

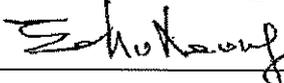
**China Harbour Engineering Company Limited**

Contract No. HY/2010/02

**Hong Kong – Zhuhai – Macao Bridge  
Hong Kong Boundary Crossing  
Facilities –  
Reclamation Works**

**Monthly EM&A Report for June 2012**

[07/2012]

	Name	Signature
Prepared & Checked:	Y T Tang	
Reviewed, Approved and Certified:	Echo Leong (ETL)	

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By Fax (2268 3970) and By Post

Attention: Mr. Michael Lo

Dear Mr. Lo,

**Re: Contract No. HY/2010/02  
Hong Kong – Zhuhai – Macao Bridge  
Hong Kong Boundary Crossing Facilities – Reclamation Work  
Monthly Environmental Monitoring & Audit Report for June 2012**

Reference is made to the Environmental Team's submission of the Monthly Environmental Monitoring & Audit Report for June 2012 (letter ref. 60249820/C/LCHC12072001 dated 20 July 2012) copied to us by E-mail on 20 July 2012.

We are pleased to inform you that we have no adverse comment on the captioned Monthly EM&A Report. We write to verify the captioned report in accordance with Condition 5.4 of EP-353/2009/D and Condition 4.4 of EP-354/2009/A (for TM-CLKL Southern Landfall Reclamation only).

We would like to remind the Environmental Team to improve on their timely submission of environmental monitoring results and monthly EM&A report, in particular for dolphin monitoring.

Thank you very much for your kind attention and please do not hesitate to contact the undersigned should you have any queries.

Yours sincerely,



Raymond Dai  
Independent Environmental Checker

c.c. HyD – Mr. Matthew Fung (By Fax: 3188 6614)  
HyD – Mr. Philip Lam (By Fax: 3188 6614)  
AECOM – Ms. Echo Leong (By Fax: 2317 7609)  
CHEC – Mr. C M Wong (By Fax: 2578 0413)

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## EXECUTIVE SUMMARY

Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Work (here below, known as “the Project”) mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL). It is a designated project and is governed by the current permits for the Project, i.e. the amended Environmental Permits (EPs) issued on 7 March 2012 (EP-353/2009/D) and 8 December 2011 (EP-354/2009/A) (for TMCLKL Southern Landfall Reclamation only).

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project’s reclamation works (i.e. the Engineer for the Project).

China Harbour Engineering Company Limited (CHEC) was awarded by Highways Department (HyD) as the Contractor to undertake the construction work of the Project and ENVIRON Hong Kong Ltd. was employed as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

AECOM Asia Co. Ltd. (AECOM) was appointed by China Harbour Engineering Company Limited to undertake the role of Environmental Team for the Project for carrying out the environmental monitoring and audit (EM&A) works.

The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016. The EM&A programme, including air quality, noise, water quality and dolphin monitoring and environmental site inspections, was commenced on 12 March 2012.

This report documents the findings of EM&A works conducted in the period between 1 and 30 June 2012. As informed by the Contractor, major activities in the reporting period were:-

### ***Marine-based Works***

- Construction of cellular wall;
- Geotextile laying and fabrication;
- Stone column installation trial;
- Silt curtain fabrication and deployment; and
- Stone blankets laying.

### ***Land-based Works***

- Site office erection and construction at Works Area WA2;
- Public Works Regional Laboratory erection and construction at Works Area WA3; and
- Constructing site access at area WA2 to Ying Hei Road, Tung Chung.

A summary of monitoring and audit activities conducted in the reporting period is listed below:

24-hour Total Suspended Particulates (TSP) monitoring	5 sessions
1-hour TSP monitoring	5 sessions
Day, evening and night time noise monitoring	4 sessions
Impact water quality monitoring	13 sessions
Impact dolphin monitoring	6 sessions
Joint Environmental site inspection	4 sessions

### **Breaches of Action and Limit Levels for Air Quality**

No Action/Limit Level exceedance of 1-hour TSP and 24-hour TSP results was recorded in the reporting month.

### **Breaches of Action and Limit Levels for Noise**

No Action/Limit Level exceedance of construction noise was recorded in the reporting month.

### **Breaches of Action and Limit Levels for Water Quality**

Two (2) Action Level exceedances were recorded at measured suspended solid (SS) in the reporting month. Investigation results show that the exceedances were not due to the Project works.

### **Impact Dolphin Monitoring**

A total of eighteen dolphin sightings were recorded during the six surveys, one on the 12th June, two on the 13th June, seven on the 14th of June, three on the 15th June and five on the 20th June. No dolphins were seen on the 25th June. Of the eighteen sightings, thirteen were “on effort” and five were “off effort”.

The predominant behavior of the dolphin observed was engaged in feeding but only one group was associated with fishing vessel (hang trawler) at the time of the sighting.

No other active construction sites were noted during the surveys within Hong Kong waters. Marine construction work was noted close to the Hong Kong–China maritime border in Chinese waters and dolphins were observed in this area (near Tai O).

### **Complaint, Notification of Summons and Successful Prosecution**

No Project related environmental complaint was received in the reporting month.

No notification of summons and successful prosecution was received in the reporting month.

### **Reporting Change**

There was no reporting change required in the reporting period.

### **Future Key Issues**

Key issues to be considered in the coming month included:-

- Site runoff should be properly collected and treated prior to discharge;
- Minimize loss of sediment from filling works;
- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities;
- Exposed surfaces/soil stockpiles should be properly treated to avoid generation of silty surface run-off during rainstorm;
- Regular review and maintenance of wheel washing facilities provided at all site entrances/exits;
- Conduct regular inspection of various working machineries and vessels within works areas to avoid any dark smoke emission;
- Suppress dust generated from work processes with use of bagged cements, earth movements, excavation activities, exposed surfaces/soil stockpiles and haul road traffic;
- Quieter powered mechanical equipment should be used;
- Provision of proper and effective noise control measures for operating equipment and machinery on-site, such as erection of movable noise barriers or enclosure for noisy plants;
- Closely check and replace the sound insulation materials regularly;
- Better scheduling of construction works to minimize noise nuisance;
- Properly store and label oil drums and chemical containers placed on site;
- Proper chemicals, chemical wastes and wastes management;
- Maintenance works should be carried out within roofed, paved and confined areas;
- Collection and segregation of construction waste and general refuse on land and in the sea should be carried out properly and regularly; and
- Proper protection and regular inspection of existing trees, transplanted/retained trees.

## 1 INTRODUCTION

### 1.1 Background

- 1.1.1 Contract No. HY/2010/02 – Hong Kong-Zhuhai-Macao Bridge Hong Kog Boundary Crossing Facilities – Reclamation Work (here below, known as “the Project”) mainly comprises reclamation at the northeast of the Hong Kong International Airport of an area of about 130-hectare for the construction of an artificial island for the development of the Hong Kong Boundary Crossing Facilities (HKBCF), and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link (TMCLKL).
- 1.1.2 Subsequent to EIA Study Brief of TMCLKL being prepared and based upon the proposed schemes for the Hong Kong-Zhuhai-Macao Bridge (HZMB) and HKBCF, it was decided to integrate the TMCLKL southern landfall reclamation with the HKBCF reclamation. It was considered that this arrangement would also provide a cost-effective connection between the HKBCF and North Lantau.
- 1.1.3 The environmental impact assessment (EIA) reports (Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities – EIA Report (Register No. AEIAR-145/2009) (HKBCFEIA) and Tuen Mun – Chek Lap Kok Link – EIA Report (Register No. AEIAR-146/2009) (TMCLKLEIA), and their environmental monitoring and audit (EM&A) Manuals (original EM&A Manuals), for the Project were approved by Environmental Protection Department (EPD) in October 2009.
- 1.1.4 EPD subsequently issued the Environmental Permit (EP) for HKBCF in November 2009 (EP-353/2009) and the Variation of Environmental Permit (VEP) in June 2010 (EP-353/2009/A), November 2010 (EP-353/2009/B), November 2011 (EP-353/2009/C) and March 2012 (EP-353/2009/D). Similarly, EPD issued the Environmental Permit (EP) for TMCLKL in November 2009 (EP-354/2009) and the Variation of Environmental Permit (VEP) in December 2010 (EP-354/2009/A).
- 1.1.5 The Project is a designated project and is governed by the current permits for the Project, i.e. the amended 1.1.5 EPs issued on 7 March 2012 (EP-353/2009/D) and 8 December 2011 (EP-354/2009/A) (for TMCLKL Southern Landfall Reclamation only).
- 1.1.6 A Project Specific EM&A Manual, which included all project-relation contents from the original EM&A Manuals for the Project, was issued in May 2012.
- 1.1.7 The Project comprises of seawall construction and reclamation works at the northeast waters off the Airport Island to provide land platform (about 130ha of area) for the construction of an artificial island for the development of the boundary crossing facilities, and about 19-hectare for the southern landfall of the Tuen Mun - Chek Lap Kok Link.
- 1.1.8 Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Highways Department (HyD) as the consultants for the design and construction assignment for the Project’s reclamation works (i.e. the Engineer for the Project).
- 1.1.9 China Harbour Engineering Company Limited (CHEC) was awarded by Highways Department (HyD) as the Contractor to undertake the construction work of the Project and ENVIRON Hong Kong Ltd. was employed as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.
- 1.1.10 AECOM Asia Co. Ltd. (AECOM) was appointed by China Harbour Engineering Company Limited to undertake the role of Environmental Team for the Project for carrying out the EM&A works.
- 1.1.11 The construction phase of the Project under the EPs was commenced on 12 March 2012 and will be tentatively completed by early Year 2016.
- 1.1.12 According to the Project Specific EM&A Manual, there is a need of an EM&A programme including air quality, noise, water quality and dolphin monitoring and environmental site inspections. The EM&A programme of the Project commenced on 12 March 2012.

