

Halcrow China Limited
AGREEMENT NO. CE 40/2000
10 YEAR EXTENDED LPM PROJECT
PHASE 2, PACKAGE G-OUTLYING ISLANDS
FEATURES IN SOK KWU WAN,
LAMMA ISLAND
PROJECT PROFILE
September 2002

合樂中國有限公司
合約編號 **CE 40/2000**
延續十年之防止山泥傾瀉計劃第二期第 G 組
南丫島索罟灣斜坡
工程項目簡介
二零零二年八月

**The Government of The Hong Kong
Special Administrative Region
Civil Engineering Department
Geotechnical Engineering Office**

香港特別行政區政府
土木工程署
土力工程處

**Civil Engineering Department
Geotechnical Engineering Office
The Government of the Hong Kong Special Administration Region**

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**Agreement No. CE 40/2000
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**10-Year Extended LPM Project
Phase 2, Package G – Outlying Islands, Investigation
Design and Supervision of Landslip Preventive Works
on Government Slopes and Related Studies
Features in Sok Kwu Wan, Lamma Island**

延續十年的防止山泥傾瀉計劃第二期第 G 組 – 離島
勘察、設計與監督政府斜坡之防止山泥傾瀉工程及
有關研究
南丫島索罟灣斜坡

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1 BASIC INFORMATION

1.1 *Project Title*

Agreement No. CE 40/2000

10-Year Extended Landslip Preventive Measures Project, Phase 2, Package G - Outlying Islands Investigation, Design and Supervision of Landslip Preventive Works on Government Slopes and Related Studies.

Location: Features in Sok Kwu Wan, Lamma Island.

1.2 *Purpose and Nature of the Project*

The acceleration of the LPM Programme was originally arranged as a 5-year Project to end in March 2000. As part of Government's long-term strategy for upgrading slopes and retaining walls (hereafter referred to as 'features') in the New Catalogue of Slopes, the GEO has extended the Project for another 10 years beyond the year 2000. This 10-Year Extended LPM Project aims to complete the upgrading works for another 2,500 substandard government features and safety screening for another 3,000 private features by the year 2010.

The objective of the project is to upgrade 60 substandard features, including cut slopes, fill slopes and retaining walls, located in Outlying Islands namely Cheung Chau, Hei Ling Chau, Lamma, Lantau and Peng Chau. These slopes are currently maintained by Architectural Services Department, Correctional Services Department, Highways Department and Lands Department. The scope of works comprises minor earthworks, soil nailing, rock slope stabilisation measures (RSSM), drainage improvements and landscaping works.

1.3 *Name of Project Proponent*

Geotechnical Engineering Office (GEO)/Works Division

Civil Engineering Department (CED)

The Government of the Hong Kong Special Administrative Region

1.4 *Location and Scale of Project*

The Agreement involves investigation, design and upgrading works for the 60 substandard features, distributed in Cheung Chau, Hei Ling Chau, Lamma, Lantau and Peng Chau. Among them, 9 features fall within Lantau South Country Park, and 2 features fall wholly, or partially, within a Conservation Area on Lamma Island.

This project profile includes the 2 features in Lamma Island only (Attachment A). A separate project profile has been prepared for the 9 features on Lantau. A general location plan (Figure A1 in Attachment A) shows the locations and feature numbers of all study slopes in Agreement CE 40/2000, with the 2 features in Lamma highlighted.

1.5 *Number and Types of Designated Projects to be Covered by the Project Profile*

In accordance with category Q.1 (a) of Part 1, Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO), 2 features (Nos. 15NW-C/C3 and 15NW-C/C4) in Lamma Island are regarded as a Designated Project. Feature No. 15NW-C/C3 falls partly within a Conservation Area, and feature No. 15NW-C/C4 falls wholly within a Conservation Area on Lamma Island. Therefore, under the EIAO an Environmental Permit must be obtained prior to the commencement of the construction of these designated features. The designated features are shown on Figure A2 in Attachment A.

1.6 *Name and Telephone Number of Contact Person(s)*

Mr Mark Shaw
Geotechnical Engineer/CM1 Section
GEO/Works Division
Civil Engineering Department
Telephone : 2762 5454
Fax : 2712 6357
E-mail : gecm11_wkd@ced.gov.hk

Mr Greg McGuire
Project Manager
Halcrow China Limited
Telephone : 2802 9228
Fax : 2827 8352
E-mail : McGuireG@halcrow.com.hk

2 **OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

2.1 *Implementation and Planning of the Proposed Project*

The Agreement was awarded to Halcrow China Ltd. (HCL) as the engineering consultant in October 2000. HCL is responsible for investigation, detailed design works and supervision of the construction works for the designated features. The proposed upgrading works for the 2 designated features in Lamma are to be undertaken in Works Contract GE/2002/17.

A sequence of the proposed slope works, generally comprising 5 activities, is as below:

Activities

Details

- (1) Minor earthworks
 - trimming back of slope to improve gradient for landscaping works and disposal of excavated material
 - removal of existing shotcrete
- (2) Soil nailing for soil slopes
 - formation of holes into the slope by drilling, installation of steel bars and grouting up the holes for soil nails
- (3) Rock Slope Stabilisation Measures (RSSM), for rock slope at 15NW-C/C3 only
 - typically comprising some, or all of the following measures; rock scaling, removal of unstable boulders, drilling for installation of rock dowels and / or bolts, and provision of rock mesh
- (4) Drainage improvement works
 - construction of concrete drainage channels to control surface runoff at the feature
 - formation of holes into slope by drilling, installation of perforated PVC pipes for drainage for raking drains
- (5) Landscaping works
 - grassing, shrubs and tree planting

Details of each of the 2 designated features and a summary of which of the activities as above are relevant to each slope are presented in Tables 1 and 2, respectively.

Table 1 – Details of the Designated Features in Sok Kwu Wan

Feature No.	Height	Length along slope toe (m)		Slope angle (°)		Existing cover	
	(m)	In Soil	In Rock	In Soil	In Rock	In Soil	In Rock
15NW-C/C3	57	35*	125*	40 – 60	80	Vegetated	Bare
15NW-C/C4	20	105	-	50 – 70	-	Shotcrete/ Chunam	-

Note: * Soil slope is present at the southern crest above the rock slope.

Table 2 Proposed Works at the Designated Features in Sok Kwu Wan

Feature No.	Proposed Works
15NW-C/C3	RSSM, Soil Nails, Raking Drains, Boulder Stabilisation, and Upgrade Drainage Channels.
15NW-C/C4	Soil Nails, Remove Fill or Landslide Debris, Remove Chunam/Shotcrete and Reapply Shotcrete, Raking Drains, Upgrade Drainage Channels, Install Vertical Dwarf Wall along toe and Apply Hydromulching on the reinstated Shotcrete Surface.

Details of the proposed geotechnical and landscaping works at the 2 designated features are presented in Attachments B and C, respectively.

2.2 *Project Time Table*

Construction works for the designated features are to be carried out under Works Contract No. GE/2002/17. The Contract is scheduled for tendering in September 2002 and is likely be commenced in December 2002 with a duration of 24 months. The proposed construction works for the 2 designated features are scheduled between October 2003 and May 2004.

The overall programme for Contract GE/2002/17 is included in Attachment D. The approximate construction periods for the activities are typically as follows:

<u>Activities</u>	<u>Anticipated Duration</u>
(1) Minor earthworks	1 – 2 months
(2) Soil nailing for soil slopes	2 – 3 months
(3) RSSM for rock slope (15NW-C/C3 only)	3 – 4 months
(4) Drainage improvement works	0.5 – 1 month
(5) Landscaping works	0.5 – 1 month

2.3 Interactions with Broader Programme Requirements or Other Projects that shall be Considered

As shown in Attachment D, the proposed works for the 2 designated features are scheduled to be carried out at the same period of time in order to minimise the duration of disturbance due to the proposed works.

There are no interactions with other ongoing projects during the same period which need to be considered.

3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

3.1 Outline Existing and Planned Sensitive Receivers and Sensitive Parts of the Natural Environment which might be Affected by the Proposed Project

3.1.1 Noise

Feature Nos. 15NW-C/C3 and 15NW-C/C4 are located near to the Sok Kwu Wan Ferry Pier. Feature No. 15NW-C/C3 is located behind a football pitch/helicopter landing pad and a basketball court; between the feature and the football pitch/helicopter landing pad is a marshy vegetated area; close to the southern end of the slope toe are an office, library and residential area. Feature No. 15NW-C/C4 is located along a path behind several restaurants/residential buildings west of the ferry pier. The path is the sole access to other villages along the coast beyond Sok Kwu Wan (Figure A3 in Attachment A).

Existing noise sensitive receivers (NSR's) and sensitive parts of the natural environment which might be affected by the designated features are indicated in Figure A2 in Attachment A and are tabulated below.

Table 3 – Identified Sensitive Receivers

Sensitive Receiver Reference	Closest Feature Reference	Distance from the Closest Feature (m)
SR1	15NW-C/C3	160
	15NW C/C4	30
SR2	15NW-C/C3	130
	15NW-C/C4	230

Sensitive Receiver Reference	Closest Feature Reference	Distance from the Closest Feature (m)
SR3	15NW-C/C3	350
	15NW-C/C4	220

Apart from the above identified NSR's, visitors to Lamma will also be sensitive to noise during the proposed work, particularly near feature No. 15NW-C/C4.

There is hardly any noise at the site, the source of noise at the area is village vehicles transporting construction materials and daily deliveries (such as gas cylinders, rubbish removal and the like) along the path. During site visits, the usage of the village vehicles on the path is noted to be relatively infrequent. There is no data on background noise in the area, however, the background noise is expected to be low.

3.1.2 *Air Quality*

Air quality sensitive receivers are the same as those noted for noise in section 3.1.1.

There is no source of air pollution in the area as there are no vehicles, except village vehicles on Lamma Island. There is no specific air quality data for the site.

The nearest air monitoring station to the site is Hong Kong Electric Company (HEC) Air Monitoring Station in Pak Kok San Tsuen, Lamma, whereas sulphur dioxide (SO₂) and nitrogen dioxide (NO₂) were monitored in the station. Annual mean concentrations of 8µg/m³ and 25µg/m³ of SO₂ and NO₂ respectively are recorded, according to Table A1 in Air Quality in Hong Kong (EPD, 2000). The results are well below the 1-year Air Quality Objectives (AQOs) for both SO₂ and NO₂ (80µg/m³) under the Air Pollution Control Ordinance. It is expected that the Total Suspended Particulates (TSP) and Respirable Suspended Particulates (RSP) in the area are also below the respective AQOs. Therefore, the overall background air quality at the site is considered to be high.

3.1.3 *Ecology*

Refer to Attachment E for survey methodology.

Habitats

Feature No. 15NW-C/C3 is an abandoned quarry behind a football pitch/helicopter landing pad and a basketball court. Quarrying works were completed some time between 1969 and the late 1970's, based on interpretation of aerial photographs and previous site inspection records. The area in between the slope and the football pitch/helicopter landing pad/basketball court is a marshy vegetated area (Figure A3 in Attachment A) covered mainly by the fern *Cyclosorus interruptus* (near the basketball court) and wetland grasses (near the football pitch/helicopter landing pad). There are also patches of shrubs (mainly *Glochidion zeylanicum*) and trees (both

planted such as *Acacia confusa* and *Frythrina variegata* var. *orientalis* and natural species such as *Schefflera heptaphylla* and *Ficus microcarpa*) in the vegetated area. Those trees are young and of about 5m to 10m high. In fact, records of site inspections in the 1980s show that the vegetated area below feature 15NW-C/C3 was dry with relatively sparse vegetation compared with its present day condition. The rock face is currently covered by sparse shrubs and trees of more or less the same species found in the vegetated area and around the slope.

The natural vegetated hillside behind the southern part of feature 15NW-C/C3 is a typical young secondary forest of Hong Kong. The dominant tree species are *S. heptaphylla*, *Sterculia lanceolata*, *Cratogeomys cochinchinense*, *Zanthoxylum avicennae* and *Mallotus paniculatus*. 16 woody climbers or climbing shrubs are recorded in this young secondary forest which suggests that natural regeneration is taking place rather satisfactorily. In addition, the occurrence of some typical woodland woody climbers such as *Gnetum lofuense* indicates that the forest has never been completely destroyed for a prolonged period of time.

The natural vegetated hillside behind the central portion of feature 15NW-C/C3 is a shrubland which is dominated by the bamboo *Pseudosasa cantori* and other shrubs including *Rhaphiolepis indica*, *Rhodomyrtus tomentosa*, *Litsea rotundifolia*, *Melastoma candidum* and *M. sanguineum*.

The natural vegetated hillside behind northern part of feature 15NW-C/C3 is a grass/shrub mix dominated by *Imperata koenigii*, *R. indica* and *R. tomentosa* etc.

For feature 15NW-C/C4, some existing trees and shrub species are growing through tree rings on the shotcreted surface. A number of landslide scars are present on the surface of the feature. The natural hillside behind western and eastern parts of the slope are shrubland and young woodland respectively. The community structure of the shrubland behind feature 15NW-C/C4 is similar to that behind feature 15NW-C/C3, they are considered continuous shrubland. The woodland behind the eastern part of feature 15NW-C/C4 is highly disturbed and planted with many fruit trees. The woodland appears to be used as a garden or Feng Shui Wood for the villagers below feature 15NW-C/C4. However, the species composition of the woodland is not a typical Hong Kong Feng Shui Wood. The dominant tree species in the woodland are the native *S. heptaphylla*, *S. lanceolata*, *C. cochinchinense* and the exotic *Dimocarpus longan* and *Acacia confusa*.

Results of the above findings are presented in Table E1 in Appendix E.

Flora

Within and in the vicinity of features 15NW-C/C3 and 15NW-C/C4, a total of 74 plant species were recorded in this survey including 28 trees, 17 shrubs, 19 climbers, 2 grasses, 5 ferns and 3 bamboos. No rare or endangered species were encountered at the site. None of the species recorded are protected in Hong Kong. Though certain species recorded are restricted in distribution in Hong Kong such as *Erycibe obtusifolia*, the site does not present high botanical value.

Fauna

Within and in the vicinity of features 15NW-C/C3 and 15NW-C/C4, 13 bird and 17 butterfly species were recorded (Tables E2 and E3 in Attachment E). No mammals were encountered and no mammal signs were found. All of the birds and butterflies are common species in Hong Kong. However, the Black Kite is considered to be a species with “Regional Concern” (Fellowes et al., 2000) and is dependent on Hong Kong. Nesting activities were observed whereby a Black Kite was seen carrying nesting materials. However, the nesting site appeared to be in tall shrubs about 0.5km up the hillside beyond features 15NW-C/C3 and 15NW-C/C4.

No reptiles were recorded and 2 amphibians, *Polypedates megacephalus* and *Philautus romeri*, were recorded in the marshy vegetated area below feature 15NW-C/C3. Both *Polypedates megacephalus* (Brown Tree Frog) and *Philautus romeri* (Romer’s Tree Frog) were heard calling in the evening of 27 April 2002. The Brown Tree Frog is a common species in Hong Kong and is abundant in the vegetated area. Romer’s Tree Frog is endemic to Hong Kong, and in particular is naturally found on only four islands (Lau and Dudgeon, 1999). It is considered a species with “Potential Global Concern” (Fellowes et al., 2000) and is, therefore, protected. According to Dr Michael Lau (pers. comm.), the vegetated area is a regular site for the Romer’s Tree Frog and its abundance was quite high when he last surveyed the site in the late 1990s. However, during the survey in the evening of 27 April 2002, only around 6 males were heard to be calling.

3.1.4 *Water*

For feature 15NW-C/C3, runoff from the rock face enters the vegetated area below the feature directly. Some overflow from this area enters a small U-channel around football pitch/helicopter landing pad and its associated drainage system which discharges into the sea. The remaining water “ponds” in the area at the toe of the slope creating a seep-fed marshy environment.

For feature 15NW-C/C4, the toe U-channel and its associated catchpits collect surface runoff from the feature. The toe catchpits are connected by a buried pipe which discharges into the sea.

3.1.5 *Landscape and Visual*

Feature 15NW-C/C3 is an abandoned quarry located near to the ferry pier, and is therefore visually very sensitive since the rock face can be seen from the ferry and the opposite side of Sok Kwu Wan. The slope face is mainly bare rock with some bare soil at the southern end of the slope, although there is some intermittent vegetation present on the rock face.

Feature 15NW-C/C4 is located along the main path from Sok Kwu Wan to Mo Tat Wan and the south-east of Lamma Island. It is located behind several restaurants and is also visible from ferries. The slope is currently covered by chunam and shotcrete.

3.1.6 *Historical and Cultural*

The Antiquities and Monument Office of the Leisure and Cultural Services Department have confirmed that at present none of 75 declared sites of cultural heritage lie in the vicinity of any features under this Agreement (CE 40/2000).

3.1.7 *Others*

There is a single grave located near to the crest at the eastern end of feature 15NW-C/C4.

4 POSSIBLE IMPACTS ON ENVIRONMENT

4.1 *Processes Involved, Including Process Flow Diagrams, Site Plans, Storage Requirements and Information on Emission and Discharges*

The two features in Sok Kwu Wan fall wholly or partly within a Conservation Area. Feature 15NW-C/C3 is located behind a football pitch/helicopter landing pad near the ferry pier and feature 15NW-C/C4 is located along a path behind several seafood restaurants. A general location plan of the 2 features is presented in Figure A2 in Attachment A.

As described in Section 2.1, the works at these designated features will comprise minor earthworks, soil nailing for soil slopes, RSSM for rock slope (15NW-C/C3 only), drainage improvement works and landscaping works. Details of the proposed works at the 2 features are presented in Attachment B.

All these activities have the potential for environmental impact. All of the activities could lead to noise impacts and the generation of dust as mechanical equipment will be used in most cases, in particular during excavation and drilling for soil nails, raking drains and rock stabilisation measures, although drainage and landscaping works are unlikely to give rise to significant amounts of noise or dust. Ecologically, there could be disturbance to the existing wildlife during the works, and some of the existing vegetation may be temporarily removed during installation of soil nails, and construction of drainage channels and maintenance staircase.

Waste will be generated largely during excavation works, construction of drainage and during removal of existing chunam and shotcrete. Waste will need to be handled and removed from the site to a controlled dumping point, i.e. EPD's Sok Kwu Wan outlying islands transfer facility, and the trip ticket system will be implemented in Contract GE/2002/17 as required by WBTC No. 21/2002. The Contractor will also be required to prepare and implement a Waste Management Plan in accordance with WBTC No. 29/2000.

Impact on water quality would be low, however, there remains a possibility that site runoff may enter the vegetated area below feature 15NW-C/C3 and the sea via the associated drainage

system. Temporary measures will be required to minimise contaminants or pollutants as far as possible resulting from uncontrolled discharge from the sites.

Romer's Tree Frog at the vegetated area below feature 15NW-C/C3 may be affected by the slope upgrading works if there is a deterioration of the water quality in the vegetated area or permanent loss of vegetation within this area.

4.2 Environmental Impact during Construction Phase

4.2.1 Noise

In the Particular Specification of Contract GE/2002/17, a maximum sound level of 75dB(A) is specified during the construction works as recommended in the "Recommended Pollution Control Clauses for Construction Contract" provided by EPD.

Noise during the construction phase will be generated from powered mechanical equipment (PME) being used during various construction activities. Operations that may generate adverse noise impacts can broadly be divided into the following 5 stages:

Activity 1 – Minor earthworks

- Minor trimming of slope to improve the gradient to allow landscaping works and disposal of excavated material and/or removal of existing shotcreted areas.

Activity 2 – Soil nailing for soil slopes

- Formation of holes into the soil slope by drilling, installation of steel bars and grouting.

