Appendix B

Summaries for Geotechnical Manual for Slopes (2nd Edition)

Table B1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigation						
Revised, Withdrawn	Geoguide 2	GMS:5930-1	17	References that provide valuable information and guidance on many aspects covered in this chapter are : (a) Code of Practice for Site Investigation, BS 5930 (British Standards Institution, 1981), and	1981; Superseded; GMS:5930-1; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 3	GMS:5930-2	20	Numerous schemes are currently employed for description, and reference may be made to the following publications for some of the most recent : International Association of Engineering Geology (1981), International Society for Rock Mechanics (1978; 1981), and British Standards Institution (1981). Unfortunately, these vary not only in the terms used but also in the definition of the same term, and it is therefore vitally important that the system or terms used for the description of soil and rock be defined in all geotechnical reports.	1981; Superseded; GMS:5930-2; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 2	GMS:5930-3	33	The Dutch cone penetrometer comprises a 60° cone, 10cm² in area, mounted on a sleeved rod. The cone is used to measure penetration resistance as it is pushed into the soil at a steady rate while the sleeve or friction mantle measures skin friction. Reading are usually taken at 200mm intervals, although a continuous reading to both cone resistance and friction can be given by an electrical cone penetrating continuously. The procedure is described in BS 5930 (1981) and ASTM (1982e). The cone resistance can be used to calculate bearing capacity and density but the results are badly affected if the penetrometer impinges on particles larger than the cone. Therefore, the equipment is unsuitable for the weathered rocks of Hong Kong but is highly suitable for marine sediments.	1981; Superseded; GMS:5930-3; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 2	GMS:5930-4	33	The Menard pressuremeter can be used to obtain strength and deformation characteristics of soils and rocks (BS 5930, 1981). The equipment consists of a probe which, when placed in a borehole, can be inflated. The volume changes of the probe, the expansion of which is limited to that in the radial plane, can be measured by means of a surface volume meter to which the probe is connected. A pressure versus volume change graph can be plotted, and this is converted into a stress-strain curve. From the test results, a limit pressure, which reflects the ultimate bearing capacity, is determined. A deformation modulus may also be determined, from which a rapid estimation of settlement	1981; Superseded; GMS:5930-4; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 2	GMS:5930-5	34	Plate bearing tests may be used to assess strength and deformation characteristics of soils and soft rocks and can be carried out in trial pits or large diameter boreholes. Standard test methods are described in BS 5930 (1981) and ASTM (1982a). The results of a plate bearing test can be badly affected by the presence of boulders immediately below the test area, and in any case the accuracy of the application of the results to the prediction of the behaviour of full-size structures is dependent upon the size of the plate used for the test. Usually a 300mm diameter plate will be adequate, but a larger area may be required to test coarse materials. The load can be applied to the plate by kentledge or by jacking against a reaction beam. However, the equipment required is cumbersome and very difficult to use on steep slopes and is, therefore, likely to be used for foundation design in level areas only.	1981; Superseded; GMS:5930-5; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 2	GMS:5930-6	36	The definitions of these terms are shown in BS 5930 (1981), and specimen test sheets and calculations are given in Section 2.6.4. Constant-head tests are likely to give more accurate results than variable-head tests but variable tests are simpler to perform.	1981; Superseded; GMS:5930-6; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geoguide 3	GMS:5930-7	74	(2) Geology. The depth of weathering, presence of colluvium or fill and the structure of the fresh and weathered rock should be assessed from the results of the surface and subsurface investigations (Chapter 2). For analysis, geological data must normally be interpreted in terms of layers of zones of materials of like engineering characteristics. When dealing with weathered rocks, one of the zonal schemes proposed by the Geological Society of London (1972), the International Association of Engineering Geology (1981) or the British Standards Institution (1981) may be appropriate for this purpose. However, there may be occasions when it is more useful to develop and individual scheme to classify zones of material for a specific site.	1981; Informative; GMS:5930-7; The context of the paragraph suggests that the citation should be replaced by reference to Geoguide 3.	4a

Table B1 - Summary of Current British Standard References and Replacement Eurocodes

