

中華電力

CLP Power

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Capco 青山發電有限公司  
Castle Peak Power Co. Ltd.

## Liquefied Natural Gas (LNG) Receiving Terminal and Associated Facilities

EIA Study (EIA Study Brief ESB-126/2005)

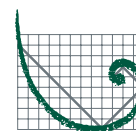
*EIA Report*  
*Part 2 - South Soko*  
*Sections 8 - 12*

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### Environmental Resources Management

21/F Lincoln House  
Taikoo Place 979 King's Road  
Island East Hong Kong  
Telephone 2271 3000  
Facsimile 2723 5660

[www.erm.com](http://www.erm.com)



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**CONTENTS**

<b>8</b>	<b>TERRESTRIAL ECOLOGY IMPACT ASSESSMENT</b>	<b>1</b>
<b>8.1</b>	<b>INTRODUCTION</b>	<b>1</b>
<b>8.2</b>	<b>LEGISLATIVE REQUIREMENTS AND EVALUATION CRITERIA</b>	<b>1</b>
<b>8.3</b>	<b>TERRESTRIAL ECOLOGICAL STUDY AREA</b>	<b>4</b>
<b>8.4</b>	<b>TERRESTRIAL ECOLOGICAL RESOURCES</b>	<b>4</b>
<b>8.5</b>	<b>EVALUATION OF ECOLOGICAL IMPORTANCE</b>	<b>43</b>
<b>8.6</b>	<b>TERRESTRIAL ECOLOGICAL ASSESSMENT</b>	<b>64</b>
<b>8.7</b>	<b>SUMMARY OF MITIGATION MEASURES</b>	<b>77</b>
<b>8.8</b>	<b>RESIDUAL ENVIRONMENTAL IMPACTS</b>	<b>80</b>
<b>8.9</b>	<b>ENVIRONMENTAL MONITORING AND AUDIT</b>	<b>80</b>
<b>8.10</b>	<b>CONCLUSIONS</b>	<b>81</b>

**ANNEX**

*Annex 8 Terrestrial Ecological Resources for South Soko*

## 8 TERRESTRIAL ECOLOGY IMPACT ASSESSMENT

### 8.1 INTRODUCTION

This section presents the terrestrial ecological baseline information gathered from the literature review and field surveys on South Soko and Shek Pik (i.e., the landing point of the water main and the electricity circuit). The surveys, covered February to July 2004, October 2005 to January 2006 for South Soko and, November 2005 to April 2006 for Shek Pik. This section also presents the results of an assessment of the ecological importance of the terrestrial habitats and resources on South Soko Island and at Shek Pik and the potential impacts from the construction and operation of the proposed Liquefied Natural Gas (LNG) terminal and associated facilities. The assessment has been based on the preliminary design of the South Soko terminal as discussed in the Project Description (*Part 2 – Section 3*). Measures required to mitigate adverse impacts are identified, where appropriate.

### 8.2 LEGISLATIVE REQUIREMENTS AND EVALUATION CRITERIA

Legislative requirements and evaluation criteria for the protection of species and habitats of terrestrial ecological importance relevant to the study are summarised as follows:

1. *Country Parks Ordinance (Cap 208);*
2. *Forests and Countryside Ordinance (Cap 96);*
3. *Wild Animals Protection Ordinance (WAPO) (Cap 170);*
4. *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586);*
5. *Town Planning Ordinance (Cap 131);*
6. *Hong Kong Planning Standards and Guidelines Chapter 10 (HKPSG);*
7. *The Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance (EIAO-TM);*
8. *United Nations Convention on Biodiversity (1992);*
9. *Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention); and,*
10. *PRC Regulations and Guidelines.*

### 8.2.1 *Country Parks Ordinance (Cap 208)*

The *Country Parks Ordinance* (Cap 208) provides for the designation and management of Country Parks and Special Areas. Country Parks are designated for the purpose of nature conservation, countryside recreation and outdoor education. Special Areas are reserved generally for the purpose of nature conservation.

### 8.2.2 *Forests and Countryside Ordinance (Cap 96)*

The *Forests and Countryside Ordinance* (Cap 96) prohibits the felling, cutting, burning or destroying of trees and growing plants in forests and plantations on Government land. The subsidiary *Forestry Regulations* prohibit the picking, felling or possession of listed rare and protected plant species. The list of protected species in Hong Kong which comes under the *Forestry Regulations* was last amended on 11 June 1993 under the *Forestry (Amendment) Regulation 1993* made under *Section 3* of the *Forests and Countryside Ordinance*.

### 8.2.3 *Wild Animals Protection Ordinance (Cap 170)*

Under the *Wild Animals Protection Ordinance* (Cap 170), designated wild animals are protected from being hunted, whilst their nests and eggs are protected from destruction and removal. All birds and most mammals including all cetaceans are protected under this Ordinance, as well as certain reptiles, amphibians and invertebrates. The *Second Schedule* of the Ordinance that lists protected species was last revised in June 1997.

### 8.2.4 *Protection of Endangered Species of Animals and Plants Ordinance (Cap 586)*

The *Protection of Endangered Species of Animals and Plants Ordinance* (Cap 586) was enacted to align Hong Kong to control regime with the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). With effect from 1 July 2006, it replaces the *Animals and Plants (Protection of Endangered Species) Ordinance* (Cap 187). The purpose of the *Protection of Endangered Species of Animals and Plants Ordinance* is to restrict the import and export of species listed in CITES Appendices so as to protect wildlife from overexploitation or extinction. The Ordinance is primarily related to controlling trade in threatened and endangered species and restricting the local possession of them.

### 8.2.5 *Town Planning Ordinance (Cap 131)*

The recently amended *Town Planning Ordinance* (Cap 131) provides for the designation of areas such as "Coastal Protection Areas", "Sites of Special Scientific Interest (SSSI)", "Green Belts" and "Conservation Areas" to promote the conservation or protection of significant habitat.

### 8.2.6 *Hong Kong Planning Standards and Guidelines Chapter 10 (HKPSG)*

*Chapter 10* of the *HKPSG* covers planning considerations relevant to conservation. This chapter details the principles of conservation, the conservation of natural landscape and habitats, historic buildings, archaeological sites and other antiquities. It also addresses the issue of enforcement. The appendices list the legislation and administrative controls for conservation, other conservation related measures in Hong Kong, and Government departments involved in conservation.

### 8.2.7 *Technical Memorandum on Environmental Impact Assessment Process under the Environmental Impact Assessment Ordinance (EIAOTM)*

*Annex 16* of the *EIAOTM* sets out the general approach and methodology for assessment of ecological impacts arising from a project or proposal, to allow a complete and objective identification, prediction and evaluation of the potential ecological impacts. *Annex 8* recommends the criteria that can be used for evaluating ecological impacts.

### 8.2.8 *Other Relevant Legislation*

The Peoples' Republic of China (PRC) is a Contracting Party to the *United Nations Convention on Biological Diversity* of 1992. The Convention requires signatories to make active efforts to protect and manage their biodiversity resources. The Government of the Hong Kong Special Administrative Region has stated that it will be "committed to meeting the environmental objectives" of the Convention.

The *Convention on Wetlands of International Importance Especially as Waterfowl Habitat (the Ramsar Convention)* applies to the HKSAR. The Convention requires parties to conserve and make wise use of wetland areas, particularly those supporting waterfowl populations. *Article 1* of the Convention defines wetlands as "areas of marsh, fen, peatland or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish or salt, including areas of marine water the depth of which at low tide does not exceed six meters." The Mai Po/Inner Deep Bay wetland was declared a Wetland of International Importance ("Ramsar site") under the Convention in 1995.

The PRC in 1988 ratified the *Wild Animal Protection Law*, which lays down basic principles for protecting wild animals. The Law prohibits the killing of protected animals, controls hunting, and protects the habitats of wild animals, both protected and non-protected. The Law also provides for the creation of lists of animals protected at the state level, under Class I and Class II. There are currently 96 animal species in Class I and 156 in Class II. Class I provides a higher level of protection for animals considered to be more threatened.

### 8.3 TERRESTRIAL ECOLOGICAL STUDY AREA

The Study Area for the terrestrial ecological assessments is 500 m from the boundary of the proposed LNG terminal on South Soko and 500 m from the land section of the proposed water main and cable circuit at Shek Pik. The Project Area is confined to the footprint areas that are to be directly affected by the proposed LNG terminal construction works on South Soko and the land section of the proposed water main and cable circuit at Shek Pik.

The South Soko LNG terminal is proposed to be located in the centre of the island, as presented in the preliminary layout *Figure 8.1*. The existing platform of the former detention centre provides the majority of land needed for the terminal; however, a small area of reclamation (less than 2 ha) will be required. The jetty for the LNG carrier extends southeast to the deeper waters of the southern coast of South Soko Island. During the construction phase of the LNG terminal, temporary construction stores and spoil storage area shall be constructed near Pak Tso Wan and make use of the concrete platform at the west of the abandoned reservoir, which will be removed and the site restored subsequent to the construction phase of the terminal.

The cable circuit and water main which provide power and water supplies to South Soko LNG terminal will connect to Shek Pik. The cable circuit will connect to the existing Shek Pik substation and the water main will connect to a new water tank located next to an existing water tank that is presently serving Shek Pik Prison (*Figure 8.2*).

### 8.4 TERRESTRIAL ECOLOGICAL RESOURCES

This section details the baseline conditions of ecological resources of the terrestrial habitats at South Soko Island and Shek Pik, and records the background, methodology, findings and evaluation of the ecological value of the habitats. Baseline conditions for each ecological component of the terrestrial environment were evaluated based on information from the literature and focussed field studies conducted for the purposes of this project.

#### 8.4.1 *Description and Historical Background of South Soko Island*

South Soko is an outlying island located in the southwest waters of the Hong Kong Special Administrative Region (HKSAR), with a total land area of approximately 120 ha. The Island is characterised by hills such as Fei Kei Teng, Nam Shan and Tai Chau Mei Teng with heights ranging from 85 m to 154 m. Two bays, namely Tung Wan and Sai Wan, are situated to the east and west of the Island respectively. The hills on the island provide protection from the wind, which led to the formation of the settlements of Ha Tsuen and Sheung Tsuen during the early 20<sup>th</sup> century at the west and south side of the island respectively (*Part 2, Section 12*).

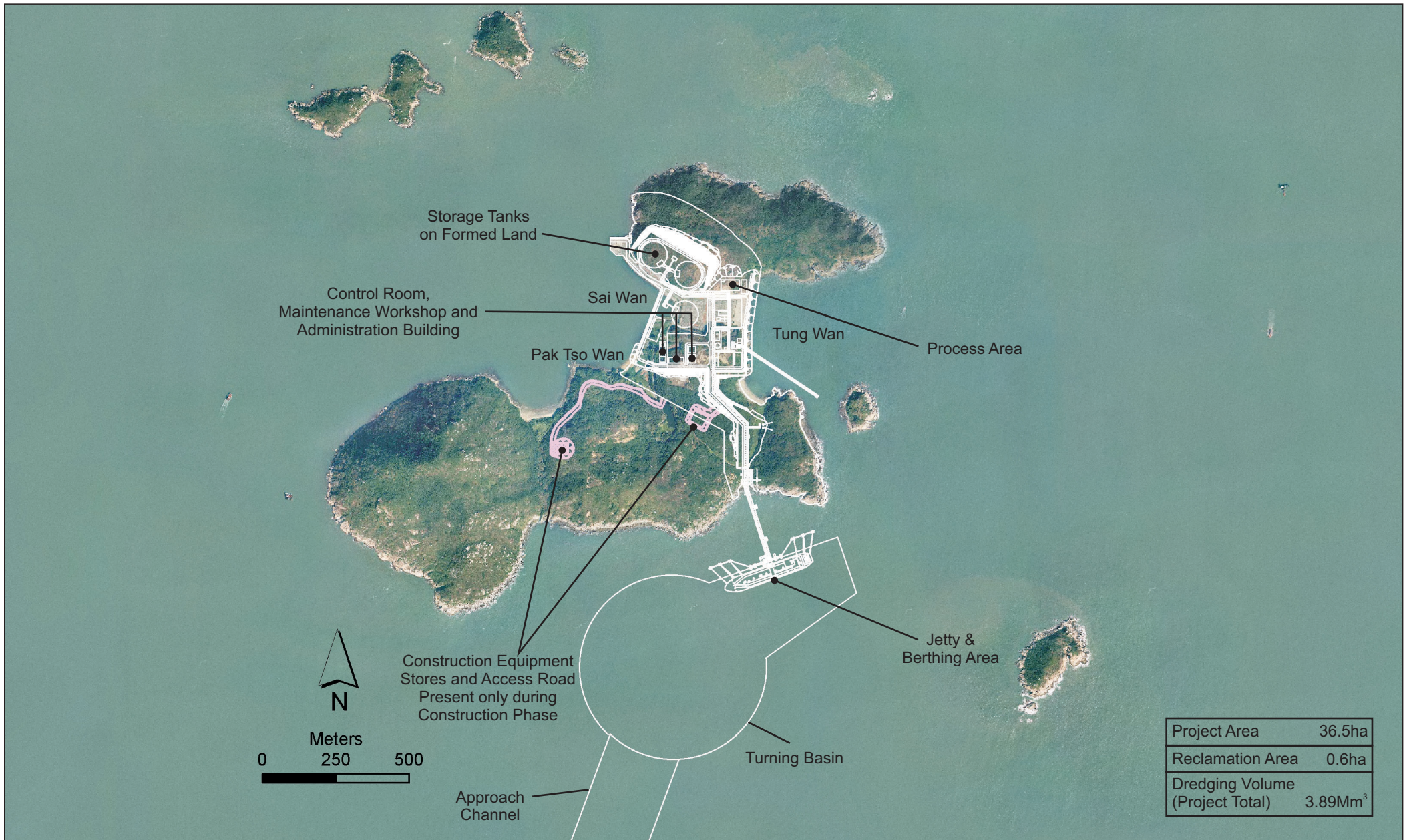


Figure 8.1

Preliminary Indicative Layout for the Proposed South Soko LNG Terminal  
(Aerial photograph source: Lands Department)

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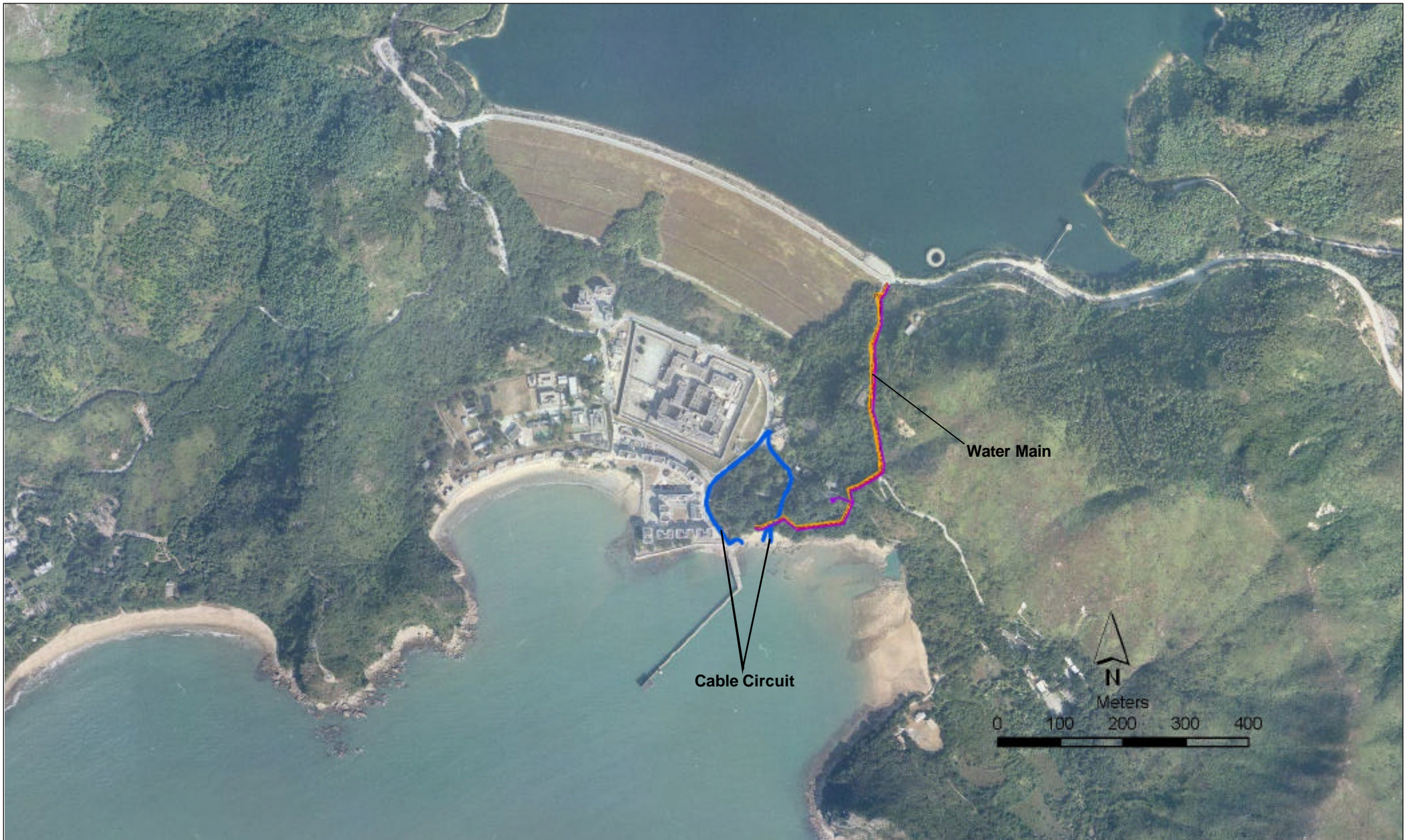


Figure 8.2

Preliminary Indicative Layout for the Proposed Water Main and Cable Circuit at Shek Pik



*Historical Background in early 1960s*

An aerial photograph of the early 1960s (D3F400 dated 1963, *Figure 8.3*) indicates settlements were concentrated in Ha Tsuen and Sheung Tsuen, comprising approximately 50 households. During this period terrace cultivation was evident and extensive on South Soko so that most of the lowland areas and some of the hill sides had been modified by human development and were occupied by agricultural lands. A small area of native woodland was found on the southeast side of Sheung Tsuen. Less disturbed areas were mainly evident on the hillside shrubland located on the south side of the island. Bare land due to soil erosion was observable on the steep slopes, particularly at Fei Kei Teng. Aside from a small pier and typhoon shelter, the shoreline of South Soko remained natural and comprised of rocks, boulders and sandy beaches.

*Historical Background between 1960s and 1980s*

The number of households in Ha Tsuen and Sheung Tsuen reduced to approximately 20 (Aerial Photograph 1986, *Figure 8.3*). The agricultural lands located near Sheung Tsuen were modified into a small reservoir surrounded with a concrete bund. By the 1980's most of the agricultural land had either been abandoned and covered by grasses and shrubs or modified into livestock farms. Plantation woodland was found surrounding Sheung Tsuen. The shoreline remained natural and fish culture activities comprising a number of fish cages were observed in Sai Wan.

*Historical Background in late 1980s*

Construction of a Detention Centre on the Island commenced in 1989 and was completed in 1991 (Aerial photograph 1989, *Figure 8.3*). By 1991, all of the inhabitants had left the island (*Part 2, Section 12*) and since this period all of the agricultural lands have been abandoned. The Detention Centre occupied the flat land located in between Tung Wan and Sai Wan and partly reclaimed the shoreline of both bays. The hillsides south of the Detention Centre were modified into cut slopes and all the vegetation above the slope was removed. A cemented path was constructed to link the Detention Centre to the top of the hill, which was developed as a helipad. All of the constructed areas around the helipad were hydroseeded to form grassland. The reservoir first visible in the 1986 aerial map was used for water storage and a plantation of trees was located on the fringes of the reservoir. The natural shoreline of Sai Wan was modified into an artificial shore with piers constructed at the north and south edges of Sai Wan. The natural shoreline of Tung Wan was also modified into artificial shore with rocks and boulders.

*Present Condition*

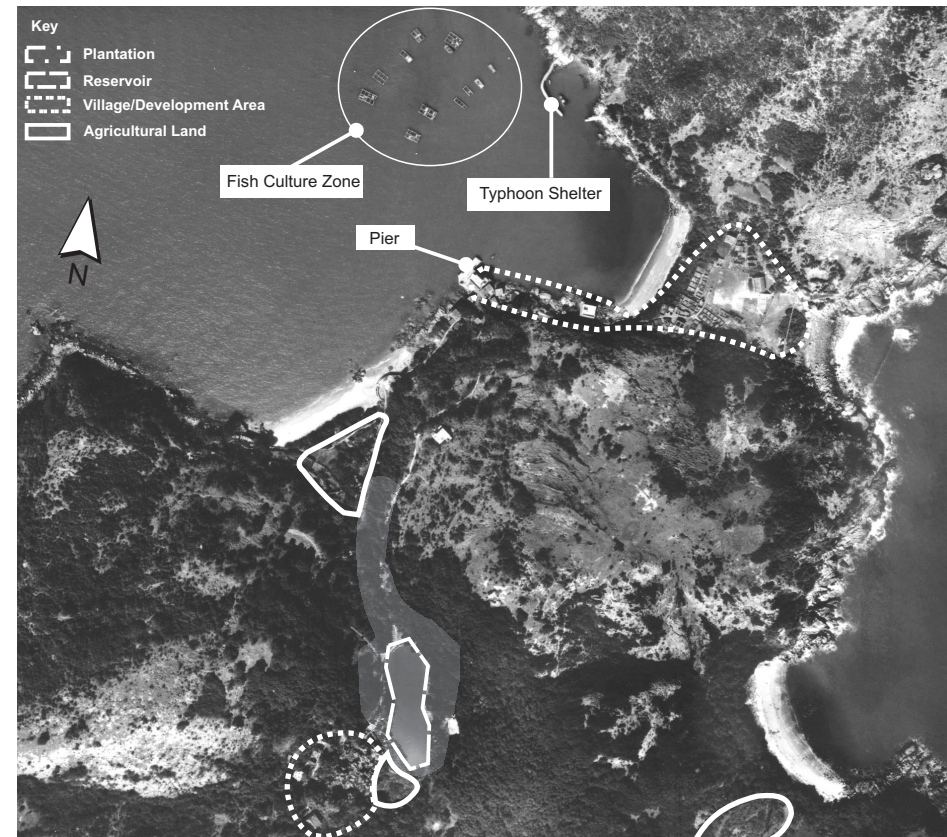
Prior to 1997, the Detention Centre and the building structures were demolished. The island is presently abandoned with no inhabitants (aerial photograph 2004, *Figure 8.3*). The concrete paths, helipad and the remaining

1963



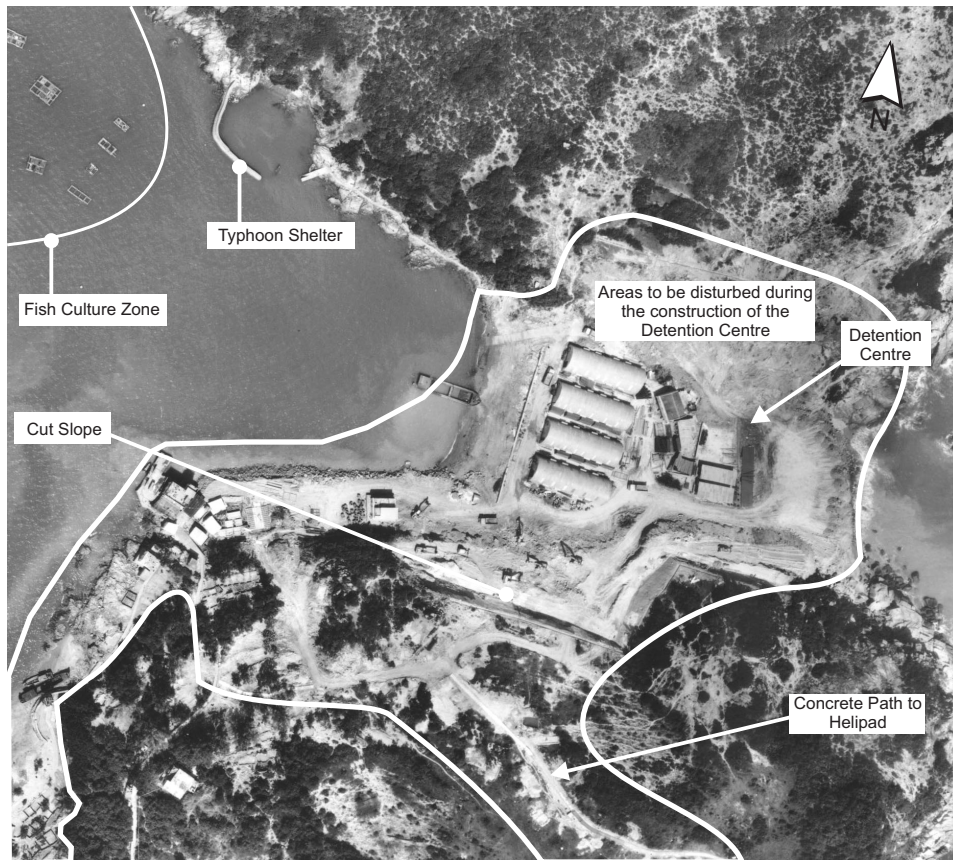
Aerial Photograph of South Soko from 1963 - A number of inhabitants were living on South Soko Island and most of the lowland areas were modified as agricultural land (Aerial photograph source: Lands Department)

1986



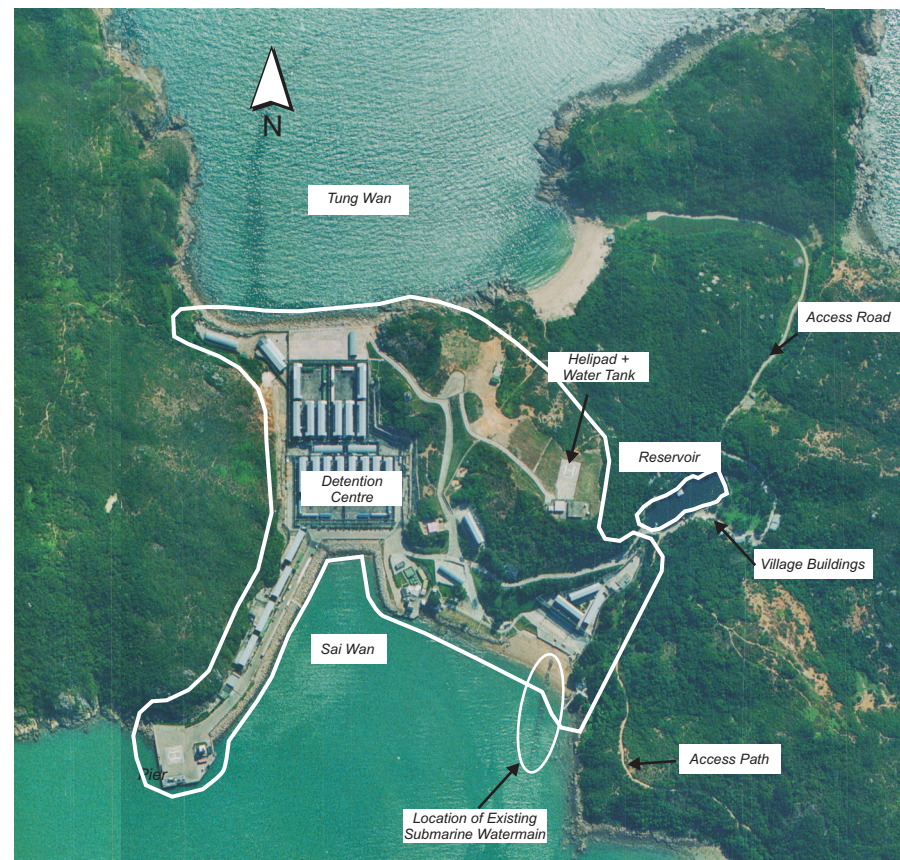
Aerial Photograph of South Soko at 1986 - South Soko supported a number of inhabitants during the early 1980's. Fish culture rafts were found in Sai Wan (Aerial photograph source: Lands Department)

1989



Aerial Photograph of South Soko at 1989 - Detention Centre was under construction (Aerial photograph source: Lands Department)

1994



Detention Centre was in place at 1994

2004



Aerial Photograph of South Soko at 2004 - This aerial photograph presents the existing condition of South Soko (Detailed Habitat Map is presented in Figure 3.4a)(Aerial photograph source: Lands Department)

Figure 8.3

Aerial Photograph of South Soko in 1963, 1986, 1989, 1994 and 2004 - (Aerial photograph sources: Lands Department)

structures of the original developments were covered by climbers and grasses. Exotic plantation was found in the middle of island at Sheung Tsuen with tiny patch of secondary woodland located at the fringe of Sheung Tsuen.

Section 11 of Part 2 presents a discussion of how the landscape has changed regularly since the early 1960s; terrestrial habitats have been affected/disturbed by the landscape changes.

## 8.4.2

### Literature Review

#### Methodology

A preliminary desktop study and literature review has been conducted to determine the existing conditions within the Study Area (including up to 500 m from the boundary fence line) and to identify habitats and species of conservation interest. The literature review included Government and private sector reports, independent and Government published literature, academic studies, vegetation maps, recent aerial photographs and land use maps, comprising the following:

- Stage 1 EIA for a New Power Station: Stage I EIA Report for Hong Kong Electric Co. Ltd <sup>(1)</sup>;
- Discovering Soko Islands. Hong Kong Discovery Volume 16 May/June 2003 <sup>(2)</sup>;
- Aerial photographs of South Soko <sup>(3)</sup> <sup>(4)</sup> <sup>(5)</sup> <sup>(6)</sup>;
- *Porcupine!* <sup>(7)</sup>;
- The Ecology and Biodiversity of Hong Kong <sup>(8)</sup>;
- Hong Kong Biodiversity <sup>(9)</sup>;
- Annual Report of the Hong Kong Bird Watching Society <sup>(10)</sup>;
- Butterfly Watching in Hong Kong <sup>(11)</sup>;
- Field Guide to Butterfly Watching in Hong Kong <sup>(12)</sup>;
- Field Guide to the Dragonflies of Hong Kong <sup>(13)</sup>;

(1) ERM (1997). Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report, prepared for the Hong Kong Electric Co Ltd.

(2) Ka M. Wong R, Kong C, Yiu V, Wong D and Hung S (2003). Discovering Soko Islands. *Hong Kong Discovery* Volume 16 May/June 2003.

(3) CW46128 dated 4<sup>th</sup> November 2002 at 8000 feet.

(4) A18929 dated 19<sup>th</sup> October 1989.

(5) A07518 dated 21<sup>st</sup> November 1986.

(6) 36467 dated 3<sup>rd</sup> February 1981 and D3F400 dated 1963.

(7) Newsletter of Department of Ecology & Biodiversity, University of Hong Kong Issues 1 to 33.

(8) Dudgeon and Corlett (2004). *The Ecology and Biodiversity of Hong Kong*. The Hong Kong University Press.

(9) Agriculture, Fisheries and Conservation Department Newsletters.

(10) Hong Kong Bird Watching Society (1990 -2000). Annual Reports.

(11) Young J J and Yiu v (2002). *Butterfly Watching in Hong Kong*. Wan Li Book Co Ltd.

(12) Yiu V (2004). Field Guide to the butterflies of Hong Kong.

(13) Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Friends of Country Park

- Gymnosperms and Angiosperms of Hong Kong <sup>(1)</sup>;
- Hong Kong Amphibians and Reptiles <sup>(2)</sup>;
- Hong Kong Butterflies <sup>(3)</sup>;
- Orchidaceae of Hong Kong <sup>(4)</sup>;
- The Avifauna of Hong Kong <sup>(5)</sup>
- A Field Guide to the Amphibians of Hong Kong <sup>(6)</sup>; and
- A Field Guide to the Venomous Land Snakes of Hong Kong <sup>(7)</sup>.

### Results

The literature review of the Study Area is summarised in the following sections.

### Habitat and Vegetation

Shrubland was the dominant habitat covering the headlands and hillsides, which represented over 60% of the total island area. Shrubs and herbs, approximately 1 to 2 meters in height, were dominated by *Cratoxylum ligustrinum*, *Schefflera octophylla*, *Raphiolepis indica*, *Ilex rotunda*, *Pueraria* spp. and *Pandanus tectorius* <sup>(8)</sup> <sup>(9)</sup>, which are common and typical in such habitat in Hong Kong. Small areas of woodland were also found in a number of locations on the island. Aquatic habitats were limited to a freshwater reservoir and some abandoned cultivation fields adjacent to the abandoned village of Sheung Tsuen. As small islands usually produce short streams, small catchment areas and low order, only first and second order streams form a radial network draining from high ground on the island. Exposed rocky shore is the predominant shore type, however boulder shore, artificial shore and some sandy beaches can be found in the sheltered areas <sup>(10)</sup>.

- (1) Xing, F.W., Ng, S.C., Chau, L.K.C. (2000). Gymnosperms and angiosperms of Hong Kong. *Memoirs of the Hong Kong Natural History Society*. 23: 21-136.
- (2) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (3) Lo Y F and Hui W L (2002). *Hong Kong Butterfly*.
- (4) Siu L P (2000). Orchidaceae of Hong Kong. *Memoirs of the Hong Kong Natural History Society*. 23: 137-147.
- (5) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (6) AFCD (2005). *A Field Guide to the Amphibians of Hong Kong*, AFCD.
- (7) Chen S K., Cheung K.S., Ho C. Y, Lam F. N., Tang W, S (2006). *A Field Guide to the Terrestrial Mammals of Hong Kong*. AFCD.
- (8) Ka M. Wong R, Kong C, Yiu V, Wong D and Hung S (2003). *Discovering Soko Islands. Hong Kong Discovery* Volume 16 May/June 2003.
- (9) ERM (1997). *Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report*, prepared for the Hong Kong Electric Co Ltd.
- (10) ERM (1997). *Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report*, prepared for the Hong Kong Electric Co Ltd.

The literature review revealed that limited information on habitat and vegetation was available within the Study Area of Shek Pik.

## Birds

Information, albeit limited, on the avifauna of South Soko, was sourced from annual Hong Kong Bird Reports published by HKBWS. A total of 15 species were reported in the Soko Islands/South Soko in the Hong Kong Bird Reports HKBWS 1995 to 2000) and HKBWS Breeding Bird Survey Report <sup>(1)</sup> as shown in Table 8.1.

**Table 8.1** *Bird Species Recorded in Soko Islands/South Soko by HKBWS (1995-2000) and Carey et al (2001) <sup>(2)</sup>*

Common Name	Species Name	Status
Besra	<i>Accipiter virgatus</i>	Localised or rare.
Black Drongo	<i>Dicrurus macrocercus</i>	Widespread and common.
Black Kite	<i>Milvus migrans</i>	Widespread and common in Hong Kong, Class II Protected Species in PRC and Appendix 2 of CITES.
Black-collared Starling	<i>Sturnus nigricollis</i>	Widespread and common.
Black-naped Tern	<i>Sterna sumatrana</i>	Localised or rare.
Chinese Bulbul	<i>Pycnonotus sinensis</i>	Widespread and common.
Common Tailorbird	<i>Orthotomus sutorius</i>	Widespread and common.
Crested Myna	<i>Acridotheres cristatellus</i>	Widespread and common.
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>	Localised or rare.
Little Swift	<i>Apus affinis</i>	Widespread and common.
Pacific Reef Egret	<i>Egretta sacra</i>	Local but not uncommon in Hong Kong, Class II Protected Species in PRC and Appendix 2 of CITES.
Spotted Dove	<i>Streptopelia chinensis</i>	Widespread and common.
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	Local but not uncommon in Hong Kong, Class II Protected Species in PRC and Appendix 2 of CITES.
White-shouldered Starling	<i>Sturnus sinensis</i>	Local but not uncommon.
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Widespread and common.

ERM's 1997 <sup>(3)</sup> study revealed that certain shrubby plant species on the island might provide food for fruit eating birds. At least 12 species of birds, including the Besra *Accipiter virgatus* and Chinese Starling *Sturnus sinensis*, were recorded in South Soko <sup>(4)</sup>. The most recent surveys undertaken by Ka

(1) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.

(2) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.

(3) ERM (1997). *Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report*, prepared for the Hong Kong Electric Co Ltd.

(4) ERM (1997). *Stage 1 EIA for a New Power Station: Stage 1 EIA Report, Draft Report*, prepared for the Hong Kong Electric Co Ltd.

*et al* (2003) <sup>(1)</sup> recorded Black Kite, Reef Egret, Common Buzzard and White-bellied Sea Eagle. Other common species recorded in South Soko included Common Sandpiper, Kestrel, Common Kingfisher, Crested Myna, Chestnut Bulbuls, White Wagtail, White-breasted Kingfisher and Crested Bulbul.

The literature review revealed that limited information on birds was available within the Study Area of Shek Pik.

### Mammals

The literature review (including the literature selected in *Section 8.3*) revealed that limited information on mammals was available within the Study Areas of South Soko and Shek Pik.

### Herpetofauna

According to Karsen *et al* (1998) <sup>(2)</sup>, the uncommon Two-striped Grass Frog *Rana taipehensis* was found on South Soko. However, the five species of amphibian reported in South Soko by Lau and Dudgeon (1999) <sup>(3)</sup>, including Gunther's Frog *Rana guentheri*, Three-striped Grass Frog *Rana macrodactyla*, Brown Tree Frog *Polypedates megacephalus*, Asiatic Painted Frog *Kaloula pulchra* and Ornate Pygmy Frog *Microhyla ornata*, did not include the Two-striped Grass Frog. All of the recorded species are common and widespread in Hong Kong <sup>(4)</sup>.

Two species of reptile, the Long-tailed Skink *Mabuya longicaudata* and Common Rat Snake *Ptyas mucosus*, have been recorded in the Soko Islands <sup>(5)</sup>. The Long-tailed Skink is common and widespread in Hong Kong, and prefers dry hillsides with tall grasses or shrubland <sup>(6)</sup>. The Common Rat Snake is listed in *Appendix 2* of CITES <sup>(7)</sup> and is considered to be of potential global concern. Despite this classification, this species is found in a variety of habitats and locations in Hong Kong <sup>(8)</sup>.

The literature review revealed that limited information on herpetofauna was available within the Study Area of Shek Pik.

- (1) Ka M. Wong R, Kong C, Yiu V, Wong D and Hung S (2003). Discovering Soko Islands. *Hong Kong Discovery* Volume 16 May/June 2003.
- (2) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (3) Lau, M. W. N. and D. Dudgeon, (1999). Composition and distribution of Hong Kong Amphibian fauna. *Memoirs of the Hong Kong Natural History Society* 22: 1-80.
- (4) Lau, M.W.N. and D. Dudgeon, (1999). Composition and distribution of Hong Kong Amphibian fauna. *Memoirs of the Hong Kong Natural History Society* 22: 1-80.
- (5) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (6) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (7) Zhao, E. (1998). China Red Data Book of Endangered Animals. Science Press, Beijing.
- (8) Zhao, E. (1998). China Red Data Book of Endangered Animals. Science Press, Beijing.

## Invertebrate

### Dragonfly

The literature review revealed that limited information on invertebrates was available within the Study Area of South Soko. Only the common dragonfly species Pied Skimmer *Pseudothemis zonata* was reported in South Soko in November 1998 by Reels and Lau (1998) <sup>(1)</sup>.

The literature review revealed that limited information on dragonflies was available within the Study Area of Shek Pik.

### Butterfly

Twenty five butterfly species, including eight Papilionidae, three Pieridae, three Danaidae, three Satyridae, three Nymphalidae, one Amathusiidae, one Riodinidae, one Lycaenidae and two Hesperidae, have been recorded at South Soko in 2003 <sup>(2)</sup>. The most abundant species recorded included Large Faun *Faunis eumeus*, South China Bush Brown *Mycalesis panthaka* and Dark-band Bush Brown *Mycalesis mineus*, and all of which were recorded near to the secondary woodland and the abandoned reservoir.

The literature review revealed that limited information on butterflies was available within the Study Area of Shek Pik.

## Stream Fauna

The literature review revealed that limited information on stream fauna was available within the Study Areas of South Soko and Shek Pik.

## Lantau South Country Park

Lantau South Country Park was designated in 1978 and covers 2,200 ha. The Park comprises an extensive area and many flora and wildlife such as snakes, birds, freshwater fish and protected plant species. Typical species included orchids, Ferret Badger, Indian Muntjac, Wild Boar, Romer's Tree Frog. The proposed water main passes through a small section of this Country Park (40 m).

### 8.4.3 *Baseline Ecological Surveys*

#### *Methodology*

The Study Areas were defined as the land area of South Soko Island and 500 m from the cable circuit and water main routes at Shek Pik. Following a literature review of available ecological information characterising the Study Areas, reconnaissance surveys were undertaken in February 2004 to update

(1) Reels and Lau (1998). Wildlife Windows One. *Porcupine!* 17: 23

(2) Ka M. Wong R, Kong C, Yiu V, Wong D and Hung S (2003). Discovering Soko Islands. *Hong Kong Discovery* Volume 16 May/June 2003.

and field check the validity of the information gathered in the review and to fill in information gaps. A number of more focused baseline field surveys were then carried out in February to July 2004, and October 2005 to January 2006 for South Soko, and January, February and April 2006 for Shek Pik to characterise the existing ecological conditions. The ecological baseline surveys were designed to fill any identified data gaps in the literature review. The baseline surveys covered a period of 10 months during both dry (February to March 2004 and November 2005 to January 2006) and wet (April to July 2004 and October 2005) seasons for South Soko and the dry season (January to February 2006) and wet season (April 2006) for Shek Pik.

The following baseline surveys were identified as necessary and the details are summarised in *Table 8.2*.



Table 8.2 *The Details of the Baseline Surveys*

Survey Type	Methodology	Date
Habitat and Vegetation	Habitat mapping and vegetation identification through ground truthing in major habitats.	12 February, 10 & 17 March, 23 July 2004, 13, 14 and 22 September 2005, 18, 25 and 27 January 2006.
Bird	Quantitative (point count method) and qualitative (recorded within Study Area) survey including day and night surveys covered both wet and dry seasons.	13 & 21 February, 17 & 18 March, 16 April, 10 May, 14 June, 23 July 2004, 13, 22 September 2005, 2, 4, 18 January, 2 February and 21 April 2006.
Mammal	Quantitative (active searching along the survey transect) and qualitative (recorded within Study Area); including day and night surveys covered both wet and dry seasons.	13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006.
Herpetofauna	Quantitative (active searching along the survey transect) and qualitative (recorded within Study Area); including day and night surveys covered both wet and dry seasons.	13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006.
Butterfly	Quantitative (point count method) and qualitative (recorded within Study Area) survey; including only day surveys covered both wet and dry seasons.	13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006.
Dragonfly	Quantitative (point count method) and qualitative (recorded within Study Area) survey; including only day surveys covered both wet and dry seasons.	13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006.
Aquatic fauna	Active searching in stream, abandoned reservoir and abandoned wet agricultural land; Using hand net and casting net for fish survey in the abandoned reservoir; including only day surveys covered both wet and dry seasons.	13 February, 10 March, 10 May, 17 June 2004 and 13 September 2005.

### Habitats and Vegetation

Field surveys focussing on the habitats and vegetation within the Study Area were performed on 12 February, 10 & 17 March, 23 July 2004, 13, 14 and 22 September 2005, 18, 25 and 27 January 2006. The aim of the surveys was to record and map habitat characteristics and distribution as well as floral

composition within the Study Area and to establish the ecological profile. The methodologies of habitat and vegetation survey were made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*.

Habitats were mapped based on recent government aerial photographs (2004)<sup>(1)</sup> and field ground truthing, and are presented in *Figure 8.4* for South Soko. The habitat map for Shek Pik is presented in *Figure 8.5*.

Representative areas of each habitat type were surveyed on foot. Plant species of each habitat type encountered and their relative abundance were recorded with special attention to any rare or protected species.

Nomenclature and conservation status of plant species follow Xing *et al* <sup>(2)</sup> and Wu and Lee <sup>(3)</sup>.

### Mammals

The methodology for the mammal survey made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*. As most mammals occur at low densities, all sightings, tracks, and signs of mammals were actively searched. Camera traps were considered not necessary for this Study, as the information from the literature review described that South Soko Island was dominated by dry and poorly vegetated shrubland and that the habitat was not favourable for mammal species.

Surveys were focussed on areas within 10m either side of the survey transects. Location of survey transects at South Soko and Shek Pik are shown in *Figure 8.6* and *Figure 8.7* respectively. Mammal surveys were carried out on 13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006. Night survey for mammals, were carried out on 10 May 2004, 14 September 2005, 18 January and 8 April 2006. The nomenclature for mammals follows Wilson and Reeder <sup>(4)</sup>.

### Birds

The methodology for the bird surveys made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*. The bird surveys were undertaken in the major habitat types (secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream and disturbed area) within the Study Area quantitatively (using the point count method). Sampling points at South Soko and Shek Pik are shown in *Figure 8.6* and *Figure 8.7*. Bird surveys were conducted on 13 & 21 February, 17 & 18 March, 16 April, 10 May, 14 June, 23 July 2004, 13 & 22 September 2005, 2,

(1) Aerial photograph of Soko Island Tai A Chau at 8,000 feet dated 9th February 2004.

(2) Xing, F.W., Ng, S.C., Chau, L.K.C. (2000). Gymnosperms and Angiosperms of Hong Kong. *Memoirs of the Hong Kong Natural History Society*. 23: 21-136.

(3) Wu, S. H. and Lee.T. C. (2000). Pteridophytes of Hong Kong. *Memoirs of the Hong Kong Natural History Society*: 23:5-20.

(4) Wilson D.E. and D.M. Reeder. (1992). *Mammal species of the world: A taxonomic and geographic reference*. Smithsonian Institution Press, Washington & London.

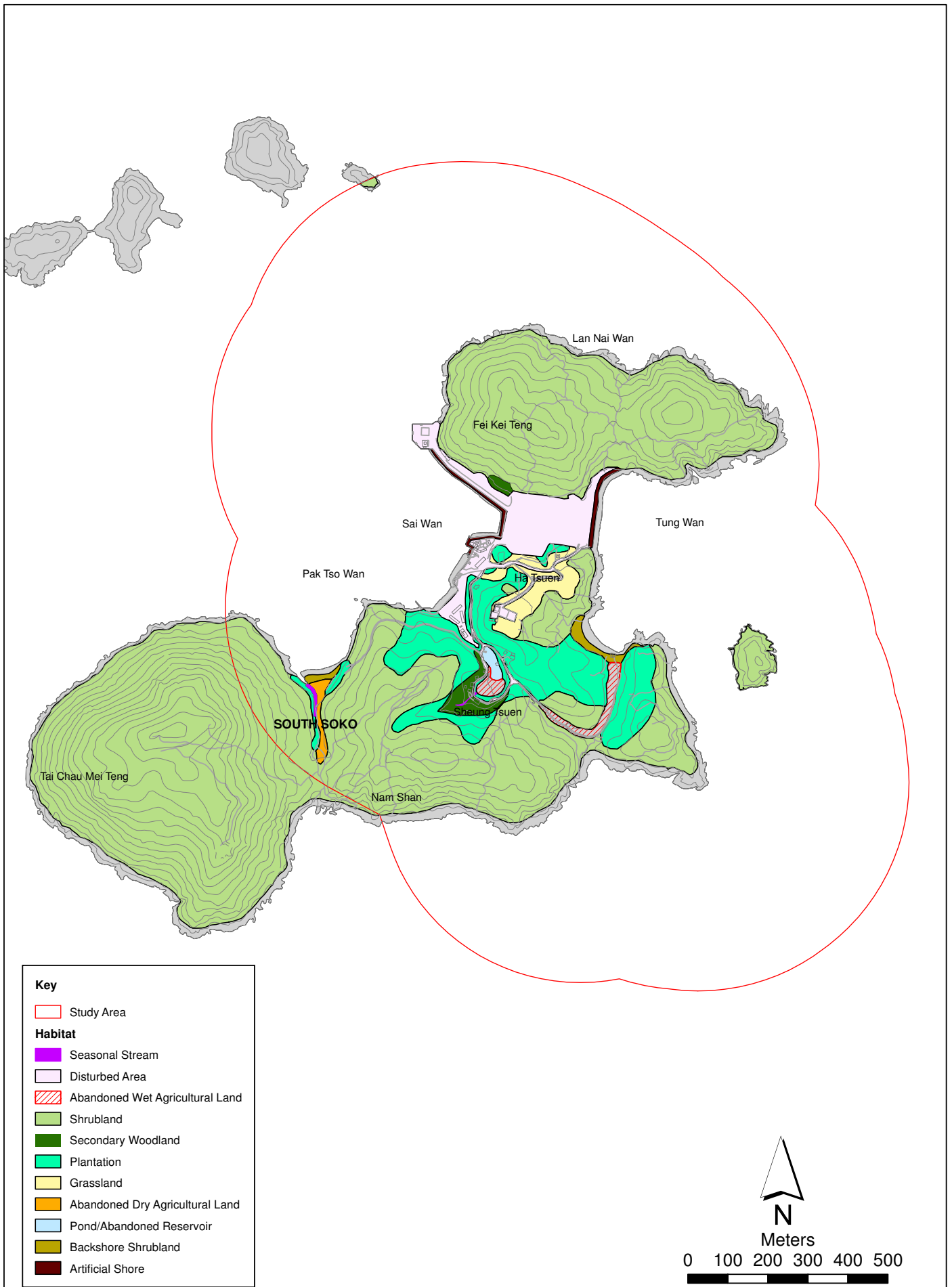


FIGURE 8.4

Habitat Map and Study Area of South Soko

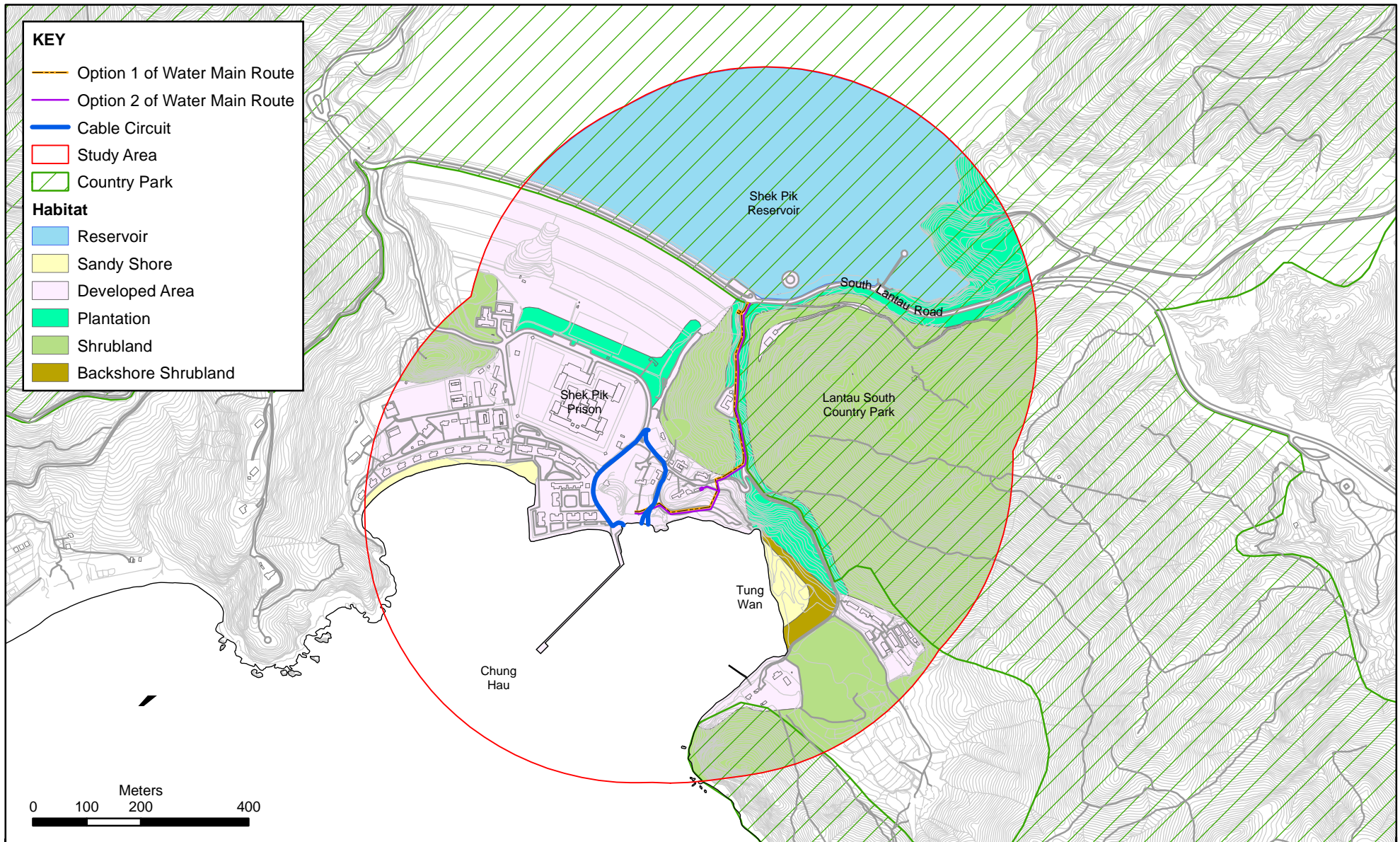


Figure 8.5

Habitat Map of Shek Pik

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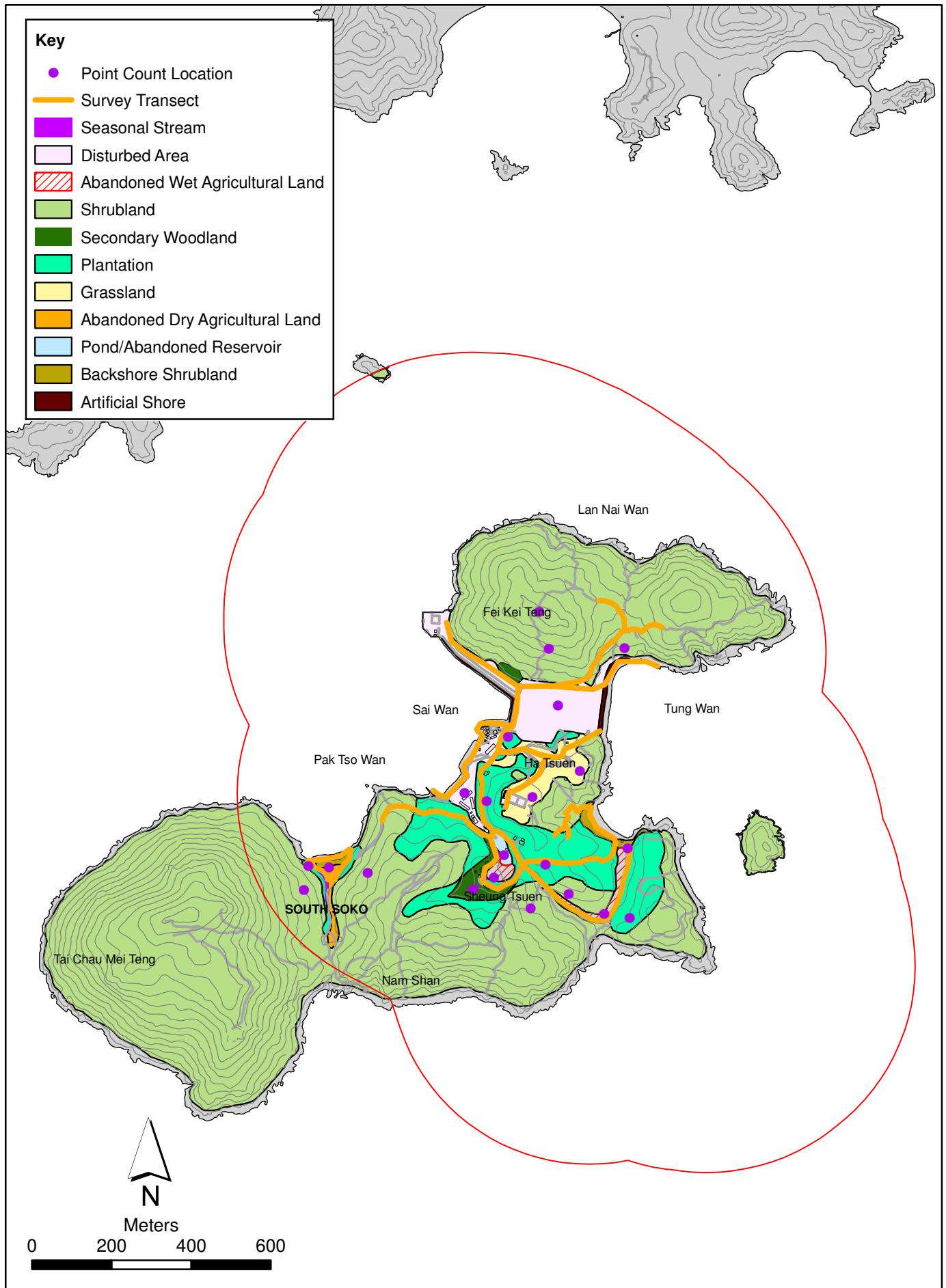


FIGURE 8.6

Sampling Location and Survey Transects for within Study Area at South Soko Baseline Ecological Surveys

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Environmental Resources Management



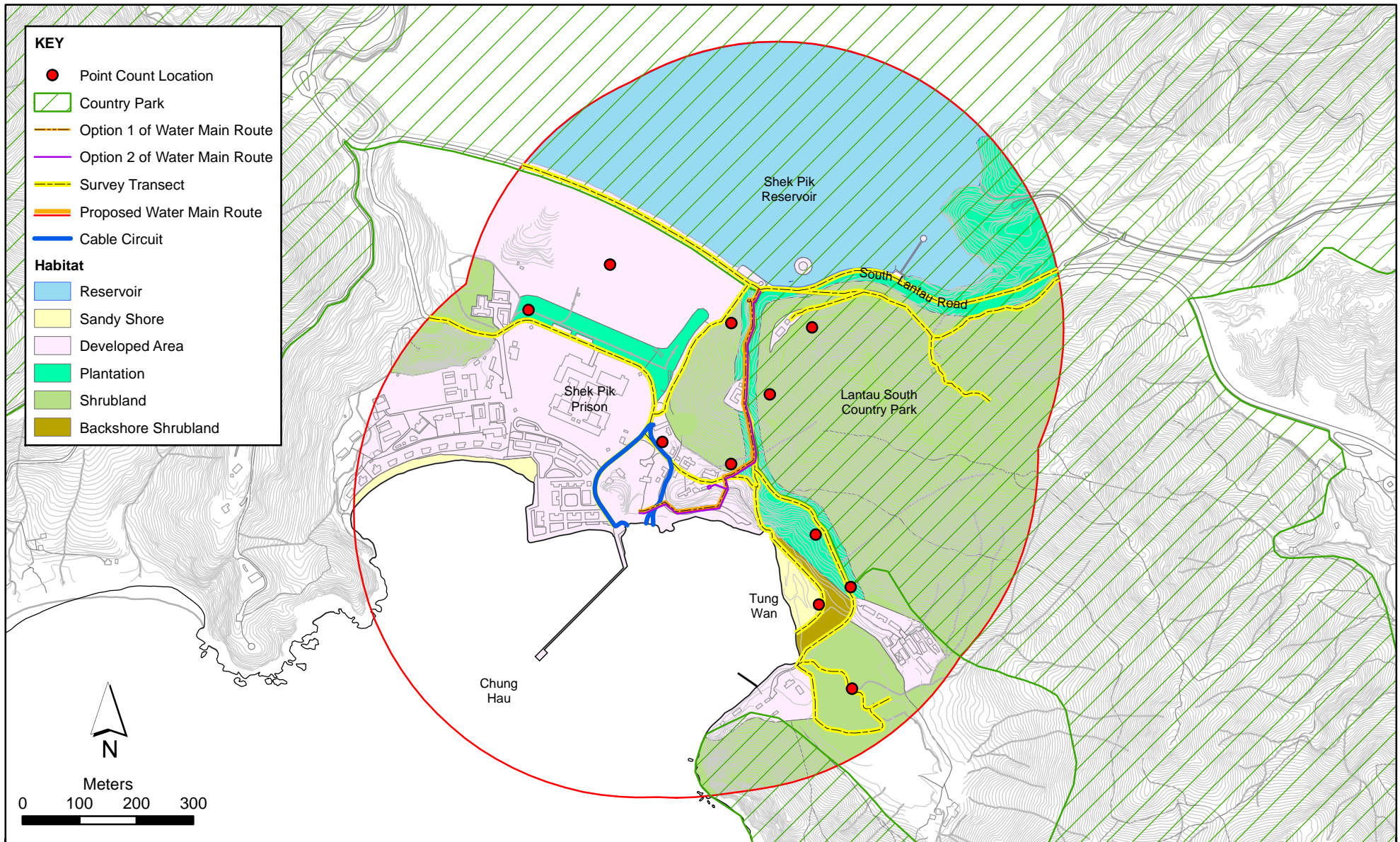


Figure 8.7

Sampling Points & Survey Transects  
for Baselin Ecological Surveys within Study Area  
at Shek Pik

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4, 18 January, 2 February and 21 April 2006. Night surveys for birds, were carried out on 18 March 2005 and 18 January 2006. For the point count method, a total of ten minutes was spent counting birds at each designated point for each visit. All birds seen or heard within 30 m of each point were counted and identified to species where possible. Relative abundance of birds recorded within point count sites has been expressed as mean number of birds per sampling point and per sampling time (total birds counted divided by total number of point count sites surveyed and total number of visits). Species richness was expressed in terms of mean number of species per sampling point and per sampling time. All the bird species encountered outside counting points but within the Study Area were also recorded in order to produce a complete species list. Signs of breeding (e.g. recently fledged juveniles and the presence of an actively used nest) and the habitat utilisation of different species were also recorded. Ornithological nomenclature followed Carey *et al* <sup>(1)</sup>.

