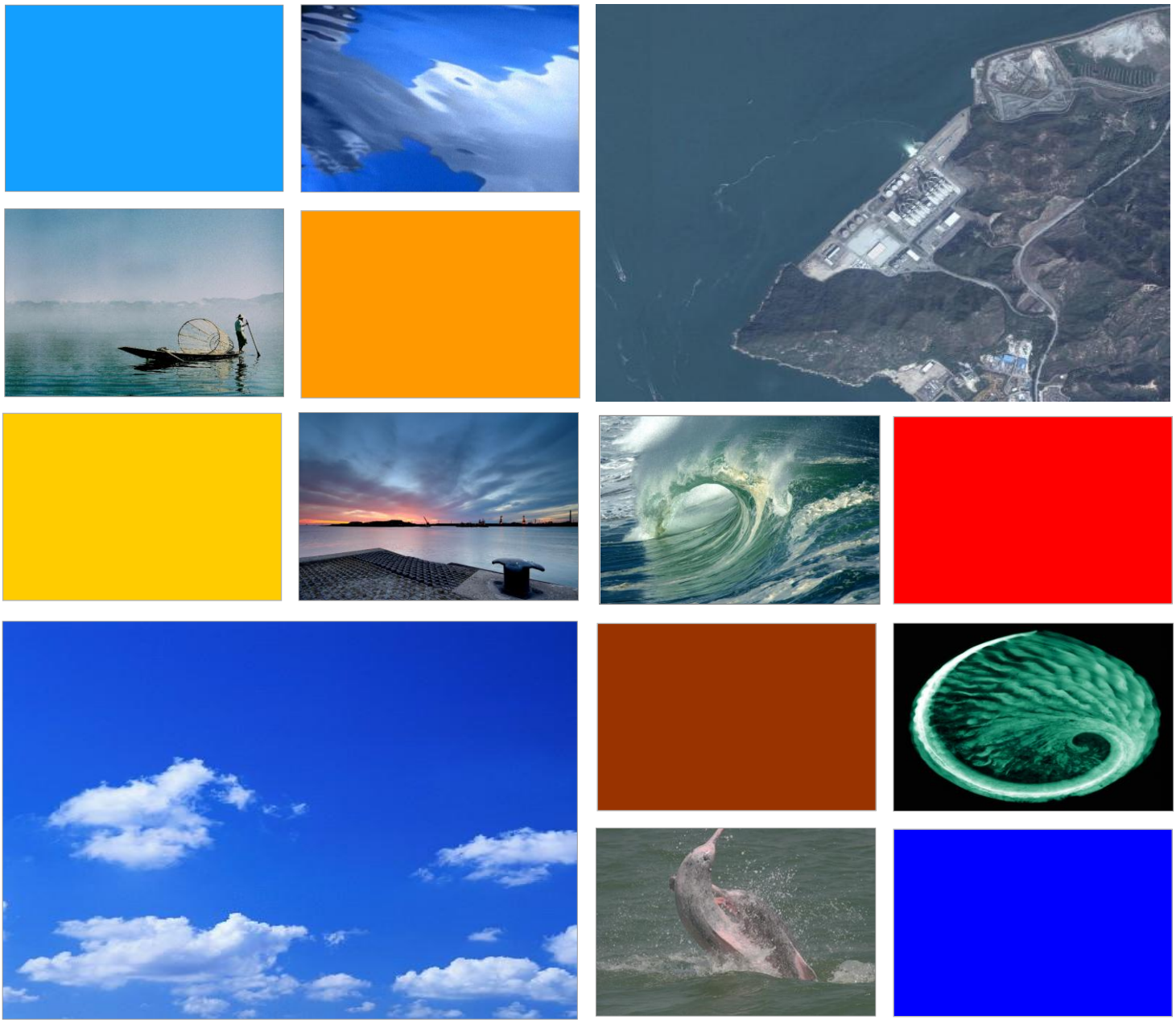

Capco 青山發電有限公司 Castle Peak Power Co. Ltd.

Black Point Gas Supply Project

Final Environmental Monitoring & Audit (EM&A) Review Report – First Phase Project

12 March 2014

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Black Point Gas Supply Project

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Final Environmental Monitoring & Audit (EM&A) Review Report – First Phase Project

ERM Document Code: 0124291_First Phase Final EM&A_Rev 0.doc
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Client: CAPCO		Project No: 0124291			
Summary: This document presents the Final Environmental Monitoring and Audit (EM&A) Review Report for the First Phase Black Point Gas Supply Project.		Date: 12 March 2014 Approved by: *Dr Robin Kennish* *Director*			
0	Final EM&A Report – First Phase	Var	JNG	RK	12/03/14
Revision	Description	By	Checked	Approved	Date

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Capco 青山發電有限公司 Castle Peak Power Co. Ltd.

CLP 中電

ExxonMobil

Black Point Gas Supply Project (First Phase)
Environmental Certification Sheet
EP-391/2010/A

Reference Document/Plan

Document/~~Plan~~ to be ~~Certified~~/ Verified:	Final Environmental Monitoring & Audit (EM&A) Review Report – First Phase Project
Date of Report:	7 March 2014
Date prepared by ET:	7 March 2014
Date received by IEC:	7 March 2014

Reference EM&A Manual/ EP Requirement

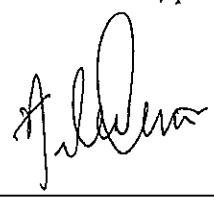
EM&A Manual:

Section 10.6

A **final EM&A report** will be prepared by the ET at the end of the construction phase.

ET Certification

I hereby certify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-391/2010/A.

Dr Helen Chiu, Environmental Team Leader:  Date: 7 March 2014

IEC Verification

I hereby verify that the above referenced document/~~plan~~ complies with the above referenced condition of EP-391/2010/A.

Dr Anne Kerr, Independent Environmental Checker:  Date: 11 March 2014

CONTENTS

EXECUTIVE SUMMARY

The Castle Peak Power Company Limited (CAPCO) a joint venture between CLP Power Hong Kong Limited (CLP) and ExxonMobil Energy Limited (EMEL) with CLP as operator and its Contractor for Gas Receiving Station (GRS) construction, Leighton Contractors (Asia) Limited (Leighton), commenced the construction of the First Phase of the Black Point Gas Supply Project (BPGSP) at the Co-located GRS area on 15 March 2011. This is the Final Environmental Monitoring and Audit (EM&A) review report presenting the EM&A works carried out for the BPGSP in accordance with the Updated EM&A Manual for the First Phase Project submitted under EP-391/2010/A, FEP-01/391/2010/A and FEP-02/391/2010/A.

Construction activities of the First Phase Project are land-based within the Black Point Power Station and marine-based in the waters off Black Point. Major construction activities undertaken include excavation, backfilling and facility installation activities at the Co-located GRS, and dredging, pipe-laying, jetting and rock armour backfilling works for the submarine gas pipeline.

Environmental Site Inspection & Audit

During the EM&A programme, twenty-five monthly joint environmental site inspections/ audits were carried out by the representatives of the Contractors, the Environmental Team (ET), CLP and the Independent Environmental Checker (IEC). Environmental performance complied with the environmental requirements and all necessary mitigation measures were properly implemented.

Water Quality

Baseline, construction phase and post-construction phase marine water quality monitoring were conducted in the EM&A programme to keep track of the water quality for dredging or jetting activities in Hong Kong waters or PRC waters within 2.5 km from the HKSAR boundary. Occasional exceedances of the Action and Limit Levels for water quality were recorded. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of the Updated EM&A Manual, these exceedances were considered to be due to natural variation in water quality characteristic of western Hong Kong waters and were unlikely to be due to the Project's dredging/jetting activities.

Waste Management

CAPCO and the Contractors (Leighton Contractors (Asia) Ltd and Wai Kee (Zens) Construction and Transportation Co Ltd) have followed the Waste Management Plan (WMP) for the handling and disposal of construction and demolition (C&D) materials (inert public fill and non-inert construction

wastes), chemical wastes, recyclable materials, sewage and dredged marine sediment. The quality and quantities of the wastes generated were in line with the EIA predictions.

Marine Ecology

Daily marine mammal exclusion zone monitoring was undertaken during the period of dredging or jetting activities in Hong Kong waters. Four sightings of the Indo-Pacific humpback dolphin *Sousa chinensis* were observed during the exclusion zone monitoring from May to August 2012 and October 2012. In accordance with the requirements described in the Updated EM&A Manual, dredging/jetting was delayed until they have left the area.

Additional marine mammal monitoring surveys were conducted for pre-construction, construction and post-construction phases to record information on dolphin distribution and abundance in the Project area. A total of seven sightings of the Indo-Pacific humpback dolphin *Sousa chinensis* were recorded during the surveys in the EM&A programme. The results showed that the general area in Black Point adjacent to the Deep Bay was used by dolphins before and after the submarine gas pipeline construction works, which suggests that dolphin activities were not affected by the construction works.

Landscape & Visual

Compensatory tree planting was completed in accordance with the approved Tree Removal Application. Per plan, a total of 17 heavy standard native trees, *Celtis sinensis*, with Diameter at Breast Height (DBH) not less than 0.1 m were planted in planters at the designated compensatory planting area within the BPPS.

Seabed Geophysical Survey

In accordance with the requirements under *Condition 3.10* of EP-391/2010/A and FEP-02/391/2010/A, the post construction phase geophysical surveys were conducted in November 2013 to record the seabed profile after the completion of the submarine pipeline installation works.

Environmental Complaints, Non-compliance & Summons

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of the First Phase Project was recorded in this EM&A programme. No environmental complaint or environmental summons was received.

The EM&A requirements have been reviewed and were considered as adequate and effective. No change to the requirements was considered to be necessary. The recommended environmental mitigation measures are also considered to be effective and efficient in reducing the potential

environmental impacts associated with the construction of the First Phase Project. No change was thus considered necessary.

Overall, the EM&A results indicated that the First Phase Project has not caused unacceptable environmental impacts. This is in agreement with the assessment presented in the EIA Report.

1 INTRODUCTION

ERM-Hong Kong, Limited (ERM) and Mott MacDonald Hong Kong Limited was appointed by the Castle Peak Power Company Limited (CAPCO) as the Environmental Team (ET) and the Independent Environmental Checker (IEC), respectively, to undertake Environmental Monitoring and Audit (EM&A) activities for the First Phase of the Black Point Gas Supply Project (BPGSP) ***(the First Phase Project)***.

1.1 PURPOSE OF THE REPORT

This is the Final EM&A review report which summarises and reviews the monitoring results and inspection/ audit findings for the EM&A programme.

1.2 STRUCTURE OF THE REPORT

The structure of the report is as follows:

Section 1 : **Introduction**
details the scope and structure of the report.

Section 2 : **Project Information**
summarises the background and scope of the First Phase Project, site description, project organization, construction programme, the construction works undertaken and the status of Environmental Permits (EP)/licences during the EM&A programme.

Section 3 : **Environmental Monitoring Requirements**
summarises the environmental monitoring including monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, and Event/Action Plans.

Section 4 : **Implementation Status on Environmental Mitigation Measures**
summarises the implementation of environmental mitigation measures as recommended in the approved EIA report, EP and relevant environmental requirements stated in the Contract Specification.

Section 5 : **EM&A Results**
summarises the monitoring results obtained in the EM&A programme and the findings of the monthly site inspections undertaken within the EM&A programme.

Section 6 : **Environmental Non-conformance**
summarises any exceedances of environmental performance standard, and environmental complaints and environmental summons received within the EM&A programme.

Section 7 : **Review of EM&A Programme**
reviews the success of the EM&A programme, including the effectiveness and efficiency of the monitoring methodology and mitigation measures, and recommendations for any improvements in the EM&A Programme.

Section 8 : **Conclusions**

2 PROJECT INFORMATION

2.1 PROJECT BACKGROUND

The Black Point Gas Supply Project (BPGSP) at the Black Point Power Station (BPPS), proposed by the Castle Peak Power Company Limited (CAPCO), a joint venture between CLP Power Hong Kong Limited (CLP) and ExxonMobil Energy Limited (EMEL) with CLP as operator, will provide facilities to import replacement gas from Mainland China.

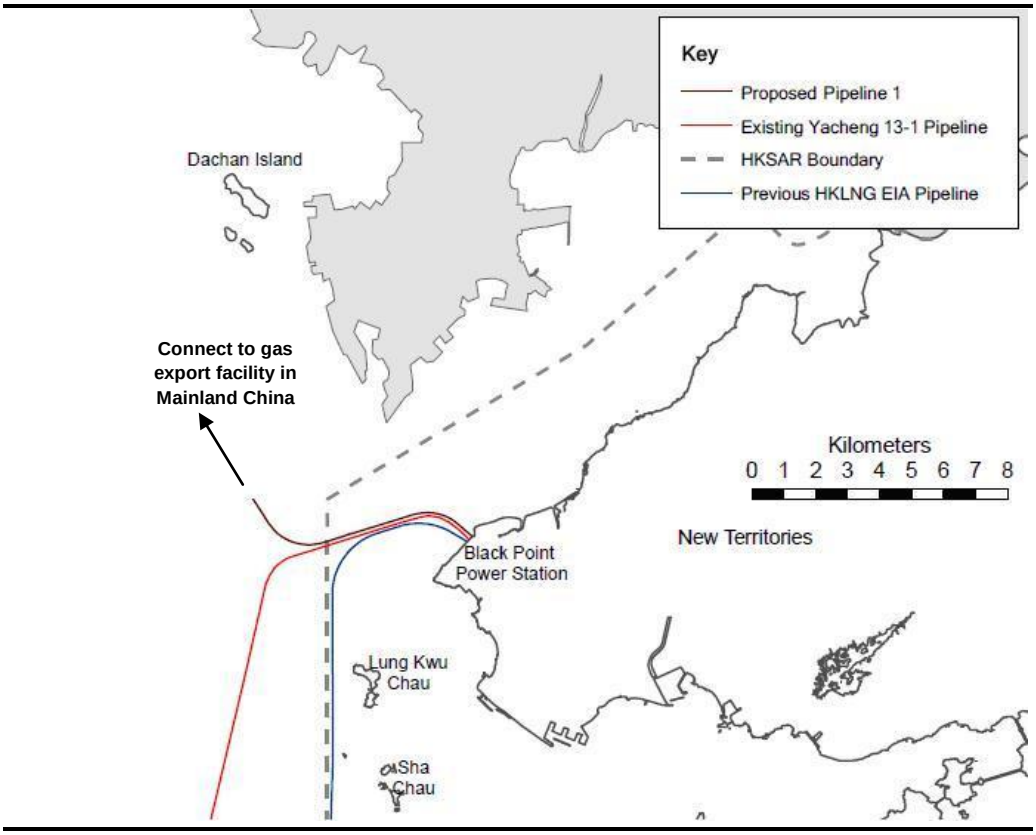
The First Phase of the BPGSP (hereafter referred to as the First Phase Project) will involve the construction and operation by PetroChina Company Limited (as the operator of the new CAPCO/PetroChina pipeline joint venture) of one submarine natural gas pipeline connecting BPPS with a gas export facility in Mainland China, while CAPCO is constructing and operating one gas receiving station (GRS) at BPPS.

An EIA of the BPGSP, including the First Phase Project, was prepared in accordance with the *EIA Study Brief* (No. ESB-208/2009) and the *Technical Memorandum of the Environmental Impact Assessment Process* (*EIAO-TM*) and submitted under the EIAO in February 2010. Subsequent to the approval of the EIA (*EIAO Register Number AEIAR-150/2010*) on 27 April 2010, an Environmental Permit (EP-391/2010) (EP) for the First Phase Project was granted by the Director of Environmental Protection (DEP) on 25 May 2010. A Further Environmental Permit (FEP-01/391/2010) (FEP) was granted to the Contractor, Leighton Contractors (Asia) Limited, of the First Phase Project on 24 February 2011. Another FEP, FEP-02/391/2010/A, was issued to the Contractor, Wai Kee (Zens) Construction & Transportation Co Ltd, on 23 March 2012. Applications for variation of the EP and FEP-01/391/2010 of the First Phase Project were submitted to the DEP and two EP variations, EP-391/2010/A and FEP-01/391/2010/A, were granted to CAPCO and Leighton Contractors (Asia) Limited respectively on 24 November 2011.

2.2 PROJECT SCOPE (FIRST PHASE)

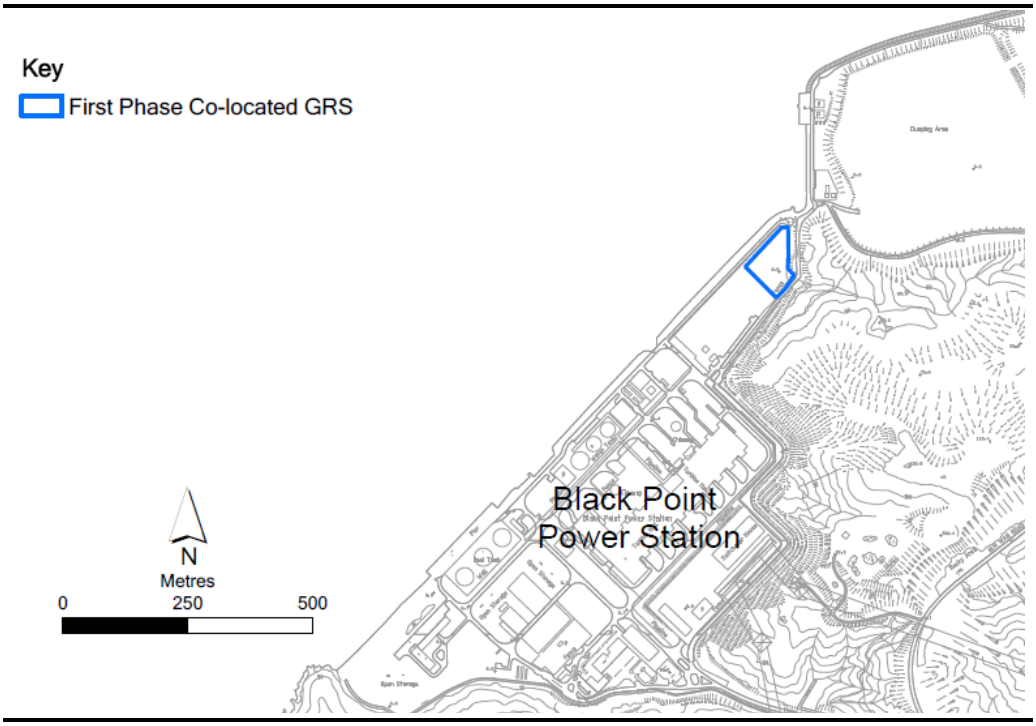
The proposed pipeline will traverse from the BPPS to a natural gas export facility in southern Guangdong Province, across the Urmston Road shipping channel and the Tonggu Waterway. It will be installed to the north of the existing Yacheng 13-1 Pipeline by approximately 100 m. Indicative routing of the proposed pipeline is depicted in *Figure 2.1*.

Figure 2.1 *Indicative Alignment of the Cross-Boundary Submarine Gas Pipeline Connecting the BPPS and the New Gas Export Facility in Mainland China*



The GRS is proposed to be located at the BPPS and will be constructed and operated within the site boundary of the BPPS, co-located with the existing GRS operated by the China National Offshore Oil Corporation (CNOOC) (hence referred to as the *Co-located GRS*). The proposed location of the Co-located GRS is presented on *Figure 2.2*.

Figure 2.2 *Location of the First Phase Gas Receiving Station (GRS)*



2.3 WORKS PROGRAMME & WORKS LOCATIONS

The construction works at the Co-located GRS area commenced on 15 March 2011. The construction programme is given in *Figure 2.3*. The locations of works are shown in *Figure 2.4*. The Sensitive Receivers in the vicinity of the proposed pipeline route are shown in *Figure 2.5*.

Figure 2.3 ***Construction Programme for the First Phase of the Black Point Gas Supply Project***

First Phase Construction	Month																								
Co-located GRS & Pipeline 1	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
Construction of GRS																									
- Installation of GRS Facilities																									
Construction of Submarine Pipeline																									
- Dredging																									
- Installation																									
- Jetting																									
- Rock Dumping																									
- Testing																									

2.4 ORGANISATION OF THE EM&A

2.4.1 *Project Organisation*

The EM&A requires the involvement of CAPCO, an Environmental Team (ET), an Independent Environmental Checker (IEC) and the Contractor(s). The roles and responsibilities of the various parties involved in the EM&A

Figure 2.4

Locations of Works for the First Phase of the Black Point Gas Supply Project

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DATE: 02/12/2010

Environmental Resources Management

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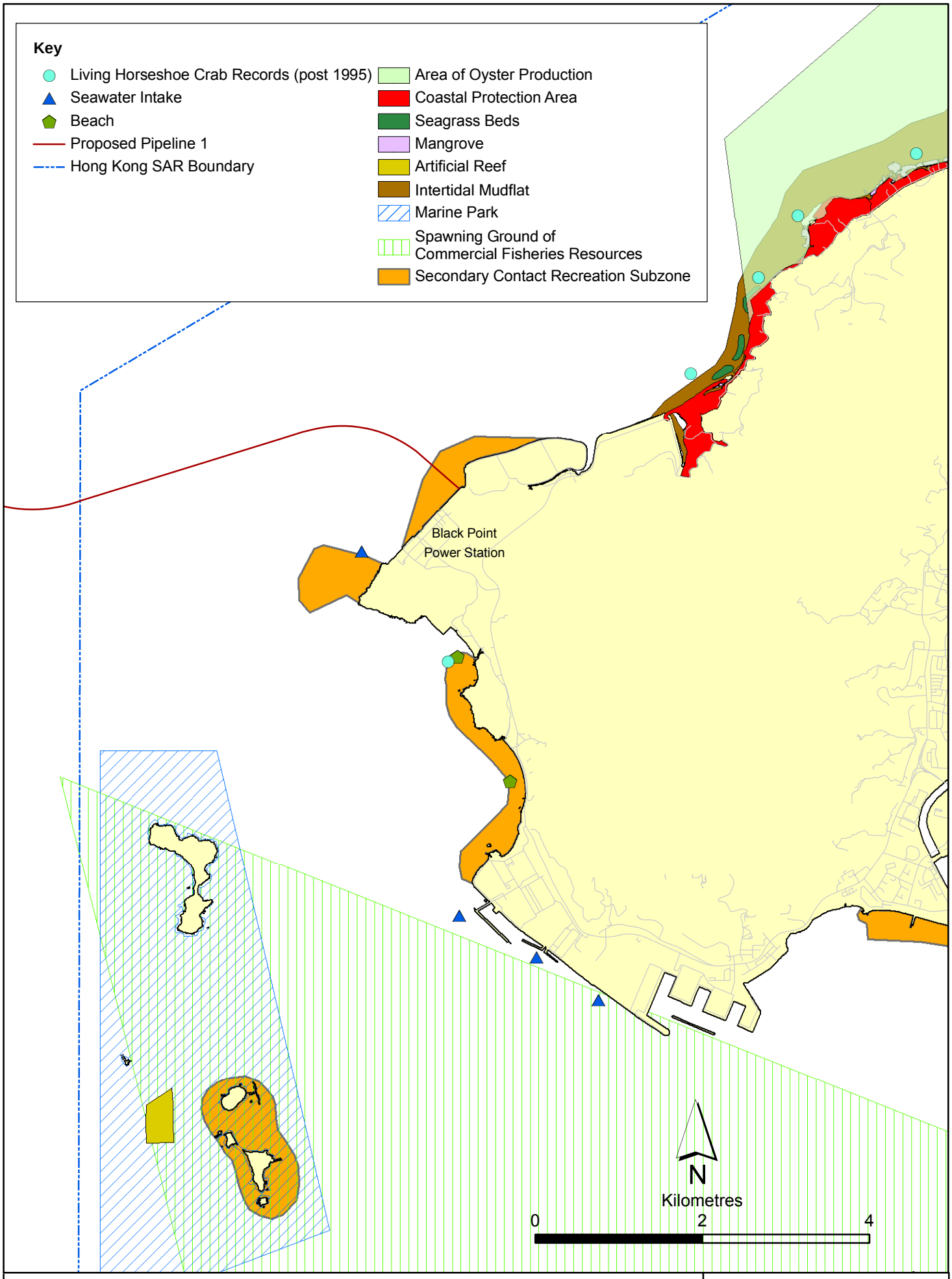

Figure 2.5

Surrounding Environment in the vicinity of Black Point

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Date: 02/12/2010

Environmental Resources Management

ERM

process have been described in the EM&A Manual for the First Phase Project and the organisation of these parties is presented in *Figure 2.6*.

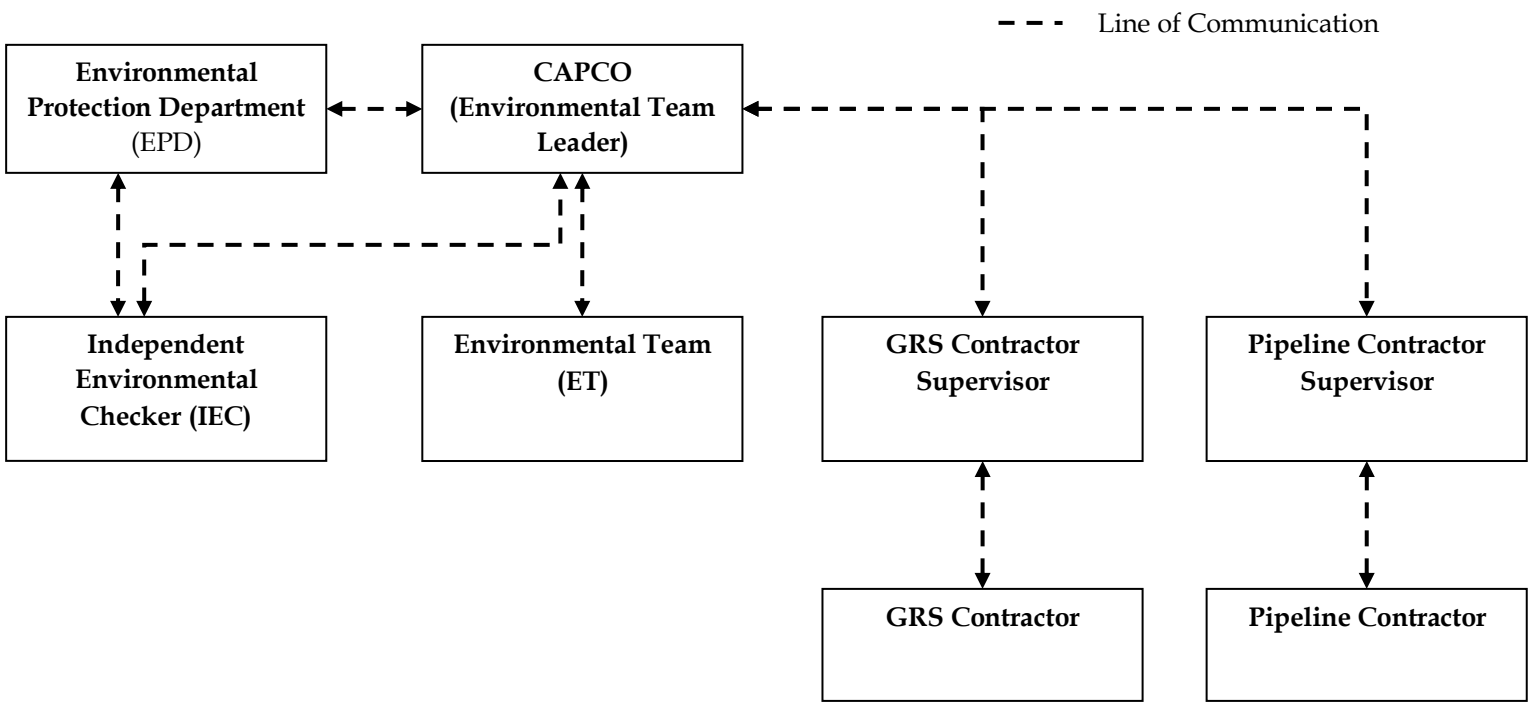
2.4.2 *Key Contact Information*

Key contact information is provided in *Table 2.1*.

Table 2.1 *Contact Information*

Name	Telephone	Facsimile	E-mail
CAPCO – Parent Environmental Permit Holder			
Mr Francis Fung	2678 4988	2678 4997	cwfung@clp.com.hk
Leighton Contractors (Asia) Limited – GRS Contractor & Further Environmental Permit Holder			
Mr Graeme Thompson	9732 9830	2529 8784	graeme.thompson@leightonasia.com
Wai Kee (Zens) Construction & Transportation Co., Ltd. – Pipeline Contractor & Further Environmental Permit Holder			
Mr Ryan Lee	2553 3667	2553 3558	lee.huiquian@gmail.com
Environmental Team Leader			
Dr Helen Chiu	2678 4159	2678 4997	helenchiu@clp.com.hk
Environmental Team			
ERM-Hong Kong, Limited	2271 3000	2723 5660	robin.kennish@erm.com
Independent Environmental Checker			
Dr Anne Kerr	2828 5757	2827 1823	Anne.Kerr@mottmac.com.hk

Figure 2.6 Project Organization and Lines of Communication



2.5 CONSTRUCTION ACTIVITIES UNDERTAKEN DURING THE EM&A MONITORING PERIOD

A summary of the major construction activities undertaken for the First Phase Project is shown in *Table 2.2*. The locations of the construction activities are shown in *Figure 2.7*.

2.6 STATUS OF ENVIRONMENTAL APPROVAL DOCUMENTS

A summary of the relevant permits, licences, and/or notifications on environmental protection for this Project is presented in *Table 2.3*.

Figure 2.7 Locations of the Construction Activities for the First Phase Project

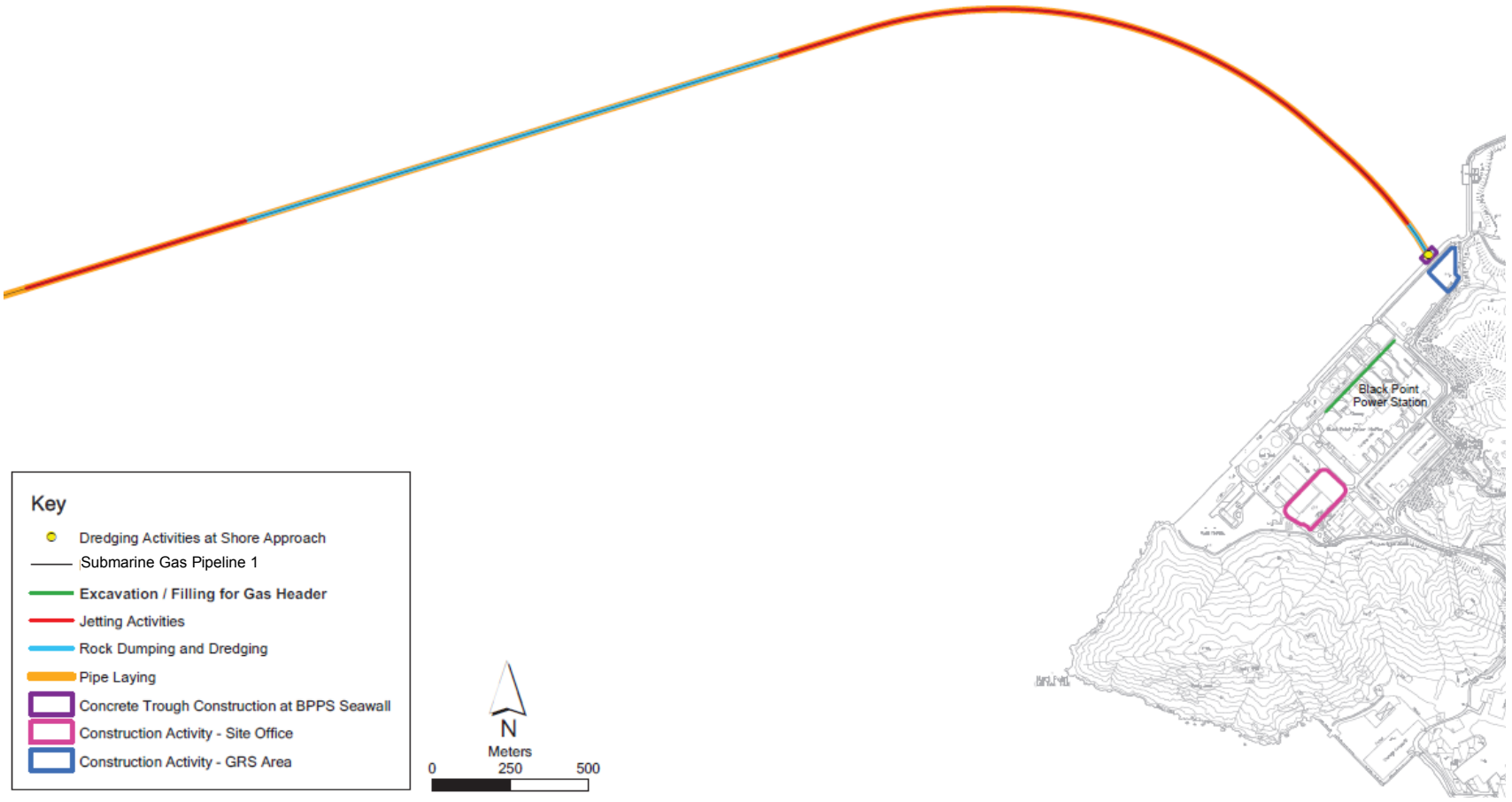


Table 2.2 Summary of Construction Activities Undertaken

Construction Activities Undertaken	Mar - May 2011	Jun - Aug 2011	Sep - Nov 2011	Dec 2011 - Feb 2012	Mar - May 2012	Jun - Aug 2012	Sep - Nov 2012	Dec 2012 - Feb 2013	Mar – Apr 2013
• Establishment of construction site offices	✓								
• Installation of temporary fencing, trial excavation and survey work for new vent stack piling works in the Co-located GRS area	✓								
• Tree felling at the Co-located GRS area	✓								
• Pre-drilling for the vent stack foundation piling works at the Co-located GRS area	✓								
• Piling works for the vent stack foundation	✓								
• Excavation for the pipe-rack foundations and the storm water drains	✓								
• Excavation for the pipe-rack foundations at the co-located GRS		✓							
• Excavation for the storm and oil water drains at the co-located GRS		✓							
• Excavation for the firewater ring main at the co-located GRS		✓							
• Construction of storm water and oily water drainage		✓							
• Erection of new vent stack pipe rack		✓							
• Installation of re-bar for new vent stack pile cap		✓							
• Erection of pipe rack		✓	✓						
• Installation of fire water ring main		✓	✓						
• Trail pit excavation for gas header		✓	✓						
• Excavation for gas header		✓	✓						
• Installation of new vent stack pile cap			✓						
• Relocation of fence			✓						
• Installation of pipeworks on pipe racks			✓						
• Installation of knock out drum			✓	✓					

Construction Activities Undertaken	Mar - May 2011	Jun - Aug 2011	Sep - Nov 2011	Dec 2011 - Feb 2012	Mar - May 2012	Jun - Aug 2012	Sep - Nov 2012	Dec 2012 - Feb 2013	Mar – Apr 2013
• Erection of vent stack structure sections			✓						
• Pipe erection in the pipe rack to knockout drum			✓						
• Installation of storm water and oily water drain			✓	✓					
• Excavation and pipe installation of fire water ring main			✓	✓					
• Installation of vent pipe				✓					
• Removal of old vent stack				✓					
• Excavation works for Gas Metering plinth installation				✓					
• Excavation works, pipe installation and welding for gas header				✓					
• Blinding layer and rock fill levelling of the onshore portion of the concrete trough					✓				
• Concrete pour for Satellite Instrument Equipment (SIE) Building ground floor slab, PRT/HIPPS skid foundation and Gas Filter skid foundation					✓				
• Construction work for SIE Building, on-shore concrete trough and new pipe racks in the co-located GRS area					✓				
• Dredging works and rock armour removal for pipeline concrete trough construction at BPPS seawall					✓				
• Mobilisation for construction of concrete trough for shore approach					✓				
• Removal of old vent stack					✓				
• Excavation and pipe laying for Gas Header and welding for Gas Header					✓	✓	✓		
• Construction work of SIE Building, piping installation and fabrication, oily water drains and civil works for various plant equipment foundations and skids in the co-located area						✓	✓		
• Gas pipeline laying						✓	✓		
• Construction work of on-shore concrete trough and new pipe racks in the co-located GRS area						✓			
• Dredging works for pipeline installation						✓			
• Installation of pre-cast units for the offshore concrete trough						✓			

Construction Activities Undertaken	Mar - May 2011	Jun - Aug 2011	Sep - Nov 2011	Dec 2011 - Feb 2012	Mar - May 2012	Jun - Aug 2012	Sep - Nov 2012	Dec 2012 - Feb 2013	Mar – Apr 2013
• Hydro-testing for Gas Header and GRS area							✓		
• Jetting, rock dumping and hydro-testing for gas pipeline installation							✓		
• Piping cleaning and leak testing in the co-located GRS area							✓		
• Backfilling for Gas Header								✓	✓
• Construction of access roads and walkaways, hydro-testing in the co-located GRS area								✓	
• Construction of new main gates at the co-located GRS area								✓	
• Installation of covers for the concrete trough								✓	
• Subsea gas pipeline rock dumping, hydro-testing and commissioning								✓	
• Installation of road barriers at the co-located GRS area									✓

Table 2.3 Summary of Environmental Licensing, Notification and Permit Status

Permit/ Licenses/ Notification	Reference	Validity Period	Status	Remarks
CAPCO				
Environmental Permit	EP-391/2010	Throughout the Contract	Superseded by Environmental Permit No. EP-391/2010/A	Permit granted on 25 May 2010
Environmental Permit	EP-391/2010/A	Throughout the Contract	Valid	Permit granted on 24 Nov 2011
Allocation of Sediment Disposal Sites	(OHS3C-01) in FM4/IC/70A	up to 31 December 2012	Expired Sediment disposal activities completed	Allocation granted on 4 Oct 2010, extension applied on 23 Dec 2011 and 22 June 2012 and subsequently approved.
Leighton Contractors (Asia) Limited				
Further Environmental Permit	FEP-01/391/2010	Throughout the Contract	Superseded by Environmental Permit No. FEP-01/391/2010/A	Permit granted on 24 February 2011
Further Environmental Permit	FEP-01/391/2010/A	Throughout the Contract	Surrendered on 15 November 2013	Permit granted on 24 Nov 2011
Further Environmental Permit	FEP-02/391/2010/A	Throughout the Contract	Valid	Permit granted on 23 March 2012
Notification of Construction Works under Air Pollution Control (Construction Dust) Regulation	--	--	Revised	Reference Number for Notification Pursuant to APC (Construction Dust) Regulation: 325647
Construction Noise Permit	GW-RW00286-11	1 May 2011 to 30 Oct 2011	Expired; new permit granted	Permit granted on 21 April 2011
Construction Noise Permit	GW-RW0423-11	3 July 2011 to 21August 2011	Expired; new permit granted	Permit granted on 28 June 2011
Construction Noise Permit	GW-RW0461-11	31 July 2011 to 29 January 2012	Expired; new permit granted	Permit granted on 12 July 2011

Permit/ Licenses/ Notification	Reference	Validity Period	Status	Remarks
Construction Noise Permit	GW-RW0491-11	21 August 2011 to 21 Feb 2012	Expired; new permit granted	Permit granted on 22 July 2011
Construction Noise Permit	GW-RW0526-11	11 September 2011 to 4 March 2012	Expired; new permit granted	Permit granted on 5 August 2011
Construction Noise Permit	GW-RW0033-12	30 January 2012 to 30 July 2012	Expired; new permit granted	Permit granted on 17 January 2012
Construction Noise Permit	GW-RW0121-12	11 March 2012 to 09 September 2012	Expired; new permit granted	Permit granted on 21 February 2012
Construction Noise Permit	GW-RW0483-12	30 July 2012 to 28 January 2013	Expired	Permit granted on 15 June 2012
Construction Noise Permit	GW-RW0809-12	16 November 2012 to 15 May 2013	Expired	Permit granted on 29 October 2012
Registration of Waste Producer under Waste Disposal (Chemical Waste)(General) Regulation	WPN 5213-432-L1048-05	Throughout the Contract	Valid	Granted on 19 April 2011 Renewed on 14 March 2012
Marine Dumping Permit	EP/MD/ 12-128	1 April 2012 to 31 July 2012	Expired	Permit granted on 23 March 2012; for dredged sediment requiring Type 1 – Open Sea Disposal. Dumping completed on 31 July 2012.
Wai Kee (Zens) Construction & Transportation Co., Ltd				
Further Environmental Permit	FEP-02/391/2010/A	Throughout the Contract	Valid	Permit granted on 23 March 2012
Construction Noise Permit	GW-RW0215-12	15 April 2012 to 14 October 2012	Expired; new permit granted	Permit granted on 26 March 2012
Construction Noise Permit	GW-RW0790-12	30 October 2012 to 29 April 2013	Expired	Permit granted on 18 October 2012
Marine Dumping Permit	EP/MD/12-142	20 April 2012 to 30 July 2012	Expired; new permit granted	Permit granted on 20 April 2012; for dredged sediment requiring Type 1 – Open Sea Disposal

Permit/ Licenses/ Notification	Reference	Validity Period	Status	Remarks
Marine Dumping Permit	EP/MD/12-141	26 April 2012 to 25 May 2012	Expired; new permit granted	Permit granted on 26 April 2012; for dredged sediment requiring Type 1 – Open Sea Disposal (Dedicated Site) or Type 2 – Confined Marine Disposal
Marine Dumping Permit	EP/MD/13-014	26 May 2012 to 25 June 2012	Expired; new permit granted	Permit granted on 22 May 2012; for dredged sediment requiring Type 1 – Open Sea Disposal (Dedicated Site) or Type 2 – Confined Marine Disposal
Marine Dumping Permit	EP/MD/13-026	10 June 2012 to 31 July 2012	Expired; new permit granted	Permit granted on 7 June 2012; for dredged sediment requiring Type 1 – Open Sea Disposal
Marine Dumping Permit	EP/MD/13-032	26 June 2012 to 25 July 2012	Expired; new permit granted	Permit granted on 21 June 2012; for dredged sediment requiring Type 1 Open Sea Disposal (Dedicated Site) and Type 2 Confined Marine Disposal
Marine Dumping Permit	EP/MD/13-044	31 July 2012 to 31 December 2012	Expired	Permit granted on 20 July 2012; for dredged sediment requiring Type 1 Open Sea Disposal
Marine Dumping Permit	EP/MD/13-045	1 August 2012 to 30 September 2012	Expired	Permit granted on 20 July 2012; for dredged sediment requiring Type 1 Open Sea Disposal
Marine Dumping Permit	EP/MD/13-043	26 July 2012 to 25 August 2012	Expired	Permit granted on 24 July 2012; for dredged sediment requiring Type 1 Open Sea Disposal (Dedicated Site) and Type 2 Confined Marine Disposal

Permit/ Licenses/ Notification	Reference	Validity Period	Status	Remarks
Marine Dumping Permit	EP/MD/13-057	26 August 2012 to 25 September 2012	Expired	Permit granted on 15 August 2012; for dredged sediment requiring Type 1 Open Sea Disposal (Dedicated Site) and Type 2 Confined Marine Disposal
Chemical Waste Producer Registration	5213-432-W3140-02	Throughout the Contract	Valid	Registration granted on 15 June 2012

3 EM&A REQUIREMENTS

3.1 GENERAL

Potential environmental impacts, which were identified during the EIA process and are associated with the construction phase of the First Phase Project, will be addressed through the monitoring and controls specified in the EM&A Manual and in the construction contracts.

During the construction phase of the First Phase Project, air quality, noise, water quality, marine ecology, fisheries, landscape and visual and waste will be subjected to EM&A, with environmental monitoring being undertaken for water quality and marine ecology as determined in the EIA. Monitoring of the effectiveness of the mitigation measures will be achieved through the environmental monitoring programme as well as through site inspections.

3.2 SITE INSPECTIONS & AUDITS

The ET will undertake site inspections of on-site practices and procedures each month. The primary objective of the inspection programme will be to assess the effectiveness of the environmental controls established by the Contractor(s) and the implementation of the environmental mitigation measures recommended in the EIA Report. The IEC will undertake monthly site audits to assess the performance of the Contractor(s) and the effectiveness of the ET.

3.3 MARINE WATER QUALITY MONITORING

In accordance with the recommendations of the EIA, water quality EM&A is required during dredging and jetting for the submarine pipeline.

3.3.1 *Water Quality Parameters*

The parameters have been selected for measurement *in situ* and in the laboratory.

The parameters to be measured *in situ* are:

- Dissolved Oxygen (DO) (% saturation and mg L^{-1})
- Salinity (‰ or ppt)
- Temperature (^{o}C)
- Turbidity (NTU)

The only parameter to be measured in the laboratory is:

- Suspended solids (SS) (mg L^{-1})

In addition to the water quality parameters, other relevant data will also be measured and recorded in Water Quality Monitoring Logs, including the location of the sampling stations, water depth, time, weather conditions, sea conditions, tidal stage, current direction and velocity, special phenomena and work activities undertaken around the monitoring and works area that may influence the monitoring results.

