

**Contract No. HY/2011/03**

**Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road  
Section between Scenic Hill and Hong Kong Boundary Crossing  
Facilities**

**Monthly EM&A Report No.44 (May 2016)**

15 June 2016

Revision 1

**Main Contractor**



**Designer**

**ATKINS**

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## Executive Summary

The Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Link Road (HKLR) serves to connect the HZMB Main Bridge at the Hong Kong Special Administrative Region (HKSAR) Boundary and the HZMB Hong Kong Boundary Crossing Facilities (HKBCF) located at the north eastern waters of the Hong Kong International Airport (HKIA).

The HKLR project has been separated into two contracts. They are Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between Scenic Hill and Hong Kong Boundary Crossing Facilities (hereafter referred to as the Contract) and Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill.

China State Construction Engineering (Hong Kong) Ltd. was awarded by Highways Department as the Contractor to undertake the construction works of Contract No. HY/2011/03. The main works of the Contract include land tunnel at Scenic Hill, tunnel underneath Airport Road and Airport Express Line, reclamation and tunnel to the east coast of the Airport Island, at-grade road connecting to the HKBCF and highway works of the HKBCF within the Airport Island and in the vicinity of the HKLR reclamation. The Contract is part of the HKLR Project and HKBCF Project, these projects are considered to be "Designated Projects", under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap 499) and Environmental Impact Assessment (EIA) Reports (Register No. AEIAR-144/2009 and AEIAR-145/2009) were prepared for the Project. The current Environmental Permit (EP) EP-352/2009/D for HKLR and EP-353/2009/K for HKBCF were issued on 22 December 2014 and 11 April 2016, respectively. These documents are available through the EIA Ordinance Register. The construction phase of Contract was commenced on 17 October 2012.

BMT Asia Pacific Limited has been appointed by the Contractor to implement the Environmental Monitoring & Audit (EM&A) programme for the Contract in accordance with the Updated EM&A Manual for HKLR (Version 1.0) and will be providing environmental team services to the Contract.

This is the forty-fourth Monthly EM&A report for the Contract which summarizes the monitoring results and audit findings of the EM&A programme during the reporting period from 1 to 31 May 2016.

## Environmental Monitoring and Audit Progress

The monthly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKLR (Version 1.0). A summary of the monitoring activities during this reporting month is listed below:

1-hr TSP Monitoring	4, 10, 16, 20, 25 and 31 May 2016
24-hr TSP Monitoring at AMS5	3, 9, 13, 19 and 24 May 2016
24-hr TSP Monitoring at AMS6	3, 9, 13, 19, 24 and 30 May 2016
Noise Monitoring	4, 10, 16, 25 and 31 May 2016
Water Quality Monitoring	2, 4, 6, 9, 11, 13, 16, 18, 20, 23, 25 and 30 May 2016
Chinese White Dolphin Monitoring	3, 12, 17 and 26 May 2016
Site Inspection	4, 11, 18 and 27 May 2016

Due to weather condition/boat availability, the dolphin monitoring schedule was rescheduled from 6 May 2016 to 12 May 2016, from 16 May 2016 to 17 May 2016 and from 23 May 2016 to 26 May 2016.

Due to power interruption and malfunction of HVS at station AMS5, the 24-hr TSP monitoring at AMS5 on 30 May 2016 was cancelled. A competent person was arranged to repair the HVS and check the power supply provided for HVS on 7 June 2016. The monitoring works will resume once the repairing work is completed.

As Strong Wind Signal No.3 was hoisted by Hong Kong Observatory on 27 May 2016, water quality monitoring on 27 May 2016 was cancelled for safety reason. However, due to safety reason, the water quality monitoring was not carried out on 28 May 2016 because thunderstorm warning was hoisted by Hong Kong Observatory on that day.

## Breaches of Action and Limit Levels

A summary of environmental exceedances for this reporting month is as follows:

Environmental Monitoring	Parameters	Action Level (AL)	Limit Level (LL)
Air Quality	1-hr TSP	0	0
	24-hr TSP	0	0
Noise	L <sub>eq</sub> (30 min)	0	0
Water Quality	Suspended solids level (SS)	0	0
	Turbidity level	0	0
	Dissolved oxygen level (DO)	0	0

## Complaint Log

There were no complaints received in relation to the environmental impacts during the reporting period.

## Notifications of Summons and Prosecutions

There were no notifications of summons or prosecutions received during this reporting month.

## Reporting Changes

This report has been developed in compliance with the reporting requirements for the subsequent EM&A reports as required by the Updated EM&A Manual for HKLR (Version 1.0).

The proposal for the change of Action Level and Limit Level for suspended solid and turbidity was approved by EPD on 25 March 2013.

The revised Event and Action Plan for dolphin monitoring was approved by EPD on 6 May 2013.

The original monitoring station at IS(Mf)9 (Coordinate- East:813273, North 818850) was observed inside the perimeter silt curtain of Contract HY/2010/02 on 1 July 2013, as such the original impact water quality monitoring location at IS(Mf)9 was temporarily shifted outside the silt curtain. As advised by the Contractor of HY/2010/02 in August 2013, the perimeter silt curtain was shifted to facilitate safe anchorage zone of construction barges/vessels until end of 2013 subject to construction progress. Therefore, water quality monitoring station IS(Mf)9 was shifted to 813226E and 818708N since 1 July 2013. According to the water quality monitoring team's observation on 24 March 2014, the original monitoring location of IS(Mf)9 was no longer enclosed by the perimeter silt curtain of Contract HY/2010/02. Thus, the impact water quality monitoring works at the original monitoring location of IS(Mf)9 has been resumed since 24 March 2014.

