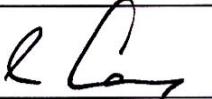


**Proposed Extension of Public Golf Course  
at Kau Sai Chau Island, Sai Kung**

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

**(Report No. 382210/002)**

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

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**March 2006**

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

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

Your ref : 40040032/CERT/02\_06.doc  
Our ref :

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 the checking of the Environmental Team's (ET) No.2 Monthly EM&A Report for February 2006 for the construction of 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. 2 Monthly EM&A report for February 2006 has been verified.
3. We would comment that our evaluation of the ET's EM&A is based on a random audit process which cannot be guaranteed to have all non-conformities identified.

Signed



---

Independent Environmental Checker

Name      Gary Tam

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          Kowloon

Date      8 March 2006

## **Executive Summary**

This is the second 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 February 2006 (25<sup>th</sup> January 2006 to 24<sup>th</sup> February 2006).

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

The major work was vegetation clearance at Holes 1, 2, 9 & 17. Excavation work was carried at Hole 2 on 26<sup>th</sup> January 2006. A temporary haul road from temporary barging point to Hole 2 was formed. In addition, the temporary haul road between Holes 1 and 2 was formed. As the bulldozers and dump trucks are not available on site, major works was confined to excavation activity at Hole 2. Stream buffer zone was demarcated at Stream A only. No work was carried out at all Stream areas. The nearest work to the Stream A is the vegetation clearance work at Holes 9 & 17.

The temporary barging point is not available on site. No dredging work for the desalination plant was carried out. No temporary site office and concrete batching plant was established at the construction site during the reporting month.

### 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	5 times
Water quality monitoring (marine + freshwater)	11 times
Terrestrial Ecology	2 times
Marine Ecology	2 times
Landscaping & Visual	2 times

### Air Quality

5 sets of 24-hour TSP monitoring were carried out on 25<sup>th</sup> January, 6<sup>th</sup>, 11<sup>th</sup>, 17<sup>th</sup> and 23<sup>rd</sup> February 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

11 sets of water quality monitoring were carried out on 25<sup>th</sup> & 27<sup>th</sup> January 2006, 6<sup>th</sup>, 8<sup>th</sup>, 11<sup>th</sup>, 13<sup>th</sup>, 15<sup>th</sup>, 17<sup>th</sup>, 20<sup>th</sup>, 22<sup>nd</sup> and 24<sup>th</sup> February 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, two action and one limit levels exceedance for SS were recorded at F\_DB on 8<sup>th</sup>, 13<sup>th</sup> and 22<sup>nd</sup> February 2006. The exceedance of measured SS value was ranging from 4 to 5 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 10<sup>th</sup> and 17<sup>th</sup> February 2006. The demarcation of the stream buffer zone had been being established at the time of the monitoring survey. Stream buffer zone demarcation establishment will be finished by the Contractor before the works fronts reach each stream. 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 23<sup>rd</sup> & 25<sup>th</sup> February 2006 at Site B2, Site C and Control Site. No marine 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 6<sup>th</sup> and 21<sup>st</sup> February 2006. Vegetation clearance work is being carried out at present. Tree protection is satisfactory. Stockpiles of cleared vegetation were found stored on site and require removal.

#### Environmental Site Auditing

Four weekly joint environmental site audits were carried out on 26<sup>th</sup> January, 3<sup>rd</sup>, 10<sup>th</sup> and 17<sup>th</sup> February 2006 with the Contractor's representative. A monthly joint environmental site audit was carried out on 24<sup>th</sup> February 2006 by the Contractor's Representative ET's representative and Independent Environmental Checker (IC(E)).

