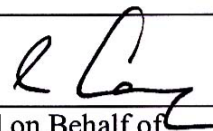


**Proposed Extension of Public Golf Course  
at Kau Sai Chau Island, Sai Kung**

**Quarterly Environmental Monitoring & Audit (EM&A) Report  
for January to March 2006**

**(Report No. 382210/Q\_001)**

Report Authorized For  
Issue By:



For and on Behalf of  
Black & Veatch Hong Kong Limited

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**April 2006**

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	Name	Signature	Date
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Your ref : 40040032/CERT/04\_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) Quarterly EM&A Report for January to March 2006 for the construction of Proposed Extension of Public Golf Course at Kau Sai Chau Island, Sai Kung.
2. 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



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Independent Environmental Checker

Name Gary Tam

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Kowloon

Date 24 April 2006

## **Executive Summary**

This is the first quarterly 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<sup>th</sup> January 2006. This report presents the results of the EM&A works conducted in the first quarter of 2006 from January to March 2006.

In the reporting quarter, the following activities took place for the Project:

- Site Clearance
- Earthworks
  - Holes 1, 2, 9 & 17
  - Desalination plant
  - Concrete batching plant
  - Site office
- Construction of temporary barging point
- Demarcation of Stream buffer zone A

## **Environmental Monitoring Works**

A summary of the monitoring activities in this quarter is listed below:

24-hour Total Suspended Particulates (TSP) monitoring at GCA B1	11 times
Water quality monitoring (marine + freshwater)	27 times
Terrestrial Ecology	3 times
Marine Ecology	3 times
Landscaping & Visual	6 times

## ***Air Quality***

All measured 24-hour TSP concentrations in the reporting quarter were below the Action and Limit (AL) Levels.

## ***Water Quality***

### Marine

One exceedance of action level for suspended solids (SS) was recorded at monitoring location M\_Coral during the reporting quarter. The exceedance was not attributed to the works and therefore no further action was required.

### Freshwater

Eight action and three limit levels exceedance for suspended solids were recorded at downstream of Stream A, B & C during the reporting quarter.

Three action and one limit levels exceedance for turbidity were recorded at downstream of Stream A, B and existing Inland Marsh during the reporting quarter.

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 and rain. Since the action and limit levels for all water quality parameters were calculated based on the dry season baseline monitoring data, the action and

limit levels are subjected to review especially for the wet season.

### ***Ecology***

#### **Terrestrial**

No non-compliance was recorded for Stream A, B and C during the reporting quarter. In general, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.

#### **Marine**

Construction of temporary barging point was started at early March 2006. Some boulders and sand were found outside the seawall and some damage (tagged) corals were recorded at Site B2. Among the 20 tagged corals, 6 of them had more obvious damages, while another two tagged corals had minor damages. The exceedance was attributed to the works and therefore further action was required. A remedial plan has been submitted to EPD and AFCD for comments and agreement on the proposed remedial actions.

No mortality, sedimentation or bleaching was found on the tagged corals at Site C and Control Site.

### **Environmental, Landscape and Visual Audit, Watching Brief, Land Contamination**

#### ***Environmental Audit***

Site audit was carried out on a weekly basis to monitor environmental issues on the construction sites. The Contractor generally implemented the mitigation measures recommended in the EIA report to minimise the environmental impacts due to the construction works. However, the temporary drainage system has not been completely implemented at the construction site during reporting quarter.

In addition, minor comments were given to the Contractor as follows:

- (i) Properly disposal of vegetation stockpiles or waste;
- (ii) Cover the exposed slope area by tarpaulin or impermeable materials;
- (iii) Maintain the integrity/function of silt fence along the whole construction site boundary;
- (iv) Wetting the rock surface before, during and after the rock breaking activity;
- (v) Frequent spraying the haul road and modification of major haul road to minimize the dust impact;
- (vi) Erection of hoarding at areas near to existing golf course;
- (vii) Prevention of silty plume generated during the rock filling activity at temporary barging point; and
- (viii) Minimize the access road within the stream buffer zone area.

