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Foreword

The Geotechnical Engineering Office (GEO) of the Civil Engineering and Development Department (CEDD) has committed to enhancing slope safety in Hong Kong in the past four decades.

While our primary objective is to safeguard the public from slope failures, GEO has always given priority attention to blend in the engineering works with the surrounding environment by making them look as natural as possible and harmonizing them with the built facilities. Our aim has been to cultivate a greener, safer and ecologically more sustainable slope environment for the community.

This album presents 23 selected slopes upgraded under the Landslip Preventive Measures Programme (LPMP) / the Landslip Prevention and Mitigation Programme (LPMitP) to highlight different landscape treatments that have been used. It showcases the endeavour of GEO and its consultants to create robust, cost-effective and eco-friendly vegetation covers for slopes around Hong Kong.

I would like to take this opportunity to extend my grateful and sincere gratitude to AECOM Asia Company Ltd who serve as consultant to GEO for the preparation of this album. The effort paid by the AECOM team members, including Messrs Victon Wong, Jeff Tang, Nelson Wong and Miss Angela Cheng, is greatly appreciated.

During the course of the preparation of the album, comments from various slope maintenance departments and the landscape unit of CEDD were received; and valuable discussions and exchanges of views were held between the consultant and GEO staff, especially Mr Ken Ho, Mr KY Choi, Dr Raymond Cheung, Dr H W Sun and Ms Lily Chan. Their contributions are gratefully acknowledged.

一直致力提高香港的斜坡安全水平。除了努力保 障公眾安全,我們亦同樣注重將斜坡鞏固工程與 周邊環境融合,以為市民提供一個綠化、安全、 生態上可持續發展的居住環境。

這本專輯精選了在「防止山泥傾瀉計劃」和「長 遠防治山泥傾瀉計劃」下23幅經綠化的斜坡,以 展示各種不同斜坡環境美化技術,藉此分享我們 及工程顧問公司多年來,以符合經濟效益的方式 為斜坡安全和綠化環境所取得的成果。

過去四十年來,土木工程拓展署轄下土力工程處 我在此衷心感謝艾奕康有限公司幫忙製作這本專 輯,對其團隊成員包括王榮隆先生、鄧展業先生、 黄柏樑先生和鄭美雲小姐所付出的心思和努力, 我深表謝意。

> 同時,我特別感謝各斜坡維修部門、土木工程拓 展署環境美化組,以及本處何建生先生、蔡廣賢 先生、張偉文博士、孫向榮博士和陳雪瑩女士對 這本專輯所提供的寶貴意見和貢獻。



Mr W K Pun Head, Geotechnical Engineering Office 潘偉強先生 十力工程處處長

October 2017 二零一七年十月

Showcasing Landscape Treatment of Slopes 斜坡環境美化典範

Slopes are found everywhere in Hong Kong, with a substantial portion of urban developments located near to hillsides. It is Government's policy to make slopes look as natural as possible, with a view to achieving the overall aim of creating a visually acceptable and ecologically sustainable slope environment.

In pursuit of a naturalistic and environmentally conforming appearance for the slopes, vegetation cover is provided wherever practicable. Native plant species can provide more suitable food and shelter for local wildlife than exotic species, therefore GEO uses native species for landscaping slope covers and engineering works on the natural terrain wherever possible. Ecological landscape treatment of slopes has formed part of the Landslip Preventive Measures Programme / Landslip Prevention and Mitigation Programme.

This album has identified 23 different slopes in the New Territories, Kowloon, Hong Kong Island and Lantau to illustrate various types of works and landscape treatments employed over the past few decades.

We hope this publication can help raise public awareness of slope safety and also promote understanding, appreciation and enjoyment of green slope environments. 香港是依山發展的城市。特區政府的政策 是盡量令斜坡看來自然,整體上務求營造 在視覺方面為市民接受,而在生態方面則 達到可持續發展的斜坡環境。

在力求斜坡及建構物外觀自然並與周圍環境配合的前提下,植被護面會盡量被採用。由於本土植物較能為本地自然生物提供適合的覓食和庇護環境,因此土力工程處會盡量採用本土植物品種來綠化斜坡和天然山坡上的工程建構物。在斜坡上建立可持續的生態環境,是防止山泥傾瀉計劃/長遠防治山泥傾瀉計劃的一個重要部分。