#### Environmental Non-conformance

There was two exceedance of action and one limit levels of suspended solids recorded at the downstream of Stream B on 8<sup>th</sup>, 13<sup>th</sup> and 22<sup>nd</sup> February 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 the following issues and take actions if necessary

- Watering the haul road especially in conjunction to the existing golf course and during excavation works regularly during the dry season.
- Minimize the water quality impact when undertaking excavation works. Temporary drainage system and contingency plan should be proposed to the Engineer's Representative (ER) for approval and ET for comment and installed before the wet season.
- Minimize the exposed areas by controlling the vegetation clearance area. Vegetation should be kept in-situ as much as possible until works require at the construction areas.
- Removal of the vegetation stockpiles as soon as the dump trucks and temporary barging point are available.
- Minimize the access roads within the stream buffer zone areas.
- Provide drip tray under the oil drums; and
- Strengthen the preventive/interim measures for the silty runoff along the boundary of the exposed areas especially at low 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, 2, 9 & 17, concrete batching plant construction, temporary haul road, installation of site office and storage areas, inland works for the desalination plant near to the existing pier;

- Silty runoff due to vegetation clearance from the exposed areas;
- Storage of chemicals/fuel and chemical waste/waste oil on site; and
- Sewage and general refuse generated from workers.

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 February 2006 (from 25<sup>th</sup> January to 24<sup>th</sup> February 2006).

### 1.2 Purpose of the Report

- 1.2.1 This is the second EM&A report which summarizes the impact monitoring results and audit findings for the EM&A programme during the reporting period from **25<sup>th</sup> January to 24<sup>th</sup> February 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 February – 24 May 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.

### 2.5 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.
2.4	Contamination Assessment Plan (CAP) submission. If land contamination is confirmed by the site investigation, submission of a Remediation Assessment	Approved	The site investigation was carried out on 14 <sup>th</sup> and 15 <sup>th</sup> February 2006. The CAR will be submitted. Based on the preliminary results, all hotspots are not contaminated.

EP-224/2005	Environmental Submission	Permit	Status	Remarks
	Plan (RAP) including a Contamination Assessment Report (CAR) is required.			
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	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**

Impacts	Parameters/descriptions	Locations	Frequencies	Duration
Air Quality	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)
Water Quality	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
Terrestrial Ecology	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

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Monthly EM&A Report

<b>Impacts</b>	<b>Parameters/descriptions</b>	<b>Locations</b>	<b>Frequencies</b>	<b>Duration</b>
<b>Marine Ecology</b>	Transplanted corals	Site D2	Quarterly for one year after transplantation	During construction
	Natural corals	Site C, Site B2, Site D2, and the 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.	During Construction
			<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.	
	Seagrass bed	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
		Site D3, and at Site D2 if seagrasses were found during the baseline monitoring.	Weekly during the first two weeks of dredging works, and then biweekly till the pipeline construction works are finished.	During Construction
		Site D3, and at Site D2 if seagrasses were found during the baseline monitoring.	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
<b>Landscape and Visual</b>	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.	During Construction and Operation
<b>Archaeology (Watching Brief)</b>	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
<b>Land Contamination</b>	Total Sulphur and Total Lead	Locations 2, 3, 6, 7 & 8	One month before commencement of work at the identified 5 hotspots	During Construction
<b>General Site Conditions</b>	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	<b>Bungalow A</b> 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		Action Level	Limit Level
GCA B1	<b>Bungalow A</b> 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</b> <b>(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</b> <b>(Bottom)</b>	All	3.7 mg/L	All	3.4 mg/L
<b>pH</b> <b>(depth-averaged)</b>		N/A	All	6.5 - 8.5
<b>SS</b> <b>(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</b> <b>(Depth-averaged)</b> <b>Dredging for submarine pipelines⊕</b>	M_RO1	6.1 mg/L	M_RO1	10.6 mg/L
<b>Turbidity (Tby)</b> <b>(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</b> <b>(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</b> <b>(depth-averaged)</b>	FCZ	0.08 mg/L	FCZ	0.09 mg/L
	All except FCZ	0.09mg/L Δ	All except FCZ	0.09 mg/L Δ
<b>Nitrite Nitrogen</b> <b>(depth-averaged)</b>	FCZ	0.02 mg/L θ	FCZ	0.02 mg/L θ
	All except FCZ	0.02 mg/L	All except FCZ	0.04 mg/L
<b>TIN</b> <b>(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</b> <b>(depth-averaged)</b>	All	0.09 mg/L Δ	All	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.

