

1. Introduction

1.1 Project Background

1.1.1 In mid-1990, the Hong Kong Jockey Club (HKJC) proposed providing a public golf course at Kau Sai Chau as a recreational golf facility, which also has the effect of restoring the land degraded by its use as an artillery range. In late 1995, the first 18-hole golf course was opened to the public, followed by a second 18-hole golf course, driving range and associated support facilities nine months later. Since opening, utilisation of the golf courses has increased considerably. Utilisation of tee-times is almost 100% on weekends/public holidays and 72% on weekdays when there is good weather (annual average utilisation is 80%). With the two existing courses in heavy demand, the Hong Kong Jockey Club has decided to expand the existing facilities by building a third golf course with supporting facilities. The "Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung" project (the Project) will provide additional golfing capacity for the public next to the existing public golf courses on Kau Sai Chau. Figure 1.1 shows the locations of the existing and proposed courses at Kau Sai Chau. The Project comprises the following major components:

- An 18-hole public golf course on the east side of the island, south of the existing golfing area, with supporting facilities; and
- A desalination plant on the west side of the island (next to the existing pier) to supplement the self-contained irrigation system.

1.2 Objectives of EIA Study

1.2.1 The Project is Designated Project under the Environmental Impact Assessment Ordinance (EIAO), and, in accordance with the EIA Study Brief for the Project, registered under the EIAO as "Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung" (Ref No. ESB-064/2000), this EIA Study will provide information on the nature and extent of environmental impacts arising from construction and operation of the Project and related concurrent activities. This information will contribute to deciding:

- | the overall acceptability of any adverse environmental consequences likely to arise as a result of the Project;
- | the conditions and requirements for detailed design, construction and operation of the Project to mitigate any potential adverse environmental consequences wherever practicable; and
- | the acceptability of residual impacts after the proposed mitigation measures are implemented.

1.2.2 Identified construction and operation impacts are:

Construction impacts of the Project:

- | construction dust and noise;
- | silty water runoff; and
- | impact on habitats.

Operation impacts of the Project:

- | runoff due to turfgrass management;
- | increased use of existing infrastructure (solid and liquid waste); and
- | operational impact from the desalination plant.

1.2.3 Based on the experience gained during the construction and operation of the existing golf courses, the current proposal includes design measures which avoid or minimize the environmental impacts.

1.2.4 The objectives of this EIA Study are:

- | to describe the Project and associated works together with the requirements for implementing the Project;
- | to identify and describe the elements of the community and environment likely to be affected by or cause adverse impacts to the Project, including both the the natural and man-made environment;
- | to identify any negative impacts on fisheries;
- | to identify and quantify emission sources, determine the significance of impacts on sensitive receivers and to propose measures to mitigate these impacts;
- | to identify and quantify water quality, determine the significance of impacts on sensitive receivers and to propose measures to mitigate these impacts;
- | to identify and quantify any potential losses and damages to flora, fauna and natural habitats;
- | to identify any negative impacts on sites of cultural heritage, and propose measures to mitigate these impacts;
- | to identify and assess any potential landscape and visual impacts, and propose measures to mitigate these impacts;
- | to identify, predict and evaluate the residual environmental impacts and the cumulative effects expected to arise during the construction and operation phases of the Project in relation to the sensitive receivers and potential affected uses; and
- | to design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and effectiveness of the environmental protection and pollution control measures adopted.

1.3 Considerations of the Environmental Impact Assessment Ordinance

1.3.1 The Environmental Impact Assessment Ordinance (EIAO) came into operation in April 1998, requiring EIA to be carried out for Designated Projects

1.3.2 The **development of an outdoor golf course** falls within the remit of the EIA Ordinance [Schedule 2, Part 1, Item O.1] which determines that the proposed project is designated under the EIAO.

