



Section 8



8 TERRESTRIAL ECOLOGY

8.1 INTRODUCTION

The impacts of major developments on the terrestrial ecology of Hong Kong have become of increasing importance and concern in the past decade. Whereas, ten years ago, it would have been unusual to consider in any detail the effects of a development on various habitats and species, it is now accepted that as a routine part of the EIA process these important issues should be addressed.

This Section provides a general review of the existing terrestrial ecology in the Study Area, (including the relevant legislation), as a background to the possible impacts of the construction and operation of the LAPH development. Key issues and possible mitigation measures have been identified and the need for ecological monitoring and further survey work has been considered.

The Terrestrial Ecology Section covers all the land above the littoral zone, that is, the seashore above the high water mark. Mangroves mark the transition between the sea and the land and are dependent on both freshwater and seawater, however as an important vegetation type, mangroves have been included in this Section.

The littoral zone (between high and low water mark) and the sublittoral zone including both the epibenthic fauna (animals living on the sea bed) and benthic infauna (animals living in the sediments) communities have been covered in the Marine Water Quality and Marine Ecology Section of this Report (Section 6).

8.2 METHODOLOGY

The ecological assessment has built on and developed the methods used for Working Paper No. 12A Environmental Baseline Report. Thus the assessment has been undertaken based on the following activities:

- additional site visits by land and water;
- further aerial photographic interpretation;
- further field survey;
- additional document review and updating the legislative position; and
- further discussions/interviews with

relevant specialists.

Based on the above, it is possible to identify the likely effects, both direct and indirect of the LAPH development on the terrestrial ecology of the Study Area. An indication of the significance of the impacts in a local and Territory wide context has been given where possible. This is in line with EPD's Advice Note 2/92 on the Application of the Environmental Impact Assessment Process to Major Private Sector Projects which states that:

"areas of conservation value, including woodlands, wildlife habitat, ecologically significant areas, and sites of cultural, archaeological and scientific interest"

should be considered as sensitive parts of the natural environment during the EIA Study.

8.3 EXISTING TERRESTRIAL ECOLOGY AND RELEVANT LEGISLATION

8.3.1 Terrestrial Ecology of the Study Area

The terrestrial ecology of the Study Area was studied in detail as part of the Environmental Baseline Study and details are given in WP No. 12A. The details are not exhaustively covered here and are presented in summary only.

As part of the Environmental Baseline, a review of the existing data was undertaken together with field work and aerial photograph interpretation. A database of ecological information was built up and expert opinion used to assess its importance and the need for further survey work. The purpose of setting up this environmental database was to facilitate the assessment of any changes to existing habitats and species with respect to both flora and fauna in the Study Area.

The majority of the Study Area land is hilly grassland with the more interesting vegetation generally being confined to the coastal fringes, upland valleys and freshwater streams. Most of the restricted access or uninhabited islands have some naturally well developed vegetation such as tall scrub and woodland; these include Hei Ling Chau, Sunshine Island and Kau Yi Chau.

The key issues which were identified in the baseline terrestrial ecology report were:

- Habitats of importance including:
 - coastal mangrove;
 - tall scrub;
 - naturally developed woodland;
 - freshwater streams and wetland;
- The confirmed presence of rare and protected species including the Reef Egret (*Egretta sacra*) and the White-bellied Sea-eagle (*Haliaeetus leucogaster*) and the need to protect their habitats. The possible presence of the rare and protected Chinese Pangolin, *Manis pentadactyla* (see glossary), which was identified in relation to possible damage to its habitats from the LAPH development; and
- The need to facilitate the protection of Sunshine Island as the possible relocation site for the extremely rare primitive species of Tree Frog endemic to Hong Kong (the Romer's Tree Frog). Recent information on the location of colonies of the Romer's Tree Frog indicate that there are eight colonies on Lantau, seven on Lamma and one on Po Toi Island.

It was suggested that the LAPH design should ensure, where possible, minimum loss of these existing habitats of importance and include mitigation measures where appropriate.

