

Review of British Standard References in Technical Guidance Documents for Migration to Eurocodes and UK National Annexes

GEO Report No. 299

Halcrow China Limited

**Geotechnical Engineering Office
Civil Engineering and Development Department
The Government of the Hong Kong
Special Administrative Region**

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Preface

In keeping with our policy of releasing information which may be of general interest to the geotechnical profession and the public, we make available selected internal reports in a series of publications termed the GEO Report series. The GEO Reports can be downloaded from the website of the Civil Engineering and Development Department (<http://www.cedd.gov.hk>) on the Internet. Printed copies are also available for some GEO Reports. For printed copies, a charge is made to cover the cost of printing.

The Geotechnical Engineering Office also produces documents specifically for publication in print. These include guidance documents and results of comprehensive reviews. They can also be downloaded from the above website.

These publications and the printed GEO Reports may be obtained from the Government's Information Services Department. Information on how to purchase these documents is given on the second last page of this report.



H.N. Wong
Head, Geotechnical Engineering Office
July 2014

Foreword

This Report presents the findings of a study to review the existing technical guidance documents for migration to Eurocodes for geotechnical works in Hong Kong. Although the technical guidance documents are based on local experience and best practice, they may also make reference to some of the British Standards. Many of the British Standards have either been withdrawn or superceded as a result of the introduction of Eurocodes and UK National Annexes, and related international/European standards. The study recommends the necessary amendments to the technical guidance documents for the migration from British Standards to Eurocodes.

Greg McGuire of Halcrow China Limited and Chris Danilewicz of the Halcrow Group Limited prepared this report with the kind assistance of Ms Florence Ko, Dr Mark Chan and Mr Frankie Lo of Standards & Testing Division of GEO. All contributions are gratefully acknowledged.



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Abstract

This Report presents the findings of a study to review the existing technical guidance documents for migration to Eurocodes for geotechnical works in Hong Kong. Although the technical guidance documents are based on local experience and best practice, they may also make reference to some of the British Standards. Many of the British Standards have either been withdrawn or superceded as a result of the introduction of Eurocodes and UK National Annexes, and related international/European standards. This report recommends the necessary amendments to the technical guidance documents for the migration from British Standards to Eurocodes.

Based on the findings of this study, amendments to the technical guidance documents are recommended and promulgated in GEO Technical Guidance Note No. 41. Proposed amendments to Section 7 of General Specification for Civil Engineering Works (2006 Edition) (GS) have been forwarded to CGE/LPM3, the Subject Officer for update of the GS, for necessary action.

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1 Introduction

Halcrow China Limited has been commissioned by the Geotechnical Engineering Office, Civil Engineering and Development Department to undertake Consultancy Agreement No. CE 26/2012 (GE) "Landslip Prevention and Mitigation Programme, 2012, Package C, Landslip Prevention and Mitigation Works - Investigation, Design and Construction". The Memorandum of Agreement for CE 26/2012 (GE) was signed by GEO and Halcrow on 7 February 2013, which was also the date of commencement.

The title of this special task is "Study to Review Technical Guidance Documents for Migration to Eurocodes for Geotechnical Works in Hong Kong".

This study was undertaken to review the existing technical guidance documents for migration to Eurocodes for geotechnical works in Hong Kong. British Standards (BS) are commonly quoted in the existing technical guidance documents. However, following the introduction of Eurocodes (EC) and UK National Annexes (UK NA) and related international/European standards, many of the BS that are referenced in the current technical guidance documents have become obsolete or have been superseded. This study has reviewed and made the necessary recommendations for amendment.

The primary outcome of the study was the preparation of a Technical Guidance Note (TGN) to promulgate the recommended changes to existing technical guidance documents resulting from the findings of the study.

2 Objectives of the Study

With the withdrawal of the old BS, to which many of the current technical guidance documents refer, it is necessary to review a number of the existing technical guidance documents so that, where relevant, these capture the new design clauses in the current EC/UK NA and related international/European standards.

The primary objective is to review the BS references in the existing technical guidance documents and make recommendations to bring the BS references up-to-date, either to their latest version of the standards or to the current EC/UK NA and related international/European standards, where appropriate.

3 Approach and Methodology for Review

3.1 Main Tasks of the Study

The major tasks of the study are set out in Items (i) and (ii) of Clause 6.2(vi)(p) of the Brief, and are summarised as follows:

- (a) Compile summaries of the BS currently referenced in the technical guidance documents to be reviewed;

- (b) Provide extracts of the relevant sections of each BS clause for ease of reference;
- (c) Describe each BS reference in connection to the design, specification or testing of geotechnical works;
- (d) Identify the relevant parts of the EC and UK NA which supercede or replace the BS reference (with extracts of the relevant EC and/or UK NA for reference);
- (e) Compare and discuss the effects of the differences that may result in the design, specification or testing of geotechnical works due to the migration to EC; and
- (f) Recommend amendments, where needed, to the technical guidance documents.

3.2 Technical Guidance Documents Reviewed

The technical guidance documents reviewed under this Study were:

- (a) Geotechnical Manual for Slopes (2nd Edition);
- (b) Geoguide 1 (2nd Edition): Guide to Retaining Wall Design;
- (c) Geoguide 2: Guide to Site Investigation;
- (d) Geoguide 3: Guide to Rock and Soil Descriptions;
- (e) Geoguide 4: Guide to Cavern Engineering;
- (f) Geoguide 6: Guide to Reinforced Fill Structure and Slope Design;
- (g) Geoguide 7: Guide to Soil Nail Design and Construction;
- (h) GCO Publication No. 1/90: Review of Design Methods for Excavation;
- (i) GCO Publication No. 2/90: Foundation Properties of Marble and Other Rocks in the Yuen Long - Tuen Mun Area;
- (j) GEO Publication No. 1/93: Review of Granular and Geotextile Filters;
- (k) GEO Publication No. 1/2006: Foundation Design and Construction;

- (l) GEO Publication No. 1/2007: Engineering Geological Practice in Hong Kong;
- (m) GEO Publication No. 1/2009: Prescriptive Measures for Man-made Slopes and Retaining Walls;
- (n) All current GEO TGNs;
- (o) Section 7 of General Specification for Civil Engineering Works;
- (p) Geospec 1: Model Specification for Prestressed Ground Anchors; and
- (q) Geospec 3: Model Specification for Soil Testing.

3.3 Approach and Methodology

3.3.1 References to British Standards

Each of the technical guidance documents in Section 3.2 was thoroughly reviewed and all existing references to BS were recorded. Initially this was carried out using key word searches, with a further round of reference checks carried out manually to ensure that all references to existing BS were sourced for review.

For each technical guidance document, a summary was prepared, showing all BS documents referenced within, the current status of those BS, extracts of the relevant sections or clauses of the BS, where practical or where specific sections were referenced, and a description of each BS quotation in connection with the design, specification and/or testing of the geotechnical related works. Cross reference(s) to the BS clause(s) and page numbers in the technical guidance document was also given.

A unique citation ID No. was assigned to each of the citations of BS and other relevant reference documents in the technical guidance documents for identification purpose.

3.3.2 Review of Eurocodes and UK National Annexes

For each BS referenced, the relevant parts of the EC/UK NA or related international/European standards which have superseded or replaced the BS were identified. Where local guidance documents exist, e.g. Geospec 3, these have taken precedence over updating to the EC/UK NA or related international/European standards. Description and extracts of relevant parts of the EC/UK NA or related international/European standards were added to the summaries where practical, although in a majority of cases general references were found to be to the whole, rather than specific portions, of the referenced standards.

