

## Message

Hong Kong's mountainous terrain, heavy rain and dense development make us prone to risk from landslides. To reduce this risk, we have implemented a comprehensive slope safety system through the setting up of safety standards, statutory and administrative geotechnical controls as well as the upgrading and maintenance of slopes. The overall risk reduction achieved over the past 20 years is a result of the effectiveness of the system. We have set out new initiatives to attain the highest international standards in slope safety for Hong Kong.

With the good progress made in the five-year Accelerated Landslip Preventive Measures (LPM) Programme, by 2000 we will have reduced the overall landslide risk of man-made slopes to less than 50% of the level in 1977. We will embark on a ten-year expanded LPM Programme in 2000 to upgrade more substandard slopes. We will also ensure that all government slopes will be regularly maintained and that private slopes will be properly maintained by their owners through education, publicity, advice and legislative enforcement. We estimate that by 2010, we will further reduce the overall landslide risk to below 25% of the level in 1977.

Your comments or suggestions, which will help us attain a higher standard in our services, are most welcome.



(Kwong Hon-sang)  
Secretary for Works

# Slope Safety for All

Our policy objective is to meet Hong Kong's needs for the highest standards of slope safety by ensuring the safety of new slopes, enhancing the safety of existing slopes, promoting proper maintenance of slopes and providing public education, publicity and information services on slope safety.

Our targets in pursuing this policy objective are –

- to reduce by the year 2000 the landslide risk arising from old substandard man-made slopes to less than 50% of the risk that existed in 1977
- to further reduce by 2010 such risk to less than 25% of the risk in 1977

## Key Result Areas (KRAs)

To ensure that this Policy Objective can be achieved, we must deliver results in a number of key areas, that is, we must –

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The following sections of this booklet explain the importance of these KRAs, describe the broad thrust of our efforts, and outline the indicators which we are using to assess progress. Each section lists the new key initiatives being taken to achieve our objectives and pinpoints the agency accountable for each initiative and the specific targets which we intend to meet.

# I

## Improve slope safety standards, technology, and administrative and regulatory frameworks

Continuous improvement in technical standards and geotechnical control is needed to meet changing public expectations on slope safety. We will enhance our geotechnical control strategy on building and infrastructure developments, publish geotechnical standards and guidance documents, investigate serious landslides and carry out research and development to apply the latest technology to improve slope safety. In so doing we will take into account technical advice provided by Professor N Morgenstern, our expert consultant, and other international and local experts.

### Indicator

Our main indicator of progress in this area is the timely revision and improvement of safety standards and the geotechnical control framework.

Initiatives	Targets
<p>To complete a three-year trial on the integrated approach to slope stability assessment as recommended by Professor Morgenstern <i>(Civil Engineering Department (CED))*</i></p>	<p>To complete a three-year trial and formulate a long-term strategy in 1999</p>
<p>To improve the technology, priority classification systems and performance measurement methods used in slope improvement works and the slope safety system <i>(CED)</i></p>	<ul style="list-style-type: none"> <li>● To complete a guidance document for an extended scope of prescriptive maintenance measures by December 1999</li> <li>● To improve Landslip Warning Criteria through research into rainfall and landslide correlation by March 1999</li> <li>● To upgrade the automatic rain gauge network by June 1999</li> </ul>
<p>To introduce improved means of site characterisation <i>(CED)</i></p>	<p>To introduce a practical geological and optical method to identify weakness in the ground in Hong Kong by September 2000</p>
<p>To produce a Highway Slope Manual <i>(CED)</i></p>	<p>To publish the Highway Slope Manual by December 2000</p>

\* the brackets denote the agency with lead responsibility for this initiative

Initiatives	Targets
<p>To review the administrative guidelines for allocating responsibility for slopes to various government departments <i>(Works Bureau (WB))</i></p>	<p>To complete revisions to administrative guidelines on maintenance of the stability of slopes by September 1999</p>
<p>To investigate serious landslides and derive post-mortem improvement measures <i>(CED)</i></p>	<p>To complete by September 1999 an audit report covering the year 1998 on the performance of the Slope Safety System of the Geotechnical Engineering Office based on a review of landslides in 1998</p>
<p>To review and amend the Buildings Ordinance to enhance the geotechnical control of building developments <i>(CED)</i></p>	<ul style="list-style-type: none"> <li>● To make interim amendments to the Buildings Ordinance to enhance geotechnical control of building developments by July 2000</li> <li>● To complete a comprehensive review of statutory geotechnical controls in private slopes and developments by December 2000</li> </ul>
<p>To conduct detailed risk assessments on natural hillside areas susceptible to landslides <i>(CED)</i></p>	<p>To complete site-specific quantitative risk assessment studies at two selected areas by August 1999</p>

