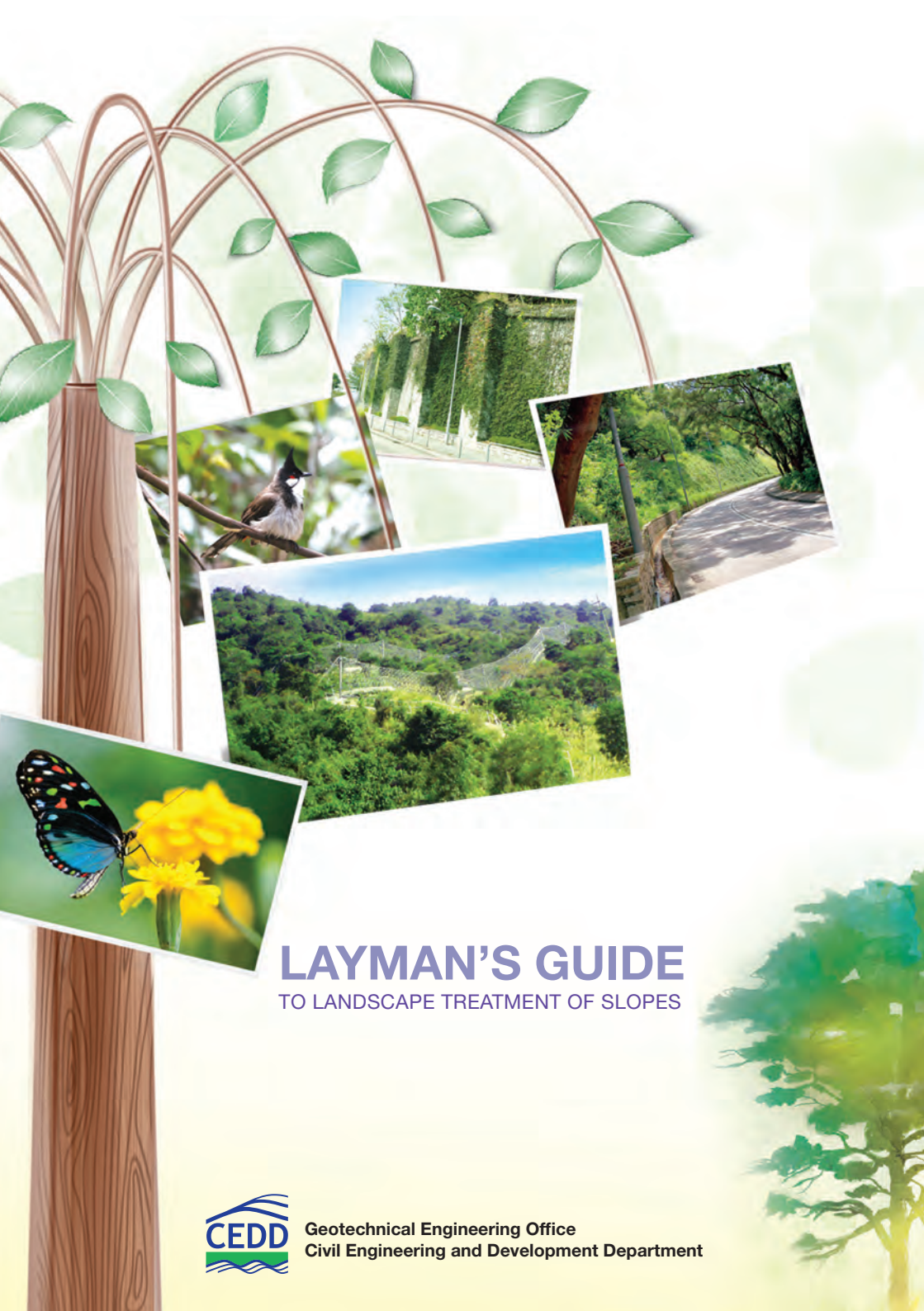

LAYMAN'S GUIDE

TO LANDSCAPE TREATMENT OF SLOPES

CEDD

Geotechnical Engineering Office
Civil Engineering and Development Department

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Designed by Edwin Eddie Tommy Advertising Limited

Foreword

This Layman's Guide is intended for the use of the general public. It provides information and general guidance on landscape treatment for slope works and natural terrain landslide mitigation measures.

