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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

APPENDIX A
STUDY BRIEF

designated projects and related activities taking place concurrently. This information will contribute to decisions by the Director on:

- (i) the overall acceptability of any adverse environmental consequences that are likely to arise as a result of the proposed project;
- (ii) the conditions and requirements for the detailed design, construction and operation of the proposed project to mitigate against adverse environmental consequences wherever practicable; and
- (iii) the acceptability of residual impacts after the proposed mitigation measures are implemented.

2. OBJECTIVES OF THE EIA STUDY

2.1 The objectives of the EIA study are as follows:

- (i) to describe the proposed project and associated works together with the requirements for carrying out the proposed project;
- (ii) to identify and describe the elements of the community and environment likely to be affected by the proposed project and/or likely to cause adverse impacts to the proposed project, including both the natural and man-made environment;
- (iii) to identify and quantify emission sources and determine the significance of impacts on sensitive receivers and potential affected uses;
- (iv) to identify and quantify any potential losses or damage to flora, fauna and natural habitats;
- (v) to identify any negative impacts on sites of cultural heritage and to propose measures to mitigate these impacts;
- (vi) to identify any potential landscape and visual impacts and to propose measures to mitigate these impacts;
- (vii) to propose the provision of infrastructure or mitigation measures so as to minimize pollution, environmental disturbance and nuisance during construction and operation of the project;
- (viii) to identify, predict and evaluate the residual (i.e. after practicable mitigation) 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;

- (ix) to identify, assesses and specify methods, measures and standards, to be included in the detailed design, construction and operation of the project which are necessary to mitigate these environmental impacts and reducing them to acceptable levels;
- (x) to investigate the extent of side-effects of proposed mitigation measures that may lead to other forms of impacts;
- (xi) to identify constraints associated with the mitigation measures recommended in the EIA study;
- (xii) to design and specify the environmental monitoring and audit requirements, if required, to ensure the implementation and the effectiveness of the environmental protection and pollution control measures adopted;
- (xiii) to consider alternative site(s) and to compare the environmental benefits and dis-benefits of each of the site in selecting a preferred site.

3. DETAILED REQUIREMENTS OF THE EIA STUDY

- 3.1 The purpose of this study brief is to scope the key issues of the EIA study. The Applicant has to demonstrate in the EIA report that the criteria in the relevant sections of the Technical Memorandum on the EIA Process of the EIAO (thereafter referred to as the TM), are fully complied with.

The Scope

- 3.2 The scope of this EIA study covers the proposed project mentioned in sections 1.2 and 1.3 above.

Technical Requirements

- 3.3 The Applicant shall conduct the EIA study to address all environmental aspects of the activities as described in the scope as set out above. The EIA study shall include the following technical requirements on specific impacts:

3.3.1 Air Quality Impact

- 3.3.1.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing air quality impact as stated in section 1 of Annex 4 and Annex 12 of the TM respectively.

3.3.1.2 The assessment area for air quality impact shall generally be defined by a distance of 500 m from the boundary of the project site, yet it may be extended depending on the circumstances and the scale of the project.

3.3.1.3 The Applicant shall assess the air pollutant concentrations in accordance with the latest set of Guidelines for Local-Scale Air Quality Assessment Using Models issued by the Modeling Section, Air Policy Group, Environmental Protection Department, HKSAR. (ref.: EPD's home page under items for Air – <http://www.info.gov.hk/epd>).

3.3.1.4 The air quality assessment shall include the following:

Background and analysis of activities

- (i) provide background information relating to air quality issues relevant to the project, e.g. description of the types of activities of the project;
- (ii) give an account, where appropriate, of the consideration/measures that had been taken into consideration in the planning of the project to abate the air pollution impact. That is, the Applicant should consider alternative construction methods/phasing programmes to minimize the constructional air quality impact;
- (iii) present the background air quality levels in the assessment area for the purpose of evaluating the cumulative air quality impacts;

Identification of ASRs and examination of emission/dispersion characteristics

- (iv) identify and describe representative existing and planned/committed ASRs that would likely be affected by the project. The Applicant shall select the assessment points of the identified ASRs such that they represent the worst impact point of these ASRs. A map showing the location and a description including the name of the buildings, their uses and height of the selected assessment points shall be given. The separation distances of these ASRs from the nearest emission sources should also be given. For phased development, the Applicant should review the development programme to take into consideration the construction stages so as to include occupiers of early as ASRs if

they may be affected by works at later phases;