The existing BS references were reviewed against the relevant parts of the EC/UK NA or related international/European standards, if any, and categorised according to the required

scope of updating of the technical guidance document using the categories given in Table 2.1 below:

Table 2.1 Categories of Updating

Category of Updating	Updates Required
1	No change to reference or citation is required.
2	Citation or reference to be deleted with no other action required.
3	Reference document has been updated. Citation to be updated to the appropriate updated reference document, using one of the following sub-categories: a) Direct update of the reference document; no re-drafting of the affected clause is required. b) Update of the reference document; some re-drafting of the affected clause is also required.
4	Reference document has been superseded or withdrawn. Citation is to be updated to the appropriate replacement reference document, using one of the following sub-categories: a) Direct replacement with a new reference document; no amendment of the affected clause required. b) Replacement with a new reference document; some amendment to the affected clause is also required.
5	Direct replacement of a reference is difficult and requires particular attention, for example the original reference has been withdrawn with no replacement, or the relevant content is not addressed in a replacement document (or replaced by multiple citations to parts of various documents), or the adoption of the replacement document may affect existing local practice.

The above categories allowed the level of updating required to be determined for each technical guidance document and also focused attention on the more onerous updates in the various BS references. It should be noted that the Categories 1, 2, 3a and 4a references required little or no updating, whilst Categories 3b and 4b references required updating of references with some additional re-wording of existing clauses in technical guidance documents. Category 5 references required more substantial revisions to existing guidance in addition to updating of references in the technical guidance documents. A summary of the changes required are given in Table 4.1.

Further explanatory notes on the scope of updating, definitions and classification of references and citations used during this study are given in Appendix A. Examples of applications in the above categories are given in Table A1 of Appendix A.

4 Key Findings for GEO Technical Guidance Documents

The findings of the review of the technical guidance documents are summarised in the following sections for each of the technical guidance documents reviewed.

Summaries of the BS currently referenced in the technical guidance documents and the necessary updates and amendments for each technical guidance document are given in Appendices B to R.

Table 4.1 summarises the categories of updating required for each of the technical guidance documents reviewed under this Study.

**Table 4.1 Summary of Updating Required for Technical Guidance Documents
(Sheet 1 of 2)**

Technical Guidance Document	Number of BS or BS EN References by Category of Updating Required ⁽¹⁾							Total
	1	2	3a	3b	4a	4b	5	
Geotechnical Manual for Slopes (2 nd Edition)	19	-	1	1	2	5	-	28
Geoguide 1 (2 nd Edition)	5	-	1	-	5	2	3	16
Geoguide 2	12	10	18	8	11	23	2	84
Geoguide 3	13	-	1	-	7	1	-	22
Geoguide 4	-	-	-	-	1	-	-	1
Geoguide 6	9	-	29	-	10	2	1	51
Geoguide 7	1	-	1	-	-	-	1	3
GCO Publication No. 1/90	2	-	-	-	-	-	1	3
GCO Publication 2/90	5	-	-	-	-	-	-	5
GEO Publication 1/93	3	-	-	-	-	2	-	5
GEO Publication No. 1/2006	14	4	5	-	2	1	3	29
GEO Publication No. 1/2007	5	-	-	-	-	7	-	12
GEO Publication No. 1/2009	1	-	-	-	-	-	-	1
Current GEO TGNs ⁽²⁾	-	-	1	-	-	-	-	1

**Table 4.1 Summary of Updating Required for Technical Guidance Documents
(Sheet 2 of 2)**

Technical Guidance Document	Number of BS or BS EN References by Category of Updating Required ⁽¹⁾							
	1	2	3a	3b	4a	4b	5	Total
Geospec 1	7	1	1	-	14	3	2	28
Geospec 3	20	-	-	-	4	-	-	24
Total	116	15	58	9	56	46	13	313

Notes: (1) Categories of Updating are defined in Table 2.1 and further details given in Appendix A.

(2) Only TGN No. 25 contains references to BS which require updating.

4.1 Geotechnical Manual for Slopes (2nd Edition)

The Geotechnical Manual for Slopes (GMS) contains a total of 28 BS references, of which 19 are Category 1 references relating to BS 5930:1981, BS 1377:1975 and BS 882:1983 and which are either referred to in Chapters 1 and 2 or Section 4.6 of the GMS, which have been superseded by later publications, or are related to Phase 1 tests in BS 1377:1975 which have been replaced by Geospec 3. These changes are already noted in the Addendum to the GMS. As these Chapters and Section of the GMS are obsolete there is no need to update the references contained therein.

Of the remaining BS references:

- One is a recommended Category 3a change, whereby the existing reference is simply updated to a later version of the same standard.
- One is a recommended Category 3b change, whereby the existing reference is updated to a later version of the same standard, with some minor re-drafting of the existing clause in the GMS.
- Two are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- Five are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in the GMS.

There are no substantial changes, or changes to current design practice in Hong Kong, as a result of the recommended updates for the GMS.

As a result of the above changes, the following additional or updated References are to be included in the GMS:

- a) BSI (1990a). *Methods of Test for Soils for Civil Engineering Purposes - Part 2: Classification Tests (BS 1377-2: 1990)*. British Standards Institution, London, 64 p.
- b) BSI (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.
- c) GCO (1988). *Guide to Rock and Soil Descriptions (Geoguide 3)*. Geotechnical Control Office, Hong Kong, 186 p. (Reprinted in 2000)
- d) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

4.2 Geoguide 1 (2nd Edition): Guide to Retaining Wall Design

Geoguide 1 contains a total of 16 BS references, of which five are Category 1 references relating to BS 8004:1986, which has been superceded. Nevertheless, in accordance with NA to BS EN 1997-1:2004, BS 8004 is one of the references that contain non-contradictory, complementary information (NCCI) for use with BS EN 1997-1:2004. In the context of Geoguide 1 the references to this standard are generally informative and are considered to be NCCI. Therefore, these references require no update and can be retained in Geoguide 1.

Of the remaining BS references:

- One is a recommended Category 3a amendment, whereby the existing reference is simply updated to a later version of the same standards.
- Five are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- Two are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in Geoguide 1.

- Three are recommended Category 5 changes, whereby particular consideration is required to recommend the necessary updates.

There are no substantial changes, or changes to current design practice in Hong Kong, as a result of the recommended updates in Categories 3a, 4a or 4b for Geoguide 1.

For the Category 5 cases, the following should be noted regarding the recommended amendments to Geoguide 1:

- BS 5400-2:1978 has been superceded and withdrawn. The replacement standard is BS EN 1991-2:2003, however, Highways Department (HyD) has recently issued the Structures Design Manual for Highways and Railways (2013 Edition), which draws upon this BS EN. The nominal surcharge loadings for highways structures, based on HA and HB loadings, previously referred to in Section 7.2.1 and Table 16 of Geoguide 1 no longer apply. Instead for local practice, surcharge loadings for new permanent earth retaining walls should be determined using the recommendations given in the new Structures Design Manual for Highways and Railways (2013 Edition). (*ID nos. GEO1:5400-1, GEO1:5400-2 & GEO1:5400-3 in Table C1 in Appendix C*).
- BS 8007:1987 has been superceded and withdrawn. This standard is referred to in Section 9.3.4 of Geoguide 1, with reference to general guidance on details of expansion, contraction and other movement joints and their spacings. This citation refers to both the description and spacing of movement joints. The description of movement joints is not reproduced in the current replacement standards, but the general guidance on provision of movement joints is covered in the principal replacement standard, BS EN 1992-3:2006. (*ID nos. GEO1:8007-1 & GEO1:8007-2 in Table C1 in Appendix C*).

