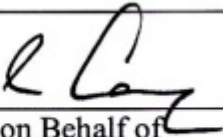


**Proposed Extension of Public Golf Course  
at Kau Sai Chau Island, Sai Kung**

**Monthly Environmental Monitoring & Audit (EM&A) Report  
for January 2006**

**(Report No. 382210/001)**

Report Authorized For Issue By:	
	For and on Behalf of Black & Veatch Hong Kong Limited

**Black & Veatch Hong Kong Limited**  
Room 1201-11, Millennium City 5,  
418 Kwun Tong Road,  
Kowloon, Hong Kong

**The Hong Kong Jockey Club**  
One Sports Road  
Happy Valley  
Hong Kong

**February 2006**

## Table of Content

### Executive Summary

#### 1. Introduction

- 1.1 *Background of the Project*
- 1.2 *Purpose of the Report*
- 1.3 *Structure of the Report*

#### 2. Project Information

- 2.1 *Background*
- 2.2 *Site Description*
- 2.3 *Project Organization*
- 2.4 *Construction Programme*
- 2.5 *Status of Environmental Submission*
- 2.6 *Summary of EM&A Requirements*

#### 3. Environmental Monitoring Requirements

- 3.1 *Air Quality*
- 3.2 *Water Quality*
- 3.3 *Ecology*
- 3.4 *Landscape and Visual*
- 3.5 *Archaeology (Watching Brief)*
- 3.6 *Land Contamination*

#### 4. Implementation Status on Environmental Protection Requirements

#### 5. Monitoring Results

- 5.1 *Air Quality*
- 5.2 *Water Quality*
- 5.3 *Ecology*
- 5.4 *Landscape and Visual*
- 5.5 *Archaeology (Watching Brief)*
- 5.6 *Land Contamination*

#### 6. Environmental Site Auditing

#### 7. Environmental Non-Conformance

- 7.1 *Summary of Environmental Non-Compliance*
- 7.2 *Summary of Environmental Complaint*
- 7.3 *Summary of Environmental Summons*

#### 8. Future Key Issues

- 8.1 *Key Issues for coming month*
- 8.2 *Monitoring Schedule for the coming month*
- 8.3 *Construction programme for the next three month*

#### 9. Recommendations and Conclusions

### List of Figure


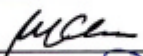

- 1.1 Master Layout Plan of the Proposed Third Golf Course
- 1.2 Project Organisation and Lines of Communication
- 3.1 Proposed Air Quality Monitoring Locations
- 3.2 Proposed Water Quality Monitoring Locations (Construction phase)
- 3.3 Proposed Ecology Monitoring Locations
- 3.4 Coral Transplantation Location
- 3.5 Locations of Coral and Seagrass Monitoring (Sites D2, D3 and C)
- 3.6 Control Site for Natural Coral Monitoring
- 3.7 Watching Brief Monitoring Area
- 3.8 Sampling Locations for Land Contamination

### List of Table

- Table 1.1 Structure of the Report
- Table 2.1 Summary of Compliance with EP conditions
- Table 2.2 Summary of Impact EM&A Requirements
- Table 3.1 Action and Limit Levels for 1-hour TSP
- Table 3.2 Action and Limit Levels for 24-hour TSP
- Table 3.3 TSP Monitoring Parameter and Frequency
- Table 3.4 Air Quality Monitoring Equipment
- Table 3.5 Derived Summaries of Action and Limit Levels for Marine Water Quality
- Table 3.6 Derived Summaries of Action and Limit Levels for Freshwater Water Quality
- Table 3.7 Water Monitoring Parameter, Frequency and Locations
- Table 3.8 Water Quality Monitoring Locations during Construction Phase
- Table 3.9 Analytical Methods to be applied to Water Quality Samples
- Table 5.3-1 Conditions of tagged corals at Site B2 with sizes and species
- Table 5.3-2 Conditions of tagged corals at Site C with sizes and species
- Table 5.3-3 Conditions of tagged corals at Control Site with sizes and species
- Table 6.1 Summary of Environmental Licensing and Permit Status
- Table 8.1 Construction works to be taken in the coming month

### List of Annex

- Annex A Tentative Construction Programme
- Annex B Monitoring Programme for the reporting month
- Annex C Event Action Plan
- Annex D Implementation status on Environmental Protection Requirements
- Annex E Monitoring results
- Annex F Calibration Certificates
- Annex G Monitoring Programme for the next three months
- Annex H Construction Programme for the next three months

	Name	Signature	Date
Prepared	Esther Tong		2/2006
Checked	Manuel Chua		2/2006
Reviewed	Johan Wong		2/2006

Our ref: 40040032/CERT/01\_06.doc

**Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung  
(Independent Environmental Checker)**

**CHECK CERTIFICATE**

1. We certify that professional skill and care have been used in checking the Environmental Team's (ET) No. 1 Monthly EM&A Report for January 2006 for the construction of the Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung.
2. We certify that the ET's EM&A programme for the reporting period has been satisfactorily executed and the No.1 Monthly EM&A Report for January 2006 has been verified.
3. We comment that our evaluation of the ET's EM&A programme is base on a random audit process which cannot be guaranteed to have all non-conformities identified.

Signed



Name

\_\_\_\_\_  
Independent Environmental Checker  
Gary Tam

Of

Hong Kong Productivity Council  
3/F., HKPC Building,  
78 Tat Chee Avenue,  
Kowloon

Date

8 February 2006

<b>DOCUMENT CONTROL</b>		Proposed Extension of Public Golf Course at Kau Sai Chau, Sai Kung		No. 382210/001	
<b>AMENDMENT RECORD</b>				Prepared by: Esther Tong	
Monthly EM&A Monitoring Report – January 2006		Client: <b>Hong Kong Jockey Club</b>		Initials: ET	
				Date: January 2006	
<b>Pages:</b>	<b>Date:</b>	<b>Issue No.</b>	<b>Description:</b>	<b>Initials:</b>	
All	Jan 06	1	Monthly EM&A Report for submission to EPD	ET	

## **Executive Summary**

This is the first monthly Environmental Monitoring and Audit (EM&A) report prepared by Black & Veatch, the designated Environmental Team (ET), for the Project “Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung”. The construction works of golf course was commenced on 16 January 2006. This report presents the results of the EM&A works conducted in the month of January 2006 (16 January 2006 to 24 January 2006).

### Summary of construction works undertaken during this report period

The major work was vegetation clearance at Holes 1 and 2 only. No excavation work was carried out carried out for all other construction areas.

### Environmental Monitoring and Audit Progress

A summary of monitoring activities in this reporting period is shown as follows:

24-hour Total Suspended Particulates (TSP) monitoring at GCA B1	1 time
Water quality monitoring (marine + freshwater)	4 times
Terrestrial Ecology	1 time
Marine Ecology	2 times
Landscaping & Visual	1 time
Joint environmental site auditing	1 time

### Air Quality

1 set of 24-hour TSP monitoring were carried out on 20<sup>th</sup> January 2006 at Bungalow A (GCA B1) at Kau Sai Chau during this reporting month. No exceedance of action and limit levels of 24-TSP was recorded at GCA B1.

### Water Quality

4 sets of water quality monitoring were carried out on 16<sup>th</sup>, 19<sup>th</sup>, 21<sup>st</sup> and 23<sup>rd</sup> January 2006 at 9 marine and 7 freshwater monitoring locations. Monitoring was performed on schedule. For marine water, no exceedance of action and limit levels was recorded at all marine monitoring locations. For freshwater, 1 limit level exceedance for SS were recorded at F\_DB on 21<sup>st</sup> Jan 2006. The exceedance of measured SS value was 6 mg/L. ET's assessment showed that the exceedance was not attributed to the works and therefore no further action was required. The exceedance is mainly due to variation of the streams.

### Ecology

Terrestrial ecology was conducted on 17<sup>th</sup> January 2006. The demarcation of the stream buffer zone had not been established at the time of the monitoring survey. Stream buffer zone demarcation will be established by the Contractor when the works fronts are approaching each stream and will be completed before onset of the wet season in 2006. In general, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.

Marine ecology was conducted on 26<sup>th</sup> & 27<sup>th</sup> January 2006 at Site B2, Site C and Control Site. No construction work had been conducted at temporary barging point (Site B2) when the present monitoring survey was conducted. No mortality, sedimentation or bleaching was found on any of the tagged corals. All sites and their vicinity still remained similar conditions as during the Baseline Survey.