- (v) provide an exhaustive list of air pollutant emission sources, including any nearby emission sources which are likely to have impact on the project. Examples of constructional stage emission sources include stock piling, blasting, concrete batching and vehicular movements on unpaved haul roads on site, etc.. Confirmation of the validity of the assumptions and the magnitude of the activities (e.g. volume of construction materials handled) shall be obtained from the relevant government/authorities and documented;

Constructional Air Quality Impact

- (vi) the Applicant shall follow the requirements of the Air Pollution Control (Construction Dust) Regulation in dust control to ensure construction dust impacts are controlled within the relevant standards as stipulated in section 1 of Annex 4 of the TM. A monitoring and audit program during constructional stage shall be initiated to verify the effectiveness of the control measures and to ensure that the construction dust levels be brought under control;
- (vii) if the Applicant anticipates a significant construction dust impact that will likely cause exceedance of the recommended limits in the TM at the ASRs despite incorporation of the dust control measures stated in (vi) above, a quantitative assessment should be carried out to evaluate then construction dust impact at the identified ASRs. The Applicant shall follow the methodology below when carrying out the quantitative assessment;

Quantitative Assessment Methodology

- (viii) the Applicant shall apply the general principles enunciated in the modeling guidelines while making allowance for the specific characteristic of each project. This specific methodology must be documented in such a level of details (preferably with tables and diagrams) to allow the readers of the assessment report to grasp how the model is set up to simulate the situation at hand without referring to the model input files. Details of the calculation of the emission rates of air pollutants for input to the modeling shall be presented in the report. The Applicant must ensure consistency between the text description and the model

files at every stage of submission. Prior agreement of the general methodology between the Applicant and the Director is advised;

- (ix) the Applicant shall identify the key/representative air pollutant parameters (types of pollutants and the averaging time concentration) to be evaluated and provide explanation for choosing these parameters for the assessment of the impact of the project;
- (x) the Applicant shall calculate the cumulative air quality impact at the identified ASRs and compare these results against the criteria set out in section 1 of Annex 4 in the TM. The predicted air quality impacts (both unmitigated and mitigated) shall be presented in the form of summary table and pollution contours, for comparison with relevant air quality standards and examination of the land use implications of these impacts. Plans of suitable scale should be used for presentation of pollution contour for determining buffer distances required;
- (xi) the Applicant shall propose remedies and mitigating measures where the predicted air quality impact exceeds the criteria set in section 1 of Annex 4 in the TM. These measures and any constraints on future land use planning shall be agreed with the relevant government departments/authorities and documented. The Applicant shall demonstrate quantitatively that the resultant impacts after incorporation of proposed mitigating measures will comply with the criteria stipulated in section 1 of Annex 4 in the TM; and
- (xii) all input and output file(s) of the model run(s) shall be submitted to the Director in electronic format.

3.3.2 Water Quality Impact

- 3.3.2.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing water pollution as stated in Annexes 6 and 14 of the TM, respectively.
- 3.3.2.2 The assessment area for the purpose of this water quality impact assessment shall cover the project area(s) as shown in Figure No. 1.1 of the Project Profile (No. PP-110/2000), plus any stream courses and the

associated water system in the vicinity that may be affected by the project.

3.3.2.3 The Applicant shall identify and analyse in the assessment all physical, chemical and biological disruptions of marine, estuarine, fresh water or ground water system(s) arising from construction and operation of the project.

3.3.2.4 The Applicant shall include the following in the water quality impact assessment:

- (i) collection and review of background information on the existing water system(s) and the respective catchment(s);
- (ii) characterization of water and sediment quality based on existing information or site surveys/tests as appropriate;
- (iii) identification and analysis of all existing and future activities and beneficial uses related to the water system(s) and identification of all water sensitive receivers;
- (iv) identification of pertinent water and sediment quality objectives, criteria and standards for the water system(s) and all the sensitive receivers;
- (v) identification of any alteration of any water courses, natural streams/ponds, wetland, change of shoreline or bathymetry, change of flow regimes, change of ground water levels, change of catchment types or areas;
- (vi) identification, analysis and quantification of all existing and future water and sediment pollution sources, including point discharges and non-point sources to surface water runoff, and analysis of the provision and adequacy of future facilities to reduce such pollution. An emission inventory on the quantities and characteristics of all these existing and future pollution sources in the assessment area shall also be provided. Field investigation and laboratory tests, as appropriate, shall be conducted to fill in any relevant information gaps. Possible impacts include application of chemicals, such as pesticides, herbicides, insecticides, fertilizers etc., associated with the operation and maintenance of golf course development on the nearby streams, mangroves, waterbodies, fish culture zones and

other sensitive uses;

