

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

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

23 June 2015

Environmental Resources Management
16/F, Berkshire House
25 Westlands Road
Quarry Bay, Hong Kong
Telephone 2271 3000
Facsimile 2723 5660

www.erm.com

Ref.: HYDHZMBEEM00_0_3097L.15

29 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**

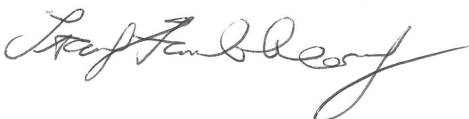
**Contract No. HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel
Section
Fourth Quarterly EM&A Report**

Reference is made to the Fourth Quarterly Environmental Monitoring and Audit (EM&A) Report (for Sep - Nov 2014) certified by the ET Leader (ET's ref.: "0212330_4th Quarterly EM&A_20150123.doc" dated 23 Jun 2015) and provided to us via email on 24 June 2015.

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

Please do contact the undersigned or the ENPO Leader Mr. Y. H. Hui should you have any queries.

Yours sincerely,
For and on behalf of
Ramboll Environ Hong Kong Limited



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

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\HYDHZMBEEM00_0_3097L.15.doc







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

**Environmental Resources
Management**

16/F, Berkshire House
25 Westlands Road
Quarry Bay, Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
E-mail: post.hk@erm.com
http://www.erm.com

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

Document Code: 0212330_4th Quarterly EM&A_20150123.doc

Client: DBJV		Project No: 0212330			
Summary: This document presents the Fourth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 23 June 2015			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	4 th Quarterly EM&A Report	VAR	JT	CAR	23/06/15
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>			
		 			

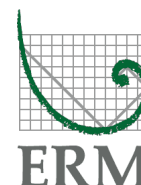


TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>I</i>
1	<i>INTRODUCTION</i>	<i>1</i>
1.1	<i>BACKGROUND</i>	<i>1</i>
1.2	<i>SCOPE OF REPORT</i>	<i>2</i>
1.3	<i>ORGANIZATION STRUCTURE</i>	<i>2</i>
1.4	<i>SUMMARY OF CONSTRUCTION WORKS</i>	<i>2</i>
2	<i>EM&A RESULTS</i>	<i>5</i>
2.1	<i>AIR QUALITY</i>	<i>5</i>
2.2	<i>WATER QUALITY MONITORING</i>	<i>8</i>
2.3	<i>DOLPHIN MONITORING</i>	<i>9</i>
2.4	<i>POST TRANSLOCATION CORAL MONITORING</i>	<i>14</i>
2.5	<i>EM&A SITE INSPECTION</i>	<i>15</i>
2.6	<i>WASTE MANAGEMENT STATUS</i>	<i>17</i>
2.7	<i>ENVIRONMENTAL LICENSES AND PERMITS</i>	<i>18</i>
2.8	<i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>	<i>20</i>
2.9	<i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i>	<i>20</i>
2.10	<i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>	<i>23</i>
3	<i>FUTURE KEY ISSUES</i>	<i>24</i>
3.1	<i>CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER</i>	<i>24</i>
3.2	<i>KEY ISSUES FOR THE COMING QUARTER</i>	<i>24</i>
3.3	<i>MONITORING SCHEDULE FOR THE COMING QUARTER</i>	<i>24</i>
4	<i>CONCLUSIONS</i>	<i>25</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). Another application for variation of environmental permit (VEP) (*EP-354/2009/B*) was granted on 28 January 2014.

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 Fourth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 September 2014 to 30 November 2014 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;
- Construction of Vertical Seawall and Sloping Seawall at Portion N-C;
- Marine Sheet Piling for Box Culvert extension at Portion N-A;
- Box Culvert extension – Backfilling and Tie Rod Installation at Portion N-A; and,
- Pre-drilling for Box Culvert Foundation at Portion N-A.

Land-based Works

- Excavation for North Launching Shaft – Reclamation Works Area – Portion N-A;
- Vibro-Compaction at Reclamation Works Area - Portion N-B;
- Land Bored Piling Works at Reclamation Works Area - Portion N-A;
- Surcharge set up at Reclamation Works Area – Portion N-C;
- Construction of temporary access at Reclamation Works Area – Portion N-A; and,
- Diaphragm Wall Construction at Reclamation Works Area – Portion N-A.

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

24-hour TSP Monitoring	23 sessions
1-hour TSP Monitoring	23 sessions
Impact Water Quality Monitoring	39 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	13 sessions
Post Translocation Coral Monitoring	1 session

Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was in effect during the period of dredging, reclamation or marine sheet piling works in open waters under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when dredging, reclamation or marine sheet piling works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring.

On 10 November 2014, night time marine works for first phase was completed. On 20 November 2014, seawall (+2.5mPD) at Northern Landfall has been fully enclosed and marine sheet pile has also been completed. There would be no dredging, reclamation or marine sheet piling works in open waters at this stage. Thus, PAM and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were discontinued from 10 November 2014 and 20 November 2014 respectively.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

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

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 two Action Level exceedances were observed for the quarterly dolphin monitoring data between September 2014 and November 2014, 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 exceedances are considered to be the natural variation of Chinese White Dolphin ranging pattern.

Post Translocation Coral Monitoring

The Fourth quarterly Coral Post-Translocation Monitoring was conducted on 23 October 2014 and the results were provided in the Fourth Quarterly Post-Translocation Coral Monitoring Report. No exceedances were recorded from the fourth quarterly coral post-translocation monitoring in this reporting period.

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.

Three potential environmental complaint cases were referred by EPD on 29 October 2014 and 12 November 2014. The interim reports were submitted to EPD on 6 November 2014 and 21 November 2014, respectively. The investigation findings showed that the cases were considered not related to the works under this Contract and is thus invalid.

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

- Land Bored Piling Works at Reclamation Works Area - Portion N-A;
- Construction of temporary access at Reclamation Works Area - Portion N-A;
- Surcharge set up at Reclamation Works Area - Portion N-C;
- Box Culvert Foundation at Reclamation Works Area - Portion N-A;
- Bored Piling Works at Works Area - N6;
- Diaphragm Wall Construction at Reclamation Works Area - Portion N-A; and,
- Excavation for North Launching Shaft at Reclamation 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

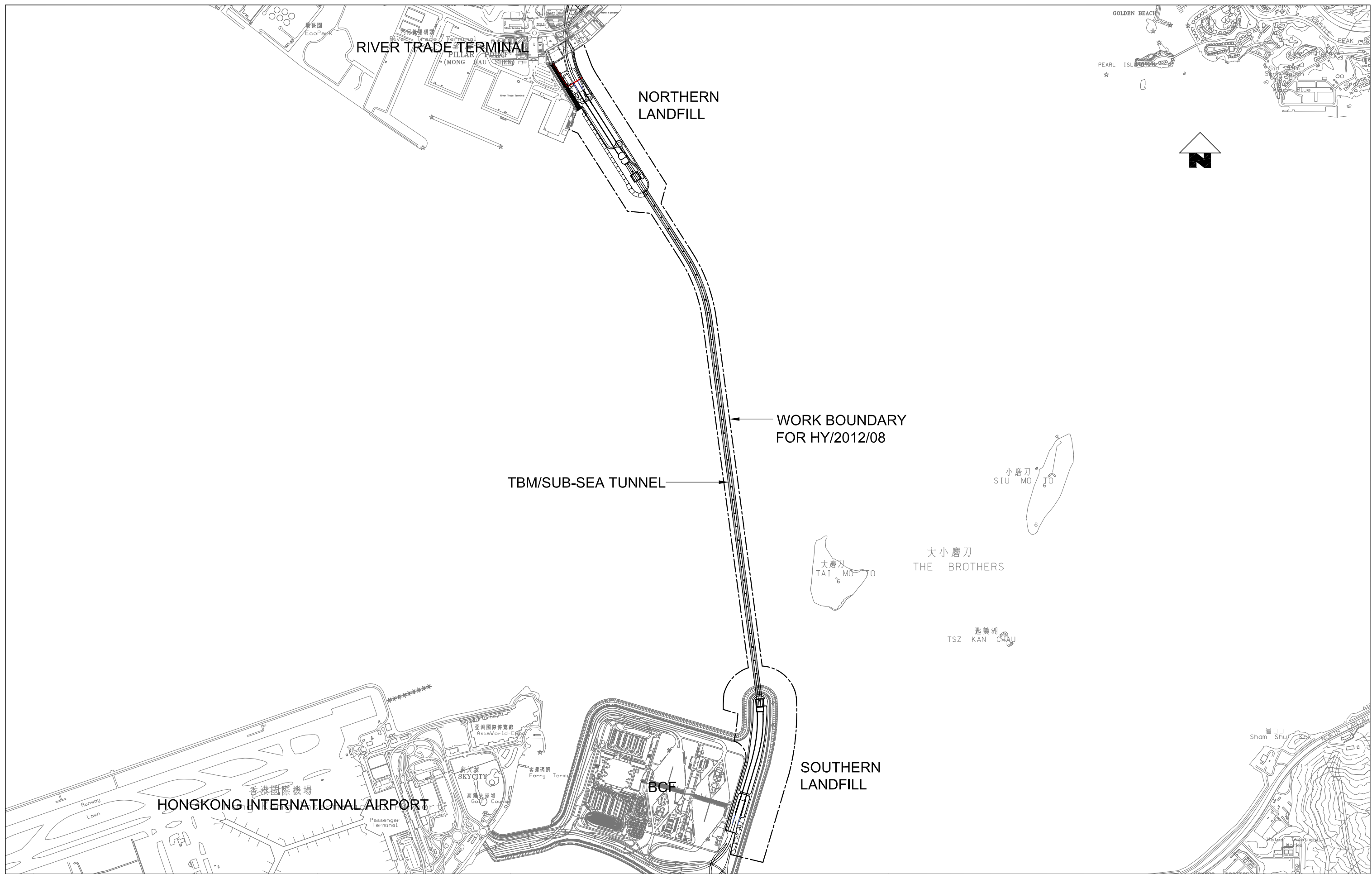
According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated 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. Another application for VEP (EP-354/2009/B) was granted on 28 January 2014.

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*.

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.



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

Main Contractor

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

路政署
HIGHWAYS DEPARTMENT

Contractor's Designer

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

1.2 SCOPE OF REPORT

This is the Fourth 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 September 2014 to 30 November 2014.

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	3465 2888	3465 2899
	IEC	F. C. Tsang	3465 2828	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

1.4 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*.

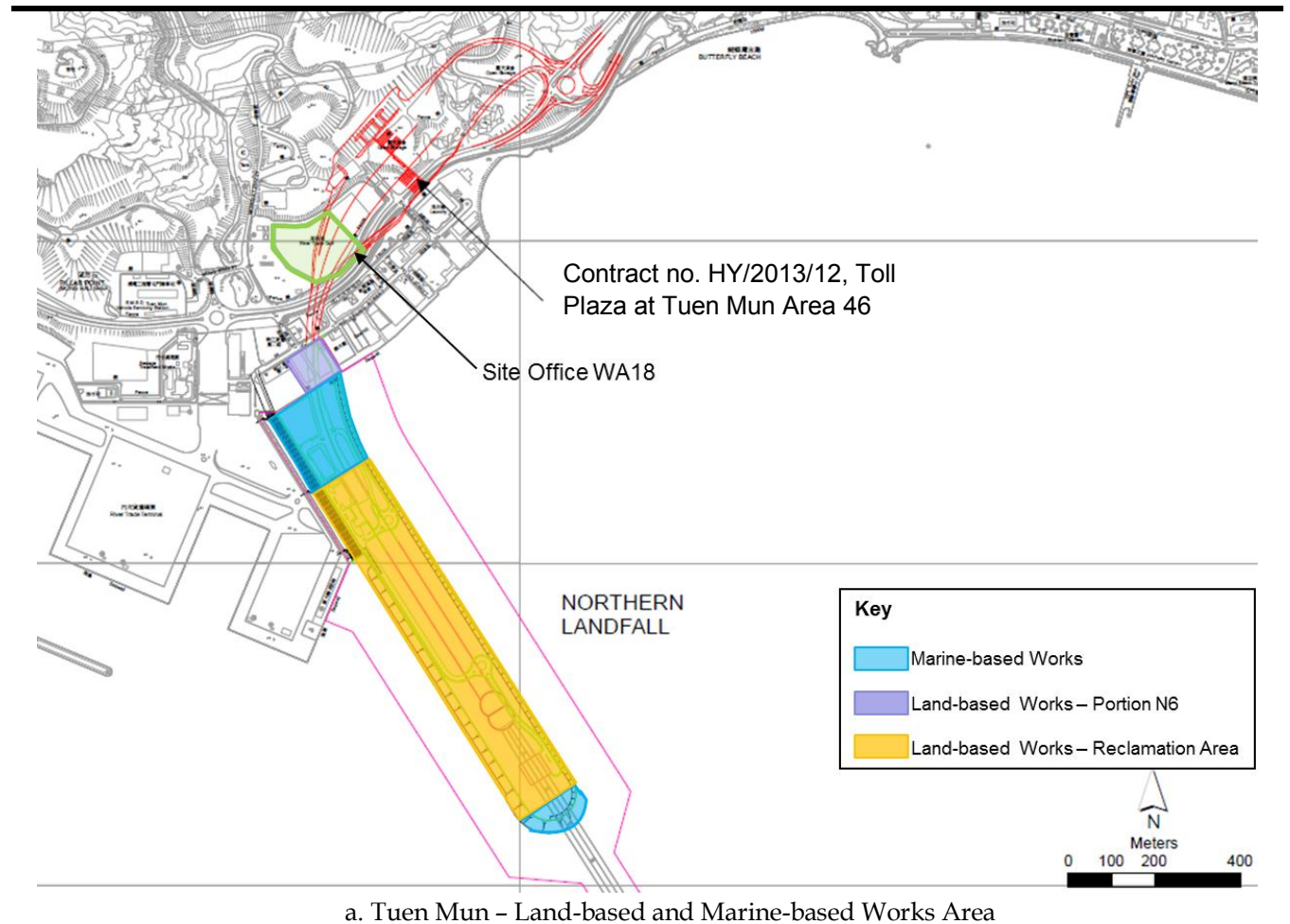
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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• Construction of Vertical Seawall and Sloping Seawall
Portion N-A
<ul style="list-style-type: none">• Marine Sheet Piling for Box Culvert extension• Box Culvert extension - Backfilling and Tie Rod Installation• Predrilling for Box Culvert Foundation
<i>Land-based Works</i>
Reclamation Works Area - Portion N-A
<ul style="list-style-type: none">• Excavation for North Launching Shaft• Land Bored Piling Works• Construction of temporary access• Diaphragm Wall Construction
Reclamation Works Area - Portion N-B
<ul style="list-style-type: none">• Vibro-Compaction
Reclamation Works Area - Portion N-C
<ul style="list-style-type: none">• Surcharge set up

Figure 1.2 Locations of Construction Activities – September 2014 to November 2014



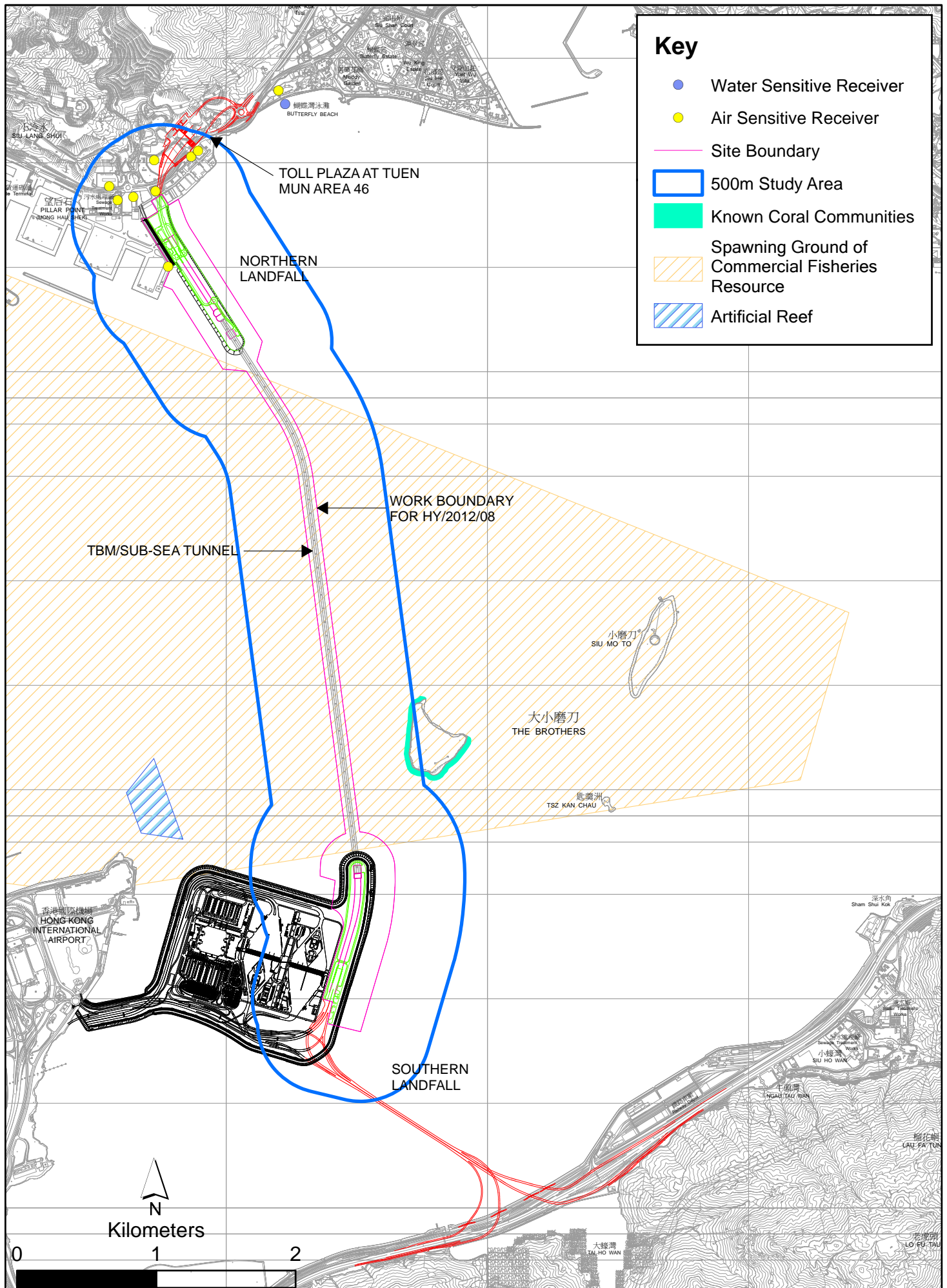


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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/A and EP-354/2009/B, 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.

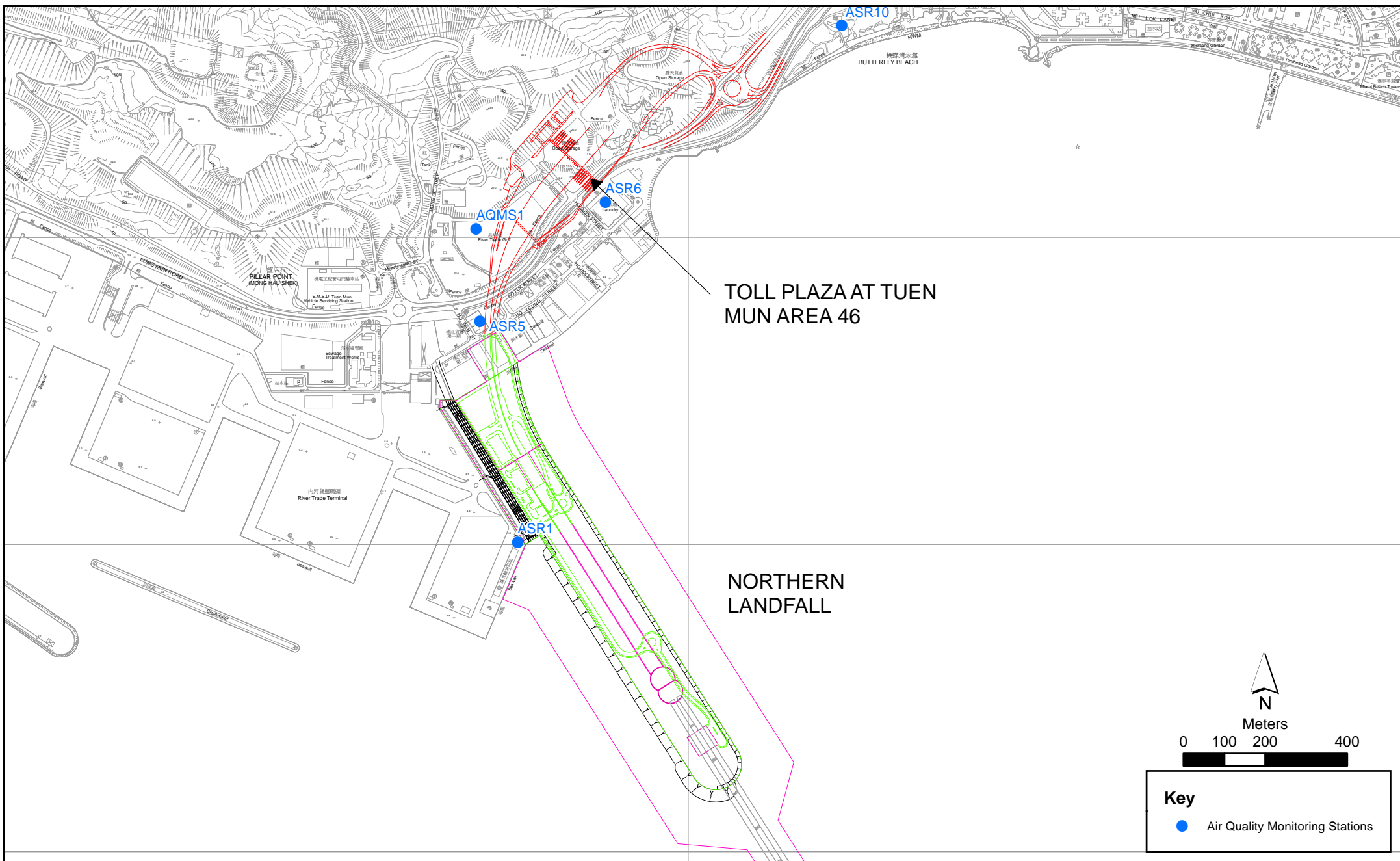


Figure 2.1

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	1, 5, 11, 17, 23 and 27 September 2014;
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 	3, 9, 15, 21, 24, 27 and 30 October 2014;
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 	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 November 2014
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*.

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 *Eleventh to Thirteenth 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 ($\mu\text{g}/\text{m}^3$)
September	ASR 1	190	65 - 404	331	500
2014 to	ASR 5	191	60 - 327	340	500
November	AQMS1	150	80 - 319	335	500
2014	ASR6	159	63 - 313	338	500
	ASR10	109	53 - 206	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 ($\mu\text{g}/\text{m}^3$)
September	ASR 1	93	58 - 128	213	260
2014 to	ASR 5	93	51 - 129	238	260
November	AQMS1	84	46 - 136	213	260
2014	ASR6	84	49 - 136	238	260
	ASR10	72	33 - 130	214	260

In this reporting period, a total of twenty-three 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. 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.

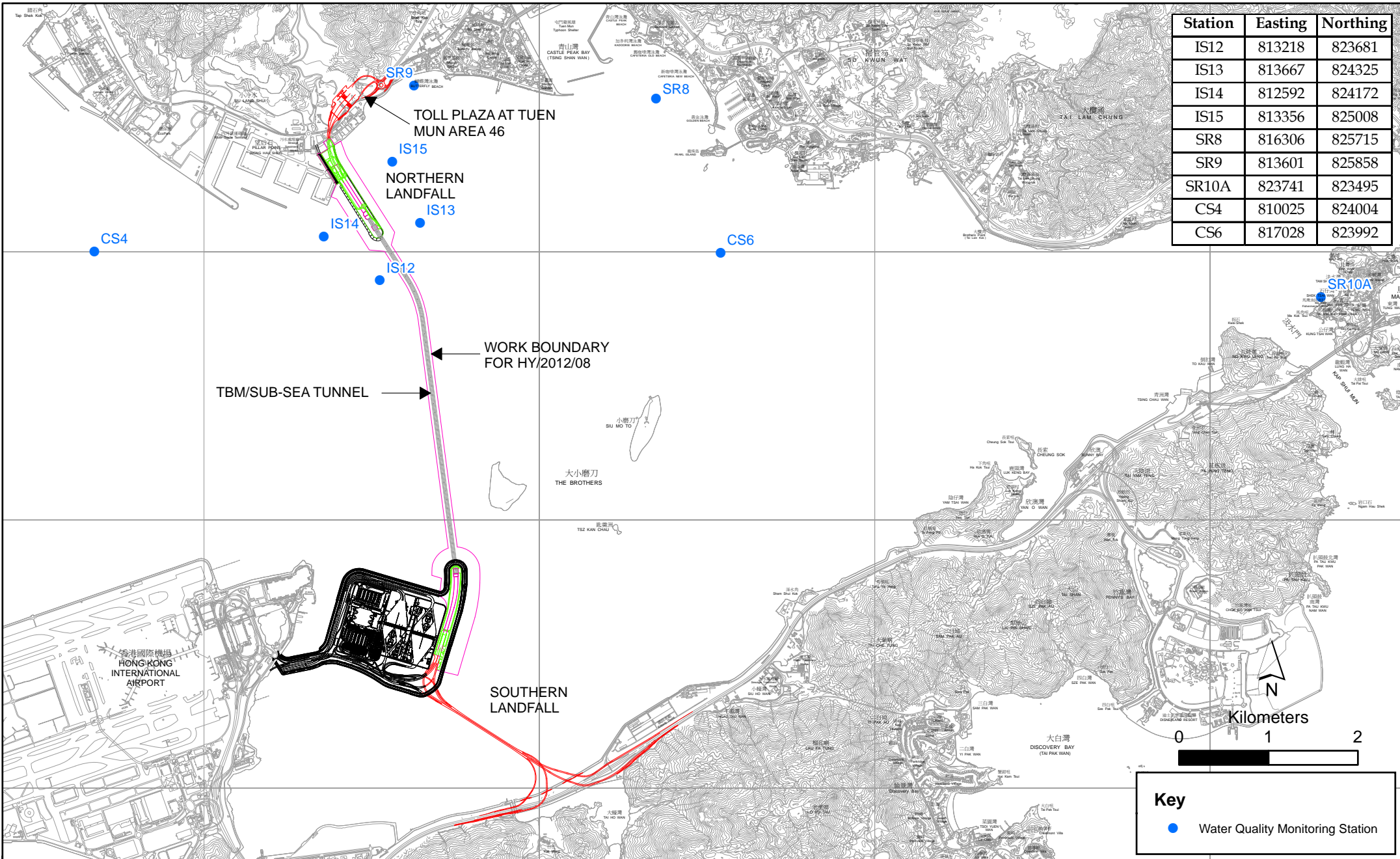


Figure 2.2

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*.

2.2.4 Results and Observations

During this reporting period, major marine works included reclamation filling at Portion N-C. Reclamation filling was undertaken between the 200 m of leading seawalls using filling materials specified in the EP and the approved EIA Report with a single layer silt curtain being deployed as a precautionary measure to reduce dispersion of suspended solids. It is useful to note that heavy marine traffic (not associated with the Project) was commonly observed nearby the Project site and its vicinity. On 20 November 2014, seawall (+2.5mPD) at Northern Landfall has been fully enclosed and marine sheet pile has also been completed. There will be no dredging, reclamation or marine sheet piling works in open waters at this stage.

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 *Eleventh to Thirteen Monthly EM&A Report*.

In this reporting period, a total of thirty-nine 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
Laser Binoculars	Nikon D90 300m 2.8D fixed focus
Marine Binocular	Nikon D90 20-300m zoom lens
Vessel for Monitoring	Infinitor LRF 1000
	Bushell 7 x 50 marine binocular with compass and reticules
	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.

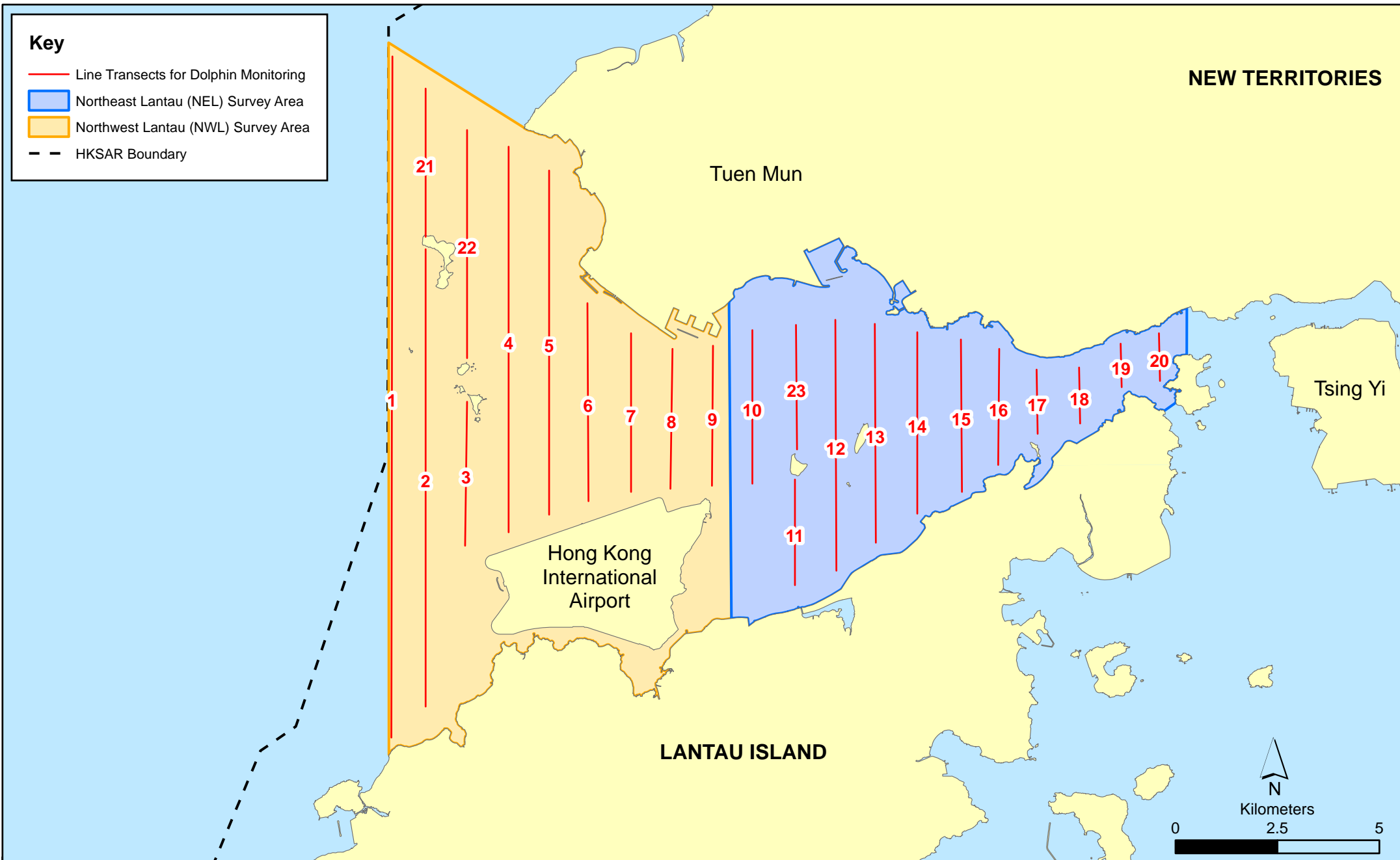


Figure 2.3

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 892.88 km of survey effort was collected, with 97.1% 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, 343.71 km and 549.17 km of survey effort were collected from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 644.60 km and 248.28 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 24 groups of 93 Chinese White Dolphin sightings were recorded during the six sets of surveys in this reporting quarter. All except four 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.

For the detailed comparison of dolphin occurrence and usage of NEL and NWL survey area between the impact phase and baseline phase monitoring, only the quarterly data of September 2014 to November 2014 from the impact phase monitoring was used in the present report to tally with the three-month period of baseline monitoring (September 2011 to November 2011).

Another comparison in dolphin distribution was made between the two quarterly periods of autumn months in 2013 and 2014 was also made

Between the two autumn periods, none of the dolphin sightings was made in NEL in autumn 2014, while there were two sightings made in autumn 2013. Moreover, more dolphin sightings were made in the middle and western portions of North Lantau waters and to the north of the airport platform in summer 2013 than in summer 2014.

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: Sep 2 nd /11 th	0.0	0.0
	Set 2: Sep 19 th /22 nd	0.0	0.0
	Set 3: Oct 7 th /13 th	0.0	0.0
	Set 4: Oct 16 th /23 th	0.0	0.0
	Set 5: Nov 4 th /10 th	0.0	0.0
	Set 6: Nov 12 th /18 th	0.0	0.0
NWL	Set 1: Sep 2 nd /11 th	5.72	28.58
	Set 2: Sep 19 th /22 nd	4.34	18.8
	Set 3: Oct 7 th /13 th	13.13	42.67
	Set 4: Oct 16 th /23 th	0.0	0.0
	Set 5: Nov 4 th /10 th	4.6	24.54
	Set 6: Nov 12 th /18 th	2.84	8.53

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 Monthly Average Encounter Rates

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	September 2014 - November 2014	September 2011 - November 2011	September 2014 - November 2014	September 2011 - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	5.10 ± 4.40	9.85 ± 5.85	20.52 ± 15.10	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 - 13 individuals per group in North Lantau region during September 2014 to November 2014. 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	
	September 2014 - November 2014	September 2011 - November 2011
Overall	3.88 ± 2.69	3.72 ± 3.13
Northeast Lantau	0.0	3.18 ± 2.16
Northwest Lantau	3.88 ± 2.69	3.92 ± 3.40

Whilst two Action Level exceedances were observed for the quarterly dolphin monitoring data between September 2014 and November 2014, 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*

Daily marine mammal exclusion zone was in effect during the period of dredging, reclamation or marine sheet piling works in open waters under this Contract. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when dredging, reclamation or marine sheet piling works were carried out outside the daylight hours under this Contract. No sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring.

On 10 November 2014, night time marine works was completed. On 20 November 2014, seawall (+2.5mPD) at Northern Landfall has been fully enclosed and marine sheet pile has also been completed. There would be no dredging, reclamation or marine sheet piling works in open waters at this stage. Thus, PAM and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were discontinued from 10 November 2014 and 20 November 2014, respectively.

2.4 *POST TRANSLOCATION CORAL MONITORING*

The Fourth quarterly Coral Post-Translocation Monitoring was conducted on 23 October 2014 and the results were provided in the *Fourth Quarterly Post-Translocation Coral Monitoring Report* under a separate cover. The findings

indicated that the Action or Limit Levels for coral monitoring were not exceeded as increase in percentage of partial mortality was not detected for both the tagged translocated and natural coral colonies when comparing to the pre-translocation dataset.

2.5 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 30 September; 8, 15, 22 and 29 October; 5, 12, 19 and 26 November 2014.

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 September 2014	Marine Works Area Portion N-A - Barge ST88 <ul style="list-style-type: none"> Site should be kept litter free. Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to maintain the bunded areas to prevent runoff. 	Marine Works Area Portion N-A - Barge ST88 <ul style="list-style-type: none"> The Contractor was reminded to clear the litter regularly. Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to check the bunded areas and provide measures to prevent runoff.
10 September 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Proper chemical labels should be placed on the chemical containers. Water spraying on haul road should be applied more often. Ponding of muddy water was observed. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to provide chemical labels on the chemical containers. The Contractor was reminded to provide adequate water spraying on exposed surface in dry conditions. The Contractor was reminded to clear the muddy water to avoid runoff.
17 September 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Sedimentation tank should be maintained more regularly after rainstorm. Accumulated refuse should be cleared. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to regularly check the capacity of sedimentation tank. The Contractor was reminded to clear the accumulated refuse.
24 September 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Water spraying should be applied more often in dry conditions. Site and surroundings should be kept tidy. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to apply spraying water more often in dry conditions. The Contractor was reminded to check for site tidiness more often.
30 September 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> General refuse was observed on the ground. Excess muddy water was observed. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to provide sufficient enclosed bins for general refuse. The Contractor was reminded to clear the excess muddy water to avoid runoff.

Inspection Date	Environmental Observations	Recommendations/ Remarks
8 October 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Excess sandy materials were observed on the seawall. Accumulated general refuse was observed. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the excess sandy materials to avoid runoff. The Contractor was reminded to clear the general refuse regularly.
15 October 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Excess sandy materials were observed near the seawall. Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> Ponding of water was observed near GI works. The side boards of the transportation trucks should be covered during the delivery of sandy materials. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the excess sandy materials to avoid sediment runoff. Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the ponding water. The Contractor was reminded to ensure side boards of the transportation trucks are covered before and during transport.
22 October 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Leakage of water was observed at the hose. Sandy materials were observed near the drainage area. Filling materials were observed above the steel platform. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to fix the host to avoid water leakage. The Contractor was reminded to clean up the gully and provide sand bags to avoid washout of sandy materials into drainage system. The Contractor was reminded to clear the filling materials above the steel platform.
29 October 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Muddy water was observed on seawall blocks. Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> Accumulated general refuse was observed. Dusty materials were observed partly covered. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the muddy water to avoid runoff. Reclamation Works Area - Portion N-B <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse. The Contractor was reminded to fully cover the dusty materials.
5 November 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> Accumulated general refuse was observed. Oil drum without chemical labels was observed. Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> Inappropriate chemical container for oil was observed. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear general refuse regularly. The Contractor was reminded to provide chemical labels to the oil drum. Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to provide proper chemical containers.
12 November 2014	Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> Excess muddy water was observed. 	Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to remove the excess muddy water.
19 November 2014	Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> Chemical containers without drip tray were observed. Chemical containers should be placed inside the drip tray. 	Reclamation Works Area - Portion N-C <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. The Contractor was reminded to place the Chemical container inside the drip tray.

Inspection Date	Environmental Observations	Recommendations/ Remarks
26 November 2014	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> General refuse was observed near the seawall. 	Reclamation Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to clear the general refuse.

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

2.6 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), imported fill, recyclable materials, chemical wastes and marine sediments. 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
September 2014	6,843	676,219	0	39	0	0	0	0
October 2014	1,228	527,237	0	33	80	60	0	0
November 2014	595	240,167	0	50	0	0	2,320	0
Total	8,666	1,443,623	0	122	80	60	2,320	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.

2.7 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/B	28 January 2014	Throughout the Contract	HyD	Application for VEP on 20 January 2014 to replace EP-354/2009/A
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-RW0223-14	29 March 2014	28 September 2014	DBJV	For works in site Portion N6
Construction Noise Permit	GW-RW0223-14	29 September 2014	28 March 2015	DBJV	For works in site Portion N6
Construction Noise Permit	GW-RW0234-14	29 March 2014	28 September 2014	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-RS0362-14	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/15-006	1 May 2014	31 October 2014	DBJV	For Type 1
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

2.8

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.

2.9

SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

For air quality impact monitoring, a total of twenty-three 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 exceedance for air quality monitoring was 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 *Eleventh to Thirteenth 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	-	-	0	0
	Limit Level	-	-	0	0
ASR1	Action Level	2014/11/14	-	2	0
	Limit Level	-	-	0	0
ASR5	Action Level	-	-	0	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-nine 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 (September 2014 to November 2014)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS4	10.2	9.0	13.3	11.7	8.3	8.0
CS6	10.9	11.7	14.1	15.2	7.7	7.5
IS12	9.2	9.5	12.0	12.3	8.2	8.1
IS13	10.0	10.5	13.0	13.7	8.0	8.0
IS14	10.4	9.7	13.5	12.6	8.0	7.9
IS15	9.6	11.0	12.5	14.2	7.9	7.9
SR10A	10.3	10.2	13.3	13.3	7.9	7.7
SR8	10.1	11.3	13.1	14.7	7.7	7.7
SR9	8.8	9.9	11.4	12.8	7.5	7.5
Mean value	10.0	10.3	13.0	13.4	7.9	7.8

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

Two Action Level exceedances of impact dolphin monitoring were 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*.

2.10 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.

Three potential environmental complaint cases were referred by EPD on 29 October 2014 and 12 November 2014. The interim reports were submitted to EPD on 6 November 2014 and 21 November 2014, respectively. The investigation findings showed that the cases were considered not related to the works under this Contract and is thus invalid. Detailed investigation findings were presented in *Appendix L* of the *Eleventh to Thirteenth Monthly EM&A Report*.

No summons/ prosecution was received during the reporting period.

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

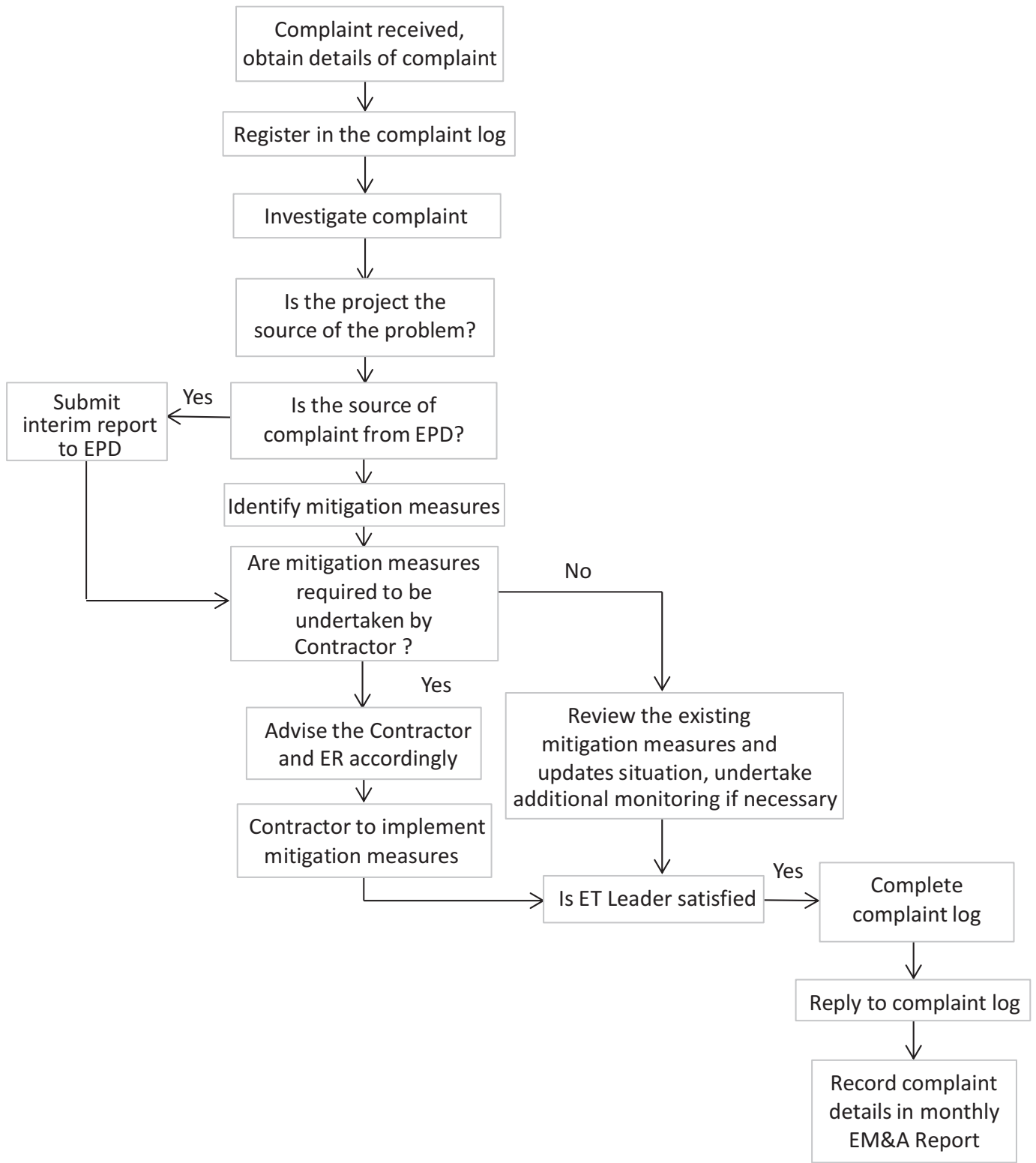


Figure 2.4

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>
Reclamation Works Area - Portion N-A
<ul style="list-style-type: none">• Land Bored Piling Works• Construction of temporary access• Box Culvert Foundation Works• Diaphragm Wall Construction• Excavation for North Launching Shaft
Reclamation Works Area - Portion N-C
<ul style="list-style-type: none">• Surcharge set up
Works Area - N6
<ul style="list-style-type: none">• Bored Piling Works

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.

This Fourth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 September 2014 to 30 November 2014, in accordance with the Updated EM&A Manual and the requirements of *EP-354/2009/B*.

