A-squared Studio

# 14-19 Tottenham Mews

## Monitoring Action Plan – Thames Water Assets

June 2023

2743-A2S-XX-XX-RP-Y-0002-01

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|---|---|
| Project Name | 14-19 Tottenham Mews |
| Project Number | 2743 |
| Client | Mark & Partners Ltd |
| Document Name | Monitoring Action Plan – Thames Water Assets |



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| 2743-A2S-XX-XX-RP-Y-0002-00 | First Issue | 00 | QS | 17.05.2023 |
| 2743-A2S-XX-XX-RP-Y-0002-01 | Second Issue - Thames Water comments, added vibration monitoring | 01 | QS | 14.06.2023 |

# Contents



# Appendices

# 1. Introduction

A-squared Studio Engineers Ltd (A-squared) has been appointed by Mark & Partners Ltd to support the monitoring scope for the 14-19 Tottenham Mews development.

This Monitoring Action Plan (MAP) defines the method of monitoring, responsibilities of each party to these works, reporting requirements, and actions that are intended to be implemented during the works progression, to ensure the continual safeguarding of the general public, works operatives within affected areas and adjacent third-party assets (in this case namely the Thames Water Utilities Limited assets surrounding and adjacent to the 14-19 Tottenham Mews development).

The required lines of communication of information / data transfer from site are also detailed herein. Furthermore, this MAP outlines individual responsibilities and actions that must be taken whilst these works are in progress, to ensure the continued safe operation of the Thames Water assets. This MAP has been produced on the basis of a traffic light trigger level system, whereby key actions / intervention measures are detailed for each trigger level, should these levels be breached during the works at any time.

Thames Water Utilities Limited may rely on the content and findings presented in this document.

## 1.1. Action Plan Aims and Objectives

This MAP has been produced in order to provide the following:

- A description of the site and surroundings.
- References to all key pieces of project information relating to these works.
- A description of the proposed construction phases, including actions.
- Details for the proposed monitoring works.
- Contact details and responsibilities of all parties to these works.
- Monitoring trigger limits and action / intervention measures.

## 1.2. Information Sources and References

Key pieces of information / reporting relevant to these works are:

- A-squared *14-19 Tottenham Mews – Thames Water Ground Movement Assessment* 2743-A2S-XX-XX-RP-Y-0001-01
- A-squared *Monitoring Specification* 2743-A2S-XX-XX-SP-Y-0001-01

## 1.3. Definitions

| | |
|---|---|
| Monitoring Contractor | TBC |
| Principal Contractor | Glenman Construction Ltd |
| Design Engineer | Mark & Partners Ltd |
| Geotechnical Engineer | A-squared Studio Engineers Ltd |

# 2. The Site and Proposed Development

## 2.1. Site Specific Information

- Principal Contractor: Glenman Construction Ltd
- Site Address: 14-19 Tottenham Mews, W1T 4AA, London
- Contact Details:
  - Nick Kidsley – Nkidsley@glenman.co.uk
- Site Working Hours:
  - Monday to Friday: 0800 to 1700

## 2.2. Scheme Details and Location

The development site is located at 14-19 Tottenham Mews, W1T 4AA in the London Borough of Camden, as shown in Figure 1.

The site is located at approximate National Grid reference of 529323E, 181799N and the site covers an area of approximately 0.05ha.

The site is currently occupied by the NHS Tottenham Mew Resource Centre and consists of a 2 storey office building at ground level. The existing building is believed to be constructed using timber framed. The building is currently vacant and the site is relatively flat across the footprint at circa 26mOD.

Further technical details of the scheme and impact on the adjacent Thames Water assets are provided in the A-squared Ground Movement Assessment report: 2743-A2S-XX-XX-RP-Y-0001-00.