### Landscaping & Visual

The landscape and visual monitoring and site audit was carried on 24<sup>th</sup> January 2006. Vegetation clearance work has commenced. Tree protection measures have not been implemented yet. The contractor was reminded to erect fencing around the preserved trees.

### Environmental Site Auditing

A monthly joint environmental site audits was carried out on 20<sup>th</sup> January 2006 by the Contractor's representative, ET's representative and Independent Environmental Checker (IC(E)).

### Environmental Non-conformance

There was one exceedance of limit level of suspended solids recorded at the downstream of stream B (F\_DB, 6mg/L) on 21<sup>st</sup> January 2006. However, such exceedance was not attributed to the project works and therefore no environmental non-conformance was recorded in the reporting month. No environmental complaint was received in this reporting period. No environmental summon was received in this reporting period.

### Implementation Status of Environmental Mitigation Measures

The Contractor was reminded to water the unpaved areas regularly during the dry season.

The Contractor was reminded to minimize the water quality impact when undertaking excavation works. Temporary drainage system and contingency plan shall be installed and proposed to the Engineer's Representative (ER) for approval and ET for comment before the wet season.

The Contractor was reminded to prepare the demarcations of buffer zone at Streams A, B and C before any major construction works carried out are being carried close to those areas.

### Future Key Issues

Key issues to be considered in the coming month include:

- Generation of dust from activities on-site during dry season : mainly Holes 1 and 2, concrete batching plants construction, temporary haul road and installation of site office;
- Site runoff due to vegetation clearance from the exposed areas; and
- Storage of chemicals/fuel and chemical waste/waste oil on site.

Potential environmental impacts arising from the construction activities in the coming month are expected to be mainly associated with dust, site runoff and waste management.

## 1. Introduction

### 1.1 Background of the Project

1.1.1 Black & Veatch (hereinafter called the "ET") was appointed by Hong Kong Jockey Club (hereinafter called the "Project Proponent") to undertake Environmental Monitoring and Audit (EM&A) for "Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung" (hereinafter called the "Project"). Under the requirements of Section 4 of Environmental Permit EP-224/2005, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality, water quality, terrestrial and marine ecology, landscape and visual, archaeology (watching brief) and land contamination are required for the Project.

1.1.2 This report summarises the environmental monitoring and audit works for the Project in January 2006 (from 16 January to 24 January 2006).

### 1.2 Purpose of the Report

1.2.1 This is the first EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **16 January 2006 to 24 January 2006**.

### 1.3 Structure of the Report

1.3.1 The structure of the report is shown in Table 1.1.

**Table 1.1 Structure of the Report**

Section		Description
1	Introduction	Details the scope and structure of the report
2	Project Information	Summarizes background and scope of the project, site description, project organization and contact details, construction programme, the construction works undertaken and the status of environmental permits/licenses during the reporting period.
3	Environmental Monitoring Requirement	Summarizes the monitoring parameters, programmes, methodology, frequency, location, action and limit levels, event action plans, environmental mitigation measures as recommended in the EIA report and relevant environmental requirements.
4	Implementation Status on Environmental Mitigation Measures	Summarizes the implementation of environmental protection measures during the reporting period.
5	Monitoring Results	Summarizes the monitoring results obtained in the reporting period.
6	Environmental Site Auditing	Summarizes the audit findings of the weekly site inspections undertaken within the reporting period.
7	Environmental Non-conformance	Summarizes any monitoring exceedance, environmental complaints and environmental summons within the reporting period.
8	Future Key Issues	Summarizes the impact forecast and monitoring schedule for the next three month (25 January 2006 – 24 April 2006).
9	Recommendations and Conclusions	Lists out any recommendations and provides an overall conclusion of the results and findings of the EM&A programme for the reporting period.



## 2. Project Information

### 2.1 Background

2.1.1 The Project comprises the following major components:

- Construction of a third 18-hole public golf course on the east side of the island, south of the existing golfing area;
- A new irrigation lake to collect surface runoff from new 18-hole golf course. Water stored at the new irrigation lake can also be diverted to existing reservoir for tertiary treatment and recycling;
- A new desalination plant adjacent to the existing pier to serve as an additional irrigation water supply for the new golf course during dry season; and
- Expansion of existing administration and maintenance buildings.

2.1.2 The potential environmental impacts of the Project have been studied in the Environmental Impact Assessment (EIA) report (EIAO Register No. AEIAR- 091/2005). The EIA was approved on 14 November 2005 under the EIAO. An Environmental Permit (EP-224/2005) was granted on 28 November 2005.

### 2.2 Site Description

2.2.1 A layout plan of the Project is provided in **Figure 1.1**.

### 2.3 Project Organization

2.3.1 Project organization and lines of communication are shown in **Figure 1.2**.

### 2.4 Construction Programme

2.4.1 The tentative construction programme for the Project is presented in **Annex A**. The construction works were commenced on 16 January 2006 and are scheduled to be completed by end of July 2007.

2.4.2 The major work was vegetation clearance work at Holes 1 and 2 only during this monitoring month. No excavation work was carried out for all other construction areas.

### 2.5 Status of Environmental Submission

2.5.1 A summary of the reporting requirement for compliance with EP conditions of the Project is listed in Table 2.1.

**Table 2.1 Summary of Compliance with EP Conditions**

EP-224/2005	Environmental Permit Submission	Status	Remarks
2.3	Management organization of the main construction companies and/or any form of joint ventures associated with the construction of the Project.	Submitted	At least one week before the commencement of construction of the Project.

EP-224/2005	Environmental Permit Submission	Status	Remarks
2.4	Contamination Assessment Plan (CAP) submission. If land contamination is confirmed by the site investigation, submission of a Remediation Assessment Plan (RAP) including a Contamination Assessment Report (CAR) is required.	In progress	At least one month before the commencement of construction at the potentially contaminated land.
3.6	Detailed methodology for Coral Transplantation submission to the Director for approval.	In progress	At least one month before commencement of the Coral Transplantation.
4.1	EM&A Manual (revised)	Submitted	At least two weeks before commencement of construction of the Project.
4.3	Baseline Monitoring Report	Submitted	At least two weeks before commencement of construction of the Project
4.5	Monthly EM&A Report for January 2006	Submitted	within 10 working days after the end of the reporting month
5.1	Set up a dedicated web site and notify the Director in writing the Internet address.	Completed	Within 6 weeks after the commencement of construction of the Project ( <a href="http://www.kscgolf.com/ema/index.asp">http://www.kscgolf.com/ema/index.asp</a> )

## 2.6 Summary of EM&A Requirements

2.6.1 The EM&A programme requires environmental monitoring for air quality, water quality, terrestrial and marine ecology, landscape and visual, archaeology (watching brief) and land contamination. The EM&A requirements for each parameter are described in subsequent sections, including:

- All monitoring parameters;
- Action and Limit Levels for all environmental parameters;
- Event and Action Plans; and
- Environmental mitigation measures, as recommended in the project EIA final report.

2.6.2 A summary of impact EM&A requirements is presented in Table 2.2.

**Table 2.2 Summary of Impact EM&A Requirements**

<b>Impacts</b>	<b>Parameters/descriptions</b>	<b>Locations</b>	<b>Frequencies</b>	<b>Duration</b>
<b>Air Quality</b>	24-Hour TSP	1 Location	Once every 6 days	During Construction
	1-Hour TSP	1 Location	Three times in every 6 days	During Construction (As required when complaint received)
<b>Water Quality</b>	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity and SS	9 marine and 7 freshwater locations	<b>First 3 months</b> 3 times a week, mid-ebb and mid-flood tides. If there is no exceedance occurs for the first 3 months, reduce to once per week.	During Construction
	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP and selected pesticides.	9 marine and 7 freshwater locations	Once per week. If there is no exceedance occurs, monitoring frequency is subjected to change and shall be agreed with EPD.	During Construction: turf establishment period (permanent low flow drainage is not completed)
	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP, Chl-a and selected pesticides.	9 marine and 6 freshwater locations	A 2-year of monitoring period for the operation phase is proposed. Monitoring should be carried out on bi-weekly basis for the first 12 months, after when the frequency will be reviewed by EPD.	During Operation
	Dissolved Oxygen, Temperature, Turbidity, pH, Salinity, SS, NO3-N, NO2-N, NH3-N, TP, Chl-a and selected pesticides	8 marine locations	Additional water quality monitoring shall be carried out after heavy rain storm or when there is an overflow event from the reservoir, irrigation buffer lake or detention ponds/tanks.	During Construction and Operation
<b>Terrestrial Ecology</b>	Monitoring aquatic fauna	Streams B, C & D	Once a month	During Construction
	Environmental Site Inspection mainly on intact of buffer zones	Streams A, B and C	Once a week	During Construction

Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung  
 Monthly EM&A Report

Impacts	Parameters/descriptions	Locations	Frequencies	Duration
Marine Ecology	Transplanted corals	D2	Quarterly for first year after transplantation	During construction
	Natural corals	Site C, Site B2, Site D2, and a Control Site.	<b>For Site D2 and the Control Site:</b> Weekly at the first two weeks of dredging works for the desalination plant pipelines. If no exceedance was recorded, the monitoring schedule would be changed to biweekly till the pipeline construction works are finished. <b>For Site C, B2 and the Control Site:</b> Monthly for the first three months of the construction phase. If no exceedance was recorded, the monitoring schedule would be changed to quarterly during the rest of the construction phase.	During Construction
		Site C, Site D2 and the Control Site.	First three months would be monthly conducted during the first two years of the operation phase. If no exceedance was recorded, the monitoring schedule would be changed to semi-annually, i.e. once in dry season and once in wet season.	During operation
	Seagrass bed	Site D3, and at Site D2	<b>Monitoring at Site D3 (D2 if necessary):</b> Weekly during the first two weeks of dredging works, and then biweekly till the pipeline construction works are finished.	During Construction
		Seagrasses at Site D3, and at Site D2	Site D2 during the baseline monitoring, would be monitored during the first two years of the operation phase. The monitoring schedule during the first three months would be monthly. After that, the monitoring schedule would be changed to semi-annually, i.e. once in dry season and once in wet season.	During Operation
	Landscape and Visual	Audits to ensure effective implementation of mitigation measures	Project area and at visual sensitive receivers	Auditing inspections and reporting shall be undertaken once every two weeks of the construction phase and once every two months of the operation phase.
Archaeology (Watching Brief)	Monitor archaeological potential sites at major cut areas	Hole 2, Hole 11, Hole 12, Hole 14, Hole 15 and Hole 16.	The archaeologist should keep the AMO informed of the progress of watching brief. The archaeologist should submit progress reports every 3 months during the programme of the watching brief.	During Construction
Land Contamination	Total Sulphur and Total Lead	Locations 2, 3, 6, 7 & 8	One month before commencement of work at the identified 5 hotspots	During Construction
General Site Conditions	Environmental Site Inspection	Works areas and areas affected by works	Periodically (weekly basis)	During Construction

### 3. Environmental Monitoring Requirements

#### 3.1 Air Quality

##### Monitoring Requirement

- 3.1.1 24-hour TSP monitoring was carried out at GCA B1 to monitor the construction dust impact level in this reporting period.
- 3.1.2 The established Action/Limit Levels (AL levels) for the 1-hour and 24-hour TSP monitoring works are summarized in Table 3.1 and Table 3.2.

**Table 3.1 Action and Limit Levels for 1-hour TSP**

Location	Description	Action Level	Limit Level
GCA B1	Bungalow A adjacent to Kau Sai Chau Public Golf Course Administration Building	277.2 $\mu\text{g m}^{-3}$	500 $\mu\text{g m}^{-3}$

Note: The action levels for GCA B1 are developed based on baseline monitoring result.

**Table 3.2 Action and Limit Levels for 24-hour TSP**

Location	Description	Action Level	Limit Level
GCA B1	Bungalow A adjacent to Kau Sai Chau Public Golf Course Administration Building	187.4 $\mu\text{g m}^{-3}$	260 $\mu\text{g m}^{-3}$

Note: The action levels for GCA B1 are developed based on baseline monitoring result.

##### Monitoring Parameters, Frequency and Programme

- 3.1.3 The monitoring parameters and frequency are summarized in Table 3.3. The monitoring programme for the reporting period is shown in **Annex B**.

**Table 3.3 TSP Monitoring Parameter and Frequency**

Parameter	Frequency
24-hour TSP	Once every 6 days
1-hour TSP	3 times every 6 days (as required in case of complaints)

##### Monitoring Locations

- 3.1.4 In accordance with the EM&A Manual, one monitoring station (GCA B1) was selected and shown in **Figure 3.1**.

##### Monitoring Equipment

- 3.1.5 24-hour and 1-hour TSP (in case of complaints received) were performed using High Volume Samplers (HVS) and measured in-situ respectively. 24-hour TSP level of samples will be collected using filters and High Volume Sampler and the collected samples will be determined by a local HOKLAS accredited laboratory upon receipt of the samples and 1-hour TSP level will be performed in-situ.

3.1.6 High volume samplers (HVS - Model GS-2310 Accu-vol) complete with the appropriate sampling inlets were installed for 24-hour TSP sampling. The HVS is composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50 Appendix B). A portable dust meter was used for the 1-hour TSP monitoring. Table 3.4 summarises the equipment used.

**Table 3.4 Air Quality Monitoring Equipment**

Equipment	Model
HVS Sampler	GS 2310 Accu-vol system
Calibrator	GMW 25
1-hour TSP Dust Meter	Laser Dust Monitor – Model LD-1 (L)

Monitoring Methodology and Calibration Details

*24-hour TSP Monitoring*

(i) Field Monitoring, Operation & Analytical Procedures

3.1.7 Operating/analytical procedures for the operation of HVS are as follows. The sampler was placed on a horizontal platform with appropriate supporting structure such that:

- the filter was at least 1.3 meters above ground;
- no two samplers should be placed less than 2 metres apart;
- the distance between the sampler and an obstacle, such as buildings, would be at least twice the height that the obstacle protrudes above the sampler;
- a minimum of 2 metres separation from walls, parapets and penthouses would be required for the rooftop samplers;
- a minimum of 2 metres separation from any supporting structure, measured horizontally would be required;
- airflow around the sampler would be unrestricted;
- no furnaces or incineration flues would be operating near the sampler;
- the sampler would be more than 20 metres from the dripline; and
- any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.

3.1.8 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m<sup>3</sup>/min. and 1.4 m<sup>3</sup>/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

3.1.9 For TSP sampling, fibreglass filters (G810) were used [Note: these filters have a collection efficiency of > 99% for particles of 0.3 mm diameter].

3.1.10 The power supply was checked to ensure the sampler worked properly.

3.1.11 On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.

3.1.12 The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.

- 3.1.13 The filter was aligned on the screen so that the gasket formed an air-tight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- 3.1.14 The shelter lid was closed and secured with the aluminum strip.
- 3.1.15 The timer was then programmed. Information was recorded on the record sheeting, which included the starting time, the weather condition, and the filter number (the initial weight of the filter paper can be found out by using the filter number).
- 3.1.16 After sampling, the filter was transferred from the filter holder of the HVS to a sealable plastic bag and sent to the laboratory for weighing. The elapsed time was also recorded.
- 3.1.17 Before weighing, all filters were conditioned for 24 hours before weighing under temperature of  $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$  and the relative humidity (RH)  $< 50\% \pm 5\%$ , preferably 40%. The HOKLAS laboratory (ALS Technichem (HK) Pty Ltd) has comprehensive quality assurance and quality control programmes.

(ii) Maintenance

- 3.1.18 Proper maintenance would be provided for the HVS as described below:
- 3.1.19 The HVS motors and their accessories have been properly maintained. Appropriate maintenance such as routine motor brushes replacement (time interval for replacement is about 500 hours) and electrical wiring checking have been conducted to ensure that the equipment and necessary power supply were in good working condition.
- 3.1.20 Initial calibration of HVS was conducted upon installation of equipment. The subsequent calibration would be provided at 2-month intervals using GMW-25 Calibration Kit.

*1-hour TSP Monitoring*

(i) Measuring Procedures

- 3.1.21 The measuring procedures of the 1-hour dust meter have been in accordance with the Manufacturer's Instruction Manual as follows:
- Set POWER to "ON", push BATTERY button, make sure that the meter's indicator is in the range with a red line and allow the instrument to stand for about 3 minutes (Then, the air sampling inlet has been capped).
  - Push the knob at MEASURE position.
  - Push "O-ADJ" button. (Then meter's indication is 0).
  - Push the knob at SENSI ADJ position and set the meter's indication to S value described on the Test Report using the trimmer for SENSI ADJ.
  - Pull out the knob and return it to MEASURE position.
  - Push "START" button.
  - All measurement procedures in section 2.3 of the approved EM&A Manual are followed during the reporting period.