Air quality (including 1-hour TSP and 24-hour TSP), marine water quality, coral and dolphin monitoring were carried out in the reporting period. Two Action Level and no Limit Level exceedances for 1-hr TSP, and no Action Level or Limit Level exceedances for 24-hr TSP were recorded during the reporting period. No Action Level or Limit Level exceedances were recorded in marine water quality impact monitoring during the reporting period. No Action Level or Limit Level exceedances were recorded in the post-translocation coral monitoring in 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 24 groups of 93 Chinese White Dolphin sightings were recorded during the six sets of surveys from September 2014 to November 2014. Whilst two Action Level exceedances were recorded for the quarterly dolphin monitoring data between September and November 2014, 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.

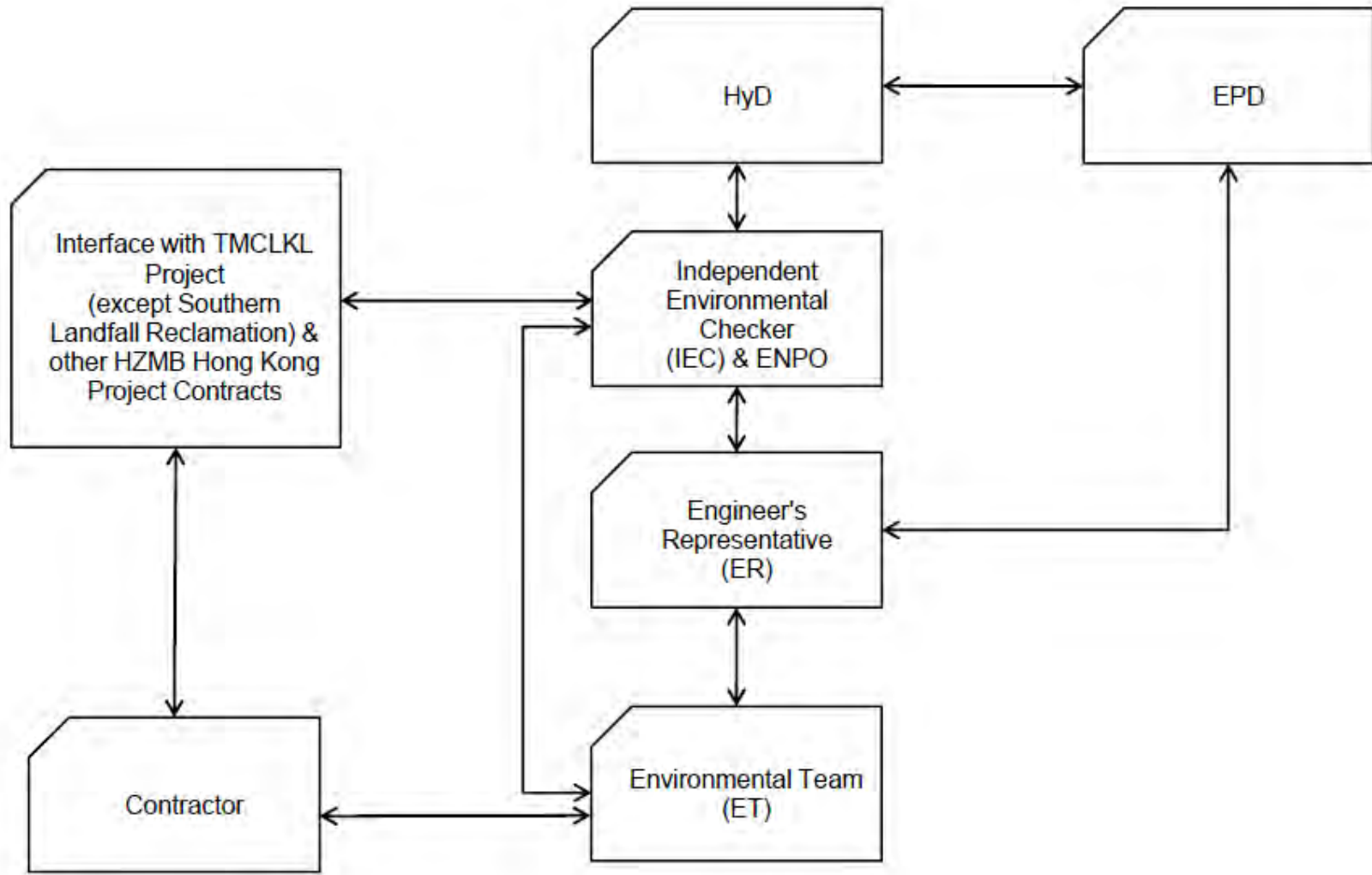
Three potential environmental complaint cases were referred by EPD on 29 October 2014 and 12 November 2014. The interim reports were submitted to EPD on 6 November 2014 and 21 November 2014, respectively. The investigation findings showed that the cases were considered not related to the works under this Contract and is thus invalid.

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	14W47 % Comp	2014					2015				
								Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr

TMCLK - Northern Connection Sub-Sea Tunnel Section

Contract Dates

Handover Date							
HD010	Portions: WA18C	0		06-Jan-15		06-Jan-15*	0%

General Submissions

Programme							
SCC0277	Detailed Works Programme - SCC27.2 - Approval by SO	30	11-Feb-14	12-Mar-14	29-Aug-14A	18-Nov-14	93%

Environmental

Environmental Permit Submissions

Supplementary WMP of C&C Tunnel at Sth.Landfall							
EP2110	Supplementary WMP of C&C Tunnel at Sth.Landfall	0		28-Jun-14		17-Nov-14	0%

General Design Submissions

(A19) DDA for Roadworks & Project Alignment

DD68310	IPs/ SO's Advance Comments/ ICE Comments	28	26-Jul-14	22-Aug-14	08-Sep-14A	13-Nov-14A	100%
DD68320	Comments Received	0		22-Aug-14		13-Nov-14A	100%
DD68330	Designer to Reply RTC + Update Submission	21	23-Aug-14	17-Sep-14	14-Nov-14A	04-Dec-14	38%
DD68340	Submit Updated DDA to SO/ ICE/ IPs	0	18-Sep-14		05-Dec-14		0%
DD68350	ICE Approval & Issue Check Cert	12	18-Sep-14	03-Oct-14	03-Sep-14A	06-Dec-14	83%
DD68360	Submit ICE Check Cert to SO	6	04-Oct-14	10-Oct-14	08-Dec-14	13-Dec-14	0%
DD68370	SO's Review	35	18-Sep-14	22-Oct-14	05-Dec-14	08-Jan-15	0%
DD68380	SO Approval with Condition R received	0		22-Oct-14		08-Jan-15	0%

(G6) IFA for Tunnel GBP

DD70750	SO's Review	35	29-Apr-14	02-Jun-14	09-Aug-14A	18-Nov-14	94%
DD70760	SO Approval with Condition R received	0		03-Jun-14		18-Nov-14	0%

GEO TGN No. 25 - Geotechnical Risk Register and Risk Mitigation Plan

GEO1030	1st Submission to GEO - GEO TGN No. 25 - Geotechnical Risk Register and Risk Mitigation Plan	0		27-Aug-14		16-Feb-15	0%
GEO1035	1st Submission GEO Review	28	28-Aug-14	24-Sep-14	17-Feb-15	16-Mar-15	0%
GEO1040	Received GEO Comment	0		24-Sep-14		16-Mar-15	0%
GEO1045	Prepare Response to Comment	12	25-Sep-14	10-Oct-14	17-Mar-15	30-Mar-15	0%
GEO1050	2nd Submission to GEO	0		10-Oct-14		30-Mar-15	0%
GEO1055	2nd GEO Review	28	11-Oct-14	07-Nov-14	31-Mar-15	27-Apr-15	0%

ETWB TCW No.15/2005 - Geotechnical Risk Assessment for North C&C, TBM Tunnels and CPs

GEO1060	1st Submission to GEO - ETWB TCW No. 15/2005 - Geotechnical Risk for North C&C, TBM Tunnels and CPs	0		27-Aug-14		16-Feb-15	0%
GEO1065	1st Submission GEO Review	28	28-Aug-14	24-Sep-14	17-Feb-15	16-Mar-15	0%
GEO1070	Received GEO Comment	0		24-Sep-14		16-Mar-15	0%
GEO1075	Prepare Response to Comment	12	25-Sep-14	10-Oct-14	17-Mar-15	30-Mar-15	0%
GEO1080	2nd Submission to GEO	0		10-Oct-14		30-Mar-15	0%
GEO1085	2nd GEO Review	28	11-Oct-14	07-Nov-14	31-Mar-15	27-Apr-15	0%

Construction Supervision Plan

GEO1115	2nd GEO Review	28	29-Mar-14	25-Apr-14	29-Mar-14A	18-Nov-14	93%
---------	----------------	----	-----------	-----------	------------	-----------	-----

Self contained Cat I/II supervising monthly report

GEO1420	1st Submission to GEO - Self contained Cat I/II supervising monthly report	0		30-May-14		15-Oct-14A	100%
GEO1425	1st Submission GEO Review	28	31-May-14	27-Jun-14	15-Oct-14A	21-Nov-14A	100%
GEO1430	Received GEO Comment	0		27-Jun-14		21-Nov-14A	100%
GEO1435	Prepare Response to Comment	12	28-Jun-14	12-Jul-14	21-Nov-14A	21-Nov-14A	100%
GEO1440	2nd Submission to GEO	0		12-Jul-14		21-Nov-14A	100%
GEO1445	2nd GEO Review	28	13-Jul-14	09-Aug-14	21-Nov-14A	21-Nov-14A	100%

Construction

Northern Landfall

North Reclamation (Phase 1)

Design Submission

(B4) DDA Construction Risk Assessment - Impact on North Landfall

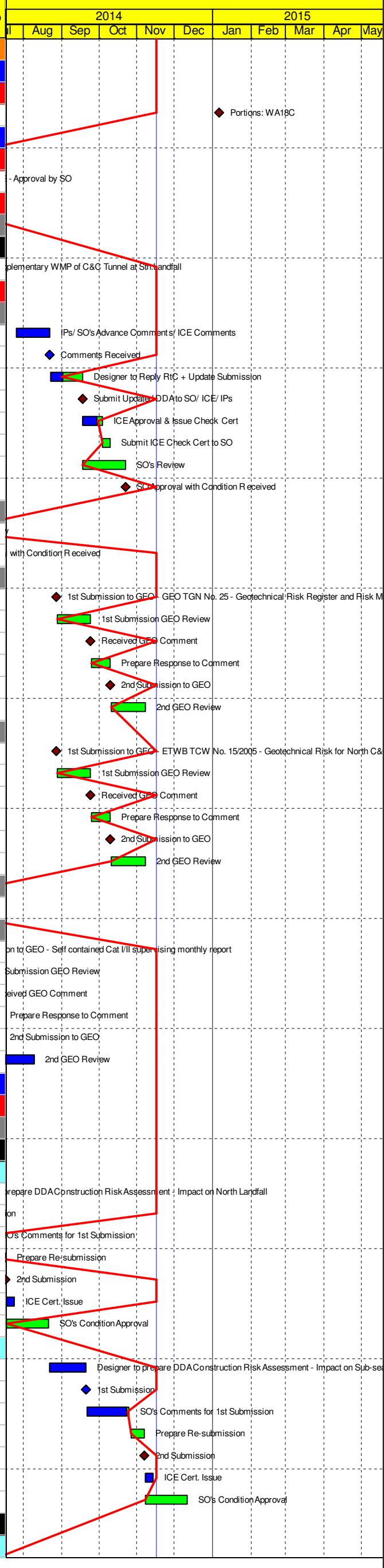
DD68390	Designer to prepare DDA Construction Risk Assessment - Impact on North Landfall	25	02-May-14	31-May-14	25-Jun-14A	26-Sep-14A	100%
DD68400	1st Submission	0		31-May-14		26-Sep-14A	100%
DD68410	SO's Comments for 1st Submission	35	01-Jun-14	05-Jul-14	27-Sep-14A	18-Nov-14	94%
DD68420	Prepare Re-submission	10	07-Jul-14	17-Jul-14	19-Nov-14	29-Nov-14	0%
DD68430	2nd Submission	0		17-Jul-14		29-Nov-14	0%
DD68440	ICE Cert. Issue	6	18-Jul-14	24-Jul-14	16-Oct-14A	22-Oct-14A	100%
DD68490	SO's Condition Approval	35	18-Jul-14	21-Aug-14	30-Nov-14	03-Jan-15	0%

(B4) DDA Construction Risk Assessment - Impact on Sub-sea Tunnel

DD71385	Designer to prepare DDA Construction Risk Assessment - Impact on Sub-sea Tunnel	25	22-Aug-14	20-Sep-14	01-Aug-14A	26-Sep-14A	100%
DD71395	1st Submission	0		20-Sep-14		26-Sep-14A	100%
DD71405	SO's Comments for 1st Submission	35	21-Sep-14	25-Oct-14	27-Sep-14A	05-Jan-15	94%
DD71415	Prepare Re-submission	10	27-Oct-14	06-Nov-14	06-Jan-15	16-Jan-15	0%
DD71420	2nd Submission	0		06-Nov-14		16-Jan-15	0%
DD71425	ICE Cert. Issue	6	07-Nov-14	13-Nov-14	16-Oct-14A	22-Oct-14A	100%
DD71435	SO's Condition Approval	35	07-Nov-14	11-Dec-14	17-Jan-15	20-Feb-15	0%

Method Statement Submission

Method Statement of Construction Methodology of Culvert Extension



■ Planned Bar
■ Planned Bar
◆ Planned Milestone
■ Progress bar
◆ Progress Milestone



Date	Revision	Checked	Approved
21-Feb-14	TMCLK/DBJ/GEN/PR...	SPa	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	14W47 % Comp	2014					2015					
								Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
NSH1350	E - Cell 1-3 - Diaphragm Wall & Toe Grouting - Perm Barette	26	08-Jul-14	06-Aug-14	23-Aug-14A	19-Oct-14A	100%	E - Cell 1-3 - Diaphragm Wall & Toe Grouting - Perm Barette										
NSH1360	E - Cell 1-3 - Capping beam Installation	18	08-Jul-14	28-Jul-14	25-Aug-14A	14-Nov-14A	100%	E - Cell 1-3 - Capping beam Installation										
NSH1370	E - Cell 1-3 - Instrumentation & Pump well Installation	6	31-Jul-14	06-Aug-14	23-Aug-14A	15-Nov-14A	100%	E - Cell 1-3 - Instrumentation & Pump well Installation										
NSH1430	E - Pumping Test for TBM Launching Shaft ELS - Cell 1-3	5	07-Aug-14	11-Aug-14	03-Nov-14A	12-Nov-14A	100%	E - Pumping Test for TBM Launching Shaft ELS - Cell 1-3										
North Launching Shaft Excavation (Cell 1 to 3)																		
NSH1440	E - Cell 1 to 3 - Shaft Excavation	77	12-Aug-14	12-Nov-14	06-Oct-14A	22-Dec-14	60%	E - Cell 1 to 3 - Shaft Excavation										
North Launching Shaft ELS Foundation & Capping Beam																		
NSH1190	E - Cell 4 to 6 - Diaphragm Wall & Toe Grouting - Shaft ELS (deleted)	49	08-Jul-14	02-Sep-14	29-Sep-14A	29-Sep-14A	100%	E - Cell 4 to 6 - Diaphragm Wall & Toe Grouting - Shaft ELS (deleted)										
NSH1200	E - Cell 4 to 6 - Diaphragm Wall & Toe Grouting - Perm Barette (deleted)	4	03-Sep-14	06-Sep-14	29-Sep-14A	29-Sep-14A	100%	E - Cell 4 to 6 - Diaphragm Wall & Toe Grouting - Perm Barette (deleted)										
NSH1210	E - Cell 4 to 6 - Prebored H-piles - Perm (deleted)	21	02-May-14	27-May-14	28-Sep-14A	29-Sep-14A	100%	Prebored H-piles - Perm (deleted)										
NSH1220	E - Cell 4 to 6 - Capping beam Installation(deleted)	18	03-Sep-14	24-Sep-14	29-Sep-14A	29-Sep-14A	100%	E - Cell 4 to 6 - Capping beam Installation(deleted)										
NSH1230	E - Cell 4 to 6 - Instrumentation & Pump well Installation (deleted)	4	20-Sep-14	24-Sep-14	29-Sep-14A	29-Sep-14A	100%	E - Cell 4 to 6 - Instrumentation & Pump well Installation (deleted)										
NSH1380	E - Pumping Test for TBM Launching Shaft ELS - Cell 4 to 6 (deleted)	6	25-Sep-14	30-Sep-14	29-Sep-14A	29-Sep-14A	100%	E - Pumping Test for TBM Launching Shaft ELS - Cell 4 to 6 (deleted)										
North Launching Shaft Excavation																		
NSH1400	E - Cell 4 to 6 - Shaft Excavation (deleted)	31	03-Oct-14	07-Nov-14	29-Sep-14A	29-Sep-14A	100%	E - Cell 4 to 6 - Shaft Excavation (deleted)										
North Launching Shaft Base Slab for TBM Launching																		
NSH1455	E - Tympanum construction for TBM break-in	12	20-Nov-14	03-Dec-14	02-Jan-15	15-Jan-15	0%	E - Tympanum construction for TBM break-in										
NSH1460	E - Cell 1 to 2 - Base Slab construction	22	13-Nov-14	08-Dec-14	23-Dec-14	20-Jan-15	0%	E - Cell 1 to 2 - Base Slab construction										
NSH1465	E - Cell 3 to 4 - Excavation to ML03 formation level	6	09-Dec-14	15-Dec-14	21-Jan-15	27-Jan-15	0%	E - Cell 3 to 4 - Excavation to ML03 formation level										
NSH1470	E - Cell 3 to 4 - ML3 Base Slab construction	12	16-Dec-14	31-Dec-14	28-Jan-15	10-Feb-15	0%	E - Cell 3 to 4 - ML3 Base Slab construction										
NSH1480	E - Cell 5 - Temporary backfilling for ML03 logistic	6	02-Jan-15	08-Jan-15	11-Feb-15	17-Feb-15	0%	E - Cell 5 - Temporary backfilling for ML03 logistic										
NSH1490	E - Cell 3 to 4 - Excavation to ML02 formation level	6	02-Jan-15	08-Jan-15	11-Feb-15	17-Feb-15	0%	E - Cell 3 to 4 - Excavation to ML02 formation level										
NSH1500	E - Cell 3 to 4 - ML02 Base Slab construction	18	09-Jan-15	29-Jan-15	18-Feb-15	17-Mar-15	0%	E - Cell 3 to 4 - ML02 Base Slab construction										
NSH1510	E - Cell 5 - Temporary backfilling for ML02 logistic	6	30-Jan-15	05-Feb-15	18-Mar-15	24-Mar-15	0%	E - Cell 5 - Temporary backfilling for ML02 logistic										
North Ventilation Shaft ELS Foundation & Capping Beam																		
A6415775	B - Setup for Shaft ELS Foundation	20	02-Aug-14	25-Aug-14	27-Oct-14A	31-Oct-14A	100%	B - Setup for Shaft ELS Foundation										
A6415780	B - Diaphragm Wall - Shaft ELS	81	26-Aug-14	01-Dec-14	01-Nov-14A	26-Feb-15	3%	B - Diaphragm Wall - Shaft ELS										
A6415790	B - Instrumentation & Pump well Installation	6	02-Dec-14	08-Dec-14	27-Feb-15	05-Mar-15	0%	B - Instrumentation & Pump well Installation										
A6415795	B - Pumping Test for Excavation	7	09-Dec-14	15-Dec-14	06-Mar-15	12-Mar-15	0%	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	27-Feb-15	04-Mar-15	0%	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	05-Mar-15	18-Mar-15	0%	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	19-Mar-15	14-Apr-15	0%	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	15-Apr-15	21-Apr-15	0%	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	22-Apr-15	23-May-15	0%	B - Vent Shaft Excavation (-8.0 to -20.0mPD) - Fill/MD/ALLUVIUM										
CLP Temporary Substation																		
Construction																		
DDP12800	1st Batch - CLP Installation & Commissioning	108	02-Jul-14	07-Nov-14	02-Jul-14A	21-Nov-14	95%	1st Batch - CLP Installation & Commissioning										
DDP12810	11kV Equipment / Switch Room installation by JV	48	20-Aug-14	18-Oct-14	20-Aug-14A	31-Oct-14A	100%	11kV Equipment / Switch Room installation by JV										
DDP12820	FS Installation by JV	24	11-Oct-14	08-Nov-14	11-Oct-14A	25-Oct-14A	100%	FS Installation by JV										
DDP12830	1st batch - Noise Measurement (deleted)	12	08-Nov-14	21-Nov-14	21-Nov-14A	21-Nov-14A	100%	1st batch - Noise Measurement (deleted)										
DDP12840	Final FS Installation by JV	6	08-Nov-14	14-Nov-14	22-Nov-14	28-Nov-14	0%	Final FS Installation by JV										
DDP12850	FSD inspection for 1st Transformer Energization	12	15-Nov-14	28-Nov-14	29-Nov-14	12-Dec-14	0%	FSD inspection for 1st Transformer Energization										
DDP12860	1st Batch - Commissioning & Energization	0		28-Nov-14		12-Dec-14*	0%	1st Batch - Commissioning & Energization										
DDP12870	2nd Batch - CLP Installation & Commissioning	95	15-Oct-14	05-Feb-15	02-Jul-14A	21-Nov-14	95%	2nd Batch - CLP Installation & Commissioning										
DDP12880	FS Installation by JV	24	09-Jan-15	06-Feb-15	20-Sep-14A	15-Oct-14A	100%	FS Installation by JV										
DDP12890	2nd Batch - Noise Measurement (to be clarified)	6	06-Feb-15	12-Feb-15	21-Nov-14A	21-Nov-14A	100%	2nd Batch - Noise Measurement										
DDP12900	Final FS Installation by JV	6	06-Feb-15	12-Feb-15	22-Nov-14	28-Nov-14	0%	Final FS Installation by JV										
DDP12910	FSD inspection for 2nd Transformer Energization	6	13-Feb-15	18-Feb-15	29-Nov-14	04-Dec-14	0%	FSD inspection for 2nd Transformer Energization										
DDP12920	2nd Batch - Commissioning & Energization	0		18-Feb-15		04-Dec-14*	0%	2nd Batch - Commissioning										
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	18-Nov-14	94%	Preparation of AIP Temporary Access Road to N8										
AP01505	Review & Comment by JV	12	17-Feb-14	01-Mar-14	19-Nov-14	02-Dec-14	0%	Review & Comment by JV										
AP01510	Designer Prepare IFA	6	03-Mar-14	08-Mar-14	03-Dec-14	09-Dec-14	0%	Designer Prepare IFA										
AP01515	Formal Submission of IFA to ICE/IPs	0		08-Mar-14		09-Dec-14	0%	Formal Submission of IFA to ICE/IPs										
AP01520	Advanced Submission of IFA to SO	0		08-Mar-14		09-Dec-14	0%	Advanced Submission of IFA to SO										
AP01525	Review & Comment by SO/ICE/IPs	28	09-Mar-14	05-Apr-14	10-Dec-14	06-Jan-15	0%	Review & Comment by SO/ICE/IPs										
AP01530	Advance Comments from SO/ Comments from ICE/ IPs Received	0		07-Apr-14		06-Jan-15	0%	Advance Comments from SO/ Comments from ICE/ IPs Received										
AP01535	Designer to Prepare RTC & Updated AIP	18	07-Apr-14	30-Apr-14	07-Jan-15	27-Jan-15	0%	Designer to Prepare RTC & Updated AIP										
AP01540	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)	0		30-Apr-14		27-Jan-15	0%	Submission of AIP to SO/ ICE together with Reply To Comment (RTC)										
AP01545	Reply to IPs Comments in RTC	0		30-Apr-14		27-Jan-15	0%	Reply to IPs Comments in RTC										
AP01550	ICE Approval & Issue of Design Check Cert.	18	02-May-14	23-May-14	28-Jan-15	17-Feb-15	0%	ICE Approval & Issue of Design Check Cert.										
AP01555	Check Cert to SO	0		23-May-14		17-Feb-15	0%	Check Cert to SO										
AP01560	No Objection or Further Minor Comments from IPs Received	0		23-May-14		17-Feb-15	0%	No Objection or Further Minor Comments from IPs Received										
AP01565	SO Review (35 Days)	35	02-May-14	05-Jun-14	01-Feb-15	07-Mar-15	0%	SO Review (35 Days)										
Method Statement Submission																		
Method Statement of Cross Passage Construction Methodology of Ground Improvement																		

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	14W47 % Comp	2014					2015						
								Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May		
DD00925	IPs/ SO's Advance Comments/ ICE Comments	28	25-Sep-14	22-Oct-14	21-Nov-14A	13-Dec-14	4%												
DD00930	Comments Received	0		22-Oct-14		13-Dec-14	0%												
DD00935	Designer to Reply RTC + Update Submission	21	23-Oct-14	15-Nov-14	15-Dec-14	10-Jan-15	0%												
DD00940	Submit Updated DDA to SO/ ICE/ IPs	0	17-Nov-14			12-Jan-15	0%												
DD00945	ICE Approval & Issue Check Cert	12	17-Nov-14	29-Nov-14	12-Jan-15	24-Jan-15	0%												
DD00950	Submit ICE Check Cert to SO	6	01-Dec-14	06-Dec-14	26-Jan-15	31-Jan-15	0%												
DD00955	IPs Review	28	17-Nov-14	14-Dec-14	12-Jan-15	08-Feb-15	0%												
DD00960	IPs No Objection Received	0		14-Dec-14		08-Feb-15	0%												
DD00980	SO's Review	35	17-Nov-14	21-Dec-14	12-Jan-15	15-Feb-15	0%												
DD00985	SO Approval with Condition R received	0		22-Dec-14		16-Feb-15	0%												
DD00995	Sub-sea Internal Structure - Precast Gallery Mould Design & Fabrication	24	22-Dec-14	21-Jan-15	16-Feb-15	21-Mar-15	0%												
DD01015	Sub-sea Tunnel - Precast Gallery Fabrication	244	22-Jan-15	21-Nov-15	23-Mar-15	16-Jan-16	0%												

Sub-sea Tunnel Cross Passage & Internal Structure

Design Submission

(G4) AIP - Cross Passage - Permanent works - Sub-sea tunnel

AP00485	SO Approval with Condition R received	0		22-Sep-14		02-Jul-14A	100%
---------	---------------------------------------	---	--	-----------	--	------------	------

(G4) DDA for Cross Passage - Permanent works - incl. Geotechnical Assessment - Sub-sea tunnel

AN1175	Lab Test Result from Phase 2 GI	0		01-Dec-14		01-Dec-14*	0%
AN1180	Early DDASub-sea Cross Passage Lining & CPOpening	151	03-Jun-14	29-Nov-14	03-Jun-14A	29-Nov-14	92%
DD01100	Preparation of DDACross Passage incl. Detailed Geotechnical Assessment	0	01-Dec-14	01-Dec-14	01-Dec-14	01-Dec-14	0%
DD01105	Review & Comment by JV	6	01-Dec-14	06-Dec-14	01-Dec-14	06-Dec-14	0%
DD01110	Designer prepare DDA	12	08-Dec-14	20-Dec-14	08-Dec-14	20-Dec-14	0%
DD01115	Formal Submission of DDAto ICE/ IPs	0		20-Dec-14		20-Dec-14	0%
DD01120	Advanced Submission to SO	0		20-Dec-14		20-Dec-14	0%
DD01125	IPs/ SO's Advance Comments/ ICE Comments	28	21-Dec-14	17-Jan-15	21-Dec-14	17-Jan-15	0%
DD01130	Comments Received	0		17-Jan-15		17-Jan-15	0%
DD01135	Designer to Reply RTC + Update Submission	21	19-Jan-15	11-Feb-15	19-Jan-15	11-Feb-15	0%
DD01140	Submit Updated DDA to SO/ ICE/ IPs	0	12-Feb-15			12-Feb-15	0%
DD01145	ICE Approval & Issue Check Cert	12	12-Feb-15	04-Mar-15	12-Feb-15	04-Mar-15	0%
DD01155	IPs Review	28	12-Feb-15	11-Mar-15	12-Feb-15	11-Mar-15	0%
DD01180	SO's Review	35	12-Feb-15	18-Mar-15	12-Feb-15	18-Mar-15	0%

(H1) DDA Temp.works for Cross Passages - Sub-sea tunnel (Type A)

AN1210	DDACP Freezing design (Structural & thermal analysis of the ice ring)	176	25-Jul-14	28-Feb-15	18-Jun-14A	27-Dec-14	81%
DD05000	Preparation of DDACross Passages Ground Freezing (TypeA)	18	02-Mar-15	21-Mar-15	29-Dec-14	19-Jan-15	0%
DD05010	Review & Comment by JV	18	23-Mar-15	16-Apr-15	20-Jan-15	09-Feb-15	0%
DD05020	Designer prepare DDA	10	17-Apr-15	28-Apr-15	10-Feb-15	27-Feb-15	0%
DD05030	Formal Submission of DDAto ICE/ IPs	0		28-Apr-15		27-Feb-15	0%
DD05040	Advanced Submission to SO	0		28-Apr-15		27-Feb-15	0%

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	17-Nov-14	15-Dec-14	0%
MS1310	Submit Method Statement to SO/ ICE	0		17-Oct-14		15-Dec-14	0%
MS1320	SO Reviews & Comments/ ICE Comments	28	18-Oct-14	14-Nov-14	16-Dec-14	12-Jan-15	0%
MS1330	Re-submission	18	15-Nov-14	05-Dec-14	13-Jan-15	02-Feb-15	0%
MS1340	ICE Approval & Issue Check Cert.	18	06-Dec-14	29-Dec-14	03-Feb-15	02-Mar-15	0%
MS1350	SO's Review	28	06-Dec-14	02-Jan-15	03-Feb-15	02-Mar-15	0%
MS1360	SO's Approval	0		02-Jan-15		02-Mar-15	0%

Southern Landfall

South Retrieval Shaft

Design Submission

(A4) Additional Ground Investigation Plan - Phase 3 - Southern Landfall

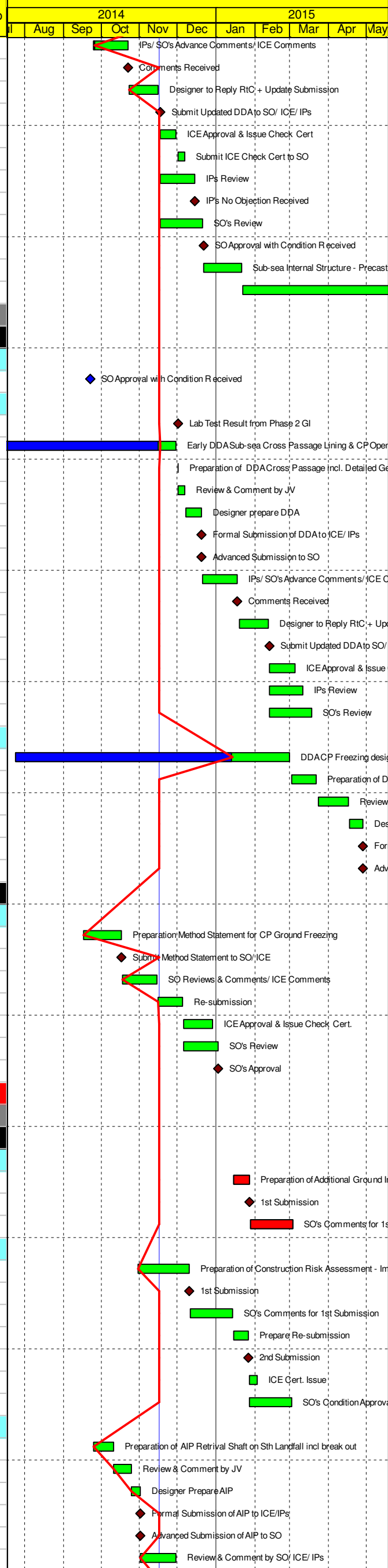
GS2870	Preparation of Additional Ground Investigation (Phase 3)	11	15-Jan-15	27-Jan-15	15-Jan-15*	27-Jan-15	0%
GS2880	1st Submission	0		27-Jan-15		27-Jan-15	0%
GS2905	SO's Comments for 1st Submission	35	28-Jan-15	03-Mar-15	28-Jan-15	03-Mar-15	0%

(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	13-Jun-15	27-Jul-15	0%
GS01205	1st Submission	0		10-Dec-14		27-Jul-15	0%
GS01210	SO's Comments for 1st Submission	35	11-Dec-14	14-Jan-15	28-Jul-15	31-Aug-15	0%
GS01215	Prepare Re-submission	10	15-Jan-15	26-Jan-15	01-Sep-15	11-Sep-15	0%
GS01220	2nd Submission	0		26-Jan-15		11-Sep-15	0%
GS01225	ICE Cert. Issue	6	27-Jan-15	02-Feb-15	12-Sep-15	18-Sep-15	0%
GS01250	SO's Condition Approval	35	27-Jan-15	02-Mar-15	12-Sep-15	16-Oct-15	0%

(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	25-Sep-14	11-Oct-14	18-Mar-15	01-Apr-15	0%
AP01605	Review & Comment by JV	12	11-Oct-14	25-Oct-14	01-Apr-15	20-Apr-15	0%
AP01610	Designer Prepare AIP	6	25-Oct-14	01-Nov-14	20-Apr-15	27-Apr-15	0%
AP01615	Formal Submission of AIP to ICE/IPs	0		01-Nov-14		27-Apr-15	0%
AP01620	Advanced Submission of AIP to SO	0		01-Nov-14		27-Apr-15	0%
AP01625	Review & Comment by SO/ ICE/ IPs	28	01-Nov-14	29-Nov-14	27-Apr-15	25-May-15	0%








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



Date	Revision	Checked	Approved
21-Feb-14	TMCLK/DBJ/GEN/PR...	SPA	WYu

Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Current Start	Current Finish	14W47 % Comp	2014					2015					
								Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May
DD69710	SO's Review	35	15-Jan-15	19-Feb-15	10-Jul-15	14-Aug-15	0%											
DD69720	SO Approval with Condition R received	0		26-Feb-15			0%											
South Ventilation Building																		
Design Submission																		
(I1) DDA for South Vent.Bldg. GBP & Arch.Submission																		
DD01410	Designer prepare DDA	15	13-Oct-14	29-Oct-14	30-Apr-15	18-May-15	0%											
DD01415	Formal Submission of DDA to ICE/ IPs	0		29-Oct-14			0%											
DD01420	Advanced Submission to SO	0		29-Oct-14			0%											
DD01425	IPs/ SO's Advance Comments/ ICE Comments	28	30-Oct-14	26-Nov-14	19-May-15	15-Jun-15	0%											
DD01430	Comments Received	0		26-Nov-14			0%											
DD01435	Designer to Reply RTC + Update Submission	21	27-Nov-14	20-Dec-14	16-Jun-15	11-Jul-15	0%											
DD01440	Submit Updated DDA to SO/ ICE/ IPs	0	22-Dec-14		13-Jul-15		0%											
DD01445	ICE Approval & Issue Check Cert	18	22-Dec-14	14-Jan-15	13-Jul-15	01-Aug-15	0%											
DD01450	Submit ICE Check Cert to SO	6	15-Jan-15	21-Jan-15	03-Aug-15	08-Aug-15	0%											
DD01455	IPs Review	28	22-Dec-14	18-Jan-15	13-Jul-15	09-Aug-15	0%											
DD01460	IP's No Objection Received	0		18-Jan-15			0%											
DD01465	SO's Review	35	22-Dec-14	25-Jan-15	13-Jul-15	16-Aug-15	0%											
DD01470	SO Approval with Condition R received	0		26-Jan-15			0%											
(I2) DDA for South Vent.Bldg.Structural Design incl.Vent.Connections																		
DD67808	Preparation of DDA Sth VB Structural Design incl. Vent Conn	18	28-Jan-15	17-Feb-15	17-Aug-15	05-Sep-15	0%											
DD67818	Review & Comment by JV	18	18-Feb-15	17-Mar-15	07-Sep-15	26-Sep-15	0%											
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	23-Jan-15	12-Feb-15	0%											
DD05820	Review & Comment by JV	18	29-Nov-14	19-Dec-14	13-Feb-15	12-Mar-15	0%											
DD05830	Designer prepare DDA	10	20-Dec-14	03-Jan-15	13-Mar-15	24-Mar-15	0%											
DD05840	Advanced Submission to SO	0		03-Jan-15			0%											
DD05850	Formal Submission of DDA to ICE/ IPs	0		03-Jan-15			0%											
DD05860	IPs/ SO's Advance Comments/ ICE Comments	28	04-Jan-15	31-Jan-15	25-Mar-15	21-Apr-15	0%											
DD05870	Comments Received	0		31-Jan-15			0%											
DD05880	Designer to Reply RTC + Update Submission	21	02-Feb-15	04-Mar-15	22-Apr-15	16-May-15	0%											

 Planned Bar
 Planned Bar
 Planned Milestone
 Progress bar
 Progress Milestone



Date	Revision	Checked	Approved
21-Feb-14	TMCLK/DBJ/GEN/PR...	SPa	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		✓

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	
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		✓

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	
		- 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		✓

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	
					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		✓

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	
					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		<>

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	
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

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	
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									

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	
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		✓

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	
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		✓

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	
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		<>

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	
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		✓

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	
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		<>

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	
		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		✓

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	
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

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

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 - September 2014**

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

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

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

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

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

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

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

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

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

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

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

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Sep	02-Sep	03-Sep	04-Sep	05-Sep	06-Sep
	WQM Mid-Flood 11:17 (09:32 - 13:02) Mid-Ebb 16:59 (15:14 - 18:44)		WQM Mid-Flood 14:33 (12:48 - 16:18) Mid-Ebb 19:42 (18:20 - 21:00)		WQM Mid-Ebb 9:34 (07:49 - 11:19) Mid-Flood 17:04 (15:19 - 18:49)	
07-Sep	08-Sep	Public Holiday 09-Sep	10-Sep	11-Sep	12-Sep	13-Sep
	WQM Mid-Ebb 12:15 (10:30 - 14:00) Mid-Flood 18:59 (17:14 - 20:44)		WQM Mid-Ebb 13:44 (11:59 - 15:29) Mid-Flood 20:05 (18:20 - 21:50)		WQM Mid-Flood 9:03 (07:18 - 10:48) Mid-Ebb 15:04 (13:19 - 16:49)	
14-Sep	15-Sep	16-Sep	17-Sep	18-Sep	19-Sep	20-Sep
	WQM Mid-Flood 12:06 (10:21 - 13:51) Mid-Ebb*		WQM Mid-Ebb 7:32 (05:47 - 09:17) Mid-Flood 20:16 (18:31 - 22:01)		WQM Mid-Ebb 9:56 (08:11 - 11:41) Mid-Flood 17:14 (15:29 - 18:59)	
21-Sep	22-Sep	23-Sep	24-Sep	25-Sep	26-Sep	27-Sep
	WQM Mid-Ebb 12:02 (10:17 - 13:47) Mid-Flood 18:28 (16:43 - 20:13)		WQM Mid-Ebb 13:06 (11:21 - 14:51) Mid-Flood 19:13 (17:28 - 20:58)		WQM Mid-Flood 14:06 (12:21 - 15:51) Mid-Ebb 20:02 (18:17 - 21:47)	
28-Sep	29-Sep	30-Sep				
	WQM Mid-Flood 10:15 (08:30 - 12:00) Mid-Ebb 15:58 (14:13 - 17:43)					

*WQM for Mid-Ebb was cancelled on 15-Sep due to adverse weather conditions.

