

PROJECT PROFILE

工程項目簡介

The University of Hong Kong  
香港大學

Reprovisioning and Upgrading of  
Salt Water Service Reservoirs in  
Western District for Water Supplies  
Department

為水務署重置及改善西區海水配水  
庫

April 2007  
二零零七年四月

**Environmental Resources Management**

香港環境資源管理顧問有限公司

21/F Lincoln House

979 King's Road

Taikoo Place

Island East, Hong Kong

香港英皇道九七九號太古坊林肯大廈二十一樓

Telephone: (852) 2271 3000

Facsimile: (852) 2723 5660

E-mail: [post.hk@erm.com](mailto:post.hk@erm.com)

<http://www.erm.com>

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For and on behalf of 代表 Environmental Resources Management 香港環境資源管理顧問有限公司
Approved by: _____ Steve Duckworth 批核: _____ 鄧瑋庫
Signed: _____ 簽署
Position: _____ Deputy Managing Director 職位: _____ 副董事總經理
Date: _____ 3 April 2007 日期: _____ 二零零七年四月三日

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# **1 BASIC INFORMATION**

## **1.1 PROJECT TITLE**

Reprovisioning and Upgrading of Salt Water Service Reservoirs in Western District for Water Supplies Department (the Project)

## **1.2 NAME OF PROJECT PROPONENT**

The University of Hong Kong (HKU)

## **1.3 NAME AND TELEPHONE NUMBERS OF CONTACT PERSONS**

Mr Kenneth Wong, Director of Estates, Estates Office, HKU

Tel: 2816 8255

## **1.4 LOCATION OF THE PROJECT**

The two proposed salt water service reservoirs are to be located in rock beneath the northern hill slopes of Lung Fu Shan immediately adjacent to the present Water Supplies Department (WSD) facilities, south of Pok Fu Lam Road (the Site). The location and general arrangement of the Site are presented in *Figure 1.1*. To minimise environmental impacts, the two salt water service reservoirs will be housed entirely in a rock cavern. In addition to the area of excavation, two areas for the temporary stockpiling of spoil and an area for on-site treatment of construction effluents are required.

## **1.5 PROJECT BACKGROUND**

WSD has occupied the Site for more than 60 years as the primary location for storage and distribution of salt and fresh water to Western Mid-levels, Kennedy Town and the Peak. In view of the age of the water storage facilities, consideration has been given to upgrading them. At present, salt water is stored in two concrete surface reservoirs and fresh water in one underground reservoir. An opportunity now arises to upgrade and reprovide these facilities as a result of the HKU's proposals to develop its Centennial Campus adjacent to the Site.

HKU has adopted sustainability as one of the guiding principles for its Centennial Campus Development. In formulating the preliminary design scheme for reproviding the salt water service reservoirs, the same principle has been followed and thorough consideration has been given to ensuring the environmental acceptability of the scheme during its construction and operation as well as enhancing HKU's vision of the future campus as a green oasis in the Western District.

Recognising that the Site has significant environmental value being located adjacent to a Country Park, HKU has undertaken its own environmental assessment to help to identify the optimal approach in which to provide the new water storage facility. We have determined that the provision of new surface reservoirs would require significant slope cutting and the loss of tree cover, which is both environmentally unacceptable and aesthetically inappropriate. Therefore it has been decided that the most environmentally responsible course of action is to relocate the salt water reservoirs in a cavern structure within the hillside. The technology involved is proven and has been used in many parts of the world but this will be the first application for water storage in Hong Kong. Adopting this method will result in no loss of existing trees and vegetation on the Site and therefore no disturbance to the existing ecology. We also believe that a single portal in rock will be more visually acceptable than extensive shotcreted cut slopes.

## **1.6** *ADDITIONAL ENVIRONMENTAL BENEFITS*

The rock cavern of the proposed scheme will be excavated using non-explosive rock tunnelling methods. No blasting will be required in the construction of the project, thereby avoiding any negative vibration and potential safety impacts. The design of the proposed scheme and the associated construction arrangements provide for far better control of potential dust and noise impacts as most of the construction activities will be contained within the rock cavern itself once the access portal and initial section are excavated. Excavation of the rock cavern will generate mainly hard rock materials, which can be reused in other projects.

Thus, compared with engineering options that require extensive slope cutting, the proposed scheme offers significant environmental benefits and represents the outcome of a lengthy, detailed and thorough design process involving not only external consultants but also in-house expertise among the HKU academic staff.

## **1.7** *PROJECT PROFILE*

The rock cavern will comprise two salt water storage tunnels connecting to a common section leading to an access portal. It will be excavated using a non-explosive drill-and-break tunnelling method. Tunnel boring machine (TBM) and blasting will not be used in the construction of the Project. As the Site can be accessed via the access road leading from Pok Fu Lam Road to the existing WSD facilities, formation of new access road and/or haul road will not be required. The cavern will be lined with concrete and the water storage reservoirs will be constructed from reinforced concrete.

Each of the two water storage tunnels of the rock cavern will be approximately 60 m in length and 17 m in span. These storage tunnels will be connected to a common section of approximately 40 m in length and 8 m in span, which will lead to an access portal on the hill slope. The internal tank dimensions of each of the salt water service reservoirs will be 46.8m (L) x 15m

(W) x 9m (H) approximately. The two reservoirs are designed to provide a combined saltwater storage capacity of 12,000m<sup>3</sup>.

The rock cavern with the two salt water service reservoirs will be handed over to and operated by WSD upon their completion.

**1.8 NUMBER AND TYPE OF DESIGNATED PROJECTS TO BE COVERED BY THE PROJECT PROFILE**

The Project involves the construction of the two reprovisioned service reservoirs entirely within rocks and is classified as a Designated Project (DP) under Item Q.2, ie “underground rock caverns”, of Schedule 2 Part I of the *Environmental Impact Assessment Ordinance (EIAO)* (Cap 499).

**2 OUTLINE OF PLANNING AND IMPLEMENTATION PROGRAMME**

HKU has appointed Black & Veatch Hong Kong Ltd (B&V) as the consultant to prepare the scheme design of the Project. The construction of the Project will be carried out by Gammon Construction Ltd (Gammon) under a design-and-construct contract arrangement. Upon the completion of construction works and commissioning tests, the Project will be handed over to WSD for operation.

The currently envisaged key target dates for the Project are presented in *Table 2.1a*.

**Table 2.1a Tentative Project Programme**

<b>Activity</b>	<b>Tentative Dates</b>
Portal/ Access Tunnel Construction	July 2007 to September 2007
Excavation for Reprovisioned Salt Water Reservoirs	September 2007 to July 2008
Construction of Reprovisioned Salt Water Reservoirs	July 2008 to December 2008
Commissioning of Reprovisioned Salt Water Reservoirs	September 2009
Handing over of Reprovisioned Salt Water Reservoirs to WSD	September 2009

The Project will be constructed at the same time as the adjacent works associated with the rearrangement and reprovisioning of other WSD facilities to vacate land for the HKU Centennial Campus development. These concurrent activities associated with other WSD facilities are envisaged to include:

- demolition of the existing Western No. 2 Salt Water Service Reservoir;
- construction of a fresh water service reservoir on the site of the existing Western No. 2 Salt Water Service Reservoir;

- slope stabilisation works for the construction of a pipe gallery and an emergency vehicle access (EVA);
- construction of the pipe gallery and laying of water pipes;
- construction of the EVA; and
- landscaping works.

### 3 MAJOR ELEMENTS OF THE SURROUNDING ENVIRONMENT

The Site is in an area where existing WSD facilities, including fresh water and salt water service reservoirs, are located. The existing environment of the Site and its surroundings were reviewed and sensitive receivers were identified in accordance with the guidelines of the *Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)*.

#### 3.1.1 Noise

Noise Sensitive Receivers (NSRs) have been identified in accordance with the criteria stipulated in Annex 13 of the *Technical Memorandum on Environmental Impact Assessment Process (EIAO-TM)*. Representative NSRs facing the Site were selected to evaluate the noise impact. The locations of these NSRs are presented in Figure 3.1 and listed in Table 3.1a.

Table 3.1a Representative Noise Sensitive Receivers

NSR No.	Description	Type of Use	Building Height	Horizontal Distance from the Portal (m)
N1	Chow Yei Ching Building, HKU	Educational institution	15-storey	170
N2	Yam Pak Building, HKU	Educational institution	5-storey	225
N3	St Paul's College Primary School	Educational institution	6-storey	240
N4	Tower 3, The Belcher's	Residential premises	44-storey	190
N5	Lady Ho Tung Hall	Residential premises	20-storey	130
N6	Starr Hall	Residential premises	25-storey	120
N7	To Li Garden	Residential premises	17-storey	130
N8	Block 1, Academic Terrace	Residential premises	26-storey	140

Chow Yei Ching Building houses lecture theatres and offices, while Yam Pak Building houses a number of research facilities. The lecture theatres at Chow Yei Ching Building are provided with central air-conditioning system and no windows. The remaining rooms of Chow Yei Ching Building are provided with central air-conditioning system. Rooms in Yam Pak Building are provided with window-type air-conditioners. The occupants of both buildings do not rely upon open windows for ventilation, and therefore the *EIAO-TM* criterion does not apply to these NSRs.

While the existing WSD staff quarters to the north of the existing WSD facilities will be retained for reuse as part of the future Centennial Campus, they are currently vacant and will no longer be used for residential purpose in the future and therefore are not selected as NSRs.

With reference to *Pok Fu Lam Outline Zoning Plan (OZP) No. S/H10/15*, there are no planned NSRs located near the Site and there are no rezoning applications under the *Town Planning Ordinance (TPO) (Cap 131)* in the vicinity of the Project. Certain buildings of the HKU Centennial Campus, which is targeted to be completed in 2012, may be potential NSRs during the operational phase of the Project. A representative NSR location within the Centennial Campus at approximately 40m from the Project is selected for the operational noise assessment and is designated as N9 in *Figure 3.1*.

### 3.1.2 *Air Quality*

The Air Sensitive Receivers (ASRs) are the same as the NSRs indicated in *Section 3.1.1* and *Figure 3.1*.

### 3.1.3 *Water*

There are two existing streams to the west and the east of the Site respectively. The construction works for the Project will not encroach on these streams and therefore will not affect these water bodies.

### 3.1.4 *Ecology*

Ecological surveys on terrestrial ecological resources including habitat, vegetation, mammals, birds, butterflies, dragonflies and herpetofauna were conducted on 19, 24 and 29 May 2006, and 19 and 20 March 2007. Night-time surveys were conducted on 24 May 2006 and 20 March 2007. The Study Area considered was an area extending a distance of 500 m from the boundary of the Site in accordance with *Annex 16* of the EIAO-TM. The habitat map for the Study Area is shown in *Figure 3.2* and the survey transects and sampling points of the wildlife surveys conducted are shown in *Figure 3.3*.

#### *Habitat and Vegetation*

Secondary woodland, plantation, natural stream and developed area were recorded within the Study Area. Developed area, which was mainly occupied by buildings and roads, was the predominant habitat within the Study Area. A total of 94 plant species were found within the Study Area. Three plant species of conservation interests including *Artocarpus hypargyrea*, *Pavetta hongkongensis* and *Aquilaria sinensis* were recorded in the secondary woodland of the Study Area (*Table A1* of *Annex A*).

The area of and plant species found within each habitat are summarised in *Table 3.1b*.



**Table 3.1b** *Area and Number of Plant Species in Each Habitat within the Study Area*

Habitat	Area (ha) or Length (km)	Number of Plant Species
Secondary Woodland	29.7 ha	75
Plantation	1.8 ha	20
Streams		16
	S1 – 110 m	
	S2 – 176 m	
Developed Area	74.6 ha	28
The Site	0.02 ha (including the cavern portal, stockpile zones and on-site construction effluent treatment system but not the rock cavern itself which is located below ground)	17

### Secondary Woodland

Secondary woodland was recorded at Lung Fu Shan to the south of the existing WSD facilities. The secondary woodland was dominated by a number of native tree species such as *Machilus breviflora*, *Machilus velutina*, *Cinnamomum camphora*, *Mallotus paniculatus*, *Sterculia lanceolata* and *Acromychia pedunculata*. The understorey was densely vegetated and dominated by woody species and climbers including *Cratoxylum cochinchinensis*, *Litsea rotundifolia*, *Rhodomyrtus tomentosa*, *Ilex asprella*, *Smilax glabra*, *Tetracera asiatica* and *Gnetum montanum*. A nationally protected tree, *Artocarpus Artocarpus hypargyrea*, a locally protected shrub species *Pavetta Pavetta hongkongensis* and a nationally protected tree species Incense Tree *Aquilaria sinensis* were identified within the woodlands. The location of plant species of conservation interests are shown in *Figure 3.4*. The woodlands were mature in age with a well-developed canopy reaching a height of 10 to 15 m and dense understorey. The woodlands were remaining intact and natural. Disturbance from human activities was limited to the construction of trails and resting areas. The ecological value of the woodland was high and it was the habitat supporting the three protected plant species mentioned above and some climax tree species. The photographic records of the secondary woodland are presented in *Figure 3.5*.

### Plantation

Plantation was found on the slope between Pok Fu Lam Road and the existing WSD facilities. The canopy was 6 to 15m in height and the plants were mostly exotic, including *Acacia confusa*, *Lophostemon conferta* and *Casurina equisetifolia*. The understorey was occupied by some native shrubs and grasses, including *Litsea glutinosa*, *Ligustrum sinense*, *Sterculia lanceolata*, *Celtis chinensis*, and *Broussonetia papyrifera*, and was simple in species composition. Slope stabilisation work was carried out for the eastern portion of the slope. As a result, shrubs and herbs of the understorey were removed and replaced with hydroseeding of grasses. The understorey of the plantation was bare with limited vegetation cover. In general, the ecological value of the

plantation was low. The photographic records of plantation are shown in *Figure 3.6*.

### Seasonal Streams

Two seasonal streams, labelled S1 and S2 in *Figures 3.2 to 3.4*, were found within the Study Area. Stream S1 flowed in a westerly direction from Lung Fu Shan towards the Pok Fu Lam Road Playground. Stream S2 flowed in a generally northerly direction from Lung Fu Shan towards Chow Yei Hing Building of HKU. The streams remained natural with rocky substratum and close canopy. Limited water flow was recorded during the surveys. The ecological value of the two natural seasonal streams was moderate.

### Developed Areas

Developed Areas, including Kennedy Town, Shek Tong Tsui, the existing HKU campus and the existing WSD facilities, were found for a major portion of the Study Area. The key features of this habitat type include buildings, roads, landscape areas and gardens. The plant species recorded, such as *Aleurites moluccana*, *Delonix regia* and *Acacia confusa*, were planted mainly for landscaping purpose. This habitat was highly developed with negligible ecological value. The photographic records of developed area are shown in *Figure 3.7*.

### The Site

The rock cavern within the Site is located underneath the secondary woodland to the south of the existing WSD facilities. There are also a number of small above-ground areas within the Site, including the portal area, the stockpile zones and the on-site construction effluent treatment plant. These above-ground areas of the Site consisted of developed area (0.01 ha) and plantation (0.01 ha). A total of 17 plant species were recorded within the Site (not including the plant species recorded within the secondary woodland located above the cavern), and all of them are commonly found in Hong Kong.

### *Wildlife*

#### Terrestrial Mammals

No mammals were recorded during the surveys.

#### Birds

Forty-two bird species were recorded during the quantitative and qualitative surveys (*Table A2 of Annex A*). There were no birds recorded during the night surveys. There were six bird species of conservation interest, including Black Kite *Milvus migran*, Greater Coucal *Centropus sinensis*, Hwamei *Garrulax canorus*, Lesser Coucal *Centropus sinensis*, Crested Goshawk *Accipiter trivirgatus* and Yellow-crested Cockatoo *Cacatua sulphurea*, encountered during the surveys, and they were mainly perching or soaring in the sky within the Study Area. Except Yellow-crested Cockatoo, all of them are recognised as Class II

protected species in the Peoples' Republic of China (PRC). Hwamei is also listed in *Appendix II* of the *Convention on International Trade in Endangered Species of Wild Flora and Fauna* (CITES). Yellow-crested Cockatoo is also listed as critically endangered by the International Union for the Conservation of Nature and Natural Resources (IUCN) and is listed in *Appendix I* of CITES. The locations of bird species of conservation value are shown in *Figure 3.4*. Since the Black Kites were commonly found soaring in the sky within the Study Area, the exact locations of the bird were not shown.

The estimated bird abundance and recorded number of bird species within the major habitats of the Study Area are summarised in *Table 3.1c*. The highest bird abundance and bird species were recorded at the plantation and secondary woodland respectively.

**Table 3.1c** *Mean Abundance and Number of Bird Species in Different Types of Habitat in the Study Area*

Habitat	Secondary Woodland	Plantation	Developed Area
No. of species	33	18	18
Number of individuals	286	83	193
Abundance (no. of individuals/ ha/survey point/survey day)	57	74	38

#### Invertebrates

- **Butterflies:** A total of 24 species of butterflies were recorded during the surveys (*Table A3* of *Annex A*). The secondary woodland habitat has the highest number of butterfly species recorded (22 out of the 24 species). The secondary woodland was also recorded to have the highest number of individual butterflies (67 individuals). The number of butterfly species and total number of individuals recorded in each type of habitat of the Study Area are summarised in *Table 3.1d*.

**Table 3.1d** *Butterfly Species Recorded in Each Habitat of the Study Area*

Habitat	Secondary Woodland	Plantation	Developed Area
No. of species	22	1	2
No. of individuals	67	3	2
No. of uncommon species	4	0	1

Among the 24 butterfly species recorded, five are uncommon in Hong Kong. The five uncommon species include Formosan Swift *Borbo cinnara*, Silver Streak Blue *Iraota timoleon*, Common Nawab *Polyura athamas*, Constable *Dichorragia nesimachus*, White Commodore *Parasarpa dudu*. The locations of butterfly species of conservation interests recorded within the Study Area are shown in *Figure 3.4*. The food plants of butterfly species of conservation interests are shown in *Table 3.1e*.

**Table 3.1e Food Plants of Butterfly Species of Conservation Interests**

Common Name	Species Name	Status	Food Plant
Formosan Swift	<i>Borbo cinnara</i>	Uncommon	<i>Apluda mutica</i> , <i>Paspalum conjugatum</i> , <i>Setaria palmifolia</i>
Silver Streak Blue	<i>Iraota timoleon</i>	Uncommon	<i>Ficus superba</i> var. <i>japonica</i>
Common Nawab	<i>Polyura athamas</i>	Uncommon	<i>Abarema clypearia</i> , <i>Albizia lebbek</i> , <i>Leucaena leucocephala</i>
Constable	<i>Dichorragia nesimachus</i>	Uncommon	<i>Meliosma fordii</i> , <i>Meliosam rigida</i>
White Commodore	<i>Parasarpa dudu</i>	Uncommon	<i>Lonicera confusa</i> , <i>Lonicera macrantha</i>

- **Dragonflies:** Only one dragonfly species, Wandering Glider *Pantala flavescens*, was recorded in the Study Area during the survey (Table A4 of Annex A). It is abundant or commonly found in Hong Kong. The highest number of individuals was recorded in the secondary woodland habitat.

### Herpetofauna

A total of three species of reptiles (Changeable Lizard, Reeves' Smooth Skink and Bowring's Gecko) and four species of amphibians (Green Cascade Frog, Asian Common Toad, Paddy Frog and Lesser Spiny Frog) were recorded in the Study Area (Table A5 of Annex A). The locations of the uncommon amphibian Lesser Spiny Frog are presented in Figure 3.4. The remaining species are common locally.

### Stream Macro-fauna

No aquatic fauna was recorded within the seasonal streams, which may be due to the limited water flow during the surveys.

### *Ecological Evaluation*

The ecological importance of the habitats and wildlife identified within the Study Area is evaluated in accordance with the criteria stipulated in Annex 8 of the EIAO-TM. The evaluation is based upon the information presented. The ecological importance of each habitat type within the Study Area is presented in Tables 3.1f to 3.1j. Evaluation of the floral and faunal species of ecological interest recorded within the Study Area is provided in Table 3.1k.