As a result of the above changes, the following additional or updated References are to be included in Geoguide 1:

- a) BSI (1980). *Specification for Mild Steel Wire for General Engineering Purposes (BS 1052:1980)*. British Standards Institution, London, 10 p.
- b) BSI (2000a). *Test Sieves - Technical Requirements and Testing - Part 1: Test Sieves of Metal Wire Cloth (BS 410-1:2000, ISO 3310-1:2000)*. British Standards Institution, London UK, 22 p.

- c) BSI (2000b). *Concrete - Part 1: Specification, Performance, Production and Conformity (BS EN 206-1:2000)*. British Standards Institution, London, 74 p.
- d) BSI (2005). *Quality Management Systems - Fundamentals and Vocabulary (BS EN ISO 9000:2005)*. British Standards Institution, London, 42 p.
- e) BSI (2006). *Eurocode 2. Design of Concrete Structures - Liquid Retaining and Containing Structures (BS EN 1992-3:2006)*. British Standards Institution, London, 23 p.
- f) BSI (2009a). *Steel Wire and Wire Products - Non-ferrous Metallic Coatings on Steel Wire, Part 1: General Principles (BS EN 10244-1:2009)*. British Standards Institution, London, 12 p.
- g) BSI (2009b). *Steel Wire and Wire Products. Non-ferrous Metallic Coatings on Steel Wire, Part 2: Zinc or Zinc Alloy Coatings (BS EN 10244-2:2009)*. British Standards Institution, London, 22 p.
- h) BSI (2009c). *Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (BS EN ISO 1461:2009)*. British Standards Institution, London, 24 p.
- i) BSI (2009d). *Quality Management Systems - Requirements (BS EN ISO 9001:2008)*. British Standards Institution, London, 40 p.
- j) BSI (2009e). *Managing for the Sustained Success of an Organization - A Quality Management Approach (BS EN ISO 9004:2009)*. British Standards Institution, London, 56 p.
- k) BSI (2011a). *Steel Wire and Wire Products - Organic Coatings on Steel Wire, Part 1: General Rules (BS EN 10245-1:2011)*. British Standards Institution, London, 22 p.
- l) BSI (2011b). *Steel Wire and Wire Products. Organic Coatings on Steel Wire, Part 2: PVC Finished Wire (BS EN 10245-2:2011)*. British Standards Institution, London, 14 p.
- m) BSI (2011c). *Guidelines for Auditing Management Systems (ISO 19011:2011) (BS EN ISO 19011:2011)*. British Standard Institution, London, 56 p.
- n) BSI (2012a). *Concrete - Complementary British Standard to BS EN 206-1 - Part 1: Method of Specifying and Guidance*

for the Specifier (BS 8500-1:2006+A1:2012). British Standards Institution, London, 66 p.

- o) BSI (2012b). *Concrete - Complementary British Standard to BS EN 206-1 - Part 2: Specification for Constituent Materials and Concrete (BS 8500-2:2006+A1:2012)*. British Standards Institution, London, 52 p.
- p) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- q) HyD (2013). *Structures Design Manual for Highways and Railways. (2013 Edition)*. Highways Department, Hong Kong, 275 p.

4.3 Geoguide 2: Guide to Site Investigation

Geoguide 2 contains a total of 84 BS references, of which 12 are Category 1 references, a number of which are referenced in an historical context. These references require no update and can be retained in Geoguide 2.

Of the remaining BS references:

- Ten are recommended Category 2 deletions of references, which are no longer essential in the context of Geoguide 2.
- There are 18 Category 3a amendments, whereby the existing references are simply updated to later versions of the same standards.
- Eight are recommended Category 3b changes, whereby the existing references are updated to later versions of the same standard, with some minor re-drafting of the existing clauses in Geoguide 2.
- Eleven are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- There are 23 recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in Geoguide 2. It should be noted that 18 of these changes are due to straightforward updates from BS 1377:1975 to Geospec 3 to suit local testing practice.

- Two are recommended Category 5 changes, whereby particular consideration is required to recommend the necessary updates.

There are no substantial changes, or changes to current design practice in Hong Kong, as a result of the recommended updates in Categories 2, 3a, 3b, 4a or 4b for Geoguide 2.

For the Category 5 cases, the following should be noted regarding the recommended amendments to Geoguide 1:

- BS 812:1975 has been superceded and withdrawn and replaced with a number of standards covering the use of aggregates. This standard is referred to in Section 19.2 on Sample Quality and Section 40.3.1 regarding Matters to be Covered of Geoguide 2. For sample quality in Section 19.2, reference can instead be made to the recently published local Construction Standard CS3:2013. For Section 40.3.1, this particular reference does not add to the guidance provided and following a review this reference can be deleted. (*ID nos. GEO2:812-2 in Table D1 in Appendix D*).
- BS 1377:1975 has been revised and withdrawn and a 1990 version issued. However, in the case of Section 12.2.1, regarding general principles for standard penetration tests (SPT), the latest standard for SPT testing is BS EN ISO 22746-3:2005+A1:2011. The reference is updated to the new BS EN ISO, with modifications to reflect the current practice for carrying out SPT in Hong Kong. The new standard incorporates items (a) and (b) of the variations currently proposed in Geoguide 2, so these are deleted. Items (c) and (d) in the current Geoguide 2 are retained and re-numbered and a new variation added to the list to suit current practice with respect to the procedure in the new BS EN ISO in that the results of the SPT should be included in borehole records without the application of corrections. The new BS EN ISO also requires the energy ratio of the drive hammer to be measured, certified and reported, which is not required in the current local practice. This would mean all hammers having to be recalibrated and is not proposed as this would be a significant change to current Hong Kong practice. The execution of the test itself is, however, unchanged in the BS EN ISO standard. Therefore, making reference to the UK practice given in UK NA to BS EN 1997-2, it is proposed that the application of corrections and the requirements on energy ratio are not to be incorporated in Geoguide 2. (*ID no. GEO2:1377-6 in Table D1 in Appendix D*).

As a result of the above changes, the following additional or updated References are to be included in Geoguide 2:

- a) BSI (1990). *Methods of Test for Soils for Civil Engineering Purposes - Parts 1 to 9 : (BS1377, Parts 1 to 9:1990)*. British Standards Institution, London, 406 p.
- b) BSI (1991). *Cathodic Protection - Part 1: Code of Practice for Land and Marine Applications - (formerly CP 1021) (BS 7361-1:1991)*. British Standards Institution, London, 122 p.
- c) BSI (2004). *Eurocode 7: Geotechnical Design – Part1: General Rules (BS EN 1997-1:2004)*. British Standards Institution, London, 168 p.
- d) BSI (2006). *Geotechnical Investigation and Testing - Sampling Methods and Groundwater Measurements - Part 1: Technical Principles for Execution (BS EN ISO 22475-1:2006)*. British Standards Institution, London, 120 p.
- e) BSI (2007). *Eurocode 7 - Geotechnical Design - Part 2: Ground Investigation and Testing (BS EN 1997-2:2007)*. British Standards Institution, London, 196 p.
- f) BSI (2008). *Guide to Safety Precautions and Procedures for the Construction and Descent of Machine-bored Shafts for Piling and Other Purposes (BS 8008:1996+A1:2008)*. British Standards Institution, London, 20 p.
- g) BSI (2009). *Code of Practice for Earthworks (BS 6031:2009)*. British Standards Institution, London, 120 p.
- h) BSI (2010). *Code of Practice for Site Investigations (BS 5930:1999+A2:2010)*. British Standards Institution, London, 192 p.
- i) BSI (2011a). *Geotechnical Investigation and Testing - Field Testing - Part 2: Dynamic Probing (BS EN ISO 22476-2:2005+A1:2011)*. British Standards Institution, London, 30 p.
- j) BSI (2011b). *Geotechnical Investigation and Testing - Field Testing - Part 3: Standard Penetration Test (BS EN ISO 22476-3:2005+A1:2011)*. British Standards Institution, London, 14 p.