8.3.2. Relevant Legislation

A number of species found in the Study Area are protected under Hong Kong Laws:

- The Reef Egret is only protected under the Wild Animals Protection Ordinance, which protects all birds; and
- The Chinese Pangolin, the White-bellied Sea-eagle and the Brown Fish Owl are all protected by two Hong Kong Ordinances; the Wild Animals Protection Ordinance and the Animals and Plants (Protection of Endangered Species) Ordinance. The possession of any individual constitutes an offence under the Animals and Plants (Protection of Endangered Species) Ordinance. In addition, the Wild Animals Protection Ordinance affords these species formal protection from hunting in the

Territory.

It should be noted that since completing the Environmental Baseline Studies, the Romer's Tree Frog has been afforded protection under the Wild Animals Protection Ordinance. This is discussed in more detail in Section 8.6.2.

8.4 CONSTRUCTION IMPACTS AND MITIGATION

8.4.1 The Tsing Chau Tsai Mega Borrow Area

Various areas within the TCT peninsula have been, or will be, allocated for borrowing. There are two broad categories of borrowing. The first comprises the temporary borrow areas on the south of TCT; five sites have been or will be utilised for different Projects (see Figure 2.11). These borrow areas mainly affect areas of hilly grassland and do not impact on any habitats or species of known importance.

The second category of borrowing is the potential Mega Borrow Area to the north of the smaller sites already identified for borrowing purposes, and generally referred to as the Quarry Area Extension. The Mega Borrow Area has not yet been committed and its form and method of working has yet to be agreed. The construction impacts and appropriate mitigation measures are discussed in detail in Appendix A1.

8.4.2 Kau Yi Chau

This island contains three areas of ecological interest; firstly it contains some woodland/tall scrub habitats of general wildlife interest, secondly it is the only known breeding site in Hong Kong for the Reef Egret and thirdly it is one of the few known breeding sites in Hong Kong for the White-bellied Sea-eagle.

The island will be physically joined to Lantau by the reclamation in Phase IV of the LAPH Development. It should be noted that the preliminary design considerations of the reclamation has taken account of the area of woodland/tall scrub on the north western side of the island which will remain. The need to protect existing habitats of importance should be taken into consideration at the detailed design stage.

The possible effects stemming from the routing, design and operation of GIL and related facilities

(including toll plaza) are important influences which, although outside the scope of the present study, will need careful construction and mitigation.

The future of the breeding sites of the Reef Egret and the White-bellied Sea-eagle are undoubtedly threatened. Kau Yi Chau is currently isolated and is not disturbed by human visitors. Its relative isolation and suitable habitat has made it an ideal site for the nesting of these birds.

It is the view of leading ornithologists in Hong Kong that the existence of these birds on Kau Yi Chau is threatened by the proposed LAPH Development to the extent that they will not be able to breed there in the future, once Kau Yi Chau is connected to Lantau by the reclamation.

The probable loss of the only known breeding site of the Reef Egret in Hong Kong is considered very significant in a Territory-wide context. The White-bellied Sea-eagle is known to breed elsewhere so the loss of this site is considered less critical. As the breeding site of these two birds is likely to be lost as a direct result of the LAPH development, it is suggested that in order to mitigate the impacts further survey work is carried out to:

- document other existing breeding sites for the White-bellied Sea Eagle, and determine whether there are other possible breeding sites for the Reef Egret on the remote offshore islands; and
- identify suitable alternative breeding sites for these species, outlining the requirements to secure their protection.

Such a survey could be combined with, or incorporated into, a more comprehensive ornithological survey of the more remote offshore islands. It is considered that there are equivalent suitable habitats on some of the more remote islands for nesting sites for both birds. It is possible that the Reef Egret already breeds elsewhere, but because of its preference for the remoter undisturbed islands, it has not been recorded in the limited survey made to date. Thus, whilst these birds will eventually, move from Kau Yi Chau, it is most probable that they will find alternative sites to breed successfully.

