

政府總部

發展局

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香港花園道美利大廈



Works Branch  
Development Bureau  
Government Secretariat  
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Hong Kong

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**Development Bureau Technical Circular (Works) No. 6/2011**

**Maintenance of Man-made Slopes and  
Emergency Works to Deal with Landslides**

**Scope**

This Circular sets out departmental responsibilities for the maintenance of man-made slopes and for emergency works to deal with landslides on man-made slopes and landslides on natural terrain or boulder falls.

2. The Secretary for Transport and Housing, and the Director of Agriculture, Fisheries and Conservation have agreed to the contents of the Circular.

**Effective Date**

3. This Circular takes immediate effect.

**Effect on Existing Circulars**

4. This Circular supersedes WBTC No. 26/99 on Maintenance of Man-made Slopes and Emergency Repair on Stability of Land. It should be read in conjunction with WBTC No. 9/96 on Standards of Good Practice for Maintenance of Man-made Slopes and Retaining Walls (Geoguide 5: Guide to Slope Maintenance), WBTC No. 9/2000 on Registration and Updating of the Catalogue of Slopes, ETWB TC(W) No. 14/2004 on Maintenance of Stormwater Drainage Systems and Natural Watercourses, ETWB TC(W) No. 13/2005 on Prescriptive Measures for Stabilisation and Improvement of Man-made Slopes and Standardised Debris-resisting Barriers for Mitigation of Natural Terrain Landslide Hazards, ETWB TC(W) 20/2005 on Upward Reporting of Major Emergency Incidents from Works Departments, and DEVB TC(W) 7/2011 on Natural Disaster Emergency Organization Responsibilities of the Development Bureau and the Transport and Housing Bureau Groups of Departments.

## Definitions

5. The following words and expressions shall be defined as follows:

“Man-made slopes” means cut and fill slopes, retaining walls, disturbed terrain features and natural terrain hazard mitigation measures (stabilisation measures and defence measures). Information on man-made slopes registered in the Government Catalogue of Slopes (see WBTC No. 9/2000) is accessible from the Hong Kong Slope Safety website: <http://hkss.cedd.gov.hk>. Some departments maintain their own lists of smaller man-made slopes which are not included in the Catalogue.

“Natural terrain” means natural ground that has not been modified significantly by human activities. It includes predominantly natural ground which may however contain man-made features such as water mains, drains, cables, minor cutting, filling or repair works, etc., but is not registered as a disturbed terrain feature.

"Maintenance" means the inspection and implementation of recommendations detailed in Geoguide 5: Guide to Slope Maintenance. Maintenance includes routine (or regular) maintenance and preventive maintenance, but does not form part of the works funded under the Landslip Prevention and Mitigation Programme (LPMitP).

“Emergency works” means works in the rescue and recovery phases of emergency response, and does not include works to reconstruct the physical infrastructure in the restoration phase (see the documents entitled “Emergency Response System” and “Contingency Plan for Natural Disasters” on Security Bureau’s website <http://www.sb.gov.hk/eng/emergency/cp.html> for the three phases of emergency response).

“Initial emergency works” means works carried out to remove immediate danger and protect life and property, e.g. removal of hazardous landslide debris, slope surface protection and surface water control works, and provision of temporary barriers.

“Subsequent emergency works” means works carried out to reinstate the operation of vital public facilities and services and to allow people to re-occupy their dwellings, e.g. shotcreting and removal of remaining landslide debris causing public concern or nuisance if required. Soil nailing is not normally required for emergency works.

## **Introduction**

6. The proper maintenance of a man-made slope is essential to ensure that the physical condition and general stability of the slope does not deteriorate to such an extent that it poses a hazard to life or property. For older man-made slopes which are unlikely to meet the current safety standard, it is desirable to improve their stability by preventive maintenance. This is normally achieved using prescriptive measures (see ETWB TC(W) No. 13/2005).

7. Information on the maintenance responsibility of registered man-made slopes is accessible from Lands Department (LandsD)'s Slope Maintenance Responsibility Information System (SMRIS) website: <http://www.slope.landsd.gov.hk/smrisk/>.

8. Maintenance is normally not required for natural terrain. However, mitigation measures are sometimes carried out on natural terrain to deal with natural terrain hazards and these will require maintenance. Such hazard mitigation measures are included in the Government Catalogue of Slopes and covered by SMRIS.

