

**Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link –
Northern Connection Sub-sea Tunnel
Section**

*Fifth Quarterly Environmental Monitoring &
Audit (EM&A) Report*

06 July 2015

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Ref.: HYDHZMBEEM00_0_3146L.15

15 June 2015

AECOM
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun,
New Territories, Hong Kong

By Fax (2293 6300) and By Post

Attention: Messrs. Edwin Ching / Andy Westmoreland

Dear Sirs,

**Re: Agreement No. CE 48/2011 (EP)
Environmental Project Office for the
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing
Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation**

**Contract No. HY/2012/08 TM-CLKL Northern Connection Sub-sea
Tunnel Section
5th Quarterly EM&A Report for Dec 2014 to Feb 2015 (EP-354/2009/D)**

Reference is made to the 5th Quarterly Environmental Monitoring and Audit (EM&A) Report (for Dec 2014 to Feb 2015) certified by the ET Leader (ET's ref.: "0212330_5th Quarterly EM&A_20150706.doc" dated 6 July 2015) and provided to us via email on 8 July 2015.

We are pleased to inform you that we have no adverse comments on the captioned quarterly EM&A Report.

Thank you for your kind attention. Please do not hesitate to contact the undersigned or the ENPO Leader Mr. Y. H. Hui should you have any queries.

Yours faithfully,



F. C. Tsang
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Matthew Fung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Dragages – Bouygues JV – Mr. C. F. Kwong (By Fax: 2293 7499)

Internal: DY, YH, SLUI, ENPO Site

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Contract No. HY/2012/08

Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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Fifth Quarterly Environmental Monitoring & Audit (EM&A) Report

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Client: DBJV		Project No: 0212330			
Summary: This document presents the Fifth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 06 July 2015			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	5 th Quarterly EM&A Report	VAR	JT	CAR	06/07/15
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>I</i>
<i>1</i>	<i>INTRODUCTION</i>	<i>1</i>
<i>1.1</i>	<i>BACKGROUND</i>	<i>1</i>
<i>1.2</i>	<i>SCOPE OF REPORT</i>	<i>2</i>
<i>1.3</i>	<i>ORGANIZATION STRUCTURE</i>	<i>2</i>
<i>1.4</i>	<i>SUMMARY OF CONSTRUCTION WORKS</i>	<i>3</i>
<i>2</i>	<i>EM&A RESULTS</i>	<i>5</i>
<i>2.1</i>	<i>AIR QUALITY</i>	<i>5</i>
<i>2.2</i>	<i>WATER QUALITY MONITORING</i>	<i>8</i>
<i>2.3</i>	<i>DOLPHIN MONITORING</i>	<i>9</i>
<i>2.4</i>	<i>EM&A SITE INSPECTION</i>	<i>14</i>
<i>2.5</i>	<i>WASTE MANAGEMENT STATUS</i>	<i>16</i>
<i>2.6</i>	<i>ENVIRONMENTAL LICENSES AND PERMITS</i>	<i>17</i>
<i>2.7</i>	<i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>	<i>19</i>
<i>2.8</i>	<i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i>	<i>19</i>
<i>2.9</i>	<i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>	<i>22</i>
<i>3</i>	<i>FUTURE KEY ISSUES</i>	<i>23</i>
<i>3.1</i>	<i>CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER</i>	<i>23</i>
<i>3.2</i>	<i>KEY ISSUES FOR THE COMING QUARTER</i>	<i>23</i>
<i>3.3</i>	<i>MONITORING SCHEDULE FOR THE COMING QUARTER</i>	<i>23</i>
<i>4</i>	<i>CONCLUSIONS</i>	<i>24</i>

<i>APPENDIX A</i>	<i>PROJECT ORGANIZATION</i>
<i>APPENDIX B</i>	<i>CONSTRUCTION PROGRAMME</i>
<i>APPENDIX C</i>	<i>ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULES (EMIS)</i>
<i>APPENDIX D</i>	<i>ACTION AND LIMIT LEVELS</i>
<i>APPENDIX E</i>	<i>MONITORING SCHEDULE</i>
<i>APPENDIX F</i>	<i>AIR QUALITY MONITORING RESULTS</i>
<i>APPENDIX G</i>	<i>WATER QUALITY MONITORING RESULTS</i>
<i>APPENDIX H</i>	<i>IMPACT DOLPHIN MONITORING</i>
<i>APPENDIX I</i>	<i>EVENT AND ACTION PLAN</i>
<i>APPENDIX J</i>	<i>CUMULATIVE STATISTICS ON EXCEEDANCE AND COMPLAINT</i>
<i>APPENDIX K</i>	<i>WASTE FLOW TABLE</i>

EXECUTIVE SUMMARY

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of the Tuen Mun – Chek Lap Kok Link Project (TM-CLK Link Project) while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with *Environmental Permit No. EP-354/2009/A*. ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO). Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B* and *EP-354/2009/C*, were granted on 28 January 2014 and 10 December 2014, respectively.

The construction phase of the Project commenced on 1 November 2013 and will tentatively be completed by the end of 2018. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Fifth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 December 2014 to 28 February 2015 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the “Project”) in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, the major activities in the reporting quarter included:

Marine-based Works

- Reclamation filling at Portion N-C; and
- Rock Bund Deposition for Marine Sheet Pile Remedial Works at Works Area – Portion N-A.

Land-based Works

- Land Bored Piling Works at Works Area - Portion N-A;
- Surcharge set up at Works Area - Portion N-C;
- Set up of Slurry Treatment Plant at Works Area – Portion N-C.
- Diaphragm Wall Construction at Works Area – Portion N-C;
- TBM Platform Construction at Works Area – Portion N-A;
- Formwork and Metal Scaffolding works at North Launching Shaft at Works Area – Portion N-A; and,
- Delivery & Assembly of TBM at Works Area – Portion N-A.

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

24-hour TSP Monitoring	29 sessions
1-hour TSP Monitoring	29 sessions
Impact Water Quality Monitoring	37 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	13 sessions

Implementation of Marine Mammal Exclusion Zone

There was no dredging or marine sheet piling works in open waters during this reporting period. The day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers was in effect throughout the period of rock bund deposition for marine sheet pile remedial works, in which no sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring in the reporting month. As informed by the Contractor, rock bund deposition for marine sheet pile remedial works was completed on 28 February 2015. Thus, the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers was suspended from 28 February 2015.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

Two Action Level exceedances for 1-hr TSP were recorded from the air quality monitoring in this reporting period. No Limit Level exceedances for 1-hr TSP were recorded. No Action or Limit Level exceedances for 24-hr TSP were recorded. The exceedances were considered to be due to the sporadic events from cumulative anthropogenic activities in this area of Hong Kong upon further investigation.

Breaches of Action and Limit Levels for Water Quality

No exceedances were recorded from the water quality monitoring in this reporting period.

Dolphin Monitoring

Whilst one Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2014 and February 2015, no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting quarter. The exceedance is considered to be the natural variation of Chinese White Dolphin ranging pattern.

Environmental Complaints, Non-compliance & Summons

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of this Contract was recorded in this reporting period.

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

Reporting Change

There was no reporting change required in the reporting period.

Upcoming Works for the Next Reporting Period

Works to be undertaken in the coming quarterly period include the following:

Land-based works

- Diaphragm Wall Construction for Ventilation Shaft at Works Area - Portion N-C;
- TBM Platform Construction at Works Area - Portion N-A;
- Delivery & Assembly of TBM at Works Area - Portion N-A ;
- Set up of Slurry Treatment Plant at Works Area - Portion N-C; and
- Maintenance of armor rocks at Works Area - Portion N-A.

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are expected to be mainly associated with dust, marine water quality, marine ecology and waste management.

1.1

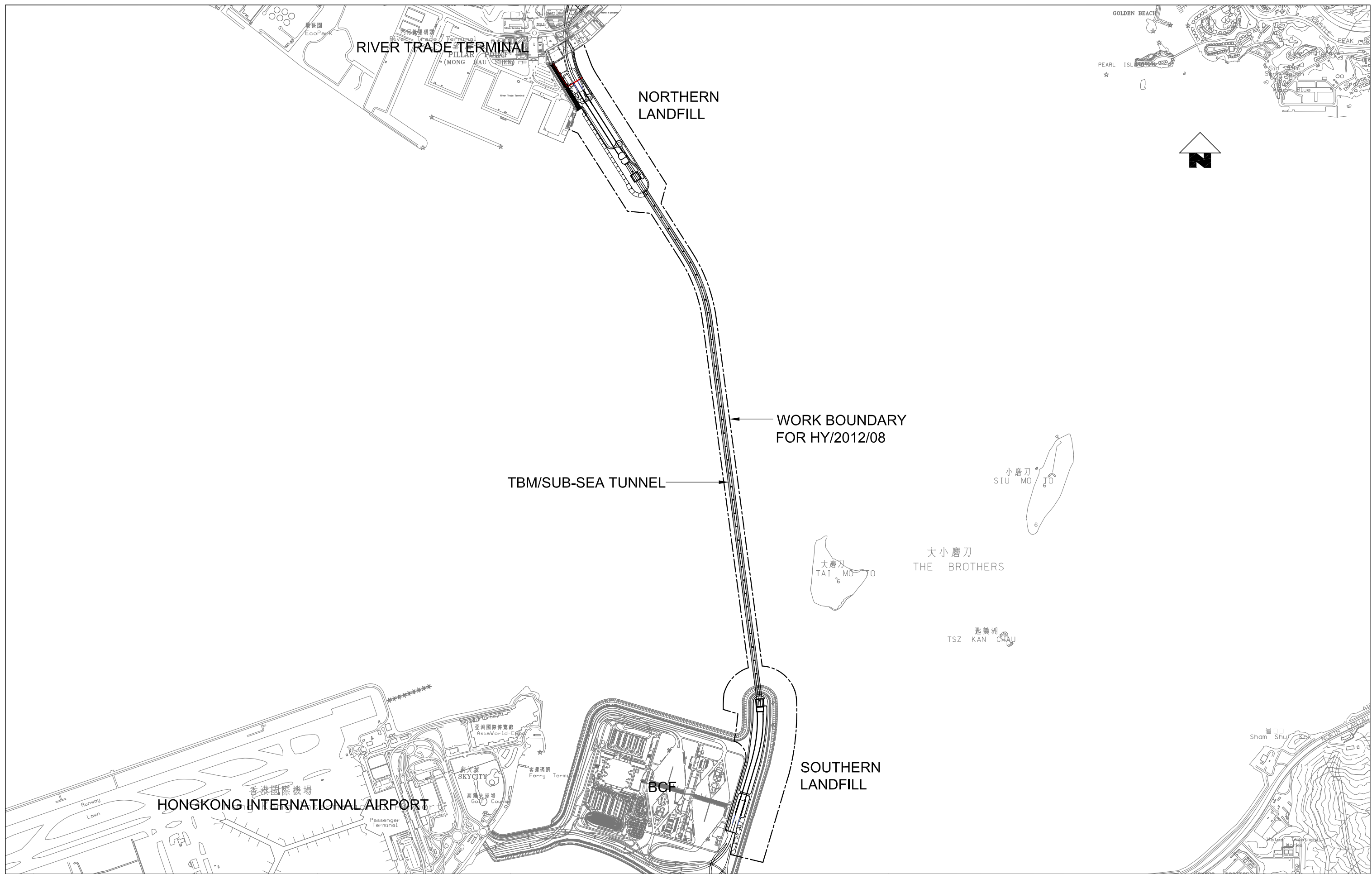
BACKGROUND

According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated increase in cross boundary traffic, developments in the Northwest New Territories (NWNT), and possible developments in North Lantau, including the Airport developments, the Lantau Logistics Park (LLP) and the Hong Kong – Zhuhai – Macao Bridge (HZMB). In order to cope with the anticipated traffic demand, two new road sections between NWNT and North Lantau – Tuen Mun – Chek Lap Kok Link (TM-CLKL) and Tuen Mun Western Bypass (TMWB) are proposed.





An Environmental Impact Assessment (EIA) of TM-CLKL (the Project) was prepared in accordance with the EIA Study Brief (No. ESB-175/2007) and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*. The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number AEIAR-146/2009), an Environmental Permit (EP-354/2009) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (VEP) (EP-354/2009A) was issued on 8 December 2010. Subsequent applications for variation of environmental permits (VEP), EP-354/2009/B and EP-354/2009/C, were granted on 28 January 2014 and 10 December 2014, respectively.

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of TM-CLKL while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with Environmental Permit No. EP-354/2009/A. ENVIRON Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

Layout of the Contract components is presented in *Figure 1.1*.



Designed By	PKV
Drawn By	DAI
Approved By	SPo
Date	11SEP2013
Rev.	Description
A	FIRST ISSUE
	11SEP13
	PKV
	Checked

Main Contractor	 
Client	
Contractor's Designer	




 A member of the Bouygues Construction group
Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營



HIGHWAYS DEPARTMENT


 Ove Arup & Partners
 Hong Kong Limited

Project Contract No. HY/2012/08
 Tuen Mun - Chek Lap Kok Link -
 Northern Connection Sub-Sea Tunnel Section
 Drawing Title **Figure 1.1**

Drawing no.	TMCLKL8-DBJ-GEN-DWG-00174
Scale	1:25000 © A3
CADD Ref.	TMCLKL8-DBJ-GEN-DWG-00174-DFT-A
Issue Status	DFT (DRAFT)
Revision	A

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed by 2018. The impact monitoring phase of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

1.2 SCOPE OF REPORT

This is the Fifth Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 December 2014 to 28 February 2015.

1.3 ORGANIZATION STRUCTURE

The organization structure of the Contract is shown in *Appendix A*. The key personnel contact names and contact details are summarized in *Table 1.1* below.

Table 1.1 *Contact Information of Key Personnel*

Party	Position	Name	Telephone	Fax
Highways Department	Engr 16/HZMB	Kenneth Lee	2762 4996	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Edwin Ching	2450 3111	2450 3099
		Andrew Westmoreland	2450 3511	2450 3099
ENPO / IEC (ENVIRON Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3547 2133	3465 2899
	IEC	F. C. Tsang	3547 2134	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Environmental Manager	C.F. Kwong	2293 7322	2670 2798
	Environmental Officer	Bryan Lee	2293 7323	2670 2798
	24-hour complaint hotline	Rachel Lam	2293 7342	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

SUMMARY OF CONSTRUCTION WORKS

The construction phase of this Contract was commenced on 1 November 2013. The three-month rolling construction programme is shown in *Appendix B*.

With reference to DBJV's information, details of major construction works carried out in this reporting period are summarized in *Table 1.2*.

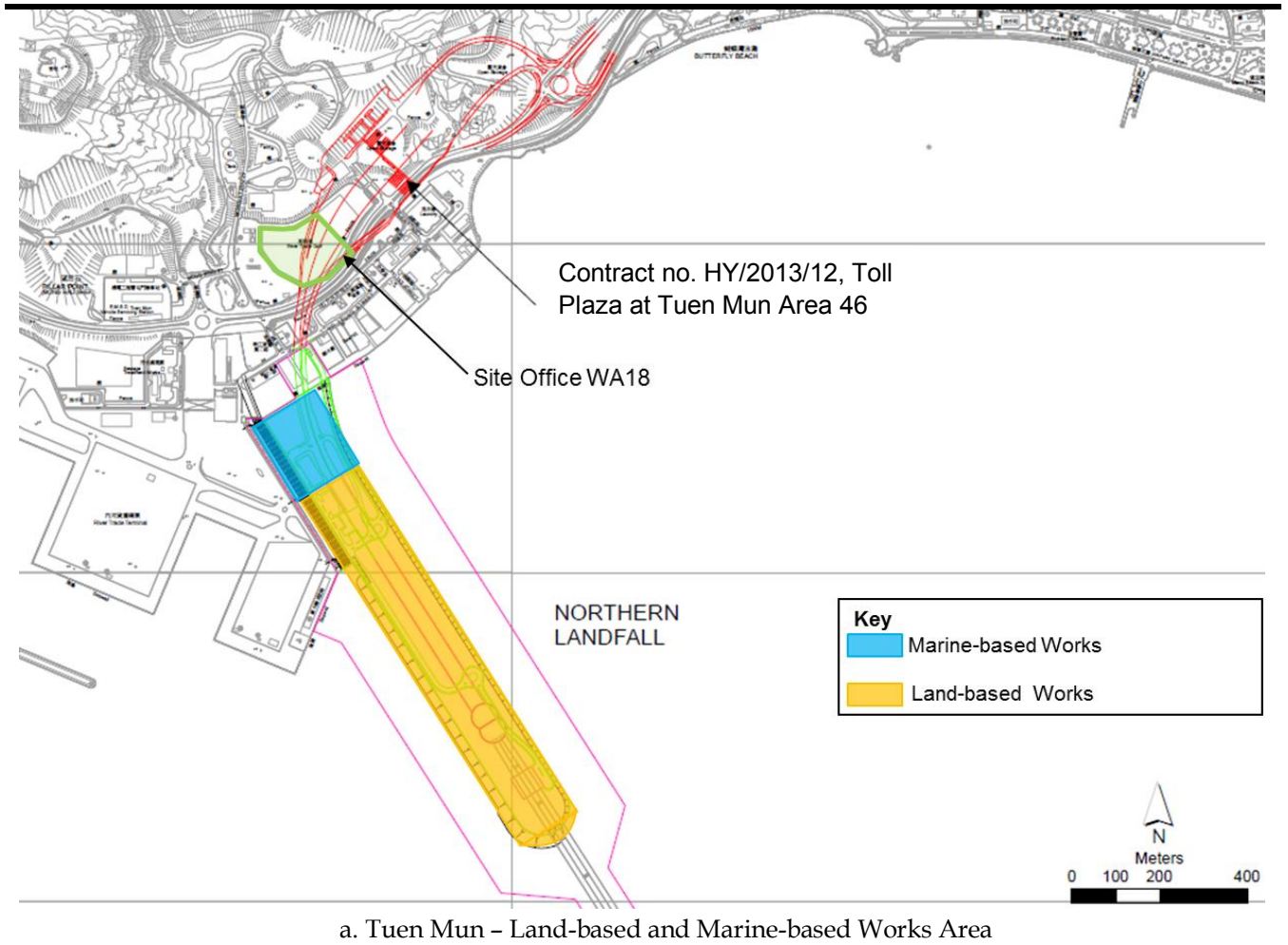
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

The implementation schedule of environmental mitigation measures is presented in *Appendix C*.

Table 1.2 *Summary of Construction Activities Undertaken during the Reporting Period*

Construction Activities Undertaken
<i>Marine-based Works</i>
Portion N-C
<ul style="list-style-type: none"> • Reclamation filling
Portion N-A
<ul style="list-style-type: none"> • Rock Bund Deposition for Marine Sheet Pile Remedial Works
<i>Land-based Works</i>
Portion N-A
<ul style="list-style-type: none"> • Land Bored Piling Works • TBM Platform Construction • Formwork and Metal Scaffolding works at North Launching Shaft • Delivery & Assembly of TBM
Portion N-C
<ul style="list-style-type: none"> • Surcharge set up • Set up of Slurry Treatment Plant • Diaphragm Wall Construction

Figure 1.2 Locations of Construction Activities – December 2014 to February 2015



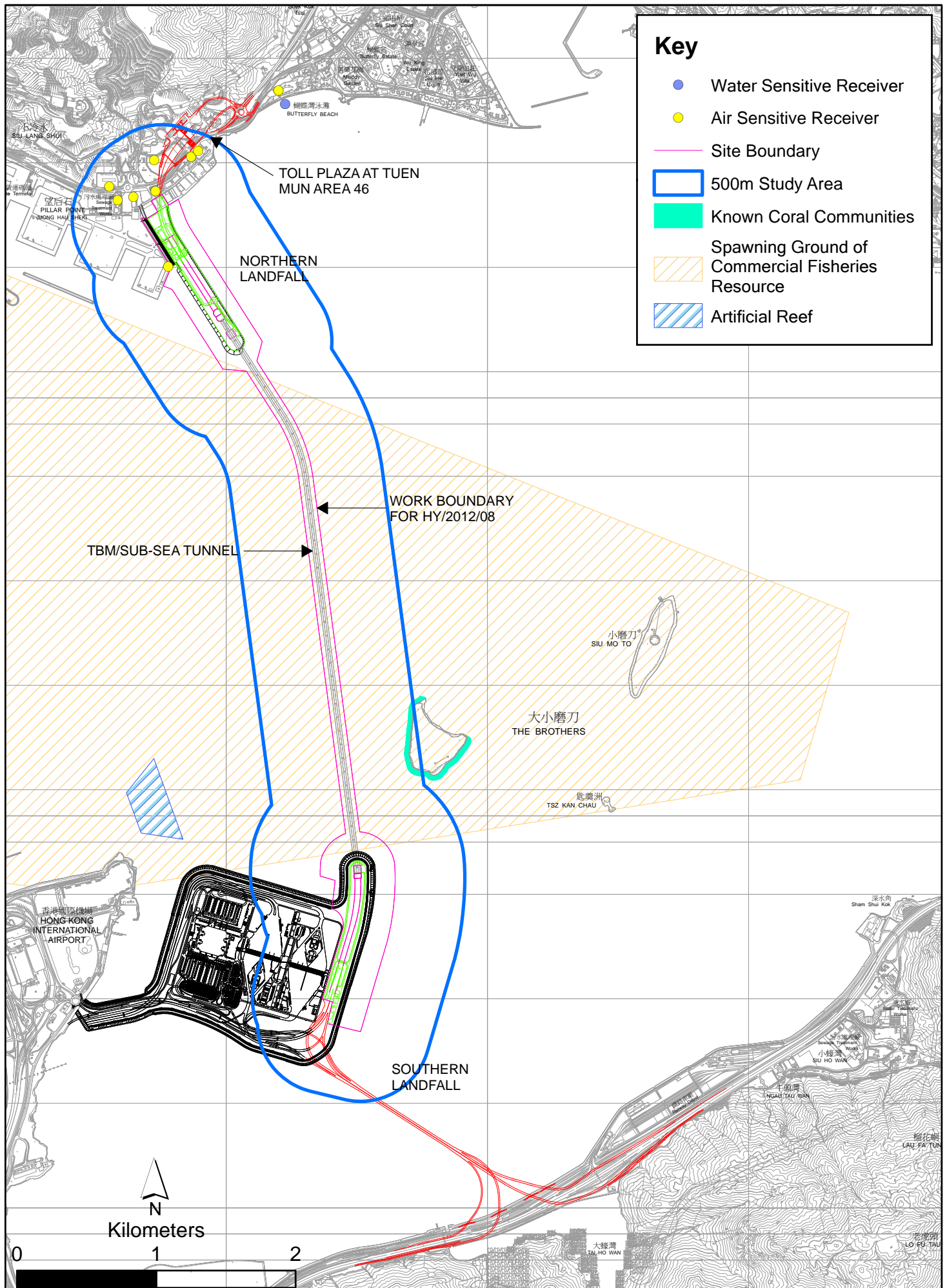


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

File: T:\GIS\CONTRACT\0212330\I\mxd\0212330_EMnA_Env_Sensitive_Receiver.mxd
Date: 15/4/2014

The EM&A programme required environmental monitoring for air quality, water quality and marine ecology as well as environmental site inspections for air quality, noise, water quality, waste management, marine ecology and landscape and visual impacts. The EM&A requirements and related findings for each component are summarized in the following sections

2.1 AIR QUALITY

As per the requirements under *Condition 2.4* of *EP-354/2009/C*, the Enhanced TSP Monitoring Plan has been prepared under *Contract No. HY/2012/08*. Details of the monitoring plan are presented in the *Enhanced TSP Monitoring Plan* ⁽¹⁾.

2.1.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual and the *Enhanced TSP Monitoring Plan*, impact 1-hour TSP monitoring was conducted three (3) times in every six (6) days and impact 24-hour TSP monitoring was carried out once in every six (6) days when the highest dust impact was expected. 1-hr and 24-hr TSP monitoring frequency was increased to three times per day every three days and daily every three days respectively as excavation works for launching shaft commenced on 24 October 2014.

High volume samplers (HVSs) were used to carry out the 1-hour and 24-hour TSP monitoring in the reporting quarter at the five (5) air quality monitoring stations in accordance with the requirements stipulated in the Updated EM&A Manual (*Figure 2.1; Table 2.1*). Wind anemometer was installed at the rooftop of ASR5 for logging wind speed and wind direction. Details of the equipment deployed are provided in *Table 2.2*.

(1) ERM (2013) Enhanced TSP Monitoring Plan. Submitted on 28 October 2013 and subsequently approved by EPD on 1 November 2013.

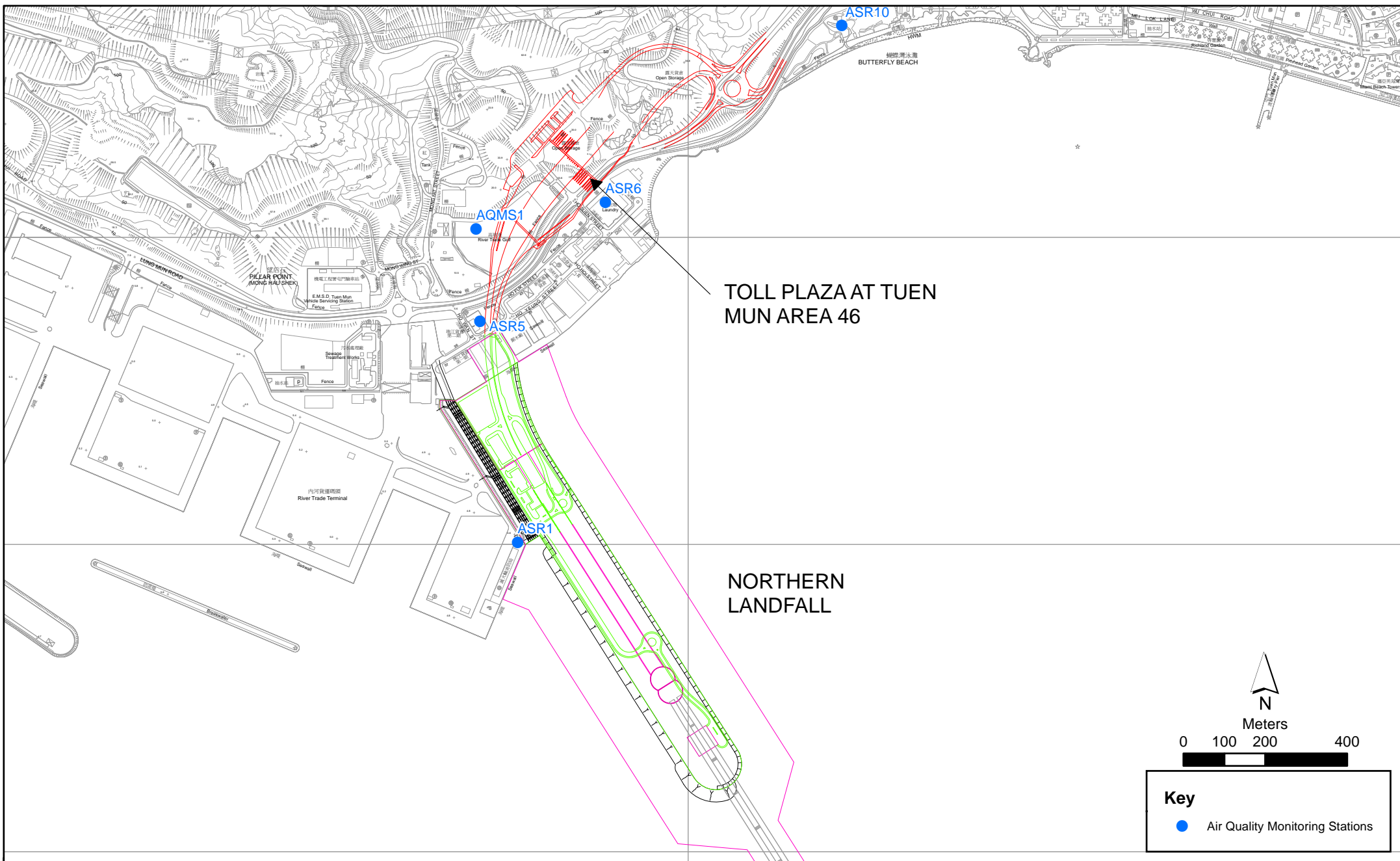


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

Table 2.1 *Locations of Impact Air Quality Monitoring Stations and Monitoring Dates in this Reporting Period*

Monitoring Station	Location	Description	Parameters & Frequency	Monitoring Dates
ASR1	Tuen Mun Fireboat Station	Office	TSP monitoring	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29
ASR5	Pillar Point Fire Station	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 6 days 	December 2014; 1, 4, 7, 10, 13, 16, 19, 22, 25, 28 and 31 January 2015;
AQMS1	Previous River Trade Golf	Bare ground	<ul style="list-style-type: none"> 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 6 days 	3, 6, 9, 12, 15, 17, 23 and 26 February 2015
ASR6	Butterfly Beach Laundry	Office	Enhanced TSP monitoring (commenced on 24 October 2014)	
ASR10	Butterfly Beach Park	Recreational uses	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 3 days 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 3 days 	

Table 2.2 *Air Quality Monitoring Equipment*

Equipment	Brand and Model
High Volume Sampler (1-hour TSP and 24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Sampler (Model No. TE-5170)
Wind Meter	Davis (Model: Weather Wizard III (S/N: WE90911A30))
Wind Anemometer for calibration	Lutron (Model No. AM-4201)

2.1.2 *Action & Limit Levels*

The Action and Limit Levels of the air quality monitoring is provided in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.1.3 *Monitoring Schedule for the Reporting Quarter*

The schedules for air quality monitoring in the reporting quarter are provided in *Appendix E*. No construction works was carried out from 19 February 2015 to 21 February 2015, thus Impact Air Quality Monitoring was postponed to 23 February 2015.

2.1.4 *Results and Observations*

Impact air quality monitoring was conducted at all designated monitoring stations in the reporting period under favourable weather conditions. The

major dust sources in the reporting period include construction activities under the Contract as well as nearby traffic emissions.

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3 and 2.4*, respectively. Monitoring results are presented graphically in *Appendix F* and detailed impact air quality monitoring data were reported in the *Fourteenth to Sixteenth Monthly EM&A Report*.

Table 2.3 *Summary of 1-hour TSP Monitoring Results in this Reporting Period*

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December 2014 to	ASR 1	196	53 - 329	331	500
	ASR 5	199	95 - 346	340	500
February 2015	AQMS1	162	56 - 348	335	500
	ASR6	151	53 - 309	338	500
	ASR10	116	55 - 251	337	500

Table 2.4 *Summary of 24-hour TSP Monitoring Results in this Reporting Period*

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December 2014 to	ASR 1	114	64 - 162	213	260
	ASR 5	112	76 - 151	238	260
February 2015	AQMS1	100	58 - 155	213	260
	ASR6	93	56 - 125	238	260
	ASR10	80	52 - 121	214	260

Two Action Level exceedances for 1-hr TSP were recorded from the air quality monitoring in this reporting period. No Limit Level exceedances for 1-hr TSP were recorded. No Action or Limit Level exceedances for 24-hr TSP were recorded. Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.15*.

2.2

WATER QUALITY MONITORING

The baseline water quality monitoring undertaken by the Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects (HKZMB) between 6 and 31 October 2011 has included all monitoring stations for the Project. Thus, the baseline monitoring results and Action/Limit Levels presented in HKZMB Baseline Monitoring Report ⁽¹⁾ are adopted for this Project.

2.2.1

Monitoring Requirements & Equipment

In accordance with the Updated EM&A Manual, impact water quality monitoring was carried out three days per week during the construction period at nine (9) water quality monitoring stations (*Figure 2.2; Table 2.5*).

Table 2.5 *Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements*

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS12	Impact Station	813218	823681	<ul style="list-style-type: none"> • Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) • DO (mg/L and % of saturation) • SS (mg/L) 	3 water depths: 1m	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS13	Impact Station	813667	824325		below sea surface,	
IS14	Impact Station	812592	824172		mid-depth and 1m	
IS15	Impact Station	813356	825008		above sea bed. If	
CS4	Control / Far Field Station	810025	824004		the water depth is	
CS6	Control / Far Field Station	817028	823992		less than 3m, mid-depth sampling only. If water	
SR8	Sensitive receiver (Gazettal beaches in Tuen Mun)	816306	825715		depth less than 6m, mid-depth may be omitted.	
SR9	Sensitive receiver (Butterfly Beach)	813601	825858			
SR10A	Sensitive receiver (Ma Wan FCZ)	823741	823495			

*Notes:

In addition to the parameters presented monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or works underway nearby were also recorded.

Table 2.6 summarizes the equipment used in the impact water quality monitoring programme.

⁽¹⁾ Agreement No. CE 35/2011 (EP) Baseline Environmental Monitoring for Hong Kong - Zhuhai - Macao Bridge Hong Kong Projects - Investigation. Baseline Environmental Monitoring Report (Version C). Submitted on 8 March 2012 and subsequently approved by EPD.

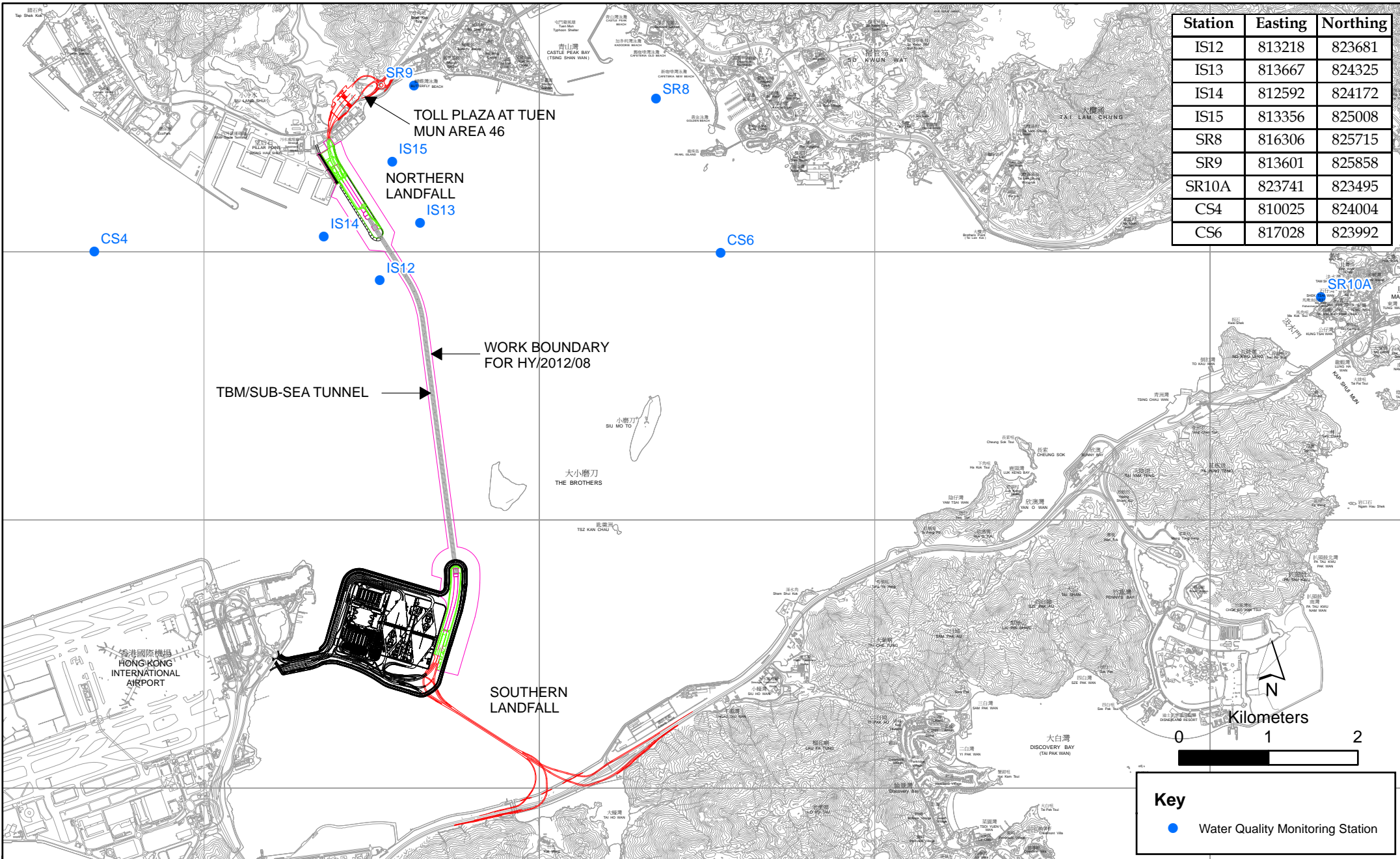


Figure 2.2

Water Quality Monitoring Station

Table 2.6 Water Quality Monitoring Equipment

Equipment	Model	Qty.
Water Sampler	Kahlsico Water-Bottle Model 135DW 150	1
Dissolved Oxygen Meter	YSI Pro 2030	1
pH Meter	HANNA HI 8314	1
Turbidity Meter	HACH 2100Q	1
Monitoring Position	“Magellan” Handheld GPS Model eXplorist GC	4
Equipment	DGPS Kodon KGP913MK2 ⁽¹⁾	1

2.2.2 Action & Limit Levels

The Action and Limit Levels of the water quality monitoring is provided in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.2.3 Monitoring Schedule for the Reporting Period

The schedules for water quality monitoring in the reporting period are provided in *Appendix E*. The water quality monitoring on 26 December 2014 was postponed to 29 December 2014 since no marine works was conducted between 25 and 26 December 2014. No construction works was carried out from 19 February 2015 to 21 February 2015, thus Impact Water Quality Monitoring was postponed to 23 February 2015.

2.2.4 Results and Observations

During this reporting period, only minor marine works included rock bund deposition for marine sheet pile remedial works was carried out at Portion N-A. According to the Contractor, rock bund deposition for marine sheet pile remedial works was completed on 28 February 2015.

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting period under favourable weather conditions. Monitoring results are presented graphically in *Appendix G* and detailed impact water quality monitoring data were reported in the *Fourteenth to Sixteenth Monthly EM&A Report*.

In this reporting period, a total of thirty-seven monitoring events were undertaken in which no exceedances were recorded. Summary of Exceedances for Water Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.17*.

2.3 DOLPHIN MONITORING

2.3.1 Monitoring Requirements

Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, the on-going impact line transect dolphin monitoring data collected by HyD’s *Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge*.

Hong Kong Link Road - Section between Scenic Hill and Hong Kong Boundary Crossing Facilities on the monthly basis is adopted to avoid duplicates of survey effort.

2.3.2 *Monitoring Equipment*

Table 2.7 summarises the equipment used for the impact dolphin monitoring.

Table 2.7 *Dolphin Monitoring Equipment*

Equipment	Model
Global Positioning System (GPS)	Garmin 18X-PC
Camera	Geo One Phottix Nikon D90 300m 2.8D fixed focus Nikon D90 20-300m zoom lens
Laser Binoculars	Infinitor LRF 1000
Marine Binocular	Bushell 7 x 50 marine binocular with compass and reticules
Vessel for Monitoring	65 foot single engine motor vessel with viewing platform 4.5m above water level

2.3.3 *Monitoring Parameter, Frequencies & Duration*

Dolphin monitoring should cover all transect lines in Northeast Lantau (NEL) and the Northwest Lantau (NWL) survey areas twice per month throughout the entire construction period. The monitoring data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong. In order to provide a suitable long-term dataset for comparison, identical methodology and line transects employed in baseline dolphin monitoring was followed in the impact dolphin monitoring.

2.3.4 *Monitoring Location*

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.3*. The co-ordinates of all transect lines are shown in *Table 2.8* below.

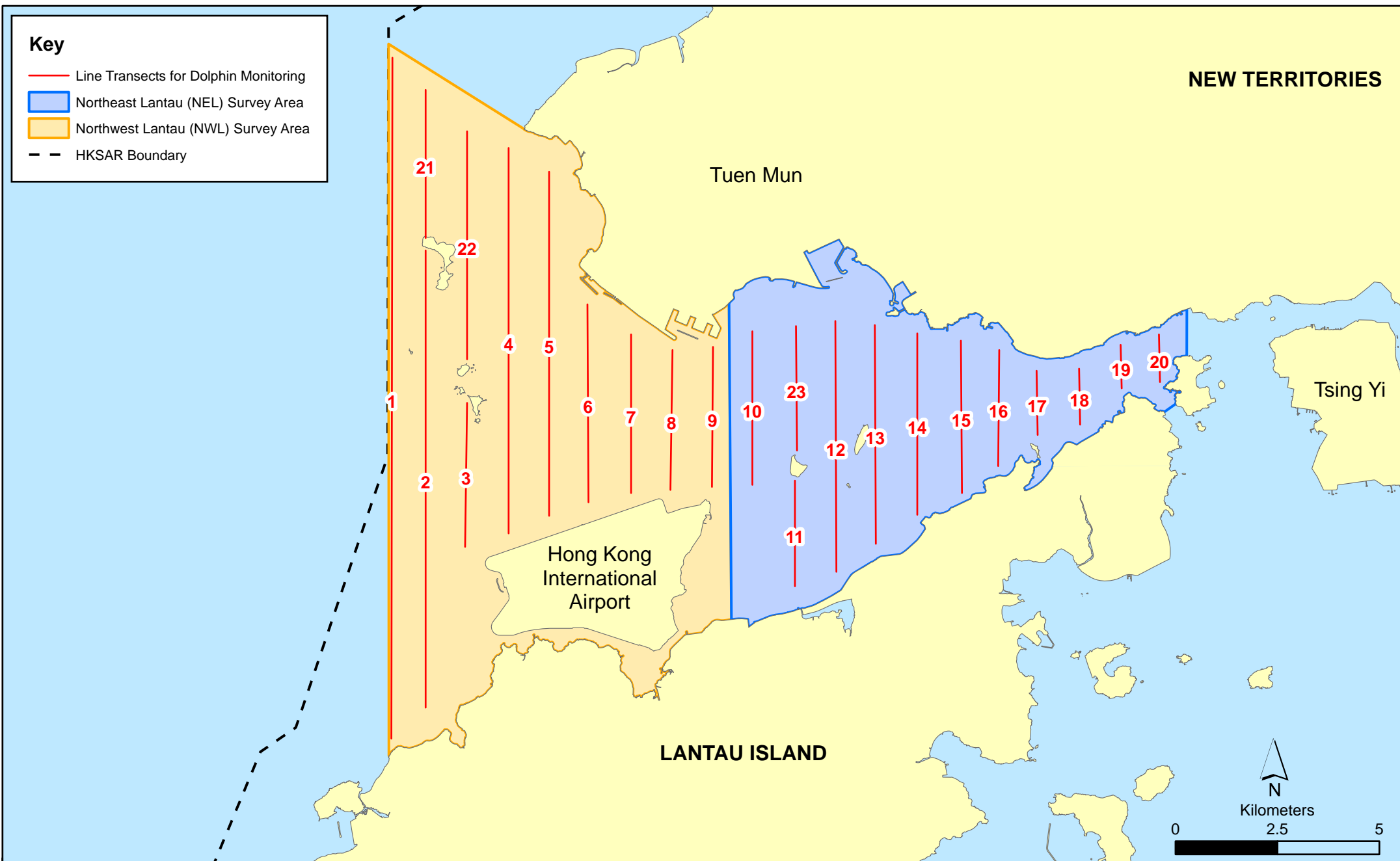


Figure 2.3

Layout of Transect Lines of Dolphin Monitoring in Northwest and Northeast Lantau Areas

Table 2.8 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	814577	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815457	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820690	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	820847	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	820892	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818449	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

2.3.5 Action & Limit Levels

The Action and Limit levels of dolphin impact monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.3.6 *Monitoring Schedule for the Reporting Period*

The dolphin monitoring schedules for the reporting period are shown in *Appendix E*.

2.3.7 *Results & Observations*

A total of 891.50 km of survey effort was conducted, with 99.6% of the total survey effort being conducted under favourable weather conditions (ie Beaufort Sea State 3 or below with good visibility) in this reporting quarter. Amongst the two areas, 347.05 km and 544.45 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 645.44 km and 246.06 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 15 groups of 52 Chinese White Dolphin sightings were recorded during the six sets of surveys in this reporting quarter. All except three sightings were made on primary lines during on-effort search, and none of the dolphin groups was associated with operating fishing vessel. During this reporting quarter, all dolphin groups were sighted in NWL, while none of the dolphin groups were sighted in NEL.

Encounter rates of Chinese White Dolphins are deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below with good visibility) in the reporting quarter with the results and comparison with baseline results present in *Tables 2.9* and *2.10*.

Table 2.9 Individual Survey Event Encounter Rates

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1: Dec 2 nd /9 th	0.0	0.0
	Set 2: Dec 15 th /23 rd	0.0	0.0
	Set 3: Jan 8 th /15 th	0.0	0.0
	Set 4: Jan 27 th /29 th	0.0	0.0
	Set 5: Feb 5 th /13 th	0.0	0.0
	Set 6: Feb 16 th /25 th	0.0	0.0
NWL	Set 1: Dec 2 nd /9 th	2.79	5.58
	Set 2: Dec 15 th /23 rd	1.41	1.41
	Set 3: Jan 8 th /15 th	4.33	21.64
	Set 4: Jan 27 th /29 th	7.52	37.59
	Set 5: Feb 5 th /13 th	1.40	1.40
	Set 6: Feb 16 th /25 th	0.0	0.0

Note: Dolphin Encounter Rates are deduced from the Two Sets of Surveys (Two Surveys in Each Set) in the reporting quarter in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.10 Quarterly Average Encounter Rates

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2014 - February 2015	September 2011 - November 2011	December 2014 - February 2015	September 2011 - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	2.91 ± 2.69	9.85 ± 5.85	11.27 ± 15.19	44.66 ± 29.85

Note: Encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions.

Group size of Chinese White Dolphins ranged from 1 - 8 individuals per group in North Lantau region during December 2014 to February 2015. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in *Table 2.11*.

Table 2.11 *Average Dolphin Group Size*

	Average Dolphin Group Size	
	December 2014 - February 2015	September 2011 - November 2011
Overall	3.47 ± 2.29	3.72 ± 3.13
Northeast Lantau	0.0	3.18 ± 2.16
Northwest Lantau	3.47 ± 2.29	3.92 ± 3.40

Whilst one Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2014 and February 2015, no unacceptable impact from the construction activities of this Contract was recorded from the general observations.

Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL.

It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

2.3.8 *Implementation of Marine Mammal Exclusion Zone*

There was no dredging or marine sheet piling works in open waters during this reporting period. The day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers was in effect throughout the period of rock bund deposition for marine sheet pile remedial works, in which no sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring in the reporting month. According to the Contractor, rock bund deposition for marine sheet pile remedial works was completed on 28 February 2015. Thus, the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers was suspended from 28 February 2015.

2.4 *EM&A SITE INSPECTION*

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteen (13) site inspections were carried out in the reporting quarter on 3, 10, 17, 24 and 31 December 2014; 7, 14, 21 and 28 January 2015; 4, 11, 18 and 25 February 2015.

Key observations during the site inspections in this reporting period are summarized in *Table 2.12*.

Table 2.12 Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Period

Inspection Date	Environmental Observations	Recommendations/ Remarks
3 December 2014	Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> Accumulated general refuse was observed. Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> Drip tray should be cleaned more frequently. 	Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse. Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to clear oily water in the drip tray.
10 December 2014	Works Area - Portion N6 <ul style="list-style-type: none"> Drip tray should be cleaned more frequently. 	Works Area - Portion N6 <ul style="list-style-type: none"> The Contractor was reminded to clear the oily water in the drip tray.
17 December 2014	Works Area - Portion N-C <ul style="list-style-type: none"> Stockpile of fill material was observed near the seawall. 	Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to remove the fill material close to the seawall.
24 December 2014	Works Area - Portion N-A <ul style="list-style-type: none"> Chemical container was observed without drip tray. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical container.
31 December 2014	Works Area - Portion N-A <ul style="list-style-type: none"> Excess muddy water was observed. Works Area - Portion N-B <ul style="list-style-type: none"> Accumulated general refuse was observed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the excess muddy water. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse.
7 January 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Oil drum without drip tray was observed. Chemical container should be removed and place in chemical storage area. Works Area - Portion N-C <ul style="list-style-type: none"> Oil drum without drip tray was observed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the oil drum. The Contractor was reminded to place the chemical container in chemical storage area. Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the oil drum.
14 January 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Excess muddy water was observed. General refuse was observed on the ground. Chemical containers should be removed and place in chemical storage area. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the excess muddy water. The Contractor was reminded to clear the general refuse on the ground. The Contractor was reminded to remove the chemical containers.
21 January 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Cement bags should be covered. Works Area - Portion N-B <ul style="list-style-type: none"> Oil drum without chemical labels was observed. Chemical containers were observed on the ground. Works Area - Portion N-C <ul style="list-style-type: none"> Excess muddy water was observed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to fully cover the cement bags. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to provide chemical labels for the oil drum. The Contractor was reminded to remove the chemical containers. Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to clear the excess muddy water.

Inspection Date	Environmental Observations	Recommendations/ Remarks
28 January 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Water spraying should be applied more frequently during windy condition. Works Area - Portion N-B <ul style="list-style-type: none"> Excess muddy water was observed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying more frequently during windy condition. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the excess muddy water.
4 February 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Oil drums without drip tray were observed. Works Area - Portion N-B <ul style="list-style-type: none"> Accumulated general refuse should be cleared more frequently. Chemical containers without drip tray were observed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the oil drums. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the general refuse more frequently. The Contractor was reminded to provide drip tray for the chemical containers.
11 February 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Used cement bags should be removed or stored properly. Idle stockpile should be covered. Cement bags should be covered. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to remove the used cement bags. The Contractor was reminded to cover the idle stockpile. The Contractor was reminded to cover the cement bags.
18 February 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Drip tray should be cleaned up more frequently. Cement bags were observed without cover. Works Area - Portion N-C <ul style="list-style-type: none"> Oil leakage was observed under the machine. Chemical containers should be stored in chemical storage area. Accumulated general refuse should be cleared more frequently. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clean up the drip tray more frequently. The Contractor was reminded to cover the cement bags. Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to fix the oil leakage problem and clean up the stained soil as chemical waste. The Contractor was reminded to store the chemical containers in proper storage area. The Contractor was reminded to clear the accumulated general refuse more frequently.
25 February 2015	Works Area - Portion N-A <ul style="list-style-type: none"> Idle stockpile should be covered by tarpaulin. Works Area - Portion N-B <ul style="list-style-type: none"> Accumulated general refuse should be cleared. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to cover the idle stockpile. Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear accumulated general refuse.

The Contractor has rectified all of the observations as identified during environmental site inspections in the reporting quarter.

2.5 WASTE MANAGEMENT STATUS

The Contractor had submitted application form for registration as chemical waste producer under the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert) and imported fill. Reference has been made to

the waste flow table prepared by the Contractor (*Appendix K*). The quantities of different types of wastes are summarized in *Table 2.13*.

Table 2.13 *Quantities of Different Waste Generated in the Reporting Period*

Month/Year	Inert Construction Waste ^(a) (tonnes)	Imported Fill (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste ^(b) (tonnes)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)	
							Category L	Category M
December 2014	10,151	108,279	0	49	0	0	0	0
January 2015	30,877	0	0	80	0	0	0	0
February 2015	4,152	0	0	74	0	0	0	0
Total	45,180	108,279	0	203	0	0	0	0

Notes:

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/ recycle of C&D materials and wastes. The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.6 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.14* below.

Table 2.14 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	363510	19 August 2013	Throughout the Contract	DBJV	-
Chemical Waste Registration	5213-422-D2516-01	10 September 2013	Throughout the Contract	DBJV	-
Construction Waste Disposal Account	7018108	19 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract HY/2012/08
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For works in site WA18
Waste Water Discharge License	WT00018433-2014	6 March 2014	31 March 2019	DBJV	For works in site Portion N6
Construction Noise Permit	GW-RW0706-14	29 September 2014	28 March 2015	DBJV	For works in site Portion N6
Construction Noise Permit	GW-RW0970-14	17 December 2014	14 May 2015	DBJV	For Dredging and Reclamation Works
Construction Noise Permit	GW-RW0550-14	25 July 2014	24 January 2015	DBJV	For Dredging and Reclamation Works
Construction Noise Permit	GW-RS0847-14	11 May 2014	10 May 2015	DBJV	For works in site WA23
Construction Noise Permit	GW-RS0674-14	18 September 2014	17 March 2015	DBJV	For GI works at Southern Landfall
Marine Dumping Permit	EP/MD/15-142	7 November 2014	31 January 2015	DBJV	For Type 1 (Open Sea Disposal)
Marine Dumping Permit	EP/MD/15-007	20 October 2014	19 November 2015	DBJV	For Type 1 (dedicated site) and Type 2 (Confined Marine Disposal)

Notes:

HyD = Highways Department

DBJV = Dragages – Bouygues Joint Venture

VEP = Variation of Environmental Permit

2.7 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

In response to the site audit findings, the Contractors carried out all corrective actions.

A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in *Appendix C*. The necessary mitigation measures relevant to this Contract were implemented properly.

2.8 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

For air quality impact monitoring, a total of twenty-nine monitoring events were undertaken in which two Action Level exceedances and no Limit Level exceedances for 1-hr TSP; no Action Level exceedances or Limit Level exceedances for 24-hr TSP were recorded. (*Table 2.15*). Further to the investigation, the recorded exceedances for air quality monitoring were considered to be sporadic event from the cumulative anthropogenic activities (eg traffic emissions from River Trade Terminal) in this area of Hong Kong. Detailed investigation findings were presented in *Appendix L* of the *Fourteenth to Sixteenth Monthly EM&A Report*.

Table 2.15 *Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter*

Station	Exceedance Level	Date of Exceedances		Number of Exceedances	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AQMS1	Action Level	20141217	-	1	0
	Limit Level	-	-	0	0
ASR1	Action Level	-	-	0	0
	Limit Level	-	-	0	0
ASR5	Action Level	20141202	-	1	0
	Limit Level	-	-	0	0
ASR6	Action Level	-	-	0	0
	Limit Level	-	-	0	0
ASR10	Action Level	-	-	0	0
	Limit Level	-	-	0	0
Total number of Action level Exceedances:				2	0
Total number of Limit level Exceedances:				0	0

For marine water quality impact monitoring, a total of thirty-seven monitoring events were undertaken in which no exceedances were recorded (*Table 2.17*).

In addition, the construction impact on depth-averaged SS was assessed to compare the quarterly mean values of depth-averaged SS with the relevant ambient mean values. Results showed that the quarterly mean values of depth-averaged SS at all monitoring stations are well below the ambient mean values (*Table 2.16*), thus no further action is required in accordance with the Updated EM&A Manual.

Table 2.16 *Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids (mg/L)*

Station	Baseline Mean		Ambient Mean ^(a)		Quarterly Mean (December 2014 to February 2015)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	10.2	9.0	13.3	11.7	7.5	7.5
CS6	10.9	11.7	14.1	15.2	7.6	7.5
IS12	9.2	9.5	12.0	12.3	7.5	7.5
IS13	10.0	10.5	13.0	13.7	7.5	7.4
IS14	10.4	9.7	13.5	12.6	7.5	7.5
IS15	9.6	11.0	12.5	14.2	7.5	7.4
SR10A	10.3	10.2	13.3	13.3	7.4	7.4
SR8	10.1	11.3	13.1	14.7	7.4	7.3
SR9	8.8	9.9	11.4	12.8	7.4	7.4
Mean value	10.0	10.3	13.0	13.4	7.5	7.4

Notes:

(a) Ambient mean value is defined as a 30% increase of the baseline mean value

Table 2.17 Summary of Exceedances for Marine Water Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level ^(a)	DO (Surface and Middle)		DO (Bottom)		Turbidity (depth-averaged)		SS (depth-averaged)	
		Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
CS6	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS12	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS13	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS14	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS15	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR8	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR9	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR10	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
Total AL Exceedances:		0	0	0	0	0	0	0	0
Total LL Exceedances:		0	0	0	0	0	0	0	0

Notes:

(a) AL = Action Level; LL = Limit Level

One Limit Level exceedance of impact dolphin monitoring was recorded in this reporting quarter. 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, there is no evidence showing that the sources of impact directly related to the construction works under this Contract that may have affected the dolphin usage in the NEL region. Detailed investigation findings are presented in *Appendix J*.

Cumulative statistics are provided in *Appendix J*.

2.9

SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.4*.

No non-compliance event was recorded during the reporting period.

No environmental complaint was received in the reporting period.

No summons/ prosecution was received during the reporting period.

Statistics on complaints, notifications of summons and successful prosecutions are summarized in *Appendix J*.

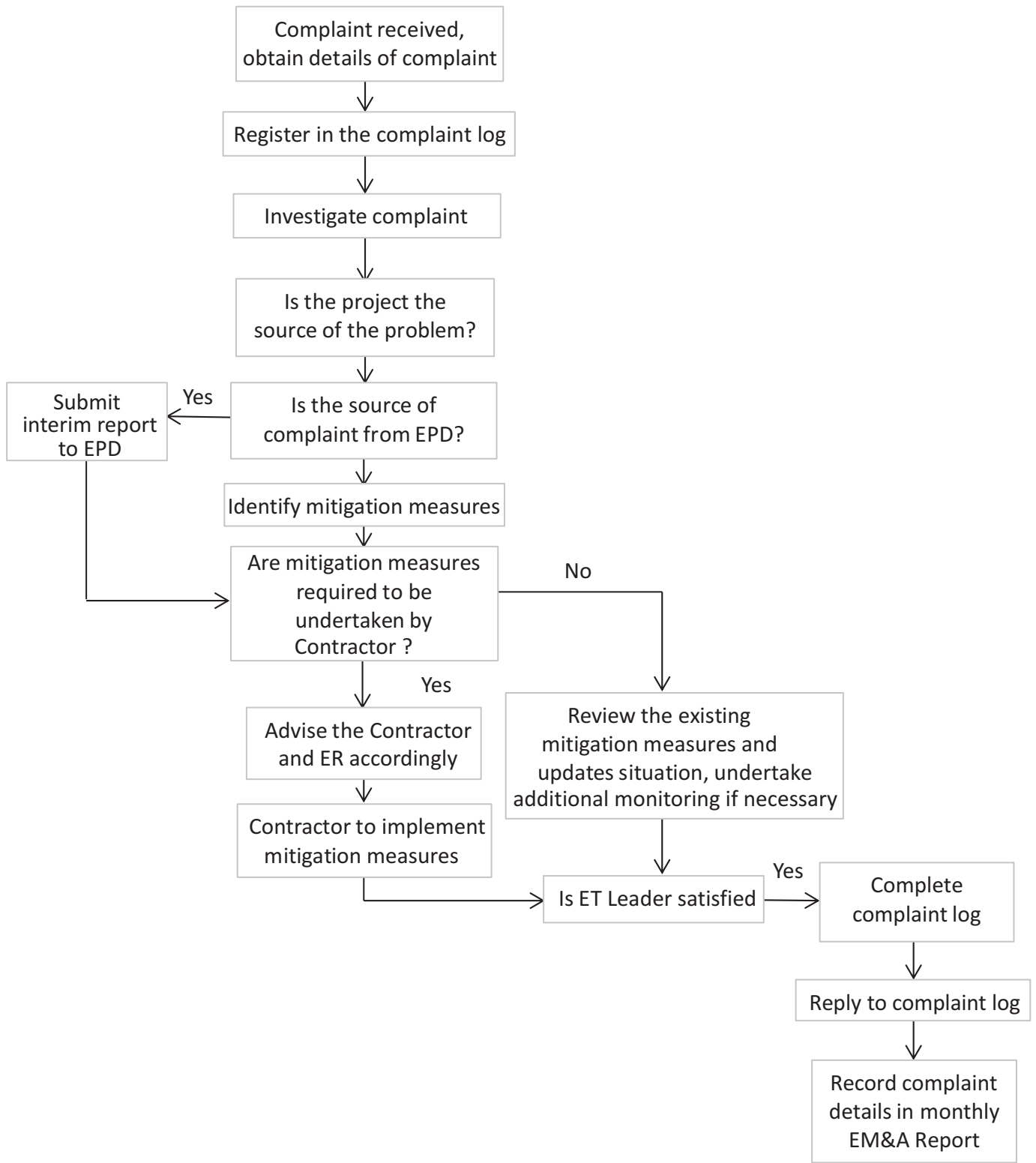


Figure 2.4

Environmental Complaint Handling Procedure

3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER

As informed by the Contractor, the major works for the Project in the coming quarter are summarized in *Table 3.1*.

Table 3.1 Construction Works to Be Undertaken in the Coming Quarter

Works to be undertaken
<i>Land-based Works</i>
<ul style="list-style-type: none">• Diaphragm Wall Construction for Ventilation Shaft at Works Area – Portion N-C;• TBM Platform Construction at Works Area – Portion N-A;• Maintenance of armor rocks at Works Area – Portion N-A;• Delivery & Assembly of TBM at Works Area – Portion N-A and,• Set up of Slurry Treatment Plant at Works Area – Portion N-C.

3.2 KEY ISSUES FOR THE COMING QUARTER

Potential environmental impacts arising from the above upcoming construction activities are mainly associated with dust, marine ecology and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality, marine water quality and marine ecology (include dolphin monitoring) are scheduled to continue for the next reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not considered to be necessary at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period.

CONCLUSIONS

This Fifth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 December 2014 to 28 February 2015, in accordance with the Updated EM&A Manual and the requirements of EP-354/2009/C.

Air quality (including 1-hour TSP and 24-hour TSP), marine water quality and dolphin monitoring were carried out in the reporting period. Two Action Level exceedances for 1-hr TSP were recorded from the air quality monitoring in this reporting period. No Limit Level exceedances for 1-hr TSP were recorded. No Action or Limit Level exceedances for 24-hr TSP were recorded. No Action Level or Limit Level exceedances were recorded in marine water quality impact monitoring during the reporting period. Investigation findings suggested that the observed exceedances for air quality monitoring were considered to be sporadic event from the cumulative anthropogenic activities (eg traffic emissions from River Trade Terminal) in this area of Hong Kong. Nevertheless, the Contractor was reminded to ensure that all dust mitigation measures are provided at the construction sites.

A total of 15 groups of 52 Chinese White Dolphin sightings were recorded during the six sets of surveys from December 2014 to February 2015. Whilst one Limit Level exceedance was recorded for the quarterly dolphin monitoring data between December 2014 and February 2015, no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations. Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the construction works of the Contract, and whether suitable mitigation measure can be applied to improve the situation.

Thirteen weekly environmental site inspections were carried out in the reporting period. Recommendations on remedial actions provided for the deficiencies identified during the site audits were properly implemented by the Contractor. No non-compliance event was recorded during the reporting period.

No environmental complaint was received during the reporting period.