Activity 3 – RSSM for rock slope (for 15NW-C/C3 only)

- Rock scaling, removal of unstable blocks, drilling of installation of rock dowels and bolts and rock mesh.

Activity 4 – Drainage improvement works

- Construction of concrete drainage channels on the slopes and provision of subsoil drains.

Activity 5 – Landscaping works

- Grassing, tuces and shrubs planting

The equipment which will be required for the construction operations during each of these stages is listed in Table 4 below:

Table 4 – Total Sound Power Levels for Each Construction Activities

Construction Activities	Equipment	CNP Equipment Code ^{note(1)}	Number of Equipment	Sound Power Level (SWL) in dB(A) ^{note(1)}	Total SWL During Operation dB(A) ^{note (2)}
Activity 1	Excavator (Backhole)	CNP081	1	112	112
Activities 2 and 3	Rock Drill, crawler mounted (pneumatic)	CNP181	1	128	128
	Air Compressor	CNP001	1	100	
	Hoist, petrol	CNP123	1	104	
	Concrete Pump	CNP047	1	109	
	Concrete Mixer	CNP046	1	96	
Activity 4	Concrete Pump	CNP047	1	109	109
	Concrete Mixer	CNP046	1	96	
Activity 5	Water Pump	CNP282	1	103	104
	Mixer	CNP046	1	96	

Notes:

- (1) Equipment codes and SWL are obtained from the Technical Memorandum on Noise from construction Work Other than Percussive Piling (EPD, 1998).
- (2) Total SWLs obtained are based on Table 4 in the Technical Memorandum as Note (1) above.
- (3) Refer to Tables F1 and F2 in Attachment F for Predicted Noise Levels.

The construction noise at the identified NSRs has been assessed in accordance with the methodology specified in the *Technical Memorandum on Noise from Construction Work Other than Percussive Piling* (EPD, 1998). The details of predicted unmitigated noise levels at the representative NSRs during the slope maintenance works is shown in Attachment F. In addition, the worst case scenario of the closest slope to the sensitive receiver has been assumed.

The results (Tables F1 and F2 in Attachment F) indicate that noise levels at most NSR's during Activities 2 and 3 exceed the contractual requirement of 75dB(A). Based on the results noise mitigation measures are required to reduce the noise level to an acceptable level (i.e. <75dB(A)).

4.2.2 Air

Earthworks and the drilling operations for soil nailing and particularly rock stabilisation could generate dust which may cause impacts, particularly during the dry season. Dust could also be

generated from the stockpiling of construction materials and waste. The Contractor will be required to comply with the Air Pollution Control (Construction Dust) Regulation in order to ensure that no adverse dust impact on the air sensitive receivers will result as far as possible.

4.2.3 Ecology

The proposed slope upgrading work will likely have direct negative impact on the Romer's Tree Frog population in the vegetated area below feature 15NW-C/C3 unless mitigation measures as described in Section 5.1.3 are implemented. Deterioration of water quality at the vegetated area and loss of vegetation would affect the Romer's Tree Frog and its habitat.

The pair of Black Kites presumed to be nesting about 0.5km up the natural slope from features 15NW-C/C3 and 15NW-C/C4 are unlikely to be affected by the slope works (Figure A3 in Attachment A). There were no signs that this pair of breeding birds was using the site for roosting or as a foraging ground.

Although no rare or endangered plant species are recorded, the young secondary forest behind feature 15NW-C/C3 and the woodland behind feature 15NW-C/C4 are in good condition and should be protected as far as is possible. The slope work will not extend more than 5m to 10m beyond the existing slope crest and will not generate significant adverse impacts on those habitats. Works in these areas will comprise drainage improvement works and the exact alignment of the proposed works can be adjusted on site to minimise the impact on the existing ecology. The approximate extent of vegetation removal during the proposed works of features 15NW-C/C3 and 15NW-C/C4 are summarised in Table 5 as below.

Table 5 – Approximate Areas of Existing Vegetation Removal

Feature No.	Approximate Work Site Area (m ²)	Approximate Area of Vegetation to be Removed (m ²) / Percentage of Removal of the Work Site (%)
15NW-C/C3	6500	550 / 8.5
15NW-C/C4	2224	200 / 9.0
TOTAL	8724	750 / 8.6

4.2.4 Water Quality

Water quality of the vegetated area below feature 15NW C/C3 may deteriorate due to the site runoff entering this area directly from the rock/soil face. Impact of the proposed works on water quality of the sea would be low, however, there is possibility that site runoff may enter the sea via associated drainage system.

4.2.5 Waste Management

Waste will be generated largely during excavation works. For feature 15NW-C/C3 a small amount of waste comprising mainly rock fragments will be generated from rock scaling.

For feature 15NW-C/C4, construction waste comprises chunam, shotcrete and soil generated from removal of existing hard surfacing, rock scaling, drainage excavations and minor trimming of 15NW-C/C4. Estimated amounts of the waste materials are summarised in Table 6 below.

Table 6 – Anticipated Waste Materials Arising

Feature No.	Removed Chunam/Shotcrete (m ³)	Soil (m ³)	Rock (m ³)	Total (m ³)
15NW-C/C3	--	--	35	35
15NW-C/C4	100	205	5	310

4.2.6 Landscape and Visual Impact

During the construction works, temporary scaffolding and working platforms will be erected on the slope face to install soil nails, undertake RSSM and carry out landscaping works. No tree felling is required for the slope upgrading works.

Table 7 – Summary of Predicted Tree Felling

Feature No.	No. of Trees to be Retained	No. of Trees to be Felled	No. of Trees to be Transplanted
15NW C/C3	See note below	Nil	Nil
15NW-C/C4	42	Nil	Nil
TOTAL	>42	0	0

Note: The exact number of the trees at crest of feature 15NW-C/C3 cannot be surveyed due to the lack of safe access to the feature crest, however, all the trees within the work site will be retained.

4.2.7 Historical and Cultural

No existing and gazetted site of cultural heritage would be affected by the proposed works.

4.2.8 *Others*

The grave near eastern end of feature 15NW-C/C4 is set back around 15m from the proposed works site and will not be affected by the proposed works.

4.3 *Environmental Impact during Operation Phase*

There will be no adverse impacts of the sensitive receivers during the operational phase. It is expected, with the landscaping works proposed, that the slope works will result in positive impacts in terms of landscape character in the long term.

Accordingly, no adverse impact will result from the operational phase.

5 ENVIRONMENTAL PROTECTION MEASURES TO BE INCORPORATED IN THE DESIGN AND ANY FURTHER ENVIRONMENTAL IMPLICATIONS

5.1 *Measures to Minimise Environmental Impacts*

5.1.1 *Noise*

The proposed works at features 15NW-C/C3 and 15NW-C/C4 will be scheduled at the same time to reduce the duration of noise impacts. Noise mitigation measures are required during soil nailing and rock stabilisation works, because noise levels at most NSR's exceed the contractual requirement of 75dB(A), (Attachment F). The major noise contributor during both soil nailing and rock stabilisation works is the noise generated by percussive drilling. The following mitigation measures are recommended to be used on the drilling equipment to attenuate the noise:

Table 8 Recommended Mitigation Measures for Noisy Equipment

Plant	Mitigation Measures	Maximum Reduction in dB(A)
Rock Drills and Tools	<u>Mitigation Measure 1:</u> <ul style="list-style-type: none"> • Fit suitably designed muffler or sound reduction equipment to reduce noise without impairing machine efficiency • Ensure all leaks in air line are sealed • Used dampened bit to eliminate ringing 	Up to 15
	<u>Mitigation Measure 2:</u> <ul style="list-style-type: none"> • Enclose breaker or rock drill in portable or fixed acoustic enclosure with suitable ventilation 	Up to 20

Source: Table B1 of Noise Control on Construction and Open Sites (BSI5228, Part I, 1997)

For the purpose of this assessment the maximum possible reduction is not used, and a attenuation of 10dB(A) has been assumed for each of the above mitigation measures when employed, as shown in Attachment G. After the provision of the above mitigation measures, the noise level at all sensitive receivers will not exceed the contractual requirement of 75dB(A) during construction and no residual impacts will occur. Monitoring of actual noise levels will be undertaken by the supervisory staff.

5.1.2 Air Quality

With the adoption of the Recommended Pollution Control Clauses in the Particular Specification for Contract GE/2001/27, as detailed in Attachment H, environmental nuisance can be kept to a minimum. In addition it is also recommended that water spraying during drilling works, particularly during dry season, be undertaken to minimise any adverse impact to the receivers. The Contractor shall ensure that there will be adequate water supply / storage for dust suppression measures.

5.1.3 Ecology

The secondary forest in the natural slope behind feature 15NW-C/C3 and the woodland behind feature 15NW-C/C4 will be protected during the works. The upper site boundaries of the construction sites for both features will be as close to the proposed works as possible and no encroachment into the secondary forest beyond work sites will be allowed. The destruction of

all vegetation on site will be monitored to avoid unnecessary removal. To avoid damage to root systems of existing trees during installation of soil nails and construction of drainage channels, the Engineer shall relocate soil nails and drainage channels as required on site should they interfere with the existing root systems.

Romer's Tree Frog is an endemic and protected species of high conservation value. As such a programme of collection, cared for in captivity and post-construction release will be undertaken. Romer's Tree Frog will be captured during the breeding season prior to works commencing and kept in captivity. Slope upgrading works on feature 15NW-C/C3 are scheduled from October 2003 to May 2004. The following measures will be undertaken to protect the Romer's Tree Frog and its habitat.

Prior to slope upgrading works:

A baseline survey will be undertaken at the start of the breeding season to estimate the existing population of Romer's Tree Frogs at the site. The results of the baseline survey will also be used as an indicator during future monitoring of the site. Individual adult specimens together with eggs and tadpoles will be collected during the breeding season, i.e. May to September 2003 prior to the commencement of construction works. The baseline survey and collection shall be carried out by an experienced ecologist familiar with this type of work.

Water in the vegetated area will be tested for dissolved oxygen, sediments, nitrates, phosphates and the like prior to slope upgrading works, in order to determine the existing range of water quality. This range will be used as an indicator by the ecologist to monitor the ongoing water quality during and after the works.

During slope upgrading works:

The collected adult specimens, eggs and tadpoles will be kept and bred in captivity by the experienced ecologist during the period of the construction works.

The construction site will be fenced off to prevent access to the majority of the vegetated area. During the construction work, a temporary staging will be erected above the vegetated area at the toe of feature 15NW-C/C3 and the gap between the rock face and the staging will be sealed to avoid encroachment into the area and provide the contractor with the necessary, but controlled, working space to undertake his works. Water quality will be continuously monitored to minimise the disturbance to any remaining frogs. Should the water quality depart from the acceptable range determined by the ecologist, the Contractor will be required by the Engineer to temporarily suspend the upgrading works until such time as an investigation has been undertaken to determine the cause of the deterioration in water quality and appropriate mitigation measures have been determined by the experienced ecologist and implemented by the Contractor.

After the slope upgrading works:

Water quality in the vegetated area will be tested after the completion of the slope upgrading works to ensure that the vegetated area is suitable for the release of the Romer's Tree Frog.

Should the water quality depart from the acceptable range determined by the experienced ecologist, mitigation measures or habitat management works may be required to return the area to a suitable state for post-construction release of the frogs.

During the wet season following completion of works i.e. June to September 2004, the collected and captive bred frogs will be released back into the vegetated area. The exact number of frogs and programme for their release shall be determined by the experienced ecologist. This will allow the frogs to be released during the breeding season, increasing the chances of successful release.

Post-construction monitoring will be undertaken by the experienced ecologist after the release of the Romer's Tree Frog. The period of post-release monitoring is envisaged to be around 12 months, however the exact period will be determined by the experienced ecologist according to the actual site conditions with reference to the baseline survey and results of on-going monitoring.

Furthermore, the slope upgrading works will not significantly change the hydrology of the feature and its surroundings, therefore, the moisture in the vegetated area can be preserved since the existing sources of seep-fed water will remain unchanged.

5.1.4 *Water*

The Contractor shall comply with the Water Pollution Control Ordinance and its subsidiary regulations.

During the proposed works, the contractor shall contain within the site all surface runoff generated from any works, dust control and vehicle washing etc. Any trade effluent or foul or contaminated or cooling or hot water shall not be discharged into any public sewer, stormwater drain, channel, stream course or the sea.

If site canteen or toilet facilities are erected, foul water effluent shall be directed to a foul sewer or to a sewage treatment and disposal facility.

Water quality in the marshy vegetated area below feature 15NW-C/C3 will be monitored before, during and after the works, in order to protect any remaining Romer's Tree Frogs on site and the frogs' habitat as far as possible. Details of the water monitoring are included in Section 5.1.3, as this is a key factor in mitigating any affect on the existing ecological habitat.

5.1.5 *Waste Management*

The Contractor shall comply with the Waste Disposal (Chemical Waste) (General) Regulation, the Waste Disposal Ordinance and its subsidiary regulations and the Dumping at Sea Ordinance.

The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from Site onto any adjoining land or

allow any waste matter which is not part of the final product from waste processing plants to be deposited anywhere within any Site or onto any adjoining land.

The Contractor will be required to prepare and implement a Waste Management Plan to reduce, re-use or recycle construction and demolition material.

The construction waste generated by the Contractor on site shall be transported to the Sok Kwu Wan outlying islands transfer facility. Following recent problems on other Contracts in Lantau, particular emphasis will be placed on the close supervision of the implementation of the trip ticket system. Independent audits of the Contractor and resident site staff procedures will be taken from time to time by experienced head office staff from the consultant to ensure that the correct procedures are being followed at all times.

5.1.6 *Landscape and Visual*

Hoarding or safety fence shall be erected along the toe of work sites for features 15NW-C/C3 and 15NW-C/C4 to screen the proposed works.

The soil portion of feature 15NW-C/C3 will be covered by hydroseed to improve the visual impact after the upgrading works. Wire mesh will be applied to the rock slope to reduce the risk of small rocks falling.

For feature 15NW-C/C4, a number of previous landslides have occurred at the feature. In the interests of public safety, it is considered necessary to retain the shotcrete surface cover after completion of the works. In order to improve the visual impact, hydromulching will be applied on the shotcrete surface to provide a vegetated surface cover, and planting works will be provided in a toe wall planter.

Table 9 – Outline Landscape Mitigation Proposals

Feature No.	Landscape Mitigation Proposal
15NW-C/C3	Hydroseeding with erosion control mat on the soil portion. Wire mesh on the rock slope. Retention and/or reinstatement of the existing seep-fed marsh vegetation at the toe.
15NW-C/C4	Apply hydromulching to the reinstated shotcrete surface. Planting in the vertical dwarf wall at toe.

5.1.7 *Cultural and Historical*

Mitigation measures are not required as no cultural and historical sites are affected by the works.

5.1.8 *Others*

No other mitigation measures are required.

5.2 *Comments on the Possible Severity Distribution and Duration of Environmental Effects*

In respect to the fauna below feature 15NW-C/C3, particular care will be taken to minimise the disturbance to the marshy vegetated area below the rock slope, which is a habitat of the Romer's Tree Frog.

Otherwise, no adverse residual noise, air, waste, water quality, ecology, and landscape and visual impacts are predicted with the application of the mitigation measures and pollution control clauses in Attachment H.

5.3 *Comments on Any Further Implications*

Though 750m², an equivalent to 8.6% of the total works site, of vegetation will be removed during the slope upgrading works; an extra 3500m² of vegetation, equivalent to 40% of the total works site area, will be provided after the upgrading works to compensate for the loss. The increase in vegetated area has positive impacts on visual impact, particularly at 15NW-C/C4, where the shotcrete surface will be covered by a vegetated surface.

5.4 *Use of Previously Approved EIA Reports*

A similar recent project is in progress in the HKSAR, for which an environment permit was granted as follows:

Agreement No. CE 74/99 and Supplementary Agreement No. 1.

The project profile for this Agreement (CED, 2001), which covers LPM Upgrading Works, albeit on Lantau Island, was submitted to EPD on 27 April 2001 (Application No. DIR-055/2001) for permission to apply directly for an Environmental Permit (EP). The Project Profile concluded that there would be no adverse long-term or accumulative effects/impacts on the environment. CED was permitted to apply directly for an EP and the EP was granted on 30 July 2001 (EP No. EP-102/2001).

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附件

1 基本資料

1.1 工程標題

合約編號 CE 40/2000

土力工程處 – 延續十年的防止山泥傾瀉計劃第二期第 G 組 – 離島
勘察、設計與監督政府斜坡之防止山泥傾瀉工程及有關研究。

位置：南丫島索岩灣。

1.2 工程目的和性質

為期 5 年的加速防止山泥傾瀉計劃原定於 2000 年 3 月完結。土力工程處已在 2000 年將該計劃再延伸了 10 年。作為政府對鞏固及維修新紀錄冊內之斜坡和擋土牆的長遠策略的一部份，此計劃目標是在 2010 年之時，完成另外 2500 幅不合標準的政府斜坡鞏固工程及完成另外 3000 幅私人斜坡的安全檢查。

本項目的目標是鞏固位於離島包括長洲、喜靈洲、南丫島、大嶼山及坪洲 60 幅不合標準的切削坡、填土坡及擋土牆，該 60 幅斜坡的維修責任屬於建築署、懲教署、路政署及地政總署。鞏固工程包括小型土方工程、為土壤斜坡安裝泥釘、鞏固石坡措施、改善排水工程及景觀美化工程。

1.3 工程項目倡議人

香港特別行政區政府
土木工程署
土力工程處/工程部

1.4 工程位置及規模

整項顧問合約包括勘察、設計與及鞏固 60 幅低於現時安全標準的斜坡，這些斜坡分佈於長洲、喜靈洲、南丫島、大嶼山和坪洲。其中的 9 幅斜坡位於南大嶼郊野公園內，2 幅斜坡全部或部分位於南丫島的自然保育區。

該工程項目簡介只包括位於南丫島的 2 幅斜坡〔見附件 A〕，其餘 9 幅位於大嶼山的斜坡將在另一份獨立工程項目簡介中作介紹。附件 A 內的圖 A1 為整體位置圖，顯示顧問合約 CE 40/2000 包括的所有斜坡的地點和編號，其中南丫島 2 幅斜坡以灰格顯示於圖中。

1.5 工程項目簡介涵蓋的指定工程項目數目與類別

根據《環境影響評估條例》附表 2 第 I 部類別 Q1(a)，本合約中位於南丫島的 2 幅斜坡鞏固工程〔斜坡編號 15NW-C/C3 和 15NW-C/C4〕被視作「指定工程項目」。斜坡編號 15NW-C/C3 之部分位於南丫島自然保育區內，而斜坡編號 15NW-C/C4 則全部位於

南丫島自然保育區內。因此，根據《環境影響評估條例》，這兩幅斜坡在施工之前必須申領環境許可證。本項目中指定斜坡參見附件 A 內的圖 A2 所示。

1.6 聯絡人姓名及電話

土木工程署
土力工程處工程組
土力工程師/CM1 組
Mr Mark Shaw
電話：2762 5454
傳真：2712 6354
電郵：gcm11_wkd@ced.gov.hk

合樂中國有限公司
項目經理
Mr Greg McGuire
電話：2802 9228
傳真：2827 8352
電郵：McGuireG@halcrow.com.hk

2 規劃大綱及工程項目的執行

2.1 工程的規劃及實施

合樂中國有限公司〔合樂〕於 2000 年 10 月取得本工程顧問合約。合樂負責對合約中的每幅斜坡及擋土牆進行勘察、詳細設計及施工監督。位於南丫島的 2 幅指定斜坡將在工程合約 GE/2002/17 中進行鞏固工程。