3.3.2 *Monitoring Equipment*

For water quality monitoring, the following equipment will be used:

- ***Dissolved Oxygen and Temperature Measuring Equipment*** - The instrument will be a portable, weatherproof dissolved oxygen measuring instrument complete with cable, sensor, comprehensive operation manuals, and will be operable from a DC power source. It will be capable of measuring: dissolved oxygen levels in the range of 0 - 20 mg L^{-1} and 0 - 200% saturation; and a temperature of 0 - 45 degrees Celsius. It shall have a membrane electrode with automatic temperature compensation complete with a cable of not less than 35 m in length. Sufficient stocks of spare electrodes and cables shall be available for replacement where necessary (e.g. YSI model 59 DO meter, YSI 5739 probe, YSI 5795A submersible stirrer with reel and cable or an approved similar instrument).

- ***Turbidity Measurement Equipment*** - The instrument will be a portable, weatherproof turbidity-measuring unit complete with cable, sensor and comprehensive operation manuals. The equipment will be operated from a DC power source, it will have a photoelectric sensor capable of measuring turbidity between 0 - 1000 NTU and will be complete with a cable with at least 35 m in length (for example Hach 2100P or an approved similar instrument).

- ***Salinity Measurement Instrument*** - A portable salinometer capable of measuring salinity in the range of 0 - 40 ppt will be provided for measuring salinity of the water at each monitoring location.

- ***Water Depth Gauge*** – A portable, battery-operated echo sounder (for example Seafarer 700 or a similar approved instrument) will be used for the determination of water depth at each designated monitoring station. This unit will preferably be affixed to the bottom of the work boat if the same vessel is to be used throughout the monitoring programme. The echo sounder should be suitably calibrated.

- ***Current Velocity and Direction*** – No specific equipment is recommended for measuring the current velocity and direction. The environmental

contractor shall seek approval of their proposed equipment with the client prior to deployment.

- ***Positioning Device*** – A Global Positioning System (GPS) shall be used during monitoring to allow accurate recording of the position of the monitoring vessel before taking measurements. The Differential GPS, or equivalent instrument, should be suitably calibrated at appropriate checkpoint (e.g. Quarry Bay Survey Nail) to verify that the monitoring station is at the correct position before the water quality monitoring commence. Marine anchors will not be used when sampling the impact stations within or on the boundaries of the Sha Chau and Lung Kwu Chau Marine Park.

- ***Water Sampling Equipment*** - A water sampler, consisting of a PVC or glass cylinder of not less than two litres, which can be effectively sealed with cups at both ends, will be used (e.g. Kahlsico Water Sampler 13SWB203 or an approved similar instrument). The water sampler will have a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler is at the selected water depth.

3.3.3 *Sampling/Testing Protocols*

All *in situ* monitoring instruments will be checked, calibrated and certified by a laboratory accredited under HOKLAS (1) or any other international accreditation scheme before use, and subsequently re-calibrated at monthly intervals throughout the stages of the water quality monitoring. Responses of sensors and electrodes will be checked with certified standard solutions before each use.

On-site calibration of field equipment shall follow the "*Guide to On-Site Test Methods for the Analysis of Waters*", BS 1427: 2009.

3.3.4 *Laboratory Measurement and Analysis*

All laboratory work shall be carried out in a HOKLAS accredited laboratory (2). Water samples of about 1,000 mL shall be collected at the monitoring stations for carrying out the laboratory analyses. The determination work shall start within the next working day after collection of the water samples. The analyses shall follow the standard methods as described in APHA Standard Methods for the Examination of Water and Wastewater, 19th Edition, unless otherwise specified (APHA 2540D for SS) with a detection limit of 1 mg L^{-1} or less.

(1) The laboratory will be contracted before commencement of the monitoring programme.

(2) The laboratory will be contracted before commencement of the monitoring programme.

3.3.5 *Monitoring Locations for Dredging/ Jetting Activities in Hong Kong Waters*

Water quality monitoring will be conducted during dredging and jetting activities in Hong Kong waters. Locations of monitoring stations R1 and M1 were adjusted as the original locations presented in the Updated EM&A Manual were occupied by oyster farms and hence became inaccessible for impact monitoring. The monitoring stations for these activities in Hong Kong waters are shown in *Figure 3.1* and detailed in *Table 3.1.*

Table 3.1 Locations of Marine Water Quality Monitoring Stations for Dredging and Jetting Activities

Station ID	Type	Coordinates	
		Easting	Northing
IE 1 (ebb)	Impact	807715.46	831268.07
IE 2 (ebb)	Impact	805831.63	830752.43
IF 1 (flood)	Impact	807952.55	832350.16
IF 2 (flood)	Impact	805837.42	831864.35
CE 1 (ebb)	Control	807715.46	830768.07
CE 2 (ebb)	Control	805832.69	830252.44
CF 1 (flood)	Control	807952.55	832850.16
CF 2 (flood)	Control	805837.47	832364.35
M1	Sensitive Receiver (Intertidal/horseshoe Crab)	810555.86	832454.84
M2	Sensitive Receiver (Seawater Intake)	807952.00	830267.00
R1	Reference	810963.51	835167.24
R2	Reference	807467.40	827115.36

3.3.6 *Monitoring Locations for Dredging/ Jetting Activities in PRC Waters*

It is proposed that the monitoring works will commence when dredging/ jetting works are conducted within a distance of about 2.5 km from the HKSAR Boundary.

The monitoring station locations have been established to identify potential impacts to the ecological sensitive receivers (i.e. Sha Chau and Lung Kwu Chau Marine Park) which are shown in *Figure 3.2*. The suggested co-ordinates of these monitoring stations are listed in *Table 3.2*.

Table 3.2 Locations of Marine Water Quality Monitoring Stations for Dredging/ Jetting Activities in PRC Waters

Station ID	Type	Coordinates	
		Easting	Northing
IE 3 (ebb)	Impact	804844.07	830452.06
IF 3 (flood)	Impact	804844.29	831556.81
CE 3 (ebb)	Control	804844.07	829452.06
CF 3 (flood)	Control	805258.29	832336.81

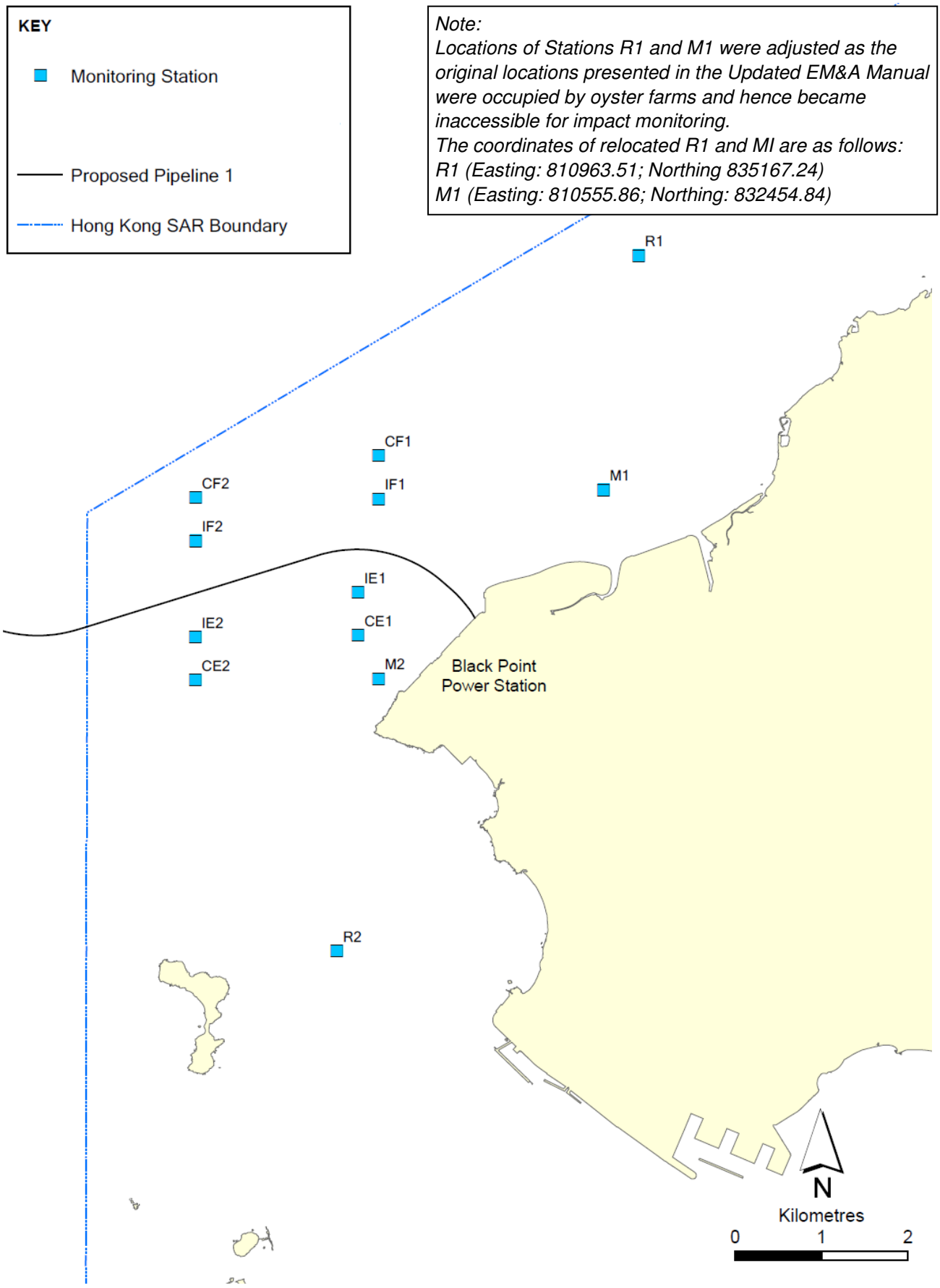


Figure 3.1 Water Quality Monitoring Stations during Dredging Activities in Hong Kong Waters

Environmental Resources Management

ERM

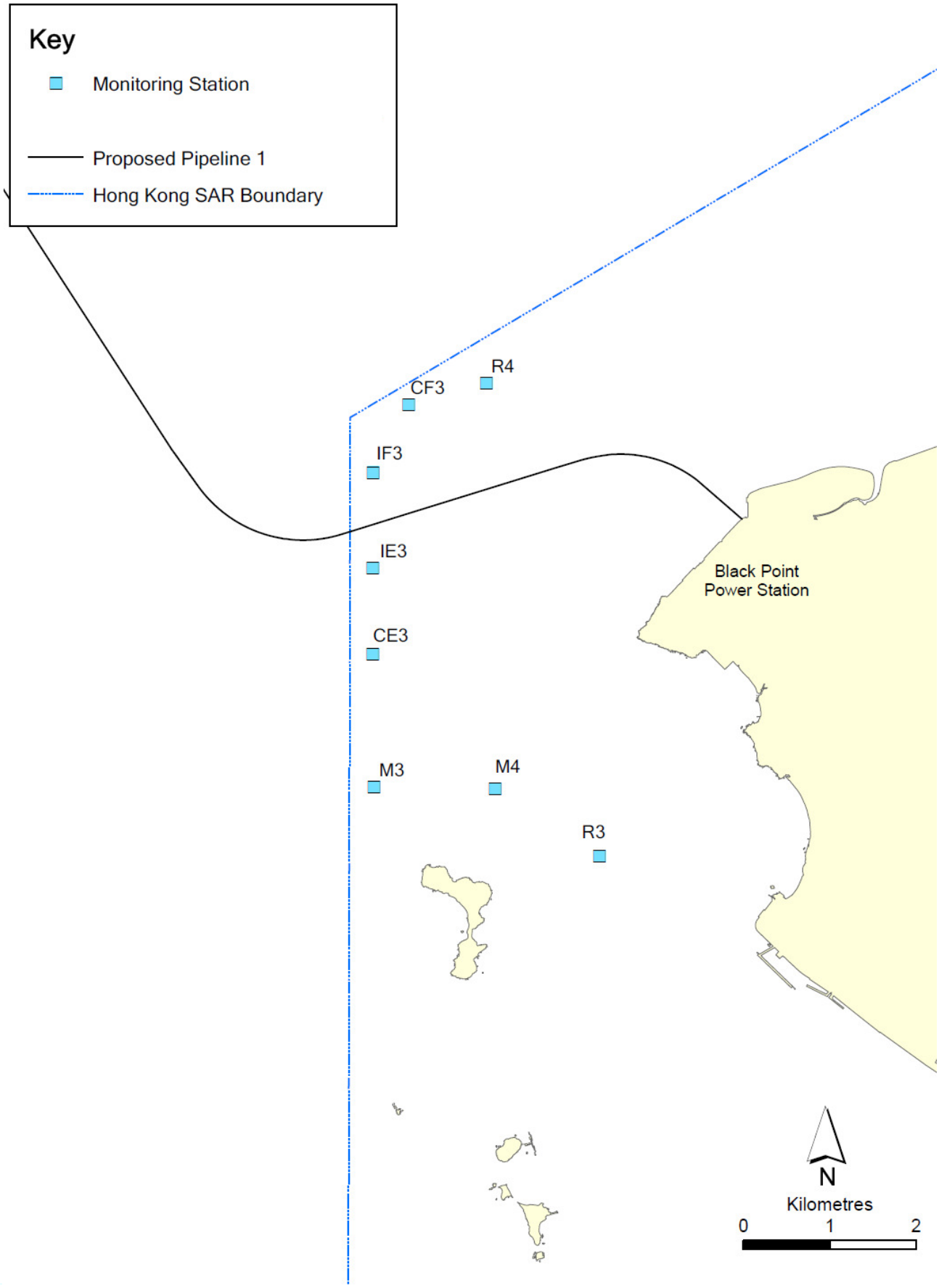


Figure 3.2 Water Quality Monitoring Stations during Dredging Activities in PRC Waters within 2.5 km of HKSAR Boundary

Environmental Resources Management

ERM

Station ID	Type	Coordinates	
		Easting	Northing
M3	Sensitive Receiver (Sha Chau and Lung Kwu Chau Marine Park)	804856.00	827916.00
M4	Sensitive Receiver (Sha Chau and Lung Kwu Chau Marine Park)	806261.00	827897.00
R3	Reference	807538.00	826455.00
R4	Reference	806157.31	832592.03

3.3.7 *Monitoring Locations for Intensive Monitoring for Jetting near Black Point Power Station Shore Approach*

During the first two days of the jetting operations near the shore approach, intensive water quality monitoring will be conducted to verify the predictions from the modelling work presented in the EIA Report.

Two sets of mobile monitoring stations will be arranged perpendicularly to the jetting path for each of the two monitoring days. Each set of mobile stations consists of one Impact station and one Control Station. One set of stations will be located on each side of the jetting works area.

Indicative locations of the mobile monitoring stations for the 2-day intensive monitoring for jetting are presented in *Figure 3.3*. The actual locations of these stations will be determined on site based on the location of the jetting machine. Locations of these mobile stations will also be adjusted according to the location and movement of the jetting machine.

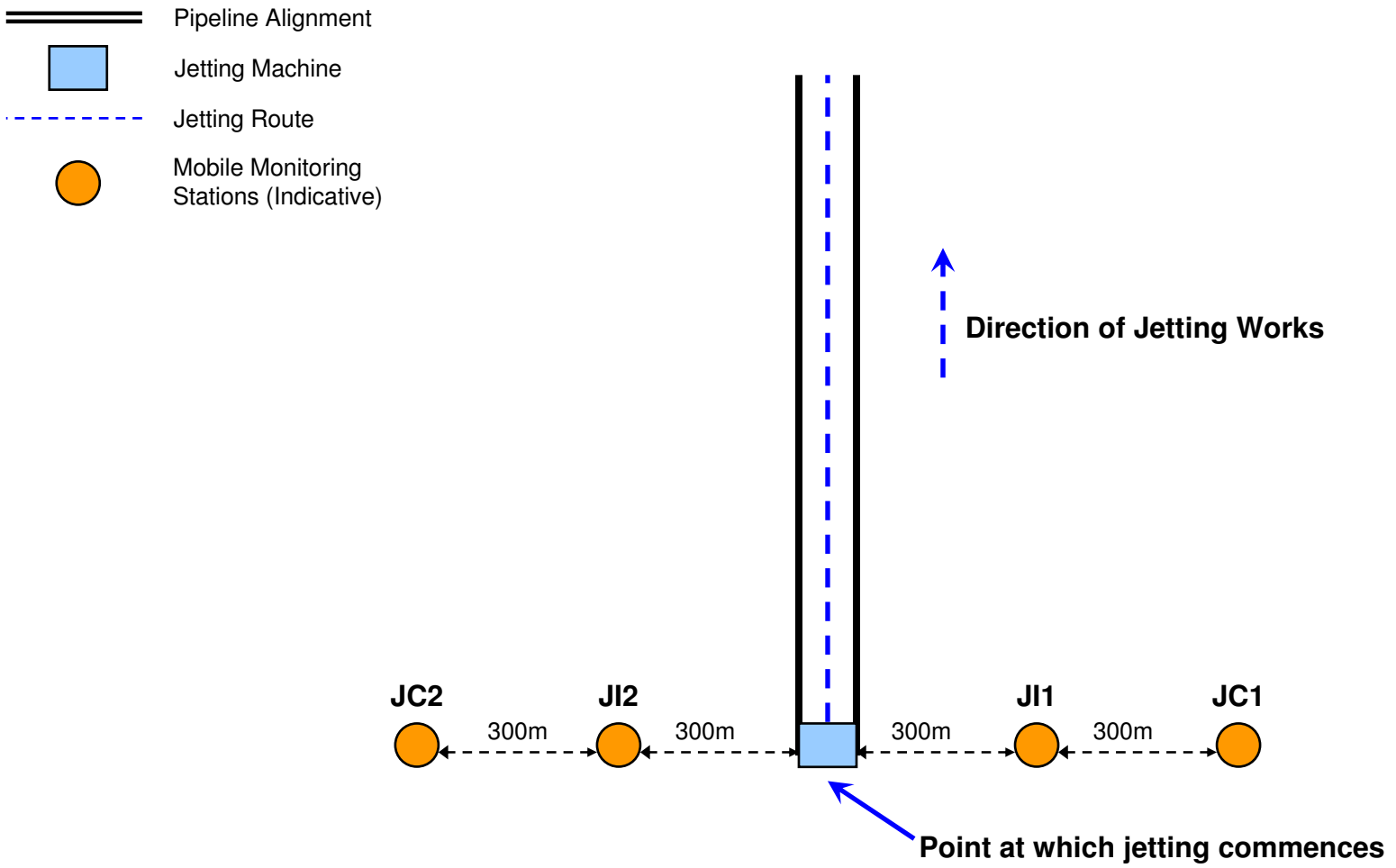
3.3.8 *Sampling Depths & Replication*

Each station will be sampled and measurements/ water samples will be taken at three depths, 1 m below the sea surface, mid-depth and 1 m above the seabed. For stations that are less than 3 m in depth, only the mid depth sample shall be taken. For stations that are less than 6 m in depth, only the surface and seabed sample shall be taken.

For *in situ* measurements, duplicate readings shall be made at each water depth at each station. Duplicate water samples shall be collected at each water depth at each station.

3.3.9 *Monitoring Frequency – Impact Monitoring*

During periods when there are dredging/ jetting works, impact monitoring should be undertaken at the monitoring stations as shown in *Figures 3.1* and *3.2* and *Tables 3.1* and *3.2* three times a week. Monitoring at each station would be undertaken at both mid-ebb and mid-flood tides on the same day. The tidal range selected for the baseline monitoring will be at least 0.5 m for both flood and ebb tides as far as practicable. The interval between two sets of monitoring would not be less than 36 hours.



Not To Scale

Figure 3.3

Indicative Locations of Intensive Water Quality Monitoring Stations During the First Two Days of Jetting Operation

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Date 14/01/2011

Environmental Resources Management

ERM

2-day Intensive Monitoring for Jetting near BPPS Shore Approach

During the first two days of the jetting operations near the shore approach (i.e. within Section 2 of the proposed pipeline), intensive water quality monitoring will be conducted. Monitoring of turbidity will be conducted continuously at the two sets of mobile monitoring stations every four hours. The methods for taking and analysing the samples will be the same as presented above. Duplicate measurements of turbidity in water samples from each depth shall be taken and analyzed at all monitoring stations.

3.3.10 *Water Quality Compliance*

Water quality monitoring will be evaluated against Action and Limit Levels. A set of new Action and Limit Levels to be adopted for impact monitoring during the wet season was submitted to EPD on 20 June 2012 and subsequently become effective starting 1 July 2012. Details are described in the *Revised Final Baseline Marine Water Quality Monitoring Report* for the First Phase Project submitted to the EPD on 26 July 2012 (1). The proposed Action and Limit Levels determined from the baseline water quality monitoring (2) in the dry season and the new Action and Limit levels to be adopted in the wet season are shown in *Table 3.3 (Hong Kong)*, *Table 3.4 (PRC Works)* and *Table 3.5 (2-day Intensive Monitoring for Jetting)*.

In the event that the levels are exceeded, appropriate actions in Event and Action Plan (*Table 3.6)* should be undertaken and a review of works will be carried out by the Contractor(s).

(1) ERM (2012) Black Point Gas Supply Project First Phase Project – Baseline Marine Water Quality Monitoring Report (Revised Final). Submitted to EPD on 26 July 2012.

(2) The *Final Baseline Water Quality Report* for the First Phase Project has been submitted on 18 April 2011and subsequently approved by the EPD,

Table 3.3 *Action and Limit Level for Water Quality – Hong Kong Dredging & Jetting Works*

Parameter	Action Level *#	Limit Level *#
DO in mgL^{-1} [b]	Surface 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for surface layer, i.e., **Dry Season = 4.80 mg/L** **Wet Season = 4.08 mg/L** Middle 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for mid-depth layer, i.e., **Dry Season = 4.80 mg/L** **Wet Season = 3.67 mg/L** Bottom 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for bottom layers, i.e., **Dry Season = 4.80 mg/L** **Wet Season = 3.49 mg/L**	Surface 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for surface layer, i.e. **Dry Season = 3.40 mg/L** **Wet Season = 2.89 mg/L** Middle 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for mid-depth layer, i.e., **Dry Season = 3.40 mg/L** **Wet Season = 2.60 mg/L** Bottom 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for bottom layers, i.e., **Dry Season = 3.50 mg/L** **Wet Season = 2.54 mg/L**
Turbidity (Tby) in NTU (Depth-averaged [a]) [c]	95%-ile of baseline data, i.e., **Dry & Wet Seasons = 15.4 NTU** [d]	99%-ile of baseline data, i.e., **Dry & Wet Seasons = 26.2 NTU** [d]
SS in mgL^{-1} (Depth-averaged [a]) [c]	95%-ile of baseline data, i.e., **Dry & Wet Seasons = 20.9 mg/L** [d]	99%-ile of baseline data, i.e., **Dry & Wet Seasons = 48.2 mg/L** [d]

Notes:

* Seasonally adjusted data: baseline data from First Phase Project Baseline Water Quality Monitoring in January to February 2011 adjusted with percentage differences in mean values from EPD Marine Water Quality Monitoring Programme between the Dry Season (November to March) and Wet Season (April to October) of 1999 to 2010 at Stations DM4, DM5 and NM5

Baseline data: data from First Phase Project Baseline Water Quality Monitoring in January to February 2011

a. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

b. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

c. For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

d. The second clause proposed in the *EM&A Manual* (i.e. 20%/ 30% exceedance of value at any impact station compared with corresponding data from control station, for Action/ Limit Level respectively) was considered to be not valid due to the mixed current directions in the Deep Bay area. The clause is therefore removed.

Table 3.4 Action and Limit Level for Water Quality – PRC Jetting / Dredging Works (within 2.5 km of HKSAR Boundary)

Parameter	Action Level *#	Limit Level *#
DO in mgL^{-1} [b]	Surface 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for surface layer, i.e., **Dry Season = 4.70 mg/L** **Wet Season = 4.00 mg/L** Middle 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for mid-depth layer, i.e., **Dry Season = 4.70 mg/L** **Wet Season = 3.59 mg/L** Bottom 5%-ile of baseline data for dry season and seasonally adjusted data for wet season for bottom layers, i.e., **Dry Season = 4.70 mg/L** **Wet Season = 3.41 mg/L**	Surface 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for surface layer, i.e. **Dry Season = 3.70 mg/L** **Wet Season = 3.15 mg/L** Middle 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for mid-depth layer, i.e., **Dry Season = 3.80 mg/L** **Wet Season = 2.90 mg/L** Bottom 1%-ile of baseline data for dry season and seasonally adjusted data for wet season for bottom layers, i.e., **Dry Season = 3.60 mg/L** **Wet Season = 2.62 mg/L**
Turbidity (Tby) in NTU (Depth-averaged [a]) [c]	95%-ile of baseline data, i.e., **Dry & Wet Seasons = 16.2 NTU** [d]	99%-ile of baseline data, i.e., **Dry & Wet Seasons = 32.3 NTU** [d]
SS in mgL^{-1} (Depth-averaged [a]) [c]	95%-ile of baseline data, i.e., **Dry & Wet Seasons = 26.5 mg/L** [d]	99%-ile of baseline data, i.e., **Dry & Wet Seasons = 50.2 mg/L** [d]

Notes:

* Seasonally adjusted data: baseline data from First Phase Project Baseline Water Quality Monitoring in January to February 2011 adjusted with percentage differences in mean values from EPD Marine Water Quality Monitoring Programme between the Dry Season (November to March) and Wet Season (April to October) of 1999 to 2010 at Stations DM4, DM5 and NM5

Baseline data: data from First Phase Project Baseline Water Quality Monitoring in January to February 2011

a. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

b. For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.

c. For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

d. The second clause proposed in the *EM&A Manual* (i.e. 20%/ 30% exceedance of value at any impact station compared with corresponding data from control station, for Action/ Limit Level respectively) was considered to be not applicable since the mean turbidity and SS levels at Impact Station during the baseline monitoring have already exceeded 120% of the respective mean levels at Control Station. The clause is therefore removed.

Table 3.5 ***Determination of Action and Limit Level for Water Quality – 2-day Intensive Monitoring for Jetting near Black Point Power Station Shore Approach***

Parameter	Action Level [c]	Limit Level [c]
Turbidity (Tby) in NTU (Depth-averaged [a]) [b]	95%-ile of baseline data, i.e., **Dry & Wet Seasons = 15.4 NTU**	99%-ile of baseline data, i.e., **Dry & Wet Seasons = 26.2 NTU**

Notes:

Baseline data: data from First Phase Project Baseline Water Quality Monitoring in January to February 2011

a. "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths.

b. For turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

c. Action and Limit Level was determined based on the results of the monitoring stations for the Hong Kong Dredging & Jetting Works (see *Table 4*)

d. The second clause proposed in the *EM&A Manual* (i.e. 20%/ 30% exceedance of value at any impact station compared with corresponding data from control station, for Action/ Limit Level respectively) was considered to be not valid due to the mixed current directions in the Deep Bay area. The clause is therefore removed.

Table 3.6 Event and Action Plan for Water Quality Monitoring during Construction Phase

Event	Action			
	ET (1)	**IEC** (1)	**Contractor(s)**	**CAPCO**
Action Level being exceeded by one sampling day	1. Repeat *in situ* measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO.	1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD.	1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice	1. Confirm receipt of notification of exceedance in writing.
Action Level being exceeded by two or more consecutive sampling days	1. Repeat *in situ* measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO; 5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented	1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD; 3. Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice; 3. Consider changes of working methods; 4. Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; 5. Implement the agreed mitigation measures.	1. Confirm receipt of notification of exceedance in writing; 2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. 3. Ensure additional mitigation measures are properly implemented.

Event	Action			
	ET (1)	IEC (1)	Contractor(s)	CAPCO
Limit Level being exceeded by one sampling day	1. Repeat *in situ* measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO; 5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented	1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD; 3. Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice; 3. Critically review the need to change working methods; 4. Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; 5. Implement the agreed mitigation measures.	1. Confirm receipt of notification of exceedance in writing; 2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. 3. Ensure additional mitigation measures are properly implemented. 4. Request Contractor(s) to critically review the working methods.
Limit Level being exceeded by two or more consecutive sampling days	1. Repeat *in situ* measurement on the next day of exceedance to confirm findings; 2. Check monitoring data, plant, equipment and Contractor(s)'s working methods; 3. Identify source(s) of impact and record in notification of exceedance; 4. Inform IEC, Contractor(s) and CAPCO; 5. Discuss with IEC and Contractor(s) on additional mitigation measures and ensure that they are implemented	1. Check monitoring data submitted by ET and Contractor(s)'s working methods; 2. Inform EPD; 3. Discuss with ET and Contractor(s) on additional mitigation measures and advise CAPCO accordingly; 4. Assess the effectiveness of the implemented mitigation measures.	1. Confirm receipt of notification of exceedance in writing; 2. Check plant and equipment and rectify unacceptable practice; 3. Critically review the need to change working methods; 4. Discuss with ET and IEC on additional mitigation measures and propose them to CAPCO within 3 working days; 5. Implement the agreed mitigation measures. 6. As directed by CAPCO, slow down or stop all or part of the marine construction works until no exceedance of Limit Level.	1. Confirm receipt of notification of exceedance in writing; 2. Discuss with the IEC on the proposed additional mitigation measures and agree on the mitigation measures to be implemented. 3. Ensure additional mitigation measures are properly implemented. 4. Request Contractor(s) to critically review the working methods; 5. Consider and instruct, if necessary, the Contractor(s) to slow down or to stop all or part of the marine construction works until no exceedance of Limit Level.

Note: (1) ET – Environmental Team, IEC – Independent Environmental Checker

3.4 WASTE MANAGEMENT EM&A

The waste management practices and recommended mitigation measures have been incorporated into a Waste Management Plan (WMP) for the First Phase Project for managing the different types of wastes by the Contractors on site. The WMP includes the arrangements for avoidance, reuse, recovery and recycling, storage, collection, treatment, the estimated rate of construction and demolition (C&D) materials generation and disposal, and the recommended mitigation measures on waste management as set out in *Section 7.4* of the approved EIA Report. The WMP also indicates the disposal arrangements and locations of C&D materials and other wastes. The WMP was submitted to the EPD in accordance with Condition 3.5 of the EP and FEP.

A Waste Disposal Plan (WDP) for contaminated marine sediment generated by the First Phase Project was prepared and submitted to the EPD in accordance with Condition 3.4 of the EP and FEP. It contains the location of the disposal site(s) / disposal option(s) as agreed by the Marine Fill Committee (MFC) and EPD.

To facilitate monitoring and control over the contractors' performance on waste management, a waste inspection and audit programme will be implemented throughout the construction phase to determine if wastes are managed in accordance with the WMP, WDP and other relevant legislative requirements. The programme will look at the aspects of waste management including waste generation, storage, recycling, transport and disposal.

Joint site inspections and audits by the representatives of the Contractor, the ET, CAPCO and the IEC will be undertaken once per month. The inspection/ audit will look at all aspects of on-site waste management practices including waste generation, storage, recycling, transport and disposal. Apart from site inspection, documents including licences, permits, disposal and recycling records will be reviewed and audited for compliance with the legislation and Contract requirements. Any irregularities observed during the site audits will be raised promptly to the contractor for rectification.

In addition to the monthly joint inspections/ audits, each construction Contractor(s) will designate a member of staff as being responsible for routine inspections and audits of on-site waste management practices, with reference to the relevant legislation and guidelines as well as the recommendations given in the Implementation Schedule contained in *Annex A*.

The Contractor(s)'s waste management practices will be audited with reference to the checklist detailed in *Table 3.7* below.

Table 3.7 Waste Management Checklist

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Necessary waste disposal permits or licences have been obtained	Before the commencement of works	Once	The ET will inform the Contractor(s), IEC and CAPCO. The Contractor(s) will apply for the necessary permits/ licences prior to disposal of the waste. The ET will verify that corrective action has been taken.
Dredged sediments are managed and disposed in accordance with the *ADV-21 (PNAP 252): Management Framework for Disposal of Dredged/ Excavated Sediment*.	Throughout the dredging works.	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to manage and dispose the dredged materials properly. The Contractor(s) will immediately suspend dredging until the dredging materials are properly managed and disposed.
Only licensed waste hauliers are used for waste collection.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to use a licensed waste haulier. The Contractor(s) will temporarily suspend waste collection of that particular waste until a licensed waste haulier is used. Corrective action will be undertaken within 48 hours.
Records of quantities of wastes generated, recycled and disposed are properly kept. For demolition material/waste, the number of loads for each day will be recorded (quantity of waste can then be estimated based on average truck load. For landfill charges, the receipts of the charge could be used for estimating the quantity).	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. The Contractor(s) will estimate the missing data based on previous records and the activities carried out. The ET will review the results and forward to CAPCO for approval.
Sufficient waste disposal points are provided. Wastes are collected and removed from site in a timely manner. General refuse is collected on a regular basis.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to remove waste accordingly.
Waste storage areas are properly cleaned and do not cause windblown litter and dust nuisance. Appropriate measures to reduce windblown litter and dust nuisance of waste will be adopted, e.g. by either covering trucks or by transporting wastes in enclosed containers.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to clean the storage area and/or cover the waste.

Activities	Timing	Checking Frequency	If non-compliance noted, Action Required
Different types of waste are segregated in different containers or skip to enhance reuse and recycling of material and proper disposal of waste.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to provide separate skips/ containers. The Contractor(s) will verify that the workers place the waste in the appropriate containers.
Chemical wastes are stored, handled and disposed of in accordance with the *Code of Practice on the Packaging, Handling and Storage of Chemical Wastes*, published by the EPD. Chemical wastes are separated for special handling and appropriate treatment at the Chemical Waste Treatment Centre at Tsing Yi.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to rectify the issues immediately. Warning will be given to the Contractor(s) if corrective actions are not taken within 24 hrs.
Demolition materials are properly covered before leaving the site.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to comply. The Contractor(s) will confirm that the demolition materials are properly covered when transport out of the site.
Wastes are disposed at licensed sites.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will warn the Contractor(s) and instruct the Contractor(s) to confirm that the wastes are disposed of at the licensed sites. Should it involve chemical waste, the Waste Control Group of EPD will be notified.
Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors are provided. A recording system for the amount of wastes generated/ recycled and disposal sites is developed and implemented.	Throughout the works	Each Month	The ET will inform the Contractor(s), IEC and CAPCO. CAPCO will instruct the Contractor(s) to comply.

Note: ET – Environmental Team, IEC – Independent Environmental Checker

3.5 MARINE ECOLOGY MONITORING

3.5.1 Marine Mammal Exclusion Zone Monitoring

The marine mammal exclusion zone monitoring will be required during periods when there are dredging/ jetting works for the submarine pipeline.

Monitoring Frequency

Daily monitoring will be conducted till the completion of dredging / jetting works.

Methodology

A marine mammal exclusion zone within a radius of 250 m from the dredgers / jetting machine will be implemented during the marine works taking place in daylight hours. The marine mammal exclusion zone will be monitored by qualified observer(s) (1) with an unobstructed, elevated view of the area. The view will be undertaken from the dredging / jetting vessel.

Qualified observer(s) will stand on the open upper decks of the vessel, allowing for observer eye heights of 4 to 5 m above water level and relatively unobstructed forward visibility between 270° and 90°. Vessel-based observation by the observer(s) shall be conducted by searching the 180° swath in front of the dredger (270° to 90°) with appropriate marine binoculars, scanning the same area with the naked eyes and occasional binocular check.

Qualified observer(s) will scan the 250 m exclusion zone for at least 30 minutes prior to the start of dredging / jetting. If cetaceans are observed in the exclusion zone, dredging / jetting will be delayed until they have left the area. This measure will confirm that the area in the vicinity of the dredging/ jetting work is clear of marine mammals prior to the commencement of works and will serve to reduce any disturbance to marine mammals. As per previous practice in Hong Kong, should cetaceans move into the works area during dredging / jetting, it is considered that cetaceans will have acclimatised themselves to the works therefore cessation of dredging / jetting is not required (2).

(1) The qualification and experience of the qualified observer(s) shall be to the satisfaction of the Director of Agriculture, Fisheries and Conservation (DAFC). The qualified observer(s) for the marine mammal monitoring must be suitably trained to conduct the visual monitoring works. CVs of the qualified observer(s) will be provided to the DAFC prior to commencement of monitoring surveys.

(2) This precautionary measure is consistent with conditions for grab dredging works inside the Sha Chau and Lung Kwu Chau Marine Park included in the issued Environmental Permit for the Permanent Aviation Fuel Facility for Hong Kong International Airport project

3.5.2 *Additional Marine Mammal Monitoring*

CAPCO will conduct additional monitoring of the distribution and abundance of dolphins during the pre-construction, construction and post-construction phases of the First Phase Project to record information on dolphin distribution in the Project areas.

Monitoring Frequency

During the pre-construction stage, one monitoring survey will be conducted per month for three months before dredging commences.

During the construction phase monthly monitoring will be conducted (i.e. one survey per month). In accordance with the recommendations of the EIA, construction phase monitoring will be undertaken during periods when there are dredging/ jetting works.

The post-construction phase monitoring will essentially repeat the frequency of the pre-construction phase monitoring (i.e. one survey per month for three months).

Each monitoring survey is expected to be completed within one day.

Survey Methodology

Pre-construction, construction and post-construction monitoring will employ the same methodology. The proposed survey transects for this additional marine mammal monitoring programme are presented in *Figure 3.4*.

Monitoring will be conducted from 12-15 m inboard vessels (with an open upper deck above the pilothouse, providing a mostly unobstructed 180° view of the area ahead of the vessel), weather permitting (Beaufort 0-5, no heavy rain, and visibility > 1,200 m). The observer team conducts searches and observations from the flying bridge area, 4-5 m eye height above the water's surface.

For each survey, up to four qualified and trained environmental scientists (observers) (1) led by a local marine mammal expert will make up the on-effort monitoring team.

As the vessel transits the transect lines at a relatively constant speed of 13-15 km/hr, the primary observer searches for dolphins continuously through 7 X 50 Fujinon marine binoculars (*Table 3.8*). The data recorder searches with unaided eye and fills-out data sheets. Both observers search ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°).

(1) The qualification and experience of the qualified observer(s) shall be to the satisfaction of the Director of Agriculture, Fisheries and Conservation (DAFC). The qualified observer(s) for the marine mammal monitoring must be suitably trained to conduct the visual monitoring works. CVs of the qualified observer(s) will be provided to the DAFC prior to commencement of monitoring surveys.

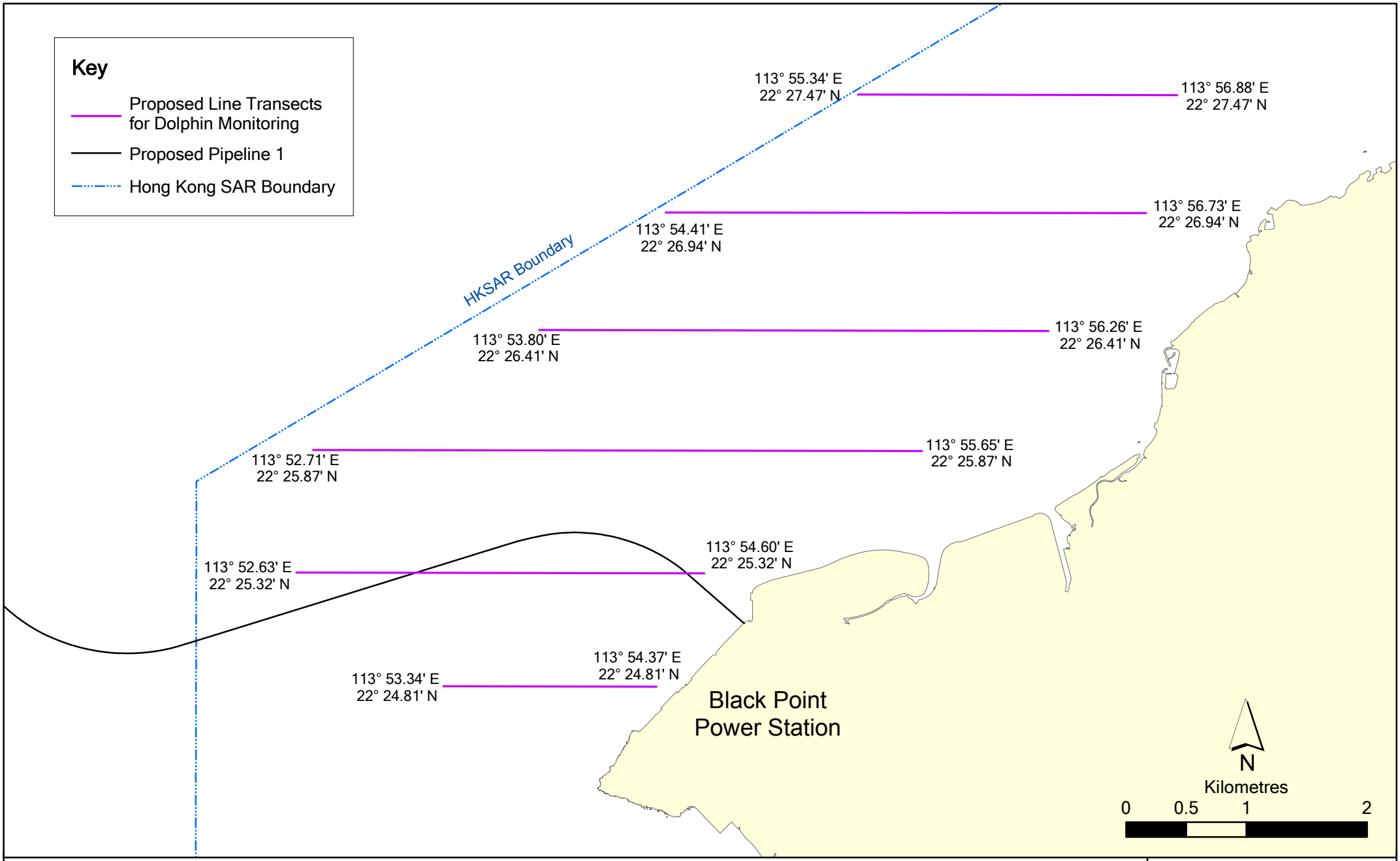

Figure 3.4

Line Transects for Additional Marine Mammal Monitoring

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Date: 04/01/2011

Environmental Resources Management

ERM

Observers rotate positions approximately every 30 minutes. There are two additional observers on the boat, who rotate into position to give observers a rest after each hour of search effort, thereby minimizing fatigue.

Table 3.8 Indicative Equipment List for Vessel Based Marine Mammal Monitoring

Type of Equipment	Model Used
Marine binoculars w/built-in compass	Fujinon 7X50 FMTR-SC
Hand-held GPS unit	Garmin Gecko
Digital 35 mm SLR camera	Canon EOS 40D
Telephotos lens (image stabilized)	Canon EF 100-400m zoom lenses
Compact flash memory cards	Sandisc 4 GB
Laser rangefinder	Bushnell Yardage Pro Compact 800

4 IMPLEMENTATION STATUS ON ENVIRONMENTAL MITIGATION MEASURES

The Contractors have implemented environmental mitigation measures and requirements as stated in the EIA Report, EM&A Manual, EP and FEP. The implementation status of the measures for the First Phase Project is summarised in the Implementation Schedule of Mitigation Measures (*Annex A*).

Status of required submissions under the EP for the First Phase Project is presented in *Table 4.1*.