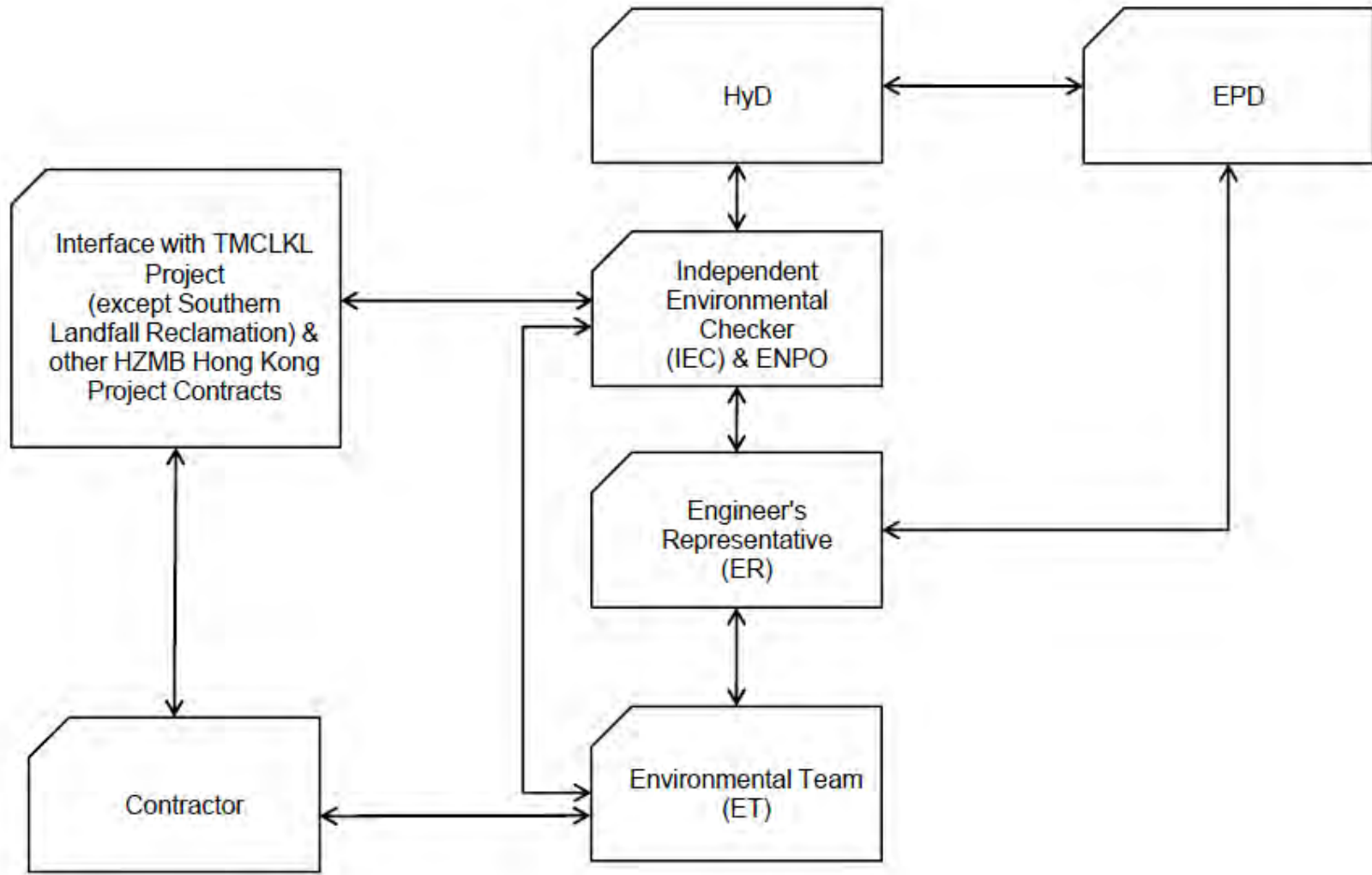
No summons/ prosecution was received during the reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not recommended at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period. The ET will keep track on the construction works to confirm

compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

Project Organization for Environmental Works



↔ Line of Communication

Appendix B

Construction Programme

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014										2015										
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug			
TMCLK - Northern Connection Sub-Sea Tunnel Section																											
General Submissions																											
General Design Submissions																											
(A19) DDA for Roadworks & Project Alignment																											
DD68350	ICE Approval & Issue Check Cert	12	18-Sep-14	03-Oct-14	03-Sep-14A	04-Feb-15A																					
DD68360	Submit ICE Check Cert to SO	6	04-Oct-14	10-Oct-14	05-Feb-15A	10-Feb-15A																					
DD68370	SO's Review	35	18-Sep-14	22-Oct-14	22-Dec-14A	22-Jun-15																					
(G6) IFA for Tunnel GBP																											
DD70750	SO's Review	35	29-Apr-14	02-Jun-14	09-Aug-14A	31-Mar-15																					
DD70760	SO Approval with Condition Received	0		03-Jun-14		31-Mar-15																					
Construction Supervision Plan																											
GEO1115	2nd GEO Review	28	29-Mar-14	25-Apr-14	01-Feb-14A	01-Apr-15																					
PAYMENT MILESTONE																											
Design and Design Checking of the Works																											
PM1115	MS 2.9 Submit AIP for ground treatment at Southern Landfall	0		29-Oct-14		30-Mar-15																					
PM1120	MS 2.10 Approve AIP for ground treatment at Southern Landfall by the Supervising Officer	0		22-Jan-15		06-May-15																					
PM1125	MS 2.11 Submit DDA for ground treatment at Southern Landfall	0		26-May-15		27-Jun-15																					
PM1135	MS 2.13 Submit Risk Assessment of CLPP submarine cables - Tunnelling Works	0		12-Jan-15		30-Mar-15																					
PM116520	MS 2.19.3 Submit DDA for Cross Passages	0		20-Dec-14		01-Jun-15																					
PM117010	MS 2.20.2 Approve DDA for TBM Sub-sea Tunnel - Internal Structure by the Supervising Officer	0		22-Dec-14		05-May-15																					
PM1180	MS 2.22 Approve AIP for Cut-and-cover Tunnel and Cross Passages at Southern Landfall by the Supervising Officer	0		17-Nov-14		01-Apr-15																					
PM1185	MS 2.23 Submit DDA for Cut-and-cover Tunnel and Cross Passages at Southern Landfall	0		13-Jan-15		01-Jun-15																					
PM1210	MS 2.28 Approve DDA for Cut-and-cover Tunnel and Cross Passages at Northern Landfall by the Supervising Officer	0		12-Feb-15		27-Apr-15																					
PM1220	MS 2.30 Approve AIP for Approach Ramp Structures to Cut-and-cover Tunnels by the Supervising Officer	0		17-Nov-14		01-Apr-15																					
PM1225	MS 2.31 Submit DDA for Approach Ramp Structures to Cut-and-cover Tunnels	0		13-Jan-15		01-Jun-15																					
PM1265	MS 2.39 Submit DDA for At grade Roads at Northern Landfall	0		25-Jul-14		06-Mar-15A																					
PM1305	MS 2.47 Submit DDA for North Ventilation Building	0		31-Oct-14		15-May-15																					
PM1325	MS 2.51 Submit DDA for Facilities Provision for TCSS	0		19-Nov-14		10-Jun-15																					
PM1345	MS 2.55 Submit DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall	0		03-Jan-15		30-Mar-15																					
PM1350	MS 2.56 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Southern Landfall by the Supervising Officer	0		08-Apr-15		25-Jun-15																					
PM1370	MS 2.60 Approve DDA for Drainage, Sewerage, Waterworks and Utilities at Northern Landfall by the Supervising Officer	0		12-Dec-14		18-Apr-15																					
PM1405	MS 2.67 Submit DDA for TBM North Approach - Tunnel Internal Structure	0		21-Jun-14		30-Mar-15																					
PM1410	MS 2.68 Approve DDA for TBM North Approach - Tunnel Internal Structure by the Supervising Officer	0		17-Sep-14		02-May-15																					
Tunnel Boring Machine (TBM) and Back-up Equipment for TBM Tunnel																											
PM1450	MS 3.1.3 Delivery to Site of cutter head of TBM for Southbound Tunnel	0		18-Feb-15		06-Mar-15A																					
PM1455	MS 3.1.4 Delivery to Site of remaining parts of TBM and back-up equipment for Southbound Tunnel	0		30-Mar-15		06-Mar-15A																					
PM1480	MS 3.1.8 Delivery to Site of cutter head of TBM for Northbound Tunnel	0		02-Sep-15		08-Jan-15A																					
PM1510	MS 3.1.14 Delivery to Site of hyperbaric intervention equipments and facilities, including but not limited to equipment	0		04-May-15		02-Jun-15																					
PM1530	MS 3.1.18 Delivery to Site of hyperbaric intervention equipments and facilities, including but not limited to equipment	0		04-May-15		02-Jun-15																					
PM1555	MS 3.1.23 Complete site assembly, testing and commissioning of Slurry Treatment Plant	0		05-Mar-15		27-Apr-15																					
Cut-and-cover Tunnel at Northern Landfall																											
PM2445	MS 4.2.3 Delivery to Site of cutter head of TBM for Northbound Northern Landfall TBM Tunnel	0		12-Dec-14		08-Jan-15A																					
PM2450	MS 4.2.4 Delivery to Site of remaining parts of TBM and back-up equipment for Northbound Northern Landfall TBM Tunnel	0		19-Jan-15		08-Apr-15																					
PM2455	MS 4.2.5 Complete site assembly, testing and commissioning of TBM for Northbound Northern Landfall TBM Tunnel	0		05-Mar-15		18-May-15																					
PM2465	MS 4.2.7 Complete walls of launching shaft	0		02-Sep-14		06-Mar-15A																					
PM2470	MS 4.2.8 Complete excavation to formation level for launching shaft and complete casting of base slab	0		29-Jan-15		08-Jan-15A																					
PM2475	MS 4.2.9 Complete all necessary works of launching shaft to facilitate launching of TBM	0		05-Feb-15		06-Mar-15A																					
PM2490	MS 4.2.12 Complete 75% of ground treatment for excavation of all Northern Landfall TBM Tunnels	0		10-Sep-14		08-Jan-15A																					
PM2495	MS 4.2.13 Complete 100% of ground treatment for excavation of all Northern Landfall TBM Tunnels	0		30-Apr-15		07-May-15																					
Temporary Pontoon																											
PM3090	MS 6A.2 Provide the operation and maintenance services for the Temporary Pontoon in accordance with the Contract.	1433	03-Dec-13	25-Oct-18	08-Feb-14A	24-Oct-18																					
Construction																											
Northern Landfall																											
North Reclamation (Phase 1)																											
Design Submission																											
(B4) DDA Construction Risk Assessment - Impact on North Landfall																											
DD68410	SO's Comments for 1st Submission	35	01-Jun-14	05-Jul-14	27-Sep-14A	02-Jan-15A																					
DD68420	Prepare Re-submission	10	07-Jul-14	17-Jul-14	02-Jan-15A	02-Jan-15A																					
DD68430	2nd Submission	0		17-Jul-14		02-Jan-15A																					
DD68490	SO's Condition Approval	35	18-Jul-14	21-Aug-14	02-Jan-15A	02-Jan-15A																					
(B4) DDA Construction Risk Assessment - Impact on Sub-sea Tunnel																											
DD71405	SO's Comments for 1st Submission	35	21-Sep-14	25-Oct-14	27-Sep-14A	02-Jan-15A																					
DD71415	Prepare Re-submission	10	27-Oct-14	06-Nov-14	02-Jan-15A	02-Jan-15A																					
DD71420	2nd Submission	0		06-Nov-14		02-Jan-15A																					
DD71435	SO's Condition Approval	35	07-Nov-14	11-Dec-14	02-Jan-15A	02-Jan-15A																					
Construction																											
Milestones																											
NRC13240	Completion of Zone A1 Reclamation up to +10mPD	0		21-Oct-14		30-Mar-15																					
NRC13250	Completion of Zone A2 Reclamation up to +10mPD	0		10-Nov-14		30-Dec-14A																					
Zone D1																											
Vertical Seawall																											
NRC11720	VS - Mass Concrete Coping - Zone D1 - (CH205 to 255)	15	18-Jun-14	05-Jul-14	22-Dec-14A	23-Jan-15A																					
NRC11790	VS - Mass Concrete Coping - Zone D1 - (CH255 to 305)	8	07-Jul-14	15-Jul-14	14-Jan-15A	11-Feb-15A																					
NRC11860	VS - Mass Concrete Coping - Zone D1 - (CH305 to 355)	8	16-Jul-14	24-Jul-14	05-Mar-15A	10-Mar-15A																					
Sloping Seawall																											

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDUGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDUGEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2015							
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul
A6416400	F - Backfilling to +6.0mPD to Existing Seawall - CH184 to CH231	1	21-Mar-14	21-Mar-14	10-Apr-15	10-Apr-15								
CH231 to CH278														
A6416273	F - Backfilling up to +0.5mPD & T3 Installation - CH231 to CH278	6	28-Mar-14	02-Apr-14	10-Nov-14A	12-Mar-15A								
A6416278	F - Backfilling up to +3.0mPD - CH231 to CH278	2	03-Apr-14	04-Apr-14	12-Apr-15	13-Apr-15								
A6416280	F - Backfilling up to +6.0mPD - CH231 to CH278	2	05-Apr-14	06-Apr-14	14-Apr-15	15-Apr-15								
A6416310	F - Anchor wall Installation - CH231 to CH278	4	07-Apr-14	10-Apr-14	16-Apr-15	20-Apr-15								
A6416480	F - Backfilling up to 0.0mPD & G2 Installation to Anchor Wall - CH231 to CH278	3	11-Apr-14	13-Apr-14	21-Apr-15	23-Apr-15								
A6416490	F - Backfilling up to +3.0mPD & G1 Installation to Anchor Wall - CH231 to CH278	2	14-Apr-14	15-Apr-14	24-Apr-15	25-Apr-15								
A6416500	F - Backfilling up to +6.0mPD to Anchor Wall - CH231 to CH278	2	16-Apr-14	17-Apr-14	26-Apr-15	27-Apr-15								
A6416510	F - Backfilling to +6.0mPD to Existing Seawall - CH231 to CH278	1	18-Apr-14	18-Apr-14	28-Apr-15	28-Apr-15								
CH278 to CH327														
A6416210	F - Backfilling up to +0.5mPD - CH278 to CH327	4	23-Mar-14	26-Mar-14	02-Apr-15	05-Apr-15								
A6416215	F - Backfilling up to +3.0mPD & T4 Installation - CH278 to CH327	5	27-Mar-14	31-Mar-14	07-Apr-15	11-Apr-15								
A6416220	F - Backfilling up to +6.0mPD - CH278 to CH327	2	01-Apr-14	02-Apr-14	12-Apr-15	13-Apr-15								
A6416340	F - Anchor wall Installation - CH278 to CH327	4	11-Apr-14	15-Apr-14	21-Apr-15	24-Apr-15								
A6416520	F - Backfilling up to 0.0mPD & G2 Installation to Anchor Wall - CH278 to CH327	3	16-Apr-14	18-Apr-14	25-Apr-15	27-Apr-15								
A6416530	F - Backfilling up to +3.0mPD & G1 Installation to Anchor Wall - CH278 to CH327	3	19-Apr-14	21-Apr-14	28-Apr-15	30-Apr-15								
A6416540	F - Backfilling up to +6.0mPD to Anchor Wall - CH278 to CH327	3	22-Apr-14	24-Apr-14	01-May-15	03-May-15								
A6416550	F - Backfilling to +6.0mPD to Existing Seawall - CH278 to CH327	1	25-Apr-14	25-Apr-14	04-May-15	04-May-15								
CH327 to CH381														
A6416155	F - Backfilling up to +0.5mPD - CH327 to CH381	3	16-Mar-14	18-Mar-14	30-Mar-15	01-Apr-15								
A6416160	F - Backfilling up to +3.0mPD & T4 Installation - CH327 to CH381	5	19-Mar-14	23-Mar-14	02-Apr-15	06-Apr-15								
A6416170	F - Backfilling up to +6.0mPD - CH327 to CH381	3	24-Mar-14	26-Mar-14	07-Apr-15	09-Apr-15								
A6416370	F - Anchor wall Installation - CH327 to CH381	3	16-Apr-14	22-Apr-14	25-Apr-15	28-Apr-15								
A6416560	F - Backfilling up to 0.0mPD & G2 Installation to Anchor Wall - CH327 to CH381	3	23-Apr-14	25-Apr-14	29-Apr-15	01-May-15								
A6416570	F - Backfilling up to +3.0mPD & G1 Installation to Anchor Wall - CH327 to CH381	3	26-Apr-14	28-Apr-14	02-May-15	04-May-15								
A6416580	F - Backfilling up to +6.0mPD to Anchor Wall - CH327 to CH381	2	29-Apr-14	30-Apr-14	05-May-15	06-May-15								
A6416590	F - Backfilling to +6.0mPD to Existing Seawall - CH327 to CH381	1	01-May-14	01-May-14	07-May-15	07-May-15								
Box Culvert Extension														
Construction														
CH000 to CH137														
A6416670	Bored Pile Construction - A43 to A62 (4 Rigs) & Land Sheet Piling - Summary	96	31-May-14	23-Sep-14	21-Jul-14A	06-Mar-15A								
A6416675	Land Sheet Pile Installation	77	24-Jun-14	23-Sep-14	10-Nov-14A	06-Mar-15A								
A6416680	Backfilling for Surcharge	18	24-Sep-14	16-Oct-14	30-Mar-15	23-Apr-15								
A6416690	Surcharge Period	180	17-Oct-14	14-Apr-15	24-Apr-15	20-Oct-15								
CH137 to CH184														
A6416770	Backfilling for Surcharge	12	20-Sep-14	06-Oct-14	30-Mar-15	16-Apr-15								
A6416780	Surcharge Period	180	07-Oct-14	04-Apr-15	17-Apr-15	13-Oct-15								
CH184 to CH231														
A6416620	Predrilling - CH184 to CH231	24	22-Mar-14	23-Apr-14	08-Nov-14A	29-Apr-15								
A6416730	Bored Pile Construction - A34 to A27 - Summary	156	22-Mar-14	30-Sep-14	30-Oct-14A	29-Aug-15								
A6416950	Bored Pile Construction - A34 to A27 - 4 out of 8 piles	39	14-May-14	28-Jun-14	30-Oct-14A	15-May-15								
A6416960	Bored Pile Construction - A34 to A27 - 6 out of 8 piles	39	30-Jun-14	14-Aug-14	16-May-15	03-Jul-15								
CH231 to CH278														
A6416630	Predrilling - CH231 to CH278	24	22-Apr-14	21-May-14	29-Apr-15	28-May-15								
A6416740	Bored Pile Construction - A26 to A19 - Summary	143	22-Apr-14	13-Oct-14	29-Apr-15	19-Oct-15								
A6417470	Bored Pile Construction - A26 to A19 - 2 out of 8 piles	36	22-Apr-14	05-Jun-14	29-Apr-15	11-Jun-15								
A6417500	Bored Pile Construction - A26 to A19 - 4 out of 8 piles	36	06-Jun-14	18-Jul-14	12-Jun-15	25-Jul-15								
CH278 to CH327														
A6416640	Predrilling - CH278 to CH327	24	26-Apr-14	26-May-14	05-May-15	02-Jun-15								
A6416750	Bored Pile Construction - A18 to A11 - Summary	117	27-May-14	15-Oct-14	03-Jun-15	22-Oct-15								
A6417530	Bored Pile Construction - A18 to A11 - 2 out of 8 piles	30	27-May-14	02-Jul-14	03-Jun-15	09-Jul-15								
CH327 to CH381														
A6416650	Predrilling - CH327 to CH381	24	02-May-14	30-May-14	08-May-15	05-Jun-15								
A6416760	Bored Pile Construction - A10 to A03	86	31-May-14	11-Sep-14	06-Jun-15	16-Sep-15								
A6417570	Bored Pile Construction - A10 to A03 - 2 out of 8 piles	22	31-May-14	26-Jun-14	06-Jun-15	03-Jul-15								
CH381 to CH399 (Box Culvert Connection)														
A6416660	F - Prebored H-piles for CKS Temporary Land Access	6	18-Feb-14	24-Feb-14	16-Mar-15A	20-Mar-15A								
A6417000	F - Steel Bridge Installation for Land Access to Zone E	52	25-Feb-14	30-Apr-14	16-Mar-15A	22-Mar-15A								
A6417010	F - Available of Land Access to Zone E	0	02-May-14		22-Mar-15A									
North Shafts Construction & Tunnel Structure														
Design Submission														
(C1) DDA for North Approach Ramp Permanent Structure														
DD70770	Preparation DDA North Approach Ramp Permanent Structure	18	28-Jun-14	19-Jul-14	02-Jan-15A	13-Jan-15A								
DD70780	Review & Comment by JV	12	21-Jul-14	02-Aug-14	13-Jan-15A	02-Apr-15								
DD70785	Designer prepare DDA	6	04-Aug-14	09-Aug-14	08-Apr-15	14-Apr-15								
DD70790	Formal Submission of DDA to ICE/ IPs	0		09-Aug-14		14-Apr-15								
DD70792	Advanced Submission to SO	0		09-Aug-14		14-Apr-15								
DD70794	IPs/SO's Advance comments / ICE comments	28	10-Aug-14	06-Sep-14	15-Apr-15	12-May-15								
DD70800	IPs/ SO's Advance Comments/ ICE Comments	28	07-Sep-14	04-Oct-14	13-May-15	09-Jun-15								
DD70805	Comments Received	0		04-Oct-14		09-Jun-15								
DD70810	Designer to Reply RIC + Update Submission	15	06-Oct-14	22-Oct-14	10-Jun-15	27-Jun-15								
DD70820	Submit Updated DDA to SO/ ICE/ IPs	0	23-Oct-14		29-Jun-15									
DD70830	ICE Approval & Issue Check Cert	18	23-Oct-14	12-Nov-14	29-Jun-15	20-Jul-15								
DD70850	IPs Review	28	23-Oct-14	19-Nov-14	29-Jun-15	26-Jul-15								

- Planned Bar
- Planned Bar - Critical
- ◆ Planned Milestone
- Progress bar
- ◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
Detailed Works Programme (Rev. C) - Three months rolling programme
Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDBUGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDBUGEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014											
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	2015	2015	2015
DD70870	SO's Review	35	23-Oct-14	26-Nov-14	29-Jun-15	02-Aug-15	SO's Review											
Construction																		
North Launching Shaft Base Slab for TBM Launching																		
NSH1455	E - Tympanum construction for TBM break-in	12	20-Nov-14	03-Dec-14	29-Jan-15A	02-Apr-15	E - Tympanum construction for TBM break-in											
NSH1460	E - Cell 1 to 2 - Base Slab construction	22	13-Nov-14	08-Dec-14	01-Dec-14A	22-Jan-15A	E - Cell 1 to 2 - Base Slab construction											
North Ventilation Shaft ELS Foundation & Capping Beam																		
A6415780	B - Diaphragm Wall - Shaft ELS	81	26-Aug-14	01-Dec-14	24-Nov-14A	28-Mar-15A	B - Diaphragm Wall - Shaft ELS											
A6415790	B - Instrumentation & Pump well Installation	6	02-Dec-14	08-Dec-14	06-Mar-15A	02-Apr-15	B - Instrumentation & Pump well Installation											
A6415795	B - Pumping Test for Excavation	7	09-Dec-14	15-Dec-14	03-Apr-15	09-Apr-15	B - Pumping Test for Excavation											
North Ventilation Shaft Excavation & Base Slab																		
A6415800	B - Vent Shaft Excavation (+6.0 to +4.0mPD) - Reclaimed Fill	5	02-Dec-14	06-Dec-14	30-Mar-15	08-Apr-15	B - Vent Shaft Excavation (+6.0 to +4.0mPD) - Reclaimed Fill											
A6415810	B - Capping Beam Installation (+6.0mPD)	12	08-Dec-14	20-Dec-14	09-Apr-15	22-Apr-15	B - Capping Beam Installation (+6.0mPD)											
A6415820	B - Vent Shaft Excavation (+4.0 to -8.0mPD) - Reclaimed Fill	19	22-Dec-14	15-Jan-15	23-Apr-15	15-May-15	B - Vent Shaft Excavation (+4.0 to -8.0mPD) - Reclaimed Fill											
A6415830	B - Ring Beam Installation (-5.5mPD)	6	16-Jan-15	22-Jan-15	16-May-15	22-May-15	B - Ring Beam Installation (-5.5mPD)											
A6415840	B - Vent Shaft Excavation (-8.0 to -20.0mPD) - Fill/MD/ALLUVIUM	27	23-Jan-15	02-Mar-15	23-May-15	25-Jun-15	B - Vent Shaft Excavation (-8.0 to -20.0mPD) - Fill/MD/ALLUVIUM											
A6415850	B - Ring Beam Installation (-18.0mPD)	6	03-Mar-15	09-Mar-15	26-Jun-15	03-Jul-15	B - Ring Beam Installation (-18.0mPD)											
CLP Temporary Substation																		
Construction																		
DDP12800	1st Batch - CLP Installation & Commissioning	108	02-Jul-14	07-Nov-14	02-Jul-14A	10-Jan-15A	1st Batch - CLP Installation & Commissioning											
DDP12860	1st Batch - Commissioning & Energization	0		28-Nov-14		10-Jan-15A	1st Batch - Commissioning & Energization											
DDP12870	2nd Batch - CLP Installation & Commissioning	95	15-Oct-14	05-Feb-15	02-Jul-14A	10-Jan-15A	2nd Batch - CLP Installation & Commissioning											
DDP12900	Final FS Installation by JV	6	06-Feb-15	12-Feb-15	10-Jan-15A	10-Jan-15A	Final FS Installation by JV											
DDP12910	FSD inspection for 2nd Transformer Energization	6	13-Feb-15	18-Feb-15	10-Jan-15A	10-Jan-15A	FSD inspection for 2nd Transformer Energization											
DDP12920	2nd Batch - Commissioning & Energization	0		18-Feb-15		10-Jan-15A	2nd Batch - Commissioning & Energization											
North Surface works for TBM Tunnelling																		
Design Submission																		
(D1) IFA for Temp. Access to Portion N8A, N8B & N8C incl. Temp. Lighting																		
AP01500	Preparation of AIP Temporary Access Road to N8	33	02-Jan-14	15-Feb-14	02-Jan-14A	13-Mar-15A	Preparation of AIP Temporary Access Road to N8											
AP01505	Review & Comment by JV	12	17-Feb-14	01-Mar-14	13-Mar-15A	18-Mar-15A	Review & Comment by JV											
AP01510	Designer Prepare IFA	6	03-Mar-14	08-Mar-14	18-Mar-15A	20-Mar-15A	Designer Prepare IFA											
AP01515	Formal Submission of IFA to ICE/IPs	0		08-Mar-14		20-Mar-15A	Formal Submission of IFA to ICE/IPs											
AP01520	Advanced Submission of IFA to SO	0		08-Mar-14		20-Mar-15A	Advanced Submission of IFA to SO											
AP01525	Review & Comment by SO/ ICE/ IPs	28	09-Mar-14	05-Apr-14	20-Mar-14A	20-Apr-15	Review & Comment by SO/ ICE/ IPs											
AP01530	Advance Comments from SO/ Comments from ICE/ IPs Received	0		07-Apr-14		20-Apr-15	Advance Comments from SO/ Comments from ICE/ IPs Received											
AP01535	Designer to Prepare Rtc & Updated AIP	18	07-Apr-14	30-Apr-14	21-Apr-15	12-May-15	Designer to Prepare Rtc & Updated AIP											
AP01540	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)	0		30-Apr-14		12-May-15	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)											
AP01545	Reply to IPs Comments in RTC	0		30-Apr-14		12-May-15	Reply to IPs Comments in RTC											
AP01550	ICE Approval & Issue of Design Check Cert.	18	02-May-14	23-May-14	13-May-15	03-Jun-15	ICE Approval & Issue of Design Check Cert.											
AP01555	Check Cert to SO	0		23-May-14		03-Jun-15	Check Cert to SO											
AP01560	No Objection or Further Minor Comments from IPs Received	0		23-May-14		03-Jun-15	No Objection or Further Minor Comments from IPs Received											
AP01565	SO Review (35 Days)	35	02-May-14	05-Jun-14	13-May-15	16-Jun-15	SO Review (35 Days)											
AP01570	SO Approval with Condition Received	0		05-Jun-14		16-Jun-15	SO Approval with Condition Received											
Construction																		
Zone E																		
A6416450	Zone E - Jet grouting for Break-in Plug	60	04-Nov-14	15-Jan-15	03-Sep-14A	09-Mar-15A	Zone E - Jet grouting for Break-in Plug											
Zone D1																		
NRC14020	Zone D1 - B/C Slurry Substitution for CP54	20	14-Jul-14	05-Aug-14	02-Sep-14A	07-Feb-15A	Zone D1 - B/C Slurry Substitution for CP54											
Zone D2																		
NRC14110	Zone D2 - B/C Slurry Substitution for CP53	22	06-Aug-14	30-Aug-14	15-Jan-15A	13-Feb-15A	Zone D2 - B/C Slurry Substitution for CP53											
Zone C1																		
NRC1202130	Zone C1 - B/C Slurry Substitution for CP52	26	27-Aug-14	26-Sep-14	02-Mar-15A	02-Mar-15A	Zone C1 - B/C Slurry Substitution for CP52											
Zone C2																		
NRC1202150	Zone C2 - Drilling for Rock Fissure Grouting for CP51	21	03-Jul-14	26-Jul-14	06-Nov-14A	10-Jan-15A	Zone C2 - Drilling for Rock Fissure Grouting for CP51											
NRC1202155	Zone C2 - Rock Fissure Grouting for CP51	44	14-Jul-14	02-Sep-14	19-Nov-14A	10-Jan-15A	Zone C2 - Rock Fissure Grouting for CP51											
NRC1202160	Zone C2 - Jet Grouting for CP51	18	20-Aug-14	10-Sep-14	10-Jan-15A	10-Jan-15A	Zone C2 - Jet Grouting for CP51											
Zone B																		
A6415895	Zone B - Unreinforced Separation D-wall	13	27-Aug-14	11-Sep-14	11-Feb-15A	31-Mar-15	Zone B - Unreinforced Separation D-wall											
A6415897	Zone B - Unreinforced Separation D-wall	13	25-Jul-14	08-Aug-14	19-Nov-14A	10-Feb-15A	Zone B - Unreinforced Separation D-wall											
A6415900	Zone B - Slurry Wall for TBM Break-out Plug	34	02-Dec-14	13-Jan-15	23-Mar-15A	23-Mar-15A	Zone B - Slurry Wall for TBM Break-out Plug											
A6415910	Zone B - Slurry Wall - Toe Grouting	24	14-Jan-15	10-Feb-15	23-Mar-15A	23-Mar-15A	Zone B - Slurry Wall - Toe Grouting											
A6415920	Zone B - Ground Treatment for TBM Break-out Plug	58	11-Feb-15	30-Apr-15	18-Mar-15A	07-May-15	Zone B - Ground Treatment for TBM Break-out Plug											
Ground Treatment																		
A6417430	Zone A - B/C Slurry Substitution for CP49	30	22-Oct-14	25-Nov-14	30-Mar-15	08-May-15	Zone A - B/C Slurry Substitution for CP49											
A6417440	Zone A - Drilling for Rock Fissure Grouting for CP48	65	11-Nov-14	28-Jan-15	30-Mar-15	19-Jun-15	Zone A - Drilling for Rock Fissure Grouting for CP48											
A6417450	Zone A - Rock Fissure Grouting for CP48	90	25-Nov-14	19-Mar-15	17-Apr-15	04-Aug-15	Zone A - Rock Fissure Grouting for CP48											
A6417460	Zone A - Jet Grouting for CP48	72	29-Jan-15	05-May-15	22-Jun-15	14-Sep-15	Zone A - Jet Grouting for CP48											
North Approach TBM Tunnelling & Cross Passage																		
Major Procurement																		
Precast Segment																		
Precast Segment ID15.60 - Production for NB North TBM Tunnel																		
A6417970	ID15.60 TBM Segment Ring Fabrication - 2 rings per day	148	30-Sep-14	25-Apr-15	25-Sep-14A	18-Jun-15	ID15.60 TBM Segment Ring Fabrication - 2 rings per day											
Design Submission																		
(D7) IFA Gantry Crane Supports/Foundation																		
DD69070	Designer to Reply Rtc + Update Submission	21	07-May-14	30-May-14	04-Dec-14A	08-Jan-15A	Designer to Reply Rtc + Update Submission											
DD69080	Submit Updated IFA to SO/ ICE/ IPs	0		31-May-14		08-Jan-15A	Submit Updated IFA to SO/ ICE/ IPs											
DD69090	ICE Approval & Issue Check Cert	12	31-May-14	14-Jun-14	11-Nov-14A	19-Jan-15A	ICE Approval & Issue Check Cert											

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDBJGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDBJGEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014															
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	2015						
DD69100	IPs Review	28	31-May-14	27-Jun-14	08-Jan-15A	03-Feb-15A																
DD69110	IPs No Objection Received	0		27-Jun-14		03-Feb-15A																
DD69120	SO's Review	35	31-May-14	04-Jul-14	08-Jan-15A	03-Feb-15A																
DD69130	SO Approval with Condition R received	0		04-Jul-14		03-Feb-15A																
(D8) IFA Thrust Frame for TBM Launching																						
DD69190	IPs/ SO's Advance Comments/ ICE Comments	28	23-May-14	19-Jun-14	01-Nov-14A	14-Jan-15A																
DD69200	Comments Received	0		19-Jun-14		14-Jan-15A																
DD69210	Designer to Reply RTC + Update Submission	21	20-Jun-14	15-Jul-14	15-Jan-15A	06-Mar-15A																
DD69220	Submit Updated IFA to SO/ ICE/ IPs	0	16-Jul-14		06-Mar-15A																	
DD69230	ICE Approval & Issue Check Cert	12	16-Jul-14	29-Jul-14	06-Mar-15A	20-Mar-15A																
DD69240	IPs Review	28	16-Jul-14	12-Aug-14	06-Mar-15A	26-Mar-15A																
DD69250	IPs No Objection Received	0		12-Aug-14		26-Mar-15A																
DD69260	SO's Review	35	16-Jul-14	19-Aug-14	06-Mar-15A	26-Mar-15A																
DD69270	SO Approval with Condition R received	0		19-Aug-14		26-Mar-15A																
(G2) DDA for TBM Tunnel Lining Structural Design - North Approach																						
DD01055	Northern TBM Segment Ring Manufacturing	173	01-Aug-14	04-Mar-15	25-Aug-14A	19-May-15																
DD01065	Northern TBM Tunnel Break-in	0	06-Mar-15		19-May-15*																	
(G2) DDA for TBM Tunnel Lining Settlement Analysis & Confinement Pressure - North Approach																						
DD00805	Review & Comment by JV	12	24-May-14	07-Jun-14	21-Nov-14A	31-Dec-14A																
DD00810	Designer prepare DDA	12	09-Jun-14	21-Jun-14	02-Jan-15A	09-Jan-15A																
DD00815	Formal Submission of DDA to ICE/ IPs	0		21-Jun-14		09-Jan-15A																
DD00820	Advanced Submission to SO	0		21-Jun-14		09-Jan-15A																
DD00825	IPs/ SO's Advance Comments/ ICE Comments	28	22-Jun-14	19-Jul-14	10-Jan-15A	21-Mar-15A																
DD00830	Comments Received	0		19-Jul-14		21-Mar-15A																
DD00835	Designer to Reply RTC + Update Submission	21	21-Jul-14	13-Aug-14	21-Mar-15A	25-Mar-15A																
DD00840	Submit Updated DDA to SO/ ICE/ IPs	0	14-Aug-14		25-Mar-15A																	
DD00845	ICE Approval & Issue Check Cert	12	14-Aug-14	27-Aug-14	30-Mar-15	16-Apr-15																
DD00850	Submit ICE Check Cert to SO	6	28-Aug-14	03-Sep-14	17-Apr-15	23-Apr-15																
DD00855	IPs Review	28	14-Aug-14	10-Sep-14	25-Mar-15A	24-Apr-15																
DD00860	IPs No Objection Received	0		10-Sep-14		24-Apr-15																
DD00880	SO's Review	35	14-Aug-14	17-Sep-14	25-Mar-15A	01-May-15																
DD00885	SO Approval with Condition R received	0		17-Sep-14		02-May-15																
(G5) DDA for Cross Passage - Permanent works - incl. Detailed Geotechnical Assessment - North																						
DD67468	IPs/ SO's Advance Comments/ ICE Comments	28	14-Nov-14	11-Dec-14	05-Dec-14A	06-Feb-15A																
DD67470	Comments Received	0		11-Dec-14		06-Feb-15A																
DD67478	Designer to Reply RTC + Update Submission	21	12-Dec-14	08-Jan-15	07-Feb-15A	11-Mar-15A																
DD67488	Submit Updated DDA to SO/ ICE/ IPs	0	09-Jan-15		11-Mar-15A																	
DD67498	ICE Approval & Issue Check Cert	12	09-Jan-15	22-Jan-15	11-Mar-15A	08-Apr-15																
DD67508	Submit ICE Check Cert to SO	6	23-Jan-15	29-Jan-15	08-Apr-15	15-Apr-15																
DD67518	IPs Review	28	09-Jan-15	05-Feb-15	11-Mar-15A	19-Apr-15																
DD67528	IPs No Objection Received	0		05-Feb-15		19-Apr-15																
DD67609*	SO's Review	35	09-Jan-15	12-Feb-15	11-Mar-15A	26-Apr-15																
DD67610	SO Approval with Condition R received	0		12-Feb-15		27-Apr-15																
(H2) DDA Temp. works for Cross Passages - North																						
DD06120	SO's Review	35	02-Aug-14	05-Sep-14	29-Aug-14A	02-Jan-15A																
DD06130	SO Approval with Condition R received	0		05-Sep-14		02-Jan-15A																
Construction																						
Northern Landfall Surface Setup for TBM operation																						
A6415930	Gantry Setup at North TBM Launching Shaft	48	29-Jul-14	23-Sep-14	20-Dec-14A	03-Jan-15A																
A6415937	Slurry Treatment Plant Foundation	25	15-Oct-14	12-Nov-14	20-Oct-14A	30-Mar-15																
A6415940	Slurry Treatment Plant 1 Setup at Northern Landfall	64	13-Nov-14	29-Jan-15	20-Nov-14A	24-Mar-15A																
A6415950	Slurry Treatment Plant 1 Commissioning	24	30-Jan-15	05-Mar-15	25-Mar-15A	27-Apr-15																
A6415955	Slurry Treatment Plant 2 Setup at Northern Landfall	54	30-Jan-15	14-Apr-15	09-Feb-15A	07-May-15																
A6415957	Slurry Treatment Plant 2 Commissioning	24	15-Apr-15	13-May-15	08-May-15	05-Jun-15																
A6416000	Hyperbaric Equipment Installation, Commissioning & Operation	59	05-May-15	15-Jul-15	03-Jun-15	12-Aug-15																
S880 TBM Assembly at North TBM Launching Shaft																						
NSH1900	S880 - TBM Launching - Front Shield Assembly	3	09-Dec-14	11-Dec-14	23-Jan-15A	27-Jan-15A																
NSH1910	S880 - TBM Launching - Cutterhead Assembly	3	12-Dec-14	14-Dec-14	27-Jan-15A	30-Jan-15A																
NSH1920	S880 - TBM Launching - Erector Assembly	3	15-Dec-14	17-Dec-14	31-Jan-15A	05-Feb-15A																
NSH1930	S880 - TBM Launching - Tail Skin Assembly	3	18-Dec-14	20-Dec-14	05-Feb-15A	12-Feb-15A																
NSH1940	S880 - TBM Launching - Main Drive Connection	2	21-Dec-14	22-Dec-14	13-Feb-15A	10-Mar-15A																
NSH1950	S880 - TBM Launching - Main Drive Shifting	2	23-Dec-14	24-Dec-14	03-Mar-15A	04-Mar-15A																
NSH1960	S880 - TBM Launching - Main Drive Thrust Frame Installation	14	25-Dec-14	07-Jan-15	20-Apr-15A	08-Apr-15																
NSH1965	S880 - TBM Launching - Gantry 2 Assembly	3	25-Dec-14	27-Dec-14	06-Mar-15A	07-Mar-15A																
NSH1970	S880 - TBM Launching - Gantry 1 Assembly	3	28-Dec-14	30-Dec-14	07-Mar-15A	08-Mar-15A																
NSH1980	S880 - TBM Launching - Gantry 1 & Main Drive connection	3	08-Jan-15	10-Jan-15	11-Mar-15A	12-Mar-15A																
NSH1990	S880 - TBM Launching - Gantry 2 & Gantry 1 connection	3	11-Jan-15	13-Jan-15	10-Mar-15A	11-Mar-15A																
NSH2000	S880 - TBM Launching - Gantry 3 assembly	3	09-Jan-15	11-Jan-15	11-Mar-15A	13-Mar-15A																
NSH2010	S880 - TBM Launching - Gantry 4 assembly	3	12-Jan-15	14-Jan-15	14-Mar-15A	16-Mar-15A																
NSH2020	S880 - TBM Launching - Gantry 3 & Gantry 2 connection	3	14-Jan-15	16-Jan-15	17-Mar-15A	20-Mar-15A																
NSH2030	S880 - TBM Launching - Gantry 4 & Gantry 3 connection	3	17-Jan-15	19-Jan-15	20-Mar-15A	22-Mar-15A																
NSH2040	S880 - TBM Launching - Testing & Commissioning	24	20-Jan-15	12-Feb-15	23-Mar-15A	28-Apr-15																
NSH2050	S880 - TBM Launching - Segment Ring Installation for Break-in	8	13-Feb-15	23-Feb-15	29-Apr-15	06-May-15																
NSH2060	S880 - TBM Launching - Final commissioning & Break-in	10	24-Feb-15	05-Mar-15	07-May-15	17-May-15																

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section

Detailed Works Programme (Rev. C) - Three months rolling programme

Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLK/DWPC/PRG/08505	SPa	WYu
28-Aug-14	TMCLK/DWPC/PRG/08505 Rev. C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014												
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug				
S882 TBM Assembly at North TBM Launching Shaft																			
NSH206010	S882 - TBM Launching - Front Shield Assembly	3	13-Feb-15	15-Feb-15	08-Mar-15A	20-Mar-15A													
NSH206020	S882 - TBM Launching - Cutterhead Assembly	3	16-Feb-15	18-Feb-15	22-Mar-15A	22-Mar-15A													
NSH206030	S882 - TBM Launching - Erector Assembly	3	22-Feb-15	24-Feb-15	24-Mar-15A	26-Mar-15A													
NSH206040	S882 - TBM Launching - Tail Skin Assembly	3	25-Feb-15	27-Feb-15	28-Mar-15A	04-May-15													
NSH2130	S882 - TBM Launching - Main Drive Connection	2	28-Feb-15	01-Mar-15	05-May-15	06-May-15													
NSH2140	S882 - TBM Launching - Main Drive Shifting	2	02-Mar-15	03-Mar-15	07-May-15	08-May-15													
NSH2150	S882 - TBM Launching - Main Drive Thrust Frame Installation	14	04-Mar-15	17-Mar-15	09-May-15	23-May-15													
NSH215010	S882 - TBM Launching - Gantry 2 Assembly	3	04-Mar-15	06-Mar-15	09-May-15	11-May-15													
NSH215020	S882 - TBM Launching - Gantry 1 Assembly	3	07-Mar-15	09-Mar-15	12-May-15	14-May-15													
NSH2160	S882 - TBM Launching - Gantry 1 & Main Drive connection	3	18-Mar-15	20-Mar-15	24-May-15	26-May-15													
NSH2170	S882 - TBM Launching - Gantry 2 & Gantry 1 connection	3	21-Mar-15	23-Mar-15	27-May-15	29-May-15													
NSH2180	S882 - TBM Launching - Gantry 3 assembly	3	10-Mar-15	12-Mar-15	16-May-15	18-May-15													
NSH2190	S882 - TBM Launching - Gantry 4 assembly	3	13-Mar-15	15-Mar-15	19-May-15	21-May-15													
NSH2200	S882 - TBM Launching - Gantry 3 & Gantry 2 connection	3	24-Mar-15	26-Mar-15	30-May-15	01-Jun-15													
NSH2210	S882 - TBM Launching - Gantry 4 & Gantry 3 connection	3	27-Mar-15	29-Mar-15	02-Jun-15	04-Jun-15													
NSH2220	S882 - TBM Launching - Testing & Commissioning	24	30-Mar-15	25-Apr-15	05-Jun-15	29-Jun-15													

North Approach TBM Tunnel - NB ID15.60m - S880

TBM10010	NB - North TBM Tunnel - CDG+Boulder with Trimix (Ch7175 to 7155 - 20m)	14	06-Mar-15	19-Mar-15	22-Jun-15	06-Jul-15
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North Ventilation Building

Design Submission

(A10) ACABAS Submissions

GS01648	Prepare 3rd Submission for ACABAS Approval	24	17-Feb-14	15-Mar-14	19-Feb-14A	30-Jan-15A
GS01650	ACABAS Approval	28	16-Mar-14	12-Apr-14	31-Jan-15A	01-Apr-15

(A11) Submissions to Design Advisory Panel of ArchSD

GS01730	Prepare Re-submission	18	19-May-14	09-Jun-14	22-Jul-14A	31-Mar-15
GS01740	ArchSD's comment	30	10-Jun-14	09-Jul-14	01-Apr-15	30-Apr-15

(I1) DDA for North Vent. Bldgs. GBP & Arch. Submission

DD01225	IPs/ SO's Advance Comments/ ICE Comments	28	29-Jun-14	26-Jul-14	10-Dec-14A	31-Mar-15
DD01230	Comments Received	0		26-Jul-14		31-Mar-15
DD01235	Designer to Reply Rtc + Update Submission	21	28-Jul-14	20-Aug-14	02-Apr-15	30-Apr-15
DD01240	Submit Updated DDA to SO/ ICE/ IPs	0	21-Aug-14		02-May-15	
DD01245	ICE Approval & Issue Check Cert	12	21-Aug-14	03-Sep-14	02-May-15	15-May-15
DD01250	Submit ICE Check Cert to SO	6	04-Sep-14	11-Sep-14	16-May-15	22-May-15
DD01255	IPs Review	28	21-Aug-14	17-Sep-14	02-May-15	29-May-15
DD01260	IPs No Objection Received	0		17-Sep-14		29-May-15
DD01265	SO's Review	35	21-Aug-14	24-Sep-14	02-May-15	05-Jun-15
DD01270	SO Approval with Condition Received	0		24-Sep-14		05-Jun-15

(I1) DDA for North & South Vent. Bldg. ABWF works

DD67638	Preparation of DDANorth & South ABWF	18	25-Sep-14	17-Oct-14	06-Jun-15	27-Jun-15
DD67648	Review & Comment by JV	24	18-Oct-14	14-Nov-14	29-Jun-15	27-Jul-15

(I2) DDA for North Vent. Bldgs. Foundation Design

DD01305	Review & Comment by JV	18	05-Sep-14	26-Sep-14	26-Dec-14A	30-Dec-14A
DD01310	Designer prepare DDA	10	27-Sep-14	10-Oct-14	31-Dec-14A	31-Dec-14A
DD01315	Formal Submission of DDA to ICE/ IPs	0		10-Oct-14		02-Jan-15A
DD01320	Advanced Submission to SO	0		10-Oct-14		02-Jan-15A
DD01325	IPs/ SO's Advance Comments/ ICE Comments	28	11-Oct-14	07-Nov-14	02-Jan-15A	23-Jan-15A
DD01330	Comments Received	0		07-Nov-14		23-Jan-15A
DD01335	Designer to Reply Rtc + Update Submission	21	08-Nov-14	02-Dec-14	24-Jan-15A	30-Jan-15A
DD01340	Submit Updated DDA to SO/ ICE/ IPs	0	03-Dec-14		30-Jan-15A	
DD01345	ICE Approval & Issue Check Cert	12	03-Dec-14	16-Dec-14	30-Jan-15A	31-Jan-15A
DD01350	Submit ICE Check Cert to SO	6	17-Dec-14	23-Dec-14	02-Feb-15A	05-Feb-15A
DD01355	IPs Review	28	03-Dec-14	30-Dec-14	30-Jan-15A	31-Mar-15
DD01360	IPs No Objection Received	0		30-Dec-14		31-Mar-15
DD01380	SO's Review	35	03-Dec-14	06-Jan-15	30-Jan-15A	04-Apr-15
DD01385	SO Approval with Condition Received	0		06-Jan-15		08-Apr-15

(I2) DDA for North Vent. Bldgs. Structural Design incl. Vent. Connections

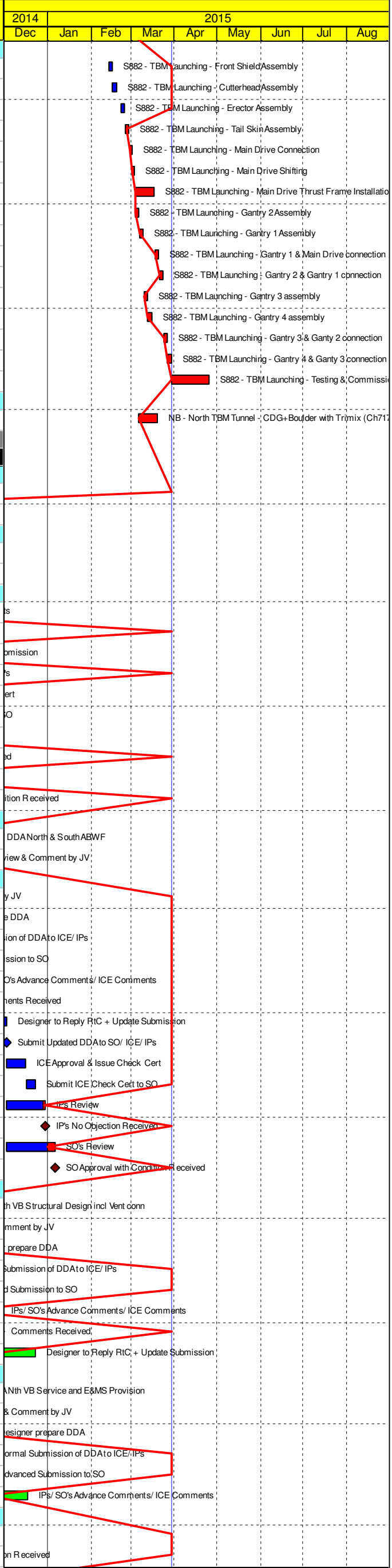
DD68008	Preparation of DDANth VB Structural Design incl Vent conn	18	05-Sep-14	26-Sep-14	24-Jan-15A	11-Apr-15
DD68018	Review & Comment by JV	18	27-Sep-14	20-Oct-14	13-Apr-15	04-May-15
DD68020	Designer prepare DDA	10	21-Oct-14	31-Oct-14	05-May-15	15-May-15
DD68028	Formal Submission of DDA to ICE/ IPs	0		31-Oct-14		15-May-15
DD68030	Advanced Submission to SO	0		31-Oct-14		15-May-15
DD68038	IPs/ SO's Advance Comments/ ICE Comments	28	01-Nov-14	28-Nov-14	16-May-15	12-Jun-15
DD68040	Comments Received	0		28-Nov-14		12-Jun-15
DD68048	Designer to Reply Rtc + Update Submission	21	29-Nov-14	23-Dec-14	13-Jun-15	09-Jul-15

(I3) DDA for North & South Vent. Bldgs. Service and E&M Provision

DD01600	Preparation of DDANth VB Service and E&MS Provision	18	12-Sep-14	04-Oct-14	30-Mar-15	23-Apr-15
DD01605	Review & Comment by JV	24	06-Oct-14	01-Nov-14	24-Apr-15	22-May-15
DD01610	Designer prepare DDA	15	03-Nov-14	19-Nov-14	23-May-15	10-Jun-15
DD01615	Formal Submission of DDA to ICE/ IPs	0		19-Nov-14		10-Jun-15
DD01620	Advanced Submission to SO	0		19-Nov-14		10-Jun-15
DD01625	IPs/ SO's Advance Comments/ ICE Comments	28	20-Nov-14	17-Dec-14	11-Jun-15	08-Jul-15

(J1) AIP Temp. works for Construction of Nth. Vent. Bldg.

AP01880	SO Review (35 Days)	35	15-Aug-14	18-Sep-14	10-Dec-14A	07-Jan-15A
AP01885	SO Approval with Condition Received	0		18-Sep-14		07-Jan-15A



■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15

Date	Revision	Checked	Approved
21-Feb-14	TMCLKDBJGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDBJGEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014																		
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	2015	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	
(J1) DDA Temp.works for Construction of Sth.Vent.Bldg.																									
DD04380	Preparation of DDANth VB & Trench ELS	18	19-Sep-14	11-Oct-14	30-Mar-15	23-Apr-15	DANth VB & Trench ELS																		
DD04390	Review & Comment by JV	18	13-Oct-14	01-Nov-14	23-Apr-15	15-May-15	& Comment by JV																		
DD04400	Designer prepare DDA	10	03-Nov-14	13-Nov-14	15-May-15	28-May-15	Designer prepare DDA																		
DD04410	Formal Submission of DDAto ICE/ IPs	0		13-Nov-14		28-May-15	Formal Submission of DDAto ICE/ IPs																		
DD04420	Advanced Submission to SO	0		13-Nov-14		28-May-15	Advanced Submission to SO																		
DD04430	IPs/ SO's Advance Comments/ ICE Comments	28	14-Nov-14	11-Dec-14	28-May-15	25-Jun-15	IPs/ SO's Advance Comments/ ICE Comments																		
DD04440	Comments Received	0		11-Dec-14		25-Jun-15	Comments Received																		
DD04450	Designer to Reply RtC + Update Submission	21	12-Dec-14	08-Jan-15	25-Jun-15	21-Jul-15	Designer to Reply RtC + Update Submission																		
(C3) DDA for North Vent Shaft & Duct Permanent Structure																									
DD67268	Preparation of DDANorth Vent Shaft & Duct Perm Structure	18	07-Aug-14	27-Aug-14	31-Jul-14A	15-Jan-15A	North Vent Shaft & Duct Perm Structure																		
DD67278	Review & Comment by JV	18	28-Aug-14	18-Sep-14	16-Jan-15A	31-Mar-15	Review & Comment by JV																		
DD67280	Designer prepare DDA	10	19-Sep-14	30-Sep-14	01-Apr-15	16-Apr-15	Designer prepare DDA																		
DD67288	Formal Submission of DDAto ICE/ IPs	0		30-Sep-14		16-Apr-15	Formal Submission of DDAto ICE/ IPs																		
DD67290	Advanced Submission to SO	0		30-Sep-14		16-Apr-15	Advanced Submission to SO																		
DD67298	IPs/ SO's Advance Comments/ ICE Comments	28	01-Oct-14	28-Oct-14	17-Apr-15	14-May-15	IPs/ SO's Advance Comments/ ICE Comments																		
DD67300	Comments Received	0		28-Oct-14		14-May-15	Comments Received																		
DD67308	Designer to Reply RtC + Update Submission	21	29-Oct-14	21-Nov-14	15-May-15	09-Jun-15	Designer to Reply RtC + Update Submission																		
DD67318	Submit Updated DDAto SO/ ICE/ IPs	0	22-Nov-14		10-Jun-15		Submit Updated DDAto SO/ ICE/ IPs																		
DD67328	ICEApproval & Issue Check Cert	12	22-Nov-14	05-Dec-14	10-Jun-15	24-Jun-15	ICEApproval & Issue Check Cert																		
DD67338	Submit ICE Check Cert to SO	6	06-Dec-14	12-Dec-14	25-Jun-15	02-Jul-15	Submit ICE Check Cert to SO																		
DD67348	IPs Review	28	22-Nov-14	19-Dec-14	10-Jun-15	07-Jul-15	IPs Review																		
DD67368	SO's Review	35	22-Nov-14	26-Dec-14	10-Jun-15	14-Jul-15	SO's Review																		
(D9) AIP Temporary support and dewatering measures for Vent Duct ELS design for Northern Landfall																									
DD69410	SOApproval with Condition R eceived	0		02-May-15		02-May-15A	SO Approval with Condition Received																		
(D9) DDA Temporary support and dewatering measures for Vent Duct ELS design for Northern Landfall																									
DD69420	Prepare DDA Temp Support & Dewatering measures for Vent Duct ELS at Northern Landfall	18	02-May-15	22-May-15	28-Jan-15A	28-Jan-15A	Prepare DDA Temp Support & Dew																		
DD69430	Review & Comment by JV	18	23-May-15	13-Jun-15	28-Jan-15A	28-Jan-15A	Review & Comment by JV																		
DD69440	Designer prepare DDA	10	15-Jun-15	26-Jun-15	28-Jan-15A	28-Jan-15A	Designer prepare DD																		
DD69450	Formal Submission of DDAto ICE/ IPs	0		26-Jun-15		28-Jan-15A	Formal Submission of																		
DD69460	Advanced Submission to SO	0		26-Jun-15		28-Jan-15A	Advanced Submissio																		
DD69470	IPs/ SO's Advance Comments/ ICE Comments	28	27-Jun-15	24-Jul-15	28-Jan-15A	28-Jan-15A	IPs/ SO's A																		
DD69480	Comments Received	0		24-Jul-15		28-Jan-15A	Comments																		
DD69490	Designer to Reply RtC + Update Submission	21	25-Jul-15	18-Aug-15	28-Jan-15A	28-Jan-15A	D																		
DD69500	Submit Updated DDAto SO/ ICE/ IPs	0	19-Aug-15		28-Jan-15A		S																		
DD69510	ICEApproval & Issue Check Cert	12	19-Aug-15	01-Sep-15	28-Jan-15A	28-Jan-15A																			
DD69520	IPs Review	28	19-Aug-15	15-Sep-15	28-Jan-15A	28-Jan-15A																			
DD69530	IPs No Objection Received	0		15-Sep-15		28-Jan-15A																			
DD69540	SO's Review	35	19-Aug-15	22-Sep-15	28-Jan-15A	28-Jan-15A																			
DD69550	SOApproval with Condition R eceived	0		22-Sep-15		28-Jan-15A																			
ETWB TCW No 15/2005 - ELS design of ventilation duct and its connections with building and tunnel																									
GEO1180	1st Submission to GEO - ETWB TCW No 15/2005 - ELS Design of Ventilation Duct	0		01-Sep-15		28-Jan-15A																			
GEO1185	1st Submission GEO Review	28	02-Sep-15	29-Sep-15	28-Jan-15A	28-Jan-15A																			
GEO1190	Received GEO Comment	0		29-Sep-15		28-Jan-15A																			
GEO1195	Prepare Response to Comment	12	30-Sep-15	14-Oct-15	28-Jan-15A	28-Jan-15A																			
GEO1200	2nd Submission to GEO	0		14-Oct-15		28-Jan-15A																			
GEO1205	2nd GEO Review	28	15-Oct-15	11-Nov-15	28-Jan-15A	28-Jan-15A																			
North Surface Roadworks, Utility & Drainage works																									
Design Submission																									
(A20) DDA for Traffic Sign & Road Marking																									
DD01725	IPs/ SO's Advance Comments/ ICE Comments	28	19-Oct-14	15-Nov-14	12-Dec-14A	31-Mar-15	IPs/ SO's Advance Comments/ ICE Comments																		
DD01730	Comments Received	0		15-Nov-14		31-Mar-15	Comments Received																		
DD01735	Designer to Reply RtC + Update Submission	21	17-Nov-14	10-Dec-14	01-Apr-15	29-Apr-15	Designer to Reply RtC + Update Submission																		
DD01740	Submit Updated DDAto SO/ ICE/ IPs	0	11-Dec-14		30-Apr-15		Submit Updated DDAto SO/ ICE/ IPs																		
DD01745	ICEApproval & Issue Check Cert	12	11-Dec-14	24-Dec-14	30-Apr-15	14-May-15	ICEApproval & Issue Check Cert																		
DD01750	Submit ICE Check Cert to SO	6	27-Dec-14	03-Jan-15	15-May-15	21-May-15	Submit ICE Check Cert to SO																		
DD01755	SO's Review	35	11-Dec-14	14-Jan-15	30-Apr-15	03-Jun-15	SO's Review																		
DD01760	SOApproval with Condition R eceived	0		14-Jan-15		03-Jun-15	SO Approval with Condition Received																		
(C2) DDA for Sewerage, Drainage, Waterworks & Utility works for North Landfall																									
DD02125	IPs/ SO's Advance Comments/ ICE Comments	28	17-Sep-14	14-Oct-14	12-Dec-14A	09-Feb-15A	nce Comments/ ICE Comments																		
DD02130	Comments Received	0		14-Oct-14		09-Feb-15A	ceived																		
DD02135	Designer to Reply RtC + Update Submission	21	15-Oct-14	07-Nov-14	09-Feb-15A	12-Mar-15A	ner to Reply RtC + Update Submission																		
DD02140	Submit Updated DDAto SO/ ICE/ IPs	0	08-Nov-14		12-Mar-15A		it Updated DDAto SO/ ICE/ IPs																		
DD02145	ICEApproval & Issue Check Cert	12	08-Nov-14	21-Nov-14	12-Mar-15A	31-Mar-15	CEApproval & Issue Check Cert																		
DD02150	Submit ICE Check Cert to SO	6	22-Nov-14	28-Nov-14	01-Apr-15	11-Apr-15	Submit ICE Check Cert to SO																		
DD02155	IPs Review	28	08-Nov-14	05-Dec-14	12-Mar-15A	11-Apr-15	IPs Review																		
DD02160	IPs No Objection Received	0		05-Dec-14		11-Apr-15	IPs No Objection Received																		
DD02165	SO's Review	35	08-Nov-14	12-Dec-14	12-Mar-15A	18-Apr-15	SO's Review																		
DD02170	SOApproval with Condition R eceived	0		12-Dec-14		18-Apr-15	SO Approval with Condition Received																		
Sub-sea Tunnel																									
Sub-sea TBM Tunnelling																									
Major Procurement																									
S881 -																									
PO103370	S881 - 13.6m dia - TBM - Manufacturing - Shield	180	28-Jun-14	31-Jan-15	28-Jun-14A	10-Mar-15A	S881 - 13.6m dia - TBM - Manufacturing - Shield																		
PO103430	S881 - 13.6m dia - TBM - Workshop Assembly	70	02-Feb-15	06-May-15	10-Mar-15A	06-May-15	S881 - 13.6m dia - TBM - WorkshopAsse																		

- Planned Bar
- Planned Bar - Critical
- Planned Milestone
- Progress bar
- Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDWGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDWGEN.PRG.08505 Rev.C	CLA	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014		2015												
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug						
PO103440	S881 - 13.6m dia - TBM - Workshop Acceptance Test	0		06-May-15		06-May-15															
PO103450	S881 - 13.6m dia - TBM - Disassembly and Packing for Transport	16	07-May-15	26-May-15	07-May-15	26-May-15															
PO103460	S881 - 13.6m dia - TBM - Delivery	20	27-May-15	15-Jun-15	27-May-15	15-Jun-15															
Precast Segment ID12.40 - Production for Sub-sea TBM Tunnel																					
A6418040	ID12.40 TBM Segment Ring Fabrication - 12 rings per day	300	22-Nov-14	19-Dec-15	29-Nov-14A	09-Mar-16															
Design Submission																					
(B6) Risk Assessment of Submarine Cable - Tunnelling Works																					
GS01400	Preparation of Risk Assessment of Submarine cables - Tunnelling Works	24	12-Dec-14	12-Jan-15	02-Jan-15A	12-Feb-15A															
GS01405	1st Submission	0		12-Jan-15		12-Feb-15A															
GS01410	SO's Comments for 1st Submission	35	13-Jan-15	16-Feb-15	12-Feb-15A	01-Apr-15															
GS01420	CLP Review (4 weeks)	28	16-Jan-15	12-Feb-15	12-Feb-15A	01-Apr-15															
GS01425	CLP Comment Received	0		12-Feb-15		01-Apr-15															
GS01430	Prepare Re-submission	12	17-Feb-15	09-Mar-15	02-Apr-15	20-Apr-15															
GS01435	ICE Cert. Issue	6	10-Mar-15	16-Mar-15	21-Apr-15	27-Apr-15															
GS01440	SO Forward ICE Cert. to CLP	3	17-Mar-15	19-Mar-15	28-Apr-15	30-Apr-15															
GS01445	2nd Submission	0		09-Mar-15		20-Apr-15															
GS01455	SO Forward Submission to CLP	3	10-Mar-15	12-Mar-15	21-Apr-15	23-Apr-15															
GS01460	CLP Review (4 weeks)	28	17-Mar-15	13-Apr-15	24-Apr-15	21-May-15															
GS01465	CLP Comment Received	0		13-Apr-15		21-May-15															
GS01467	SO's Condition Approval	35	12-Mar-15	15-Apr-15	21-Apr-15	25-May-15															
(G1) IFA for Structural Health Monitoring System for TBM Tunnel																					
DD71040	Submit ICE Check Cert to SO	6	16-Jun-14	21-Jun-14	23-Dec-14A	05-Jan-15A															
DD71050	IPs Review	28	31-May-14	27-Jun-14	23-Dec-14A	30-Mar-15															
DD71060	IPs No Objection Received	0		27-Jun-14		30-Mar-15															
DD71070	SO's Review	35	31-May-14	04-Jul-14	23-Dec-14A	01-Apr-15															
DD71080	SO Approval with Condition Received	0		04-Jul-14		01-Apr-15															
DD71200	TBM Segment Mould Acceptance & Trial	0	11-Jul-14		01-Apr-15																
(G1) DDA for TBM Tunnel Lining Structural Design - Sub-sea tunnel																					
DD6670	Sub-sea TBM Tunnel Segment - Fabrication	265	06-Oct-14	29-Aug-15	03-Jan-15A	23-Dec-15															
(G1) DDA for TBM Tunnel Lining Settlement Analysis & Confinement Pressure - Sub-sea tunnel																					
AN1150	DDA Settlement Analysis & Confinement Pressure for Sub-sea Tunnel	246	21-Nov-13	24-Sep-14	21-Nov-13A	02-Apr-15															
DD6690	Preparation of DDA TBM Confinement - Sub-sea tunnel	0	25-Sep-14	25-Sep-14	08-Apr-15	08-Apr-15															
DD6700	Review & Comment by JV	12	25-Sep-14	10-Oct-14	08-Apr-15	21-Apr-15															
DD6705	Designer prepare DDA	12	11-Oct-14	24-Oct-14	22-Apr-15	06-May-15															
DD6710	Formal Submission of DDA to ICE/ IPs	0		24-Oct-14		06-May-15															
DD6715	Advanced Submission to SO	0		24-Oct-14		06-May-15															
DD6720	IPs/ SO's Advance Comments/ ICE Comments	28	25-Oct-14	21-Nov-14	07-May-15	03-Jun-15															
DD67258	Comments Received	0		21-Nov-14		03-Jun-15															
DD6730	Designer to Reply RIC + Update Submission	21	22-Nov-14	16-Dec-14	04-Jun-15	29-Jun-15															
(G3) DDA for TBM Tunnel Internal Structures (Sub-sea)																					
DD00925	IPs/ SO's Advance Comments/ ICE Comments	28	25-Sep-14	22-Oct-14	21-Nov-14A	21-Jan-15A															
DD00930	Comments Received	0		22-Oct-14		21-Jan-15A															
DD00935	Designer to Reply RIC + Update Submission	21	23-Oct-14	15-Nov-14	21-Jan-15A	31-Mar-15															
DD00940	Submit Updated DDA to SO/ ICE/ IPs	0	17-Nov-14		01-Apr-15																
DD00945	ICE Approval & Issue Check Cert	12	17-Nov-14	29-Nov-14	01-Apr-15	18-Apr-15															
DD00950	Submit ICE Check Cert to SO	6	01-Dec-14	06-Dec-14	20-Apr-15	25-Apr-15															
DD00955	IPs Review	28	17-Nov-14	14-Dec-14	01-Apr-15	28-Apr-15															
DD00960	IPs No Objection Received	0		14-Dec-14		28-Apr-15															
DD00980	SO's Review	35	17-Nov-14	21-Dec-14	01-Apr-15	05-May-15															
DD00985	SO Approval with Condition Received	0		22-Dec-14		05-May-15															
DD00995	Sub-sea Internal Structure - Precast Gallery Mould Design & Fabrication	24	22-Dec-14	21-Jan-15	06-May-15	03-Jun-15															
DD01015	Sub-sea Tunnel - Precast Gallery Fabrication	244	22-Jan-15	21-Nov-15	04-Jun-15	02-Apr-16															
Sub-sea Tunnel Cross Passage & Internal Structure																					
Design Submission																					
(G4) DDA for Cross Passage - Permanent works - incl. Geotechnical Assessment - Sub-sea tunnel																					
AN1180	Early DDA Sub-sea Cross Passage Lining & CPOpening	151	03-Jun-14	29-Nov-14	03-Jun-14A	09-May-15															
DD01100	Preparation of DDACross Passage incl. Detailed Geotechnical Assessment	0	01-Dec-14	01-Dec-14	11-May-15	11-May-15															
DD01105	Review & Comment by JV	6	01-Dec-14	06-Dec-14	11-May-15	16-May-15															
DD01110	Designer prepare DDA	12	08-Dec-14	20-Dec-14	18-May-15	01-Jun-15															
DD01115	Formal Submission of DDA to ICE/ IPs	0		20-Dec-14		01-Jun-15															
DD01120	Advanced Submission to SO	0		20-Dec-14		01-Jun-15															
DD01125	IPs/ SO's Advance Comments/ ICE Comments	28	21-Dec-14	17-Jan-15	02-Jun-15	29-Jun-15															
DD01130	Comments Received	0		17-Jan-15		29-Jun-15															
Method Statement Submission																					
Method Statement of Cross Passage Ground Freezing																					
MS1300	Preparation Method Statement for CP Ground Freezing	25	17-Sep-14	17-Oct-14	30-Mar-15	02-May-15															
MS1310	Submit Method Statement to SO/ ICE	0		17-Oct-14		02-May-15															
MS1320	SO Reviews & Comments/ ICE Comments	28	18-Oct-14	14-Nov-14	03-May-15	30-May-15															
MS1330	Re-submission	18	15-Nov-14	05-Dec-14	01-Jun-15	22-Jun-15															
MS1340	ICE Approval & Issue Check Cert.	18	06-Dec-14	29-Dec-14	23-Jun-15	14-Jul-15															
MS1350	SO's Review	28	06-Dec-14	02-Jan-15	23-Jun-15	20-Jul-15															
Southern Landfall																					
South Cut & Cover Tunnel																					
Design Submission																					
(E2) AIP for South C&C Box & Approach Ramp																					

Legend:

- Planned Bar
- Planned Bar - Critical
- Planned Milestone
- Progress bar
- Progress Milestone