- (vii) prediction and quantification, by mathematical modeling or other technique subject to approval of the Director, of impacts on the water system(s) and the sensitive receivers due to those alterations and changes identified in (v) above and the pollution sources identified in (vi) above. The prediction shall adopt historical record of rainfall in the area of period not less than 10 years. Possible impacts include changes in hydrology, flow regime, sediment erosion or deposition, water and sediment quality and the effects on the aquatic organism due to such changes. The prediction shall include possible different construction stages or sequences, and different operation stages,

cumulative impacts due to other projects, activities or pollution sources within a boundary around the assessment area, subject to the agreement of the Director shall also be predicted and quantified;

- (viii) assessment and quantification of all existing and future waste water generation activities and analysis on the adequacy of existing and future sewerage infrastructure;
- (ix) identification and quantification of all dredging, fill extraction, filling, reclamation, mud/sediment transportation and disposal activities and requirements. Potential fill source and dumping ground to be involved shall also be identified. Field investigation, sampling and laboratory tests to characterise the sediment/mud concerned shall be conducted as appropriate. The ranges of parameters to be analyzed; the number, type and methods of sampling; sample preservation; laboratory tests; and the laboratory to be used shall be subject to the approval of the Director,

prediction, quantification and assessment of impacts on the physical regime, water and sediment quality of the water system(s) and the sensitive receivers due to the activities identified in above. The prediction and quantification of impacts caused by, amongst others, sediment re-suspension and contaminants release shall be carried out with mathematical modeling or other techniques subject to the approval of the Director,

identification and evaluation of the best practicable dredging and

reclamation methods to minimise dredging and dumping requirements and demand for fill sources based on the criterion that existing marine mud shall be left in place and not be disturbed as far as possible,

cumulative impacts due to other dredging, filling or dumping activities within a boundary around the Study Area shall also be predicted and quantified;

- (x) proposal for upgrading or providing any effective infrastructure, water pollution prevention and mitigation measures to be implemented during the construction, operation stages so as to reduce the water and sediment quality impacts to within standards. Requirements to be incorporated in the project contract document shall also be proposed;
- (xi) formulation through an effective measure to reduce potential silty run off, in addition to scheduling work to dry season;
- (xii) best management practices to reduce storm water and non-point source pollution shall be investigated and proposed as appropriate. The proposed management practices shall also include preparation and application of chemicals, such as pesticides, herbicides, insecticides, fertilizers etc., in the area; and
- (xiii) evaluation and quantification of residual impacts on the water system(s) and the sensitive receivers with regard to the appropriate water and sediment quality objectives, criteria, standards or guidelines.

3.3.3 Waste Management Implications

3.3.3.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing waste management implications as stated in Annexes 7 and 15 of the TM, respectively.

3.3.3.2 The assessment of waste management implications shall cover the following:

- (i) Analysis of Activities and Waste Generation

The Applicant shall identify the quantity, quality and timing of

the waste arising as a result of the construction and operation activities, based on the sequence and duration of these activities.

- (ii) Proposal for Waste Management
 - (a) Prior to considering the disposal options for various types of wastes, opportunities for reducing waste generation and on-site or off-site re-use shall be fully evaluated. Measures which can be taken in the planning and design stages e.g. by modifying the design approach and in the construction stage for maximising waste reduction shall be separately considered.
 - (b) Having been taken into account all the opportunities for reducing waste generation and maximising re-use, the types and quantities of the wastes required to be disposed of as a consequence shall be estimated and the disposal options for each type of waste described in detail. Pretreatment process of slurry before disposal shall be addressed in details. The disposal method recommended for each type of wastes shall take into account the result of the assessment in (c) below.
 - (c) The impact caused by handling (including labelling, packaging & storage), collection, and disposal of wastes shall be addressed in detail and appropriate mitigation measures proposed. This assessment shall cover the following areas:
 - potential hazard;
 - air and odour emissions;
 - noise;
 - wastewater discharge; and
 - public transport.