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Oct	02-Oct	03-Oct	04-Oct
			WQM Mid-Flood 12:43 (11:03 - 14:33) Mid-Ebb 17:57 (16:20 - 19:30)		WQM Mid-Flood 15:38 (13:53 - 17:23) Mid-Ebb 21:19 (19:34 - 23:04)	
05-Oct	06-Oct	07-Oct	08-Oct	09-Oct	10-Oct	11-Oct
	WQM Mid-Ebb 11:02 (09:17 - 12:47) Mid-Flood 17:45 (16:00 - 19:30)		WQM Mid-Ebb 12:38 (10:53 - 14:23) Mid-Flood 18:49 (17:04 - 20:34)		WQM Mid-Ebb 14:02 (12:17 - 15:47) Mid-Flood 19:51 (18:06 - 21:36)	
12-Oct	13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct
	WQM Mid-Flood 10:47 (09:02 - 12:32) Mid-Ebb 16:06 (14:21 - 17:51)		WQM Mid-Flood 12:59 (11:14 - 14:44) Mid-Ebb 17:42 (16:30 - 18:55)		WQM Mid-Flood 15:52 (14:07 - 17:37) Mid-Ebb 21:31 (20:00 - 23:00)	
19-Oct	20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct
	WQM Mid-Ebb 10:46 (09:01 - 12:31) Mid-Flood 17:13 (15:28 - 18:58)		WQM Mid-Ebb 12:02 (10:17 - 13:47) Mid-Flood 18:01 (16:16 - 19:48)		WQM Mid-Ebb 13:09 (11:24 - 14:54) Mid-Flood 18:53 (17:08 - 20:38)	
26-Oct	27-Oct	28-Oct	29-Oct	30-Oct	31-Oct	
	WQM Mid-Flood 9:26 (08:11 - 11:41) Mid-Ebb 15:04 (13:19 - 16:49)		WQM Mid-Flood 11:23 (09:38 - 13:08) Mid-Ebb 16:46 (15:01 - 18:31)		WQM Mid-Flood 13:58 (12:13 - 15:43) Mid-Ebb 19:35 (18:00 - 21:10)	

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Nov
02-Nov	03-Nov	04-Nov	05-Nov	06-Nov	07-Nov	08-Nov
	WQM Mid-Ebb 9:41 (07:56 - 11:26) Mid-Flood 16:28 (14:43 - 18:13)		WQM Mid-Ebb 11:29 (09:44 - 13:14) Mid-Flood 17:36 (15:51 - 19:21)		WQM Mid-Ebb 13:00 (11:15 - 14:45) Mid-Flood 18:41 (16:56 - 20:26)	
09-Nov	10-Nov	11-Nov	12-Nov	13-Nov	14-Nov	15-Nov
	WQM Mid-Flood 9:45 (08:00 - 11:30) Mid-Ebb 15:04 (13:19 - 16:49)		WQM Mid-Flood 11:22 (09:37 - 13:07) Mid-Ebb 16:25 (14:45 - 18:05)		WQM Mid-Ebb 5:19 (03:34 - 07:04) Mid-Flood 17:41 (15:56 - 19:26)	
16-Nov	17-Nov	18-Nov	19-Nov	20-Nov	21-Nov	22-Nov
	WQM Mid-Ebb 8:45 (07:00 - 10:30) Mid-Flood 15:45 (14:00 - 17:30)		WQM Mid-Ebb 10:43 (08:58 - 12:28) Mid-Flood 16:43 (14:58 - 18:28)		WQM Mid-Ebb 12:06 (10:21 - 13:51) Mid-Flood 17:42 (15:57 - 19:27)	
23-Nov	24-Nov	25-Nov	26-Nov	27-Nov	28-Nov	29-Nov
	WQM Mid-Flood 8:40 (06:55 - 10:25) Mid-Ebb 14:10 (12:25 - 15:55)		WQM Mid-Flood 10:19 (08:34 - 12:04) Mid-Ebb 15:44 (13:59 - 17:29)		WQM Mid-Flood 12:11 (10:26 - 13:56) Mid-Ebb 17:41 (15:56 - 19:26)	

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

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

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

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

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

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

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

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

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

Appendix F

Impact Air Quality Monitoring Results

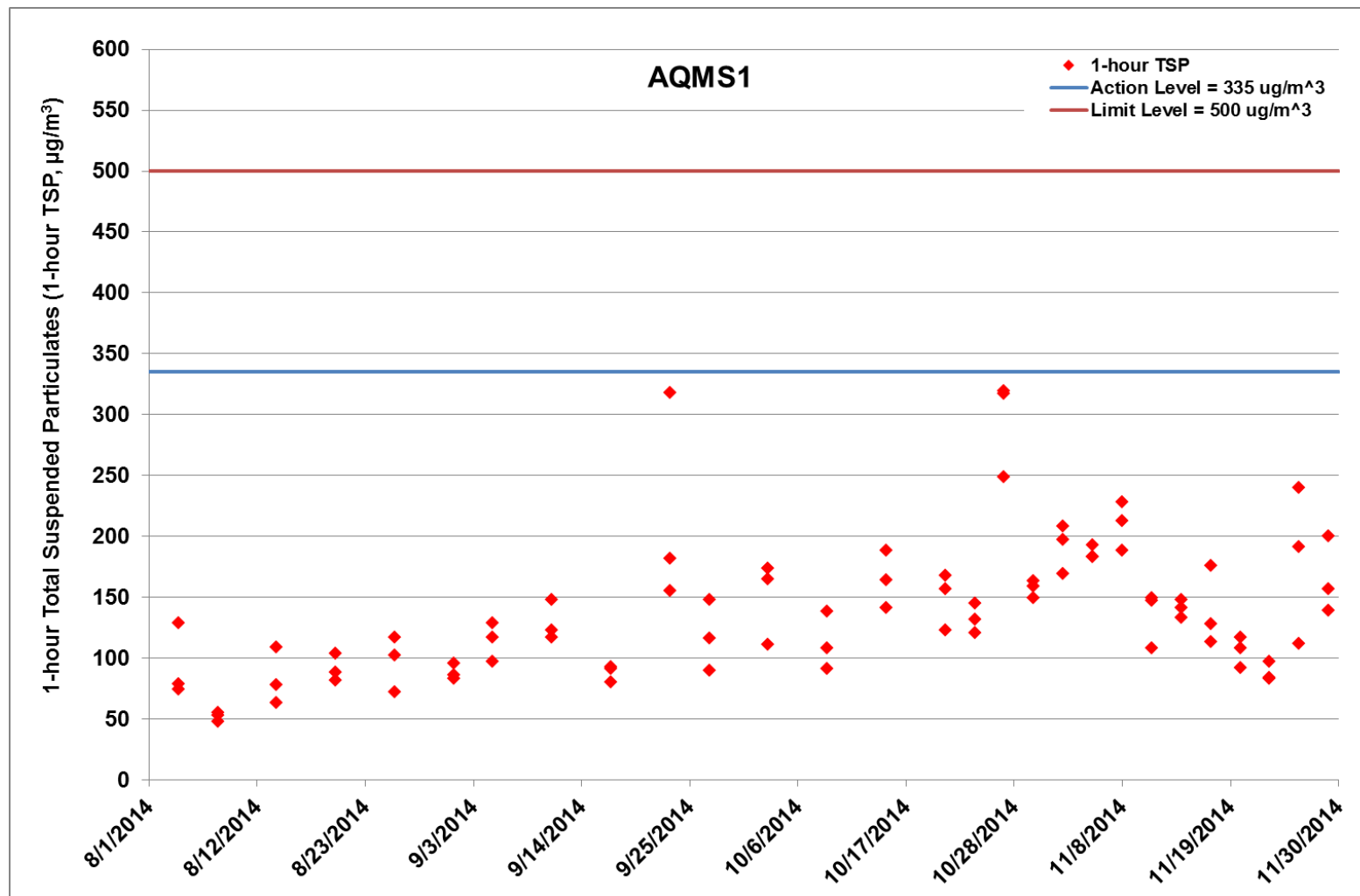


Figure F.1 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



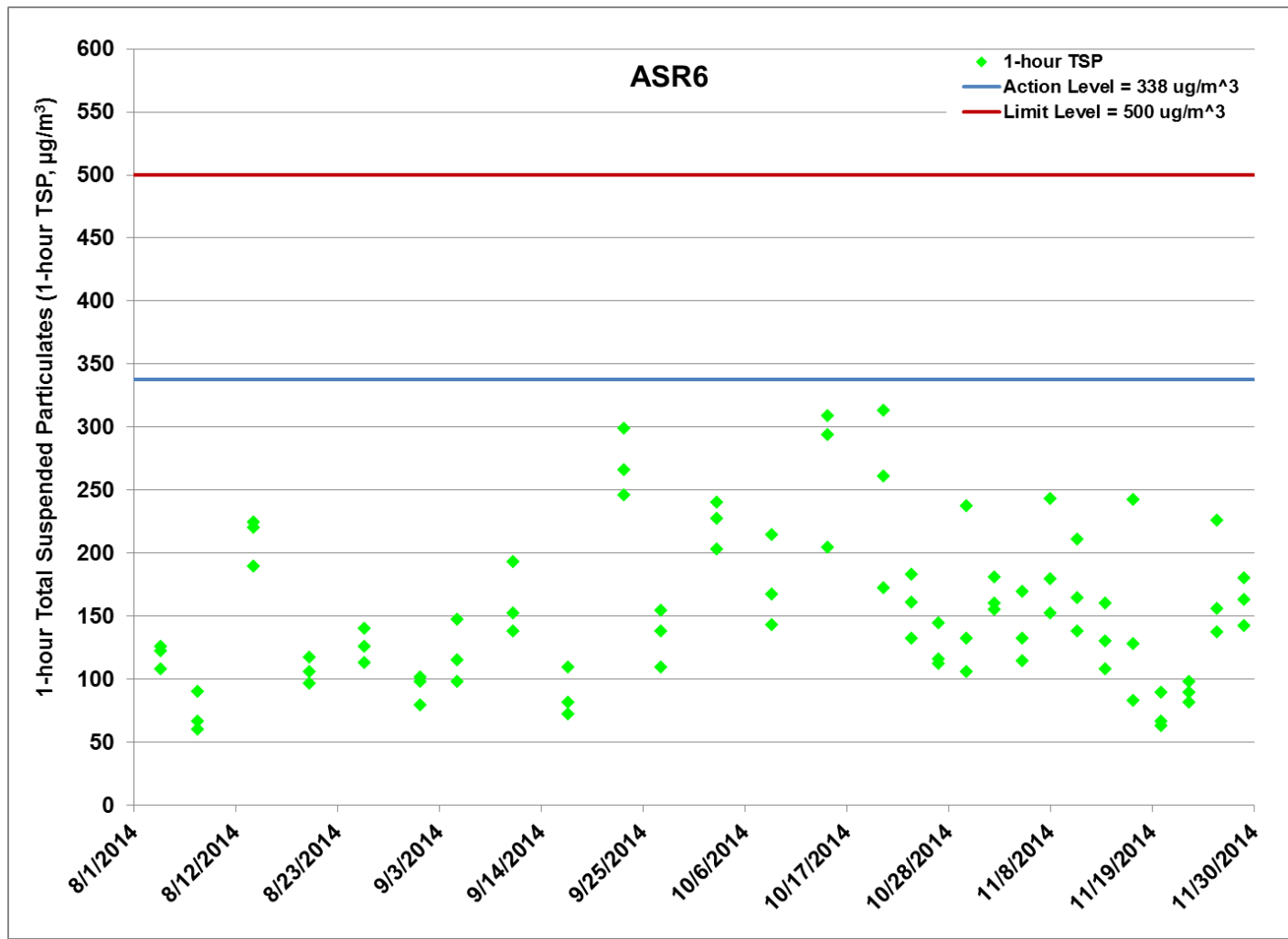


Figure F.2 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



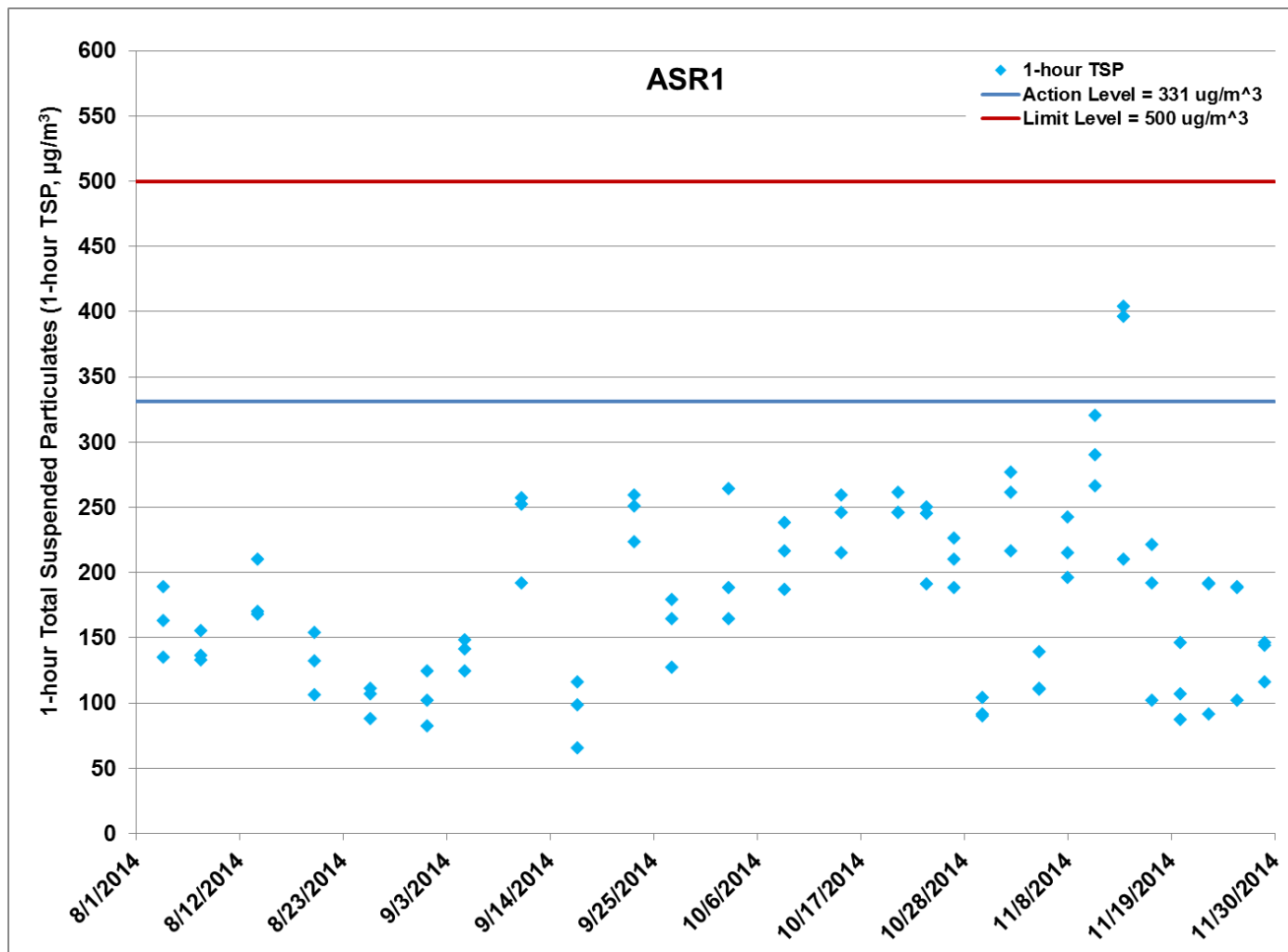


Figure F.3 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



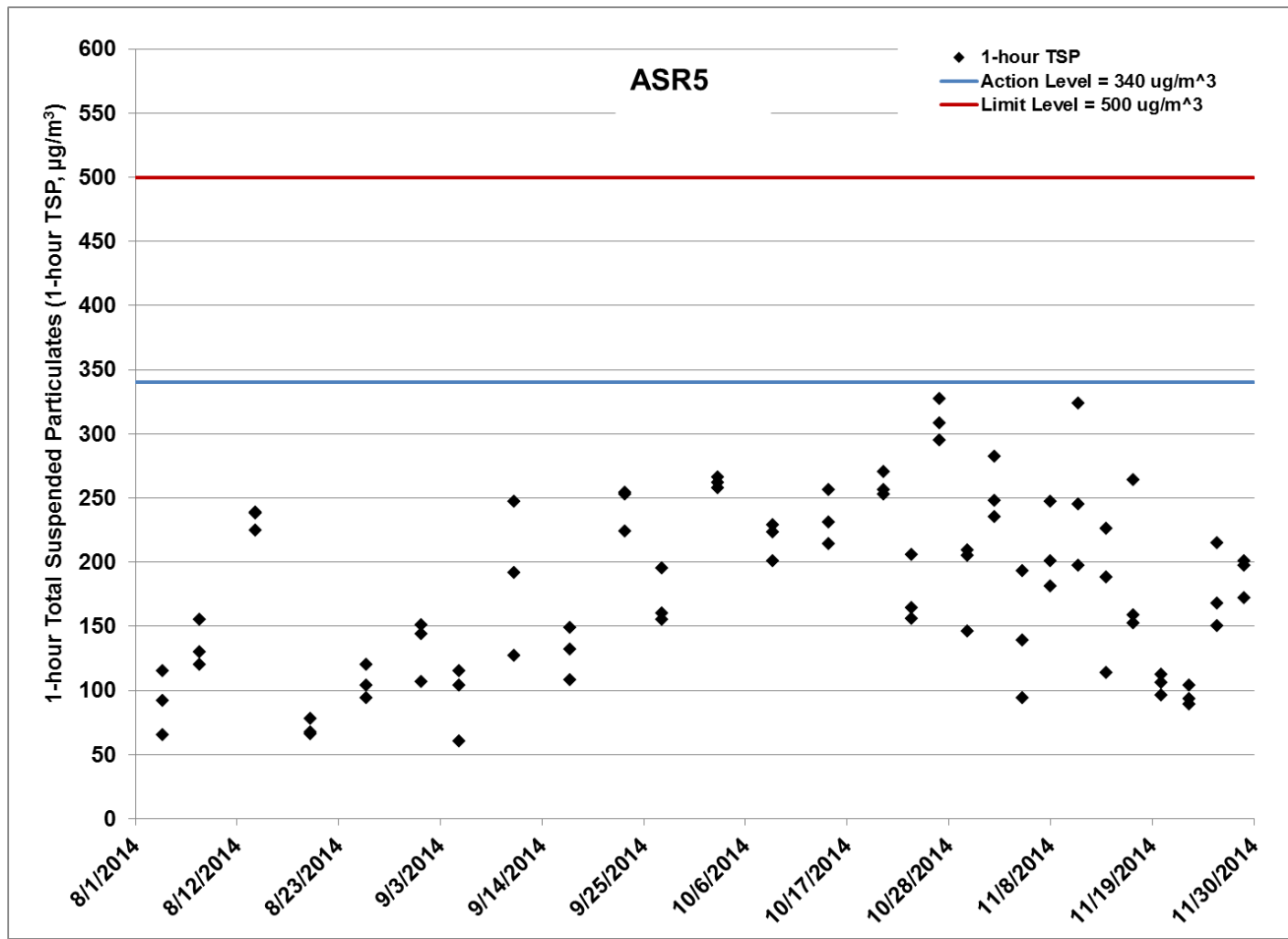


Figure F.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



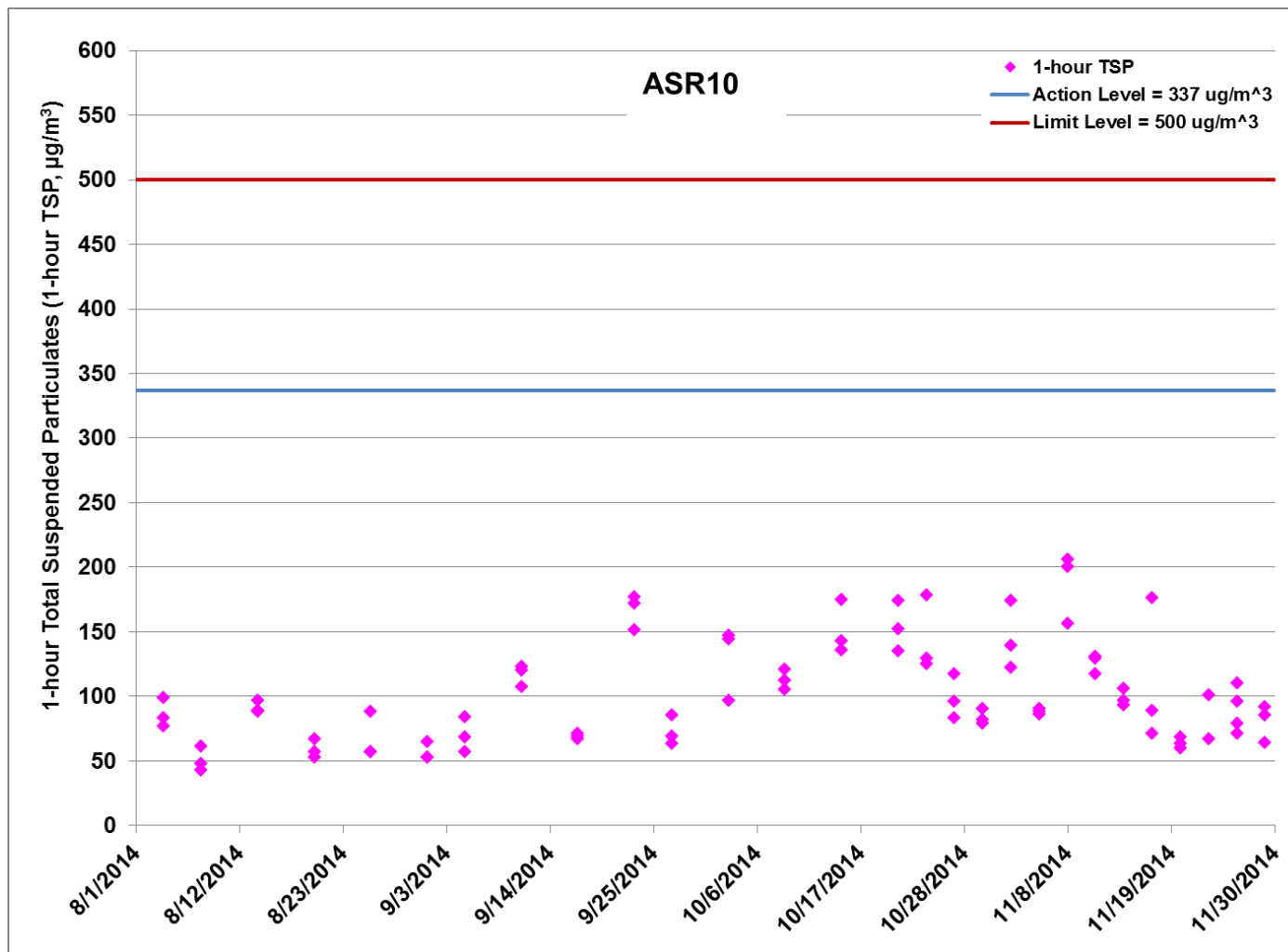


Figure F.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



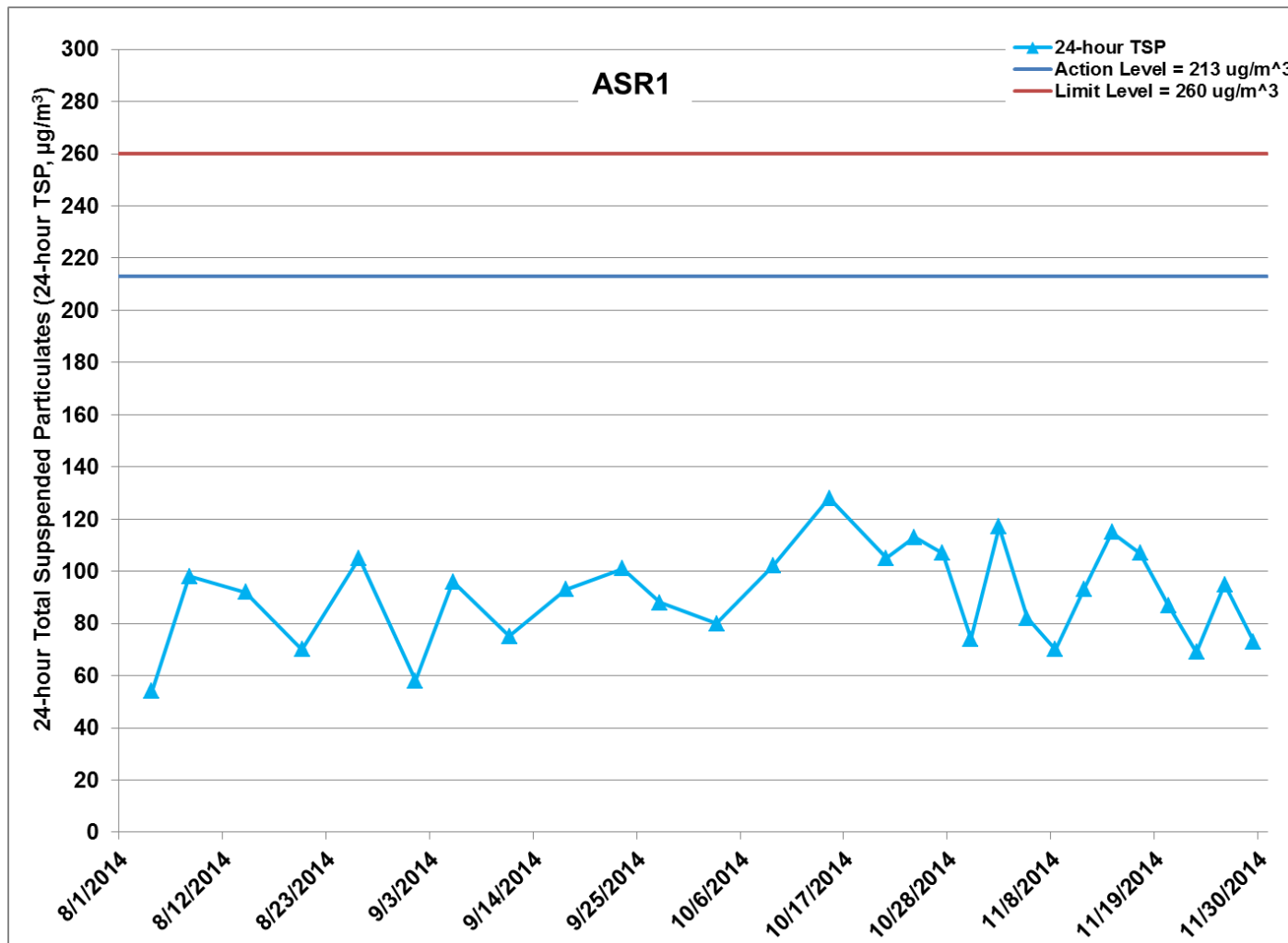


Figure F.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



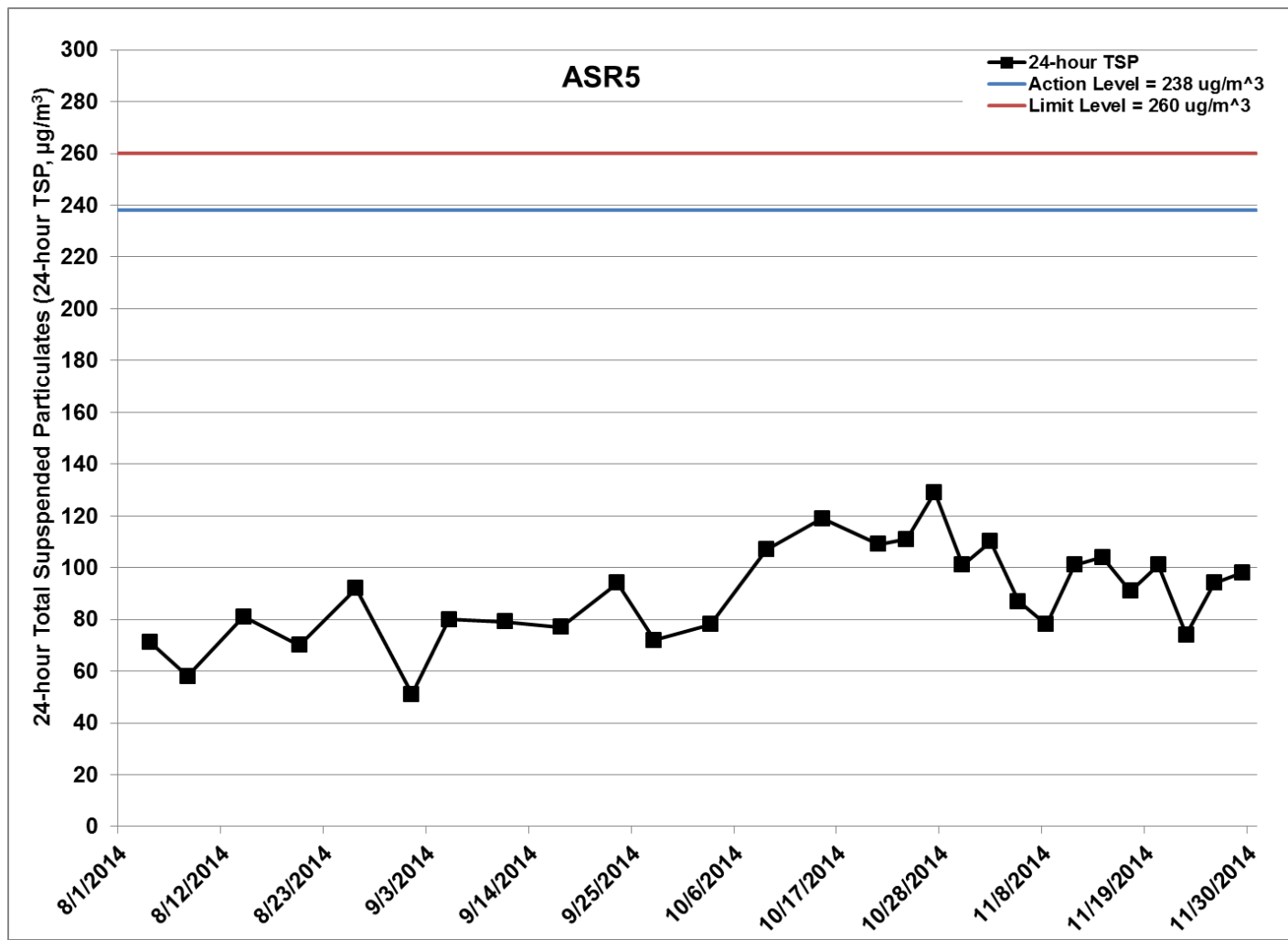


Figure F.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



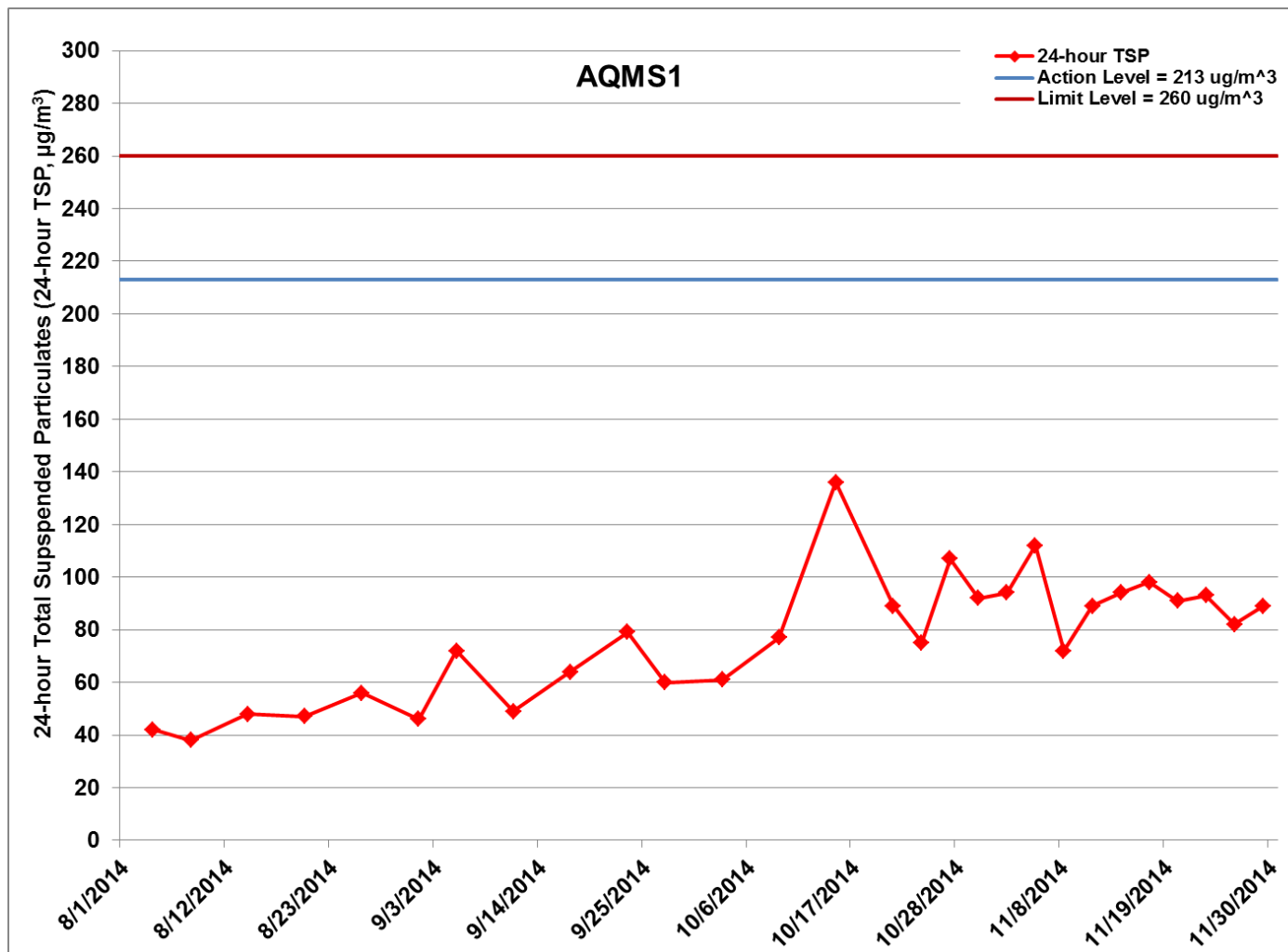


Figure F.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



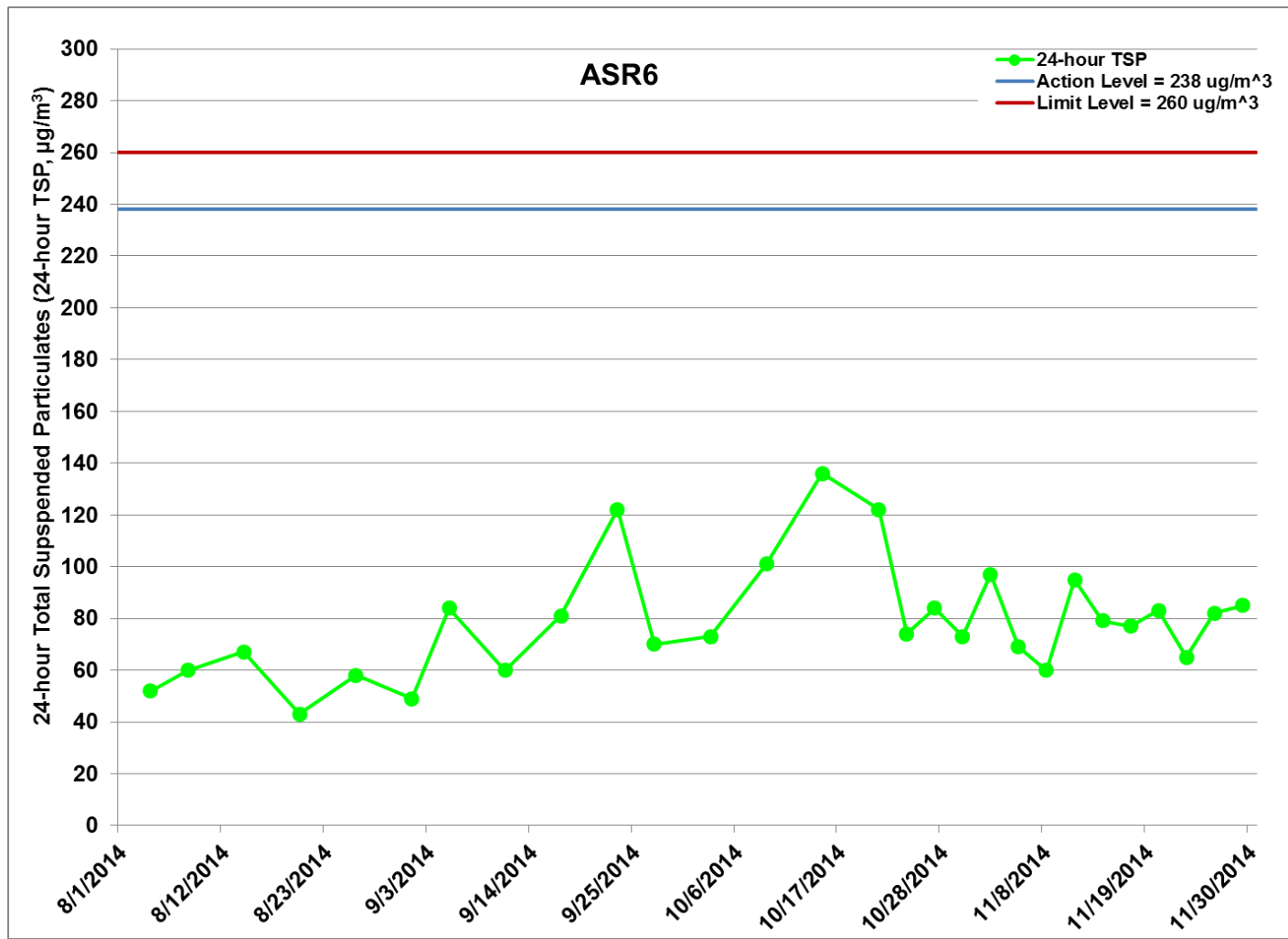


Figure F.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



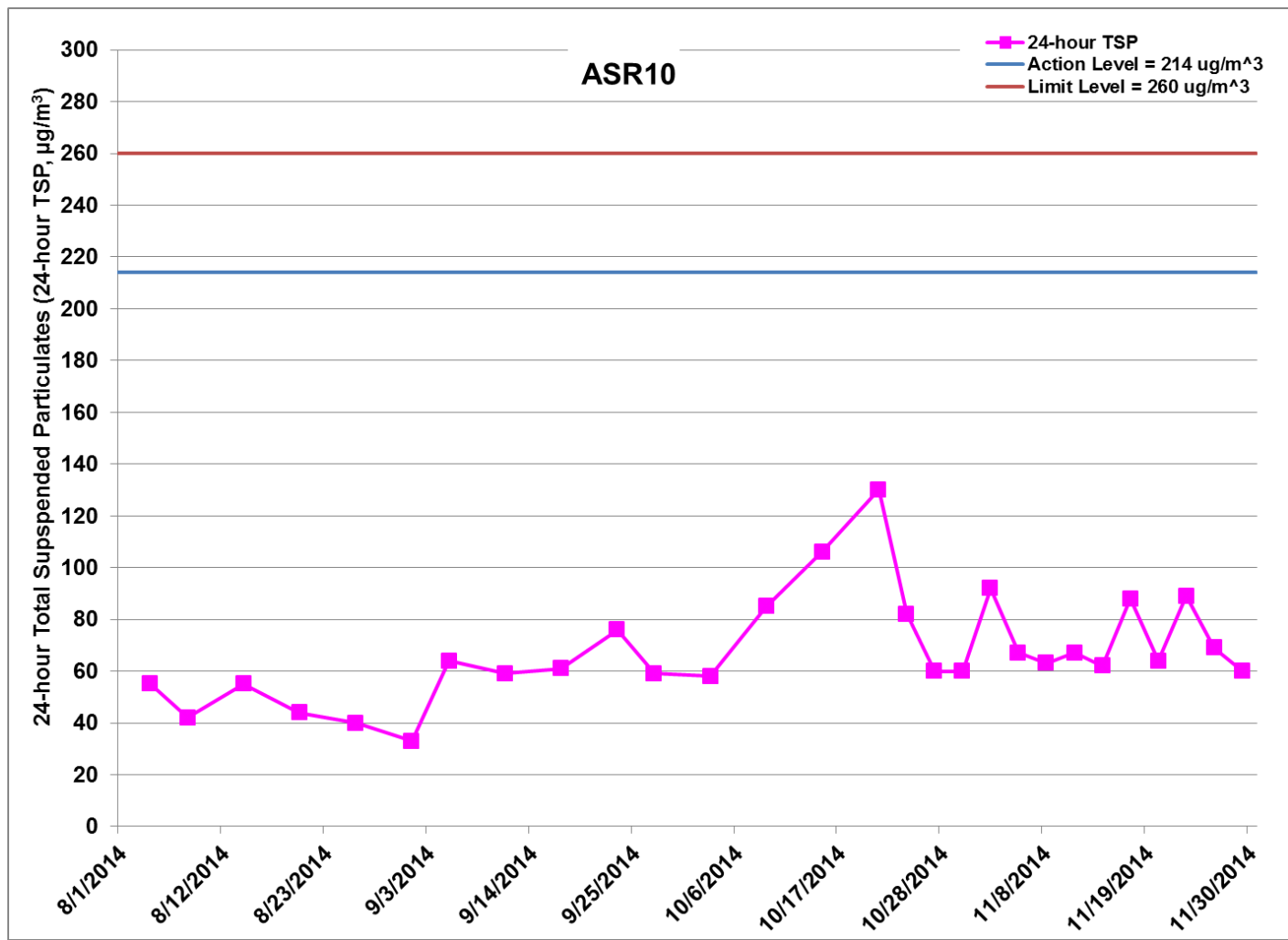


Figure F.10 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 August 2014 and 30 November 2014 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Diaphragm Wall Construction at Reclamation Area - Portion N-A (1/8/2014 - 30/11/2014), Excavation for Launching Shaft (24/10/2014 - 30/11/2014) & Construction of CLP Temporary Substation at N6 (1/8/2014 - 31/8/2014).

Ref: 0212330_Impact AQM graphs_Qrpt Sep 2014_Nov 2014_REV a.xlsx



Appendix G

Impact Water Quality Monitoring Results

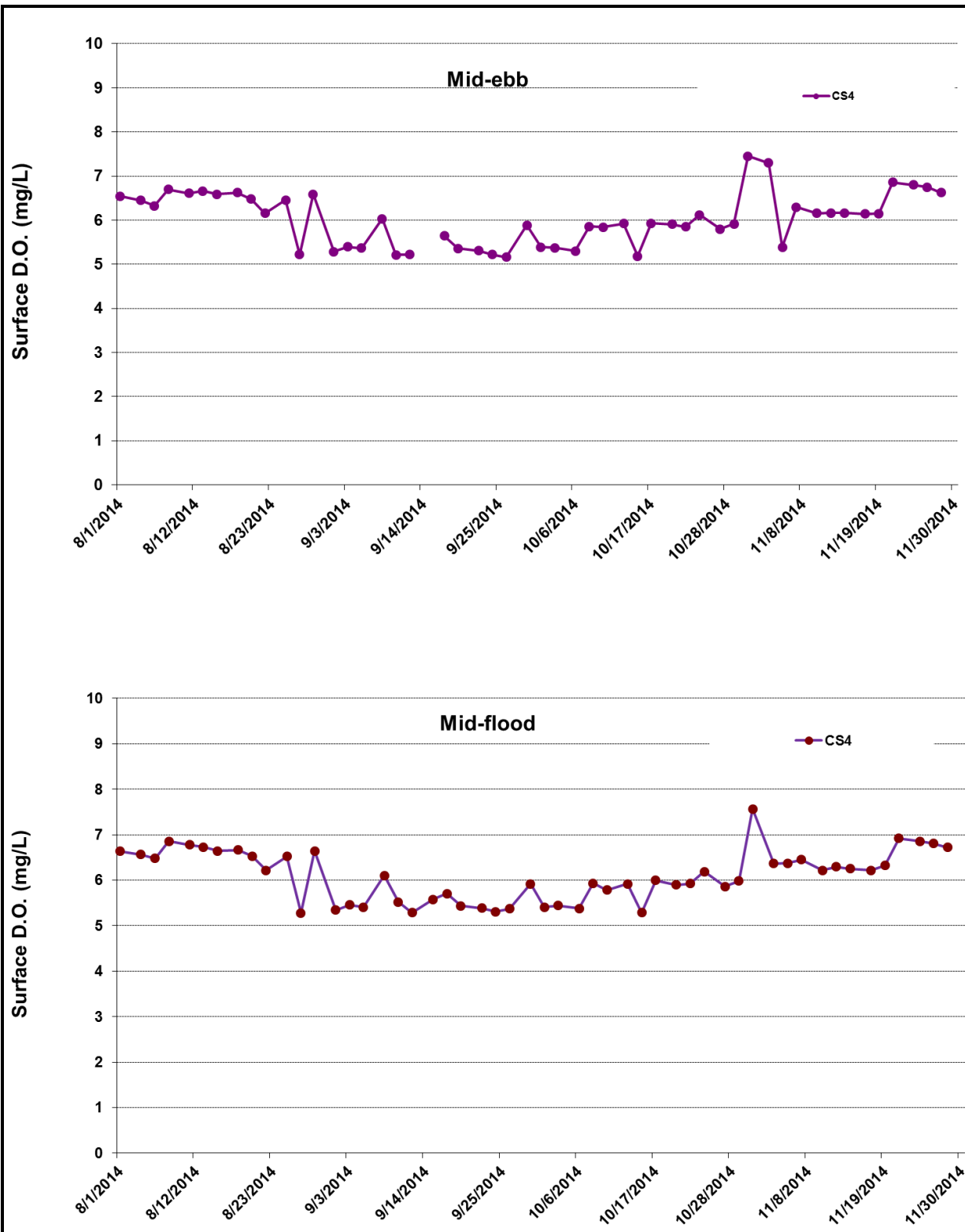


Figure G1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



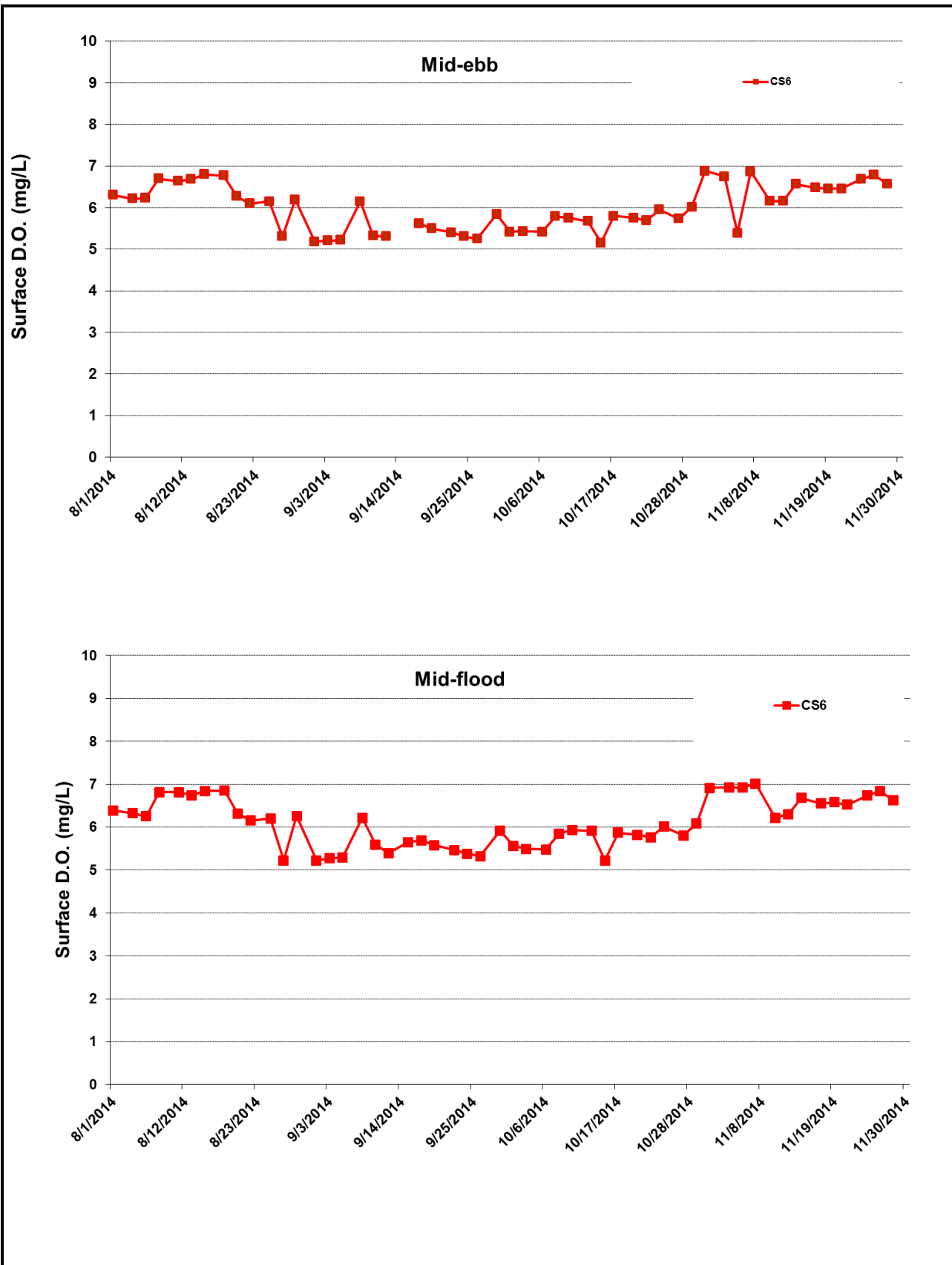


Figure G2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



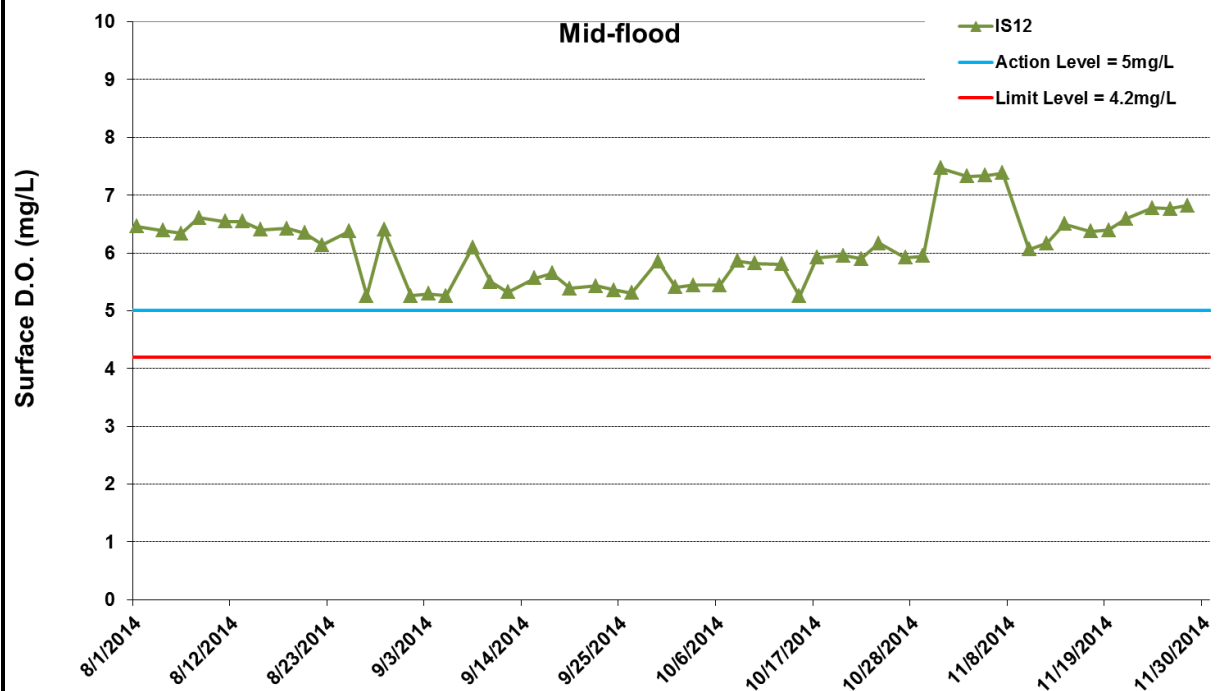
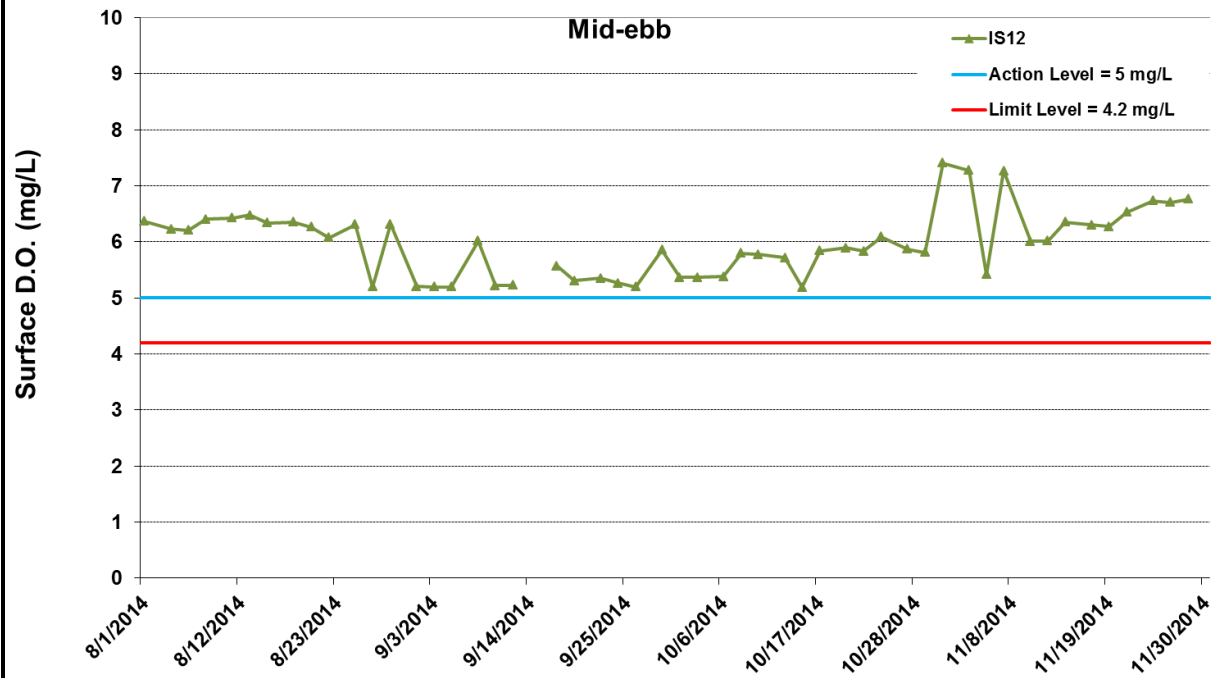


