MOTT MACDONALD

Expansion of Hong Kong International Airport into a Three-Runway System

Construction Phase Quarterly EM&A Report No.4 (1 October to 31 December 2016)

February 2017

Airport Authority Hong Kong

20/F AIA Kowloon Tower
Landmark East
100 How Ming Street
Kwun Tong
Kowloon
Hong Kong

T +852 2828 5757
F +852 2827 1823
mottmac.hk

Expansion of Hong Kong International Airport into a Three-Runway System

Construction Phase Quarterly EM&A Report No.4 (1 October to 31 December 2016)

February 2017

Airport Authority Hong Kong

This Construction Phase Quarterly EM&A Report No. 4 has been reviewed and certified by

the Environmental Team Leader (ETL) in accordance with

Section 15.4 of the Updated EM&A Manual

Certified by: 

Terence Kong
Environmental Team Leader (ETL)
Mott MacDonald Hong Kong Limited

Date 9 February 2017

AECOM
8/F, Grand Central Plaza, Tower 2,
138 Shatin Rural Committee Road,
Shatin, Hong Kong
香港新界沙田鄉事會路 138 號新城
市中央廣場第 2 座 8 樓
www.aecom.com

+852 3922 9000 tel
+852 2317 7609 fax

Our Ref : 60440482/C/JCHL170210

By Email

Airport Authority Hong Kong
HKIA Tower, 1 Sky Plaza Road
Hong Kong International Airport
Lantau, Hong Kong

Attn: Mr. Lawrence Tsui, Senior Manager

10 February 2017

Dear Sir,

Contract No. 3102
3RS Independent Environmental Checker Consultancy Services

Quarterly EM&A Report No.4 (For 1 October 2016 to 31 December 2016)

Reference is made to the Environmental Team's submission of Quarterly EM&A Report No.4 (For 1 October 2016 to 31 December 2016) under Condition 15.4 of the Environmental Permit No. EP-489/2014 certified by the ET Leader on 9 February 2017.

We would like to inform you that we have no adverse comment on the captioned submission. Therefore we write to verify the captioned submission.

Should you have any query, please feel free to contact our Isabella Yeung at 3922 9348 or the undersigned at 3922 9376.

Yours faithfully,
AECOM Asia Co. Ltd.

Jackel Law
Independent Environmental Checker

Contents

Tables

Figures

Appendices

Executive Summary

The "Expansion of Hong Kong International Airport into a Three-Runway System" (the Project) serves to meet the future air traffic demands at Hong Kong International Airport (HKIA). On 7 November 2014, the Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) for the Project was approved and an Environmental Permit (EP) (Permit No.: EP-489/2014) was issued for the construction and operation of the Project.

Airport Authority Hong Kong (AAHK) commissioned Mott MacDonald Hong Kong Limited (MMHK) to undertake the role of Environmental Team (ET) for carrying out the Environmental Monitoring & Audit (EM&A) works during the construction phase of the Project in accordance with the Updated EM&A Manual.

This is the 4th Construction Phase Quarterly EM&A Report for the Project which summarizes the monitoring results and audit findings of the EM&A programme during the reporting period from 1 October 2016 to 31 December 2016.

Key Activities in the Reporting Period

Key activities of the Project carried out in the reporting period were related to the following contracts:

Advanced Works:

Contract P560 (R) Aviation Fuel Pipeline Diversion Works

- Horizontal Directional Drilling (HDD) work at launching site and Sheung Sha Chau;
- Stockpiling of excavated materials from HDD operation at stockpiling area;
- Site preparation works and construction of containment pit on Sheung Sha Chau Island; and
- Casing installation and pipeline supporting works on Sheung Sha Chau Island.

Reclamation Works:

Contracts 3201 to 3205 Deep Cement Mixing (DCM) Works

- Laying of geotextile and sand blanket; and
- DCM trial works.

Other Works:

Contract 3213 CLP Cable Diversion Enabling Works

- Installation of silt curtain;
- Excavation works and removal of armour rock at the western part of the airport;
- Construction of drawpit; and
- Installation of cable trough, backfilling, and reinstatement of armour rock.

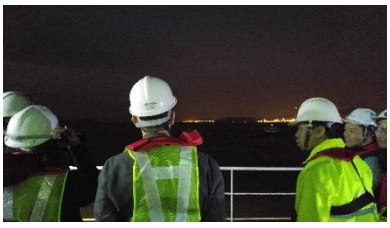
EM&A Activities Conducted in the Reporting Period

The EM&A programme was undertaken in accordance with the Updated EM&A Manual of the Project. A summary of the monitoring and audit activities during this reporting period is presented as below:

Monitoring/ Audit Activities	Number of Sessions
1-hour Total Suspended Particulates (TSP) Air Quality Monitoring	96
Noise Monitoring	65
Water Monitoring	39
Ecological Monitoring	3
Vessel line-transect surveys for Chinese White Dolphin (CWD) monitoring	6
Land-based theodolite tracking survey effort for CWD monitoring	15

Dolphin Observers Training

Ecological Monitoring



Night Vision Device Testing for Dolphin Exclusion Zone Monitoring

In total, 2,543 ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. All the High Speed Ferries (HSFs) had travelled through the Speed Control Zone (SCZ) with average speeds within 15 knots, which complied with the SkyPier Plan, except one HSF travelled at an average speed of 16.4 knots as the captain had to give way to an approaching vessel to ensure safety. Nine ferry movements had minor deviations from the diverted route during the reporting period and all of them are related to public safety / emergency situations. In November, one ferry did not travel through the diverted route as the concerned captain decided to bypass the SCZ due to passenger misbehaviour incident happened during passenger loading at SkyPier. After the incident, the concerned captain has been instructed to follow the requirements of the Marine Travel Routes and Management Plan for HSFs of SkyPier (the SkyPier Plan).

Between October and December 2016, ET has conducted weekly audit of relevant information to ensure the contractors have provided sufficient information to the Marine Traffic Control Center (MTCC) and the contractors are fully complied with the requirements of the Marine Travel Routes and Management Plan for Construction and Associated Vessel (MTRMP-CAV). A total of 14 skipper training workshops have been held by ET between October to December 2016 with concerned captains of construction vessels associated with 3RS contracts. Another 16 skipper training workshops have been held by contractors' Environmental Officers (EO) and competency test had been conducted subsequently with the trained captains by ET.

On the implementation of Marine Mammal Watching Plan, silt curtains were in place by the contractor of CLP cable diversion enabling works as well as the DCM contractors for sand blanket laying works and dolphin observers were deployed in accordance with the Plan. On the implementation of Dolphin Exclusion Zone (DEZ) Plan, DCM trials associated dolphin observers were deployed by contractors for continuous monitoring of the DEZ for DCM works in accordance with the DEZ Plan. Trainings for the dolphin observers were provided by the ET prior to the aforementioned works, with the training records kept by the ET. Testing on night vision devices for DEZ monitoring was also conducted before the DCM trials. From the contractors' daily observation records and DEZ monitoring log records, no dolphin or other marine mammals were observed within or around the DEZ and silt curtains during this reporting quarter.

Review of Environmental Quality Performance Limits (Action and Limit levels)

For water quality, the monitoring results for dissolved oxygen (DO), total alkalinity, and chromium obtained during the reporting period were in compliance with their corresponding Action and Limit Levels. For turbidity, suspended solids (SS) and nickel, some of the testing results had exceeded the relevant Action or Limit Levels during the reporting period. Actions had been taken according to the Event and Action Plan of the EM&A Manual. Investigations were carried out immediately for each of the exceedance cases, and the investigation findings concluded that all the exceedances were not due to the Project.

No breach of the Action or Limit Levels in relation to the construction dust, noise, waste and CWD monitoring were recorded during the reporting period.

Implementation Status and Review of Environmental Mitigation Measures

Weekly site audits were carried out during the reporting period to confirm the implementation measures undertaken by the Contractors. Environmental issues related to the construction activities, including air quality, noise, waste, CWD, ecology and landscape & visual were monitored and/or reviewed.

The recommended environmental mitigation measures, as included in the EM&A programme, were implemented properly in the reporting period. The EM&A programme effectively monitored the construction activities and ensure the proper implementation of mitigation measures.

Summary Findings of the EM&A Programme

The following table summarizes the key findings of the EM&A programme during the reporting period:

	Yes	No	Details	Analysis / Recommendation / Remedial Actions
Breaches of Limit Level^		✓	No project-related limit level exceedance was recorded.	Nil
Breaches of Action Level^		✓	No project-related action level exceedance was recorded.	Nil
Complaints Received	✓		A complaint on night time work at Sheung Sha Chau was received on 29 Dec 2016.	The complaint is currently under investigation in accordance with the Complaint Management Plan
Notification of any summons and status of prosecutions		✓	Neither notifications of summons nor prosecution were received.	Nil
Changes that affect the EM&A	✓		The Baseline Water Quality Monitoring Report was updated on 12 December 2016. There were no changes to the construction works that may affect the EM&A.	Nil

Remarks: ^ only exceedance of action/ limit level related to Project works will be highlighted.

1 Introduction

1.1 Background

On 7 November 2014, the Environmental Impact Assessment (EIA) Report (Register No.: AEIAR-185/2014) for the "Expansion of Hong Kong International Airport into a Three-Runway System" (the Project) was approved and an Environmental Permit (EP) (Permit No.: EP-489/2014) was issued for the construction and operation of the Project.

Airport Authority Hong Kong (AAHK) commissioned Mott MacDonald Hong Kong Limited (MMHK) to undertake the role of Environmental Team (ET) for carrying out the Environmental Monitoring & Audit (EM&A) works during the construction phase of the Project in accordance with the Updated EM&A Manual (the Manual) submitted under EP Condition 3.1. The Manual is available on the Project's dedicated website (accessible at: http://env.threerunwaysystem.com/en/index.html). AECOM Asia Company Limited (AECOM) was employed by AAHK as the Independent Environmental Checker (IEC) for the Project.

The Project covers the expansion of the existing airport into a three-runway system (3RS) with key project components comprising land formation of about 650 ha and all associated facilities and infrastructure including taxiways, aprons, aircraft stands, a passenger concourse, an expanded Terminal 2, all related airside and landside works and associated ancillary and supporting facilities. The existing submarine aviation fuel pipelines and submarine power cables also require diversion as part of the works.

Construction of the Project is to proceed in the general order of diversion of the submarine aviation fuel pipelines, diversion of the submarine power cables, land formation, and construction of infrastructure, followed by construction of superstructures.

The updated overall phasing programme of all construction works was presented in Appendix A of the Construction Phase Monthly EM&A Report No. 7. Contract information is presented in **Appendix A**.

1.2 Scope of this Report

This is the 4th Construction Phase Quarterly EM&A Report for the Project which summarizes the key findings of the EM&A programme during the reporting period from 1 October 2016 to 31 December 2016.

1.3 Project Organisation

The Project's organisation structure and the contact details of the key personnel are provided in **Appendix B** and **Table 1.1** respectively.

Table 1.1: Contact Information of Key Personnel

Party	Position	Name	Telephone
Project Manager's Representative (Airport Authority Hong Kong)	Senior Manager, Environment	Lawrence Tsui	2183 2734
Environmental Team (ET)	Environmental Team Leader	Terence Kong	2828 5919

Party	Position	Name	Telephone
(Mott MacDonald Hong Kong Limited)			
	Deputy Environmental Team Leader	Heidi Yu	2828 5704
	Deputy Environmental Team Leader	Keith Chau	2972 1721
Independent Environmental Checker (IEC) (AECOM Asia Company Limited)	Independent Environmental Checker	Jackel Law	3922 9376
	Deputy Independent Environmental Checker	Joanne Tsoi	3922 9423
Advanced Works:			
Contract P560(R) Aviation Fuel Pipeline Diversion Works (Langfang Huayuan Mechanical and Electrical Engineering Co., Ltd.)	Project Manager	Wei Shih	2117 0566
	Environmental Officer	Lyn Lau	5172 6543
DCM Works:			
Contract 3201 DCM (Package 1) (Penta-Ocean-China State-Dong-Ah Joint Venture)	Project Director	Tsugunari Suzuki	9178 9689
	Environmental Officer	Kanny Cho	9019 1962
Contract 3202 DCM (Package 2) (Samsung-BuildKing Joint Venture)	Project Manager	Ilkwon Nam	9643 3117
	Environmental Officer	Dickson Mak	9525 8408
Contract 3203 DCM (Package 3) (Sambo E&C Co., Ltd.)	Project Manager	Seong Jae Park	9683 8693
	Environmental Officer	Calvin Leung	9203 5820
Contract 3204 DCM (Package 4) (CRBC-SAMBO Joint Venture)	Project Manager	Kyung-Sik Yoo	9683 8697
	Environmental Officer	David Man	6421 3238
Contract 3205 DCM (Package 5)	Deputy Project Manager	Min Park	9683 0765

Party	Position	Name	Telephone
(Bachy Soletanche - Sambo Joint Venture)			
	Environmental Officer	Margaret Chung	9130 3696
Reclamation Works:			
Contract 3206 (ZHEC-CCCC-CDC Joint Venture)	Project Manager	Kim Chuan Lim	3693 2288
	Environmental Officer	Kwai Fung Wong	3693 2252
Other Works:			
Contract 3213 CLP Cable Diversion Enabling Works (Wing Hing Construction Company)	Project Manager	MIcheal Kan	9206 0550
	Environmental Officer	Ivy Tam	2151 2090

1.4 Contact information for the Project

The contact information for the Project is provided in **Table 1.2**. The public can contact us through the following channels if they have any queries and comments on the environmental monitoring data and project related information.

Table 1.2: Contact Information of the Project

Channels	Contact Information
Hotline	3908 0354
Email	env@3rsproject.com
Fax	3747 6050
Postal Address	Airport Authority Hong Kong HKIA Tower 1 Sky Plaza Road Hong Kong International Airport Lantau Hong Kong Attn: Environmental Team Leader Mr Terence Kong c/o Mr Lawrence Tsui (TRD)

1.5 Summary of Construction Works

The key activities of the Project carried out in the reporting period included five in-progress DCM contracts, an advanced works contract, and a CLP cable diversion enabling work contract. The DCM contracts involved DCM trials, laying of geotextile and sand blanket; the advanced works contract involved HDD works including site preparation works and construction of containment pit, stockpiling of excavated materials from HDD operation, pilot hole drilling, casing installation, and pipeline supporting works; and the CLP cable diversion enabling work contract involved

installation of silt curtain, excavation works and removal of armour rock, construction of drawpit, installation of cable trough, backfilling, and reinstatement of armour rocks.

The locations of the works areas are presented in **Figure 1.1** to **Figure 1.2.** Some site investigation works were carried out during the reporting period.

1.6 Summary of EM&A Programme Requirements

The status for all environmental aspects is presented in **Appendix A**. The EM&A requirements remained unchanged during the reporting period.

Table 1.3: Summary of Status for All Environmental Aspects under the Updated EM&A Manual

Parameters	EM&A Requirements	Status
Air Quality		
Baseline Monitoring	At least 14 consecutive days before commencement of construction work	The baseline air quality monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
Impact Monitoring	At least 3 times every 6 days	On-going
Noise		
Baseline Monitoring	Daily for a period of at least two weeks prior to the commencement of construction works	The baseline noise monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
Impact Monitoring	Weekly	On-going
Water Quality		
General Baseline Water Quality Monitoring for reclamation, water jetting and field joint works	Three days per week, at mid-flood and mid-ebb tides, for at least four weeks prior to the commencement of marine works.	The baseline water quality monitoring result has been reported in Water Quality Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
General Impact Water Quality Monitoring for reclamation, water jetting and field joint works	Three days per week, at mid-flood and mid-ebb tides.	On-going
Initial Intensive Deep Cement Mixing (DCM) Water Quality Monitoring	At least four weeks	To be commenced according to the detailed plan on DCM
Regular DCM Water Quality Monitoring	Three times per week until completion of DCM works.	On-going
Waste Management		
Waste Monitoring	At least weekly	On-going
Land Contamination		
Supplementary Contamination Assessment Plan (CAP)	At least 3 months before commencement of any soil remediation works.	To be submitted with the relevant construction works
Contamination Assessment Report (CAR) for Golf Course	CAR to be submitted for golf course first; programme for submission of supplementary CAR at the other areas to be agreed.	The CAR for Golf Course was submitted to EPD.

Parameters	EM&A Requirements	Status
Terrestrial Ecology		
Pre-construction Egretry Survey Egretry Survey Plan	Once per month in the breeding season between April and July, prior to the commencement of HDD drilling works.	The revised Egretry Survey Plan was submitted and approved by EPD under EP Condition 2.14.
Ecological Monitoring	Monthly monitoring during the HDD construction works period from August to March.	On-going
Marine Ecology		
Pre-Construction Phase Coral Dive Survey	Prior to marine construction works	The Coral Translocation Plan was submitted and approved by EPD under EP Condition 2.12.
Coral Translocation	-	On-going
Chinese White Dolphins (CWD)		
Baseline Monitoring	6 months of baseline surveys before the commencement of land formation related construction works. Vessel surveys: Two full surveys per month; Land-based theodolite tracking: Two days per month at the Sha Chau station and two days per month at the Lung Kwu Chau Station; and PAM: For the whole duration of baseline period.	Baseline CWD results were reported in the CWD Baseline Monitoring Report and submitted to EPD in accordance with EP Condition 3.4.
Impact Monitoring	Vessel surveys: Two full surveys per month; Land-based theodolite tracking: One day per month at the Sha Chau station and one day per month at the Lung Kwu Chau Station; and PAM: For the whole duration for land formation related construction works.	On-going
Landscape and Visual		
Baseline Monitoring	One-off survey within the Project site boundary prior to commencement of any construction works	The baseline landscape & visual monitoring result has been reported in Baseline Monitoring Report and submitted to EPD under EP Condition 3.4.
Impact Monitoring	Weekly	On-going
Environmental Auditing		
Regular site inspection	Weekly	On-going
Marine Mammal Watching Plan (MMWP) implementation measures	Monitor and check	On-going
Dolphin Exclusion Zone Plan (DEZP) implementation measures	Monitor and check	On-going
SkyPier High Speed Ferries (HSF) implementation measures	Monitor and check	On-going

Parameters	EM&A Requirements	Status
Construction and Associated Vessels Implementation measures	Monitor and check	On-going
Complaint Hotline and Email channel	Construction phase	On-going
Environmental Log Book	Construction phase	On-going

Taking into account the construction works in the reporting period, impact monitoring of air quality, noise, water quality, waste management, ecology, CWD, and landscape & visual were carried out in the reporting period.

The EM&A programme also involved weekly site inspections and related auditing conducted by the ET for checking the implementation of the required environmental mitigation measures recommended in the approved EIA Report. In order to enhance environmental awareness and closely monitor the environmental performance of the contractors, environmental briefings and regular environmental management meetings were conducted.

The EM&A programme has been following the recommendations presented in the approved EIA Report and the Updated EM&A Manual. A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix C**.

2 Environmental Monitoring and Auditing

2.1 Air Quality Monitoring

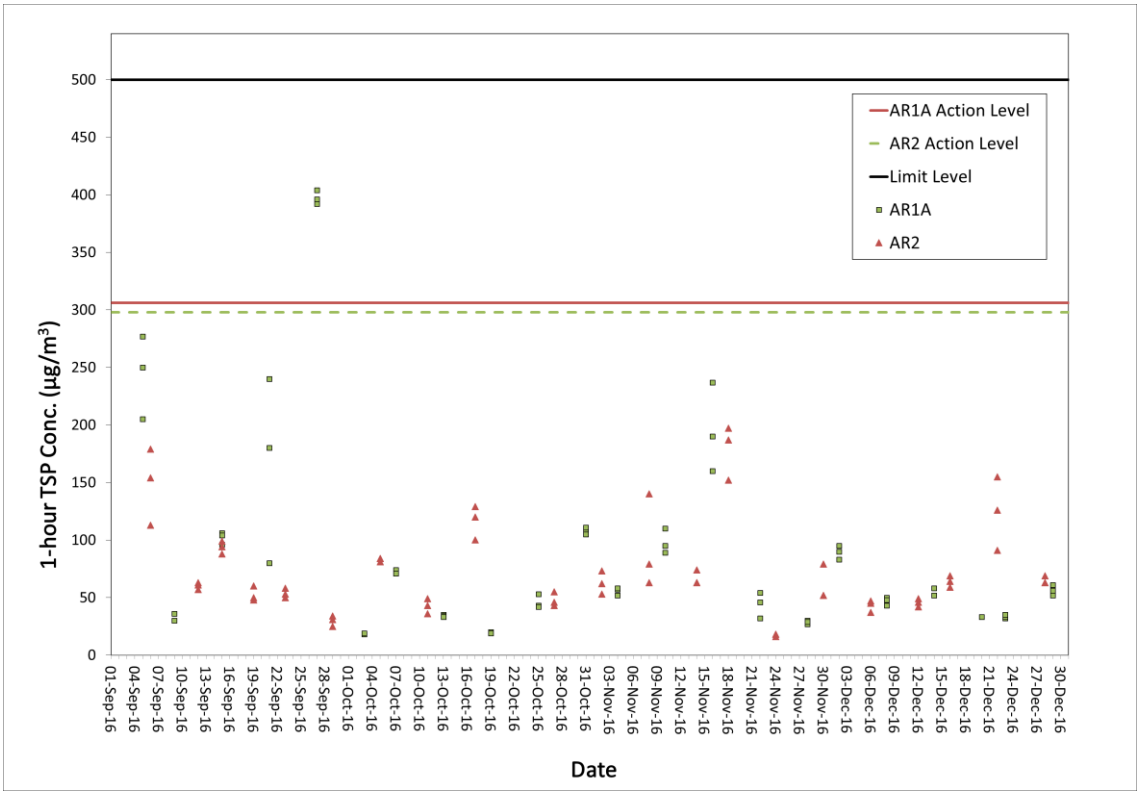
Impact 1-hour Total Suspended Particulates (TSP) monitoring was conducted three times every 6 days at two representative monitoring stations during the reporting period. The locations of monitoring stations are described in **Table 2.1** and presented in **Figure 2.1**. The Action and Limit Levels of the air quality monitoring are also provided in **Table 2.1** for reference.

Table 2.1: Impact Air Quality Monitoring Stations

Monitoring Station	Location	Action Level (µg/m^3)	Limit Level (µg/m^3)
AR1A	Man Tung Road Park	306	500
AR2	Village House at Tin Sum	298	

The graphical plots of impact air quality monitoring results during the reporting period are presented in **Graph 1**.

Graph 1: Graphical Plot of 1-hour TSP concentration at AR1A and AR2 during the Reporting Period



No exceedance of the Action and Limit Level was recorded at AR1 and AR2 in the reporting period.

The weather varied from sunny to rainy in the reporting quarter. Wind direction was mainly north or northwest in the reporting quarter.

The key activities of the Project carried out in the reporting period included five in-progress DCM contracts, an advanced works contract, and a CLP cable diversion enabling work contract. The DCM contracts involved DCM trials, laying of geotextile and sand blanket; the advanced works contract involved HDD pilot hole drilling, site preparation works and construction of containment pit, casing installation, and pipeline supporting works; and the CLP cable diversion enabling work contract involved installation of silt curtain, excavation works and removal of armour rock, construction of drawpit, installation of cable trough, backfilling, and reinstatement of armour rock. Those works were not likely to cause adverse dust pollution.

The active construction site is around 3 km away from the nearest air sensitive receiver in Tung Chung. The major dust sources during the reporting period were observed to be local air pollution and nearby traffic emissions. It is considered that the monitoring work in the reporting period was effective and there was no adverse impact attributable to the works of the Project.

2.2 Noise Monitoring

Impact noise monitoring was conducted at five representative monitoring stations once per week during 0700 and 1900 during the reporting period. The locations of monitoring stations are described in **Table 2.2** and presented in **Figure 2.1**. The Action and Limit Levels of the noise monitoring are provided in **Table 2.2** for reference.

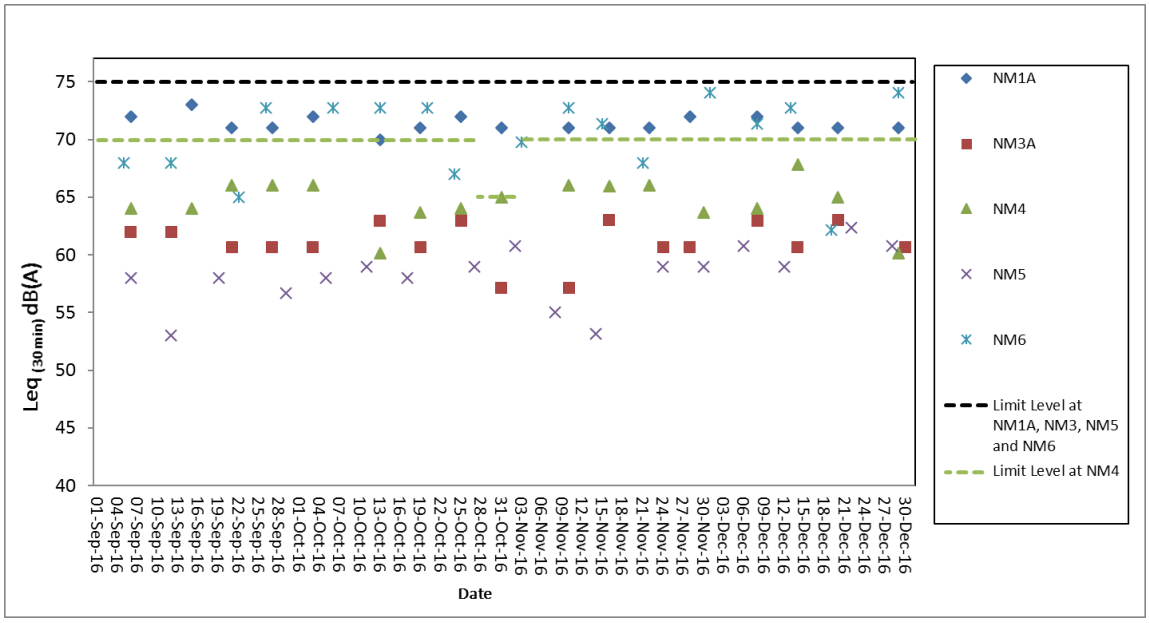
The graphical plots of impact noise quality monitoring results during the reporting period are presented in **Graph 2**.

Table 2.2: Impact Noise Quality Monitoring Stations

Monitoring Station	Location	Action Level	Limit Level
NM1A	Man Tung Road Park	When one documented complaint is received from any one of the sensitive receivers	75 dB(A)
NM3A	Site Office		75 dB(A)
NM4[(i)]	Ching Chung Hau Po Woon Primary School		65dB(A) / 70 dB(A)
NM5	Village House in Tin Sum		75 dB(A)
NM6	House No. 1, Sha Lo Wan		75 dB(A)

Note: (i) reduce to 70dB(A) for school and 65dB(A) during school examination periods.

Graph 2: Graphical Plot of Leq $_{(30min)}$ at NM1A, NM3A, NM4, NM5 and NM6 during the Reporting Period



No exceedance of the Action and Limit Level was recorded at all monitoring stations in the reporting period.

The key activities undertaken in the reporting period were not likely to cause adverse noise impact. The active construction work is around 900 m away from the nearest noise sensitive receivers in the villages in North Lantau. The major noise sources during the reporting period were observed to be aircraft noise at NM3A and NM5, aircraft noise and helicopter noise at NM6, road traffic noise at NM1A, and school activities at NM4 in the background. It is considered that the monitoring work in the reporting period was effective and there was no adverse impact attributable to the works of the Project.

2.3 Water Quality Monitoring

Water quality monitoring was conducted at a total of 22 water quality monitoring stations, comprising 12 impact stations, seven sensitive receiver stations, and three control stations in the vicinity of the water quality sensitive receivers around the airport island in accordance with the Updated EM&A Manual. **Table 2.3** describes the details of the monitoring stations. **Figure 2.2** shows the locations of the monitoring stations.

Table 2.3: Monitoring Locations and Parameters for Impact Water Quality Monitoring

Monitoring Stations	Description	Coordinates		Parameters
		Easting	Northing	
C1	Control	804247	815620	DO, pH, Temperature, Salinity, Turbidity, SS, Total Alkalinity, Heavy Metals[2]
C2	Control	806945	825682	
C3[3]	Control	817803	822109	
IM1	Impact	806458	818351	
IM2	Impact	806193	818852	
IM3	Impact	806019	819411	
IM4	Impact	805039	819570	

Monitoring Stations	Description	Coordinates		Parameters
		Easting	Northing	
IM5	Impact	804924	820564	
IM6	Impact	805828	821060	
IM7	Impact	806835	821349	
IM8	Impact	807838	821695	
IM9	Impact	808811	822094	
IM10	Impact	809838	822240	
IM11	Impact	810545	821501	
IM12	Impact	811519	821162	
SR1[(1)]	Future Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) Seawater Intake for cooling	812586	820069	DO, pH, Temperature, Salinity, Turbidity, SS
SR2[(3)]	Planned marine park/ hard corals at The Brothers/ Tai Mo To	814166	821463	
SR3	Sha Chau and Lung Kwu Chau Marine Park/ fishing and spawning grounds in North Lantau	807571	822147	
SR4A	Sha Lo Wan	807810	817189	
SR5A	San Tau Beach SSSI	810696	816593	
SR6	Tai Ho Bay, Near Tai Ho Stream SSSI	814663	817899	
SR7	Ma Wan Fish Culture Zone (FCZ)	823742	823636	
SR8	Seawater Intake for cooling at Hong Kong International Airport (East)	811593	820417	

Notes:
(1) The seawater intakes of SR1 for the future HKBCF are not yet in operation, the future permanent location for SR1 during impact monitoring is subject to finalisation after the HKBCF seawater is commissioned.

(2) Details of selection criteria for the two heavy metals for early regular DCM monitoring refer to the Detailed Plan on Deep Cement Mixing available on the dedicated 3RS website http://env.threerunwaysystem.com/en/ep-submissions.html). DCM specific water quality monitoring parameters (total alkalinity and heavy metals) were only conducted at C1 to C3, SR2, and IM1 to IM12

(3) According to the baseline water quality monitoring report, C3 station is not adequately representative as a control station of impact/ SR stations during the flood tide. The control reference has been changed from C3 to SR2 from 1 September 2016 onwards.

2.3.1 Action and Limit Levels for Water Quality Monitoring

The Action and Limit Levels for general water quality monitoring and regular DCM monitoring are presented in **Table 2.4**. The control and impact stations during flood tide and ebb tide for general water quality monitoring and regular DCM monitoring are presented in **Table 2.5**.

Table 2.4: Action and Limit Levels for General Water Quality Monitoring and Regular DCM Monitoring

Parameters	Action Level (AL)	Limit Level (LL)
Action and Limit Levels for general water quality monitoring and regular DCM monitoring (excluding SR1& SR8)		
DO in mg/L (Surface, Middle & Bottom)	Surface and Middle 4.5 mg/L	Surface and Middle 4.1 mg/L

Parameters	Action Level (AL)		Limit Level (LL)	
			5 mg/L for Fish Culture Zone (SR7) only	
	Bottom 3.4 mg/L		Bottom 2.7 mg/L	
Suspended Solids (SS) in mg/L	23	or 120% of upstream control station at the same tide of the same day, whichever is higher	37	or 130% of upstream control station at the same tide of the same day, whichever is higher
Turbidity in NTU	22.6		36.1	
Total Alkalinity in ppm	95		99	
Representative Heavy Metals for early regular DCM monitoring (Chromium)	0.2		0.2	
Representative Heavy Metals for early regular DCM monitoring (Nickel)	3.2		3.6	
Action and Limit Levels SR1				
SS (mg/l)	To be determined prior to its commissioning		To be determined prior to its commissioning	
Action and Limit Levels SR8				
SS (mg/l)	52		60	

Note:

1. For DO measurement, non-compliance occurs when monitoring result is lower than the limits.
2. For parameters other than DO, non-compliance of water quality results when monitoring results is higher than the limits.
3. Depth-averaged results are used unless specified otherwise.
4. Details of selection criteria for the two heavy metals for early regular DCM monitoring refer to the Detailed Plan on Deep Cement Mixing available on the dedicated 3RS website http://env.threerunwaysystem.com/en/ep-submissions.html)
5. The action and limit levels for the two representative heavy metals chosen will be the same as that for the intensive DCM monitoring.

Table 2.5: The Control and Impact Stations during Flood Tide and Ebb Tide for General Water Quality Monitoring and Regular DCM Monitoring

Control Station	Impact Stations
Flood Tide	
C1	IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, SR3
SR2[^1]	IM7, IM8, IM9, IM10, IM11, IM12, SR1A, SR3, SR4A, SR5A, SR6, SR8
Ebb Tide	
C1	SR4A, SR5A, SR6
C2	IM1, IM2, IM3, IM4, IM5, IM6, IM7, IM8, IM9, IM10, IM11, IM12, SR1A, SR2, SR3, SR7, SR8

[^1] As per findings of Baseline Water Quality Monitoring Report, the control reference has been changed from C3 to SR2 from 1 Sep 2016 onwards.