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28-Aug-14	TMCLKDBJGEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014 2015											
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug			
AP3210	SO Review (35 Days)	35	14-Oct-14	17-Nov-14	03-Dec-14A	01-Apr-15	SO Review (35 Days)											
AP3220	SO Approval with Condition Received	0		17-Nov-14		01-Apr-15	SO Approval with Condition Received											
(E2) DDA for South C&C Box & Approach Ramp																		
DD00460	Preparation DDA Sth C&C Box and Approach Ramp	18	18-Nov-14	08-Dec-14	02-Apr-15	27-Apr-15	Preparation DDA Sth C&C Box and Approach Ramp											
DD00470	Review & Comment by JV	18	09-Dec-14	31-Dec-14	28-Apr-15	19-May-15	Review & Comment by JV											
DD00480	Designer prepare DDA	10	02-Jan-15	13-Jan-15	20-May-15	01-Jun-15	Designer prepare DDA											
DD00490	Formal Submission of DDA to ICE/ IPs	0		13-Jan-15		01-Jun-15	Formal Submission of DDA to ICE/ IPs											
DD00500	Advanced Submission to SO	0		13-Jan-15		01-Jun-15	Advanced Submission to SO											
DD00510	IPs/ SO's Advance Comments/ ICE Comments	28	14-Jan-15	10-Feb-15	02-Jun-15	29-Jun-15	IPs/ SO's Advance Comments/ ICE Comments											
DD00520	Comments Received	0		10-Feb-15		29-Jun-15	Comments Received											
(F3) AIP Temp. Support for South C&C, Portal & ELS																		
DD69590	Prepare AIP South C&C ELS	18	20-Sep-14	13-Oct-14	02-Mar-15A	19-Mar-15A	Prepare AIP South C&C ELS											
DD69600	Review & Comment by JV	18	14-Oct-14	03-Nov-14	20-Mar-15A	14-Apr-15	Review & Comment by JV											
DD69610	Designer prepare AIP	10	04-Nov-14	14-Nov-14	15-Apr-15	25-Apr-15	Designer prepare AIP											
DD69620	Formal Submission of AIP to ICE/ IPs	0		14-Nov-14		25-Apr-15	Formal Submission of AIP to ICE/ IPs											
DD69630	Advanced Submission to SO	0		14-Nov-14		25-Apr-15	Advanced Submission to SO											
DD69640	IPs/ SO's Advance Comments/ ICE Comments	28	15-Nov-14	12-Dec-14	26-Apr-15	23-May-15	IPs/ SO's Advance Comments/ ICE Comments											
DD69650	Comments Received	0		12-Dec-14		23-May-15	Comments Received											
DD69660	Designer to Reply RTC + Update Submission	21	13-Dec-14	09-Jan-15	26-May-15	18-Jun-15	Designer to Reply RTC + Update Submission											
DD69670	Submit Updated AIP to SO/ ICE/ IPs	0	10-Jan-15		19-Jun-15		Submit Updated AIP to SO/ ICE/ IPs											
DD69680	ICE Approval & Issue Check Cert	12	10-Jan-15	23-Jan-15	19-Jun-15	04-Jul-15	ICE Approval & Issue Check Cert											
DD69690	IPs Review	28	10-Jan-15	06-Feb-15	19-Jun-15	16-Jul-15	IPs Review											
DD69710	SO's Review	35	10-Jan-15	13-Feb-15	19-Jun-15	23-Jul-15	SO's Review											
Method Statement Submission																		
Method Statement of Construction Methodology of C&C Tunnels																		
MS1700	Preparation Method Statement for C&C Tunnels	25	28-Mar-15	30-Apr-15	30-Mar-15	02-May-15	Preparation Method Statement for C&C Tunnels											
MS1710	Submit Method Statement to SO	0		30-Apr-15		02-May-15	Submit Method Statement to SO											
MS1720	SO Reviews & Comments	28	01-May-15	28-May-15	03-May-15	30-May-15	SO Reviews & Comments											
MS1730	Re-submission	18	29-May-15	18-Jun-15	01-Jun-15	22-Jun-15	Re-submission											
MS1740	SO's Review	28	19-Jun-15	16-Jul-15	23-Jun-15	20-Jul-15	SO's Review											
South Retrieval Shaft																		
Design Submission																		
(A4) Additional Ground Investigation Plan - Phase 3 - Southern Landfall																		
GS2870	Preparation of Additional Ground Investigation (Phase 3)	11	15-Jan-15	27-Jan-15	20-Feb-15A	02-Mar-15A	Preparation of Additional Ground Investigation (Phase 3)											
GS2880	1st Submission	0		27-Jan-15		02-Mar-15A	1st Submission											
GS2905	SO's Comments for 1st Submission	35	28-Jan-15	03-Mar-15	02-Mar-15A	08-Apr-15	SO's Comments for 1st Submission											
GS2910	SO's Condition Approval	0		03-Mar-15		08-Apr-15	SO's Condition Approval											
(A5) Ground Investigation Report - Phase 3 - Southern Landfall																		
GS2960	Preparation of Ground Investigation Report - Phase 3 - Southern Landfall	36	01-Apr-15	18-May-15	08-May-15	19-Jun-15	Preparation of Ground Investigation Report - Phase 3 - Southern Landfall											
GS2970	*1st Submission	0		18-May-15		19-Jun-15	*1st Submission											
GS2980	SO's Comments for 1st Submission	35	19-May-15	22-Jun-15	20-Jun-15	24-Jul-15	SO's Comments for 1st Submission											
(B5) AIP Construction Risk Assessment - Impact on South Landfall																		
GS01200	Preparation of Construction Risk Assessment - Impact on South Landfall	36	30-Oct-14	10-Dec-14	02-Feb-15A	31-Mar-15	Preparation of Construction Risk Assessment - Impact on South Landfall											
GS01205	1st Submission	0		10-Dec-14		31-Mar-15	1st Submission											
GS01210	SO's Comments for 1st Submission	35	11-Dec-14	14-Jan-15	01-Apr-15	05-May-15	SO's Comments for 1st Submission											
GS01215	Prepare Re-submission	10	15-Jan-15	26-Jan-15	06-May-15	16-May-15	Prepare Re-submission											
GS01220	2nd Submission	0		26-Jan-15		16-May-15	2nd Submission											
GS01225	ICE Cert. Issue	6	27-Jan-15	02-Feb-15	18-May-15	23-May-15	ICE Cert. Issue											
GS01250	SO's Condition Approval	35	27-Jan-15	02-Mar-15	17-May-15	20-Jun-15	SO's Condition Approval											
(B5) DDA Construction Risk Assessment - Impact on South Landfall																		
DD68500	Preparation of Construction Risk Assessment - Impact on South Landfall	36	03-Mar-15	17-Apr-15	22-Jun-15	03-Aug-15	Preparation of Construction Risk Assessment - Impact on South Landfall											
(F1) AIP Temp. works - Retrieval Shaft on Southern Landfall incl. break-out																		
AP01600	Preparation of AIP Retrieval Shaft on Sth Landfall incl. break out	12	20-Sep-14	06-Oct-14	02-Mar-15A	13-Mar-15A	Retrieval Shaft on Sth Landfall incl. break out											
AP01605	Review & Comment by JV	12	07-Oct-14	20-Oct-14	13-Mar-15A	31-Mar-15	Review & Comment by JV											
AP01610	Designer Prepare AIP	6	21-Oct-14	27-Oct-14	01-Apr-15	11-Apr-15	Designer Prepare AIP											
AP01615	Formal Submission of AIP to ICE/ IPs	0		27-Oct-14		11-Apr-15	Formal Submission of AIP to ICE/ IPs											
AP01620	Advanced Submission of AIP to SO	0		27-Oct-14		11-Apr-15	Advanced Submission of AIP to SO											
AP01625	Review & Comment by SO/ ICE/ IPs	28	28-Oct-14	24-Nov-14	12-Apr-15	09-May-15	Review & Comment by SO/ ICE/ IPs											
AP01630	Advance Comments from SO/ Comments from ICE/ IPs Received	0		24-Nov-14		09-May-15	Advance Comments from SO/ Comments from ICE/ IPs Received											
AP01635	Designer to Prepare RTC & Updated AIP	18	25-Nov-14	15-Dec-14	11-May-15	01-Jun-15	Designer to Prepare RTC & Updated AIP											
AP01640	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)	0		15-Dec-14		01-Jun-15	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)											
AP01645	Reply to IPs Comments in RTC	0		15-Dec-14		01-Jun-15	Reply to IPs Comments in RTC											
AP01650	ICE Approval & Issue of Design Check Cert.	18	16-Dec-14	08-Jan-15	02-Jun-15	23-Jun-15	ICE Approval & Issue of Design Check Cert.											
AP01655	Check Cert to SO	0		08-Jan-15		23-Jun-15	Check Cert to SO											
AP01660	No Objection or Further Minor Comments from IPs Received	0		08-Jan-15		23-Jun-15	No Objection or Further Minor Comments from IPs Received											
AP01680	SO Review (35 Days)	35	17-Dec-14	20-Jan-15	02-Jun-15	06-Jul-15	SO Review (35 Days)											
(F2) AIP Temp. works of Ground Treatment for TBMs passing under Southern Landfall																		
AP01900	Preparation of AIP Ground Improvement works in Sth Landfall Seawall	18	01-Sep-14	22-Sep-14	27-Mar-15A	27-Mar-15A	Preparation of AIP Ground Improvement works in Sth Landfall Seawall											
AP01905	Review & Comment by JV	18	23-Sep-14	15-Oct-14	27-Mar-15A	27-Mar-15A	Review & Comment by JV											
AP01910	Designer Prepare AIP	12	16-Oct-14	29-Oct-14	27-Mar-15A	27-Mar-15A	Designer Prepare AIP											
AP01915	Formal Submission of AIP to ICE/ IPs	0		29-Oct-14		27-Mar-15A	Formal Submission of AIP to ICE/ IPs											
AP01920	Advanced Submission of AIP to SO	0		29-Oct-14		27-Mar-15A	Advanced Submission of AIP to SO											
AP01925	Review & Comment by SO/ ICE/ IPs	28	30-Oct-14	26-Nov-14	27-Mar-15A	27-Mar-15A	Review & Comment by SO/ ICE/ IPs											
AP01930	Advance Comments from SO/ Comments from ICE/ IPs Received	0		26-Nov-14		27-Mar-15A	Advance Comments from SO/ Comments from ICE/ IPs Received											
AP01935	Designer to Prepare RTC & Updated AIP	18	27-Nov-14	17-Dec-14	27-Mar-15A	27-Mar-15A	Designer to Prepare RTC & Updated AIP											

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDJEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDJEN.PRG.08505 Rev.C	CLa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	2014 2015											
							Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug			
AP01940	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)	0		17-Dec-14		30-Mar-15	◆ Submission of AIP to SO/ ICE together with Reply To Comment (RTC)											
AP01945	Reply to IPs Comments in RTC	0		17-Dec-14		30-Mar-15	◆ Reply to IPs Comments in RTC											
AP01950	ICE Approval & Issue of Design Check Cert.	18	18-Dec-14	10-Jan-15	30-Mar-15	23-Apr-15	ICE Approval & Issue of Design Check Cert.											
AP01955	Check Cert to SO	0		10-Jan-15		23-Apr-15	◆ Check Cert to SO											
AP01960	No Objection or Further Minor Comments from IPs Received	0		10-Jan-15		23-Apr-15	◆ No Objection or Further Minor Comments from IPs Received											
AP01980	SO Review (35 Days)	35	19-Dec-14	22-Jan-15	02-Apr-15	06-May-15	SO Review (35 Days)											
AP01985	SO Approval with Condition Received	0		22-Jan-15		06-May-15	◆ SO Approval with Condition Received											
(F2) DDA Temp works of Ground Treatment for TBMs passing under Southern Landfall																		
DD04740	Preparation of DDA Ground Improvement in Southern Landfall Seawall	18	01-Apr-15	25-Apr-15	08-May-15	29-May-15	Preparation of DDA Ground Improvement in Southern Landfall Seawall											
DD04750	Review & Comment by JV	18	27-Apr-15	18-May-15	30-May-15	19-Jun-15	Review & Comment by JV											
DD04760	Designer prepare DDA	6	19-May-15	26-May-15	22-Jun-15	27-Jun-15	Designer prepare DDA											
DD04770	Formal Submission of DDA to ICE/ IPs	0		26-May-15		27-Jun-15	◆ Formal Submission of DDA to ICE/ IPs											
DD04780	Advanced Submission to SO	0		26-May-15		27-Jun-15	◆ Advanced Submission to SO											
DD04790	IPs/ SO's Advance Comments/ ICE Comments	28	27-May-15	23-Jun-15	28-Jun-15	25-Jul-15	IPs/ SO's Advance Comments/ ICE Comments											
South Ventilation Building																		
Design Submission																		
(I1) DDA for South Vent. Bldg. GBP & Arch. Submission																		
DD01400	Preparation of DDA Sth VB GBP & Arch Submission	18	21-Aug-14	11-Sep-14	12-Jan-15A	12-Feb-15A	GBP & Arch Submission											
DD01405	Review & Comment by JV	24	12-Sep-14	11-Oct-14	13-Feb-15A	20-Feb-15A	Review & Comment by JV											
DD01410	Designer prepare DDA	15	13-Oct-14	29-Oct-14	21-Feb-15A	25-Feb-15A	Designer prepare DDA											
DD01415	Formal Submission of DDA to ICE/ IPs	0		29-Oct-14		25-Feb-15A	◆ Formal Submission of DDA to ICE/ IPs											
DD01420	Advanced Submission to SO	0		29-Oct-14		25-Feb-15A	◆ Advanced Submission to SO											
DD01425	IPs/ SO's Advance Comments/ ICE Comments	28	30-Oct-14	26-Nov-14	25-Feb-15A	04-May-15	IPs/ SO's Advance Comments/ ICE Comments											
DD01430	Comments Received	0		26-Nov-14		04-May-15	◆ Comments Received											
DD01435	Designer to Reply RTC + Update Submission	21	27-Nov-14	20-Dec-14	05-May-15	29-May-15	Designer to Reply RTC + Update Submission											
DD01440	Submit Updated DDA to SO/ ICE/ IPs	0	22-Dec-14		30-May-15		◆ Submit Updated DDA to SO/ ICE/ IPs											
DD01445	ICE Approval & Issue Check Cert	18	22-Dec-14	14-Jan-15	30-May-15	19-Jun-15	ICE Approval & Issue Check Cert											
DD01450	Submit ICE Check Cert to SO	6	15-Jan-15	21-Jan-15	22-Jun-15	27-Jun-15	Submit ICE Check Cert to SO											
DD01455	IPs Review	28	22-Dec-14	18-Jan-15	30-May-15	26-Jun-15	IPs Review											
DD01460	IPs No Objection Received	0		18-Jan-15		26-Jun-15	◆ IPs No Objection Received											
DD01465	SO's Review	35	22-Dec-14	25-Jan-15	30-May-15	03-Jul-15	SO's Review											
(I2) DDA for South Vent. Bldg. Foundation Design																		
DD01500	Preparation of DDA Sth VB Foundation	18	01-Apr-15	25-Apr-15	30-May-15	19-Jun-15	Preparation of DDA Sth VB Foundation											
DD01505	Review & Comment by JV	18	27-Apr-15	18-May-15	22-Jun-15	13-Jul-15	Review & Comment by JV											
South Surface Roadworks, Utility & Drainage works																		
Design Submission																		
(E3) DDA for Sewerage, Drainage, Waterworks & Utility works for South Landfall																		
DD05810	Preparation of DDA Sewerage & Drainage works for Sth Landfall	18	08-Nov-14	28-Nov-14	02-Mar-15A	15-Mar-15A	Preparation of DDA Sewerage & Drainage works for Sth Landfall											
DD05820	Review & Comment by JV	18	29-Nov-14	19-Dec-14	16-Mar-15A	25-Mar-15A	Review & Comment by JV											
DD05830	Designer prepare DDA	10	20-Dec-14	03-Jan-15	25-Mar-15A	27-Mar-15A	Designer prepare DDA											
DD05840	Advanced Submission to SO	0		03-Jan-15		27-Mar-15A	◆ Advanced Submission to SO											
DD05850	Formal Submission of DDA to ICE/ IPs	0		03-Jan-15		27-Mar-15A	◆ Formal Submission of DDA to ICE/ IPs											
DD05860	IPs/ SO's Advance Comments/ ICE Comments	28	04-Jan-15	31-Jan-15	30-Mar-15	26-Apr-15	IPs/ SO's Advance Comments/ ICE Comments											
DD05870	Comments Received	0		31-Jan-15		27-Apr-15	◆ Comments Received											
DD05880	Designer to Reply RTC + Update Submission	21	02-Feb-15	04-Mar-15	27-Apr-15	21-May-15	Designer to Reply RTC + Update Submission											
DD05890	Submit Updated DDA to SO/ ICE/ IPs	0	05-Mar-15		22-May-15		◆ Submit Updated DDA to SO/ ICE/ IPs											
DD05900	ICE Approval & Issue Check Cert	12	05-Mar-15	18-Mar-15	22-May-15	05-Jun-15	ICE Approval & Issue Check Cert											
DD05910	Submit ICE Check Cert to SO	6	19-Mar-15	25-Mar-15	06-Jun-15	12-Jun-15	Submit ICE Check Cert to SO											
DD05920	IPs Review	28	05-Mar-15	01-Apr-15	22-May-15	18-Jun-15	IPs Review											
DD05930	IPs No Objection Received	0		01-Apr-15		18-Jun-15	◆ IPs No Objection Received											
DD05940	SO's Review	35	05-Mar-15	08-Apr-15	22-May-15	25-Jun-15	SO's Review											
DD05950	SO Approval with Condition Received	0		08-Apr-15		25-Jun-15	◆ SO Approval with Condition Received											

■ Planned Bar
■ Planned Bar - Critical
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone

TMCLK - Northern Connection Sub-Sea Tunnel Section
 Detailed Works Programme (Rev. C) - Three months rolling programme
 Progress as of 30-Mar-15



Date	Revision	Checked	Approved
21-Feb-14	TMCLKDBJGEN.PRG.08505	SPa	WYu
28-Aug-14	TMCLKDBJGEN.PRG.08505 Rev. C	CLa	WYu

Appendix C

Environmental Mitigation
and Enhancement Measure
Implementation Schedules

*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	An effective watering programme of twice daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit.	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓

WATER QUALITY

Marine Works (Sequence A)

6.1	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall	TM-CLKL southern landfall reclamation filling	Contractor	TM-EIAO		Y		N/A
6.1	-	a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall	TM-CLKL northern landfall reclamation filling	Contractor	TM-EIAO		Y		✓
6.1	-	Use of cage type silt curtains round all grab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.	All areas dredging works	Contractor	TM-EIAO		Y		✓
	Figure 1.1 of Annex C	A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	Trailer suction hopper dredgers shall not allow mud to overflow.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	The use of Lean Material Overboard (LMOB) systems shall be prohibited.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	Annex A Figure 6.2b Appendix D6b	For other parts of the reclamation works construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. It should be noted that the protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2b and detailed in Appendices D6b. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation; - Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓

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Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		- Reclamation dredging and filling for Portion 1 of HKLR;							
6.1	-	The filling material for the other parts of the works are the same as Sequence A;	All other areas/backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	5.7	Cage type silt curtain (with steel enclosure) shall be used for grab dredgers working in the site of HKBCF and TM- CLKL southern reclamation. Cage type silt curtains will be applied round all grab dredgers at other works area.	HKBCF, HKLR and TM-CLKL grab dredging	Contractor	TM-EIAO		Y		✓
6.1	Annex A	A layer of floating type silt curtain will be applied around all works as defined in Appendix D6b.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	TM-CLKL northern landfall: - Reclamation filling shall not proceed until at least 200m section of leading seawall at both the east and west sides of the reclamation are formed above +2.5 mPD, except for 100m gaps for marine access;	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
<i>General Marine Works</i>									
6.1	-	Use of TMB for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N.A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	All areas/ throughout construction period	Contractor	Marine Fill Committee		Y		✓

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					Guidelines. DASO permit conditions.				
6.1	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit		Y		✓

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Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					conditions.				
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
<i>Land Works</i>									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.1	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		N/A

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	All areas/ throughout construction period	Contractor	TM-EIAO Waste Disposal Ordinance		Y		✓
6.1	-	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.	Roadside/ design and operation	Design Consultant/ Contractor	TM-EIAO	Y		Y	✓
6.1	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓
<i>Water Quality Monitoring</i>									
6.1	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations.	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	✓
ECOLOGY									

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/ during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		N/A.
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6		The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established.	Contract mobilisation	Contractor	TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		Y		✓
12.6		The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The surplus surcharge should be transferred to a fill bank	Reclamation areas / after surcharge works	Contractor	TMEIA		Y		N/A
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			✓
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Reclamation areas / throughout dredging works	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
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						D	C	O	
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: <i>f</i> suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; <i>f</i> Having a capacity of <450L unless the specifications have been approved by the EPD; and <i>f</i> Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. <i>f</i> Clearly labelled and used solely for the storage of chemical wastes; <i>f</i> Enclosed with at least 3 sides; <i>f</i> Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; <i>f</i> Adequate ventilation; <i>f</i> Sufficiently covered to prevent rainfall	All areas / throughout construction period	Contractor	TMEIA		Y		<>

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*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
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						D	C	O	
		entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and f Incompatible materials are adequately separated.							
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		N/A
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

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						D	C	O	
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

*** Remarks:**

- ✓ 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

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Appendix D

Summary of Action and Limit Levels

Table D1 *Action and Limit Levels for 1-hour and 24-hour TSP*

Parameters	Action	Limit
24 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR1 = 213 ASR5 = 238 AQMS1 = 213 AQMS2 = 238 ASR10 = 214	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR1 = 331 ASR5 = 340 AQMS1 = 335 AQMS2 = 338 ASR10 = 337	500

Table D2 *Action and Limit Levels for Water Quality*

Parameter	Action Level#	Limit Level#
DO in mg/L ^(a)	<u>Surface and Middle</u> 5.0 mg/L	<u>Surface and Middle</u> 4.2 mg/L
	<u>Bottom</u> 4.7 mg/L	<u>Bottom</u> 3.6 mg/L
Turbidity in NTU (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 27.5 NTU	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data, i.e., 47.0 NTU
SS in mg/L (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 23.5 mg/L	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L

Notes:

Baseline data: data from HKZMB Baseline Water Quality Monitoring between 6 and 31 October 2011.

- (a) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths
- (c) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary
- (e) The 1%-ile of baseline data for surface and middle DO is 4.2 mg/L, whilst for bottom DO is 3.6 mg/L.

Table D3 *Action and Limit Levels for Impact Dolphin Monitoring*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 70% of baseline & ANI < 70% of baseline	STG < 70% of baseline & ANI < 70% of baseline
Limit Level	[STG < 40% of baseline & ANI < 40% of baseline] and STG < 40% of baseline & ANI < 40% of baseline	

Notes:

1. STG means quarterly encounter rate of number of dolphin sightings, which is **6.00 in NEL** and **9.85 in NWL** during the baseline monitoring period
2. ANI means quarterly encounter rate of total number of dolphins, which is **22.19 in NEL** and **44.66 in NWL** during the baseline monitoring period
3. For North Lantau Social Cluster, AL will be trigger if NEL or NWL fall below the criteria; LL will be triggered if both NEL and NWL fall below the criteria.

Table D4 *Derived Value of Action Level (AL) and Limit Level (LL)*

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

Appendix E

EM&A Monitoring Schedules

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - December 2014**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		public holiday	public holiday	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
28-Dec	29-Dec	30-Dec	31-Dec			
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM					

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - January 2015**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				public holiday 1-Jan	2-Jan	3-Jan
				1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan	10-Jan
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - February 2015**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Feb	02-Feb	03-Feb	04-Feb	05-Feb	06-Feb	07-Feb
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
08-Feb	09-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		public holiday	public holiday	public holiday
22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		

No construction works will be carried out from 19-Feb to 21-Feb hence AQM will postpone to 23-Feb.

HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-sea Tunnel Section Impact Marine Water Quality Monitoring (WQM) Schedule (December 14)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec
	WQM Mid-Ebb 8:02 (06:17 - 09:47) Mid-Flood 15:02 (13:17 - 16:47)		WQM Mid-Ebb 10:14 (08:29 - 11:59) Mid-Flood 16:23 (14:38 - 18:08)		WQM Mid-Ebb 12:01 (10:16 - 13:46) Mid-Flood 17:35 (15:50 - 19:20)	
07-Dec	08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec
	WQM Mid-Ebb 14:04 (12:19 - 15:49) Mid-Flood 19:16 (17:31 - 21:01)		WQM Mid-Flood 10:09 (08:24 - 11:54) Mid-Ebb 15:18 (13:33 - 17:03)		WQM Mid-Flood 11:28 (09:43 - 13:13) Mid-Ebb 16:40 (14:55 - 18:25)	
14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec
	WQM Mid-Flood 13:45 (12:00 - 15:30) Mid-Ebb 20:15 (18:30 - 22:00)		WQM Mid-Ebb 8:46 (07:01 - 10:31) Mid-Flood 15:06 (13:21 - 16:51)		WQM Mid-Ebb 10:53 (09:08 - 12:38) Mid-Flood 16:23 (14:38 - 18:08)	
21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec
	WQM Mid-Ebb 13:13 (11:28 - 14:58) Mid-Flood 18:27 (16:42 - 20:12)		WQM Mid-Flood 9:18 (07:33 - 11:03) Mid-Ebb 14:43 (12:58 - 16:28)			
28-Dec	29-Dec	30-Dec	31-Dec	01-Jan	02-Jan	03-Jan
	WQM Mid-Flood 13:19 (11:34 - 15:04) Mid-Ebb 19:57 (18:12 - 21:42)		WQM Mid-Ebb 8:41 (06:56 - 10:26) Mid-Flood 15:00 (13:15 - 16:45)			

Remarks: WQM on 26 December 2014 was postponed to 29 December 2014 since no marine works was conducted on 25 and 26 December 2014.

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-sea Tunnel Section
Impact Marine Water Quality Monitoring (WQM) Schedule (January 15)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				01-Jan	02-Jan	03-Jan
					WQM Mid-Ebb 11:02 (09:17 - 12:47) Mid-Flood 16:29 (14:44 - 18:14)	
04-Jan	05-Jan	06-Jan	07-Jan	08-Jan	09-Jan	10-Jan
	WQM Mid-Ebb 13:09 (11:24 - 14:54) Mid-Flood 18:25 (16:40 - 20:10)		WQM Mid-Flood 9:04 (07:19 - 10:49) Mid-Ebb 14:18 (12:33 - 16:03)		WQM Mid-Flood 9:59 (08:14 - 11:44) Mid-Ebb 15:21 (13:36 - 17:06)	
11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
	WQM Mid-Flood 11:36 (09:51 - 13:21) Mid-Ebb 17:35 (15:50 - 19:20)		WQM Mid-Flood 13:04 (11:19 - 14:49) Mid-Ebb 20:05 (18:20 - 21:50)		WQM Mid-Ebb 9:19 (07:34 - 11:04) Mid-Flood 14:49 (13:04 - 16:34)	
18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan
	WQM Mid-Ebb 12:13 (10:28 - 13:58) Mid-Flood 17:26 (16:13 - 19:43)		WQM Mid-Ebb 13:42 (11:57 - 15:27) Mid-Flood 19:04 (17:19 - 20:49)		WQM Mid-Flood 9:33 (07:48 - 11:18) Mid-Ebb 15:11 (13:26 - 16:56)	
25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan
	WQM Mid-Flood 11:34 (09:49 - 13:19) Mid-Ebb 17:58 (16:13 - 19:43)		WQM Mid-Flood 13:09 (11:24 - 14:54) Mid-Ebb 20:31 (18:46 - 22:16)		WQM Mid-Ebb 9:47 (08:20 - 11:15) Mid-Flood 15:04 (13:19 - 16:49)	

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-sea Tunnel Section
Impact Marine Water Quality Monitoring (WQM) Schedule (February 15)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Feb	02-Feb	03-Feb	04-Feb	05-Feb	06-Feb	07-Feb
	WQM Mid-Ebb 12:19 (10:34 - 14:04) Mid-Flood 17:39 (15:54 - 19:24)		WQM Mid-Ebb 13:23 (11:38 - 15:08) Mid-Flood 18:54 (17:09 - 20:39)		WQM Mid-Flood 8:46 (07:01 - 10:31) Mid-Ebb 14:18 (12:33 - 16:03)	
08-Feb	09-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb
	WQM Mid-Flood 10:01 (08:16 - 11:46) Mid-Ebb 16:00 (14:15 - 17:45)		WQM Mid-Flood 11:06 (09:21 - 12:51) Mid-Ebb 17:42 (15:57 - 19:27)		WQM Mid-Flood 12:43 (10:58 - 14:28) Mid-Ebb 20:24 (18:39 - 22:09)	
15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb
	WQM Mid-Ebb 11:12 (09:27 - 12:57) Mid-Flood 16:20 (14:35 - 18:05)		WQM Mid-Ebb 12:42 (10:57 - 14:27) Mid-Flood 18:11 (16:26 - 19:56)			
22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb
	WQM Mid-Flood 9:56 (08:11 - 11:41) Mid-Ebb 16:16 (14:31 - 18:01)		WQM Mid-Flood 11:13 (09:28 - 12:58) Mid-Ebb 18:18 (16:33 - 20:03)		WQM Mid-Flood 7:46 (06:45 - 08:45) Mid-Ebb 13:00 (11:15 - 14:45)	

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - December 2014**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Dec	2-Dec	3-Dec	4-Dec	5-Dec	6-Dec
		Impact Dolphin Monitoring				
7-Dec	8-Dec	9-Dec	10-Dec	11-Dec	12-Dec	13-Dec
		Impact Dolphin Monitoring				
14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec
	Impact Dolphin Monitoring					
21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec
		Impact Dolphin Monitoring				
28-Dec	29-Dec	30-Dec	31-Dec			

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - January 2015**

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
				Impact Dolphin Monitoring		
11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan
				Impact Dolphin Monitoring		
18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan
25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan	31-Jan
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - February 2015**

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

Appendix F

Impact Air Quality Monitoring Results

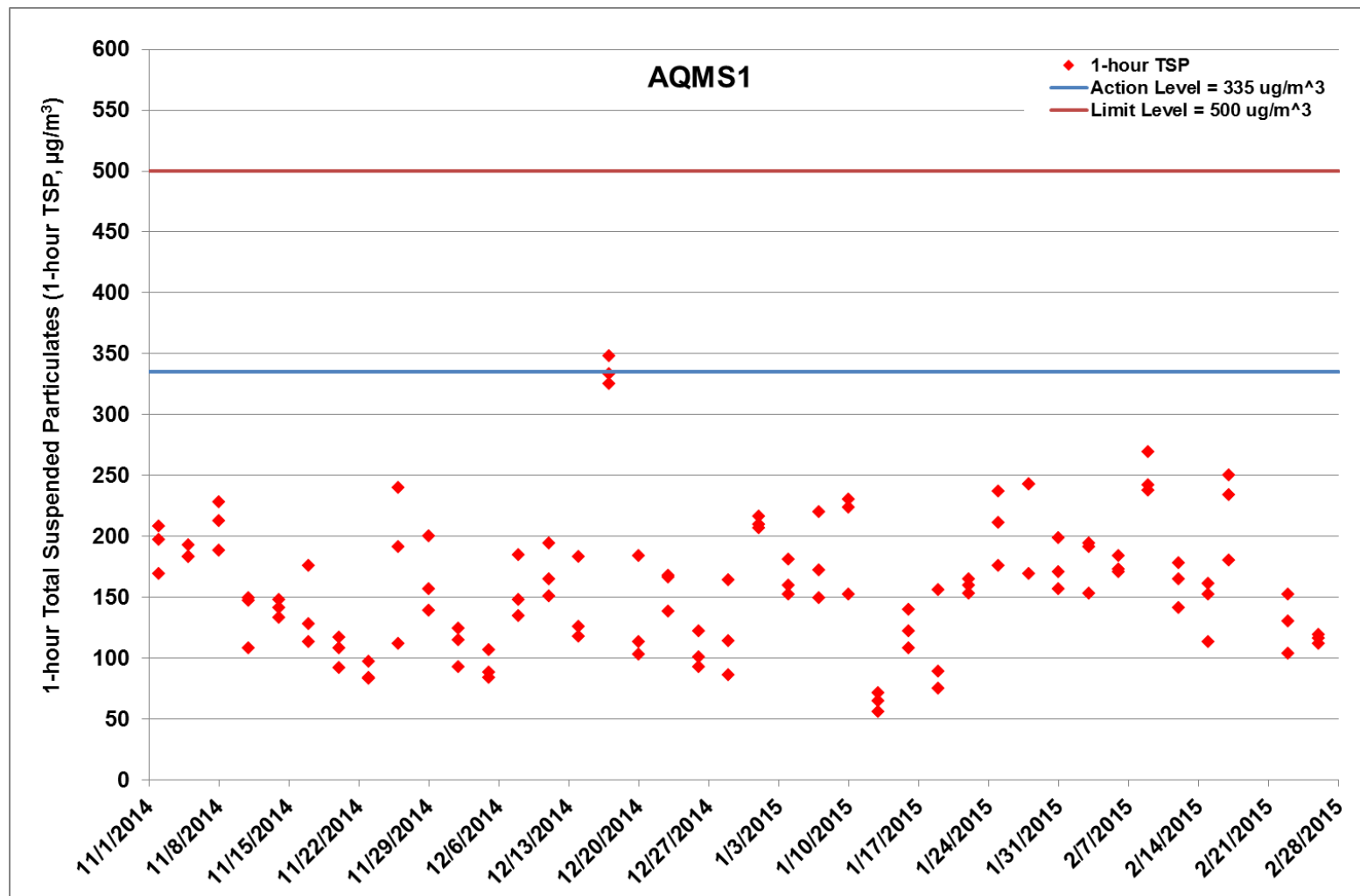


Figure F.1 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014). Ref:

0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



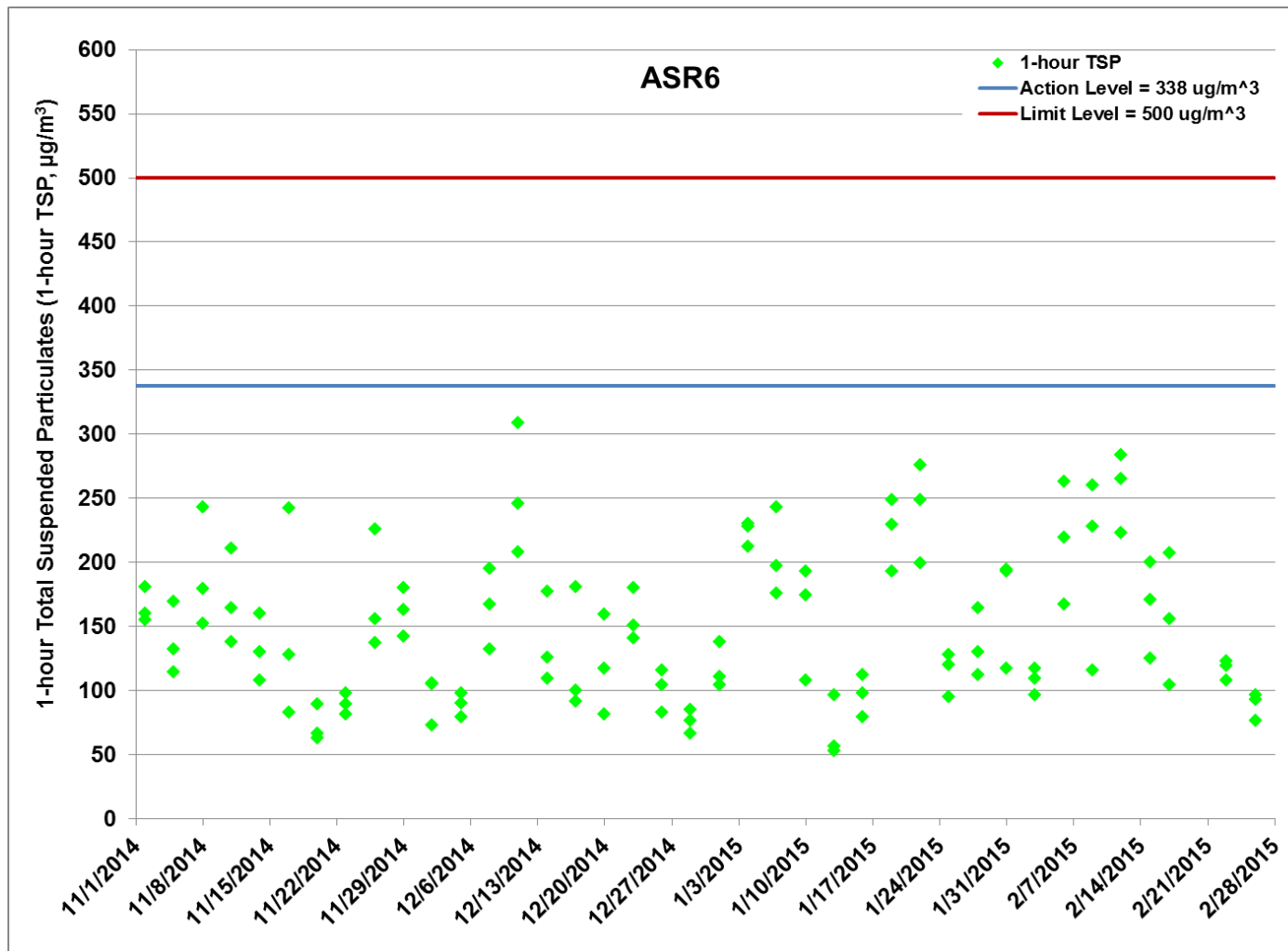


Figure F.2 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014). Ref:

0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



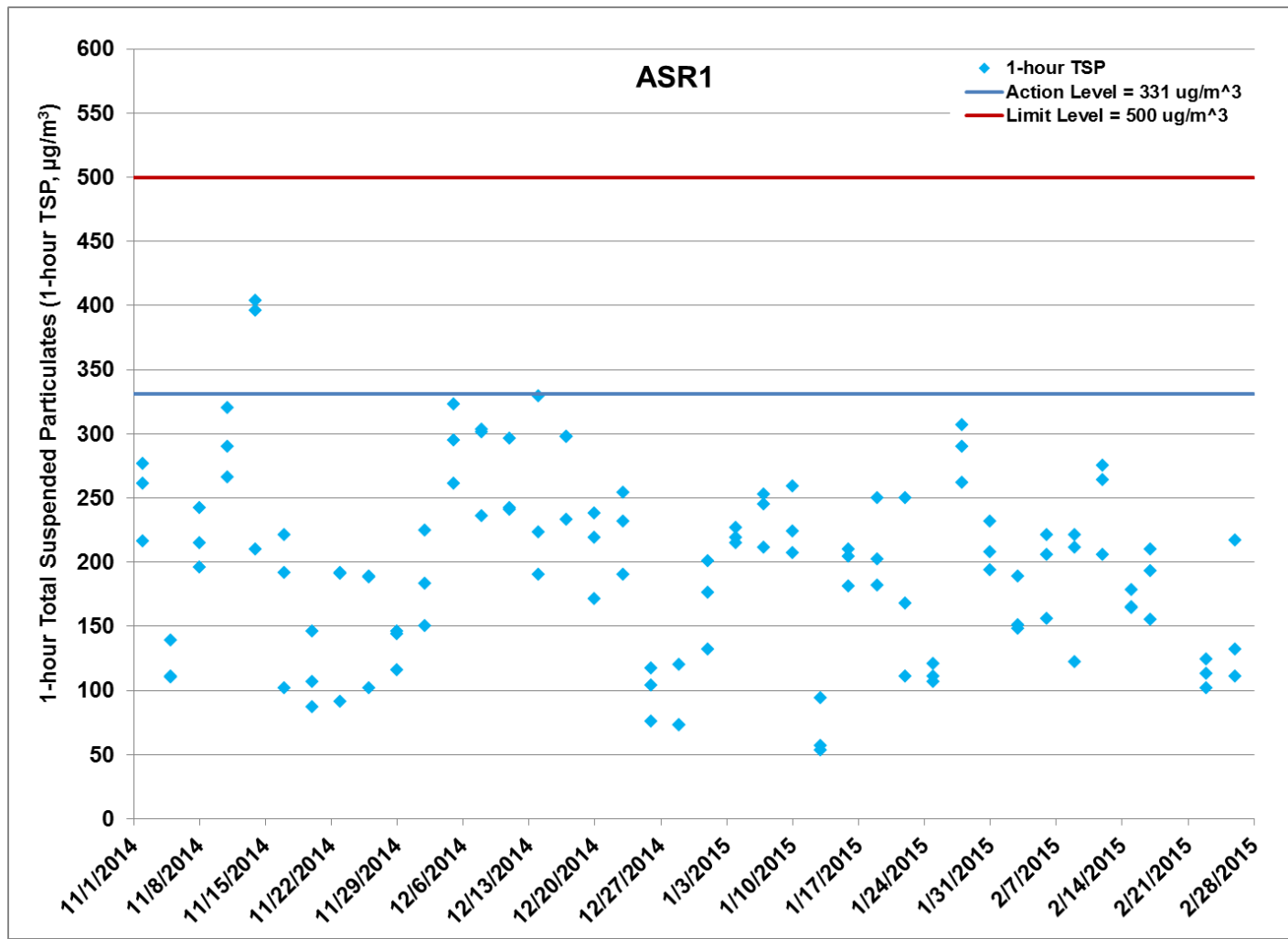


Figure F.3 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014). Ref:

0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



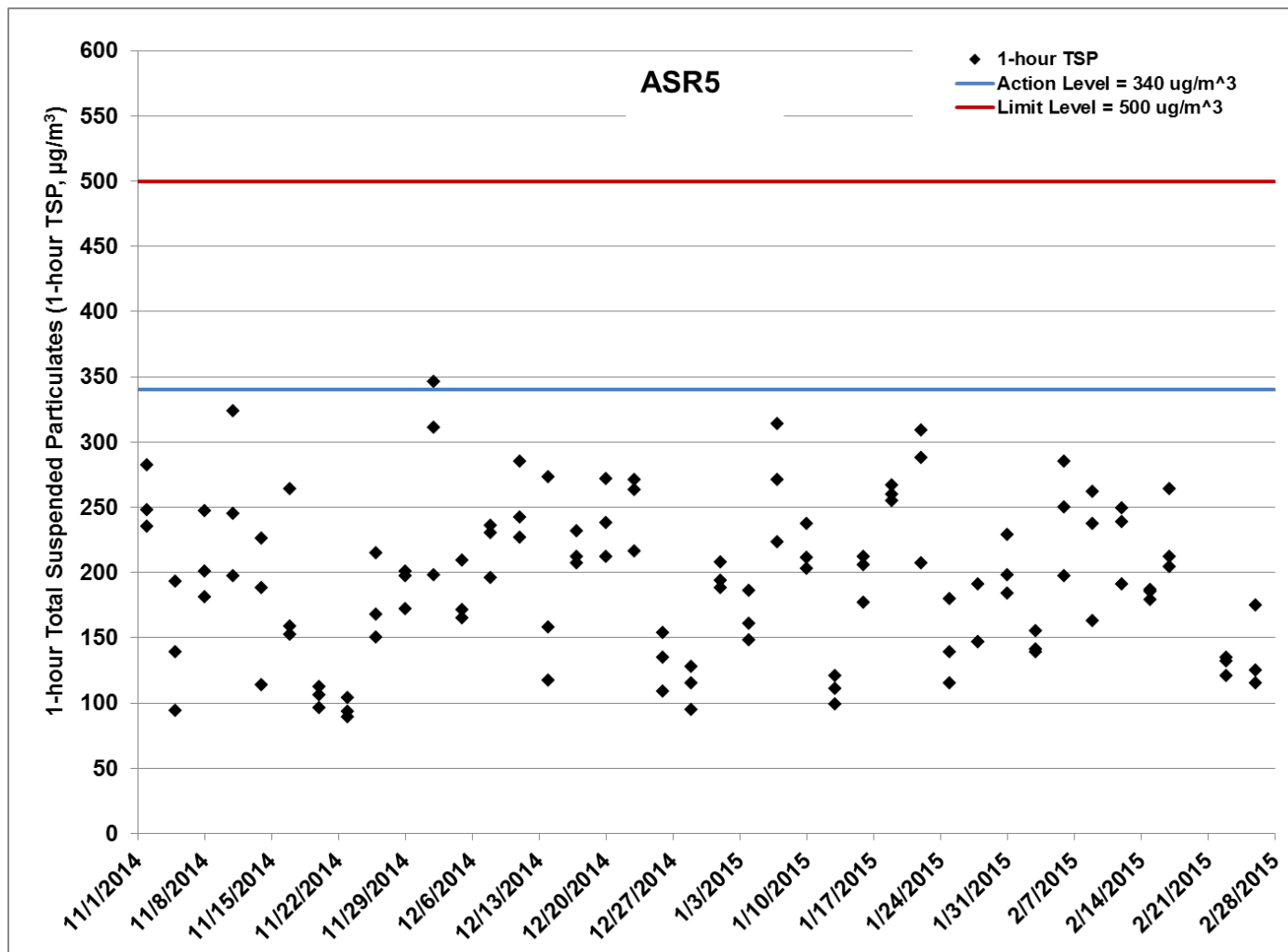


Figure F.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



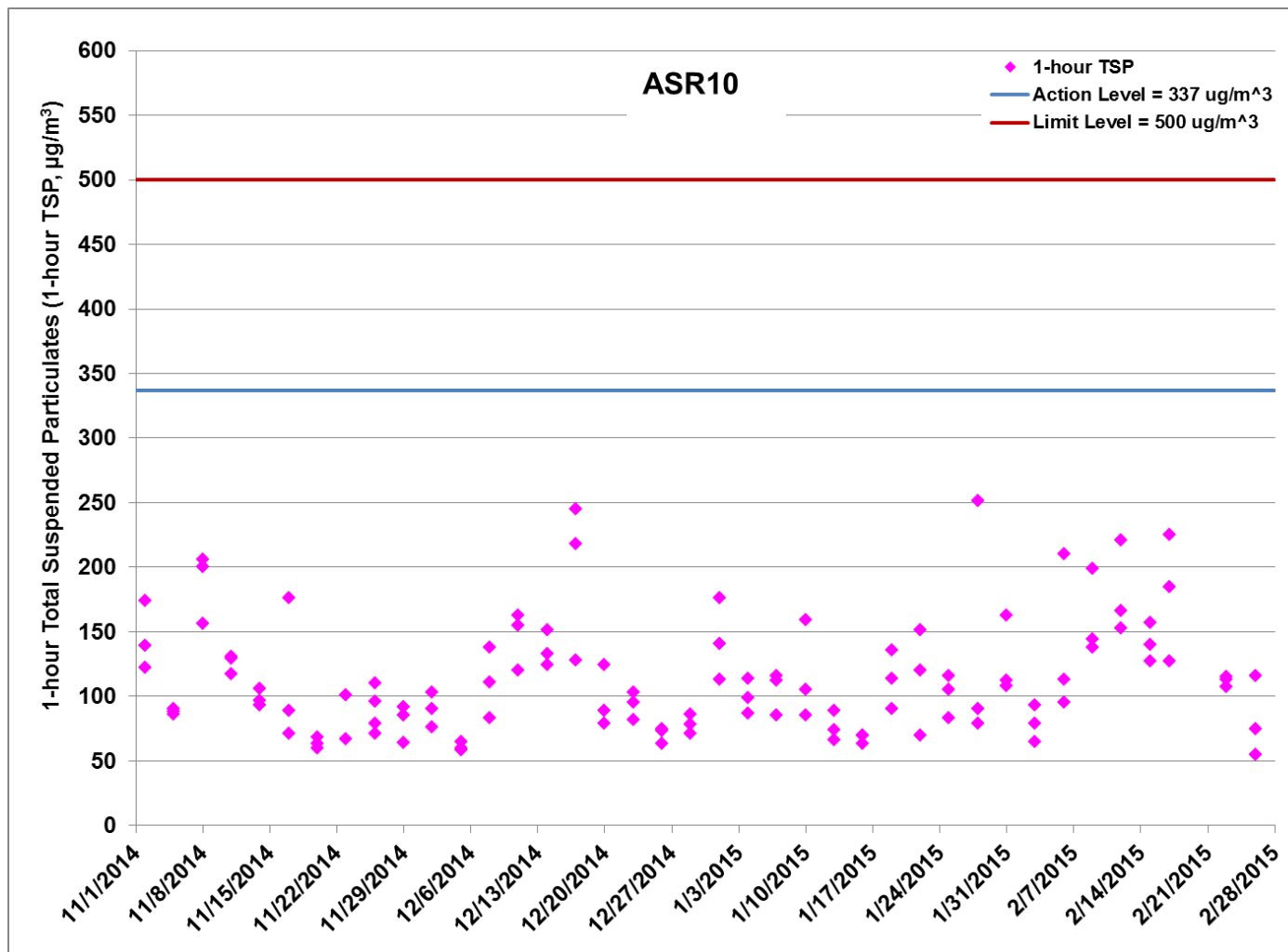


Figure F.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



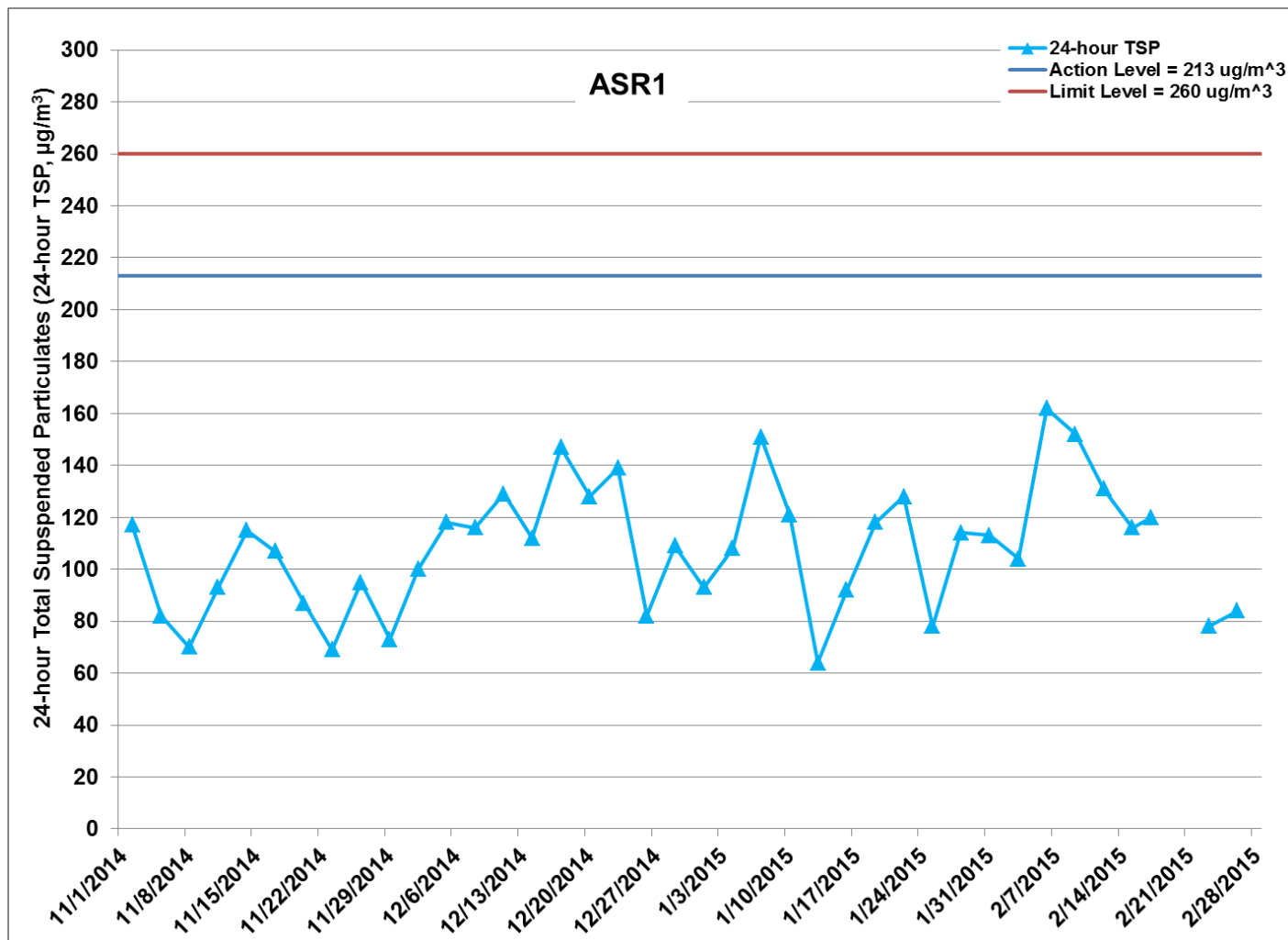


Figure F.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



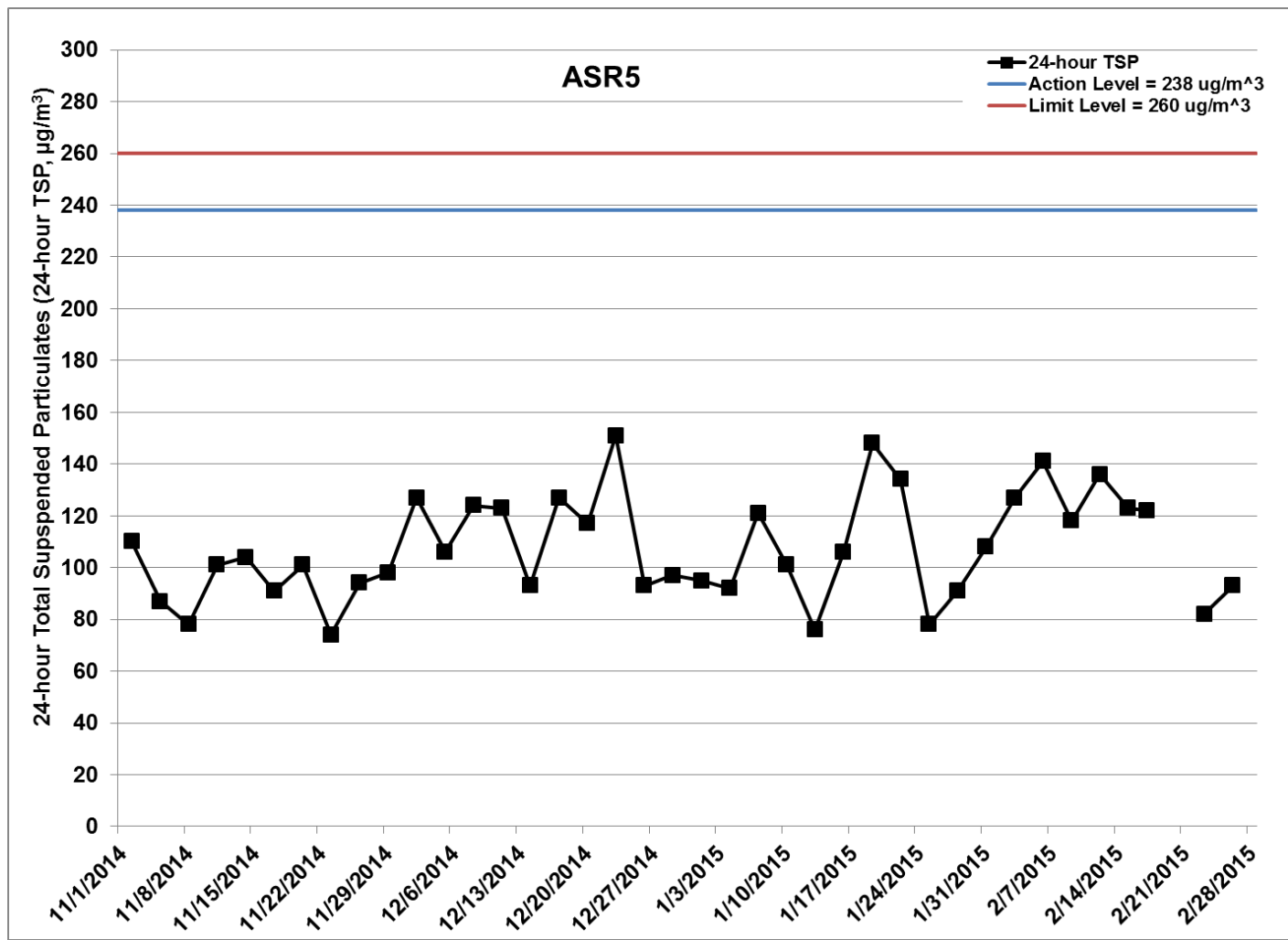


Figure F.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



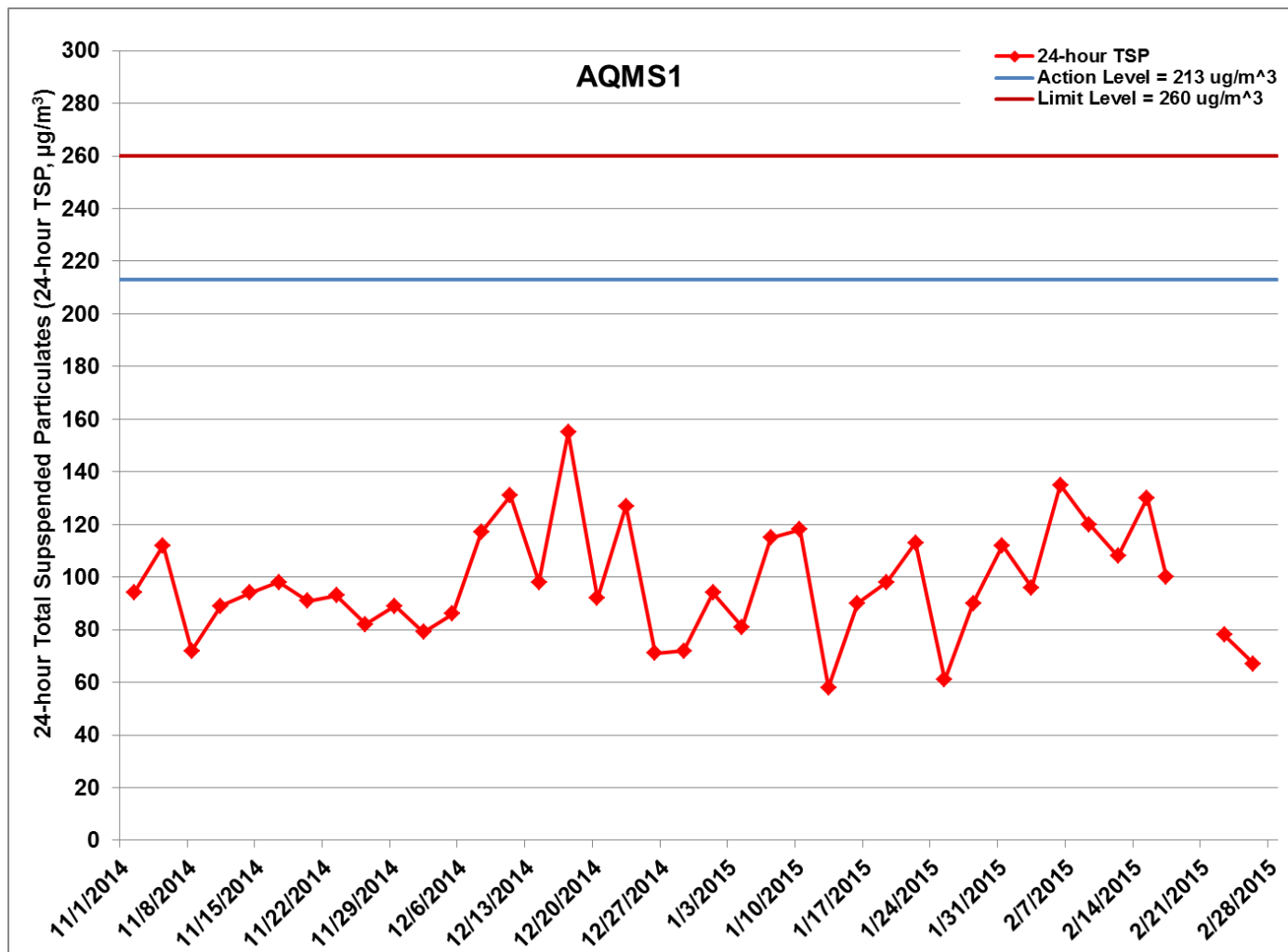


Figure F.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



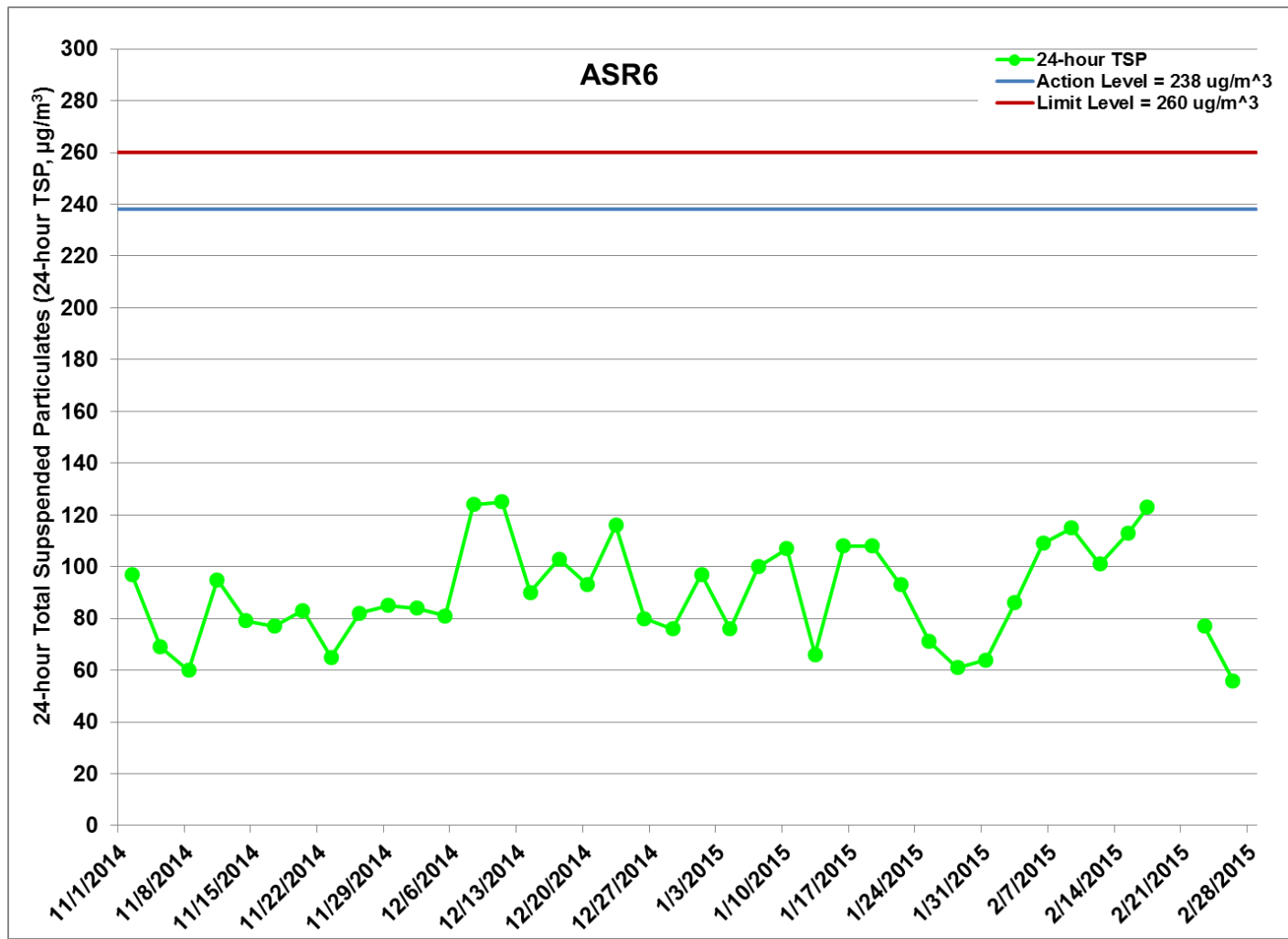


Figure F.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



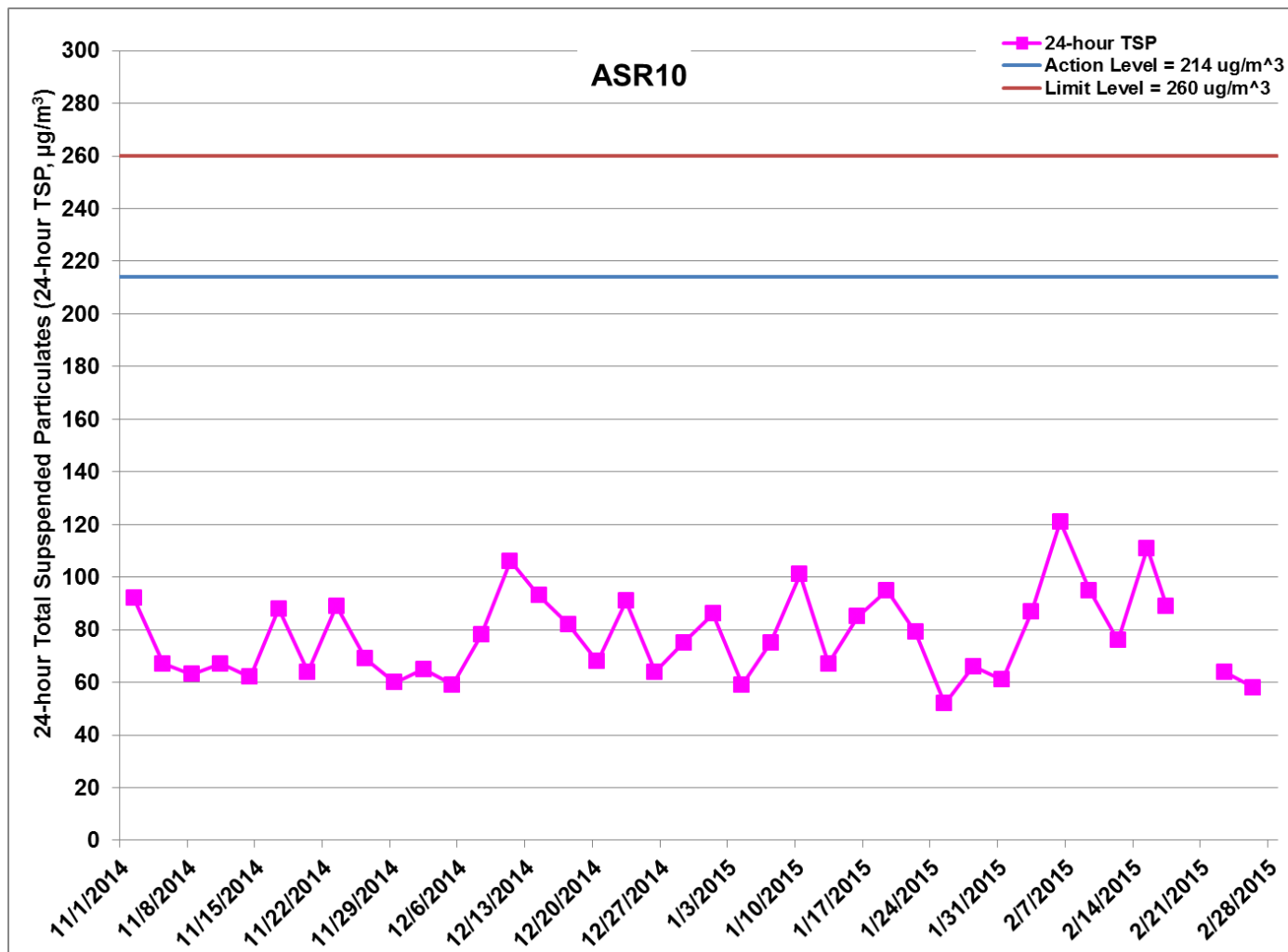


Figure F.10 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2014 and 28 February 2015 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: TBM Platform Construction at Works Area - Portion N-A (22/12/2014 - 28/2/2015), Diaphragm Wall Construction at Works Area - Portion N-A (1/11/2014 - 30/11/2014) and Excavation for Launching Shaft (1/11/2014 - 30/11/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Dec 2014_Feb 2015_REV a.xlsx



Appendix G

Impact Water Quality Monitoring Results

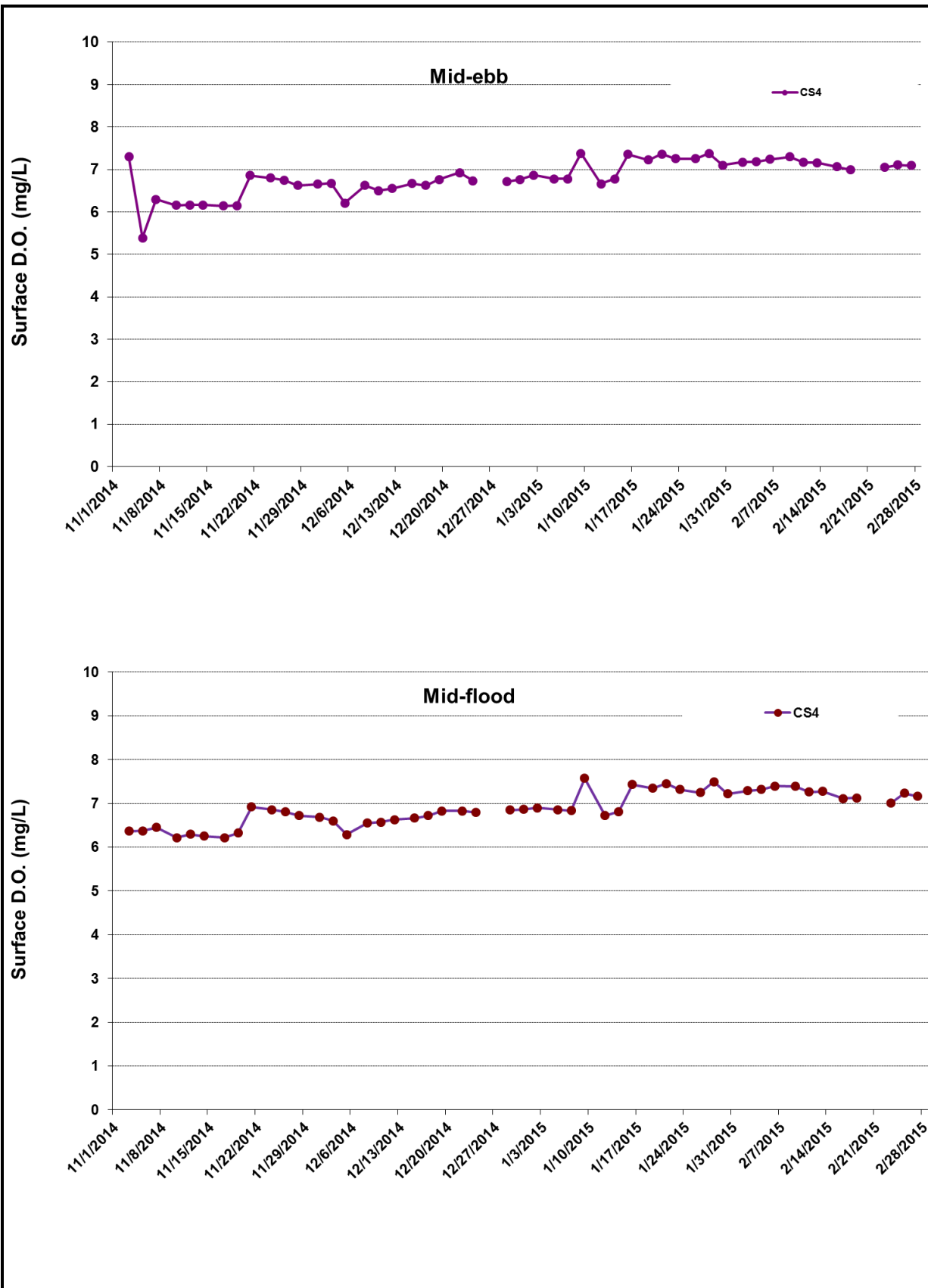
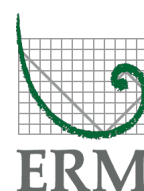


Figure G1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.

Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



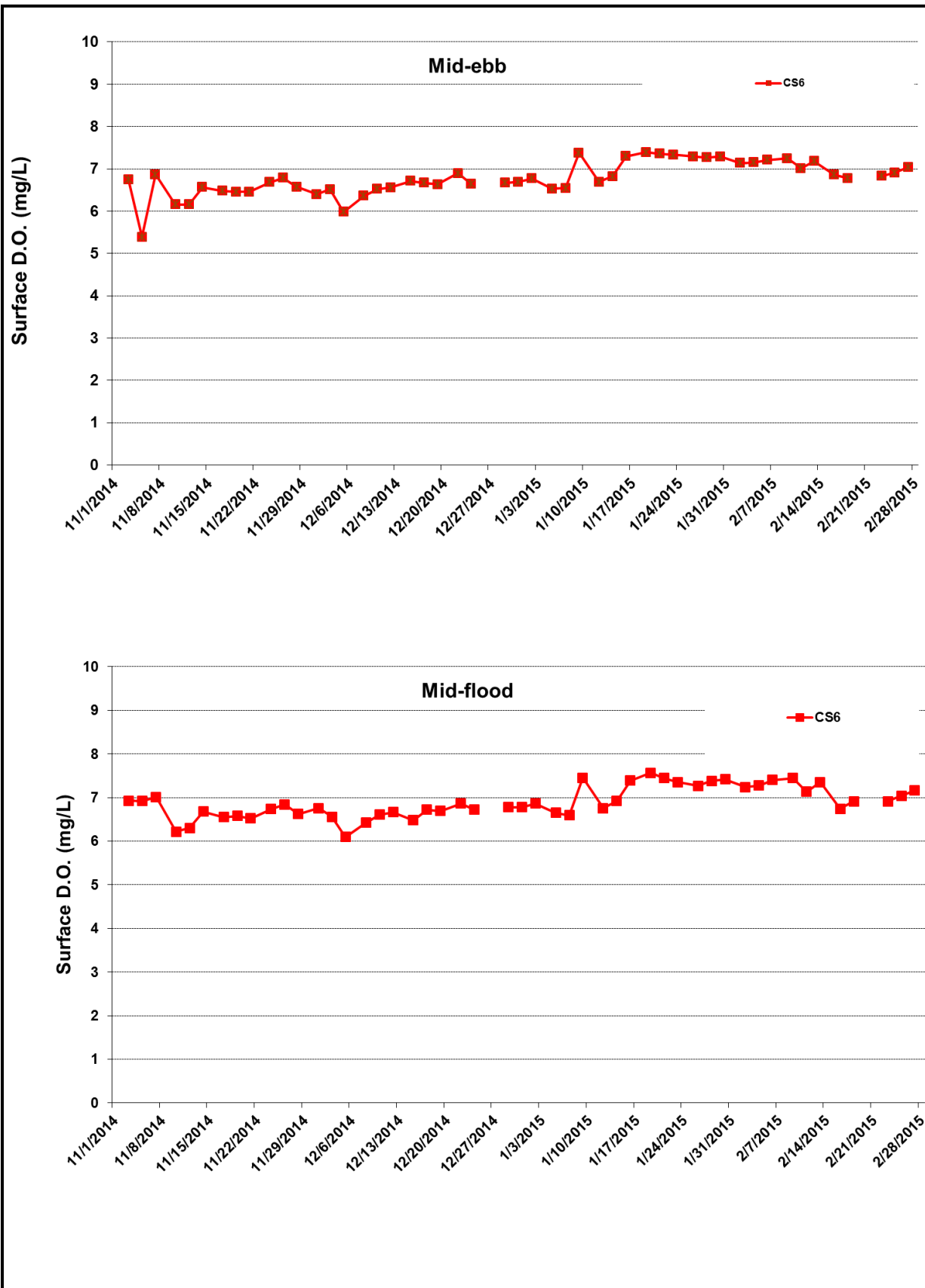
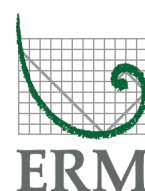


Figure G2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



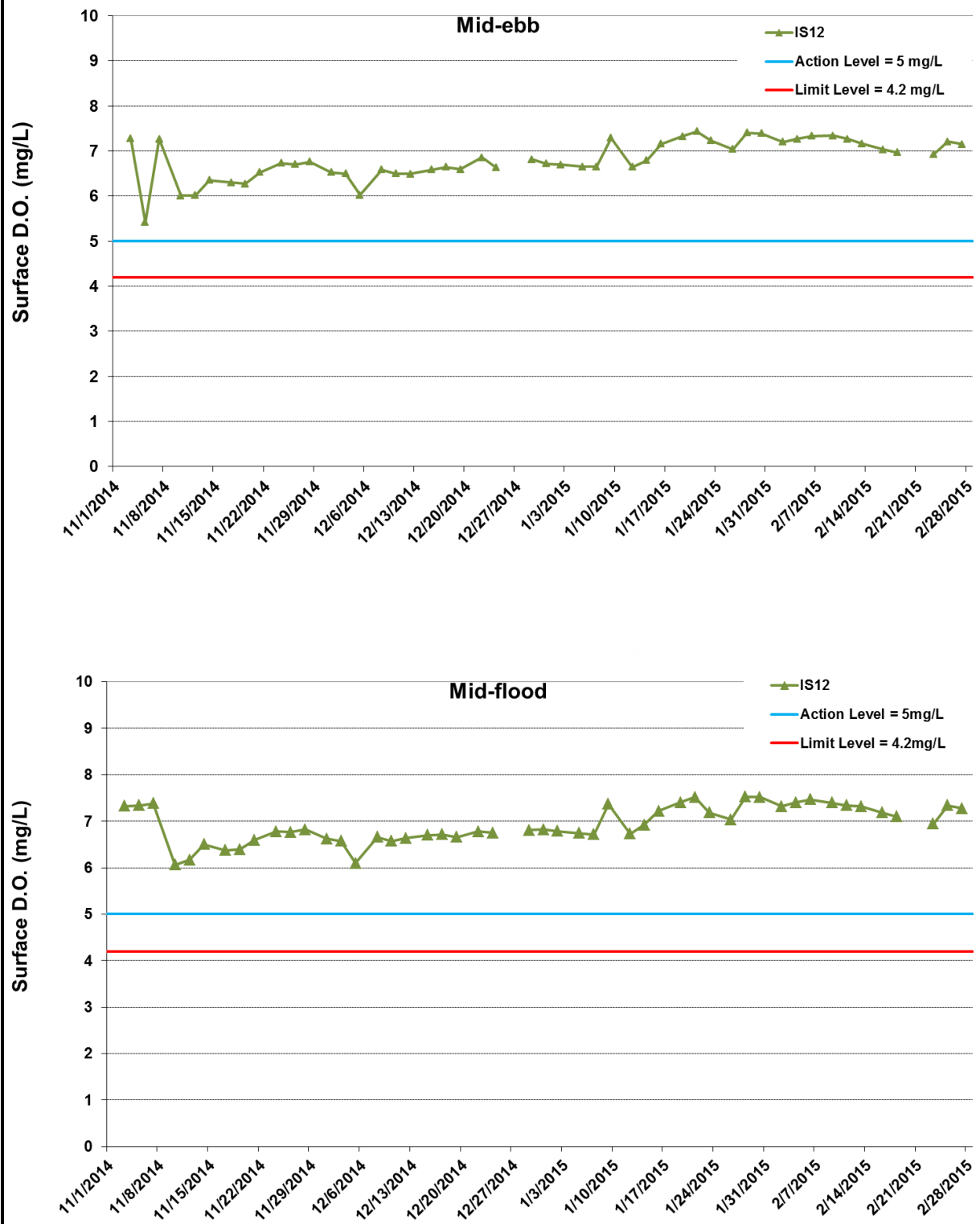


Figure G3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



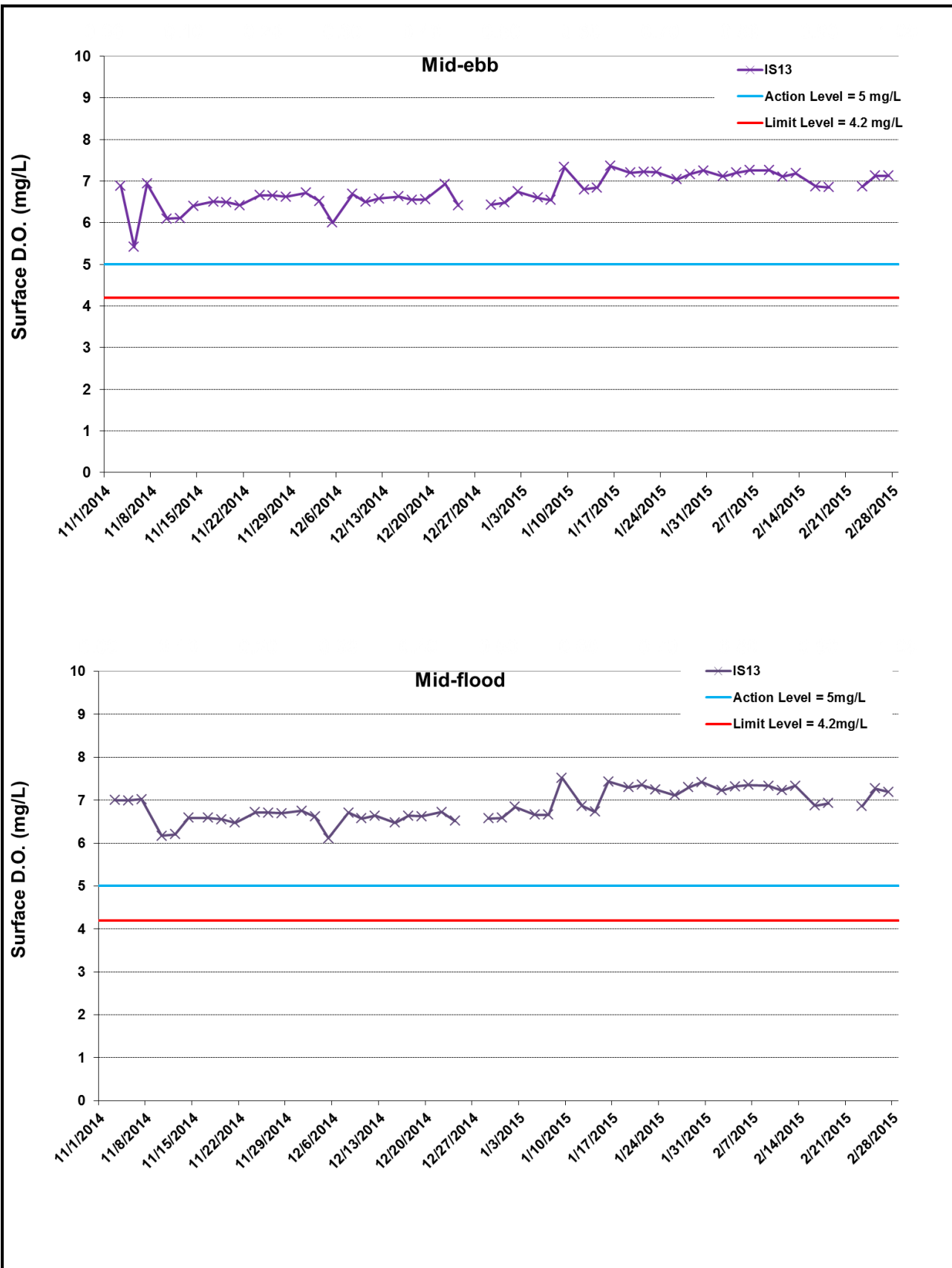
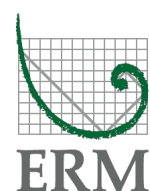


Figure G4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



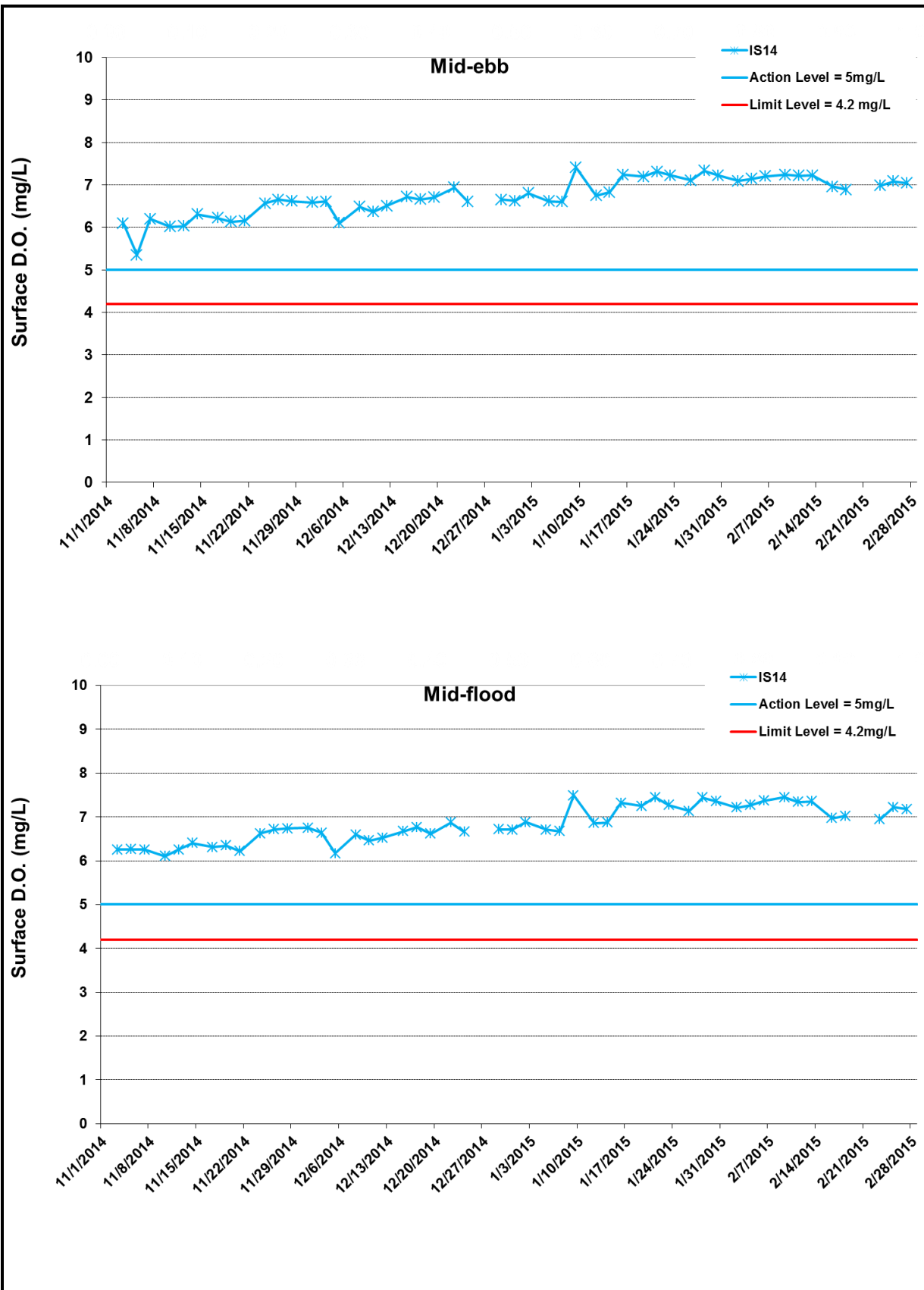


Figure G5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



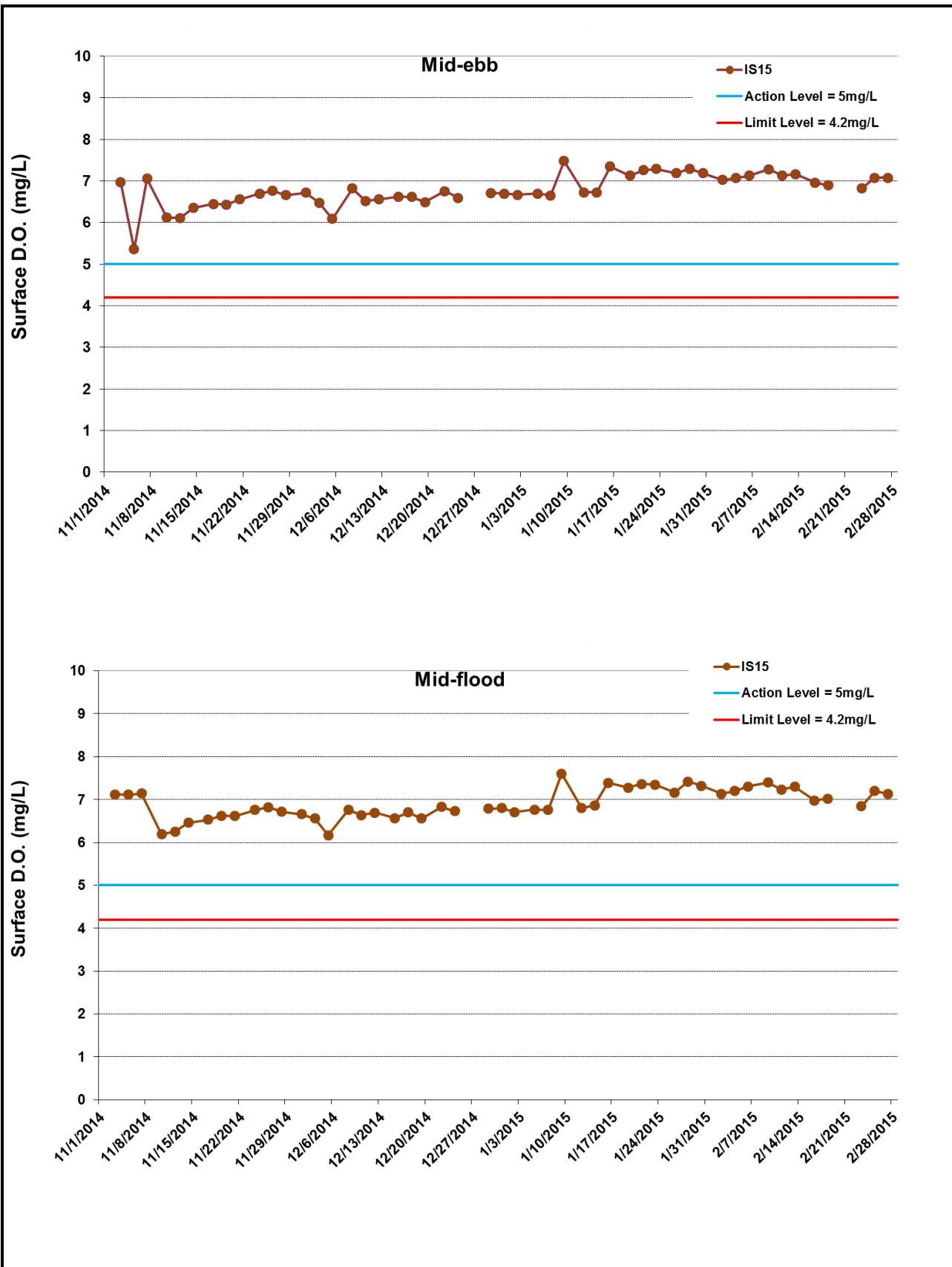


Figure G6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



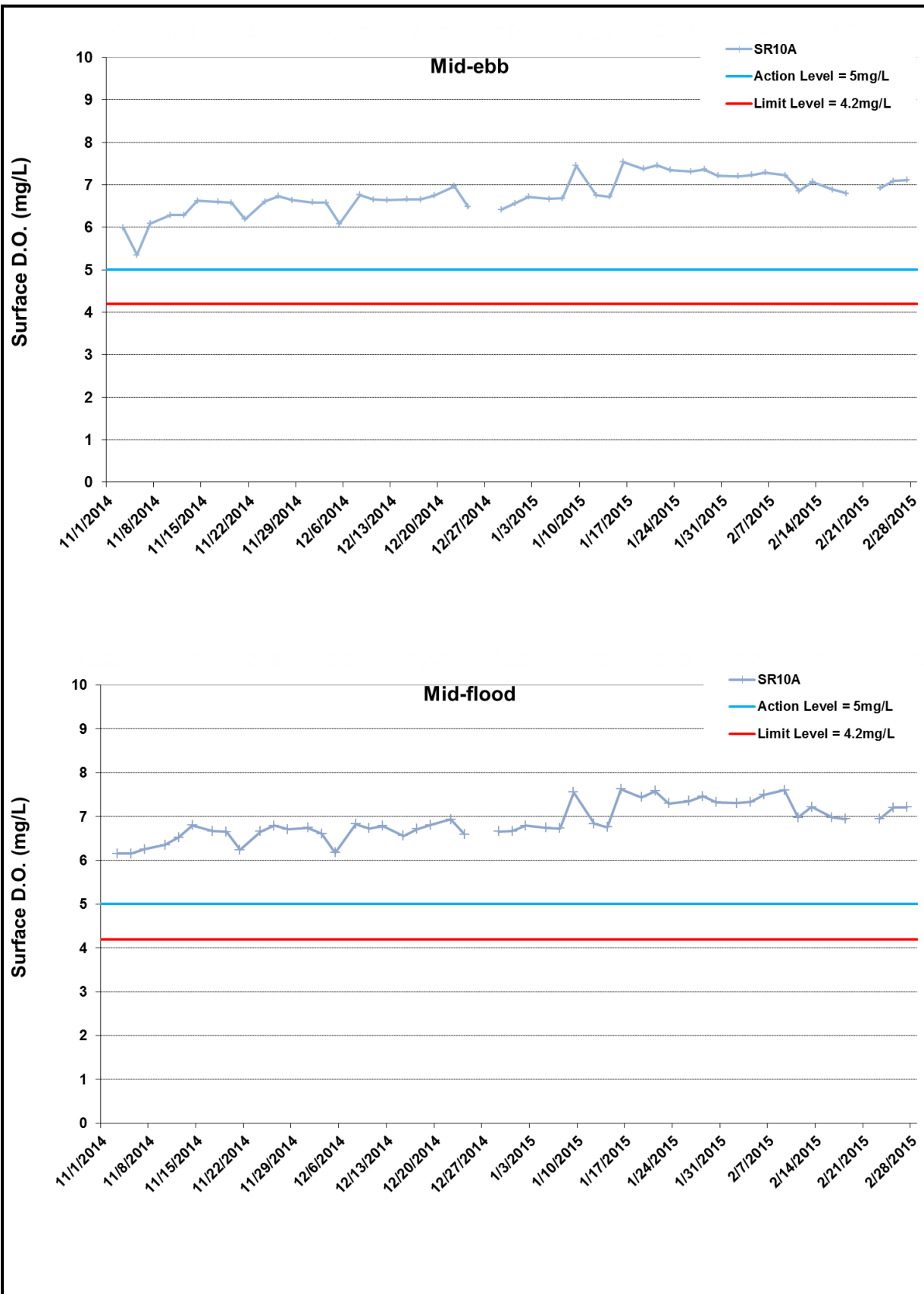


Figure G7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



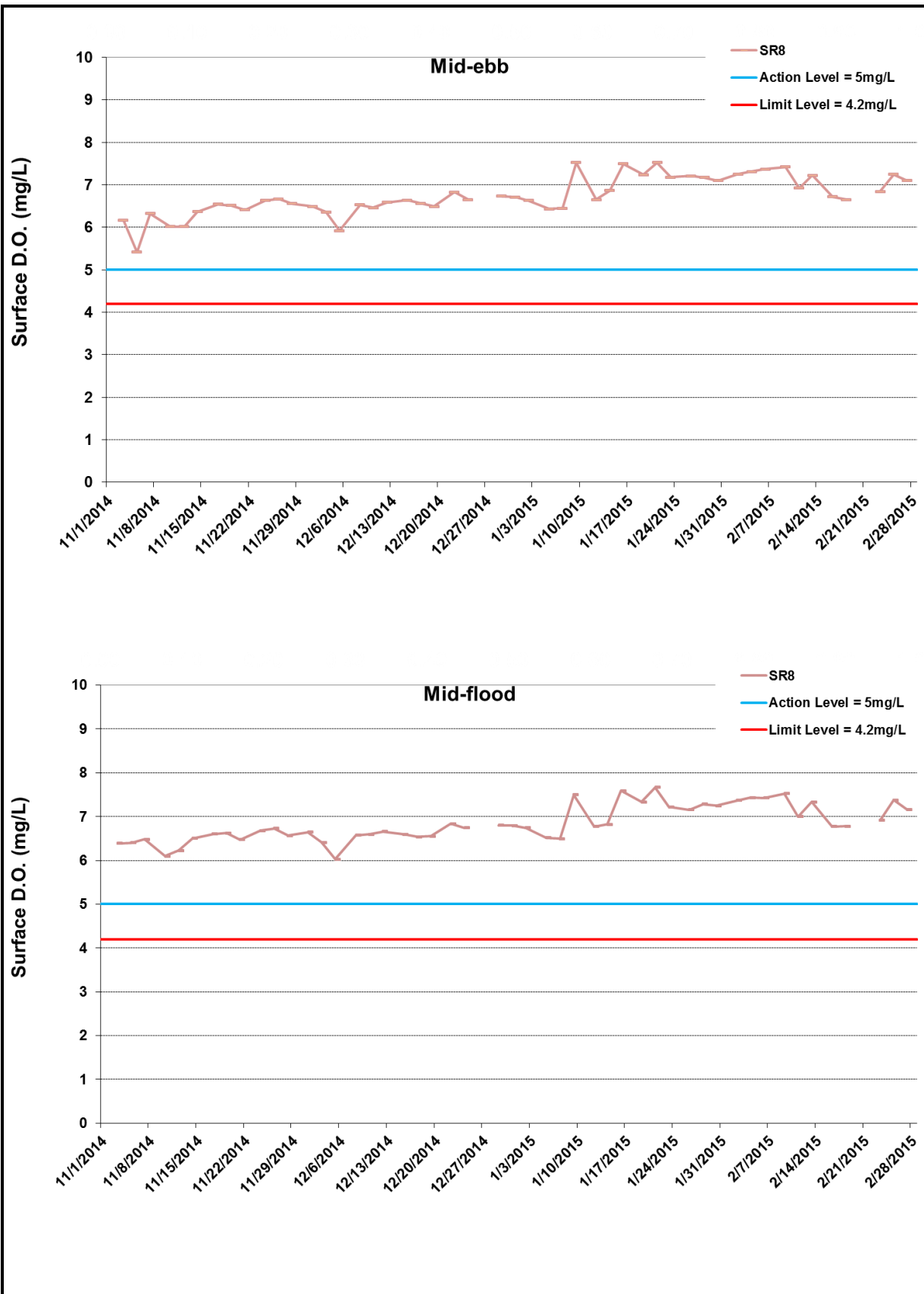


Figure G8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



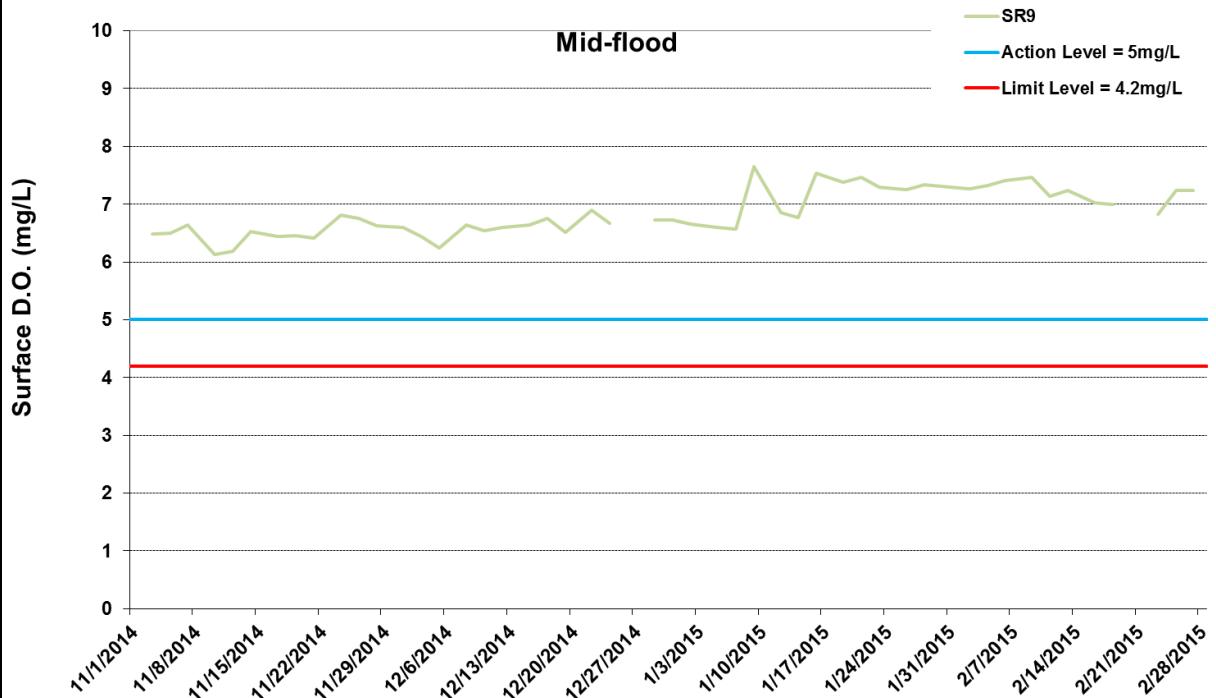
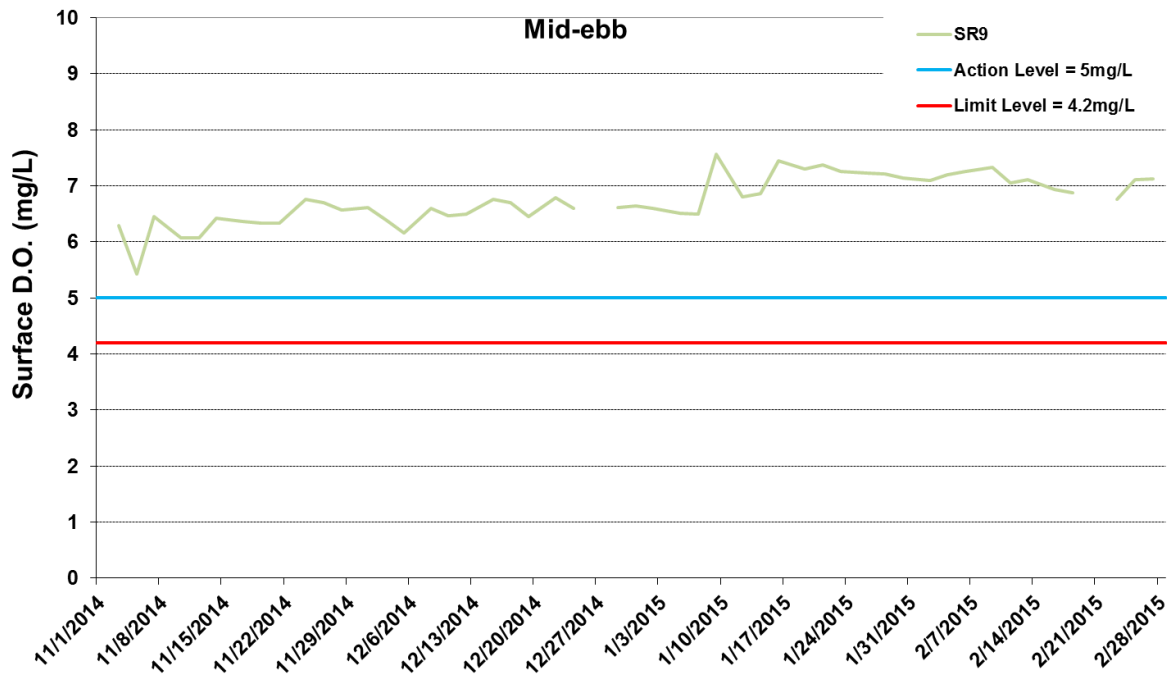
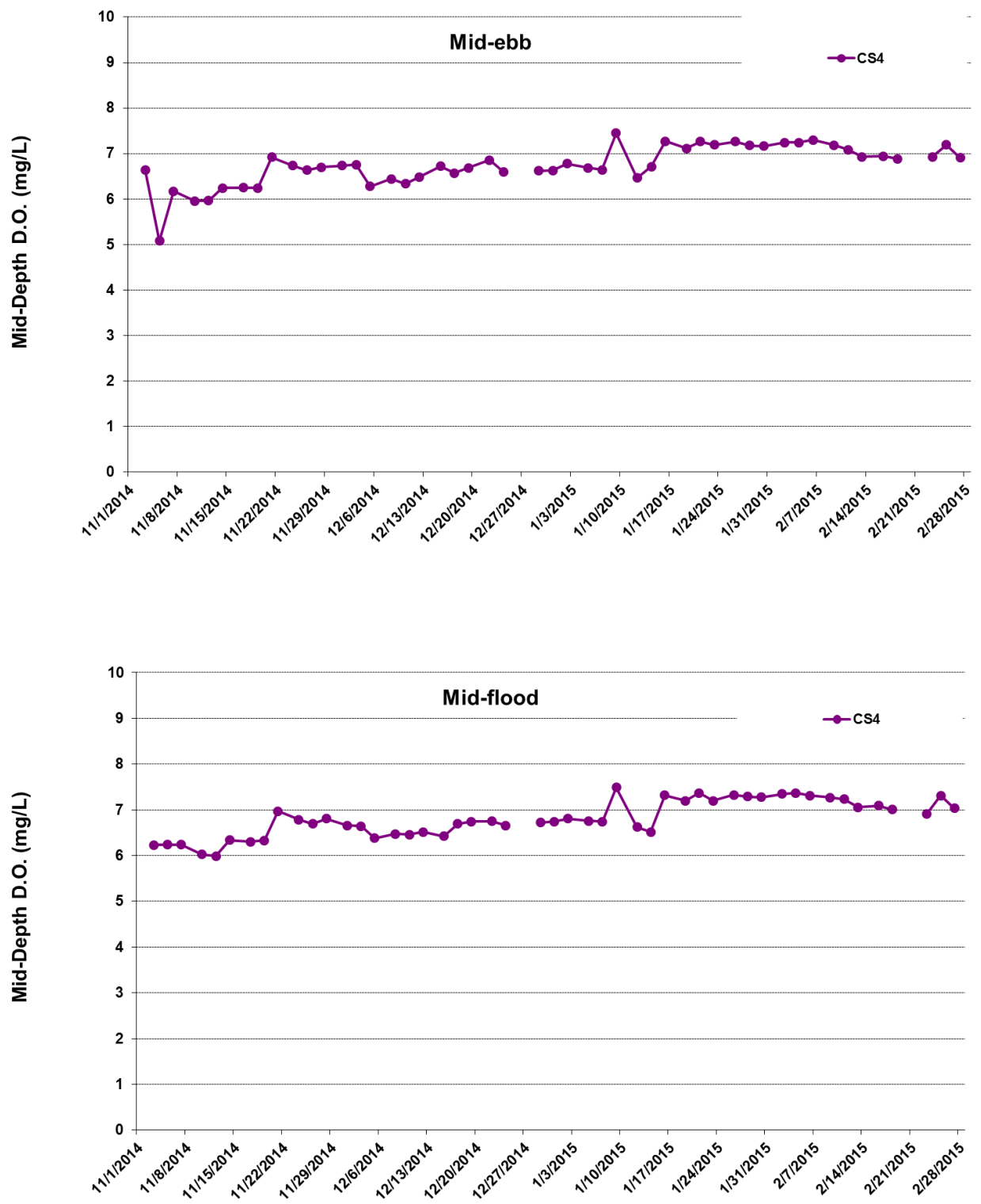


Figure G9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2014 and 28 February 2015 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

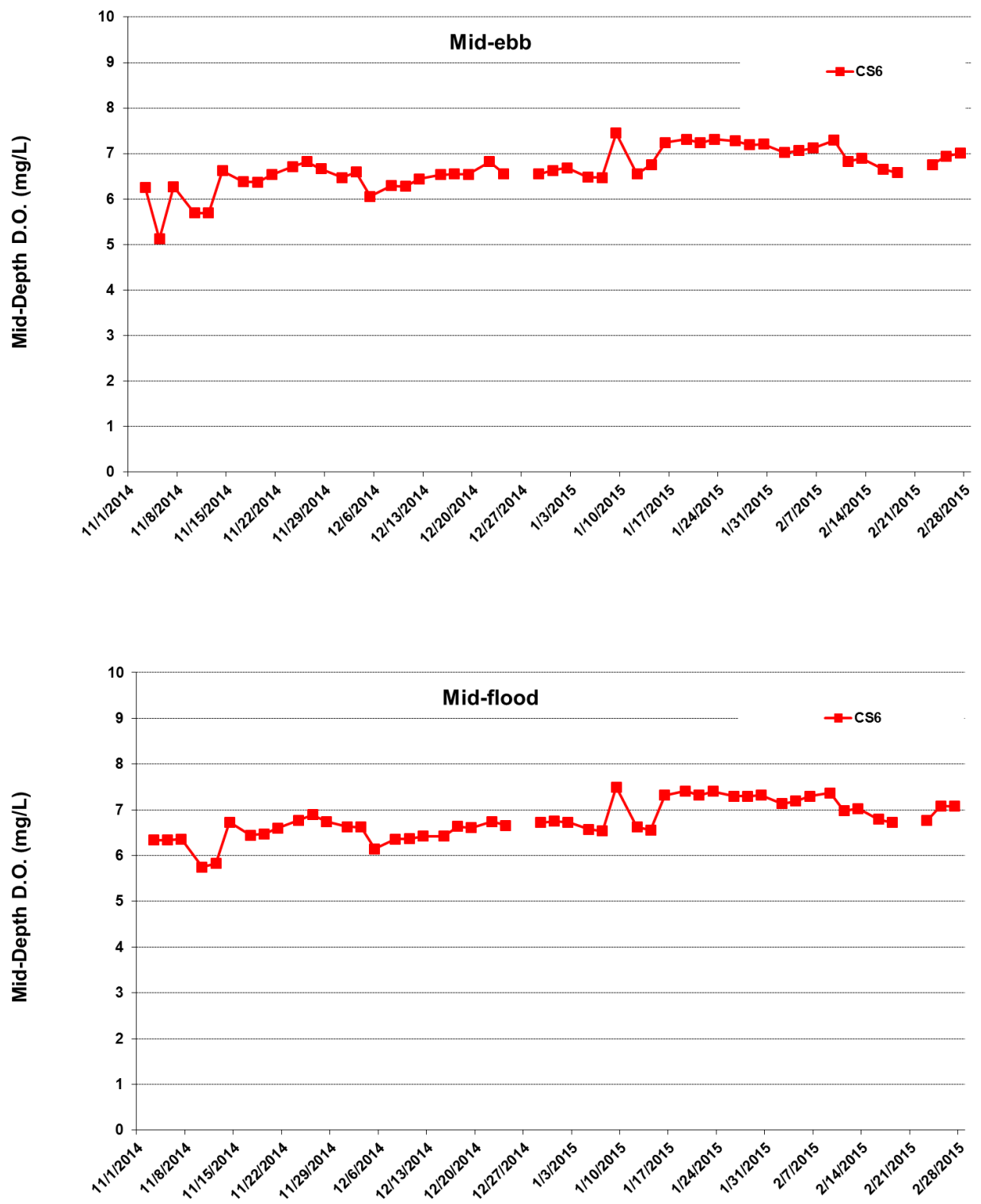




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

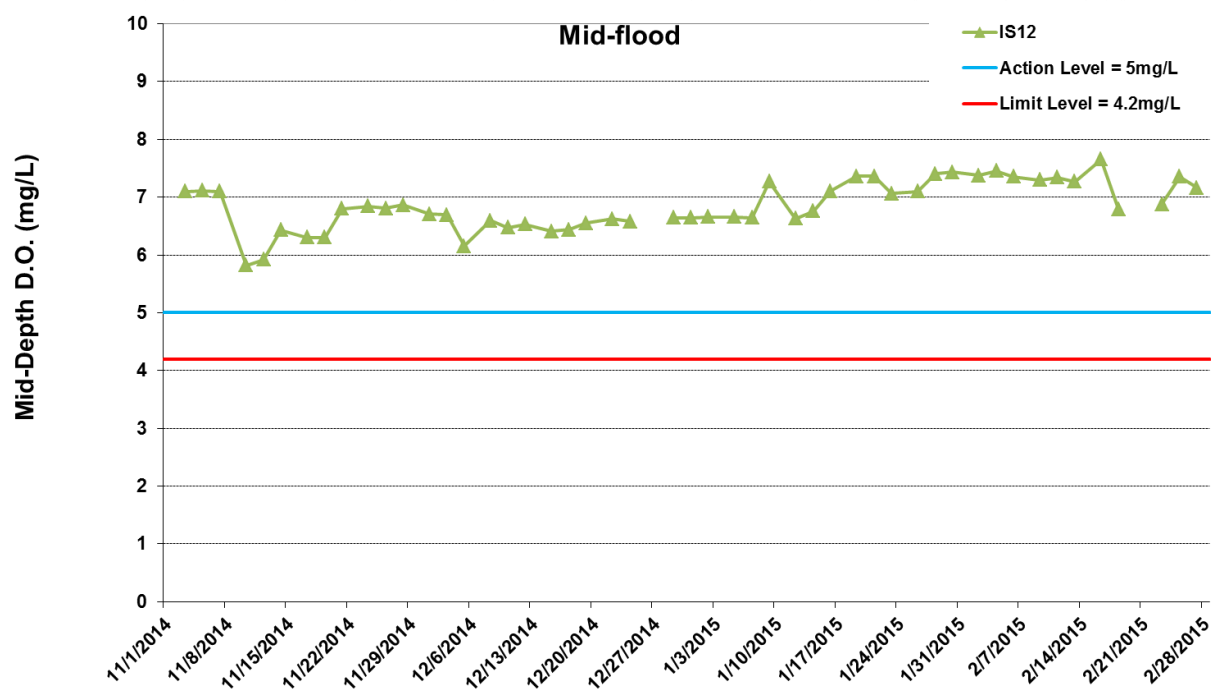
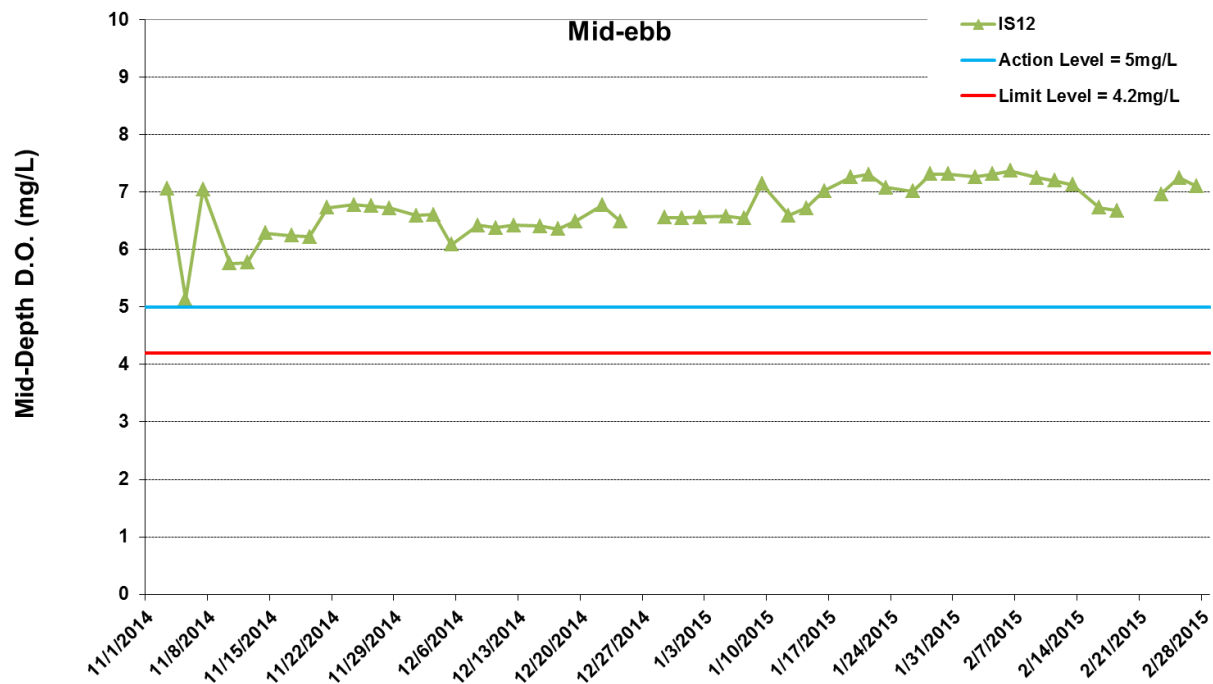




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

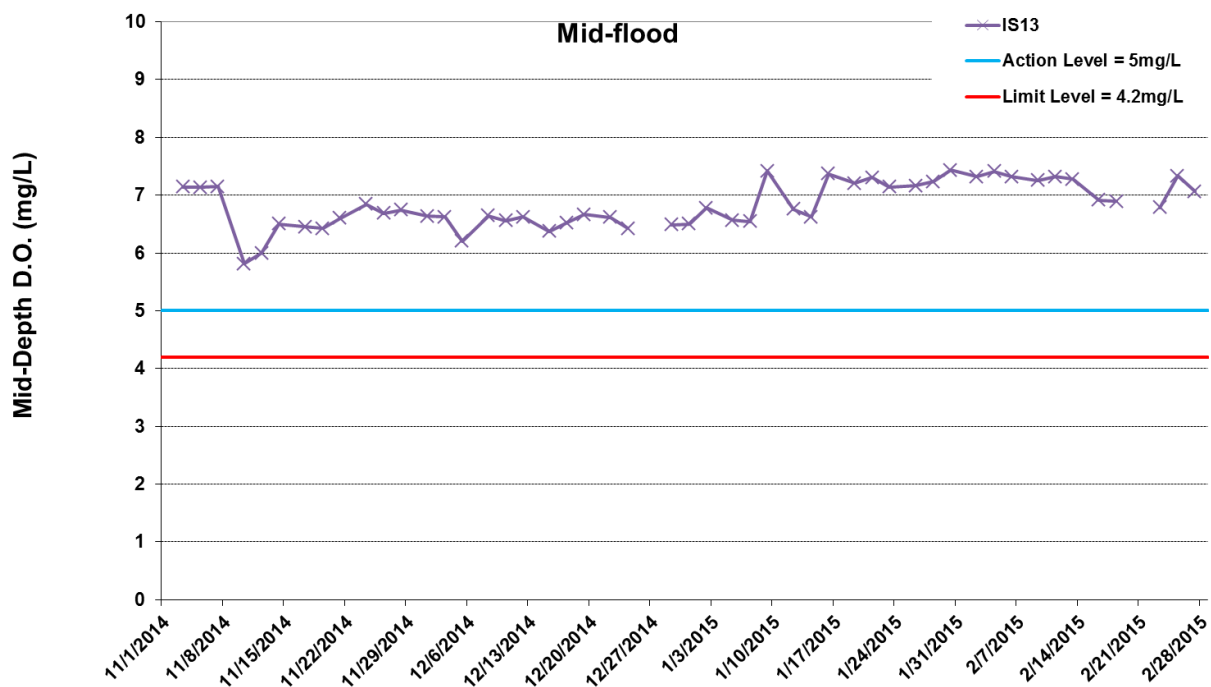
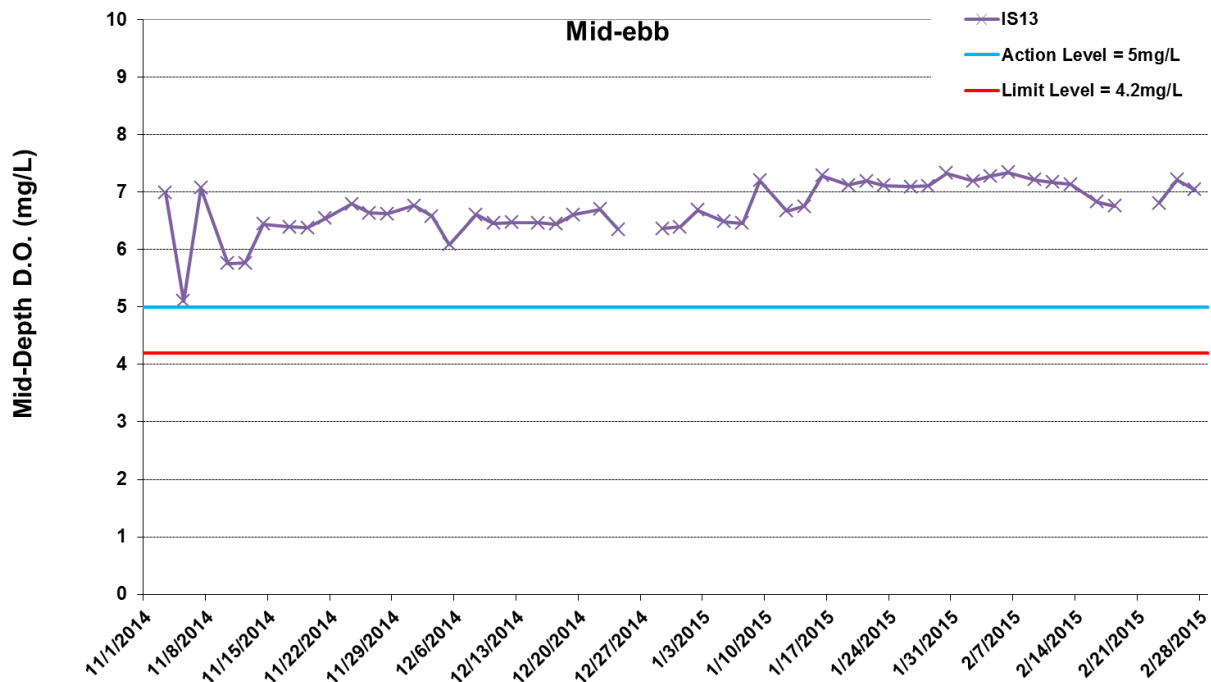




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

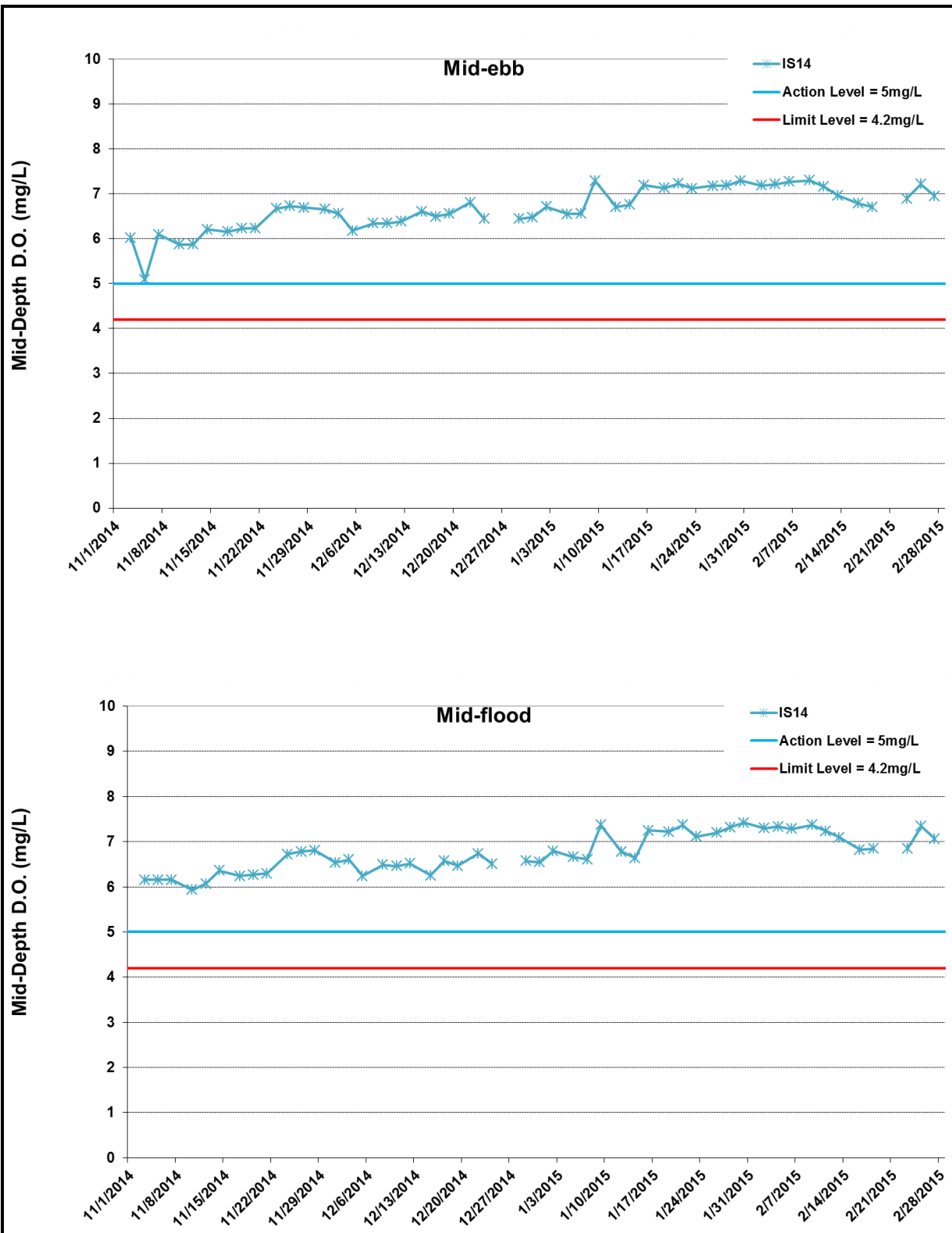




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

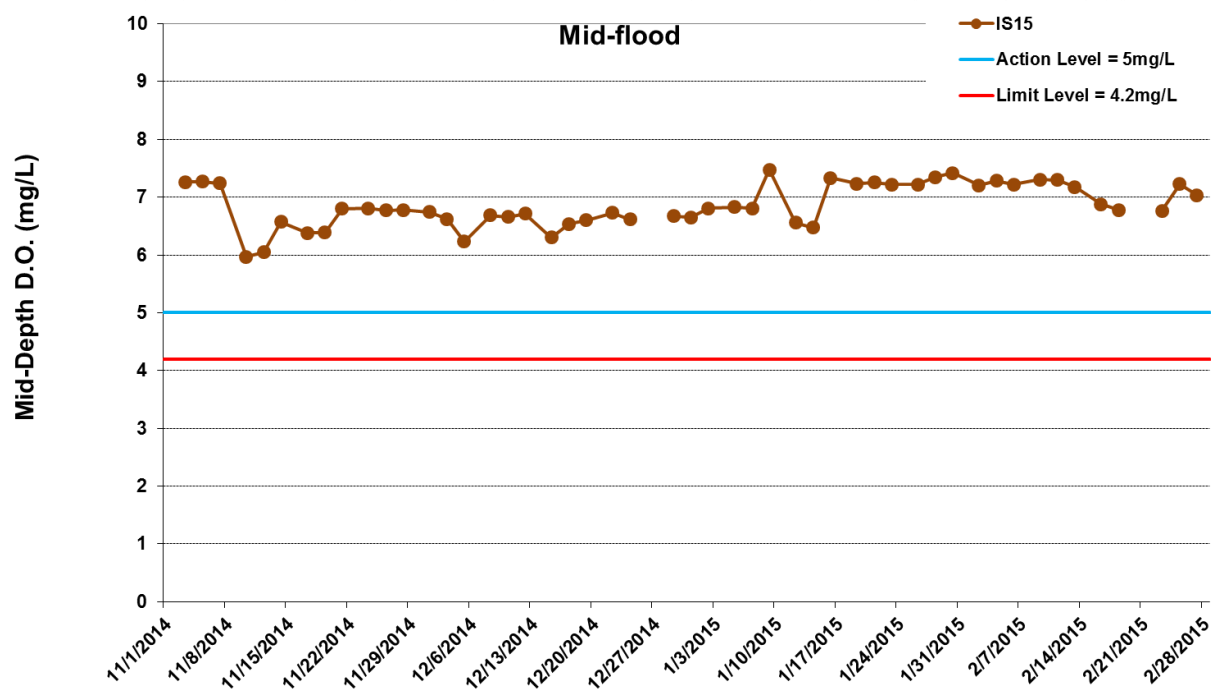
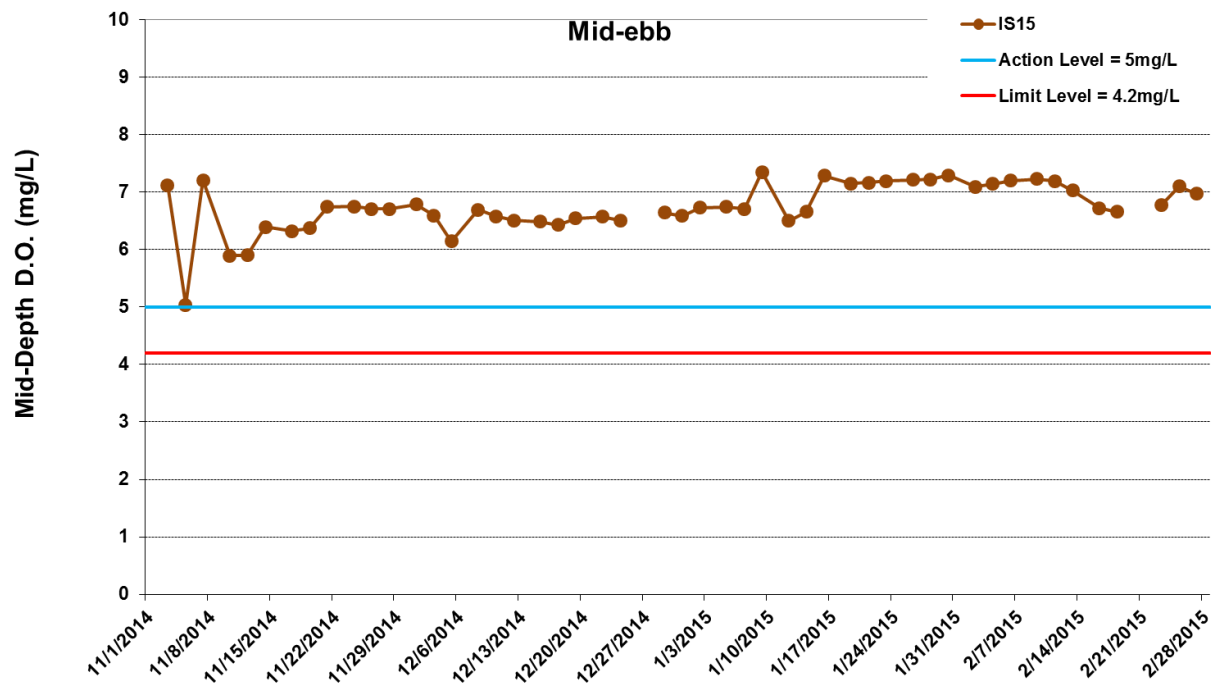




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls

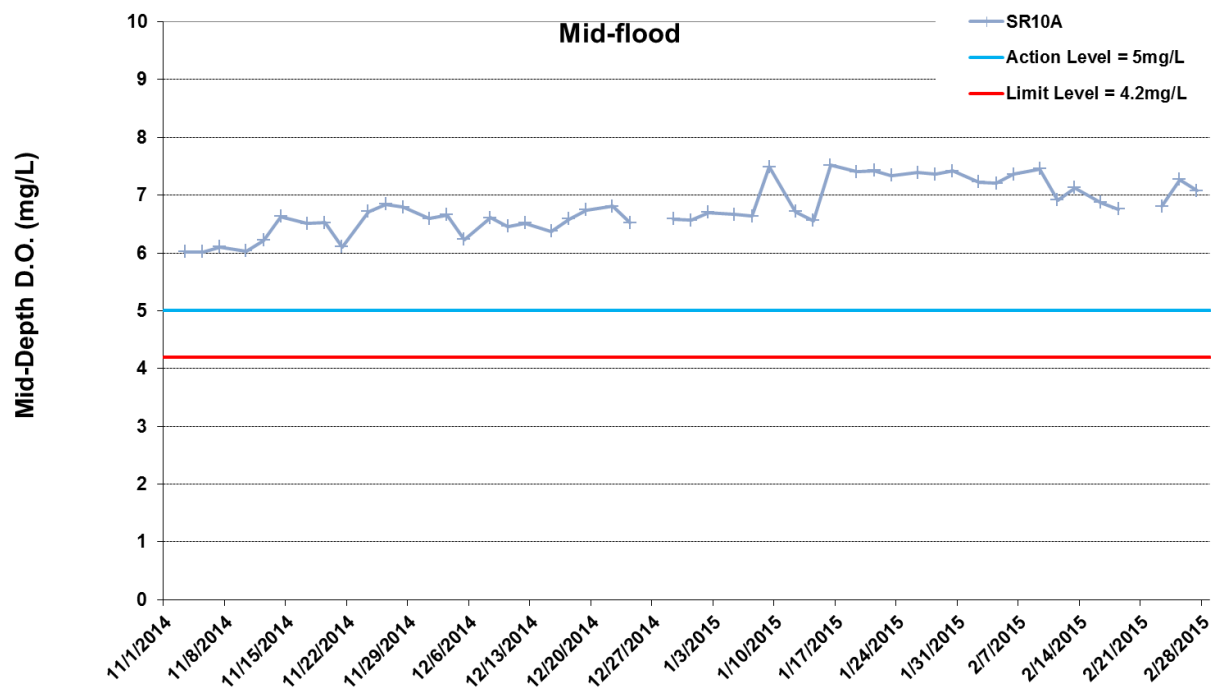
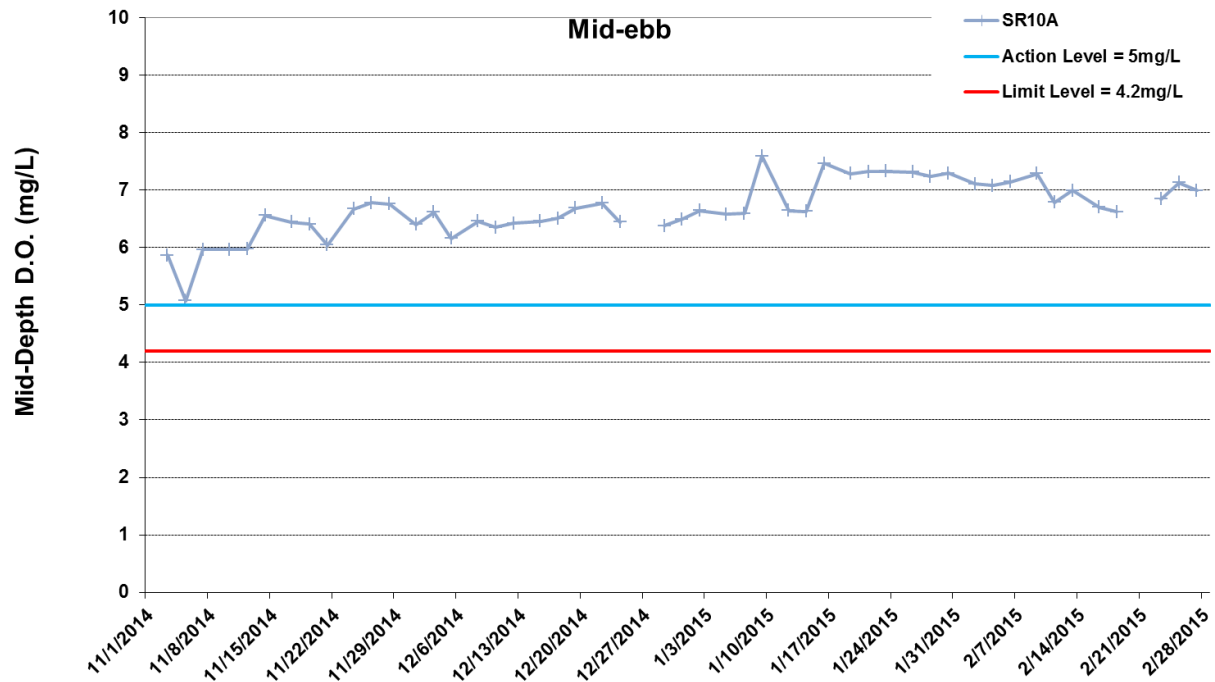