Transect lines 1, 2, 7, 8, 9 and 11 for dolphin monitoring have been revised due to the obstruction of the permanent structures associated with the construction works of HKLR and the southern viaduct of TM-CLKL, as well as provision of adequate buffer distance from the Airport Restricted Areas. The EPD issued a memo and confirmed that they had no objection on the revised transect lines on 19 August 2015.

## Future Key Issues

The future key issues include potential noise, air quality, water quality and ecological impacts and waste management arising from the following construction activities to be undertaken in the upcoming month:

- Dismantling/trimming of Temporary 40mm Stone Platform for Construction of Seawall at Portion X;
- Filling Works behind Stone Platform at Portion X;
- Construction of Seawall at Portion X;
- Loading and Unloading Filling Materials at Portion X;
- Pipe Piling at Portion X;

- Construction of box culvert PR14 at Portion X;
- Excavation and Lateral Support Works at Scenic Hill Tunnel (Cut & Cover Tunnel) at Portion X;
- Construction of Tunnel Box Structure at Scenic Hill Tunnel (Cut & Cover Tunnel) at Portion X;
- Pipe Piling Works for Scenic Hill Tunnel (Cut & Cover Tunnel) at Portion X and Y;
- Pre-bored works for excavation in Scenic Hill Tunnel (Cut & Cover Tunnel) at Portion X and Y;
- Excavation Works for HKBCF to Airport Tunnel at Portion X;
- Excavation and Lateral Support Works for HKBCF to Airport Tunnel East (Cut & Cover Tunnel) at Portion X;
- Works for Diversion of Airport Road;
- Utilities Detection at Airport Road / Airport Express Line/ East Coast Road;
- Establishment of Site Access at Airport Road / Airport Express Line/East Coast Road;
- Pipe Roofing Drilling/ Mined Tunnel Excavation / Box Jacking underneath Airport Road and Airport Express Line;
- Excavation and Lateral Support Works for HKBCF to Airport Tunnel West (Cut & Cover Tunnel) at Airport Road;
- Utility Culvert Excavation at Portion Y;
- Sub-structure & superstructure works for Highway Operation and Maintenance Area Building at Portion Y;
- Excavation for Scenic Hill Tunnel at West Portal; and
- Superstructure works for Scenic Hill Tunnel West Portal Ventilation building at West Portal.

## 1 Introduction

### 1.1 Basic Project Information

- 1.1.1 The Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Link Road (HKLR) serves to connect the HZMB Main Bridge at the Hong Kong Special Administrative Region (HKSAR) Boundary and the HZMB Hong Kong Boundary Crossing Facilities (HKBCF) located at the north eastern waters of the Hong Kong International Airport (HKIA).
- 1.1.2 The HKLR project has been separated into two contracts. They are Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between Scenic Hill and Hong Kong Boundary Crossing Facilities (hereafter referred to as the Contract) and Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill.
- 1.1.3 China State Construction Engineering (Hong Kong) Ltd. was awarded by Highways Department (HyD) as the Contractor to undertake the construction works of Contract No. HY/2011/03. The Contract is part of the HKLR Project and HKBCF Project, these projects are considered to be “Designated Projects”, under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap 499) and Environmental Impact Assessment (EIA) Reports (Register No. AEIAR-144/2009 and AEIAR-145/2009) were prepared for the Project. The current Environmental Permit (EP) EP-352/2009/D for HKLR and EP-353/2009/K for HKBCF were issued on 22 December 2014 and 11 April 2016, respectively. These documents are available through the EIA Ordinance Register. The construction phase of Contract was commenced on 17 October 2012. [Figure 1.1](#) shows the project site boundary. The works areas are shown in [Appendix N](#).
- 1.1.4 The Contract includes the following key aspects:
- New reclamation along the east coast of the approximately 23 hectares.
  - Tunnel of Scenic Hill (Tunnel SHT) from Scenic Hill to the new reclamation, of approximately 1km in length with three (3) lanes for the east bound carriageway heading to the HKBCF and four (4) lanes for the westbound carriageway heading to the HZMB Main Bridge.
  - An abutment of the viaduct portion of the HKLR at the west portal of Tunnel SHT and associated road works at the west portal of Tunnel SHT.
  - An at grade road on the new reclamation along the east coast of the HKIA to connect with the HKBCF, of approximately 1.6 km along dual 3-lane carriageway with hard shoulder for each bound.
  - Road links between the HKBCF and the HKIA including new roads and the modification of existing roads at the HKIA, involving viaducts, at grade roads and a Tunnel HAT.
  - A highway operation and maintenance area (HMA) located on the new reclamation, south of the Dragonair Headquarters Building, including the construction of buildings, connection roads and other associated facilities.
  - Associated civil, structural, building, geotechnical, marine, environmental protection, landscaping, drainage and sewerage, tunnel and highway electrical and mechanical works, together with the installation of street lightings, traffic aids and sign gantries, water mains and fire hydrants, provision of facilities for installation of traffic control and surveillance system (TCSS), reprovisioning works of affected existing facilities, implementation of transplanting, compensatory planting and protection of existing trees, and implementation of an environmental monitoring and audit (EM&A) program.
- 1.1.5 This is the forty-fourth Monthly EM&A report for the Contract which summarizes the monitoring results and audit findings of the EM&A programme during the reporting period from 1 to 31 May 2016.

- 1.1.6 BMT Asia Pacific Limited has been appointed by the Contractor to implement the EM&A programme for the Contract in accordance with the Updated EM&A Manual for HKLR (Version 1.0) for HKLR and will be providing environmental team services to the Contract. Ramboll Environ Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project. The project organization with regard to the environmental works is as follows.

