

## MESSAGE ON SLOPE MAINTENANCE

Under the climatic conditions we experience in Hong Kong, a man-made slope or retaining wall that is not maintained will deteriorate. In time, it may become unstable and collapse, causing injury to persons, damage to property and disruption to normal life. If this happens, suffering and hardship may result and great expense may be incurred in compensating for the damage and in reinstating the ground to make it safe.



To accomplish proper slope maintenance, slope owners should set up their own Slope Maintenance System to maintain the slopes for which they are responsible.

This Model Slope Maintenance Plan is prepared for use by private slope owners in setting up their own Slope Maintenance System. To suit the requirements of individual owners, the text in this Model Plan may need to be modified. Explanatory notes are provided to assist slope owners to prepare their own Plan from this Model Plan.

It is important to note that slope maintenance alone may not be adequate in ensuring that a slope or a retaining wall meets the current safety standards. Private slope owners should also arrange for Stability Assessment, if not yet conducted, to determine whether the stability of their slopes or retaining walls is adequate.

The Geotechnical Engineering Office has set up a Community Advisory Unit to provide information and advisory services to private slope owners on slope maintenance and other slope-related issues. If owners require assistance, they are welcome to contact the Community Advisory Unit at 2760 5800.

A handwritten signature in black ink, appearing to read 'R K S Chan', written in a cursive style.

(R K S Chan)

Head of the Geotechnical Engineering Office

# LIST OF DOCUMENTS

MESSAGE ON SLOPE MAINTENANCE

MODEL SLOPE MAINTENANCE PLAN

EXPLANATORY NOTES

ANNEX 1 : SAMPLE OF ORGANIZATION CHART FOR SLOPE MAINTENANCE

ANNEX 2 : FLOW CHART FOR CONFIRMING THE SLOPES FOR WHICH THE SLOPE OWNER IS RESPONSIBLE

ANNEX 3 : SAMPLE OF MASTER LIST OF GENERAL SLOPE MAINTENANCE DOCUMENTS/RECORDS

ANNEX 4 : SAMPLE OF SLOPE INVENTORY

ANNEX 5 : DOCUMENTS/RECORDS TO BE KEPT IN INDIVIDUAL SLOPE FOLDERS

ANNEX 6 : SLOPE MAINTENANCE INSPECTIONS AND THEIR FOLLOW-UP WORKS/ACTIONS

ANNEX 7 : SAMPLE OF ANNUAL PROGRAMME OF SLOPE MAINTENANCE INSPECTIONS AND WORKS

ANNEX 8 : INFORMATION SOURCES

# SLOPE MAINTENANCE PLAN

## 1. **Management Organization**

The Property Manager<sup>note 1</sup> is appointed by the Slope Owner<sup>note 2</sup> to be responsible for arranging, overseeing and reviewing all matters related to slope maintenance.

*[Insert if applicable: Duties and responsibilities of other personnel involved in slope maintenance activities. An organization chart which shows the chain of responsibilities, authorities and accountability of individual personnel can be given in the form of an Appendix. A sample of an organization chart is given in Annex 1.]*

## 2. **Standard and Legislation**

All slopes and retaining walls, hereinafter refer as slopes, for which the Slope Owner is responsible shall be maintained to the standards of Geoguide 5 - Guide to Slope Maintenance (GEO, 1998).

Statutory legislation including Building Management Ordinance (Chapter 344), Buildings Ordinance (Chapter 123), Employment Ordinance (Chapter 57), Occupational Safety and Health Ordinance (Chapter 509) shall be observed when arranging for and carrying out the slope maintenance activities.

*[Insert if applicable: Brief description of other internal instructions/procedures issued for personnel to follow in respect of slope maintenance activities. Details can be given in the form of Appendices.]*

*[Note: Flow chart for confirming the slopes for which the Slope Owner is responsible is shown in Annex 2.]*

## 3. **Slope Maintenance Documents and Records**

The Property Manager or his/her delegate<sup>note 3</sup> shall keep all slope maintenance documents/records including the following two main types:

- (a) “General” - Documents/records concerning/affecting all or most slopes, e.g. this Slope Maintenance Plan, Slope Inventory, consultancy agreements and contract documents.
- (b) “Individual Slope” - Documents/records pertinent to each specific slope, e.g. slope boundary shown on the lease documents, maintenance manual, design or stability assessment report, records of slope maintenance inspections and works. An Individual Slope Folder shall be opened for each slope to keep its information.