It is Government's policy to make slopes in Hong Kong look as natural as possible. We are striving to improve the quality of our living environment through active planting, preservation of trees and other vegetations, together with proper maintenance. With this commitment and effort, we believe that we can achieve the overall aim of creating a greener, more harmonious and ecologically sustainable slope environment.

The first edition of this document was published in 2002. There had since been continuous development in slope engineering and landscaping techniques, which led to the issue of GEO Publication No. 1/2011 "Technical Guidelines on Landscape Treatment for Slopes" by the Geotechnical Engineering Office. We have therefore taken the opportunity to update this Layman's Guide in order to promulgate the latest best practice.

We trust that this document will continue to serve the purpose of helping and encouraging private slope owners to provide appropriate landscape treatment to their slopes when planning maintenance, upgrading and new developments.

For more detailed guidance, readers may refer to GEO Publication No. 1/2011.

Y C Chan
Head, Geotechnical Engineering Office
July 2012

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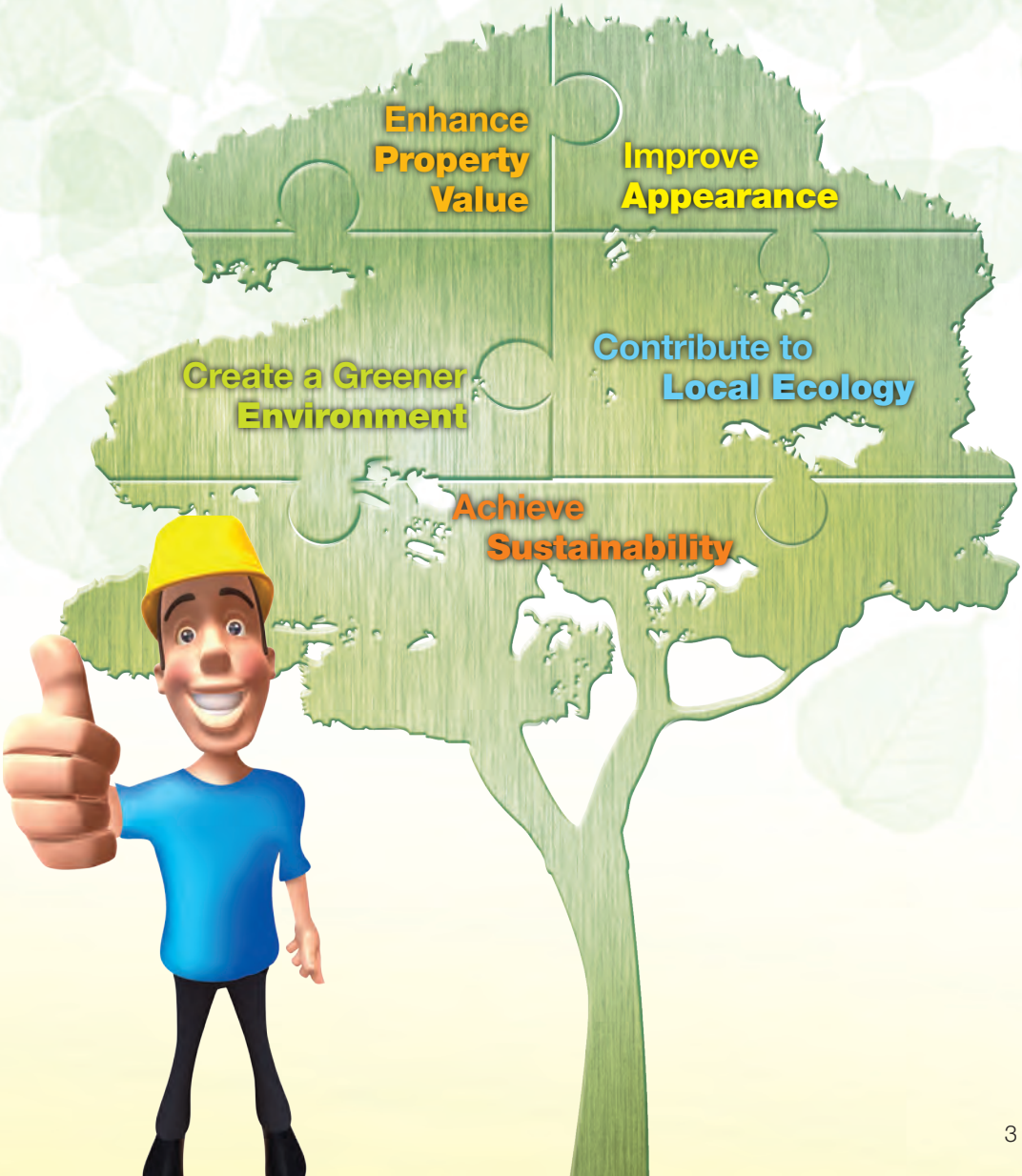
Why bother with landscape treatment for slopes?