2.3.2 Summary of Monitoring Results

During the reporting period, water quality monitoring was conducted at 12 impact stations (IM), seven sensitive receiver (SR) stations and three control stations in the vicinity of water quality sensitive receivers around the airport island in accordance with the Updated EM&A Manual. The purpose of water quality monitoring at the IM stations is to promptly capture any potential water quality impacts from the Project before the impacts could become apparent at sensitive receivers (represented by the SR stations).

The monitoring results for DO, total alkalinity, and chromium obtained during the reporting period were in compliance with their corresponding Action and Limit Levels. For turbidity, SS and nickel, some of the testing results had exceeded the relevant Action Levels or Limit Levels during the reporting period. Investigations were carried out immediately for each of the exceedance cases, and the investigation findings concluded that all the exceedances were not due to the Project. Summaries of turbidity, SS, and nickel compliance status are presented in **Table 2.6 to 2.10**.

Findings for Turbidity Exceedance

Table 2.6 and **Table 2.7** presents a summary of the turbidity compliance status at IM and SR stations during mid-ebb and mid-flood tide for the reporting quarter.

Table 2.6: Summary of Turbidity Compliance Status at IM and SR Stations (Mid-Ebb Tide)

Date	IM1	IM2	IM3	IM4	IM5	IM6	IM7	IM8	IM9	IM10	IM11	IM12	SR2	SR3	SR4A	SR5A	SR6	SR7	SR8
19/11/2016																			
No. of Turbidity Exceedances	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Table 2.7: Summary of Turbidity Compliance Status at IM and SR Stations (Mid-Flood Tide)

Date	IM1	IM2	IM3	IM4	IM5	IM6	IM7	IM8	IM9	IM10	IM11	IM12	SR2	SR3	SR4A	SR5A	SR6	SR7	SR8
01/10/2016																			
01/11/2016																			
17/11/2016																			
No. of Turbidity Exceedances	0	0	0	0	0	0	0	0	1	1	0	1	0	0	0	0	0	0	0

Note: The monitoring dates that are not presented in the above tables were in full compliance with their corresponding Action and Limit Levels. Detailed results are presented in **Appendix D**.
Legend:

- No exceedance of Action Level and Limit Level
- Exceedance of Action Level recorded at monitoring station located downstream of the 3RS Project based on dominant tidal flow
- Exceedance of Action Level recorded at monitoring station located upstream of the 3RS Project based on dominant tidal flow
- Upstream station with respect to 3RS Project during the respective tide based on dominant tidal flow

Investigations were conducted for each of exceedances and details of the investigation findings are presented in the Construction Phase Monthly EM&A Report no. 10 and 11. All exceedances were found to be not due to the Project.

IM Stations

Overall, the turbidity exceedances that occurred during this reporting quarter appeared to be very sporadic and isolated cases with neither temporal nor spatial trend to indicate that the turbidity exceedances were linked to Project activities. Such isolated cases appear to be more characteristic of natural fluctuation, and this is supported by the baseline monitoring which also showed occasionally elevated turbidity levels that are of a magnitude similar to or greater than the turbidity exceedances that occurred during this reporting quarter.

SR Stations

There were no turbidity exceedances at any SR stations.

Findings for SS Exceedances

Table 2.8 and **Table 2.9** presents a summary of the SS compliance status at IM and SR stations during mid-ebb and mid-flood tide for the reporting quarter.

Table 2.8: Summary of SS Compliance Status at IM and SR Stations (Mid-Ebb Tide)

Date	IM1	IM2	IM3	IM4	IM5	IM6	IM7	IM8	IM9	IM10	IM11	IM12	SR2	SR3	SR4A	SR5A	SR6	SR7	SR8
04/10/2016																			
15/10/2016																			
20/10/2016																			
25/10/2016																			
12/11/2016																			
15/11/2016																			
19/11/2016																			
26/11/2016																			
29/11/2016																			
01/12/2016																			
03/12/2016																			
No. of SS Exceedances	2	3	2	3	2	5	2	0	1	1	0	0	0	3	5	0	0	0	0

Table 2.9: Summary of SS Compliance Status at IM and SR Stations (Mid-Flood Tide)

Date	IM1	IM2	IM3	IM4	IM5	IM6	IM7	IM8	IM9	IM10	IM11	IM12	SR2	SR3	SR4A	SR5A	SR6	SR7	SR8
04/10/2016																			
15/10/2016																			
20/10/2016																			
22/10/2016																			
25/10/2016																			
01/11/2016																			
03/11/2016																			
05/11/2016																			
08/11/2016																			
12/11/2016																			
15/11/2016																			
17/11/2016																			
19/11/2016																			
24/11/2016																			
29/11/2016																			
17/12/2016																			
20/12/2016																			
27/12/2016																			
No. of SS Exceedances	2	3	3	1	0	1	1	0	0	1	2	3	0	0	6	1	9	0	0

Note: The monitoring dates that are not presented in the above tables were in full compliance with their corresponding Action and Limit Levels. Detailed results are presented in **Appendix D**.
Legend:

No exceedance of Action Level and Limit Level
Exceedance of Action Level recorded at monitoring station located downstream of the 3RS Project based on dominant tidal flow
Exceedance of Action Level recorded at monitoring station located upstream of the 3RS Project based on dominant tidal flow
Exceedance of Limit Level recorded at monitoring station located downstream of the 3RS Project based on dominant tidal flow
Exceedance of Limit Level recorded at monitoring station located upstream of the 3RS Project based on dominant tidal flow
Upstream station with respect to 3RS Project during the respective tide based on dominant tidal flow

Investigations were conducted for each of the exceedances and details of the investigation findings are presented in the Construction Phase Monthly EM&A Report no. 10, 11 and 12. All exceedances were found to be not due to the Project.

IM Stations

Overall, it was observed that the SS exceedances during this reporting quarter occurred frequently at those IM stations which are located upstream of the 3RS Project, particularly during mid-flood tide. Such exceedances at upstream stations would unlikely be affected by the Project.

Separately, during mid-ebb tide, it is observed that exceedances at IM stations occur at both upstream and downstream stations on the same monitoring day. Such concurrent (upstream and downstream) exceedances observed at these IM stations on the same monitoring day suggest that there might be other sources of SS that were not related to the Project.

SR Stations

At SR stations, except for SR4A during mid-ebb tide, exceedances occurred when the respective SR stations are located upstream of the Project during mid-ebb and mid-flood tide, hence exceedances at these upstream SR stations are unlikely to be due to the Project. In addition, it is noted that similarly high SS levels were observed at these SR stations during baseline monitoring, which suggested that such SS elevations are not uncommon under ambient conditions due to natural fluctuation.

Separately, some temporal trend is observed affecting SR4A during mid-ebb tide. While this SR station is located downstream of the Project during mid-ebb tide, similar exceedances at the IM stations located between the Project and the SR station was not observed on most of the monitoring days, while the baseline monitoring results at SR4A showed similarly high SS levels during baseline monitoring. It is thus considered that such SS elevations are not uncommon under ambient conditions due to natural fluctuation.

Findings for Nickel Exceedances

Table 2.10 presents a summary of the nickel compliance status at IM and SR stations for the reporting quarter. There were no nickel exceedances during mid-ebb tide for the reporting quarter.

Table 2.10: Summary of Nickel Compliance Status at IM Stations (Mid-Flood Tide)

Date	IM1	IM2	IM3	IM4	IM5	IM6	IM7	IM8	IM9	IM10	IM11	IM12	SR2	SR3	SR4A	SR5A	SR6	SR7	SR8
22/11/2016																			
No. of nickel Exceedances	0	0	0	0	0	0	1	1	1	0	0	0	0	0	0	0	0	0	0

Note: The monitoring dates that are not presented in the above table were in full compliance with their corresponding Action and Limit Levels. Detailed results are presented in **Appendix D**.
Legend:
No exceedance of Action Level and Limit Level

Exceedance of Action Level recorded at monitoring station located downstream of the 3RS Project based on dominant tidal flow

Exceedance of Action Level recorded at monitoring station located upstream of the 3RS Project based on dominant tidal flow

Exceedance of Limit Level recorded at monitoring station located downstream of the 3RS Project based on dominant tidal flow

Exceedance of Limit Level recorded at monitoring station located upstream of the 3RS Project based on dominant tidal flow

Upstream station with respect to 3RS Project during the respective tide based on dominant tidal flow

Investigations were conducted for each of the exceedances and details of the investigation findings are presented in the Construction Phase Monthly EM&A Report no. 11. All exceedances were found to be not due to the Project.

IM Stations

Nickel is a representative heavy metal for DCM monitoring, however, the investigations found that no DCM activities were conducted during the monitoring period. Hence it is considered that occasional elevations in nickel levels may arise due to other sources not associated with the Project.

SR Stations

There were no nickel exceedances at any SR stations.

Conclusions

Based on the findings of the exceedance investigations presented in Construction Phase Monthly EM&A Report no. 10, 11 and 12, it was concluded that the exceedances during this reporting quarter were not due to the Project. Hence no SR stations were adversely affected by the Project. All required actions under the Event and Action Plan had been followed. Exceedances appeared to be due to natural fluctuation (such as naturally higher baseline SS levels at individual SR stations) or other sources not related to the Project.

Nevertheless, recognising that the IM stations represent a 'first line of defense', the non-project related exceedances identified at IM stations have been attended to as triggers of precautionary measures. As part of the EM&A programme, the construction methods and mitigation measures for water quality will continue to be monitored and opportunities for further enhancement will continue to be explored and implemented where possible, to strive for better protection of water quality and the marine environment.

In the meantime, the contractors were reminded to implement and maintain all mitigation measures during weekly site inspection. These include maintaining the silt curtain for sand blanket laying properly and maintaining the levels of materials on barges to avoid overflow as recommended in the EM&A Manual.

2.4 Waste Monitoring

In accordance with the Updated EM&A Manual, the waste generated from construction activities was audited once per week to determine if wastes were being managed in accordance with the Waste Management Plan (WMP) prepared for the Project, contract-specific WMP, and any statutory and contractual requirements. All aspects of waste management including waste generation, storage, transportation and disposal were assessed during the audits. The Action and Limit Levels of the construction waste are provided in **Table 2.11**.

Table 2.11: Action and Limit Levels for Construction Waste

Monitoring Stations	Action Level	Limit Level
Construction Area	When one valid documented complaint is received	Non-compliance of the WMP, contract-specific WMPs, any statutory and contractual requirements

Weekly waste monitoring of the Project construction works was carried out by the ET to check and monitor the implementation of proper waste management practices during the construction phase during the reporting period.

Recommendations were provided during monitoring including provision of drip trays for chemical containers, provision of proper label for chemical containers, proper disposal of sewage effluent from construction workforce as well as proper collection, sorting and disposal of C&D materials. In addition, relevant contractors were reminded to provide spill kit and chemical storage area, and to handle the chemical waste properly. The contractors had taken actions to implement the recommended measures.

Based on the updated information, metals and paper were recycled and about 395m^3 of excavated materials were produced from the HDD launching site and Sheung Sha Chau under P560(R) during the reporting period. The generated excavated materials were temporarily stored at storage and stockpiling area. The excavated material will be reused in the Project.

During the reporting period, around 29 tonnes of general refuse and 0.36 tonnes of chemical waste were disposed of to the West New Territories (WENT) Landfill and Tsing Yi Chemical Waste Treatment Centre respectively. No Construction and Demolition (C&D) material was disposed off-site during the reporting period.

No exceedance of the Action or Limit Levels was recorded in the reporting period.

2.5 CWD Monitoring

2.5.1 Summary of Monitoring Requirements

CWD monitoring was conducted by vessel line-transect survey at a frequency of two full survey per month, supplemented by land-based theodolite tracking for twice per month at the Sha Chau station and three times per month at the Lung Kwu Chau station as well as Passive Acoustic Monitoring. Monitoring was fully completed in the reporting period. The locations of CWD monitoring by vessel survey transect are shown in **Figure 2.3**, whilst the land-based survey stations are described in **Table 2.12** and depicted in **Figure 2.4**. Location of Passive Acoustic Monitoring is shown in **Figure 2.10**.

Table 2.12: Land-based Survey Station Details

Stations	Location	Geographical Coordinates	Station Height (m)	Approximate Tracking Distance (km)
D	Sha Chau (SC)	22° 20' 43.5" N 113° 53' 24.66" E	45.66	2
E	Lung Kwu Chau (LKC)	22° 22' 44.83" N 113° 53' 0.2" E	70.40	3

The Action Level (AL) and Limit Level (LL) for CWD monitoring were formulated by an action response approach using the running quarterly dolphin encounter rates (STG and ANI) derived

from baseline monitoring data, as presented in the CWD Baseline Monitoring Report. The derived values of AL and LL for CWD monitoring are shown in **Table 2.13**.

Table 2.13: Derived Values of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

	NEL, NWL, AW, WL and SWL as a Whole
Action Level	Running quarterly STG < 1.86 & ANI < 9.35
Limit Level	Two consecutive running quarterly (3-month) STG < 1.86 & ANI < 9.35

2.5.2 Summary of Monitoring Results

Vessel Line-transect Survey

Survey Effort

During the reporting period, six complete sets of vessel line-transect surveys were conducted from October to December 2016 to cover all transects in NEL, NWL, AW, WL and SWL survey area twice per month.

A total of around 1396 km of survey effort was collected from these surveys, with around 83.8% of the total survey effort being conducted under favourable weather condition (i.e. Beaufort Sea State 3 or below with favourable visibility). Details of the survey effort data were presented in **Appendix E**.

Sighting Distribution

From October to December 2016, 59 groups of CWD with 156 individuals were sighted. Amongst the sightings of CWD, 47 groups with 128 individuals were made during on-effort search under favourable weather condition.

When breaking down the sightings by survey areas, 15 sightings with 54 individuals, 18 sightings with 46 individuals and 14 sightings with 28 individuals were recorded in NWL, WL and SWL respectively within this reporting quarter. No CWD was sighted in NEL and AW survey areas. It is specifically noted from the record in NWL that the numbers of sightings and CWD individuals show an observable re-bounce in December 2016 (8 sightings with 30 individuals) compared to the previous two months (4 sightings with 12 individuals in October and 3 sightings with 12 individuals in November 2016), in which the numbers of sightings and individuals in December are both greater than the sums of October and November 2016.

Distribution of CWD sightings recorded from October to December 2016 during on-effort search under favourable weather condition are illustrated in **Figure 2.5**. CWD sightings were relatively more frequent in WL than in NWL and SWL. In NWL, sightings were mainly recorded around Lung Kwu Chau. Two sightings were recorded in the southwestern corner of NWL survey area close to the Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road alignment. No sightings of CWDs were recorded within or in close vicinity of the 3RS land-formation footprint. CWD sightings in WL were evenly distributed in both coastal and off-shore areas near Tai O. In SWL waters, CWDs were most frequently sighted along the coast from Fan Lau to Lo Kei Wan, with a few scattered sightings around Soko Islands. Details of the sighting data were presented in **Appendix E**.

Figure 2.5: Sightings Distribution of Chinese White Dolphins

[Pink circle: Sighting locations of CWD, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Red polygon: 3RS land-formation footprint]

Note: Only on-effort sightings under Beaufort 3 or below were presented in the figure.

Encounter Rate

The dolphin encounter rates for the number of dolphin sightings per 100km survey effort (STG) and for the total number of dolphins per 100km survey effort (ANI) in the whole survey area (i.e. NEL, NWL, AW, WL and SWL) for October, November and December 2016 are summarized in **Table 2.14**.

In this reporting quarter, both the monthly and running quarterly encounter rates STG and ANI show decline in November 2016 but re-bounce in December 2016. Comparing with the previous reporting quarter (i.e. August to September 2016), the dolphin encounter rates (both STG and ANI) show a decline from the previous quarter, from 4.29 to 4.02 and 18.32 to 10.95 respectively, attributed to the drops of dolphin sightings in October and November 2016.

Table 2.14: Summary of Monthly and Running Quarterly STG and ANI of Chinese White Dolphin for Previous and Current Reporting Quarters

	Previous Reporting Quarter		Current Reporting Quarter		
	Aug 16	Sep 16	Oct 16	Nov 16	Dec 16
Monthly STG	3.48	3.50	4.65	2.54	4.89
Monthly ANI	14.17	14.65	9.81	7.11	15.96
Running Quarterly STG	4.93	4.29	3.84	3.55	4.02
Running Quarterly ANI	20.57	18.32	13.02	10.74	10.95

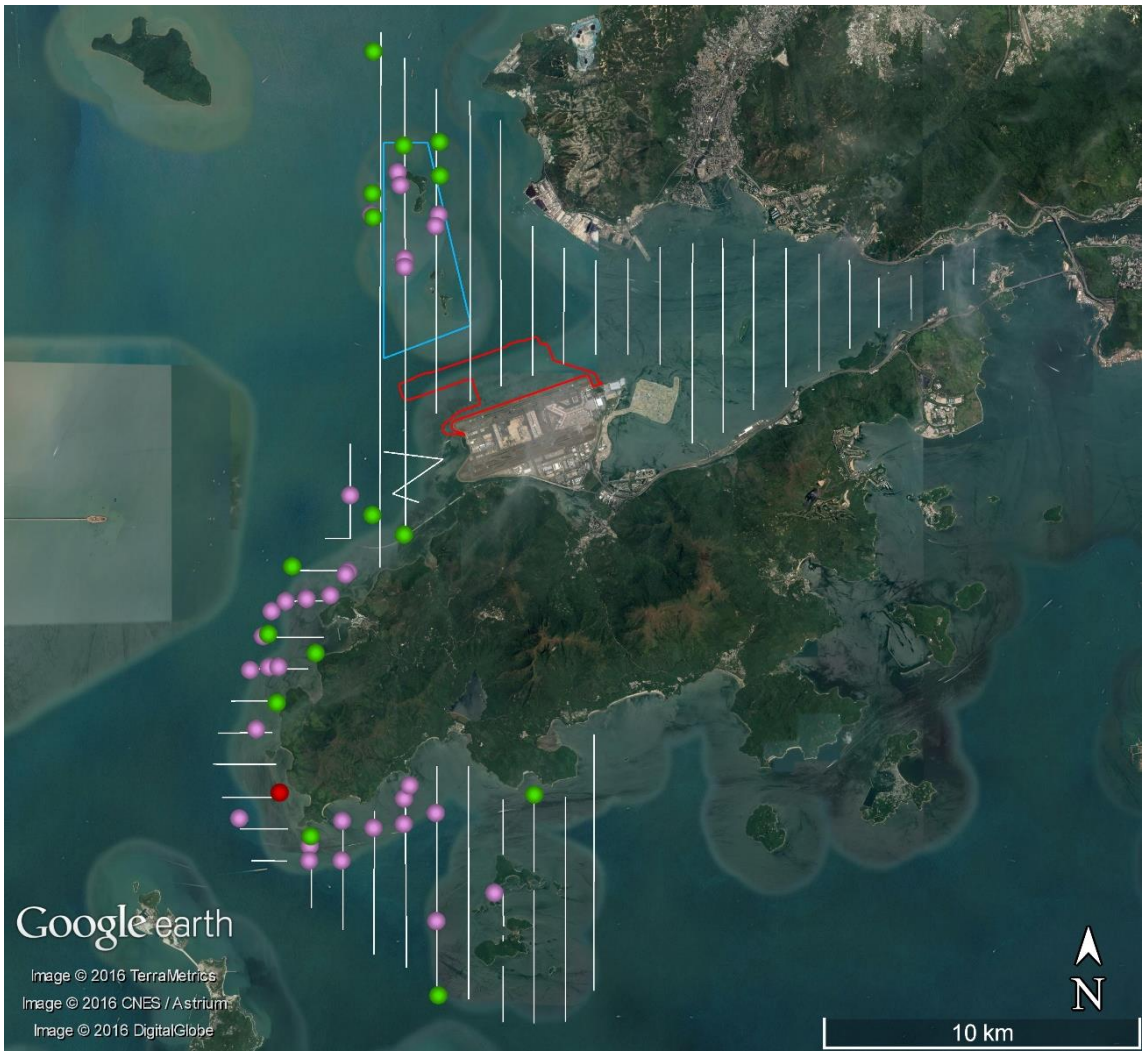
Note: For detailed calculations of encounter rates STG and ANI, please refer to the Monthly EM&A Reports No. 10, No. 11 and No. 12.

Group Size

Between October and December 2016, the group size of CWDs ranged from 1 to 11 individuals per group. The average group size of CWDs was 2.7 individuals per group. The majority of the CWD sightings, with a total number of 31 groups out of the 47 groups were in small group size (i.e. 1-2 individuals). In NWL, the numbers of sightings with small group size and with medium group size (i.e. 3-9 individuals) were similar. While in WL and SWL, CWD groups with small group size were dominant. One large CWD group with 11 individuals was sighted in coastal area between Peaked Hill and Fan Lau in WL. Sighting locations of CWD groups with different group sizes were depicted in **Figure 2.6**.

Figure 2.6: Sighting Locations of Chinese White Dolphins with Different Group Sizes

[Pink circle: Sighting locations of CWD with group size from 1 to 2 individuals, Green circle: Sighting locations of CWD with group size from 3 to 9 individuals, Red circle: Sighting locations of CWD with group size of 10 or above, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Red polygon: 3RS land-formation footprint]



Note: Only on-effort sightings under Beaufort 3 or below were presented in the figure.

Activities and Association with Fishing Boats

During October to December 2016, 20 groups of CWDs were sighted with feeding activities. Amongst these 20 groups of feeding CWDs, one group was observed in association with operating pair trawlers at southwestern corner of Soko Islands close to the boundary of Hong Kong waters, two groups were sighted in association with operating purse seiners in NWL and SWL. In NWL waters, the majority of the feeding activities of CWDs were observed north to Lung Kwu Chau. In WL, CWDs were mainly being observed feeding in waters around Tai O. In SWL, more feeding sightings of CWDs were recorded along the coast from Fan Lau to Tai Long Wan Campgroup. The sighting locations of CWDs engaged in different behaviours during the reporting quarter were illustrated in **Figure 2.7**.

Figure 2.7: Sighting Locations of Chinese White Dolphins Engaged in Different Behaviours

[Indigo rhombus: Foraging, Green circle: Socializing, Pink square: Resting, Yellow triangle: Travelling, White line: Vessel survey transects, Blue polygon: SCLKCMP, Red polygon: 3RS land-formation footprint]

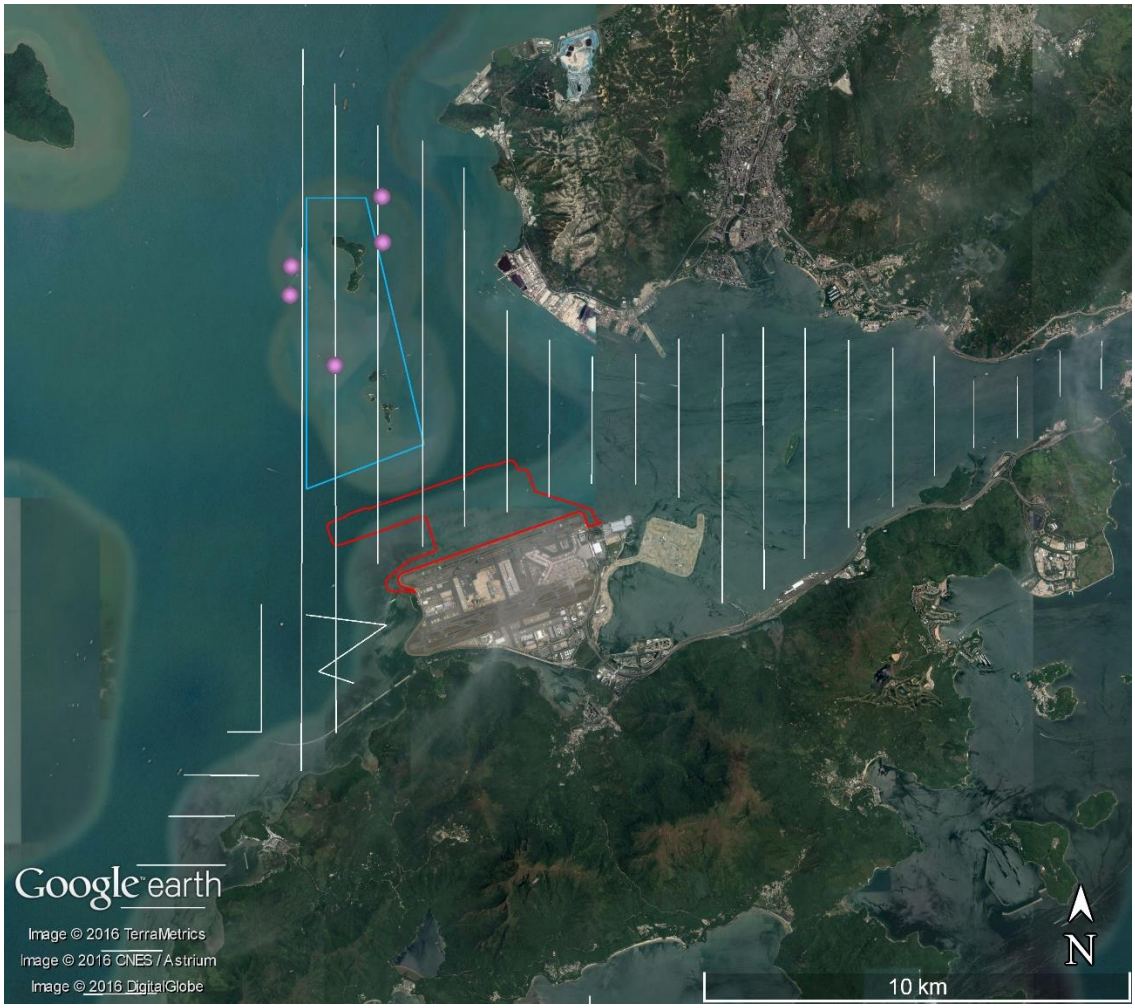
Note: Only on-effort sightings under Beaufort 3 or below were presented in the figure.

Mother-calf Pairs

From October to December 2016, one mother-calf and one mother-spotted juvenile pairs were sighted in NWL around SCLKCMP. The same mother-spotted juvenile pair (i.e. NLMM013 and NLMM006) was re-sighted for totally four times during the reporting quarter. The sighting locations of these two mother-calf pairs in NWL were shown in **Figure 2.8**. On the other hand, one mother-and-unspotted juvenile pair was sighted in SWL under Beaufort 4 sea state in November 2016.

Figure 2.8: Sighting Locations of Mother-calf Pairs

[Pink circle: Sighting locations of mother-calf pairs, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Red polygon: 3RS land-formation footprint]



Note: Only on-effort sightings under Beaufort 3 or below were presented in the figure.

Photo Identification

During October to December 2016, a total number of 54 different CWD individuals sighted altogether 74 times were identified. Re-sighting information of CWD individuals provides an initial idea of their range use and apparent connection between different areas around Lantau. Amongst these 54 different CWD individuals, 14 animals (i.e. NLMM002, NLMM006, NLMM010, NLMM013, NLMM046, SLMM002, SLMM010, SLMM011, SLMM012, SLMM014, SLMM022, WLMM027, WLMM049 and WLMM061) were sighted more than once. Four individuals including SLMM010, SLMM011, SLMM012 and WLMM027 were re-sighted in different survey areas within this reporting quarter.

A summary of photo identification works is presented in **Table 2.15**. Representative photos of the 54 identified individuals and figures depicting the sighting locations of the aforementioned 14 re-sighted individuals recorded in this reporting quarter are presented **Appendix E**.

Table 2.15: Summary of Photo Identification

Individual ID	Date of sighting	Sighting Group No.	Area
NLMM002	04/11/2016	2	NWL
	19/12/2016	7	NWL
NLMM004	19/12/2016	6	NWL
NLMM005	28/10/2016	1	NWL
NLMM006	28/10/2016	2	NWL
	04/11/2016	2	NWL
	19/12/2016	3	NWL
		7	NWL
NLMM010	19/12/2016	5	NWL
		7	NWL
NLMM012	28/10/2016	1	NWL
NLMM013	28/10/2016	2	NWL
	04/11/2016	2	NWL
	19/12/2016	3	NWL
		7	NWL
NLMM023	05/10/2016	4	NWL
NLMM039	28/10/2016	1	NWL
NLMM040	28/10/2016	1	NWL
NLMM041	28/10/2016	1	NWL
NLMM042	28/10/2016	1	NWL
NLMM043	21/11/2016	1	NWL
NLMM044	21/11/2016	1	NWL
NLMM045	02/12/2016	1	NWL
NLMM046	19/12/2016	2	NWL
		6	NWL
NLMM047	19/12/2016	6	NWL
NLMM048	19/12/2016	7	NWL
NLMM049	19/12/2016	7	NWL
SLMM002	26/10/2016	2	WL
	05/12/2016	5	WL
SLMM003	05/12/2016	5	WL
SLMM007	05/12/2016	3	WL
SLMM010	18/11/2016	1	WL
	05/12/2016	5	WL
	13/12/2016	8	SWL
SLMM011	24/10/2016	7	WL
	21/11/2016	1	NWL

Individual ID	Date of sighting	Sighting Group No.	Area
SLMM012	28/11/2016	4	SWL
	05/12/2016	5	WL
SLMM013	26/10/2016	2	WL
SLMM014	26/10/2016	10	SWL
	13/12/2016	4	SWL
SLMM017	28/11/2016	4	SWL
SLMM019	05/12/2016	1	WL
SLMM022	25/10/2016	4	WL
	05/12/2016	5	WL
SLMM028	04/11/2016	1	NWL
SLMM029	05/12/2016	5	WL
SLMM031	13/12/2016	7	SWL
SLMM033	14/11/2016	1	SWL
SLMM037	05/12/2016	5	WL
SLMM049	05/12/2016	5	WL
SLMM052	26/10/2016	7	SWL
SLMM053	13/12/2016	9	SWL
WLMM001	17/11/2016	1	WL
WLMM007	05/12/2016	3	WL
WLMM026	04/11/2016	1	NWL
WLMM027	05/10/2016	1	NWL
	24/10/2016	7	WL
	04/11/2016	1	NWL
WLMM028	28/11/2016	6	SWL
WLMM029	28/11/2016	6	SWL
WLMM030	19/12/2016	4	NWL
WLMM032	26/10/2016	5	WL
WLMM035	26/10/2016	5	WL
WLMM049	24/10/2016	1	WL
	26/10/2016	3	WL
WLMM050	28/10/2016	1	NWL
WLMM054	05/10/2016	2	NWL
WLMM060	24/10/2016	1	WL
WLMM061	26/10/2016	1	WL
		5	WL
WLMM062	17/11/2016	1	WL
WLMM063	05/12/2016	4	WL

Land-based Theodolite Tracking

Survey Effort

During October to December 2016, a total number of 15 days of land-based theodolite tracking survey effort was completed, including nine days on Lung Kwu Chau and six days on Sha Chau. In total, 30 CWD groups were tracked during the surveys, with overall 0.3 group of CWD sighted per hour.

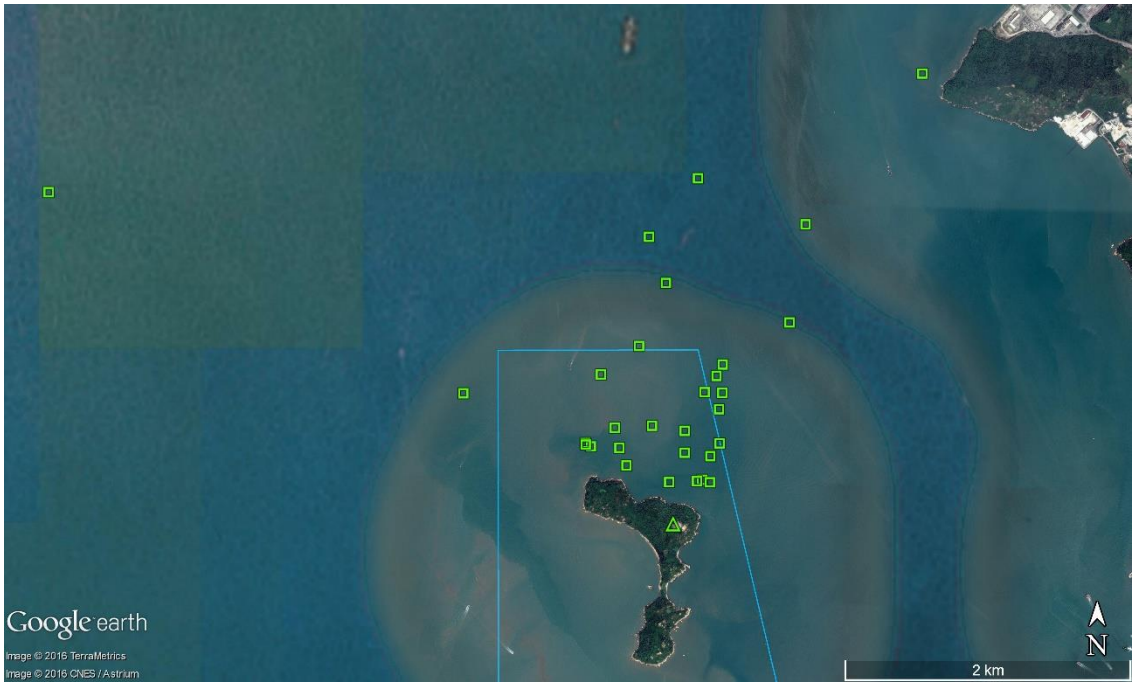
Information on survey effort and CWD groups sighted during these land-based theodolite tracking surveys are presented in **Table 2.16**. Details on the survey effort and CWD groups tracked are

presented in **Appendix E**. The first sighting locations of CWD groups tracked during land-based theodolite tracking surveys between October and December 2016 are shown in **Figure 2.9**.