### Herpetofauna

The methodology for the herpetofauna surveys made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*. All reptiles and amphibians were recorded by direct observation and active searching in potential concealed locations such as in leaf litter, under stones and logs. Auditory detection of species-specific advertisement calls was used to survey frogs and toads. Surveys were focussed on areas within 10 m either side of the survey transects. Location of survey transects at South Soko and Shek Pik are shown in *Figure 8.6* and *Figure 8.7*.

Herpetofauna surveys were carried out on 13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2 February and 8 April 2006 through active searching within the Study Area. Night surveys for amphibians were carried out on 10 May 2004, 14 September 2005, 18 January and 8 April 2006. Nomenclature used in this report for reptiles follows Karsen *et al* <sup>(2)</sup> while that for amphibians follows Lau and Dudgeon <sup>(3)</sup> and AFCD <sup>(4)</sup>.

### Invertebrates (Dragonflies and Butterflies)

The methodology of invertebrate survey was made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*. Dragonflies and butterflies of different habitats within the Study Area were surveyed on 13 & 21 February, 9 & 10 March, 19 April, 10 May, 17 June, 23 July 2004, 14 September and 28 December 2005, 18 January, 2

- (1) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (2) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (3) Lau, M.W.N. and D. Dudgeon, (1999). Composition and distribution of Hong Kong Amphibian fauna. *Memoirs of the Hong Kong Natural History Society* 22: 1-80.
- (4) AFCD (2005). A Field Guide to the Amphibians of Hong Kong. AFCD.

February and 8 April 2006 using the transect count method. During the transect count surveys, all of the dragonflies and butterflies found within 10 m either sides of the transect were identified and counted. Location of survey transects at South Soko and Shek Pik are shown in *Figure 8.6* and *Figure 8.7*. Habitats of small size including streams and abandoned wet agricultural lands were surveyed using the point count method instead. For the point count method, a total of five minutes was spent counting butterflies and dragonflies at each point for each visit. All butterflies and dragonflies seen within 10 m of each point were counted and identified to species where possible. Relative abundance of the dragonflies and butterflies in each type of habitat were estimated. Dragonflies and butterflies encountered outside survey transects and counting points but within the Study Area were also recorded in order to produce a complete species list. Nomenclature for butterflies follows Walthew <sup>(1)</sup>, Yiu 2004 <sup>(2)</sup> and dragonfly nomenclature follows Wilson <sup>(3)</sup>.

### Aquatic Fauna

The methodology for the aquatic fauna surveys made reference to those proposed in the *Technical Guidance Notes 7/2002* and *10/2004* of the *EIA Ordinance*. Field surveys were undertaken on 13 February, 10 March, 10 May, 17 June 2004 and 13 September 2005 to identify the water bodies and aquatic resources in the Study Area. The water bodies, including a stream, an abandoned reservoir and abandoned wet agricultural lands, were actively searched for the presence of aquatic fauna. Fish surveys were conducted within the abandoned reservoir by direct observation and active sampling. Direct observation was undertaken for sensitive species or individuals in the middle of the abandoned reservoir, and active searching using hand nets and casting nets was carried out for most areas of the abandoned reservoir. All fish species recorded were identified in the field and the number of individuals seen was also recorded. The classification of the stream fauna followed Chong and Dudgeon <sup>(4)</sup> and AFCD <sup>(5)</sup>, while the conservation status of the stream fauna followed Fowler <sup>(6)</sup>, AFCD <sup>(7)</sup> and Yue and Chen <sup>(8)</sup>.

The information presented in the following sections is based on the findings of the baseline surveys performed during the periods February to July 2004 and October 2005 to February 2006. The baseline ecological conditions have been evaluated based on the criteria laid out in *Annexes 8 & 16* of the *EIAOTM*.

- (1) Walthew, G. (1997). The status and flight periods of Hong Kong butterflies. *Porcupine!* 16: 34-37.
- (2) Yiu V (2004). *Field Guide to the butterflies of Hong Kong*. Hong Kong Discovery Ltd.
- (3) Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong.
- (4) Chong, D. H. and D. Dudgeon, (1992). Hong Kong stream fishes: an annotated checklist with remarks on conservation status. *Memoirs of the Hong Kong Natural History Society*, Vol. 19, pp. 79-112.
- (5) AFCD (2004). *Field Guide to the Fresh water Fish of Hong Kong*. Friends of the Country Parks.
- (6) Fowler, H. W., (1972). A Synopsis of the Fishes of China, Vols. 1 & 2 (reprint), Antiquariaat Junk, Dr. R. Schierenberg & Sons N. V., P. O. Box 5, Netherlands. Pp. 1459.
- (7) AFCD (2004). *Field Guide to the Fresh water Fish of Hong Kong*. Friends of the Country Parks.
- (8) Yue, P. and Y. Chen (ed) (1998). *China Red Data Book of Endangered Animals, Pisces*, Science Press, Beijing, China. Pp. 247, pls. VII.



The findings of the baseline surveys undertaken in South Soko were also used to compare with other outlying islands in southern Hong Kong Waters, including North Soko, Shek Kwu Chau, Sunshine Island, Hei Ling Chau, Green Island, Little Green Island, Lamma Island, Tung Lung Chau and Po Toi Island, and south Lantau including Chi Ma Wan Peninsula, Pui O, Cheung Sha and Tai O in order to obtain a more comprehensive understanding of the existing ecological resources and significance of South Soko. The locations of the areas for comparison are shown in *Figure 8.8*.

### *Results of Baseline Ecological Surveys*

## **South Soko**

### Existing Habitat and Vegetation

South Soko is an outlying island located in the southwest waters of the Hong Kong SAR, with a total area of approximately 120 ha. The majority of the lowland area of South Soko (near the central part of the island) was historically developed as a Detention Centre and its associated facilities (helipad and concrete paths) which have subsequently been demolished.

Habitats found within the Study Area included secondary woodland, plantation, shrubland, backshore shrubland, grassland, abandoned wet agricultural land, abandoned dry agricultural land, abandoned reservoir, seasonal stream and disturbed area. The habitat map is presented in *Figure 8.4*. The Study Area was dominated by shrubland, which covered most of the hill-side areas. Secondary woodland occupied the valley and behind the old villages such as Sheung Tsuen. The former Detention Centre and associated facilities, covered by a concrete platform, were classified as disturbed areas. Aquatic habitats were limited to an abandoned reservoir surrounded by concrete road, streams of short length and small catchment areas, and abandoned wet agricultural lands.

A total of 132 plant species were recorded within the Study Area (*Table 1 of Annex 8*) with one additional plant species recorded during tree surveys conducted on 4 May 2006. Among the recorded plant species, there were 20 tree species, 52 shrub species, 10 grass species, 2 palm species, 3 sedges, 24 climber species, 17 herb species, 3 fern species and one orchid. Coastal vegetation, species of which are well adapted to adverse environments such as limited water supply, strong wind and saline conditions (typical characteristics of island habitats), were frequently found throughout the Study Area <sup>(1)</sup>. There were nine species of typical coastal vegetation found in the Study Area including *Rhapis excelsa*, *Zoysia matrella*, *Pandanus tectorius*, *Phoenix henceana*, *Celtis sinensis*, *Mallotus paniculata*, *Thespesia populnea*, *Miscanthus sinensis* and *Cratogeomys cochinchinensis*. The whole Study Area was dominated by a suite of plant species that included *Cratogeomys cochinchinensis*, *Mallotus paniculatus*, *Paederia scandens*, *Psychotria rubra*, *Rhaphiolepis indica*,

(1) Dudgeon and Corlett (2004). *The Ecology and Biodiversity of Hong Kong*. The Hong Kong University Press.

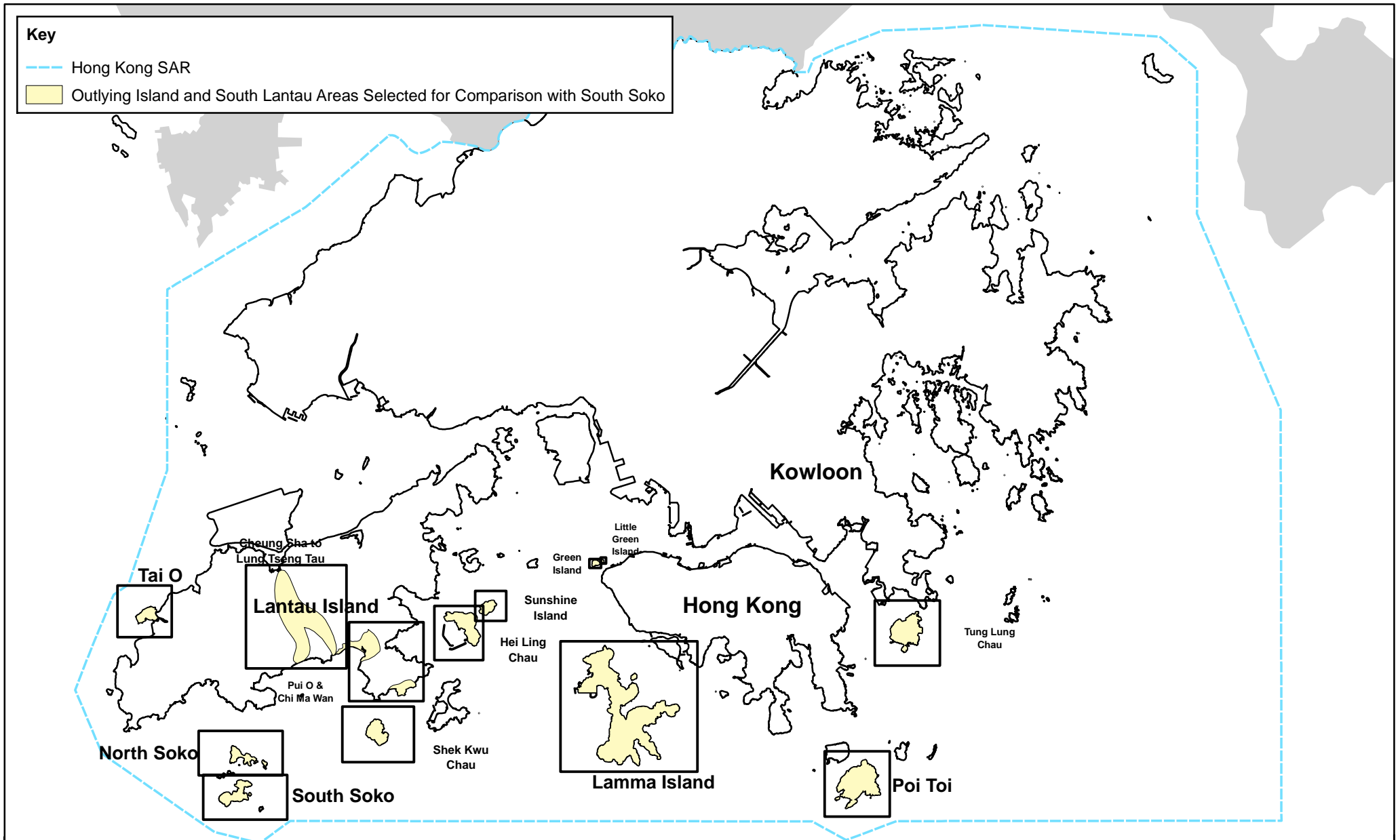


Figure 8.8

Locations of Outlying Islands and South Lantau Areas Selected for Comparison with South Soko

*Scolopia chinensis*, *Thespesia populnea* and *Zanthoxylum avicennae*, which were mainly found in shrubland, the major habitat type within the Study Area. Nine individuals of an orchid Golden Eulophia *Eulophia flava*, which is protected locally under the *Forest and Countryside Ordinance (Cap 96)* and rare in Hong Kong <sup>(1)</sup> were recorded during the tree survey on 4 May 2006. Table 8.3 lists the approximate areal extent and number of plant species recorded in each habitat type.

**Table 8.3** *Habitat Types Recorded Within the South Soko Study Area*

Habitat Type	Approximate Area (hectare)/ Length (m)	Number of Plant Species Recorded
Secondary woodland	1 ha	72
Plantation	11.4 ha	54
Shrubland	85.7 ha	75
Backshore shrubland	0.5 ha	14
Grassland	2.1 ha	28
Abandoned wet agricultural land	1.0 ha	37
Abandoned dry agricultural land	0.4 ha	27
Stream	90 m	28
Abandoned reservoir	0.2 ha	7
Disturbed area	6.5 ha	41
Bare rocks, artificial shore and sandy beach*	11.2 ha	Not applicable

Note: \* Bare rocks, artificial shore and sandy beach were grouped to marine ecological resources and will be discussed in detail in *Part 2, Section 9*.

### Secondary Woodland

Small patches of secondary woodland (approximately 1 ha) are located at the west of the abandoned reservoir and at the fringe of shrubland. The woodlands were densely vegetated with canopy species reaching the height of 15 m. It is mainly comprised of native tree species and fruit trees planted by local villagers several decades ago, which included *Celtis sinensis*, *Cinnamomum camphora*, *Machilus chinensis*, *Ficus microcarpa* and *Dimocarpus longan*. Most trees were mature in size and hence the ecological value of secondary woodland is considered as moderate. Secondary woodland will develop towards a climax habitat (mature woodland) through succession and natural colonization, it was in the initial stages of this process. Photographic records of secondary woodland are shown in *Figure 8.9*.

### Plantation

Plantation was mainly found in the middle of the island and at the fringe of the buildings and facilities of the demolished Detention Centre. The plantation extended to the west of Pak Tso Wan and the western side of Tung Wan. The canopy species of the plantations were 10 to 12 meters in height

(1) Gloria Siu Lai -ping (2000). Orchidaceae of Hong Kong. *Memories of the Hong Kong Natural History Society*. Page 137 – 147.



Native and common plant species *Ficus superba* found at the fringe of secondary woodland.



Secondary woodland located at the west of abandoned reservoir comprises mainly native trees and fruit trees planted by local villagers long ago, such that the ecological importance is considered moderate.



Secondary Woodland was found at the Southwest of a Natural stream.

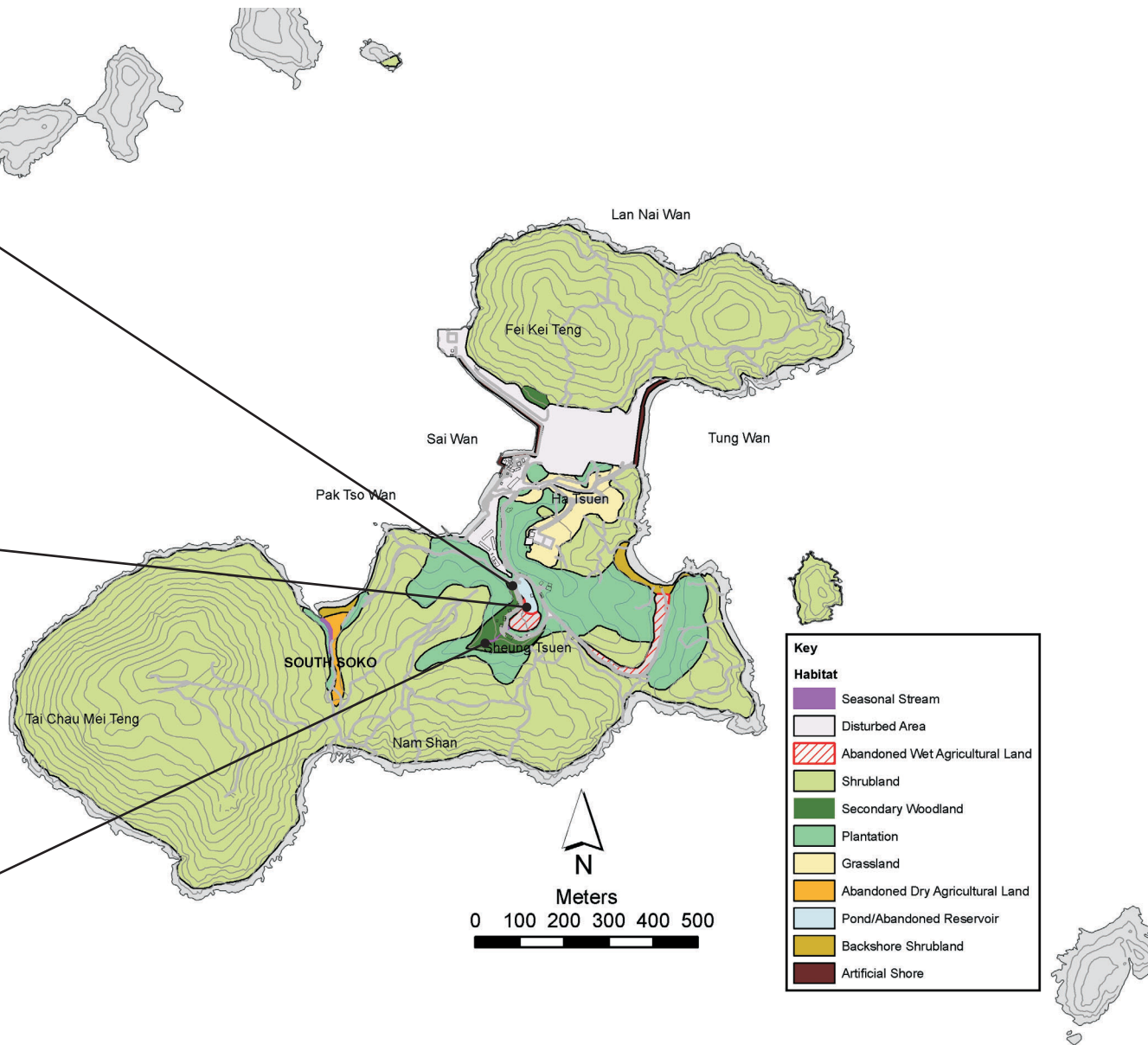


Figure 8.9

Photographic Records of Secondary Woodland Habitat

with diameters at breast height (dbh) ranging from 5 cm to 25 cm. The plantation was dominated by *Acacia confusa* established 10 to 20 years ago. Some of the native shrubs and tree saplings in the understory developed as canopy species after the degeneration of individuals of *Acacia confusa*. The canopy species was dominated by *Acacia confusa* and *Casuarina equisetifolia*. There were 54 plant species recorded within the plantation and all of them are common or very common in Hong Kong. The floristic diversity and structural complexity of the plantation was low to moderate. Photographic records of plantation are shown in *Figure 8.10*.

Outlying islands such as South Soko support generally limited sized woodland habitats (*Table 2a of Annex 8*), due to steep terrain and crests of islands which cannot retain water or deep top soil, resulting in physical conditions that limit the development of remote woodlands. Exposure to strong winds and locations away from seed sources (mature woodlands) also restricts the establishment of tall trees on the island. It can be seen from *Table 2a of Annex 8* that, Chi Ma Wan and Tai O offer comparable habitats, and have large and continuous woodland patches. The colonisation by trees and development into large woodland in these two areas is facilitated by their geographical linkage to similar habitats on Lantau Island and the availability of reliable water sources. In comparison, South Soko lacks the linkage with other similar habitats, is more exposed and has a less reliable year round water source. In conclusion, the ecological importance of secondary woodland and plantation in South Soko is moderate, and low to moderate respectively.

### Shrubland

Shrubland is defined as woody vegetation with a modal height of 1 m to 4 m and is a transitional stage in the ecological succession between grassland and woodland/forest. Shrubland was the dominant habitat of South Soko, comprising more than 70% of the total land area. The shrubland consisted of shrubs, sedges and grasses 0.5 to 2 meters in height and a total of 75 plant species were found during the surveys. The shrubland was dominated by native plant species such as *Cratogeomys cochinchinense*, *Celtis sinensis*, *Rhodomyrtus tomentosa*, *Melastoma candidum*, *Ilex asprella*, *Ficus microcarpa*, *Phyllanthus emblica*, *Litsea glutinosa* and *Daphniphyllum calycinum*. Young trees such as *Machilus chinensis*, *Mallotus paniculatus* and *Macaranga tanarius* intermingled with the low shrubs and were more frequently found in the valleys, areas of water supply or sheltered areas. Photographic records of shrubland are shown in *Figure 8.11*. All of the recorded plant species are commonly found in Hong Kong except nine individuals of an orchid *Golden Eulophia Eulophia flava*, which is protected locally under the *Forest and Countryside Ordinance (Cap 96)*, recorded at the shrubland near to Fei Kei Teng during tree survey on 4 May 2006. *Golden Eulophia Eulophia flava* is rare in Hong Kong and only recorded in Lantau Island, Tai Tam, Cape d'Aguilar and Lamma Island. *Golden Eulophia* is an annual terrestrial herb usually found on hillsides and flowers in April and May. It has been propagated for

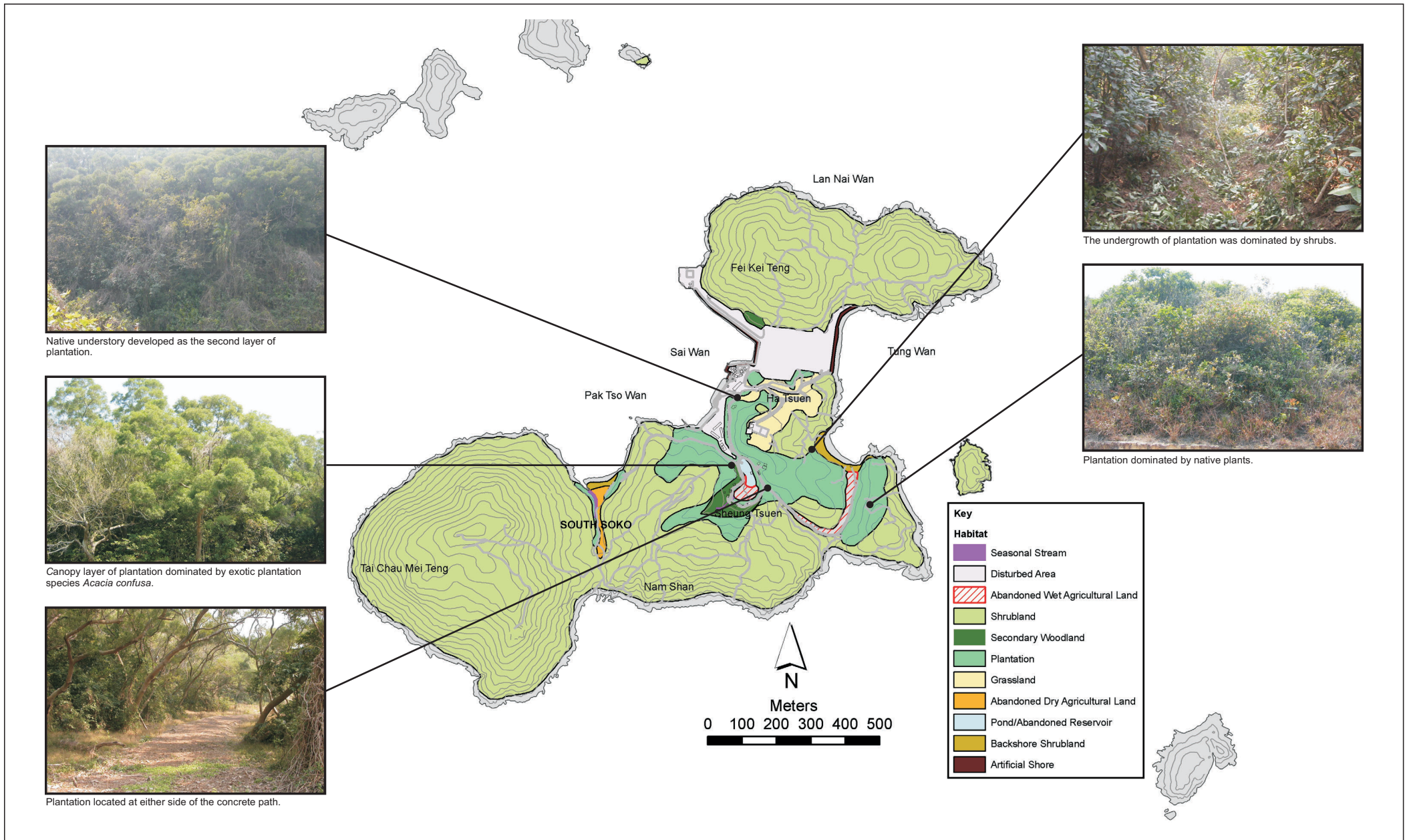


Figure 8.10

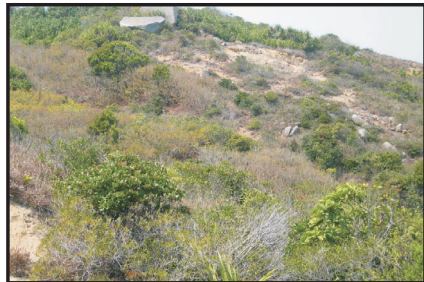
Photographic Records of Plantation Habitat



Plant species of low shrubland on the wind-facing slope were below 1.5 m in height. Higher percentage of grass cover was recorded.



Shrubland at the back of the rocky shore dominated by backshore vegetation such as the common *Pandanus* sp.



Bare ground found in the shrubland.



Shrubs dominated in the wind-sheltered area.



Shrubland at the fringe of secondary woodland densely covered by climbers and tall shrubs with a height of 1.5 m to 3.5 m.

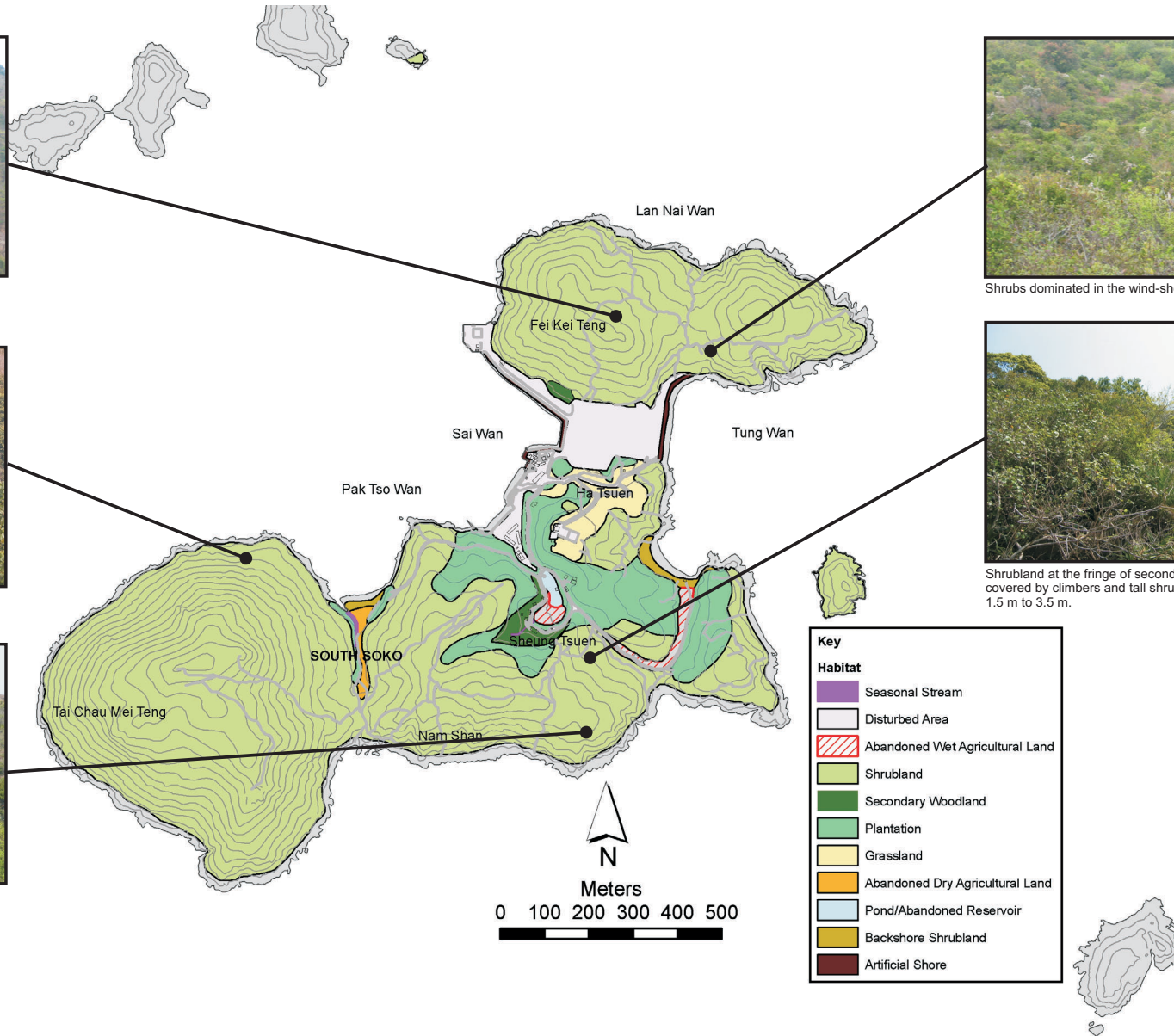


Figure 8.11

Photographic Records of Shrubland Habitat

ornamental uses locally. The location of Golden Eulophia within the Study Area is shown in *Figure 8.12*. The floristic diversity and the structural complexity of shrubland are moderate and low to moderate respectively.

Shrubland is one of the most extensive vegetation types, other than grassland and secondary forest, in Hong Kong <sup>(1)</sup>. Shrubland is the dominant habitat on outlying islands, as well as Hong Kong's territory, which usually covers over 50% and up to 85% of the total area (*Table 2b of Annex 8*). The domination by shrubland habitats is due to the harsh environmental conditions, such as limited water supply, low water retention capability of the soil, exposure to sunlight and strong winds. The plant species recorded in the shrubland of South Soko are commonly found in elsewhere in Hong Kong hillsides. In conclusion, the ecological importance of shrubland in South Soko is low to moderate.

#### Backshore Shrubland

Backshore shrubland refers to the dense tall shrubland found behind the sandy beaches and is composed mainly of coastal plant species. Backshore shrubland was found along the southern end of Tung Wan and along Pak Tso Wan (at the southwestern part of South Soko Island). The photographic records of backshore shrubland are shown in *Figure 8.13*. The backshore shrublands were of medium age, with some landscape plant species previously planted and intermingled with the native species. A large amount of rubbish, such as plastic bags and bottles, were washed onto the shore and had accumulated in the backshore shrubland. Backshore shrubland only occupied fringing areas along the shore and consisted mainly of vegetation including *Thespesia populnea*, *Ipomoea brasiliensis*, *Scaevola sericea* and *Cerbera manghas*. A total of 14 plant species of 0.3 to 2.5 meters in height were found in the backshore shrubland during the surveys. All of the plant species were common or very common in Hong Kong. The floristic diversity and the structural complexity of the backshore shrubland were low.

Backshore shrubland is typically found at the back of sheltered sandy beaches but seldom found on Hong Kong's outlying islands (*Table 2c of Annex 8*). In comparison with the backshore shrubland recorded in Pui O (South Lantau), the plant species composition of the habitat on South Soko (14 species) is more simple than those found in Pui O (24 species). Backshore shrubland habitat in Hong Kong is generally regarded as low quality habitat with relatively low floristic diversity and structural complexity. The ecological importance of backshore shrubland on South Soko is considered to be low.

(1) Dudgeon and Corlett (2004). *The Ecology and Biodiversity of Hong Kong*. The Hong Kong University Press.



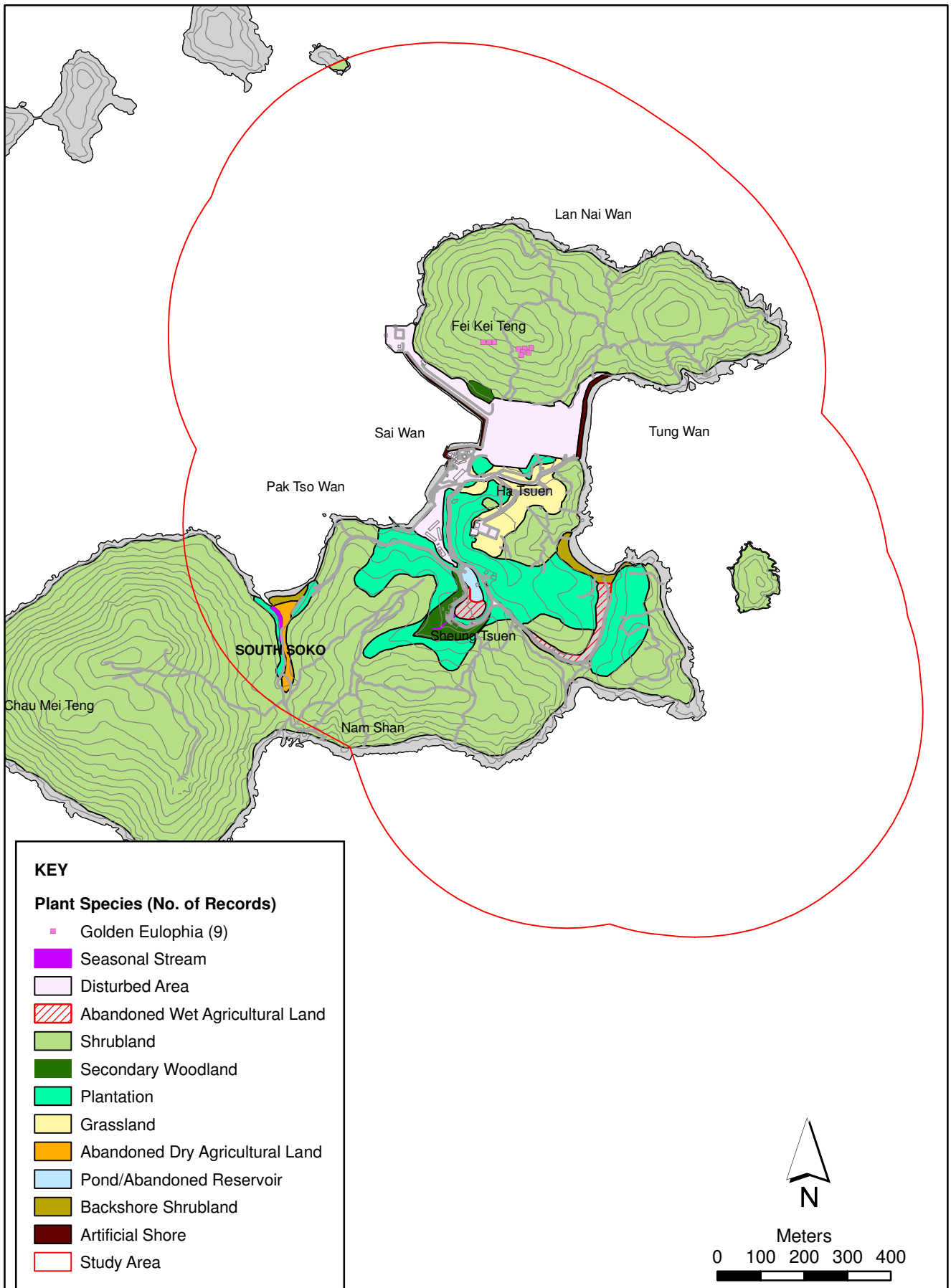


FIGURE 8.12

Location of Plant Species Recorded within the Study Area  
 (Recorded in February to July 2004 and  
 October 2005 to January 2006, May 2006)

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Environmental  
 Resources  
 Management





Rubbish found in the vegetation of the backshore shrubland.



Rubbish found in the backshore shrubland during high tide. *Pandanus tectorius* which is very common in Hong Kong was one of the dominant plant species in the backshore shrubland.



Rubbish found in the vegetation of the backshore shrubland.

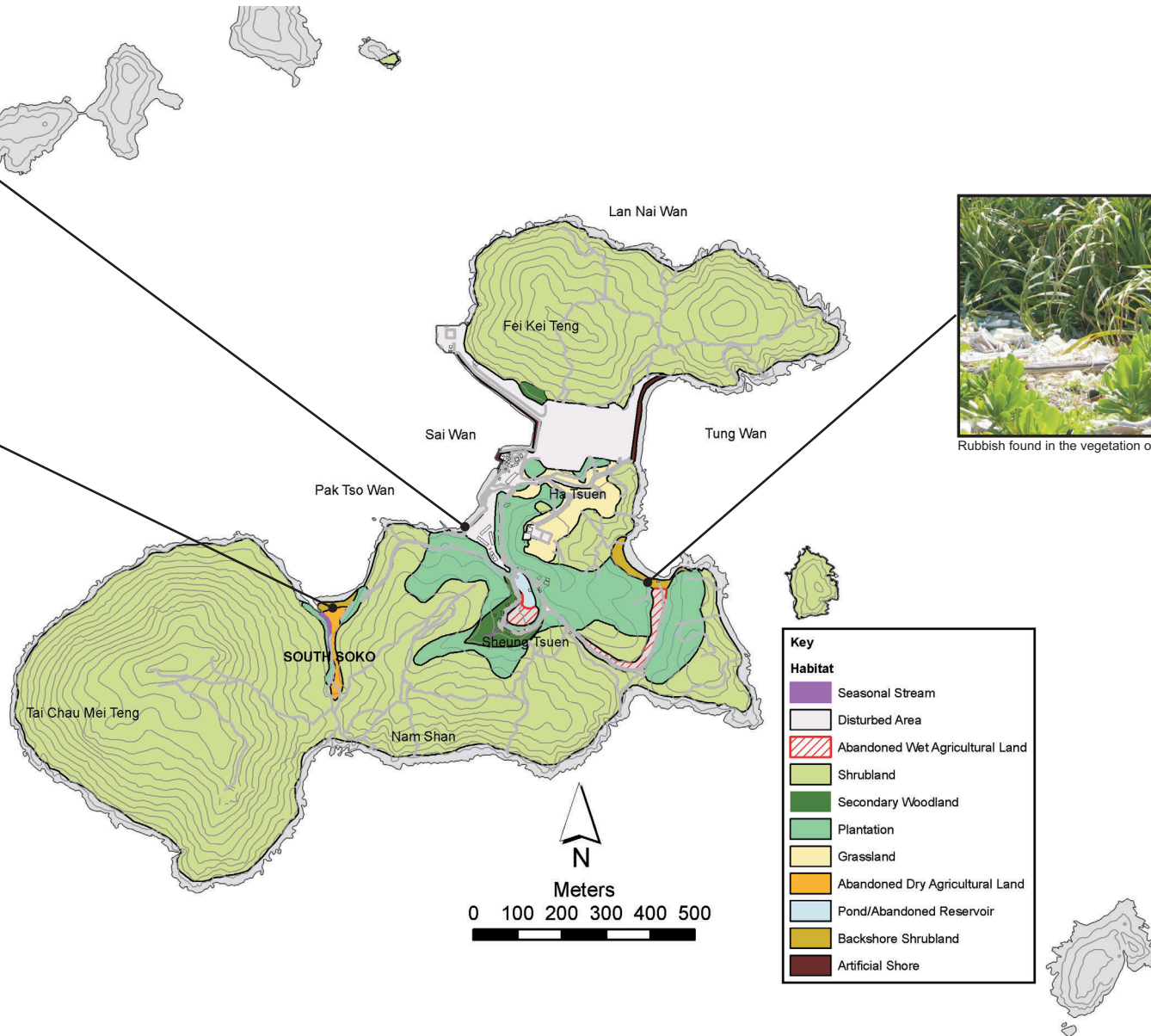


Figure 8.13

Photographic Records of Backshore Shrubland Habitat

## Grassland

Grassland is defined as vegetation dominated by herbaceous and grassy plant species with a modal height less than 1.5 m. Grassland was found located at the hillside next to Ha Tsuen. The photographic records of grassland are shown in *Figure 8.14*. Concrete paths and a helipad, considered to be the associated facilities of the Detention Centre, were found within the grassland. The grassland is expected to have originated from the shrubland located in the area prior to the development of the Detention Centre. The grassland consisted of grasses and shrubs 0.5 to 2 meters in height, and a total of 28 plant species were found during the surveys. The grassland was dominated by several grass species including *Digitaria sanguinalis*, *Ischaemum aristatum* and *Paspalum conjugatum* and scattered with native shrubs such as *Cratoxylum cochinchinense*, *Rhodomytus tomentosa* and *Melastoma candidum*. A few individuals of *Acacia confusa* were found at the edge of the grassland. All of the plant species are common or very common in Hong Kong. The floristic diversity and structural complexity of the grassland habitat were low. In accordance with the observation during the dry and wet season baseline surveys, the conditions of the grassland have not changed and maintained a simple floristic structure. The simple structure is probably due to periodic weeding (the helipad was frequently used by Government Flying Service for training and operation) or by the eroded soils of the area which restricted the colonization of other plant species.

Grassland is one of the most extensive vegetation types in Hong Kong<sup>(1)</sup>. Grassland was low in percentage cover (1.8%) on South Soko, which is similar to other outlying islands (*Table 2d of Annex 8*) as most of the grasslands develop into shrubland or shrubby grassland if there is no disturbance (i.e., hill fire) for a period of time. Grassland habitats in Hong Kong are generally regarded as low quality habitat with low floristic diversity and structural complexity<sup>(2)</sup>. The ecological importance of grassland on South Soko is considered to be low.

## Abandoned Wet Agricultural Land

Abandoned wet agricultural land refers to the waterlogged and seasonally or permanently submerged former agricultural land that is dominated by emergent hydrophytes. Abandoned wet agricultural lands were found in conjunction with the abandoned reservoir near Sheung Tsuen and at the southeast of South Soko. The photographic records of the abandoned wet agricultural land are shown in *Figure 8.15*. The abandoned wet agricultural land located near Sheung Tsuen occupied the south corner of the abandoned reservoir and is hydrologically linked with it. The wetland plants were dominated by *Phragmites australis*, *Colocasia esculenta* and *Polygonum* sp. The abandoned wet agricultural land located at the southeast of South Soko was

(1) Dudgeon and Corlett (2004). *The Ecology and Biodiversity of Hong Kong*. The Hong Kong University Press.

(2) Dudgeon and Corlett (2004). *The Ecology and Biodiversity of Hong Kong*. The Hong Kong University Press.



The grassland dominated by grass *Digitaria sanguinalis* with exotic trees such as *Acacia confusa* planted at the edges.



Bare ground was common within the grassland.



Concrete paths leading to the helipad were found within the grassland.

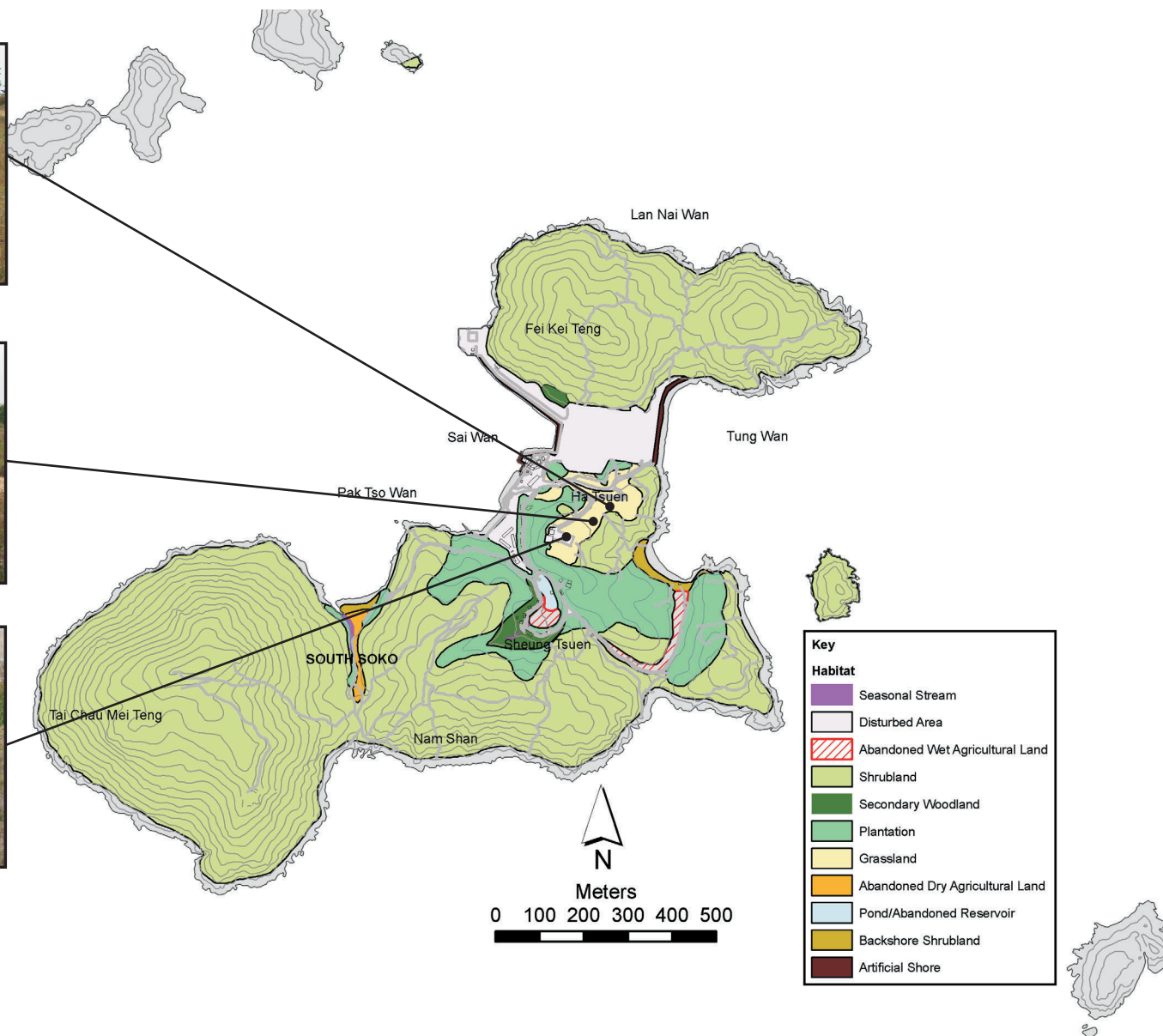


Figure 8.14

Photographic Records of Grassland Habitat



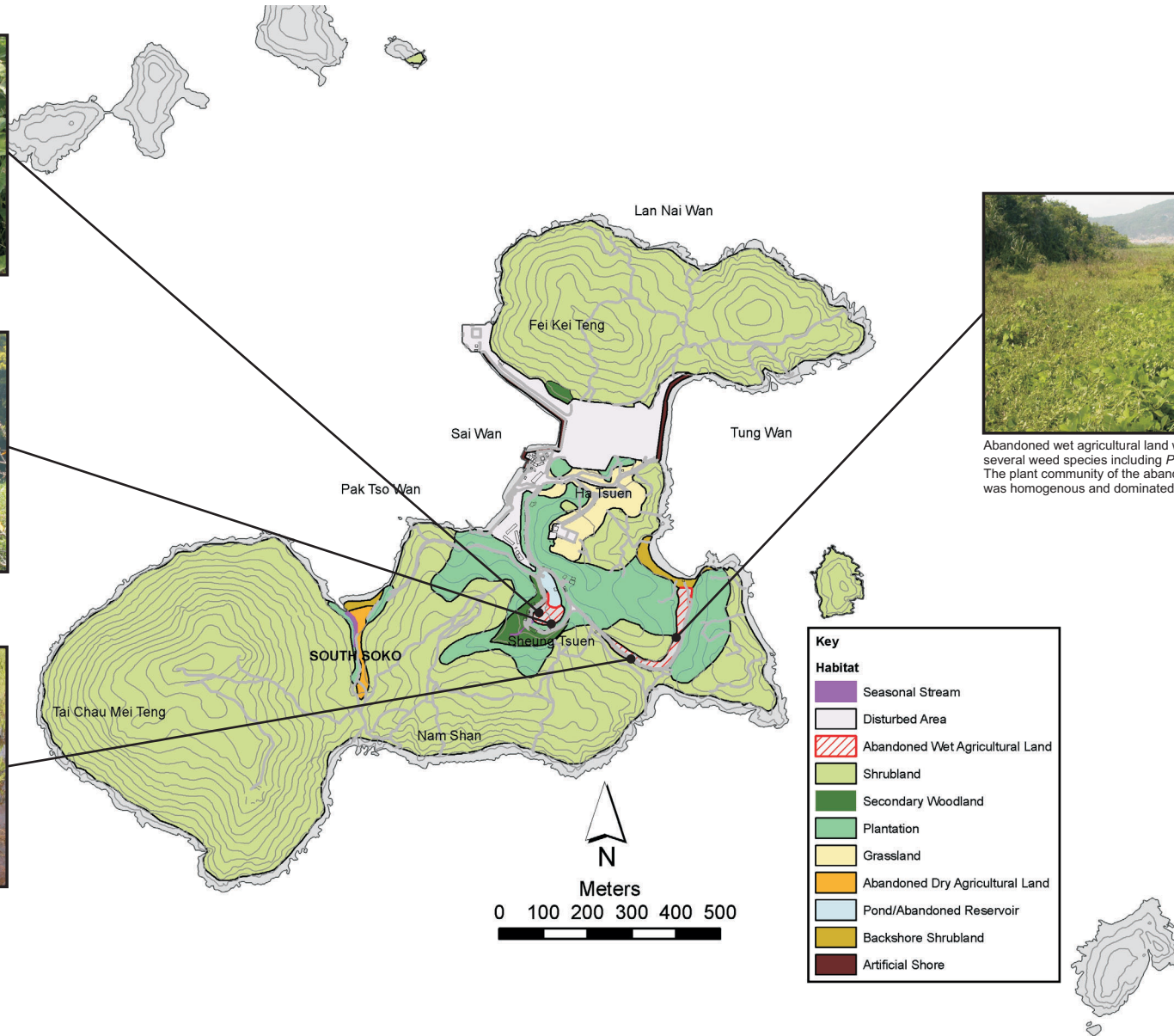
The cultivated plant Taro was one of the dominant plant species within the abandoned wet agricultural land.