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls





*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G16 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2014 and 28 February 2015 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



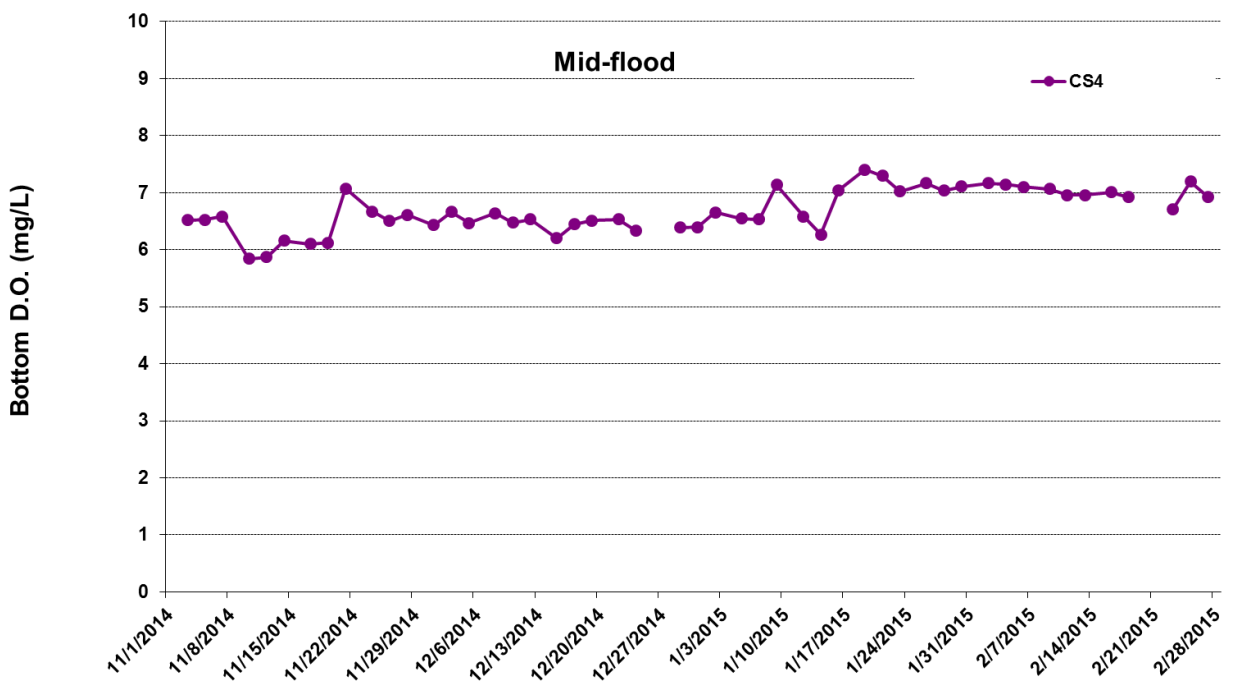
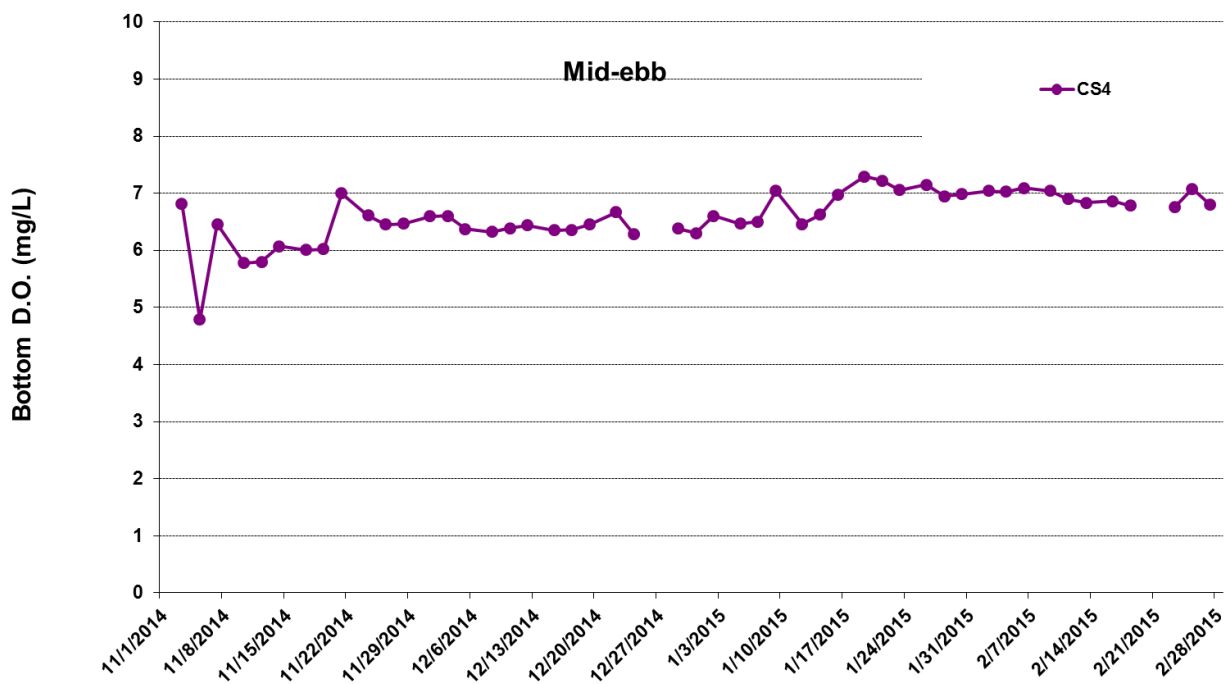


Figure G17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



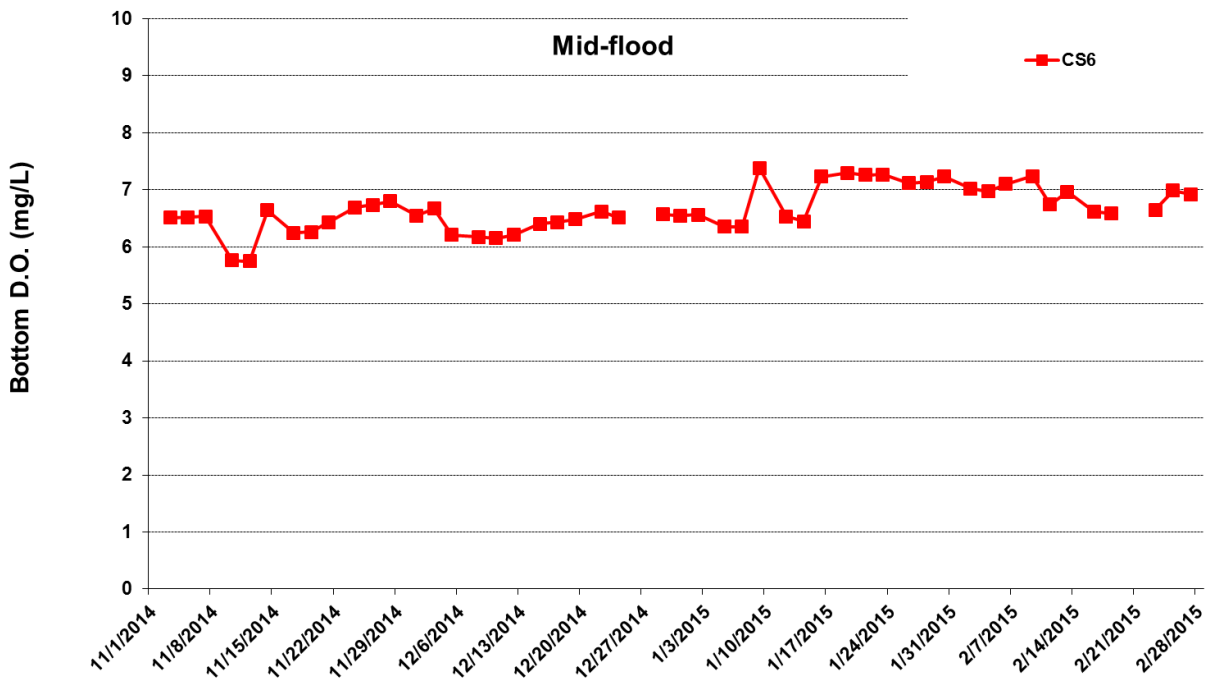
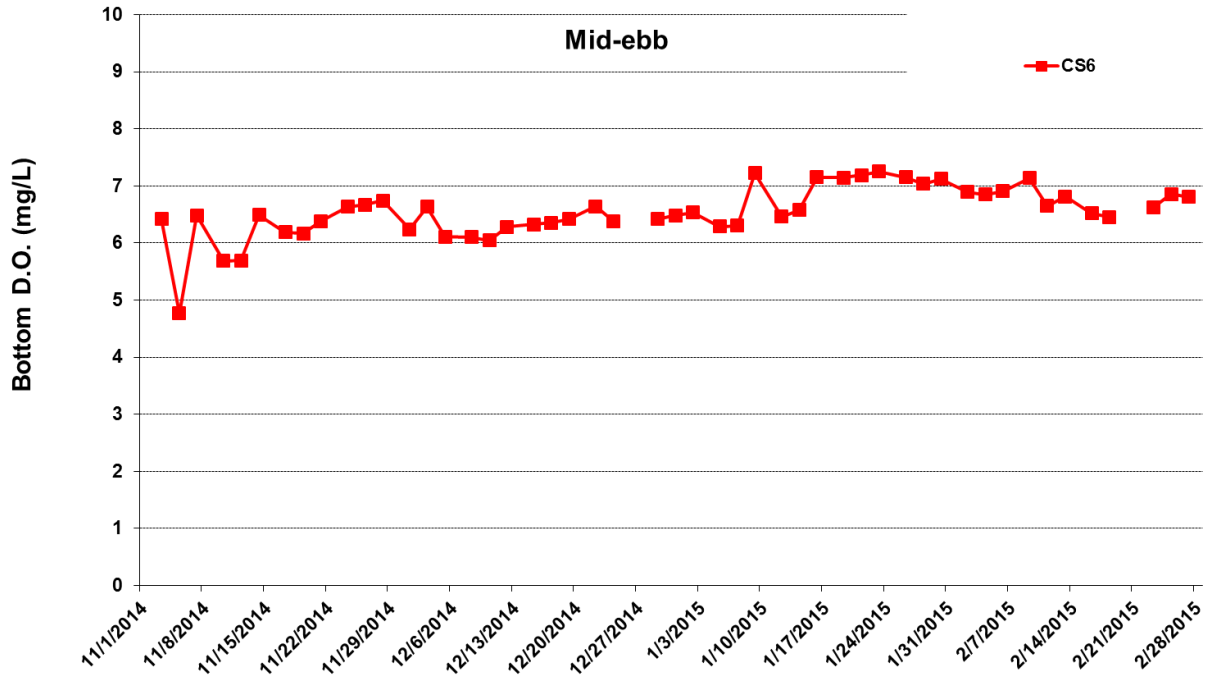


Figure G18 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



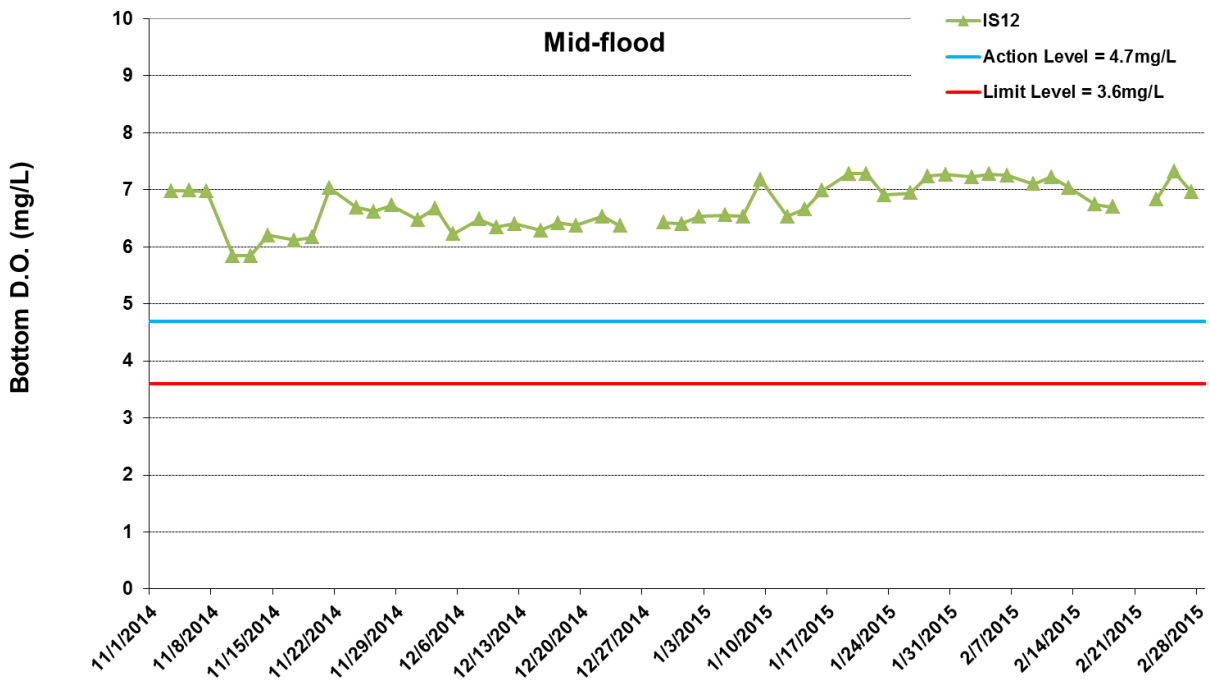
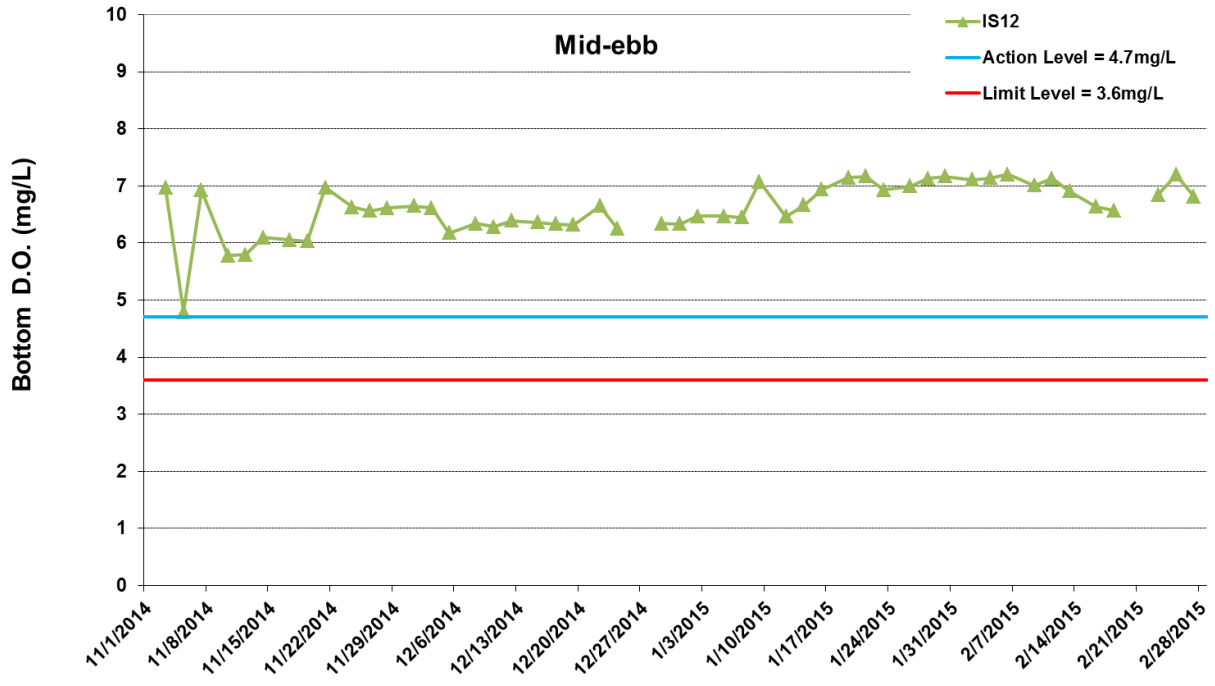


Figure G19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



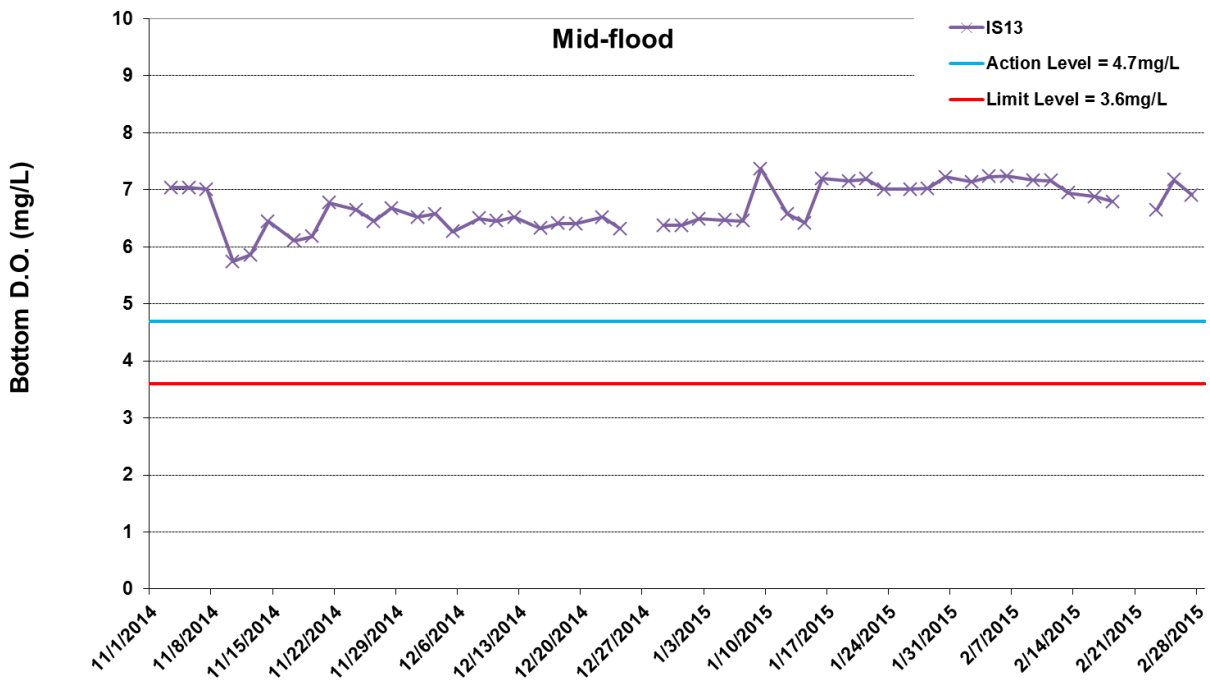
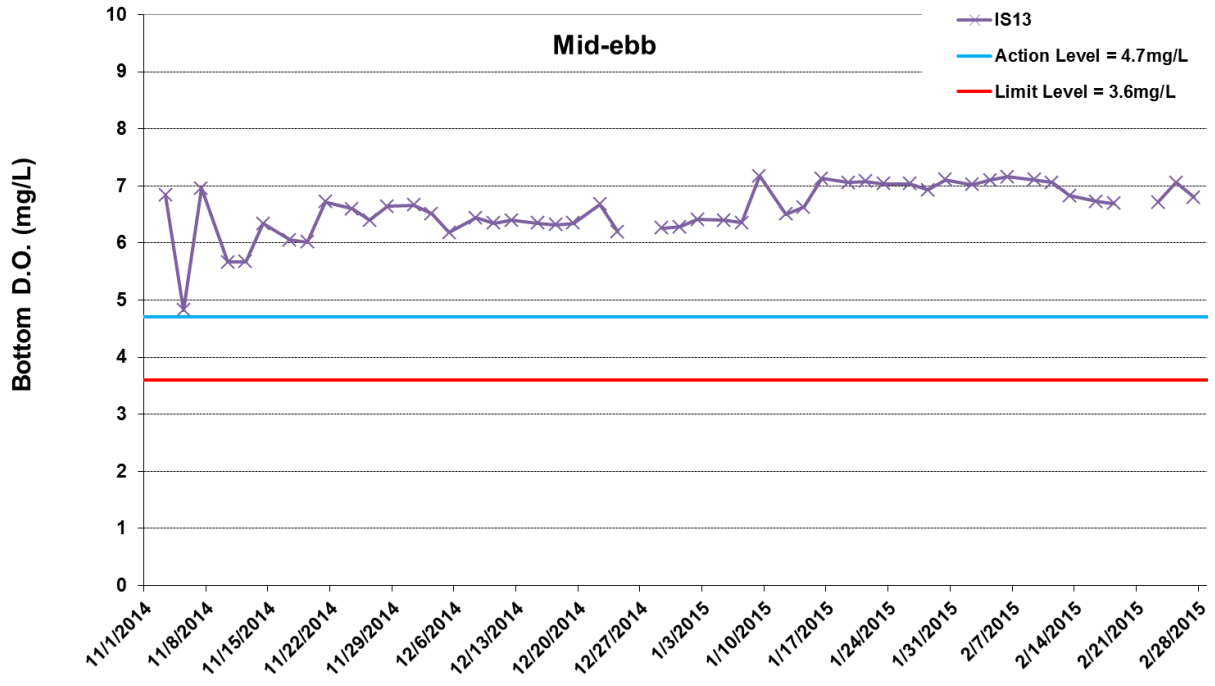


Figure G20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



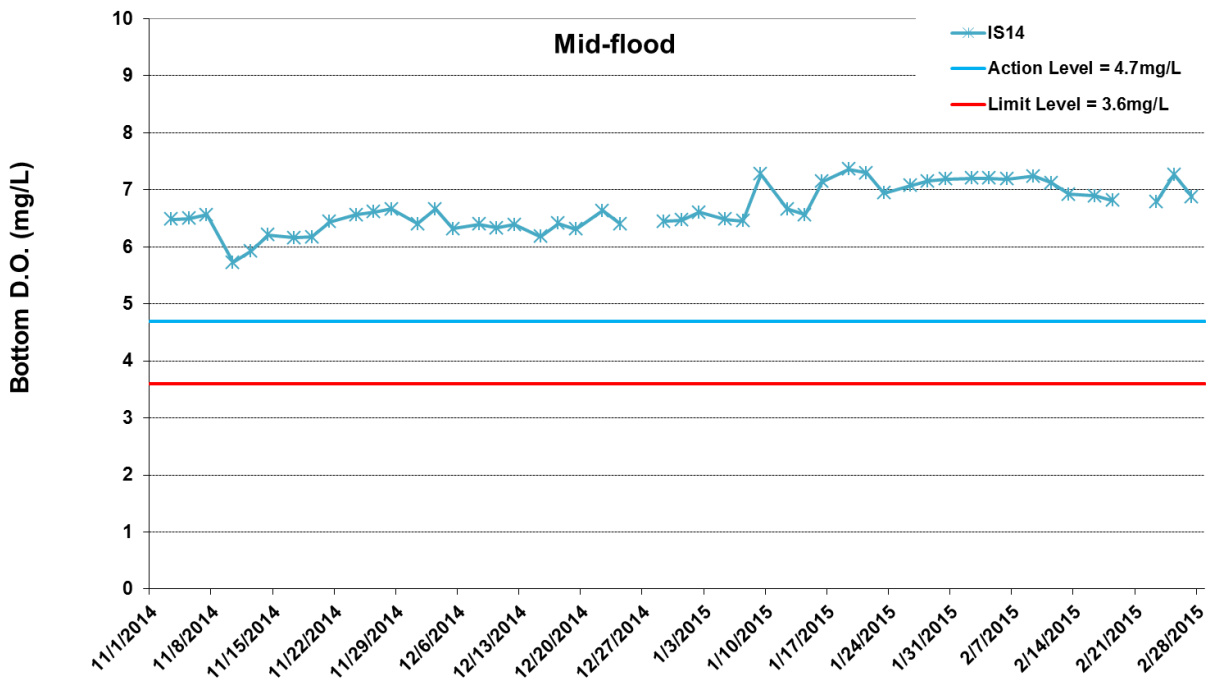
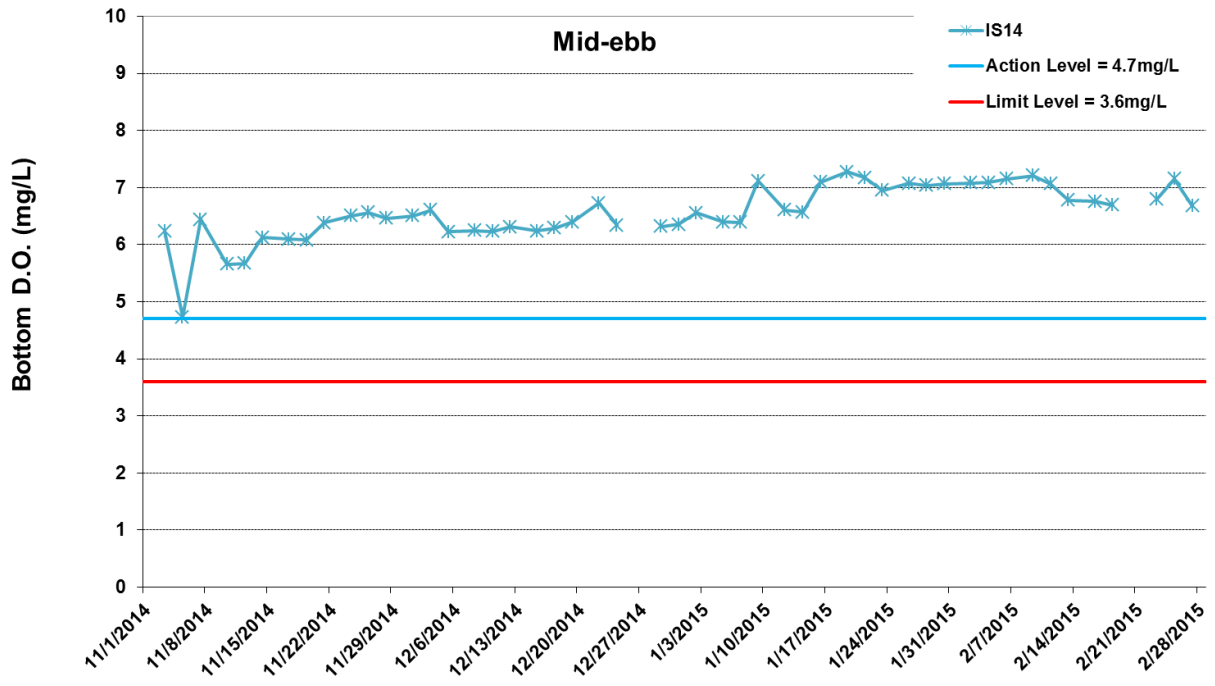


Figure G21 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



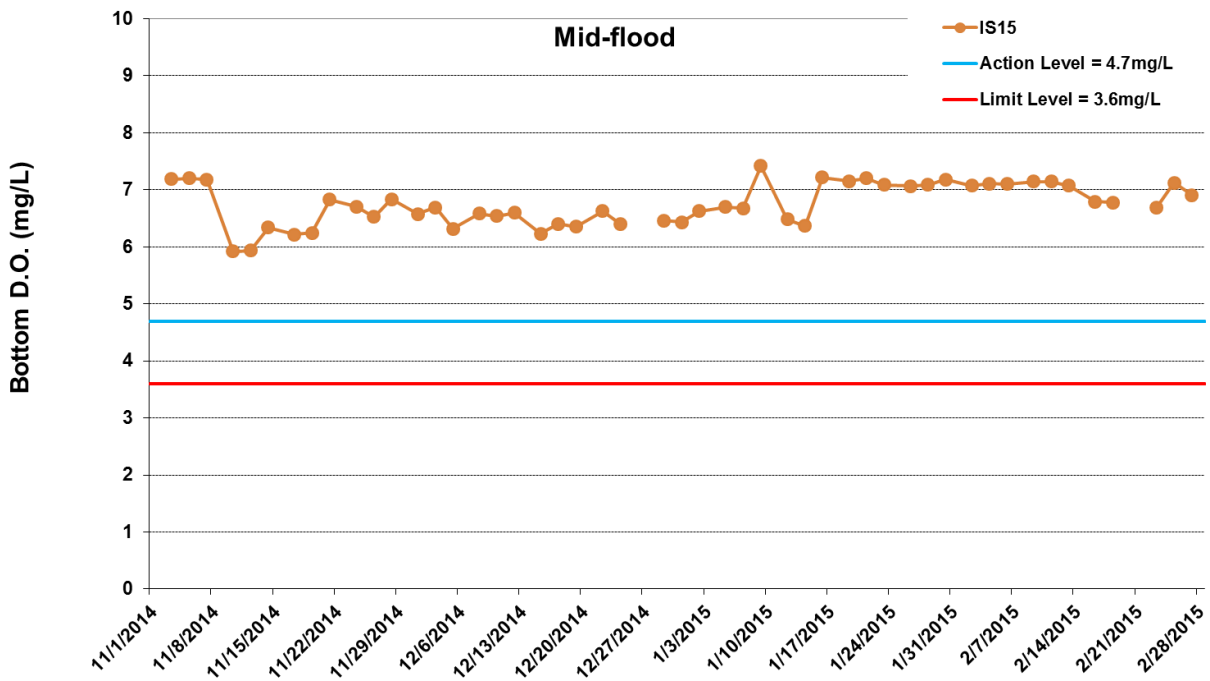
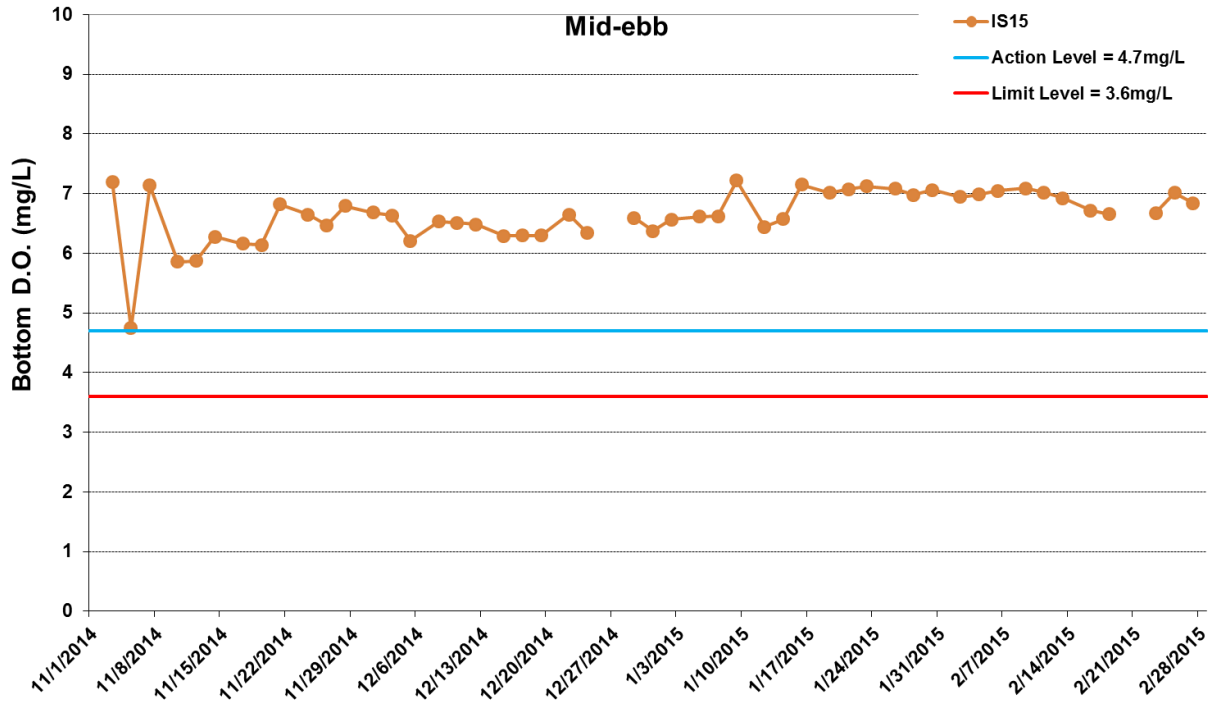


Figure G22 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



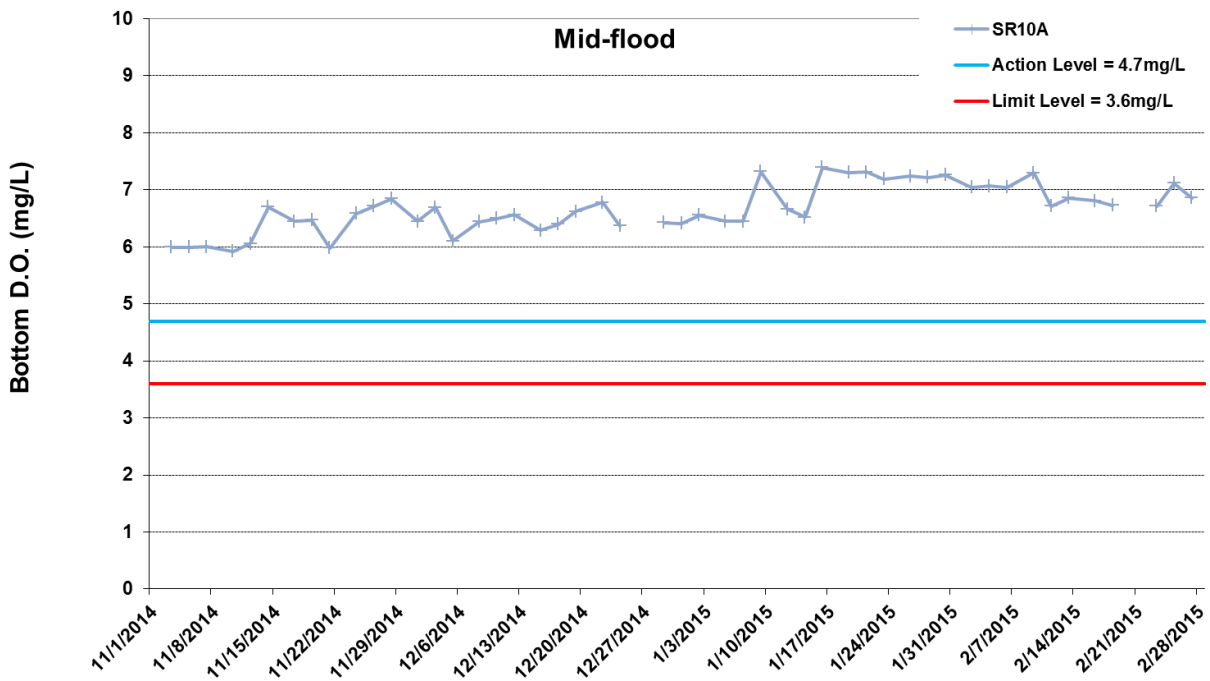
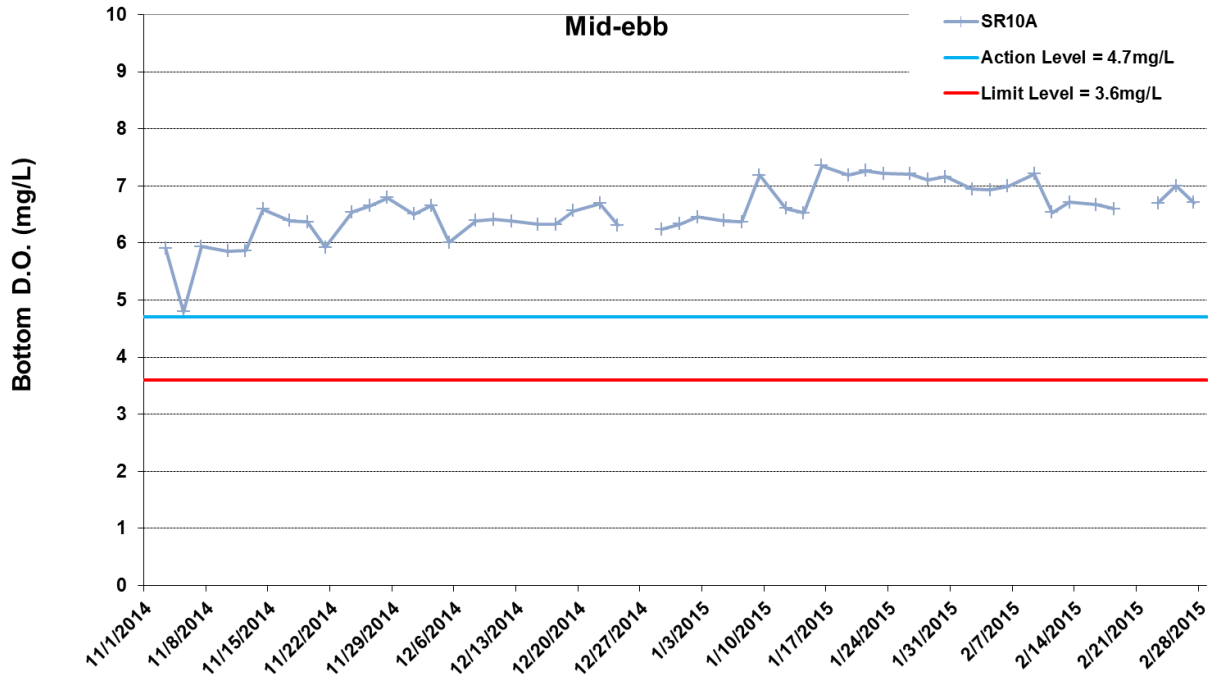


Figure G23 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



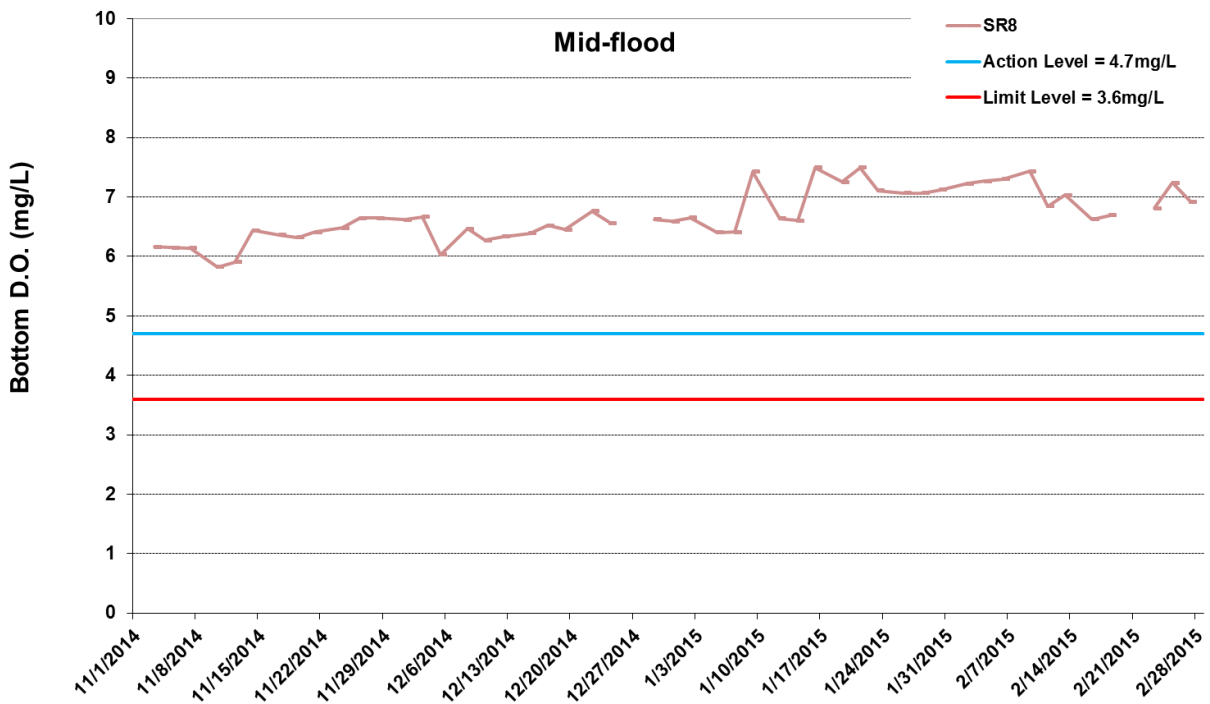
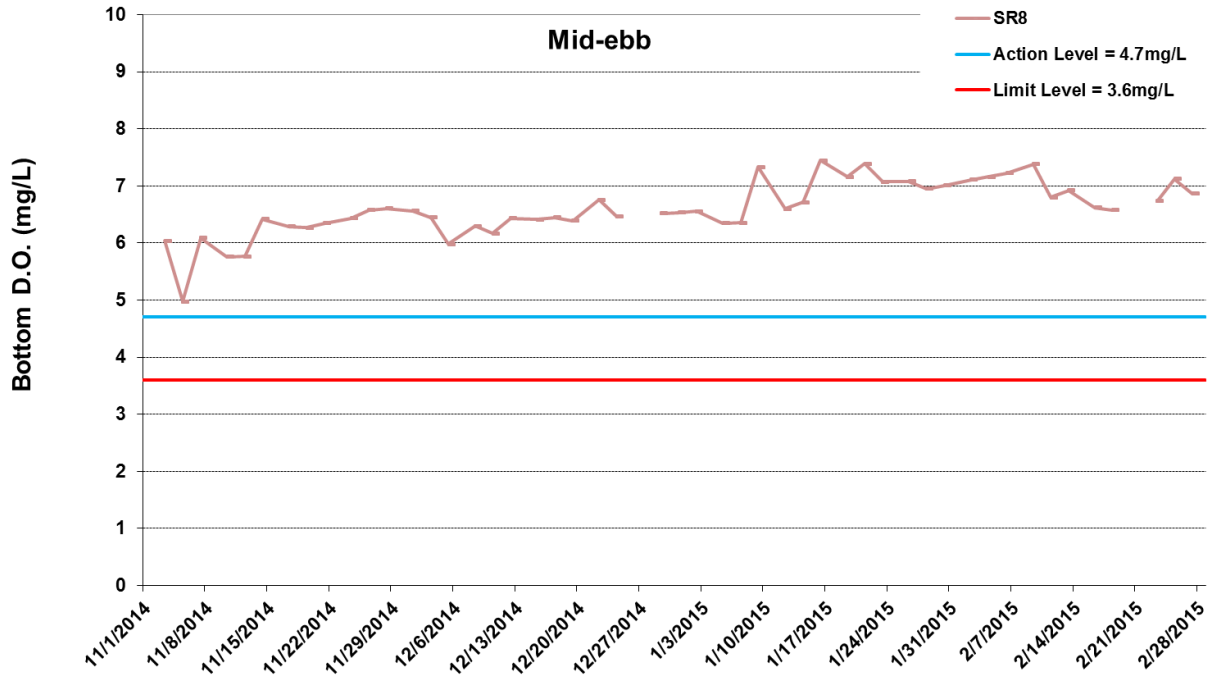


Figure G24 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



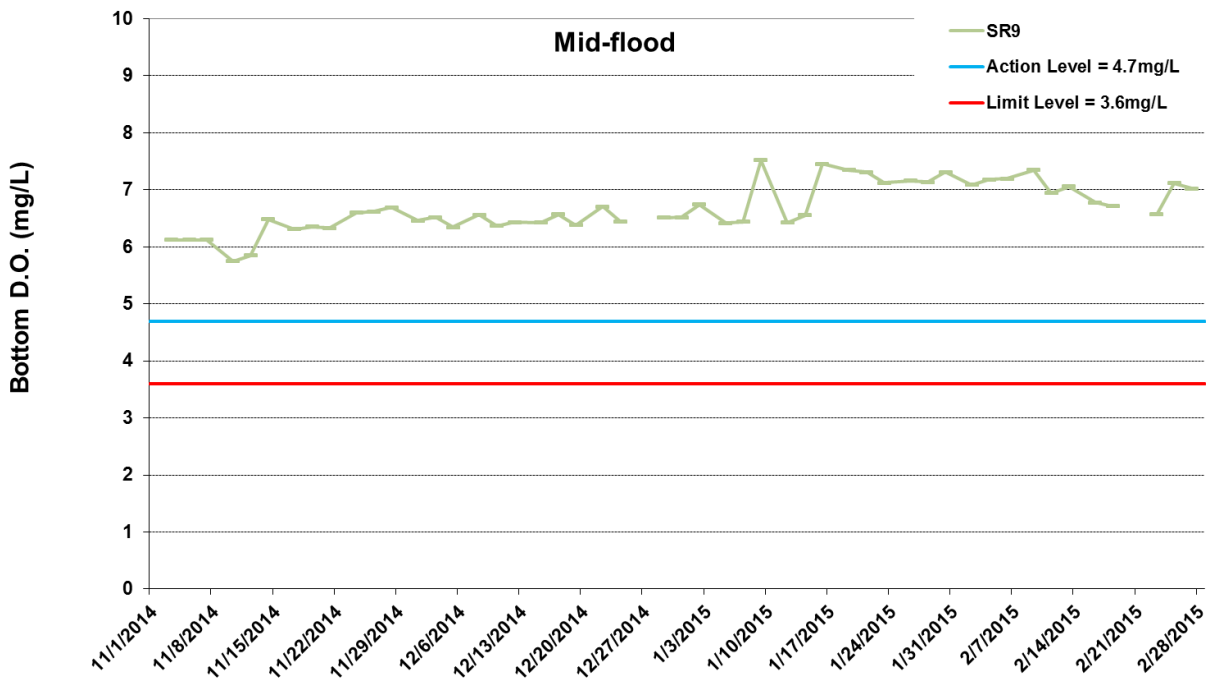
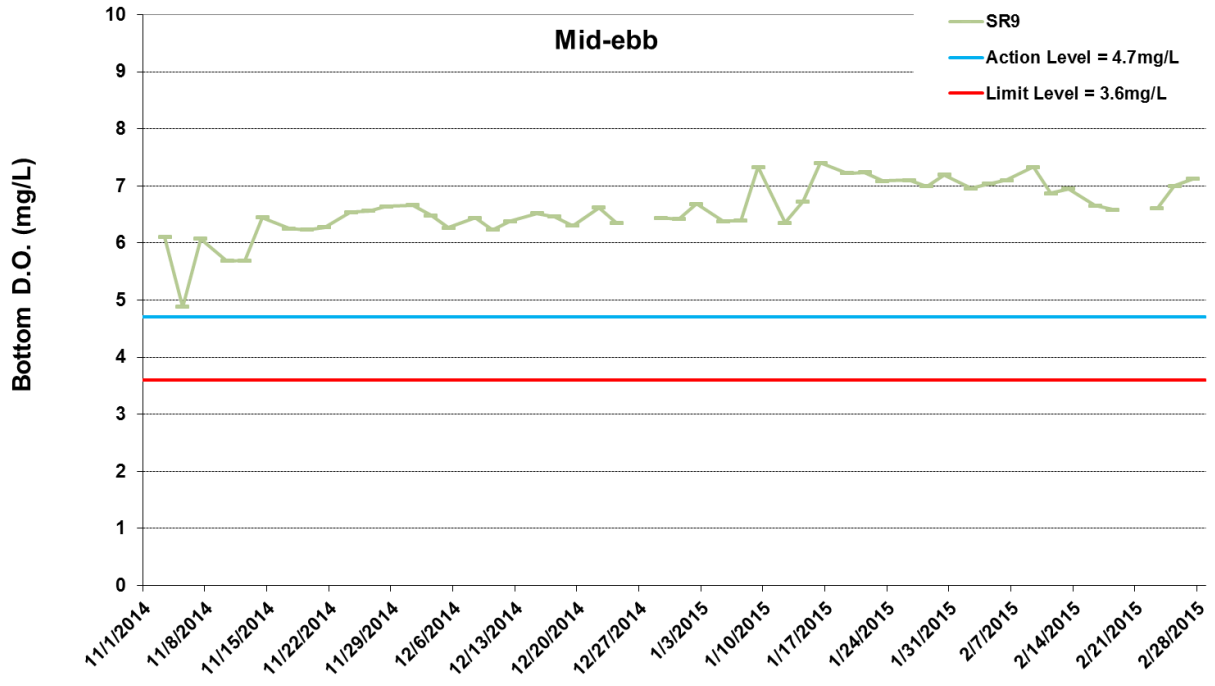


Figure G25 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2014 and 28 February 2015 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015. Ref: 0212330_Impact-WQM_February2015_graphs_Rev a.xls



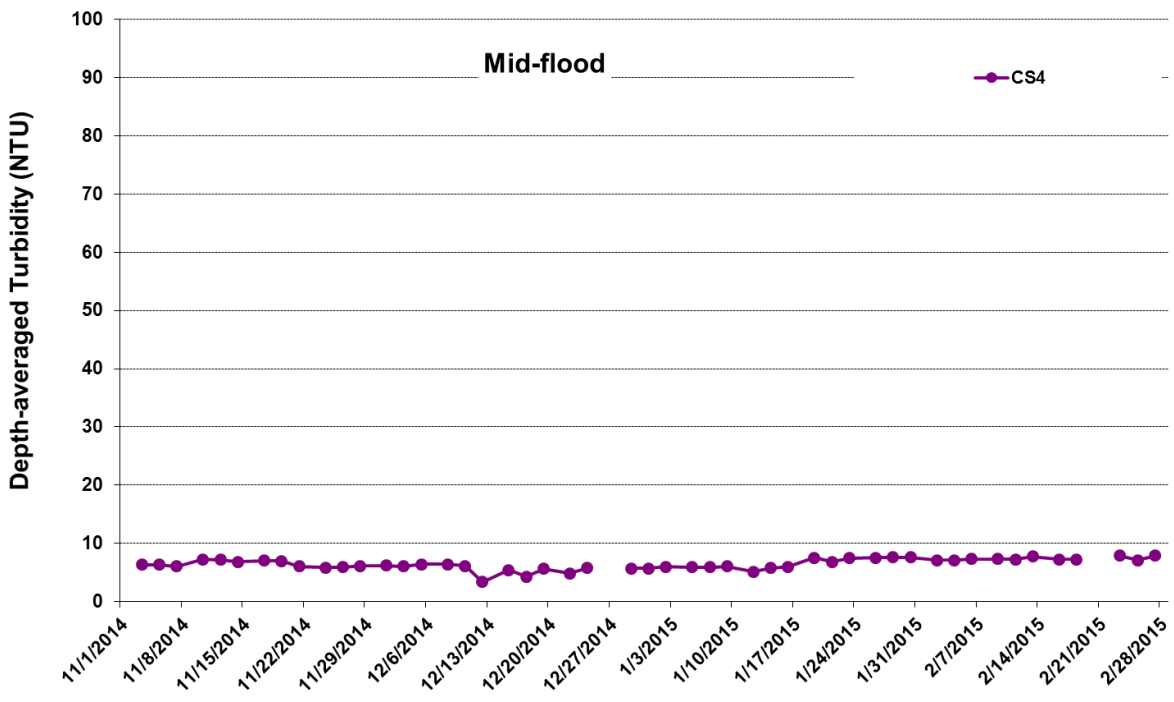
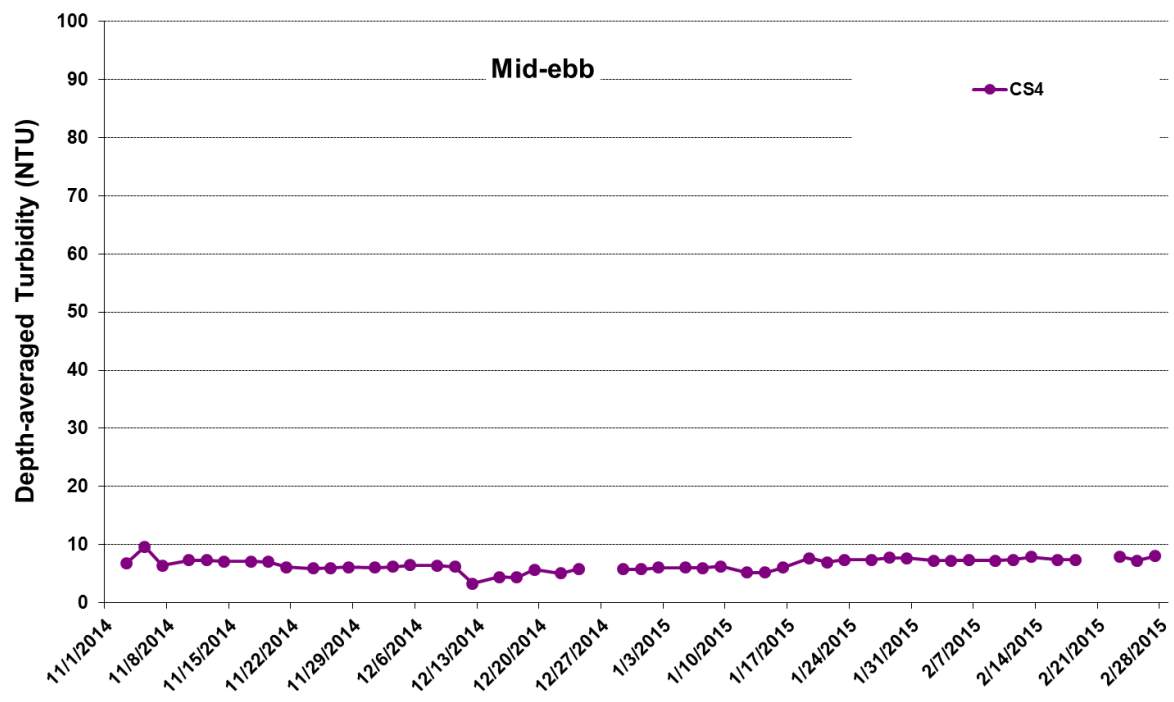


Figure G26 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



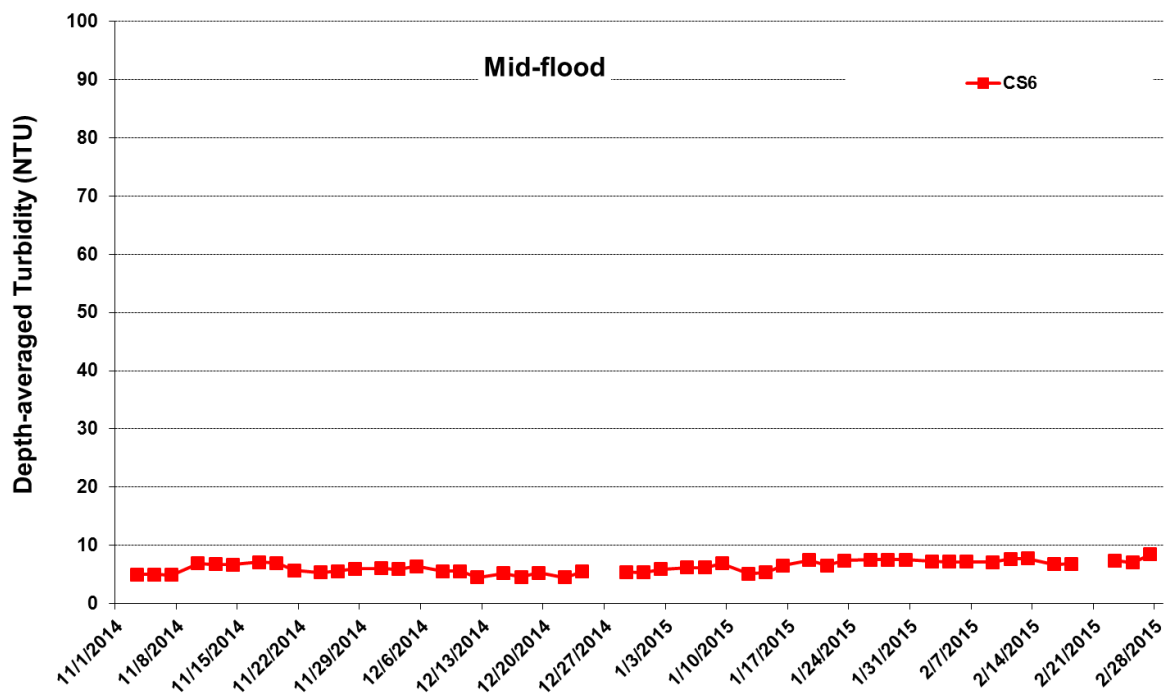
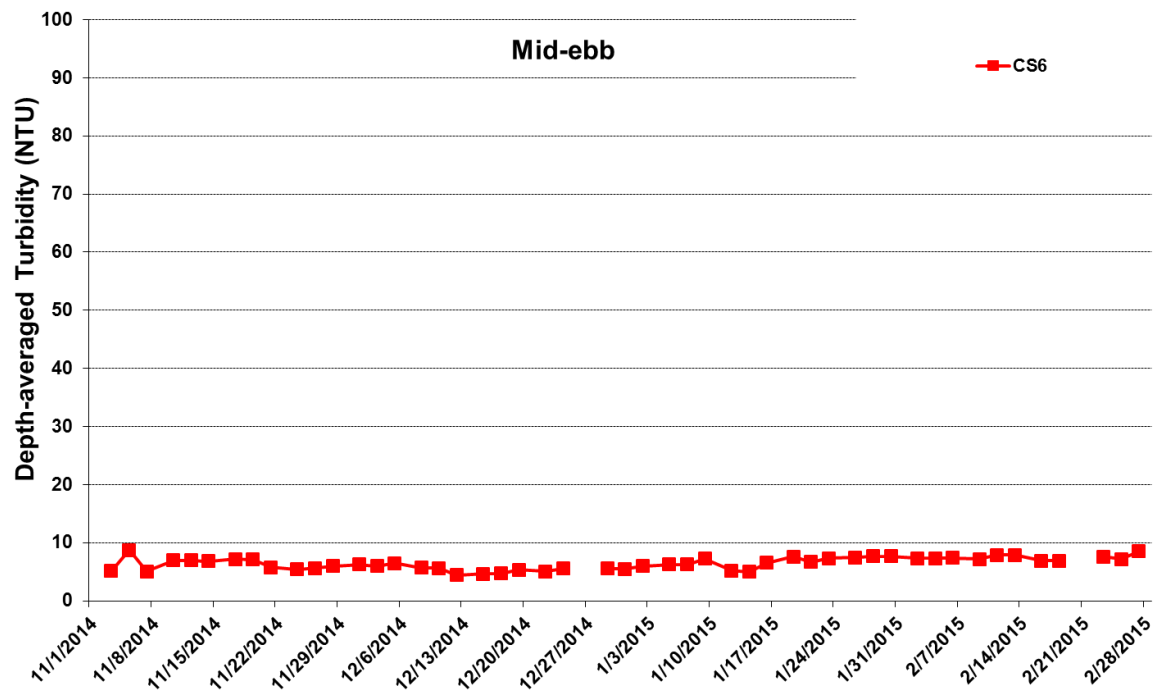


Figure G27 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



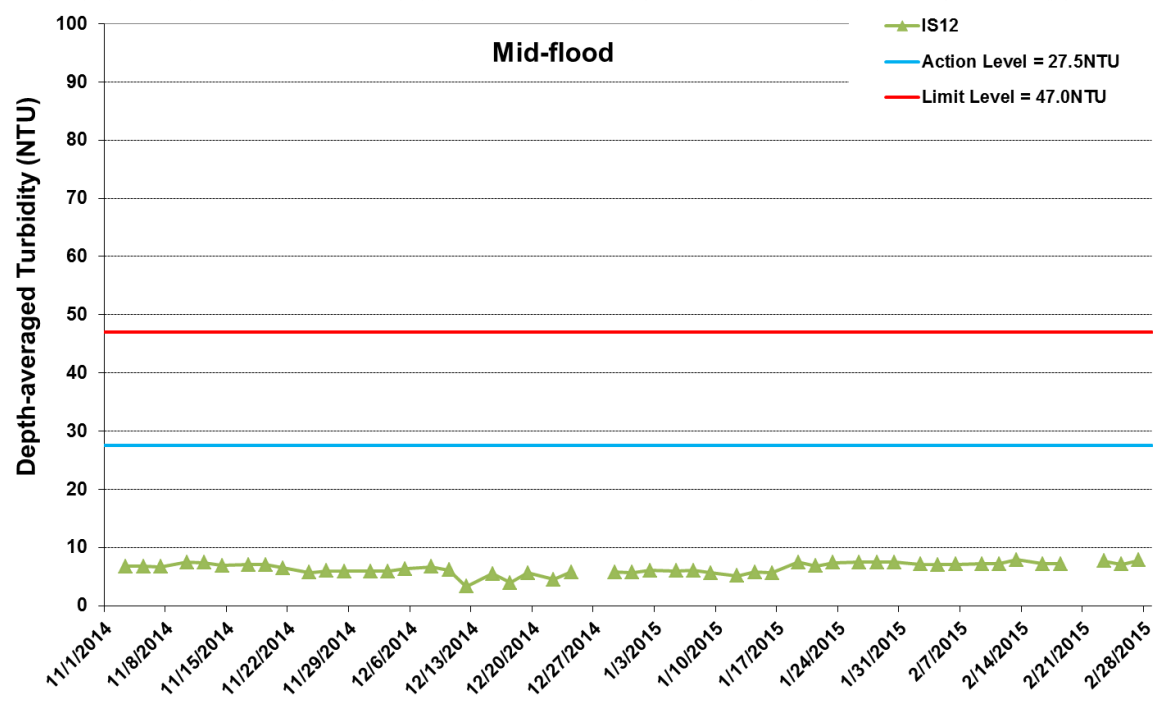
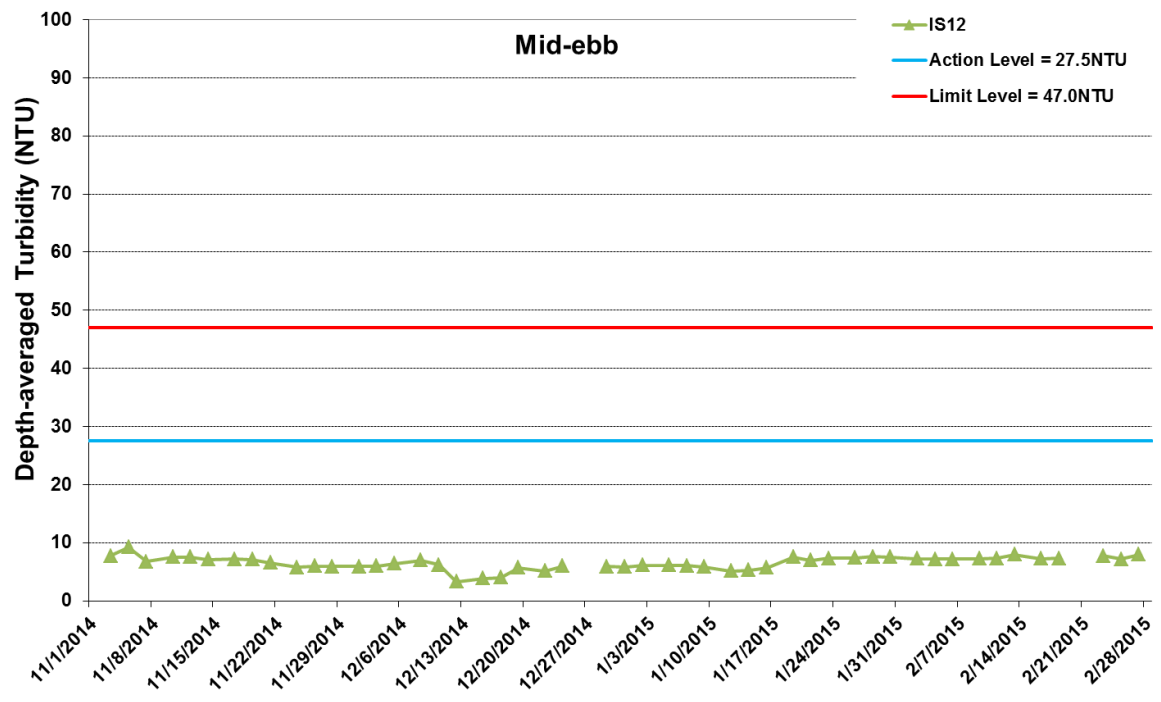


