movement Calculations | | | | | Strain | Strain Hor Disp | rizontal Disp placement C Curve | placement Curve | Curvature | | | | | |
| [m] 0.0 | | [m] [m] 1 0.0 3.1285 | Sagging | [%] 0.011695 | [%] 0.037500 | [%] 0.041140 -3 | 374.86E-6 -3 | 390.74E-6 | [m] 1626.9 | 0 Negligible) | | | | |
| Tensile horizo | ontal strains are | 2 3.1285 2.3506 | Hogging | 0.0029850 | 0.037500 | 0.037852 -3 | 374.86E-6 3 | 378.32E-6 | 8317.8 | Negligible) | | | | |
| | | | | | | | | | | | | | | |
| Specific Buildir | ng Damage Results | - Critical Values fo | or All Segme | nts within I | Each Sub-Stru | cture | | | | | | | | |
| Structure: Par | rty Wall (78/76) | Sub-structure | Sub 1 | Мах | Max Gradient | Max Gradient | Min | Min | Damage Cat | egory | | | | |
| Offset from Line for | Ratio Horizo Stra | ntal : | Settlement | Tensile Strain | of Horizontal | of Vertical Displacement | Radius of Ra Curvature Cu | adius of urvature | | -31 | | | | |
| Movement Calculations | re1 te1 | | [| 19.1 | Curve | Curve | (HOGGING) (2 | (m) | | | | | | |
| 0.0 | 0.0014316 -0.01 | 8848 171.22E-6 | 0.73034 | 0.0062843 | 207.90E-6 | 171.22E-6 | 5 21080. | 46704. 0 |) (Negligibl | e) | | | | |
| Structure: No Vertical I | 76 Front Elevati Deflection Avera | on Sub-struct ge Max Slope | ure: Sub 2 Max | Max M | lax Gradient | Max Gradient | Min | Min | Damage Cate | gory | | | | |
| Offset from Line for Vertical | Ratio Horizo Stra | ntal : in | Settlement | Tensile Strain I | of Horizontal Pisplacement | of Vertical Displacement Curve | Radius of Rad Curvature Cur (Hogging) (Sa | lius of rvature agging) | | | | | | |
| Movement Calculations [m] | [%] [%] | | [mm] | [%] | Curve | | [m] | [m] | | | | | | |
| 0.0 | 0.0013452 0.01 | 8274 213.61E-6 | 0.73034 | 0.018351 | -205.53E-6 | 213.61E-6 | 14226. | 9189.6 0 | (Negligible |) | | | | |
| Structure: No Vertical I | 80 Front Elevati Deflection Avera | on Sub-struct ge Max Slope | ure: Sub 3 Max | Max M | ax Gradient | Max Gradient | Min | Min | Damage Cate | gory | | | | |
| Offset from Line for Vertical | Ratio Horizo Stra | ntal : in | Settlement | Tensile Strain I | of Horizontal Pisplacement | of Vertical Displacement Curve | Radius of Rad Curvature Cur (Hogging) (Sa | dius of rvature agging) | | | | | | |
| Movement Calculations [m] | [%] [%] | | [mm] | [%] | Curve | | [m] | [m] | | | | | | |
| 0.0 | 0.023764 -0.06 | 1911 984.16E-6 | 1.1410 | 0.019325 | 686.52E-6 | 984.16E-6 | 495.87 | 4287.0 0 | (Negligible |) | | | | |
| Structure: Par Vertical I | rty Wall (78/80) Deflection Avera | Sub-structure ge Max Slope | : Sub 4 Max | Max | Max Gradient | Max Gradient | t Min | Min | Damage Cat | egory | | | | |
| Offset from Line for Vertical | Ratio Horizo Stra | ntal in | Settlement | Tensile Strain | of Horizontal Displacement | of Vertical Displacement Curve | Radius of Ra Curvature Cu (Hogging) (S | adius of urvature Sagging) | | | | | | |
| Movement Calculations | [%] [%] | | [mm] | [%] | Curve | | [m] | [m] | | | | | | |
| 0.0 | 0.011695 0.03 | 7500 -390.74E-6 | 1.3963 | 0.041140 | -374.86E-6 | -390.74E-6 | 5 8317.8 | 1626.9 0 |) (Negligibl | e) | | | | |
| Specific Buildir | ng Damage Results | - Critical Segment | ts within Eac | start | End Curva | ture May Slor | ne Max | Max | Min | Min | Damage C | ategory | | |
| Scructure Name | e Falametel | Sub-Structure | e Segment | Start | End Curve | cure max biop | Settlement | Tensile Strain | Radius of Curvature | Radius of Curvature | Damage C | acegory | | |