9. Emergency works are often required to deal with landslide danger originating from man-made slopes and natural terrain during or after inclement weather and upon receiving reports from the public or concerned departments.

## **Policy**

10. All registerable man-made slopes, and the smaller man-made slopes in the lists maintained by departments, affecting life and property must be properly maintained to the standards specified in Geoguide 5 (promulgated through WBTC No. 9/96).

11. The maintenance responsibility for man-made slopes is based on the "owner-maintains" principle and the "beneficiary-maintains" principle. The former is firmly entrenched in law and prevails over the latter. The latter is in the sense that the slopes have been formed to provide space for developments below or to support the land above, and can be taken as "whoever benefited or affected should maintain". If a landslide occurs on a man-made slope, the party responsible for slope maintenance shall also respond to the landslide incident and take necessary action.

12. Where an emergency causing real and imminent danger to human life and/or property arises, officers of the departments with landslide emergency responsibility must act expeditiously and must not be deterred from taking quick action which is reasonable in the circumstances because of doubts over legal liability. The first consideration must always be the protection of life and/or property (including vital public facilities and services). Departments with emergency

responsibility shall ensure that they are adequately prepared to deal with landslide emergencies including those arising from natural terrain.

### **Responsibilities for Man-made Slopes**

13. Departmental responsibilities for the maintenance of man-made slopes situated in different categories of land are depicted at Appendix A.

14. Lease or grant conditions or other land documents may specify the maintenance responsibility for the land. These may be different from that shown in Appendix A, in which case the terms of the lease, grant or document shall prevail. For example, under certain lease conditions, the lessee can be made responsible for the maintenance of a parcel of land outside the lot boundary.

15. Several parties, Government or private, may be identified as each being responsible for a portion of a man-made slope. If the parties are all Government departments, then generally it is desirable to have one department to carry out the actual maintenance. Maintenance departments involved in such a slope are encouraged to agree on a single department to do the maintenance (usually the department responsible for maintenance of the largest portion of the slope), with or without funds provided by the others, and such department shall be registered accordingly in the SMRIS database. If the slope involves private parties, the situation is more complicated as legal responsibility is involved. Notwithstanding, it is good practice and conducive to public safety for the department responsible for the Government portion to inspect the entire slope as far as reasonable and practicable. Where there is a need to carry out inspection or works within private property (including former Housing Authority properties such as those under the Tenant Purchase Scheme), the responsible department should liaise with the property owners or their agents and if necessary obtain assistance from the Buildings Department (BD) and, where necessary, the Police. This department should notify the Geotechnical Engineering Office (GEO) and the BD immediately if any signs of instability or distress or other serious problems on the private portion are discovered during their inspections. Temporary evacuation can be carried out with the assistance of the Police, with or without the presence of the GEO and the BD, when the situation so warrants.

16. When the maintenance responsibility of a man-made slope on unallocated Government land is disputed, the matter shall be referred to the Sub-committee on Unallocated Slopes (Sub-committee) set up under the Standing Committee on Slope Safety (SCOSS) for a decision. Notwithstanding, departments shall take up the maintenance responsibility of the slopes allocated to them by LandsD (SIMAR Unit) even if they are under appeal, until the Sub-committee has made a ruling on the appeal to the contrary. SMRIS should be updated as soon as possible after the Sub-committee decision. Any disagreements to the decision of the Sub-committee will need to be brought up to and resolved at the Policy Secretary level, if necessary.

17. The department responsible for the maintenance of a man-made slope (or their maintenance agent) should carry out emergency inspection and works to that slope in the event of a landslide reported during or after inclement weather. Where there is a need to carry out emergency inspection or works within private property (including former Housing Authority properties such as those under the Tenant Purchase Scheme), the responsible department should liaise with the property owners or their agents and if necessary obtain assistance from the BD and, where necessary, the Police.

18. Where registered squatter structures (i.e. those surveyed by Housing Department in 1982) are affected or threatened by a landslide and there is immediate and obvious danger, the responsible department shall arrange with the Police, Lands D and the Housing Department (HD) for immediate evacuation and shall seek GEO's advice on follow-up action. The need for any permanent evacuation and clearance of registered squatter structures shall always be confirmed by the GEO. LandsD shall urgently check the squatter status, land status and conditions in the land documents. Unless slope repair or defence measures are required to protect authorised facilities and in doing so the registered squatter structures are also protected, LandsD shall clear the registered squatter structures affected under existing policy on Non-development Clearance (NDC) of squatters on slope safety ground. However, if minor works on Government land will remove a threat or obviate the need for a large clearance of squatters, the responsible slope maintenance department shall undertake these works according to their priority and resources available. In the case of squatter clearance under the NDC policy where slope repair works are not required, the slope maintenance department shall clear the debris.

