Release the value of your land

CASE STUDY

HYDROGEOLOGICAL PUMP TESTING FOR ELECTRICITY CONVERTER STATION

PROJECT: PETERHEAD

PROJECT VALUE: £196,000

PROJECT TIMESCALE: 3 years

DATE AWARDED: NOVEMBER 2018

CHALLENGE:

This site in North-East Scotland was proposed as the location for an electricity converter station for a major green energy infrastructure project.

The underlying geology was granite. However, soft, boggy ground conditions posed a challenge to access. Several deep boreholes from a previous phase of the site investigation also showed artesian conditions. As well as the ground conditions, poor winter weather and limited daylight also provided further challenges to logistics and working on-site.

PROJECT SCOPE:

With groundwater management a key risk to the construction project, ERS was appointed by the developer to install groundwater pumping and monitoring wells, undertake pump testing and monitor groundwater to support the design of the converter station building.

To overcome the access issues caused by the ground conditions, ERS first installed a 400m long temporary road to facilitate moving heavy equipment and personnel to the drilling area during the testing programme.

Once the access road was installed and the rigs were in place, 7 nr boreholes were sunk to 30 mbgl. The underlying granite bedrock was weathered and fractured, and this proved to be unpredictable and technically challenging for the drilling crews.

Once the boreholes were complete, monitoring and pumping wells were then installed. Monitoring wells comprised nested (shallow/deep) piezometers to allow groundwater level monitoring from various depths. Step and constant rate pump tests were undertaken under permit from SEPA. Flow and level data was continuously monitored and recorded during the tests. All tests were carried out by ERS engineers.

PROJECT SCOPE CONT:

During the testing phase, one borehole earmarked for pump testing in the design was not bearing sufficient water to carry out tests due to ground conditions. A replacement well was drilled to allow pump testing to be carried out as required by the client.

Once the first round of tests was completed, ERS was invited back to carry out a second round of ground investigation and testing. This involved trial pits/ trenches, and another 6 nr boreholes (windowless sampler with rotary follow on) sunk to between 7 and 23 mbgl, three of which were fitted with gas and groundwater monitoring wells to facilitate long-term monitoring. Groundwater level monitoring and permeability testing was also carried out by ERS' engineers. Soil and rock samples were also taken, with testing taking place at a suitable laboratory.

OUTCOMES:

ERS' site team successfully carried out the required drilling and testing required by the client, including the installation of an additional borehole when required to complete the necessary tests. The team then went back to the site to complete an additional round of drilling and trial pits at the client's request.

Once each phase of ground investigation works was complete, the team collated and processed all data produced during testing and reported it back to the client to the format required by their design team.

ERS received the following feedback from client: "ERS *worked well to achieve our challenging project brief, as well as keeping on top of the resourcing, planning, cost, and communication.*"