Table 4.1 Status of Required Submission

EP Condition	Submission	Date of Submission to EPD
Condition 1.11	Notification on commencement of construction of the Project	14 January 2011
Condition 2.3	Submission of Updated EM&A Manual	1 March 2011
Condition 2.4	Submission of Updated EM&A Programme	1 March 2011
Condition 3.1	Notification on Management Organization of the Main Construction Company	22 February 2011
Condition 3.4	Submission of Waste Disposal Plan (WDP)	1 March 2011
Condition 3.5	Submission of Waste Management Plan (WMP)	11 April 2011
Condition 3.6	Submission of Silt Curtain Deployment Plan for Jetting Operation	9 August 2012
Condition 3.6	Submission of Intensive Water Quality Monitoring Results	19 October 2012
Condition 5.1	Submission of Baseline Marine Water Quality Monitoring Report (Final)	18 April 2011
	Submission of Baseline Marine Water Quality Monitoring Report (Revised Final)	26 July 2012
Condition 5.3	Submission of First Quarterly EM&A Summary Report – March to May 2011	15 July 2011
	Submission of Second Quarterly EM&A Summary Report – June to August 2011	30 September 2011
	Submission of Third Quarterly EM&A Summary Report – September to November 2011	30 December 2011
	Submission of Fourth Quarterly EM&A Summary Report – December 2011 to February 2012	30 March 2012
	Submission of Fifth Quarterly EM&A Summary Report – March to May 2012	4 July 2012
	Submission of Sixth Quarterly EM&A Summary Report – June to August 2012	5 October 2012
	Submission of Seventh Quarterly EM&A Summary Report – September to November 2012	2 January 2013
	Submission of Eighth Quarterly EM&A Summary Report – December 2012 to February 2013	28 March 2013

EP Condition	Submission	Date of Submission to EPD
	Submission of Monthly EM&A Report – March 2011	14 April 2011
	Submission of Monthly EM&A Report – April 2011	14 May 2011
	Submission of Monthly EM&A Report – May 2011	14 June 2011
	Submission of Monthly EM&A Report – June 2011	14 July 2011
	Submission of Monthly EM&A Report – July 2011	12 August 2011
	Submission of Monthly EM&A Report – August 2011	14 September 2011
	Submission of Monthly EM&A Report – September 2011	14 October 2011
	Submission of Monthly EM&A Report – October 2011	14 November 2011
	Submission of Monthly EM&A Report – November 2011	14 December 2011
	Submission of Monthly EM&A Report – December 2011	14 January 2012
	Submission of Monthly EM&A Report – January 2012	12 February 2012
	Submission of Monthly EM&A Report – February 2012	14 March 2012
	Submission of Monthly EM&A Report – March 2012	13 April 2012
	Submission of Monthly EM&A Report – April 2012	14 May 2012
	Submission of Monthly EM&A Report – May 2012	14 June 2012
	Submission of Monthly EM&A Report – June 2012	13 July 2012
	Submission of Monthly EM&A Report – July 2012	14 August 2012
	Submission of Monthly EM&A Report – August 2012	14 September 2012
	Submission of Monthly EM&A Report – September 2012	12 October 2012
	Submission of Monthly EM&A Report – October 2012	14 November 2012
	Submission of Monthly EM&A Report – November 2012	14 December 2012
	Submission of Monthly EM&A Report – December 2012	14 January 2013
	Submission of Monthly EM&A Report – January 2013	14 February 2013
	Submission of Monthly EM&A Report – February 2013	14 March 2013
	Submission of Monthly EM&A Report – March & April 2013	12 April 2013
	Submission of First Annual EM&A Summary Report – March 2011 to February 2012	30 March 2012
	Submission of Second Annual EM&A Summary Report – March 2012 to February 2013	13 May 2013

5 EM&A RESULTS

5.1 SITE INSPECTIONS & AUDITS

Twenty-five monthly joint site inspections were conducted by representatives of the Contractors, the ET, CAPCO and the IEC for the EM&A programme of the First Phase Project from March 2011 to April 2013. Locations inspected included the dredging barges GD1 and GD1104, the derrick lighter Shun Tak 32, the jetting barge, the Co-located GRS area, the project site office compound, the project store, the temporary stockpiling area, the bar bending and stockpiling areas near the project site office compound, and the gas header excavation area. There was no non-compliance recorded during the site inspections.

Environmental performance complied with environmental requirements and all necessary mitigation measures were properly implemented. Specific observations identified from the monthly site inspections, if any, are summarized in *Table 5.1*. The ET confirmed that the construction activities were in compliance with the environmental requirements and all necessary mitigation measures were properly implemented.

Table 5.1 Specific Observations Identified from the Monthly Site Inspections

Inspection Date	Observations	Remarks
25 March 2011	No specific observation was identified.	–
29 April 2011	No specific observation was identified.	–
27 May 2011	Small amount of general wastes were observed inside the recycling skips.	The Contractor had segregated the general wastes from the waste recycling skips immediately after the site audit. The Contractor was recommended to display banner on waste recycling skips to promote awareness on waste segregation.
24 June 2011	Stockpiles of excavated materials were not entirely covered by tarpaulin sheets at the Co-located GRS area.	It was understood that the tarpaulin sheets were removed as a precaution to the typhoon during the week. The Contractor was reminded to cover the stockpiles properly and the situation was rectified immediately after the site audit.
27 July 2011	No specific observation was identified.	–
29 August 2011	While water spraying on haul road was conducted regularly to control potential fugitive dust emission, the sprayed areas dried up quickly due to the hot and sunny weather.	The Contractor was requested to increase the frequency of water spraying under hot and dry weather.

Inspection Date	Observations	Remarks
28 September 2011	A small amount of stagnant water was found in the drip tray of a diesel generator.	The Contractor was requested to drain the water immediately and was reminded to promptly rectify such situation in the future.
28 October 2011	Some stockpiles of excavated materials at the Co-located GRS area and the temporary stockpiling areas were not properly covered with tarpaulin sheets.	The Contractor was requested to cover the stockpiles materials immediately and was reminded to promptly rectify such situation in the future.
24 November 2011	A few stockpiles of excavated materials at the Co-located GRS area and the temporary stockpiling areas, and the exposed slope at the Co-located GRS area, were not properly covered with tarpaulin sheets. Also, stagnant water was observed on the haul road due to a damaged water hose underneath.	The Contractor was requested to cover the stockpiles materials and exposed slope immediately, and to repair the damaged water hose and clear the stagnant water immediately. The Contractor was requested and was reminded to promptly rectify such situation in the future.
28 December 2011	Most stockpiles were properly covered by tarpaulin and a few stockpiles were being covered by the contractor.	The Contractor was requested to complete covering of all stockpiles with tarpaulin.
30 January 2012	A small area of exposed slope at the Co-located GRS area was not properly covered with tarpaulin sheets. Also, at the Co-located GRS area a drain plug of a diesel generator drip tray was found missing.	The Contractor was requested to cover the exposed slope immediately and was reminded to promptly rectify such situation in the future. Since the generator was not in use, the Contractor was requested to remove the generator from the project site.
22 February 2012	No specific observation was identified.	–
29 March 2012	It was observed that most stockpiles were properly covered by tarpaulin and a few stockpiles were being covered by the Contractor.	The Contractor was requested to complete covering of all stockpiles with tarpaulin.
26 April 2012	It was observed that most stockpiles were properly covered by tarpaulin and a few stockpiles at the temporary stockpiling area were being covered by the Contractor.	The Contractor was requested to complete covering of all stockpiles with tarpaulin.
25 May 2012	No specific observation was identified.	–
28 June 2012	It was observed that most stockpiles were properly covered by tarpaulin and a few stockpiles were being covered by the Contractor.	The Contractor was requested to complete covering of all stockpiles with tarpaulin.
27 July 2012	It was observed that most stockpiles	The Contractor was requested to complete

Inspection Date	Observations	Remarks
	were properly covered by tarpaulin and a few stockpiles at the temporary stockpiling area were being covered by the Contractor.	covering of all stockpiles with tarpaulin.
27 August 2012	It was observed that most stockpiles were properly covered by tarpaulin and a few stockpiles at the temporary stockpiling area were being covered by the Contractor.	The Contractor was reminded to complete covering of all stockpiles with tarpaulin.
27 September 2012	No specific observation was identified.	–
19 October 2012	Emission of black smoke from diesel generators was observed on the jetting barge. Also, temporary stockpiles at the co-located GRS area were not fully covered.	The Contractor was requested to conduct regular maintenance and checking of diesel power mechanical equipment. Also, the Contractor was reminded to fully cover the temporary stockpiles at the co-located GRS area with tarpaulin.
28 November 2012	Stockpiles at the temporary stockpiling area were not fully covered.	The Contractor was reminded to fully cover the temporary stockpiles at the temporary stockpiling area with tarpaulin.
24 December 2012	Stockpiles at the temporary stockpiling area were not fully covered.	The Contractor was reminded to fully cover the temporary stockpiles at the temporary stockpiling area with tarpaulin.
30 January 2013	No specific observation was identified.	–
26 February 2013	No specific observation was identified.	–
10 April 2013	No specific observation was identified.	–

5.2 MARINE WATER QUALITY MONITORING

5.2.1 Baseline Water Quality Monitoring

Baseline water quality monitoring was conducted between 19 January and 16 February 2011 at 20 designated monitoring stations (six Impact stations, six Control stations, four Sensitive Receiver stations and four Reference stations) established for the First Phase Project and in accordance with the requirements described in the Project's EM&A Manual (see monitoring schedule in *Annex C*). No major activities influencing water quality were observed in the vicinity of the Project's marine works area during the baseline monitoring. Water quality monitoring results are, therefore, considered to be representative of the baseline conditions of the areas where marine works will be undertaken for the First Phase Project. The baseline monitoring results were used to determine the Action and Limit Levels for dissolved oxygen

(DO), suspended solids (SS) and turbidity for impact monitoring to be conducted during periods when there are dredging/ jetting works for the First Phase Project (see *Section 3.3.10*). The *Revised Final Baseline Water Quality Report* for the First Phase Project, which summarized the findings and results of the baseline water quality monitoring, has been submitted on 26 July 2012 and subsequently approved by the EPD. Key baseline monitoring results are presented graphically in *Annex D1*.

5.2.2 *Construction Phase Water Quality Monitoring*

During the construction phase, marine dredging and jetting activities were undertaken in Hong Kong waters and PRC waters within 2.5 km from HKSAR boundary between May and October 2012, as follows:

- Dredging activities for submarine pipeline trench construction in PRC waters within 2.5 km from HKSAR boundary commenced on 5 May 2012 and were completed on 24 June 2012;
- Dredging activities for the construction of pipeline concrete trough at the BPPS seawall commenced on 19 May 2012 and were completed on 21 May 2012;
- Dredging activities for the construction of pipeline along the Urmston Road Section commenced on 6 June 2012 and were completed on 1 August 2012;
- Dredging works at the pipeline shore approach section near the BPPS seawall was conducted between 20 and 31 August 2012;
- Jetting activities for the construction of pipeline from Urmston Road to HKSAR boundary were commenced on 1 October 2012 and completed on 2 October 2012; and
- Jetting works near the shore approach (i.e. from Urmston Road to Black Point) was commenced on 6 October 2012 and completed on 31 October 2012.

Per plan and in accordance with the requirements described in the Updated EM&A Manual, marine water quality impact monitoring was conducted during periods when there were dredging/jetting works. Impact monitoring was undertaken three times per week during the period of dredging/jetting works (see monitoring schedule in *Annex C*). Monitoring results are presented graphically in *Annex D2* and detailed observations were reported in the *Fifteen* to *Eighteenth* and *Twentieth Monthly EM&A Report* for the First Phase Project. Key findings of the construction phase water quality monitoring are summarised below.

It is useful to note that some adverse weather conditions, including heavy rainfall, Thunderstorm Warning and Tropical Cyclone Signal, were recorded during the monitoring period. In addition, heavy marine traffic (not

associated with this Project) was commonly observed nearby the monitoring stations with several mud/sand carrying vessels passed by during the sampling event. Both weather conditions and marine traffic may affect the monitoring results.

Impact Monitoring during Dredging Activities

For dredging activities in Hong Kong waters, a total of 27 impact monitoring events were conducted and exceedances were recorded in 12 events (*Table 5.2*).

For dredging activities in PRC waters within 2.5 km from HKSAR boundary, a total of 21 impact monitoring events were conducted and exceedances were recorded in 14 events (*Table 5.2*).

Table 5.2 Summary of Exceedances for Marine Water Quality Impact Monitoring

Location [a]	Month/ Year	Exceedance Level	Dissolved Oxygen			Depth-averaged Turbidity	Depth-averaged Suspended Solids	Total Number of Monitoring Events	Number Monitoring Events with Exceedance
			Surface	Mid-Depth	Bottom				
PRC Waters	May 2012	Action	✓	✓	✓	✓	✓	11	8
		Limit	✓	✓	–	–	–		
	June 2012 [b]	Action	✓	✓	✓	✓	✓	10	6
		Limit	✓	✓	–	✓	✓		
							Total:	**21**	**14**
HKSAR Waters	May 2012	Action	✓	✓	✓	–	–	1	1
		Limit	–	–	–	–	✓		
	June 2012	Action	✓	✓	✓	✓	–	9	4
		Limit	✓	✓	–	–	–		
	July 2012	Action	✓	✓	✓	✓	–	12	6
		Limit	–	–	–	✓	✓		
	August 2012	Action	–	–	–	✓	✓	5	1
		Limit	–	–	–	–	–		
	September 2012 [c]	Action	–	–	–	–	–	–	–
		Limit	–	–	–	–	–		
	October 2012	Action	✓	–	–	✓	✓	15	4
		Limit	–	–	–	✓	–		
							Total:	**42**	**16**

Notes:
(a) PRC = People Republic of China waters within a distance of about 2.5 km from the HKSAR Boundary
(b) Dredging in PRC waters from 2.5km away from HKSAR boundary completed in 24 June 2012
(c) No dredging/jetting works were undertaken in September 2012 in HKSAR waters

Closed grab dredgers were used and silt curtains were deployed during dredging works, and the dredging rates were within the limits described in the approved EIA Report. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the

Event and Action Plan of Updated EM&A Manual, the above exceedances were considered to be due to natural seasonal variation in water quality characteristic of western Hong Kong waters and were unlikely to be due to the Project's dredging activities.

Impact Monitoring during Jetting Activities

For jetting activities in Hong Kong waters, a total of 13 impact monitoring events were undertaken and exceedances were recorded in two events (*Table 5.2*).

In addition, as per the requirements of the Updated EM&A Manual, a two-day intensive water quality monitoring for jetting near BPPS shore approach was conducted on 6 and 7 October 2012. Details and results of the two-day intensive water quality monitoring are presented in the *Technical Note on 2-day Intensive Monitoring for Jetting near Black Point Power Station Shore Approach* submitted to EPD in 19 October 2012 (1). Action/Limit Exceedances in depth-averaged Turbidity were recorded on 6 and 7 October 2012. As explained in the Technical Note, the observed exceedances were not considered to be associated with the Project's jetting works.

The silt curtains were deployed and working properly during jetting operations. Details of the jetting machine and silt curtain deployment plan are presented in *Annex E* of the *Twentieth Monthly EM&A Report*. The level of jetting activities was within the working rate described in the EP and approved EIA Report. Following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of Updated EM&A Manual, these exceedances were considered to be due to natural variation in water quality characteristics of western Hong Kong waters and were unlikely to be due to the Project's jetting activities.

5.2.3 Post-Construction Water Quality Monitoring

Post-construction water quality monitoring was conducted between 12 March and 13 April 2013 at 20 designated monitoring stations in the same manner as the baseline monitoring upon the completion of marine works for the First Phase Project (see monitoring schedule in *Annex C*).

The monitoring results are presented graphically in *Annex D3* and detailed observations were reported in the *First Phase Project – Post-Construction Marine Water Quality Monitoring Report* (2). Key findings of the post-construction phase water quality monitoring are summarised below.

(1) ERM (2012) Technical Note on 2-day Intensive Monitoring for Jetting near Black Point Power Station Shore Approach. Submitted to EPD on 19 October 2012.

(2) ERM (2013) First Phase Project - Post-Construction Marine Water Quality Monitoring Report. Submitted to EPD on 24 May 2013.

In general, the dissolved oxygen, turbidity and suspended solids levels recorded during the post-construction monitoring were mostly comparable to the results obtained during the baseline and impact monitoring periods. Whilst exceedances of the Action Levels, and occasionally the Limit Levels, in depth-averaged turbidity and suspended solids were recorded, such fluctuations were also observed during the baseline monitoring and are considered to be sporadic in nature and characteristic of the water quality in this area of Hong Kong.

Since the overall water quality after the completion of the First Phase Project was found to be comparable to that reported prior to the commencement of the Project's marine works, it is concluded that no deterioration of marine water quality was observed and hence the impact of the Project works on the water quality of the Project works areas is considered to be negligible.

5.3 WASTE MANAGEMENT

Wastes generated from the First Phase Project include mainly construction and demolition (C&D) materials (inert public fill and non-inert construction wastes), chemical wastes, recyclable materials, sewage and dredged marine sediment. Reference has been made to the Monthly Summary Waste Flow Table prepared by Leighton Contractors (Asia) Limited and Wai Kee (Zens) Construction & Transportation Co Ltd (*Annex B*). The quantities of different types of wastes are summarized in *Table 5.3* with reference to relevant handling records for this Project. The trend of waste generation during the construction phase is illustrated in *Figure 5.1*.

Table 5.3 Quantities of Different Wastes Generated from the Construction Phase

Month / Year	Quantity							
	C&D Materials (inert) [a]	C&D Materials (non-inert) [b]	Chemical Waste [c]	Recyclable Materials [d]	C&D Materials (Inert) Re-used [e]	Sewage [f]	Marine Sediment[g]	
							Type I [h]	Type II [i]
Mar - May 2011	869 tonnes	9.8 tonnes	0 kg	1,440 kg	100 tonnes	103 m^3	0 m^3	0 m^3
Jun - Aug 2011	2,108 tonnes	12 tonnes	0 kg	0 kg	0 tonnes	297.5 m^3	0 m^3	0 m^3
Sep - Nov 2011	3,241 tonnes	31 tonnes	0 kg	3,480 kg	0 tonnes	408 m^3	0 m^3	0 m^3
Dec 2011 - Feb 2012	7,805 tonnes	33 tonnes	250 kg	1,540 kg	0 tonnes	460 m^3	0 m^3	0 m^3
Mar - May 2012	4,522 tonnes	52 tonnes	0 kg	15,962 kg	0 tonnes	514 m^3	0 m^3	0 m^3
Jun - Aug 2012	3,631 tonnes	120 tonnes	0 kg	7,999 kg	1,292 tonnes	620 m^3	25,282 m^3	84,250 m^3
Sep - Nov 2012	2,060 tonnes	80 tonnes	12 kg	23,052 kg	0 tonnes	628 m^3	0 m^3	0 m^3
Dec 2012 - Feb 2013	1,635 tonnes	41 tonnes	0 kg	8,530 kg	0 tonnes	530 m^3	0 m^3	0 m^3
Mar – Apr 2013	510 tonnes	35 tonnes	0 kg	6,215 kg	0 tonnes	190 m^3	0 m^3	0 m^3
Total	**26,381 tonnes**	**413.8 tonnes**	**262 kg**	**68,218 kg**	**1,392 tonnes**	**3750.5 m^3**	**25,282 m^3**	**84,250 m^3**

Notes:

(a) Inert C&D materials include concrete, rubble, earth, boulder, sand, tile, masonry and used bentonite and were disposed of at the Tuen Mun Area 38 Public Fill.

(b) Non-inert C&D materials after segregation were sent to WENT Landfill.

(c) A licensed waste collector has been engaged for the collection of chemical wastes for disposal or recycling at licensed facilities.

(d) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

(e) Inert C&D materials recycled include broken concrete, materials reused in the First Phase Project and materials reused in other Projects.

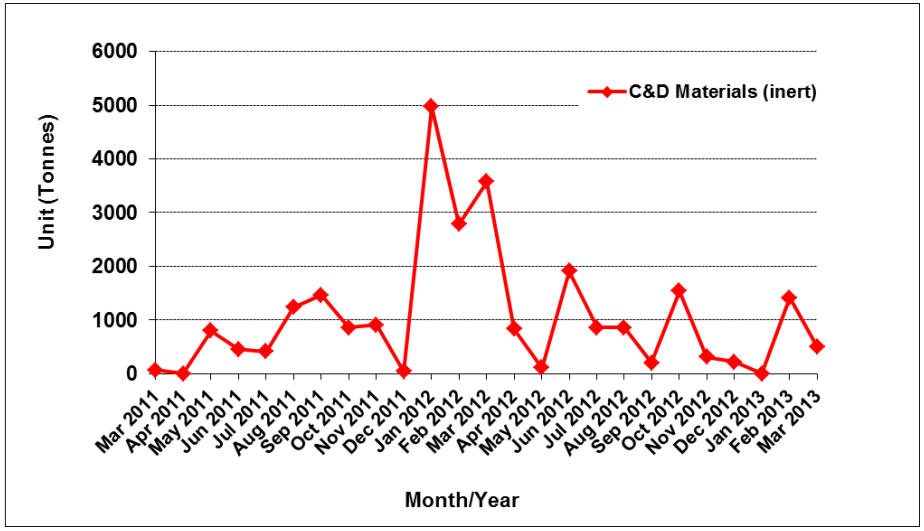
(f) Sewage generated by toilets with holding tanks was collected and disposed of off-site at Pillar Point Sewage Treatment Works.

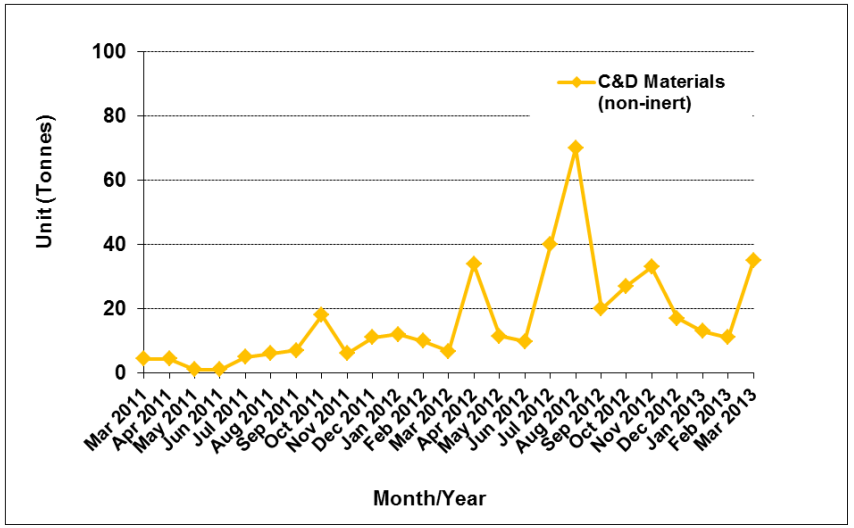
(g) Marine sediment (*in situ* volume) generated from dredging activities by the Contractor (Wai Kee and Leighton).

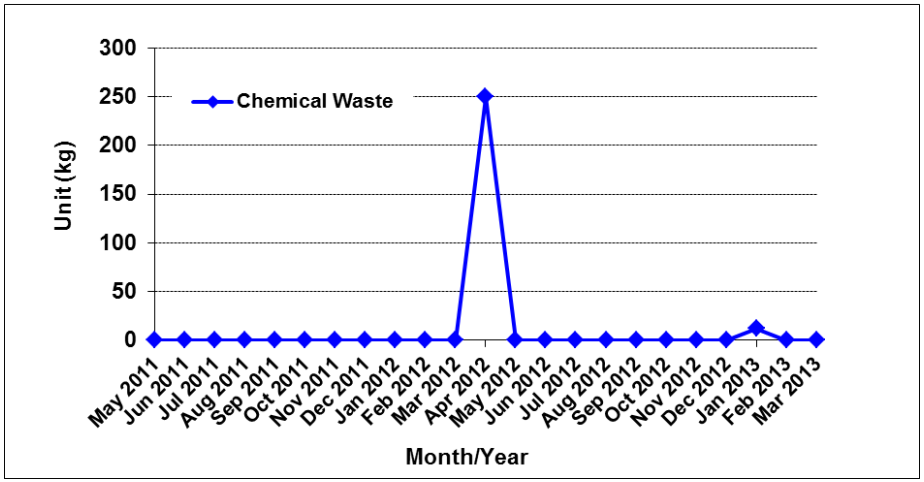
(h) Type I sediments are disposed of at the South Cheung Chau Sea and East Ninepin Sea Sediment Disposal Area

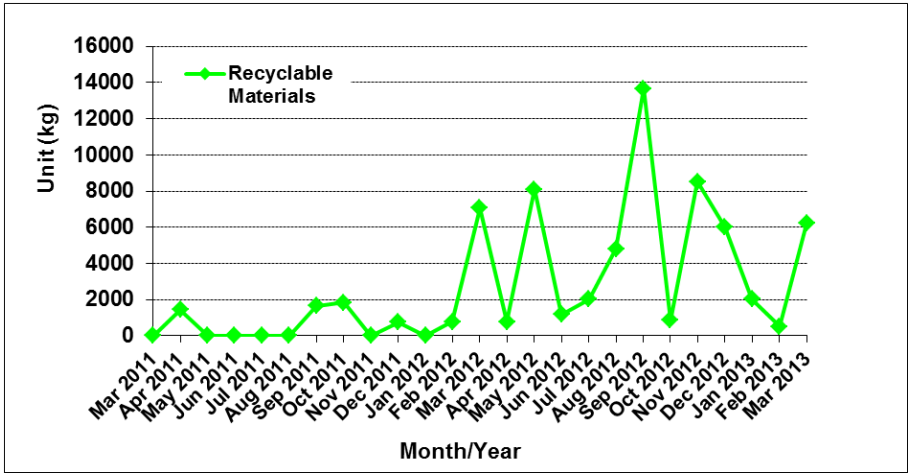
(i) Type II sediments are disposed of at the Mud Pit V of East of Sha Chau Confined Marine Sediment Disposal facility

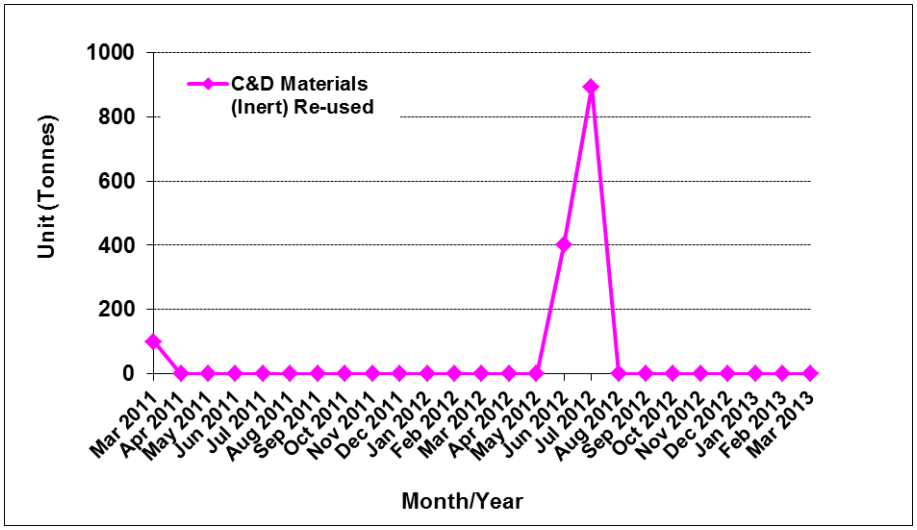
Figure 5.1 Wastes generated during the Construction Phase

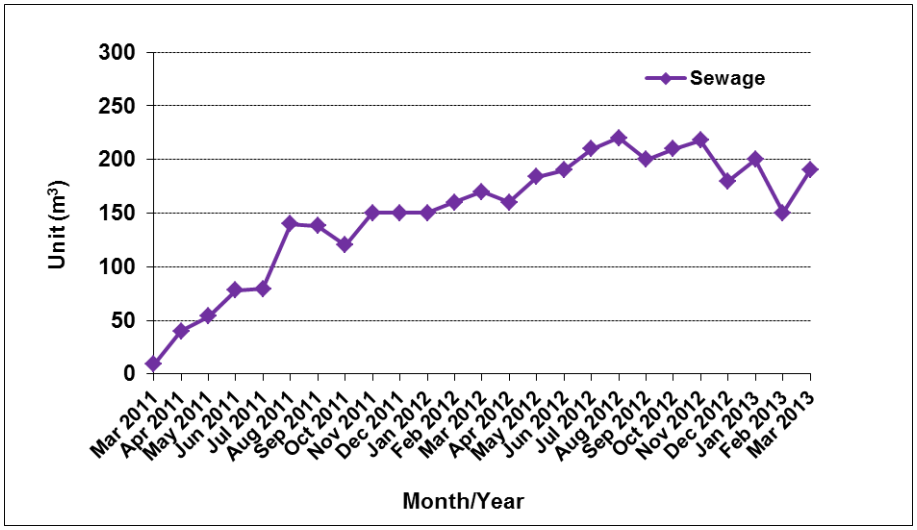









C&D Materials (Inert) Re-used
Unit (Tonnes)
1000
800
600
400
200
0
Mar 2011
Apr 2011
May 2011
Jun 2011
Jul 2011
Aug 2011
Sep 2011
Oct 2011
Nov 2011
Dec 2011
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Month/Year


Sewage
Unit (m³)
300
250
200
150
100
50
0
Mar 2011
Apr 2011
May 2011
Jun 2011
Jul 2011
Aug 2011
Sep 2011
Oct 2011
Nov 2011
Dec 2011
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
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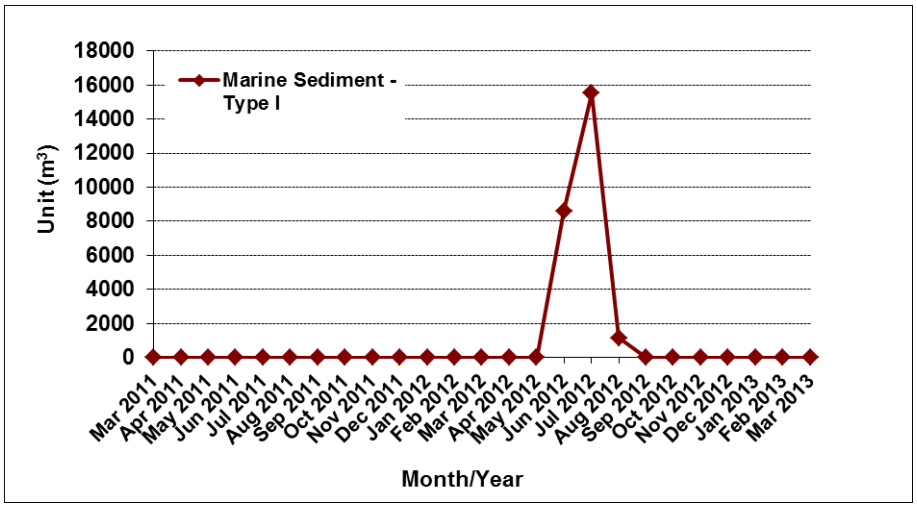
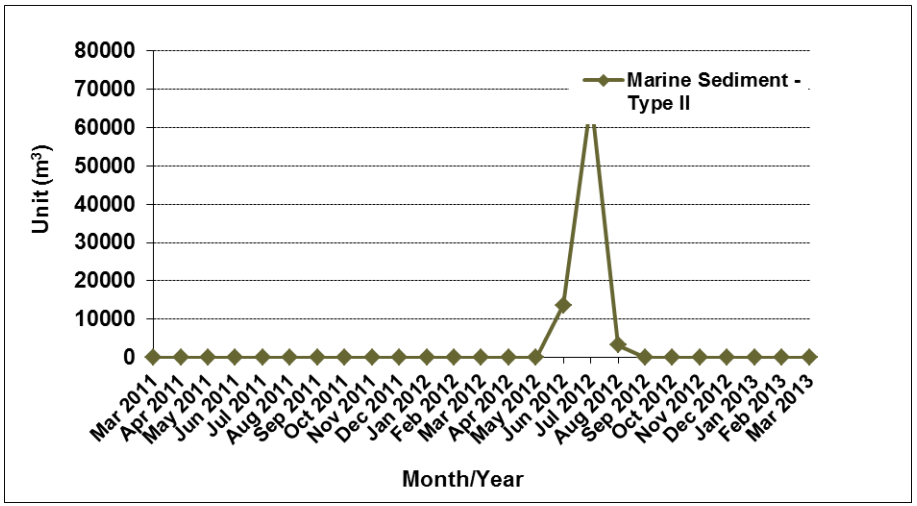
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Month/Year


Marine Sediment - Type I
Unit (m³)
18000
16000
14000
12000
10000
8000
6000
4000
2000
0
Mar 2011
Apr 2011
May 2011
Jun 2011
Jul 2011
Aug 2011
Sep 2011
Oct 2011
Nov 2011
Dec 2011
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Month/Year


Marine Sediment - Type II
Unit (m³)
80000
70000
60000
50000
40000
30000
20000
10000
0
Mar 2011
Apr 2011
May 2011
Jun 2011
Jul 2011
Aug 2011
Sep 2011
Oct 2011
Nov 2011
Dec 2011
Jan 2012
Feb 2012
Mar 2012
Apr 2012
May 2012
Jun 2012
Jul 2012
Aug 2012
Sep 2012
Oct 2012
Nov 2012
Dec 2012
Jan 2013
Feb 2013
Mar 2013
Month/Year

5.4 MARINE ECOLOGY MONITORING

5.4.1 Marine Mammal Exclusion Zone Monitoring

Daily marine mammal exclusion zone monitoring was undertaken during the period of dredging or jetting activities in Hong Kong waters from May to August and in October 2012. Four sightings of the Indo-Pacific humpback dolphin *Sousa chinensis* were recorded in July 2012, while no sightings were recorded in May, June, August and October 2012. In accordance with the requirements described in the Updated EM&A Manual, dredging/jetting was delayed until they have left the area. The sighting records are provided in *Annex E*.

5.4.2 Additional Marine Mammal Monitoring

Additional monitoring surveys of the distribution and abundance of dolphin during the pre-construction (August to October 2011), construction (May to October 2012) and post-construction (March to May 2013) phases of the First Phase Project were conducted to record the information on dolphin distribution in the Project areas. The surveys were conducted as per the methodology described in the Updated EM&A Manual for the First Phase Project.

A total of 87.8 km of survey effort was collected from the three line-transect vessel surveys for the pre-construction phase monitoring. No marine construction activities was observed along the survey transects during the pre-construction phase surveys. One sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* was observed during the survey in August 2011, while no sightings of this species was observed during the surveys in September and October 2011 (*Figure 5.2*). The sighting in August 2011 consisted of two dolphins, with a mother (identified as #CH34 from photo-identification) accompanying its dead calf and another individual (identified as #NL226 from photo-identification), and was made off the Black Point headland in outer Deep Bay. No other marine mammal species were sighted during the three pre-construction surveys.

A total of 167.7 km of survey effort was collected from the six line-transect vessel surveys for the construction phase monitoring. A total of five sightings of 12 dolphins were observed near HKSAR Boundary and the submarine pipeline alignment (*Figure 5.2*). The sighting record is provided in *Annex E*. Only two individuals, identified as #NL267 and #NL301 from photo-identification, were recognized during the six surveys in Deep Bay. No other marine mammal species were sighted during the six construction surveys.

A total of 84.1 km of survey effort was collected from the three line-transect vessel surveys for the post-construction phase monitoring. No marine

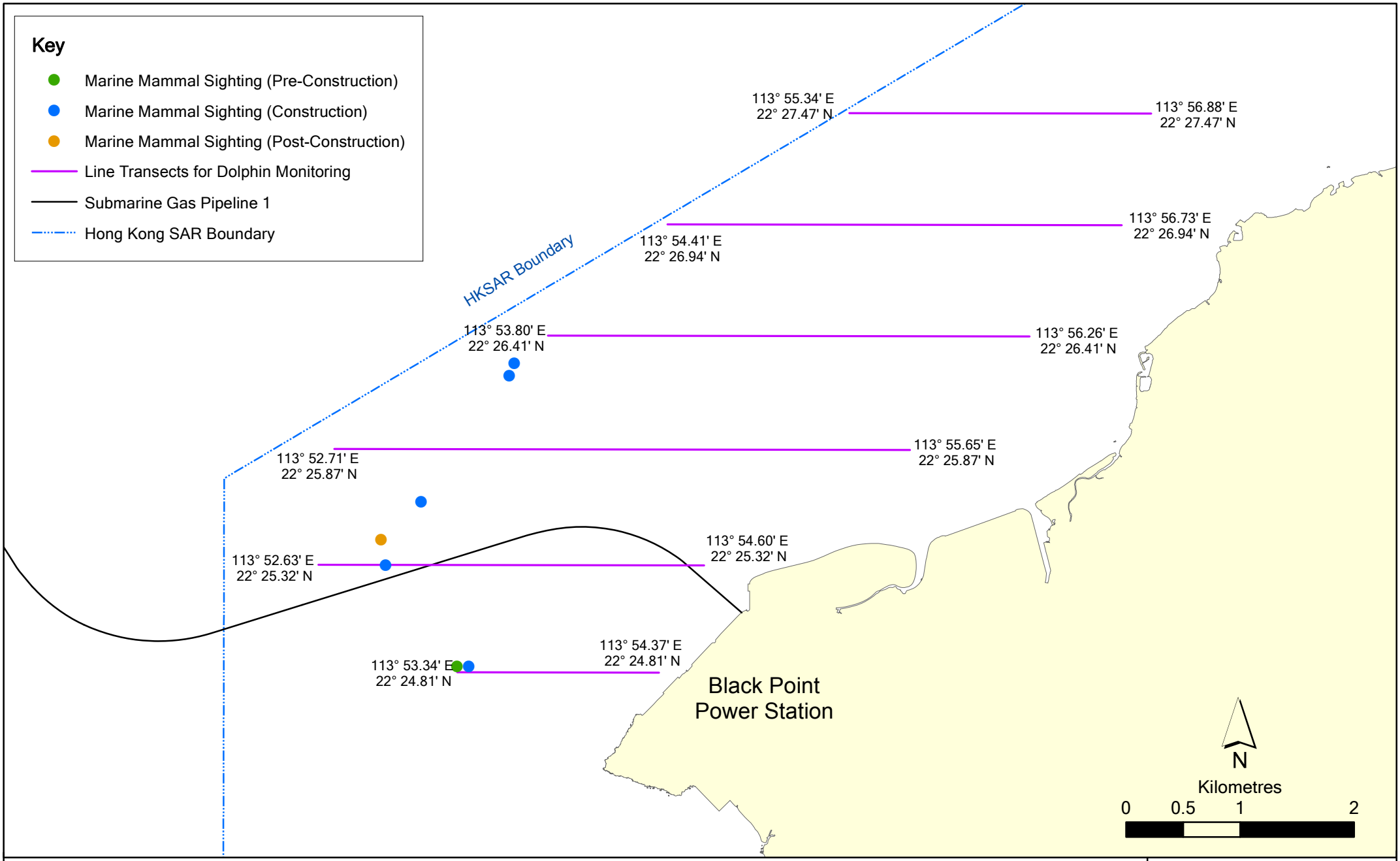


Figure 5.2

Line Transects and Marine Mammal Sightings for Additional Marine Mammal Monitoring

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Date: 11/2/2014

Environmental Resources Management

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construction activities was observed along the survey transects during the post-construction phase surveys. One group of two dolphins (identified as #NL48 and #NL182 from photo-identification) were sighted during the survey in March 2013, while no sightings of this species was observed during the surveys in April and May 2013 (*Figure 5.2*). The sighting in March 2013 was made at the mouth of Deep Bay. No other marine mammal species were sighted during the three post-construction surveys.

Dolphin encounter rates were calculated for the three phases and compared. The encounter rates in Deep Bay recorded in the six-month construction period (ER(STG): 2.6; ER(ANI): 6.5)) were the highest among the three phases. On the contrary, the ones recorded during the three-month pre-construction period (ER(STG): 1.2; ER (ANI): 2.4)) and three-month post-construction period (ER(STG): 1.2; ER(ANI): 2.5)) were very similar, but were much lower than the ones during the construction period. As the dolphin occurrence during the baseline and post-construction periods were essentially the same, and the dolphin encounter rate was higher during the construction phase, it appeared that dolphin occurrence in Deep Bay was not affected by the construction works.

In addition, the ranging patterns of the identified dolphin individuals were analysed where possible. Ranging pattern of the four individuals (CH34, NL48, NL182 and NL226) indicated that their range uses were not affected by the gas pipeline construction activities.

The results, therefore, showed that the general area in Black Point adjacent to the Deep Bay was used by the dolphins before and after the submarine gas pipeline construction works, which suggests that dolphin activities were not affected by the construction works.

5.5 LANDSCAPE & VISUAL

Compensatory tree planting was completed in accordance with the approved Tree Removal Application (TRA, Tuen Mun Town Lot No. 378) under *the Lands Department Lands Administration Office Practice Note No. 7/2007 – Tree Preservation and Tree Removal Application for Building Development in Private Projects (LAO PN No. 7/2002)*. Per plan, a total of 17 heavy standard native trees, *Celtis sinensis*, with Diameter at Breast Height (DBH) not less than 0.1 m were planted in planters at the designated compensatory planting area within the BPPS. All trees were in good condition as observed during the monthly joint site inspection on 25 May 2012.

5.6 SEABED GEOPHYSICAL SURVEY

In accordance with the requirements under Condition 3.10 of EP-391/2010/A and FEP-02/391/2010/A, the post construction phase geographical surveys were conducted in November 2013 to record the seabed profile after the

completion of the submarine pipeline installation works. Side scan sonar and echo sounding surveys were conducted within an area of 100 to 150 m on both side of the alignment of the proposed pipeline.

Results of the post-construction phase geophysical surveys confirmed the restoration of seabed profile and configurations after the completion of pipeline works. The findings of the seabed geophysical survey are summarized in *Annex F*.

5.7 COMPARISON WITH EIA PREDICTIONS

Findings of the EM&A activities undertaken were compared with the relevant EIA predictions where appropriate to provide a review of the validity of the EIA predictions and identify potential shortcomings in the EIA recommendations.

For the wastes generated from the construction activities include C&D materials, chemical waste, recyclable materials and sewage, the quality and quantities of the wastes generated were in line with the EIA predictions (*Table 5.4*). For dredged sediment, the quantity of sediments generated was in line with CEDD's allocated disposal volumes (*Table 5.5*). These wastes were also disposed of in accordance with the recommendations of the EIA.

Table 5.4 Construction Waste Generation – Comparison between EM&A Results and EIA Predictions

Type of Waste	EM&A Results (March 2011 – April 2013)	EIA Predictions
C&D Materials (non-inert)	414 tonnes, i.e. ~ 1,172 m^3	10,000 m^3
Chemical Waste	262 kg, i.e. ~ 262 L	A few hundred litres per month
Sewage	2,292 m^3	15 m^3 per day, i.e. ~ 3,600 m^3 for 12 months

Table 5.5 Marine Sediments (in situ volume) Generated from the First Phase Project

Type of Marine Sediment	Certified volume (Mm^3)	CEDD Allocated Disposal Volume (Mm^3)
Category L	0.049	0.056
Category M_p	0.082	0.076
Category M_f	0.037	0.036
Total	**0.168**	**0.168**

Construction phase water quality and marine ecology monitoring were conducted per plan during the dredging/jetting period. Whilst occasional exceedances of the Action and Limit Levels for water quality were recorded, as explained in *Section 5.2*, the observed exceedances were considered to be

due to natural seasonal variation in water quality characteristic of western Hong Kong waters and the heavy marine traffic in the vicinity. The review of monitoring data suggested that marine dredging/ jetting activities have proceeded in an environmentally acceptable manner. Results from the post-construction water quality monitoring further suggested that the overall water quality after the completion of the First Phase Project was found to be comparable to that reported prior to the commencement of the Project's marine works. It is concluded that no deterioration of marine water quality was observed and hence the impact of the Project works on the water quality of the Project works areas is considered to be negligible. This is considered to be in line with the EIA predictions.

The results of additional marine mammal monitoring showed that the general area in Black Point adjacent to the Deep Bay was used by the dolphins before and after the submarine gas pipeline construction works, which suggests that dolphin activities were not affected by the construction works. This is in line with the EIA predictions.

6 ENVIRONMENTAL NON-CONFORMANCE

6.1 SUMMARY OF ENVIRONMENTAL NON-COMPLIANCE

No non-compliance of Action and Limit Levels for water quality was recorded during the EM&A programme.

No non-compliance of EIA/ EM&A/ EP/ legislative requirements was recorded during the EM&A programme.

6.2 SUMMARY OF ENVIRONMENTAL COMPLAINT

No complaint was received during the EM&A programme.

6.3 SUMMARY OF ENVIRONMENTAL SUMMON AND SUCCESSFUL PROSECUTION

No summons/ prosecution was received during the EM&A programme.

7 REVIEW OF EM&A PROGRAMME

7.1 SITE INSPECTIONS & AUDITS

Monthly joint environmental site inspections have been conducted during the EM&A programme to assess the effectiveness of the environmental controls established by the Contractor(s) and the implementation of the environmental mitigation measures recommended in the EIA Report. Findings of the site inspections confirmed that the environmental mitigation measures recommended in the EIA Report were properly implemented by the Contractor, and the recommended mitigation measures have been working effectively. There was no non-compliance recorded during the site inspections and environmental performance complied with environmental requirements.

The requirements for site inspections and audits have been reviewed and were considered as adequate. The recommended environmental mitigation measures are also considered to be effective and efficient in reducing the potential environmental impacts associated with the construction of the First Phase Project.

7.2 MARINE WATER QUALITY MONITORING

Baseline, construction phase and post-construction phase water quality monitoring were conducted during the EM&A programme. Whilst occasional exceedances of Action and Limit Levels for water quality were recorded, following the review of monitoring data and marine works details in accordance with the procedures stipulated in the Event and Action Plan of Updated EM&A Manual, these exceedances were considered to be due to natural variation in water quality characteristic of western Hong Kong waters and were unlikely to be due to the Project's marine works.

The monitoring programme has been reviewed and was considered to be adequate to cater for the nature of works.

7.3 WASTE MANAGEMENT

The waste inspection and audit programme has been implemented throughout the EM&A programme of the First Phase Project. Wastes generated from construction activities have been managed in accordance with the recommendations in the EIA Report, the EM&A Manual, the WMP and other relevant legislative requirements.

The requirements for construction waste management have been reviewed and were considered as adequate.