Figure G3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



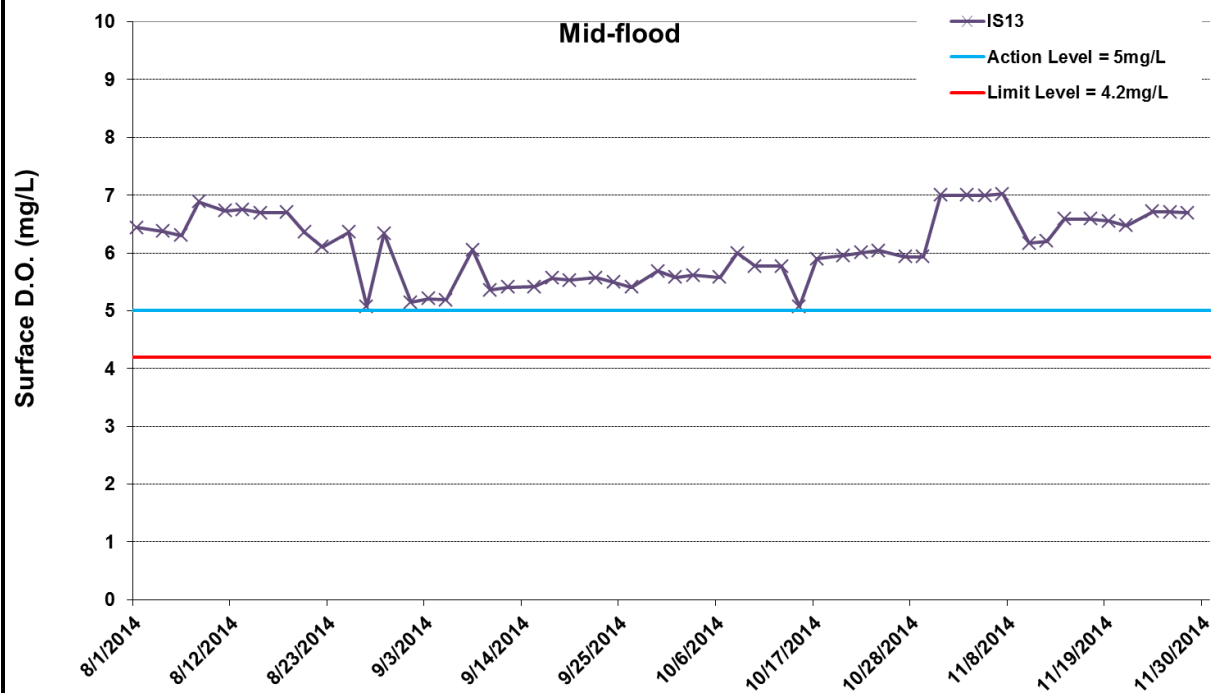
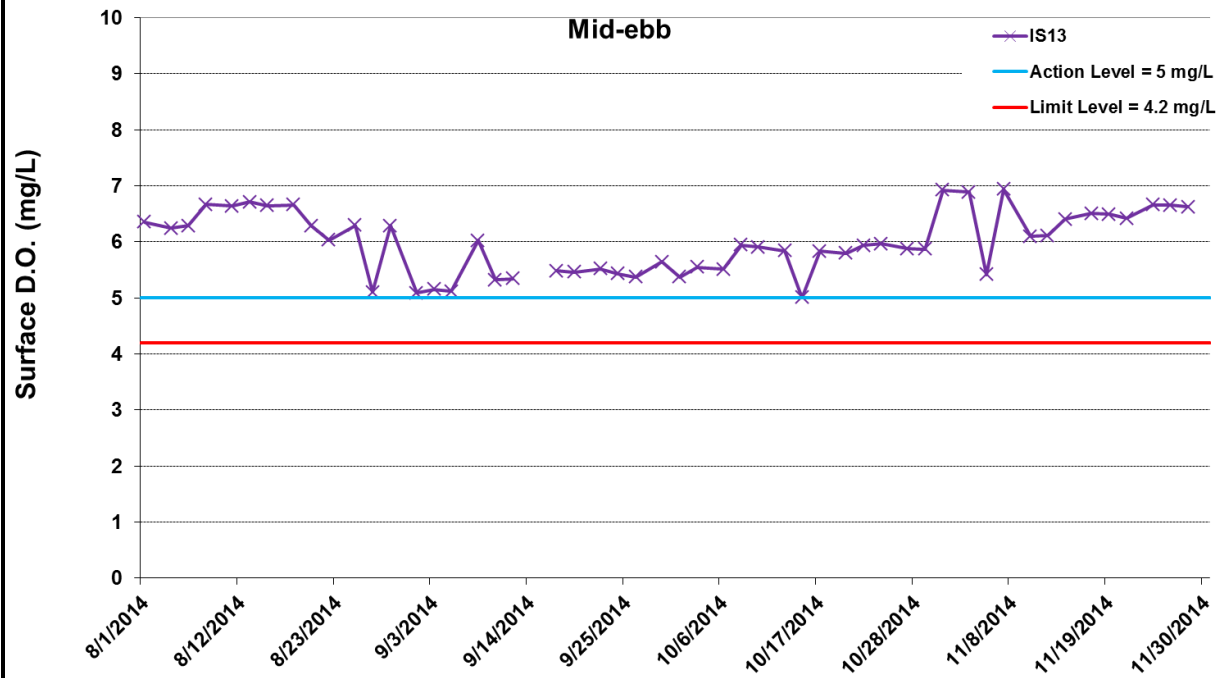


Figure G4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



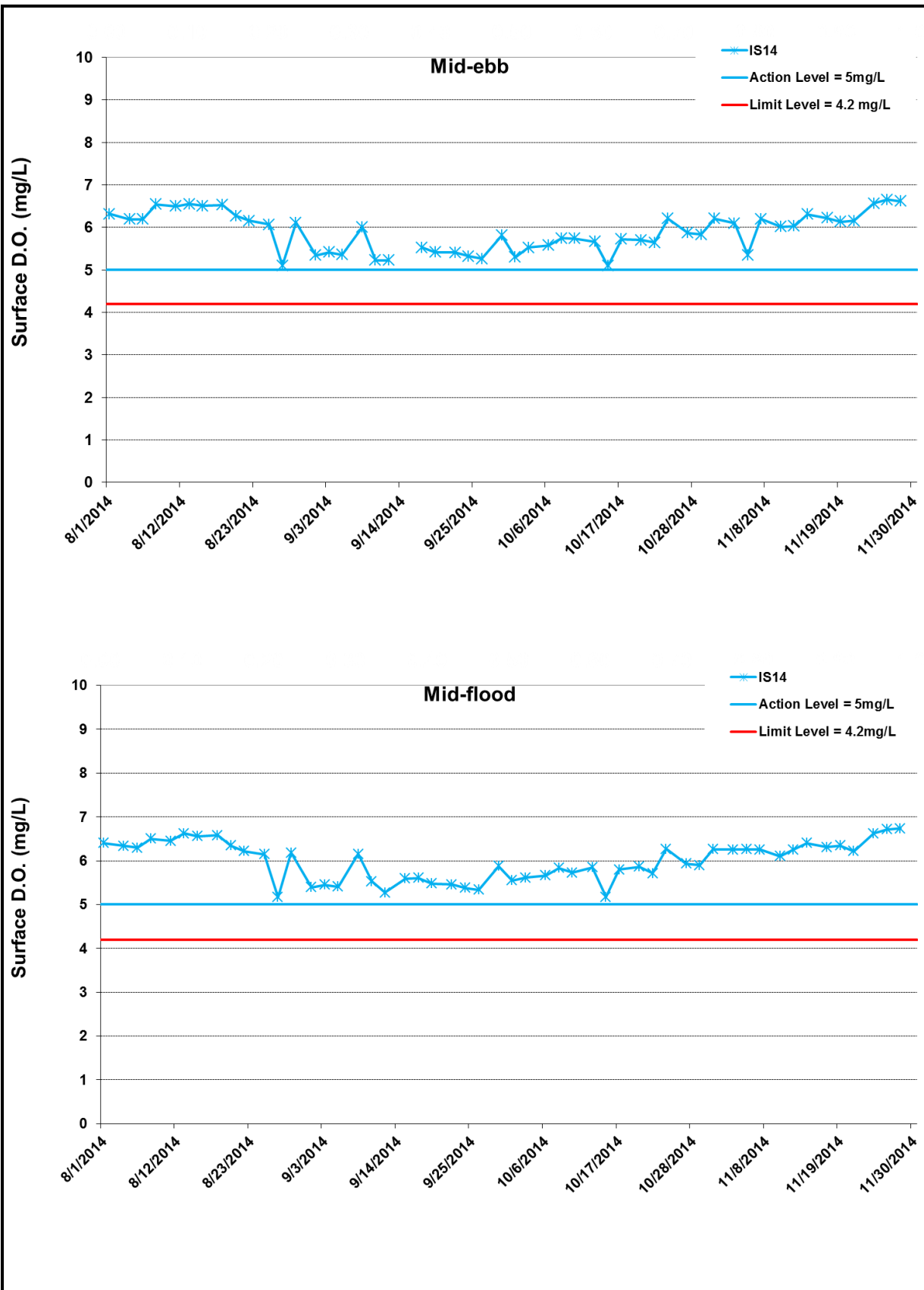


Figure G5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



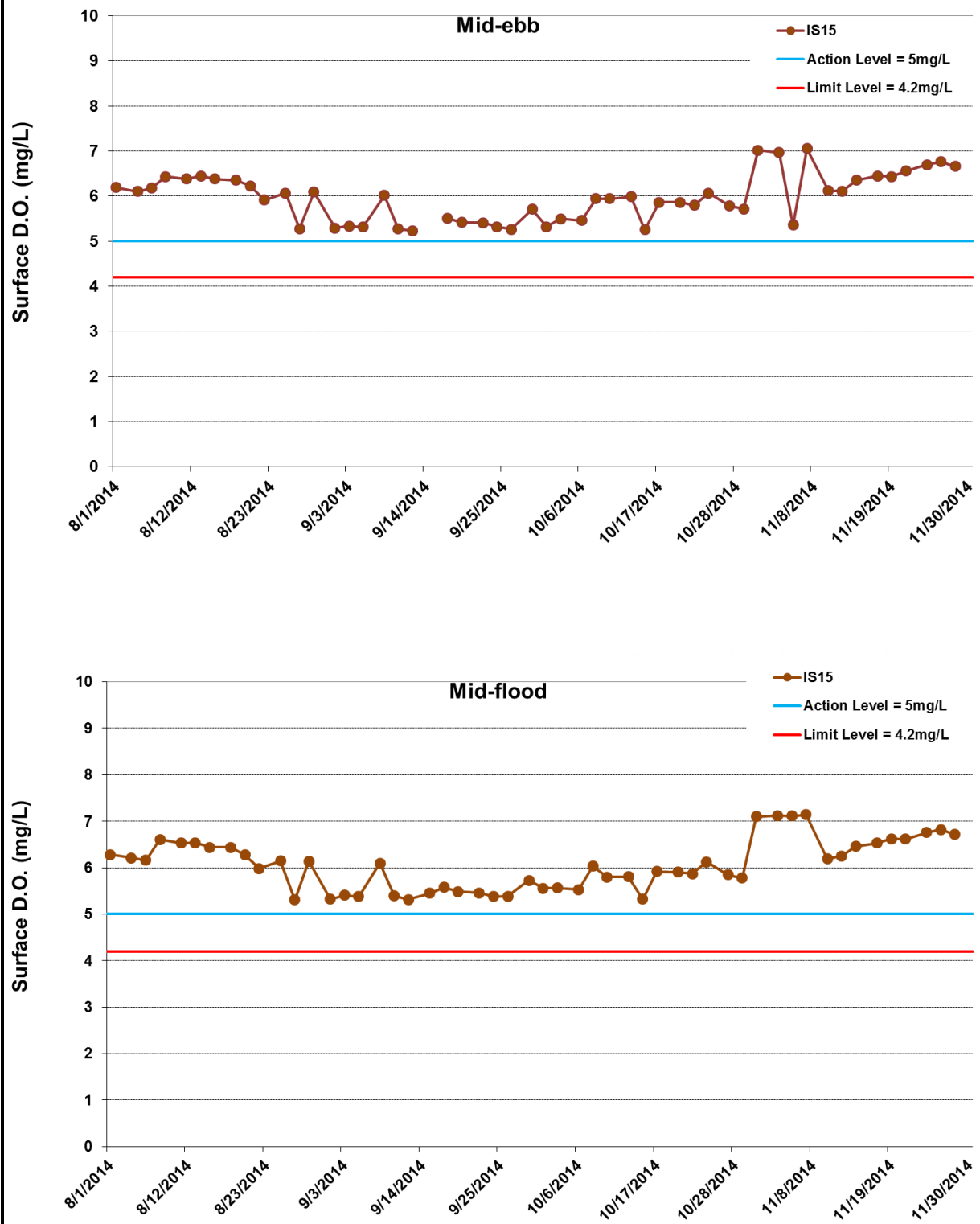
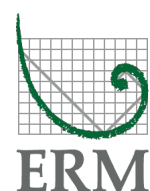


Figure G6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



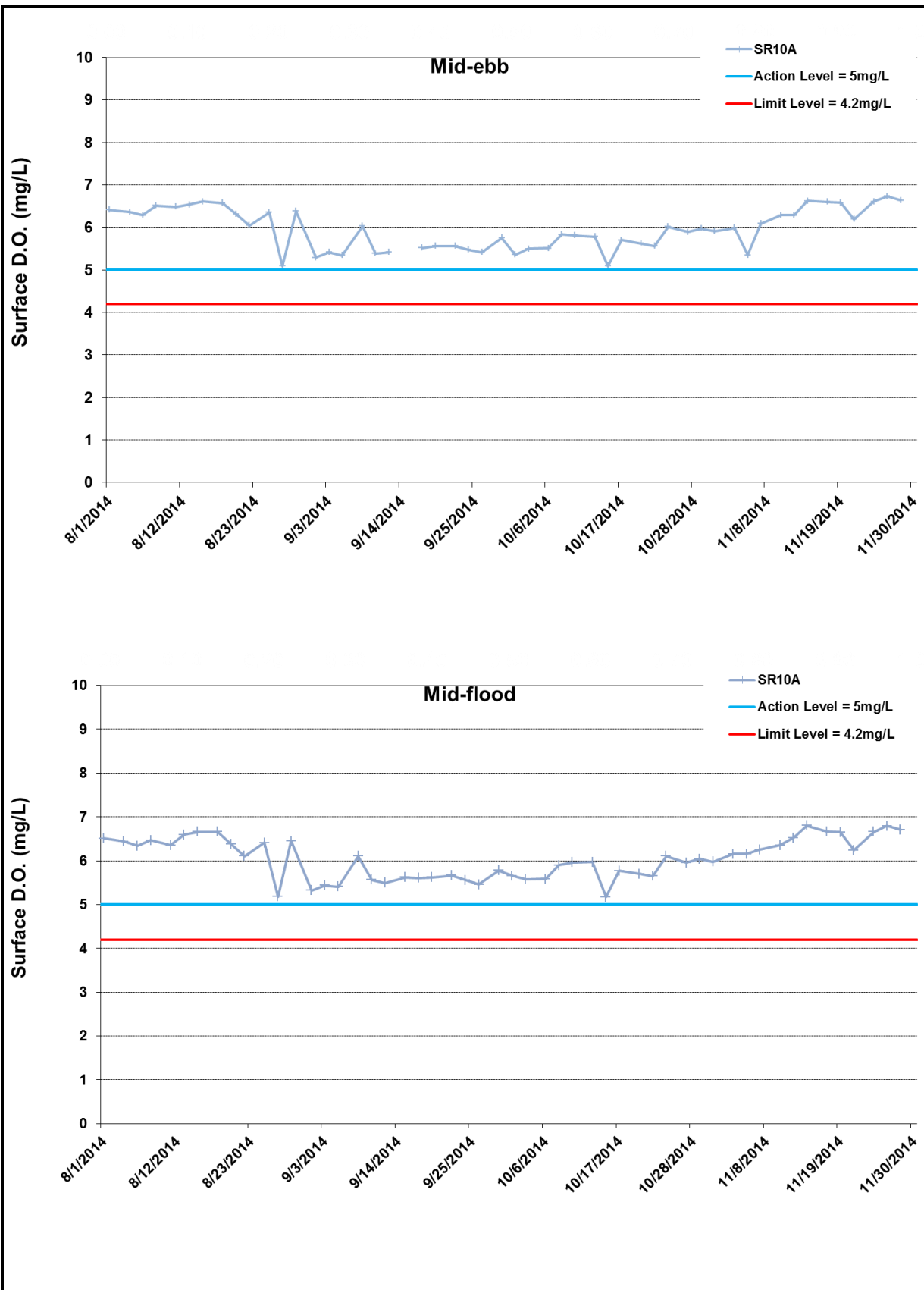
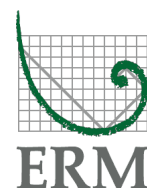


Figure G7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather. Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



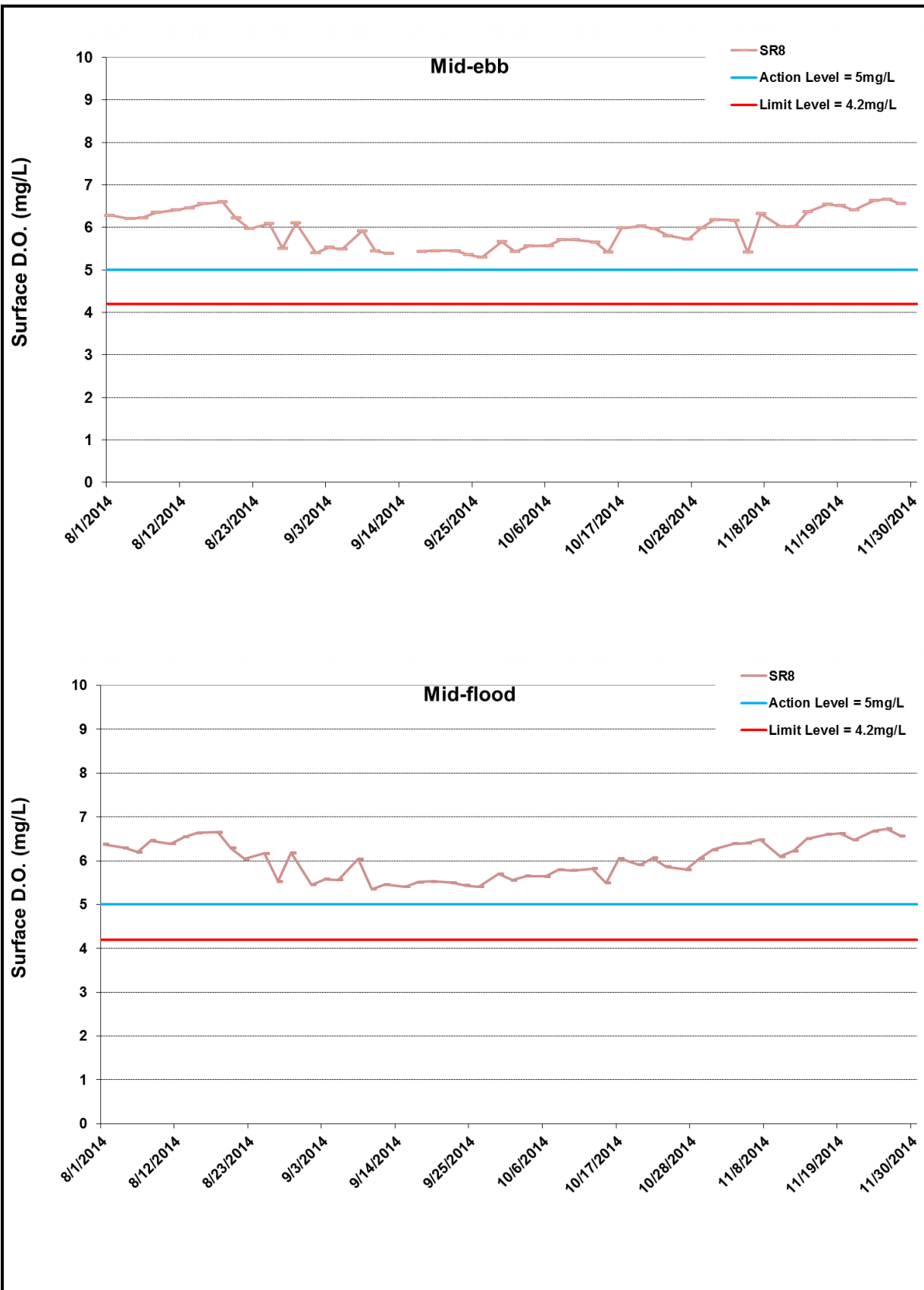


Figure G8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



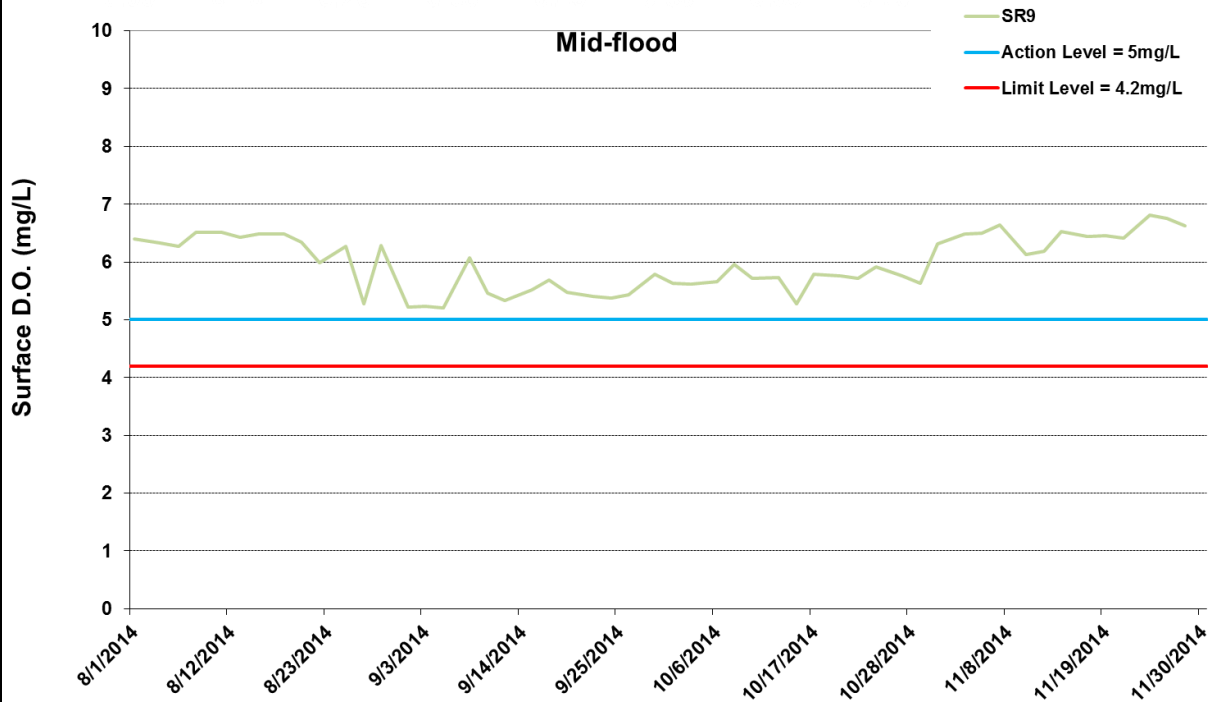
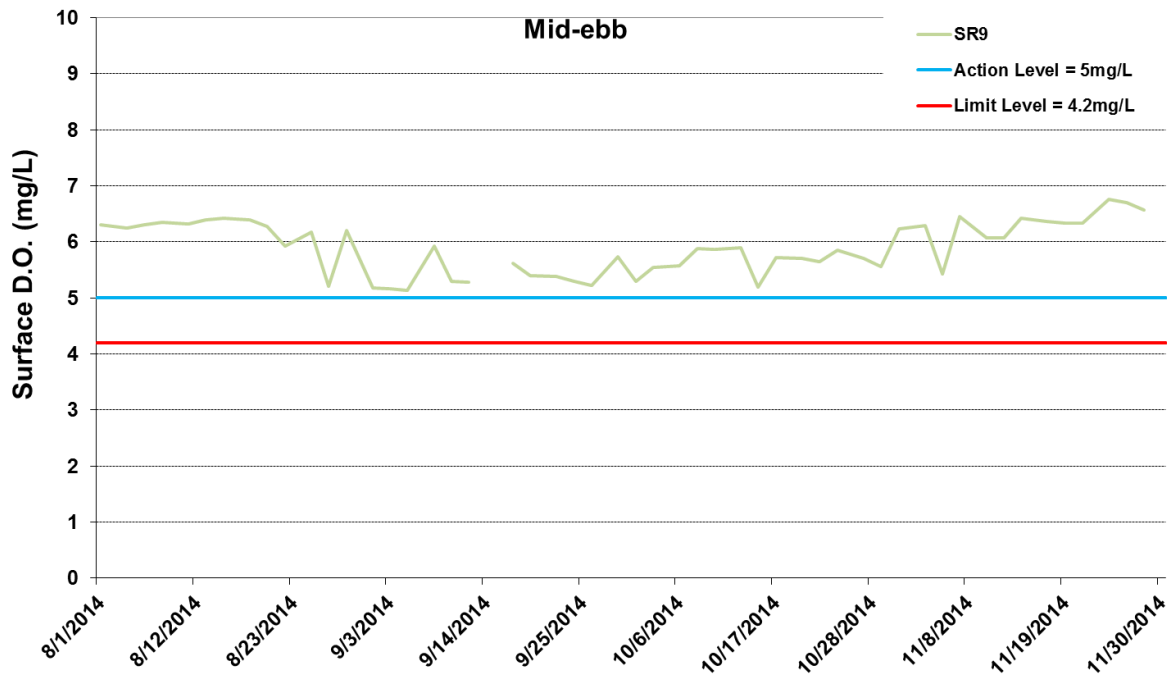
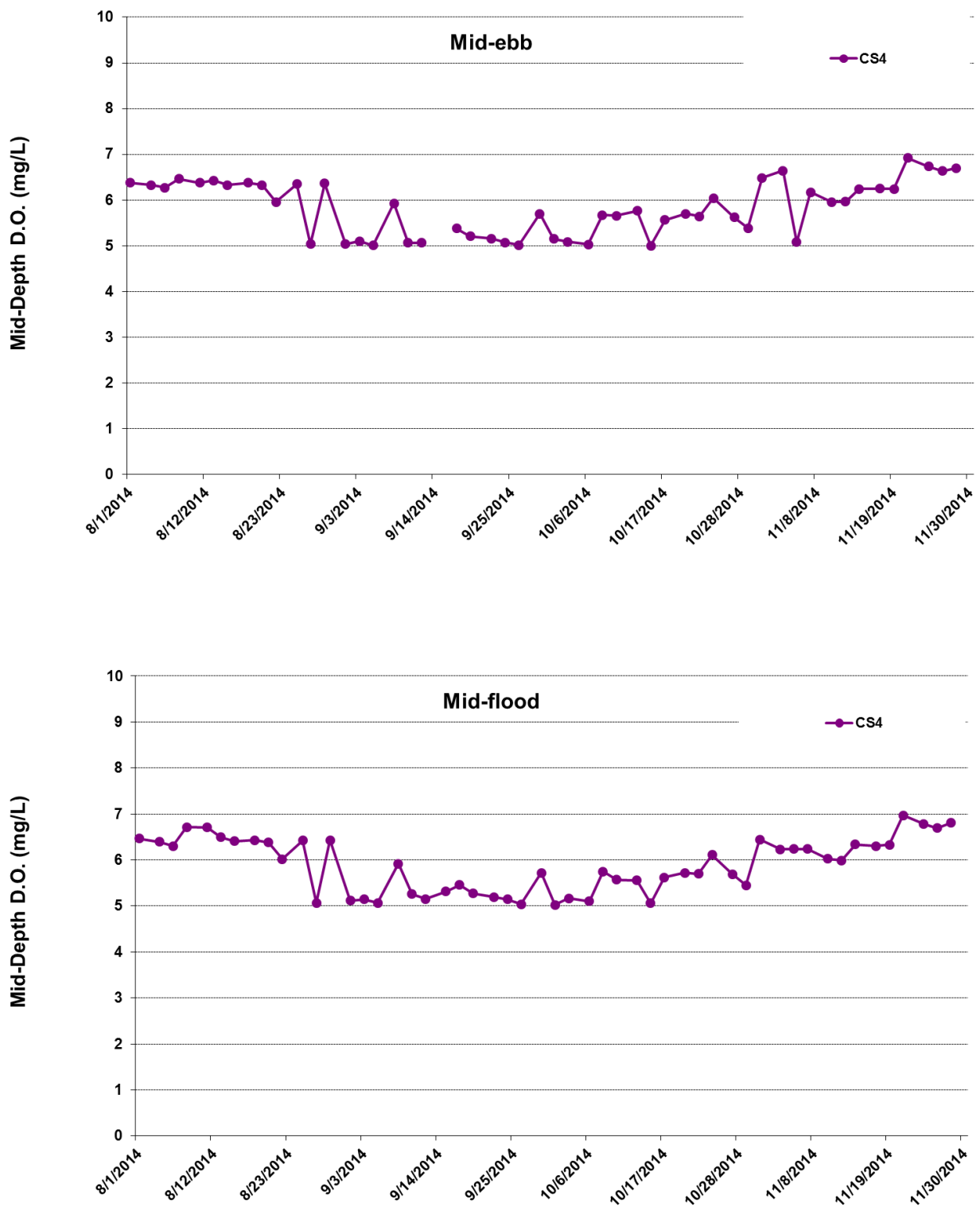


Figure G9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 August 2014 and 30 November 2014 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls

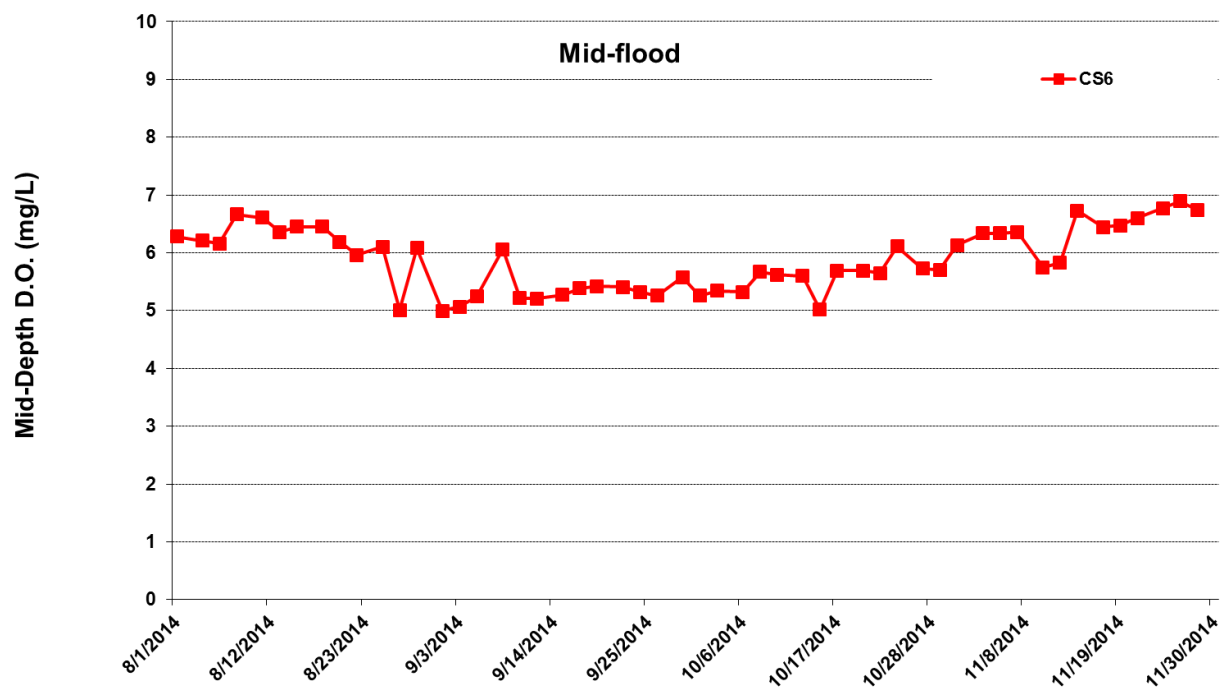
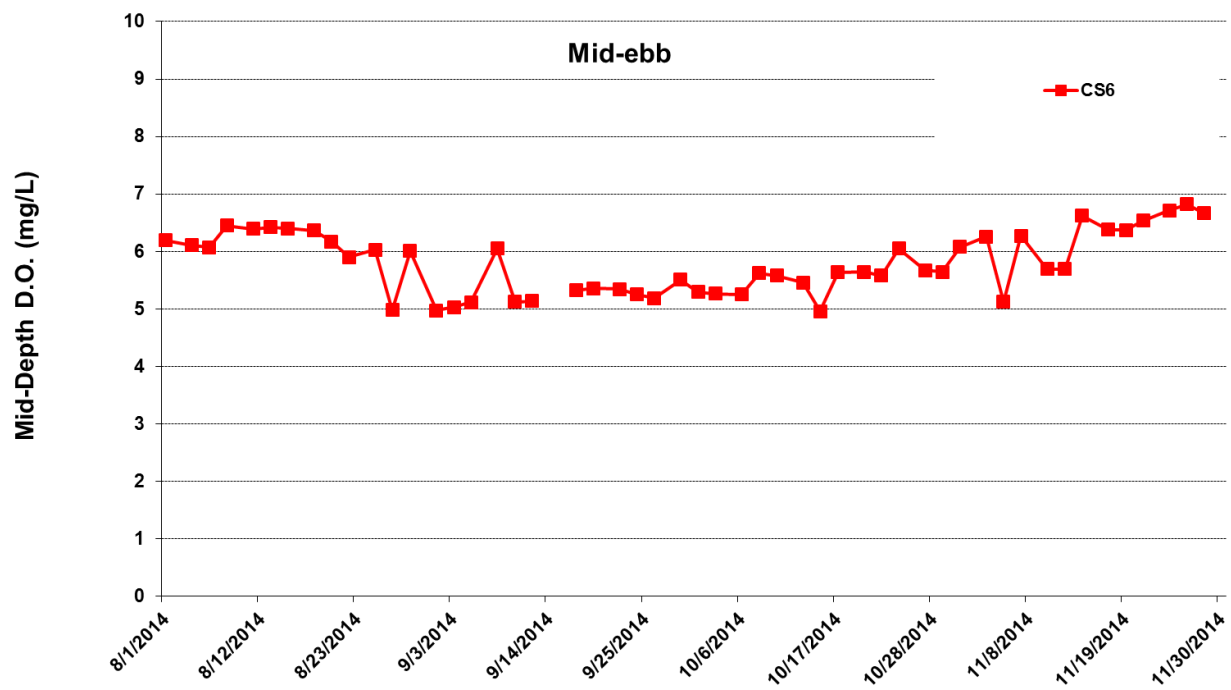




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

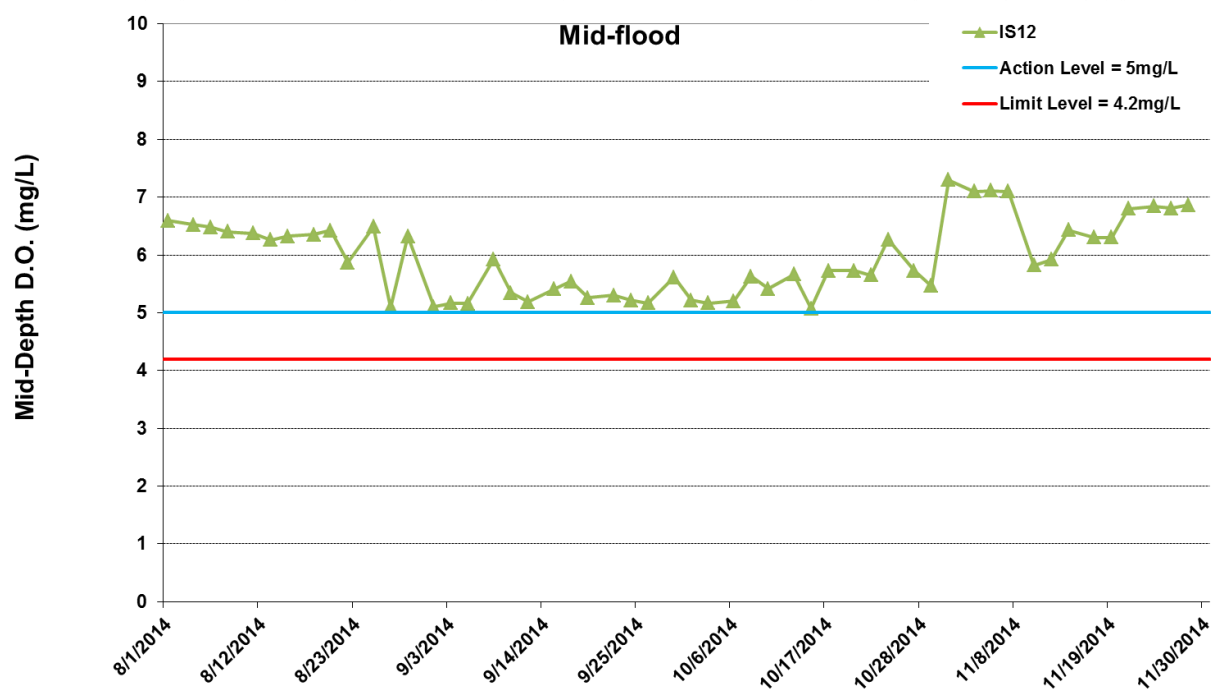
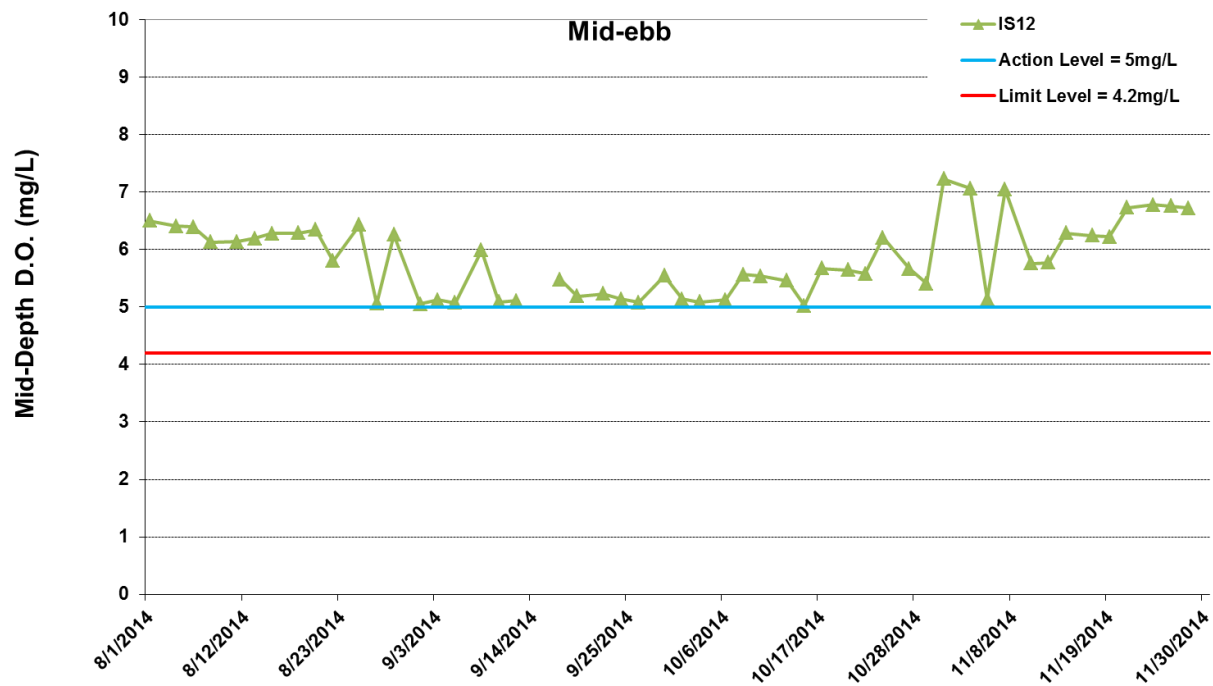