(ii) Maintenance

- 3.1.22 The 1-hour TSP meter would be checked at 3 month intervals and calibrated at 1-year intervals throughout all stages of the air quality baseline monitoring.

Event and Action Plans

3.1.23 The Event and Action Plan (EAP) for air quality monitoring is presented in **Annex C**.

**3.2 Water Quality**

Monitoring Requirement

3.2.1 Water quality monitoring was conducted in accordance with the EM&A Manual. Tables 3.5 & 3.6 show the established Action/Limit Levels for the water environmental monitoring parameters.

**Table 3.5 Derived Summaries of Action and Limit Levels for Marine Water Quality**

Parameters	Location	Action	Location	Limit
<b>DO (surface &amp; middle)</b>	FCZ	5.8 mg/L	FCZ	5.3 mg/L
	All except FCZ	4.9 mg/L	All except FCZ	4.6 mg/L
<b>DO (bottom)</b>	All	3.7 mg/L	All	3.4 mg/L
<b>pH (depth-averaged)</b>		N/A	All	6.5 - 8.5
<b>SS (depth-averaged)☆</b>	FCZ	4.5 mg/L	FCZ	5.6 mg/L
	All except FCZ	6.1 mg/L	All except FCZ	10.6 mg/L
<b>SS (depth-averaged) Dredging for submarine pipelines⊕</b>	M_RO1	6.1 mg/L	M_RO1	10.6 mg/L
<b>Turbidity (Tby) (depth-averaged) ☆</b>	FCZ	2.9 NTU	FCZ	3.9 NTU
	All except FCZ	3.3 NTU	All except FCZ	6.2 NTU
<b>Ammonia Nitrogen (depth-averaged)</b>	FCZ	0.02 mg/L	FCZ	0.03 mg/L
	All except FCZ	0.05 mg/L Δ	All except FCZ	0.05 mg/L Δ
<b>Nitrate Nitrogen (depth-averaged)</b>	FCZ	0.08 mg/L	FCZ	0.09 mg/L
	All except FCZ	0.09 mg/L Δ	All except FCZ	0.09 mg/L Δ
<b>Nitrite Nitrogen (depth-averaged)</b>	FCZ	0.02 mg/L	FCZ	0.02 mg/L
	All except FCZ	0.02 mg/L	All except FCZ	0.04 mg/L
<b>TIN in mg L<sup>-1</sup> (depth-averaged)</b>	FCZ	0.12 mg/L	FCZ	0.14 mg/L
	All except FCZ	0.16 mg/L	All except FCZ	0.18 mg/L
<b>Total Phosphorus (depth-averaged)</b>	FCZ	0.07 mg/L	FCZ	0.09 mg/L
	All except FCZ	0.09 mg/L Δ	All except FCZ	0.09 mg/L Δ

Remarks:

☆ : Action and limit levels are subjected to review especially for wet season throughout the construction phase of the project.

⊕ : Action and limit levels are subjected to review before the dredging works.

Δ : Trigger level has made reference to existing golf course guideline values.

**FCZ** including fish culture zones of Kai Lung Wan, Tai Tau Chau and Kau Sai

**All except FCZ** including remaining impact monitoring station of M\_RO1, M\_Marsh, M\_BP and M\_Coral.

Control monitoring locations: M\_A & M\_B



**Table 3.6 Derived Summaries of Action and Limit Levels for Freshwater Water Quality**

Parameters	Location	Action	Location	Limit
<b>DO (mid-depth)</b>		N/A	All	4 mg/L
<b>pH (mid-depth)</b>		N/A	All	6.0 - 9.0
<b>SS (mid-depth) ☆</b>	All	3 mg/L and 120% of upstream control station's SS at the same tide of the same day	All	4 mg/L and 130% of upstream control station's SS at the same tide of the same day
<b>Turbidity (Tby) (mid-depth) ☆</b>	All	4 NTU and 120% of upstream control station's Tby at the same tide of the same day	All	5 NTU and 130% of upstream control station's Tby at the same tide of the same day
<b>Ammonia Nitrogen (mid-depth)</b>		N/A	All	0.01 mg/L
<b>Nitrate Nitrogen (mid-depth)</b>	All	0.11 mg/L	All	0.13 mg/L
<b>Nitrite Nitrogen (mid-depth)</b>		N/A	All	0.01 mg/L
<b>Total Inorganic Nitrogen (mid-depth)</b>	All	0.13 mg/L	All	0.15 mg/L
<b>Total Phosphorus (mid-depth)</b>		N/A	All	0.02 mg/L

Remarks:

☆ : Action and limit levels are subjected to review especially for wet season.

Freshwater monitoring locations: F\_UA, F\_DA, F\_UB, F\_DB, F\_UC, F\_DC and F\_Inland Marsh

As most of the freshwater samples for NH<sub>3</sub>-N and NO<sub>3</sub>-N were reported with levels below the detection limit of 0.01 mg/L, limit level is set at 0.01 mg/L. Similarly for TP, a limit level of 0.02 mg/L (the detection limit of TP) is imposed.

#### Monitoring Parameters, Frequency and Programme

3.2.2 For marine water quality, measurements shall be taken at both mid-flood and mid-ebb tides and at three water depths (1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth is less than 6 m, in which case the mid-depth station may be omitted). Should the water depth be less than 3 m, only the mid-depth station will be monitored.

3.2.3 For the stream course, measurements shall be taken at mid-water depth.

3.2.4 The water quality parameters which need to be monitored are as follows:

- Marine water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity
- Freshwater water quality - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity

- 3.2.5 Additional marine and freshwater water quality monitoring parameters for the impact monitoring during construction include nitrate nitrogen (NO<sub>3</sub>-N), nitrite nitrogen (NO<sub>2</sub>-N), ammonia nitrogen (NH<sub>3</sub>-N), total phosphate (TP) and selected pesticides.
- 3.2.6 The ET Leader shall propose the additional monitoring parameters for approval by IC(E), Engineer, EPD and AFCD, and shall submit such information for approval at least 2 weeks before the turf establishment period.
- 3.2.7 Additional water quality monitoring at Tai Tau Chau FCZ (TTC), Kai Lung Wan FCZ (KLW), Kau Sai FCZ (KS), downstream of the existing marsh (M\_Marsh), marine water of Port Shelter (M\_Coral), existing reservoir (F\_Inland M) and Control stations (M\_A and M\_B) shall be carried out after heavy rain storm or when there is an overflow event from the reservoir, irrigation buffer lake or detention ponds/tanks. The heavy rain storm shall be defined when there is an amber/red/black rainstorm warning signal issued by the Hong Kong Observatory. The water sample shall be taken within 24 hours after the black/red/amber rainstorm warning signal is cancelled. Please refer to revised EM&A manual for the sampling condition requirement after a heavy rain storm event occurs. The monitoring parameters shall include dissolved oxygen, temperature, turbidity, suspended solids, pH and salinity. Additional parameters shall be the same as stated in paragraphs 3.2.5-3.2.6.

*Monitoring Frequency*

- 3.2.8 The monitoring parameters and frequency are summarized in Table 3.7. The monitoring programme for the reporting period is shown in **Annex B**.