*Phragmites communis* was one of the dominant plant species and occupied the northern part of the abandoned wet agricultural land.



A thin layer of water (approximately 2 to 3 cm) was found in the abandoned wet agricultural land during the wet season.



Abandoned wet agricultural land was naturally colonized by several weed species including *Pueraria* and *Wedelia* spp. The plant community of the abandoned wet agricultural land was homogenous and dominated by 3 to 4 plant species.

Figure 8.15

Photographic Records of Abandoned Wet Agricultural Land Habitat

dominated by *Wedelia chinensis*, *Ludwigia epilobioides* and *Colocasia esculenta*. The abandoned wet agricultural land located at the southeast of South Soko was situated in a valley with a concrete road (approximately 3 metres wide), and the wet vegetated area extended to cover most of the concrete road, in particular those areas frequently flooded (with a water layer of approximately 2 ~ 5 cm deep). The area coverage of the abandoned wet agricultural land varied with the amount of available water, as it was observed to have diminished during the dry season. The abandoned wet agricultural lands consisted of vegetation 0.5 to 1 meter in height and a total of 37 plant species were found during the surveys. All of the plant species are common or very common in Hong Kong. The floristic diversity and the structural complexity of the abandoned wet agricultural lands are low to moderate.

Most of the outlying islands, such as Green Island, Sunshine Island and Po Toi Island, do not have sufficient water supply or lowland areas and therefore lack wetland habitats such as abandoned wet agricultural land (Table 2e of Annex 8). In conclusion, the ecological importance of the abandoned wet agricultural land is low to moderate.

#### Abandoned Dry Agricultural Land

Abandoned dry agricultural land was found at the backshore of Pak Tso Wan. This habitat is similar to abandoned wet agricultural land in appearance, however, it does not have waterlogged soil and is rarely submerged. The photographic records of abandoned dry agricultural land are shown in Figure 8.16. Cultivation activities in this habitat ceased a long time ago. The abandoned dry agricultural land was dominated by weed species including *Mikania micrantha*, *Paederia scandens* and *Wedelia chinensis* 0.3 to 0.5 meters in height. A total of 27 plant species were found during the surveys and all of the plant species are common or very common in Hong Kong. The floristic diversity, structural complexity, and ecological value of the abandoned dry agricultural land habitat is low.

Abandoned agricultural land was also found on Lamma Island, North Soko and Pui O (Table 2f of Annex 8), but in relatively small areas. The floristic composition of abandoned agricultural land in South Soko and Pui O was very simple, and is similar to that found in similar habitats elsewhere in Hong Kong. In conclusion, the ecological importance of the abandoned agricultural land in South Soko is low.

#### Stream

Two natural seasonal streams, located near Sheung Tsuen and Pak Tso Wan, lie within the Study Area. Photographic records of the two seasonal streams are shown in Figure 8.17. The riparian vegetation communities of the stream near Sheung Tsuen were integrated with the surrounding secondary woodland and shrubland. The riparian vegetation communities of the natural stream near Pak Tso Wan were similar to the backshore shrubland. The beds of the streams were rocky with medium-sized boulders and very

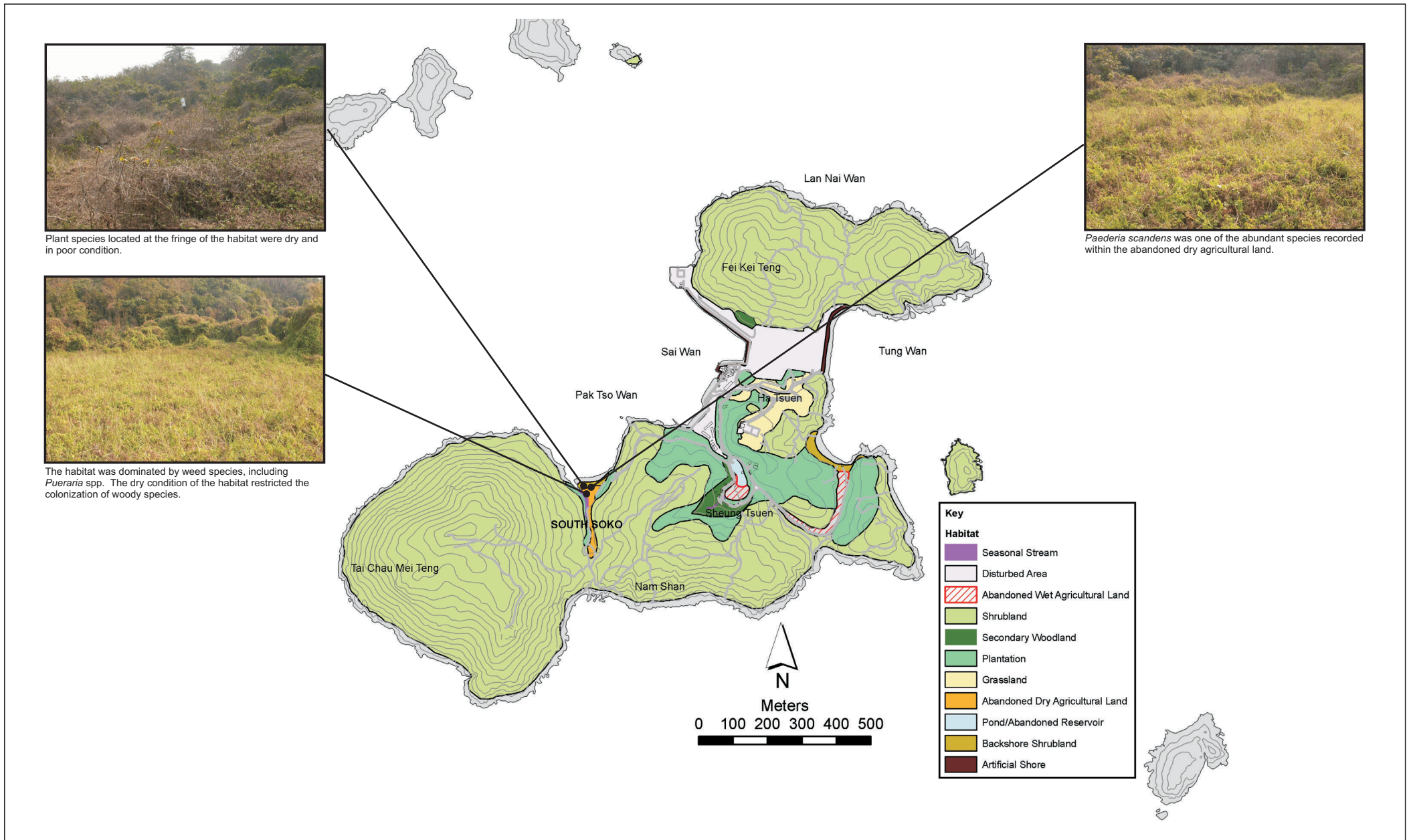


Figure 8.16

Photographic Records of Abandoned Dry Agricultural Land

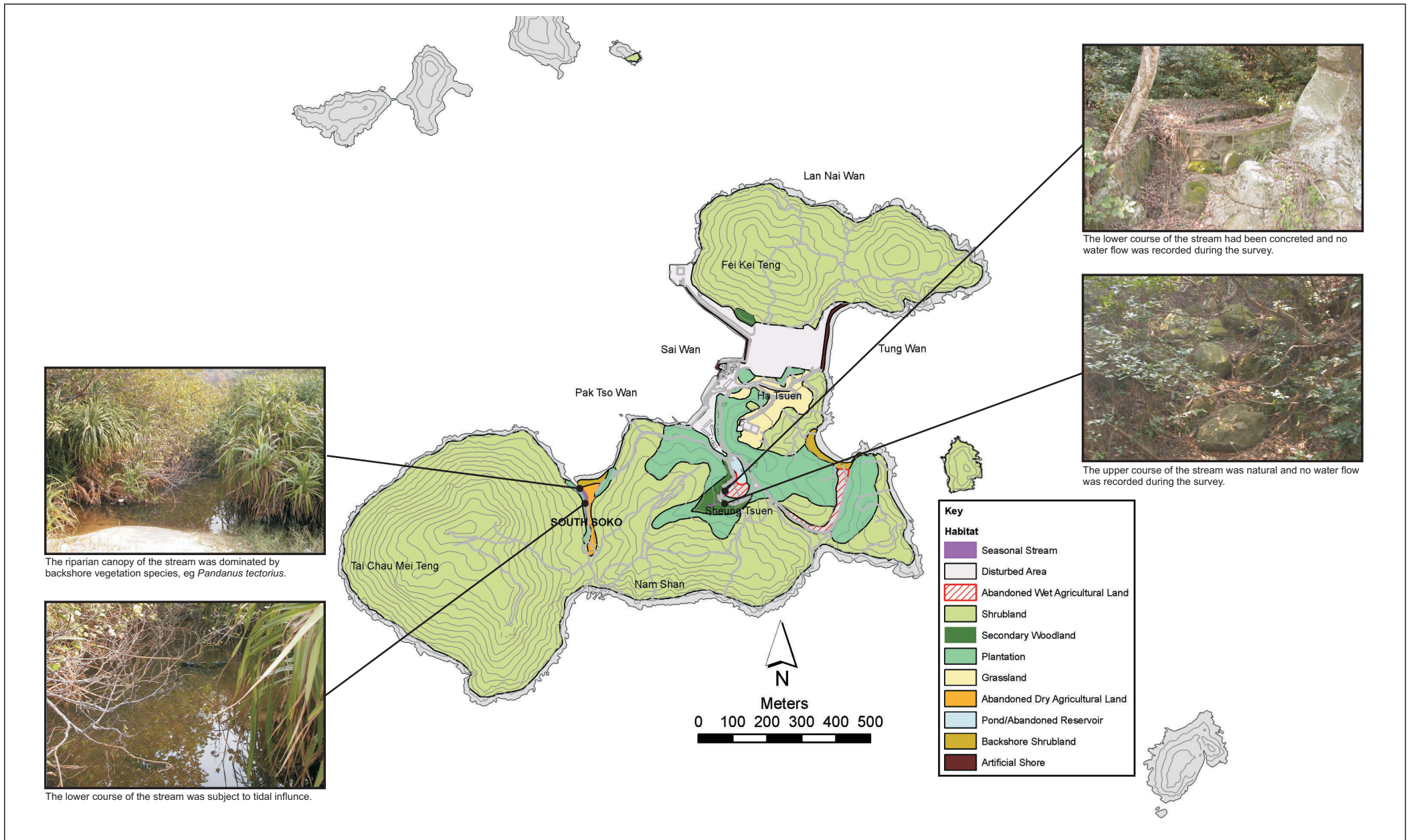


Figure 8.17

Photographic Records of Seasonal Stream Habitat



limited water flow even during the wet season. A total of 28 plant species were found along the stream and no rare or protected species were recorded. The structural complexity and floristic diversity of the natural seasonal streams are low.

Permanent stream habitat is not present in most of the outlying islands due to the geographical setting of the islands (i.e., small catchment and steep slope). The seasonal streams on South Soko were of much smaller scale compared to the permanent streams in Lantau which are larger and show a higher abundance and diversity of aquatic fauna (i.e., 20 fish species found in Pui O) (Table 2g of Annex 8). No stream fauna of conservation interest were found in the two streams, which indicate the low ecological importance of the streams located in South Soko.

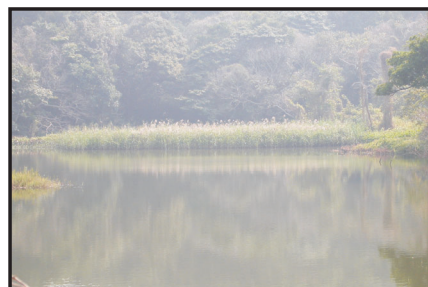
#### Abandoned Reservoir

An abandoned reservoir constructed for water storage during the 1980s (see Section 8.3), enclosed by plantation and secondary woodland, was found near Sheung Tsuen. The abandoned reservoir is elliptical in shape and not more than 2-3 meters deep. The bunds of the reservoir were lined with concrete and surrounded by a concrete road, partially degraded and covered by vegetation in certain areas. Due to the height difference between the abandoned reservoir and the concrete road, most of the bunds have vertical walls. The southernmost region of the abandoned reservoir was abandoned wet agricultural land covered by reeds and Taro. The bottom of the abandoned reservoir was mostly sandy, scattered with waste materials and rocks, including granite and broken concrete. During the latest survey in October 2005, it was found that the water level in the abandoned reservoir had dropped dramatically (from 1.5 meters to 0.5 meters). Photographic records of the abandoned reservoir are shown in Figure 8.18. The flora of abandoned reservoir consisted of seven plant species including *Polygonum* sp., *Pistia stratiotes*, *Lantana camara*, *Carex chinensis*, *Bidens pilosa* and *Phragmites australis*, which were mainly located on the bund and in the shallow water of the abandoned reservoir. All of the plant species are common or very common in inundated habitats in Hong Kong. The floristic diversity and the structural complexity of the abandoned reservoir is low.

The ecological significance of the abandoned reservoir was compared with similar habitat types on other outlying islands in the vicinity and south Lantau area (Table 2h of Annex 8). Ponds were recorded in Tai O, however they originated from fishponds and were subject to tidal influence (Table 2h of Annex 8). Both the ponds in Tai O and the abandoned reservoir in South Soko were of low floral and faunal diversity and low ecological importance. Neither abandoned reservoir nor similar pond type habitat has been recorded on other outlying islands.



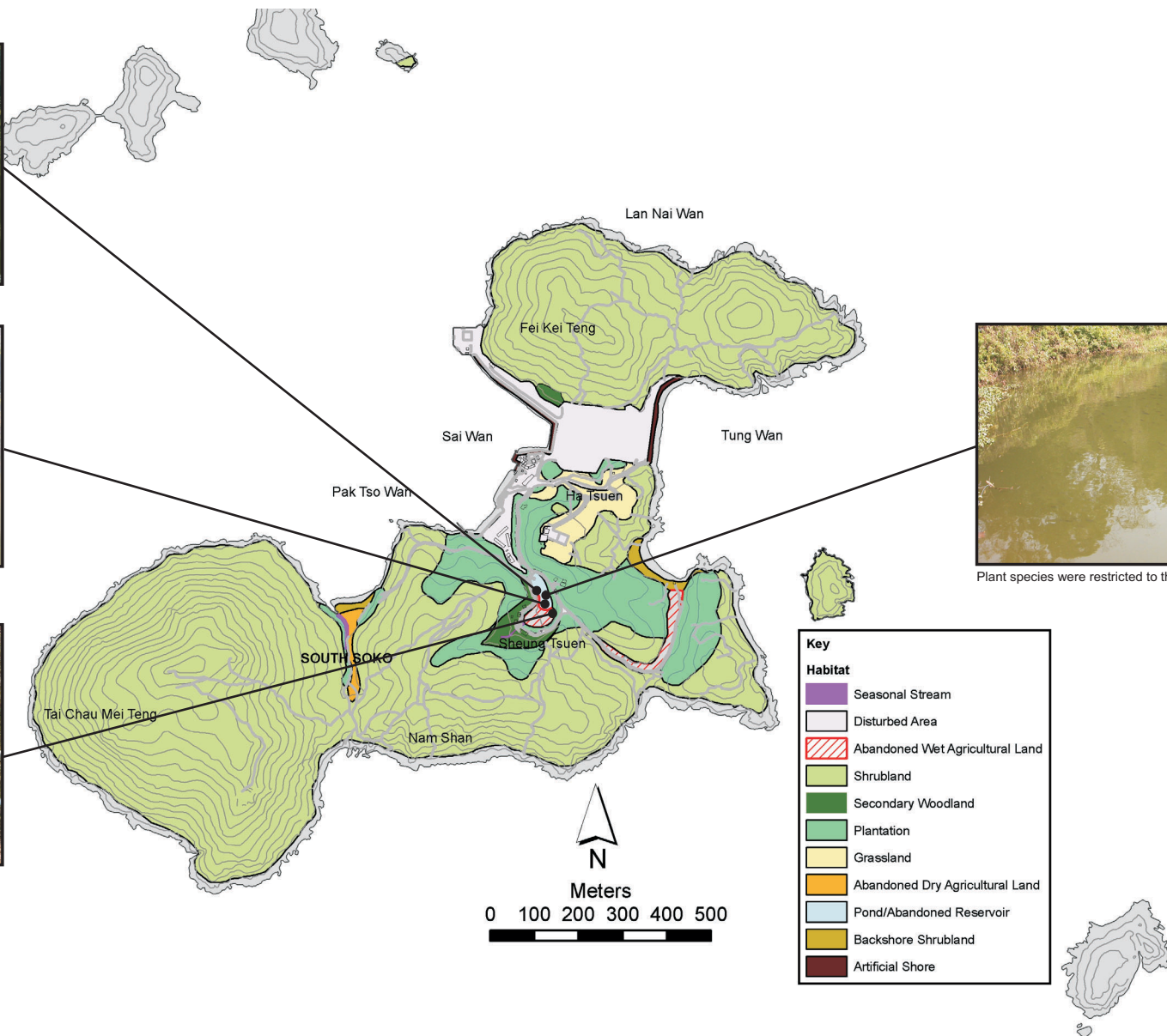
Overview of the abandoned reservoir



Abandoned wet agricultural land located at the fringe of the abandoned reservoir.



Concrete path surrounding the abandoned reservoir with a weed covering.



Plant species were restricted to the pond bund of the reservoir.

Figure 8.18

Photographic Records of Abandoned Reservoir Habitat

## Disturbed Area

Disturbed areas included the former Detention Centre and associated facilities located between Sai Wan and Tung Wan, abandoned villages such as Sheung Tsuen and concrete slopes. Photographic records of disturbed area are shown in *Figure 8.19*. The Detention Centre was constructed in the 1980s and operated for less than 10 years and was demolished after 1996. However, the helipad is frequently used by the Government Flying Service. Underground and surface stormwater drainage channels are present on the concrete platform of the former Detention Centre and these trap rainwater during the wet season. Forty one plant species were recorded within the disturbed area, which were mainly landscape plants such as *Araucaria heterophylla* and *Acalypha wilkesiana*. Other than landscape plants, weed species *Bidens pilosa* dominated the disturbed area and covered most of the areas adjacent to the beach at Sai Wan. All of the plant species are common or very common in Hong Kong. The floristic diversity and the structural complexity of the disturbed area are low.

All of the outlying islands and south Lantau are developed to a certain extent (*Table 2i of Annex 8*). Due to disturbance within the habitat, neither rare nor protected species were found. As such, the ecological importance of the disturbed area on South Soko is negligible.

## Wildlife

### Mammals

Three Feral Cats (*Felis catus*) and an individual of Buff-bellied Rat *Rattus tanezumi* were recorded during the survey. The Feral Cat was recorded in the developed area (near the pier) and sandy beach. The Buff-bellied Rat was recorded in the abandoned wet agricultural land and is a common mammal species in Hong Kong. The identified mammals were considered to have no conservation significance.

The lack of native mammal species in South Soko, which is similar to findings on other outlying islands, is most likely due to the isolation and limited size of the area. South Lantau has a variety of large-sized habitats and therefore can support higher number of mammal species.

### Birds

A total of 75 species of birds were identified during the surveys. 22 were recorded only during the dry season, 23 species were recorded only during wet season, and 28 species were recorded in both seasons within the Study Area. 54 species were recorded at the sampling points during point count surveys and an additional 21 species were recorded outside of the sampling points, but within the Study Area (*Table 3 of Annex 8*). The details of the bird data are shown in *Table 4 of Annex 8*. Relative abundance and species richness in each type of surveyed habitat, based on the results of the point

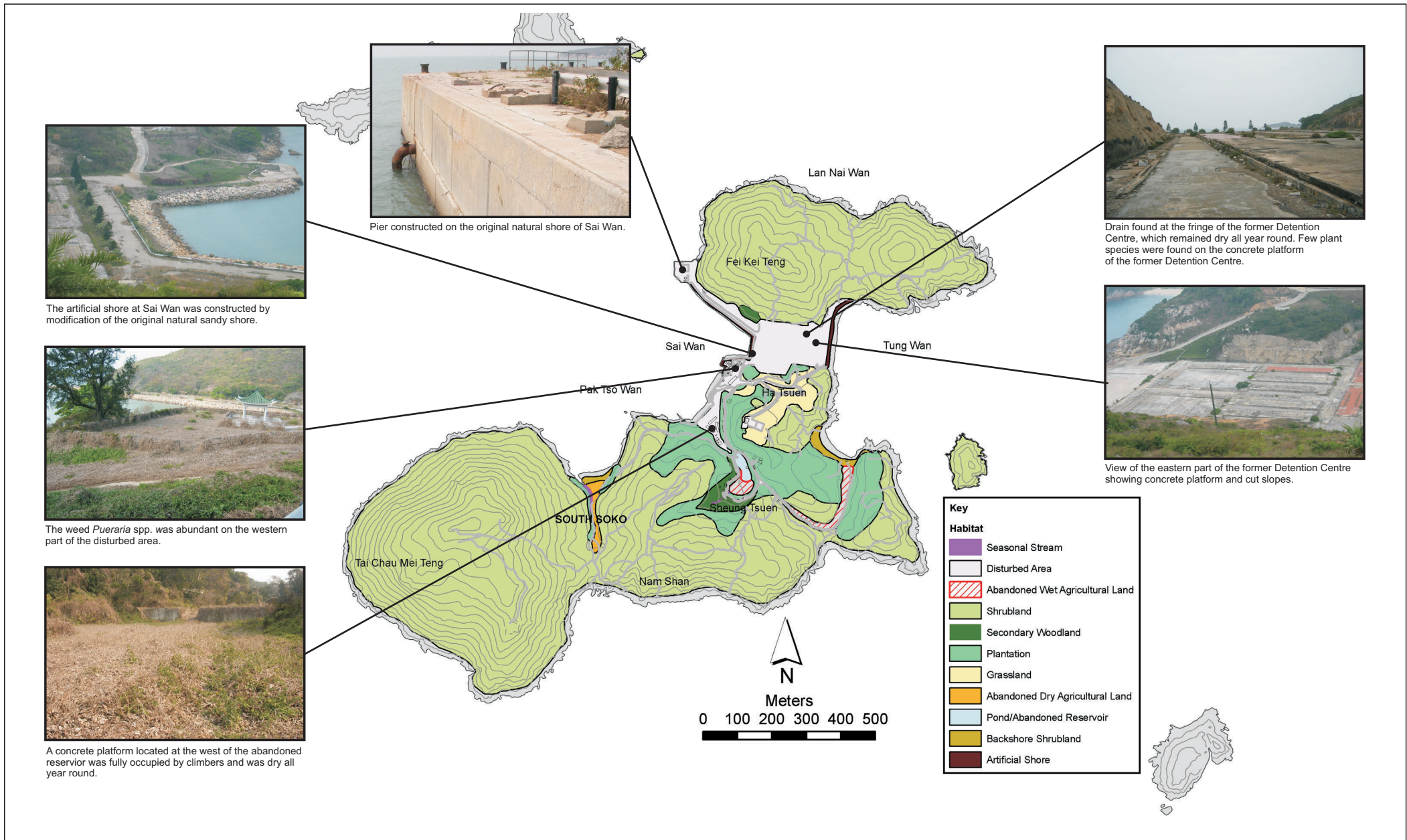


Figure 8.19

Photographic Records of Disturbed Area Habitat

count method, are presented in *Table 8.4*. The highest mean number of individuals (determined on a per hectare and per survey day basis) was recorded in the abandoned reservoir and disturbed area habitats. Stream habitat supported the highest mean number of bird species (per sampling point). The secondary woodland and abandoned reservoir habitats recorded the highest total number of bird species.

**Table 8.4** *Abundance and Species Richness of Birds within the South Soko Study Area*

	Season	W	P	Sh	G	AW	R	S	D	Total
Number of sampling points surveyed (each sampling point covered an area of ~ 0.28 ha)		1	5	5	2	4	1	2	2	22
Number of survey days	Dry	6	6	6	6	6	6	6	6	6
	Wet	6	6	6	6	6	6	6	6	6
Total number of individuals	Dry	14	119	124	9	39	35	20	247	607
	Wet	6	93	38	16	43	31	25	5	257
	Overall	20	212	162	25	82	66	45	252	864
Mean abundance (no. of birds per hectare per survey day)	Dry	8.3	14.2	14.8	2.7	5.8	20.8	5.9	73.5	16.5
	Wet	3.6	11.1	4.5	4.8	6.4	18.5	7.4	1.5	7.0
	Overall	5.9	12.6	19.3	3.7	6.1	19.6	6.5	37.5	11.7
Total No. of Species Recorded	Dry	10	26	9	5	12	15	11	10	48
	Wet	4	18	14	10	16	15	5	5	54
	Overall	12	34	18	13	21	26	15	13	54
Species richness (mean no. of species per sampling point)	Dry	1.7	0.9	0.3	0.4	0.5	2.5	0.9	0.8	1.3
	Wet	0.7	0.6	0.5	0.8	0.7	2.5	0.4	0.4	1.46
	Overall	1.0	1.1	0.3	1.1	0.9	4.3	1.3	1.1	0.73

Habitat: W = secondary woodland, P = exotic plantation; Sh = shrubland, G = grassland, AW = abandoned wet agricultural land, R = abandoned reservoir, S = stream, D = disturbed area.

Avifauna recorded at South Soko during the surveys showed a certain degree of seasonal variation. Bird abundance (total number of individuals) during the dry season was higher than in the wet season, particularly in the woodlands, shrubland, abandoned reservoir and disturbed area (*Table 8.4*). However, the number of bird individuals recorded in grassland, abandoned wet agricultural land and stream were higher in the wet season. The total number of bird species recorded in South Soko was slightly higher during the wet season than the dry season (*Table 4 of Annex 8*). Among the recorded species, there were 33 residents, 18 passage migrants, 6 summer visitors and 28 winter visitors (*Table 3 of Annex 8*). All of the residents are common or very common bird species.

Most of the bird species recorded are common and widespread in Hong Kong (such as Chinese Bulbul *Pycnonotus sinensis*) and generally of low conservation importance (eg Crested Myna *Acridotheres cristatellus*). Of the 75 bird species recorded within the Study Area, there were 11 species of conservation interest

according to Fellowes 2002 <sup>(1)</sup> including Great Frigatebird *Fregata minor*, Black Kite *Milvus lineatus*, Osprey *Pandion haliaetus*, White-bellied Sea Eagle *Haliaeetus leucogaster*, Crested Serpent Eagle *Spilornis cheela*, Eurasian Hobby *Falco subbuteo*, Peregrine Falcon *Falco peregrinus*, Pacific Reef Egret *Egretta sacra*, Common Buzzard *Buteo buteo*, Crested Goshawk *Accipiter trivirgatus* and Greater Coucal *Centropus sinensis*. The locations of the recorded rare/ endangered species, except Great Frigatebird, Eurasian Hobby, Crested Goshawk and Black Kite, are shown on *Figure 8.20*.

The Great Frigatebird is an “oceanic” bird and occurs worldwide in tropical oceans and mainly in the Indo-Pacific area, but locally are rare. There have been three records of Great Frigatebird reported in Hong Kong, all juveniles or immature and all between mid April and late May <sup>(2)</sup>. An immature Great Frigatebird was recorded passing overhead on South Soko at a height of several hundred meters. The Great Frigatebird did not utilise the habitats within the Study Area.

The Black Kite is a very widespread and common species in Hong Kong and its distribution pattern and density is presented in *Figure 1* of *Annex 8*. It is conspicuous in the urban area and over Victoria Harbour all year around. It is more numerous in winter than in summer and the number peaks in December and January <sup>(3)</sup>. They are found in a wide variety of coastal and inland habitats, including small islands, sea-coasts, intertidal mudflat, fish ponds, reservoirs, landfills and grassy hillsides at all altitudes. It is protected in China and listed as a Class 2 Protected Animal of the PRC and in *Appendix 2* of CITES. Black Kites were only recorded soaring in the sky during the surveys, the exact locations of the bird cannot therefore be shown in *Figure 8.20*. Black Kites usually forage over a large area and South Soko is considered to be part of their foraging areas.

The Pacific Reef Egret occurs throughout its range in eastern and southern Asia. It is resident in China’s Coastal provinces from Zhejiang south to Taiwan, Guangdong and Hainan <sup>(4)</sup>, and is widespread along the coastline in Hong Kong, being mainly found along the rocky coastlines in southern areas such as Cape d’ Aguilar and Chung Hom Kok and along the coast of outlying islands such as the Soko Islands, Lamma, Po Toi Waglan Island and Bluff Island. Records of Pacific Reef Egret in Stonecutters Island, Mai Po, Tai Po,

- (1) Fellowes, J.R. *et.al.* (2002). Wild Animals to Watch: Terrestrial and Freshwater Fauna of Conservation Concern in Hong Kong. *Memoirs of the Hong Kong Natural History Society* 25: 123-160 etc.
- (2) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (3) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (4) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.

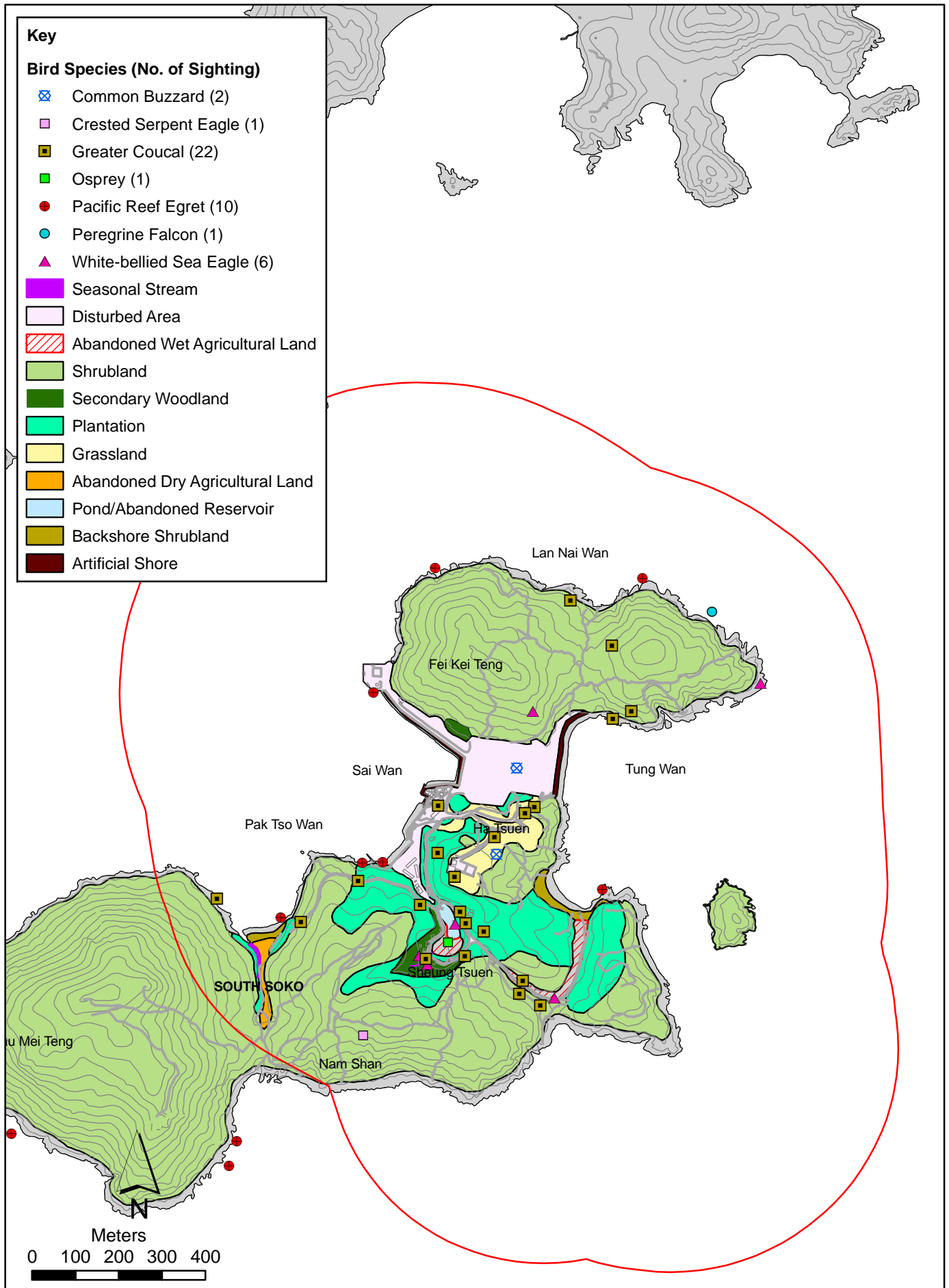


FIGURE 8.20

Location of Bird Species Recorded within the Study Area  
 (February to July 2004, October 2005 to January 2006)  
 (Not including Black Kite, Eurasian Hobby  
 Crested Goshawk and Great Frigatebird)

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Environmental  
 Resources  
 Management



and Tung Chung have been made at different periods<sup>(1)</sup>. The distribution pattern and density of Pacific Reef Egrets in Hong Kong SAR is presented in *Figure 8.1 of Annex 8*. They were recorded either flying or perching on rocky shores on the north of the South Soko during the surveys.

The Crested Serpent Eagle occurs throughout much of the oriental region from India to eastern China and south to the Sunda Islands. It has been noted throughout the year in Guangdong and is considered a forest bird species in southern China; in Hong Kong, it is an uncommon resident and also a passage migrant, and is usually found in New Territories. The Crested Serpent Eagle is listed in *Appendix 2* of CITES and also as a *Class 2* Protected Animal of PRC. Breeding and nesting activities have not been recorded in Hong Kong. Its distribution pattern and density in the Hong Kong SAR is presented in *Figure 2 of Annex 8*. A single Crested Serpent Eagle was found (i.e. one sighting record) perching on a rock on the hillside of Nam Shan during the survey. It is considered that South Soko is a minor foraging site for the species, as it is a passage migrant and usually forages over a large area.

The Greater Coucal is a *Class 2* Protected Animal in the PRC <sup>(2)</sup>. However, it occupies many types of habitats in Hong Kong <sup>(3)</sup>, and is a common resident. It is frequently found in grasslands, mangroves, marshes, agricultural lands with scattered trees and bushes, open canopy shrubland, fung shui woods and gardens, and has been noted foraging in refuse. The distribution pattern and density of Greater Coucal in Hong Kong SAR is presented in *Figure 2 of Annex 8*. It was found perching in the plantation and secondary woodland at Sheung Tsuen, grassland at Ha Tsuen and shrubland at Fei Kei Teng during the surveys.

The Eurasian Hobby occurs in southern China and is an uncommon passage migrant in mid winter and a scarce summer visitor in Hong Kong. The Eurasian Hobby is listed in *Appendix 2* of CITES and is also a *Class 2* Protected Animal of PRC <sup>(4)</sup>. It is widespread and usually occurs near Deep Bay, but favours open countryside. This species is mainly found over abandoned wet agricultural lands, agricultural land and lightly wooded hills. The distribution pattern and density of the species in the Hong Kong SAR is presented in *Figure 3 of Annex 8*. The Eurasian Hobby was found (only one sighting record) flying past the former Detention Centre during the surveys. It is considered that South Soko is a minor foraging site of the Eurasian Hobby as it is a passage migrant and usually forages over a large area.

- (1) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (2) Viney, C., Phillipps, K., and Lam, C.Y. (1996). *Birds of Hong Kong and South China*. Government Printer, Hong Kong.
- (3) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.
- (4) J. MacKinnon, K. Phillipps, and He F. Q (2000). *Field Guide to the Birds of China*. Oxford Univerisyt Press.



The Peregrine Falcon is listed in *Appendix 1* of CITES <sup>(1)</sup>. It is resident in Hong Kong, widespread and even seen in urban areas. The distribution pattern and density of the Peregrine Falcon in Hong Kong SAR is presented in *Figure 3* of *Annex 8*. It was found (only one sighting record) flying around the rocky shore at the north of South Soko during the surveys. Taking into account the widespread distribution pattern of Peregrine Falcon in Hong Kong, South Soko seems to be a minor foraging site of the species.

The White-bellied Sea Eagle is resident in Guangdong and southern Fujian and occasionally occurs in Jiangsu and Hainan. It is an uncommon resident in Hong Kong in coastal areas and offshore islands. The White-bellied Sea Eagle is listed as a rare species in the China Red Data Book, Class II protected species in PRC and CITES *Appendix II* <sup>(2)</sup>. They are mostly found in rocky coastlines but are also seen over reservoirs and hills close to the sea. The most recent comprehensive studies undertaken by AFCD (Tsim *et al* <sup>(3)</sup>) reported that there were eight breeding sites in Hong Kong, including Pa Tau Kwu in Lantau Island, Green Island and Wong Ma Kok in Hong Kong Island, Stonecutters Island in Kowloon, Yeung Chau, Tai Ngam Hau, Tsim Chau and Sham Chung in Sai Kung (*Figure 4* of *Annex 8*). An immature (~2 years old) White-bellied Sea Eagle was observed (a total of 3 sighting records) occasionally soaring in the sky and perching in the shrubland at the north of South Soko during the survey. The White-bellied Sea Eagle usually forages over a large area and South Soko is considered to be one of its foraging areas.

The Osprey has been recorded as a migrant along the east coast of China. A locally uncommon winter visitor in most of Hong Kong, although in Deep Bay and Mai Po it is recorded throughout the year with most records in winter. It is listed in *Appendix 2* of CITES and also a *Class 2* Protected Animal of PRC. There is no suggestion of breeding activity having ever occurred in Hong Kong. The Osprey was found perching (only one sighting record) in the abandoned wet agricultural land near Sheung Tsuen during the surveys. South Soko is considered to be a minor foraging site of the Osprey as it is a winter visitor and usually forages over a large area.

The Crested Goshawk has been recorded as a resident in China from Sichuan and Yunnan east to Guangxi and Hainan, and in Taiwan. It is considered as one of the characteristic forest species of southeast China. First identified in Hong Kong at Pok Fu Lam in 1983<sup>(4)</sup>, it is a locally uncommon resident widespread in the forest and mature woodlands of the New Territories in Hong Kong. The species is listed in *Appendix 2* of CITES and also *Class 2*

(1) J. MacKinnon, K. Phillipps, and He F. Q (2000). *Field Guide to the Birds of China*. Oxford University Press.

(2) J. MacKinnon, K. Phillipps, and He F. Q (2000). *Field Guide to the Birds of China*. Oxford University Press.

(3) Tsim ST, Lee W H, Cheung C S, Chow K L, Ma Y N and Liu K Y (2003). The Population and breeding ecology of White-bellied Seaeagles in Hong Kong. *Hong Kong Biodiversity Issue No. 5* August 2003.

(4) Carey, G.J., Chalmers, M.L., Diskin, D.A., Kennerley, P.R., Leader, P.J., Leven, M.R., Lewthwaite, R.W., Melville, D.S., Turnbull, M., and Young, L. (2001). *The Avifauna of Hong Kong*. Hong Kong Bird Watching Society, Hong Kong.

Protected Animal of PRC <sup>(1)</sup>. The Crested Goshawk was recorded flying over the abandoned reservoir during the dry season surveys. Since Crested Goshawk is widespread in the New Territories and the Deep Bay areas, South Soko is considered to be a minor foraging site of the Crested Goshawk.

The Common Buzzard is a common winter visitor and scarce passage migrant in Hong Kong. It has been reported annually since 1958, mainly in the Mai Po and Deep Bay Areas, although it has been reported from a wide variety of habitats in the New Territories including marshes, fish ponds, active or abandoned agricultural land, woodlands, grassland, shrubland or even urban areas. The Common Buzzard is listed in *Appendix 2* of CITES and also *Class 2* Protected Animal of PRC <sup>(2)</sup>. It was recorded flying over the open areas on South Soko such as the disturbed area and grassland during the surveys. Since the Common Buzzard is widespread in the New Territories and Deep Bay area, South Soko is considered to be a minor foraging site.

Juveniles of three bird species were recorded within the Study Area (*Table 8.5*). Juvenile Chinese Bulbul, Greater Coucal and Black Drongo were recorded in the plantation, abandoned wet agricultural land, shrubland and beside the abandoned reservoir respectively. The Chinese Bulbul and Black Drongo are common and widespread in Hong Kong while the Greater Coucal is a *Class 2* Protected Animal in the PRC, but is a common resident in Hong Kong.

**Table 8.5** *Bird Species Showing Breeding Activities Within the South Soko Study Area*

Common Name	Habitat Type Recorded	Observation
Chinese Bulbul <i>Pycnonotus sinensis</i>	Plantation, shrubland, abandoned wet agricultural land and stream	Juveniles recorded
Black Drongo <i>Dicrurus macrocercus</i>	Tree next to the abandoned reservoir	Juveniles recorded
Greater Coucal <i>Centropus sinensis</i>	Plantation	Juveniles recorded

Overall, the species diversity of birds on South Soko is considered to be moderate, taking into account of the survey effort and the size of surveyed areas, compared with other outlying islands and south Lantau (*Table 5* of *Annex 8*).

#### Invertebrates

##### Butterfly

A total of 58 species of butterfly were recorded within the Study Area during the quantitative surveys (*Tables 6a* and *6b* of *Annex 8*). Eleven species were recorded qualitatively outside sampling transects and points but within the Study Area. All the butterfly species recorded (both quantitatively and

(1) J. MacKinnon, K. Phillipps, and He F. Q (2000). *Field Guide to the Birds of China*. Oxford Univerisyt Press.

(2) J. MacKinnon, K. Phillipps, and He F. Q (2000). *Field Guide to the Birds of China*. Oxford Univerisyt Press.

qualitatively) are shown in Table 6c of Annex 8. Fifteen uncommon and two rare butterfly species were recorded. Their distribution and favoured food plants are listed in Table 8.6. Uncommon species included Banded Awl *Hasora chromus*, Long-banded Silverline *Spindasis lohita*, Three-spot Grass Yellow *Eurema blanda*, Plain Cupid *Chilades pandava*, Common Nawab *Polyura athamas*, Yellow Pansy *Junonia hierta*, White Commodore *Parasarpa dudu*, Striped Blue Crow *Euploea mulciber*, Bush Hopper *Ampittia dioscorides*, Formosan Swift *Borbo cinnara*, Indian Palm Bob *Suastus gremius*, Blue Pansy *Junonia orithya*, Tree Flitter *Hyarotis adrastus*, Conjoined Swift *Pelopidas conjunctus* and Indian Fritillary *Argyreus hyperbius*. The rare butterfly species are Red Lacewing *Cethosia bibles* and Dark Grass Blue *Zizeeria karsandra*. Locations of these species recorded within the Study Area are shown in Figure 8.21.

**Table 8.6** *Food Plants of the Rare and Uncommon Butterflies Recorded within the South Soko Study Area*

Common Name	Species Name	Food Plant	Habitat Recorded
Banded Awl	<i>Hasora chromus</i>	<i>Pongamia pinnata</i>	Plantation and Abandoned wet agricultural land
Long-banded Silverline	<i>Spindasis lohita</i>	<i>Crematogaster</i> sp.	plantation
Three-spot Grass Yellow	<i>Eurema blanda</i>	Larvae feed on a variety of <i>Caesalpiniaceae</i> and <i>Mimosaceae</i> , including <i>Delonix regia</i> and <i>Albizia lebbek</i>	Plantation
Plain Cupid	<i>Chilades pandava</i>	<i>Cycas circinalis</i>	Abandoned wet agricultural land
Common Nawab	<i>Polyura athamas</i>	<i>Acacia sinulate</i> , <i>Albizia corniculata</i> , <i>A. lebbek</i> , <i>Archidendron clypearia</i> , <i>Leucaena leucocephala</i> , <i>Peltophorum pterocarpum</i>	Plantation
Yellow Pansy	<i>Junonia hierta</i>	<i>Barleria cristata</i>	Plantation and abandoned wet agricultural land
White Commodore	<i>Parasarpa dudu</i>	<i>Lonicera confusa</i> , <i>L. macrantha</i>	Disturbed area
Striped Blue Crow	<i>Euploea mulciber</i>	<i>Toxocarpus wightianus</i> , <i>Nerium indicum</i>	Shrubland, plantation and Secondary woodland
Bush Hopper	<i>Ampittia dioscorides</i>	<i>Oryza sativa</i> , <i>Leersia hexandra</i>	Abandoned wet agricultural land
Formosan Swift	<i>Borbo cinnara</i>	<i>Apluda mutica</i> , <i>Capillipedium parviflorum</i> , <i>Digitaria setigera</i> , <i>Paspalum conjugatum</i> and <i>Setaria palmifolia</i>	Abandoned wet agricultural land

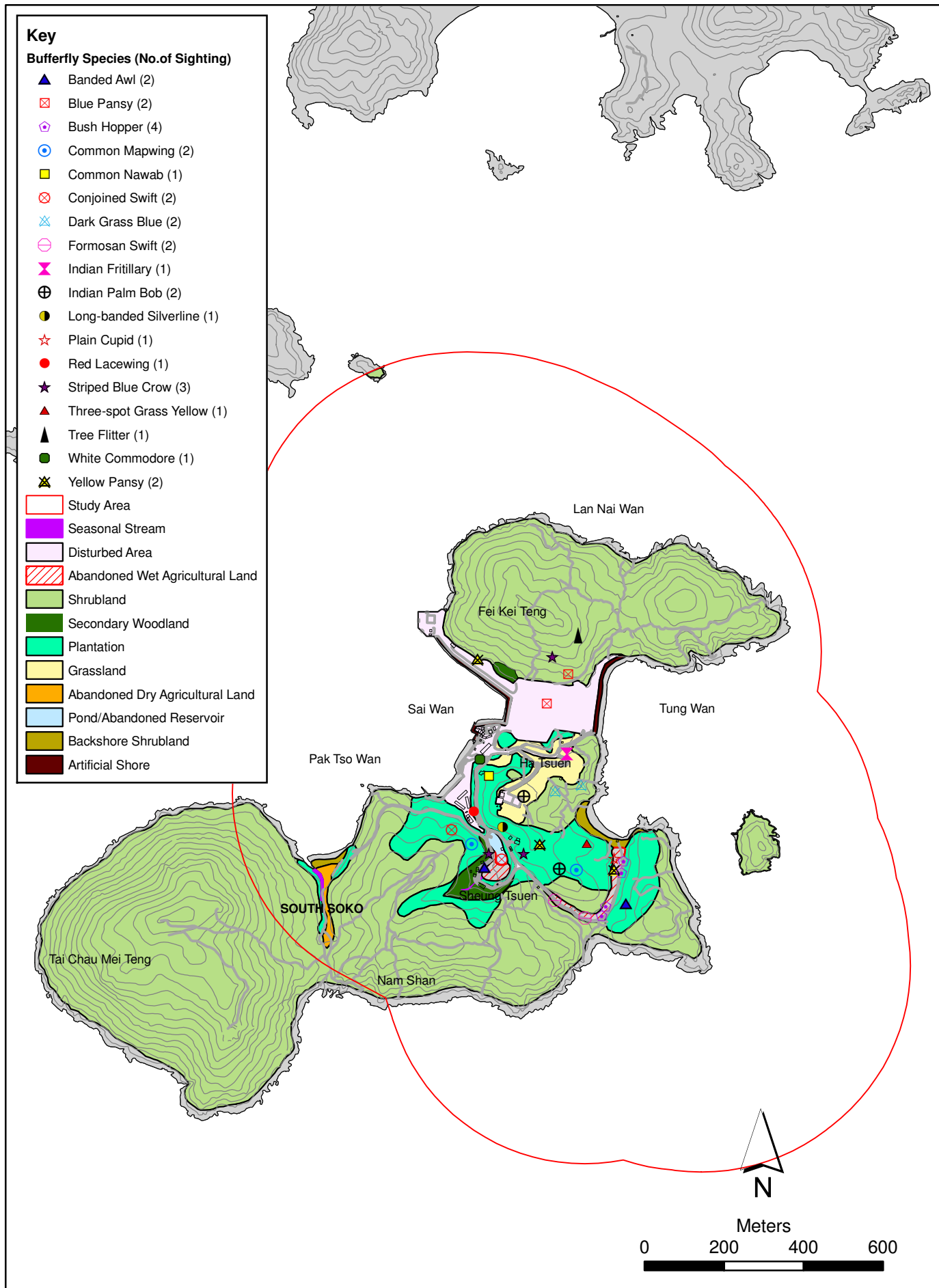


FIGURE 8.21

Location of Butterfly Species Recorded within the Study Area  
 (Recorded in February to July 2004 and  
 October 2005 to January 2006)

Environmental  
 Resources  
 Management



Common Name	Species Name	Food Plant	Habitat Recorded
Indian Palm Bob	<i>Suastus gremius</i>	<i>Phoenix hanceana</i> , <i>P. roebelinii</i> , <i>Rhapis excelsa</i>	Grassland and plantation
Dark Grass Blue	<i>Zizeeria karsandra</i>	<i>Amaranthus spinosus</i> , <i>A. tricolour</i> and <i>A. viridis</i>	shrubland
Blue Pansy	<i>Junonia orithya</i>	<i>Antirrhinum majus</i> , <i>Striga lutea</i> , <i>Justicia procumbens</i> and <i>Lepidagathis incurva</i>	Disturbed area, shrubland
Tree Flitter	<i>Hyarotis adrastus</i>	<i>Calamus tetradactylus</i> , <i>Chrysalidocarpus lutescens</i> , and <i>Phoenix roehelenii</i>	Shrubland
Red Lacewing	<i>Cethosia biblis</i>	<i>Passiflora cochinchinensis</i>	Disturbed area
Conjoined Swift	<i>Pelopidas conjunctus</i>	<i>Miscanthus sinensis</i>	Plantation and abandoned reservoir
Indian Fritillary	<i>Argyreus hyperbius</i>	<i>Viola betonicifolia</i> and <i>V. odorata</i>	Grassland

Most of the uncommon butterfly species were found at the fringe of the plantation or on the abandoned wet agricultural land located at the middle of South Soko.

Butterfly abundance in plantation habitat was considered high, medium in the abandoned wet agricultural land, at abandoned reservoir and the secondary woodland, and low in other types of habitats (Table 8.7). Species richness was considered medium to high in the plantation, medium in abandoned wet agricultural land, shrubland and abandoned reservoir, and low in other types of habitats.

Table 8.7 Mean Abundance of Butterflies Recorded at South Soko

	Season	W	P	Sh	AW	AD	St	R	D
No. of individual/ha	Dry	0	7.1	4.2	3.0	2.4	0	2.4	0
	Wet	32.1	73.3	26.2	40.5	7.1	1.8	42.9	2.4
No. of species	Dry	0	8	2	4	3	0	4	0
	Wet	6	35	20	24	11	2	22	3
No. of uncommon/rare species		1	4	11	0	2	1	0	2

Habitat: AW = abandoned wet agricultural land, W = Secondary woodland, P = plantation, S = shrubland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, St = stream

Both of the abundance and species richness of butterflies recorded in South Soko were higher during the wet season. The abundance of butterflies was about 10 times higher in the wet season than in the dry season and species numbers in the wet and dry seasons were 56 and 11 respectively (Tables 6a and 6b of Annex 8). The species diversity of butterflies on South Soko is considered to be moderate, taking into account the survey effort and the size of surveyed areas, compared with other outlying islands and south Lantau (Table 7 of Annex 8).

Dragonfly

Eighteen species of dragonfly were recorded in different habitats at South Soko during the surveys (Table 8 of Annex 8). No additional species were recorded during qualitative surveys. All of the dragonflies were recorded in South Soko during the wet season.

Dragonfly abundance was considered medium to high in abandoned wet agricultural land, medium in abandoned reservoir and stream, and low in plantation, abandoned dry agricultural land and disturbed area. No dragonflies were recorded in shrubland and secondary woodland during the surveys (Table 8.8). Dragonfly species richness was considered to be low in all habitats recorded in the Study Area.

Table 8.8 Mean Abundance of Dragonfly Recorded at South Soko

	Season	W	P	Sh	AW	AD	St	R	D
No. of individual/ ha	Dry	0	0	0	0	0	0	0	0
	Wet	0	6.0	0	51.8	6.0	19.6	23.2	4.8
No. of species	Dry	0	0	0	0	0	0	0	0
	Wet	0	6	0	11	6	5	7	7

Habitat: AW = abandoned wet agricultural land, W = Secondary woodland, P = Plantation, S = shrubland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, St = stream.

Except for the Greater Blue Skimmer *Orthetrum melania*, Common Evening Hawker *Anaciaeschna jaspidea* and Eastern Lilysquatter *Cercion melanotum*, all of the recorded species are common and widespread in Hong Kong <sup>(1)</sup>. The details of the Greater Blue Skimmer, Common Evening Hawker and Eastern Lilysquatter are listed as follows:

- Greater Blue Skimmer is uncommon in Hong Kong and has been recorded in Black's Link (Hong Kong Island), Bride's Pool, Kang Mun Tsui, Pok Fu Lam Reservoir, Sam A Tsuen, Sha Lo Tung and Tai Lam Country Park <sup>(2)</sup> <sup>(3)</sup>.
- Common Evening Hawker is uncommon in Hong Kong and has been recorded in Long Valley, Mai Po Marshes, Sha Lo Tung and Tai Po Kau <sup>(4)</sup>.
- Eastern Lilysquatter is uncommon in Hong Kong and has been recorded in Tin Shui Wai (Hong Kong Wetland Park), Lai Chi Wo, Luk Keng and Shek Kwu Chau.

The uncommon dragonfly Greater Blue Skimmer was recorded in grassland and near to the abandoned buildings of Ha Tsuen. The Common Evening

(1) Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong.

(2) Wilson, K.D.P. (1995). *Hong Kong Dragonflies*. Urban Council, Hong Kong.

(3) Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong.

(4) Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Agriculture, Fisheries and Conservation Department, Friends of Country Park and Cosmos Book Ltd. Hong Kong.