本專輯挑選分佈在香港島、九龍、新界及 大嶼山的23幅斜坡,介紹過去十數年間各 斜坡鞏固及環境美化工程的成果。

希望本專輯在提升公眾對斜坡安全意識之餘,亦能促進市民對斜坡環境美化工程的 了解及欣賞。

Landscape Design Objectives 斜坡園景設計目標

1. Minimise Impacts on Natural Environment 盡量減低對自然環境的影響





2. Contribute to Environmental **Sustainability and Local Ecology** 維護環境的可持續性及區內生態環境

3. Create a Greener **Environment** 締造更綠化的環境



4. Provide Aesthetically **Pleasing Cityscape** 提供美觀悅目的社區環境



5. Match with Surrounding Landscape/Natural Topography 配合四周景物及天然地形





Locations of the 23 Slopes 23幅斜坡位置圖

LANTAU

大嶼山

Tin Hau Temple Road 天后廟道 11SE-A/FR61

Stubbs Road 司徒拔道 11SW-B/C24

11SW-D/C601 Peak Road 山頂道

11SW-D/F641 Bowen Road 寶雲道

11NE-A/C43 Fung Shing Street 豐盛街

11NE-C/C242 Ngau Tau Kok Playground 牛頭角遊樂場

Wah King Hill Road 華景山路 11NW-A/C34

11NW-B/C101 Shek Kip Mei Park 石硤尾公園

11NW-B/C166 Junction Road Park 聯合道公園

11NW-B/C167 Junction Road 聯合道

11NW-D/C90 Hau Man Street 孝民街

11NW-D/C94 Chung Hau Street 忠孝街

11NW-D/CR110 Princess Margaret Road 公主道



6SE-B/C236 Route Twisk 荃錦公路 Kwai Hing Road 葵興路 7SW-C/C100 7SW-C/C352 Sam Tung Uk Road 三棟屋路 8SW-A/CR8 Tai Mong Tsai Road 大網仔路 9SE-B/ND4 Yu Tung Road 裕東路 10SW-C/C64 South Lantau Road 嶼南道 10SW-C/C165 South Lantau Road 嶼南道 10SW-C/C198 South Lantau Road 嶼南道 13NE-A/C243 South Lantau Road 嶼南道 12SW-A/C189 Tai Au Mun Road 大坳門路

Location Plan 位置圖 I 7











Removal of existing shotcrete surface, provision of hydroseeding, tree and shrub planting

Design Outcome

Provision of pleasant greenery on rock fill slope with the integration of storm water pipes below the slope surface to reduce visual impact, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作 移除原有的混凝土護面,並噴植草籽、栽種 樹木及灌木

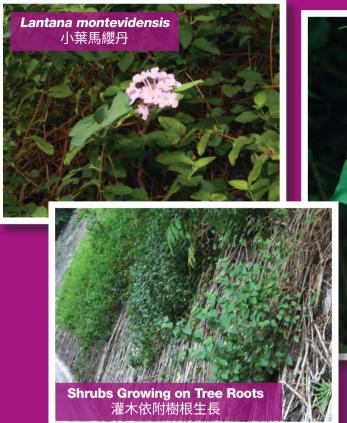
Ficus hispida 對葉榕

設計成效

於堆石坡面下建造及改善地下排水管道,並提供斜坡環境美化,從而提升整體視覺效果、採用本土植物品種,能為本地自然生物提供適合的覓食和庇護環境,從而提供可持 續和改善生態的棲息地







Removal of shotcrete surface, preservation of existing trees on slope, provision of hydromulching and shrub planting

Design Outcome

Conversion of shotcrete surface to a vegetation cover, provision of effective shade and aesthetically pleasing greenery along Stubbs Road, reduction of traffic noise, enhancement of local ecology

美化工作

移除原有的混凝土護面,保存現有 樹木,噴植草籽及栽種灌木

設計成效

將混凝土護面轉換為植被護面,為 司徒拔道提供理想遮蔭及綠色環 境、減低交通噪音,並提升區內生 態價值

Bougainvillea spectabilis 簕杜鵑















美化工作

移除原有的混凝土護面,噴植草籽,並在斜坡底部建造種植槽栽 種樹木及灌木

Toe Planter with Tree and Shrub Planting 灌木及樹木生長於種植槽

Design Outcome

Increase of green coverage, provision of greenery to blend in with the natural woodland planting at the urban fringe along Fung Shing Street