| Party Wall | Max Slope | Sub 1 | 2 | [m] 0.79125 | [m] 2.3476 Hoggi | ng 171.22E- | [mm] -6 0.60415 | [%] 0.0020920 | (Hogging) [m]) 21080. | (Sagging) [m] - 0 | (Negligible |) | | |
| (78#76) | Max Settlement Max Tensile | Sub 1 Sub 1 | 1 | 0.0 0 | .79125 Saggi 4.3833 Hoggi | ng 166.65E- ng 137.53E- | -6 0.73034 -6 0.27550 | 0.0037717 | 23517. | 46704. 0 - 0 | (Negligible (Negligible |) | | |
| | Strain Min Radius of Curvature | Sub 1 | 2 | 0.79125 | 2.3476 Hoggi | ng 171.22E- | -6 0.60415 | 0.0020920 | 21080. | - 0 | (Negligible |) | | |
| | (Hogging) Min Radius of Curvature | Sub 1 | 1 | 0.0 0 | .79125 Saggi | ng 166.65E- | -6 0.73034 | 0.0037717 | | 46704. 0 | (Negligible |) | | |
| No 76 Front Elevation | (Sagging) Max Slope | Sub 2 | 1 | 0.0 | 1.5524 Saggi | ng 213.61E- | - 6 0.73034 | 0.010885 | - i | 9189.6 0 | (Negligible |) | | |
| | Max Settlement Max Tensile Strain | Sub 2 Sub 2 | 1 | 0.0 | 1.5524 Saggi 3.1636 Hoggi | ng 213.61E- ng 213.61E- | -6 0.73034 -6 0.44701 | 0.010885 | - 14226. | 9189.6 0 - 0 | (Negligible (Negligible |) | | |
| | Min Radius of Curvature (Hogging) | Sub 2 | 2 | 1.5524 | 3.1636 Hoggi | ng 213.61E- | -6 0.44701 | 0.018351 | 14226. | - 0 | (Negligible |) | | |
| | Min Radius of Curvature (Sagging) | Sub 2 | 1 | 0.0 | 1.5524 Saggi | ng 213.61E- | -6 0.73034 | 0.010885 | - 5 | 9189.6 0 | (Negligible |) | | |
| No 80 Front Elevation | Max Slope | Sub 3 | 1 | 0.0 | 1.5506 Hoggi | ng 984.16E- | -6 1.1410 | 0.019325 | 495.87 | - 0 | (Negligible |) | | |
| | Max Sectiement Max Tensile Strain | Sub 3 | 1 | 0.0 | 1.5506 Hoggi | ng 984.16E- | -6 1.1410 | 0.019325 | 495.87 | - 0 | (Negligible |) | | |
| | Min Radius of Curvature (Hogging) | Sub 3 | 1 | 0.0 | 1.5506 Hoggi | ng 984.16E- | -0 1.1410 | 0.019325 | 495.87 | - 0 | (Negligible | 1 | | |
| | Min Radius of Curvature (Sagging) | Sub 3 | 2 | 1.5506 | 4.3546 Saggi | ng 237.53E- | -ь 0.76475 | 0.0051532 | - | 4287.0 0 | (Negligible |) | | |
| Party Wall (78#80) | Max Slope Max Settlement | Sub 4 Sub 4 | 1 | 0.0 | 3.1285 Saggi 3.1285 Saggi | ng 390.74E- | -6 1.3963 -6 1.3963 | 0.041140 | | 1626.9 0 1626.9 0 | (Negligible |) | | |
| | Max Tensile Strain Min Radius of | Sub 4 Sub 4 | 1 | 0.0 | 3.1285 Saggi 5.4792 Hogei | ng 390.74E- | -6 1.3963 | 0.041140 | 2 8317.8 | 1626.9 0 | (Negligible |) | | |
| | Curvature (Hogging) Min Radius of | Sub 4 | 1 | 0.0 | 3.1285 Sage | ng 390 742- | -6 1.3963 | 0.041140 |) | 1626 9 0 | (Negligible |) | Fig | Q1-TAB |
| | indiatub of | | 1 | 0.0 | 98991 | | 1.3903 | | | | | | | |

| \cap | | S | SOUTHERN TESTING | | | | | | Job No. | | Sheet No. | Sheet No. | |
|-------------------------------|------------------------|--------------------------|-----------------------|-------|-----|--------------------|---------------------|--------------------------|--|--|---------------------|-----------|------|
| Oasys | | | LABORATORIES | | | | | | | J13124 | | | |
| 78 Malden London NV | Road | | | | | | | | Drg. R | əf. | | | |
| Q1 - long to | erm moven | nents | | | | | | | Made by TRL | / | Date 11-Jan-2018 | Che | cked |
| Structure Name | Parameter | Critical Sub-Structur | Critical e Segment | Start | End | Curvature Max Slop | e Max Settlement | Max Tensile Strain | Min e Radius of Curvature (Hogging) | Min Radius of Curvature (Sagging) | Damage Category | | |
| | Curvature (Sagging) | | | | | | | | | | | | |