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

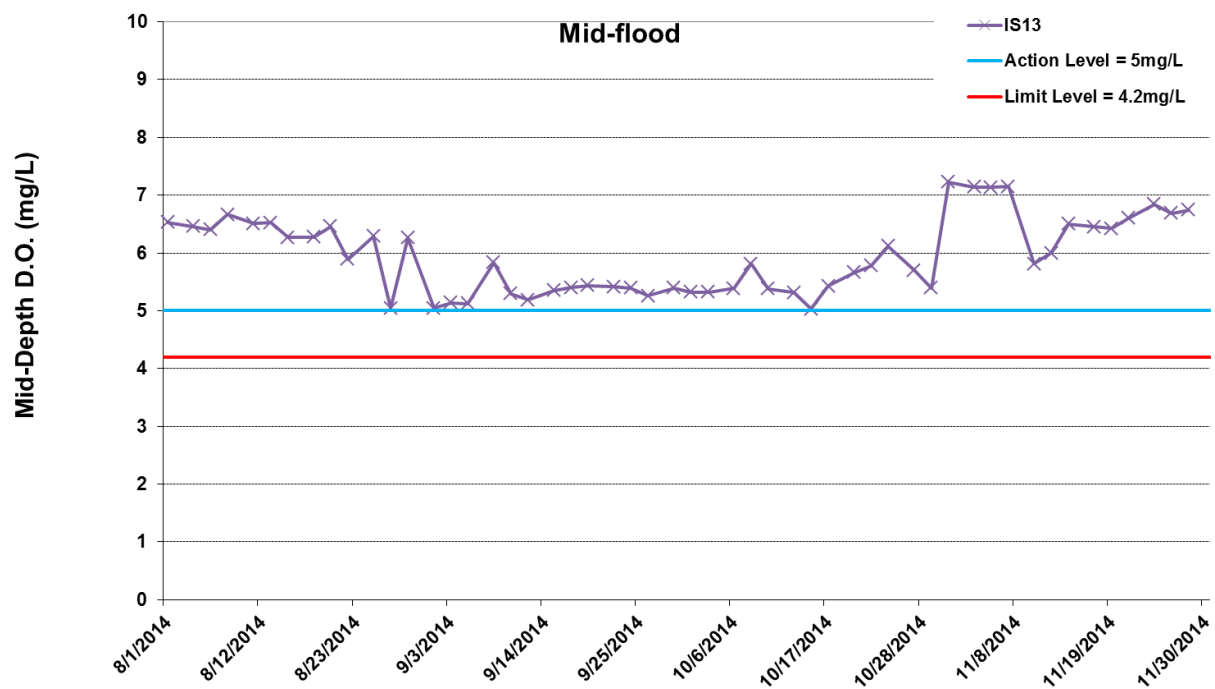
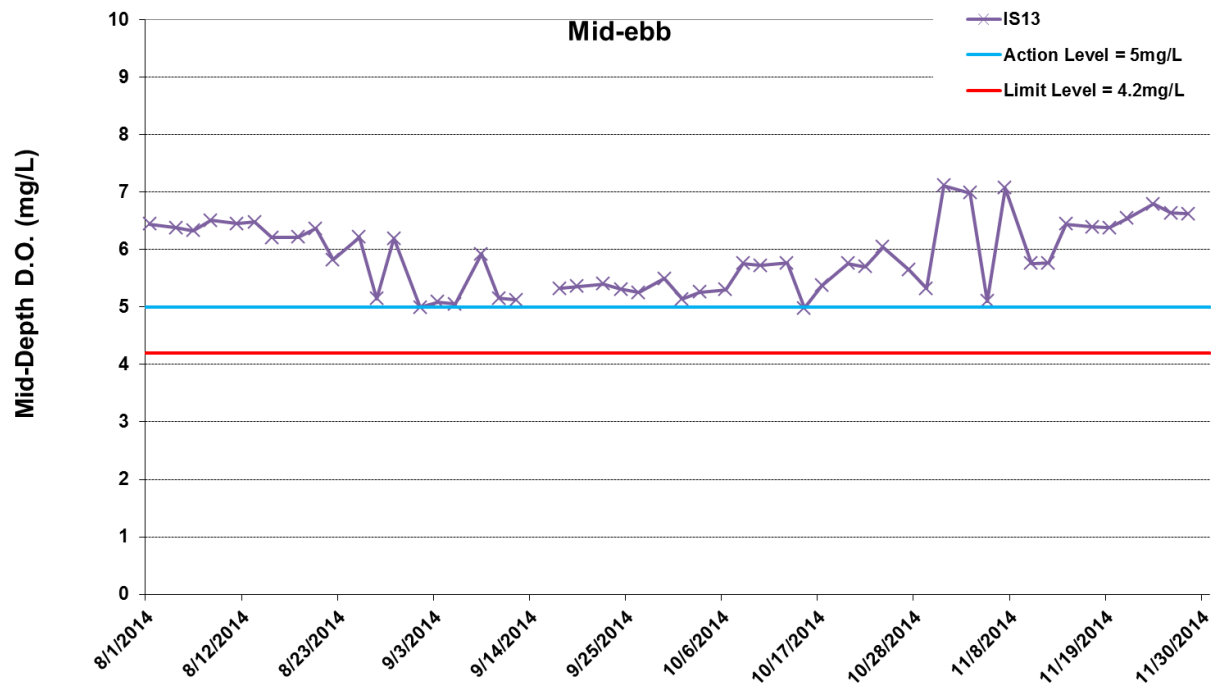




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

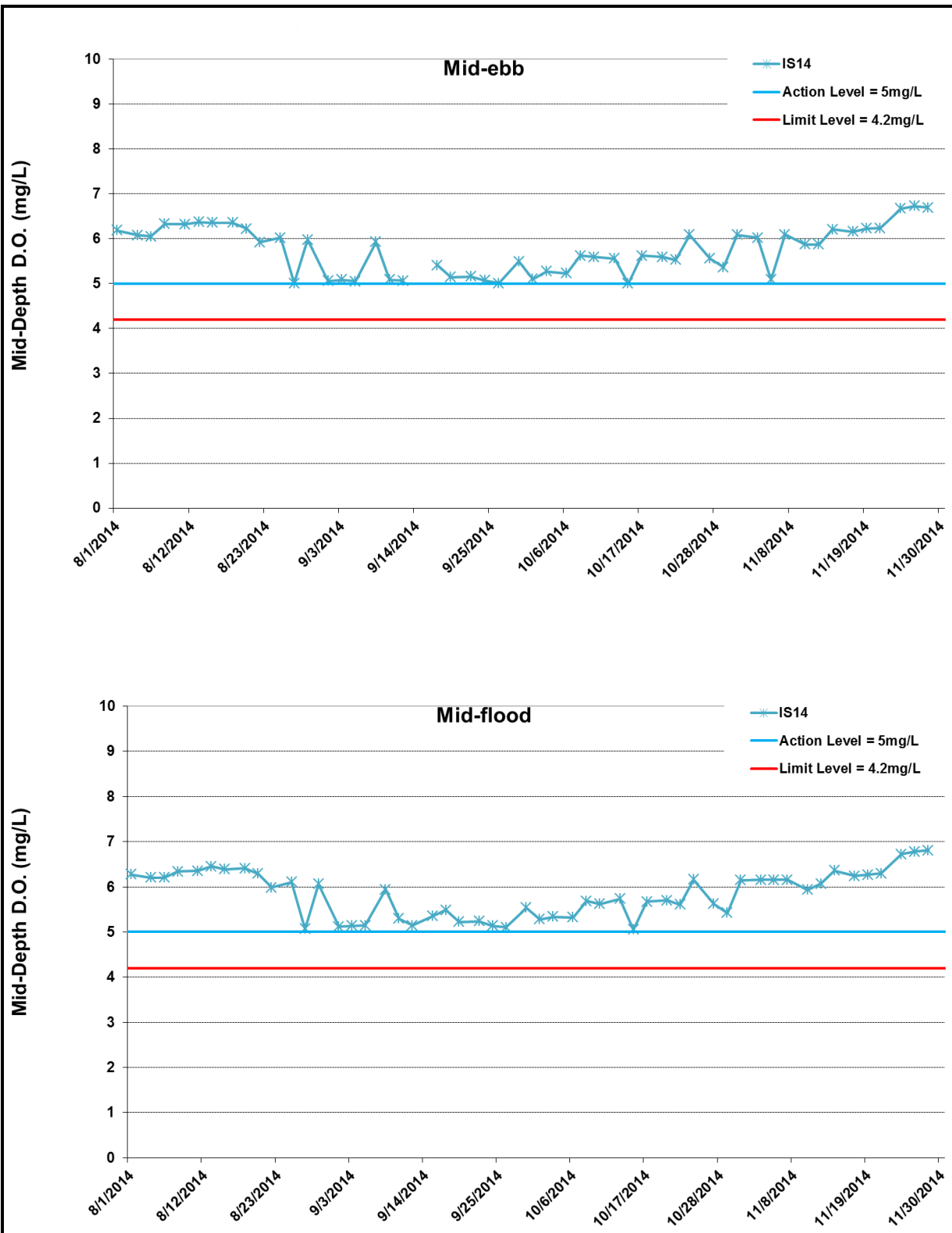




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

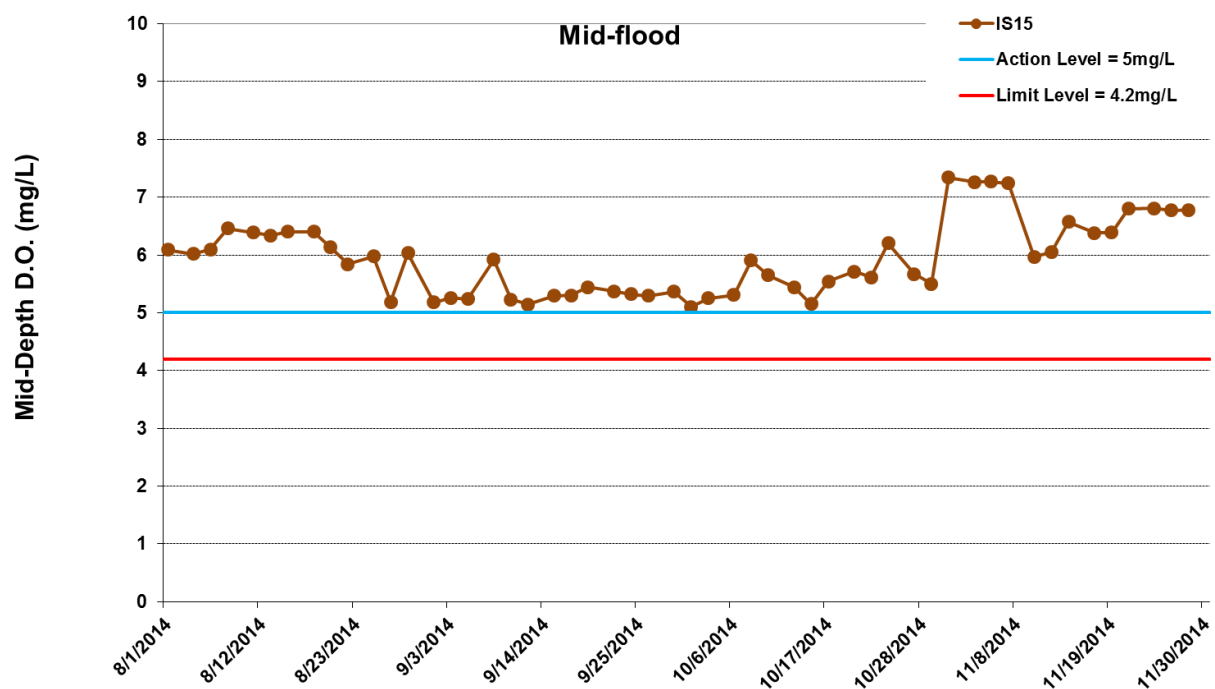
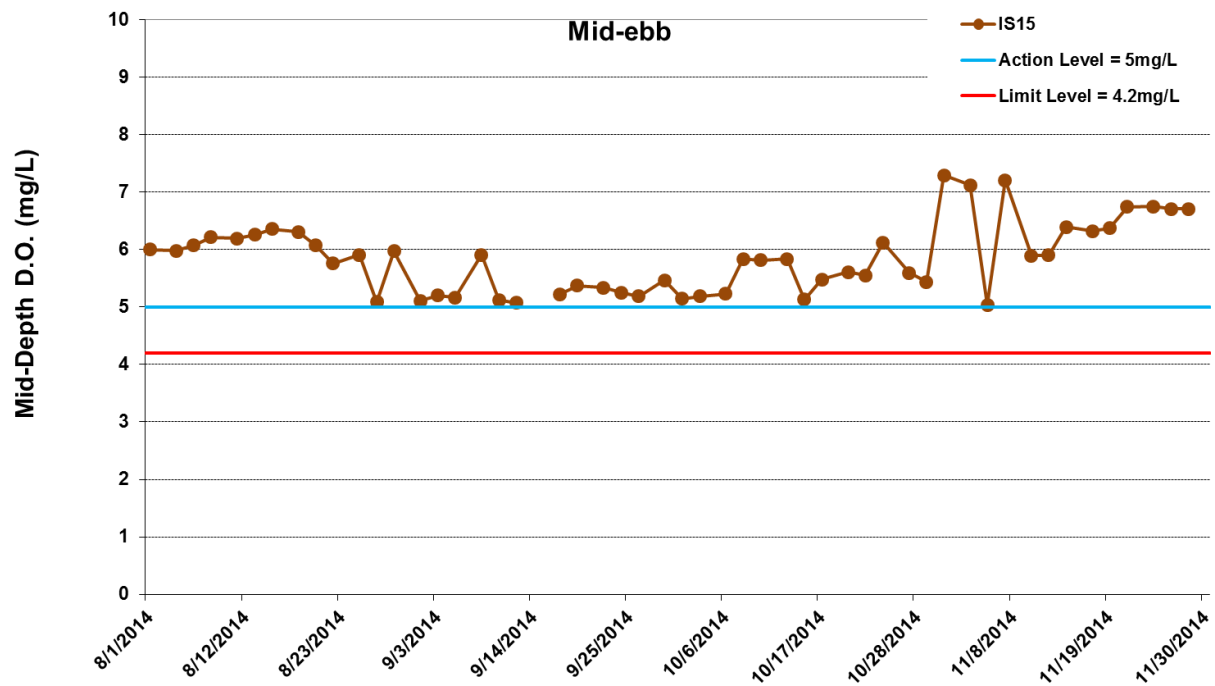




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

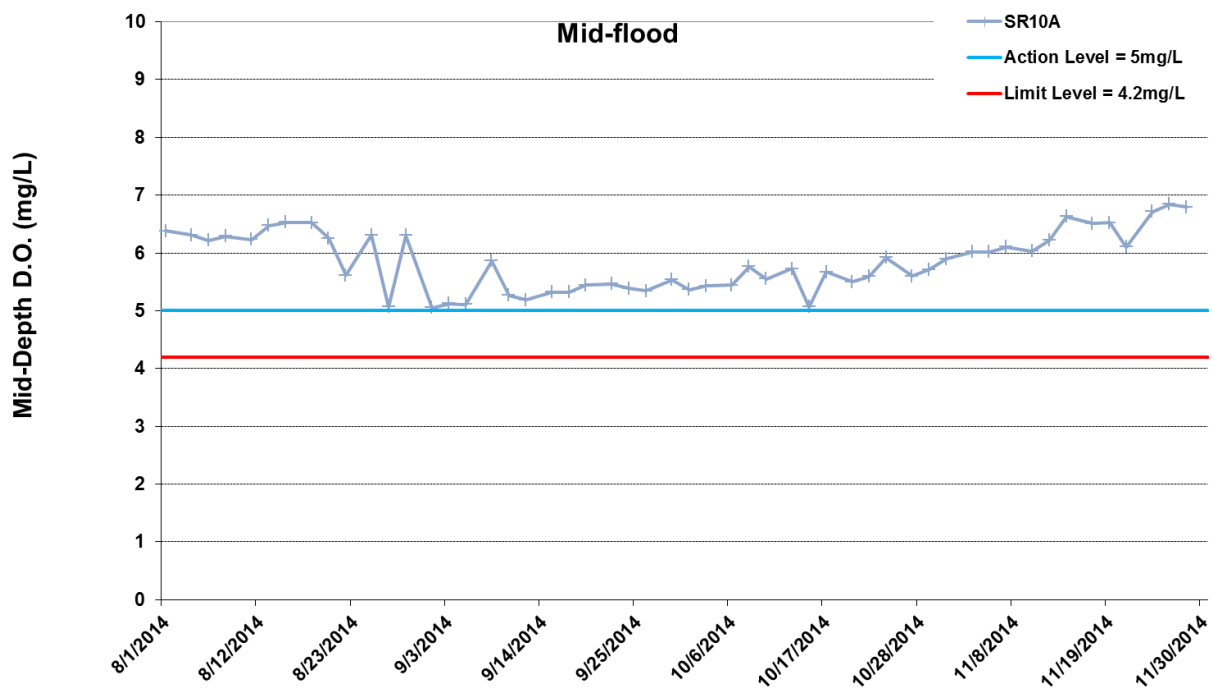
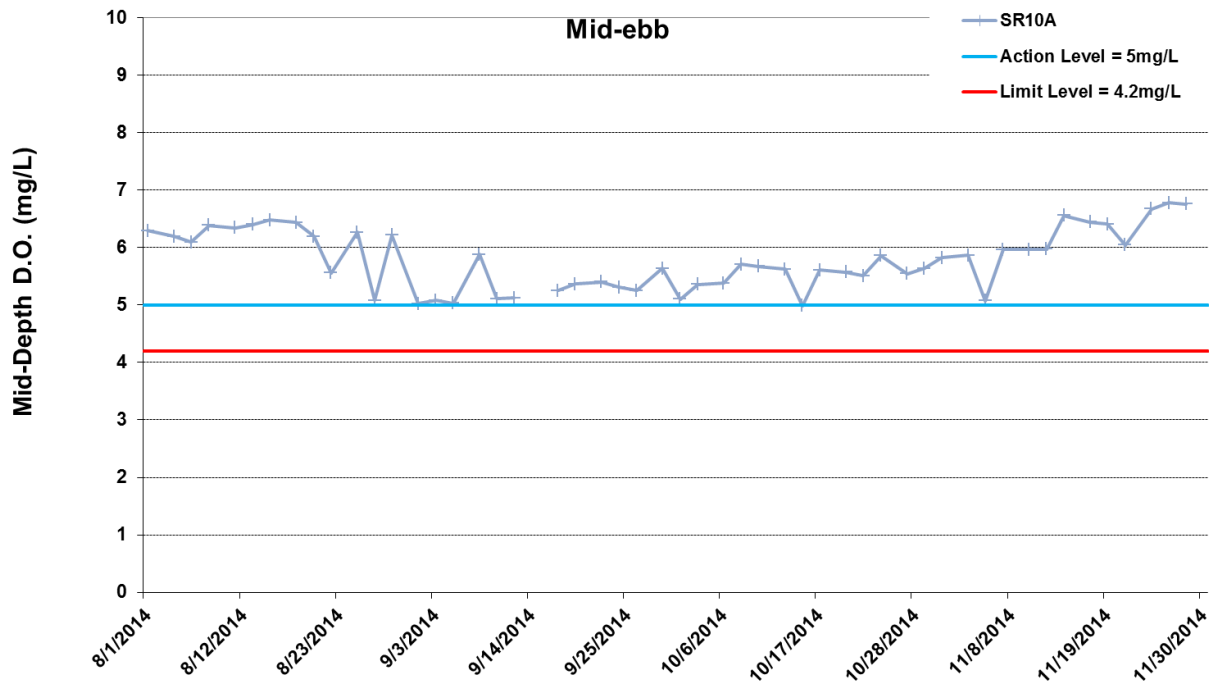




*No data for Stations SR8 and SR9 due to shallow water depth (< 6m).

Figure G15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 August 2014 and 30 November 2014 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.





*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 August 2014 and 30 November 2014 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



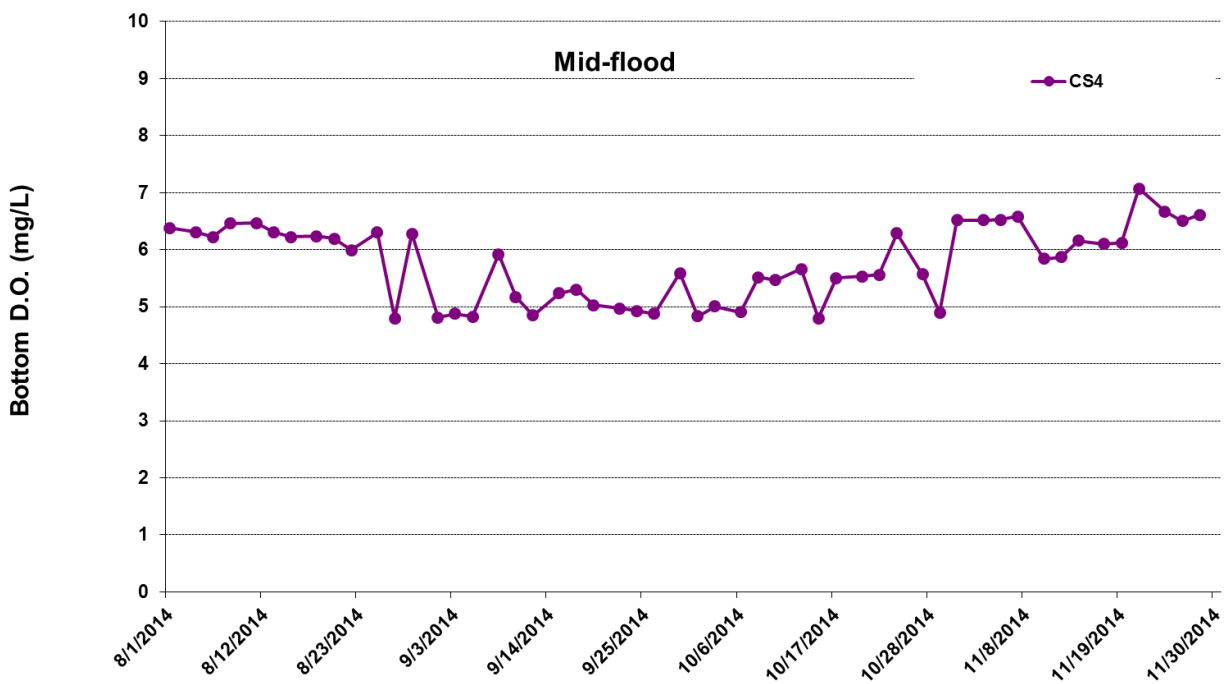
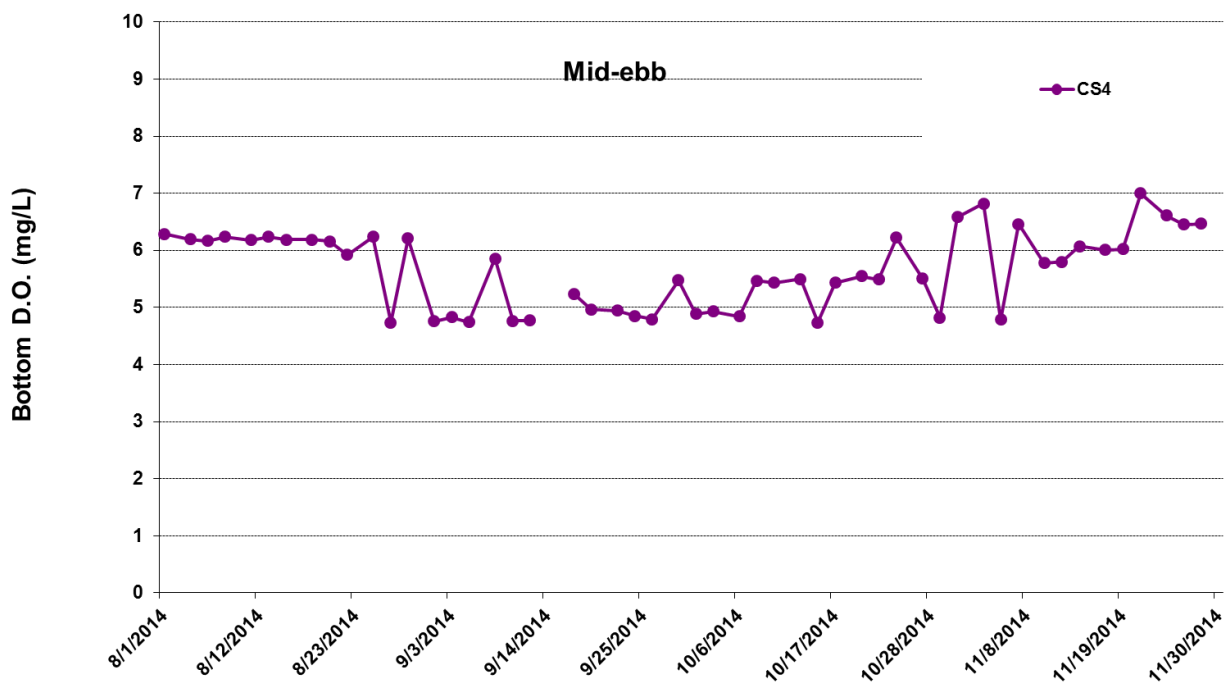


Figure G17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



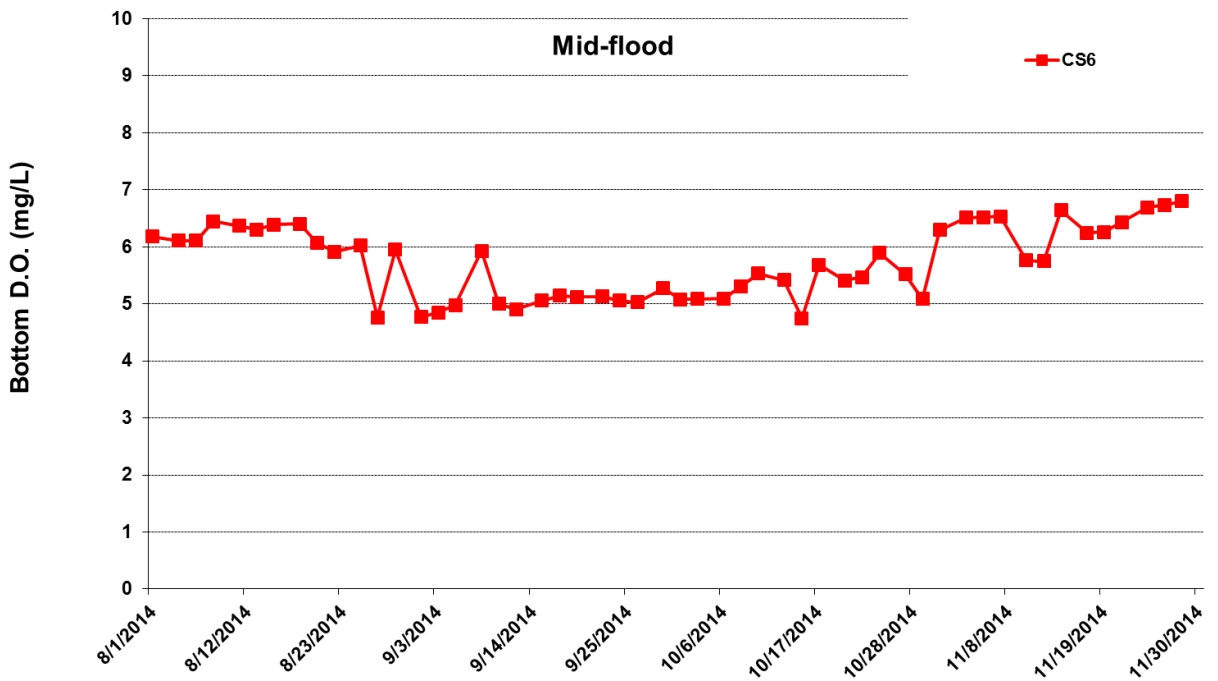
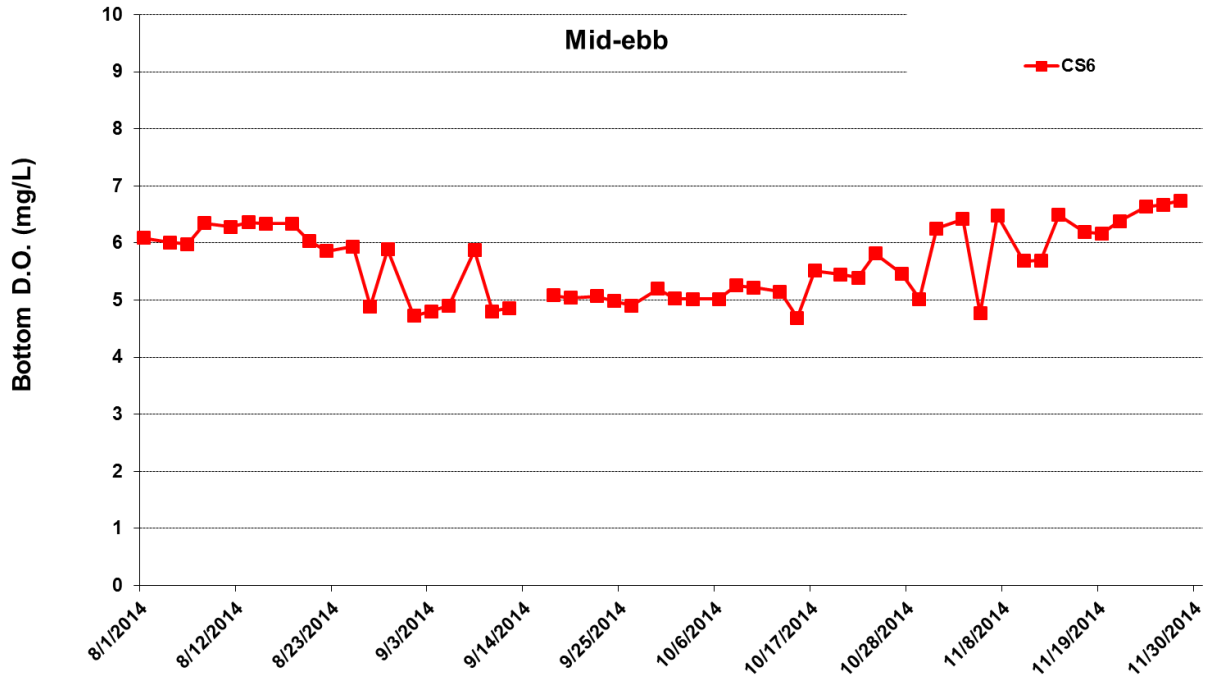


Figure G18 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



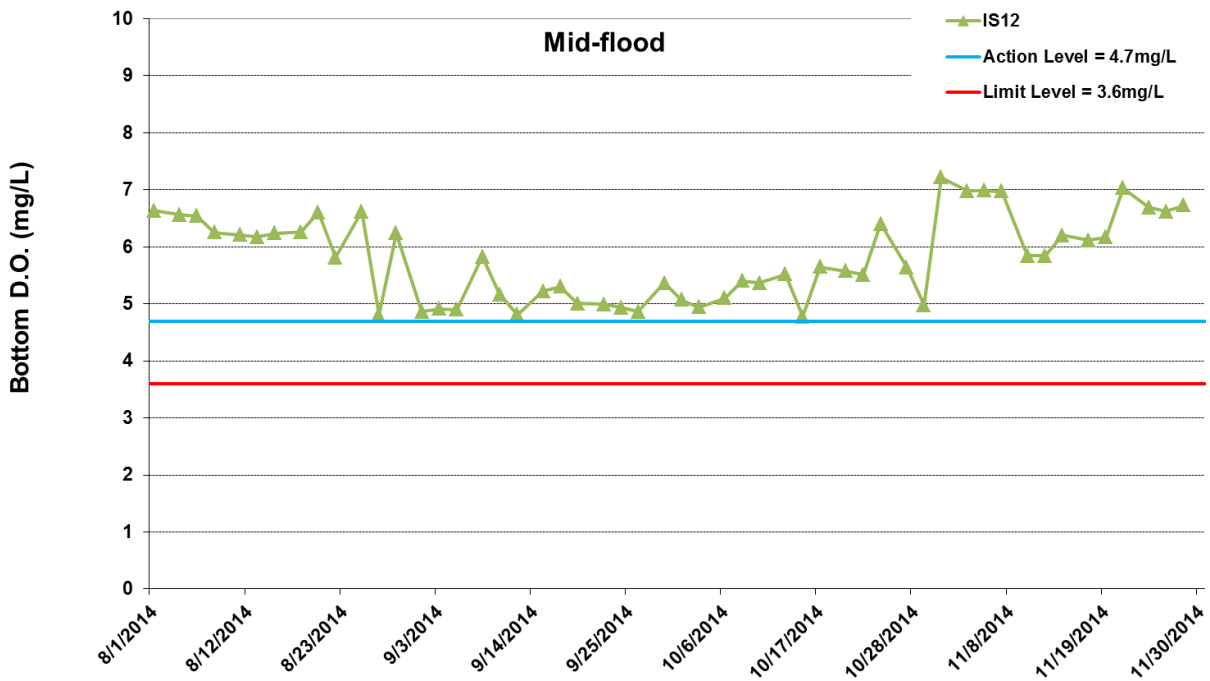
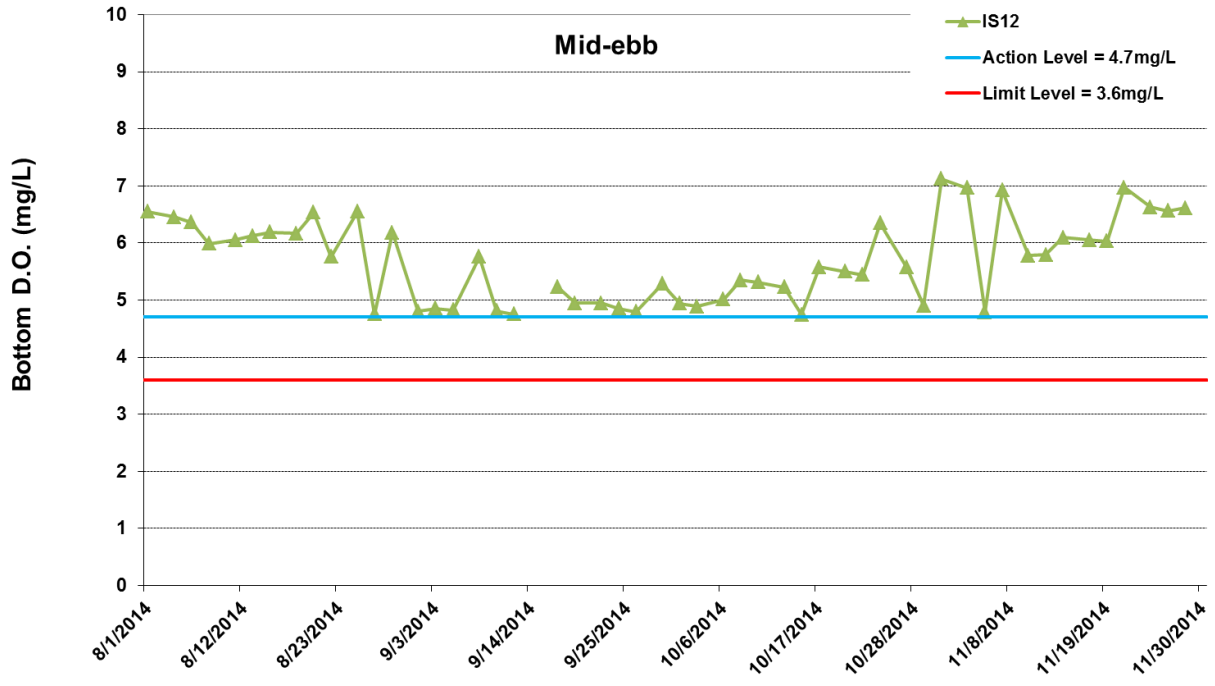


Figure G19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



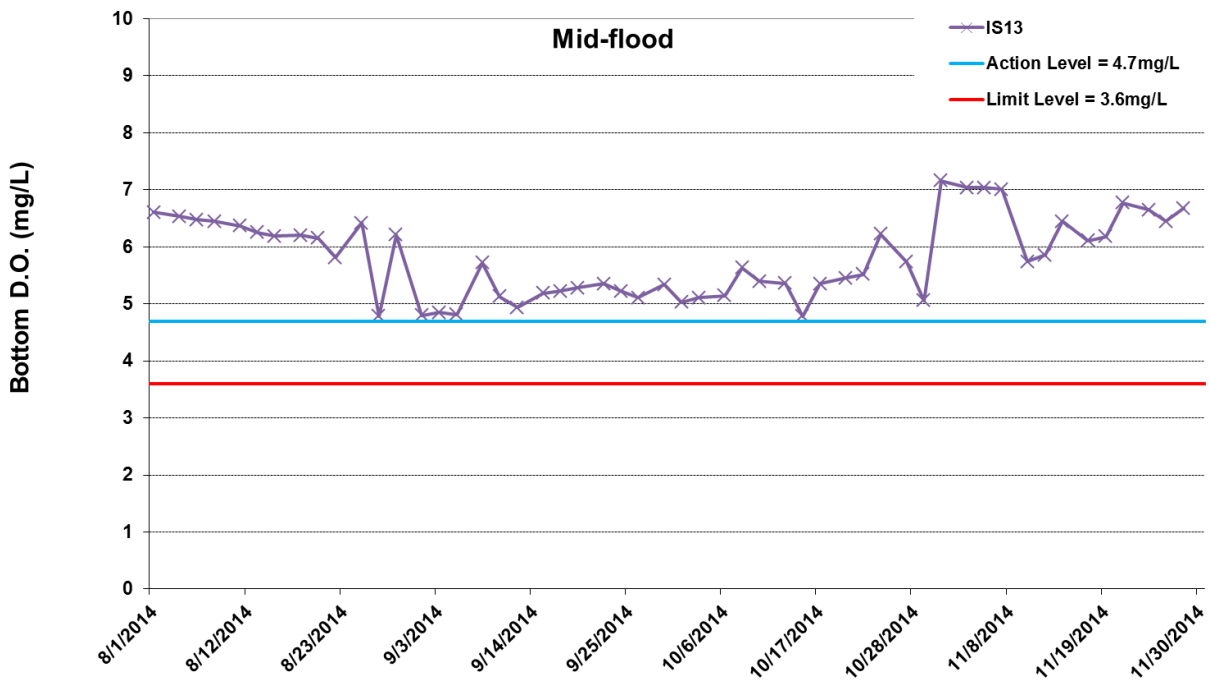
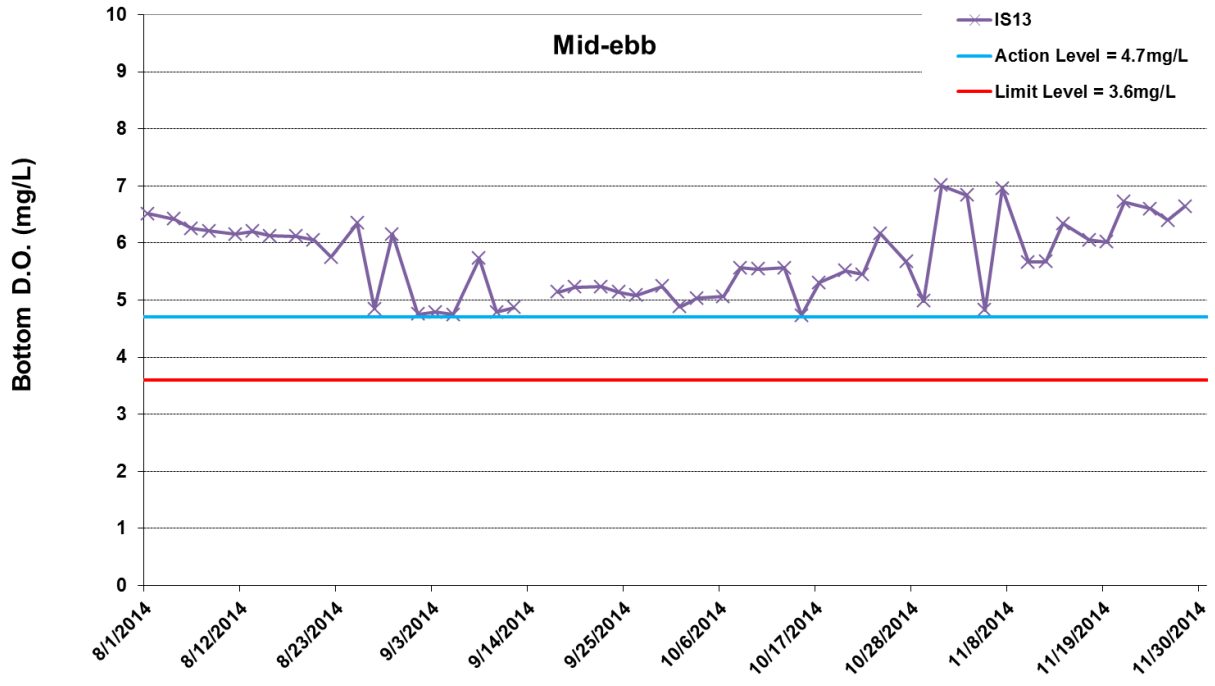


Figure G20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



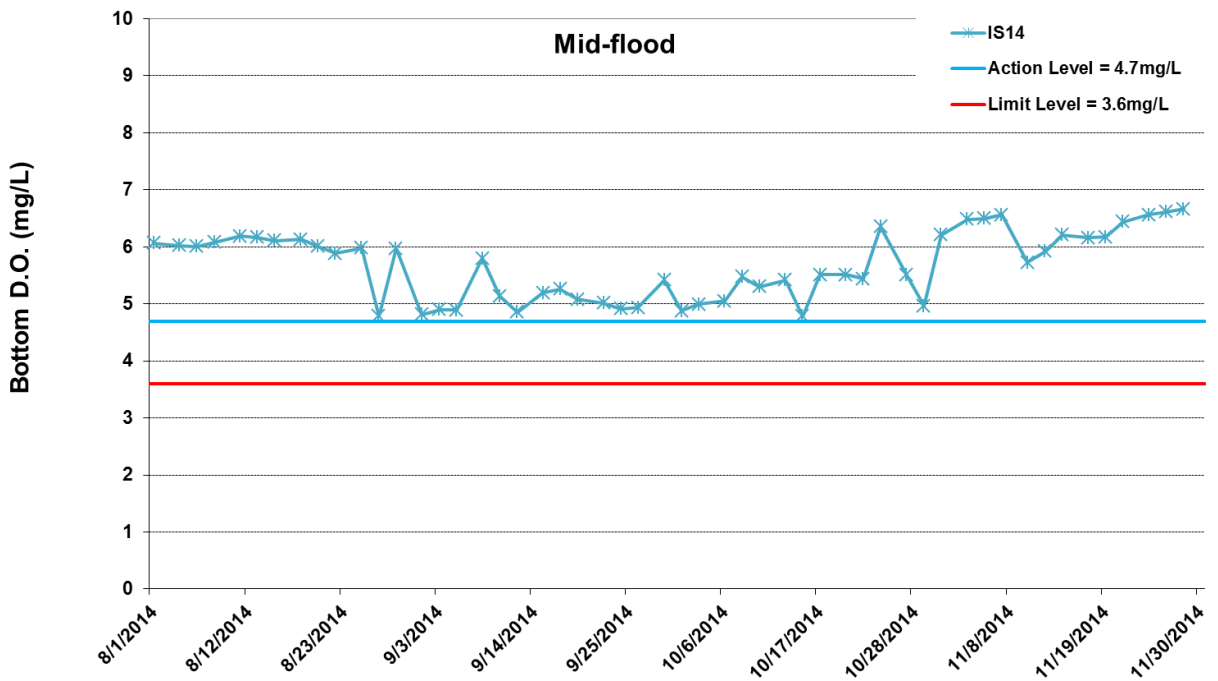
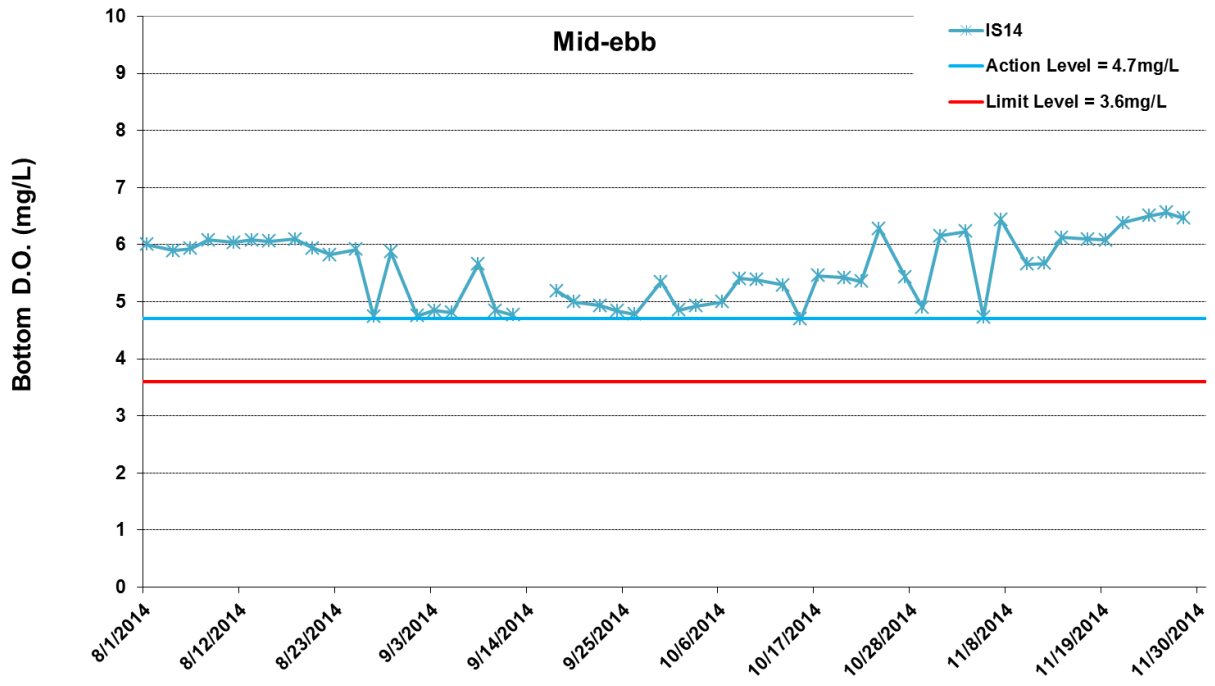