所擬鞏固斜坡工程共分為以下五個階段：

建造事項	詳情
(1) 小型土方工程	- 切削斜坡，改善其坡度，以便進行景觀美化工程並處置開挖土方。 - 移除現有的噴射混凝土護面。
(2) 為土壤斜坡安裝設泥釘	- 利用鑽探在斜坡開鑿小孔，在孔內安裝鋼筋條並以灌漿封住泥釘孔。
(3) 鞏固岩石坡措施〔只限於斜坡 15NW-C/C3〕	- 典型措施包括以下部份或全部項目：去除鬆石、移除不穩固的孤石、安裝石釘及/或石栓、及防石網。
(4) 改善排水工程	- 在斜坡上建造混凝土排水渠道以控制坡面的排水。 - 利用鑽探在斜坡開鑿小孔，並在孔內放置疏水管作為傾斜排水通道。
(5) 景觀美化工程	- 種植青草、喬木及灌木。

以下表一和二顯示本工程項目簡介包括的 2 幅指定斜坡的詳情和建議工程摘要：

表一：索罟灣指定斜坡的詳情

斜坡編號	高度〔米〕	沿斜坡腳的長度〔米〕		斜坡坡度〔度〕		現有覆蓋面	
		土壤部份	岩石部份	土壤部份	岩石部份	土壤部份	岩石部份
15NW-C/C3	57	35*	125*	40-60	80	植被	裸露
15NW-C/C4	20	105	--	50-70	--	噴射混凝土/灰泥	--

註：*土壤斜坡位於岩石斜坡之上的南面頂部。

表二：索罟灣指定斜坡的擬建工程

斜坡編號	建議工程
15NW-C/C3	鞏固石坡措施，安裝泥釘和傾斜排水管、孤石穩定措施和改善排水工程。
15NW-C/C4	安裝泥釘、移除填土或山泥傾瀉的泥石、移除現有灰泥/噴射混凝土護面、重新噴射混凝土新護面、安裝傾斜排水管、改善排水工程、沿坡腳建造綠化植被牆及在噴射混凝土面上噴泥草。

附件 B 及 C 分別顯示 2 幅指定斜坡的所擬鞏固工程及景觀美化工程。

2.2 工程項目的時間表

指定斜坡的鞏固工程將於工程合約 GE/2002/17 中進行。該工程合約將於 2002 年 9 月進行承建商招標，並暫定於 2002 年 12 月動工，為期 24 個月。這 2 幅指定斜坡的鞏固工程定於 2003 年 10 月至 2004 年 5 月進行。

附件 D 顯示整個建造工程合約 GE/2002/17 的流程圖，各項建造事項的大約施工期如下：

建造事項	預計施工期
(1) 小型土方工程	1 – 2 個月
(2) 為土壤斜坡安裝泥釘	2 – 3 個月
(3) 鞏固石坡措施〔只限於斜坡 15NW-C/C3〕	3 – 4 個月
(4) 改善排水工程	0.5 – 1 個月
(5) 景觀美化工程	0.5 – 1 個月

2.3 與其他項目計劃之要求或其他須要考慮的工程項目之間的相互影響

附件 D 顯示南丫島 2 幅指定斜坡的鞏固工程將會同時進行，從而將工程期間對環境的影響減到最小。

本工程在同一時期內與其他正在進行的工程項目之間的相互影響無需考慮。

3 周圍環境的主要元素

3.1 可能受擬建工程項目影響的現有及計劃中的感應強的地方及自然環境中的敏感部分

3.1.1 噪音

編號為 15NW-C/C3 和 15NW-C/C4 的斜坡鄰近索罟灣碼頭。編號為 15NW-C/C3 的斜坡位於一個足球場/直昇機停機坪和籃球場的後方。斜坡和球場/直昇機停機坪之間是濕軟的草地，而靠近坡腳南端是辦公室、圖書館和住宅區。編號為 15NW-C/C4 的斜坡則位於碼頭西邊的酒樓及住宅區之後方的小徑邊。該小徑是沿索罟灣海邊通往其他鄉村的唯一通道〔見附件 A 中圖 A3〕。

附件 A 中圖 A2 顯示指定斜坡附近可能受工程影響的自然環境之中的現有的噪音感應強的地方，並已列於下表：

表 3：已經確認的噪音感應強的地方

噪音感應強的地方編號	最近的斜坡編號	距離最近的斜坡〔米〕
SR1	15NW-C/C3	160
	15NW-C/C4	30
SR2	15NW-C/C3	130
	15NW-C/C4	230
SR3	15NW-C/C3	350
	15NW-C/C4	220

除了以上已經確認的噪音感應強的地方外，於建造工程進行期間到南丫島的遊客也會受到噪音滋擾，特別是在編號為 15NW-C/C4 的斜坡附近。

現時該工程地點幾乎沒有噪音，該地區的噪音來源於沿小徑運送建築材料及作日常運輸〔例如石油汽及垃圾〕之鄉村小型車輛。現場考察期間，鄉村車輛沿小徑的使用量並不頻繁。現時沒有關於該地區背景噪音的數據，但是該地區的背景噪音預計是比較低的。

3.1.2 空氣質素

空氣質素感應強的地方和 3.1.1 中指出的噪音感應強的地方一樣。

在南丫島上除鄉村車輛外並無其他車輛行駛，所以該地區沒有空氣污染來源。故在擬建工地也沒有空氣質素數據。

距離工程地盤最近的空氣質素監測站是位於南丫島北角新村之香港電力公司空氣質素監測站，該監測站主要是監測二氧化硫和二氧化氮的含量。根據“香港空氣質素二零零零年報”之表 A1，二氧化硫和二氧化氮在空氣的年平均含量分別為 $8\mu\text{g}/\text{m}^3$ 和 $25\mu\text{g}/\text{m}^3$ ，此結果遠低於空氣污染管制條例中二氧化硫及二氧化氮的一年空氣質素目標值〔 $80\mu\text{g}/\text{m}^3$ 〕。估計工程地盤區域之總懸浮粒子及可吸入懸浮粒子也應該低於有關的空氣質素數值。所以，工程地盤區域的整體空氣質素應為較高。

3.1.3 生態

研究方法見附件 E。

生態環境

位於足球場/直昇機停機坪和籃球場後方的斜坡〔15NW-C/C3〕是一個已棄置的石礦場，根據航空照片解釋及以往的地盤視察紀錄，採礦活動於 1969 至 70 年代末結束。斜坡和球場/直昇機停機坪之間是一塊濕軟的草地〔見附件 A 圖 A3〕，草地主要由蕨類植物毛蕨〔靠近籃球場〕和濕地草類〔靠近足球場/直昇機停機坪〕覆蓋。該草地

上還有一些灌木〔主要為香港算盤子〕和樹木〔人工種植的有台灣相思和刺桐，自然生長的有鵝掌柴和榕樹〔細葉榕〕〕。這些樹木都很年輕，大約 5 至 10 米高。事實上，八十年代的地盤視察記錄顯示斜坡〔15NW-C/C3〕下的草地很乾而且地下的植物比較稀疏，亦沒有現時茂盛。岩石表面現在被稀疏的灌木和樹木覆蓋，其種類跟該草地及斜坡附近的類同。

位於編號為 15NW-C/C3 之斜坡南部後方的自然植被山坡是香港典型的年輕次生林。最主要的樹種有鵝掌柴、假蘋婆、黃牛木、襖欖花椒和白楸。在這片年輕次生林中共錄有 16 種攀緣植物和攀緣灌木，說明了該地自然再生的情況令人滿意。此外，一些典型的林地攀緣植物的出現，例如買麻藤，也說明了長期以來這個森林從未被完全破壞過。

斜坡 15NW-C/C3 中段後方的自然植被山坡是灌木林，主要為托竹和其他灌木，包括石斑木〔車輪梅〕、桃金娘、豺皮樟、野牡丹和毛稔。

斜坡 15NW-C/C3 北部後方的自然植被山坡主要由草地和灌木混合組成，種類有絲茅、石斑木〔車輪梅〕和桃金娘等。

在斜坡 15NW-C/C4 上，噴射混凝土表面的樹環現已生長了一些樹木和灌木。斜坡表面有許多山泥傾瀉留下的痕跡。斜坡西部和東部後方的自然山坡分別為灌木地和年輕林地。斜坡 15NW-C/C4 後方的灌木地的生態結構跟斜坡 15NW-C/C3 十分類同，它們一起構成連續的灌木地。斜坡 15NW-C/C4 東部後方的林地受到較大破壞並種有不同的果樹。雖然林地的樹木品種並不是典型的香港風水樹，斜坡 15NW-C/C4 下面的林地顯然已被村民作為花園或風水樹林。這些林地的主要樹木種類為本地的鵝掌柴、假蘋婆、黃牛木和外來的龍眼和台灣相思。

以上調查結果列於附件 E 的表 E1 中。

植物

在斜坡 15NW-C/C3 和 15NW-C/C4 的範圍內，共錄有 74 種植物，包括 28 種樹木、17 種灌木、19 種攀緣植物、2 種草類、5 種蕨類植物和 3 種竹類。工程範圍內沒有發現罕見或瀕危植物。這些種類中沒有香港的受保護的植物。雖然有些植物種類只有限地分佈於香港的某些地方，例如丁公藤，但是這個工程地盤範圍內的植物學價值並不高。

動物

斜坡 15NW-C/C3 和 15NW-C/C4 的工程範圍內共錄有 13 種鳥類和 17 種蝴蝶類〔見附件 E 表 E2 和 E3〕，但並沒有發現哺乳類動物及其痕跡，而所有的鳥類和蝴蝶均為香港的常見種類。不過，其中之一的黑鳶是一種具有區域性保護價值的品種〔Fellowes *et al.*, 2000〕，並且寄生於香港。本調查發現黑鳶在該區域有築巢的行為，因為一隻黑鳶帶有築巢用的材料在該區出現。築巢地點可能為斜坡 15NW-C/C3 和 15NW-C/C4 後方約 0.5 公里之山坡的高灌木叢中。

在斜坡 15NW-C/C3 坡腳之濕軟草地沒有爬蟲類動物的記錄，但記錄中有 2 種兩棲動物：白額樹蛙和盧氏小樹蛙。2002 年 4 月 27 日晚間曾聽見白額樹蛙（棕樹蛙）和盧氏小樹蛙的叫聲。棕樹蛙在香港屬於常見品種，且富藏於該濕軟草地之中。盧氏小樹蛙是一種只產於香港的品種，尤其是只在四個離島上發現其生長着〔Lau 和 Dudgeon, 1999〕。此類樹蛙被認為是具有“世界保護價值”的品種〔Fellowes et al., 2002〕，因此必須受到保護。根據劉惠寧博士在 90 年代末在該地所做的一次調查〔pers. comm〕，該草地是盧氏小樹蛙的聚居地且樹蛙數量豐富。可是在 2002 年 4 月 27 日晚間進行生態調查中，只聽見 6 隻雄蛙的叫聲。

3.1.4 水

在斜坡 15NW-C/C3 上，岩石表面的逕流直接流入斜坡下方的草地。從該地溢出的部份逕流流入足球場周圍的細小 U 型水渠並進入相連的排水系統排向大海；而其餘逕流匯集於坡腳而形成坡腳草地之濕軟環境。

至於斜坡 15NW-C/C4，坡腳的 U 型水渠和相連的集水坑收集了斜坡表面的逕流。坡腳的集水坑跟暗藏管道相連，再將積水排向大海。

3.1.5 景觀及視覺

鄰近碼頭的斜坡 15NW-C/C3 是一個已棄置的石礦場。由於從渡輪上和索罟灣對面岸邊均可以看見裸露的岩石，從視覺上而言，該斜坡十分顯眼。儘管在岩石表面間斷有些植被，但斜坡表面主要是裸露的岩石面以及在斜坡南端為裸露的土壤。

斜坡 15NW-C/C4 位於一條以索罟灣至模達灣以及至南丫島東南部的主要小徑邊，該斜坡地處酒家群的後方且從渡輪碼頭的附近水域亦可以看見。斜坡表面現被灰泥和噴射混凝土覆蓋。

3.1.6 歷史及文化

經康樂及文化事務署古物古蹟辦事處的證實，在本顧問合約〔CE 40/2000〕的 60 幅斜坡的範圍內沒有包括現時 75 個法定文化遺產地址。

3.1.7 其他

斜坡 15NW-C/C4 之東端坡頂上方附近有一幅墓碑。

4 對環境可能造成的影響

4.1 擬建工程項目涉及的工序包括工序流程圖、場地平面圖、貨物貯存要求、散發物及排放物的資料

南丫島的 2 幅斜坡部分或全部的位於自然保育區內。斜坡 15NW-C/C3 位於靠近碼頭的一個足球場/直昇機停機坪後面。斜坡 15NW-C/C4 則位於海鮮酒家後方的一條主要小徑邊。2 幅斜坡的位置圖顯示於附件 A 的平面圖 A2 上。

正如上文第 2.1 節所述，這些指定斜坡工程將包括小型土方工程，為土壤斜坡安裝泥釘，鞏固岩石坡措施〔只限於斜坡 15NW-C/C3〕，改善排水工程及景觀美化工程。有關該 2 幅斜坡之擬建工程之具體事項請參閱附件 B。

上述所有工程事項均可能構成環境影響，儘管改善排水及景觀美化工程不會引起大量噪音及塵埃，但由於大部份之工程項目需要使用機動設備，尤其在進行土方開挖以及為安裝泥釘、傾斜排水道及鞏固石坡的鑽探工程期間，卻可能會造成噪音影響及產生塵埃。從生態角度而言，施工期間可能對野生生物構成滋擾。而安裝泥釘、排水道及修築維修階梯時亦將會暫時性去除小部份現有的植物。

開挖工程、修建排水道及移除現有灰泥和噴射混凝土將會引致廢料的產生，這些建築廢料必需經過處理及運送至管制傾瀉地點，即環境保護署的索罟灣離島廢物轉運設施。根據工務局技術通告〔WBTC〕21/2002 的要求，運送廢料時必須依據合約 GE/2002/17 執行有關的載運記錄制度。承建商亦必須根據工務局技術通告〔WBTC〕29/2000 預備和執行廢物管理計劃。

擬建的斜坡鞏固工程對於水質影響較小，但工程地盤的廢料亦有機會被帶到斜坡 15NW-C/C3 下方的草地及經過相連的排水系統而排向大海，所以必需執行有關的暫時性措施以防止污染物不受控地排放。

若斜坡鞏固工程使草地水質下降或草地植物永久損失，則棲身於斜坡 15NW-C/C3 坡腳草地的盧氏小樹蛙可能會遭受影響。

4.2 施工期間對環境的影響

4.2.1 噪音

根據環保處發出的“建議納入建築合約的污染管制條款”，此工程合約〔合約編號 GE/2002/17〕規定在施工進行期間，最大聲率級不可超出 75 分貝。

在施工期間，由於需要使用機動設備進行各項建築項目，故噪音將會產生。可產生負面的噪音影響的工程項目大致可以分為以下五個階段：

- ◆ 項目一 - 小型土方工程：切削斜坡，改善坡度，以便進行景觀美化工程；處理開挖物料及/或移除現有的噴射混凝土覆蓋面。

- ◆ 項目二 - 為土壤斜坡安裝泥釘：利用鑽探在斜坡開鑿小孔，並在小孔內安裝鋼筋條及灌漿封孔工程。
- ◆ 項目三 - 為岩石坡進行鞏固措施〔只限於斜坡 15NW-C/C3〕：去除鬆石、移除不穩固的孤石、安裝石釘、石栓及防石網。
- ◆ 項目四 - 改善排水工程：在斜坡上建造混凝土排水渠道，並提供地下排水設施。
- ◆ 項目五 - 景觀美化工程：種植青草、喬木及灌木。

下表 4 顯示各個施工階段所須使用的設備：

表 4：各項建築項目的估計聲功率級別

建築項目	機動設備	建築噪音 許可證 設備代號 ⁽¹⁾	設備數目	聲功率級別 分貝(A) ⁽¹⁾	運作期間的 總聲功率級 ⁽²⁾
項目一	挖土機 〔反鏟挖土機〕	CNP081	1	112	112
項目二 及三	備有履帶的鑽石機 〔氣動〕	CNP181	1	128	128
	空氣壓縮機	CNP001	1	100	
	起重機、汽油	CNP123	1	104	
	混凝土泵	CNP047	1	109	
	混凝土攪拌機	CNP046	1	96	
項目四	混凝土泵	CNP047	1	109	109
	混凝土攪拌機	CNP046	1	96	
項目五	水泵	CNP282	1	103	104
	攪拌機	CNP046	1	96	

附註*：(1) 設備代號及聲功率乃根據《管制建築工程噪音〔撞擊式打樁除外〕技術備忘錄》〔EPD, 1998〕釐定。

(2) 運作期的總聲功率級乃根據附註〔1〕之技術備忘錄內的表 4 釐定。

(3) 預估之噪音級別請參閱附件 F 之 F1 和 F2。

工程顧問已根據《管制建築工程噪音〔撞擊式打樁除外〕技術備忘錄》〔EPD, 1998〕的特定方法，對已定噪音感應強的地方進行了建築噪音評估。附件 F 詳列在斜坡進行

修葺期間，在具代表性的噪音感應強的地方，於採取防禦措施前的預估噪音水平。此外在計算噪音水平時，已考慮了最惡劣情況，即選擇了最接近噪音感應強的地方之斜坡作評估。

評估結果顯示〔附件 F 內的表 F1 及 F2〕，建築項目二和三對大部分噪音感應強的地方的最高噪音水平均超過工程合約規定的 75 分貝。因此，承建商必須採取噪音防禦措施以減低噪音至可接受之水平〔即少於 75 分貝〕。

4.2.2 空氣

土方工程及為安裝泥釘和鞏固工程而進行的鑽探工程，特別是在乾旱的季節，均可構成塵埃影響。此外，儲存挖土物料或廢料本身亦可成為塵埃的來源。所以，承建商亦須遵守《空氣污染管制〔建築塵埃〕規例》，儘量確保空氣污染感應強的地方不會受到塵埃導致的負面影響。

4.2.3 生態

斜坡鞏固工程可能對斜坡 15NW-C/C3 下草地的盧氏小樹蛙種群有直接的不良影響，除非採取 5.1.3 節所描述的防禦措施。草地水質下降及植物損失，均可影響盧氏小樹蛙及其聚居地。

在 15NW-C/C3 和 15NW-C/C4 上方 0.5 公里之自然斜坡上築巢的兩隻黑鳶不太可能受到斜坡工程影響〔見附錄 A 圖 A3〕。沒有跡象顯示那對黑鳶在該工程地盤作為棲息和覓食的基地。

儘管沒有罕見或瀕危植物記錄，斜坡 15NW-C/C3 後面的年輕次生林和斜坡 15NW-C/C4 後面的林地狀況很好，應盡可能受到保護。由於斜坡鞏固工程只伸延至現有斜坡坡頂後面 5 至 10 米，因此不會對上述生態環境造成較大的不良影響。上述區域內的鞏固工程包括排水道改善工程，這些排水道的具體位置可在地盤內加以調整，以減低工程對生態的影響。預計 2 幅斜坡鞏固工程將導致的植被清除列於下表 5：

表 5：現有植被的清除面積

斜坡編號	工程地盤估計面積〔平方米〕	植被清除的估計面積〔平方米〕/佔地盤面積的百分比〔%〕
15NW-C/C3	6500	550 / 8.5
15NW-C/C4	2224	200 / 9.0
總計	8724	750 / 8.6

4.2.4 水質

斜坡 15NW-C/C3 下方草地的水質可能會因為施工地盤的逕流直接從岩石/土壤表面流入草地而下降。工程對於海水水質的影響將很小，但工程地盤的逕流亦有可能通過相連的排水系統流入大海。