7.4 MARINE ECOLOGY MONITORING

Daily marine mammal exclusion zone monitoring and additional monthly marine mammal monitoring during the pre-construction, construction and post-construction phases of the First Phase Project were conducted. The monitoring programme has been reviewed and was considered to be adequate to cater for the nature of works.

7.5 SUMMARY OF RECOMMENDATIONS

Findings of the EM&A programme indicate that the recommended mitigation measures have been properly implemented and working effectively. The EM&A programme has been reviewed and was considered as adequate and effective.

8 CONCLUSIONS

This Final EM&A Review Report presents the findings of the EM&A activities undertaken for the First Phase Project, in accordance with the Updated EM&A Manual and the requirements of EP-391/2010/A , FEP-01/391/2010/A and FEP-02/391/2010/A.

Twenty-five monthly joint environmental site inspections were conducted in the EM&A programme. It confirmed that the environmental mitigation measures recommended in the EIA Report were properly implemented by the Contractor and were working effectively.

Baseline, construction phase and post-construction phase water quality monitoring, and marine mammal monitoring were conducted in accordance with the requirements described in the Updated EM&A Manual. Exceedances of Action and Limit Level for water quality were occasionally recorded during dredging/jetting works in Hong Kong waters and in PRC waters within 2.5 km from HKSAR boundary. These exceedances were considered to be due to natural variation in water quality characteristic of western Hong Kong waters and were unlikely to be due to the Project'a marine works. The review of monitoring data suggested that marine dredging/jetting activities have proceeded in an environmentally acceptable manner.

CAPCO and the Contractors have followed the Waste Management Plan (WMP) for handling and disposal of construction and demolition (C&D) materials (inert public fill and non-inert construction wastes), chemical wastes, recyclable materials, sewage and dredged marine sediment generated from the First Phase Project.

No non-compliance event was recorded during the EM&A programme.

No complaint and summons/prosecution was received during the EM&A programme.

The EM&A programme was considered effective in reflecting the environmental conditions at the site. The site inspection results also indicated that the First Phase Project has not caused unacceptable environmental impacts and the mitigation measure were effectively implemented.

The EM&A programme has been reviewed and was considered as adequate and effective.

Annex A

Implementation Schedule of Mitigation & Precautionary Measures

Annex A-1 Implementation Schedule for Environmental Protection Measures for the Black Point Gas Supply Project (First Phase)

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
1. Air Quality Measures					
S4.8	Dust control measures stipulated in the *Air Pollution Control (Construction Dust) Regulation* will be implemented during the construction of the GRS to control the potential fugitive dust emissions.	Land Site / During Construction	Contractor(s)	Air Pollution Control (Construction Dust) Regulation	✓
S4.8	Site practices such as regular maintenance and checking of the diesel powered mechanical equipment will be adopted to avoid any black smoke emissions and to minimize gaseous emissions.	Land Site / During Construction	Contractor(s)	-	✓
S4.10	EM&A in the form of site inspection and audit of dust generating activities.	Land Site / During Construction	Environmental Team (ET) & Independent Environmental Checker (IEC)	Environmental Impact Assessment Ordinance	✓
S4.10	A commissioning test for heaters will be conducted to ensure the stack design, heater operation and the emission information adopted in the assessment is maintained.	Land Site / During Construction/ commissioning	CAPCO	-	N/A. Test to be conducted prior to commissioning.
S4.6, EP4.1	The GRS shall be designed and operated in accordance with the following parameters: • The maximum number of gas heaters shall not be more than seven, and no more than six gas heaters shall be operated simultaneously. The total amount of NOx and CO emissions emitted from the heaters in operation shall not be more than 8.22kg and 5.14kg per hour respectively; • The stack height shall not be less than 15m above ground; • The exhaust gas velocity of the gas heaters shall not be less than $10ms^{-1}$ under full load operation; and • The exhaust gas temperature of the gas heaters shall not be less than 280 °C under full load operation.	Land Site / During Design and Operation	CAPCO	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
2. Noise					
S5.7	EM&A in the form of site inspection and audit of construction activities.	Land Site / During Construction	Environmental Team (ET) & Independent Environmental Checker (IEC)	Environmental Impact Assessment Ordinance	✓
3. Water Quality					
S6 Annex 6A	Dredging/ jetting plants will be required to comply with the rates modelled in the EIA (*S6 Annex 6A* and *Annex 14A*-2) for the various activities assessed.	Marine works areas / During Construction	Contractor(s) and ET	-	✓
S6.9	Dredged marine mud will be disposed of in a gazetted marine disposal area in accordance with the *Dumping at Sea Ordinance (DASO)* permit conditions.	Dredged areas/ During Construction	Contractor(s)	Dumping at Sea Ordinance	✓
S6.9	Disposal vessels will be fitted with tight bottom seals in order to prevent leakage of material during transport.	Dredged areas/ During Construction	Contractor(s)	Dumping at Sea Ordinance	✓
S6.9	Barges will be filled to a level, which ensures that material does not spill over during transport to the disposal site and that adequate freeboard is maintained to ensure that the decks are not washed by wave action.	Dredged areas/ During Construction	Contractor(s)	-	✓
S6.9	After dredging, any excess materials will be cleaned from decks and exposed fittings before the vessel is moved from the dredging area.	Dredged areas/ During Construction	Contractor(s)	Dumping at Sea Ordinance	✓
S6.9	The contractor(s) will confirm that the works cause no visible foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the dredging site.	Dredged areas/ During Construction	Contractor(s)	-	✓
S6.9	Monitoring and automation systems will be used to improve the crew's information regarding the various dredging parameters to improve dredging accuracy and efficiency.	Dredged areas/ During Construction	Contractor(s)	-	✓
S6.9	Control and monitoring systems will be used to alert the crew to leaks or any other potential risks such as chemicals and oils.	Dredged areas/ During Construction	Contractor(s)	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S6.9	When the dredged material has been unloaded at the disposal areas, any material that has accumulated on the deck or other exposed parts of the vessel will be removed and placed in the hold or a hopper. Under no circumstances will decks be washed clean in a way that permits material to be released overboard.	Dredged areas/ During Construction	Contractor(s)	Dumping at Sea Ordinance	✓
S6.9	Dredgers will maintain adequate clearance between vessels and the seabed at all states of the tide and reduce operations speed to ensure that excessive turbidity is not generated by turbulence from vessel movement or propeller wash.	Dredged areas/ During Construction	Contractor(s)	-	✓
S6.9	Mitigation measures to be implemented during submarine pipeline installation activities are presented in *Annex 14A-2*.	Marine works areas / During Construction	Contractor(s)	-	✓
S6.9	Channels, earth bunds or sand bag barriers will be provided on site to direct stormwater to silt removal facilities. The design of silt removal facilities (e.g. silt traps or sedimentation facilities) will make reference to the guidelines in *Appendix A1* of *ProPECC PN 1/94*. All drainage facilities and erosion and sediment control structures will be inspected on a regular basis and maintained to confirm proper and efficient operation at all times and particularly during rainstorms. Deposited silt and grit will be removed regularly.	Land Site / During Construction	Contractor(s)	ProPECC PN 1/94 TM standard under the WPCO	✓
S6.9	Earthworks to form the final surfaces will be followed up with surface protection and drainage works to prevent erosion caused by rainstorms.	Land Site / During Construction	Contractor(s)	-	✓
S6.9	Appropriate surface drainage will be designed and provided where necessary.	Land Site / During Construction	Contractor(s)	-	✓
S6.9	The precautions to be taken at any time of year when rainstorms are likely together with the actions to be taken when a rainstorm is imminent or forecasted and actions to be taken during or after rainstorms are summarised in *Appendix A2* of *ProPECC PN 1/94*.	Land Site / During Construction	Contractor(s)	ProPECC PN 1/94	✓
S6.9	Oil interceptors will be provided in the drainage system where necessary and regularly emptied to prevent the release of oil and grease into the storm water drainage system after accidental spillages.	Land Site / During Construction	Contractor(s)	-	N/A

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S6.9	Temporary and permanent drainage pipes and culverts provided to facilitate runoff discharge will be adequately designed for the controlled release of storm flows.	Land Site / During Construction	Contractor(s)	-	✓
S6.9	The temporary diverted drainage will be reinstated to the original condition when the construction work has finished or when the temporary diversion is no longer required.	Land Site / During Construction	Contractor(s)	-	N/A
S6.9	During the early stages of work, portable chemical toilets will be used and the effluent will either be shipped offsite or be disposed of at sewage treatment work (STW) at BPPS.	All facilities / During Construction	Contractor(s)	-	✓. Toilets with holding tanks have been provided. Portable chemical toilets have been provided
S6.9	Debris and refuse generated on-site will be collected, handled and disposed of properly to avoid entering the nearby WSRs. Stockpiles of cement and other construction materials will be kept covered when not being used.	All facilities / During Construction	Contractor(s)	-	✓
S6.9	Oil leakage or spillage will be contained and clean up immediately. Waste oil will be collected and stored for recycling or disposal, in accordance with the *Waste Disposal Ordinance*.	All facilities / During Construction	Contractor(s)	Waste Disposal Ordinance	✓
S6.10	Water quality monitoring shall be undertaken for suspended solids, salinity, turbidity, and dissolved oxygen. If exceedances occur due to dredging/ jetting activities, event and action plan shall be adopted.	Designated monitoring stations as defined in EM&A Manual /Construction period for dredging/ jetting works	ET	Environmental Impact Assessment Ordinance	✓
S6.9	The surface runoff from the GRS should be connected to a storm water channel via a grit and oil interceptor. These grit and oil interceptors will be regularly cleaned and maintained in good working condition. Trapped oil and grease should be disposed of periodically by waste collection contractor using a suitable liquid waste collection vehicle	GRS/ During Operation	CAPCO	-	✓
S6.9	Any oil leakage or spillage will be contained and cleaned up immediately.	GRS/ During Operation	CAPCO	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S6.9	Waste oil will be collected and stored for recycling or disposal in accordance with the *Waste Disposal Ordinance*.	GRS/ During Operation	CAPCO	Waste Disposal Ordinance	✓
4. Waste Management					
S7.5	The Contractor shall identify a coordinator/ approved personnel for implementing standard site practices and managing wastes. The waste coordinator shall implement the Waste Management Plan which specifies procedures such as a recording system to facilitate tracking of loads and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. Responsibilities also include arrangements for collection and effective disposal of wastes to appropriate facilities.	Contract mobilisation / During construction	Contractor(s)	-	✓
S7.5	The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges. A trip ticket system (TTS) for the removal of C&D materials from the site to the designated disposal facility will be implemented.	Contract mobilisation / During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes DEVB TC(W) No. 6/2010, Trip-ticket System for Disposal of Construction and Demolition Material Water Pollution Control Ordinance	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	A 'chit' ticket system (TTS) for the disposal of C&D materials will be implemented.	Contract mobilisation / During construction	Contractor(s)	Waste Disposal (Charges for Disposal of Construction Waste) Regulation	✓
S7.5	No waste shall be burnt on site. Wastes shall be collected by licensed waste haulier and be disposed of at licence sites.	Land site/ During construction	Contractor(s)	Air Pollution Control Ordinance	✓
S7.5	Rock and soil may be excavated from site formation works and that will be reused as fill material for the Project as far as practicable.	Land site / During construction	Contractor(s)	WBTC No. 2/93, Public Dumps	✓
S7.5	Material shall be reused on site as far as practicable, including formwork plywood, topsoil and excavated material.	Land site / During construction	Contractor(s)	WBTC 32/92, The Use of Tropical Hard Wood on Construction Site	✓
S7.5	C&D materials will be sorted on site into inert waste (public fill) and non-inert waste (construction waste). Public fill will be disposed of at public fill reception facilities (e.g. Tuen Mun Area 38 or other locations as agreed with CEDD). Construction waste, such as timber, paper, plastics and general refuse, cannot be reused and need to be disposed of at the West New Territories (WENT) Landfill.	Land site / During construction	Contractor(s)	-	✓
S7.5	The site and surroundings shall be kept tidy and litter free. Waste storage area shall be properly cleaned and shall not cause windblown litter and dust nuisance.	All areas / During construction	Contractor(s)	WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness. Works Bureau, Hong Kong SAR Government	✓
S7.5	Stockpiled material shall avoid vegetated areas.	Land site / During construction	Contractor(s)		✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	Stockpiles shall be covered by tarpaulins and/or watered as needed.	Land site / During construction, particularly dry season	Contractor(s)	Air Pollution Control (Construction Dust) Regulation	✓
S7.5	Storage of material on site shall be kept to a minimum. Construction materials shall be planned and stocked carefully to reduce amount of waste generated and avoid unnecessary generation of waste.	All areas / During construction	Contractor(s)	-	✓
S7.5	Use of reusable non-timber formwork to reduce the amount of C&D materials	All areas / During construction	Contractor(s)	Works Branch Technical Circular (WBTC) No. 32/92, The Use of Tropical Hard Wood on Construction Site	✓
S7.5	Prior to disposal of construction waste, wood, steel and other metals will be separated to the extent practical, for re-use and/or recycling to reduce the quantity of waste to be disposed of to landfill	All areas / During construction	Contractor(s)	-	✓
S7.5	Wheel washing facilities shall be used by all trucks leaving the site to prevent the transfer of mud onto public roads.	Site entrances and exits / During construction	Contractor(s)	Air Pollution Control (Construction Dust) Regulation	✓
S7.5	Any unused chemicals and those with remaining functional capacity shall be recycled to the extent practical.	Land site / During construction	Contractor(s)	-	✓
S7.5	Temporary storage areas for general refuse shall be enclosed or contained to avoid environmental impacts.	All areas / During construction	Contractor(s)	WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	Sufficient dustbins shall be provided for storage of waste. Wastes shall be timely cleared and shall be disposed of to the nearest licensed facility.	All areas / During construction	Contractor(s)	WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.	✓
S7.5	Waste oils, chemicals or solvents shall not be disposed of to drain. Drainage systems, sumps and oil interceptors shall be cleaned and maintained regularly.	All facilities / During construction	Contractor(s)	-	✓
S7.5	Standard site practice shall be implemented to avoid waste generation and promote waste minimisation.	All facilities / During construction	Contractor(s)	-	✓
S7.5	Waste materials such as paper, metal, timber and waste oil shall be recycled as far as practicable. Different types of waste shall be segregated and stored of in different containers, skips or stockpiles to enhance reuse or recycling of material and their proper disposal. Recycling bins will be provided at strategic locations to facilitate recovery of aluminium can and waste paper from the site.	Land Site / During construction	Contractor(s)	ETWBTC No. 33/2002, Management of Construction and Demolition Material Including Rock	✓
S7.5	C&D materials will be wetted as quickly as possible to the extent practice after filling to reduce the potential dust and water quality impacts of site formation works	All facilities / During construction	Contractor(s)	-	✓
S7.5	Dredged marine mud shall be disposed of in marine disposal sites designated by the Marine Fill Committee (MFC) and under the requirements of the *Dumping at Seas Ordinance*.	Dredging / During construction	Contractor(s)	Dumping at Sea Ordinance	✓
S7.5	Waste containers shall be in good condition and fitted with lids or covers to prevent waste from escaping or the ingress of water. Waste containers shall be in a secure area on hardstanding.	All facilities / During construction	Contractor(s)	WBTC Nos. 6/2002 and 6/2002A, Enhanced Specification for Site Cleanliness and Tidiness.	✓
S7.5	Proper storage and site practices shall be adopted to reduce the potential for damage or contamination of construction materials.	All facilities / During construction	Contractor(s)	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	Plan and stock construction materials carefully to reduce amount of waste generated and avoid unnecessary generation of waste	All facilities / During construction	Contractor(s)	-	✓
S7.5	Emergency equipment to deal with any spillage or fire shall be kept on site.	All facilities / During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓
S7.5	Suitable chemical waste storage areas shall be formed at the works site for temporary storage pending collection. Chemical wastes shall be separated for special handling and shall be disposed of via a licensed waste collector at appropriate licensed treatment facility, e.g. the Chemical Waste Treatment Centre at Tsing Yi.	Land site/ Chemical Waste Treatment Centre at Tsing Yi/ During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓
S7.5	Containers used for storage of chemical waste shall be: • Maintained in good condition and clearly labelled in both English and Chinese; • Suitable for the substance they are holding, resistant to corrosion, and securely closed; and • Capacity of less than 450 L unless the specifications have been approved by the EPD.	All facilities / During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	Storage areas for chemical waste shall: • Be clearly labelled and used solely for the storage of chemical waste; • Be enclosed on at least 3 sides; • Have adequate ventilation; • Be arranged so that incompatible materials are appropriately separated • Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest; and • Be covered to prevent rainfall from entering	All facilities / During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓
S7.5	Leaking containers shall be contained and removed from site as soon as is reasonably practicable.	All facilities / During construction	Contractor(s)	Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes	✓
S7.5	Training shall be provided to site personnel in proper waste management and chemical handling procedures, the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycling.	All facilities / During construction	Contractor(s)	-	✓
S7.5	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site inspection and audit programme shall be undertaken. Waste flow tables (WFT) will be used as a recording system to document the amount of waste generated, recycled and disposed of (including the disposal sites).	All facilities / During construction	ET and IEC	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S7.5	Appropriate measures to reduce windblown litter and dust transportation of waste by either covering trucks or by transporting wastes in enclosed containers.	All facilities / During construction	Contractor(s)	-	✓
5. Marine Ecology (Marine Mammals)					
S8.8	The vessel operators will be required to control and manage all effluent from vessels	Marine works area / During construction	Contractor(s) and ET	-	✓
S8.8	A policy of no dumping of rubbish, food, oil, or chemicals will be strictly enforced. This will also be covered in the contractor briefings	Marine works area / During construction	Contractor(s) and ET	-	✓
S8.8	All vessel operators working on the Project construction phase will be given a briefing, alerting them to the possible presence of dolphins in the area, and the guidelines for safe vessel operation in the presence of cetaceans. If high speed vessels are used by the contractors, they will be required to slow to 10 knots when passing through a high density dolphin area (Sha Chau and Lung Kwu Chau)	Marine works area / During construction	Contractor(s) and ET	-	✓
S8.8	The vessel operators engaged during the construction phase will be required to use predefined and regular routes, as these will become known to dolphins using these waters	Marine works area / During construction	Contractor(s) and ET	-	✓
S8.8	A marine mammal exclusion zone within a radius of 250 m from dredgers/ jetting machine will be implemented during the construction phase. Qualified observer(s) will scan the 250 m-exclusion zone for at least 30 minutes prior to the start of dredging. If cetaceans are observed in the exclusion zone, dredging/ jetting will be delayed until they have left the area. As per previous practice in Hong Kong, should cetaceans move into the works area during dredging/ jetting, it is considered that cetaceans will have acclimatised themselves to the works therefore cessation of dredging is not required	Works areas along the pipeline route / During Dredging/ Jetting for the Gas Pipeline Installation	Contractor(s) and ET	-	✓

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
S8.8	Except for the pipeline section along Urmston Road, dredging/ jetting works shall be restricted to a daily maximum of 12 hours with daylight operations. Because of marine traffic constraints, dredgers/ jetting machine may need to operate 24 hours on the pipeline section which crosses the Urmston Road channel off Black Point enabling completion in the shortest possible time	Works areas along the pipeline route / During Dredging/ Jetting for the Gas Pipeline Installation	Contractor(s) and ET	-	✓
S8.8	Monitoring will be conducted for the distribution and abundance of dolphins during the construction and post-construction phase of the project. Three months of pre-construction dolphin monitoring will also be conducted. The protocols for this will be agreed with AFCD in advance.	Marine works areas / Pre-construction, during construction and post-construction	CAPCO	-	✓
6. Fisheries					
S9.10	Geophysical survey will be conducted during the pre-construction and post-construction of pipeline works to confirm the seabed would be reinstated to its original level.	Pre-construction and Post-construction after pipeline works	ET	-	✓
7. Landscape & Visual					
S10.5.11	Site hoardings to be compatible with surrounding landscape.	Land site / During Construction	Contractor(s)	-	✓
S10.5.11	The tree requiring removal is to be compensated in accordance with relevant government guidelines	Land site / During Construction	Contractor(s)	-	✓
S10.6.13	The colours of the proposed GRS should be selected to complement the existing industrial surroundings.	Land site / Pre-Construction (Detail Design)	Contractor(s)	-	✓
8. Cultural Heritage No mitigation measures were specified in the EIA report as no sites of terrestrial or marine archaeological potential are located in the Project Area.					
9. Hazard to Life					

EIA Ref.	Environmental Protection Measures	Location/Duration of Measures/Timing of Completion of Measures	Implementation Agent	Relevant Legislation & Guidelines	Status
EP3.12	The first major piece of equipment in the GRS for connecting the offshore pipeline shall be an Emergency Shutdown (ESD) valve, which can be closed in order to isolate the GRS from the source of gas in the event of an emergency	Land site / Pre-Construction (Detail Design)	CAPCO	-	✓

Remark:
✓ Compliance of Mitigation Measures
<> Compliance of Mitigation but need improvement
x Non-compliance of Mitigation Measures
▲ Non-compliance of Mitigation Measures but rectified by Leighton Contractors (Asia) Limited
Δ Deficiency of Mitigation Measures but rectified by Leighton Contractors (Asia) Limited
N/A Not Applicable in Reporting Period

Annex A-2 Summary of Mitigation Measures during the Dredging/ Jetting Activities for this Project

Marine Work Location (Zone)	Marine Work & Plant Type	No. of Plant	Specific Mitigation Measures	Status
Gas Pipeline – Shore Approach (KP 4.89 – KP 4.78)	Dredging by Closed Grab Dredger	1	Grab dredging speed shall be no more than 57 m per day or 4.75 m per hour, whichever is less. Silt curtain(s) will be installed during grab dredging operations along this pipeline section *.	✓
Gas Pipeline – Black Point to Urmston Road (KP 4.78 – KP 2.52)	Trenching by Jetting Machine	1	Jetting speed shall be no more than 360 m per day or 30 m per hour, whichever is less. Silt curtain(s) will be installed along the marine works areas during jetting operations for the installation of this pipeline section *. The extent of silt curtain(s) installation will be determined based on site condition (e.g. bathymetry of the works area) and navigation safety considerations. Details of the design and implementation of the silt curtain(s) will be developed before construction and verified by the Independent Environmental Checker (IEC) and agreed with EPD. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures will be examined by the ET and the IEC, discussed with the Contractor, EPD and CAPCO.	✓
Gas Pipeline – across Urmston Road (KP 2.52 – KP 0.73)	Dredging by Closed Grab Dredger	1	Grab dredging speed shall be no more than 57 m per day or 2.5 m per hour, whichever is less. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures, such as cage-type silt curtain, will be examined by the ET and the IEC, discussed with the Contractor, EPD and CAPCO *.	✓
Gas Pipeline – from Urmston Road to HKSAR boundary (KP 0.73 – KP 0)	Trenching by Jetting Machine	1	Jetting speed shall be no more than 360 m per day or 30 m per hour, whichever is less. Should non-compliance occur at the respective impact station during water quality monitoring, the use of additional mitigation measures will be examined by the ET and the IEC, discussed with the Contractor, EPD and CAPCO *.	✓

* Details of silt curtain installation shall be submitted to the IEC for verification prior to the commencement of dredging/jetting works.

Remark:
- ✓ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by Contractor
- Δ Deficiency of Mitigation Measures but rectified by Contractor
- N/A Not Applicable in Reporting Period

Annex B

Waste Flow Table

Leighton Contractors (Asia) Ltd

CONTRACT NO. PO4500641608 BLACK POINT GAS SUPPLY PROJECT - M2554

Waste Flow Table Year: 2011

Month	Actual Quantities of Inert Construction Waste Reused/Recycled			Actual Quantities of Construction Waste Recycled						Actual Quantities of Disposed Material			
	Broken Concrete[1] Recycled	Re-used in Project	Re-used in Other Projects[2]	Metals Recycled	Paper Recycled	Cardboard Packaging Recycled	Plastic[3] Recycled	Timber	Others[4]	Chemical Waste[5] to Licensed Facilities		Inert Construction Waste[6] to Public Fill	Construction Waste to Landfill
										Liquid	Solid		
	(tonnes)	(tonnes)	(tonnes)	(kg)	(kg)	(kg)	(kg)	(kg)	(nos.)	(litres)	(kg)	(tonnes)	(tonnes)
Jan	0	0	0	0	0	0	0	0	0	0	0	0.00	0
Feb	0	0	0	0	0	0	0	0	0	0	0	0.00	2.59
Mar	0	100	0	0	0	0	0	0	0	0	0	67.85	4.34
Q1 total	0	100	0	0	0	0	0	0	0	0	0	68	6.93
Apr	0	0	0	14	0	220	6	1200	0	0	0	0.00	4.41
May	0	0	0	0	0	0	0	0	0	0	0	801.02	1.03
Jun	0	0	0	0	0	0	0	0	0	0	0	457.35	1.18
Q2 total	0	0	0	14	0	220	6	1200	0	0	0	1258	6.62
Jul	0	0	0	0	0	0	0	0	0	0	0	416.15	5.06
Aug	0	0	0	0	0	0	0	0	0	0	0	1234.79	5.52
Sep	0	0	0	1650	0	0	0	0	0	0	0	1468.02	7.19
Q3 total	0	0	0	1650	0	0	0	0	0	0	0	3119	17.77
Oct	0	0	0	950	880	0	0	0	1	0	0	859.50	18.22
Nov	0	0	0	0	0	0	0	0	0	0	0	913.44	6.28
Dec	0	0	0	7	740	0	3	0	0	0	0	43.81	10.89
Q4 total	0	0	0	957	1620	0	3	0	1	0	0	1817	35.39
Grand total	**0**	**100**	**0**	**2621**	**1620**	**220**	**9**	**1200**	**1**	**0**	**0**	**6261.93**	**66.71**

Note / Definition:

1. Broken concrete for recycling into aggregates (eg Tuen Mun Area 38).
2. Other projects include third-parties (eg quarries).
3. Plastic refers to plastic bottles/containers, plastic sheets/foam from packaging material.
4. Examples of other waste recycled may include tyres and computer equipment
5. Chemical waste is split into 2 components: liquid waste (eg spent lubricating oil) and solid waste (eg spent batteries).
6. Inert construction waste is also known as public fill. It includes, for example, concrete, rubble, earth, boulder, sand, tile, masonry and used bentonite.

Leighton Contractors (Asia) Ltd

CONTRACT NO. PO4500641608 BLACK POINT GAS SUPPLY PROJECT - M2554

Waste Flow Table Year: 2012

Month	Actual Quantities of Inert Construction Waste Reused/Recycled			Actual Quantities of Construction Waste Recycled[1]						Actual Quantities of Disposed Material				
	Broken Concrete[2] Recycled	Re-used in Project	Re-used in Other Projects[3]	Metals Recycled	Paper Recycled	Cardboard Packaging Recycled	Plastic[4] Recycled	Timber	Others[5]	Chemical Waste[6] to Licensed Facilities		Inert Construction Waste[7] to Public Fill	Type 1 Sea Mud to Open Sea Disposal Site	Construction Waste to Landfill
										Liquid	Solid			
	(tonnes)	(tonnes)	(tonnes)	(kg)	(kg)	(kg)	(kg)	(kg)	(nos.)	(litres)	(kg)	(tonnes)	(cub. m)	(tonnes)
Jan	0	0	0	0	0	0	0	0	0	0	0	4974.25	0	11.55
Feb	0	0	0	10	780	0	0	0	0	0	250	2786.54	0	10
Mar	0	0	0	6445	625	0	0	0	0	0	0	3574.56	0	6.69
Q1 total	0	0	0	6455	1405	0	0	0	0	0	250	11335	0	28.24
Apr	0	0	0	15	775	0	0	0	0	0	0	833.48	0	33.92
May	0	0	0	7080	510	300	50	0	162	0	0	113.48	0	11.47
Jun	0	400	0	25	590	540	5	0	19	0	0	1910.25	0	9.83
Q2 total	0	400	0	7120	1875	840	55	0	181	0	0	2857	0	55.22
Jul	0	0	892	48	460	590	22	900	0	0	0	858.93	432	40.03
Aug	0	0	0	4800	0	0	0	0	0	0	0	862.33	0	70.01
Sep	0	0	0	13065	394	196	5	0	0	0	0	206.59	0	20.13
Q3 total	0	0	892	17913	854	786	27	900	0	0	0	1928	432	130.17
Oct	0	0	0	20	279	566	5	0	0	0	0	1542.45	0	26.52
Nov	0	0	0	8310	0	0	0	0	212	0	12	311.16	0	32.78
Dec	0	0	0	6000	0	0	0	0	0	0	0	219.63	0.00	17.24
Q4 total	0	0	0	14330	279	566	5	0	212	0	12	2073	0	76.54
Grand total	**0**	**400**	**892**	**45818**	**4413**	**2192**	**87**	**900**	**393**	**0**	**262**	**18193.65**	**432.00**	**290.17**

Note / Definition:

1. Provide further breakdown in Part D2 of Monthly Environmental Report.
2. Broken concrete for recycling into aggregates (eg Tuen Mun Area 38).
3. Other projects include third-parties (eg quarries).
4. Plastic refers to plastic bottles/containers, plastic sheets/foam from packaging material.
5. Examples of other waste recycled may include tyres and computer equipment
6. Chemical waste is split into 2 components: liquid waste (eg spent lubricating oil) and solid waste (eg spent batteries).
7. Inert construction waste is also known as public fill. It includes, for example, concrete, rubble, earth, boulder, sand, tile, masonry and used bentonite.

Leighton Contractors (Asia) Ltd

CONTRACT NO. PO4500641608 BLACK POINT GAS SUPPLY PROJECT - M2554

Waste Flow Table Year: 2013

Month	Actual Quantities of Inert Construction Waste Reused/Recycled			Actual Quantities of Construction Waste Recycled						Actual Quantities of Disposed Material				
	Broken Concrete[1] Recycled	Re-used in Project	Re-used in Other Projects[2]	Metals Recycled	Paper Recycled	Cardboard Packaging Recycled	Plastic[3] Recycled	Timber	Others[4]	Chemical Waste[5] to Licensed Facilities		Inert Construction Waste[6] to Public Fill	Type 1 Sea Mud to Open Sea Disposal Site	Construction Waste to Landfill
										Liquid	Solid			
	(tonnes)	(tonnes)	(tonnes)	(kg)	(kg)	(kg)	(kg)	(kg)	(nos.)	(litres)	(kg)	(tonnes)	(cub. m)	(tonnes)
Jan	0	0	0	0	523	1190	307	0	0	0	0	0.00	0	12.6
Feb	0	0	0	0	357	153	0	0	0	0	0	1414.81	0	11.06
Mar	0	0	0	5375	527	263	50	0	0	0	0	509.51	0	34.78
Q1 total	0	0	0	5375	1407	1606	357	0	0	0	0	1924	0	58.44
Apr														
May														
Jun														
Q2 total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Jul														
Aug														
Sep														
Q3 total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Oct														
Nov														
Dec														
Q4 total	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand total	**0**	**0**	**0**	**5375**	**1407**	**1606**	**357**	**0**	**0**	**0**	**0**	**1924.32**	**0.00**	**58.44**

Note / Definition:

1. Broken concrete for recycling into aggregates (eg Tuen Mun Area 38).
2. Other projects include third-parties (eg quarries).
3. Plastic refers to plastic bottles/containers, plastic sheets/foam from packaging material.
4. Examples of other waste recycled may include tyres and computer equipment
5. Chemical waste is split into 2 components: liquid waste (eg spent lubricating oil) and solid waste (eg spent batteries).
6. Inert construction waste is also known as public fill. It includes, for example, concrete, rubble, earth, boulder, sand, tile, masonry and used bentonite.

Wai Kee (Zens) Construction & Transportation Co., Ltd.
Black Point Gas Supply Project - The Second West-East Gas Pipeline Project-Hong Kong

Monthly Summary Waste Flow Table (November 2012)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly						
	Total Quantity Generated	Hard Rock and Large Borken Concrete	Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Imported Fill	Metals	Paper / Cardboard Packaging	Plastics (3)	Chemical Waste	Marine Sediment		
	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	S. Cheung Chau/ m3 (Type I)	E. Sha Chau/ m3 (Type II)	E. Ninepin/ m3 (Type I)
JAN													
FEB													
MAR													
APR													
MAY													
JUNE	0	0	0	0	0	0	0	0	0	0	8,600	13,650	0
SUB-TOTAL	0	0	0	0	0	0	0	0	0	0	8,600	13,650	0
JULY	0	0	0	0	0	0	0	0	0	0	14,650	67,350	450
AUG	0	0	0	0	0	0	0	0	0	0	0	3,250	1,150
SEPT	0	0	0	0	0	0	0	0	0	0	0	0	0
OCT	0	0	0	0	0	0	0	0	0	0	0	0	0
NOV	0	0	0	0	0	0	0	0	0	0	0	0	0
DEC													
TOTAL	0	0	0	0	0	0	0	0	0	0	23,250	84,250	1,600

Forecast of Total Quantities of C&D Materials to be Generated from the Contract												
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposal as Public Fill	Imported Fill	Metals	Paper / Cardboard Packaging	Plastics (3)	Chemical Waste	Marine Sediment		
[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000m^3]	[in '000kg]	[in '000kg]	[in '000kg]	[in '000kg]	S. Cheung Chau/ m3 (Type I)	E. Sha chau/m3 (Type II)	E. Ninepin/ m3 (Type I)
0	0	0	0	0	0	0	0	0	0	26,000	145,600	46,800

Notes :

(1) The performance targets are given in PS Clause 6(14)
(2) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the site
(3) Plastics refer to plastic bottles / containers, plastic sheets / foam from packaging material
(4) The contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amont of C&D materials expected to be generated from the Works is equal to or exceeding 50000m3

Annex C

Schedules for Water Quality Monitoring and Additional Marine Mammal Monitoring

Black Point Gas Supply Project (First Phase)
Water Quality Baseline Monitoring Schedule - January 2011

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1-Jan
2-Jan	3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan
9-Jan	10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan
16-Jan	17-Jan	18-Jan	19-Jan	20-Jan	21-Jan	22-Jan
			Mid-Ebb: 1238hrs Mid-Flood: 1749hrs *Baseline Monitoring*		Mid-Ebb: 1402hrs Mid-Flood: 1931hrs *Baseline Monitoring*	
23-Jan	24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan
	Mid-Flood: 1021hrs Mid-Ebb: 1612hrs *Baseline Monitoring*		Mid-Flood: 1134hrs Mid-Ebb: 1817hrs *Baseline Monitoring*		Mid-Flood:1303hrs Mid-Ebb: 2112hrs *Baseline Monitoring*	
30-Jan	31-Jan					
	Mid-Ebb: 1140hrs Mid-Flood: 1629hrs *Baseline Monitoring*					

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Water Quality Baseline Monitoring Schedule - February 2011

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Feb	2-Feb	Public Holiday 3-Feb	Public Holiday 4-Feb	Public Holiday 5-Feb
			Mid-Ebb: 1255hrs Mid-Flood: 1806hrs *Baseline Monitoring*			
6-Feb	7-Feb	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb
	Mid-Flood:0924hrs Mid-Ebb:1522hrs *Baseline Monitoring*		Mid-Flood: 1007hrs Mid-Ebb: 1636hrs *Baseline Monitoring*		Mid-Flood: 1059hrs Mid-Ebb: 1832hrs *Baseline Monitoring*	
13-Feb	14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb
	Mid-Flood: 0957hrs Mid-Ebb: 2220hrs *Baseline Monitoring*		Mid-Ebb: 1140hrs Mid-Flood: 1652hrs *Baseline Monitoring*			
20-Feb	21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb
27-Feb	28-Feb					

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Water Quality Baseline Monitoring Schedule - March 2011

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Mar	2-Mar	3-Mar	4-Mar	5-Mar
6-Mar	7-Mar	8-Mar	9-Mar	10-Mar	11-Mar	12-Mar
13-Mar	14-Mar	15-Mar	16-Mar	17-Mar	18-Mar	19-Mar
		Planned Commencement Date of Construction Works				
20-Mar	21-Mar	22-Mar	23-Mar	24-Mar	25-Mar	26-Mar
27-Mar	28-Mar	29-Mar	30-Mar	31-Mar		

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Pre-Construction Phase) - August 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Aug	02-Aug	03-Aug	04-Aug	05-Aug	06-Aug
07-Aug	08-Aug	09-Aug	10-Aug	11-Aug	12-Aug	13-Aug
				Additional Marine Mammal Monitoring (Pre-Construction Phase)		
14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug	20-Aug
21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug	27-Aug
28-Aug	29-Aug	30-Aug	31-Aug			

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Pre-Construction Phase) - September 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				01-Sep	02-Sep	03-Sep
04-Sep	05-Sep	06-Sep	07-Sep	08-Sep	09-Sep	10-Sep
11-Sep	12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	17-Sep
			Additional Marine Mammal Monitoring (Pre-Construction Phase)			
18-Sep	19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep
25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Sep	

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Pre-Construction Phase) - October 2011

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Oct
02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	07-Oct	08-Oct
09-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct
				Additional Marine Mammal Monitoring (Pre-Construction Phase)		
16-Oct	17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	22-Oct
23-Oct	24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct
30-Oct	31-Oct					

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - May 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 3.1.
Impact-PRC Monitoring: Water Quality Monitoring During Dredging Activities in PRC Waters within 2.5 km from HKSAR boundary. For monitoring stations please refer to Figure 3.2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Public Holiday 1-May	2-May	3-May	4-May	5-May
6-May	7-May	8-May	9-May	10-May	11-May	12-May
	Mid-Flood; 0656hrs Mid-Ebb; 1343hrs *Impact-PRC Monitoring*		Mid-Flood; 0817hrs Mid-Ebb; 1520hrs *Impact-PRC Monitoring*		Mid-Flood; 0948hrs Mid-Ebb; 1701hrs *Impact-PRC Monitoring*	
13-May	14-May	15-May	16-May	17-May	18-May	19-May
	Mid-Flood; 1355hrs Mid-Ebb; 2018hrs *Impact-PRC Monitoring*		Mid-Flood; 1622hrs Mid-Ebb; 1031hrs *Impact-PRC Monitoring*		Mid-Flood; 1807hrs Mid-Ebb * *Impact-PRC Monitoring*	Mid-Flood; 1851hrs Mid-Ebb; 1214hrs *Impact-HK Monitoring*
20-May	21-May	22-May	23-May	24-May	25-May	26-May
	Mid-Flood; 2011hrs Mid-Ebb; 1319hrs *Impact-PRC Monitoring*		Mid-Flood; 0718hrs Mid-Ebb; 1425hrs *Impact-PRC Monitoring*		Mid-Flood; 0824hrs Mid-Ebb; 1538hrs *Impact-PRC Monitoring*	
27-May	28-May	29-May	30-May	31-May		
	Mid-Flood; 1049hrs Mid-Ebb; 1755hrs *Impact-PRC Monitoring*		Mid-Flood; 1408hrs Mid-Ebb; 2021hrs *Impact-PRC Monitoring*			

* Monitoring for mid-ebb tide scheduled in the morning was cancelled due to adverse weather condition.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - May 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		Public Holiday 1-May	2-May	3-May	4-May	5-May
6-May	7-May	8-May	9-May	10-May	11-May	12-May
13-May	14-May	15-May	16-May	17-May	18-May	19-May
20-May	21-May	22-May	23-May	24-May	25-May	26-May
			Additional Marine Mammal Monitoring (Construction Phase)			
27-May	28-May	29-May	30-May	31-May		

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - June 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 1.
Impact-PRC Monitoring: Water Quality Monitoring During Dredging Activities in PRC Waters within 2.5 km from HKSAR boundary. For monitoring stations please refer to Figure 2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jun	2-Jun
					Mid-Flood; 1647hrs Mid-Ebb; 1017hrs *Impact-PRC Monitoring*	
3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
	Mid-Flood; 1954hrs Mid-Ebb; 1245hrs *Impact-PRC Monitoring*		Mid-Flood; 0717hrs Mid-Ebb; 1421hrs *Impact-PRC Monitoring*	Mid-Flood; 0803hrs Mid-Ebb; 1508hrs *Impact-HK Monitoring*	Mid-Flood; 0850hrs Mid-Ebb; 1554hrs *Impact-PRC Monitoring*	Mid-Flood; 0941hrs Mid-Ebb; 1640hrs *Impact-HK Monitoring*
10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun
	Mid-Flood; 1153hrs Mid-Ebb; 1818hrs *Impact-PRC Monitoring*	Mid-Flood; 1314hrs Mid-Ebb; 1914hrs *Impact-HK Monitoring*	Mid-Flood; 1444hrs Mid-Ebb; 0903hrs *Impact-PRC Monitoring*	Mid-Flood; 1604hrs Mid-Ebb; 0957hrs *Impact-HK Monitoring*	Mid-Flood; 1708hrs Mid-Ebb; 1040hrs *Impact-PRC Monitoring*	Mid-Flood; 1802hrs Mid-Ebb; 1118hrs *Impact-HK Monitoring*
17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	Public Holiday 23-Jun
	Mid-Flood; 1927hrs Mid-Ebb; 1227hrs *Impact-PRC Monitoring*	Mid-Flood* Mid-Ebb* *Impact-HK Monitoring*	Mid-Flood; 2039hrs Mid-Ebb; 1337hrs *Impact-PRC Monitoring*	Mid-Flood; 0702hrs Mid-Ebb; 1412hrs *Impact-HK Monitoring*	Mid-Flood; 0741hrs Mid-Ebb; 1447hrs *Impact-PRC Monitoring*	Mid-Flood; 0821hrs Mid-Ebb; 1523hrs *Impact-HK Monitoring*
24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun
		Mid-Flood; 1058hrs Mid-Ebb; 1728hrs *Impact-HK Monitoring*		Mid-Flood; 1353hrs Mid-Ebb; 1947hrs *Impact-HK Monitoring*		Mid-Flood* Mid-Ebb* *Impact-HK Monitoring*

* Monitoring was cancelled due to adverse weather condition.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - June 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jun	2-Jun
3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun
17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun
			Additional Marine Mammal Monitoring (Construction Phase)			
24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - July 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 1

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Jul	Public Holiday 2-Jul	3-Jul	4-Jul	5-Jul	6-Jul	7-Jul
		Mid-Flood: 12:35 Mid-Ebb: 19:50 *Impact-HK Monitoring*		Mid-Flood: 7:08 Mid-Ebb: 14:09 *Impact-HK Monitoring*		Mid-Flood: 8:42 Mid-Ebb: 15:32 *Impact-HK Monitoring*
8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
		Mid-Flood: 11:18 Mid-Ebb: 17:22 *Impact-HK Monitoring*		Mid-Flood: 8:07 Mid-Ebb: 13:59 *Impact-HK Monitoring*		Mid-Flood: 10:05 Mid-Ebb: 17:05 *Impact-HK Monitoring*
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
		Mid-Flood: 12:06 Mid-Ebb: 19:11 *Impact-HK Monitoring*		Mid-Flood: 13:19 Mid-Ebb: 20:15 *Impact-HK Monitoring*		Mid-Flood: 7:37 Mid-Ebb: 14:30 *Impact-HK Monitoring*
22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
		Mid-Flood* Mid-Ebb* *Impact-HK Monitoring*		Mid-Flood: 12:14 Mid-Ebb: 18:03 *Impact-HK Monitoring*		Mid-Flood: 8:31 Mid-Ebb: 15:48 *Impact-HK Monitoring*
29-Jul	30-Jul	31-Jul				
		Mid-Flood: 11:35 Mid-Ebb: 18:52 *Impact-HK Monitoring*				

* Monitoring was cancelled due to adverse weather condition.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - July 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Jul	Public Holiday 2-Jul	3-Jul	4-Jul	5-Jul	6-Jul	7-Jul
			Additional Marine Mammal Monitoring (Construction Phase)			
8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
29-Jul	30-Jul	31-Jul				

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - August 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 1

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Aug	02-Aug	03-Aug	04-Aug
05-Aug	06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug
12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug
19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug
		Mid-Flood: 09:02 Mid-Ebb: 15:17 *Impact-HK Monitoring*		Mid-Flood: 10:58 Mid-Ebb: 16:47 *Impact-HK Monitoring*		Mid-Ebb: 08:00 Mid-Flood: 14:06 *Impact-HK Monitoring*
26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	
		Mid-Flood: 10:30 Mid-Ebb: 17:53 *Impact-HK Monitoring*		Mid-Flood: 12:09 Mid-Ebb: 19:01 *Impact-HK Monitoring*		

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - August 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Aug	02-Aug	03-Aug	04-Aug
05-Aug	06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug
			Additional Marine Mammal Monitoring (Construction Phase)			
12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug
19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug
26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - September 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 1

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Sep
02-Sep	03-Sep	04-Sep	05-Sep	06-Sep	07-Sep	08-Sep
09-Sep	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	15-Sep
16-Sep	17-Sep	18-Sep	19-Sep	20-Sep	21-Sep	22-Sep
23-Sep	24-Sep	25-Sep	26-Sep	27-Sep	28-Sep	29-Sep
Public Holiday 30-Sep						

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - September 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Sep
02-Sep	03-Sep	04-Sep	05-Sep	06-Sep	07-Sep	08-Sep
09-Sep	10-Sep	11-Sep	12-Sep	13-Sep	14-Sep	15-Sep
16-Sep	17-Sep	18-Sep	19-Sep	20-Sep	21-Sep	22-Sep
23-Sep	24-Sep	25-Sep	26-Sep	27-Sep	28-Sep	29-Sep
Public Holiday 30-Sep						

Additional Marine Mammal Monitoring (Construction Phase)

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Water Quality Impact Monitoring Schedule - October 2012

Impact-HK Monitoring: Water Quality Monitoring for Dredging and Jetting Activities in Hong Kong Waters. For monitoring stations please refer to Figure 1

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Public Holiday 01-Oct	Public Holiday 02-Oct	03-Oct	04-Oct	05-Oct	06-Oct
		Mid-Flood 08:51 Mid-Ebb 14:00 *Impact-HK Monitoring*		Mid-Flood 09:30 Mid-Ebb 15:01 *Impact-HK Monitoring*		Mid-Flood 11:11 Mid-Ebb 16:10 *2-day intensive WQM for jetting* *Impact-HK Monitoring*
07-Oct	08-Oct	09-Oct	10-Oct	11-Oct	12-Oct	13-Oct
2-day intensive WQM for jetting		Mid-Flood 15:00 Mid-Ebb 06:48 *Impact-HK Monitoring*		Mid-Flood 16:36 Mid-Ebb 09:26 *Impact-HK Monitoring*		Mid-Flood 17:30 Mid-Ebb 11:10 *Impact-HK Monitoring*
14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-Oct
		Mid-Flood 19:03 Mid-Ebb 13:19 *Impact-HK Monitoring*		Mid-Flood 09:11 Mid-Ebb 14:51 *Impact-HK Monitoring*		Mid-Flood 11:16 Mid-Ebb 16:34 *Impact-HK Monitoring*
21-Oct	22-Oct	Public Holiday 23-Oct	24-Oct	25-Oct	26-Oct	27-Oct
		Mid-Flood 15:06 Mid-Ebb 07:14 *Impact-HK Monitoring*		Mid-Flood 16:34 Mid-Ebb 09:38 *Impact-HK Monitoring*		Mid-Flood 17:30 Mid-Ebb 11:16 *Impact-HK Monitoring*
28-Oct	29-Oct	30-Oct	31-Oct			
		Mid-Flood 18:41 Mid-Ebb 13:04 *Impact-HK Monitoring*				

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Construction Phase) - October 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Public Holiday 01-Oct	Public Holiday 02-Oct	03-Oct	04-Oct	05-Oct	06-Oct
07-Oct	08-Oct	09-Oct	10-Oct	11-Oct	12-Oct	13-Oct
14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct	20-Oct
	Additional Marine Mammal Monitoring (Construction Phase)					
21-Oct	22-Oct	Public Holiday 23-Oct	24-Oct	25-Oct	26-Oct	27-Oct
28-Oct	29-Oct	30-Oct	31-Oct			

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Black Point Gas Supply Project (First Phase)
Water Quality Monitoring Schedule (Post Construction Phase) - March 2013

For monitoring stations please refer to Figure 1 & 2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-Mar	02-Mar
03-Mar	04-Mar	05-Mar	06-Mar	07-Mar	08-Mar	09-Mar
10-Mar	11-Mar	12-Mar Mid-Flood: 1925hrs Mid-Ebb: 1328hrs *Post Monitoring*	13-Mar	14-Mar Mid-Flood: 0819hrs Mid-Ebb: 1432hrs *Post Monitoring*	15-Mar	16-Mar Mid-Flood: 0906hrs Mid-Ebb: 1542hrs *Post Monitoring*
17-Mar	18-Mar	19-Mar Mid-Flood: 1013hrs Mid-Ebb: 1808hrs *Post Monitoring*	20-Mar	21-Mar Mid-Flood: 0818hrs Mid-Ebb: 2049hrs *Post Monitoring*	22-Mar	23-Mar Mid-Flood: 1556hrs Mid-Ebb: 1040hrs *Post Monitoring*
24-Mar	25-Mar	26-Mar Mid-Flood: * Mid-Ebb: 1221hrs *Post Monitoring*	27-Mar	28-Mar Mid-Flood: 1953hrs Mid-Ebb: 1330hrs *Post Monitoring*	Public Holiday 29-Mar	Public Holiday 30-Mar
31-Mar						

Note: * Survey was cancelled due to adverse weather condition.