- k) BSI (2012a). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 2: Water Permeability Tests in a Borehole using Open Systems (BS EN ISO 22282-2:2012)*. British Standards Institution, London, 27 p .
- l) BSI (2012b). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 3: Water Pressure Tests in Rock (BS EN ISO 22282-3:2012)*. British Standards Institution, London, 26 p.
- m) BSI (2012c). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 4: Pumping Tests (BS EN ISO 22282-4:2012)*. British Standards Institution, London, 25 p.
- n) BSI (2012d). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 5: Infiltrometer Tests (BS EN ISO 22282-5:2012)*. British Standards Institution, London, 21 p.
- o) BSI (2012e). *Geotechnical Investigation and Testing - Geohydraulic Testing - Part 6: Water Permeability Tests in a Borehole using Closed Systems (BS EN ISO 22282-6:2012)*. British Standards Institution, London, 15 p .
- p) BSI (2012f). *Geotechnical Investigation and Testing - Field Testing, Part 1: Electrical Cone and Piezocone Penetration Test (BS EN ISO 22476-1:2012)*. British Standards Institution, London, 36 p.
- q) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- r) GEO (2002). *Guide to Reinforced Fill Structure and Slope Design (Geoguide 6)*. Geotechnical Engineering Office, Hong Kong, 236 p.
- s) HKSARG (2013). *Construction Standard CS3:2013 - Aggregates for Concrete*. The Government of the Hong Kong Special Administrative Region, Hong Kong, 140 p

4.4 Geoguide 3: Guide to Rock and Soil Descriptions

Geoguide 3 contains a total of 22 BS references, of which 13 are Category 1 references, a number of which are referenced in an historical context. These references require no update and can be retained in Geoguide 3.

Of the remaining BS references:

- One is a recommended Category 3a amendment, whereby the existing reference is simply updated to a later version of the same standard.
- Seven are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- One is a recommended Category 4b change, whereby the existing reference is amended to a replacement standard containing the same guidance, with some minor re-drafting of the existing clause in Geoguide 3.

There are no substantial changes, or changes to current design practice in Hong Kong, as a result of the recommended updates for Geoguide 3.

The following additional References are to be included in Geoguide 3:

- a) BSI (2010). *Code of Practice for Site Investigations (BS 5930:1999+A2:2010)*. British Standards Institution, London, UK, 206 p.
- b) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

4.5 Geoguide 4: Guide to Cavern Engineering

Geoguide 4 contains one reference to BS 1377-3:1990, which is a current standard. However, local Hong Kong practice for the tests referred to in Geoguide 4 is that these are carried out in accordance with Geospec 3. Accordingly, this is a Category 4a case requiring a simple update from the current BS standard to the local standard.

There are no changes to current practice in Hong Kong as a result of the recommended updates for Geoguide 4.

The following additional Reference is to be included in Geoguide 4:

- a) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

4.6 Geoguide 6: Guide to Reinforced Fill Structure and Slope Design

Geoguide 6 contains a total of 51 BS or BS EN references, of which 9 are Category 1 references requiring no update and which can be retained in Geoguide 6.

Of the remaining BS and BS EN references:

- A total of 29 are recommended Category 3a amendments, whereby the existing references are simply updated to later versions of the same references.
- A further ten are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- Two are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in Geoguide 6.
- One is a recommended Category 5 change, requiring particular attention in order to recommend the necessary updates.

For the Category 5 case, the following should be noted regarding the recommended amendments to Geoguide 6:

- BS 8006:1995 has been updated to the 2010 version. However, the microbial activity testing described in Annex B of BS 8006:1995 has been deleted in the current standard, which advises that bacterial activity should be investigated if it is considered a risk. This is usually done by means of redox testing, although the standard does not specify any particular test. Given that the microbial activity test is no longer recognised, the entire Clause A.55 is deleted from the Model Specification given in the Appendix of Geoguide 6. This deletion also affects Table A.2 of which is amended to suit. (*ID nos. GEO6:8006-8 in Table G1 in Appendix G*).

As a result of the above changes, the following additional or updated References are to be included in Geoguide 6:

- a) BSI (2000). *Concrete - Part 1: Specification, Performance, Production and Conformity (BS EN 206-1:2000)*. British Standards Institution, London, 74 p.
- b) BSI (2004a). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 230 p.
- c) BSI (2004b). *Hot Rolled Products of Structural Steels - Part 1: General Technical Delivery Conditions (BS EN*

- 10025-1:2004). British Standards Institution, London, 36 p.
- d) BSI (2004c). *Hot Rolled Products of Structural Steels - Part 2: Technical Delivery Conditions for Non-alloy Structural Steels (BS EN 10025-2:2004)*. British Standards Institution, London, 38 p.
 - e) BSI (2005a). *Steel Fabric for the Reinforcement of Concrete - Specification (BS 4483:2005)*. British Standards Institution, London, 18 p.
 - f) BSI (2005b). *Steel Wire for the Reinforcement of Concrete Products - Specification (BS 4482:2005)*. British Standards Institution, London, 30 p.
 - g) BSI (2006a). *Cold Rolled Low Carbon Steel Flat Products for Cold Forming - Technical Delivery Conditions (BS EN 10130:2006)*. British Standards Institution, London, 16 p.
 - h) BSI (2006b). *Execution of Special Geotechnical Works - Reinforced Fill (BS EN 14475:2006)*. British Standards Institution, London, 60 p.
 - i) BSI (2008a). *Geosynthetics - Wide-width Tensile Test (ISO 10319:2008) (BS EN ISO 10319:2008)*. British Standards Institution, London, 18 p.
 - j) BSI (2008b). *Geosynthetics - Tensile Test for Joints/Seams by Wide-width Strip Method (ISO 10321:2008) (BS EN ISO 10321:2008)*. British Standards Institution, London, 20 p.
 - k) BSI (2009a). *Hot Dip Galvanized Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (ISO 1461:2009) (BS EN ISO 1461:2009)*. British Standards Institution, London, 24 p.
 - l) BSI (2009b). *Metallic Materials - Tensile Testing, Part 1: Method of Test at Ambient Temperature (BS EN ISO 6892-1:2009)*. British Standards Institution, London, 76 p.
 - m) BSI (2009c). *Steel for the Reinforcement of Concrete - Weldable Reinforcing Steel - Bar, Coil and Decoiled product - Specification (BS 4449:2005+A2:2009)*. British Standards Institution, London, 34 p.
 - n) BSI (2010). *Code of Practice for Strengthened/Reinforced Soils and Other Fills (BS 8006-1:2010)*. British Standards Institution, London, 260 p.

- o) BSI (2012a). *Concrete - Complementary British Standard to BS EN 206-1 - Part 1: Method of Specifying and Guidance for the Specifier (BS 8500-1:2006+A1:2012)*. British Standards Institution, London, 66 p.
- p) BSI (2012b). *Concrete - Complementary British Standard to BS EN 206-1 - Part 2: Specification for Constituent Materials and Concrete (BS8500-2:2006+A1:2012)*. British Standards Institution, London, 52 p.
- q) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.
- r) HKSARG (2012). *Construction Standard CS2:2012 - Steel Reinforcing Bars for the Reinforcement of Concrete*. The Government of the Hong Kong Special Administrative Region, Hong Kong, 50 p.

4.7 Geoguide 7: Guide to Soil Nail Design and Construction

Geoguide 7 contains a total of three BS or BS EN ISO references, of which one is Category 1 reference relating to BS 1377-3:1990, which is a current standard and applicable for the tests referred to in Geoguide 7. This reference requires no update and can be retained in Geoguide 7.