1.3.3 Although the existing golf course facilities were constructed before the enactment of the EIAO, an Environmental Impact Assessment (EIA), Environmental Monitoring and Audit (EM&A) Manual and Turfgrass Management Plan were produced and approved by the Environmental Protection Department (EPD). The EIA was also presented and commented on by both the Advisory Committee on the Environment (ACE) and the Legislative Council. During construction and operation of the existing golf courses, the monitoring of environmental indicators has confirmed that the courses have been operating within the acceptable environmental parameters.

1.4 Structure of the EIA Report

1.4.1 The structure of this EIA Report is outlined in the following table.

Table 1.1 EIA Report Structure

Chapter	Title	Approach and Key Issues
1	Introduction	Introduces the project, EIA requirements and layout of the EIA report
2	Project Description	Outlines the objectives and scope of environmental assessments; Summarises the options considered and presents benefits and disbenefits
3	Sensitive Receivers	Description of the identified sensitive receivers
4	Air Impact Assessment	Each self-contained chapter identifies the applicable legislation, methodology of assessment, presents an assessment of impact, recommends mitigation if applicable and quantifies and assesses significance of any residual impact.
5	Noise Impact Assessment	
6	Water Quality Impact Assessment	
7	Waste Management	
8	Terrestrial Ecology	

9	Marine Ecology	
10	Fisheries	
11	Land Contamination Assessment	
12	Landscape and Visual Impact Assessment	
13	Cultural Heritage Impact Assessment	
14	Environmental Monitoring and Auditing	Presents proposals for the construction and operation of an EM&A programme.
15	Environmental Outcome	Presents the environmental benefits of the proposed project
16	Conclusions	Draws together the earlier chapters and summarises the findings

2. Project description

2.1 Reporting Phase of existing golf course development (the Existing Courses)

2.1.1 The Environmental Studies for the two existing 18-hole golf course, constructed on the north end of the island, were carried out before the enactment of the EIA Ordinance. However, these studies were submitted to the Government and discussed by the Advisory Committee on the Environment (ACE). The endorsed report was

[1] entitled “Kau Sai Chau Development EIA (Final Report, March 1994)” . This EIA covered construction and operation of the public golf courses, driving range and ancillary facilities (e.g. administration building, maintenance facilities and ferry service).

2.1.2 An Additional Ecological Survey Report was submitted in July 1994 to provide further survey data and clarification on outstanding ecological issues.

2.1.3 The "turfgrass management plan" was included in the operations manual entitled “Hong Kong Golf Course Handbook: Environmental Considerations for Design, Construction and Operation” [2] was produced in July 1994.

2.1.4 Construction and operation phase Environmental Monitoring and Audit (EM&A) was carried out from August 1994 to January 1999. The associated reporting documents were entitled “Environmental Monitoring and

[3] Audit (EM&A) reports for Kau Sai Chau Development” . The monitoring work identified in the EIA documents continued until January 1999 to satisfy the EM&A agreements for the Project. However, the Jockey Club Kau Sai Chau Public Golf Course Ltd (KSCPGC) has continued water quality and ecology monitoring, and the following reports were produced: “Hong Kong Jockey Club Kau Sai Chau Public Golf Course - Ecological

[4] Monitoring Report July 1999 to June 2000” , and the “Hong Kong Jockey Club Kau Sai Chau Public Golf

[5] Course Quarterly Environmental Monitoring and Audit Reports” (up until May 2001) .

2.2 Refinement of the Project since issue of the EIA Study Brief

2.2.1 An application for a Study Brief under the EIAO on 21 December 2000 and included a Project Profile (PP). EPD processed the Application and the EIA Study Brief No ESB-64/2000 (enclosed under Appendix A) was issued to the HKJC on 29 January 2001 -.

2.2.2 Subsequent to the issue of the EIA Study Brief, discussions were held between the Hong Kong Jockey Club, the designer, the engineer and the environmental team to refine the design. Layout details of the proposed

third golf course, such as the irrigation and drainage systems, have been revised so that the finalised design maximises playability and engineering feasibility while at the same time takes account of environmental constraints and long term sustainability. A crucial change is the removal of the proposal to include a reservoir. A review concluded that by using a different grass type, fresh water usage can be significantly reduced. Shortfall will be provided for by the inclusion of a small desalination plant. The viability of construction and operation of the desalination plant is included in this EIA Report.