Black Point Gas Supply Project (First Phase)
Water Quality Monitoring Schedule (Post Construction Phase) - April 2013

For monitoring stations please refer to Figure 1 & 2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Public Holiday 01-Apr	02-Apr Mid-Flood: 1017hrs Mid-Ebb: 1731hrs *Post Monitoring*	03-Apr	Public Holiday 04-Apr	05-Apr	06-Apr Mid-Flood: 1555hrs Mid-Ebb: 1037hrs *Post Monitoring*
07-Apr	08-Apr	09-Apr Mid-Flood: 1836hrs Mid-Ebb: 1230hrs *Post Monitoring*	10-Apr	11-Apr Mid-Flood: 2002hrs Mid-Ebb: 1336hrs *Post Monitoring*	12-Apr	13-Apr Mid-Flood: 0800hrs Mid-Ebb: 1442hrs *Post Monitoring*
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
28-Apr	29-Apr	30-Apr				

Black Point Gas Supply Project (First Phase)
Water Quality Monitoring Schedule (Post Construction Phase) - March 2013

For monitoring stations please refer to Figure 1 & 2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-Mar	02-Mar
03-Mar	04-Mar	05-Mar	06-Mar	07-Mar	08-Mar	09-Mar
10-Mar	11-Mar	12-Mar Mid-Flood: 1925hrs Mid-Ebb: 1328hrs *Post Monitoring*	13-Mar	14-Mar Mid-Flood: 0819hrs Mid-Ebb: 1432hrs *Post Monitoring*	15-Mar	16-Mar Mid-Flood: 0906hrs Mid-Ebb: 1542hrs *Post Monitoring*
17-Mar	18-Mar	19-Mar Mid-Flood: 1013hrs Mid-Ebb: 1808hrs *Post Monitoring*	20-Mar	21-Mar Mid-Flood: 0818hrs Mid-Ebb: 2049hrs *Post Monitoring*	22-Mar	23-Mar Mid-Flood: 1556hrs Mid-Ebb: 1040hrs *Post Monitoring*
24-Mar	25-Mar	26-Mar Mid-Flood: * Mid-Ebb: 1221hrs *Post Monitoring*	27-Mar	28-Mar Mid-Flood: 1953hrs Mid-Ebb: 1330hrs *Post Monitoring*	Public Holiday 29-Mar	Public Holiday 30-Mar
31-Mar						

Note: * Survey was cancelled due to adverse weather condition.

Black Point Gas Supply Project (First Phase)
Water Quality Monitoring Schedule (Post Construction Phase) - April 2013

For monitoring stations please refer to Figure 1 & 2.

Reference Tidal Station: Lok On Pai (Source: HK Observatory Department)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	Public Holiday 01-Apr	02-Apr Mid-Flood: 1017hrs Mid-Ebb: 1731hrs *Post Monitoring*	03-Apr	Public Holiday 04-Apr	05-Apr	06-Apr Mid-Flood: 1555hrs Mid-Ebb: 1037hrs *Post Monitoring*
07-Apr	08-Apr	09-Apr Mid-Flood: 1836hrs Mid-Ebb: 1230hrs *Post Monitoring*	10-Apr	11-Apr Mid-Flood: 2002hrs Mid-Ebb: 1336hrs *Post Monitoring*	12-Apr	13-Apr Mid-Flood: 0800hrs Mid-Ebb: 1442hrs *Post Monitoring*
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
28-Apr	29-Apr	30-Apr				

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Post Construction Phase) - March 2013

For line transects of marine mammal monitoring please refer to Figure 3.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-Mar	02-Mar
03-Mar	04-Mar	05-Mar	06-Mar	07-Mar	08-Mar	09-Mar
10-Mar	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	16-Mar
17-Mar	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	23-Mar
				Additional Marine Mammal Monitoring (Post Construction Phase)		
24-Mar	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	30-Mar
31-Mar						

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Post Construction Phase) - April 2013

For line transects of marine mammal monitoring please refer to Figure 3.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Apr	02-Apr	03-Apr	04-Apr	05-Apr	06-Apr
07-Apr	08-Apr	09-Apr	10-Apr	11-Apr	12-Apr	13-Apr
14-Apr	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	20-Apr
		Additional Marine Mammal Monitoring (Post Construction Phase)				
21-Apr	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	27-Apr
28-Apr	29-Apr	30-Apr				

Black Point Gas Supply Project (First Phase)
Schedule for Additional Marine Mammal Monitoring (Post Construction Phase) - May 2013

For line transects of marine mammal monitoring please refer to Figure 3.

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-May	02-May	03-May	04-May
05-May	06-May	07-May	08-May	09-May	10-May	11-May
12-May	13-May	14-May	15-May	16-May	17-May	18-May
			Additional Marine Mammal Monitoring (Post Construction Phase)			
19-May	20-May	21-May	22-May	23-May	24-May	25-May
26-May	27-May	28-May	29-May	30-May	31-May	

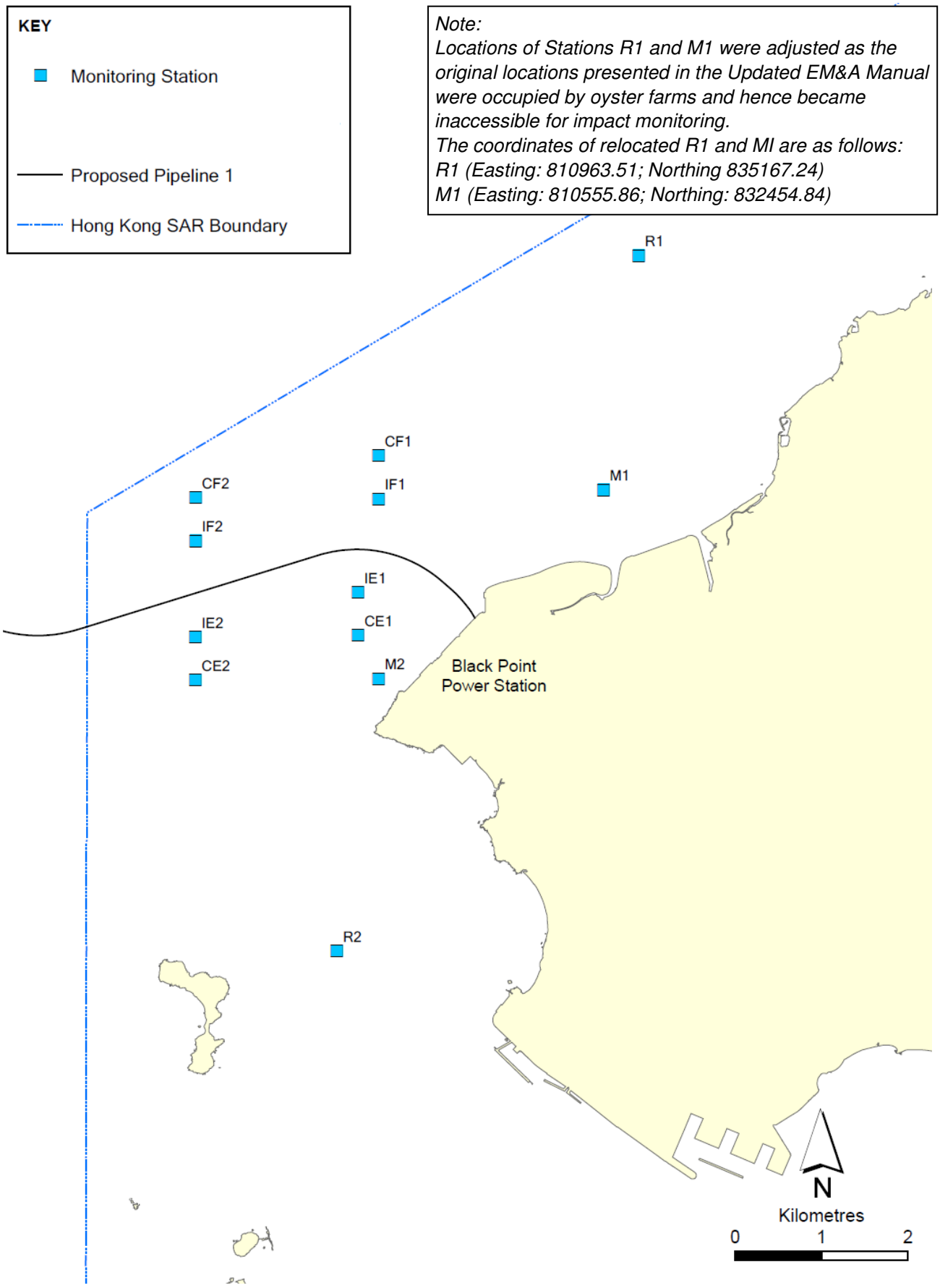

Figure 1 **Water Quality Monitoring Stations during Dredging Activities in Hong Kong Waters**

Environmental Resources Management

ERM

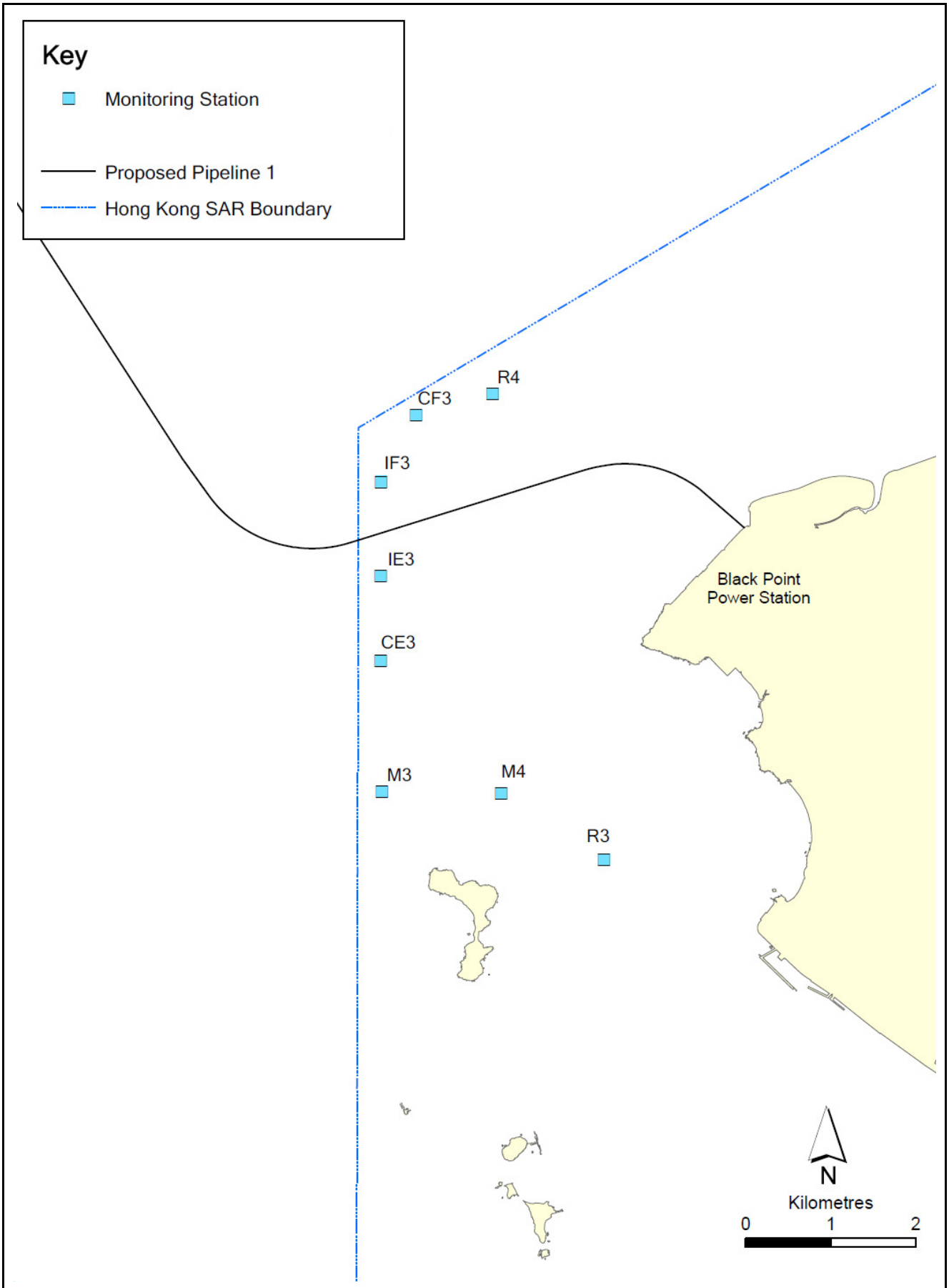

Figure 2 **Water Quality Monitoring Stations during Dredging Activities in PRC Waters within 2.5 km of HKSAR Boundary**

Environmental Resources Management

ERM

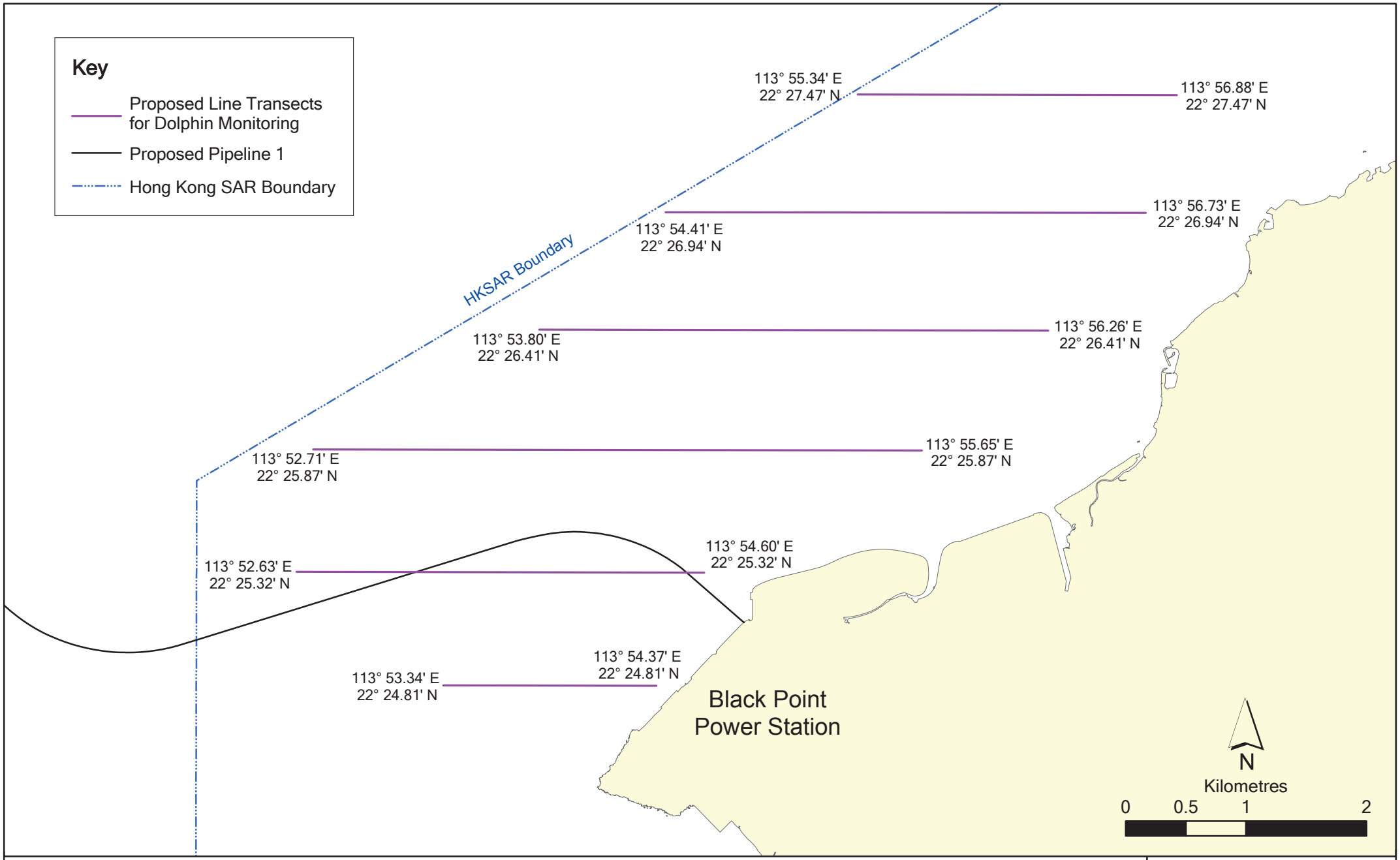

Figure 3

Line Transects for Post-Project Marine Mammal Monitoring

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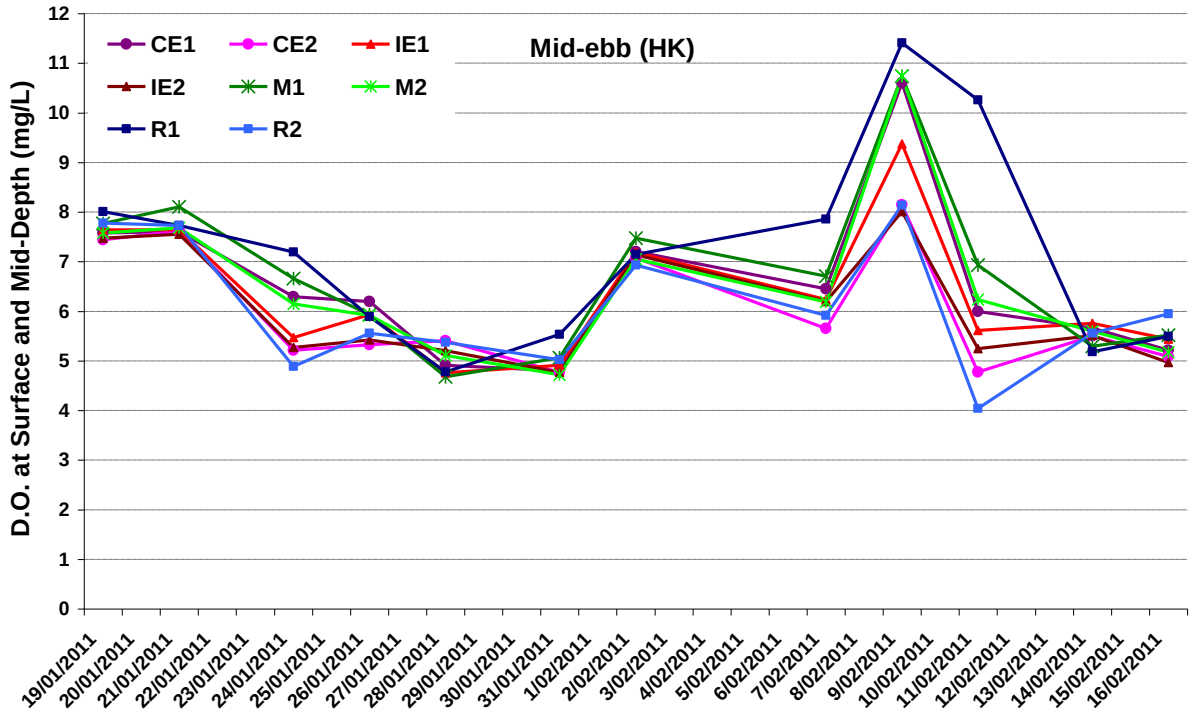
Date: 04/01/2011

Environmental Resources Management

ERM

Annex D1

Baseline Marine Water Quality Monitoring Results – January to February 2011



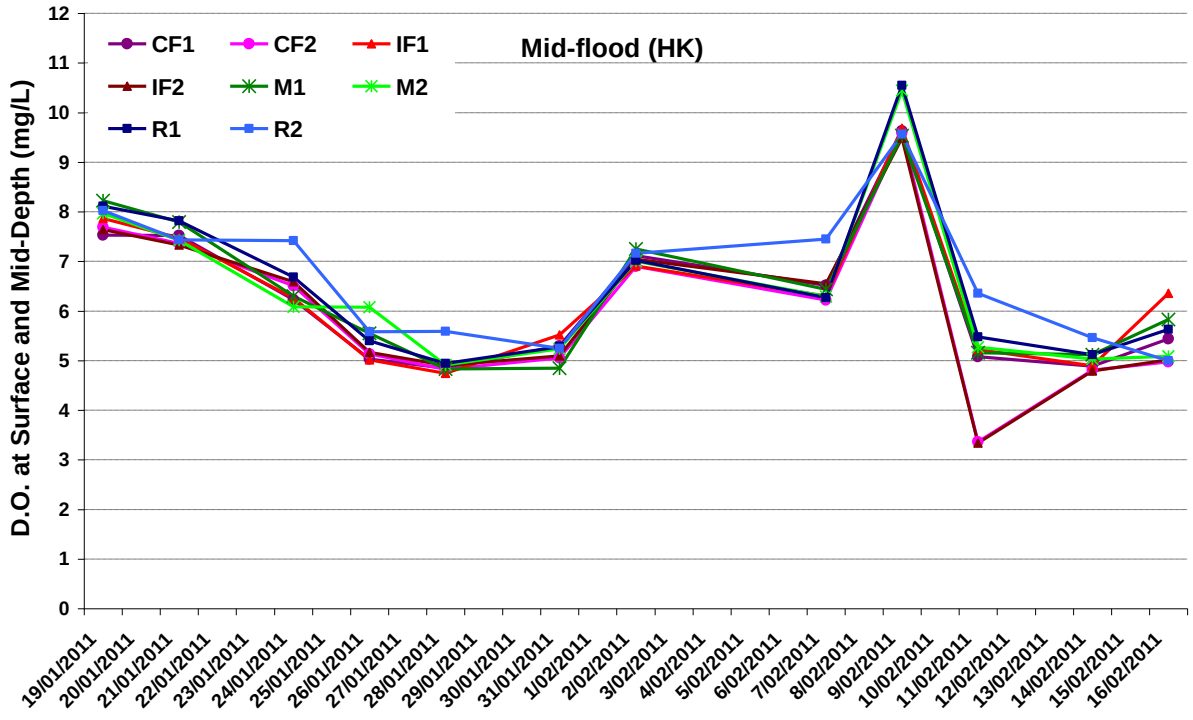
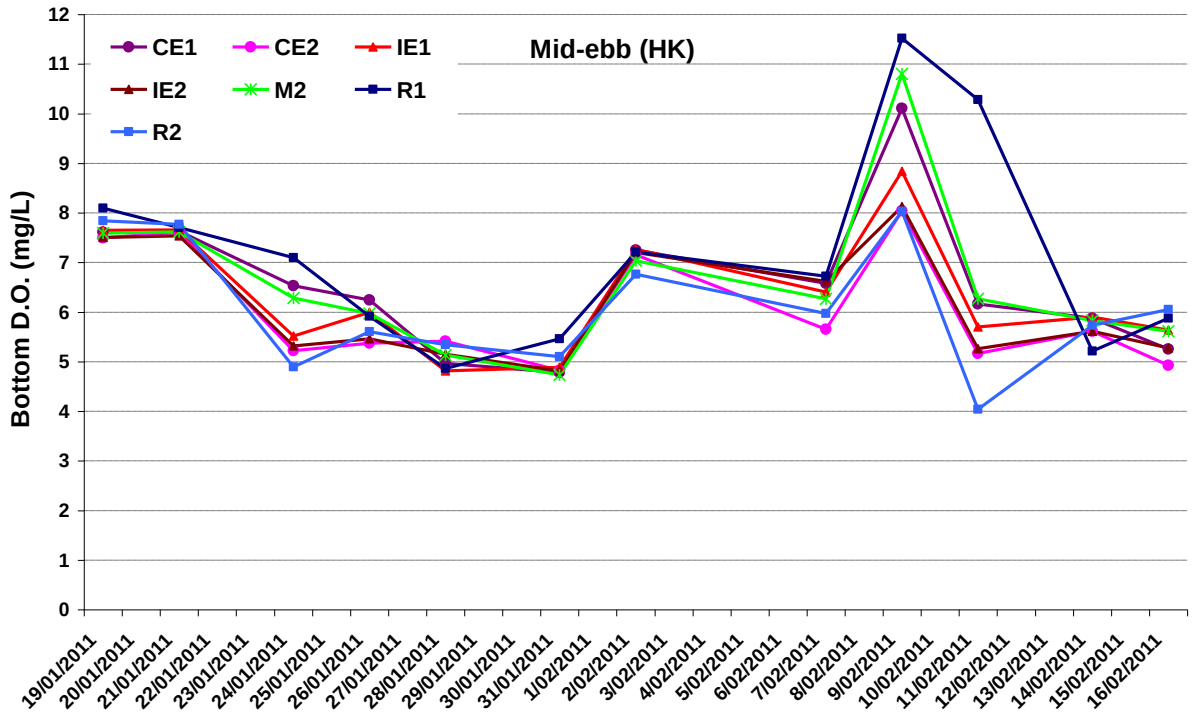


Figure D1 Baseline Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface and middle waters between 19 January and 16 February 2011 at Monitoring Stations for Hong Kong Dredging & Jetting Works.

Ref: *0124291_Annex D water graphs.doc*



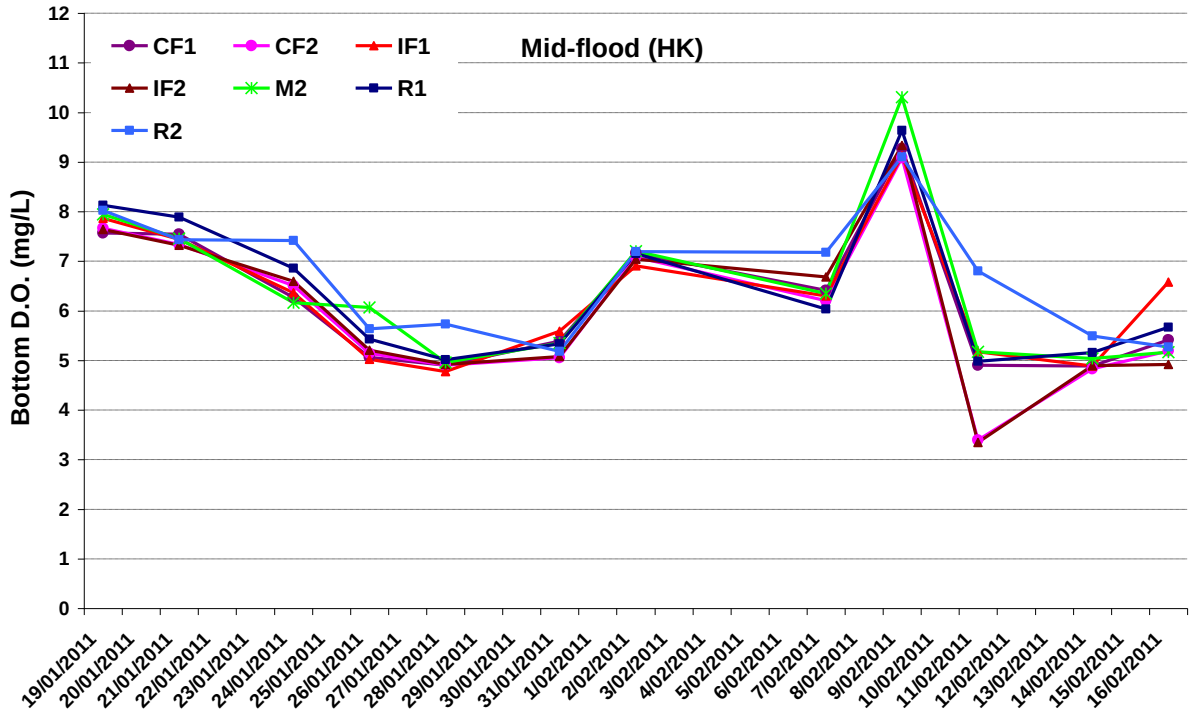


Figure D2 Baseline Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 19 January and 16 February 2011 at Monitoring Stations for Hong Kong Dredging & Jetting Works.

Ref: 0124291_Annex D water graphs.doc

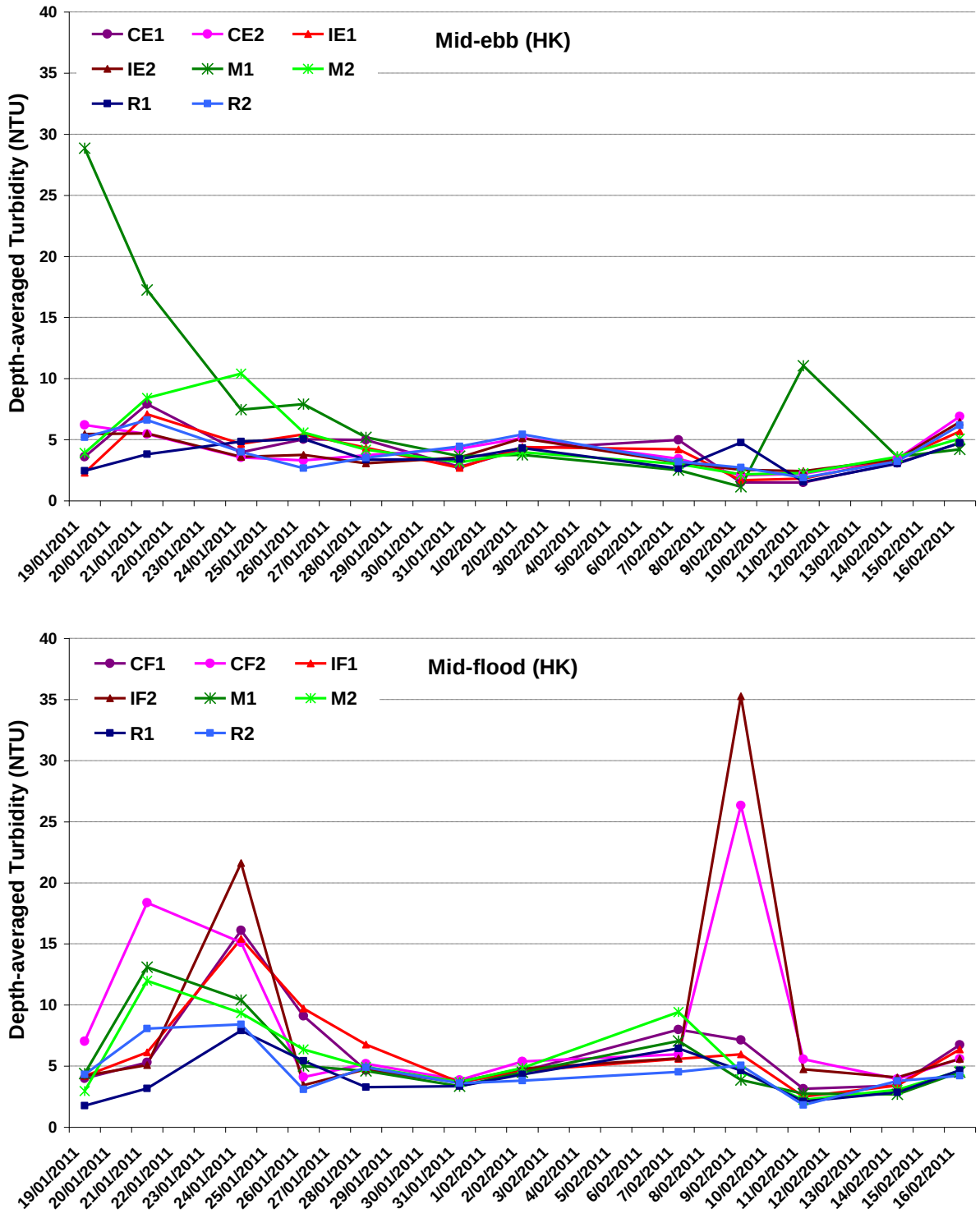


Figure D3 Baseline Monitoring – Depth-averaged Level of Turbidity (NTU) between 19 January and 16 February 2011 at Monitoring Stations for Hong Kong Dredging & Jetting Works.

Ref: 0124291_Annex D water graphs.doc

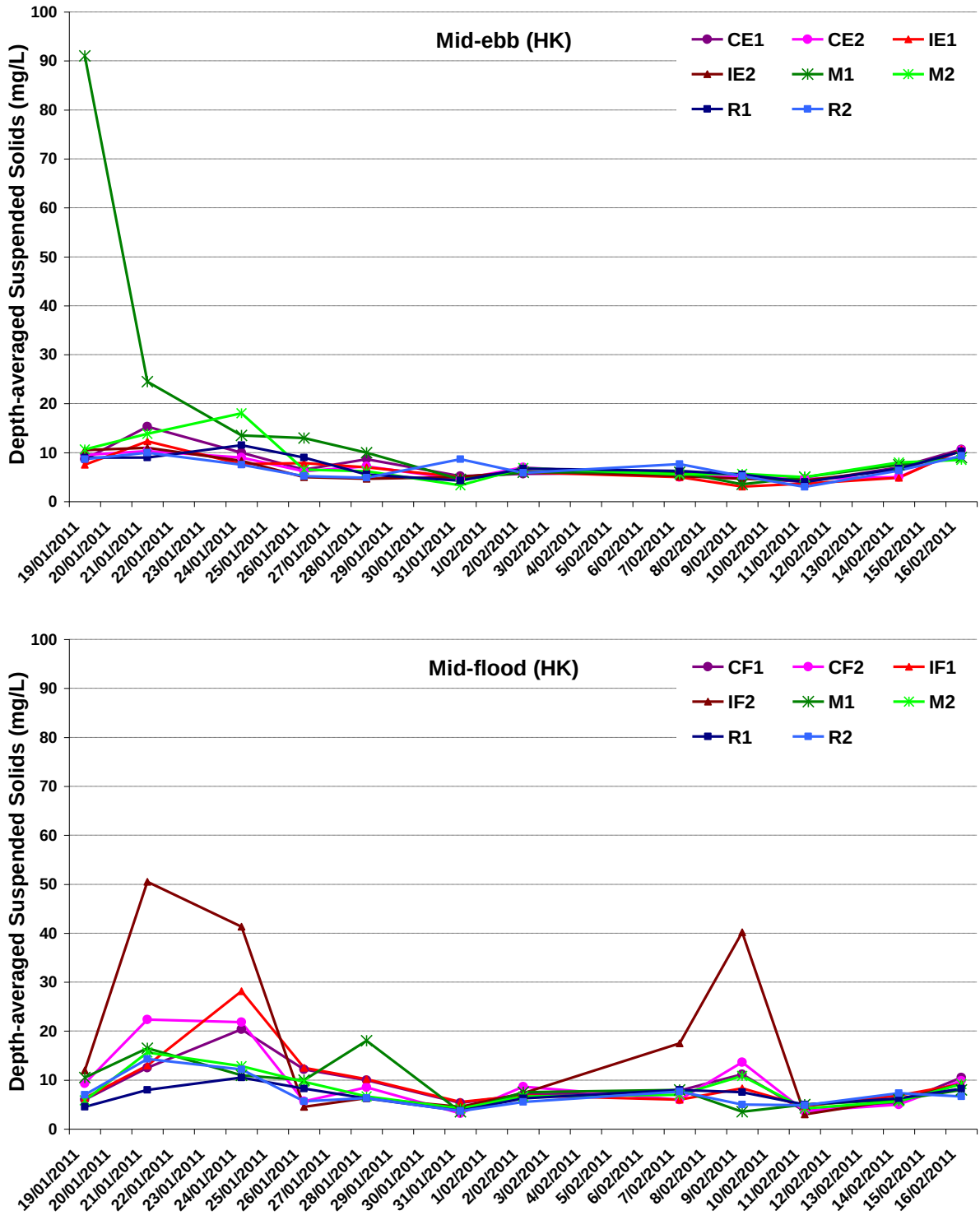
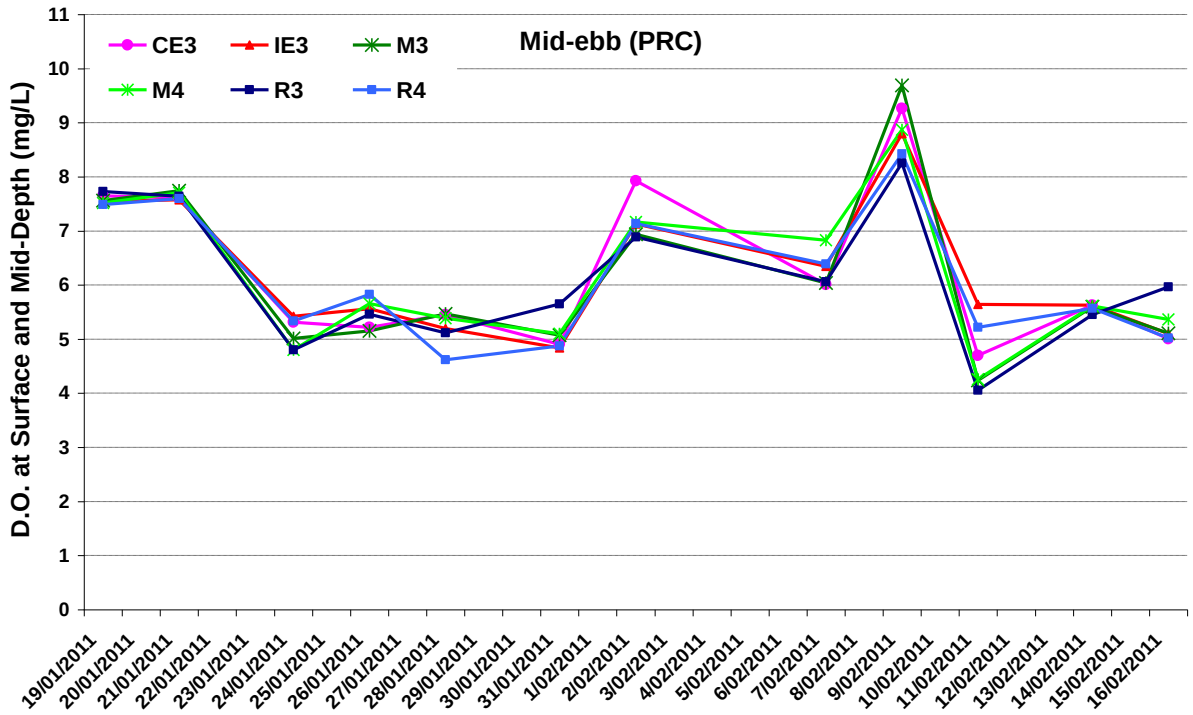


Figure D4 Baseline Monitoring – Depth-averaged Level of Suspended Solids (mg/L) between 19 January and 16 February 2011 at Monitoring Stations for Hong Kong Dredging & Jetting Works.