## 1.2 Project Organisation

- 1.2.1 The project organization structure and lines of communication with respect to the on-site environmental management 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
Supervising Officer's Representative (Ove Arup & Partners Hong Kong Limited)	(Chief Resident Engineer, CRE)	Robert Antony Evans	3968 0801	2109 1882
Environmental Project Office / Independent Environmental Checker (Ramboll Environ Hong Kong Limited)	Environmental Project Office Leader	Y. H. Hui	3465 2888	3465 2899
	Independent Environmental Checker	Antony Wong	3465 2888	3465 2899
Contractor (China State Construction Engineering (Hong Kong) Ltd)	Project Manager	S. Y. Tse	3968 7002	2109 2588
	Environmental Officer	Federick Wong	3968 7117	2109 2588
Environmental Team (BMT Asia Pacific)	Environmental Team Leader	Claudine Lee	2241 9847	2815 3377
24 hours complaint hotline	---	---	5699 5730	---

## 1.3 Construction Programme

- 1.3.1 A copy of the Contractor's construction programme is provided in [Appendix B](#).

## 1.4 Construction Works Undertaken During the Reporting Month

- 1.4.1 A summary of the construction activities undertaken during this reporting month is shown in **Table 1.2**.



**Table 1.2 Construction Activities During Reporting Month**

Description of Activities	Site Area
Dismantling/trimming of temporary 40mm stone platform for construction of seawall	Portion X
Filling works behind stone platform	Portion X
Construction of seawall	Portion X
Loading and unloading of filling materials	Portion X
Pipe piling	Portion X
Construction of box culvert PR14	Portion X
Excavation and lateral support works for Scenic Hill Tunnel (Cut & Cover Tunnel)	Portion X
Construction of tunnel box structure at Scenic Hill Tunnel (Cut & Cover Tunnel)	Portion X
Pipe piling works for Scenic Hill Tunnel (Cut & Cover Tunnel)	Portion X and Y
Excavation for HKBCF to Airport Tunnel	Portion X
Excavation and Lateral Support Works for HKBCF to Airport Tunnel East (Cut & Cover Tunnel)	Portion X
Superstructure works for Scenic Hill Tunnel West Portal Ventilation building	West Portal
Pre-bored works for excavation in Scenic Hill Tunnel (Cut & Cover Tunnel)	Portion X and Y
Works for diversion	Airport Road
Utilities detection	Airport Road/ Airport Express Line/ East Coast Road
Establishment of Site Access	Airport Road/ Airport Express Line/ East Coast Road
Canopy pipe drilling / Box Jacking underneath Airport Express Line	Airport Express Line
Pipe roofing drilling / Mined Tunnel excavation underneath Airport Road	Airport Road
Excavation and Lateral Support Works for HKBCF to Airport Tunnel West (Cut & Cover Tunnel)	Airport Road
Utility culvert excavation	Portion Y
Sub-structure & superstructure works for Highway Operation and Maintenance Area Building	Portion Y
Superstructure works for Scenic Hill Tunnel West Portal Ventilation building	West Portal
Excavation for Scenic Hill Tunnel	West Portal

## 2 Air Quality Monitoring

### 2.1 Monitoring Requirements

- 2.1.1 In accordance with the Contract Specific EM&A Manual, baseline 1-hour and 24-hour TSP levels at two 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 for 1-hr TSP and 24-hr TSP are provided in **Table 2.1** and **Table 2.2**, respectively.

**Table 2.1 Action and Limit Levels for 1-hour TSP**

Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS 5 – Ma Wan Chung Village (Tung Chung)	352	500
AMS 6 – Dragonair / CNAC (Group) Building (HKIA)	360	

**Table 2.2 Action and Limit Levels for 24-hour TSP**

Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS 5 – Ma Wan Chung Village (Tung Chung)	164	260
AMS 6 – Dragonair / CNAC (Group) Building (HKIA)	173	260

### 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 Contract 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 2.3**.

**Table 2.3 Air Quality Monitoring Equipment**

Equipment	Brand and Model
Portable direct reading dust meter (1-hour TSP)	Sibata Digital Dust Monitor (Model No. 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 AMS5 and AMS6 were set up at the proposed locations in accordance with Contract Specific EM&A Manual.
- 2.3.2 [Figure 2.1](#) shows the locations of monitoring stations. **Table 2.4** describes the details of the monitoring stations.

**Table 2.4 Locations of Impact Air Quality Monitoring Stations**

Monitoring Station	Location
AMS5	Ma Wan Chung Village (Tung Chung)
AMS6	Dragonair / CNAC (Group) Building (HKIA)

## 2.4 Monitoring Parameters, Frequency and Duration

2.4.1 **Table 2.5** summarizes the monitoring parameters, frequency and duration of impact TSP monitoring.

**Table 2.5 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) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
  - (iii) A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler was provided.
  - (iv) No furnace or incinerator flues are nearby.
  - (v) Airflow around the sampler was unrestricted.
  - (vi) Permission was obtained to set up the samplers and access to the monitoring stations.
  - (vii) A secured supply of electricity was obtained to operate the samplers.
  - (viii) The sampler was located more than 20 meters from any dripline.
  - (ix) Any wire fence and gate, required to protect the sampler, did not obstruct the monitoring process.
  - (x) 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 aluminium 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 m<sup>3</sup>/min, and complied with the range specified in the Updated EM&A Manual for HKLR (Version 1.0) (i.e. 0.6-1.7 m<sup>3</sup>/min).
  - (x) The programmable digital timer was set for a sampling period of 24 hours, 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 C](#).

#### 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 Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Air Sampler. Calibration certificates of the Laser Dust Monitors are provided in [Appendix C](#).

## 2.6 Monitoring Schedule for the Reporting Month

2.6.1 The schedule for air quality monitoring in May 2016 is provided in [Appendix D](#).

## 2.7 Monitoring Results

2.7.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Tables 2.6** and **2.7** respectively. Detailed impact air quality monitoring results and relevant graphical plots are presented in [Appendix E](#).