⊗ : All are based on EM&A baseline monitoring data due to marked difference between EPD turbidity data and those from the baseline survey.

Δ : For nutrient monitoring (except NO<sub>2</sub>-N) at non-FCZ stations, the trigger level has made reference to the existing golf course guideline values. The guideline value of NO<sub>2</sub>-N is below the current detection limit of 0.01mg/L and thus not used.

θ : The same action and limit level of 0.02 mg/L is determined from the EM&A baseline data as 78% of the NO<sub>2</sub>-N data are <= 0.01 mg/L and all remaining 22% equal to 0.02 mg/L.

**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>		6.3 mg/L	All	4 mg/L ξ
<b>pH (mid-depth)</b>		N/A	All	6.0 - 9.0
<b>SS (mid-depth) ?</b>	All	3.8 mg/L or 120% of upstream control station's SS at the same tide of the same day	All	8 mg/L or 130% of upstream control station's SS at the same tide of the same day
<b>Turbidity (Tby) (mid-depth) ?</b>	All	3.1 NTU or 120% of upstream control station's Tby at the same tide of the same day	All	4 NTU or 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	0.10 mg/L	All	0.11 mg/L
<b>Nitrite Nitrogen (mid-depth)</b>		N/A	All	0.01 mg/L
<b>TIN (mid-depth)</b>	All	0.12 mg/L	All	0.13 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 were reported of NH<sub>3</sub>-N, NO<sub>3</sub>-N 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.

ξ : Water Quality Objectives of the Port Shelter

#### 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 ( $\text{NO}_3\text{-N}$ ), nitrite nitrogen ( $\text{NO}_2\text{-N}$ ), ammonia nitrogen ( $\text{NH}_3\text{-N}$ ), 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>Marine Water</b> Fish culture zone stations: TTC, KLW, KS
Temperature (°C)		Control stations: M_A, M_B
Turbidity (NTU)	<u>Marine water :</u> 2 times per day – 1 for mid-flood and 1 for mid-ebb	Impact stations: M_BP, M_RO1, M_Marsh, M_Coral
pH	<u>Freshwater :</u> once per day	<b>Freshwater Water</b>
Salinity (ppt)		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)		

### 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
<b>Marine Water (9 stations)</b>					
TTC	Tai Tau Chau Fish Culture Zone	latitude 22° 22' 03.7"	longitude 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
<b>Fresh Water (7 stations)</b>					
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**

Determinant	Standard Method	Reporting Limit
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*
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 Sau 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 and a Control Site near the AFCD's Coral Buoy at Sharp Island (**Figure 3.4**), 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 column*, *Hydnophora exesa*, *Leptastrea pruinosa*, *Lithophyllum 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 – 3.5**. 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 11, Hole 12, Hole 14, Hole 15 & Hole 16. The monitoring locations are present in **Figure 3.6**.

#### 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 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 Contamination Assessment Plan (CAP) shall be submitted to EPD for approval before site investigation. If land contamination is confirmed by the site investigation, submission of a Remediation Assessment Plan (RAP) including a Contamination Assessment Report (CAR) is required. Potential land contamination hotspots are presented in **Figure 3.7**.