## 1.2 Scope of Report

1.2.1 This is the forth monthly EM&A Report under the Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. This report presents a summary of the environmental monitoring and audit works, list of activities and mitigation measures proposed by the ET for the Project in June 2012.

## 1.3 Project Organization

1.3.1 The project organization structure is shown in Appendix A. The key personnel contact names and numbers are summarized in Table 1.1.

**Table 1.1 Contact Information of Key Personnel**

Party	Position	Name	Telephone	Fax
<b>Engineer's Representative (ER)</b>  (Ove Arup & Partners Hong Kong Limited)	Chief Resident Engineer	Michael Lo	2528 3031	2668 3970
<b>IEC / ENPO</b>  (ENVIRON Hong Kong Limited)	Independent Environmental Checker	Raymond Dai	3743 0788	3548 6988
	Environmental Project Office Leader	Y. H. Hui	3743 0788	3548 6988
<b>Contractor</b>  (China Harbour Engineering Company Limited)	General Manager (S&E)	Daniel Leung	3157 1086	2578 0413
	Environmental Officer	C. M. Wong	3157 1086	2578 0413
	24-hour Hotline	C. M. Wong	9448 0325	--
<b>ET</b>  (AECOM Asia Company Limited)	ET Leader	Echo Leong	3922 9280	2317 7609

## 1.4 Summary of Construction Works

1.4.1 The construction phase of the Project under the EP commenced on 12 March 2012.

1.4.2 As informed by the Contractor, details of the major works carried out in this reporting period are listed below:-

### **Marine-based Works**

- Construction of cellular wall;
- Geotextile laying and fabrication;
- Stone column installation trial;
- Silt curtain fabrication and deployment; and
- Stone blankets laying.

***Land-based Works***

- Site office erection and construction at Works Area WA2;
- Public Works Regional Laboratory erection and construction at Works Area WA3; and
- Constructing site access at area WA2 to Ying Hei Road, Tung Chung.

1.4.3 The 3-month rolling construction programme of the Project is shown in Appendix B.

1.4.4 The general layout plan of the Project site showing the detailed works areas is shown in Figure 1.

1.4.5 The environmental mitigation measures implementation schedule are presented in Appendix C.

**1.5 Summary of EM&A Programme Requirements**

1.5.1 The EM&A programme required environmental monitoring for air quality, noise, water quality, marine ecology and environmental site inspections for air quality, noise, water quality, waste management, marine ecology, and landscape and visual impact. The EM&A requirements for each parameter described in the following sections include:-

- All monitoring parameters;
- Monitoring schedules for the reporting month and forthcoming month;
- Action and Limit levels for all environmental parameters;
- Event / Action Plan;
- Environmental mitigation measures, as recommended in the Project EIA reports; and
- Environmental requirement in contract documents.

## 2 AIR QUALITY MONITORING

### 2.1 Monitoring Requirements

2.1.1 In accordance with the Project Specific EM&A Manual, baseline 1-hour and 24-hour Total Suspended Particulates (TSP) levels at 4 air quality monitoring stations were established. Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days. The Action and Limit level of the air quality monitoring is provided in Appendix D.

### 2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at each designated monitoring station. The HVS meets all the requirements of the Project Specific EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. Brand and model of the equipment is given in Table 2.1.

**Table 2.1 Air Quality Monitoring Equipment**

Equipment	Brand and Model
Portable direct reading dust meter (1-hour TSP)	Sibata Digital Dust Monitor (Model No. LD-3 and LD-3B)
High Volume Sampler (24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Air Sampler (Model No. TE-5170)

### 2.3 Monitoring Locations

2.3.1 Monitoring locations AMS2 and AMS7 were set up at the proposed locations in accordance with Project Specific EM&A Manual. For AMS6 (Dragonair/CNAC (Group) Building), permission on setting up and carrying out impact monitoring works was sought, however, access to the premise has not been granted yet on this report issuing date. For monitoring location AMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact air quality monitoring was conducted at site boundary of the site office area in Works Area WA2 (AMS3A) respectively. Same baseline and Action Level for air quality, as derived from the baseline monitoring data recorded at Ho Yu College, was adopted for this alternative air quality location.

2.3.2 Figure 2 shows the locations of monitoring stations. Table 2.2 describes the details of the monitoring stations.

**Table 2.2 Locations of Impact Air Quality Monitoring Stations**

Monitoring Station	Location	Description
AMS2	Tung Chung Development Pier	Rooftop of the premise
AMS3A	Site Boundary of Site Office Area at Works Area WA2	On ground at the area boundary
AMS6*	Dragonair/CNAC (Group) Building	On ground at boundary of the premise
AMS7	Hong Kong SkyCity Marriott Hotel	On ground at boundary of the premise

\*Remark: Permission on setting up and carrying out impact monitoring works was sought, however, access to the premise has not been granted yet on this report issuing date.

## 2.4 Monitoring Parameters, Frequency and Duration

2.4.1 Table 2.3 summarizes the monitoring parameters, frequency and duration of impact TSP monitoring.

**Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration**

Parameter	Frequency and Duration
1-hour TSP	Three times every 6 days while the highest dust impact was expected
24-hour TSP	Once every 6 days

## 2.5 Monitoring Methodology

### 2.5.1 24-hour TSP Monitoring

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
- (i) A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.
  - (ii) No two samplers should be placed less than 2 meters apart.
  - (iii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
  - (iv) A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler.
  - (v) A minimum of 2 meters separation from any supporting structure, measured horizontally is required.
  - (vi) No furnace or incinerator flues nearby.
  - (vii) Airflow around the sampler was unrestricted.
  - (viii) Permission was obtained to set up the samplers and access to the monitoring stations.
  - (ix) A secured supply of electricity was obtained to operate the samplers.
  - (x) The sampler was located more than 20 meters from any dripline.
  - (xi) Any wire fence and gate, required to protect the sampler, did not obstruct the monitoring process.
  - (xii) Flow control accuracy was kept within  $\pm 2.5\%$  deviation over 24-hour sampling period.
- (b) Preparation of Filter Papers
- (i) Glass fibre filters, G810 were labelled and sufficient filters that were clean and without pinholes were selected.
  - (ii) All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not

variable by more than  $\pm 3$  °C; the relative humidity (RH) was  $< 50\%$  and not variable by more than  $\pm 5\%$ . A convenient working RH was  $40\%$ .

- (iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.

(c) Field Monitoring

- (i) The power supply was checked to ensure the HVS works properly.
- (ii) The filter holder and the area surrounding the filter were cleaned.
- (iii) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- (iv) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
- (v) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
- (vi) Then the shelter lid was closed and was secured with the aluminum strip.
- (vii) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
- (viii) A new flow rate record sheet was set into the flow recorder.
- (ix) On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around  $1.1 \text{ m}^3/\text{min}$ , and complied with the range specified in the updated EM&A Manual (i.e.  $0.6\text{-}1.7 \text{ m}^3/\text{min}$ ).
- (x) The programmable digital timer was set for a sampling period of 24 hrs, and the starting time, weather condition and the filter number were recorded.
- (xi) The initial elapsed time was recorded.
- (xii) At the end of sampling, on site temperature and atmospheric pressure readings were taken and the final flow rate of the HVS was checked and recorded.
- (xiii) The final elapsed time was recorded.
- (xiv) The sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
- (xv) It was then placed in a clean plastic envelope and sealed.
- (xvi) All monitoring information was recorded on a standard data sheet.
- (xvii) Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.

(d) Maintenance and Calibration

- (i) The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- (ii) 5-point calibration of the HVS was conducted using TE-5025A Calibration Kit prior to the commencement of baseline monitoring. Bi-monthly 5-point calibration of the HVS will be carried out during impact monitoring.
- (iii) Calibration certificate of the HVSs are provided in Appendix E.

