

Project Unique ID	
Site Name	44 Dartmouth Park

Monitoring Methodology: **Installation and Monitoring**

Ref: 1680-MS

Issued: June 2016



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MONITORING METHODOLOGY

1. Introduction

The purpose of this proposal is to put forward a monitoring system that will measure the effects that the demolition and construction activity may have on the neighbouring structures.

The monitoring will consist of 3D Reflective Targets.

This proposal details the methods of structural monitoring from installation and implementation to reporting and analysis.

2. Installation

2.1 Control

Monitoring control station will be established around site perimeter, from which the monitoring targets will be surveyed. The coordinate system will be specific to the monitoring, unless instructed otherwise.

Additional survey targets for control will be placed on surrounding structures outside of the site's zone of influence and these points will be accurately fixed in the 3-dimensional plane.

Their positions will be determined during the establishment of the primary control. Access and permission to install these points will have to be provided by others.

These targets will be used to establish station coordinates prior the commencement of each survey. Their coordinates will be calculated using the resection method calculated within the instrument. This method of control establishment allows for accurate control to be determined without having to rely on a fixed station position in close proximity to site.

2.2 3D Reflective Targets

Monitoring targets are to be established at their approximate locations indicated on Figures 1-5 below. The exact locations of the targets will be determined by the line of sight from the survey station.

The monitoring points will be installed using a specially adapted long-reach pole, which is sufficient to establish targets at approximately 3rd floor level. If this is deemed to be too low, a window or roof access will be required.

Access and permission to install and survey all points will need to be provided by the client.

To enable the installation of targets on the rear elevation of No.46, vegetation will need to be removed in the target locations.

