Kau Sai Chau Golf Academy

Project Profile

January 2014

The Hong Kong Jockey Club

Mott MacDonald

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Executive Summary

E.1 Background and Purpose of Project

Since 1995 the Hong Kong Jockey Club (HKJC) (The Project Proponent) has operated a public golf course on the island of Kau Sai Chau (KSC), east of Sai Kung in the North East New Territories[1]. Prior to development of the golf course, the northern part of the island was the site of a military range. This activity stripped top soil and surface vegetation creating a situation where silty runoff was adversely impacting water quality.

In December 1995 two 18-hole golf courses[2], a clubhouse, wastewater treatment works, a reservoir to provide irrigation water to the golf courses and a ferry pier to provide access were opened to the public. Development was carried out before enactment of the Environmental Impact Assessment Ordinance (EIAO), the project is classified as exempted project, but a full Environmental Impact Assessment (EIA) was carried out (EIA-037/BC)[3]. In 2008 a third course was opened on the east side of the island. The East Course included an EIA carried out to an EIAO Study Brief (AEIAR-091/2005)[4].

The initial EIA (EIA-037/BC) referred to a Golf Centre for the public, and a public education element was an objective from the planning stages. Before the East Course was constructed, the HKJC signed a Memorandum of Understanding with the Government that for the benefit of the community and further development of the sport of golfing, steps would be taken to establish a public facility, such as a Golf Academy. The proposed Golf Academy represents the fulfilment of the promise to provide a community project by providing a public educational resource for people with an interest in a career in the golf industry. In addition, the Golf Academy will also partner with the Hong Kong Golf Association to deliver public and community golf outreach programmes in schools and to youth through community organisations.

E.2 Establishment of a Golf Academy

Despite the growth in popularity in golf, the development of golf in Hong Kong would benefit from dedicated training facilities combined with structured programmes. There is also a lack of community golf outreach programmes, and golf industry management training programmes. The KSC Golf Course has planned to establish a Golf Academy at KSC, with the following vision:

- To produce a world class Golf Academy;
- To introduce golf to a wider community and promote the game of golf within Hong Kong;
- To use golf as a vehicle to promote life skills, build character, self-discipline, and promote

[1] The facility is managed on a day to day basis by the Jockey Club Kau Sai Chau Public Golf Course Limited on behalf of HKJC.
[2] The North and South courses
[3] Environmental Impact Assessment Reports Placed under Section 15(1)(f) of the Ordinance - EIA-037/BC
[4] EIA Reports Approved under the Ordinance - EIAO Register No.: AEIAR-091/2005

healthy choices;

- To create and support a pathway to enable Hong Kong people to take up and excel in the game of golf;
- To supply qualified golf management graduates to the region; and
- To introduce new accommodation services at KSC to support the Golf Academy.

The Golf Academy, upon completion, will offer the following programmes/facilities to the public:

- Player Pathway – World class coaching and golf instruction will be offered adopting a holistic approach with provision of specialist support staff in strength and conditioning; nutrition; sport psychology; biomechanics and physiology. The programmes will be delivered in cutting edge facilities for practice, and player analysis with an emphasis on creating a healthy and competitive training environment.
- Career and Industry Pathway – The Academy will partner with tertiary institutions in Hong Kong and overseas to provide Golf Management training offering Golf Business Certificate/Diploma courses, as well as a 4-year Degree Programme in Golf Management. The Programme delivery options include a combination of on-site at KSC golf courses using KSC staff and facilities for practical work and training; off-site delivery at partnering institution campus, and on-line.
- Coaching Pathway – The Academy will offer specific programmes on high performance coaching skills and knowledge, especially for KSC's own teaching professionals who will need training to enhance their skills set to deliver elite coaching under the Golf Academy.
- Golf Outreach Programme – The Golf Academy seek partners to introduce the game to, and develop the skills of primary and secondary school students as part of their regular physical education programmes or to youths through community organisations.
- Golf Academy Accommodation – A total of 79 rooms will be available to support the operation of the Golf Academy.

E.3 Continuous Environmental Improvement

From the opening of the original facility in December 1995 to date, the Project Proponent has carried out environmental and ecological monitoring that demonstrate operations have improved water quality and enhanced the ecological carrying capacity of the island. Ongoing management has increased the native bird population, dragonfly, reptile, amphibian and mammal species. The latest annual ecological monitoring report[5] confirms the ecological improvements over time.

[5] Annual Monitoring Report for the Kau Sai Chau Golf Course October 2012.

In 2005, KSC was the first golf course in China to be certified as an Audubon Co-operative Sanctuary for Wildlife, it was winner of the Asian Golf Course Environmental Award at the Asia Pacific Golf Development Summit in 2008 and in November 2011 became the first golf course in Asia-Pacific to achieve internationally recognised sustainability certification from the Golf Environment Organization.

Corporate responsibility extends into the operations of the golfing facilities. A closed loop drainage system collects rainwater falling within the boundary of the golf courses and directs it to a reservoir on site where it is recycled as irrigation water removing any reliance on external potable water. KSC also operates a fleet of solar powered golf carts and operates the first hybrid solar powered electrical / ultra low sulphur diesel powered ferry fleet in the world.

E.4 Scale of the Project

The Project will occupy about 10ha of land within the existing South Course. The existing courses occupy approximately 250ha. There will be conversion of around 1.5ha of non-managed to managed turf for Golf Academy practice areas and the Golf Academy will occupy about 0.5ha. A new 600m long road will link the Golf Academy to the existing Jetty / Clubhouse road. The remaining areas comprise modification of four existing holes to wrap around the Golf Academy and its practice areas.

The Golf Academy comprises the front block and the rear block with a building footprint of 0.5ha[6]. Overnight and day users of the Golf Academy (including staff, students and golfers) will number about 310 people per day. Existing use of KSC facilities is about 860 people per day. The front block of two storeys (plus one basement in the western portion of the block), incorporates classrooms, practical training environments for golf training and learning, canteen and overnight student accommodation and open directly onto golf practice areas. The rear block of three storey building provides accommodation for staff and overnight hostel accommodation. The height of the buildings varies from approximately 7.6m to 17.6m from ground levels due to undulating topography of the site.

In terms of construction, only standard equipment and plant and equipment consistent with construction of a standard, low-rise reinforced concrete building and earthmoving to modify and re-landscape four holes will be used.

E.5 Planning and Implementation Programme

It is anticipated that work would start on site in Q1 of 2014. It is planned to sod turf rather than seed the fairways and tees to reduce the amount of time that there is open ground. Modification of the four existing holes will be completed in early Q4 in 2014. Work on the Academy and practice areas is scheduled to commence in Q3 2014 with completion in Q4 2015.

[6] The existing administration building and maintenance facility occupy a footprint of about 0.95ha.

E.6 Conclusions of the Assessment

Standard construction mitigation will be applied to the works and with the remoteness from noise and air quality sensitive receivers no adverse impact is anticipated. On water quality, all works for the Project are within the catchment of a closed loop drainage system, where all run off is collected by and drained to the main reservoir via small ponds and lakes. Water is recycled onto the golf course via the closed loop irrigation system. Barges will bring construction materials to the site on average two occasions each week. Deliveries will be into the existing jetty at a point where materials are currently delivered. This delivery practice has operated without incident since the jetty was constructed in 1995.

In terms of operation, the Golf Academy is a public teaching and training facility and no noise and air quality impacts are anticipated. The existing wastewater treatment plant will be expanded to accommodate Golf Academy flows. Discharge into the closed loop drainage system will not increase nutrient loading on this system. The treated water will be reused for water flushing and irrigation for the area associated with the Golf Academy, the potential of surplus effluent leading to an overflow of the existing reservoir is considered to be low. Cut and fill materials will be balanced to minimise waste generation. Visual impact will be slight as buildings are limited to three storeys (ranged from approximately 7.6m to 17.6m from ground levels due to undulating topography), designed to blend with the existing environment and most receivers with line of sight are located over one kilometre from the Project Area. Operational management of the turf grass will follow a Turf Grass Management Plan, prepared for the original North and South courses, refined and operating successfully for over 20 years and targeted at minimising pesticide use. All turf grass associated with practice areas and realigned holes are within the closed loop drainage system.

Ecological features have benefited from the management approaches on KSC by the Project Proponent. The area occupied by the Golf Academy was extensively reworked during the construction of the South Course and construction has been designed to minimise footprint. On its completion, areas within the Golf Academy boundary not occupied by impervious or turfed areas will recreate native conditions. Therefore, impact on ecology is anticipated to be beneficial.

Landscape impact during construction is expected to be moderate adverse due to temporary loss of vegetation. However, such impact is temporary and will be mitigated to insubstantial in the operation phase by reinstatement and compensatory planting.

An Environmental Monitoring and Audit (EM&A) programme will be implemented during the construction and operation of the Golf Academy as outlined in Appendix I.

It is concluded that construction and operation of the Golf Academy on Kau Sai Chau will have minimal impact on the environment and will not create a change to the environmental conditions or

environmental outcome described in the original EIA (EIA-037/BC)[7] for the Kau Sai Chau project and the EIA Report approved under the EIA Ordinance (EIAO Register No.: AEIAR-091/2005)[8].

[7] Environmental Impact Assessment Reports Placed under Section 15(1)(f) of the Ordinance - EIA-037/BC

[8] EIA Reports Approved under the Ordinance - EIAO Register No.: AEIAR-091/2005

1. Basic Information

1.1 Project Title

The Title of this project is:

"**Kau Sai Chau Golf Academy**" (hereafter referred to as "The Project").

1.2 Project Description and Nature of the Project

The North Course was opened in December 1995, the South Course in 1996 and the East Course in 2008. Development of the North and South Courses was carried out before enactment of the EIA Ordinance (EIAO), the project is classified as exempted project, but a full Environmental Impact Assessment was carried out (EIA-037/BC)[9]. In 2008 a third course was opened on the east side of the island. The East Course included an Environmental Impact Assessment carried out to an EIAO Study Brief (AEIAR-091/2005)[10]. The Project represents development within the North and South Courses, assessed in EIA-037/BC.

The Project comprises:

- Construction of a Golf Academy (with access road) in two blocks of teaching areas, supporting facilities and overnight hostel accommodation;
- Golf practice areas immediately in front of the classrooms to support teaching and training;
- Modification of South Course hole 11 and minor modification of South Course holes 12 to 14 to wrap around the Golf Academy; and
- Upgrading of the sewage treatment plant to accept Golf Academy flows.

This project is considered as material change to an exempted project with physical addition or alteration to the designated project that results in no adverse impact with mitigation measures in place. The designated project by virtue of Items F.4 and O.1 of Schedule 2 of EIAO:

Item F.4 specifies: "*An activity for the reuse of treated sewage effluent from a treatment plant.*"

Item O.1 specifies: "*An outdoor golf course and all managed turf area.*"

This project profile in accordance with Annex 2 of EIAO-TM is prepared for the direct application for an environmental permit under Section 5(10) of the EIAO.

1.3 Name of the Project Proponent

The Project Proponent is **The Hong Kong Jockey Club** (HKJC)**.** The Project will be operated by the Jockey Club Kau Sai Chau Public Golf Course Ltd. (JCKSCPGCL), an independent company set up by HKJC to manage and operate the golf facility on Kau Sai Chau.

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[9] Environmental Impact Assessment Reports Placed under Section 15(1)(f) of the Ordinance - EIA-037/BC

[10] EIA Reports Approved under the Ordinance - EIAO Register No.: AEIAR-091/2005

1.4 Contact Persons

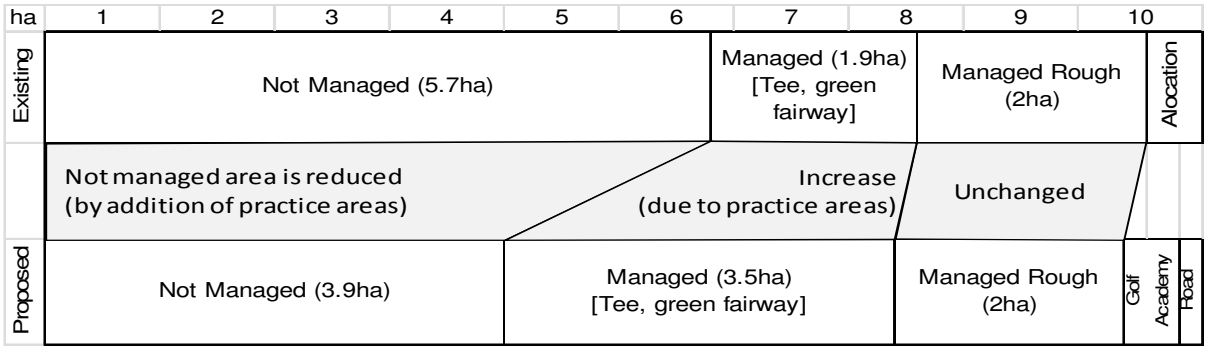
Environmental Consultant	Project Proponent
Mott MacDonald Hong Kong Limited 20/F AIA Kowloon Tower Landmark East 100 How Ming Street Kwun Tong, Kowloon Hong Kong	The Hong Kong Jockey Club One Sports Road Happy Valley Hong Kong
Ms Julia Chan	Mr Andrew Morrison
Tel No. 2828 5769	Tel No. 2966 7201

1.5 Location of the Project

The Golf Academy will be located on Kau Sai Chau Island, Port Shelter, Northeast New Territories shown in **Figure 1.1**. The Project is in the centre of the island within the existing South Course.

1.6 Scale of the Project

The Project will occupy about 10Ha of land within the existing South Course. The existing courses occupy approximately 250ha. There will be conversion of around 1.5ha of land that currently has no management to managed turf for Golf Academy practice areas and the Golf Academy will occupy about 0.5ha. A new 600m long road will link the Golf Academy to the existing Jetty / Clubhouse road. The remaining areas comprise modification of four existing holes to wrap around the Golf Academy and its practice areas. The following sketch shows how land is reconfigured.



The Golf Academy comprises 2,000m² of teaching space, 2,700m² of accommodation and 500m² of supporting facilities in a footprint of 5,000m² (0.5ha). In comparison the existing Kau Sai Chau administration and maintenance facility occupy 6,500m² and 3,000m² respectively (0.9ha) within the 250ha of existing golf course development. The two storey front block contains the teaching areas and overnight student accommodation; the three storey rear block is set into the hillside and comprises instructor and hostel accommodation (building height ranged from 7.6m to 17.6m from ground levels due to undulating topography of the site). Daily occupancy of the Golf Academy facilities will be approximately 310 staff, students and golfers compared to the 860 staff, golfers and visitors who currently use Kau Sai Chau facilities each day.

Existing tees, fairways, bunkers and greens on holes 11 to 14 will be adjusted to wrap around the Golf Academy. The following table identifies the works required and **Figure 1.2** the locations.

Table 1.1: Details of the Hole Realignments and Practice Areas

Hole	Existing Situation	Future
11	Short hole falling within footprint of Golf Academy	Realigned 200m south. Becomes a tee and green without intervening fairway
12	Existing tees become greens for hole 13.	New tees constructed close to hole 11 green.
13	Existing green becomes tee for hole 14	New green replaces old tees of hole 12.
14	Existing tees realigned south to accommodate practice area	New tees replace old green of hole 13.
Practice North	Scrubland / upper section of driving range	Driving and practical areas immediately in front of the Golf Academy (direct access).
Practice South	Access tracks and scrubland south of Hole 13	Putting practice area, immediately behind Golf Academy

In order to optimise the footprint and reduce earthworks, HKJC has requested that Lands Department vary the Kau Sai Chau Government Land Allocation (No SK446) by extending the southern boundary (See **Figure 1.2**) to add a strip of land of approximately 120m by 30m (0.4ha) to realign the tees and green on hole 11 so that the golfer drives from the tee onto a target fairway and green. The land between the tee and hole will be returned to natural vegetation. On completion of realignment, over 75% (0.3ha) of the extended land allocation will be returned to natural vegetation. This is considered to be a minor change to the existing conditions.

1.7 Current Project and the Original Approved EIAs

This section compares the Project with the elements assessed in the EIA for development of the North and South Courses and the East Course assessed in Environmental Impact Assessments EIA-037/BC and AEIAR-091/2005 respectively.

Table 1.2: Comparison of Elements in the Project with the original EIAs

	Element	In the Project	In EIA-037/BC	In AEIAR-091/2005
Onsite	Turf Grass	South Course: 4 holes realigned 350yds (120, 22, 142, 66) (3%) Hole lengths unchanged	North and South Courses: 36 Holes 12,598 yds (5906 & 6692 yds) and Practice Range (4.8Ha)	East Course: 18 holes 7,000 yds
	Access Road	Additional 600m	900m	N.A.
	Buildings	Golf Academy (0.5ha)	Administration (0.7ha) Maintenance (0.3ha)	Desalination plant Extension of the administration and maintenance buildings
	Wastewater Treatment Plant	Total sewage generated: approx.145.3m³/day Additional 80m³/day capacity	150m³/day	Additional 75m^3/day (Maximum capacity of 225 m³/day)
	Drainage System	No change - closed loop	Self Contained (closed loop)	Self Contained (closed loop)
	Turf Grass Management Plan	Additional 1.5ha (0.6%)	250ha	Additional 40ha

	Element	In the Project	In EIA-037/BC	In AEIAR-091/2005
	Visitors to the Island	Additional 310 (35%)	1440 (including ~30 staff based on island)	N.A.
Offsite	Barging Point	Temporary	Temporary	Temporary

Note: (i) The EIA for development of the North and South Courses refers to EIA-037/BC; the EIA for development of the East Course refers to EIA-115/2005.

It was concluded in EIA-037/BC and AEIAR-091/2005 that with the recommended mitigation measures applied, no unacceptable residual impacts are anticipated. These recommended mitigation measures include the following, which will also be adopted for this Project as environmental protection measures where applicable:

- Dust control measures during construction;
- Protective measures to prevent silt migration during construction;
- Proper waste management and control;
- Turf grass management plan;
- Reuse of treated effluent for irrigation; and
- Compensatory planting and habitat reinstatement.

1.8 Site History and Ecological Improvement

1.8.1 Site History

During 1939 to 1975, Kau Sai Chau was an artillery target practice range. The northeast tip of the island has historically been used as a burial site. These land uses created conditions where fires and physical damage to topsoil led to significant erosion on the north end of the island. Construction of the Golf Courses re-contoured these badly eroded sites and served as an effective firebreak reducing incidence and impact of hill fires.

1.8.2 Ecological improvement

The environment on Kau Sai Chau has been monitored continuously since initial Golf Course construction was completed in 1995. The latest annual ecological monitoring report (to June 2012) notes that wildlife habitats have recovered from historic erosion and fire damage, and many species of native flora and fauna have re-colonised the island.

The number of wildlife species has increased rapidly since 1995. Species of butterflies have increased from 14 to 61, dragonfly species from 8 to 40, reptiles and amphibians from 4 to 18 and mammal species from 6 to 11 (including Barking Deer, Chinese Porcupines, Masked Palm Civets, Small Indian Civets, and Wild Boar). Eight snake species now occur on northern Kau Sai Chau, where none was recorded in pre-golf course studies. The bird species list now includes 155 species which represents 34% of the total number of species recorded in Hong Kong since the mid-1940s compared to less than 30 recorded in pre-golf course studies.

Mangrove restoration below the reservoir dam, constructed to provide irrigation water for the golf courses, mitigated habitat losses. It has also allowed enabling colonisation by species that were not planted as part of the mitigation efforts in 1994, including mangrove-associated species along the backshore zone.

Created wetlands are prominent features of the Kau Sai Chau golf course landscape providing both habitats for wildlife and purification of treated wastewater as part of the closed loop drainage and irrigation system. The waterbirds, reptiles, amphibians and fish in these wetlands are evidence that management created and maintains quality habitats for freshwater flora and fauna.

1.8.3 Consideration of Alternatives

The Proponent committed to developing a training establishment on Kau Sai Chau in the initial EIA (EIA-037/BC), referred to a Golf Centre for the public. Before the East Course was constructed, a Memorandum of Understanding was signed with Government that for the benefit of the community and further development of the sport of golfing, steps would be taken to establish a public facility, such as a Golf Academy.

For logistical reasons the Golf Academy should be close to the existing Administration Building but separate to create an identity and remove unnecessary distractions. The proposed location also has the advantage of using the same driving range space for the Administration Building and the Golf Academy. The proposed Golf Academy is strategically located in the middle of the land facing the existing Administration Building such that the hitting bays of Golf Academy and Administration Building are facing each other and share one driving range. This maximize the efficiency and usage of existing driving range and also reduce the project area for building a new driving range for Golf Academy. The site selected within the South Course is the only practical option to develop a facility on the island. Offsite locations would remove the opportunity to provide direct access to existing golfing facilities and efficiently use the site.

Layouts of the Golf Academy and its practice areas have been investigated but the option selected represents the location and design that minimises: earthmoving; impact on trees; hard footprint of buildings and access ways and changes to existing turf grass.

The maximum building height of 17.6m above ground level happens at the rear block. In fact, the rear block consists of 3 accommodation storeys at 3.5m floor-to-floor height each only. The reason for the 17.6m building height is due to the allowance of a 7-metre landscape planting zone and the design to reduce cut and fill. The 7-metre landscape planting zone proposed between the drop-off area on ground floor and the rear block is to integrate the building with the landscape context of the site. To create the landscape zone by building set-back on the sloping site, the extent of site formation and associated disturbance is reduced by raising the lowermost accommodation storey to 6.5m above ground. The lowermost accommodation floor of the rear block is connected to the ground by circulation stair and lift core and a very modest-sized lobby.

Stepping of height for the rear block is proposed for staff and golfers' accommodation (segments 7 to 11). Further lowering of the building height for the rear block by either further excavation into the soil or more spread-out of the building footprint is reckoned to have negative environmental impacts. Further soil excavation to lower the building would be encroaching into the solid rock and generate substantial amount of construction and demolition (C&D) waste which is undesirable from environmental point of view.

At close range of the proposed Golf Academy building, the height of existing Administration Building is more than 20m high with 2 storeys and 1 basement. The proposed Golf Academy building is highly compatible with the surrounding environment.

To be harmonized with the rural setting, the overall building mass is divided out into 11 segments connected by open-air bridges to better adapt into the topography. The undulating feature roof line and stepping accommodation blocks create dynamic height profile to echo with the mountain ridge behind. Delicate in-out / localized set-back of façade design further breaks down the scale and avoids making a monotonous and urban-like building. Green planters, climbers on buildings' end walls and big trees are proposed at specific locations to blend the building with this tranquil site full of greenery.

The proposed multi-purpose room / sports hall aims to serve as a recreational facility for multiple sports and events. It also supports activities of the accommodation guests. The multi-purpose room / sports hall is designed to have a clear headroom of 7.5 metres for a badminton court for normal leisure / training use rather than the 9-metre international competition standard. This enables the reduction of the visual building bulk of the space.

2. Planning, Implementation Programme

2.1 Implementation Programme

The construction of the Golf Academy, practice areas and realignment of four fairways is proposed to commence in Q1 2014 with anticipated construction of 22 months (**Figure 2.1**).

		2014				2015			
		Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
Holes 11 - 14	Earthworks								
	Shaping and Turfing								
Golf Academy	Site Formation								
	Substructure								
	Superstructure								
	Mechanical and Electrical installation								
	Interior Fitting Out								
Practice Areas	Earthworks								
	Shaping and Turfing								
Related Works	Access Road								
	Wastewater Treatment Plant Upgrade								

Figure 2.1 Preliminary Implementation Programme

Three construction Zones (see **Figure 2.2**) with specific activities are identified as:

- Zone 1 – Modification of holes 11 - 14 around the Golf Academy and its practice areas;
- Zone 2 – The Golf Academy; and
- Zone 3 – A works area for the Contractor on the existing driving range and a transfer area at the landward end of the existing jetty where barges will transfer construction material.

Initial works will concentrate on the modification of holes 11 - 14. Earthworks will last around two to four months in each of the three construction zones. All cut material (approx 52,000m^3) will be used onsite as fill material (original EIA allowed 800,000 m^3). There will be no net import or export of earthmoving material. Earthmoving will be followed by shaping and planting of four months. Like the East Course, it is planned to sod turf rather than plant seed to reduce the amount of time that there is open ground. Work on the modification of holes 11 - 14 are scheduled to be completed in early Q4 2014.

Work on the Golf Academy substructure is scheduled to commence in Q4 2014 with construction for a period of 13.5 months for completion in Q4 2015.

2.2 Construction Plant for the Works

2.2.1 General

There are two aspects to the works: (i) earthworks comprising bulk earthmoving for modification of holes 11 to 14 and Academy practice areas and shaping and planting; and (ii) construction of the Golf Academy structure and fitting out and sewage treatment plant upgrade.

2.2.2 Earthworks

The works will not require special equipment other than standard earthmoving equipment.

Earthworks will include stripping and storing of topsoil for reuse, bulk excavation using excavators, haulage to fill locations, or stockpiles, and grading works with bulldozers. In the event of rock being encountered it will be broken down using excavator mounted pneumatic breakers. Suitable precautions and preventive measures for the discovery of buried or abandoned ordnance during the construction will be made. The earthworks will be carried out on three fronts corresponding to the north-west, north-east and south-east areas of the site. Material excavated will generally be moved to the centre and the west of the site where filling operations take place. A water bowser will be on site to ensure areas are dampened to reduce the potential for dust blow.

Turf grass establishment will use small lorries to transport sod grass to the planting area placed by hand. Small hand held mechanical tools will also be used in this operation. During planting, trees and shrubs will be established. This operation will require a small excavator to create a planting hole and light vehicles to transport trees and shrubs to the planting location.

2.2.3 Golf Academy Construction

The works will not require special equipment other than standard Powered Mechanical Equipment (PME) common to Hong Kong construction projects. The Golf Academy will be constructed with plant and equipment associated with construction of a low-rise reinforced concrete building. Pre-cast concrete construction was considered but size of the development and the island location suggests that it will not be a practical option. If appropriate, precast beams and panels may be used in the structure. Under engineering conditions that apply to Kau Sai Chau, no percussive piling work will be carried out. Mini piles, using a boring machine, may be considered in the final design of the Project.

Strip foundations will use small excavators and handheld equipment to construct formwork. A bar bender will cut and bend steel for the reinforced concrete and a concrete mixer truck will supply concrete from the batching plant located in the works area described below. A new sewage pipe will connect the Golf Academy to the existing wastewater treatment plant and electrical and telecommunications cabling will be laid to the existing switch room and substation located at the existing administration building via the existing driving range / works area. A water pipe will be laid from the Golf Academy to existing supply pipework on the jetty / clubhouse access road, at its junction with the new access road. Pipe and cable routes are identified in **Appendix A**.

Building construction requires erection of scaffolding, construction of formwork to create columns, beams, floors and ceilings. External and internal walls and infill panels will be formed in blockwork. Equipment will include electricity generators, hand held power tools, excavators, cranes, vibratory pokers for concreting activities and delivery trucks. Pipework, for water supply and sewerage transfer and electrical and telecommunications cabling, will use a small excavator to excavate and backfill shallow trenches and a lorry to bring equipment to the working area. The routings are within the Project area (See **Appendix A**)

2.2.4 Concrete Batching Plant

Due to its island location a small concrete batching plant will be required for construction. While the precise details are not known it is assumed that a small, self-contained batching plant will be erected and operated within the Contractor's compound (on the existing driving range – see **Figure 2.2**). The total volume of concrete required will be approximately 6,000-7,000m³ for the access road and Golf Academy site formation work and 7,000m³ for the Golf Academy buildings and ancillary structures. This assumes insitu construction of columns and beams, floor slabs (if not precast) and structural topping. Over the eleven months construction the plant could generate around 50 to 60m³ per day or the equivalent of less than one 6.0m³ concrete mixer truck delivery each hour. All deliveries of concrete from batching plant to final placement will be within the Project area. The existing access road will not be used. Modern batching plants are designed to avoid fugitive emissions and the stockpiles will be enclosed, covered and damped down when required. Cement will be transported from the mainland in bags on pallets, wrapped to ensure no dust emission during transport. At the batching plant cement will transferred under controlled conditions to an enclosed hopper. No adverse impact due to dust emission is anticipated.

2.2.5 Temporary Barging Point

To deliver construction material onto the island a barge transfer point will be required. The intensity of barging activity will be low (predicted to be average two movements per week) and it is proposed that the existing jetty is used. It is close to the site of construction activity and has been operated for the purpose of unloading materials for golf course operations without incident since Kau Sai Chau commenced golfing activities in 1995. During the period of operation there have been no incidences of accidents or spills of material during transfer. Opening an alternative site for temporary barging will create new and additional impacts including: work in currently undisturbed marine zones; construction of new temporary accesses and demobilisation on completion of works. Therefore, an alternative dedicated barging point is not preferred and has not been pursued.

Ferry access to the jetty must be maintained and if golf course visitors (pedestrians) and construction vehicles share the same main jetty, there are potential safety issues. Therefore, current practice of using an area at the landward end of the jetty for barging will be followed. A temporary platform will be constructed above the high water mark to allow material to be transferred from barges onto trucks with temporary staging at the jetty for onward transfer to the contractor's compound. The temporary platform will be constructed above the high water mark; there will be no works in the inter-tidal zone.

2.2.6 Sewage Treatment Plant Upgrade

The proposed upgrading works for the sewage treatment plant (STP) will be carried out entirely within the footprint of the existing sewage treatment plant area (see **Figure 2.3**). The works will not require special equipment other than standard PME common to Hong Kong construction projects. The arrangement of STP upgrade is shown in **Appendix D.7** with details of the operation of the STP discussed in **Section 4.4.2**.

3. Elements of Surrounding Environment

3.1 Introduction

The potential impacts associated with construction and operation of the Golf Academy have been assessed to the criteria listed in Annexes of the Technical Memorandum on Environmental Impact Assessment Ordinance (EIAO). Potential environmental issues during the construction and operation phases include air quality (dust), noise, water quality, waste management, ecology, landscape and visual outlook and cultural heritage.

3.2 Air Quality

3.2.1 Background Air Quality

The Project area is rural; the only activities are golf course operations on the northern part of the Island and Kau Sai Chai Village at the southern tip of the Island. There are no air quality monitoring stations operated by the Environmental Protection Department (EPD) at Kau Sai Chau or in the immediate area. Sha Tin fixed air quality monitoring station is the nearest station (about 10 km from Kau Sai Chau) from the Project. It is in a different airshed and reflects an urban environment not typical of Kau Sai Chau. A rural environment is considered more appropriate.

3.2.2 Air Sensitive Receivers

Three air sensitive receivers (ASRs) have been identified within a study area 500m from the site boundary. The ASRs are the existing golf course, the Administration Building and maintenance building on site. Beyond 500m three ASRs are identified as the unoccupied village of Yim Tin Tsai, a campsite on north Kau Sai Chau and Kau Sai Chau Village, which are all over 1000m from the site. ASRs within the golf course could be subject to air quality impact arising from construction phase activities of the Project. Operation of the Golf Academy should pose no air quality impact. The original EIA predicted no impact on sensitive receivers as Kau Sai Chau was uninhabited.

The details of the representative ASRs are shown in **Table 3.1** and the locations are shown in **Figure 3.1**.

Table 3.1: Representative ASRs during Construction Phase

ASRs	Description	Type of Use	Distance from works (m)	Assessment
A1	Existing golf course users	Walk / drive past	20+	No[(i)] – low exposure
A2	Existing Administration Building	Office	72	No – enclosed space
A3	Existing Maintenance Building	Office	90	
A4	Yim Tin Tsai Village (unoccupied)	Residential	1400	No – too distant from Works
A5	Louisa Landale Campsite	Hostel / Campsite	1000	
A6	Kau Sai Chau Village	Residential	2400	

Note: (i) Golf course users could potentially be adjacent to the works area. However, the closest tracks / playing areas are more than 20m from the site boundary and these ASR are only exposed for very short periods when adjacent to works.

3.3 Noise

3.3.1 Baseline Conditions

The existing environment at Kau Sai Chau is quiet / rural. The noise environment is characterised by marine traffic and activities associated with golf course operation.

3.3.2 Noise Sensitive Receivers

No Noise Sensitive Receiver (NSR) is identified within a study area 300m from the site boundary. The existing Administration Building where staff and golfers work or congregate with acoustic insulation offices and as community uses are considered as noise tolerant uses. The representative NSRs are at least 1,000m away from the works boundary are shown in **Table 3.2** and the locations are shown in **Figure 3.1**.

Table 3.2: Representative NSRs during Construction Phase

NSRs	Description	Type of Use	Distance from works	
N1	Administration Building	Office	72m	No assessment – Considered as tolerant uses
N2	Kau Sai Chau Village	Residential	2,400m	Not appropriate for assessment – too distant from Works site
N3	Yim Tin Tsai Village (unoccupied)	Residential	1,400m	
N4	Louisa Landale Campsite	Hostel / Campsite	1,000m	

Three NSRs greater than 300m from the site are Kau Sai Chau village (south end of Island and completely screened by topography), the Louisa Landale campsite and the unoccupied village located at Yim Tin Tsai.

There will be no noise impact due to the construction of the Project as there will be no noise sensitive receivers within 300m assessment boundary. Given the functions of the Golf Academy, no operation phase impact is anticipated.

3.4 Water

3.4.1 Closed Loop Drainage System

The Golf Academy and realignment of holes 11 to 14 are in the centre of Kau Sai Chau Island and all activities associated with construction are within a catchment that can only drain into the closed loop drainage system[11]. **Appendix B** includes a drawing showing the subsurface drainage on completion showing all Project facilities within the closed catchment.

The drainage system collects all overland and subsurface drainage and passes it through lake features to the reservoir. From the reservoir, water is re-circulated for reuse on the golf course through the closed loop irrigation system. For this reason, migration to the marine environment of any material deposited within the Golf Academy catchment is extremely unlikely. **Figure 3.2**

[11] One area is outside the closed loop drainage system catchment. This is the lower 50m of the new Golf Academy access road. It is discussed elsewhere.

shows how the closed loop drainage and irrigation system operates. Cross sections in **Appendix C** indicate how the water falling within the catchment is directed into the site drainage system. There is no opportunity for offsite migration.

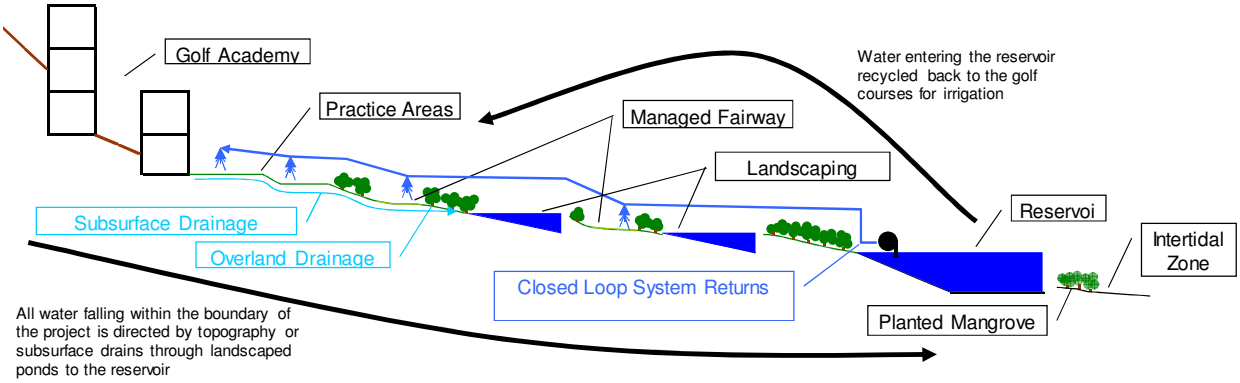


Figure 3.2 Schematic of the Closed Loop Drainage and Irrigation System

3.4.2 Turf Grass Management Plan

A Turf Grass Management Plan (TGMP) has operated since the opening of North and South Courses in 1995. The TGMP was adjusted in 2005 to accommodate differences in management approaches for the East Course that used seashore paspalum turf grass where bermuda turf grass was used on the North and South Courses. The best defence against pest invasion is a healthy turf and cultural practices that favour turf growth over pest occurrence have been adopted and are enshrined in the TGMP. The TGMP defines the need to minimise application of fertilizer, fungicides and pesticides, only use herbicides in extreme conditions when persistent weeds need to be removed, only use products that are registered with AFCD under the Pesticides Ordinance (Cap. 133) and as far as possible spot spray to reduce chemical use. KSC have carried out a comprehensive water quality monitoring program since operations commenced and there has been no detection of any chemicals in the fresh water bodies within KSC since 1995. In fact the variety and numbers of fresh water habitat species such as dragonflies, frogs, and butterflies has steadily increased since commencement of operations at KSC, demonstrating an improvement in the water quality of the freshwater habitats within KSC due to the operations of the Golf Course.

3.4.3 Existing Water Features

No permanent water features are identified in the Project Area. Site visits in October 2012 (wet season) and January 2013 (dry season), identified two drainage features shown in **Figure 3.3**. Flows occur for short periods after a rainfall event together with some temporary ponding. Downstream, flows enter the subsurface closed loop drainage system. This first feature is located in the northern half of the Project Area, it is small (width from 0.1m to 0.3m), had low basal flow and shallow water depth (less than 0.1m) in most of the reaches. At the downstream end it enters the closed loop drainage system. A separate water feature originates upstream (south east) of the Project Areas in an open channel, it is piped under a track and fairway then enters the closed loop drainage system.

Potential water quality impacts could arise from the discharge of construction run-off, effluent from dewatering activities, implementation of dust suppression measures and, potentially, sewage effluent generated by the workforce during the construction phase. The Contractor is required to implement good site practices and appropriate mitigation measures as stipulated in Technical Memorandum on EIAO. With these measures in addition to the closed loop drainage and irrigation system that will intercept all drainage within the Project Area, it is anticipated that there will be no adverse water quality impact.

3.4.4 Sewerage and Sewage Treatment

As mentioned in **Section 1.6**, the daily occupancy of the Golf Academy facilities will be approximately 310 staff, students and golfers compared to the 860 staff, golfers and visitors who currently use Kau Sai Chau facilities each day. There will be an additional 145.3m^3/day of sewage to be generated by the new Golf Academy, which required an additional of 80m^3/day capacity of the current sewage treatment system. **Appendix D.2** shows the calculations of additional sewage generated and water demand.

The existing sewage treatment plant (STP) will be expanded to accommodate Golf Academy flows (**Appendix E.3 Plate 6**). All treated effluent from the STP will be directed to the existing reservoir for reuse and recycling as golf course irrigation water or as flushing water. The valves, joints and pipes for transporting the treated effluent will be clearly distinguished from those for potable water or sewage to avoid potential health and hygiene problems associated with incorrect connection of pipes.

The proposed upgrading works of the STP will be designed to conform to the same water quality parameters as is currently in place for the existing discharge content, which is also in line with the required standards stipulated in the Technical Memorandum Standards for Effluents Discharged into Drainage and Sewerage systems, Inland and Coastal Waters (EPD, 1991) under Group B inland waters with beneficial use as irrigation and summarised in **Table 3.3** below.

Table 3.3: Criteria for Treated Effluent

Parameter	Unit	Final Effluent
BOD_5	mg/l	20
COD	mg/l	80
Suspended solids	mg/l	30
Nitrate + Nitrite Nitrogen	mg/l	30
Ammonia Nitrogen	mg/l	5
E. Coli	count/100ml	100

Assuming the treated sewage effluent has 100% recovery of the sewage quantity, the flushing water requirement for 310 staff and visitors with 0.07 m^3/day/head (under Water Services Department requirement) is 21.7 m^3/day. The irrigation requirement for the Golf Academy building landscape area and practice area are approximately 32.0 m^3/day and 52.0 m^3/day respectively. The total water demand of flushing and irrigation water is approximately 105.7 m^3/day. There will be a surplus of (145.3 – 105.7 m^3/day) approximately 40 m^3/day effluent going to the reservoir. The most conservative result (with details in **Appendix D.2**) indicated an excess of approximately 123.6 m^3/day effluent will be generated by the STP and discharge into the reservoir during the wettest months of the year (between April and August) without the need for extracting water from

the reservoir for irrigation. This represents 0.027% of the full reservoir volume or a rise in approximately 53mm level, the change is considered to be negligible. Also, the increased chances of having an overflow of treated effluent in the reservoir to the marine environment are expected to be very low as shown in **Appendices D.1** and **D.6**. Hence, no adverse impact to the marine water quality is expected.