**Table 3.1f** *Ecological Evaluation of Secondary Woodland*

<b>Criteria</b>	<b>Secondary Woodland</b>
Naturalness	Natural habitat with minor development in the form of exercise trail and concrete path
Size	Secondary woodland with an overall size of approximately 29.7 ha
Diversity	Moderate for vegetation (a total of 75 species for the whole area, mostly native trees and shrubs), and faunal diversity
Rarity	Species of conservation interest included Artocarpus, Incense Tree, Pavetta, Crested Goshawk, Hwamei, Black Kite, Lesser Coucal, Silver Streak Blue, Common Nawab, Constable and White Commodore
Re-creatability	Habitat characteristics and species composition are difficult to be recreated. It will take more than 30 years for the secondary woodland to be re-created.
Fragmentation	Secondary woodland mainly exists as a continuous patch.
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity
Potential Value	High
Nursery /Breeding Ground	Nil
Age	Mature
Abundance/ Richness of Wildlife	Moderate for avifauna and butterflies, low for dragonfly
<b>Overall Ecological Value</b>	<b>High</b>

**Table 3.1g** *Ecological Evaluation of Plantation*

<b>Criteria</b>	<b>Plantation</b>
Naturalness	Man-made habitat dominated by exotic plants
Size	Exotic plantation with an overall size of 1.8 ha Approximately 0.01ha of plantation located within the Site
Diversity	Low diversity of plant (20 species), low diversity of fauna.
Rarity	Bird species Black Kite was recorded
Re-creatability	Habitat characteristics and species composition are easy to recreate. It will take around 5 to 10 years for the plantation to be re-created.
Fragmentation	Not applicable
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity.
Potential Value	Low
Nursery/ Breeding Ground	Species of conservation interest included Black Kite
Age	Young (10 years) based on tree size, woodland structure and species composition
Abundance/ Richness of Wildlife	Low abundance for wildlife
<b>Overall Ecological Value</b>	<b>Low</b>

**Table 3.1h** *Ecological Evaluation of Seasonal Streams*

<b>Criteria</b>	<b>Seasonal Stream S1</b>	<b>Seasonal Stream S2</b>
Naturalness	Natural.	Natural.
Size	The total length was approximately 110 m with rocky substratum	The total length was approximately 176 m with rocky substratum.
Diversity	Low for plant and no aquatic fauna recorded.	Low for plant and no aquatic fauna recorded.
Rarity	Not applicable	Not applicable
Re-creatability	Re-creatable	Re-creatable
Fragmentation	Not applicable	Not applicable
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity	Not functionally linked to any highly valued habitat in close proximity
Potential Value	Moderate ecological potential	Moderate ecological potential
Nursery/Breeding Ground	No significant nursery or breeding ground recorded	No significant nursery or breeding ground recorded
Age	Not applicable	Not applicable
Abundance/ Richness of Wildlife	Not recorded	Not recorded
<b>Overall Ecological Value</b>	<b>Moderate</b>	<b>Moderate</b>

**Table 3.1i** *Ecological Evaluation of Developed Area*

<b>Criteria</b>	<b>Developed Area</b>
Naturalness	Man-made habitat
Size	The overall size was approximately 74.6 ha. Approximately 0.01 ha of developed area located within the Site.
Diversity	Low for flora and fauna
Rarity	Species of conservation interests included Black Kite, Yellow-crested Cockatoo and Formosan Swift
Re-creatability	Readily re-creatable
Fragmentation	Not applicable
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity
Potential Value	Low
Nursery/Breeding Ground	None
Age	Not applicable
Abundance/Richness of Wildlife	Low
<b>Overall Ecological Value</b>	<b>Negligible</b>

**Table 3.1j** *Ecological Evaluation of the Site*

<b>Criteria</b>	<b>The Site</b>
Naturalness	Above ground area consisted of man-made habitat, including plantation and developed area
Size	The overall size was approximately 0.02 ha (0.01 ha of plantation and 0.01 ha of developed area) for above ground structures including cavern portal, stockpile zones and on-site construction effluent treatment system
Diversity	Low for flora and fauna
Rarity	None of the species of conservation interests were found
Re-creatability	Readily re-creatable
Fragmentation	Not applicable
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity
Potential Value	Low
Nursery/Breeding Ground	None
Age	Not applicable
Abundance/Richness of Wildlife	Low
<b>Overall Ecological Value</b>	<b>Low</b>

**Table 3.1k Evaluation of Floral and Faunal Species with Ecological Interest within the Study Area**

Species	Location	Protection Status	Distribution	Rarity
<b>Plants</b>				
Incense Tree <i>Aquilaria sinensis</i>	Secondary woodland	Not protected locally but Category II nationally protected species in PRC and is listed as vulnerable in the China Plant Red Data Book and by IUCN (2002)	Lowland forests and fung shui woods	Common
Artocarpus <i>Artocarpus hypargyrea</i>	Secondary woodland	Nationally protected species and recorded in the China Plant Red Data Book	Woodland	Common
Pavetta <i>Pavetta hongkongensis</i>	Secondary woodland	Locally protected species	Woodland	Common
<b>Birds</b>				
Black Kite <i>Milvus migran</i>	In various habitats of the Study Area; soaring and roosting	Class II Protected Animal in PRC	Found in many types of habitats; East Eurasia	Common and widespread in Hong Kong
Crested Goshawk <i>Accipiter trivirgatus</i>	Flying above the Study Area, with aerial display activity above the secondary woodland	Class II Protected Animal in PRC	Found in woodland habitats in Hong Kong	Common and widespread in Hong Kong
Greater Coucal <i>Centropus sinensis</i>	Recorded in the secondary woodland of the Study Area;	Class II Protected Animal in PRC	Found in many types of habitats in Hong Kong; Oriental	Common and widespread in Hong Kong
Hwamei <i>Garrulax canorus</i>	Recorded in the secondary woodland of the Study Area; perching	Appendix 2 of CITES	Found in woodland and hillsides with thick scrub cover; Oriental	Common in Hong Kong with suitable habitats
Lesser Coucal <i>Centropus sinensis</i>	Recorded in the secondary woodland of the Study Area; foraging	Class II Protected Animal in PRC	Found in shrubby areas of Hong Kong; Oriental	Common and widespread in Hong Kong
Yellow-crested Cockatoo <i>Cacatua sulphurea</i>	Recorded at the existing HKU campus, ie the developed area	Appendix 1 of CITES	Found in woodland and urban area of Hong Kong. Original range is Sulawesi and adjacent islands	Common



Species	Location	Protection Status	Distribution	Rarity
<b>Butterflies</b>				
Formosan Swift <i>Borbo cinnara</i>	Developed area	Not protected	Found in open areas of Hong Kong, especially grassland	Uncommon
Silver Streak Blue <i>Iraota timoleon</i>	Secondary woodland	Not protected	Found in shrubland, woodland and open area in Hong Kong	Uncommon
Common Nawab <i>Polyura athamas</i>	Secondary woodland	Not protected	Found in open area in Hong Kong	Uncommon
Constable <i>Dichorragia nesimachus</i>	Secondary woodland	Not protected	Found in woodland and hillside of Hong Kong. Male is strongly territorial.	Uncommon
White Commodore <i>Parasarpa dudu</i>	Secondary woodland	Not protected	Found in open area and hill tops of Hong Kong, strongly territorial	Uncommon
<b>Herpetofauna</b>				
Lesser Spiny Frog <i>Rana exilispinosa</i>	Secondary woodland	Uncommon	Found in streams	Not protected

### 3.1.5

#### *Landscape and Visual*

##### *Baseline Landscape Conditions*

The landscape character of the Site is primarily man-made due to the presence of the existing WSD facilities and the engineered slope. According to the Landscape Value Mapping of Hong Kong, the Site classified as 'Institutional Landscape'. The surrounding area is dominated by the existing WSD facilities. The existing Landscape Character Area (LCA) Institutional Landscape is considered to have a low sensitivity to change.

The two Landscape Resources (LRs) that may be affected by the works are the concrete areas adjacent to the existing reservoirs and the engineered slope. The Landscape Resources (LRs) that will be affected are considered to have a low sensitivity to change. The works will involve the removal of concrete and the excavation of the portal into the existing engineered slope.

Further discussions on the sensitivity of the landscape elements around the Site and their ability to accommodate changes are provided in *Section 4.6*.

##### *Baseline Visual Conditions*

The Site is set at the threshold of the existing WSD reservoirs and the wooded hill slopes to the south. Whilst the area is generally green, the Site is obviously man-modified. Four Visually Sensitive Receivers (VSRs) have

been identified, VSR1 Adjacent Residents, VSR2 Country Park Visitors, VSR3 Sitting-out Area Users and VSR4 Campus Users.

Further discussions on the sensitivity of the visual elements around the Site and their ability to accommodate changes are provided in *Section 4.6*.

#### **4 POSSIBLE IMPACT ON THE ENVIRONMENT**

The construction of the Project will involve minor works on the existing engineered slope to form the access portal, excavation of the cavern, lining of the cavern and construction of the water storage structures.

The reprovisioned salt water service reservoirs will be unmanned and the daily operations will be performed through remote monitoring and control devices installed at Sheung Wan Salt Water Pumping Station, which is also linked back to a supervisory control and data acquisition (SCADA) system at the Hong Kong and Islands Regional Depot of WSD at North Point. Appropriate lighting and closed circuit television (CCTV) cameras will also be installed inside the rock cavern to assist real-time monitoring of the conditions of the service reservoirs. The service reservoirs will be attended by WSD staff on a regular basis for surveillance of the conditions on site. The service reservoirs will also be drained down and cleaned annually in the same way as the existing facilities.

The potential environmental impacts that may arise from the construction and operation of the Project are summarised in *Table 4.1a*. Further details on the consideration of the potential environmental impacts are provided in the sections to follow.

**Table 4.1a** *Potential Sources of Environmental Impacts*

<b>Potential Impact</b>	<b>Construction</b>	<b>Operation</b>
• Gaseous Emissions	No	No
• Dust	Yes	No
• Odour	No	No
• Noise	Yes	Yes
• Night-time Operations	No	Yes
• Traffic Generation	No	No
• Liquid Effluents, Discharges or Contaminated Runoff	Yes	Yes
• Generation of Waste or By-products	Yes	Yes
• Manufacturing, Storage, Use, Handling, Transport, or Disposal of Dangerous Goods, Hazardous Materials or Wastes	No	No
• Risk of Accidents resulting in Environmental Pollution or Hazard	No	No
• Disposal of Spoil Material	Yes	No
• Disposal of Potentially Contaminated Materials	No	No
• Disruption of Water Movement or Bottom Sediment	No	No
• Ecology	No	No
• Unsightly Visual Appearance	Yes	No
• Cultural Heritage	No	No

## **4.1** *AIR QUALITY*

### **4.1.1** *Construction Phase*

Dust is expected to arise from the construction works of the Project, including the formation of the access portal, the excavation of the cavern and transportation of spoil, but the potential impact will be minimal with the dust control measures incorporated. The majority of the construction activities will be conducted within the cavern after the relatively minor works for forming the access portal. Non-explosive drill-and-break method will be employed for the excavation and any dust generated will be effectively contained in the cavern. The excavation works for the Project will generate mainly rock, which have a low potential to generate dust. The areas for temporary stockpiling of excavated materials will be provided with enclosed shelters. In addition, the Contractor will implement dust suppression measures, such as covering of load and wetting down of access road, as stipulated in the *Air Pollution Control (Construction Dust) Regulation* and other relevant guidelines throughout the construction period.

With the confined working space for the construction of the Project, the total number of diesel-powered construction equipment to be operated at the time will be small. The potential of air quality impact associated with gaseous emissions from the above-mentioned equipment is considered low.

Taking the above into account, no adverse impact on air quality is anticipated during the construction phase of the Project.

#### 4.1.2 *Operational Phase*

The operation of the Project will not generate any dust. During the operational phase, an induced draught will be provided to ventilate the cavern and to maintain a safe working environment within the cavern during access. As a standard safety feature, the operation of the ventilation fans may also be triggered by an interlocked gas detection system. The extracted air will disperse effectively through a dedicated ductwork system at the access portal. Considering the small volume of exhaust and its rapid dispersion, no adverse impact on air quality is anticipated to arise from the operation of the Project.

#### 4.1.3 *Cumulative Impact*

Similar to the case for the Project, the Contractor will implement dust suppression measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* and other relevant guidelines throughout the construction period of the concurrent adjacent works. With the implementation of these measures, no adverse cumulative impact on air quality is anticipated.

### 4.2 *NOISE*

#### 4.2.1 *Construction Phase*

##### *Construction Activities and Programme*

The use of Powered Mechanical Equipment (PME) during the construction phase of the Project may affect the nearby NSRs. The construction will involve minor slope works, construction of portal and access tunnel, rock excavation and construction of Salt Water Service Reservoirs (SWSRs) Nos. 1 and 2. Construction of the two SWSRs will be undertaken at the same time. The preliminary construction programme and plant inventory are given in *Annex B*. The construction plant inventory presented has been confirmed by the Contractor to be reasonable and practicable for the intended Project programme.

Demolition of Western No. 2 Salt Water Service Reservoir, construction of Fresh Water Service Reservoir No. 1, pipe gallery, pipe laying, construction of EVA, slope stabilisation works and some landscaping works will be undertaken at the same time as the construction of the Project. The potential cumulative noise impacts from the contemporary occurrence of these works have also been considered. The construction programme and the anticipated PME required for these concurrent adjacent works are presented in *Annex B*.

##### *Noise Criteria*

Under the *EIAO*, potential noise impact arising from general construction works during normal working hours (ie 07:00 to 19:00 hrs on any day not being a Sunday or public holiday) at the openable windows of buildings is to

be assessed in accordance with the noise criteria specified in the *EIAO-TM*. The *EIAO-TM* noise standards are presented in *Table 4.2a*.

**Table 4.2a** *EIAO-TM Day-time Construction Noise Standards ( $L_{eq, 30 min}$  dB(A))*

Use	Noise Standard (dB(A))
Domestic Premises	75
Educational Institutions (normal periods)	70
Educational Institutions (during examination periods)	65

The schedule of construction works is indicated in *Annex B*. In general, there would be no construction activities undertaken outside the period from 07:00 to 19:00 hrs. Should night time works be required, the Contractor must apply for a Construction Noise Permit (CNP) and ensure full compliance with the requirements of the *Noise Control Ordinance (NCO)*(Cap 400). The *Technical Memorandum on Noise from Construction Work other than Percussive Piling (GW - TM)* and *Technical Memorandum on Noise from Construction Work in Designated Areas Piling (DA-TM)* detailed the procedures adopted by Environmental Protection Department (EPD) for assessing such application.

The Noise Control Authority will consider a well-justified CNP application, for construction works within restricted hours as guided by the relevant technical memoranda issued under the *NCO*. The Noise Control Authority will take into account adjoining land uses and any previous complaints against construction activities at the Site before making a decision. Nothing in this document shall bind the Noise Control Authority in making its decision. The Noise Control Authority may include any conditions in a CNP that it considers appropriate. Failure to comply with any such conditions may lead to cancellation of the CNP and prosecution actions under the *NCO*.

#### *Assessment Assumptions*

Most of the construction works will be carried out inside the rock cavern and a 15-dB attenuation has been applied for the PME that will be used inside the cavern. The use of PME in the open areas of the Project will be limited so as to minimise construction noise. Full enclosure with folding doors will be provided for the portal area. Enclosed shelters will also be provided for the two stockpile zones. These enclosures will be purpose-designed to be free-standing structures and their erection will only involve lifting and installing minor fixtures. Sketches of the full enclosure and enclosed shelters are shown in *Annex B*.

In reality, some of the PME will not be operating continuously within a work site. Utilisation rates for some PME that have been adopted in the assessment are summarised in *Table 4.2b*. The utilisation rates are considered realistic and practicable for the Contractor to achieve the construction programme.

**Table 4.2b Utilisation Rates for PME**

PME	Utilisation Rate
Shotcrete machine, bar bender and cutter (electric), steel circular cutter (electric), hand-held percussive drill (electric), hand-held vibratory poker and crane lorry for pipe laying	50%
Jumbo drill boomer, hydraulic crawler rig, backhoe, excavator-mounted breaker, excavator/loader, dump truck, minidigger, bob cat, concrete lorry mixer, crane lorry and gantry crane	75%

*Impact Assessment*

The predicted façade noise levels due to the construction activities are calculated in accordance with the methodology described in *GW-TM*. The results indicated that the predicted façade noise levels are in the range of 55 to 70dB(A) and 66 to 70dB(A) at N1 to N3 and N4 to N8, respectively. The predicted noise levels comply with the noise criteria described in *Table 4.2a*. The results are summarised in *Table 4.2c* with details of the calculations given in *Annex C*.

**Table 4.2c Predicted Construction Noise Levels**

NSR No.	Description	Predicted Maximum Noise Level, dB(A)	Noise Criterion, $L_{eq, 30min}$ , dB(A)
N1	Chow Yei Ching Building, HKU	70	[1]
N2	Yam Pak Building, HKU	56 [2]	[1]
N3	St Paul's College Primary School	55 [2]	70 (65)
N4	Tower 3, The Belcher's	66	75
N5	Lady Ho Tung Hall	69	75
N6	Starr Hall	69	75
N7	To Li Garden	70	75
N8	Block 1, Academic Terrace	70	75

Notes:

- [1] Noise criterion from EIAO-TM does not apply for N1 and N2 as they do not rely on opened windows for ventilation.
- [2] A -10dB(A) attenuation was applied to N2 and N3 as the construction site will be totally invisible from the NSRs as they are located at a level significantly lower than the construction site.

*Cumulative Impact*

Reference has been made to the construction programme and PME list for the concurrent adjacent works that are envisaged to be undertaken at the same time as those for the Project and the cumulative noise levels have been predicted. The construction plant list for the concurrent adjacent works has been confirmed by the contractor for these works to be reasonable and practicable for the intended programme of these works. The results indicate that the cumulative noise levels comply with the noise criteria stipulated in *EIAO-TM*. The cumulative noise levels are summarised in *Table 4.2d* with details of the calculations given in *Annex C*.

**Table 4.2d Predicted Cumulative Construction Noise Levels**

NSR No.	Description	Predicted Maximum Noise Level, dB(A)	Noise Criterion, $L_{eq, 30min}$ , dB(A)
N1	Chow Yei Ching Building, HKU	91	[1]
N2	Yam Pak Building, HKU	64 <sup>[2]</sup>	[1]
N3	St Paul's College Primary School	61 <sup>[2]</sup>	70 (65)
N4	Tower 3, The Belcher's	73	75
N5	Lady Ho Tung Hall	75	75
N6	Starr Hall	75	75
N7	To Li Garden	75	75
N8	Block 1, Academic Terrace	75	75

Notes:

- [1] Noise criterion from EIAO-TM does not apply for N1 and N2 as they do not rely on opened windows for ventilation.
- [2] A -10dB(A) attenuation was applied to N2 and N3 as the construction site will be totally invisible from the NSRs as they are located at a level significantly lower than the construction site.

Should construction works during evening or night-time be necessary and involve the use of PME or Prescribed Construction Work (PCW) during the restricted hours, the Contractor will be responsible to apply to EPD for a CNP under the NCO. This requirement will also be enforced through the Contract documentation.

*Groundborne Construction Noise*

Vibration induced by the use of PME inside the cavern may be a source of groundborne noise. The major vibration generating equipment will be the jumbo drill boomer and hydraulic breakers. Other PME are ancillary equipment and are expected to have little contribution to groundborne construction noise impact. The cavern is located at more than 120m from the nearest NSR, Chow Yei Ching Building of HKU. Other NSRs are located at more than 130m from the cavern and separated by Pok Fu Lam Road.

In the groundborne noise assessment undertaken for the *EIA for KCRC Kowloon Southern Link* (EIA Register No. : AEIAR-083/2005), no significant groundborne noise impacts were predicted for an NSR at a mere distance of 16m from rock tunnelling works. With the much larger separation between the NSRs and the cavern, and the background vibration from the traffic on Pok Fu Lam Road, groundborne noise from the rock excavation works of the Project is not anticipated to cause any adverse impact on the NSRs in the vicinity.

**4.2.2 Operational Phase**

*Fixed Plant Noise Sources*

The operational fixed noise sources include a treatment unit with a generator, which will be operated outside the portal during the annual cleaning of the service reservoirs, and an exhaust air fan of the ventilation system provided for the regular operations. The fan will be housed in a kiosk with a closed

design and will be equipped with an acoustic silencer to attenuate the noise generated from the rotating parts when the system is in operation.

There may be operation and maintenance, albeit infrequent, during the night-time period. The ventilation system will be put into operation during the night-time under such circumstances to maintain a safe working environment inside the cavern. It is considered necessary to include a maximum Sound Power Level (SWL) from the noise sources in the procurement document for the ventilation equipment to ensure compliance with the noise criteria during both day-time and night-time periods.