Hawker was recorded at the sandy shore (Figure 8.22). The Eastern Lilysquatter was recorded on the eastern bank of the abandoned reservoir (information provided by AFCD, Figure 8.22).

The species diversity of dragonfly on South Soko is considered to be low to moderate when compared with that of south Lantau (Table 9 of Annex 8).

#### Herpetofauna

Six amphibian species, including Gunther's Frog *Rana guentheri*, Three-striped Grass Frog *Rana microdactyla*, Brown Tree Frog *Polypedates megacephalus*, Asiatic Painted Frog *Kaloula pulchra*, Ornate Pigmy Frog *Microhyla ornata* and Marbled Pigmy Frog *Microhyla pulchra*, were recorded within the Study Area during the surveys. All of the recorded species are common and widespread in Hong Kong (1).

Eight species of reptile were recorded within the Study Area during the surveys; Bowring's Gecko *Hemidactylus bowringii*, Reeves' Smooth Skink *Scincella reevesii*, Common Rat Snake *Ptyas mucosus*, Checkered Keelback *Xenochrophis piscator*, Chinese Gecko *Gekko chinensis*, Common Blind Snake *Ramphotyphlops braminus*, Bamboo Snake *Trimeresurus albolabris*, Plumbeous Water Snake *Enhydris plumbea*. All of recorded reptile species are common in Hong Kong with the exception of Plumbeous Water Snake, which is uncommon. The Common Rat Snake, however, is listed in Appendix 2 of CITES and considered of potential global concern (2). It can be found in a great variety of habitats and locations in Hong Kong, and is less common in densely wooded areas and mountain grassland (3). A Common Rat Snake was recorded in the abandoned wet agricultural lands located at the southeast of South Soko during the wet season survey. The Plumbeous Water Snake was recorded in the drains of the disturbed area during the wet season survey. The Plumbeous Water Snake is an uncommon reptile species (4), that may be found in a great variety of habitats in Hong Kong, and less commonly in Lantau, Cheung Chau, Peng Chau, Lamma, Ping Chau and Shek Kwu Chau (5). The preferred habitats of the Plumbeous Water Snake are stagnant, muddy water, marshes, shallow ponds, wet cultivated fields or slow-flowing streams in lowland region, which were located in the vicinity of the developed area. Therefore the developed area is not preferred habitat for the Plumbeous Water Snake and the record could be regarded as an atypical occurrence. The

- (1) Lau, M.W.N. and D. Dudgeon, (1999). Composition and distribution of Hong Kong Amphibian fauna. *Memoirs of the Hong Kong Natural History Society* 22: 1-80.
- (2) Fellowes, J. R., Lau, M. W. N., Dudgeon, D., Reels, G. T., Ades, G. W. J., Carey, G. J., Chan, B. P. L., Kendrick, R. C., Lee, K. S., Leven, M. R., Wilson, K. D. P. and Yu, Y. T. (2002). Wild Animal to Watch: Terrestrial and Freshwater and Freshwater Fauna of Conservation Concern in Hong Kong. *Memoirs of Hong Kong Natural History Society* 25: 123-160.
- (3) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.
- (4) Chen S K, Cheung K. S., Ho CY, Lam F N, Tang W.S. (2006). *A Field Guide to the Venomous Land Snakes of Hong Kong* Friends of the Country Parks
- (5) Karsen, S. J., Lau, M. W. N. and Bogadek, A. (1998). *Hong Kong Amphibians and Reptiles*. Urban Council, Hong Kong.

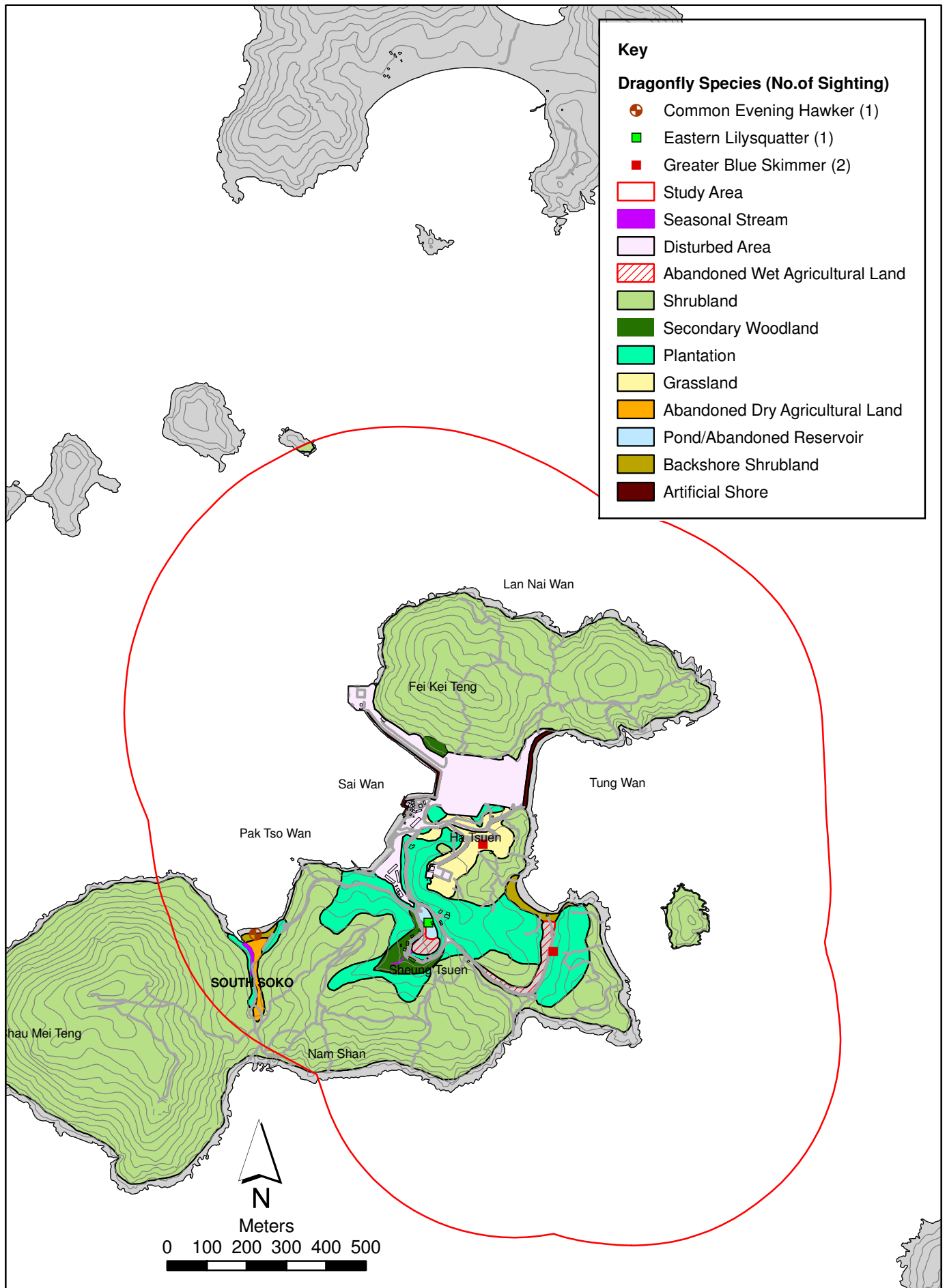


FIGURE 8.22

Location of Dragonfly Species Recorded within the Study Area  
(Recorded in February to July 2004 and  
October 2005 to January 2006)

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Environmental  
Resources  
Management





locations of Common Rat Snake and Plumbeous Water Snake recorded within the Study Area are shown in *Figure 8.23*.

The species diversity of herpetofauna on South Soko is considered to be moderate taking into account the survey effort and the size of surveyed areas, compared with other outlying islands and south Lantau (*Table 10 of Annex 8*).

#### Aquatic Fauna

No aquatic fauna were recorded in the streams during the surveys. The freshwater snail *Melanooides tuberculata* was recorded in the abandoned wet agricultural land located at south-east of South Soko.

A total of nine freshwater fish species, including Carp *Cyprinus carpio*, Chinese Catfish *Clarias fuscus*, Catfish *Clarias* sp., Mosquito Fish *Gambusia affinis*, Tilapia *Oreochromis niloticus*, Small Snakehead *Channa asiatica*, Mullet sp. *Chelon* sp., Spotted Scat *Scatophagus argus*, Crescent-banded Grunter *Terapon jarbua* and one shrimp (*Macrobrachium* sp.) were recorded in the abandoned reservoir. All of the recorded fish species are introduced exotic species. The survey results are presented in *Table 8.9*.

**Table 8.9** *Fish Species and Individuals Recorded from the Abandoned Reservoir at South Soko*

Scientific Name	Status	Protection Status	Origin	Abundance
Carp <i>Cyprinus carpio</i>	Obs.	Common	Exotic to Hong Kong	+
Chinese Catfish <i>Clarias fuscus</i>	Obs.	Common	Exotic to Hong Kong	++
Catfish <i>Clarias</i> sp.	Obs.	Common	Exotic to China	+
Mosquito Fish <i>Gambusia affinis affinis</i>	Cap.	Common	Exotic to China	+++
Tilapia <i>Oreochromis niloticus</i>	Cap.	Common	Exotic to China	+++
Small Snakehead <i>Channa asiatica</i>	Obs.	Common	Exotic to China	+
Mullet <i>Chelon</i> sp.	Obs.	Common	Exotic to China	+++
Spotted Scat <i>Scatophagus argus</i>	Obs.	Common	Exotic to China	+++
Crescent-banded Grunter <i>Terapon jarbua</i>	Cap.	Common	Exotic to China	+++

+ = less than 5 individuals; ++ = 5-10 individuals; +++ = more than 10 individuals

Cap. = Captured; Obs. = Observed. Protection status of fish species is reference to Wang sung (1998) *China Red Data Book of Endangered Animals-Pisces*. Science Press.

The recorded fish species were either aggregated or solitary over the abandoned reservoir in different substrata and water depths. Numbers of individuals found in each region may differ due to the habitat preference of each fish species. Tilapia, which is one of the most common exotic species, is the dominant fish species in this small abandoned reservoir.

The species diversity of aquatic fauna, particularly fish species, on South Soko is considered to be low, compared with South Lantau (*Table 11 of Annex 8*).

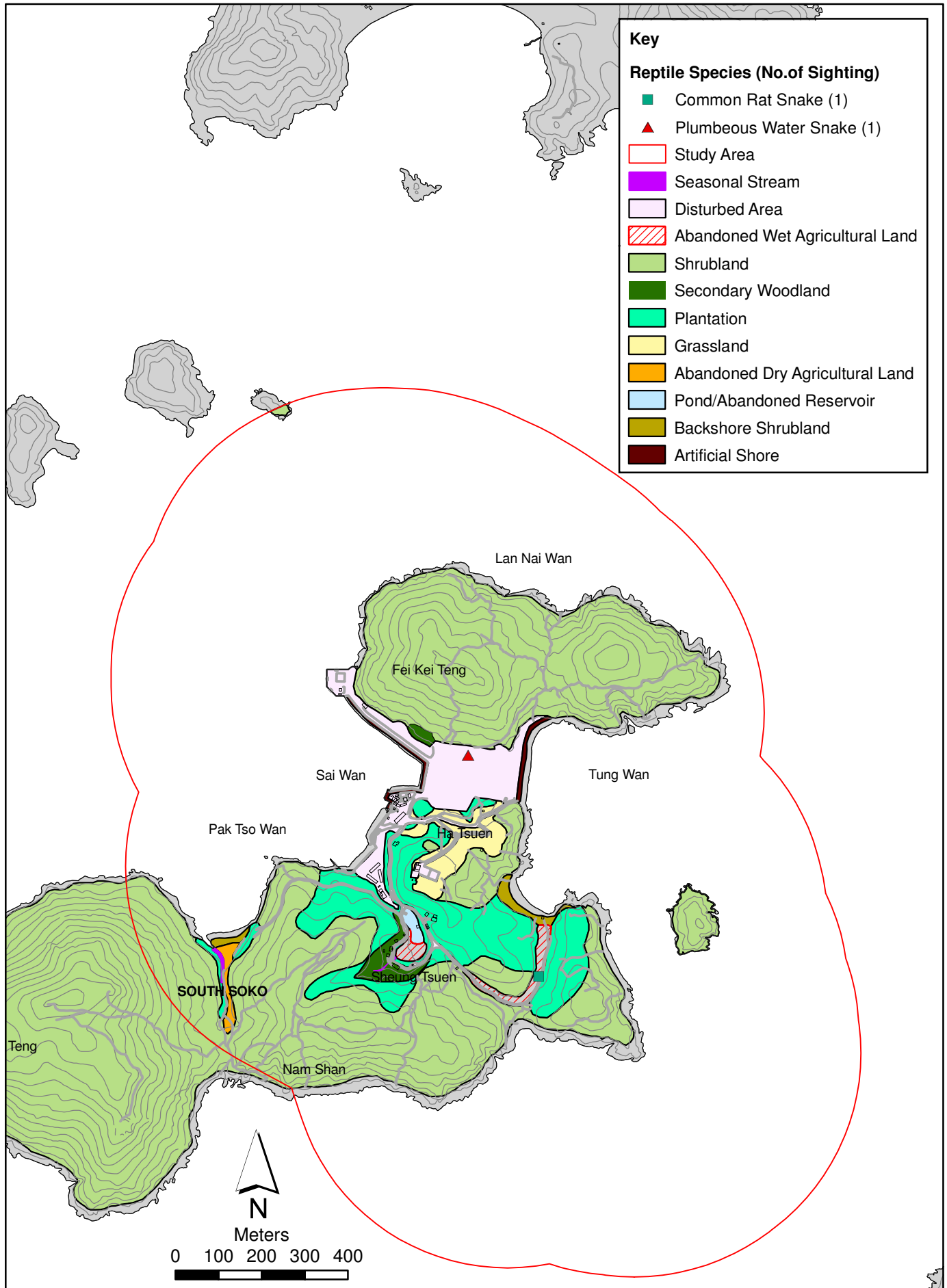


FIGURE 8.23

Location of Reptile Species Recorded within the Study Area  
 (Recorded in February to July 2004 and  
 October 2005 to January 2006)

The absence of, or restricted number of, aquatic fauna on South Soko and other outlying islands is mainly due to the low quality and/or lack of aquatic habitats.

#### Present Condition of the Project Area at South Soko

The Project Area comprises the works area and the areas for the installation of various structures of the development. The terrestrial habitats recorded in the Project Area were mainly disturbed area and shrubland, with patches of secondary woodland, plantation, backshore shrubland, abandoned wet agricultural land, and grassland. The sizes of each habitat covered and impacted by the Project Area are shown in *Table 8.10*.

**Table 8.10** *Habitats within the Project Area at South Soko*

Habitat	Ecological Importance	Approximate Total Area within Project Boundary (ha)	Approximate Impacted Area by the Project (Ha)
Secondary woodland	Moderate	0.2	0.2
Plantation	Low to moderate	6.7	3.3
Shrubland	Low to moderate	16.8	8.3
Abandoned Wet Agricultural Land	Low to moderate	0.6	0.5
Backshore Shrubland	Low	0.4	-
Grassland	Low	2.1	1.8
Disturbed Area	Negligible	5.8	5.6
Artificial Shore	(to be discussed in <i>Section 9</i> Marine Ecology)	0.5	-
Rocky Shore	(to be discussed in <i>Section 9</i> Marine Ecology)	3.6	-

Small patch of secondary woodland was found within the Project Area. The woodlands were densely vegetated with canopy species reached the height of 15 m. It mainly comprised of native tree species and fruit trees planted by local villagers several decades ago, which included *Celtis sinensis*, *Cinnamomum camphora*, *Machilus chinensis*, *Ficus microcarpa* and *Dimocarpus longan*. Most canopy species were mature in size and hence the ecological value of secondary woodland is considered as moderate. Secondary woodland will develop towards a climax habitat (mature woodland) through succession and natural colonization, it was in the initial stages of this process.

The plantation was located at the southern part of the Project Area and dominated by the exotic canopy species *Acacia confusa*, with native undergrowth including *Ficus microcarpa*, *Litsea glutinosa*, *Litsea rotundifolia* and *Eurya nitida*.

The dominant habitat, shrubland, was located at the north of the Project Area with a canopy of about 1.5 meters in height and dominated by native species such as *Rhodomyrtus tomentosa*, *Embelia laeta* and *Cratoxylum cochinchinensis*. The shrubland originated from hill fire affected shrubby grassland that has been subject to soil erosion, which has resulted in poor vegetation cover and dry conditions. Due to the simple floristic diversity and lack of structural complexity, the ecological importance of plantation and shrubland is low to moderate.

The abandoned wet agricultural land is located at the southern part of the Project Area and was dominated by a few common wetland plants including *Ludwigia epilobioides* and *Colocasia esculenta*. The extent of the abandoned wet agricultural land was subject to the availability of water and diminished during the dry season survey. The floristic diversity, structural complexity and ecological value of the abandoned wet agricultural land area are low to moderate. The grassland was dominated by *Ischaemum aristatum* and the vegetation was generally less than 1 m in height.

Backshore shrubland was found along the southern end of Tung Wan. The backshore shrublands were of medium age, with some landscape plant species previously planted and intermingled with the native species. A large amount of rubbish, such as plastic bags and bottles, were washed onto the shore and had accumulated in the backshore shrubland. Backshore shrubland only occupied fringing areas along the shore and consisted mainly of vegetation including *Thespesia populnea*, *Ipomoea brasiliensis*, *Scaevola sericea* and *Cerbera manghas*. The floristic diversity and the structural complexity of the backshore shrubland were low.

The grassland was located at the southeast of the Project Area, created during the formation of a helipad in the 1990s and considered to be low in ecological importance.

The disturbed area was located in the middle of the Project Area and consisted of the demolished Detention Centre, pier, concrete paths, cut slopes and a few landscape plants including *Araucaria heterophylla* and *Acalypha wilkesiana*. All of the recorded plant species are common or very common in Hong Kong. The ecological importance of the disturbed area was considered to be negligible.

Artificial shore and rocky shore habitats within the Project Area are discussed in detail in *Section 9 Marine Ecology*.

A number of species of conservation interest found within the Study Area were recorded in the Project Area. The bird species Greater Coucal, White-bellied Sea Eagle, Common Buzzard and Black Kite were identified either perching or flying past Project Area. Butterfly species including Bush Hopper, Formosan Swift, Three-spot Grass Yellow, Indian Palm Bob, Dark Grass Blue, Yellow Pansy, Striped Blue Crow, White Commodore and

Common Nawab were recorded flying within the plantation and abandoned wet agricultural land of the Project Area (Figure 8.21). Dragonfly species Greater Blue Skimmer were recorded flying within the abandoned wet agricultural land of the Project Area (Figure 8.22). The Common Rat Snake, a protected reptile species was found within the abandoned wet agricultural land of the Project Area (Figure 8.23).

## Shek Pik

### Existing Habitat and Vegetation

The habitats recorded within the Study Area at Shek Pik were plantation, shrubland, backshore shrubland, developed area and reservoir.

A total of 108 plant species were recorded within the Study Area (Table 12 of Annex 8). Among the recorded plant species, there were 23 tree species, 47 shrub species, 5 grass species, 2 palm species, 2 sedges, 21 climber species, 7 herb species and 1 fern species. Coastal vegetation species which are well adapted to adverse environments such as limited water supply, strong wind and saline conditions, were frequently found within the Study Area. An Acacia plantation was found on both sides of Shek Pik Reservoir Road and at the fringe of the developed area. The Study Area mainly comprised developed area and shrubland, the developed area being dominated by Acacia plantation and landscape plants while the shrubland being dominated by typical native shrubs including *Cratoxylum cochinchinensis*, *Mallotus paniculatus*, *Psychotria rubra*, *Rhaphiolepis indica*, *Thespesia populnea* and *Zanthoxylum avicennae*. A locally protected plant species *Pavetta hongkongensis* was found within the Study Area. Table 8.11 lists the area extent and number of plant species recorded in each habitat type.

**Table 8.11** *Habitat Types Recorded Within the Shek Pik Study Area*

Habitat Type	Approximate Area (hectare)	Number of Plant Species Recorded
Plantation	7.7	24
Shrubland	34.6	78
Backshore vegetation	1.4	15
Developed area	27.4	18

### Plantation

Plantation was found on both sides of the Shek Pik Reservoir Road and the fringe of developed area, and generally comprised *Acacia confusa*, established 10 to 15 years ago. The understorey was sparsely vegetated by native shrubs subsequent to the degeneration of some individuals of *Acacia confusa*. The canopy species of the plantation were 6 to 8 meters in height, with diameters at breast height (dbh) ranging from 5 cm to 25 cm. Photographic records of plantation are shown in Figure 8.24. There were 24 plant species recorded within the plantation, which are common or very common in Hong Kong.

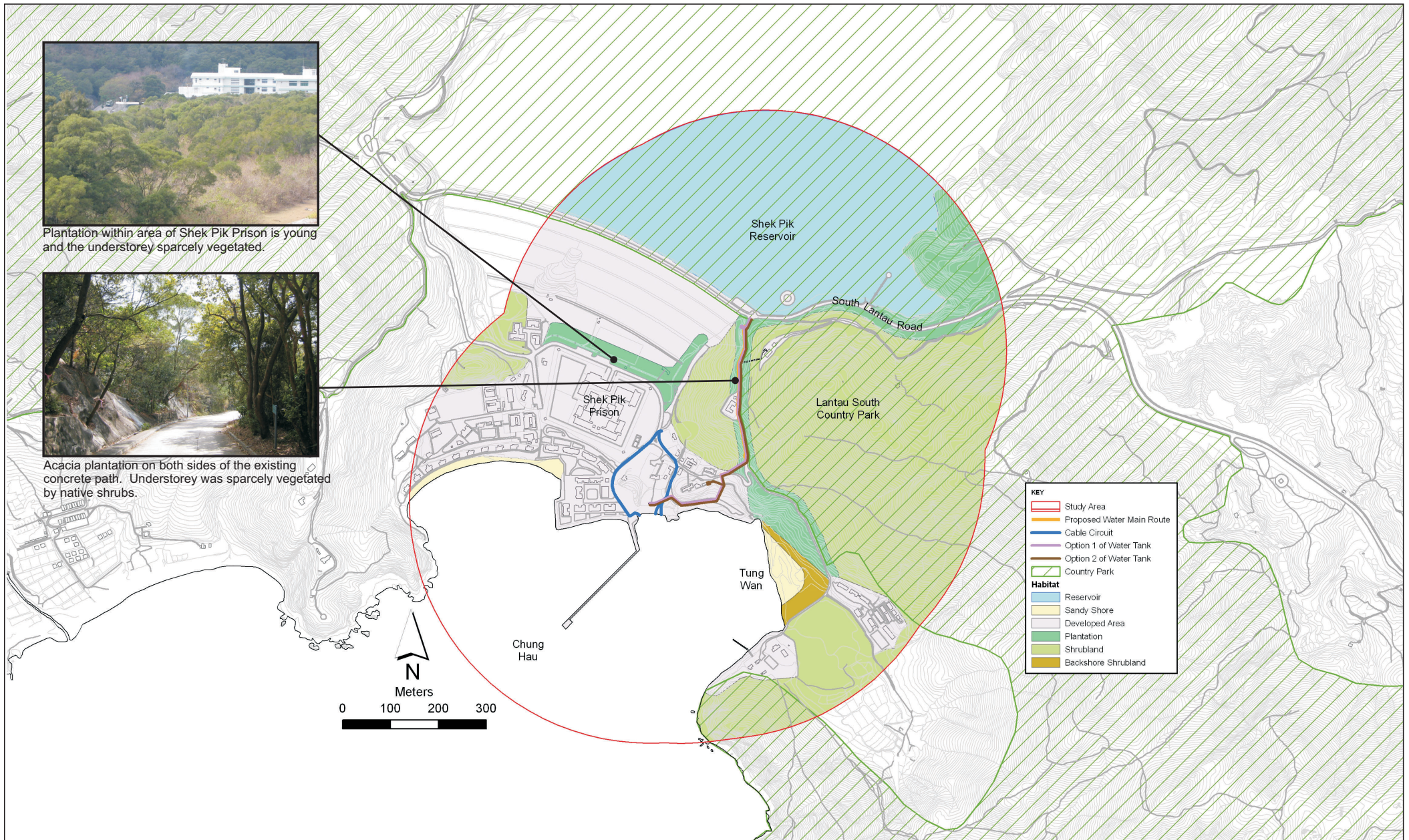


Figure 8.24

Photographic Records of Plantation Habitat within Study Area of Shek Pik

The floristic diversity and structural complexity of the plantation is low. The ecological value of plantation areas at Shek Pik was considered to be low.

### Shrubland

Shrubland was one of the dominant habitats within the Study Area at Shek Pik comprising 49% of the total land area. The shrubland consisted of shrubs, sedges and grasses 0.5 to 1.5 meters in height and a total of 78 plant species were found during the surveys. The shrubland was dominated by native species such as *Cratoxylum cochinchinense*, *Celtis sinensis*, *Rhodomyrtus tomentosa*, *Melastoma candidum*, *Ilex asprella*, *Ficus microcarpa*, *Phyllanthus emblica*, *Litsea glutinosa* and *Daphniphyllum calycinum*. Photographic records of shrubland are shown in *Figure 8.25*. All of the plant species are common or very common in Hong Kong with the exception of a locally protected shrub species *Pavetta Pavetta hongkongensis* was found. The location of *Pavetta* found within the Study Area is shown in *Figure 8.26*. The floristic diversity and the structural complexity of shrubland are moderate and low to moderate respectively. In conclusion, the ecological importance of shrubland at Shek Pik is low to moderate.

### Backshore Shrubland

Backshore shrubland was found at the southeast of the Study Area within groundcover and backshore vegetation. Photographic records of Backshore shrubland are shown in *Figure 8.27*. The backshore shrubland only occupied fringing areas along the shore and were dominated by coastal plants including *Zoysia matrella*, *Pandanus tectorius*, *Phoenix henceana*, *Thespesia populnea*, *Cerbera manghas*, *Ipomoea brasiliensis*, and *Wedelia chinensis*. A total of 15 plant species of 0.3 to 2.5 meters in height were found. All of the plant species are common or very common in Hong Kong. The floristic diversity and the structural complexity of backshore shrubland at Shek Pik is low.

### Developed Area

Developed areas were found at the western part of the Study Area and included a residential area, roads and offices and was the dominant habitat within the Study Area. The area was dominated by *Acacia* plantation and landscape species, with the height of canopy species reaching 4 to 8 meters. A total of 18 plant species were recorded, all of which are common or very common in Hong Kong. The floristic diversity and the structural complexity of developed area at Shek Pik is low and the ecological value was considered negligible. Photographic records of the developed area are shown in *Figure 8.28*.

### Reservoir

Part of the Shek Pik Reservoir lies within the northern part of the Study Area. No vegetation was found within the reservoir and hence no ecological

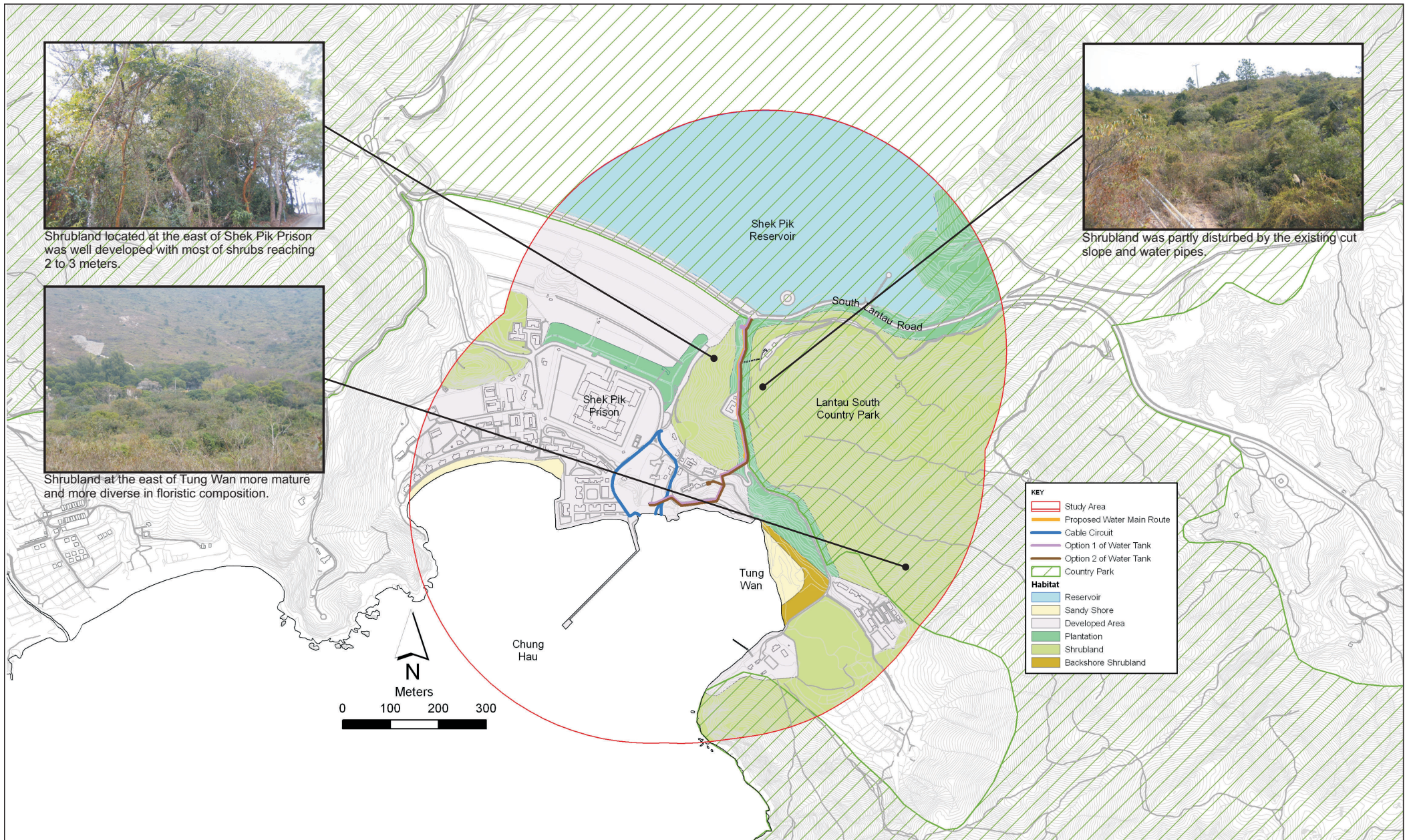


Figure 8.25

Photographic Records of Shrubland Habitat within Study Area of Shek Pik



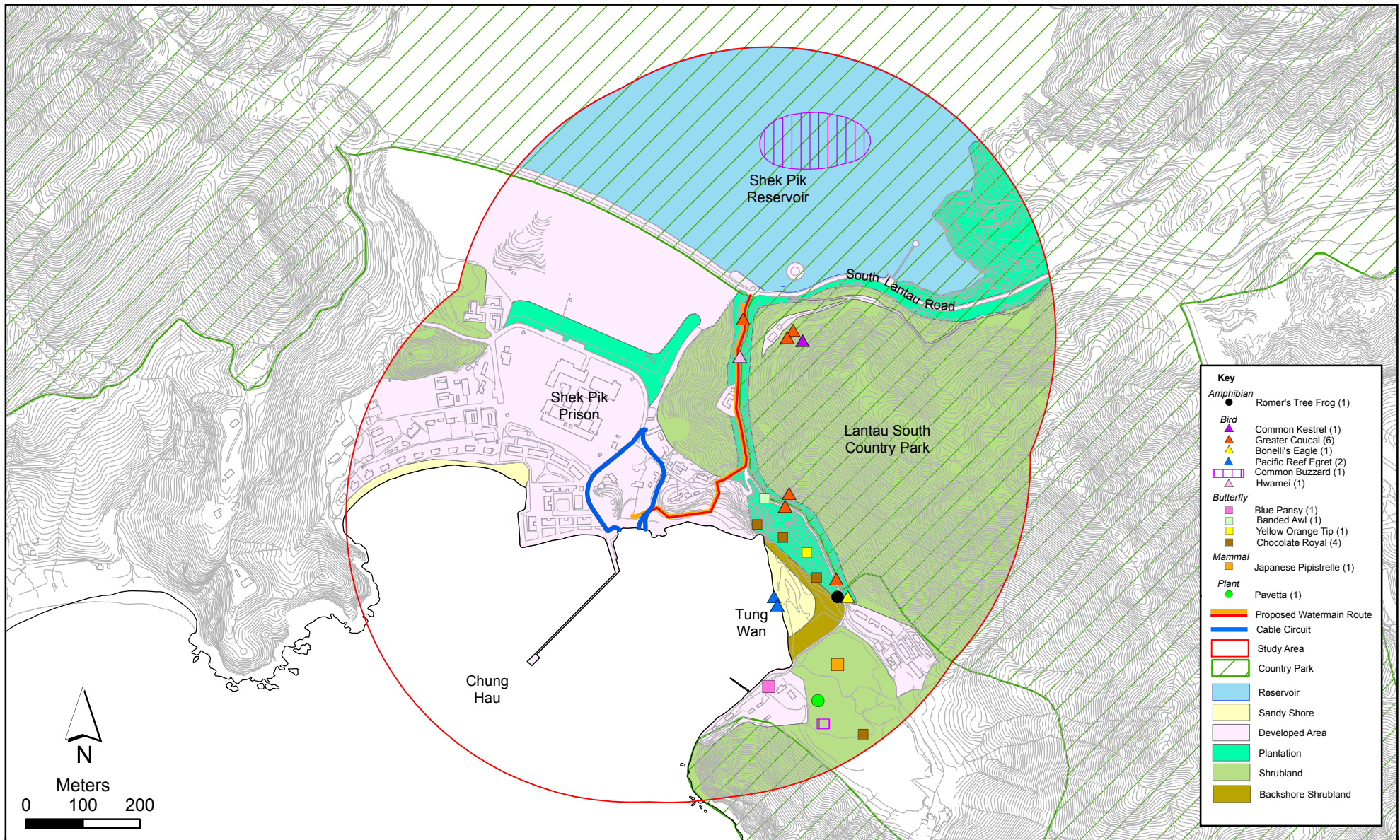


Figure 8.26

Location of Species of Conservation Interest within Study Area

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Management



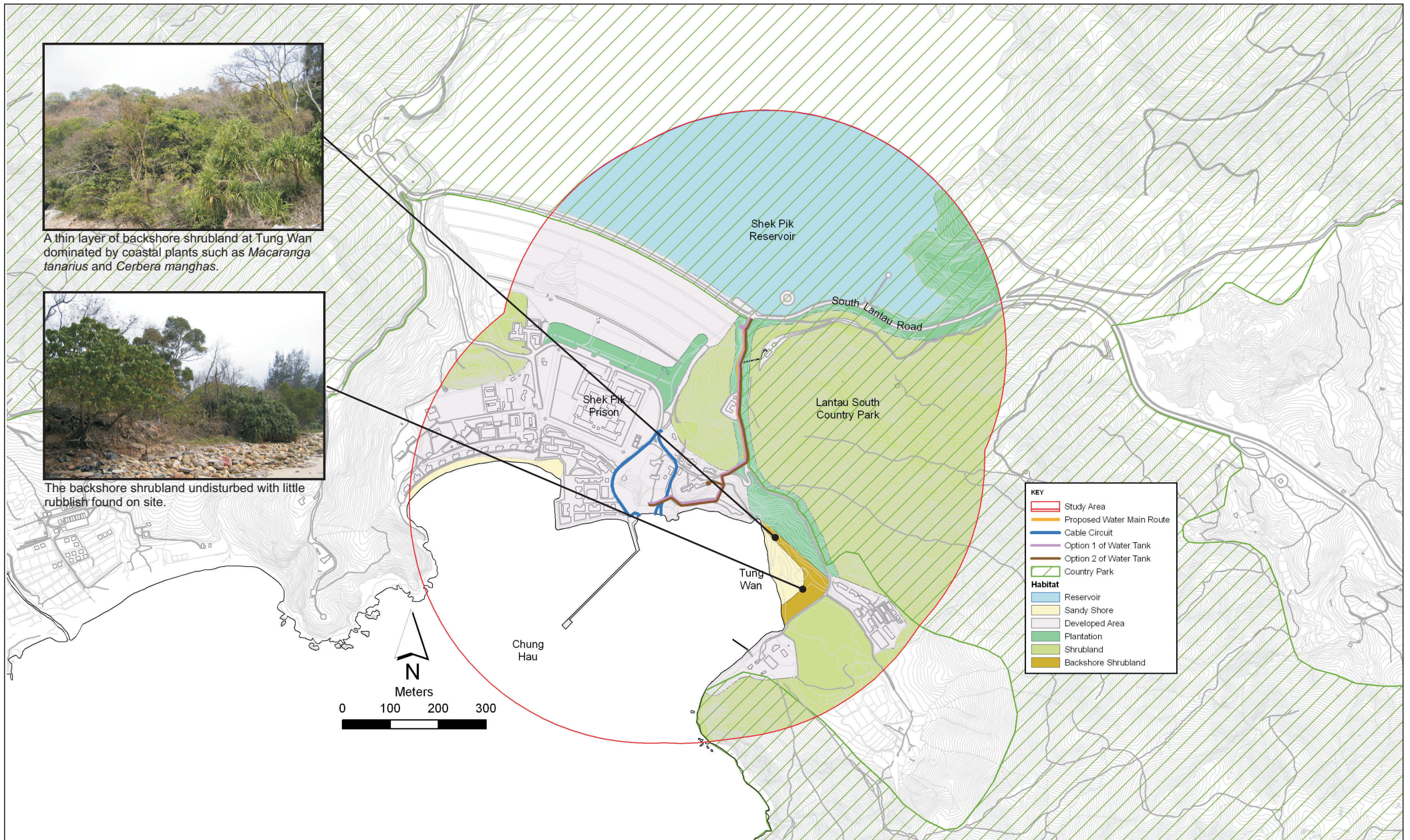


Figure 8.27

Photographic Records of Backshore Shrubland Habitat within Study Area of Shek Pik

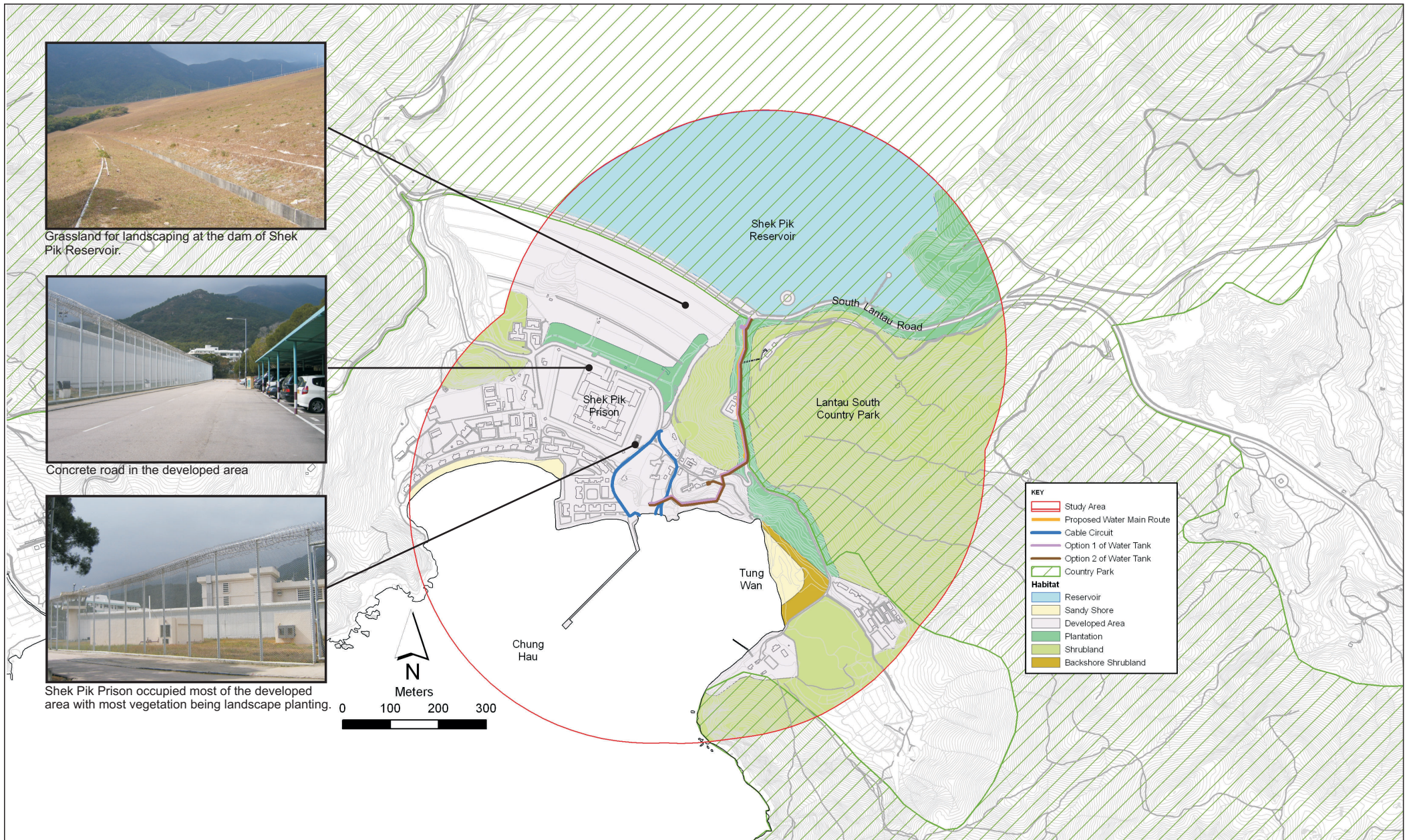


Figure 8.28

Photographic Records of Developed Area Habitat within Study Area of Shek Pik

baseline surveys were conducted. The water main route does not physically affect the reservoir.

### Wildlife

#### Mammal

Three mammal species, Japanese Pipistrelle (bat) *Pipistrellus abramus*, Tanezumi Rat *Rattus tanezumi* and Brown Musk Shrew *Suncus murinus* were recorded within the Study Area (Tables 13a and 13b of Annex 8). The Japanese Pipistrelle *Pipistrellus abramus* is protected under the *Wild Animal Protection Ordinance*, however, the other two species were considered to have no conservation significance. The Japanese Pipistrelle was recorded in shrubland during the night survey program as shown in Figure 8.26.

#### Birds

A total of 53 species of birds were identified within the Study Area. Forty eight species were recorded at the sampling points during point count surveys and an additional five species were recorded outside of the sampling points but within the Study Area (Table 14 of Annex 8). The details of the bird data are shown in Table 15 of Annex 8). Relative abundance and species richness in each type of surveyed habitat, based on the results of the point count method, are presented in Table 8.12.

Both the highest mean number of individuals of birds (determined on a per hectare, per survey point and per survey day basis) and the highest mean number of bird species (per sampling point) were recorded in the developed area, while shrubland recorded the highest total number of bird species.

Table 8.12 Abundance and Species Richness of Birds Recorded within the Shek Pik Study Area

	Season	Plantation	Shrubland	Backshore Shrubland	Developed Area	Total
Number of sampling points surveyed (each sampling point covered an area of ~ 0.28 ha)		3	5	1	2	11
Number of survey days	Dry	2	2	2	2	2
	Wet	1	1	1	1	1
	Overall	3	3	3	3	3
Total number of individuals	Dry	216	206	22	167	611
	Wet	44	92	1	32	169
	Overall	260	298	23	199	780
Mean abundance (no. of birds per hectare per survey day)	Dry	128.5	73.5	39.3	149.1	98.9
	Wet	52.3	65.7	3.57	57.1	54.6
	Overall	103.1	70.9	27.4	118.4	84.4
Total no. of species recorded	Dry	24	26	11	24	42
	Wet	15	17	1	6	24
	Overall	26	38	9	27	48
Species richness (mean no. of species per sampling point)	Dry	2.4	4.3	5.5	12	1.9
	Wet	3	5.7	1	12	2.4
	Overall	1.7	4.2	3.0	9.0	1.6

Among the recorded species, there were 30 residents, 18 passage migrants, 24 winter visitors and one summer visitor.

Most of the bird species recorded are common and widespread in Hong Kong (such as Light-vented Bulbul *Pycnonotus sinensis*), and generally of low conservation importance (e.g. Crested Myna *Acridotheres cristatellus*). Eight species of conservation interest were recorded including Pacific Reef Egret *Egretta sacra*, Black-eared Kite *Milvus lineatus*, Bonelli's Eagle *Hieraetus fasciatus*, Common Buzzard *Buteo buteo*, Common Kestrel *Falco tinnunculus*, Collared Scops Owl *Otus lettia*, Greater Coucal *Centropus sinensis* and Hwamei *Garrulax canorus*. The locations of these species, with the exception of the Black Kite, are shown on Figure 8.26.

As Black Kites were only recorded soaring over the area during the surveys, the exact locations of the bird cannot be shown in Figure 8.26. Black Kites usually forage over a large area and Shek Pik is considered to be part of their foraging areas. The Pacific Reef Egret was recorded roosting on rocky shores along the coastal line of Shek Pik during the surveys. The Greater Coucal was found roosting in various habitats during the surveys.

The Common Buzzard was recorded flying over open areas such as the developed area. The Common Buzzard is listed as *Class 2 Animal of PRC* and *Appendix II* of CITES. Since the Common Buzzard is widespread in the New Territories and Deep Bay areas, Shek Pik is considered to be a minor foraging site for the species.

The Bonelli's Eagle is a scarce resident in Hong Kong. It is listed as *Class 2 Animal of PRC* and *Appendix II* of CITES. It was recorded flying over the plantation during the surveys.

The Common Kestrel is a common autumn migrant and less common winter visitor. It is listed as *Class 2 Animal of PRC* and *Appendix II* of CITES. It was recorded flying over the shrubland during the surveys.

The Collared Scops Owl is a common and widespread resident in Hong Kong, using a variety of wooded habitats including fung shui woods, forests and shrubland with scattered large trees. It is listed as *Class 2 Animal of PRC* and *Appendix II* of CITES. It is widespread in the central and eastern New Territories and on Hong Kong Island, and has also been recorded in the northwest New Territories, parts of Lantau, urban Kowloon, Kat O, Ngo Mai Chau, Tap Mun and Po Toi Islands. The species was recorded in developed areas during the surveys.

The Hwamei is listed in *Appendix II* of CITES. It is a common and widespread breeding resident in Hong Kong and almost endemic to China. The Hwamei is commonly found on hillsides and shrubland in Hong Kong and has also been seen at large parks in Yuen Long and Hong Kong Island. It was recorded at shrubland during the survey.

Overall, the species diversity of birds at Shek Pik is considered low to moderate.

## Invertebrates

### Butterfly

A total of 29 species of butterfly were recorded within the Study Area during the surveys (*Tables 16a* and *16b* of *Annex 8*). Twelve species were recorded in dry season while 22 species were recorded in wet season. No additional butterfly species were recorded outside the point count location.

Four uncommon butterfly species, Blue Pansy *Junonia orithya*, Chocolate Royal *Remelana jangala*, Yellow Orange Tip *Ixias pyrene*, and Banded Awl *Hasora chromus* were recorded within the Study Area. The distribution and favoured food plants are listed in *Table 8.13*, the locations of Blue Pansy *Junonia orithya*, Chocolate Royal *Remelana jangala*, Yellow Orange Tip *Ixias pyrene*, and Banded Awl *Hasora chromus* recorded within the Study Area are shown in *Figure 8.26*.

**Table 8.13** *Food Plants of the Uncommon Butterflies Recorded within the Shek Pik Study Area*

Common Name	Species Name	Food Plant	Habitat Recorded
Blue Pansy	<i>Junonia orithya</i> ,	<i>Antirrhinum majus</i> , <i>Striga lutea</i> , <i>Justicia procumbens</i> and <i>Lepidagathis incurva</i>	Developed area
Chocolate Royal	<i>Remelana jangala</i>	<i>Cratoxylum cochinchinense</i> , <i>Embelia laeta</i> , <i>Sterculia lanceolata</i> and <i>Rhododendron</i> sp.	Shrubland, plantation
Banded Awl	<i>Hasora chromus</i>	<i>Pongamia pinnata</i>	Plantation
Yellow Orange Tip	<i>Ixias pyrene</i>	<i>Capparis cantoniensis</i>	Plantation

Butterfly abundance in the plantation area was considered low to moderate, and low in other types of habitats (Table 8.14).

**Table 8.14** *Mean Abundance of Butterflies Recorded at Shek Pik*

	Season	Plantation	Shrubland	Developed Area
Mean no. of individual/ha	Dry	8.9	2.85	5.35
	Wet	19.0	15.0	0
	Overall	12.3	6.9	3.6
No. of species	Dry	4	5	3
	Wet	12	14	0
	Overall	16	16	3
No. of uncommon/rare species	Dry	0	0	1
	Wet	3	1	0
	Overall	3	1	1

Both the abundance and species richness of butterflies were higher during the wet season. Species diversity was considered to be moderate, taking into account of the survey effort and the size of surveyed areas. The presence of shrubland and plantation support the higher diversity of butterfly species.

### Dragonflies

Three dragonfly species; Yellow Featherlegs *Copera marginipes*, Evening Skimmer *Tholymis tillarga* and Wandering Glider *Pantala flavescens* were recorded at Shek Pik in the wet season (Table 17 of Annex 8). All of them are common and widespread in Hong Kong. The abundance of dragonfly species was considered low in all habitats recorded in the Study Area.

### Herpetofauna

Five amphibian species, including the Paddy Frog *Fejervarya limnocharis*, Gunther's Frog *Rana guentheri*, Brown Tree Frog *Polypedates megacephalus*, Asiatic Painted Frog *Kaloula pulchra*, and Romer's Tree Frog *Philautus romeri* were recorded within the Study Area during the surveys (Tables 18a and 18b of

Annex 8). All of the recorded species identified are common and widespread in Hong Kong <sup>(1)</sup> with the exception of the Romer's Tree Frog, which is an endemic species and protected under the *Wild Animals Protection Ordinance (Cap 170)*. The Romer's Tree Frog was heard on the concrete road near Tung Wan under the plantation during survey, shown in *Figure 8.26*.

There were five species of reptile recorded within the Study Area during the surveys. Reptile species recorded included Common Blind Snake *Ramphotyphlops braminus*, Bowring's Gecko *Hemidactylus bowringii*, Reeves' Smooth Skink *Scincella reevesii*, Changeable Lizard *Calotes versicolor* and Chinese Gecko *Gekko chinensis*. All of the recorded reptiles are common in Hong Kong.

#### Present Condition of the Project Area at Shek Pik

The land sections of the cable circuit and water main are proposed to run mainly along the existing road from the shore to the new water tank and to Shek Pik Cable Substation. There are two options for the proposed location of new water tank. Water tank of Option 1 is proposed to be located at the fringe of the reservoir dam, occupies a small area of Acacia plantation. Water tank of Option 2 is proposed to be located at the fringe the existing chlorination plant at Shek Pik Reservoir Road. A new section of water main will be constructed to connect the new water tank to the existing water main for both options. The habitats of the water main and cable circuit routes include developed area and plantation. The sizes of each habitat covered by the Project Area are shown in *Table 8.15*.

**Table 8.15** *Habitats within the Shek Pik Project Area*

Habitat	Ecological Importance	Approximate Area (ha)
Plantation	Low	0.004 ha
Developed Area	Negligible	0.15 ha

The Acacia plantation is found along both sides of the road (proposed alignment of the cable circuit and water main) dominated by the exotic canopy species *Acacia confusa*, with native undergrowth including *Litsea glutinosa*, *Litsea rotundifolia* and *Eurya nitida*. Due to the simple floristic diversity and lack of structural complexity, the ecological importance of Acacia plantation is low.

The developed area is located at the western part of the Project Area and comprised residential buildings, concrete roads, and a few landscape plants including *Acacia confusa*, *Delonix regia* and *Bauhinia blackeana*. All of the recorded plant species are common or very common in Hong Kong. The ecological importance of the developed area was considered to be negligible.

(1) Lau, M.W.N. and D. Dudgeon, (1999). Composition and distribution of Hong Kong Amphibian fauna. *Memoirs of the Hong Kong Natural History Society* 22: 1-80.



Two bird species of conservation interest, including the Greater Coucal and Hwamei have been recorded within plantation of the Project Area. Their locations within the Project Area are shown in *Figure 8.26*.

## 8.5 EVALUATION OF ECOLOGICAL IMPORTANCE

In this section the ecological importance of the terrestrial habitats and wildlife identified within the Study Area and Project Area are evaluated in accordance with the *EIAO TM Annex 8* criteria.

- Naturalness;
- Size;
- Diversity;
- Rarity;
- Re-creatability;
- Ecological Linkage;
- Potential value;
- Nursery Ground;
- Age; and,
- Abundance.

The evaluation is based upon the information presented in the previous *Section 8.4.3*.

### 8.5.1 Habitats within Study Area

The ecological importance of each habitat type within the Study Area of South Soko and Shek Pik and the habitats within the Study Area are presented in *Tables 8.16-8.26*.

#### *Secondary Woodland*

Small patches of secondary woodlands (approximately 1 ha) are located at the west of the abandoned reservoir in South Soko and these patches have moderate ecological importance. They are comprised mainly of native trees and fruit plants cultivated by local villagers and remain at an initial succession stage. Outlying islands including South Soko generally support a limited size of woodland habitat, mainly due to the steeper terrain and crests of islands resulting in reduced water storage and greater wind exposure, limiting the ability of woodlands to sustain or develop. In conclusion, the ecological importance of secondary woodland in South Soko is moderate (*Table 8.16*).

Table 8.16 Ecological Evaluation of Secondary Woodland at South Soko

Criteria	Secondary Woodland
Naturalness	Secondary, semi-natural, originally from native trees and fruit trees cultivated by local villagers.
Size	Small patches of secondary woodland (approximately 1 ha) located to the west of the abandoned reservoir and fringe of shrubland.
Diversity	Moderate in diversity of plant species and structural complexity. Low to moderate for bird, moderate for butterfly and low for other faunal diversity.
Rarity	Bird species White-bellied Sea Eagle and Greater Coucal, Uncommon butterfly species Striped Blue Crow were recorded.
Re-creatability	It may take more than 30 years for the secondary woodland to develop.
Fragmentation	Not fragmented but small in size.
Ecological Linkage	Not linked to any ecologically significant area.
Potential Value	Moderate to high, as mature woodland.
Nursery/ Breeding Ground	Nil.
Age	Mature (more than 30 years) based on tree size, structure and species composition.
Abundance/ Richness of Wildlife	Low to moderate for birds and butterflies and low for other faunal species.
<b>Overall Ecological Importance</b>	<b>Moderate</b>

### Plantation

The plantation of South Soko was dominated by exotic plants *Acacia confusa* as canopy species with development of native undergrowth. The floristic diversity and structural complexity of the plantation in South Soko are low to moderate.

The plantation at Shek Pik was dominated by exotic plant species and the understorey occupied by several species of native shrubs. The floristic diversity and structural complexity of the plantation in Shek Pik are low. The ecological importance of the plantation area in Shek Pik is low (Table 8.17).