Table 2.16: Summary of Survey Effort and CWD Group of Land-based Theodolite Tracking

Land-based Station	# of Survey Sessions	Survey Effort (hh:mm)	# CWD Groups Sighted	CWD Group Sighting per Survey Hour
October 2016				
Lung Kwu Chau	3	18:00	13	0.7
Sha Chau	2	12:00	0	0
Total	**5**	**30:00**	**13**	**0.4**
November 2016				
Lung Kwu Chau	3	18:10	10	0.6
Sha Chau	2	12:00	0	0
Total	**5**	**30:10**	**10**	**0.3**
December 2016				
Lung Kwu Chau	3	18:00	7	0.4
Sha Chau	2	12:00	0	0
Total	**5**	**30:00**	**7**	**0.2**
Overall	**15**	**90:10**	**30**	**0.3**

Figure 2.9: Plots of First Sightings of All CWD Groups from Land-based Stations
[Green triangle: LKC station; Green square: CWD group off LKC; Blue line: SCLKCMP boundary]



Progress Update on Passive Acoustic Monitoring (PAM)

An Ecological Acoustic Recorder (EAR) has been deployed and positioned to the south of Sha Chau Island with 20% duty cycle (**Figure 2.10**) with data from the EAR intended primarily to supplement the data collected from the land-based theodolite station on Sha Chau. The EAR deployment generally lasts around 4-6 weeks followed by a period of data retrieval for subsequent

analysis. As the data analysis takes more than two months after retrieval, PAM results are not suitable for reporting in quarterly reports. Detailed analysis of PAM data will be presented in the annual CWD report to coincide and supplement the data collected from the land-based theodolite survey station at Sha Chau.

Site Audit for CWD-related Mitigation Measures

During this reporting quarter, silt curtains were in place by the contractor of CLP cable diversion enabling works as well as the DCM contractors for sand blanket laying works and at least two dolphin observers were deployed by each contractor in accordance with the Marine Mammal Watching Plan. Teams of at least two dolphin observers were deployed by contractors for continuous monitoring of the Dolphin Exclusion Zone (DEZ) for DCM trial works in accordance with the DEZ Plan. Trainings for the dolphin observers were provided by the ET prior to the aforementioned works, with a cumulative total of 137 individuals being trained and the training records kept by the ET. Testing on night vision devices for Dolphin Exclusion Zone monitoring was also conducted before the DCM trials. From the contractors' daily observation records and DEZ monitoring log records, no dolphin or other marine mammals were observed within or around the DEZ and silt curtains in this reporting quarter. These contractors' records were also audited by the ET during site inspection.

Audits of acoustic decoupling for construction vessels were carried out during weekly site inspection and summarised in **Section 2.6**. Summary of audits of SkyPier High Speed Ferries route diversion and speed control and construction vessel management are presented in **Section 2.8** and **Section 2.9** respectively.

2.6 Weekly Environmental Site Inspection

Site inspections of the construction works were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. Bi-weekly site inspections were also conducted by the IEC. Observations have been recorded in the site inspection checklist and passed to the Contractor together with the appropriate recommended mitigation measures where necessary.

The key observations from site inspection and associated recommendations were related to:

- provision of drip trays for chemical containers;
- display of noise emission labels for air compressors;
- display of Non-road mobile machinery (NRMM) labels for generators;
- improvement of dust control and spill prevention measures;
- better maintenance of drainage channel;
- sewage effluent from construction workforce; and
- proper collection, sorting and disposal of inert and non-inert C&D materials.

In addition, recommendations were provided during site inspection on construction vessels, which include:

- provision of spill kit and chemical waste storage area for the chemical waste;
- display of Environmental Permit;
- provision of spare silt curtain on required construction vessels; and
- provision of acoustic decoupling for noisy equipment.

The daily visual inspection checklists for silt curtains and bi-weekly diver inspection records which were implemented by the contractors in accordance with the Silt Curtain Deployment Plan had

been checked during site inspection and reviewed at the end of the reporting period, summarizing that the silt curtains were maintained in the correct positions and intact without obvious defects or damage.

A summary of implementation status of the environmental mitigation measures for the construction phase of the Project during the reporting period is provided in **Appendix C**.

2.7 Ecological Monitoring

In accordance with the Updated EM&A Manual, ecological monitoring shall be undertaken monthly at the HDD daylighting location on Sheung Sha Chau Island to identify and evaluate any impacts with appropriate actions taken as required to address and minimise any adverse impact found.

Monthly ecological monitoring was carried out in October, November and December 2016 on Sheung Sha Chau Island. No encroachment or disturbance to the egretry area at Sheung Sha Chau was recorded during ecological monitoring.

2.8 Audit of the SkyPier Plan

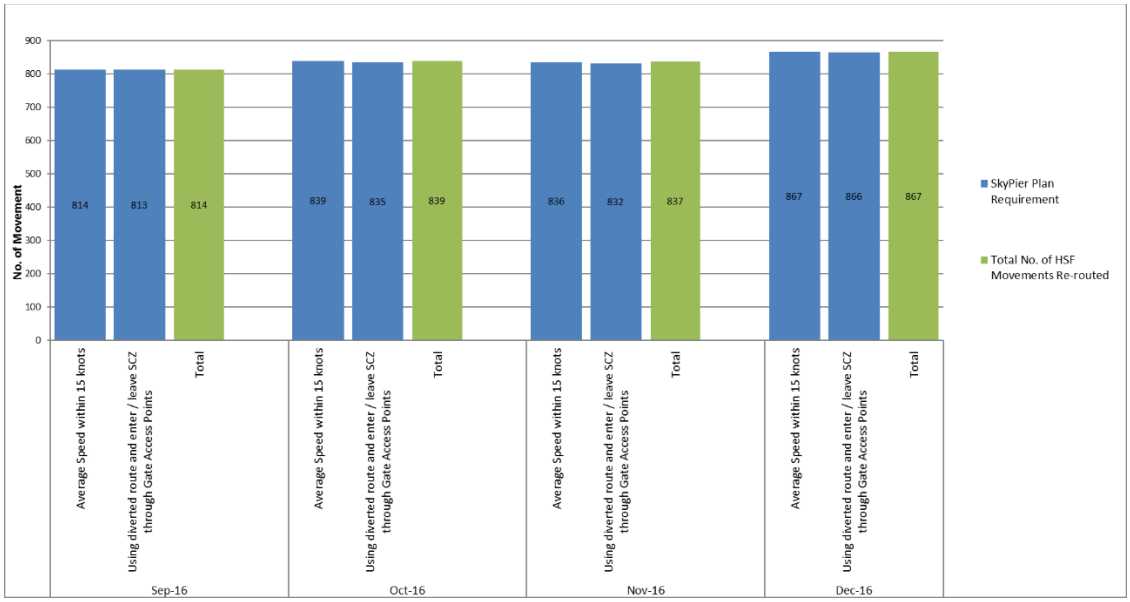
In total, 2,543 ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. The daily movements of all SkyPier HSFs in the reporting period ranged between 1 and 96, which falls within the maximum daily cap number of 125.

There was only one HSF movement on 21 October 2016 as Typhoon Signal No. 8 was hoisted on that day. Status of compliance with annual daily average of 99 movements will be further reviewed in the annual EM&A Report.

All the HSFs had travelled through the SCZ with average speeds within 15 knots (7.3 knots to 14.6 knots), which complied with the SkyPier Plan, except one HSF travelled at an average speed of 16.4 knots as the captain had to give way to an approaching vessel to ensure safety. Ten ferry movements had deviations from the diverted route during the reporting period. Notices were sent to the ferry operators and the cases have been investigated. Nine of cases were due to public safety considerations, i.e., strong tidal wave and current or giving way to other vessels, and the HSFs had returned to the normal route following the SkyPier Plan as soon as practicable. In November, one ferry did not travel through the diverted route on 22 November 2016. Further information has been requested from the concerned Ferry Operator (FO) and ET's investigation found that the concerned captain decided to bypass the SCZ so as to reduce the travel time due to passenger misbehaviour incident happened during passenger loading at SkyPier. After the incident, the concerned captain has been instructed to follow the requirements of the SkyPier Plan. Letter has also been sent to other captains of the same FO to remind them the SkyPier Plan requirements. The summary of the SkyPier Plan monitoring result (October to December 2016) is presented in **Graph 3**.

Insufficient Automatic Identification System (AIS) data were received from some HSFs during the reporting period. After investigation, it was found that missing of AIS data for the concerned ferries were due to interference effect of AIS signal as reported by the FO after checking the condition of the AIS transponders. Vessel captains were requested to provide the radar track photos which indicated the vessel entered the SCZ though the gate access point and no speeding in the SCZ. Ferry operator's explanation has been accepted.

Graph 3: Summary of SkyPier Plan Monitoring Results (October to December 2016)



2.9 Audit of Construction and Associated Vessels

The audit of construction and associated vessels in accordance with the MTRMP-CAV has been started in August 2016. ET has conducted weekly audit of relevant information including AIS data, vessel tracks and other relevant records to ensure sufficient information has been provided by the contractors to the Marine Traffic Control Center (MTCC) and the contractors are complied with the requirements of the MTRMP-CAV. The contactors have submitted endorsed 3-month rolling programme for construction vessel activities to MTCC in order to help maintain the number of construction vessels to a practicable minimum. The IEC has also performed audit on the compliance of the requirements as part of the EM&A programme.

Between October and December 2016, deviations including speeding in the works area, entry from non-designated gates, not following the designated route and entering no-entry zones were identified. All the concerned contractors were reminded to comply with the requirements of the MTRMP-CAV during the weekly MTCC audit and such deviations were also reviewed during the Environmental Management Meeting.

A total of 14 skipper training workshops have been held by ET between October and December 2016 with 260 concerned captains of construction vessels associated with the 3RS Contracts to familiarise them with the predefined routes, general education on local cetaceans, guidelines for avoiding adverse water quality impact, the required environmental practices / measures while operating construction and associated vessels under the Project, and guidelines for operating vessels safely in the presence of CWDs. Another 16 skipper training workshops have been held with 74 concerned captains by contractor's EO and competency test had been conducted subsequently with the trained captains by ET. In addition, ET had participated in the 3rd, 4th, 5th Marine Management Liaison Group meeting held on 24 October, 28 November, and 19 December 2016 to assist and resolve any marine issues which may be encountered under 3RS Project.

2.10 Review of the Key Assumptions Adopted in the EIA Report

With reference to Appendix E of the Updated EM&A Manual, it is noted that the key assumptions adopted in approved EIA report for the construction phase are still valid and no major changes

are involved. The environmental mitigation measures recommended in the approved EIA Report remain applicable and shall be implemented in undertaking construction works for the Project.

3 Report on Non-compliance, Complaints, Notifications of Summons and Prosecutions

3.1 Compliance with Other Statutory Environmental Requirements

During the reporting period, environmental related licenses and permits required for the construction activities were checked. No non-compliance with environmental statutory requirements was recorded.

3.2 Analysis and Interpretation of Complaints, Notification of Summons and Status of Prosecutions

3.2.1 Complaints

During the reporting period, a complaint was received on 29 December 2016 regarding night time work at Sheung Sha Chau. The case is currently under investigation in accordance with the Complaint Management Plan.

3.2.2 Notifications of Summons or Status of Prosecution

During the reporting period, neither notifications of summons nor prosecution were received.

3.3 Cumulative Statistics

Cumulative statistics on exceedance, non-compliance, complaints, notifications of summons and status of prosecutions are summarized in **Table 3.1** and **Table 3.2**.

Table 3.1: Statistics for Valid Exceedances for the Environmental Monitoring

		Total No. Recorded in the Reporting Month	Total No. Recorded since the Project Commenced
1-hr TSP	Action	0	0
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Waste	Action	0	0
	Limit	0	0
Water	Action	0	0
	Limit	0	0
CWD	Action	0	0
	Limit	0	0

Remark: Exceedances, which are not project related, are not shown in this table.

Table 3.2: Statistics for Non-compliance, Complaints, Notifications of Summons and Prosecution

Reporting Period	Cumulative Statistics			
	Non-compliance	Complaints	Notifications of Summons	Prosecutions
This reporting period	0	1	0	0
From 28 December 2015 to end of the reporting period	0	1	0	0

4 Conclusion and Recommendation

In this quarterly period from 1 October 2016 to 31 December 2016, the EM&A programme has been implemented as planned, including 96 sets of air quality measurements, 65 sets of construction noise measurements, 39 sets of water quality measurements, 6 complete sets of vessel line-transect surveys and 15 days of land-based theodolite tracking survey effort for Chinese White Dolphin (CWD) monitoring, three ecological monitoring on Sheung Sha Chau Island, as well as environmental site inspections, landscape & visual, and waste monitoring for the Project's construction works.

The key activities of the Project carried out in the reporting period included five in-progress DCM contracts, an advanced works contract, and a CLP cable diversion enabling work contract. The DCM contracts involved DCM trials, laying of geotextile and sand blanket; the advanced works contract involved HDD pilot hole drilling, site preparation works and construction of containment pit, casing installation, and pipeline supporting works; and the CLP cable diversion enabling work contract involved installation of silt curtain, excavation works and removal of armour rock, construction of drawpit, installation of cable trough, backfilling, and reinstatement.

For water quality, the monitoring results for DO, total alkalinity, and chromium obtained during the reporting period were in compliance with their corresponding Action and Limit Levels. For turbidity, SS and nickel, some of the testing results exceeded the relevant Action or Limit Levels during the reporting period. Investigations were carried out immediately for each of the exceedance cases, and the investigation findings concluded that all the exceedances were not due to the Project.

No breach of the Action or Limit Levels in relation to the construction dust, noise, waste and CWD monitoring were recorded during the reporting period. All site observations made by the ET were recorded in the site inspection checklists and passed to the contractor together with the recommended follow-up actions. No encroachment or disturbance to the egretry area on Sheung Sha Chau was recorded during monthly ecological monitoring.

In total, 2,543 ferry movements between HKIA SkyPier and Zhuhai / Macau were audited in the reporting period. All the HSFs had travelled through the SCZ with average speeds within 15 knots, which complied with the SkyPier Plan, except one HSF travelled at an average speed of 16.4 knots as the captain had to give way to an approaching vessel to ensure safety. Nine ferry movements had minor deviation from the diverted route during the reporting period and all of them are related to public safety / emergency situations. In November, one ferry did not travel through the diverted route as the concerned captain decided to bypass the SCZ due to passenger misbehavior incident happened during passenger loading at SkyPier. After the incident, the concerned captain has been instructed to follow the requirements of the SkyPier Plan.

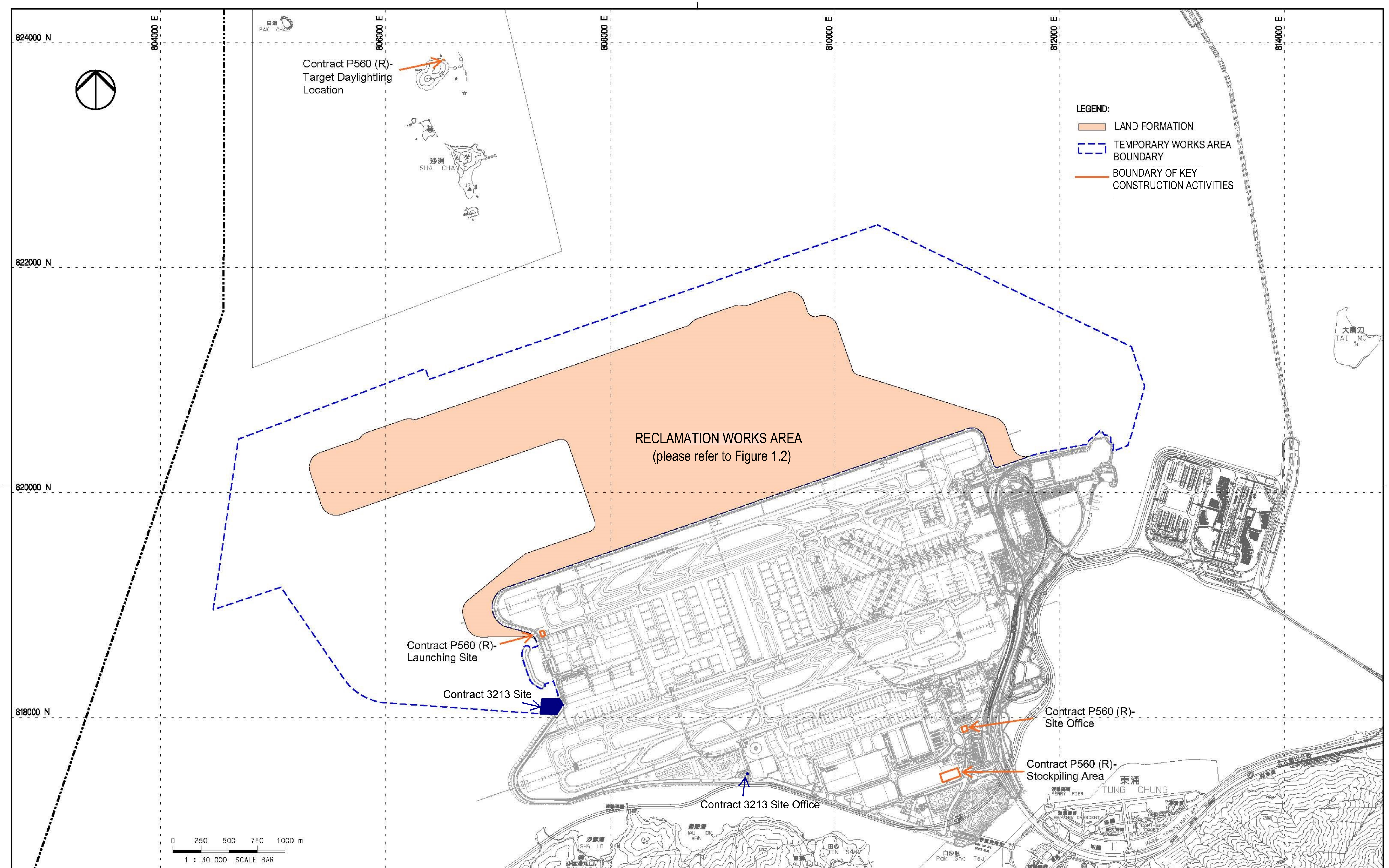
Between October and December 2016, ET has conducted weekly audit of relevant information to ensure sufficient information has been provided by the contractors to the MTCC and the contractors are fully complied with the requirements of the MTRMP-CAV. A total of 14 skipper training workshops have been held by ET between October to December 2016 with concerned captains of construction vessels associated with 3RS contracts. Another 16 skipper training workshops have been held by contractor's EO and competency test had been conducted subsequently with the trained captains by ET.

On the implementation of Marine Mammal Watching Plan, silt curtains were in place by the contractor of CLP cable diversion enabling works as well as the DCM contractors for sand blanket laying works and dolphin observers were deployed in accordance with the Plan. On the

implementation of DEZ Plan, Dolphin observers were deployed by contractors for continuous monitoring of the DEZ for DCM trial works in accordance with the DEZ Plan. Trainings for the dolphin observers were provided by the ET prior to the aforementioned works, with the training records kept by the ET. Testing on night vision devices for DEZ monitoring was also conducted before the DCM trials. From the contractors' daily observation records and DEZ monitoring log records, no dolphin or other marine mammals were observed within or around the DEZ and silt curtains in this reporting quarter.

The recommended environmental mitigation measures, as included in the EM&A programme, have been effectively implemented during the reporting period. Also, the EM&A programme implemented by the ET has effectively monitored the construction activities and ensure the proper implementation of mitigation measures.

Figures


824000 N
822000 N
820000 N
818000 N
804000 E
806000 E
808000 E
810000 E
812000 E
814000 E
Contract P560 (R)-
Target Daylightling
Location
LEGEND:
LAND FORMATION
TEMPORARY WORKS AREA
BOUNDARY
BOUNDARY OF KEY
CONSTRUCTION ACTIVITIES
RECLAMATION WORKS AREA
(please refer to Figure 1.2)
Contract P560 (R)-
Launching Site
Contract 3213 Site
Contract P560 (R)-
Site Office
Contract P560 (R)-
Stockpiling Area
Contract 3213 Site Office
東涌
TUNG CHUNG
沙洲
SHA CHAU
大磨刀
0 250 500 750 1000 m
1 : 30 000 SCALE BAR

Rev.	Date	Description	Checked
A	31AUG15	FIRST ISSUE	DC

香港國際機場 HONG KONG INTERNATIONAL AIRPORT

Mott MacDonald

Title

LOCATIONS OF KEY CONSTRUCTION ACTIVITIES IN THIS REPORTING PERIOD

Consultant's Signatures for Approval		Date
Design	DC	31AUG15
Checkers	DC	31AUG15
Design Supervisor	EC	31AUG15
Authorised Representative	JFP	31AUG15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

FIGURE 1.1

Scale at A3 1 : 30000

Rev. A

Filename: J:\355482\REPORT\ENV\CWSLP\FIG 1.dgn

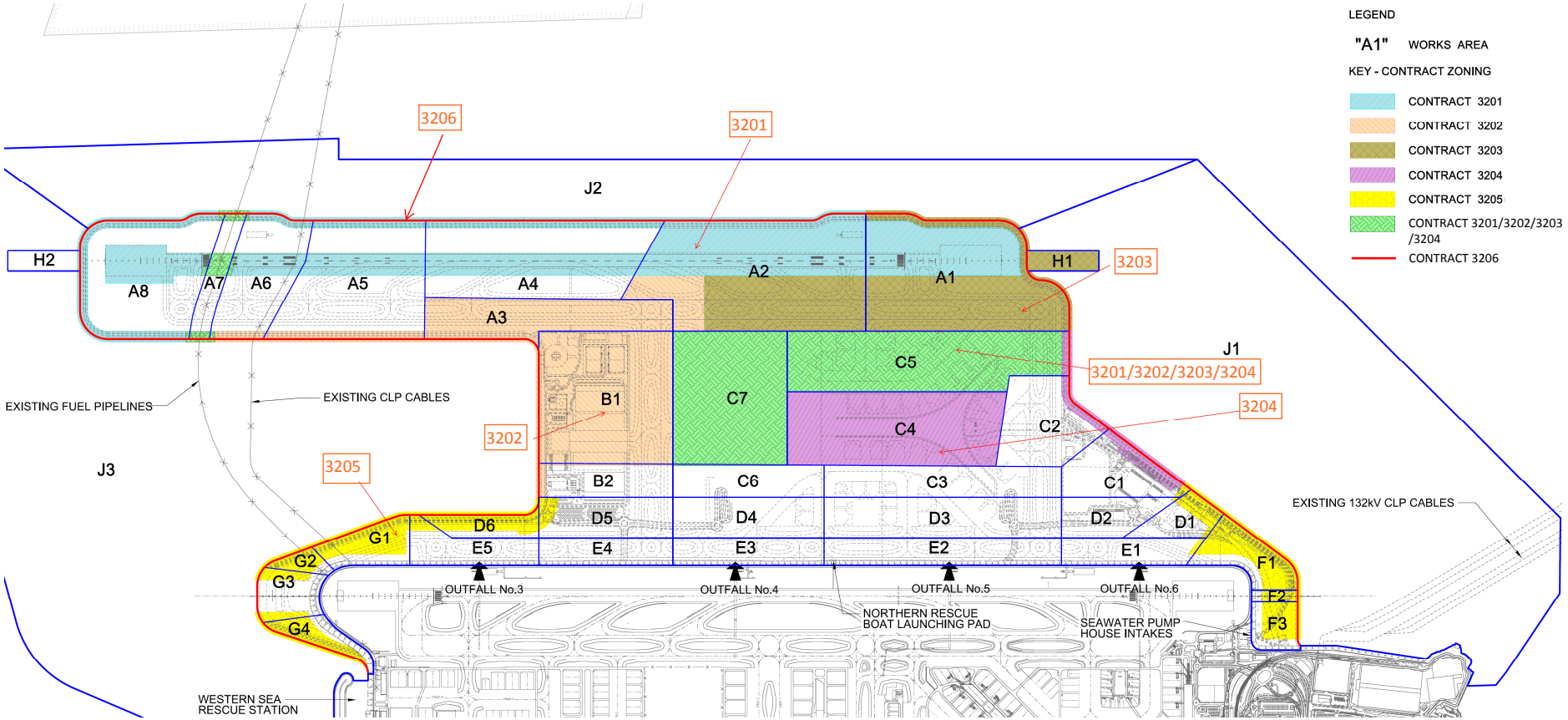


FIGURE 1.2- LOCATIONS OF RECLAMATION WORKS AREA

LEGEND:

- RECLAMATION AREA
- NOISE MONITORING STATION (UPDATED EM&A MANUAL)
- AIR QUALITY MONITORING STATION (UPDATED EM&A MANUAL)
- CHEK LAP KOK WIND STATION

806000 E
808000 E
810000 E
812000 E
814000 E
820000 N
818000 N

NM1A AR1A
NM2
NM3A
NM4
NM5 AR2
NM6

0 200 400 600 800 1000 m
1 : 22 500 SCALE BAR

Rev.	Date	Description	Checked
A	06JAN16	FIRST ISSUE	RO
B	29JAN16	GENERAL REVISION	RO
C	11FEB16	GENERAL REVISION	RO

香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Airport Authority HKIA Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2181 7111 Fax : (852) 2824 0717

Mott MacDonald

Title

LOCATIONS OF AIR AND NOISE MONITORING STATIONS AND CHEK LAP KOK WIND STATION

Consultant's Signatures for Approval		Date
Design	AM	11FEB16
Checkers	AM / TK	11FEB16
Approver	EC	11FEB16

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

FIGURE 2.1

Scale at A3 1 : 22500

Rev. C

Filename: J:\355482\REPORT\ENV\EMA\160211\FIG 2.1.dgn

805000 E
810000 E
815000 E
820000 E
825000 N
820000 N
815000 N
HKSAR BOUNDARY
C1
C2
C3
IM1
IM2
IM3
IM4
IM5
IM6
IM7
IM8
IM9
IM10
IM11
IM12
SR2
SR3
SR4A
SR5A
SR6
SR7
SR8
LEGEND:
LAND FORMATION FOOTPRINT
500m ENVELOPE
IMPACT STATION
SENSITIVE RECEIVER
CONTROL STATION
0 500 1000 1500 2000 m
1 : 60 000 SCALE BAR

Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	DC
B	04MAY16	GENERAL REVISION	RO
C	06JUN16	GENERAL REVISION	LC

香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Airport Authority HKIA Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2188 7111 Fax : (852) 2824 0717

Mott MacDonald

Title

WATER QUALITY MONITORING STATIONS

Consultant's Signatures for Approval		Date
Design	DC	06JUN16
Checkers	DC / TK	06JUN16
Approver	EC	06JUN16

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

FIGURE 2.2

Scale at A3 1 : 60000

Rev. C

Filename: J:\355482\REPORT\ENV\EMA\160606\MCL-P132-EMA-5-002.dgn

800000 E
805000 E
810000 E
815000 E
820000 E
825000 E
830000 E
835000 E
840000 E
845000 E
830000 N
825000 N
820000 N
815000 N
810000 N
805000 N

NORTHWEST LANTAU

NORTHEAST LANTAU

SOUTHWEST LANTAU

WEST LANTAU

LEGEND:
- HKSAR BOUNDARY
- LAND FORMATION FOOTPRINT
- DOLPHIN VESSEL SURVEY TRANSECT ROUTE
- DOLPHIN VESSEL SURVEY TRANSECT ROUTE

0 1 2 3 4 km
1 : 125 000 SCALE BAR

Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	JC

香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Airport Authority HKIA Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2188 7111 Fax : (852) 2824 0717

Mott MacDonald

Title

VESSEL BASED DOLPHIN MONITORING TRANSECTS IN BASELINE MONITORING

Consultant's Signatures for Approval		Date
Design	JC	02DEC15
Checkers	JC / TK	02DEC15
Approver	EC	02DEC15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

FIGURE 2.3

Scale at A3 1 : 125000

Rev. A

Filename: J:\355482\REPORT\ENV\EMA\151202\MCL-P132-EMA-10-002.dgn

804000 E
806000 E
808000 E
810000 E
812000 E
814000 E
816000 E
818000 E
820000 N
822000 N
824000 N
826000 N

E
D

沙洲及龍鼓洲海岸公園
SHA CHAU AND LUNG KWU CHAU MARINE PARK

HKSAR BOUNDARY

LEGEND:
- LAND FORMATION FOOTPRINT
- HONG KONG INTERNATIONAL AIRPORT
- LAND BASED SURVEY LOCATION

0 500 1000 1500 2000 m
1 : 45,000 SCALE BAR

Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	JC

香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Airport Authority HKIA Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2188 7111 Fax : (852) 2824 0717

Mott MacDonald

Title

LAND BASED DOLPHIN MONITORING IN BASELINE AND CONSTRUCTION PHASES

Consultant's Signatures for Approval		Date
Design	JC	02DEC15
Checkers	JC / TK	02DEC15
Approver	EC	02DEC15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No.

FIGURE 2.4

Scale at A3 1 : 45000

Rev. A

Filename: J:\355482\REPORT\ENV\EMA\151202\MCL-P132-EMA-10-004.dgn

804000 E
806000 E
808000 E
810000 E
812000 E
814000 E
816000 E
818000 E
820000 N
822000 N
824000 N
826000 N
828000 N

URMSTON ROAD

龍鼓洲
LUNG KWU CHAU

沙洲及龍鼓洲海岸公園
SHA CHAU AND LUNG KWU CHAU MARINE PARK

沙洲
SHA CHAU

A5

HKSAR BOUNDARY

LEGEND:

LAND FORMATION FOOTPRINT

HONG KONG INTERNATIONAL AIRPORT

AUTONOMOUS PASSIVE ACOUSTIC MONITORING LOCATION

0 500 1000 1500 2000 m
1 : 45 000 SCALE BAR

Rev.	Date	Description	Checked
A	02DEC15	FIRST ISSUE	JC

香港國際機場 HONG KONG INTERNATIONAL AIRPORT
Airport Authority HKIA Tower, 1 Sky Plaza Road, Hong Kong International Airport, Lantau, Hong Kong
Tel : (852) 2181 7111 Fax : (852) 2824 0717

Mott MacDonald

Title

LOCATIONS FOR AUTONOMOUS PASSIVE ACOUSTIC MONITORING IN BASELINE AND CONSTRUCTION PHASES

Consultant's Signatures for Approval		Date
Design	JC	02DEC15
Checkers	JC / TK	02DEC15
Approver	EC	02DEC15

EXPANSION OF HONG KONG INTERNATIONAL AIRPORT INTO A THREE-RUNWAY SYSTEM

Drawing No. FIGURE 2.10

Scale at A3 1 : 45000

Rev. A

Filename: J:\355482\REPORT\ENV\EMA\151202\MCL-P132-EMA-10-005.dgn

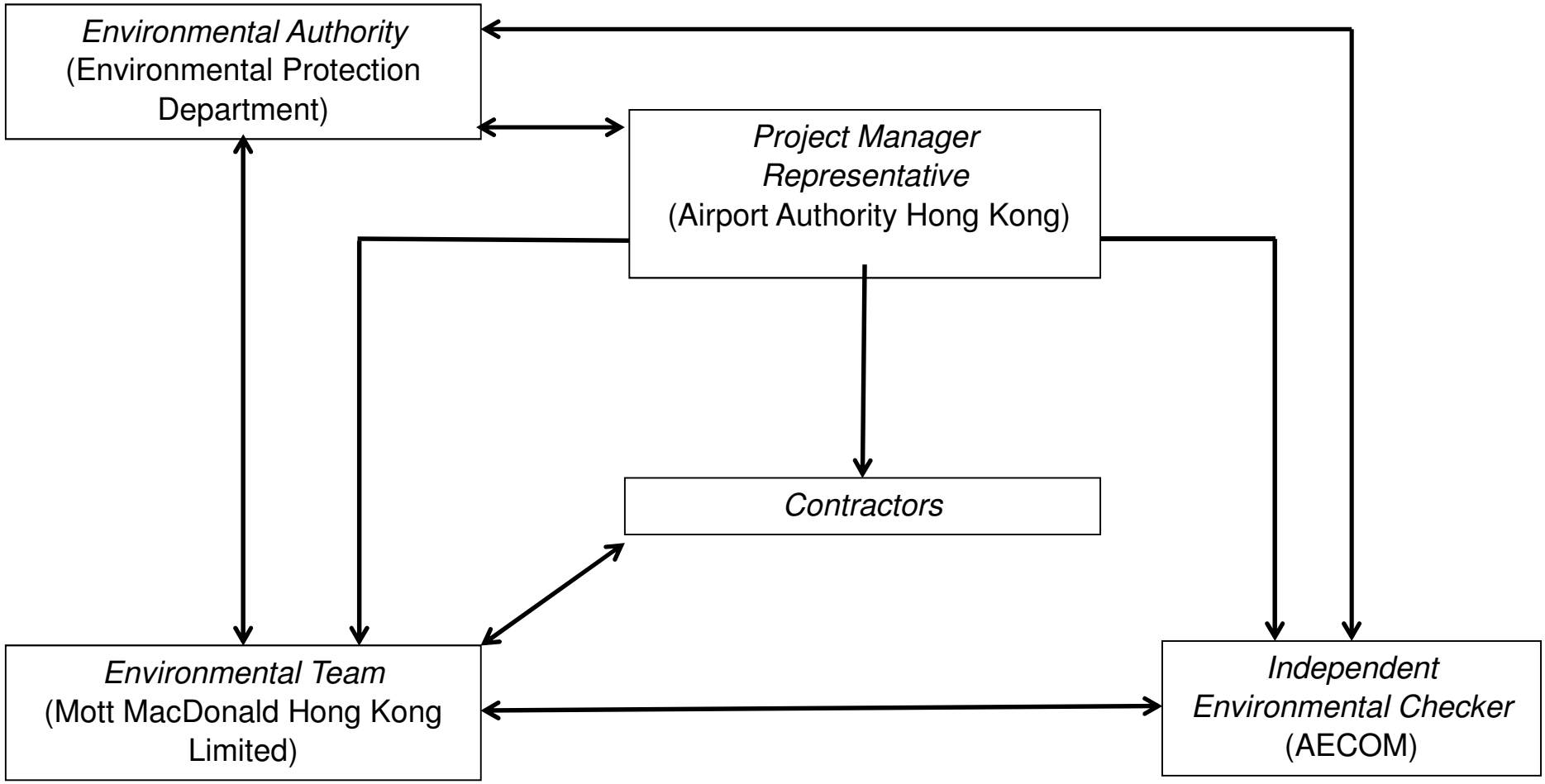
Appendix A. Construction Programme and Contract Description

Contract Description

Contract No.	Contract Title	Contractor	Key Construction Activities
P560 (R)	Aviation Fuel Pipeline Diversion Works	Langfang Huayuan Mechanical and Electrical Engineering Co., Ltd.	Diversion of the existing submarine aviation fuel pipelines will use a horizontal directional drilling (HDD) method forming two rock drill holes by drilling through bedrock from a launching site located at the west of the airport island to a daylighting point adjacent to the offshore receiving platform at Sha Chau. Two new pipelines will be installed through the drilled tunnels. The total length is approximately 5 km. Drilling works will proceed from the HDD launching site at the airport island.
3201	Deep Cement Mixing (Package 1)	Penta-Ocean-China State-Dong-Ah Joint Venture	The works covered by the Contract 3201, 3202, 3203 and 3204 comprise ground improvement of seabed using Deep Cement Mixing (DCM) method, the major construction activities including without limitation the following • Geophysical surveys; • Supply and placing of geotextile and sand blanket under seawalls; • Supply, maintenance, installation and removal of silt curtain systems; • Preliminary construction trails; • Supply and installation of DCM clusters within the works areas; and • Coring, sampling and testing of DCM treated soils and reporting works.
3202	Deep Cement Mixing (Package 2)	Samsung-BuildKing Joint Venture	
3203	Deep Cement Mixing (Package 3)	Sambo E&C Co.,Ltd	
3204	Deep Cement Mixing (Package 4)	CRBC-SAMBO Joint Venture	
3205	Deep Cement Mixing (Package 5)	Bachy Soletanche- Sambo Joint Venture	
3206	Reclamation Contract	ZHEC-CCCC-CDC Joint Venture	The works covered by the Contract 3206 comprise the formation of approximately 650 hectares of land north of the existing airport island for the project, the major construction activities including without limitation the following • Site clearance and demolition; • Geotechnical and ground improvement works; • Seawall construction; • Marine and land filling works; and • Civil works.