He/She shall also keep a master list of the “General” documents/records and a Slope Inventory listing the documents and records pertinent to individual slopes.

Documents/Records for individual slopes shall be maintained throughout the life of the

slopes. Obsolete documents and records shall only be destroyed subject to the approval of the Property Manager.

*[Note: Samples of the master list of “General” documents/records and the Slope Inventory are given in Annexes 3 and 4 respectively. Suggested documents/records to be kept in the Slope Folder are listed in Annex 5.]*

#### **4. Programme of Inspections and Works**

The Property Manager or his/her delegate shall prepare an annual programme for slope maintenance inspections/works in accordance with the requirements regarding scope, frequency and personnel stipulated in Maintenance Manuals. If the Maintenance Manual for individual slope has not yet been prepared, requirements specified in the Geoguide 5 shall be followed.

The Property Manager or his/her delegate shall ensure that all inspections and works are conducted by the responsible personnel according to the planned programme. He/She shall also review the progress against the planned programme periodically and revise the programme when necessary to ensure that the scope and objectives of the inspections/works can be achieved.

*[Note: Key requirements of the main slope maintenance activities stipulated in Geoguide 5 are also given in the Layman’s Guide to Slope Maintenance. A summary of the required inspections and their follow-up works is given in Annex 6 and a sample of an annual programme is given in Annex 7.]*

#### **5. Procurement of Services for Maintenance Inspections and Works**

If consultants and contractors are to be engaged for slope maintenance inspections and works, or other related services, the Property Manager or his/her delegate shall arrange for the procurement of the services following Section 20A and Section 44 of the Building Management Ordinance (Chapter 344).

*[Note: Information sources for the Building Management Ordinance, and lists of Registered Professional Engineers (Geotechnical) and Registered Contractors are given in Annex 8.]*

#### **6. Training**

The Property Manager or his/her delegate is responsible for organizing training, when necessary, for personnel responsible for slope maintenance. He/She keeps training materials on slope maintenance.

*[Note: An Internet course on slope maintenance will be available from mid-2001 for open learning through the Hong Kong Slope Safety Website (<http://hkss.ced.gov.hk>).]*

*[Insert if applicable:]*

#### **7. Other Slope-Related Issues**

*Any other information relevant to slope maintenance or related issues can be given in the form of an Appendix.]*

## EXPLANATORY NOTES

This Model Plan covers mainly the management planning and arrangement for slope maintenance. Technical details should be referred to in the Guide to Slope Maintenance (Geoguide 5); key requirements are also described in the Layman's Guide to Slope Maintenance for easy reference.

The text in this Model Plan may need to be modified to suit the requirements of individual owners. If owners require assistance on how to prepare their Slope Maintenance Plan, they are welcome to contact the Community Advisory Unit of the Geotechnical Engineering Office at 2760 5800.

To assist in preparation of a Slope Maintenance Plan from this Model Plan, supplementary notes are given in *italics* in the text of the Model Plan to denote specific details which need to be filled in. Explanatory notes of some specific terms in the text are given below to describe their intent and/or details.

**Note 1:** The Property Manager is a person appointed by the Slope Owner<sup>note2</sup> to manage his/her property, following the Deed of Mutual Covenant and Building Management Ordinance where applicable.