4.2.5 廢料管理

工程產生的廢料大部分是由開挖工程產生的。對於斜坡 15NW-C/C3，去除鬆石工程將產生少量以岩石碎塊為主的廢料。

對於斜坡 15NW-C/C4，工程產生的廢料主要來自於灰泥、噴射混凝土及清除現有的噴漿混凝土表面的泥土，去除鬆石、挖掘排水渠及切削斜坡產生的土石類。預計產生的廢料數量列於下表 6。

表 6：預計產生的廢料量

斜坡編號	清除的灰泥及 噴射混凝土 〔立方米〕	土壤 〔立方米〕	岩石 〔立方米〕	總計 〔立方米〕
15NW-C/C3	--	--	35	35
15NW-C/C4	100	205	5	310

4.2.6 景觀和視覺

在施工期間，在斜坡表面將會架設臨時腳手架和施工平臺，以便進行泥釘安裝和進行岩石鞏固及景觀美化工程。斜坡鞏固工程期間不需要砍伐任何樹木。

表 7：預計砍伐樹木總表

斜坡編號	保留樹木數量	砍伐樹木數量	移植樹木數量
15NW-C/C3	見備註	零	零
15NW-C/C3	42	零	零
總計	>42	0	0

備註: 由於沒有安全路徑到斜坡 15NW-C/C3 的頂部，樹木的確切數量不能調查得到，但是該工程地盤內的所有樹木都將被保留。

4.2.7 歷史及文化

建議的斜坡鞏固工程將不會影響現有或建議中的文化遺產地址。

4.2.8 其他

在斜坡 15NW-C/C4 的東端附近有一個墓地，該墓地位於地盤邊界以外的 15 米處，所以擬建的斜坡鞏固工程將不會對其造成影響。

4.3 營運作期間對環境的影響

工程的營運期間將不會對感應強的地方造成負面影響，相反景觀美化工程預料會對景觀造成長期的正面影響。

因此，工程營運期間不會帶來不良的影響。

5 將採取的環保措施和其他影響

5.1 減低環境影響的措施

5.1.1 噪音

斜坡 15NW-C/C3 和 15NW-C/C4 的鞏固工程將安排在同一時間進行，從而減短工程進行期間的噪音影響持續期。預計在大部份噪音感應強的地方，由於安裝泥釘及鞏固石坡措施的噪音水平將會超過合約要求的 75 分貝〔見附件 F〕，所以需要採取噪音防禦措施。安裝泥釘及鞏固石坡措施中的主要噪音來源是撞擊式鑽進。表 8 詳列在使用鑽探設備時可採取的防禦措施，以減低所發放的噪音：

表 8：為噪音設備而建議的防禦措施

設備	防禦措施	最大減噪分貝
鑽石機及相關工具	防禦措施 1： <ul style="list-style-type: none">• 安裝專門設計的消聲器或減聲設備，在不降低機器效率的情況下減小噪音；• 確保密封所有氣喉的漏隙；• 使用減震鑽頭以防止高音噪聲。	最大達到 15
	防禦措施 2： <ul style="list-style-type: none">• 將破碎機或岩石鑽孔機包在活動或固定的隔音罩里，並作適當的通風措施。	最大達到 20

來源：施工和露天地盤噪音管制表 B1〔BS5228:Part I, 1997〕

為評估目的所用的最大可能減噪分貝不會用於本工程，而上表所述之有關設備的噪音水平可減低 10 分貝之措施將被採用於本工程(見附件 G)。採取以上防禦措施後，所有噪音感應強的地方在施工期間的噪音水平都不會超過合約要求的 75 分貝，並且不會造成任何剩餘影響。地盤的實際噪音水平將會由有關監察人員進行量度。

5.1.2 空氣質素

通過採用工程合約 GE/2001/27 中之特別條例的“建議污染管制條款”後〔詳見附件 H〕，環境損害將維持至最低。此外，在鑽探施工期間建議進行噴水，特別在乾燥季節，從而減小對污染感應強的地方造成不良影響。承建商應該確保此類塵土防禦措施中有足夠的水供應。

5.1.3 生態

斜坡 15NW-C/C3 後方的自然山坡上的次生林和斜坡 15NW-C/C4 後方的林地在鞏固工程期間將會受到保護。2 幅斜坡工程地盤的上方邊界將盡可能靠近工程範圍，而不允許侵入工程範圍外的次生林的範圍。地盤的任何植被清除都將受到監控，以避免不必要的移除。若安裝泥釘及建造排水道會影響成熟樹木的樹根，則工程師會在現場重新設訂泥釘及排水道的位置以免防礙現有樹根生長系統。

盧氏小樹蛙是具較高保護價值的本地品種，將盡可能受到保護。因此捕捉、飼養及放回原地的程序將會執行。在工程展開前的產卵季節期間會捕捉盧氏小樹蛙，並加以人工飼養。斜坡 15NW-C/C3 的鞏固工程安排在 2003 年 10 月至 2004 年 5 月期間進行。盧氏小樹蛙及其聚居地的保護措施如下：

斜坡改造工程開始前：

在工程展開前的產卵季節初期會進行一項基線調查以估計盧氏小樹蛙的數目。基線調查的結果亦會作為今後對於地盤監控的參照。在鞏固工程展開前的產卵季節，即 2003 年 5 月至 9 月期間將進行捕捉盧氏小樹蛙卵和蝌蚪的工作。基線調查和捕捉樹蛙的工作將由經驗豐富而又熟悉該類盧氏小樹蛙的生態專家進行。

斜坡工程開始前將對草地的水質中的可溶氧、沉積物、硝酸鹽及磷酸鹽進行例試，以確定適合盧氏小樹蛙生存的現有水質範圍。生態專家將使用該範圍來監控施工期和竣工後的水質情況。

斜坡鞏固工程期間：

施工期間，捕捉到的盧氏小樹蛙、卵和蝌蚪將由有經驗的生態專家保存及飼養。

工程地盤將用圍欄封閉以防止進入草地範圍。施工期間，斜坡 15NW-C/C3 坡腳的草地上方將修建一個臨時平台，平台和岩石表面的縫隙將被密封，以免影響下方之草地。該平台為承建商提供了一個可控制而又足夠的工作空間。草地的水質將持續受到監控，以減小對任何仍然存留在草地中的樹蛙之影響。如果水質超出了由有經驗的生態專家所定的可接受範圍，工程師將會要求承建商暫停斜坡鞏固工程，直至發現有關水質變壞之原因，並由承建商執行由生態專家制定的防禦措施。

斜坡鞏固工程完成後：

斜坡工程竣工後將對草地的水質進行測試，確保草地仍然適合盧氏小樹蛙棲身。如果水質超出了預先由有經驗的生態專家制定的可接受範圍，可能需要進行防禦措施及樹蛙聚居地管理工程，從而恢復草地的環境至適合放回樹蛙。

飼養的盧氏小樹蛙將於雨季（即 2004 年 6 月至 9 月）被放回原地。盧氏小樹蛙放回原居地的實際數目和程序將由有經驗的生態專家確定。樹蛙在產卵季節內被放回草地以增加其生存率。

盧氏小樹蛙被放回後，富有經驗的生態專家將對其進行監控工作，而監控的時期預定為 12 個月，可是確實的監控時期將會由有經驗的生態專家因應基線調查和工程進行期間持續監控的結果再定。

此外，斜坡改善工程不會改變斜坡的水文地理狀況，以及現有的草地水源亦不會改變，因此草地的水份可以被完整保存。

5.1.4 水

承建商應遵守水污染管制條例及其附屬規例。

施工期間，承建商應對任何工程、塵土控制和車輛清洗產生的地面逕流收集在地盤範圍內。承建商不允許在任何公眾污水管道、雨水渠、水渠、天然水道或向大海排放任何工業廢水、髒水、污染水、冷卻水或熱水。

如果地盤內設立餐廳或衛生設施，髒水應直接排放至污水管道或污水處理設備。

在斜坡工程開始前、施工期和竣工後均會對草地的水質進行監控，以盡量保護任何草地剩餘的樹蛙以及其聚居地。水質監控的詳情見 5.1.3 節，此監控對於影響現有的生態環境所應採取的防禦措施是一項重要因素。

5.1.5 廢料管理

承建商應遵守“一般化學廢物”的廢物處理規例、廢物處置條例及其附屬規例和海上傾倒物料條例。

承建商不應允許任何含有沙石、水泥、泥沙或任何懸浮或可溶解物質的髒水、污水或廢水從地盤流入任何相鄰區域，或任何未經處理的廢物堆積在地盤內或相鄰區域的任何地方。

承建商必須預備及執行廢物管理計劃以減少、再用及循環再造廢物。

承建商在地盤產生的建築廢物將被運送到索罟灣離島廢物轉運設施。考慮到最近在大嶼山其他建造工程中發生的問題，本工程會特別注意實行廢物運載記錄系統。經驗豐

富的顧問公司高級人員將不時進行承建商和駐地盤人員工作程序的獨立審查，確保正確的運作程序貫切於整個工程期間。

5.1.6 景觀和視覺

斜坡編號 15NW-C/C3 和 15NW-C/C4 的坡腳將設置臨時圍板或安全欄，以遮擋地盤內工程進行的視線。

鞏固工程後，斜坡 15NW-C/C3 的土壤表面將被噴草覆蓋，以改善工程後的視覺效果。岩石斜坡將用防石網遮蓋以減少小塊岩石鬆落的危險。

在斜坡 15NW-C/C4 上曾經發生多次山泥傾瀉，為公眾的安全利益着想，工程師考慮有必要在工程竣工後保持以噴射混凝土護面覆蓋斜坡表面。為了改善其視覺效果，噴射混凝土面上會進行噴草以制造植被並在坡腳建造綠化植被牆。

表 9：景觀防禦措施之建議

斜坡編號	景觀防禦措施之建議
15NW-C/C3	土壤部分安裝侵蝕控制網及噴草；岩石部分安裝防石網。 保留和/或恢復現有坡腳濕軟草地上的植物。
15NW-C/C4	在已被修理完整的混凝土面上噴草。 在坡腳建造綠化植被牆。

5.1.7 歷史及文化

由於沒有文化遺產地址會受影響，所以無需進行任何防禦措施。

5.1.8 其他

無需進行其他的環境防禦措施。

5.2 對環境影響可能產生的嚴重性、分佈範圍及持續時間的評論

就在斜坡 15NW-C/C3 下方的動物生態而言，由於該地是盧氏小樹蛙的聚居地，故此應該特別注意減小對該斜坡下濕潤草地的生態環境影響。

除此以外，因為採取了環境防禦措施和污染控制條例〔見附件 H〕，本工程預計不會造成在剩餘噪音、空氣、廢料、水質、生態、景觀及視覺方面的負面影響。

5.3 對其他影響的評論

雖然只有相等於工程地盤總面積 8.6%的 750 平方米的植被將於斜坡鞏固工程進行期間被移除；但在鞏固工程後相當於工程地盤總面積 40%的 3,500 平方米的面積上將會進行植被種植。植被範圍的增加將對景觀產生正面的影響，尤其是對於斜坡 15NW-C/C4，其整個噴射混凝土面將會被植被覆蓋。

5.4 使用以前通過的環評報告

以下是最近類似的工程項目，該項目正在本港展開並已取得環境許可證。

合約編號 CE 74/99 及附加合約編號 1

此合約編號為〔CED，2001〕的工程包括在大嶼山內的防止山泥傾瀉斜坡鞏固工程。土木工程署於 2001 年 4 月 27 日提交該工程項目簡介〔申請編號 DIR 055/2001〕以直接向環保署申請環境許可證。該簡介的結論是其工程不會對環境造成長期的或累積的負面影響。土木工程署的申請獲得接納，環境許可證於 2001 年 7 月 30 日發出〔環境許可證編號 EP-102/2001〕。

6 參考資料

詳見本項目簡介之英文版的第 20 頁及 21 頁。

ATTACHMENTS

附件

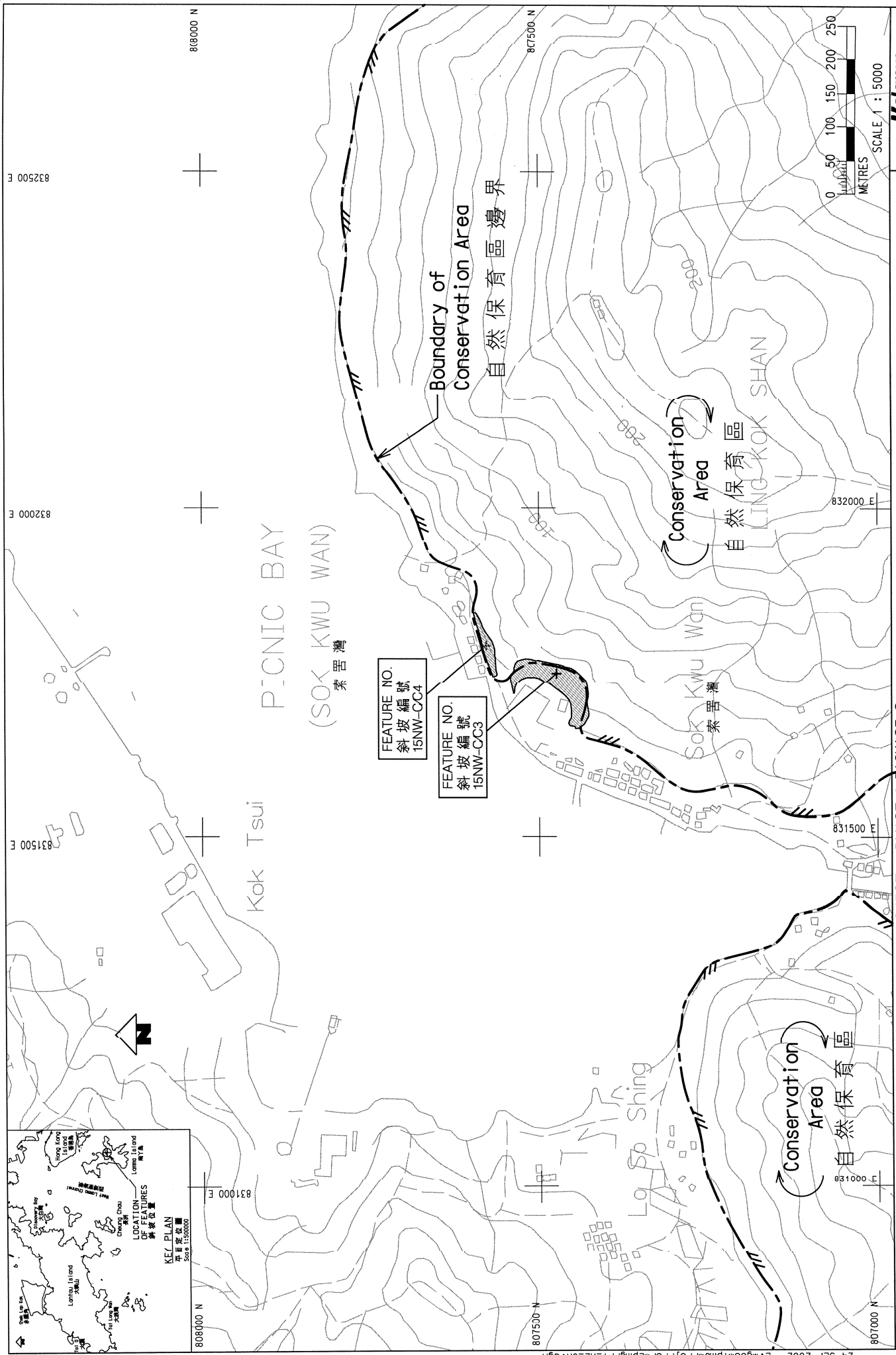
- A. Location Plans and Locations of Sensitive Receivers
斜坡位置圖及噪音感應強的地方位置圖
- B. Construction Details for the Designated Features
指定斜坡之建造工程詳情
- C. Landscaping Details for the Designated Features
指定斜坡之景觀美化工程詳情
- D. Indicative Works Programme
工程流程圖說明
- E. Results of the Ecological Survey
生態環境調查結果
- F. Predicted Noise Level without Mitigation Measures
採取防禦措施前，噪音感應的地方噪音水平評估
- G. Predicted Noise Levels after Mitigation Measures
採取防禦措施後，噪音感應的地方噪音水平評估
- H. Particular Specification Clauses included in Contract GE/2002/17
工程合約 GE/2002/17 內的特殊條列
 - Pollution Control
污染控制
 - Waste Management
廢料管理

ATTACHMENT A

附件 A

Location Plans and Locations of Sensitive Receivers

位置圖及噪音感應強的地方位置圖



832500 E
832000 E
831500 E
831000 E
808000 N
807500 N
807000 N

818000 N
817500 N

PICNIC BAY
(SOK KWU WAN)
索罟灣

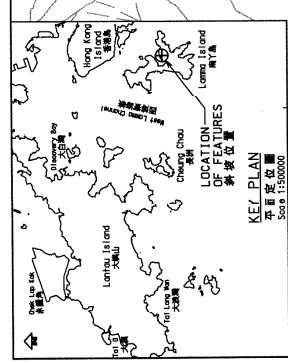
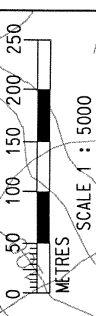
FEATURE NO.
斜坡編號
15NW-CC4

FEATURE NO.
斜坡編號
15NW-CC3

Boundary of
Conservation Area
自然保育區邊界

Conservation
Area
自然保育區

Conservation
Area
自然保育區

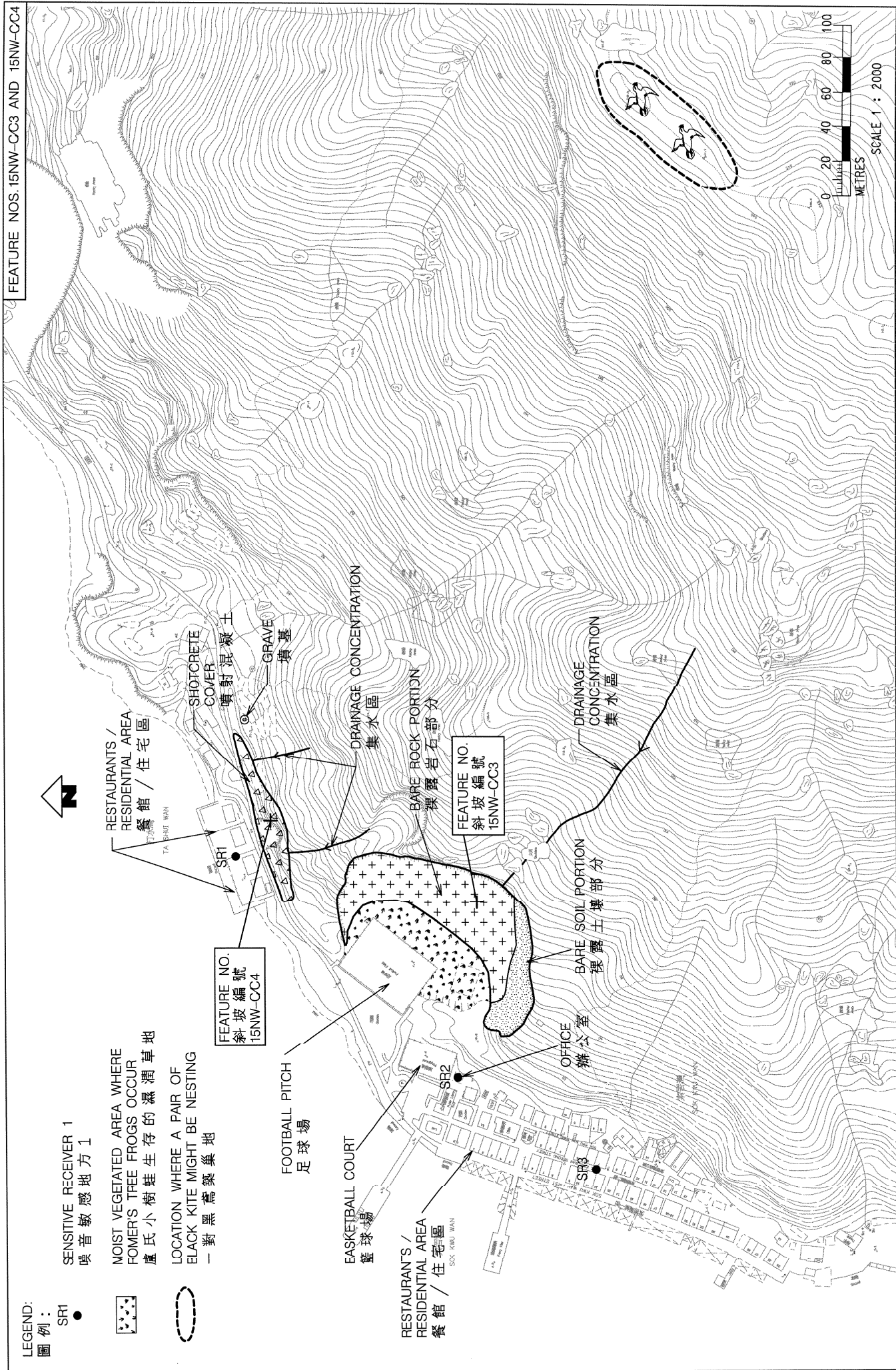


Halcrow
合榮中國有限公司
FIGURE A2
圖 A2

AGREEMENT NO. CE 40/2000 GEO 10-YEAR EXTENDED LPM PROJECT - PHASE 2, PACKAGE G
合約編號 C E 40 / 2000 延續十年的防止山泥傾瀉計劃第二期第 G 組