設計成效 在市區周邊,沿豐盛街提供樹蔭 及配合四周地貌的綠化環境















11NW-A/C34

Landscape Treatment

Removal of shotcrete surface, hydroseeding, preservation of existing trees, shrub and tree planting

Design Outcome

Translation of a dull shotcreted slope to a woodland slope to reduce heat island effect, provision of a pleasant green backdrop to Wah King Hill Road, absorption of traffic noise, enhancement of local ecological values

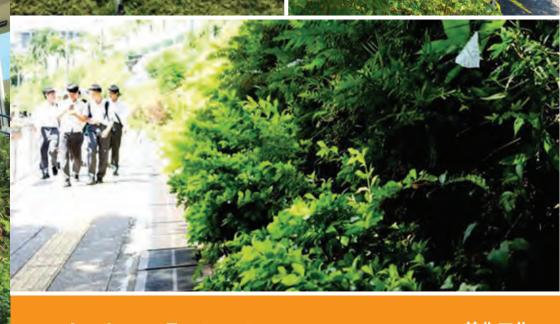
美化工作 移除原有的混凝土護面,噴植草籽,保存原有樹木, 栽種灌木和樹木

將單調的混凝土護面轉換為林地植被,以降低熱島效應,為華景山路提供令人心曠神怡的綠化景致、減低交通噪音,並提升區內生態價值









Removal of existing shotcrete cover, hydromulching, provision of toe planters with shrubs

Design Outcome

Transformation of shotcrete surface to an aesthetically pleasing green cover, maximization of greening within densely populated urban area, reduction of heat island effect, enhancement of local ecological values

美化工作 移除原有的混凝土護面,噴植草籽,並在斜坡 底部建造種植槽栽種灌木

設計成效 以植被代替原有的混凝土護面,並於人口稠密 地區加添青葱氣息,減低熱島效應,並提升區 內生態價值







Removal of existing shotcrete surface, provision of hydroseeding with tree seed mix

Design Outcome

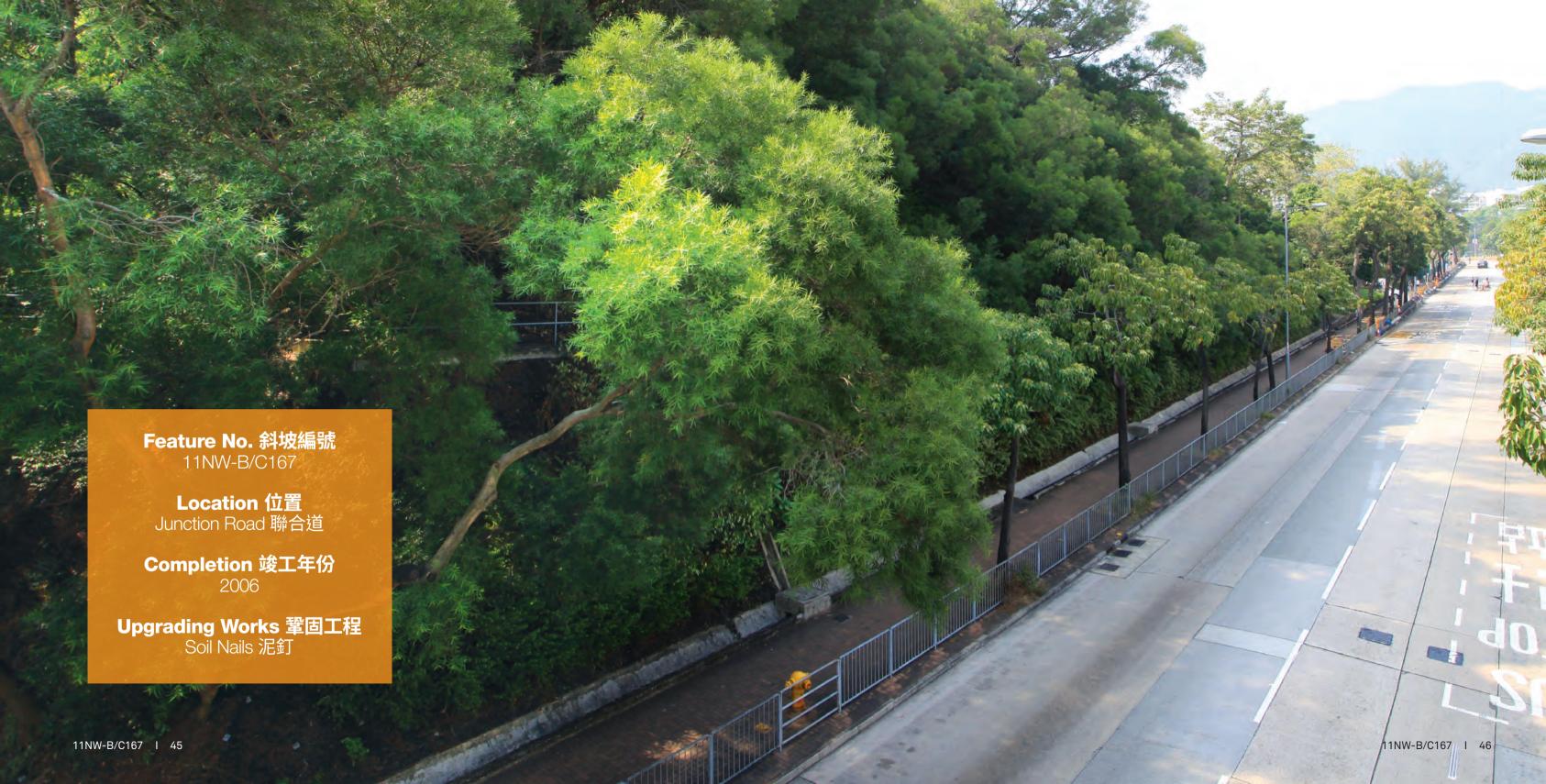
Provision of gratifying greening on slope surface, promotion of woodland establishment to provide smooth transition from urban area to the adjacent natural woodland, enhancement of aesthetic and ecological values