19. A newly-formed or modified registerable slope must be registered in the Catalogue of Slopes (see WBTC No. 9/2000). Upon registration of the newly-formed or modified slope in the Catalogue of Slopes, GEO will request LandsD (SIMAR Unit) to identify its maintenance responsibility according to this Circular, in the context of continuously updating the slope maintenance responsibility database (i.e. the SMRIS database). Upon completion of the identification of the maintenance responsibility, LandsD (SIMAR Unit) will inform the responsible bureaux/departments.

20. For the sake of ensuring public safety, the department responsible for forming or modifying the slope should continue to be responsible for its maintenance until the maintenance responsibility is taken over by another party. Both the department forming or modifying the slope and the department taking over the maintenance responsibility should ensure that action has been taken to register the maintenance responsibility in the SMRIS database. While pending updating of the maintenance responsibility in SMRIS, the works department who has agreed to take over the slope shall, with immediate effect, assume the full responsibility for its maintenance.

## **Responsibilities for Natural Terrain**

21. While maintenance is normally not required for natural terrain, this does not obviate any responsibility with respect to stability of land and landslide emergency action the owners or occupiers of land may have under the relevant land documents, common law or statutes. The parties responsible for undertaking emergency inspection and works to deal with a natural terrain landslide or boulder fall originating from different categories of land are depicted in Appendix A. This is based on the principle that if a landslide or boulder fall occurs on natural terrain affecting or threatening a facility, the party responsible for maintaining that facility shall respond to the incident. By doing so, the concerned party would benefit through taking responsive action to attend to the incident and protect his facility.

22. Under the principle referred to in paragraph 21, the Government department maintaining the facility affected or threatened (or their maintenance agent) shall therefore carry out the emergency inspection and emergency works (including clearance of debris). For cases not covered by this principle, Highways Department (HyD) shall be responsible for the emergency inspection and works, including the initial and subsequent emergency works. However, with effect from 1 April 2011, in case the subsequent emergency works involve over 750 m<sup>2</sup> of shotcreting or stabilisation of overhanging rocks or boulders at the upper stretch of the landslide and for which HyD cannot spare resources to attend to at the relevant times, GEO shall be responsible for carrying out such subsequent emergency works upon request by HyD. HyD shall maintain the safety of the site on GEO's advice, pending handing over the site to GEO's contractor. If GEO is not able to cope with such subsequent emergency works, the case shall be dealt with under the Emergency Command System (ECS) (see DEVB TC(W) No. 7/2011).

23. Where the facilities of more than one department are affected or threatened, the department with the facilities affected or threatened most shall carry out the emergency inspection and coordinate all emergency works. If appropriate, the department carrying out the landslide emergency works shall work with Drainage Services Department, who shall carry out clearance or repair of the blocked or damaged stormwater drainage systems and natural watercourses to deal with flooding risk in accordance with ETWB TC(W) No. 14/2004. If any department cannot cope with the emergency works under its responsibility, the case shall be dealt with under the ECS.

24. Where the natural terrain landslide or boulder fall has affected or threatens private property, the actions described in paragraph 17 shall be followed. Where it has affected or threatens registered squatter structures, the actions described in paragraph 18 shall be followed except that HyD shall carry out the minor works on unallocated Government land if needed and, in the case of squatter clearance where slope repair works or defence measures are not required, HyD shall clear the landslide debris.

25. The slope repair works or natural terrain hazard mitigation measures would in some cases convert that part of the land to a registerable man-made slope, the subsequent maintenance responsibility for which would be determined by LandsD (SIMAR Unit) according to this Circular.

### **Roles of GEO**

26. GEO facilitates slope maintenance work undertaken by the slope maintenance departments and assumes an overall co-ordination role. It assists by way of compiling updated slope data, producing maintenance standards and technical guidance, researching and developing cost-effective engineering techniques for slope maintenance, providing training to maintenance staff, advising on prioritisation of slopes for maintenance action, coordinating preventive maintenance works, providing technical assistance on difficult cases, as well as carrying out audits and reviews of the maintenance operations. Depending on circumstances, it will carry out subsequent emergency works.