Figure G28 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



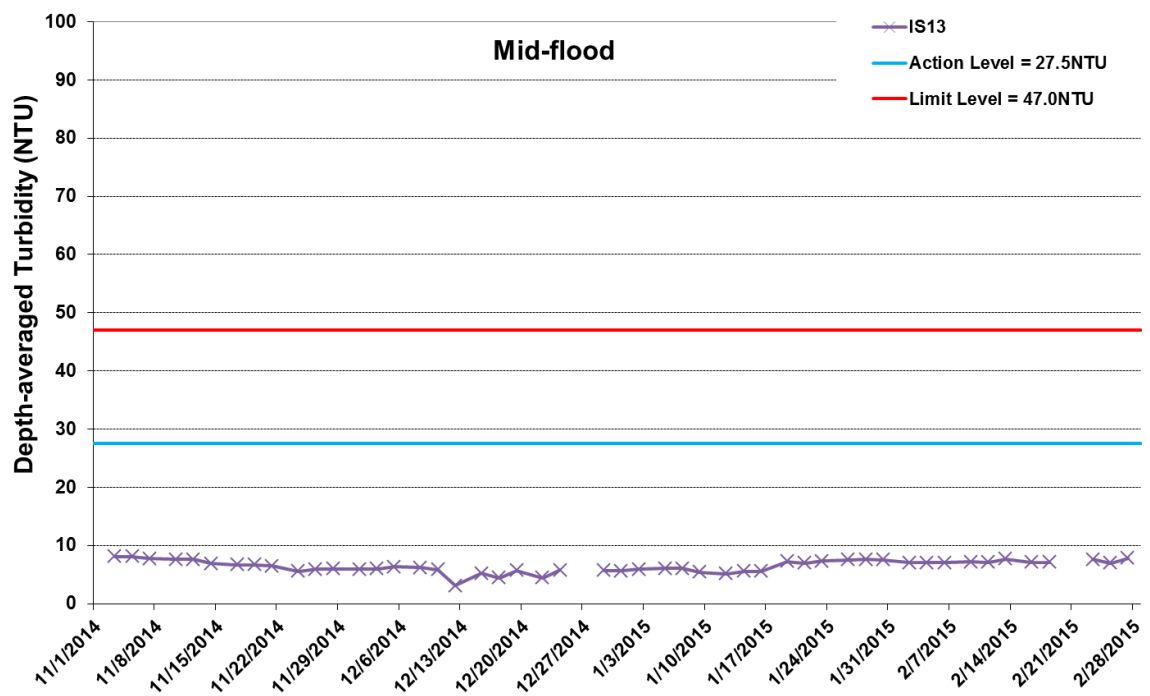
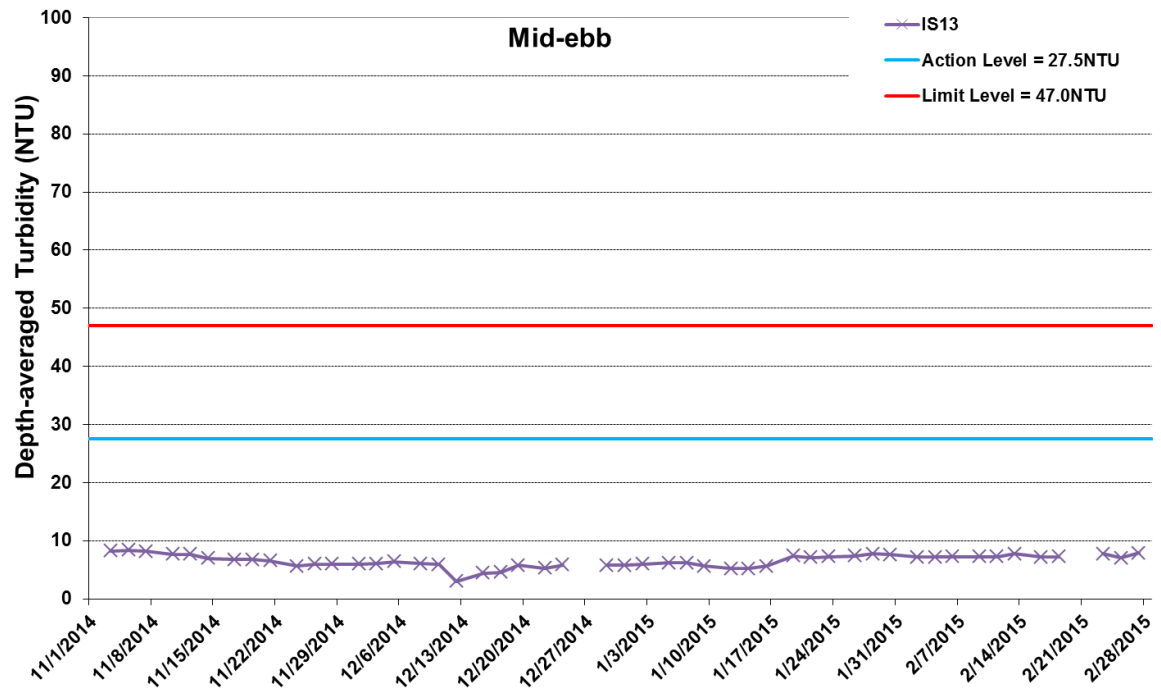


Figure G29 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



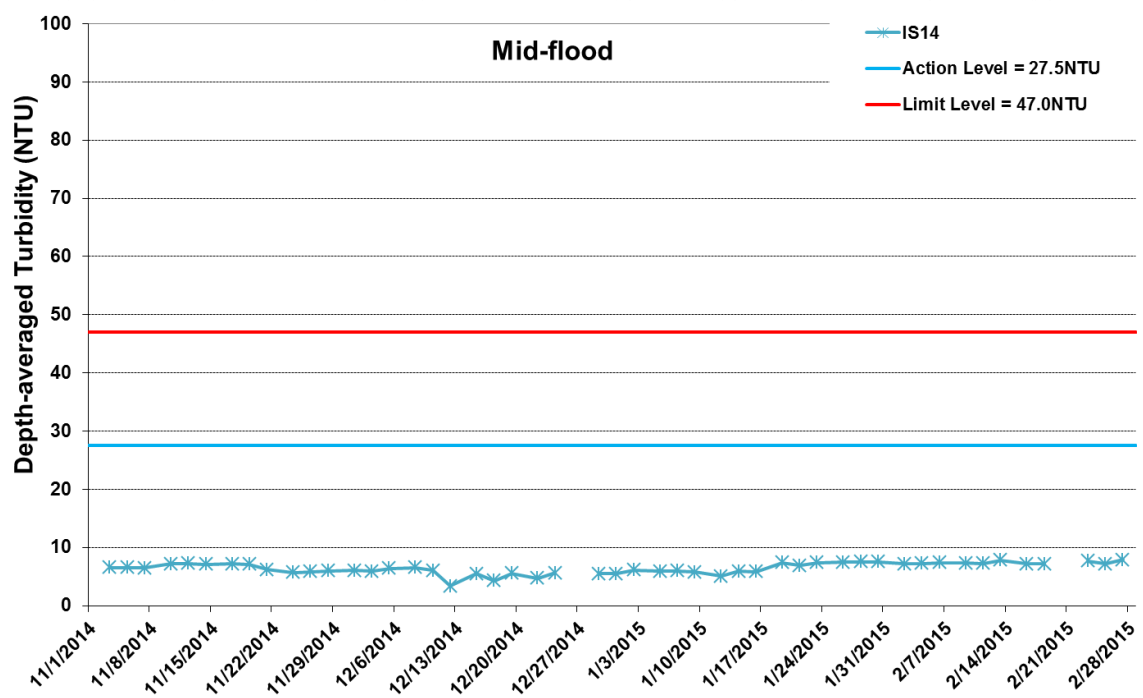
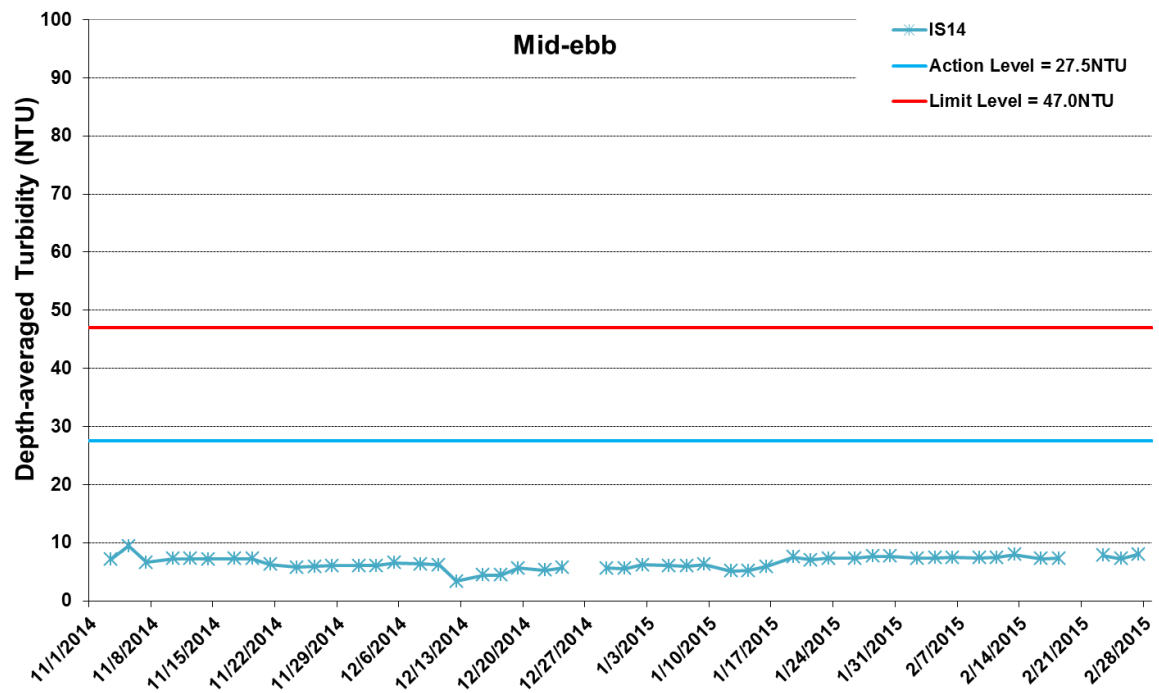


Figure G30 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



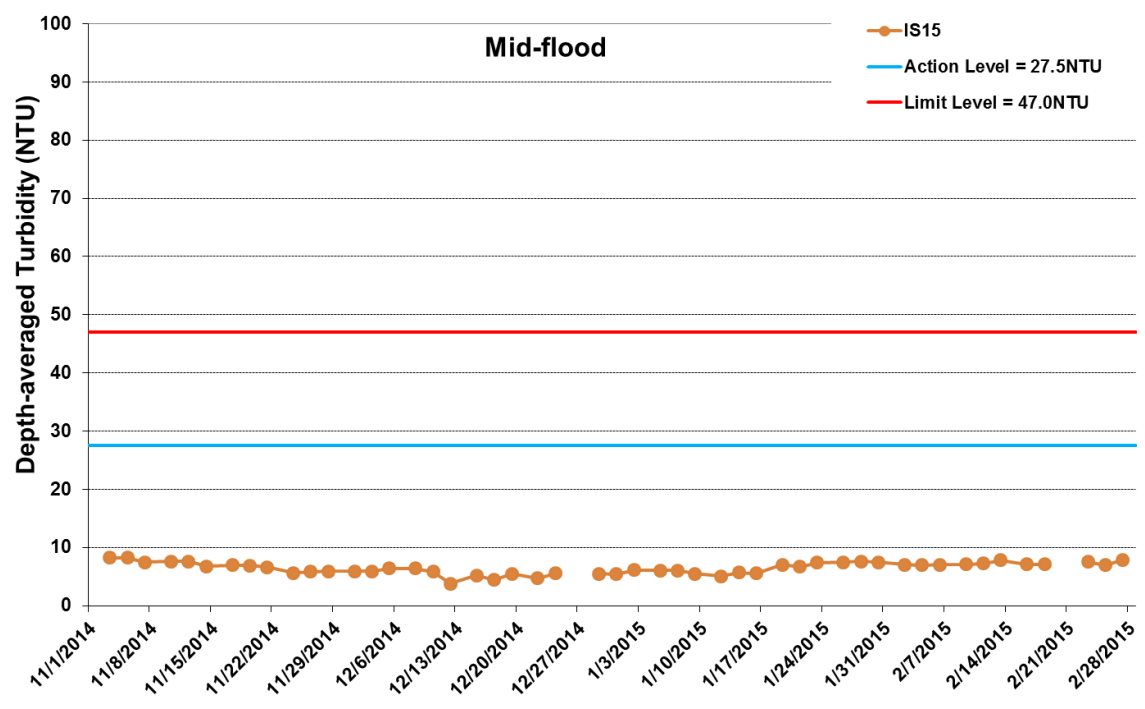
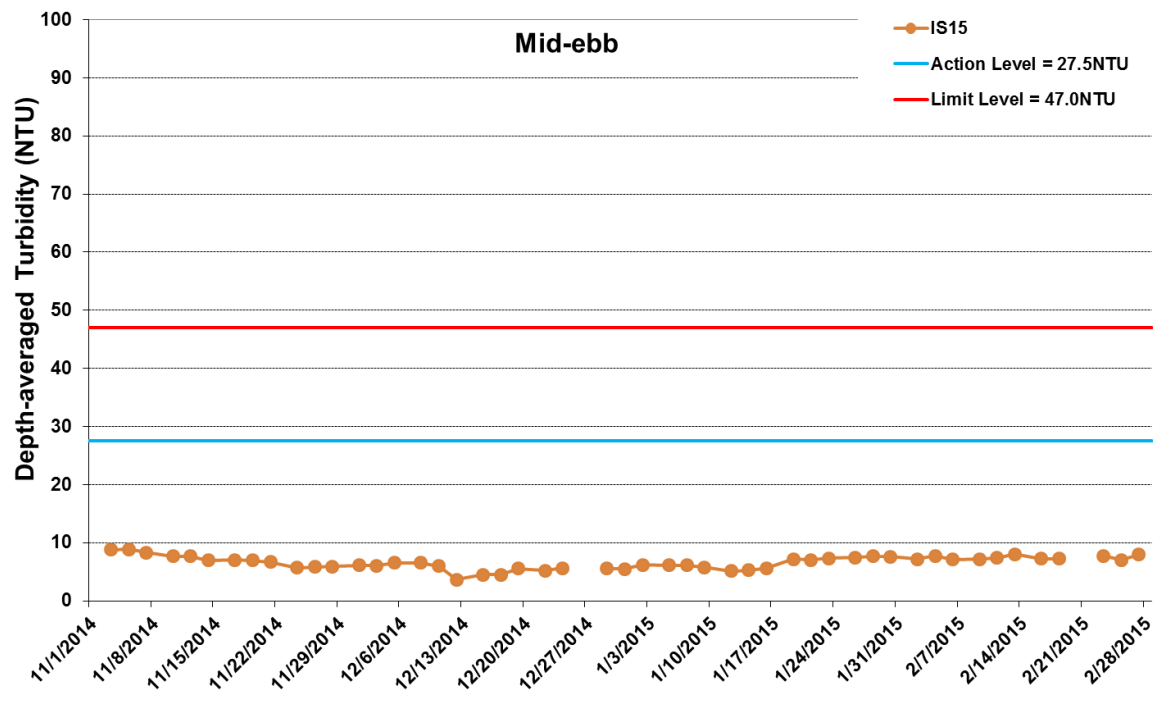


Figure G31 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



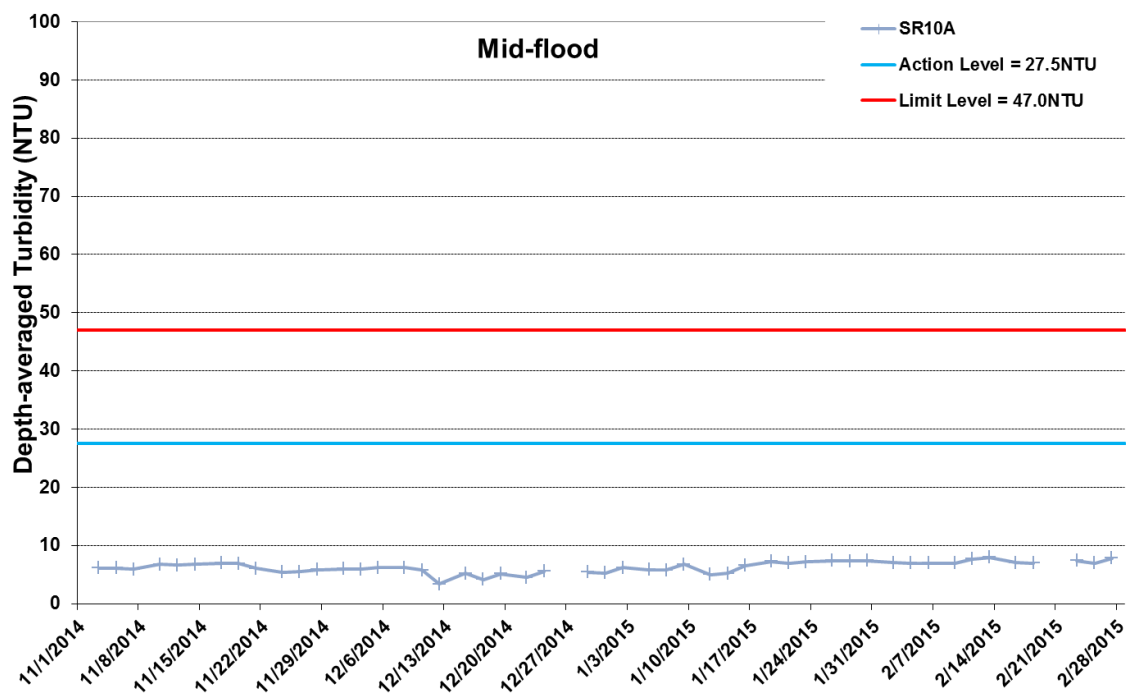
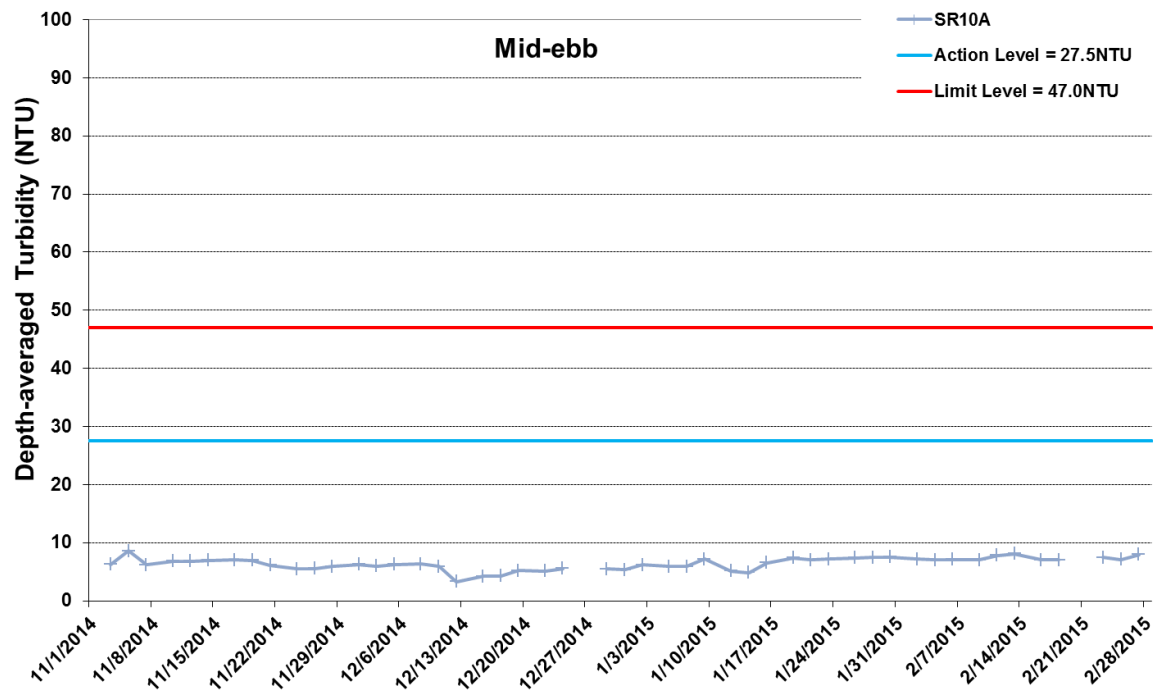


Figure G32 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



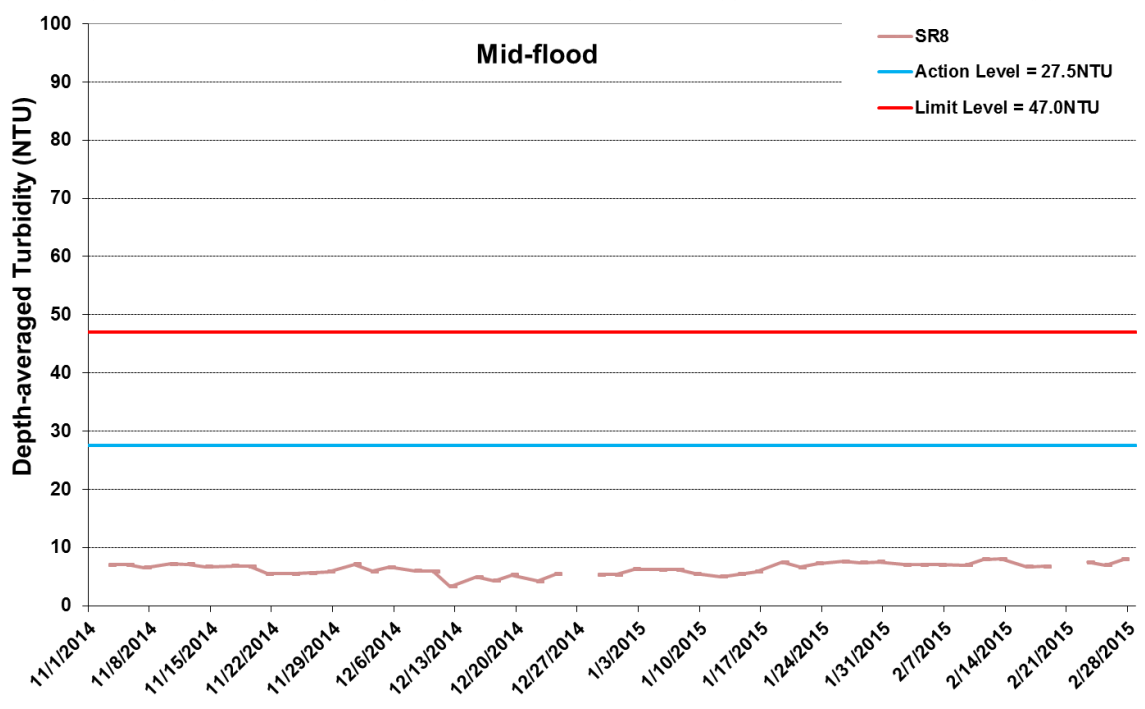
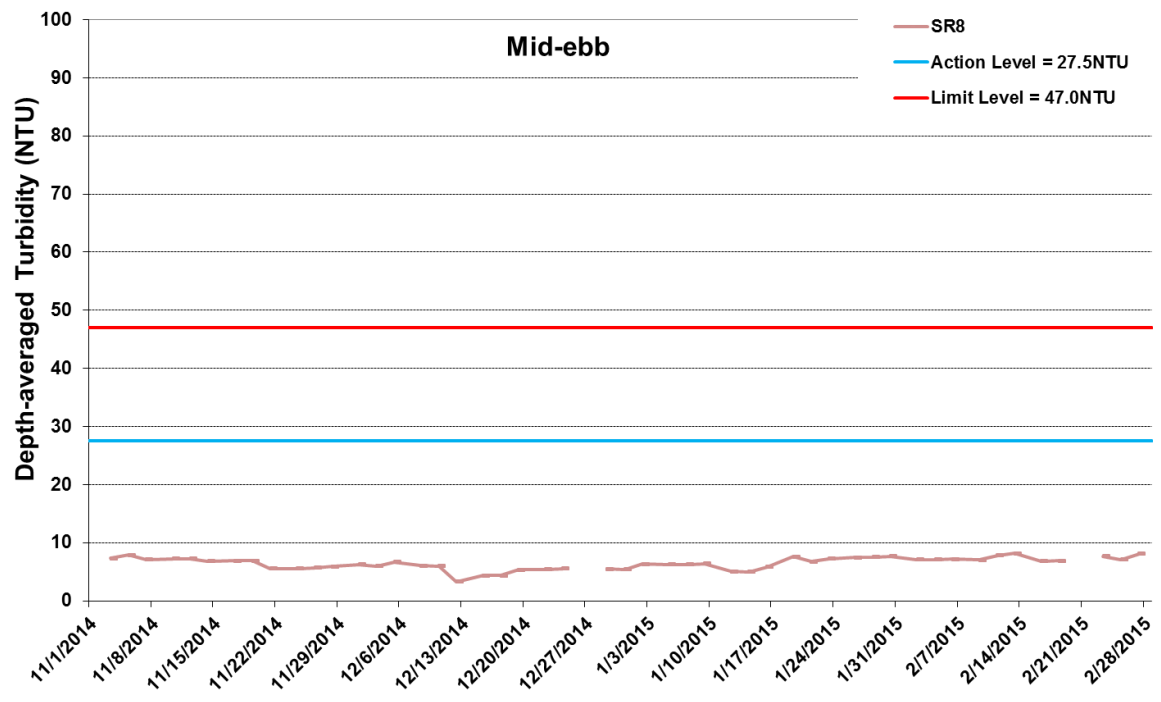


Figure G33 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



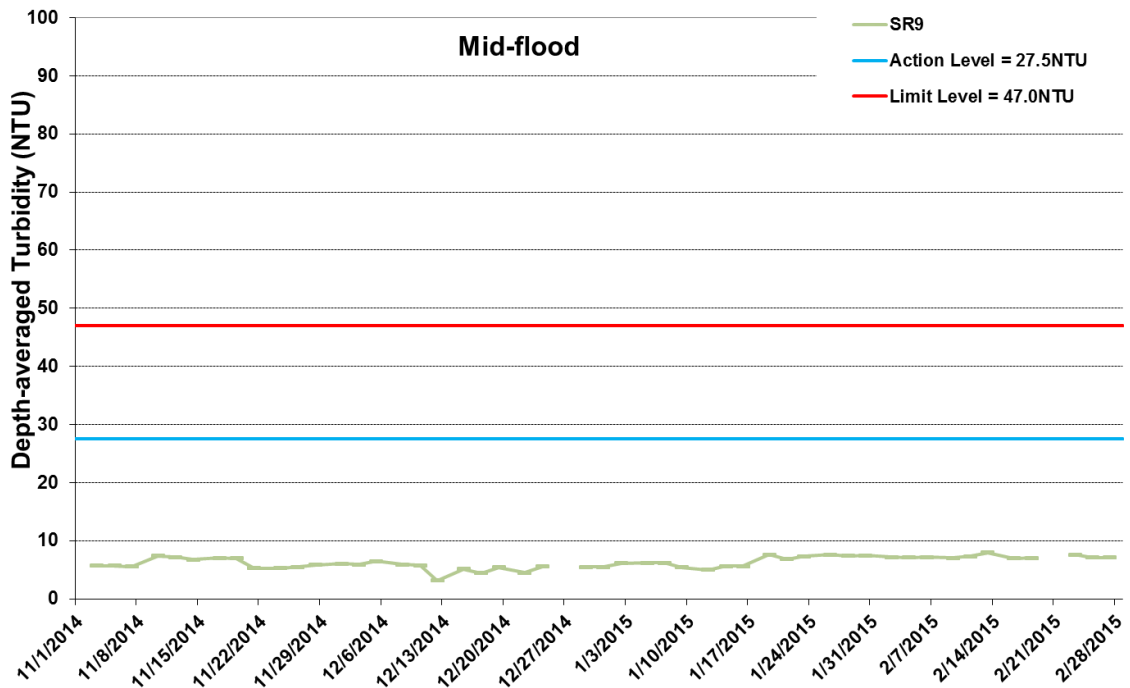
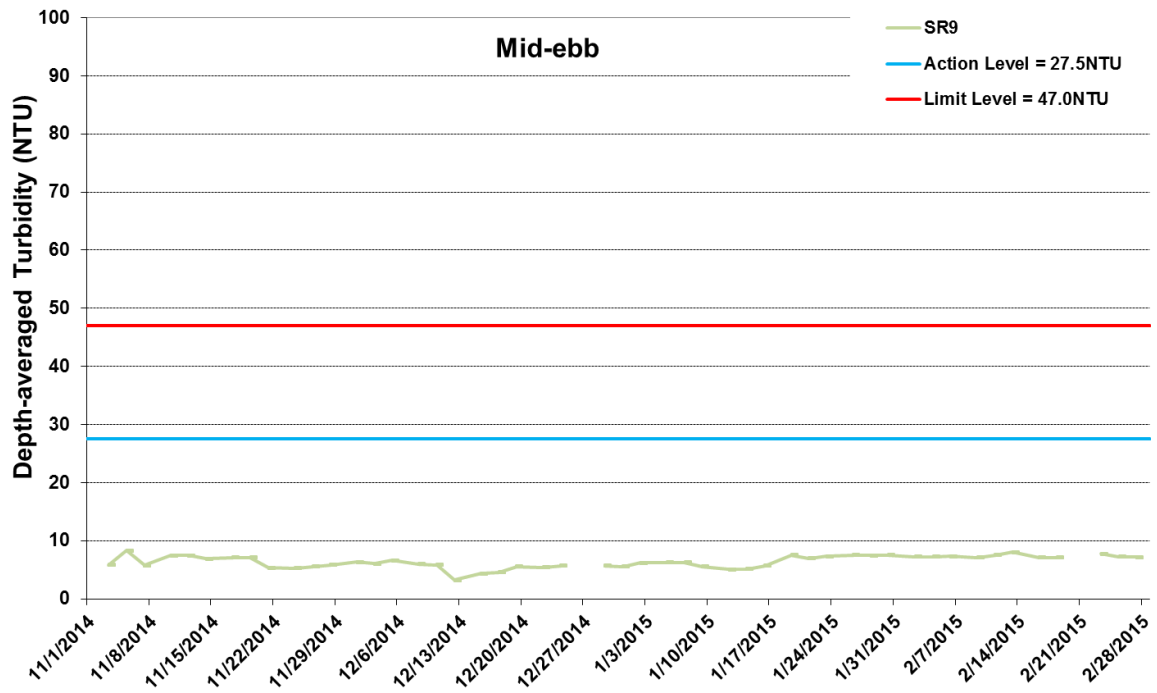


Figure G34 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2014 and 28 February 2015 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



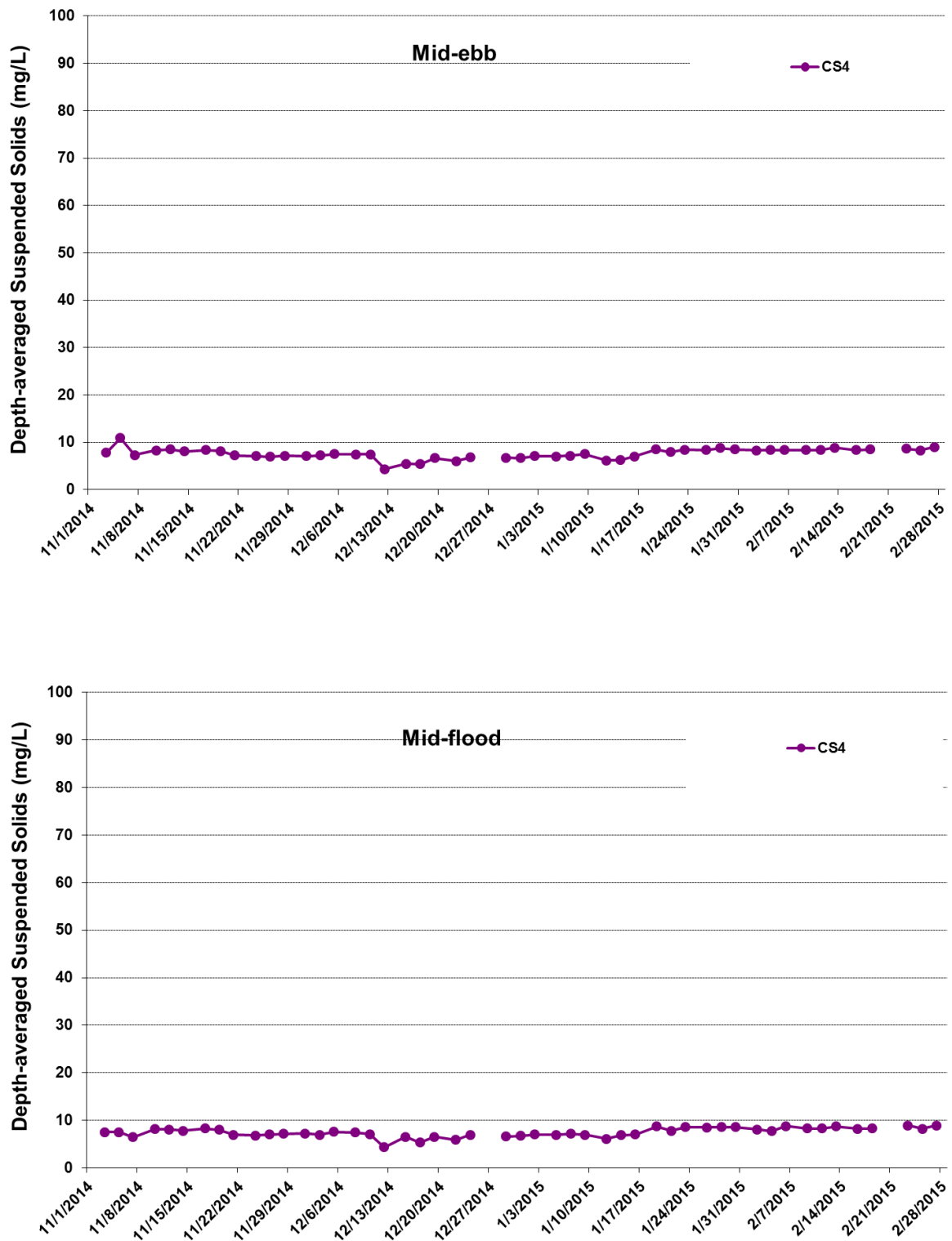


Figure G35 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



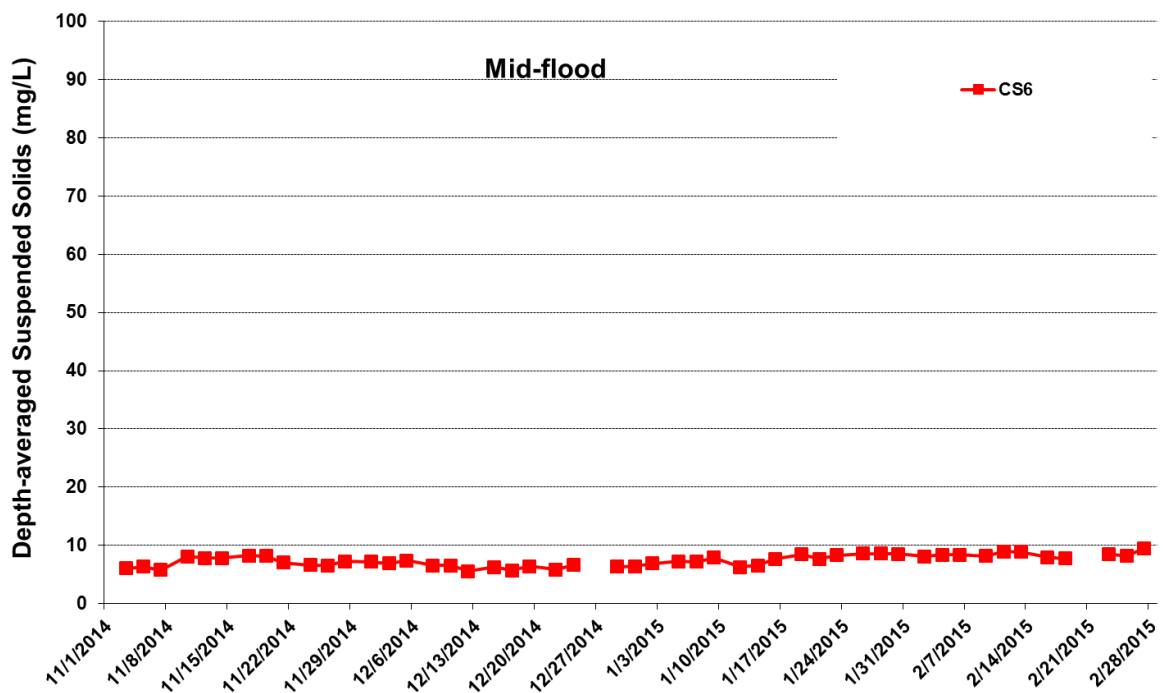
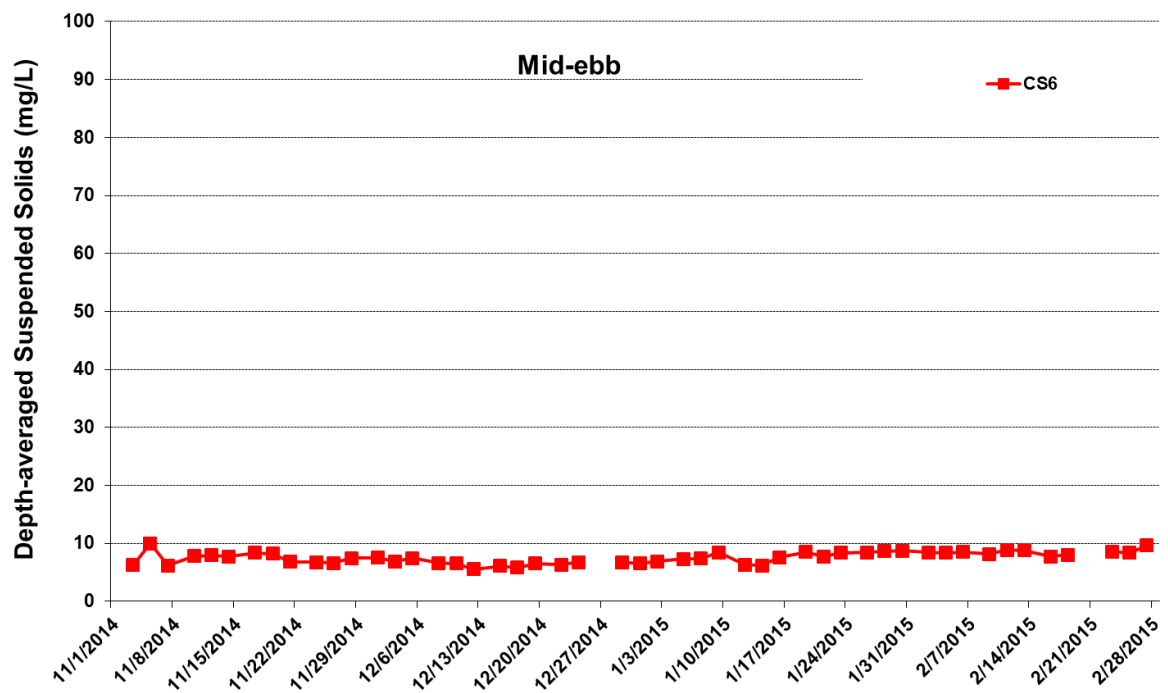


Figure G36 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



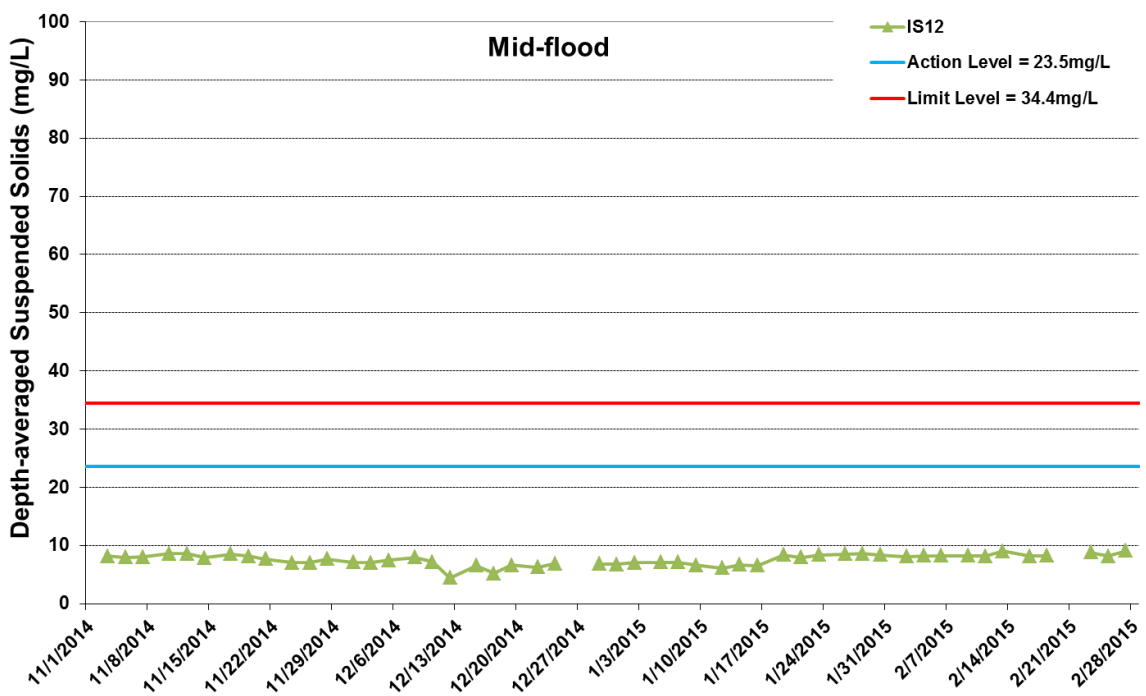
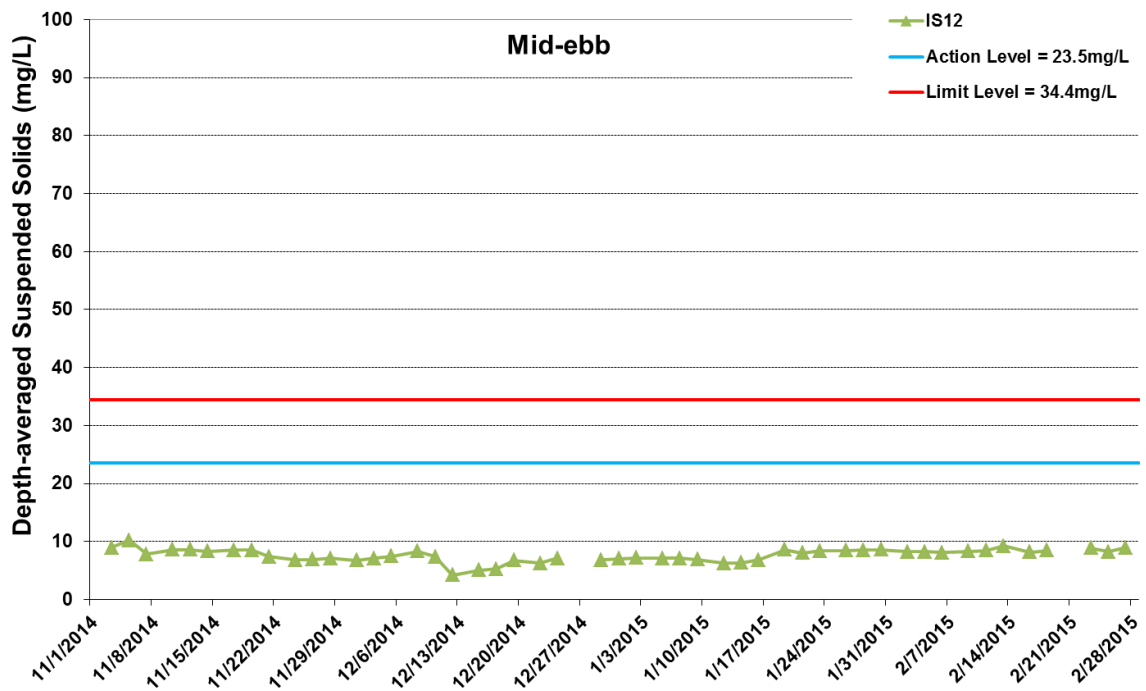


Figure G37 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



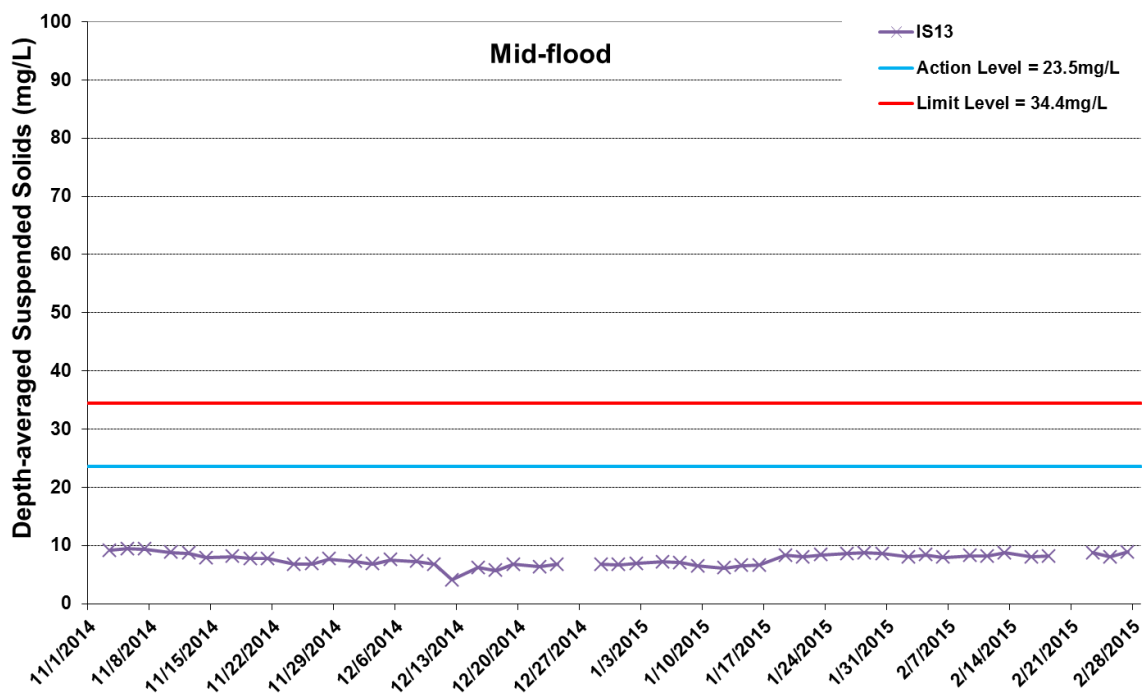
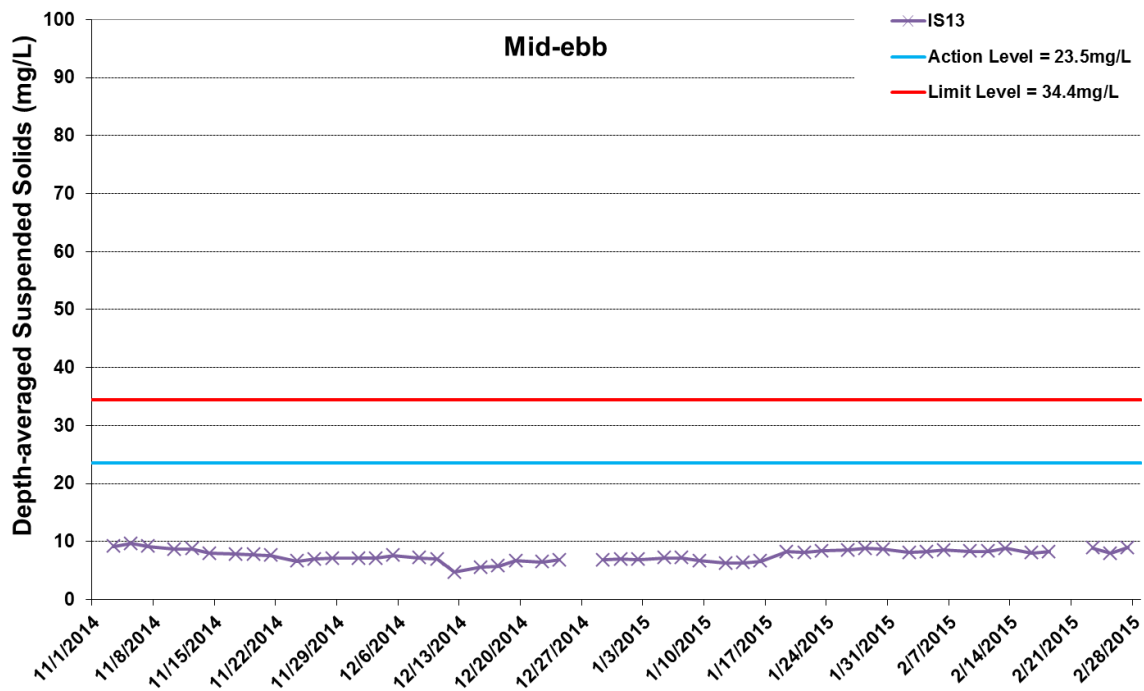


Figure G38 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



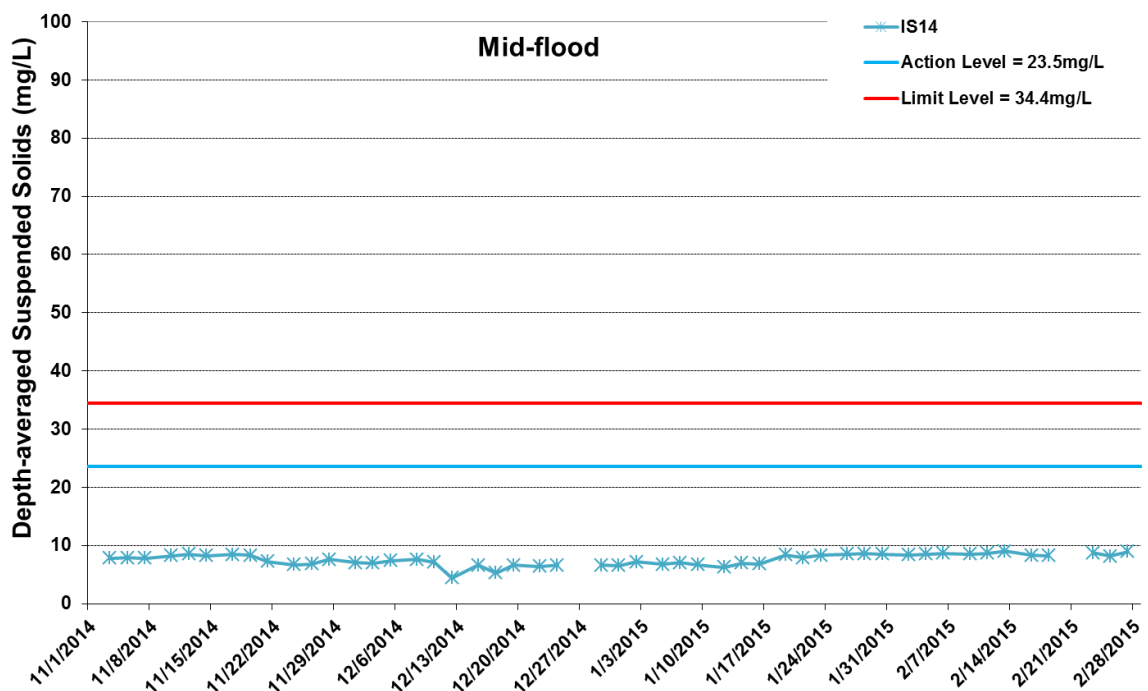
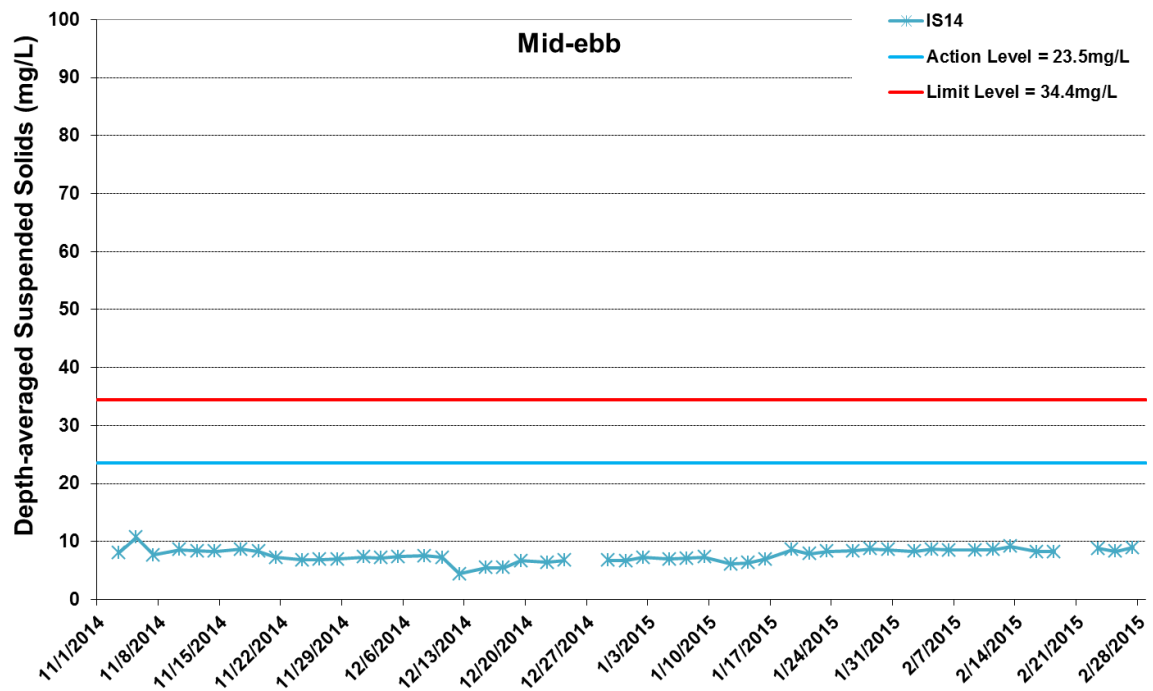


Figure G39 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



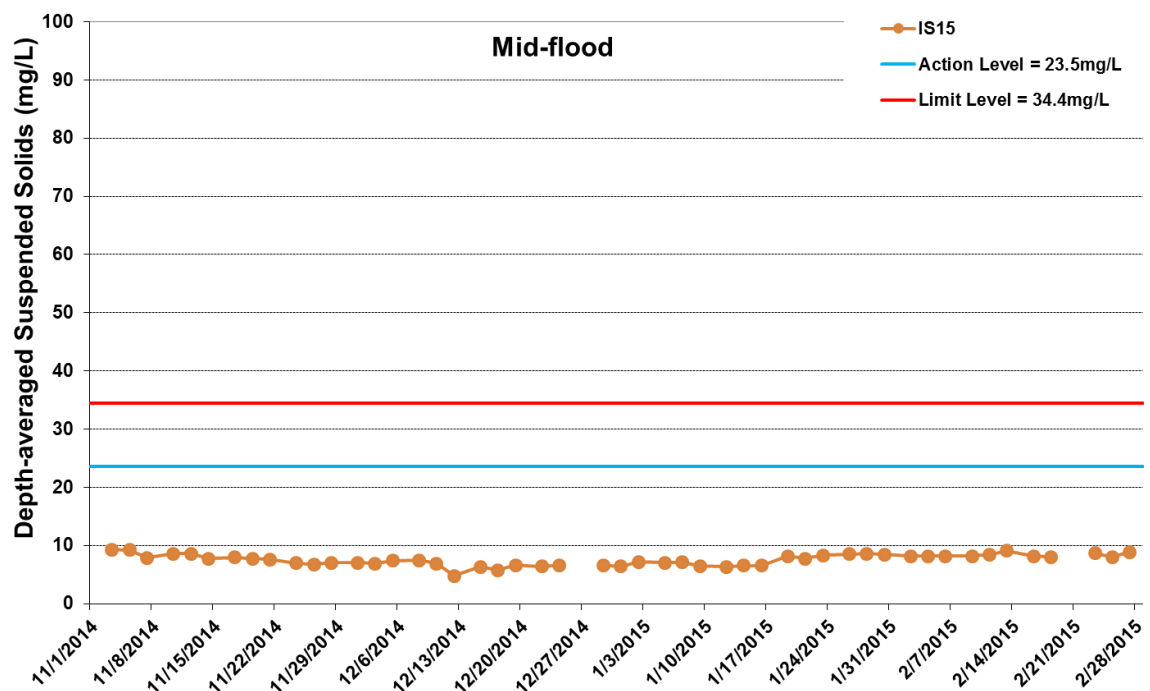
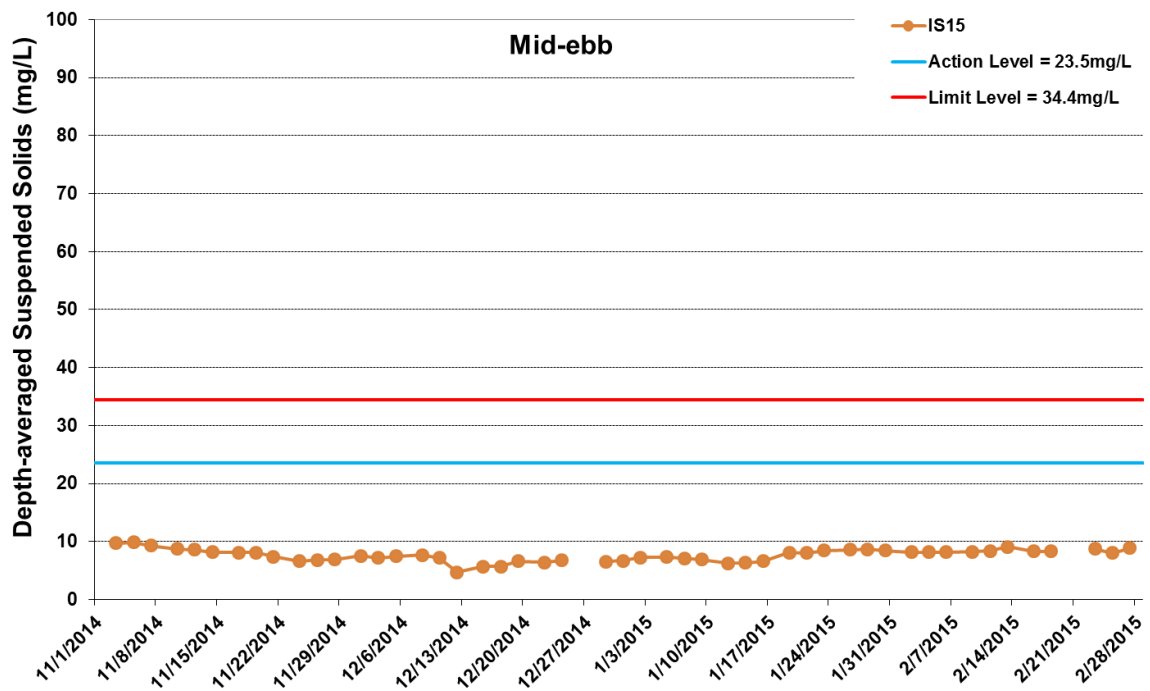


Figure G40 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



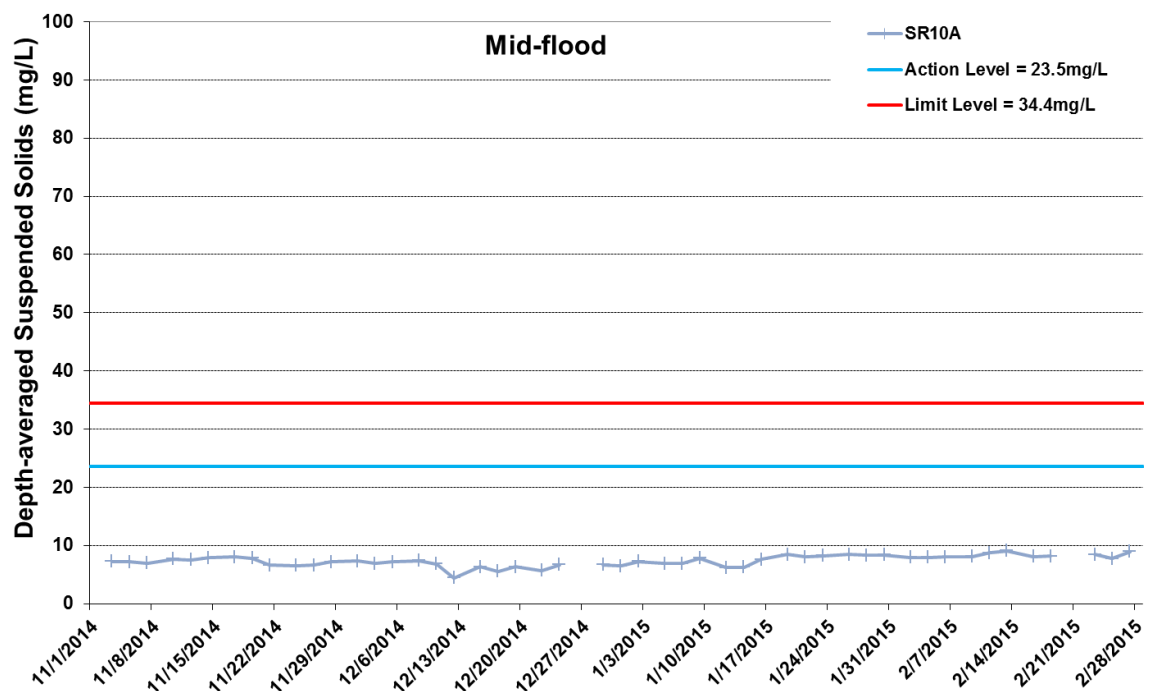
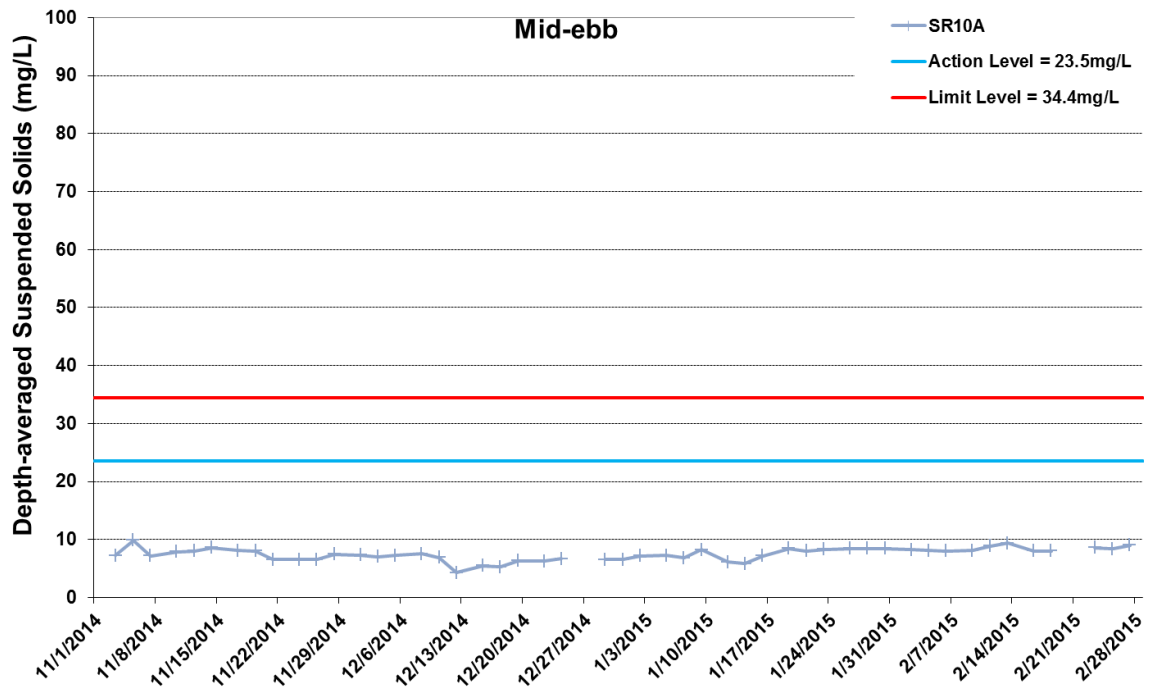


Figure G41 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



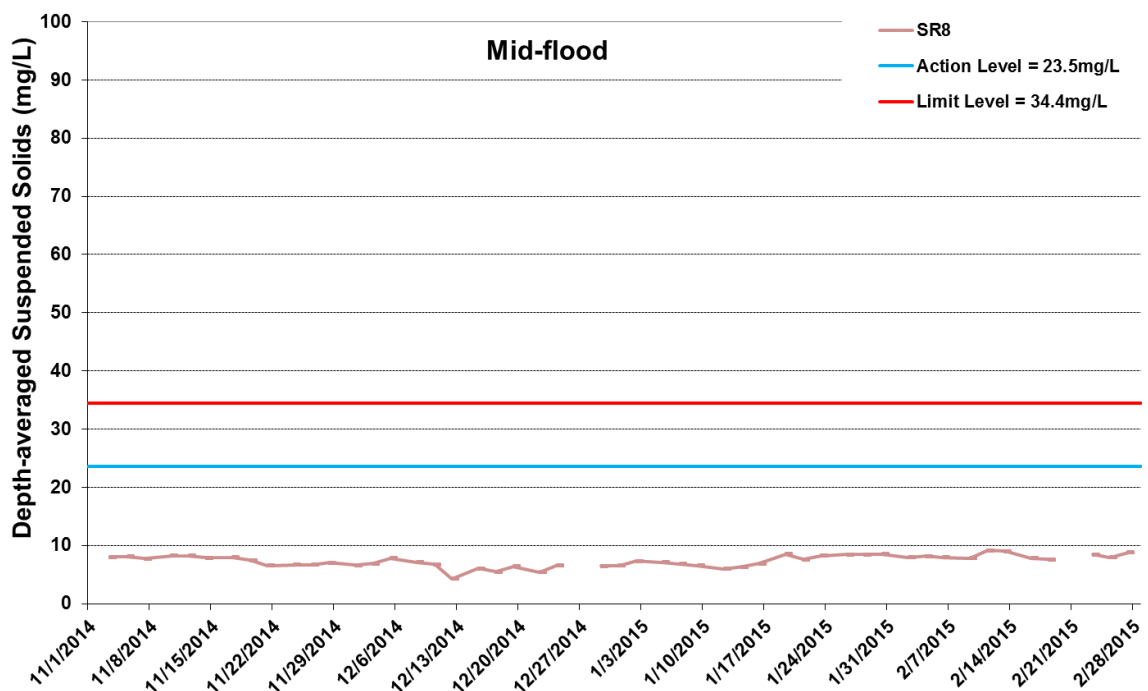
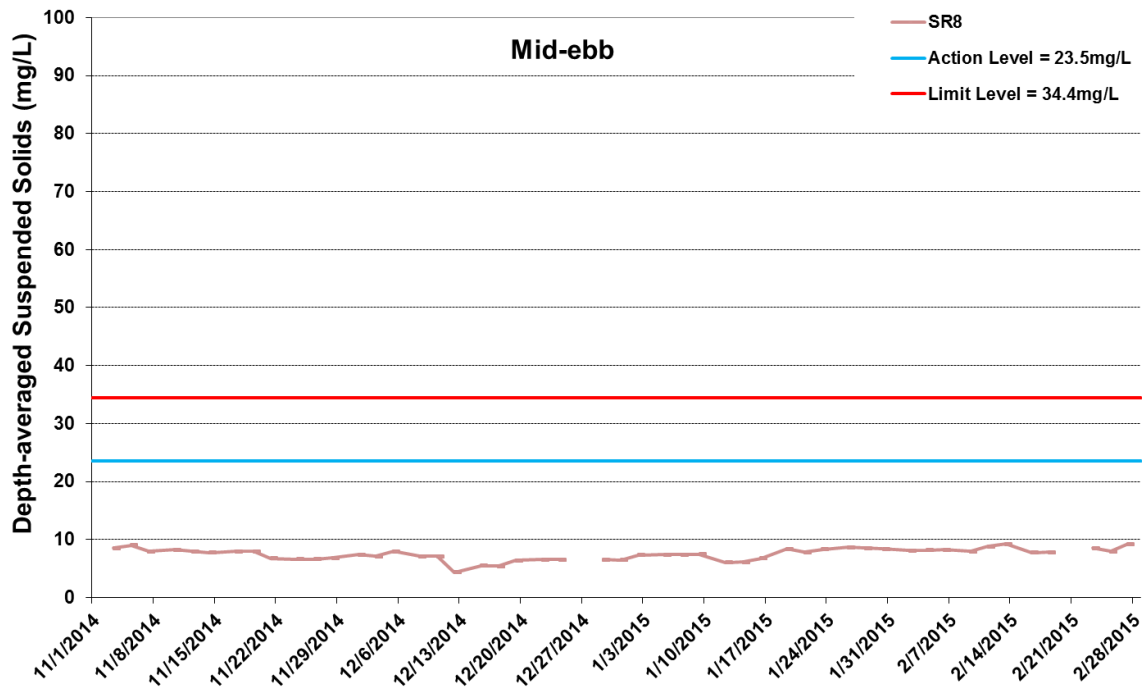


Figure G42 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 – 11/20/2014); Sheet Piling (11/1/2014 – 11/20/2014); Filling (11/1/2014 – 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



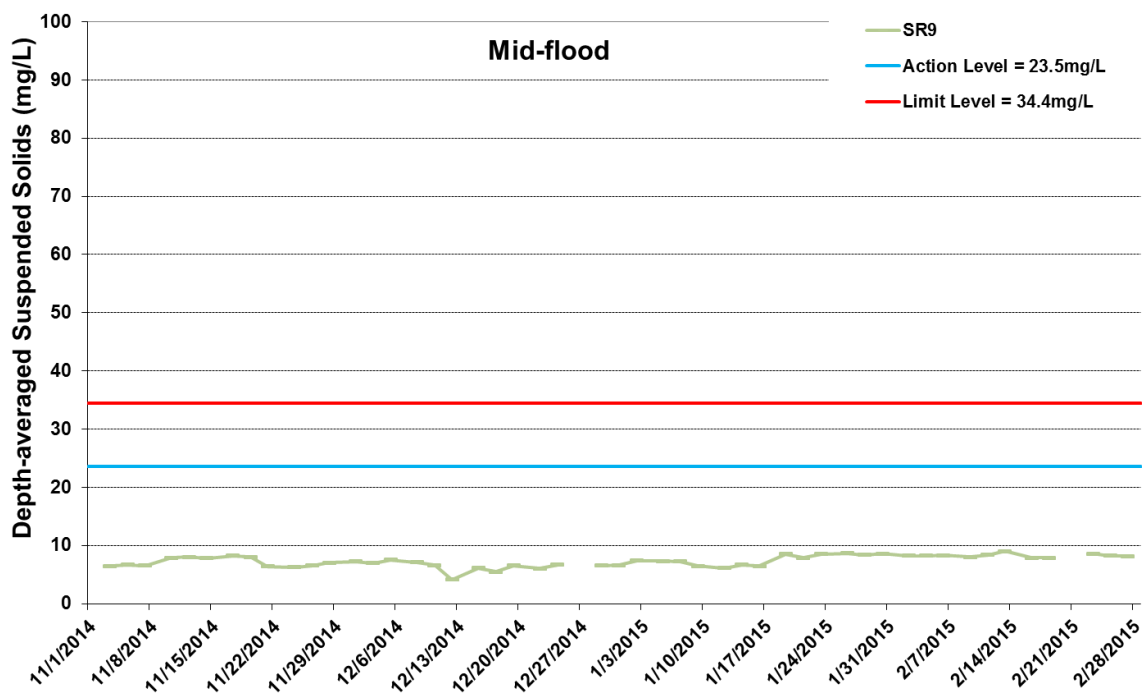
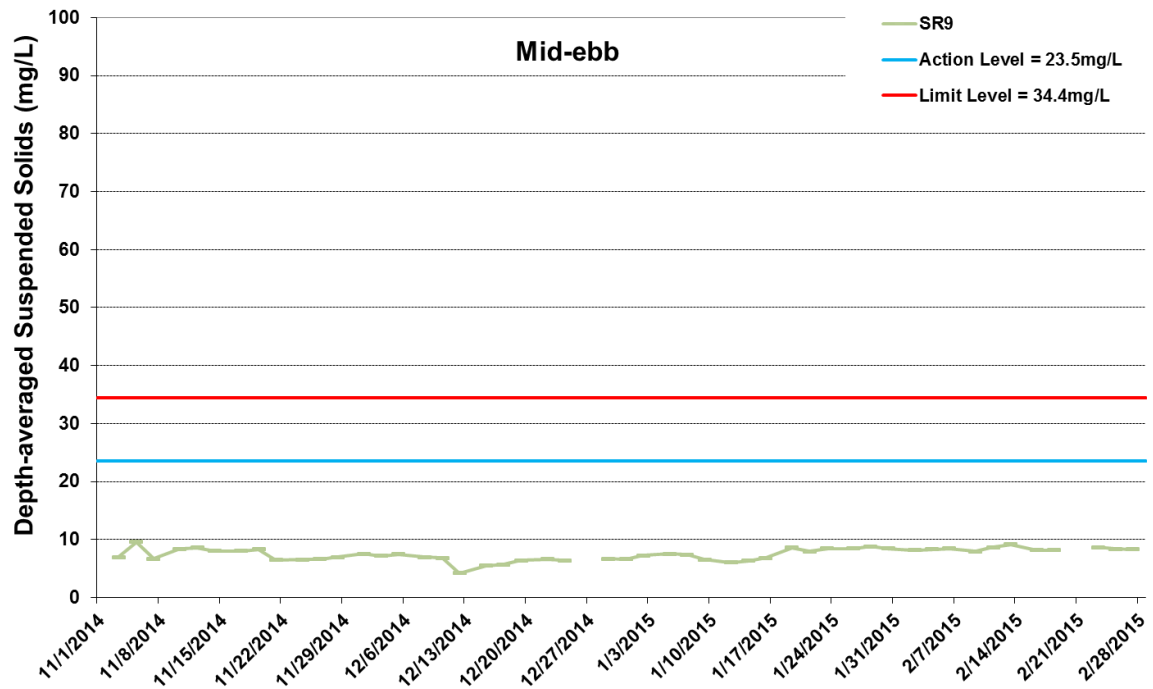


Figure G43 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2014 and 28 February 2015 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Construction of Temporary Seawalls (11/1/2014 - 11/20/2014); Sheet Piling (11/1/2014 - 11/20/2014); Filling (11/1/2014 - 11/20/2014). WQM on 20 February 2015 was postponed to 23 February 2015.