**Table 3.7 Water Quality Monitoring Parameter, Frequency and Locations**

Parameters	Frequency	Location
Dissolved Oxygen (mg/L)	<b>3 days per week</b>	<b><u>Marine Water</u></b> Fish culture zone stations: TTC, KLW, KS
Temperature (°C)		Control stations: M_A, M_B
Turbidity (NTU)		Impact stations: M_BP, M_RO1, M_Marsh, M_Coral
pH		
Salinity (ppt)		<b><u>Freshwater Water</u></b> Stream A (F_UA, F_DA) Stream B (F_UB, F_DB) Stream C (F_UC, F_DC) Inland Marsh (F_Inland_M)
Suspended Solids (mg/L)		
	<p><u>Marine water</u> : 2 times per day – 1 for mid-flood and 1 for mid-ebb</p> <p><u>Freshwater</u> : once per day</p>	

Monitoring Locations

3.2.9 The water quality monitoring locations for marine and freshwater (**Figure 3.2**) are summarized in Table 3.8.

**Table 3.8 Water Quality Monitoring Locations during Construction Phase**

Identification Number	Location	Co-ordinates		Approx. Water Depth	No. of Depth
		latitude	longitude		
<i>Marine Water (9 stations)</i>					
TTC	Tai Tau Chau Fish Culture Zone	22 22 03.7	114 19 19.6	9.5 m	3
KLW	Kai Lung Wan Fish Culture Zone	22 22 10.6	114 18 01.4	13 m	3
KS	Kau Sai Fish Culture Zone	22 20 26.5	114 18 59.9	11 m	3
M_BP	Temporary barging point	22 21 50.6	114 19 16.7	9.6 m	3
M_RO1	Desalination plant south of the existing pier	22 21 51.8	114 18 17.7	5 m	2
M_Marsh	Discharge point at the existing marsh	22 22 19.8	114 19 05.4	7.7 m	3
M_Coral	Marine water of Port Shelter	22 21 21.3	114 19 42.7	10.2m	3
M_A	Water Control Station of Port Shelter	22 22 51.3	114 18 34.5	7.5 m	3
M_B	Water Control Station of Port Shelter	22 20 26.4	114 20 11.8	16.5 m	3
<i>Fresh Water (7 stations)</i>					
F_UA	Upstream and downstream of stream A	22 21 32.3	114 19 06.5	-	1
F_DA		22 21 33.5	114 19 06.8		1
F_UB	Upstream and downstream of stream B	22 21 23.9	114 19 16.1	-	1
F_DB		22 21 27.2	114 19 16.0		1
F_UC	Upstream and downstream of stream C	22 21 14.8	114 19 26.4	-	1
F_DC		22 21 03.5	114 19 32.0		1
F_Inland M	Downstream of the existing marsh (Inland)	22 22 17.9	114 18 59.1	-	1

Monitoring Equipment

3.2.10 The equipment listed below shall be supplied by the ET and approved by the IC(E) and the Engineer for water quality monitoring.

*Dissolved Oxygen and Temperature Measuring Equipment*

3.2.11 The instrument shall be a portable and weatherproof DO measuring instrument complete with cable and sensor, and use a DC power source. The equipment shall be capable of measuring:

- dissolved oxygen levels in the range of 0 - 20 mg L<sup>-1</sup> and 0 - 200% saturation; and
- a temperature of 0 - 45 degrees Celsius.

3.2.12 It shall have a membrane electrode with automatic temperature compensation complete with a cable. Sufficient stocks of spare electrodes and cables shall be available for replacement where

necessary. (For example, YSI model 59 meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

- 3.2.13 Should salinity compensation not be built-in in the DO equipment, in-situ salinity shall be measured to calibrate the DO equipment prior to each DO measurement.

*Turbidity Measurement Instrument*

- 3.2.14 Turbidity shall be measured in situ by the nephelometric method. The instrument shall be portable and weatherproof turbidity measuring instrument using a DC power source complete with cable, sensor and comprehensive operation manuals. It shall have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU (for example, Hach model 2100P or an approved similar instrument). The cable shall not be less than 25m in length. The meter shall be calibrated in order to establish the relationship between NTU units and the levels of suspended solids.

*Suspended Solids*

- 3.2.15 A water sample at least 2.5L in capacity with messenger and using a 10m line should be collected. Samples should be submitted to HOKLAS accredited laboratory as soon as possible for gravimetric analysis for suspended.

*Sampler*

- 3.2.16 A water sampler is required. It shall comprise a transparent PVC cylinder, with a capacity of not less than 2 litres, which can be effectively sealed with latex cups at both ends. The sampler shall have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth (for example, Kahlsico Water Sampler or an approved similar instrument).

*Water Depth Detector*

- 3.2.17 A portable, battery-operated echo sounder shall be used for the determination of water depth at each designated monitoring station. This unit can either be hand held or affixed to the bottom of the work boat, if the same vessel is to be used throughout the monitoring programme.

*Salinity*

- 3.2.18 A portable salinometer capable of measuring salinity in the range of 0 - 40 parts per thousand (ppt) shall be provided for measuring salinity of the water at each monitoring location.

*pH*

- 3.2.19 The instrument shall consist of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It shall be readable to 0.1pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 shall be used for calibration of the instrument before and after use. Details of the method shall comply with APHA, 19th ed. 4500-HTB.

*Flow Rate Meter*

- 3.2.20 A portable, battery-operated flow meter should be used for the determination of water depth at each designated monitoring location and record in m<sup>3</sup>/s. A hand held or meter fixed to the underside of the survey boat may be used.

*Sample Containers and Storage*

- 3.2.21 Water samples for laboratory analysis shall be stored in high density polythene bottles with no preservative added, packed in ice (cooled to 4°C without being frozen) and delivered to the laboratory and analysed as soon as possible after collection. Sufficient volume of samples shall be collected to achieve the required detection limit.

*Monitoring Position Equipment*

- 3.2.22 A hand-held or boat-fixed type digital Differential Global Positioning System (DGPS) with way point bearing indication or other equipment instrument of similar accuracy, shall be provided and used during marine water monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Monitoring Methodology and Calibration Details

- 3.2.23 Dissolved oxygen (DO), temperature, turbidity, pH and salinity were measured in situ at the designated water quality monitoring stations. General observation, weather conditions, with the sampling time, date and location were marked on the field record sheet.
- 3.2.24 Water samples were taken from each monitoring station for laboratory analysis. The sample identification number, sampling location, date, time, project name and analyses were required.
- 3.2.25 The samples were placed in a cooler with ice (to 4°C without being frozen) and kept away from sunlight. Samples were submitted to a Hong Kong Laboratory Accreditation Scheme (HOKLAS) or other international accredited laboratory for analysis within 24 hours of sampling.

*Calibration of In-Situ Instruments*

- 3.2.26 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme before use and subsequently re-calibrated at three monthly intervals throughout all stages of the water quality monitoring programme. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter were carried out before measurement at each monitoring location.

*Laboratory Analysis*

- 3.2.27 All laboratory work were carried out by ALS Technichem Pty Ltd (HOKLAS accredited laboratory). Water samples were collected at the monitoring and control stations for carrying out the laboratory determinations. The determination work will start within 24 hours after collection of the water samples. The analysis shall follow the standard methods according to APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, or an equivalent method approved by EPD.

**Table 3.9 Analytical Methods to be applied to Water Quality Samples**

<b>Determinant</b>	<b>Standard Method</b>	<b>Reporting Limit</b>
Suspended Solids	APHA 2540 D	2 mg/L
Nitrate Nitrogen	APHA 4500-NO <sub>3</sub> <sup>-</sup>	0.01 mg/L
Nitrite Nitrogen	APHA 4500-NO <sub>2</sub> <sup>-</sup>	0.01 mg/L
Ammonia Nitrogen	APHA 4500-NH <sub>3</sub> (D)	0.01 mg/L
Total phosphorus	ASTM D515-88B	0.02 mg/L*

Determinant	Standard Method	Reporting Limit
Chlorophyll a	APHA 10200 H2 &3	0.5 µg/L

Remarks: \*After review baseline data, the detection limit report will be revised to 0.02 mg/L.

#### *QA/QC Procedure*

- 3.2.28 ALS Technichem Pty Ltd. has comprehensive quality assurance and quality control programmes. For QA/QC procedures of parameters, one duplicate sample was analysed for every batch of 20 samples as required by HOKLAS.

#### Event and Action Plans

- 3.2.29 The Event and Action Plan (EAP) for water quality monitoring is presented in **Annex C**.

### **3.3 Ecology**

#### Introduction

- 3.3.1 The marine and terrestrial ecological monitoring surveys for the ecological EM&A were conducted in accordance with the EM&A manual.
- 3.3.2 As stipulated in the EM&A Manual, the ecological monitoring surveys for terrestrial ecology would be conducted monthly during the construction phase. Monitoring survey would consist of aquatic fauna survey. While the majority of the Project Area would be subject to site formation, natural streams would be partially or fully preserved and protected by buffer zones, and therefore would constitute the primary target of the terrestrial ecological monitoring. Special attention should thus be paid to ecologically sensitive streams to ensure minimum damage to existing vegetation and streams. The purpose of the monitoring survey was to check the conditions of the stream habitat and the associated aquatic fauna communities.
- 3.3.3 While the ecological monitoring surveys for marine ecology included coral monitoring at both the eastern and western coasts of Kau Sai Chau Island. The coral monitoring at the western coast would be conducted concurrently with the dredging works which has yet to conduct, and therefore had not been commenced. The coral monitoring at the eastern Kau Sai Chau would be monthly during the construction phase. Monitoring survey would consist of checking tagged corals at both impact sites and control site. The purpose of the monitoring survey was to check the conditions of the tagged corals and the impact sites.