## 2.5.2 1-hour TSP Monitoring

(a) Measuring Procedures

The measuring procedures of the 1-hour dust meter were in accordance with the Manufacturer's Instruction Manual as follows:-

- (i) Turn the power on.
- (ii) Close the air collecting opening cover.
- (iii) Push the "TIME SETTING" switch to [BG].
- (iv) Push "START/STOP" switch to perform background measurement for 6 seconds.
- (v) Turn the knob at SENSI ADJ position to insert the light scattering plate.
- (vi) Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- (vii) Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- (viii) Pull out the knob and return it to MEASURE position.
- (ix) Push the "TIME SETTING" switch the time set in the display to 3 hours.

- (x) Lower down the air collection opening cover.
  - (xi) Push “START/STOP” switch to start measurement.
- (b) Maintenance and Calibration
- (i) The 1-hour TSP meter was calibrated at 1-year intervals against a continuous particulate TEOM Monitor, Series 1400ab. Calibration certificates of the Laser Dust Monitors are provided in Appendix E.
  - (ii) 1-hour validation checking of the TSP meter against HVS is carried out on half-year basis at the air quality monitoring locations.

## 2.6 Monitoring Schedule for the Reporting Month

2.6.1 The schedule for air quality monitoring in June 2012 is provided in Appendix F.

2.6.2 Disconnection of power supply to HVS at AMS3A (Site boundary of site office at WA2) was noted on 14 and 15 June 2012 and the monitoring was resumed at 14:00 on 15 June 2012.

2.6.3 Power supply to HVS at AMS3A (Site boundary of site office at WA2) was interrupted on 21 June 2012 and the monitoring was resumed at 12:30 on 21 June 2012.

## 2.7 Results and Observations

2.7.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in Table 2.4 and 2.5 respectively. Detailed impact air quality monitoring results are presented in Appendix G.

**Table 2.4 Summary of 1-hour TSP Monitoring Results in the Reporting Period**

	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
<b>AMS2</b>	73.0	66.8 – 77.1	374	500
<b>AMS3A</b>	77.0	62.5 – 86.7	368	500
<b>AMS7</b>	71.3	63.8 – 76.2	370	500

**Table 2.5 Summary of 24-hour TSP Monitoring Results in the Reporting Period**

	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
<b>AMS2</b>	33.4	13.0 – 43.6	176	260
<b>AMS3A</b>	47.4	25.1 – 90.9	167	260
<b>AMS7</b>	43.4	28.5 – 54.0	183	260

- 2.7.2 The major dust source in the reporting period included construction activities from the Project, construction activities by other contacts, as well as nearby traffic emissions.
- 2.7.3 All 1-hour TSP and 24-hour TSP results were below the Action and Limit Level at all monitoring locations in the reporting month.
- 2.7.4 The event action plan is annexed in Appendix L.
- 2.7.5 Meteorological information collected from the wind station during the monitoring periods on the monitoring dates, as shown in Figure 2, including wind speed and wind direction, is annexed in Appendix H.

### 3 NOISE MONITORING

#### 3.1 Monitoring Requirements

3.1.1 In accordance with the Project Specific EM&A Manual, impact noise monitoring was conducted for at least once per week during the construction phase of the Project. The Action and Limit level of the noise monitoring is provided in Appendix D.

#### 3.2 Monitoring Equipment

3.2.1 Noise monitoring was performed using sound level meter at each designated monitoring station. The sound level meters deployed comply with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to check the sound level meters at a known sound pressure level. Brand and model of the equipment is given in Table 3.1.

**Table 3.1 Noise Monitoring Equipment**

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-31
Acoustic Calibrator	Rion NC-73

#### 3.3 Monitoring Locations

3.3.1 Monitoring locations NMS2 was set up at the proposed locations in accordance with Project Specific EM&A Manual. However, for monitoring location NMS3 (Ho Yu College), as proposed in the Project Specific EM&A Manual, approval for carrying out impact monitoring could not be obtained from the principal of the school. Permission on setting up and carrying out impact monitoring works at nearby sensitive receivers, like Caribbean Coast and Coastal Skyline, was also sought. However, approvals for carrying out impact monitoring works within their premises were not obtained. Impact noise monitoring was conducted at site boundary of the site office area in Works Area WA2 (NMS3A) respectively. Same baseline noise level, as derived from the baseline monitoring data recorded at Ho Yu College, was adopted for this alternative noise monitoring location.

3.3.2 Figure 2 shows the locations of the monitoring stations. Table 3.2 describes the details of the monitoring stations.

**Table 3.2 Locations of Impact Noise Monitoring Stations**

Monitoring Station	Location	Description
NMS2	Seaview Crescent Tower 1	Free-field on the rooftop of the premise
NMS3A	Site Boundary of Site Office Area at Works Area WA2	1m from the exterior façade of the container office on ground at the area boundary

#### 3.4 Monitoring Parameters, Frequency and Duration

3.4.1 Table 3.3 summarizes the monitoring parameters, frequency and duration of impact noise monitoring.

**Table 3.3 Noise Monitoring Parameters, Frequency and Duration**

Parameter	Frequency and Duration
30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays (Monday to Saturday). $L_{eq}$ , $L_{10}$ and $L_{90}$ would be recorded.	At least once per week

### 3.5 Monitoring Methodology

#### 3.5.1 Monitoring Procedure

- (a) The sound level meter was set on a tripod at a height of 1.2 m above the ground for free-field measurements at NMS2. A correction of +3 dB(A) shall be made to the free field measurements.
- (b) Façade measurements were made at NMS3A.
- (c) The battery condition was checked to ensure the correct functioning of the meter.
- (d) Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:-
  - (i) frequency weighting: A
  - (ii) time weighting: Fast
  - (iii) time measurement:  $L_{eq(30\text{-minutes})}$  during non-restricted hours i.e. 07:00 – 1900 on normal weekdays;  $L_{eq(5\text{-minutes})}$  during restricted hours i.e. 19:00 – 23:00 and 23:00 – 07:00 of normal weekdays, whole day of Sundays and Public Holidays.
- (e) Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator for 94dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- (f) During the monitoring period, the  $L_{eq}$ ,  $L_{10}$  and  $L_{90}$  were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- (g) Noise measurement was paused during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible. Observations were recorded when intrusive noise was unavoidable.
- (h) Noise monitoring was cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind with gusts exceeding 10m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

#### 3.5.2 Maintenance and Calibration

- (a) The microphone head of the sound level meter was cleaned with soft cloth at regular intervals.
- (b) The meter and calibrator were sent to the supplier or HOKLAS laboratory to check and calibrate at yearly intervals.
- (c) Calibration certificates of the sound level meters and acoustic calibrators are provided in Appendix E.

### 3.6 Monitoring Schedule for the Reporting Month

- 3.6.1 Due to the adverse weather condition and hoisting of thunderstorm warning signals during the impact noise monitoring period, access to the impact noise monitoring location at NMS2 was rejected by the property management staff. The impact noise monitoring at NMS2 is rescheduled to 22 June 2012.
- 3.6.2 The schedule for construction noise monitoring in June 2012 is provided in Appendix F.

### 3.7 Monitoring Results

- 3.7.1 The monitoring results for construction noise are summarized in Table 3.4 and the monitoring data is provided in Appendix I.

**Table 3.4 Summary of Construction Noise Monitoring Results in the Reporting Period**

	Average, dB(A), $L_{eq}(30\text{ mins})$	Range, dB(A), $L_{eq}(30\text{ mins})$	Limit Level, dB(A), $L_{eq}(30\text{ mins})$
NMS2	68.8*	60.8 – 73.5*	75
NMS3A	69.6	56.7 – 74.8	75

\*+3dB(A) Façade correction included

- 3.7.2 No noise Action Level and Limit Level exceedance was recorded at all monitoring stations in the reporting month.
- 3.7.3 Major noise sources during the noise monitoring included construction activities of the Project, construction activities by other contracts and nearby traffic noise.
- 3.7.4 The event action plan is annexed in Appendix L.

## 4 WATER QUALITY MONITORING

### 4.1 Monitoring Requirements

4.1.1 Impact water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. For impact water quality monitoring, measurements were taken in accordance with the Project Specific EM&A Manual. Appendix D shows the established Action/Limit Levels for the environmental monitoring works.