美化工作 移除原有的混凝土護面,噴植草籽及樹木種籽

設計成效 為市民提供宜人綠化景致,為都市與天然林地創 造理想緩衝地帶,提升整體外觀與生態價值















Removal of existing shotcrete surface, hydroseeding, shrub and groundcover planting and provision of toe planters with ornamental shrubs

Design Outcome

Translation of dull shotcrete cover to vegetated surface to achieve environmental sustainability, provision of pleasant streetscape along Hau Man Street, absorption of traffic noise, enhancement of local ecological values

美化工作 移除原有的混凝土護面,噴植草籽,栽種地被植物及灌木,在斜坡底部建造種植槽栽種觀賞性高的灌木

設計成效 將單調的混凝土護面轉換為植被,沿孝民街提供 宜人的綠化街景、減低交通噪音,並提升區內生 態價值











Removal of existing shotcrete surface, hydroseeding, provision of toe planter with shrubs and climbers

Design Outcome

Enhancement of the visual amenity along Chung Hau 沿忠孝街增添宜人景致,並減低熱島效應及Street, reduction of heat island effect, absorption of 交通噪音,也提升區內生態價值 traffic noise, enhancement of local ecological values

美化工作 移除原有的混凝土護面,噴植草籽,在斜坡 底部建造種植槽栽種灌木及攀爬植物

設計成效



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Landscape Treatment

Removal of shotcrete surface, preservation of existing trees on slope, hydroseeding and shrub mix planting

Design Outcome

Transformation of a shot creted slope to a natural woodland slope to lessen heat island effect, enhancement of the visual amenity of the roadside environment, absorption of traffic noise, enhancement of local ecological values

美化工作 移除原有的混凝土護面,保存原有樹木,噴植草籽並栽 種灌木

設計成效 將原有的混凝土護面轉為天然林地坡面,為街道加添自 然氣息及減低交通噪音,並提升區內生態價值









Removal of shotcrete cover, preservation of existing trees on slope, hydroseeding, woodland tree and shrub mix planting

Lygodium japonicum

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Design Outcome

Successful integration of the upgrading works to match with the natural landscape along Route Twisk, preservation of existing trees on slope and minimization of impacts on the natural environment