27. GEO also provides geotechnical advice upon request and if needed inspects reported landslide incidents. The department requesting GEO's advice should report accurately the landslide location and consequence. Priority for landslide inspection will be based on known landslide consequence. Serious landslide incidents, which are major emergency incidents (Category 1 or 2) as defined in ETWB TC(W) 20/2005, are given the highest priority, followed by significant landslide incidents (defined as those resulting in damage to property, building evacuation, disruption to traffic or media attention). GEO will inspect such incidents with the department responsible for the emergency works.

28. For other landslide incidents, the slope maintenance department or department maintaining the facility or land affected (or their maintenance agent) should normally inspect the incidents first and carry out the necessary works. They may request GEO to provide geotechnical advice on action to take to deal with these incidents. If necessary, GEO will make an inspection, normally with the department responsible for the works.

29. After completion of the necessary emergency works by the departments, GEO will include the failed man-made slopes and natural terrain catchments in the LPMitP selection exercise and will take action based on their risk ranking. Where necessary, the failed slopes and natural terrain catchments will be injected into the LPMitP for priority action.

**( C S Wai )**  
**Permanent Secretary for Development (Works)**

**RESPONSIBILITIES OF GOVERNMENT DEPARTMENTS FOR  
THE MAINTENANCE OF MAN-MADE SLOPES AND  
EMERGENCY WORKS TO DEAL WITH LANDSLIDES ON MAN-MADE SLOPES AND  
LANDSLIDES ON NATURAL TERRAIN OR BOULDER FALLS**

Land Category	Remarks	Maintenance/ Emergency Works by (Note 1)	Maintenance/ Emergency Works Funded by
<b>A. Man-made Slopes</b>			
1. <u>Allocated Government Land</u> <sup>(Note 2)</sup>			
(a) DEVB Departments except EMSD and PD		DEVB Dept	DEVB Dept
(b) HyD		HyD	HyD
(c) Other Departments (e.g. AFCD, D of Health, EDB, EMSD, EPD, FEHD, GPA, HAD, LCSD and PD)		ArchSD (except where the premises and land are not maintained by ArchSD)	ArchSD
(d) Village Resite	See ETWB TC(W) No. 55/2002	ArchSD/HyD	ArchSD/HyD
(e) Hospital Authority	Public hospitals	Hospital Authority	Hospital Authority
2. <u>Country Parks</u>	Only slopes adjacent to AFCD roads, footpaths and country park facilities such as barbecue sites, picnic sites, shelters, but excluding permanent buildings or facilities covered under land Category A1(c)	AFCD	AFCD/CEDD (Note 3)
3. <u>Defence Land</u>		Hong Kong Garrison	Hong Kong Garrison



Land Category	Remarks	Maintenance/ Emergency Works by (Note 1)	Maintenance/ Emergency Works Funded by
<p>4. <u>Alienated Land</u></p> <p>(a) Private (leased land)</p> <p>(b) Vested land</p> <p>(c) Temporary</p>	<p>Including Airport land grant to the AA, Private Sector Participation, Home Ownership, Tenants Purchase, and Buy or Rent Option Schemes, and Divested Retail and Carpark Properties</p> <p>Including: MTRC Public housing</p> <p>Including licences, permits, temporary occupations, easements, wayleaves, short-term waivers, short-term tenancies, etc., and only if covered by conditions in these documents</p>	<p>Lessee <sup>(Note 4)</sup></p> <p>Vestee: MTRC HD</p> <p>Licensee, tenant, permittee, etc.</p>	<p>Lessee <sup>(Note 4)</sup></p> <p>Vestee: MTRC HA</p> <p>Licensee, tenant, permittee, etc.</p>
<p>5. <u>Unallocated Government Land</u></p> <p>(a) Land assigned to private parties</p> <p>(b) Land utilised/maintained by or affecting facility managed/maintained by a Government department without allocation</p>	<p>Only if covered by lease conditions or land documents</p> <p>Examples include access roads, footpaths, catchwaters, water mains, pipelines, water treatment facilities, reservoirs, drainage reserves and systems, sewage treatment facilities, country park facilities, and Government buildings</p>	<p>Lessee/grantee</p> <p>Department utilising/maintaining the land or managing/maintaining the facility/land affected, or their agent</p>	<p>Lessee/grantee</p> <p>Department utilising/maintaining the land or managing/maintaining the facility/land affected, or their agent</p>