3.5 Waste

Construction will generate wastes that can be divided into categories based on their composition and ultimate method of disposal. The waste types include:

- Construction and Demolition (C&D) material;
- General refuse from construction activities; and
- Chemical waste from construction machinery.

Current practice at Kau Sai Chau is to source separate waste, recycle where possible and transport bagged waste to the mainland for disposal. There is no on-site disposal facility and this practice would continue after the Golf Academy is commissioned.

3.6 Ecology

Confirmatory vegetation and wildlife ecological surveys were undertaken within and in the vicinity of the Project Area during October 2012 and January 2013. In the vegetation survey, floral species encountered were identified, their relative abundance recorded and extent of different habitat types noted. There is a 0.4ha extension of the southern boundary beyond that described in the original EIA (see **Figure 1.2**). However, no special ecological features were identified during surveys conducted for the original EIA or during the current surveys. On completion of Hole 11 realignment 75% of the proposed extension will be returned to natural vegetation. Therefore the impact of the change on the existing ecology is considered to be minimal.

In the wildlife survey, birds, insects (only butterflies and dragonflies), amphibians, reptiles, mammals and freshwater fauna were identified. Surveys were conducted by direct observation of individuals with the aid of binoculars, and traces of presence such as burrows, nests, footprints and droppings.

A dive survey was carried out in May 2013 on the north side of the existing jetty where barges will unload construction materials and plant. The survey was conducted over a 50 metre radius from the eastern end of the sloping seawall encompassing the north side of the jetty, the seawall north of the barge unloading area and the (sandy) seabed. The proposed barging location is at the landward end of the jetty by the existing sand stockpile.

Plate 1: Area for dive survey – Note covered sand stockpile in background where barges unload

3.6.1 Habitat and Vegetation

Representative photographs of the habitats and floral species and relative abundance are presented in **Appendix E**. The two major existing habitat types are turfed areas (approximately 3.78ha) and shrubland (approximately 9.36ha) (**Appendix E.3 Plates 2 and 3**). A habitat map showing the existing habitats is presented in **Figure 3.4**. The turfed habitat is frequently mowed golf course grassland with some paved trails. Grass species present include *Eremochloa ciliaris*, *Eriachne pallescens* and *Sacciolepis indica*. *Lindernia rotundifolia* is also commonly observable in the turfed area.

The shrubland habitat covers all areas which do not show signs of regular mowing. These areas are mainly slopes with shrub coverage dominated by *Baeckea frutescens*, *Dicranopteris pedata*, *Lepidosperma chinense* and *Rhodomyrtus tomentosa*. Young trees, such as *Macaranga tanarius var. tomentosa*, *Glochidion zeylanicum*, *Schefflera heptaphylla* and *Zanthoxylum avicennae* are also observed mainly in the lowland areas. Other commonly encountered floral species include *Breynia fruticosa*, *Hedyotis acutangula*, *Lygodium microphyllum* and *Melastoma malabathricum*. The majority of the floral species recorded are either locally common or very common.

No floral species of conservation concern was recorded during the vegetation survey. One tree species *Ixonanthes reticulata*, is included in the current edition of the publication 'Rare and Precious Plants of Hong Kong' published by AFCD. It is at the periphery of the Project Area. This species is considered 'Vulnerable' in China but 'can be found in various localities in Hong Kong and the populations are not under any particular threat.' Specimen will not be impacted by work.

3.6.2 Wildlife

Birds

Common birds were observed in the golf course areas. Except Black Kite *Milvus migrans*, all the bird species recorded are not of conservation interest. A list of birds recorded is presented in Table 1 of **Appendix E**. Black Kite *Milvus migrans* was recorded flying over the Project Area. This species is considered to be of Regional Concern (Fellowes et al., 2002) and listed in Class II State Major Protected Animal in Mainland China. It is widespread in Hong Kong, present all year, with a population group of winter visitors (Allcock et al., 2012). Black Kite inhabits a wide variety

of coastal and inland habitats (Carey et al., 2001). These habitats are readily available in the vicinity of the Project area. No significant breeding or over-wintering behaviour for this species was noted near the Project area; therefore the potential impact on this species is negligible.

Butterflies and Dragonflies

Butterflies and dragonflies observed in the Project Area are common in Hong Kong. No species of conservation concern was recorded. The lists of butterflies and dragonflies recorded are provided in Tables 2 and 3 of **Appendix E** respectively.

Amphibians, Reptiles and Mammals

No reptiles, amphibians or mammals were recorded in the Project area during the survey.

Freshwater Fauna

Freshwater shrimps, crab and mayfly nymph were recorded in some small puddles in the drainage channel within the Project Area (See **Figure 3.3** and **Appendix E.3 Plate 4**). These species were commonly found in Hong Kong. A list of freshwater fauna recorded is shown in Table 4 of **Appendix E**.

Marine Fauna

A temporary barging point will be established on the northern / landward side of the existing jetty. Barging activity will be approximately average two barge visits per week during the peak construction activity at start up and during the building of the Academy. The survey noted a low coverage of hard corals (1-5%) on existing rip rap boulders protecting the northern side of the jetty and concentrated at the seaward end of the pier. Twenty four species were recorded including two uncommon species *Coscinaraea* sp and *Favites paraflexuosa* with the remainder common and abundant in Hong Kong (for details see **Appendix F**). No rare coral species were identified and no other marine species of conservation importance were encountered. The site selected for the barging point has historically and is currently used in a similar mode when bulky deliveries of sand, materials, equipment and operational golf course supplies are needed.

3.7 Landscape and Visual

3.7.1 Landscape Resources and Character

The landscape within the Project Area is dominated by frequently-maintained turfed areas and natural shrubland as described in **Section 3.6.1**, both of which are of low sensitivity to disturbance and highly compatible with changes. Streams are also present as a landscape resource. These landscape resources are shown in **Figure 3.3**. The landscape character of the entire Project Area is a golf course within a semi-natural rural setting. Photographs showing the existing landscape resources and landscape character are shown in **Appendix E.3 Plates 1** to **4**. 283 scattered trees with fair to good health conditions are present, mainly in shrubland, detailed in the Tree Removal Application (August 2013). The trunk diameter of the trees mainly ranges from 100mm to 200/250mm. Tree height ranges from 3m to 9m and crown spread from 2m to 12m. Dominant tree species include *Macaranga tanarius var. tomentosa*, *Glochidion zeylanicum*,

Schefflera heptaphylla and *Zanthoxylum avicennae* (for detailed findings of tree survey please see **Appendix G**).

As discussed in **Section 3.6.1**, only one floral species *Ixonanthes reticulata*, which is included in the current edition of the publication 'Rare and Precious Plants of Hong Kong' published by AFCD, is found within the Project Area.

3.7.2 Visually Sensitive Receivers

The views of the Project Area contain high quality landscape features. The Project Area on the island of Kau Sai Chau, is isolated from most visually sensitive receivers (VSRs) who are located more than one kilometre away. The exceptions are golfers and staff on Kau Sai Chau who are close to the Project Area though their sensitivity to visual changes is low due to the temporary nature of their views and availability of alternative views. **Table 3.4** summarises the description and sensitivities of identified key VSRs.

Table 3.4: Representative VSRs

Key VSRs	Number of Receivers	Viewing Distance (m)	Degree of Visibility of Project Area	Sensitivity
Staff and students at the Hong Kong Federation of Youth Group JC Sai Kung Outdoor Training Centre	Few	2500	Full	Low
Students and staff at the Hong Kong University of Science and Technology	Many	5000	Partial	Low
Students and staff of YMCA Wong Yi Chau Youth Camp	Few	2000	Full	Low
Students and staff of Sai Kung Central Lee Siu Yam Memorial School	Few	3800	Glimpse	Low
Residents of the Floral Villas	Few	3000	Full	High
Residents of Tai Wan Village	Few	4500	Full	High
Residents of Violet Garden House	Few	4300	Full	High
Residents of Sea View Villa House	Few	4500	Full	High
Residents of Villas located on the Clearwater Bay Peninsula	Medium	5500	Partial	High
Residents of Residential Towers located in Hang Hau	Many	6500	Partial	High
Residents of Siu Yat Building	Many	4000	Partial	High
Hikers and visitors on Sharp Island	Few	1000	Full	Medium
Users of Silverstrand Beach	Few	6000	Partial	Low
Hikers along Sheung Yiu Country Trail	Few	3000	Full	Medium
Golfers on the existing golf courses	Medium	20	Full	Medium
Visitors to Yim Tin Tsai and St. Joseph's Cathedral	Few	1500	Full	Medium
Visitors to Sai Kung Promenade	Many	3800	Glimpse	Low
Seaborne travellers in Port Shelter	Few	500	Partial	Low
Seaborne travellers in Rocky Harbour	Few	1200	Full	Low

3.8 Cultural Heritage

Based on desk top study and site visit conducted in August 2012, no declared monuments, graded historic buildings, sites of archaeological interest and other built heritage sites were recorded within the 100 m assessment area. However, five grave sites were recorded lie within 100 m from the works boundary (**Table 3.5** and **Figure 3.5**). Out of the five grave sites, only two grave sites are located within the proposed site area.

Grave site (G01) is situated within the footprint of the Golf Academy (**Appendix H**). The grave is in a dilapidated condition retaining only the stele of the grave. The site was visited by representatives of DLO, KSCPGCL and HKJC on 28th December 2012 and it was subsequently noted by DLO that records confirmed the grave had been abandoned, remains removed and compensation paid in 1997. The remaining parts of the grave will be removed during construction.

A second grave site (G05) is located on the west side of the existing driving range. The upper section of the driving range will be a Contractor's compound during construction and regraded on completion. No works activity will be carried out within 15 metres of the grave and no adverse impact is anticipated. There are three other grave sites (G02, G03, and G04) located in the 100m assessment boundary but outside the Project Area and no adverse impact is anticipated with good site practices for the construction works.

Table 3.5: Grave sites recorded within the assessment area

No.	Easting	Northing	Dimensions (m)		Height (m)	Distance from Site Area (m)	Remark
G01	850049.8	825014.9	5.4 x 4.0		1.6	0	Dilapidated - confirmed abandoned and will be removed
G02	850174.5	825065.4	Grave	3.6 x 3.6	n/a	37	Graves outside the proposed site area boundary and will not be affected by the works.
			Gravestone	1.8 x 0.9	1		
G03	850180.2	825060.4	Grave	2.5 x 2.5	n/a	35	
			Gravestone	0.85 x 0.85	1.0		
G04	849977.8	825231.8	4.5 x 3.2		1.7	16	
G05	850033.7	825219.1	Grave 3.0 x 2.5 approx.		n/a	0	On edge of the exiting driving range. No works will be carried out within 15m of the grave site
			Gravestone	1.0 x 0.2	1.0		

Source: 2012 Topographic survey by Wu Hil & Associated Ltd.

4. Potential Environmental Impacts

4.1 Introduction

This section describes potential environmental impacts that could be encountered during the earthworks, shaping and turfing of the golf playing areas, replanting in non-golfing areas and Golf Academy construction.

The Golf Academy and modification of holes 11-14 will not require special equipment other than standard earthmoving equipment and plant and PME associated with construction a low-rise reinforced concrete building

4.2 Air Quality

4.2.1 Construction Phase

During construction, activities will include site clearance, site formation, earth moving and construction of the foundation and superstructure of the building etc. which are classified as "notifiable" and "regulatory" work under the *Air Pollution Control (Construction Dust) Regulation*. According to the schedule under the regulation, the Contractor shall implement standard dust suppression measures to control the dust emissions level.

The principal air quality impact during the construction phase will be fugitive dust. Fugitive dust will be generated from the excavation, filling, operation of a small concrete batching plant and temporary stockpiling of dusty construction materials.

Dust emissions from the excavation and earthworks operation shall be controlled. Standard dust mitigation measures including water spaying, dust suppression chemical will be implemented before, during and after the works to maintain surface wetness.

4.2.2 Concrete Batching

It is estimated that the total volume of concrete required will be between 6,000 and 7,000m^3 for the access road and work associated with site formation and 7,000m^3 for the buildings and ancillary structures, assuming insitu construction of columns and beams, precast floor slabs and structural topping. A batching plant will be established in the Contractor's compound.

The batching plant and silo are relatively small (output rate of around 50-60m^3) equating to less than one concrete truck per hour. Concrete would be delivered to the working area by truck or concrete pump. Vehicles transporting concrete would travel directly to the placement point within the Project boundary without the need to use the existing jetty / administration building road.

4.2.3 Operation Phase

The Golf Academy is a public educational resource including overnight hostel accommodation and will not include activities with potential to generate significant, adverse air quality impact. Therefore no operational phase air quality impact from the Golf Academy is anticipated.

4.3 Noise

4.3.1 Construction Phase

No NSR is identified within the study area 300m from the site boundary. Therefore construction noise impacts are not anticipated.

4.3.2 Operational Phase

The Golf Academy is a public educational resource including overnight accommodation and will not include activities with potential to generate significant, adverse noise impact. Therefore no operational phase noise impact from the Golf Academy is anticipated.

4.4 Water

4.4.1 Construction Phase

General

Potential sources of water quality impact associated with the construction of the Golf Academy and associated works have been identified as:

- Construction site runoff and drainage;
- General construction activities;
- Sewage effluent from the construction workforce; and
- Operation of the temporary barging point.

Construction Site Runoff and Drainage

Runoff from the Project Area may contain suspended solids, contaminants and increased loads of sediments. Potential sources of pollution from site drainage include:

- Runoff and erosion from site surfaces, drainage channels, earth working areas and stockpiles;
- Release of grouting and cement materials with storm water;
- Wash water from dust suppression sprays and wheel wash facilities; and
- Fuel, oil solvents and lubricants from maintenance of construction vehicles and mechanical equipment.

An implementation plan will minimise areas of exposed earth, prevent water entering exposed areas and trap any silt before it leaves the construction area. The standard mitigation measures incorporated will ensure that there is no potential for offsite silt migration. In the unlikely event of offsite migration, the Golf Academy is sited within an enclosed catchment and all water generated

will pass into the closed loop drainage and irrigation system, detailed in **Section 3.4** and **Figure 3.2**. Any runoff would enter the subsurface drainage system and pass through landscaping ponds where silt will settle out before entering the reservoir of the island. A small area where the Golf Academy access road joins the existing road at the west end of the site falls outside the closed loop drainage system catchment. The area affected is very small (< 0.4ha). During construction, this area will be bunded to ensure no discharge to the west of the island. Any water generated within the bunded area will be captured, silt settled out and effluent pumped into the closed loop drainage catchment. There will be no possibility of discharge to the west of island and the marine environment. Therefore, adverse impacts on the marine environment are not anticipated.

General Construction Activities

On-site construction activities may result in water pollution from the following:

- Uncontrolled discharged of debris and rubbish such as packaging, construction materials, and refuse; and
- Spillages of liquids stored on-site, such as oil, diesel and solvents.

Good construction and site management practices should be observed to ensure that litter, fuels, and solvents do not enter the existing closed loop drainage system.

Sewage Effluent

Sewage will be generated from the workforce during the construction phase. However, this will be collected by temporary facilities (e.g. portable chemical toilets) installed within the construction site and directed to the existing sewage treatment plant. Therefore, sewage generated from the site would not result in any increase in impact on existing water features.

Operation of Temporary Barging Point.

A temporary barging point at the landward end of the jetty will be used to transfer construction material onto the island. The Golf Academy construction will follow the existing established practices including the provision of a temporary platform, with edge bunds. There will be no permanent storage at the jetty; unloaded material will be transferred direct to trucks for onward transfer to the Contractor's compound within the Project boundary. Loose loads will be encapsulated prior to loading onto the barge to ensure no spillage during the transfer operation, except for sand which will be transferred direct from the barge by conveyor as established practice. In addition to the bunded platform, a silt curtain will be in place during transfer operations and a spill kit will be located at the barging point. With these controls of prevention (encapsulation) and mitigation (bunding on the transfer platform, silt curtain and spill kits) in place there is no opportunity for materials to enter and adversely impact on the marine environment. Six operational practices have been identified to mitigate potential impact from spillage of loads during the transit operations, they are:

- Construction of a temporary jetty, above the intertidal zone to trap any material dropped during transfer;
- Edge bunds surrounding the transfer area;

- An impervious layer covering the transfer area, within the bunded area;
- Encapsulation of all loads with potential to spill;
- An impervious sheet laid over the gap between the temporary jetty and barge; and
- A silt curtain deployed around the barging area when appropriate.

In addition a fully equipped spill kit will be deployed on-site during any unloading activity. The following **Figure 4.1** indicates the mitigation measures.

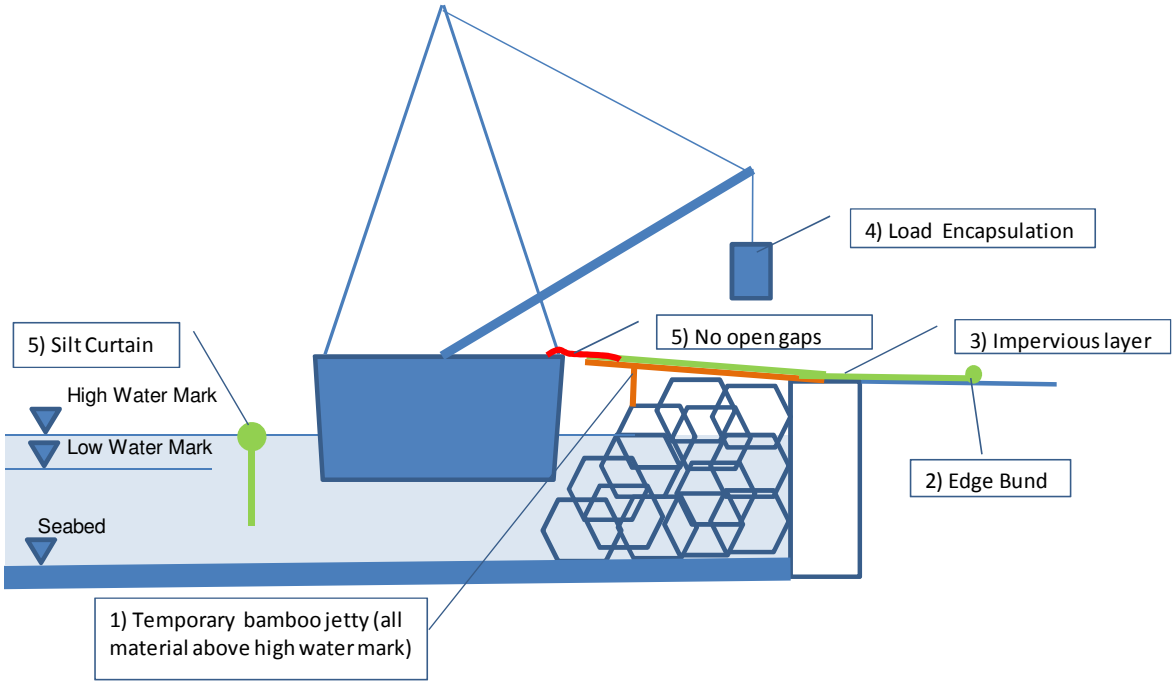


Figure 4.1 Mitigation Measures to be Deployed at the Barging Point

4.4.2 Operation Phase

The current sewage treatment plant is a combined Rotating Biological Contactor (RBC) and blivet that has proven ability to accommodate existing flows. An upgrade to accommodate the Golf Academy flows will duplicate the existing blivet process and the design will target not raising biological load in the effluent, therefore no additional impact on the existing water features is anticipated due to effluent generated from Golf Academy activities. **Appendix D.7** shows the schematic of the STP upgrade which lists out the additional components, while the dimension and schematic connection of the respective units are shown in **Appendix D.8**.

The wastewater treatment plant upgrade and commissioning would take place during the building phase of the Golf Academy (between Q4 2014 and Q4 2015), the phasing sequence of which is shown in **Appendix D.9**. The upgrade will be added in such a way that operation of the STP will be maintained, providing full coverage to the existing golf course during the upgrade works. This

upgrade sequence has been provided in full consultation with the supplier of the STP upgrade equipment.

After treatment, effluent passes to the closed loop drainage system through landscaped ponds to the reservoir where it is recycled for irrigation of the golf course. As mentioned in Section 3.4.4, the total water demand of flushing and irrigation water is approximately 105.77 m^3/day, while the sewage to be generated is approximately 145.3m^3/day, thus there will be approximately 40m^3/day surplus effluent in normal condition and 123.6 m^3/day in wettest season without the need for extracting water from the reservoir for irrigation. The potential risk that leads to the overflow of reservoir is considered to be negligible.

However, if there is an overflow event from the reservoir directly into the sea due to heavy rain storm event, no deleterious effect on the marine water of the Port Shelter Water Control Zone (WCZ) is expected, since the quality of the overflow water releasing into the reservoir at the end of the treatment process are more stringent than the requirements allowed for effluents discharged into the coastal waters of Tolo and Port Shelter WCZ. In addition, due to the dilution effect by the large water body of the reservoir, the overflow water quality shall be no worse than the quality of the existing treated effluent. Hence, no adverse impact to the marine water quality is expected.

The bottom section of the access road falls outside the catchment of the closed loop drainage system. The area affected is small (50m long by 5m wide or 0.025ha). Any water falling on the road will be directed to a grit and petrol interceptor installed as part of the project. There is no anticipated change or impact predicted on the existing marine environment.

4.5 Waste

4.5.1 Land Contamination

The works will be carried out on land that has been reworked during the formation of the South Course or is undeveloped scrubland; therefore no new sources of land contamination are anticipated. It is, therefore, anticipated that there will be no contaminated soil generated due to Golf Academy works.

4.5.2 Construction Phase

Earthworks

Cut and fill quantities have been calculated to balance, there will be no need to import or export earthworks material to / from Kau Sai Chau. Approximately 52,000 m^3 of material will be moved as cut / fill during the earthworks stage. Rock extracted will be broken down using mechanical plant and incorporated as fill within the project area, there will be no rock crushing plant used on the island.

General Refuse

The small construction workforce will generate refuse comprising: food scraps; paper; empty containers; etc. Refuse will be managed so that intentional or accidental release to the surrounding environment does not occur. Disposal of refuse on site will be to dedicated, enclosed

collection areas and bins with off-island transport to a suitable disposal facility. Standard methods of collection for site wastes will be implemented to prevent waste materials being blown by wind, flushed or leaching into the ground or creating potential odour nuisance or pest and vermin issues.

Waste management storage areas will be maintained and cleaned regularly. With implementation of standard good waste management practices, adverse environmental impacts are not expected to arise from the storage, handling and transportation of wastes from construction workforce.

Chemical Waste

Material classified as chemical wastes will require special handling and storage arrangements before removal for appropriate treatment at the licensed Chemical Waste Treatment Facility.

Wherever possible, opportunity will be taken to reuse and recycle materials. With handling, storage and disposal of chemical wastes in accordance with these standard requirements, adverse environmental impacts are not expected.

4.5.3 Operation Phase

During the operation phase, waste from the Golf Academy will be incorporated with the wastes generated from the existing golf facilities. Material that cannot be recycled and reused on-site will be bagged and regularly taken from the island to Sai Kung for disposal to a suitable facility.

4.6 Ecology

4.6.1 Construction Phase

During construction, site formation will temporarily affect both turfed and shrubland habitats. As most floral species recorded are either locally common or very common with no floral species of conservation concern recorded within and in the vicinity of the Project Area, and given that both habitat types are locally common and readily replaceable, the ecological impacts on vegetation and habitats during the construction stage are expected to be slight and acceptable.

Three trees *Ixonathes rereticulata a*re located within the Project Area but not affected by any works[12]. *Ixonathes rereticulata are* included in the current edition of 'Rare and Precious Plants of Hong Kong' issued by AFCD. The book notes status in China was "Vulnerable" and had been recorded in the China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province. Nevertheless, the AFCD publication states that this species "can be found in various localities in Hong Kong and the populations are not under any particular threat". There will be no impact on the tree species *Ixonanthes reticulata* as the three identified individuals are not affected by the works and will be retained *in situ* (Tree Removal Application dated June 2013).

Most of the fauna species (including bird, butterfly, dragonfly and freshwater fauna species) recorded within the Project area are common in Hong Kong with no conservation concern. There

[12] The three trees are located in the south west of the site.

are large areas of similar habitats available in the vicinity. Potential impact on these common fauna species is anticipated to be negligible.

There is one fauna species of conservation concern, which is bird species Black Kite *Milvus migrans,* recorded within the Project area, as mentioned in **Section 3.6.2**. For Black Kite which did not show any breeding or over-wintering behaviour within or near the Project area, potential impact on this widespread bird species is regarded as negligible.

A dedicated dive survey conducted in May 2013, identified hard corals on existing rip-rap (boulders) forming the north side of the existing jetty (see **Appendix F** for details). A temporary barging point will operate at the landward end of the jetty during the construction phase. The area selected for the barging point is currently used by barges delivering materials to the island. It is an infrequent activity occurring on average two times every three weeks. The current barging activity does not appear to be impacting on the existing coral community located towards the seaward end of the jetty. There were no corals identified at the proposed barge unloading area. Therefore no direct impact on coral, from contact, is anticipated from barge movements. An area of potential impact is spill from the barges during unloading activities. However this impact will be mitigated by requiring loose material transported to the island encapsulated in bags or containerised and specific mitigation at the barging point including construction of a temporary platform, edge bunds and an impervious layer covering the transfer area (see **Section 4.4.1** and **Figure 4.1**). This will remove potential for loose materials to enter the marine environment and therefore no impact from material dropped or spilled is anticipated. As a further precaution a silt curtain will contain the barging area during specific unloading operations. The Contractor will also be required to maintain spill kits at the barging point. Therefore no change in existing marine conditions is anticipated during construction.

4.6.2 Operational Phase

Upon completion of earthworks, the modified holes 11-14 will be turfed and compensate for the temporary loss of turfed habitat during the construction phase. For areas that are not turfed, or part of the Golf Academy building or other hard-standing areas, natural regeneration of shrubland habitat can be expected even in the absence of the proposed mitigation grass and shrub planting. Therefore, the overall impact on vegetation and habitats during the operational phase is expected to be minimal. **Figure 4.2** indicates how these areas will be returned to grasses and shrubs. **Table 4.1** summarises the changes in coverage of turfed area, shrubland and developed area

Table 4.1: Existing coverage and coverage upon completion of Project of different habitats

Habitat	Existing coverage [ha]	Coverage upon completion of Project [ha]	Change in coverage [ha]
Turfed area	3.78	6.16	+2.38
Shrubland	9.36	6.01	-3.35
Developed area	0.15	1.12	+0.97

4.7 Landscape and Visual

4.7.1 Construction Phase

Sources of potential landscape impact during construction include tree removal, vegetation clearance and site formation works. Potential impacts will mainly be on existing vegetation. However, this impact is largely temporary. The impact of the Golf Academy buildings and realignment of South Course holes 11 to 14 is relatively small in relation to Kau Sai Chau as a whole. Therefore, the potential impact on the landscape is considered slight during construction.

Within the Project Area, 283 trees were identified in a survey carried out in 2012. There are 118 trees that will be retained in-situ and 2 trees will be transplanted. The remaining 154 trees will be directly affected by the proposed works and will be felled.

Felled trees will be compensated with the planting of 269 standard and heavy standard trees with trunk diameters, at breast height, of 60mm and 100mm respectively. The aggregated trunk diameter for the 154 felled trees is 22,390mm and the total aggregated trunk diameter of the compensation planting is 22,420mm (a compensation planting ratio of 1:1.75 in quantity and 1:1 in in terms of quality). The 1:1 planting ratio, within the project area (154 trees), will maintain the existing aesthetics of the landscape comprising small groups of native trees as opposed to extensive woodland. The remaining 115 compensatory trees will be planted in eight locations on the North and South courses where there is adequate space to accommodate them. Therefore, tree planting within the Golf Academy Project Area and within other areas of the golf course will fully compensate for trees felled. A dedicated Tree Removal Application (June 2013) has been prepared for the Project.

Potential visual impacts on VSRs are expected to be insubstantial due to the long distance between the Project Area and the locations of the VSRs. Visual impacts to golfers and workers on Kau Sai Chau are considered slight given that the scale of the proposed works is small and high quality alternative views are available.

4.7.2 Operational Phase

Potential landscape impacts during the operational phase are expected to be negligible as the landscape will largely be restored to the natural high quality environment of the existing golf courses upon completion of the works.

The primary potential visual impacts of the Project during the operational phase will be the addition of the Golf Academy. This addition is considered to be acceptable as the major geomorphic features of the island, such as Tai Leng Ridge and the Central Valley, will remain intact, thus preserving the overall landscape character of Kau Sai Chau. Also, due to the long distance between the Project Area and the locations of most VSRs (over 1km), visual impacts are expected to be negligible. Potential visual impacts to golfers and workers on Kau Sai Chau are also considered insubstantial once the proposed works is completed and works areas reinstated.

4.8 Cultural Heritage

One identified grave falls within the boundary of the Golf Academy. However a site visit by DLO, JCKSCPGCL and HKJC on 28th December 2012, and subsequent document searches by DLO

have confirmed that the grave had been abandoned and could be removed. Grave site G05 is sited within the existing golf driving range, portions of which will be used as a Contractor's compound during the construction phase. However, there will be no works allowed within 15 metres of the grave site. Therefore no impact is anticipated on cultural heritage sites.

5. Environmental Protection Measures and Any Further Environmental Implications

5.1 Air Quality

5.1.1 Construction Phase

Generally, construction plant will remain within the Project Area, except for a small number of vehicles moving construction material from the barging point at the ferry pier to works area. The Contractor will implement standard dust mitigation measures to maintain emissions at acceptable levels. The Contractor shall follow the dust mitigation measures during the construction phase.

- All the dusty materials should be sprayed with water to maintain damp conditions prior to any loading or transfer.
- All dusty materials should be covered with tarpaulin or similar material during transportation.
- All the dusty materials stockpiles shall be either: (i) covered entirely by imperious sheet; (ii) placed in a three sided and top sheltered area; (iii) sprayed with water; or (iv) have dust suppression chemicals applied to the entire stockpile.
- The only unpaved haul roads are inside the works area during the earthworks phase, they shall be sprayed with water or dust suppression chemicals to keep the surface wet.
- Vehicle washing facilities shall be provided where vehicles leave the Works Area to access the ferry pier.

5.1.2 Operational Phase

No adverse air quality impact is anticipated from the operation of the Golf Academy or its practice areas. Therefore no specific mitigation measures are identified or required.

5.2 Noise

5.2.1 Construction Phase

To minimise the construction noise as far as practicable, and protect the quiet environment on the island, the Contractor shall follow good working practices during the construction phase:

- The Contractor shall comply with the statutory and non-statutory requirements and guidelines;
- The Contractor shall implement the *Code of Practices on Good management Practices to Prevent Violation of the Noise Control Ordinance (Chapter 400)(for Construction Industry)*;
- The Contractor shall submit the method of construction and method statement including the noise mitigation measures to the Engineer's Representative for approval before commencing any construction works;
- The Contractor shall ensure that all the noise mitigation measures are implemented which are identified in the method of construction and method statement.

- The Contractor shall avoid locating noisy equipment and noisy activities near to NSRs (users of the golf course). Where this cannot be avoided, suitable noise barriers should be provided.

- The Contractor should keep the number of operating PME to a minimum. Unused equipment, machinery should be turned off and using equipment and machinery in parallel shall be avoided in order to minimise the noise level.

5.2.2 Operational Phase

No adverse noise impact is anticipated from the operation of the Golf Academy or its practice areas. Therefore no specific mitigation measures are identified or required.

5.3 Water

5.3.1 Construction Phase

Potential water quality impacts primarily relate to the un-controlled discharged of sediments/ silts during the construction phase. In order to control surface runoff the Contractor should comply with the Water Pollution Control Ordinance (WPCO) and its subsidiary regulation. The key control measures proposed are:

- To reduce the period of bare ground exposure, applying turf grass “sods” rather than seeding.

The key issue is the potential impact on the marine environment. The works will incorporate bunds to prevent rainwater entering the site and interceptors and settlement facilities to trap any sediment and prevent it leaving the works area. Earthworks associated with hole realignment, the practice areas and site formation of the Golf Academy building fall within the catchment of the closed loop drainage system, therefore if silt does escape from the working area it will be collected by and drained to the 500,000m^3 reservoir via small ponds and lakes from where it is recycled onto the golf course via the closed loop irrigation system. With the closed loop drainage system accepting the entire Golf Academy catchment, no offsite migration of silty water into the marine environment is anticipated.

A temporary barging point at the landward end of the jetty will be used to transfer construction material onto the island following existing established practices. No spill incidents have been recorded since the golf courses opened. The proposed barging point will include a temporary platform, with edge bunds and erected above the low water mark, where material will pass from barge to the transit area. Loose loads will be encapsulated prior to loading onto the barge to ensure no spillage during the transfer operation. Sand which will be transferred direct from the barge by conveyor as established practice. In addition to the bunded platform, a silt curtain will be in place during transfer operations and a stocked spill kit will be available at the barging point. With these controls of prevention (encapsulation) and mitigation (bunding on the transfer platform, silt curtain and spill kits) in place there is no opportunity for materials to enter and adversely impact on the marine environment.

A small area where the access road joins the exiting jetty / clubhouse access is outside the closed loop drainage catchment. Bunds will be installed prior to any works commencing and any water falling within the areas will be first settled and then pumped into the closed loop drainage system. Therefore no offsite migration of silty water into the marine environment is anticipated.

5.3.2 Operational Phase

The permit from EPD for allowable effluent discharge is limited to 225m^3/day. Data from the HKJC shows that maximum demand for the existing facility is 160m^3/day.

Development of the Golf Academy will generate around 310 additional visitors to Kau Sai Chau, made up of 156 overnight visitors, 100 day visitors and 54 staff. This equates to an additional sewage output of 132.1m^3/day, using the methodology of the GESF of the EPD. With a 10% margin to reflect possible design development, estimated output would be 145.3m^3/day, giving a combined total of 305.3m^3/day to the existing wastewater treatment plant. This equates to the same size of modular upgrade included in 2007. Therefore, it is proposed to duplicate the last modular upgrade that is a proven technology on Kau Sai Chau in an upgrade that will take place during the building phase of the Golf Academy.

Note that there are no laundry facilities on island and this situation will not change with the development of the Academy. Laundry will be sent to the mainland for laundering. There will be a small personal laundry within the Golf Academy for the student golfers.

Operational phase management of turf grass will follow a Turf Grass Management Plan, prepared for the original North and South courses. This plan has been refined over time and has operated successfully for over 20 years. All turf grass associated with the practice areas and realigned holes of the Project will be within the closed loop drainage system catchment. Therefore no offsite impact is anticipated.

The bottom section of the access road falls outside the catchment of the closed loop drainage system. The area affected is small (< 0.4ha). Any water falling on the road will be directed a grit and petrol interceptor installed as part of the project. No adverse impact on the existing marine environment is anticipated.

5.4 Waste

5.4.1 Construction Phase

Cut and fill during the earthworks will be balanced; there will be no import or export of material. Small amounts of construction waste will be generated during construction of the Golf Academy, primarily packaging and will need to be removed from site. Waste management in the form of avoiding, minimising, reusing and recycling will be adopted in order to minimise the generation of various wastes and associated environmental impacts during the construction stage. The Contractor shall comply with the Waste Disposal Ordinance and its subsidiary regulations and implement the necessary waste management measures. The following control measures are recommended:

- All excavated material will be reused on site – cut and fill have been designed to balance.
- Waste arisings will be minimised and be handled, transported and disposed of in suitable manner.
- For off island disposal the Contractor should adopt a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill.

- Chemical waste shall be handled in accordance with the Code of Practice on the Packaging Handling and Storage of Chemical Waste.

- All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminium cans, plastic bottles etc. should be provided to facilitate reuse or recycling of materials and their proper disposal.

- Suitable precautions and preventive measures for the discovery of buried or abandoned ordnance during the construction shall be made.

5.4.2 Operational Phase

The Golf Academy will continue the current practice at Kau Sai Chau to source separate waste, recycle where possible and transport bagged waste to the mainland for disposal. There is no on-island disposal facility and this would continue after the construction of the Golf Academy.

5.5 Ecology

5.5.1 Environmental Protection Measures

As the potential ecological impacts on vegetation and habitats are expected to be slight and acceptable, no specific protection measures are required. However, standard good site practices are recommended to minimise potential disturbance to habitats as far as practicable. These include the following:

- Works areas should be clearly demarcated;

- Construction activities will be restricted within the demarcated works areas;

- Equipment, plant and stockpiles will be established and maintained in the Contractor's compound;

- Fully functional fire-fighting equipment should be provided in works areas; and

- Works areas should be reinstated as soon as practicable upon completion of works.

In addition, to expedite the habitat recovery of shrubland, shrub planting as part of reinstatement is recommended. Shrub species should be carefully selected to match with the existing shrub species in the vicinity of the works areas. Recommended species include *Breynia fruticosa*, *Melastoma malabathricum* and *Rhodomyrtus tomentosa*.

For operation of the temporary barging point on the north side and at the landward end of the existing jetty the following operational procedures will be adopted to avoid impact on the environment and specifically corals at the seaward end of the existing jetty:

- A temporary platform, with edge bund, will be erected above the low water mark to provide a secure transfer movement from barge to jetty (no work in the marine environment);

- No unloading from barges other than at the identified temporary barging point;

- Loose material encapsulated (in bags or other containers) prior to loading onto the barge to ensure no spillage during transfer at Kau Sai Chau;
- Silt curtain deployed in waters surrounding the barge during transfer of material;
- Fully functional spill kit deployed at the barging point during unloading operations; and
- Reinstatement of barging point carried out as soon as practicable upon completion of works

5.5.2 Further Environmental Implications

Within the implementation of the proposed protection measures, the potential ecological impacts of the Project are expected to be minimal and acceptable.

5.6 Landscape and Visual

5.6.1 Environmental Protection Measures

Though landscape and visual impacts are expected to be minor, standard good site practices and design harmonized with the surrounding environment are recommended to minimise potential landscape and visual impacts as far as practicable. These good site practices and landscape and visual protection measures include the following:

Construction Phase

- Extent of works areas minimised as far as practicable;
- Construction period minimised and construction phasing carefully considered to minimise potential landscape and visual impacts (primarily users of the golf course, others are distant);
- Sensitive hoarding, canvas and / or screens will be used to visually screen the construction activities and works areas;
- Lighting units directed to minimise unnecessary light spill. Night-time lighting controlled by hooding all lights and minimising night-time works;
- Topsoil, where the soil material meets acceptable criteria and where practical, stripped and stored for re-use in the construction of the soft landscape works;
- Grassing should be carried out as soon as practicable after site formation works;
- Trees to be retained on-site carefully protected during construction. Detailed Tree Protection Specification should be provided in the Contract Specification, under which the Contractor should be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in Contractor's Works Area; and
- Trees unavoidably affected will be transplanted where practicable. The Tree Removal Application (June 2013) identifies 2 trees to be transplanted. Where possible, trees should be

transplanted directly from existing locations to their final recipient locations without being held in a temporary nursery site. Detailed Tree Transplanting Specification should be provided in the Contract Specification and sufficient time for preparation should be allowed in the construction programme

Operation Phase

- Sensitive design of buildings and structures in terms of scale, height and bulk adopted to minimise visual impacts;
- Appropriate colours and tones used for all hard elements within the landscape (concrete channels, access stairs, railings, catch pits etc);
- Compensatory tree planting provided for trees felled due to the Project. The Tree Removal Application (June 2013) identifies 269 compensatory trees will be planted to compensate for the felling of 154 trees. Native trees species, such as *Celtis sinensis*, *Cinnamomum burmannii*, *Elaeocarpus chinensis*, *Ficus microcarpa*, *Sapium discolour* and *Sterculia lanceolata*, are recommended for compensatory tree planting;
- Appropriate landscape screening and / or vertical greening will be provided for above-ground buildings and structures as far as practicable;
- All disturbed areas reinstated to standards as good as, or better than, the original condition, with floral species compatible to the existing vegetation in adjacent areas; and
- Conduct post-construction monitoring for transplanted and newly planted trees to review the survival and growth.

5.6.2 Further Environmental Implications

With the implementation of the proposed good site practices, temporary landscape and visual impacts during construction will be minimised. The primary receivers are users of the golf course who will have transitory views of the working area. Other sensitive receivers are off island and distant. The residual impacts are, therefore, expected to be slight and acceptable, as illustrated by the photomontages for the mostly affected VSRs as shown in **Figures 5.1a** and **5.1d**.