Table 8.17 Ecological Evaluation of Plantation at South Soko and Shek Pik

Criteria	Plantation at South Soko	Plantation at Shek Pik
Naturalness	Secondary, semi-mature, exotic	Secondary, young age, exotic.
Size	A continuous patch of trees with overall size of approximately 11.4 ha, the plantation is located mainly in the middle of the Study Area.	Plantation was found along the fringes of the concrete path within the Study Area, comprising 7.7 ha.
Diversity	Moderate in diversity of plants (54 species) and structural complexity. Low to moderate for birds (34 species) high for butterflies (36 species), and low for other faunal diversity.	Low in diversity of plant (24 species) and structural complexity. Low for bird (26 species), low for butterfly (13 species), and low for other faunal diversity.
Rarity	Bird species of conservation interest included Greater Coucal, and Crested Goshawk were recorded. Uncommon butterfly species; Common Nawab, Long-banded Silverline, Striped Blue Crow, Yellow Pansy, Tree-spot Grass Yellow, Banged Angle, Common Mapping, Indian Palm Bob and Conjoined Swift. Rare butterfly species included Red Lacewing.	Endemic amphibian species Romer's Tree Frog was recorded. Five bird species of conservation interests; Greater Coucal, Common kestrel, Black Kite, Hwamei and Bonelli's Eagle were recorded respectively. Three uncommon butterfly species; Chocolate Royal, Yellow Orange Tip and Banded Awl.
Re-creatability	Habitat characteristics and species composition are easy to recreate. However it may take more than 10 years for the plantation to develop.	Habitat characteristics and species composition are easy to recreate.
Fragmentation	Medium, the woodlands were fragmented by the concrete road/path.	High, the plantations were fragmented by the concrete road/path.
Ecological Linkage	Not linked to any ecologically significant area.	Not linked to any ecologically significant area.
Potential Value	Moderate, becoming mature woodland if given time and protection from disturbance.	Low
Nursery/ Breeding Ground	Juvenile of protected bird species Greater Coucal were recorded during the survey.	Nil
Age	Young (10 to 20 years old) based on tree size, structure and species composition.	Young (10 to 20 years old) based on tree size, structure and species composition.
Abundance/ Richness of Wildlife	High for butterfly, low to moderate for avifauna and low for other faunal species.	Low for avifauna and other faunal species.
<b>Overall Ecological Importance</b>	<b>Low to moderate</b>	<b>Low</b>

### *Shrubland*

Shrubland was the dominant habitat on South Soko, making up to 85% of vegetation cover on the island. The species of conservation interest included the orchid Golden Eulophia, protected bird species Greater Coucal, Crested Serpent Eagle, Pacific Reef Egret and White-bellied Sea Eagle, and uncommon butterfly species Tree Flitter, Blue Pansy and Dark Grass Blue. The floristic diversity and the structural complexity of shrubland are moderate and low to moderate respectively. In conclusion, the ecological importance of shrubland in South Soko is low to moderate.

Shrubland was also the dominant habitat at Shek Pik, and occupied 51% of vegetation cover. One locally protected plant species *Pavetta hongkongensis*, one uncommon butterfly Chocolate Royal as well as the uncommon bird species including Common Kestrel and Common Buzzard were recorded. A locally protected mammal, the Japanese Pipistrelle, was recorded during the night survey. The floristic diversity and the structural complexity of shrubland are moderate, and low to moderate respectively. In conclusion, the ecological importance of shrubland at Shek Pik is low to moderate.

The ecological evaluation of shrublands at South Soko and Shek Pik are shown in *Table 8.18*.

Table 8.18 Ecological Evaluation of Shrubland

Criteria	Shrubland at South Soko	Shrubland at Shek Pik
Naturalness	Natural habitat with limited human disturbance.	Natural habitat with limited human disturbance.
Size	The shrubland was the dominant habitat within the Study Area with overall size of approximately 85.7 ha.	The shrubland was the dominant habitat within the Study Area with overall size of approximately 34.6 ha.
Diversity	Medium diversity of plant (75 species) and structural complexity. Moderate for bird and low for other fauna.	Medium diversity of plant (78 species) and low to moderate in structural complexity. Low to moderate for bird and other fauna.
Rarity	Protected orchid Golden Eulophia, protected bird species: Greater Coucal, Crested Serpent Eagle, Pacific Reef Egret and White-bellied Sea Eagle. Uncommon butterfly species: Tree Flitter, Blue Pansy and Dark Grass Blue.	A locally protected plant species <i>Pavetta hongkongensis</i> , uncommon butterfly species Chocolate Royal and bird species of conservation interests including Black Kite, Common Kestrel, Greater Coucal, Hwamei, Collared Scops Owl and Common Buzzard and a locally protected mammal Japanese Pipistrelle were recorded.
Re-creatability	Readily recreatable.	Readily recreatable.
Fragmentation	Shrubland mainly exists as a continuous patch.	Shrubland mainly exists as a continuous patch.
Ecological Linkage	Not linked to any ecologically significant areas.	Not linked to any ecologically significant areas.
Potential Value	Moderate.	Moderate.
Nursery/Breeding Ground	Juveniles of bird species Chinese Bulbul was recorded during the wet season surveys.	Nil
Age	Moderate.	Moderate.
Abundance/Richness of Wildlife	Moderate for avifauna and low for other faunal species.	Low to moderate for avifauna and other faunal species.
<b>Overall Ecological Importance</b>	<b>Low to moderate</b>	<b>Low to moderate</b>

### Backshore Shrubland

Backshore shrubland habitat in Hong Kong is generally regarded as low quality habitat with relatively low floristic diversity and structural complexity.

Backshore shrubland at South Soko was found along the southern end of Tung Wan and along the sandy shore at Pak Tso Wan. The ecological importance of backshore shrubland on South Soko is considered to be low.

Backshore shrubland was found along Tung Wan at Shek Pik. The backshore shrubland was young in age and spread scarcely along the beach. All of the plant species are common or very common coastal species in Hong Kong. The floristic diversity and the structural complexity of backshore shrubland

are low. The ecological importance of backshore shrubland at Shek Pik is considered to be low.

The ecological evaluation of backshore shrublands at South Soko and Shek Pik are shown in *Table 8.19*.

**Table 8.19** *Ecological Evaluation of Backshore Shrubland*

Criteria	Backshore Shrubland at South Soko	Backshore Shrubland at Shek Pik
Naturalness	Natural, disturbed by littering.	Natural
Size	The overall size was approximately 0.5 ha.	The overall size was approximately 1.4 ha.
Diversity	Low for vegetation (total of 14 species), low for bird and other faunal species.	Low for vegetation (total of 15 species), low for bird and other faunal species.
Rarity	No rare species.	Bird species Pacific Reef Egret is of conservation interest.
Re-creatability	Readily creatable.	Readily creatable.
Fragmentation	Low.	Low.
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	Low.	Low.
Nursery/Breeding Ground	No significant nursery or breeding ground recorded.	No significant nursery or breeding ground recorded.
Age	Young.	Young.
Abundance/Richness of Wildlife	Abundance of avifauna, dragonfly and butterfly were low.	Abundance of avifauna, dragonfly and butterfly were low.
<b>Overall Ecological Importance</b>	<b>Low</b>	<b>Low</b>

### *Grassland*

Grassland habitats in Hong Kong are generally regarded as low quality habitat with low floristic diversity and structural complexity. Grassland at South Soko was found on the hillside next to Ha Tsuen. The grassland is expected to have been created as a result of the landscaping works during the construction of the Detention Centre. All of the recorded plant species are common or very common in Hong Kong. The floristic diversity and structural complexity of the grassland habitat were low. The ecological importance of grassland on South Soko is considered to be low (*Table 8.20*).

Table 8.20 Ecological Evaluation of Grassland at South Soko

Criteria	Grassland
Naturalness	Man-made habitat, created for helipad and concrete walkways of the former Detention Centre.
Size	The overall size was approximately 2.1 ha, located in the middle of the Study Area.
Diversity	Low diversity of plant (28 species) and structural complexity. Low in faunal diversity.
Rarity	Protected bird species Greater Coucal and Common Buzzard were recorded uncommon dragonfly Greater Blue Skimmer and uncommon butterfly Indian Fritillary and Indian Palm Bob were found.
Re-creatability	Readily recreatable.
Fragmentation	Not fragmented.
Ecological Linkage	Not linked to any ecological significant area.
Potential Value	Low.
Nursery/Breeding Ground	No significant nursery or breeding ground recorded during the survey.
Age	Young.
Abundance/Richness of Wildlife	Low for avifauna, butterfly and dragonfly.
<b>Overall Ecological Importance</b>	<b>Low</b>

#### *Abandoned Wet Agricultural Land*

Abandoned wet agricultural lands were found in conjunction with the abandoned reservoir near Sheung Tsuen and at the southeast of South Soko. All of the recorded plant species are common or very common in Hong Kong. The floristic diversity and the structural complexity of the abandoned wet agricultural lands are low to moderate. In conclusion, the ecological importance of the abandoned wet agricultural lands found on South Soko was low to moderate (Table 8.21).

Table 8.21 Ecological Evaluation of Abandoned Wet Agricultural Land at South Soko

Criteria	Abandoned Wet Agricultural Land
Naturalness	Semi-natural, originated from abandoned agricultural land.
Size	The overall size was approximately 1.0 ha.
Diversity	Low for vegetation (total of 37 species), low to moderate for bird and dragonflies, low for butterfly and herpetofauna.
Rarity	Protected bird species including Osprey, Greater Coucal, and White-bellied Sea Eagle were recorded. Uncommon butterfly and dragonfly species including Yellow Pansy, Formosan Swift and Bush Hopper. A protected reptile species, the Common Rat Snake was also recorded.
Re-creatability	Readily creatable.
Fragmentation	Fragmented at Sheung Tsuen.
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity.
Potential Value	Moderate.
Nursery/Breeding Ground	Juveniles of bird species Chinese Bulbul were recorded during the wet season surveys.
Age	Young.
Abundance/Richness of Wildlife	Abundance of avifauna, dragonfly and butterfly were low.
<b>Overall Ecological Importance</b>	<b>Low to moderate</b>

#### *Abandoned Dry Agricultural Land*

Abandoned dry agricultural land was found at the backshore of Pak Tso Wan at South Soko. All of the plant species are common or very common in Hong Kong. The floristic diversity, structural complexity and ecological value of the abandoned dry agricultural land habitat are low. The faunal diversity of the habitat was moderate for bird and low for butterfly, dragonfly and herpetofauna. In conclusion, the ecological importance of the abandoned agricultural land in South Soko is low to moderate (Table 8.22).



Table 8.22 Ecological Evaluation of Abandoned Dry Agricultural Land at South Soko

Criteria	Abandoned Dry Agricultural Land
Naturalness	Man-made
Size	The overall size was approximately 0.4 ha.
Diversity	Low for vegetation (total of 27 species), moderate for bird and low for butterfly, dragonfly and herpetofauna.
Rarity	None recorded.
Re-creatability	Readily creatable.
Fragmentation	Not fragmented.
Ecological Linkage	Not functionally linked to any highly valued habitat in close proximity.
Potential Value	Low.
Nursery/Breeding Ground	No significant nursery or breeding ground recorded.
Age	Young.
Abundance/Richness of Wildlife	Abundance of avifauna, dragonfly and butterfly were low.
<b>Overall Ecological Importance</b>	<b>Low to moderate</b>

### Stream

Two seasonal streams, located near Sheung Tsuen and Pak Tso Wan, were found within the Study Area. The riparian vegetation communities of the stream near Sheung Tsuen were integrated with the surrounding secondary woodland and shrubland. The riparian vegetation communities of the natural stream near Pak Tso Wan were similar to the backshore shrubland. The beds of the streams were rocky with medium-sized boulders and very limited water flow even during the wet season. A total of 28 plant species were found along the stream and no rare or protected species were recorded. No stream fauna were found in either of the two streams on the South Soko Island. The structural complexity and species diversity of the natural streams are therefore low. In conclusion, the ecological importance of the stream in South Soko is low to moderate (Table 8.23).

Table 8.23 *Ecological Evaluation of Streams at South Soko*

Criteria	Natural Stream at the Backshore of Pak Tso Wan and Natural Stream at the south of Abandoned Reservoir
Naturalness	Natural.
Size	The total length was less than 100 m.
Diversity	Low for plant and aquatic fauna.
Rarity	Nil
Re-creatability	Re-creatable.
Fragmentation	Not applicable.
Ecological linkage	Not functionally linked to any highly valued habitat in close proximity.
Potential value	Medium ecological potential.
Nursery/breeding ground	No significant nursery or breeding ground recorded.
Age	Not applicable.
Abundance/Richness of wildlife	Low for all wildlife including avifauna and aquatic fauna.
<b>Overall Ecological Importance</b>	<b>Low to moderate</b>

*Abandoned and Active Reservoirs*

An abandoned water reservoir, enclosed by secondary woodland, was found near Sheung Tsuen at South Soko. The bottom of the abandoned reservoir was generally sandy, scattered with waste materials and some rocks, including granite and broken concrete. All of the recorded plant species are common or very common in Hong Kong. The species diversity and the structural complexity of the abandoned reservoir are low. Ecological importance of the abandoned reservoir is presented in *Table 8.24*.

A reservoir (Shek Pik Reservoir) was recorded at Shek Pik. The reservoir is under active management and is used for water collection from nearby hills and slopes. No vegetation was recorded within the reservoir. The species diversity and the structural complexity of the reservoir are low. Ecological importance of the reservoir is presented in *Table 8.24*.

**Table 8.24 Ecological Evaluation of Abandoned Reservoir at South Soko and Reservoir at Shek Pik**

Criteria	Abandoned Reservoir (South Soko)	Reservoir (Shek Pik)
Naturalness	Man-made, created for water storage.	Man-made, created for water storage.
Size	The overall size was approximately 0.2 ha.	The overall size was approximately 23 ha.
Diversity	Low for vegetation (total of 7 species), Low for butterfly, dragonfly and herpetofauna. Fish species are all introduced exotics of low ecological value.	Nil for vegetation, low for wildlife.
Rarity	Protected bird species White-bellied Sea Eagle was recorded flying over the area. Uncommon butterfly species Conjoined Swift and uncommon dragonfly species Eastern Lilysquatter were recorded.	Protected bird species Common Buzzard was recorded flying over the area.
Re-creatability	Readily creatable.	Readily creatable.
Fragmentation	Not fragmented.	Not fragmented.
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.	Low
Nursery/ Breeding Ground	No significant nursery or breeding ground recorded.	No significant nursery or breeding ground recorded.
Age	Young.	Young.
Abundance/ Richness of Wildlife	Abundance of avifauna, dragonfly and butterfly were low. Moderately high abundance of the invasive fish species <i>Tilapia</i> spp.	Low for wildlife.
<b>Overall Ecological Importance</b>	<b>Low</b>	<b>Low</b>

The disturbed area included the concrete platform of the former Detention Centre located between Sai Wan and Tung Wan, abandoned village (i.e., Sheung Tsuen), piers, concrete roads and paths, and cut slopes at South Soko. The Detention Centre was constructed in the late 1980s and demolished during the late 1990s. All of the remaining structures were also abandoned after demolition of the building structure of the former Detention Centre. All of the recorded plant species are common or very common in Hong Kong. The species diversity and the structural complexity of disturbed area are low. In conclusion, the ecological importance of the disturbed area in South Soko is negligible (Table 8.25).

The developed area at Shek Pik included the concrete roads, residential buildings and Shek Pik Prison. All of the recorded plant species are common or very common in Hong Kong. The species diversity and the structural complexity of developed area are low. In conclusion, the ecological importance of the disturbed area at Shek Pik is negligible (Table 8.25).

**Table 8.25** *Ecological Evaluation of Disturbed Area at South Soko and Developed Area at Shek Pik*

Criteria	Disturbed Area (South Soko)	Developed Area (Shek Pik)
Naturalness	Man-made habitat consisting demolished Detention Centre and associated facilities.	Man-made habitat consisting concrete roads, residential buildings and Shek Pik Prison.
Size	The overall size was approximately 6.5 ha.	The overall size was approximately 27.4 ha.
Diversity	Low for vegetation (total of 41 species), moderate for bird and low for butterfly, dragonfly and herpetofauna.	Low for vegetation (total of 18 species), low to moderate for bird and low for butterfly, dragonfly and herpetofauna.
Rarity	Protected bird species Common Buzzard was recorded flying over. Uncommon butterfly species White Commodore and Blue Pansy were recorded. Protected reptile species Plumbeous Water Snake was recorded.	Uncommon butterfly species Blue Pansy, birds of conservation interests included Black Kite.
Re-creatability	Readily creatable.	Readily 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	Low.	Low.
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	Abundance of avifauna, dragonfly and butterfly were low.	Abundance of avifauna, dragonfly and butterfly were low.
<b>Overall Ecological Importance</b>	<b>Negligible</b>	<b>Negligible</b>

### 8.5.2 *Ecological Evaluation of the Project Area*

#### *South Soko*

The Project Area at South Soko is approximately 36.5 ha with most (approximately 17.9 ha will be permanently and 1.8 ha temporarily impacted) of the area disturbed by construction of cut slopes, concrete paths, the former detention centre, pier and helipad. Natural habitats are of relatively low ecological importance and young in age. The diversity of floral and faunal species in the Project Area is low. The floral and faunal species of conservation interest recorded within the Project Area were the orchid Golden Eulophia, bird species Greater Coucal, White-bellied Sea Eagle, Common Buzzard and Black Kite; butterfly species Bush Hopper, Formosan Swift, Three-spot Grass Yellow, Indian Palm Bob, Dark Grass Blue, Yellow Pansy, Striped Blue Crow, White Commodore, Blue Pansy, Tree Flitter and Common Nawab; dragonfly species included the Greater Blue Skimmer; and the reptile species Plumbeous Water Snake and Common Rat Snake. In conclusion, the ecological importance of the Project Area is considered to be Low.

*Shek Pik*

The Project Area at Shek Pik was approximately 0.15 ha in area including plantation and developed areas of relatively low ecological importance. The Project Area was low in floral and faunal species and no species of conservation interest were recorded within the Project Area. In conclusion, the ecological importance of the Project Area at Shek Pik is considered to be Low. It should be noted that although the ecological values of both Shek Pik and South Soko are considered to be low, the ecological significance of Shek Pik is considered to be less than that of South Soko.

**Table 8.26** *Ecological Evaluation of the Project Areas*

Criteria	Project Area at South Soko	Project Area at Shek Pik
Naturalness	Previous history of disturbance, i.e., construction of cut slope, concrete path, detention centre, pier and helipad. Natural habitats were of relatively low ecological importance with only a small patch of secondary woodland is of moderate ecological value.	Disturbed, i.e., existing water pipes, concrete road and Shek Pik Prison. Natural habitats were of relatively low ecological importance. Part of the area is located within Lantau South Country Park.
Size	Total: approximately 19.7 ha. Approximately 0.2 ha of secondary woodland, 3.3 ha of plantation, 8.3 ha of shrubland, 0.5 ha of abandoned wet agricultural land, 1.8 ha of grassland and 5.6 ha of disturbed area recorded within the Project Area.	Total: approximately 0.15 ha. of developed area and 0.004 ha of plantation recorded within the Project Area.
Diversity	Low for vegetation and fauna.	Low for vegetation and fauna.
Rarity	Orchid species Golden Eulophia, Bird species included the Greater Coucal, White-bellied Sea Eagle, Common Buzzard and Black Kite; butterfly species included the Bush Hopper, Formosan Swift, Three-spot Grass Yellow, Indian Palm Bob, Dark Grass Blue, Yellow Pansy, Striped Blue Crow, White Commodore, Blue Pansy, Tree Flitter and Common Nawab; dragonfly species included the Greater Blue Skimmer; and the reptile species Plumbeous Water Snake and Common Rat Snake were recorded within the Project Area.	Nil
Re-creatability	Readily creatable.	Readily 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. Part of the area locate within Lantau South Country Park.

Criteria	Project Area at South Soko	Project Area at Shek Pik
Potential Value	Low to moderate.	Low
Nursery/Breeding Ground	No significant breeding ground recorded.	No significant breeding ground recorded.
Age	Young.	Young.
Abundance/Richness of Wildlife	Abundance of fauna was low.	Abundance of fauna was low.
<b>Overall Ecological Importance</b>	<b>Moderate for Secondary Woodland</b> <b>Low to Moderate for Plantation, Shrubland and Abandoned Wet Agricultural Land</b> <b>Low for Grassland</b> <b>Negligible for Disturbed Area</b> <b>Overall Considered to be Low</b>	<b>Low for Plantation</b> <b>Negligible for Developed Area</b> <b>Overall Considered to be Low and less significance than South Soko.</b>

### 8.5.3

#### *Flora and Fauna of Ecological Interest*

The following floral and faunal species of conservation interest were recorded within the Study Area during the surveys:

- **Plant at South Soko:** A protected and rare plant species Golden Eulophia was recorded within the Study Area at South Soko during tree survey in May 2006.
- **Plant at Shek Pik:** A protected plant species Pavetta *Pavetta hongkongensis* was found within the Study Area at Shek Pik during the survey.
- **Mammals at Shek Pik:** One locally protected bat species Japanese Pipistrelle *Pipistrellus abramus* was recorded within the Study Area.
- **Birds at South Soko:** Eleven bird species of conservation interest, the Great Frigatebird *Fregata minor*, Black Kite *Milvus lineatus*, Osprey *Pandion haliaetus*, White-bellied Sea Eagle *Haliaeetus leucogaster*, Crested Serpent Eagle *Spilornis cheela*, Eurasian Hobby *Falco subbuteo*, Peregrine Falcon *Falco peregrinus*, Pacific Reef Egret *Egretta sacra*, Common Buzzard *Buteo buteo*, Crested Goshawk *Accipiter trivirgatus* and Greater Coucal *Centropus sinensis*, were recorded within the Study Area of South Soko. Aside from the Black Kite, Pacific Reef Egret, White-bellied Sea Eagle and the Greater Coucal, the birds of conservation interest were sighted either only once or flying over the island.
- **Birds at Shek Pik:** Eight bird species of conservation interest; Black Kite *Milvus lineatus*, Pacific Reef Egret *Egretta sacra*, Common Buzzard *Buteo buteo*, Greater Coucal *Centropus sinensis*, Common Kestrel *Falco tinnunculus*, Collared Scops Owl *Otus lettia*, Hwamei *Garrulax canorus* and Bonelli's Eagle *Hieraaetus fasciatus* were recorded within the Study Area at Shek Pik. Aside from the Black Kite, Pacific Reef Egret and Collared

Scops Owl, the birds of conservation interest were sighted flying over Shek Pik.

- **Reptiles at South Soko:** An uncommon reptile, the Plumbeous Water Snake, was recorded in the drainage channel of disturbed area. A protected reptile species Common Rat Snake *Ptyas mucosus* was recorded in the abandoned wet agricultural land located at the southeast of South Soko during the wet season survey.
- **Amphibian at Shek Pik:** An endemic and protected amphibian species, the Romer's Tree Frog *Philautus romeri* was heard at the plantation during a night survey at Shek Pik.
- **Butterflies at South Soko:** Fifteen uncommon and two rare butterfly species including the Banded Awl *Hasora chromus*, Long-banded Silverline *Spindasis lohita*, Three-spot Grass Yellow *Eurema blanda*, Plain Cupid *Chilades pandava*, Common Nawab *Polyura athamas*, Yellow Pansy *Junonia hierta*, White Commodore *Parasarpa dudu*, Striped Blue Crow *Euploea mulciber*, Bush Hopper *Ampittia dioscorides*, Formosan Swift *Borbocinnara*, Tree Flitter *Hyarotis adrastus*, Blue Pansy *Junonia orithya*, Conjoined Swift *Pelopidas conjunctus*, Indian Palm Bob *Suastus gremius*, and Indian Fritillary *Argyreus hyperbius*, and the rare butterfly species Dark Grass Blue *Zizeeria karsandra* and Red Lacewing *Cethosia bibles*, respectively were recorded within the Study Area. Most of the butterfly species of conservation interest were found at the fringe of the secondary woodland or the abandoned wet agricultural land located in the middle of South Soko.
- **Butterflies at Shek Pik:** Four uncommon butterfly species including the Blue Pansy *Junonia orithya*, Chocolate Royal *Remelana jangala*, Banded Awl *Hasora chromus* and Yellow Orange Tip *Ixias pyrene* were recorded within the Study Area.
- **Dragonflies at South Soko:** Three uncommon dragonfly species were recorded. The Greater Blue Skimmer *Orthetrum melania* and Common Evening Hawker *Anaciaeschna jaspidea* were recorded in grassland, abandoned wet agricultural land and sandy shore respectively. One uncommon damselfly Eastern Lilysquatter *Cercion melanotum* (recorded by AFCD) was recorded in the abandoned reservoir.

In accordance with Annex 8 of the EIAO TM the list and evaluation of the above species of ecological interest are provided in Table 8.27 and Table 8.28.

Table 8.27 Evaluation of Species of Conservation Interest Recorded within the Study Area of South Soko

Name	Location	Protection Status	Distribution	Rarity
<b>Plant</b>				
Golden Eulophia <i>Eulophia flava</i>	Recorded in shrubland at South Soko, within the Project Area.	Locally protected plant species	Recorded in Tai Tam, Lantau Island, Lamma Island and Cape D's Aguilar	Rare in Hong Kong
<b>Bird</b>				
Black-eared Kite <i>Milvus lineatus</i>	Various habitats at South Soko. Soaring; >10 sighting records, outside of Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC; Appendix 2 of CITES	Found in many types of habitat areas; East Eurasia	Common and widespread in Hong Kong
Common Buzzard <i>Buteo buteo</i>	Recorded in over open area of the Study Area, including, developed area and grassland at South Soko; within the Project Area.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Widespread in Eurasia	Common winter visitor to Hong Kong
Crested Serpent Eagle <i>Spilornis cheela</i>	On the top of a shrubland at South Soko; perching; one sighting record, outside the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC; Appendix 2 of CITES	Found in terrestrial habitats in Hong Kong	Rare in Hong Kong
Eurasian Hobby <i>Falco subbuteo</i>	In the disturbed area at South Soko; flying past; one sighting record, outside of Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC; Appendix 2 of CITES	Found in open country in Hong Kong	Rare in Hong Kong
Great Frigatebird <i>Fregata minor</i>	Flying past South Soko at a height of several hundred metres; one sighting record, outside the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i>	This "Oceanic" bird and occurs worldwide in tropical oceans and mainly in the Indo-Pacific area.	Rare in Hong Kong
Greater Coucal <i>Centropus sinensis</i>	In various habitats of South Soko; perching; 15 sighting records within the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC	Found in many types of habitats in Hong Kong.	Common and widespread in Hong Kong; Rare in China



Name	Location	Protection Status	Distribution	Rarity
Osprey <i>Pandion haliaetus</i>	Recorded on a tree next to the abandoned wet agricultural land at South Soko; perching and flying; not within Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC; <i>Appendix 2 of CITES</i>	Found in Deep Bay area and coastal habitats in Hong Kong.	Uncommon in Hong Kong
Crested Goshawk <i>Accipiter trivirgatus</i>	Record in the pond area of the Study Area at Shek Pik, outside of Project Area.	Class 2 Protected Animal of PRC; <i>Appendix 2 of CITES</i>	Mainly utilise woodland, widespread in China	Uncommon in Hong Kong
Pacific Reef Egret <i>Egretta sacra</i>	Along the coastline of rocky shore at South Soko; perching; 8 sighting records, not within the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC;	Found in coastal habitats in Hong Kong	Common and widespread in Hong Kong
Peregrine Falcon <i>Falco peregrinus</i>	Along the coastline of rocky shore at South Soko; flying past; one sighting record, not within the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; <i>Appendix 1 of CITES</i>	Found in many types of habitats in Hong Kong	Rare in Hong Kong
White-bellied Sea Eagle <i>Haliaeetus leucogaster</i>	In various habitats of South Soko; soaring and perching; three sighting records within the Project Area.	<i>Wild Animals Protected Ordinance (Cap 170)</i> ; Class 2 Protected Animal of PRC; <i>Appendix 2 of CITES</i>	Found in coastal habitats and reservoirs in Hong Kong	Uncommon in Hong Kong
<b>Herpetofauna</b>				
Common Rat Snake <i>Ptyas mucosus</i>	Abandoned wet agricultural land located at the southeast of South Soko. Within the Project Area.	<i>Appendix 2 of CITES</i>	Widespread	Common
Plumbeous Water Snake	Drainage channel of disturbed area at South Soko. Within the Project Area.	Not protected	Widespread	Uncommon

Name	Location	Protection Status	Distribution	Rarity
<b>Butterfly</b>				
Banded Awl <i>Hasora chromus</i>	Abandoned wet agricultural land and secondary woodland at South Soko, outside the Project Area.	Not protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Blue Pansy <i>Junonia orithya</i> ,	Shrubland and developed area at South Soko, Within Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Bush Hopper <i>Ampittia dioscorides</i>	Abandoned wet agricultural land at South Soko. Within the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Common Nawab <i>Polyura athamas</i>	Plantation of South Soko. Within the Project Area.	Not protected	Widespread in Hong Kong	Uncommon in Hong Kong
Conjoined Swift <i>Pelopidas conjunctus</i>	Plantation, abandoned reservoir at South Soko, outside the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Dark Grass Blue <i>Zizeeria karsandra</i>	Shrubland at South Soko. Within the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Rare in Hong Kong
Formosan Swift <i>Borbo cinnara</i>	Abandoned wet agricultural land at South Soko. Within the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Indian Fritillary <i>Argyreus hyperbius</i>	Grassland at South Soko. Within the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Indian Palm Bob <i>Suastrus gremius</i>	Grassland and plantation at South Soko. Within the Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Long-banded Silverline <i>Spindasis lohita</i>	Plantation at South Soko. Within the Project Area.	Not protected	Widespread in Hong Kong	Uncommon in Hong Kong

Name	Location	Protection Status	Distribution	Rarity
Plain Cupid <i>Chilades pandava</i>	Abandoned wet agricultural land at South Soko. Within the Project Area.	Not protected	Restricted distribution in Hong Kong	Uncommon in Hong Kong, considered of local concern
Red Lacewing <i>Cethosia biblis</i>	Plantation at South Soko, not be directly affected by the development.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Rare in Hong Kong
Striped Blue Crow <i>Euploea mulciber</i>	Secondary woodland, plantation and shrubland at South Soko, within the Project Area.	Not protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Three-spot Grass Yellow <i>Eurema blanda</i>	Plantation at South Soko. Within the Project Area.	Not protected	Sporadically distributed in Hong Kong	Uncommon in Hong Kong
Tree Flitter <i>Hyarotis adrastus</i>	Abandoned wet agricultural land at South Soko, outside of Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
White Commodore <i>Parasarpa dudu</i>	Disturbed area at South Soko. Within the Project Area.	Not protected	Widespread in Hong Kong	Uncommon in Hong Kong
Yellow Pansy <i>Junonia hierta</i>	Disturbed area at South Soko. Within the Project Area.	Not protected	Not widespread, found in a few scattered localities	Uncommon in Hong Kong
<b>Dragonfly</b>				
Common Evening Hawker <i>Anaciaeschna jaspidea</i>	Sandy shore at South Soko. Outside the Project Area.	Not protected	Found in a few localities in Hong Kong	Uncommon in Hong Kong
Eastern Lilysquatter <i>Cercion melanotum</i>	Abandoned Reservoir at South Soko. Outside the Project Area.	Not protected	Found in a few localities in Hong Kong	Uncommon in Hong Kong

Name	Location	Protection Status	Distribution	Rarity
Greater Blue Skimmer <i>Orthetrum melania</i>	Grassland at South Soko. Within the Project Area.	Not protected	Found in a few localities in Hong Kong	Uncommon in Hong Kong

Table 8.28 Evaluation of Species of Conservation Interest Recorded within the Study Area of Shek Pik

Name	Location	Protection Status	Distribution	Rarity
<b>Plant</b>				
<i>Pavetta hongkongensis</i>	Recorded in shrubland at Shek Pik, outside of Project Area.	Locally protected plant species	Widely distributed in Hong Kong woodland	Common
<b>Mammal</b>				
Japanese Pipistrelle <i>Pipistrellus abramus</i>	Recorded in shrubland at Shek Pik, outside of Project Area.	<i>Wild Animals Protection Ordinance (Cap 170)</i>	Widespread	The most common bat in Hong Kong
<b>Bird</b>				
Black-eared Kite <i>Milvus lineatus</i>	In various habitats at Shek Pik; Soaring; >10 sighting records. outside of Project Area.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Found in many types of habitats; East Eurasia	Common and widespread in Hong Kong
Bonelli's Eagle <i>Hieraaetus fasciatus</i>	Recorded in flight over Study Area at Shek Pik, outside of Project Area.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Widespread in South China, North Africa and South Eurasia	Rare and local resident in Hong Kong
Collared Scops Owl <i>Otus lettia</i>	Heard during night survey at Tung Wan and the prison at Shek Pik, outside of Project Area.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Widespread in Asia	Widespread resident in Hong Kong
Common Buzzard <i>Buteo buteo</i>	Flying over the shrubland at Shek Pik.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Widespread in Eurasia	Common winter visitor to Hong Kong
Common Kestrel <i>Falco tinnunculus</i>	Recorded in flight over shrubland of Study Area at Shek Pik, outside of Project Area.	Class 2 Protected Animal of PRC; Appendix 2 of CITES	Widespread in China, Eurasia and Africa	Common and widespread autumn migrant, less common winter visitor
Greater Coucal <i>Centropus sinensis</i>	Flying over the plantation at Shek Pik. within Project Area.	Class 2 Protected Animal of PRC	Found in many types of habitats in Hong Kong.	Common and widespread in Hong Kong; Rare in China

Name	Location	Protection Status	Distribution	Rarity
Hwamei <i>Garrulax canorus</i>	Recorded in plantation at Shek Pik. Within Project Area.	Appendix 2 of CITES	Found in shrubland in Hong Kong; Oriental	Common and widespread in Hong Kong
Pacific Reef Egret <i>Egretta sacra</i>	Along the coastline of rocky shore at Shek Pik; perching; 8 sighting records, outside of Project Area.	Class 2 Protected Animal of PRC;	Found in coastal habitats in Hong Kong	Common and widespread in Hong Kong
<b>Herpetofauna</b>				
Romer's Tree Frog <i>Philautus romeri</i>	Recorded in plantation at Shek Pik, outside of Project Area.	Wild Animals Protection Ordinance (Cap 170)	Found on Lamma, Lantau, Po Toi and Chek Lap Kok Islands	Restricted and endemic
<b>Butterfly</b>				
Banded Awl <i>Hasora chromus</i>	Plantation at Shek Pik however, it was outside of Project Area.	Not protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Blue Pansy <i>Junonia orithya</i> ,	Developed area at Shek Pik, outside of Project Area.	Not Protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Chocolate Royal <i>Remelana jangala</i>	Plantation and shrubland at Shek Pik, outside of Project Area.	Not protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong
Yellow Orange Tip <i>Ixias pyrene</i>	Plantation at Shek Pik Reservoir, outside of Project Area.	Not protected	Not widespread, found in a few scattered localities in Hong Kong	Uncommon in Hong Kong

## 8.6 TERRESTRIAL ECOLOGICAL ASSESSMENT

### 8.6.1 Assessment Methodology

The potential impacts due to the construction and operation of the proposed LNG terminal on South Soko, electricity cable circuit and the water main at Shek Pik are assessed (following the *EIAO-TM Annex 16* guidelines) in the following sections, and the impacts evaluated (based on the criteria in *EIAO-TM Annex 8*).

### 8.6.2 Potential Sources of Impact

Potential impacts that may arise from the construction and operational phases for both South Soko and Shek Pik are detailed below.

*Construction Phase*

- Direct habitat and vegetation loss and habitat fragmentation resulting from land take for the LNG terminal and associated facilities;
- Direct loss of inactive/less mobile/habitat-specific wildlife nesting/inhabiting the affected area;
- Associated potential impacts to wildlife, including restriction of wildlife utilisation of the area (i.e., transit, feeding and roosting), degradation of habitat quality/ ecological function as a result of temporary and permanent loss, isolation and fragmentation of ecological habitat; and
- Potential impacts to the surrounding habitat and associated wildlife due to physical disturbance of this habitat including noise, increased human activity or hill fire.

*Operational Phase*

- Potential impacts to the surrounding habitat and associated wildlife due to increased human activities and disturbance (i.e., noise and light) associated with the operation of the LNG terminal at South Soko.
- Potential impacts to avifauna during operation of the LNG terminal at South Soko due to the increase in noise, air pollution, lighting, glare and physical barrier.
- Potential impacts to the surrounding habitat and associated wildlife due to LNG leakage, vaporisation and fire hazard during the operation of the LNG terminal at South Soko.

**8.6.3 Assessment of Ecological Impacts**

The land-based Project Area (excluding sandy shore and artificial shore) at South Soko to be directly affected will be approximately 19.7 ha (for the detailed location refers to *Figure 8.29*). The Project Area at Shek Pik to be directly affected will be approximately 0.15 ha (*Figure 8.30*). The major impact on terrestrial ecological resources will be direct habitat loss.

*Construction Phase***South Soko**

The potential direct impacts during the construction phase will be:

Habitat Loss

- Permanent loss of secondary woodland (approximately 0.2 ha), plantation (approximately 2.8 ha), shrubland (approximately 7.3 ha), grassland (approximately 1.8 ha), abandoned wet agricultural land (approximately 0.5 ha) and disturbed area (approximately 5.3 ha) due to the construction

of the LNG terminal platform and cryogenic pipeline route (refer to *Figure 8.29* and *Table 8.29*);

- Relocation and potential loss of floral species (Golden Eulophia) of conservation interest;
- Temporary loss of plantation (approximately 0.5 ha) and disturbed area (approximately 0.3 ha) and shrubland (approximately 1.0 ha) due to the construction of temporary construction stores, access road and spoil storage (details refer to *Figure 8.29* and *Table 8.29*) which will be revegetated after completion of work; and,
- Potential loss of foraging and feeding ground for wildlife, particularly species of conservation interest recorded in the Study Area of South Soko during the surveys (*Table 8.29*).

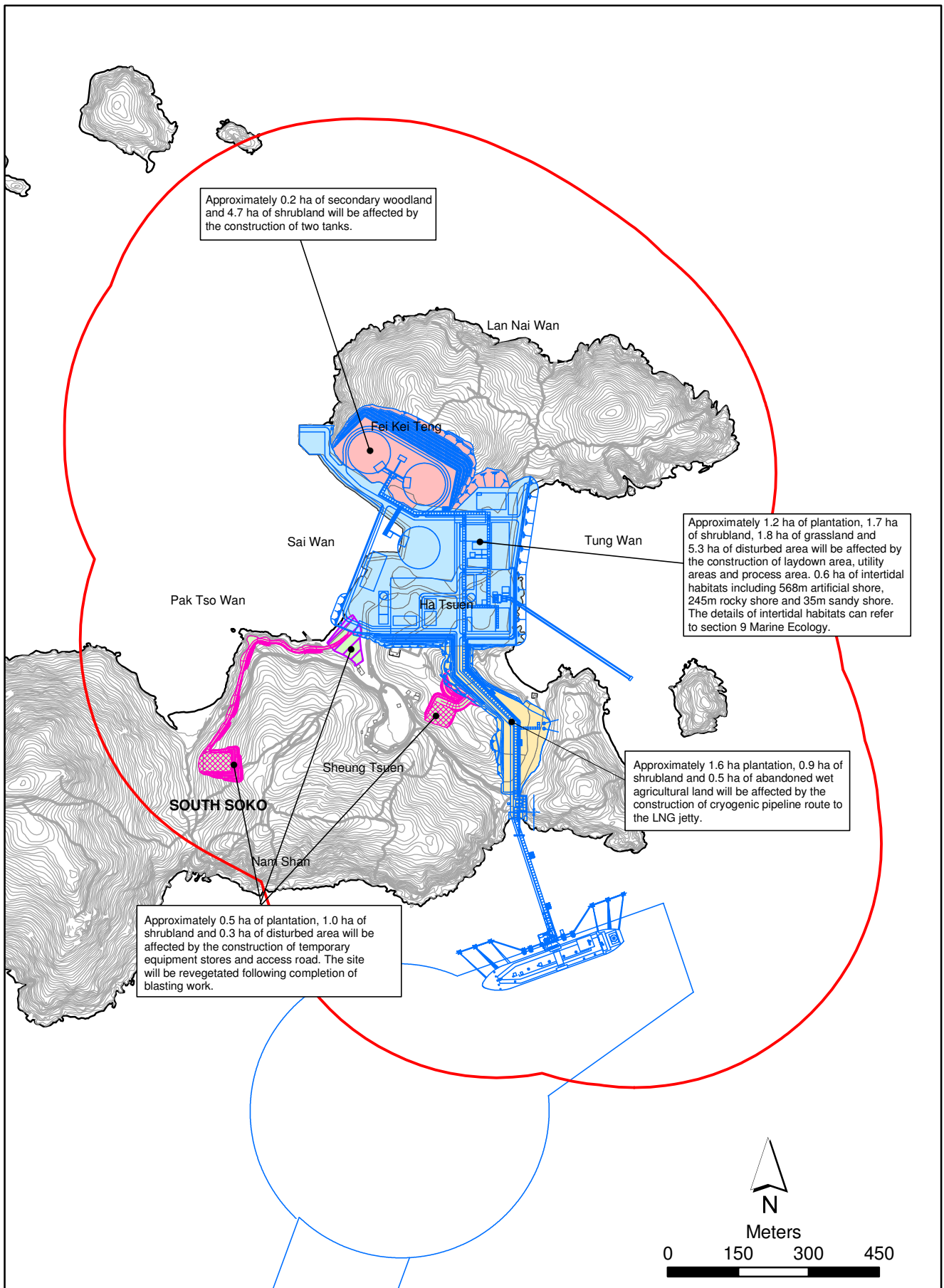


FIGURE 8.29

Impacts of the Development of LNG Terminal on Existing Habitats at South Soko

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Date: 23/11/2006

Environmental Resources Management





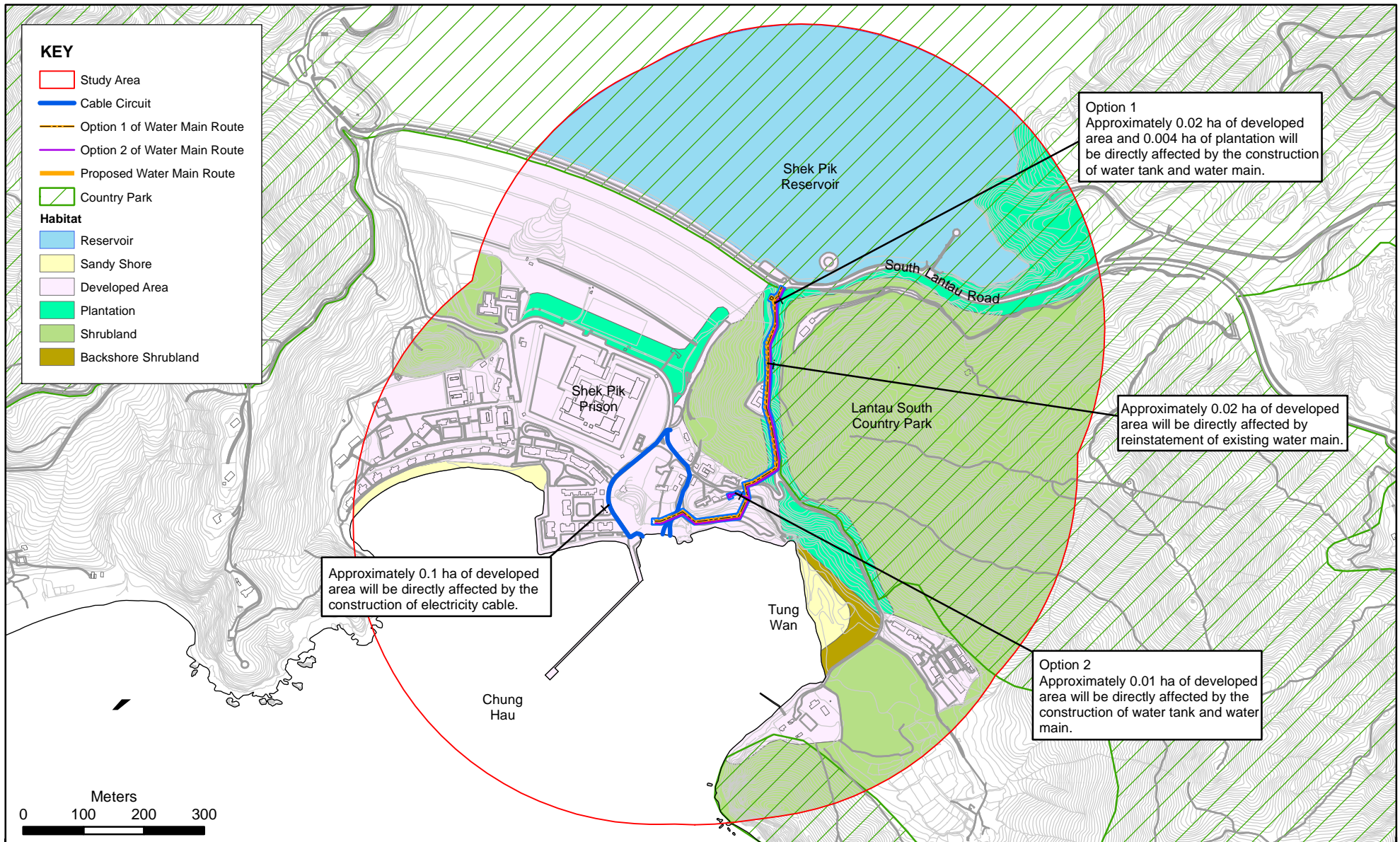


Figure 8.30

Impacts of Development of Electricity Cable & Water Main on the Existing Habitats at Shek Pik

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Date: 24/08/2006

Environmental  
Resources  
Management



Table 8.29 Overall Habitat Loss at South Soko due to the LNG terminal

Impacted Habitats	Permanent Loss (Land Take for the LNG Terminal) (ha)	Potential Temporary Loss (Land Take for the Construction Stores, Spoil Storage Area, Access Road and Cut Slope) (ha)	Ecological Importance of the Affected Habitats
Secondary Woodland	~ 0.2	-	Moderate
Plantation	~ 2.8	~ 0.5	Low to moderate
Shrubland	~ 7.3	~ 1.0	Low to moderate
Abandoned Wet Agricultural Land	~ 0.5	-	Low to moderate
Grassland	~ 1.8	-	Low
Disturbed Area	~ 5.3	~ 0.3	Negligible

Note: The total permanent area loss by the excavation/soil levelling and cut/slope stabilisation is 18.5 ha. 0.6 ha of which are the upper intertidal habitats along 560m artificial shore, 245m rocky shore and 35m sandy shore and is detailed in Section 9 Marine Ecology.

Table 8.30 Impacts on the Species of Conservation Interest at South Soko

Species of Conservation Interest	Impacts	Location Recorded
<b>Plant</b>		
Golden Eulophia (protected under the FCPO in Hong Kong)	A small part of their associated habitat (approximately 8.3 ha of shrubland) will be affected, there are extensive similar habitats in proximity (at least 82 ha of shrubland available on South Soko Island).	Shrubland at Fei Kei Teng.
<b>Birds</b>		
Greater Coucal (protected under WAPO in Hong Kong, Class 2 Protected Animal of PRC)	A small part of their associated habitat (approximately 3.3 ha of plantation, 8.3 ha of shrubland and 1.8 ha of grassland) will be affected, there are extensive similar habitats in proximity (at least approximately 11 ha of plantation, 82 ha of shrubland and 2.1 ha of grassland available on South Soko Island).	Plantation, shrubland and grassland at Ha Tsuen (perching).
White-bellied Sea Eagle (protected under WAPO in Hong Kong, Class 2 Protected Animal of PRC, Appendix 2 of CITES)	A small part of their associated habitat (approximately 8.3 ha of shrubland) will be affected, there are extensive similar habitats in proximity (at least 82 ha of shrubland available on South Soko Island).	Shrubland at Fei Kei Teng (perching).
Black Kite (protected under WAPO in Hong Kong, Class 2 Protected Animal of PRC, Appendix 2 of CITES)	A small part of their associated habitat will be affected, there are extensive similar habitats in proximity (at least 11 ha of plantation and 82 ha of shrubland available on South Soko Island).	Soaring in the sky over the site.

Species of Conservation Interest	Impacts	Location Recorded
Common Buzzard (protected under WAPO in Hong Kong, Class 2 Protected Animal of PRC, Appendix 2 of CITES)	A small part of their associated habitat will be affected, there are extensive similar habitats in proximity (at least 11 ha of plantation and 82 ha of shrubland available on South Soko Island).	Open area of shrubland, disturbed area and grassland.
<b>Butterfly</b>		
Bush Hopper (uncommon), Formosan Swift (uncommon), Three-spot Grass Yellow (uncommon), Indian Palm Bob (uncommon), Dark Grass Blue (rare), Yellow Pansy (uncommon), Striped Blue Crow (uncommon), Tree Flitter (uncommon), Blue Pansy (uncommon), Common Nawab (uncommon) and White Commodore (uncommon)	A small part of their associated habitat (approximately 0.5 ha abandoned wet agricultural land, 3.3 ha of plantation, 1.8 ha of grassland and 8.3 ha of shrubland) will be affected, there are extensive similar habitats in proximity (at least 0.5 ha of abandoned agricultural land, 11 ha of secondary woodland, 82 ha of shrubland on South Soko Island).	Abandoned wet agricultural land at Sheung Tsuen, plantation, grassland, shrubland and disturbed area (pier) at Sai Wan
<b>Dragonflies</b>		
Greater Blue Skimmer (uncommon)	Their foraging habitat (approximately 1.8 ha of grassland) will be affected (at least 2.1 ha of grassland on South Soko).	Grassland.
<b>Reptiles</b>		
Common Rat Snake (Appendix 2 of CITES)	A small part of their associated habitat (approximately 0.5 ha abandoned wet agricultural land) will be affected; there are extensive similar habitats in close proximity (at least 0.5 ha of abandoned wet agricultural land on South Soko Island).	Abandoned wet agricultural land at Sheung Tsuen.

It should be noted that the routing of cryogenic pipeline to the jetty (Figure 8.29) has been aligned to avoid the disturbance of the central area of South Soko. Should the existing concrete path (approximately 4 m wide) from Sai Wan to the south of South Soko passing along the abandoned reservoir and abandoned wet agricultural land to be used for the routing of cryogenic pipeline to the jetty, extensive slope cutting and stabilisation works and disturbance to the abandoned reservoir could not be avoided. The existing concrete path has a level of approximately +20 mPD and with steep slope along the majority of the path. As the engineering design requires the final ground level of cryogenic pipeline be +10 mPD along the whole route (to at least 50 m wide), extensive slope stabilisation work (with hill side of a level of up to 30 m) on both sides of the cryogenic pipeline route will be required with the need to drain the abandoned reservoir during the construction phase. According to the baseline surveys, the existing abandoned reservoir is the foraging habitat for several species of conservation interest including dragonfly Eastern Lilysquatter, butterfly Conjoined Swift, bird species Black Kite and White-bellied Sea Eagle. Moreover, the existing concrete road (4 m

wide) is required to be widened for the accommodation of the cryogenic pipeline (to at least 50 m wide, with slope stabilisation work on both sides) that extensive disturbances and tree cutting on the existing plantation and abandoned reservoir along the concrete road are predicted. The routing of cryogenic pipeline to the jetty from the eastern side towards the south of South Soko is approximately 100 m shorter than going along the existing concrete road, which has reduced the area of habitat loss and disturbance of wildlife.

#### Habitat Fragmentation and Isolation

Habitat fragmentation and isolation is not expected as the existing natural habitats, in particular the shrubland and plantation to the north and south, are already physically separated by the site of the former Detention Centre and associated roads and paths.

Habitat fragmentation and isolation effects to the surrounding habitats from the clearance of a corridor for the cryogenic pipeline from the terminal to the LNG carrier jetty (approximately 50 m wide) is expected to be minimal as the affected habitats are located in the eastern end of the island and as such, the larger undisturbed habitats will remain untouched.

#### Other Impacts

Secondary impacts to the surrounding habitats at South Soko (generally of low ecological importance) and associated wildlife may arise from the increased noise impact, human activities and disturbance, and construction site runoff. The impacts are expected to be low owing to the temporary nature and relatively small scale of the construction works, environmental management measures and regular checks on construction boundaries will be conducted. Impacts to ecological resources are not expected to be unacceptable.

#### **Shek Pik**

The installation of the water main and electricity cable circuit at Shek Pik will involve construction of new water tank, reinstatement of existing water main site clearance and trenching work, which will lead to the loss of existing habitats, mainly in the developed area.

The potential direct impacts during the construction phase will be:

#### Habitat Loss

- Permanent loss of plantation (approximately 0.004 ha) and developed area (approximately 0.02 ha) for option 1 water tank, or permanent loss of developed area of 0.01 ha of developed area for option 2 water tank due to the installation of new water tank (refer to *Figure 8.30* and *Table 8.31*);

- Temporary loss of developed area (approximately 0.1 ha), due to the trenching work for the installation of electricity cable circuit (refer to Figure 8.30 and Table 8.31);
- Temporary loss of developed area (approximately 0.02 ha), due to the trenching work for reinstatement of existing water main (refer to Figure 8.30 and Table 8.31); and,
- Potential loss of foraging and feeding ground of the associated wildlife (Table 8.32).

**Table 8.31 Overall Habitat Loss at Shek Pik due to the Water Main and Cable Circuit**

Development	Impacted Habitats	Permanent Loss (Land Taken for the Water Tank) (ha)	Potential Temporary Loss (Land Take for Trenching Work) (ha)	Ecological Importance of the Affected Habitats
New Water Tank Option 1	Plantation	~ 0.004		Low
	Developed Area	~ 0.02		Negligible
New Water Tank Option 2	Developed Area	~ 0.01		Negligible
Electricity Cable	Developed Area		~ 0.1	Low
Reinstatement of Existing Water Main	Developed Area		~ 0.02	Negligible

**Table 8.32 Impacts on the Species of Conservation Interest at Shek Pik**

Species of Conservation Interest	Impacts	Location Recorded
<b>Birds</b>		
Greater Coucal (protected under WAPO in Hong Kong, Class 2 Protected Animal of PRC)	A small part of their associated habitat (approximately 0.004 ha of plantation) will be affected, there are extensive similar habitats in proximity (approximately 8.8 ha of plantation).	Plantation, shrubland (perching).
Hwamei <i>Appendix 2</i> of CITES	A small part of their associated habitat (approximately 0.004 ha of plantation) will be affected, there are extensive similar habitats in proximity (approximately 8.8 ha of plantation).	Plantation.

## Habitat Fragmentation and Isolation

Habitat fragmentation and isolation is not expected as the electricity cable and water main will be installed mainly along or next to the existing Shek Pik Reservoir Road.

### Other Impacts

Secondary impacts to the surrounding habitats at Shek Pik (generally of low ecological importance) and associated wildlife may arise from the potential of increased noise impact, human activities and disturbance and construction site runoff. The impacts are expected to be low owing to the existing human presence in the area, the temporary nature and relatively small scale of the construction works, and environmental management measures and regular checks on construction practices will be conducted. Impacts are not expected to be unacceptable.