Figure G21 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



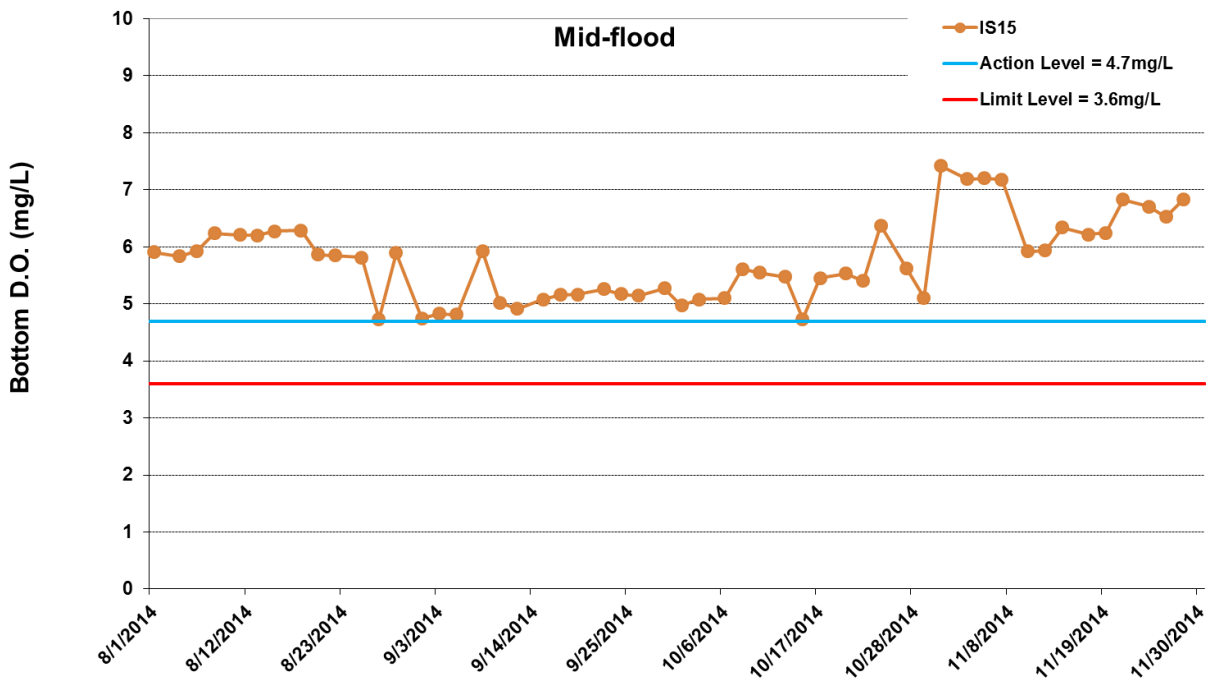
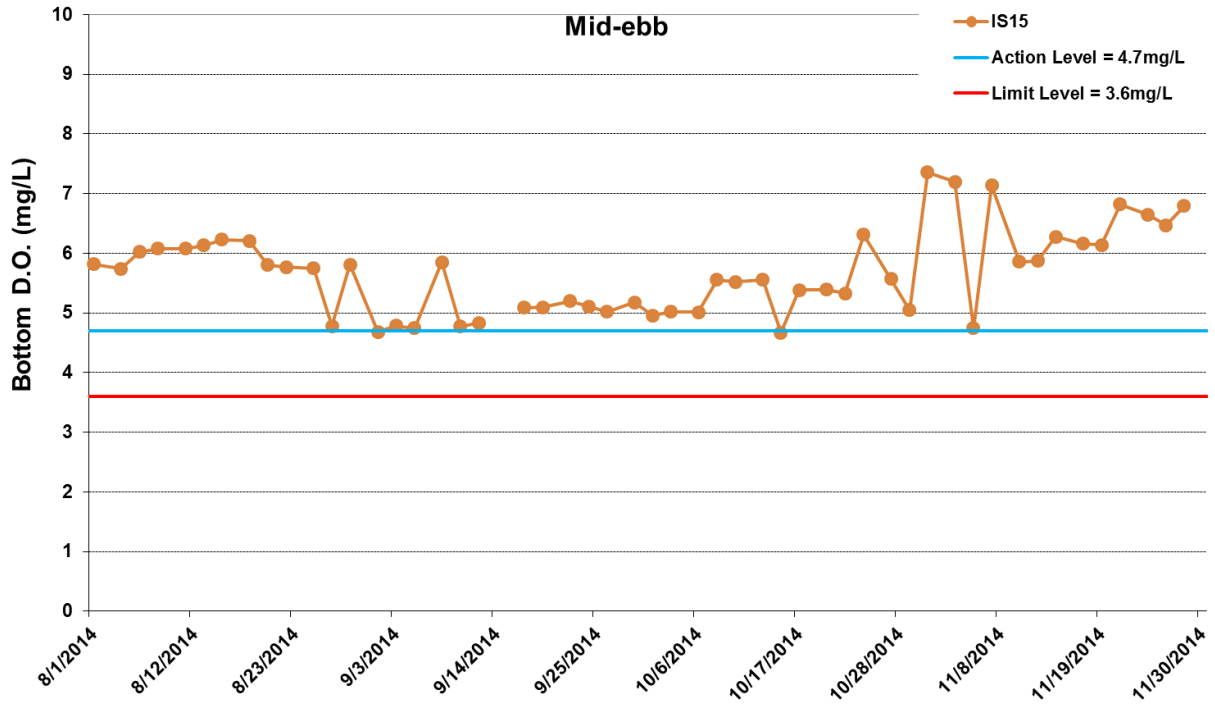


Figure G22 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



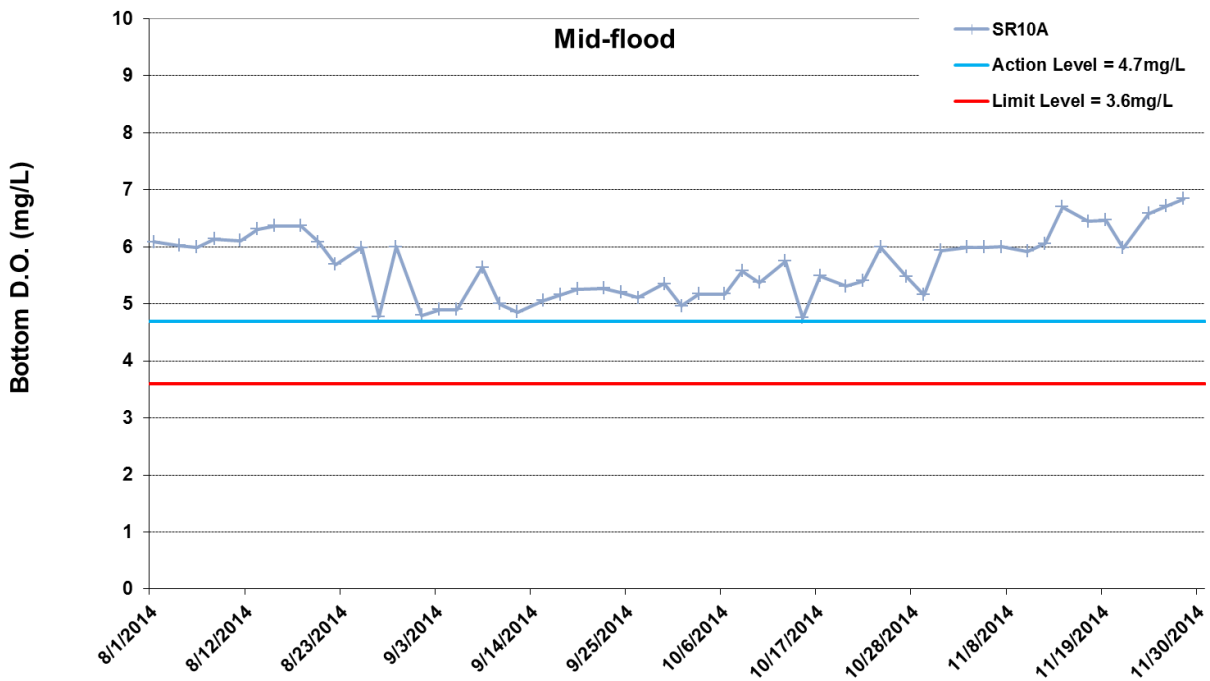
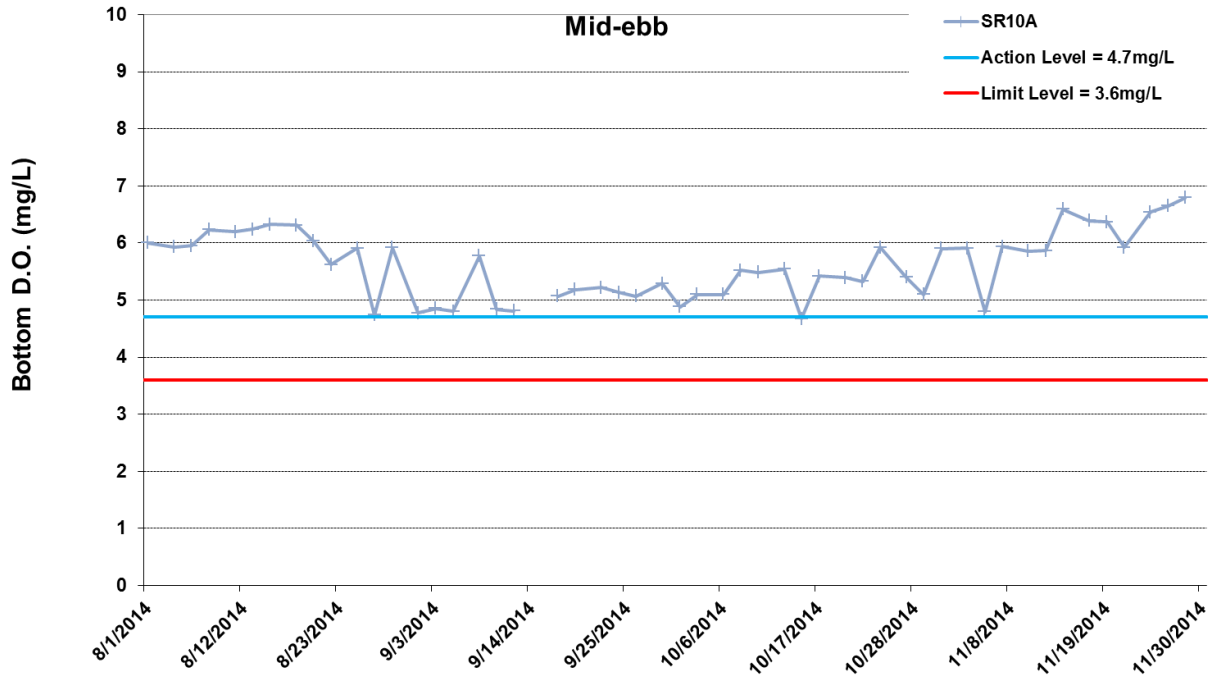


Figure G23 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



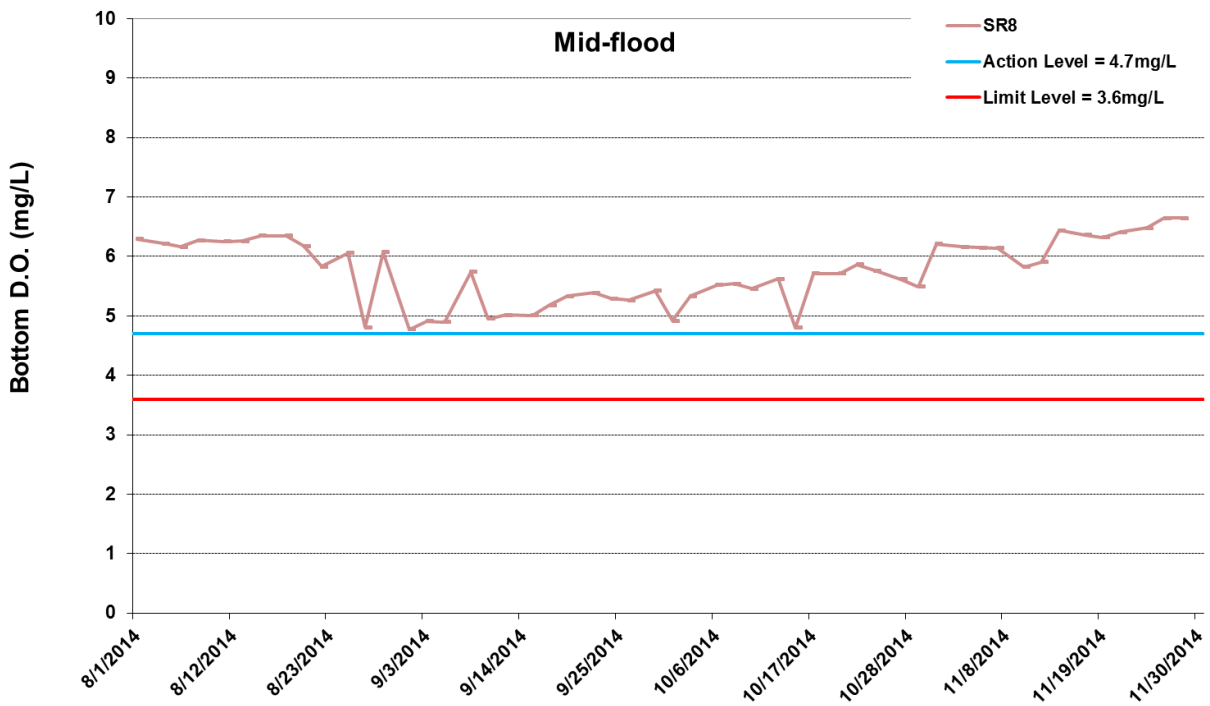
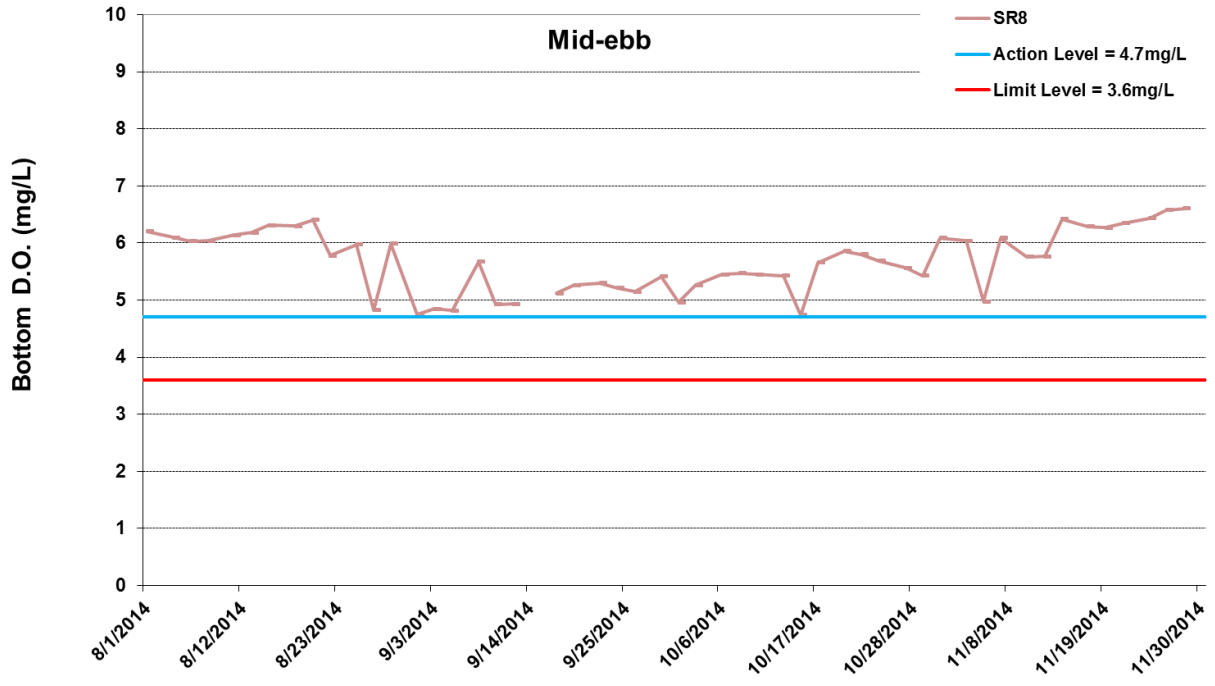


Figure G24 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



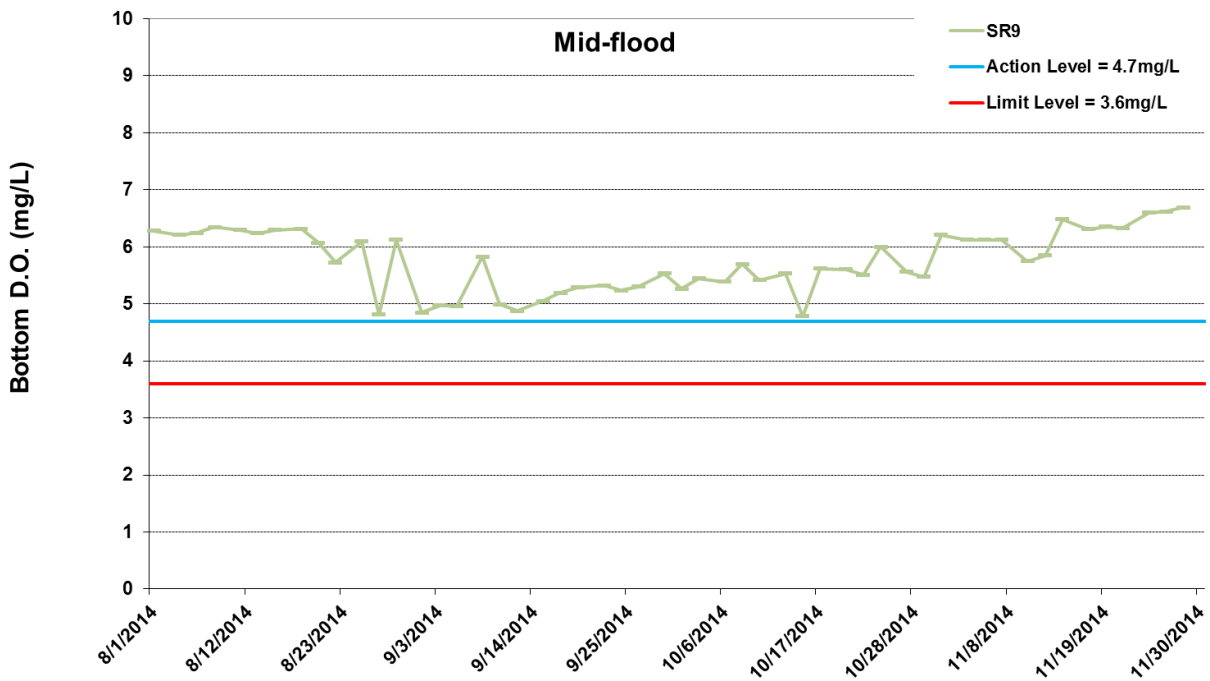
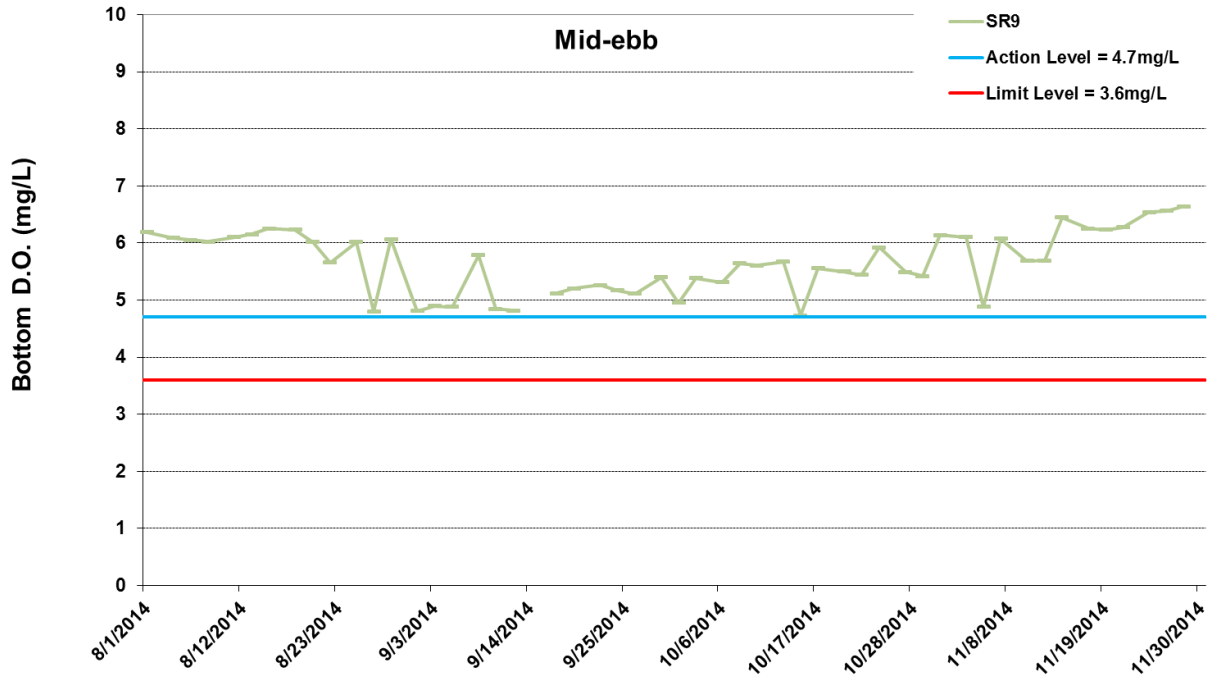


Figure G25 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 August 2014 and 30 November 2014 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.

Ref: 0212330_Impact-WQM_November2014_graphs_Rev a.xls



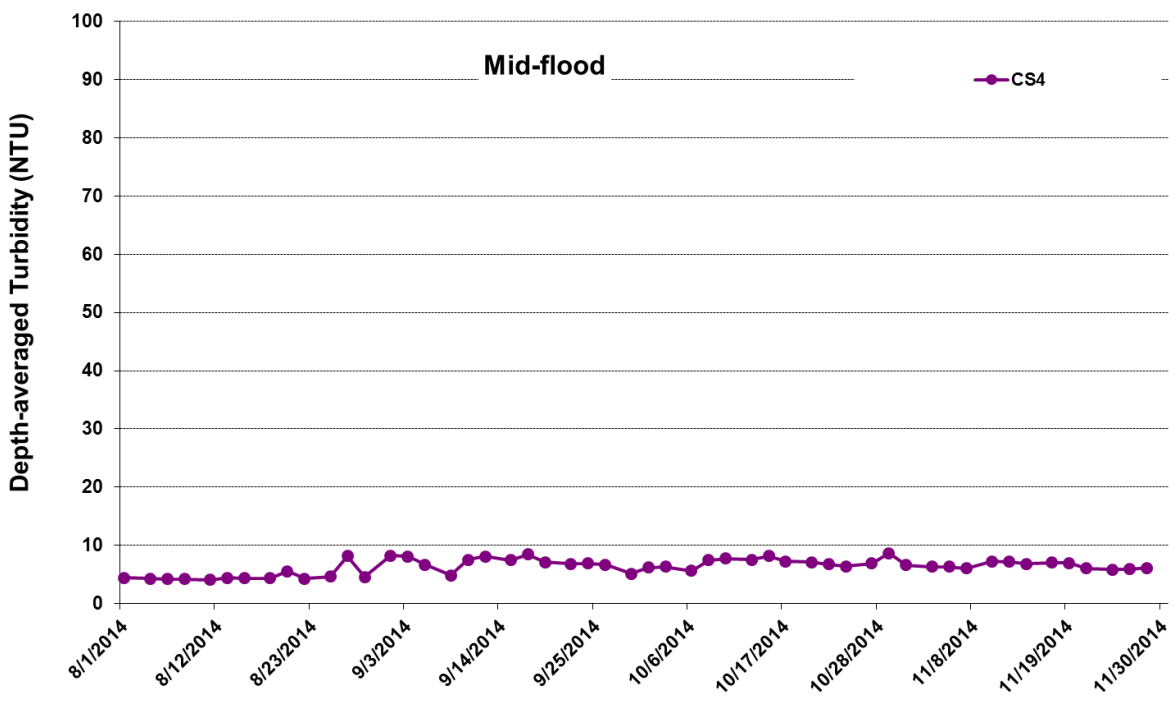
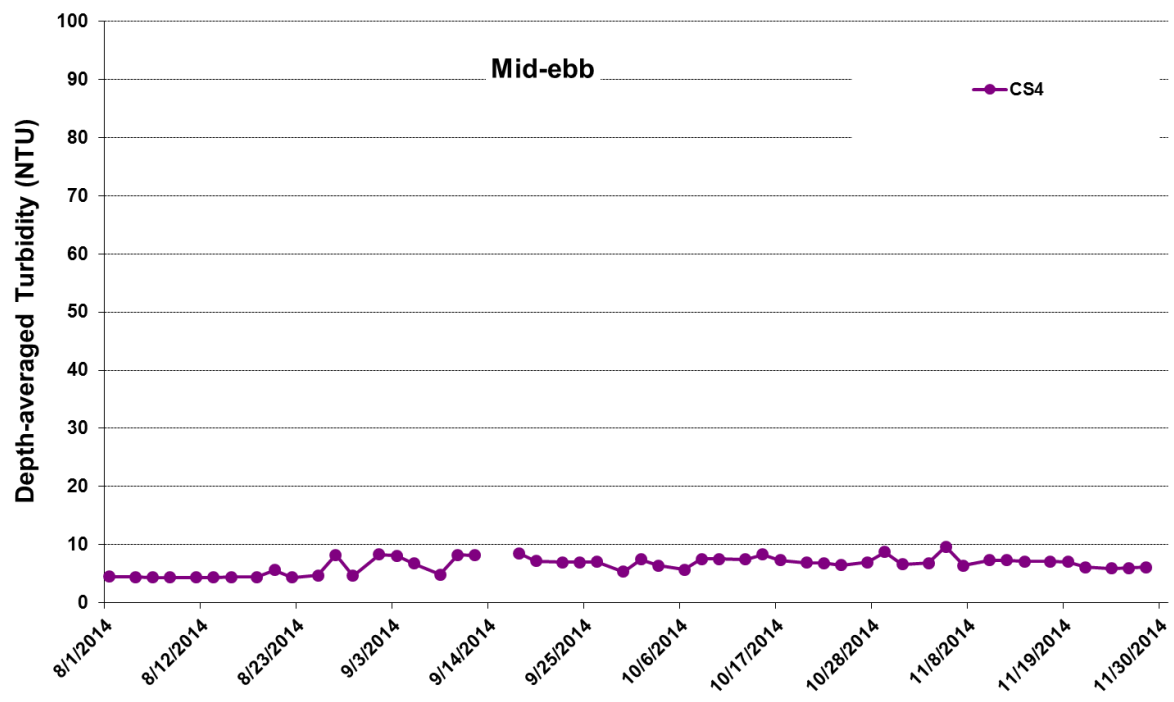


Figure G26 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



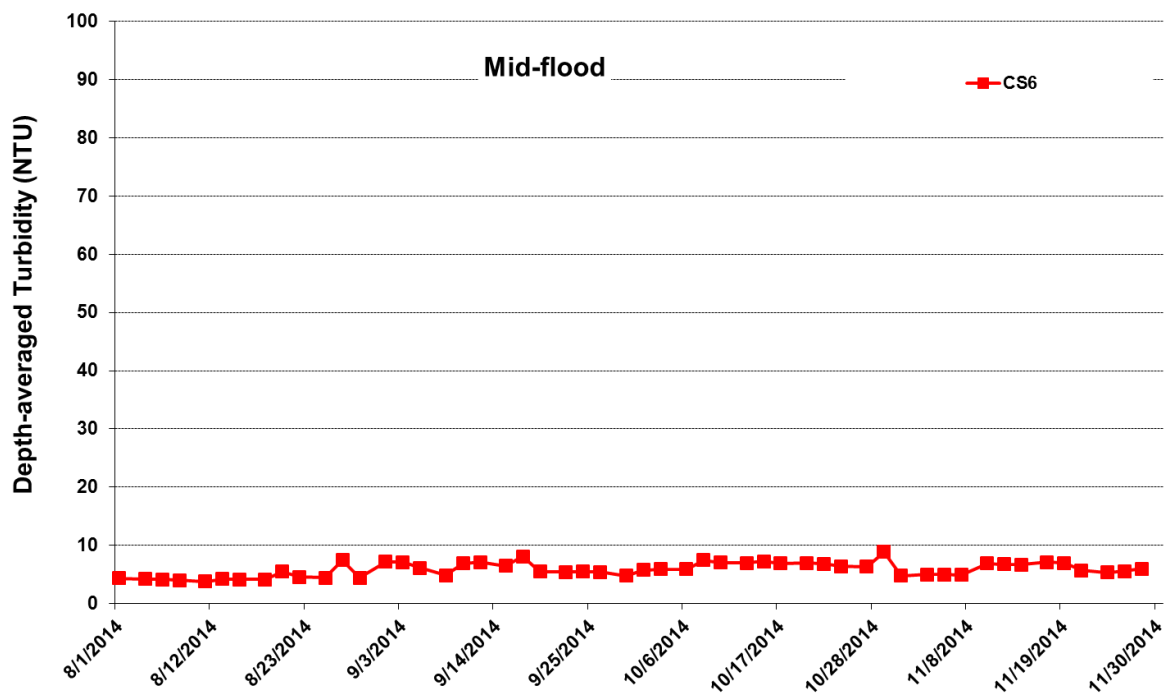
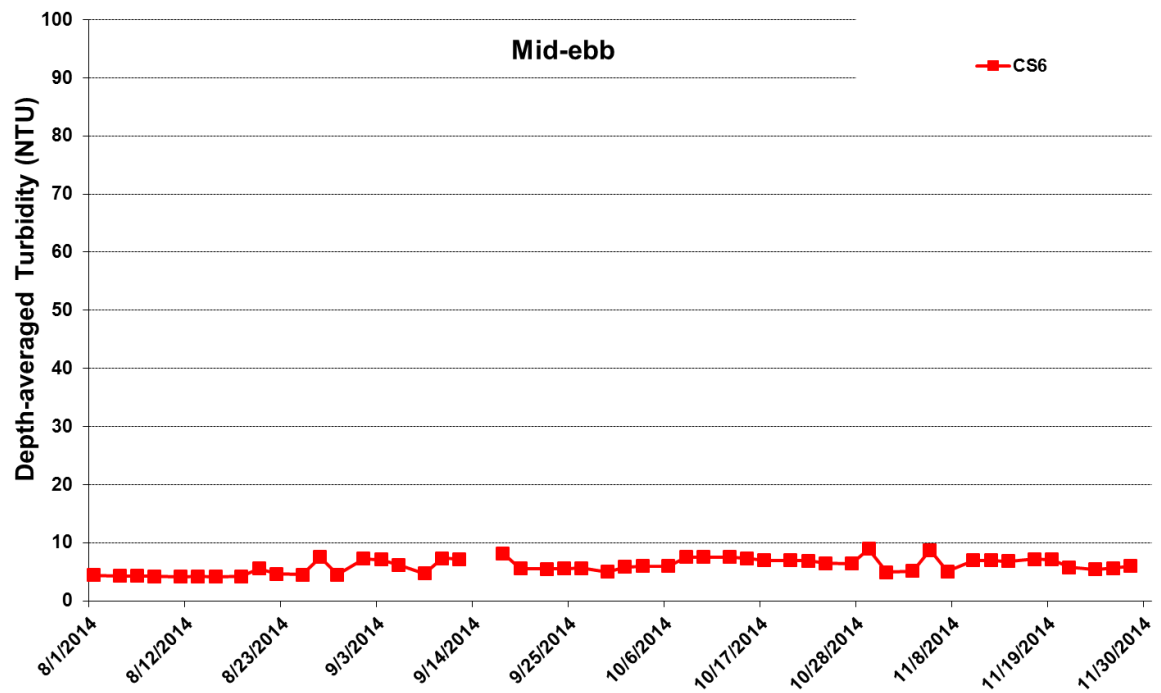


Figure G27 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



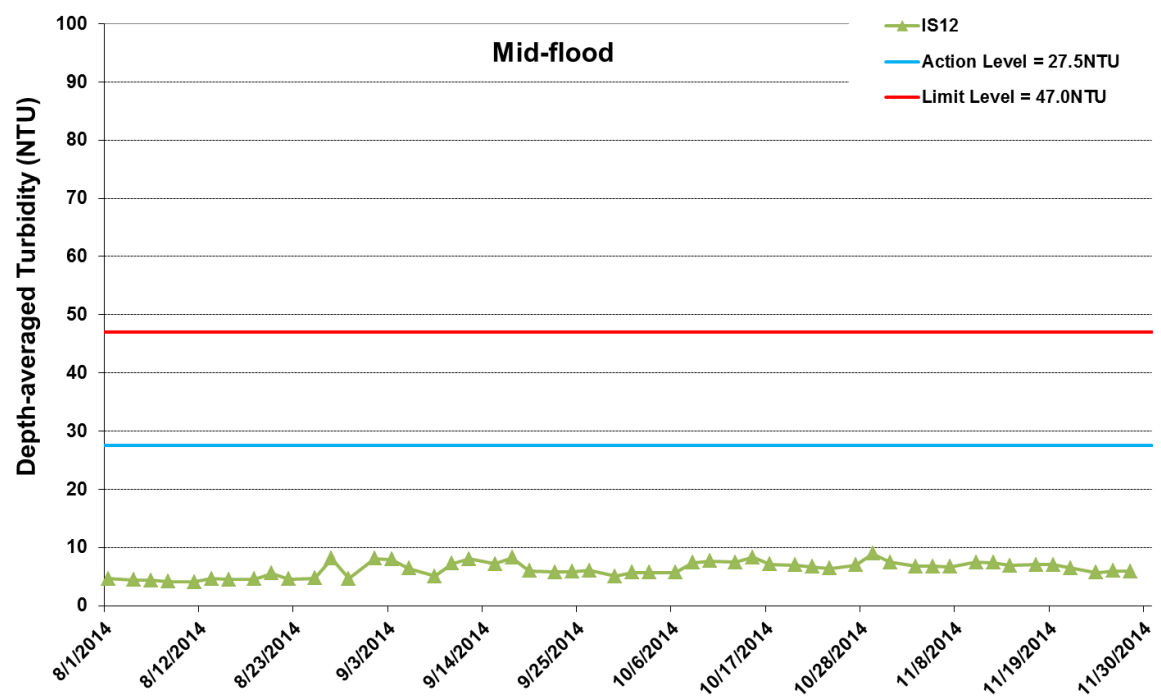
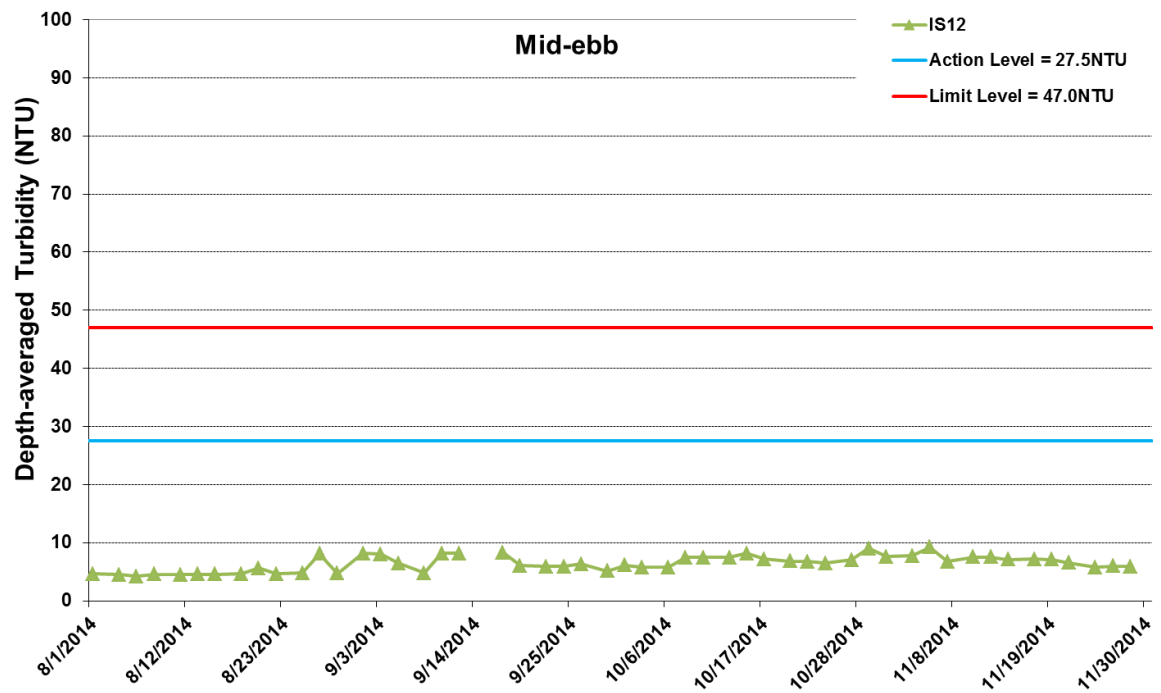


Figure G28 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



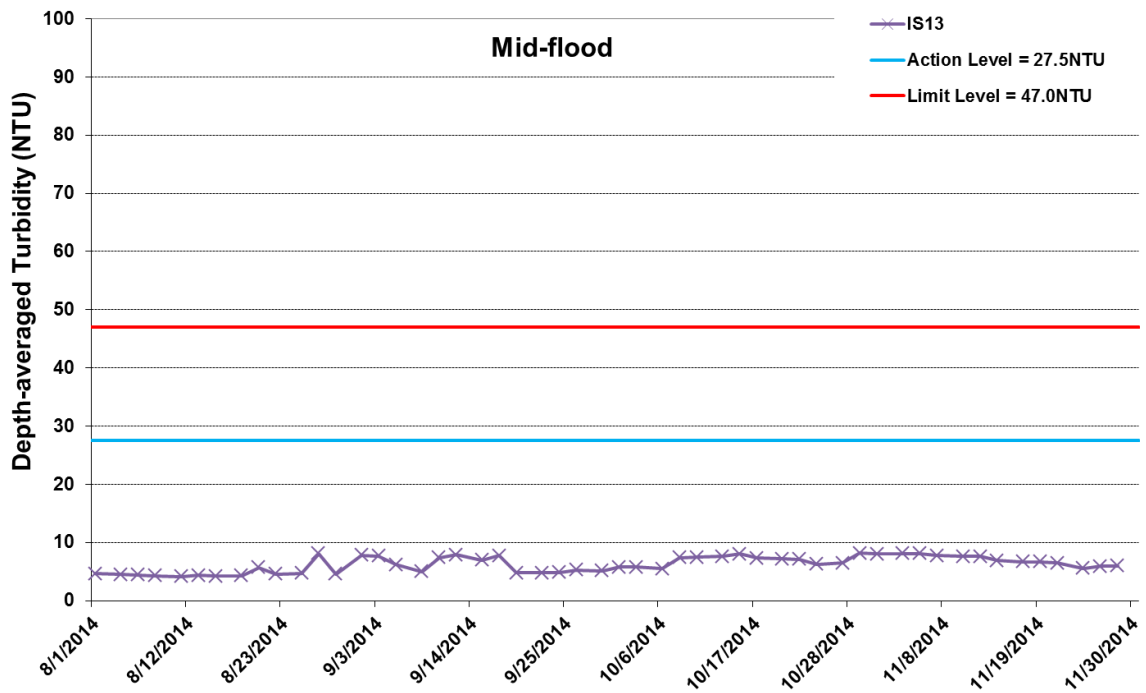
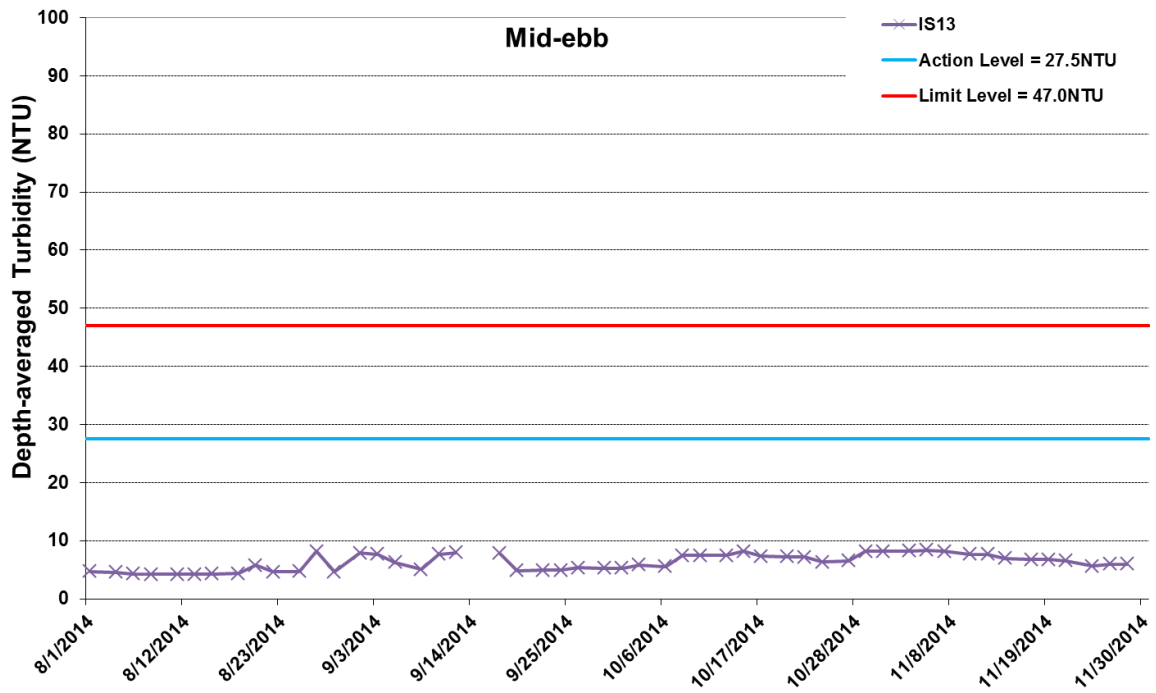