Of the remaining BS references:

- One is a recommended Category 3a amendment, whereby the existing BS EN ISO reference, which is already a BS EN standard, simply requires updating to a later version of the same standard.
- One is a recommended Category 5 change, requiring particular attention in order to recommend the necessary updates.

For the Category 5 change, the following should be noted regarding the recommended amendments to Geoguide 7:

- BS 8110-2:1978 has been withdrawn and the replacement standard is BS EN 1992-1-1:2004. The reference occurs in Section 5.6.3 of Geoguide 7 and relates to equation 5.3 for calculation of the allowable pullout resistance provided by the grout-reinforcement bond length in the passive zone of a soil nail. However, the new BS EN standard changes the basis for design and the current coefficient of friction at the grout-reinforcement interface, β , in the current equation 5.3 is not supported by the new BS EN standard. The equation

is therefore updated based on the recommended design guidance in BS EN 1992-1-1:2004. (*ID nos. GEO7:8110-1 & GEO7:8110-2 in Table H1 in Appendix H*).

As a result of the above changes, the following additional or updated References are to be included in Geoguide 7:

- a) BSI (2004). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 225 p.
- b) BSI (2009). *Hot Dip Galvanised Coatings on Fabricated Iron and Steel Articles - Specifications and Test Methods (ISO 1461:2009) (BS EN ISO 1461: 2009)*. British Standards Institution, London, 16 p.
- c) BSI (2005). *UK National Annex to Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (NA to BS EN 1992-1-1:2004)*. British Standards Institution, London, 20 p.

4.8 GCO Publication No. 1/90: Review of Design Methods for Excavation

GCO Publication No. 1/90 contains three references to BS 8081:1989, which is a current standard, albeit partially replaced. Two of these are Category 1 references and require no update. The third is a Category 5 update, regarding a general statement in Section 8.1.4 of the Publication that “a comprehensive treatment of the design of anchors” is given in various references including BS 8081:1989.

For the Category 5 case, the following should be noted regarding the recommended amendments to GCO Publication No. 1/90:

- BS 8081-2:1989 is current, albeit partially replaced. The current reference in the Publication is a general statement about the design of ground anchors. In this regard it is considered that additional references, BS EN 1997-1:2004 and BS EN 1537:2013 be added to this section of the Publication to provide additional up to date design references, which may be of use to the users of GCO Publication No. 1/90. It should be noted that the factors of safety in Geospec 1 are not compatible with limit state analysis. (*ID no. P1-90:8081-2 in Table II in Appendix I*).

As a result of the above change, the following additional References are to be included in GCO Publication No. 1/90:

- a) BSI (2004). *Eurocode 7: Geotechnical Design - Part 1: General Rules (BS EN 1997-1:2004)*. British Standards

Institution, London, 168 p.

- b) BSI (2013). *Execution of Special Geotechnical Works - Ground Anchors (BS EN 1537:2013)*. British Standards Institution, London, 56 p.

4.9 GCO Publication No. 2/90: Foundation Properties of Marble and Other Rocks in the Yuen Long - Tuen Mun Area

GCO Publication No. 2/90 contains five BS references, all of which are Category 1 and are either historical references to BS 5930:1981 regarding background information on how weathering and mass classification systems were developed for use in Hong Kong or are references to BS 8004:1986, which has been superceded, but for this particular standard are informative and considered to be NCCI. Therefore, these references can be retained in GCO Publication No. 2/90 and no updating of this particular guidance document is required.

4.10 GEO Publication No. 1/93: Review of Granular and Geotextile Filters

GEO Publication No. 1/93 contains five BS references, three of which are Category 1 references to current standards, requiring no update and can be retained in the Publication.

Of the remaining BS references:

- Two are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in Geoguide 2.

As a result of the above change, the following additional Reference is to be included in GEO Publication No. 1/93:

- a) GEO (2001). *Model Specification for Soil Testing (Geospec 3)*. Geotechnical Engineering Office, Hong Kong, 340 p.

4.11 GEO Publication No. 1/2006: Foundation Design and Construction

GEO Publication No. 1/2006 contains a total of 29 BS or BS EN references, of which 14 are Category 1 references requiring no update and which can be retained in the Publication.

Of the remaining BS and BS EN references:

- Four are recommended Category 2 deletions of references, which are no longer essential in the context of the Publication.

- Five are recommended Category 3a amendments, whereby the existing references are simply updated to the later versions of the same references.
- Two are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- One is a recommended Category 4b change, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in GEO Publication No. 1/2006.
- Three are recommended Category 5 changes, whereby particular consideration is required to recommend the necessary updates.

For the Category 5 cases, the following should be noted regarding the recommended amendments to GEO Publication No. 1/2006:

- BS 8110-1:1997 has been replaced by BS EN 1992-1-1:2004 and the exposure classes referenced in Section 6.14 on Corrosion of Piles are reproduced in BS EN 1992-1-1:2004. GEO Publication No. 1/2006 is amended to refer to the BS EN reference. (*ID no. P1-2006:8110-3 in Table L1 in Appendix L*).
- BS 5228-4:1992 was updated in a 2009 version of the same standard, but the stated value of $k = 0.75$ for hammer drive piles quoted in Section 8.2.6.4 on Vibration is not found in the updated BS. Instead BS 5228-2:2009 states that the k value has a value in the range of 1 to 5 depending on the ground conditions and pile resistance. The reference is updated to the 2009 version and the text re-worded accordingly to match with the advice given. (*ID no. P1-2006:5228-3 in Table L1 in Appendix L*).
- BS EN 1536:2000 has been updated to a 2010 version. Whilst this is already a BS EN reference the opportunity has been taken to update Table 8.7, which refers to the old standard. The updated 2010 standard contains additional requirements regarding filter cake and an additional row has been included in Table 8.7 to include the information. (*ID no. P1-2006:1536-3 in Table L1 in Appendix L*).

As a result of the above change, the following updated or additional References are to be included in GEO Publication No. 1/2006:

- a) BSI (2004a). *Eurocode 2: Design of Concrete Structures - Part 1-1: General Rules and Rules for Buildings (BS EN 1992-1-1:2004)*. British Standards Institution, London, 225 p.
- b) BSI (2004b). *Eurocode 7: Geotechnical Design - Part 1: General Rules (BS EN 1997-1:2004)*. British Standards Institution, London, 167 p.
- c) BSI (2007). *Eurocode 7: Geotechnical Design - Part 2: Ground Investigation and Testing (BS EN 1997-2:2007)*. British Standards Institution, London, 196 p.
- d) BSI (2009). *Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2: Vibration (BS 5228-2:2009)*. British Standards Institution, London, 89 p.
- e) BSI (2010a). *Execution of Special Geotechnical Works - Bored Piles (BS EN 1536:2010)*. British Standards Institution, London, 82 p.
- f) BSI (2010b). *Mechanical Vibration and Shock. Vibration of Fixed Structures. Guidelines for the Measurement of Vibrations and Evaluation of their Effects on Structures (BS ISO 4866:2010)*. British Standards Institution, London, 40 p.
- g) BSI (2012a). *Maritime works - Part 1-3: General - Code of practice for geotechnical design (BS 6349-1-3:2012)*. British Standards Institution, London, 64 p.
- h) BSI (2012b). *Concrete. Complementary British Standard to BS EN 206-1. Method of Specifying and Guidance for the Specifier (BS 8500-1:2006+A1:2012)*. British Standards Institution, London, 59 p.

4.12 GEO Publication No. 1/2007: Engineering Geological Practice in Hong Kong

GEO Publication No. 1/2007 contains a total of 12 BS references, five of which are Category 1 historical references to earlier standards and can be retained in the Publication.

