SPECIFICATION AND RELATED DOCUMENTS FOR GROUND INVESTIGATION IN IRELAND

2nd Edition 2016
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The Geotechnical Society of Ireland and Engineers Ireland has developed and prepared a revised Specification for Ground Investigation in Ireland (2nd Edition, 2016). The first edition was published by Engineers Ireland in 2006 and provided guidance on the importance of understanding ground and groundwater conditions in construction and civil engineering projects. It is hoped that this updated document will be used by engineers and client representatives in the scoping, planning and implementation of ground investigations for building and infrastructure projects in Ireland.

The document contains a technical specification, notes for guidance and bill of quantities. The notes for guidance are provided for each stage of a site investigation including desk studies, site reconnaissance and intrusive ground investigations (incorporating exploratory techniques, in situ testing, laboratory testing and reporting). Health and safety aspects relating to ground investigation are presented and discussed.

The specification and guidance notes have been prepared for use by all relevant groups within the construction and civil engineering industry. They should not be considered as exhaustive and it is recommended that users refer to the documents listed in the references and bibliography.

The involvement of a Chartered Engineer or Professional Geologist (Ground Practitioner) is considered by Engineers Ireland to be essential in the planning, procurement, supervision and reporting of ground investigation works. Obtaining geotechnical advice at the early stages of project planning and development (and subsequently through the stages of design, construction and operation/maintenance) will ensure that the risks associated with ground and groundwater conditions are properly assessed and minimised.

**Specification:** This Specification is modelled on the UK Specification for Ground Investigation (2012) published by ICE Publishing, a division of Thomas Telford Ltd, a wholly owned subsidiary of the Institution of Civil Engineers (ICE). The Specification and guidance notes have been written to reflect ground investigation practices in Ireland and fulfil Eurocode 7 Part 2 Ground Investigation and Testing.

**Notes for Guidance:** The notes for guidance which do not form part of the contract are provided for the Specification, Schedules and Bill of Quantities.

**Schedules:** The schedules can be extended to provide for increased levels of technical complexity to meet the requirements of a particular project. Where a schedule is not required then the term ‘Not required” should be inserted alongside the Schedule title. A Bill of Quantities which defines items and payment details is presented in an Annex.

**Bill of Quantities:** The Bill of Quantities is provided so that the majority of ground investigations can make use of it as a standard form in the contract. Some procurers may opt to use the Specification and their own form of contract and a formal method of measurement and item coverage. The contract documentation should make it clear whether the Bill of Quantities in the Annex is to be adopted for a particular investigation.

**Feedback:** Feedback is important and it is recognised that the Specification and accompanying documentation will be updated in the future. Users are invited to submit comments or recommendations to the Geotechnical Society of Ireland.
Use of the Specification for Ground Investigation

The Specification for Ground Investigation is intended for general use in ground investigation and geotechnical projects, for contracts of any size. The emphasis is on encouraging carefully designed and safely executed good-quality geotechnical work.

The Specification is independent of the Conditions of Contract. It has been assumed that the Employer will appoint an Engineer, or equivalent person e.g. Project Manager, as defined in the Conditions of Contract. If an independent Engineer/Project Manager is not appointed, the Employer should nominate an appropriate individual to act as the Engineer/Project Manager who may, for instance, be employed by the Contractor. It has further been assumed that technical direction of the ground investigation will be the responsibility of an experienced ground practitioner (ideally a chartered engineer or professional geologist), who may be the Engineer/Project Manager or person appointed to assist and advise the Engineer. Where the roles of Engineer/Project Manager and Investigation Supervisor are combined and fulfilled by a member of the Contractor’s staff, the investigation will become a ‘Design and Investgate’ form.

Depending upon the complexity of the investigation, other specialists may need to be involved in the work in order that the full range of disciplines (e.g. geotechnics, contamination, waste assessment, geophysics, archaeology, ecology and safety) relevant to the specific investigation are adequately covered. Appropriately qualified and experienced ground practitioners may be from the staff of the Engineer, may be independent specialist consultants or may be employees of the Contractor. This involvement of ground practitioners is considered to be essential to the success of any ground investigation.