**Table 2.6 Summary of 1-hour TSP Monitoring Results During the Reporting Month**

Monitoring Station	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AMS5	116	80 - 222	352	500
AMS6	117	86 - 184	360	500

**Table 2.7 Summary of 24-hour TSP Monitoring Results During the Reporting Month**

Monitoring Station	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
AMS5	39	21 - 60	164	260

AMS6	58	32 - 88	173	260
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- 2.7.2 No Action and Limit Level exceedances of 1-hr TSP and 24-hr TSP were recorded at AMS5 and AMS6 during the reporting month.
- 2.7.3 The event action plan is annexed in [Appendix F](#).
- 2.7.4 The wind data obtained from the on-site weather station during the reporting month is shown in [Appendix G](#).

### 3 Noise Monitoring

#### 3.1 Monitoring Requirements

- 3.1.1 In accordance with the Contract 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 **Table 3.1**.

**Table 3.1 Action and Limit Levels for Noise during Construction Period**

Monitoring Station	Time Period	Action Level	Limit Level
NMS5 – Ma Wan Chung Village (Ma Wan Chung Resident Association) (Tung Chung)	0700-1900 hours on normal weekdays	When one documented complaint is received	75 dB(A)

#### 3.2 Monitoring Equipment

- 3.2.1 Noise monitoring was performed using sound level meters 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 are given in **Table 3.2**.

**Table 3.2 Noise Monitoring Equipment**

Equipment	Brand and Model
Integrated Sound Level Meter	B&K 2238
Acoustic Calibrator	B&K 4231

#### 3.3 Monitoring Locations

- 3.3.1 Monitoring location NMS5 was set up at the proposed locations in accordance with Contract Specific EM&A Manual.
- 3.3.2 [Figure 2.1](#) shows the locations of monitoring stations. **Table 3.3** describes the details of the monitoring stations.

**Table 3.3 Locations of Impact Noise Monitoring Stations**

Monitoring Station	Location
NMS5	Ma Wan Chung Village (Ma Wan Chung Resident Association) (Tung Chung)

## 3.4 Monitoring Parameters, Frequency and Duration

3.4.1 **Table 3.4** summarizes the monitoring parameters, frequency and duration of impact noise monitoring.

**Table 3.4 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 podium for free-field measurements at NMS5. A correction of +3 dB(A) shall be made to the free field measurements.
- (b) The battery condition was checked to ensure the correct functioning of the meter.
- (c) 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
- (d) Prior to and after each noise measurement, the meter was calibrated using the acoustic calibrator for 94.0 dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- (e) 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.
- (f) 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.
- (g) 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 C](#).

### 3.6 Monitoring Schedule for the Reporting Month

- 3.6.1 The schedule for construction noise monitoring in May 2016 is provided in [Appendix D](#).



### 3.7 Monitoring Results

- 3.7.1 The monitoring results for construction noise are summarized in **Table 3.5** and the monitoring results and relevant graphical plots are provided in [Appendix E](#).

**Table 3.5 Summary of Construction Noise Monitoring Results During the Reporting Month**

Monitoring Station	Average $L_{eq}$ (30 mins), dB(A)	Range of $L_{eq}$ (30 mins), dB(A)	Limit Level $L_{eq}$ (30 mins), dB(A)
NMS5	62	58 – 67	75

\*A correction factor of +3dB(A) from free field to facade measurement was included.

- 3.7.2 There were no Action and Limit Level exceedances for noise during daytime on normal weekdays of the reporting month.
- 3.7.3 Major noise sources during the noise monitoring included construction activities of the Contract, nearby traffic and insect noise.
- 3.7.4 The event action plan is annexed in [Appendix F](#).

## 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 is detected, and that timely action is taken to rectify the situation. For impact water quality monitoring, measurements were taken in accordance with the Contract Specific EM&A Manual. **Table 4.1** shows the established Action/Limit Levels for the environmental monitoring works. The ET proposed to amend the Action Level and Limit Level for turbidity and suspended solid and EPD approved ET's proposal on 25 March 2013. Therefore, Action Level and Limit Level for the Contract have been changed since 25 March 2013.

4.1.2 The original and revised Action Level and Limit Level for turbidity and suspended solid are shown in **Table 4.1**.

**Table 4.1 Action and Limit Levels for Water Quality**

Parameter (unit)	Water Depth	Action Level	Limit Level
Dissolved Oxygen (mg/L) (surface, middle and bottom)	Surface and Middle	5.0	4.2 except 5 for Fish Culture Zone
	Bottom	4.7	3.6
Turbidity (NTU)	Depth average	27.5 or 120% of upstream control station's turbidity at the same tide of the same day;  The action level has been amended to "27.5 <b>and</b> 120% of upstream control station's turbidity at the same tide of the same day" since 25 March 2013.	47.0 or 130% of turbidity at the upstream control station at the same tide of same day;  The limit level has been amended to "47.0 <b>and</b> 130% of turbidity at the upstream control station at the same tide of same day" since 25 March 2013.
Suspended Solid (SS) (mg/L)	Depth average	23.5 or 120% of upstream control station's SS at the same tide of the same day;  The action level has been amended to "23.5 <b>and</b> 120% of upstream control station's SS at the same tide of the same day" since 25 March 2013.	34.4 or 130% of SS at the upstream control station at the same tide of same day and 10mg/L for Water Services Department Seawater Intakes;  The limit level has been amended to "34.4 <b>and</b> 130% of SS at the upstream control station at the same tide of same day and 10mg/L for Water Services Department Seawater Intakes" since 25 March 2013

Notes:

- (1) Depth-averaged is calculated by taking the arithmetic means of reading of all three depths.
- (2) For DO, non-compliance of the water quality limit occurs when monitoring result is lower than the limit.
- (3) For SS & turbidity non-compliance of the water quality limits occur when monitoring result is higher than the limits.
- (4) The change to the Action and limit Levels for Water Quality Monitoring for the EM&A works was approved by EPD on 25 March 2013.