Figure G29 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



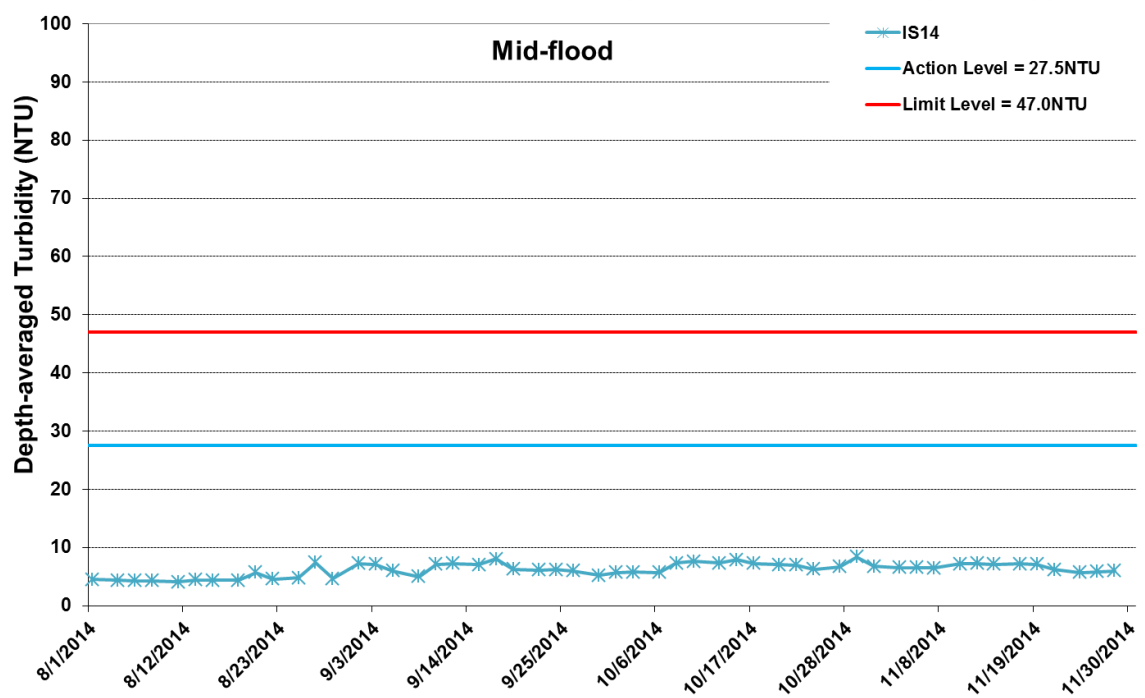
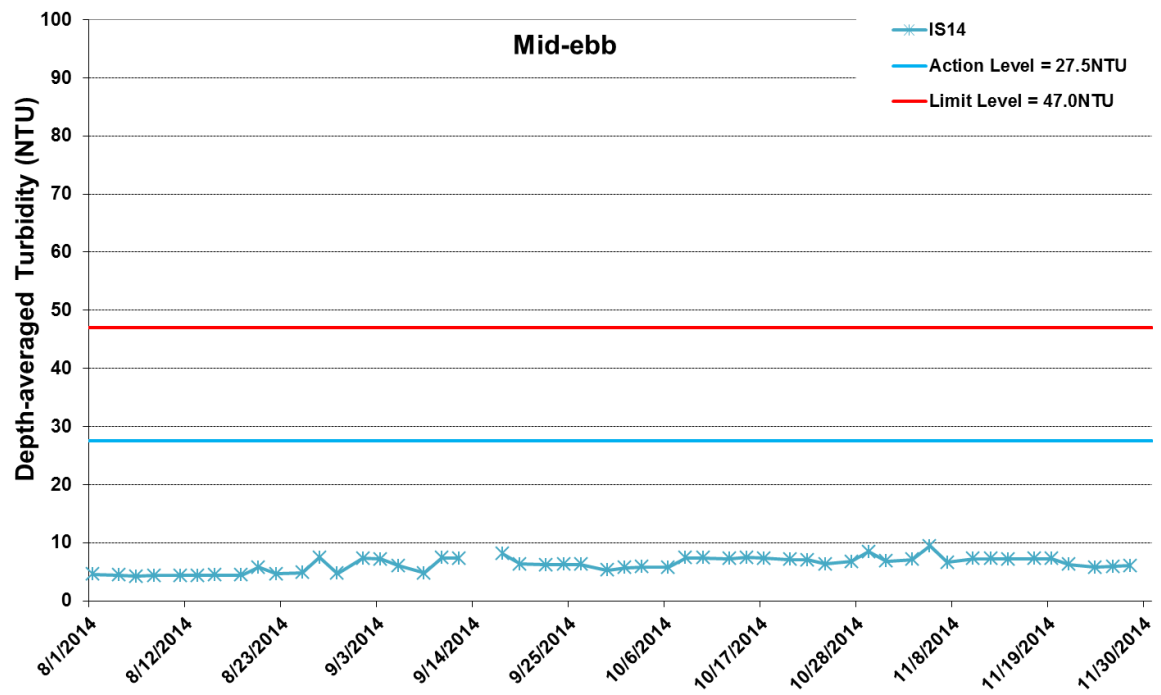


Figure G30 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



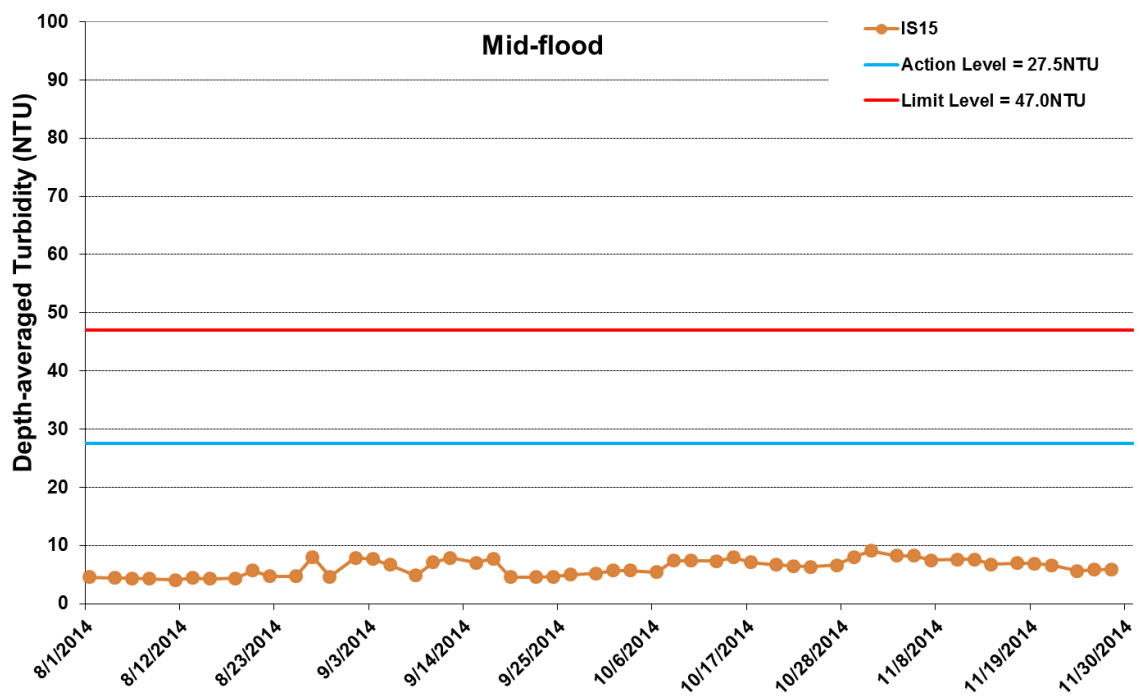
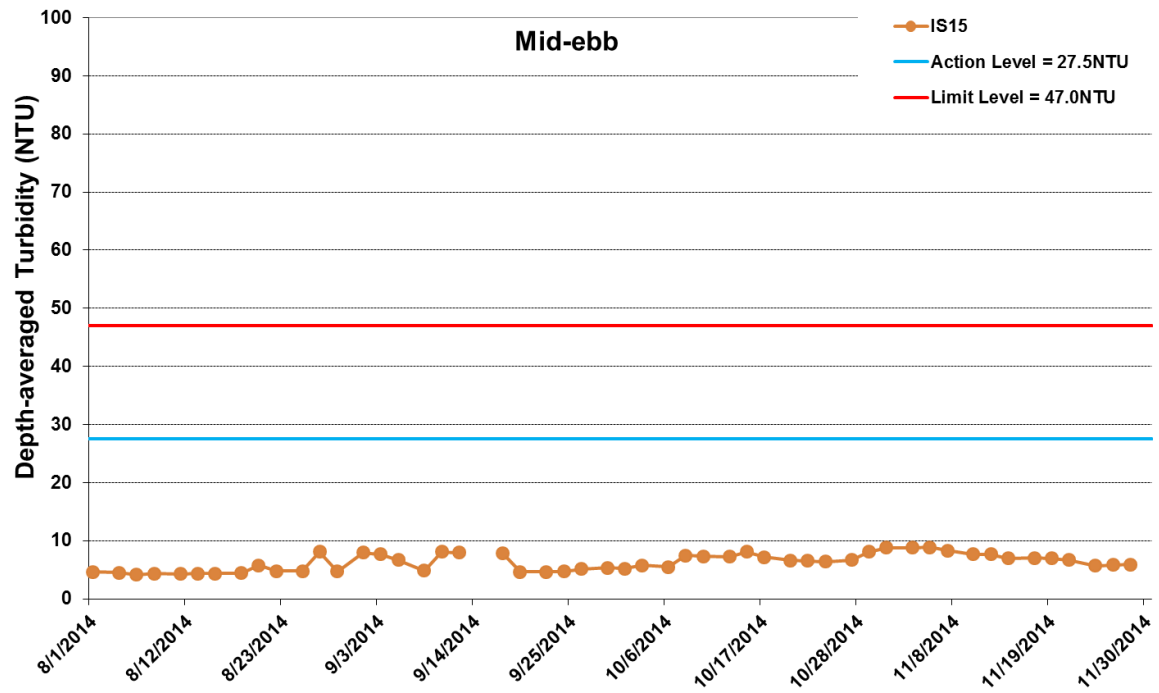


Figure G31 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



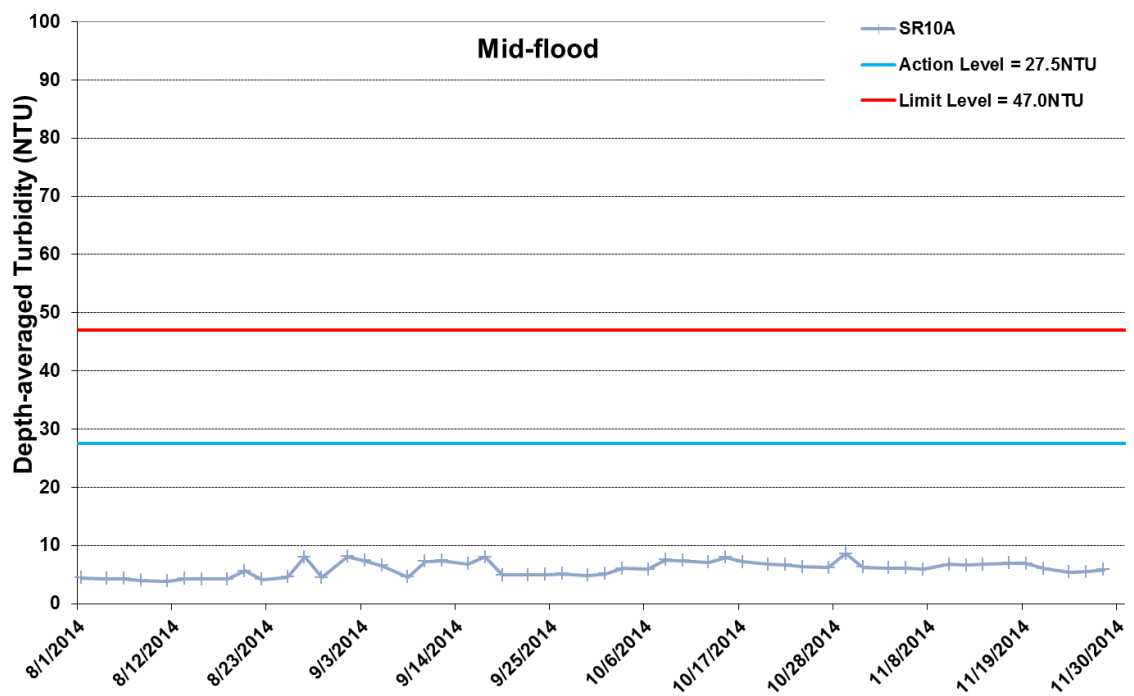
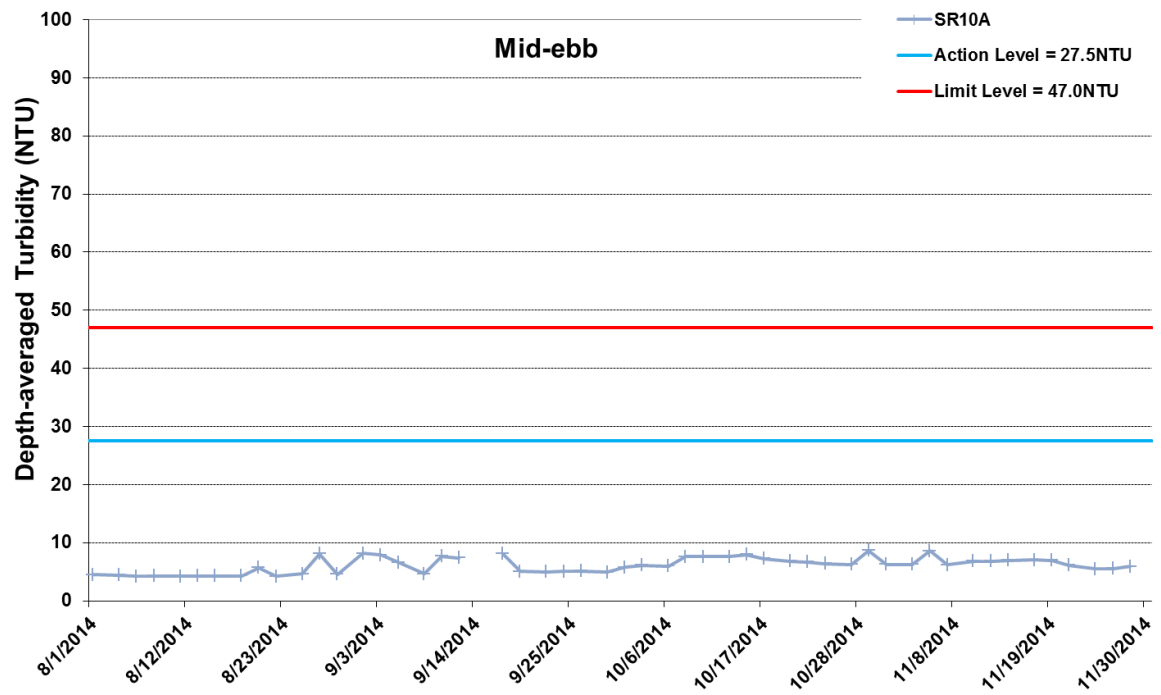


Figure G32 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



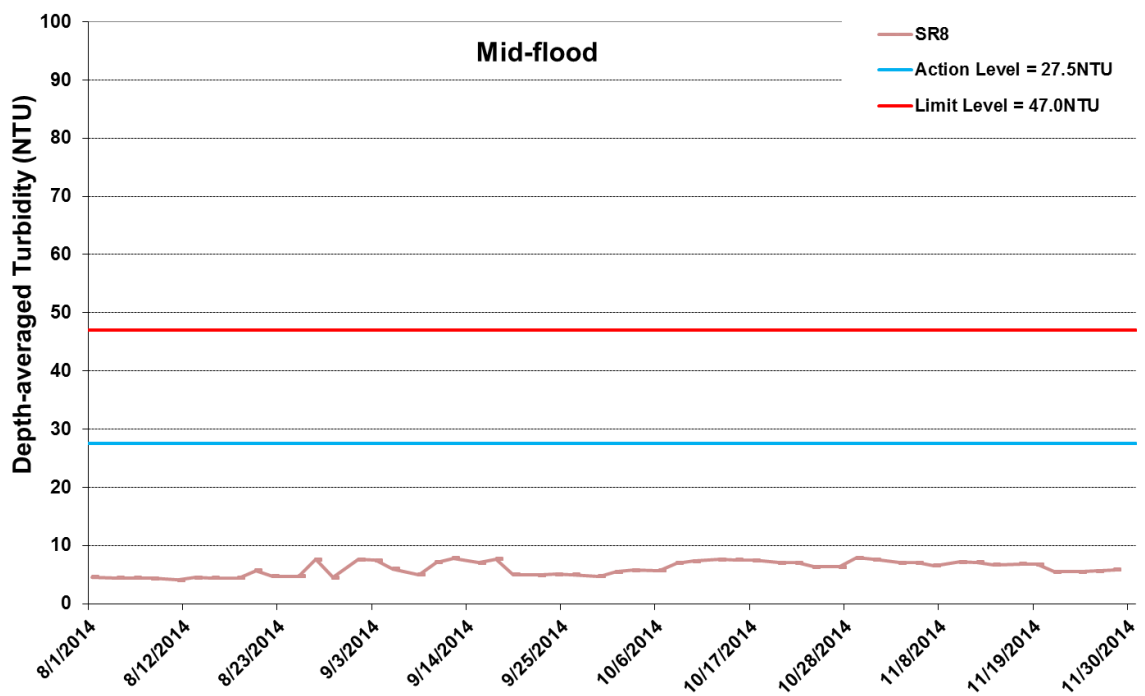
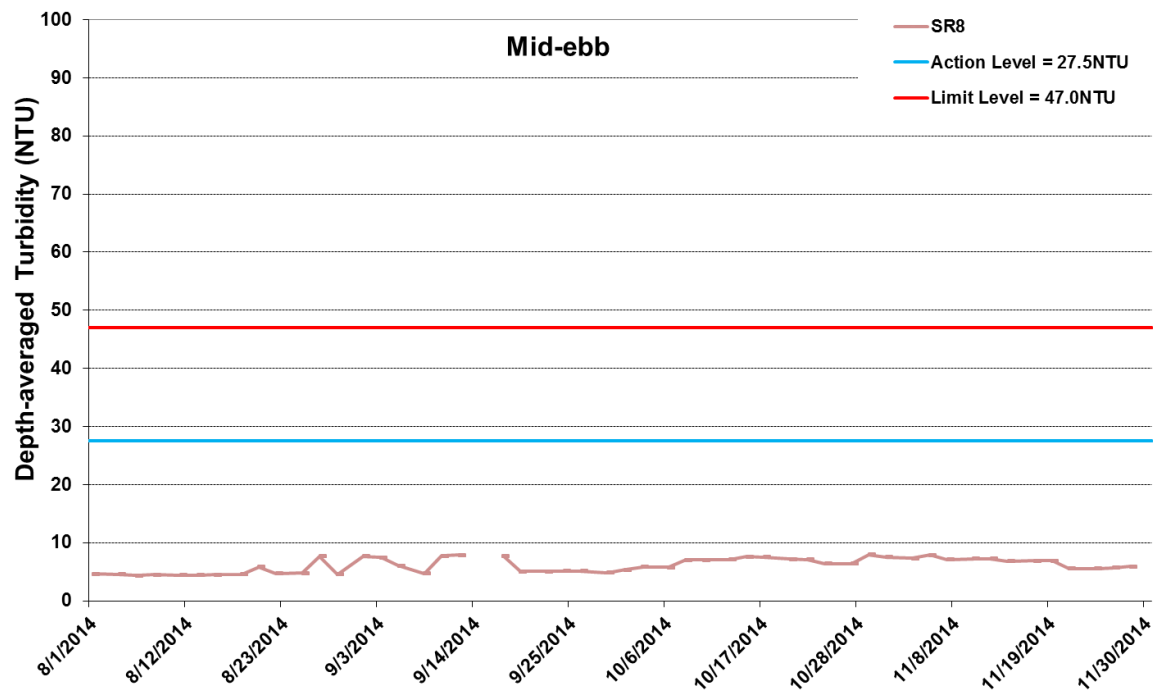


Figure G33 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



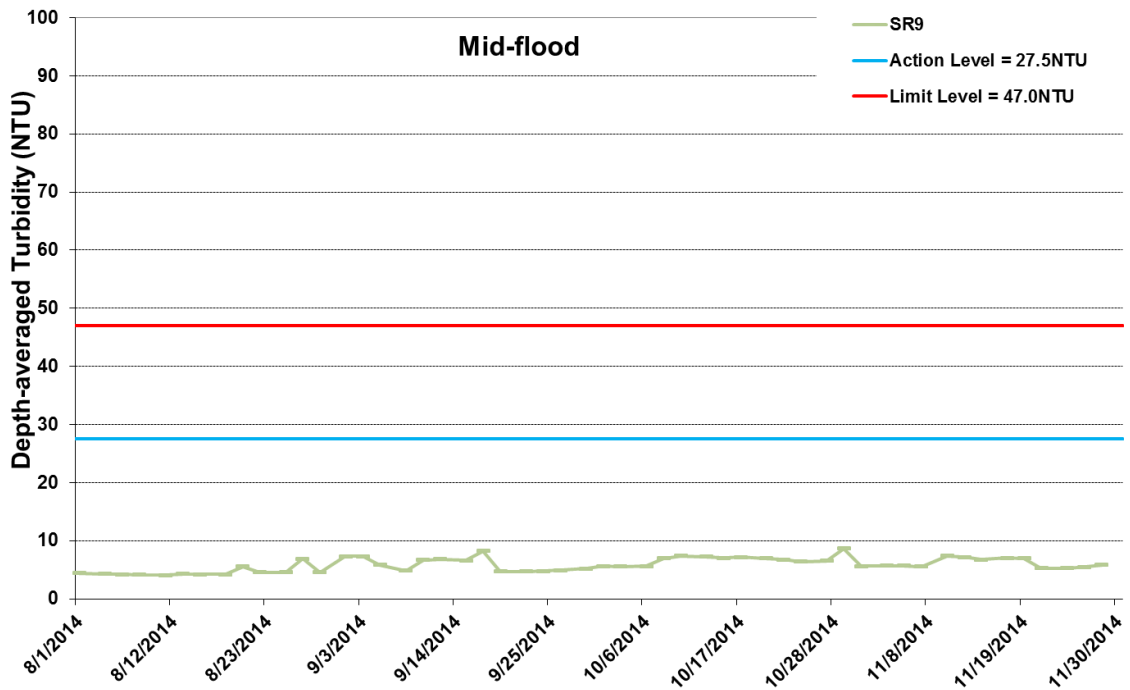
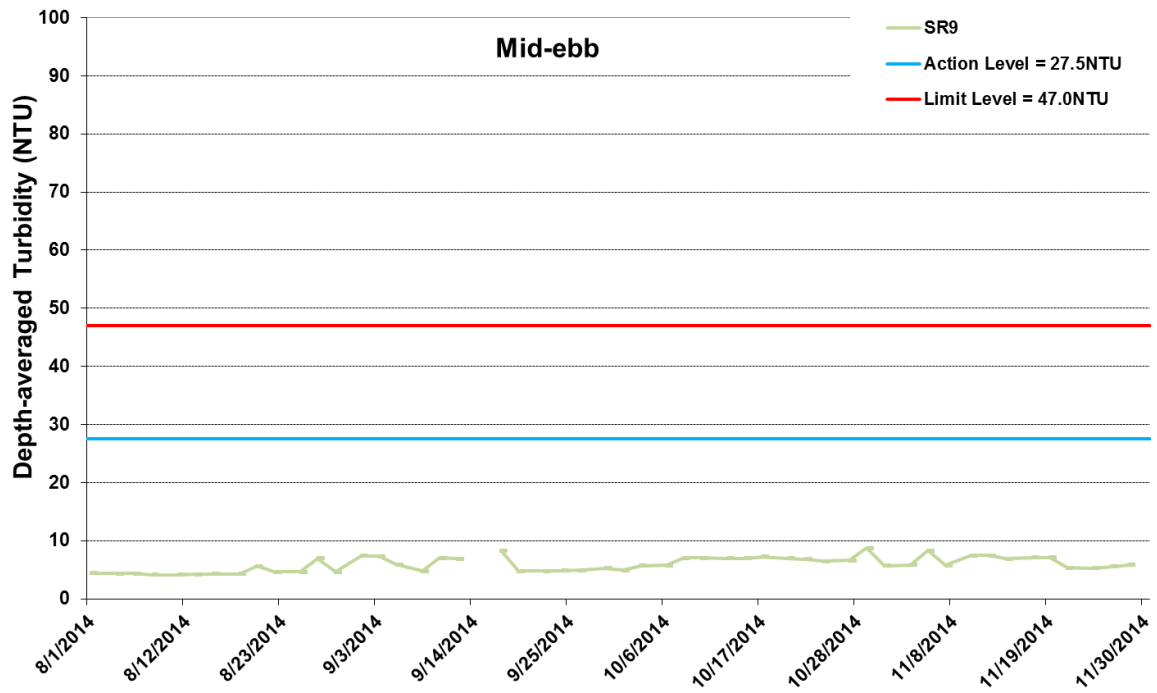


Figure G34 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 August 2014 and 30 November 2014 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



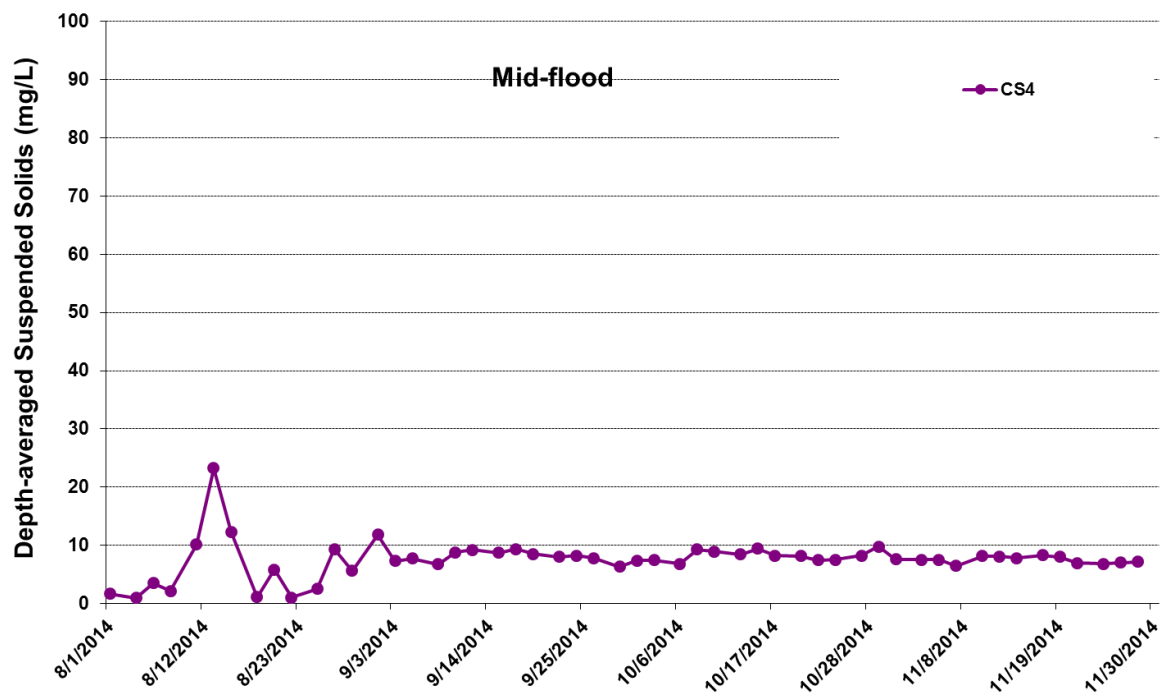
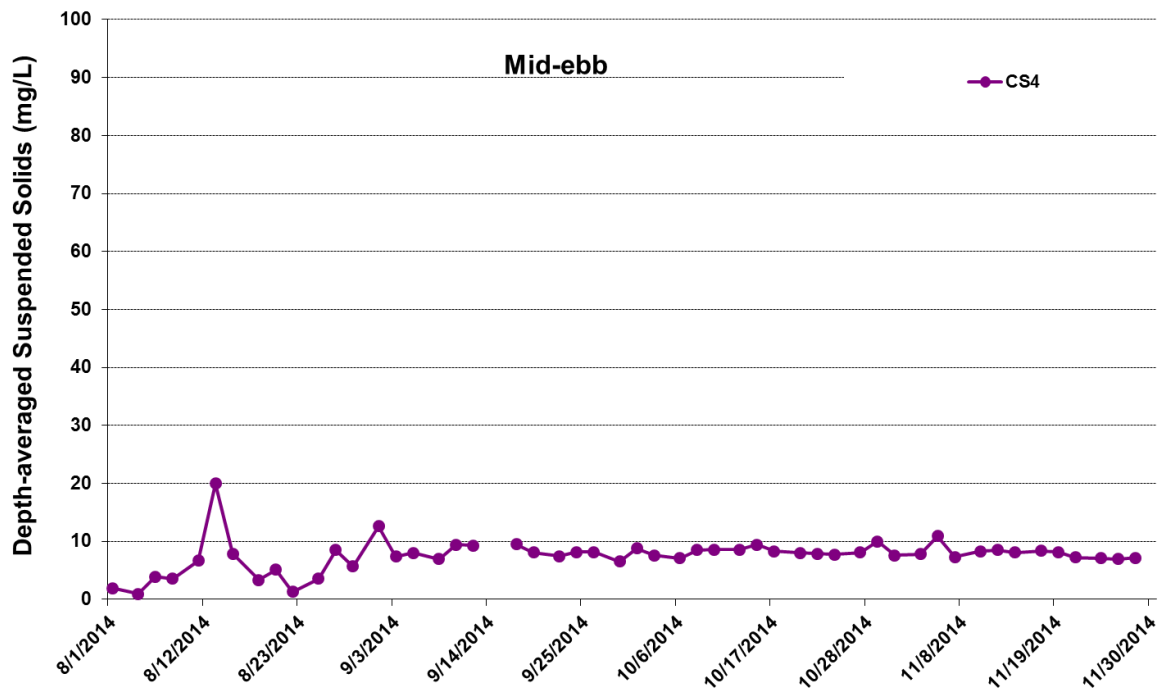


Figure G35 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at CS4. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



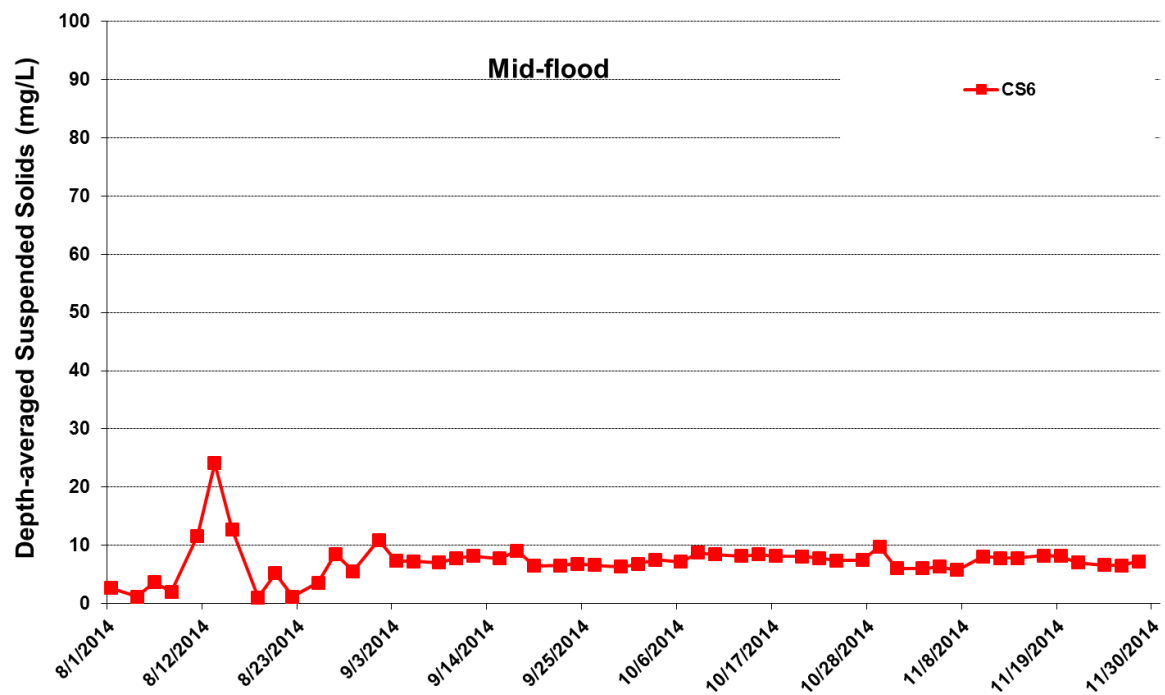
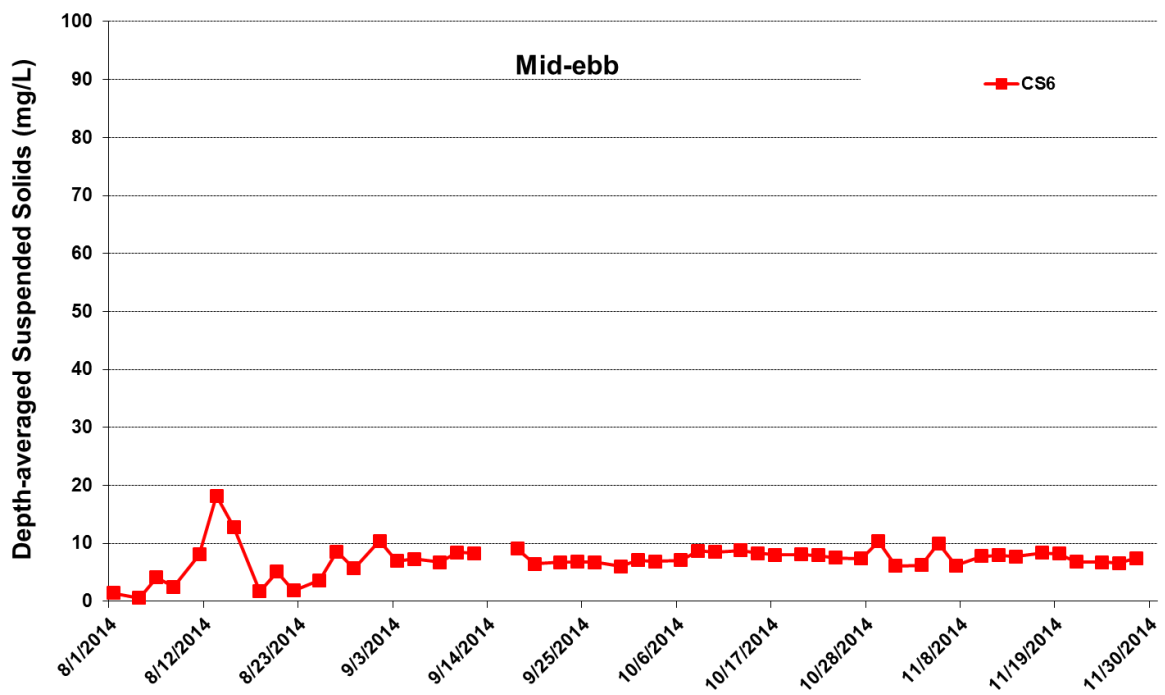


Figure G36 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at CS6. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



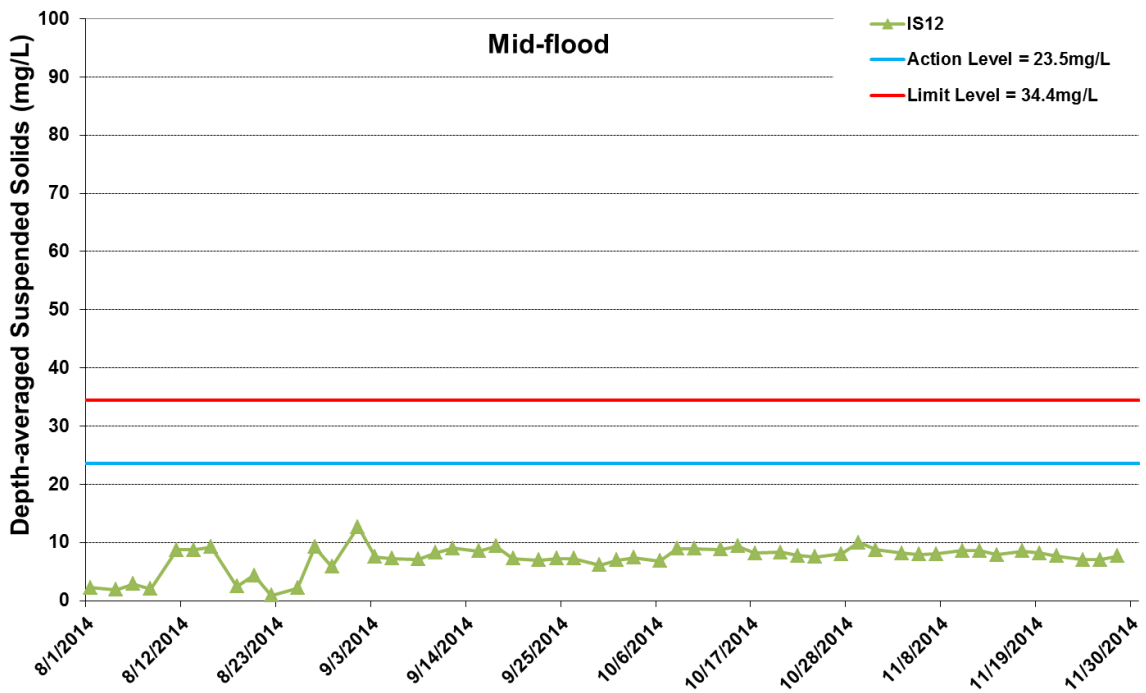
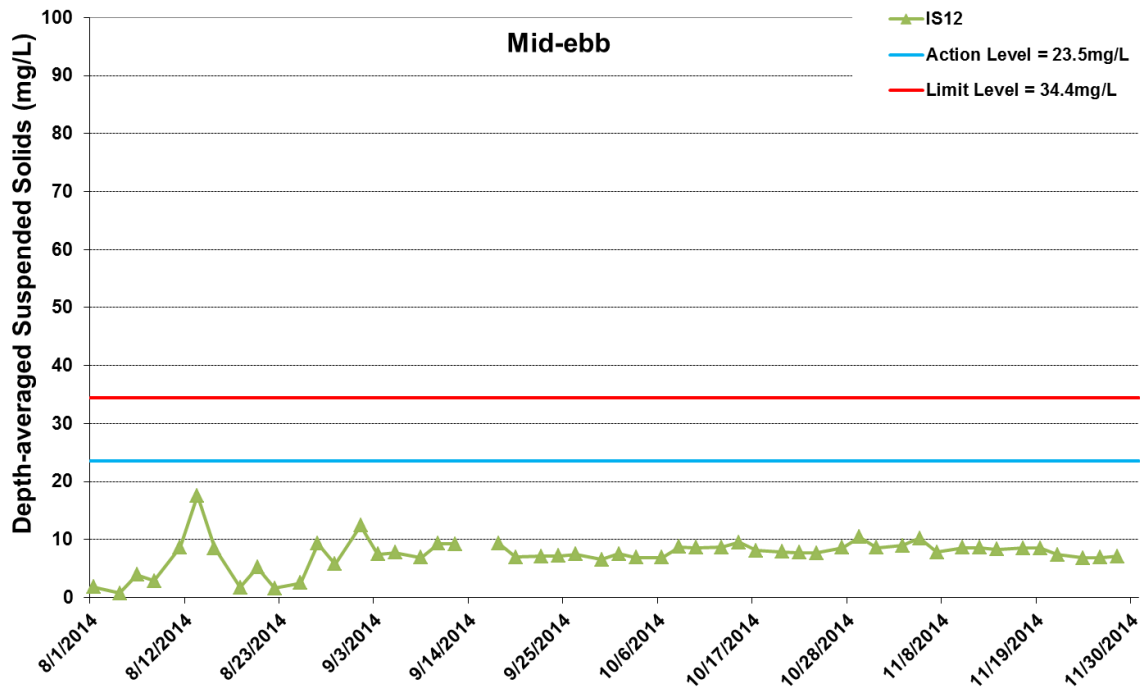


Figure G37 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at IS12. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



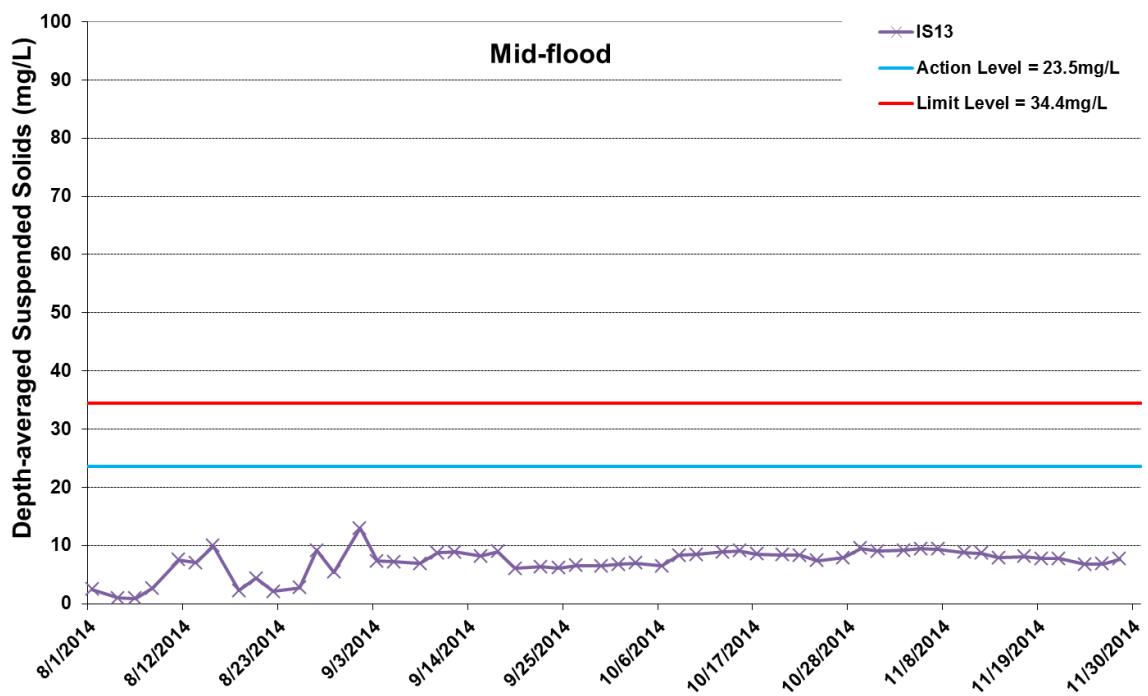
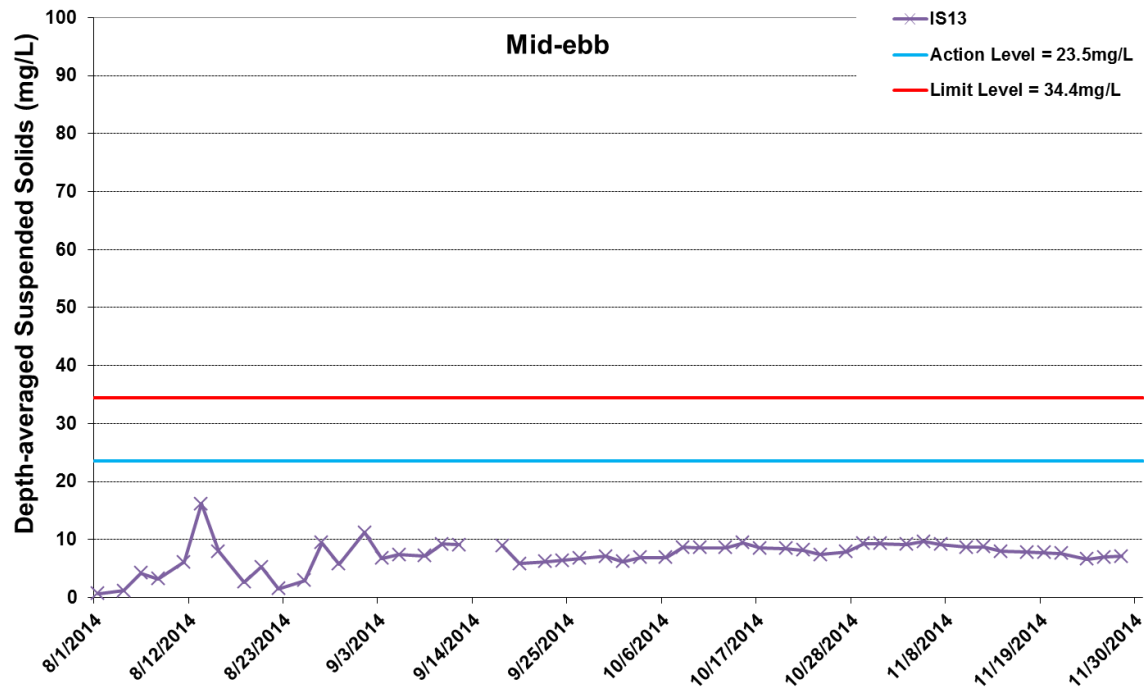