BS Status	Relevant Updated Code for Citation	ID No.	Page no.	Existing Content of Technical Guidance Document	General Comments to define Scope of Updating / Specific Clauses in EN (s) / UK NA(s)	Scope of Updating
BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes						
Revised, Withdrawn	Geoguide 2	GMS:1377-1	32	This test is most commonly used to give a rough relative measure of the density of granular soils. The procedure is described in BS 1377 (1975). The test and its interpretation have been reviewed recently by Nixon (1982). The results can be significantly affected by the testing technique, so while carrying out the test and interpreting the results the following points should be noted: (a) The borehole casing should not be ahead of the borehole, and water balance should be maintained if carrying out the test below the water table. (b) Large diameter rods (BW or equivalent) or smaller rods with rod supports should be used to reduce energy dissipation. (c) An automatic trip hammer should be used to drive the sampler, as the accuracy of a monkey and slip winch is too dependent on the skill of the operator. BS 1377 (1975) recommends that, where penetration of less than 300mm is achieved for 50 blows, the test be halted and the penetration recorded. It is common practice in Hong Kong, however, to continue the test up to 300mm penetration regardless of the number of blows required. This can damage equipment. Provided penetration is accurately recorded, approximate N values greater than 50 can be estimated from the penetration achieved for the first 50 blows.	1975; Superseded; GMS:1377-1; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3. (NB There are two citations in this section.)	1
Revised, Withdrawn	Geoguide 2	GMS:1377-2	34	The vane is used to measure the undrained shear strength of soft to firm clays and silts. Standard test methods are described in BS 1377 (1975) and ASTM (1982b). Erratic results are obtained if the soil contains gravel or any other large particles, and in Hong Kong the use of the vane should be limited to the marine sediments.	1975; Superseded; GMS:1377-2; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding documents are Geoguide 2 and Geoguide 3.	1
Revised, Withdrawn	Geospec 3	GMS:1377-3	41	The standard method of moisture content determination is described in BS 1377 (1975) (test 1(A). The subsidiary methods (tests 1(B) & 1(C)) are suitable only for site testing (see Chapter 9).	1975; Superseded; GMS:1377-3; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 5.	1
Revised, Withdrawn	Geospec 3	GMS:1377-4	42	The Atterberg Limit tests are described in BS 1377 (1975). Two methods of determining the liquid limit of the soil fraction passing a 425 µm test sieve are described (tests 2(A) & 2(B)). The cone penetrometer method (test 2(A)) is preferable to the Casagrande method (test 2(B)) because it is easier to perform and less prone to operator error, but either method is acceptable. Very few correlation tests have been carried out for the two methods on Hong Kong soils. The one point method (test 2(C)) should not be used unless there is insufficient material available to carry out	1975; Superseded; GMS:1377-4; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 6.	1
Revised, Withdrawn	Geospec 3	GMS:1377-5	42	Test 6 of BS 1377 (1975) describes the standard method for determining specific gravity. The removal of air under a vacuum from an oven-dried sample is difficult when the soil contains silt- and clay-sized particles. Three variations to the standard method have been found to improve deairing : (a) the test is carried out on a sample at natural moisture content instead of oven-dried, (b) the soil and water mixture is boiled at atmospheric pressure and then under vacuum, or (c) kerosene is used instead of distilled water (this method should not be combined with (a) or (b).	1975; Superseded; GMS:1377-5; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 7.	1
Revised, Withdrawn	Geospec 3	GMS:1377-6	42	The standard method of wet-sieving coarse-grained soils is described in test 7A of BS 1377 (1975). This test requires preparation of the sample by wet-sieving on a 63 µm BS test sieve to remove silt- and clay-sized particles, followed by dry-sieving of the remaining coarse material. Some soils have a large amount of clay-sized particles in the interstices of the large particles, and these need additional dispersion. The method of dry-sieving (test 7(B)) is not recommended for Hong Kong soils because clay particles may adhere to larger-sized particles. The pipette and hydrometer methods of particle size analysis for fine-grained soils are described in BS 1377 (1975) (tests 7(C) & 7(D)). Although in BS 1377 the pipette method is preferred, the hydrometer method (test 7(D)) is suitable for most Hong Kong soils.	1975; Superseded; GMS:1377-6; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 8. (NB There are two citations in this section.)	1

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Revised, Withdrawn	Geospec 3	GMS:1377-7	43	Hong Kong soils contain negligible amounts of naturally occurring sulphate. Sulphate tests are therefore necessary only where pollution of groundwater from industrial effluent or other contaminants occurs, and where such pollution could result in sulphates attacking cement in either cement-stabilised soils or concrete. BS 1377 (1975) test 9 describes the determination of total sulphate content of soil, and test 10, the sulphate content of groundwater aqueous soil extracts. It should be noted that the Building Research Station Digests referred to in the Standard have now been superseded by BRE Digest 250 (Building Research Establishment, 1981), and reference should therefore be made to this more recent publication, particularly when determining water-soluble sulphate concentration.	1975; Superseded; GMS:1377-7; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 9.3.	1
Revised, Withdrawn	Geospec 3	GMS:1377-8	43	The standard electrometric method of determining acidity using a pH meter is described in test 11A of BS 1377 (1975), and this can be applied either to the sampled soil in suspension in water or to samples of ground-water. The subsidiary calorimetric method of test 11B also gives acceptable results. The pH can alter if there is a delay between sampling and testing, so field measurement should be used.	1975; Superseded; GMS:1377-8; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 9.5.	1
Revised, Withdrawn	Geospec 3	GMS:1377-9	43	The relationship between dry density and moisture content for a soil used for fill is determined by the standard compaction test, as detailed in test 12 of BS 1377 (1975). Many Hong Kong soils are susceptible to crushing during a compaction test. The extent to which this occurs can be checked by carrying out particle size distribution analyses on a sample before and after the test. The BS description of the test gives an alternative method for soils susceptible to crushing, and this should be followed where appropriate. Good practice would normally require the use of this method at all times.	1975; Superseded; GMS:1377-9; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 10.	1
Revised, Withdrawn	Geospec 3	GMS:1377-10	44	The one-dimensional consolidation test on small specimens (BS 1377, 1975, test 17) is suitable only for fine-grained materials. Hong Kong soils which contain sands and gravels can be tested in a large oedometer or in a triaxial cell. The bulk modulus of the soil obtained from a triaxial consolidation test or from the consolidation stage of a triaxial test can be related satisfactorily to the one-dimensional coefficient of compressibility, mv. The calculation of the coefficients of compressibility and consolidation from this information is described by Akroyd (1969) and Bishop & Henkel (1976).	1975; Normative; GMS:1377-10; Test method is now contained in Geospec 3 cl 14.	4a
Revised, Withdrawn	Geospec 3	GMS:1377-11	51	It is most important to present good records of both soil and rock tests. Appendix B of BS 1377 (1975) and Akroyd (1969) give typical data and calculation forms for the tests they describe.	1975; Informative; GMS:1377-11; The current reference to BS1377:1975 is only relevant if tests are conducted to that standard. Given that tests are to be conducted to the requirements of Geospec 3, it is recommended that Appendix B (General Information to be Included in Test Reports) of Geospec 3 be cited.	4b
Revised, Withdrawn	Geospec 3	GMS:1377-12	83	Where a slope of loose fill is to be stabilised to eliminate the possibility of a flow-slide, the surface layers should be stripped to a vertical depth of not less than 3m and replaced with fill compacted to a density of not less than 95% of British standard maximum dry density. A drainage system may be required between old and recompacted fill to prevent the development of water pressure behind the compacted face. Alternatively, in some circumstances the required insitu density may be achieved by the use of dynamic compaction techniques.	1975; Informative; GMS:1377-12; It is considered that the term '95% of British Standard maximum dry density' is short hand for '95% of maximum dry density as measured by dry density/moisture content relationship testing carried out in accordance with BS1377:1975'. It is recommended that the text be amended to read '95% of maximum dry density determined in accordance with Geospec 3'.	4b
Revised, Withdrawn	Geospec 3	GMS:1377-13	111	Areas of over-excavation on slopes flatter than 1 on 1.5 may be made good with suitable fill compacted to 95% of British Standard maximum dry density (BS 1377, test 12). The surface on which fill is to be replaced should be benched, and fill should be placed in horizontal layers, with care being taken to ensure that the compaction of the fill at the surface of the slope meets the required standard. Where it is necessary to reinstate over-excavated slopes that are steeper than 1 on 1.5 cement-stabilised soil or concrete should be used with due regard being given to drainage of	1975; Informative; GMS:1377-13; It is considered that the term '95% of British Standard maximum dry density' is short hand for '95% of maximum dry density as measured by dry density/moisture content relationship testing carried out in accordance with BS1377:1975'. It is recommended that the text be amended to read '95% of maximum dry density determined in accordance with Geospec 3'.	4b
Revised, Withdrawn	Geospec 3	GMS:1377-14	113	Trenches excavated on or above slopes provide a location where infiltration of water into the hillside can eventually lead to slope instability. A trench cut into the toe of a slope can also undermine its stability and should not be permitted. Trenches loosely backfilled with soil will permit almost as much infiltration from the surface as an open trench and will permit the lateral flow of water along the trench through the backfilled material. Excavations for services above slopes should therefore not be opened up during the wet season unless unavoidable. When such excavations are carried out in the wet season, the trench should be protected against the ingress of runoff from the surface in which the trench is excavated by means of sand bags, concrete kerbs or small compacted earthfill bunds along each side of the trench. Pumps should be provided at all low points on the trench to maintain the bottom in a dry state, and a watchman should supervise the maintenance and functioning of pumps at all times when work is not proceeding. On completion of work, the trench should be backfilled in layers not greater than 150mm deep, and each layer should be compacted to not less than 95% of British Standard maximum dry density (see Sections 9.5.1 and 9.5.5).	1975; Informative; GMS:1377-14; It is considered that the term '95% of British Standard maximum dry density' is short hand for '95% of maximum dry density as measured by dry density/moisture content relationship testing carried out in accordance with BS1377:1975'. It is recommended that the text be amended to read '95% of maximum dry density determined in accordance with Geospec 3'.	4b