LOCATION PLAN OF FEATURE NOS. 15NW-CC3 AND 15NW-CC4
斜坡 15NW-C / C3 和 15NW-C / C4 平面位置圖

24 SEP 2002 E:\g*\p\m*proj\Prof*img\p1_A2.CH.dgn



LEGEND:
圖例:

SENSITIVE RECEIVER 1
噴音敏感地方 1

MOIST VEGETATED AREA WHERE FORMERS TREE FROGS OCCUR
盧氏小樹蛙生存的濕潤草地

LOCATION WHERE A PAIR OF BLACK KITE MIGHT BE NESTING
一對黑鸞築巢地

SR1 ●



FOOTBALL PITCH
足球場

BASKETBALL COURT
籃球場

RESTAURANTS / RESIDENTIAL AREA
餐館 / 住宅區

S/S KIU WAN

FEATURE NO.
斜坡編號
15NW-CC3

OFFICE
辦公室

BARE SOIL PORTION
裸露土壤部分

BARE ROCK PORTION
裸露岩石部分

DRAINAGE CONCENTRATION
集水區

DRAINAGE CONCENTRATION
集水區

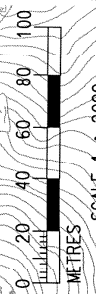
SHOTCRETE COVER
噴射混凝土

GRAVE
墳墓

RESTAURANTS / RESIDENTIAL AREA
餐館 / 住宅區

TA SHUI WAN

FEATURE NO.
斜坡編號
15NW-CC4



AGREEMENT NO. CE 40/2000 GEO 10-YEAR EXTENDED LPM PROJECT - PHASE 2, PACKAGE G
合約編號 C E 40 / 2 C 0 延續十年的防止山泥傾瀉計劃第二期第 G 組

SUMMARY OF FINDINGS ON THE ECOLOGICAL SURVEY AT FEATURE NOS. 15NW-CC3 AND 15NW-CC4
斜坡 15 N W - C / C 3 和 15 N W - C / C 4 的生態調查結果概要

Halcrow
合樂中國有限公司
FIGURE A3
圖 A3

ATTACHMENT B

附件 B

Construction Details for the Designated Features

建築工程詳情

Feature No.

斜坡編號

15NW-C/C3

15NW-C/C4

Drawing No.

繪圖編號

LPM 0217/3291

LPM 0217/3292

LPM 0217/3293

LPM 0217/3301

LPM 0217/3302

LPM 0217/3303

GENERAL NOTES
 1. THIS DRAWING TO BE READ IN CONNECTION WITH STANDARD DRAWINGS AND ALL OTHER RELEVANT DRAWINGS AND SPECIFICATIONS AND INSTRUCTIONS ISSUED BY THE ENGINEER.
 2. ALL DIMENSIONS ARE IN METRES UNLESS OTHERWISE SPECIFIED.
 3. ALL LEVELS ARE IN METRES ABOVE PRINCIPAL DATUM.
 REFER TO THE RELEVANT NOTES ON DRAWING FOR THE WORKS AS STATED IN THIS DRAWING.

NO.	REVISION	DATE	BY	CHECKED
1	ISSUED FOR TENDER			
2	FOR CONSTRUCTION			

DESIGNED BY: **WONG YU CHUNG**
 CHECKED BY: **WONG YU CHUNG**
 DRAWN BY: **WONG YU CHUNG**
 APPROVED BY: **WONG YU CHUNG**

PROJECT NO. **LPN 0217 / 3293**
 PROJECT NAME: **PHASE 2 PACKAGE G - FOR SLOPE AND RETENTIVE WORKS FOR SLOPE AT SOK KWU WAN LARMA ISLAND**

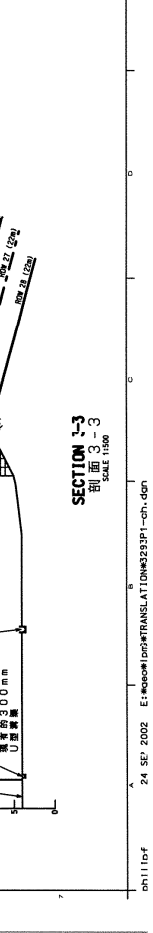
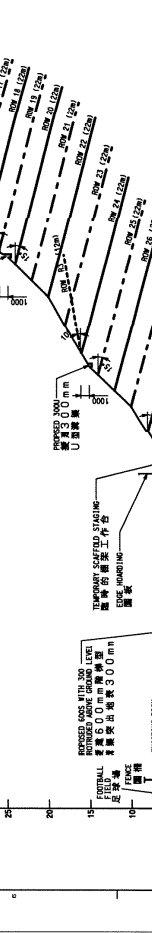
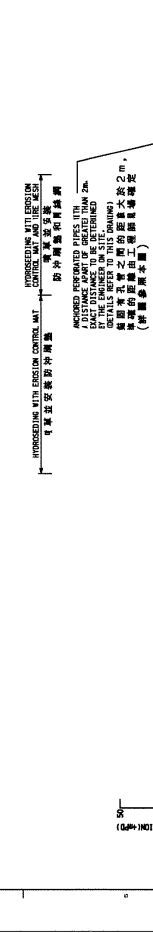
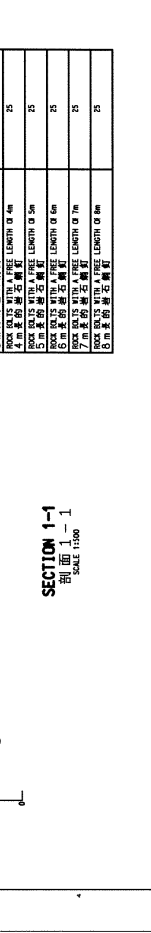
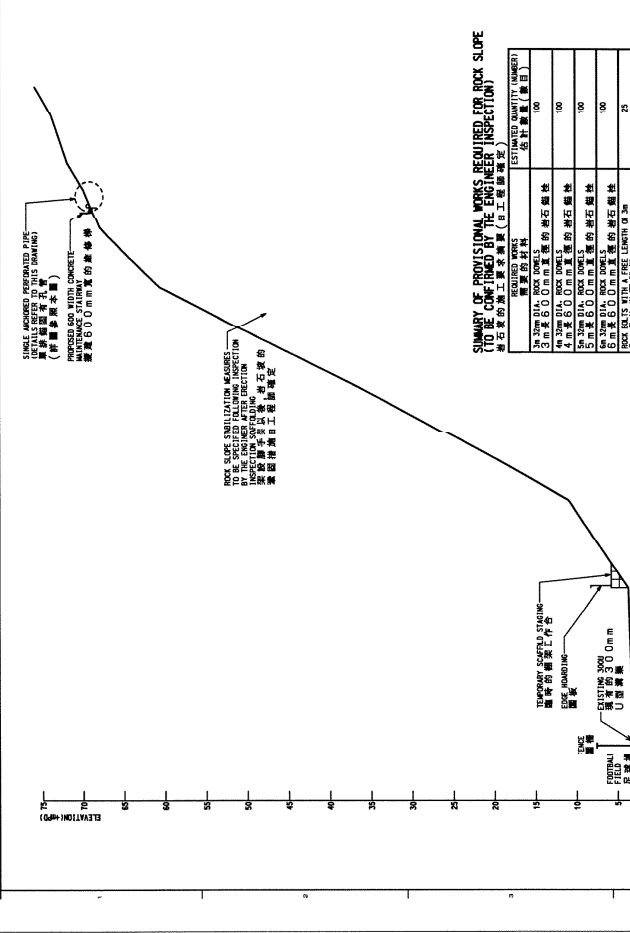
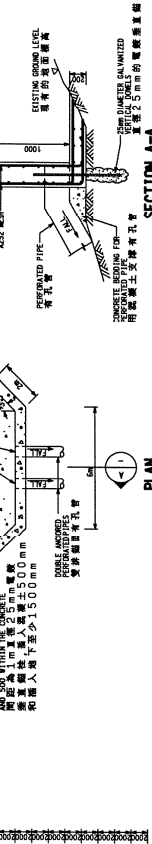
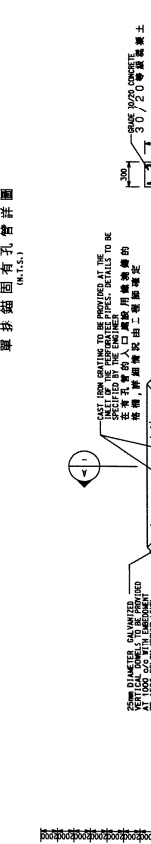
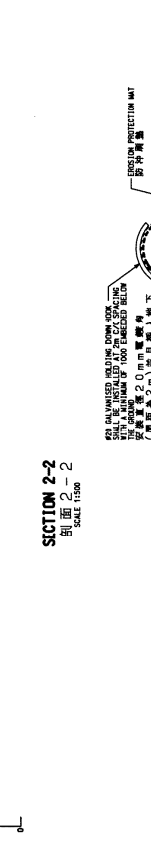
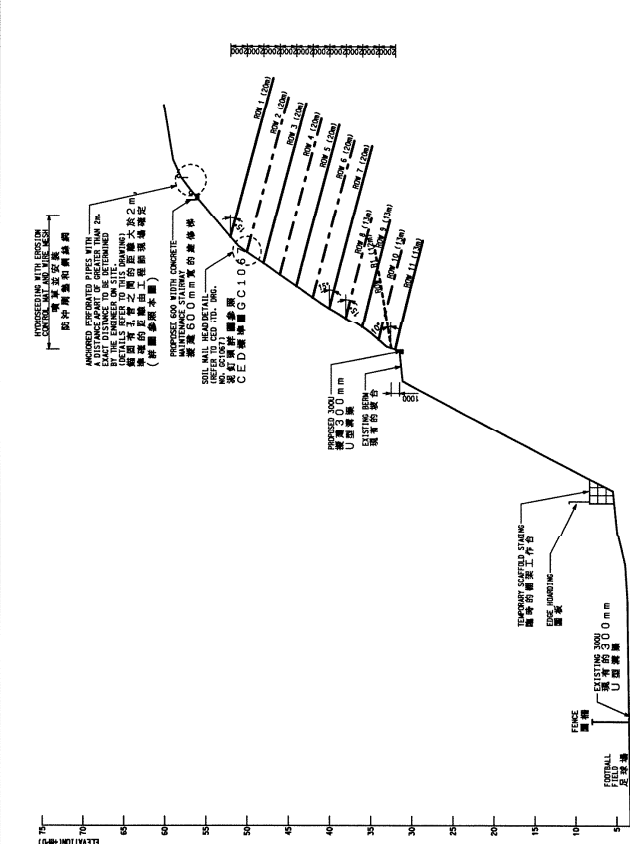
CLIENT: **CONSTRUCTION DEPARTMENT**
 PROJECT: **NO. 15HW-C03**
 LOCATION: **East of The Helicopter Landing Pad, Sok Kwu Wan Larma Island**

SCALE: **1:250**
 DRAWING NO. **LPM 0217 / 3293**
 SHEET NO. **PI**

DATE: **11/11/2002**
 PROJECT: **PHASE 2 PACKAGE G - FOR SLOPE AND RETENTIVE WORKS FOR SLOPE AT SOK KWU WAN LARMA ISLAND**

CONTRACT NO. **LPN 0217 / 3293**
 CONTRACT VALUE: **HK\$ 1,250,000**

ENGINEER: **HALCROW CONSULTANTS**
 OFFICE: **10/F, 100, QUEEN'S ROAD CENTRAL, HONG KONG**



ATTACHMENT C

附件 C

Landscaping Details for the Designated Features

景觀緩解工程詳情

Feature No.

斜坡編號

15NW-C/C3

15NW-C/C4

Drawing No.

繪圖編號

LPM 0217/L3291

LPM 0217/L3301

ATTACHMENT D

附件 D

Indicative Works Programme

工程流程圖說明

ATTACHMENT E

附件 E

Results of the Ecological Survey

生態環境調查結果

Preliminary Ecological Assessment of Slopes on Lamma

南丫島指定斜坡的初步生態評估

Agreement No. CE 40/2000,

GEO 10-Year Extended LPM Project, Phase 2, Package G

合約編號 **CE 40/2000**

延續十年之防止山泥傾瀉計劃第二期第 G 組

Dr Billy C.H. Hau

侯智恆博士

Department of Ecology & Biodiversity

The University of Hong Kong

香港大學生態學及生物多樣性學系

METHODOLOGY

Field works were conducted on the Lamma sites in day time on 13th, March 2002 and 27th, April 2002 and in the evening of 27th, April 2002 (until 20:00 hours).

During fieldwork visual searching for plants, birds, amphibians, reptiles and butterflies was conducted. The calls of birds and amphibians were also used to survey these groups. Visual searching for mammal signs such as scats and mud holes was also conducted. Since the rock faces of feature 15NW-C/C3 has no deep crevices and there are no caves, bats are not surveyed. Dragonflies are not surveyed as it is still too early in the season. All woody plants were identified to species on site. Doubtful or unknown species was collected and identified in the HKU herbarium. Herbaceous species was not studied except protected ones such as orchids and pitcher plant. Relevant experts were consulted with the possible occurrence of rare or endangered species at all sites. Results of the assessment are presented in the Text and Tables E1 to E3 in Appendix E.

評估方法

實地考察於 2002 年 3 月 13 日和 4 月 27 日的日間及 4 月 28 日的夜間（直至夜間八時）在南丫島的指定斜坡進行。

考察方法包括目視搜尋植物，鳥類，兩棲類，爬蟲類動物和蝴蝶；以及辨認鳥類和兩棲類的叫聲。今次考察亦包括目視搜尋哺乳類的痕跡如糞便及土坑，由於斜坡 15NW-C/C3 表面並無深坑及洞穴，故此是次調查並無包括蝙蝠。由於季節問題此考察並沒包括蜻蜓。所有在指定斜坡範圍內的木本植物均作實地辨認；而一些實地不能辨認及不知名的木本植物，會抽取植物樣本到香港大學的植物標本室加以辨認。除了受保護植物如蘭花及瓶子草，草本植物並不包括在考察範圍內。本評估亦參考有關專家對稀有及瀕危物種在評估地點範圍內出現的意見。以上評估的結果於內文描述，本附件內表 E1 至 E3 概括評估結果。

Table E1 - Plant Species Recorded at Features 15NW-C/C3 and 15NW-C/C4 at Sok Kwu Wan, Lamma. Synonyms are included in brackets for clarity.
 表 E1 - 在南丫島索罟灣斜坡 15NW-C/C3 和 15NW-C/C4 所記錄到的植物。括弧內為該種類的別名，以免混淆。

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Stream woodland 溪邊樹林	Abundance 豐富度 15NW-C/C3		Abundance 豐富度 15NW-C/C4		Notes 備註
					Rock face & slope base 石坡及坡腳	On the natural slope 天然斜坡	Shotcrete/ rock surface 噴射混凝 土/石坡	On the natural slope 天然斜坡	
PTEROPHYTES									
蕨類植物									
<i>Cyclosorus interruptus</i>	Thelypteridaceae	毛蕨	Herb 草本	***					
<i>Dicranopteris pedata</i>	Gleicheniaceae	芒萁	Herb 草本	***	**	***			
<i>Lygodium scandens</i>	Lygodiaceae	小葉海金沙	Climbing fern 攀緣蕨類	**				**	
<i>Osmunda vachellii</i>	Osmundaceae	華南紫萁	Herb 草本	**					
<i>Pteris biaurita</i>	Pteridaceae	狹眼鳳尾蕨	Herb 草本	**					
GYMNOSPERMS									
裸子植物									
<i>Gnetum lofuense</i>	Gnetaceae	買麻藤	Woody climber 木質籐本				**		
ANGIOSPERMS									
被子植物									
<i>Acacia confusa</i>	Mimcsaceae	台灣相思	Tree 樹木	**			**	*	Planted 人工種植
<i>Antirhea chinensis</i>	Rubiaceae	毛茛	Tree 樹木			**		**	
<i>Aporosa dioica</i>	Euphorbiaceae	銀柴	Tree 樹木		*	**		**	

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Stream woodland 溪邊樹林	Abundance 豐富度 15NW-C/C3		Abundance 豐富度 15NW-C/C4		Notes 備註
					Rock face & slope base 石坡及坡腳	On the natural slope 天然斜坡	Shotcrete/ rock surface 噴射混凝 土石坡	On the natural slope 天然斜坡	
<i>Aquilaria sinensis</i>	Thymelaeaceae	土沉香	Tree 樹木	*					Seedlings 種子種植
<i>Archidendron lucidum</i>	Fabaceae	亮葉猴耳環	Shrub 灌木		*			**	
<i>Ardisia crenata</i>	Myrsinaceae	朱砂根	Shrub 灌木		*				
<i>Arundinaria</i> sp.	Poaceae		Bamboo 竹					**	
<i>Asparagus cochinchinensis</i>	Asparagaceae	天門冬	Climbing Shrub 灌木		**				
<i>Bambusa textilis</i>	Poaceae	青皮竹	Bamboo 竹					**	Planted 人工種植
<i>Bauhinia championii</i>	Fabaceae	缺葉藤	Woody climber 木質藤本		**				
<i>Bougainvillea spectabilis</i>	Nyctaginaceae	葉子花	Woody climber 木質藤本					*	Planted 人工種植
<i>Bridelia tomentosa</i>	Euphorbiaceae	土蜜樹	Tree 樹木	**	**			*	
<i>Caesalpinia crista</i> (<i>C. nuga</i>)	Fabaceae	華南雲實 (假老虎筋)	Woody climber 木質藤本		**			**	
<i>Celtis sinensis</i>	Ulmaceae	榿樹	Tree 樹木					*	
<i>Cratogeomys cochinchinense</i>	Clusiaceae	黃牛木	Tree 樹木		***			**	
<i>Dalbergia benthamii</i>	Fabaceae	兩廣黃檀	Woody climber 木質藤本	***	**			**	