Impact on trees will be addressed with the proposed transplantation and compensatory planting. It is recommended a post-construction monitoring for the transplanted and newly planted trees be conducted to review the survival and growth status. The overall impacts on trees are considered negligible. However, landscape impact due to temporary loss of trees during construction is expected to be moderate adverse, which will be mitigated by compensatory and reinstatement planting upon completion of construction works, and therefore considered acceptable.

Potential landscape and visual impacts during operational phase will include rapid reinstatement of disturbed areas, sympathetic design of buildings and greening measures for hard structures. Off island receivers are distant and golf course users have only transitory views of the Project Therefore, residual impacts are considered insubstantial.

5.7 Cultural Heritage

One grave site (G01) was identified as being directly impacted by construction of the Project. However enquiries through District Lands Office confirmed that the grave was abandoned and that all remains associated with the grave had been removed and compensation has been made to the family. Therefore the site is considered to be abandoned and can be removed. Grave site (G05) is located on the existing driving range. No work will be carried out within 15 metres of the grave and no adverse impact is anticipated.

5.8 Environmental Monitoring and Audit

Environmental Monitoring and Audit (EM&A) will be carried out in the construction phase of the Project and it will draw on the findings of the Project Profile. A dedicated EM&A monitoring proforma has been prepared and is included as **Appendix I**. The weekly noise, air quality and water quality monitoring and reporting will be carried out by the Contractor and audited by an appropriately qualified team independent of the Contractor. In addition, a post-construction monitoring for transplanted and newly planted trees by qualified botanist/horticulturalist is recommended to review the survival and growth status.

5.8.1 Air Quality

Some air quality impacts are anticipated during construction, and it is recommended to carry out the good site practices listed in the EM&A monitoring proforma during the construction phase of the Project. Fugitive dust impact is the principal concern with regard to air quality, and these may occur during various aspects of construction works, including: access roads; handling of cement, exposed earth and dusty materials; excavation, earthworks and site clearance, operation of belt conveyor system and cement production. The Contractor shall implement the mitigation measures as recommended in order to minimise adverse air quality impact as a result of the proposed works.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

5.8.2 Noise

Although no adverse construction noise impacts are anticipated, it is still recommended to carry out the good site practices listed in the EM&A monitoring proforma during the construction phase of the Project. These include: careful scheduling of construction works; minimising cumulative noise sources from various construction activities; switching off noisy equipment when not in use; and proper maintenance of PME. The Contractor shall implement the mitigation measures as recommended.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

5.8.3 Water Quality

Potential water quality impacts during construction were identified for the following works: construction site runoff and drainage; general construction activities; sewage effluent from the

construction workforce; and operation of the temporary barging point. The Contractor shall implement the mitigation measures as recommended in order to minimise adverse water quality impact as a result of the proposed works. More generally, it is also recommended to carry out the good site practices listed in the EM&A monitoring proforma during the construction phase of the Project. Provided these are properly implemented, no adverse water quality impacts are anticipated.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

5.8.4 Waste Management

The Contractor is required to comply with all relevant legislation and subsidiary regulations and implement the necessary waste management measures. It is recommended to carry out the good site practices listed in the EM&A monitoring proforma during the construction phase of the Project. Waste management in the form of avoiding, minimising, reusing and recycling will be adopted in order to minimise the generation of various wastes and associated environmental impacts during the construction stage. The Contractor shall implement mitigation measures as recommended in order to minimise adverse impact as a result of the proposed works.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

5.8.5 Ecology

As the potential ecological impacts on vegetation and habitats are expected to be slight and acceptable, no specific protection measures are required. However, standard good site practices are recommended to minimise potential disturbance to habitats as far as practicable. In addition, to expedite the habitat recovery of shrubland, shrub planting as part of reinstatement is recommended. Shrub species should be carefully selected to match with the existing shrub species in the vicinity of the works areas. Furthermore, for operation of the temporary barging point on the north side and at the landward end of the existing jetty, operational procedures have been recommended to avoid impact on the environment and specifically corals at the seaward end of the existing jetty. The Contractor shall implement mitigation measures as recommended.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

5.8.6 Landscape and Visual

Though landscape and visual impacts are expected to be minor, standard good site practices and design harmonized with the surrounding environment are recommended to minimise potential landscape and visual impacts as far as practicable. These include a post-construction monitoring for the transplanted and newly planted trees to be conducted to review the survival and growth status. The Contractor shall implement mitigation measures as recommended in order to minimise adverse landscape and visual impact as a result of the proposed works.

Weekly site inspections shall be carried out to ensure successful implementation of mitigation measures during construction.

All new planting upon completion of construction works, including turfing, shrub planting and tree planting, will be undertaken and maintained by the Project Proponent. For trees to be transplanted, they are recommended to be monitored once a week for 2 months after being transplanted to their final recipient locations, and then once every 2 months for the following 10 months until the transplanted trees are well established.

6. Previously Approved EIA Reports

6.1 Exempted Project under the EIAO

The initial development of two 18 hole golf courses was carried out before the enactment of the EIA Ordinance. However Environmental Studies were carried out and submitted to Government and the Advisory Committee on the Environment (ACE). Therefore the project is identified as an exempted project under EIAO with the Environmental Impact Assessment Reports placed under Section 15(1)(f) of the Ordinance (Document EIA-037/BC).

The endorsed report "Kau Sai Chau Development EIA (Final Report, March 1994)" covered impacts and mitigation for the construction and operation of the North and South courses, driving range and ancillary facilities (the administration building, maintenance facility and ferry and construction of a reservoir to provide irrigation water). Other reports included ecological surveys (July 1994) and a Turf Grass Management Plan, included in an operations manual entitled "Hong Kong Golf Course Handbook: Environmental Considerations for the Design, Construction and Operation" (July 1994).

6.2 EIA Reports Approved under the EIAO

A second EIA for golf courses on Kau Sai Chau was prepared under the requirements of the EIAO. The second EIA was for a golf course on the East side of the Island. In addition to the design and operation of the 18 hole golf course the operational facilities were extended to include (i) a small desalination plant to provide additional irrigation water and (ii) extension of the existing wastewater treatment facility and the reuse of its effluent for golf course irrigation.

A Project Profile: PP-110/2000 - Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung was submitted in December 2000 and subsequently a Study Brief was Issued (ESB-064/2000) in January 2001. The output of the EIA studies (AEIAR-091/2005[13]) comprised an Executive Summary, EIA Report and an EM&A Manual. The EIA was approved without conditions on 14 Nov 2005 and the Environmental Permit (AEP-224/2005) was issued on 28 November 2005 and Variation of the Environmental Permit was issued on 17 August 2006[14].

Key features of the EIA were for the construction and operation of an 18 hole golf course, a closed low flow drainage system, desalination plant, a temporary barging facility and the reuse of treated effluent for irrigation purposes.

[13] http://www.epd.gov.hk/eia/register/report/eiareport/eia_1122005/index.htm

[14] Related to Temporary

7. Conclusion

7.1 General

In terms of construction impacts the site will not require special equipment other than standard earthmoving equipment and plant and equipment associated with construction of a three story building in reinforced concrete, typical of village houses constructed in the New Territories. Standard environmental mitigation practices are considered sufficient to mitigate all impacts to acceptable levels.

7.2 Air Quality

The works on the Golf Academy are remote from sensitive receivers on the mainland. The closest sensitive receivers are workers and users of the golf course in the Administration Building. The potential for adverse impact stems from the bulk earthworks phase of the Project when holes 11 to 14 are modified. However, standard construction dust mitigation practices will be implemented to ensure that golfers and workers on the island are not impacted by dust impact. Off island sensitive receivers are remote from emission sources and no adverse impact is anticipated.

No operation phase air quality impacts are anticipated from the operation of the Golf Academy or its practice areas.

7.3 Noise

The Golf Academy is remote from sensitive receivers on the mainland in Sai Kung and there is physical shielding by topography for these receivers. Standard construction noise mitigation practices will be implemented to ensure that golfers and workers on the island have impact mitigated as far as is practicable.

No operation phase noise impacts are anticipated from the operation of the Golf Academy or its practice areas.

7.4 Water

In relation to silty run off during the earthworks phase, an implementation plan will be identified to minimise areas of exposed earth, prevent water entering exposed areas and trap any silt before it leaves the construction area. In the unlikely event of escape of silty runoff, topography and subsurface drainage will direct runoff into the existing golf course closed loop drainage system where all run off is collected by and drained to the main reservoir via small ponds and lakes from where it is recycled onto the golf course via the closed loop irrigation system. Therefore offsite migration of any silty material during construction to the marine environment is not anticipated.

In relation to operation phase impacts on water quality, the current waste-water treatment plant will be upgraded. The current plant is a Rotating Biological Contactor (RBC) and a blivet package plant that has proven ability to accommodate existing flows. The upgrade will duplicate the existing blivet process and therefore no additional impact is envisaged due to discharge. It is also noted that treated effluent passes through a number of ponds that provide tertiary treatment before it passes into the reservoir used for irrigation. The surplus from the demand of water for

irrigation and toilet flushing for the future Golf Academy will be in low volume, the surplus of effluent that will lead to an overflow of the existing reservoir is considered to be negligible. This approach was identified in both the EIA for the North and South courses ((EIA-037/BC) and the East Course (AEIAR-091/2005). During operation, the reservoir recycles water to the golf course by capturing all inflow. It is therefore not anticipated that any adverse impact will occur on the adjacent marine environment due to discharges from Kau Sai Chau operations.

7.5 Waste

The project is of relatively small scale and the amount of C&D material that needs to be removed off site and disposed of is small. Standard waste management practices of avoiding, minimising, reusing and recycling will be adopted in order to minimise the generation of various wastes and associated environmental impacts during the construction stage.

For the operation phase, the Golf Academy will continue the current practice of source separating waste, recycling where possible and transport of bagged waste to the mainland for disposal. There is no on-site disposal facility and this practice would continue after the new build.

7.6 Ecology

Ecological features have been shown to have benefitted from the active and passive management approaches on Kau Sai Chau by the Project Proponent. Historically the northern half of Kau Sai Chau was regularly damaged by hill fires and topsoil was severely eroded. The area occupied by the Golf Academy was extensively reworked during the construction of the South Course. The construction of the Golf Academy has been designed to minimise footprint. During wet and dry season surveys no features or species of conservation concern were identified within the Golf Academy site that would be impacted during the construction phase. On completion large areas within the Golf Academy boundary will recreate, through native planting, conditions existing before work commenced. Therefore while there will be some short term impact on habitat, in the medium and long term the impact on ecology is anticipated to be beneficial. Specifically, management practices will continue to remove potential for hill fires.

A temporary barging point will be operated on the north side and at the landward end of the existing jetty for the construction period. This area is currently used by barges supplying goods and materials to maintain operations on Kau Sai Chau, no spill incidents have been reported during operation. During Golf Academy construction there will be average two barge movements per week transferring material across a temporary platform constructed above the high water mark. Sand will be transferred by conveyors mounted on the barges, as existing practice. There will be no temporary works installed in the marine environment. A dive survey identified coral species at the deeper, seaward end of the jetty but this area is unaffected by barge movements. The possibility of spillage to the marine environment will be removed by requiring lose material, except sand, to be encapsulated during transport, providing edge bunds and impervious surfaces at the transfer point, deploying spill kits at the transfer point and providing a silt curtain in the water to contain the unloading area when barges are operating. Therefore no impact on the marine environment is anticipated.

7.7 Landscape and Visual

Sources of potential landscape impacts include tree removal, vegetation clearance and site formation works. Potential impacts will be mainly on existing vegetation and are generally temporary. With the implementation of the proposed good practices, potential landscape impacts can be minimised and the residual impacts are expected to be slight and acceptable.

There are 283 trees identified within the Project Area that have generally established since the North and South Courses were opened in 1995. Prior to 1995, conditions on site (erosion, hill fire and limited water) had prevented establishment of tree species on open hills. Of the 283 trees identified, 118 (40%) will be retained in-situ and 2 will be transplanted. The remaining 154 trees directly affected by the proposed works will be felled and compensated with the planting of 269 standard and heavy standard trees. The aggregated trunk diameter for the felled trees is 22,390mm and the total aggregated trunk diameter of the compensation planting is 22,420mm (a compensation planting ratio of 1: 1.75 in quantity and 1:1in in terms of quality). The 1:1 planting ratio, within the project area (154 trees), will maintain the existing aesthetics of the landscape comprising small groups of native trees as opposed to extensive woodland. The remaining 115 compensatory trees will be planted in eight locations on the North and South Courses where there is adequate space to accommodate them. The residual impacts on trees are expected to be negligible.

Potential visual impacts to the VSRs are expected to be insubstantial due to distance between the Golf Academy and the VSRs, the reinstatement of the turf and shrubland and additional tree planting.

Overall, in terms of Annex 10, Clause 1.1 (c) of the EIAO – TM, the landscape and visual impacts are acceptable with mitigation measures because there will be no significant effects on the landscape, no significant visual effects caused by the appearance of the project, or no interference with key views.

7.8 Cultural Heritage

A grave has been identified within the proposed footprint of the Academy. However District Lands Office confirmed that the grave has been abandoned, with remains removed and compensation paid.

Grave site G05 is identified on the edge of the existing driving range, on the edge of the Contractor's compound. The grave will not be disturbed by the works but the grave will be clearly marked during the construction programme to ensure that there is no possibility of accidental damage.

7.9 Environmental Monitoring and Audit

A dedicated Environmental Monitoring and Audit (EM&A) programme has been prepared (See **Appendix I**) for the construction and operation phases of the Project. It draws together the findings of the Project Profile and follows the EM&A programme adopted the EM&A Manual covered in this Project Profile. Weekly noise, air quality and water quality monitoring and reporting will be carried out by the Contractor and audited by an appropriately qualified person, independent of the Contractor. In addition, a post-construction monitoring for transplanted and

newly planted trees by qualified botanist/horticulturalist is recommended to review the survival and growth status.

7.10 Summary

The following table summarises the findings of the main text. It identifies the elements of construction or operation activities that have potential to impact on the environment. It summarises the assessment of their potential for impact and the residual impact. The objective is to show that the activities involved in the construction and operation of the Golf Academy on Kau Sai Chau will not create a material change in environmental conditions that were identified in the earlier EIAs.

The elements identified are:

1) Barging point activity - potential for spill and impact on coral from operation of the barging point located at the landward end of the existing jetty will be mitigated by duplicating the existing processes of barge deliveries to the island that has operated without incident since 1995 and supplemented with Project specific mitigation requirements.

2) Batching plant operation – A batching plant will operate within the Contractor's compound for the duration of the Golf Academy construction. Intensity of activity is low (approximately 10m^3 of concrete per hour that is equivalent to the contents of a conventional concrete truck each hour).

3) Pesticide use on turf grass areas –The Kau Sai Chau Turf Grass Management Plan that has operated since the first golf courses opened and has promoted minimal use of pesticide and adopting hand weeding, spot spraying and the adoption of organic pesticides as preferred treatment solutions. The turf grass areas that form the Golf Academy and the modified holes 11-14 are all located within the catchment of the closed loop drainage system. All runoff is directed through landscaped ponds and the pipework to the dedicated reservoir on the island where it is recirculated as irrigation water. There is very limited potential for offsite migration of any turf grass runoff.

4) Earthworks – During the initial earthworks dust, silty runoff and noise are potential issues. Apart from the golf course, sensitive uses are all over 1000m from the earthworks activities. Earthworks will also involve disturbance and rehabilitation of turfed area and shrubland habitats.

5) Sewage effluent – To accommodate the additional sewage flows generated by the Golf Academy activities the existing Wastewater Treatment Plant will be upgraded to ensure no increase in effluent load from its discharge. Discharges are to the closed loop drainage system and therefore do not enter the marine waters surrounding Kau Sai Chau.

6) Activities on the access road – There are potential noise and air quality impacts from vehicles transferring construction material from the barging point at the existing jetty to the Contractor's compound. However, intensity is low, equivalent to two trucks running ever hour to and from the jetty during peak construction of the Golf Academy. Once material has been transferred to the Contractor's compound vehicles will not access the access road as all activities will be contained within the Project boundary. The closest noise and air sensitive receivers are over 1,000m from the access road. The only other users of the access road are the vehicles transferring visitors from the jetty to the clubhouse in dedicated vehicles.

7) Operation of the Golf Academy – The Golf Academy comprising student education in classroom and practical outdoor environments and the associated administration activities will be of low intensity.

The following table summarises the outcomes of the assessment

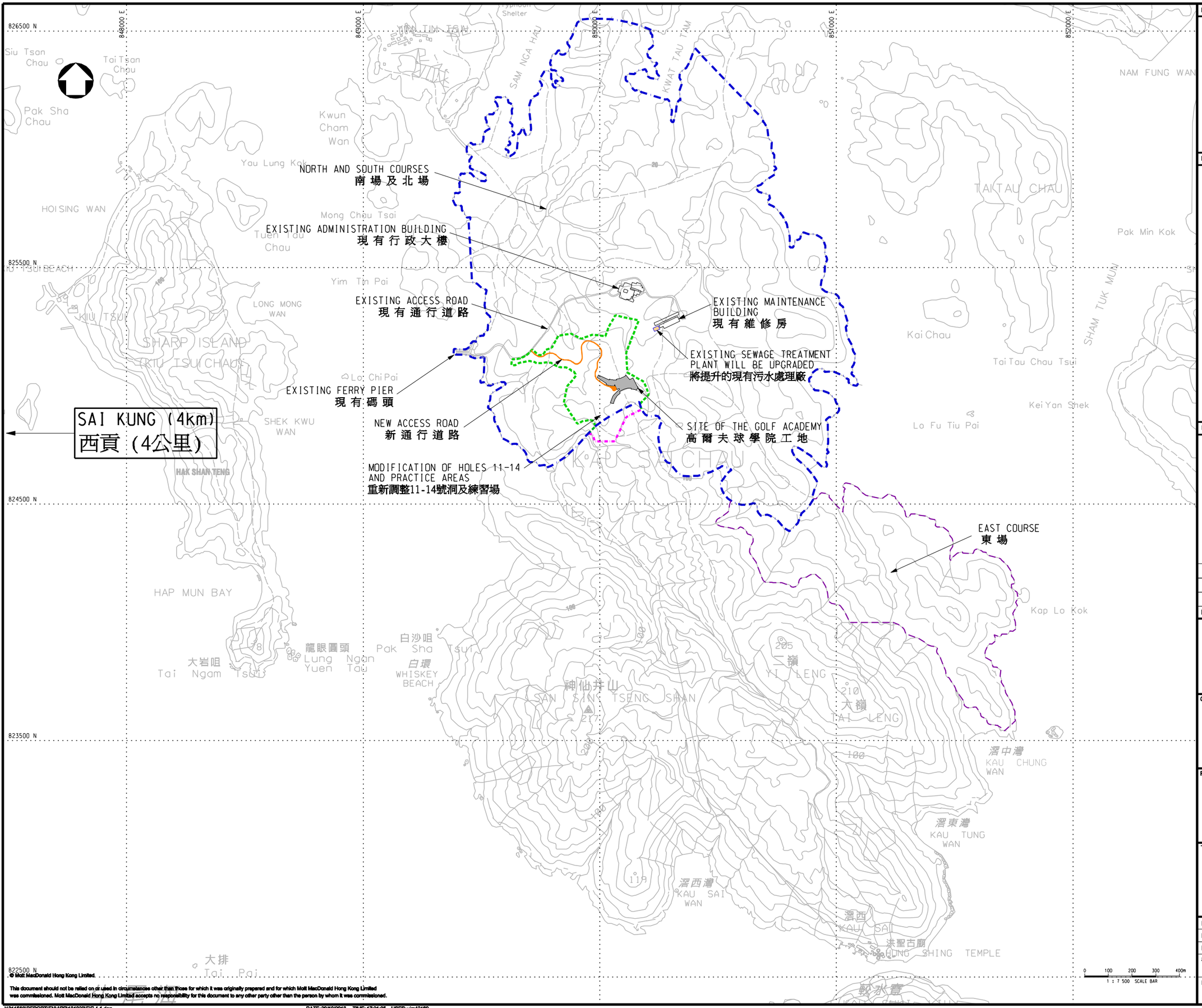
Table 7.1: Summary of Outcomes for the Assessment

Element	Activities	Phase		Potentially Affected Environment	Potential Impact Area	Adopted working or operational procedures	Assessment outcomes that confirm EIAO compliance
		Const	Op's				
1) Barging Point	Up to two movements per week. Similar to current activity	✓		Marine waters	Potential for spill during unloading	Standard process. Bunded landing transfer area. Encapsulation. Silt curtain. Spill kits.	Proven operating system. With the low frequency of operations and standard management practise no residual impact anticipated on marine waters.
2) Concrete Batching	Small plant located in working area. Closest non golf course SR over 1km away	✓		Air Quality	Potential for dusty emissions during operation	Standard process Modern plant designed to avoid emissions Enclosure of storage areas	With low frequency of operation (up to 10m³ / hr) and standard management practise no impact anticipated. No sensitive uses are directly affected.
3) Turf Grass Management	Use of pesticides to control growth of invasive species		✓	Marine environment	Potential for runoff to the marine environment	Will follow a Turfgass Management Plan successfully operated since opening of the first courses. Realigned holes 11- 14 and practice areas located within the catchment of the closed loop drainage system	All runoff passes to the dedicated reservoir on the island where it is recirculated as irrigation water to Kau Sai Chau. No offsite migration is anticipated. Therefore no detectable impact on the marine environment.
4) Earthworks	Moving earth and rock to form platform for Golf Academy and realign holes 11-14	✓		Air, noise, water and ecology	Potential for dust, construction plant noise and silty runoff; habitat disturbance	Cut and fill balanced. Standard mitigation for noise dust and silty runoff; rehabilitation of disturbed habitats	Air and noise sensitive receivers over 1000m for construction area. No impact on noise and air sensitive uses. For water quality, topographic containment inside closed loop drainage system. If runoff migrates from works areas it enters the closed loop drainage system and is recycled within Kau Sai Chau. No detectable impact on the marine environment. Disturbed habitats will largely be

Element	Activities	Phase		Potentially Affected Environment	Potential Impact Area	Adopted working or operational procedures	Assessment outcomes that confirm EIAO compliance
		Const	Op's				
							compensated by habitat rehabilitation.
5) Sewage	Sewage generated by activities of the new Golf academy		✓	Water courses and marine environment	Potential for effluent to enter water courses and marine environment	Existing plant upgraded	Plant designed for no increase in effluent load. Discharges to closed loop drainage system. Discharge recycled and does not enter the marine waters. No detectable impact on the marine environment.
6) Access Road	Vehicles on the existing access road	✓	✓	Air and noise	Potential for impact on noise and air sensitive receivers	Standard mitigation during construction. Maintain vehicles and coverage of loads	Closest noise and air sensitive receivers are over 1000m form the access road. Construction phase impact equivalent to two vehicles running continuously on the access road. No sensitive receivers will be affected by vehicles on the access road.
7) Golf Academy	Day to day operation of the Golf Academy		✓	Water courses and marine environment	Potential for effluent, solid waste impact	Standard mitigation will duplicate established clubhouse operations.	Student education in classroom and practical outdoor environments and the associated administration activities will be of low intensity. Minimal impact. No detectable impact at sensitive receivers.

The assessment has concluded, without doubt or uncertainty that for the level of activity and the modes of construction and operation, the Golf Academy and its associated facilities, will have minimal impact on the environment. With the implementation of proposed mitigation measures similar to the previous EIAs, including dust suppression measures, good site practices, turf grass management plan, closed loop drainage system and reuse of treated effluent as far as practicable, the Project will not create a material change to the environmental conditions described in the original EIA for the Kau Sai Chau project (EIA-037/BC) and the EIA Report approved under the EIA Ordinance (EIAO Register No.: AEIAR-091/2005).

Figures



Notes

Key to symbols

PROPOSED SITE AREA
擬建工地

PROPOSED BOUNDARY EXTENSION
擬議延伸邊界

EXISTING GOLF COURSE BOUNDARY
現有高爾夫球場邊界

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P3	OCT 13	MING	GENERAL REVISION	JC	AFK
P2	FEB 13	MING	GENERAL REVISION	LC	AFK
P1	JAN 13	MING	FIRST ISSUE	LC	AFK

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Kau Sai Chau 滘西洲 The Jockey Club Public Golf Course 賽馬會・公眾高爾夫球場

Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

Title

LOCATION OF THE PROJECT
項目位置

Designed	LC		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	LC		Approved	AFK	
Scale at A1	1:7500	Status	PRE	Rev	P3

Drawing Number
FIGURE 1.1 圖 1.1

J:\311558\REPORT\ENV\PP\13102\FIG 1.2.dgn DATE:28/10/2013 TIME:11:46:33 USER:ylm42169

Notes

Key to symbols

PROPOSED SITE AREA
擬建工地

PROPOSED BOUNDARY EXTENSION
擬議延伸邊界

EXISTING GOLF COURSE BOUNDARY
現有高爾夫球場邊界

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	OCT 13	MING	GENERAL REVISION	VW	AFK
P1	FEB 13	MING	FIRST ISSUE	LC	AFK

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

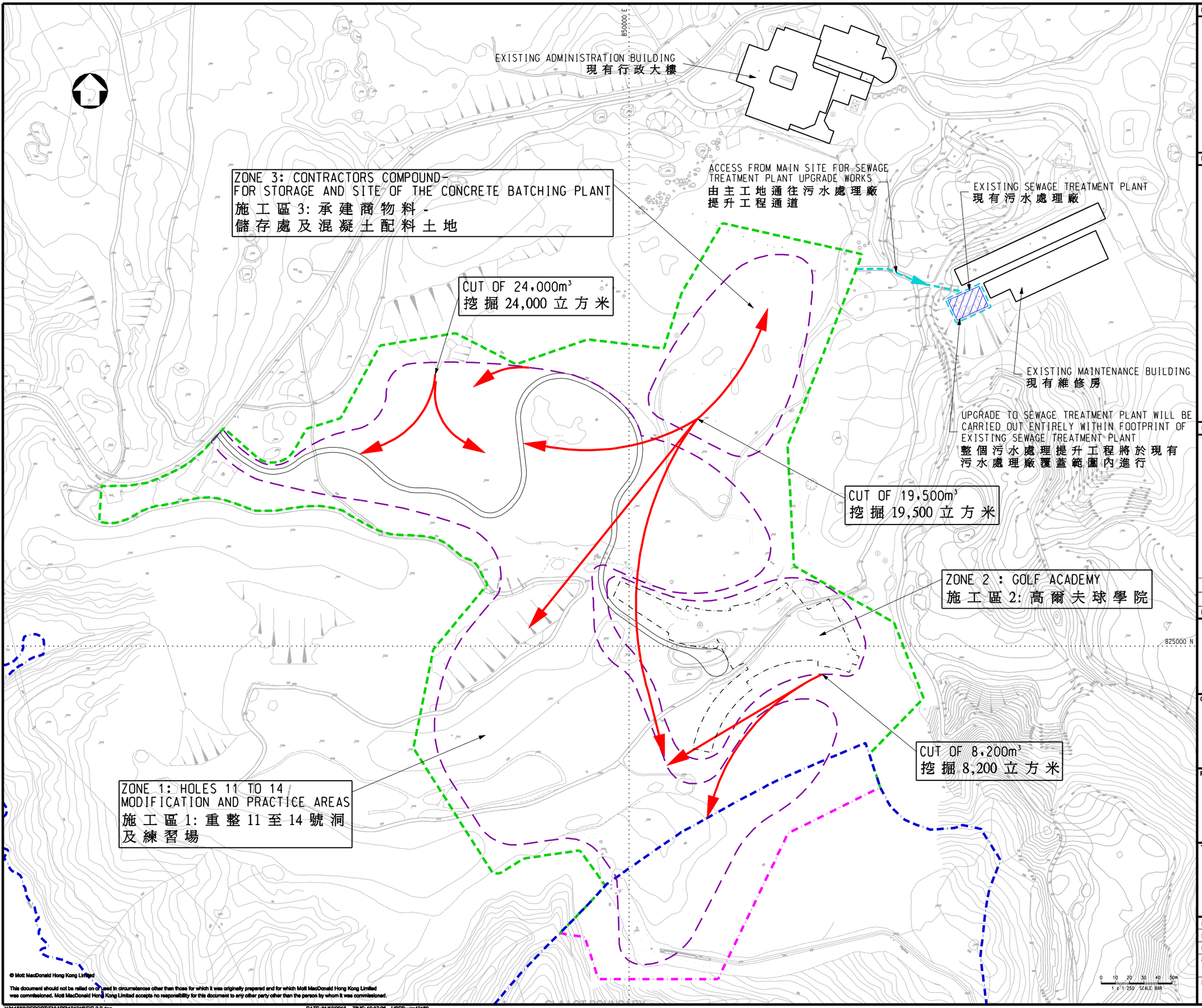
Title

LAYOUT OF THE GOLF ACADEMY AND HOLE MODIFICATION
高爾夫球學院及球洞調整平面圖

Designed	LC		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	LC		Approved	AFK	
Scale at A1 1:3000		Status PRE		Rev P2	

Drawing Number

FIGURE 1.2 圖 1.2



Notes

Key to symbols

- PROPOSED SITE AREA 擬建工地
- PROPOSED BOUNDARY EXTENSION 擬議延伸邊界
- EXISTING GOLF COURSE BOUNDARY 現有高爾夫球場邊界

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	DEC 13	MING	GENERAL REVISION	PK	AFK
P1	OCT 13	MING	FIRST ISSUE	JC	AFK

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

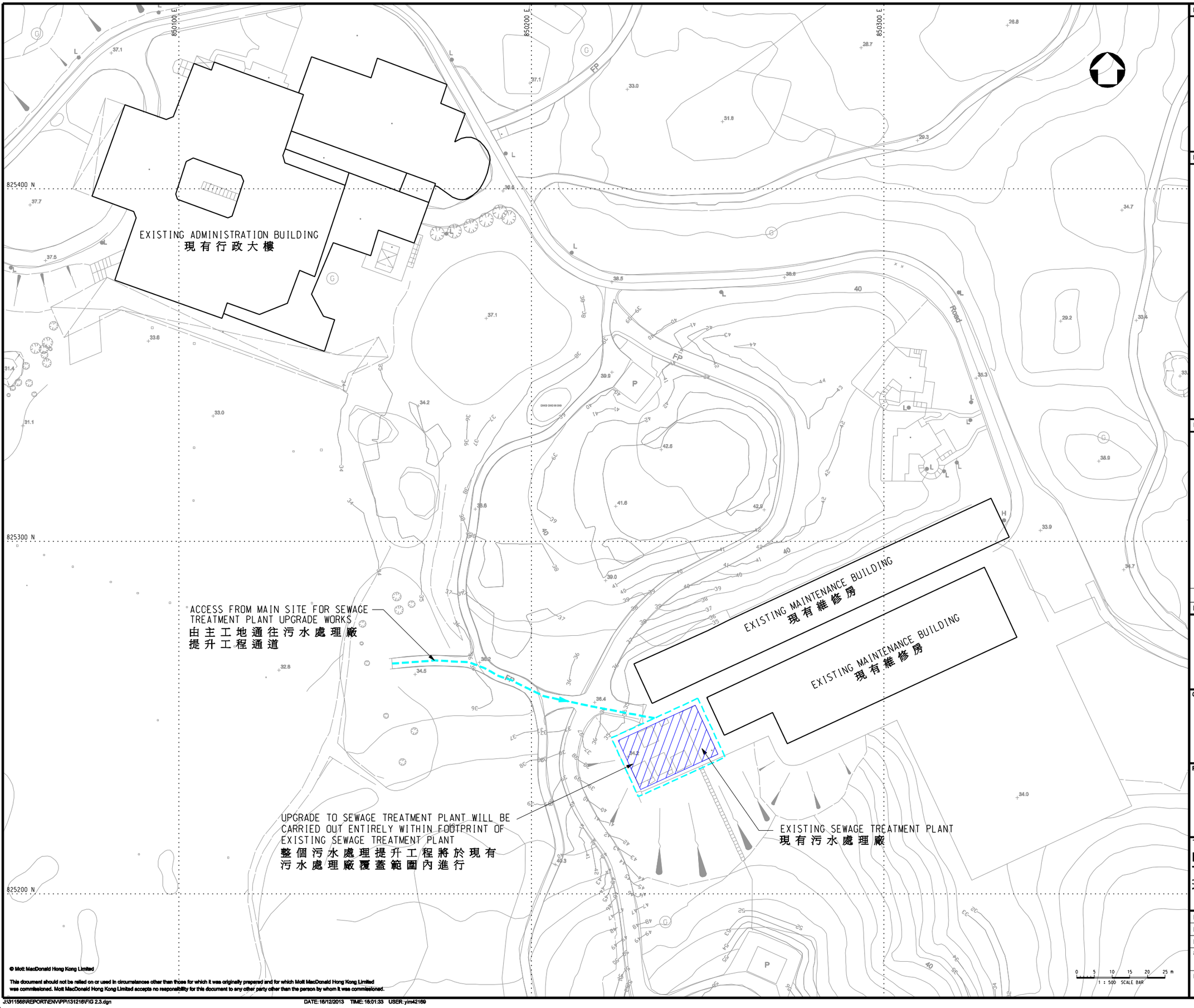
Title

CONSTRUCTION ZONES AND EARTH-WORKING OPERATIONS
施工區及土方工程運作

Designed	VW		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	VW		Approved	AFK	
Scale at A1 1:1250		Status PRE		Rev P2	

Drawing Number

FIGURE 2.2 圖 2.2



Notes

Key to symbols

Reference drawings

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

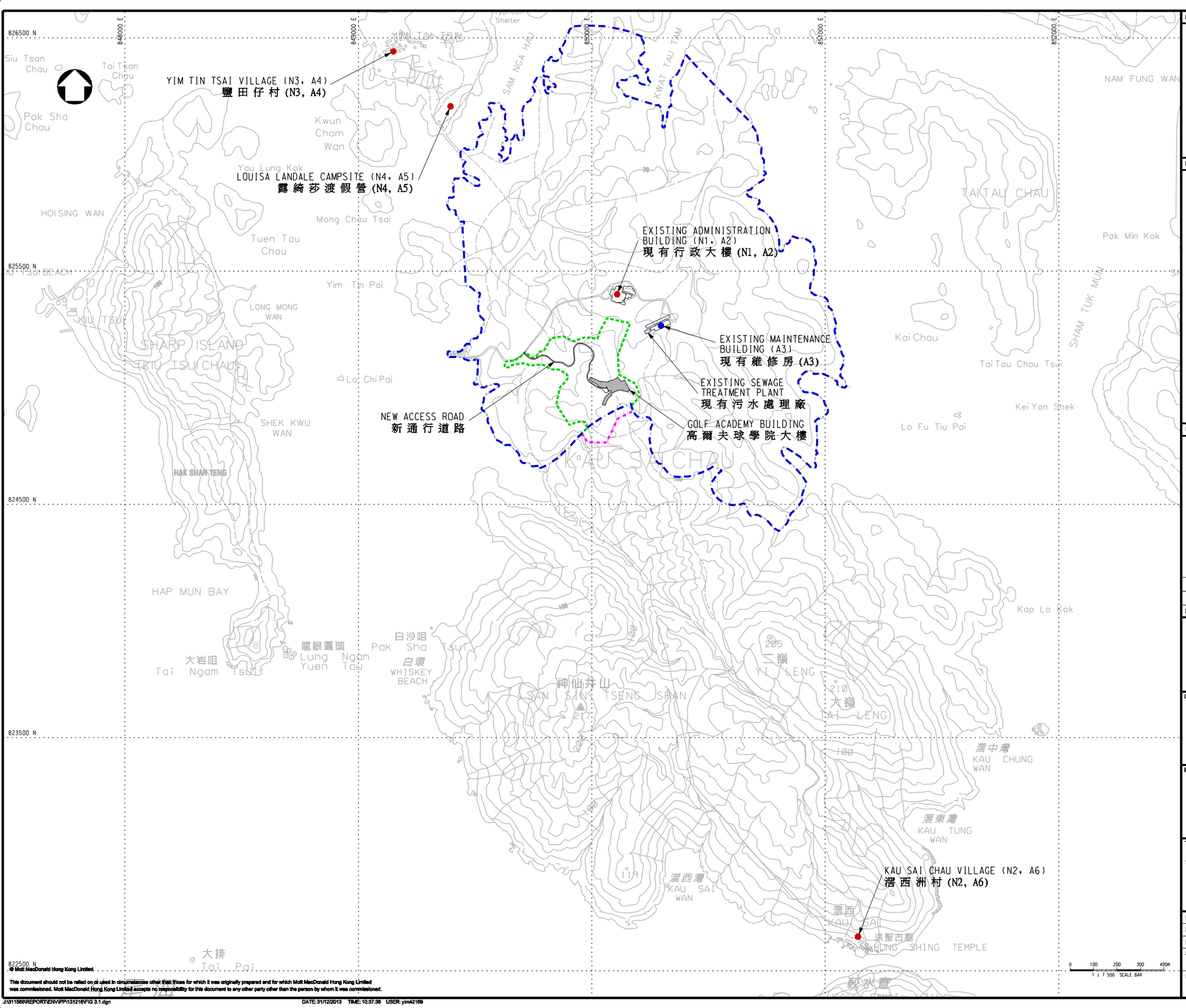
Title

EXISTING AND PROPOSED SEWAGE TREATMENT PLANT UPGRADE
現有及擬議污水處理廠提升

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	AFK	
Scale at A1 1:500		Status PRE		Rev P1	

Drawing Number

FIGURE 2.3 圖 2.3



Notes

Key to symbols

- PROPOSED SITE AREA 擬建工地
- PROPOSED BOUNDARY EXTENSION 擬議延伸邊界
- EXISTING GOLF COURSE BOUNDARY 現有高爾夫球場邊界
- AIR SENSITIVE RECEIVER 空氣敏感受體
- AIR AND NOISE SENSITIVE RECEIVER 空氣及噪音敏感受體

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	DEC 13	MING	GENERAL REVISION	PK	AFK
P1	OCT 13	MING	FIRST ISSUE	JC	AFK

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

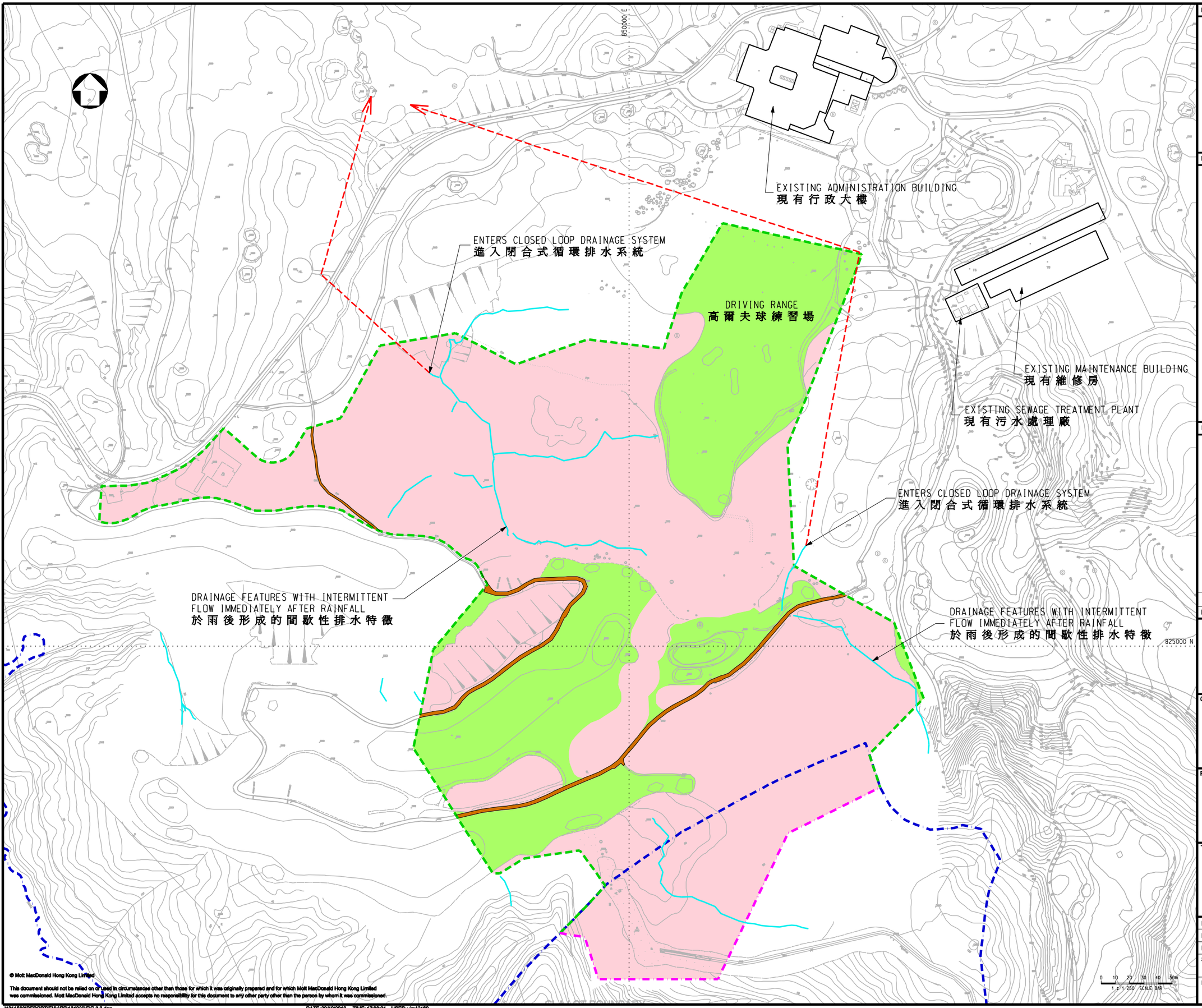
Title

AIR SENSITIVE RECEIVERS (ASRs) & NOISE SENSITIVE RECEIVERS (NSRs)
空氣敏感受體及噪音敏感受體

Designed	VW		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	VW		Approved	AFK	
Scale at A1	1:7500	Status	PRE	Rev	P2