#### *Noise Criteria*

The *EIAO-TM* and *Technical Memorandum on Noise From Places Other than Domestic Premises, Public Places or Construction Sites (IND-TM)* specify the applicable Acceptable Noise Levels (ANLs) for the operation of the Project. The ANLs are dependent on the Area Sensitivity Rating (ASR) and the time of the day. The ANLs are presented in *Table 4.2e*.

**Table 4.2e ANLs to be used as Operational Noise Criteria**

Time Period	L <sub>Aeq, 30min</sub> (dB(A))		
	ASR "A"	ASR "B"	ASR "C"
Day-time (ie 07:00-19:00 hrs)	60	65	70
Evening (ie 19:00-23:00 hrs)	60	65	70
Night-time (ie 23:00-07:00 hrs)	50	55	60

Fixed plant noise is controlled under *Section 13* of the *NCO* and the predictions are made in accordance with the *IND-TM*. The noise criteria for planning and design of Designated Projects are set out in the *EIAO-TM* as follows:

- the noise level at the facade of the nearest NSR is at least 5 dB(A) lower than the appropriate ANL (as shown in *Table 4.2e*) as specified in the *IND-TM*; or,
- the prevailing background noise level (for quiet areas with a noise level 5 dB(A) below the appropriate ANL).

The noise criteria stipulated in the *IND-TM* are also dependent on the ASR of the NSR, as shown in *Table 4.2e*.

As the Project is located in an urban area and the NSRs are directly affected by the influencing factor of heavy traffic on Pok Fu Lam Road, an ASR of "C" has been assigned.

#### *Impact Assessment*

Maximum allowable SWLs for the treatment unit and at the exhaust louvre of the ventilation system, taking into account the separation distances from the NSRs, cumulative noise impacts from other noise sources, as well as tonality and façade corrections, are predicted based on the *IND-TM*. The predicted maximum allowable SWLs should be taken into account in the detailed design



to ensure compliance with the relevant statutory requirements. The maximum allowable SWLs is summarised in *Table 4.2f* and the detailed calculations are shown in *Annex D*.

**Table 4.2f** *Maximum Allowable SWLs for the Treatment Unit and at the Exhaust Louvre*

Noise Source	Maximum Allowable SWL, dB(A)
Treatment Unit	97
Exhaust Louvre	95

The above maximum allowable SWLs for the treatment unit and at the exhaust louvre will be included in the procurement documents for the respective equipment. With the adoption of the maximum allowable SWLs in the design, operational noise impacts are not anticipated.

### 4.3 WATER QUALITY

#### 4.3.1 Construction Phase

During the construction phase, potential sources of water quality impact are expected to include groundwater from cavern excavation, construction run-off and sewage effluent. The Contractor will implement good site practices and appropriate mitigation measures in accordance with the *Practice Note for Professional Persons on Construction Site Drainage (ProPECC PN 1/94)* and other relevant guidelines. A dedicated proprietary treatment system, WetSep, will be deployed for proper treatment of silty runoff and/or groundwater generated from rock excavation while sufficient toilet facilities will be provided for the proper collection of sewage effluents generated from site staff and workers for treatment offsite or discharge via appropriate connections to existing public sewers. With the implementation of the above measures, no adverse water quality impact is anticipated during the construction phase.

#### 4.3.2 Operational Phase

During the annual cleaning of the salt water service reservoirs, the controlled discharge of the residual volume of the stored salt water will first be treated to the relevant limits stipulated in the *Technical Memorandum on Standards for Effluents Discharged into Drainage and Sewerage System, Inland & Coastal Water (WPCO-TM)* issued under the *Water Pollution Control Ordinance (WPCO)* (Cap 358) prior to discharge into surface drainage channels in the same way as in the case of the existing facilities.

### 4.4 WASTE MANAGEMENT

#### 4.4.1 Construction Phase

During the construction phase, the main activities that will potentially result in the generation of wastes include slope works, rock excavation and the construction of the reservoirs. The typical waste types associated with these activities are:

- excavated material;
- construction and demolition (C&D) material;
- chemical waste;
- sewage; and
- general refuse.

#### *Excavated Material*

Excavated materials comprising soft material (or soil) and rock will be generated from the slope works and the excavation works. The quantity of soft material expected to be generated during the slope works in the portal area is approximately 75 m<sup>3</sup> (ie 1.2 m<sup>3</sup>d<sup>-1</sup>). The cavern excavation work will take around 10 months and is expected to generate about 35,309 m<sup>3</sup> of rock (ie 135.8 m<sup>3</sup>d<sup>-1</sup>). As filling is not required for the subsequent construction works, these materials will not be reused on-site and will require off-site disposal.

The small amount of soft material will be disposed of at the fill bank in Tseung Kwan O (TKO) Area 137. The material will be temporarily stockpiled on-site and will be collected by a maximum of 2 trucks on a weekly basis. The excavated rock can be sent to the Lam Tei Quarry and Anderson Quarry for crushing and reuse in other construction projects. A maximum of 23 trucks per day will be required to remove the excavated rock. The transportation of excavated materials will be carefully planned to ensure that the above daily truck trips are as evenly distributed over the duration of the working hours as possible and the trucks for the transportation of excavated materials will access the Site via the existing access road to the WSD facilities from Pok Fu Lam Road, which is a major road with an Annual Average Daily Traffic (AADT) of about 33,000 according to the *Annual Traffic Census 2005* published by Transport Department, to minimise potential traffic or secondary environmental impact.

With carefully planned transportation arrangements and the proper implementation of good construction site practice, the handling and transportation of excavated materials is not anticipated to cause adverse environmental impacts.

#### *C&D Material*

C&D material consisting of waste concrete/shotcrete, timber, packaging material, steel etc will be generated from the construction of the cavern and the salt water service reservoirs. It is estimated that approximately 628 m<sup>3</sup> of waste shotcrete and 287 m<sup>3</sup> of waste concrete, which are inert construction wastes categorised as public fill. A maximum of 3 trucks per week will transport the public fill to the fill bank in TKO Area 137 for disposal.

With the proper implementation of good construction site practice, the handling and transportation of the small quantity of C&D material is not anticipated to cause adverse environmental impacts.

#### *Chemical Waste*

Chemical waste, as defined under the *Waste Disposal (Chemical Waste) (General) Regulation*, includes any unwanted substances specified under *Schedule 1* of the *Regulation*. Substances likely to be generated from the construction of the Project will include:

- used paint, engine oils, hydraulic fluids and waste fuel;
- spent mineral oils/cleaning fluids from mechanical machinery; and
- spent solvents/solutions from equipment cleaning activities.

Chemical wastes may pose environmental, health and safety hazards if not stored and disposed of in an appropriate manner as outlined in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*. These hazards may include:

- toxic effects to workers;
- adverse effects on air, water and land from spills; and
- fire hazards.

With respect to the scale of the construction activities, it is anticipated that the quantity of chemical waste to be generated will be small (ie less than a hundred litres per month during the construction phase). With the incorporation of suitable arrangements for the storage, handling, transportation and disposal of chemical wastes under the requirements stated in the *Waste Disposal (Chemical Waste) (General) Regulation* and the *Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes*, no adverse environmental and health impacts, and hazards will result from the handling, transportation and disposal of chemical waste arising from the Project.

#### *Sewage*

Sewage will arise from the construction workforce. It is estimated that a maximum of about 45 workers and site staff will be working at the site at any one time. With a sewage generation rate of 0.15 m<sup>3</sup> per worker per day, about 6.8 m<sup>3</sup> of sewage will be generated per day. An adequate number of portable toilets will be provided on site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a licensed contractor. No adverse environmental impacts are envisaged.

### *General Refuse*

The presence of a construction site with workers and associate site office will result in the generation of general refuse (mainly consists of food waste, aluminium cans and waste paper) which requires off-site disposal. The storage of general refuse has the potential to give rise to adverse environmental impacts. These include odour if the waste is not collected frequently, windblown litter and visual impact.

Assuming up to 45 workers and site staff will be working on site at any one time, with a general refuse generation rate of 0.65 kg per worker per day, the maximum amount of general refuse to be generated will be about 29.3 kg per day.

Recyclable materials (ie paper, plastic bottles and aluminium cans) will be separated for recycling, in order to reduce the amount of general refuse to be disposed of at landfill. Adequate number of enclosed waste containers will be provided to avoid over-spillage of waste.

The non-recyclable refuse will be placed in bags and stored in enclosed containers, and disposed of on a daily basis to the Island West Transfer Station or the SENT Landfill. Given that the quantity of general refuse to be disposed of is small, no adverse impact on the operation of these waste disposal facilities is anticipated.

With the implementation of the good construction site practices, no adverse environmental impacts caused by the storage, handling, transport and disposal of general refuse are expected.

### *Summary of Waste Arisings during Construction Phase*

Table 4.4a summarises the waste arisings during construction of the Project.

**Table 4.4a** *Waste Arisings During Construction Phase*

<b>Waste Type</b>	<b>Quantity</b>	<b>Disposal</b>
Excavated Material	Soft material: 75 m <sup>3</sup> (1.2 m <sup>3</sup> d <sup>-1</sup> ) Rock: 35,309 m <sup>3</sup> (135.8 m <sup>3</sup> d <sup>-1</sup> )	At public fill reception facility At quarry
C&D Material	Public fill: 915 m <sup>3</sup> (2.3 m <sup>3</sup> d <sup>-1</sup> )	At public fill reception facility
Chemical Waste	<100 litre per month	Collected by licensed contractor
Sewage	6.8 m <sup>3</sup> d <sup>-1</sup>	Collected by licensed contractor
General Refuse	29.3 kgd <sup>-1</sup>	At landfill directly or indirectly via transfer station

#### 4.4.2

#### *Operational Phase*

The two salt water service reservoirs will be cleaned annually. Effluent from the cleaning process will be treated on-site with a dedicated mobile treatment unit to relevant standards stipulated in *WPCO-TM* before disposal to surface drains following the current operational practice for the existing salt water service reservoirs. It is estimated that a total of approximately 46 m<sup>3</sup> of dewatered sludge (at 30% solid content) will be generated annually from the effluent treatment process. The sludge will be temporarily stored in enclosed containers on-site and will be disposed of to SENT Landfill by truck, similar to the current practice for the existing service reservoirs. The handling and transportation of the small amount of sludge generated annually will not cause adverse environmental impacts.

#### 4.4.3

#### *Cumulative Impact*

##### *Construction Phase*

During the construction phase of the Project, there will be other adjacent works being undertaken concurrently in the Project vicinity as described in *Section 2*.

These concurrent adjacent works will also generate waste and may lead to cumulative impacts. The waste arisings from the Project and the concurrent adjacent works are compared and shown in *Table 4.4b*.

**Table 4.4b** *Comparison of Waste Arisings from the Project and the Concurrent Adjacent Works for Other WSD Facilities*

Waste Type		Waste from the Project	Waste from Concurrent Adjacent Works
Excavated Material	Soft material	75 m <sup>3</sup> (1.2 m <sup>3</sup> d <sup>-1</sup> )	22,123 m <sup>3</sup> (81.4 m <sup>3</sup> d <sup>-1</sup> )
	Artificial hard material	-	3,110 m <sup>3</sup> (12.1 m <sup>3</sup> d <sup>-1</sup> )
	Rock	35,309 m <sup>3</sup> (135.8 m <sup>3</sup> d <sup>-1</sup> )	10,169m <sup>3</sup> (33.8 m <sup>3</sup> d <sup>-1</sup> )
C&D Material	Public fill	915 m <sup>3</sup> (2.3 m <sup>3</sup> d <sup>-1</sup> )	2,338 m <sup>3</sup> (4.6 m <sup>3</sup> d <sup>-1</sup> )
	Construction waste	-	584 m <sup>3</sup> (1.1 m <sup>3</sup> d <sup>-1</sup> )
	Steel	-	200 tonne
Chemical Waste		<100 litre per month	<100 litre per month
Sewage		6.8 m <sup>3</sup> d <sup>-1</sup>	14.3 m <sup>3</sup> d <sup>-1</sup>
General Refuse		29.3 kgd <sup>-1</sup>	61.8 kgd <sup>-1</sup>

The total number of trucks transporting waste from the Project and the concurrent adjacent works to the respective disposal facilities is estimated to be less than 60 vehicles per day. The handling and transportation of waste from the Project and the concurrent adjacent works is not expected to cause adverse environmental impacts with the adoption of carefully planned transportation arrangements to even out the daily truck trips and the implementation of good construction site practices.

### *Operational Phase*

Approximately 60 m<sup>3</sup> of dewatered sludge will be generated from the two adjacent new fresh water service reservoirs during their annual cleaning. Including the sludge from the Project, a total of about 106 m<sup>3</sup> of dewatered sludge will be generated annually from the cleaning of salt water and fresh water service reservoirs. The sludge will be temporarily stored in enclosed containers on-site and will be disposed of at SENT Landfill by trucks in a manner similar to the current practice. The handling and transportation of the small amount of sludge generated from the annual cleaning of the reservoirs will not cause adverse environmental impacts.

## **4.5**      *ECOLOGY*

### **4.5.1**    *Construction Phase*

#### *Habitat Loss*

The construction works for the Project will lead to the direct loss of plantation (0.01 ha) and developed area (0.01 ha). Since the portal of the cavern will be located on the existing engineered slope and the cavern will be an underground structure, the secondary woodland and associated plant species of conservation interest will not be affected. The impacts due to the loss of foraging ground are also considered to be minimal given the small area of the low quality habitats affected, which are also located next to the currently highly disturbed areas, and the large extent of similar and less disturbed habitats present in the vicinity. No adverse ecological impact associated with habitat loss is anticipated.

#### *Habitat Fragmentation and Isolation*

The natural habitats may be fragmented as a result of the implementation of the Project. The effects of habitat fragmentation and isolation are expected to be minimal as the affected habitats are located on the edge of the continuum of the natural habitats (secondary woodland). Most of the upland habitats will remain untouched.

#### *Other Impacts*

Secondary impacts to the surrounding habitats and associated wildlife may arise from the potential of increased noise, human activities and disturbance such as hill fire, import, storage or handling of construction materials and construction site runoff. The impacts are expected to be low owing to the temporary nature and small scale of the construction activities (formation of the access portal and excavation of an initial section of the cavern) in the vicinity of the natural habitats (secondary woodland). Given that regular checks on construction site practice (ie prohibit open fire and silty runoff) will be conducted, no adverse secondary ecological impact is expected.

#### 4.5.2 *Operational Phase*

Similar to the construction phase, operational phase impacts on terrestrial ecology may arise from increased human activities resulting in disturbance to the surrounding habitats and associated wildlife, if uncontrolled. Given the fact that the Project will be completely underground and the operations will involve only regular inspections and the annual cleaning of the salt water service reservoirs within the cavern, the potential ecological impacts are expected to be minimal.

#### 4.5.3 *Cumulative Impact*

Other works will be undertaken concurrently in the areas adjacent to the Project, no adverse cumulative impacts are anticipated as the habitat loss due to these adjacent activities will occur either in a highly disturbed habitat of negligible ecological value (developed area) or a small area at the intersection of the developed area and the secondary woodland.

### 4.6 *LANDSCAPE AND VISUAL IMPACT*

#### 4.6.1 *Construction Phase*

##### *Landscape Impacts*

Four areas within the Site, namely the access portal, the two stockpile zones and the area for accommodating the on-site runoff treatment system, may generate landscape impacts during construction.

The portal will result in disturbance to the existing engineered slope, the existing concrete landscape and the lawn adjacent to the existing service reservoirs. The construction of the portal will only require the removal of two shrubs of low landscape value.

The landscape impacts from by the construction effluent treatment system and the two enclosed stockpile zones will be small as all of these areas are mostly concreted and contain no landscape elements of any value.

##### *Landscape Impact Assessment*

The impacts of the Project on the LCAs and LRs are both considered to be small in magnitude. *Table 4.6a* presents the significance thresholds of the landscape impacts.

**Table 4.6a Landscape Impacts during Construction**

LCA/LR	Name of LCA/LR	Sensitivity to Change	Magnitude of Change before Mitigation	Magnitude of Change after Mitigation	Significance Threshold of Impact after Mitigation
LCA 1	Institutional Landscape	Medium	Small	Small	Slight
LR 1	WSD Facilities	Low	Small	Negligible	Negligible
LR2	Woodland	High	Negligible	Negligible	Negligible

As indicated in *Table 4.6a* there will only be slight impacts on the Landscape Character of the Institutional Landscape and there will be negligible impacts on the Landscape Resources.

*Visual Impacts*

The construction of the rock cavern will cause temporary visual impacts to some nearby residential and recreational users of the surrounding areas. These impacts will mostly arise from the construction equipment and infrastructure required to construct the Project. These include the noise and dust enclosure at the portal entrance, the two enclosed stockpile zones and the runoff treatment plant.

*Visual Impact Assessment*

The identified VSRs have varying sensitivities that are outlined in *Table 4.6b*. The magnitude of change will vary amongst the VSRs as some will have clearer views to the Site. The magnitude of change before and after mitigation is shown in *Table 4.6b*.

**Table 4.6b Visual Impacts during Construction**

VSR	Name of VSR	Sensitivity to Change	Magnitude of Change before Mitigation	Magnitude of Change after Mitigation	Significance Threshold of Impact after Mitigation
VSR 1	Adjacent Residents	High	Small	Small	Moderate
VSR 2	Country Park Visitors	High	Small	Small	Moderate
VSR 3	Sitting-out Area Users	High	Small	Small	Moderate
VSR 4	Campus Users	Medium	Small	Small	Slight

*Table 4.6b* shows that there will be moderate visual impacts on the Adjacent Residents, the Country Park Visitors and the Sitting-out Area Users, and slight impacts on the Campus Visitors during the construction phase of the Project.



## 4.6.2 Operational Phase

### Landscape Impacts

Upon completion of the construction phase, no further impacts on either the LCAs or LRs are expected for the Project.

### Visual Impacts

On completion of the Centennial Campus, the buildings will completely screen the portal from view. Similarly, due to the viewing angle from the Country Park and the sitting-out area, the portal will not be visible from these areas. Taking the above into account, the portal will only present a transient visual impact to the surrounding VSRs.

**Table 4.6c** Visual Impacts During Operation

VSR	Name of VSR	Sensitivity to Change	Magnitude of Change before Mitigation	Magnitude of Change after Mitigation	Significance Threshold of Impact after mitigation	Impact Significance After Mitigation	
						Day 1	Year 10
VSR 1	Adjacent Residents	High	Small	Negligible	Negligible	Negligible	Negligible
VSR 2	Country Park Visitors	High	Negligible	Negligible	Negligible	Negligible	Negligible
VSR 3	Sitting-Out Area Users	High	Negligible	Negligible	Negligible	Negligible	Negligible
VSR 4	Campus Users	Medium	Small	Negligible	Negligible	Negligible	Negligible

Table 4.6c shows that the residual visual impacts from the Project will be negligible upon completion of the Centennial Campus.

## 4.7 CULTURAL HERITAGE

### 4.7.1 Construction Phase

A Grade III Historic Building, the Elliot Treatment Works, is located by the proposed access portal of the cavern. Based on the current design scheme, the Elliot Treatment Works will be retained *in situ*. Direct impact to the Treatment Works in terms of encroachment upon the building is avoided. The construction plant and methods chosen for the Project and the concurrent adjacent works have given full consideration to potential indirect impacts to the Treatment Works. No TBM and blasting will be employed to minimise vibration impacts. Some precautionary measures to protect the building structure of the Treatment Works against potential indirect impacts are considered appropriate and are discussed further in Section 5.7.

No known archaeological sites are identified within the boundary of the Site. The cavern to be excavated is located entirely within rocks with no archaeological potential. Impact on archaeological resources is not expected.

#### 4.7.2 *Operational Phase*

As the Project will be used for water storage only, there will be no direct or indirect impact on cultural heritage resources.

## 5 *ENVIRONMENTAL PROTECTION MEASURES*

### 5.1 *AIR QUALITY*

With the major construction activities for the Project to be undertaken inside the cavern and the stockpile zones enclosed with dedicated shelters, negligible dust impact is anticipated. The dust impact will be further minimised with the implementation of the dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation*, which are summarised as follows:

- any stockpile of dusty material outside the cavern and the stockpile zone shelters will be covered entirely with impervious sheeting or sprayed with water or a dust suppression chemical to keep the entire surface wet;
- all dusty materials will be sprayed with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation to keep the dusty materials wet;
- where a vehicle leaving the works site is carrying a load of dusty materials, the load will be covered entirely with clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle; and
- the working area of any excavation or earth moving operation will be sprayed with water or a dust suppression chemical immediately after the operation to keep the entire surface wet.