Landscaped man-made slope

Before

After

Fat Kwong Street, Homantin

Landscaped retaining wall

Before

After

South Lantau Road, Lantau Island

Landscaped natural terrain landslide mitigation measures

Before

After

Artist's impression of the mitigation measures upon maturing of landscaping plants

Yu Tung Road, Tung Chung

What are the landscape design objectives?

1. Minimise impacts on the natural environment

Minimise the extent of engineering works and retain as much existing vegetations as practicable

2. Fit in with surrounding landscape/natural topography

The slope topography and composition should be designed to match the surrounding landform and landscape

3. Create a greener environment

Vegetation is aesthetically pleasing and environmentally friendly

4. Contribute to environmental sustainability and local ecology

Native tree species provide natural habitats for wild life to thrive, and they can spread naturally. Planting them improves the local ecology

5. Achieve a natural appearance

Solutions using natural materials (e.g. rock and vegetation) are visually preferable to artificial materials

6. Mitigate visual impact

Where artificial or built elements are used, efforts should be made to blend these elements into their surroundings

7. Aesthetically pleasing

The landscape design of features should conform to the principles of good aesthetic design

i. Unity and coherence

Planting at the toe and above a retaining wall successfully creates a unified appearance to the whole slope

ii. Proportion and scale

Buttresses with masonry facing suitably sized and dispositioned to create a sense of proportion

iii. Pattern and texture

Various techniques used in a co-ordinated manner, resulting in a composition having both pattern and texture

iv. Rhythm and complexity

Ribbed finish and plain concrete create a scene with both rhythm and complexity

v. Colour

Colours of random patterned masonry complement the surroundings

vi. Albedo (Reflectivity)

Small-sized surface blocks mingled with vegetation reduce the reflectivity of a hard surface

Tips for landscaping slopes

Tip 1 Preserve existing trees

Providing tree protection zone and/or protective wrapping around tree trunks during construction

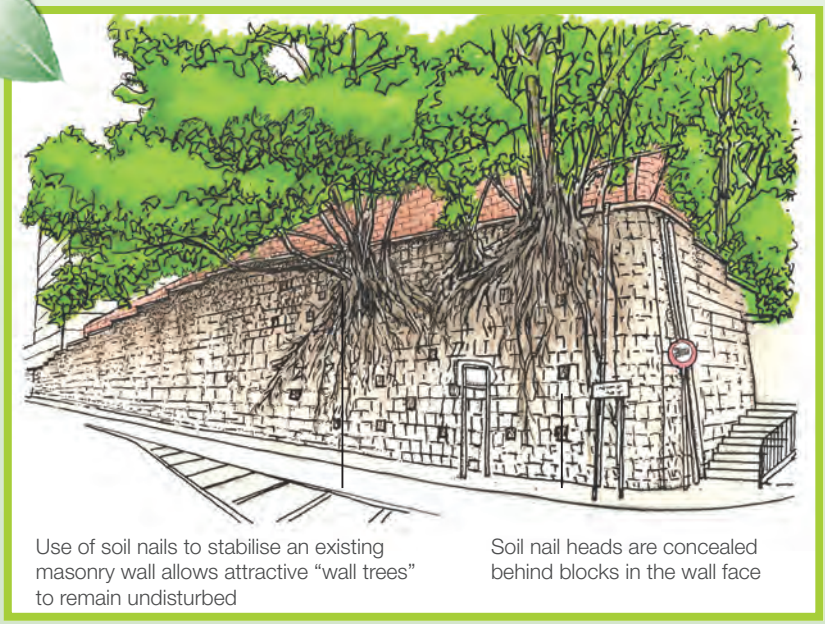
Planting strips above and below masonry wall to promote root growth of wall trees

