

Geoguide 5 – Guide to Slope Maintenance**Third Edition****AMENDMENT NO.: GG5/02/2018****BACKGROUND**

This Amendment Sheet updates the Geoguide 5 in accordance with the latest technical policy promulgated by *Development Bureau Technical Circular (Works) No. 2/2018 – Registration and Updating of the Catalogue of Slopes*. Major amendments involve the revision of the maintenance requirements of natural terrain hazard mitigation measures.

This amendment sheet also incorporates minor updates of technical guidance pertaining to the maintenance of the fixing of wire mesh on rock slopes.

The amendments are given below.

AMENDMENTS**CHAPTER 1**

(a) Section 1.1

INTRODUCTION

Replace paragraph 1 with the following:-

Regular maintenance is generally essential for all man-made slopes and retaining walls, disturbed terrain features and natural terrain hazard mitigation measures to avoid deterioration or to upkeep their functions.

CHAPTER 2

(b) Section 2.2

MAINTENANCE MANAGEMENT

Add the following after the 2nd sentence in paragraph 2:-

For natural terrain hazard mitigation measures which require Routine Maintenance Inspections (see Section 7.3), if a Maintenance Manual is not available, the same arrangement should be adopted.

CHAPTER 4

(c) Section 4.5

**TECHNICAL ASPECTS OF MAINTENANCE FOR
MAN-MADE SLOPES AND RETAINING WALLS**

In paragraph 7, replace the 4th sentence with the following:-

If obvious defects are identified, e.g. rock mesh netting does not closely follow or detaches from the rock slope profile, additional anchorage points should be provided.

CHAPTER 7**MAINTENANCE REQUIREMENTS FOR NATURAL
TERRAIN HAZARD MITIGATION MEASURES**

(d) Section 7.1

In paragraph 1, item (a), line 2, replace ‘...boulder buttresses, soil nails,...’ with ‘...concrete buttresses, soil nails, rock dowels / bolts,...’.

In paragraph 3, line 1, replace ‘...the stabilisation (e.g. major regrading) or Defence Measures...’ with ‘...earthworks (e.g. major regrading)...’.

(e) Section 7.2

Add the following after the 1st sentence in paragraph 2:-

For Stabilisation Measures which do not require Routine Maintenance Inspections or Engineer Inspections for Maintenance, maintenance manual is generally not required. In such case, proper construction record should be prepared (see details in the 4th paragraph of Section 7.3).

(f) Section 7.3

Add the following after paragraph 2:-

For the following Stabilisation Measures which generally require little maintenance, it may not be cost effective to arrange Routine Maintenance Inspections of these Stabilisation Measures as the construction of maintenance access may be extensive and costly, and may cause undesirable environmental impacts:-

- (a) soil nails;
- (b) rock dowels / bolts; and
- (c) concrete buttresses other than those ≥ 3 m high that are constructed to support boulders or rock slopes affecting and in close proximity to Consequence-to-life Category 1 facilities.

Therefore, Routine Maintenance Inspections of these Stabilisation Measures are normally not required unless specified by the designer. To avoid the need of future maintenance, proper design provision should be allowed to prevent erosion of founding materials of concrete buttresses (Section 5.4.6 (3) of Geotechnical Manual for Slopes (GCO, 1984) refers; see also Sections 7.3 and 7.4 of this Geoguide regarding the provisions of drainage on natural hillsides). For Stabilisation Measures that do not require maintenance manuals, proper construction records, including as-built plans, typical cross-sections, as-built record photographs, and basic information of design, e.g. the purpose of the Stabilisation Measures, the developments or facilities to be protected, the hazards being mitigated against, etc., should be prepared by the designer for record purposes.

Notwithstanding the above, drainage works constructed on natural hillside require proper maintenance. The lack of proper maintenance of drainage works could result in adverse conditions (e.g. concentrated surface runoff) contributing to hillside instability. The maintenance requirements of the

drainage works on natural hillsides as stipulated in Sections 7.3 and 7.4 should be followed.

Maintenance of drainage works on natural hillsides could be resource-demanding. Disproportionate tangible and intangible (e.g. environmental impact) costs may be incurred for provision of maintenance access to drainage works. As such, any provision of drainage works in association with Stabilisation Measures should be fully justified with consideration given to the benefits of the drainage works, the hillside condition in the absence of any drainage works before construction of the Stabilisation Measures, the implications of long-term commitment to the drainage maintenance, as well as the tangible and intangible costs of providing maintenance access. Where drainage works are considered necessary, the proposed drainage works should be located close to existing access points as far as practicable in order to ease the future maintenance effort and minimise the extent of maintenance access.

APPENDIX D

SCOPE OF SERVICES FOR ENGINEER INSPECTIONS FOR MAINTENANCE FOR GOVERNMENT SLOPES

(g) Section 2

In Part 2 - Site Inspection, item (d), line 1, replace ‘WBTC No. 9/2000’ with ‘DEVB TC(W) No. 2/2018’.

In Part 3 - Assessment, item (g), line 3, replace ‘WBTC No. 9/2000’ with ‘DEVB TC(W) No. 2/2018’.

APPENDIX F

INDICATIVE RECORD SHEETS FOR ENGINEER INSPECTIONS FOR MAINTENANCE

(h) Sheet 4 of 10

Under the column ‘Items to be checked’, replace ‘Rock mesh netting & its anchorage points’ with ‘Rock mesh netting, its anchorage points & wire ropes’.

Under the column ‘Condition’ for the item ‘Rock mesh netting, its anchorage points & wire ropes’, replace ‘Adequate/Inadequate anchorage points’ with ‘Firmly Fixed/Detached’.

APPENDIX G

INDICATIVE FORMAT FOR MAINTENANCE MANUAL FOR NATURAL TERRAIN HAZARD MITIGATION MEASURES

(i) Sheet 1 of 4

Add Note (3) after ‘Stabilisation Measures⁽²⁾’ as follows:-

(3) For the following Stabilisation Measures, Routine Maintenance Inspections and Engineer Inspections for Maintenance are normally not required unless specified by the designer:-

- (a) soil nails;
- (b) rock dowels / bolts; and
- (c) concrete buttresses other than those ≥ 3 m high that are constructed to support boulders or rock slopes affecting and in close proximity to Consequence-to-life Category 1 facilities.

In ‘Stabilisation Measures’, replace ‘Boulder Buttresses’ with ‘Concrete Buttresses’.

In ‘Stabilisation Measures’, delete the item ‘Soil Nails’.

In Note (2), line 2, replace ‘(e.g. buttresses and soil nails)’ with ‘(e.g. concrete buttresses)’.

RELATED DOCUMENTS

DEVB (2018). *Registration and Updating of the Catalogue of Slopes (Development Bureau Technical Circular (Works) No. 2/2018)*. Development Bureau, Hong Kong, 3 p.