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Revised, Withdrawn	Geospec 3	GMS:1377-15	113	The basic requirements for all fills to be placed in or on slopes in Hong Kong is that they should, in general, be compacted to at least 95% of British Standard maximum dry density (see Chapter 3). In some exceptional cases, such as fills forming platforms that do not and will not support structures, the degree of compaction specified for some of the fill may be reduced to 90% of Standard, providing that the fill forming the peripheral slopes is compacted to 95% (see Figure 9.1).	1975; Informative; GMS:1377-15; It is considered that the term '95% of British Standard maximum dry density' is short hand for '95% of maximum dry density as measured by dry density/moisture content relationship testing carried out in accordance with BS1377:1975'. It is recommended that the text be amended to read '95% of maximum dry density determined in accordance with Geospec 3'.	4b
Revised, Withdrawn	Geospec 3	GMS:1377-16	116	(1) Sand replacement method. This method is described in BS 1377 (1975) (tests 15(A) and 15(B). The two tests differ only in the size of equipment, the second being more suitable for coarse-grained soils. The method is accurate but requires considerable care. The calibration of the sand is sensitive to humidity and should be checked daily. The sand should be oven-dried and stored for about a week for the moisture content to reach equilibrium with the atmospheric humidity. If the sand is to be used again, it should be dried and sieved to remove any fill material before further use. The test should not be carried out when compaction plant is operating nearby.	1975; Superseded; GMS:1377-16; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. Test method is now contained in Geospec 3 cl 11.	1
Revised, Withdrawn	BS1377-9:1990	GMS:1377-17	117	(3) Core cutter method. A sample of the fill is taken using a thin-walled core cutter (BS 1377) test 15(D) which can be either driven or jacked into the fill. The weight of the sample is measured and, with the known volume of the core cutter, the density is determined. The sampling process can change the density of the fill, and the presence of gravel in the fill can cause disturbance of the sample and give rise to errors in determining density. This method is not recommended for normal compaction control.	1975; Normative; GMS:1377-17; The core cutter method is not described in Geospec 3. It is, however, described in BS1377-9:1990 cl 2.4. If the method is retained then the reference requires updating.	3a
Revised, Withdrawn	Geospec 3	GMS:1377-18	118	(1) Standard methods. The best method of determining moisture content is by oven drying (BS 1377, test 1(A)) but this has the disadvantage of taking twenty four hours before a result is available. A decision on whether fill requires more compaction to meet the specification is therefore also delayed for up to twenty four hours.	1975; Superseded; GMS:1377-18; References to Phase 1 tests of BS1377:1975 were previously replaced in the Geotechnical Manual for Slopes in accordance with item (p) of the Addendum to the GMS. As such, no updating of BS reference is required. The superseding document is Geospec 3.	1
Revised, Withdrawn	BS1924-2:1990	GMS:1377-19	118	(2) Rapid methods. Two rapid methods for site use are given in BS 1377 (tests 1(B) and 1(C)). They are not as accurate as the standard method and cannot be used for soils containing large proportions of halloysite, gypsum, or calcareous or organic matter. They are, however, generally suitable for Hong Kong soils. Soil moisture content may also be rapidly determined using the Speedy Moisture Content Tester, which measures the pressure of acetylene gas released when carbide reacts with the soil moisture. However, this method is not sufficiently reliable for strict control.	1975; Normative; GMS:1377-19; The rapid methods for determination of moisture content are no longer contained in BS1377, but their limitations are discussed in Clause 3.1 of BS1377:1990. Several methods of rapid determination of moisture content were also given in BS1924-2:1990 Methods of test for cement-stabilized and lime-stabilized materials, including the sand bath method (BS1377:1975 Test 1B), the 'Speedy' tester method and the microwave oven method. However BS1924-2:1990 was recently withdrawn by BSI with no replacement standard yet issued. The reference is to be updated to the BS1377:1990 version with the limitations spelt out.	3b
BS882:1983 Specification for aggregates from natural sources for concrete						
Revised, withdrawn	GEO Publication 1/93	GMS:882-1	67	While the United States Army Corps of Engineers (1953) criteria are applicable to silty soils, it has been found by experiment under relatively low heads that the U.S. Army Corps of Engineers concrete sand is suitable for use as a filter for all silts and finer soils. The grading of BS 882 zone 2 natural sand is very similar to that of the U.S. Army Corps of Engineers concrete sand. This is shown in Figure 4.9, which also shows the grading of a free-draining material that may be used in conjunction with this sand. The grading for BS 882 zone 2 sand produced from crushed stone can be unacceptable, as this standard permits 20% of the material to be finer than the 150 μm sieve (see Rule 6 in Table 4.1).	1983; Superseded; GMS:882-1; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding document is GEO Publication 1/93.	1
Revised, withdrawn	GEO Publication 1/93	GMS:882-2	240	"British Standard Test Sieves" mentioned in the X-axis of the graph. And: "Note 1: Filter A - This envelope describes the United States Corps of Engineers concrete sand which will act as a filter for all silts and finer soils. The grading of BS 882 Zone 2 sand is very similar to the United States Corps of Engineers concrete sand.	1983; Superseded; GMS:882-2; The corresponding chapter/section of the Geotechnical Manual for Slopes has been superseded by subsequent GEO publications as noted in the Addendum to the GMS. As such, no updating of BS reference is required. The superseding document is GEO Publication 1/93.	1
Reference Section of Report						
Revised, withdrawn	BS1377:1990 (Parts 1 to 9), Geospec 3	GMS:1377-20	148	British Standards Institution (1975). Methods of Testing Soils for Civil Engineering Purposes. (BS 1377:1975). British Standards Institution, London, 143 p.	1975; Reference; GMS:1377-20; There are 21 citations of BS1377:1975 in the manual. 12 occur in superseded parts of the manual and are not considered further. There are four normative and five informative citations. One normative citation requires ascribing to BS1377-2:1990 and one to BS1377-9:1990. All the other citations can be ascribed to Geospec 3. The current reference only need be retained for the superseded citations.	1