#### Ecological Mitigation Measures and Implementations

- 3.3.4 Ecological mitigation measures to be implemented during the construction phase include the following:
- Establishment of buffer zones for the natural stream courses during both construction phase.
  - Provision of temporary bypass channels or pipes during construction phase for stream courses subject to pipe culverting.
  - Protection of water quality of the natural stream courses and temporary bypass channels or pipes.
  - Transplantation of coral colonies within the dredging area for the desalination plant prior to the dredging works.
  - Avoidance of corals when the anchoring points are deployed, and to shift the floating temporary barging point to the location with least corals within the mapping area.
  - Regular site audit of ecological mitigation measures and good site practice.

### Monitoring Frequency and Schedule

#### **Terrestrial Ecology**

- 3.3.5 As reported in the EIA Report, there were four perennial natural streams (Streams A-D) within the Assessment Area for the EIA Study. Streams A, B & C were located within the Project Area, while Stream D was outside the Project Areas and acted as the main stream draining the western part of the Assessment Area. Buffer Zone would be established for the three streams within the Project Area along their partial length (Stream A) or full length (Streams B & C) (**Figure 3.3**). Moreover, Streams B, C & D would be monitored for aquatic fauna monthly during the construction phase. Monitoring on the implementation of the mitigation measures for stream protection, the effectiveness of stream buffer zones, and the aquatic fauna in streams would be conducted during the entire construction phase.
- 3.3.6 The objectives of the monitoring survey are to check the status of *Caridina trifasciata* and *Nanhaipotamon hongkongensis*. The surveys covered natural stream courses within the assessment area (Streams A to D), and aquatic fauna were studied by various sampling methods depending upon site conditions. Methods included direct observation, active searching, and sample collection using hand-nets. Hand nets were used to collect swimming organisms such as shrimps and fish. Where necessary boulders on the stream beds were overturned to locate aquatic organisms such as crabs. Aquatic species encountered was recorded, with special attention to rare or protected species.

#### **Marine Ecology**

- 3.3.7 As required in the EM&A Manual, prior to the commencement of all construction works, a baseline survey of natural corals were conducted in December 2005. At each of the Site C, Site B2, Site D2 (**Figure 3.5**) and a Control Site near the AFCD's Coral Buoy at Sharp Island (**Figure 3.6**), 20 natural coral colonies in good conditions (i.e. generally intact and no sign of bleaching) and significant sizes (over 20 cm in diameter) were selected and tagged. Each of the tagged coral colonies was identified to species level and their conditions, in terms of percentages of survival, sedimentation and bleaching, were recorded. Each coral was attached with a plastic label with assigned number and then photographed. The species and the size of each tagged corals were also recorded. The species of corals to have been tagged included the following 15 species: *Cyphastrea serailia*, *Favia speciosa*, *Favites abdita*, *Favites pentagona*, *Goniastrea aspera*, *Goniopora columna*, *Hydnophora exesa*, *Leptastrea pruinosa*, *Lithophyllon undulatum*, *Pavona decussate*, *Platygyra acuta*, *Platygyra carnosus*, *Plesiastrea versipora*, *Psammocora superficialis*, and *Turbinaria peltata*. All tagged corals were in good conditions, without significant sign of bleaching or being covered by sediments. The seagrass beds in Site D3 were also surveyed for their extent, coverage percentage and health conditions. The results of the baseline survey were presented in the Baseline Report.
- 3.3.8 The reporting month was the Month One of the construction programme. As the dredging works for the desalination plant had not been commenced, the impact sites to be monitored in this monitoring survey were Site B2 and Site C (impact sites on the eastern Kau Sai Chau Island for the new golf course) only, while Site D2 and Site D3 (impact sites on the western Kau Sai Chau Island for desalination plant) were not required in this survey.
- 3.3.9 The schedule for the impact sites on the eastern Kau Sai Chau Island during construction would be monthly in the first three months of the construction programme, quarterly till the end of the construction and then. The present survey was the first monitoring survey. The survival and health conditions of the coral colonies would be recorded.

- 3.3.10 During the weekly site inspection, ET monitored and audited the implementation of the recommended mitigation measures for terrestrial and marine ecology. Monitoring locations for ecology are shown in **Figures 3.3 – 3.6**. The monitoring programme for the reporting period is shown in **Annex B**.

#### Event and Action Plans

- 3.3.11 The Event and Action Plan (EAP) for ecology monitoring is presented in **Annex C**.

### **3.4 Landscape and Visual**

- 3.4.1 The EIA concluded that the landscape and visual impacts associated with the construction of the third golf course are anticipated to be acceptable with mitigation. In order to ensure that the effective management and implementation of landscape mitigation measures developed and defined in the EIA, the ET conducted regular site inspections of the construction work sites.

- 3.4.2 Auditing inspections and reporting are undertaken once every two weeks of the construction phase. The effectiveness of the mitigation works has been audited in order to ensure impact reduction levels are achieved as described in the EIA report for this monitoring month. The monitoring programme for the reporting period is shown in **Annex B**.

### **3.5 Archaeology (Watching Brief)**

#### Introduction

- 3.5.1 The archeological impact assessment conducted in the EIA concluded that some potential for archaeological material remains at the Wan Chai Archaeological Site and a watching brief is recommended during the construction phase.

- 3.5.2 A watching brief is a process whereby a qualified and licensed archaeologist monitors the excavation works during the construction phase in areas identified (and agreed with the Antiquities and Monuments Office (AMO)) to be of archaeological potential.

- 3.5.3 The archaeologist conducting the watching brief should obtain a licence prior to commencement of works as stipulated in Section 12 of the Antiquities and Monuments Ordinance (Cap. 53). The licence was granted on 22 December 2005.

#### Monitoring Location

- 3.5.4 The monitoring locations include Hole 2, Hole 10, Hole 11, Hole 12, Hole 13, Hole 14, Hole 15, Hole 16 and Hole 17. The monitoring locations are present in **Figure 3.7**.

#### Monitoring Frequency

- 3.5.5 A total of 18 days of monitoring is considered as minimum, and additional arrangement for watching brief should be made in consultation with AMO in case significant archaeological findings are unearthed in the course of excavation work.

#### Progress Report

- 3.5.6 Archaeologist should submit progress reports every 3 months during the programme of the watching brief.



3.5.7 Vegetation clearance for Hole 1 and Hole 2 was carried out during this reporting month. No major excavation work was carried out at Hole 2.

3.5.8 A summary table for categories of archaeological find and recommended action is presented in **Annex C**.

### **3.6 Land Contamination**

#### Potential Areas Recommended for Further Investigation

3.6.1 Preparation of Contamination Assessment Plan (CAP) is in progress. The major work is vegetation clearance at Hole 1 and Hole 2 only. Those areas are not the potential hotspots identified in the EIA report. Potential land contamination hotspots are presented in **Figure 3.8**.

**4. Implementation Status on Environmental Protection Requirements**

- 4.1.1 The major work on site was vegetation clearance at Holes 1 and 2 during this monitoring month.
- 4.1.2 No construction site office, concrete batching plant and temporary barging point were located at the construction site. Only two bulldozers and one rock breaker were on site for vegetation clearance purpose.
- 4.1.3 No dredging work was carried out near to the existing pier for the desalination plant pipelines.
- 4.1.4 The preliminary master construction programme (open area exposure) submitted by the Contractor may cause potential air and water quality impacts to the nearby sensitive receivers. The construction programme has to be reviewed by the Contractor and will submit to ER for further approval.
- 4.1.5 Most of the mitigation measures are not applicable during this reporting month (only vegetation clearance at Holes 1 and 2). Summary of implementation status is provided in **Annex D**.

## 5. Monitoring Results

### 5.1 Air Quality

5.1.1 Dust monitoring was conducted as scheduled in the reporting month. Monitoring of air quality was conducted on 1 occasion in January 2006. All monitoring data are provided in **Annex E**. Monitoring of 24-hour TSP was conducted at GCA B1 on 20 January 2006. The QA/QC results for laboratory testing in the reporting month were acceptable. The QA/QC results are summarised in **Annex F**.

5.1.2 All measured 24-hour TSP concentration was below the Action/Limit Levels. No exceedance was recorded in the reporting month. No 1-hour TSP measurement was required due to no complaint was received during this monitoring month.

### 5.2 Water Quality

5.2.1 Marine and freshwater water quality monitoring were conducted at the 9 and 7 designated monitoring stations respectively. All monitoring data are provided in **Annex E**.