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Stream woodland 溪邊樹林	Abundance 豐富度 15NW-C/3		Abundance 豐富度 15NW-C/4		Notes 備註
					Rock face & slope base 石坡及坡腳	On the natural slope 天然斜坡	Shotcrete/ rock surface 噴射混凝土 石坡	On the natural slope 天然斜坡	
<i>Dalbergia hancei</i>	Fabaceae	藤黃檀	Woody climber 木質藤本		**				
<i>Daphniphyllum calycinum</i>	Daphniphyllaceae	牛耳楓	Tree 樹木		**		***		
<i>Dimocarpus longan</i>	Sapindaceae	龍眼	Tree 樹木				**		Planted 人工種植
<i>Embelia ribes</i>	Myrsinaceae	白花酸藤子	Woody climber 木質藤本		***		**		
<i>Erycibe obtusifolia</i>	Convolvulaceae	丁公藤	Woody climber 木質藤本		**				Restricted 分佈狹窄
<i>Erythrina variegata</i>	Papilionaceae	刺桐	Tree 樹木	***					Planted 人工種植
<i>Eurya nitida</i>	Theaceae	細齒葉柃	Shrub 灌木	***	**		***		
<i>Ficus hispida</i>	Moraceae	對葉榕	Tree 樹木		**		*		
<i>Ficus microcarpa</i>	Moraceae	榕樹 (細葉榕)	Tree 樹木	**	*		**		
<i>Ficus variolosa</i>	Moraceae	變葉榕	Shrub 灌木				**		
<i>Ficus virens</i> var. <i>sublaeaeolata</i>	Moraceae	黃葛樹	Tree 樹木		*				
<i>Glochition lanceolarium</i>	Euphorbiaceae	艾膠算盤子	Shrub 灌木	*					
<i>Glochition zeylanicum</i>	Euphorbiaceae	香港算盤子	Shrub 灌木	***					
<i>Gordonia axillaris</i>	Theaceae	大頭茶	Tree 樹木		***				

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Stream woodland 溪邊樹林	Abundance 豐富度 15NW-C/C3		Abundance 豐富度 15NW-C/C4		Notes 備註
					Rock face & slope base 石坡及坡腳	On the natural slope 天然斜坡	Shotcrete/ rock surface 噴射混凝土 石坡	On the natural slope 天然斜坡	
<i>Gymnema sylvestris</i>	Asclepiadaceae	匙羹藤	Woody climber 木質籐本	**	**				
<i>Hibiscus tiliaceus</i>	Malvaceae	黃槿	Tree 樹木	**					
<i>Ilex asprella</i>	Aquifoliaceae	梅葉冬青	Shrub 灌木	**	**	*	*		
<i>Imperata koenigii</i> (<i>I. cylindrica</i>)	Poaceae	絲茅 (白茅)	Grass 莎草	***	*	***	**		
<i>Ipomoea cairica</i>	Convolvulaceae	五爪金龍	Vine 攀緣植物	**			**		Invasive species 外來入侵品種
<i>Ischaemum indicum</i>	Poaceae	細毛鴨咀草	Grass 莎草	**	**	**	**		
<i>Lantana camara</i>	Verbenaceae	馬纓丹	Shrub 灌木	**	**	*	**		
<i>Litsea glutinosa</i>	Lauraceae	潺槁樹	Tree 樹木	*	*		*		
<i>Litsea monopetala</i>	Lauraceae	假柿木薑子	Tree 樹木	*	*				
<i>Litsea rotundifolia</i>	Lauraceae	豺皮樟	Shrub 灌木	***	***	**	***		
<i>Lonicea longiflora</i>	Caprifoliaceae	長花忍冬	Vine 攀緣植物	***	***	**	**		
<i>Macaranga tanarius</i>	Euphorbiaceae	血桐	Tree 樹木	***	***	**	**		
<i>Mallotus paniculatus</i>	Euphorbiaceae	白楸	Tree 樹木	***	***	**	**		
<i>Melastoma candidum</i>	Melastomataceae	野牡丹	Shrub 灌木	***	***	**	**		
<i>Melastoma sanguineum</i>	Melastomataceae	毛稔	Shrub 灌木	***	***	**	**		
<i>Melodinus suaveolens</i>	Apocynaceae	山橙	Woody climber 木質籐本			***	***		
<i>Microcos paniculata</i>	Tiliaceae	破布葉 (布渣葉)	Tree 樹木	**	*		**		

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Stream woodland 溪邊樹林	Abundance 豐富度 15NW-C/C3		Abundance 豐富度 15NW-C/C4		Notes 備註
					Rock face & slope base 石坡及坡腳	On the natural slope 天然斜坡	Shotcrete/ rock surface 噴射混凝 土/石坡	On the natural slope 天然斜坡	
<i>Mikania micrantha</i>	Asteraceae	薇金菊	Vine 攀緣植物	***					Invasive species 外來入侵品種
<i>Pandanus tectorius</i>	Pandanaceae	露兜樹	Tree 樹木				***		
<i>Phoenix hanceana</i>	Areaceae	刺葵	Shrub 灌木		**				
<i>Phyllanthus emblica</i>	Euphorbiaceae	餘甘子	Tree 樹木		**				
<i>Pseudosasa camtori</i>	Poaceae	托竹	Bamboo 竹		***				
<i>Psidium guajava</i>	Myrtaceae	番石榴	Tree 樹木				**		Planted 人工種植
<i>Psychotria asiatica</i>	Rubiaceae	九節 (山大刀)	Shrub 灌木	*	***				
<i>Psychotria serpens</i>	Rubiaceae	蔓九節	Woody climber 木質籐本		**				
<i>Rhaphiolepis indica</i>	Rosaceae	石斑木 (車輪梅)	Shrub 灌木	***	**				
<i>Rhodomyrtus tomentosa</i>	Myrtaceae	桃金娘	Shrub 灌木		***				
<i>Rhus succedanea</i>	Anacardiaceae	木蠟樹 (野漆)	Tree 樹木				**		
<i>Schefflera heptaphylla</i> (<i>S. octophylla</i>)	Araliaceae	鵝掌柴 (鴨腳木)	Tree 樹木	***	**				
<i>Scolopia chinensis</i>	Flacourtiaceae	刺柃	Tree 樹木		*				
<i>Severinia buxifolia</i>	Rutaceae	酒餅	Shrub 灌木		**				
<i>Smilax glabra</i>	Smilacaceae	土茯苓	Climbing Shrub 攀緣灌木		**				
<i>Sterculia lanceolata</i>	Sterculiaceae	假蘋婆	Tree 樹木	***	**			**	

Scientific name 學名	Family 科	Chinese name 中文名字	Growth Form 生長形態	Abundance 豐富度		Notes 備註
				15NW-C/C3 Stream woodland 溪邊樹林	15NW-C/C4 Rock face & slope base 石坡及坡腳	
<i>Tetracera asiatica</i>	Dilleniaceae	錫葉藤	Woody climber 木質籐本	***	On the natural slope 天然斜坡	Abundance 豐富度 15NW-C/C4 Shoterete/ rock surface 噴射混凝 土石坡
<i>Urceola rosea</i>	Apocynaceae	酸葉膠藤	Woody climber 木質籐本	**	On the natural slope 天然斜坡	On the natural slope 天然斜坡
<i>Uvaric macrophylla</i> (<i>U. microcarpa</i>)	Annonaceae	紫玉盤	Woody climber 木質籐本	**	On the natural slope 天然斜坡	On the natural slope 天然斜坡
<i>Vitex regundo</i>	Verbenaceae	黃荊	Shrub 灌木			*
<i>Zanthoxylum avicemae</i>	Rutaceae	綴欖花椒	Tree 樹木	***		

Notes: (1) Index of local abundance: "*" = rare; "**" = common; "***" = abundant.
備註: 豐富度: "*" = 不常見, "**" = 常見, "***" = 很常見。

(2) Plant species were recorded on 13 March 2002.
以上植物於2002年3月13日記錄。

Table E2 – Bird Species Recorded at Features 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan, Lamma

表 E2 – 在南丫島索罟灣斜坡 15NW-C/C3 和 15NW-C/C4 所記錄到的鳥類。

Scientific name	English name	Chinese name	Abundance
學名	英名名字	中文名字	豐富度
<i>Milvus migrans</i>	Black Kite	黑鳶(麻鷹)	**
<i>Streptopelia chinensis</i>	Spotted Dove	珠頸斑鳩	**
<i>Eudynamys scolopacea</i>	Common Koel	噪鵲	**
<i>Pycnonotus jocosus</i>	Red-whiskered Bulbul	紅耳鸚	***
<i>Pycnonotus sinensis</i>	Chinese Bulbul	白頭鸚	**
<i>Hypsipetes castanonotus</i>	Chestnut Bulbul	栗背短腳鸚	*
<i>Copsychus saularis</i>	Oriental Magpie Robin	鵲鴝	**
<i>Prinia inornata</i>	Plain Prinia	褐頭鷓鴣	**
<i>Orthotomus sutorius</i>	Common Tailor Bird	長尾縫葉鶯	**
<i>Zosterops japonica</i>	Japanese White-eye	暗綠繡眼鳥	**
<i>Sturnus nigricollis</i>	Black-collared Starling	黑領椋鳥	**
<i>Acridotheres cristatellus</i>	Crested Mynah	八哥	**
<i>Pica pica</i>	Common Magpie	喜鵲	**

Notes: (1) In dex of local abundance: "*" = rare; "**" = common; "***" = abundant.
備註： 豐富度： "*" = 不常見; "**" = 常見; "***" = 很常見。

(2) Bird species were recorded on 13 March 2002 and 27 April 2002.
以上鳥類於 2002 年 3 月 13 日及 4 月 27 日記錄。

Table E3 – Butterfly Species Recorded at Features 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan, Lamma

表 E3 – 在南丫島索罟灣斜坡 15NW-C/C3 和 15NW-C/C4 所記錄到的蝴蝶。

Scientific name	English name	Chinese name	Abundance
學名	英名名字	中文名字	豐富度
HESPERIDAE 弄蝶科			
<i>Matapa aria</i>	Common Redeye	瑪弄蝶	*
<i>Tagiadea litigiosus</i>	Water Snow Flat	沾邊裙弄蝶	*
PAPILIONIDAE 鳳蝶科			
<i>Graphium sarpedon</i>	Common Bluebottle	青鳳蝶	**
<i>Chilasa clytia</i>	Common Mime	斑鳳蝶	*
<i>Papilio polytes polytes</i>	Common Mormon	玉帶鳳蝶	***
<i>Papilio helenus</i>	Red Helen	玉斑鳳蝶	**
<i>Papilio protenor</i>	Dark Mormon	藍鳳蝶	*
<i>Papilio paris</i>	Paris Peacock	巴黎翠鳳蝶	***
<i>Papilio bianor</i>	Chinese Peacock	碧鳳蝶	*
PIERIDAE 粉蝶科			
<i>Artogeia canidia</i>	Common White	東方菜粉蝶	**
<i>Hebomoia glaucippe</i>	Great Oragne Tip	鶴頂粉蝶	**
<i>Catopsilia Pomona</i>	Lemon Migrant	遷粉蝶	*
LYCAENIDAE 灰蝶科			
<i>Abisara echerius</i>	Plum Judy	蛇目褐蛺蝶	**
NYMPHALIDAE 蛺蝶科			
<i>Lethe confuse</i>	Common White-banded Brown	白帶黛眼蝶	*
<i>Junonia iphita</i>	Chololate Pansy	鉤翅眼蛺蝶	*
<i>Faunis eumeus</i>	Common Faun	串珠環蝶	***
<i>Athyma perius</i>	Common Sergeant	玄珠帶蛺蝶	**

Notes: (1) In dex of local abundance: "*" = rare; "**" = common; "***" = abundant.
備註： 豐富度： "*" = 不常見; "**" = 常見; "***" = 很常見。

(2) Butterfly species were recorded on 13 March 2002 and 27 April 2002.
以上蝴蝶於 2002 年 3 月 13 日及 4 月 27 日記錄。



Plate E1 - A View of Romer's Tree Frog

圖 E1 - 盧氏小樹蛙的概觀

Source of Photograph: Dr Michael Lau

相片來源：劉惠寧博士

ATTACHMENT F

附件 F

Predicted Noise Level without Mitigation Measures

採取緩解措施前，噪音感應的地方
噪音水平評估

Table F1 – Predicted Noise Levels at the Noise Sensitive Receivers without Mitigation Measures Individual Slope Works at 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan, Lamma

表 F1 – 對噪音感應強地方的估計噪音水平〔採取緩解措施前〕南丫島索罟灣，於 15NW-C/C3 和 15NW-C/C4 的斜坡工程

Receivers Reference (Note 1) 參考編號 〔註 1〕	Closest Slope Reference (Note 1) 最接近斜坡參考 編號〔註 1〕	Slant Distance (m) 斜距 〔米〕	Predicted Noise Level (dB(A)) ^(Notes 3 & 4) 估計噪音水平[(dB(A))] 〔註三及四〕				
			Activity 1 (Note 2) 活動一 〔註 2〕	Activity 2 (Note 2) 活動二 〔註 2〕	Activity 3 (Notes 2 & 5) 活動三 〔註 2 及 5〕	Activity 4 (Note 2) 活動四 〔註 2〕	Activity 5 (Note 2) 活動五 〔註 2〕
SR1	15NW-C/C3	160	60	76	76	57	52
	15NW-C/C4	30	74	90	--	71	66
SR2	15NW-C/C3	40	72	88	88	69	64
	15NW-C/C4	150	60	76	--	57	52
SR3	15NW-C/C3	350	54	70	70	51	46
	15NW-C/C4	220	57	73	--	54	49

- Notes:
備註:
- (1) Refer to Figure A3 in Attachment A for the locations of the sensitive receivers.
感應強地方的位置可參考附件 A 中的圖 A3。
 - (2) Refer to Section 2.1 for details of each activity.
活動詳情可參考第 2.1 部分。
 - (3) Predicted noise levels are obtained based on Technical Memorandum on Noise from Construction Work other than Percussive Piling (EPD, 1998).
估計噪音水平乃根據〈管制建築工程噪音〔撞擊式打樁除外〕技術備忘錄〉釐定。
 - (4) Refer to Table 4 for total sound power levels for each activity.
活動的聲功率級可參考表 4。
 - (5) Activity 3 (rock slope stabilization measures) is not required for feature 15NW-C/C4.
活動三〔石坡鞏固措施〕不適用於斜坡 15NW-C/C4。
 - (6) **77** Denotes predicted noise level exceed the contract requirement of 75 db(A).
77 代表估計噪音水平超過合約要求的 75 分貝。

Table F2 – Predicted Noise Levels at the Noise Sensitive Receivers without Mitigation Measures
Cumulative Effect of Slope Works at 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan,
Lamma

表 F2 – 對噪音感應強地方的估計噪音水平〔採取緩解措施前〕南丫島索罟灣，於 15NW-C/C3
和 15NW-C/C4 的斜坡工程的累積影響

Receivers Reference (Note 1) 參考編號 〔註 1〕	Predicted Noise Level (dB(A)) (Notes 3, 4 & 5) 估計噪音水平〔dB(A)〕〔註三、四及五〕				
	Activity 1 (Note 2) 活動一 〔註 2〕	Activity 2 (Note 2) 活動二 〔註 2〕	Activity 3 (Note 2) 活動三 〔註 2〕	Activity 4 (Note 2) 活動四 〔註 2〕	Activity 5 (Note 2) 活動五 〔註 2〕
	SR1	74	90	76	71
SR2	72.5	88.5	88	69.5	64.5
SR3	59	75	70	56	51

- Notes:
- (1) Refer to Figure A3 in Attachment A for the locations of the sensitive receivers.
感應強地方的位置可參考附件 A 中的圖 A3。
 - (2) Refer to Section 2.1 for details of each activity.
活動詳情可參考第 2.1 部分。
 - (3) Predicted noise levels are obtained based on Technical Memorandum on Noise from Construction Work other than Percussive Piling (EPD, 1998).
估計噪音水平乃根據〈管制建築工程〉噪音〔撞擊式打樁除外〕技術備忘錄釐定。
 - (4) Refer to Table 4 for total sound power levels for each activity.
活動的聲功率級可參考表 4。
 - (5) Summation of noise levels for cumulative effect of slope works is based on Table 4 of the Technical Memorandum as (3) above.
斜坡工程中累積影響的噪音水平之總和乃是根據〈技術備忘錄〉〔見註二〕內之表 4 釐定。
 - (6) **76** denotes predicted noise level exceed the contract requirement of 75 dB(A).
76代表估計噪音水平超過合約要求的 75 分貝。

ATTACHMENT G

附件 G

Predicted Noise Level after Mitigation Measures

採取緩解措施後，噪音感應的地方噪音水平
評估

Table G1 – Reduced Noise Levels at the Noise Sensitive Receivers after Proposed Mitigation Measures – Individual Slope Works at 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan, Lamna

表 G 1 – 對噪音感應強地方的減弱後噪音水平〔採取緩解措施後〕南丫島索罟灣，於 15NW-C/C3 和 15NW-C/C4 的斜坡工程

Receivers Reference ^(Note 1) 參考編號 (註 1)	Closest Slope Reference ^(Note 1) 最接近斜坡參考編號 (註 1)	Slant Distance (m) 斜距 (米)	Reduced Noise Level (dB(A)) ^(Notes 3 & 4) 減弱後噪音水平[(dB(A))] (註三及四)				
			Activity 1 ^(Note 2)	Activity 2 ^(Note 2)	Activity 3 ^(Notes 2 & 5)	Activity 4 ^(Note 2)	Activity 5 ^(Note 2)
			活動一 (註 2)	活動二 (註 2)	活動三 (註 2 及 5)	活動四 (註 2)	活動五 (註 2)
SR1	15NW-C/C3	160	40	56	56	57	52
	15NW-C/C4	30	54	70	--	71	66
SR2	15NW-C/C3	40	52	68	68	69	64
	15NW-C/C4	150	40	56	--	57	52
SR3	15NW-C/C3	350	34	50	50	51	46
	15NW-C/C4	220	37	53	--	54	49

- Notes: (1) Refer to Figure A3 in Attachment A for the locations of the sensitive receivers.
備註：感應強地方的位置可參考附件 A 中的圖 A3。
- (2) Refer to Section 2.1 for details of each activity.
活動詳情可參考第 2.1 部份。
- (3) Reduced noise levels are obtained based on Noise Control on Construction and Open Sites (BSI, 1997), refer to Section 10.1 for assumed attenuation.
減弱後噪音水平乃根據〈建築及露天工地噪音管制〉(BSI, 1997)，參考第 10.1 部份去假設紓緩噪音結果。
- (4) Refer to Table 4 for total sound power levels for each activity.
活動的聲功率級可參考表 4。
- (5) Activity 3 (rock slope stabilization measures) is not required for slopes 15NW-C/C4.
活動〔石坡鞏固措施〕不適用於斜坡 15NW-C/C4。
- (6) **68** denotes reduced noise level.
68 代表減弱後噪音水平。

Table G2 – Reduced Noise Levels at the Noise Sensitive Receivers after Proposed Mitigation Measures
Cumulative Effect of Slope Works at 15NW-C/C3 and 15NW-C/C4 along Sok Kwu Wan, Lamma

表 G 2 – 對噪音感應強地方的減弱後噪音水平〔採取緩解措施前〕南丫島索罟灣，於 15NW-C/C3 和 15NW-C/C4 的斜坡工程的累積影響

Receivers Reference (Note 1) 參考編號 (註 1)	Reduced Noise Level (dB(A)) (Notes 3 & 4) 減弱後噪音水平[(dB(A))]〔註三及四〕				
	Activity 1 (Note 2) 活動一 (註 2)	Activity 2 (Note 2) 活動二 (註 2)	Activity 3 (Note 2) 活動三 (註 2)	Activity 4 (Note 2) 活動四 (註 2)	Activity 5 (Note 2) 活動五 (註 2)
SR1	54	70	56	71	66
SR2	52.5	68.5	68	69.5	64.5
SR3	39	55	50	56	51

- Notes: (1) Refer to Figure A3 in Attachment A for the locations of the sensitive receivers.
備註: 感應強地方的位置可參考附件 A 中的圖 A3。
- (2) Refer to Section 2.1 for details of each activity.
活動詳情可參考第 2.1 部分。
- (3) Reduced noise levels are obtained based on Noise Control on Construction and Open Sites (BSI, 1997), refer to Section 10.1 for assumed attenuation.
減弱後噪音水平乃根據〈建築及露天工地噪音管制〉(BSI, 1997)，參考第 10.1 部份去假設紓緩噪音結果。
- (4) Refer to Table 4 for total sound power levels for each activity.
活動的聲功率級可參考表 4。
- (5) Summation of noise levels for cumulative effect of slope work is based on Table 4 of the Technical Memorandum as (3) above.
斜坡工程中累積影響的噪音水平之總和乃是根據〈技術備忘錄〉〔見註三〕內之表 4 釐定。
- (6) $\overline{77}$ denotes Reduced noise level.
 $\overline{77}$ 代表減弱後噪音水平。

ATTACHMENT H

附件 H

Particular Specification Clauses included in Contract GE/2002/17

工程合約 GE/2002/17 內的特殊條文

- **Pollution Control**
污染控制
- **Waste Management**
廢物處理

POLLUTION CONTROL

污染管制

Add the following Clauses to Section 1 of the GS:-

以下條款加入GS第一節：

Pollution control:

General

污染管制：

一般

1.34A1

(1) The Contractor shall undertake environmental protection measures to reduce the environmental impacts arising from the execution of the Works. In particular, he shall arrange his method of working to minimize the effects on the air, noise, water quality as well as nuisance of waste within and outside the Site, on transport routes and at the loading, dredging and dumping areas.