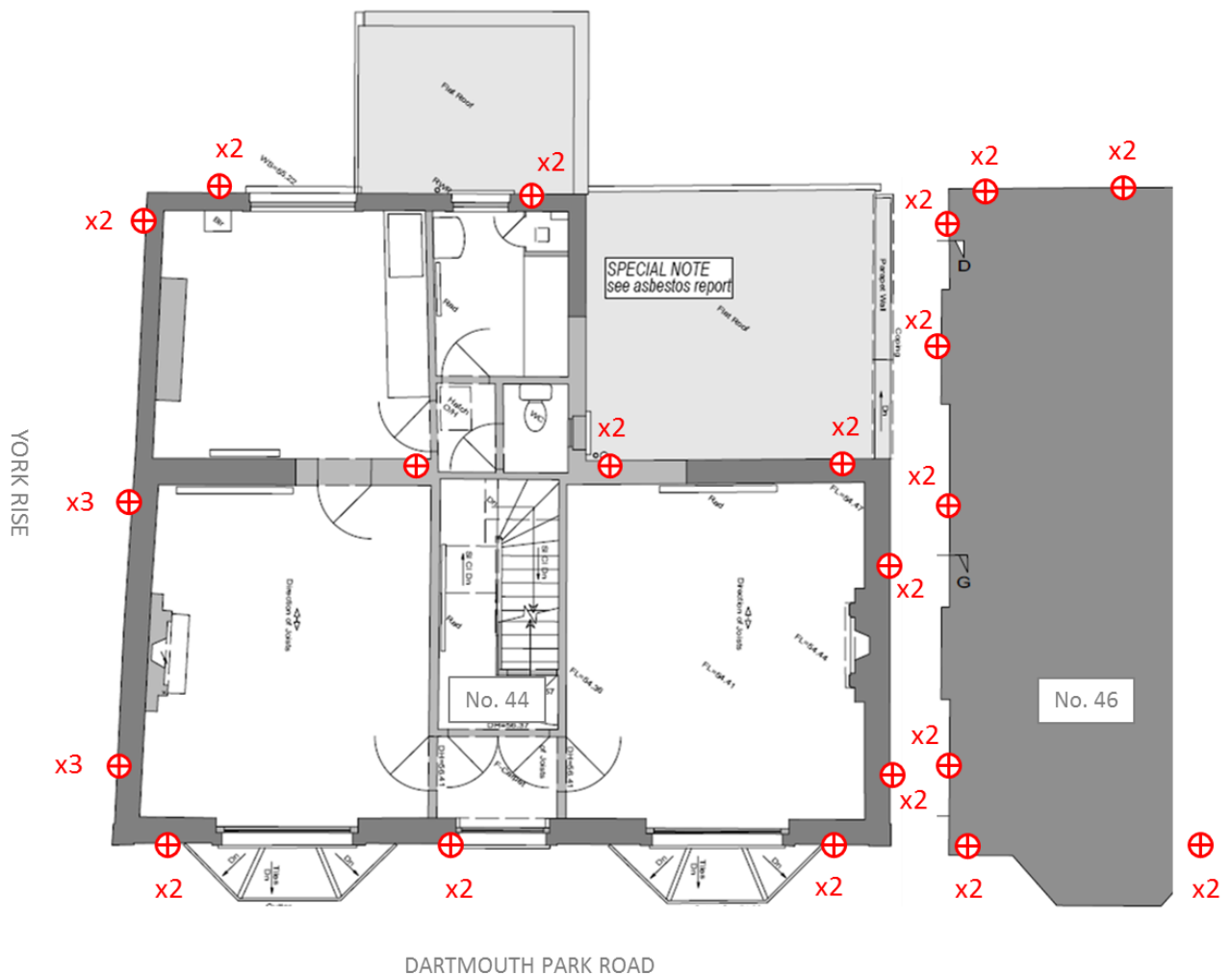


Figure 1 – Proposed Monitoring Point Location Plan

 Approximate location of 3D Reflective Target

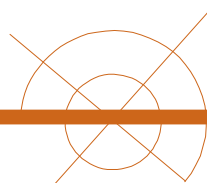
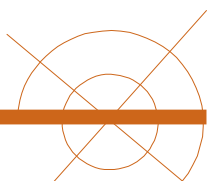