Ref: 0124291_Annex D water graphs.doc



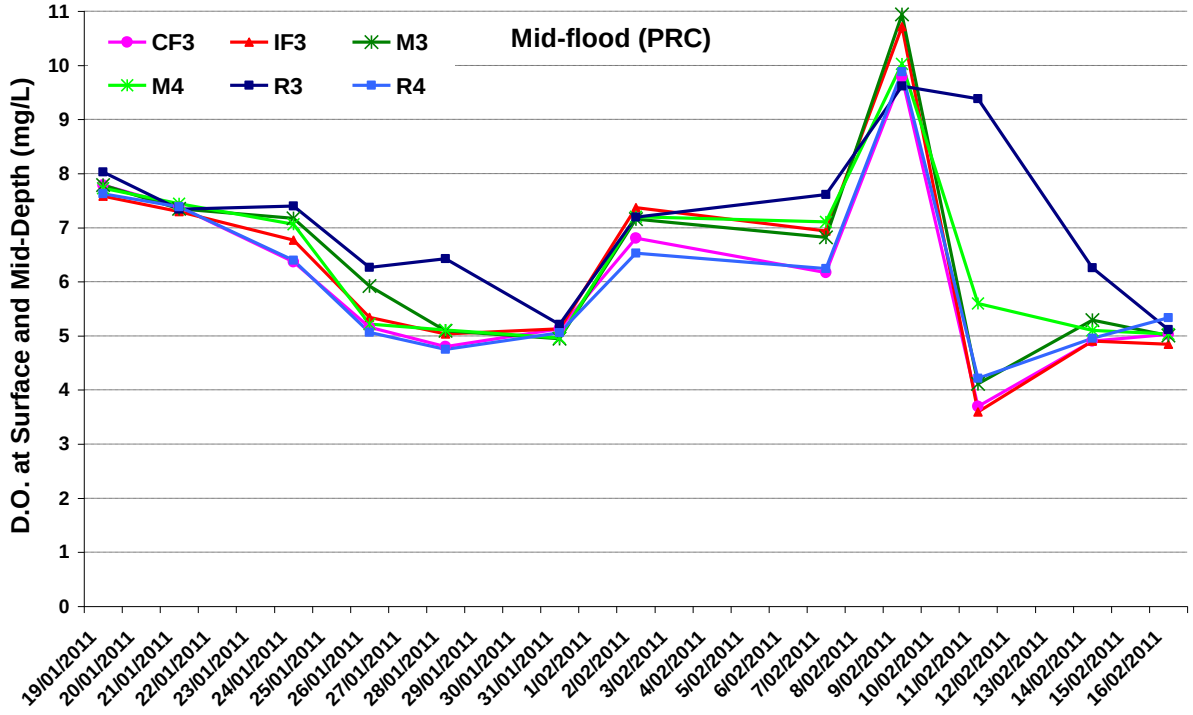
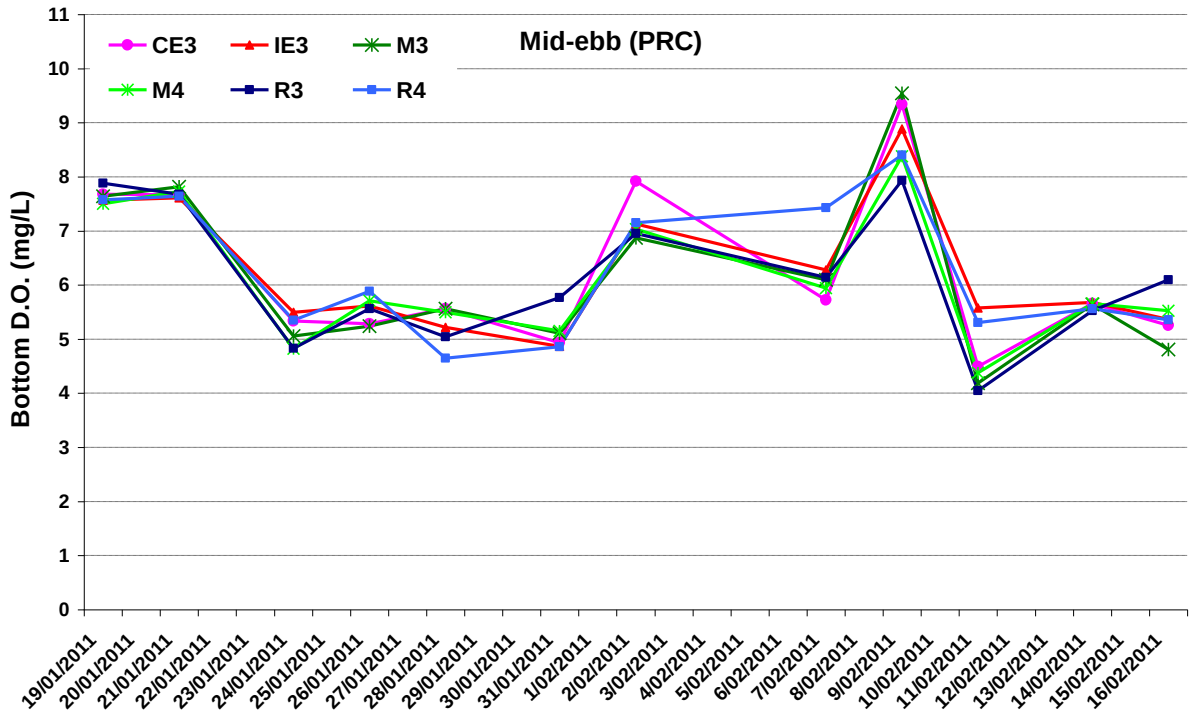


Figure D5 Baseline Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface and middle waters between 19 January and 16 February 2011 at Monitoring Stations for PRC Jetting / Dredging Works.

Ref: *0124291_Annex D water graphs.doc*



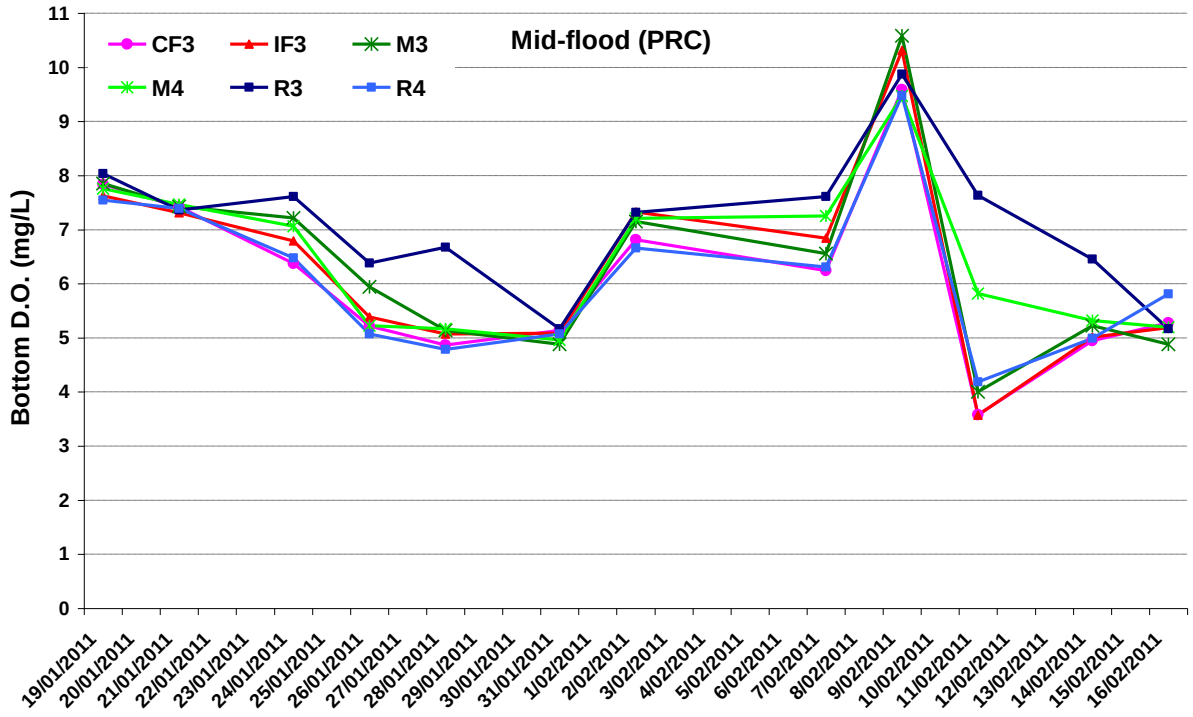


Figure D6 Baseline Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 19 January and 16 February 2011 at Monitoring Stations for PRC Jetting / Dredging Works.

Ref: 0124291_Annex D water graphs.doc

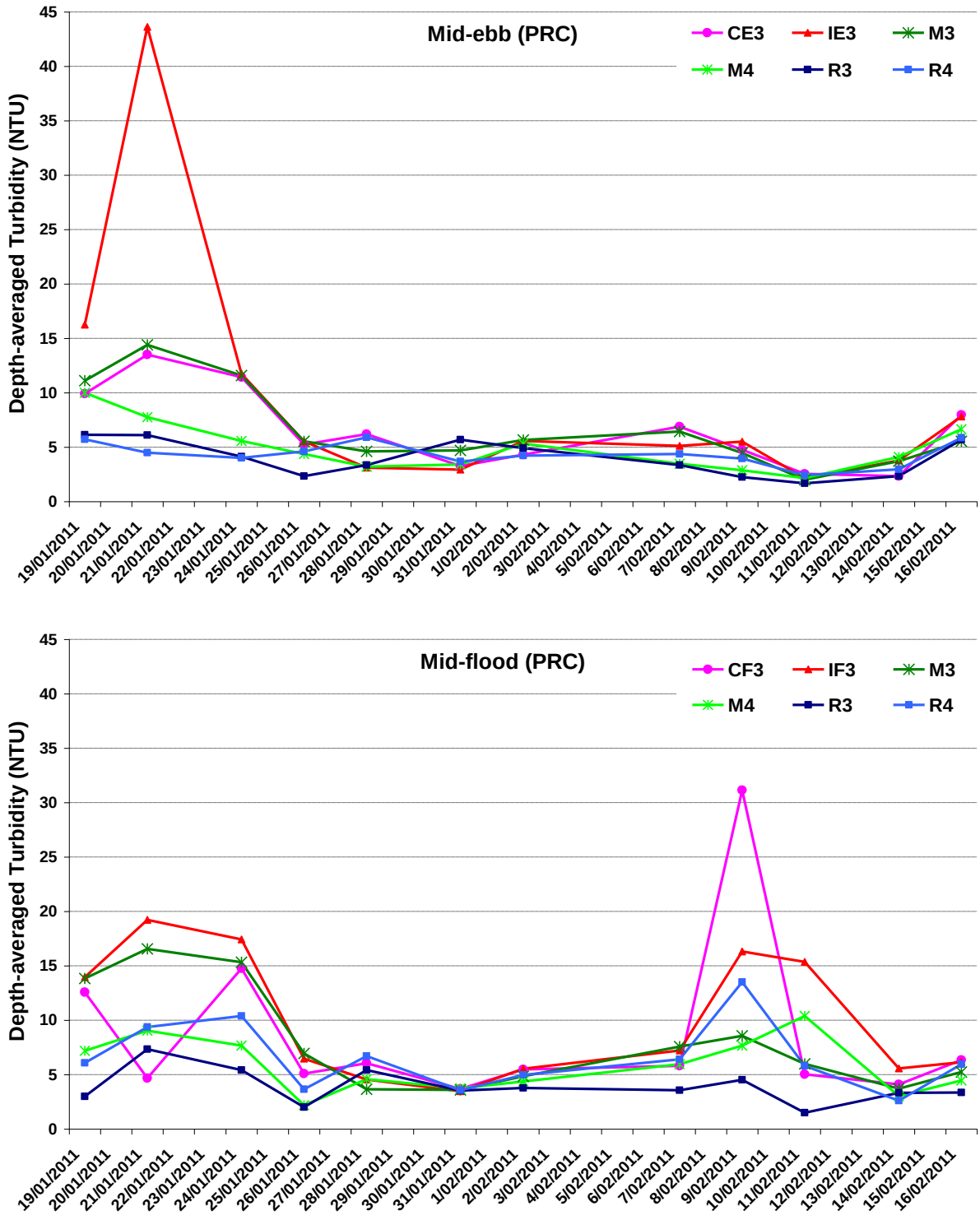
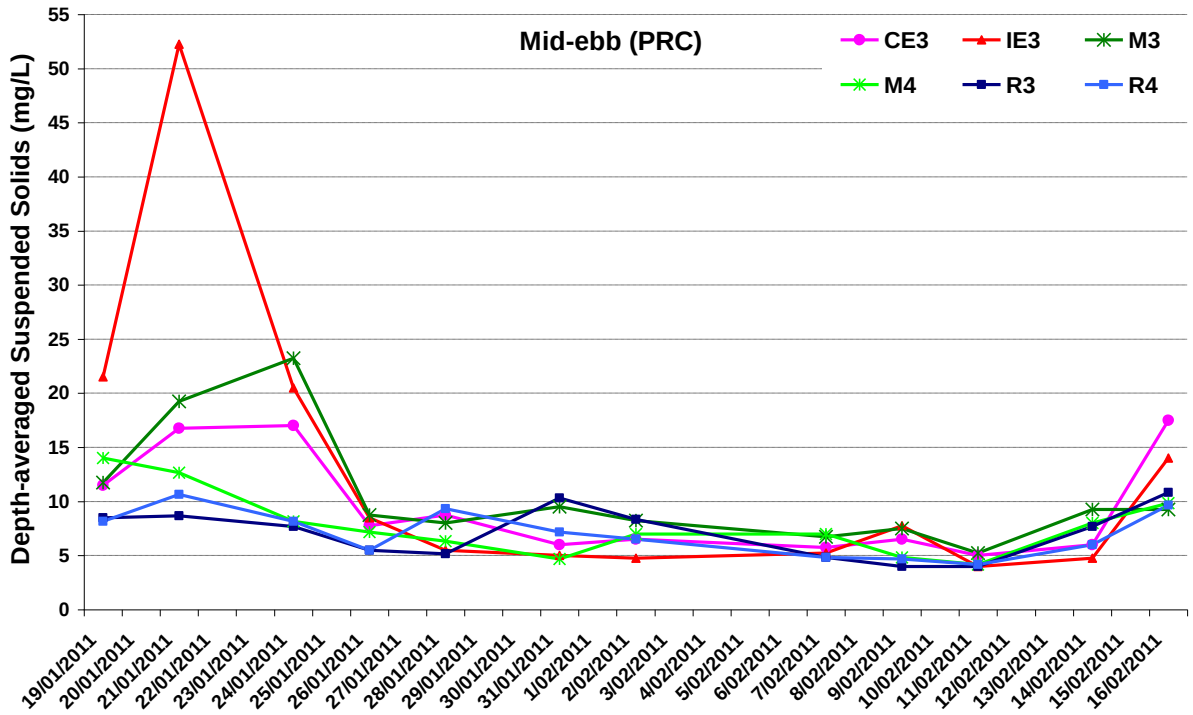


Figure D7 Baseline Monitoring – Depth-averaged Level of Turbidity (NTU) between 19 January and 16 February 2011 at Monitoring Stations for PRC Jetting / Dredging Works.

Ref: 0124291_Annex D water graphs.doc



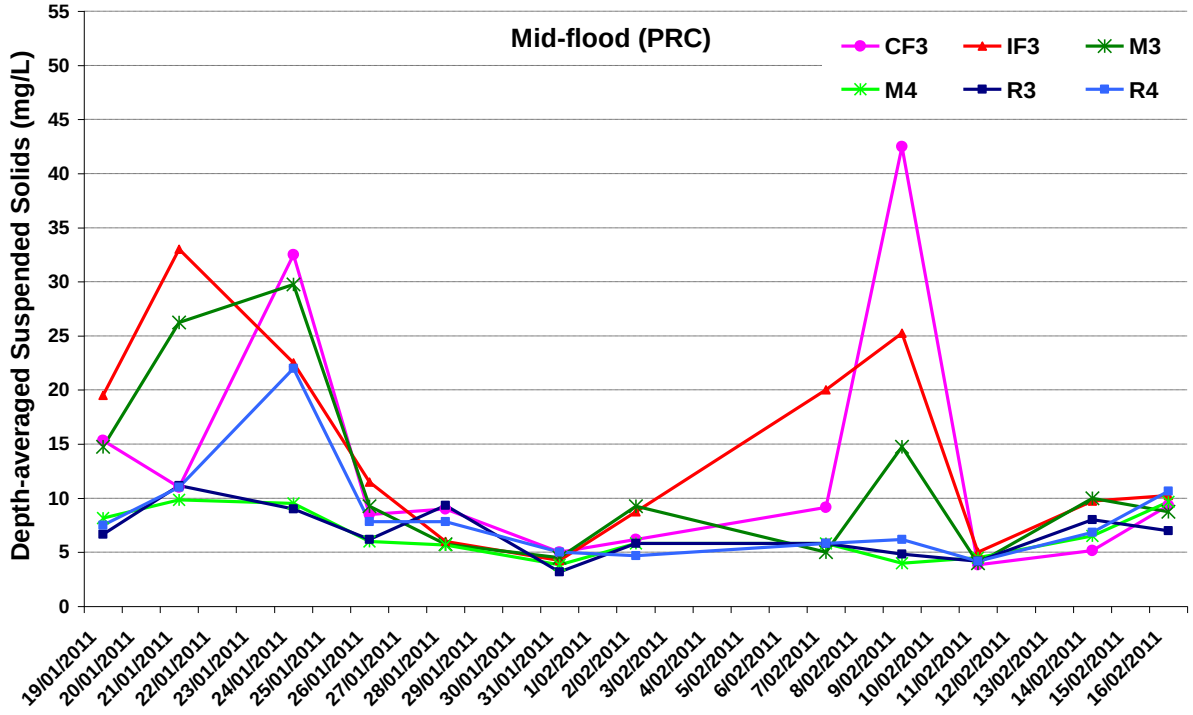
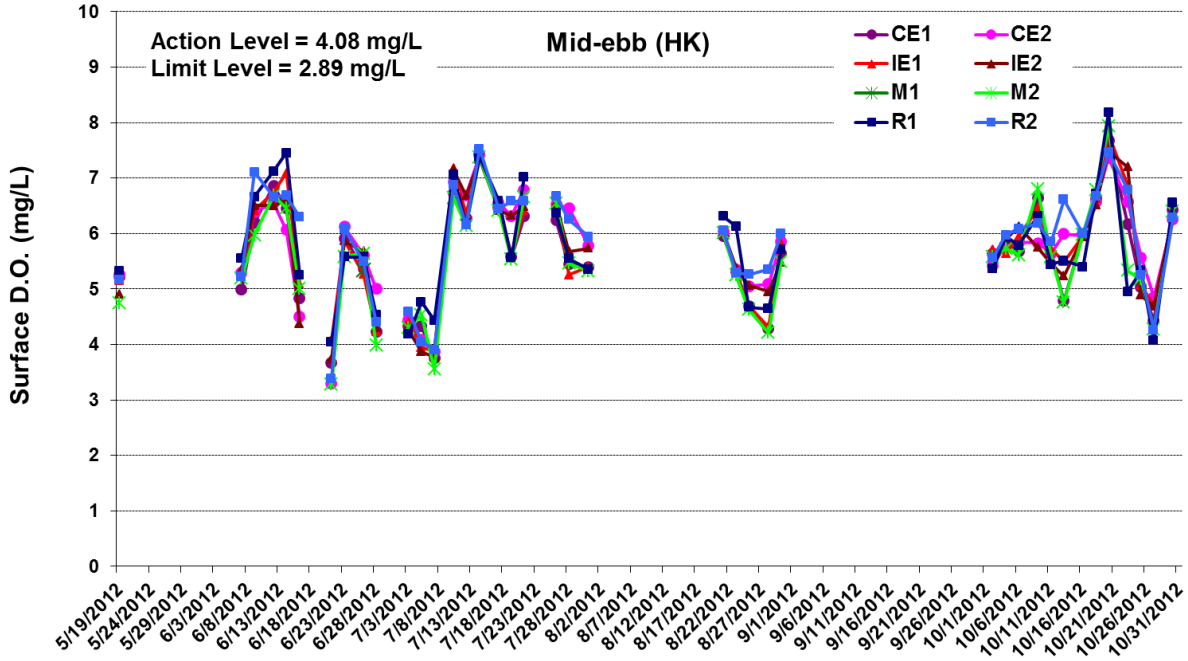


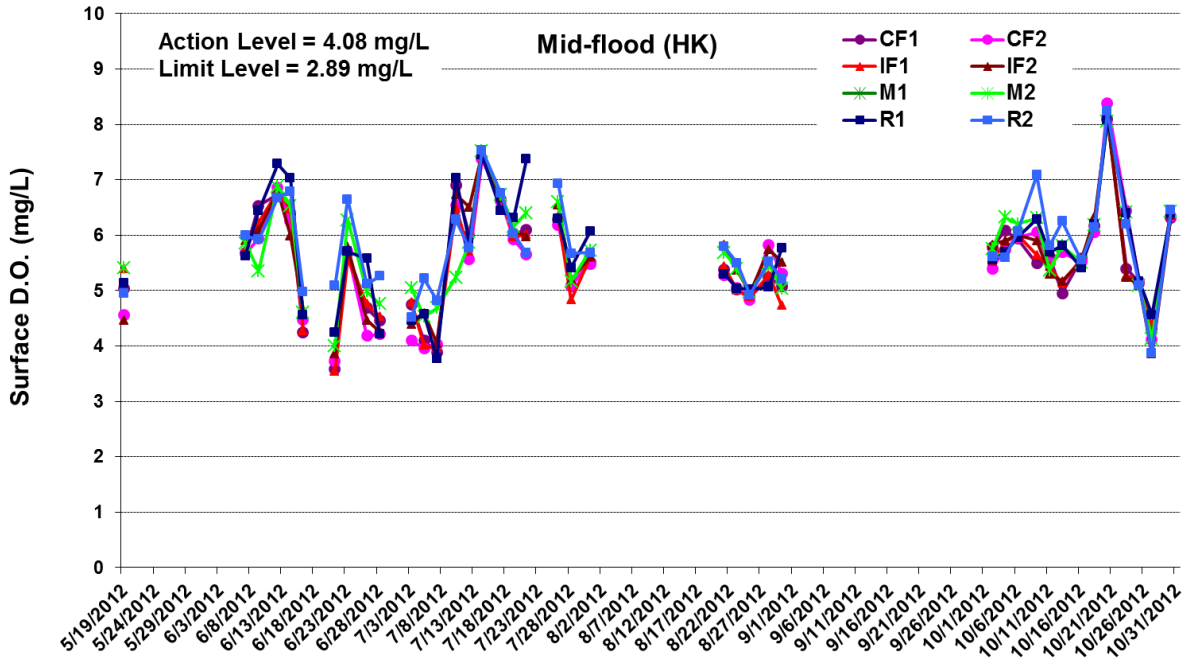
Figure D8 Baseline Monitoring – Depth-averaged Level of Suspended Solids (mg/L) between 19 January and 16 February 2011 at Monitoring Stations for PRC Jetting / Dredging Works.

Ref: 0124291_Annex D water graphs.doc

Annex D2

Construction Phase Marine Water Quality Monitoring Results – May to October 2012

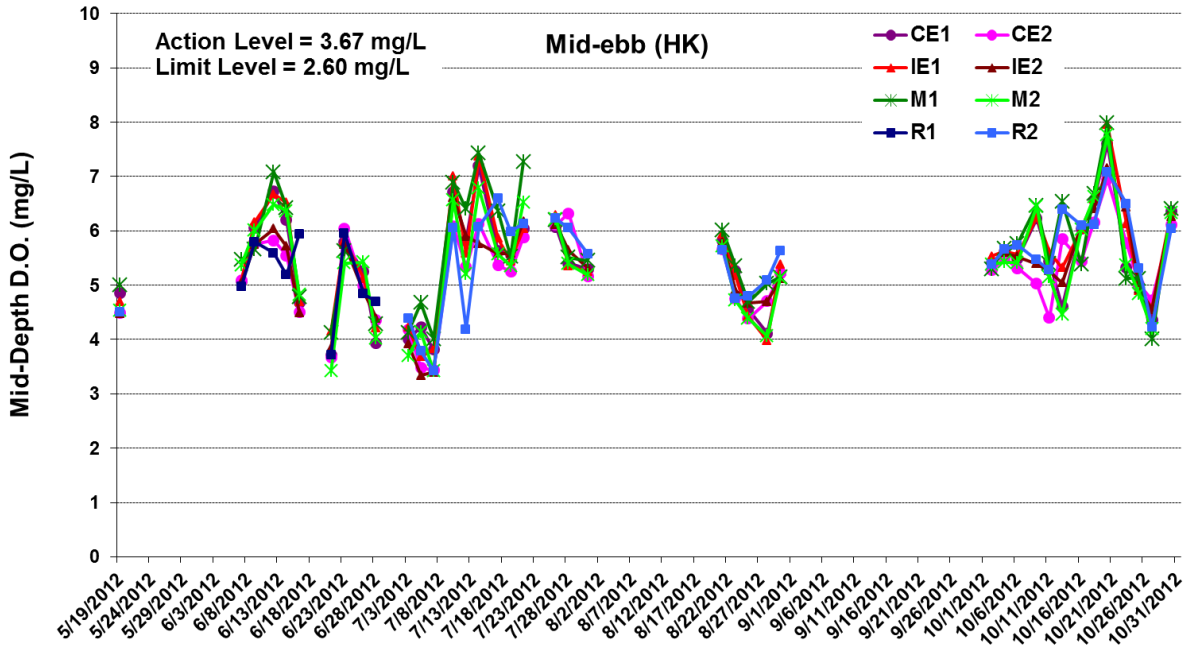


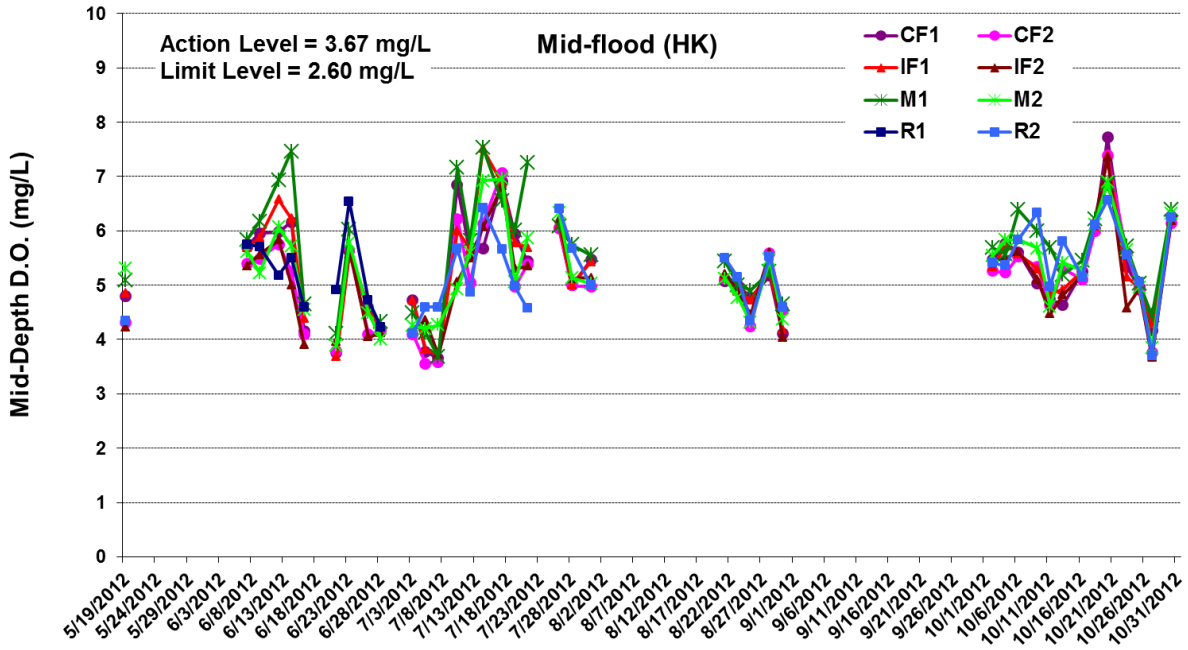


* No data for Station M1 due to shallow water depth (< 3m).

Figure D1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 19 May and 30 October 2012 at Monitoring Stations for Hong Kong Dredging/Jetting Works. No monitoring was conducted during adverse weather condition, or when dredging works was not undertaken.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls

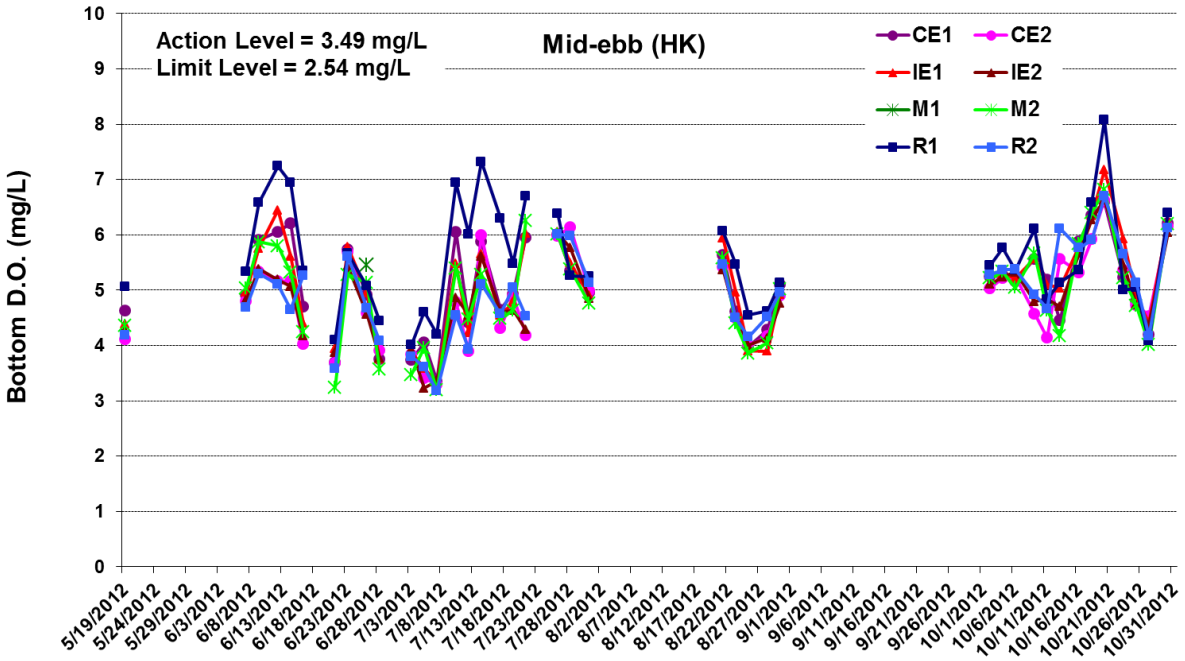


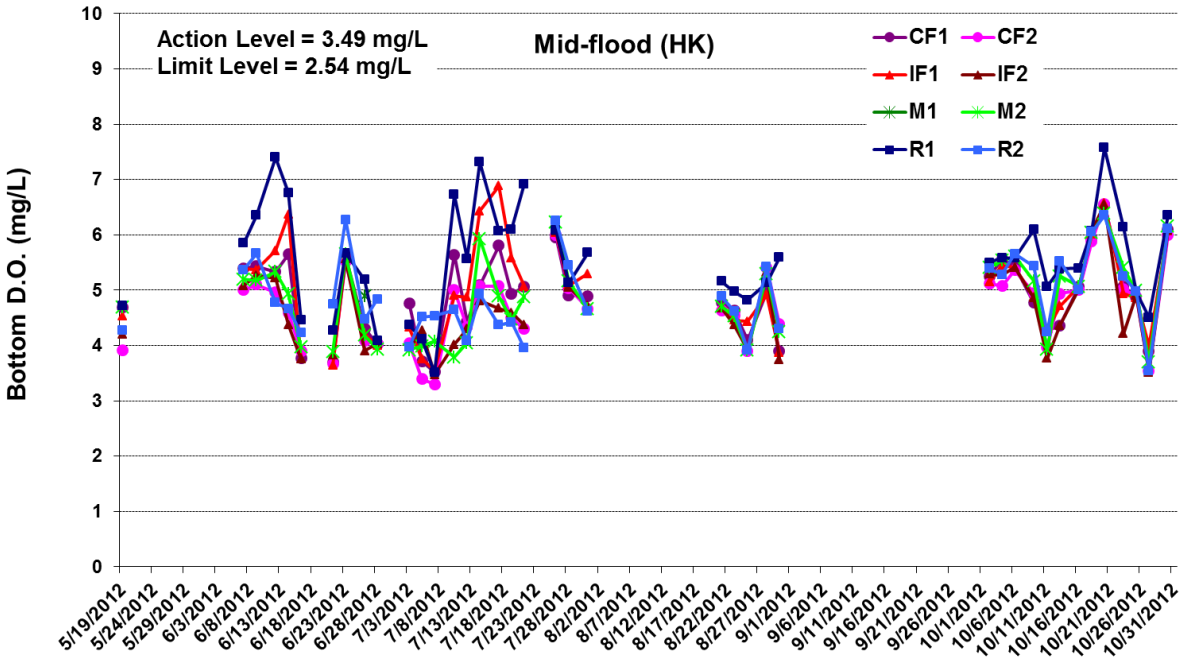


* No data for Station R1 due to shallow water depth (< 6m).

Figure D2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 19 May and 30 October 2012 at Monitoring Stations for Hong Kong Dredging Works. No monitoring was conducted during adverse weather condition, or when dredging works was not undertaken.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls





* No data for Station M1 due to shallow water depth (< 3m).

Figure D3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 19 May and 30 October 2012 at Monitoring Stations for Hong Kong Dredging Works. No monitoring was conducted during adverse weather condition, or when dredging works was not undertaken.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls

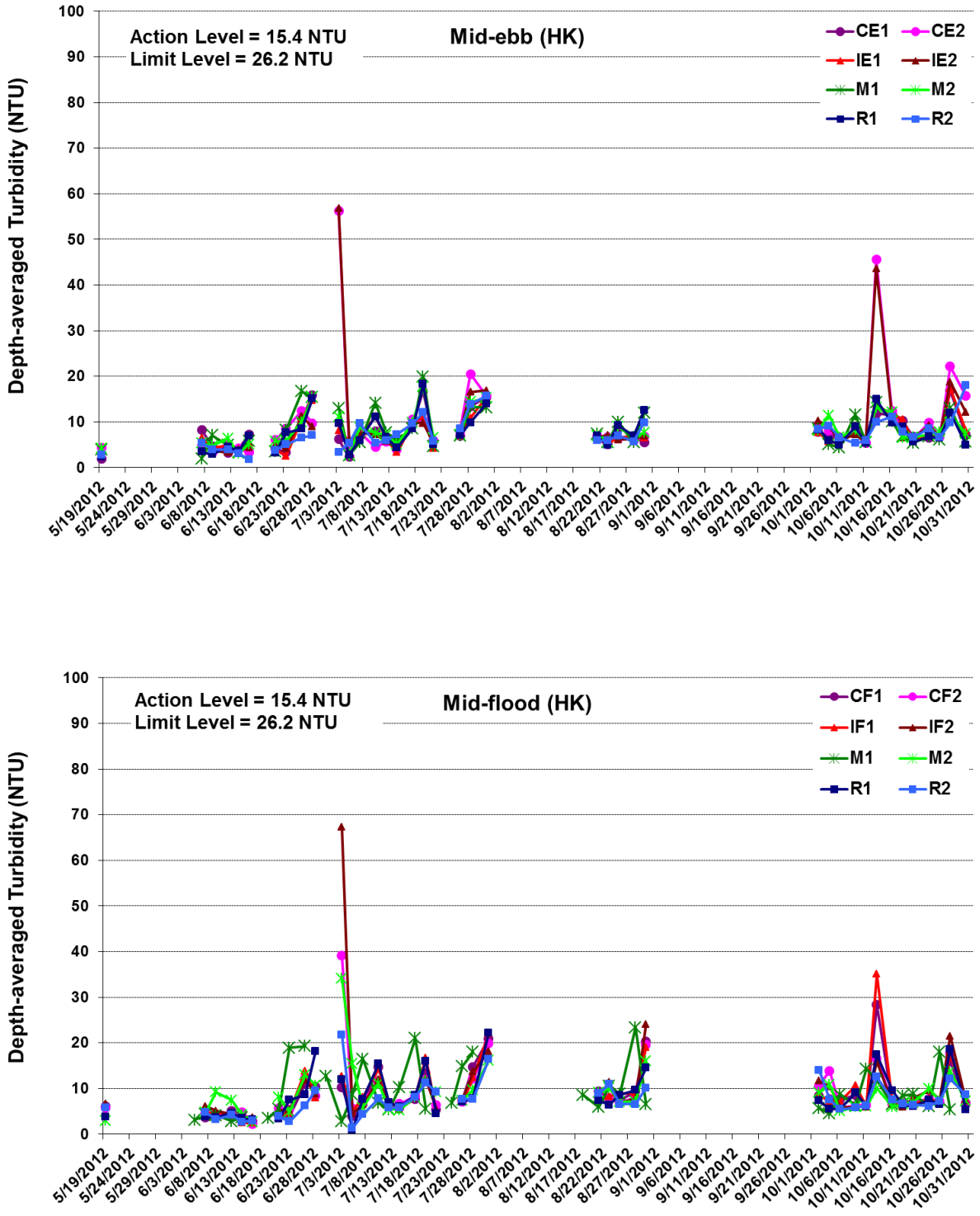
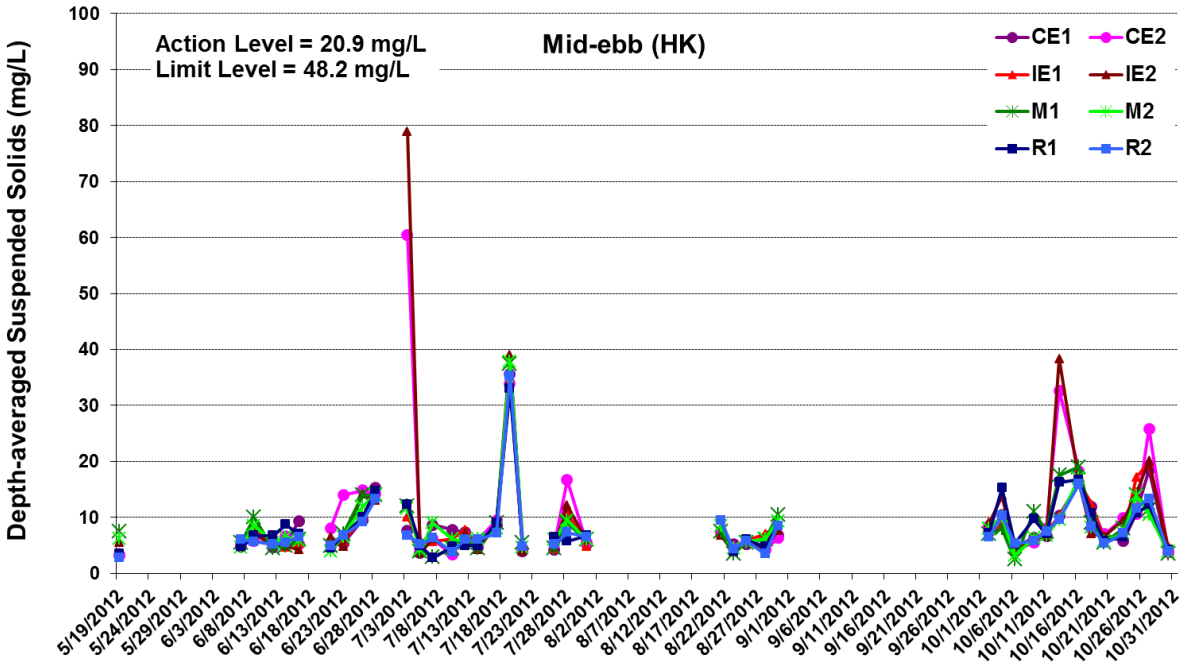


Figure D4 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 19 May and 30 October 2012 at Monitoring Stations for Hong Kong Dredging Works. No monitoring was conducted on 19 and 30 June 2012 due to adverse weather condition. No monitoring was conducted during adverse weather condition, or when dredging works was not undertaken.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls



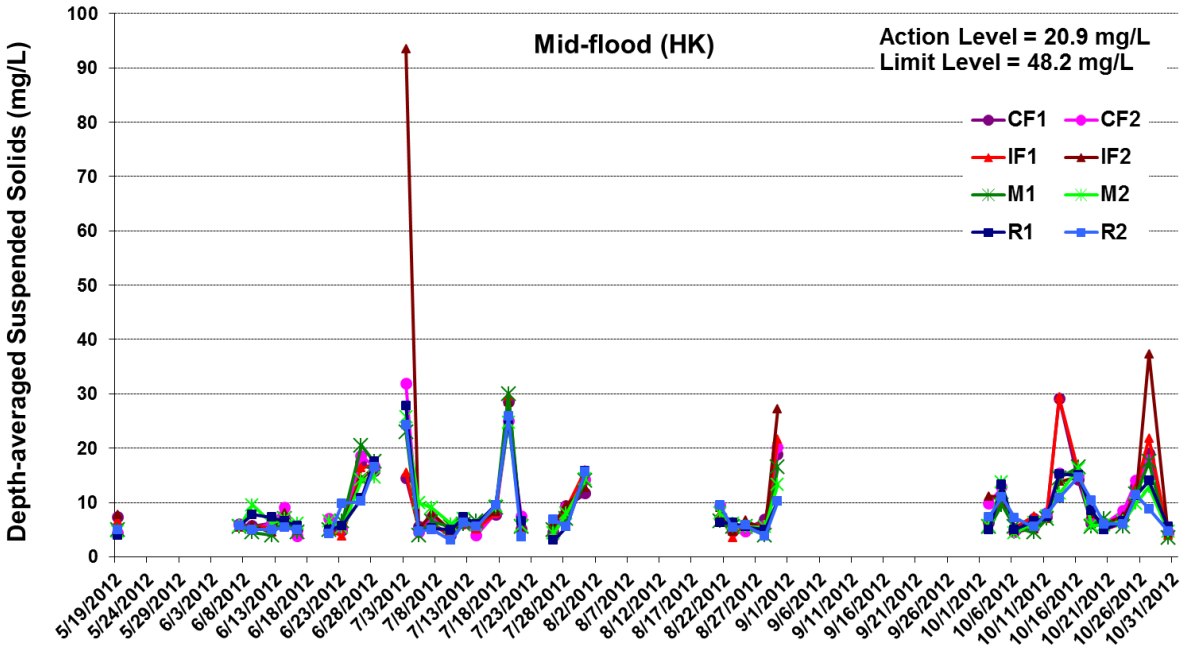
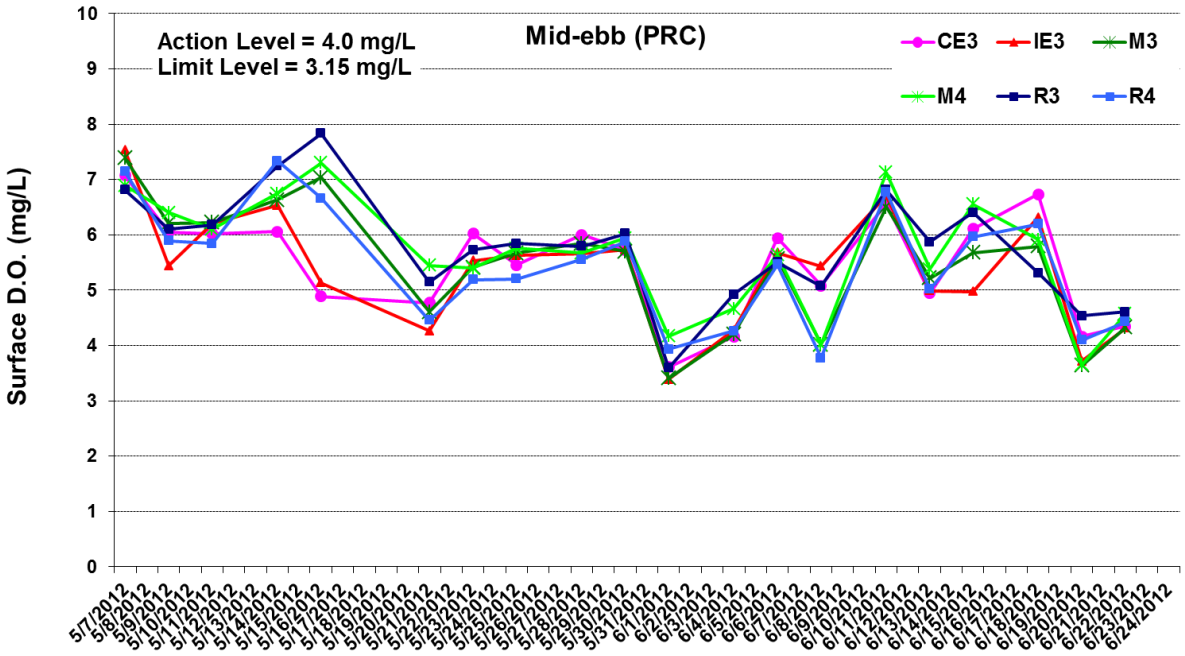


Figure D5 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 19 May and 30 October 2012 at Monitoring Stations for Hong Kong Dredging Works. No monitoring was conducted during adverse weather condition, or when dredging works was not undertaken.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls



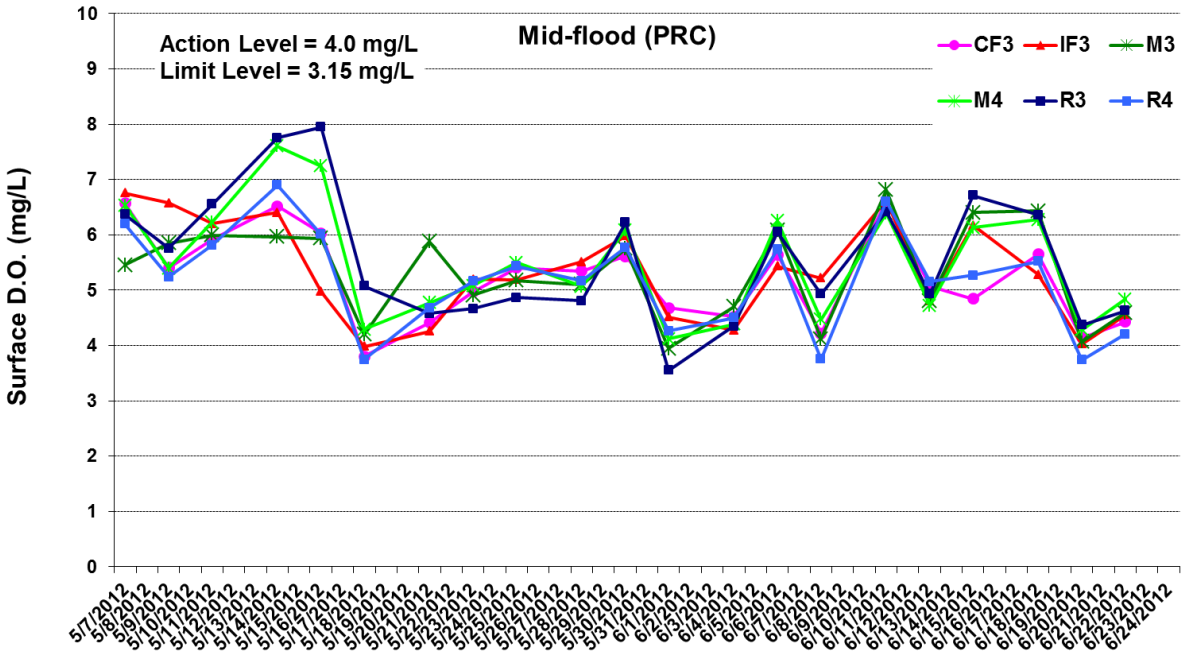
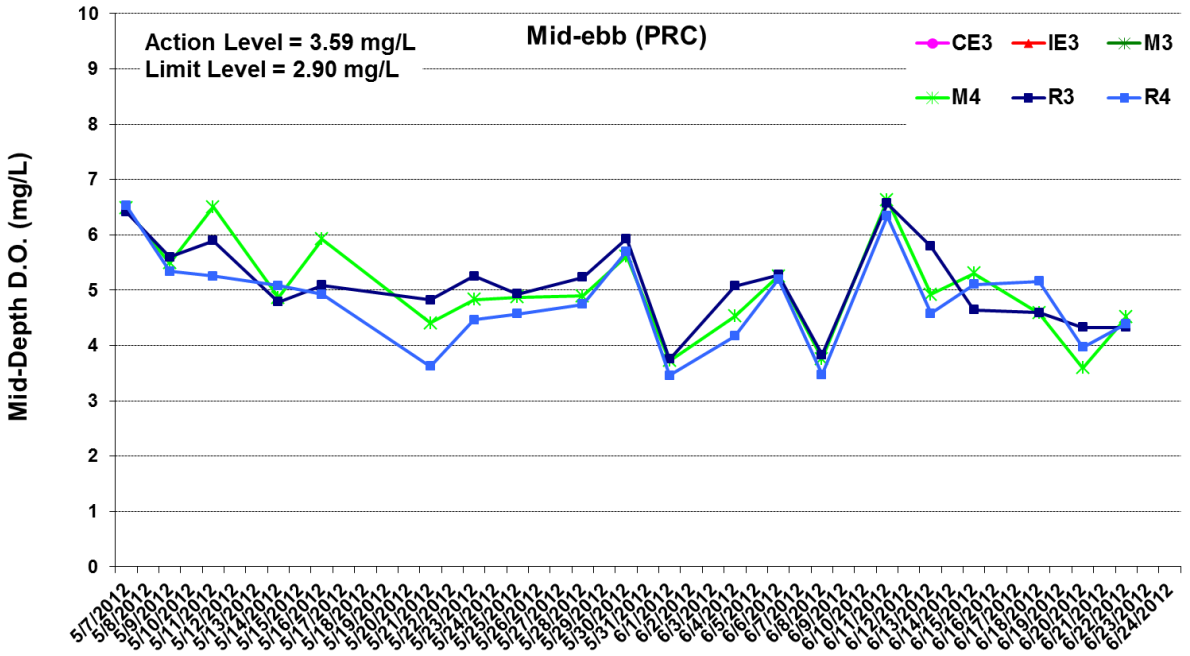
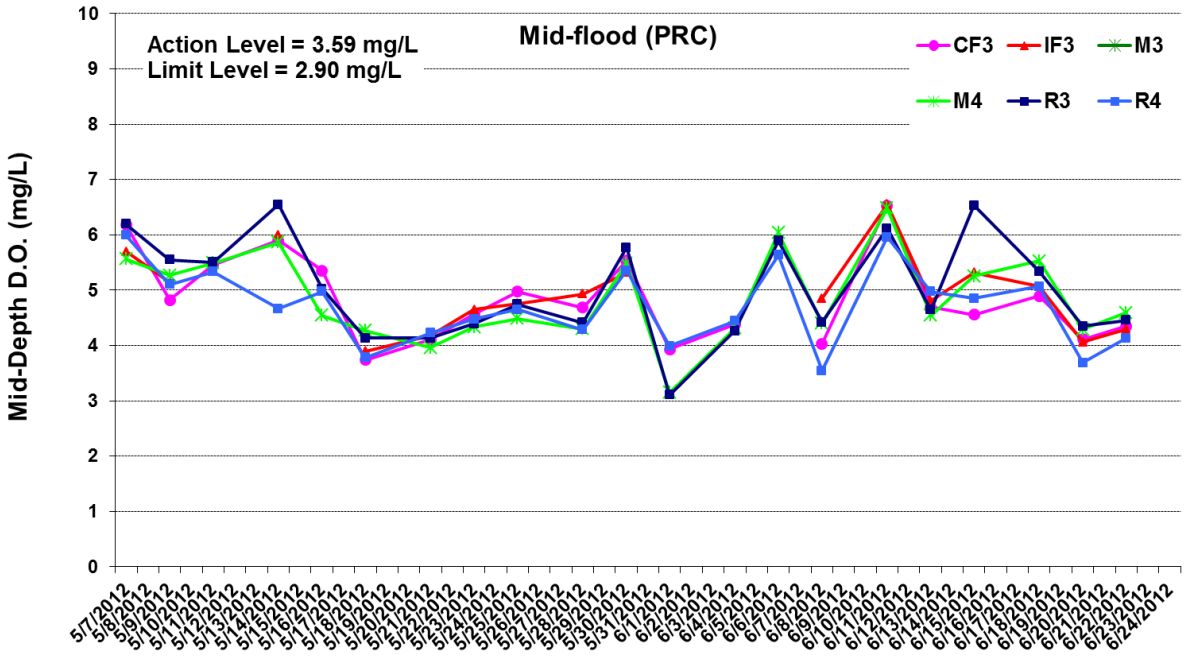


Figure D6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 7 May and 22 June 2012 at Monitoring Stations for PRC Dredging Works within 2.5 km from HKSAR Boundary. Note no dredging works was undertaken on 1 and 18 June 2012, and dredging works was completed on 24 June 2012.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls





* No data for Stations CE3, IE3 and M3 during mid-ebb tide due to shallow water depth (< 6m).