Drawing Number

FIGURE 3.1 圖 3.1



Notes

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- TURFED AREA 草皮範圍
- SHRUBLAND 灌木叢
- DEVELOPED AREA 已發展範圍
- STREAM 溪流

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 13	MING	FIRST ISSUE	PK	AFK

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

Title

HABITAT MAP
(EXISTING WATER FEATURES)
生境圖(現有流水位置)

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	AFK	
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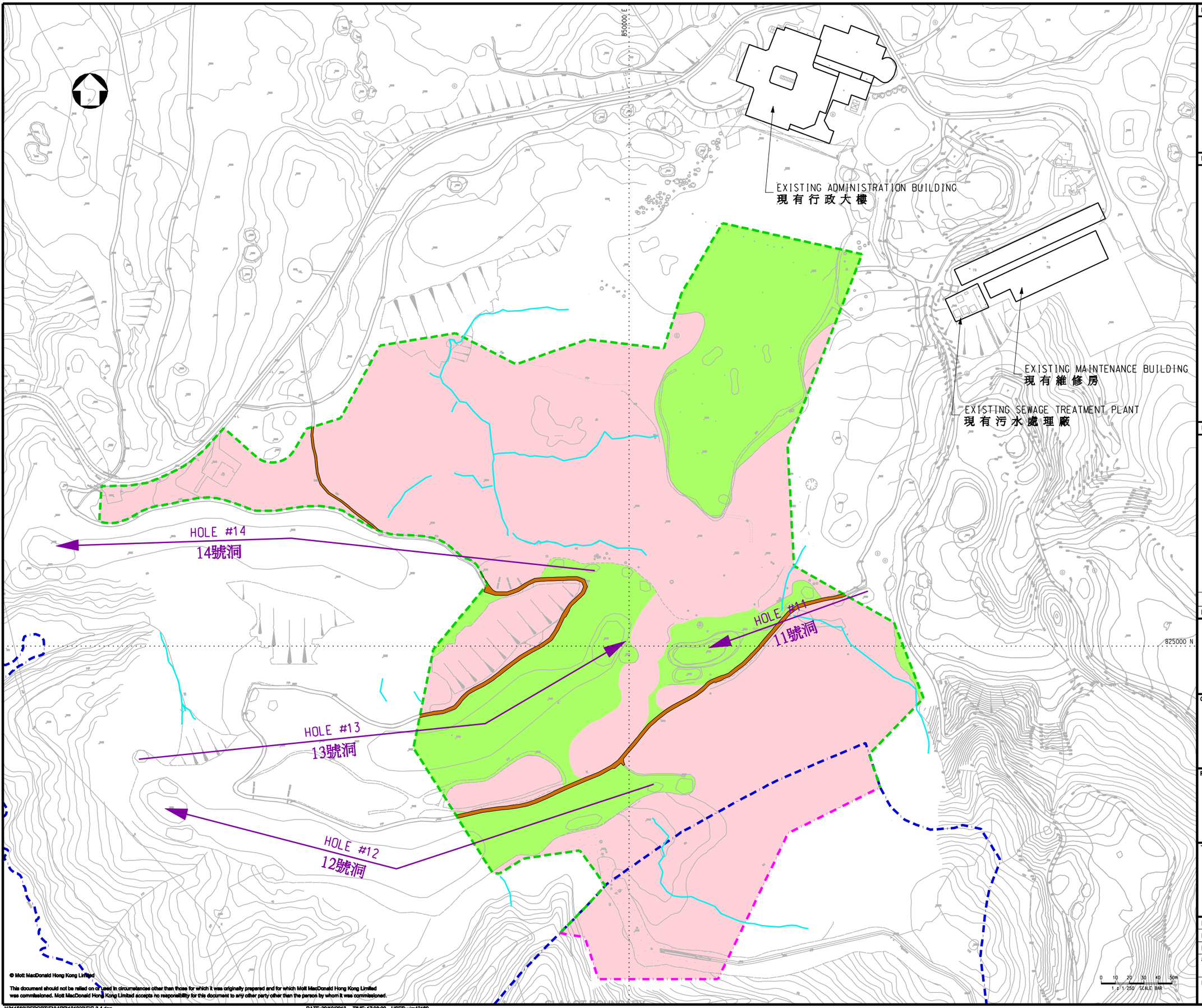
Drawing Number

FIGURE 3.3 圖 3.3



Notes

Key to symbols

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- DEVELOPED AREA 已發展範圍
- STREAM 溪流

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

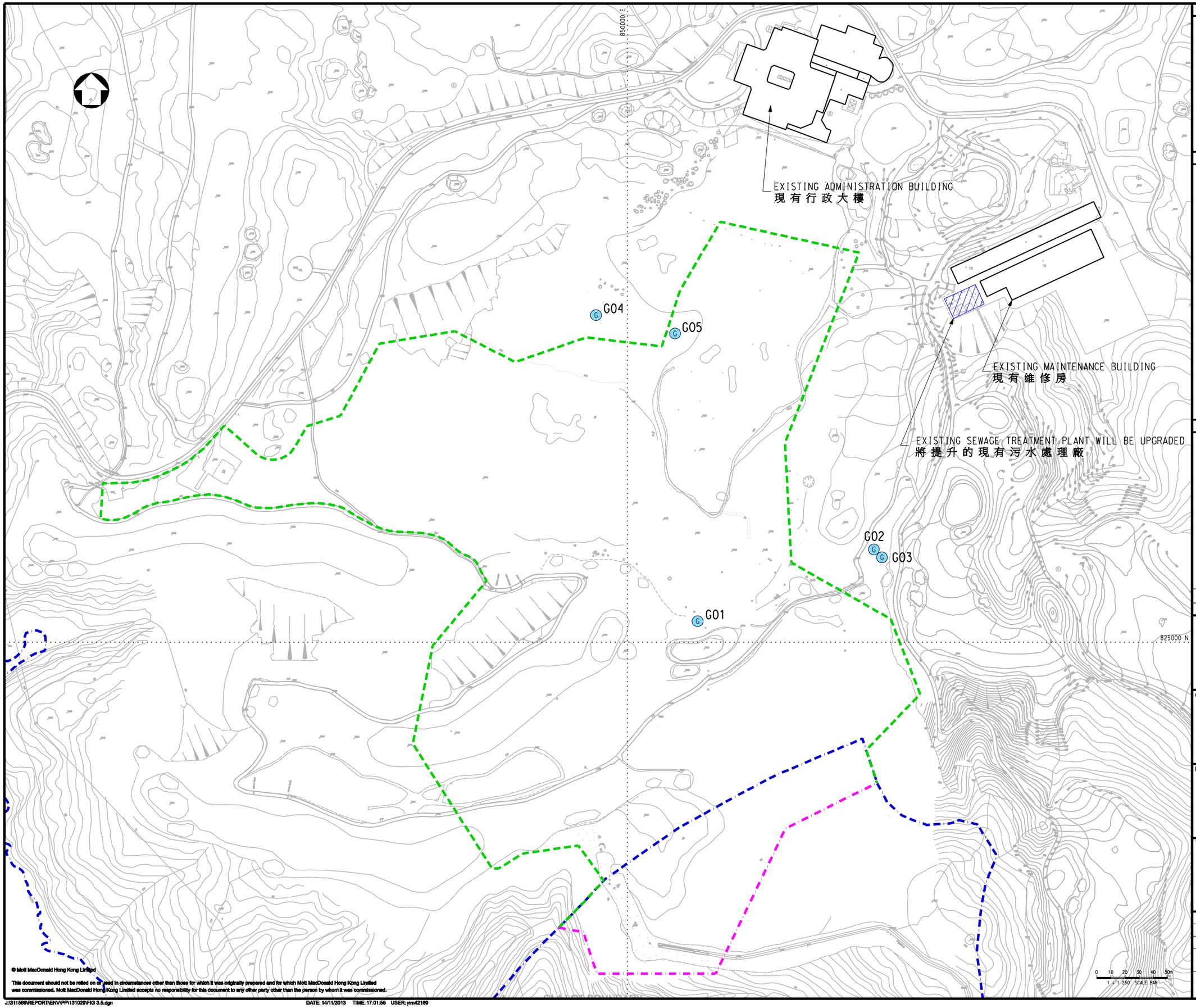
Title

HABITAT MAP (EXISTING)
現有生境圖

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	AFK	
Scale at A1 1:1250		Status PRE		Rev P1	

Drawing Number

FIGURE 3.4 圖 3.4



Notes

Key to symbols

PROPOSED SITE AREA
擬建工地

PROPOSED BOUNDARY EXTENSION
擬議延伸邊界

EXISTING GOLF COURSE BOUNDARY
現有高爾夫球場邊界

G GRAVE
墳墓

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	NOV 13	MING	FIRST ISSUE	VW	AFK

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KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

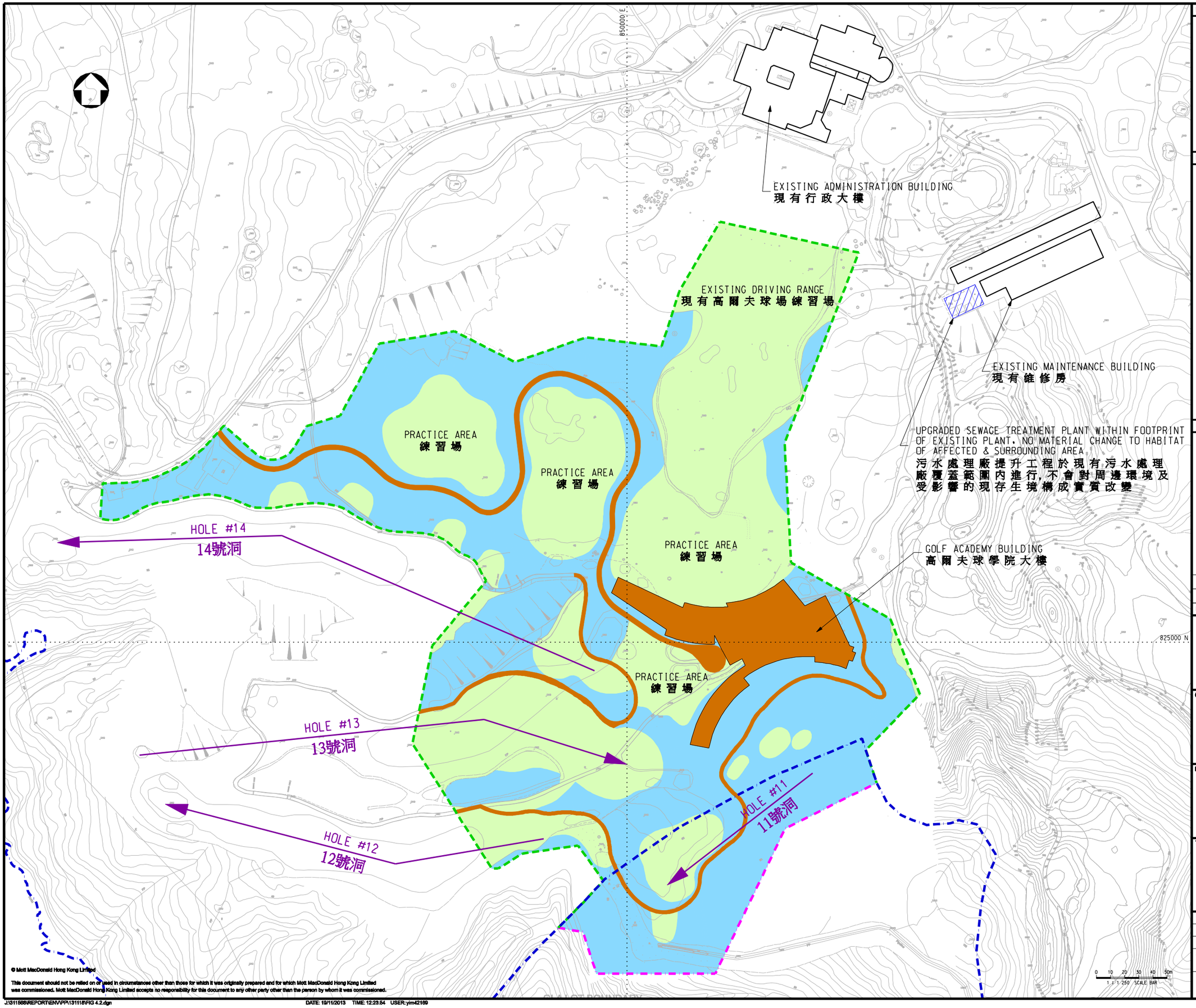
Title

LOCATION OF GRAVE SITE
墳墓位置圖

Designed	VW		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	VW		Approved	AFK	
Scale at A1 1:1250		Status PRE		Rev P1	

Drawing Number

FIGURE 3.5 圖 3.5



J:\311588\REPORT\ENV\PP\131116\FIG 4.2.dgn DATE: 19/11/2013 TIME: 12:23:54 USER:yim42169

Notes

Key to symbols

- PROPOSED SITE AREA 擬建工地
- PROPOSED BOUNDARY EXTENSION 擬議延伸邊界
- EXISTING GOLF COURSE BOUNDARY 現有高爾夫球場邊界
- TURFED AREA 草皮範圍
- SHRUBLAND 灌木叢
- DEVELOPED AREA 已發展範圍

Reference drawings

Rev	Date	Drawn	Description	Ch'k'd	App'd
P2	NOV 13	MING	GENERAL REVISION	PK	AFK
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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

Title

HABITAT MAP
(IN OPERATION PHASE)
運作期的生境圖

Designed	PK		Eng check	JC	
Drawn	MING		Coordination	JC	
Dwg check	PK		Approved	AFK	
Scale at A1 1:1250		Status PRE		Rev P2	

Drawing Number

FIGURE 4.2 圖 4.2

EXISTING VIEW FROM YIM TIN TSAI

現時從鹽田仔的景觀

VIEW FROM YIM TIN TSAI WITHOUT MITIGATION MEASURES

沒有緩解措施的情況下，從鹽田仔的景觀

J:\311568\CAD_ADMIN\MMH-311568-P-A1_TLB-N(C1).dgn DATE: 03/12/2013 TIME: 11:58:34 USER: yim42169

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 13	PKC	FIRST ISSUE	JC	AFK

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雅邦 Urbis Limited

Client

香港賽馬會 The Hong Kong Jockey Club

Kau Sai Chau 滘西洲 The Jockey Club Public Golf Course

Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

Title

PHOTOMONTAGES OF VIEWS FROM MOSTLY AFFECTED VSR
最受影響的視覺敏感受體的景觀合成照片
(SHEET 1 OF 4) (圖 1 之 4)

Designed	PKC		Eng check	JC	
Drawn	PKC		Coordination	JC	
Dwg check	JC		Approved	AFK	
Scale at A1		Status PRE		Rev P1	

Drawing Number

FIGURE 5.1a 圖 5.1a

VIEW FROM YIM TIN TSAI WITH MITIGATION MEASURES AT DAY 1 OF OPERATION

有緩解措施的情況下，營運期的第一天從鹽田仔的景觀

VIEW FROM YIM TIN TSAI WITH MITIGATION MEASURES AT YEAR 10 OF OPERATION

有緩解措施的情況下，營運期的第十年從鹽田仔的景觀

J:\311568\CAD_ADMIN\MMH-311568-P-A1_TLB-N(C1).dgn DATE: 03/12/2013 TIME: 11:58:34 USER: yim42169

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	OCT 13	PKC	FIRST ISSUE	JC	AFK

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Wilbis Limited 雅邦

Client

香港賽馬會 The Hong Kong Jockey Club

Kau Sai Chau 滘西洲 The Jockey Club Public Golf Course

Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

Title

PHOTOMONTAGES OF VIEWS FROM MOSTLY AFFECTED VSR
最受影響的視覺敏感受體的景觀合成照片
(SHEET 2 OF 4) (圖 2 之 4)

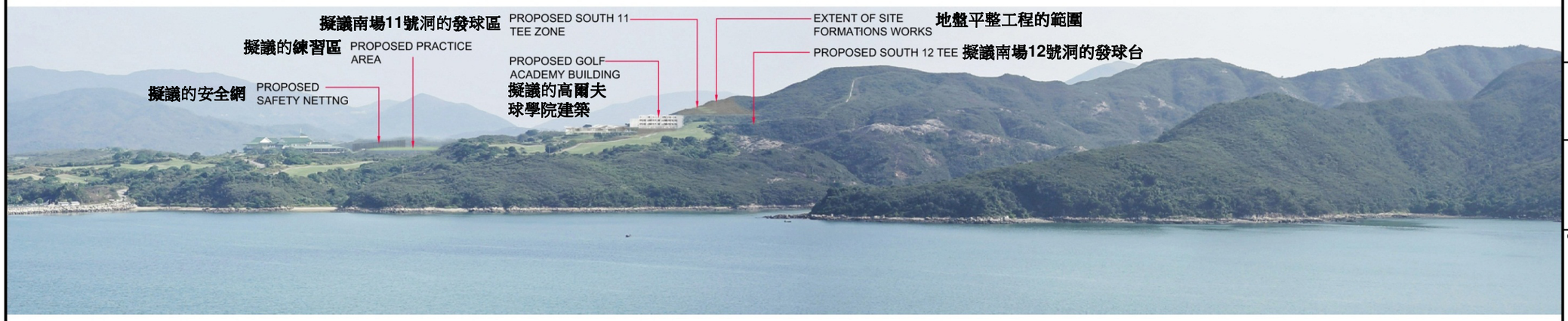
Designed	PKC		Eng check	JC	
Drawn	PKC		Coordination	JC	
Dwg check	JC		Approved	AFK	
Scale at A1		Status PRE		Rev P1	

Drawing Number

FIGURE 5.1b 圖 5.1b

EXISTING HIGH LEVEL VIEW FROM SHARP ISLAND

現時從橋咀洲高處的景觀



HIGH LEVEL VIEW FROM SHARP ISLAND WITHOUT MITIGATION MEASURES

沒有緩解措施的情況下，從橋咀洲高處的景觀

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Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	NOV 13	PKC	FIRST ISSUE	JC	AFK

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Title

PHOTOMONTAGES OF VIEWS FROM MOSTLY AFFECTED VSR
最受影響的視覺敏感受體的景觀合成照片
(SHEET 3 OF 4) (圖 3 之 4)

Designed	PKC		Eng check	JC	
Drawn	PKC		Coordination	JC	
Dwg check	JC		Approved	AFK	
Scale at A1		Status	PRE	Rev	P1

Drawing Number

FIGURE 5.1c 圖 5.1c

HIGH LEVEL VIEW FROM SHARP ISLAND WITH MITIGATION MEASURES AT DAY 1 OF OPERATION

有緩解措施的情況下，營運期的第一天從橋咀洲高處的景觀

HIGH LEVEL VIEW FROM SHARP ISLAND WITH MITIGATION MEASURES AT YEAR 10 OF OPERATION

有緩解措施的情況下，營運期的第十年從橋咀洲高處的景觀

Rev	Date	Drawn	Description	Ch'k'd	App'd
P1	NOV 13	PKC	FIRST ISSUE	JC	AFK

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Project

KAU SAI CHAU GOLF ACADEMY
滘西洲高爾夫球學院

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PHOTOMONTAGES OF VIEWS FROM MOSTLY AFFECTED VSR
最受影響的視覺敏感受體的景觀合成照片
(SHEET 4 OF 4) (圖 4 之 4)

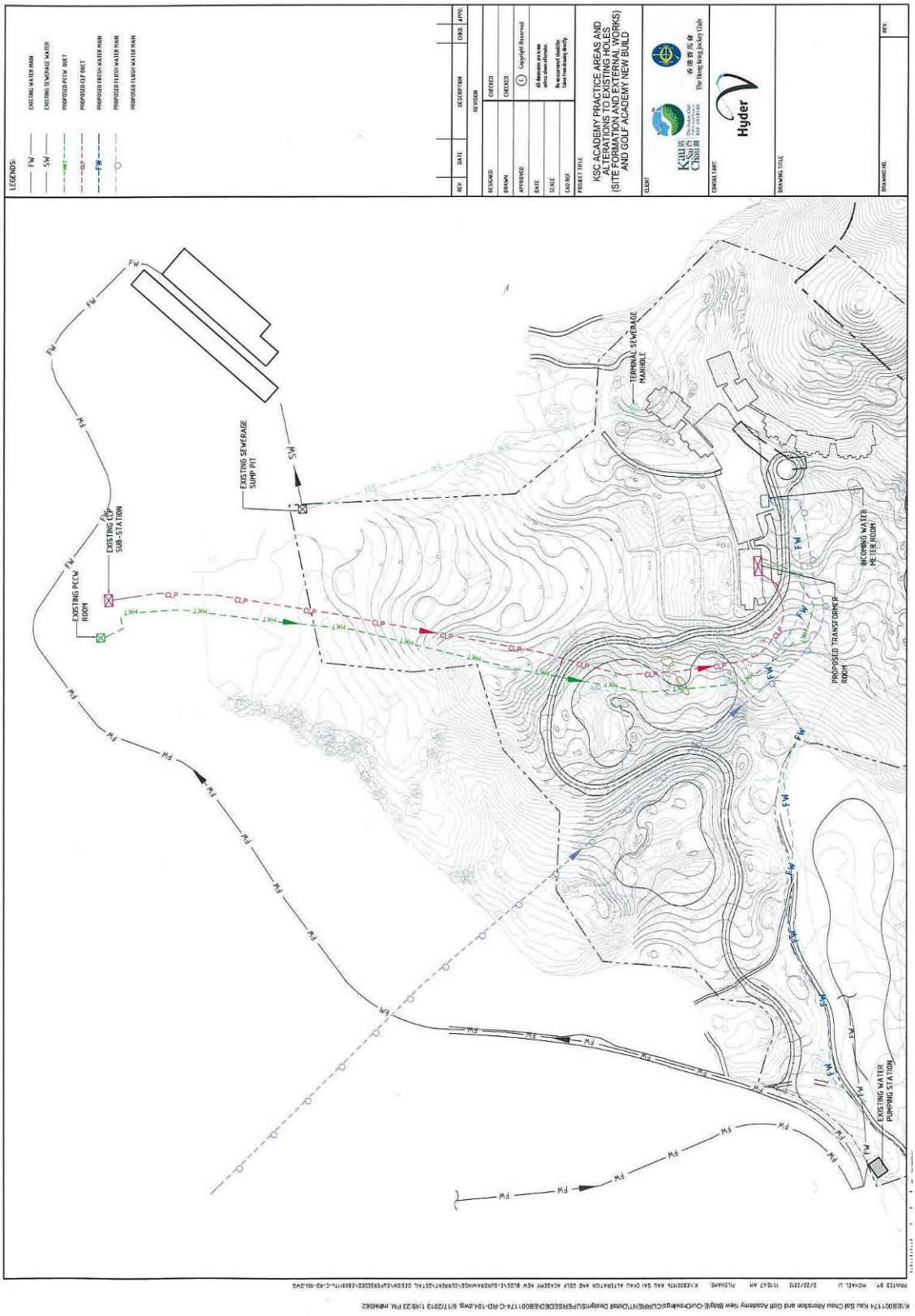
Designed	PKC		Eng check	JC	
Drawn	PKC		Coordination	JC	
Dwg check	JC		Approved	AFK	
Scale at A1		Status	PRE	Rev	P1

Drawing Number

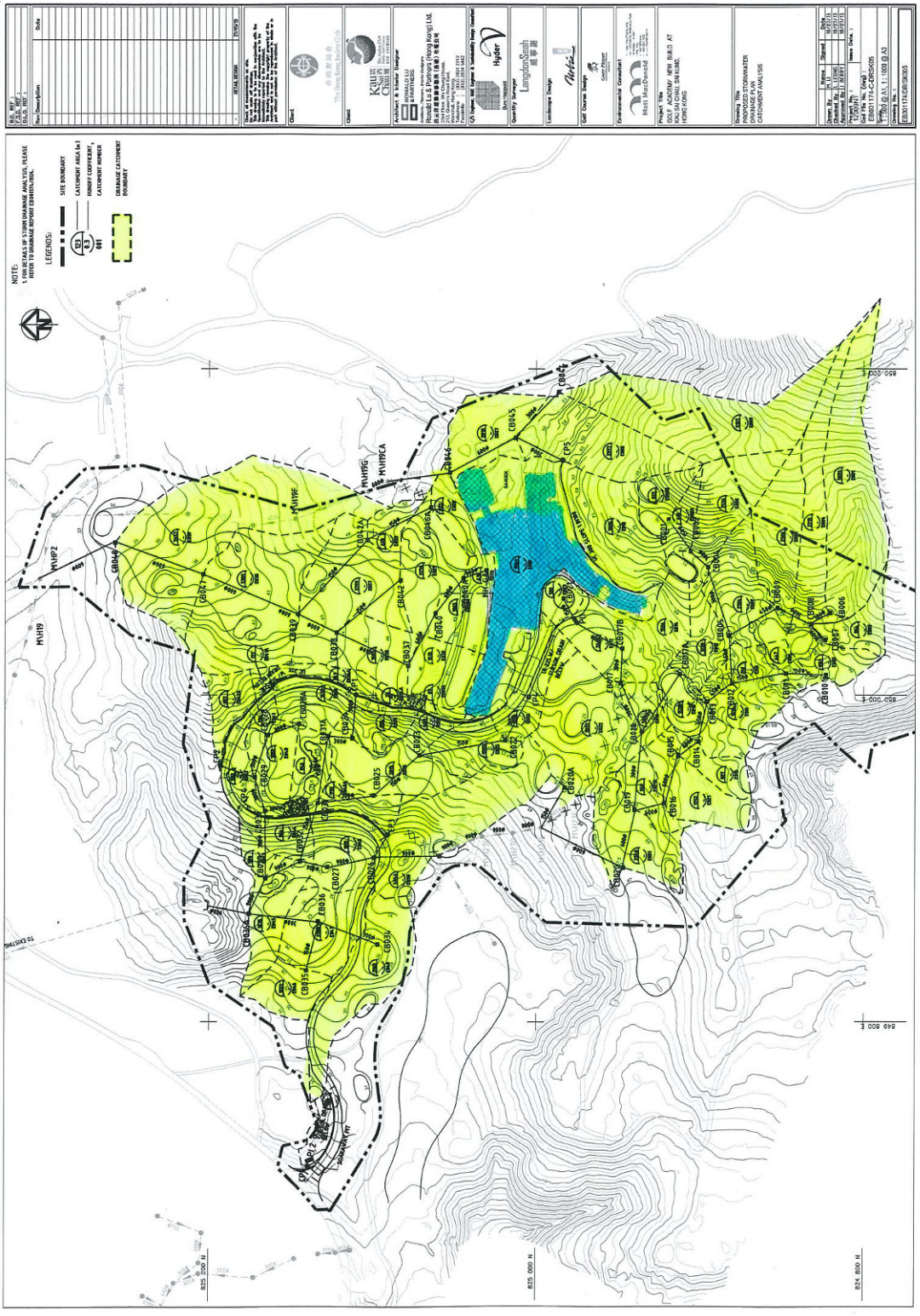
FIGURE 5.1d 圖 5.1d

Appendices

Appendix A. Water Supply and Sewerage pipework

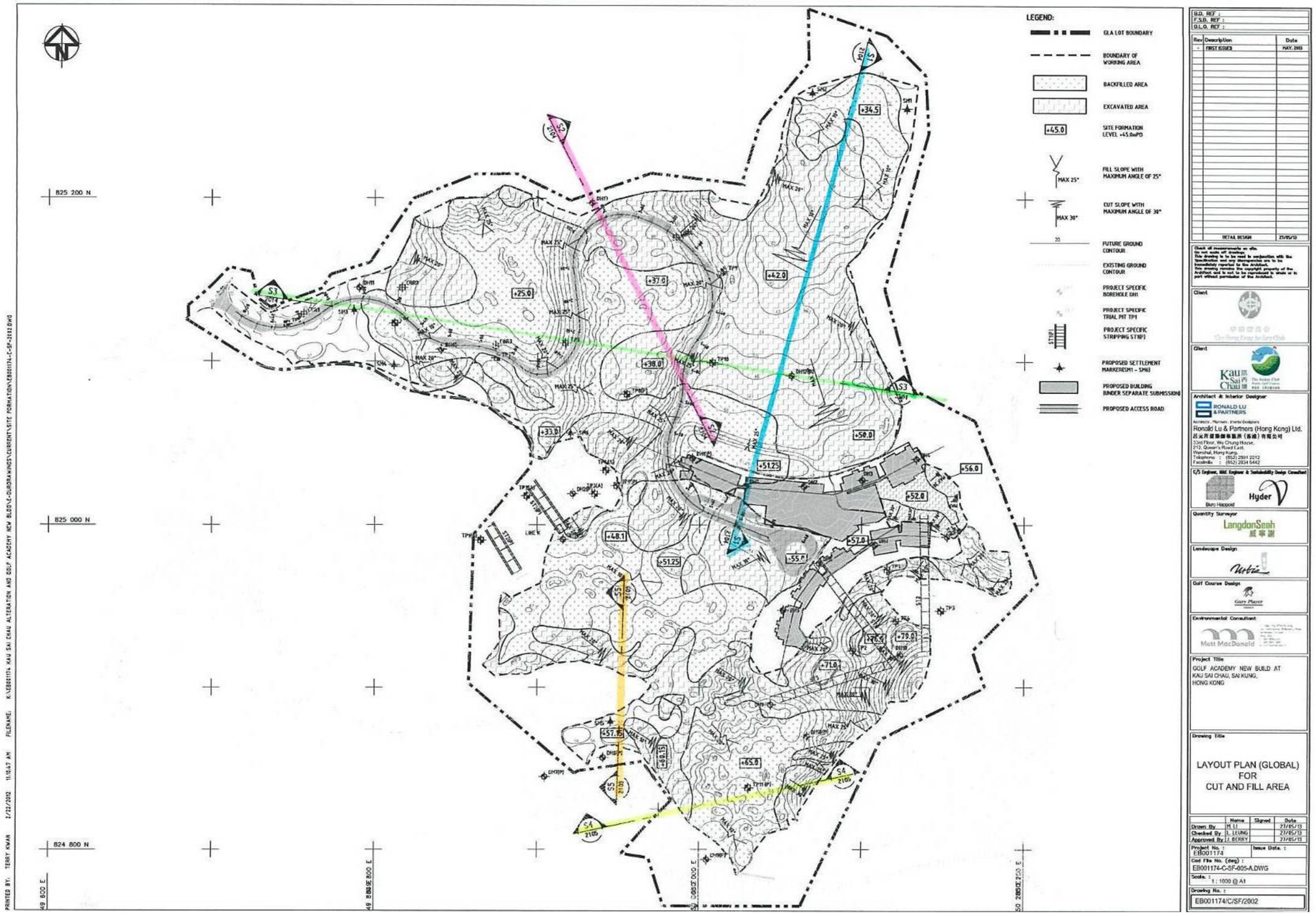


Appendix B. Catchment of the Closed Loop Drainage System

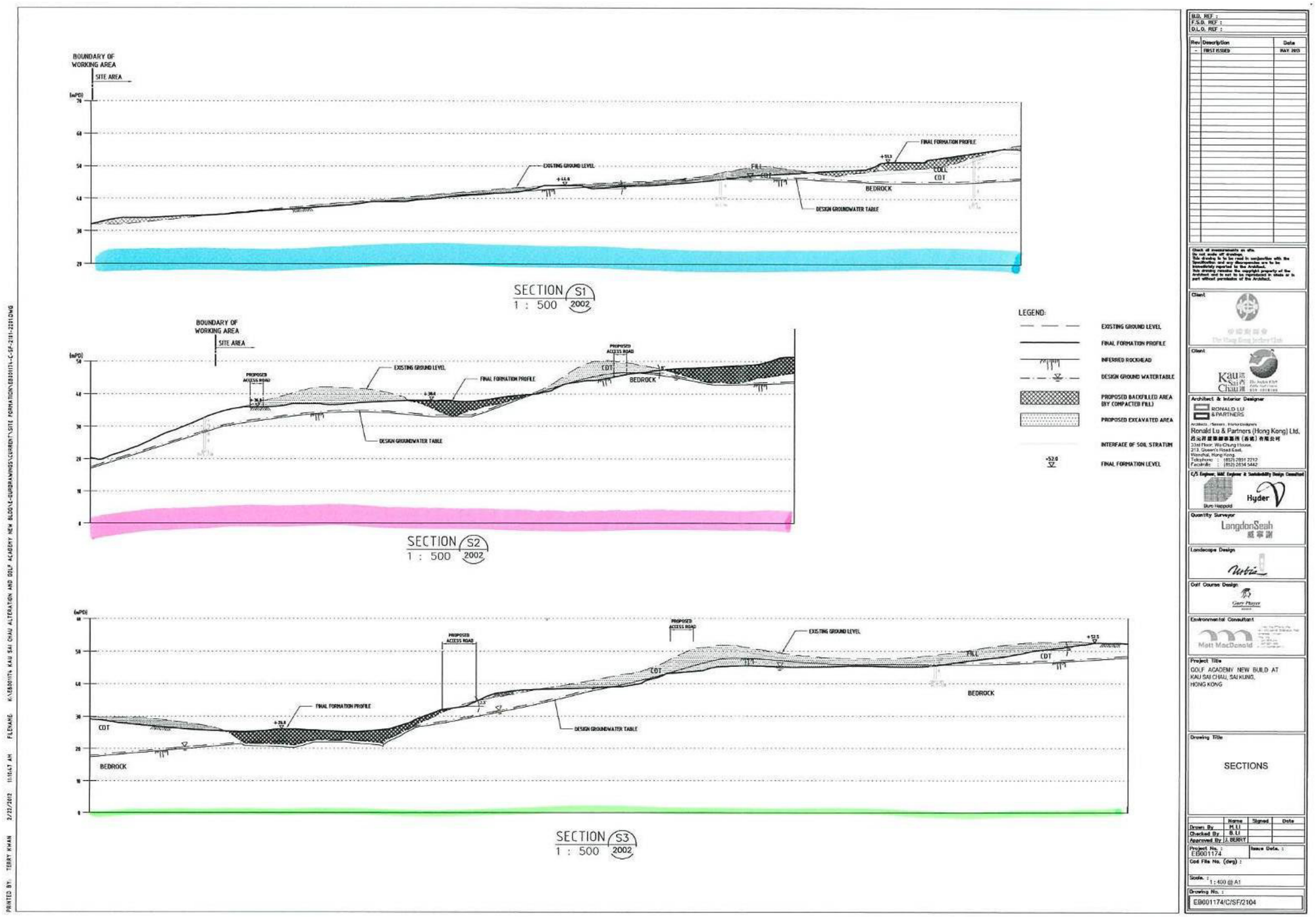


Appendix C. Site Cross Sections

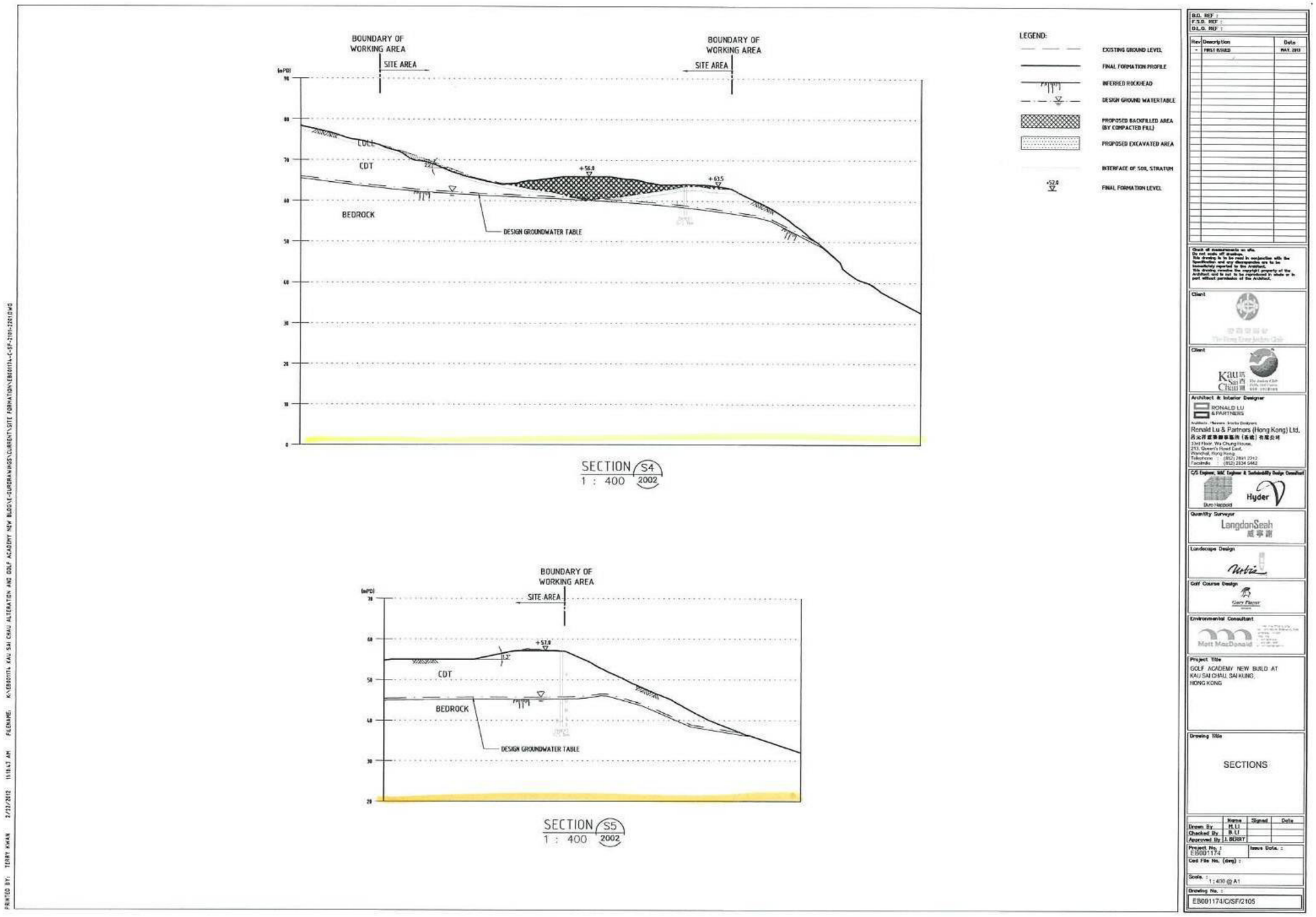
C.1. Location of Cross Sections



C.2. Cross sections through North Project Area



C.3. Cross sections through South Project Area



Appendix D. Upgrade of Sewage Treatment Plant

D.1. Water Quality Impact Assessment

SEWAGE TREATMENT PLANT UPGRADE WORK

Hong Kong Jockey Club (HKJC) is the permit holder of the Environmental Permit (EP) No. EP-224/2005/A under the Environmental Impact Assessment Ordinance (EIAO) for the operation of the Public Golf Course at Kau Sai Chau. The Public Golf Course is served by a Sewage Treatment Plant (STP).