2.2.3 Other development items included in the EIA Study Brief, such as recreational facilities, floodlight, hostels for early bird golfers and walking trails, are no longer to be provided and thus not covered in this EIA Report.

2.3 Description of the Area and Project

The island of Kau Sai Chau

2.3.1 Kau Sai Chau has an area of about 700 ha, and is located approximately 5km east of Sai Kung in the South East New Territories. It is the fifth largest island in Hong Kong being about 4km long in a north-south orientation, and 2km across at its widest point. The island forms a dominant feature of the area due to its mountain peaks.

2.3.2 Being an island, it can only be accessed by a ferry service from Sai Kung Ferry Pier that runs past the southern tip of Sharp Island (Kiu Tsui Chau). The travel time is about 15 minutes.

2.3.3 Historically, Kau Sai Chau was used as a military firing range, and within the Project site, there is still visible evidence of this former activity on the hillside where the thin scrubland cover has been exposed and there has been extensive washout of soil from the hillside during rainfall. There are also a number of graves scattered around the north end of the island, some of which are around the area of the proposed third golf course.

2.3.4 The small village of Kau Sai lies at the southern tip of the island, but it is isolated from the Project by the island topography. The village on the small island of Yim Tin Tsai is over 1 km to the northwest of the site, and is currently uninhabited.

The Existing Courses

2.3.5 The Hong Kong Jockey Club developed a public golf course on Kau Sai Chau in the mid 1990's to promote the sport of golf to the people of Hong Kong. The course attracts around 180,000 visitors each year.

2.3.6 There are two courses, the North Course (18-hole) and the South Course (18-hole). A reservoir produces irrigation water. In addition to the golf courses, supporting facilities include an administration building, a driving range, a maintenance workshop, and a pier.

2.3.7 The Existing Courses was the subject of an Environmental Impact Assessment (EIA), though this was before the enactment of the EIAO and the project was classed as being "exempted" under the EIAO i.e. work carried out before the EIAO. The EIA identified environmental mitigation for incorporation into the design and operation phases of the project, including Environmental Monitoring and Audit Requirements for construction and operation phases and a "Turf Management Plan".

Proposed third 18-hole golf course

2.3.8 The location of the proposed third 18-hole golf course is on the east side of Kau Sai Chau, immediately south of the Existing Courses (Figure 2.1).

2.3.9 The proposed site is currently unzoned, and comprises an approximately 300 metres wide and 1.5 km long strip of undulating scrubland. The site is bounded to the west by steep rugged uplands (up to 210 m) and incised valleys, and to the south and east by steep rocky coastline. North of the site is the existing Jockey Club Kau Sai Chau Public Golf Course that occupies the northern half of the island.

2.3.10 The proposed golf course will be 7,000 yards in play length, and players will use electric golf carts to drive along the dedicated cart paths along the fairways of the 18 holes. To form the course, approximately 530,000 cubic meters of material will have to be moved in an earth reshaping operation. Unlike the first two courses, the proposed third course will be turfed with *Seashore Paspalum*. Besides higher tolerance to stress (heavy traffic), this grass is salt tolerant which means less fresh water will be needed for irrigation. In addition, it is more resistant to diseases and insects so less pesticide will be needed. In order to provide irrigation to the proposed third course during dry periods, a desalination plant will be incorporated into the Project. In addition to environmental assessment, this aspect of the Project is also subject to Government Gazettal requirements.

2.3.11 Certain elements of infrastructure support are already available in the existing golf course facilities (administration building, maintenance building, sewage treatment works and water supply), and will be shared or extended to provide additional capacity for the proposed third golf course.

2.4 Need for the Project

2.4.1 Since the opening of the Existing Courses in 1995, the game of golf has become extremely popular with the Hong Kong public, and the demand for it is on the rise.