In addition to dust suppression measures, diesel-powered equipment will be properly maintained to control gaseous emissions associated with its operation.

The above mitigation measures have been incorporated in the Contract document for the Project construction works to ensure that dust nuisance and air quality impact from gaseous emissions are minimised.

### 5.2 *NOISE*

Adverse noise impact is not expected during the construction phase of the Project but good site practices will still be adopted by the Contractor to minimise noise emissions:

- idling PME will be switched off;
- noisy PME will be placed inside the cavern or sited as far away from the NSRs as practicable;
- quiet PME will be used as far as practicable;
- where possible, stored materials and temporary structures will be sited in practical locations to screen NSRs from noisy on-site construction activities; and,
- work sequences to avoid the simultaneous use of noisy PME in close proximity to NSRs will be planned ahead of the commencement of the works.

Adequate direct noise mitigation measures for the ventilation system, such as silencers and acoustic louvres, will be provided to meet the relevant statutory requirements and to prevent adverse operational noise impact from arising. A detailed noise assessment will be undertaken for the detailed design of the ventilation system before its procurement and installation.

### 5.3

#### *WATER QUALITY*

In order to control tunnelling groundwater and surface runoff such that no residual water quality impact will result from the construction phase of the Project, the Contractor will comply with the relevant standards of *WPCO-TM* and other relevant regulations. These mitigation measures include:

- all tunnelling groundwater will be directed through a dedicated collection system to the treatment facility (WetSep);
- all runoff arising from the Site will be properly collected and treated;
- peripheral interceptor drains around the Site boundary and local flood prevention measures for heavy rainfall events will be provided to segregate surface runoff generated from within the Site and that from areas outside the Site;
- silty runoff treatment facility (WetSep) and oil interceptor will be provided;
- any effluent or polluted water will not be discharged directly into public sewer and stormwater drain; and
- the Contractor will design and implement all the mitigation measures and practices specified in *ProPECC PN 1/94* and other relevant guidelines.

Appropriate clauses with specific requirements on the above measures have been included in the Contract documentation to ensure their implementation during the construction phase of the Project and relevant licences are obtained by the Contractor under the provisions of *WPCO* prior to any discharge of effluents. The Contractor will prepare a detailed construction site drainage

management plan, which will clearly present details of the temporary site drainage and treatment arrangements, prior to commencement of the construction works.

For the controlled discharge of residual salt water during the annual cleaning of the salt water service reservoirs, a dedicated mobile treatment unit will be deployed to treat the effluent to relevant *WPCO-TM* standards prior to discharge in a manner similar to the current arrangements for the existing service reservoirs. An appropriate *WPCO* licence will be obtained for the purpose of such discharge.

## 5.4

### *WASTE MANAGEMENT*

#### *Construction Phase*

Good construction site practices to avoid or further reduce the potential environmental impacts associated with the handling, collection and disposal of construction and chemical wastes arising from the construction of the Project are described in the following paragraph.

The Contractor will ensure that all the necessary waste disposal permits or licences are obtained prior to the commencement of the construction works.

#### *Management of Waste Disposal*

The Contractor will open a billing account with EPD in accordance with the *Waste Disposal (Charges for Disposal of Construction Waste) Regulation*. Every construction waste or public fill load to be transferred to the Government waste disposal facilities such as public fill reception facilities, sorting facilities, landfills will required a valid “chit” which contains the information of the account holder to facilitate waste transaction recording and billing to the waste producer. A trip-ticket system will also be established in accordance with *ETWBTC No.31/2004* to monitor the disposal of construction waste at the SENT Landfill and to control fly-tipping. The trip-ticket system has been included as one of the contractual requirements and will be implemented by the Contractor.

A recording system (similar to the summary tables shown in the relevant *Appendices of ETWBTC No. 19/2005*) for the amount of waste generated, recycled and disposed of (including the disposal sites) will be established during the construction phase.

#### *Measures for the Reduction of Construction Waste Generation*

Inert and non-inert construction waste will be segregated and stored in different containers or skips to facilitate reuse or recycling of the inert waste and proper disposal of the non-inert construction waste. Specific areas of the Site will be designated for such segregation and storage if immediate use is not practicable.

To reduce the potential dust and water quality impacts of the construction works, construction waste will be wetted as quickly as possible after excavation.

#### *Chemical Waste*

The Contractor will register as a chemical waste producer with EPD. Chemical waste will be handled in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes* as follows:

Containers used for storage of chemical wastes will:

- be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed;
- have a capacity of less than 450 L unless the specifications have been approved by EPD; and
- display a label in English and Chinese in accordance with instructions prescribed in *Schedule 2* of the Regulations.

The storage area for chemical wastes will:

- be clearly labelled and used solely for the storage of chemical waste;
- be enclosed on at least three sides;
- have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest;
- have adequate ventilation;
- be covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and
- be arranged so that incompatible materials are appropriately separated.

Chemical waste will be disposed of:

- via a licensed waste collector; and
- to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers.

#### *Sewage*

An adequate number of portable toilets will be provided on site to ensure that sewage from site staff is properly collected. The portable toilets will be desludged and maintained regularly by a licensed contractor.

### *General Refuse*

General refuse will be stored in enclosed bins separately from construction and chemical wastes. The general refuse will be delivered to the SENT Landfill or the Island West Transfer Station on a daily basis to reduce odour, pest and litter impacts.

Recycling bins will be provided at strategic locations to facilitate recovery of aluminium cans and waste paper from the Site. Materials recovered will be sold for recycling.

### *Staff Training*

At the commencement of the construction works, training will be provided to workers on the concepts of site cleanliness and on appropriate waste management procedures, including waste reduction, reuse and recycling.

## **5.4.2 Operational Phase**

All dewatered sludge (>30% dry solid) will be stored in enclosed container on-site before being transported to landfill for disposal.

## **5.5 ECOLOGY**

As discussed in *Section 4.5*, the potential ecological impacts due to the construction and operation of the Project are considered to be low. The following measures will be implemented to further reduce the potential impacts and disturbance to the surrounding habitats:

- Storm water runoff from the construction site will be directed into existing drainage channel via adequately designed sand/silt removal facilities such as sand/silt traps and oil interceptors. Channels, bunds or sand bag barriers will be provided on site to properly direct storm water to such silt removal facilities.
- Fences or hoardings along the boundary of the Site will be erected before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas in particular the secondary woodland.
- The boundaries of the Site will be regularly checked to ensure that they are not breached and that damage does not occur to surrounding areas.

## **5.6 LANDSCAPE AND VISUAL IMPACT**

The following measures are proposed to reduce any potential landscape and/or visual Impacts:

- Site hoardings: During the construction period, site hoardings, roof covers, noise barriers and offices will be coloured to complement the surrounding landscape and to minimise their visibility.
- Construction areas: The Contractor will maintain the Site in a neat and tidy state during construction to minimise visual impacts.
- Portal materials and finishes: The portal will be finished with materials and finishes that complement the surrounding landscape and are of low reflectivity.
- New plantings: Where opportunities for new plantings exist that are not in conflict with the completion of the reprovisioning works, new plantings will be installed.

The above measures are to be implemented as soon as technically feasible during the Project. Detailed design of the measures will be undertaken during the detailed design phase.

*Figure 5.1* presents a digital simulation of the Project prior to the construction of the Centennial Campus. Upon the completion of the Centennial Campus, the Project will be completely screened by other WSD facilities and the campus buildings.

According to *Annex 10* of the *EIAO-TM* the residual landscape and visual impacts are considered to be acceptable with mitigation measures.

## 5.7

### *CULTURAL HERITAGE*

The construction plant list and construction methods to be employed for the Project and the concurrent adjacent works have given consideration to the minimisation of potential vibration impact on the Elliot Treatment Works adjacent to the access portal during the construction phase. It is also recommended that a structural survey of the Elliot Treatment Works be undertaken by a specialist surveyor approved by the Antiquities and Monuments Office (AMO) of the Leisure and Cultural Services Department (LCSD) to record the condition of the historic building. The survey should focus on the quality of construction and finishes and the general condition of the structure and its finishes. A schedule of defects (including cracks) is to be prepared for submission to the Engineer and AMO and should be supported by photographic record. Based on the survey findings and review of construction method, a construction vibration limit should be established and agreed with AMO and the Engineer. Upon agreement with AMO and the Engineer, vibration monitoring is recommended during the construction stage. Where exceedance of the vibration limit is noted, the works should be stopped and the Contractor should be required to prepare a plan for the approval of the Engineer and AMO to ensure that the works could continue without exceedance of the vibration criteria. Should, at any time during the works, the Engineer note damage to the decoration and structure of the building, the works should be stopped and a method proposed by the

Contractor to ensure no further deterioration in the structure of the building. Such measures may include selection of alternative construction plant, construction method.

As no operational impact is identified, no mitigation measure is considered necessary during the operation of the Project.

## 5.8 *CONSTRUCTION SITE ENVIRONMENTAL MANAGEMENT*

While no adverse environmental impact has been predicted for the construction of the Project in this Project Profile, the Contractor will be required to implement a comprehensive environmental management system to ensure that the construction activities are conducted in an environmentally accountable manner. As a means to keep track of the environmental performance of the construction works, a monitoring programme for construction noise and dust is also being formulated for the nearby sensitive receivers, such as The Belcher's and Starr Hall. The monitoring will assist the Contractor in identifying at an early stage potential environmental issues potentially arising due to a change in circumstances during the construction phase. Regular environmental audits of the Site will be conducted to ensure that mitigation measures are implemented as intended. Appropriate training on construction site environmental management will also be provided to all construction staff and workers involved in the Project.

## 5.9 *COMMENT ON THE POSSIBLE SEVERITY, DISTRIBUTION AND DURATION OF ENVIRONMENTAL EFFECTS*

Based on the findings of the assessments in this Project Profile, the environmental impacts potentially arising from the Project is considered to be minor and transient. With the implementation of appropriate mitigation measures discussed above, no adverse residual environmental impacts are anticipated.

With the view that no adverse impact is expected to arise from the Project and that the mitigation measures proposed meet the requirements of the EIAO-TM, HKU intends to directly apply for an Environmental Permit under the provisions of *Section 5(11)* of the EIAO.

## 6 *USE OF PREVIOUSLY APPROVED EIA REPORTS*

Reference was made to the *EIA for KCRC Kowloon Southern Link* (EIA Register No. : AEIAR-083/2005 approved on 30 March 2005) during the preparation of this Project Profile for the considerations on groundborne construction noise.