The STP was originally installed with a capacity of 150m^3/day. This was upgraded to 225m^3/day with the addition of a blivet unit in 2005.

It is now proposed to provide a further 80m^3/day capacity by the addition of another blivet unit (of the same maker and model as the 2005 upgrade).

This calculation assesses the potential implication of the extra loading from the upgraded STP on the existing water circulation system beyond the discharge point.

REQUIRED CAPACITY FOR STP UPGRADE

1. The existing STP setup has a maximum rated capacity of 225m^3/day. Typical peak demand recorded to date is 160m^3/day. The excess, or spare capacity is 225 - 160 = **65m^3/day**.

2. The new Golf Academy will accommodate both day and overnight visitors and staff. The estimated users, as confirmed by Kau Sai Chau Golf Club (hereafter referred to as the Operator), is **210** overnight visitor & staff, and **100** day visitors, making a total of **310** persons.

3. The visitors include both sexes and a range of age groups. The usage profile of the visitors when at the academy is dictated by the programme of the Academy, which in turn is defined and controlled by the Operator.

4. The calculation of the sewage flow for the above population is carried out with reference to the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) published by the Environmental Protection Department (EPD). The flow factor used correspond to that recommended for future planning usage for “General – Outlying Island, Sai Kung” class of use, i.e. **0.27m^3/day/capita** for overnight stay visitors. Refer to **Appendix D.2**.

5. The existing STP flow data records have also been obtained from the maintenance contractor and used in back calculation to estimate the actual sewage load on the existing set up. This exercise shows that the actual sewage loading on the system is **significantly less** than the planning values used in point 4 above. The GESF load factors are considered as a conservative assumption for the design of STP upgrade. The resulting design can therefore be regarded as conservative, i.e. more onerous than conditions likely to be encountered in use. Refer to **Appendix D.2** for this back calculation and comparison.

6. Furthermore, a **10%** allowance is included in the sewage flow calculation, resulting in an even greater margin of safety.

7. The total sewage generated by the new Golf Academy is estimated to be **145.33m^3/day**.

8. The capacity required from the STP upgrade is

   Total sewage generated – Excess Capacity of current system

   = 145.33m^3/day – 65m^3/day = **80m^3/day**

   This figure has been used as the proposed sizing of the STP upgrade.

WATER QUALITY IMPACT FROM INCREASED SEWAGE DISCHARGE ON EXISTING RESERVOIR

1. The quality standard applicable to the upgrade would be the same as that applicable to the current STP. Refer to **Table 3.3** in **Section 3.4.4**.

2. Point 6.10.52 from Section 6 of EIA Report No. EIA-112/2005 shows that net increase of Total Inorganic Nitrogen (TIN) and Total Phosphate (TP) from the previous STP upgrade, taking into account nutrient absorption rates at primary catchment, would be equivalent to 0.084kg/day and 0.003kg/day respectively before discharge to the existing reservoir. Upon dilution in the conservatively lowest credible volume of the reservoir (dead storage) of 56,503m^3, this would result in concentrations at undetectable levels. By the same logic, since the effluent from the proposed STP upgrade would also be treated to the same standard, and since the volume of the new STP upgrade would be very similar to that of the previous upgrade (80m^3/day compared to 75m^3/day), the resulting concentration would also be effectively undetectable. Therefore **no cumulative impact on the water quality** to the existing reservoir with the additional load from the sewage treatment work is expected. Refer to **Appendix D.3**.

RISK OF OVERFLOW TO EXISTING RESERVOIR

1. The following are basic parameters of the existing reservoir (from *App A6-2 Land Drainage System* of EIA Report No. EIA-112/2005 – Refer to **Appendix D.4**):

   a. Full Capacity: 464,859m^3 (W.L at 12mPD)

   b. Dead Volume: 56,503m^3

   c. Surface Area: 7ha (approximate)

   d. Lowest Water Level: typically in March, which is the end of the dry season

2. The output from the STP is discharged into the existing reservoir, which supplies water for all irrigation and flushing requirements of the golf course. A **water balance** has been calculated to

compare the volume generated by the STP upgrade against the volume required for flushing and irrigation purposes at the new Golf Academy. Refer to **Appendix D.5**.

3. The most conservative (onerous) result from the balance calculation, which is an **excess of 123.63m^3/day** generated by the STP going into the reservoir, is used for the calculation of overflow risk. This corresponds to the situation during the wettest months of the year (between April and August) when the Golf Academy is in use (thus generating effluent through the STP) but no water is extracted from the reservoir for irrigation purposes.

4. It should be noted that 123.63m^3/day represent **0.027%** of the full reservoir volume, and continuous input of that amount into the reservoir in its near-full state would lead to a **level rise over the month** of:

   (123.6m^3/day x 30 days) / 7 hectares = 123.6 x 30 / (7 x 10000)

   = 0.053m = 53mm level difference to reservoir

   This is considered to be **negligible**.

5. The actual change in level in the reservoir would also depend on rainfall on the primary catchment of the reservoir, evapotranspiration from the study area, and irrigation usage. A more in-depth calculation is therefore provided, based on the calculation presented in *Appendix A6-2 Land Drainage System* of EIA Report No. EIA-112/2005 (Point 4.68 from **Appendix D.4**). This calculation is presented in **Appendix D.6**. The first seven columns are reproduced from the calculations in the current report. Columns 8 to 10 include the impact of the Golf Academy.

6. As shown in the calculation in **Appendix D.6**, with the addition of excess flow from the Golf Academy, the risk of overflow has only changed for the month of **September** (from no risk to yes), with an excess volume of 2891m^3 over the whole month. Using the methodology of point 4.69 from **Appendix D.4** (maximum number of rainy days for August taken over the study period from 1994 to 2004 for which data is available is 3, leading to a frequency risk of 3/365 = 0.82% per year) the maximum number of rainy days in September (from Table 35 of **Appendix D.4**) is 2, leading to a frequency of risk of **0.55%** per year. The same conclusion can therefore be drawn that the overflow volume and frequency is extremely low and therefore acceptable.

7. Moreover, in the event of an overflow, the **concentration** of pollutants in the overflow water would have been **diluted** by the passage through the reservoir (from calculations provided in section assessing water quality, these concentrations would effectively be **undetectable**). Given that the quality of the discharge from the STP, before taking into account any diluting effect of the reservoir, is already more stringent than that required for discharge into coastal waters of Tolo and Port Shelter Water Control Zone (WCZ), **no deleterious effect** on the marine water of the Port Shelter WCZ is expected. This is the same conclusion as Point 4.71 of **Appendix D.4**.

CONCLUSIONS

- The **volume of excess flow** generated by the Golf Academy is **insignificant** compared to the volume of the existing reservoir.

- The **excess flow**, after treatment by the upgraded STP system, will have **no deleterious effect** on the existing water circulation system on the island, including the reservoir.

- Assuming the most onerous credible scenario, using consistently the most conservative assumption on a range of factors (i.e. load factor, requirement for irrigation, rainfall volume, rainfall frequency, operating condition), it is possible to quantify the increase in risk of an overflow event at the reservoir caused by the waste water from the Golf Academy. This is a virtually insignificant increase (<1% per annum) in the month of September. The **volume of overflow** is also considered to be **insignificant**.

- Any **discharge** from the reservoir into the marine environment would have pollutant concentrations significantly lower (**effectively undetectable**) than that allowable for discharge into Tolo and Port Shelter WCZ.

- The Golf Academy and associated STP provision required to serve it would therefore have **no deleterious impact** on the existing condition of the island and the surrounding ecosystem.

D.2. Sewage Calculation for the New Golf Academy

Buro Happold	CALCULATION OF ACTUAL UNIT FLOW FACTOR AT EXISTING KSC FACILITIES	Page 1 of 1
	Project Name: Kau Sai Chau Golf Academy	Project No.: 030573
	By: MJC	Rev: A
	Checked by: PRW	Date:05/12/2013

1.0. Design Assumptions

This calculation of the **ACTUAL UNIT FLOW FACTOR (m3/day/capita)** for the existing facilities at Kau Sai Chau has been calculated to show that the unit flow factor used in the calculation for estimating the daily sewage flow for the proposed new Golf Academy is "conservative".

The existing facility comprising the Administration Building/Clubhouse which is used on a regular basis by members of the public and staff 7 days a week from the hours of 7am to 8pm who spend time on the Golf Course or on the Driving Range. The new Golf Academy will be a facility that will be used far less frequently than the public golf course and is restricted to a maximum number of building users (i.e. 156 visitors (overnight), 100 visitors (day) and 54 staff (overnight))

If the calculated ACTUAL UNIT FLOW FACTOR for the existing facilities at Kau Sai Chau is shown to be "LOWER" than the UNIT FLOW FACTOR used for the estimation of the daily sewage flow for the proposed new Golf Academy, then this would indeed demonstrate that our estimation is conservative.

2.0. Existing Building Occupancy*

	June 2013	July 2013	August 2013	September 2013
Average number of people/day (patrons)	513 people/day	486 people/day	472 people/day	503 people/day
Average number of people/day (staff)	289 people/day	268 people/day	273 people/day	280 people/day
Average number of people/day (total)	**802** people/day	**754** people/day	**745** people/day	**783** people/day

3.0. Existing Effluent Discharge**

	June 2013	July 2013	August 2013	September 2013
Average daily flow (sewage)	90 m3/day	90 m3/day	102 m3/day	97 m3/day

4.0. Calculation

	June 2013	July 2013	August 2013	September 2013
Average Dry Weather Sewage Flow	90 m3/day	90 m3/day	102 m3/day	97 m3/day
Calculated Unit Flow Factor	**0.112** m3/day/capita	**0.119** m3/day/capita	**0.137** m3/day/capita	**0.124** m3/day/capita

5.0. Summary

Calculated Unit Flow Factor (Average)	**0.123** m3/day/capita	*(Average of 0.112, 0.119, 0.137 and 0.124)*
Estimated Unit Flow Factor for sewage flow estimate for Golf Academy (Average)	**0.620** m3/day/capita	*(Average of 0.27, 0.09 and 1.5)*
Difference	**-0.497 m3/day/capita**	

Therefore, this calculation shows that the unit flow factors used for estimating the sewage flow from the new Golf Academy are much higher than the ACTUAL unit flow factors for the existing facility at Kau Sai Chau. The existing facility at KSC is used far more frequently than the proposed new Golf Academy.

This record for the past 4 months is a representative sample, and more historical data can also be provided if required. The past 4 months is also considered to be "peak season" where the water demand would be construed to be higher than the winter season, and therefore, is considered to represent the most onerous conditions.

* based on actual records received from Kau Sai Chau (5th December 2013)
** based on actual records received from the STP Maintenance Service Contractor (4th December 2013)

The Jockey Club Kau Sai Chau Public Golf Course Limited
Number of golfers, general visitors and staff that attended the Golf Course between Jun and Sep 2013

	No of golfers	No of non-golfers	Total no of visitors	Daily avg no of patrons	Daily avg no of staff *	Daily total no of people
Jun-13	11,607	3,771	15,378	513	289	802
Jul-13	11,536	3,540	15,076	486	268	754
Aug-13	10,518	4,126	14,644	472	273	745
Sep-13	11,818	3,259	15,077	503	280	783
	45,479	14,696	60,175	493	278	771

* Including both full-time & part-time staff.

F A X

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Tel: (852) 2690 2208
Fax: (852) 2947 0832

Date: **4 December 2013**

To: Mr. Gerald Tang, Kau Sai Chau Golf Club
Fax No: 2792 0982
From: Chai Wai Leugn
Reference: 5083-PR06A
Subject: Kau Sai Chau **STP Sewage Flow**
No. of Pages: 1 **(including cover)**

Dear Gerald,

The effluent discharged flow from the Sewage Treatment Plant for the month of June 2013 to September 2013 are summarized below:

	Month	Jun 2013	Jul 2013	Aug 2013	Sep 2013
1.	Average Daily Flow	90 m^3/d	90 m^3/d	102 m^3/d	97 m^3/d
2.	Peak Daily Flow	130 m^3/d	130 m^3/d	130 m^3/d	140 m^3/d

Buro Happold	DAILY SEWAGE FLOW ESTIMATION	Page 1 of 1
	Project Name: Kau Sai Chau Golf Academy	Project No.: 030573
	By: PRW	Rev: E
	Checked by: DL Date: 13/12/2012	

1.0. Design Assumptions

The checking of the sewerage system for the proposed works shall be carried out in accordance with the Sewerage Manual Part 1, Drainage Services Department, Hong Kong and the Guidelines for Estimating Sewage Flows for Sewage Infrastructure Planning (GESF) published by the Environmental Protection Department (EPD).

2.0. Building Occupancy (Overnight stay)

Level	Students (Overnight)		Golfers (Overnight)		Staff (Overnight)	
Totals	**60**	**people**	**96**	**people**	**54**	**people**

Confirmed by RLP via email 12/12/2012

3.0. Calculation

	Visitors (Overnight) i.e. Students and Golfer's Rooms		Visitors (Day)		Staff (Overnight)	
Number of people (based on current planning) - RLP drawings dated 17th September 2012	156	persons	100	persons (say)	54	persons
Unit flow factor	0.27	m3/day/capita	0.09	m3/day/capita	1.5	m3/day/capita
Average Dry Weather Sewage Flow	42.12	m3/day	9	m3/day	81	m3/day
Sub-Total			**132.12**	**m3/day**		
Allow 10% margin			**13.21**	**m3/day**		
Total			**145.33**	**m3/day**		

1. It is assumed that the visitor will stay at the golf course at an average duration of 4 hours.
2. It is assumed that visitors will generate 1/3 of the domestic flow of people who stay overnight.

4.0. Summary

Allowed Sewage (current EPD permit) / Sewage Treatment Plant existing capacity	225	m3/day	(according to Feasibility Study)
Sewage Treatment Plant (typical maximum demand)	160	m3/day	(according to Feasibility Study)
Additional sewage flow from new Golf Academy Building	**145.33**	m3/day	
Total New Sewage flow (with Golf Academy included)	**305.33**	**m3/day**	
Required Additional capacity of Sewage Treatment Plant	**-80**	**m3/day**	

Therefore, the existing Sewage Treatment Plant will need to be upgraded/extended to allow for the increase in sewage from the new Golf Academy Building.

D.3. Excerpt from Chapter 6 of EIA Report No. EIA-112/2005

implementation of proposed closed drainage system, annual run-off from Holes S1, S7 and S9 (1,219 m³) will be diverted back to the existing reservoir for irrigation rather than flowing into the existing marsh, and the net run-off flow volume into existing marsh will be reduced by 7.3%. In terms of turfgrass area, there is a net reduction of 6.6% with the proposed drainage system.

6.10.38 There is a pond as the final receptor located in the secondary catchment of the existing golf courses prior water overflow to the marine water. The pond is bound on the upstream by the marsh and has been efficiently acting as a sink for various nutrients, and on the downstream side by a concrete weir. Thus, in the dry season the pond is effectively an enclosed water body, but overflow to the sea occurs when water supply is adequate in heavy rain.

6.10.39 The predicted run-off concentration at Hole 5 and part of Hole 6 during the first 3-month establishment (worst case scenario) is extremely low. The predicted TIN and TP concentrations before discharge into the marsh are 0.08 mg/L and 0.014 mg/L respectively (Appendix A6.2). The water quality monitoring results at the marsh for TIN and TP ranged from 0.2-1.7 mg/L and 0.01-0.1 mg/L respectively. Total inorganic nitrogen concentrations from Hole 5 and part of Hole 6 during 1 in 2-year rainstorm events comply with (i) Table 6.4 guideline values for the existing golf course (TIN $\leq$ 0.145 mg/L) and (ii) WQO guideline value at Port Shelter WCZ ($\leq$ 0.1 mg/L) (Table 6.1). For total phosphate, there is no WQO guideline value at Port Shelter. The predicted concentrations of TP are in compliance with the Table 6.4 guideline values (TP $\leq$ 0.09 mg/L). Thus, no adverse impact on water quality is expected from Hole 5 and part of Hole 6 during the operation phase of the proposed third golf course.

6.10.40 In addition, monitoring results at Marine Station B (immediate discharge from pond after marsh) over the past 9 years show that all run-off are well below the WQOs standards at Port Shelter WCZ. With the 7.3% flow reduction to the marsh when the proposed third golf course comes into operation, no impact on the water quality is expected.

Overflow events

6.10.41 The predicted maximum frequency of overflow events (based on rainfall in Hong Kong over the past 10 years) at the proposed new lakes (lake near Hole 4 and lake near Hole 10) is 7 days per year only (storm event greater than 1 in 2-year return period), and it is considered to be low (1.91% per year). The TIN concentration from the new lakes during overflow is well within the WQO standard. No water quality impact is expected from the closed low flow land drainage system during the operation phase of the proposed third golf course.

Additional Sewage Discharge during Operation

6.10.42 During the operation phase, the increased amount of effluent generated will be directed to the licensed sewage treatment works (STP) on the site of the existing golf courses. The STP will need to be extended to accommodate the additional flows, with the maximum capacity increasing from 150m³/day to 225 m^3/day.

6.10.43 The existing STP is based on the Rotating Biological Contactor (RBC) technology and includes for sludge dewatering (filter press). It is proposed to install a new STP adjacent to the existing plant to cater exclusively to the additional flow (75m³/d) from the expansion of golf course to minimize the disruption to the existing STP. The two flows will be combined and use for irrigation and recycle purposes. The new STP can be installed prior to the completion of the clubhouse renovations such that part of the flow to the existing plant can be diverted to the new plant for the purpose of pre-commissioning the biological elements of the new plant.

6.10.44 After passing through the new STP, semi-treated wastewaters will be returned to the existing plant for treatment. In this way, biomass will steadily accumulate in the new plant to the point where the new plant was fully commissioned. At such time as the clubhouse expansion will be completed, the additional 75m^3/day of sewage generated will be fully treated from day one which provides a "seamless" transition. An additional benefit would be that, during the commissioning of the new STP, loads to the existing plant would be reduced thus enhancing its performance.

6.10.45 It is proposed that the 75m^3/day of sewage which will be generated in the extended clubhouse facilities will be combined with the 150 m^3/day of sewage currently generated in the clubhouse facilities. The combined flow will then be delivered to the influent bar screens at the existing sewage treatment plant. On passing through the bar screens, the combined sewage flow will be collected in the existing flow balance tank.

6.10.46 150 m^3/day of the combined flow collected in the balance tank will be treated in the existing plant as per the present day situation. The remaining 75m^3/day of the combined flow collected in the balance tank will be drawn off at a constant rate by new pumps installed in the existing balance tank. These pumps will be controlled by level sensors and a new control panel.

6.10.47 The 75m^3/day of sewage will be pumped to a new STP located adjacent to the existing STP. This new STP will operate totally independently of the existing plant other than for sludge handling. Sludge stored in the new STP will be periodically drawn off and dewatered in the existing sludge dewatering facilities.

6.10.48 To provide ensure the plant meets the *E.Coli* standard the existing UV disinfection lamps shall be replaced with larger units. In addition the existing micro-drum filters shall be replaced with larger units to ensure the suspended solid (SS) is maintained.

6.10.49 All discharges during the operation phase of the proposed extension of Sewage Treatment Works (STWs) located at the existing golf courses are required to comply with Technical Memorandum for Effluents Discharged into Drainage and Sewerage Systems, Inland and Coastal Waters issued under Section 21 of the WPCO. The existing effluent discharge standard for the STW include BOD (20 mg/L), COD (80 mg/L), SS (30 mg/L) and E. coli (100 cfu/100mL) and these shall be maintained. Application for a discharge licence variation for the proposed changes to the existing STWs should be made and consulted in advance to the Environmental Compliance Division of EPD before the operation of the STWs.

6.10.50 The STW plant extension will be subject to detailed design by the specialist plant suppliers employed by the main contractor and shall meet the requirements of the

performance specification provided by the Engineer in the contract documents. The contractor shall be responsible to liaise with EPD and seek approval and agreement to modification of the discharge consent permit.

6.10.51 Treated Effluent from the STP will continue to be directed to the reservoir on the existing golf courses. Lake 1 at the existing golf courses is the first collection point, and the maximum total inorganic nitrogen and total phosphate concentrations recorded over the past 9 years were 6.06 mg/L and 0.42 mg/L respectively. The effluent water was diverted to a series of lakes at the existing golf courses and finally discharge to the existing reservoir for reuse and recycling as golf course irrigation over the past 9 years. The turfgrass at the primary catchment of the existing golf course acted as a filter system and can polish the treated effluent from the sewage treatment plant.

6.10.52 A net increase of TIN and TP loads of 0.42 kg/day and 0.03 kg/day from the STW is expected during the operation phase of the third golf course. The treated effluent from the sewage treatment works will also be using the same way through the same dischrage route (series of lakes and turfgrass area) before final storage in the existing reservoir for irrigation. The lowest nutrient absorption rates by the turf at the primary catchment for TIN and TP are 98 and 99% (please refer to Appendix A6.2 for details), and the expected TIN and TP concentrations before discharge to the existing reservoir are 0.084 kg/day and 0.003 kg/day. If the lowest reservoir volume (dead storage) is 56,503 m³, both estimated TIN and TP concentrations are at undetectable levels. No cumulative impact on the water quality to the existing reservoir with the additional load from the sewage treatment work is expected.

6.11 Mitigation Measures

Key mitigation measures during Construction Phase

- Proposed 18-hole Golf Course Layout Design – buffer zone at streams;
- Run-off and Drainage Management – silty and turf establishment run-off;
- Concrete bridge construction;
- Dredging during construction of desalination plant's intake and outfall;
- General construction activities;
- On-Site Sewage Effluents; and
- Concrete batching plant.

Key mitigation measures during Operation phase

- Chemicals and Pesticides Run-off (closed low flow drainage system); and
- Hole 5 and part of Hole 6 – Filter system and biopesticides.

Construction Phase

Proposed 18-hole Golf Course Layout Design

6.11.1 Three main sensitive streams (Stream A, B and C) were identified on the site of the proposed third golf course (Figure 6.6a). To avoid and minimize the water quality impacts on all identified sensitive streams during the construction phase, the proposed third golf course design layout has been carefully designed (mainly for Hole 10, 15, 16 and 17) to maintain the integrity of all sensitive streams.

6.11.2 Crossings would be required at the streams for access to fairways (greenskeeping equipment, golfers, golf buggies). Three permanent bridges are proposed, one at each stream course (Figure 6.5a). Two of these permanent bridges (at Streams A and C) would be supported by piers behind the stream banks and thus would not encroach onto the stream beds or stream banks. The bridge at Stream B would be a culvert bridge, with the stream passing beneath the bridge through a 450 mm diameter pipe. Two additional culvert crossings are proposed at the highest reach of tributary B1 of Stream B. In contrast to the underground pipe culvert at tributary A2, these culverts are only to enable passage of golfers and buggies, and are therefore much shorter (less than 2 m in length). They are also located at the highest and steepest stream reach of tributary B1. This reach of the stream would be dry during most of the year.

6.11.3 All sensitive streams are protected through the use of buffer zones along the length of the streams. For the golf course design of Holes 15/16, the whole length of Stream C is protected through the use of the buffer zones (20m on both sides) as conservative and precautionary measures. For Streams A and B, the smaller tributary of Stream A2 and an old tributary of Stream B3 (relatively non-sensitive) will be partially turned into underground channels due to engineering design constraints and playability issues for the proposed third golf course. For the partly channeled portions at Streams A and B, water flow path will be maintained during the construction phase (temporary diversion if necessary) and the operation phase (underground pipes) of the proposed third golf course. The proposed underground pipe proposed is to ensure (i) no dehydration impact at the downstream location of the stream which can support fish species and other aquatic species and (ii) maintaining the water flow during the operation phase of the proposed third golf course.

6.11.4 Twenty-metre (20 m) buffer zones on both sides of the streams will be demarcated as a preventative mitigation measure to reduce disturbance during construction phase of the golf course, except for the portions of Streams A, which is of low ecological value, and an old tributary of Stream B. Details of the terrestrial ecological assessment are presented in Chapter 8. On one side of part of the Stream B, the buffer zone would be reduced to 5m, and this relatively small buffer zone is proposed due to space limitation and playability requirement of the golf course at the proposed Hole 10. The buffer zones are shown in Figure 6.6b.

6.11.5 For construction activities which must be carried out near natural streams (within the buffer zone), mainly the construction of crossings, preventative mitigation measures during the construction stage should be followed by the contractor. These are as follows:

- The proposed works site inside or in the proximity of natural streams should be temporarily isolated, by placement of sandbags or silt curtains and

D.4. Excerpt from Appendix A6-2 of EIA Report No. EIA-112/2005

Table 30 Predicted Concentrations at Irrigation Lake 1D (After Establishment)

	TIN	TP
Annual fertilizer load#	465 kg/ha x 19.94 ha = 9272 kg N	47 kg/ha x 19.94 ha =937 kg P
Annual residual load##	9272 x (1-0.984) = 148 kg N	937 x (1-0.994) = 5.6 kg P
Annual runoff volume from Holes 1-18 + S1,S7,S9*	2381111 m^3	
Expected concentrations at Irrigation Lake 1D	(148/2381111)x1000 = 0.06 mg N/L	(5.6/2381111)x1000 = 0.002 mg P/L

Remarks:
- Please refer to Table 13 for fertilizer load; ## - Please refer to Table 10
* - The annual rainfall volume is lowest record of the past 10 years in Hong Kong.

(v) Existing reservoir

4.65 The expected pollutant concentration at the Irrigation Lake 1D is better than the 9 years monitoring data at existing reservoir as shown in Table 31.

Table 31 Proportion Flow of Additional Pollutant Load to Existing Reservoir

	m^3	flow proportion
Existing Reservoir	439,007$^{\Omega}$	0.942
Additional 1 in 2 yrs surface runoff volume from the third golf course and part of the existing golf course (S1, S7 and S9)	25,852	0.058

Remark: $^{\Omega}$ - Worst case scenario: Assume the existing reservoir has already contained 439,007m^3 of water (maximum volume is 464859 m^3), the addition pollutant flow from the proposed third golf course (Irrigation lake) and existing golf course (S1, S7 and S9) will induce the overflow event at existing reservoir during 1 in 2 years rainstorm event.

Table 32 Expected Existing Reservoir Pollutant Concentrations with the additional Pollutant Load during the Operational Phase of the Proposed Third Golf Course

Concentration at Irrigation Lake 1D		Concentration at existing reservoir		Flow proportion		Cumulative concentration at existing reservoir	
TIN (mg/L)	TP (mg/L)	TIN (mg/L)	TP (mg/L)	Lake 1D	Reservoir	TIN (mg/L)	TP (mg/L)
First Year: Turf establishment period (First 3 months) + 9 months of after establishment period							
0.08	0.014	0.86	0.1	0.058	0.942	0.08 x 0.058 + 0.86 x 0.942 = 0.814 mg/L	0.014 x 0.058 + 0.1 x 0.942 = 0.095 mg/L
Second Year: 12 months of Establishment period							
0.06	0.002	0.86	0.1	0.058	0.942	0.06 x 0.058 + 0.86 x 0.942 = 0.813 mg/L	0.002 x 0.058 + 0.1 x 0.942 = 0.094 mg/L

Remarks: TIN and TP at existing reservoir is the highest record over the past 9 years monitoring data (worst case scenario)

4.66 The expected TIN and TP concentrations (Table 30) with the addition of the pollutant load from the proposed third golf course at the existing reservoir is well within the range of water quality at existing reservoir over the past 9 years (TIN range from 0.4 to 0.86 mg/L; TP range from 0.02 to 0.1 mg/L). Therefore, no cumulative impact to the water quality at the existing reservoir during the operational phase of the third golf course is expected when 1 in 2 years rainstorm event occurs. The volume of the additional flow from the proposed third golf course is only 4% to the existing reservoir.

4.67 Overflow events at the existing reservoir was extremely low over 9 years operational phase of the existing golf course but there is no available record for the frequent of the overflow event at the existing reservoir. The most relevant record is water level at the existing reservoir. Based on the Jockey Club experience, water level at the existing reservoir in March is the lowest when it compares to any other months with a year. It normally takes at least 2-3 months to refill the existing reservoir at the full capacity but depends on the rainfall volume, irrigation usage and evapotranspiration rate at existing golf course.

4.68 All assumptions are based on the worst case scenario to estimate the overflow event at the existing reservoir, they are shown as follows:

(i) Highest volume recorded in the existing reservoir in March over past 9 years is approximate 340,897 m^3 (recorded at 8.8 mPD); Full capacity of the existing reservoir (12 mPD equals to 464,859 m^3); and

(ii) Maximum monthly rainfall recorded based on the past 10 year's rainfall record.

Table 33 Estimation on the overflow events at the existing reservoir

	Maximum rainfall# (m^3)	ET## (m^3/month)	Irrigation usage (m^3/month)	Net volume flow into reservoir (m^3)*	Volume in the existing reservoir (before) m^3	Volume in the existing reservoir (after) m^3	Probability of overflow event at existing reservoir
Jan	8,880	40,406	50,341	-81,867	-	-	-
Feb	18,216	36,598	53,583	-71,964	-	-	-
Mar	25,389	42,504	24,154	-41,270	-	-	-
Apr	61,289	50,784	8,873	1,632	340,897	342,529	No < 464,859 m^3
May	120,188	63,480	38,064	18,644	342,529	361,172	No < 464,859 m^3
Jun	142,692	69,883	26,332	46,477	361,172	407,649	No < 464,859 m^3
Jul	122,768	83,076	33,607	6,086	407,649	413,735	No < 464,859 m^3
Aug	148,536	74,962	17,898	55,676	413,735	469,411	Yes > 464,859 m^3
Sep	113,736	66,571	56,367	-9,202	-	-	-
Oct	54,952	62,266	56,367	-63,681	-	-	-
Nov	13,320	49,018	44,956	-80,653	-	-	-
Dec	10,360	42,338	51,459	-83,437	-	-	-

Remarks:
- Rainfall water flows into the existing reservoir (HKO)
- Evapotranspiration rate (HKO)
* Net volume flow into reservoir = Maximum rainfall - evapotranspiration - irrigation usage

4.69 Table 31 shows that no net water is runoff into the existing reservoir for storage during September to March (negative value) due to the rainfall volume gain is less than evapotranspiration loss and irrigation usage. Net water only starts built up in the existing reservoir from April to August gradually. Overflow event happens only during August based on the worst case scenario estimation, the excess quantity is 4,552 m^3. Maximum number (past 10 years) of rainy days in August is 3 days. The overflow volume and frequency is considered extremely low (0.82% per year).

4.70 Table 34 shows the decreasing trend of annual rainfall over years.

Table 34 Monthly rainfall (mm/month) over the past 10 years in Hong Kong

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Annual
1994	0	50.5	26.5	6	183.7	290.2	1147.2	597.6	298.9	2.2	0.2	122.6	2725.6
1995	21.1	33.1	32.4	76.3	20.8	243.9	668.7	1090.1	81.4	476.9	1.8	7.9	2754.4
1996	1.3	27.2	83.1	228.7	313.9	404	230.3	308.3	604	44.8	3.5	0	2249.1
1997	44.6	111.7	34.8	133.2	300.8	783.6	746	829	232.9	112.8	7.1	6.5	3343.0
1998	48.9	153.7	55.3	237.1	335.2	814.5	267.2	245.4	230.9	133.9	28.8	13.7	2564.6
1999	4.5	0	23.6	176.9	177.8	197.4	203.8	892	365.7	38.8	15.7	32.9	2129.1
2000	70.3	27.6	40.9	547.7	208.3	443.3	304	600.7	152.6	204.1	96.8	56	2752.3
2001	47.6	10.9	56.5	133	162	1083.6	656.4	318.9	563.3	10.7	23.3	44.6	3110.8
2002	25	4.6	238.7	12.4	275.6	237.6	320.8	365.9	723	199	23.3	64.1	2490.0
2003	21.7	15.1	38.6	84.5	249	523.5	101.8	415	394	48.6	50.1	0	1941.9
2004	51	51.8	104.3	147.2	194.4	144.7	386.7	488.5	167.3	2.3	0.4	0	1738.6

4.71 Moreover, the additional flow from the proposed third golf course will theoretical dilute the concentration of pollutant in the reservoirs but the effect is insignificant. Even overflow event occurs at the existing reservoir, all marine monitoring locations including Fish Culture Zones of Tai Tau Chau and Kai Lung Wan are well within the WQO guidelines of Port Shelter over the past 9 years monitoring data. Therefore, no impacts will be anticipated during the normal operation or overflow events at the existing reservoir.

5. Prediction on overflow occurrence - Past 10 years rainfall record in Hong Kong

4.72 Maximum rainfall (mm/day) in Hong Kong over the past 10 years is summarized at Table 35. The rainfall record showed that rain occurs mainly at wet season dominantly between April to September.

Table 35 Maximum rainfall over the past 10 years in Hong Kong

	Maximum rainfall (mm/d)											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
1994	25	4.1	14.6	**167**	69.1	**187**	53.8	**197**	93.9	116	44.1	25.8
1995	2.2	0	3.6	81.5	46.9	148	86	**288**	128	30.8	15.7	10.8
1996	51.8	69.3	14.9	88.2	99.8	118.9	128.9	78.9	66.9	53	10.8	7.8
1997	30.5	33.9	7.8	63.4	56.6	145.1	122.6	**199.7**	96.3	54.6	3.2	4
1998	31.8	58.4	14.6	76.4	78.1	**411.3**	80.8	41.9	65.7	54.4	14.7	8.4
1999	2.4	0	7.9	81.5	46.9	61.3	41.8	**207.4**	**276**	30.8	15.7	4
2000	32.6	4.8	14.6	**172.5**	69.1	**168.1**	53.8	**153.2**	93.9	116	44.1	25.8
2001	27.3	8.8	46.2	46.6	50.8	136.4	142.1	90.6	133.2	9.2	1.1	18.4
2002	13.7	2.6	130	9.2	56.3	109.2	71.8	91.7	**162.8**	66.2	9.2	23
2003	16.5	14.4	10.7	65.4	141.1	134.3	31.2	77.5	97	32.7	32.7	40.3
2004	30.7	15	89	55.4	124.4	34.2	94.3	114.7	58.8	2.3	0.4	1
Max. rainfall over 10 years of rainfall record	51.8	69.3	130	172.5	141.1	411.3	142.1	288	276	116	44.1	40.3

Remarks:
The data is provided by Hong Kong Observatory
Data with **bold and underline** means rainfall >149 mm/d.

4.73 For rainfall intensity for 1 in 2 years is 149 mm/d[3] (8 hrs) (The maximum capacity for the proposed low flow drainage system can be catered). If the rainfall intensity exceeds this intensity, overflow at the proposed new lakes may occur at the new proposed lakes near Holes 4 and 10.

4.74 Table 34 presents the number of days which the rainfall in Hong Kong is greater than 149 mm/d based on the past 10 year's maximum rainfall record. The predicted maximum overflow frequency from the new lakes is 7 days per year only at the proposed new lakes. With the low overflow event occurrence frequency is expected, no water quality impact is anticipated during the operational phase of the proposed third golf course.

Table 36 Number of days that rainfall greater than the retaining capacity of proposed new lakes

Days	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec	Sub-Total
1994	0	0	0	0	0	1	0	2	0	0	0	0	3
1995	0	0	0	0	0	0	0	1	0	0	0	0	1
1996	0	0	0	0	0	0	0	0	0	0	0	0	0
1997	0	0	0	0	0	0	0	1	0	0	0	0	1
1998	0	0	0	0	0	1	0	0	0	0	0	0	1
1999	0	0	0	0	0	0	0	3	1	0	0	0	4
2000	0	0	0	1	0	1	0	1	0	0	0	0	3
2001	0	0	0	0	0	0	0	0	0	0	0	0	0
2002	0	0	0	0	0	0	0	0	2	0	0	0	2
2003	0	0	0	0	0	0	0	0	0	0	0	0	0
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
Max	0	0	0	1	0	1	0	3	2	0	0	0	**7**

[3] Despite some variations in extreme rainfall across the Territory, the rainfall statistics at RO headquarters/King's Park are recommended for general application because of long-term and good quality records at other stations are not readily available in digitized form for statistical analysis. The recommended Intensity-Duration-Frequency (IDF) relationship is based on the Gumbel Solution in the frequency analysis of the annual maximum rainfall recorded at RO Headquarters and King's Park (RO, 1991). For detail calculation, please refer to DSD Stormwater Drainage Manual (Planning, Design and Management).

APPENDIX A

WATER QUALITY MONITORING DATA AT EXISTING GOLF COURSE (1996-2004)

Freshwater Monitoring Results (1996-1999)

		Ammonia Nitrogen (mg/L)	Nitrite Nitrogen (mg/l)	Nitrate Nitrogen (mg/L)	Total Kjeldah Nitrogen (mg/L)	Total Phosphate (mg/L)	Ortho Phosphate (mg/L)	Chl a (µg/L)
Lake 1	Oct-96	<0.1	0.07	5.89	1.7	0.05	<0.01	45
Lake 1	Nov-96	<0.1	0.07	1.88	0.6	0.21	0.09	20
Lake 1	Dec-96	1.5	0.17	1.89	1.8	0.21	0.04	10
Lake 1	Jan-97	4.1	0.93	3.77	4.8	0.39	0.32	<5
Lake 1	Feb-97	<0.1	0.03	2.09	1.1	0.27	0.04	<5
Lake 1	Mar-97	0.6	0.33	2.53	1.8	0.36	0.13	<5
Lake 1	Apr-97	<0.1	0.04	2.55	0.6	0.18	0.15	25
Lake 1	May-97	<0.1	0.04	0.92	1.5	0.17	0.03	95
Lake 1	Jun-97	0.2	0.02	0.86	1.1	0.19	0.11	10
Lake 1	Jul-97	<0.1	0.02	1.06	0.8	0.1	0.04	170
Lake 1	Aug-97	<0.1	<0.01	1.14	0.8	0.03	<0.01	65
Lake 1	Sep-97	0.2	0.04	1.06	1.2	0.13	0.07	15
Lake 1	Oct-97	<0.1	0.02	0.63	0.6	0.05	<0.01	15
Lake 1	Nov-97	<0.1	0.05	1.85	0.7	0.09	0.02	40
Lake 1	Dec-97	<0.1	0.02	2.22	0.6	0.04	0.02	30
Lake 1	Jan-98	0.3	0.18	3.09	1.6	0.08	0.08	115
Lake 1	Feb-98	0.4	<0.01	1.57	1.5	0.14	0.08	10
Lake 1	Mar-98	<0.1	0.02	2.32	1.3	0.42	0.02	25
Lake 1	Jun-98	<0.1	<0.01	0.08	0.2	<0.01	<0.01	<5
Lake 1	Oct-98	<0.1	0.04	0.73	0.8	0.09	<0.01	55
Lake 1	Jan-99	<0.1	0.05	4.9	0.9	0.04	<0.01	25
Lake 1	Mar-99	<0.1	0.02	1.22	1.5	0.04	<0.01	15
Lake 1	Jun-99	<0.1	<0.01	2.04	1.1	0.08	<0.01	25
Lake 1	Sept-99	<0.1	0.04	1.08	0.8	0.36	<0.01	30
Reservoir	Jul-95	0.42	0.04	0.33	1.52	<0.01	0.02	15
Reservoir	Sep-95	<0.1	<0.01	0.56	0.1	<0.01	<0.01	15
Reservoir	Oct-95	0.2	0.15	0.38	1.3	0.03	<0.01	20
Reservoir	Jan-96	<0.1	<0.01	0.5	0.5	<0.01	<0.01	<5
Reservoir	Apr-96	<0.1	0.09	0.68	0.5	0.08	0.06	25
Reservoir	May-96	<0.1	0.03	0.57	0.3	0.17	<0.01	60
Reservoir	Jun-96	<0.1	0.03	0.68	1	0.11	0.36	75
Reservoir	Jul-96	<0.1	0.06	0.70	1.5	0.14	0.23	<54
Reservoir	Aug-96	<0.1	0.06	0.44	1.2	0.18	0.16	45
Reservoir	Oct-96	<0.1	<0.01	0.06	3.5	0.16	0.11	240
Reservoir	Oct-96	<0.1	<0.01	0.84	1.1	<0.01	<0.01	<5
Reservoir	Nov-96	<0.1	0.03	0.76	0.4	0.04	<0.01	20
Reservoir	Dec-96	<0.1	<0.01	0.75	1.2	0.02	0.04	10
Reservoir	Jan-97	<0.1	0.04	0.82	0.6	0.03	<0.01	<5
Reservoir	Feb-97	<0.1	<0.01	0.68	0.2	0.03	<0.01	10
Reservoir	Mar-97	<0.1	<0.01	0.59	0.6	0.02	<0.01	10
Reservoir	Apr-97	<0.1	<0.01	0.14	0.8	0.04	<0.01	45
Reservoir	May-97	<0.1	0.04	0.16	0.8	0.05	0.02	20

D.5. Water Balance Calculation for the New Golf Academy

Taking into account the total volume of sewage generated by GA

GENERATION

1)	Sewage from GA building (figure from MEP engineer, calc version as shown)	145.33	m3/day	(from 131213 - KSC GA Sewerage calculation_revE_unit flow factor)
	Treated sewage effluent is assumed to have 100% recovery of the sewage quantity for assessment of the impact on the discharge to the reservoir for storage, and then to be reused for toilet flushing and irrigation purposes.			