3213	CLP Cable Diversion Enabling Works	Wing Hing Construction Company	CLP cable diversion enabling works of Sha Chau South, Sheung Sha Chau and Lung Kwu Chau at Hong Kong International Airport Landside. The major construction activities including without limitation the following: • Geotechnical instrumentation and monitoring of the Works; • Temporary removal of armour rock and underlayers of existing seawall and subsequent reinstatement to its original condition; • Construction of the concrete cable trough embedded at about 3m below the surface of the existing seawall; and • Supply, installation, maintenance, and subsequent removal of temporary generator sets for temporary power supply with associated fuel supply and pump system located at Sheung Sha Chau, Sha Chau South and Lung Kwu Chau Islands.

Appendix B. Project Organization Chart


Environmental Authority
(Environmental Protection Department)
Project Manager Representative
(Airport Authority Hong Kong)
Contractors
Environmental Team
(Mott MacDonald Hong Kong Limited)
Independent Environmental Checker
(AECOM)

Appendix C. Environmental Mitigation Implementation Schedule (EMIS) for Construction Phase

Appendix C Environmental Mitigation Implementation Schedule (EMIS) for Construction Phase

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Air Quality Impact – Construction Phase		
5.2.6.2	2.1	-	**Dust Control Measures** ▪ Water spraying for 12 times a day or once every two hours for 24-hour working at all active works area.	Within construction site / Duration of the construction phase	I
5.2.6.3	2.1	-	▪ Covering of at least 80% of the stockpiling area by impervious sheets. Water spraying of all dusty materials immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling.	Within construction site / Duration of the construction phase	I
5.2.6.4	2.1	-	Dust control practices as stipulated in the Air Pollution Control (Construction Dust) Regulation should be adopted. These practices include: Good Site Management ▪ Good site management is important to help reducing potential air quality impact down to an acceptable level. As a general guide, the Contractor should maintain high standard of housekeeping to prevent emission of fugitive dust. Loading, unloading, handling and storage of raw materials, wastes or by-products should be carried out in a manner so as to minimise the release of visible dust emission. Any piles of materials accumulated on or around the work areas should be cleaned up regularly. Cleaning, repair and maintenance of all plant facilities within the work areas should be carried out in a manner minimising generation of fugitive dust emissions. The material should be handled properly to prevent fugitive dust emission before cleaning.	Within construction site / Duration of the construction phase	I
			Disturbed Parts of the Roads ▪ Each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials; or ▪ Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.	Within construction site / Duration of the construction phase	I
			Exposed Earth ▪ Exposed earth should be properly treated by compaction, hydroseeding, vegetation planting or seating with latex, vinyl, bitumen within six months after the last construction activity on the site or part of the site where the exposed earth lies.	Within construction site / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Loading, Unloading or Transfer of Dusty Materials ▪ All dusty materials should be sprayed with water immediately prior to any loading or transfer operation so as to keep the dusty material wet.	Within construction site / Duration of the construction phase	I
			Debris Handling ▪ Any debris should be covered entirely by impervious sheeting or stored in a debris collection area sheltered on the top and the three sides; and ▪ Before debris is dumped into a chute, water should be sprayed so that it remains wet when it is dumped	Within construction site / Duration of the construction phase	I
			Transport of Dusty Materials ▪ Vehicle used for transporting dusty materials/spoils should be covered with tarpaulin or similar material. The cover should extend over the edges of the sides and tailboards.	Within construction site / Duration of the construction phase	I
			Wheel washing ▪ Vehicle wheel washing facilities should be provided at each construction site exit. Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels.	Within construction site / Duration of the construction phase	I
			Use of vehicles ▪ The speed of the trucks within the site should be controlled to about 10km/hour in order to reduce adverse dust impacts and secure the safe movement around the site; ▪ Immediately before leaving the construction site, every vehicle should be washed to remove any dusty materials from its body and wheels; and ▪ Where a vehicle leaving the construction site is carrying a load of dusty materials, the load should be covered entirely by clean impervious sheeting to ensure that the dusty materials do not leak from the vehicle.	Within construction site / Duration of the construction phase	I
			Site hoarding Where a site boundary adjoins a road, street, service lane or other area accessible to the public, hoarding of not less than 2.4m high from ground level should be provided along the entire length of that portion of the site boundary except for a site entrance or exit.	Within construction site / Duration of the construction phase	I
5.2.6.5	2.1	-	**Best Practices for Concrete Batching Plant** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Cement Works (Concrete Batching Plant) BPM 3/2 as well as in the future Specified Process licence should be adopted. The best practices are recommended to be applied to both the land based and floating concrete batching plants. Best practices include: Cement and other dusty materials	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ The loading, unloading, handling, transfer or storage of cement, pulverised fuel ash (PFA) and/or other equally dusty materials shall be carried in a totally enclosed system acceptable to EPD. All dust-laden air or waste gas generated by the process operations shall be properly extracted and vented to fabric filtering system to meet the required emission limit; ▪ Cement, PFA and/or other equally dusty materials shall be stored in storage silo fitted with audible high level alarms to warn of over-filling. The high-level alarm indicators shall be interlocked with the material filling line such that in the event of the silo approaching an overfilling condition, an audible alarm will operate, and after 1 minute or less the material filling line will be closed; ▪ Vents of all silos shall be fitted with fabric filtering system to meet the required emission limit; ▪ Vents of cement/PFA weighing scale shall be fitted with fabric filtering system to meet the required emission limit; and ▪ Seating of pressure relief valves of all silos shall be checked, and the valves re-seated if necessary, before each delivery.		
			Other raw materials ▪ The loading, unloading, handling, transfer or storage of other raw materials which may generate airborne dust emissions such as crushed rock, sand, stone aggregate, shall be carried out in such a manner to prevent or minimize dust emissions; ▪ The materials shall be adequately wetted prior to and during the loading, unloading and handling operations. Manual or automatic water spraying system shall be provided at all unloading areas, stock piles and material discharge points; ▪ All receiving hoppers for unloading relevant materials shall be enclosed on three sides up to 3 m above the unloading point. In no case shall these hoppers be used as the material storage devices; ▪ The belt conveyor for handling materials shall be enclosed on top and two sides with a metal board at the bottom to eliminate any dust emission due to wind-whipping effect. Other type of enclosure will also be accepted by EPD if it can be demonstrated that the proposed enclosure can achieve same performance; ▪ All conveyor transfer points shall be totally enclosed. Openings for the passage of conveyors shall be fitted with adequate flexible seals; ▪ Scrapers shall be provided at the turning points of all conveyors to remove dust adhered to the belt surface; ▪ Conveyors discharged to stockpiles of relevant materials shall be arranged to minimize free fall as far as practicable. All free falling transfer points from conveyors to stockpiles shall be enclosed with chute(s) and water sprayed; ▪ Aggregates with a nominal size less than or equal to 5 mm should be stored in totally enclosed structure such as storage bin and should not be handled in open area. Where there is sufficient buffer area	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			surrounding the concrete batching plant, ground stockpiling may be used; ▪ The stockpile shall be enclosed at least on top and three sides and with flexible curtain to cover the entrance side; ▪ Aggregates with a nominal size greater than 5 mm should preferably be stored in a totally enclosed structure. If open stockpiling is used, the stockpile shall be enclosed on three sides with the enclosure wall sufficiently higher than the top of the stockpile to prevent wind whipping; and ▪ The opening between the storage bin and weighing scale of the materials shall be fully enclosed.		
			Loading of materials for batching ▪ Concrete truck shall be loaded in such a way as to minimise airborne dust emissions. The following control measures shall be implemented: (a) Pre-mixing the materials in a totally enclosed concrete mixer before loading the materials into the concrete truck is recommended. All dust-laden air generated by the pre-mixing process as well as the loading process shall be totally vented to fabric filtering system to meet the required emission limit; and (b) If truck mixing batching or other types of batching method is used, effective dust control measures acceptable to EPD shall be adopted. The dust control measures must have been demonstrated to EPD that they are capable to collect and vent all dust-laden air generated by the material loading/mixing to dust arrestment plant to meet the required emission limit. ▪ The loading bay shall be totally enclosed during the loading process.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Vehicles ▪ All practicable measures shall be taken to prevent or minimize the dust emission caused by vehicle movement; and ▪ All access and route roads within the premises shall be paved and adequately wetted.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Housekeeping A high standard of housekeeping shall be maintained. All spillages or deposits of materials on ground, support structures or roofs shall be cleaned up promptly by a cleaning method acceptable to EPD. Any dumping of materials at open area shall be prohibited.	Within Concrete Batching Plant / Duration of the construction phase	N/A
5.2.6.6	2.1	-	**Best Practices for Asphaltic Concrete Plant** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Tar and Bitumen Works (Asphaltic Concrete Plant) BPM 15 (94) as well as in the future Specified Process licence should be adopted. These include: Design of Chimney ▪ The chimney shall not be less than 3 metres plus the building height or 8 metres above ground level, whichever is the greater;	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ The efflux velocity of gases from the main chimney shall not be less than 12 m/s at full load condition; ▪ The flue gas exit temperature shall not be less than the acid dew point; and ▪ Release of the chimney shall be directed vertically upwards and not be restricted or deflected.		
			Cold feed side ▪ The aggregates with a nominal size less than or equal to 5 mm shall be stored in totally enclosed structure such as storage bin and shall not be handled in open area; ▪ Where there is sufficient buffer area surrounding the plant, ground stockpiling may be used. The stockpile shall be enclosed at least on top and three sides and with flexible curtain to cover the entrance side. If these aggregates are stored above the feeding hopper, they shall be enclosed at least on top and three sides and be wetted on the surface to prevent wind-whipping; ▪ The aggregates with a nominal size greater than 5 mm should preferably be stored in totally enclosed structure. Aggregates stockpile that is above the feeding hopper shall be enclosed at least on top and three sides. If open stockpiling is used, the stockpiles shall be enclosed on three sides with the enclosure wall sufficiently higher than the top of the stockpile to prevent wind whipping; ▪ Belt conveyors shall be enclosed on top and two sides and provided with a metal board at the bottom to eliminate any dust emission due to the wind-whipping effect. Other type of enclosure will also be accepted by EPD if it can be demonstrated that the proposed enclosure can be achieve the same performance; ▪ Scrapers shall be provided at the turning points of all belt conveyors inside the chute of the transfer points to remove dust adhered to the belt surface; ▪ All conveyor transfer points shall be totally enclosed. Openings for the passages of conveyors shall be fitted with adequate flexible seals; and ▪ All materials returned from dust collection system shall be transferred in enclosed system and shall be stored inside bins or enclosures.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Hot feed side ▪ The inlet and outlet of the rotary dryer shall be enclosed and ducted to a dust extraction and collection system such as a fabric filter. The particulate and gaseous concentration at the exhaust outlet of the dust collector shall not exceed the required limiting values; ▪ The bucket elevator shall be totally enclosed and the air be extracted and ducted to a dust collection system to meet the required particulates limiting value; ▪ All vibratory screens shall be totally enclosed and dust tight with close-fitted access inspection opening. Gaskets shall be installed to seal off any cracks and edges of any inspection openings; ▪ Chutes for carrying hot material shall be rigid and preferably fitted with abrasion resistant plate inside. They shall be inspected daily for leakages; ▪ All hot bins shall be totally enclosed and dust tight with close-fitted access inspection opening. Gaskets shall be installed to seal off any cracks and edges of any inspection openings. The air shall be extracted	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			and ducted to a dust collection system to meet the required particulates limiting value; and ▪ Appropriate control measures shall be adopted in order to meet the required bitumen emission limit as well as the ambient odour level (2 odour units).		
			Material transportation ▪ The loading, unloading, handling, transfer or storage of other raw materials which may generate airborne dust emissions such as crushed rocks, sands, stone aggregates, reject fines, shall be carried out in such a manner as to minimize dust emissions; ▪ Roadways from the entrance of the plant to the product loading points and/or any other working areas where there are regular movements of vehicles shall be paved or hard surfaced; and ▪ Haul roads inside the Works shall be adequately wetted with water and/or chemical suppressants by water trucks or water sprayers.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Control of emissions from bitumen decanting ▪ The heating temperature of the particular bitumen type and grade shall not exceed the corresponding temperature limit of the same type listed in Appendix 1 of the Guidance Note; ▪ Tamper-free high temperature cut-off device shall be provided to shut off the fuel supply or electricity in case the upper limit for bitumen temperature is reached; ▪ Proper chimney for the discharge of bitumen fumes shall be provided at high level; ▪ The emission of bitumen fumes shall not exceed the required emission limit; and The air-to-fuel ratio shall be properly controlled to allow complete combustion of the fuel. The fuel burners, if any, shall be maintained properly and free from carbon deposits in the burner nozzles.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Liquid fuel ▪ The receipt, handling and storage of liquid fuel shall be carried out so as to prevent the release of emissions of organic vapours and/or other noxious and offensive emissions to the air.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Housekeeping ▪ A high standard of housekeeping shall be maintained. Waste material, spillage and scattered piles gathered beneath belt conveyors, inside and around enclosures shall be cleared frequently. The minimum clearing frequency is on a weekly basis.	Within Concrete Batching Plant / Duration of the construction phase	N/A
5.2.6.7	2.1	-	**Best Practices for Rock Crushing Plants** The relevant best practices for dust control as stipulated in the Guidance Note on the Best Practicable Means for Mineral Works (Stone Crushing Plant) BPM 11/1 (95) as well as in the future Specified Process licence should be adopted. These include: Crushers ▪ The outlet of all primary crushers, and both inlet and outlet of all secondary and tertiary crushers, if not	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			installed inside a reasonably dust tight housing, shall be enclosed and ducted to a dust extraction and collection system such as a fabric filter; ▪ The inlet hopper of the primary crushers shall be enclosed on top and 3 sides to contain the emissions during dumping of rocks from trucks. The rock while still on the trucks shall be wetted before dumping; ▪ Water sprayers shall be installed and operated in strategic locations at the feeding inlet of crushers; and ▪ Crusher enclosures shall be rigid and be fitted with self-closing doors and close-fitting entrances and exits. Where conveyors pass through the crusher enclosures, flexible covers shall be installed at entries and exits of the conveyors to the enclosure.		
			Vibratory screens and grizzlies ▪ All vibratory screens shall be totally enclosed in a housing. Screenhouses shall be rigid and reasonably dust tight with self-closing doors or close-fitted entrances and exits for access. Where conveyors pass through the screenhouse, flexible covers shall be installed at entries and exits of the conveyors to the housing. Where containment of dust within the screenhouse structure is not successful then a dust extraction and collection system shall be provided; and ▪ All grizzlies shall be enclosed on top and 3 sides and sufficient water sprayers shall be installed at their feeding and outlet areas.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Belt conveyors ▪ Except for those conveyors which are placed within a totally enclosed structure such as a screenhouse or those erected at the ground level, all conveyors shall be totally enclosed with windshield on top and 2 sides; ▪ Effective belt scraper such as the pre-cleaner blades made by hard wearing materials and provided with pneumatic tensioner, or equivalent device, shall be installed at the head pulley of designated conveyor as required to dislodge fine dust particles that may adhere to the belt surface and to reduce carry-back of fine materials on the return belt. Bottom plates shall also be provided for the conveyor unless it has been demonstrated that the corresponding belt scraper is effective and well maintained to prevent falling material from the return belt; and ▪ Except for those transfer points which are placed within a totally enclosed structure such as a screenhouse, all transfer points to and from conveyors shall be enclosed. Where containment of dust within the enclosure is not successful, then water sprayers shall be provided. Openings for any enclosed structure for the passage of conveyors shall be fitted with flexible seals.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Storage piles and bins ▪ Where practicable, free falling transfer points from conveyors to stockpiles shall be fitted with flexible curtains or be enclosed with chutes designed to minimize the drop height. Water sprays shall also be used where required. ▪ The surface of all surge piles and stockpiles of blasted rocks or aggregates shall be kept sufficiently wet	Within Concrete Batching Plant / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			by water spraying wherever practicable; ▪ All open stockpiles for aggregates of size in excess of 5 mm shall be kept sufficiently wet by water spraying where practicable; or ▪ The stockpiles of aggregates 5 mm in size or less shall be enclosed on 3 sides or suitably located to minimize wind-whipping. Save for fluctuations in stock or production, the average stockpile shall stay within the enclosure walls and in no case the height of the stockpile shall exceed twice the height of the enclosure walls. ▪ Scattered piles gathered beneath belt conveyors, inside and around enclosures shall be cleared regularly.		
			Rock drilling equipment Appropriate dust control equipment such as a dust extraction and collection system shall be used during rock drilling activities.	Within Concrete Batching Plant / Duration of the construction phase	N/A
			Hazard to Human Life – Construction Phase		
Table 6.40	3.2	-	▪ Precautionary measures should be established to request barges to move away during typhoons.	Construction Site / Construction Period	I
Table 6.40	3.2	-	▪ An appropriate marine traffic management system should be established to minimize risk of ship collision.	Construction Site / Construction Period	I
Table 6.40	3.2	-	▪ Location of all existing hydrant networks should be clearly identified prior to any construction works.	Construction Site / Construction Period	N/A
			Noise Impact – Construction Phase		
7.5.6	4.3	-	**Good Site Practice** Good site practice and noise management can significantly reduce the impact of construction site activities on nearby NSRs. The following package of measures should be followed during each phase of construction: ▪ only well-maintained plant to be operated on-site and plant should be serviced regularly during the construction works; ▪ machines and plant that may be in intermittent use to be shut down between work periods or should be throttled down to a minimum; ▪ plant known to emit noise strongly in one direction, should, where possible, be orientated to direct noise away from the NSRs; ▪ mobile plant should be sited as far away from NSRs as possible; and ▪ material stockpiles and other structures to be effectively utilised, where practicable, to screen noise from on-site construction activities.	Within the Project site / During construction phase / Prior to commencement of operation	I
7.5.6	4.3	-	**Adoption of QPME** ▪ QPME should be adopted as far as applicable.	Within the Project site / During construction	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
				phase / Prior to commencement of operation	
7.5.6	4.3	-	**Use of Movable Noise Barriers** ▪ Movable noise barriers should be placed along the active works area and mobile plants to block the direct line of sight between PME and the NSRs.	Within the Project site / During construction phase / Prior to commencement of operation	I
7.5.6	4.3	-	**Use of Noise Enclosure/ Acoustic Shed** ▪ Noise enclosure or acoustic shed should be used to cover stationary PME such as air compressor and generator.	Within the Project site / During construction phase / Prior to commencement of operation	I
			Water Quality Impact – Construction Phase		
8.8.1.2 and 8.8.1.3	5.1	2.26	**Marine Construction Activities** <u>General Measures to be Applied to All Works Areas</u> ▪ Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation; ▪ Use of Lean Material Overboard (LMOB) systems shall be prohibited; ▪ Excess materials shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessels are moved; ▪ Plants should not be operated with leaking pipes and any pipe leakages shall be repaired quickly; ▪ Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; ▪ All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; ▪ The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site; and ▪ For ground improvement activities including DCM, the wash water from cleaning of the drilling shaft should be appropriately treated before discharge. The Contractor should ensure the waste water meets the WPCO/TM requirements before discharge. No direct discharge of contaminated water is permitted.	Within construction site / Duration of the construction phase	I
			<u>Specific Measures to be Applied to All Works Areas</u> ▪ The daily maximum production rates shall not exceed those assumed in the water quality assessment in	Within construction site / Duration of the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			the EIA report; ▪ A maximum of 10 % fines content to be adopted for sand blanket and 20 % fines content for marine filling below +2.5 mPD prior to substantial completion of seawall (until end of Year 2017) shall be specified in the works contract document; ▪ An advance seawall of at least 200m to be constructed (comprising either rows of contiguous permanent steel cells completed above high tide mark or partially completed seawalls with rock core to high tide mark and filter layer on the inner side) prior to commencement of marine filling activities; ▪ Closed grab dredger shall be used to excavate marine sediment; ▪ Silt curtains surrounding the closed grab dredger shall be deployed in accordance with the Silt Curtain Deployment Plan; and ▪ The Silt Curtain Deployment Plan shall be implemented.		
			<u>Specific Measures to be Applied to Land Formation Activities prior to Commencement of Marine Filling Works</u> ▪ Double layer 'Type III' silt curtains to be applied around the active eastern works areas prior to commencement of sand blanket laying activities. The silt curtains shall be configured to minimise SS release during ebb tides. A silt curtain efficiency test shall be conducted to validate the performance of the silt curtains; ▪ Double layer silt curtains to enclose WSRs C7a and silt screens installed at the intake points for both WSR C7a and C8 prior to commencement of construction; and ▪ The silt curtains and silt screens should be regularly checked and maintained.	Within construction site / Duration of the construction phase	I
			<u>Specific Measures to be Applied to Land Formation Activities during Marine Filling Works</u> ▪ Double layer 'Type II' or 'Type III' silt curtains to be applied around the eastern openings between partially completed seawalls prior to commencement of marine filling activities. The silt curtains shall be configured to minimise SS release during ebb tides; ▪ Double layer silt curtains to be applied at the south-western opening prior to commencement of marine filling activities; ▪ Double layer silt curtain to enclose WSR C7a and silt screens installed at the intake points for both WSR C7a and C8 prior to commencement of marine filling activities; and ▪ The silt curtains and silt screens should be regularly checked and maintained.	Within construction site / Duration of the construction phase	N/A
			<u>Specific Measures to be Applied to the Field Joint Excavation Works for the Submarine Cable Diversion</u> ▪ Only closed grabs designed and maintained to avoid spillage shall be used and should seal tightly when operated. Excavated materials shall be disposed at designated marine disposal area in accordance with	Within construction site / Duration of the construction phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			the Dumping and Sea Ordinance (DASO) permit conditions; and ▪ Silt curtains surrounding the closed grab dredger to be deployed as a precautionary measure.		
8.8.1.4	5.1	-	**Modification of the Existing Seawall** ▪ Silt curtains shall be deployed around the seawall modification activities to completely enclose the active works areas, and care should be taken to avoid splashing of rockfill / rock armour into the surrounding marine environment. For the connecting sections with the existing outfalls, works for these connection areas should be undertaken during the dry season in order that individual drainage culvert cells may be isolated for interconnection works.	At the existing northern seawall / Duration of the construction phase	I
8.8.1.5	5.1	-	**Construction of New Stormwater Outfalls and Modifications to Existing Outfalls** ▪ During operation of the temporary drainage channel, runoff control measures such as bunding or silt fence shall be provided on both sides of the channel to prevent accumulation and release of SS via the temporary channel. Measures should also be taken to minimise the ingress of site drainage into the culvert excavations.	Within construction site / Duration of the construction phase	N/A
8.8.1.6 8.8.1.7	5.1	2.27	**Piling Activities for Construction of New Runway Approach Lights and HKIAAA Marker Beacons** Silt curtains shall be deployed around the piling activities to completely enclose the piling works and care should be taken to avoid spillage of excavated materials into the surrounding marine environment. <u>For construction of the eastern approach lights at the CMPs</u> ▪ Ground improvement via DCM using a close-spaced layout shall be completed prior to commencement of piling works; ▪ Steel casings shall be installed to enclose the excavation area prior to commencement of excavation; ▪ The excavated materials shall be removed using a closed grab within the steel casings; ▪ No discharge of the cement mixed materials into the marine environment will be allowed; and ▪ Excavated materials shall be treated and reused on-site.	Within construction site / Duration of the construction phase	N/A
8.8.1.8	5.1	-	**Construction Site Runoff and Drainage** The site practices outlined in ProPECC Note PN 1/94 should be followed as far as practicable in order to minimise surface runoff and the chance of erosion. The following measures are recommended: ▪ Install perimeter cut-off drains to direct off-site water around the site and implement internal drainage, erosion and sedimentation control facilities. Channels, earth bunds or sand bag barriers should be provided on site to direct storm water to silt removal facilities. The design of the temporary on-site drainage system should be undertaken by the Contractors prior to the commencement of construction (for works areas located on the existing Airport island) or as soon as the new land is completed (for works areas located on the new landform); ▪ Sand/silt removal facilities such as sand/silt traps and sediment basins should be provided to remove	Within construction site / Duration of the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			sand/silt particles from runoff to meet the requirements of the TM-DSS standards under the WPCO. The design of efficient silt removal facilities should make reference to the guidelines in Appendix A1 of ProPECC Note PN 1/94. Sizes may vary depending upon the flow rate. The detailed design of the sand/silt traps should be undertaken by the Contractors prior to the commencement of construction; ▪ All drainage facilities and erosion and sediment control structures should be regularly inspected and maintained to ensure proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit should be regularly removed, at the onset of and after each rainstorm to ensure that these facilities are functioning properly; ▪ Measures should be taken to minimize the ingress of site drainage into excavations. If excavation of trenches in wet periods is necessary, they should be dug and backfilled in short sections wherever practicable. Water pumped out from foundation excavations should be discharged into storm drains via silt removal facilities; ▪ In the event that contaminated groundwater is identified at excavation areas, this should be treated on-site using a suitable wastewater treatment process. The effluent should be treated according to the requirements of the TM-DSS standards under the WPCO prior to discharge to foul sewers or collected for proper disposal off-site. No direct discharge of contaminated groundwater is permitted; ▪ All vehicles and plant should be cleaned before leaving a construction site to ensure no earth, mud, debris and the like is deposited by them on roads. An adequately designed and sited wheel washing facility should be provided at construction site exits. Wash-water should have sand and silt settled out and removed regularly to ensure the continued efficiency of the process. The section of access road leading to, and exiting from, the wheel-wash bay to the public road should be paved with sufficient backfall toward the wheel-wash bay to prevent vehicle tracking of soil and silty water to public roads and drains. All washwater should be treated according to the requirements of the TM-DSS standards under the WPCO prior to discharge;		
8.8.1.9	5.1	-	**Sewage Effluent from Construction Workforce** ▪ Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site where necessary to handle sewage from the workforce. A licensed contractor should be employed to provide appropriate and adequate portable toilets and be responsible for appropriate disposal and maintenance.	Within construction site / During construction phase	I
8.8.1.10 8.8.1.11	5.1		**General Construction Activities** ▪ Construction solid waste, debris and refuse generated on-site should be collected, handled and disposed of properly to avoid entering any nearby storm water drain. Stockpiles of cement and other construction materials should be kept covered when not being used; and ▪ Oils and fuels should only be stored in designated areas which have pollution prevention facilities. To prevent spillage of fuels and solvents to any nearby storm water drain, all fuel tanks and storage areas should be provided with locks and be sited on sealed areas, within bunds of a capacity equal to 110% of the storage capacity of the largest tank. The bund should be drained of rainwater after a rain event.	Within construction site / During construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
8.8.1.12 8.8.1.13	5.1	2.28	**Drilling Activities for the Submarine Aviation Fuel Pipelines** To prevent potential water quality impacts at Sha Chau, the following measures shall be applied: ▪ A 'zero-discharge' policy shall be applied for all activities to be conducted at Sha Chau; ▪ No bulk storage of chemicals shall be permitted; and ▪ A containment pit shall be constructed around the drill holes. This containment pit shall be lined with impermeable lining and bunded on the outside to prevent inflow from off-site areas.	Within construction site / During construction phase	I
			At the airport island side of the drilling works, the following measures shall be applied for treatment of wastewater: ▪ During pipe cleaning, appropriate desilting or sedimentation device should be provided on site for treatment before discharge. The Contractor should ensure discharge water from the sedimentation tank meet the WPCO/TM requirements before discharge; and ▪ Drilling fluid used in drilling activities should be reconditioned and reused as far as possible. Temporary enclosed storage locations should be provided on-site for any unused chemicals that needs to be transported away after all the related construction activities are completed. The requirements in ProPECC Note PN 1/94 should be adhered to in the handling and disposal of bentonite slurries.	Within construction site / During construction phase	I
			Waste Management Implication – Construction Phase		
10.5.1.1	7.1	-	Opportunities to minimise waste generation and maximise the reuse of waste materials generated by the project have been incorporated where possible into the planning, design and construction stages, and the following measures have been recommended: ▪ The relevant construction methods (particularly for the tunnel works) and construction programme have been carefully planned and developed to minimise the extent of excavation and to maximise the on-site reuse of inert C&D materials generated by the project as far as practicable. Temporary stockpiling areas will also be provided to facilitate on-site reuse of inert C&D materials; ▪ Priority should be given to collect and reuse suitable inert C&D materials generated from other concurrent projects and the Government's PFRF as fill materials for the proposed land formation works; ▪ Only non-dredged ground improvement methods should be adopted in order to completely avoid the need for dredging and disposal of marine sediment for the proposed land formation work; ▪ Excavation work for constructing the APM tunnels, BHS tunnels and airside tunnels will not be down to the CMPs beneath the fill materials in order to avoid excavating any sediments; and ▪ For the marine sediments expected to be excavated from the piling works of TRC, APM & BHS tunnels, airside tunnels and other facilities on the proposed land formation area, piling work of marine sections of the approach lights and HKIAAA beacons, basement works for some of T2 expansion area and excavation works for the proposed APM depot should be treated and reused on-site as backfilling materials, although required treatment level / detail and the specific re-use mode are under development.	Project Site Area / During design and construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
10.5.1.1	7.1	-	The following good site practices should be performed during the construction activities include: ▪ Nomination of an approved person, such as a site manager, to be responsible for good site practices, arrangements for collection and effective disposal to an appropriate facility, of all wastes generated at the site; ▪ Training of site personnel in proper waste management and chemical waste handling procedures; ▪ Provision of sufficient waste disposal points and regular collection for disposal; ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks by tarpaulin/ similar material or by transporting wastes in enclosed containers. The cover should be extended over the edges of the sides and tailboards; ▪ Stockpiles of C&D materials should be kept wet or covered by impervious sheets to avoid wind-blown dust; ▪ All dusty materials including C&D materials should be sprayed with water immediately prior to any loading transfer operation so as to keep the dusty material wet during material handling at the barging points/ stockpile areas; ▪ C&D materials to be delivered to and from the project site by barges or by trucks should be kept wet or covered to avoid wind-blown dust; ▪ The speed of the trucks including dump trucks carrying C&D or waste materials within the site should be controlled to about 10 km/hour in order to reduce the adverse dust impact and secure the safe movement around the site; and ▪ To avoid or minimise dust emission during transport of C&D or waste materials within the site, each and every main temporary access should be paved with concrete, bituminous hardcore materials or metal plates and kept clear of dusty materials. Unpaved parts of the road should be sprayed with water or a dust suppression chemical so as to keep the entire road surface wet.	Project Site Area / Construction Phase	I
10.5.1.3	7.1	-	The following practices should be performed to achieve waste reduction include: ▪ Use of steel or aluminium formworks and falseworks for temporary works as far as practicable; ▪ Adoption of repetitive design to allow reuse of formworks as far as practicable; ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal; ▪ Encourage collection of aluminium cans, PET bottles and paper by providing separate labelled bins to enable these wastes to be segregated from other general refuse generated by the work force; ▪ Any unused chemicals or those with remaining functional capacity should be collected for reused as far as practicable; ▪ Proper storage and site practices to minimise the potential for damage or contamination of construction materials; and	Project Site Area / Construction Phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Plan and stock construction materials carefully to minimise amount of waste generated and avoid unnecessary generation of waste.		
10.5.1.5	7.1		▪ Inert and non-inert C&D materials should be handled and stored separately to avoid mixing the two types of materials.	Project Site Area / Construction Phase	I
10.5.1.5	7.1	-	▪ Any recyclable materials should be segregated from the non-inert C&D materials for collection by reputable licensed recyclers whereas the non-recyclable waste materials should be disposed of at the designated landfill site by a reputable licensed waste collector.	Project Site Area / Construction Phase	I
10.5.1.6	7.1	-	▪ A trip-ticket system promulgated shall be developed in order to monitor the off-site delivery of surplus inert C&D materials that could not be reused on-site for the proposed land formation work at the PFRF and to control fly tipping.	Project Site Area / Construction Phase	I
10.5.1.6	7.1	2.32	▪ The Contractor should prepare and implement a Waste Management Plan detailing various waste arising and waste management practices.	Construction Phase	I
10.5.1.16	7.1	-	The following mitigation measures are recommended during excavation and treatment of the sediments: ▪ On-site remediation should be carried out in an enclosed area in order to minimise odour/dust emissions; ▪ The loading, unloading, handling, transfer or storage of treated and untreated sediment should be carried out in such a manner to prevent or minimise dust emissions; ▪ All practical measures, including but not limited to speed control for vehicles, should be taken to minimise dust emission; ▪ Good housekeeping should be maintained at all times at the sediment treatment facility and storage area; ▪ Treated and untreated sediment should be clearly separated and stored separately; and ▪ Surface runoff from the enclosed area should be properly collected and stored separately, and then properly treated to levels in compliance with the relevant effluent standards as required by the Water Pollution Control Ordinance before final discharge.	Project Site Area / Construction Phase	N/A
10.5.1.18	7.1	-	The marine sediments to be removed from the cable field joint area would be disposed of at the designated disposal sites to be allocated by the MFC. The following mitigation measures should be strictly followed to minimise potential impacts on water quality during transportation of the sediments requiring Type 1 disposal: ▪ Bottom opening of barges shall be fitted with tight fitting seals to prevent leakage of material; ▪ Monitoring of the barge loading shall be conducted to ensure that loss of material does not take place during transportation. Transport barges or vessels shall be equipped with automatic self-monitoring devices as specified by EPD; and ▪ Barges or hopper barges shall not be filled to a level that would cause the overflow of materials or sediment laden water during loading or transportation.	Project Site Area / Construction Phase	N/A
10.5.1.19	7.1	-	Contractor should register with the EPD as a chemical waste producer and to follow the relevant guidelines. The following measures should be implemented:	Project Site Area / Construction Phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Good quality containers compatible with the chemical wastes should be used; ▪ Incompatible chemicals should be stored separately; ▪ Appropriate labels must be securely attached on each chemical waste container indicating the corresponding chemical characteristics of the chemical waste, such as explosive, flammable, oxidizing, irritant, toxic, harmful, corrosive, etc; and ▪ The contractor will use a licensed collector to transport and dispose of the chemical wastes at the approved Chemical Waste Treatment Centre or other licensed recycling facilities, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.		
10.5.1.20	7.1	-	▪ General refuse should be stored in enclosed bins or compaction units separated from inert C&D material. A reputable waste collector should be employed by the contractor to remove general refuse from the site for disposal at designated landfill sites. An enclosed and covered area should be provided to reduce the occurrence of 'wind blown' light material.	Project Site Area / Construction Phase	I
10.5.1.21	7.1	-	▪ The construction contractors will be required to regularly check and clean any refuse trapped or accumulated along the newly constructed seawall. Such refuse will then be stored and disposed of together with the general refuse.	Project Site Area / Construction Phase	N/A
			Land Contamination – Construction Phase		
11.10.1.2 to 11.10.1.3	8.1	2.32	For areas inaccessible during site reconnaissance survey ▪ Further site reconnaissance would be conducted once the areas are accessible in order to identify any land contamination concern for the areas. ▪ Subject to further site reconnaissance findings, a supplementary Contamination Assessment Plan (CAP) for additional site investigation (SI) (if necessary) may be prepared and submitted to EPD for endorsement prior to the commencement of SI at these areas. ▪ After completion of SI, the Contamination Assessment Report (CAR) will be prepared and submitted to EPD for approval prior to start of the proposed construction works at the golf course, the underground and above-ground fuel storage tank areas, emergency power generation units, airside petrol filling station and fuel tank room. ▪ Should remediation be required, Remediation Action Plan (RAP) and Remediation Report (RR) will be prepared for EPD's approval prior to commencement of the proposed remediation and any construction works respectively.	Project Site Area inaccessible during site reconnaissance / Prior to Construction Phase	N/A
11.8.1.2	8.1	-	If contaminated soil is identified, the following mitigation measures are for the excavation and transportation of contaminated materials (if any): ▪ To minimize the incidents of construction workers coming in contact with any contaminated materials, bulk earth-moving excavation equipment should be employed; ▪ Contact with contaminated materials can be minimised by wearing appropriate clothing and personal protective equipment such as gloves and masks (especially when working directly with contaminated	Project Site Area / Construction Phase	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			material), provision of washing facilities and prohibition of smoking and eating on site; ▪ Stockpiling of contaminated excavated materials on site should be avoided as far as possible; ▪ The use of any contaminated soil for landscaping purpose should be avoided unless pre-treatment was carried out; ▪ Vehicles containing any excavated materials should be suitably covered to reduce dust emissions and/or release of contaminated wastewater; ▪ Truck bodies and tailgates should be sealed to prevent any discharge; ▪ Only licensed waste haulers should be used to collect and transport contaminated material to treatment/disposal site and should be equipped with tracking system to avoid fly tipping; ▪ Speed control for trucks carrying contaminated materials should be exercised. 8km/h is the recommended speed limit; ▪ Strictly observe all relevant regulations in relation to waste handling, such as Waste Disposal Ordinance (Cap 354), Waste Disposal (Chemical Waste) (General) Regulation (Cap 354) and obtain all necessary permits where required; and ▪ Maintain records of waste generation and disposal quantities and disposal arrangements.		
			Terrestrial Ecological – Construction Phase		
12.10.1.1	9.2	2.14	**Pre-construction Egretry Survey** ▪ Conduct ecological survey for Sha Chau egretry to update the latest boundary of the egretry.	Breeding season (April - July) prior to commencement of HDD drilling works at HKIA	I
12.7.2.3 and 12.7.2.6	9.1	2.30	**Avoidance and Minimisation of Direct Impact to Egretry** ▪ The daylighting location will avoid direct encroachment to the Sheung Sha Chau egretry. The daylighting location and mooring of flat top barge, if required, will be kept away from the egretry; ▪ In any event, controls such as demarcation of construction site boundary and confining the lighting within the site will be practised to minimise disturbance to off-site habitat at Sheung Sha Chau Island; and ▪ The containment pit at the daylighting location shall be covered or camouflaged.	During construction phase at Sheung Sha Chau Island	I
12.7.2.5	9.1	2.30	**Preservation of Nesting Vegetation** ▪ The proposed daylighting location and the arrangement of connecting pipeline will avoid the need of tree cutting, therefore the trees that are used by ardeids for nesting will be preserved.	During construction phase at Sheung Sha Chau Island	I
12.7.2.4 and 12.7.2.6	9.1	2.30	**Timing the Pipe Connection Works outside Ardeid's Breeding Season** ▪ All HDD and related construction works on Sheung Sha Chau Island will be scheduled outside the ardeids' breeding season (between April and July). No night-time construction work will be allowed on	During construction phase at Sheung Sha Chau Island	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			Sheung Sha Chau Island during all seasons.		
12.10.1.1	9.3	-	**Ecological Monitoring** ▪ During the HDD construction works period from August to March, ecological monitoring will be undertaken monthly at the HDD daylighting location on Sheung Sha Chau Island to identify and evaluate any impacts with appropriate actions taken as required to address and minimise any adverse impact found.	at Sheung Sha Chau Island	I
			Marine Ecological Impact – Pre-construction Phase		
13.11.4.1	10.2.2	-	▪ Pre-construction phase Coral Dive Survey.	HKIAAA artificial seawall	I
			Marine Ecological Impact – Construction Phase		
13.11.1.3 to 13.11.1.6	-	-	**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for marine resources, especially the CWD population.	Land formation footprint / during detailed design phase to completion of construction	N/A
13.11.1.7 to 13.11.1.10	-	2.31	**Use of Construction Methods with Minimal Risk/Disturbance** ▪ Use of non-dredge method for the main land formation and ancillary works including the diversion of the aviation fuel pipeline to the AFRF; ▪ Use of Deep Cement Mixing (DCM) method instead of conventional seabed dredging for the land formation works to reduce the risk of negative impacts through the elevation of suspended solids and contaminants on CWDs, fisheries and the marine environment; ▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; ▪ Avoid bored piling during CWD peak calving season (Mar to Jun); ▪ Prohibition of underwater percussive piling; and ▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of submarine cables and pipelines to minimise the disturbance to the CWDs and other marine ecological resources.	During construction phase at marine works area	I
13.11.2.1 to 13.11.2.7	-	-	**Mitigation for Indirect Disturbance due to Deterioration of Water Quality** ▪ Water quality mitigation measures during construction phases include consideration of alternative construction methods, deployment of silt curtain and good site practices; ▪ Alternative construction methods including use of non-dredge methods for ground improvement (e.g. Deep Cement Mixing (DCM), prefabricated vertical drains (PVD), sand compaction piles, steel cells, stone columns and vertical sand drains); ▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new	All works area during the construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			runway; and ▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to the CWDs and other marine ecological resources.		
13.11.1.12	-	-	**Strict Enforcement of No-Dumping Policy** ▪ A policy prohibiting dumping of wastes, chemicals, oil, trash, plastic, or any other substance that would potentially be harmful to dolphins and/or their habitat in the work area; ▪ Mandatory educational programme of the no-dumpling policy be made available to all construction site personnel for all project-related works; ▪ Fines for infractions should be implemented; and ▪ Unscheduled, on-site audits shall be implemented.	All works area during the construction phase	I
13.11.1.13	-	-	**Good Construction Site Practices** ▪ Regular inspection of the integrity and effectiveness of all silt curtains and monitoring of effluents to ensure that any discharge meets effluent discharge guidelines; ▪ Keep the number of working or stationary vessels present on-site to the minimum anytime; and ▪ Unscheduled, on-site audits for all good site practice restrictions should be conducted, and fines or penalties sufficient to be an effective deterrent need to be levied against violators.	All works area during the construction phase	I
13.11.1.3 to 13.11.1.6	-	-	**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for marine resources, especially the CWD population.	Land formation footprint / during detailed design phase to completion of construction	N/A
13.11.5.4 to 13.11.5.13	10.3.1	-	**SkyPier High Speed Ferries' Speed Restrictions and Route Diversions** ▪ SkyPier HSFs operating to / from Zhuhai and Macau would divert north of SCLKC Marine Park with a 15 knot speed limit to apply for the part-journeys that cross high CWD abundance grid squares as indicatively shown in **Drawing No. MCL/P132/EIA/13-023** of the EIA Report. Both the alignment of the northerly route and the portion of routings to be subject to the speed limit of 15 knots shall be finalised prior to commencement of construction based on the future review of up-to-date CWD abundance and EM&A data and taking reference to changes in total SkyPier HSF numbers; and ▪ A maximum of 10 knots will be enforced through the designated SCLKC Marine Park area at all times.	Area between the footprint and SCLKC Marine Park during construction phase	I
			Other mitigation measures ▪ The ET will audit various parameters including actual daily numbers of HSFs, compliance with the 15-knot speed limit in the speed control zone and diversion compliance for SkyPier HSFs operating to / from Zhuhai and Macau; and ▪ The effectiveness of the CWD mitigation measures after implementation of initial six month SkyPier HSF diversion and speed restriction will be reviewed.	Area between the footprint and SCLKC Marine Park during construction phase	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
13.11.5.14 to 13.11.5.18	10.3.1	2.31	**Dolphin Exclusion Zone** ▪ Establishment of a 24 hr Dolphin Exclusion Zone (DEZ) with a 250 m radius around the land formation works areas; ▪ A DEZ would also be implemented during ground improvement works (e.g. DCM), water jetting works for submarine cables diversion, open trench dredging at the field joint locations and seawall construction; and ▪ A DEZ would also be implemented during bored piling work but as a precautionary measure only.	Marine waters around land formation works area during construction phase	I
13.11.5.19	10.4	2.31	**Acoustic Decoupling of Construction Equipment** ▪ Air compressors and other noisy equipment that must be mounted on steel barges should be acoustically-decoupled to the greatest extent feasible, for instance by using rubber or air-filled tyres; and ▪ Specific acoustic decoupling measures shall be specified during the detailed design of the project for use during the land formation works.	Around coastal works area during construction phase	I
13.11.5.20	10.6.1	2.29	**Spill Response Plan** ▪ An oil and hazardous chemical spill response plan is proposed to be established during the construction phase as a precautionary measure so that appropriate actions to prevent or reduce risks to CWDs can be undertaken in the event of an accidental spillage.	Construction phase	I
13.11.5.21 to 13.11.5.23	10.6.1	-	**Construction Vessel Speed Limits and Skipper Training** ▪ A speed limit of 10 knots should be strictly observed for construction vessels at areas with the highest CWD densities; and ▪ Vessels traversing through the work areas should be required to use predefined and regular routes (which would presumably become known to resident dolphins) to reduce disturbance to cetaceans due to vessel movements. Specific marine routes shall be specified by the Contractor prior to construction commencing.	All areas north and west of Lantau Island during construction phase	I
			Fisheries Impact – Construction Phase		
14.9.1.2 to 14.9.1.5	-	-	**Minimisation of Land Formation Area** ▪ Minimise the overall size of the land formation needed for the additional facilities to minimise the overall loss of habitat for fisheries resources.	Land formation footprint / during detailed design phase to completion of construction	N/A
14.9.1.6	-	-	**Use of Construction Methods with Minimal Risk/Disturbance** ▪ Use of non-dredge method for the main land formation and ancillary works including the diversion of the aviation fuel pipeline to the AFRF; ▪ Use of Deep Cement Mixing (DCM) method instead of conventional seabed dredging for the land formation works to reduce the risk of negative impacts through the elevation of suspended solids and contaminants on fisheries and the marine environment;	During construction phase at marine works area	I