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Revised, withdrawn	BS5930:1999+A2:2010, Geoguide 2, Geoguide 3	GMS:5930-8	148	British Standards Institution (1981). Code of Practice for Site Investigation. (BS 5930:1981). British Standards Institution, London, 147 p.	1981; Reference; GMS:5930-8; There are seven citations of BS5930:1981; one is informative and the other six occur in a superseded part of the manual. The citations in the superseded part of the manual are to remain unchanged. Consequently the reference to BS5930:1981 will have to remain. The informative citation can be reallocated to Geoguide 3.	1
Revised, withdrawn	BS EN 12620:2002+A1:2008, GEO Publication 1/93	GMS:882-3	-	Reference is missing from the References Section of the GMS - this is superseded by BS EN 12620:2002+A1:2008.	1983; Reference; GMS:882-3; The cited document has no reference listed in the manual. There are two citations, both informative but in the superseded section of the manual. There is, therefore, no need to add a reference.	2

Table B2 - Extracts of Relevant Sections or Clauses of the British Standards and Eurocodes / National Annexes

Relevant Updated Code for Citation	ID No.	Page no.	Scope of Updating	Extracts of Relevant Sections or Clauses of the superseded British Standard(s)	Extracts of Relevant Sections or Clauses of the replacement British/European Standards
Technical Clauses in Report					
BS5930:1981 Code of Practice for Site Investigation					
Geoguide 2	GMS:5930-1	17	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 3	GMS:5930-2	20	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 2	GMS:5930-3	33	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 2	GMS:5930-4	33	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 2	GMS:5930-5	34	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 2	GMS:5930-6	36	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 3	GMS:5930-7	74	4a	BS5930:1981 cl 44.3.4.	Geoguide 3 cl 2.4.4.
BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes					
Geoguide 2	GMS:1377-1	32	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geoguide 2	GMS:1377-2	34	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-3	41	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-4	42	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-5	42	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-6	42	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-7	43	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-8	43	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-9	43	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
Geospec 3	GMS:1377-10	44	4a	Geotechnical Manual for Slopes cl 3.6	Geospec3 cl 14
Geospec 3	GMS:1377-11	51	4b	Example test sheets contained in BS1377:1975 that are suitable for tests carried out to BS1377:1975.	Appendix B of Geospec 3 gives guidance on information to be included in test reports.
Geospec 3	GMS:1377-12	83	4b	No extract available as citation is ambiguous.	N/A
Geospec 3	GMS:1377-13	111	4b	No extract available as citation is ambiguous.	N/A
Geospec 3	GMS:1377-14	113	4b	No extract available as citation is ambiguous.	N/A
Geospec 3	GMS:1377-15	113	4b	No extract available as citation is ambiguous.	N/A
Geospec 3	GMS:1377-16	116	1	Geotechnical Manual for Slopes cl 9.5.5 (1)	Geospec3 cl 11
BS1377-9:1990	GMS:1377-17	117	3a	Geotechnical Manual for Slopes cl 9.5.5 (3)	BS1377-9:1990 cl 2.4
Geospec 3	GMS:1377-18	118	1	Geotechnical Manual for Slopes cl 9.5.5 (3)	N/A - Phase 1 tests for BS1377:1975 have already been replaced by Geospec 3 via the Addendum to the GMS.
BS1924-2:1990	GMS:1377-19	118	3b	Geotechnical Manual for Slopes cl 9.5.5 (3)	BS1924-2:1990 cl 1.3
BS882:1983 Specification for aggregates from natural sources for concrete					
GEO Publication 1/93	GMS:882-1	67	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.
GEO Publication 1/93	GMS:882-2	240	1	N/A - Section of Geotechnical Manual for Slopes has been superseded.	N/A - Section of Geotechnical Manual for Slopes has been superseded.

Table B3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
Technical Clauses in Report						
BS5930:1981 Code of Practice for Site Investigation						
GMS:5930-1	17	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-2	20	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-3	33	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-4	33	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-5	34	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-6	36	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:5930-7	74	4a	Description of rock mass weathering classification system.	Description of rock mass weathering classification system.	No change	Update reference and citation to Geoguide 3.
BS1377:1975 Methods of Test for Soils for Civil Engineering Purposes						
GMS:1377-1	32	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:1377-2	34	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geoguides 2 and 3.
GMS:1377-3	41	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-4	42	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-5	42	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-6	42	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-7	43	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-8	43	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.