DEMAND

1)	Flushing Water requirement 310 (staff & visitor) X 0.07 m3/day/head (WSD requirement)	21.7	m3/day	
2)	Irrigation requirement for GA building landscape:	32.0	m3/day	(figure from landscape architect, Urbis)
3)	Irrigation requirements for practice area adjacent to GA	52.0	m3/day	(figure from golf-course designer, typical consumption)
	Total demand	105.7	m3/day	

WATER BALANCE

Scenario 1: irrigation water extracted at usual rate

GENERATION - DEMAND = 145.33 - 105.7 = **39.63** m3/day

Scenario 2: wet season, only flushing water extracted (this is logical, since STP output would only occur with occupancy at the Academy, which would create flushing requirement)

GENERATION - DEMAND = 145.33 - 21.7 (flushing only) = **123.63** m3/day

Scenario 2 above is the most conservative case, and shall be used in calculations for estimating reservoir overflow risk.

D.6. Calculation of Risk of Overflow

Table 33 Estimation on the overflow events at the existing reservoir
(Columns A to G taken from Appendix A6-2 Land Drainage System of EIA-112/2005)

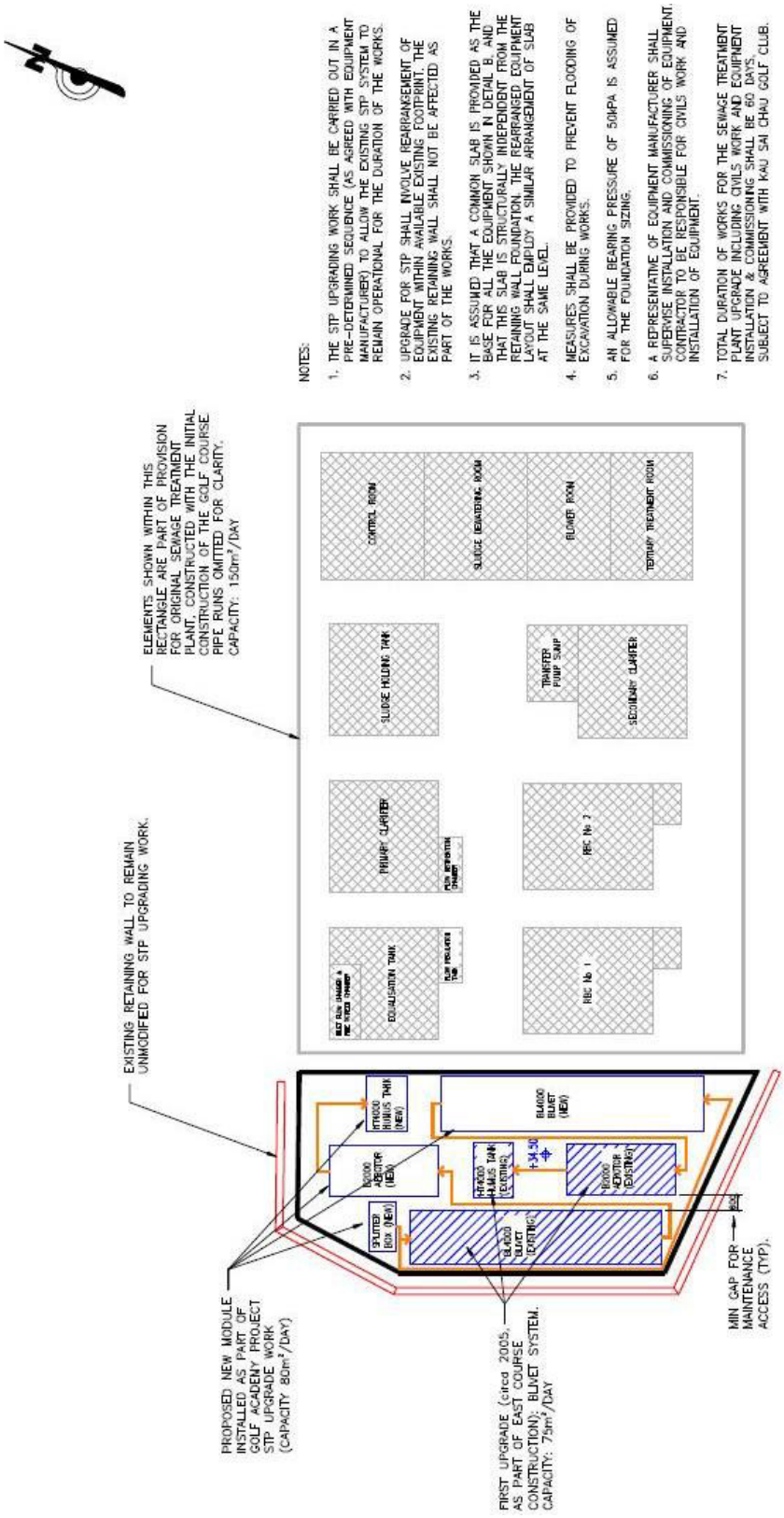
Existing Reservoir
464,859.00 m³ (full capacity)

Taking into account input from Golf Academy
123.63 m3/day
3770.715 m3/month

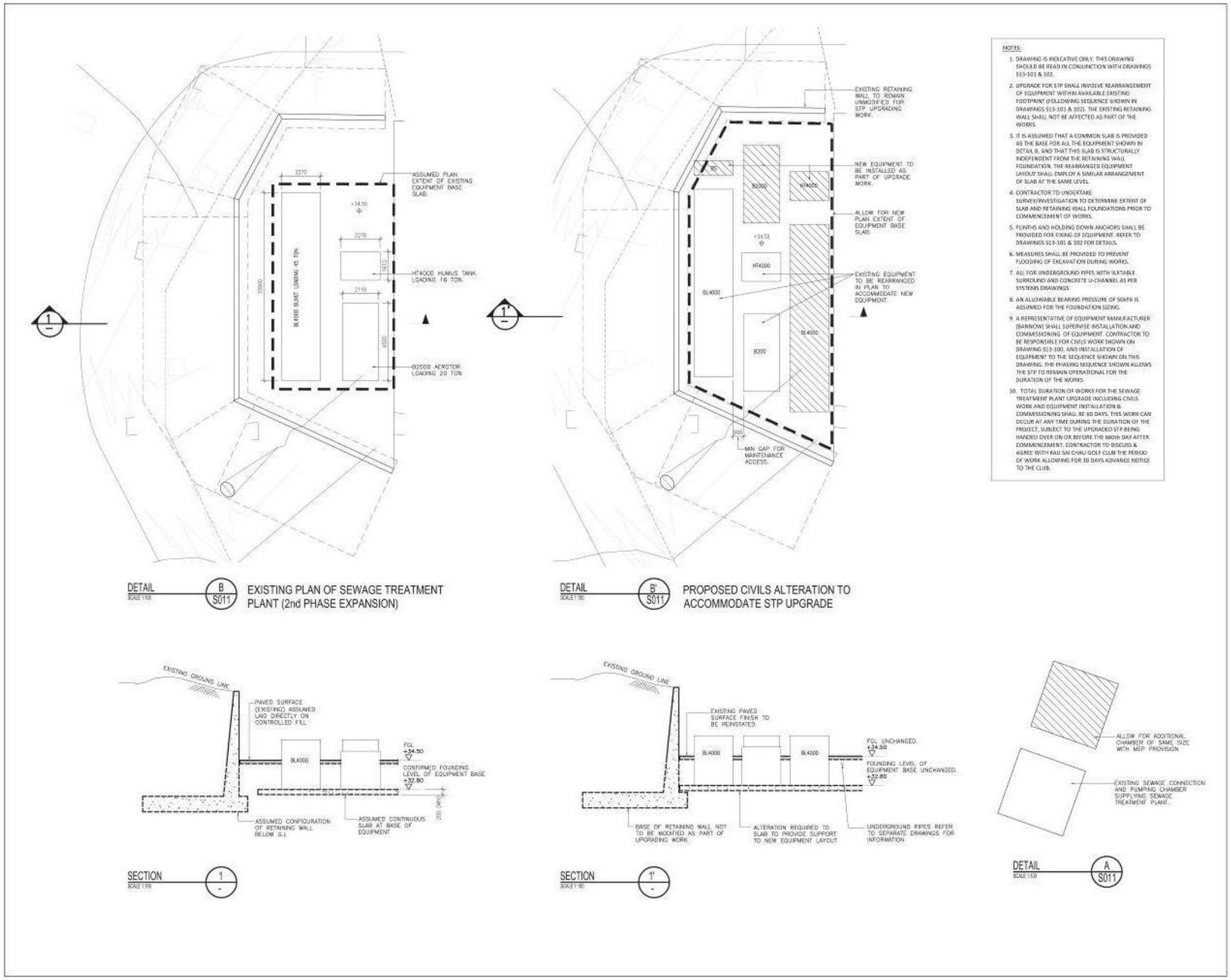
	A	B	C	D	E	F	G	H	I	J
	Maximum rainfall# (m³)	ET## (m³/month)	Irrigation usage (m³/month)	Net volume flow into reservoir (m³)*	Volume in the existing reservoir (before) m³	Volume in the existing reservoir (after) m³	Probability of overflow event at existing reservoir (EIA-112/2005)	With input from Golf Academy (Column F + 123.63 m3/day)** m³	Probability of overflow event at existing reservoir (current)	Excess quantity (Total volume - reservoir capacity) m³
Jan	8,880	40,406	50,341	-81,867	-	-	-			
Feb	18,216	36,598	53,583	-71,964	-	-	-			
Mar	25,389	42,504	24,154	-41,270	-	-	-			
Apr	61,289	50,784	8,873	1,632	340,897	342,529	No < 464859 m³	346,300	No < 464859 m³	
May	120,188	63,480	38,064	18,644	342,529	361,172	No < 464859 m³	364,943	No < 464859 m³	
Jun	142,692	69,883	26,332	46,477	361,172	407,649	No < 464859 m³	411,420	No < 464859 m³	
Jul	122,768	83,076	33,607	6,086	407,649	413,735	No < 464859 m³	417,506	No < 464859 m³	
Aug	148,536	74,962	17,898	55,676	413,735	469,411	Yes > 464859 m³	473,182	Yes > 464859 m³ ^	8,323
Sep	113,736	66,571	56,367	-9,202	-	-	-	467,750	Yes > 464859 m³ ^^	2,891
Oct	54,952	62,266	56,367	-63,681	-	-	-	407,840	No < 464859 m³	
Nov	13,320	49,018	44,956	-80,653	-	-	-			
Dec	10,360	42,338	51,459	-83,437	-	-	-			

Remarks:
- Rainfall water flows into the existing reservoir (HKO)
- Evapotranspiration rate (HKO)
* Net volume flow into reservoir = Maximum rainfall - evapotranspiration - irrigation usage
** Monthly flow into reservoir = 123.63 * 30 or 31 days
^ Probability as for 2005 assessment
^^ Contribution from Golf Academy would lead to a maginal increase in probability of overflow

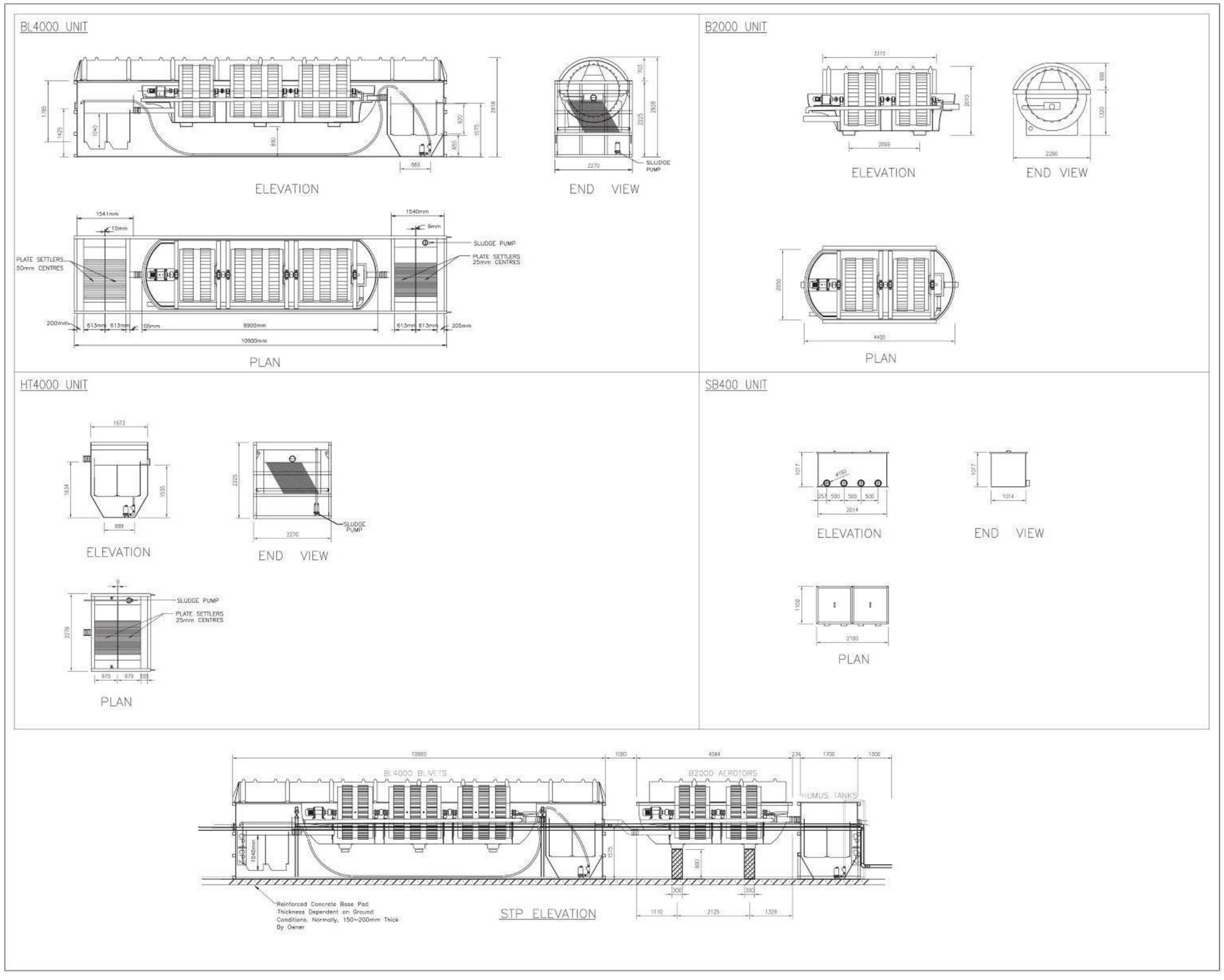
D.7. Arrangement of Sewage Treatment Plant Upgrade



D.8. Civil Works Required for Sewage Treatment Plant Upgrade



D.9. Sewage Treatment Plant System Components



B.D. REF.:
F.S.D. REF.:
D.L.O. REF.:

Rev	Description	Date
-	FOR TENDER	02/09/13

Check all measurements on site.
Do not scale off drawings.
This drawing is to be read in conjunction with the Specification and any discrepancies are to be immediately reported to the Architect.
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Client: 香港賽馬會 The Hong Kong Jockey Club

Client: Kau Sai Chau 公開 The Jockey Club Public Golf Course

Architect & Interior Designer:
RONALD LU & PARTNERS
Architects Planners Interior Designers
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C/S Engineer, M&E Engineer & Sustainability Design Consultant: Buro Happold

Quantity Surveyor: LangdonSeah 滙華謝

Landscape Design: Urbis

Golf Course Design: Gary Player

Fire Engineering: ARUP

Catering Consultant: Food Service Consultants, Ltd.

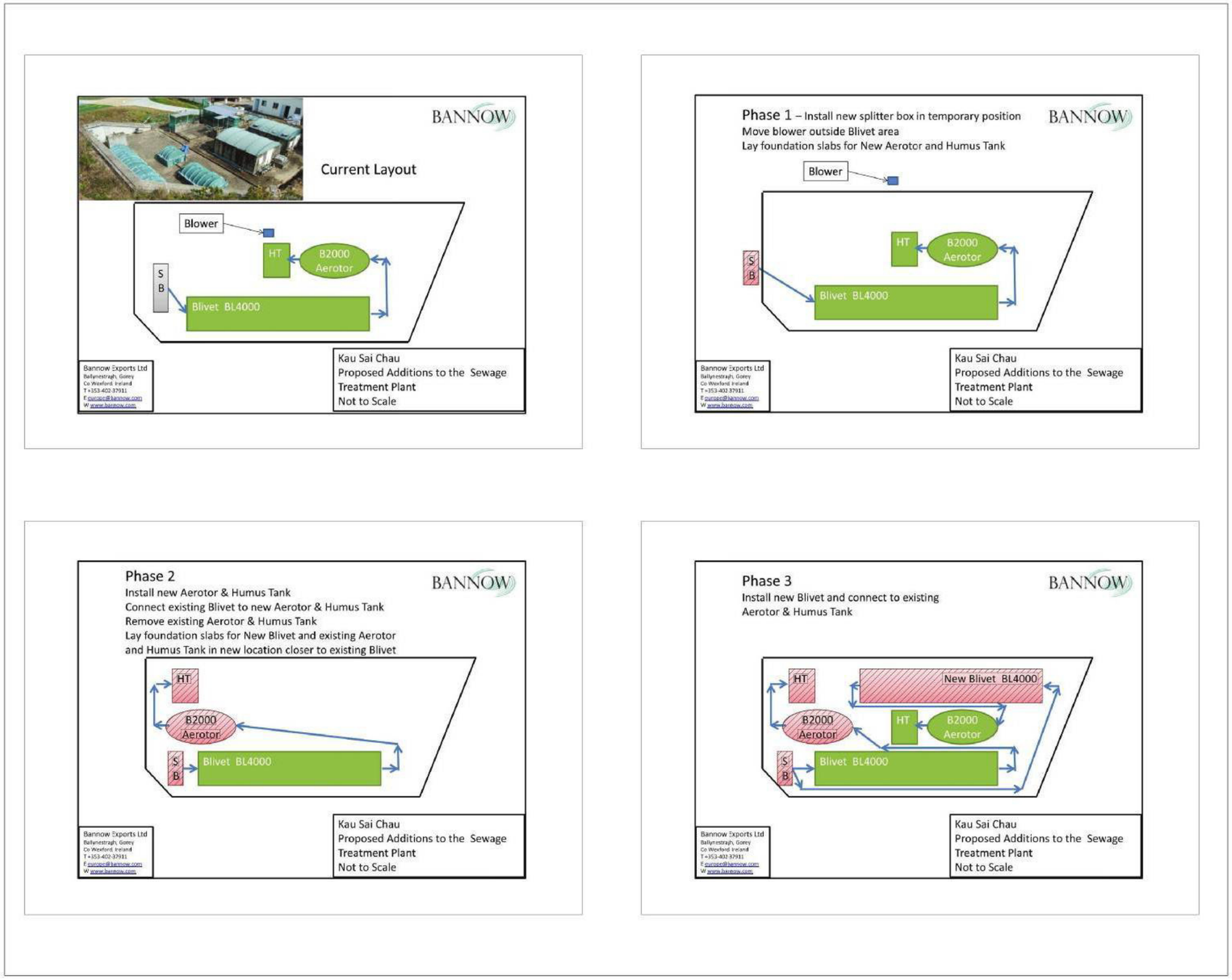
Project Title:
GOLF COURSE PRACTICE AREAS AND ALTERATION TO EXISTING HOLES AN GOLF ACADEMY NEW BUILD AT KAU SAI CHAU, SAI KUNG, HONG KONG

Drawing Title:
SEWAGE TREATMENT PLANT SYSTEM COMPONENTS.

Drawn By	TN		
Checked By	KH		
Approved By	PC		

Project No.: 030573
Issue Date: 02/09/13
Cad File No.:
SCALE:
Drawing No.: S13-101
Authorised Person's Signature:
Authority's / Client's Approval:

D.10. Sewage Treatment Plant Phasing Sequence



Appendix E. Ecological Baseline

E.1. List of Fauna recorded in the Project Area

Table 1 Birds recorded within the Project Area

Scientific Name	Common Name	Status in Hong Kong[1]	Protection status/ Level of Concern[2]
Acridotheres cristatellus	Crested Myna	very common resident	--
Milvus migrans	Black Kite	present all year and widespread	Cap. 586, CPS (2), (RC)
Motacilla alba	White Wagtail	common in winter and spring	--
Phoenicurus auroreus	Daurian Redstart	common winter visitor	--
Pycnonotus aurigaster	Sooty-headed Bulbul	common resident	--
Pycnonotus sinensis	Chinese Bulbul	abundant and widespread resident, with migrants and winter visitor	--

Notes:

(1) Reference for status in Hong Kong: Allcock, J., Carey, G.J., Chow, G. and Welch, G. (eds.) (2012). *Hong Kong Bird Report 2009-10*. Hong Kong: The Hong Kong Bird Watching Society..

(2) All wild birds are protected under the Wild Animals Protection Ordinance (Cap.170).
Abbreviations for Protection Status/ Level of Concern:
Cap. 586 – Listed in Protection of Endangered Species of Animals and Plants Ordinance;
CPS – Listed in "National Key Protected Species" in mainland China; 1 = Grade 1; 2 = Grade 2;
CRDB – China Red Data Book: E = Endangered, V = Vulnerable, R = Rare, I = Indeterminate (Zheng & Wang 1998);
Level of Concern – LC = Local Concern, RC = Regional Concern, PRC = Potential Regional Concern, PGC = Potential Global Concern, GC = Global Concern. Letters in parentheses indicate that the assessment is on the basis of restrictedness in breeding and/or roosting sites rather than in general occurrence. (Reference: Fellowes, J.R., Lau, M.W.N., Dudgeon, D., Reels, G.T., Ades, G.W.J., Carey,G.J., Chan, B.P.L., Kendrick, R.C., Lee, K.S., Leven, M.R., Wilson, K.D.P. and Yu, Y.T. (2002). Wild Animals to Watch: Terrestrial and Freshwater Fauna of Conservation Concern in Hong Kong. *Memoirs of the Hong Kong Natural History Society*, 25, 123-160.)

Table 2 Butterflies recorded within the Project Area

Scientific Name	Common Name	Local Restrictedness[1]
Abisara echerius	Plum Judy	Very Common
Chilasa clytia	Common Mime	Common
Danaus genutia	Common Tiger	Common
Delias pasithoe	Red-base Jezebel	Very Common
Graphium sarpedon	Common Bluebottle	Very Common
Eurema hecabe	Common Grass Yellow	Very Common
Papilio memnon	Great Mormon	Very Common
Papilio polytes	Common Mormon	Very Common
Pathysa antiphates	Five-bar Swordtail	Common
Zizeeria maha	Pale Grass Blue	Very Common

Notes: (1) Reference for local restrictedness: Chan, A., Cheung, J., Sze, P., Wong, A., Wong, E. and Yau, E. (2011). A review of the local restrictedness of Hong Kong butterflies. *Hong Kong Biodiversity*, Issue No. 21: 1-12. Agriculture, Fisheries and Conservation Department, Hong Kong.

Table 3 Dragonflies recorded within the Project Area

Scientific Name	Common Name	Commonness[1]
Orthetrum chrysis	Red-faced Skimmer	Common
Pantala flavescens	Wandering Glider	Abundant
Tramea virginia	Saddlebag Glider	Common
Trithemis aurora	Crimson Dropwing	Abundant
Trithemis festiva	Indigo Dropwing	Abundant

Notes: (1) Reference for commonness: Tam, T., Leung, K., Kwan, B.S.P., Wu, K.K.Y., Tang, S.S.H, So, I.W.Y., Cheng, J.C.Y., Yuen, E.F.M., Tsang, Y. and Hui, W. (2011). *The Dragonflies of Hong Kong*. Hong Kong: Friends of the Country Parks: Cosmos Books Ltd. Agriculture, Fisheries and Conservation Department.

Table 4 Freshwater fauna recorded within the Project Area

Scientific Name	English Name	Abundance[1]
Caridina trifasciata	Freshwater shrimp	Common; locally abundant in a few streams in the eastern New Territories
Nanhaipotamon hongkongense	Freshwater crab	Common
Family *Baetidae*	Mayfly	Very common; the most abundant and widespread family of Hong Kong mayflies

Notes: (1) Reference for abundance: Dudgeon, D. (2003). *Hillstreams* (Hong Kong Field Guides 2). Hong Kong: The Department of Ecology & Biodiversity, The University of Hong Kong: Wan Li Book Co., Ltd.

E.2. List of Flora recorded in the Project Area

Table 1 Relative Abundance of Flora Species in Different Habitat Types within the Project Area

Scientific Name	Chinese Name	Relative Abundance[(1)] in Turfed Area	Relative Abundance[(1)] in Shrubland
Acacia confusa	台灣相思		+
Acronychia pedunculata	山油柑		+
Adenosma glutinosum	毛麝香		+
Ageratum conyzoides	藿香薊		+
Altingia chinensis	蕈樹		+
Aporusa dioica	銀柴		+
Aster baccharoides	白舌紫菀		+
Axonopus compressus	地毯草	+++	
Baeckea frutescens	崗松		++++
Bidens alba	白花鬼針草	+	+
Blechnum orientale	烏毛蕨		+
Breynia fruticosa	黑面神		++
Caesalpinia pulcherrima	洋金鳳		+
Carallia brachiata	竹節樹		+
Cassytha filiformis	無根藤		+
Casuarina equisetifolia	木麻黃		+
Celtis sinensis	朴樹		+
Cinnamomum burmannii	陰香		+
Cinnamomum camphora	樟		+
Cinnamomum parthenoxylon	黃樟		+
Commelina diffusa	節節草		+
Conyza sumatrensis	蘇門白酒草		+
Cyclosorus parasiticus	華南毛蕨		+
Cyperus distans	疏穗莎草		+
Desmodium heterocarpon	假地豆		+
Dianella ensifolia	山菅蘭		+
Dicranopteris pedata	芒萁		+++
Digitaria longiflora	長花馬唐	++++	
Diospyros morrisiana	羅浮柿		+
Elaeocarpus chinensis	中華杜英		+
Emilia sonchifolia	一點紅	+	+
Eremochloa ciliaris	蜈蚣草	+++	+
Eremochloa ophiuroides	假儉草	+++	
Eriachne pallescens	鷓鴣草		+
Eriocaulon sexangulare	華南穀精草		+
Eupatorium odoratum	飛機草		+
Euphorbia hirta	飛揚草		+
Eurya nitida	細齒葉柃		+
Ficus altissima	高山榕		+
Ficus hirta	粗葉榕		+

Scientific Name	Chinese Name	Relative Abundance[1] in Turfed Area	Relative Abundance[1] in Shrubland
Ficus hispida	對葉榕		+
Ficus microcarpa	細葉榕		+
Ficus subpisocarpa	筆管榕		+
Ficus variegata	青果榕		+
Glochidion eriocarpum	毛果算盤子		+
Glochidion hirsutum	厚葉算盤子		+
Glochidion wrightii	白背算盤子		+
Glochidion zeylanicum	香港算盤子		++
Gonocarpus chinensis	黃花小二仙草		+
Hedyotis acutangula	方骨草		++
Ilex graciliflora	細花冬青		+
Ipomoea purpurea	圓葉牽牛		+
Itea chinensis	老鼠刺		+
Ixonanthes reticulata	黏木		+
Lantana camara	馬纓丹		+
Lepidosperma chinense	鱗子莎		+++
Ligustrum sinense	山指甲		+
Lindernia crustacea	母草	+	+
Lindernia rotundifolia	迷你虎耳草	+	+
Litsea glutinosa	潺槁樹		+
Litsea rotundifolia var. oblongifolia	豺皮樟		+
Lygodium microphyllum	小葉海金沙		++
Macaranga tanarius var. tomentosa	血桐		++
Machilus velutina	絨毛潤楠		+
Mallotus paniculatus	白楸		+
Mangifera indica	杧果		+
Melastoma dodecandrum	地菟	+	
Melastoma malabathricum	野牡丹		++
Melastoma sanguineum	毛菟		+
Microlepia hancei	華南鱗蓋蕨		+
Mikania micrantha	薇甘菊	+	++
Miscanthus floridulus	五節芒		+
Mitrasacme pygmaea	水田白		+
Mussaenda pubescens	玉葉金花		++
Ormosia emarginata	凹葉紅豆		+
Oxalis corniculata	酢漿草	+	+
Palhinhaea cernua	鋪地蜈蚣		++
Phyllanthus cochinchinensis	越南葉下珠	+	++
Polygonum perfoliatum	杠板歸		+
Polyspora axillaris	大頭茶		+
Psychotria serpens	蔓九節		+
Pterocypsela indica	翅果菊		+
Reevesia thyrsoidea	梭羅樹		+
Rhaphiolepis indica	石斑木		++
Rhodomyrtus tomentosa	桃金娘		+++

Scientific Name	Chinese Name	Relative Abundance[1] in Turfed Area	Relative Abundance[1] in Shrubland
Rhus succedanea	野漆樹		++
Sacciolepis indica	囊穎草		+
Sapium discolor	山烏桕		+
Sapium sebiferum	烏桕		+
Schefflera heptaphylla	鴨腳木		++
Sinosideroxylon wightianum	革葉鐵欖		+
Smilax glabra	土茯苓		+
Solena amplexicaulis	茅瓜		+
Sterculia lanceolata	假蘋婆		+
Symplocos sumuntia	山礬		+
Urena lobata	肖梵天花		+
Viola diffusa	蔓堇菜		+
Viola verecunda	堇菜		+
Zanthoxylum avicennae	簕欓花椒		++
Total no. of species recorded		**10**	**70**

Notes:

(1) Abundance: ++++ = highly abundant; +++ = abundant; ++ = fairly abundant; + = in low abundance

E.3. Representative Photographs of the Project Area

Plate 1 Panoramic view of the Project Area

Plate 2 Turf Area

Plate 3 Shrubland

Plate 4 Intermittent flow stream

Plate 5 Abandoned grave

Plate 6 Existing sewage treatment plant to be upgraded

Appendix F. Marine Ecology

INTRODUCTION

A dive survey was conducted at the northern side of the existing ferry pier on the western coast of Kau Sai Chau Island, to verify if there are any marine fauna of conservation importance in that area.

METHODOLOGY

A dive survey was conducted in May 2013. The survey area covers a 50m radius from the eastern end of the sloping seawall of the ferry pier, at its northern side. Marine fauna of conservation importance such as corals were searched and recorded, with the species, their locations, and approximate abundance (in terms of coverage percentage).

RESULTS

The survey conducted at the northern side of Kau Sai Chau ferry pier confirmed the occurrence of a low coverage of hard corals within the survey area.

The survey area covers a section of sloping seawalls along the northern side of the pier, and the seabed further northward. In general, the seabed is mostly sandy with scattered boulders. There were larger-sized boulders (diameter over 50 cm) and smaller-sized boulders (diameter below 50 cm) within the survey area, with more larger-sized boulders close to the seawalls.

A total of 24 species of hard corals were recorded (see **Table 1**). Among them, only two species are uncommon in Hong Kong (i.e. *Coscinaraea* sp. and *Favites paraflexuosa*), and the remaining are all common/abundant/dominant in Hong Kong. There was no rare coral species found during our survey.

The overall coverage percentage of corals was low (about 1-5%), and the sizes of the coral colonies were low-moderate, with occasional colonies reached 30-40 cm diameter.

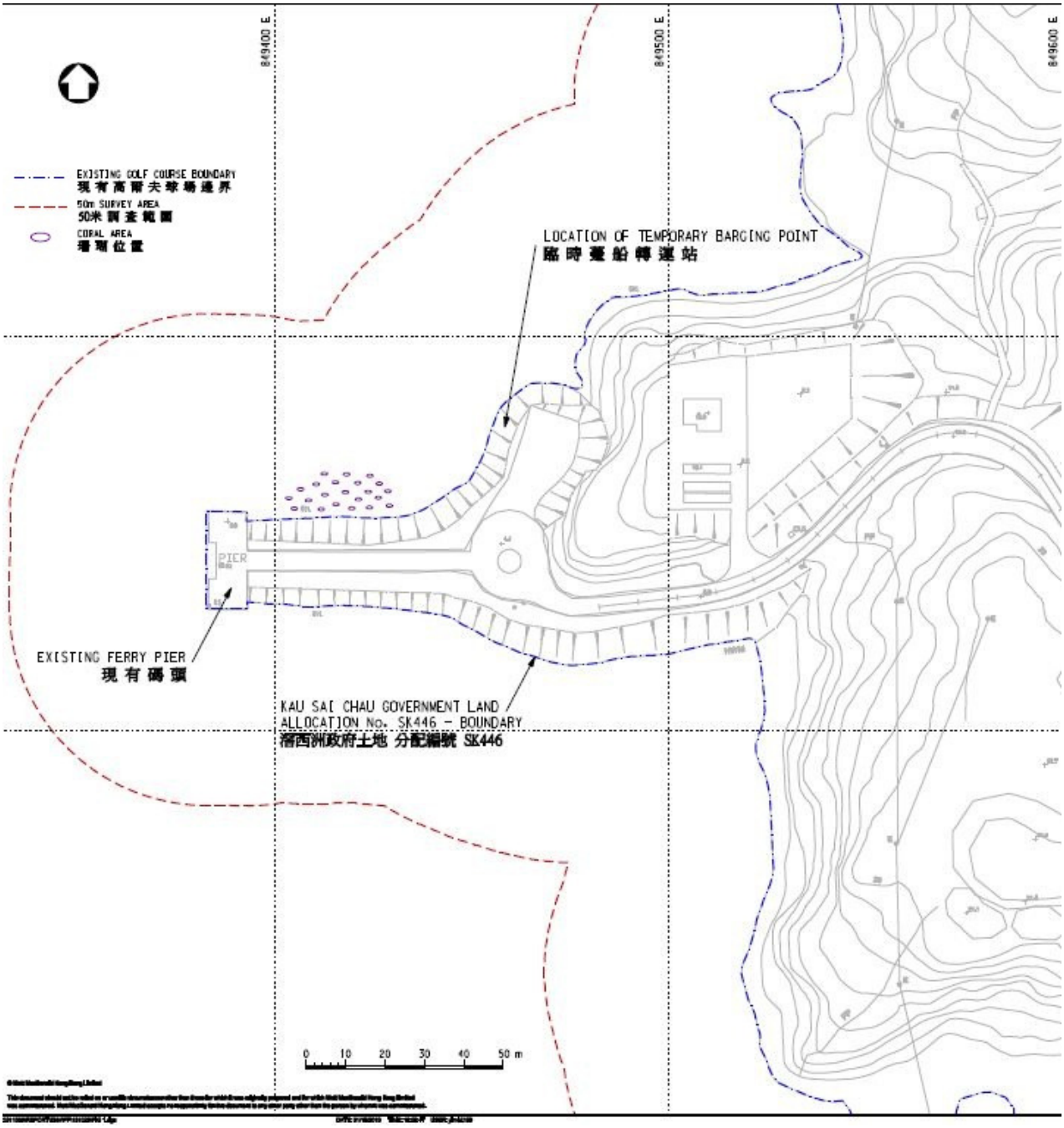
The corals mainly concentrated at the western part of the survey area close to the seaward end of the pier (see **Figure 1**), on the larger boulders close to the seawalls.

Other features observed during the dive survey included very low coverage percentage (< 0.1 %) of dead standing corals as well as other benthic fauna. Besides hard corals, no other marine species of conservation importance was found.

Table 1 **Coral species recorded in the survey area at Kau Sai Chau**

Hard coral species	Commonness in Hong Kong
Montipora peltiformis	Common
Psammocora superficialis	Abundant
Pavonna descussata	Abundant
Porites lutea	Dominant
Goniopora columna	Abundant
Goniopora lobata	Common
Coscinaraea sp.	Uncommon
Lithophyllon ndulatum	Common
Favia speciosa	Abundant
Favia favus	Abundant
Favia lizardensis	Common
Favia rotumana	Abundant
Favia veroni	Common
Favites chinensis	Dominant
Favites abdita	Dominant
Favites pentagona	Dominant
Favites paraflexuosa	Uncommon
Platygyra carnosus	Common
Oulastrea crispata	Common
Leptastrea purpurea	Abundant
Leptastrea pruinosa	Abundant
Cyphastrea serailia	Dominant
Cyphastrea japonica	Abundant
Turbinaria peltata	Common
Total no. of species	**24**

Figure 1: Distribution of coral colonies within the survey area



Appendix G. Tree Species within Project Boundary

Botanical Name	Chinese Common Name	Number of Trees
Acacia confusa	台灣相思	2
Acronychia pedunculata	山油柑	4
Altingia chinensis	蕈樹	2
Aporusa dioica	銀柴	2
Carallia brachiata	竹節樹	1
Casuarina equisetifolia	木麻黃	1
Celtis sinensis	朴樹	6
Cinnamomum burmannii	陰香	3
Cinnamomum camphora	樟	1
Cinnamomum parthenoxylon	黃樟	6
Dead Tree	枯樹	2
Diospyros morrisiana	羅浮柿	14
Elaeocarpus chinensis	中華杜英	1
Eurya nitida	細齒葉柃	2
Ficus altissima	高山榕	2
Ficus microcarpa	細葉榕	14
Ficus subpisocarpa	筆管榕	7
Ficus variegata	青果榕	2
Glochidion wrightii	白背算盤子	5
Glochidion zeylanicum	香港算盤子	47
Ilex graciliflora	細花冬青	5
Itea chinensis	鼠刺	1
Ixonanthes reticulata	黏木	3
Litsea glutinosa	潺槁樹	1
Macaranga tanarius var. tomentosa	血桐	53
Machilus velutina	絨毛潤楠	3
Mallotus paniculatus	白楸	4
Mangifera indica	杧果	1
Ormosia emarginata	凹葉紅豆	2
Polyspora axillaris	大頭茶	1
Reevesia thyrsoidea	梭羅樹	2
Rhaphiolepis indica	車輪梅	13
Rhus succedanea	野漆樹	8
Sapium discolor	山烏桕	7
Sapium sebiferum	烏桕	7
Schefflera heptaphylla	鵝掌柴	23
Sinosideroxylon wightianum	革葉鐵欖	4
Sterculia lanceolata	假蘋婆	1
Symplocos sumuntia	山礬	1
Zanthoxylum avicennae	簕欓花椒	19
	Grand Total	**283**

Tree Assessment Schedule at

Address	Golf Course at Kau Sai Chau		
Lot	Government Land Allocation No. SK446	in D.D.	
Prepared by	Daniel Jackson	on	10-Jun-2013
Field Survey was conducted/updated on	Sep - Oct 2012		
To be read in conjunction with drawing nos.	HKJC6/TW01 to TW15	Rev.	A
		Rev.	
		Rev.	