Figures

附圖

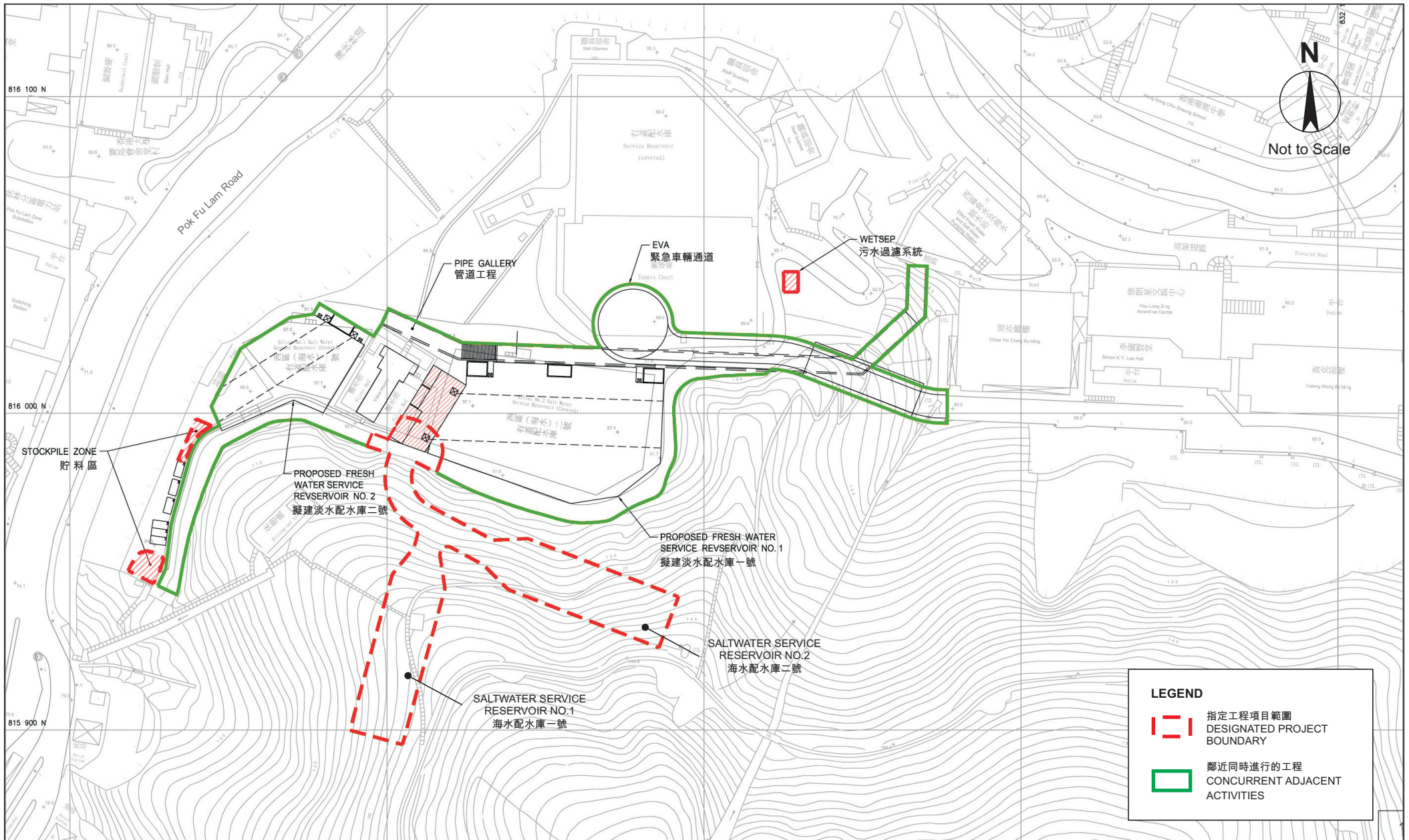


Figure 1.1  
圖 1.1

Site Plan  
工地位置

FILE: 0063857a.cdr  
DATE: 03/04/2007

Environmental  
Resources  
Management



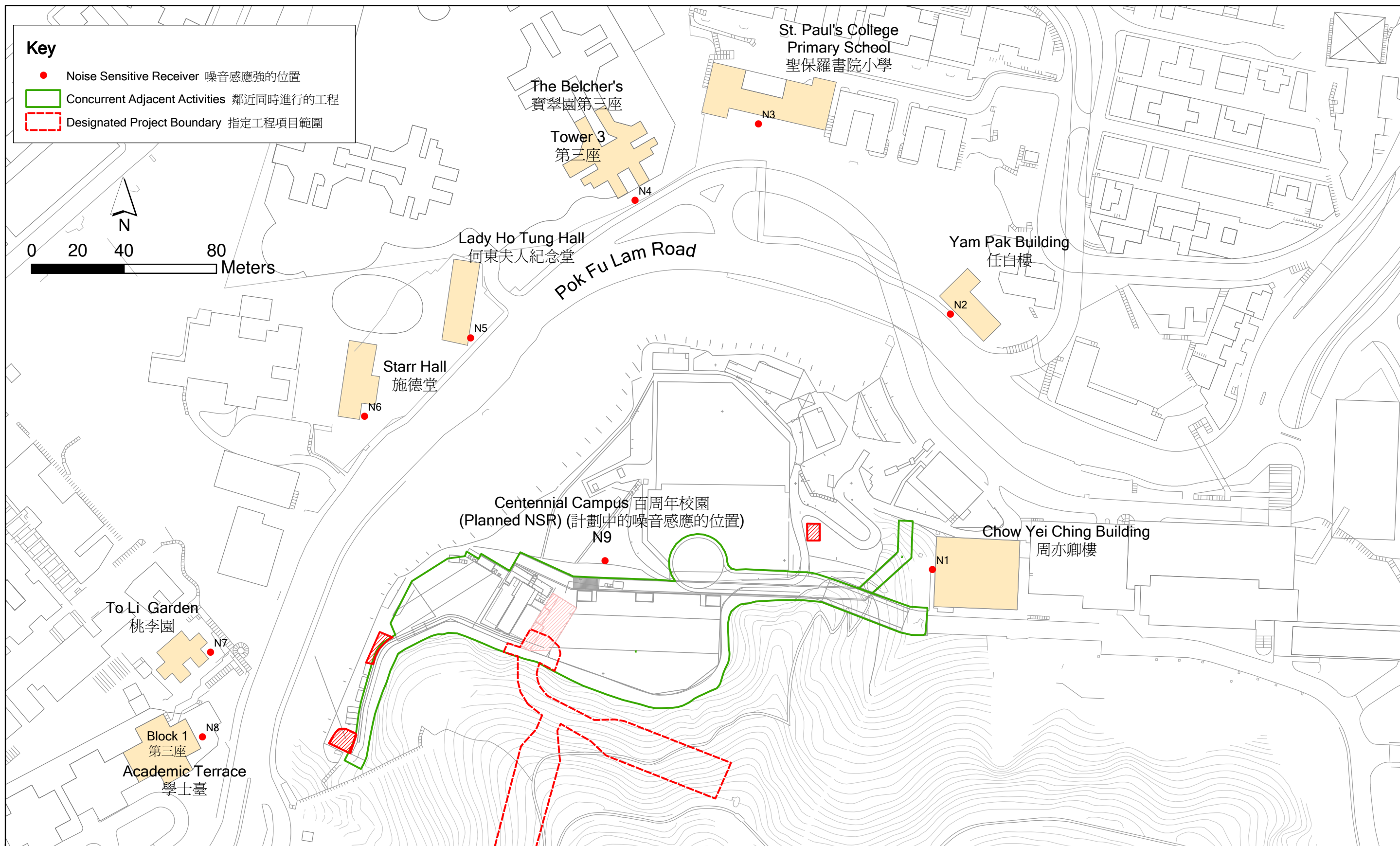


Figure 3.1  
圖 3.1

Locations of Noise Sensitive Receivers  
噪音感應強的位置

File: 0063857\_2.mxd  
Date: 21/03/2007

Environmental  
Resources  
Management



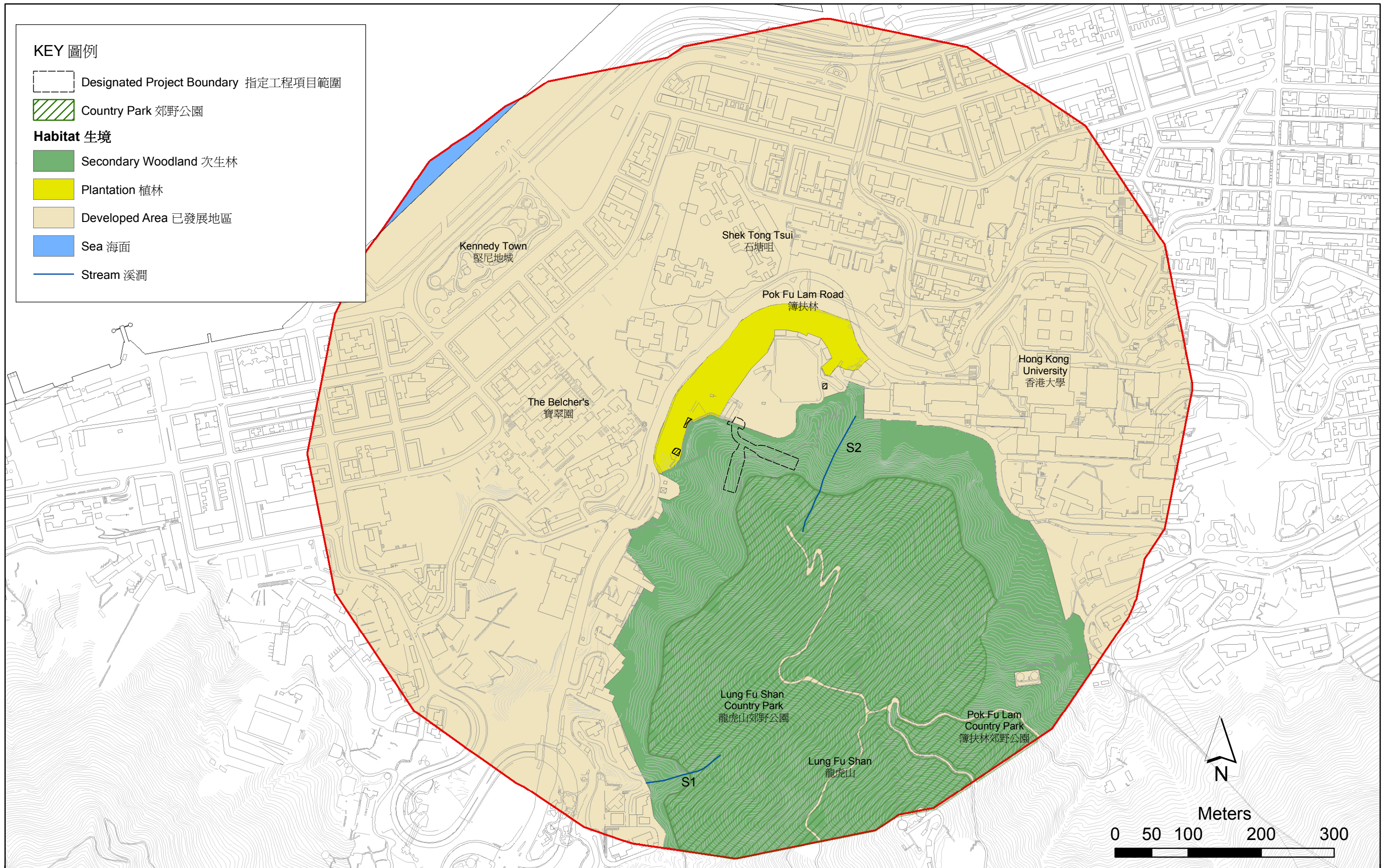


Figure 3.2  
圖 3.2

Habitat Map of Study Area  
考察地區生境圖

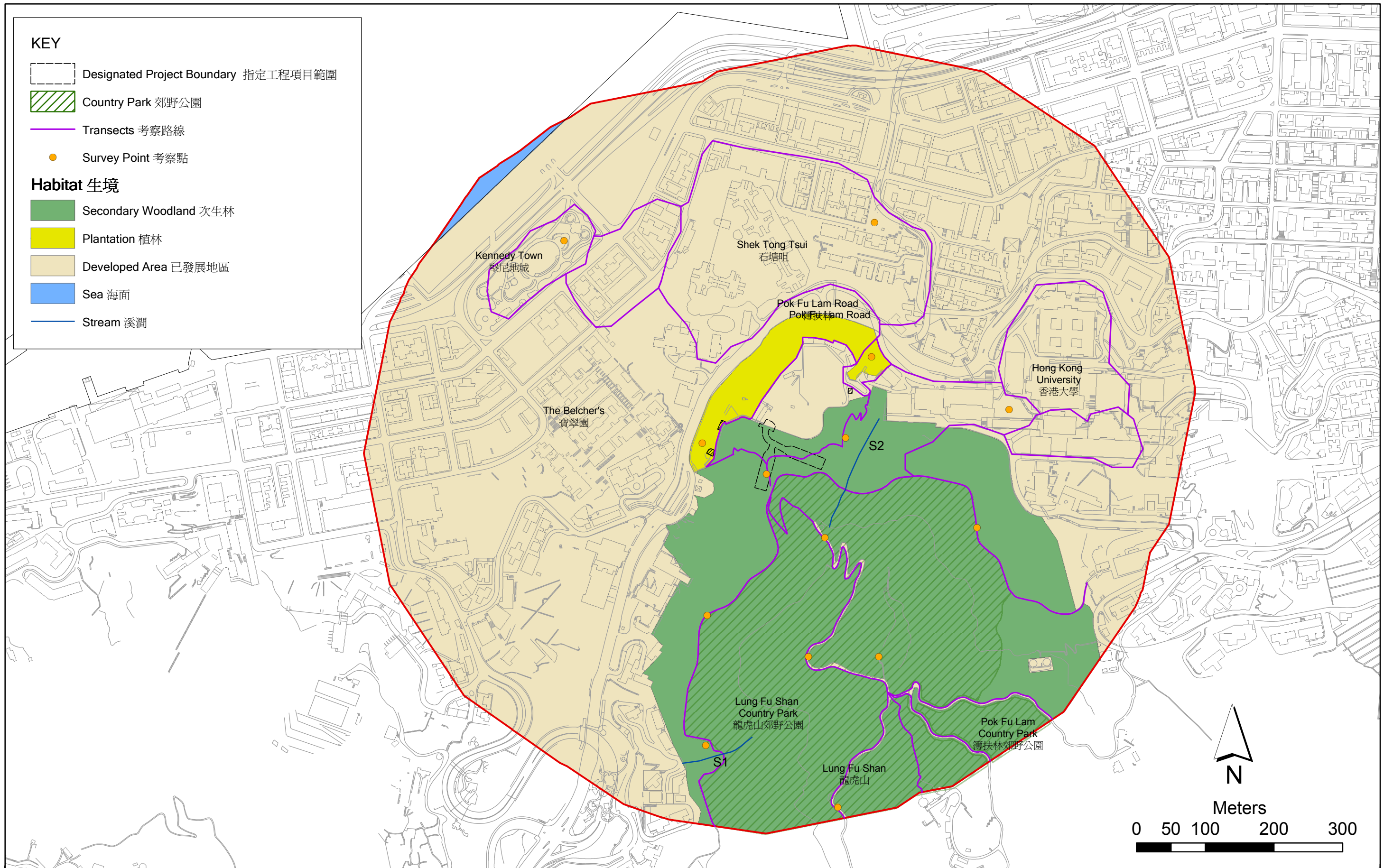


Figure 3.3  
圖 3.3

Survey Transect & Sampling Points for Wildlife Surveys within Study Area  
考察地區內之考察點和路線

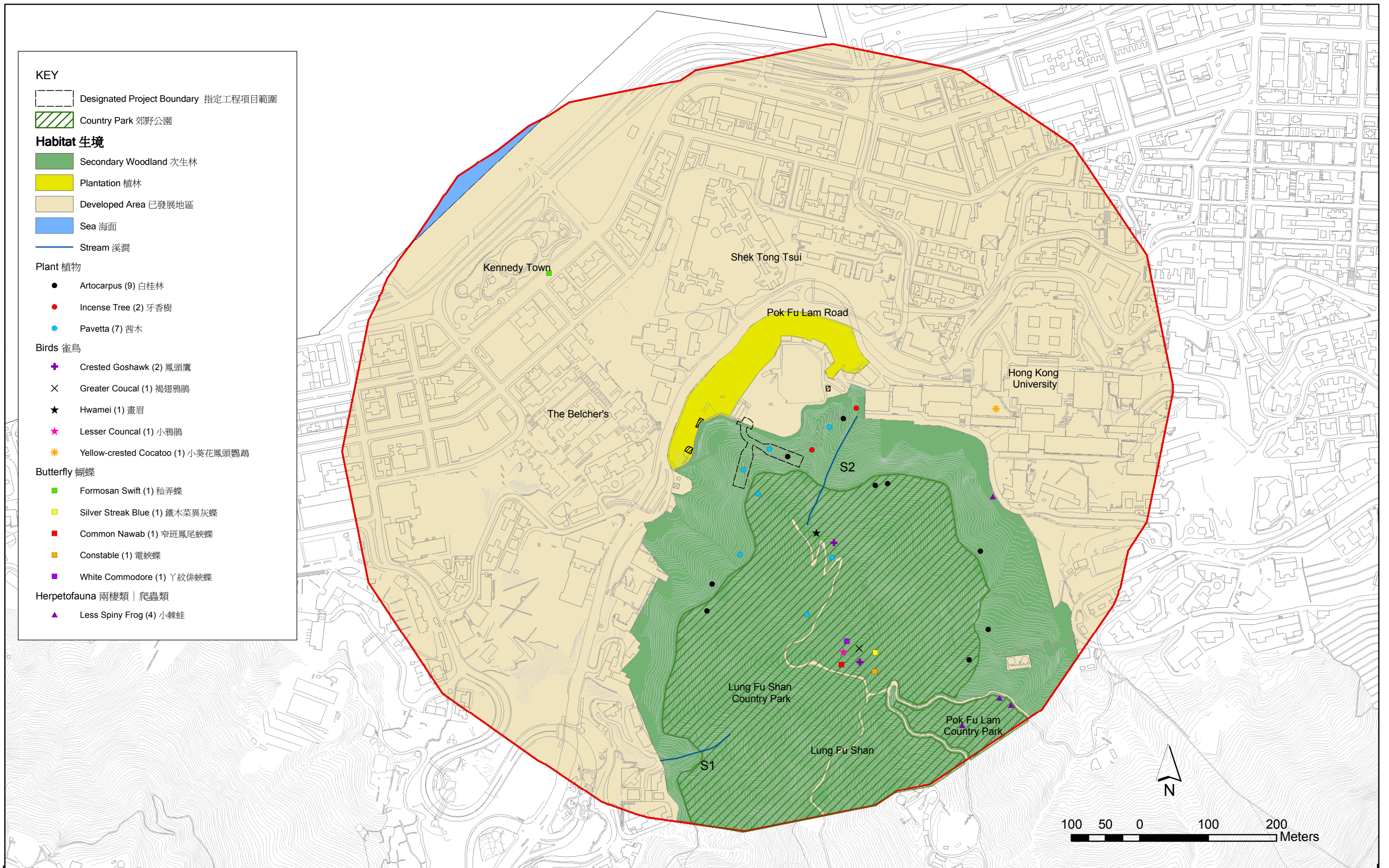


Figure 3.4  
圖 3.4

Species of Conservation Interest  
具特別保育價值之生物品種

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Date: 27/03/2007

Environmental  
Resources  
Management





Secondary woodland was found within the Study Area which consisted of canopy layer, climbers and understory with limited disturbance. 考察地區內之次生林較少受人為干擾，清晰可分為樹冠層，攀援植物和林下植株。



The understory of the secondary woodland was densely vegetated and dominated by native shrubs including *Cratoxylum cochinchinensis*, *Litsea rotundifolia* and *Ilex asprella*. 次生林的林內植物生長繁盛，並以原生灌木品種黃牛木、豺皮樟和梅葉冬青為主。



Establishment of cut slope and lamp posts along the morning exercise trail were the major disturbances to the secondary woodland, which were limited in extent. 次生林有限度地受發展干擾，如建立晨運徑和鋪設街燈。

Figure 3.5  
圖 3.5

Photographic Record of Secondary Woodland  
次生林之圖片記錄

FILE: 0063857b  
DATE: 22/03/2007

Environmental  
Resources  
Management





The plantation was dominated by exotic trees including *Acacia confusa*, *Lophostemon conferta* and *Casurina equisetifolia*, and was low in species diversity of vegetation. 植物主要以外來植物品種為主，品種偏少，包括台灣相思，紅膠木和木麻黃。



The portion of understory without slope work was sparsely occupied by some native shrubs and herbs. The species diversity of vegetation in the understory was low. 植林林底植物物種較少，未有做斜坡鞏固的地方，林底植物亦不繁盛。



The eastern part of the plantation has limited understory after stabilization work. 植林東面地區因斜坡工程而使林底植物更見稀少。

Figure 3.6  
圖 3.6

Photographic Record of Plantation  
植林之圖片記錄

FILE: 0063857c  
DATE: 22/03/2007

Environmental  
Resources  
Management







Water Service Reservoir was one of the structures within the developed area and the project site. 有蓋儲水庫位於已發展地區。



Limited landscape area dominated by landscape plants was found within the developed area. 已發展地區較少綠化地點和植物。



Praya Bay Garden is the biggest garden within the developed area to provide greenery. A variety of landscape plants were found in the garden. 位於已發展地區的卑路乍灣公園為該區最大的綠化地點，擁有一些綠化植物。



Buildings, flyovers and traffic roads were commonly found in the developed area. 已發展地區主要以建築物、道路為主。

Figure 3.7  
圖 3.7

FILE: 0063857d  
DATE: 22/03/2007

Photographic Record of Developed Area  
已發展地區之圖片記錄

Environmental  
Resources  
Management



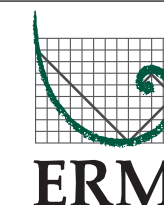


Figure 3.8  
圖 3.8

Existing Site Conditions  
現在工地情況

FILE: 0063857\_Fig3.8  
DATE: 22/03/2007

Environmental  
Resources  
Management



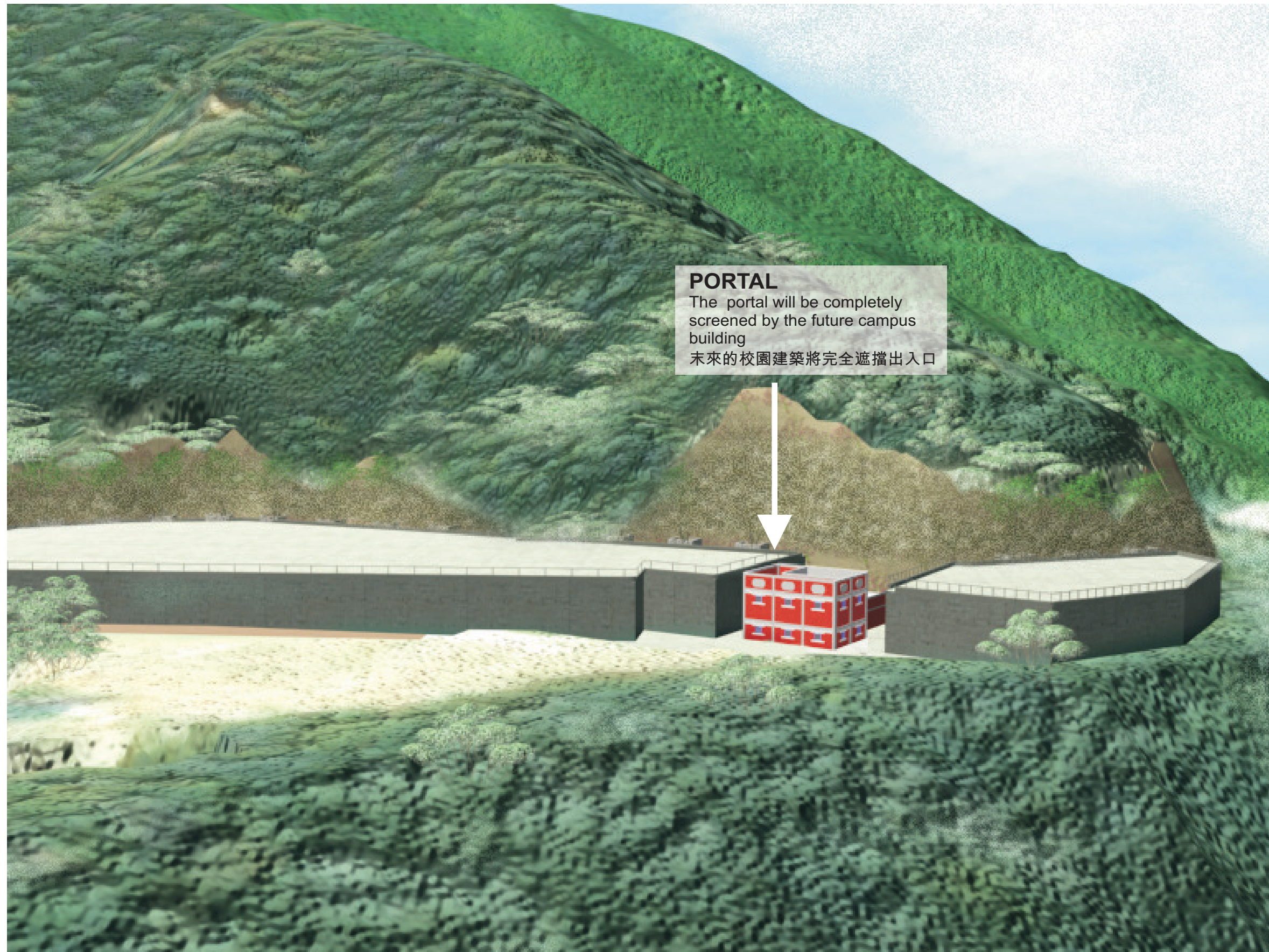
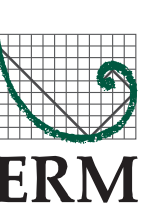


Figure 5.1  
圖 5.1

Digital Simulation of Completed Project Prior to Construction of Centennial Campus  
電腦模擬在百週年校園建築前完工的項目

FILE: 006385\_Fig5.1  
DATE: 02/04/2007

Environmental  
Resources  
Management



ERM

Annex A

附錄 A

Ecological Baseline Data

生態基線資料

表 Table A1 考察範圍內記錄之植物物種 Plant Species in the Study Area

Scientific Name 學名	Growth Form 生長形態	Origin 物源	Commonness 普遍性	Relative Abundance 相對數量				
				Secondary Woodland 次生林	Plantation 植林	Natural Stream 溪澗	Developed Area 已發展地區	Project Site 項目地區
<i>Acacia confuse</i> 台灣相思	T	E	VC		D		A	A
<i>Acalypha wilkesiana</i> 紅桑	S	E	VC				O	
<i>Acronychia pedunculata</i> 山油柑	T	N	C	F				
<i>Aglaia odorata</i> 米仔蘭	S	E	VC				F	
<i>Alangium chinense</i> 八角楓	S	N	C	F	F	O		O
<i>Aleurites moluccana</i> 石栗	T	N	VC	S	O		F	
<i>Alocasia macrorrhiza</i> 假海芋	H	N	VC	O	F	F		O
<i>Antirrhoea chinensis</i> 毛茛	T	N	C	S				
<i>Aporosa dioica</i> 銀柴	S	N	C	F		O		O
<i>Aquilaria sinensis</i> 牙香樹	T	N	P	S				
<i>Archidendron lucidum</i> 亮葉猴耳環	S	N	VC	F				
<i>Artocarpus heterophylla</i> 白桂木	T	N	P	O				
<i>Ardisia crenata</i> 大羅傘	S	N	C	F				O
<i>Asparagus cochinchinensis</i> 天門冬	H	N	VC	F				
<i>Berchemia racemosa</i> 勾兒茶	C	N	C	F		O		O
<i>Bougainvillea glabra</i> 勒杜鵑	S	E	VC				F	
<i>Breynia fruticosa</i> 黑面神	S	N	VC	F				
<i>Bridelia tomentosa</i> 土蜜樹	S	N	VC	F	F			F
<i>Broussonetia papyrifera</i> 構	T	N	C	O	O		O	O
<i>Callistemon rigidus</i> 紅千層	T	E	VC				O	
<i>Callicarpa cathayana</i> 華紫珠	S	N	C	S				
<i>Casuarina equisetifolia</i> 木麻黃	T	E	VC		F		F	
<i>Celtis sinensis</i> 朴樹	T	N	VC	A	F		F	O
<i>Cinnamomum camphora</i> 樟樹	T	N	C	F	S		O	O
<i>Cratoxylum cochinchinense</i> 黃牛木	S	N	VC	A				
<i>Dalbergia millettii</i> 香港黃檀	C	N	VC	O		F		
<i>Desmos cochinchinensis</i> 假鷹爪	C	N	C	A				

Scientific Name 學名	Growth Form 生長形態	Origin 物源	Commonness 普遍性	Relative Abundance 相對數量				
				Secondary Woodland 次生林	Plantation 植林	Natural Stream 溪澗	Developed Area 已發展地區	Project Site 項目地區
<i>Dianella ensifolia</i> 山菅蘭	H	N	VC	F		F		
<i>Dimocarpus longan</i> 龍眼	T	N	VC				O	
<i>Diospyros vaccinioides</i> 小果柿	S	N	VC	F				
<i>Elaeocarpus hainanensis</i> 水石榕	S	E	C				O	
<i>Embelia laeta</i> 酸藤果	C	N	VC	F		F		
<i>Eurya japonica</i> 柃	S	N	VC	F				
<i>Evodia leptota</i> 三椏苦	S	N	C	F		F		
<i>Ficus elastica</i> 印度象樹	T	E	VC				O	
<i>Ficus hirta</i> 粗葉榕	S	N	VC	F			O	
<i>Ficus hispida</i> 對葉榕	T	N	VC	O	O		O	
<i>Ficus microcarpus</i> 細葉榕	T	N	VC	F		O	F	O
<i>Ficus superba</i> 黃葛樹	T	N	VC				F	
<i>Gahnia tristis</i> 黑沙草	Se	N	VC	F				
<i>Garcinia oblongifolia</i> 黃牙果	T	N	VC	F				
<i>Glochidion eriocarpum</i> 毛果算盤子	S	N	VC	F				
<i>Gnetum montanum</i> 買麻藤	C	N	VC	F		O		
<i>Gordonia axillaries</i> 大頭茶	S	N	VC	F				
<i>Gossampinus malabarica</i> 木棉	T	E	VC				O	
<i>Ilex asprella</i> 梅葉冬青	S	N	VC	F				
<i>Ilex cinerea</i> 灰冬青	S	N	C	O				
<i>Ilex rotunda</i> 鐵冬青	S	N	VC	F				
<i>Ilex pubescens</i> 毛冬青	S	N	VC	F				
<i>Itea chinensis</i> 鼠刺	T	N	C	S				
<i>Lantana camara</i> 馬纓丹	S	E	VC	O			F	
<i>Leucaena leucocephala</i> 銀合歡	T	E	VC		F			S
<i>Ligustrum sinensis</i> 山指甲	S	N	VC		F	F	F	O
<i>Liriope spicata</i> 鳶尾	H	N	VC	F				
<i>Litsea cubeba</i> 山蒼樹	S	N	VC	S				O
<i>Litsea glutinosa</i> 潺槁	T	N	VC	F	F		O	O
<i>Litsea rotundifolia</i> 豹皮樟	S	N	VC	A		F		