承建商應採取環境保護措施，減少施工對環境的影響。特別必須在施工方法中進行安排，將地盤內外、運輸通道和卸貨、疏濬、傾卸區域內，施工對空氣、噪音、水質的影響以及廢物的影響減到最小。

(2) The Contractor shall observe and comply with relevant environmental protection and pollution control ordinances. He shall maintain on site, and provide one copy for the Engineer, with copies of the relevant enacted ordinances and their regulations, which shall include but not be limited to the following :

承建商應該了解並遵守相關的環境保護和污染管制條例，應該在地盤存有相關條例和規例的副本，並提供給工程師，其中應包括但不限於以下：

- (a) Air Pollution Control Ordinance (Cap 311);
空氣污染管制條例〔章號 311〕；
- (b) Waste Disposal Ordinance (Cap 354);
廢物處置條例〔章號 354〕；
- (c) Water Pollution Control Ordinance (Cap 358);
水污染管制條例〔章號 358〕；
- (d) Noise Control Ordinance (Cap 400);
噪音管制條例〔章號 400〕；
- (e) Dumping at Sea Ordinance (Cap 466);
海上傾倒物料條例〔章號 466〕；
- (f) Environmental Impact Assessment Ordinance (Cap 499);
環境影響評估條例〔章號 499〕；
- (g) Factories and Industrial Undertakings Ordinance (Cap 59);
工廠及工業經營條例〔章號 59〕；
- (h) Buildings Ordinance (Cap 123);
建築物條例〔章號 123〕；
- (i) Public Health and Municipal Services Ordinance (Cap 132);
公眾衛生及市政條例〔章號 132〕；
- (j) Public Cleansing and Prevention of Nuisances (Regional Council) By-Laws (Cap 132);
(no Chinese translation available) ;
- (k) Public Cleansing and Prevention of Nuisances (Urban

- Council) By-Laws (Cap 132);
(no Chinese translation available) ;
- (l) Summary Offences Ordinance (Cap 228);
簡易程序治罪條例〔章號 228〕；
- (m) Merchant Shipping (Oil Pollution) (Hong Kong) Order 1975;
商業船運〔石油污染〕〔香港〕令 Business Shipping (Oil Pollution) (Hong Kong) Order 1975;
- (n) Waste Disposal (Chemical Waste) (General) Regulation;
廢物處置〔化學廢物〕〔一般〕；規例；
- (o) Air Pollution Control (Open Burning) Regulation;
空氣污染管制〔露天焚燒〕規例；
- (p) Air Pollution Control (Construction Dust) Regulation;
空氣污染管制〔建造工程塵埃〕規例；
- (q) Air Pollution Control (Furnaces Ovens and Chimneys) (Installation and Alteration) Regulation.
空氣污染管制〔火爐、烘路、煙囪〕〔安裝及更改〕規例。

(3) The Contractor shall design, construct, operate and maintain pollution control measures to ensure compliance with the contract provisions as well as the environmental ordinances and their regulations. The Contractor shall also conduct compliance monitoring following a programme as agreed with the Engineer, and submit the monitoring results to the Engineer.

承建商應該設計、實施、運營和維持污染管制措施，確保符合合約規定以及環境條例和規例。承建商亦應該按照工程師認可的程序對符合情況進行監管，並向工程師提交監管結果。

(4) General mitigation measures shall include, but not be limited to the following :

一般的緩解措施應包括但不限於以下：

- (a) The Contractor shall take every precaution to prevent earth, rock or debris from depositing on public or private rights of way as a result of his operations including any deposits arising from the movement of plant or vehicles. In the event of any earth, rock or debris from construction works being deposited on public or private rights of way then all such earth, rock or debris shall be immediately removed and the affected rights of way restored to their original state by the Contractor to the satisfaction of the Engineer.
承建商應該採取一切預防措施防止施工過程中在公共或私人地方堆積土壤、石塊或碎屑，包括移動設備或車輛導致的堆積。如果施工過程中有任何土壤、石塊或碎屑堆積在公共或私人地方，承建商必須立刻清除這些土壤、石塊或碎屑，將受影響的地方恢復到原來的狀態，直到工程師滿意。
- (b) In the event of any spoil or debris from construction

works being deposited on adjacent land or seabed or any silt washed down to any area, then all such spoil, debris or material and silt shall be immediately removed and the affected land or seabed and areas restored to their natural state by the Contractor to the satisfaction of the Engineer.

如果施工中有任何廢物或碎屑堆積在鄰近的土地或海床，或有淤泥沖刷到任何地方，承建商應將所有這些廢物、碎屑、材料和淤泥立刻清除，並將受影響的土地、海床或其他地方恢復到原來的自然狀態，直到工程師滿意。

(5) The Contractor shall make due allowance in his rates and in his programme for the carrying out of the Works in compliance with the environmental protection control requirements under the Contract.

承建商在制定投標價錢和流程圖時應該考慮合約對環境保護管制的要求。

Water pollution control 1.34A2
水質污染管制

(1) The Contractor shall observe and comply with the Water Pollution Control Ordinance and its subsidiary regulation.

承建商應該了解並遵守水污染管制條例及其附屬規例。

(2) The Contractor shall carry out the Works in such a manner as to minimize adverse impacts on the water quality during execution of the Works. In particular he shall arrange his method of working to minimise the effects on the water quality within and outside the Sites and on the transport routes.

承建商在施工中應該盡量將對水質的不良影響減到最小。特別應該在施工方法中進行安排，將地盤內外和運輸通道上水質的影響減到最小。

(3) The Contractor shall follow the practices, and be responsible for all the mitigation measures as specified in the Professional Persons Environmental Consultative Committee Practice Note (ProPECC PN) 1/94 "Construction Site Drainage" issued by the Director of Environmental Protection. The design of the mitigation measures shall be submitted by the Contractor to the Engineer for approval.

承建商應該遵守專業守則，負責“專業人士環保事務諮詢委員會專業守則(ProPECC PN) 1/94 “施工地盤排水”中規定的所有的緩解措施，該守則由環境保護署署長發佈。承建商應該將緩解措施設計交給工程師進行審核批准。

Surface runoff
地面徑流

1.34A3

The Contractor shall contain within the Site all surface runoff generated from foundation works, dust control and vehicle washing, etc.

承建商應該在地盤內，將所有地基工程、抑制塵土和清潔車輛產生的地面水流進行收集。

**Discharge into sewers
and drains**
排放至污水渠及排水
渠

1.34A4

(1) The Contractor shall not discharge directly or indirectly or cause or permit or suffer to be discharged into any public sewer, stormwater drain, channel, stream-course or sea any trade effluent or foul or contaminated water or cooling or hot water without the prior written consent of the Engineer in consultation with the Director of Environmental Protection and Director of Water Supplies, who may as a condition of granting his consent require the Contractor to provide, operate and maintain at the Contractor's own expense to the satisfaction of the Engineer suitable works for the treatment and disposal of such trade effluent or foul or contaminated or cooling or hot water. The design of such treatment works shall be submitted to the Engineer for approval not less than one month before the commencement of the relevant works.

在沒有工程師與環境保護署署長及水務署署長協商發出書面許可的情況下，承建商不應該直接或間接向公共污水管、雨水渠、水渠、水道或海洋排放任何工業廢水、髒水、污水、冷卻水或熱水，或導致、允許、遭受任何此類排放。作為發出許可的條件，環境保護署署長及水務署署長可能要求承建商自己負責出資採取適當的措施，對這些工業廢水、髒水、污水、冷卻水或熱水進行處理和處置。處理工程開始前一個月內，承建商必須將處理設備的設計交給工程師審核批准。

(2) If any office, site canteen or toilet facilities is erected, foul water effluent shall be directed to a foul sewer or to a sewage treatment and disposal facility either directly or indirectly by means of pumping or other means approved by the Engineer. Prior written consent of the Engineer in consultation with the Director of Environmental Protection and Director of Water Supplies shall be obtained before connections are made.

如果修建了任何辦公室、地盤食堂或衛生設施，髒水應以工程師認可的方式，直接或間接通過水泵或其他方法排放到污水管道或污水處理設備，開通排放前必須獲得工程師與環境保護署署長及水務署署長協商發出的書面許可。

Noise control
噪音管制

1.34A5

(1) The Contractor shall observe and comply with the Noise Control Ordinance and its subsidiary regulations.

承建商應該了解並遵守噪音管制條例及其附屬規例。

(2) The Contractor shall ensure that all plant and equipment to be used on the Site are properly maintained in good operating condition and noisy construction activities shall be effectively sound-reduced by means of silencers, mufflers, acoustic linings or shields, acoustic sheds or screens or other means, to avoid disturbance to any nearby noise sensitive receivers.

承建商應該確保地盤使用的所有設備和設施維持在良好的運作狀態，並通過減聲器、消聲器、隔音內墊或屏障、隔音棚或屏風等方法，有效地減小施工作業產生的噪音，以避免干擾任何附近的對噪音敏感的地方。

(3) For carrying out any construction work other than percussive

piling during the time period from 0700 to 1900 hours on any day not being a General Holiday, the Contractor shall comply with the following requirements

在非假日的早上 7 點至晚上 7 點進行衝擊打樁之外的工程，承建商必須遵守以下要求：

- (a) The noise level measured at 1m from the most affected external facade of the nearby noise sensitive receivers from the construction works alone during any 30 minute period shall not exceed an equivalent sound level (Leq) of 75dB(A).
在噪音敏感地方附近最受施工影響的 1 米範圍外測量噪音水平，30 分鐘內噪音水平不得超過 75 分貝。
- (b) The noise level measured at 1m from the most affected external facade of the nearby schools from the construction works alone during any 30 minute period shall not exceed an equivalent sound level (Leq) of 70 dB(A) [65 dB(A) during school examination periods]. The Contractor shall liaise with the schools and/or the Examination Authority to ascertain the exact dates and times of all examination periods during the course of the contract.
在附近學校的最受施工影響的外圍 1 米處測量噪音水平，30 分鐘噪音水平不得超過 70 分貝（學校考試期間為 65 分貝。承建商應該與學校和考試局聯系，確定合同施工期間所有考試的確實日期和時間。
- (c) Should the limits stated in the above sub-clause (a) and (b) be exceeded, the construction shall stop and shall not re-commence until appropriate measures acceptable to the Engineer that are necessary for compliance have been implemented.
如果超過以上條款（a）和（b）中的限制，應停止施工，直到執行了所需的噪音符合標準、工程師認可的適當措施，方可復工。
- (d) The Contractor shall adopt, where necessary, the use of quiet construction equipment (QCE) and/or shall employ the quietest practicable working methods when carrying out demolition works, and/or road opening works during restricted hours.
必要的情況下，承建商應該採用寧靜施工設備，或者在限制時間進行拆除作業或道路開挖時採用最安靜的可行的施工方法。

(4) Before the commencement of any work, the Engineer may require the methods of working, plant equipment and sound-reducing

measures to be used on the Site to be made available for trial demonstration inspection and approval to ensure that they are suitable for the project.

任何施工開始前，工程師可能要求在地盤使用施工方法、施工設備和消音措施，以便進行測試檢查和批准，確保適用於該項目。

(5) The Contractor shall devise, arrange methods of working and carry out the Works in such a manner so as to minimise noise impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure that these methods are implemented.

承建商應該在施工方法中進行設計和安排，盡量將工程對周圍環境的噪音影響減到最小，並提供經過適當培訓並有經驗的人員，這些措施如常確保執行。

(6) Notwithstanding the requirements and limitations set out in sub-clause (3) above and subject to compliance with sub-clauses (2) and (5) above, the Engineer may upon application in writing by the Contractor, allow the use of equipment and the carrying out of any construction activities for any duration provided that he is satisfied with the application which, in his opinion, is considered to be of absolute necessity and adequate noise insulation has been provided to the schools to be affected, or of emergency nature, and not in contravention with the Noise Control Ordinance in any respect.

儘管有以上條款〔3〕提出的要求和限制，以及必須遵守條款〔2〕和〔5〕，工程師可能經過承建商書面申請，允許承建商在任何時間段使用設備進行任何施工作業，前提是他對申請滿意，認為施工是必需的，並且已經對受影響的學校進行隔音，或者認為施工是由於緊急情況，並且與噪音管制條例無任何衝突。

(7) The Contractor shall, when necessary, apply for a construction noise permit in accordance with the Noise Control (General) Regulations prior to the commencement of the relevant part(s) of the works, display the permit as required and provide a copy to the Engineer.

必要的情況下，承建商應該在相關工程開始前，申請符合噪音管制〔一般〕條例的施工噪音許可証，顯示許可證明，及向工程師提供副本。

(8) Measures that are to be taken to protect adjacent schools and other adjacent noise sensitive receivers, if necessary, shall include, but not be limited to, adequate noise barriers. The barriers shall be of substantial construction and designed to reduce transmission of noise (simple plywood hoarding will not be sufficient). The barriers shall be surmounted with baffle boxes designed to reduce transmission of noise. The barriers shall be designed to BS 5228(1984). The location and details of the barriers shall be submitted to the Engineer for approval before works commence adjacent to schools and other noise sensitive receivers.

必要的情況下，保護附近學校和其他噪音敏感地方的措施

應該包括〔但是不限於〕足夠的隔音屏障。屏障應該有一定的施工量，設計為可以減少噪音傳遞〔簡單的夾板並不夠〕。屏障上應該裝有可減少噪音傳遞的防音。屏障應按照 BS 5228(1984)要求設計。在鄰近學校和噪音敏感地方施工前，屏障的位置和細節應交給工程師審查批准。

(9) Notwithstanding the provision in the above sub-clauses of this PS Clause, the Contractor shall ensure that all percussive drilling machines operated on the Site should be muffled.

儘管有以上條款的規定，承建商應該確保地盤內的所有衝擊打樁機器經過消音處理。

(10) Drilling equipment for soil nailing and rock drilling shall be fitted with suitable designed muffler or sound reduction equipment to reduce noise without impairing machine efficiency. Any leaks in air lines shall be sealed. A dampened bit shall be used to eliminate ringing.

打泥釘和鑽岩的打樁設備應裝有適當設計的消音器或減聲設備，以便在不影響機器效率的情況下減消噪音。所有氣喉漏隙必須密封以免洩漏空氣。應使用減震鑽頭防止高聲噪音。

(11) Any stoppage which may be ordered by the Engineer on account of failure to comply with sub-clauses (3)(a), (3)(b) and/or (7) of this PS Clause will not entitle the Contractor to any extension of time for completion or any compensation whatsoever.

由於承建商違反了條款(3)(a)、(3)(b)和/或(7)的規定而可能被工程師命令停工。承建商不會因此條文獲得任何時間延長或補償。

(12) Nothing in this PS Clause shall absolve the Contractor from his responsibility to comply with the provision of the relevant legal requirement.

PS 條款中的任何規定都不免除承建商遵守相關法律要求的責任。

(13) No excavator-mounted breaker shall be used within 125m from any nearby noise sensitive receivers. The Contractor shall use hydraulic concrete crusher whenever applicable.

在噪音敏感地方附近 125 米範圍內不允許使用任何挖土機上的破碎機。如可行，承建商應該使用油壓混凝土破碎機。

(14) For the purpose of the sub-clauses of this PS Clause, any domestic premises, hotel, hostel, temporary housing accommodation, hospital, medical clinic, educational institution, place of public worship, library, court of law, performing arts centre or office building shall be considered as a noise sensitive receiver.

對於 PS 條款中的子條款，任何私人住宅、酒店、旅館、臨屋、醫院、診所、教育機構、公共拜神點、圖書館、法庭、藝術表演中心或辦公建築均被認為是噪音敏感地方。

Air pollution control
空氣污染管制

1.34A6

(1) The Contractor shall observe and comply with the Air Pollution Control Ordinance and its subsidiary regulations, particularly the Air Pollution Control (Open Burning) Regulations and Air Pollution Control (Construction Dust) Regulations and Air Pollution Control (Smoke) Regulations.

承建商應該了解並遵守空氣污染管制條例及其附屬規例，特別是空氣污染管制〔露天焚燒〕規例、空氣污染管制〔建造工程塵埃〕和空氣污染管制〔煙霧〕規例。

(2) The Contractor shall undertake at all times to prevent dust nuisance and smoke as a result of his activities.

承建商應該隨時採取措施阻止施工產生塵埃和煙霧。

(3) The Contractor shall ensure that there will be adequate water supply/storage for dust suppression.

承建商應該確保有足夠的水供應/儲備以便抑制塵埃。

(4) The Contractor shall devise, arrange methods of working and carrying out the works in such a manner so as to minimize dust impacts on the surrounding environment, and shall provide experienced personnel with suitable training to ensure these methods are implemented.

承建商應該在施工方法中進行設計和安排，盡量將塵埃對周圍環境的影響減到最小，並提供經過適當培訓並有經驗的人員確保這些方法如常執行。

(5) Before the commencement of any work, the Engineer may require the methods of working, plant, equipment and air pollution control system to be used on the site to be made available for inspection and approval to ensure that they are suitable for the project.