Kau Yi Chau has also been identified as the possible location of a Radar Station for Vessel Traffic Systems. The proposals have not been finalised but the potential of affecting areas of

natural woodland have already been highlighted. Current information on this development indicates that any significant damage to the woodland can be avoided. The existence of the facility will, by its construction and operation put pressure on the bird breeding conditions previously discussed.

8.4.3 Discovery Bay

This area includes all the land between Sz Pak Tsui and Hai Kam Tsui. The development proposals for any possible expansion of Discovery Bay have not yet been finalised. The size and form of possible future development may ultimately depend upon any future road links out of the Discovery Bay area. There are two possible road links to Discovery Bay; one would come from the NLE and the other would come from the Container Port. It is understood that Government is currently considering a range of strategic options which include the forecasted expansion at Discovery Bay.

The option to connect Discovery Bay to the Container Port would open up Yi Pak Wan, Sam Pak Wan and Sz Pak Wan as sites for future development. These three valley areas contain woodland and freshwater streams. Any future development proposals would have the opportunity to enhance these habitats with careful and sensitive design. Work undertaken in connection with the Container Port has highlighted the need to retain these habitats. Whilst there are no protected or endangered species associated with them, they are becoming much more restricted in distribution and should be retained wherever possible. There are also opportunities to enhance the woodland structure and increase the woodland habitat by additional planting; these have already been identified in WP No. 24A *Rural Hinterland Strategy*.

A small area of degraded mangrove was identified in Section 2 at Yi Pak Wan. Hong Kong Resorts International Ltd. have recently put forward plans which would remove this area of mangrove. It should be noted that the Government and the PAA have agreed to commission an ecological study on the mangroves of Hong Kong with a view to assign different levels of conservation value to mangrove stands in the Territory and to develop conservation management plans for those mangrove stands which have a high conservation value. However, as the area at Yi Pak Wan is small and already degraded and its interest is declining, it is considered far less critical than the protection of the larger, healthier areas of mangrove in the Territory such as at Three Fathoms Cove, Deep Bay, Sha Tau Kok and Tai

O.

The Brown Fish Owl (a protected species) was recorded in the Discovery Bay area in 1987. It is considered to have been attracted by the mangrove swamp and the dammed up water behind, which formed an easy protected area for hunting. It has not been recorded since, probably due to the deterioration of its habitat as a result of works already undertaken in this area. Again, given the correct specialist advice, it would be possible to recreate the appropriate habitat conditions for the Brown Fish Owl, providing this was given priority and was not in conflict with other land uses. This issue however is not directly related to the LAPH development and whilst it would be desirable to create suitable habitats for this protected species to breed, it is not seen as the Government's responsibility in relation to the development. It should be noted that it is very rare for this species to breed in Hong Kong.

8.4.4 North Lantau Shoreline

The whole of the North Lantau shore, within and beyond the Study Area, will be subject to extensive reclamation and development related to the PADS projects. Environmentally significant habitats such as coastal woodlands above the shoreline should be retained and the proposed level of the reclamation will ensure that these habitats are not adversely affected by the works as such.

The mangrove habitat at Yam O Wan is likely to be lost due to development of the area as a direct and indirect result of the NLE. Reclamation associated with the North Shore development is likely to further affect the bird population of Yam O Wan (which is particularly favoured by waders and shorebirds) however, the preceding effect of the NLE works will have changed the baseline conditions such that when the LAPH development takes place, the existing interest will have declined.

Also the water embayment created by the current North Shore layout proposals may be detrimental to any remaining flora and fauna. However, given a sensitive design the unreclaimed area of Yam O Wan which becomes landlocked in Phase IV could be suitable for habitat creation/preservation. This should be studied further during the detailed design stage.

8.4.5 Other Possible Impacts/Considerations during Construction

Other potential impacts/considerations relating to the terrestrial ecology of the Study Area include:

- increased usage of the area for recreation purposes;
- increased threat of fire damage to vegetation as a result of increased usage;
- the need for areas to be managed to retain and enhance their conservation interest; and
- the increased danger of disturbance to species.