Figure D7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 7 May and 22 June 2012 at Monitoring Stations for PRC Dredging Works within 2.5 km from HKSAR Boundary. Note no dredging works was undertaken on 1 and 18 June 2012, and dredging works was completed on 24 June 2012.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls

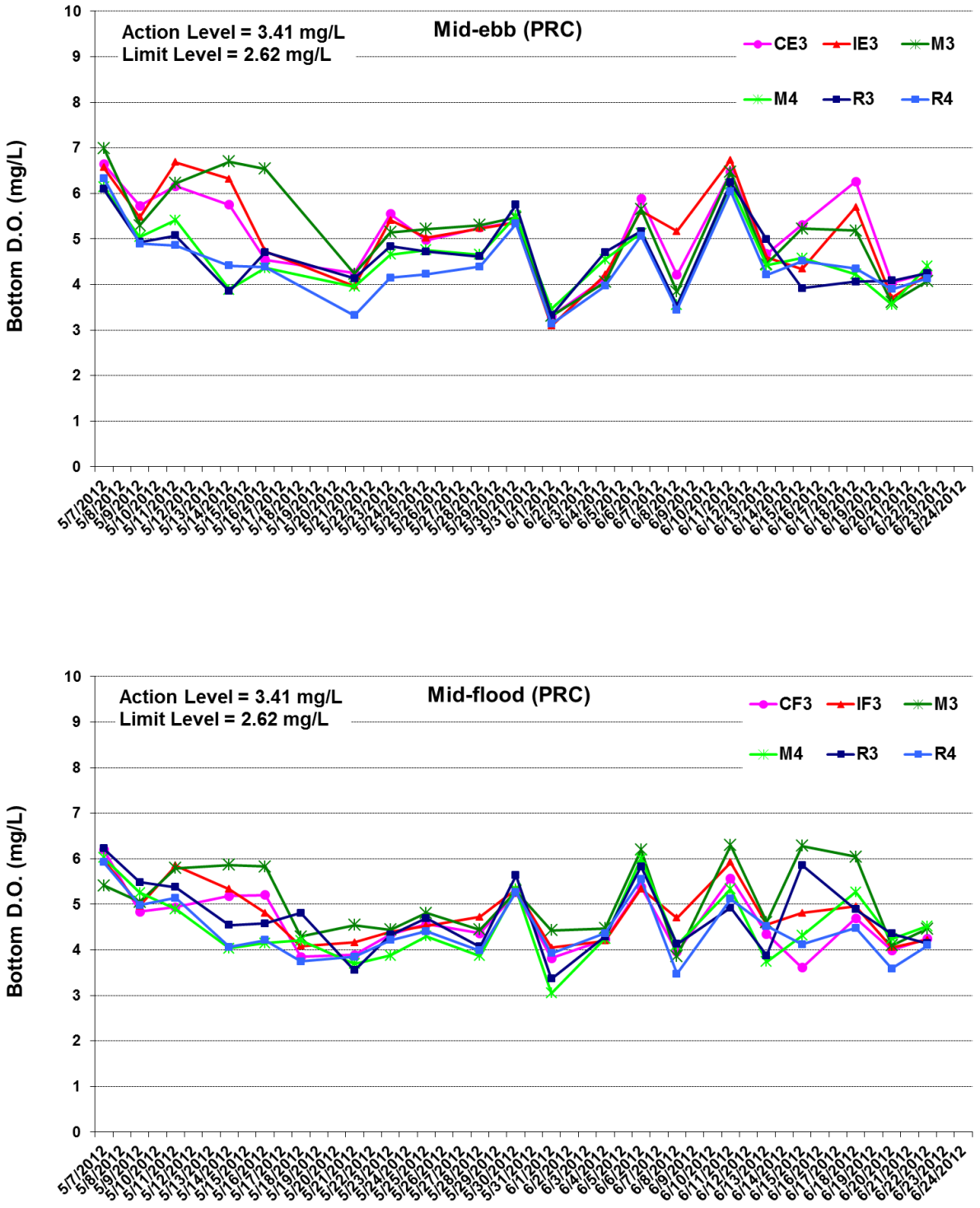
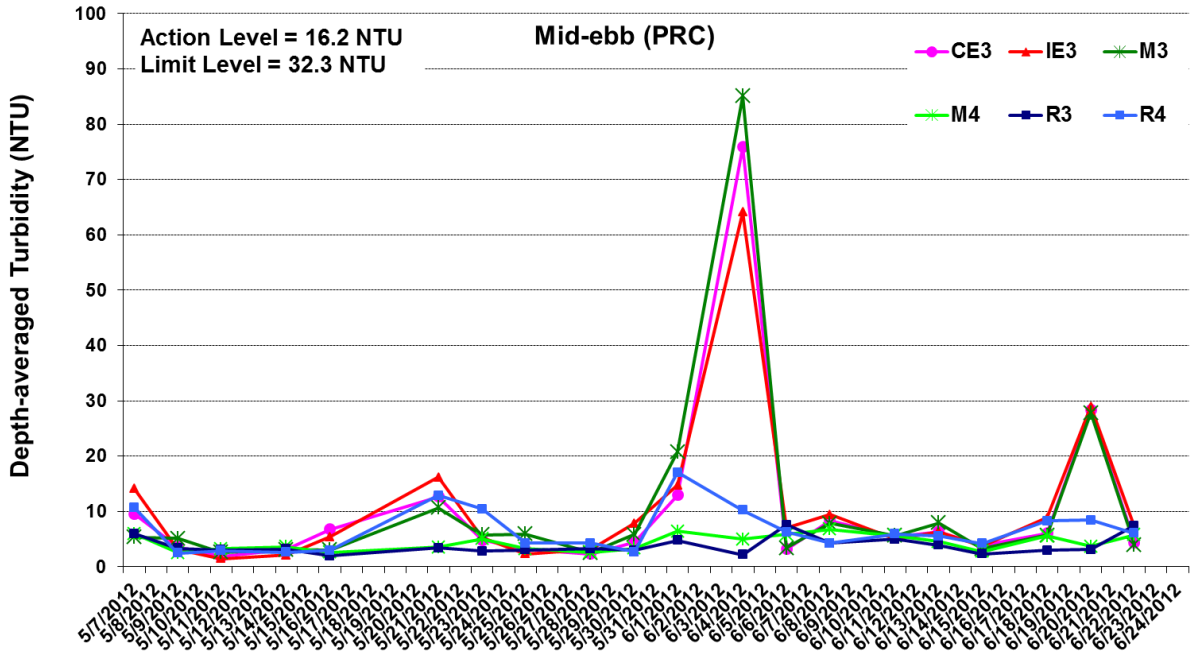


Figure D8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 7 May and 22 June 2012 at Monitoring Stations for PRC Dredging Works within 2.5 km from HKSAR Boundary. Note no dredging works was undertaken on 1 and 18 June 2012, and dredging works was completed on 24 June 2012.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls



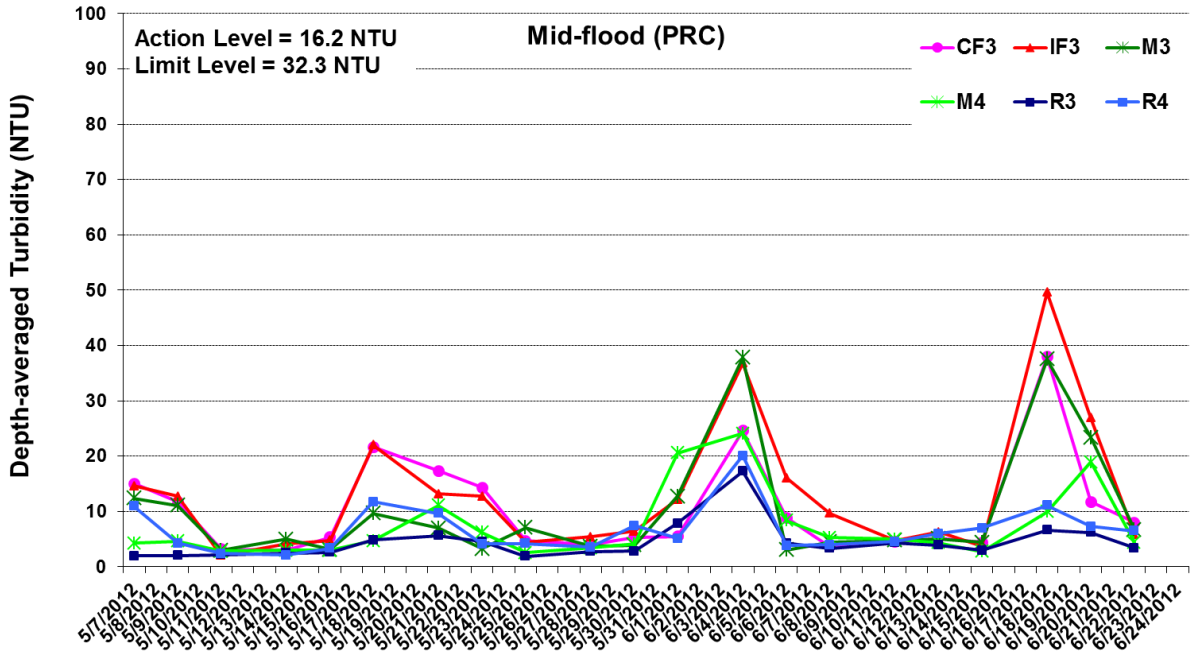
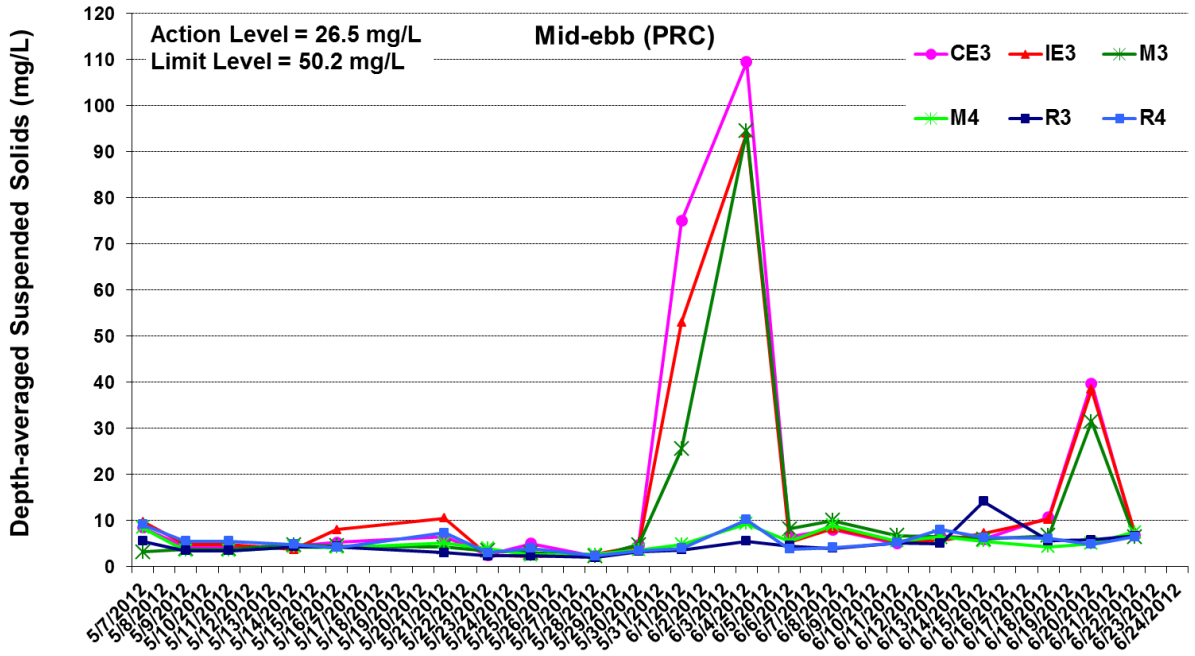


Figure D9 Impact Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 7 May and 22 June 2012 at Monitoring Stations for PRC Dredging Works within 2.5 km from HKSAR Boundary. Note no dredging works was undertaken on 1 and 18 June 2012, and dredging works was completed on 24 June 2012.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls



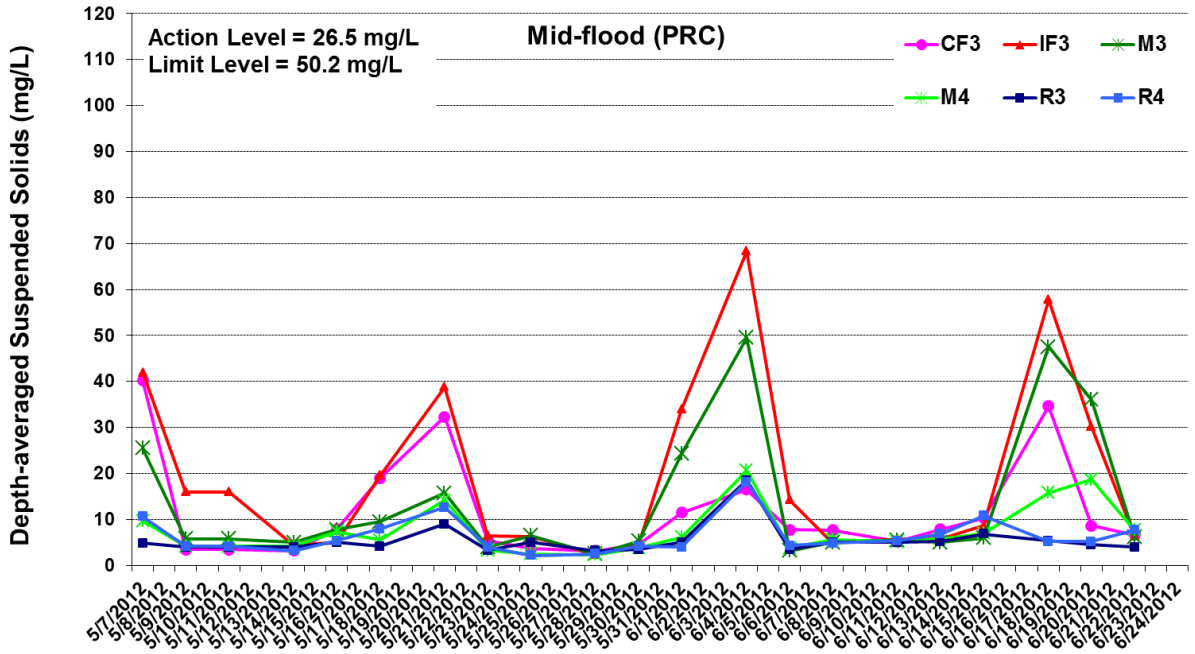
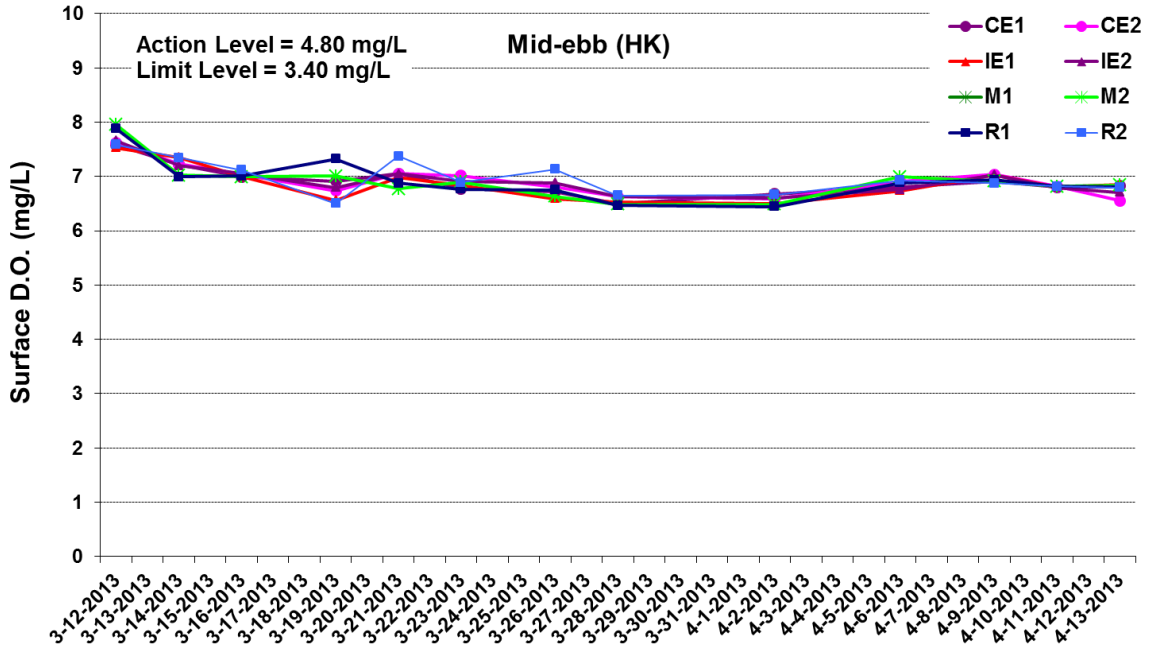


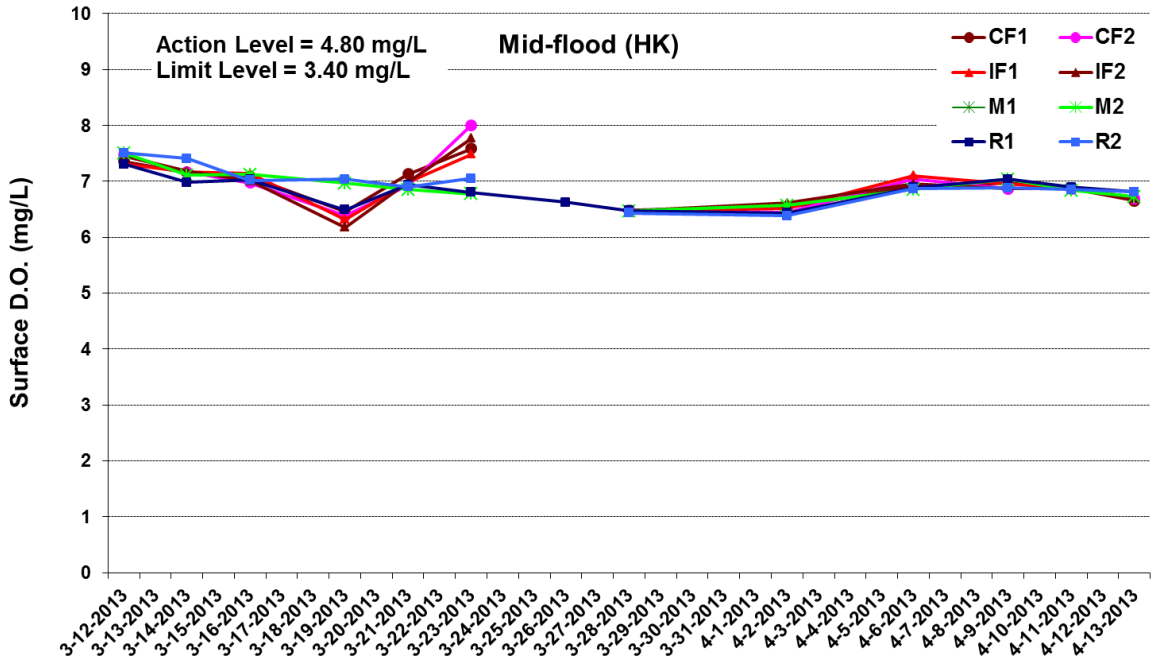
Figure D10 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 7 May and 22 June 2012 at Monitoring Stations for PRC Dredging Works within 2.5 km from HKSAR Boundary. Note no dredging works was undertaken on 1 and 18 June 2012, and dredging works was completed on 24 June 2012.

Ref: 0124291_Impact-WQ_2nd Annual graphs Rev a.xls

Annex D3

Post-Construction Marine Water Quality Monitoring Results – March to April 2013

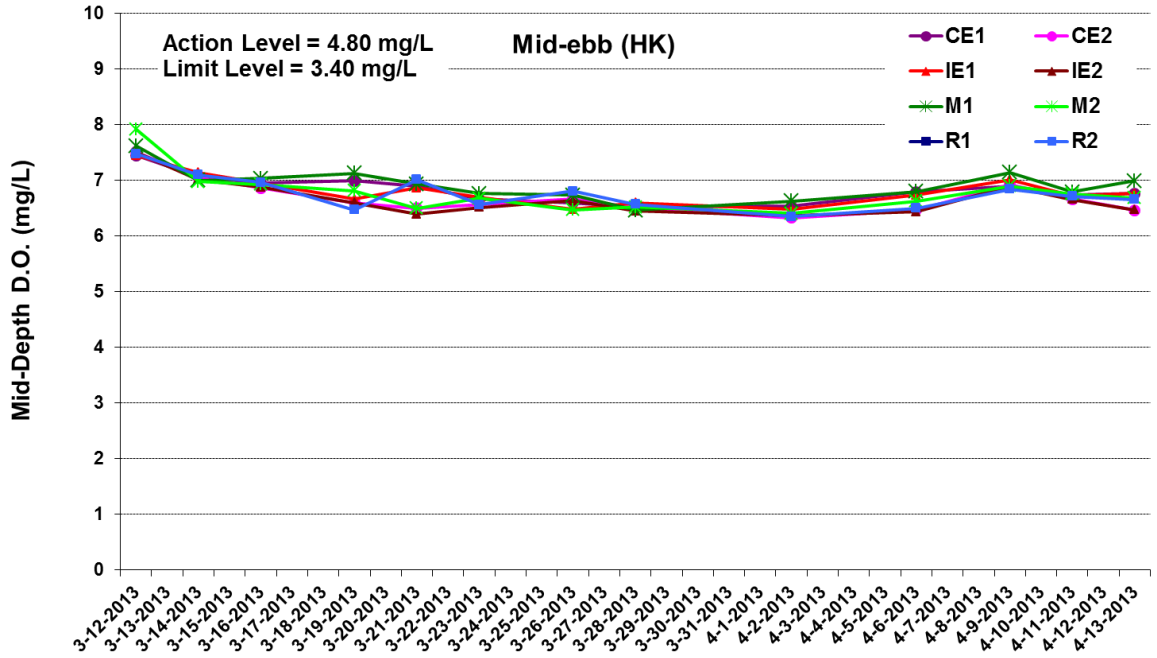


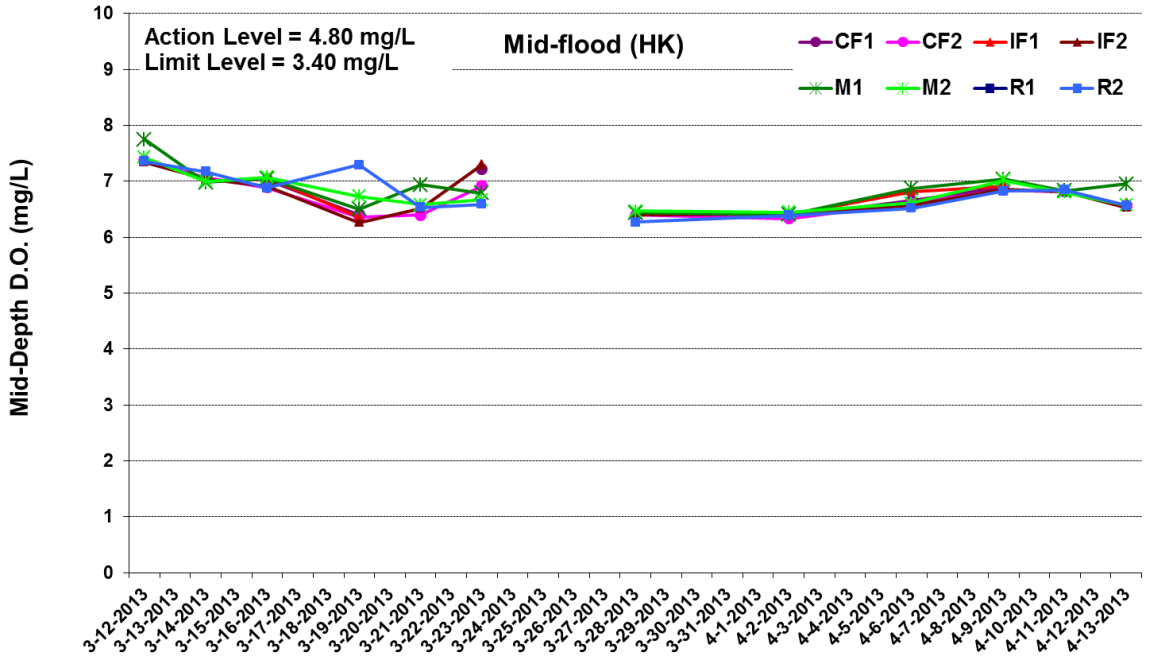


* No data for Station M1 due to shallow water depth (< 3m).

Figure D1 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 12 March and 13 April 2013 at Monitoring Stations for Hong Kong Dredging/Jetting Works. Note no mid-flood tide monitoring was conducted on 26 March 2013 at CF1, CF2, IF1, IF2, M1, M2 & R2 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls

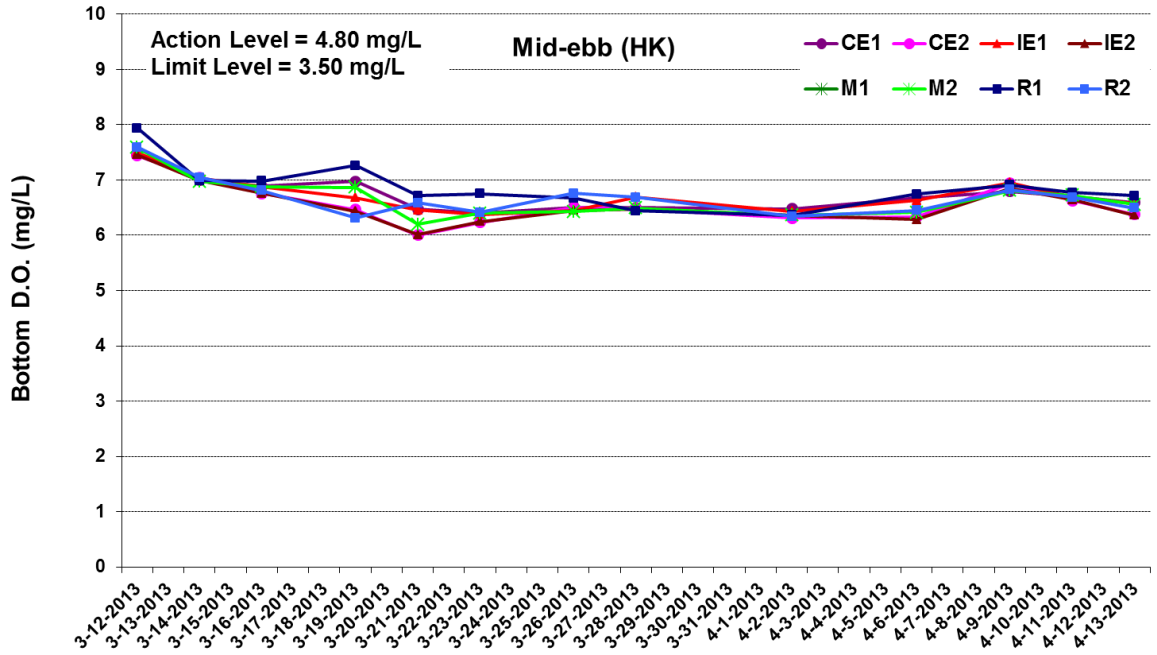


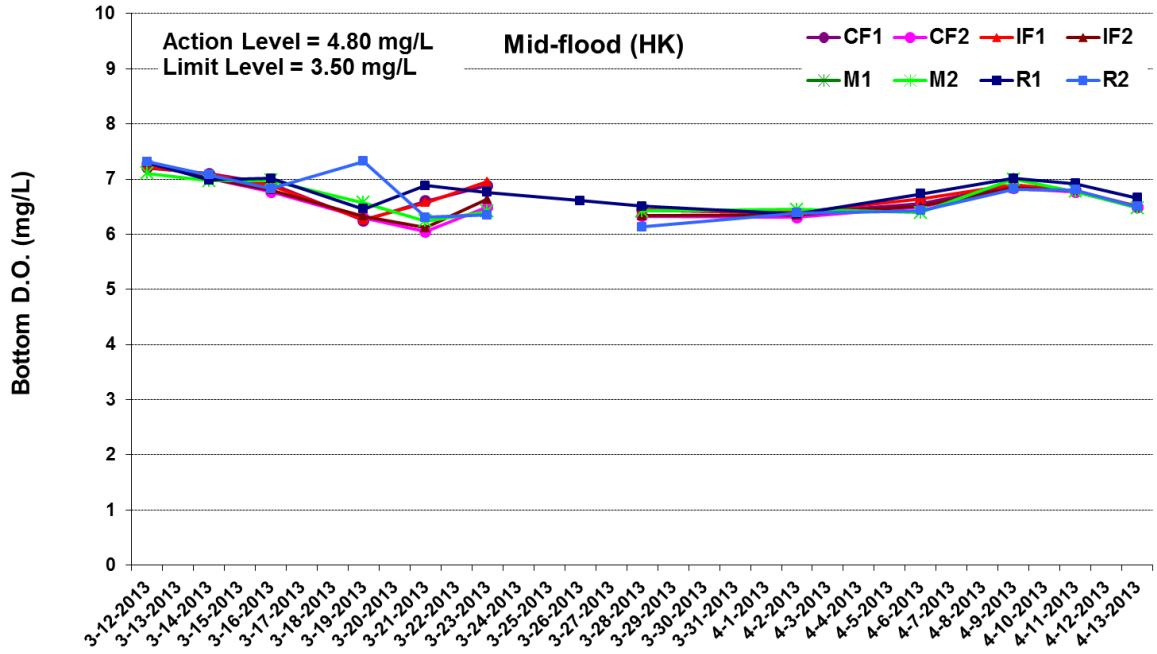


* No data for Station R1 due to shallow water depth (< 6m).

Figure D2 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 12 March and 13 April 2013 at Monitoring Stations for Hong Kong Dredging/Jetting Works. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls

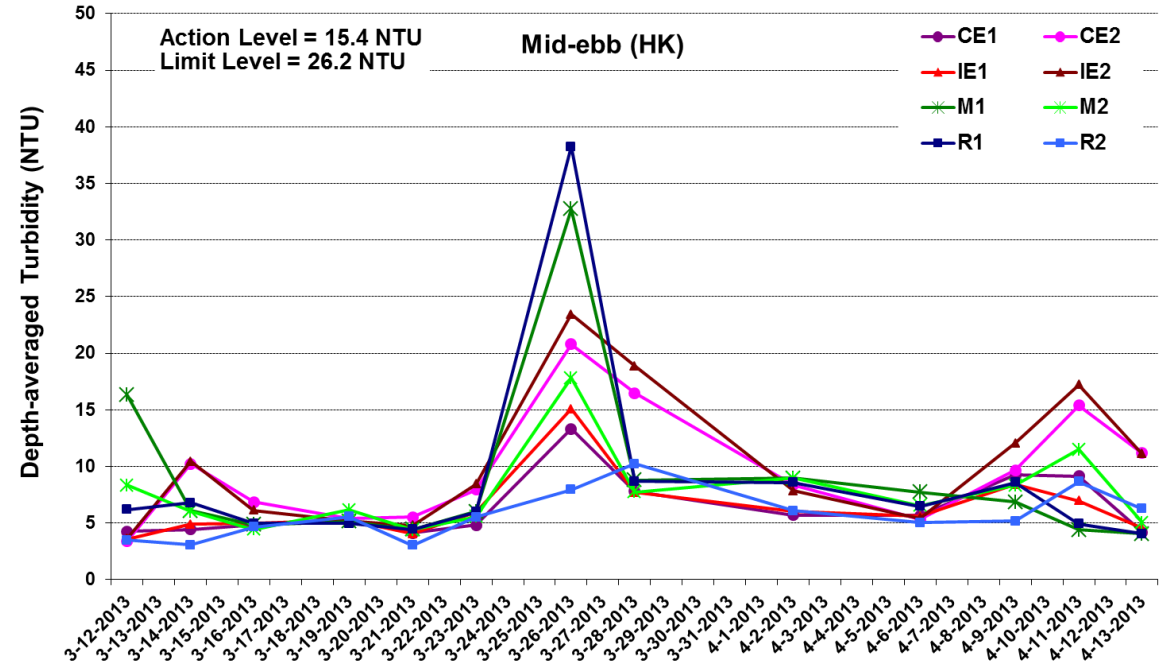




* No data for Station M1 due to shallow water depth (< 3m).