## 4.2 Monitoring Equipment

4.2.1 **Table 4.2** summarises the equipment used in the impact water quality monitoring programme.

**Table 4.2 Water Quality Monitoring Equipment**

Equipment	Brand and Model
DO and Temperature Meter, Salinity Meter, Turbidimeter and pH Meter	YSI Model 6820 V2-M, 650
Positioning Equipment	DGPS – KODEN : KGP913MkII, KBG3
Water Depth Detector	Layin Associates: SM-5 & SM5A
Water Sampler	Wildlife Supply Company : 5487-10

## 4.3 Monitoring Parameters, Frequency and Duration

4.3.1 **Table 4.3** summarises the monitoring parameters, frequency and monitoring depths of impact water quality monitoring as required in the Contract Specific EM&A Manual.

**Table 4.3 Impact Water Quality Monitoring Parameters and Frequency**

Monitoring Stations	Parameter, unit	Frequency	No. of depth
Impact Stations: IS5, IS(Mf)6, IS7, IS8, IS(Mf)9 & IS10,  Control/Far Field Stations: CS2 & CS(Mf)5,  Sensitive Receiver Stations: SR3, SR4, SR5, SR10A & SR10B	<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>	Three times per week during mid-ebb and mid-flood tides (within $\pm 1.75$ hour of the predicted time)	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).

## 4.4 Monitoring Locations

4.4.1 In accordance with the Contract Specific EM&A Manual, thirteen stations (6 Impact Stations, 5 Sensitive Receiver Stations and 2 Control Stations) were designated for impact water quality monitoring. The six Impact Stations (IS) were chosen on the basis of their proximity to the reclamation and thus the greatest potential for water quality impacts, the five Sensitive Receiver Stations (SR) were chosen as they are close to the key sensitive receives and the two Control 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 The locations of these monitoring stations are summarized in **Table 4.4** and shown in [Figure 2.1](#).

**Table 4.4 Impact Water Quality Monitoring Stations**

Monitoring Stations	Description	Coordinates	
		Easting	Northing
IS5	Impact Station (Close to HKLR construction site)	811579	817106
IS(Mf)6	Impact Station (Close to HKLR 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
SR3	Sensitive receivers (San Tau SSSI)	810525	816456
SR4	Sensitive receivers (Tai Ho Inlet)	814760	817867
SR5	Sensitive receivers (Artificial Reef In NE Airport)	811489	820455
SR10A	Sensitive receivers (Ma Wan Fish Culture Zone)	823741	823495
SR10B	Sensitive receivers (Ma Wan Fish Culture Zone)	823686	823213
CS2	Control Station (Mid-Ebb)	805849	818780
CS(Mf)5	Control Station (Mid-Flood)	817990	821129

## 4.5 Monitoring Methodology

### 4.5.1 Instrumentation

- (a) The in-situ water quality parameters including dissolved oxygen, temperature, salinity and turbidity, pH were measured by multi-parameter meters.

### 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.

- (f) The analysis method and detection limit for SS is shown in **Table 4.5**.

**Table 4.5 Laboratory Analysis for Suspended Solids**

Parameters	Instrumentation	Analytical Method	Detection Limit
Suspended Solid (SS)	Weighting	APHA 2540-D	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 Calibrations

- (a) All in situ monitoring instruments would be calibrated by ALS Technichem (HK) Pty Ltd. before use and at 3-monthly intervals throughout all stages of the water quality monitoring programme. The procedures of performance check of sonde and testing results are provided in [Appendix C](#).

### 4.6 Monitoring Schedule for the Reporting Month

- 4.6.1 The schedule for impact water quality monitoring in May 2016 is provided in [Appendix D](#).

### 4.7 Monitoring Results

- 4.7.1 Impact water quality monitoring was conducted at all designated monitoring stations during the reporting month. Impact water quality monitoring results and relevant graphical plots are provided in [Appendix E](#).
- 4.7.2 For marine water quality monitoring, no Action Level and Limit Level exceedances of turbidity level, dissolved oxygen level and suspended solid level were recorded during the reporting month.
- 4.7.3 Water quality impact sources during water quality monitoring were the construction activities of the Contract, nearby construction activities by other parties and nearby operating vessels by other parties.
- 4.7.4 The event action plan is annexed in [Appendix F](#).

## 5 Dolphin Monitoring

### 5.1 Monitoring Requirements

- 5.1.1 Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins.
- 5.1.2 The Action Level and Limit Level for dolphin monitoring are shown in **Table 5.1**.

**Table 5.1 Action and Limit Levels for Dolphin Monitoring**

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 4.2 & ANI < 15.5	STG < 6.9 & ANI < 31.3
Limit Level	(STG < 2.4 & ANI < 8.9) and (STG < 3.9 & ANI < 17.9)	

Remarks:

1. STG means quarterly encounter rate of number of dolphin sightings.
  2. ANI means quarterly encounter rate of total number of dolphins.
  3. For North Lantau Social Cluster, AL will be trigger if either NEL **or** NWL fall below the criteria; LL will be triggered if both NEL **and** NWL fall below the criteria.
- 5.1.3 The revised Event and Action Plan for dolphin Monitoring was approved by EPD in 6 May 2013. The revised Event and Action Plan is annexed in [Appendix F](#).

### 5.2 Monitoring Methodology

#### Vessel-based Line-transect Survey

- 5.2.1 According to the requirements of the Updated EM&A Manual for HKLR (Version 1.0), dolphin monitoring programme should cover all transect lines in NEL and NWL survey areas (see **Figure 1 of Appendix H**) twice per month. The co-ordinates of all transect lines are shown in **Table 5.2**. The coordinates of several starting points have been revised due to the obstruction of the permanent structures associated with the construction works of HKLR and the southern viaduct of TM-CLKL, as well as provision of adequate buffer distance from the Airport Restricted Areas. The EPD issued a memo and confirmed that they had no objection on the revised transect lines on 19 August 2015, and the revised coordinates are in red and marked with an asterisk in **Table 5.2**.