Appendix H

Impact Dolphin Monitoring Survey

CONTRACT NO. HY/2012/08

**Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link
(Northern Connection Sub-sea Tunnel Section)
Dolphin Quarterly Monitoring**

*5th Quarterly Progress Report (December 2014-February 2015)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

Submitted by
Samuel K.Y. Hung, Ph.D., Hong Kong Cetacean Research Project

2 April 2015

1. Introduction

- 1.1. As part of the Hong Kong-Zhuhai-Macao Bridge, the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Northern Connection Sub-sea Tunnel Section (Contract no. HY/2012/08) comprises the sub-sea TBM tunnels (two tubes with cross passages) across the Urmston Road to connect Tuen Area 40 and Hong Kong Boundary Crossing Facilities (HKBCF) of approximately 4 km in length with dual 2-lane carriageway, the tunnels at both the southern landfall and the northern landfall for construction of approach roads to the sub-sea TBM tunnels of approximately 1.5 km in length, as well as the northern landfall reclamation of approximately 16.5 hectares and about 20.km long seawalls. Dragages – Bouygues Joint Venture (hereinafter called the “Contractor”) was awarded as the main contractor for the Northern Connection Sub-sea Tunnel Section, and ERM Hong Kong Limited would serve as the Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme.
- 1.2. According to the updated EM&A Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. However, as such surveys have been undertaken by the HKLR03 and HKBCF projects in the same areas (i.e. NWL and NEL), a combined monitoring approach is recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring will end upon the completion of the dolphin monitoring carried out by HKLR03 contract.
- 1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by ERM Hong Kong Limited as the dolphin specialist for the TM-CLKL Northern Connection Sub-sea Tunnel Section EM&A project. He is responsible for the dolphin monitoring study, including the data collection on Chinese White

Dolphins during the construction phase (i.e. impact period) of the TM-CLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.

- 1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to examine any potential impacts of TM-CLKL construction works on the dolphins.
- 1.5. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.
- 1.6. This report is the fifth quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, summarizing the results of the surveys findings during the period of December 2014 to February 2015, utilizing the survey data collected by HKLR03 project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

- 2.1.1. According to the requirement of the updated EM&A manual, dolphin monitoring programme should cover all transect lines in NEL and NWL survey areas (see Figure 1) twice per month throughout the entire construction period. The co-ordinates of all transect lines conducted during the HKLR03 dolphin monitoring surveys are shown in Table 1.

Table 1 Co-ordinates of transect lines conducted by HKLR03 project

Line No.	Easting	Northing		Line No.	Easting	Northing	
1	Start Point	804671	814577	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815457	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820690	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321

8	Start Point	811508	820847		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	820892		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	820872		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818449		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807					
12	End Point	815542	824882					

- 2.1.2. The HKLR03 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 16 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2013, 2014). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines was labeled as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected along primary and secondary lines were similar in NEL and NWL survey areas. Therefore, both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.2. Photo-identification Work

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the HKLR03 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. A professional digital camera (*Canon EOS 7D* or *60D* model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. Data Analysis

- 2.3.1. Distribution Analysis – The line-transect survey data was integrated with the Geographic Information System (GIS) in order to visualize and interpret different spatial and temporal patterns of dolphin distribution using sighting positions. Location data of dolphin groups were plotted on map layers of Hong Kong using a desktop GIS (ArcView[®] 3.1) to examine their distribution patterns in details. The dataset was also stratified into different subsets to examine distribution patterns of dolphin groups with different categories of group sizes, young calves and activities.

2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collect under Beaufort 3 or below condition would be used for the encounter rate analyses. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in North Lantau), which was also compared with the one deduced from the six events during the baseline period (i.e. six sets of line-transect surveys in North Lantau).

Secondly, the encounter rates were calculated using both primary and secondary survey effort collected under Beaufort 3 or below condition as in AFCD long-term monitoring study. The encounter rate of sightings and dolphins were deduced by dividing the total number of on-effort sightings (STG) and total number of dolphins (ANI) by the amount of survey effort for the quarterly period of September to November 2014.

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km² grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km²) and dolphin densities (total number of dolphins from on-effort sightings per km²) were then calculated for each 1 km by 1 km grid with the aid of GIS. Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km² grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km² grid within the study area:

$$SPSE = ((S / E) \times 100) / SA\%$$

$$DPSE = ((D / E) \times 100) / SA\%$$

where S = total number of on-effort sightings
D = total number of dolphins from on-effort sightings
E = total number of units of survey effort
SA% = percentage of sea area

- 2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, socializing, traveling, and milling/resting) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView[®] 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

- 3.1.1. During the period of December 2014 to February 2015, six sets of systematic line-transect vessel surveys were conducted under the HKLR03 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these HKLR03 surveys, a total of 891.50 km of survey effort was collected, with 99.6% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas, 347.05 km and 544.45 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.3. The total survey effort conducted on primary lines was 645.44 km, while the effort on secondary lines was 246.06 km. Both survey effort conducted on primary and secondary lines were considered as on-effort survey data. Summary table of the survey effort is shown in Appendix I.
- 3.1.4. During the six sets of HKLR03 monitoring surveys in December 2014 to February 2015, a total of 15 groups of 52 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort search. Twelve of the 15 on-effort sightings were made on

primary lines, while the other three were made on secondary lines. In this quarterly period, all dolphin groups were sighted in NWL, while none of them were sighted in NEL. A summary table of the dolphin sightings is shown in Appendix II.

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys in December 2014 to February 2015 is shown in Figure 1. The majority of dolphin sightings made in the present quarter were concentrated in the northwestern end of the North Lantau region, with higher concentration near the northern boundary of the survey area and around Lung Kwu Chau (Figure 1). One exceptional sighting of a lone dolphin was made to the north of the airport, while dolphin did not appear at all in the rest of the North Lantau region.
- 3.2.2. Notably, none of the dolphin groups were sighted in the vicinity of TMCLKL northern landfall or southern viaduct section, and the HKLR03/HKBCF reclamation site (Figure 1).
- 3.2.3. Sighting distribution of the present impact phase monitoring period (December 2015 to February 2015) was compared to the one during the baseline monitoring period (September to November 2011). In the present quarter, dolphins have completely avoided the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past quarters, which have resulted in extremely low to zero dolphin encounter rate in this area.
- 3.2.4. In NWL survey area, dolphin occurrence was also drastically different between the baseline and impact phase quarters. During the present impact monitoring period, much fewer dolphins occurred in the middle portion of North Lantau region than during the baseline period, where dolphins supposedly moved between their core areas around Lung Kwu Chau and the Brothers Islands (Figure 1). Moreover, more dolphins were sighted near Sha Chau and Black Point during the baseline period than during the present impact monitoring period (Figure 1). A number of dolphin groups were sighted to the west of Chek Lap Kok airport (especially near the HKLR09 alignment) during the baseline period, but they have disappeared from this area during the present impact phase period.
- 3.2.5. Another comparison in dolphin distribution was made between the three quarterly periods of winter months in 2012-13, 2013-14 and 2014-15 (Figure 2). Among the three winter periods, no dolphin sighting was made in NEL in 2014-15, while there were two sightings made there in 2013-14, and eight sightings in 2012-13 (Figure 2). This clearly indicated a progressive decline in dolphin usage in NEL waters in the past few years.
- 3.2.6. Moreover, dolphins regularly occurred in the middle and western portions of North Lantau waters (especially between Black Point and Lung Kwu Chau, as well as around Sha Chau) during the winter of 2012-13, but such usage has also progressively diminished in 2013-14 and 2014-15 (Figure 2). The temporal trend indicated that dolphin usage in the overall North Lantau region has greatly diminished during the winter

months of the past few years.

3.3. Encounter rate

3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) for each set of the HKLR03 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of HKLR03 surveys were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during December 2014 – February 2015

SURVEY AREA	DOLPHIN MONITORING DATES	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (2 & 9 Dec 2014)	0.00	0.00
	Set 2 (15 & 23 Dec 2014)	0.00	0.00
	Set 3 (8 & 15 Jan 2015)	0.00	0.00
	Set 4 (27 & 29 Jan 2015)	0.00	0.00
	Set 5 (5 & 13 Feb 2015)	0.00	0.00
	Set 6 (16 & 25 Feb 2015)	0.00	0.00
Northwest Lantau	Set 1 (2 & 9 Dec 2014)	2.79	5.58
	Set 2 (15 & 23 Dec 2014)	1.41	1.41
	Set 3 (8 & 15 Jan 2015)	4.33	21.64
	Set 4 (27 & 29 Jan 2015)	7.52	37.59
	Set 5 (5 & 13 Feb 2015)	1.40	1.40
	Set 6 (16 & 25 Feb 2015)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (December 2014 – February 2015) and baseline monitoring period (September – November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2014 – February 2015	September - November 2011	December 2014 – February 2015	September - November 2011
Northeast Lantau	0.00	6.00 ± 5.05	0.00	22.19 ± 26.81
Northwest Lantau	2.91 ± 2.69	9.85 ± 5.85	11.27 ± 15.19	44.66 ± 29.85

- 3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.77 sightings and 9.62 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil.
- 3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were zero, and such low occurrence of dolphins in NEL have been consistently recorded in the past eight quarters of HKLR03 monitoring (Table 4). It is a serious concern that dolphin occurrence in NEL in the eight quarters (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have been exceptionally low when compared to the baseline period (Table 4). Dolphins have almost vacated from NEL waters since January 2014, with only one group of four dolphins sighted since then.

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	6.00 ± 5.05	22.19 ± 26.81
December 2012-February 2013 (Impact)	3.14 ± 3.21	6.33 ± 8.64
March-May 2013 (Impact)	0.42 ± 1.03	0.42 ± 1.03
June-August 2013 (Impact)	0.88 ± 1.36	3.91 ± 8.36
September-November 2013 (Impact)	1.01 ± 1.59	3.77 ± 6.49
December 2013-February 2014 (Impact)	0.45 ± 1.10	1.34 ± 3.29
March-May 2014 (Impact)	0.00	0.00
June-August 2014 (Impact)	0.42 ± 1.04	1.69 ± 4.15
September-November 2014 (Impact)	0.00	0.00
December 2014-February 2015 (Impact)	0.00	0.00

- 3.3.4. Moreover, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period were also much lower (reductions of 70.5% and 74.8% respectively) than the ones recorded in the 3-month baseline period, indicating a dramatic decline in dolphin usage of this survey area during the present impact phase period (Table 5).

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 ± 5.85	44.66 ± 29.85
December 2012-February 2013 (Impact)	8.36 ± 5.03	35.90 ± 23.10
March-May 2013 (Impact)	7.75 ± 3.96	24.23 ± 18.05
June-August 2013 (Impact)	6.56 ± 3.68	27.00 ± 18.71
September-November 2013 (Impact)	8.04 ± 1.10	32.48 ± 26.51
December 2013-February 2014 (Impact)	8.21 ± 2.21	32.58 ± 11.21
March-May 2014 (Impact)	6.51 ± 3.34	19.14 ± 7.19
June-August 2014 (Impact)	4.74 ± 3.84	17.52 ± 15.12
September-November 2014 (Impact)	5.10 ± 4.40	20.52 ± 15.10
December 2014-February 2015 (Impact)	2.91 ± 2.69	11.27 ± 15.19

- 3.3.5. Notably, the last eighth consecutive quarters of HKLR03 monitoring have triggered the Action Levels under the Event and Action Plan, while the current quarter has triggered the Limit Level. As discussed recently in Hung (2014), the dramatic decline in dolphin usage of NEL waters in 2012 and 2013 (including the declines in abundance, encounter rate and habitat use in NEL, as well as shifts of individual core areas and ranges away from NEL waters) was possibly related to the HZMB construction works that were commenced in 2012. It appeared that such noticeable decline has already extended to NWL waters progressively in 2013 and 2014.
- 3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.7. For the comparison between the baseline period and the present quarter (ninth quarter of the HKLR03 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0059 and 0.0330 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both dolphin encounter rates of STG and ANI.
- 3.3.8. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. first nine quarters of the HKLR03 impact phase being assessed), the p-values

for the differences in average dolphin encounter rates of STG and ANI were 0.0009 and 0.0003 respectively. Even if the alpha value is set at 0.01, significant differences were detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).

- 3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in NEL and NWL waters in the present quarterly period, and such low occurrence has been consistently documented in previous quarters. This raises serious concern, as the decline in dolphin usage in North Lantau waters could possibly link to the HZMB-related construction activities.
- 3.3.10. To ensure the continuous usage of North Lantau waters by the dolphins, every possible measure should be implemented by the contractors and relevant authorities to minimize all disturbances to the dolphins.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to eight individuals per group in North Lantau region during December 2014 to February 2015. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from impact monitoring period (December 2014 – February 2015) and baseline monitoring period (September – November 2011)

	Average Dolphin Group Size	
	December 2014 – February 2015	September – November 2011
Overall	3.47 ± 2.29 (n = 15)	3.72 ± 3.13 (n = 66)
Northeast Lantau	0.00	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.47 ± 2.29 (n = 15)	3.92 ± 3.40 (n = 49)

- 3.4.2. The average dolphin group sizes in NWL waters during December 2014 to February 2015 were slightly smaller than the ones recorded during the three-month baseline period (Table 6). Ten of the 15 groups were composed of 1-4 individuals only, while none of the dolphin group had more than 10 individuals.
- 3.4.3. Distribution of dolphins with larger group sizes (five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the one in baseline period. During the winter of 2014-15, distribution of the few larger dolphin groups were concentrated near Lung Kwu Chau (Figure 3). This distribution pattern was very different from the baseline period, when the larger dolphin groups were distributed more evenly in NWL waters with a few more sighted in NEL waters (Figure 3).

3.5. *Habitat use*

- 3.5.1. From December 2014 to February 2015, the most heavily utilized habitats by Chinese White Dolphins mainly concentrated around Lung Kwu Chau and the northern end of NWL survey area (Figures 4a and 4b). None of the grids in NEL recorded the presence of dolphins. Moreover, all grids near TMCLKL and HKLR09 alignments as well as the HKLR03/HKBCF reclamation sites did not record any presence of dolphins during on-effort search in the present quarterly period.
- 3.5.2. However, it should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.
- 3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL was dramatically different from the present impact monitoring period (Figure 5). During the baseline period, nine grids between Siu Mo To and Shum Shui Kok recorded moderately high to high dolphin densities, which was in stark contrast to complete absence of dolphins during the present impact phase period (Figure 5).
- 3.5.4. The density patterns between the baseline and impact phase monitoring periods were also very different in NWL, with higher dolphin usage around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period (Figure 5). During the present impact phase period, the dolphin usage was confined to the northwestern end of the survey area around Lung Kwu Chau.

3.6. *Mother-calf pairs*

- 3.6.1. During the present quarterly period, no young calves (i.e. unspotted calves or unspotted juveniles) for the first time among the ten quarters of HKLR03 impact phase monitoring. This absence of young calves is also in stark contrast to their regular occurrence during the baseline period. Their absences should be of a serious concern, and the occurrence of calves should be closely monitored in the upcoming quarters.

3.7. *Activities and associations with fishing boats*

- 3.7.1. Only one dolphin sighting each was associated with feeding and socializing activities respectively during the three-month study period. The percentage of sightings associated with feeding activities during the present quarter (6.7%) was much lower than the one recorded during the baseline period (11.6%). On the other hand, the percentage of socializing activities during the present impact phase monitoring period (6.6%) was slightly higher than the one recorded during the baseline period (5.4%). None of the 15 dolphin groups were engaged in traveling or milling/resting behaviour.
- 3.7.2. Distribution of dolphins engaged in feeding and socializing activities during the present three-month period is shown in Figure 6. The lone sightings associated with feeding and socializing activities were located to the north of the airport and near Lung Kwu Chau

respectively (Figure 6). Distribution of dolphin sightings associated with these activities during the impact phase was very different from the distribution pattern of these activities during the baseline period (Figure 6).

3.7.3. As in the past monitoring quarters, none of the 15 dolphin groups was found to be associated with an operating fishing vessel in North Lantau waters during the present impact phase period. The extremely rare events of fishing boat association in the present and previous quarters were consistently found, and were likely related to the recent trawl ban being implemented in December 2012 in Hong Kong waters.

3.8. *Summary of photo-identification works*

3.8.1. From December 2014 to February 2015, over 1,500 digital photographs of Chinese White Dolphins were taken during the HKLR03 impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, 24 individuals sighted 32 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these 32 re-sightings were made in NWL.

3.8.3. The majority of identified individuals were sighted only once or twice during the three-month period, with the exception of one individual (CH34) being sighted thrice.

3.8.4. Two of these 24 individuals (NL259 and NL285) were also sighted in West Lantau waters during the HKLR09 monitoring surveys for the same three-month period, showing their extensive movement between North and West Lantau regions.

3.8.5. Five recognized females (NL98, NL104, NL123, NL202 and WL17) were accompanied with calves during their re-sightings. Some of these mothers were frequently sighted with their calves throughout the HKLR03 impact phase monitoring period since October 2012.

3.9. *Individual range use*

3.9.1. Ranging patterns of the 24 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.

3.9.2. All identified dolphins sighted in this quarter were utilizing their range use in NWL, but have avoided the NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as during the baseline period.

3.9.3. Notably, two individuals (NL259 and NL285) sighted in NWL and NEL waters consistently in the past have extended their range use to WL waters in the present quarter. It should be further monitored to examine whether there has been any consistent shifts of home ranges of individuals from North Lantau to West Lantau, which could also possibly be related to the HZMB-related construction works.

4. Conclusion

- 4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of the TMCLKL construction project on Chinese White Dolphins was noticeable from general observations.
- 4.2. Although the dolphins infrequently occurred along the alignment of TMCLKL northern connection sub-sea tunnel section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.
- 4.3. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

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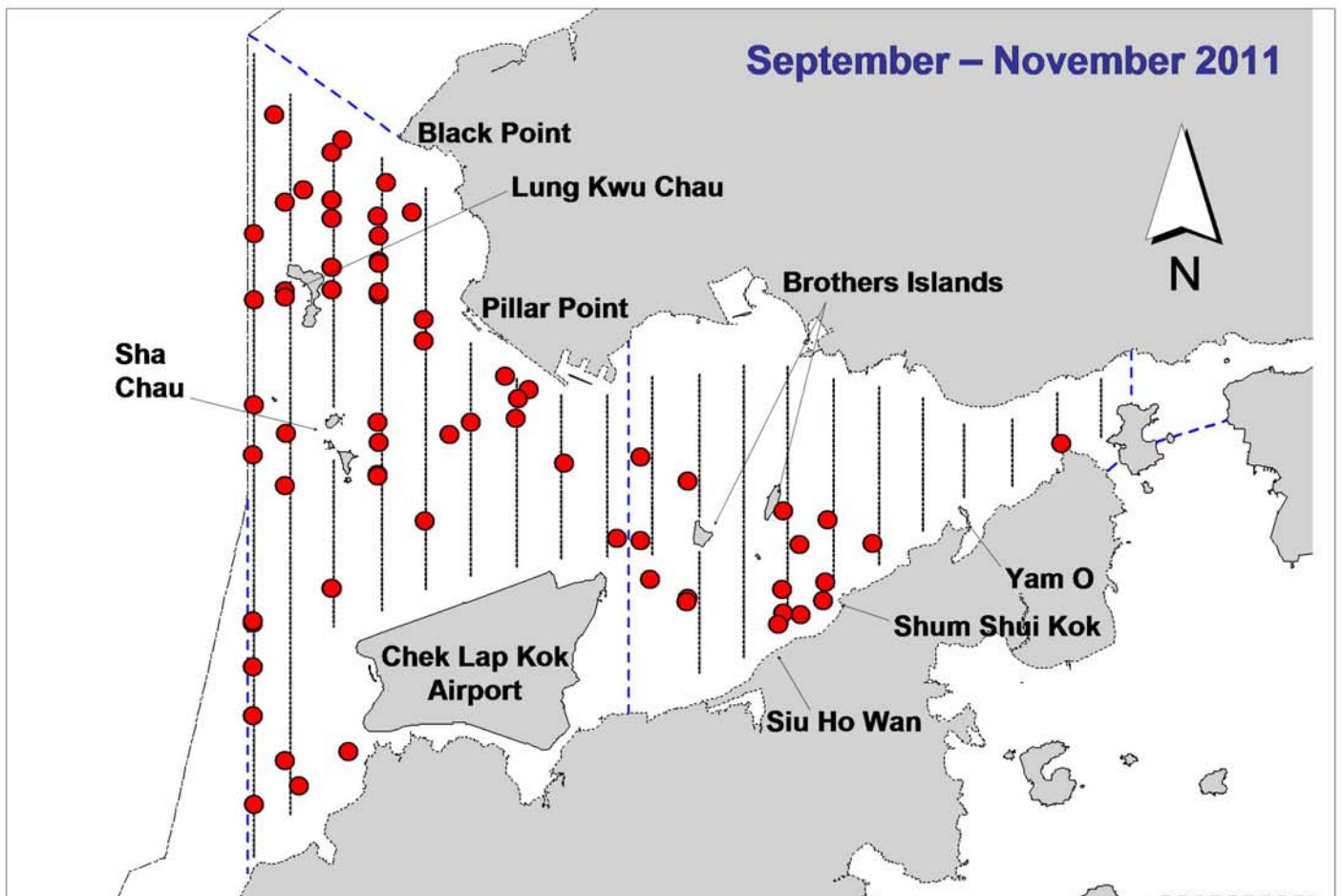
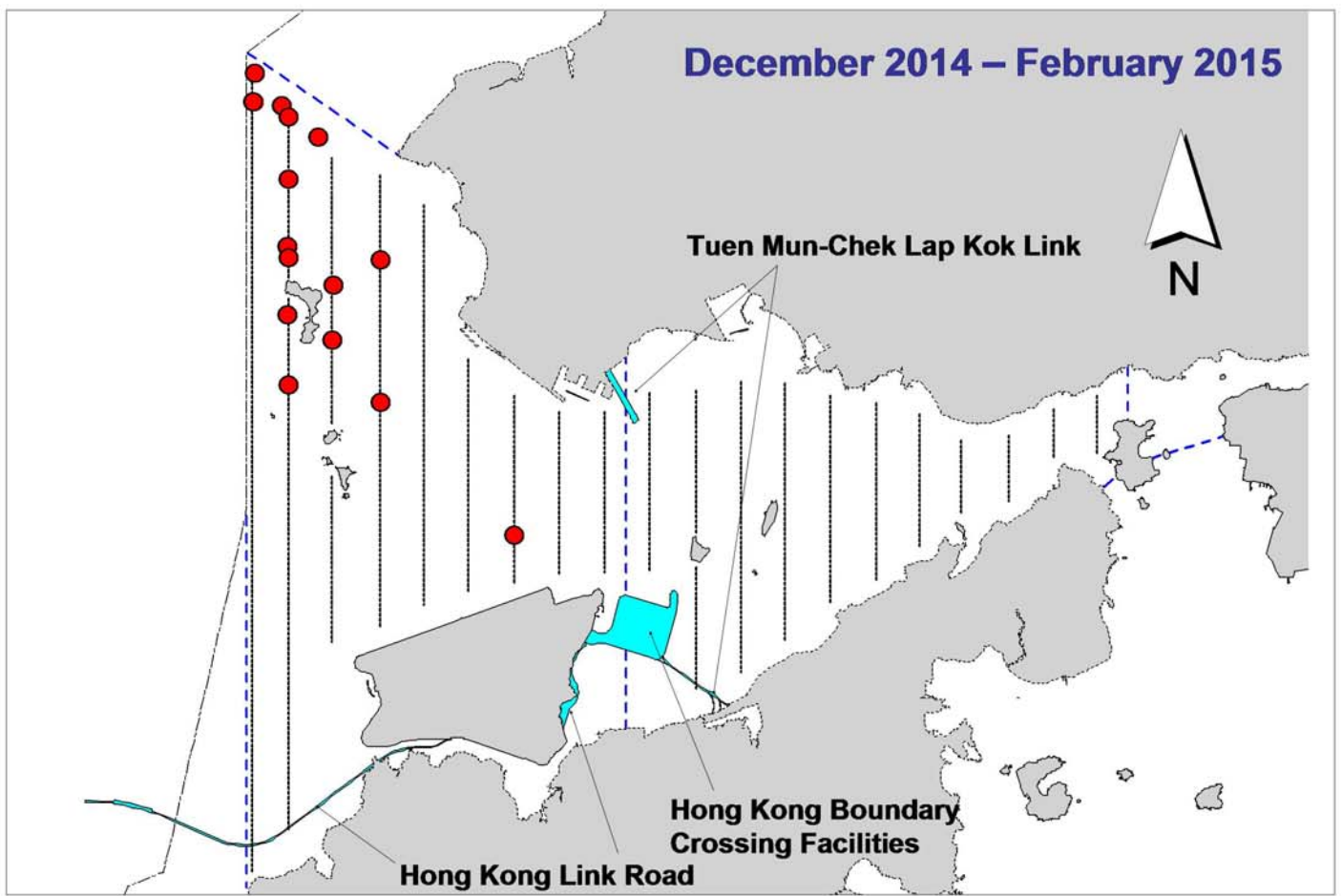


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

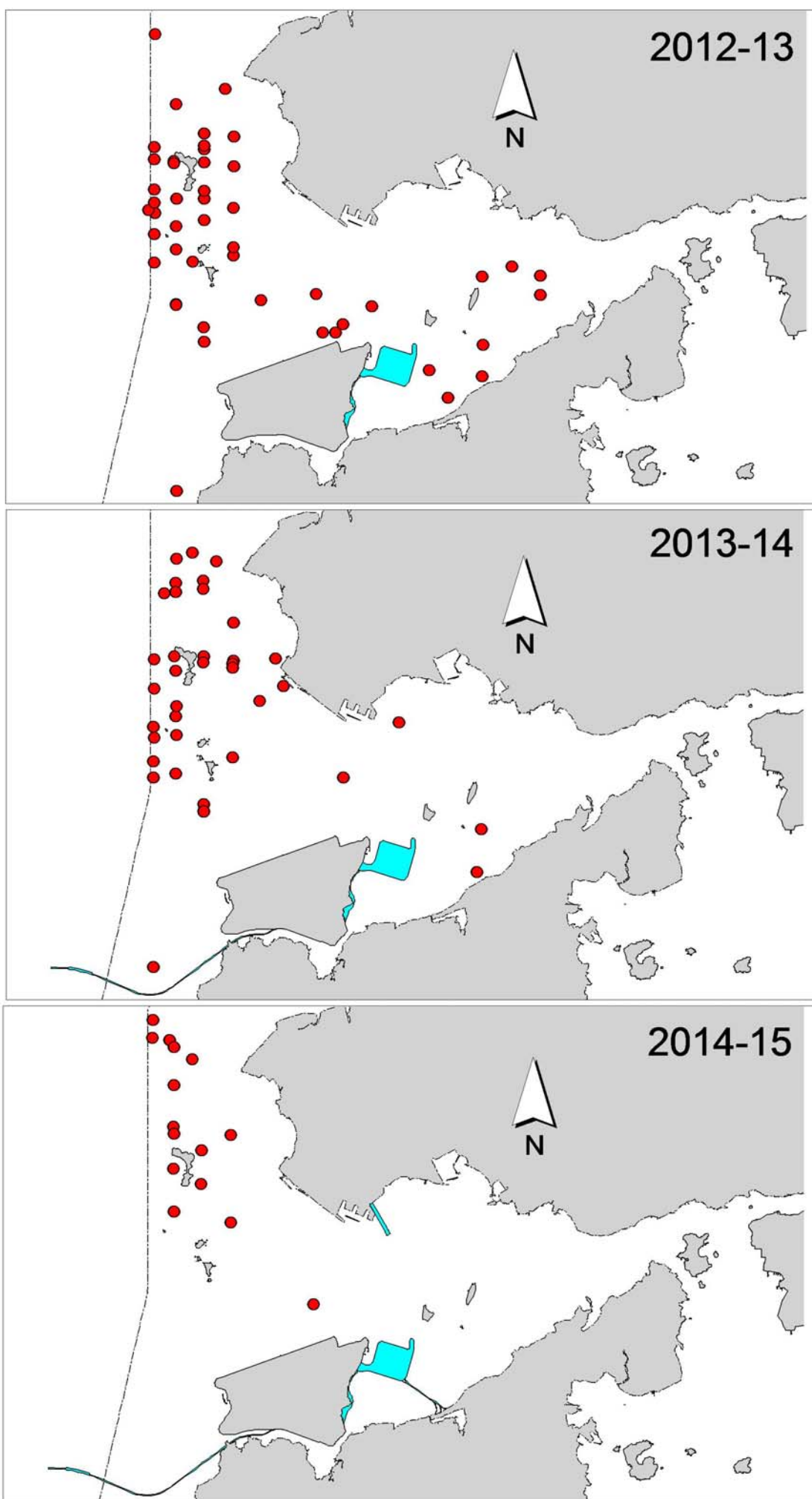


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the same winter quarters of HKLR03 impact phase in 2012-13, 2013-14 and 2014-15

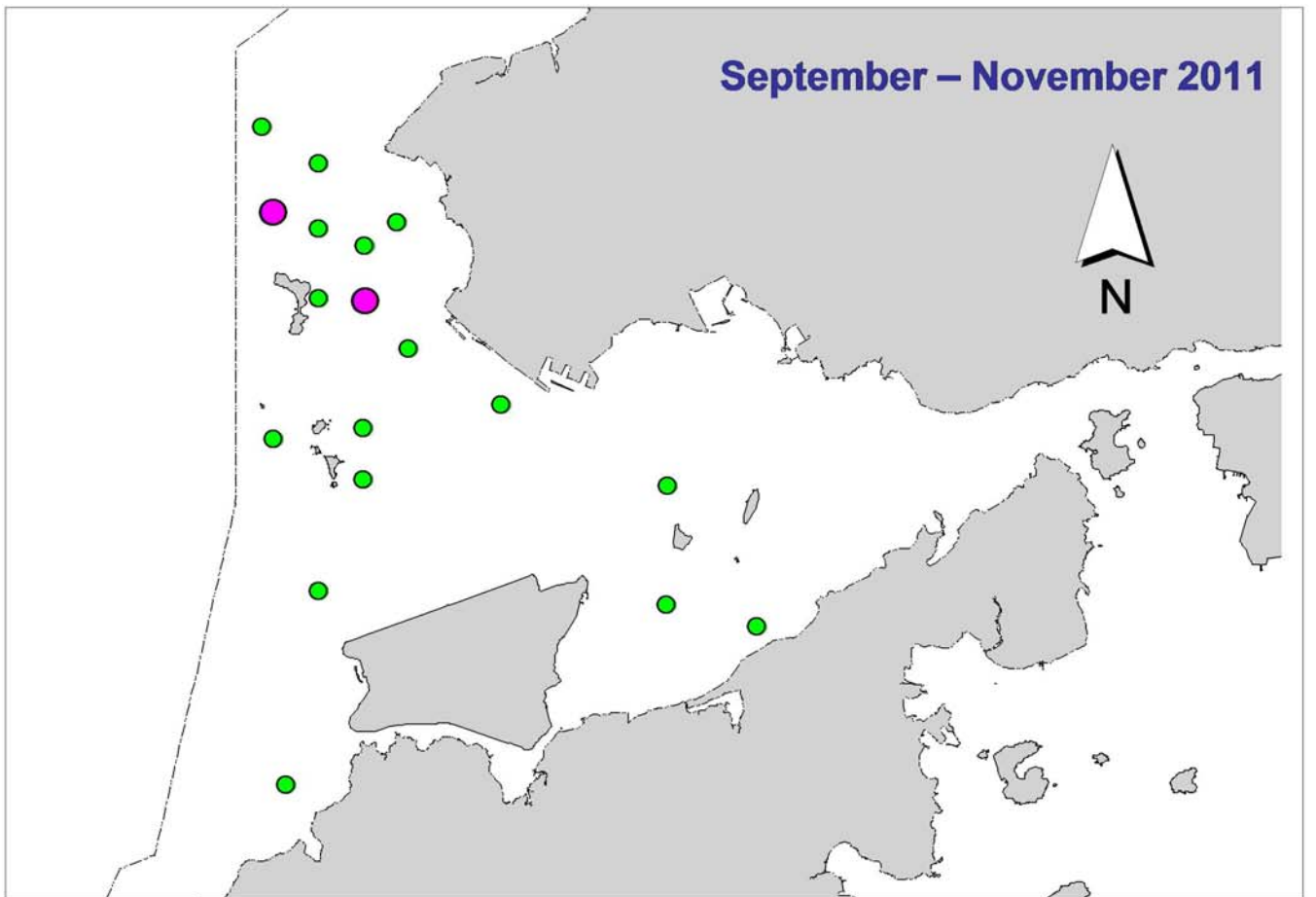
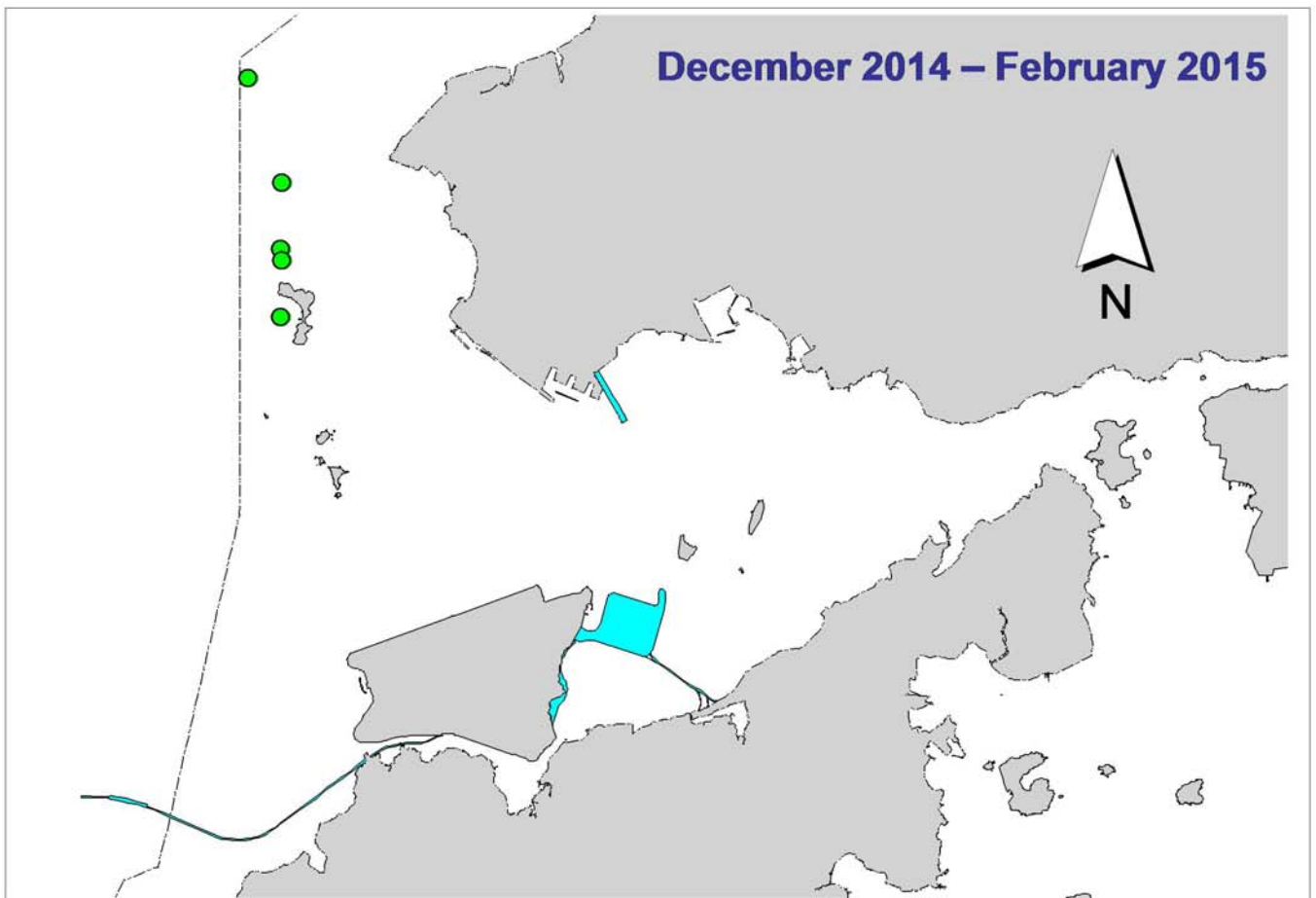


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

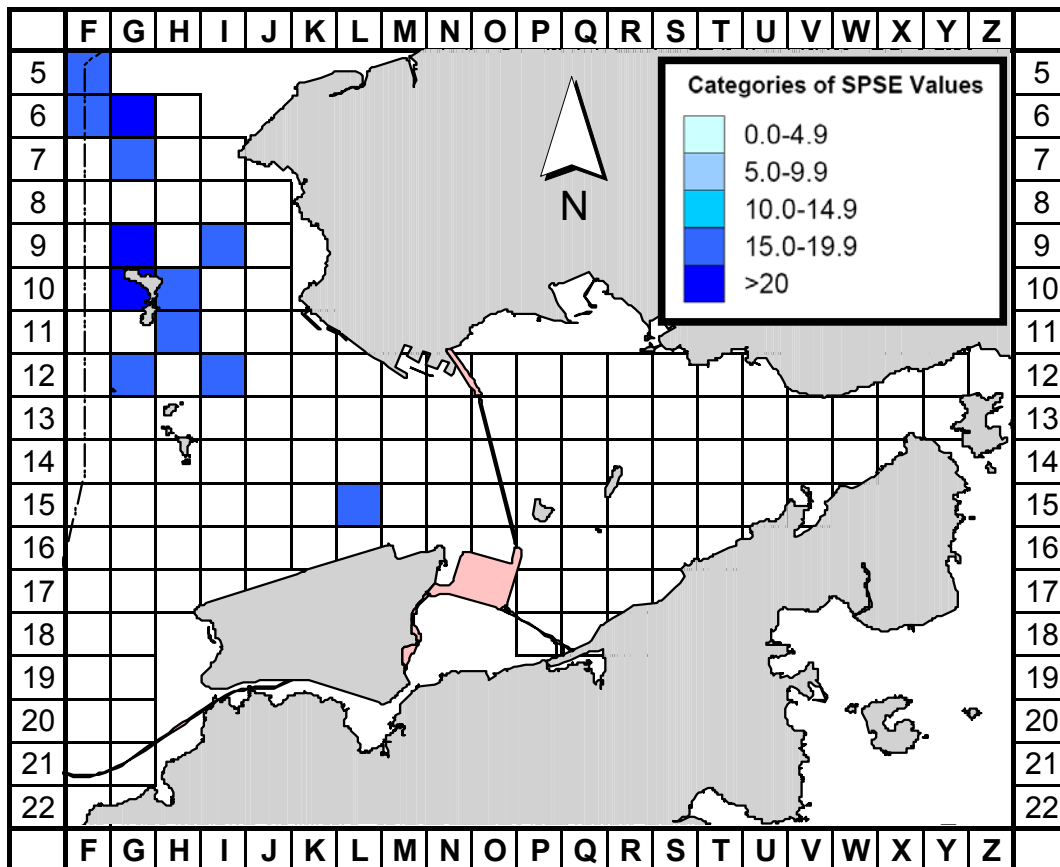


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec 14-Feb 15) (SPSE = no. of on-effort sightings per 100 units of survey effort)

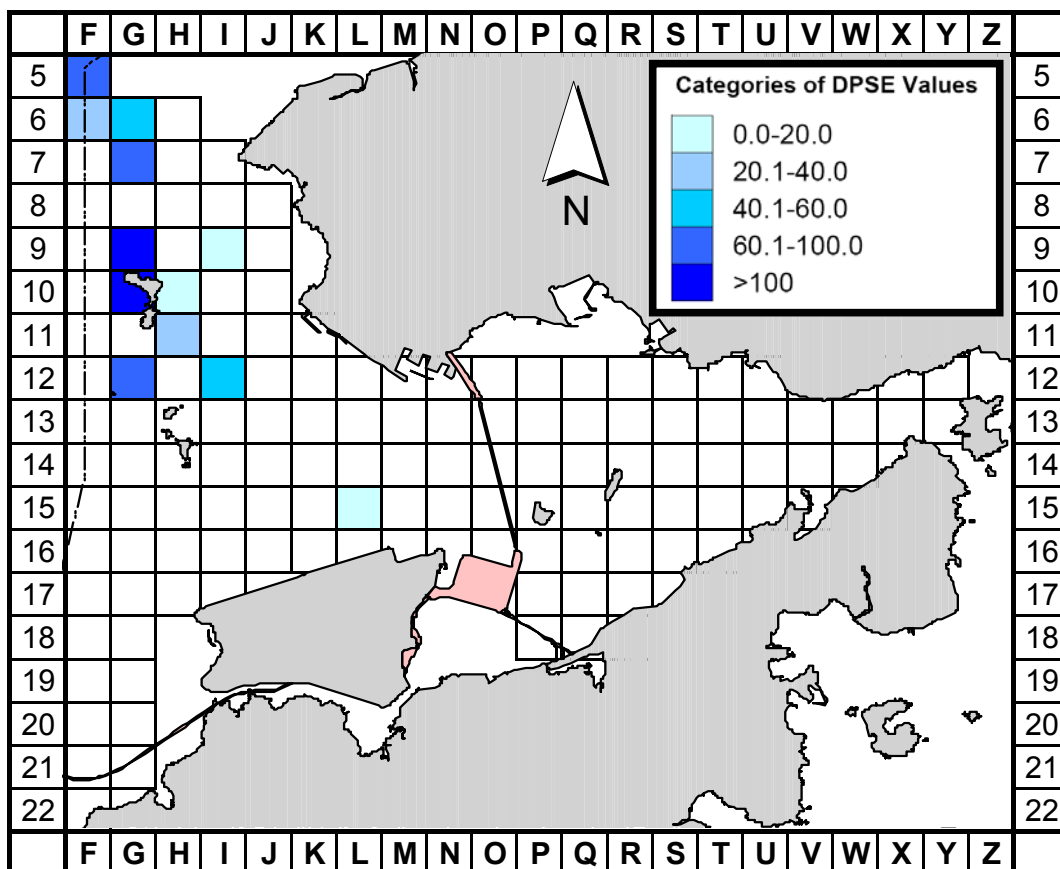


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec 14-Feb 15) (DPSE = no. of dolphins per 100 units of survey effort)

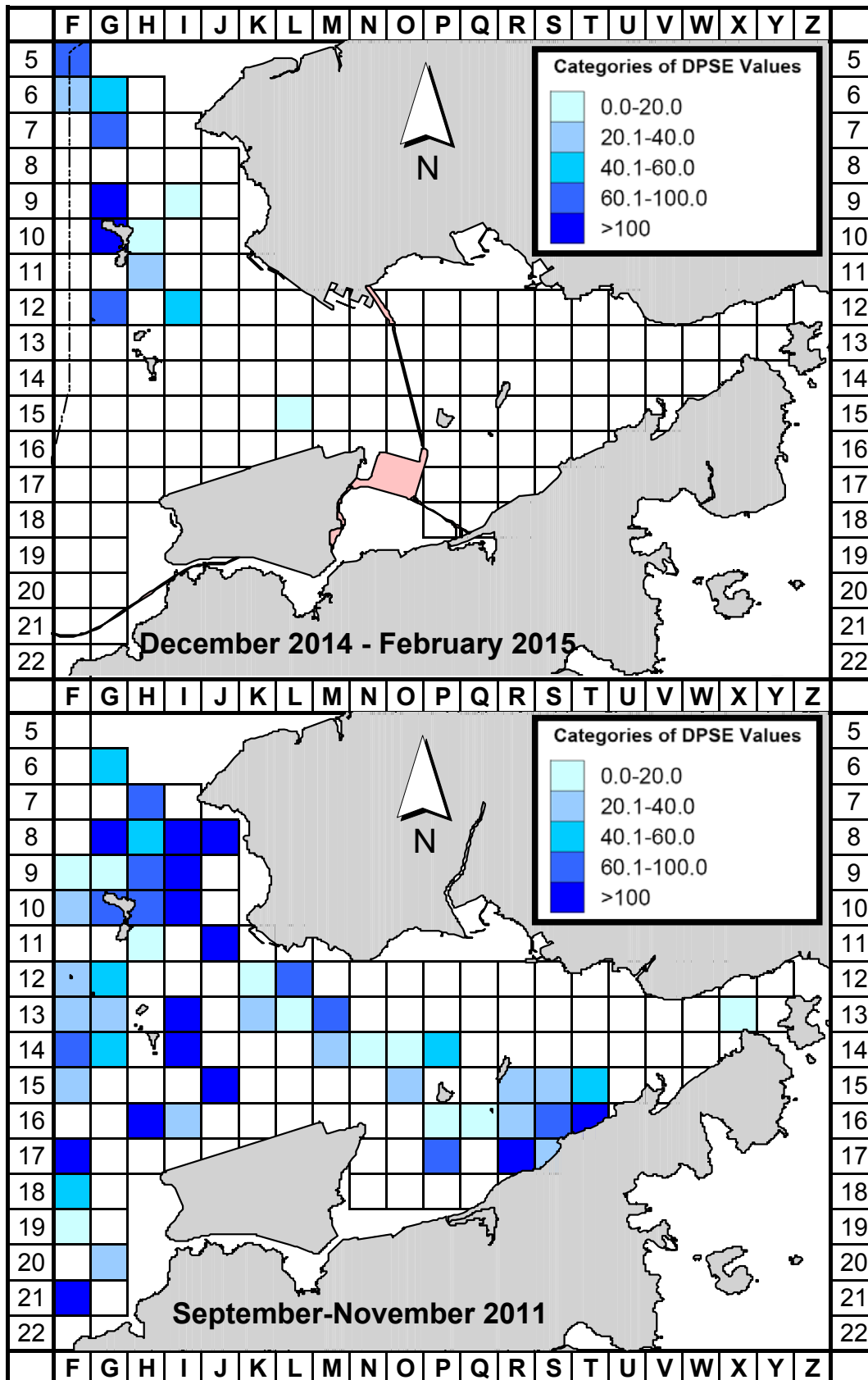


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (September-November 2014) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

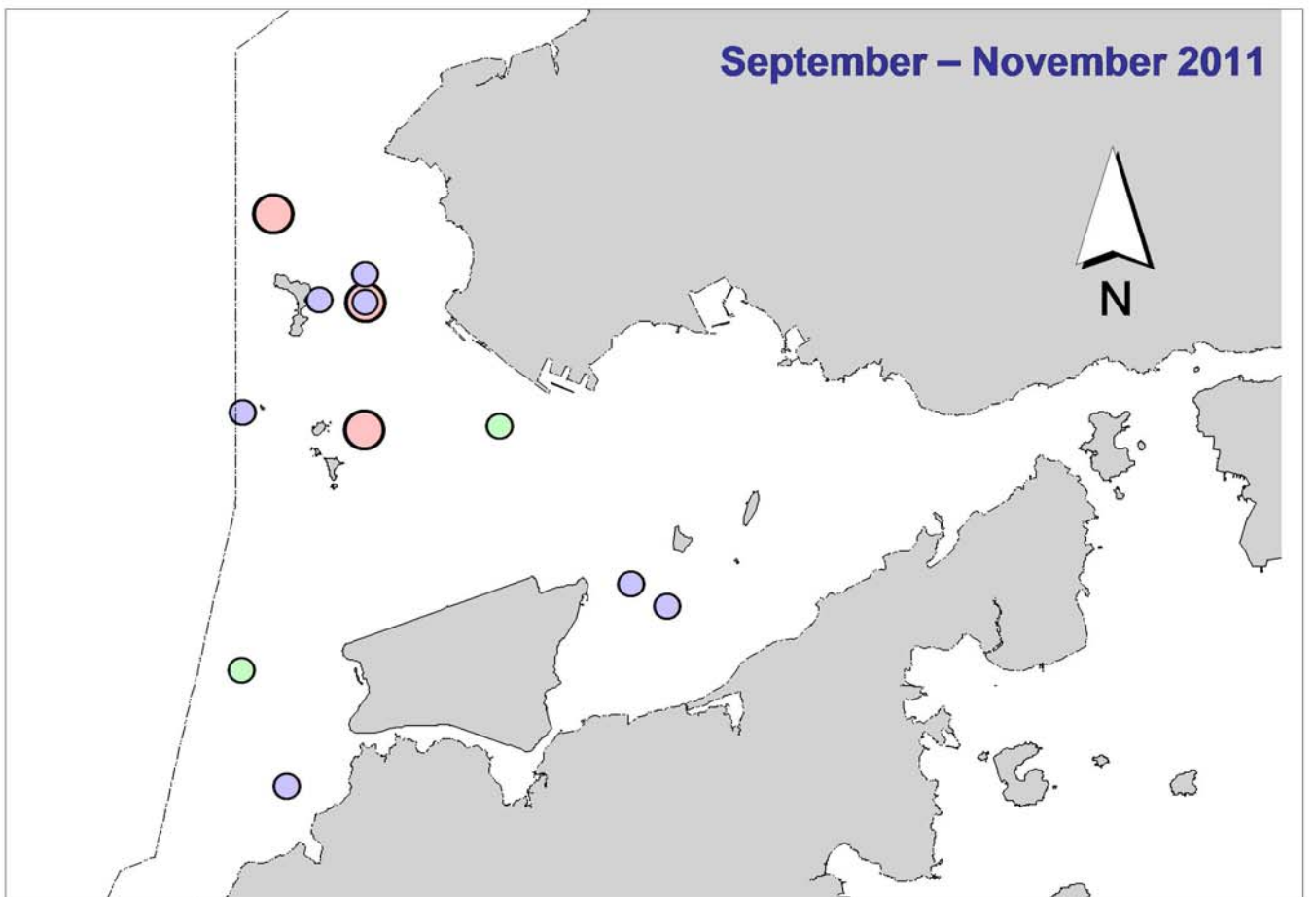
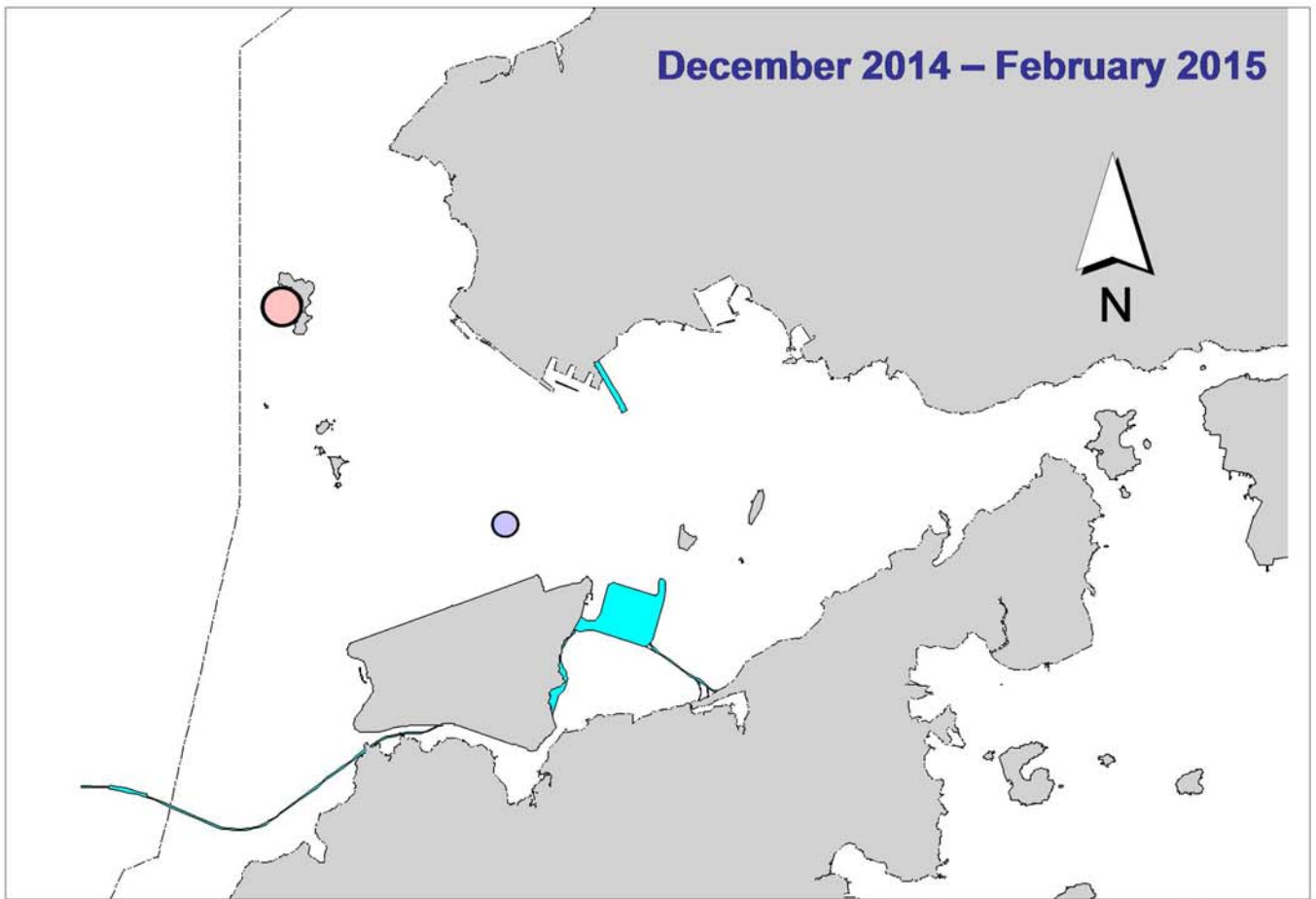


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (December 2014 - February 2015)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
2-Dec-14	NE LANTAU	2	15.30	WINTER	STANDARD31516	HKLR	P
2-Dec-14	NE LANTAU	3	2.28	WINTER	STANDARD31516	HKLR	P
2-Dec-14	NE LANTAU	2	7.54	WINTER	STANDARD31516	HKLR	S
2-Dec-14	NE LANTAU	3	2.28	WINTER	STANDARD31516	HKLR	S
2-Dec-14	NW LANTAU	2	18.17	WINTER	STANDARD31516	HKLR	P
2-Dec-14	NW LANTAU	3	23.09	WINTER	STANDARD31516	HKLR	P
2-Dec-14	NW LANTAU	2	10.54	WINTER	STANDARD31516	HKLR	S
2-Dec-14	NW LANTAU	3	2.10	WINTER	STANDARD31516	HKLR	S
9-Dec-14	NE LANTAU	1	5.79	WINTER	STANDARD31516	HKLR	P
9-Dec-14	NE LANTAU	2	14.41	WINTER	STANDARD31516	HKLR	P
9-Dec-14	NE LANTAU	1	2.20	WINTER	STANDARD31516	HKLR	S
9-Dec-14	NE LANTAU	2	8.30	WINTER	STANDARD31516	HKLR	S
9-Dec-14	NW LANTAU	1	2.11	WINTER	STANDARD31516	HKLR	P
9-Dec-14	NW LANTAU	2	28.31	WINTER	STANDARD31516	HKLR	P
9-Dec-14	NW LANTAU	2	5.13	WINTER	STANDARD31516	HKLR	S
9-Dec-14	NW LANTAU	3	2.45	WINTER	STANDARD31516	HKLR	S
15-Dec-14	NW LANTAU	2	31.56	WINTER	STANDARD31516	HKLR	P
15-Dec-14	NW LANTAU	3	9.34	WINTER	STANDARD31516	HKLR	P
15-Dec-14	NW LANTAU	2	12.90	WINTER	STANDARD31516	HKLR	S
15-Dec-14	NE LANTAU	1	3.57	WINTER	STANDARD31516	HKLR	P
15-Dec-14	NE LANTAU	2	13.37	WINTER	STANDARD31516	HKLR	P
15-Dec-14	NE LANTAU	1	3.76	WINTER	STANDARD31516	HKLR	S
15-Dec-14	NE LANTAU	2	6.50	WINTER	STANDARD31516	HKLR	S
23-Dec-14	NE LANTAU	2	19.81	WINTER	STANDARD31516	HKLR	P
23-Dec-14	NE LANTAU	2	9.69	WINTER	STANDARD31516	HKLR	S
23-Dec-14	NE LANTAU	3	0.90	WINTER	STANDARD31516	HKLR	S
23-Dec-14	NW LANTAU	2	13.36	WINTER	STANDARD31516	HKLR	P
23-Dec-14	NW LANTAU	3	16.71	WINTER	STANDARD31516	HKLR	P
23-Dec-14	NW LANTAU	2	5.81	WINTER	STANDARD31516	HKLR	S
23-Dec-14	NW LANTAU	3	1.82	WINTER	STANDARD31516	HKLR	S
8-Jan-15	NE LANTAU	2	20.00	WINTER	STANDARD31516	HKLR	P
8-Jan-15	NE LANTAU	2	10.40	WINTER	STANDARD31516	HKLR	S
8-Jan-15	NW LANTAU	2	10.06	WINTER	STANDARD31516	HKLR	P
8-Jan-15	NW LANTAU	3	21.99	WINTER	STANDARD31516	HKLR	P
8-Jan-15	NW LANTAU	2	5.53	WINTER	STANDARD31516	HKLR	S
8-Jan-15	NW LANTAU	3	1.94	WINTER	STANDARD31516	HKLR	S
15-Jan-15	NW LANTAU	2	0.89	WINTER	STANDARD31516	HKLR	P
15-Jan-15	NW LANTAU	3	36.39	WINTER	STANDARD31516	HKLR	P
15-Jan-15	NW LANTAU	2	1.05	WINTER	STANDARD31516	HKLR	S
15-Jan-15	NW LANTAU	3	11.06	WINTER	STANDARD31516	HKLR	S
15-Jan-15	NE LANTAU	2	9.56	WINTER	STANDARD31516	HKLR	P
15-Jan-15	NE LANTAU	3	7.91	WINTER	STANDARD31516	HKLR	P
15-Jan-15	NE LANTAU	2	8.56	WINTER	STANDARD31516	HKLR	S
15-Jan-15	NE LANTAU	3	1.17	WINTER	STANDARD31516	HKLR	S
27-Jan-15	NE LANTAU	2	10.35	WINTER	STANDARD31516	HKLR	P
27-Jan-15	NE LANTAU	3	7.00	WINTER	STANDARD31516	HKLR	P
27-Jan-15	NE LANTAU	2	6.55	WINTER	STANDARD31516	HKLR	S
27-Jan-15	NE LANTAU	3	3.90	WINTER	STANDARD31516	HKLR	S
27-Jan-15	NW LANTAU	2	10.38	WINTER	STANDARD31516	HKLR	P
27-Jan-15	NW LANTAU	3	26.22	WINTER	STANDARD31516	HKLR	P
27-Jan-15	NW LANTAU	4	3.10	WINTER	STANDARD31516	HKLR	P

Appendix I. (cont'd)

(Abbreviations: BEAU = Beaufort Sea State; P = Primary Line Effort; S = Secondary Line Effort)