5.2.2 Monitoring of marine and freshwater locations were conducted on 4 occasions in January 2006. The QA/QC results for laboratory testing in the reporting month were acceptable. The QA/QC results are summarised in **Annex F**.

#### Marine Water

5.2.3 No exceedance of action and limit level was recorded at all marine water monitoring locations during this monitoring month.

#### Freshwater

5.2.4 1 limit level exceedance for SS was recorded at F\_DB on 21<sup>st</sup> Jan 2006.

5.2.5 The ET considered that exceedances were not attributed to construction work as there were only vegetation clearance at Holes 1 & 2 which were far away from all sensitive streams and existing marsh. The exceedances were considered as the natural variation for the dry season. Explanation of the SS exceedances at the impact monitoring locations are as follows:

- ◆ No construction work was carried out near to Streams A, B and C and existing marsh during this reporting month. Vegetation clearance was only carried out at Holes 1 and 2 which was far from all streams and inland marsh.
- ◆ The maximum measured SS value was 6 mg/L which was considered a good water quality representative.
- ◆ The baseline data represents a good dry season water quality that was measured in Nov and Dec 2005. The action and limit levels of SS and turbidity are subjected to further review (especially before wet season) in order to ensure the action and limit levels are sufficient to protect the streams from adverse impacts. With the consideration of the natural variation by the long-term monitoring results in future, a more representative action and limit levels can be established to distinguish between the natural variation and actual impact from the construction site.

- ◆ The range of difference between upstream and downstream is between 0 mg/L to 3 mg/L. In some cases, the measured SS levels at both upstream and downstream of the same stream. It can confirm that the exceedance was due to the stringent action and limit levels and the natural fluctuation of the stream itself.

### 5.3 Ecology

5.3.1 Terrestrial and marine ecology monitoring photos are provided in **Annex E**.

#### Terrestrial Ecology

- 5.3.2 The Monitoring Survey for the reporting month was conducted on 17 January 2006. Other than the site clearance and the pathways to facilitate the EM&A sampling on environmental parameters such as water quality and air quality by ET personnel, no major construction works had commenced within the site when the survey was conducted.
- 5.3.3 Although the streams have not been affected by developments or pollution sources, they are relatively small. Water depth was less than 0.3m in most of the stream reaches.
- 5.3.4 Stream A is located within the Project Area. It includes two main tributaries (A1 and A2 in Figure 8.2 of the EIA Report). Stream A was heavily silted with sediments from eroded hillsides all year round, particularly downstream of the confluence of the two main tributaries. The stream had low flow.
- 5.3.5 Stream B is located within the Project Area. It had clear flow (with little sediment in the stream beds) of moderate volume during the wet season. This stream has two main tributaries, B1 and B2 (see Figure 8.2 of the EIA Report). Stream B also contains a long estuarine section of muddy sandy substrate.
- 5.3.6 Stream C is located within the Project Area. It has had low but clear flow. In contrast to Stream B, Stream C drains to a sandy beach at Kau Chung Wan, and therefore lacks a clear estuarine zone.
- 5.3.7 Stream D is located outside the Project Area but within the Assessment Area and is the main stream draining the west side of the Assessment Area. It had clear water and moderate flow levels. Stream D is the only stream with deeper water depth among the four streams (water depth over 0.3 m in some of the stream reaches).
- 5.3.8 The demarcation of the stream buffer zone had not been established at the time of the monitoring survey (**Annex E - Photo Plate 5.3-1**). As advised by the works contractor, stream buffer zone demarcation will be established when the works fronts are approaching each stream and will be completed before wet season in 2006.
- 5.3.9 In general, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey. Water levels in the 4 streams were low due to dry season. For the two tributaries in Stream B, B1 tributary was dry but there was flow in B2 tributary. Photos of Streams A to D were shown in **Photo Plate 5.3-1 (Annex E)**.
- 5.3.10 The habitats and vegetation generally remained intact within the project site, within the stream buffer zone and outside the project area. Other than the historical erosion of hillsides and the access paths to the project site, no earthwork, human or fire disturbance was observed.
- 5.3.11 Aquatic fauna communities were checked during the monitoring survey. Atyid shrimp *Caridina trifasciata* were found in Stream B, Stream C & Stream D during the present monitoring survey

(**Annex E - Photo Plate 5.3-1**). Abundance was low in all streams but slightly higher in Stream C. Small-sized individuals of *Caridina trifasciata*, presumably juveniles, and mature large-sized individuals were also found. The endemic freshwater crab *Nanhaipotamon hongkongense* which had been recorded before in Streams C and D, however, was not found during the present monitoring survey.

- 5.3.12 Other aquatic fauna encountered during the monitoring included Freshwater snail *Brotia hainanensis*, which is usually found in streams with good water quality, found at B2 tributary of Stream B.

#### Marine Ecology

- 5.3.13 The present Marine Ecological Monitoring Survey was conducted during high tide on 26 & 27 January 2006. The weather conditions were good and calm. At each site to be monitored for corals, the 20 colonies of natural corals selected during the Baseline Survey were recovered and checked for conditions.
- 5.3.14 Site B2 was the location for the temporary barging point. No construction works had been conducted at this location when the present monitoring survey was conducted. The site and its vicinity still remained similar conditions as during the Baseline Survey. All 20 tagged corals were recovered. No mortality, sedimentation or bleaching was found on any of the tagged corals (see **Table 5.3-1**). The corals remained similar conditions as during the Baseline Survey (**Annex E - Photo Plates 5.3-2 to 5.3-5**). No difference was found on the conditions of the tagged corals within and outside the proposed floating barging point boundary.
- 5.3.15 Site C was on the south-eastern coast of Kau Sai Chau Island and had a high coral coverage among the sites investigated during the EIA Study. The sizes of coral colonies at Site C were also larger than those at other sites. Site C was away from the boundary of the new golf course and would not be subject to direct impacts during construction. The site and its vicinity still remained similar conditions as during the Baseline Survey. All 20 tagged corals were recovered. No mortality, sedimentation or bleaching was found on any of the tagged corals (see **Table 5.3-2**). The corals remained similar conditions as during the Baseline Survey (**Annex E - Photo Plates 5.3-6 to 5.3-9**).
- 5.3.16 The Control Site is the buoy of coral marker established by AFCD in Sharp Island. Similar with Site C, both the coral coverage percentage and the sizes of coral colonies were high at this site and would not be impacted by the Project. The site and its vicinity still remained similar conditions as during the Baseline Survey. All 20 tagged corals were recovered. No mortality, sedimentation or bleaching was found on any of the tagged corals (see **Table 5.3-3**). The corals remained similar conditions as during the Baseline Survey (**Annex E - Photo Plates 5.3-10 to 5.3-13**).
- 5.3.17 **Photo Plates 5.3-2 to 5.3-13** showed the photos of each tagged corals. The assigned number, species and sizes of the tagged corals were listed in **Tables 5.3-1 to 5.3-3** below.

**Table 5.3-1 Conditions of tagged corals at Site B2 with sizes and species**

Code of tagged corals	Species	Baseline Survey			Month One (January 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
B-01	<i>Platygyra acuta</i>	0	0	0	0	0	0
B-02	<i>Favia speciosa</i>	0	0	0	0	0	0
B-03	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-04	<i>Leptastrea pruinosa</i>	0	0	0	0	0	0
B-05	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
B-06	<i>Favia speciosa</i>	0	0	0	0	0	0
B-07	<i>Favia speciosa</i>	0	0	0	0	0	0
B-08	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-09	<i>Favia speciosa</i>	0	0	0	0	0	0
B-10	<i>Favia speciosa</i>	0	0	0	0	0	0
B-11	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-12	<i>Plesiastrea versipora</i>	0	0	0	0	0	0
B-13	<i>Plesiastrea versipora</i>	0	0	0	0	0	0
B-14	<i>Goniastrea aspera</i>	0	0	0	0	0	0
B-15	<i>Lithophyllon undulatum</i>	0	0	0	0	0	0
B-16	<i>Favia speciosa</i>	0	0	0	0	0	0
B-17	<i>Favia speciosa</i>	0	0	0	0	0	0
B-18	<i>Turbinaria peltata</i>	0	0	0	0	0	0
B-19	<i>Favia speciosa</i>	0	0	0	0	0	0
B-20	<i>Favia speciosa</i>	0	0	0	0	0	0