Figure D3 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters between 12 March and 13 April 2013 at Monitoring Stations for Hong Kong Dredging/Jetting Works. Note no mid-flood tide monitoring was conducted on 26 March 2013 at CF1, CF2, IF1, IF2, M1, M2 & R2 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



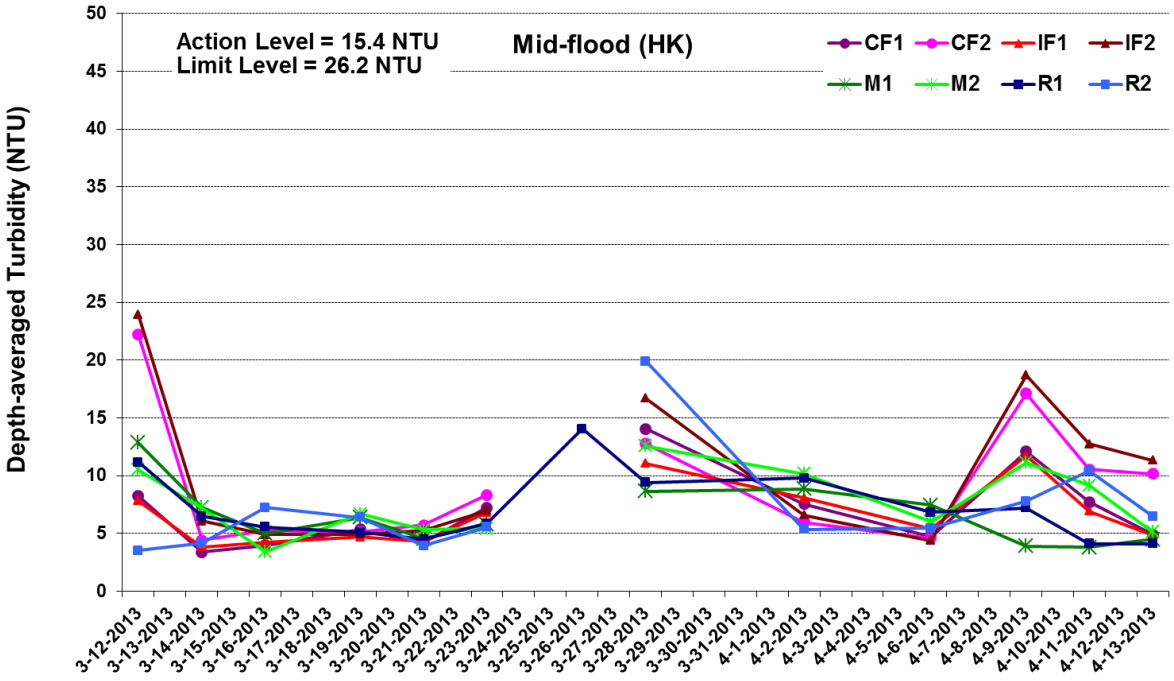
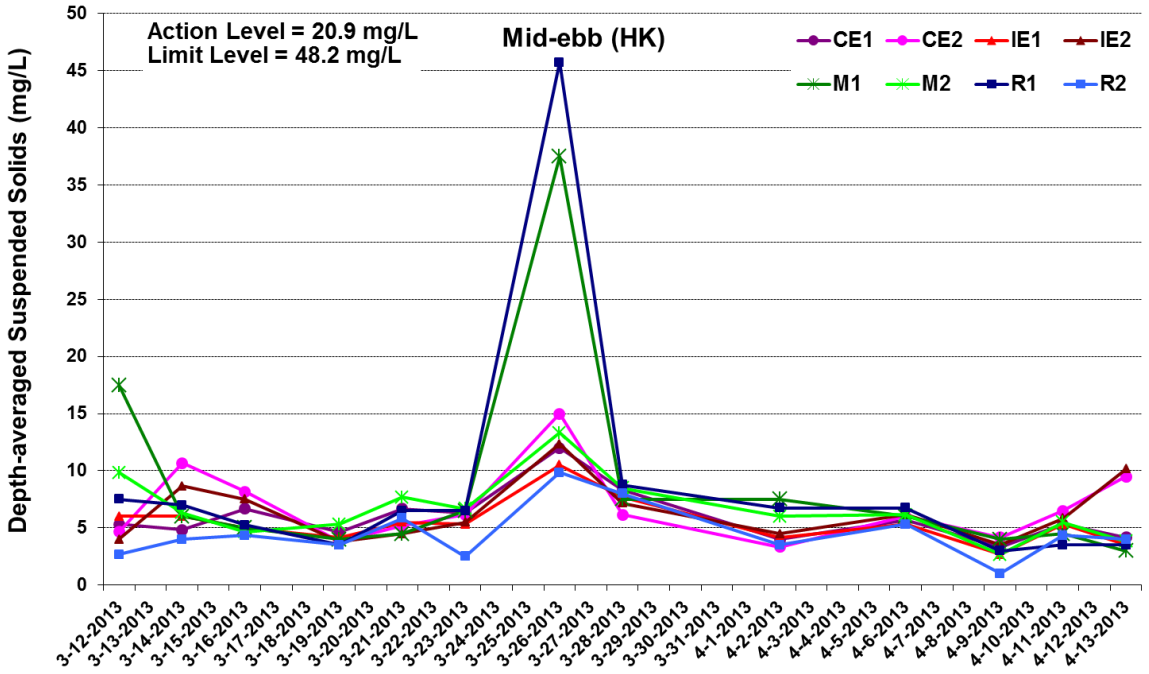


Figure D4 Post-Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 12 March and 13 April 2013 at Monitoring Stations for Hong Kong Dredging/Jetting Works. Note no mid-flood tide monitoring was conducted on 26 March 2013 at CF1, CF2, IF1, IF2, M1, M2 & R2 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



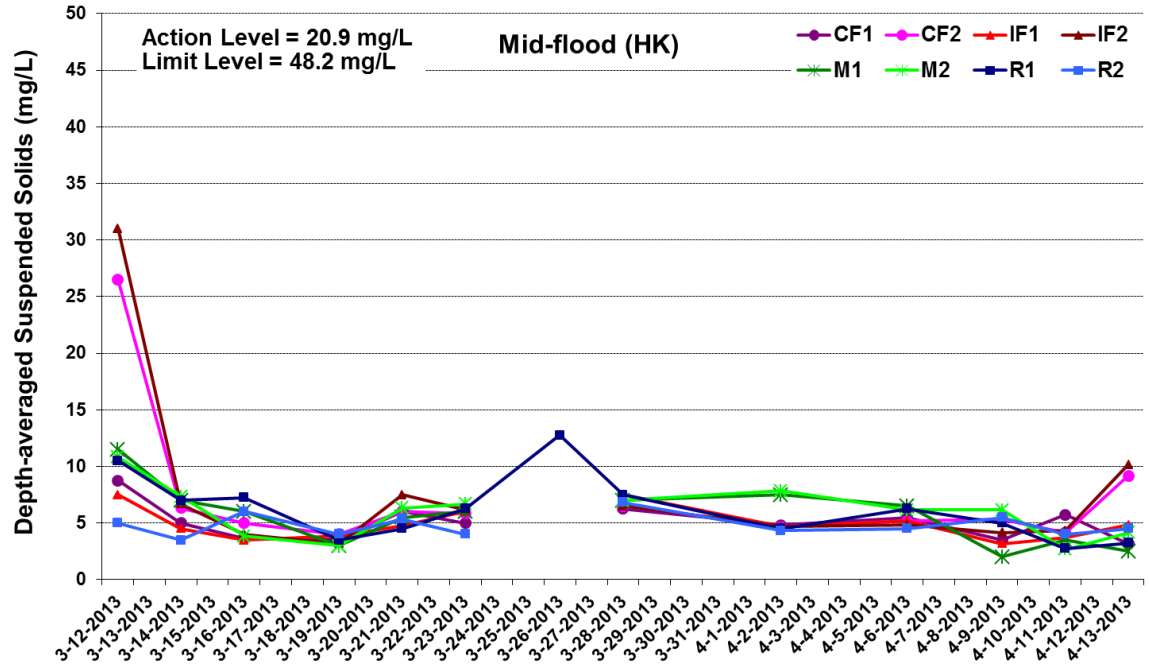
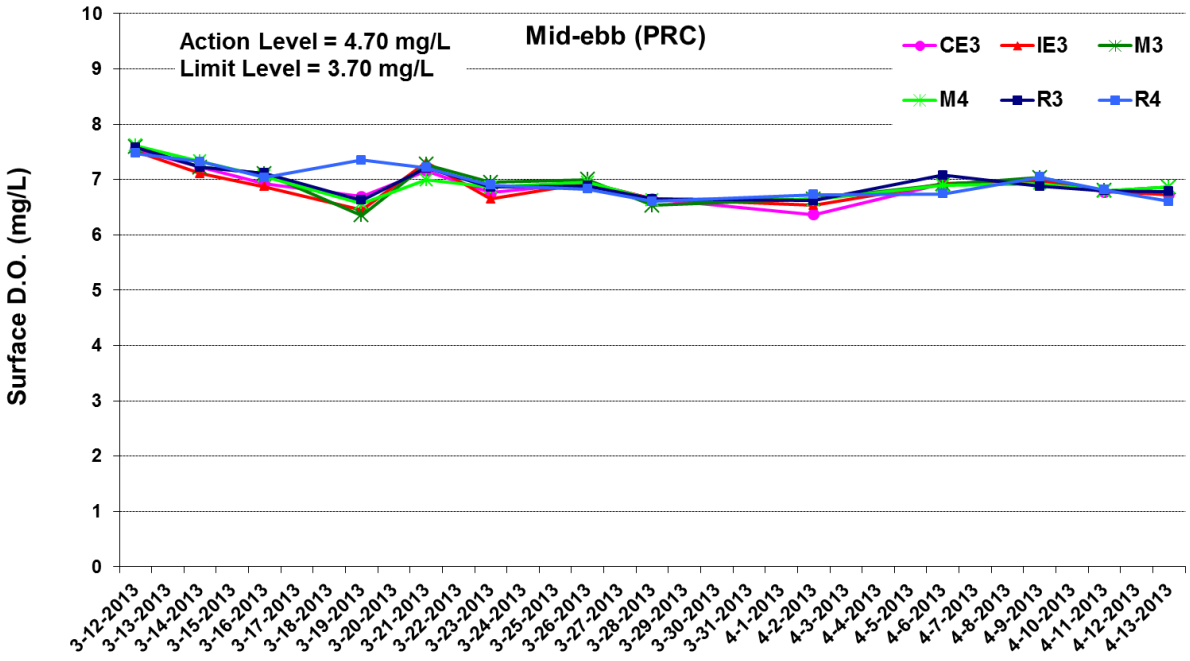


Figure D5 Post-Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 12 March and 13 April 2013 at Monitoring Stations for Hong Kong Dredging/Jetting Works. Note no mid-flood tide monitoring was conducted on 26 March 2013 at CF1, CF2, IF1, IF2, M1, M2 & R2 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



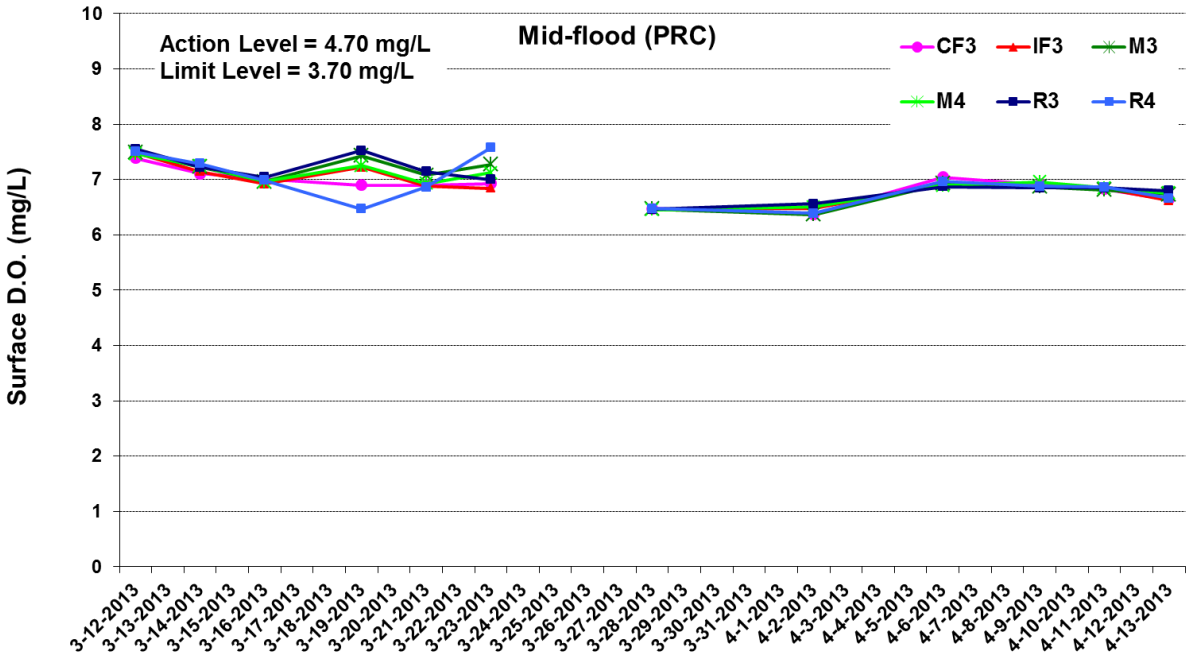
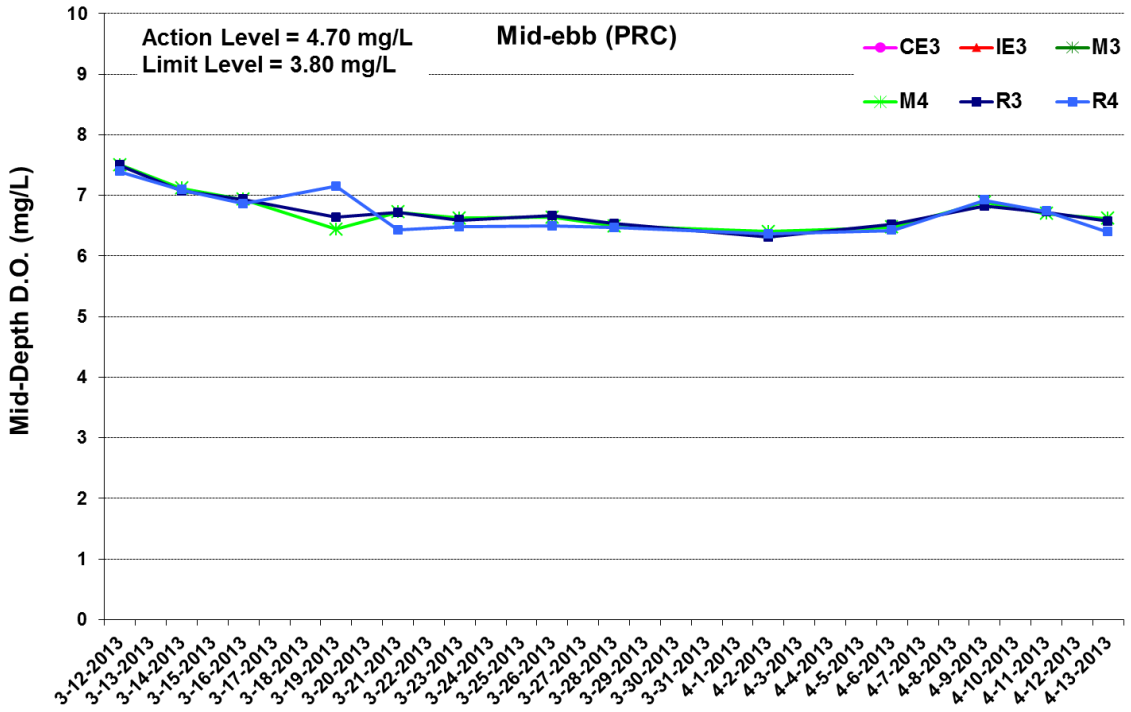
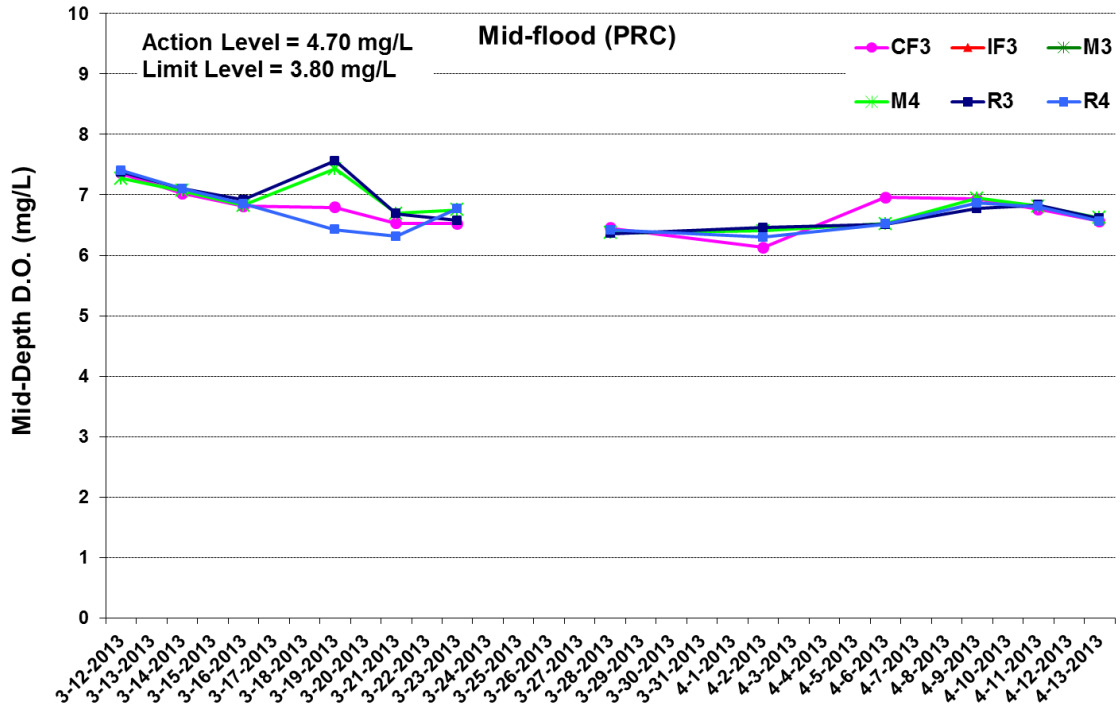


Figure D6 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 12 March and 13 April 2013 at Monitoring Stations for PRC Dredging/Jetting Works within 2.5 km from HKSAR Boundary. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls

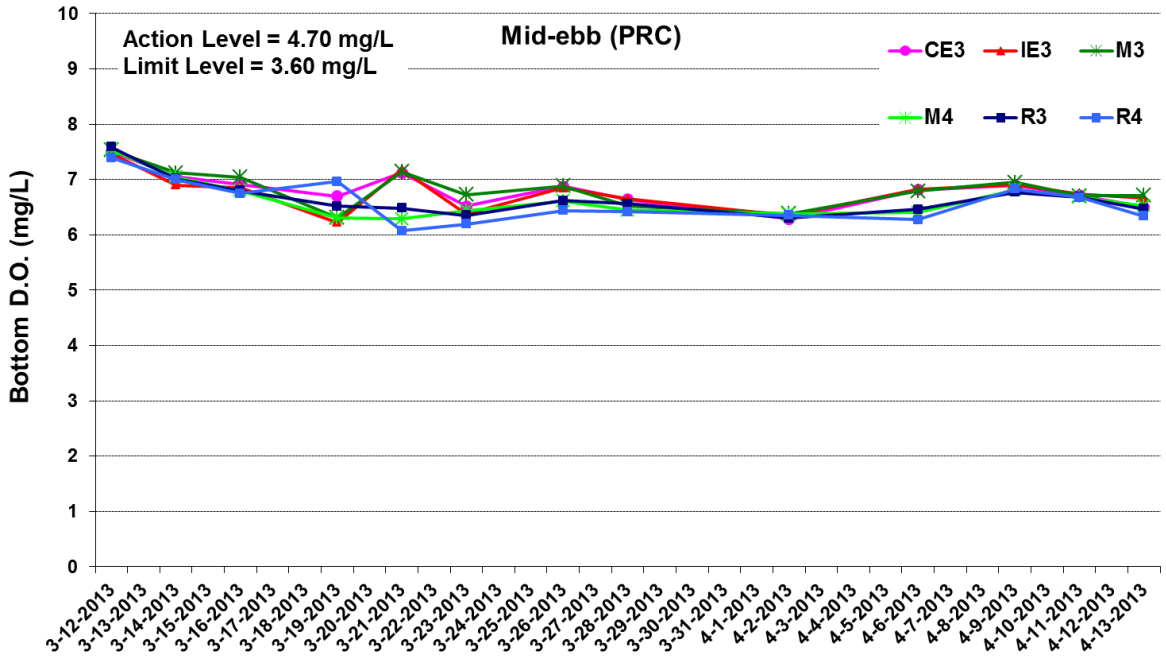




* No data for Stations CE3, IE3 and M3 during mid-ebb tide due to shallow water depth (< 6m).

Figure D7 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 12 March and 13 April 2013 at Monitoring Stations for PRC Dredging/Jetting Works within 2.5 km from HKSAR Boundary. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



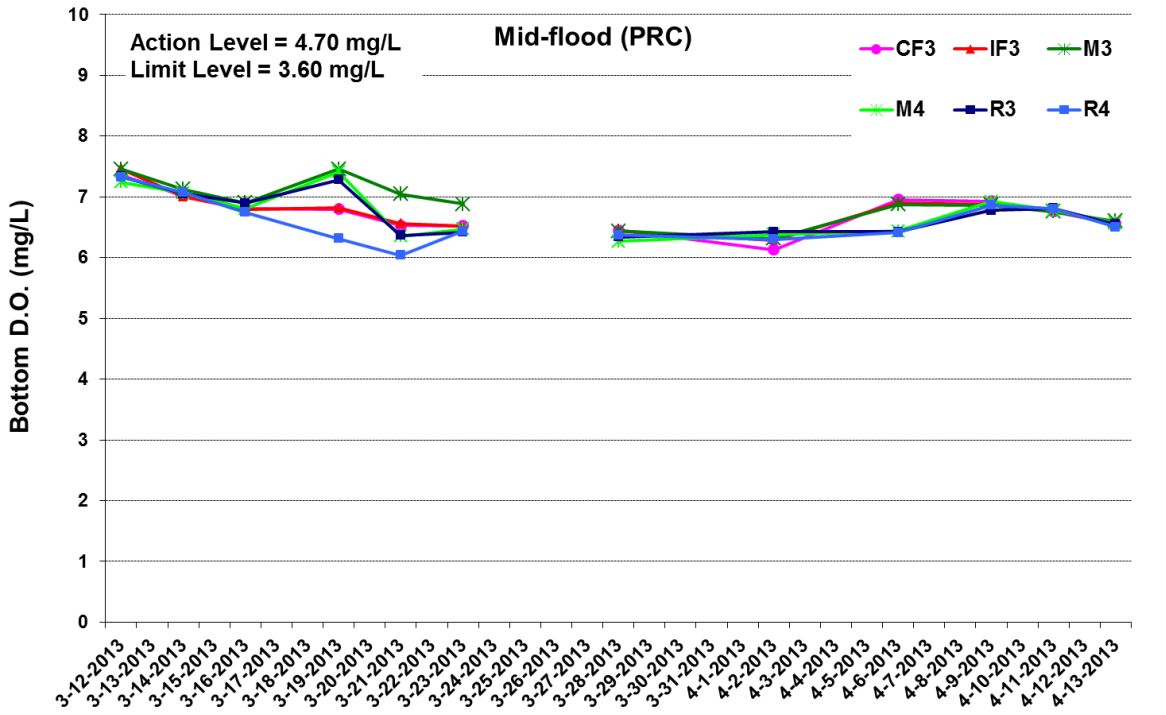
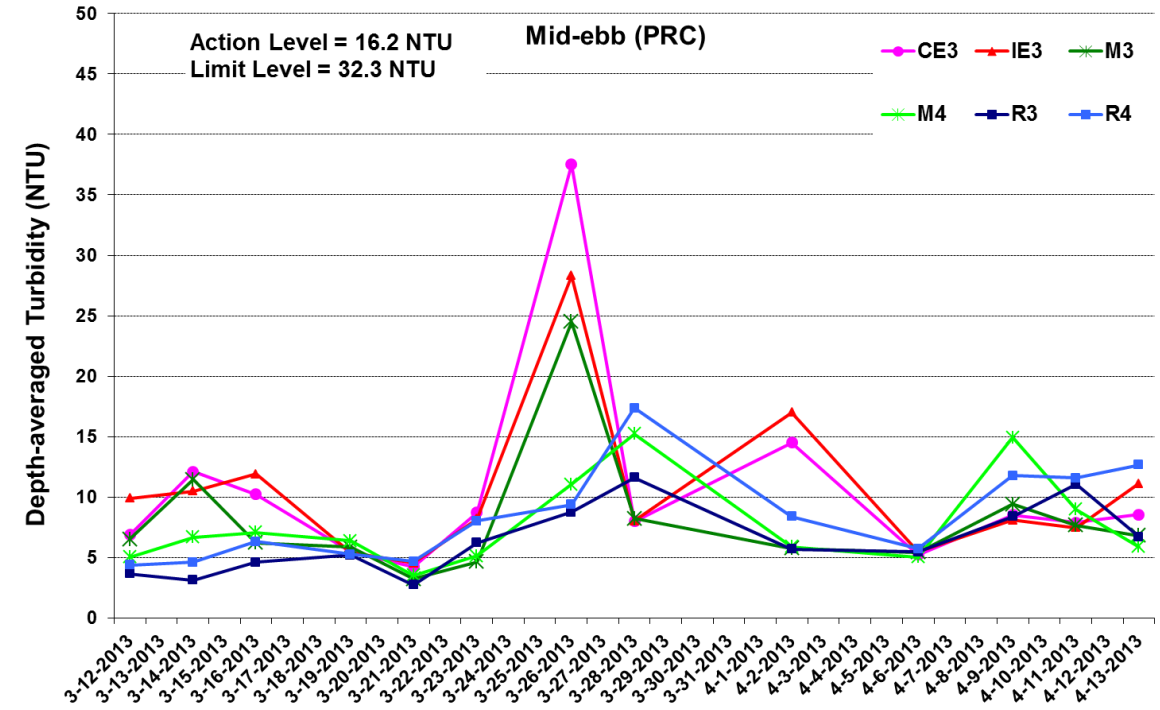


Figure D8 Post-Construction Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 12 March and 13 April 2013 at Monitoring Stations for PRC Dredging/Jetting Works within 2.5 km from HKSAR Boundary. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



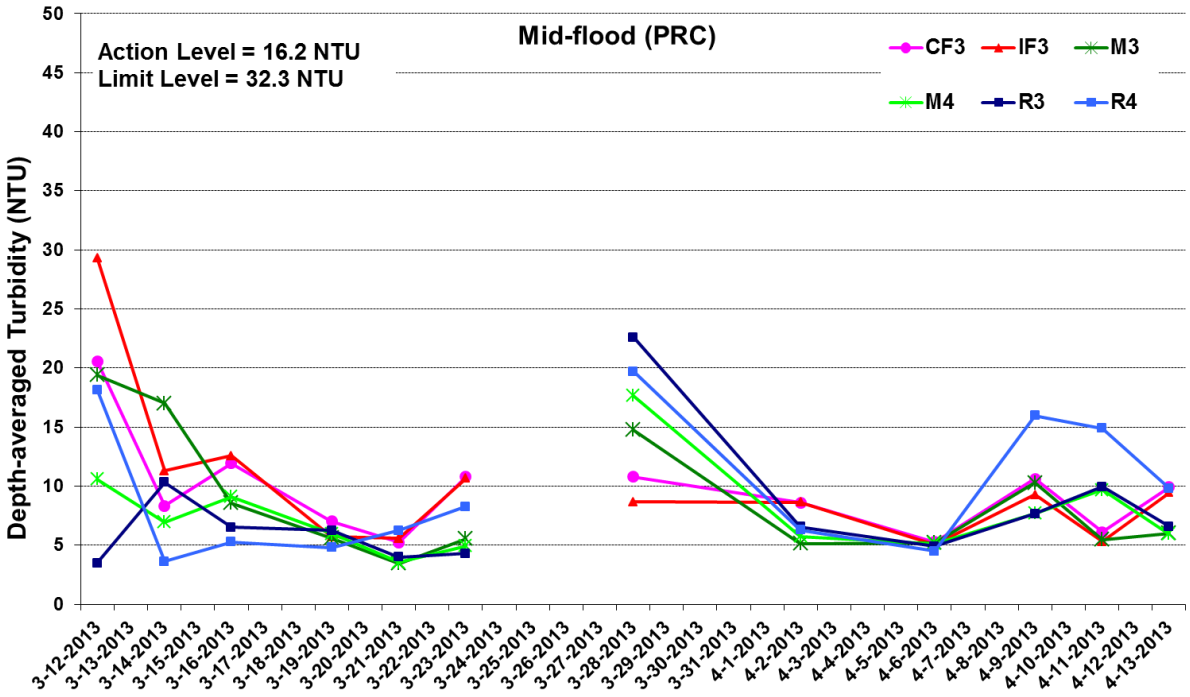
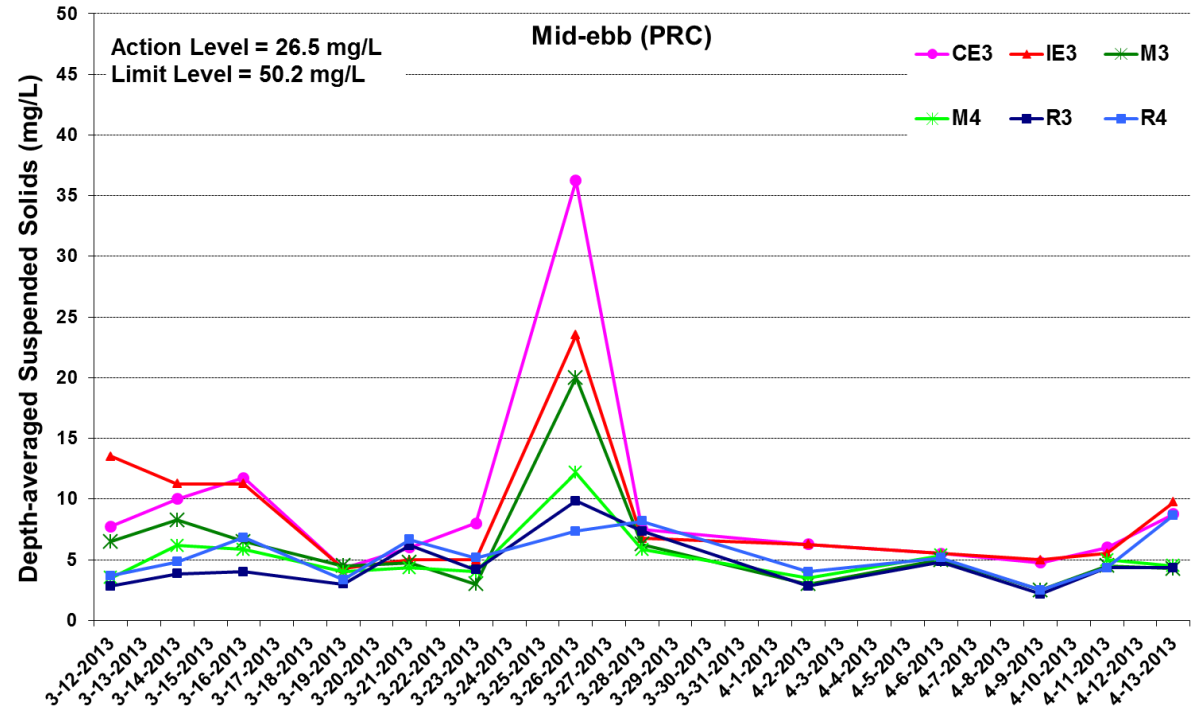


Figure D9 Post-Construction Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 12 March and 13 April 2013 at Monitoring Stations for PRC Dredging/Jetting Works within 2.5 km from HKSAR Boundary. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls



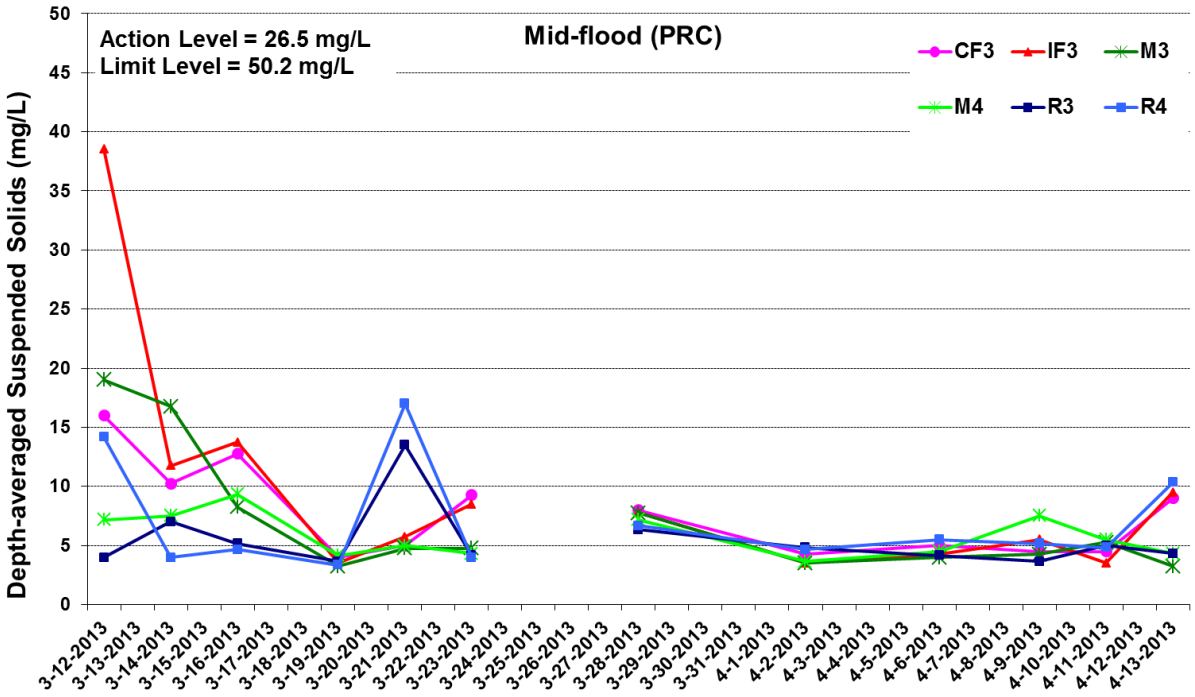


Figure D10 Post-Construction Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 12 March and 13 April 2013 at Monitoring Stations for PRC Dredging/Jetting Works within 2.5 km from HKSAR Boundary. Note no mid-flood tide monitoring was conducted on 26 March 2013 due to adverse weather condition.

Ref: 0124291_Post-WQ_graphs Rev a.xls

Annex E

Marine Mammal Sighting Record

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**11 August 2011**	Time	**10:42**	Sighting No.	**1**
Sighting Distance (metres)	--			Sighting Angle (O)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	**22.4136 N, 113.8886 E**				
Sighting Position (dolphin)	**22.4136 N, 113.8886 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By Samuel Hung

Group Size Best **Two animals & one dead calf** High Low

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
		2

FP‡ Group Composition Claves Adults

Beaufort □ 0 □ 1 ● 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other

Photos □ Yes ● No

Survey Area Deep Bay

Survey Type EM&A – Pre-construction transect survey

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting
□ Breaching □ Spy-hopping □ Porpoishing

Other Behaviour **N/A**

Identified Individual(s) **CH34 (with her dead calf), and NL226**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**23 May 2012**	Time	**12:59**	Sighting No.	**1**
Sighting Distance (metres)	--	Sighting Angle (O)	--		
Sighting Angle – Dolphins	--	Sighting Angle – Bow of Boat	--		
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.4378 N, 113.8938 E**	(Trip:	--	km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species ● Humpback Dolphin □ Finless Porpoise □ Other

Effort ● On □ Off

Seen By Samuel Hung

Group Size Best **Two animals** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
		2

FP‡ Group Composition Claves _____ Adults _____

Beaufort □ 0 □ 1 □ 2 □ 3 ● 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other _____

Photos □ Yes ● No

Survey Area Deep Bay

Survey Type EM&A – Construction transect survey

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting

□ Breaching □ Spy-hopping □ Porpoishing

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin

† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult

‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**20 June 2012**	Time	**11:31**	Sighting No.	**3**
Sighting Distance (metres)	--			Sighting Angle (O)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.4220 N, 113.8829 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species ● Humpback Dolphin □ Finless Porpoise □ Other

Effort ● On □ Off

Seen By Samuel Hung

Group Size Best **Two animals** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
	2	

FP‡ Group Composition Claves _____ Adults _____

Beaufort □ 0 □ 1 ● 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other _____

Photos □ Yes ● No

Survey Area Deep Bay

Survey Type EM&A – Construction transect survey

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting

□ Breaching □ Spy-hopping □ Porpoishing

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin

† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult

‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**20 June 2012**	Time	**13:02**	Sighting No.	**4**
Sighting Distance (metres)	--			Sighting Angle (O)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.4369 N, 113.8934 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By Samuel Hung

Group Size Best **One animals** High _____ Low _____

CWD* Group Composition†

UC		UJ		SJ	
SS		SA	1	UA	

FP‡ Group Composition Claves _____ Adults _____

Beaufort □ 0 □ 1 ● 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other _____

Photos □ Yes ● No

Survey Area Deep Bay

Survey Type EM&A – Construction transect survey

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting
□ Breaching □ Spy-hopping □ Porpoishing

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**20 June 2012**	Time	**13:11**	Sighting No.	**5**
Sighting Distance (metres)	--			Sighting Angle (O)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.4265 N, 113.8859 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species • Humpback Dolphin □ Finless Porpoise □ Other

Effort • On □ Off

Seen By Samuel Hung

Group Size Best **Two animals** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
		2

FP‡ Group Composition Claves _____ Adults _____

Beaufort □ 0 □ 1 • 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. • None □ Pair □ Shrimp □ Hang □ Other _____

Photos □ Yes • No

Survey Area Deep Bay

Survey Type EM&A – Construction transect survey

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing • Travelling □ Milling/Resulting
□ Breaching □ Spy-hopping □ Porpoishing

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**4 July 2012**	Time	**11:26**	Sighting No.	**1**
Sighting Distance (metres)	--			Sighting Angle (O)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.4137 N, 113.8900 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species ● Humpback Dolphin □ Finless Porpoise □ Other

Effort ● On □ Off

Seen By **Samuel Hung**

Group Size Best **One animal** High _____ Low _____

CWD* Group Composition†

UC		UJ		SJ	
SS		SA	**1**	UA	

FP‡ Group Composition Claves _____ Adults _____

Beaufort □ 0 □ 1 ● 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other _____

Photos □ Yes ● No

Survey Area **Deep Bay**

Survey Type **EM&A – Construction transect survey**

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting
□ Breaching □ Spy-hopping □ Porpoising

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**3 July 2012**	Time	**1215-1245**	Sighting No.	**1**
Sighting Distance (metres)	**80**			Sighting Angle (O)	**100°**
Sighting Angle – Dolphins	**< 60°**			Sighting Angle – Bow of Boat	**150°**
Sighting Position (Initial)	**2nd Floor of the dredging vessel**				
Sighting Position (dolphin)	**Heading northwest**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By **George Ho**

Group Size Best **One animal** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
	1	

FP‡ Group Composition Claves _____ Adults _____

Beaufort ● 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. □ None □ Pair □ Shrimp □ Hang ● Other **Dredging vessel**

Photos □ Yes ● No

Survey Area **Within 250 m of the marine mammal exclusion zone**

Survey Type **EM&A – Marine Mammal Exclusion Zone Monitoring during the period of dredging activities in Hong Kong waters**

BEHAVIOUR / COMMENTS

- □ Feeding
- □ Socializing
- ● Travelling
- □ Milling/Resulting
- □ Breaching
- □ Spy-hopping
- □ Porpoising

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**4 July 2012**	Time	**0830-0900**	Sighting No.	**1**
Sighting Distance (metres)	**200**			Sighting Angle (O)	**90°**
Sighting Angle – Dolphins	**< 60°**			Sighting Angle – Bow of Boat	**180°**
Sighting Position (Initial)	**2nd Floor of the dredging vessel**				
Sighting Position (dolphin)	**Heading southeast**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By **George Ho**

Group Size Best **One animal** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
	1	

FP‡ Group Composition Claves _____ Adults _____

Beaufort ● 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. □ None □ Pair □ Shrimp □ Hang ● Other Dredger

Photos □ Yes ● No

Survey Area **Within the 250 m marine mammal exclusion zone**

Survey Type **EM&A – Marine Mammal Exclusion Zone Monitoring during the period of dredging activities in Hong Kong waters**

BEHAVIOUR / COMMENTS

□ Feeding	□ Socializing	● Travelling	□ Milling/Resulting
□ Breaching	□ Spy-hopping	□ Porpoising	

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**6 July 2012**	Time	**1215-1245**	Sighting No.	**1**
Sighting Distance (metres)	**150**		Sighting Angle (O)		**90°**
Sighting Angle – Dolphins	**< 60°**		Sighting Angle – Bow of Boat		**180°**
Sighting Position (Initial)	**2nd Floor of the dredging vessel**				
Sighting Position (dolphin)	**Heading northwest**		(Trip:	--	km)

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By George Ho

Group Size Best **One animal** High _____ Low _____

CWD* Group Composition†

UC	UJ	SJ
SS	SA	UA
	1	

FP‡ Group Composition Claves _____ Adults _____

Beaufort ● 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. □ None □ Pair □ Shrimp □ Hang ● Other **Dredging vessel**

Photos □ Yes ● No

Survey Area **Within 250 m of the marine mammal exclusion zone**

Survey Type **EM&A – Marine Mammal Exclusion Zone Monitoring during the period of dredging activities in Hong Kong waters**

BEHAVIOUR / COMMENTS

- □ Feeding
- □ Socializing
- ● Travelling
- □ Milling/Resulting
- □ Breaching
- □ Spy-hopping
- □ Porpoising

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**19 July 2012**	Time	**1215-1300**	Sighting No.	**1**
Sighting Distance (metres)	200		Sighting Angle (O)		0°
Sighting Angle – Dolphins	< 60°		Sighting Angle – Bow of Boat		0°
Sighting Position (Initial)	2nd Floor of the dredging vessel				
Sighting Position (dolphin)	**Heading Southwest**		(Trip:	--	km)

LOW PRIORITY DATA (Record During or After Sighting)

Species
- ● Humpback Dolphin
- □ Finless Porpoise
- □ Other

Effort
- ● On
- □ Off

Seen By **Jamius Yeung**

Group Size Best **2 animals** High _____ Low _____

CWD* Group Composition†

UC		UJ		SJ	
SS		SA	**2**	UA	

FP‡ Group Composition Claves _____ Adults _____

Beaufort ● 0 □ 1 □ 2 □ 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. □ None □ Pair □ Shrimp □ Hang ● Other **Dredging vessel**

Photos □ Yes ● No

Survey Area **Within 250 m of the marine mammal exclusion zone**

Survey Type **EM&A – Marine Mammal Exclusion Zone Monitoring during the period of dredging activities in Hong Kong waters**

BEHAVIOUR / COMMENTS

● Feeding	□ Socializing	● Travelling	□ Milling/Resulting
□ Breaching	□ Spy-hopping	□ Porpoising	

Other Behaviour **N/A**

Identified Individual(s) **N/A**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

DOLPHIN / PORPOISE SIGHTING SHEET

HIGH PRIORITY DATA (Record at Initial Sighting)

Date	**21 March 2013**	Time	**11:40**	Sighting No.	**1**
Sighting Distance (metres)	--			Sighting Angle (°)	--
Sighting Angle – Dolphins	--			Sighting Angle – Bow of Boat	--
Sighting Position (Initial)	--				
Sighting Position (dolphin)	**22.424 N, 113.883 E**			(Trip: -- km)	

LOW PRIORITY DATA (Record During or After Sighting)

Species ● Humpback Dolphin □ Finless Porpoise □ Other

Effort ● On □ Off

Seen By **Samuel Hung**

Group Size Best **Two animals** High ____ Low ____

CWD* Group Composition†

UC		UJ		SJ	
SS		SA	**2**	UA	

FP‡ Group Composition Claves ____ Adults ____

Beaufort □ 0 □ 1 □ 2 ● 3 □ 4 □ 5 □ 6 □ 7+

Boat Assoc. ● None □ Pair □ Shrimp □ Hang □ Other ____

Photos □ Yes ● No

Survey Area **Deep Bay**

Survey Type **EM&A – Post-Construction transect survey**

BEHAVIOUR / COMMENTS

□ Feeding □ Socializing ● Travelling □ Milling/Resulting
□ Breaching □ Spy-hopping □ Porpoising

Other Behaviour **N/A**

Identified Individual(s) **#NL48 and #NL182**

Other Comments **N/A**

* CWD = Chinese White Dolphin
† UC = Unspotted Calf, UJ = Unspotted Juvenile, SJ = Spotted Juvenile, SS = Spotted Sub-Adult, SA = Spotted Adult, UA = Unspotted Adult
‡ Finless Porpoise

Annex F

Results of Seabed Geophysical Surveys

F1 RESULTS OF SEABED GEOPHYSICAL SURVEY

F1.1 INTRODUCTION

In accordance with the requirements under *Condition 3.10* of FEP-02/391/2010/A and EP-391/2010/A of the First Phase of the Black Point Power Gas Supply Project (BPGSP) ("the First Phase Project"), seabed geophysical surveys are required to record the seabed profile in the pre-construction and post-construction phases of the submarine gas pipeline works.

The geophysical seabed surveys were conducted by independent hydrographic surveyor Eric Tang & Associates Limited between 8 and 14 November 2013 for the post-construction phase survey. The seabed profile collected from the post-construction phase survey is compared with the profile of the pre-construction phase in an attempt to confirm the restoration of seabed profile and configurations after the completion of pipeline works.

F1.2 SITE CONDITION

The water depths along the pipeline route range from 3 to 21 m and the pipeline was laid at about 1.5 to 3 m and 3 to 6 m below the existing seabed in the dredged and non-dredged trenches, respectively.

The weather condition during the geophysical surveys was fine. The sea condition was calm in general with occasionally wavy condition due to marine vessels passed by during the surveys.

F1.3 METHODOLOGY AND EQUIPMENT

The geophysical surveys using Multi-beam Echo Sounding and Sub-bottom Profiling were conducted within an area of 100 to 150 m on both side of the alignment of the pipeline. These surveys allowed for a comprehensive investigation of the seabed, and below the seabed. The equipment for the post-construction geophysical surveys is listed in *Table F1.1*.

Table F1.1 Equipment List for Geophysical Seabed Surveys

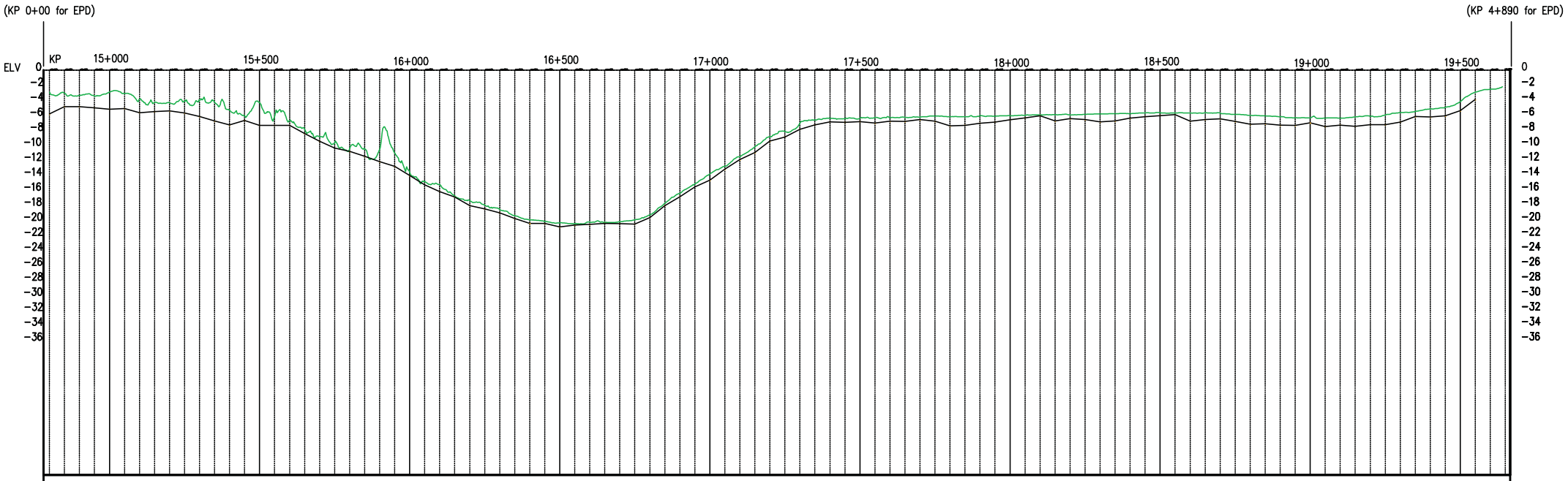
Type of Equipment	**Model Used**
Survey Vessel	Class II survey vessel – "Leung Ngau Chai"
Positioning and Navigation	Trimble SPS351
Multi-Beam Echo Sounding	ODOM ES3 Multi-beam Echo Sounder, 240 kHz
Speed of Sound Measurement	ODOM Digibar Pro
Sub-bottom Profiling	Tritech SeaKing Parametric Sub-Bottom Profiler

Type of Equipment	Model Used
Tide Gauge	Tide data of the government tide gauge installed in Chek Lap Kok
Survey software	ODOM ES3, HYPACK 2013 and HYSWEEP

F1.4 SUMMARY OF FINDINGS

The cross-section seabed profiles of pre-construction phase and post-construction phase are showed on *Figure F1*. Whilst slight fluctuations in the vertical seabed profile were identified, the overall seabed profile of post-construction phase agrees with that in the pre-construction phase of the pipeline works. The survey data confirmed that the seabed affected by the installation of submarine gas pipeline is restored to its original profile and configuration.

LONGITUDINAL PROFILE FROM KP14780 – KP19550



LEGEND :

Seabed Profile (November 2013) - Post-Construction Phase

Seabed Profile (March 2012) - Pre-Construction Phase

Client : WAI KEE 惠記 ZENS

Surveyor : ERIC TANG & ASSOCIATES LTD.
JOB NO. : H011

Project Name :
BLACK POINT GAS SUPPLY PROJECT
THE SECOND WEST-EAST SUBMARINE GAS PIPELINE
HONG KONG BRANCH LINE WITHIN HKSAR WATERS
PROVISION OF SURVEY SERVICES
DURING MAINTENANCE PERIOD COMPLETED

Revision No.	Date	Drawn by	Checked by	Approved by	Remarks
0	25/11/2013	Jack Chow	S K WONG	Eric Tang	

Figure F1

Notes :
1. Survey Date : 16 November 2013
2. Survey Datum : Hong Kong Principal Datum
3. Horizontal Scale: 1 : 5000
4. Vertical Scale : 1 : 200
5. All levels are in meters refer to Principal Datum