The remaining seven BS references are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with minor re-drafting of the existing clauses in GEO Publication No. 1/2007.

There are no changes to current practice in Hong Kong as a result of the recommended updates for GEO Publication No. 1/2007.

The following additional References are to be included in GEO Publication No. 1/2007:

- a) BSI (2003). *Geotechnical Investigation and Testing - Identification and Classification of Rock - Part 1: Identification and Description* (BS EN ISO 14689-1:2003). British Standards Institution, London, 16 p.
- b) BSI (2007). *Eurocode 7. Geotechnical Design. Ground Investigation and Testing* (BS EN 1997-2:2007). British Standards Institution, London, 196 p.
- c) BSI (2010). *Code of Practice for Site Investigations* (BS 5930:1999+A2:2010). British Standards Institution, London, 192 p.

4.13 GEO Publication No. 1/2009: Prescriptive Measures for Man-made Slopes and Retaining Walls

This Publication contains one reference to BS EN 1997-1:2004 (Eurocode 7) which is a current standard. As it already refers to a BS EN standard, it is a Category 1 case and no updating of this guidance document is required.

4.14 Current Technical Guidance Notes (TGNs)

All of the current TGNs (TGN Nos. 1 to 39) were reviewed and it was determined that only TGN No. 25, "*Geotechnical Risk Management for Tunnel Work*", contained reference to a British Standard. Therefore, no summaries are required for the remaining TGN.

For TGN No. 25 there is one reference to BS 6164:2001, the Code of Practice for Safety in Tunnelling in the Construction Industry. This remains the most up to date standard, albeit BS 6164:2011 is the latest version. Therefore, this is a Category 3a update requiring the current reference in TGN No. 25 to be updated to the 2011 version.

The following updated Reference is to be included in TGN No. 25:

- a) BSI (2011). *BS 6164:2011 Code of Practice for Safety in Tunnelling in the Construction Industry*. British Standards Institution, London, 162 p.

4.15 Section 7 of the General Specification for Civil Engineering Works

Proposed amendments to Section 7 of General Specification for Civil Engineering Works (2006 Edition) (GS) have been forwarded to CGE/LPM3, the Subject Officer for update of the GS, for necessary action. As they would possibly be subject to changes, the

proposed amendments are included in Appendix P for information, but are not discussed in detail here.

4.16 Geospec 1: Model Specification for Prestressed Ground Anchors

Geospec 1 contains a total of 28 BS references, of which 7 are Category 1 references requiring no update and which can be retained in the Publication.

Of the remaining BS and BS EN references:

- One is a recommended Category 2 deletion of reference to BS 4757:1971 (Nineteen-wire Steel Strand for Pre-stressed Concrete), which has been withdrawn with no replacement.
- One is a recommended Category 3a amendment, whereby the existing reference is simply updated to a later version of the same standard.
- Fourteen are recommended Category 4a changes, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.
- Three are recommended Category 4b changes, whereby the existing references are amended to their replacement standards containing the same guidance, with some minor re-drafting of the existing clauses in Geospec 1.
- Two are recommended Category 5 changes, whereby particular attention is required to recommend the necessary updates.

For the Category 5 cases, the following should be noted regarding the recommended amendments to Geospec 1:

- BS 5075:Part 1:1982 and BS 5075:Part 3:1985 have been superceded by a total of eleven separate standards. The eleven standards are to be included in the updated Specification and the Clause reworded so that admixtures shall only be used with the prior agreement of, and to the standards deemed appropriate by, the Engineer. (*ID nos. Geospec1: 5075A-2 and 5075B-2 in Table Q1 in Appendix Q*).

As a result of the above change, the following updated or additional References are to be included in Geospec 1:

- a) BSI (1996). *Elastomeric Seals - Material Requirements for Pipe Joint Seals used in Water and Drainage Applications - Part 1: Vulcanized Rubber (BS EN 681-1:1996)*. British Standards Institution, London, 19 p.
- b) BSI (2001). *Admixtures for Concrete, Mortar and Grout - Part 6: Sampling, Conformity Control and Evaluation of Conformity (BS EN 934-6:2001)*. British Standards Institution, London, 10 p.
- c) BSI (2002). *Mixing Water for Concrete - Specification for Sampling, Testing and Assessing the Suitability of Water Including Water Recovered from Processes in the Concrete Industry, as Mixing Water for Concrete (BS EN 1008:2002)*. British Standards Institution, London, 18 p.
- d) BSI (2003). *Plastics and Ebonite - Determination of Indentation Hardness by Means of a Durometer (Shore Hardness) (BS EN ISO 868:2003)*. British Standards Institution, London, 5 p.
- e) BSI (2004a). *Mechanical Tests for Post-tensioning Systems (BS EN 13391:2004)*. British Standards Institution, London, 21 p.
- f) BSI (2004b). *Plastics - Thermoplastic Materials - Determination of Vicat Softening Temperature (VST) (BS EN ISO 306:2004)*. British Standards Institution, London, 10 p.
- g) BSI (2005a). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 4: Determination of Bleeding of Concrete (BS EN 480-4:2005)*. British Standards Institution, London, 5 p.
- h) BSI (2005b). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 5: Determination of Capillary Absorption (BS EN 480-5:2005)*. British Standards Institution, London, 6 p.
- i) BSI (2005c). *Admixtures of Concrete, Mortar and Grout - Test Methods - Part 6: Infrared Analysis (BS EN 480-6:2005)*. British Standards Institution, London, 5 p.
- j) BSI (2005d). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 11: Determination of Air Void Characteristics in Hardened Concrete (BS EN 480-11:2005)*. British Standards Institution, London, 19 p.

- k) BSI (2005e). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 12: Determination of the Alkali Content of Admixtures (BS EN 480-12:2005)*. British Standards Institution, London, 9 p.
- l) BSI (2006). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 2: Determination of Setting Time (BS EN 480-2:2006)*. British Standards Institution, London, 10 p.
- m) BSI (2009). *Admixtures for Concrete, Mortar and Grout - Test Methods, Part 10: Determination of Water Soluble Chloride Content (BS EN 480-10:2009)*. British Standards Institution, London, 8 p.
- n) BSI (2011a). *Cement, Part 1: Composition, Specifications and Conformity Criteria for Common Cements (BS EN 197-1:2011)*. British Standards Institution, London, 46 p.
- o) BSI (2011b). *Admixtures for Concrete, Mortar and Grout - Test Methods - Part 1: Reference Concrete and Reference Mortar for Testing (BS EN 480-1:2006+A1:2011)*. British Standards Institution, London, 11 p.
- p) BSI (2011c). *Plastics Piping Systems for Water Supply, and for Drainage and Sewerage under Pressure - Polyethylene (PE), Part 1: General (BS EN 12201-1:2011)*. British Standards Institution, London, 20 p.
- q) BSI (2011d). *Plastics Piping Systems for Water Supply, and for Drainage and Sewerage under Pressure - Polyethylene (PE), Part 2: Pipes (BS EN 12201-2:2011)*. British Standards Institution, London, 29 p.
- r) BSI (2012a). *High Tensile Steel Wire and Strand for the Prestressing of Concrete - Specification (BS 5896:2012)*. British Standards Institution, London, 24 p.
- s) BSI (2012b). *Admixtures for Concrete, Mortar and Grout - Test Methods, Part 8: Determination of the Conventional Dry Material Content (BS EN 480-8:2012)*. British Standards Institution, London, 7 p.
- t) BSI (2012c). *Admixtures for Concrete, Mortar and Grout, Part 2: Concrete Admixtures - Definitions, Requirements Conformity, Marking and Labelling (BS EN 934-2:2009+A1:2012)*. British Standards Institution, London, 24 p.

