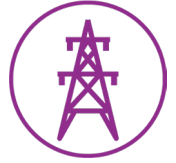




CASE STUDY

Edinburgh Gin Distillery & Visitors Centre



RESTRICTED ACCESS

CLIENT

Edinburgh Gin

CONTRACTOR

George Shakey and Sons Limited

SCOPE OF WORKS

Bored Bearing Piles
Rotary Bored Piles
Contiguous Piled Retaining Wall
SFA Piles
Drill & Case Mini Piles

Project Brief

Roger Bullivant Limited (RB) supported George Sharkey and Sons Limited's proactive and pragmatic approach in delivering this landmark project in the heart of the 'Old Town' of Edinburgh. In doing so, RB's involvement began early in the project, providing specialist design input to assist the design team, Etime Consulting, in adopting a suitable and cost-effective solution.

Given the challenging ground conditions on this restricted access site, delivering the project with minimal impact posed a significant challenge. However, the team was able to overcome these obstacles and deliver the project to a high standard.



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RESTRICTED ACCESS



Key Issues/Requirements

- ↳ £552k sub-contract by George Sharkey and Sons Limited to install the Foundation Bearing Piles and Contiguous Piled Wall for the new Edinburgh Gin Distillery and Visitors Centre.
- ↳ RB were required to provide a design methodology to suit the underlying ground conditions using both information provided by the Client, along with RB's local knowledge and experience working in the area.
- ↳ The geotechnical works associated with the site consisted of a combination of 660/600mm diameter rotary bored bearing piles and a contiguous piled wall, and 220/190mm diameter overburden system bearing piles internally within the existing Victorian Arches. All piles were designed in accordance with Eurocodes.
- ↳ During delivery of the project on site, RBL worked closely with the operations team from George Sharkey and Sons Limited ensuring a clear understanding was in place between both parties. Through continual dialogue and regular progress meetings the works progressed on programme throughout. This approach allowed other site works to be co-ordinated not only while RBL were on site but also between our visits.

Solution

- ↳ The historic stone retaining wall showed obvious signs of historical movement, however no recent monitoring data was available within the last 13 years. From discussions between City of Edinburgh Council and the Project Engineer, it was concluded that the wall was stable with no signs of recent movement and no longer a significant concern. Nevertheless, the new substructure required to be designed to mitigate risk of destabilisation as a result of the basement construction.
- ↳ The scheme was originally proposed as 450mm diameter contiguous piled wall formed at the foot of the existing historic retaining wall on site, which was to be un-propped in both the temporary and permanent conditions with very stringent deflection limits specified. Over the course of several design workshops with all relevant stakeholders several concepts were discussed to limit deflections; including the use of rock anchors formed through the wall and into the underlying bedrock.
- ↳ The construction of the historic stone retaining wall was largely unknown given the lack of historic drawings and limited site investigations. A localised area of the wall was observed to be founded on bedrock and assumptions were made within the design on this basis.

RBL explained that although rock anchors may offer a reduction in head deflection of the wall, they were not suitable given the uncertainty over construction of the wall and potential for detrimental effect on the wall during formation. Furthermore, if rock anchors were to be incorporated as a permanent element within the works a suitable inspection and maintenance scheme would require to be implemented which the current design of the structure did not lend itself to.

- ↳ RBL, therefore, suggested that in lieu of rock anchors, increasing the contiguous piled wall diameter, in addition to the introduction of temporary props during the construction stage and buttress walls as part of the permanent works, would assist in limiting deflections. Through collaboration with the temporary works engineer and project engineer, RBL were able to demonstrate through design that deflection could be kept within tolerable limits.

RESTRICTED ACCESS

- ↳ Constraints of the project included restricted access works within listed Victorian arches, restricted room on plan externally, and piling near a historical retaining wall that had undergone historical movement / remedial works. In addition to this, the site is in a prominent location in Edinburgh at the junction of Cranston Street and East Market Street. Therefore, noise and nuisance associated with the works needed to be kept to a minimum.
- ↳ Unconfined compressive strength (UCS) values of the bedrock ranged from 33.7-64.80MPa. To ensure piles achieved the minimum design penetration into the bedrock as dictated by our in-house pile design, all piles were installed using rotary bored / DTH drilling techniques.
- ↳ All piles were designed in-house and constructed in accordance with Eurocodes. Verification of SLS was delivered during the works by undertaking a non-working static load test, with maximum settlement recorded as 3.50mm at test loads exceeding 2000kN and performing well within the requirements of the specification. Design of the contiguous piled wall was also carried out in-house and monitoring of the wall is on-going as construction works progress, with temporary props now installed to facilitate basement construction. Results of this again indicate that the wall is performing well within the limits of the specification.
- ↳ All 660/600 rotary bored piles were reinforced with 6 No. 20mm dia, 25mm dia or 32mm dia longitudinal bars. Due to minimum pile depths and restricted working space on site, several pile cages were spliced and jointed on site during the installation process. All 220/190mm dia mini-piles were reinforced with a single GEWI bar full-depth. All reinforcement cages were supplied with debonding foam over the upper section to assist follow on contractors with cropping and trimming the piles to final cut-off levels.

Achievements

- ↳ Despite sub-zero temperatures throughout January 2023 temporarily halting all site works, all piling was completed ahead of programme.
- ↳ The project was delivered on time over the course of three visits, ensuring the build programme could be achieved, forming piles within the historical arches, and a contiguous piled retaining wall and temporary cased bearing piles externally.