### *Operational Phase*

#### **South Soko**

Operational phase impacts to terrestrial ecology may arise from increased human activities in the area resulting in disturbance to the surrounding habitats and associated wildlife, if uncontrolled.

Vapourisation of LNG releases will be a potential risk provided that there is an ignition source in the vicinity. The unlikely event of leakage of LNG will be handled by the terminal's fire prevention system (details are presented in *Part 2 Section 13 Hazard to Life Assessment*), and consequently impacts to the terrestrial ecological resources through spread of fire would not be expected. The impacts associated with accidental spills of LNG are discussed in *Part 2 Section 13 Hazard to Life Assessment*.

To the extent practical, structures will utilise appropriate design to complement the surrounding landscape. Materials and finishes will be considered during detailed design. The major lighting sources will be pointed inward and downwards to avoid disturbance to birds.

The equipment of the terminal are guaranteed by suppliers that they are free of the characteristics of tonality, impulsiveness and intermittency which indicate that the noise level will remain, at low level and mainly restricted within the terminal area. In addition, the noise emission sources will mainly be enclosed within building structures and therefore noise impacts on birds due to the operation of the terminal are not expected to be significant.

The air emission due to the operation of the terminal will be mainly restricted within the terminal area. Bird species will expect to have low utilisation within the terminal area during operation, and significant air impact on birds due to the operation of the terminal are not expected.

**Shek Pik**

No significant impacts are expected to arise from the operation of the water main or electricity cable at Shek Pik.

*Cumulative Impact*

At present there are no planned projects on South Soko or Shek Pik that could have cumulative terrestrial ecological impacts with the construction of the LNG terminal.

**8.6.4 Impact Evaluation**

*Habitat Loss*

**South Soko**

Potential impacts to ecology have been evaluated according to *Table 1 of Annex 8 of the EIAO TM*. *Tables 8.33 to 8.36* present an evaluation of the habitat loss due to the Project on South Soko.

Secondary Woodland

There shall be permanent habitat loss of approximately 0.2 ha of secondary woodland at South Soko. In view of the the small size of the habitat affected (0.2 ha), availability similar habitat in the vicinity, it is considered that impact to the wildlife within the secondary woodland would not be significant.

**Table 8.33 Overall Impact Evaluation for Secondary Woodland at South Soko**

<b>Evaluation Criteria</b>	<b>Secondary Woodland</b>
<i>Habitat quality</i>	The habitat quality is moderate.
<i>Species</i>	No species of conservation interest will be impacted.
<i>Size/Abundance</i>	Permanent loss approximately 0.2 ha
<i>Duration</i>	The impact will persist during the construction and operational phases.
<i>Reversibility</i>	The secondary woodland is small in size. The habitat loss could be recreated but would require a certain period of time to reach maturity.
<i>Magnitude</i>	The scale of the habitat loss and impact is small in the context of the surrounding similar habitats, flora and fauna.
<b>Overall Impact Conclusion Low</b>	

Plantation

The permanent and temporary habitat loss of plantation habitat at South Soko are approximately 2.8 and 0.5 ha respectively, and will have the potential to impact bird (Greater Coucal) and butterfly species (Common Nawab, Three-spot Grass Yellow, Indian Palm Bob, Long-banded Silverline, Striped Blue

Crow, Common Mapwing, Banded Awl, Yellow Pansy and White Commodore). In view of the generally low to moderate ecological importance of the plantation, the small size of the habitat affected (3.6 ha), availability similar habitat in the vicinity and the high mobility of birds and butterflies, it is considered that impact to the birds and butterflies within the plantation would not be significant.

**Table 8.34 Overall Impact Evaluation for Plantation at South Soko**

Evaluation Criteria	Plantation
<i>Habitat quality</i>	The habitat quality is low to moderate.
<i>Species</i>	The potential exists for direct and indirect impacts to the wildlife, including bird (Greater Coucal) and butterfly species (Common Nawab, Three-spot Grass Yellow, Indian Palm Bob, Long-banded Silverline, Striped Blue Crow, Common Mapwing, Yellow Pansy and White Commodore). In view of the generally extensive available similar habitat in the vicinity, high mobility of birds and butterflies, it is believed that impact to the birds and butterflies within the Project Area would not be significant.
<i>Size/Abundance</i>	Approximately 2.8 ha of plantation will be lost permanently and 0.5 ha plantation will be lost temporarily.
<i>Duration</i>	The impact will persist during the construction and operational phases.
<i>Reversibility</i>	The plantation is dominated by exotic canopy species. The habitat could be recreated but require around 10 years time to reach maturity.
<i>Magnitude</i>	The scale of the habitat loss and impact is small in the context of the surrounding similar habitats, flora and fauna.
<b>Overall Impact Conclusion Low</b>	

### Shrubland

The permanent and temporary habitat loss of the shrubland at South Soko involves approximately 7.3 ha and 1.0 ha respectively, with potential impacts to floral and faunal species of conservation interest, including orchid Golden Eulophia, birds (White-bellied Sea Eagle and Common Buzzard), and butterfly species (Striped Blue Crow, Tree Flitter and Blue Pansy) in shrubland. In view of the generally poor vegetation cover and the dryness of the shrubland, it is considered that the Project Area does not provide optimal habitat for birds and butterflies, and that the impact to wildlife would not be significant. Impacts to Golden Eulophia located within the Project Site can be reduced by transplantation.



Table 8.35 Overall Impact Evaluation for Shrubland at South Soko

Evaluation Criteria	Shrubland
<i>Habitat quality</i>	The habitat quality is low to moderate.
<i>Species</i>	The potential exists for direct and indirect impacts to floral and faunal species, including orchid (Golden Eulophia), bird (White-bellied Sea Eagle and Common Buzzard), and butterfly species (Striped Blue Crow, Tree Flitter and Blue Pansy) in shrubland.. In view of the generally poor vegetation cover and the dryness of the shrubland, it is considered that the Project Area does not provide optimal habitats for birds and butterflies.
<i>Size/Abundance</i>	Approximately 7.3 ha of shrubland will be lost permanently and 1.0 ha of shrubland will be lost temporarily.
<i>Duration</i>	The impact will persist during the construction and operational phases.
<i>Reversibility</i>	The shrubland originated from the hill fire affected shrubby grassland. It is readily creatable.
<i>Magnitude</i>	The scale of the habitat loss and impact is small in the context of the surrounding similar habitats and flora and fauna present.
<b>Overall Impact Conclusion Low</b>	

## Abandoned Wet Agricultural Land

The habitat loss of abandoned wet agricultural land amounts to approximately 0.5 ha. Wildlife species potentially affected, include butterflies (Bush Hopper and Formosan Swift) and the Common Rat Snake. In view of the low ecological value of abandoned wet agricultural land, it is considered that the habitat to be lost does not provide optimal habitat for birds and butterflies.

Table 8.36 Overall Impact Evaluation for Abandoned Wet Agricultural Land at South Soko

Evaluation Criteria	Abandoned Wet Agricultural Land
<i>Habitat quality</i>	The habitat quality is low to moderate.
<i>Species</i>	The potential exists for direct and indirect impacts to wildlife, including butterfly species Bush Hopper and Formosan Swift and reptile species Common Rat Snake recorded in abandoned wet agricultural land. The affected habitat is believed to be foraging area. In view of the low ecological value of abandoned wet agricultural land, it is believed that the area affected does not provide optimal habitat for birds and butterflies.
<i>Size/Abundance</i>	Approximately 0.5 ha of abandoned wet agricultural land will be lost permanently.
<i>Duration</i>	The impact will persist during the construction and operational phases.
<i>Reversibility</i>	Abandoned wet agricultural land regenerated after cessation of agricultural activities. It is readily creatable.
<i>Magnitude</i>	The scale of the habitat loss and impact is small in the context of the surrounding similar habitats and flora and fauna present.
<b>Overall Impact Conclusion Low</b>	

## Grassland and Disturbed Area

The habitat loss of the grassland and disturbed area at South Soko amounts to approximately 1.8 ha (permanent loss) and 5.6 ha (permanent and temporary loss) respectively. Wildlife species potentially affected include bird (Greater Coucal and Common Buzzard), butterflies (Yellow Pansy, Blue Pansy, Indian Fritillary, White Commodore and Indian Palm Bob) and dragonflies Greater Blue Skimmer. In view of the generally low ecological importance of grassland and disturbed area, the small size of the habitat to be affected, the availability of similar habitat in the vicinity and the high mobility of bird species, it is predicted that impacts to the bird species within the Project Area would not be significant.

**Table 8.37** *Overall Impact Evaluation for Grassland and Disturbed Area within Project Area at South Soko*

<b>Evaluation Criteria</b>	<b>Grassland &amp; Disturbed Area</b>
<i>Habitat quality</i>	The habitat quality is low or negligible.
<i>Species</i>	The potential exists for direct and indirect impacts to the wildlife, including birds (Greater Coucal and Common Buzzard), butterflies (Yellow Pansy, Blue Pansy, Indian Fritillary, White Commodore and Indian Palm Bob) and dragonfly (Greater Blue Skimmer). In view of the generally low ecological importance of grassland and disturbed area, small size of the habitat to be affected, similar habitat in the vicinity and the high mobility of bird species, it is predicted that impacts to the bird species within the Project Area would not be significant.
<i>Size/Abundance</i>	Area lost permanently is approximately 5.3 ha for the disturbed area and 1.8 ha for the grassland and area lost temporarily is approximately 0.3 ha for the disturbed area.
<i>Duration</i>	The impact will persist during the construction and operational phases.
<i>Reversibility</i>	The grassland and disturbed area were mainly created in 1990s.
<i>Magnitude</i>	The scale of the habitat loss is small in the context of the surrounding similar habitats.
<b>Overall Impact Conclusion</b>	<b>Low to Negligible</b>

In conclusion, the direct ecological impacts due to the construction of the LNG terminal are expected to be of low severity and magnitude, and will not contribute to any potential cumulative impact.

Habitat loss (permanent and temporary) due to the Project during construction and operation will reduce the area of foraging and feeding grounds for wildlife (particularly the species of conservation interest recorded), including Greater Coucal, White-bellied Sea Eagle Common Buzzard, Common Rat Snake, Yellow Pansy, Blue Pansy, Tree Flitter, Common Nawab, Common Mapwing, Striped Blue Crow, Indian Palm Bob, Three-spot Grass Yellow, Indian Palm Bob, White Commodore, Greater Blue Skimmer, Bush Hopper and Formosan Swift. The impacts are expected to be low owing to the extensive habitat areas available in the vicinity, as well as the temporary nature of the construction work, and given that regular checks on

construction boundaries will be conducted. Potential impacts on the protected plant species Golden Eulophia, will be reduced through transplantation prior to the commencement of the construction works.

### Shek Pik

Potential impacts to ecology have been evaluated according to *Table 1 of Annex 8 of the EIAO TM*. *Tables 8.38 to 8.39* present an evaluation of the habitat loss at Shek Pik due to the Project.

The permanent habitat loss of plantation at Shek Pik involves about 0.004 ha if option 1 of new water tank is required. Bird species of conservation interests included Hwamei and Greater Coucal will be impacted by the loss of plantation. In view of the generally low ecological importance of the plantation, low abundance of wildlife, the small size of the habitat affected, the availability of similar habitat in the vicinity and its temporary nature, it is considered that impact to wildlife within the Project Area would not be significant.

**Table 8.38 Overall Impact Evaluation for Plantation at Shek Pik**

Evaluation Criteria	Plantation
<i>Habitat quality</i>	The habitat quality is low.
<i>Species</i>	Species of conservation interest included bird species Hwamei and Greater Coucal.
<i>Size/Abundance</i>	Area loss permanently is small in size: approximately 0.004 ha.
<i>Duration</i>	The impact will persist during the construction and operation phase.
<i>Reversibility</i>	Not Applicable
<i>Magnitude</i>	The scale of the habitat loss and impact is small in the context of the surrounding similar habitats and flora and fauna present.
<b>Overall Impact Conclusion Low</b>	

The permanent habitat loss of developed area at Shek Pik involves approximately 0.02 ha and 0.01 ha for the adoption of option 1 and option 2 of new water tank. In view of the generally low ecological importance of developed area, the small size of the habitat to be affected and the availability of similar habitat in the vicinity, it is predicted that impacts to the wildlife within the Project Area would not be significant.

Table 8.39 Overall Impact Evaluation for Developed Area at Shek Pik

Evaluation Criteria	Developed Area
<i>Habitat quality</i>	The habitat quality is negligible.
<i>Species</i>	The potential exists for direct and indirect impacts to the wildlife. In view of the generally low ecological importance of developed area, small size of the habitat to be affected and similar habitat in the vicinity, it is predicted that impacts to the wildlife within the Project Area would not be significant.
<i>Size/Abundance</i>	Area lost permanently and temporarily are approximately 0.02 ha and 0.12 ha respectively.
<i>Duration</i>	The impact will persist during the construction and operational phases for permanent loss and only during construction phase for temporary loss.
<i>Reversibility</i>	The developed area is readily recreatable.
<i>Magnitude</i>	The scale of the habitat loss is small in the context of the surrounding similar habitats.
<b>Overall Impact Conclusion</b>	<b>Negligible</b>

In conclusion, the direct ecological impacts due to the installation of the water main and electricity circuit, and the construction of the new water tank at Shek Pik are expected to be of low severity and magnitude, and will not contribute to any potential cumulative impact.

Habitat loss (permanent and temporary) due to the Project during the construction and operation will reduce the area of foraging and feeding grounds of the wildlife close to the Project Areas. Impacts are expected to be low, owing to the extensive habitats alternative available in the vicinity, as well as the temporary nature and small scale of the construction work, and given that regular checks on construction boundaries will be undertaken.

#### *Other Associated Impacts*

**Habitat Fragmentation and Isolation** – As the LNG terminal will mainly be located on the existing disturbed area and as the scale of the habitat loss is small in the context of the surrounding similar habitats, the potential impacts of habitat fragmentation and isolation are considered to be minimal.

**Other Impacts** – Increased human activity and disturbance due to the Project during construction have the potential to affect the surrounding natural habitats and the associated wildlife. These potential impacts are expected to be low given that regular checks on construction boundaries will be conducted.

The major lighting sources will be pointed inward and downwards so all light rays travel downward and not horizontally or up to avoid disturbance to birds. These impacts would be considered less-than-significant because there are large undisturbed habitats remain untouched in South Soko. No unacceptable air and noise impacts towards birds during the operational phase at either South Soko or Shek Pik are expected.

## 8.7 SUMMARY OF MITIGATION MEASURES

*Annex 16* of the *EIAO TM* states that the general policy for mitigation of significant ecological impacts, in order of priority, is:

**Avoidance:** Potential impacts should be avoided to the maximum extent practicable by adopting suitable alternatives;

**Minimisation:** Unavoidable impacts should be minimised by taking appropriate and practicable measures such as constraints on intensity of works operations or timing of works operations; and

**Compensation:** The loss of important species and habitats may be provided for elsewhere as compensation. Enhancement and other conservation measures should always be considered whenever possible.

### 8.7.1 Avoidance

As part of the site selection process for the LNG terminal, a total of 27 sites have been analysed (see Part 1 *Section 5* of this EIA Report). Two sites (Black Point and South Soko) were selected for further analysis. Disturbance to terrestrial ecological resources of acknowledged conservation significance was avoided by screening out the following areas from consideration:

- Wild Animal Protection Areas;
- Conservation Areas;
- Coastal Protection Areas;
- Registered Sites of Special Scientific Interests (SSSIs); and,
- Country Parks.

The Project Area on South Soko (mainly shrubland and disturbed area), is not considered to contain important wildlife and floristic habitat. Furthermore, the proposed LNG terminal will be mainly located in habitats such as the already disturbed areas which were formerly part of the Detention Centre.

It should be noted that the routing of cryogenic pipeline to the jetty (*Figure 8.29*) has been aligned to avoid the disturbance of the central area of South Soko. Should the existing concrete path (approximately 4 m wide) from Sai Wan to the south of South Soko passing along the abandoned reservoir and abandoned wet agricultural land to be used for the routing of cryogenic pipeline to the jetty, extensive slope cutting and stabilisation works and disturbance to the abandoned reservoir could not be avoided. The existing concrete path has a level of approximately +20 mPD and with steep slope along the majority of the path. As the engineering design requires the final ground level of cryogenic pipeline be +10 mPD along the whole route (to at least 50 m wide), extensive slope stabilisation work (with hill side of a level of

up to 30 m) on both sides of the cryogenic pipeline route are required with the need to drain the abandoned reservoir during the construction phase. According to the baseline surveys, the existing abandoned reservoir is the foraging habitat for several species of conservation interest including dragonfly Eastern Lilysquatter, butterfly Conjoined Swift, bird species Black Kite and White-bellied Sea Eagle. Moreover, the existing concrete road (4 m wide) is required to be widened for the accommodation of the cryogenic pipeline (to at least 50 m wide, with slope stabilisation work on both sides) that extensive disturbances and tree cutting on the existing plantation and abandoned reservoir along the concrete road are expected. The routing of cryogenic pipeline to the jetty from the eastern side towards the south of South Soko is approximately 100 m shorter than going along the existing concrete road, which has reduced the area of habitat loss and disturbance of wildlife.

The Project Area at Shek Pik (mainly developed area), was also not considered to constitute important wildlife or floristic habitat. None of the terrestrial habitats recorded in the Study Area at Shek Pik are of high ecological importance, with most of the habitats recorded as low to moderate and the developed area is regarded as negligible ecological importance. The proposed water pipeline/circuit route will also be located mainly in developed areas, along existing roads. Reinstatement work of the existing water main shall be confined to the developed area.

### 8.7.2

#### *Minimisation*

The previous discussion in *Section 8.6* has indicated that the impacts on ecological resources due to the construction and operation of the proposed LNG terminal are generally expected to be low and acceptable. It should be noted that this is a win-win option to reduce the disturbance through minimising sea reclamation (disturbance to marine habitat and mammals) and to allow a balance of cut and fill for the proposed land formation. The following conservation measures to reduce disturbance to surrounding habitats will be also taken.

#### *Habitat and Wildlife*

- The routing of temporary haul road to the construction stores has reduced the disturbance to natural habitat in the vicinity by following an abandoned road instead of formation of new path;
- The temporary construction store was located next to the proposed cryogenic pipeline. This has minimised the disturbance to natural habitat by avoiding the construction of temporary haul road and fulfil the safety requirement of at least 300 m away from the store at the same time;
- To the extent practical, structures will utilise appropriate design to complement the surrounding landscape. Materials and finishes will be considered during detailed design; and,

- The major lighting sources will be pointed inward and downwards where practicable to ensure the light rays travel downward and not horizontally or up to reduce light spill.

#### *Vegetation Loss*

- The Golden Eulophia (9 individuals) recorded within the Project Area will be transplanted to a similar habitat in the vicinity, i.e., shrubland with open canopy and south facing, which can be found in the southern part of South Soko. A detailed vegetation survey on the Golden Eulophia within the impacted shrubland and Project Area would be conducted by a suitably qualified botanist/ ecologist to identify and record the affected individuals prior to the commencement of site clearance works. Feasibility and suitability of transplanting the affected plant species of conservation interest would be carefully studied and suitable receptor sites would be identified. Detailed transplantation proposal providing information of transplantation methodology, recipient site, implementation programme, watering requirement, post-transplanting monitoring and personal involved shall be submitted to and approved by EPD and AFCD. Transplantation would be undertaken and supervised by a suitably qualified botanist/ horticulturist. After transplantation, monitoring will be undertaken to check the performance and health conditions of the transplanted individuals on a weekly basis in the first month after transplantation and monthly basis for addition eleven months. Remedial actions will be discussed with AFCD in the event of unsuccessful transplantation.

#### *Appropriate Construction Practice*

- Erect fences along the boundary of the works area before the commencement of works to prevent vehicle movements, and encroachment of personnel, onto adjacent areas;
- Regularly check the work site boundaries to ensure that they are not breached and that damage does not occur to surrounding areas; and,
- Reinstate temporarily affected areas, particularly the plantation and shrubland habitats at South Soko, and plantation at Shek Pik, immediately after completion of construction works, through on-site tree/shrub planting. The tree/shrub species will be chosen with reference to those in the surrounding area and the food plant of butterfly species of conservation interest (*Table 8.6*) and/or *Annex 8*.

### 8.7.3

#### *Compensation*

- The Project will provide compensatory tree and shrub planting for the loss of secondary woodland (approximately 0.2 ha), shrubland (1.9 ha), grassland (1.3 ha) and revegetate the temporary lost habitat including the areas of the temporary construction stores and spoil storage area (refer to

Table 11.6 in Section 11). The location of the proposed compensatory planting is presented in Figure 11.20. The selection of planting species shall be made with reference to the species identified in Annex 8 and be native to Hong Kong or the South China region, and will include food plants of the butterfly species of conservation interest (refer to Table 8.6), to provide additional measures for the butterflies.

## 8.8 RESIDUAL ENVIRONMENTAL IMPACTS

### 8.8.1 South Soko

No adverse residual impact due to the construction and operation of the LNG terminal is expected at South Soko after the implementation of the proposed mitigation measures including provision of approximately 0.2 ha of compensatory secondary woodland planting, approximately 1.9 ha of shrub planting, approximately 1.3 ha of grass planting and transplantation of individuals of the Golden Eulophia. The residual habitat loss after mitigation will be 2.8 ha of plantation, 5.4 ha of shrubland, 0.5 ha of abandoned wet agricultural land, 0.5 ha of grassland and 5.3 ha of disturbed area. The affected areas are considered to be low/negligible to moderate quality habitats.

### 8.8.2 Shek Pik

Approximately 0.004 ha of plantation and 0.02 ha of developed area will be permanently lost and 0.12 ha of developed area will be temporarily lost. The affected areas are considered to be low/negligible quality habitat. No adverse residual impact due to the construction of electricity cable circuit and water main is expected.

## 8.9 ENVIRONMENTAL MONITORING AND AUDIT

The implementation of the ecological mitigation measures described in Section 8.7 will be included within the environmental monitoring and audit requirement during the construction period.

The Golden Eulophia is identified of conservation interest in the shrubland that will have the potential to be directly impacted by the proposed developments under this Project. As a mitigation measure, the affected individuals will be transplanted to suitable nearby habitats prior to the construction phase as far as practicable. A detailed vegetation survey on the Golden Eulophia covering the impacted shrubland will be conducted within the shrubland and Project Area by a suitably qualified botanist/ ecologist to identify and record the affected individuals prior to the commencement of site clearance works. Feasibility and suitability of transplanting the affected plant species will be carefully studied and suitable receptor sites will be identified. Detailed transplantation proposal providing information of transplantation methodology, recipient site, implementation programme,



watering requirement, post-transplanting monitoring and personal involved shall be submitted to and approved by EPD and AFCD. Transplantation will be supervised by a suitably qualified botanist/ horticulturist. After transplantation, monitoring will be undertaken to check the performance and health conditions of the transplanted individuals on a weekly basis for the first month after transplantation and monthly basis for addition eleven months. Remedial actions will be discussed with AFCD in the event of unsuccessful transplantation.

## 8.10 CONCLUSIONS

### 8.10.1 South Soko

The terrestrial ecological resources recorded within the Study Area comprise secondary woodland, plantation, shrubland, grassland, backshore shrubland, seasonal stream, abandoned wet agricultural land, abandoned dry agricultural land, abandoned reservoir and disturbed areas, with their associated wildlife. Of these habitats, secondary woodland (approximately 1 ha) has moderate ecological importance. Plantation, shrubland, abandoned wet agricultural land and seasonal stream have low to moderate ecological importance. The remaining habitats are of low or negligible ecological importance.

The proposed LNG terminal will be located mainly in habitats such as the already disturbed areas which were formerly part of the now demolished Detention Centre. The impact on the natural habitats is considered to be low, and no adverse residual impact is expected after the implementation of the recommended mitigation measures. The measures include the adoption of appropriate construction practices, transplantation of Golden Eulophia and compensatory tree planting. These measures will reduce potential disturbance to the surrounding environment. Environmental monitoring and audit measures in form of regular checks as part of site inspections are recommended.

During the operation phase of the LNG terminal at South Soko no adverse impacts to terrestrial ecology are expected.

### 8.10.2 Shek Pik

The terrestrial ecological resources recorded within the Study Area included plantation, shrubland, backshore shrubland and developed area, as well as associated wildlife. Of these habitats, shrubland has low to moderate ecological importance while plantation and backshore vegetation have low ecological value. The remaining habitat is of negligible ecological importance. It should be noted that the overall ecological value of Project Area in Shek Pik is considered to be low, and is less significant than that of South Soko.

The proposed electricity cable circuit and water main will be located in habitats such as the developed area which is adjacent to the existing Shek Pik

Prison and concrete road. The impact on natural habitats is considered to be low, and no adverse residual impact is expected after the implementation of the recommended mitigation measures. Appropriate construction practices and reinstatement of affected areas of plantation and shrubland reduce potential disturbance to the surrounding environment.

During the operation phase of the electricity cable circuit and water main at Shek Pik adverse impacts to terrestrial ecology are not expected to occur.

Annex 8

## Terrestrial Ecological Resources for South Soko

Table 1 Plant Species Recorded Within the Study Area of South Soko

Species	Growth Form	Origin	Status	Local Abundance										
				P	W	S	G	AWAL	BS	ADAL	R	St	D	
<i>Acacia confusa</i>	T	E	VC	D		O	S							O
<i>Acalypha wilkeesiana</i>	S	N	VC		O									O
<i>Ageratum conyzoides</i>	H	N	VC				F							
<i>Alocasia macrorrhiza</i>	H	N	VC					F						
<i>Alysicarpus bupleurifolius</i>	S	N	C				O							
<i>Aporosa dioica</i>	S	N	VC	O	F	O								
<i>Araucaria heterophylla</i>	T	N	C											F
<i>Archidendron lucidum</i>	S	N	VC	O	F	F	O							
<i>Asparagus cochinchinensis</i>	H	N	C			O								
<i>Atalantia buxifolia</i>	S	N	VC	O	O	F							F	
<i>Avicennia marina</i>	S	N	C						O					
<i>Berchemia lineata</i>	C	N	C				S							
<i>Bidens pilosa</i>	H	N	VC	O	F	O	O	O	O	F	O	O	O	A
<i>Blechnum orientale</i>	F	N	VC											O
<i>Breynia fruticosa</i>	S	N	VC	O	F	A								O
<i>Bridelia tomentosa</i>	S	N	VC	O	F									
<i>Broussonetia papyrifera</i>	S	E	C		O			O						
<i>Caesalpinia vernalis</i>	C	N	C	O	O	O								
<i>Callicarpa cathayana</i>	S	N	C	O	O	O								
<i>Canthium dicoccum</i>	S	N	C		O									
<i>Carex chinensis</i>	Se	N	C					F		A	F	F	F	
<i>Cassytha filiformis</i>	C	N	VC			F	O	F					O	O
<i>Casuarina equisetifolia</i>	T	N	VC	O										

Species	Growth Form	Origin	Status	Local Abundance								
				P	W	S	G	AWAL	BS	ADAL	R	St
<i>Celtis sinensis</i>	T	N	C	O	F	O	S	O			O	O
<i>Centella asiatica</i>	H	N	VC				O	O		F		O
<i>Cerbera manghas</i>	T	E	C			O			F			
<i>Chloris barbata</i>	G	E	VC				S			O		
<i>Cinnamomum camphora</i>	T	N	C		F							
<i>Citrus maxima</i>	S	E	C		O							
<i>Clerodendrum fragrans</i>	S	N	C		O	F					O	
<i>Clerodendrum inerme</i>	S	N	C		O						O	O
<i>Cocculus orbiculatus</i>	C	N	C		O	F	O					
<i>Colocasia esculenta</i>	H	N	VC					A				
<i>Commelina communis</i>	H	N	C					O				
<i>Cratogeomys cochinchinensis</i>	S	N	VC	O		A						O
<i>Crinum asiaticum</i>	S	N	C			O						
<i>Cyperus malaccensis</i>	Se	N	C					F				
<i>Dalbergia millettii</i>	C	N	VC			F						
<i>Daphniphyllum calycinum</i>	T	N	C	F	F	F						
<i>Derris trifoliata</i>	C	N	C	O	O							
<i>Desmos cochinchinensis</i>	S	N	VC	F	F							
<i>Dicranopteris linearis</i>	F	N	VC			O	S					O
<i>Digitaria sanguinalis</i>	G	N	C				A			F	F	O
<i>Dimocarpus longan</i>	T	N	C		F			O				
<i>Duranta repens</i>	S	E	C									O
<i>Eichhornia crassipes</i>	H	E	VC					O		O		
<i>Embelia laeta</i>	C	N	VC	F	F	F						O
<i>Embelia ribes</i>	C	N	C			O						

Species	Growth Form	Origin	Status	Local Abundance											
				P	W	S	G	AWAL	BS	ADAL	R	St	D		
<i>Eulophia flava</i>	H	N	R			S									
<i>Euphorbia hirta</i>	H	N	VC												F
<i>Eurya nitida</i>	S	N	VC			F									O
<i>Ficus hispida</i>	T	N	VC		O			F					F		O
<i>Ficus microcarpa</i>	T	N	VC		F	O							F		O
<i>Ficus pumila</i>	C	N	VC		O										
<i>Ficus superba</i>	T	N	VC		F	F		O					F		O
<i>Garcinia oblongifolia</i>	T	N	C		F										
<i>Gardenia jasminoides</i>	S	N	C	O	O	F									
<i>Gymnema sylvestre</i>	C	N	C	O	O	F									O
<i>Helicteres angustifolia</i>	S	N	VC			F	F			F					
<i>Ilex asprella</i>	S	N	VC	F	F	A									O
<i>Ipomoea brasiliensis</i>	C	N	VC							F					
<i>Ipomoea cairica</i>	C	N	VC					F							
<i>Ischaemum aristatum</i>	G	N	VC			F	A	F		F					F
<i>Lantana camara</i>	S	E	VC	F	F	O	F	F				F	O		F
<i>Ligustrum sinense</i>	S	N	VC	F	F										
<i>Liriope spicata</i>	H	N	VC			O									
<i>Litsea glutinosa</i>	T	N	VC	F	F	F				O			O		O
<i>Litsea rotundifolia</i>	S	N	VC	O	F	F									
<i>Ludwigia epilobioides</i>	H	N	VC					F		F					
<i>Lygodium dichotomum</i>	C	N	VC	O	O	O		O					O		
<i>Macaranga tanarius</i>	T	N	VC										O		F
<i>Machilus chinensis</i>	T	N	C		F	S									
<i>Mallotus paniculatus</i>	T	N	C	O	F	O									O

Species	Growth Form	Origin	Status	Local Abundance										
				P	W	S	G	AWAL	BS	ADAL	R	St	D	
<i>Melastoma candidum</i>	S	N	VC	O	O	F								F
<i>Melastoma sanguineum</i>	S	N	VC	O	O	F								
<i>Melia azedarach</i>	T	N	VC		O									
<i>Microcos paniculata</i>	T	N	C	O	O	F								
<i>Mikania micrantha</i>	C	E	VC	O		O	O	O			A			F
<i>Millettia reticulata</i>	C	N	VC			F					O			
<i>Mimosa pudica</i>	S	N	C				O				F			
<i>Miscanthus floridulus</i>	G	N	VC	O										O
<i>Miscanthus sinensis</i>	G	N	VC			O	O	O			O			
<i>Morus alba</i>	S	N	C		F	O		S			O			
<i>Mussaenda pubescens</i>	S	N	VC	F	F	F								
<i>Neyraudia arundinacea</i>	G	N	VC			O	O						O	
<i>Osmunda cinnamomea</i>	F	N	C					A			F			
<i>Paederia scandens</i>	C	N	C	F				F	O		A			A
<i>Pandanus forceps</i>	S	N	C		O	O		O	O		O		F	O
<i>Pandanus tectorius</i>	S	N	VC	O	O	F							F	O
<i>Paspalum conjugatum</i>	G	N	C				F				F		F	
<i>Pennisetum purpureum</i>	G	N	C					O			O			
<i>Phoenix hanceana</i>	P	N	C		O	F				O				S
<i>Phragmites australis</i>	G	N	C					A	O			O		
<i>Phyllanthus cochinchinensis</i>	S	N	VC			O					O			
<i>Pistia stratiotes</i>	H	N	VC					O				O		
<i>Polygonum sp.</i>	H	N	C	O				F			F	F	F	
<i>Psidium guajava</i>	S	E	C		O									
<i>Psychotria rubra</i>	S	N	VC	A	F	F							O	

Species	Growth Form	Origin	Status	Local Abundance										
				P	W	S	G	AWAL	BS	ADAL	R	St	D	
<i>Pteroloma triquetrum</i>	H	N	VC			F								
<i>Pueraria lobata</i>	C	N	VC	O	O	O				O				A
<i>Rhaphiolepis indica</i>	S	N	VC	O	O	A								O
<i>Rhapis excelsa</i>	P	N	C		O									
<i>Rhodomyrtus tomentosa</i>	S	N	VC	F	F	A	O						F	
<i>Rhus chinensis</i>	S	N	VC	O	O	F								
<i>Rhus succedanea</i>	S	N	VC	F	F	F								F
<i>Rhynchelytrum repens</i>	G	N	VC			F	O	O						F
<i>Ricinus communis</i>	H	N	C					O						O
<i>Sageretia theezans</i>	C	N	C	O	O	F								
<i>Sapium discolor</i>	S	N	C	O	O	O							O	
<i>Sapium sebiferum</i>	S	N	C	O	O	O	S	O						
<i>Scaevola sericea</i>	H	N	VC			O			F					
<i>Schefflera octophylla</i>	S	N	VC	F	O	F							O	F
<i>Scleria levis</i>	Se	N	VC					F		F				
<i>Scolopia chinensis</i>	S	N	VC			A	S							
<i>Smilax china</i>	C	N	VC	O	O	F				O				
<i>Sterculia lanceolata</i>	T	N	C		F	F		O		O			F	
<i>Strophanthus divaricatus</i>	C	N	VC		F	F								
<i>Strychnos cathayensis</i>	S	N	C			O			S					
<i>Taxillus chinensis</i>	C	N	C			O								
<i>Thespesia populnea</i>	T	N	C		O				A				O	
<i>Thunbergia fragrans</i>	C	N	C		S									
<i>Trema orientalis</i>	S	N	VC	O	F			S						
<i>Tricalysia dubia</i>	S	N	VC	O	F	F								



Species	Growth Form	Origin	Status	Local Abundance									
				P	W	S	G	AWAL	BS	ADAL	R	St	D
<i>Wedelia chinensis</i>	C	N	VC	O	O	S	O	O	F	O		O	F
<i>Wikstroemia chinensis</i>	S	N	VC	O	O	F							
<i>Wikstroemia indica</i>	S	N	VC	O	O	F	O						
<i>Urena lobata</i>	S	N	VC	F	F		O	F					
<i>Verbena officinalis</i>	H	N	C										O
<i>Viburnum odoratissimum</i>	S	N	C	O	O								
<i>Zanthoxylum avicennae</i>	S	N	VC	F	F	F							
<i>Zanthoxylum nitidum</i>	S	N	C	O	O								
<i>Zoysia matrella</i>	G	N	C			O			F	O			
<b>Total no. of species</b>				<b>54</b>	<b>72</b>	<b>75</b>	<b>28</b>	<b>37</b>	<b>14</b>	<b>27</b>	<b>7</b>	<b>28</b>	<b>41</b>

Code for habitat: P = plantation, W = secondary woodland, S = shrubland, G = grassland, AWAL = abandoned wet agricultural land, BS = backshore shrubland, ADAL = abandoned dry agricultural land, R = Reservoir, St = Stream, D = Developed area

Code for abundance: A=Abundant; F=Frequent; O=Occasional; S=Scarce

Code for Status: C=Common; VC=Very Common; P=Protected, R=Rare

Code for Plant Form: G=Grass; Climber; H=Herb; Se=Sedge; G=Grass; F=Fern; P=Palm; S=Shrub; T=Tree

Code for Origin: N=Native; E=Exotic

Table 2a Woodlands Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location	Size of the Study Area (ha)	Size and % Coverage of Woodland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current study	120	Secondary woodland and plantation 12.5 ha (10.4%)	79	Low to moderate for plantation and moderate for secondary woodland	Low to moderate for plantation and moderate for woodland	<i>Acacia confusa</i> for plantation and <i>Ficus microcarpa</i> for secondary woodland	Nil
ERM 1997	120	Woodland & exotic plantation 6 ha (5%) <sup>(1)</sup>	No information	No information	No information	Not specified.	1
<b>North Soko</b>							
ERM 1997	52	Woodland & exotic plantation 5.2 ha (10%) <sup>(1)</sup>	No information	No information	No information	<i>Acacia confusa</i>	1
Aerial Photograph 2004a	52	Woodland and exotic plantation 7.8 ha (15%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Shek Kwu Chau</b>							
ERM 1997	117	Exotic plantation 11.7 ha (10%) <sup>(1)</sup>	No information	Low	Low to moderate	<i>Tristania conferta</i>	Nil
Aerial photograph 2004b	117	Exotic plantation 11.7 ha (10%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Sunshine Island</b>							
ERM 1997	53	Exotic Plantation 2.7 ha (5%) <sup>(1)</sup>	No information	Low	Low	<i>Tristania conferta</i>	Nil
Aerial photograph 2004c	53	Nil	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Hei Ling Chau</b>							

Location	Size of the Study Area (ha)	Size and % Coverage of Woodland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
Aerial photograph 2004d	190	Exotic Plantation 38 ha (20%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Lamma Island</b>							
ERM 2004b	79	Secondary woodland 20.5 ha (26%)	64	Medium	Moderate	<i>Cinnamomum camphora</i> , <i>Mallotus paniculatus</i> , <i>Sterculia lanceolata</i> and <i>Macraranga tanarius</i>	1
CUHK 1999	670	Fung shui forest and secondary woodland 20.1 ha (3%)	28	High	Moderate	<i>Aporusa dioica</i> , <i>Litchi chinensis</i> , <i>Psychotria rubra</i> and <i>Sterculia lanceolata</i>	No information
<b>Tung Lung Chau</b>							
CUHK 1999	245	Woodland 4.9 ha (2%)	34	Low to medium	Low	<i>Dimocarpus longan</i> , <i>Ficus variolosa</i> , <i>Litsea rotundifolia</i> , <i>Schefflera octophylla</i> and <i>Sterculia lanceolata</i>	Nil
<b>Po Toi</b>							
ERM 1998	373	Woodland 3.7ha (~ 1%) <sup>(1)</sup>	Not specified	Not specified	Not specified	Not specified	7
CUHK 1999	373	Woodland 1.6 ha (0.42%) <sup>(1)</sup>	27	Low	Low	<i>Rhaphiolepis indica</i> , <i>Sterculia lanceolata</i> , <i>Litsea glutinosa</i> , <i>Heterosmilax gaudichaudiana</i>	7
<b>Green Island</b>							
BMT/ERM 1999	11	Secondary Woodland 8.8 ha (> 80%) <sup>(1)</sup>	120	High	High	<i>Mallotus paniculatus</i> , <i>Sterculia lanceolata</i> , <i>Microcos paniculata</i> and <i>Schefflera octophylla</i>	9
<b>Little Green Island</b>							
BMT/ERM 1999	1.5	Secondary Woodland 1.2 ha (> 80%) <sup>(1)</sup>	58	High	High	<i>Microcos paniculata</i> and <i>Mallotus paniculatus</i>	1
<b>Chi Ma Wan Peninsula and Pui O</b>							

Location	Size of the Study Area (ha)	Size and % Coverage of Woodland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
MCL 1999	384	Fung Shui Forest and Lowland Forest 76ha (20%)	113	High	Moderate to high	<i>Aquilaria sinensis</i> , <i>Bischofia javanica</i> , <i>Machilus chekiangensis</i> , <i>Ailanthus fordii</i> , and <i>Sterculia lanceolata</i>	8
<b>Cheung Sha to Lung Tseng Tau</b>							
MAL 2001	601	Secondary woodland and plantation 274ha (46%)	Not specified	Moderate	Moderate to high	<i>Tristania conferta</i> , <i>Litsea glutinosa</i> , <i>Microcos paniculatus</i> , <i>Celtis tetrandra</i> , <i>Bridelia tomentosa</i> , <i>Ficus variegata</i> , <i>Schefflera octophylla</i> and <i>Microcos paniculatus</i>	4
<b>Tai O</b>							
ERM 2001	350	Natural woodland 100 ha (28%)	15	Moderate	High	Not specified	3

- Notes: (1) Area estimated from the habitat map presented in the report.  
ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.  
Aerial photograph 2004a - Aerial photograph of North Soko Island at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004b - Aerial photograph of Shek Kwu Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004c - Aerial photograph of Sunshine Island at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004c - Aerial photograph of Hei Ling Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.  
CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.  
ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited*.  
BMT/ERM 1999 - Babbie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report*.  
MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report*.  
ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.
- (2) Area estimated from the aerial photographs at 2004.

Table 2b Shrubland Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location	Size of the Areas (ha)	Size and % Coverage of Shrubland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	Shrubland 86 ha (72%)	75	Moderate	Low to moderate	<i>Cratoxylum cochinchinense</i> , <i>Celtis sinensis</i> , <i>Rhodomyrtus tomentosa</i> , <i>Melastoma candidum</i> , <i>Ilex asprella</i> , <i>Ficus microcarpa</i> , <i>Phyllanthus emblica</i> , <i>Litsea glutinosa</i> and <i>Daphniphyllum calycinum</i> .	1
ERM 1997	120	Tall shrubland, low shrubland and shrubland with grass ~108 ha (85%) <sup>(1)</sup>	Not specified	Moderate	Low to moderate	<i>Cratoxylum cochinchinense</i> , <i>Schefflera octophylla</i> , <i>Rhodomyrtus tomentosa</i> and <i>Melastoma sanguineum</i> .	Nil
<b>North Soko</b>							
ERM 1997	52	Tall shrubland, Tall shrub with grass, Low shrubland with grass 39 ha (75%) <sup>(1)</sup>	No information	Low to moderate	Low to moderate	<i>Rhodomyrtus tomentosa</i> , <i>Breynia fruticosa</i> , <i>Phoenix hanceana</i> , <i>Phyllanthus emblica</i> , <i>Cratoxylum cochinchinense</i> , <i>Melastoma sanguineum</i> , <i>Sapium sebiferum</i> and <i>Rhaphiolepis indica</i> , <i>Schefflera octophylla</i> .	1
Aerial photograph 2004a	52	Shrubland 42 ha (80%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Shek Kwu Chau</b>							
ERM 1997	117	Tall shrubland, low shrubland and shrubland with grass 99 ha (>85%) <sup>(1)</sup>	No information	Moderate	Moderate	<i>Rhus chinensis</i> , <i>Litsea glutinosa</i> , <i>Machilus velutina</i> , <i>Zanthoxylum avicennia</i> , <i>Gnetum montanum</i> , <i>Morinda umbellata</i> , <i>Rhodomyrtus tomentosa</i> and <i>Breynia fruticosa</i> .	Nil

Location	Size of the Areas (ha)	Size and % Coverage of Shrubland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
Aerial photograph 2004b	117	Shrubland 93.6 ha (>85%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Sunshine Island</b>							
ERM 1997	53	Tall Shrubland, low shrubland with grass, and low shrub 40 ha (75%) <sup>(1)</sup>	No information	Low	Low	<i>Psychotria rubra, Litsea rotundifolia, Melastoma sanguineum, Rhodomyrtus tomentosa, Schefflera octophylla, Litsea glutinosa, Sterculia lanceolata and Zanthoxylum avicennia.</i>	Nil
Aerial photograph 2004c	53	Shrublands 45 ha (85%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Hei Ling Chau</b>							
Aerial photograph 2004	190	Shrubland 76 ha (40%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Lamma Island</b>							
ERM 2004	79	Shrublands 49.5 ha (63%) <sup>(1)</sup>	74	Low to moderate	Low	<i>Rhodomyrtus tomentosa, Cratoxylum cochinchinense, Eurya nitida and Embelia laeta.</i>	Nil
CUHK 1999	670	Tall shrubland and low shrub 29 ha (43%)	56	Moderate to high	Moderate to high	<i>Psychotria rubra, litsea rotundifolia, Melastoma sanguineum, Rhodomyrtus tomentosa, Schefflera octophylla, Litsea glutinosa and Sterculia lanceolata.</i>	1
<b>Tung Lung Chau</b>							
CUHK 1999	245	Tall shrubland, Low shrubland, Grassland with low shrub 171.5 ha (70%)	64	Low to moderate	Low to moderate	<i>Psychotria rubra, Litsea rotundifolia, Melastoma sanguineum, Rhodomyrtus tomentosa, Schefflera octophylla, Litsea glutinosa and Sterculia lanceolata.</i>	Nil
<b>Po Toi</b>							

Location	Size of the Areas (ha)	Size and % Coverage of Shrubland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
ERM 1998	373	Tall shrubland, shrubland, shrubland with grass 223ha (60%) <sup>(1)</sup>	179	Moderate	Low to moderate	<i>Sterculia lanceolata</i> , <i>Cratoxylum cochinchinense</i> , <i>Machilus velutina</i> , <i>Dalbergia milliti</i> , <i>Rhodomrytus tomentosa</i> , <i>Rhaphiolepis indica</i> and <i>Smilax</i> spp.	7
CUHK 1999	373	Tall shrubland and low shrubland 164 ha (44%) <sup>(1)</sup>	54	Moderate	Low	<i>Sterculia lanceolata</i> , <i>Cratoxylum cochinchinense</i> , <i>Machilus velutina</i> , <i>Dalbergia millettii</i> , <i>Rhodomrytus tomentosa</i> , <i>Rhaphiolepis indica</i> and <i>Smilax</i> spp.	Nil
<b>Green Island</b>							
BMT/ERM 1999	11	Shrubland 1ha (10%) <sup>(1)</sup>	128	High	High	<i>Schefflera octophylla</i> , <i>Microcos paniculata</i> , <i>Mallotus paniculatus</i> , <i>Sterculia lanceolata</i> , <i>Desmos cochinchinensis</i> , <i>Psychotria rubra</i> and <i>Litsea rotundifolia</i>	9
<b>Little Green Island</b>							
BMT/ERM 1999	1.5	Shrubland 0.2ha (13%) <sup>(1)</sup>	93	High	High	<i>Melastoma sanguineum</i> , <i>Rhodomrytus tomentosa</i> , <i>Raphiolepis indica</i> and <i>Litsea rotundifolia</i> .	Nil
<b>Chi Ma Wan Peninsula and Pui O</b>							
MCL 1999	384	Shrubland 126ha (33%)	127	Moderate to high	Moderate to high	<i>Litsea rotundifolia</i> , <i>Rhodomrytus tomentosa</i> , <i>Cratoxylum cochinchinense</i> , <i>Eurya nitida</i> and <i>Strophanthus divaricatus</i>	5
<b>Cheung Sha to Lung Tseng Tau</b>							

Location	Size of the Areas (ha)	Size and % Coverage of Shrubland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Species of Ecological/Conservation Interest
MAL 2001	601	Tall shrubland and shrubland and grassland mosaic 247ha (41%)	Not specified	Moderate	Moderate	<i>Sapium discolor</i> , <i>Rhus chinensis</i> , <i>Mallotus paniculatus</i> , <i>Litsea rotundifolia</i> , <i>Raphiolepis indica</i> , <i>Embelia ribes</i> , <i>Dalbergia hancei</i> , <i>Dianella ensifolia</i> , <i>Baeckea fruticosa</i> , <i>Ilex asprella</i> , <i>Rhodomyrtus tomentosa</i> and <i>Dicranopteris linearis</i> .	Nil
<b>Tai O</b>							
ERM 2001	350	Shrubland and grassland mosaic ~ 105 ha (30%) <sup>(1)</sup>	Not specified	Low	Low	Not specified	Nil

- Notes: (1) Area estimated from the habitat map presented in the report.  
ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.  
Aerial photograph 2004a - Aerial photograph of North Soko Island at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004b - Aerial photograph of Shek Kwu Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004c - Aerial photograph of Sunshine Island at 8,000 feet dated 2<sup>nd</sup> February 2004.  
Aerial photograph 2004c - Aerial photograph of Hei Ling Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.  
CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.  
ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited*.  
BMT/ERM 1999 - Bantie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report*.  
MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report*.  
ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.
- (2) Area estimated from the aerial photographs at 2004.



Table 2c Backshore Shrubland Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of the Areas (ha)	Size and % Coverage of Backshore Shrubland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	0.6ha (0.5%)	14	Low	Low	<i>Thespesia populnea</i> , <i>Ipomoea brasiliensis</i> , <i>Pittosporum tobira</i> and <i>Cerbera manghas</i>	Nil
<b>Chi Ma Wan Peninsula and Pui O</b>							
MCL 1999	384	3.5 ha (1%)	24	Low to moderate	Moderate	<i>Caesalpinia bonduc</i> , <i>Pandanus tectorius</i> and <i>Casuarina equisetifolia</i>	Nil

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

MCL 1999- Mott Cornell Ltd (1999). 132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.

Table 2d Grassland Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(3)</sup>	Size of the Areas (ha)	Size and % Coverage of Grassland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/ Conservation Interest
<b>South Soko</b>							
Current Study	120	2 ha (1.8%)	28	Low	Low	<i>Digitaria sanguinalis</i> , <i>Ischaemum aristatum</i> and <i>Paspalum conjugatum</i>	Nil
ERM 1997	120	4 ha (3 %) <sup>(1)</sup>	Not specified	Not specified	Not specified	Not specified	Nil
<b>North Soko</b>							
ERM 1997	52	5 ha (10%) <sup>(1)</sup>	No information	Low	Low	<i>Arundinella setosa</i> , <i>Ischaemum</i> spp., and <i>Neyraudia reynaudiana</i>	Nil
Aerial photograph 2004	52	8 ha (15%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Shek Kwu Chau</b>							
ERM 1997	117	6 ha (5%) <sup>(1)</sup>	No information	Low	Low	<i>Arundinella setosa</i> , <i>Ischaemum</i> spp., and <i>Neyraudia reynaudiana</i>	Nil
Aerial photograph 2004	117	6 ha (5%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Sunshine Island</b>							
ERM 1997	53	11 ha (20%) <sup>(1)</sup>	No information	Low	Low	No information	Nil
Aerial photograph 2004	53	8 ha (15%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Hei Ling Chau</b>							
Aerial photograph 2004	190	19 ha (10%) <sup>(2)</sup>	Not applicable	Not applicable	Not applicable	Not applicable	Not applicable
<b>Lamma Island</b>							
ERM 2004b	79	Shrubby grassland 8 ha (10 %)	25	Low	Low	<i>Ischaemum aristatum</i> and <i>Eriachne pallescens</i>	Nil
CUHK 1999	670	Grassland with lowshrub 230 ha (31%)	20	Low	Low	<i>Ischaemum</i> spp. and <i>Rhodomyrtus tomentosa</i>	Nil

Location <sup>(3)</sup>	Size of the Areas (ha)	Size and % Coverage of Grassland	Number of Plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/ Conservation Interest
<b>Tung Lung Chau</b>							
CUHK 1999	245	46 ha (19%)	23	Low	Low	<i>Axonopus compressus</i> , <i>Digitaria</i> spp. and <i>Eleusina indica</i>	Nil
<b>Po Toi</b>							
ERM 1998D	373	60 ha (15%)	Not specified	Low	Low	<i>Arundinella nepalensis</i> , <i>Eulalia</i> spp., <i>Ischaemom</i> spp. and <i>Cymbopogon</i> spp.	Nil
CUHK 1999	373	12 ha (3%)	22	Low	Low	<i>Arundinella setosa</i> , <i>Ischaemum</i> spp., and <i>Neyraudia reynaudiana</i>	
<b>Green Island</b>							
BMT/ERM 1999	11	6 ha (5%)	56	Moderate	Moderate	<i>Embelia laeta</i> , <i>Cymbopogon</i> sp.	4
<b>Little Green Island</b>							
BMT/ERM 1999	1.5	0.1 ha (5%)	71	Moderate	Moderate	<i>Embelia laeta</i> , <i>Cymbopogon</i> sp.	4
<b>Chi Ma Wan Peninsula and Pui O</b>							
MCL 1999	384	29 ha (7.6%)	56	Low	Low	<i>Arundinella setosa</i> , <i>Ischaemum</i> spp., <i>Neyraudia reynaudiana</i> , <i>Axonopus compressus</i> , <i>Digitaria</i> spp. and <i>Eleusina indica</i>	Nil
<b>Cheung Sha to Lung Tseng Tau</b>							
MAL 2001	601	43.5 ha or 7.3%	Not specified	Low	Low	<i>Arundinella setosa</i> , <i>Ischaemum</i> sp. and <i>Cymbopogon</i> sp.	Nil

Notes: (1) Area estimated from the habitat map presented in the report.

ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.

Aerial photograph 2004a - Aerial photograph of North Soko Island at 8,000 feet dated 2<sup>nd</sup> February 2004.

Aerial photograph 2004b - Aerial photograph of Shek Kwu Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.

Aerial photograph 2004c - Aerial photograph of Sunshine Island at 8,000 feet dated 2<sup>nd</sup> February 2004.

Aerial photograph 2004c - Aerial photograph of Hei Ling Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.

CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.

ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited*.

BMT/ERM 1999 - Babtie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.

MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.*

MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report.*

ERM 2001- ERM HK Ltd (2001). *Study on Revitalisation of Tai O for planning Department. Final report.*

- (2) Area estimated from the aerial photographs at 2004.
- (3) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

Table 2e Abandoned Wet Agricultural Land Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(2)</sup>	Size of the Areas (ha)	Size and % Coverage of Abandoned Wet Agricultural Land	Number of Plant Species Recorded	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	1.1 ha (0.9%)	37	Low	Low	<i>Phragmites communis</i> and <i>Polygonum</i> sp.	Nil
<b>Chi Ma Wan Peninsula and Pui O</b>							
MCL 1999	384	29 ha (7.6%)	52	High	Moderate	<i>Bacopa monnieri</i> , <i>Sacciolepis indica</i> , <i>Isachne globosa</i> , <i>Rotala indica</i> and <i>Chrysopogon aciculatus</i>	4
<b>Cheung Sha to Lung Tsung Tau</b>							
MAL 2001	601	1 ha (0.2%)	Not specified	Moderate	Moderate	<i>Panicum typheron</i> , <i>Digitaria</i> sp., <i>Cyperus</i> sp., <i>Panicum typheron</i> , <i>Digitaria</i> sp. and <i>Cyperus</i> sp., <i>Ludwigia adscendens</i> , <i>Mikania micrantha</i> and <i>Ipomoea</i> sp.	Nil
<b>Tai O</b>							
ERM 2001	350	17.5 ha (5%) <sup>(1)</sup>	Not specified	Moderate to high	Moderate	Not specified	Nil

Notes: (1) Areas estimated from the habitat map presented in the report.

MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau*. EIA Report.

MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha*. EIA Report.

ERM 2001- ERM HK Ltd (2001). *Study on Revitalisation of Tai O for planning Department*. Final report.