3.3.4 Land Contamination Impact

- 3.3.4.1 The Applicant shall investigate whether there is potential land contamination problem arising from the former artillery range.
- 3.3.4.2 If the potential for land contamination exists, an assessment shall be conducted in accordance with the guidelines for potential contaminated land issues as given in section 3 of Annex 19 of the TM as appropriate

and remedial measures shall be proposed if necessary.

3.3.5 Ecological Impact (both Aquatic and Terrestrial)

- 3.3.5.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing ecological impact as stated in Annexes 8 and 16 of the TM, respectively.
- 3.3.5.2 The assessment area for the purpose of this ecological impact assessment shall include all areas within 500 m distance from the project area as shown in Figure No. 1.1 of the Project Profile (No. PP-110/2000), or the area likely to be impacted by the project.
- 3.3.5.3 In the ecological impact assessment, the Applicant shall examine the flora, fauna and other components of the ecological habitats within the assessment area. The aim shall be to protect, maintain or rehabilitate the natural environment. In particular, the proposed project shall avoid impacts on recognised sites of conservation importance and other ecological sensitive areas. The assessment shall identify and quantify as far as possible the potential ecological impacts associated with the project.
- 3.3.5.4 The assessment shall include the following:
- (i) review the findings of relevant studies and collate all the available information regarding the ecological characters of the assessment area;
 - (ii) evaluate the information collected and identify any information gap relating to the assessment of potential ecological impacts to the terrestrial and aquatic environment;
 - (iii) carry out necessary field surveys (the duration of which shall be at least 9 months and shall cover the wet and dry seasons) and investigations to verify the information collected, fill the information gaps identified and fulfill the objectives of the EIA study; the field surveys shall include survey of freshwater fish and dragonflies since rare species have been reported on Kau Sai Chau;
 - (iv) establish the general ecological profile and describe the characteristics of each habitat found; major information to be provided shall include:

- (a) description of the physical environment;
 - (b) habitat maps of suitable scale (1:1000 to 1:5000) showing the types and locations of habitats in the assessment area;
 - (c) ecological characteristics of each habitat type such as size, vegetation type, species present, dominant species found, species diversity and abundance, community structure, seasonal patterns, inter-dependence of the habitats and species, and presence of any features of ecological importance;
 - (d) representative colour photos of each habitat type and any important ecological features identified; and
 - (e) species found that are rare, endangered and/or listed under local legislation, international conventions for conservation of wildlife/habitats or red data books;
- (v) investigate and describe the existing wildlife uses of various habitats with special attention to those wildlife groups and habitats with conservation interests, including:
- (a) wetland,
 - (b) natural stream courses,
 - (c) birds,
 - (d) stream fauna,
 - (e) dragonflies,
 - (f) freshwater fish,
 - (g) mammals,
 - (h) and other habitats and wildlife groups identified as having special conservation interests by the study;
- (vi) describe all recognized sites of conservation importance in the proposed development site and its vicinity and assess whether these sites will be affected by the proposed development or not;
- (vii) using suitable methodology, identify, evaluate and quantify as far as possible any direct, indirect, on-site, off-site, primary, secondary and cumulative ecological impacts such as destruction of habitats, reduction of species abundance/diversity, loss of feeding grounds, reduction of ecological carrying capacity and habitat fragmentation

and in particular the following:

- (a) impacts associated with dredging, fill extraction, filling, reclamation, mud/sediment transportation and disposal activities during construction stage;
 - (b) habitat loss and disturbance to wildlife during construction stage;
 - (c) deterioration of environmental qualities (e.g. water quality) caused by contaminants release and the subsequent impacts to the biological communities during operation stage; and
 - (d) potential adverse ecological/behavioural impacts of floodlighting on wildlife such as bats, birds and nocturnal mammals;
- (viii) evaluate the significance and acceptability of the ecological impacts identified using well-defined criteria;
- (ix) recommend all possible alternatives (such as modifications of layout and design) and practicable mitigation measures to avoid, minimize and/or compensate for the adverse ecological impacts identified such as:
- (a) to address the impacts of reservoir construction especially with regard to the removal of the existing transplanted mangrove area and the possible failure to relocate the mangrove plants, and objectively compare against the impacts of other possible alternatives for irrigation, such as enhancing the capacity of the current reservoir;
 - (b) to investigate other options of the future site for the proposed reservoir; taking into account the ecological importance of the areas affected;
- (x) undertake a comprehensive review of the turfgrass management plan for the existing golf course, based on which the future EIA should develop a new turfgrass management regime for the operation of the proposed golf course, and such a turfgrass management plan should be included in the future EIA report for further review;