HKJC KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES — **Urbis Limited**

Existing Tree Assessment Schedule — **Rev. B**

Tree ID Number	Photo No.	Tree Species (in botanical name)	Chinese Common Name	Original Location (Lot/GA/YA/GHBA etc)	Tree Size			Form	Health Condition	Amenity Value	Anticipated Survival Rate After Transplanting (High/Med/Low)	Top of Soil Level Above Root Collar	Proposed Treatment		Justification for Proposed Tree Removal (See bottom of schedule for justification note.)	Remarks (including justification for proposed tree removal, precious or rare or endangered species; anticipated root-ball size to be preserved (with ⌀. X depth in mm) etc.)
					Overall Height (M)	Trunk Diameter (mm)	Average Crown Spread (M)	(Good/Fair/Poor)	(Good/Fair/Poor)	(High/Med/Low)			in initial/approved application (Retain/Transplant/Fell)	in this revision, if applicable (Retain/Transplant/Fell)		
T1	1	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	6	260	5	Good	Good	Med	Low	45.76	Fell	Fell	B	-
T2	2-3	*Symplocos sumuntia*	山礬	GLA SK 446	6	280	4	Good	Good	High	Med	46.17	Fell	Fell	B	-
T3	4-5	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	160	5	Fair	Fair	Low	Low	45.50	Fell	Fell	B	-
T4	6-7	*Celtis sinensis*	朴樹	GLA SK 446	7	360	7	Good	Good	Med	Med	45.87	Fell	Fell	B	Multiple trunks.
T5	8-9	*Ficus subpisocarpa*	筆管榕	GLA SK 446	7	300	7	Fair	Good	Med	Med	52.46	Fell	Fell	A1	-
T6	10-11	*Cinnamomum burmannii*	陰香	GLA SK 446	7	120	3	Fair	Fair	Low	Low	52.60	Fell	Fell	A1	-
T7	12-14	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	160	4	Fair	Fair	Low	Low	44.04	Fell	Fell	B	-
T8	15-16	*Mallotus paniculatus*	白楸	GLA SK 446	6	150	6	Fair	Fair	Low	Low	42.35	Fell	Fell	B	On slope.
T9	17-19	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	110	3	Fair	Fair	Low	Low	43.70	Fell	Fell	B	Multiple trunks.
T10	20-21	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	120	4	Fair	Fair	Low	Low	43.83	Fell	Fell	B	-
T11	22-23	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	150	7	Fair	Fair	Low	Low	43.20	Fell	Fell	B	Multiple trunks.
T12	24-25	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	180	6	Fair	Fair	Low	Low	43.49	Fell	Fell	B	Twin trunks.
T13	26-27	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	140	5	Fair	Fair	Low	Low	43.54	Fell	Fell	B	-
T14	28-29	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	120	4	Fair	Fair	Low	Low	42.68	Fell	Fell	B	-
T15	30-31	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	200	5	Fair	Fair	Low	Low	41.96	Fell	Fell	B	-
T16	32-33	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	3	100	3	Fair	Fair	Low	Low	41.85	Fell	Fell	B	On slope. Climbers on tree.
T17	34	*Acronychia pedunculata*	山油柑	GLA SK 446	5	160	5	Fair	Good	Med	Low	39.71	Fell	Fell	B	On slope.
T18	35-37	*Acronychia pedunculata*	山油柑	GLA SK 446	6	210	6	Good	Good	Med	Low	39.36	Fell	Fell	B	On slope. Twin trunks.
T19	38-39	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	4	140	5	Fair	Good	Low	Low	41.18	Fell	Fell	B	On slope. Climbers on tree.
T20	40-42	*Sinosideroxylon wightianum*	革葉鐵欖	GLA SK 446	5	130	5	Fair	Good	Low	Low	39.83	Fell	Fell	B	On slope. Dead stub found on tree.
T21	43-44	*Sinosideroxylon wightianum*	革葉鐵欖	GLA SK 446	7	250	6	Good	Good	Med	Low	39.55	Fell	Fell	B	On slope. Multiple trunks.
T22	45, 47-48	*Ilex graciliflora*	細花冬青	GLA SK 446	8	120	2	Fair	Good	Med	Low	36.13	Fell	Fell	B	On slope.
T23	46-48	*Ilex graciliflora*	細花冬青	GLA SK 446	7	110	2	Fair	Good	Med	Low	35.62	Fell	Fell	B	On slope. Twin trunks.
T24	49-50	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	130	5	Fair	Fair	Low	Low	35.25	Fell	Retain	-	On slope. Climbers on tree.

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T25	51-52	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	200	5	Fair	Fair	Low	Low	35.57	Fell	Retain	-	On slope.
T26	53-54	*Mallotus paniculatus*	白楸	GLA SK 446	5	110	4	Fair	Good	Low	Low	30.94	Fell	Fell	B	-
T27	55	*Altingia chinensis*	蕈樹	GLA SK 446	8	150	5	Good	Good	Med	Low	32.17	Fell	Fell	B	On slope.
T28	56	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	4	Fair	Fair	Low	Low	28.90	Fell	Fell	B	-
T37	57-58	*Mangifera indica*	杧果	GLA SK 446	7	310	5	Fair	Fair	Med	Low	27.80	Fell	Fell	B	On slope.
T38	59-60	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	330	8	Fair	Fair	Low	Low	29.22	Fell	Fell	B	Multiple trunks.
T39	61-62	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	3	110	3	Poor	Poor	Low	Low	29.59	Fell	Fell	B	Suppressed. Pest infested with gall.
T40	63-64	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	160	4	Fair	Fair	Low	Low	27.57	Fell	Fell	B	On slope.
T41	65-66	*Eurya nitida*	細齒葉柃	GLA SK 446	4	120	4	Fair	Fair	Med	Low	27.36	Fell	Fell	B	-
T42	67-68	*Rhaphiolepis indica*	車輪梅	GLA SK 446	5	120	5	Good	Good	Med	Med	24.72	Fell	Fell	B	-
T43	69-70	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	140	4	Good	Good	Med	Med	30.81	Fell	Fell	B	-
T44	71-72	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	130	3	Fair	Good	Med	Med	30.27	Fell	Fell	B	-
T45	73-74	*Sapium discolor*	山烏桕	GLA SK 446	5	110	4	Fair	Good	Med	Low	30.23	Fell	Fell	B	-
T46	75-76	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	190	5	Fair	Fair	Med	Med	28.89	Fell	Retain	-	On slope. 4 trunks
T47	77-78	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	110	4	Good	Good	Med	Low	28.73	Retain	Retain	-	On slope.
T48	79-81	*Sapium discolor*	山烏桕	GLA SK 446	8	220	7	Good	Good	Med	Low	28.59	Retain	Retain	-	On slope.
T49	82-83	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	4	110	4	Fair	Fair	Low	Low	24.57	Retain	Retain	-	On slope.
T51	84-86	*Reevesia thyrsoidea*	梭羅樹	GLA SK 446	7	140	6	Fair	Fair	Med	Low	22.18	Fell	Retain	-	2 trunks; On slope, closely grown trunks with included bark
T52	86-88	*Reevesia thyrsoidea*	梭羅樹	GLA SK 446	7	180	5	Fair	Fair	Med	Low	22.18	Fell	Retain	-	4 trunks On slope, closely grown trunks crossed
T53	89-90	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	150	6	Fair	Fair	Low	Low	17.81	Fell	Fell	B	At swamp, bent trunk
T55	91-92	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	5	100	4	Fair	Fair	Med	Low	22.55	Fell	Retain	-	-
T56	93	*Sapium discolor*	山烏桕	GLA SK 446	6	110	5	Fair	Good	Med	Low	23.40	Retain	Retain	-	-
T57	94-97	*Sinosideroxylon wightianum*	革葉鐵欖	GLA SK 446	5	150	4	Fair	Fair	Low	Low	25.98	Fell	Fell	B	On slope. Twin trunks. Wound on trunk.
T58	98-99	*Sinosideroxylon wightianum*	革葉鐵欖	GLA SK 446	5	140	5	Poor	Fair	Med	Low	20.48	Fell	Fell	B	-
T59	100-101	*Diospyros morrisiana*	羅浮柿	GLA SK 446	4	100	2	Fair	Fair	Low	Low	45.99	Fell	Fell	B	On slope. Wound on trunk.
T60	102-103	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	140	4	Fair	Fair	Med	Low	44.81	Fell	Fell	B	On slope. Twin trunk. Leaning.
T65	104-105	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	130	3	Fair	Fair	Med	Low	19.63	Retain	Retain	-	2 trunks
T65A	106-107	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	100	3	Poor	Poor	Low	Low	18.31	Fell	Retain	-	Seriously leaning, seriously covered by climber

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T66	108-109	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	180	5	Fair	Fair	Low	Low	17.89	Fell	Fell	B	2 trunks; Covered by climber
T67	110-111	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	190	6	Poor	Fair	Low	Low	18.44	Fell	Fell	B	On crest of slope beside a swamp, bent trunk
T68	112-113	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	150	6	Fair	Fair	Low	Low	18.44	Fell	Fell	B	At swamp, bent trunk
T69	114	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	100	4	Fair	Fair	Low	Low	17.87	Fell	Fell	B	On crest of slope beside a swamp, covered by climber
T70	115-116	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	210	5	Fair	Fair	Low	Low	18.43	Fell	Fell	B	On crest of slope beside a swamp, covered by climber
T71	117-118	*Sapium sebiferum*	烏桕	GLA SK 446	7	160	5	Fair	Fair	Med	Low	18.35	Fell	Fell	B	Bent trunk
T72	119-120	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	100	5	Poor	Fair	Low	Low	18.49	Fell	Fell	B	Bent trunk, unbalanced crown
T73	121-122	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	100	5	Fair	Fair	Low	Low	18.45	Fell	Fell	B	Covered by climber
T74	123-124	*Sapium sebiferum*	烏桕	GLA SK 446	6	150	5	Fair	Fair	Med	Low	18.33	Fell	Fell	B	On slope beside stream, leaning, suppressed by bamboo
T75	125-127	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	8	210	7	Fair	Fair	Med	Low	17.70	Fell	Fell	B	On slope beside stream, leaning, root exposed above slope surface, suppressed by bamboo
T76	128-129	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	6	140	4	Fair	Fair	Med	Low	18.09	Fell	Fell	B	2 trunks
T77	130-132	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	7	190	6	Poor	Fair	Med	Low	17.86	Fell	Fell	B	On slope beside stream
T79	133-134	*Rhus succedanea*	野漆樹	GLA SK 446	6	180	5	Fair	Fair	Med	Low	18.58	Fell	Fell	B	On crest of slope beside stream, leaning up slope, closed to T80, suppressed by bamboo
T80	135-136	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	6	230	5	Fair	Fair	Med	Low	18.17	Fell	Fell	B	Low branching, on slope beside stream, leaning, suppressed by bamboo
T81	137-138	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	120	4	Poor	Fair	Low	Low	16.32	Retain	Retain	-	Leaning trunk.
T82	139-140	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	7	230	7	Fair	Fair	Low	Low	16.38	Fell	Retain	-	Pruned branch found on tree.
T82A	141-142	*Mallotus paniculatus*	白楸	GLA SK 446	6	150	4	Good	Good	Med	Low	16.09	Fell	Retain	-	-
T83	143-144	*Mallotus paniculatus*	白楸	GLA SK 446	3	110	5	Fair	Fair	Low	Low	17.26	Fell	Retain	-	-
T84	145-146	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	110	4	Fair	Fair	Low	Low	17.89	Fell	Retain	-	Pruned branch found on tree.
T85	147-148	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	130	3	Poor	Fair	Low	Low	18.37	Fell	Fell	B	On slope beside stream, bent trunk, exposed root above slope surface, closed to T86 & T87
T85A	149-151	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	220	6	Poor	Good	Med	Low	18.57	Fell	Fell	B	Bent trunk, climber growing up on tree
T86	147-148	*Sapium sebiferum*	烏桕	GLA SK 446	7	140	3	Poor	Fair	Low	Low	18.54	Fell	Fell	B	On slope beside stream, bent trunk, closed to T85 & T87
T87	147 ,152	*Sapium sebiferum*	烏桕	GLA SK 446	8	200	7	Poor	Fair	Low	Low	18.63	Fell	Fell	B	On slope beside stream, bent trunk, unbalanced crown, closed to T85 & T86
T88	153-154	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	180	5	Fair	Good	Med	Low	19.87	Fell	Fell	B	On slope beside stream
T89	155-157	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	8	260	9	Fair	Good	Med	Low	18.99	Fell	Fell	B	3 trunks; Crossed branches with rubbing wounds
T90	158-159	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	8	180	6	Fair	Good	Med	Low	18.97	Fell	Fell	B	-
T91	160-161	*Sapium sebiferum*	烏桕	GLA SK 446	6	140	4	Good	Fair	Med	Low	19.63	Fell	Fell	B	-
T92	162-163	*Rhus succedanea*	野漆樹	GLA SK 446	5	140	4	Fair	Fair	Low	Low	20.22	Fell	Fell	B	Leaning, climber growing up on tree
T93	164-166	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	110	3	Fair	Good	Low	Low	20.40	Fell	Fell	B	Climber growing up on tree

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T94	167-168	*Carallia brachiata*	竹節樹	GLA SK 446	4	100	5	Good	Good	Med	Med	22.20	Fell	Fell	B	Multiple trunks.
T95	169-170	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	110	2	Fair	Fair	Med	Med	22.80	Fell	Fell	B	-
T96	171-173	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	170	5	Good	Good	Med	Low	26.80	Fell	Fell	B	On slope. Twin trunk.
T97	174-176	*Ilex graciliflora*	細花冬青	GLA SK 446	6	110	2	Fair	Good	Med	Low	23.19	Fell	Fell	B	On slope. Multiple trunks. Climbers on tree.
T98	176-177	*Ilex graciliflora*	細花冬青	GLA SK 446	6	140	3	Fair	Good	Med	Low	25.48	Fell	Fell	B	On slope. Twin trunks.
T99	178-180	*Ficus subpisocarpa*	筆管榕	GLA SK 446	6	270	6	Good	Good	Med	High	29.97	Transplant	Transplant	B	-
T100	181-182	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	160	4	Fair	Fair	Med	Med	22.84	Fell	Fell	B	Mud tubes observed.
T101	183-184	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	180	2	Poor	Fair	Low	Low	51.14	Fell	Fell	A1	Leading shoot broken.
T102	185-186	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	170	1	Poor	Fair	Low	Low	51.11	Fell	Fell	A1	Bent trunk.
T103	187-188	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	7	210	4	Fair	Fair	Low	Low	51.22	Fell	Fell	A1	-
T104	189-190	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	170	5	Poor	Fair	Low	Low	51.08	Fell	Fell	A1	Bent trunk. Unbalanced canopy.
T105	191-192	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	100	1	Poor	Fair	Low	Low	50.86	Fell	Fell	A1	Bent trunk.
T106	193-194	*Sapium sebiferum*	烏桕	GLA SK 446	5	130	5	Fair	Good	Med	Med	51.11	Fell	Fell	A1	-
T107	195-196	*Sapium sebiferum*	烏桕	GLA SK 446	5	120	4	Fair	Good	Med	Med	53.89	Fell	Fell	A1	-
T108	197-198	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	110	3	Poor	Fair	Low	Low	50.98	Fell	Fell	B1	Bent trunk.
T109	199-200	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	100	4	Poor	Fair	Low	Low	49.96	Fell	Fell	B1	Bent trunk.
T110	201-202	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	100	4	Good	Good	Med	Med	51.84	Fell	Fell	B	Multiple trunks.
T111	203-204	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	6	150	5	Fair	Fair	Low	Low	50.92	Fell	Fell	B1	-
T112	205-206	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	110	5	Poor	Poor	Low	Low	50.31	Fell	Fell	B1	Bent and leaning trunk. Climbers on tree.
T113	207-208	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	100	5	Fair	Good	Low	Med	51.17	Fell	Retain with Pruning	B2	Twin trunks.
T114	209-210	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	100	5	Fair	Fair	Med	Med	51.17	Fell	Retain with Pruning	B2	Twin trunks.
T115	211-212	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	7	140	7	Good	Good	Med	Med	50.74	Fell	Retain with Pruning	B2	Multiple trunks.
T116	213-214	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	4	150	6	Good	Good	Med	Med	51.69	Fell	Retain with Pruning	B2	Low branching.
T117	215-216	*Eurya nitida*	細齒葉柃	GLA SK 446	4	100	5	Fair	Good	Med	Low	53.61	Fell	Fell	B2	Multiple trunks.
T118	217-218	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	6	110	3	Fair	Fair	Low	Med	54.10	Fell	Fell	B2	-
T119	219-220	*Aporusa dioica*	銀柴	GLA SK 446	5	110	4	Fair	Fair	Low	Low	54.56	Fell	Fell	B2	Climbers on tree.
T120	221-222	*Diospyros morrisiana*	羅浮柿	GLA SK 446	5	100	2	Fair	Fair	Med	Med	54.76	Fell	Retain with Pruning	B2	Twin trunks with included bark. Climbers on tree.
T121	223-224	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	130	5	Good	Good	Med	Med	54.29	Fell	Retain with Pruning	B2	-
T122	225-227	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	3	Poor	Poor	Low	Low	53.93	Fell	Retain with Pruning	B2	Bent trunk. Leading shoot broken. Watersprouts found.

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T123	228-229	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	150	5	Good	Good	Med	Med	54.04	Fell	Retain	-	-
T124	230-231	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	110	5	Fair	Fair	Med	Med	53.93	Fell	Retain	-	Unbalanced canopy.
T126	232-233	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	4	100	4	Fair	Good	Low	Med	54.29	Fell	Retain	-	-
T127	234-235	*Diospyros morrisiana*	羅浮柿	GLA SK 446	5	110	5	Fair	Fair	Med	Med	55.83	Fell	Retain	-	-
T128	236-237	*Diospyros morrisiana*	羅浮柿	GLA SK 446	4	110	4	Fair	Fair	Med	Med	57.21	Fell	Retain	-	Climbers on tree.
T129	238-239	*Cinnamomum burmannii*	陰香	GLA SK 446	4	100	3	Fair	Fair	Low	Low	56.89	Fell	Retain	-	-
T130	240-242	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	160	4	Fair	Fair	Low	Low	42.59	Retain	Retain	-	-
T131	243-245	*Rhus succedanea*	野漆樹	GLA SK 446	6	150	4	Fair	Fair	Low	Low	55.05	Fell	Fell	A1	Wound on trunk.
T132	246-247	*Rhus succedanea*	野漆樹	GLA SK 446	5	120	5	Fair	Fair	Low	Low	55.97	Fell	Fell	A1	Climbers on tree.
T133	248-249	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	100	4	Fair	Fair	Low	Low	56.54	Fell	Fell	A1	-
T134	250-252	*Rhus succedanea*	野漆樹	GLA SK 446	6	130	6	Fair	Good	Low	Low	56.45	Fell	Fell	A1	-
T135	253-254	*Elaeocarpus chinensis*	中華杜英	GLA SK 446	4	130	3	Fair	Good	Med	Med	55.68	Fell	Fell	A1	Climbers on tree.
T136	255-256	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	130	5	Fair	Good	Med	Med	54.83	Fell	Fell	A1	Climbers on tree.
T137	257-258	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	110	6	Good	Good	Med	Med	52.75	Retain	Retain	-	Multiple trunks.
T138	259-260	*Celtis sinensis*	朴樹	GLA SK 446	5	150	4	Good	Fair	Low	Med	52.54	Retain	Retain	-	-
T139	261-262	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	100	3	Poor	Fair	Low	Low	53.22	Retain	Retain	-	Unbalanced canopy.
T140	263-264	*Ficus microcarpa*	細葉榕	GLA SK 446	9	540	12	Good	Good	High	High	49.71	Retain	Retain	-	A sign with words "In memory of Michael Hayman " was found at the base of the tree.
T141	265-266	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	220	8	Fair	Fair	Low	Low	42.50	Retain	Retain	-	-
T142	267-268	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	4	120	4	Fair	Good	Low	Med	42.39	Retain	Retain	-	Climbers on tree.
T143	269	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	150	5	Good	Good	Med	Med	44.62	Retain	Retain	-	-
T144	270-271	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	120	4	Good	Good	Med	Med	46.25	Retain	Retain	-	-
T145	272-273	*Rhus succedanea*	野漆樹	GLA SK 446	7	220	5	Fair	Good	Med	Low	45.07	Retain	Retain	-	On slope.
T146	274-275	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	6	100	5	Good	Good	Med	Med	39.79	Retain	Retain	-	Low branching.
T147	276-277	*Cinnamomum burmannii*	陰香	GLA SK 446	6	120	4	Fair	Good	Med	Low	40.93	Retain	Retain	-	-
T148	278-279	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	150	4	Fair	Fair	Low	Low	47.02	Fell	Fell	B	-
T149	280-281	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	7	200	4	Fair	Fair	Low	Low	48.31	Fell	Fell	B	At the crest of slope.
T150	282-283	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	120	5	Fair	Fair	Med	Med	45.71	Fell	Fell	B	Twin trunks.
T151	284-285	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	100	3	Fair	Fair	Med	Med	45.27	Fell	Fell	B	-
T152	286-287	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	170	4	Fair	Fair	Low	Low	48.83	Fell	Fell	B	Low branching.

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T153	288-289	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	120	4	Fair	Fair	Low	Low	48.97	Fell	Fell	B	Low branching.
T154	290-291	*Ficus subpisocarpa*	筆管榕	GLA SK 446	8	280	6	Fair	Good	Med	High	27.59	Retain	Retain	-	-
T155	292-293	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	320	8	Good	Fair	Low	Low	29.56	Retain	Retain	-	-
T156	294-295	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	230	7	Fair	Fair	Low	Low	29.95	Retain	Retain	-	-
T157	296-297	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	8	330	6	Fair	Fair	Low	Low	29.98	Retain	Retain	-	-
T158	298-299	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	100	8	Poor	Fair	Low	Low	30.16	Retain	Retain	-	Leaning trunk. Climbers on tree.
T159	300-301	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	310	7	Fair	Fair	Low	Low	35.55	Fell	Retain	-	-
T160	302-303	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	120	6	Fair	Fair	Low	Low	34.84	Fell	Retain	-	-
T161	304-305	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	130	6	Fair	Fair	Low	Low	34.80	Fell	Retain	-	-
T162A	306-307	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	170	3	Fair	Fair	Low	Low	34.64	Fell	Fell	B	Climbers on tree. Included bark found at branch conjunction.
T163	308-309	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	6	Fair	Fair	Low	Low	33.91	Fell	Fell	B	-
T164	310-311	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	5	Fair	Fair	Low	Low	33.41	Fell	Fell	B	-
T165	312-313	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	7	Fair	Fair	Low	Low	34.19	Fell	Retain	-	-
T201	314-315	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	2	140	1	Poor	Fair	Low	Low	51.81	Fell	Fell	A2	Hard pruned.
T202	316-317	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	180	2	Poor	Fair	Low	Low	51.81	Fell	Fell	A2	Multiple trunks. Hard pruned.
T203	318-319	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	120	1	Poor	Fair	Low	Low	51.84	Fell	Fell	A2	Hard pruned.
T204	320-321	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	130	1	Poor	Fair	Low	Low	51.92	Fell	Fell	A2	Hard pruned.
T205	322-323	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	120	1	Fair	Fair	Low	Low	51.94	Fell	Fell	A2	-
T206	324-325	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	120	2	Poor	Fair	Low	Low	51.91	Fell	Fell	A2	Leaning trunk.
T207	326-327	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	100	2	Poor	Fair	Low	Low	51.90	Fell	Fell	A2	Bent trunk.
T208	328-329	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	120	3	Fair	Fair	Low	Low	51.96	Fell	Fell	A2	Bent trunk.
T209	330-331	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	100	2	Fair	Fair	Low	Low	51.86	Fell	Fell	A2	Bent trunk.
T210	332-333	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	140	3	Fair	Fair	Low	Low	51.84	Fell	Fell	A2	Bent trunk.
T211	334-335	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	140	4	Poor	Fair	Low	Low	52.02	Fell	Fell	A2	Bent trunk.
T212	336-337	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	2	110	2	Poor	Fair	Low	Low	51.85	Fell	Fell	A2	Bent trunk.
T213	338-339	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	110	3	Poor	Fair	Low	Low	51.98	Fell	Fell	A2	Unbalanced canopy.
T214	340-341	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	100	4	Poor	Fair	Low	Low	51.87	Fell	Fell	A2	-
T215	342-343	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	110	3	Poor	Fair	Low	Low	51.86	Fell	Fell	A2	Leaning trunk.
T216	344-346	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	110	4	Fair	Fair	Low	Low	51.95	Fell	Fell	A2	-

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T217	347-348	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	100	3	Fair	Fair	Low	Low	51.94	Fell	Fell	A2	-
T218	349-350	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	110	4	Fair	Fair	Low	Low	51.99	Fell	Fell	A2	-
T219	351-352	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	130	4	Fair	Fair	Low	Low	51.95	Fell	Fell	A2	-
T220	353-354	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	150	4	Fair	Fair	Low	Low	52.04	Fell	Fell	A2	-
T221	355-356	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	140	4	Poor	Fair	Low	Low	52.14	Fell	Fell	A2	Co-dominant stems.
T222	357-358	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	130	3	Fair	Fair	Low	Low	52.08	Fell	Fell	A2	-
T223	359-360	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	5	100	3	Fair	Fair	Low	Low	52.31	Fell	Fell	A2	-
T224	361-362	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	150	4	Good	Good	Med	Med	55.60	Retain	Retain	-	Twin trunks.
T225	363-364	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	110	3	Fair	Fair	Low	Low	52.03	Fell	Fell	A2	-
T226	365-366	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	100	4	Fair	Fair	Low	Low	53.46	Fell	Retain with Pruning	A1	-
T227	367-368	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	5	140	3	Fair	Good	Low	Low	55.64	Fell	Fell	A1	-
T228	369-370	*Diospyros morrisiana*	羅浮柿	GLA SK 446	4	100	2	Fair	Fair	Med	Med	52.91	Fell	Fell	B	-
T229	371-372	*Acacia confusa*	台灣相思	GLA SK 446	6	220	4	Fair	Fair	Low	Low	56.29	Fell	Fell	B	Twin trunks with included bark.
T230	373-374	*Glochidion wrightii*	白背算盤子	GLA SK 446	6	260	4	Fair	Good	Med	Low	54.66	Fell	Fell	E	On slope.
T231	375-376	*Diospyros morrisiana*	羅浮柿	GLA SK 446	6	100	3	Fair	Good	Med	Med	56.27	Fell	Fell	E	On slope.
T232	377-378	*Diospyros morrisiana*	羅浮柿	GLA SK 446	5	130	3	Fair	Good	Med	Med	56.64	Fell	Fell	E	On slope. Twin trunks.
T233	379-380	*Diospyros morrisiana*	羅浮柿	GLA SK 446	5	100	3	Fair	Fair	Med	Med	55.12	Fell	Fell	E	On slope.
T234	381-382	*Diospyros morrisiana*	羅浮柿	GLA SK 446	5	100	3	Fair	Good	Med	Med	55.16	Fell	Fell	E	On slope.
T235	383-384	*Glochidion wrightii*	白背算盤子	GLA SK 446	5	100	3	Fair	Fair	Low	Low	56.87	Fell	Fell	E	On slope. Climbers on tree.
T236	385-386	*Celtis sinensis*	朴樹	GLA SK 446	2	130	2	Poor	Fair	Low	Low	55.28	Fell	Fell	B	Bent trunk. Wound on branch. Climbers on tree.
T237	387-388	*Ficus microcarpa*	細葉榕	GLA SK 446	6	330	5	Good	Good	Med	High	55.44	Transplant	Transplant	B	-
T238	389-390	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	120	3	Fair	Fair	Low	Low	55.81	Fell	Fell	A1	-
T239	391-392	*Casuarina equisetifolia*	木麻黃	GLA SK 446	4	120	3	Fair	Good	Low	Low	61.07	Fell	Fell	D1	-
T240	393-394	*Acacia confusa*	台灣相思	Outside GLA SK 446	3	210	4	Fair	Good	Low	Low	62.38	Fell	Fell	D1	Multiple trunks.
T241	395-396	*Rhaphiolepis indica*	車輪梅	GLA SK 446	4	110	4	Fair	Good	Med	Med	56.80	Fell	Fell	C	-
T243	397-398	*Ficus microcarpa*	細葉榕	GLA SK 446	5	500	5	Good	Good	Med	High	48.66	Retain	Retain	-	-
T244	399-400	*Ficus subpisocarpa*	筆管榕	GLA SK 446	3	170	4	Fair	Fair	Med	High	49.34	Retain	Retain	-	Twin trunks. Climbers on tree.
T245	401-402	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	380	6	Fair	Fair	Low	Low	40.24	Retain	Retain	-	-

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T246	403-404	*Celtis sinensis*	朴樹	GLA SK 446	7	250	5	Fair	Fair	Low	Low	37.34	Retain	Retain	-	Leading shoot broken.
T247	405-406	*Cinnamomum camphora*	樟	GLA SK 446	5	160	4	Fair	Poor	Low	Low	37.69	Retain	Retain	-	Borer observed.
T248	407-408	*Ficus subpisocarpa*	筆管榕	GLA SK 446	4	250	5	Good	Fair	Med	Med	35.92	Retain	Retain	-	Borer observed.
T249	409-410	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	110	5	Fair	Fair	Low	Low	35.78	Retain	Retain	-	-
T250	411-412	*Litsea glutinosa*	潺槁樹	GLA SK 446	5	230	5	Good	Good	Med	Low	37.68	Retain	Retain	-	-
T251	413-414	*Ficus microcarpa*	細葉榕	GLA SK 446	6	280	6	Good	Good	Med	High	34.78	Retain	Retain	-	Multiple woody aerial roots.
T252	415-418	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	260	5	Fair	Fair	Low	Low	46.87	Fell	Retain	-	Wound on trunk. Watersprouts found.
T253	419-420	*Ficus microcarpa*	細葉榕	GLA SK 446	5	240	4	Fair	Good	Med	High	46.02	Transplant	Retain	-	-
T254	421-423	*Ficus microcarpa*	細葉榕	GLA SK 446	4	230	4	Fair	Good	Med	Med	44.81	Fell	Retain	-	On slope. Multiple trunks.
T255	424-426	*Ficus microcarpa*	細葉榕	GLA SK 446	7	400	9	Fair	Fair	Med	Low	45.82	Fell	Retain	-	Girdling roots with included bark. Wound on exposed root.
T256	427-428	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	3	100	2	Fair	Good	Low	Low	57.91	Retain	Retain	-	-
T257	429-430	*Sapium discolor*	山烏桕	GLA SK 446	5	140	5	Good	Good	Med	Med	53.01	Fell	Retain	-	-
T258	431-432	*Glochidion zeylanicum*	香港算盤子	GLA SK 446	4	100	5	Fair	Fair	Low	Low	52.23	Fell	Fell	A2	-
T259	433-434	*Glochidion wrightii*	白背算盤子	GLA SK 446	4	110	4	Fair	Fair	Low	Low	55.67	Retain	Retain	-	Dieback branches observed.
T260	435-436	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	7	220	6	Fair	Good	Low	Low	32.21	Retain	Retain	-	-
T261	437-438	*Glochidion wrightii*	白背算盤子	GLA SK 446	6	110	3	Fair	Fair	Low	Low	32.99	Retain	Retain	-	-
T262	439-440	*Sapium discolor*	山烏桕	GLA SK 446	4	100	4	Fair	Good	Low	Med	32.70	Fell	Retain	-	Climbers on tree.
T263	441-442	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	150	6	Fair	Fair	Low	Low	43.26	Fell	Retain	-	On slope.
T264	443-444	*Ficus subpisocarpa*	筆管榕	GLA SK 446	5	200	7	Good	Good	Med	Med	40.48	Transplant	Retain	-	Climbers on tree.
T265	445-446	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	110	4	Fair	Good	Low	Med	32.03	Fell	Retain	-	-
T265A	447-448	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	3	200	4	Fair	Good	Med	Med	31.07	Fell	Retain	-	Multiple trunks. Climbers on tree.
T266	449-450	*Sapium discolor*	山烏桕	GLA SK 446	7	150	5	Fair	Good	Med	Low	31.03	Retain	Retain	-	-
T267	451-452	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	180	6	Fair	Good	Low	Low	30.86	Retain	Retain	-	-
T268	453-454	*Ficus subpisocarpa*	筆管榕	GLA SK 446	5	200	5	Good	Good	Med	High	31.62	Retain	Retain	-	-
T269	455	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	230	6	Fair	Good	Low	Low	40.98	Retain	Retain	-	On slope.
T272	456-457	*Ficus microcarpa*	細葉榕	GLA SK 446	6	260	6	Fair	Good	Med	High	43.14	Retain	Retain	-	-
T273	458-460	*Rhaphiolepis indica*	車輪梅	GLA SK 446	5	180	4	Fair	Good	Med	Med	40.10	Retain	Retain	-	-
T274	461-462	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	120	4	Fair	Fair	Low	Low	29.44	Retain	Retain	-	-
T275	463-465	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	5	120	4	Fair	Fair	Low	Low	22.26	Retain	Retain	-	-

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T276	466-467	*Ficus altissima*	高山榕	GLA SK 446	4	140	4	Poor	Fair	Low	Med	34.64	Retain	Retain	-	Suppressed. Unbalanced canopy.
T277	468-469	*Ficus altissima*	高山榕	GLA SK 446	6	480	10	Good	Good	High	Med	34.56	Retain	Retain	-	At the crest of slope.
T278	470-471	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	160	4	Fair	Fair	Low	Low	33.66	Retain	Retain	-	At the crest of slope. Suppressed.
T279	472-473	*Ficus microcarpa*	細葉榕	GLA SK 446	5	150	4	Fair	Good	Med	High	33.68	Retain	Retain	-	Climbers on tree.
T282	474-475	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	100	4	Fair	Fair	Low	Low	30.49	Fell	Fell	B	-
T283	476-477	*Acronychia pedunculata*	山油柑	GLA SK 446	5	110	5	Fair	Good	Med	Low	31.82	Fell	Fell	B	On slope. Twin trunks.
T284	478-480	*Acronychia pedunculata*	山油柑	GLA SK 446	5	110	6	Fair	Good	Med	Low	32.41	Fell	Fell	B	On slope. Twin trunks.
T285	481-483	*Ormosia emarginata*	凹葉紅豆	GLA SK 446	6	100	5	Fair	Fair	Med	Low	30.91	Fell	Fell	B	Multiple trunks.
T286	484-485	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	110	4	Fair	Fair	Low	Low	31.56	Fell	Fell	B	-
T288	486-487	*Altingia chinensis*	蕈樹	GLA SK 446	8	100	3	Fair	Fair	Med	Low	35.08	Fell	Fell	B	Multiple trunks.
T408	488-489	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	3	100	2	Fair	Good	Low	High	33.83	Retain	Retain	-	-
T409	490-491	*Machilus velutina*	絨毛潤楠	GLA SK 446	6	120	3	Good	Good	Med	Low	32.29	Retain	Retain	-	-
T410	492-493	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	7	270	6	Fair	Fair	Low	Low	31.01	Retain	Retain	-	-
T411	494-495	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	5	180	5	Fair	Fair	Low	Low	29.96	Retain	Retain	-	-
T412	496-497	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	6	100	3	Fair	Poor	Low	Low	32.65	Retain	Retain	-	Leading shoot broken, which started dying and decaying.
T413	498-499	*Celtis sinensis*	朴樹	GLA SK 446	4	140	4	Fair	Fair	Med	Med	33.26	Retain	Retain	-	-
T414	500-501	*Ficus microcarpa*	細葉榕	GLA SK 446	5	280	6	Fair	Good	Med	High	33.11	Retain	Retain	-	Twin trunks.
T415	502-503	*Glochidion wrightii*	白背算盤子	GLA SK 446	5	130	5	Fair	Fair	Low	Low	33.15	Retain	Retain	-	-
T416	504-505	*Ficus microcarpa*	細葉榕	GLA SK 446	4	160	4	Fair	Good	Low	High	33.11	Retain	Retain	-	-
T417	506-507	*Ficus microcarpa*	細葉榕	GLA SK 446	4	220	6	Fair	Good	Med	High	33.15	Retain	Retain	-	Multiple woody aerial roots.
T420	508-509	*Ficus variegata*	青果榕	GLA SK 446	4	140	3	Fair	Fair	Med	Med	31.14	Retain	Retain	-	-
T421	510-512	*Ficus variegata*	青果榕	GLA SK 446	5	430	3	Fair	Fair	Med	Med	32.39	Retain	Retain	-	Hard pruned. Low branching.
T428	513-514	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	100	3	Fair	Good	Low	Low	40.54	Retain	Retain	-	-
T429	515-516	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	240	4	Fair	Good	Med	Med	40.72	Retain	Retain	-	Twin trunks.
T430	517-518	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	250	5	Fair	Good	Low	Low	42.10	Retain	Retain	-	Low branching.
T431	519-520	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	130	2	Fair	Good	Low	Med	41.32	Retain	Retain	-	-
T432	521-522	*Ficus microcarpa*	細葉榕	GLA SK 446	6	240	4	Fair	Good	Med	High	42.95	Retain	Retain	-	-
T433	523-524	*Aporusa dioica*	銀柴	GLA SK 446	4	100	3	Poor	Poor	Low	Low	28.13	Retain	Retain	-	Climbers on tree.
T434	525-526	*Rhaphiolepis indica*	車輪梅	GLA SK 446	3	100	2	Fair	Good	Med	Med	41.13	Retain	Retain	-	-

Tree ID Number	Photo No.	Tree Species (in botanical name)	Chinese Common Name	Original Location (Lot/GA/YA/GHBA etc)	Tree Size			Form	Health Condition	Amenity Value	Anticipated Survival Rate After Transplanting (High/Med/Low)	Top of Soil Level Above Root Collar	Proposed Treatment		Justification for Proposed Tree Removal (See bottom of schedule for justification note.)	Remarks (including justification for proposed tree removal, precious or rare or endangered species; anticipated root-ball size to be preserved (with ⌀. X depth in mm) etc.)
					Overall Height (M)	Trunk Diameter (mm)	Average Crown Spread (M)	(Good/Fair/Poor)	(Good/Fair/Poor)	(High/Med/Low)			in initial/approved application (Retain/Transplant/Fell)	in this revision, if applicable (Retain/Transplant/Fell)		
T435	527-528	*Rhaphiolepis indica*	車輪梅	GLA SK 446	5	140	3	Fair	Good	Med	Med	41.60	Retain	Retain	-	-
T436	529-530	Dead Tree	枯樹	GLA SK 446	4	110	3	-	-	-	-	24.10	Retain	Retain	-	-
T437	531-532	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	5	100	2	Fair	Good	Low	Med	39.04	Retain	Retain	-	-
T438	533-534	*Celtis sinensis*	朴樹	GLA SK 446	6	290	5	Poor	Poor	Low	Low	26.96	Retain	Retain	-	Climbers on tree.
T439	535-536	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	5	180	6	Fair	Fair	Med	Low	22.11	Retain	Retain	-	-
T440	537-538	Dead Tree	枯樹	GLA SK 446	6	220	5	-	-	-	-	22.37	Retain	Retain	-	-
T441	539-540	*Cinnamomum parthenoxylon*	黃樟	GLA SK 446	6	270	5	Fair	Fair	Med	Low	21.60	Retain	Retain	-	-
T442	541-542	*Rhus succedanea*	野漆樹	GLA SK 446	7	160	6	Fair	Fair	Low	Low	21.53	Retain	Retain	-	-
T444	543-544	*Rhus succedanea*	野漆樹	GLA SK 446	5	140	5	Fair	Fair	Low	Low	23.33	Retain	Retain	-	-
T445	545-546	*Machilus velutina*	絨毛潤楠	GLA SK 446	6	140	5	Good	Good	Med	Low	28.43	Retain	Retain	-	-
T446	547-548	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	190	4	Fair	Fair	Low	Low	56.32	Fell	Fell	D2	Twin trunks.
T447	549-550	*Itea chinensis*	鼠刺	GLA SK 446	3	110	3	Fair	Fair	Low	Low	54.19	Fell	Retain	-	-
T448	551-552	*Ixonanthes reticulata*	黏木	GLA SK 446	5	110	3	Fair	Good	High	Low	53.38	Retain	Retain	-	The species is recorded in China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province, whose status in China is "Vulnerable".
T450	553-554	*Ficus microcarpa*	細葉榕	GLA SK 446	5	190	3	Fair	Good	Low	Low	51.78	Fell	Retain	-	Climbers on tree.
T451	555-556	*Ixonanthes reticulata*	黏木	GLA SK 446	3	100	2	Fair	Good	High	Low	49.44	Retain	Retain	-	On slope. Climbers on tree. The species is recorded in China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province, whose status in China is "Vulnerable".
T451A	557-559	*Ormosia emarginata*	凹葉紅豆	GLA SK 446	4	130	5	Fair	Fair	Med	Low	52.03	Fell	Retain	-	On slope. Wound found at trunk base.
T454	560-561	*Rhaphiolepis indica*	車輪梅	GLA SK 446	5	170	3	Fair	Fair	Med	Low	54.34	Fell	Fell	D2	On slope. Multiple trunks.
T455	562-563	*Rhaphiolepis indica*	車輪梅	GLA SK 446	3	110	2	Fair	Good	Med	Low	58.49	Fell	Fell	D1	On slope. Growing closed to rock.
T456	564-565	*Zanthoxylum avicennae*	簕欓花椒	GLA SK 446	3	100	2	Fair	Good	Low	Low	57.49	Fell	Fell	D1	On slope. Growing closed to rock.
T457	566-567	*Ixonanthes reticulata*	黏木	GLA SK 446	5	140	4	Fair	Good	High	Low	46.88	Retain	Retain	-	On slope. The species is recorded in China Plant Red Data Book and Illustration of Rare & endangered plant in Guangdong Province, whose status in China is "Vulnerable".
T468	568-569	*Polyspora axillaris*	大頭茶	GLA SK 446	3	120	3	Good	Fair	Med	Low	61.02	Fell	Fell	B2	On slope. Multiple trunks.
T469	570-571	*Machilus velutina*	絨毛潤楠	GLA SK 446	3	110	3	Good	Good	Med	Low	54.46	Fell	Fell	C	On slope. Multiple trunks.
T470	572	*Ilex graciliflora*	細花冬青	GLA SK 446	5	160	4	Good	Good	Med	Low	53.66	Fell	Retain with Pruning	-	On slope. Multiple trunks.
T471	573-574	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	3	100	3	Fair	Fair	Low	Low	34.51	Retain	Retain	-	Climbers on tree.
T472	575-576	*Sapium discolor*	山烏桕	GLA SK 446	4	140	5	Fair	Good	Low	Low	37.25	Retain	Retain	-	Co-dominant trunk with included bark.