Figure 2 – Proposed locations of Targets on front elevations of No.44 and No.46



Figure 3 – Proposed locations of Targets on rear elevations of No.44 and No.46



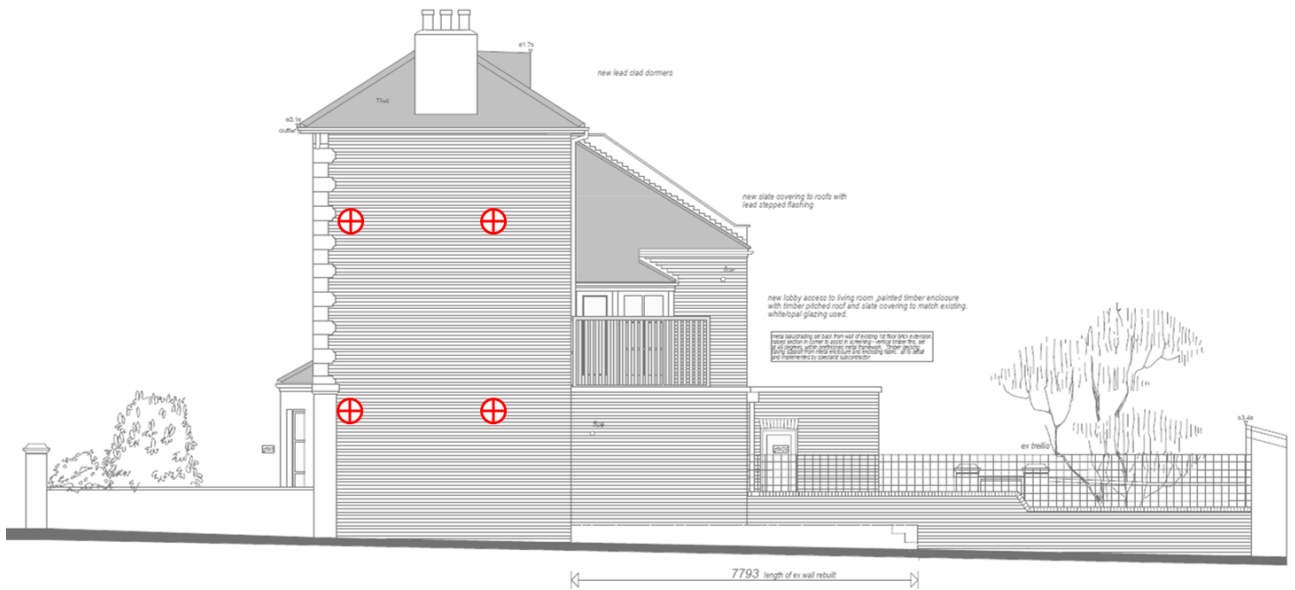
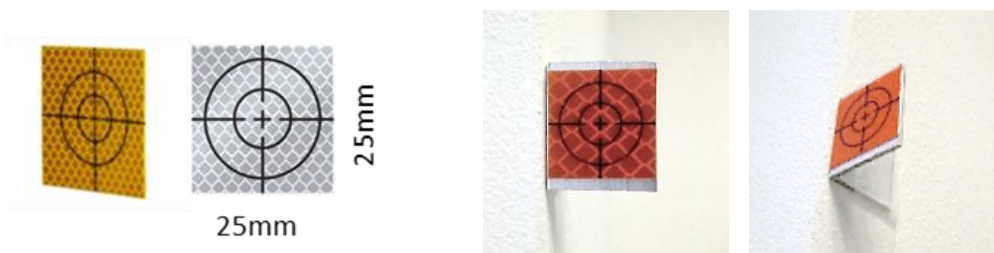


Figure 4 – Proposed locations of Targets on North/East elevation of no.44

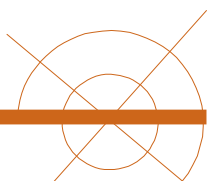


Figure 5 – Proposed locations of Targets on South/West elevation of no.44

The targets will be attached to the walls using an adhesive.



Example of Reflective Target and Target on right angled bracket



3. Monitoring Procedure

Two rounds of angles are surveyed in both faces for each survey point. The data is recorded and stored on the instrument. The instrument also displays differences in real-time, allowing the surveyor to assess the extent of any deviation in the field, and if necessary, report large deviation immediately to Head Office. Monitoring Targets will be surveyed 3-dimensionally with an accuracy better than $\pm 2\text{mm}$.

4. Monitoring frequency

The frequency of the measurements has been set to:

- weekly - during ground works (10 weeks)
- monthly – thereafter (42 weeks)

A clear instruction (in writing) will need to be provided by the client for SES to commence the installation, regular monitoring or change of frequency.

5. Trigger Values

Trigger values will need to be specified by the structural engineers prior to the commencement of works.

6. Reporting

On completion of each cycle of readings the data is emailed from site to head office for computation and reporting. Any large deviations identified in the field are relayed back to Head Office immediately for review.

The reporting will be provided in PDF format

Each report will contain the following information:

- Executive Summary including:
 - Summary of results
 - Trigger Limits
 - Instrumentation
- Schedule of visits including:
 - Date of survey,
 - Weather conditions during survey,
 - Surveyor responsible for the survey.
 - Applicable notes and accuracies
- Survey results showing:
 - Tabular data highlighting exceeding specified trigger limits.
 - Graphs showing vertical and horizontal movements with time.
 - Location plans.

7. Instrumentation

Total Station Theodolite



Leica TS30
 Angular Standard Deviation
 Distance Standard Deviation
 Absolute error

Motorised Total Station
 $\pm 1''$ arc
 $\pm 1\text{mm}+1\text{ppm}$
 $\pm 2\text{mm}$