(2) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

Table 2f Abandoned Dry Agricultural Land Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(2)</sup>	Size of the Areas (ha)	Size and % Coverage of Abandoned Dry Agricultural Land	Number of plant Species Record	Floristic Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	0.5 ha (0.4%)	27	Low	Low	<i>Mikania micrantha</i> , <i>Paederia scandens</i> and <i>Wedelia chinensis</i>	Nil
ERM 1997	120	1.2 ha (1%) <sup>(1)</sup>	Not specified	Not specified	Not specified	Not specified	Not specified
<b>North Soko</b>							
ERM 1997	52	0.3 ha (5%) <sup>(1)</sup>	Not specified	Not specified	Not specified	Not specified	Not specified
<b>Lamma Island</b>							
CUHK 1999	670	33.5 ha (5%)	No information	No information	No information	No information	No information
<b>Chi Ma Wan Peninsula and Pui O</b>							
MAL 2001	384	12 ha (3%)	16	Low	Low	<i>Ipomoea batatas</i> , <i>Lactuca sativa</i> , <i>Clausena lansium</i> , and <i>Dimocarpus longan</i>	Nil

- Notes: (1) Area estimated from the habitat map presented in the report.  
ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.  
CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.  
MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report*.
- (2) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

Table 2g Streams Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of the Areas (ha)	Number of Streams and Length (Km)	Seasonal or Permanent	Floristic Diversity	Natural or Artificial	Abundance of Stream Fauna	Number of Species of Ecological/Conservation Interests
<b>South Soko</b> Current Study	120	2 streams Length: 0.09 km	Both seasonal	Low to moderate	Mostly natural	Nil	Nil
<b>Lamma Island</b> ERM 2004b	79	4 streams Length: 1.1 Km	Seasonal	Low to moderate	Partially disturbed	Low, Low to moderate and High	1 (Romer's Tree Frog tadpole)
<b>Tung Lung Chau</b> CUHK 1999	245	1 stream Length: short length	Seasonal	Low	Partially disturbed	No information	No information
<b>Po Toi</b> ERM 1998	373	1 stream Length: not provided	Seasonal	Low	Natural	Low	1 (Romer's Tree Frog tadpoles)
<b>Chi Ma Wan Peninsula and Pui O</b> MCL 1999	384	4 streams Length: not provided	Seasonal and permanent	Low to moderate	Mostly natural	High	<i>Parazacco spilurus</i> , Atyid shrimps <i>Caridina apodosis</i> and <i>Caridina serrata</i>
<b>Cheung Sha to Lung Tseng Tau</b> MCL 2003	601	~ 40 streams Length: generally excess 0.5 Km in length	Seasonal and permanent	High	Mostly natural	High	Romer's Tree Frog, Short-legged Toad, Rice Fish and Lesser Spiny Frog, Beijiang Thick-lipped Barb, Black-headed Thick-lipped Goby and Philippine Neon Goby.
<b>Tai O</b>							

Location <sup>(1)</sup>	Size of the Areas (ha)	Number of Streams and Length (Km)	Seasonal or Permanent	Floristic Diversity	Natural or Artificial	Abundance of Stream Fauna	Number of Species of Ecological/Conservation Interests
ERM 2001	350	1 stream Length: long than 0.5 Km	Permanent	Not specified	Mostly natural	Low to moderate	Nil

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.  
 ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED.*  
 CUHK 1999 – CUHK (1999). Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park.  
 ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited.*  
 BMT/ERM 1999 - Babbie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
 MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.*  
 MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report.*  
 ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.  
 ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report



Table 2h Abandoned Reservoir Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of the Areas (ha)	Size and % Coverage of Pond	Number of Plant Species Recorded	Floristic and Faunal Diversity	Structural Complexity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	0.2 ha (0.2%)	7	Low	Low	<i>Polygonum</i> sp., and <i>Pistia stratiotes</i>	Nil
<b>Tai O</b>							
ERM 2001	350	7 ha (~ 2%)	Not specified, fringed with mangrove trees.	Low	Low	Not specified	Nil

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.  
ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.

Table 2i Disturbed Area Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(3)</sup>	Size of the Areas (ha)	Size and % Coverage of Disturbed Area	Number of Plant Species Recorded	Components of Disturbed Area	Floristic Diversity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
<b>South Soko</b>							
Current Study	120	7.2 ha (6%)	41	Concrete path, helicopter landsite, pier and abandoned houses.	Low	<i>Araucaria heterophylla</i> and <i>Acalypha wilkesiana</i>	Nil
ERM 1997	120	6 ha (5%) <sup>(1)</sup>	No information	Detention Centre, artificial shore and abandoned villages.	Low	No information	Nil
<b>North Soko</b>							
ERM 1997	52	0.5 ha (1%) <sup>(1)</sup>	No information	Village houses	Low	No information	Nil
<b>Shek Kwu Chau</b>							
ERM 1997	117	5.9 ha (5%) <sup>(1)</sup>	No information	Village houses and pier.	No information	No information	Nil
<b>Hei Ling Chau</b>							
Aerial photograph 2004	190	19 ha (10%) <sup>(2)</sup>	Not applicable	Village houses, pier and concrete paths.	Not applicable	Not applicable	Not applicable
<b>Lamma Island</b>							
ERM 2004	79	3.9 ha (0.05%) <sup>(1)</sup>	25	Village houses and concrete path.	Low	<i>Michelia alba</i> and <i>Ficus microcarpa</i> .	Nil
CUHK 1999	670	67 ha (10%)	18	Electric power station, Village houses, pier and concrete paths.	Low	<i>Michelia alba</i> and <i>Ficus microcarpa</i> .	Nil
<b>Tung Lung Chau</b>							
CUHK 1999	245	2.5 ha (< 1 %)	No Information	Village houses, concrete path, hiking trails and radar station.	Low	<i>Mikania micrantha</i> , <i>Ipomoea cairica</i> and <i>Lantana camara</i> ,	Nil
<b>Po Toi</b>							

Location <sup>(3)</sup>	Size of the Areas (ha)	Size and % Coverage of Disturbed Area	Number of Plant Species Recorded	Components of Disturbed Area	Floristic Diversity	Dominant Plant Species	Number of Plant Species of Ecological/Conservation Interest
CUHK 1999	373	3.7 ha (< 1%)	No information	Village house, concreted and hiking trails.	Low	No information	Nil
<b>Green Island</b>							
BMT/ERM 1999	11	1 ha (< 1%)	No information	Government houses.	No information	No information	No information
<b>Little Green Island</b>							
BMT/ERM 1999	1.5	0.2 ha (< 1%)	No information	Abandoned village house.	No information	No information	No information
<b>Chi Ma Wan Peninsula and Pui O</b>							
MCL 1999	384	115 ha (30%)	50	Village houses, concrete roads, and buildings.	Low	<i>Acacia confusa, Mikania micrantha, Ipomoea cairica, Lantana camara, and Eupatorium catarium</i>	Nil
<b>Cheung Sha to Lung Tseng Tau</b>							
MCL 2003	601	23 ha (3.9 %)	No information	Village house, services drainage and Roads.	Low	No information	Nil
<b>Tai O</b>							
ERM 2001	350	<17 ha (5%)	No information	Village houses, concrete roads and buildings.	Low	No information	Nil

Notes: (1) Area estimated from the habitat map presented in the report.  
 ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.  
 Aerial photograph 2004 - Aerial photograph of Hei Ling Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.  
 CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.  
 ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited*.  
 BMT/ERM 1999 - BMBT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
 MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report*.  
 MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report*.

ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.

ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report

- (2) Area estimated from the aerial photographs at 2004.
- (3) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

Table 3

## Bird Species Recorded within the Study Area of South Soko

Common Name	Species Name	Habitat (Dry Season)	Habitat (Wet Season)	Common -ness	Status
Artic Warbler	<i>Phylloscopus borealis</i>		P, R	U	PM
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>		P, AW	U	PM &WV
Asian Stubtail Warbler	<i>Urosphena squameiceps</i>	P		U	WV
Barn Swallow	<i>Hirundo rustica</i>	Sh, P	W, G, Sh, P	CW	SV, PM
Black Drongo	<i>Dicrurus macrocercus</i>	D	G, R, Sh, W	CW	SV
Black Kite	<i>Milvus migrans</i>	Sh, P, AW, S, R, G, SS	W, D, R, Sh, P, G, S, SS	CW	R
Black-faced Bunting	<i>Emberiza spodocephala</i>	P		CW	WV
Black-naped Tern	<i>Sterna sumatrana</i>		(Sea)	R	SV
Blue Rock Thrush	<i>Monticola solitarius</i>	R, RS, D, Sh	Sh	U	R
Blue Whistling Thrush	<i>Myophonus caeruleus</i>	P		CW	R
Broad-billed Roller	<i>Eurystomus orientalis</i>		R	R	PM
Brown Shrike	<i>Lanius cristatus</i>		P	CW	PM
Brownish-flanked Bush Warbler	<i>Cettia fortipes</i>	S		R	PM &WV
Chestnut Bulbul	<i>Hypsipetes castanonotus</i>	P, R		R	R
Chinese Bulbul	<i>Pycnonotus sinensis</i>	W, S, Sh, P, SS, AW	AW, R, Sh, SS, P, S	CW	R
Chinese Pond Heron	<i>Ardeola bacchus</i>		AW, R	CW	R
Common Black Bird	<i>Turdus merula</i>	P		U	WV
Common Buzzard	<i>Buteo buteo</i>	D, G		U	WV
Common Kingfisher	<i>Alcedo atthis</i>	R, RS	R, AW, SS	CW	R
Common Magpie	<i>Pica pica</i>	SS, AW, R, G, P	P, AW, SS, R	CW	R
Common Sandpiper	<i>Actitis hypoleucos</i>		RS	CW	PM, WV
Common Tailorbird	<i>Orthotomus sutorius</i>	W, Sh, P, S, R	Sh, P, AW	CW	R
Crested Goshawk	<i>Accipiter trivirgatus</i>	S		R	R
Crested Myna	<i>Acridotheres crisatellus</i>	W, D, RS, Sh, SS, P, AW	D, RS, Sh, SS, P, S	CW	R
Crested Serpent Eagle	<i>Spilornis cheela</i>		Sh	R	R
Daurian Redstart	<i>Phoenicurus aureoreus</i>	Sh, P, G	W, P, Sh, S, R, AW	U	WV
Dollarbird	<i>Eurystomus orientalis</i>		SS, R	R	PM
Dusky Warbler	<i>Phylloscopus fuscatus</i>	Sh, P, AW		U	WV
Eurasian Hobby	<i>Falco subbuteo</i>	D, W		R	PM
Eurasian Woodcock	<i>Scolopax rusticola</i>		AW (Night Survey)	R	WV

Common Name	Species Name	Habitat (Dry Season)	Habitat (Wet Season)	Common -ness	Status
Fan-tailed Warbler	<i>Cisticola juncidis</i>		Sh, G	U	PM & WV
Great Frigatebird	<i>Fregata minor</i>		(soar high in sky)	VR	Uncertain in (SV?)
Greater Coucal	<i>Centropus sinensis</i>	D, Sh, SS, P	Sh, P, AW	CW	R
Grey Wagtail	<i>Motacilla cinerea</i>		SS	CW	WV
Grey-backed Thrush	<i>Turdus hortulorum</i>	P, S		U	WV
Grey-streaked Flycatcher	<i>Muscicapa griseisticta</i>		P	R	PM
Grey-tailed Tattler	<i>Heteroscelus brevipes</i>		SS	R	PM
Hair-crested Drongo	<i>Dicrurus hottentottus</i>		D	R	SV
Indian Cuckoo	<i>Cuculus micropterus</i>		P	U	SV
Japanese Bush Warbler	<i>Cettia diphone</i>	P, S		U	WV
Japanese Thrush	<i>Turdus cardis</i>	P		R	WV
Japanese White-eye	<i>Zosterops japonicus</i>	W, Sh, P, AW, R	P, S, AW	CW	R
Large-billed Crow	<i>Corvus macrorhynchos</i>	D, G, Sh, SS, P, R	W, Sh, P, SS, D	CW	R
Little Egret	<i>Egretta garzetta</i>		SS	CW	R & WV
Little Swift	<i>Apus affinis</i>	Sh	P	CW	R, PM
Long-tailed Shrike	<i>Lanius schach</i>	W, D, Sh, P, AW, G, R	W, G, Sh, P, AW	CW	R
Olive-backed Pipit	<i>Anthus hodgsoni</i>	Sh, P	P	CW	WV
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>	AW		U	PM
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Sh, P		CW	PM, WV
Osprey	<i>Pandion haliaetus</i>		D	U	R
Pacific Reef Egret	<i>Egretta sacra</i>	RS, SS	RS, SS	U	R
Pale-legged Leaf Warbler	<i>Phylloscopus tenellipes</i>		P	R	PM
Pallas' Warbler	<i>Phylloscopus proregulus</i>	P, S		U	PM & WV
Peregrine Falcon	<i>Falco peregrinus</i>		RS	R	R
Pintail / Swinhoe's Snipe	<i>Gallinago stenuramegala</i>	AW	AW	R	PM, WV
Red-flanked Blue-tail	<i>Tarsiger cyanurus</i>	P		U	WV
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	AW, Sh, P	Sh, P, AW, R	CW	R
Reef Egret	<i>Egretta sacra</i>	D		R	R
Richard's Pipit	<i>Anthus richardi</i>	D, G		CW	R, PM, WV
Rufous Turtle Dove	<i>Streptopelia orientalis</i>	S, R, P		CW	WV
Rufous-tailed Robin	<i>Luscinia sibilans</i>	P		R	WV
Savanna Nightjar	<i>Caprimulgus affinis</i>		P (Night Survey)	R	R
Scaly Thrush	<i>Zoothera dauma</i>	D, S		R	WV

Common Name	Species Name	Habitat (Dry Season)	Habitat (Wet Season)	Common-ness	Status
Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>		P, AW	R	R
Siberian Stonechat	<i>Saxicola maurus</i>		W	CW	WV
Spotted Dove	<i>Streptopelia chinensis</i>	D, S, Sh, P, AW	W, Sh, SS, P, AW	CW	R
White Wagtail	<i>Motacilla alba</i>	RS, SS, AW	D, SS, R, G	CW	WV
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>	R, Sh, P	P, SS	U	R
White-backed Munia	<i>Lonchura striata</i>	P		CW	R
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>		AW, D	CW	R
White-rumped Munia	<i>Lonchura striata</i>	P	S, R	U	R
White-shouldered Starling	<i>Sturnus sinensis</i>		W		
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	AW, R, P, SS	R, P	CW	R
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	Sh, P	Sh, P	CW	R
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	P, Sh, S, AW, R	P	CW	WV
<b>Number of Species Recorded</b>		<b>49</b>	<b>53</b>		

Habitats: D = disturbed area, G = grassland, AW = abandoned wet agricultural land, R = abandoned reservoir, RS = rocky shore, S = stream, Sh = shrubland, SS = sandy shore, P = plantation, W = secondary woodland. Commonness: CW = common and widespread, U = uncommon and localised, R = rare and localized, VR = very rare. Status: PM-Passage migrant, R-Resident, SV-Summer visitor, WV-Winter visitor.

Commonness and status of birds are reference to C Viney, Karen Philipps and Lam Chiu Ying (1993) *Birds of Hkng Kong and South China*.

Table 4 Bird Species Recorded Within the Study Area of South Soko

Common Name	Species Name	Secondary Woodland			Disturbed Area			Grassland			Abandoned Wet Agricultural Land			Abandoned Reservoir			Stream			Shrubland			Plantation			
		Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	
Artic Warbler	<i>Phylloscopus borealis</i>																							2	2	
Asian Brown Flycatcher	<i>Muscicapa dauurica</i>										1	1												3	3	
Barn Swallow	<i>Hirundo rustica</i>		1	1				2	2					1	1									1	1	
Black Drongo	<i>Dicrurus macrocerus</i>				1		1		1					9	9						7	7		11	11	
Black-faced Bunting	<i>Emberiza spodocephala</i>																						1		1	
Black Kite	<i>Milvus migrans</i>	1		1	1		1	1	3	4		4	4	1	3	4		1	1	3	3	6	2		2	
Blue Rock Thrush	<i>Monticola solitarius</i>				2		2														1	1				
Blue Whistling Thrush	<i>Myophonus caeruleus</i>																						1		1	
Broad-billed Roller	<i>Eurystomus orientalis</i>													1	1											
Brownish-flanked Bush Warbler	<i>Cettia fortipes</i>																	1		1						
Chestnut Bulbul	<i>Hypsipetes castanonotus</i>												13		13									2		2
Chinese Bulbul	<i>Pycnonotus sinensis</i>	2		2	1		1		1	1	9	15	24		2	2	7	4	11	29	3	32	27	15	42	
Common Black Bird	<i>Turdus merula</i>																						1		1	
Common Buzzard	<i>Buteo buteo</i>	1		1	1		1	1		1				1		1										
Common Kingfisher	<i>Alcedo atthis</i>										2	2	5	4	9											
Common Magpie	<i>Pica pica</i>				1		1				1	1	2	1	1	2										
Common Tailorbird	<i>Orthotomus sutorius</i>		1	1										1	1	1		1	1	1	2	3	1	3	4	
Crested Goshawk	<i>Accipiter trivirgatus</i>																	1		1						
Crested Myna	<i>Acridotheres cristatellus</i>		3	3	234	2	236		2	2	9	6	15		2	2		14	14	62	12	74	15	31	46	
Daurian Redstart	<i>Phoenicurus auroreus</i>		1	1				1		1				1	1						1	1	2	1	3	
Dusky Warbler	<i>Phylloscopus fuscatus</i>										1		1										1		1	
Fan-tailed Warbler	<i>Cisticola juncidis</i>								2	2											2	2				
Greater Coucal	<i>Centropus sinensis</i>										5	5	1		1					3		3	1	2	3	
Grey Wagtail	<i>Motacilla cinerea</i>					1	1								1	1										



Common Name	Species Name	Secondary Woodland			Disturbed Area			Grassland			Abandoned Wet Agricultural Land			Abandoned Reservoir			Stream			Shrubland			Plantation			
		Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	
Grey-backed Thrush	<i>Turdus hortulorum</i>															1		1					7		7	
Hair-crested Drongo	<i>Dicrurus hottentottus</i>					1	1																			
Indian Cuckoo	<i>Cuculus micropterus</i>																							1	1	
Japanese Bush Warbler	<i>Cettia diphone</i>															2		2					1		1	
Japanese Thrush	<i>Turdus cardis</i>																						2		2	
Japanese White-eye	<i>Zosterops japonicus</i>										8	1	9	3		3		2	2	19		19	23	9	32	
Large-billed Crow	<i>Corvus macrorhynchos</i>		2	2	2	1	3	2		2			2		2				1		1	1	2		3	
Little Egret*	<i>Egretta garzetta</i>																									
Long-tailed Shrike	<i>Lanius schach</i>	2	2	4	2		2		1	1	2	1	3	1		1		1		1	6	1	7	4	5	9
Olive-backed Pipit	<i>Anthus hodgsoni</i>																						2		2	
Oriental Reed Warbler	<i>Acrocephalus orientalis</i>										1		1													
Oriental Turtle Dove	<i>Streptopelia orientalis</i>																						3		3	
Osprey	<i>Pandion haliaetus</i>														1	1										
Pale-legged Leaf Warbler	<i>Phylloscopus tenellipes</i>					1	1																			
Pallas' Warbler	<i>Phylloscopus proregulus</i>																						2		2	
Pintail / Swinhoe's Snipe	<i>Gallinago stenura / megala</i>											1	1				3		3							
Red-flanked Blue-tail	<i>Tarsiger cyanurus</i>																						3		3	
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>										1	2	3		2	2				2		2	2	2	4	
Richard's Pipit	<i>Anthus richardi</i>				2		2	4	1	5																
Rufous Turtle Dove	<i>Streptopelia orientalis</i>												1		1	1		1					2		2	
Scaly Thrush	<i>Zoothera dauma</i>																									
Scarlet-backed Flowerpecker	<i>Dicaeum cruentatum</i>											2	2											1	1	
Siberian Stonechat	<i>Saxicola maurus</i>		1	1																						
Spotted Dove	<i>Streptopelia chinensis</i>		1	1					2	2	1	2	3				1		1	1		1	2	1	3	
White Wagtail	<i>Motacilla alba</i>								1	1	1		1		1	1										
White-backed Munia	<i>Lonchura striata</i>												1	1	2		2	2					1		1	

Common Name	Species Name	Secondary Woodland			Disturbed Area			Grassland			Abandoned Wet Agricultural Land			Abandoned Reservoir			Stream			Shrubland			Plantation			
		Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	Dry	Wet	All	
White-bellied Sea Eagle	<i>Haliaeetus leucogaster</i>												1		1									1	1	
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>												1		1											
White-shouldered Starling	<i>Sturnus sinensis</i>		2	2																						
Yellow-bellied Prinia	<i>Prinia flaviventris</i>											1		1							3		3		2	2
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>											4		4	2		2	1		1	2		2	10	10	
	<b>Total Species</b>	4	10	12	10	5	13	5	10	13	12	16	21	15	15	26	11	5	15	12	9	16	26	18	34	
	<b>Total number of bird</b>	6	14	20	247	6	253	9	16	25	39	46	85	35	31	66	20	23	43	132	35	167	119	93	213	

\* bird species recorded qualitatively within the Study Area, but outside the point count location.

Table 5 Bird Species Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Record	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>						
Current study	120	Secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream, disturbed area, abandoned reservoir, abandoned dry agricultural land and backshore vegetation.	6 days in dry season and 6 days in wet season (Feb - Jul 2004, September 2005 – January 2006).	Total: 75 Secondary woodland (20), Plantation (34), Shrubland (16), grassland (13), Abandoned wet agricultural land (21), stream (16), disturbed area (13) and abandoned reservoir (26).	868	Total: 11 Secondary woodland (2), Plantation (1), shrubland (3), Grassland (2), abandoned wet agricultural land (4), abandoned reservoir (1) and rock and boulder (3).
ERM 1997	120	Woodland, tall shrub, low shrub, urban area, bare soil, grassland, other wetland, abandoned cultivation, tall shrub with grass, Building mixed with cultivation and inland water.	No details on survey effort available.	Total: 12	> 30	Total: 2 (Habitat not mentioned).
<b>North Soko</b>						
ERM 1997	52	Grassland, low scrub with grass, plantation woodland, tall shrub, bare soil, low scrub, urban area, abandoned cultivation, woodland and tall scrub with grass.	No details on survey effort available.	Total: 21	No information	Total: 2 (Habitat not specified).
<b>Shek Kwu Chau</b>						
ERM 1997	117	Plantation woodland, tall shrub, bare soil, low shrub, urban area, abandoned cultivation, tall shrub with grass, building mixed with cultivation, abandoned cultivation and woodland, and inland water.	No details on survey effort available.	Total: 24	No information	Total: 1 (Habitat not specified).

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Record	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
<b>Sunshine Island</b> ERM 1997	53	Grassland, low shrub with grass, plantation woodland, tall shrub, bare soil and low shrub.	No details on survey effort available.	Total: 5	No information	Nil
<b>Hei Ling Chau</b> Aerial photograph 2004	190	Woodland, tall shrubland, low shrubland, grassland, backshore shrubland, and plantation.	No details on survey effort available.	No information	No information	No information
<b>Lamma Island</b> ERM 2004b	79	Secondary woodland, shrubland, shrubby grassland, natural and modified stream, village/developed area.	6 days and 2 night surveys in wet season (May – Jun 2004).	Total: 38 Secondary woodland (30), shrubland (19) and shrubby grassland (18).	578	Total: 3 Secondary woodland (1), Shrubland (1) and soaring in the sky (2).
CUHK 1999	670	Abandoned cultivation land, bareland, grassland, grassland with bareland, grassland with low shrub, grassland /low shrub/bareland, low shrubland, human settlement and woodland.	One day in July 1999 of the wet season.	Total: 10 Urban area (5), water bodies (5), tall shrub (5), woodland (6), and grassland (1).	57	Nil recorded in the survey, but at least 14 in the literature review. (Habitat not specified).
<b>Tung Lung Chau</b> CUHK 1999	245	Woodland, tall shrubland, low shrubland, grassland, bareland, human settlement, grassland with low shrubland, low shrubland with bareland, grassland with bareland, and grassland/low shrubland/bareland.	One day in June 1999 of the wet season.	Total: 11 Woodland (2), tall shrubland (5), cultivated land (4) and sandy shore (6).	67	Nil recorded in the survey but at least 3 in the literature review.

**Po Toi**

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Record	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
ERM 1998D	373	Bare soil grassland, land shrub, land shrub with grass, tall shrub, tall shrub with grass, woodland, rural area (building and developed area)	Twice per month in a year (total 24 survey days covering wet and dry seasons)	Total: 123 Scrubland (27), woodland (20), and coastal areas (6). Other habitat not specified.	No information	Total: 27 Coastal areas (2), Fung shui forest (1)
CUHK 1999	373	Woodland, tall shrubland, low shrubland, grassland, bareland, human settlement, grassland with low shrubs, low shrubland with bareland, grassland/low shrubland/bareland and others.	One day in July 1998 of the wet season	Total: 7 Woodland (5), Estuary (4), tall shrubland (3) and grassland with bareland (1)	54	Nil
<b>Green Island</b>						
BMT/ERM 2000	11	Woodland, shrubland, grassland and human settlement.	10 survey days (Jul 1999 – May 2000) covering both wet and dry season.	Total: 75	Not specified	Total: 8
<b>Little Green Island</b>						
BMT/ERM 2000	1.5	Woodland, shrubland, grassland and human settlement.	10 survey days (July 1999 - May 2000) covering both wet and dry season.	Total: 25	Not specified	Total: 5
<b>Chi Ma Wan Peninsula and Pui O</b>						
MCL 1999	384	Forest, tall shrubland, shrubland and grass mixture, wetland, farmland, abandoned farmland, rocky shore, sandy beach, backshore shrubland, mangrove, brackish mudflat, plantation, wasteland, stream and village area.	3 days in dry season (Oct–Dec 1998)	Total: 47 Wetland (9), mangrove (8), Brackish mudflat (9), stream (2), shrubland and grassland mixture (6), tall shrub (5), rocky shore (1) and forest (14).	188	Total: 5 Wetland (2), Sandy beach (1), Tall shrub (1) and Estuary (1).
<b>Cheung Sha to Lung Tseng Tau</b>						

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Record	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
MAL 2001	601	Secondary woodland, Plantation woodland, Tall shrubland, Shrubland-grassland mosaic, Grassland, Stream and riparian, Agricultural land, Wasteland, Freshwater marsh (Fong Yuen) and Village area	10 days and 4 nights survey covering both wet and dry season (May 2000 – Jan 2001).	Total: 46	Not quantified	Total: 5 (Habitat not specified).

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report

ERM 1997 - ERM (1997). *Seabed Ecology Studies: Sokos Final Report CED*.

Aerial photograph 2004c - Aerial photograph of Hei Ling Chau at 8,000 feet dated 2<sup>nd</sup> February 2004.

CUHK 1999 – CUHK (1999). *Feasibility Study of Lamma Island, Po Toi and Tung Lung Chau as Country Park*.

ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited*.

BMT/ERM 1999 - Babtie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.

MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report*.

MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report*.

ERM 2001- ERM HK Ltd (2001). Study on Revitalisation of Tai O for planning Department. Final report.

Table 6a *Butterfly Species and Their Abundance Recorded During Point Count at South Soko in Dry Season*

Common Names	Species Name	W	P	Sh	G	D	AD	R	AW	St	Commonness
<b>Papilionidae</b>											
Common Mormon	<i>Papilio polytes</i>		1					1			VC
<b>Pieridae</b>											
Common Grass Yellow	<i>Eurema hecabe</i>		1					1	1	1	VC
<b>Lycaenidae</b>											
Lime Blue	<i>Chilades lajus</i>		1		1			1			VC
Plum Judy	<i>Abisara echerius</i>		1	6				1			VC
Punchinello	<i>Zemeros flegyas</i>		1						1		C
<b>Nymphalidae</b>											
Common Evening Brown	<i>Melanitis leda</i>		2								C
Common Sailor	<i>Neptis hylas</i>		4					2		2	VC
Dark Brand Bush Brown	<i>Mycalesis mineus</i>								1		VC
Rustic	<i>Cupha erymanthis</i>		1						1		VC
Straight Five-ring	<i>Ypthima lisandra</i>			1							C
<b>Total butterflies</b>		<b>0</b>	<b>12</b>	<b>7</b>	<b>1</b>	<b>0</b>	<b>4</b>	<b>4</b>	<b>5</b>	<b>0</b>	
<b>Total species</b>		<b>0</b>	<b>8</b>	<b>2</b>	<b>1</b>	<b>0</b>	<b>3</b>	<b>4</b>	<b>4</b>	<b>0</b>	

Habitat: AW = abandoned wet agricultural land, W = secondary woodland, P= plantation, Sh = shrubland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, St = stream. Commonness: VC = very common, C = common, UC = uncommon, R=rare. Commonness of butterflies is reference to Yiu V (2004). *Field Guide to the butterflies of Hong Kong*.

Table 6b *Butterfly Species and Their Abundance Recorded During Point Count at South Soko in Wet Season*

Common Name	Species Name	W	P	Sh	G	D	AD	R	AW	St	Commonness
<b>Hesperiidae</b>											
Chestnut Angle	<i>Odontoptilum angulatum</i>	2	1								C
Banded Awl	<i>Hasora chromus</i>							2	2		UC
Bush Hopper	<i>Ampittia dioscorides</i>								3		UC
Forest Hopper	<i>Astictopterus jama</i>		1								C
Formosan Swift	<i>Borbo cinnara</i>								1		UC
Indian Palm Bob	<i>Suastus gremius</i>				1						UC
Oriental Straight Swift	<i>Parnara bada</i>							2			C
Greenish Palm Dart	<i>Telicota ancilla</i>								2		C
<b>Papilionidae</b>											
Chinese Peacock	<i>Papilio bianor</i>			2							VC
Common Bluebottle	<i>Graphium sarpedon</i>		1	2				4	1		VC
Common Mime	<i>Chilasa clytia</i>		1	2					1		C
Common Mormon	<i>Papilio polytes</i>	2	5	2	1		1	11	6		VC
Five-bar Swordtail	<i>Pathysa antiphates</i>		1								C
Great Mormon	<i>Papilio memnon</i>		17						5		VC

Common Name	Species Name	W	P	Sh	G	D	AD	R	AW	St	Commonness
Lime Butterfly	<i>Papilio demoleus</i>		1	3			1				C
Paris Peacock	<i>Papilio paris</i>		3					1	2		VC
Red Helen	<i>Papilio helenus</i>	2	6								VC
Spangle	<i>Papilio protenor</i>		4				1	1			VC
<b>Pieridae</b>											
Common Grass Yellow	<i>Eurema hecabe</i>		10	6	1		1	8	7	2	VC
Common Gull	<i>Cepora nerissa</i>		3				1	2	1		C
Indian Cabbage White	<i>Pieris canidia</i>		2					2			VC
Lemon Migrant	<i>Catopsilia</i>		2					1	1		C
	<i>pomona</i>										
Mottled Emigrant	<i>Catopsilia</i>			1							C
	<i>pyranthe</i>										
Red-based Jezebel	<i>Delias pasithoe</i>			3			1				VC
Three-spot Grass Yellow	<i>Eurema blanda</i>		1								UC
Yellow Orange Tip	<i>Ixias pyrene</i>							1			C
<b>Lycaenidae</b>											
Dark Grass Blue	<i>Zizeeria</i>			2							R
	<i>karsandra</i>										
Lime Blue	<i>Chilades lajus</i>		7	2		1	1		3		VC
Long-banded Silverline	<i>Spindasis lohita</i>							5			UC
Pale Grass Blue	<i>Zizeeria maha</i>		13					4	11		VC
Plain Cupid	<i>Chilades pandava</i>								1		UC
Plum Judy	<i>Abisara echerius</i>		3	3			1	4	2		VC
Punchinello	<i>Zemeros flegyas</i>		2	3						1	C
<b>Nymphalidae</b>											
Blue Pansy	<i>Junonia orithya</i>						1				UC
Blue Tiger	<i>Tirumala</i>		2	3				3	1		C
	<i>limniace</i>										
Blue-spotted Crow	<i>Euploea midamus</i>		3	1				5			VC
Ceylon Blue Glassy Tiger	<i>Ideopsis similis</i>		1	1							VC
Common Crow	<i>Euploea core</i>			1							VC
Common Duffer	<i>Discophora</i>		1								C
	<i>sondaica</i>										
Common Five Ring	<i>Ypthima baldus</i>		1	1				2			VC
Common Jester	<i>Symbrenthia</i>							1			C
	<i>lilaea</i>										
Common Lascar	<i>Pantoporia</i>			1							VC
	<i>hordonia</i>										
Common Nawab	<i>Polyura athamas</i>		1								UC
Common Sailor	<i>Neptis hylas</i>		7	1				4	4		VC
Dark Brand Bush Brown	<i>Mycalesis</i>							1	4		VC
	<i>mineus</i>										
Glassy Tiger	<i>Parantica aglea</i>		2				1		1		VC
Great Eggfly	<i>Hypolimnas</i>								1		C
	<i>bolina</i>										
Indian Fritillary	<i>Argyreus</i>					1					UC
	<i>hyperbius</i>										
Large Faun	<i>Faunis eumeus</i>		2								VC
Mapwing	<i>Cyrestis</i>		2				1				C
	<i>thyodamas</i>										
Peacock Pansy	<i>Junonia almana</i>								5		C
Rustic	<i>Cupha</i>	1	15					5	3		VC
	<i>erymanthis</i>										



Common Name	Species Name	W	P	Sh	G	D	AD	R	AW	St	Commonness
Staff Sergeant	<i>Athyma selenophora</i>		1								C
Straight Five-ring	<i>Ypthima lisandra</i>			4		2		1			C
Striped Blue Crow	<i>Euploea mulciber</i>	1	1	1							UC
White Commodore	<i>Parasarpa dudu</i>		1								UC
Yellow Pansy	<i>Junonia hierta</i>		1				2		1		UC
<b>Total butterflies</b>		<b>10</b>	<b>124</b>	<b>44</b>	<b>4</b>	<b>4</b>	<b>12</b>	<b>70</b>	<b>69</b>	<b>3</b>	
<b>Total species</b>		<b>6</b>	<b>35</b>	<b>20</b>	<b>4</b>	<b>3</b>	<b>11</b>	<b>22</b>	<b>24</b>	<b>2</b>	

Habitat: AW = abandoned wet agricultural land, W = secondary woodland, P = plantation, Sh = shrubland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, St = stream. Commonness: VC = very common, C = common, UC = uncommon, R = rare. Commonness of butterflies is reference to Yiu V (2004). *Field Guide to the butterflies of Hong Kong*.

Table 6c *Butterfly Species Recorded at South Soko*

Common Names	Species Name	Habitat Recorded in		Commonness
		Dry Season	Wet Season	
Banded Awl	<i>Hasora chromus</i>		R, AW	UC
Blue Pansy	<i>Junonia orithya</i>		D	UC
Blue Tiger	<i>Tirumala limniace</i>		Sh, R, P, AW	C
Blue-spotted Crow	<i>Euploea midamus</i>		Sh, R, P	VC
Bush Hopper	<i>Ampittia dioscorides</i>		AW	UC
Ceylon Blue Glassy Tiger	<i>Ideopsis similis</i>		Sh, P	VC
Chestnut Angle	<i>Odontoptilum angulatum</i>		W, P	C
Chinese Peacock	<i>Papilio bianor</i>		Sh	VC
Common Bluebottle	<i>Graphium sarpedon</i>		Sh, R, P, AW	VC
Common Crow	<i>Euploea core</i>		Sh	VC
Common Duffer	<i>Discophora sondaica</i>		P	C
Common Evening Brown	<i>Melanitis leda</i>	P		C
Common Five Ring	<i>Ypthima baldus</i>		Sh, R, P	VC
Common Grass Yellow	<i>Eurema hecabe</i>	AD, R, TW, AW	Sh, G, AD, R, W, AW, St	VC
Common Gull	<i>Cepora nerissa</i>		AD, R, P, AW	C
Common Indian Crow	<i>Euploea core</i>		AD, R, AW	VC
Common Jester	<i>Symbrenthia lilaea</i>		R	C
Common Lascar	<i>Pantoporia hordonia</i>		P	VC
Common Mapwing	<i>Cyrestis thyodamas</i>		AD, P	C
Common Mime	<i>Chilasa clytia</i>		Sh, P, AW	C
Common Mormon	<i>Papilio polytes</i>	AD, P	Sh, G, AD, R, W, AW	VC
Common Nawab	<i>Polyura athamas</i>		P	UC
Common Sailor	<i>Neptis hylas</i>	AD, P, AW	Sh, R, P, AW	VC
Common Straight Swift	<i>Parnara guttata</i>		AW, R	C
Common Tiger	<i>Danaus genutia</i>		AW, R	VC

Common Names	Species Name	Habitat Recorded in Dry Season	Habitat Recorded in Wet Season	Commonness
Conjoined Swift	<i>Pelopidas conjunctus</i>		P, R	UC
Contiguous Swift	<i>Polytremis lubricans</i>		AW, R	C
Dark Brand Bush Brown	<i>Mycalesis mineus</i>	R	R, AW	VC
Dark Grass Blue	<i>Zizeeria karsandra</i>		Sh	R
Five-bar Swordtail	<i>Pathysa antiphates</i>		P	C
Forest Hopper	<i>Astictopterus jama</i>		P	C
Formosan Swift	<i>Borbo cinnara</i>		AW	UC
Glassy Tiger	<i>Parantica aglea</i>		AD, P, AW	VC
Great Eggfly	<i>Hypolimnas bolina</i>		AW	C
Great Mormon	<i>Papilio memnon</i>		P, AW, W	VC
Greenish Palm Dart	<i>Telicota ancilla</i>		AW	C
Indian Cabbage White	<i>Pieris canidia</i>		R, W	VC
Indian Fritillary	<i>Argyreus hyperbius</i>		G	UC
Indian Palm Bob	<i>Suastus gremius</i>		G	UC
Large Faun	<i>Faunis eumeus</i>		W	VC
Lemon Emigrant	<i>Catopsilia pomona</i>		R, P, AW	C
Lime Blue	<i>Chilades lajus</i>	G, R, P	Sh, D, AD, P, AW	VC
Lime Butterfly	<i>Papilio demoleus</i>		Sh, AD, P	C
Long-banded Silverline	<i>Spindasis lohita</i>		R	UC
Mottled Emigrant	<i>Catopsilia pyranthe</i>		Sh	C
Oriental Straight Swift	<i>Parnara bada</i>		R	C
Pale Grass Blue	<i>Zizeeria maha</i>		R, P, AW	VC
Paris Peacock	<i>Papilio paris</i>		R, P, AW	VC
Peacock Pansy	<i>Junonia almana</i>		AW	C
Plain Cupid	<i>Chilades pandava</i>		AW	UC
Plum Judy	<i>Abisara echerius</i>	Sh, R, P	Sh, AD, R, W, AW	VC
Punchinello	<i>Zemeros flegyas</i>	P, AW	Sh, P, St	C
Red Helen	<i>Papilio helenus</i>		P, W	VC
Red Lacewing	<i>Cethosia biblis</i>	P		R
Red-based Jezebel	<i>Delias pasithoe</i>		Sh, AD	VC
Rustic	<i>Cupha erymanthis</i>	P, AW	R, P, W, AW	VC
South Sullied Sailer	<i>Neptis clinia</i>		R	C
Spangle	<i>Papilio protenor</i>		AD, R, P	VC
Staff Sergeant	<i>Athyma selenophora</i>		AW	C
Straight Five-ring	<i>Ypthima lisandra</i>	Sh	Sh, D, R	C
Striped Blue Crow	<i>Euploea mulciber</i>		Sh, W, P	UC
Tailed Jay	<i>Graphium agamemnon</i>		R, P	VC
Tawny Rajah	<i>Charaxes bernardus</i>		P, R, AW	VC
Three-spot Grass Yellow	<i>Eurema blanda</i>		P	UC
Tree Filter	<i>Hyarotis adrastus</i>	AW		UC
Water Snow Flat	<i>Tagiades</i>		P, AW, R	VC

Common Names	Species Name	Habitat Recorded in Dry Season	Habitat Recorded in Wet Season	Commonness
	<i>litigiosus</i>			
White Commodore	<i>Parasarpa dudu</i>		P	UC
Yellow Orange Tip	<i>Ixias pyrene</i>		R	C
Yellow Pansy	<i>Junonia hierta</i>		AD, P, AW	UC

Habitat: AW = abandoned wet agricultural land, W = secondary woodland, p = plantation, Sh = shrubland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, St = stream. Commonness: VC = very common, C = common, UC = uncommon, R = rare. Commonness of butterflies is reference to Yiu V (2004). *Field Guide to the butterflies of Hong Kong*.

Table 7 Butterfly Species Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Efforts	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interests
<b>South Soko</b>						
Current study	120	Secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream, disturbed area, abandoned reservoir, abandoned dry agricultural land and backshore vegetation.	6 days during dry season (Feb – Mar 04, Nov 05- Jan 06) and 6 days during wet season (Apr – July 04, Sept – Oct 05).	Total: 56 Secondary woodland (5), plantation (35), shrubland (21), disturbed area (3), Abandoned dry agricultural land (12), abandoned reservoir (23), abandoned wet agricultural land (24), and stream (2).	372	Total: 17 Disturbed area (2), Abandoned wet agricultural land (4), Grassland (2), Plantation (9), Shrubland (2) and abandoned reservoir (1).
<b>Lamma Island</b>						
ERM 2004	79	Secondary woodland, shrubland, shrubby grassland, natural and modified stream, and village/developed area.	3 days transect surveys in the wet season (May – Jun 2004).	Total: 63 Secondary woodland (61), Shrubland (26), shrubby grassland (23) and village/developed area (3).	Not provided	Total: 16 (All recorded in Secondary woodland).
<b>Green Island</b>						
BMT/ERM 2000	11	Secondary woodland, shrubland, grassland and developed areas.	September – November 1997; March – May 1998, monthly.	Total: 61	969	Total: 10 (all recorded in woodland)
<b>Little Green Island</b>						
BMT/ERM 2000	11	Secondary woodland, shrubland and grassland.	September – November 1997; March – May 1998, monthly.	Total: 34	194	Total: 2 (Both recorded in woodland).
<b>Chi Ma Wan Peninsula and Pui O</b>						

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Efforts	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interests
MCL 1999	384	Forest, tall shrubland, shrubland and grass mixture, wetland, farmland, abandoned farmland, rocky shore, sandy beach, backshore shrubland, mangrove, brackish mudflat, plantation, wasteland, stream and village area.	2 survey days in dry season (Oct and Nov 2000).	Total 28: Wetland (12), forest (28), wasteland (17), abandoned farmland (12) and stream (6).	190	Total: 4 (All recorded in forest).
<b>Cheung Sha to Lung Tseng Tau</b>						
MAL 2001	601	Secondary woodland, Plantation woodland, Tall shrubland, Shrubland-grassland mosaic, Grassland, Stream, Agricultural land, Wasteland, Freshwater marsh and Village area.	12 survey days in wet season (Jun - Oct 2001) and 9 days in dry season (Sept and Oct 200).	Total: 104	Not provided	Total: 8 (All recorded in woodland).

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.  
 ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report  
 ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited.*  
 BMT/ERM 1999 - Babbie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
 MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.*  
 MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report.*

Table 8 Dragonfly Species and Their Abundance Recorded at South Soko in Wet Season

Common Name	Species Name	W	P	D	G	AD	R	AW	S	Commonness
Asian Pintail	<i>Acisoma panorpoides</i>							1		C
Blue Dasher	<i>Brachydiplax chalybea</i>							1		C
Blue Percher	<i>Diplacodes trivialis</i>			1						A
Common Blue Jewel	<i>Rhinocypha perforate perforata</i>		1	1						
Common Blue Skimmer	<i>Orthetrum glaucum</i>		3				3	1	1	A
Common Bluetail	<i>Ischnura senegalensis</i>						6	3		A
Common Red Skimmer	<i>Orthetrum pruinosum</i>			1	1	2			1	A
Crimson Dropwing	<i>Trithemis aurora</i>			1		2				A
Evening Skimmer	<i>Tholymis tillarga</i>						3			C
Greater Blue Skimmer	<i>Orthetrum melania</i>			1		1		1		UC
Green Skimmer	<i>Orthetrum sabina</i>			1	1	2				C
Marsh Dancer	<i>Onychargia atrocyana</i>							3		C
Marsh Skimmer	<i>Orthetrum luzonicum</i>					1		21		A
Orange-tailed Sprite	<i>Ceriatrion auranticum</i>		1				6	27		A
Pied Skimmer	<i>Pseudothemis zonata</i>		2				8		3	C
Red-faced Skimmer	<i>Orthetrum chrysis</i>							5	3	C
Variegated Flutterer	<i>Rhyothemis variegata</i>		1				3	1		C
Wandering Glider	<i>Pantala flavescens</i>		2	2		2	10	23	25	A
<b>Total dragonflies</b>		<b>0</b>	<b>10</b>	<b>8</b>	<b>2</b>	<b>10</b>	<b>39</b>	<b>87</b>	<b>33</b>	
<b>Total species</b>		<b>0</b>	<b>6</b>	<b>7</b>	<b>2</b>	<b>6</b>	<b>7</b>	<b>11</b>	<b>5</b>	

Habitat : AW = abandoned wet agricultural land, W = secondary woodland, R = abandoned reservoir, D = disturbed area, AD = abandoned dry agricultural land, S = stream, G = grassland. No dragonfly was recorded in shrubland. Commonness: A = abundant, C = common, UC = uncommon. Commonness of dragonflies is reference to Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Friends of Country Park.

Table 9 Dragonfly Species Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>1</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>						
Current study	120	Secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream, disturbed area, abandoned reservoir, abandoned dry agricultural land and backshore vegetation.	6 days in wet season (Feb - Mar 04, Sept – Oct 05) and 6 days in dry season (Apr - Jul 04, Nov 05-Jan 06) with two night surveys in June 2004 and Sept 2005	Total: 18 Abandoned wet agricultural land (11), Plantation (6), abandoned reservoir (7), disturbed area (7), abandoned dry agricultural land (6), stream (5).	189	Total: 3 Grassland (1), sandy shore (1), abandoned reservoir (1)
<b>Chi Ma Wan Peninsula and Pui O</b>						
MCL 1999	384	Forest, tall shrubland, shrubland and grass mixture, wetland, farmland, abandoned farmland, rocky shore, sandy beach, backshore shrubland, mangrove, brackish mudflat, plantation, wasteland, stream and village area.	2 survey days in dry season (Oct – Nov 2000).	Not specified, mainly found near to wetland and stream.	17	Nil
<b>Cheung Sha to Lung Tseng Tau</b>						
MAL 2001	601	Secondary woodland, Plantation woodland, Tall shrubland, Shrubland-grassland mosaic, Grassland, Stream and riparian, Agricultural land, Wasteland, Freshwater marsh (Fong Yuen) and Village area.	12 survey days in wet season (Jun – Sept 2000) and 9 survey days in dry season (Oct – Nov 2000).	Total: 37 Mainly found at stream and shrubland.	Note quantified.	Total: 4 Tall shrubland (1) and Stream (4).

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.  
MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau*. EIA Report.  
MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha*. EIA Report.

Table 10 Herpetofauna Species Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>						
Current study	120	Secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream, disturbed area, abandoned reservoir, abandoned dry agricultural land and backshore vegetation.	6 survey days in wet season (Feb – Mar 2004, Sept – Nov 05) and 6 survey days in dry season (April - Jul 2004, Nov 05 – Jan 06) and two night survey in June 04 and Sept 05.	Total: 14 6 amphibian species 8 reptile species	Not quantified.	Total: 2 Abandoned wet agricultural land (1), disturbed area (1)
<b>Lamma Island</b>						
ERM 2004	79	Secondary woodland, shrubland, shrubby grassland, natural and modified stream, and village/developed area.	3 survey days in wet season and one night survey (May – Jun 2004).	Total: 8 5 amphibian species 3 reptile species	Not quantified.	Total: 1 Secondary woodland (1), shrubland (1), Stream (1) and village/developed area (1).
<b>Po Toi</b>						
ERM 1998	373	Bare soil grassland, land shrub, land shrub with grass, tall shrub, tall shrub with grass, woodland, rural area (building and developed area)	No information.	Total: 9 3 amphibian species 6 reptile species	Not quantified.	Total: 2
<b>Green Island</b>						
BMT/ERM 2000	11	Woodland, shrubland, stream and developed area.	Survey undertaken during spring and early summer 1998 including a night survey.	Total: 7	57	Nil
<b>Chi Ma Wan Peninsula and Pui O</b>						



Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
MCL 1999	384	Forest, tall shrubland, shrubland and grass mixture, wetland, farmland, abandoned farmland, rocky shore, sandy beach, backshore shrubland, mangrove, brackish mudflat, plantation, wasteland, stream and village area.	2 survey days in dry season (Oct and Nov 2000).	Total: 9 4 amphibian species 5 reptile species (All found in Pui O Marsh and Taro Bed).	Not quantified.	Total: 2 Pui O Marsh and Taro Bed (2)
<b>Cheung Sha to Lung Tseng Tau</b>						
MAL 2001	601	Secondary woodland, Plantation woodland, Tall shrubland, Shrubland-grassland mosaic, Grassland, Stream and riparian, Agricultural land, Wasteland, Freshwater marsh (Fong Yuen) and Village area.	4 survey days in wet season (Jun 2001) and 4 survey days in dry season (Oct – Nov 2001) for both day and night surveys.	Total: 29 12 amphibian species 17 reptile species	Not quantified	Total: 4 for amphibian species Stream (4), Plantation woodland (1) and Tall Shrub (1).  Total: 3 for reptile species Plantation woodland (2), Tall shrub (1) and Stream (1).

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.  
 ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report  
 ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited.*  
 BMT/ERM 1999 - Babbie BMT (Hong Kong) Ltd (1999). Green Island Development EWQIA & MTIA Studies. Final Environmental and Water Quality Impact Assessment Report. For the Territory Development Department.  
 MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.*  
 MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report.*

Table 11 Aquatic Fauna Recorded on South Soko in Comparison with Other Outlying Islands and South Lantau

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
<b>South Soko</b>						
Current study	120	Secondary woodland, plantation, shrubland, grassland, abandoned wet agricultural land, stream, disturbed area, abandoned reservoir, abandoned dry agricultural land and backshore vegetation.	2 survey days in dry season (Feb-Mar 2004) and 4 survey days in wet season (April and July 2004, Sept 2005).	Total: 9 Abandoned wet agricultural land (1), abandoned reservoir (9)	Not quantified.	Nil
<b>Lamma Island</b>						
ERM 2004	79	Secondary woodland, shrubland, shrubby grassland, natural and modified stream, village/developed area	2 survey days in wet season (May and Jun 2004).	Total: 3 Stream (3)	Not quantified	Nil Total: 1 Stream (1)
<b>Po Toi</b>						
ERM 1998	373	Bare soil grassland, land shrub, land shrub with grass, tall shrub, tall shrub with grass, woodland, rural area (building and developed area)	One survey day (July 1997) and one survey day for dry season (Feb 1997).	Total: 31 Stream (31)	Not quantified	Nil Nil
<b>Chi Ma Wan Peninsula and Pui O</b>						

Location <sup>(1)</sup>	Size of Study Area (ha)	Habitats Recorded within the Study Area	Survey Effort	Number of Species Recorded	Total Number of Individuals Recorded	Number of Species of Ecological/Conservation Interest
MCL 1999	384	Forest, tall shrubland, shrubland and grass mixture, wetland, farmland, abandoned farmland, rocky shore, sandy beach, backshore shrubland, mangrove, brackish mudflat, plantation, wasteland, stream and village area.	3 survey days in dry season in October and November 2000.	Total: 29 Stream (20), Marsh (9)	Not quantified	Total: 3 Abandoned cultivation land (2), Stream (1)
<b>Cheung Sha to Lung Tseng Tau</b>						
MAL 2001	601	Secondary woodland, Plantation woodland, Tall shrubland, Shrubland-grassland mosaic, Grassland, Stream and riparian, Agricultural land, Wasteland, Freshwater marsh (Fong Yuen) and Village area	At least 14 days (Jul 2000 - Jan 2001).	Total: 18 Stream (14), Marsh (4)	Not quantified.	Total: 4 Stream (3), Marsh (1)

Note: (1) Other outlying islands and south Lantau areas without the specified habitat are not shown in the table.