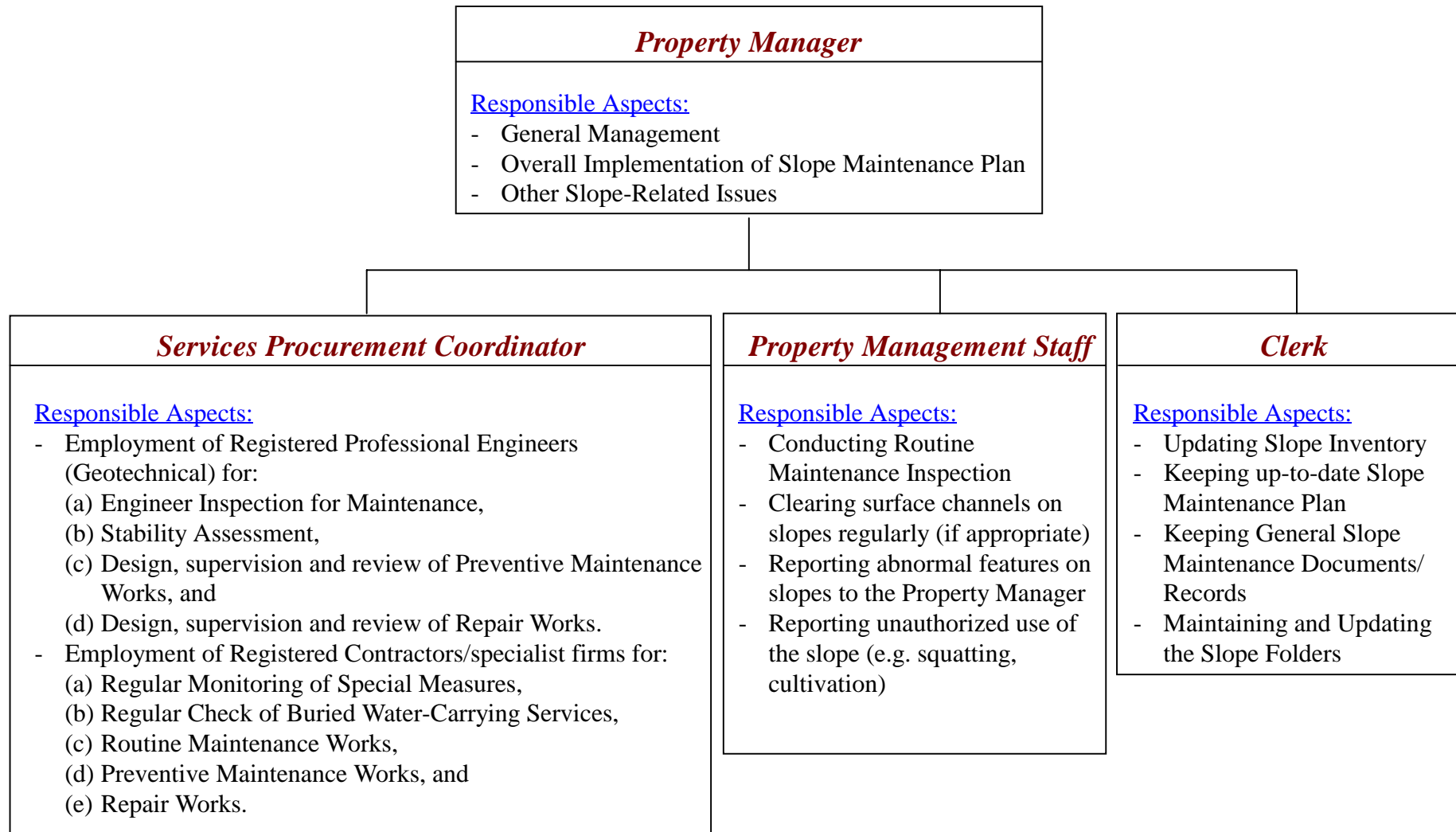
**Note 2:** The Slope Owner is the Lot Owner(s)/Owners' Corporation/Mutual Aid Committee whichever is applicable.