Table B3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
GMS:1377-9	43	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-10	44	4a	Method of test for soils.	Method of test for soils.	No change	The text should be replaced in its entirety by references to Geoguide 2 and Geospec 3.
GMS:1377-11	51	4b	Examples of data report forms.	Advice on data to be included in test reports.	Advice will be consistent with current HK requirements.	The text should be revised and refer to Geospec 3.
GMS:1377-12	83	4b	Ambiguous citation as the reference does not detail the information suggested by the text.	N/A	Clarification of requirements.	Amend the text to remove reference to 'British standard maximum dry density'. Provide correct reference text.
GMS:1377-13	111	4b	Ambiguous citation as the reference does not detail the information suggested by the text.	N/A	Clarification of requirements.	Amend the text to remove reference to 'British standard maximum dry density'. Provide correct reference text.
GMS:1377-14	113	4b	Ambiguous citation as the reference does not detail the information suggested by the text.	N/A	Clarification of requirements.	Amend the text to remove reference to 'British standard maximum dry density'. Provide correct reference text.
GMS:1377-15	113	4b	Ambiguous citation as the reference does not detail the information suggested by the text.	N/A	Clarification of requirements.	Amend the text to remove reference to 'British standard maximum dry density'. Provide correct reference text.
GMS:1377-16	116	1	N/A	N/A	N/A	No amendment required as this section of Geotechnical Manual for Slopes has been superseded by Geospec3.
GMS:1377-17	117	3a	Method of test for soils.	Method of test for soils.	No change	The text should be replaced in its entirety by references to Geoguide 2 and BS1377-9:1990.
GMS:1377-18	118	1	Method of test for soils.	Method of test for soils.	No change	No amendment required as this reference to a Phase 1 test has already been replaced by Geospec3 in the addendum to the GMS.
GMS:1377-19	118	3b	Method of test for soils.	Method of test for soils.	No change	The text should be revised and refer to BS1377-2:1990.
BS882:1983 Specification for aggregates from natural sources for concrete						
GMS:882-1	67	1	Specification of filter gradings.	Specification of filter gradings.	No change	Amend the text to remove reference to BS882:1983 and amend text accordingly.
GMS:882-2	240	1	Specification of filter gradings.	Specification of filter gradings.	No change	Amend the text to remove reference to BS882:1983 and amend text accordingly.

Table B3 - Description of Standards, Differences and Recommended Amendments

ID No.	Page no.	Scope of Updating	Description of Design, Specification and/or Testing Required		Effects of differences in Adopting Up-to-date Standard(s)	Recommended Amendments
			Quoted Standard(s)	Up-to-date Standard(s)		
Reference Section of Report						
GMS:1377-20	148	1	This reference document is: Revised, withdrawn.	The current document(s) is (are): BS1377:1990 (Parts 1 to 9), Geospec 3	No change	The current reference should remain as citations to it remain in the superseded part of the Manual, however additional references to Geoguide 2, Geospec 3, BS1377-2:1990 and BS1377-9:1990 are required.
GMS:5930-8	148	1	This reference document is: Revised, withdrawn.	The current document(s) is (are): BS5930:1999+A2:2010, Geoguide 2, Geoguide 3	No change	The current reference should remain as citations to it remain in the superseded part of the Manual, however additional reference to Geoguide 3 is required.
GMS:882-3	-	2	This reference document is: Revised, withdrawn.	The current document(s) is (are): BS EN 12620:2002+A1:2008, GEO Publication 1/93	No change	The cited document is not listed in the reference section. As the entire section on filters is now superseded by GEO Publication 1/93, there is no need to add the reference.

Table B4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
17	BS5930:1981	1	GMS:5930-1	References that provide valuable information and guidance on many aspects covered in this chapter are : (a) Code of Practice for Site Investigation, BS 5930 (British Standards Institution, 1981), and	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
20	BS5930:1981	1	GMS:5930-2	Numerous schemes are currently employed for description, and reference may be made to the following publications for some of the most recent : International Association of Engineering Geology (1981), International Society for Rock Mechanics (1978; 1981), and British Standards Institution (1981). Unfortunately, these vary not only in the terms used but also in the definition of the same term, and it is therefore vitally important that the system or terms used for the description of soil and rock be defined in all geotechnical reports.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
32	BS1377:1975	1	GMS:1377-1	This test is most commonly used to give a rough relative measure of the density of granular soils. The procedure is described in BS 1377 (1975). The test and its interpretation have been reviewed recently by Nixon (1982). The results can be significantly affected by the testing technique, so while carrying out the test and interpreting the results the following points should be noted: (a) The borehole casing should not be ahead of the borehole, and water balance should be maintained if carrying out the test below the water table. (b) Large diameter rods (BW or equivalent) or smaller rods with rod supports should be used to reduce energy dissipation. (c) An automatic trip hammer should be used to drive the sampler, as the accuracy of a monkey and slip winch is too dependent on the skill of the operator. BS 1377 (1975) recommends that, where penetration of less than 300mm is achieved for 50 blows, the test be halted and the penetration recorded. It is common practice in Hong Kong, however, to continue the test up to 300mm penetration regardless of the number of blows required. This can damage equipment. Provided penetration is accurately recorded, approximate N values greater than 50 can be estimated from the penetration achieved for the first 50 blows.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
33	BS5930:1981	1	GMS:5930-3	The Dutch cone penetrometer comprises a 60° cone, 10cm² in area, mounted on a sleeved rod. The cone is used to measure penetration resistance as it is pushed into the soil at a steady rate while the sleeve or friction mantle measures skin friction. Reading are usually taken at 200mm intervals, although a continuous reading to both cone resistance and friction can be given by an electrical cone penetrating continuously. The procedure is described in BS 5930 (1981) and ASTM (1982e). The cone resistance can be used to calculate bearing capacity and density but the results are badly affected if the penetrometer impinges on particles larger than the cone. Therefore, the equipment is unsuitable for the weathered rocks of Hong Kong but is highly suitable for marine sediments.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)