**Table 5.2 Co-ordinates of Transect Lines**

Line No.	Easting	Northing		Line No.	Easting	Northing	
1	Start Point	804671	815456*	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815913*	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671

Line No.	Easting	Northing	Line No.	Easting	Northing		
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820880*	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123*	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303*	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853*	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

Note:

Co-ordinates in red and marked with asterisk are revised co-ordinates of transect line.

- 5.2.2 The survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 18 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2015). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 5.2.3 Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 Fujinon marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 5.2.4 During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance travelled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 5.2.5 Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 5.2.6 When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.
- 5.2.7 Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in **Figure 1 of Appendix H**) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines was labeled

as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected along primary and secondary lines were similar in NEL and NWL survey areas. Therefore, both primary and secondary survey effort were presented as on-effort survey effort in this report.

- 5.2.8 Encounter rates of Chinese White Dolphins (number of on-effort sightings per 100 km of survey effort and number of dolphins from all on-effort sightings per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using primary survey effort alone, as well as the combined survey effort from both primary and secondary lines.

#### Photo-identification Work

- 5.2.9 When a group of Chinese White Dolphins were sighted during the line-transect survey, the survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 5.2.10 A professional digital cameras (Canon EOS 7D and 60D models), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 5.2.11 All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 5.2.12 Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 5.2.13 All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database. Detailed information on all identified individuals will be further presented as an appendix in quarterly EM&A reports.

### 5.3 Monitoring Results

#### Vessel-based Line-transect Survey

- 5.3.1 During the month of May 2016, two sets of systematic line-transect vessel surveys were conducted on 3<sup>rd</sup>, 12<sup>th</sup>, 17<sup>th</sup> and 26<sup>th</sup> to cover all transect lines in NWL and NEL survey areas twice. The survey routes of each survey day are presented in **Figures 2 to 5 of Appendix H**.
- 5.3.2 From these surveys, a total of 300.96 km of survey effort was collected, with 99.7% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (**Annex I of Appendix H**). Among the two areas, 115.56 km and 185.40 km of survey effort were collected from NEL and NWL survey areas respectively. Moreover, the total survey effort conducted on primary lines was 217.80 km, while the effort on secondary lines was 83.16 km.
- 5.3.3 During the two sets of monitoring surveys in May 2016, no Chinese White Dolphins were sighted. In fact, this is the second monitoring month during HKLR03 construction that no dolphin was sighted in North Lantau waters (note: the previous one was in May 2015).



- 5.3.4 During the May's surveys, encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) are shown in **Table 5.3** and **Table 5.4**.

**Table 5.3 Individual Survey Event Encounter Rates**

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1: May 3 <sup>rd</sup> / 12 <sup>th</sup>	0.0	0.0
	Set 2: May 17 <sup>th</sup> / 26 <sup>th</sup>	0.0	0.0
NWL	Set 1: May 3 <sup>rd</sup> / 12 <sup>th</sup>	0.0	0.0
	Set 2: May 17 <sup>th</sup> / 26 <sup>th</sup>	0.0	0.0

Remarks:

- Dolphin Encounter Rates Deduced from the Two Sets of Surveys (Two Surveys in Each Set) in May 2016 in Northeast (NEL) and Northwest Lantau (NWL).

**Table 5.4 Monthly Average Encounter Rates**

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	Primary Lines Only	Both Primary and Secondary Lines	Primary Lines Only	Both Primary and Secondary Lines
Northeast Lantau	0.0	0.0	0.0	0.0
Northwest Lantau	0.0	0.0	0.0	0.0

Remarks:

- Monthly Average Dolphin Encounter Rates (Sightings Per 100 km of Survey Effort) from All Four Surveys Conducted in May 2016 on Primary Lines only as well as Both Primary Lines and Secondary Lines in Northeast (NEL) and Northwest Lantau (NWL).

## Conclusion

- 5.3.5 During this month of dolphin monitoring, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations.
- 5.3.6 Due to monthly variation in dolphin occurrence within the study area, it would be more appropriate to draw conclusion on whether any impacts on dolphins have been detected related to the construction activities of this project in the quarterly EM&A report, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period (March – May 2016) and baseline monitoring period (3-month period) will be made.

## 5.4 Reference

- 5.4.1 Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.
- 5.4.2 Hung, S. K. 2015. Monitoring of Marine Mammals in Hong Kong waters: final report (2014-15). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department, 198 pp.

- 5.4.3 Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

## 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. During the reporting month, five site inspections were carried out on 4, 11, 18 and 27 May 2016.

6.1.2 A summary of observations found during the site inspections and the follow up actions taken by the Contractor are described in **Table 6.1**.