Land Category	Remarks	Maintenance/ Emergency Works by (Note 1)	Maintenance/ Emergency Works Funded by		
(c) Land affecting public roads	Except for roads maintained by others, e.g. AFCD, DSD, HAD and WSD, and military roads	HyD	HyD		
(d) Land affecting public housing estates and HA facilities		HD	CEDD <sup>(Note 3)</sup>		
(e) All other land affecting life or property <sup>(Notes 5)</sup>		LandsD	LandsD/CEDD <sup>(Note 3)</sup>		
<b>B. Natural Terrain</b>					
1. <u>Allocated Government Land</u>	Same as for Category A1 to A4	Same as for Category A1 to A4	Same as for Category A1 to A4		
(a) Categories A1 to A4					
2. <u>Unallocated Government Land</u>	Examples include Country park facilities Government premises Drainage and sewage facilities Roads and footpaths Water supply facilities				
(a) Government facilities affected or threatened by a natural terrain landslide or boulder fall				AFCD ArchSD DSD  HyD WSD (emergency inspection and works only)	CEDD <sup>(Note 6)</sup>
(b) All other facilities affected or threatened by a natural terrain landslide or boulder fall				Examples include railways, private buildings, public housing estates, village houses, roads and footpaths, private utility services, registered squatter structures if they cannot be cleared, etc.	HyD/GEO (emergency inspection and works only)

- Note 1 The Maintenance Agent (MA) as defined by the SIMAR section of LandsD and recorded in the SMRIS (<http://www.slope.landsd.gov.hk/smr/s/>) is responsible for the maintenance of registered man-made slopes. The land allocatee can be the MA itself or it may engage other parties as its MA other than the one specified here, if it so wishes.
- Note 2 Allocated land includes temporary and permanent allocations. Temporary allocation here includes any allocation for the purpose of carrying out construction works, in which case the allocatee would normally have consultants or contractors available for taking care of the necessary slope maintenance works within the works site during the term of the allocation.
- Note 3 Engineer Inspections, repair works (including emergency works) and enhanced maintenance are funded under CEDD's block vote 5101CX.
- Note 4 BD will carry out emergency works recommended by GEO in accordance with section 27A(4) of the Buildings Ordinance, if the lessee is unable or unwilling to carry out the works.
- Note 5 This sub-category includes man-made slopes affecting registered squatter structures (i.e. those surveyed by HD in 1982).
- Note 6 Emergency works for natural terrain landslides on unleased and unallocated Government land are funded under CEDD's block vote 5001BX, except for repair works to natural terrain landslide mitigation measures (e.g. barriers) registered in SMRIS for which the respective maintenance department is responsible, using funds for repair/maintenance of their man-made slopes. Funding from CEDD block vote 5001BX is to cover the cost of works including clearance of debris arising from landslides, as well as the cost of any necessary investigation and consultancy fees. GEO's LPM Branch will issue an allocation warrant/works expenditure authorisation to the works department upon receipt of an estimate and confirmation of the eligibility of the works. Alternatively, the works department may provide an estimate and obtain an allocation warrant/works expenditure authorisation from GEO's LPM Branch at the beginning of each financial year. Where necessary, the eligibility of the works for natural terrain landslides on unleased and unallocated Government land in respect of CEDD block vote 5001BX may be confirmed with the GEO District Division that recommended the works.

Abbreviations:	AA	Airport Authority
	AFCD	Agriculture, Fisheries and Conservation Department
	ArchSD	Architectural Services Department
	BD	Buildings Department
	CEDD	Civil Engineering and Development Department
	DEVB	Development Bureau
	D of Health	Department of Health
	DSD	Drainage Services Department
	EDB	Education Bureau
	EMSD	Electrical and Mechanical Services Department
	EPD	Environmental Protection Department
	FEHD	Food and Environmental Hygiene Department
	GEO	Geotechnical Engineering Office of CEDD
	GPA	Government Property Agency
	HA	Housing Authority
	HAD	Home Affairs Department
	HD	Housing Department
	HyD	Highways Department
	LandsD	Lands Department
	LCSD	Leisure and Cultural Services Department
	MTRC	Mass Transit Railway Corporation
	PD	Planning Department
	WSD	Water Supplies Department