任何施工開始前，工程師可能要求在地盤使用施工方法、施工設備和空氣污染管制系統，以便進行測試檢查和批准，確保其適用於該項目。

WASTE MANAGEMENT

廢物管理

- General requirements** 1.34A7 **總體要求** The Contractor shall observe and comply with the Waste Disposal Ordinance and its subsidiary regulations.
承建商應了解並遵守廢物處置條例及其附屬規例。
- Waste nuisance control** 1.34A8 **廢物公害管制** The Contractor shall not permit any sewage, waste water or effluent containing sand, cement, silt or any other suspended or dissolved material to flow from the Site onto any adjoining land or allow any waste matter or refuse which is not part of the final product from waste processing plants to be deposited anywhere within the Site or onto any adjoining land. He shall arrange removal of such matter from the site or any building erected or to be erected thereon in a proper manner to the satisfaction of the Engineer in consultation with the Director of Environmental Protection.
承建商不應允許任何含有沙、水泥、泥沙或任何懸浮或可溶解物質的髒水、污水或工業廢水從地盤流入任何鄰近區域，或允許任何廢物或垃圾堆積在地盤內或鄰近區域，除非是經過廢物處理的最終產品。承建商應該以適當的方式從地盤或已修建或將要修建在地盤的建築物安排清除這些廢物，直到工程師與環境保護署署長協商表示滿意。
- Chemical waste control** 1.34A9 **化學廢物管制** (1) The Contractor shall observe and comply with the Waste Disposal (Chemical Waste) (General) Regulation.
承建商應該了解並遵守廢物處置〔化學廢物〕〔一般〕規例。
(2) The Contractor shall apply for registration as chemical waste producer under the Waste Disposal (Chemical Waste) (General) Regulation when chemical waste is produced. All chemical waste shall be properly stored, labelled, packaged and collected in accordance with the Regulation.
承建商如果要產生化學廢物，必須根據廢物處置〔化學廢物〕〔一般〕規例，申請登記為化學廢物產生者。所有化學廢物必須按照規例，進行適當的儲存、標記、包裝和收集。
- Designated public fill stockpile area, fill bank and outlying island transfer facilities** 1.34A10 **指定的公眾填土貯存區、填料庫和離島廢物轉運設施** (1) The Contractor shall deliver construction and demolition (C&D) material (i.e. public fill and C&D waste) generated from the Contract to the designated CED public fill stockpile area at Mui Wo, fill bank at Tseung Kwan O Area 137 as a contingency plan or the designated EPD outlying island transfer facilities at Mui Wo or Yung Shue Wan or Sok Kwu Wan in Lamma Island, or other outlets, if available, may be designated by the Public Fill Committee of the CED. The delivery of C&D material to the designated CED areas at Mui Wo and Tseung Kwan O and EPD facility at Mui Wo shall be by dump trucks, whilst deliveries to the EPD facilities at Lamma Island shall be by village vehicles. In the event that C&D materials are transferred by barge to any of these areas or facilities then the Contractor shall arrange for the C&D materials to be taken off the barge and delivered to the areas or facilities by dump truck or village vehicle. The location plans of these

facilities are attached in Appendix H to this PS. If the Contractor plans to dispose of C&D material at any other public filling facility, he shall inform the Engineer and obtain the Engineer's agreement prior to the disposal.

承建商應該將合約工程中產生的建造及拆卸物料〔即公眾填土和建築廢物〕送到指定的梅窩公眾填土貯存區，或將軍澳第137區填土庫作為急用途，或南丫島的榕樹或索罟灣的環境保護署離島廢物轉運設施，若經土木工程署公眾填土科委員會同意，承建商亦可把公眾填土送到其他指定的填土設施，若該指定設施可供使用。將公眾填土向指定的梅窩及將軍澳土木工程署區域和梅窩環境保護署設施運送時，應該使用卸土卡車，至於向南丫島的環境保護署設施運送的則應該使用鄉村車輛。如果使用駁船運送公眾填土，承建商應該安排卸下公眾填土再用卸土卡車或鄉村車輛運送到指定區。這些區域的位置安排見PS的附錄H。如果承建商計劃在任何公眾填土設施處理公眾填土，則應在開始處理前通知工程師，並獲得許可。

(2) A trip ticket is required for each truck or village vehicle load delivered to the public fill stockpile area, fill bank or outlying island transfer facilities. Dump trucks or village vehicles without trip tickets will be rejected.

每輛運送物料到公眾填土貯存區、填土庫或離島廢物轉運設施的卡車或車輛都要有載運記錄。沒有載運記錄的卸土卡車或鄉村車輛將被拒絕進入。

(3) The dump trucks or village vehicles shall have valid Dumping Licences issued by the Civil Engineering Department (CED) and Environmental Protection Department (EPD) for their respective public filling facilities. Dump trucks or village vehicles without Dumping Licences will be rejected. The application forms for Dumping Licence and the associated condition as stipulated in the Dumping Licence are attached in Appendix H to this PS.

卸土卡車或鄉村車輛應該持有土木工程署和環境保護署對各公共填土區頒發的有效傾卸泥土執照。沒有傾卸泥土執照的卸土卡車或鄉村車輛將被拒絕進入。PS附錄H中有傾卸泥土執照申請表和牌照中規定的相關條件。

(4) The inert C&D materials to be delivered to the public fill stockpile area, fill bank and outlying island transfer facilities shall be in accordance with the conditions stipulated in the Dumping Licences.

要送到公眾填土貯存區、填土庫或離島廢物轉運設施的惰性公眾填土應該符合傾卸泥土執照上規定的條件。

(5) The Contractor shall break down any over-size public fill / C&D material to less than 250mm in size for disposal.

承建商應該將所有過大的公眾填土 / 填土拆小至小於250毫米大小，便於棄置。

(6) The normal opening hours of the CED public fill stockpile area and fill bank are from 8:30 am to 12:00 noon and from 1:00 pm to 6:00

pm Monday to Friday. The Contractor shall be responsible to check the updated time table and opening hours of these areas.

土木工程署公眾填土貯存區和填料庫的一般開放時間為星期一至五早上8:30至中午12:00、下午1:00至晚上6:00。承建商應該負責檢查最新的時間表和這些區域的開放時間。

(7) All waste delivery vehicles have to be weighed at the weighbridges installed at the EPD outlying island transfer facility. The size of waste delivery vehicles shall not exceed the capacity of the individual weighbridges, as follows:-

所有廢物運送車輛都要在環境保護署離島廢物轉運設施的過磅橋進行秤重。廢物運送車輛的大小不能超過每個過磅橋的容量，如下所列：

Weighbridge 過磅橋	Mui Wo 梅窩	Yung Shue Wan, Lamma Island 南丫島榕樹灣	Sok Kwu Wan, Lamma Island 南丫島索罟灣
Capacity 容量	16 tonnes 16噸	10 tonnes 10噸	4 tonnes 4噸
Dimensions (m) 大小〔米〕	4.88 (L) 〔長〕 x 2.59 (W) 〔寬〕	4.87 (L) 〔長〕 x 2.44 (W) 〔寬〕	2.75 (L)〔長〕 x 2.14 (W)〔寬〕

(8) Each of EPD outlying island transfer facility is designed to handle a maximum monthly tonnage, as follows:-

每個環境保護署離島廢物轉運設施均定下每月處理的最大噸數，如下所列：

Outlying Islands Transfer Facility 離島廢物轉運設施	Domestic Waste and C&D Waste (tonnes / month) 家居廢物和 建築廢物 〔噸/月〕	Public Fill (tonnes / month) 公眾填土 〔噸/月〕
Mui Wo 梅窩	9450	6600
Yung Shue Wan 榕樹灣	3900	2550
Sok Kwu Wan 索罟灣	300	255

However, with prior arrangement, the Contractor may request in written to EPD to increase the capacities beyond the maximum tonnage over a short period of time.

但是，經過事先安排，承建商也可以書面要求環境保護署在短期間內增加處理量至最大噸數。

(9) The Contractor shall note that each EPD transfer facility accept only the following types of C&D materials :-

承建商應該注意環境保護署轉運設施只接受下列的公眾填料：

- (a) Any C&D waste with not more than 30% by weight of inert material; and
任何惰性物料重量不超過 30% 的建築廢物；
- (b) Public fill.
公眾填土。

Trip-ticket system for disposal of C&D material

棄置公眾填料的載運記錄制度

1.34A11

(1) The Contractor shall produce a Construction and Demolition Material Disposal Delivery Form (the Form), as per Appendix H to this PS, for each and every vehicular trip transporting C&D material, i.e. public fill or C&D waste, off Site. The Contractor shall complete the Form in duplicate except for the Time of Departure.

承建商應該為每次從地盤運出公眾填料的車輛（即公眾填土或建築廢物）填寫建造及拆卸物料棄置運送表格〔表格〕，見 PS 附錄 H。除了離開時間外，承建商須填寫表格及副本。

(2) Prior to the dump truck or village vehicle leaving the Site, the Contractor shall present to the site supervisory staff the completed Form. The site supervisory staff shall insert the Time of Departure and stamp the Form. The site supervisory staff shall retain a copy of the Form and return the original to the Contractor. The Form shall be carried on board the dump truck or village vehicle at all times throughout the vehicular trip.

卸土卡車或鄉村車輛離開地盤前，承建商應該向地盤監督人員出示填寫好的表格。地盤監督人員應該填上離開時間，然後蓋章。地盤監督人員會保留表格的副本，正本會交還承建商。表格應在卸土卡車或鄉村車輛行車途中放在車上。

(3) For each vehicular trip, the Contractor shall present to the operator of the public fill stockpile area, fill bank or outlying island transfer facility (the Operator) the stamped Form prior to disposal of C&D material. The Operator shall stamp and return the Form to the Contractor together with a computer print-out receipt to acknowledge the disposal of public fill. The Contractor shall submit the stamped Form and original receipt to the Engineer's Representative within 2 working days of the vehicular trip. Late return without any acceptable reason might be regarded as non-compliance by the Engineer's Representative.

對於每架車輛，承建商應該在開始公眾填料處置前，向公眾填土貯存區、填料庫或離島廢物轉運設施的操作員〔操作員〕出示蓋章的表格。操作員應該給表格蓋章，連同一份電腦打印的、並表示已經進行公共填土處置的收據，一起交還承建商。承建商應該在車輛運送完成的兩個工作天內，將蓋了章的表格和收據原件交給工程師代表。如果遲了提交，又沒有可接受的理由，可能會被工程師代表視為違反規定。

(4) The Contractor acknowledges and shall permit the Engineer's Representative to request and obtain information from the operator of the public fill stockpile area, fill bank or outlying island transfer facility verifying the receipt and the accuracy of the information on that receipt.

承建商應該認可並允許工程師代表從公眾填土貯存區、填料庫或離島廢物轉運設施的操作員，確認收據及其準確性。

(5) All C&D material shall become the property of the Contractor when it is removed from the Site.

所有公眾填料被清除離開地盤後成為承建商的財產。

WASTE MANAGEMENT PLAN

廢物管理計劃

Time for submission 提交時間	1.34A12	<p>The Contractor shall submit within 14 days of the date of the Employer's letter of acceptance of the Tender three copies of a waste management plan (WMP) for the Engineer's approval. The Contractor shall review the WMP at monthly intervals and shall submit a revised and updated WMP if necessary. If and when the Engineer is of the opinion that the WMP does not meet the requirements of the Contract, the Engineer may by notice in writing require the Contractor to revise or update the WMP and the Contractor shall comply with that requirement within 7 days of the date of the notice.</p> <p>承建商應該在僱主發出投標接受信後 14 日內，提交廢物管理計劃〔計劃〕〔三份副本〕給工程師審核批准。承建商亦應每月審核計劃，並在有需要的地方修改及更新計劃。如果工程師認為計劃不符合合約要求，工程師可以書面通知承建商，要求修改或更新計劃，承建商應該在發出通知後 7 日內達到要求。</p>
Organization 機構	1.34A13	<p>The Contractor shall include in the WMP, a chart setting out the roles and responsibilities of the Contractor's personnel responsible for waste management and appropriate mitigation measures.</p> <p>承建商須在廢物管理計劃中附上一張表格列出承建商負責廢物管理的人員的職務和責任，以及適當的緩解措施。</p>
Analysis of Construction and Demolition (C&D) Material 公眾填料分析	1.34A14	<p>The Contractor shall include in the WMP an analysis of when, what quantities and type of construction and demolition (C&D) material are anticipated to be generated in the course of the execution of the Works.</p> <p>承建商須在廢物管理計劃中，在工程施工期間所產生公眾填料的預計時間、數量和類型。</p>
Classification of C&D Material 公眾填料分類	1.34A15	<p>The Contractor shall classify and list in the WMP the types and quantities of C&D material generated according to the following categories:-</p> <p>承建商應該在廢物管理計劃中根據以下類目對公眾填料的類型和數量進行分級並列出：</p> <p>(a) Inert portion of C&D material (public fill): 公眾填料〔公眾填土〕中惰性物料的部分：</p>

- (i) public fill that can be reused and/or recycled to enable it to be reused in the Contract
可再利用和/或循環再造的公眾填土，可在合約工程中再使用；
- (ii) surplus public fill to be delivered to public filling facilities
將被運送到公眾填土設施的過剩公眾填土；
- (iii) surplus public fill to be delivered and reused at the Contractor's own outlets as approved by the Engineer.
經過工程師允許下，將被運送到承建商所屬的地方再次利用的公共填土。

(b) Non-inert portion of C&D material (C&D waste), including general refuse:
公眾填料〔建築廢物〕中非惰性的部分，包括一般垃圾：

- (i) Chemical waste
化學廢物；
- (ii) C&D waste to be recycled
將被循環再造的建築廢物；
- (iii) C&D waste to be re-used
將被再次使用的建築廢物；
- (iv) C&D waste to be returned
將被返還的建築廢物；
- (v) C&D waste which cannot be reused or recycled and has to be disposed of at landfill sites.
不能再利用或循環再造並必須在填土場處置的建築廢物。

**Avoidance/
minimization of C& D
material**
避免/減少產生公眾填
料

1.34A16 The Contractor shall submit proposals for avoidance/ minimization of the generation of C&D material. These may include, but are not limited to, programming of works, good site management to minimize over ordering and cross contamination, improving site practice, the use of metal formwork, the use of excavated material for filling, etc.
承建商應該提交避免/減少產生公眾填料的建議書。這應該包括〔但不限於〕施工計劃、良好的地盤管理以避免訂購過量物料和交叉污染減到最少、改進地盤施工操作、使用金屬模板、將挖掘出的物料用於填滿等等。

Sorting facilities
分類工具

1.34A17 The Contractor shall identify and show in the WMP a specific area on Site to facilitate sorting of C&D material. The sorting should be carried out as per the classification and should include the separation of C&D material into public fill, C&D waste for proper disposal, as well as the

sorting of C&D material by category to facilitate re-use/recycling/return.

承建商應該在廢物管理計劃中確定並標明地盤上用於分類公眾填料的特定地方。分類應該按每個種類進行，並將公眾填料分成公眾填土和可以適當處置的建築廢物，並按門類將物料分類以便再利用/循環再造/返還。

Proposal for handling, recycling and return of C & D material

公眾填料處理、循環再造和返還建議書

1.34A18

The Contractor shall submit a proposal for handling, recycling, re-use and return of the suitable C&D material which should include:

承建商應該提交一份適當的公眾填料處理、循環再造、再利用和返還的建議書，包括：

- (a) Concrete/brick/aggregates
混凝土/磚頭/集料
- (h) Timber
木材
- (c) Paper/Cardboard
紙/紙板
- (d) Metal
金屬
- (e) Others (e.g. plastic, foam board etc.)
其它（例如塑料、泡沫板等）

Chemical waste
化學廢物

1.34A19

The Contractor should identify chemical waste which will be generated from construction activities, and propose means of packaging, labelling, storage, transportation and disposal in accordance with statutory regulations.

承建商應該確定施工中會產生的化學廢物，按照法律規定，建議包裝、標誌、儲存、運輸和處置的方法。

General refuse
一般垃圾

1.34A20

The Contractor should submit a proposal for minimizing, storage and disposal of general refuse. The proposal should include how recyclable material can be separately collected to facilitate recycling.

承建商應該提交一份減少、儲存和處置一般垃圾的建議書。建議書應該包括如何將可循環再造的物料分類收集，以便於循環再造。

Disposal of surplus C & D material
過剩的公眾填料棄置

1.34A21

Surplus C&D material disposal arrangement shall follow the policy set out in WBTC No. 21/2002 "Trip-ticket System for Disposal of Construction and Demolition Material". The Contractor shall specify the disposal outlets and propose the means of transportation of the C&D material.

過剩的公眾填料棄置安排應該遵守 WBTC No. 21/2002 “建造及拆卸物料處置的運載記錄制度”中規定的政策。承建商應該說明棄置填料的地点，並建議公眾填料的運輸方法。

Site cleanliness
地盤清潔

1.34A22 The Contractor shall submit a proposal of how he will maintain the Site in a clean and tidy condition. The proposal shall include a daily checklist to facilitate the Engineer to check the Contractor's compliance in implementing this proposal.

承建商應該提交一份如何將地盤保持清潔整齊的建議書。建議書應包括一份日常檢查清單，以便工程師檢查承建商遵守建議書的情況。

Monitoring and auditing proposal
監察和審核建議書

1.34A23 The Contractor shall submit a monitoring and auditing proposal to ensure that the requirements of the WMP are properly implemented and to facilitate the Engineer to audit the Contractor's performance in implementing the WMP.

承建商應該提交一份監察和審核建議書，確保廢物管理計劃的要求如期執行，以便工程師審核承建商執行計劃的情況。

Records
記錄

1.34A24 The Contractor shall keep adequate and proper records (such as delivery docket, photographs and measurement records) relating to the implementation of the WMP and submit such records of each calendar month to the Engineer within the first week of the following calendar month.

承建商應該對廢物管理計劃的執行情況保持足夠和適當的記錄〔例如，運送記錄表、照片和測量記錄〕，並將每月的記錄在下個月的第一週內交給工程師。

Report
報告

1.34A25 The Contractor shall be required to submit a report on the implementation of the WMP in a form to be agreed by the Engineer after the completion of the Contract. The report shall include the following information and any other information as the Engineer may consider appropriate:

承建商將被要求在合約工程完成後，以工程師認可的方式，提交廢物管理計劃執行情況的報告。報告應該包括以下資料和工程師所需的其他資料：

- (a) the quantities of different types of C&D material as estimated at the commencement of the Contract;
合約工程開始時預算的各種公眾填料的數量；
- (b) a statistics on the monthly quantities of different types of C&D material generated and their disposal method;
and
每月產生的各種公眾填料的數量及其棄置方法；
- (c) reasons for any significant difference between the estimated quantities at (a) and the actual quantities at (b).
預算數量(a)和實際數量(b)出現差異的主要原因。

Other environmental control
其他環境管制措施

1.34A26 (1) Without prejudice to the generality of GCC Clause 30, any vehicle with an open load compartment used for transferring dusty materials off Site shall have properly fitted side and tail boards. Dusty materials shall not be loaded to a level higher than the side and tail

boards, and shall be covered by a suitable tarpaulin (or any other impervious covering material as approved by the Engineer) in good condition before leaving the Site. The tarpaulin shall be properly secured and extended at least 300 mm over the edges of the side and tail boards and be properly secured and maintained throughout the journey to the off-loading destination.

在不損害 GCC 條款 30 的一般性的情況下，任何有露天貨斗用於運載易生塵埃物料離開地盤的車輛，都應該有適當的側面和後面擋板。易生塵埃物料離開地盤前應該用適當的防水油布〔或工程師批准的任何不透水覆蓋材料〕覆蓋。防水油布應該有適當的保護，並在車輛側面和後面擋板邊緣伸出 300 毫米，在運送到卸貨目的地的過程中要有良好的保護和維護。

(2) For the purpose of sub-clause (1) of this clause, "dusty materials" include but are not limited to cement, earth, pulverized fuel ash, aggregates, silt, stonefines, sand, debris, saw dust and wooden chips.

在本條款子條款〔1〕中，“易生塵埃物料”包括但不限於水泥、土壤、粉煤灰、集料、淤泥、石碎、沙、碎屑、木屑和木條。

(3) The Contractor shall not light fires on any Site for the burning of debris or other materials.

承建商不應該在任何地盤點火焚燒碎屑或其他物料。

(4) The Contractor shall not do or permit anything to be done within any Site that may become a nuisance or annoyance to occupants of nearby premises.

承建商不應該允許在地盤內進行任何可能危害或干擾附近房屋的行為。

(5) The Contractor shall not install any furnace, boiler or other equipment or use any fuel that may produce air pollutants without the prior written consent of the Director of Environmental Protection.

承建商在未獲得環境保護署署長書面許可前，不應該安裝任何火爐、鍋爐或其他可能產生空氣污染的設備，或使用任何可能產生空氣污染的燃料。