

# Case Study

## Customer:

Greenhatch Group

## Project:

5 year monitoring project in an historic part of London

## Solution:

Trimble S9 and the Trimble Access Monitoring Module



area, along with surrounding restaurants, offices and listed buildings are closely monitored during the early demolition and piling work. Access on site is restricted and additionally the client required all the information to be in the hands of its structural engineers within 24 hours of collection. The deliverable was to include 2D analysis graphs and x,y,z values for any detected 3D movement along with their delta values. Jordan decided that the best monitoring method for this work would be a semi-automated system using a Trimble S9 1" Total Station and a TSC3 logger running Trimble's specially developed Monitoring Module which can be added onto Trimble's Access field survey software, along with Trimble T4D Lite to

present the data and create the deliverables.

"The S9 and T4D Lite have enabled us to deliver exactly what the structural engineers require, all within their specified 24 hour period."

**Jordan Knight,  
Greenhatch Group**

Jordan knew from previous experience that the Trimble S9 was a fast and above all, reliable instrument thanks to its MagDrive, SurePoint and FineLock technology\* and that when combined with the Trimble Access Monitoring Module 1\*\* and TD4 Lite, he would have a solution that would

deliver exactly to the client's specification. Convinced of the system's speed and reliability, he felt confident that all the survey work could be undertaken with just one day on site rather than the two days predicted by other companies. This time saving would not only reduce cost for the client but also the additional logistics that two days on site would require and Jordan believes that this helped secure the contract for Greenhatch.

As with many monitoring projects, this job did not require the continuous, real-time 24/7 measurements a fully remote system would supply. Therefore, during the early stages of the work Greenhatch engineers would visit the site once a week. On each visit, the engineer would use the Trimble Access Monitoring Module to collect the data, analyse it whilst still in the field to pick

## Achievable Monitoring

A move into monitoring can be achieved on almost any budget thanks to a new era of software that allows for the collection, display and analysis of data without the need for a real-time monitoring system.

Demand for monitoring is on the rise. Ageing infrastructure, construction projects, particularly those in built-up areas, and natural events require improved awareness of movement if sites and surrounding buildings are to be kept safe. It's a critical component in today's project environment and for those survey practices prepared to undertake this work, an opportunity to expand services and add new clients.

For Greenhatch Group, an evolving practice that offers a range of survey and engineering services through its three UK and one European office, it is not unusual to have between ten and fifteen monitoring projects running simultaneously. Governing the choice of system for each of these projects is the level of sophistication required for the deliverable along with each individual site's logistics. Whilst Greenhatch Group has an extensive survey portfolio at its disposal, it has a 'horses for courses' approach when it comes to selecting the most suitable monitoring system for the client's requirements. These choices range from fully automated real-time systems using Trimble's high accuracy S9 1" Total

Stations combined with Trimble 4D Control monitoring software (T4D) to semi-automated systems using a very cost-effective web portal version of the software, T4D Lite. The company also has a Trimble SX10 Scanning Total Station which is used on monitoring jobs where there is no clear indication as to where targets should be placed such as on a bowing building, retaining wall, or simply as a backup to other methods.

One of Greenhatch's current monitoring projects sees Engineering Manager Jordan Knight running a 5 year job in an historic part of London where the original Roman settlement was based. The work involves the demolition of old buildings and the construction of new student accommodation and public exhibition spaces which will showcase the area's renowned Roman Wall.

### Site logistics and client deliverables dictate system choice

This project is still in its initial phases and therefore Jordan's current focus is to ensure that the Roman Wall and basement



▲ The Trimble S9 in use on the project

up any obvious movement and then process and deliver the client requested deliverables, via the Cloud, all within the specified 24 hour period.

172 small monitoring prisms were therefore mounted discretely on selected buildings around the site and six setup positions were established for the S9 to tie into on each return visit. These coordinates were stored in the Trimble Access Monitoring Module. The Monitoring Module was used to control the measurement workflow and automate the measuring process with Jordan able to pre-define how many measurement rounds were required and to which targets, along with the measuring order and amount of time between each round.

Whilst all data is currently being delivered well within the client's specified 24 hour deadline, it is Jordan's aim to fully exploit the functionality of T4D Lite so that the process becomes almost instantaneous. In particular, this will be assisted by T4D Lite's ability to create fail safe, clear deliverables (reports, charts, graphs, scatter plots etc) without the need to manually manage Excel spreadsheets.

### Back up from the SX10

If a reading over a trigger value occurs, the Greenhatch engineer can immediately alert the client (who has a plan of all the targets for fast identification of the problem area) and provide an output report from T4D Lite showing delta values there and then. In these cases, Greenhatch has offered to undertake a 3D scan with the Trimble SX10 Scanning Total Station. Whilst the client was initially dubious about the concept of using 3D scanning for deformation purposes, they have since been won over by the SX10's mm survey grade accuracy and see it as a useful back-up that will assist in reassuring the structural engineers. The SX10 will also be used later in the project to create 3D scans for use with the project's BIM model.

Jordan reports that the monitoring system is functioning well and the demolition team delighted with the speed and quality of the deliverable and the added value of the SX10 scans if required. As the project progresses to include the monitoring of both the heritage aspects of the site as well as the slab which is constructed above a Thames sewer, additional prisms will be added. If at any stage Jordan needs to

take the monitoring work from semi-automated to fully automated, this is easily achievable by upgrading to the full version of Trimble 4D Control. The existing data can be imported from T4D Lite, to allow historic information to be used as the project progresses.

Jordan concludes, "Access time is tight on this project and the reliability of the Trimble S9 combined with the fail-safe deliverables generated by T4D Lite has enabled us to deliver exactly what the structural engineers require, all within their specified 24 hour period. As ever KOREC support is on hand when we need it bringing another level of assurance to what we do and based on the success of this early monitoring job, Greenhatch will be undertaking additional engineering and survey work on this site."

*\* Trimble FineLock is smart tracking technology that enables the S9 to detect a target without interference from surrounding prisms, as well as measuring around 670 horizontal and vertical angles per measurement, giving very precise results.*

*\*\* The Trimble Access Monitoring Module gives the surveyor a nice workflow to create the monitoring job, measuring routine, QA options and reports. Once the points have been measured, the data logger takes control of the process, freeing up the surveyor to undertake other tasks on site. Once all the measurements have been completed, the surveyor can view the results, create various reports on site and either email or synchronise them via the Trimble Connect cloud back to the office along the measured job file, which can be imported into T4D Lite.*



▲ Trimble's S9 is recognised worldwide for its high level of accuracy

**Trimble 4D Lite is available on a free 30 day trial at [www.t4dlite.com/T4DLite/SignUp](http://www.t4dlite.com/T4DLite/SignUp)**

## Contact us:

Please do get in touch for further information on any of the products or services mentioned in this case study, a demonstration, support or just a chat about your requirements.

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