Table B4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
33	BS5930:1981	1	GMS:5930-4	The Menard pressuremeter can be used to obtain strength and deformation characteristics of soils and rocks (BS 5930, 1981). The equipment consists of a probe which, when placed in a borehole, can be inflated. The volume changes of the probe, the expansion of which is limited to that in the radial plane, can be measured by means of a surface volume meter to which the probe is connected. A pressure versus volume change graph can be plotted, and this is converted into a stress-strain curve. From the test results, a limit pressure, which reflects the ultimate bearing capacity, is determined. A deformation modulus may also be determined, from which a rapid estimation of settlement may be made.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
34	BS5930:1981	1	GMS:5930-5	Plate bearing tests may be used to assess strength and deformation characteristics of soils and soft rocks and can be carried out in trial pits or large diameter boreholes. Standard test methods are described in BS 5930 (1981) and ASTM (1982a). The results of a plate bearing test can be badly affected by the presence of boulders immediately below the test area, and in any case the accuracy of the application of the results to the prediction of the behaviour of full-size structures is dependent upon the size of the plate used for the test. Usually a 300mm diameter plate will be adequate, but a larger area may be required to test coarse materials. The load can be applied to the plate by kentledge or by jacking against a reaction beam. However, the equipment required is cumbersome and very difficult to use on steep slopes and is, therefore, likely to be used for foundation design in level areas only.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
34	BS1377:1975	1	GMS:1377-2	The vane is used to measure the undrained shear strength of soft to firm clays and silts. Standard test methods are described in BS 1377 (1975) and ASTM (1982b). Erratic results are obtained if the soil contains gravel or any other large particles, and in Hong Kong the use of the vane should be limited to the marine sediments.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
36	BS5930:1981	1	GMS:5930-6	The definitions of these terms are shown in BS 5930 (1981), and specimen test sheets and calculations are given in Section 2.6.4. Constant-head tests are likely to give more accurate results than variable-head tests but variable tests are simpler to perform.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
41	BS1377:1975	1	GMS:1377-3	The standard method of moisture content determination is described in BS 1377 (1975) (test 1(A). The subsidiary methods (tests 1(B) & 1(C)) are suitable only for site testing (see Chapter 9).	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
42	BS1377:1975	1	GMS:1377-4	The Atterberg Limit tests are described in BS 1377 (1975). Two methods of determining the liquid limit of the soil fraction passing a 425 µm test sieve are described (tests 2(A) & 2(B)). The cone penetrometer method (test 2(A)) is preferable to the Casagrande method (test 2(B)) because it is easier to perform and less prone to operator error, but either method is acceptable. Very few correlation tests have been carried out for the two methods on Hong Kong soils. The one point method (test 2(C)) should not be used unless there is insufficient material available to carry out tests 2(A) or 2(B)).	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)

Table B4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
42	BS1377:1975	1	GMS:1377-5	Test 6 of BS 1377 (1975) describes the standard method for determining specific gravity. The removal of air under a vacuum from an oven-dried sample is difficult when the soil contains silt- and clay-sized particles. Three variations to the standard method have been found to improve deairing : (a) the test is carried out on a sample at natural moisture content instead of oven-dried, (b) the soil and water mixture is boiled at atmospheric pressure and then under vacuum, or (c) kerosene is used instead of distilled water (this method should not be combined with (a) or (b)."	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
42	BS1377:1975	1	GMS:1377-6	The standard method of wet-sieving coarse-grained soils is described in test 7A of BS 1377 (1975). This test requires preparation of the sample by wet-sieving on a 63 µm BS test sieve to remove silt- and clay-sized particles, followed by dry-sieving of the remaining coarse material. Some soils have a large amount of clay-sized particles in the interstices of the large particles, and these need additional dispersion. The method of dry-sieving (test 7(B)) is not recommended for Hong Kong soils because clay particles may adhere to larger-sized particles. The pipette and hydrometer methods of particle size analysis for fine-grained soils are described in BS 1377 (1975) (tests 7(C) & 7(D)). Although in BS 1377 the pipette method is preferred, the hydrometer method (test 7(D)) is suitable for most Hong Kong soils.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
43	BS1377:1975	1	GMS:1377-7	Hong Kong soils contain negligible amounts of naturally occurring sulphate. Sulphate tests are therefore necessary only where pollution of groundwater from industrial effluent or other contaminants occurs, and where such pollution could result in sulphates attacking cement in either cement-stabilised soils or concrete. BS 1377 (1975) test 9 describes the determination of total sulphate content of soil, and test 10, the sulphate content of groundwater aqueous soil extracts. It should be noted that the Building Research Station Digests referred to in the Standard have now been superseded by BRE Digest 250 (Building Research Establishment, 1981), and reference should therefore be made to this more recent publication, particularly when determining water-soluble sulphate concentration.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
43	BS1377:1975	1	GMS:1377-8	The standard electrometric method of determining acidity using a pH meter is described in test 11A of BS 1377 (1975), and this can be applied either to the sampled soil in suspension in water or to samples of ground-water. The subsidiary calorimetric method of test 11B also gives acceptable results. The pH can alter if there is a delay between sampling and testing, so field measurement should be used.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)