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
			▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; and ▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to fisheries resources.		
14.9.1.11	-		**Strict Enforcement of No-Dumping Policy** ▪ A policy prohibiting dumping of wastes, chemicals, oil, trash, plastic, or any other substance that would potentially be harmful to dolphins and/or their habitat in the work area; ▪ Mandatory educational programme of the no-dumpling policy be made available to all construction site personnel for all project-related works; ▪ Fines for infractions should be implemented; and ▪ Unscheduled, on-site audits shall be implemented.	All works area during the construction phase	I
14.9.1.12	-		**Good Construction Site Practices** ▪ Regular inspection of the integrity and effectiveness of all silt curtains and monitoring of effluents to ensure that any discharge meets effluent discharge guidelines; ▪ Keep the number of working or stationary vessels present on-site to the minimum anytime; and ▪ Unscheduled, on-site audits for all good site practice restrictions should be conducted, and fines or penalties sufficient to be an effective deterrent need to be levied against violators.	All works area during the construction phase	I
14.9.1.13 to 14.9.1.18	-		**Mitigation for Indirect Disturbance due to Deterioration of Water Quality** ▪ Water quality mitigation measures during construction phases include consideration of alternative construction methods, deployment of silt curtain and good site practices; ▪ Alternative construction methods including use of non-dredge methods for ground improvement (e.g. Deep Cement Mixing (DCM), prefabricated vertical drains (PVD), sand compaction piles, steel cells, stone columns and vertical sand drains); ▪ Use of bored piling in short duration to form the new approach lights and marker beacons for the new runway; and ▪ Use of horizontal directional drilling (HDD) method and water jetting methods for placement of undersea cables and pipelines to minimise the disturbance to fisheries resources.	All works area during the construction phase	I
			Landscape and Visual Impact – Construction Phase		
Table 15.6	12.3	-	**CM1 -** The construction area and contractor's temporary works areas should be minimised to avoid impacts on adjacent landscape.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM2 -** Reduction of construction period to practical minimum.	All works areas for duration of works;	N/A

EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
				Upon handover and completion of works.	
Table 15.6	12.3	-	**CM3 -** Phasing of the construction stage to reduce visual impacts during the construction phase.	All works areas for duration of works; Upon handover and completion of works.	N/A
Table 15.6	12.3	-	**CM4 -** Construction traffic (land and sea) including construction plants, construction vessels and barges should be kept to a practical minimum.	All works areas for duration of works; Upon handover and completion of works.	I
Table 15.6	12.3	-	**CM5 -** Erection of decorative mesh screens or construction hoardings around works areas in visually unobtrusive colours.	All works areas for duration of works; Upon handover and completion of works. – may be disassembled in phases	N/A
Table 15.6	12.3	-	**CM6 -** Avoidance of excessive height and bulk of site buildings and structures.	New passenger concourse, terminal 2 expansion and other proposed airport related buildings and structures under the project; Upon handover and completion of works.	N/A
Table 15.6	12.3	-	**CM7** - Control of night-time lighting by hooding all lights and through minimisation of night working periods.	All works areas for duration of works; Upon handover and completion of works. – may be disassembled in phases	N/A
Table 15.6	12.3	-	**CM8 -** All existing trees shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas.	All existing trees to be retained; Upon handover and completion of works.	I

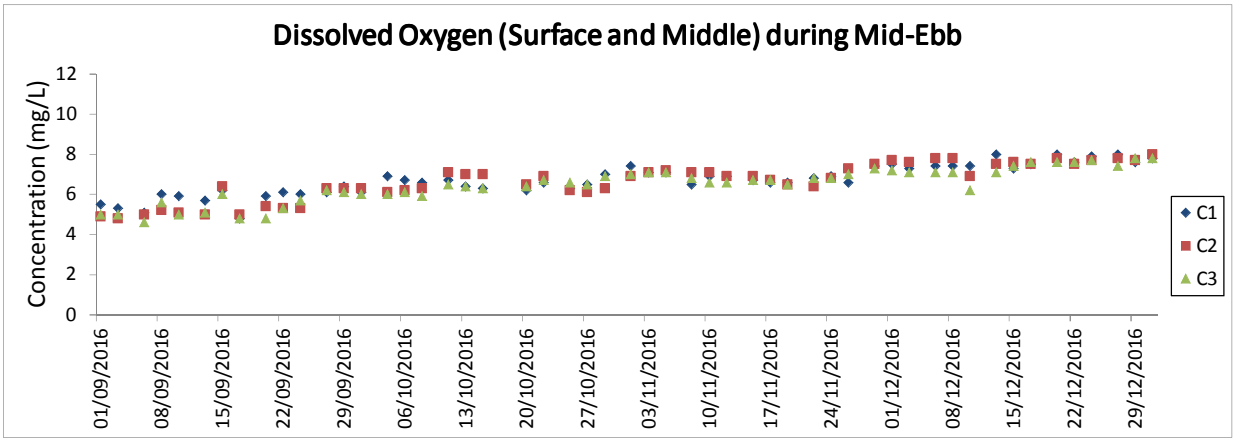
EIA Ref.	EM&A Ref.	EP Condition	Environmental Protection Measures	Location / Duration of measures Timing of completion of measures	Mitigation Measures Implemented?^
Table 15.6	12.3	-	**CM9 -** Trees unavoidably affected by the works shall be transplanted where practical. A detailed Tree Transplanting Specification shall be provided in the Contract Specification, if applicable. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme.	All existing trees to be affected by the works; Upon handover and completion of works.	N/A
Table 15.6	12.3	-	**CM10 -** Land formation works shall be followed with advanced hydroseeding around taxiways and runways as soon as practical.	All affected existing grass areas around runways and verges/Duration of works; Upon handover and completion of works.	N/A
			Cultural Heritage Impact – Construction Phase		
			Not applicable.		
			Health Impact – Aircraft Emissions		
			Not applicable.		
			Health Impact – Aircraft Noise		
			Not applicable.		

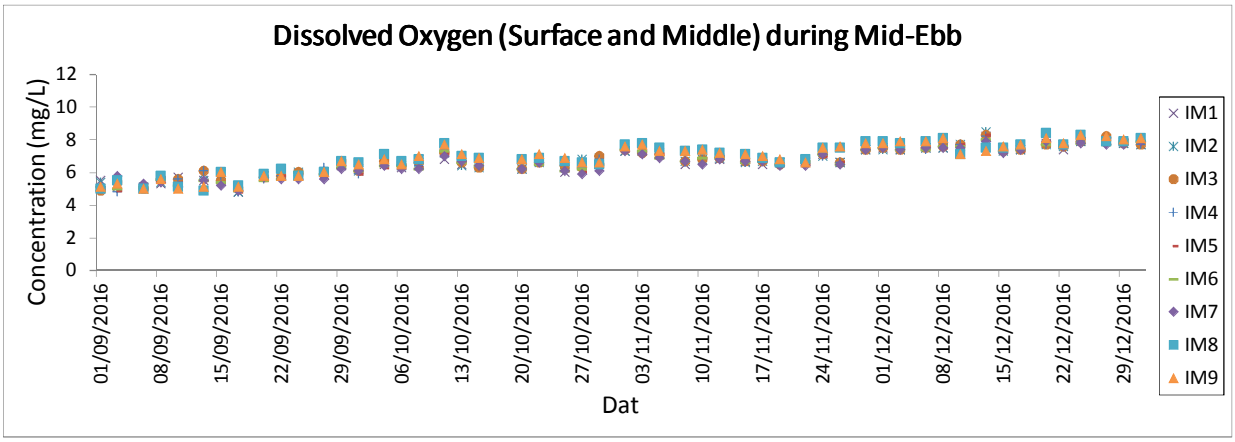
Notes:

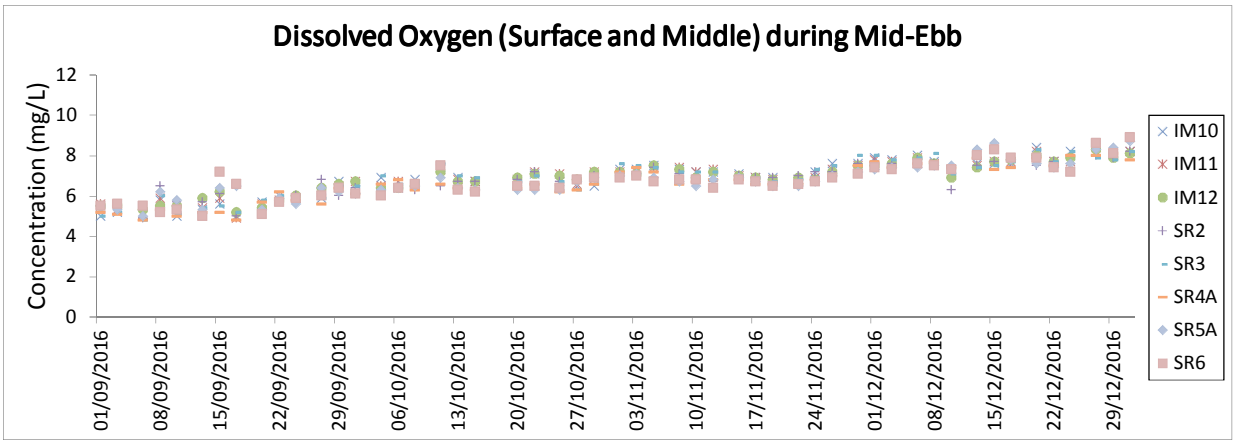
I= implemented where applicable; N/A= not applicable to the construction works implemented during the reporting month.

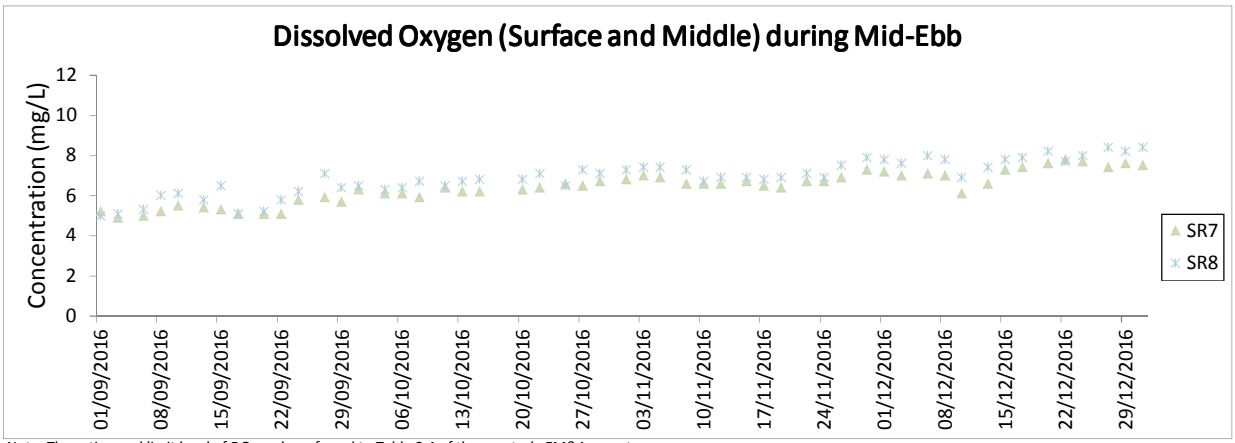
^ Checked by ET during site inspection

Appendix D. Graphical Plots of Water Quality Monitoring Result

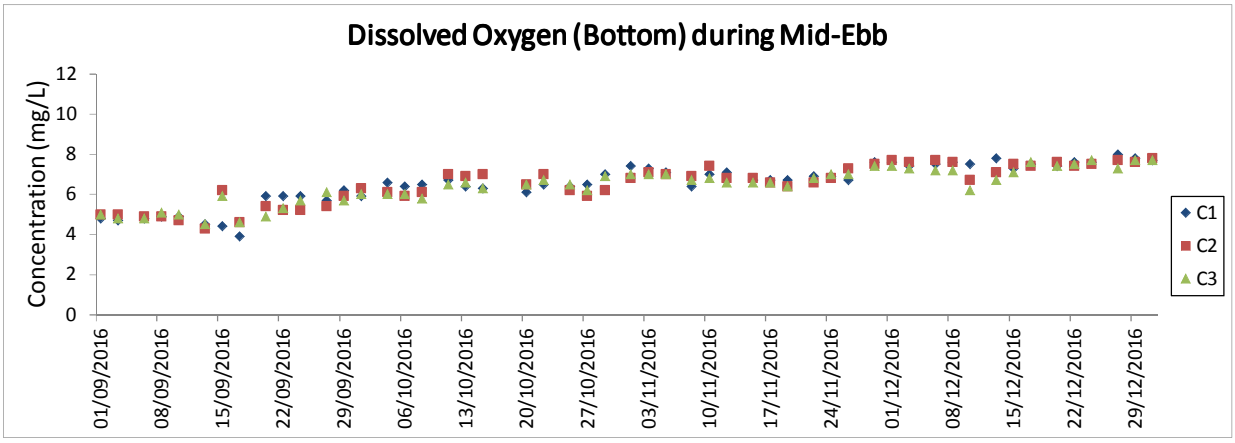


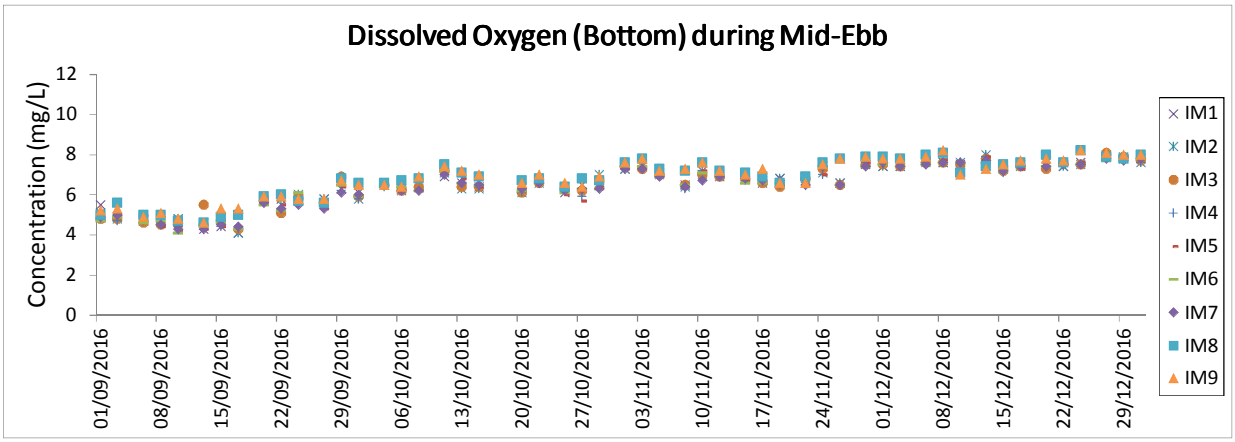


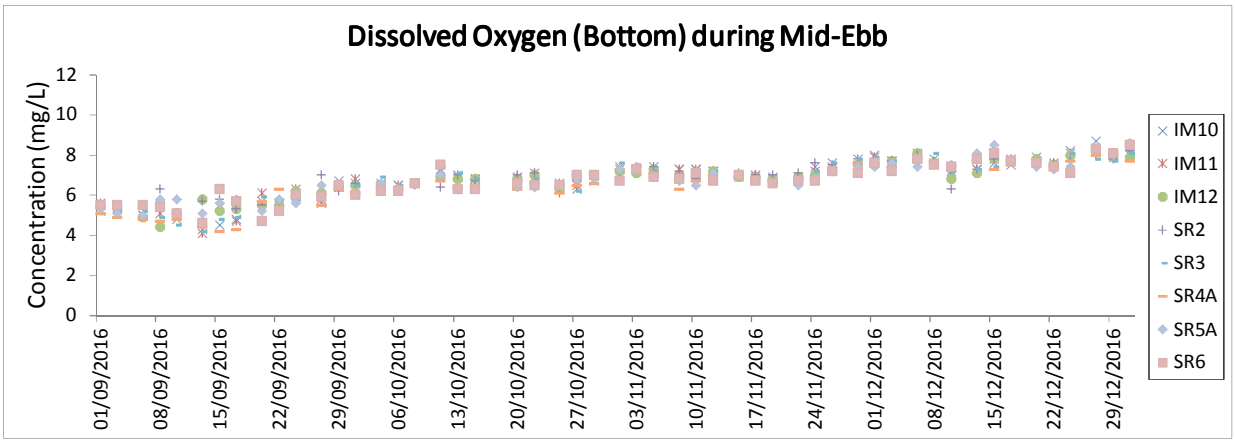


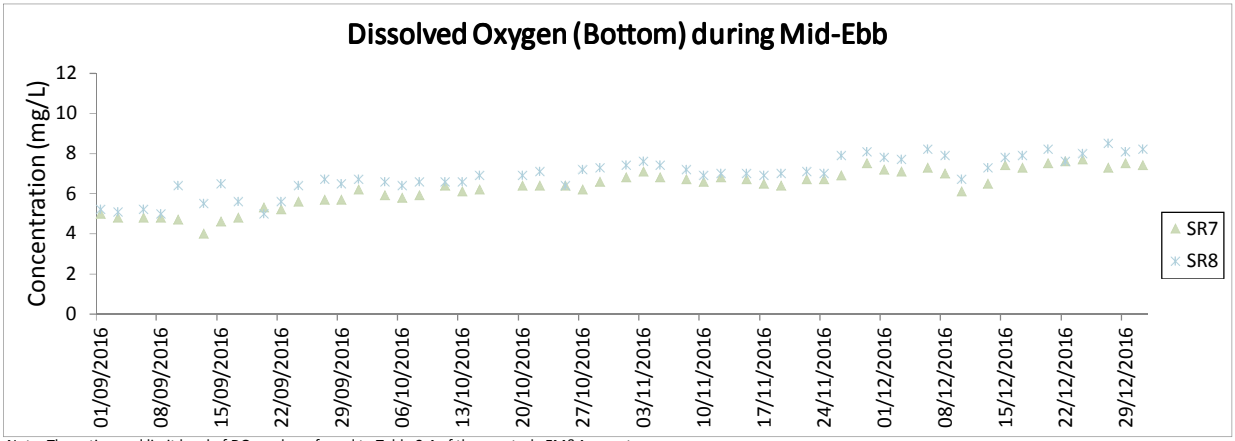


Note: The action and limit level of DO can be referred to Table 2.4 of the quarterly EM&A report.