### 4.2 Monitoring Equipment

4.2.1 Table 4.1 summarises the equipment used in the impact water quality monitoring programme.

**Table 4.1 Water Quality Monitoring Equipment**

<b>Equipment</b>	<b>Brand and Model</b>
Dissolved Oxygen (DO) and Temperature Meter, Salinity Meter and Turbidimeter	YSI Model 6820
pH Meter	YSI Model 6820 or Thermo Orion 230A+
Positioning Equipment	JRC DGPS 224 Model JLR-4341 with J-NAV 500 Model NWZ4551
Water Depth Detector	Eagle Cuda-168
Water Sampler	Kahlsio Water Sampler (Vertical) 2.2 L with messenger

### 4.3 Monitoring Parameters, Frequency and Duration

4.3.1 Table 4.2 summarises the monitoring parameters, frequency and monitoring depths of impact water quality monitoring as required in the Project Specific EM&A Manual.

**Table 4.2 Impact Water Quality Monitoring Parameters and Frequency**

Monitoring Stations	Parameter, unit	Frequency	No. of depth
<p><i>Impact Stations:</i>                      IS5, IS(Mf)6, IS7, IS8, IS(Mf)9, IS10, IS(Mf)11, IS(Mf)16, IS17</p> <p><i>Control/Far Field Stations:</i>                      CS(Mf)3, CS(Mf)5, CS4, CS6, CSA</p> <p><i>Sensitive Receiver Stations:</i>                      SR3-SR7, SR10A&amp;SR10B</p>	<ul style="list-style-type: none"> <li>• Depth, m</li> <li>• Temperature, °C</li> <li>• Salinity, ppt</li> <li>• Dissolved Oxygen (DO), mg/L</li> <li>• DO Saturation, %</li> <li>• Turbidity, NTU</li> <li>• pH</li> <li>• Suspended Solids (SS), mg/L</li> </ul>	<p>Three times per week during mid-ebb and mid-flood tides (within ± 1.75 hour of the predicted time)</p>	<p>3                      (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).</p>

#### 4.4 Monitoring Locations

- 4.4.1 In accordance with the Project Specific EM&A Manual, twenty-one stations (9 Impact Stations, 7 Sensitive Receiver Stations and 5 Control/Far Field Stations) were designated for impact water quality monitoring. The nine Impact Stations (IS) were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the seven Sensitive Receiver Stations (SR) were chosen as they are close to the key sensitive receives and the five Control/ Far Field Stations (CS) were chosen to facilitate comparison of the water quality of the IS stations with less influence by the Project/ ambient water quality conditions.
- 4.4.2 Due to safety concern and topographical condition of the original locations of SR4 and SR10B, alternative impact water quality monitoring stations, naming as SR4(N) and SR10B(N), were adopted, which are situated in vicinity of the original impact water quality monitoring stations (SR4 and SR10B) and could be reachable.
- 4.4.3 Same baseline and Action Level for water quality, as derived from the baseline monitoring data recorded, were adopted for these alternative impact water quality monitoring stations.

4.4.4 The locations of these monitoring stations are summarized in Table 4.3 and depicted in Figure 3.

**Table 4.3 Impact Water Quality Monitoring Stations**

Station	Description	East	North
IS5	Impact Station (Close to HKBCF construction site)	811579	817106
IS(Mf)6	Impact Station (Close to HKBCF construction site)	812101	817873
IS7	Impact Station (Close to HKBCF construction site)	812244	818777
IS8	Impact Station (Close to HKBCF construction site)	814251	818412
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850
IS10	Impact Station (Close to HKBCF construction site)	812577	820670
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497
IS17	Impact Station (Close to HKBCF construction site)	814539	820391
SR3	Sensitive receivers (San Tau SSSI)	810525	816456
SR4(N)	Sensitive receivers (Tai Ho)	814705	817859
SR5	Sensitive receivers (Artificial Reef in NE Airport)	811489	820455
SR6	Sensitive receivers (Sha Chau and Lung Kwu Chau Marine Park)	805837	821818
SR7	Sensitive receivers (Tai Mo Do)	814293	821431
SR10A	Sensitive receivers (Ma Wan FCZ)1	823741	823495
SR10B(N)	Sensitive receivers (Ma Wan FCZ)2	823683	823187
CS(Mf)3	Control Station	809989	821117
CS(Mf)5	Control Station	817990	821129
CS4	Control Station	810025	824004
CS6	Control Station	817028	823992
CSA	Control Station	818103	823064

## 4.5 Monitoring Methodology

### 4.5.1 Instrumentation

- (a) The in-situ water quality parameters, viz. dissolved oxygen, temperature, salinity, turbidity and pH, were measured by multi-parameter meters (i.e. Model YSI 6820 CE-C-M-Y) and pH meter (i.e. Thermo Orion 230A+) respectively.

### 4.5.2 Operating/Analytical Procedures

- (a) Digital Differential Global Positioning Systems (DGPS) were used to ensure that the correct location was selected prior to sample collection.
- (b) Portable, battery-operated echo sounders were used for the determination of water depth at each designated monitoring station.
- (c) All in-situ measurements were taken at 3 water depths, 1 m below water surface, mid-depth and 1 m above sea bed, except where the water depth was less than 6 m, in which case the mid-depth station was omitted. Should the water depth be less than 3 m, only the mid-depth station was monitored.
- (d) At each measurement/sampling depth, two consecutive in-situ monitoring (DO concentration and saturation, temperature, turbidity, pH, salinity) and water sample for SS. The probes were

retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of DO or turbidity parameters was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.

- (e) Duplicate samples from each independent sampling event were collected for SS measurement. Water samples were collected using the water samplers and the samples were stored in high-density polythene bottles. Water samples collected were well-mixed in the water sampler prior to pre-rinsing and transferring to sample bottles. Sample bottles were pre-rinsed with the same water samples. The sample bottles were then be packed in cool-boxes (cooled at 4°C without being frozen), and delivered to ALS Technichem (HK) Pty Ltd. for the analysis of suspended solids concentrations. The laboratory determination work would be started within 24 hours after collection of the water samples. ALS Technichem (HK) Pty Ltd. is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes. For QA/QC procedures, one duplicate samples of every batch of 20 samples was analyzed.
- (f) The analysis method and reporting and detection limit for SS is shown in Table 4.4.

**Table 4.4 Laboratory Analysis for Suspended Solids**

Parameters	Instrumentation	Analytical Method	Reporting Limit	Detection Limit
Suspended Solid (SS)	Weighting	APHA 2540-D	0.5mg/L	0.5mg/L

- (g) Other relevant data were recorded, including monitoring location / position, time, water depth, tidal stages, weather conditions and any special phenomena or work underway at the construction site in the field log sheet for information.

#### 4.5.3 Maintenance and Calibration

- (a) All in situ monitoring instruments would be calibrated and calibrated by ALS Technichem (HK) Pty Ltd. before use and at 3-monthly intervals throughout all stages of the water quality monitoring programme. Calibration details are provided in Appendix E.
- (b) The dissolved oxygen probe of YSI 6820 was calibrated once per monitoring day by wet bulb method. Before the calibration routine, the sensor for dissolved oxygen was thermally equilibrated in water-saturated air. Calibration cup is served as a calibration chamber and it was loosened from airtight condition before it is used for the calibration. Calibration at ALS Technichem (HK) Pty Ltd. was carried out once every three months in a water sample with a known concentration of dissolved oxygen. The sensor was immersed in the water and after thermal equilibration, the known mg/L value was keyed in and the calibration was carried out automatically.
- (c) The turbidity probe of YSI 6820 is calibrated two times a month. A zero check in distilled water was performed with the turbidity probe of YSI 6820 once per monitoring day. The probe will be calibrated with a solution of known NTU at ALS Technichem (HK) Pty Ltd. once every three months.

## 4.6 Monitoring Schedule for the Reporting Month

- 4.6.1 The schedule for impact water quality monitoring in June 2012 is provided in Appendix F.

## 4.7 Results and Observations

- 4.7.1 Impact water quality monitoring was conducted at all designated monitoring stations in the reporting month. Impact water quality monitoring results and graphical presentations are provided in Appendix J.
- 4.7.2 Two (2) exceedances were recorded for measured suspended solid (SS) in the reporting month. Number of exceedances recorded in the reporting month at each impact station are summarised in Table 4.5.