2.4.2 The heavy demand at Kau Sai Chau can be demonstrated by the following facts:

- ▮ Over 60,000 telephone calls in the first hour of opening the daily booking system at 9:30 am for Saturday/Sunday/public holiday (maximum of 500 players per day).
- ▮ Almost 100% utilisation of tee-times on weekends/public holidays and 72% for weekdays (during good weather months). Annual average utilisation is at 80%.
- ▮ Over 8,000 golf students, including 3,600 juniors (under 21 years), attend classes on the Existing Courses each year.
- ▮ A daily record of 1,200 visitors visit the island, including golfers, golf students, driving range users and general weekend visitors.

2.4.3 The growing popularity of the game is also demonstrated by the establishment of 10 commercially-run driving range facilities throughout Hong Kong and the New Territories in the last 8 years.

2.5 Major components of the Project

Site formation and slope works

2.5.1 The permanent works comprise cut and fill works, slope works, earth retaining walls, lakes for irrigation water. The temporary works will involve the formation of working platforms and material storage areas. The earthworks will include excavation of temporary ditches along the sides of the excavations to collect surface water. Desilted water will be discharged into existing drainage system.

Drainage and Irrigation system

2.5.2 The permanent drainage system for the proposed golf course comprises a comprehensive network of storm water drains, low flow rising mains, irrigation rising mains and gravity drains, lake and low flow storage tanks/pumping stations. The irrigation supply systems include two significant pumping stations, the seawater intake pumping station for the desalination plant and a low-level irrigation supply pumping station at the existing reservoir..

Golf Course formation and general landscaping

2.5.3 The holes of the proposed third golf course will be constructed in three main groups (North, Centre and South). The overall development of the proposed third golf course will be the tees, greens and fairways areas. The landscape work has two sections: stabilization and erosion control for exposed soil and slopes, and planting material for amenity purposes.

Cart Paths and Bridge Construction

2.5.4 The cart paths subgrade will be used to provide access to the various holes for construction vehicles to deliver capping sand and the turf. Concreting of cart paths will be one of the last construction tasks (after completion of drainage works, utility installation and irrigation works), after which no heavy construction or maintenance plant or equipment will be needed.

2.5.5 The permanent bridge works include formwork assembly, steel fixing, concrete pouring for the footing/cap and abutment walls, striking and lifting of formwork after concreting, and lifting and installation of precast concrete beams.

Desalination Plant and temporary barging point

2.5.6 The existing pier will be used temporarily for transportation of material during the construction phase of the desalination plant and associated sea water pumping station on the west side of the island. It will also be used for delivery of construction workers, building plant and building material. A temporary barging point will be located on the east side of the proposed third golf course for major deliveries of equipment and construction workers to site during the construction phase, and will be decommissioned after the construction of the proposed Project has been completed.

Operation phase of the proposed third golf course

2.5.7 The 18-hole golf course will contain infrastructure including a desalination plant, irrigation lake, cart paths, bridges and small structures (halfway house and rain shelters).

Engineering Issues

2.5.8 Major engineering issues arising from expanding the existing golf facilities are:

- Source of irrigation water during operation;
- Earthworks during construction; and
- Provision of drainage.

2.5.9 Minor engineering issues include upgrading of the sewage treatment facilities and extension of the administration and maintenance buildings.

Irrigation water supply

2.5.10 The Existing Courses are irrigated with water collected from the catchment of the courses and stored in a reservoir. In addition, sewage treatment works effluent is recycled for irrigation purposes. There is insufficient water storage capacity in the existing reservoir to fully irrigate the proposed third golf course, and even though the storage capacity of the existing reservoir will be maximized and a closed low flow drainage system will reuse and recycle water, there will still be a shortfall in supply.

2.5.11 To minimise additional water requirements, different grass species were reviewed, and *Seashore Paspalum* has been selected. This grass species is salt tolerant so that saline water can be used for irrigation, though fresh water is needed to avoid salt build-up. A further advantage of this grass over other species is that it requires less water. However, there will still be a shortfall, and potential sources of additional water supply were studied, including (i) construction of a new inland reservoir at the south end of the island and (ii) use of desalinated seawater.