#### ***Landscaping & Visual***

Bi-weekly site audits were conducted in respect of landscape and visual mitigation measure in the reporting period. Tree protection on site was satisfactory. Stockpiles of cleared vegetation were found stored on site and require removal.

#### ***Watching Brief***

Watching Brief was carried out at Hole 2. The major activities were carried out at part of the Hole 2 (40%) was rock breaking activity. Other Hole 2 areas were remained the same as after vegetation clearance. No vegetation clearance and excavation were carried out at other watching brief area (Holes 11, 12, 14, 15 & 16).

### ***Land Contamination***

The Contamination Assessment Plan (CAP) was approved by EPD on 17<sup>th</sup> February 2006. Site investigation was carried out on 14<sup>th</sup> and 15<sup>th</sup> February 2006. Site audit was carried out with IEC on 14<sup>th</sup> February 2006 with the Contractor's representatives. Contamination Assessment Report (CAR) was submitted to EPD for approval on 23<sup>rd</sup> March 2006. Based on the results, all 5 hotspots are not contaminated by Lead and Sulfur. Therefore, Remediation Assessment Plan (RAP) is not required.

### **Environmental Complaints and Prosecution**

One environmental complaint was received by the Contractor on 28<sup>th</sup> February 2006 in this reporting period regarding the contaminated water discharged from the construction activities to the fish pond area (Tiu Cham Wan - inactive culture zone). ET carried out investigation and no contaminated water was found within the fish pond area. In addition, ET weekly site audit also indicated that no silty water was runoff from the construction site and no fish culture activity was observed in the inactive fish pond during the reporting quarter. However, the Contractor was reminded to implement sufficient temporary drainage system on site before wet season.

EPD carried out site inspection on 10<sup>th</sup> March 2006. A yellow form issued by EPD under the APCO was received on 30<sup>th</sup> March 2006. Major warnings are (i) no erection of 2.4m hoarding at the area access to public and (ii) no dust suppression mitigation measure provided during rock filling activity at the temporary barging point.

### **Environmental Licensing and Permitting**

License/Permits granted to the Project include the Environmental Permit (EP), construction noise permit (CNP) and chemical waste producer.

### **Future Key Issues**

Major construction activities will be undertaken in the coming quarter, including cut-and-fill activity for Hole 1, 2, 3, 8, 9 & 17, installation of concentrate batching plant, construction of site office and extension of maintenance building. The anticipated environmental impacts will be mainly on air quality from excavation and water quality impact due to silty runoff to marine and stream courses.

**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 is the first quarterly EM&A report which summarises the environmental monitoring and audit works for the Project in the first quarter of 2006 from January to March 2006.



## **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<sup>th</sup> November 2005 under the EIAO. An Environmental Permit (EP-224/2005) was granted on 28<sup>th</sup> 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<sup>th</sup> January 2006 and are scheduled to be completed by end of July 2007.

### **2.5 Summary of EM&A Requirements**

2.5.1 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.

### ***Monitoring Parameters and Locations***

- 2.5.2 24-hour TSP was the monitoring parameter for dust monitoring. One location for monitoring air quality was identified.
- 2.5.3 The water quality parameters which need to be monitored are as follows:
- Marine water quality (9 monitoring locations) - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS), pH and salinity
  - Freshwater water quality (7 monitoring locations) - dissolved oxygen (DO), temperature, turbidity, suspended solids (SS) , pH and salinity
- 2.5.4 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.
- 2.5.5 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.
- 2.5.6 Aquatic fauna and integrity of stream buffer zone at Streams A, B and C were identified to monitor the potential land formation impact on terrestrial ecology especially stream courses. For coral monitoring, there were one control and three impact monitoring locations were identified to monitor the marine construction activities.
- 2.5.7 Watching Brief (archaeology) monitoring locations are identified at the cut areas of Holes 2, 11, 12, 14, 15 & 16.
- 2.5.8 The monitoring locations for air, water, ecology and watching brief (archaeology) are depicted in **Annex B**.