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

- 4.1.1 The major works at construction site were (i) vegetation clearance at Holes 1, 2, 9 and 17, (ii) excavation at Hole 2 and (iii) construct a temporary haul road from temporary barging point to Hole 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. The Contractor has provided interim/minimize preventive mitigation measures to control silty runoff and dust suppression at this early stage.
- 4.1.3 No dredging work has been carried out near to the existing pier for the desalination plant pipelines but minor land formation for the desalination plant was started in mid February 2006 to the north of the existing Kau Sai Chau pier.
- 4.1.4 Stream buffer zone at Stream A has been demarcated to prevent any works/equipment intrusion. As discussed with the Contractor, no work will be approach to the Streams B and C for this reporting month. The purpose is to minimize any disturbance to the stream due to the installation of the fencing which will strip a minimum amount of vegetation off along the edge of buffer zones areas. Contractor agreed that the demarcation of stream buffer zones at B and C will be carried out until works approach to those sensitive areas.
- 4.1.5 The revised construction programme has been submitted by the Contractor and under review by Jockey Club, ER and ET. The Contractor was reminded to ensure the revised programme should indicate minimize the exposed area in wet season, control vegetation clearance at sensitive areas and provide sufficient mitigation measures to minimize the potential silty runoff from the construction site. In addition, turf establishment should not be concentrated in a short period of time to reduce the potential nutrients and pesticides runoff to freshwater and marine water sensitive receivers. The Temporary Drainage Master Plan has not yet been submitted by the Contractor for approval during this reporting month.
- 4.1.6 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 5 occasions in January and February 2006. All monitoring data are provided in **Annex E**. Monitoring of 24-hour TSP was conducted at GCA B1 on 25<sup>th</sup> January, 6<sup>th</sup>, 11<sup>th</sup>, 17<sup>th</sup> and 23<sup>rd</sup> February 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 was conducted on 11 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 Two action and one limit levels exceedance for SS was recorded at F\_DB on 8<sup>th</sup>, 13<sup>th</sup> and 22<sup>nd</sup> February 2006.
- 5.2.5 The ET considered that exceedances were not attributed to construction work as excavation work was conducted at Hole 2 mainly. Although there was vegetation clearance (around 30%) at Holes 9 & 17, it was 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.
  - ◆ The measured maximum exceedance of SS value was 5 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 form 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 establish to distinguish between the natural variation and actual impact from the construction site.

- ◆ In general, upstream water quality for stream B is slightly better than downstream during this reporting month.

### 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 10<sup>th</sup> & 17<sup>th</sup> February 2006. Site clearance works had been being conducted at the northern part of the new golf course site (areas close to the existing golf course). There were also pathways to facilitate the land surveying works and 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. Its main stream section (downstream to the confluence of two tributaries) would be protected by stream buffer zone (**Figure 3.3**). Stream A was heavily silted with sediments from eroded hillsides all year round, particularly at the main stream section. 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 also has two main tributaries, B1 and B2. The full length of Stream B (two tributaries and the main stream) would all be protected by buffer zone (**Figure 3.3**). Stream B also contains a long estuarine section of muddy sandy substrate.
- 5.3.6 Stream C is located within the Project Area. This stream also has two main tributaries. 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. The full length of Stream C (two tributaries and the main stream) would all be protected by buffer zone (**Figure 3.3**)
- 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). As Stream D is outside the construction area, buffer zone would not be needed for this stream.
- 5.3.8 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. The majority of Stream C was also dry, with limited number of isolated (not connected by surface flow) shallow pools in the downstream section. Photos of Streams A to D were shown in **Photo Plate 5.3-1 (Annex E)**.
- 5.3.9 The habitats and vegetation generally remained intact within a large portion of the project site (outside the site clearance works), within the stream buffer zone and outside the project area. Other than the site clearance, the historical erosion of hillsides, and the access paths to the project site, no earthwork, human disturbance or fire disturbance was observed.

- 5.3.10 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 B. Stream C had been of higher shrimp abundance in the January 2006 survey, but became much dryer in the present survey and thus the shrimp abundance had dropped. Two juvenile individuals of the endemic freshwater crab *Nanhaiopotamon hongkongense*, which had been recorded in Streams C and D during the EIA study but not recovered in the January 2006 survey, was found inside burrows on the dry channel bed of Stream C during the present monitoring survey (**Annex E - Photo Plate 5.3-2**).
- 5.3.11 Other aquatic fauna and flora 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, and Long-armed Palemond shrimp *Macrobrachia hainanensis* in the isolated shallow pools in Stream C, and Sundew. Some wild boar footprints were also found at the stream bed of Stream A (**Annex E - Photo Plate 5.3-1**).
- 5.3.12 The demarcation of the stream buffer zone had been partially established at Stream A main stream and Tributary B2 of Stream B at the time of the monitoring survey (**Annex E - Photo Plate 5.3-2**). As the construction works were still close to the exiting golf course, it is anticipated that the establishment of stream buffer zone demarcation will be finished before the works fronts reach each stream.