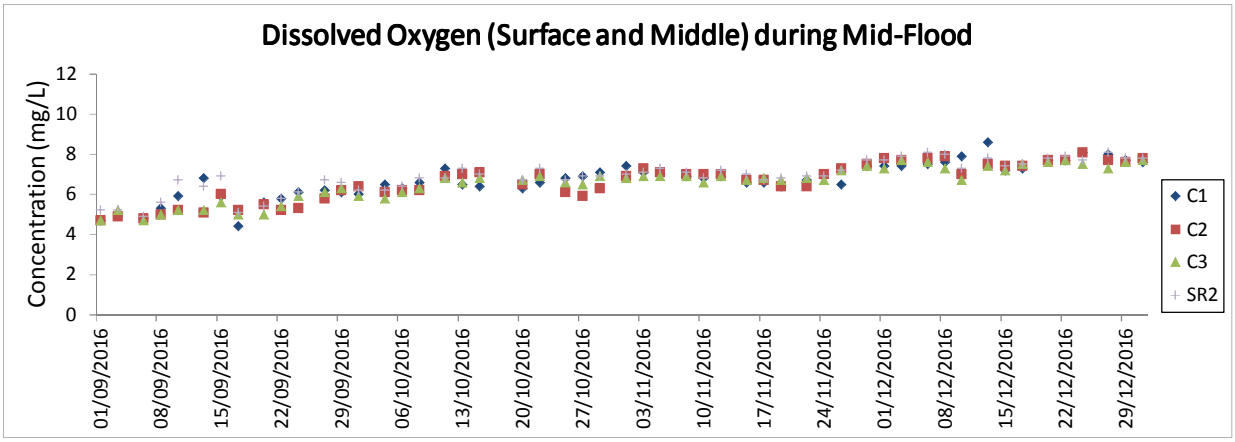


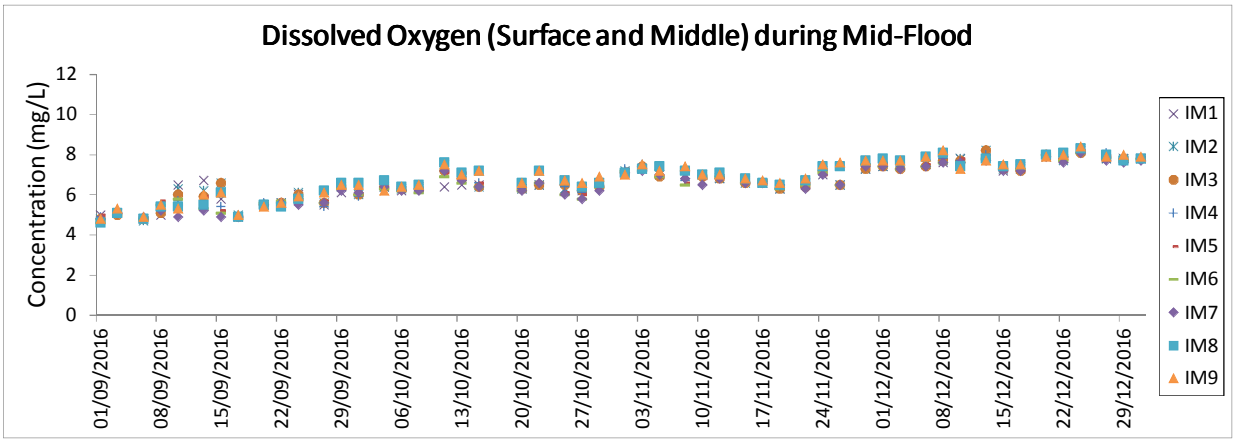


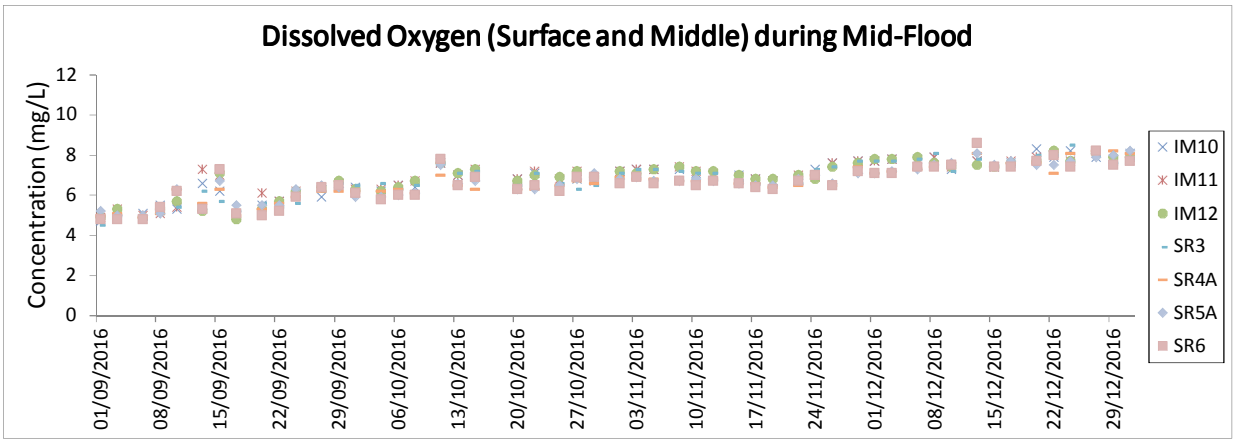


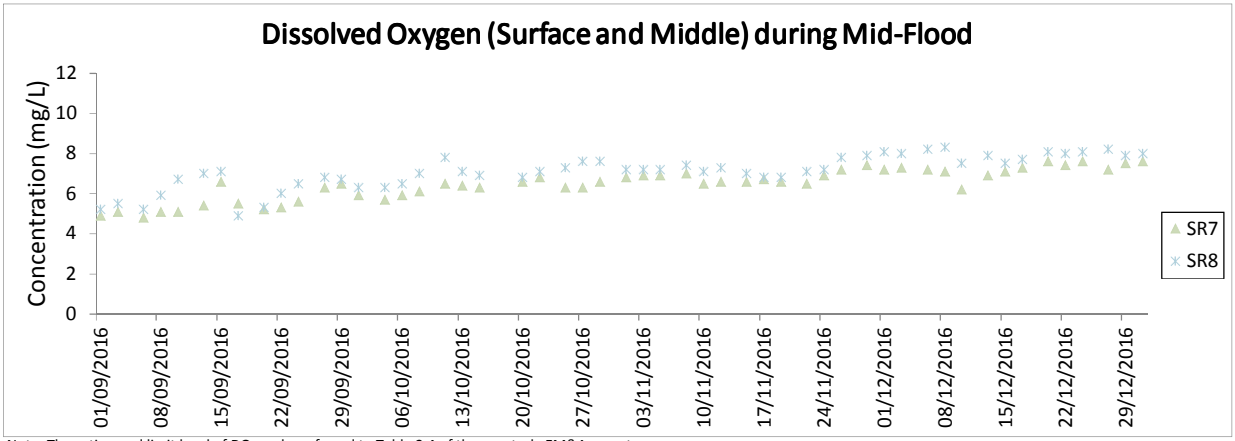


Note: The action and limit level of DO can be referred to Table 2.4 of the quarterly EM&A report.

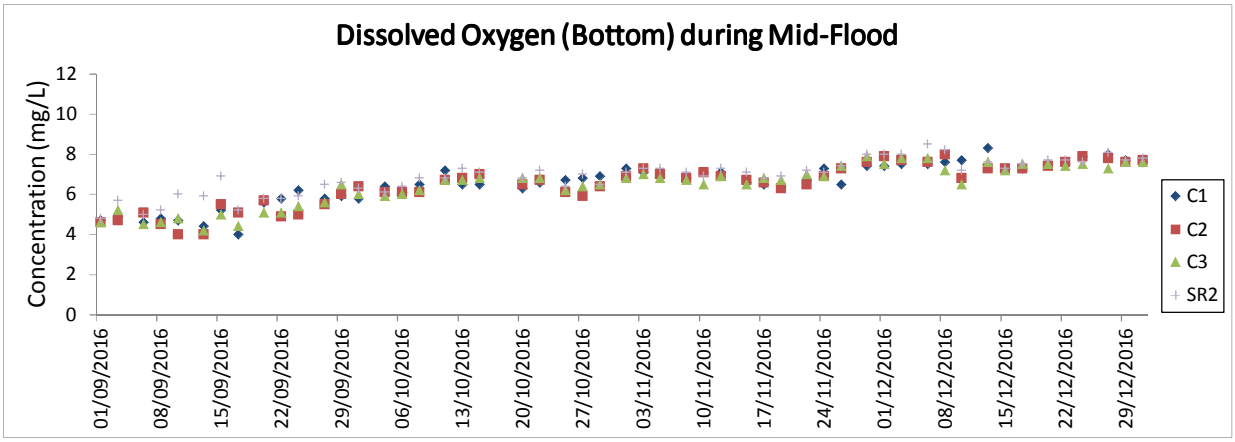


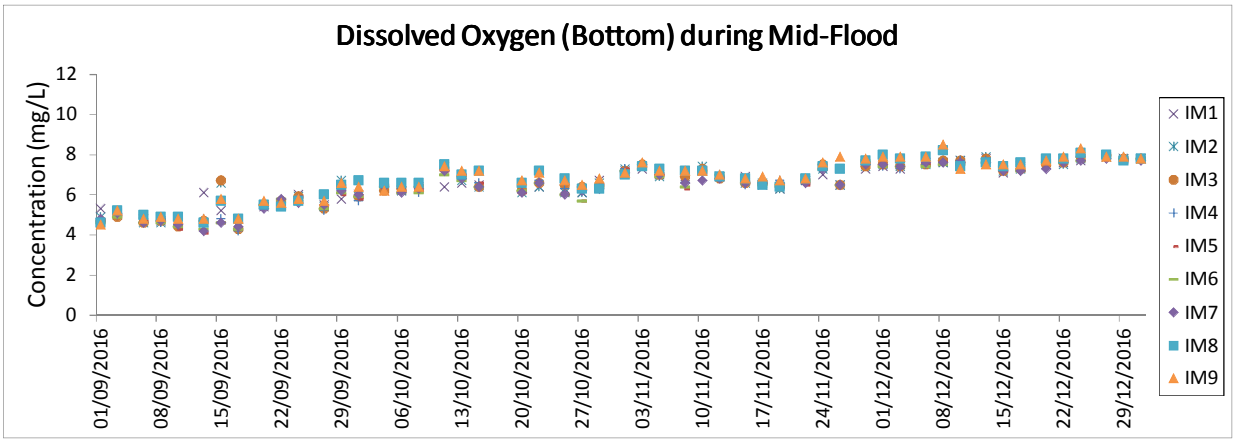


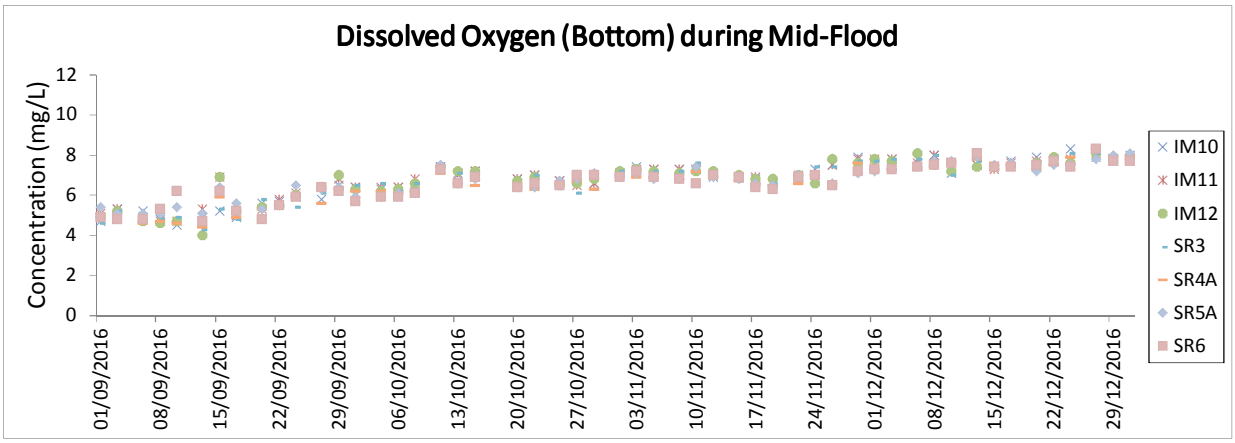


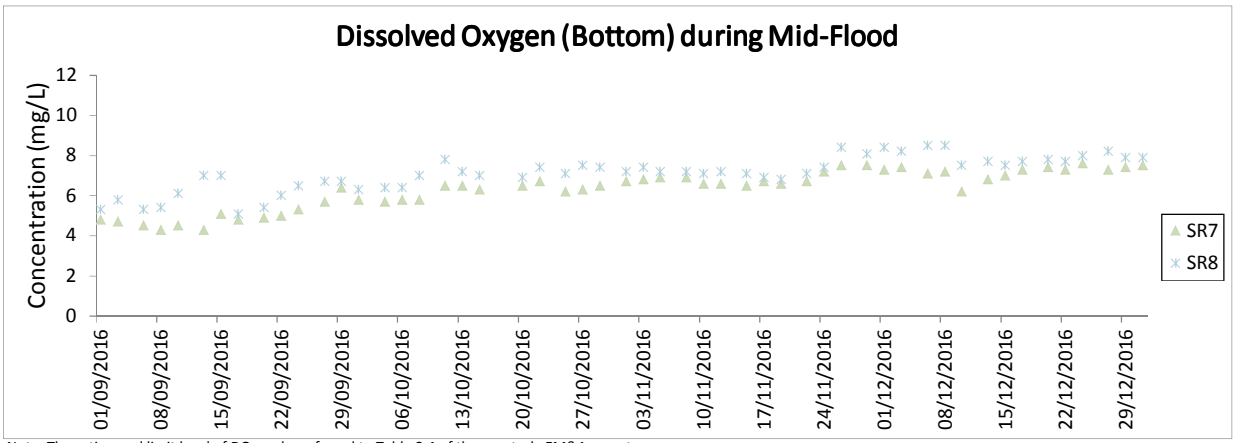


Note: The action and limit level of DO can be referred to Table 2.4 of the quarterly EM&A report.

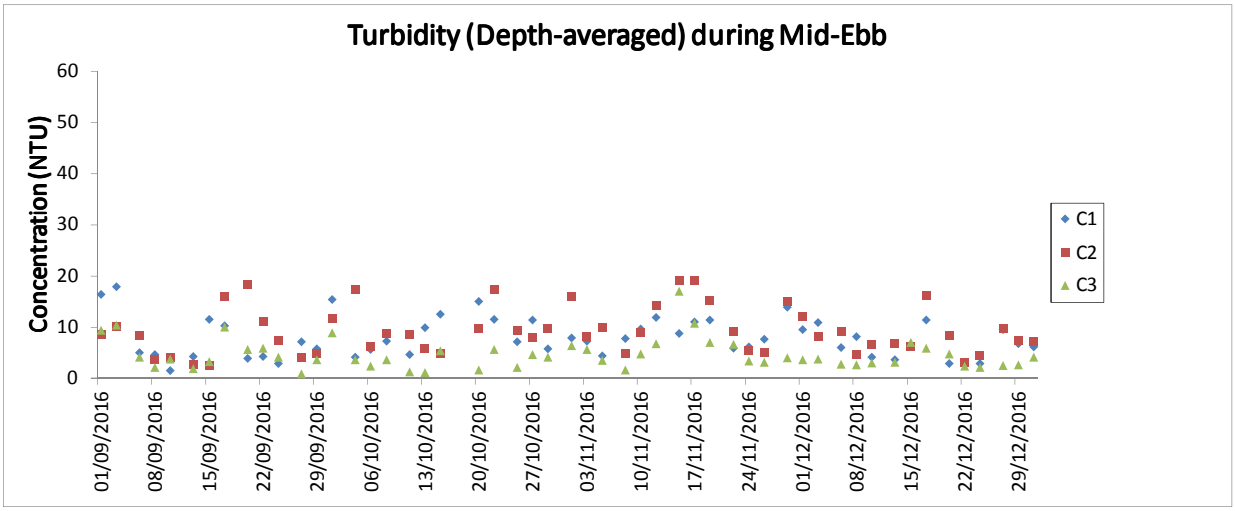


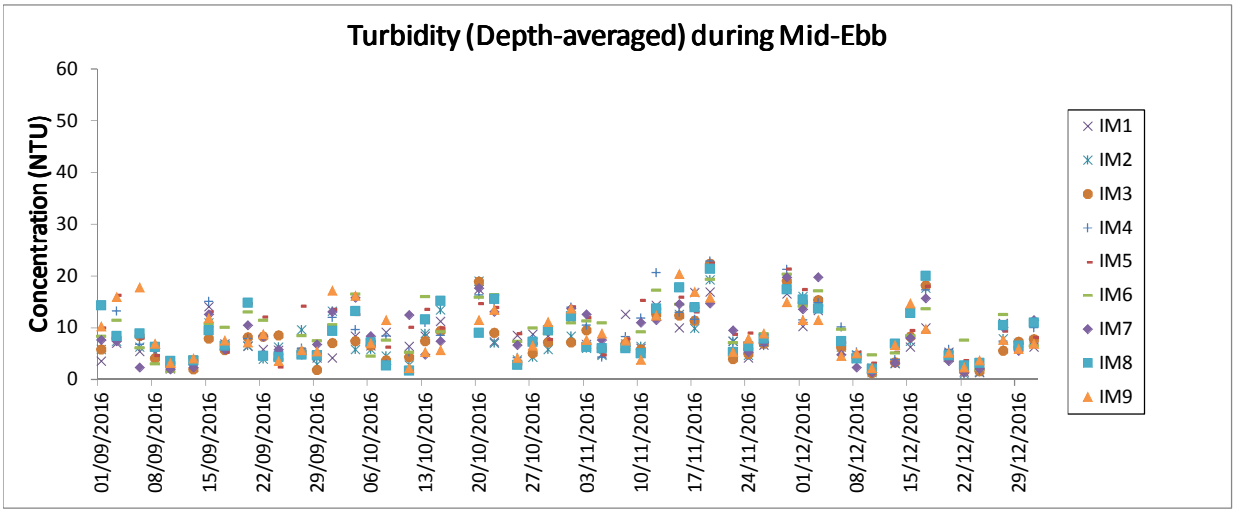


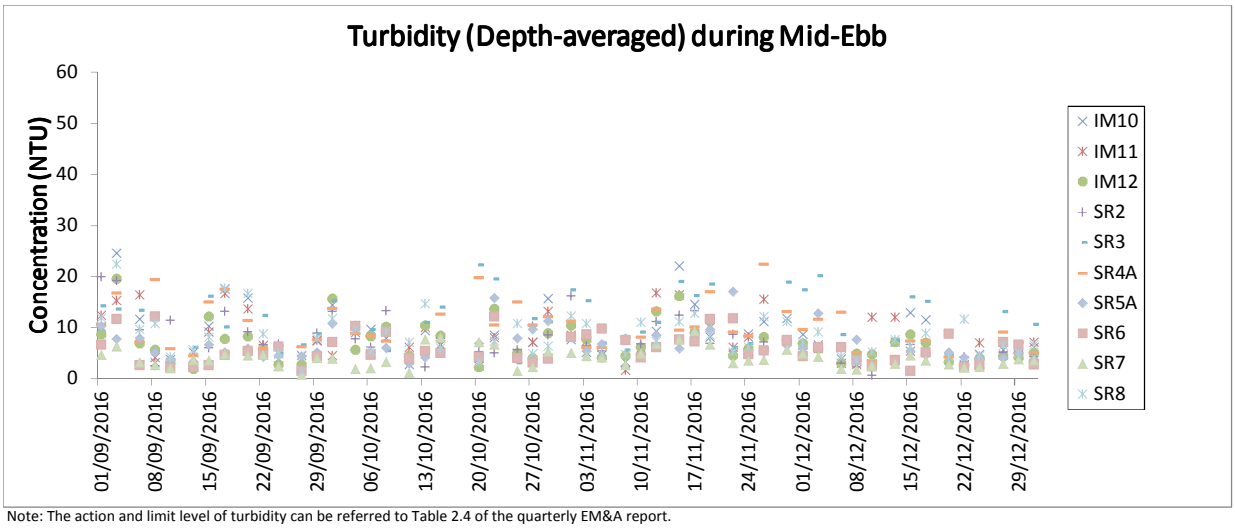




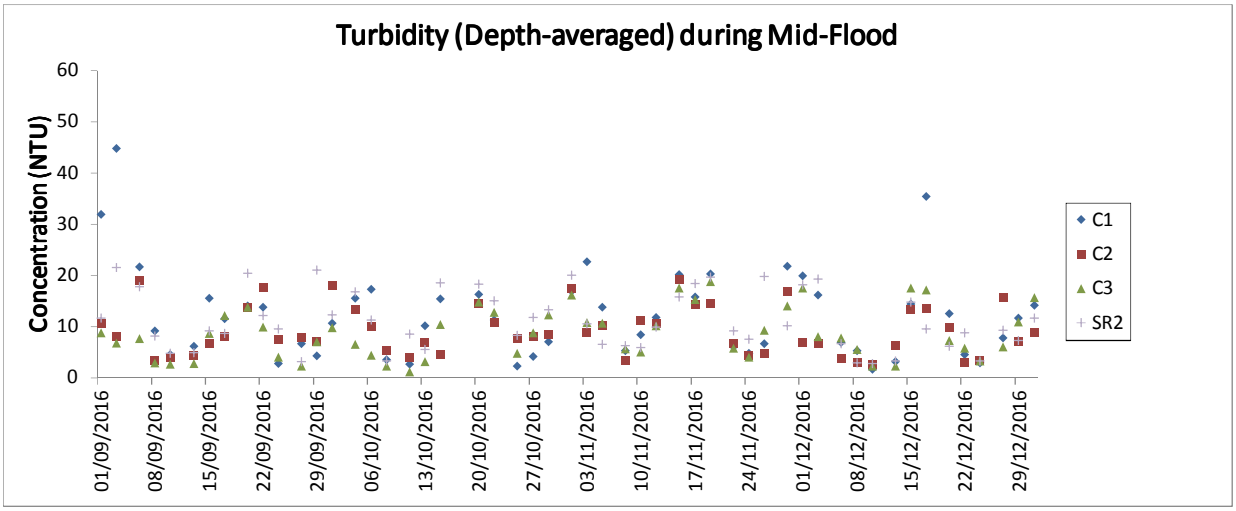
Note: The action and limit level of DO can be referred to Table 2.4 of the quarterly EM&A report.

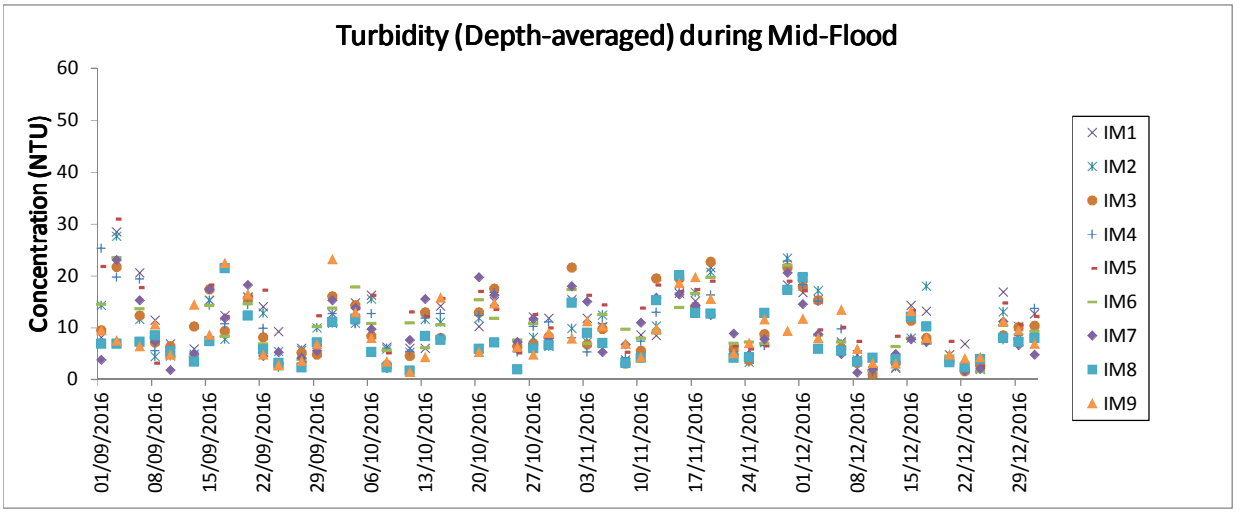


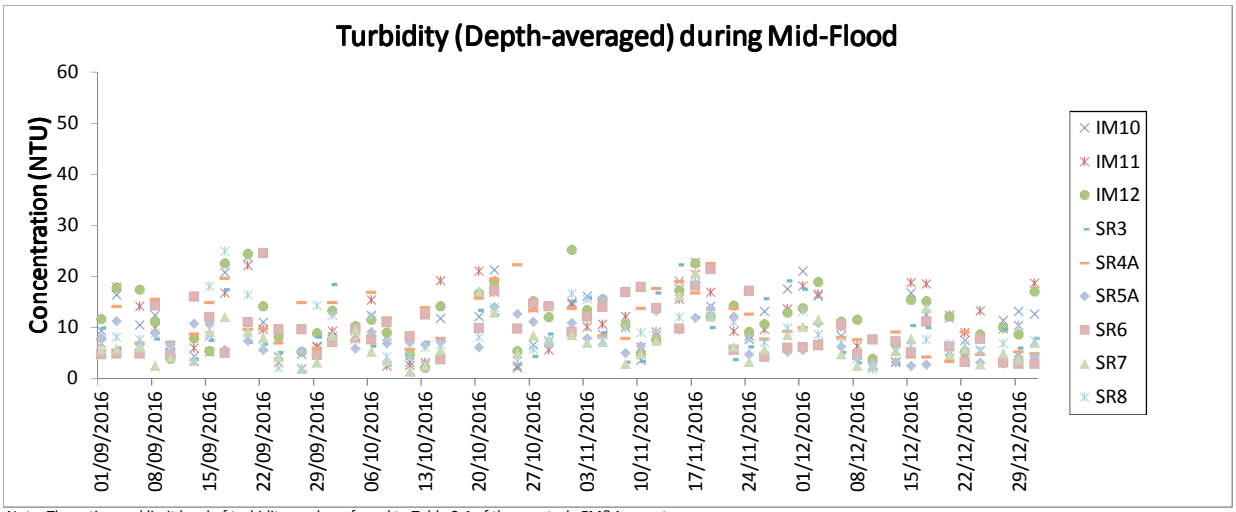




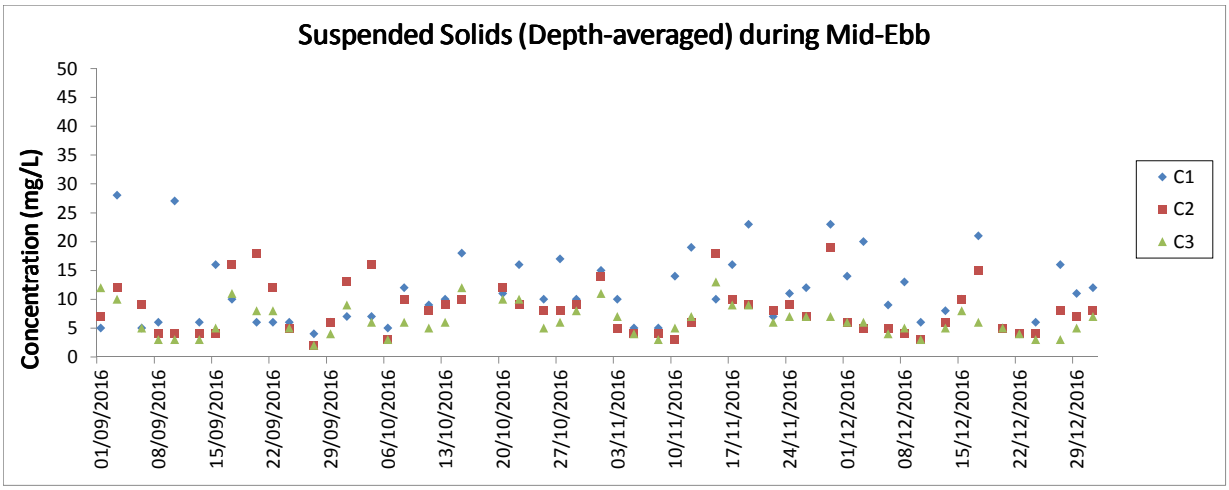
Note: The action and limit level of turbidity can be referred to Table 2.4 of the quarterly EM&A report.

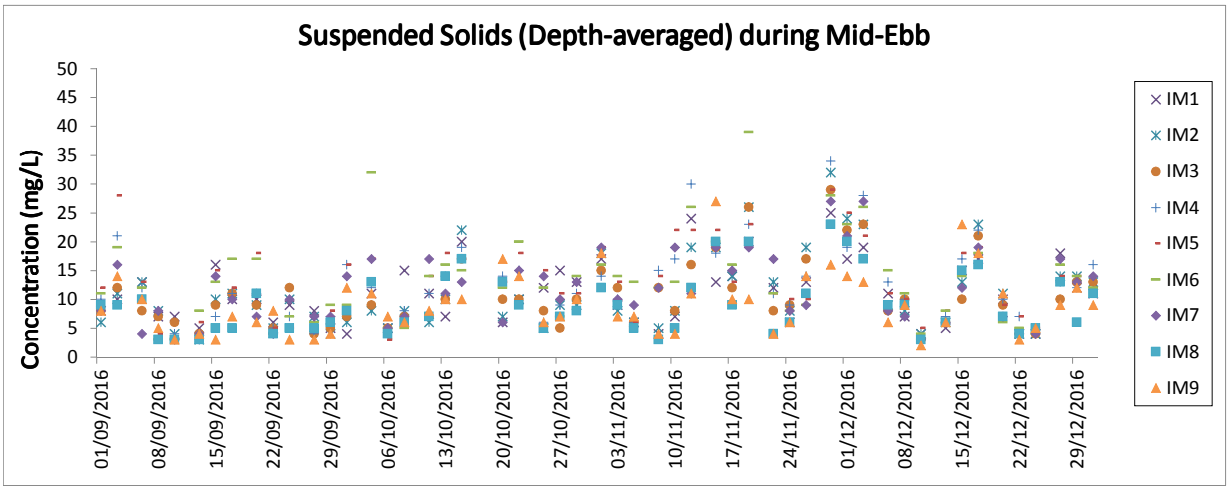


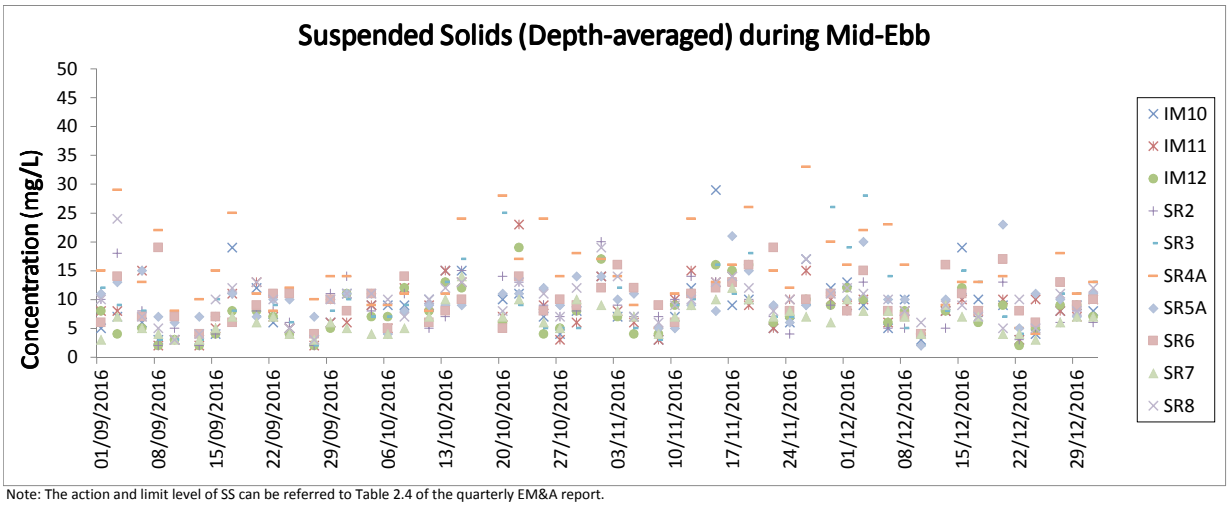




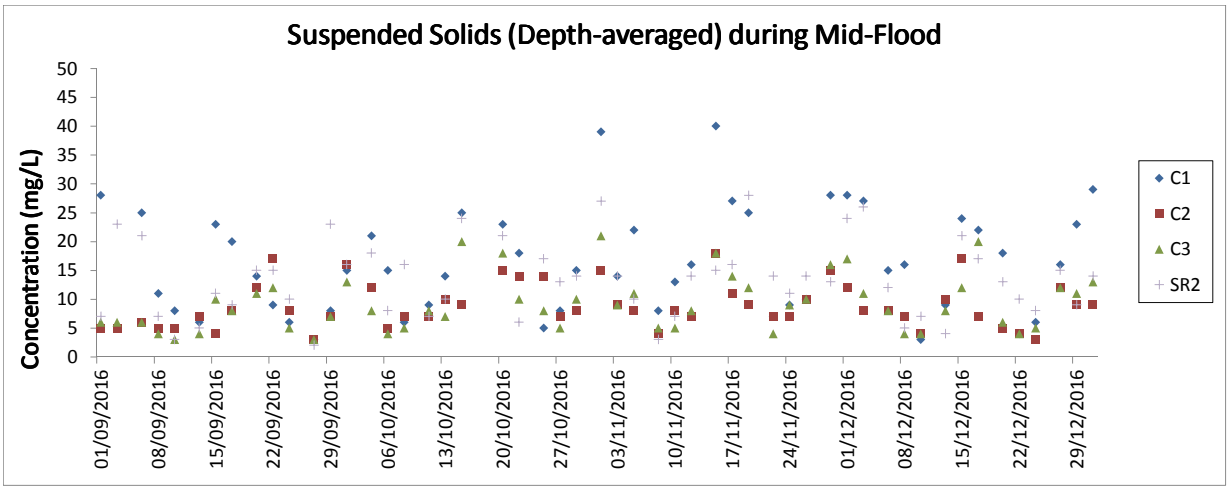
Note: The action and limit level of turbidity can be referred to Table 2.4 of the quarterly EM&A report.