### ***Monitoring Methodology and Calibration Details***

- 2.5.9 All monitoring works were conducted and monitoring equipment was regularly calibrated in accordance with the EM&A Manual. Calibration records were shown in the monthly EM&A reports for January to March 2006.

### ***Environmental Quality Performance Limits (Action and Limit Levels)***

- 2.5.10 The environmental quality performance limits, i.e. Action and Limit Levels (AL Levels) were derived from the baseline monitoring results and make reference to EIA report and latest EPD monitoring data. If the measured environmental quality parameters exceed the AL Levels, the respective action plan would be implemented. The AL Levels for each environmental parameter are given in **Annex C**.

### **3. Monitoring Result & Site Audit**

#### **3.1 Air Quality**

- 3.1.1 Graphical presentation of the trend of the monitoring results of 24-hour TSP is provided in **Annex D**. All measured 24-hour TSP in the reporting quarter was below the Action and Limit (AL) Levels.

#### **3.2 Water Quality**

- 3.2.1 Graphical presentations of the trends of the monitoring results of water quality are provided in **Annex D**. One exceedance of SS for marine water quality (M\_Coral) was recorded in the reporting period. A total of eleven and four exceedances for SS and turbidity for stream courses quality were recorded during the reporting quarter (Downstream of Streams A, B and C and existing inland marsh).

#### **3.3 Ecology**

- 3.3.1 In general, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.
- 3.3.2 Coral damage was recorded on 23<sup>rd</sup> March 2006 during the construction of temporary barging point (Site B2). Some boulders and sand were found outside the seawall and some damage (tagged) corals were recorded. Among the 20 tagged corals, 6 of them had more obvious damages (i.e. B-03, B-04, B-06, B-07, B-09 and B-10), while another two tagged corals (i.e. B-08 & B-15) had minor damages. An assessment survey will be proposed and then formulate practicable remedial plan.
- 3.3.3 No mortality, sedimentation and bleaching was recorded at Site C and Control Site for corals during the reporting quarter.

#### **3.4 Landscape and Visual**

- 3.4.1 The only landscape resource change during the site clearance work is the loss of scrubland. As the construction progress, more vegetation and shrubs will be cleared, which will be followed by planting works.

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

- 3.5.1 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 and completed in May 2006. For the proposed construction programme at Holes 11, 12, 14, 15 and 16 within the watching brief area will be starting from Dec 2006, Oct 2006, Jul 2006, Mar 2007 & Jul 2006 respectively.

#### **3.6 Land Contamination**

- 3.6.1 The Contamination Assessment Plan (CAP) was approved by EPD on 17<sup>th</sup> February 2006. Site investigation was carried out on 14<sup>th</sup> and 15<sup>th</sup> February 2006. Site audit was carried out with IEC on 14th February 2006 with the Contractor's representatives. Contamination Assessment Report (CAR) was submitted to EPD for approval on 23<sup>rd</sup> March 2006. Based on the results, all 5 hotspots are not contaminated by Lead and Sulfur. Therefore, Remediation Assessment Plan (RAP) is not required.

#### **4. Environmental Audit**

##### **4.1 Implementation Status of Environmental Mitigation Measures**

- 4.1.1 Site audit was carried out on a weekly basis to monitor environmental issues at the construction sites to ensure that all mitigation measures were implemented timely and properly.
- 4.1.2 The major activities in the reporting quarter included cut-and-fill activity at Holes 1, 2, 9 & 17, land formation for desalination plant, site office and concrete batching plant and construction of temporary barging point. The Contractor generally implemented the mitigation measures recommended in the EIA report to minimise the environmental impacts due to the construction works.
- 4.1.3 The Contractor has provided interim/minimum preventive mitigation measures (silt fence mainly, rock bund covered with geotextile fabric at some low areas) to control silty runoff. For dust suppression, it was provided mainly at Hole 2 excavation (with water sprayer). Dust suppression on other areas was mainly controlled by water trucks on haul roads.
- 4.1.4 Stream buffer zone at Stream A and part of Stream B (tributary mainly) have been demarcated to prevent any works/equipment intrusion. As discussed with the Contractor, no work will approach Streams B and C during the reporting quarter. 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. The 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 quarter.
- 4.1.6 Summary of implementation status is provided in **Annex E**.