**Figure 1 Site boundary and surrounding features**


**Figure 2** **Thames Water assets on adjacent streets – Watermains**

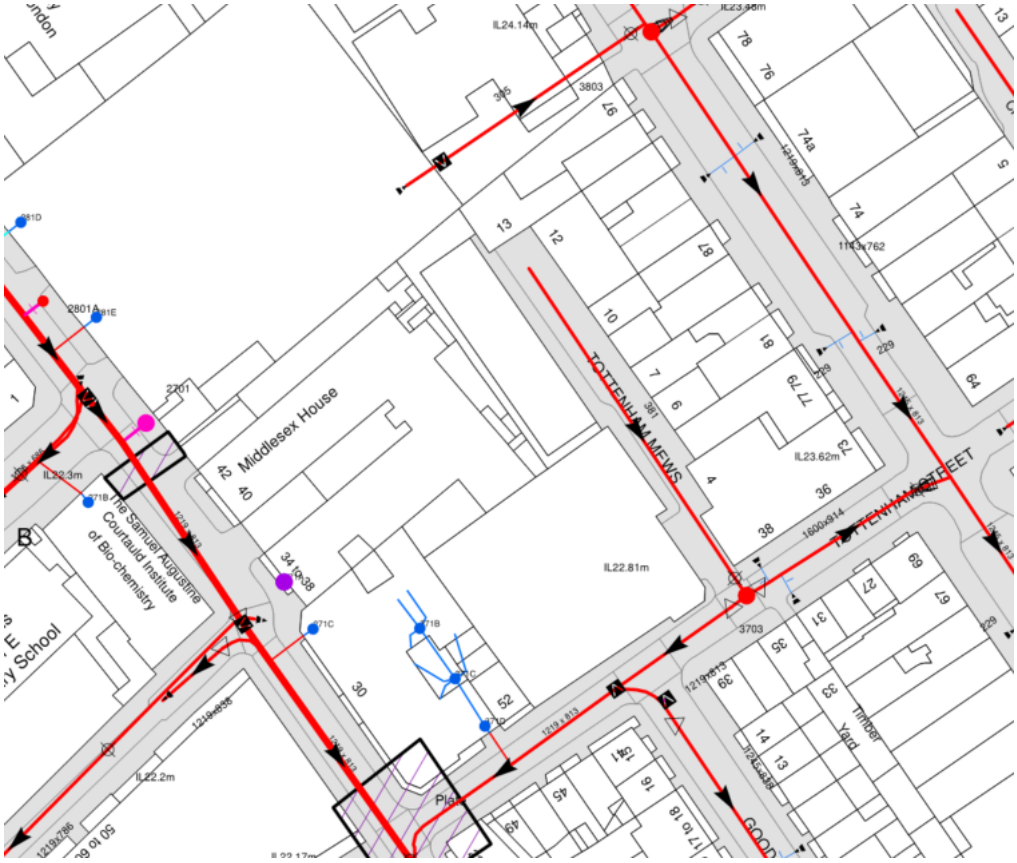



**Figure 3 Thames Water assets on adjacent streets – Sewers**

# 3. Site Constraints and Interfaces

## 3.1. Review of Key Constraints and Interfaces

A review of existing infrastructure and immediate site interfaces was carried out. The primary constraints and interfaces which need to be reviewed and managed as part of the proposed monitoring works are:

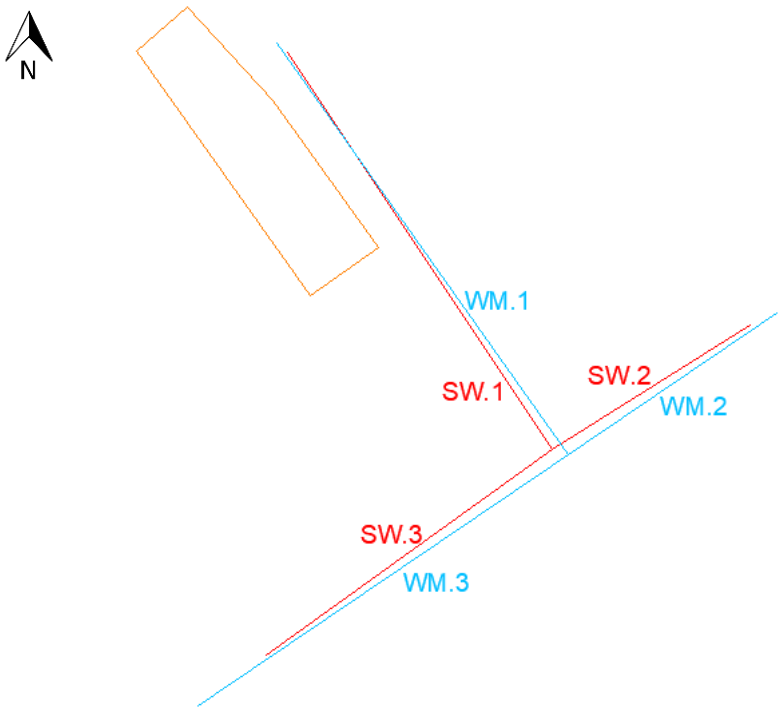
- Adjacent roads / pavements and any below ground services.
- Interaction with the nearby Thames Water assets.

## 3.2. Existing Infrastructure Subject to Monitoring

### 3.2.1. Thames Water Infrastructure

The Thames Water assets positioned in close proximity to the site and are shown in Figure 4. The assets include a water main, various water lines, and sewer lines.

A commercial agreement is in place between the client at Thames Water to ensure all appropriate asset protection liaison is undertaken. This MAP shall be reviewed fully by Thames Water for approval prior to the commencement of construction works.




Blue line – water line

Red line – sewer line

**Figure 4 Thames Water Assets labelled as per the ground movement impact assessment document**

### 3.2.2. Surrounding Pavements / Hardstanding

Pavements / hardstanding surrounding the works will also be monitored during the works, in order to determine the extent of ground movement / settlements immediately adjacent to the proposed building footprints.

# 4. Ground Movement Impact Assessment

A ground movement impact assessment (GMA) was undertaken by A-squared (document referenced in Section 1.2); this GMA forms the basis of derivation of the works monitoring trigger limits (as detailed in Section 9 herein).

The GMA has also been provided as Appendix A for ease of reference.

The GMA will be reviewed and approved by Thames Water subject to the satisfactory completion and implementation of this MAP. Should the works proposals deviate from that presented herein (through design change or otherwise) the content of both the GMA and this MAP will require review to ensure these aspects are sufficiently coordinated.

# 5. Works Programme / Milestones

## 5.1. Programme

The works programme (current at the time of drafting this document) is provided below.

## 5.2. Key Works Milestones

The anticipated key works milestones relevant to the scheme monitoring are as follows (may require updating if programme is altered):

- Piling prep and works: 30.06.23 to 01.09.23
- Substructure excavation (lift pits, pile caps, ground beam excavation): 04.09.23 to 08.12.23

The current programme marks 08.12.23 as the completion date for the substructure works.

The monitoring period that is considered critical to the protection of the adjacent Thames Water assets is the substructure works, from piling and excavation through to construction of the basement and ground floor permanent works slabs. Monitoring is proposed to continue beyond the substructure works, all details of the monitoring proposals are set out in Section 7.

# 6. Works RAMS

## 6.1. Contractor RAMS

The Contractor will provide RAMS for piling and monitoring separately.

This document should be reviewed in full and understood by all relevant stakeholders to these works.

# 7. Monitoring Objectives and Proposals

## 7.1. Overview

The fundamental aspects of the monitoring strategy include a robust scope, sufficient data measurement frequency, effective data review and understanding, timely interpretation of said data against pre-agreed trigger limits, and the implementation of mitigation measures / actions on site should they be required.

The monitoring works are required to inform the construction process and provide advance warning of potentially damaging movements and movement trends, thereby allowing ample time for works means and methods to be modified, if necessary, to control these movements.

The primary objectives of the monitoring works proposed for this scheme are detailed in Table 1.