- (xi) evaluate the feasibility and effectiveness of the recommended mitigation measures and define the scope, type, location, implementation arrangement, subsequent management and maintenance of such measures;
- (xii) determine and quantify as far as possible the residual ecological impacts after implementation of the proposed mitigation measures;
- (xiii) evaluate the severity and acceptability of the residual ecological impacts using well-defined criteria. If off-site mitigation measures are considered necessary to mitigate the residual impacts, the guidelines and requirements laid down in the PELB Technical Circular No. 1/9 shall be followed; and
- (xiv) review the need for and recommend any ecological monitoring programme required.

3.3.6 Fisheries Impact

3.3.6.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing fisheries impact as stated in Annexes 9 and 17 of the TM.

- 3.3.6.2
- (i) the assessment area for the purpose of this fisheries impact assessment shall include all areas within 500 m distance from the project area as shown in Figure No. 1.1 of the Project Profile (No. PP110/2000), or the area likely to be impacted by the project; and
 - (ii) the above should include the potential fishery impact on any proposed Fisheries Protection Area (Port Shelter) from the captioned project to protect fishery resources there.

3.3.6.3 The fisheries impact assessment shall include the following:

- (i) description of the physical environmental background;
- (ii) description and quantification as far as possible existing fisheries activities (e.g. capture fisheries, aquaculture, shellfish farming/collection, etc.);
- (iii) description and quantification as far as possible the existing fisheries resources (e.g. major fisheries products and stocks);

- (iv) identification of parameters (e.g. water quality parameters) and areas (e.g. breeding/spawning grounds, nursery grounds, reefs) that are important to fisheries;
- (v) identification and quantification as far as possible any direct/indirect impacts to fisheries (e.g. deterioration of fishing grounds/fish culture zones, loss of breeding grounds, reduction of catch/productivity);
- (vi) evaluation of impacts and make proposals for any environmental mitigation measures with details on justification, description of scope and programme, feasibility as well as staff and financial implications including those related to subsequent management and maintenance requirements of the proposals; and
- (vii) review the need for monitoring during the construction and operation phases of the project and, if necessary, propose a monitoring and audit programme.

3.3.7 Impact on Cultural Heritage

- 3.3.7.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing impact on cultural heritage as stated in Annexes 10 and 19 of the TM, respectively.
- 3.3.7.2 The assessment area for the purpose of the impact on cultural heritage shall be defined as the project area(s) as shown in Figure No. 1.1 of the Project Profile (No. PP-110/2000) and the area(s) in the vicinity that may be affected by the project.
- 3.3.7.3 The historical, archaeological and cultural heritage impact study should take into account the importance of cultural heritage in Hong Kong and address the potential impacts to the historical, archaeological and cultural resources within the assessment area.
- 3.3.7.4 The examination of the assessment area should also allow a more general appraisal of archaeology, architectural history and historic landscapes of the areas that the development will take place. The project should be modified and, if necessary, supplemented to accommodate off-site areas of spoil disposal, construction sites and traffic routes which could affect archaeological, historic and cultural

resources as these are identified during the evolution of the engineering design.

3.3.7.5 The historical, archaeological and cultural heritage impact assessment should focus on:

- (i) Investigation of archaeological potential of the study area by:
 - (a) developing a field evaluation programme to identify areas to be investigated;
 - (b) producing field evaluation protocols to determine the sampling technique, the sample rational to be applied and the site record forms to be used, the evaluation protocols should be compatible with the data capture requirements of the Antiquities and Monuments Office (AMO); and
 - (c) undertaking field evaluations.
- (ii) Identification of historical buildings and structures which will be affected by the remaining development within the study area :
 - (a) historic buildings and structures include a variety of forms with a wide range of different functions like domestic, working and cultural uses; places of worship, houses, agricultural buildings, boundary and milestones, industrial buildings and workshops; and
 - (b) landscape features include sites of historical events, historic field patterns, tracks and fish ponds and cultural elements such as fung shui woodlands and clan grave sites.
- (iii) Evaluation of impacts on cultural heritage and proposals for any mitigation measures with detailed elaboration on scope of work and financial implications.
 - (a) heritage resources within the Study Areas should be identified through reference to appropriate records, such as the archives of the AMO, and through consultations with relevant village representatives, appropriate academic sources and other Government sources, including the Lands Department, District Offices, etc.;

