

CUSTOMER

Tri-Tech Surveys

PROJECT

Monitoring York's
historic city walls

SOLUTION

Trimble S7 Total
Stations, Settop M1
comms boxes and
Trimble T4D software

Securing the past

As the York Station Gateway Project gets underway, a carefully planned approach to a challenging site has enabled Tri-Tech Surveys to install an automated 24/7 Trimble monitoring system that's delivering the high-quality data needed to keep the walls and the general public safe.

Surrounding the beautiful city of York are the longest medieval town walls in England. At 3.4km they are the most complete in England, beautifully preserved and a major tourist attraction. Having survived many threats over the centuries including invaders, rioters and threats to demolish them, today they are a Scheduled Ancient Monument and a Grade 1 listed building.

Keeping these walls safe, along with the members of the public in their vicinity, is therefore a priority during the extensive construction work that's being carried out throughout 2024 as part of the York Station Gateway Project. This project will see the council working in partnership with West Yorkshire Combined Authority, Network Rail, and LNER with initial construction works being carried out by John Sisk and Son. Improvement works will see the removal of an existing bridge, the installation of a contiguous piled retaining wall to protect the walls and construction of an improved transport hub with dedicated spaces for passengers, cyclists, pedestrians, buses, drivers and taxis.

Collaborative planning

Under the guidance of Managing Director, Ted Harland, Tri-Tech Surveys has a wealth of experience in delivering high accuracy survey and engineering data, including monitoring solutions, and operates nationally in both the public and private sectors. Having worked with the project's client previously, Ted Harland, Joe Haines (Director) and Jack Brittain (Director) were able to liaise closely with their team to see how best to meet the brief to monitor a 100m section of York's walls over an initial period of 35 weeks.

With a particularly tight timeline due to the upcoming demolition of an existing bridge further complicated by limited access to an extremely busy site, Joe knew that careful planning of both the system and the positions of the total stations would be key to the success of the project and a fast and efficient installation. Following a site visit with the client, three locations with power were pinpointed where the total stations would be secure and have the best line of site to their particular zone with one zone would requiring more extensive monitoring than the other two.

Additionally, Joe suggested taking the monitoring solution beyond the spec by suggesting a fully automated system rather than a manual one. This would reduce visits to the busy site to a minimum and provide far more data which would allow for better analysis and the ability to pick up any movement within minutes.

Essential: Weatherproof Total Stations

As Tri-Tech Surveys are long term Trimble users, Joe knew that the company's Trimble S7 with its IP65 rating (protected against water jets from any angle) would be ideal for the exposed locations where the total stations would be positioned. Trimble S7s are also equipped with



One of the three Trimble S7's in the customised cage

Main challenges of the site:

- Avoiding disruption to the main works on a busy site
- Short two-week lead time to plan, test and install.
- Avoidance of any damage to listed buildings during target and total station installation.
- Access for a MEWP to position the total stations high enough for the best line of sight.
- Careful planning to include adding in more targets in one of the zones during certain periods of the works.



Aerial view of the site



Strategic locations were carefully selected for each of the three Trimble S7 Total Stations

VISION technology for video robotic control for scene documentation and photogrammetric measurements making them a reliable choice for checking the lines of site remotely if anything should occur. The company's existing S7 was therefore supplemented by two further ones purchased from KOREC.

With time tight, KOREC supplied the instruments within days to ensure that the installation could run smoothly during a week in April. The KOREC monitoring team was also briefed ready to handle any site issues during the set up.

Installation: Careful planning ensures a smooth set up

Before the installation, the Tri-Tech team customised the total station cages removing some of the bars for a better line of sight whilst ensuring that they remained secure and protected. Permission was also sought for fixing targets on the wall and for locating one of the total stations on a Grade 2 Listed Building. Finally, system testing was carried out at the office.

On site, the S7's were positioned using a MEWP (mobile elevated work platform) and fixed to Network Rail's lost luggage office, the chimney of a nearby cottage and York Station. The total stations were then connected to a Settop M1 box which remotely manages and controls Trimble total stations for real-time monitoring. Also, in case of power outages or interruptions, the Settop M1 ensures the data is safely stored on a local disk. The total station information relayed from the M1 comms hub is fed into Trimble's 4D Control software wirelessly for generating alerts based on various agreed tolerances and for data analysis and trend spotting.

During the five-day installation, over 150 targets were also positioned as per the planned design, carefully affixed to the mortar between the stones of the wall to avoid any damage. Following initial observations, the system went live with rounds taken up to every 5 minutes depending on the work underway.

Monitoring System used:

- 3x Trimble S7 Total Stations
- 3x Settop M1 comms box
- Trimble T4D software

“.....we have complete confidence in the reliability of the Trimble S7's, they're sturdy workhorses, particularly well-suited to the challenging condition, where we deploy them.”

Joe Haines, Director, Tri-Tech Surveys



Trimble S7 Total Station and the Settop M1 housed alongside

Joe Haines reports that they are now over a month into the project, and everything is working smoothly: "The system we've installed is working well and really, we only need to return to site to position any new targets. The client is delighted that we are over delivering on the spec and that this data can be used to analyse additional trends, such as temperature changes, to ensure everything is within tolerance."

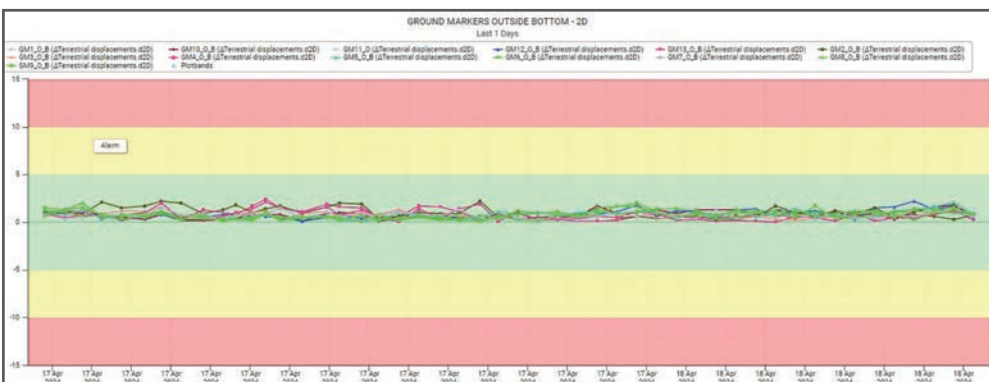
"With tight lead times and a compact schedule, our team's collective effort with the client has proved instrumental in navigating this complex project. KOREC has consistently been available whenever we've needed them, and we have complete confidence in the reliability of the Trimble S7's. They're sturdy workhorses, particularly well-suited to the challenging conditions where we deploy them."



A prism in position



Fixing the prisms



Trimble's 4D Control software is used for generating alerts based on various agreed tolerances and for data analysis and trend spotting

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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Settop M1 box