Combined tree rings

Localised wall to retain existing trees

Examples of tree preservation

Existing wall trees are retained after upgrading works using soil nails



Use of soil nails to stabilise an existing masonry wall allows attractive “wall trees” to remain undisturbed

Soil nail heads are concealed behind blocks in the wall face

Tip 2 Select the planting goal

(plant the right vegetation at the right place)

Slopes in rural areas or urban fringe areas – connected to natural vegetation

Ecological Planting

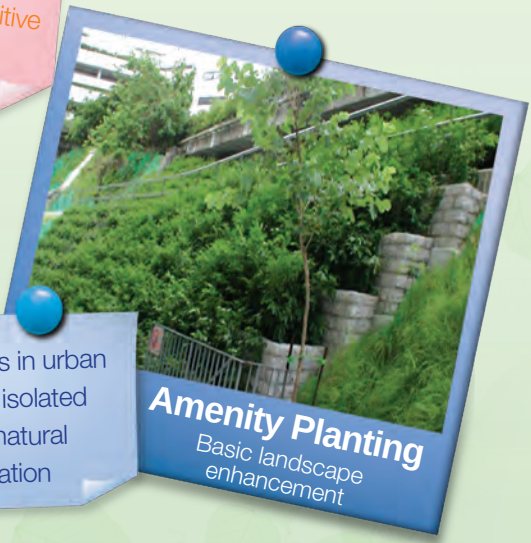
Integration with the surrounding natural vegetation

Slopes in parks/ gardens or other visually sensitive areas

Ornamental Planting

Emphasis on a pleasing appearance

Slopes in urban areas isolated from natural vegetation



Amenity Planting

Basic landscape enhancement

Note: Consult a landscape architect on the selection of the planting goal as necessary

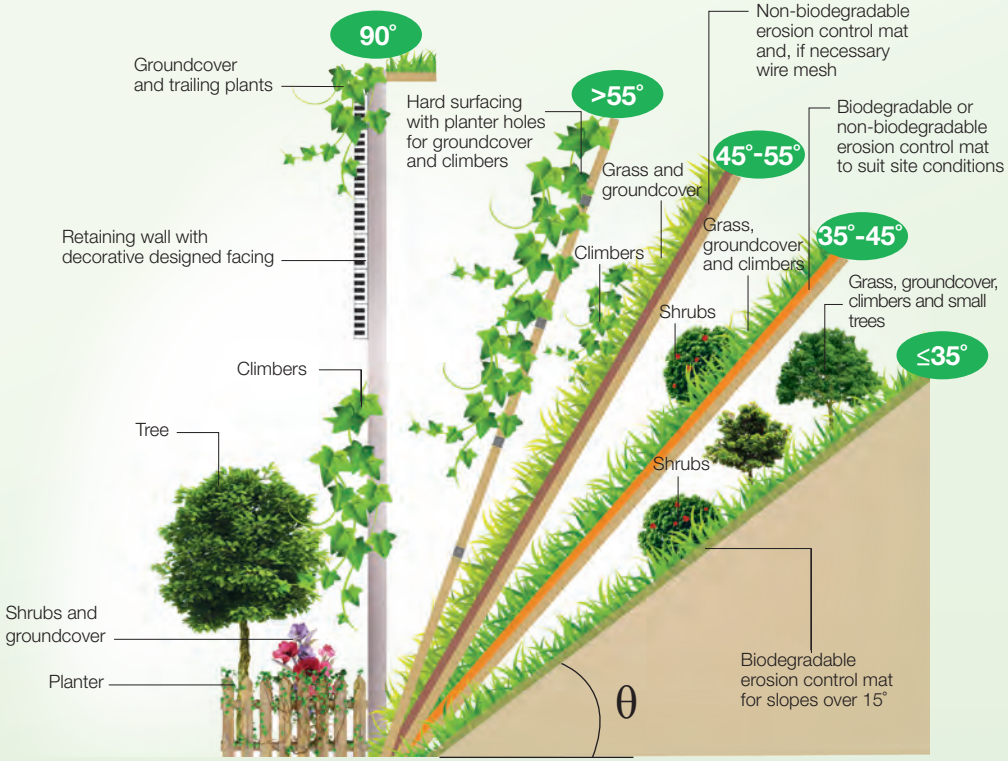
Examples of different planting goals

Ecological Planting | Improve visual appearance and enhance ecological value by planting native species