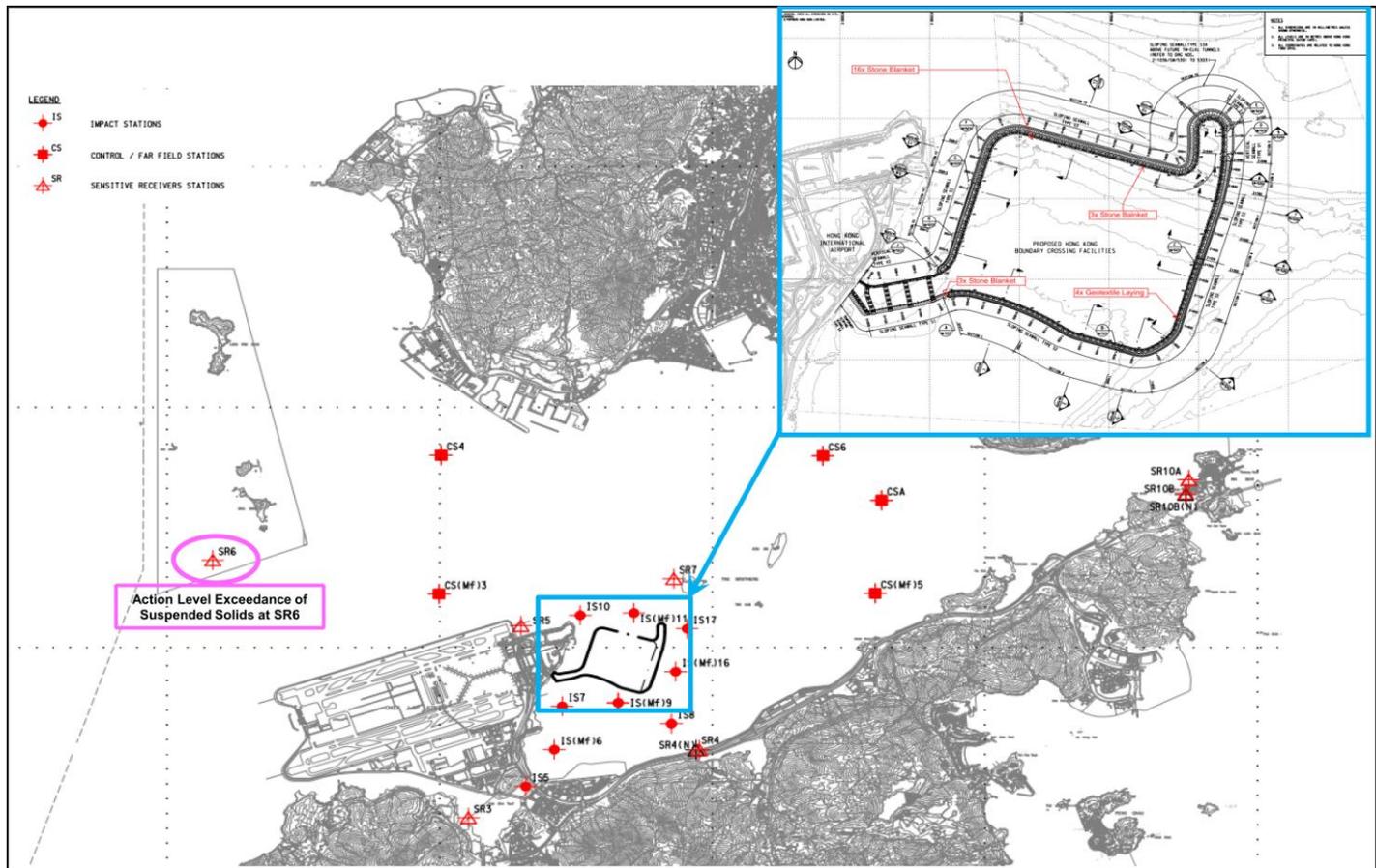
**Table 4.5 Summary of Water Quality Exceedances**

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS		Total	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)6	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS7	Action	0	0	0	0	0	0	0	1 (18 June 12)	0	1 (18 June 12)
	Limit	0	0	0	0	0	0	0	0	0	0
IS8	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)9	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS10	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)11	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS(Mf)16	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
IS17	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR3	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR4(N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR5	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR6	Action	0	0	0	0	0	0	1 (4 June 12)	0	1 (4 June 12)	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR7	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10A	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
SR10B (N)	Action	0	0	0	0	0	0	0	0	0	0
	Limit	0	0	0	0	0	0	0	0	0	0
<b>Total</b>	<b>Action</b>	0	0	1	0	0	0	0	0	2 (4; 18 June 12)	
	<b>Limit</b>	0	0	0	0	0	0	0	0	0	

Note: S: Surface; and  
 M: Mid-depth.

4.7.3 Two (2) Action Level exceedances were recorded at measured suspended solid (SS) in the reporting month. The Action Level exceedances were recorded on 4 June 2012 during mid-ebb tide at Sensitive Receiver Station SR6 and 18 June 2012 during mid-flood tide at Impact Station IS7, where 34.0mg/L and 30.0 mg/L of SS was recorded for SR6 and IS7 respectively.

For exceedance recorded at SR6, it was found that only preparation works, like geotextile laying and stone blanket laying, which are not likely to cause water quality impact, were carried out during the monitoring period at mid-ebb tide. Location plan showing the locations of the mentioned works is shown below:

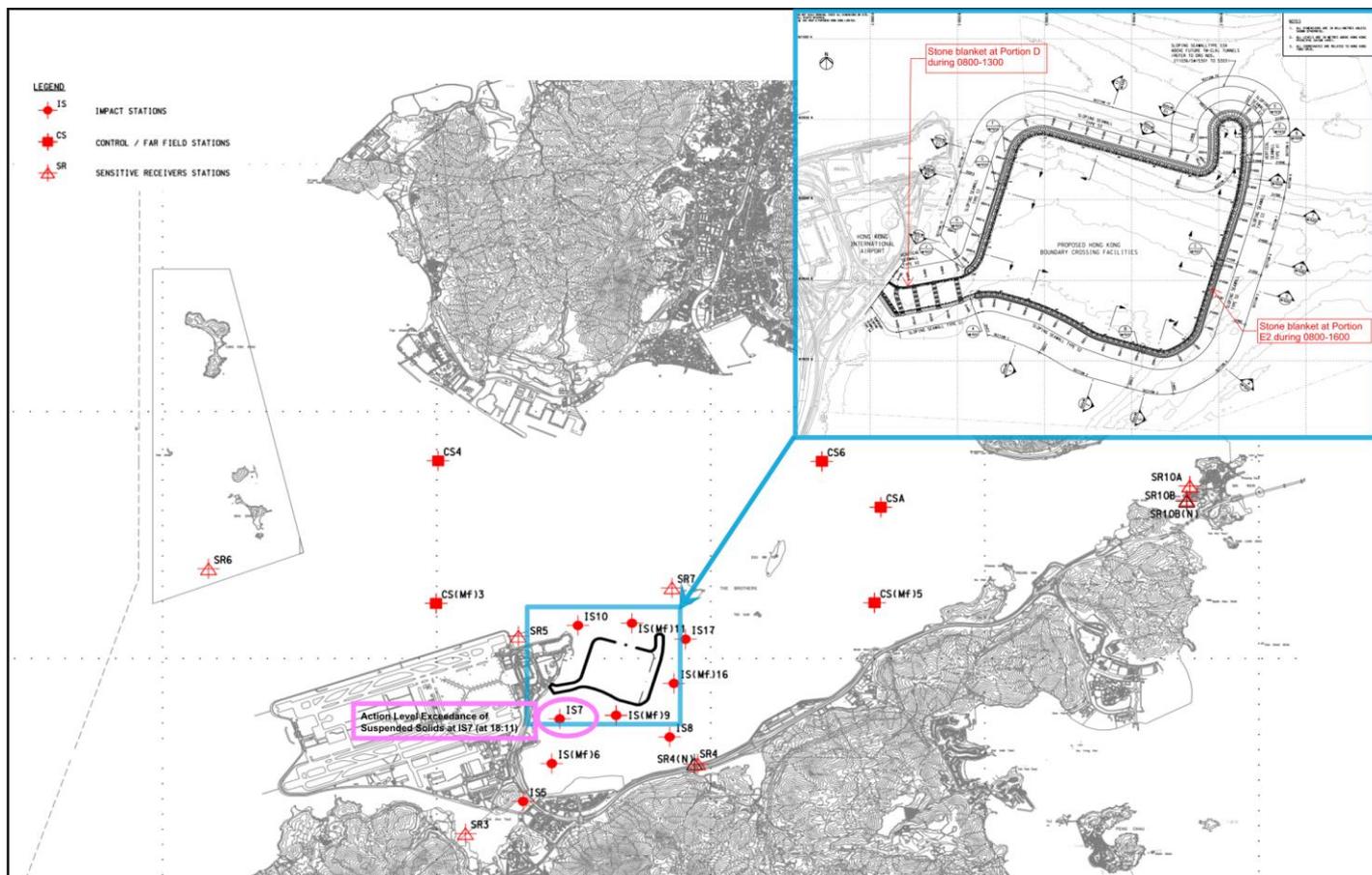


Monitoring Station at SR6 was considered as an upstream station during mid-ebb tide. Turbidity and SS levels recorded at CS(Mf)3 and CS4 on the monitoring date were well below the Action and Limit Levels.