2.5.12 Other sources of water, such as potable water from the Water Supplies Department (WSD) was not considered as WSD does not permit large-scale irrigation with potable water, while a geological desk study indicated that ground water wells would provide minimal volume of water.

Earthworks

2.5.13 Based on the topography of the proposed third golf course, it is estimated that 530,000 m³ of soil and rock will have to be excavated and re-compacted to form the proposed third golf course.

2.5.14 The earthworks are designed to ensure the quantities of cut and fill are balanced, i.e. there is no import/export of material. Where possible, cut and fill quantities have also been balanced locally to eliminate the need of transporting large quantities of fill around the site. This approach will reduce potential issues for adverse air, noise and water quality during the construction phase of the Project. Lakes that form water features within the site can be used as sedimentation ponds during the construction phase.

Drainage

2.5.15 The catchments of the proposed third golf course are currently drained by natural stream courses which discharge to the sea. Many areas of the site are steep, and erosion of stream courses and washed out areas of hillside are apparent. All identified existing sensitive streams/rivers will be retained in their natural state and protected by buffer zones to minimize disturbance.

2.5.16 All surface runoff from the golf course (except Hole 5 and part of Hole 6) will be diverted into the existing reservoir, which will provide a final polishing (tertiary treatment), through lakes and underground tanks, which provide temporary storage. The water in the existing reservoir will be used for irrigation and will only overflow to the marine environment in heavy rainstorms. The closed loop low flow drainage system constructed to serve as a water collection network for the proposed third golf course will allow maximum reuse and recycling of water.

2.5.17 Overland flow from Holes N15, S1, S2, S3, S4, S6, S7 & S8 & S9 of the Existing Courses flow into a marsh for polishing before overflowing into the marine water. With the implementation of the closed loop drainage system, overland drainage from Holes S1, S7 and S9 will be diverted back to the existing reservoir for irrigation rather than into the marsh. With this approach there will be a 7.3% golf course runoff load reduction to the marsh area. A filter system is proposed to further polish the surface runoff from Hole 5 and part of Hole 6 of the proposed third golf course as a further mitigation measure. Biopesticides are proposed to be used at these areas to reduce pesticide usage.

Extension of existing sewage treatment facilities

2.5.18 Sewage from the existing golf course facilities is treated at a self-contained sewage treatment plants located within the existing maintenance buildings. The maximum capacity of this plant is 150m³/day when operating continuously. The estimated maximum flow will be 225m³/day when the proposed third golf course comes into operation. To deal with the additional load, the existing sewage treatment plant will be upgraded by adding additional treatment units.

2.5.19 Treated sewage effluent is currently discharged into the existing reservoir for final polishing. It mixes with surface water runoff here, and is used to irrigate the Existing Courses.

2.6 Consideration of Alternative Location

2.6.1 An alternative site outside Kau Sai Chau has not been considered since it is necessary to optimise existing facilities rather than duplicating them at other separate sites.

2.7 Design considerations of Closed Low flow Drainage and Irrigation System

2.7.1 A closed low flow design is designed to collect the golf course run-off and divert it back to the existing reservoir for irrigation purpose. In order to protect the identified sensitive streams, the proposed closed low flow drainage network and golf course design layout has to be designed to ensure no contact of stream beds during the construction and operation phases of the third golf course. An inland reservoir has been considered at the southern part for the proposed third golf course to provide irrigation water. Due to the sensitivity of stream (near Hole 15/16), this is not considered in order to avoid the potential impacts. A desalination plant provides for irrigation water is therefore recommended.

2.8 Scenario with the Project

2.8.1 If the Project does not proceed, the silty runoff from the eroded slopes within the Project boundary will continue to impact on the water quality and ecology. The water quality of the existing heavily silted stream is expected to be substantially improved during the operation phase of the proposed third golf course.