- (b) if the consultants identifies any additional buildings and structures within the study area which are of potential historic or cultural importance and not recorded by AMO, the office should be reported as soon as possible. The historic and cultural value of the items will be further assessed by the AMO; and
- (c) the criteria to be adopted to assess the level of direct and indirect impacts to the heritage resources and to develop appropriate mitigation measures, should be established in close liaison with the relevant specialists within the EIA Study Team and should be agreed by the AMO prior to application.

3.3.8 Landscape and Visual Impact

- 3.3.8.1 The Applicant shall follow the criteria and guidelines for evaluating and assessing landscape and visual impact as stated in Annexes 10 and 18 of the TM, respectively. Both construction and operation impacts within the study area shall be assessed.
- 3.3.8.2 The assessment area for the landscape impact assessment shall include all areas within a 500 m distance from the proposed project. The assessment area for the visual impact assessment shall be defined by the visual envelope of the proposed project.
- 3.3.8.3 The Applicant shall describe, appraise, analyse and evaluate the existing landscape resources and character of the assessment area. A system should be derived for judging landscape and visual impact significance as required under the TM. The sensitivity of the landscape framework and its ability to accommodate change shall be particularly focused on. The Applicant shall identify the degree of compatibility of the proposed project(s) with the existing landscape. The landscape impact assessment shall quantify the potential landscape impact as far as possible so as to illustrate the significance of such impacts arising from the proposed development. Clear mapping of the landscape impact is required.
- 3.3.8.4 The Applicant shall assess the visual impacts of the proposed project. Clear mapping of the visual impact is required. The assessment shall include the following:

- (i) identification and plotting of visual envelope of the proposed project within the assessment area;
- (ii) identification of the key groups of sensitive receivers within the visual envelope with regard to views from both ground level and elevated vantage points;
- (iii) description of the visual compatibility of the project with the surrounding and the planned setting, and its obstruction and interference with key views of the adjacent areas;
- (iv) the severity of visual impacts in terms of distance, number of sensitive receivers shall be identified. Night time glare to be generated from floodlighting shall be considered in the assessment. The visual impacts of the project with and without mitigation measures shall be included so as to demonstrate the effectiveness of the proposed mitigation measures; and
- (v) detail description of the locations of streams to be affected, and the degree of impacts as a result of such regrading, as proposed in Paragraph 5.7 of the submitted Project Profile (No. PP-110/2000) to “regrade currently silted streams”.

3.3.8.5 Alternative design that would avoid or reduce the landscape and visual impact shall be evaluated for comparison before adopting other mitigation or compensatory measures to alleviate the impacts. The mitigation measures proposed shall not only be concerned with damage reduction but should also include consideration of potential enhancement of existing landscape. The Applicant shall recommend mitigation measures to minimize the adverse effects identified above, including provision of a landscape design.

3.3.8.6 The mitigation measures shall also include preservation of vegetation, transplanting of mature trees, design of structures, provision of finishes to structures, colour scheme and texture of materials used, provision of screen planting, re-vegetation of disturbed land, compensatory planting, and any measures to mitigate the disturbance of the existing land use. Parties shall be identified for the on-going management and maintenance of any proposed mitigation measures to ensure their effectiveness throughout the operation phase of the proposed project. A practical programme and funding proposal for the implementation of

the recommended measures shall be provided.

3.3.8.7 Coloured perspective drawings, plans and section/elevation diagrams, annotated oblique aerial photographs, photographs taken at vantage points, photo-retouching and photomontage shall be adopted to illustrate the landscape and visual impacts of the proposed project. The Applicant shall record the technical details in preparing the illustration, which may need to be submitted for verification of the accuracy of the illustration.