The Specification relies heavily on good practice set out in BS 5930 (2015), Code of Practice for site investigations. The reproduction of parts of BS 5930 in the Specification, although in some ways preferable to cross-references, has been rejected in favour of keeping the Specification as brief as possible. Particular reference should also be made to the CIRIA Site investigation manual, SP25 and to BS 1377, Methods of test for soils for civil engineering purposes. Attention is drawn to the increasing use of previously developed and contaminated land which will require specific and detailed investigation, particularly with respect to previous history. There are several important publications in connection with investigating contaminated land which are extensively referenced in the Specification, e.g. the CLR reports and BS 10175, Investigation of potentially contaminated sites – Code of Practice. Special consideration must also be given to the hazards and risks to which all staff on site and the public may be exposed (see the companion publication Guidance for Safe Investigation of Potentially Contaminated Land and CIRIA C681, Unexploded ordnance, A guide for the construction industry).

Health and safety pre-execution should include a properly designed and executed desk study for ground investigations, especially where previous industrial or commercial use of the land has taken place. The importance of making the results of the desk study available to all parties cannot be overemphasised if a safe and effective investigation is to be designed and undertaken. If a desk study has not been carried out prior to an intrusive investigation, it is strongly recommended that this essential preliminary study is included in the scope of the investigation works.

If inappropriate or incomplete pricing is to be avoided, with the consequent risk of subsequent claims and disruption to the investigation, the information provided and the investigation requirements need to be fully detailed in the Schedules. For example, if groundwater aquifer protection measures are required, then the method of protection to be adopted (e.g. multiple casing sizes with seals between them) needs to be stated together with the expected number of casing size reductions, the lengths of and materials to be used for seals and whether allowance for standing time is required. A similar approach of providing full details needs to be taken by the investigation procurer to many other items e.g. traffic management, additional Personal Protective Equipment over and above statutory minimum requirements, access limitations, etc. This Specification is general in nature and may require to be modified for a specific investigation.
It is also recognised that many investigations now require combinations of methods to a much greater extent than was previously the case, e.g. field and laboratory testing and sampling both during the intrusive phase of work and subsequently from installed instruments. Furthermore, sampling for geotechnical purposes and for contamination or waste assessments demands different techniques, transport and storage conditions and, in respect of contamination and waste consideration aspects, laboratory testing needs to be carried out within much shorter timescales. This edition reflects this situation with an increased number of sub-divisions.

Successful ground investigation work will only be accomplished when the quality and appropriateness of the work, rather than the lowest cost, are recognised as the first priority. Attention must therefore be given to initial desk studies, careful planning, the employment of properly equipped contractors utilising competent operatives and the supervision of the field and laboratory work by experienced ground practitioners. The following Notes for Guidance are intended to assist with the contract documentation, but experienced ground practitioners should be involved for an appreciation of the technical aspects of the work.

Ground practitioners and other personnel provided by the Contractor

If the Bill of Quantities and associated Preamble (provided in Annex 1) is incorporated into the contract documentation, then ground practitioners and other personnel provided by the Contractor for professional attendance will be paid for on a time and expenses basis under bill item A7 in the bill of quantities. The provision of advice and assistance to the Engineer or Investigation Supervisor should be paid for on a time and expenses basis, as would the cost of preparing any desk study, Ground Investigation Report and Geotechnical Interpretative or Design Reports.

Contract documentation

Information and requirements specific to the particular contract are to be inserted in the Schedules which are cross-referenced to the clause numbers in the Specification and accompanying Notes for Guidance. Any amendments or additions to the Specification should be identified within the appropriate Schedule. It is intended that the Irish Specification for Ground Investigation be simply referenced in any contract documentation, with the Schedules included as necessary.

Documentation for a particular contract should comprise:

Instructions for Tendering (separate document)
Letter or Form of Agreement (and Appendix)
Conditions of Contract (reference to published Document)
Amendments and additions to Conditions of Contract
Pre-construction Information

Specification for Ground Investigation (reference to published Document)

Schedules
Schedule 1: Information
Schedule 2: Exploratory holes
Schedule 3: Investigation Supervisor’s facilities
Schedule 4: Specification amendments
Schedule 5: Specification additions
If required, the Contract may also include the Bill of Quantities for ground investigation contained in Annex 1, comprising:

Preamble (reference to published document)
Preamble amendments
Works items
Summary of Bill of Quantities
Appendix A: Rates for ground practitioners and other personnel

It should be noted that a formal Method of Measurement and Item Coverage are not required for use with the Annex 1 Bill, as the Specification, together with the Preamble to the Bill of Quantities, adequately defines the Bill items for payment. Additional items may be included in the Specification and Bill with the minimum of documentation. Alternatively, a formal Method of Measurement and Item Coverage (together with an appropriate Bill of Quantities) may be included with the Contract documentation. This is likely to result in duplication of statements and increased complexity of the documentation, however, particularly when additional items are included.