## II

### Ensure safety standard of new slopes

The design and construction of a slope to standards recognised by the geotechnical profession is the first step towards maintaining its long-term safety. We will upgrade our geotechnical control of the design and construction of slopes in all private and public developments through quality assurance of our checking work.

#### Indicator

Our indicator of progress in this area is the extent to which we are able to contain the number of substandard man-made slopes.

#### Initiative

To check more effectively the design and standard of supervision of construction of all new slopes  
*(Civil Engineering Department)*

#### Target

To maintain quality-assured checking by obtaining ISO 9001 Certification of checking work of the Geotechnical Engineering Office by March 1999



## Rectify substandard government man-made slopes

Prior to the setting up of the Geotechnical Engineering Office in 1977, there was very limited geotechnical control of slope formation both in the private and public sectors. The stability of many old slopes is therefore in doubt. Of the 42 000 old slopes, about 70% (i.e., 30 000) are government owned and about 10 000 of these affect developments and major roads. We will maintain an on-going LPM Programme up to the year 2010 to rectify substandard government slopes systematically so as to reduce progressively the risk from slopes which affect the community more directly.

### Indicator

Our indicator of progress in this area is the number of substandard government slopes upgraded or found to be up to the required safety standard.



Initiatives	Targets
<p>To accelerate the LPM Programme for the upgrading of large substandard government slopes to cope with the increased number of slopes identified through the new slope cataloguing exercise, and extend the Programme up to 2010</p> <p><i>(Civil Engineering Department (CED))</i></p>	<p>To increase the current LPM output by 40% by upgrading 250 man-made slopes per year from 1999 onwards</p>
<p>To upgrade smaller roadside government slopes not covered by the LPM Programme to reduce the landslide risk posed to road users</p> <p><i>(Highways Department)</i></p>	<p>To upgrade an additional 90 smaller roadside government man-made slopes every year from 1999 onwards</p>
<p>To rectify government slopes affecting schools to reduce the landslide risk to students</p> <p><i>(CED)</i></p>	<p>To complete by mid-1999 the study and necessary improvement works for 200 government man-made slopes affecting schools</p>

# IV

## Maintain all government man-made slopes

Regular maintenance is essential to the continued stability of all man-made slopes. In addition to regular maintenance, we will also carry out enhanced maintenance using prescriptive measures to achieve quick improvements to the stability of those older slopes. To this end we will clearly identify the maintenance responsibility of all man-made slopes, government or private, and disseminate the information to concerned parties. For government slopes, we will ensure that the responsible government departments will carry out the necessary regular maintenance as well as enhanced maintenance.

### Indicator

Our indicator of progress in this area is the number of government slopes maintained in accordance with the unified standard as promulgated in Geoguide 5 - A Guide to Slope Maintenance.

Initiatives	Targets
<p>To complete the systematic identification of the maintenance responsibility for the estimated 60 000 man-made slopes in Hong Kong</p> <p><i>(Lands Department (LD))</i></p>	<p>To complete the task by the end of 1999</p>
<p>To disclose the slope maintenance responsibility to the public and to upkeep the database and handle appeal cases</p> <p><i>(LD)</i></p>	<p>To disclose the slope maintenance responsibility to the public by the end of 1999</p>
<p>To enhance the capability of six government departments responsible for the maintenance of government slopes to cope with the increased number of slopes identified through the new slope cataloguing exercise</p> <p><i>(Works Bureau (WB))</i></p>	<ul style="list-style-type: none"> <li>● To strengthen Slope Maintenance Units in the six government departments responsible for the maintenance of government man-made slopes from April 1999</li> <li>● To complete a thorough review of slope maintenance by 2000</li> </ul>