**Note 3:** The delegate is a dedicated person or a group of persons assigned to be responsible for the following specific tasks:

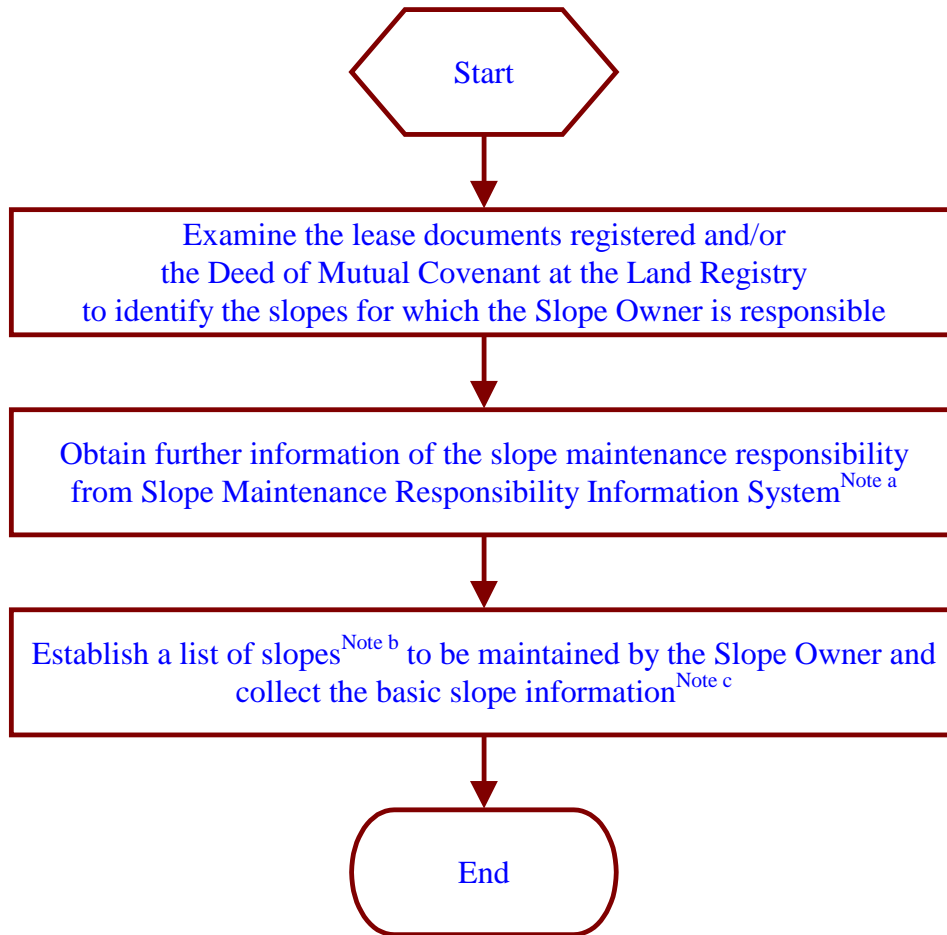
- (a) keeping the slope maintenance documents/records and establishing/maintaining a master list of "General" documents/records and a Slope Inventory;
- (b) planning, monitoring and reviewing the annual programme and reporting major discrepancies to the Slope Owner;
- (c) arranging for the procurement of services including employment of Registered Professional Engineers (Geotechnical), specialist firms and Registered Contractors, and
- (d) organizing training.

Depending on the number of slopes to be maintained and number of responsible persons available, the above specific tasks can be re-organized to suit the organization/structure of the existing management team. If the above tasks are carried out by a group of persons, their responsible areas, authorities and duties should be clearly stated in Section 1, Management Organization, of the Slope Maintenance Plan.

## ANNEX 1: SAMPLE OF ORGANIZATION CHART FOR SLOPE MAINTENANCE



## ANNEX 2: FLOW CHART FOR CONFIRMING THE SLOPES FOR WHICH THE SLOPE OWNER IS RESPONSIBLE



### Notes:

Note a : Slope Owners can access the Slope Maintenance Responsibility Information System at its Website <http://www.slope.landsd.gov.hk/smris> or at the Slope Maintenance Responsibility Information Centre located in the Lands Department at 1/F, North Point Government Offices, 333 Java Road, North Point, Hong Kong.

Note b : If in doubt about the slope maintenance responsibility, Slope Owners should seek legal advice.