美化工作 移除原有的混凝土護面,保存原有樹木,噴植草籽,栽 種喬木和灌木

設計成效

成功將斜坡鞏固工程與荃錦公路沿途綠致景色融合,並保存斜坡上原有樹木,以盡量減低對自然環境的影響











Planting of climbers over the slope, provision of shrubs and trees along toe planter

Design Outcome

Successful formation of a green curtain (formed by climbers) screening the concrete buttresses, reduction of heat island effect, enhancement of aesthetic and ecological values

美化工作 於斜坡面栽種攀緣植物,並在斜坡底部建造種植槽種 植樹木及灌木

成功利用攀緣植物編織成一個綠色屏障,覆蓋混凝土 擋土牆及石坡以加強綠化,同時也減低熱島效應,並 提升其觀賞及生態價值













Hydroseeding with tree seeds

Design Outcome

Use of masonry facing to mitigate the visual impact of retaining wall, provision of natural woodland planting to promote environmental sustainability, enhancement of local ecological values

美化工作 噴植草籽及樹木種籽

設計成效 麻石圖案營造自然美感,以減低擋土牆的視覺 影響,並於斜坡上栽種天然林地植物促進本地 生態可持續發展,並提升區內生態價值







Vertical planting on reinforced concrete wall, hydroseeding, shrub planting

Design Outcome

Minimization of the visual impact of concrete structure and blend in the structure with adjacent natural environment, contribution to environmental sustainability, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作

於混凝土牆身垂直栽種植物,噴植草籽,並於周邊 種植灌木

設計成效

綠色植物紓緩混凝土牆的視覺影響和減低硬面的反照率,使混凝土泥石壩與周遭天然環境融合,提供可持續發展的生態環境、採用本土植物品種,能為本地自然生物提供適合的覓食和庇護環境,從而提供可持續和改善生態的棲息地







Removal of shotcrete cover, hydromulching, hydroseeding, tree and shrub planting, provision of toe planters

Design Outcome

Provision of instant and effective greenery, promotion of natural woodland establishment to blend in the slope with adjacent natural setting along South Lantau Road, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作

移除原有的混凝土護面,噴植草籽,栽種灌木、樹木,並在斜坡底部建造種植槽

設計成效 提供即時及有效的綠化植物,促進天然林地 的發展,從而令斜坡融入嶼南路沿途的天然 環境、採用本土植物品種,能為本地自然生 物提供適合的覓食和庇護環境,從而提供可 持續和改善生態的棲息地







Removal of shotcrete cover, hydromulching, hydroseeding, tree and shrub planting, provision of toe planters

Design Outcome

Use of stepped masonry faced toe planters to match with the surrounding topography and existing landscape, promotion of natural woodland establishment to blend in the slope with adjacent natural setting along South Lantau Road, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作

移除原有的混凝土護面,噴植草籽及樹木種籽,栽種 樹木、灌木,以及建造麻石面種植槽

設計成效

在斜坡底部建造梯級式麻石面種植槽栽種植物,以配合周邊地貌及現有環境,促進天然林地的發展,從而令斜坡融入嶼南道沿途的天然環境、採用本土植物品種,能為本地自然生物提供適合的覓食和庇護環境,從而提供可持續和改善生態的棲息地









Removal of shotcrete cover, hydromulching, hydroseeding, tree and shrub planting, provision of toe planters