**Table 1 Objectives of the proposed monitoring works**

| Monitoring Objective | Description |
|---|---|
| Construction process control | Provision of data that informs decisions made as an integral part of the pile foundation construction process (such as the need for backfilling or other measures if movements exceed expected values at any given works phase). |
| Design verification | Provision of data to validate assumptions and predictions made during the design process, and to verify that the excavations and pile installation is performing in line with the assumptions made in producing the scheme ground movement assessment. |
| Risk management | Provision of data that may be used to trigger mitigation / contingency actions to control the risks associated with the impact of the construction works. |
| Liability | Provides data that may be reviewed by third parties. |
| Asset protection | Provision of data that can be used in connection with mitigation / contingency plans to protect existing assets, ensuring their continual safe operation; in this case the Thames Water assets. |

| | |
|---|---|
| Legislative compliance | Provides evidence in support of a safe system of work for the site personnel and affected third parties. Assists the design team in meeting their obligations under the CDM guidelines. |

## 7.2. Scope of Monitoring Works

The scope of the proposed works is detailed in full in the monitoring specification (document reference Section 1.2). The specification is provided in Appendix C and is the latest version at the time of writing. Should scope changes be implemented, this should be reflected both in this MAP and the works specification.

The outline scope of works is as follows:

- Survey Monitoring of the Thames Water assets shown in Figure 5.
- Vibration Monitoring of the Thames Water assets. The vibration monitoring locations should be along the length of the Thames Water sewer at closest proximity to the piling/boring machinery at any given time.

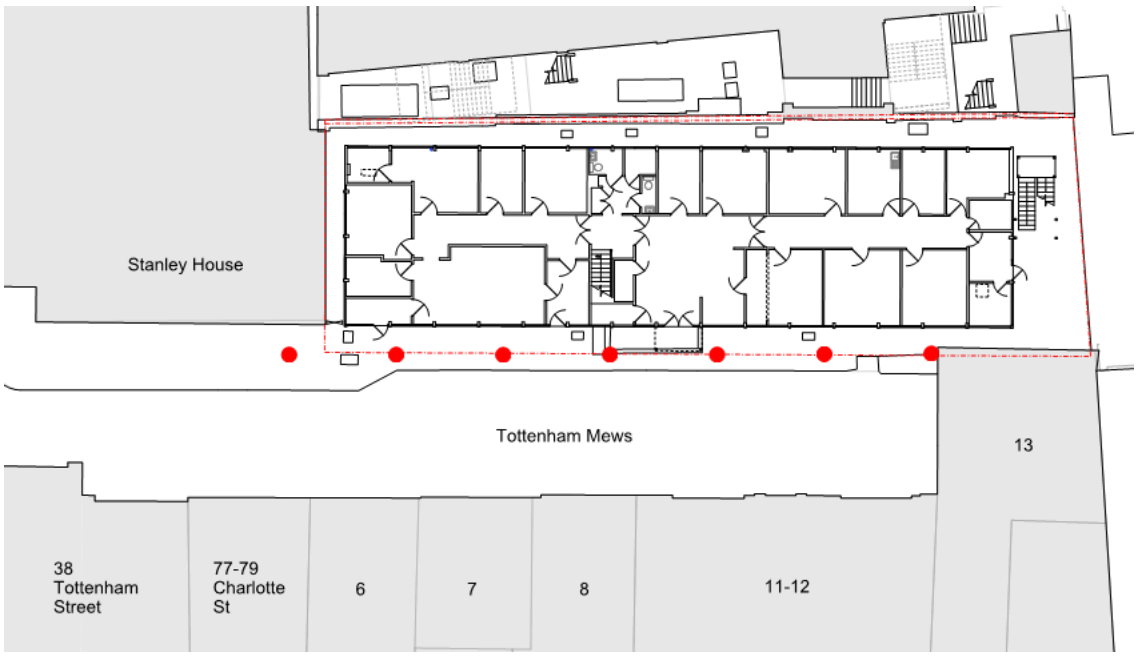



**Figure 5 Proposed monitoring survey pin locations on adjacent footpaths marked in red**

## 7.3. Data Acquisition Duration and Frequency

The data acquisition and data frequency are detailed in full in the scheme monitoring specification presented in Appendix C.