Note c : Basic slope information, such as location, boundary, coordinates, geometry, drainage provisions, nearby facilities and site observations, of man-made slopes in the Slope Catalogue can be obtained from the Slope Information System (SIS) maintained by the Geotechnical Engineering Office (GEO). Slope Owners can access the SIS at the Hong Kong Slope Safety Website <http://hkss.ced.gov.hk> or at 7/F, Civil Engineering Building, 101 Princess Margaret Road, Homantin. Each man-made slope in the Slope Catalogue was assigned with a unique GEO registration number.

## ANNEX 3: SAMPLE OF MASTER LIST OF GENERAL SLOPE MAINTENANCE DOCUMENTS/RECORDS

### List of General Document

1. Slope Maintenance Plan
2. Slope Inventory
3. Consultancy Agreements
4. Works Contract Documents
5. Annual Programme of Inspections and Works

*[insert: all other general documents related to slope maintenance]*

### List of Reference Documents

6. Guide to Slope Maintenance – Geoguide 5
7. Layman’s Guide to Slope Maintenance
8. Code of Practice on Inspection and Maintenance of Water Carrying Services Affecting Slopes

*[insert: all other reference documents related to slope maintenance]*

## ANNEX 4: SAMPLE OF SLOPE INVENTORY

GEO Slope Registration No.	Ref. No. of Maintenance Manual	Ref. No. of Design/ Stability Assessment Report	Other Reference Documents	Routine Maintenance Inspection (Last Inspection/ Next Inspection)	Engineer Inspection for Maintenance (Last Inspection/ Next Inspection)	Regular Monitoring of Special Measures (Last Monitoring/ Next Monitoring)	Regular Check of Buried Water- Carrying Services (Last Checking/ Next Checking)	Works Completion Date
11SW-A/CR XXX	MM 1/2000	SA 1/2000	-	11/2/1999  2/2000	15/9/1995  9/2000	-	-  5/2000	12/3/1999
11SW-A/F XXX	MM 2/2000	SA 2/2000	Landslide Report 1/1987	11/2/1999  2/2000	16/9/1995  9/2000	-	-  5/2000	18/3/1999
11SW-A/R XX	MM 3/2000	Design Report 2/1984	-	11/2/1999  2/2000	17/9/1995  9/2000	8/1997  8/2000	-  6/2000	30/3/1999