ERM 2004-ERM HK Ltd (2004). Renewable Energy by a Wind Turbine System on Lamma Island: Final Environmental Impact Assessment for the Hongkong Electric Company Limited. Final Report

ERM 1998 - ERM HK Ltd (1998d). *Po Toi Island: Terrestrial Ecological Study for the Hongkong Electric Company Limited.*

MCL 1999- Mott Cornell Ltd (1999). *132 KV Supply Circuit from Pui O via Chi Ma Wan Peninsula via Sea Crossing towards Cheung Chau. EIA Report.*

MAL 2001-Moucel Asia Ltd (2001). *Improvement to Tung Chung Road between Lung Tseng Tau and Cheung Sha. EIA Report.*

Table 12 Plant Species Recorded Within the Study Area of Shek Pik

Species	Growth Form	Origin	Status	Local Abundance			
				Plantation	Shrubland	Sandy Shore	Disturbed Area
<i>Acacia confusa</i>	T	E	VC	D	O		A
<i>Acalypha wilkesiana</i>	S	N	VC				O
<i>Ageratum conyzoides</i>	H	N	VC	O	O		
<i>Alangium chinense</i>	S	N	C		O		
<i>Alocasia macrorrhiza</i>	H	N	VC		O		
<i>Antirhoea chinensis</i>	S	N	C	O	O		
<i>Aporosa dioica</i>	S	N	VC	O	F		
<i>Atalantia buxifolia</i>	S	N	VC		F		
<i>Baeckea frutescens</i>	S	N	VC		F		
<i>Bauhinia blackeana</i>	T	N	VC	O			F
<i>Berchemia racemosa</i>	C	N	C		O		
<i>Bidens pilosa</i>	H	N	VC		O		
<i>Breynia fruticosa</i>	S	N	VC	O	F		
<i>Bridelia tomentosa</i>	S	N	VC	O	F		
<i>Caesalpinia vernalis</i>	C	N	C	O			
<i>Cansjera rheedii</i>	S	N	C		O		
<i>Carex chinensis</i>	Se	N	C		O		
<i>Cassia siamea</i>	T	E	C				O
<i>Cassytha filiformis</i>	C	N	VC	O	F		
<i>Casuarina equisetifolia</i>	T	N	VC	O			
<i>Celtis sinensis</i>	T	N	C		F	O	
<i>Cerbera manghas</i>	T	E	C		O	O	
<i>Cinnamomum camphora</i>	T	N	C				O

Species	Growth Form	Origin	Status	Local Abundance			
				Plantation	Shrubland	Sandy Shore	Disturbed Area
<i>Cocculus orbiculatus</i>	C	N	C				O
<i>Cratogeomys cochinchinensis</i>	S	N	VC	O	F		
<i>Cyperus malaccensis</i>	Se	N	C		O		
<i>Daphniphyllum calycinum</i>	T	N	C	O	O		
<i>Delonix regia</i>	T	E	VC				F
<i>Desmos cochinchinensis</i>	S	N	VC		O		
<i>Dianella ensifolia</i>	H	N	VC		F		
<i>Dicranopteris linearis</i>	F	N	VC		F		
<i>Dimocarpus longan</i>	T	N	C				O
<i>Embelia laeta</i>	C	N	VC	O	F		
<i>Embelia ribes</i>	C	N	C		F		
<i>Erythrina variegata</i>	T	E	C				F
<i>Eurya nitida</i>	S	N	VC		F		
<i>Excoecaria agallocha</i>	S	N	C			F	
<i>Ficus hispida</i>	T	N	VC		F		
<i>Ficus microcarpa</i>	T	N	VC				F
<i>Ficus pumila</i>	C	N	VC	S	S		
<i>Ficus variegata</i>	T	N	C		O		
<i>Ficus variolosa</i>	S	N	C	O	O		
<i>Gardenia jasminoides</i>	S	N	C		F		
<i>Glochidion eriocarpum</i>	S	N	VC	O			
<i>Glochidion wrightii</i>	S	N	VC				O
<i>Gymnema sylvestre</i>	C	N	C		F		
<i>Ilex asprella</i>	S	N	VC				

Species	Growth Form	Origin	Status	Local Abundance			
				Plantation	Shrubland	Sandy Shore	Disturbed Area
<i>Ilex rotunda</i>	S	N	VC		O		
<i>Illigera celebica</i>	C	N	C				
<i>Inula cappa</i>	H	N	VC		F		
<i>Ipomoea brasiliensis</i>	C	N	VC		S	F	
<i>Ipomoea cairica</i>	C	N	VC				
<i>Ischaemum aristatum</i>	G	N	VC		O	O	
<i>Lantana camara</i>	S	E	VC				O
<i>Litsea cubeba</i>	S	N	VC		F		
<i>Litsea glutinosa</i>	T	N	VC		F		
<i>Litsea rotundifolia</i>	S	N	VC		A		
<i>Lygodium dichotomum</i>	C	N	VC		F		
<i>Macaranga tanarius</i>	T	N	VC				O
<i>Mallotus paniculatus</i>	T	N	C				
<i>Melastoma candidum</i>	S	N	VC		F		
<i>Melastoma sanguineum</i>	S	N	VC		F		
<i>Melia azedarach</i>	T	N	VC		S		
<i>Microcos paniculata</i>	T	N	C		F		
<i>Mikania micrantha</i>	C	E	VC		S		
<i>Millettia reticulata</i>	C	N	VC		O		
<i>Mimosa pudica</i>	S	N	C		O		O
<i>Miscanthus floridulus</i>	G	N	VC		O		
<i>Miscanthus sinensis</i>	G	N	VC		O		
<i>Mussaenda pubescens</i>	S	N	VC		F		
<i>Paederia scandens</i>	C	N	C		O	S	

Species	Growth Form	Origin	Status	Local Abundance			
				Plantation	Shrubland	Sandy Shore	Disturbed Area
<i>Pandanus forceps</i>	S	N	C		O	O	
<i>Pandanus tectorius</i>	S	N	VC		O		
<i>Paspalum conjugatum</i>	G	N	C		O	O	
<i>Pavetta hongkongensis</i>	S	N	P		S		
<i>Phoenix hanceana</i>	P	N	C		O	O	
<i>Phyllanthus cochinchinensis</i>	S	N	VC				O
<i>Phyllanthus emblica</i>	S	N	VC		F		
<i>Pinus elliottii</i>	T	E	VC		O		
<i>Psychotria rubra</i>	S	N	VC		F		
<i>Rhaphiolepis indica</i>	S	N	VC		F		
<i>Rhapis excelsa</i>	P	N	C		O		
<i>Rhodomyrtus tomentosa</i>	S	N	VC		F		
<i>Rhus chinensis</i>	S	N	VC		O		
<i>Rhus succedanea</i>	S	N	VC		F		
<i>Ricinus communis</i>	H	N	C		O	F	
<i>Sageretia theezans</i>	C	N	C		F		
<i>Sansevieria trifasciata</i>	H	E	C				O
<i>Sapium discolor</i>	S	N	C		F		
<i>Sapium sebiferum</i>	S	N	C		F		
<i>Schefflera octophylla</i>	S	N	VC	O	F		
<i>Scolopia chinensis</i>	S	N	VC	O	O		
<i>Smilax china</i>	C	N	VC		F		
<i>Sterculia lanceolata</i>	T	N	C	O			
<i>Strophanthus divaricatus</i>	C	N	VC		F		

Species	Growth Form	Origin	Status	Local Abundance			
				Plantation	Shrubland	Sandy Shore	Disturbed Area
<i>Taxillus chinensis</i>	C	N	C		O		
<i>Tetracera asiatica</i>	C	N	VC	O	O		
<i>Thespesia populnea</i>	T	N	C			S	
<i>Trema orientalis</i>	S	N	VC				O
<i>Wedelia chinensis</i>	C	N	VC	S		O	
<i>Wikstroemia chinensis</i>	S	N	VC		F		
<i>Wikstroemia indica</i>	S	N	VC		F	O	
<i>Uvaria microcarpa</i>	C	N	C	O			O
<i>Vitex negundo</i>	S	N	C	O			
<i>Vitex rotundifolia</i>	S	N	C		O	A	
<i>Zanthoxylum avicennae</i>	S	N	VC	O			
<i>Zanthoxylum nitidum</i>	S	N	C		O		
<i>Zoysia matrella</i>	G	N	C			F	
<b>Total no. of species</b>				<b>24</b>	<b>78</b>	<b>15</b>	<b>18</b>

Code for abundance: A=Abundant; F=Frequent; O=Occasional; S=Scarce

Code for Status: C=Common; VC=Very Common; P=Protected

Code for Plant Form: G=Grass; Climber; H=Herb; Se=Sedge; G=Grass; F=Fern; P=Palm; S=Shrub; T=Tree

Code for Origin: N=Native; E=Exotic



Table 13a Mammal Species Recorded at Shek Pik in Dry Season

Common Name	Species Name	Status	Shrubland	Plantation
Japanese Pipistrelle	<i>Pipistrellus abramus</i>	P	3	
Tanezumi Rat	<i>Rattus tanezumi</i>	A		1
Brown Musk Shrew	<i>Suncus murinus</i>	C		1

Note: A = Abundant, C = Common, UC = Uncommon, P = Protected. Commonness of mammal species is reference to Shek, C.T. (2006). *A Field Guide to the Terrestrial Mammals of Hong Kong*. AFCD.

Table 13b Mammal Species Recorded at Shek Pik in Wet Season

Common Name	Species Name	Status	Developed Area
Tanezumi Rat	<i>Rattus tanezumi</i>	A	1

Note: A = Abundant, C = Common, UC = Uncommon, P = Protected. Commonness of mammal species is reference to Shek, C.T. (2006). *A Field Guide to the Terrestrial Mammals of Hong Kong*. AFCD.

Table 14 Bird Species Recorded within the Study Area at Shek Pik

Common Name	Species Name	Habitats Recorded in Dry Season	Habitat Recorded in Wet Season	Commonness	Status in Hong Kong	Remark
Barn Swallow	<i>Hirundo rustica</i>		D	CW	PM	Flying over
Black Drongo	<i>Dicrurus macrocercus</i>		Sh, D	CW	SV	
Black Kite	<i>Milvus migrans</i>	Sh, D, P	Sh	CW	R, WV	Flying over
Black-capped Kingfisher	<i>Halcyon pileata</i>	SS		U	WV, PM	
Black-collared Starling	<i>Sturnus nigricollis</i>	D, P	Sh, P	CW	R	
Black-faced Bunting	<i>Emberiza spodocephala</i>	Sh		CW	WV, PM	
Blue Rock Thrush	<i>Monticola solitarius</i>	SS		U	WV, PM	
Bonelli's Eagle	<i>Hieraetus fasciatus</i>	P		R	R	Flying over
Cattle Egret	<i>Bubulcus ibis</i>		D	CW	R	22 seen
Chestnut Bulbul	<i>Hypsipetes castanonotus</i>	Sh		R	R, WV	
Collared Crow	<i>Corvus torquatus</i>	Sh, D		U	R	
Collared Scops Owl	<i>Otus lettia</i>	Sh		U	R	Heard
Common Black Bird	<i>Turdus merula</i>	Sh, D, P		U	WV, PM	
Common Buzzard	<i>Buteo buteo</i>	Sh, Re		U	WV	Flying over

Common Name	Species Name	Habitats Recorded in Dry Season	Habitat Recorded in Wet Season	Commonness	Status in Hong Kong	Remark
Common Kestrel	<i>Falco tinnunculus</i>	Sh		U	WV, PM	Flying over
Common Kingfisher	<i>Alcedo atthis</i>	SS		CW	R	
Common Koel	<i>Eudynamis scolopacea</i>		P	CW	R	
Common Magpie	<i>Pica pica</i>	Sh, D, P	Sh, P	CW	R	
Common Sandpiper	<i>Actitis hypoleucos</i>	SS		CW	WV, PM	
Common Tailorbird	<i>Orthotomus sutorius</i>	P, SS	Sh, P	CW	R	
Crested Myna	<i>Acridotheres cristatellus</i>	D, P	D	CW	R	Up to 36
Daurian Redstart	<i>Phoenicurus aureus</i>	Sh, D, P		U	WV	
Dusky Thrush	<i>Turdus naumanni</i>	Sh		R	WV	
Dusky Warbler	<i>Phylloscopus fuscatus</i>	Sh, P		U	WV, PM	
Eurasian Tree Sparrow	<i>Passer montanus</i>	D		CW	R	
Eurasian Woodcock	<i>Scolopax rusticola</i>	Sh		R	WV	
Great Tit	<i>Parus major</i>	Sh, D, P	Sh	CW	R	
Greater Coucal	<i>Centropus sinensis</i>	P	Sh, P	CW	R	
Grey-backed Thrush	<i>Turdus hortulorum</i>	Sh, D, P		U	WV	
Hair-crested Drongo	<i>Dicrurus hottentottus</i>		Sh	U	R, PM	
Hwamei	<i>Garrulax canorus</i>		Sh	U	R	
Japanese White-eye	<i>Zosterops japonicus</i>	Sh, D, P	Sh, P	CW	R, WV	
Large-billed Crow	<i>Corvus macrorhynchos</i>	Sh, D, P	Sh, P	CW	R	
Light-vented Bulbul	<i>Pycnonotus sinensis</i>	Sh, D, P	Sh, P	CW	R	
Masked Laughing Thrush	<i>Garrulax perspicillatus</i>	D	Sh, P	CW	R	
Olive-backed Pipit	<i>Anthus hodgsoni</i>	Sh, D, P		CW	WV, PM	
Oriental Magpie Robin	<i>Copsychus saularis</i>	D, P	Sh, P	CW	R	
Oriental Turtle Dove	<i>Streptopelia orientalis</i>	Sh, D, P		CW	WV, PM	
Pacific Reef Egret	<i>Egretta sacra</i>	SS	SS	U	R	
Red-flanked Blue-tail	<i>Tarsiger cyanurus</i>	Sh, D		U	WV, PM	
Red-throated Flycatcher	<i>Ficedula albicilla</i>	P, SS		R	WV, PM	

Common Name	Species Name	Habitats Recorded in Dry Season	Habitat Recorded in Wet Season	Commonness	Status in Hong Kong	Remark
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	Sh, D, P	Sh, P	CW	R	
Richard's Pipit	<i>Anthus richardi</i>	D	D	CW	WV, PM	
Scaly Thrush	<i>Zoothera dauma</i>	D		R	WV, PM	
Siberian Rubythroat	<i>Luscinia calliope</i>	Sh		U	WV, PM	
Sooty-headed Bulbul	<i>Pycnonotus aufragaster</i>	P		CW	R	
Spotted Dove	<i>Streptopelia chinensis</i>	Sh, D, P	Sh, D, P	CW	R	
White Wagtail	<i>Motacilla alba</i>	Sh, D, SS		CW	WV, PM	
White-breasted Waterhen	<i>Amaurornis phoenicurus</i>	Sh		CW	R	
White-rumped Munia	<i>Lonchura striata</i>	Sh		CW	R	
White-throated Kingfisher	<i>Halcyon smyrnensis</i>	Sh, SS		CW	R	
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	Sh, P	Sh, P	CW	R	
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	Sh, D, P	P	CW	WV, PM	

Habitats: Sh = Shrubland, P = Plantation, SS = Backshore Shrubland, D = Developed Area, Re = Reservoir

Commonness & Distribution: CW = common and widespread, U = uncommon and localised, R = rare and localized, VR = very rare. Commonness of bird species is reference to Commonness and status of birds are reference to C Viney, Karen Philipps and Lam Chiu Ying (1993) *Birds of Hkng Kong and South China*.

Main Status: R = Resident, WV = Winter Visitor, SV = Summer Visitor, PM = Passage Migrant

Table 15a Bird Species Recorded within Each Habitat of Shek Pik in Dry Season

Common Name	Species Name	Habitat			
		Plantation	Shrubland	Backshore Shrubland	Developed Area
Black Kite	<i>Milvus migrans</i>	1	3		1
Black-capped Kingfisher	<i>Halcyon pileata</i>			2	
Black-collared Starling	<i>Sturnus nigricollis</i>	38			14
Black-faced Bunting	<i>Emberiza spodocephala</i>		2		
Blue Rock Thrush	<i>Monticola solitarius</i>			1	
Bonelli's Eagle	<i>Hieraaetus fasciatus</i>	1			
Chestnut Bulbul	<i>Hypsipetes castanonotus</i>		7		
Collared Crow	<i>Corvus torquatus</i>		2		1
Common Black Bird	<i>Turdus merula</i>	4	4		1
Common Kingfisher	<i>Alcedo atthis</i>		1	2	
Common Magpie	<i>Pica pica</i>	2	8		3
Common Sandpiper	<i>Actitis hypoleucos</i>			1	
Common Tailorbird	<i>Orthotomus sutorius</i>	2		1	
Crested Myna	<i>Acridotheres cristatellus</i>	14			36
Daurian Redstart	<i>Phoenicurus aureoreus</i>	4	1	1	1
Dusky Warbler	<i>Phylloscopus fuscatus</i>	1	3		
Eurasian Tree Sparrow	<i>Passer montanus</i>				5
Great Tit	<i>Parus major</i>	7	9		1
Greater Coucal	<i>Centropus sinensis</i>	1			
Grey-backed Thrush	<i>Turdus hortulorum</i>	4	11		2
Japanese White-eye	<i>Zosterops japonicus</i>	20	25		8
Kestrel	<i>Falco tinnunculus</i>		1		
Large-billed Crow	<i>Corvus macrorhynchos</i>	16	9		2

Common Name	Species Name	Habitat			
		Plantation	Shrubland	Backshore Shrubland	Developed Area
Light-vented Bulbul	<i>Pycnonotus sinensis</i>	65	80		37
Masked Laughing Thrush	<i>Garrulax perspicillatus</i>				2
Olive-backed Pipit	<i>Anthus hodgsoni</i>	5	2		16
Oriental Magpie Robin	<i>Copsychus saularis</i>	1		1	1
Red-flanked Blue-tail	<i>Tarsiger cyanurus</i>		1		1
Red-throated Flycatcher	<i>Ficedula albicilla</i>	1		1	
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	12	7		16
Reef Egret	<i>Egretta sacra</i>			8	
Richard's Pipit	<i>Anthus richardi</i>				9
Rufous Turtle Dove	<i>Streptopelia orientalis</i>	1	1		1
Scaly Thrush	<i>Zoothera dauma</i>				1
Siberian Rubythroat	<i>Luscinia calliope</i>		1		
Sooty-headed Bulbul	<i>Pycnonotus augrigaster</i>	3			
Spotted Dove	<i>Streptopelia chinensis</i>	11	17		5
White Wagtail	<i>Motacilla alba</i>		2	3	1
White-backed Munia	<i>Lonchura striata</i>		2		
White-throated Kingfisher	<i>Halcyon smyrnensis</i>		1	1	
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	1	1		
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>	1	5		2
	Total number of individual	216	206	22	167
	Total number of species	24	26	11	24

Table 15b Bird Species Recorded within Each Habitat of Shek Pik in Wet Season

Common Name	Species Name	Shrubland	Developed Area	Plantation	Backshore Shrubland
Barn Swallow	<i>Hirudo rustica</i>		3		
Black Drongo	<i>Dicrurus macrocercus</i>	2	1		
Black Kite	<i>Milvus migrans</i>	3			
Black-collared Starling	<i>Sturnus nigricollis</i>	1		2	
Cattle Egret	<i>Bubulcus ibis</i>		22	2	
Common Koel	<i>Eudynamis scolopacea</i>			3	
Common Magpie	<i>Pica pica</i>	1		2	
Common Tailorbird	<i>Orthotomus sutorius</i>	1		1	
Crested Myna	<i>Acridotheres cristatellus</i>		4		
Great Tit	<i>Parus major</i>	2			
Greater Coucal	<i>Centropus sinensis</i>	3		2	
Hair-crested Drongo	<i>Dicrurus hottentottus</i>	3			
Hwamei	<i>Garrulax canorus</i>	1			
Japanese White-eye	<i>Zosterops japonicus</i>	2		3	
Large-billed Crow	<i>Corvus macrorhynchos</i>	3		8	
Light-vented Bulbul	<i>Pycnonotus sinensis</i>	29		8	
Masked Laughing Thrush	<i>Garrulax perspicillatus</i>	11		5	
Oriental Magpie Robin	<i>Copsychus saularis</i>	2		1	
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>	20		2	
Reef Egret	<i>Egretta sacra</i>				1

Common Name	Species Name	Shrubland	Developed Area	Plantation	Backshore Shrubland
Richard's Pipit	<i>Anthus richardi</i>		1		
Spotted Dove	<i>Streptopelia chinensis</i>	7	1	3	
Yellow-bellied Prinia	<i>Prinia flaviventris</i>	1		1	
Yellow-browed Warbler	<i>Phylloscopus inornatus</i>			1	
	Total number of individual	92	32	44	1
	Total number of species	17	6	15	1

Table 16a *Butterfly Species Recorded at Shek Pik in Dry Season*

Common Name	Scientific Name	Status	Shrubland	Developed Area	Plantation
<b>Papilionidae</b>					
Common Mormon	<i>Papilio polytes</i>	VC			1
<b>Pieridae</b>					
Red-base Jazebel	<i>Delias pasithoe</i>	VC			1
Indian Cabbage White	<i>Pieris canidia</i>	VC		1	
Common Grass Yellow	<i>Eurema hecabe</i>	VC	1		
<b>Lycaenidae</b>					
Pale Grass Blue	<i>Zizeeria maha</i>	VC	2	3	
Plum Judy	<i>Abisara echerius</i>	VC	3		
<b>Nymphalidae</b>					
Blue Pansy	<i>Junonia orithya</i>	UC		1	
Common Evening Brown	<i>Melanitis leda</i>	C	1		
Rustic	<i>Cupha erymanthis</i>	VC			1
Angled Castor	<i>Ariadne ariadne</i>	C	1		
Common Tiger	<i>Danaus genutia</i>	VC		1	
Ceylon Blue Glassy Tiger	<i>Ideopsis similis</i>	VC			1

Notes: Status VC = Very Common, C = Common, UC = Uncommon, R = Rare. Commonness of butterflies is reference to Yiu V (2004). *Field Guide to the butterflies of Hong Kong*.

Table 16b *Butterfly Species Recorded at Shek Pik in Wet Season*

Common Name	Scientific Name	Status	Shrubland	Plantation
<b>Hesperiidae</b>				
Banded Awl	<i>Hasora chromus</i>	UC		1
Chestnut Angle	<i>Odontoptilum angulatum</i>	C	1	
<b>Papilionidae</b>				
Common Bluebottle	<i>Graphium sarpedon</i>	VC	3	
Five-bar Swordtail	<i>Pathysa antiphates</i>	C	1	1
Chinese Peacock	<i>Papilio bianor</i>	VC		1
Red Helen	<i>Papilio helenus</i>	VC	1	2
Great Mormon	<i>Papilio memnon</i>	VC	1	
Paris Peacock	<i>Papilio paris</i>	VC	3	
Common Mormon	<i>Papilio polytes</i>	VC	1	2
Spangle	<i>Papilio protenor</i>	VC		1
<b>Pieridae</b>				
Indian Cabbage White	<i>Pieris canidia</i>	VC	1	
Yellow Orange Tip	<i>Ixias pyrene</i>	UC		1
Common Grass Yellow	<i>Eurema hecabe</i>	VC	2	
<b>Lycaenidae</b>				
Plum Judy	<i>Abisara echerius</i>	VC	4	
Chocolate Royal	<i>Remelana jangala</i>	UC	1	3
Slate Flash	<i>Rapala manea</i>	C		1
Transparent Six-line Blue	<i>Nacaduba kurava</i>	C	1	
<b>Nymphalidae</b>				
Common Evening Brown	<i>Melanitis leda</i>	C	1	
Dark-brand Bush Brown	<i>Mycalesis mineus</i>	VC	2	



Common Name	Scientific Name	Status	Shrubland	Plantation
Common Faun	<i>Faunis eumeus</i>	VC		1
Common Sergeant	<i>Athyma perius</i>	C		1
Common Sailer	<i>Neptis hylas</i>	VC		1

Note: Status VC = Very Common, C = Common, UC = Uncommon, R = Rare, Commonness of butterflies is reference to Yiu V (2004). *Field Guide to the butterflies of Hong Kong*.

Table 17 *Dragonflies Species Recorded at Shek Pik in Wet Season*

Common Name	Scientific Name	Status	Shrubland	Developed Area	Plantation
Yellow Featherlegs	<i>Copera marginipes</i>	A	2	1	1
Evening Skimmer	<i>Tholymis tillarga</i>	C	1		
Wandering Glider	<i>Pantala flavescens</i>	A	54		

Note: Status A = Abundant, C = Common, UC = Uncommon, R = Rare, Commonness of dragonflies is reference to Wilson, K.D.P. (2004). *Field Guide to the Dragonflies of Hong Kong*. Friends of Country Park.

Table 18a *Amphibians and Reptiles Species Recorded at Shek Pik in Dry Season*

Common Name	Scientific Name	Status	Shrubland	Developed Area	Plantation
<b>Amphibians</b>					
Gunther's Frog	<i>Rana guentheri</i>	A	1		2
Romer's Tree Frog	<i>Philautus romeri</i>	UC			1
Brown Tree Frog	<i>Polypedates megacephalus</i>	A			1
Asiatic Painted Frog	<i>Kaloula pulchra</i>	C			2
<b>Reptiles</b>					
Chinese Gecko	<i>Gekko chinensis</i>	A			2
Bowring's Gecko	<i>Hemidactylus bowringii</i>	A	3	1	3
Changeable Lizard	<i>Calotes versicolor</i>	A	1		
Reeves' Smooth Skink	<i>Scincella reevesii</i>	A			2

Note: Abundance: A = Abundant, C = Common, UC = Uncommon, Commonness of amphibian is reference to AFCD (2005). *A Field Guide to the Amphibians of Hong Kong*. AFCD.

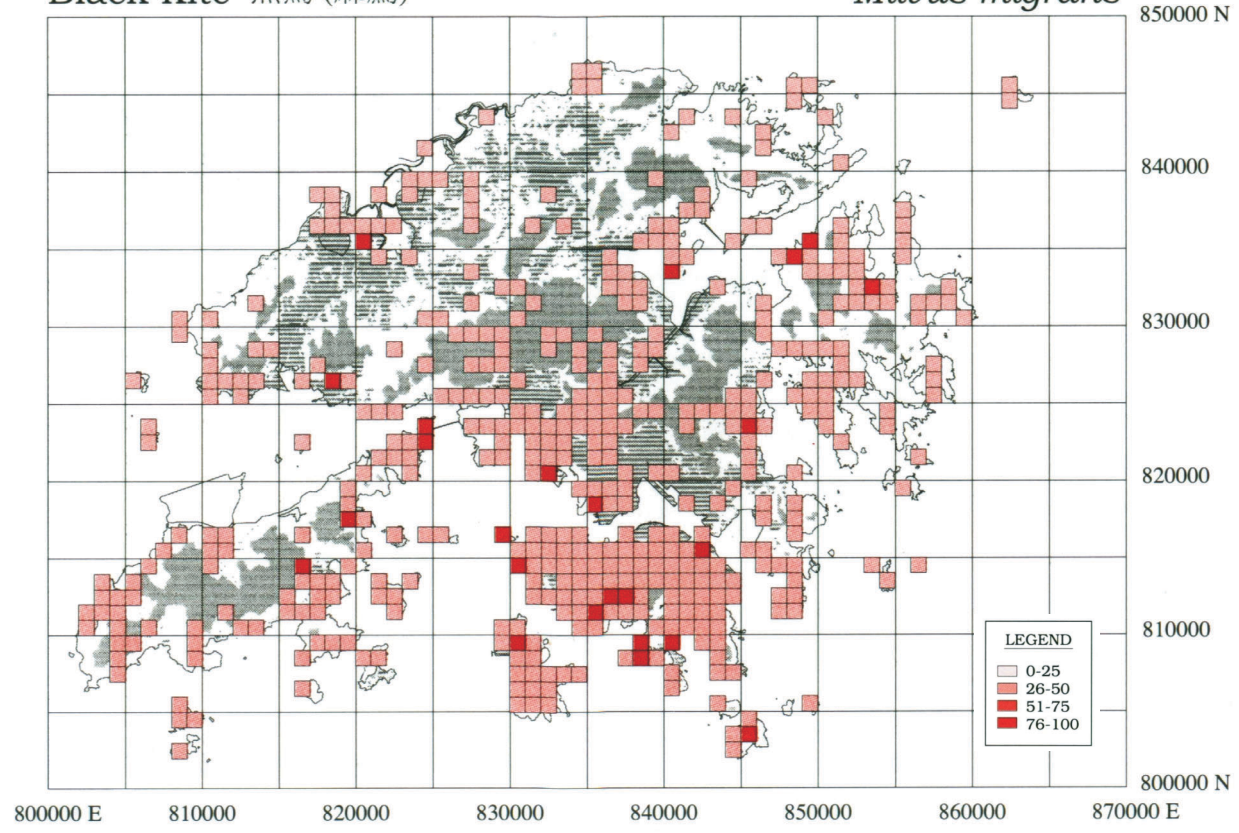
Table 18b *Amphibians and Reptiles Species Recorded at Shek Pik in Wet Season*

Common Name	Scientific Name	Status	Shrubland	Developed Area	Plantation
<b>Amphibians</b>					
Paddy Frog	<i>Fejervarya limnocharis</i>	A	1	1	1
Gunther's Frog	<i>Rana guentheri</i>	A	6		4
Brown Tree Frog	<i>Polypedates megacephalus</i>	A	4		
Asiatic Painted Frog	<i>Kaloula pulchra</i>	C	2		6
<b>Reptiles</b>					
Bowring's Gecko	<i>Hemidactylus bowringii</i>	A	1	4	10
Reeves' Smooth Skink	<i>Scincella reevesii</i>	A			1
Common Blind Snake	<i>Ramphotyphlops braminus</i>	A	1		

Note: Abundance: A = Abundant, C = Common Commonness of amphibian is reference to AFCD (2005). *A Field Guide to the Amphibians of Hong Kong*. AFCD.

Black Kite 黑鳶 (麻鷹)

*Milvus migrans*



Pacific Reef Egret 岩鷺

*Egretta sacra*

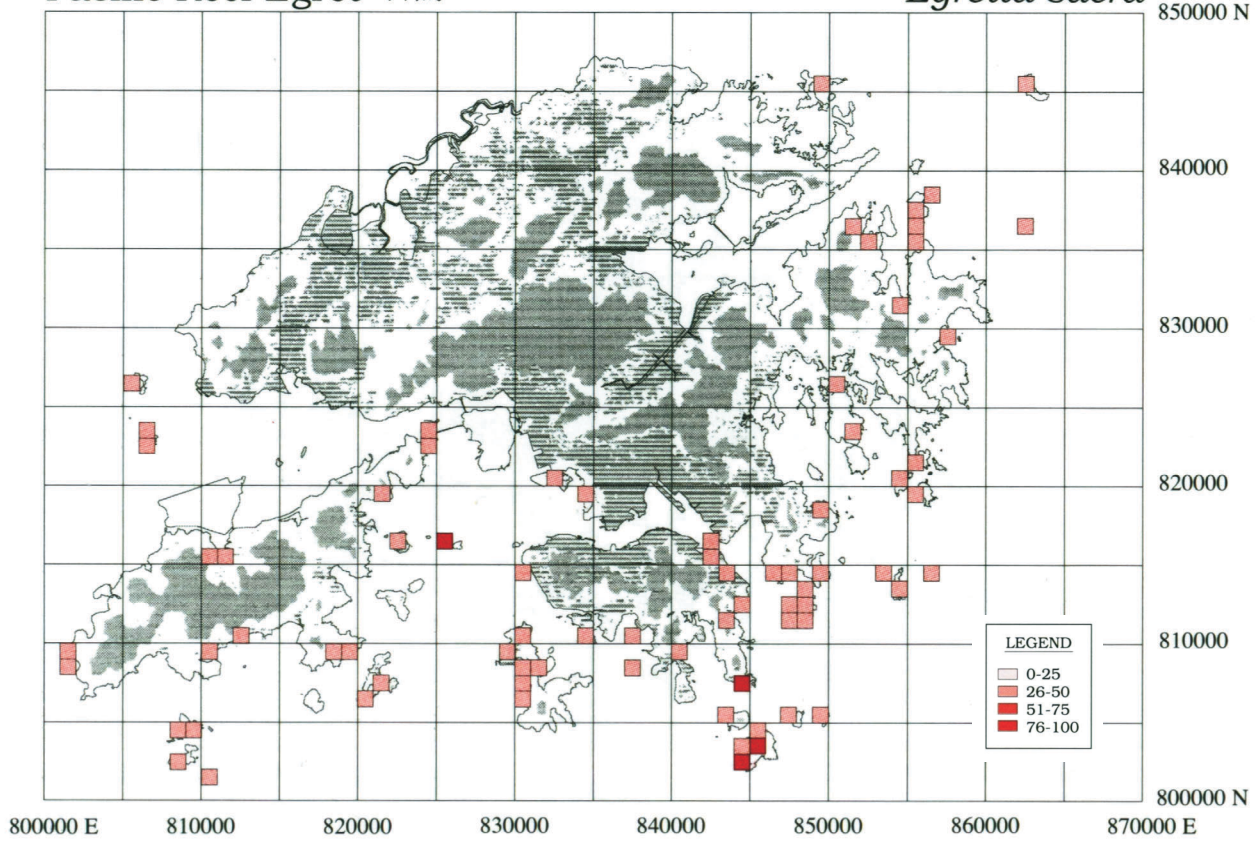


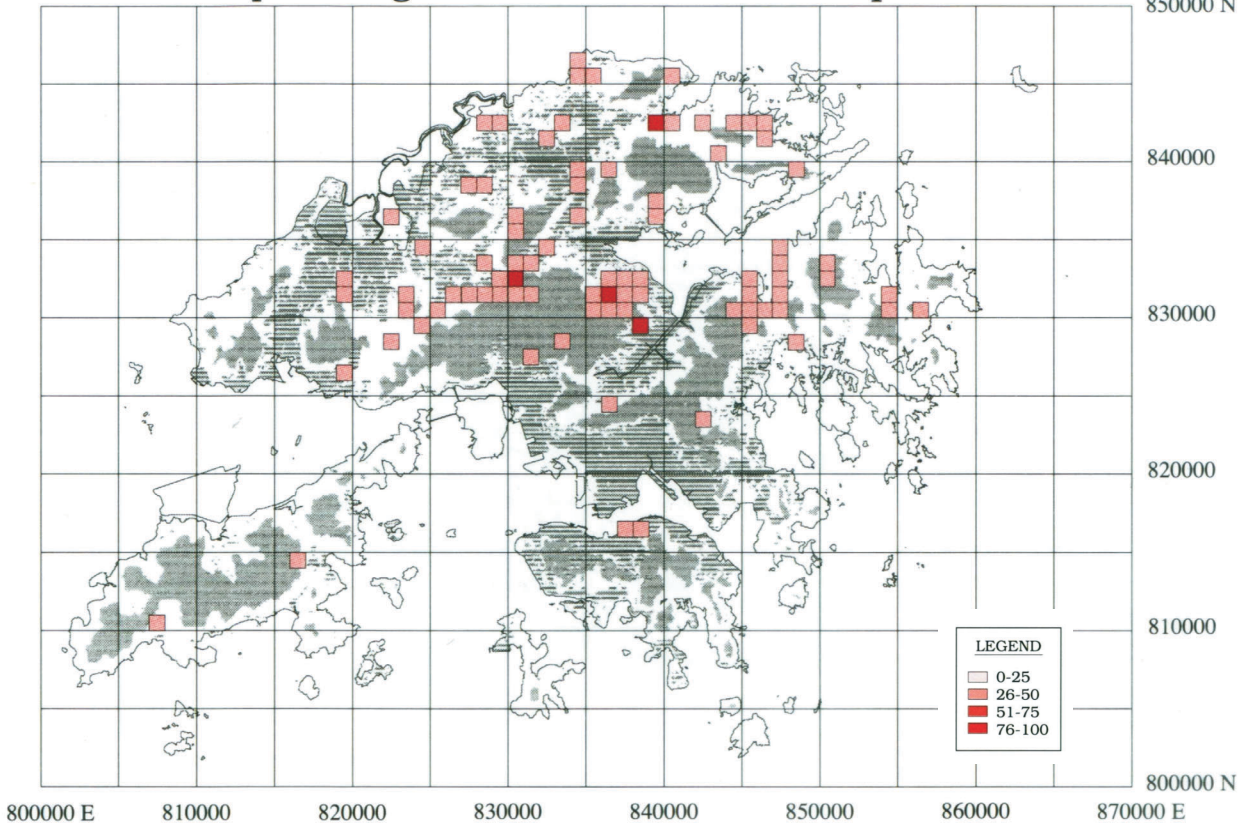
Figure 1

Distribution Pattern and Density of Black Kite and Pacific Reef Egret in Hong Kong  
(Information extracted from Carey *et al* 2001)

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DATE: 05/10/2006

Crested Serpent Eagle 蛇鵟

*Spilornis cheela*



Greater Coucal 褐翅鴉鵂

*Centropus sinensis*

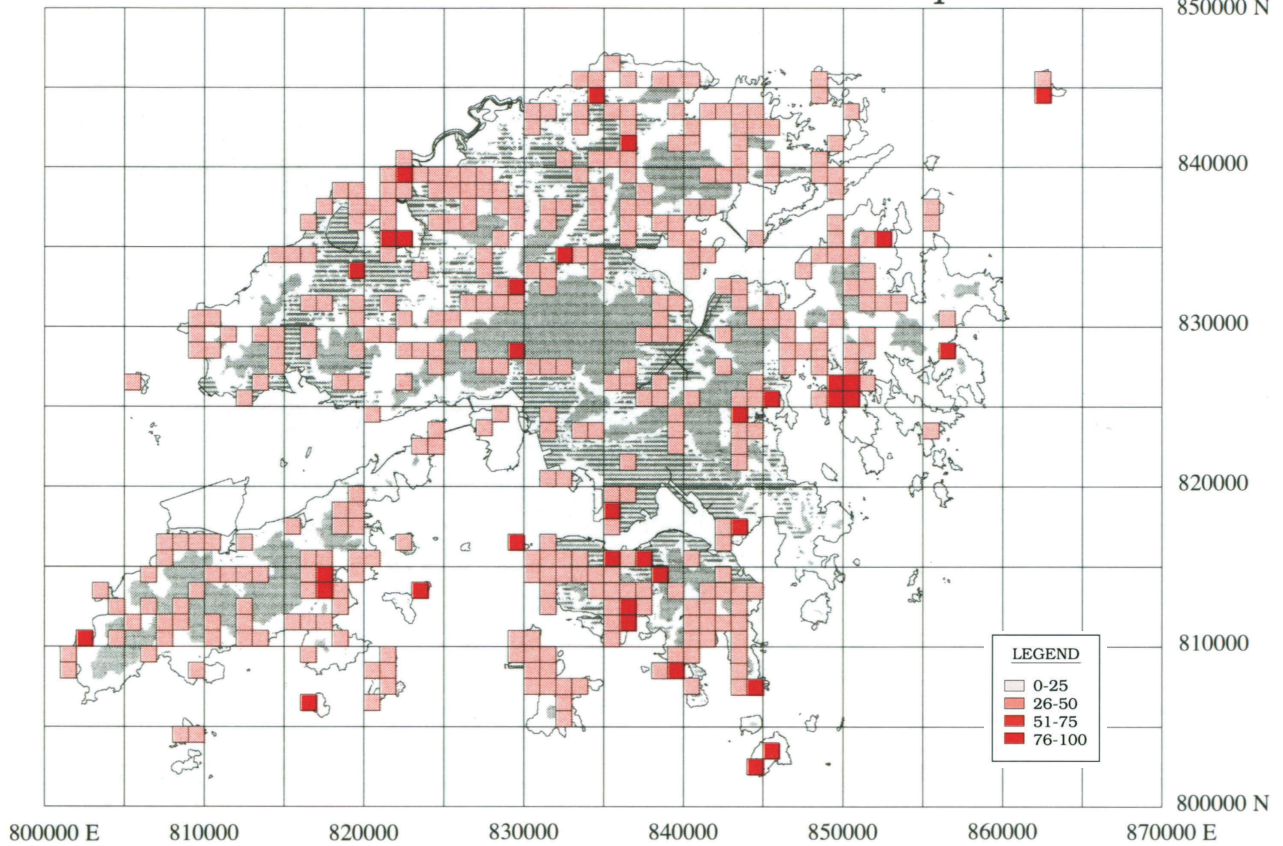


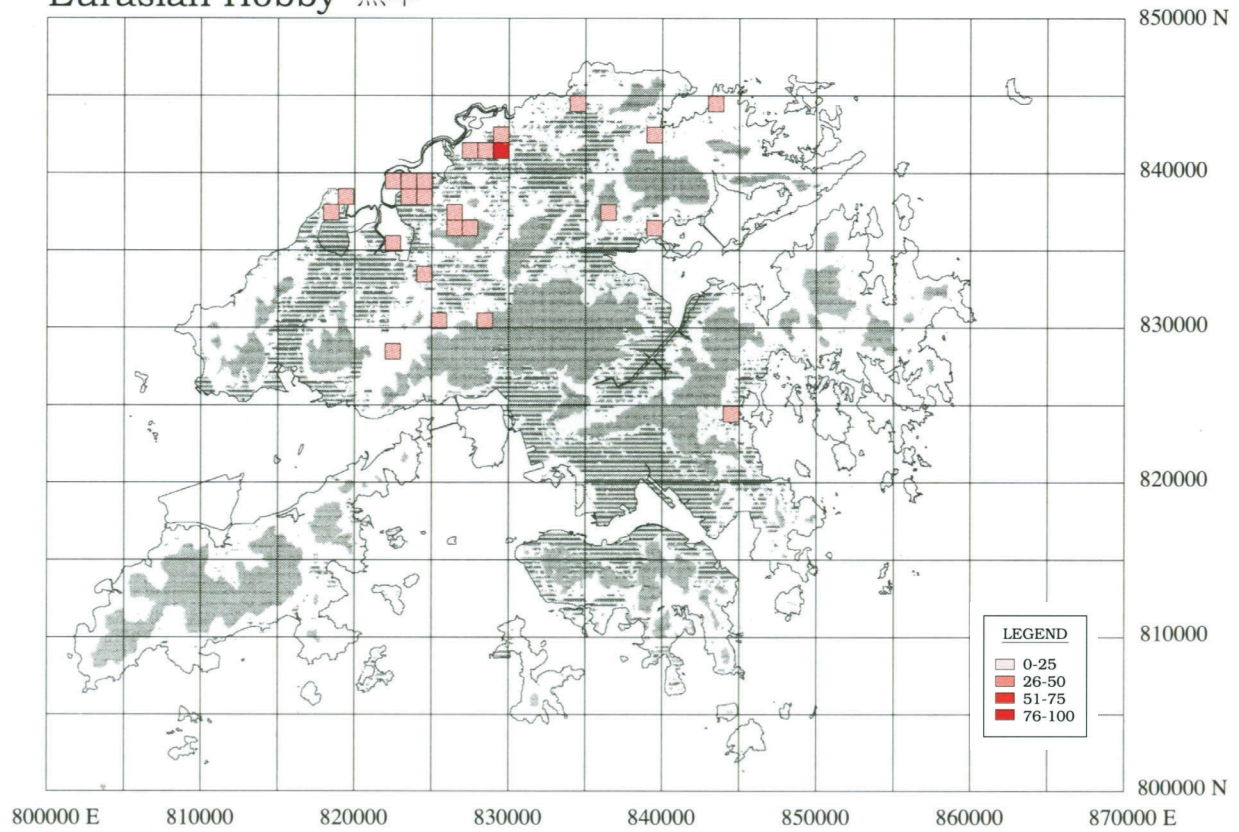
Figure 2

Distribution Pattern and Density of Crested Serpent Eagle and Greater Coucal in Hong Kong  
(Information extracted from Carey *et al* 2001)

Environmental  
Resources  
Management



### Eurasian Hobby 燕隼



### Peregrine Falcon 遊隼

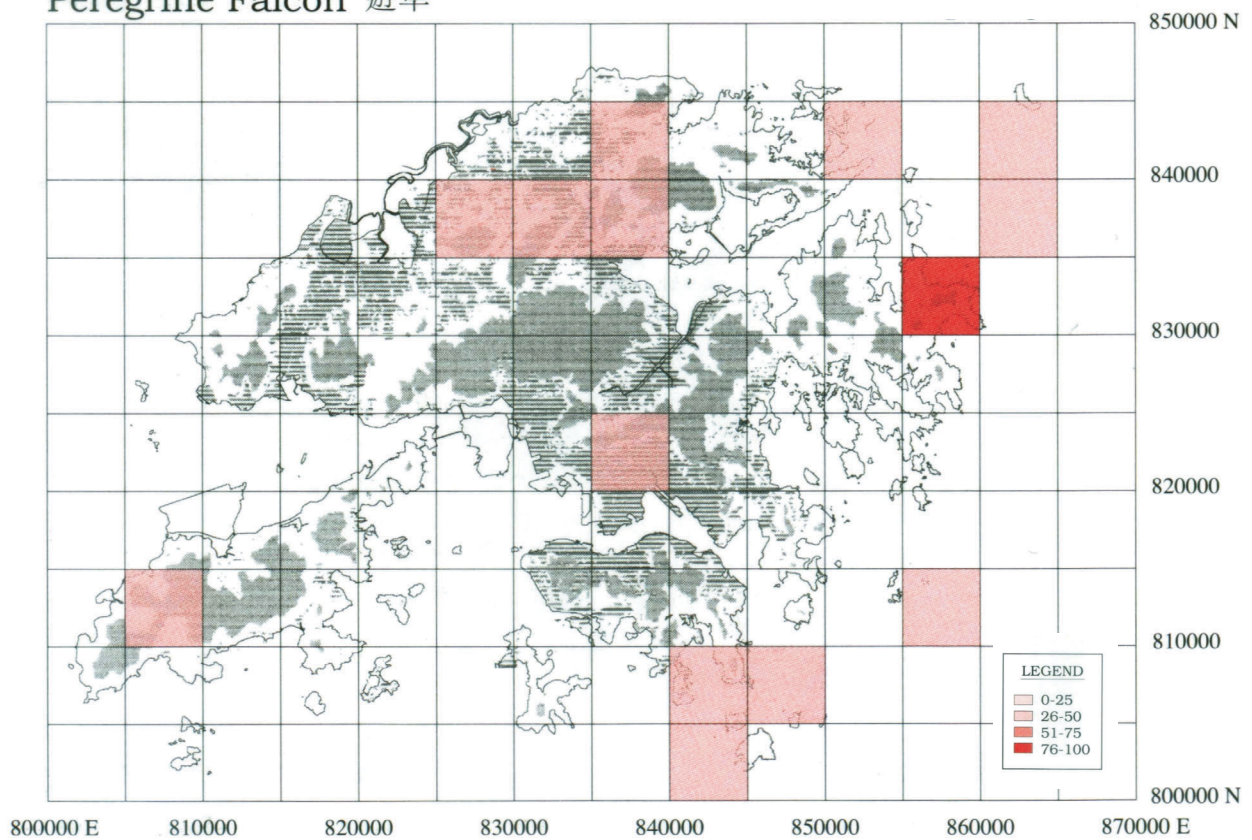


Figure 3

Distribution Pattern and Density of Eurasian Hobby and Peregrine Falcon in Hong Kong  
(Information extracted from Carey *et al* 2001)

Environmental  
Resources  
Management



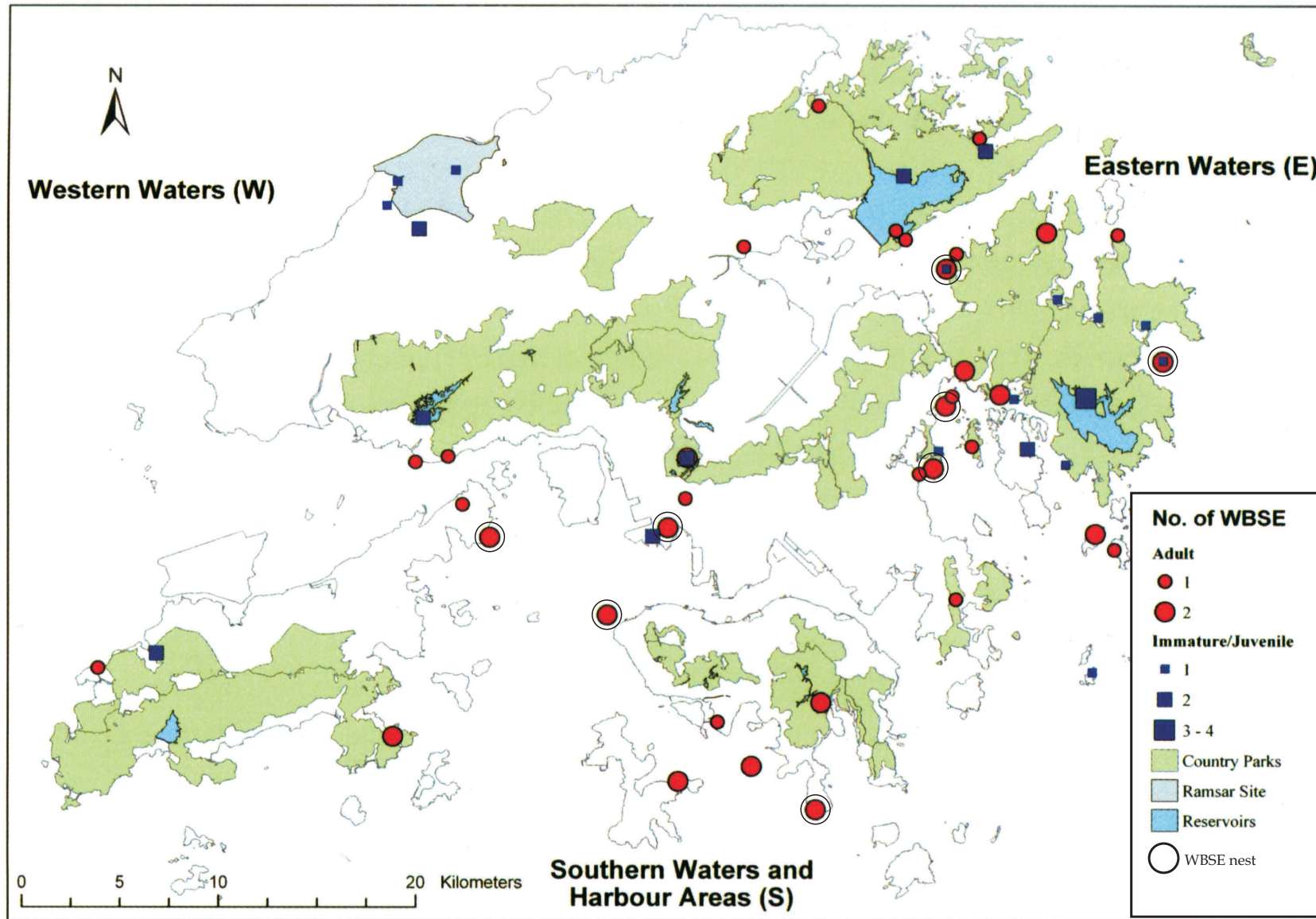
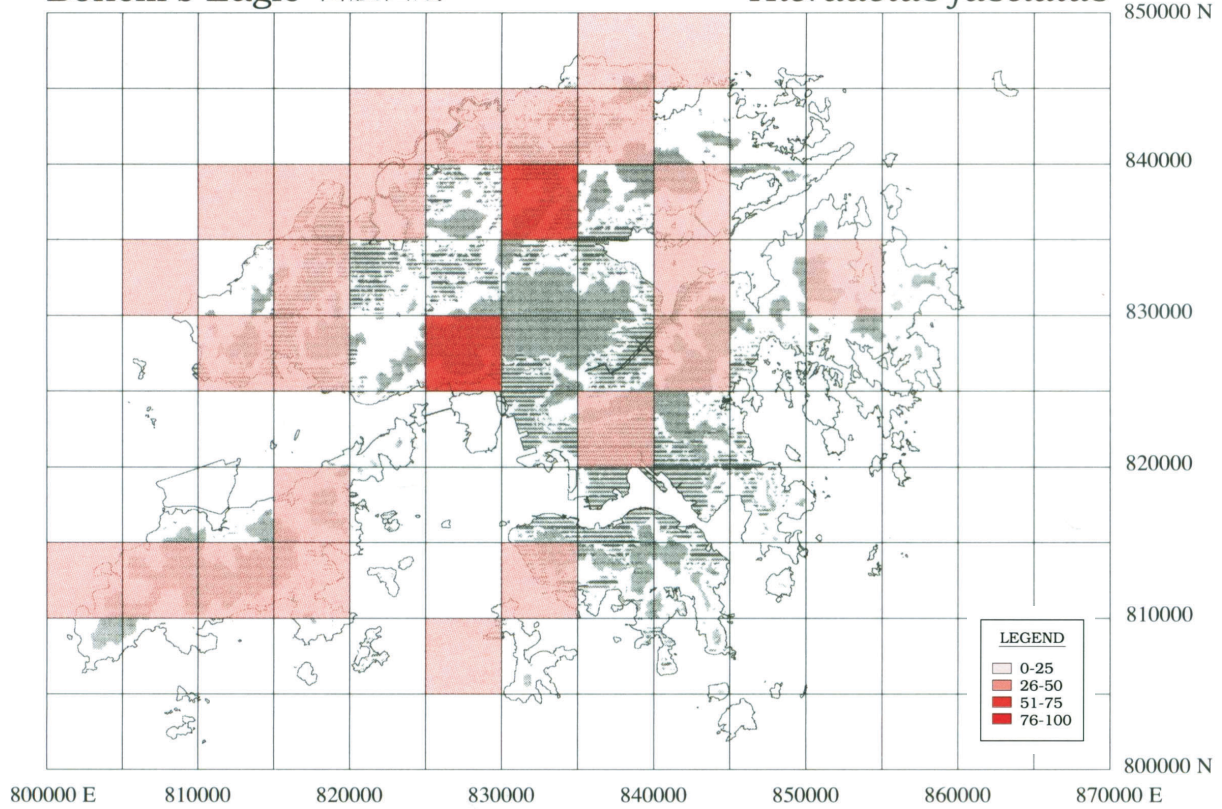


Figure 4

Location of the Nest, Distribution Pattern and Density of White-bellied Sea Eagle in Hong Kong  
(Information extracted from Tsim *et al* 2003)

Bonelli's Eagle 白腹山鵟

*Hieraetus fasciatus*



Collared Scops Owl 領角鴞

*Otus bakkamoena*

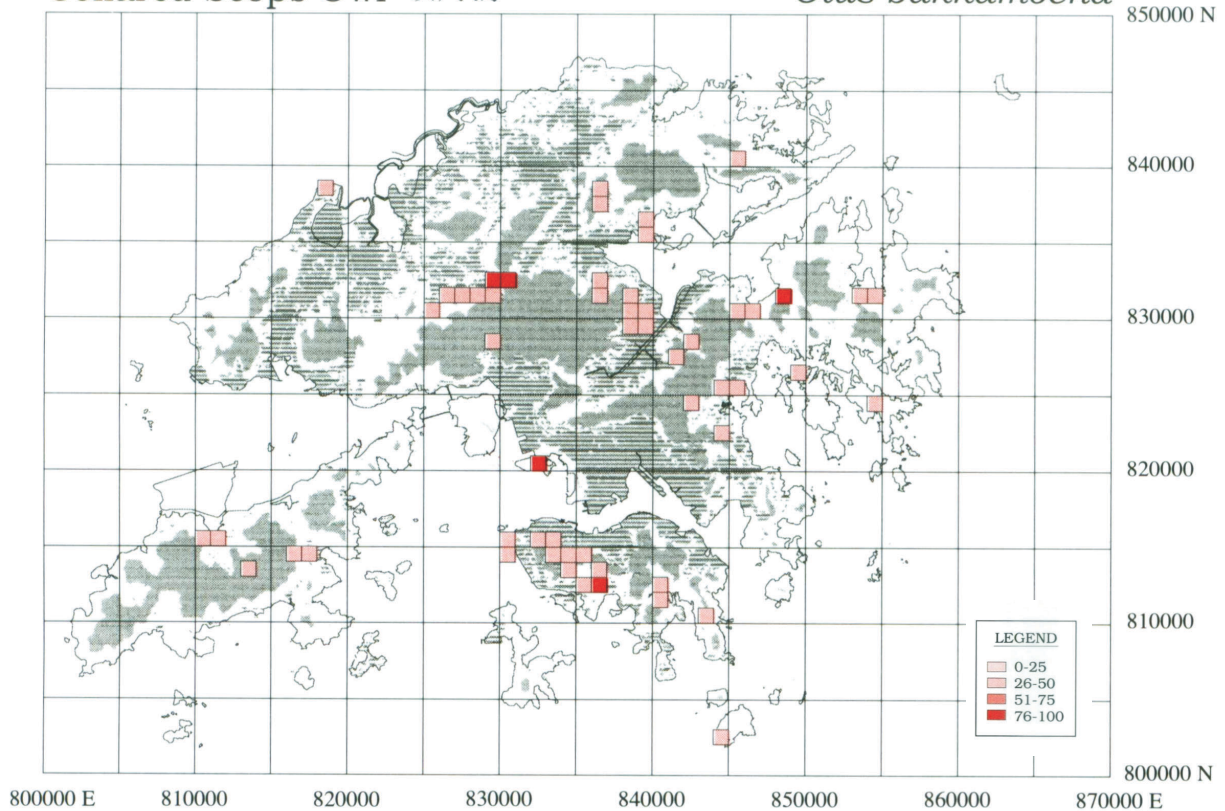


Figure 5

Distribution Pattern and Density of Bonelli's Eagle and Collared Scops Owl in Hong Kong  
(Information extracted from Carey *et al* 2001)

Environmental  
Resources  
Management

