Geotechnical and Geophysical Data Integration

Issue

Both oil and gas and offshore wind farm developments particularly, are now larger than have been previously conceived. This presents a significant challenge for developers who wish to understand the often complex ground conditions without spending huge sums of money on borehole campaigns targeting each and every turbine/structure.

The answer is to conduct a geotechnical/geophysical data integration study to maximise information and significantly reduce costs for the Client.

Analysis

RPS Energy has successfully conducted and are engaged in geotechnical/geophysical integration studies on both large scale wind farm developments and large oil and gas field developments in UK waters and overseas. Integration studies have been used to optimise geotechnical datasets to aid in foundation type and parameter selection and to increase the confidence in the soil conditions across a development site.

Actions

The RPS Energy Geophysical and Geotechnical teams work closely together to produce 3D engineering geological models from geophysical and geotechnical data. These models are kept live and updated at all stages of the development process from reconnaissance surveys to assigning final geotechnical parameters for detailed foundation design.

With the ongoing development of the model, site investigation locations can be selected to focus the investigation, targeting specific formations in order to optimise data acquisition. The geotechnical data gathered can then be interpolated or extrapolated via the model to other locations which are interpreted to be in the same formation.

This allows a suite of parameters to be developed for an individual formation if necessary, both proximal to and distal from investigation points aimed at reducing the number of boreholes that are needed. A reduction of one or two boreholes can make the integration study financially sound, however the reduction is often more significant.

Other developers are warming to this integrated approach and discussions with certifying authorities have revealed that they are very much in support of this holistic approach.
Case Study

Outcome

Geotechnical/Geophysical Data Integration is an efficient method to fully understand the ground conditions in 3 and sometimes 4 dimensions across a site. In general, the larger the site, the greater the benefit of conducting an integration study.

Resources

RPS Energy Engineering Geologists, Geophysicists, and GIS analysts work as an integrated team to produce quality studies which are used by the Client to better understand the ground conditions and their engineering implications at wind farm and oil and gas development sites.