- u) BSI (2012d). *Plastics - Determination of Tensile Properties, Part 1: General Principles (BS EN ISO 527-1:2012)*. British Standards Institution, London, 23 p.
- v) BSI (2012e). *Plastics - Determination of Tensile Properties, Part 2: Test Conditions for Moulding and Extrusion Plastics (BS EN ISO 527-2:2012)*. British Standards Institution, London, 11 p.
- w) BSI (2012f). *Plastics - Methods for Determining the Density of Non-cellular Plastics, Part 1: Immersion Method, Liquid Pycnometer (BS EN ISO 1183-1:2012)*. British Standards Institution, London, 10 p.
- x) BSI (2013). *Execution of Special Geotechnical Works - Ground Anchors (BS EN 1537:2013)*. British Standards Institution, London, 52 p.
- y) HKSARG (2010). *Construction Standard, Testing Concrete (CS1:2010)*. The Government of Hong Kong Special Administrative Region, Hong Kong, Volumes 1 and 2, 61 p. and 99 p.

4.17 Geospec 3: Model Specification for Soil Testing

Geospec 3 contains a total of 24 BS references, of which 20 are Category 1 references requiring no update and which can be retained in the Publication.

Of the remaining BS and BS EN references:

- Four are recommended Category 4a amendments, whereby the existing references are simply amended to their replacement standards containing the same or similar guidance.

As a result of the above change, the following updated or additional References are to be included in Geospec 3:

- a) BSI (2008). *Geometrical Product Specifications (GPS) - Dimensional Measuring Equipment - Design and Metrological Characteristics of Mechanical Dial Gauges (BS EN ISO 463:2006)* (Incorporating Corrigenda January 2009 and June 2011). British Standard Institute, London, 24 p.
- b) BSI (2011a). *Laboratory Glassware - Volumetric Instruments - Methods for Testing of Capacity and for Use (ISO 4787 : 2010, Corrected Version 2010-06-05) (BS EN ISO 4787:2011)*. British Standard Institute, London, 30 p.

- c) BSI (2011b). *Metallic Materials - Calibration of force-proving instruments used for the verification of uniaxial testing machines (ISO 376:2011) (BS EN ISO 376:2011)*. British Standard Institute, London, 42 p.
- d) BSI (2013). *Test Sieves - Technical Requirements and Testing. Part 2: Test Sieves of Perforated Metal Plate (BS ISO 3310-2:2013)*. British Standards Institute, London, 18 p.

5 Discussion

Table 5.1 summarises the updating required.

Table 5.1 Summary of Category of Updating Required

Technical Guidance Document	Number of BS References by Category of Updating Required ⁽¹⁾						
	1	2	3a	3b	4a	4b	5
No. of References	116	15	58	9	56	46	13
% of Total References	37%	5%	18%	3%	18%	15%	4%

Note: (1) Total number of BS and BS EN references = 313.

From the above tables the following is noted about the current BS references as a result of this Study:

- (a) Just over 35% of references required no updating (Category 1).
- (b) A small proportion (about 5%) of the references were deleted, mainly as a result of other updates (Category 2).
- (c) Approximately 35% of the references required a simple update in the year of issue of the current reference, or a simple change to refer to a new current standard (be it a BS or BS EN) containing similar guidance. No other amendments than the reference itself were required (Categories 3a or 4a).
- (d) Approximately 20% of the references required an update in the year of issue of the current reference, or replacement by a new current standard (be it a BS or BS EN) containing

similar guidance. In these cases further amendments, as well as the reference itself, were required to the contents of the existing technical guidance documents to bring it into line with the new or updated reference (Categories 3b or 4b).

- (e) Less than 5% of the references required more significant amendment, or particular consideration (Category 5).

For the Category 5 cases, details of the required changes are outlined in the individual findings for each technical guidance document in Section 4. On the whole the required changes are not considered to be onerous to current Hong Kong practice.

6 Recommendations for Amendment

The recommended changes outlined in Section 4 for the various technical guidance documents have been summarised into a series of amendments to the technical guidance documents (Appendices B to R). The necessary amendments to the technical guidance documents are promulgated in GEO Technical Guidance Note No. 41.

7 References

The technical guidance documents under this Study, as outlined in Section 3.2 above, and the various BS references therein were reviewed but are not listed here for brevity. In addition to these documents and standards the following were useful references during the course of this Study:

Bond, A. & Harris, A. (2008). *Decoding Eurocode 7*. London: Taylor & Francis, 598 p,

Driscoll, R., Scott, P. & Powell, J. (2008). *CIRIA C641. EC7 - Implications for UK Practice. Eurocode 7 Geotechnical Design*. CIRIA, 126 p.

Hencher, S. (2012). *Practical Engineering Geology*. London: Spon Press, 450 p.

Simpson, B. & Driscoll, R. (1998). *Eurocode 7: A Commentary*. BRE Publications, 179 p.

Appendix A

Explanatory Notes for Definitions, Classifications and Scope of Updating

A.1 Summary Tables

The citations of British Standards (BS) published by BSI, and other reference documents, in technical guidance documents are listed in the summary tables in the following appendices. A unique citation ID No. is assigned to each citation for identification purpose.

A.2 Definitions

Reference. A document published by BSI and listed as a reference or mentioned directly in the Technical Guidance Document.

Citation. Text in the Technical Guidance Document that guides the reader to a reference. This may consist of the publishers name followed by the year of publication (e.g. BSI, 1981) or it may be an abbreviated title and date of the reference (e.g. BS 5930:1981).

References must have at least one citation.

A.3 Classification of References

Each reference is classified by BSI as:

- (1) "**Current**" or "**Confirmed, Current**": The reference document is the current standard as published by BSI.
- (2) "**Withdrawn**": The reference document has been withdrawn by BSI and there is no equivalent standard. This tends to be restricted to testing methods or materials that are no longer used. Withdrawal may be on health, safety or environmental grounds.
- (3) "**Revised, Withdrawn**": The reference document has undergone a revision by BSI and has been re-issued. This usually means that the date of publication changes and there may be a slight change in the title.
- (4) "**Superseded, Withdrawn**": The reference document has been replaced by a completely new standard or set of standards.

In addition, the main categories set out above may be qualified by terms such as "partially withdrawn" or "obsolescent".

The term Non-Contradictory, Complementary Information (NCCI) is applied to the valid parts of partially withdrawn standards. This term applies particularly to BSI Codes of Practice, which traditionally contained both normative design standards and informative material, which have been replaced by purely normative European Design Standards (Eurocodes). In these cases, the use of the informative parts of partially withdrawn British

Standards is permitted through the UK National Annexes to the Eurocodes. The lists of references containing NCCI for use with Eurocodes in the UK are contained in UK National Annexes to the Eurocodes.

A.4 Classification of Citations

Each citation is classified as:

- (1) **Normative.** The text accompanying the citation gives direction that must be followed (e.g. test standards that are to be applied).
- (2) **Informative.** The text accompanying the citation is general and advisory (e.g. informing the reader that further information may be found in a particular reference).
- (3) **Historical.** The citation is in text that gives historical information about the origins of the Technical Guidance Document or supports actions carried out in the past (e.g. accompanying test results quoted in the Technical Guidance Document).
- (4) **Superseded.** The citation occurs in a block of text that has been superseded by another Technical Guidance Document.

A.5 Scope of Updating

The following table sets out the scope of updating required for each citation and reference.