3.3.8.8 To facilitate the landscape and visual impact assessment, a plan showing the nature and layout of different uses within the golf course including key architectural/design features, building heights, development intensities, circulation system and broad landscaping proposals would also be required.

3.3.9 Earthwork Impact

3.3.9.1 The cumulative impacts of earthwork in both the golf course construction and the reservoir construction programmes should be properly assessed, and preventive measures devised.

4. ENVIRONMENTAL MONITORING & AUDIT (EM&A) REQUIREMENTS

4.1 The Applicant shall identify in the EIA study whether there is any need for EM&A activities during the construction and operation phases of the project and, if affirmative, to define the scope of the EM&A requirements for the project in the EIA study.

4.2 Subject to the confirmation of the EIA study findings, the Applicant shall comply with the requirements as stipulated in Annex 21 of the TM.

4.3 The Applicant shall prepare a project implementation schedule (in the form of a checklist) containing all the EIA study recommendations and mitigation measures with reference to the implementation programme.

5. SUMMARY OF ENVIRONMENTAL OUTCOMES

5.1 The EIA report shall contain a summary of the key environmental outcomes arising from the EIA study, including the population and environmentally sensitive areas protected, environmentally friendly designs recommended, key environmental problems avoided, and

environmental benefits of environmental protection measures recommended.

6. DURATION OF VALIDITY

- 6.1 This EIA study brief is valid for 24 months after the date of issue. If the EIA study does not commence within this period, the Applicant shall apply to the Director for another EIA study brief afresh before commencement of the EIA study.

7. REPORT REQUIREMENTS

- 7.1 In preparing the EIA report, the Applicant shall refer to Annex 11 of the TM for the contents of an EIA report. The Applicant shall also refer to Annex 20 of the TM which stipulates the guidelines for the review of an EIA report.
- 7.2 The Applicant shall supply the Director with the following number of copies of the EIA report and the executive summary:
- (i) 40 copies of the EIA report in English and 80 copies of the executive summary (each bilingual in both English and Chinese) as required under section 6(2) of the EIAO to be supplied at the time of application for approval of the EIA report.
 - (ii) when necessary, addendum to the EIA report and the executive summary submitted in (i) above as required under section 7(1) of the EIAO, to be supplied upon advice by the Director for public inspection.
 - (iii) 20 copies of the EIA report in English and 50 copies of the executive summary (each bilingual in both English and Chinese) with or without Addendum as required under section 7(5) of the EIAO, to be supplied upon advice by the Director for consultation with the Advisory Council on the Environment.
- 7.3 In addition, to facilitate the public inspection of the EIA Report via the EIAO Internet Website, the Applicant shall provide electronic copies of both the EIA Report and the Executive Summary Report prepared in Hyper Text Markup Language (HTML) (version 4.0 or later) and in DynaDoc Format (version 3.0 or later) [for Chinese documents] and in Portable Document Format (PDF) version 3.0 or later [for English documents], unless otherwise agreed by the Director. For the HTML version, a content page capable of providing hyperlink to each section and sub-section of the EIA Report and the Executive Summary Report shall be included in the beginning of the document. Hyperlinks to all figures, drawings and tables in the EIA report and executive summary shall be provided in the main text from where the respective references are made. All graphics in the report

shall be in interlaced GIF format unless otherwise agreed by the Director.

- 7.4 The electronic copies of the EIA report and the Executive Summary shall be submitted to the Director at the time of application for approval of the EIA Report.
- 7.5 When the EIA Report and the Executive Summary are made available for public inspection under section 7(1) of the EIAO, the content of the electronic copies of the EIA Report and the Executive Summary must be the same as the hard copies and the Director shall be provided with the most updated electronic copies.

8. OTHER PROCEDURAL REQUIREMENTS

- 8.1 During the EIA study, if there is any change in the name of the Applicant for this EIA study brief, the Applicant mentioned in this study brief must notify the Director immediately.
- 8.2 If there is any key change in the scope of the project mentioned in sections 1.2 and 1.3 of this EIA study brief and in Project Profile (No. PP-110/2000), the Applicant must seek confirmation from the Director in writing on whether or not the scope of issues covered by this EIA study brief can still cover the key changes, and the additional issues, if any, that the EIA study must also address. If the changes to the project fundamentally alter the key scope of the EIA study brief, the Applicant shall apply to the Director for another EIA study brief afresh.

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