Geo-Environmental

Three Arch Cutting| Case Study

Services Supplied on these Projects:

- Provision of a Construction Phase Plan and RAMS pack specific to the proposed investigation and attendance of a PTS qualified Geo-Environmental Engineer.
- Construction of 1 No. rotary borehole constructed with a Comacchio 305 multi-purpose drilling rig using dynamic sampling techniques to depths of 10.0m to determine ground conditions at depth from the crest to the toe cuttings.
- Standard Penetration Tests (SPTs) were undertaken within the borehole at 1.50m intervals to provide additional data to inform and support geotechnical assessment.
- Two groundwater monitoring wells were installed within BH1 upon completion of drilling to depths of 9.0m and 4.0m.
- In order to characterise the general chemical quality of the soils at shallow depth, two samples of shallow soils were submitted to a UKAS accredited laboratory for analysis.
- Provision of a Factual Report detailing the encountered ground and groundwater conditions and the results of in-situ and laboratory base testing. The report would be delivered in electronic format only.

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Geo-Environmental Services Limited was instructed on behalf of Osbourne to undertake a Geotechnical Assessment at Three Arch Cutting near to Sherbourne in Dorset.

Emergency works had been undertaken which involved the removal of failed material from the running line and removal of dangerous trees. A temporary speed restriction had been imposed and subsequently a toe wall of ballast bags was constructed to remove the speed. It was proposed to remove the ballast bags and construct a permanent toe wall, with associated crest and track drainage works and removal of contaminated ballast.

As such, the objectives were to obtain information on ground conditions in support of the slope stability assessment for the cutting and aid the design of the proposed upgrade to the drainage.

This was a rapid reaction project and we were required to mobilise to the site very quickly, something we could cope with because of our robust supply chain management and electronic resource management platform.

A further difficulty on this project was that the borehole was undertaken at the crest of the slope with a road running within metres of the plant. This required negotiations with the local Council, as well as Network Rail, Osbournes and Arcadis, the latter of who were the lead consultant on this project.

Whilst in this instance Arcadis undertook the slope stability and analysis themselves, Geo-Environmental have the in-house experience and the software to undertake slope stability assessments and designs in our own right and have done so on numerous projects in the highways, housing and utility sectors. Our staff include Chartered Engineers, Chartered Geologists, Chartered Environmentalists and Chartered Scientists.

About the project:

Applicability of the project:

Across the UK Network Rail manage a portfolio of over 190,000 earthwork assets that includes:

- Embankments – a construction that allows railway lines to pass at an acceptable level and gradient over low lying ground.
- Soil cuttings – an excavation that allows railway lines to pass at an acceptable level and gradient through the surrounding ground that is composed entirely or predominantly of soil.
- Rock cuttings – an excavation that allows railway lines to pass at an acceptable level and gradient through the surrounding ground that is composed entirely or predominantly of rock.

As most of the rail infrastructure slopes are in excess of 150 years old and do not offer comparable levels of capability and resilience to modern engineered slopes. These can fail if not maintained and therefore slope stability assessments play a key role in maintaining rail infrastructure.

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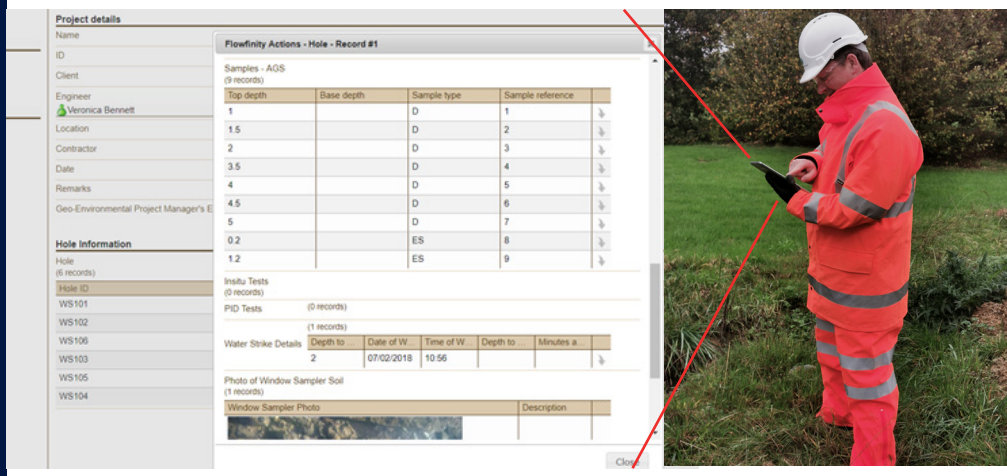
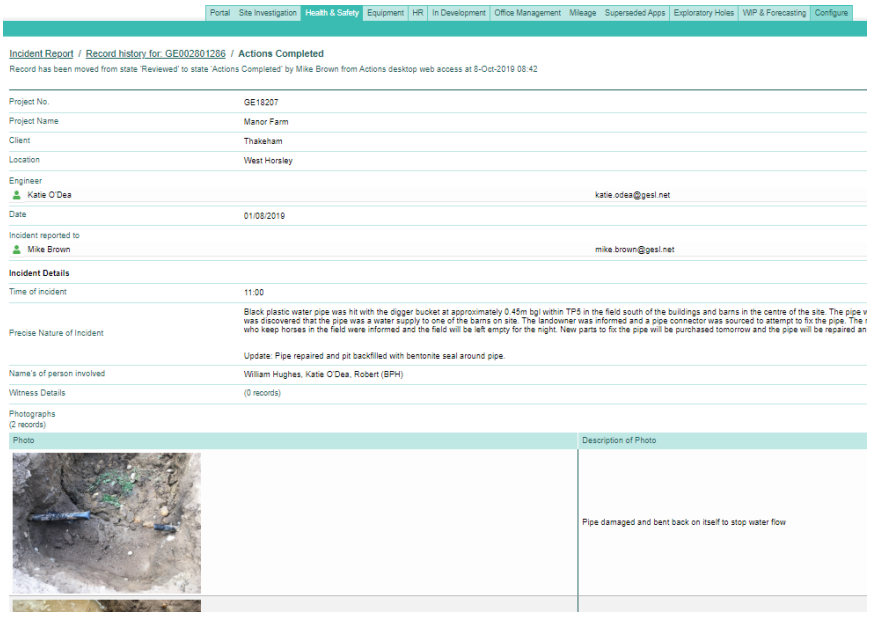
On this project and all others, a key risk to both quality and timeliness is the collection of data. In the past all soils were logged on-site with log books and due to a number of factors this led to errors creeping in to the data logging process and delays in results being formally written up.

This risk is mitigated by ensuring that all site logging/notation is now electronically collected on-site with tablets, using custom created logging apps. These apps compile a preliminary information report for our clients in real time. These apps can be customised in different formats to suit the needs of different clients, allowing us to have sections of reports completed before the engineer has left site. This reduces the time taken to compile final reports, allowing us to meet deadlines. Where necessary data can then be sent to our clients on the same day, ensuring that they are always up to date with any preliminary findings.



The same system is also used to record any incidents or near misses. These can be recorded on site at the time that the incident happens. The benefit of this is that other staff, management, suppliers and clients can be instantly informed of any site incidents, allowing decisions to be made quickly.