Table A1 Scope of Updating Required to BS, BS EN and BS EN ISO Sourced References

Case	Actions	Applications
1	No change to reference or citation.	The citation is "Historical". The citation is "Superseded". The reference is current. The citation refers to current material in a partially revised reference, for example NCCI identified in the UK National Annex of a BS EN document.
2	Citation or reference to be deleted.	The reference has no citations. The citation is not relevant to the context of the guidance.
3	Update of the reference and citations.	The original reference document has been revised.
4	Replacement of the reference and citations.	The original reference document has been superseded. An appropriate local guidance document has superseded the British Standard in local practice.
5	Direct replacement of a reference is difficult and requires particular attention.	The original reference document has been withdrawn with no replacement. The citation is highly specific and this element is not addressed in the replacement document. A reference to a single document requires changing to multiple citations to parts of various documents. Changing the reference would significantly affect existing local practice.

Categories 3 and 4 above are each split into two sub-categories, as follows, to further define the level of effort required in updating the existing references:

- (a) Direct update or replacement of the reference document; no amendment of the affected clause required; and
- (b) Update or replacement of the reference document; some amendments to the affected clause also required.

Appendices B to R
(Contained in CD attachment)

GEO PUBLICATIONS AND ORDERING INFORMATION

土力工程處刊物及訂購資料

A selected list of major GEO publications is given in the next page. An up-to-date full list of GEO publications can be found at the CEDD Website <http://www.cedd.gov.hk> on the Internet under "Publications". Abstracts for the documents can also be found at the same website. Technical Guidance Notes are published on the CEDD Website from time to time to provide updates to GEO publications prior to their next revision.

Copies of GEO publications (except geological maps and other publications which are free of charge) can be purchased either by:

Writing to

Publications Sales Unit,
Information Services Department,
Room 626, 6th Floor,
North Point Government Offices,
333 Java Road, North Point, Hong Kong.

or

- Calling the Publications Sales Section of Information Services Department (ISD) at (852) 2537 1910
- Visiting the online Government Bookstore at <http://www.bookstore.gov.hk>
- Downloading the order form from the ISD website at <http://www.isd.gov.hk> and submitting the order online or by fax to (852) 2523 7195
- Placing order with ISD by e-mail at puborder@isd.gov.hk

1:100 000, 1:20 000 and 1:5 000 geological maps can be purchased from:

Map Publications Centre/HK,
Survey & Mapping Office, Lands Department,
23th Floor, North Point Government Offices,
333 Java Road, North Point, Hong Kong.
Tel: (852) 2231 3187
Fax: (852) 2116 0774

Requests for copies of Geological Survey Sheet Reports and other publications which are free of charge should be directed to:

For Geological Survey Sheet Reports which are free of charge:

Chief Geotechnical Engineer/Planning,
(Attn: Hong Kong Geological Survey Section)
Geotechnical Engineering Office,
Civil Engineering and Development Department,
Civil Engineering and Development Building,
101 Princess Margaret Road,
Homantin, Kowloon, Hong Kong.
Tel: (852) 2762 5380
Fax: (852) 2714 0247
E-mail: jsewell@cedd.gov.hk

For other publications which are free of charge:

Chief Geotechnical Engineer/Standards and Testing,
Geotechnical Engineering Office,
Civil Engineering and Development Department,
Civil Engineering and Development Building,
101 Princess Margaret Road,
Homantin, Kowloon, Hong Kong.
Tel: (852) 2762 5346
Fax: (852) 2714 0275
E-mail: florenceko@cedd.gov.hk

部份土力工程處的主要刊物目錄刊載於下頁。而詳盡及最新的土力工程處刊物目錄，則登載於土木工程拓展署的互聯網網頁 <http://www.cedd.gov.hk> 的“刊物”版面之內。刊物的摘要及更新刊物內容的工程技術指引，亦可在這個網址找到。

讀者可採用以下方法購買土力工程處刊物(地質圖及免費刊物除外):

書面訂購

香港北角渣華道333號
北角政府合署6樓626室
政府新聞處
刊物銷售組

或

- 致電政府新聞處刊物銷售小組訂購 (電話: (852) 2537 1910)
- 進入網上「政府書店」選購，網址為 <http://www.bookstore.gov.hk>
- 透過政府新聞處的網站 (<http://www.isd.gov.hk>) 於網上遞交訂購表格，或將表格傳真至刊物銷售小組 (傳真: (852) 2523 7195)
- 以電郵方式訂購 (電郵地址: puborder@isd.gov.hk)

讀者可於下列地點購買1:100 000、1:20 000及1:5 000地質圖：

香港北角渣華道333號
北角政府合署23樓
地政總署測繪處
電話: (852) 2231 3187
傳真: (852) 2116 0774

如欲索取地質調查報告及其他免費刊物，請致函：

免費地質調查報告:

香港九龍何文田公主道101號
土木工程拓展署大樓
土木工程拓展署
土力工程處
規劃部總土力工程師
(請交:香港地質調查組)
電話: (852) 2762 5380
傳真: (852) 2714 0247
電子郵件: jsewell@cedd.gov.hk

其他免費刊物:

香港九龍何文田公主道101號
土木工程拓展署大樓
土木工程拓展署
土力工程處
標準及測試部總土力工程師
電話: (852) 2762 5346
傳真: (852) 2714 0275
電子郵件: florenceko@cedd.gov.hk

MAJOR GEOTECHNICAL ENGINEERING OFFICE PUBLICATIONS

土力工程處之主要刊物

GEOTECHNICAL MANUALS

Geotechnical Manual for Slopes, 2nd Edition (1984), 300 p. (English Version), (Reprinted, 2011).

斜坡岩土工程手冊(1998)，308頁(1984年英文版的中文譯本)。

Highway Slope Manual (2000), 114 p.

GEOGUIDES

Geoguide 1 Guide to Retaining Wall Design, 2nd Edition (1993), 258 p. (Reprinted, 2007).

Geoguide 2 Guide to Site Investigation (1987), 359 p. (Reprinted, 2000).

Geoguide 3 Guide to Rock and Soil Descriptions (1988), 186 p. (Reprinted, 2000).

Geoguide 4 Guide to Cavern Engineering (1992), 148 p. (Reprinted, 1998).

Geoguide 5 Guide to Slope Maintenance, 3rd Edition (2003), 132 p. (English Version).

岩土指南第五冊 斜坡維修指南，第三版(2003)，120頁(中文版)。

Geoguide 6 Guide to Reinforced Fill Structure and Slope Design (2002), 236 p.

Geoguide 7 Guide to Soil Nail Design and Construction (2008), 97 p.

GEOSPECS

Geospec 1 Model Specification for Prestressed Ground Anchors, 2nd Edition (1989), 164 p. (Reprinted, 1997).

Geospec 3 Model Specification for Soil Testing (2001), 340 p.

GEO PUBLICATIONS

GCO Publication No. 1/90 Review of Design Methods for Excavations (1990), 187 p. (Reprinted, 2002).

GEO Publication No. 1/93 Review of Granular and Geotextile Filters (1993), 141 p.

GEO Publication No. 1/2006 Foundation Design and Construction (2006), 376 p.

GEO Publication No. 1/2007 Engineering Geological Practice in Hong Kong (2007), 278 p.

GEO Publication No. 1/2009 Prescriptive Measures for Man-Made Slopes and Retaining Walls (2009), 76 p.

GEO Publication No. 1/2011 Technical Guidelines on Landscape Treatment for Slopes (2011), 217 p.

GEOLOGICAL PUBLICATIONS

The Quaternary Geology of Hong Kong, by J.A. Fyfe, R. Shaw, S.D.G. Campbell, K.W. Lai & P.A. Kirk (2000), 210 p. plus 6 maps.

The Pre-Quaternary Geology of Hong Kong, by R.J. Sewell, S.D.G. Campbell, C.J.N. Fletcher, K.W. Lai & P.A. Kirk (2000), 181 p. plus 4 maps.

TECHNICAL GUIDANCE NOTES

TGN 1 Technical Guidance Documents