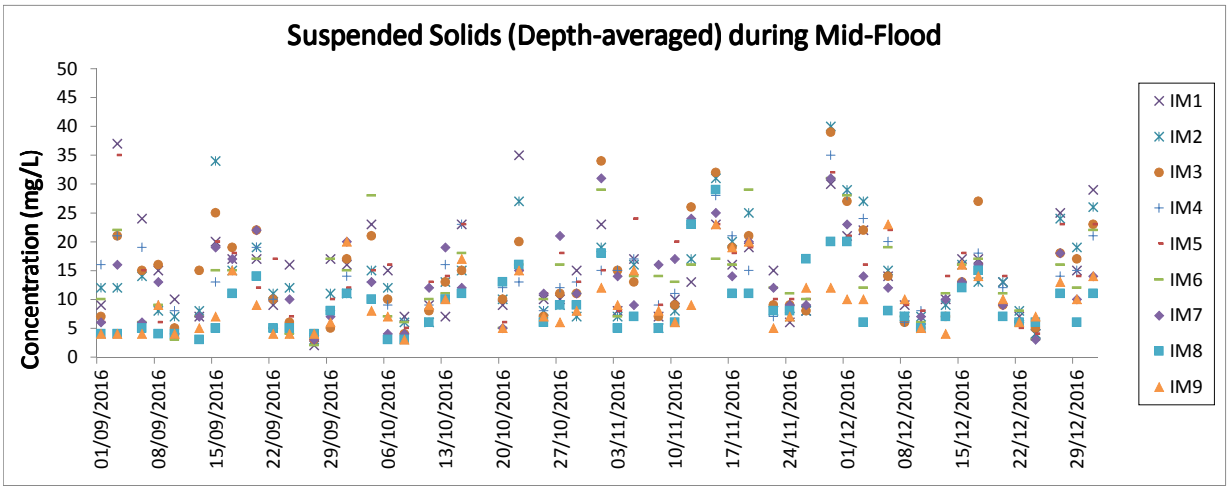


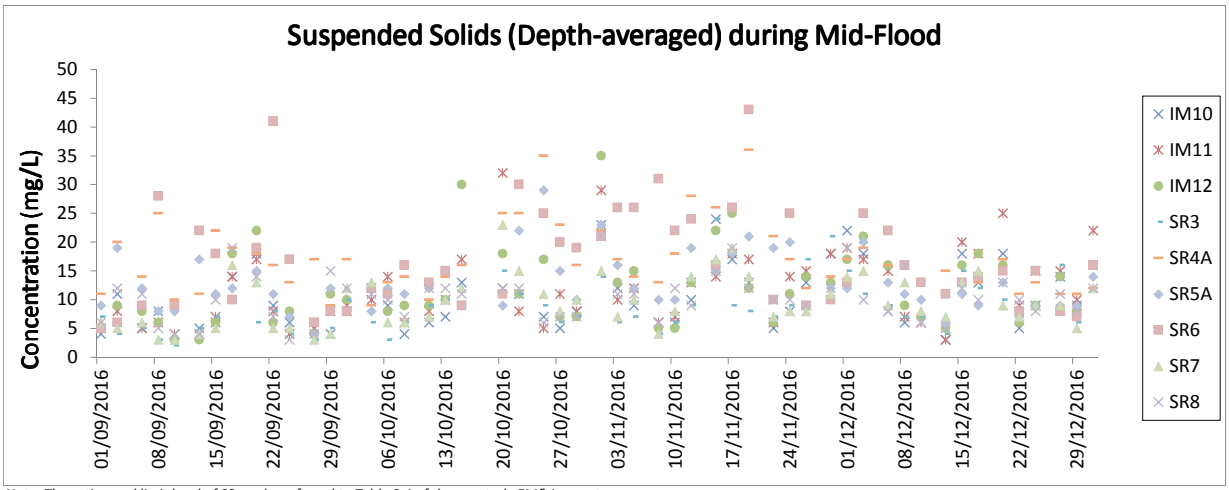




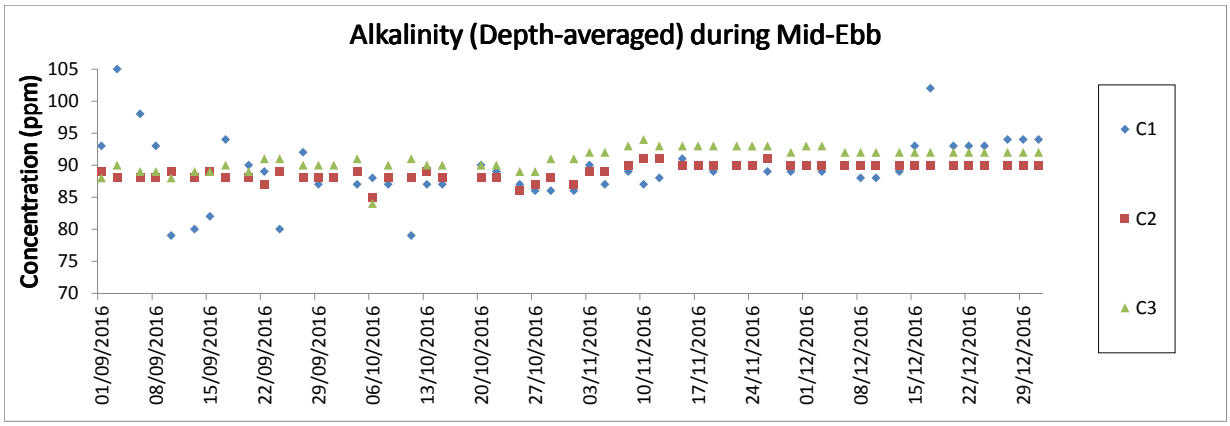
Note: The action and limit level of SS can be referred to Table 2.4 of the quarterly EM&A report.

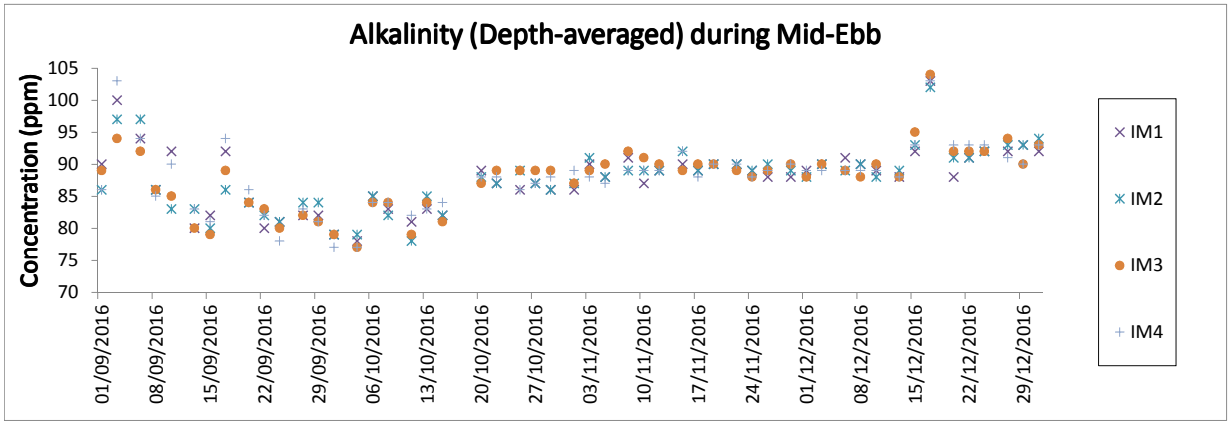


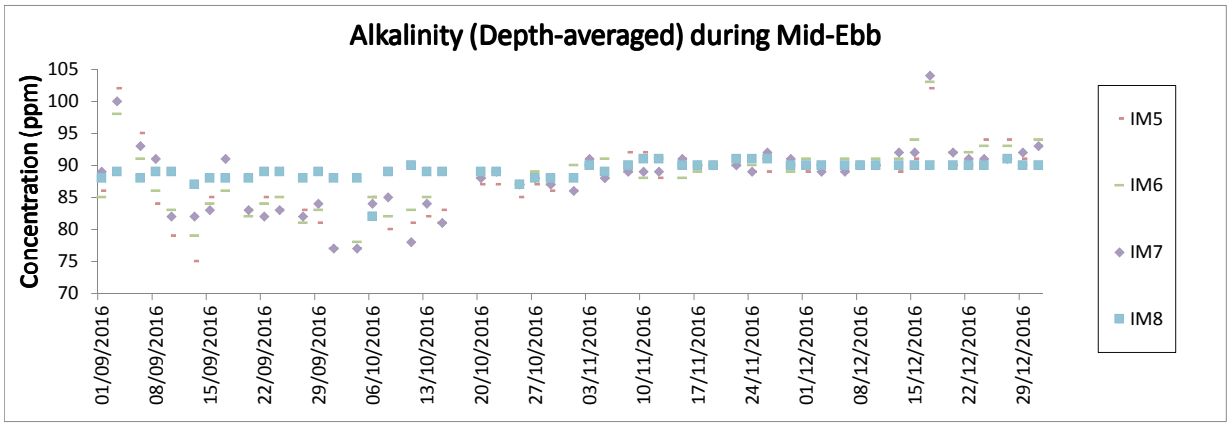


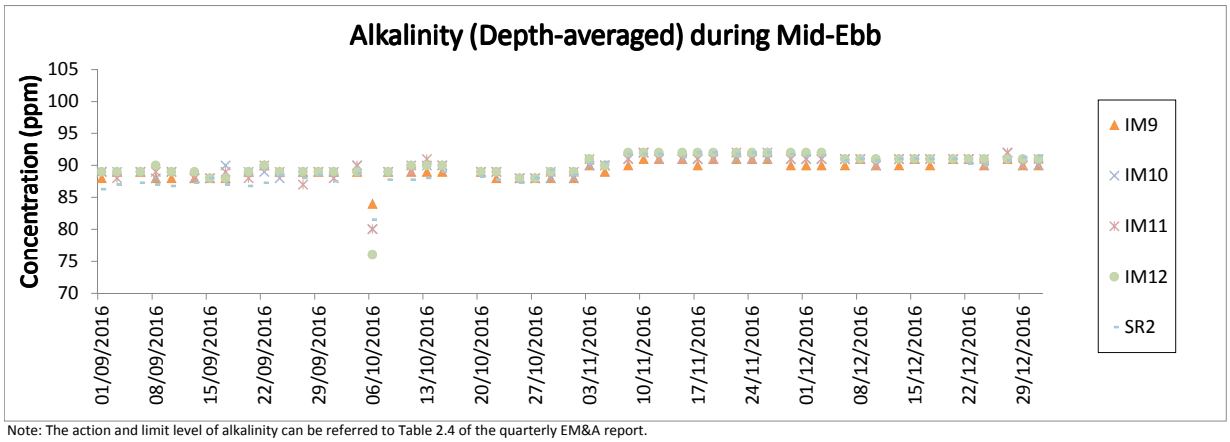


Note: The action and limit level of SS can be referred to Table 2.4 of the quarterly EM&A report.

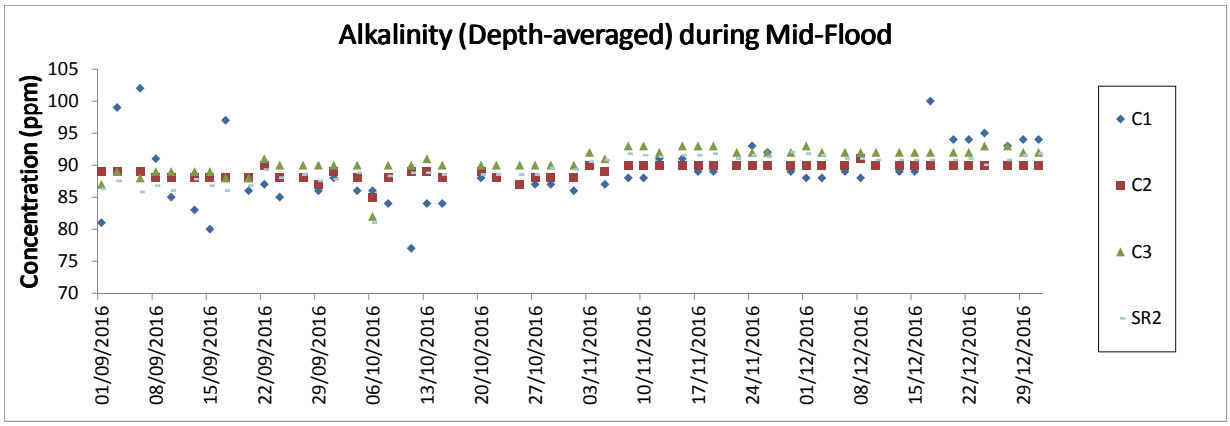


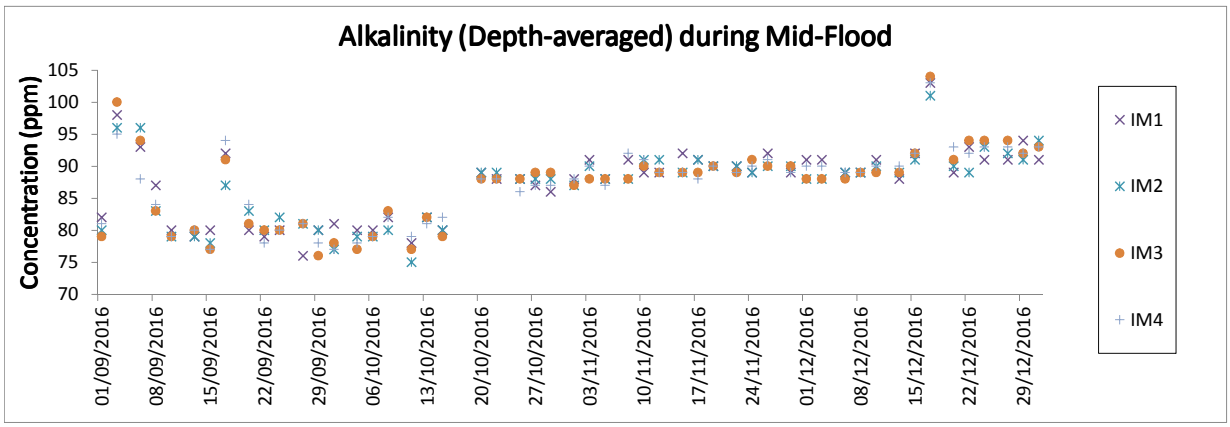


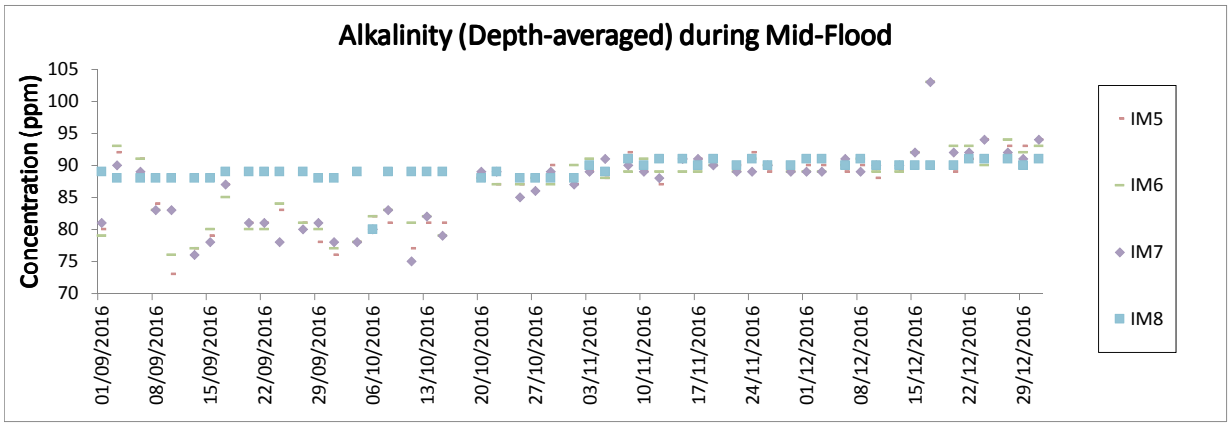


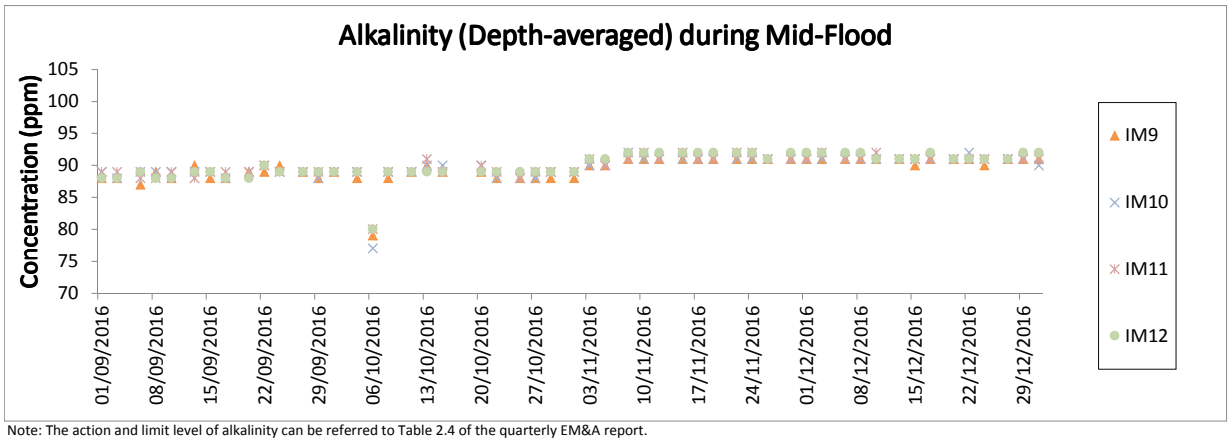


Note: The action and limit level of alkalinity can be referred to Table 2.4 of the quarterly EM&A report.

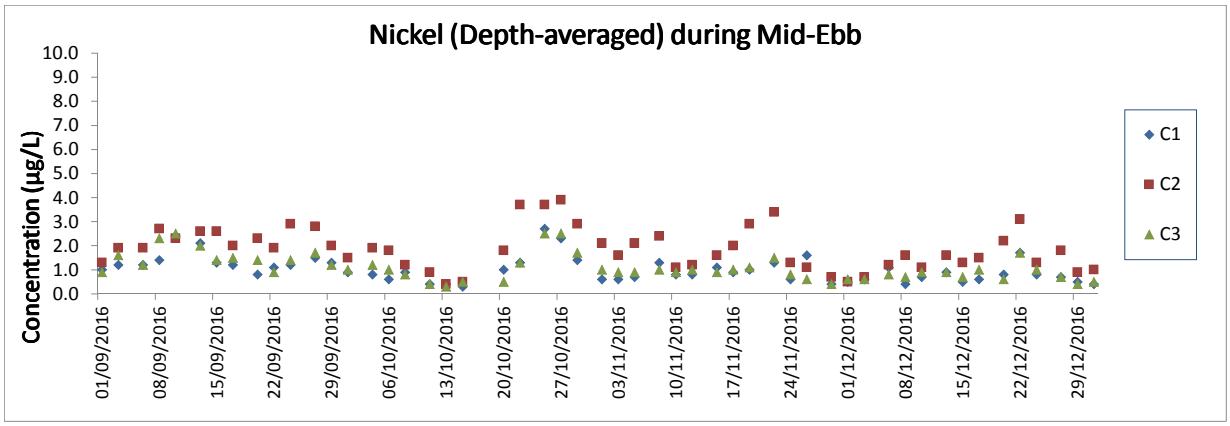


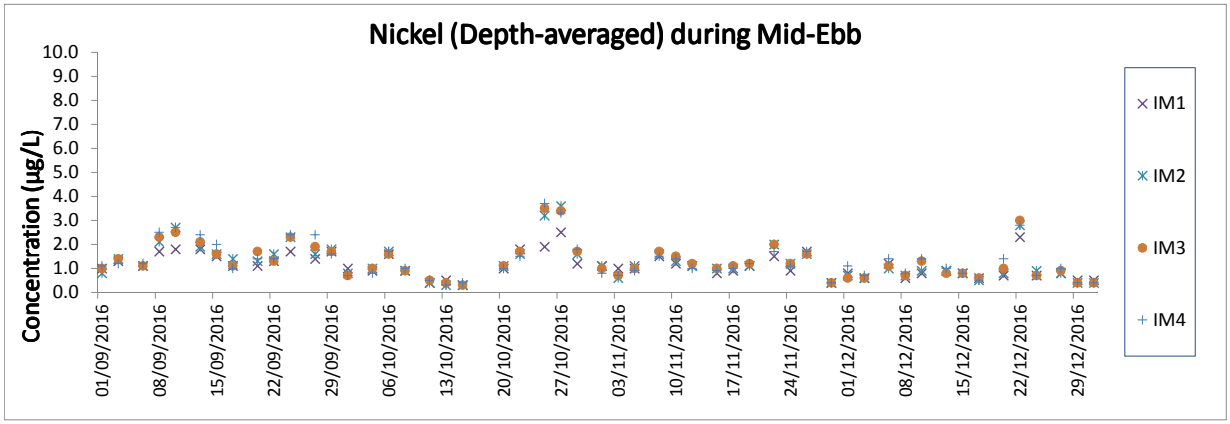


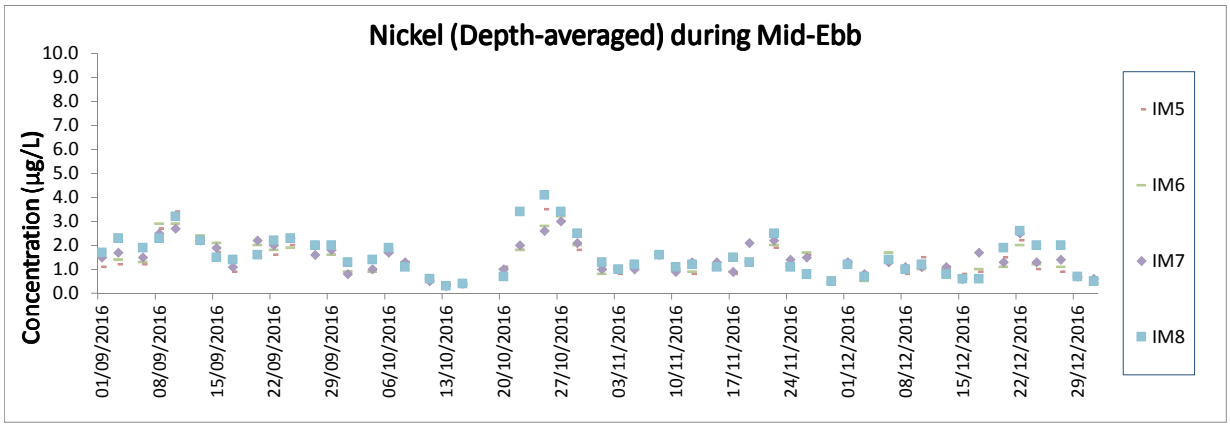


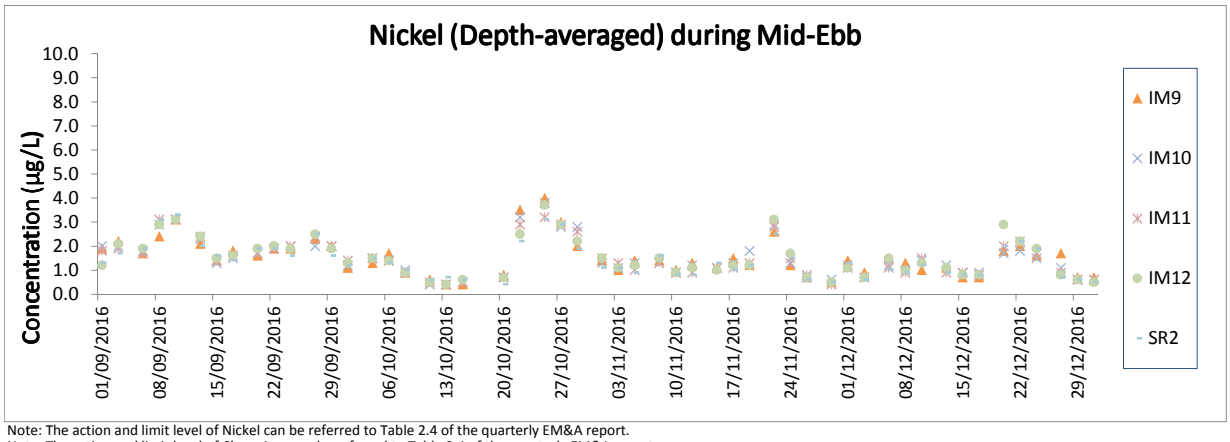


Note: The action and limit level of alkalinity can be referred to Table 2.4 of the quarterly EM&A report.

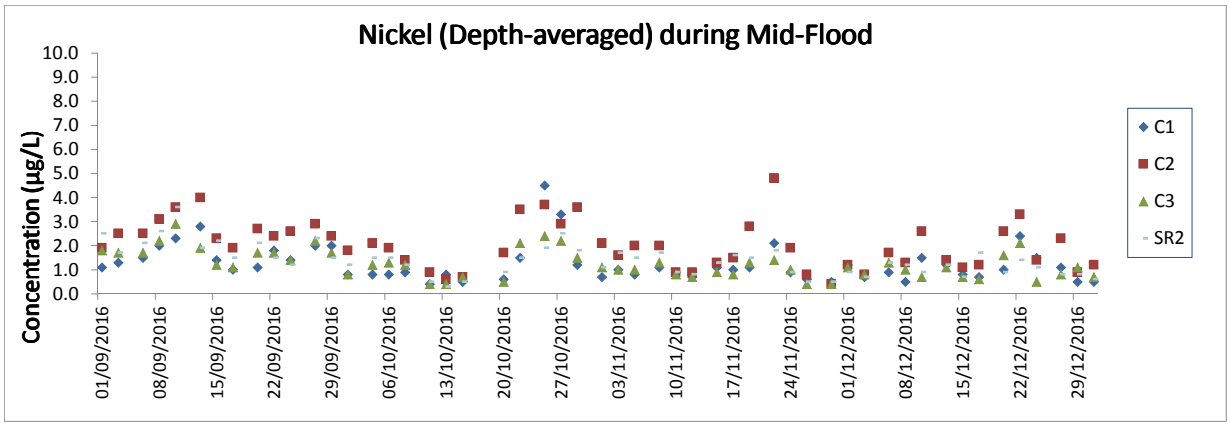


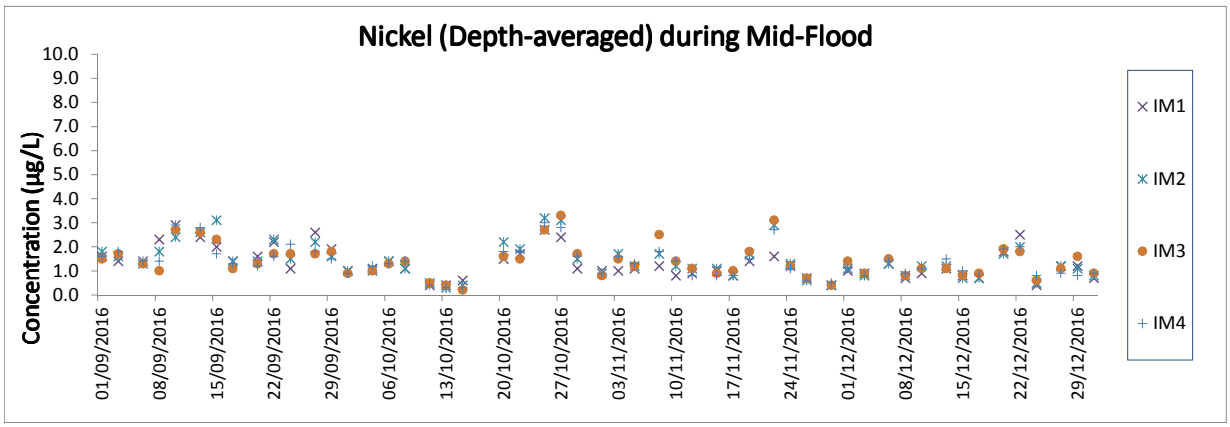


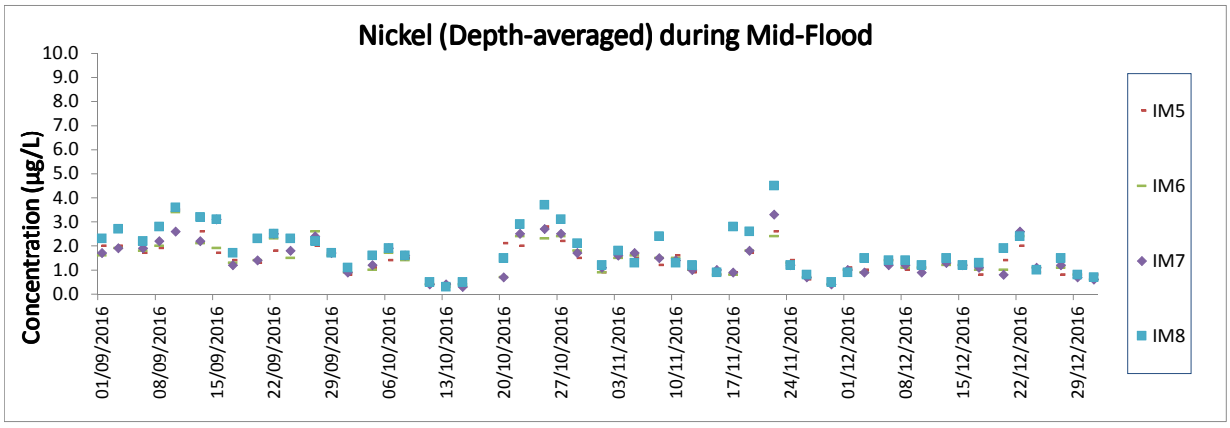


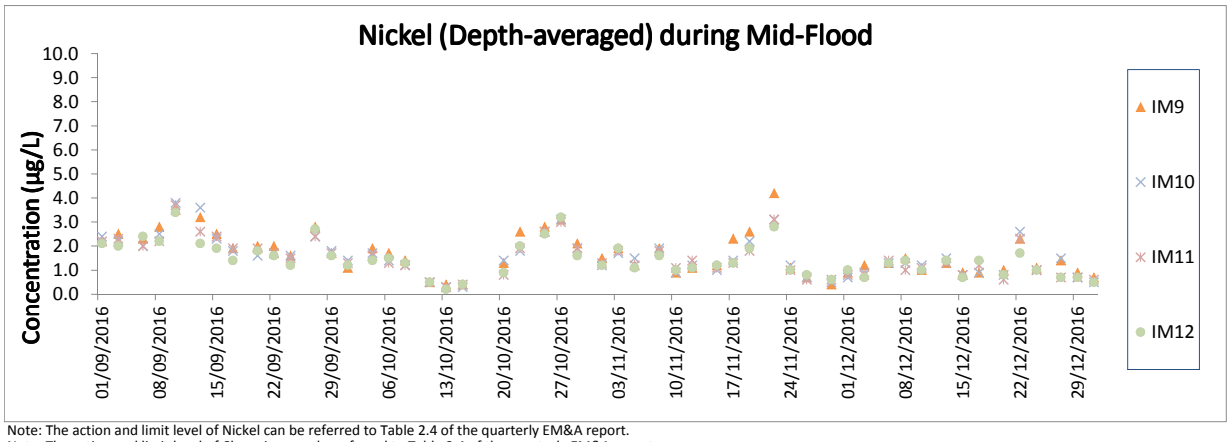


Note: The action and limit level of Nickel can be referred to Table 2.4 of the quarterly EM&A report.
Note: The action and limit level of Chromium can be referred to Table 2.4 of the quarterly EM&A report.
The monitoring results of Chromium at all monitoring stations during mid-flood and mid-ebb tides were below the reporting limit <0.2 µg/L