Scientific Name 學名	Growth Form 生長形態	Origin 物源	Commonness 普遍性	Relative Abundance 相對數量				
				Secondary Woodland 次生林	Plantation 植林	Natural Stream 溪潤	Developed Area 已發展地區	Project Site 項目地區
<i>Lophostemon conferta</i> 紅膠木	T	E	VC	O	F			
<i>Lygodium dichotomum</i> 鋪地蜈蚣	F	N	VC	O				
<i>Macaranga tanarius</i> 血桐	T	N	VC	F	F		F	S
<i>Machilus breviflorum</i> 短序潤楠	T	N	C	A				
<i>Machilus velutina</i> 絨楠	T	N	C	A				
<i>Maesa perlarius</i> 鱯魚膽	S	N	C	F				
<i>Mallotus paniculatus</i> 白楸	T	N	VC	F	F			
<i>Mangifera indica</i> 杧果	T	N	VC	S				
<i>Melaleuca leucadendron</i> 白千層	T	E	VC		O		F	O
<i>Melastoma sanguineum</i> 毛稔	S	N	VC	F				
<i>Melia azedarach</i> 苦楝	T	E	VC				O	
<i>Miscanthus sinensis</i> 芒草	G	N	VC					
<i>Murraya exotica</i> 九里香	S	N	VC				O	
<i>Mussaenda pubescens</i> 玉葉金花	S	N	C	F				
<i>Ormosia emarginata</i> 凹葉紅豆	T	N	C	S				
<i>Pandanus forceps</i> 露兜籐	S	N	VC	S		O		
<i>Panicum notatum</i> 山黍	G	N	C		F		F	
<i>Parthenocissus himalayana</i> 爬牆虎	C	E	VC				F	
<i>Pavetta hongkongensis</i> 茜木	S	N	P	O				
<i>Phyllanthus cochinchinensis</i> 越南葉下株	S	N	VC	F				
<i>Psychotria rubra</i> 山大刀	S	N	VC	F				
<i>Rapanea neriifolia</i> 密花樹	S	N	VC	O				
<i>Rhaphis excelsa</i> 棕竹	P	E	VC	S				
<i>Rhaphiolepis indica</i> 春花	S	N	VC	O				
<i>Rhodomyrtus tomentosa</i> 崗稔	S	N	VC	S				
<i>Rhus succedanea</i> 野漆樹	S	N	VC	F				
<i>Rubus reflexus</i> 蛇泡籐	C	N	VC	F		O		
<i>Sageretia theezans</i> 雀梅藤	C	N	VC	O	S			
<i>Sapium discolor</i> 山烏柏	S	N	VC	F				
<i>Sapium sebiferum</i> 烏柏	S	N	VC	F				

Scientific Name 學名	Growth Form 生長形態	Origin 物源	Commonness 普遍性	Relative Abundance 相對數量				
				Secondary Woodland 次生林	Plantation 植林	Natural Stream 溪澗	Developed Area 已發展地區	Project Site 項目地區
<i>Schefflera heterophylla</i> 鴨腳木	S	N	VC	F	S	F	F	
<i>Smilax glabra</i> 土伏苓	C	N	VC	F				
<i>Sterculia lanceolata</i> 假萍婆	T	N	C	F		F		
<i>Tricalysia dubia</i> 狍骨柴	S	N	VC	F				
<i>Uvaria microcarpa</i> 紫玉盤	C	N	C	F				
<i>Wedelia chinensis</i> 蟛蜞菊	C	N	VC	O				
<i>Zanthoxylum avicennae</i> 箭欖	S	N	VC	A				
<b>Total 總數</b>				<b>75</b>	<b>20</b>	<b>16</b>	<b>28</b>	<b>17</b>

Abundance 數量 : A=Abundant 大量 ; F=Frequent 常見 ; O=Occasional 偶然 ; S=Scarce 稀少

Status 普遍性 : C=Common 常見 ; VC=Very Common 普遍 ; P=Protected 受保護

Plant Form 生長形態 : G=Grass 草本; C= Climber 攀藤 ; H=Herb 草木 ; Se=Sedge 莎草; P=Palm 棕櫚 ; S=Shrub 灌木; T=Tree 喬木

Origin 物源 : N=Native 原生 ; E=Exotic 外來



表 Table A2 考察範圍內記錄之鳥類物種 Bird Species Recorded in the Study Area

Common Name 俗名	Species Name 學名	Commonness 普遍性	Secondary Woodland 次生林	Plantation 植林	Developed Area 已發展地區
Barn Swallow 家燕	<i>Hirundo rustica</i>	CW	8	4	8
Black Kite 鳶(麻鷹)	<i>Milvus migrans</i>	CW	50	22	6
Black-collared Starling 黑領椋鳥	<i>Sturnus nigricollis</i>	CW	2		4
Black-throated Laughing Thrush 黑領噪鵲	<i>Garrulax poecilorhynchus</i>	R	6		
Black-winged Cuckoo Shrike 暗灰鶇鶇	<i>Coracina melaschistos</i>	R		1	
Blue Magpie 紅咀藍鶇	<i>Urocissa erythrorhyncha</i>	CW			2
Common Koel 噪鶇	<i>Eudynamis scolopacea</i>	CW	1	1	1
Common Magpie 喜鶇	<i>Pica pica</i>	CW	2		1
Common Tailorbird 火尾縫葉鶇	<i>Orthotomus sutorius</i>	CW	13	6	
Crested Goshawk 鳳頭鷹	<i>Accipiter trivirgatus</i>	R	3		
Crested Myna 八哥	<i>Acridotheres cristatellus</i>	CW			2
Dusky Warbler 褐柳鶇	<i>Phylloscopus fuscatus</i>	U	1		
Eurasian Tree Sparrow 麻雀	<i>Passer montanus</i>	CW			101
Forest Wagtail 林鶇領	<i>Dendronanthus indicus</i>	R	1		
Fork-tailed Sunbird 尾太陽鳥	<i>Aethopyga christinae</i>	CW	2	2	
Great Tit 大山雀	<i>Parus major</i>	CW	7	2	
Greater Coucal 褐翅鴉鶇(毛雞)	<i>Centropus sinensis</i>	CW	1		
Grey Wagtail 灰鶇鶇	<i>Motacilla cinerea</i>	CW		1	
Grey-backed Thrush 灰背鶇	<i>Turdus hortulorum</i>	U	9	1	
House Swift 小白腰雨燕	<i>Apus nipalensis</i>	CW			6
Hwamei 畫眉	<i>Garrulax canorus</i>	U	3		
Japanese Thrush 烏灰鶇	<i>Turdus cardis</i>	R	2		
Japanese White-eye 相思	<i>Zosterops japonicus</i>	CW	53	4	5
Large-billed Crow 大咀烏鴉	<i>Corvus macrorhynchos</i>	CW	5		
Lesser Coucal 小鴉鶇	<i>Centropus bengalensis</i>	U	1		
Light-vented Bulbul 白頭鶇	<i>Pycnonotus sinensis</i>	CW	31	14	5
Masked Laughing Thrush 黑臉噪鶇	<i>Garrulax perspicillatus</i>	CW	13		3
Olive-backed Pipit 樹鶇	<i>Anthus hodgsoni</i>	CW	12	10	

Common Name 俗名	Species Name 學名	Commonness 普遍性	Secondary Woodland 次生林	Plantation 植林	Developed Area 已發展地區
Oriental Magpie Robin 鵲鴝	<i>Copsychus saularis</i>	CW	7	3	5
Pale Thrush 白腹鶇	<i>Turdus pallidus</i>	U	1		
Pallas' Warbler 黃腰柳鶇	<i>Phylloscopus proregulus</i>	U	2		
Red-whiskered Bulbul 紅耳鶇	<i>Pycnonotus jocosus</i>	CW	22	6	17
Red-tailed Robin 紅尾歌鶇	<i>Luscinia sibilans</i>	R	1		
Scarlet-backed Flowerpecker 朱背啄花鳥	<i>Dicaeum cruentatum</i>	R		1	
Spotted Dove 珠頸斑鳩	<i>Streptopelia chinensis</i>	CW	4		6
Tristram Bunting 白眉鶇	<i>Emberiza tristrami</i>	R	3		
Violet Whistling Thrush 紫嘯鶇	<i>Myiophoneus caeruleus</i>	CW	1	1	
White Wagtail 黃鶇鶇	<i>Motacilla alba</i>	CW		1	3
White-rumped Munia 白腰文鳥	<i>Lonchura striata</i>	CW	6		4
Yellow-bellied Prinia 灰頭鷓鴣	<i>Prinia flaviventris</i>	CW	4		
Yellow-browed Warbler 黃眉柳鶇	<i>Phylloscopus inornatus</i>	CW	9	3	
Yellow-crested Cuckoo 小葵花鳳頭鸚鵡	<i>Cacatua sulphurea</i>	U			5
<b>Total Species 物種總數</b>			<b>33</b>	<b>18</b>	<b>18</b>
<b>Total Individuals 個體總數</b>			<b>286</b>	<b>83</b>	<b>193</b>

Commonness 普遍性: CW = common and widespread 常見及廣泛分佈; U = uncommon 非常見; R = rare 少見

表 Table A3 考察範圍內記錄之蝴蝶物種 Butterfly Species Recorded in the Study Area

Common Name 俗名	Species Name 學名	Commonness 普遍性	Secondary Woodland 次生林	Plantation 植林	Developed Area 發展區
Forest Hopper 腌翅弄蝶	<i>Astictopterus jama</i>	Common 常見	1		
Formosan Swift 杣弄蝶	<i>Borbo cinnara</i>	Uncommon 不常見			1
Pale Grass Blue 酢醬灰蝶	<i>Zizeeria maha</i>	Very Common 十分常見	4		
Common Hedge Blue 鈕灰蝶	<i>Acytolepis puspa</i>	Common 常見	3		
Silver Streak Blue 鐵木筴異灰蝶	<i>Iraota timoleon</i>	Uncommon 不常見	1		
Dark Cerulean 雅灰蝶	<i>Jamides bochus</i>	Common 常見	1		
Common Bluebottle 青鳳蝶	<i>Graphium sarpedon</i>	Very Common 不常見	6		
Tailed Jay 統師青鳳蝶	<i>Graphium agamemnon</i>	Very Common 十分常見	4		
Red Helen 玉斑鳳蝶	<i>Papilio helenus</i>	Very Common 十分常見	10		
Common Mormon 玉帶鳳蝶	<i>Papilio polytes</i>	Very Common 十分常見	5		
Great Mormon 英鳳蝶	<i>Papilio memnon</i>	Common 常見	3		
Chinese Peacock 碧鳳蝶	<i>Papilio bianor</i>	Very Common 十分常見	4		
Paris Peacock 巴黎翠鳳蝶	<i>Papilio paris</i>	Very Common 十分常見	9		
Great Orange Tip 鶴頂粉蝶	<i>Hebomoia glaucippe</i>	Common 常見	1		
Indian Cabbage White 大紅蛺蝶	<i>Pieris canidia</i>	Very Common 十分常見			1
Rustic 黃襟蛺蝶	<i>Cupha erymanthis</i>	Very Common 十分常見	1		
Common Nawab 窄斑鳳尾蛺蝶	<i>Polyura athamas</i>	Uncommon 不常見	1		
Constable 電蛺蝶	<i>Dichorragia nesimachus</i>	Uncommon 不常見	1		
White Commodore 丫紋俳蛺蝶	<i>Parasarpa dudu</i>	Uncommon 不常見	1		
Glassy Tiger 絹斑蝶	<i>Parantica aglea</i>	Very Common 十分常見	1		
Large Faun 串珠環蝶	<i>Faunis eumeus</i>	Very Common 十分常見	2	3	
Plum Judy 蛇目褐蛺蝶	<i>Abisara echerius</i>	Very Common 十分常見	5		
Common Five-ring 矍眼蝶	<i>Ypthima baldus</i>	Common 常見	2		

Common Name 俗名	Species Name 學名	Commonness 普遍性	Secondary Woodland 次生林	Plantation 植林	Developed Area 發展區
Dark-band Bush Brown 小眉眼蝶	<i>Mycalesis mineus</i>	Very Common 十分常見	1		
Total Species 物種總數			22	1	2
Total Individual 個體總數			67	3	2

表 Table A4 考察範圍內記錄之蜻蜓物種 *Dragonfly Species Recorded in the Study Area*

Common Name 俗名	Species Name 學名	Secondary Woodland 次生林	Plantation 植林	Developed Area 已發展地區	Status
Wandering Glider 黃蜻	<i>Pantala flavescens</i>	3	1	2	Abundant

表 Table A5 考察範圍內記錄之兩棲及爬蟲物種 *Amphibian and Reptiles Recorded in the Study Area*

Common Name 俗名	Species Name 學名	Habitat 棲息地	Commonness 普遍性	Number of Individuals Recorded 已記錄之個體數量
<b>Reptiles 爬蟲動物</b>				
Changeable Lizard 變色樹蜥 (雞冠蛇)	<i>Calotes versicolor</i>	Secondary woodland 次生林	Common 常見	1
Reeves' Smooth Skink 長尾南蜥	<i>Scincella reevesii</i>	Secondary woodland 次生林	Common 常見	1
Bowring's Gecko 原尾蜥虎 (鹽蛇)	<i>Hemidactylus bowringii</i>	Secondary woodland 次生林	Common 常見	5
<b>Amphibians 兩棲動物</b>				
Asian Common Toad 黑框蟾蟳 (癩蝦蟆)	<i>Bufo melanostictus</i>	Secondary woodland and Developed area 次生林及已發展地區	Common 常見	6
Green Cascade Frog 大綠蛙	<i>Rana livida</i>	Secondary woodland 次生林	Common 常見	3

Common Name 俗名	Species Name 學名	Habitat 棲息地	Commonness 普遍性	Number of Individuals Recorded 已記錄之個體數量
Lesser Spiny Frog 小棘蛙	<i>Rana exilispinosa</i>	Secondary woodland 次生林	Uncommon 常見	9
Paddy Frog 澤蛙	<i>Rana limnocharis</i>	Secondary woodland 次生林	Common 不常見	3

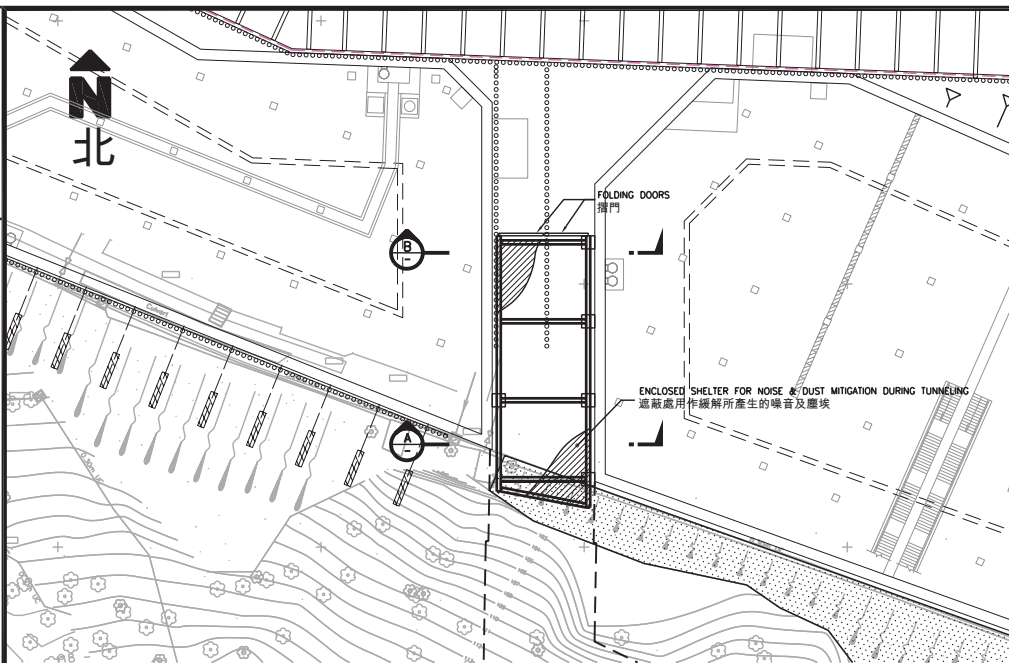
Annex B

附錄 B

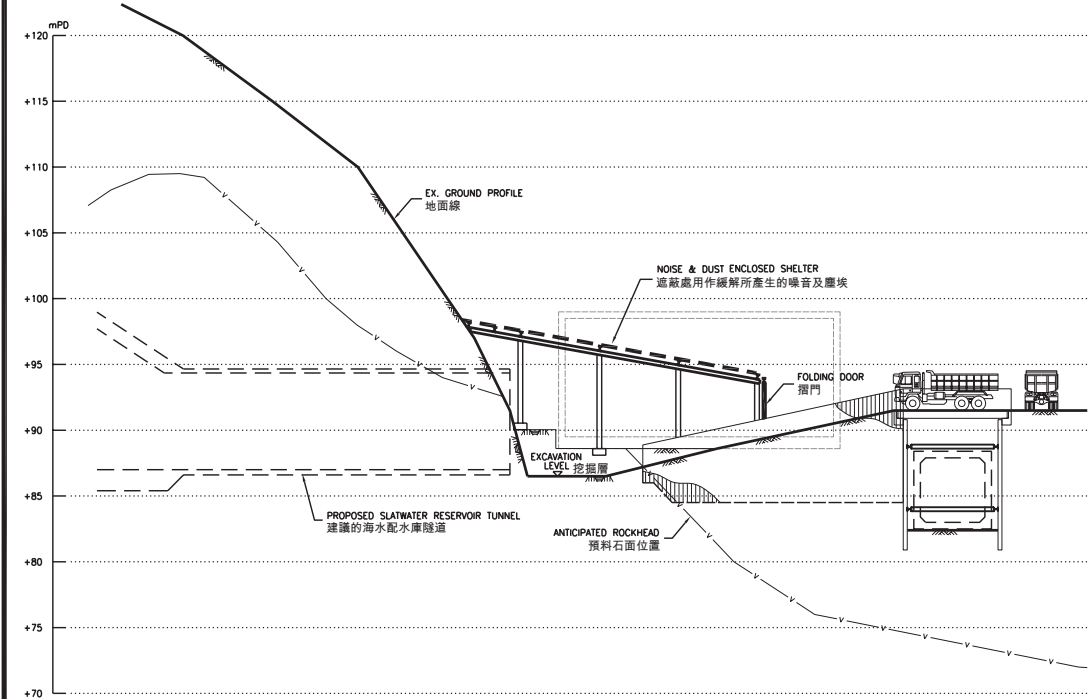
Plans and Sections Showing  
the Project and the  
Ventilation Layout during  
Operational Phase