## ANNEX 5: DOCUMENTS/RECORDS TO BE KEPT IN INDIVIDUAL SLOPE FOLDERS

### List of Documents

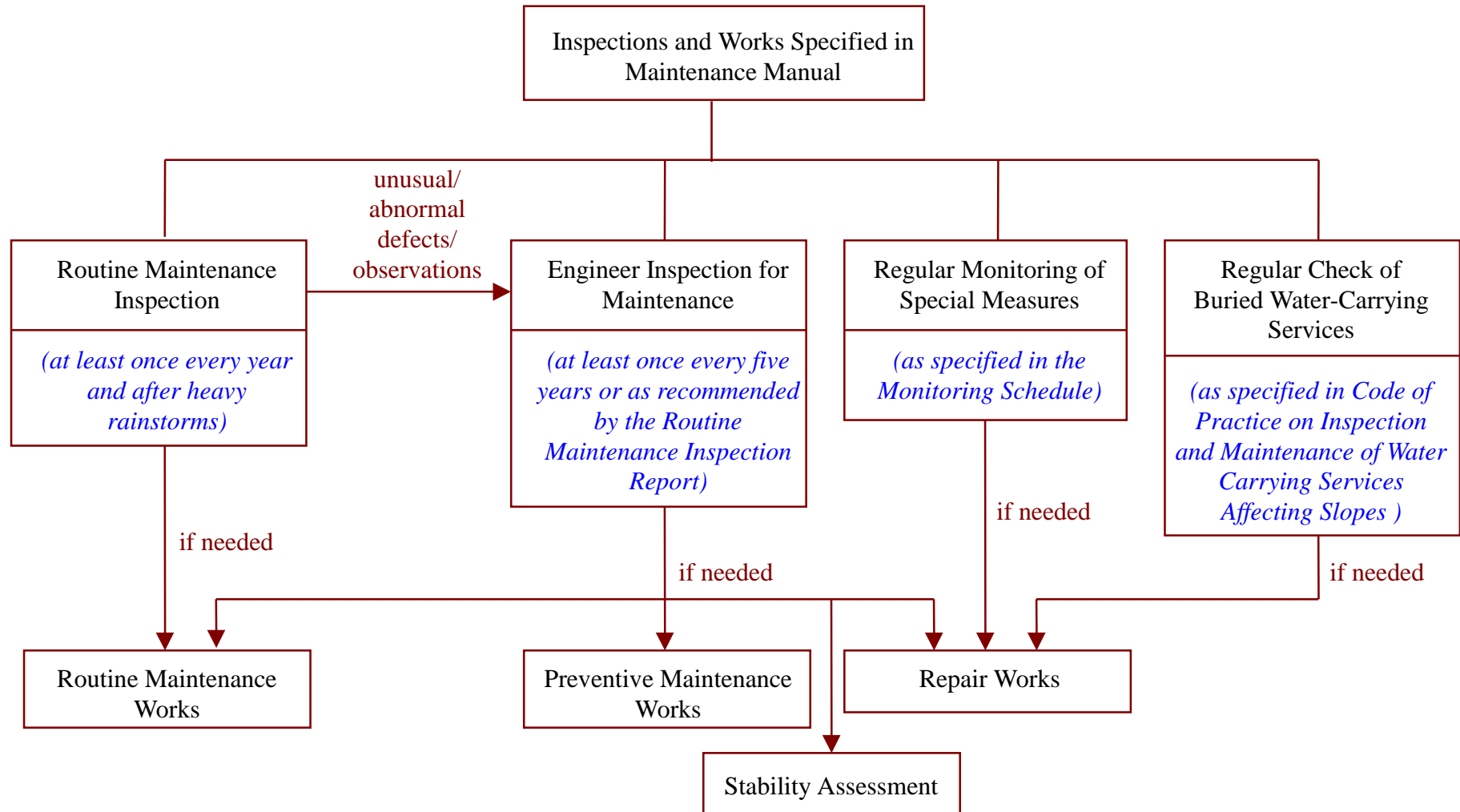
1. Slope boundary plan shown on the lease documents and/or the Deed of Mutual Covenant
2. Slope record obtained from the Slope Maintenance Responsibility Information System
3. Maintenance Manual
4. Design or Stability Assessment Report

*[insert: all other documents such as records of past instability, utility plans on which the buried water-carrying services affecting or to be affected by slope were shown.]*

### List of Inspections and Works Records

1. Routine Maintenance Inspection
2. Engineer Inspection for Maintenance
3. Regular Check of Buried Water-Carrying Services
4. Regular Monitoring of Special Measures
5. Routine Maintenance Works
6. Preventive Maintenance Works
7. Repair Works

## ANNEX 6: SLOPE MAINTENANCE INSPECTIONS AND THEIR FOLLOW-UP WORKS/ACTIONS



Note: Those items in brackets are the minimum frequencies recommended in the guidelines published in Geoguide 5.