Note: The action and limit level of Nickel can be referred to Table 2.4 of the quarterly EM&A report.
Note: The action and limit level of Chromium can be referred to Table 2.4 of the quarterly EM&A report.
The monitoring results of Chromium at all monitoring stations during mid-flood and mid-ebb tides were below the reporting limit <0.2 µg/L

Appendix E. Summary of Chinese White Dolphin Monitoring Results

CWD Small Vessel Line-transect Survey — Survey Effort Data

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE
5-Oct-16	NWL	2	57.65	AUTUMN	32166	3RS ET
5-Oct-16	NWL	3	24.37	AUTUMN	32166	3RS ET
7-Oct-16	SWL	2	19.10	AUTUMN	32166	3RS ET
7-Oct-16	SWL	3	41.15	AUTUMN	32166	3RS ET
7-Oct-16	SWL	4	2.05	AUTUMN	32166	3RS ET
19-Oct-16	NEL	2	2.20	AUTUMN	32166	3RS ET
19-Oct-16	NEL	3	18.00	AUTUMN	32166	3RS ET
19-Oct-16	NEL	4	27.50	AUTUMN	32166	3RS ET
20-Oct-16	NEL	2	30.40	AUTUMN	32166	3RS ET
20-Oct-16	NEL	3	16.80	AUTUMN	32166	3RS ET
24-Oct-16	AW	1	4.80	AUTUMN	32166	3RS ET
24-Oct-16	WL	1	5.39	AUTUMN	32166	3RS ET
24-Oct-16	WL	2	6.10	AUTUMN	32166	3RS ET
24-Oct-16	WL	3	15.88	AUTUMN	32166	3RS ET
24-Oct-16	WL	4	3.82	AUTUMN	32166	3RS ET
24-Oct-16	SWL	3	4.89	AUTUMN	32166	3RS ET
24-Oct-16	SWL	4	0.41	AUTUMN	32166	3RS ET
25-Oct-16	SWL	2	1.05	AUTUMN	32166	3RS ET
25-Oct-16	SWL	3	31.73	AUTUMN	32166	3RS ET
25-Oct-16	SWL	4	28.02	AUTUMN	32166	3RS ET
25-Oct-16	SWL	5	2.00	AUTUMN	32166	3RS ET
26-Oct-16	AW	2	2.81	AUTUMN	32166	3RS ET
26-Oct-16	AW	3	1.83	AUTUMN	32166	3RS ET
26-Oct-16	WL	2	12.50	AUTUMN	32166	3RS ET
26-Oct-16	WL	3	9.25	AUTUMN	32166	3RS ET
26-Oct-16	WL	4	9.44	AUTUMN	32166	3RS ET
26-Oct-16	SWL	3	1.06	AUTUMN	32166	3RS ET
26-Oct-16	SWL	4	4.03	AUTUMN	32166	3RS ET
28-Oct-16	NWL	1	6.27	AUTUMN	32166	3RS ET
28-Oct-16	NWL	2	73.09	AUTUMN	32166	3RS ET
28-Oct-16	NWL	3	0.90	AUTUMN	32166	3RS ET
4-Nov-16	NWL	2	22.59	AUTUMN	32166	3RS ET
4-Nov-16	NWL	3	60.71	AUTUMN	32166	3RS ET
11-Nov-16	NEL	1	15.31	AUTUMN	32166	3RS ET
11-Nov-16	NEL	2	31.79	AUTUMN	32166	3RS ET
14-Nov-16	SWL	2	62.10	AUTUMN	32166	3RS ET
14-Nov-16	SWL	3	0.90	AUTUMN	32166	3RS ET
16-Nov-16	NEL	2	1.90	AUTUMN	32166	3RS ET
16-Nov-16	NEL	3	41.92	AUTUMN	32166	3RS ET
16-Nov-16	NEL	4	3.28	AUTUMN	32166	3RS ET
17-Nov-16	SWL	2	1.15	AUTUMN	32166	3RS ET
17-Nov-16	SWL	3	5.59	AUTUMN	32166	3RS ET
17-Nov-16	WL	2	13.18	AUTUMN	32166	3RS ET
17-Nov-16	WL	3	17.84	AUTUMN	32166	3RS ET
17-Nov-16	AW	2	4.91	AUTUMN	32166	3RS ET
18-Nov-16	AW	2	1.43	AUTUMN	32166	3RS ET
18-Nov-16	AW	3	3.25	AUTUMN	32166	3RS ET

DATE	AREA	BEAU	KM SEARCHED	SEASON	VESSEL	TYPE
18-Nov-16	WL	2	18.03	AUTUMN	32166	3RS ET
18-Nov-16	WL	3	11.86	AUTUMN	32166	3RS ET
18-Nov-16	WL	4	2.45	AUTUMN	32166	3RS ET
18-Nov-16	SWL	3	6.84	AUTUMN	32166	3RS ET
21-Nov-16	NWL	2	3.82	AUTUMN	32166	3RS ET
21-Nov-16	NWL	3	26.42	AUTUMN	32166	3RS ET
21-Nov-16	NWL	4	43.55	AUTUMN	32166	3RS ET
21-Nov-16	NWL	5	7.91	AUTUMN	32166	3RS ET
28-Nov-16	SWL	2	7.14	AUTUMN	32166	3RS ET
28-Nov-16	SWL	3	35.02	AUTUMN	32166	3RS ET
28-Nov-16	SWL	4	16.84	AUTUMN	32166	3RS ET
28-Nov-16	SWL	5	1.39	AUTUMN	32166	3RS ET
2-Dec-16	NWL	2	24.31	WINTER	32166	3RS ET
2-Dec-16	NWL	3	54.34	WINTER	32166	3RS ET
2-Dec-16	NWL	4	3.20	WINTER	32166	3RS ET
5-Dec-16	AW	2	4.86	WINTER	32166	3RS ET
5-Dec-16	WL	2	9.23	WINTER	32166	3RS ET
5-Dec-16	WL	3	23.91	WINTER	32166	3RS ET
5-Dec-16	SWL	2	5.52	WINTER	32166	3RS ET
5-Dec-16	SWL	3	1.31	WINTER	32166	3RS ET
13-Dec-16	SWL	2	52.96	WINTER	32166	3RS ET
13-Dec-16	SWL	3	7.50	WINTER	32166	3RS ET
14-Dec-16	AW	3	1.96	WINTER	32166	3RS ET
14-Dec-16	AW	4	2.96	WINTER	32166	3RS ET
14-Dec-16	WL	3	13.26	WINTER	32166	3RS ET
14-Dec-16	WL	4	18.34	WINTER	32166	3RS ET
14-Dec-16	WL	5	2.20	WINTER	32166	3RS ET
14-Dec-16	SWL	3	2.29	WINTER	32166	3RS ET
14-Dec-16	SWL	4	4.41	WINTER	32166	3RS ET
19-Dec-16	NWL	2	39.79	WINTER	32166	3RS ET
19-Dec-16	NWL	3	22.34	WINTER	32166	3RS ET
19-Dec-16	NWL	4	3.20	WINTER	32166	3RS ET
20-Dec-16	NWL	2	7.59	WINTER	32166	3RS ET
20-Dec-16	NEL	1	3.67	WINTER	32166	3RS ET
20-Dec-16	NEL	2	17.41	WINTER	32166	3RS ET
20-Dec-16	NEL	3	22.32	WINTER	32166	3RS ET
20-Dec-16	NEL	4	3.00	WINTER	32166	3RS ET
22-Dec-16	SWL	2	0.90	WINTER	32166	3RS ET
22-Dec-16	SWL	3	25.80	WINTER	32166	3RS ET
22-Dec-16	SWL	4	23.20	WINTER	32166	3RS ET
22-Dec-16	SWL	5	13.20	WINTER	32166	3RS ET
23-Dec-16	NEL	1	7.40	WINTER	32166	3RS ET
23-Dec-16	NEL	2	27.00	WINTER	32166	3RS ET
23-Dec-16	NEL	3	12.80	WINTER	32166	3RS ET

CWD Small Vessel Line-transect Survey — Sighting Data

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.
5-Oct-16	1	1048	CWD	2	NWL	2	N/A	OFF	3RS ET	22.2716	113.8719	AUTUMN	NONE
5-Oct-16	2	1141	CWD	1	NWL	3	19	ON	3RS ET	22.3571	113.8781	AUTUMN	NONE
5-Oct-16	3	1212	CWD	2	NWL	3	N/A	OFF	3RS ET	22.4076	113.8761	AUTUMN	NONE
5-Oct-16	4	1246	CWD	2	NWL	2	102	ON	3RS ET	22.3696	113.8886	AUTUMN	NONE
7-Oct-16	1	1200	FP	2	SWL	3	116	ON	3RS ET	22.1486	113.9174	AUTUMN	NONE
24-Oct-16	1	1017	CWD	4	WL	2	206	ON	3RS ET	22.2698	113.8436	AUTUMN	NONE
24-Oct-16	2	1054	CWD	1	WL	3	87	ON	3RS ET	22.2599	113.8416	AUTUMN	NONE
24-Oct-16	3	1127	CWD	2	WL	3	91	ON	3RS ET	22.2404	113.8307	AUTUMN	NONE
24-Oct-16	4	1154	CWD	1	WL	3	108	ON	3RS ET	22.2236	113.8326	AUTUMN	NONE
24-Oct-16	5	1242	CWD	1	WL	4	11	ON	3RS ET	22.2018	113.8219	AUTUMN	NONE
24-Oct-16	6	1252	CWD	2	WL	3	48	ON	3RS ET	22.1983	113.8274	AUTUMN	NONE
24-Oct-16	7	1321	CWD	3	WL	3	N/A	OFF	3RS ET	22.1918	113.8383	AUTUMN	NONE
24-Oct-16	8	1403	CWD	1	SWL	3	45	ON	3RS ET	22.1863	113.8587	AUTUMN	NONE
25-Oct-16	1	1457	CWD	1	SWL	4	N/A	OFF	3RS ET	22.1943	113.8519	AUTUMN	NONE
25-Oct-16	2	1511	CWD	1	WL	3	N/A	OFF	3RS ET	22.2166	113.8338	AUTUMN	NONE
25-Oct-16	3	1518	CWD	1	WL	3	N/A	OFF	3RS ET	22.2293	113.8371	AUTUMN	NONE
25-Oct-16	4	1523	CWD	3	WL	3	N/A	OFF	3RS ET	22.2386	113.8406	AUTUMN	PURSE SEINE
26-Oct-16	1	1032	CWD	1	WL	2	135	ON	3RS ET	22.2675	113.8600	AUTUMN	NONE
26-Oct-16	2	1047	CWD	2	WL	2	149	ON	3RS ET	22.2616	113.8553	AUTUMN	NONE
26-Oct-16	3	1112	CWD	1	WL	2	168	ON	3RS ET	22.2500	113.8348	AUTUMN	NONE
26-Oct-16	4	1133	CWD	2	WL	2	38	ON	3RS ET	22.2413	113.8394	AUTUMN	NONE
26-Oct-16	5	1219	CWD	7	WL	4	286	ON	3RS ET	22.2143	113.8219	AUTUMN	NONE
26-Oct-16	6	1309	CWD	1	WL	4	390	ON	3RS ET	22.1885	113.8419	AUTUMN	PURSE SEINE
26-Oct-16	7	1350	CWD	4	SWL	3	441	ON	3RS ET	22.1933	113.8493	AUTUMN	NONE
26-Oct-16	8	1403	CWD	2	SWL	3	14	ON	3RS ET	22.1905	113.8490	AUTUMN	NONE
26-Oct-16	9	1412	CWD	2	SWL	3	395	ON	3RS ET	22.1863	113.8488	AUTUMN	NONE
26-Oct-16	10	1440	CWD	1	SWL	3	63	ON	3RS ET	22.1976	113.8589	AUTUMN	NONE
28-Oct-16	1	0949	CWD	7	NWL	2	210	ON	3RS ET	22.3757	113.8682	AUTUMN	NONE
28-Oct-16	2	1145	CWD	2	NWL	2	623	ON	3RS ET	22.3548	113.8781	AUTUMN	NONE
4-Nov-16	1	1041	CWD	4	NWL	3	330	ON	3RS ET	22.2788	113.8779	AUTUMN	NONE
4-Nov-16	2	1221	CWD	3	NWL	3	149	ON	3RS ET	22.3807	113.8890	AUTUMN	NONE

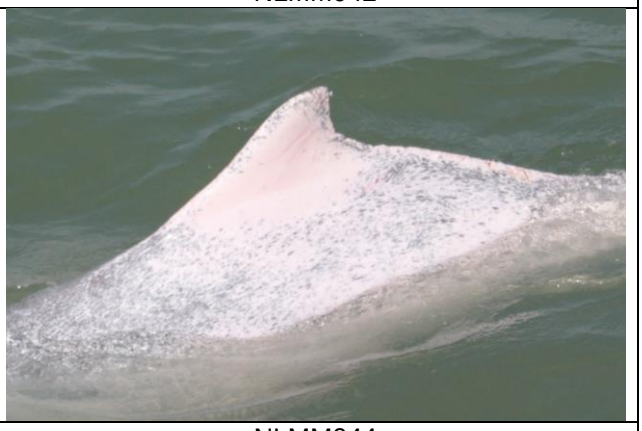
DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.
14-Nov-16	1	1406	CWD	1	SWL	2	19	ON	3RS ET	22.2076	113.8796	AUTUMN	NONE
17-Nov-16	1	1226	CWD	4	WL	3	1	ON	3RS ET	22.2311	113.8389	AUTUMN	NONE
17-Nov-16	2	1308	CWD	3	WL	2	390	ON	3RS ET	22.2452	113.8508	AUTUMN	NONE
17-Nov-16	3	1415	CWD	2	WL	2	11	ON	3RS ET	22.2900	113.8614	AUTUMN	NONE
18-Nov-16	1	1041	CWD	1	WL	3	243	ON	3RS ET	22.2571	113.8373	AUTUMN	NONE
21-Nov-16	1	1035	CWD	5	NWL	3	9	ON	3RS ET	22.2844	113.8683	AUTUMN	NONE
28-Nov-16	1	1048	FP	1	SWL	3	52	ON	3RS ET	22.1579	113.9360	AUTUMN	NONE
28-Nov-16	2	1112	FP	1	SWL	4	125	ON	3RS ET	22.1689	113.9277	AUTUMN	NONE
28-Nov-16	3	1116	FP	1	SWL	4	183	ON	3RS ET	22.1703	113.9273	AUTUMN	NONE
28-Nov-16	4	1139	CWD	4	SWL	3	86	ON	3RS ET	22.2050	113.9178	AUTUMN	NONE
28-Nov-16	5	1430	CWD	1	SWL	3	125	ON	3RS ET	22.1967	113.8778	AUTUMN	NONE
28-Nov-16	6	1514	CWD	5	SWL	4	148	ON	3RS ET	22.1979	113.8683	AUTUMN	NONE
2-Dec-16	1	1129	CWD	2	NWL	3	172	ON	3RS ET	22.3780	113.8768	WINTER	NONE
2-Dec-16	2	1234	CWD	2	NWL	3	187	ON	3RS ET	22.3664	113.8876	WINTER	NONE
5-Dec-16	1	1028	CWD	2	WL	2	34	ON	3RS ET	22.2683	113.8608	WINTER	NONE
5-Dec-16	2	1045	CWD	1	WL	3	100	ON	3RS ET	22.2606	113.8480	WINTER	NONE
5-Dec-16	3	1110	CWD	5	WL	3	171	ON	3RS ET	22.2506	113.8363	WINTER	NONE
5-Dec-16	4	1154	CWD	1	WL	3	42	ON	3RS ET	22.2412	113.8365	WINTER	NONE
5-Dec-16	5	1250	CWD	11	WL	2	276	ON	3RS ET	22.2056	113.8398	WINTER	NONE
13-Dec-16	1	1040	FP	2	SWL	2	195	ON	3RS ET	22.1740	113.9361	WINTER	NONE
13-Dec-16	2	1051	FP	3	SWL	2	19	ON	3RS ET	22.1676	113.9355	WINTER	NONE
13-Dec-16	3	1122	FP	1	SWL	2	123	ON	3RS ET	22.1761	113.9285	WINTER	NONE
13-Dec-16	4	1239	CWD	2	SWL	2	611	ON	3RS ET	22.1771	113.9056	WINTER	NONE
13-Dec-16	5	1350	CWD	5	SWL	3	87	ON	3RS ET	22.1480	113.8884	WINTER	PAIR TRAWLER
13-Dec-16	6	1413	CWD	1	SWL	3	297	ON	3RS ET	22.1691	113.8878	WINTER	NONE
13-Dec-16	7	1436	CWD	1	SWL	2	72	ON	3RS ET	22.1998	113.8876	WINTER	NONE
13-Dec-16	8	1452	CWD	1	SWL	2	280	ON	3RS ET	22.2039	113.8779	WINTER	PURSE SEINE
13-Dec-16	9	1544	CWD	2	SWL	2	90	ON	3RS ET	22.1956	113.8685	WINTER	NONE
19-Dec-16	1	0925	CWD	1	NWL	2	N/A	OFF	3RS ET	22.3975	113.8818	WINTER	NONE
19-Dec-16	2	0943	CWD	6	NWL	3	687	ON	3RS ET	22.4160	113.8686	WINTER	NONE
19-Dec-16	3	1026	CWD	2	NWL	2	358	ON	3RS ET	22.3696	113.8679	WINTER	NONE
19-Dec-16	4	1036	CWD	4	NWL	2	460	ON	3RS ET	22.3689	113.8685	WINTER	NONE
19-Dec-16	5	1224	CWD	1	NWL	2	50	ON	3RS ET	22.3817	113.8760	WINTER	NONE

DATE	STG #	TIME	CWD/FP	GP SZ	AREA	BEAU	PSD	EFFORT	TYPE	DEC LAT	DEC LON	SEASON	BOAT ASSOC.
19-Dec-16	6	1234	CWD	4	NWL	2	497	ON	3RS ET	22.3893	113.8778	WINTER	NONE
19-Dec-16	7	1255	CWD	9	NWL	2	119	ON	3RS ET	22.3903	113.8888	WINTER	PURSE SEINE

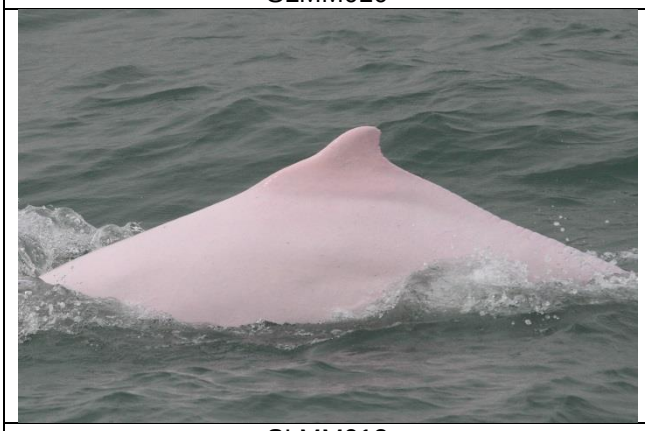
Abbreviations: STG# = Sighting Number; GP SZ = Dolphin Group Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance (in metres); N/A = Not Applicable; DEC LAT = Latitude (WGS84 in Decimal), DEC LON = Longitude (WGS84 in Decimal); BOAT ASSOC. = Fishing Boat Association

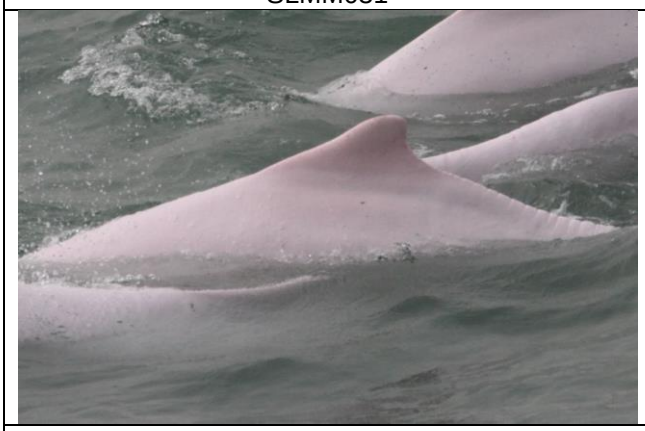
CWD Small Vessel Line-transect Survey **Photo Identification**

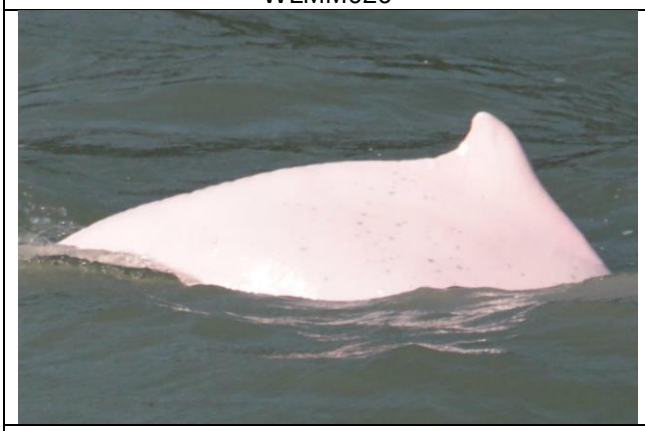
	
NLMM002	NLMM004
	
NLMM005	NLMM006
	
NLMM010	NLMM012

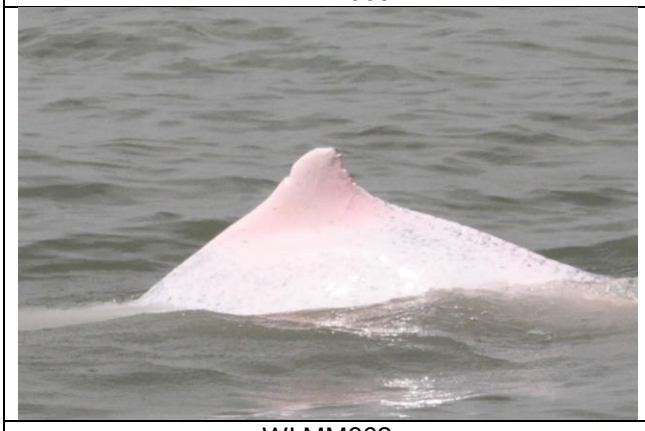
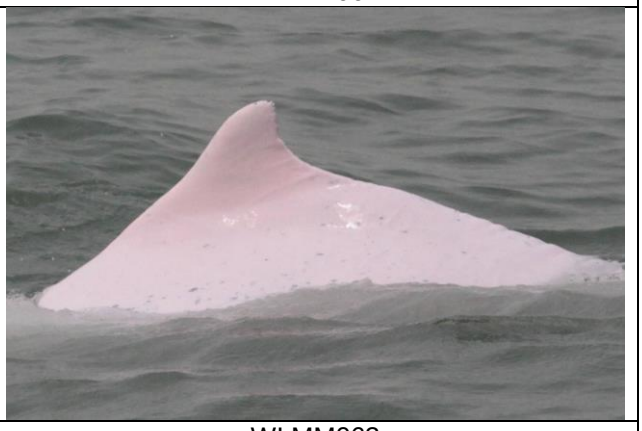
	
NLMM013	NLMM023
	
NLMM039	NLMM040
	
NLMM041	NLMM042
	
NLMM043	NLMM044

	
NLMM045	NLMM046
	
NLMM047	NLMM048
	
NLMM049	SLMM002
	
SLMM003	SLMM007

	
SLMM010	SLMM011
	
SLMM012	SLMM013
	
SLMM014	SLMM017
	
SLMM019	SLMM022

	
SLMM028	SLMM029
	
SLMM031	SLMM033
	
SLMM037	SLMM049
	
SLMM052	SLMM053

	
WLMM001	WLMM007
	
WLMM026	WLMM027
	
WLMM028	WLMM029
	
WLMM030	WLMM032

	
WLMM035	WLMM049
	
WLMM050	WLMM054
	
WLMM060	WLMM061
	
WLMM062	WLMM063

CWD Small Vessel Line-transect Survey **Photo Identification – Re-sighting Locations**

[Pink circle: Sighting locations of individual dolphin, White line: Vessel survey transects, Blue polygon: Sha Chau and Lung Kwu Chau Marine Park (SCLKCMP), Red polygon: 3RS land-formation footprint]

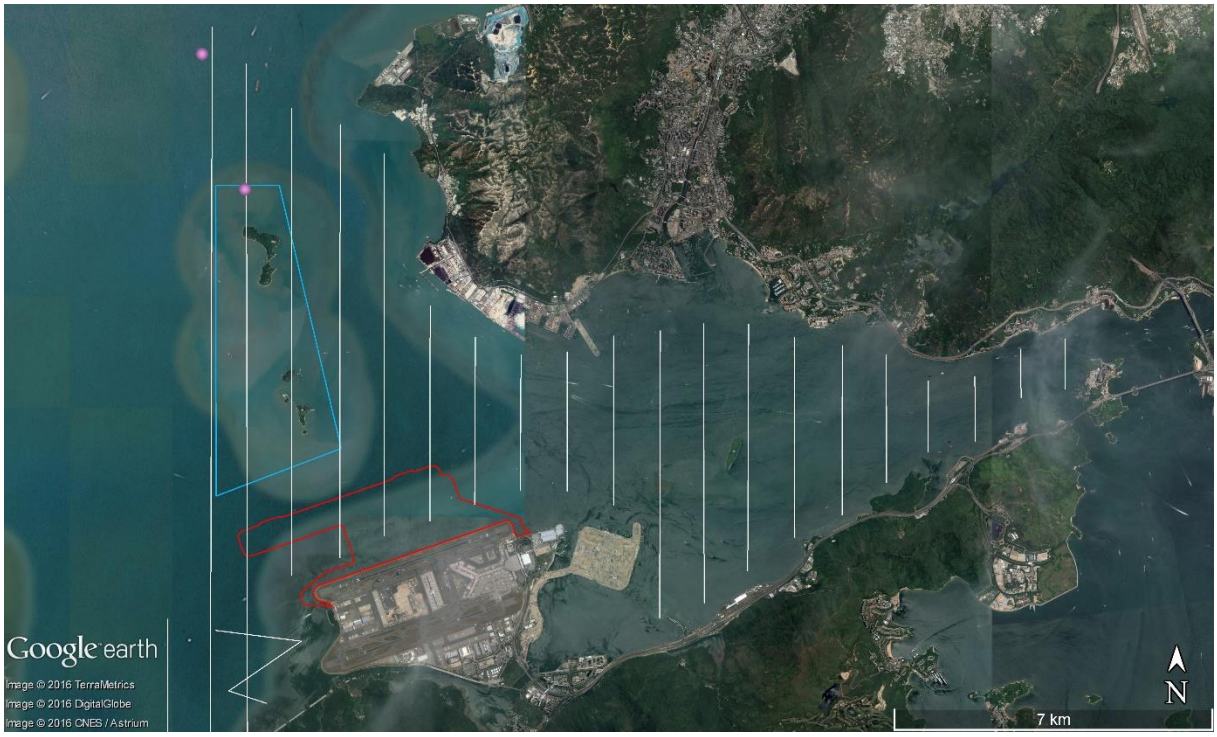
NLMM002

NLMM006

NLMM010

NLMM013

NLMM046



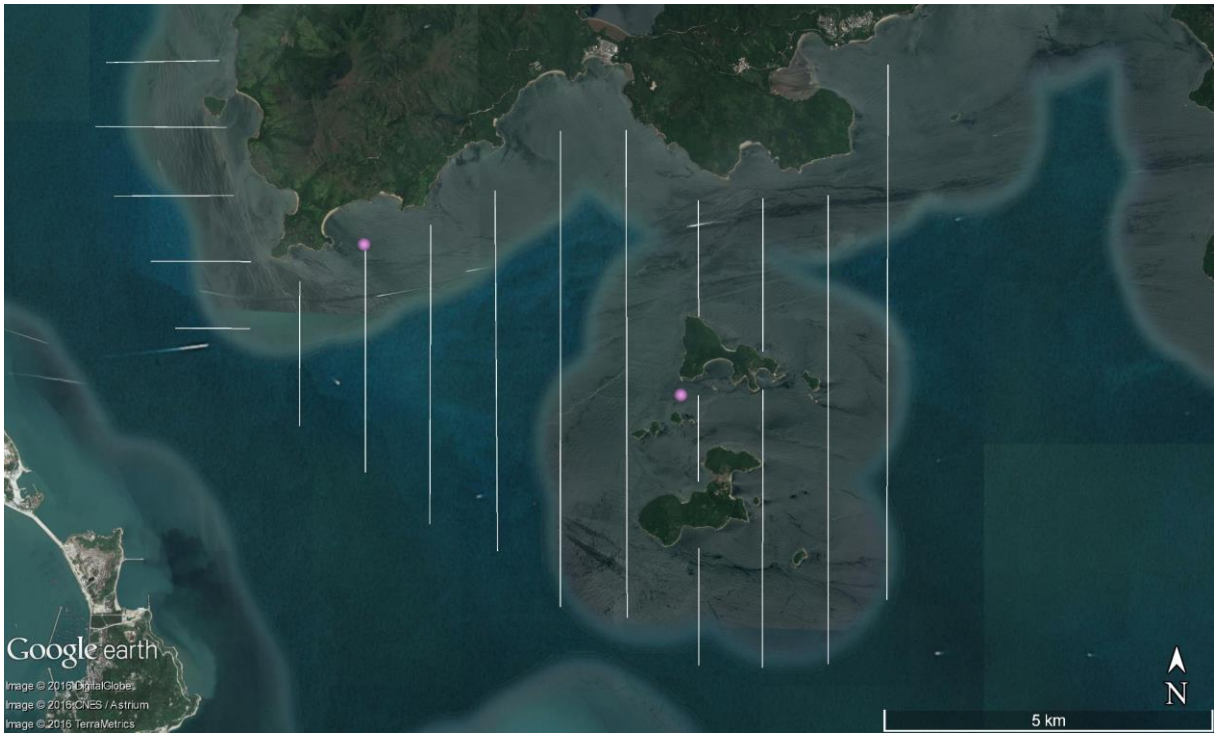
SLMM002

SLMM010

SLMM011

SLMM012

SLMM014



SLMM022

WLMM027

WLMM049

WLMM061

CWD Land-based Theodolite Tracking

CWD Groups by Survey Date

Date	Station	Start	End	Duration	Beaufort	Visibility	No. of Focal Follow	Dolphin Group Size
4-Oct-16	Lung Kwu Chau	8:42	14:42	6:00	2-3	2	6	1-4
6-Oct-16	Lung Kwu Chau	8:37	14:37	6:00	2-3	2	3	2-4
17-Oct-16	Sha Chau	8:36	14:36	6:00	3	3	0	N/A
27-Oct-16	Lung Kwu Chau	8:51	14:51	6:00	2	2	4	1-3
28-Oct-16	Sha Chau	8:38	14:38	6:00	2	2-3	0	N/A
7-Nov-16	Lung Kwu Chau	8:30	14:30	6:00	2-3	2-3	5	1-3
8-Nov-16	Sha Chau	8:34	14:34	6:00	2-3	2-3	0	N/A
15-Nov-16	Lung Kwu Chau	9:26	15:26	6:00	2	4	3	2-3
17-Nov-16	Sha Chau	8:44	14:44	6:00	2	3	0	N/A
25-Nov-16	Lung Kwu Chau	8:38	14:48	6:10	2	2	2	2-3
7-Dec-16	Lung Kwu Chau	8:53	14:53	6:00	2-4	3	1	1
8-Dec-16	Lung Kwu Chau	8:40	14:10	5:30	3	3	1	5
9-Dec-16	Sha Chau	8:35	14:35	6:00	2	3	0	0
12-Dec-16	Lung Kwu Chau	8:42	15:12	6:30	2-3	2	5	1-3
16-Dec-16	Sha Chau	8:49	14:49	6:00	3	3	0	0

Visibility: 1=Excellent, 2=Good, 3=Fair, 4=Poor

mottmac.hk