# 8. Monitoring Plan

## 8.1. Project Team Roles and Responsibilities

**Principal Contractor – Glenman Construction Ltd**

The Principal Contractor holds ultimate responsibility for site management and health and safety issues.

The Principal Contractor will also be carrying out the major groundworks during the construction of the development basement / substructure. These works are considered a critical phase of the overall monitoring plan.

The Principal Contractor is responsible for reviewing the monitoring data weekly and confirming that readings are as expected / within the defined trigger limits. The design team (Mark & Partners) shall be informed if a trigger limit is breached and the outlined sequence of actions, as per Section 8.2, shall be implemented.

| Representation for Principal Contractor Glenman Construction Ltd | | | |
|---|---|---|---|
| 1st | Nick Kidsley | NKidsley@glenman.co.uk | - |

**Instrumentation / Monitoring Contractor – TBC**

The Monitoring Contractor is responsible for the installation/up-keep/calibration and maintenance of manual and electronic monitoring/logging equipment.

The Monitoring Contractor is also responsible for the timely provision of interpreted data to the project team, as detailed herein. The Monitoring Contractor shall make data available in a timely manner to the Design Team.

| Representation for Monitoring Contractor (TBC) | | | |
|---|---|---|---|
| 1st | TBC | TBC | - |
| 2nd | TBC | TBC | - |

**Design Team / Engineers – Mark & Partners Ltd**

Mark & Partners perform the function of scheme structural engineer. They have the responsibility for the structural scheme and provide an overarching link and coordination of the required specialist sub-consultants during the monitoring works.

| Representation for Mark & Partners Ltd | | | |
|---|---|---|---|
| 1st | Najib Sheeka | najib@markandpartners.co.uk | 079 8062 3119 |
| 2nd | Alex Mark | alex@markandpartners.co.uk | - |

**Thames Water**

Thames Water are not responsible for the execution of any elements of the site works or monitoring scope. They should be provided access to all monitoring data / reporting throughout the duration of the works in a timely fashion for their review.

| Representation for Thames Water | | | |
|---|---|---|---|
| 1st | Ioannis Antonakos | Ioannis.Antonakos@thameswater.co.uk | - |

## 8.2. Contingent Actions and Preventative Measures

### 8.2.1. Weekly Monitoring Review Meeting

Each week, the Design Engineer shall review the interpreted data provided by the Monitoring Contractor in order to identify any trends and if appropriate raise early warnings. This will be reported back to the Principal Contractor on a weekly basis to confirm if any actions need to be taken.

If no concerns are highlighted, then works shall proceed as normal.

If a concern is raised, then a meeting shall be arranged with Mark & Partners Ltd/Monitoring Contractor/Thames Water and the following agenda shall be followed. If persons are not able to attend, then a conference call (MS Teams or similar may be used to expedite) shall be utilised for efficiency.

1. Review trend(s) of movements against predicted movements.
2. Review works being carried out and identify likely cause.
3. Agree working solution.
4. Action agreed changes to works, toolbox talks to be given to site team members.
5. Progress works and review monitoring data more regularly for the subsequent week (i.e. daily review of tiltmeter and all data / feedback from site).
6. If movement trend(s) have stabilized following (5.), continue in general accordance with this section.

### 8.2.2. Trigger Level Definitions

Trigger levels have been evaluated on the basis of the GMA predictions.

The following colour code system for the trigger values is proposed:

**GREEN** All behaviour as predicted, continue works and monitoring as specified and as per design intent.

**AMBER** Minor displacement occurring outside that predicted, but movement remaining within acceptable limits to prevent damage to neighbouring assets. Review / check monitoring data, increase frequency to daily or otherwise as advised by the Designer and review monitoring trends to establish timeline for any potential further trigger limit breach. The associated frequency of reporting should be updated to match the increased frequency in monitoring. Review implementation of potential contingency measures and pre-mobilise / mobilise mitigation arrangements in the case of a RED exceedance.