## ANNEX 7: SAMPLE OF ANNUAL PROGRAMME OF SLOPE MAINTENANCE INSPECTIONS AND WORKS

Item	Sub-Item	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>1.</b>	<b><u>Slope No. 11SW-A/CR XXX</u></b>												
1.1	<i>Routine Maintenance Inspection*</i>	■											
1.2	<i>Engineer Inspection for Maintenance</i>										■		
1.3	<i>Leakage Check of Buried Water-Carrying Services</i>				■								
1.4	<i>Routine Maintenance Works (if any)</i>		////										
1.5	<i>Preventive Maintenance Works or Repair Works (if any)</i>						////				////		
<b>2.</b>	<b><u>Slope No. 11SW-A/F XXX</u></b>												
2.1	<i>Routine Maintenance Inspection*</i>	■											
2.2	<i>Engineer Inspection for Maintenance</i>										■		
2.3	<i>Leakage Check of Buried Water-Carrying Services</i>					■							
2.4	<i>Routine Maintenance Works (if any)</i>		////										
2.5	<i>Preventive Maintenance Works or Repair Works (if any)</i>						////					////	
<b>3.</b>	<b><u>Slope No. 11SW-A/R XX</u></b>												
3.1	<i>Routine Maintenance Inspection*</i>	■											
3.2	<i>Engineer Inspection for Maintenance</i>										■		
3.3	<i>Monitoring of Ground Anchors</i>									■			
3.4	<i>Leakage Check of Buried Water-Carrying Services</i>					■							
3.5	<i>Routine Maintenance Works (if any)</i>			////									
3.6	<i>Preventive Maintenance Works or Repair Works (if any)</i>							////					////

Note: \* Additional inspections of surface drainage system and surface protection shall be carried out after heavy rainstorms such as events associated with the issue of Typhoon Signal No. 8 or above, Landslip Warnings, Rainstorm Red or Black Warnings.

## ANNEX 8: INFORMATION SOURCES

### Key Information Sources:

Information/Services	Sources
Advice and information on slope safety and slope maintenance matters	(a) Community Advisory Unit of Geotechnical Engineering Office (Tel: 2760 5800, E-mail: gecau1_ssd@ced.gov.hk) (b) GEO Slope Safety Hotline 2885 5888
Slope Information System	(a) Slope Safety Division of Civil Engineering Department (CED) (Tel: 2760 5760) (b) CED Homepage <a href="http://www.info.gov.hk/ced">http://www.info.gov.hk/ced</a> (c) Hong Kong Slope Safety Website <a href="http://hkss.ced.gov.hk">http://hkss.ced.gov.hk</a>
Slope Maintenance Responsibility Information System	(a) Slope Maintenance Responsibility Information Centre (Tel: 2231 3333) (b) Slope Maintenance Responsibility Information System Website <a href="http://www.slope.landsd.gov.hk/smris">http://www.slope.landsd.gov.hk/smris</a>
Statutory requirements of Building Management Ordinance	(a) Home Affairs Department (HAD) - Building Management Resource Centre (Tel: 2332 9113/ 2186 8111) (b) HAD Homepage <a href="http://www.info.gov.hk/had">http://www.info.gov.hk/had</a> (c) Bilingual Laws Information System Website <a href="http://www.justice.gov.hk">http://www.justice.gov.hk</a>

### Other Information Sources:

Information	Sources
Code of Practice on Building Management and Maintenance	(a) Home Affairs Department (HAD) - Building Management Resource Centre (Tel: 2332 9113/ 2186 8111) (b) HAD Homepage <a href="http://www.info.gov.hk/had">http://www.info.gov.hk/had</a>
Code of Practice on Procurement of Supplies, Goods and Services	(a) Home Affairs Department (HAD) - Building Management Resource Centre (Tel: 2332 9113/ 2186 8111) (b) HAD Homepage <a href="http://www.info.gov.hk/had">http://www.info.gov.hk/had</a>
List of Licensed Plumbers	(a) Water Supplies Department (WSD) Customer Enquiry Centres (b) District Offices
List of Registered Contractors	(a) Buildings Department (BD) (Tel: 2135 2525) (b) District Offices (c) BD Homepage <a href="http://www.info.gov.hk/bd">http://www.info.gov.hk/bd</a>
List of Registered Professional Engineers (Geotechnical)	(a) Engineers Registration Board (Tel: 2895 4446, Homepage <a href="http://www.erb.org.hk">http://www.erb.org.hk</a> ) (b) Hong Kong Slope Safety Website <a href="http://hkss.ced.gov.hk">http://hkss.ced.gov.hk</a> (c) GEO Slope Safety Hotline 2885 5888
Statutory requirements of other relevant Ordinances	(a) Bilingual Laws Information System Website <a href="http://www.justice.gov.hk">http://www.justice.gov.hk</a>