#### Marine Ecology

- 5.3.13 The present Marine Ecological Monitoring Survey was conducted during high tide on 23<sup>rd</sup> & 25<sup>th</sup> February 2006. The weather conditions were cloudy and windy, especially at Site B2 and Site C, the water was turbid and the underwater visibility was low (approximately less than 2m). Abundant macro algae were present at all three monitored sites on the surfaces of boulder or corals. 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. Except some land works at the nearby abandoned pier, no marine construction works had been conducted at this location since the Baseline Survey when the present monitoring survey was conducted. 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 5.3-3 to 5.3-6**). 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 5.3-7 to 5.3-10**).
- 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 5.3-11 to 5.3-14**).

5.3.17 **Photo Plates 5.3-3 to 5.3-14** showed the photos of each tagged corals. The assigned numbers, species, mortality percentage, sedimentation coverage percentage and bleaching percentage of the tagged corals during baseline survey and the present survey were presented in **Tables 5.3-1 to 5.3-3** below. No impact on the tagged corals was identified. The presence of abundant macro algae was considered due to the short-term seasonal bloom of algae at spring each year, rather than the construction works on Kau Sai Chau, as the algae were also recorded at the Control Site.

**Table 5.3-1 Conditions of tagged corals at Site B2**

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Two (February 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>Lithophyllum 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**

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Two (February 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
C-14	<i>Favia speciosa</i>	0	0	0	0	0	0
C-15	<i>Goniopora columnna</i>	0	0	0	0	0	0
C-16	<i>Platygyra carnosus</i>	0	0	0	0	0	0
C-17	<i>Goniopora columnna</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**

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Two (February 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 serilia</i>	0	0	0	0	0	0
X-10	<i>Cyphastrea serilia</i>	0	0	0	0	0	0
X-11	<i>Platygyra carnosus</i>	0	0	0	0	0	0

Code of tagged corals	Species	Baseline Survey (December 2005)			Month Two (February 2006)		
		Mortality (%)	Sedimentation (%)	Bleaching (%)	Mortality (%)	Sedimentation (%)	Bleaching (%)
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. Trees in the construction area had not been removed or transplanted.
- 5.4.2 The change of landscape character is negligible as the present construction area is hidden and has a limited extent.
- 5.4.3 Change of view conditions is also negligible as the construction area is hidden in a valley and visual impacts to sensitive receivers are screened by the mountains.

#### 5.5 Archaeology (Watching Brief)

- 5.5.1 Excavation was carried out at Hole 2 during this monitoring month and watching brief monitoring was carried out. The proposed construction programme of cut-and-fill for Hole 2 will start from January to April 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 Contamination Assessment Plan (CAP) was approved by EPD 17th February 2006. Site investigation was carried out on 14th and 15th February 2006. Site audit was carried out with IEC on 14th February 2006 with the Contractor's representatives. The preparation of Contamination Assessment Report (CAR) is in-progress. Based on the preliminary results, all 5 hotspots are not contaminated by Lead and Sulfur. Therefore, Remediation Assessment Plan (RAP) will not be required.

## 6. Environmental Site Auditing

- 6.1.1 The weekly site inspections were conducted by the ET with Contractor's representative and/or Jockey Club's representative on 26<sup>th</sup> January, 3<sup>rd</sup>, 10<sup>th</sup>, 17<sup>th</sup> & 24<sup>th</sup> February 2006 and the monthly joined site inspection with IEC and the Contractor's representative undertaken on 24<sup>th</sup> February 2006. The following observations and recommendations were made.
- 6.1.2 The environmental permit was displayed at the existing Kau Sai Chau pier and relevant documents were available at the existing administration building.

### Dust Mitigation Measures

- 6.1.3 Excavation work was carried out at Hole 2. Automatic sprinklers were provided when the rock breaking activities were carried out for dust suppression. A standby water tank was available on site. The Contractor was reminded to minimize the dust generated by the site vehicles moving along the haul road between Holes 1 and 2 near to the existing golf course (S6 and S7).