**RED** Movements exceeding limit and magnitudes that may potentially cause damage to neighbouring assets. Stop all works in the affected area of the site, review impact of increase in predicted movement on asset, and if required, implement contingency measures.

The proposed trigger limits are summarised in Section 9. These should be agreed with all interested parties prior to the start of the piling works.

### 8.2.3. Exceedance of Trigger Level

In any instance of an exceedance of a trigger level being encountered, works shall continue only if it is safe to do so. The Principal Contractor shall verify and confirm the exceedance with the Monitoring Contractor immediately. Once confirmed, the Designer and Thames Water representatives shall be informed of the exceedance by the Principal Contractor.

The movement data shall be reviewed closely on a more frequent basis. In turn, an Emergency Review Panel meeting shall be arranged within 24 hours with the Principal Contractor (to chair), the Designer and Geotechnical Engineer, and the Monitoring Contractor (to take minutes) to discuss the outline agenda shown in Table 2 below. Each Thames Water representative should be informed of all discussion outcomes / actions.

**Table 2 Emergency Review Panel meeting agenda**

| Agenda Item | Discussion |
|---|---|
| 1 | Review exceedance on the Monitoring Contractor's monitoring data against predicted movements. |
| 2 | Review works being carried out and identify the likely cause. |
| 3 | Agree working solution, if required, through application of the pre-agreed contingency measures detailed in this MAP. |
| 4 | Action any agreed changes to the works, toolbox talks to be given to site team members. |
| 5 | Progress works and review monitoring data more regularly for the subsequent month. |
| 6 | If movement trend(s) have stabilised, define new monitoring frequency. |

MS Teams or similar to be used for all meetings where site attendance is not required for speed/efficiency.

### 8.2.4. Contingency Measures / Actions

Indicative actions associated with the breach of specific trigger limits are presented in the following sections. However, the final actions implemented will be subject to the precise nature of any ground movement trend(s) and the cause of said movements.

The Principal Contractor shall have access to an available stockpile of suitable backfill material as an immediate contingency, if required, to backfill the excavation.

**GREEN** All behaviour is predicted, continue works and monitoring.

**AMBER** If an AMBER trigger level is exceeded, the actions presented in Section 8.2.3 should be implemented. Monitoring frequency shall be increased in the affected area as advised by the Designer and a review of the data shall be undertaken to assess the trend and determine timescales for when the RED trigger limit may be breached. The Designer shall update the ground movement assessment based on the new movement trend and shall update/increase the red trigger limit if feasible and subject to confirmation from Thames Water representatives. A visual inspection of any affected monitoring location should be undertaken by the Principal Contractor (or Designer) and Monitoring Contractor. Contingency measures shall be fully designed and ready for deployment if movement trends are expected to continue past the updated RED trigger limit. In advance of the works as part of the preparation of RAMS, outline design of any contingency measures should be undertaken to verify their effectiveness

**RED** If the RED trigger limit is or is likely to be exceeded, works should cease temporarily pending the actions of Section 8.2.3. Depending on the location of the exceedance, it may be possible to pause works in a local /particular region of the site. This review shall be carried out by the Principal Contractor and Designer as soon as practically possible after the works have stopped. The review shall critically appraise all the available monitoring data and construction records and then decide and agree upon the appropriate course of action. This may authorise the restart of the works with modified parameters or trigger levels. Such modifications shall be subject to appropriate analysis, checks and approvals by all relevant stakeholders

It should be noted that trigger values are for guidance only. Should a red trigger limit be breached, the monitoring data should be used to reassess the likely impact before implementing any contingency measure. This would be undertaken by reassessing the differential movement and net lateral deflection across the structures.