2.8.2 The golf course extension would extend the fire-break effect over a larger area, thus providing greater protection to more of the remaining natural areas on the island. This will encourage natural succession on shrublands and other unaffected habitats. Loss of individual trees will be also compensated by proposed tree planting.

2.8.3 The ecological monitoring of the existing golf course over the last ten years showed that the golf course has provided habitats for a diverse array of wildlife including birds, herpetofauna, dragonflies and butterflies. Numbers of species and densities are generally higher on the existing golf course than in surrounding habitats. With the implementation of the proposed third golf course, the conversion of highly degraded habitats will result in enhancement of avian biodiversity in future.

2.9 Continuous Public Involvement (CPI)

2.9.1 During the EIA study, there has been some discussion with non-Government Organization (NGO's) and Sai Kung District Council (Table 2.3).

2.9.2 The key concerns from greens groups are mainly on the water quality to the Port Shelter during the operation phase of the proposed third golf course. Our proposed closed low flow drainage design to collect, recycle and reuse the golf course runoff, using a drought tolerance and disease resistance new turf (Seashore

paspalum) than the existing golf courses (Bermuda grass) and specific turfgrass management plan for the proposed third golf course have provide sufficient protection on the freshwater and marine water quality in Port Shelter in future. In addition to protect the identified sensitive streams, all identified streams will be preserved by buffer zones in order to protect water quality and integrity of ecology at the freshwater streams. With the proposed buffer zone and restoration of the eroded slope after the construction of the proposed third golf course, improvement (in terms of water quality) of water quality at the existing heavily silty Stream A is expected.

Table 2.3 Summary of Continuous Public Involvement

Date	Subject
12 Dec 00	Meeting with World Wide Fund for Nature Hong Kong
13 Dec 00	Meeting with Friends of Earth
14 Dec 00	Meeting with the Conservancy Association
15 Dec 00	Meeting with Green Power
12 July 05	Meeting with Conservancy Association (Site Visit at Kau Sau Chau)
15 July 05	Meeting with World Wide Fund for Nature Hong Kong and Kadoorie Farm & Botanic Garden
26 July 05	Consultation with Sai Kung District Council

2.10 Project Programme

2.10.1 The proposed construction programme will span 20 months (from Jan 2006 to July 2007). Figure 2.2 shows the preliminary construction programme of the Project. The major construction activities in time sequence are mobilization/site preparation, bulk irrigation supply, temporary works for material delivery, permanent bridge construction, earthworks, deep drainage system, profiling, sand capping/land drainage system, turfing and establishment.

2.11 Interactions with Other Projects

2.11.1 The Project is located on an island and adjacent to the boundary of the existing golf courses. There are no works identified on any adjacent areas and the closest urban area is Sai Kung which is over 4Km from the project boundary. No direct interface between this Project and any other projects in the area is therefore expected, and no cumulative impacts are anticipated.

3. Sensitive Receivers

3.1 Introduction

3.1.1 In this section, the sensitive receivers which may be impacted by construction and operation activities at the proposed third golf course on Kau Sai Chau are identified. Figure 3.1 gives the locations of the key existing and planned sensitive receivers.

3.2 Residential Properties

3.2.1 Residential development at Sai Kung (5 km to the northwest of the Project site) and Kau Sai village (1 km to the southwest of the Project site) are separated geographically from the Project site, and do not have direct line of sight to the proposed third golf course. Villages on the Tai Mong Tsai Road (2.5 km to the north) are also shielded by topography. The village on Yim Tin Tsai, north of the existing courses, is currently uninhabited (1.75 km from the Project site). There is shielding topography to the south and southwest.

3.3 Beaches & Sandy Bays

3.3.1 There are gazetted beaches on the west side of Sharp Island (Kiu Tsui Chau), at Hap Mun and Kiu Tsui. While there are no gazetted beaches on Kau Sai Chau, several sandy beaches on this island are popular at weekends, including Kau Chung Wan (SB1) and Kau Tung Wan (SB2) which are immediately south of the Project site. Kau Sai Wan (on the south side of the island, west of Kau Sai Village, B1) and Pak Sha Tsui (on the west side of Kau Sai Chau, B2) are two sandy beaches.