Tree ID Number	Photo No.	Tree Species (in botanical name)	Chinese Common Name	Original Location (Lot/GA/YA/GHBA etc)	Tree Size			Form (Good/Fair/Poor)	Health Condition (Good/Fair/Poor)	Amenity Value (High/Med/Low)	Anticipated Survival Rate After Transplanting (High/Med/Low)	Top of Soil Level Above Root Collar	Proposed Treatment		Justification for Proposed Tree Removal (See bottom of schedule for justification note.)	Remarks (including justification for proposed tree removal, precious or rare or endangered species; anticipated root-ball size to be preserved (with ⌀. X depth in mm) etc.)
					Overall Height (M)	Trunk Diameter (mm)	Average Crown Spread (M)						in initial/approved application (Retain/Transplant/Fell)	in this revision, if applicable (Retain/Transplant/Fell)		
T473	577-578	*Schefflera heptaphylla*	鵝掌柴	GLA SK 446	4	110	2	Fair	Fair	Low	Low	35.01	Retain	Retain	-	-
T474	579-580	*Sterculia lanceolata*	假蘋婆	GLA SK 446	4	130	4	Good	Good	Med	Med	52.39	Fell	Fell	A1	-
T475	581-582	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	4	180	4	Fair	Fair	Low	Low	52.88	Fell	Fell	A1	-
T476	583-584	*Macaranga tanarius var. tomentosa*	血桐	GLA SK 446	6	330	6	Fair	Fair	Low	Low	29.92	Fell	Fell	B	-

Justification for Proposed Tree Removal:

A1 Conflicts with building structure and associated site formations work including drainage
A2 Affected by construction access and work areas required by contruction equipment
B1 Affected by site formations works associated with new golf practice areas and access road
B2 Affected by installation of drainage system
C Affected by site formations works associated realignment of existing South 11 and new carth path
D1 Affected by site formations works associated realignment of existing South 12
D2 Conflicts with sight lines of the realigned 12th hole and therefore removed to improve safety
E Affected by site formations works associated realignment of existing South 13
F Affected by site formations works associated realignment of Existing South 14

NORTH

SCALE 1 : 250

0 2 4 6 8 10m

REFER TO DWG. NO. HKJC6/TW05

MATCH LINE

T146(R)

T147(R)

T142(R)

T141(R)

T130(R)

T143(R)

T145(R)

T144(R)

MATCH LINE

REFER TO DWG. NO. HKJC6/TW02

KEY PLAN

LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
- EXISTING PROPERTY LINE
- TEMPORARY LAND ALLOCATION
- PROPOSED EXTENT OF SITE FORMATIONS
- PROJECT BOUNDARY
- T49(R) EXISTING TREES TO BE RETAINED
- T93(F) EXISTING TREES TO BE FELLED
- T44(T) EXISTING TREES TO BE TRANSPLANTED
- T44(P) EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
- EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
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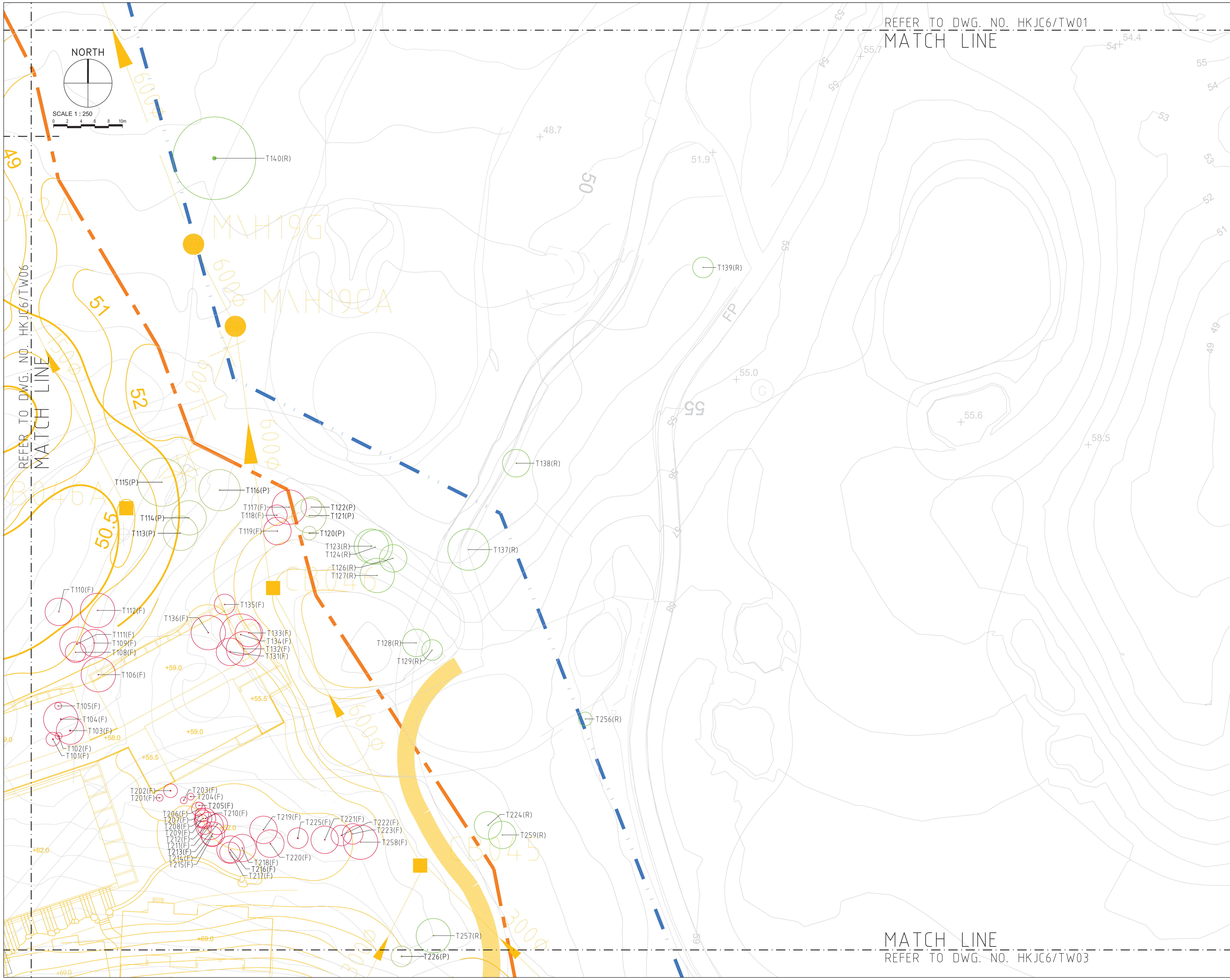
Job title

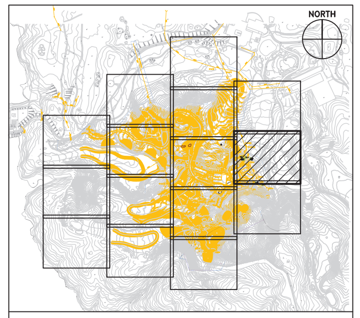
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 1)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW01





LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
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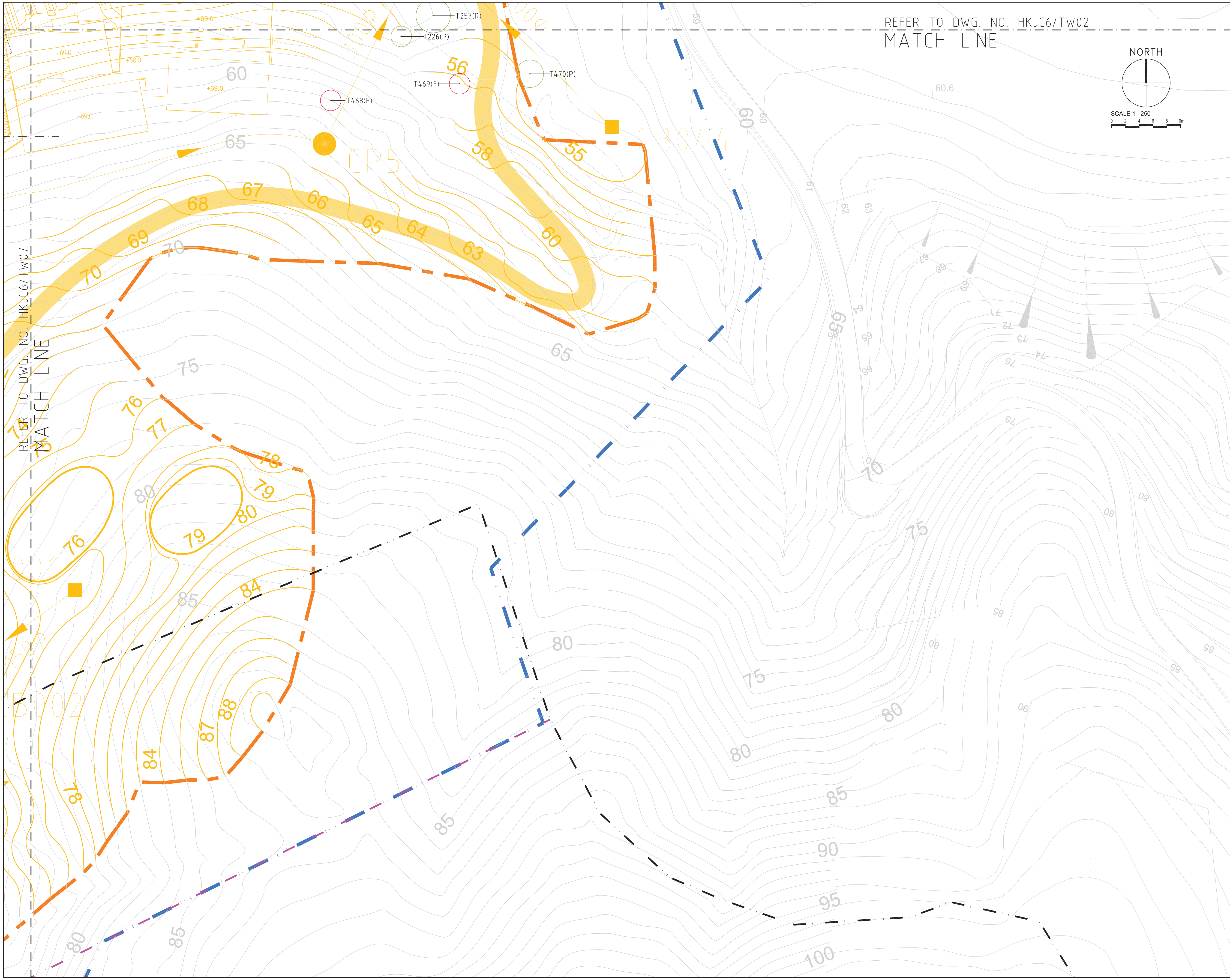
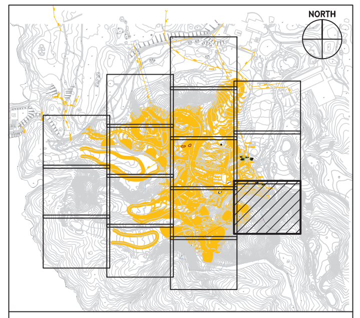
Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 2)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW02





KEY PLAN

LEGEND

	PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
	PROPOSED ROAD AND PATH LAYOUTS
	EXISTING PROPERTY LINE
	TEMPORARY LAND ALLOCATION
	PROPOSED EXTENT OF SITE FORMATIONS
	PROJECT BOUNDARY
T49(R)	EXISTING TREES TO BE RETAINED
T93(F)	EXISTING TREES TO BE FELLED
T44(T)	EXISTING TREES TO BE TRANSPLANTED
T44(P)	EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
	EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

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Job title

KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 3)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW03

NORTH

SCALE 1 : 250

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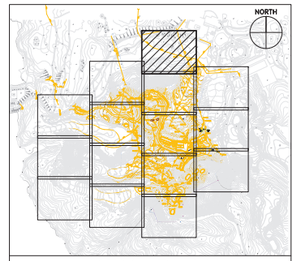

KEY PLAN

LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
- EXISTING PROPERTY LINE
- TEMPORARY LAND ALLOCATION
- PROPOSED EXTENT OF SITE FORMATIONS
- PROJECT BOUNDARY
- T49(R) — EXISTING TREES TO BE RETAINED
- T93(F) — EXISTING TREES TO BE FELLED
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- T44(P) — EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
- EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

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Job title

KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 4)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW04

REFER TO DWG. NO. HKJC6/TW09
MATCH LINE

MATCH LINE
REFER TO DWG. NO. HKJC6/TW05

NORTH

SCALE 1 : 250

0 2 4 6 8 10m

REFER TO DWG. NO. HKJC6/TW04
MATCH LINE

REFER TO DWG. NO. HKJC6/TW09
MATCH LINE

MATCH LINE
REFER TO DWG. NO. HKJC6/TW01

REFER TO DWG. NO. HKJC6/TW10/1
MATCH LINE

MATCH LINE
REFER TO DWG. NO. HKJC6/TW06

CB047
CB029
CB028
CB028A
CB031A
CB039
CB038
CB024
MVH19F
CP2
CP4

T148(F)
T152(F)
T153(F)
T149(F)
T60(F)
T151(F)
T150(F)
T59(F)

KEY PLAN

LEGEND

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Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 5)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW05

NORTH

SCALE 1 : 250
0 2 4 6 8 10m

REFER TO DWG. NO. HKJC6/TW05
MATCH LINE

REFER TO DWG. NO. HKJC6/TW10
MATCH LINE

REFER TO DWG. NO. HKJC6/TW02
MATCH LINE

REFER TO DWG. NO. HKJC6/TW11
MATCH LINE

MATCH LINE
REFER TO DWG. NO. HKJC6/TW07

CB024
CB025
CB023
CB037
CB042
CB040
CB040A
CB022
CP1
CP4
MH 52A
MH 225

T23(F)
T22(F)
T288(F)
T21(F)
T20(F)
T19(F)
T18(F)
T17(F)
T16(F)
T15(F)
T14(F)
T12(F)
T13(F)
T11(F)
T8(F)
T7(F)
T9(F)
T10(F)
T4(F)
T3(F)
T2(F)
T1(F)
T107(F)
T474(F)
T475(F)
T5(F)
T6(F)
T238(F)
T237(T)
T236(F)
T255(R)

KEY PLAN

LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
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- T44(T) EXISTING TREES TO BE TRANSPLANTED
- T44(P) EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
- EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
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Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 6)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW06

NORTH

SCALE 1 : 250
0 2 4 8 10m

MATCH LINE
REFER TO DWG. NO. HKJC6/TW06

MATCH LINE
REFER TO DWG. NO. HKJC6/TW11

MATCH LINE
REFER TO DWG. NO. HKJC6/TW03

MATCH LINE
REFER TO DWG. NO. HKJC6/TW12

MATCH LINE
REFER TO DWG. NO. HKJC6/TW08

T236(F)
T229(F)
T227(F)
T228(F)
T230(F)
T231(F)
T232(F)
T233(F)
T234(F)
T235(F)
T455(F)
T456(F)
T446(F)
T454(F)
T239(F)
T241(F)

CB020A
CB021
CB017
CB017B
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CB015
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CB014
CB013
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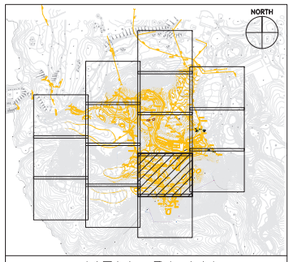
CB005
CB012
CB004
CB001
PH1

KEY PLAN



LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
- EXISTING PROPERTY LINE
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Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
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Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 7)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW07

NORTH

SCALE 1 : 250

0 2 4 6 8 10m

REFER TO DWG. NO. HKJC6/TW12
MATCH LINE

REFER TO DWG. NO. HKJC6/TW07
MATCH LINE

T240(F)

CB011 CB010 CB009 CB008 CB007 CB006

300ø 150ø 225ø

KEY PLAN

LEGEND

- PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
- PROPOSED ROAD AND PATH LAYOUTS
- EXISTING PROPERTY LINE
- TEMPORARY LAND ALLOCATION
- PROPOSED EXTENT OF SITE FORMATIONS
- PROJECT BOUNDARY
- T49(R) EXISTING TREES TO BE RETAINED
- T93(F) EXISTING TREES TO BE FELLED
- T44(T) EXISTING TREES TO BE TRANSPLANTED
- T44(P) EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
- EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 8662

Job title

KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 8)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW08

NORTH

SCALE 1 : 250

0 2 4 6 8 10m

MATCH LINE
REFER TO DWG. NO. HKJC6/TW04

MATCH LINE
REFER TO DWG. NO. HKJC6/TW05

MATCH LINE
REFER TO DWG. NO. HKJC6/TW13

MATCH LINE
REFER TO DWG. NO. HKJC6/TW10

T49(R)
T65(R)
T56(R)
T65A(R)
T48(R)
T47(R)
T46(R)
T55(R)
T51(R)
T52(R)
T53(F)
T66(F)
T69(F)
T76(F)
T68(F)
T67(F)
T77(F)
T72(F)
T70(F)
T71(F)
T73(F)
T74(F)
T75(F)
T57(F)
T58(F)
T79(F)
T80(F)
T87(F)
T86(F)
T85(F)
T85A(F)
T89(F)
T90(F)
T91(F)
T88(F)
T81(R)
T82(R)
T83(R)
T84(R)
T82A(R)

KEY PLAN

LEGEND

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A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Planning, Urban Design, Landscape, Golf & Environmental Consultants
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Job title

KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 9)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW09

REFER TO DWG. NO. HKJC6/TW09
MATCH LINE

REFER TO DWG. NO. HKJC6/TW13
MATCH LINE

REFER TO DWG. NO. HKJC6/TW14
MATCH LINE

REFER TO DWG. NO. HKJC6/TW05
MATCH LINE

REFER TO DWG. NO. HKJC6/TW06
MATCH LINE

REFER TO DWG. NO. HKJC6/TW11

NORTH

SCALE 1 : 250
0 2 4 6 8 10m

T165(R)
T476(F)
T44(F)
T162A(F)
T45(F)
T43(F)
T42(F)
T41(F)
T40(F)
T39(F)
T38(F)
T37(F)
T92(F)
T93(F)
T97(F)
T98(F)
T94(F)
T95(F)
T100(F)
T99(T)
T96(F)
T286(F)
T26(F)
T282(F)
T285(F)
T28(F)
T27(F)
T288(F)
T283(F)
T284(F)
T25(R)
T24(R)
T262(R)
T265A(R)
T265(R)

CB035
CB036
CB027
CB026
CB034
CB032
MXH23A
MXH23B
MXH23C

150ϕ
300ϕ
750ϕ
600ϕ

31.25

KEY PLAN

LEGEND

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A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Siu On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 8662

Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 10)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW10

NORTH

SCALE 1 : 250
0 2 4 6 8 10m

REFER TO DWG. NO. HKJC6/TW10
MATCH LINE

REFER TO DWG. NO. HKJC6/TW14
MATCH LINE

REFER TO DWG. NO. HKJC6/TW06
MATCH LINE

REFER TO DWG. NO. HKJC6/TW07
MATCH LINE

REFER TO DWG. NO. HKJC6/TW15
MATCH LINE

MATCH LINE
REFER TO DWG. NO. HKJC6/TW12

T265A(R)
T265(R)
T260(R)
T261(R)
T268(R)
T267(R)
T266(R)
T269(R)
T252(R)
T263(R)
T264(R)
T254(R)
T253(R)

MVH23D
MVH23E
MVH23F
EB02
EB01

35 40 45 46 47 48 49 50 51
47.5
48.5
600ø
900ø
1500ø

KEY PLAN

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A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
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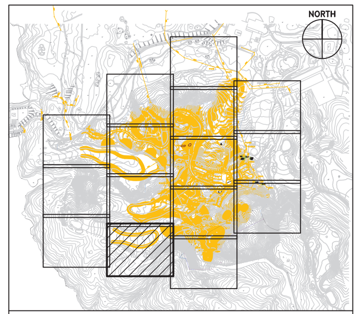
Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 11)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW11



KEY PLAN

LEGEND

	PROPOSED GOLF ACADEMY BUILDING AND REALIGNED SOUTH COURSE HOLES
	PROPOSED ROAD AND PATH LAYOUTS
	EXISTING PROPERTY LINE
	TEMPORARY LAND ALLOCATION
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	PROJECT BOUNDARY
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T93(F)	EXISTING TREES TO BE FELLED
T44(T)	EXISTING TREES TO BE TRANSPLANTED
T44(P)	EXISTING TREES TO BE RETAINED WITH ROOT AND/ OR CROWN PRUNING
	EXISTING TREES OUTSIDE BOUNDARY OF WORKS

Amendment Numbers	Date	Amendment Description	Drawn by	Checked by	Approved by
A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Urbis Limited 雅邦

Planning, Urban Design, Landscape, Golf & Environmental Consultants
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Job title

KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title

TREE WORKS PLAN (SHEET 12)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW12

NORTH

SCALE 1 : 250
0 2 4 6 8 10m

MATCH LINE
REFER TO DWG. NO. HKJC6/TW09

MATCH LINE
REFER TO DWG. NO. HKJC6/TW10

MATCH LINE
REFER TO DWG. NO. HKJC6/TW14

T154(R)
T155(R)
T156(R)
T157(R)
T158(R)
T159(R)
T160(R)
T161(R)
T163(F)
T164(F)
T275(R)

SOAKAWAY PIT

UC2 SUBSOIL DRAIN

Road

Cover Channel

FP

KEY PLAN

LEGEND

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A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Urbis Limited
Planning, Urban Design, Landscape, Golf & Environmental Consultants
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Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 13)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW13

REFER TO DWG. NO. HKJC6/TW13
MATCH LINE

NORTH

SCALE 1 : 250
0 2 4 6 8 10m

T274(R)
T442(R)
T436(R)
T441(R)
T439(R)
T440(R)
T437(R)
T273(R)
T434(R)
T435(R)
T272(R)
T432(R)
T431(R)
T430(R)
T428(R)
T429(R)
T245(R)
T444(R)
T433(R)
T438(R)
T445(R)
T251(R)
T279(R)
T408(R)
T277(R)
T276(R)
T278(R)
T411(R)
T410(R)
T420(R)
T409(R)
T421(R)
T412(R)
T417(R)
T413(R)
T416(R)
T415(R)
T414(R)
T471(R)
T248(R)
T249(R)
T473(R)
T246(R)

MATCH LINE
REFER TO DWG. NO. HKJC6/TW10

MATCH LINE
REFER TO DWG. NO. HKJC6/TW11

MATCH LINE
REFER TO DWG. NO. HKJC6/TW15

KEY PLAN

LEGEND

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A	29/05/13	GENERAL REVISIONS	AC	DJ	AD

Planning, Urban Design, Landscape, Golf & Environmental Consultants
Urbis Limited, 11/F Sui On Centre, 188 Lockhart Road, Wan Chai, Hong Kong. Tel 2802 3333 Fax 2802 1662

Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 14)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW14

REFER TO DWG. NO. HKJC6/TW14
MATCH LINE

NORTH

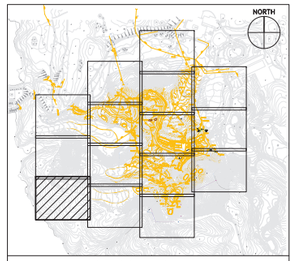
SCALE 1 : 250
0 2 4 6 8 10m

T473(R)
T250(R)
T472(R)
T246(R)
T247(R)

30
35
20
40
FP
E
38.0
24.2

MATCH LINE
REFER TO DWG. NO. HKJC6/TW11

MATCH LINE
REFER TO DWG. NO. HKJC6/TW12



KEY PLAN

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Job title
KAU SAI CHAU GOLF ACADEMY, PRACTICE AREAS AND ALTERATIONS TO EXISTING HOLES

Drawing title
TREE WORKS PLAN (SHEET 15)

Drawn	JC	Scale	1:250@A1 / 1:500@A3
Designed	DJ	Date	SEP 2012
Approved by	AD	Dwg. No.	HKJC6/TW15

Appendix H. Records of Cultural Heritage

Grave No.G01	Easting: 850049.8	Northing: 825014.9
	Family: Chan	Location: Kau Sai Chau
	Dimension:5.4m x 4m	Date of original burial: 1973
		Status: Abandoned
	Inscription:	佳城坐巽向乾兼巳吉庚分弇 師地李子遊定針 顯始祖考 諱運如陳公府君墓 奉祀八世孫平珊平康卒二大方子孫等敬立 一九七三年癸丑十月吉日修
		

Grave No.: G02	Easting：850174.5	Northing：825065.4
	Family: Ma	Location: Kau Sai Chau
	Dimension Grave: 3.6m x 3.6m Gravestone 1.8m x 0.9m	Date of original burial: 1996
		Status: Active
Inscription (plaque):	Inscription (plaque left):	Inscription (plaque right):
馬田昌太公之墓 新做屋 一九九六年十月八日 丙子年八月廿六日立	進長祖先 丙子年八月廿六日	初保太公 丙子年八月廿六日

Grave No.：G03	Easting： 850180.2	Northing：825060.4
	Family: Shek	Location: Kau Sai Chau
	Dimension: Grave: 2.5m x 2.5m Gravestone 0.85m x 0.85m	Date of original burial: 1932
		Status: Active
Inscription (plaque):	皇清顯考四世祖石公新財墓 民國廿一年孟冬月吉日重修 坐坤向旦兼申寅之原 高要鍾敏政指穴 奉祀男 洪銀 全和 全貴 彩銀 興德 全善 孫 滿銀 全德 全歡 全順 全就 曾玄仝立	

Grave No. G04	Easting：849977.8	Northing：825231.8
	Family: Unknown	Location: Kau Sai Chau
	Dimension: Grave: 4.5m x 3.2m	Date of original burial: Unknown
Inscription (plaque):	Inscription (plaque):	
Remark: In dilapidated condition and overgrown with thick vegetation. Style similar to G01		

Grave No.: G05	Easting：850033.7	Northing：825219.1
	Family: Unknown	Location: Kau Sai Chau
	Dimension: Grave: approx. 3.0m x 2.5m Gravestone: 1.0 x 0.2m	Date of original burial: Unknown
Inscription (plaque):	Unknown	
Remark: Overall grave area not defined.	 	

Appendix I. Environmental Monitoring and Audit

Kau Sai Chau Golf Academy
Environmental Team

WEEKLY SITE INSPECTION CHECKLIST

Inspection Date		Time		Inspected By	Client: Contractor: IEC:
Site Location					

Weather

Condition:		Fine		Sunny		Overcast		Drizzle		Rain		Storm		Hazy
Temperature:					Humidity:		High		Moderate		Low		
Wind:		Calm		Light		Breeze		Strong	Remarks:				

Please tick each item as 'Yes', 'No' or 'N/A or not obs' as appropriate

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
	AIR QUALITY					
	Access roads:					
1.	Section between jetty and Golf Academy access road - keep clear of dusty materials.					
2.	Section within Golf Academy project to Contractor works areas - Spray with water or a dust suppression chemical					
3.	Any access road within the Project Area sprayed with water or a dust suppression chemical and kept clear of dusty materials.					
	Cement:					
4.	For every stock of more than 20 bags of cement or dry pulverised fuel ash, cover entirely by impervious sheeting or place in an area sheltered on the top and 3 sides;					
5.	For cement or dry pulverised fuel ash delivered in bulk, store in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line such that an audible alarm is triggered and the material filling stops within one minute;					
6.	Do not overfill silos used for the storage of cement or dry pulverised fuel ash; and					
7.	Carry out loading, unloading, transfer, handling or storage of bulk cement or dry pulverised fuel ash during or after the de-bagging process, in a totally enclosed system or facility, and install effective fabric filter or equivalent air pollution control system on vent or exhaust systems.					
8.	Dispose cement, pulverised fuel ash or any other dusty materials collected by fabric filters or other air pollution control system or equipment in totally enclosed containers.					
	Exposed earth:					
9.	Properly treated by application of water spraying, surface compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, shortcrete or temporary fabric covers; and					

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
10.	Schedule construction programme to complete works on open areas as quickly as possible.					
	Stockpile of dusty materials:					
11.	For stockpile over 50 m^3, entirely cover by impervious sheeting with enclosure extending at least 1 m above and beyond the stored materials;					
12.	Place in an area sheltered on the top and the 3 sides; and					
13.	Spray with water or dust suppression chemical.					
	Loading, unloading or transfer of dusty materials:					
14.	Spray all dusty materials with water or a dust suppression chemical immediately prior to any loading, unloading or transfer operation; and					
15.	Control the height from which excavated materials are dropped to a practical minimum.					
	Use of vehicles:					
16.	Restrict vehicles to minimum practicable speed limits (typically less than 10 km/h); and					
17.	Where a vehicle operating between the jetty and Project Area or within the Project Area is carrying a load of dusty material, load is entirely covered by clean impervious sheeting which extends over the edges of properly fitting side and tail boards and dampen materials before transportation, if necessary;					
18.	For pneumatic or power-driven drilling, cutting, polishing, breaking or crushing – spray water or a dust suppression chemical continuously on surface during operation.					
	Disposal of Dusty Material:					
19.	Cement, pulverised fuel ash or any other dusty materials collected by fabric filters or other air pollution control system or equipment should be disposed of in totally enclosed containers.					
	Earthworks:					
20.	For excavation or earth moving – spray working area of any excavation or earth moving operation with water or a dust suppression chemical immediately before, during and immediately after the operation.					
	Site clearance:					
21.	Spray working area for the uprooting of trees, shrubs or vegetation, or for the removal of boulders, poles, pillars or temporary or permanent structures with water or a dust suppression chemical immediately before, during and immediately after operation; and					
22.	Cover all demolished items (including trees, shrubs, vegetation, boulders, poles, pillars, structures, debris, rubbish and other items arising from site clearance) that may dislodge dust particles entirely by impervious sheeting or placed in an area sheltered on the top and 3 sides within a day of demolition.					
	General requirements:					
23.	Operate air pollution control system, equipment, measure and vehicles properly and effectively, in accordance to manufacturer's instructions;					
24.	In the event of a malfunctioning or breakdown of any air pollution control system or equipment, suspend the plant, process or activity concerned as soon as practicable until such time as the air pollution control system or equipment is restored to its proper function;					

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
25.	Do not use compressed air jet for cleaning or clearing dust from vehicles, equipment, other materials and persons except for cleaning formwork or other surfaces receiving concrete prior to concreting or clearing of slopes prior to shattering; and					
26.	Shut down all vehicles and plant in intermittent use between work period or throttle down to a minimum idling speed.					
	Site boundary and entrance:					
37.	Generally vehicles should not leave the Project Area. If they do vehicle wheels should be washed at a vehicle washing facility, including a high pressure water jet at the designated vehicle exit point;					
38.	Paved area where vehicle washing takes place and the section of the road between the washing facilities and the exit point of concrete, bituminous material or hardcore;					
	Transfer of dusty materials with a belt conveyor system:					
40.	Enclose belt conveyor for the transfer of dusty materials on the top and 2 sides;					
41.	Enclose every transfer point between any 2 belt conveyors;					
	For concrete production using bulk cement as raw materials:					
42.	Store cement (delivered in bulk) in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line such that an audible alarm is triggered and the material filling stops within one minute;					
43.	Do not overfill silos used for the storage of cement;					
44.	Carry out loading, unloading, transfer, handling or storage of bulk or any cement during or after the de-bagging process, in a totally enclosed system or facility, and install effective fabric filter or equivalent air pollution control system on vent or exhaust systems; and					
45.	For production of concrete or any other substances using bagged cement in a standard bag (not exceeding 50 kg), carry out de-bagging, batching and mixing processes in an area sheltered on the top and 3 sides.					
	NOISE					
1.	Schedule construction work carefully to maximize any required noisy work during less sensitive hours (e.g. golf course operating period(s));					
2.	Minimise the cumulative noise sources from various activities;					
3.	Keep KSCPGC users informed of what is being planned through the management team so that they are more likely to accept the inevitable impact noise, resulting in fewer complaints;					
4.	Limit the time workers spend in noisy areas by moving them to quiet work areas before their daily noise exposure becomes excessive;					
5.	Switch off noisy equipment when not in use;					
6.	Locate noisy equipment as far away is possible from any Noise Sensitive Receivers (NSRs);					
7.	Select quieter equipment;					
8.	Use electricity supply from public utility for all machinery if possible, to avoid generator noise;					
9.	Use stockpiles of earth as a natural sound barrier whenever possible;					

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
10.	Provide regular and effective maintenance for all Powered Mechanical Equipment (PME) in order to prolong the life of equipment as well as to reduce noise emission;					
11.	Undertake regular site supervision and training to promote good site practice – unnecessary noise disturbance created from shouting, colliding of materials or striking of steel bars can be avoided;					
12.	Take care when loading and unloading vehicles, dismantling scaffolding or moving materials, to reduce unnecessary noise impact;					
13.	Use alternative methods, such as a totally enclose conveyor belt system to avoid the use of noisier plant such as dump trucks;					
14.	Arrange delivery of noisy/bulky equipment/material to avoid disturbance to surrounding golf course users and within permitted hours;					
15.	Provide adequate planning with contingency to ensure that length operations, e.g. concrete pours, can be completed within the permitted hours;					
16.	Avoid carrying out noisy operation in early morning. Schedule such operation after 9:00 a.m. as far as practicable;					
17.	Fabricate units off-site to minimize impacts on-site, when practicable;					
18.	Plan routes for construction vehicles carefully, to reduce noise to golf course users;					
19.	Maintain equipment in good condition. Use lubricant to reduce noise impacts;					
20.	Monitor noise impact on-site regularly. If there is an exceedance, further mitigation measures may be necessary;					
	WATER QUALITY					
	Surface Water Run-off / Groundwater / Boring Water:					
1.	Discharge into closed loop drainage system via adequate sand/silt removal facilities (e.g. sand traps, silt traps and sediment basins) to minimize siltation in water discharged;					
2.	Storm water should be directed to silt removal facilities by channels, earth bunds and sand bag barriers;					
3.	Earth works final surfaces are well compacted and surface protection performed immediately after final surface formation;					
4.	Open stockpiles of construction materials (e.g. aggregates, sand and fill) should be covered with tarpaulin, etc, during rainstorms;					
	Wastewater from Concrete Batching:					
5.	Wastewater from mixer trucks and drums, etc, is recycled to minimize discharge;					
6.	Pump sum of water recycling system should be provided with standby pump and alternating devices to prevent pollution from wastewater overflow;					
7.	Surplus wastewater only discharged after silt removal and pH adjustment (6-10);					
8.	Surface run-off should be segregated from concrete batching and casting areas;					
9.	Wastewater or contaminated surface run-off requires more elaborate chemical treatment before disposal into closed loop drainage system.					
	Wastewater from Building Construction Activities (e.g. plastering, internal decorating, cleaning of works):					

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
10.	Treated with silt removal and pH adjustment (6-10) prior to discharged to existing treatment works;					
11.	Before commencing demolition – all sewers and drainage connection are sealed to prevent building debris, soil, etc, from entering public sewers/drains;					
12.	Wash water is removed for silt and before discharging into closed loop drainage system;					
	WASTE MANAGEMENT					
	Construction & Demolition Material					
1.	Are C&D material recycled and properly segregated on-site?					
	Chemical Waste					
2.	For those processes that generate chemical waste, have alternatives, which generate reduced quantities or even no chemical waste, or less dangerous types of chemical waste been considered?					
3.	For containers used for the storage of chemical waste:					
	• Are they suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed?					
	• Do they have a capacity of less than 450L unless the specifications have been approved by EPD?					
	• Have a label in English and Chinese been displayed in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation?					
4.	For the storage area for chemical waste:					
	• Are they clearly labelled and used solely for the storage of chemical waste?					
	• Are they enclosed on at least 3 sides?					
	• Do they have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest?					
	• Do they have adequate ventilation?					
	• Are they covered to prevent rainfall entering?					
	• Are they arranged so that incompatible materials are adequately separated?					
5.	For disposal of chemical waste:					
	• Is disposal of chemical waste via a licensed waste collector?					
	• Is it delivered to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Facility which also offers a chemical waste collection service and can supply the necessary storage containers?					
	• Is it delivered to a recycling or reprocessing facility licensed by EPD?					
	General					
6.	Are general refuse stored in enclosed bins or compaction units separate from demolition and chemical waste?					
7.	Is a reputable waste collector employed to remove general refuse daily to minimise odour, pest and litter?					
8.	Is burning of refuse on site strictly prohibited?					
9.	Are separate, labelled bins provided for collection of aluminium cans to recover them from the waste stream by individual collectors?					
10.	Are office wastes reduced through recycling of paper?					
11.	Are different types of waste segregated and stored in different containers, skips or stockpiles to enhance reuse or recycling?					

	Item	Close-out on last comments Y/N	Yes	No	N/A or not obs	Remarks
12.	Has a trip-ticket system been included In order to monitor the disposal of C&D and solid wastes at public filling facilities and landfills and to control fly-tipping?					
13.	Has a Waste Management Plan been prepared?					
14.	Has a recording system for the amount of wastes generated, recycled and disposed (including the disposal sites) been proposed?					
15.	Are wastes handled and stored securely without loss or leakage to minimise the potential for pollution?					
16.	Are reputable waste collectors authorised to collect specific category of waste concerned employed?					
17.	Are appropriate measures (e.g. covering trucks or transporting wastes in enclosed containers) employed to minimise windblown litter and dust during transportation?					
18.	Are waste disposal permit obtained from appropriate authorities in accordance with relevant ordinances?					
19.	Are general refuse collected frequently?					
20.	Are there any procedures developed by site staff and civil engineering Contractor to ensure no illegal disposal of wastes occur?					
21.	Are waste storage areas well maintained and cleaned regularly?					
22.	Are records of the quantities of wastes generated, recycled and disposed maintained?					
	Operation of Temporary Barging Point					
1.	Construction of a temporary jetty, above the intertidal zone to trap any material dropped during transfer;					
2.	Edge bunds surrounding the transfer area					
3.	An impervious layer covering the transfer area, within the bunded area					
4.	Encapsulation of all loads with potential to spill prior to transport;					
5.	An impervious sheet laid over the gap between the temporary jetty and barge					
6.	Silt curtain deployed around the barging area when appropriate.					
7.	Fully equipped spill kit will be deployed on-site during any unloading activity. The following sketch indicates the mitigation measures.					
	Other - Environmental Permit Environmental Permit – EP-___/2013/ Is the Environmental Permit displayed conspicuously at the site entrance s/exits for public's information at any times?					

Other Observations:

Client's Representative	Contractor's Representative	Independent Environmental Consultant's Representative
( )	( )	( )