### 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 (water proof) were installed and strengthen at the relative low points (vulnerable to silty runoff) of the construction site boundary at Holes 1, 2, 9 and 17 as a preventative measures. Some occasional rain showers were observed during this monitoring month.

### Ecology

- 6.1.6 Only Stream buffer zone at Stream A has been established during this reporting month. The whole buffer zone aims to protect the streams and avoid any works/equipment intrusion into the buffer zone. Vegetation clearance works at Holes 9 and 17 were carried out but far away from Stream A. No work has been carried out near Streams B and C. The Contractor was reminded to demarcate Streams B and C buffer zones before any construction work close to the buffer zone areas.

### Waste / Chemical Management

- 6.1.7 Cleared vegetation was stockpile and located mainly in Hole 1 for wind/sun drying before proper disposal. As confirmed by Contractor, once the dump trucks and temporary barging point are available, vegetation stockpiles and construction waste will be disposal off-site properly.
- 6.1.8 No chemical storage area was available on site during the reporting month. Some oil tanks were required as the standby fuel. Drip trays were provided underneath the oil tanks to prevent leakage on the bare ground.

### Landscape and Visual

- 6.1.9 During the site audit, site clearance works and excavation at Hole 2 were observed. Trees within the construction area were protected properly. No felling and transplanting of trees have been

carried out since the commencement of the construction. Trees within the site clearance area were in fair condition. Stockpiles of cleared vegetation were recorded on site. The Contractor was reminded to dispose vegetation stockpiles properly once temporary barging point and dump trucks available on site.

- 6.1.10 Green hoarding were erected near the desalination plant to reduce visual impacts.

Status of Environmental Licensing and Permitting

- 6.1.11 Permits / licences submission and approval status are summarised in Table 6.1. The Contractor was reminded to confirm whether the concrete batching plant is a specified processes and licence for operation is required. In addition, the Contractor was required to clarify the necessity of obtaining an effluent discharge licence from the construction site activities under WPCO.

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

Permit/licence/notification form title	Submission date	Status	Registration No.
Application for a construction noise permit for the use of powered mechanical equipment for the purpose of carrying out construction work other than percussive piling and/or the carrying out of prescribed construction work.	January 2006	Approved on 16 <sup>th</sup> February 2006	GW-RE0012-06 (valid until 3 <sup>rd</sup> July 2006)
Notification of the air pollution control (construction dust) regulation	January 2006	awaiting approval	
Registration as a chemical waste producer	January 2006	Register on 7 <sup>th</sup> February 2006	WPN-5213-813-C1186-04
Application for a permit to dump material at sea under the Dumping at Sea Ordinance	January 2006	awaiting approval	
Application of exemption account for the construction waste charging scheme	January 2006	Approved on 16 <sup>th</sup> January 2006	A/C no. 5005322 (valid until 2 <sup>nd</sup> August 2007)

**7. Environmental Non-Conformance**

**7.1 Summary of Environmental Non-Compliance**

- 7.1.1 Two action and one limit levels were recorded for freshwater monitoring stations (F\_DB) in this reporting month. The exceedances were 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 as follows.

- Construction of temporary barging point
- Construction of site haul road to Hole 2 (Site office)
- Construction of haul road (GH 3 to 8)
- Construction of site office
- Construction of concrete batching plant
- Land formation for desalination plant
- Cut and fill at Golf Holes 1, 2, 9 & 17

### **8.2 Monitoring Schedule for the coming month**

8.2.1 The tentative schedule of air, 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 25<sup>th</sup> January 2006 to 24<sup>th</sup> February 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 Three exceedances of SS were 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 For terrestrial ecology, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.
- 9.1.5 No marine construction work had been conducted at temporary barging point (Site B2). At Site B2, Site C and Control Site, 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.
- 9.1.6 Vegetation clearance work is being carried out at present. Tree protection is satisfactory. Stockpiles of cleared vegetation were found stored on site and require removal. The Contractor was reminded to dispose the vegetation stockpiles and construction waste when dump trucks and temporary barging point are available on site.
- 9.1.7 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.
- 9.1.8 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.