Turbidity and SS values recorded at Impact Stations closer to the works area (e.g. IS10, IS(Mf)11 and IS17) were all below the Action and Limit Level during the mid-ebb tide on the same day.

The exceedance was then considered as non-Project related.

For exceedance recorded at IS7, it was found that only preparation works, like stone blanket laying, which is not likely to cause water quality impact, was carried out between 08:00 to 16:00 on the monitoring day. No stone column installation trial was conducted on the monitoring day. No major marine based construction activity was carried out during the monitoring period of mid-flood tide. A location plan showing the locations of the mentioned works is shown below:



Turbidity and SS values recorded at Impact Stations closer to the works area (e.g. IS(Mf)9 and IS10) were all below the Action and Limit Level during the mid-flood tide on the same day.

Based on the on-site observation, strong rough current was noted during the monitoring period. Also, Tropical Cyclone Warning Signal No.1 was hoisted by HKO during the monitoring period.

It is considered that the Action Level exceedance as non-Project related.

4.7.4 Generally, water quality impact sources during the water quality monitoring were potentially activities of the Project and nearby operating vessels by other parties.

4.7.5 The event action plan is annexed in Appendix L.

## 5 DOLPHIN MONITORING

### 5.1 Monitoring Requirements

- 5.1.1 Vessel based surveys for the Chinese White Dolphin (CWD), *Sousa chinensis*, are to be conducted by a dedicated team comprising a qualified marine mammal ecologist and experienced marine mammal observers (MMOs). The purpose of the surveys are to evaluate the impact of the HKCBF reclamation and, if deemed detrimental, to take appropriate action as per the EM&A manual.
- 5.1.2 This ‘Impact Monitoring’ follows several months of ‘Baseline Monitoring’ so similar survey methodologies have been adopted to facilitate comparisons between datasets. Further, the data collected are compatible with, and are available for, incorporation into the data set managed by the Agriculture, Fisheries and Conservation Department (AFCD) as part of Hong Kong’s long term Marine Mammal Monitoring Programme.

### 5.2 Monitoring Equipment

- 5.2.1 Table 5.1 summarises the equipment used for the impact dolphin monitoring.

**Table 5.1 Dolphin Monitoring Equipment**

Equipment	Model
Commercially licensed motor vessel	15m in length with a 4.5m viewing platform
Global Positioning System (GPS) x2	Garmin 18X-PC Geo One Phottix
Computers (Corei7) x2	Windows /MSO 10 Logger
AIS receiver	Logger – GPS linked
Camera	Nikon D90 300m 2.8D fixed focus Nikon D90 20-300m zoom lens
Laser Rangefinder	Infinitor LRF1000/Visionking 900
Marine Binocular x3	Nexus 7 x 50 marine binocular with compass and reticules Fujinn 7 x 50 marine binocular with compass and reticules

### 5.3 Monitoring Frequency and Conditions

- 5.3.1 Dolphin monitoring is conducted twice per month in each survey area (but three times per month for June and July 2012 in order to compensate the deficit of on effort survey in previous months).
- 5.3.2 Dolphin monitoring is conducted when visibility is good, e.g., over 1km and with a Beaufort Sea State of 4 or better.
- 5.3.3 When thunder storm, black rain or typhoon warnings are in force, all survey effort is stopped.

### 5.4 Monitoring Methodology and Location

- 5.4.1 The impact dolphin monitoring is vessel-based and combines line-transect and photo-ID methodology. The survey follows pre-set and fixed transect lines in the two areas defined by AFCD as:
- Northeast Lantau survey area; and
  - Northwest Lantau survey area.
- 5.4.2 The co-ordinates for the transect lines and layout map have been provided by AFCD and are shown in Table 5.2 and Figure 4.

**Table 5.2 Impact Dolphin Monitoring Line Transect Co-ordinates (Provided by AFCD)**

ID	HK Grid System		Long Lat in WGS84	
	X	Y	Long	Lat
1	804671	814577	113.870308	22.269741
1	804671	831404	113.869975	22.421696
2	805475	815457	113.878087	22.277704
2	805477	826654	113.877896	22.378814
3	806464	819435	113.887615	22.313643
3	806464	822911	113.887550	22.345030
4	807518	819771	113.897833	22.316697
4	807518	829230	113.897663	22.402113
5	808504	820220	113.907397	22.320761
5	808504	828602	113.907252	22.396462
6	809490	820466	113.916965	22.323003
6	809490	825352	113.916884	22.367128
7	810499	820690	113.926752	22.325043
7	810499	824613	113.926688	22.360464
8	811508	820847	113.936539	22.326475
8	811508	824254	113.936486	22.357241
9	812516	820892	113.946329	22.326894
9	812516	824254	113.946279	22.357255
10	813525	818270	113.956156	22.303225
10	813525	824657	113.956065	22.360912
11	814556	818449	113.966160	22.304858
11	814556	820992	113.966125	22.327820
12	815542	818807	113.975726	22.308109
12	815542	824882	113.975647	22.362962
13	816506	819480	113.985072	22.314192
13	816506	824859	113.985005	22.362771
14	817537	820220	113.995070	22.320883
14	817537	824613	113.995018	22.360556
15	818568	820735	114.005071	22.325550
15	818568	824433	114.005030	22.358947
16	819532	821420	114.014420	22.331747
16	819532	824209	114.014390	22.356933
17	820451	822125	114.023333	22.338117
17	820451	823671	114.023317	22.352084
18	821504	822371	114.033556	22.340353
18	821504	823761	114.033544	22.352903
19	822513	823268	114.043340	22.348458
19	822513	824321	114.043331	22.357971
20	823477	823402	114.052695	22.349680
20	823477	824613	114.052686	22.360610
21	805476	827081	113.877878	22.382668
21	805476	830562	113.877811	22.414103
22	806464	824033	113.887520	22.355164
22	806464	829598	113.887416	22.405423
23	814559	821739	113.966142	22.334574
23	814559	824768	113.966101	22.361920

## 5.5 Monitoring Procedures

5.5.1 The study area incorporates 23 transects which are to be surveyed twice per month. Each survey day lasts approximately 9 hours. In June and July 2012, the transects will be monitored 3 times each per month in order to compensate the deficit of on effort survey in previous months..

5.5.2 The survey vessel departs from Tung Chung Development Pier, Tsing Yi Public Pier or the nearest safe and convenient pier.

- 5.5.3 When the vessel reaches the start of a transect line, “on effort” survey begins. Areas between transect lines and traveling to and from the study area are defined as “off effort”.
- 5.5.4 The transect line was surveyed at a speed of 6-8 knots (11-14 km/hr). For the sake of safety, the speed was sometimes a bit slower to avoid collision with other vessels. There are a minimum of four marine mammal observers (MMOs) present on each survey, rotating through four positions, observers (2), data recorder (1) and ‘rest’ (1). Rotations occur every 30 minutes or at the end of dolphin encounters. The data recorder records effort, weather and sightings data directly onto the programme Logger. The observers search with naked eye and binoculars between 90° and 270° abeam (bow being 0°).
- 5.5.5 When a group of dolphins is sighted, position, bearing and distance data are recorded immediately onto the computer and, after a short observation, an estimate made of group size. These parameters are linked to the time-GPS-ships data which are automatically stored in the programme Logger throughout the survey period. In this manner, information on heading, position, speed, weather, effort and sightings are stored in a format suitable for use with DISTANCE software for subsequent line transect analyses.
- 5.5.6 Once the vessel leaves the transect line, it is deemed to be “off effort”. The dolphins are approached with the purpose of taking high resolution pictures for proper photo-identification of individual CWD. Attempts to photograph all dolphins in the group are made. Both the left and right hand sides of the dorsal fin area of each dolphin in the group are photographed, if possible. On finishing photographing, the vessel will return to the transect line at the point of departure and “on effort” survey is resumed. If another group of dolphins is sighted while travelling back to the transect line, the event shall be treated as an “off effort sighting” and noted accordingly.
- 5.5.7 As time and GPS data are automatically logged throughout the survey and are linked to sightings data input, start and end times of encounters and deviation from the transect lines are recorded and can be subsequently reviewed.

## 5.6 Monitoring Schedule for the Reporting Month

- 5.6.1 The schedule for dolphin monitoring in June 2012 is provided in Appendix F.

## 5.7 Results and Observations

- 5.7.1 Dolphin surveys were conducted on 12th, 13th, 14th, 15th, 20th and 25th June. Typhoon Signal 3 affected the survey scheduled 19th June, this survey was moved to 25th June. In summary, all “on effort” survey in June 2012 were conducted under favourable conditions (Beaufort 3 or below), a total of 361.5km on effort survey were conducted. The details are shown below:-

(1) 12 June 2012 – a total of 52.9km on-effort transect was travelled under favourable sea conditions;

(2) 13 June 2012 – a total of 50.3km on-effort transect was travelled under favourable sea conditions;

(3) 14 June 2012 – a total of 82.4km on-effort transect was travelled under favourable sea conditions;

(4) 15 June 2012 – a total of 58.9km on-effort transect was travelled under favourable sea conditions;

(5) 20 June 2012 – a total of 81.9km on-effort transect was travelled under favourable sea conditions; and

(6) 25 June 2012 – a total of 35.1km on-effort transect was travelled under favourable sea conditions.