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Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
43	BS1377:1975	1	GMS:1377-9	The relationship between dry density and moisture content for a soil used for fill is determined by the standard compaction test, as detailed in test 12 of BS 1377 (1975). Many Hong Kong soils are susceptible to crushing during a compaction test. The extent to which this occurs can be checked by carrying out particle size distribution analyses on a sample before and after the test. The BS description of the test gives an alternative method for soils susceptible to crushing, and this should be followed where appropriate. Good practice would normally require the use of this method at all times.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
44	BS1377:1975	4a	GMS:1377-10	The one-dimensional consolidation test on small specimens (BS 1377, 1975, test 17) is suitable only for fine-grained materials. Hong Kong soils which contain sands and gravels can be tested in a large oedometer or in a triaxial cell. The bulk modulus of the soil obtained from a triaxial consolidation test or from the consolidation stage of a triaxial test can be related satisfactorily to the one-dimensional coefficient of compressibility, mv. The calculation of the coefficients of compressibility and consolidation from this information is described by Akroyd (1969) and Bishop & Henkel (1976).	The one-dimensional consolidation test on small specimens (GeoSpec 3, GEO, 2001, Clause 14) is suitable only for fine-grained materials. Hong Kong soils which contain sands and gravels can be tested in a large oedometer or in a triaxial cell. The bulk modulus of the soil obtained from a triaxial consolidation test or from the consolidation stage of a triaxial test can be related satisfactorily to the one-dimensional coefficient of compressibility, mv. The calculation of the coefficients of compressibility and consolidation from this information is described by Akroyd (1969) and Bishop & Henkel (1976).
51	BS1377:1975	4b	GMS:1377-11	It is most important to present good records of both soil and rock tests. Appendix B of BS 1377 (1975) and Akroyd (1969) give typical data and calculation forms for the tests they describe.	It is most important to present good records of both soil and rock tests. Appendix B of Geospec 3 (GEO, 2001) and Akroyd (1969) give typical data and calculation forms as well as information to be included in test reports for the tests they describe.
67	No reference	1	GMS:882-1	While the United States Army Corps of Engineers (1953) criteria are applicable to silty soils, it has been found by experiment under relatively low heads that the U.S. Army Corps of Engineers concrete sand is suitable for use as a filter for all silts and finer soils. The grading of BS 882 zone 2 natural sand is very similar to that of the U.S. Army Corps of Engineers concrete sand. This is shown in Figure 4.9, which also shows the grading of a free-draining material that may be used in conjunction with this sand. The grading for BS 882 zone 2 sand produced from crushed stone can be unacceptable, as this standard permits 20% of the material to be finer than the 150 µm sieve (see Rule 6 in Table 4.1).	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
74	BS5930:1981	4a	GMS:5930-7	(2) Geology. The depth of weathering, presence of colluvium or fill and the structure of the fresh and weathered rock should be assessed from the results of the surface and subsurface investigations (Chapter 2). For analysis, geological data must normally be interpreted in terms of layers of zones of materials of like engineering characteristics. When dealing with weathered rocks, one of the zonal schemes proposed by the Geological Society of London (1972), the International Association of Engineering Geology (1981) or the British Standards Institution (1981) may be appropriate for this purpose. However, there may be occasions when it is more useful to develop and individual scheme to classify zones of material for a specific site.	(2) Geology. The depth of weathering, presence of colluvium or fill and the structure of the fresh and weathered rock should be assessed from the results of the surface and subsurface investigations (Chapter 2). For analysis, geological data must normally be interpreted in terms of layers of zones of materials of like engineering characteristics. When dealing with weathered rocks, one of the zonal schemes proposed by the Geological Society of London (1972), the International Association of Engineering Geology (1981) or Geoguide 3 (GCO, 2001) may be appropriate for this purpose. However, there may be occasions when it is more useful to develop and individual scheme to classify zones of material for a specific site.

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Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
83	BS1377:1975	4b	GMS:1377-12	Where a slope of loose fill is to be stabilised to eliminate the possibility of a flow-slide, the surface layers should be stripped to a vertical depth of not less than 3m and replaced with fill compacted to a density of not less than 95% of British Standard maximum dry density. A drainage system may be required between old and recompacted fill to prevent the development of water pressure behind the compacted face. Alternatively, in some circumstances the required insitu density may be achieved by the use of dynamic compaction techniques.	Where a slope of loose fill is to be stabilised to eliminate the possibility of a flow-slide, the surface layers should be stripped to a vertical depth of not less than 3m and replaced with fill compacted to a density of not less than 95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001). A drainage system may be required between old and recompacted fill to prevent the development of water pressure behind the compacted face. Alternatively, in some circumstances the required insitu density may be achieved by the use of dynamic compaction techniques.
111	BS1377:1975	4b	GMS:1377-13	Areas of over-excavation on slopes flatter than 1 on 1.5 may be made good with suitable fill compacted to 95% of British Standard maximum dry density (BS 1377, test 12). The surface on which fill is to be replaced should be benched, and fill should be placed in horizontal layers, with care being taken to ensure that the compaction of the fill at the surface of the slope meets the required standard. Where it is necessary to reinstate over-excavated slopes that are steeper than 1 on 1.5 cement-stabilised soil or concrete should be used with due regard being given to drainage of groundwater and seepage.	Areas of over-excavation on slopes flatter than 1 on 1.5 may be made good with suitable fill compacted to 95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001). The surface on which fill is to be replaced should be benched, and fill should be placed in horizontal layers, with care being taken to ensure that the compaction of the fill at the surface of the slope meets the required standard. Where it is necessary to reinstate over-excavated slopes that are steeper than 1 on 1.5 cement-stabilised soil or concrete should be used with due regard being given to drainage of groundwater and seepage.
113	BS1377:1975	4b	GMS:1377-14	Trenches excavated on or above slopes provide a location where infiltration of water into the hillside can eventually lead to slope instability. A trench cut into the toe of a slope can also undermine its stability and should not be permitted. Trenches loosely backfilled with soil will permit almost as much infiltration from the surface as an open trench and will permit the lateral flow of water along the trench through the backfilled material. Excavations for services above slopes should therefore not be opened up during the wet season unless unavoidable. When such excavations are carried out in the wet season, the trench should be protected against the ingress of runoff from the surface in which the trench is excavated by means of sand bags, concrete kerbs or small compacted earthfill bunds along each side of the trench. Pumps should be provided at all low points on the trench to maintain the bottom in a dry state, and a watchman should supervise the maintenance and functioning of pumps at all times when work is not proceeding. On completion of work, the trench should be backfilled in layers not greater than 150mm deep, and each layer should be compacted to not less than 95% of British Standard maximum dry density (see Sections 9.5.1 and 9.5.5).	Trenches excavated on or above slopes provide a location where infiltration of water into the hillside can eventually lead to slope instability. A trench cut into the toe of a slope can also undermine its stability and should not be permitted. Trenches loosely backfilled with soil will permit almost as much infiltration from the surface as an open trench and will permit the lateral flow of water along the trench through the backfilled material. Excavations for services above slopes should therefore not be opened up during the wet season unless unavoidable. When such excavations are carried out in the wet season, the trench should be protected against the ingress of runoff from the surface in which the trench is excavated by means of sand bags, concrete kerbs or small compacted earthfill bunds along each side of the trench. Pumps should be provided at all low points on the trench to maintain the bottom in a dry state, and a watchman should supervise the maintenance and functioning of pumps at all times when work is not proceeding. On completion of work, the trench should be backfilled in layers not greater than 150mm deep, and each layer should be compacted to not less than 95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001) (see Sections 9.5.1 and 9.5.5).
113	BS1377:1975	4b	GMS:1377-15	The basic requirements for all fills to be placed in or on slopes in Hong Kong is that they should, in general, be compacted to at least 95% of British Standard maximum dry density (see Chapter 3). In some exceptional cases, such as fills forming platforms that do not and will not support structures, the degree of compaction specified for some of the fill may be reduced to 90% of Standard, providing that the fill forming the peripheral slopes is compacted to 95% (see Figure 9.1).	The basic requirements for all fills to be placed in or on slopes in Hong Kong is that they should, in general, be compacted to at least 95% of maximum dry density determined in accordance with Geospec 3 (GEO, 2001) (see Chapter 3). In some exceptional cases, such as fills forming platforms that do not and will not support structures, the degree of compaction specified for some of the fill may be reduced to 90% of Standard, providing that the fill forming the peripheral slopes is compacted to 95% (see Figure 9.1).

