



Geotechnical site investigations



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 - Australian Drilling Industry Association
 - Australian Geomechanics Society
 - Austroads
 - Cement Concrete and Aggregates Association
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 - CSIRO
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 - New Zealand Geotechnical Society
 - University of Newcastle
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-

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Australian Standard[®]

Geotechnical site investigations

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PREFACE

This Standard was prepared by the members of the joint Standards Australia/Standards New Zealand Committee CE-015, Site Investigations, to supersede AS 1726—1993.

After consultation with stakeholders in both countries, Standards Australia and Standards New Zealand decided to develop this Standard as an Australian Standard only, at this time, rather than a joint Australian/New Zealand Standard. This document may become a joint stand in future revisions.

The objective of this Standard is to establish the requirements for the execution of effective geotechnical site investigations and to provide a standardized system for the description and classification of soils and rocks. It addresses spatial and physical characteristics of soil, rock and groundwater, but does not cover the chemical, biological or other environmental aspects of the investigation of contaminated ground.

Commentary on the changes from the 1993 edition is set out in Appendix F.

Statements expressed in mandatory terms in Notes to Tables are deemed to be requirements of this Standard. Figures provided in this Standard are informative.

The term ‘informative’ has also been used in this Standard to define the application of the appendices to which it applies. An ‘informative’ appendix is only for information and guidance.

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STANDARDS AUSTRALIA

Australian Standard

Geotechnical site investigations

1 SCOPE

This Standard specifies requirements for the execution of geotechnical site investigations and provides a standardized system for the identification, description and classification of soils and rocks.

This Standard applies to geotechnical site investigation of natural or filled ground for—

- (a) new construction;
- (b) maintenance of existing facilities;
- (c) the evaluation of post construction performance;
- (d) the assessment of failure; and
- (e) broad geotechnical studies.

NOTE: Commentary on the changes from the 1993 edition is set out in Appendix F.

2 EXCLUSIONS

This Standard does not cover the following:

- (a) The application of geotechnical site investigation outcomes for geotechnical design.
- (b) The chemical, biological or environmental aspects of the investigation of contaminated ground.

3 NORMATIVE REFERENCES

The following normative documents are referenced in this Standard:

NOTE: Documents referenced for informative purposes are listed in the Bibliography.

AS

4133 Methods of testing rocks for engineering purposes

4133.4.1 Method 4.1: Rock strength tests—Determination of point load strength index

4133.4.2.1 Method 4.2.1: Rock strength tests—Determination of uniaxial compressive strength of 50 MPa and greater

4 DEFINITIONS

For the purpose of this Standard, the definitions below apply.

4.1 Acid sulfate soil

Naturally occurring soils, sediments or organic substrates (e.g. peat) that contain sulfide minerals (predominantly pyrite) or their oxidation products. In an undisturbed state where soil is saturated, acid sulfate soils are generally benign. However, if the soils are excavated or exposed to air by a lowering of the groundwater level, the sulfides react with oxygen to form sulfuric acid.

NOTE: Refer to Appendix D.

4.2 Carbonate rock

A rock containing more than 50% by weight of carbonate compounds (such as calcium carbonate).

4.3 Carbonate soil

A soil containing more than 50% by weight of carbonate compounds (such as calcium carbonate).

4.4 Cemented soil

A soil bound with a cementing substance, such that if remoulded and recompacted to its original density and moisture content, exhibits a significantly lower strength than in its undisturbed condition.

4.5 Classification

A system which places a material into one of a limited number of groups on the basis of a defined characteristic or set of characteristics. For example, a soil classification may be based on the grading and plasticity of disturbed samples.

4.6 Cohesive and non-cohesive soils

Soils are conveniently divided into two groups based on the ability of a soil mass to hold together. Those capable of holding together are termed 'cohesive' and those having no ability, or strength, to hold together by themselves at very low applied total stress levels are termed 'non-cohesive'.

4.7 Competent person

A person who has, through a combination of training, education and experience, acquired knowledge and skills enabling that person to correctly perform a specified task.

4.8 Consistency

The ability of the soil, at specific moisture contents, to resist mechanical stress or manipulation (remoulding).

4.9 Contamination

The condition of land or water where any chemical substance or waste has been added as a direct or indirect result of human activity above background level and represents, or potentially represents, an adverse health or environmental impact. Contamination may have an impact on human health during construction or the service life of a structure erected on the site or may have detrimental effects on the environment.

NOTE: While this Standard does not address investigation of the presence of contamination or management of such contamination, the possibility of the presence of contamination should be considered during the planning and conduct of geotechnical site investigations.

4.10 Controlled fill

Any fill for which engineering properties are controlled during placement. Sometimes referred to as structural or engineered fill.

4.11 Description, soil or rock

A statement of the physical characteristics of a sample of soil or rock.

4.12 Desk study

A study to collate and review the existing information relevant to the site.

4.13 Dispersive soils

Those soils, which by nature of their mineralogy and pore water chemistry, are susceptible to separation in water of individual clay particles.

NOTE: Refer to Appendix D.

4.14 Duricrust

A cemented zone occurring in weathered rock or soil formed by the mobilization and deposition of minerals.

4.15 Engineered fill

Refer to 'Controlled fill'.

4.16 Fill

A volume of material that has been placed by anthropogenic processes.

4.17 Geotechnical

Pertaining to the nature, condition and physical properties of the earth's crust (whether soil or rock and including water and gases therein), which affect its engineering performance.

4.18 Geotechnical model

The interpretation of ground conditions in a form useful for engineering design or assessment. It may contain a surface and subsurface model detailing the geological and engineering characteristics of the various materials and groundwater.

4.19 Geotechnical site investigation

The process of assessing and evaluating the geotechnical characteristics of a site.

4.20 Groundwater

Water located beneath the earth's surface in pore spaces, fractures and voids in soil and rock.

4.21 In situ

In the place and condition in which it exists naturally.

4.22 Liquid limit (w_L)

Moisture content at which the soil passes from the plastic to the liquid state as determined by the liquid limit test.

4.23 May

Indicates that a statement is an option.

4.24 Monitoring

Recording observations and/or measurements over a period of time.

4.25 Mottled

Having areas of two or more colours or shades in a spotted or blotched, irregular configuration.

4.26 Plastic limit (w_P)

Moisture content at which the soil becomes too dry to be in a plastic condition as determined by the plastic limit test.

4.27 Plasticity index (I_P)

Numerical difference between the liquid limit and the plastic limit of a soil.

4.28 Project

The wider project for which a geotechnical site investigation is carried out.

4.29 Shall

Indicates that a statement is mandatory.

4.30 Should

Indicates that a statement is a recommendation.

4.31 Soil

Particulate materials that occur in the ground and can be disaggregated or remoulded by hand in air or water without prior soaking.

4.32 Rock

Any aggregate of minerals and/or organic materials that cannot be disaggregated by hand in air or water without prior soaking.

4.33 Uncontrolled fill

Materials that have been deposited by anthropogenic processes, which do not meet the definition of 'controlled fill'.

4.34 Undisturbed sample

A term applied to samples obtained using techniques designed to minimize changes in the properties of the sample.

5 OVERVIEW OF GEOTECHNICAL SITE INVESTIGATIONS**5.1 Process****5.1.1 General**

The delivery of geotechnical site investigations should follow an iterative process in which the outcomes of the investigations are reviewed against the purpose for which the investigation is being carried out and further investigations are planned as required. This process is illustrated in Figure 1. Quality assurance and work health and safety programs should be in place during this entire process.