3.4 Fisheries

3.4.1 There are four Fish Culture Zones (FCZs) around Kau Sai Chau. Two are close to the Project site at Tai Tau Chau (F1) and Tiu Cham Wan (currently abandoned but could be reactivated on application, F2). The third at Kau Sai (F3) is remote from the Project site (to the south west) and the fourth, Kai Lung Wan (F4) is on the west side of island but is only marginally susceptible to impact from ferry access.

3.5 Cultural Heritage Sites

3.5.1 There are four sites identified on the island: (1) Rock carving on the headland north of the ferry pier (west side of the island, AF1), remote from the Project; (2) & (3) two un-excavated Late Neolithic sites (AP1 and AP2), one of which is within the Project site on the east side of the island, while the second is within the boundary of the potential reservoir site (major valley on the west side of the island) and (4) Memorial stone to Dr Barbara Ward (AF2) on the south side of the island, remote from the Project. A Late Neolithic site is behind the beach, north of the existing ferry pier. In addition, Hung Shing Temple (a declared monument) and the historic graves (please refers to CHIA report for details) are located on the island.

3.6 Natural Environment

3.6.1 Kau Sai Chau Island is divided between the natural uplands of the southern half of the island and the modified landscape of the existing golf course in the north. The proposed development site of the Project will occupy a flatter platform on the east side of the island. This area comprises the lower slopes of the steep upland and undulating/incised valleys characterised by naturally vegetated knolls.

3.6.2 The existing habitats of the Project area have been mapped from aerial photography, validated by site visits undertaken in October and November 2004, and are shown on Figure 3.2. The island is steep and relatively dry. Outside of the turfgrass and shrubland of the existing golf courses, the island is dominated by eroded badlands and scrub vegetation. Patches of shrubland occur where water is readily available, primarily along streams. Coastal waters near the shore are generally degraded due to past erosion and possibly due to Fish Culture Zone operation, but patches of coral persist and are identified and located at Kap Lo Kok. Moreover, seagrass (SEA) was identified during the sub-tidal survey in March 2005 and is located just south of the existing pier.

3.6.3 Ecological resources of interest on and around the site include:

- a marsh/pond complex at the north edge of the existing golf courses, which harbours dragonflies of conservation interest, waterbirds and amphibians;
- streams on the central/southern section of the site: some are in poor condition due to erosion from firing range damage, but the structure of others is reasonably intact;
- small patches of mangroves in inlets on the east side of the island, including two sites planted as compensation for mangrove loss during construction of the original golf courses;

- hard coral communities at Kap Lo Kok, east Kau Sai Chau;
- seagrass, west Kau Sai Chau; and
- protected plant species, including Bamboo Orchid *Arundina chinensis* and New Year Flower *Enkianthus quinqueflorus* found near ravines across the island's uplands.

3.7 Existing and Past Land Uses of the Project Site

3.7.1 The Project site is currently undeveloped, comprising scrubland and incised stream courses. There are several areas where former use as an artillery firing range have removed the thin surface vegetation and allowed rainwater to wash out material. There have been no formal activities in this area since its cessation of use as an artillery firing range, and there has been no systematic checking and removal of unexploded ordnance.

3.7.2 Kau Chung Wan beach at the southern end of the Project area is used by weekend visitors. There is no pier or jetty so boats must anchor in the bay, and there are no facilities at the beach.

3.7.3 There is an inactive, abandoned Fish Culture Zone in a Tiu Cham Wan immediately to the east of the Project site.

[1]

For the Royal Hong Kong Jockey Club by AXIS Environmental Consultants Ltd. (March 1994)

[2]

AXIS Environmental Consultants Ltd. (July 1994)

[3]

AXIS Environmental Consultants Ltd./Hyder Consulting for the Royal Hong Kong Jockey Club/Jockey Club Kau Sai Chau Public Golf Course Ltd.

[4]

Ecosystems Ltd.,

[5]

Hyder Consulting Ltd