Design Outcome

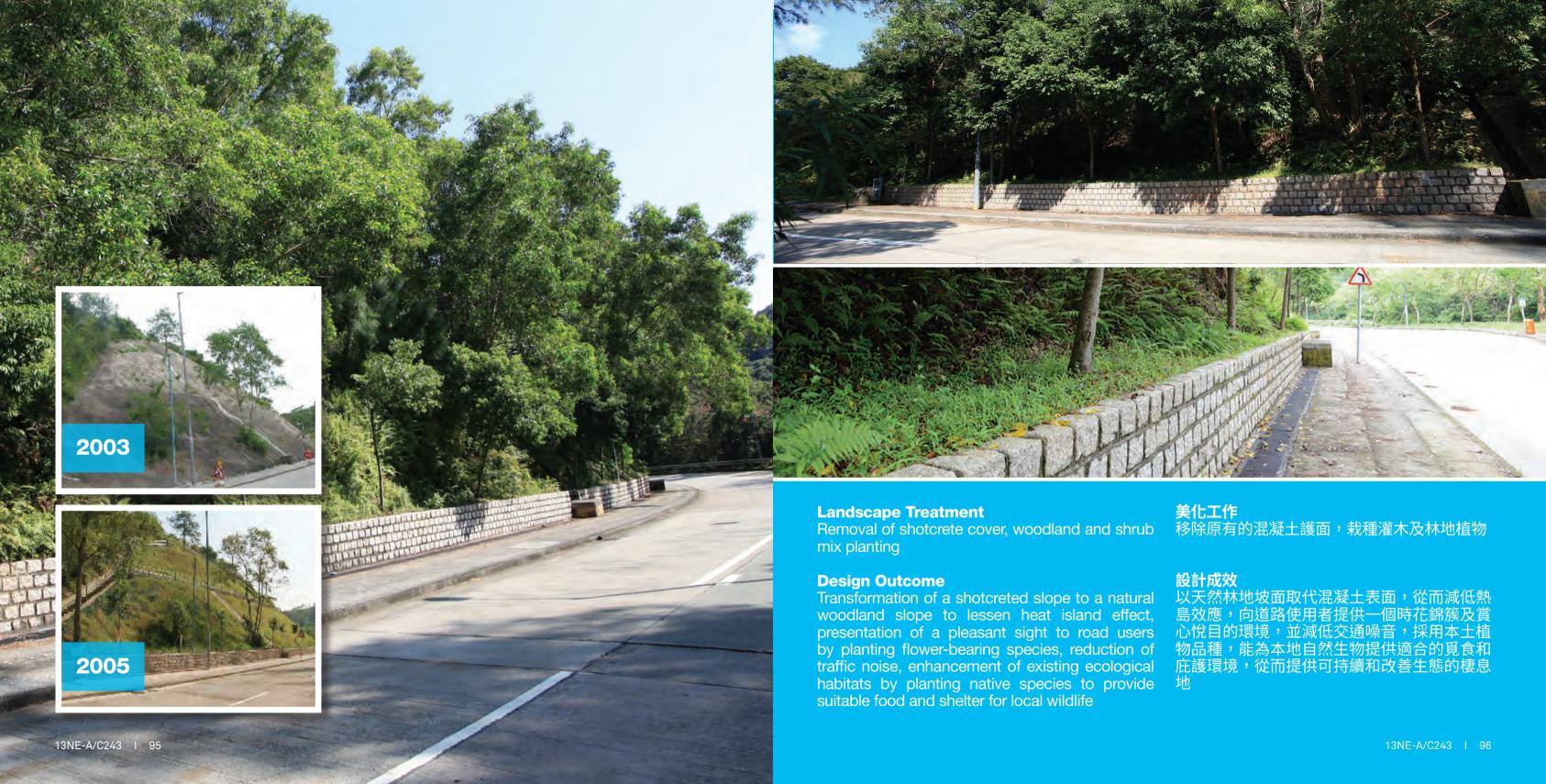
Provision of instant and effective greenery, promotion of natural woodland establishment to blend in the slope with adjacent natural setting along South Lantau Road, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作

移除原有的混凝土護面,噴植草籽、栽種樹木、灌木,以及建造麻石面種植槽

設計成效 提供即時及有效的綠化植物,促進天然林地的發展,從而令斜坡融入嶼南道沿途天然環境、採用本土植物品種,能為本地自然生物提供適合的覓食和庇護環境,從而提供可持續和改善生態的棲息地













Removal of shotcrete cover, hydromulching, provision of toe planter

Design Outcome

Conversion of shotcrete cover into vegetated surface to reduce heat island effect, promotion of natural woodland succession for environmental sustainability, enhancement of existing ecological habitats by planting native species to provide suitable food and shelter for local wildlife

美化工作 移除原有的混凝土護面,噴植草籽,並建造種植槽

設計成效 以植被面取代混凝土護面,從而減低熱島效應,讓斜坡 融合自然環境,促進生態物種可持續發展、採用本土 植物品種,能為本地自然生物提供適合的覓食和庇護環 境,從而提供可持續和改善生態的棲息地

Ecological Habitats on Slopes across Hong Kong



常見棲息於香港斜坡的生態物種



Ecological Habitats 生態物種 I 101