**Table 5.3-2 Conditions of tagged corals at Site C with sizes and species**

Code of tagged corals	Species	Baseline Survey			Month One (January 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
C-01	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-02	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-03	<i>Favia speciosa</i>	0	0	0	0	0	0
C-04	<i>Favites abdita</i>	0	0	0	0	0	0
C-05	<i>Turbinaria peltata</i>	0	0	0	0	0	0
C-06	<i>Favia speciosa</i>	0	0	0	0	0	0
C-07	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-08	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-09	<i>Favia speciosa</i>	0	0	0	0	0	0
C-10	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-11	<i>Favia speciosa</i>	0	0	0	0	0	0
C-12	<i>Platygyra acuta</i>	0	0	0	0	0	0
C-13	<i>Platygyra carnosus</i>	0	0	0	0	0	0

Code of tagged corals	Species	Baseline Survey			Month One (January 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
C-14	<i>Favia speciosa</i>	0	0	0	0	0	0
C-15	<i>Goniopora columna</i>	0	0	0	0	0	0
C-16	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-17	<i>Goniopora columna</i>	0	0	0	0	0	0
C-18	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-19	<i>Favites pentagona</i>	0	0	0	0	0	0
C-20	<i>Favia speciosa</i>	0	0	0	0	0	0

**Table 5.3-3 Conditions of tagged corals at Control Site with sizes and species**

Code of tagged corals	Species	Baseline Survey			Month One (January 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
X-01	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-02	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-03	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-04	<i>Pavona decussata</i>	0	0	0	0	0	0
X-05	<i>Hydnophora exesa</i>	0	0	0	0	0	0
X-06	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-07	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-08	<i>Favites abdita</i>	0	0	0	0	0	0
X-09	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
X-10	<i>Cyphastrea serailia</i>	0	0	0	0	0	0
X-11	<i>Platygyra carnosus</i>	0	0	0	0	0	0
X-12	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-13	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-14	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-15	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-16	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-17	<i>Favia speciosa</i>	0	0	0	0	0	0
X-18	<i>Platygyra acuta</i>	0	0	0	0	0	0
X-19	<i>Goniastrea aspera</i>	0	0	0	0	0	0
X-20	<i>Cyphastrea serailia</i>	0	0	0	0	0	0

## 5.4 Landscape and Visual

- 5.4.1 The only landscape resource changed during the site clearance work is the loss of shrubland. However, the impact had been already covered in the EIA report and impact is considered acceptable.

5.4.2 The change of landscape character is negligible as the present construction area was hidden with a limited extent.

5.4.3 Change of view conditions is also negligible as the construction area was hidden in a valley and visual impacts to sensitive receivers were screened by the mountains.

#### **5.5 Archaeology (Watching Brief)**

5.5.1 No excavation was carried out at Hole 2 during this monitoring month and watching brief monitoring is not required. The proposed construction programme for Hole 2 will be starting from February to June 2006. The tentative submission of the first progress report to AMO will be on April 2006 (quarterly basis).

#### **5.6 Land Contamination**

5.6.1 The CAP has been prepared by Contractor and reviewed by ET. It will be submitted to EPD for approval under the EP requirement before any construction works near to those identified hotspots. No construction activity has been carried out at those 5 hotspots during this monitoring month.



## **6. Environmental Site Auditing**

6.1.1 During the weekly site inspection conducted by the ET and the monthly joined site inspection with IEC and the Contractor undertaken on 20 Jan 2006, the following observations and recommendations were made.

6.1.2 Project proponent is reminded to display the environmental permit and relevant documents once the construction site office is available.

### Dust Mitigation Measures

6.1.3 No stockpile was observed on site during the site visit. No excavation work was carried out. The construction site was neat and tidy.

### Land Based Water Quality

6.1.4 A temporary drainage master plan had not been submitted by the Contractor for ER to review during this monitoring month. Project proponent, ER and ET had reminded Contractor to submit the plan for comment and approval. It is recommended that installation of approved temporary drainage system at the construction site shall be available before the wet season.

6.1.5 Silt fences and boulders covered with silt curtains were installed at the relative low points (vulnerable to silty runoff) of the construction site boundary at Holes 1 & 2 as a preventative measures. Some occasional rain showers were observed during this monitoring month.

### Ecology

6.1.6 Stream buffer zone demarcations have not been established at all three identified streams (A, B and C). The vegetation clearance works at Holes 1 & 2 are far away from all identified streams. The Contractor has been reminded that the demarcation of buffer zones shall be finished before any work close to the buffer zone areas or wet season.

### Waste / Chemical Management

6.1.7 Cut vegetation was grouped together and located in the central part of the construction site for drying before disposal. The site was neat and tidy.

### Landscape and Visual

6.1.8 During the site audit, only site clearance works were observed. No felling and transplanting of trees had been carried out since the commencement of the construction. Stockpiles were covered by plastic cover to reduce visual impact. Trees within the site clearance area were in fair condition and the site is generally neat and tidy. The contractor was reminded to erect fencing around the preserved trees.

### Status of Environmental Licensing and Permitting

6.1.9 Permits / licences submission and approval status are summarised in Table 6.1.

**Table 6.1 Summary of Environmental Licensing and Permit Status**

<b>Permit/licence</b>	<b>Submission date</b>	<b>Status</b>
Construction noise permit	Jan 2006	awaiting approval
Notification of the air pollution control (construction dust) regulation	Jan 2006	awaiting approval
Chemical Waste producer	Jan 2006	awaiting approval
Construction Waste (Dumping Permit)	Jan 2006	awaiting approval

**7. Environmental Non-Conformance**

**7.1 Summary of Environmental Non-Compliance**

7.1.1 One exceedance of limit level was recorded for freshwater monitoring stations in this reporting month. The exceedance was considered not project related (no works near to any streams) and mainly contributed by natural variation. Hence, no further mitigation measure was required.

**7.2 Summary of Environmental Complaint**

7.2.1 No environmental complaints were received in this monitoring month.

**7.3 Summary of Environmental Summons**

7.2.2 There was no notification of summons with respect to environmental issues registered in this month.

## 8. Future Key Issues

### 8.1 Key Issues for coming month

8.1.1 Works to be taken for the coming monitoring period are summarized in Table 8.1.

**Table 8.1 Construction works to be taken in the coming month**

<b>Construction of Low Level Intake Pumping Station</b> <u>Pumping Station : Civil Work</u> Installation of temporary hoarding & fence Installation of sheet pile for pumping station
<b>Existing maintenance building</b> <u>Maintenance Building : Structure Work</u> Construction of wash room/changing room etc. on new extension area <u>Construction of Retaining Wall No. 2</u> Excavate on the retaining wall RW2 Construction of retaining wall RW2
<b>Existing Administration Building</b> <u>Admin. Building : Structure Works</u> Excavation and testing to structural foundation
<b>Construction of Golf Course Hole No. 1</b> <u>GH 01 : Cut &amp; Fill Works</u> Earth/slope construction works (fill) from Golf Hole2
<b>Construction of Golf Course Hole No. 2</b> <u>GH 02 : Cut &amp; Fill Works</u> Earth/slope construction works (cut) Earth/slope construction works (fill)

Remarks: Design of Haul Road from temporary barging point to contractor's Site compound will be submitted to ER for approval early next month.

### 8.2 Monitoring Schedule for the coming month

8.2.1 The tentative schedule of TSP, water, ecology and landscape & visual monitoring for the next three months is presented in **Annex F**. The environmental monitoring will be conducted at the same monitoring locations in this reporting month. The monitoring programme has been reviewed and was considered as adequate to cater the nature of works to be undertaken.

### 8.3 Construction programme for the next three month

8.3.1 The construction programme for the next three months is presented in **Annex G**.

**9. Recommendations and Conclusions**

- 9.1.1 The Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from 16 January 2006 to 24 January 2006 in accordance with EM&A Manual and the requirement under EP-224/2005.
- 9.1.2 No exceedance of the Action and Limit Levels of 24-hour TSP.
- 9.1.3 One exceedance of SS was recorded at the water quality monitoring stations (F\_DB) during the reporting month but such exceedance was not attributed to the project activities.
- 9.1.4 The Contractor was instructed to erect fencing to protect the preserved trees whenever they are adjacent to construction activities. No construction activities should be allowed inside the fenced area.
- 9.1.5 No environmental non-compliance was recorded during the site audit. No environmental complaints/summons/prosecutions were received during the reporting period since the commencement of the Project.
- 9.1.6 The ET will keep track of the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.