工程項目圖則及切面圖以及  
運作期間的通風設計圖

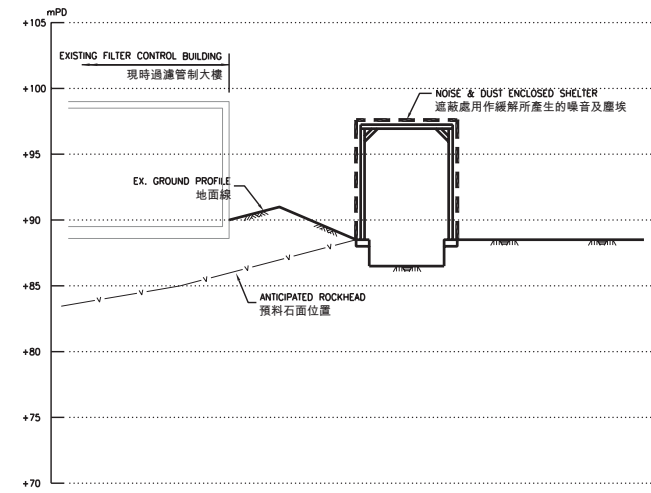
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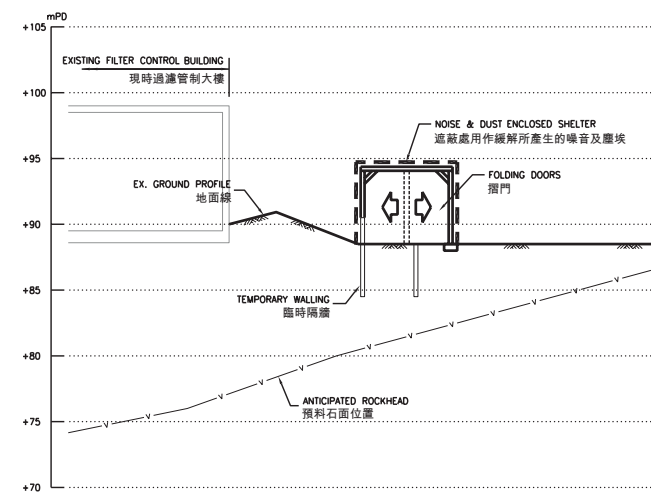
**LAYOUT PLAN 佈局圖** 1 : 200



**LONGITUDINAL SECTION 縱向切面圖** 1 : 200

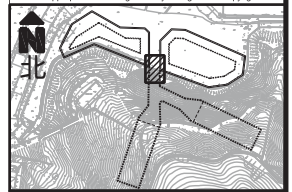


**SECTION 切面圖 A - A** 1 : 200



**SECTION 切面圖 B - B** 1 : 200

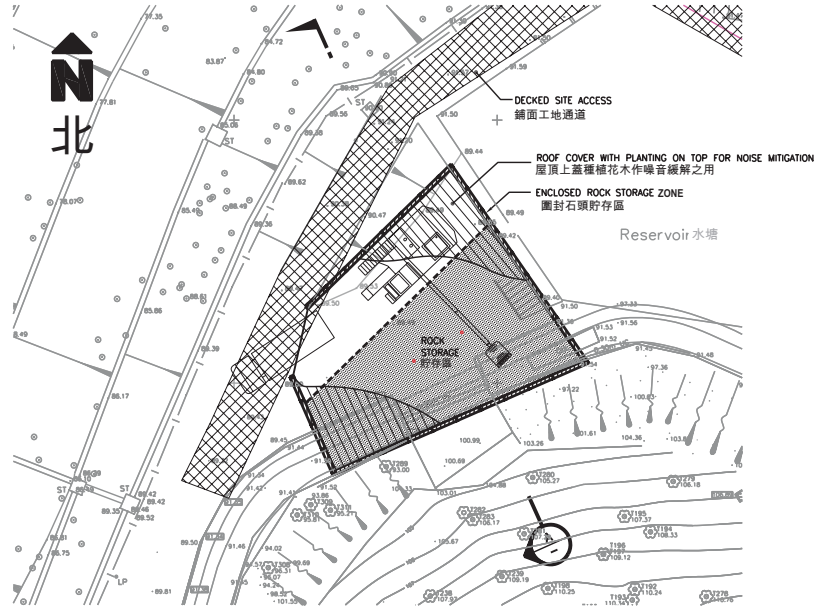
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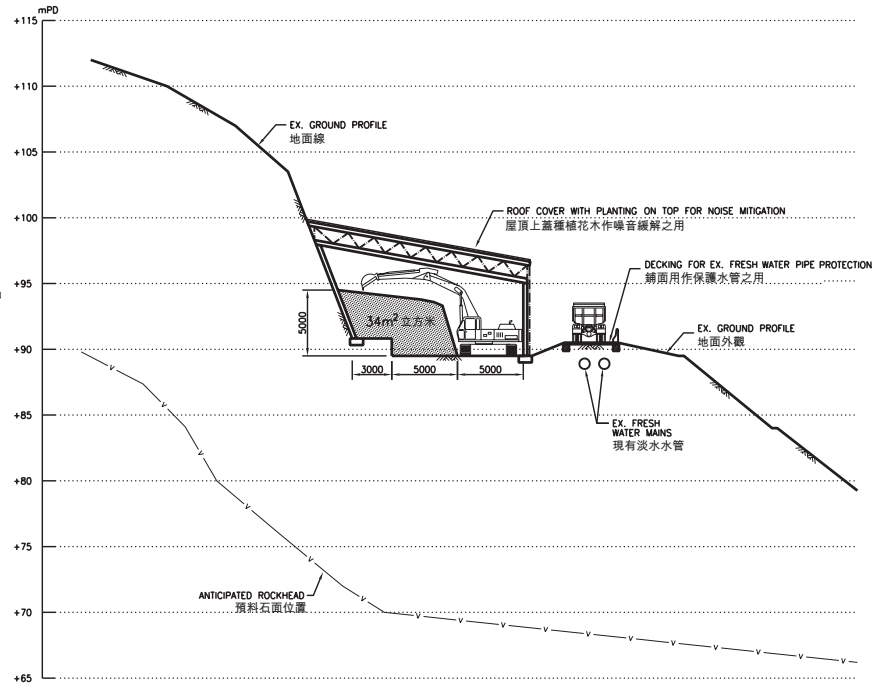
**KEY PLAN 佈置圖**

<b>ENCLOSED SHELTER FOR SALTWATER RESERVOIR TUNNELLING FOR NOISE &amp; DUST MITIGATION</b>			
在海水配水庫隧道工程用作緩解噪音及塵埃的遮蔽處			
Drawn	TS	Scale	AS SHOWN @A1
Designed	MC	Figure No.	Annex B-1
Checked	SKC	圖號	附件B-1
Approved	SKC	Drawing No.	T06166-9054
CAD Ref		Rev	0

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**LAYOUT PLAN 佈局圖** 1 : 200



**SECTION 切面圖 A - A** 1 : 200

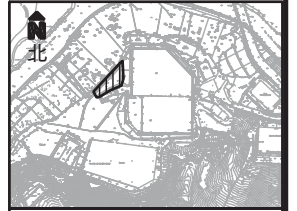
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**KEY PLAN 佈置圖**

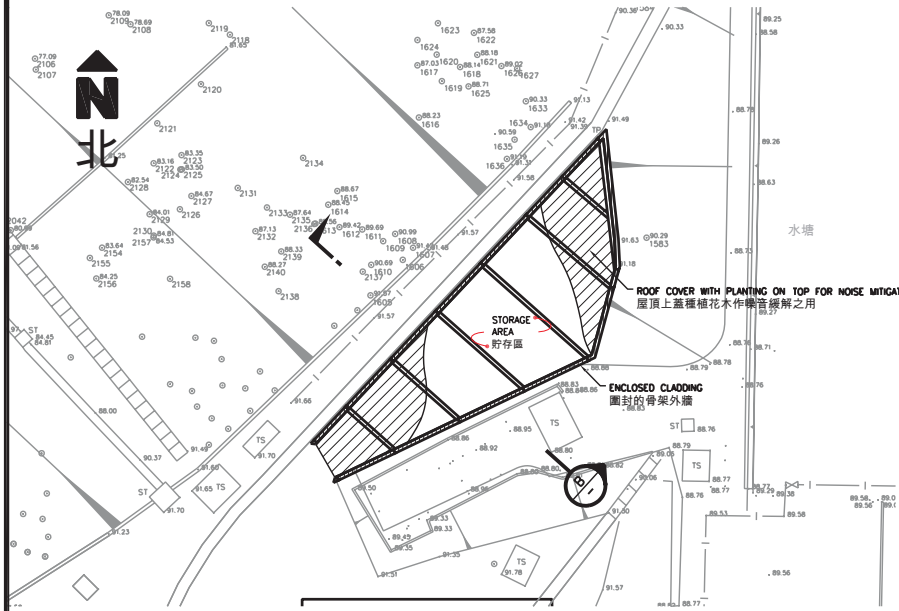
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ENCLOSED ROCK STORAGE ZONE 圍封的石頭貯存區			
Drawn	YS	Scale	AS SHOWN @A1
Designed	MC	Figure No. Annex B-2	
Checked	SKC	圖號 附件 B-2	
Approved	SKC	Drawing No	Rev
CAD Ref		T06166-9052	0

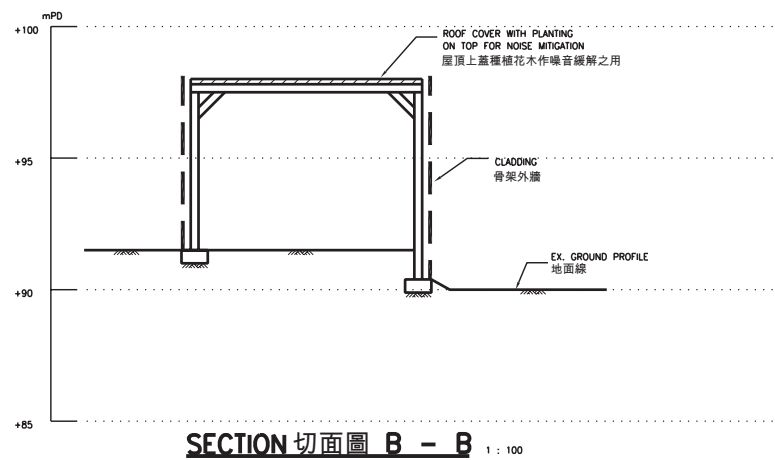




**KEY PLAN 佈置圖**



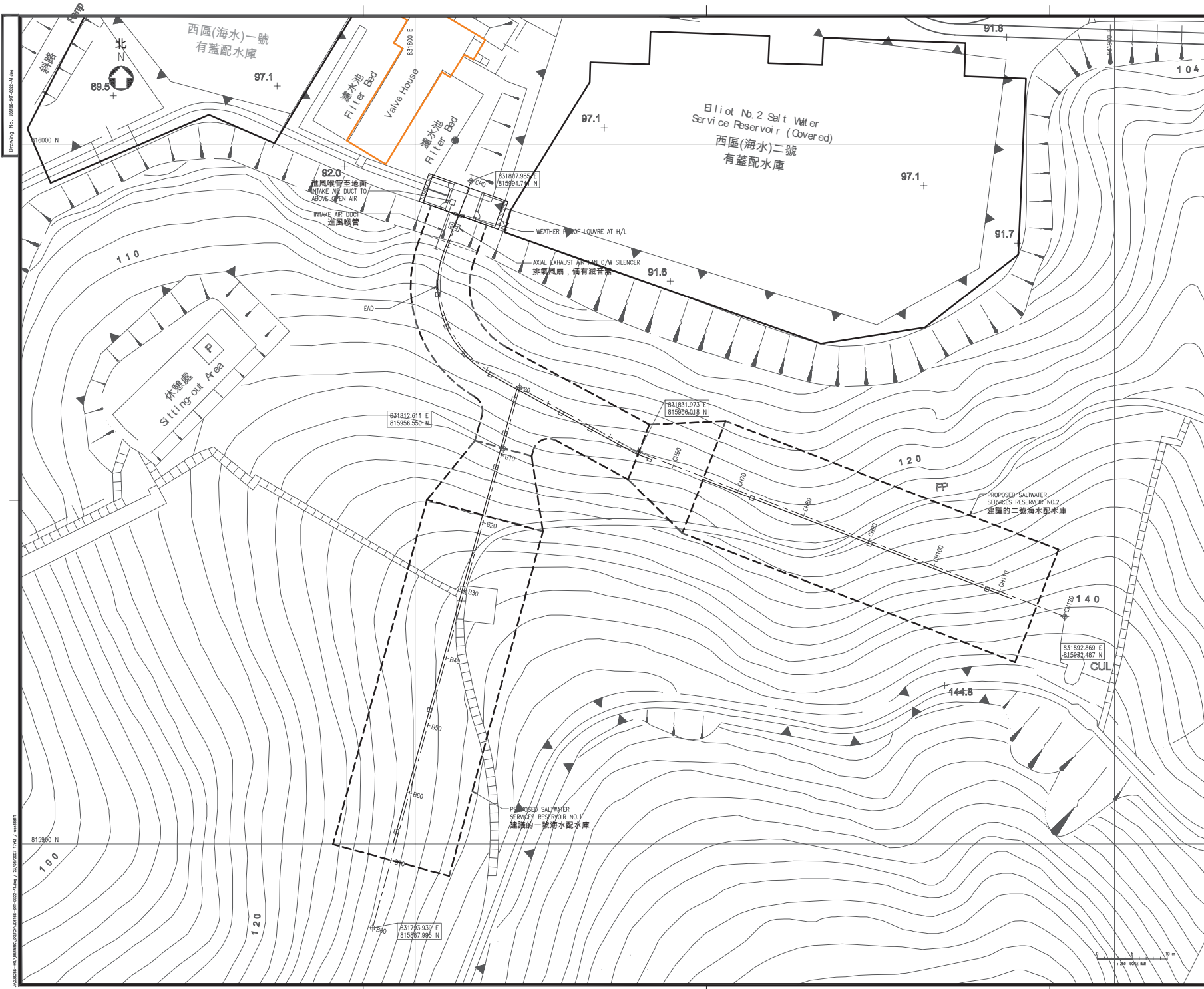
**LAYOUT PLAN 佈局圖 1 : 200**



**SECTION 切面圖 B - B 1 : 100**



ENCLOSED ROCK STORAGE ZONE 圍封的石頭貯存區			
Drawn	YS	Scale	AS SHOWN @A1
Designed	MC	Figure No. Annex B-3 圖號 附件 B-3	
Checked	SKC		
Approved	SKC	Drawing No	Rev
CAD Ref		T06166-9053	0

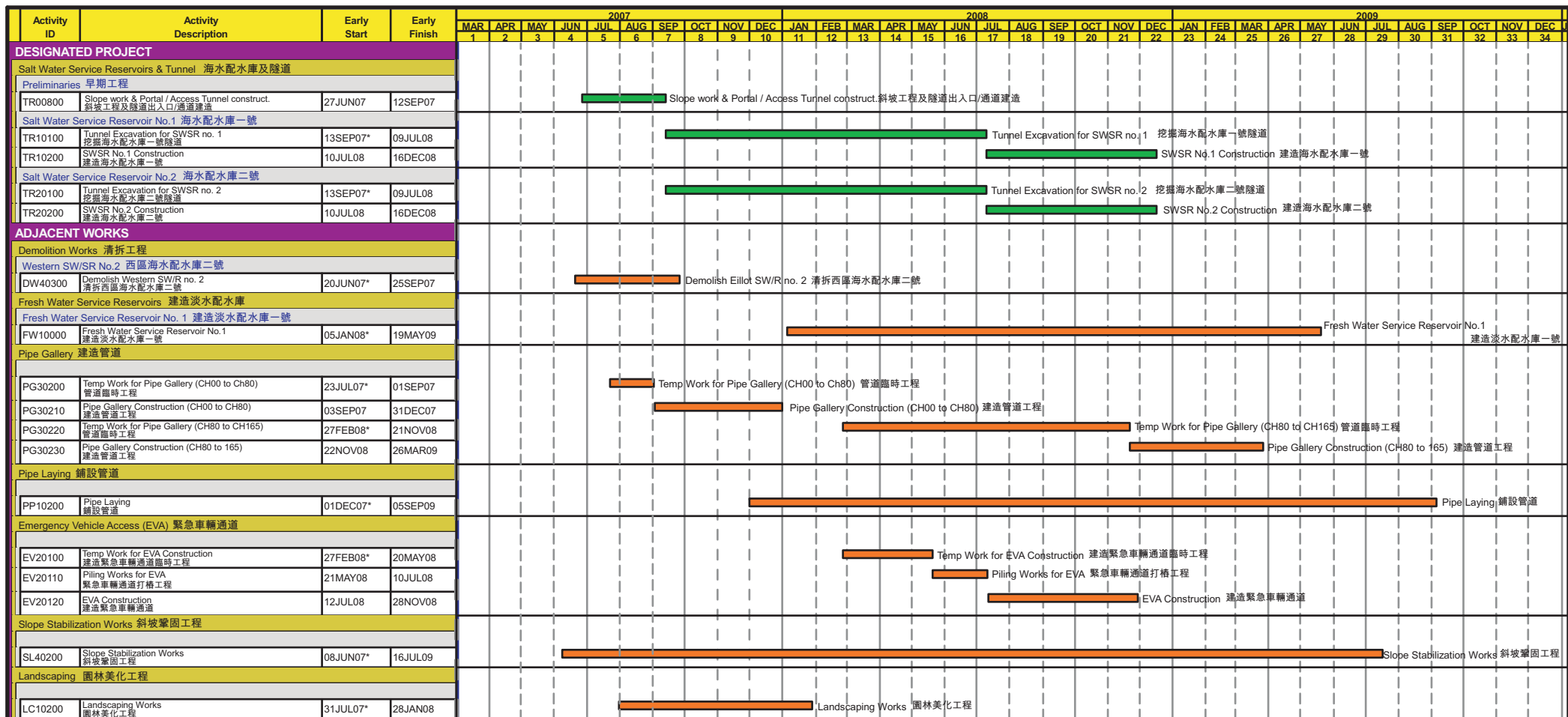


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LEGEND:

EAG	EXHAUST AIR GRILLE 排風欄
VCD	VOLUME CONTROL DAMPER 容量控制氣閘
H/L	HIGH LEVEL 高位
EAD	EXHAUST AIR DUCT 排風管
F.D.	FIRE DAMPER 消防氣閘
□	EXHAUST AIR GRILLE 排風欄

Title	
SALTWATER RESERVOIR SERVICES TUNNEL - VENTILATION LAYOUT 海水配水庫隧道 - 通風佈局	
Drawn XJ	Scale 1:250(A1) 1:500(A3)
Design PW	Figure No. Annex B-4
Checked CN	圖號 附件 B-4
Approved TC	Drawing No.
CAD Ref J06166-SKT-0022-A1.dwg	Rev A1



Start Date 01MAR07  
 Finish Date 05SEP09  
 Data Date 01MAR07  
 Run Date 19MAR07 18:44



EP01  
 Sheet 1 of 1  
**重置西區海水配水庫施工工序**  
 Repronis of Salt Water Service Reservoirs in Western District  
 Construction Programme

Figure No. Annex B-5  
 圖號 附件 B-5

Date	Revision	Checked	Approved

Annex C

附錄 C

## Construction Noise Assessment

建築噪音評估

**Construction Plant Inventory**

**施工時使用的機動設備**

No. 號數	Activities 工序	PME 機動設備	CNP ref. 技術備忘錄 的辨認代碼	No. of PME 數量	On-time % 運作時間	Barrier 屏障修正	Unit SWL 聲功率級 (分貝(A))	SWL, dB(A) 修正後的聲功率級 (分貝(A))	Total SWL, dB(A) 聲功率級總數 (分貝(A))	
<b>DESIGNATED PROJECT 指定工程項目</b>										
<b>Salt Water Service Reservoirs (SWSR) &amp; Tunnel 海水配水庫及隧道</b>										
1	Slope work & portal / access tunnel construction 斜坡工程及隧道出入口/通道建造	Jumbo Drill L2C Boomer 鑽機	CNP 182	1	75%	-15	123	107	<b>116</b>	
		Hydraulic crawler rig 油壓履帶型鑽井架	[1-g]	2	75%	-15	110	97		
		Backhoe, tracked 履帶式鋤耕機	CNP 030	2	75%	-15	115	102		
		Breaker, excavator mounted (hydraulic) 破碎機，裝在挖土機上（油壓）	CNP 028	2	75%	-15	122	109		
		Loader 搬土機	CNP 081	1	75%	-15	112	96		
		Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	[1-a]	2	75%		105	107		
		Shotcrete machine 噴射水泥沙漿機	[1-b]	1	50%	-15	105	87		
		Dry shotcrete machine 噴射混凝土機	[1-b]	1	50%	-15	105	87		
		Minidigger 小型挖土機	[1-c]	1	75%	-15	94	78		
		Bob Cat 小型搬土機	[1-c]	1	75%	-15	94	78		
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	2	100%	-15	102	90		
		Concrete lorry mixer 混凝土攪拌車	CNP 044	2	75%		109	111		
		Ventilation fan 抽氣扇	CNP 241	1	100%		108	108		
		Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機	[1-h]	1	75%		105	104		
		Gantry crane 起重架	CNP 049	1	75%	-15	95	79		
2	Tunnel excavation for SWSR No. 1 挖掘一號海水配水庫隧道	Jumbo Drill L2C Boomer 鑽機	CNP 182	1	75%	-15	123	107		<b>116</b>
		Hydraulic crawler rig 油壓履帶型鑽井架	[1-g]	2	75%	-15	110	97		
		Backhoe, tracked 履帶式鋤耕機	CNP 030	2	75%	-15	115	102		
		Breaker, excavator mounted (hydraulic) 破碎機，裝在挖土機上（油壓）	CNP 028	2	75%	-15	122	109		
		Loader 搬土機	CNP 081	1	75%	-15	112	96		
		Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	[1-a]	2	75%		105	107		
		Shotcrete machine 噴射水泥沙漿機	[1-b]	1	50%	-15	105	87		
		Dry shotcrete machine 噴射混凝土機	[1-b]	1	50%	-15	105	87		
		Minidigger 袖珍型挖土機	[1-c]	1	75%	-15	94	78		
		Bob Cat 袖珍型挖土機	[1-c]	1	75%	-15	94	78		
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	2	100%	-15	102	90		