The proposed trigger limits are summarised in Section 9. These should be agreed with all interested parties prior to the start of the works.

#### 8.2.5. Hold Points

After each key construction stage, i.e. piling prep and building construction, there is to be a hold point where the monitoring data is reviewed and compared to the predictions and trigger limits.

The Principal Contractor will be responsible for supervising the construction works and ensuring that all the requirements of the Monitoring Action Plan are met in full.

# 9. Trigger Limits

## 9.1. Survey Monitoring

The following table details the trigger limits to be adopted during the works.

Traffic light trigger limits have been provided for the monitoring pins placed within the pavement adjacent to the works, within the 1 mm settlement contour, and above Thames Water assets. These are provided as vertical only.

**Table 3 Monitoring works triggers**

| Trigger Level | Monitoring Survey Pins (Vertical) |
|---|---|
| **GREEN** | 0 to 14 mm |
| **AMBER** | 14 to 20 mm |
| **RED** | >20 mm |

## 9.2. Vibration Monitoring

All boring and construction operations must be controlled to ensure that limited vibration is transmitted to the Thames Water assets. 'Real-time' vibration monitoring will be used to measure vibrations in proximity to Thames Water assets. A peak particle velocity of 10mm/s at the face of the apparatus (i.e the Thames Water asset being monitored) is the maximum allowable vibration stated in the Thames Water *Guidance on Working near our Assets*. This value has been adopted as the red trigger for vibration at ground level near the Thames Water assets. An amber trigger of 5mm/s should also be adopted.

Note the number and location of monitoring locations will depend on the precise sequencing of the proposed development. The proposed locations will need to be reviewed as the design develops and as the sequencing for any construction activities becomes more defined.

# 10. Communication of Monitoring Data

The monitoring data is required to be made available in a timely fashion by the Monitoring Contractor, such that the Principal Contractor may review this weekly.

The requirements are outlined in full in the monitoring specification and this MAP.

The following general rules should apply to the transfer:

- The Monitoring Contractor shall make interpreted data available within 24 hours of each monitoring visit (where manual monitoring is undertaken), to enable the Principal Contractor (and Designer if required) to review the data set and implement any required contingency measures / actions.
- The Principal Contractor shall contact the Design Team should a trigger be breached.
- Manually surveyed data should be accessible as soon as practicable from the point of survey via an automated data summary web portal.
- The Monitoring Contractor shall provide formal summary reports every two weeks, detailing the works undertaken and the movement trends recorded for all positions. The Monitoring Contractor should also make all data available in excel format.
- The Monitoring Contractor shall also issue these reports to the Thames Water contacts provided in this document.

The following general rules shall apply for each trigger limit range:

- If movement monitoring is within the green category level, then the Monitoring Contractor shall adhere to the above points.
- Should an amber category level be recorded, the Principal Contractor, Design Team, and Thames Water shall be notified immediately. A review shall be undertaken by the Monitoring Contractor of all available monitoring data in order to establish any possible causes for the excessive ground movements. A meeting should be held by the project team (including Thames Water) to agree on contingency actions (see details of Sections 8.2.3 / 8.2.4).
- Should a red category level be detected, the Principal Contractor, Design Team, and Thames Water shall be notified immediately that works on the site must cease. The only exception to this is any construction / works that are required as emergency measures to mitigate al necessary health and safety and structural risks. A review shall be undertaken by the Monitoring Contractor of all available monitoring data to establish any possible causes for excessive ground movements. A meeting should be held by the project team (including Thames Water) to agree on contingency actions (see details of Sections 8.2.3 / 8.2.4).
- The Monitoring Contractor shall on each visit to the site inspect the area surrounding the works current at that time for any obvious signs of movement (hard standing cracking etc.). Any new cracking or similar observed by the Monitoring Contractor not previously identified should be immediately reported to the Principal Contractor and Design Team.

# Appendix A:  Ground movement impact assessment

# Appendix B:  RAMS

# Appendix C:  Monitoring Specification

A-squared Studio

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