**Table 6.1 Summary of Environmental Site Inspections**

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
6 Apr 2016	1. General refuse was accumulated at N26.	1. General refuse at N26 was removed.	4 May 2016
29 Apr 2016	1. Misaligned silt curtains were observed at Portion X. 2. Gaps were observed at the silt curtains at Portion X.	1. The silt curtain was maintained properly. 2. The silt curtain was maintained properly.	18 May 2016
	3. An abandoned blue hose was observed at PR10. 4. An abandoned discharge pipe was observed at PR10. 5. Stagnant water was observed along the haul road at S11. 6. The design of wheel washing bay was not appropriate at S9. 7. No chemical label for chemical containers was observed at S11. 8. Water pits were observed at S11. 9. Construction materials were stacked under the trees at S9. 10. No proper container was provided for chemicals at S11.	3. The abandoned blue hose at PR10 was removed on site. 4. The abandoned discharge pipe at PR10 was blocked to prevent surface runoff to adjacent water body. 5. The stagnant water at haul road of S11 was removed and the road surface was levelled to avoid accumulation of water. 6. A water hose for wheel washing was provided at the exit of S9. 7. Chemical labels were provided for the chemical containers at S11. 8. The water pits at S11 were removed. 9. The construction materials stacked under the trees at S9 were removed. 10. The chemicals at S11 were removed.	4 May 2016
4 May 2016	1. Stagnant water and oil were found inside a drip tray at A2. 2. Accumulation of refuse was observed at S8.* 3. Accumulation of refuse was observed at S15. 4. Accumulation of refuse was observed at S25. 5. Accumulation of refuse was observed at N1. 6. Stagnant water was found inside a drip tray provided for a generator at HMA.* 7. Stagnant water was found inside a H-beam at S8. 8. A stockpile of sand and a stockpile of over 20 bags of cement were not	1. The drip tray at A2 was removed. 2. The Contractor was reminded to remove the accumulated waste at S8. 3. The accumulation refuse at S15 was removed. 4. The accumulation refuse at S25 was removed. 5. The accumulation refuse at N1 was removed. 6. The Contractor was reminded to remove the stagnant water inside the drip tray at HMA. 7. The stagnant water inside the H-beam at S8 was removed. 8. The stockpile of sand and the stockpile of over 20 bags of cement at A2 bridge of N20 were covered with impervious	All observations were closed on 18 May 2016 except the outstanding observations (Items 2 and 6).

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
	covered with impervious sheeting at A2 bridge of N20.	sheeting.	
11 May 2016	<ol style="list-style-type: none"> <li>1. Accumulation of refuse was observed at HMA.</li> <li>2. Accumulation of refuse was observed at S23.</li> <li>3. Accumulation of refuse was observed at S25.</li> <li>4. Stagnant water was observed at S8.</li> <li>5. Stagnant water was observed at S23.</li> <li>6. Wastewater treatment facility was not in operation at S23. There was no wastewater discharge during the site inspection. However, the treated waste water at the outlet of the treatment facility was silty.</li> <li>7. No marking was provided for the discharge pipes to indicate the source at S23.</li> <li>8. The mechanical cover of dump truck was not closed at S11 during transportation of fill material.</li> </ol>	<ol style="list-style-type: none"> <li>1. The accumulated refuse at HMA was removed.</li> <li>2. The accumulated refuse at S23 was removed.</li> <li>3. The accumulated refuse at S25 was removed.</li> <li>4. The stagnant water at S8 was removed.</li> <li>5. The stagnant water at S23 was removed.</li> <li>6. The waste water treatment facility at S23 was maintained and operated properly.</li> <li>7. The disused discharge pipes at S23 were removed and the source of the discharge was marked on the remaining discharge pipes.</li> <li>8. The mechanical cover of dump truck was closed at S11 during transportation of fill material.</li> </ol>	18 May 2016
18 May 2016	<ol style="list-style-type: none"> <li>1. No drip tray was provided for chemical drums at S7.*</li> <li>2. Accumulation of refuse was observed at HMA.</li> <li>3. Leakage from waste water treatment facility was observed at N26.</li> <li>4. A stockpile of dusty fill material at N30 was not covered with impervious sheeting.</li> <li>5. Rubbish was found on the gully at N30.</li> <li>6. Stagnant water was observed at S11.</li> <li>7. Accumulation of refuse was observed at S16.*</li> <li>8. Generation of fugitive dust was observed at S16 during pipe piling.</li> <li>9. Accumulation of refuse was observed at S25.</li> <li>10. No adequate wheel washing facility was provided at N30.</li> <li>11. Stagnant water was observed inside H beams at C&amp;C.</li> </ol>	<ol style="list-style-type: none"> <li>1. The Contractor was reminded to provide drip trays for chemical drums at S7.</li> <li>2. The accumulated refuse at HMA was removed.</li> <li>3. The waste water treatment facility was maintained and the leakage was stopped from the waste water treatment facility.</li> <li>4. The stockpile of dusty fill material at N30 was removed.</li> <li>5. Sand bags were placed around the gully at N30.</li> <li>6. The stagnant water at S11 was removed.</li> <li>7. The Contractor was reminded to remove the accumulated refuse at S16.</li> <li>8. The dust screen of the drilling rig was utilized during the drilling activities to prevent fugitive dust emission.</li> <li>9. The accumulated refuse at S25 was removed.</li> <li>10. An adequate wheel washing facility was provided at N30.</li> <li>11. The stagnant water inside H beams at C&amp;C was removed.</li> </ol>	All observations were closed on 27 May 2016 except the outstanding observations (Items 1 and 7).

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
27 May 2016	<ol style="list-style-type: none"> <li>1. Gap of silt curtains were observed at Portion X.</li> <li>2. Accumulated waste was observed at Western Portal.</li> <li>3. No drip tray was provided for chemical containers at Western Portal.</li> <li>4. Stagnant water was observed at Western Portal.</li> <li>5. Stagnant water inside the drip tray and no chemical label for chemical containers was observed at Western Portal.</li> <li>6. Chemicals leakage was observed at Western Portal.</li> <li>7. Rubbish was observed at Western Portal.</li> </ol>	<p>The Contractor was recommended to:</p> <ol style="list-style-type: none"> <li>1. maintain the silt curtain properly at Portion X.</li> <li>2. remove the accumulated waste at Western Portal.</li> <li>3. provide a drip tray for the chemical containers at Western Portal.</li> <li>4. remove the stagnant water at Western Portal.</li> <li>5. remove the stagnant water and proper chemical labels should be provided for all chemical containers at Western Portal.</li> <li>6. remove the leakage and proper maintain the machinery at Western Portal.</li> <li>7. remove the rubbish at Western Portal.</li> </ol>	<p>Follow-up actions for the observations issued for the last weekly site inspection of the reporting month will be inspected during the next site inspections.</p>

Notes:

\* Outstanding observations.