**Construction Plant Inventory****施工時使用的機動設備**

No. 號數	Activities 工序	PME 機動設備	CNP ref. 技術備忘錄 的辨認代碼	No. of PME 數量	On-time % 運作時間	Barrier 屏障修正	Unit SWL 聲功率級 (分貝(A))	SWL, dB(A) 修正後的聲功率級 (分貝(A))	Total SWL, dB(A) 聲功率級總數 (分貝(A))
		Concrete lorry mixer 混凝土攪拌車	CNP 044	2	75%		109	111	
		Ventilation fan 抽氣扇	CNP 241	1	100%		108	108	
		Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機	[1-h]	1	75%		105	104	
		Gantry crane 起重架	CNP 049	1	75%	-15	95	79	
3	SWSR No. 1 construction 建造一號海水配水庫	Concrete lorry mixer 混凝土攪拌車	CNP 044	1	75%		109	108	115
		Poker, vibratory, hand-held (electric) 混凝土震動機，手提	CNP 170	2	75%	-15	113	100	
		Crane, mobile/barge mounted (diesel) 起重機，流動／裝在躉船上（油渣）	CNP 048	2	75%		112	114	
		Bar bender and cutter (electric) 鋼筋彎曲機及切割機（電機）	CNP 021	2	50%	-15	90	75	
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	1	100%	-15	102	87	
4	Tunnel excavation for SWSR No. 2 挖掘二號海水配水庫隧道	Jumbo Drill L2C Boomer 鑽機	CNP 182	1	75%	-15	123	107	116
		Hydraulic crawler rig 油壓履帶型鑽井架	[1-g]	2	75%	-15	110	97	
		Backhoe, tracked 履帶式鋤耕機	CNP 030	2	75%	-15	115	102	
		Breaker, excavator mounted (hydraulic) 破碎機，裝在挖土機上（油壓）	CNP 028	2	75%	-15	122	109	
		Loader 搬土機	CNP 081	1	75%	-15	112	96	
		Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	[1-a]	2	75%		105	107	
		Shotcrete machine 噴射水泥沙漿機	[1-b]	1	50%	-15	105	87	
		Dry shotcrete machine 噴射混凝土機	[1-b]	1	50%	-15	105	87	
		Minidigger 袖珍型挖土機	[1-c]	1	75%	-15	94	78	
		Bob Cat 袖珍型挖土機	[1-c]	1	75%	-15	94	78	
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	2	100%	-15	102	90	
		Concrete lorry mixer 混凝土攪拌車	CNP 044	2	75%		109	111	
		Ventilation fan 抽氣扇	CNP 241	1	100%		108	108	
		Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機	[1-h]	1	75%		105	104	
		Gantry crane 起重架	CNP 049	1	75%	-15	95	79	

Annex C-1  
附錄 C-1

**Construction Plant Inventory**

**施工時使用的機動設備**

No. 號數	Activities 工序	PME 機動設備	CNP ref. 技術備忘錄 的辨認代碼	No. of PME 數量	On-time % 運作時間	Barrier 屏障修正	Unit SWL 聲功率級 (分貝(A))	SWL, dB(A) 修正後的聲功率級 (分貝(A))	Total SWL, dB(A) 聲功率級總數 (分貝(A))
5	SWSR No. 2 construction 建造二號海水配水庫	Concrete lorry mixer 混凝土攪拌車	CNP 044	2	75%		109	111	<b>114</b>
		Poker, vibratory, hand-held (electric) 混凝土震動機，手提	CNP 170	2	75%	-15	113	100	
		Crane, mobile/barge mounted (diesel) 起重機，流動/裝在躉船上(油渣)	CNP 048	1	75%		112	111	
		Bar bender and cutter (electric) 鋼筋彎曲機及切割機(電機)	CNP 021	1	50%	-15	90	72	
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	1	100%	-15	102	87	
6	Wastewater filtration 污水處理	Wetsep 污水處理設備	CNP 283	2	100%		85	88	<b>88</b>
<b>CONCURRENT ADJACENT WORKS 鄰近同時進行的其他工程項目</b>									
7	Demolition of Western SW/SR No. 2 清拆西區二號海水配水庫	Breaker, excavator mounted (pneumatic) 破碎機，裝在挖土機上(氣動)	CNP 027	1	75%	-5	122	116	<b>117</b>
		Backhoe with crusher 鋤耕壓碎機	[1-d]	1	75%		103	102	
		Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	[1-a]	2	75%		105	107	
		Cutter, circular, steel (electric) 切割機,圓型,鋼鐵(電動)	[1-e]	1	50%	-5	112	104	
		Air blower (electric) 鼓風機(電動)	[1-f]	1	100%		95	95	
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	1	100%	-10	102	92	
		Water pump (electric) 水泵(電動)	CNP 281	1	100%		88	88	
		Drill, percussive, hand-held (electric) 鑽，手提撞擊式(電動)	CNP 064	2	50%	-5	103	98	
8	Construction of Fresh Water Service Reservoir No. 1 建造一號食水配水庫	Concrete lorry mixer 混凝土攪拌車	CNP 044	2	75%		109	111	<b>114</b>
		Poker, vibratory, hand-held (electric) 混凝土震動機，手提	CNP 170	2	50%	-5	110	105	
		Crane, mobile/barge mounted (diesel) 起重機，流動/裝在躉船上(油渣)	CNP 048	1	75%		110	109	
		Bar bender and cutter (electric) 鋼筋彎曲機及切割機(電機)	CNP 021	1	50%	-5	110	102	
		Air Compressor, air flow > 10m <sup>3</sup> /min and < 30m <sup>3</sup> /min 空氣壓縮機，氣流量 > 10米 <sup>3</sup> /分鐘及 ≤ 30米 <sup>3</sup> /分鐘	CNP 002	1	100%	-10	102	92	

Annex C-1  
附錄 C-1

**Construction Plant Inventory**

**施工時使用的機動設備**

No. 號數	Activities 工序	PME 機動設備	CNP ref. 技術備忘錄 的辨認代碼	No. of PME 數量	On-time % 運作時間	Barrier 屏障修正	Unit SWL 聲功率級 (分貝(A))	SWL, dB(A) 修正後的聲功率級 (分貝(A))	Total SWL, dB(A) 聲功率級總數 (分貝(A))	
9	Pipe gallery construction 建造水管坑道工程	A Excavator/loader, wheeled/tracked 挖土機/搬土機, 輪動式/履帶式 Hydraulic crawler rig 油壓履帶型鑽井架 Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	CNP 081	1	75%		112	111	<b>113</b>	
			[1-g]	1	75%		110	109		
			[1-a]	1	75%		105	104		
		B Concrete lorry mixer 混凝土攪拌車 Bar bender and cutter (electric) 鋼筋彎曲機及切割機 (電機) Poker, vibratory, hand-held (electric) 混凝土震動機, 手提	CNP 044	1	75%		109	108	<b>110</b>	
			CNP 021	1	50%	-5	90	82		
			CNP 170	1	50%	-5	113	105		
		C Water pump (electric) 水泵 (電動) Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機 Crane, mobile/barge mounted (diesel) 起重機, 流動/裝在躉船上 (油渣)	CNP 281	1	100%		88	88	<b>112</b>	
			[1-h]	1	75%		105	104		
			CNP 048	1	75%		112	111		
				A + C						
		or B + C								<b>114</b>
10	Pipe laying 鋪設管道	Crane lorry 貨車起重機 Cutter, circular, steel (electric) 切割機, 圓型, 鋼鐵 (電動)	CNP 048	1	50%		112	109	<b>110</b>	
			[1-e]	1	50%	-5	112	104		
11	EVA construction 建造緊急車輛通道	A Excavator/loader, wheeled/tracked 挖土機/搬土機, 輪動式/履帶式 Hydraulic crawler rig 油壓履帶型鑽井架	CNP 081	2	75%		112	114	<b>116</b>	
			[1-g]	2	75%		110	112		
		B Concrete lorry mixer 混凝土攪拌車 Bar bender and cutter (electric) 鋼筋彎曲機及切割機 (電機) Poker, vibratory, hand-held (electric) 混凝土震動機, 手提	CNP 044	2	75%		109	111	<b>113</b>	
			CNP 021	1	50%	-5	90	82		
			CNP 170	2	50%	-5	113	108		
		C Water pump (electric) 水泵 (電動) Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機 Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車	CNP 281	2	100%		88	91	<b>113</b>	
			[1-h]	2	75%		105	107		
		[1-a]	2	75%		105	107			



**Construction Plant Inventory****施工時使用的機動設備**

No. 號數	Activities 工序	PME 機動設備	CNP ref. 技術備忘錄 的辨認代碼	No. of PME 數量	On-time % 運作時間	Barrier 屏障修正	Unit SWL 聲功率級 (分貝(A))	SWL, dB(A) 修正後的聲功率級 (分貝(A))	Total SWL, dB(A) 聲功率級總數 (分貝(A))
		Crane, mobile/barge mounted (diesel) 起重機，流動／裝在躉船上（油渣）	CNP 048	1	75%		112	111	
		A + C							118
		or B + C							116
12	Slope stabilisation works 斜坡鞏固工程	Soil nail drilling 泥釘鑽孔	[1-g]	2	75%	-5	110	107	112
		Shotcrete machine 噴射水泥沙漿機	[1-b]	1	50%	-5	105	97	
		Excavator/loader, wheeled/tracked 挖土機／搬土機，輪動式／履帶式	CNP 081	1	75%		112	111	

Note SWL refer to the document prepared by the Noise Control Authority 聲功率級參考噪音管制監督編制的文件 ([http://www.epd.gov.hk/epd/english/application\\_for\\_licences/guidance/files/OtherSWLe.pdf](http://www.epd.gov.hk/epd/english/application_for_licences/guidance/files/OtherSWLe.pdf))

附注[1]

- [1-a] Dump truck, 5.5 tonne < gross vehicle weight < 38 tonne 卸土車
- [1-b] Shotcrete machine 噴射水泥沙漿機
- [1-c] Excavator, mini-robot mounted 挖土機，裝在迷你遙控機上
- [1-d] Concrete crusher, excavator mounted 混凝土碎石機，裝在挖土機上
- [1-e] Cutter, circular, steel (electric) 切割機，圓型，鋼鐵（電動）
- [1-f] Air blower (electric) 鼓風機（電動）
- [1-g] Hydraulic crawler rig 油壓履帶型鑽井架
- [1-h] Crane lorry, 5.5 tonne < gross vehicle weight < 38 tonne 貨車起重機

-5	With movable noise barrier 使用可移動的隔音屏障
-10	Fully-enclosed 完全圍封
-15	Inside tunnel 在隧道內

Note The construction plant inventory for the Project and the concurrent adjacent works was confirmed reasonable and practicable for the Contractor to achieve the construction programme.

附注[2]

這些施工機動設備都是符合實際和可行讓承建商可按照其施工計劃完成工程。

**Construction Programme****施工流程圖**

No. 號數	Activities 工序	2007							2008											
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
<b>DESIGNATED PROJECT 指定工程項目</b>																				
<b>Salt Water Service Reservoirs (SWSR) &amp; Tunnel 海水配水庫及隧道</b>																				
1	Slope work & portal / access tunnel construction 斜坡工程及隧道出入口/通道建造	Y	Y	Y																
2	Tunnel excavation for SWSR No. 1 挖掘一號海水配水庫隧道				Y	Y	Y	Y	Y	Y	Y	Y	Y							
3	SWSR No. 1 construction 建造一號海水配水庫													Y	Y	Y	Y	Y	Y	Y
4	Tunnel excavation for SWSR No. 2 挖掘二號海水配水庫隧道				Y	Y	Y	Y	Y	Y	Y	Y	Y							
5	SWSR No. 2 construction 建造二號海水配水庫													Y	Y	Y	Y	Y	Y	Y
6	Wastewater filtration 污水處理	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
<b>CONCURRENT ADJACENT WORKS 鄰近同時進行的其他工程項目</b>																				
7	Demolition of Western SW/SR No. 2 清拆西區二號海水配水庫	Y	Y	Y	Y															
8	Construction of Fresh Water Service Reservoir No. 1 建造一號食水配水庫									Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
9	Pipe gallery construction A + C Temp work for pipe gallery 管道臨時工程 (CH00 to CH80)		Y	Y																
	B + C Pipe gallery construction 建造管道工程 (CH00 to CH80)				Y	Y	Y	Y												
	A + C Temp work for pipe gallery 管道臨時工程 (CH80 to CH165)											Y	Y	Y	Y	Y	Y	Y	Y	Y
	B + C Pipe gallery construction 建造管道工程 (CH80 to CH165)																			Y
10	Pipe laying 鋪設管道							Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
11	EVA construction A + C Temp work for EVA construction 建造緊急車輛通道臨時工程										Y	Y	Y							
	A + C Piling works for EVA 緊急車輛通道打樁工程												Y							
	B + C EVA construction 建造緊急車輛通道													Y	Y	Y	Y	Y	Y	Y
12	Slope stabilisation works 斜坡鞏固工程	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y

**Summary of Predicted Noise Levels****建築噪音評估的總結**

	NSR Location 噪音感應強的地方	Predicted Construction Noise Level (dB(A)) 預計的噪音聲級 (分貝(A)修正)																				Max. 最大數 dB(A)
		2007								2008												
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
N1	Chow Yei Ching Building, HKU 香港大學周亦卿樓	67	67	67	70	70	70	70	70	70	70	70	70	70	68	68	68	68	68	68	70	
N2	Yam Pak Building, HKU 香港大學任白樓	54	54	54	56	56	56	56	56	56	56	56	56	56	55	55	55	55	55	55	56	
N3	St Paul's College Primary School 聖保羅書院小學	53	53	53	55	55	55	55	55	55	55	55	55	55	53	53	53	53	53	53	55	
N4	Tower 3, The Belcher's 寶翠園第三座	65	65	65	66	66	66	66	66	66	66	66	66	66	65	65	65	65	65	65	66	
N5	Lady Ho Tung Hall 香港大學何東夫人堂	69	69	69	68	68	68	68	68	68	68	68	68	68	67	67	67	67	67	67	69	
N6	Starr Hall 香港大學施德堂	69	69	69	69	69	69	69	69	69	69	69	69	69	68	68	68	68	68	68	69	
N7	To Li Garden 桃李園	69	69	69	70	70	70	70	70	70	70	70	70	70	68	68	68	68	68	68	70	
N8	Block 1, Academic Terrace 學士臺第一座	68	68	68	70	70	70	70	70	70	70	70	70	70	69	69	69	69	69	69	70	

**Summary of Cumulative Noise Levels****與其他工程項目合計時之建築噪音評估的總結**

	NSR Location 噪音感應強的地方	Predicted Construction Noise Level (dB(A)) 預計的噪音聲級 (分貝(A)修正)																			Max. 最大數 dB(A)
		2007								2008											
		Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
N1	Chow Yei Ching Building, HKU 香港大學周亦卿樓	86	91	91	86	86	86	88	88	88	90	90	90	88	88	88	88	88	88	88	91
N2	Yam Pak Building, HKU 香港大學任白樓	61	64	64	62	60	60	61	62	62	64	64	64	62	62	62	62	62	62	62	64
N3	St Paul's College Primary School 聖保羅書院小學	58	60	60	59	57	57	57	59	59	61	61	61	59	58	58	58	58	58	58	61
N4	Tower 3, The Belcher's 寶翠園第三座	70	72	72	70	68	68	69	70	70	73	73	73	70	69	69	69	69	69	69	73
N5	Lady Ho Tung Hall 香港大學何東夫人堂	72	75	75	72	71	71	72	73	73	74	74	74	73	72	72	72	72	72	72	75
N6	Starr Hall 香港大學施德堂	73	75	75	73	72	72	73	74	74	75	75	75	74	73	73	73	73	73	73	75
N7	To Li Garden 桃李園	74	75	75	74	73	73	74	74	74	75	75	75	74	74	74	74	74	74	74	75
N8	Block 1, Academic Terrace 學士臺第一座	74	75	75	75	74	74	74	75	75	75	75	75	75	74	74	74	74	74	74	75



Annex D

附錄 D

## Calculation of Maximum Allowable SWLs

可允許的最高聲功率

Annex D  
附錄 D

**Calculation of Maximum Allowable SWLs for Treatment Unit and Exhaust Louvre**

**污水處理機組及排氣口可允許的最高聲功率**

NSR 噪音感應強的地方	Limiting time period 限制時段	ANL-5 Noise Criteria 噪音標準 <sup>[1]</sup> , dB(A) 分貝(A)聲功	Noise Source 噪音源	Apportioned Criteria 分配標準	Distance from NSR to noise source 距離, m	Corrections 修正, dB(A) 分貝(A)聲功			Maximum Allowable SWL 可允許的最高聲功率, dB(A) 分貝(A)聲功
						Distance 距離	Façade 聲音反射	Tonal 音調	
N1	Chow Yei Ching Building, HKU 香港大學周亦卿樓 日間	65	Treatment Unit 污水處理機組	63	170	-52.6	3	3	110
			Exhaust Louvre 排氣口	61	170	-52.6	3	3	108
N2	Yam Pak Building, HKU 香港大學任白樓 日間	66	Treatment Unit 污水處理機組	63	225	-55.0	3	3	112
			Exhaust Louvre 排氣口	61	225	-55.0	3	3	110
N3	St Paul's College Primary School 聖保羅書院小學 日間	65	Treatment Unit 污水處理機組	63	240	-55.6	3	3	113
			Exhaust Louvre 排氣口	61	240	-55.6	3	3	111
N9	HKU Centennial Campus 香港大學百周年校園 日間	65	Treatment Unit 污水處理機組	63	40	-40.0	3	3	97
			Exhaust Louvre 排氣口	61	40	-40.0	3	3	95
N4	Tower 3, The Belcher's 寶翠園第三座 Night-time 夜間	55	Exhaust Louvre 排氣口	55	190	-53.6	3	3	103
N5	Lady Ho Tung Hall 香港大學何東夫人堂 Night-time 夜間	55	Exhaust Louvre 排氣口	55	130	-50.3	3	3	99
N6	Starr Hall 香港大學施德堂 Night-time 夜間	55	Exhaust Louvre 排氣口	55	120	-49.6	3	3	99
N7	To Li Garden 桃李園 Night-time 夜間	55	Exhaust Louvre 排氣口	55	130	-50.3	3	3	99
N8	Block 1, Academic Terrace 學士臺第一座 Night-time 夜間	55	Exhaust Louvre 排氣口	55	140	-50.9	3	3	100
Permissible SWL for Treatment Unit 污水處理機組可允許的最高聲功率, dB(A) = 97									
Permissible SWL for Louvre 排氣口可允許的最高聲功率, dB(A) = 95									

**Note 附注:**

[1] The NSR is directly affected by Pok Fu Lam Road. As per the Traffic Censuses 2005, the AADT of Pok Fu Lam Road (from Pokfield Road to Hill Road Flyover) was 32,970. Therefore, the ASR for the NSRs is C.

噪音感應強的地方直接受到薄扶林道所產生的噪音影響。根據2005交通統計年報，薄扶林道的車輛流量全年每日平均架次為32,970。因此，其「地區對噪音感應程度的級別」應定為「C級」。