5.7.2 The effort summary is shown Table 5.3 and 5.4 respectively. For Table 5.3, only on-effort information extracted. Transect conducted in Beaufort larger than 3 and time/distance with sightings are not included.

**Table 5.3 Impact Dolphin Monitoring Survey Effort Summary**

Date	Status	Sea State (on effort only)	Distance (km)
12-6-12	ON	0.5	20.5
12-6-12	ON	1	4.6
12-6-12	ON	1.5	17.8
12-6-12	ON	2	1.9
12-6-12	ON	2.5	5.3
12-6-12	ON	3	2.8
<b>Total</b>			<b>52.9</b>
13-06-12	ON	0.5	32.6
13-06-12	ON	1	17.7
<b>Total</b>			<b>50.3</b>
14-06-12	ON	0.5	13.7
14-06-12	ON	1	22.5
14-06-12	ON	1.5	5.6
14-06-12	ON	2	32.5
14-06-12	ON	2.5	8.1
<b>Total</b>			<b>82.4</b>
15-06-12	ON	1	13.8
15-06-12	ON	1.5	5.3
15-06-12	ON	2	28.5
15-06-12	ON	2.5	3.3
15-06-12	ON	3	8
<b>Total</b>			<b>58.9</b>
20-06-12	ON	1	31.5
20-06-12	ON	1.5	40.3
20-06-12	ON	2	10.1
<b>Total</b>			<b>81.9</b>
25-06-12	ON	2	15.9
25-06-12	ON	2.5	14.9
25-06-12	ON	3	4.3
<b>Total</b>			<b>35.1</b>
<b>TOTAL JUNE 2012</b>			<b>361.5</b>

**Table 5.4 Impact Dolphin Monitoring Survey Details in June 2012**

Date	Location	No. Sightings ON EFFORT	No. Sightings OFF EFFORT	Total km ON EFFORT
12-06-12	NW Lantau	0	1	52.9
13-06-12	NW and NE Lantau	2	0	50.3
14-06-12	NW Lantau	6	1	82.4
15-06-12	NW and NE Lantau	2	1	58.9
20-06-12	NW Lantau	3	2	81.9
25-06-12	NW Lantau and NE Lantau	0	0	35.1
<b>Total km ON EFFORT June 2012</b>				<b>361.5</b>

- 5.7.3 A total of eighteen dolphin sightings were recorded during the six surveys, one on the 12th June, two on the 13th June, seven on the 14th of June, three on the 15th June and five on the 20th June. No dolphins were seen on the 25th June. Of the eighteen sightings, thirteen were “on effort” and five were “off effort”. Sighting details are summarised and plotted in Appendix K and Figure 5, respectively.
- 5.7.4 Behaviour: eight groups were feeding but only one of these groups was associated with a fishing vessel (hang trawler); four groups were surface active and were socializing; four groups were travelling; one groups activity was unknown. One group was also noted as “other”. This particular group was feeding in the Marine Park area north of Lung Kwu Chau when vessels associated with the new anchorage disturbed them. Pilot and anchorage vessels maneuvered through the group in an erratic manner as ship anchors were being repositioned. The dolphins appeared to be attempting to avoid the pilot ships and large vessel but were having difficulty doing so as the movement and speed of the vessels were neither directed nor consistent. This area is an important feeding area for dolphins and, as such, the close proximity of the new anchorage appears to be disturbing this behaviour.
- 5.7.5 Noteworthy Observations: one mother and calf pair was noted. One survey resulted in no sightings although weather conditions for that day were good. Hong Kong Observatory hoisted Signal T3 which effected survey work on the 19th June. After very few sightings in NEL during March-May, several sightings were made in NEL and around the HKBCF. This is similar to the observations made by MMOs at HKBCF; only three sightings throughout March-May and several sightings in June.
- 5.7.6 No other active construction sites were noted during the surveys within Hong Kong waters. Marine construction work was noted close to the Hong Kong–China maritime border in Chinese waters and dolphins were observed in this area (near Tai O).
- 5.7.7 The event action plan is annexed in Appendix L.

## 6 ENVIRONMENTAL SITE INSPECTION AND AUDIT

### 6.1 Site Inspection

6.1.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. In the reporting month, 4 site inspections were carried out on 7, 14, 21 and 28 June 2012.

6.1.2 Particular observations during the site inspections are described below:

#### ***Air Quality***

6.1.3 No adverse observation was identified in the reporting month.

#### ***Noise***

6.1.4 No adverse observation was identified in the reporting month.

#### ***Water Quality***

6.1.5 Part of the curtains was found distorted. The Contractor was informed to rectify the situation.

#### ***Chemical and Waste Management***

6.1.6 A chemical container was found improperly stored on the barge FTP23 at Portion A. The Contractor was reminded to properly store chemical container in works area with provision of drip tray.

6.1.7 Oil drums were found improperly stored on barge San Hang Bo 601 at Portion C2a, and used oil drums on barge San Hang Bo 208 at Portion C2a were found improperly treated. Drip trays should be provided to oil drums stored within works areas and used oil drums should be properly cleaned and labeled.

Moreover, oil stains were also noted on the barge San Hang Bo 208, where power pack and vibratory clamp placed. Proper measures like drip trays/tarpaulin sheets should be provided to retain any leaked oil and oil stains should be cleared. (Under follow-up status)

6.1.8 Waste skip placed at Works Area WA4 was full and stockpile of C&D wastes was also noted. The Contractor was reminded to sort the C&D wastes properly and dispose of the C&D wastes timely.

6.1.9 General refuse was stockpiled on barge San Hang Bo 208 and 601 at Portion C2a. The Contractor was reminded to remove the general refuse timely, designate areas and provide proper containers to store general refuse generated in works areas. (Under follow-up status)

#### ***Landscape and Visual Impact***

6.1.10 No relevant works was carried out in the reporting month.

#### ***Others***

6.1.11 No adverse observation was identified in the reporting month.

6.1.12 The Contractor has rectified most of the observations as identified during environmental site inspection in the reporting month. Rectifications of remaining identified items are undergoing by the Contractor. Follow-up inspections on the status on provision of mitigation measures will be conducted to ensure all identified items are mitigated properly.

## **6.2 Advice on the Solid and Liquid Waste Management Status**

- 6.2.1 The Contractor had registered as a chemical waste producer for this Project. Receptacles were available for general refuse collection and sorting.
- 6.2.2 As advised by the Contractor, 96,400 m<sup>3</sup> of rock fill was imported for the Project use in the reporting period. 1.99 tonnes of general refuse were generated and disposed of in the reporting period. Monthly summary of waste flow table is detailed in Appendix M.
- 6.2.3 The Contractor is advised to properly maintain on site C&D materials and wastes storage, collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse / recycle of C&D materials and wastes. The Contractor is reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.
- 6.2.4 The Contractor is reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practise on the Packaging, Labelling and Storage of Chemical Wastes.

### 6.3 Environmental Licenses and Permits

6.3.1 The environmental licenses and permits for the Project and valid in the reporting month is summarized in Table 6.1.

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

Statutory Reference	License/ Permit	License or Permit No.	Valid Period		License/ Permit Holder	Remarks
			From	To		
EIAO	Environmental Permit	EP-353/2009/D	07/03/2012	N/A	HyD	Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities
		EP-354/2009/A	08/12/2010	N/A		Tuen Mun – Chek Lap Kok Link (TMCLKL Southern Landfall Reclamation only)
APCO	NA notification	--	30/12/2011	--	CHEC	Works Area WA2 and WA3
APCO	NA notification	--	17/01/2012	--	CHEC	Works Area WA4
WPCO	Discharge License	N/A	Application in process	N/A	CHEC	Discharge of Construction Runoff
WDO	Chemical Waste Producer Registration	5213-951-C1186-21	30/3/2012	N/A	CHEC	Chemical waste produced in Contract HY/2010/02
WDO	Billing Account for Disposal of Construction Waste	7014181	05/12/2011	N/A	CHEC	Waste disposal in Contract HY/2010/02
NCO	Construction Noise Permit	GW-RS0392-12	16/4/2012	15/10/2012	CHEC	Marine-based areas in Contract HY/2010/02
NCO	Construction Noise Permit	GW-RS0378-12	16/4/2012	15/10/2012	CHEC	Works Area WA3 in Siu Ho Wan
NCO	Construction Noise Permit	GW-RS0430-12	27/4/2012	18/10/2012 (Cancelled from 1900 on 6 June 2012)	CHEC	Works Area WA2 in Tung Chung
NCO	Construction Noise Permit	GW-RS0616-12	6/6/2012	5/12/2012	CHEC	Works Area WA2 in Tung Chung

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

- 6.4.1 In response to the site audit findings, the Contractors carried out corrective actions.
- 6.4.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in Appendix C. Most of the necessary mitigation measures were implemented properly.
- 6.4.3 Regular marine travel route for marine vessels were implemented properly in accordance to the submitted plan and relevant records were kept properly.
- 6.4.4 Regarding the implementation of dolphin monitoring and protection measures (i.e. implementation of Dolphin Watching Plan, Dolphin Exclusion Zone and Silt Curtain integrity Check), regular checking were conducted by the experienced MMOs within the works area to ensure no dolphin was trapped by the enclosed silt curtain systems. Silt curtain systems were also inspected timely in accordance to the submitted plan. All inspection records were kept properly.
- 6.4.5 Acoustic decoupling measures on noisy plants on construction vessels were checked regularly and these measures were well implemented.

