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## The use of geophysics in ground investigation

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Geophysics plays an important role in ground investigation by providing cost-effective high value data. Continual developments in instrumentation and research coupled with advances in processing, interpretation, modelling and visualisation software have improved the applications and performance of geophysics in ground investigations.

The application of geophysics in ground investigation should be undertaken by a suitably qualified and experienced geotechnical engineer or engineering geologist in association with the geophysicist. This will ensure that the appropriate ground specific applications and techniques are employed, that are practicable, timely, proportionate and in context with the proposed development.

This presentation considers the various geophysical methods available and their applications and will provide case studies of geophysical surveys undertaken for a range of different project types and varying ground conditions. Both shallow surface and downhole geophysical techniques are assessed (Figure 1).



*Figure 1: Typical surface geophysical methods; (Left) Microgravity. (Right): EM31 Survey*

The merits of carrying out a phased ground investigation where the geophysics is carried out following a desk study and site reconnaissance walk over survey is discussed. This considers the potential cost savings and application of the geophysical data in targeting the intrusive ground investigation work.

The limitations of geophysical techniques are presented. These include looking at the effects of working in an urban environment, geophysical noise and the effect of challenging ground conditions such as discrete changes in soil and rock properties that may also preclude the application of the geophysics.

Future developments and applications of geophysics, such as the use of geophysical techniques to aid in the derivation of geotechnical parameters of soil and rock, are also presented.