As well as having the potential to be detrimental, these issues also present positive opportunities to retain and enhance the existing ecological interest of the Study Area. The issues are addressed in detail in WP No. 24.

8.5 OPERATIONAL IMPACTS AND MITIGATION

Once the Container Port and its related developments are operational, the impacts on the terrestrial ecology will change in nature and on current knowledge are likely to be minimal.

Potential impacts could include:

- disturbance to habitats and species as a direct result of increased public access to the area;
- increased threat of hill fires affecting established vegetation or newly planted areas; and
- possible pollution or alteration of freshwater streams of value to wildlife.

Care should be taken to ensure these potential impacts are kept to an absolute minimum.

8.6 KEY AREAS OF ECOLOGICAL INTEREST

8.6.1 Retention of Existing Habitats of Importance

The impacts on specific areas such as the TCT peninsula, Kau Yi Chau, Discovery Bay and the North Lantau Shoreline have been discussed in Section 8.4. Outside these areas, the vast majority of the rural hinterland and its habitats will remain intact and untouched by the LAPH developments.

Disregarding the TCT peninsula, (the future of which still remains uncertain), the majority of the ecologically important habitats identified in the Environmental Baseline Report (February 1992) will remain intact. This includes the actual TCT Mega Borrow Area and the western wooded valleys and associated freshwater streams at Fa Peng and Tso Wan.

8.6.2 Sunshine Island

During the LAPH Studies the Romer's Tree Frog has been added to the list of species protected under the Wild Animals Protection Ordinance. This species was first afforded protection under this Ordinance as recently as July 1992. Research work on the Romer's Tree Frog is currently being undertaken by the Hong Kong University with the support of the World Wide Fund for Nature. The first trial relocation releases into the wild of the captive bred Romer's Tree Frogs are anticipated in the near future. These initial releases will be on other sites with a view to monitoring its progress and lead up to its release on Sunshine Island in 1993.

Within the LAPH Study, it has been an agreed aim to ensure that Sunshine Island would not be adversely affected either directly or indirectly by the proposed developments. Within the agreed LAPH development strategy, the island will remain intact and independent. Thus, it should remain an ideal relocation site for this extremely rare primitive species. This species which is endemic to Hong Kong, is only known in just three locations worldwide, one of which, at Chek Lap Kok, has already been severely affected by the Airport Development.

8.7 MONITORING AND FURTHER SURVEY WORK

It is suggested that further survey work could be undertaken to promote the understanding of various rare or protected species and their habitat requirements. These include:-

- a survey of the Chinese Pangolin in the Rural Hinterland; and
- a survey of the breeding habitats of the Reef Egret and also the White-bellied Sea-eagle.

The scope of these surveys will need to be agreed with AFD prior to commencement. However it is

considered that they should include as a minimum.

- distribution;
- population estimates;
- viability;
- behavioural aspects; and
- an assessment of the territory wide importance.

In addition, monitoring the effects of the road links in the saddle between Penny's Bay and Ta Shui Wan on mammal movement is recommended.

With regard to the detailed protection of habitats during the construction phases, it is suggested that specialist environmental staff should be employed on site with the specific responsibility of ensuring sensitive habitats and species are afforded the proper protection on the ground.

It is recommended that habitat preservation and the potential for habitat creation in the Yam O Wan embayment should be studied.

8.8 CONCLUSIONS

In general terms, the impacts of the LAPH developments on the terrestrial ecology of the Study Area are unlikely to be of major significance.

Key issues which have been identified by this ecological assessment are:

- the possible impacts of the Tsing Chau Tsai Mega Borrow Area and the opportunity to reduce potential impacts on the habitats of ecological importance;
- the possible effect of habitat reduction and habitat severance on the Chinese Pangolin. Mitigation measures and further survey have been suggested; and
- the probable loss of the breeding sites of the Reef Egret and the White-bellied Sea-eagle on Kau Yi Chau. Mitigation measures and further survey have been suggested.

Of these key issues, the potential loss of the only breeding site in Hong Kong for the Reef Egret on

Kau Yi Chau is the only issue considered to be of significance in a Territory-wide context.