#### **6.5 Summary of Exceedances of the Environmental Quality Performance Limit**

- 6.5.1 All 1-hour TSP and 24-hour TSP results were below the Action and Limit Level at all monitoring locations in the reporting month.
- 6.5.2 For construction noise, no Action and Limit Level exceedance was recorded at all monitoring stations in the reporting period.
- 6.5.3 Two (2) Action Level exceedances were recorded at measured suspended solid (SS) in the reporting month. The Action Level exceedances were recorded on 4 June 2012 during mid-ebb tide at Sensitive Receiver Station SR6 and 18 June 2012 during mid-flood tide at Impact Station IS7.

Construction activities carried out, monitoring results recorded from other monitoring stations and on-site observations during the monitoring periods were obtained and analyzed. Based on the investigation findings, it was found that these exceedances were not due to the Project works.

Details of these two Action Level exceedances are shown in Section 4.7.3 and Appendix J.

- 6.5.4 Cumulative statistics on exceedances is provided in Appendix M.

#### **6.6 Summary of Complaints, Notification of Summons and Successful Prosecutions**

- 6.6.1 The Environmental Complaint Handling Procedure is annexed in Figure 6.
- 6.6.2 There was no Project related environmental complaint was received in the reporting period.
- 6.6.3 No notification of summons and prosecution was received in the reporting period.
- 6.6.4 Statistics on complaints, notifications of summons and successful prosecutions are summarized in Appendix M.

## 7 FUTURE KEY ISSUES

### 7.1 Construction Programme for the Coming Months

7.1.1 As informed by the Contractor, the major works for the Project in July and August 2012 will be:-

#### ***Marine-based Works***

- Geotextile laying and fabrication;
- Stone column installation trial;
- Construction of cellular wall;
- Construction of seawalls;
- Silt curtain fabrication and deployment; and
- Stone blankets laying.

#### ***Land-based Works***

- Site office erection and construction at Works Area WA2;
- Public Works Regional Laboratory erection and construction at Works Area WA3; and
- Constructing site access at area WA2 to Ying Hei Road, Tung Chung.

### 7.2 Key Issues for the Coming Month

7.2.1 Key issues to be considered in the coming months:-

- Site runoff should be properly collected and treated prior to discharge;
- Minimize loss of sediment from filling works;
- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities;
- Exposed surfaces/soil stockpiles should be properly treated to avoid generation of silty surface run-off during rainstorm;
- Regular review and maintenance of wheel washing facilities provided at all site entrances/exits;
- Conduct regular inspection of various working machineries and vessels within works areas to avoid any dark smoke emission;
- Suppress dust generated from work processes with use of bagged cements, earth movements, excavation activities, exposed surfaces/soil stockpiles and haul road traffic;
- Quieter powered mechanical equipment should be used;
- Provision of proper and effective noise control measures for operating equipment and machinery on-site, such as erection of movable noise barriers or enclosure for noisy plants;
- Closely check and replace the sound insulation materials regularly;
- Better scheduling of construction works to minimize noise nuisance;
- Properly store and label oil drums and chemical containers placed on site;
- Proper chemicals, chemical wastes and wastes management;
- Maintenance works should be carried out within roofed, paved and confined areas;
- Collection and segregation of construction waste and general refuse on land and in the sea should be carried out properly and regularly; and
- Proper protection and regular inspection of existing trees, transplanted/retained trees.

### 7.3 Monitoring Schedule for the Coming Month

7.3.1 The tentative schedule for environmental monitoring in July 2012 is provided in Appendix F.

## 8 CONCLUSIONS AND RECOMMENDATIONS

### 8.1 Conclusions

- 8.1.1 The construction phase and EM&A programme of the Project commenced on 12 March 2012.
- 8.1.2 All 1-hour TSP and 24-hour TSP results were below the Action and Limit Level at all monitoring locations in the reporting month.
- 8.1.3 For construction noise, no Action and Limit Level exceedance was recorded at all monitoring stations in the reporting period.
- 8.1.4 Two (2) Action Level exceedances were recorded at measured suspended solid in the reporting month. Investigation results show that the exceedances were not due to the Project works.
- 8.1.5 A total of eighteen dolphin sightings were recorded during the six surveys, one on the 12th June, two on the 13th June, seven on the 14th of June, three on the 15th June and five on the 20th June. No dolphins were seen on the 25th June. Of the eighteen sightings, thirteen were “on effort” and five were “off effort”.
- 8.1.6 The predominant behavior of the dolphin observed was engaged in feeding but only one group was associated with fishing vessel (hang trawler) at the time of the sighting.
- 8.1.7 No other active construction sites were noted during the surveys within Hong Kong waters. Marine construction work was noted close to the Hong Kong–China maritime border in Chinese waters and dolphins were observed in this area (near Tai O).
- 8.1.8 Environmental site inspection was carried out 4 times in June 2012. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site audits.
- 8.1.9 No Project related environmental complaint was received in the reporting period.
- 8.1.10 No notification of summons and prosecution was received in the reporting period.

### 8.2 Recommendations

- 8.2.1 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:-

#### ***Air Quality Impact***

- All working plants and vessels on site should be regularly inspected and properly maintained to avoid dark smoke emission.
- All vehicles should be washed to remove any dusty materials before leaving the site.
- Haul roads should be sufficiently dampened to minimize fugitive dust generation.
- Wheel washing facilities should be properly maintained and reviewed to ensure properly functioning.
- Temporary exposed slopes and open stockpiles should be properly covered.
- Enclosure should be erected for cement debagging, batching and mixing operations.
- Water spraying should be provided to suppress fugitive dust for any dusty construction activity.

#### ***Construction Noise Impact***

- Quieter powered mechanical equipment should be used as far as possible.

- Noisy operations should be oriented to a direction away from sensitive receivers as far as possible.
- Proper and effective noise control measures for operating equipment and machinery on-site should be provided, such as erection of movable noise barriers or enclosure for noisy plants. Closely check and replace the sound insulation materials regularly
- Vessels and equipment operating should be checked regularly and properly maintained.
- Noise Emission Label (NEL) shall be affixed to the air compressor and hand-held breaker operating within works area.
- Better scheduling of construction works to minimize noise nuisance.

#### ***Water Quality Impact***

- Regular review and maintenance of silt curtain systems, drainage systems and desilting facilities in order to make sure they are functioning effectively.
- Construction of seawall should be completed as early as possible.
- Regular inspect and review the loading process from barges to avoid splashing of material.
- Silt, debris and leaves accumulated at public drains, wheel washing bays and perimeter u-channels and desilting facilities should be cleaned up regularly.
- Silty effluent should be treated/ desilted before discharged. Untreated effluent should be prevented from entering public drain channel.
- Proper drainage channels/bunds should be provided at the site boundaries to collect/intercept the surface run-off from works areas.
- Exposed slopes and stockpiles should be covered up properly during rainstorm.

#### ***Chemical and Waste Management***

- All types of wastes, both on land and floating in the sea, should be collected and sorted properly and disposed of timely and properly. They should be properly stored in designated areas within works areas temporarily.
- All chemical containers and oil drums should be properly stored and labelled.
- All plants and vehicles on site should be properly maintained to prevent oil leakage.
- All kinds of maintenance works should be carried out within roofed, paved and confined areas.
- All drain holes of the drip trays utilized within works areas should be properly plugged to avoid any oil and chemical waste leakage.
- Oil stains on soil surface and empty chemical containers should be cleared and disposed of as chemical waste.

#### ***Landscape and Visual Impact***

- All existing, retained/transplanted trees at the works areas should be properly fenced off and regularly inspected.