Initiatives	Targets
<p>To complete the systematic inspection and repair of all government underground drains and water pipes which may affect the stability of adjacent slopes (WB)</p>	<ul style="list-style-type: none"> <li>● To complete the systematic inspection and necessary repair works of underground water pipes, sewers and drains within public housing estates and affecting slopes by 2000</li> <li>● To complete the systematic inspection and necessary repair works of underground water pipes, sewers and drains within government buildings and affecting slopes by 2001</li> <li>● To complete the systematic inspection and necessary repair works of underground water pipes affecting slopes near buildings and major roads by 2002</li> <li>● To complete the systematic inspection and necessary repair works of underground sewers and drains affecting slopes near buildings and major roads by 2004</li> </ul>

# V

## Ensure that owners take responsibility for slope safety

To reduce the landslide risk posed by private slopes, private owners must take up their responsibility to maintain private man-made slopes and to upgrade those which are substandard. We will continue to carry out safety-screening of pre-1977 private man-made slopes to establish prima facie evidence for serving Dangerous Hillside Orders to private owners under the Buildings Ordinance to require them to upgrade their substandard slopes. We will also continue to take statutory action to require private owners to inspect and repair private underground drains and water pipes which may affect the stability of adjacent slopes. Together with the new public education, publicity and information services outlined in the next KRA, we will ensure that private owners take care of their own slopes, thereby achieving a major reduction in the landslide risk posed by private slopes.

### Indicator

Our indicator of progress in this area is the number of landslip preventive measures taken by private owners.

Initiatives	Targets
<p>To carry out more safety screening studies of private slopes to require owners to rectify their substandard slopes</p> <p><i>(Civil Engineering Department / Buildings Department (BD))</i></p>	<p>To complete safety screening studies of 300 man-made private slopes per year from 1999 onwards</p>
<p>To enforce more vigorously the provisions of the Buildings Ordinance to require owners to inspect and repair private underground drains and water pipes which may affect the stability of adjacent slopes</p> <p><i>(BD)</i></p>	<p>To complete screening studies of underground services affecting 500 slopes per year and serve Section 27C Orders where necessary for investigation and repair of suspected services from 1999 onwards</p>

# VI

## Promote public awareness and response in slope safety through public education, publicity and information services

Many private owners are unaware of their slope maintenance responsibility or, as laymen, they do not possess the required knowledge or expertise in slope improvement or maintenance works. We will provide the public with slope information, identify the ownership of each man-made slope in terms of maintenance responsibility, and provide an advisory service on how to tackle slopes. We will step up public education on slope maintenance and enhance our public communication channels on slope safety matters. To minimise the adverse consequences of landslips to the community, we will continue to educate the public on slope safety so that they can take personal safety precautions to protect themselves and their families in times of heavy rainstorms.

### Indicators

Our indicators of progress in this area are –

- the level of public awareness of the slope safety problem in Hong Kong
- the level of public response to avoid landslide risk

Initiatives	Targets
<p>To establish a new and comprehensive slope information system containing information on all 60 000 slopes in Hong Kong and accessible to the public through internet <i>(Civil Engineering Department (CED))</i></p>	<ul style="list-style-type: none"> <li>● To establish the system by the end of 1998</li> <li>● To develop the full slope information system on the internet and in Building Management Resource Centres by March 1999</li> </ul>
<p>To enhance and reinforce private owners' acceptance of their responsibility for slope safety <i>(CED)</i></p>	<p>To set up a Community Advisory Unit in the Geotechnical Engineering Office in April 1999 to –</p> <ul style="list-style-type: none"> <li>● organise seminars and talks for private slope owners on matters relating to slope safety and maintenance</li> <li>● provide a meet-the-public service to answer queries and provide information on slope safety matters</li> <li>● meet private owners' representatives who have received Dangerous Hillside Orders to advise them on how to proceed with the necessary slope upgrading works</li> </ul>



Initiatives	Targets
	<ul style="list-style-type: none"> <li>● meet Owners' Corporations and Mutual Aid Committees to advise them on how to proceed with the necessary slope maintenance works</li> </ul>
<p>To step up publicity on emergency preparedness and personal precautionary action during landslide warnings (CED)</p>	<ul style="list-style-type: none"> <li>● To prepare an educational kit on slope safety by December 1999</li> <li>● To stage eight roving exhibitions on slope safety issues in 1999</li> </ul>