Amenity Planting | Basic landscape enhancement by planting a mixture of exotic and native species on slopes that are isolated from the natural vegetation

Ornamental Planting | Emphasis on a pleasing appearance by planting of flowering shrubs and trees

Create planting opportunities



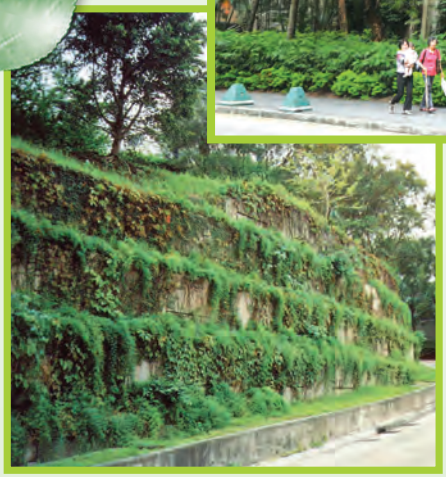
Slope Gradient (θ)	Possible Planting on Slope Face*
$\theta \leq 15^\circ$	Grass hydroseeding with pit planting of trees, shrubs, groundcover and climbers
$15^\circ < \theta \leq 35^\circ$	Grass hydroseeding with pit planting of small trees (up to about 3 m height when mature), shrubs, groundcover and climbers
$35^\circ < \theta \leq 45^\circ$	Grass hydroseeding with pit planting of shrubs, groundcover and climbers
$45^\circ < \theta \leq 55^\circ$	Grass hydroseeding with groundcover and climbers in root tube planters
$\theta > 55^\circ$	Planter holes through hard surface cover for planting of groundcover and climbers

Source: Figure 2.15 and Table 2.2 of GEO Publication No. 1/2011

Note: (*) Recommendations are not mandatory and consult a landscape architect as necessary

Examples of creating planting opportunities

Climbers and screen planting at the toe



Terracing of a retaining wall for planting

Toe and berm planters

Species commonly planted in Hong Kong

Use of native species is encouraged

Climbers

Ficus pumila (Creeping Fig)

Parthenocissus dalzielii
(Diverse-leaved Creeper)

Species commonly planted in Hong Kong

Use of native species is encouraged

Groundcover

Dicranopteris pedata
(Dichotomy Forked Fern)

Blechnum orientale (Oriental Blechnum)

Species commonly planted in Hong Kong

Use of native species is encouraged

Shrubs

Melastoma sanguineum
(Blood-red Melastoma)

Rhaphiolepis indica
(Hong Kong Hawthorn)

Ardisia crenata
(Hilo Holly)

Species commonly planted in Hong Kong

Use of native species is encouraged

Small Trees

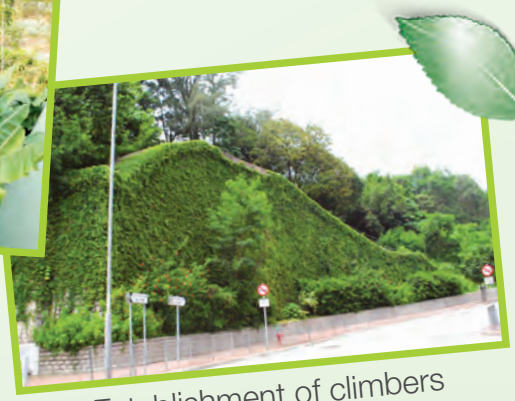
Melicope pteleifolia
(Thin Evodia)

Polyspora axillaris
(Hong Kong Gordonia)