##### **4.2 Status of Environmental Licensing and Permitting**

- 4.2.1 Valid environmental licenses and permits for the project during the reporting quarter are summarised in **Annex F**.

##### **4.3 Advice on Solid and Liquid Waste Management Status**

- 4.3.1 The solid waste generated from the construction site was mainly dry vegetation after clearance and general refuse. For general refuse, it was collected by a licensed collector regularly. Due to the temporary barging point was not available during the reporting quarter, vegetation was not disposed properly and stockpile on site temporarily. The Contractor was reminded to dispose the vegetation once the temporary barging point was available.

**5. Non-compliance (Exceedances) of the Environmental Quality Performance Limits (Action and Limit Levels)**

**5.1 Air Quality**

5.1.1 No non-compliance was recorded at air monitoring location during the reporting quarter.

**5.2 Water Quality**

5.2.1 One exceedance of action level for SS was recorded at M\_Coral location (marine water).

5.2.2 A total of eleven and four exceedances for SS and turbidity were recorded at F\_DA, F\_DB, F\_DC and F\_Inland Marsh.

5.2.3 However, the exceedances were considered not project related as project works were not close to any of the stream courses and M\_Coral location during the reporting quarter. Therefore, all exceedances were not considered non-compliance. The exceedances were mainly due to the natural variation and rain.

**5.3 Ecology**

5.4.1 No non-compliance was recorded for Stream A, B and C during the reporting quarter.

5.4.2 One non-compliance was recorded on the coral damage for the construction of temporary barging point (Site B2) during this reporting quarter. Six tagged corals at Site B2 were found damaged to various extents.

5.4.3 The non-compliance was attributed to the works and therefore further action was required. A remedial plan had been submitted to EPD and AFCD for comments and agreement on the proposed remedial actions.

**5.4 Summary of Environmental Complaint**

5.4.1 One complaint was received during this reporting quarter. A copy of complaint letter (forward by Contractor) from the fish pond holder (Tiu Cham Wan) was received on 11<sup>th</sup> March 2006. One of their concerns was on the water quality that the construction activities may potentially pollute the water quality within their fish pond area.

5.4.2 The Contractor has been reminded to modify the haul road to minimize the potential silty runoff and some progresses have been observed during the site audit. The Contractor was again reminded to install sufficient temporary drainage before wet season. Site audit and monitoring was routinely carried out in January and February 2006 (nearest monitoring location is M\_BP). No non-compliance was recorded. In addition, on-site observation reveals no evidence of fish culture activity in the mentioned area.

**5.5 Summary of Environmental Summons**

5.5.1 There was no notification of summons with respect to environmental issues registered in this reporting quarter.

## **6. Recommendations and Conclusions**

- 6.1.1 This Quarterly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken during the period from January to March 2006 in accordance with EM&A Manual and the requirement under EP-224/2005.
- 6.1.2 No exceedance of the Action and Limit Levels was recorded for 24-hour TSP.
- 6.1.3 One exceedance of action level for SS was recorded at M\_Coral.
- 6.1.4 Eleven and four suspended solids and turbidity exceedance were recorded at F\_DA, F\_DB, F\_DC and F\_Inland Marsh.
- 6.1.5 For terrestrial ecology, the streams and the riparian vegetation were in natural conditions similar to the condition during the Baseline Survey.
- 6.1.6 Six tagged corals at Site B2 were found damaged to various extends. This has been reported to relevant parties. Incident report and remedial action proposed by Contractor will be submitted to EPD and AFCD for comments. For Site C and the Control Site, the tagged corals still remained similar conditions as during the Baseline Survey. No mortality, sedimentation or bleaching was found on the tagged corals in these two sites.
- 6.1.7 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 temporary barging point is available on site.
- 6.1.8 No environmental non-compliance was recorded during the site audit. One environmental complaint and no environmental summons/prosecutions were received during the reporting period since the commencement of the Project.
- 6.1.9 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.