6.1.3 The Contractor has rectified most of the observations as identified during environmental site inspections within the reporting month. Follow-up actions for outstanding observations will be inspected during the next site inspections.

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

6.2.1 The Contractor registered as a chemical waste producer for the Project. Sufficient numbers of receptacles were available for general refuse collection and sorting.

6.2.2 Monthly summary of waste flow table is detailed in [Appendix I](#).

6.2.3 The Contractor was 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 Practice on the Packaging, Labelling and Storage of Chemical Wastes.

## 6.3 Environmental Licenses and Permits

6.3.1 The valid environmental licenses and permits during the reporting month are summarized in [Appendix K](#).

## 6.4 Implementation Status of Environmental Mitigation Measures

6.4.1 In response to the site audit findings, the Contractors have rectified most of the observations as identified during environmental site inspections during the reporting month. Follow-up actions for outstanding observations will be inspected during the next site inspections.

6.4.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in [Appendix L](#). 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 Dolphin Watching Plan was implemented during the reporting month. No dolphins inside the silt curtain were observed. The relevant records were kept properly.

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

- 6.5.1 No Action and Limit Level exceedances of 1-hr TSP and 24-hr TSP were recorded at AMS5 and AMS6 during the reporting month.
- 6.5.2 For construction noise, no Action and Limit Level exceedances were recorded at the monitoring station during the reporting month.
- 6.5.3 For marine water quality monitoring, no Action Level and Limit Level exceedances of turbidity level, dissolved oxygen level and suspended solid level were recorded during the reporting month.

## 6.6 Summary of Complaints, Notification of Summons and Successful Prosecution

- 6.6.1 There were no complaints received during the reporting month. The details of cumulative statistics of Environmental Complaints are provided in [Appendix J](#).
- 6.6.2 No notification of summons and prosecution was received during the reporting period.
- 6.6.3 Statistics on 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 construction activities for June 2016 are summarized in **Table 7.1**.

**Table 7.1 Construction Activities for June 2016**

Site Area	Description of Activities
Portion X	Dismantling/Trimming of Temporary 40mm Stone Platform for Construction of Seawall
Portion X	Filling Works behind Stone Platform
Portion X	Construction of Seawall
Portion X	Loading and Unloading of Filling Materials
Portion X	Pipe Piling
Portion X	Construction of box culvert PR14
Portion X	Excavation and Lateral Support Works at Scenic Hill Tunnel (Cut & Cover Tunnel)
Portion X	Construction of Tunnel Box Structure at Scenic Hill Tunnel (Cut & Cover Tunnel)
Portion X and Y	Pipe piling works for Scenic Hill Tunnel (Cut & Cover Tunnel)
Portion X and Y	Pre-bored works for excavation in Scenic Hill Tunnel (Cut & Cover Tunnel)
Portion X	Excavation Works for HKBCF to Airport Tunnel
Portion X	Excavation and Lateral Support Works for HKBCF to Airport Tunnel East (Cut & Cover Tunnel)
Airport Road	Works for Diversion of Airport Road
Airport Road / Airport Express Line/East Coast Road	Utilities Detection
Airport Road / Airport Express Line/East Coast Road	Establishment of Site Access
Airport Road/Airport Express Line	Pipe Roofing Drilling/ Mined Tunnel Excavation/ Box Jacking underneath Airport Road and Airport Express Line
Airport Road	Excavation and Lateral Support Works for HKBCF to Airport Tunnel West (Cut & Cover Tunnel)
Portion Y	Utility Culvert Excavation
Portion Y	Sub-structure & superstructure works for Highway Operation and Maintenance Area Building
West Portal	Excavation for Scenic Hill Tunnel
West Portal	Superstructure works for Scenic Hill Tunnel West Portal Ventilation building

## 7.2 Environmental Monitoring Schedule for the Coming Month

7.2.1 The tentative schedule for environmental monitoring in June 2016 is provided in [Appendix D](#).



## 8 Conclusions

### 8.1 Conclusions

- 8.1.1 The construction phase and EM&A programme of the Contract commenced on 17 October 2012. This is the forty-fourth Monthly EM&A report for the Contract which summarizes the monitoring results and audit findings of the EM&A programme during the reporting period from 1 to 31 May 2016.

#### **Air Quality**

- 8.1.2 No Action and Limit Level exceedances of 1-hr TSP and 24-hr TSP were recorded at AMS5 and AMS6 during the reporting month.

#### **Noise**

- 8.1.3 For construction noise, no Action and Limit Level exceedances were recorded at the monitoring station during the reporting month.

#### **Water Quality**

- 8.1.4 For marine water quality monitoring, no Action Level and Limit Level exceedances of turbidity level, dissolved oxygen level and suspended solid level were recorded during the reporting month.

#### **Dolphin**

- 8.1.5 During the May's surveys of the Chinese White Dolphin, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations.
- 8.1.6 Due to monthly variation in dolphin occurrence within the study area, it would be more appropriate to draw conclusion on whether any impacts on dolphins have been detected related to the construction activities of this project in the quarterly EM&A report, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period (March – May 2016) and baseline monitoring period (3-month period) will be made.

#### **Environmental Site Inspection and Audit**

- 8.1.7 Environmental site inspection was carried out on 4, 11, 18 and 27 May 2016. Recommendations on remedial actions were given to the Contractors for the deficiencies identified during the site inspections.
- 8.1.8 There were no complaints received in relation to the environmental impact during the reporting period.
- 8.1.9 No notification of summons and prosecution was received during the reporting period.