Tip 4 Landscape the engineering elements and slope furniture

Landscape the engineering elements

Use of grillage system to retain existing vegetation



Establishment of climbers on retaining wall

Landscape the slope furniture

Stairways blended in with the surroundings to minimise visual impact

Examples of landscape treatment

1. Landscape softworks

Ecological planting to achieve a sustainable environment

Well maintained trees and ornamental shrubs on a slope

Provide ferns and other shade tolerant species under tree cover

Examples of landscape treatment

2. Landscape hardworks

Decorative designs on a retaining wall, enhanced by trees and shrubs in a toe planter

Masonry facing, common landscape hardwork for slopes

Apply masonry-like finish to a hard surface

Subdue grey colour paint applied to concrete rock slope preventive measures

Examples of landscape treatment

3. Hybrid landscape treatment

Climbers forming a green curtain to screen the concrete buttresses

Openings on slope to allow planting to green the hard surface

Climbers on a retaining wall with palm trees and decorative shrubs in front

Typical maintenance of landscape works

Landscape softworks:

- inspecting trees and plants
- trimming vegetation as necessary
- replacing vegetation where necessary
- spraying against pests
- removing invasive species

Landscape hardworks:

- repairing damage to surface finishes

Are landscape works costly?

Landscape works are generally not costly. Advice on the cost of the landscape works should be obtained from a landscape architect.


1
Slope Safety above all
2
Seek advice from a landscape architect
3
Retain existing vegetation where possible
4
Create planting opportunities
5
More use of native species
6
Choose hard surface materials that minimise visual impact
7
Proper maintenance of landscaping works
Seven Things to Remember

Assistance

More guidance can be found in GEO Publication No. 1/2011 "Technical Guidelines on Landscape Treatment for Slopes" which is available from:

Publications Sales Unit
Information Services Department
http://www.bookstore.gov.hk
Tel. No.: (852) 2537 1910

or from the following website:

http://www.cedd.gov.hk/eng/publications/

For more information on slope related matters, please contact

Community Advisory Unit
Geotechnical Engineering Office
Civil Engineering and Development Department
Tel. No.: (852) 2760 5800

Other relevant websites:

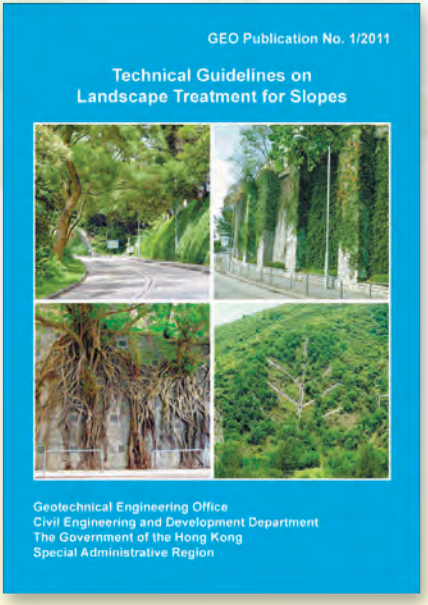
Civil Engineering and Development Department
http://www.cedd.gov.hk

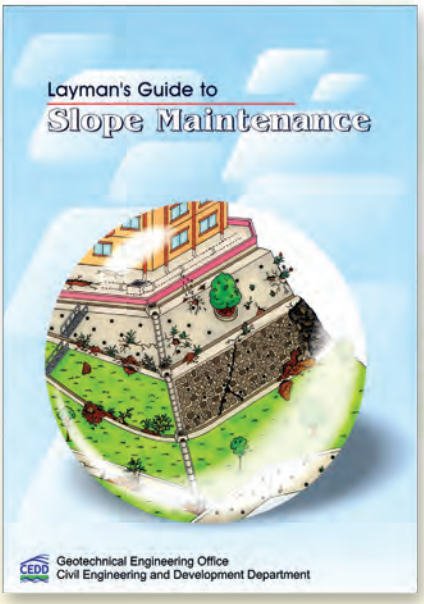
Greening and Landscape Office of Development Bureau
http://www.greening.gov.hk

Hong Kong Slope Safety
http://hkss.cedd.gov.hk

The Hong Kong Institute of Landscape Architects
http://www.hkila.com

Relevant publications









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