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
27-Jan-15	NW LANTAU	2	7.53	WINTER	STANDARD31516	HKLR	S
27-Jan-15	NW LANTAU	3	4.15	WINTER	STANDARD31516	HKLR	S
27-Jan-15	NW LANTAU	4	0.80	WINTER	STANDARD31516	HKLR	S
29-Jan-15	NW LANTAU	1	1.41	WINTER	STANDARD31516	HKLR	P
29-Jan-15	NW LANTAU	2	15.47	WINTER	STANDARD31516	HKLR	P
29-Jan-15	NW LANTAU	3	13.03	WINTER	STANDARD31516	HKLR	P
29-Jan-15	NW LANTAU	1	2.34	WINTER	STANDARD31516	HKLR	S
29-Jan-15	NW LANTAU	2	4.25	WINTER	STANDARD31516	HKLR	S
29-Jan-15	NW LANTAU	3	0.60	WINTER	STANDARD31516	HKLR	S
29-Jan-15	NE LANTAU	1	4.67	WINTER	STANDARD31516	HKLR	P
29-Jan-15	NE LANTAU	2	15.57	WINTER	STANDARD31516	HKLR	P
29-Jan-15	NE LANTAU	2	10.56	WINTER	STANDARD31516	HKLR	S
5-Feb-15	NE LANTAU	2	11.79	WINTER	STANDARD31516	HKLR	P
5-Feb-15	NE LANTAU	3	8.03	WINTER	STANDARD31516	HKLR	P
5-Feb-15	NE LANTAU	1	0.20	WINTER	STANDARD31516	HKLR	S
5-Feb-15	NE LANTAU	2	7.00	WINTER	STANDARD31516	HKLR	S
5-Feb-15	NE LANTAU	3	3.88	WINTER	STANDARD31516	HKLR	S
5-Feb-15	NW LANTAU	2	11.86	WINTER	STANDARD31516	HKLR	P
5-Feb-15	NW LANTAU	3	19.78	WINTER	STANDARD31516	HKLR	P
5-Feb-15	NW LANTAU	2	3.96	WINTER	STANDARD31516	HKLR	S
5-Feb-15	NW LANTAU	3	4.10	WINTER	STANDARD31516	HKLR	S
13-Feb-15	NW LANTAU	1	10.31	WINTER	STANDARD31516	HKLR	P
13-Feb-15	NW LANTAU	2	24.74	WINTER	STANDARD31516	HKLR	P
13-Feb-15	NW LANTAU	3	4.98	WINTER	STANDARD31516	HKLR	P
13-Feb-15	NW LANTAU	1	4.92	WINTER	STANDARD31516	HKLR	S
13-Feb-15	NW LANTAU	2	8.01	WINTER	STANDARD31516	HKLR	S
13-Feb-15	NE LANTAU	2	16.97	WINTER	STANDARD31516	HKLR	P
13-Feb-15	NE LANTAU	2	9.83	WINTER	STANDARD31516	HKLR	S
16-Feb-15	NE LANTAU	2	17.07	WINTER	STANDARD31516	HKLR	P
16-Feb-15	NE LANTAU	1	2.87	WINTER	STANDARD31516	HKLR	S
16-Feb-15	NE LANTAU	2	7.61	WINTER	STANDARD31516	HKLR	S
16-Feb-15	NW LANTAU	1	0.90	WINTER	STANDARD31516	HKLR	P
16-Feb-15	NW LANTAU	2	36.33	WINTER	STANDARD31516	HKLR	P
16-Feb-15	NW LANTAU	3	2.60	WINTER	STANDARD31516	HKLR	P
16-Feb-15	NW LANTAU	2	10.57	WINTER	STANDARD31516	HKLR	S
16-Feb-15	NW LANTAU	3	2.60	WINTER	STANDARD31516	HKLR	S
25-Feb-15	NW LANTAU	2	9.90	WINTER	STANDARD31516	HKLR	P
25-Feb-15	NW LANTAU	3	19.50	WINTER	STANDARD31516	HKLR	P
25-Feb-15	NW LANTAU	2	3.50	WINTER	STANDARD31516	HKLR	S
25-Feb-15	NW LANTAU	3	4.30	WINTER	STANDARD31516	HKLR	S
25-Feb-15	NE LANTAU	1	1.20	WINTER	STANDARD31516	HKLR	P
25-Feb-15	NE LANTAU	2	16.30	WINTER	STANDARD31516	HKLR	P
25-Feb-15	NE LANTAU	3	2.00	WINTER	STANDARD31516	HKLR	P
25-Feb-15	NE LANTAU	2	10.40	WINTER	STANDARD31516	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (December 2014 - February 2015)

(Abbreviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Line)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
2-Dec-14	1	1428	1	NW LANTAU	3	207	ON	HKLR	826916	806457	WINTER	NONE	P
9-Dec-14	1	1315	3	NW LANTAU	2	280	ON	HKLR	824445	807513	WINTER	NONE	P
23-Dec-14	1	1335	1	NW LANTAU	3	151	ON	HKLR	827424	807518	WINTER	NONE	P
8-Jan-15	1	1355	1	NW LANTAU	2	148	ON	HKLR	830029	806123	WINTER	NONE	S
8-Jan-15	2	1421	8	NW LANTAU	3	556	ON	HKLR	827716	805449	WINTER	NONE	P
15-Jan-15	1	1132	2	NW LANTAU	3	189	ON	HKLR	830762	804693	WINTER	NONE	P
15-Jan-15	2	1143	5	NW LANTAU	3	24	ON	HKLR	831349	804705	WINTER	NONE	P
15-Jan-15	3	1156	3	NW LANTAU	3	464	ON	HKLR	830673	805331	WINTER	NONE	S
27-Jan-15	1	1409	2	NW LANTAU	3	163	ON	HKLR	825753	806454	WINTER	NONE	S
27-Jan-15	2	1442	3	NW LANTAU	3	410	ON	HKLR	830429	805475	WINTER	NONE	P
29-Jan-15	1	1104	4	NW LANTAU	3	63	ON	HKLR	824825	805464	WINTER	NONE	P
29-Jan-15	2	1128	6	NW LANTAU	2	143	ON	HKLR	826287	805456	WINTER	NONE	P
29-Jan-15	3	1150	7	NW LANTAU	2	343	ON	HKLR	827483	805469	WINTER	NONE	P
29-Jan-15	4	1208	5	NW LANTAU	2	143	ON	HKLR	829122	805472	WINTER	NONE	P
13-Feb-15	1	1344	1	NW LANTAU	2	103	ON	HKLR	821649	810495	WINTER	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in December 2014 - February 2015

ID#	DATE	STG#	AREA
CH34	15/01/15	1	NW LANTAU
	15/01/15	2	NW LANTAU
	29/01/15	4	NW LANTAU
NL48	23/12/14	1	NW LANTAU
	15/01/15	3	NW LANTAU
NL98	15/01/15	2	NW LANTAU
NL103	29/01/15	2	NW LANTAU
NL104	08/01/15	2	NW LANTAU
NL123	08/01/15	2	NW LANTAU
NL136	02/12/14	1	NW LANTAU
NL145	08/01/15	2	NW LANTAU
	29/01/15	2	NW LANTAU
NL182	15/01/15	1	NW LANTAU
	15/01/15	2	NW LANTAU
NL202	08/01/15	2	NW LANTAU
NL210	29/01/15	2	NW LANTAU
NL214	09/12/14	1	NW LANTAU
NL220	09/12/14	1	NW LANTAU
NL259	15/01/15	3	NW LANTAU
NL261	08/01/15	2	NW LANTAU
NL284	15/01/15	2	NW LANTAU
	29/01/15	2	NW LANTAU
NL285	08/01/15	2	NW LANTAU
NL286	08/01/15	2	NW LANTAU
NL287	29/01/15	1	NW LANTAU
NL306	29/01/15	1	NW LANTAU
	13/02/15	1	NW LANTAU
NL307	09/12/14	1	NW LANTAU
	29/01/15	1	NW LANTAU
WL17	27/01/15	1	NW LANTAU
WL188	29/01/15	2	NW LANTAU
WL231	29/01/15	2	NW LANTAU

Appendix IV. Twenty-four individual dolphins that were identified during December 2014 – February 2015 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL104



NL123



NL136



NL145



Appendix IV. (cont'd)

NL182



NL202



NL210



NL214



Appendix IV. (cont'd)

NL220



NL259



NL261



NL284



Appendix IV. (cont'd)



NL285



NL286



NL287



NL306

Appendix IV. (cont'd)

NL307



WL17



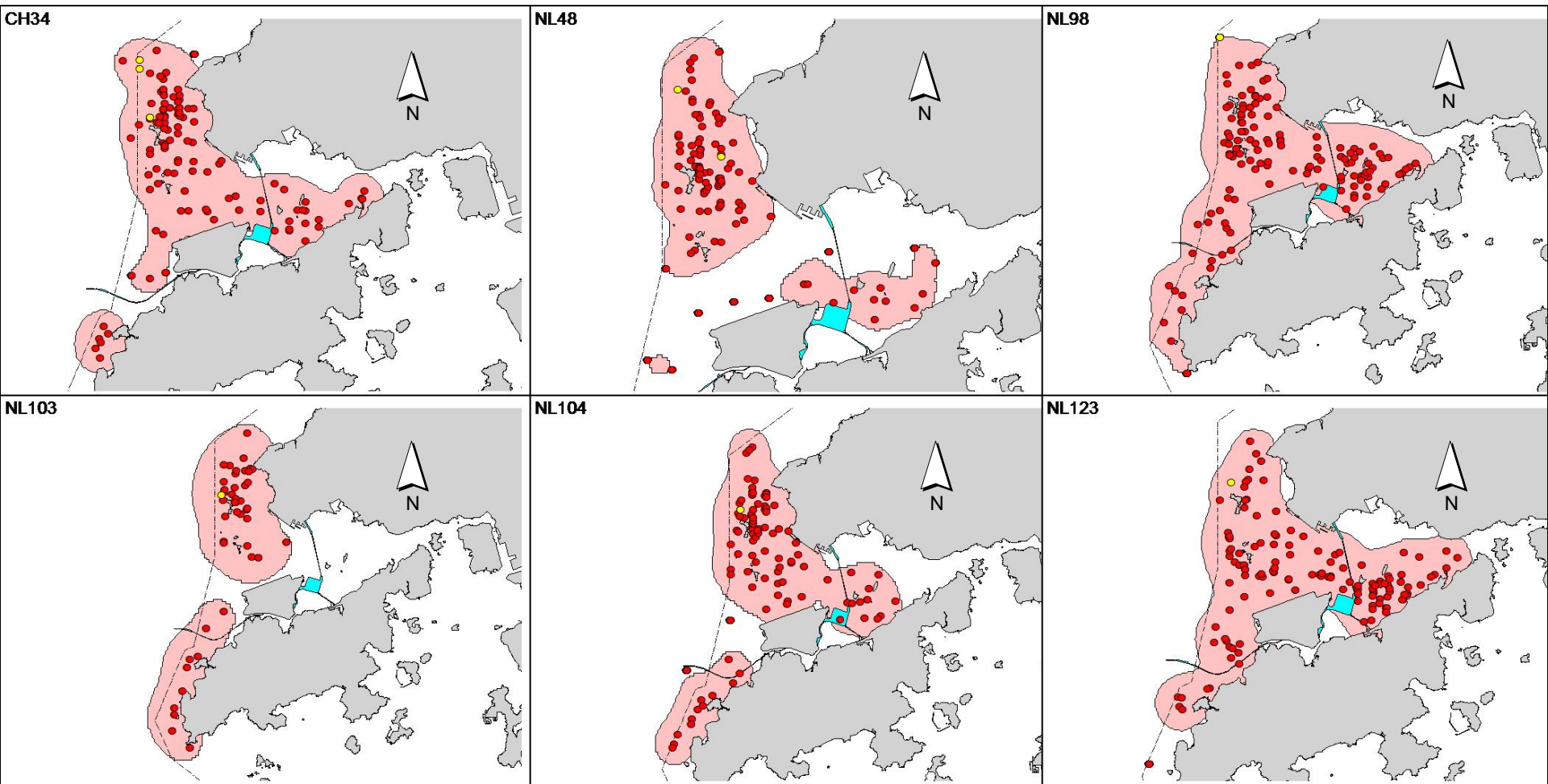
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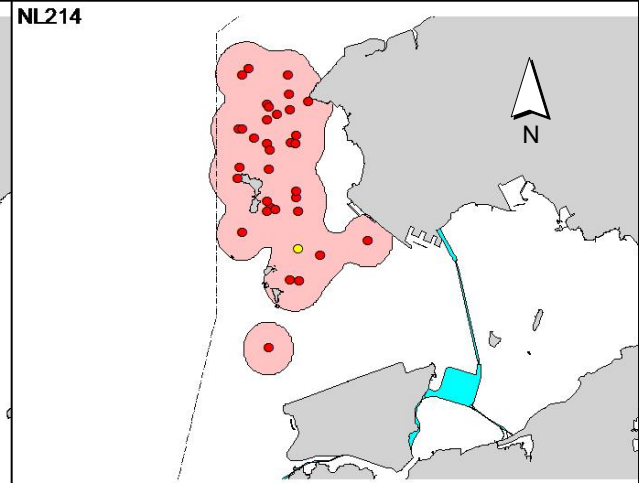
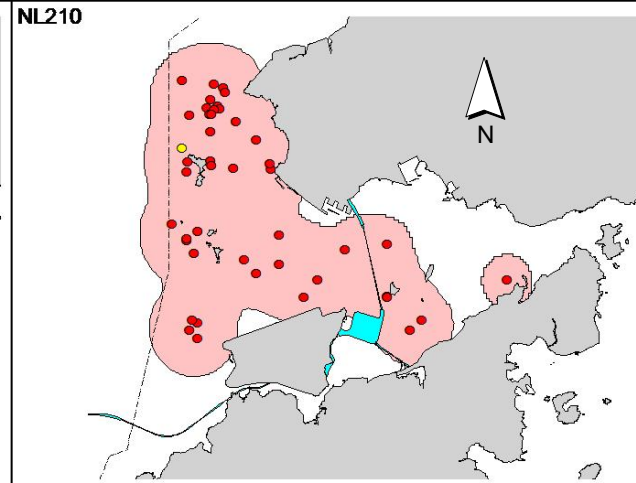
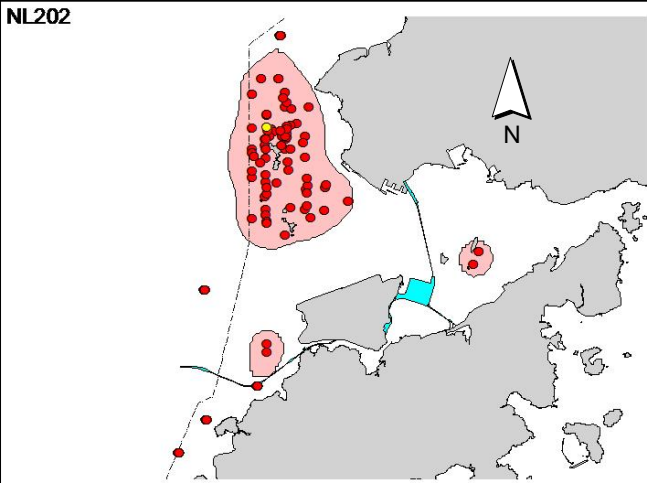
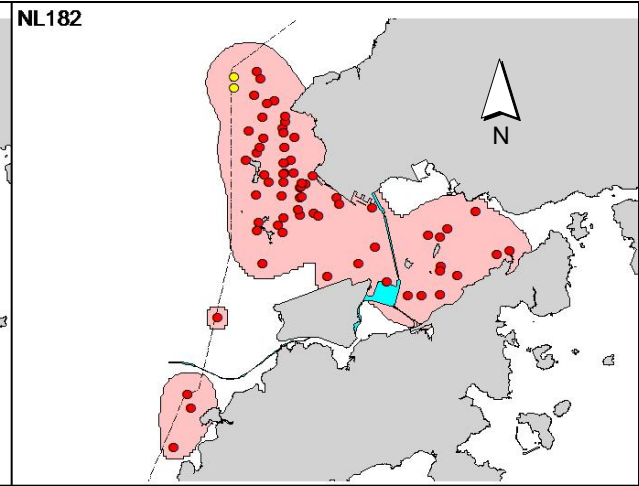
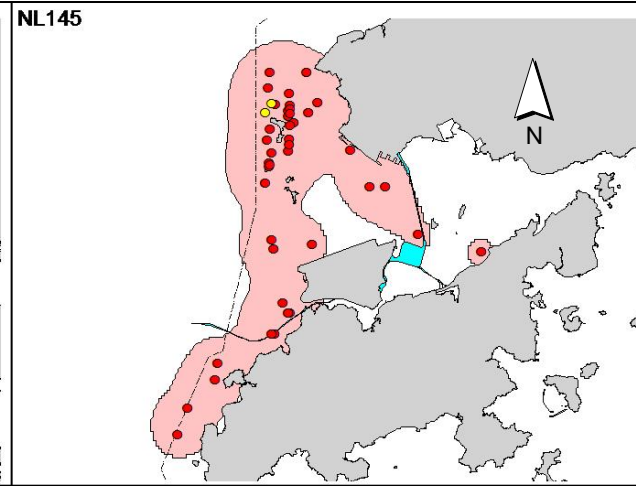
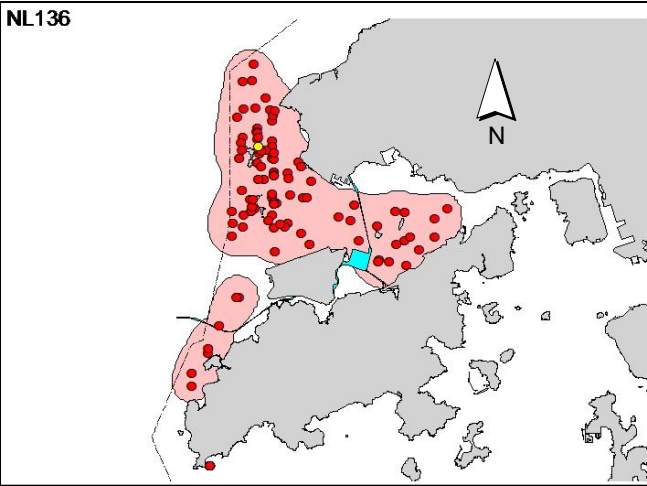
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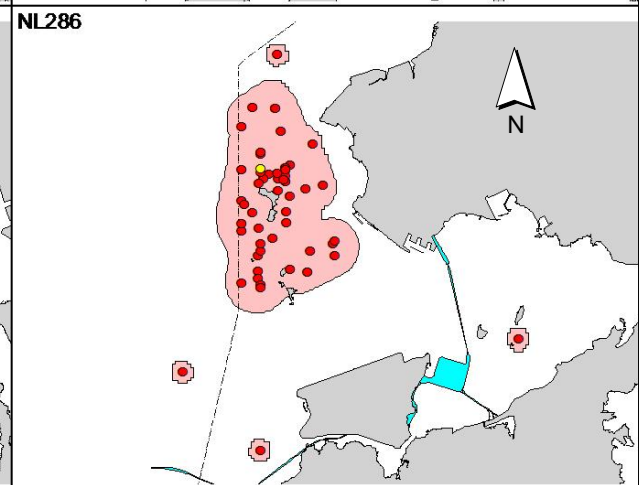
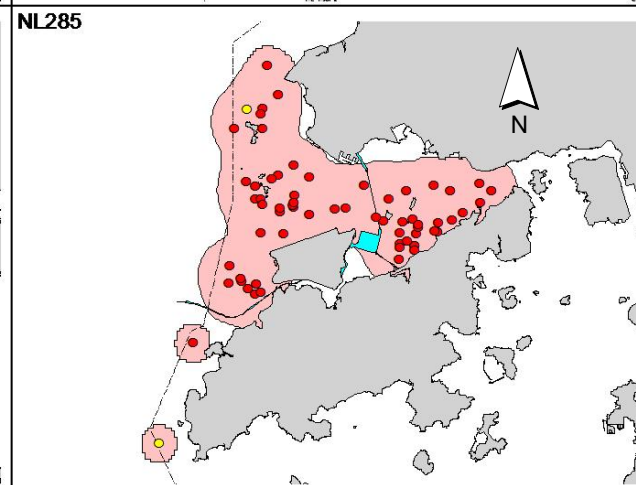
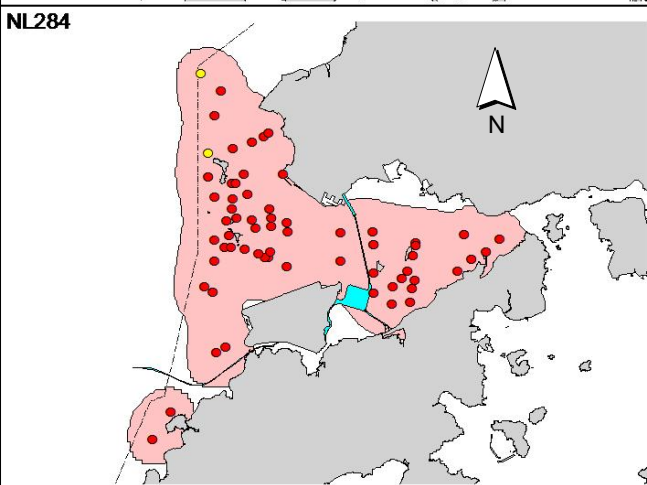
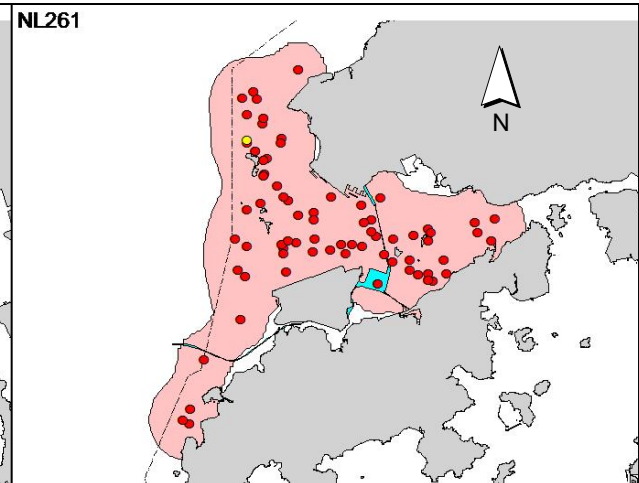
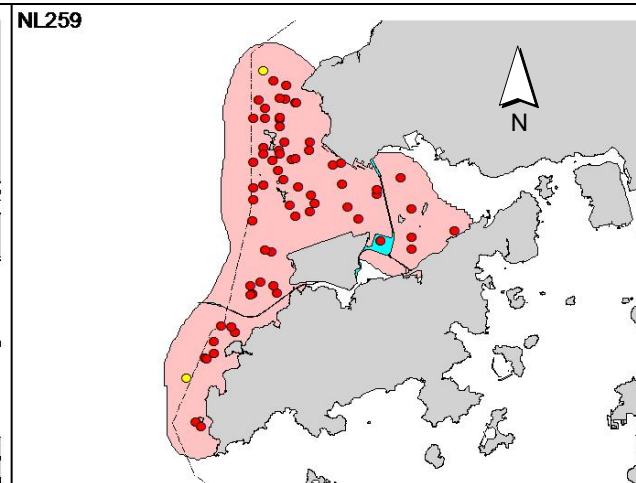
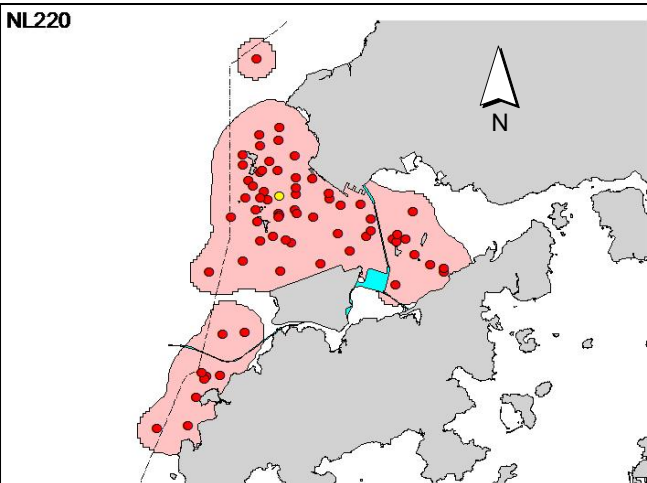
Appendix V. Ranging patterns (95% kernel ranges) of 24 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicates sightings made in December 2014 – February 2015)



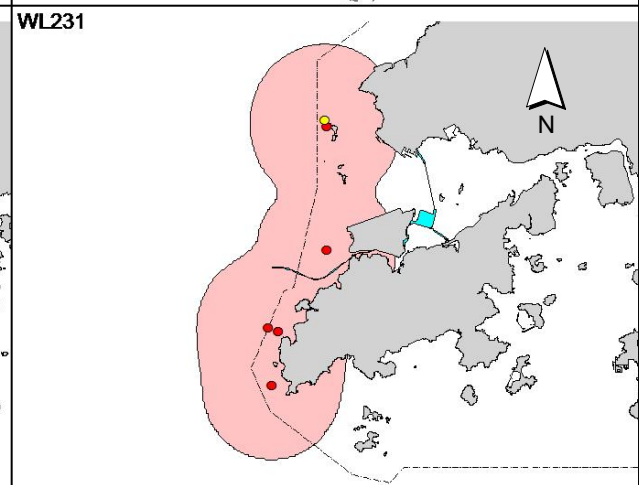
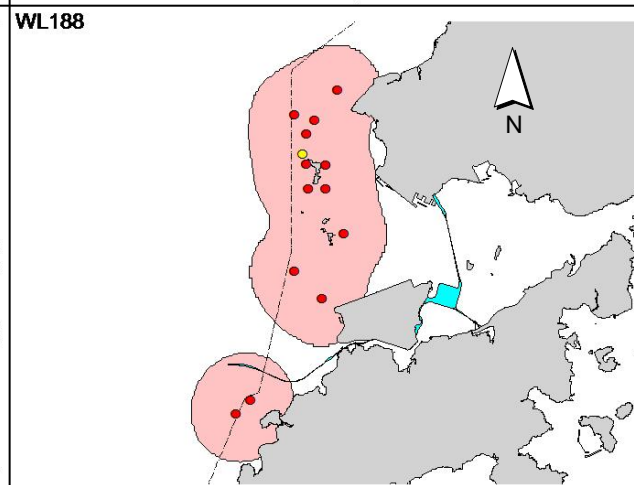
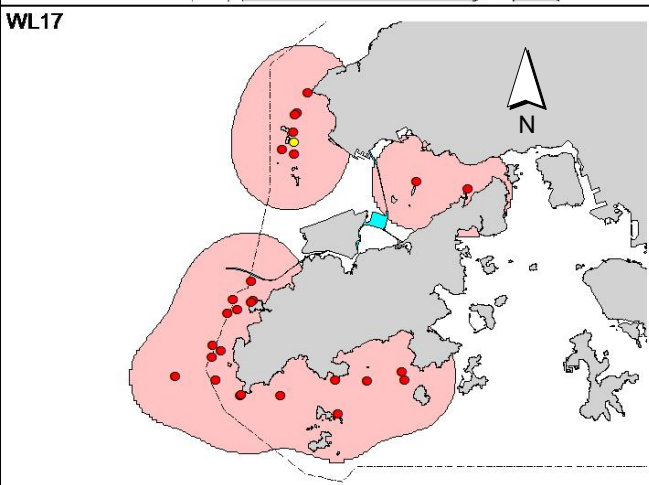
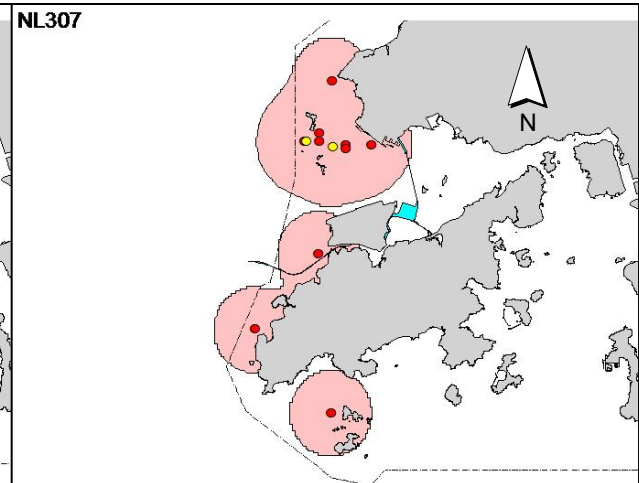
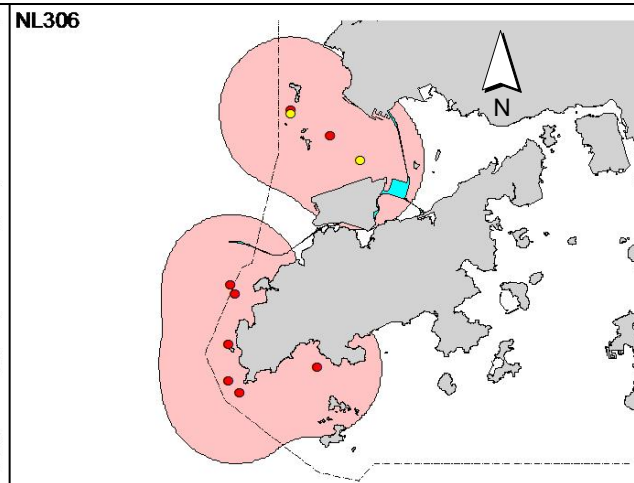
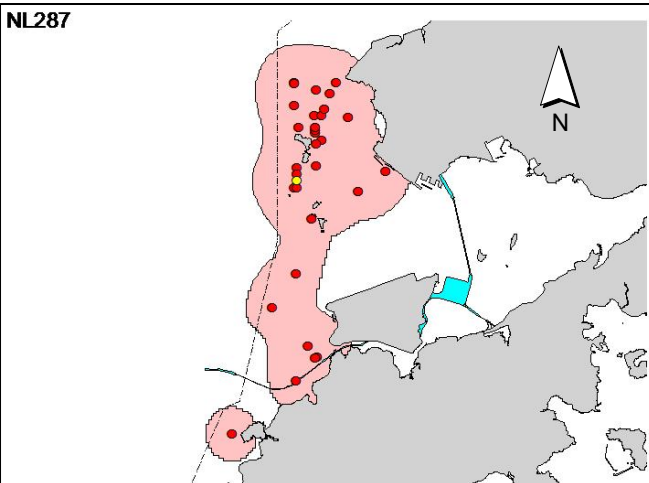
Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix I

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

Action Level	Action			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
Exceedance recorded	<ol style="list-style-type: none"> 1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Action Level, the exceedance is then confirmed. 3. Inform the IEC and the SOR. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Discuss with the IEC and the Contractor on remedial actions required. 7. If exceedance continues, arrange meeting with the IEC and the SOR. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check the Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice 2. Amend working methods if appropriate 3. If the exceedance is confirmed to be Project related, submit proposals for remedial actions to IEC within 3 working days of notification 4. Implement the agreed proposals 5. Amend proposal if appropriate

	Action			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
Limit Level				
Exceedance recorded	<ol style="list-style-type: none"> 1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Limit Level, the exceedance is then confirmed. 3. Inform the IEC, the SOR, the DEP and the Contractor. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 7. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 8. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 9. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. If the exceedance is confirmed to be Project related after investigation, in consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. If the exceedance is confirmed to be Project related after investigation, submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

Note: (a) ET – Environmental Team; IEC – Independent Environmental Checker; SOR – Supervising Officer's Representative

Event & Action Plan for Water Quality

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat <i>in situ</i> measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor and SOR; Check monitoring data, all plant, equipment and Contractor's working methods. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working methods. 	<ol style="list-style-type: none"> Confirm receipt of notification of non-compliance in writing; Notify Contractor. 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor, SOR and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SOR and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Action level; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor on possible remedial actions; Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly; Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Ensure mitigation measures are properly implemented; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> Inform the Supervising Officer and confirm notification of the non-compliance in writing; Rectify unacceptable practice; Check all plant and equipment and consider changes of working methods; Submit proposal of additional mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the

Event	ET Leader	IEC	SOR	Contractor
	<ol style="list-style-type: none"> 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. 	<ol style="list-style-type: none"> 1. Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly. 	<ol style="list-style-type: none"> 1. writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods. 	<ol style="list-style-type: none"> 1. non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR.
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Note: ET – Environmental Team, IEC – Independent Environmental Checker, SOR – Supervising Officer's Representative

Event / Action Plan for Impact Dolphin Monitoring

EVENT	ACTION*			
	ET	IEC	SOR	Contractor
Action Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor. 	<ol style="list-style-type: none"> 1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.
Limit Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, SOR and 	<ol style="list-style-type: none"> 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If SOR is satisfied with the 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and SOR the necessity of additional dolphin monitoring and any other

EVENT	ACTION*			
	ET	IEC	SOR	Contractor
	<p>3. Identify source(s) of impact;</p> <p>4. Inform the IEC, SOR and Contractor of findings;</p> <p>5. Check monitoring data;</p> <p>6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.</p> <p>7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.</p>	<p>Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <p>4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise SOR of the results and findings accordingly.</p> <p>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.</p>	<p>proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, SOR to signify the agreement in writing on such proposals and any other mitigation measures.</p> <p>3. Supervise the implementation of additional monitoring and/or any other mitigation measures.</p>	<p>potential mitigation measures.</p> <p>3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary.</p> <p>4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.</p>

Appendix J

Cumulative Statistics on
Exceedances, Complaints,
Notifications of Summons
and Successful Prosecutions

Table J1 *Cumulative Statistics on Exceedances*

Monitoring Parameters	Action/Limit Level	Total No. recorded in this reporting quarter	Total No. recorded since project commencement
1-Hr TSP	Action	2	30
	Limit	0	2
24-Hr TSP	Action	0	5
	Limit	0	1
Water Quality	Action	0	6
	Limit	0	1
Impact Dolphin Monitoring	Action	0	7
	Limit	1	1

Table J2 *Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions*

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (Dec 2014 to Feb 2015)	0	0	0
Total No. received since project commencement	4	0	0

Email
message

**Environmental
Resources
Management**

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun–Chek Lap
Kok Link–Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Air Quality
Impact Monitoring

Date 12 December 2014

16/F Berkshire House,
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com



ERM

Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_2December2014_1hrTSP_Station ASR5

A total of one Action Level Exceedance was recorded on 2 December 2014.

Regards,

A handwritten signature in black ink, appearing to be 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the addressee and is confidential. If you are not the addressee it may be unlawful for you to read, copy, distribute, disclose or otherwise use the information in this facsimile. If you are not the intended recipient, please telephone or fax us.



ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
 TUEN MUN – CHEK LAP KOK LINK –
 NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_2December2014_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]	
Date	2 December 2014 (Measured) 11 December 2014 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR5 = 340
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR5 = 238
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 ($346 \mu\text{g}/\text{m}^3$) during 1510 - 1610 hrs.	
Works Undertaken (at the time of monitoring event)	On 2 December 2014, Excavation Works for launching shaft were carried out at Reclamation Works Area Portion N-A; Land Bored Piling Works at Reclamation Works Area Portion N-A and Surcharge Set Up at Reclamation Works Area Portions N-B and N-C.	

Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance(s) are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> • Considering the relatively higher levels of 1-hour TSP between 1500 and 1700 hrs at most monitoring stations, it is probably unlikely that the level of land-based construction works under this Contract can cause increase in 1-hour TSP of this magnitude and scale. It is considered that the observed exceedances for 1-hour TSP at ASR5 may represent sporadic event associated with traffic emissions and anthropogenic activities during afternoon rush hour at River Trade Terminal. • According to the construction information provided by the Contractor, the majority of construction works on 2 December 2014 were Excavation Works for launching shaft at Reclamation Works Area Portion N-A; Land Bored Piling Works at Reclamation Works Area Portion N-A and Surcharge Set Up at Reclamation Works Area Portions N-B and N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying by water trucks on exposed soil within the Project site and associated work areas; use of wheel washing facilities; hydro-seeding of area where works have been completed). • Whilst exceedances of Action Level were observed at ASR5, the 24-hr TSP level at the monitoring station (ASR1 = 127 µg/m³) on 2 December 2014 were in compliance with the Action and Limit Levels. • Same level and extent of construction works were carried out at the same works area on 29th November and 5th December whilst no exceedance was recorded. • With reference to the recorded wind direction (ranged between 34° and 65°, blowing from a North-Easterly direction) during the period of the observed 1-hr TSP exceedances, Station ASR5 is located upstream to the land-based construction activities at the Reclamation Works Area, thus the observed exceedance should not be affected by the dust, if any, generated by the construction activities under this Contract. • As stated in the EIA report (Section 4.2.3), the background TSP level of Tuen Mun is higher than the other region of Hong Kong, thus the exceedances may be also contributed cumulatively by the other construction works / traffic within the Tuen Mun Area rather than causing by the construction works of the Project.
Actions Taken / To Be Taken	<p>Based on the record of subsequent weekly site inspection on 3 December 2014, no dust nuisance was recorded at the Reclamation Works Area and activities conducted in this Contract's work has strictly followed the requirements stated in the EP (EP-354/2009/B) (see photo records on <i>Annex A</i>). In addition, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. watering at least 12 times per day on all exposed soil within the Project site and associated work areas; use of wheel washing facilities; hydro-seeding of area where works have been completed) throughout the construction period, no additional mitigation is deemed necessary. The Enhanced TSP Monitoring has commenced on 24 October 2014, the ET will monitor for future trends in exceedances.</p>
Remarks	<p>The monitoring results and the locations of air quality monitoring stations are attached.</p>

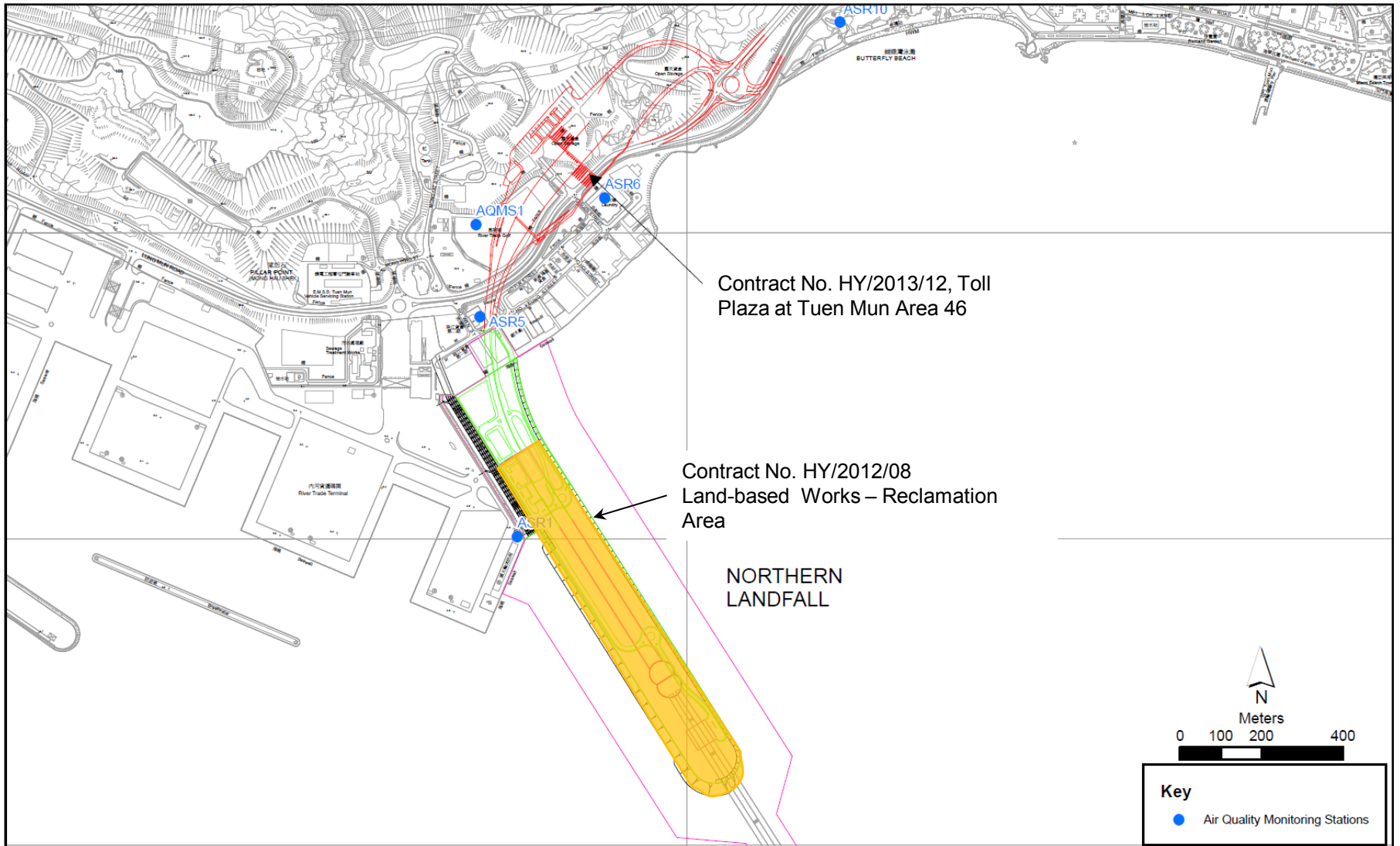


Figure 1

Indicative Construction Works Area on 2 December 2014

Project	Works	Date	Station	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	29-11-2014	ASR10	8:00	1-hour TSP	92	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR10	9:02	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR10	10:04	1-hour TSP	64	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR6	8:12	1-hour TSP	163	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR6	9:14	1-hour TSP	180	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR6	10:16	1-hour TSP	142	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR5	8:23	1-hour TSP	197	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR5	9:25	1-hour TSP	172	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR5	10:27	1-hour TSP	201	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR1	8:34	1-hour TSP	116	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR1	9:36	1-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR1	10:38	1-hour TSP	144	ug/m3
TMCLKL	HY/2012/08	29-11-2014	AQMS1	8:45	1-hour TSP	200	ug/m3
TMCLKL	HY/2012/08	29-11-2014	AQMS1	9:47	1-hour TSP	157	ug/m3
TMCLKL	HY/2012/08	29-11-2014	AQMS1	10:49	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR10	11:06	24-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR6	11:18	24-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR5	11:29	24-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	29-11-2014	ASR1	11:40	24-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	29-11-2014	AQMS1	11:51	24-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR6	12:55	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR6	13:57	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR6	14:59	1-hour TSP	106	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR10	12:43	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR10	13:45	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR10	14:47	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR5	13:06	1-hour TSP	198	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR5	14:08	1-hour TSP	311	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR5	15:10	1-hour TSP	346	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR1	13:17	1-hour TSP	225	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR1	14:19	1-hour TSP	150	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR1	15:21	1-hour TSP	183	ug/m3
TMCLKL	HY/2012/08	02-12-2014	AQMS1	13:29	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	02-12-2014	AQMS1	14:31	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	02-12-2014	AQMS1	15:33	1-hour TSP	124	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR6	16:01	24-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR10	15:49	24-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR5	16:02	24-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	02-12-2014	ASR1	16:23	24-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	02-12-2014	AQMS1	16:35	24-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR1	8:38	1-hour TSP	323	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR1	9:40	1-hour TSP	261	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR1	10:42	1-hour TSP	295	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR5	8:27	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR5	9:29	1-hour TSP	165	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR5	10:31	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR6	8:16	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR6	9:18	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR6	10:20	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR10	8:05	1-hour TSP	65	ug/m3

TMCLKL	HY/2012/08	05-12-2014	ASR10	9:07	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR10	10:09	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	05-12-2014	AQMS1	8:50	1-hour TSP	107	ug/m3
TMCLKL	HY/2012/08	05-12-2014	AQMS1	9:52	1-hour TSP	88	ug/m3
TMCLKL	HY/2012/08	05-12-2014	AQMS1	10:54	1-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR1	11:44	24-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR5	11:33	24-hour TSP	106	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR6	11:22	24-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	05-12-2014	ASR10	11:11	24-hour TSP	59	ug/m3
TMCLKL	HY/2012/08	05-12-2014	AQMS1	11:56	24-hour TSP	86	ug/m3

Meteorological Data for Air Quality Impact Monitoring on 2/12/2014

Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction (degree)
14/12/02	0:00	3.1	45
14/12/02	1:00	2.2	43
14/12/02	2:00	3.1	36
14/12/02	3:00	3.1	32
14/12/02	4:00	3.1	21
14/12/02	5:00	4	24
14/12/02	6:00	4	28
14/12/02	7:00	3.1	25
14/12/02	8:00	3.1	23
14/12/02	9:00	3.6	33
14/12/02	10:00	3.1	32
14/12/02	11:00	2.7	38
14/12/02	12:00	2.2	33
14/12/02	13:00	1.8	19
14/12/02	14:00	1.8	25
14/12/02	15:00	2.2	34
14/12/02	16:00	1.8	62
14/12/02	17:00	2.2	65
14/12/02	18:00	2.2	68
14/12/02	19:00	2.2	61
14/12/02	20:00	2.2	54
14/12/02	21:00	2.2	39
14/12/02	22:00	2.2	51
14/12/02	23:00	2.7	57
14/12/03	0:00	2.7	30
14/12/03	1:00	2.2	55
14/12/03	2:00	2.2	50
14/12/03	3:00	1.8	64
14/12/03	4:00	1.3	27
14/12/03	5:00	1.3	51
14/12/03	6:00	0.9	32
14/12/03	7:00	0.9	44
14/12/03	8:00	1.3	47
14/12/03	9:00	1.3	58
14/12/03	10:00	1.3	62
14/12/03	11:00	1.3	27
14/12/03	12:00	1.8	116
14/12/03	13:00	2.2	124
14/12/03	14:00	1.3	113
14/12/03	15:00	1.3	103
14/12/03	16:00	0.9	127
14/12/03	17:00	1.3	140
14/12/03	18:00	0.4	122



Annex A Photo Records taken during Weekly Site Inspection

*Note: Photos taken on 3/12/2014



Hydro-seeding of area where works have been completed. (Reclamation Works Area)

Email
message

**Environmental
Resources
Management**

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun-Chek Lap
Kok Link-Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Air Quality
Impact Monitoring

Date 29 December 2014

16/F Berkshire House,
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com



ERM

Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_17December2014_1hrTSP_Station AQMS1

A total of one Action Level Exceedance was recorded on 17 December 2014.

Regards,

A handwritten signature in black ink, appearing to be 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

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ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
 TUEN MUN – CHEK LAP KOK LINK –
 NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	0212330_17December2014_1hrTSP_Station AQMS1 [Total No. of Exceedances = 1]	
Date	17 December 2014 (Measured) 24 December 2014 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	AQMS1 = 335
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	AQMS1 = 213
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at AQMS1 ($348 \mu\text{g}/\text{m}^3$) during 1444 - 1544 hrs.	
Works Undertaken (at the time of monitoring event)	On 17 December 2014, Land Bored Piling Works were carried out at Reclamation Works Area Portion N-A and Surcharge Set Up at Reclamation Works Area Portions N-B and N-C.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance(s) are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> According to the construction information provided by the Contractor, the majority of construction works on 17 December 2014 were Land Bored Piling Works at Reclamation Works Area Portion N-A and Surcharge Set Up at Reclamation Works Area Portions N-B and N-C. During the period of the land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. water spraying by water trucks on exposed soil within the Project site and associated work areas; use of wheel washing facilities; hydro-seeding of area where works have been completed). Whilst exceedances of Action Level were observed at AQMS1, the 24-hr TSP level at the monitoring station (AQMS1 = $155 \mu\text{g}/\text{m}^3$) on 17 December 2014 were in compliance with the Action and Limit Levels. Same level and extent of construction works were carried out at the same works area on 14th December and 20th December whilst no exceedance was recorded. It is thus considered that the observed exceedances for 1-hour TSP at AQMS1 may represent sporadic event associated with traffic emissions and anthropogenic activities during afternoon rush hour at Lung Mun Road. With reference to the recorded wind direction (ranged between 44° and 60°, blowing from a North-Easterly direction) and wind speed (ranged from 2.7 to 5.4 m/s) during the period of the observed 1-hr TSP exceedances, Station AQMS1 is located upstream to the land-based construction activities at the Reclamation Works Area, thus the observed exceedance should not be affected by the dust, if any, generated by the construction activities under this Contract. As stated in the EIA report (Section 4.2.3), the background TSP level of Tuen Mun is higher than the other region of Hong Kong, thus the exceedances may be also contributed cumulatively by the other construction works / traffic within the Tuen Mun Area rather than causing by the construction works of the Project. 	

Actions Taken/ To Be Taken	Based on the record of weekly site inspection on 17 December 2014, no dust nuisance was recorded at the Reclamation Works Area and activities conducted in this Contract's work has strictly followed the requirements stated in the EP (EP-354/2009/C) (see photo records on <i>Annex A</i>). In addition, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual (e.g. use of water truck on exposed soil within the Project site and associated work areas; use of wheel washing facilities; hydro-seeding of area where works have been completed) throughout the construction period, no additional mitigation is deemed necessary. The Enhanced TSP Monitoring has commenced on 24 October 2014, the ET will monitor for future trends in exceedances.
Remarks	The monitoring results and the locations of air quality monitoring stations are attached.

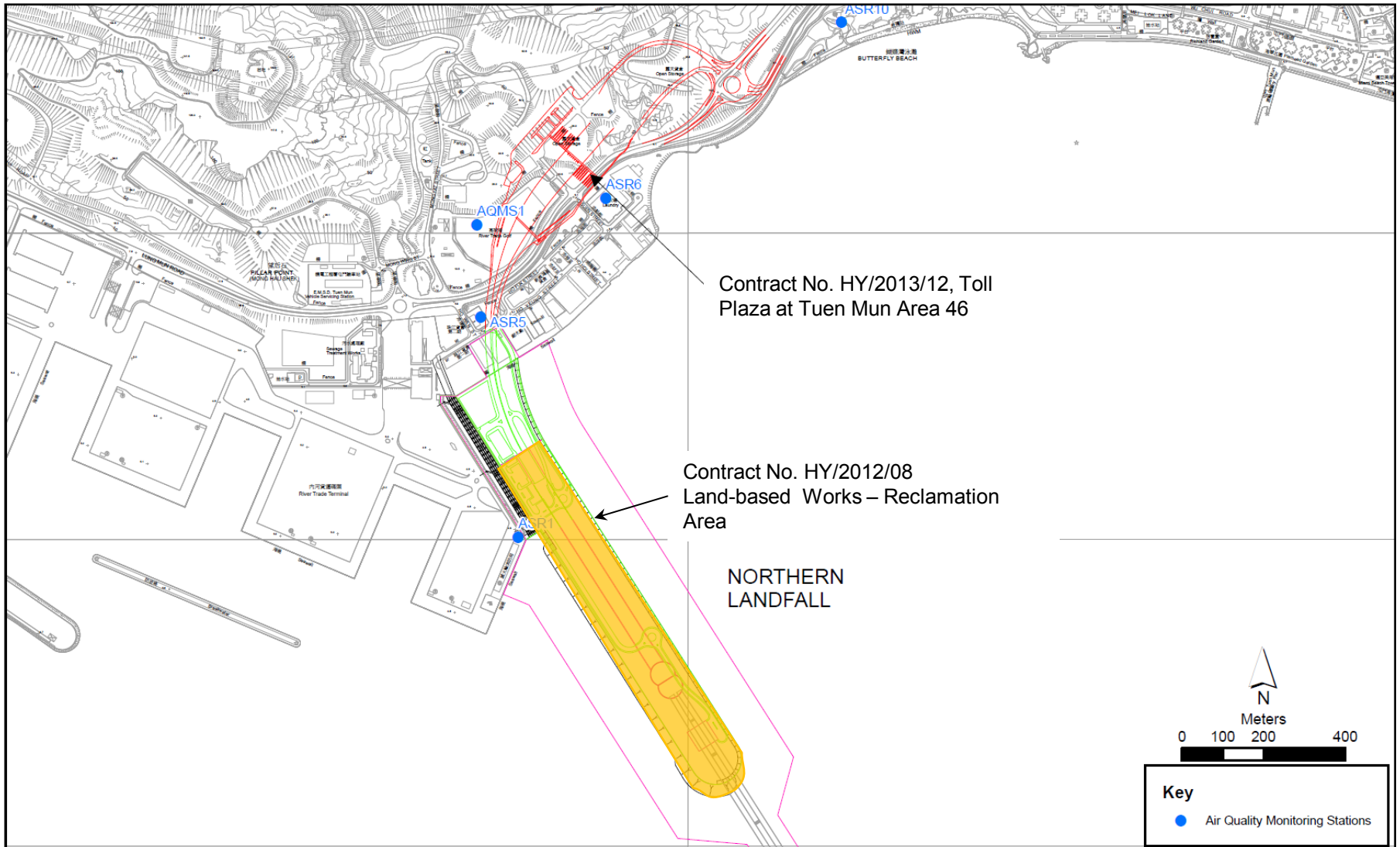


Figure 1

Indicative Construction Works Area on 17 December 2014

Project	Works	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2014-12-14	AQMS1	Sunny	08:45	1-hour TSP	183	ug/m3
TMCLKL	HY/2012/08	2014-12-14	AQMS1	Sunny	09:47	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2014-12-14	AQMS1	Sunny	10:49	1-hour TSP	126	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR1	Sunny	08:34	1-hour TSP	329	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR1	Sunny	09:36	1-hour TSP	223	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR1	Sunny	10:38	1-hour TSP	190	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR5	Sunny	08:23	1-hour TSP	273	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR5	Sunny	09:25	1-hour TSP	158	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR5	Sunny	10:27	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR6	Sunny	08:12	1-hour TSP	177	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR6	Sunny	09:14	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR6	Sunny	10:16	1-hour TSP	126	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR10	Sunny	08:00	1-hour TSP	151	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR10	Sunny	09:02	1-hour TSP	124	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR10	Sunny	10:04	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR10	Sunny	12:57	1-hour TSP	218	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR10	Sunny	13:59	1-hour TSP	245	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR10	Sunny	15:01	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR6	Sunny	13:09	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR6	Sunny	14:11	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR6	Sunny	15:13	1-hour TSP	181	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR5	Sunny	13:20	1-hour TSP	207	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR5	Sunny	14:22	1-hour TSP	212	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR5	Sunny	15:24	1-hour TSP	232	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR1	Sunny	13:30	1-hour TSP	298	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR1	Sunny	14:32	1-hour TSP	298	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR1	Sunny	15:34	1-hour TSP	233	ug/m3
TMCLKL	HY/2012/08	2014-12-17	AQMS1	Sunny	13:42	1-hour TSP	325	ug/m3
TMCLKL	HY/2012/08	2014-12-17	AQMS1	Sunny	14:44	1-hour TSP	348	ug/m3
TMCLKL	HY/2012/08	2014-12-17	AQMS1	Sunny	15:46	1-hour TSP	333	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR10	Sunny	08:00	1-hour TSP	124	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR10	Sunny	09:02	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR10	Sunny	10:04	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR6	Sunny	08:10	1-hour TSP	159	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR6	Sunny	09:12	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR6	Sunny	10:14	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR5	Sunny	08:23	1-hour TSP	272	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR5	Sunny	09:25	1-hour TSP	238	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR5	Sunny	10:27	1-hour TSP	212	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR1	Sunny	08:33	1-hour TSP	238	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR1	Sunny	09:35	1-hour TSP	219	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR1	Sunny	10:37	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	2014-12-20	AQMS1	Sunny	08:45	1-hour TSP	184	ug/m3
TMCLKL	HY/2012/08	2014-12-20	AQMS1	Sunny	09:47	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2014-12-20	AQMS1	Sunny	10:49	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2014-12-14	AQMS1	Sunny	11:51	24-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR1	Sunny	11:40	24-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR5	Sunny	11:29	24-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR6	Sunny	11:18	24-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2014-12-14	ASR10	Sunny	11:06	24-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR10	Sunny	16:03	24-hour TSP	82	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR6	Sunny	16:15	24-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR5	Sunny	16:26	24-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	2014-12-17	ASR1	Sunny	16:36	24-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	2014-12-17	AQMS1	Sunny	16:48	24-hour TSP	155	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2014-12-20	ASR10	Sunny	11:06	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR6	Sunny	11:16	24-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR5	Sunny	11:29	24-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2014-12-20	ASR1	Sunny	11:39	24-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2014-12-20	AQMS1	Sunny	11:51	24-hour TSP	92	ug/m3

Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction (degree)
14/12/17	0:00	4.5	48
14/12/17	1:00	5.4	45
14/12/17	2:00	4.9	41
14/12/17	3:00	5.4	42
14/12/17	4:00	5.8	50
14/12/17	5:00	4.9	15
14/12/17	6:00	5.8	19
14/12/17	7:00	4.9	20
14/12/17	8:00	5.8	25
14/12/17	9:00	6.3	36
14/12/17	10:00	6.7	51
14/12/17	11:00	5.4	44
14/12/17	12:00	4	48
14/12/17	13:00	3.1	52
14/12/17	14:00	3.1	59
14/12/17	15:00	2.7	56
14/12/17	16:00	2.7	60
14/12/17	17:00	2.2	47
14/12/17	18:00	1.8	13
14/12/17	19:00	0	53
14/12/17	20:00	0.9	5
14/12/17	21:00	1.3	11
14/12/17	22:00	1.3	14
14/12/17	23:00	4	37



Annex A Photo Records taken during Weekly Site Inspection

*Note: Photos taken on 17/12/2014



Hydro-seeding of area where works have been completed. (Reclamation Works Area)



Use of water truck on exposed soil within the Project site and associated work areas. (Reclamation Works Area)

Email
message

**Environmental
Resources
Management**

To ENVIRON - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun–Chek Lap
Kok Link–Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Impact Dolphin
Monitoring

Date 3 July 2015

16/F Berkshire House,
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com



ERM

Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_Dec2014/Feb2015_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between December 2014 and February 2015.

Regards,

A handwritten signature in black ink, appearing to be 'Jovy Tam'.

Mr Jovy Tam
Environmental Team Leader

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ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08

TUEN MUN – CHEK LAP KOK LINK –
NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Impact Dolphin Monitoring
Notification of Exceedance

Log No.	0212330_Dec2014/Feb2015_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedances = 1 Limit Level Exceedance]	
Date	December 2014 to February 2015 (monitored) 2 April 2015 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0 & ANI = 0
	NWL	STG = 2.9 & ANI = 11.3
	One Limit Level Exceedance is recorded in the quarterly impact dolphin monitoring at NEL and NWL between December 2014 and February 2015. The exceedance was reported in the approved <i>Sixteenth Monthly EM&A Report</i> dated 12 March 2015.	
Statistical Analyses	<p>Further to the review of the available and relevant dolphin monitoring data in the EM&A programme under this Contract, statistical analyses were conducted as follows:</p> <ul style="list-style-type: none"> A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present quarter, December 2014 to February 2015) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the averages encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0059$) and in ANI ($p = 0.0330$) between Period were detected. A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters*, December 2012 to February 2015) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the averages encounter rates between the baseline and cumulative impact monitoring quarters. By setting $\alpha = 0.01$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0009$) and in ANI ($p = 0.0003$) between Cumulative Period and Location were detected. <p>*Note: The commencement date under <i>Contract No. HY/2012/08</i> is 1 November 2013.</p>	
Works Undertaken (in the monitoring quarter)	<p>In the quarter between December 2014 and February 2015, the major marine works under <i>Contract No. HY/2012/08</i> included:</p> <ul style="list-style-type: none"> Phase-I reclamation was completed on 8 December 2014. Rock bund deposition for marine sheet piling remedial works at Marine Works Area – Portion N-A 	

Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance is considered not caused by the Project, in view of the following:</p> <ul style="list-style-type: none"> • The <i>Monitoring of Marine Mammals in Hong Kong Waters (2013 – 14)</i> ⁽¹⁾ reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this project), which is likely a contributing factor for the decrease in dolphin abundances in NEL. • As per the findings from the EIA report (Section 8.11.9), the major influences on the Chinese White Dolphin (CWD) are marine traffics, dredging works and reclamation/filling works. The Contractor has implemented the marine traffic control as per the requirements in the EP-354/2009/C and the updated EM&A Manual. Filling works were undertaken within 200m leading seawall throughout the filling period and the working rate described in the EP and the approved EIA Report were strictly followed. On 8 December 2014, Phase-I reclamation was completed. No dredging or marine sheet piling works were carried out during the monitoring quarter. During this quarter of dolphin monitoring, no unacceptable impact on CWD due to the activities under this Contract was observed. • According to the findings of the approved EIA report (Section 8.11.9), filling works are expected to increase the level of suspended solids (SS) in the vicinity waters of the project, which would lead to indirect loss of prey availability and increase in level of bioaccumulative contaminants in CWD. According to the findings in the quarterly water monitoring results between December 2014 and February 2015, the impact mean level of SS (Mid-ebb: 7.5 mg/L; Mid-flood: 7.4 mg/L) in this quarter is below of the baseline mean level of SS (Mid-ebb: 10.0 mg/L; Mid-flood: 10.3 mg/L). This would imply that no unacceptable impact on SS levels was associated with the marine works under this Contract, and thus no indirect impacts on marine habitat quality due to change in water quality is observed in this Contract.
Actions Taken/ To Be Taken	<p>With reference to the site inspection records in this quarter, the respective marine ecological mitigation measures (including 250 m dolphin exclusion zone, passive acoustic monitoring, underwater acoustic decoupling plan and marine traffic control) have been implemented properly by the Contractor throughout the marine works period. No immediate additional action is considered necessary. The ET will monitor for future trends in exceedance(s).</p> <p>A meeting was held on 27 April 2015 with attendance of ENPO, Resident Site Staff (RSS), Environmental Team (ET) and dolphin specialist for Contract No. HY/2010/02, RSS, ET, dolphin specialist and main Contractor for Contract No. HY/2011/03. The discussion/recommendation as recorded in the minutes of the meeting, which might be relevant to this Contract are summarized below. It was concluded that the HZMB works is one of the contributing factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB works as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors. It was reminded that the ETs shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractor to ensure the relevant measures were fully implemented. It was recommended that the marine works of HZMB projects should be completed as soon as possible so as to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible.</p>
Remarks	<p>The results of impact water quality and impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved <i>Fourteenth to Sixteenth EM&A Monthly Reports</i>.</p>

(1) Hung SKY (2014). Prepared for AFCD. Available from: http://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/con_mar_chi_chi.html

Appendix K

Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No. / Works Order No.: HY/2012/08

Monthly Summary Waste Flow Table for December 2014 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
2013 Sub-total	3.718	0.000	0.000	0.000	3.718
Jan-2014	9.012	0.000	0.000	0.000	9.012
Feb-2014	0.000	0.000	0.000	0.000	0.000
Mar-2014	0.105	0.000	0.000	0.000	0.105
Apr-2014	0.022	0.000	0.000	0.000	0.022
May-2014	1.016	0.000	0.000	0.000	1.016
Jun-2014	4.393	0.000	0.000	0.000	4.393
Half Year Sub-total	14.548	0.000	0.000	0.000	14.548
Jul-2014	14.405	0.000	0.000	0.000	14.405
Aug-2014	12.728	0.000	0.000	0.000	12.728
Sep-2014	6.843	0.000	0.000	0.000	6.843
Oct-2014	1.228	0.000	0.000	0.000	1.228
Nov-2014	0.595	0.000	0.000	0.000	0.595
Dec-2014	10.151	0.000	0.000	0.000	10.151
Project Total Quantities	64.216	0.000	0.000	0.000	64.216

Month	Monthly Construction & Demolition Material Movements (Import Fill Materials & Marine Mud Disposal)							
	Imported Fill to WA 23 & Reclamation Area (Rockfill 400)	Imported Fill to WA 23 & Reclamation Area (Rockfill 200)	Imported Fill to WA 23 & Reclamation Area (Rockfill Type A)	Imported Fill to Reclamation Area (Public Fill) (by Barge)	* Imported Fill to Reclamation Area (Public Fill)(From Rambler Channel) (by Truck)	* Imported Fill to Reclamation Area (From RTT Barging Point) (by Truck)	Marine Disposal (Cat. L)	Marine Disposal (Cat. M _P & M _F)
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 m ³)	(in '000 m ³)
2013 Sub-total	211.541	2.508	19.460	0.000	0.000	45.472	61.600	18.200
Jan-2014	177.300	4.050	8.544	0.000	0.000	124.412	34.000	12.500
Feb-2014	143.891	27.825	5.371	0.000	0.000	81.296	18.500	24.500
Mar-2014	257.304	53.388	27.958	113.789	0.000	63.961	37.300	40.450
Apr-2014	198.245	10.186	41.702	191.094	0.000	26.640	28.600	15.400
May-2014	236.816	4.612	65.308	150.749	43.718	15.165	18.700	29.150
Jun-2014	233.430	2.856	37.103	108.667	25.433	0.000	40.700	7.700
Half Year Sub-total	1246.986	102.917	185.986	564.299	69.151	311.474	177.800	129.700
Jul-2014	177.859	0.000	65.758	161.817	22.958	0.000	37.950	7.150
Aug-2014	174.710	23.110	33.127	351.703	40.379	0.000	12.100	0.000
Sep-2014	124.251	28.994	23.424	476.618	22.932	0.000	0.000	0.000
Oct-2014	22.217	22.729	17.547	481.962	0.000	0.000	0.000	0.000
Nov-2014	25.889	22.640	16.268	175.370	0.000	0.000	2.320	0.000
Dec-2014	23.498	2.830	1.431	80.520	0.000	0.000	0.000	0.000
Project Total Quantities	2006.951	205.728	363.001	2292.289	155.420	356.946	291.770	155.050

• Fields under review. These are good imported purchased material, not wastes generated from the site.

Month	Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
2013 Sub-total	0.000	0.000	0.380	0.380	0.000	0.000	0.000	0.000	0.172
Jan-2014	0.000	0.000	0.130	0.130	0.000	0.000	0.000	0.000	0.045
Feb-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.020	0.020	0.028
Mar-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.036
Apr-2014	0.000	0.000	0.160	0.160	0.000	0.000	0.000	0.000	0.026
May-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.042
Jun-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.030	0.030	0.030
Half Year Sub-total	0.000	0.000	0.290	0.290	0.000	0.000	0.050	0.050	0.207
Jul-2014	0.000	0.000	0.300	0.300	0.000	0.000	0.000	0.000	0.033
Aug-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.022
Sep-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.039
Oct-2014	0.000	0.000	0.080	0.080	0.000	0.000	0.060	0.060	0.033
Nov-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.050
Dec-2014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.049
Project Total Quantities	0.000	0.000	1.050	1.050	0.000	0.000	0.110	0.110	0.605

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*							
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill	Imported Fill	Marine Disposal (Cat. L)	Marine Disposal (Cat. M)
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 m ³)	(in '000 m ³)
5.000	0.000	0.000	0.000	5.000	180.000	5.000	40.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
0.000	0.050	0.000	0.000	0.100

- Notes:
- (1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
 - (2) The waste flow table shall also include C&D materials 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 amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).

Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No. / Works Order No.: HY/2012/08

Monthly Summary Waste Flow Table for February 2015 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	64.216	0.000	0.000	0.000	64.216
Jan-2015	30.877	0.000	0.000	0.000	30.877
Feb-2015	4.152	0.000	0.000	0.000	4.152
Mar-2015					
Apr-2015					
May-2015					
Jun-2015					
Half Year Sub-total					
Jul-2015					
Aug-2015					
Sep-2015					
Oct-2015					
Nov-2015					
Dec-2015					
Project Total Quantities	99.245	0.000	0.000	0.000	99.245

Month	Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	0.000	0.000	1.050	1.050	0.000	0.000	0.110	0.110	0.605
Jan-2015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.080
Feb-2015	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.074
Mar-2015									
Apr-2015									
May-2015									
Jun-2015									
Half Year Sub-total									
Jul-2015									
Aug-2015									
Sep-2015									
Oct-2015									
Nov-2015									
Dec-2015									
Project Total Quantities	0.000	0.000	1.050	1.050	0.000	0.000	0.110	0.110	0.759

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*							
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill	Imported Fill	Marine Disposal (Cat. L)	Marine Disposal (Cat. M)
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 m ³)	(in '000 m ³)
5.000	0.000	0.000	0.000	5.000	180.000	5.000	40.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
0.000	0.050	0.000	0.000	0.100

- Notes:
- (1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
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