Table B4 - Recommended Revisions to Existing Clauses referring to British Standards

Page no.	BS Referenced in Technical Guidance Document	Scope of Updating (1)	ID No.	Existing Content of Technical Guidance Document	Recommended Content for Updated Technical Guidance Document
116	BS1377:1975	1	GMS:1377-16	(1) Sand replacement method. This method is described in BS 1377 (1975) (tests 15(A) and 15(B). The two tests differ only in the size of equipment, the second being more suitable for coarse-grained soils. The method is accurate but requires considerable care. The calibration of the sand is sensitive to humidity and should be checked daily. The sand should be oven-dried and stored for about a week for the moisture content to reach equilibrium with the atmospheric humidity. If the sand is to be used again, it should be dried and sieved to remove any fill material before further use. The test should not be carried out when compaction plant is operating nearby.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
117	BS1377:1975	3a	GMS:1377-17	(3) Core cutter method. A sample of the fill is taken using a thin-walled core cutter (BS 1377) test 15(D) which can be either driven or jacked into the fill. The weight of the sample is measured and, with the known volume of the core cutter, the density is determined. The sampling process can change the density of the fill, and the presence of gravel in the fill can cause disturbance of the sample and give rise to errors in determining density. This method is not recommended for normal compaction control.	(3) Core cutter method. A sample of the fill is taken using a thin-walled core cutter (BS 1377-9, Clause 2.4 (BSI, 1990a)) which can be either driven or jacked into the fill. The weight of the sample is measured and, with the known volume of the core cutter, the density is determined. The sampling process can change the density of the fill, and the presence of gravel in the fill can cause disturbance of the sample and give rise to errors in determining density. This method is not recommended for normal compaction control.
118	BS1377:1975	1	GMS:1377-18	(1) Standard methods. The best method of determining moisture content is by oven drying (BS 1377, test 1(A)) but this has the disadvantage of taking twenty four hours before a result is available. A decision on whether fill requires more compaction to meet the specification is therefore also delayed for up to twenty four hours.	No Change. (Phase 1 tests for BS 1377:1975 were previously replaced by Geospec 3 as per the addendum to Geotechnical Manual for Slopes.)
118	BS1377:1975	3b	GMS:1377-19	(2) Rapid methods. Two rapid methods for site use are given in BS 1377 (tests 1(B) and 1(C)). They are not as accurate as the standard method and cannot be used for soils containing large proportions of halloysite, gypsum, or calcareous or organic matter. They are, however, generally suitable for Hong Kong soils. Soil moisture content may also be rapidly determined using the Speedy Moisture Content Tester, which measures the pressure of acetylene gas released when carbide reacts with the soil moisture. However, this method is not sufficiently reliable for strict control.	(2) Rapid methods for site use, for example the sand bath method and the calcium carbide method, are provided for in BS 1377-2 (BSI, 1990a). The sand bath method is not as accurate as the standard method and cannot be used for soils containing large proportions of halloysite, gypsum, or calcareous or organic matter. The calcium carbide method measures the pressure of acetylene gas released when carbide reacts with the soil moisture. However, this method is not sufficiently reliable for strict control.
148	BS1377:1975	1	GMS:1377-20	British Standards Institution (1975). Methods of Testing Soils for Civil Engineering Purposes. (BS 1377:1975). British Standards Institution, London, 143 p.	British Standards Institution (1975). Methods of Test for Soils for Civil Engineering Purposes. (BS 1377:1975). British Standards Institution, London, 143 p.
148	BS5930:1981	1	GMS:5930-8	British Standards Institution (1981). Code of Practice for Site Investigations (BS5930:1981). British Standards Institution, London, 148 p.	No change.
240	No reference	1	GMS:882-2	"British Standard Test Sieves" mentioned in the X-axis of the graph. And: Note 1: Filter A - This envelope describes the United States Corps of Engineers concrete sand which will act as a filter for all silts and finer soils. The grading of BS 882 Zone 2 sand is very similar to the United States Corps of Engineers concrete sand.	No Change. (Section superseded. See addendum to Geotechnical Manual for Slopes.)
	Additional reference required.				British Standards Institution (1990a). Methods of test for soils for civil engineering purposes – Part 2: Classification tests (BS 1377-2:1990). British Standards Institution, London, 64 p.

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	Additional reference required.				British Standards Institution (1990b). Methods of test for soils for civil engineering purposes – Part 9: In-situ tests (BS 1377-9:1990). British Standards Institution, London, 70 p.
	Additional reference required.				GCO (1988). Guide to Rock and Soil Descriptions (Geoguide 3). Geotechnical Control Office, Hong Kong, 186 p. (Reprinted in 2000)
	Additional reference required.				GEO (2001). Model Specification for Soil Testing (Geospec 3). Geotechnical Engineering Office, Hong Kong, 340 p.