Figure G38 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at IS13. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



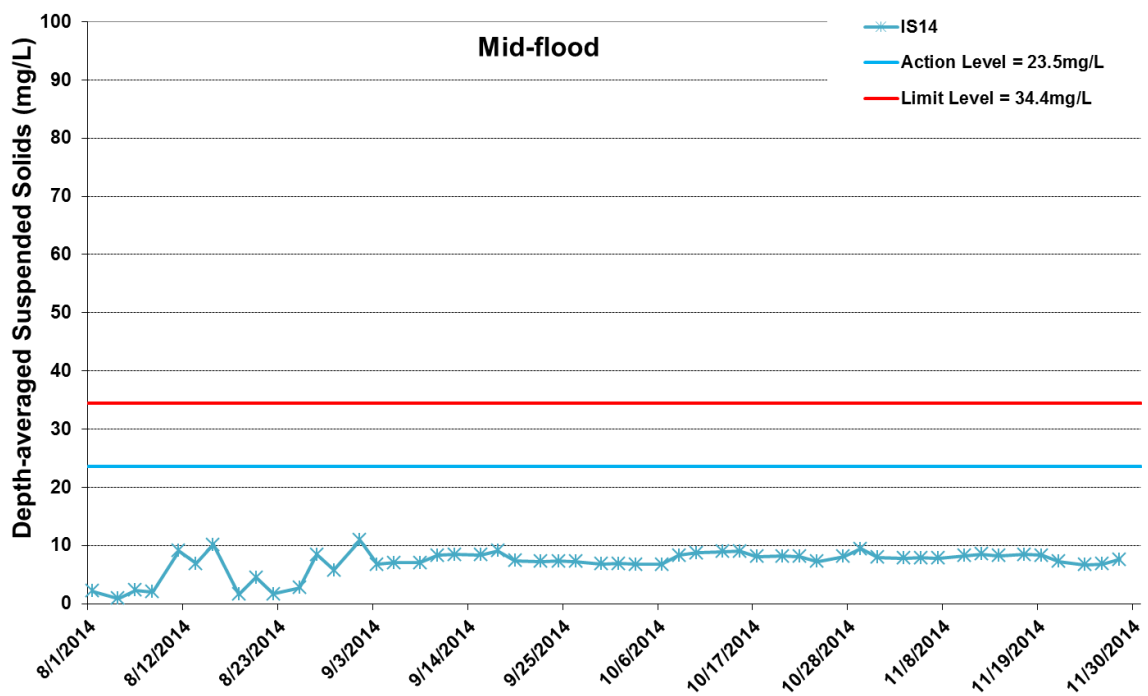
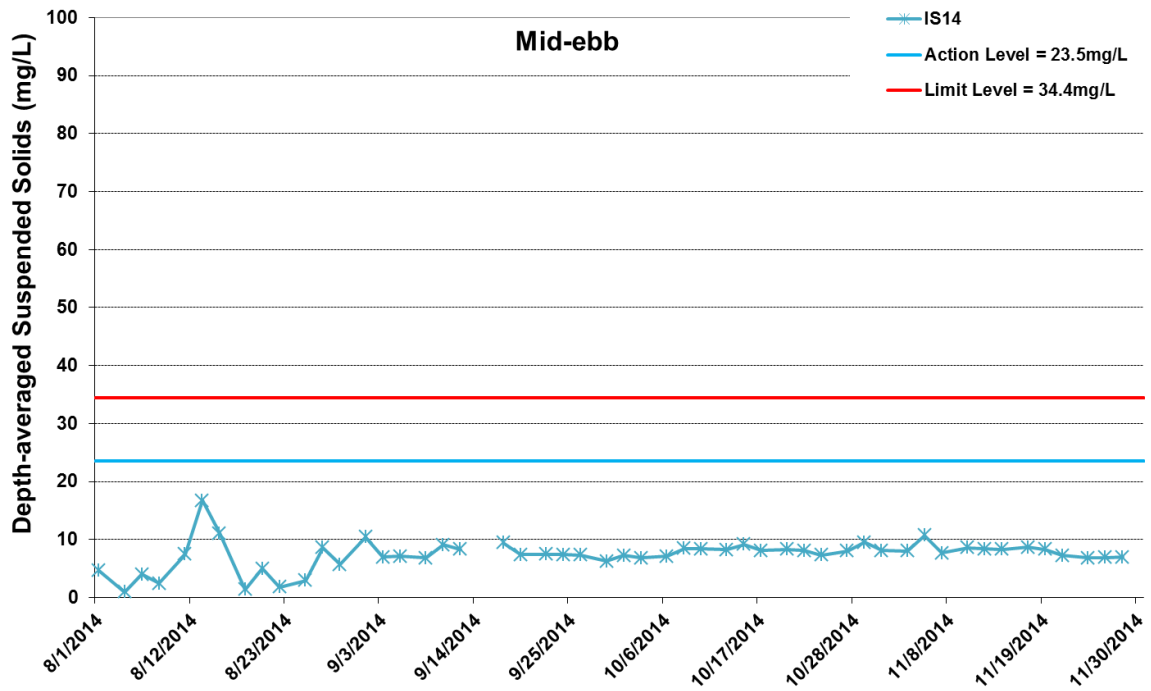


Figure G39 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at IS14. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



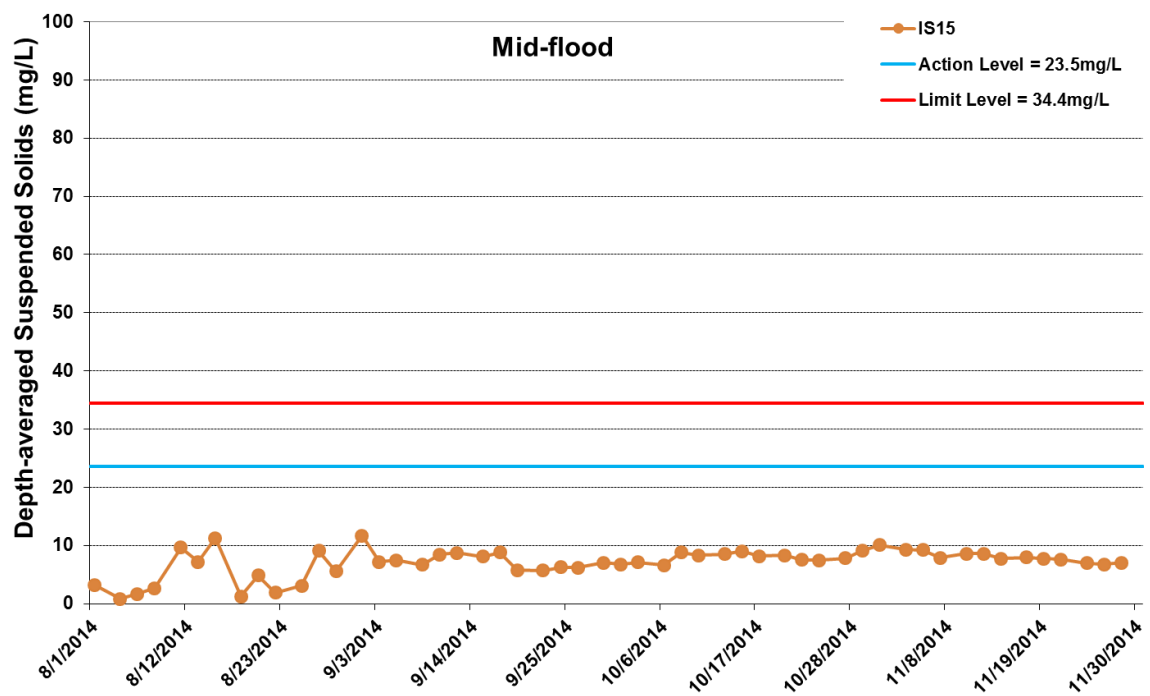
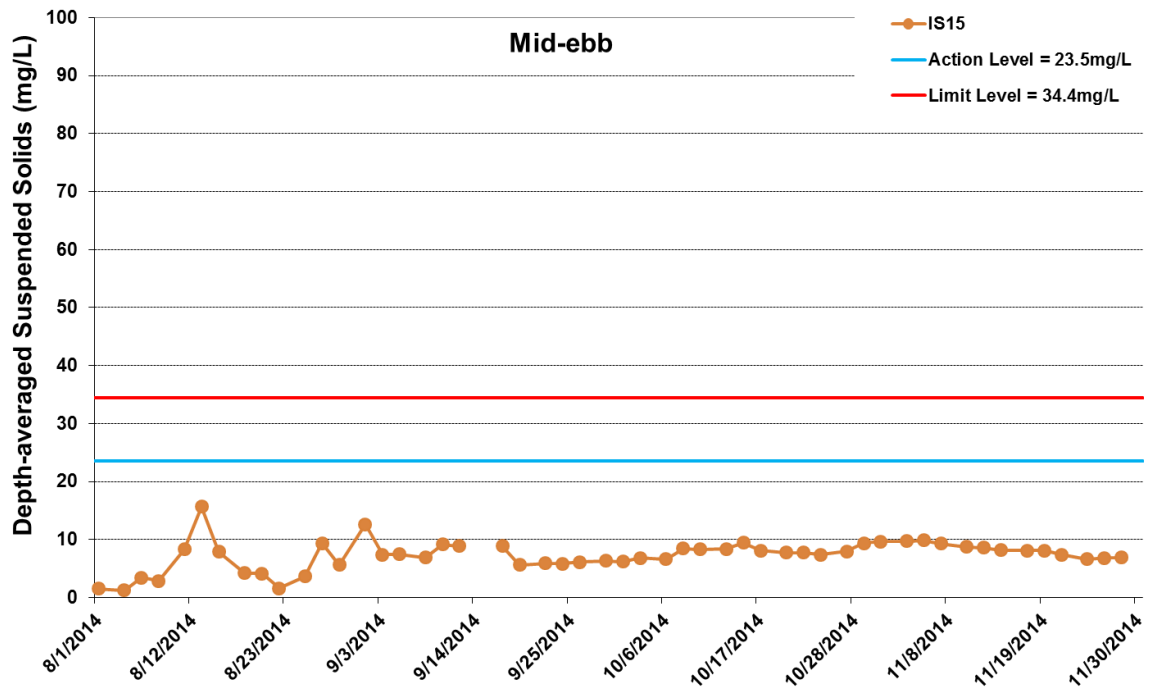


Figure G40 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at IS15. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



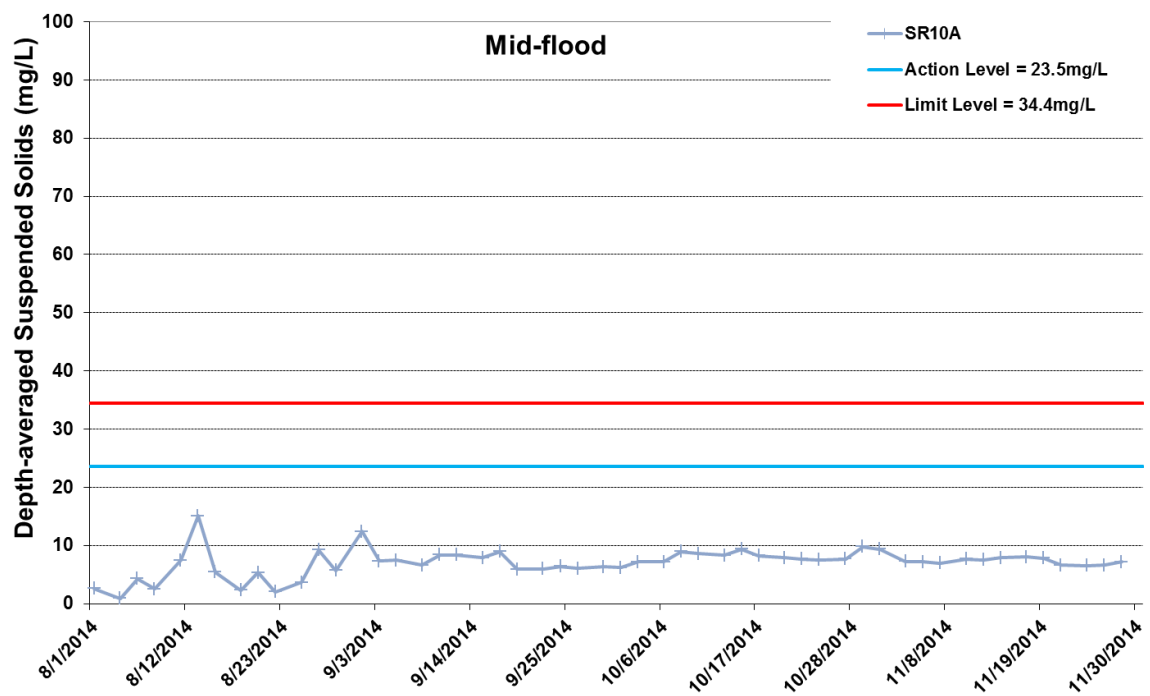
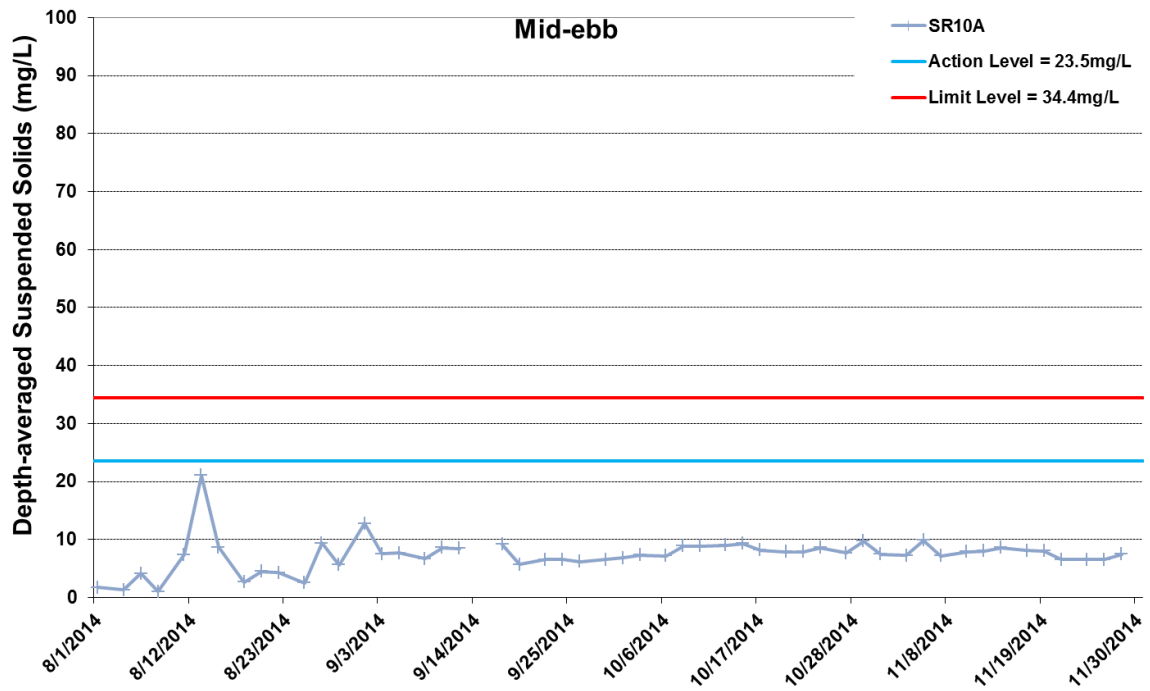


Figure G41 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at SR10A. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 – 8/6/2014); Construction of Temporary Seawalls (8/1/2014 – 11/20/2014); Sheet Piling (8/1/2014 – 11/20/2014); Filling (8/1/2014 – 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



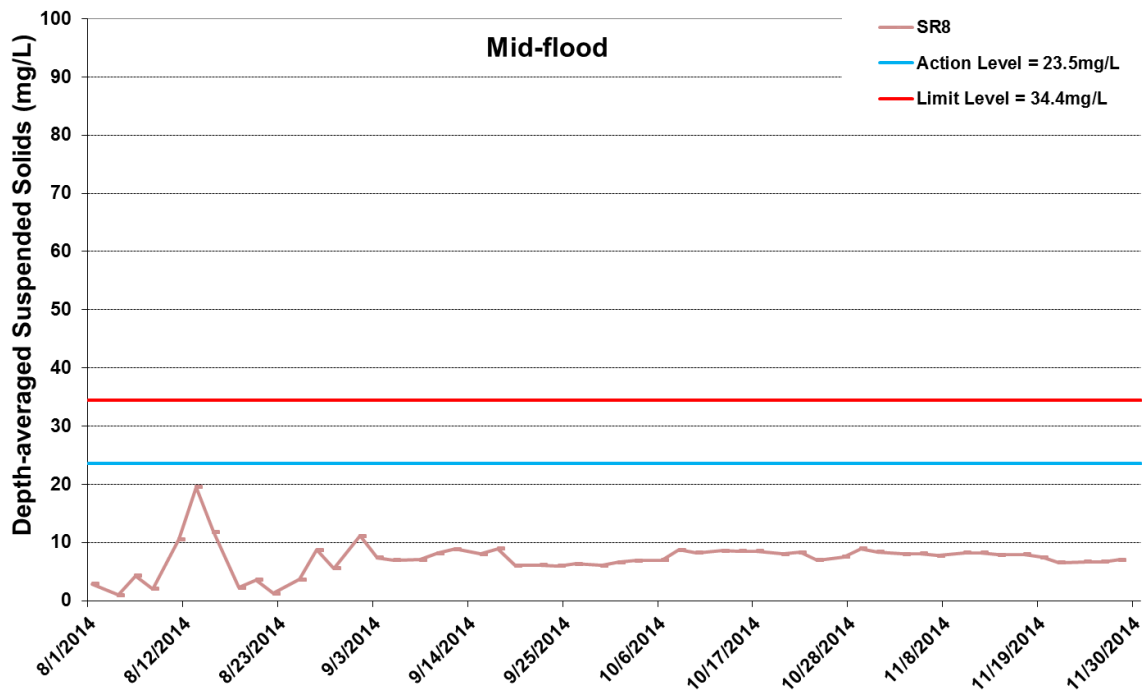
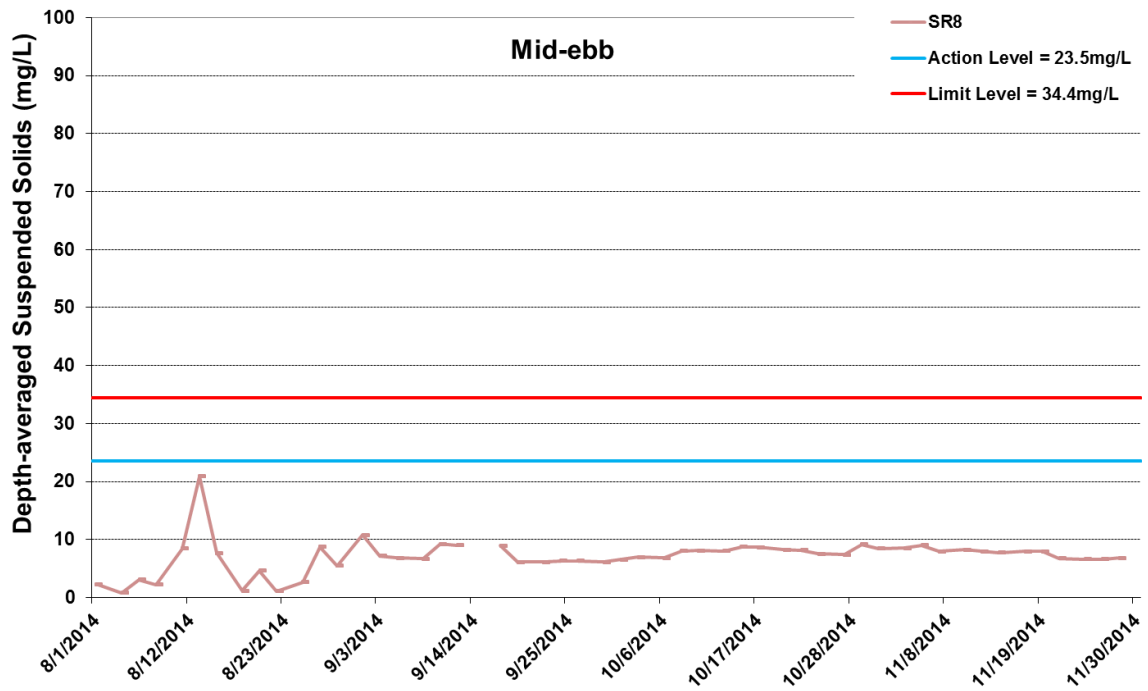


Figure G42 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at SR8. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



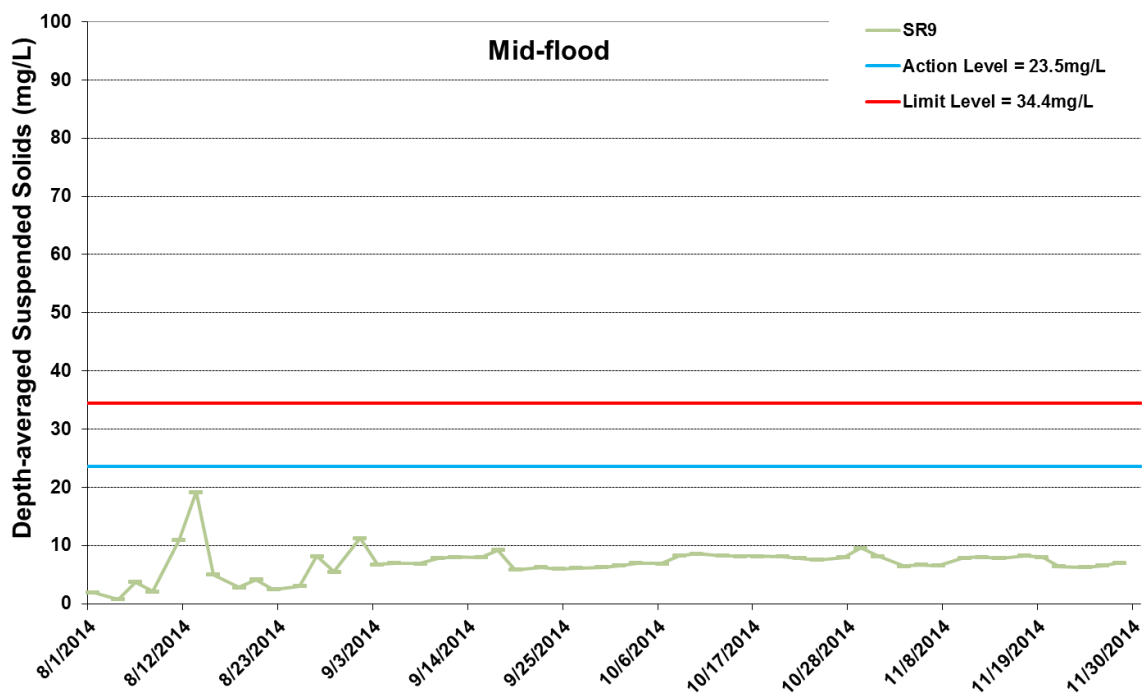
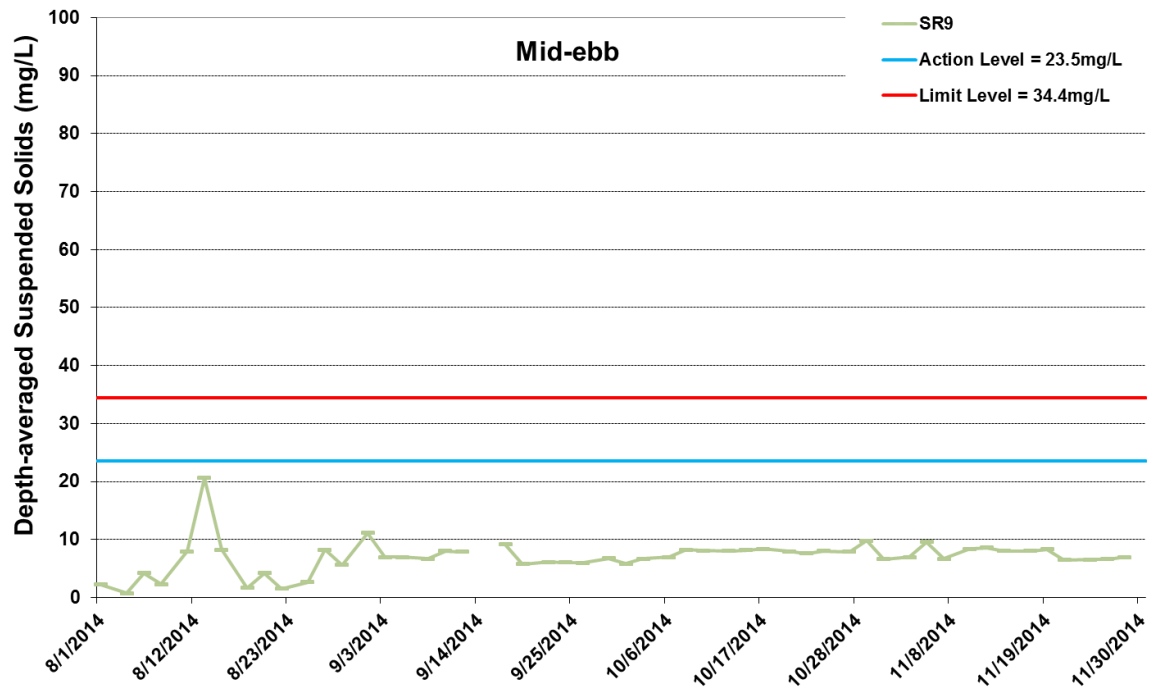


Figure G43 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 August 2014 and 30 November 2014 at SR9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine construction activities included: Dredging (8/1/2014 - 8/6/2014); Construction of Temporary Seawalls (8/1/2014 - 11/20/2014); Sheet Piling (8/1/2014 - 11/20/2014); Filling (8/1/2014 - 11/20/2014). Please note WQM Mid-Ebb on 15-Sep was cancelled due to adverse weather.



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**

*4th Quarterly Progress Report (September-November 2014)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

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

8 January 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 fourth 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 September to November 2014 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 September to November 2014, 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 892.88 km of survey effort was collected, with 97.1% 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, 343.71 km and 549.17 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 644.60 km, while the effort on secondary lines was 248.28 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 from September to November 2014, a total of 24 groups of 93 Chinese White Dolphins were sighted. All except two dolphin sightings were made during on-effort search. Twenty on-effort sightings were made on

primary lines, while another two on-effort sightings 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 September to November 2014 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 around Lung Kwu Chau (Figure 1). A few other sightings were scattered around Sha Chau and to the north of the airport platform. No dolphin sighting was made in NEL in the present quarter.
- 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 (September to November 2014) 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 three quarters, which have resulted in extremely low dolphin encounter rates in this area.
- 3.2.4. In NWL survey area, dolphin occurrence was also very different between the baseline and impact phase quarters. During the present impact monitoring period, there appeared to be 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). Notably, a number of dolphin sightings were made to the west of Chek Lap Kok airport (especially near the HKLR09 alignment) during the baseline period, but the dolphins were not sighted there at all during the present impact phase period.
- 3.2.5. Another comparison in dolphin distribution was made between the two quarterly periods of autumn months in 2013 and 2014 was also made (Figure 2). Among the two autumn periods, no dolphin sighting was made in NEL in the autumn of 2014, while there were two sightings made there in the autumn of 2013. Moreover, a lot more dolphin sightings were made in the middle and western portions of North Lantau waters (especially between Black Point and Lung Kwu Chau, as well as around Sha Chau) in the autumn of 2013 than in the autumn of 2014. The comparison indicated that dolphin usage in North Lantau waters was further diminished in autumn of 2014 from the same period in the previous year.

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 September – November 2014 deduced from HKLR03 monitoring surveys

SURVEY AREA	HKLR03 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 & 11 Sep 2014)	0.00	0.00
	Set 2 (19 & 22 Sep 2014)	0.00	0.00
	Set 3 (7 & 13 Oct 2014)	0.00	0.00
	Set 4 (16 & 23 Oct 2014)	0.00	0.00
	Set 5 (4 & 10 Nov 2014)	0.00	0.00
	Set 6 (12 & 18 Nov 2014)	0.00	0.00
Northwest Lantau	Set 1 (2 & 11 Sep 2014)	5.72	28.58
	Set 2 (19 & 22 Sep 2014)	4.34	18.80
	Set 3 (7 & 13 Oct 2014)	13.13	42.67
	Set 4 (16 & 23 Oct 2014)	0.00	0.00
	Set 5 (4 & 10 Nov 2014)	4.60	24.54
	Set 6 (12 & 18 Nov 2014)	2.84	8.53

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (September – November 2014) 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 2014	September - November 2011	September - November 2014	September - November 2011
Northeast Lantau	0.00	6.00 ± 5.05	0.00	22.19 ± 26.81
Northwest Lantau	5.10 ± 4.40	9.85 ± 5.85	20.52 ± 15.10	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 4.18 sightings and 16.17 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 seven quarters of HKLR03 monitoring (Table 4).

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

- 3.3.4. It is a serious concern that dolphin occurrence in NEL in the seven quarters (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) of HKLR03 monitoring have been exceptionally low when compared to the baseline period (Table 4). 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.
- 3.3.5. Moreover, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period were also much lower (reductions of 48.2% and 54.1% respectively) than the ones recorded in the 3-month baseline period, indicating a noticeable decline in dolphin usage of this survey area during the present construction 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

- 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 (eighth quarter of the HKLR03 impact phase being assessed), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.0222 and 0.0662 respectively. If the alpha value is set at 0.1, significant difference was 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 eight quarters of the HKLR03 impact phase being assessed), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.0019 and 0.0006 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 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 could possibly link to the HZMB-related construction activities in NEL waters.
- 3.3.10. It should also be noted that dolphin usage in NWL have been diminished progressively in the past few quarters (Table 5), and such downward trend should be closely monitored, as

the potential impacts of HZMB-related works on the dolphins may have been extended to the entire North Lantau region.

3.4. *Group size*

- 3.4.1. Group size of Chinese White Dolphins ranged from one to 13 individuals per group in North Lantau region during September – November 2014. 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 (September – November 2014) and baseline monitoring period (September – November 2011)

	Average Dolphin Group Size	
	September – November 2014	September – November 2011
Overall	3.88 ± 2.69 (n = 24)	3.72 ± 3.13 (n = 66)
Northeast Lantau	0.00	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.88 ± 2.69 (n = 24)	3.92 ± 3.40 (n = 49)

- 3.4.2. The average dolphin group sizes in the entire North Lantau region as well as in NWL waters during September – November 2014 were similar to the ones recorded during the three-month baseline period (Table 6). Sixteen of the 24 groups were composed of 1-4 individuals only, while there was only one dolphin group with 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 autumn of 2014, distribution of the majority of larger dolphin groups were concentrated near Lung Kwu Chau (Figure 3). This distribution pattern was quite 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 September to November 2014, the most heavily utilized habitats by Chinese White Dolphins mainly concentrated around Lung Kwu Chau (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 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 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).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the three-month study period, only four unspotted juveniles (UJ) were sighted in NWL survey areas. These young calves comprised of 4.3% of all animals sighted, which was lower than the percentage recorded during the baseline monitoring period (6.8%).
- 3.6.2. All four young calves were sighted around Lung Kwu Chau (Figure 6), which was very different from their distribution pattern during the baseline period when young calves were sighted throughout the NWL survey area as well as a few sighted in NEL waters. None of these young calves were sighted in the vicinity of the TMCLKL/HKLR09 alignments and HKBCF/HKLR03 reclamation sites during the present quarter (Figure 6).
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. A total of three dolphin sightings were 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 (8.3%) was lower than the one recorded during the baseline period (11.6%). On the contrary, the percentage of socializing activities during the present impact phase monitoring period (4.2%) was slightly lower than the one recorded during the baseline period (5.4%). One group of five dolphins was also engaged in traveling activity during the present quarter.
- 3.7.2. Distribution of dolphins engaged in feeding, socializing and traveling activities during the present three-month period is shown in Figure 7. The three sightings associated with feeding and traveling activities all occurred to the north of Lung Kwu Chau, while the lone sighting associated with socializing activity was located to the north of the airport (Figure 7). 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 7).
- 3.7.3. During the three-month period, none of the 24 dolphin groups was found to be associated with an operating fishing vessels in North Lantau waters. 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 September to November 2014, over 2,000 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, 26 individuals sighted 49 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these 49 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 five individuals (NL202, NL214, NL233, NL286 and WL05) being sighted thrice and two individuals (NL48 and NL182) being sighted four times.
- 3.8.4. Five of these 26 individuals were also sighted in West Lantau waters during the HKLR09 monitoring surveys for the same three-month period, showing their movement between North and West Lantau regions.
- 3.8.5. Five recognized females (NL104, NL182, NL202, NL233 and NL256) were accompanied with their calves during their re-sightings.

3.9. *Individual range use*

- 3.9.1. Ranging patterns of the 26 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 (and some also in WL), 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 HKLR03 impact monitoring quarters as well as during the baseline period.
- 3.9.3. For many individuals that have previously utilized the Brothers Islands as their major core area of activities, they have apparently shifted their range use away from this important habitat (e.g. NL136, NL182, NL259; Appendix V). Such shifts of range use and core area use were also documented by Hung (2014), as well as in the past monitoring quarters in 2013 and 2014 under the HKLR03 monitoring study.
- 3.9.4. On the other hand, there were a few individuals sighted in NWL and NEL waters consistently in the past, but have extended their range use to WL waters in the present quarter (e.g. NL259). 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

- Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.
- Hung, S. K. 2013. Monitoring of Marine Mammals in Hong Kong waters: final report (2012-13). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department, 168 pp.
- Hung, S. K. 2014. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2013-14). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 231 pp.
- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

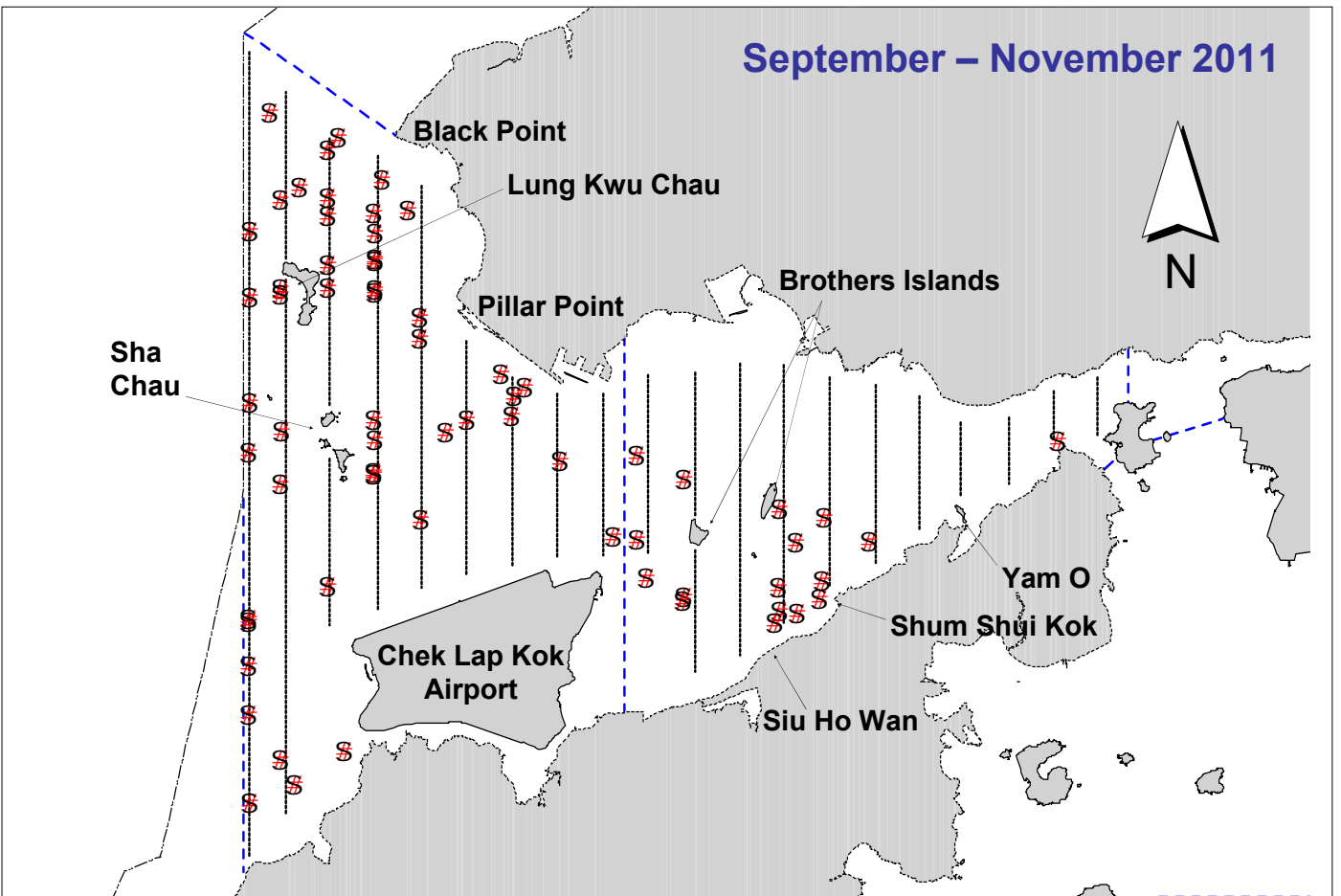
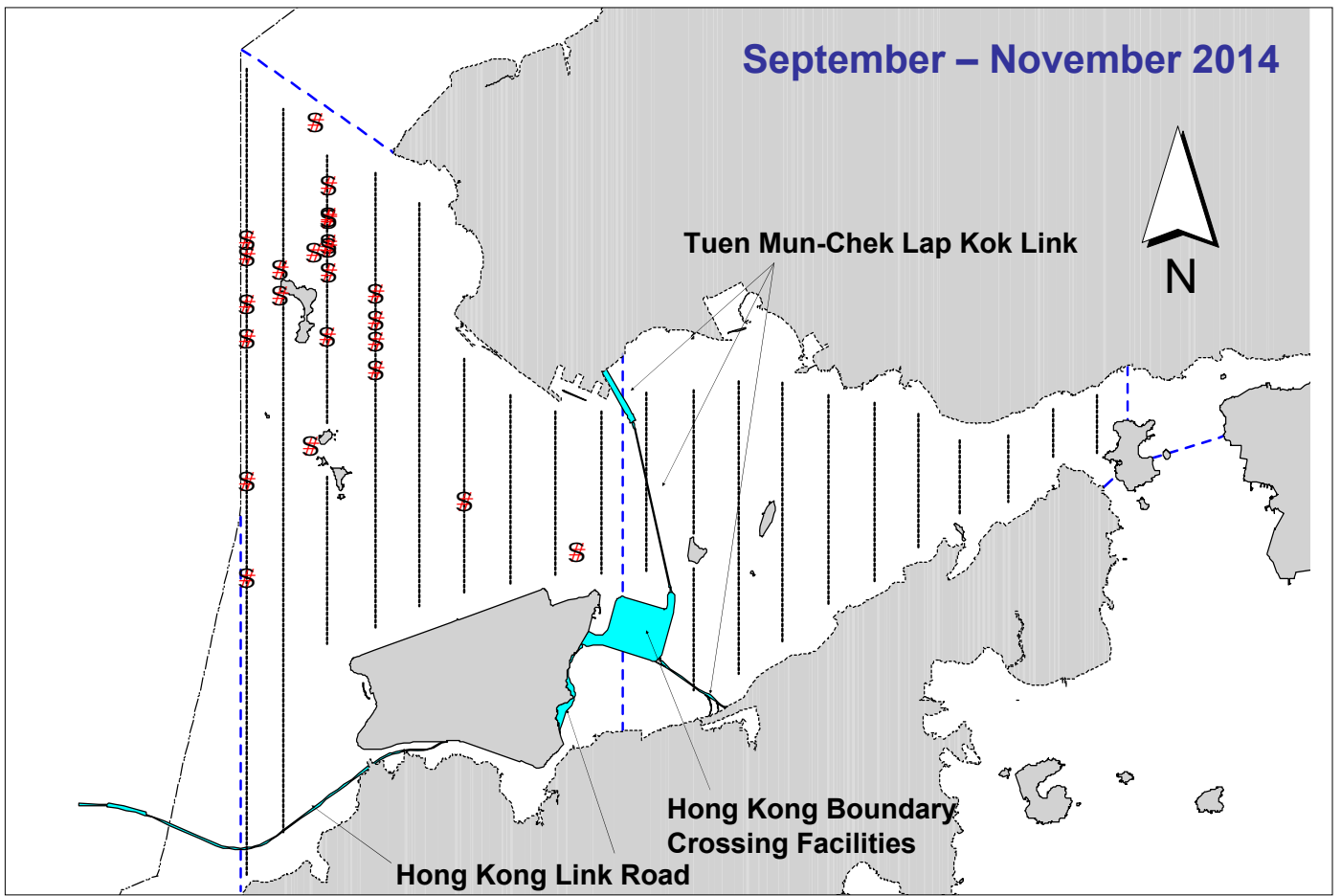


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

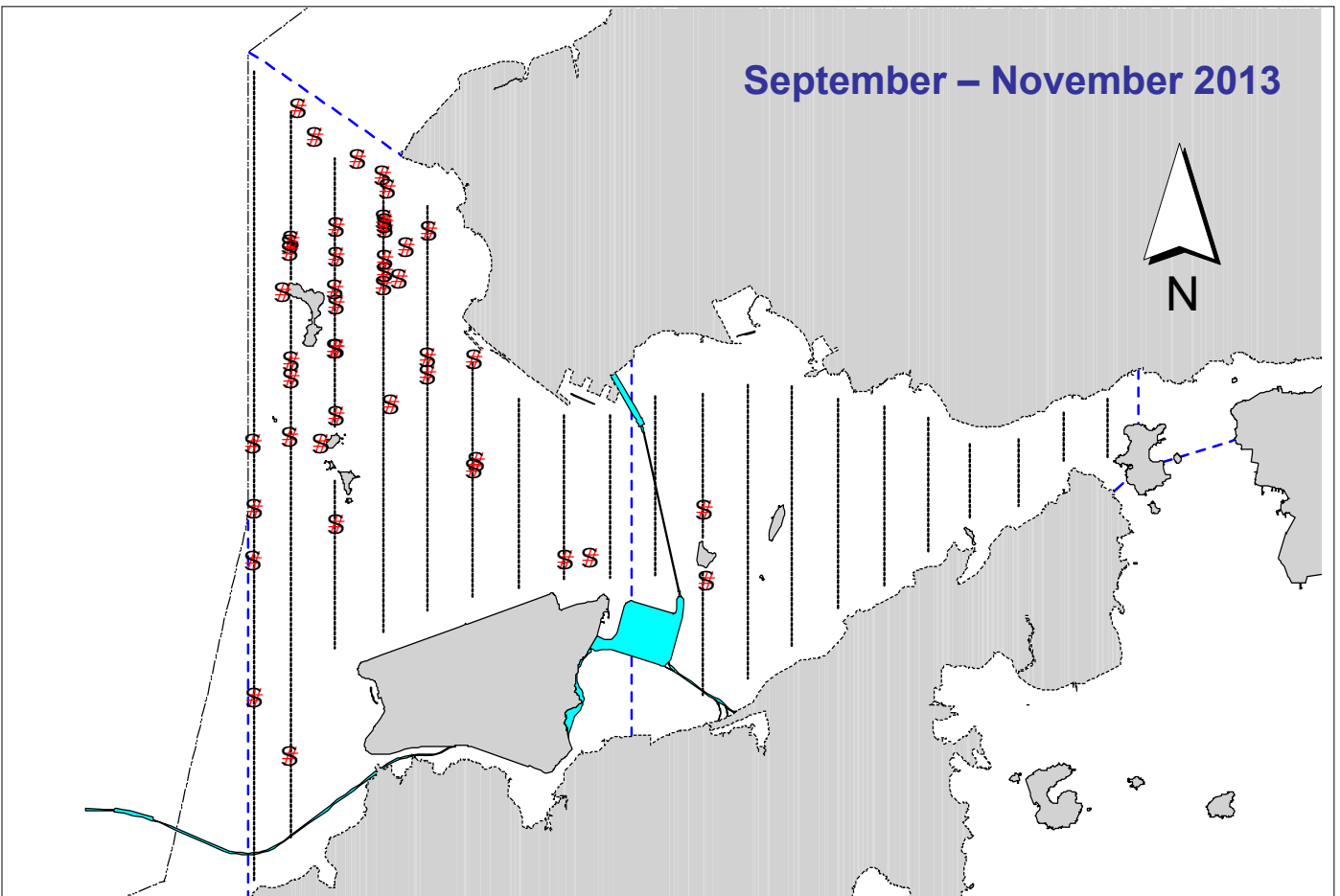
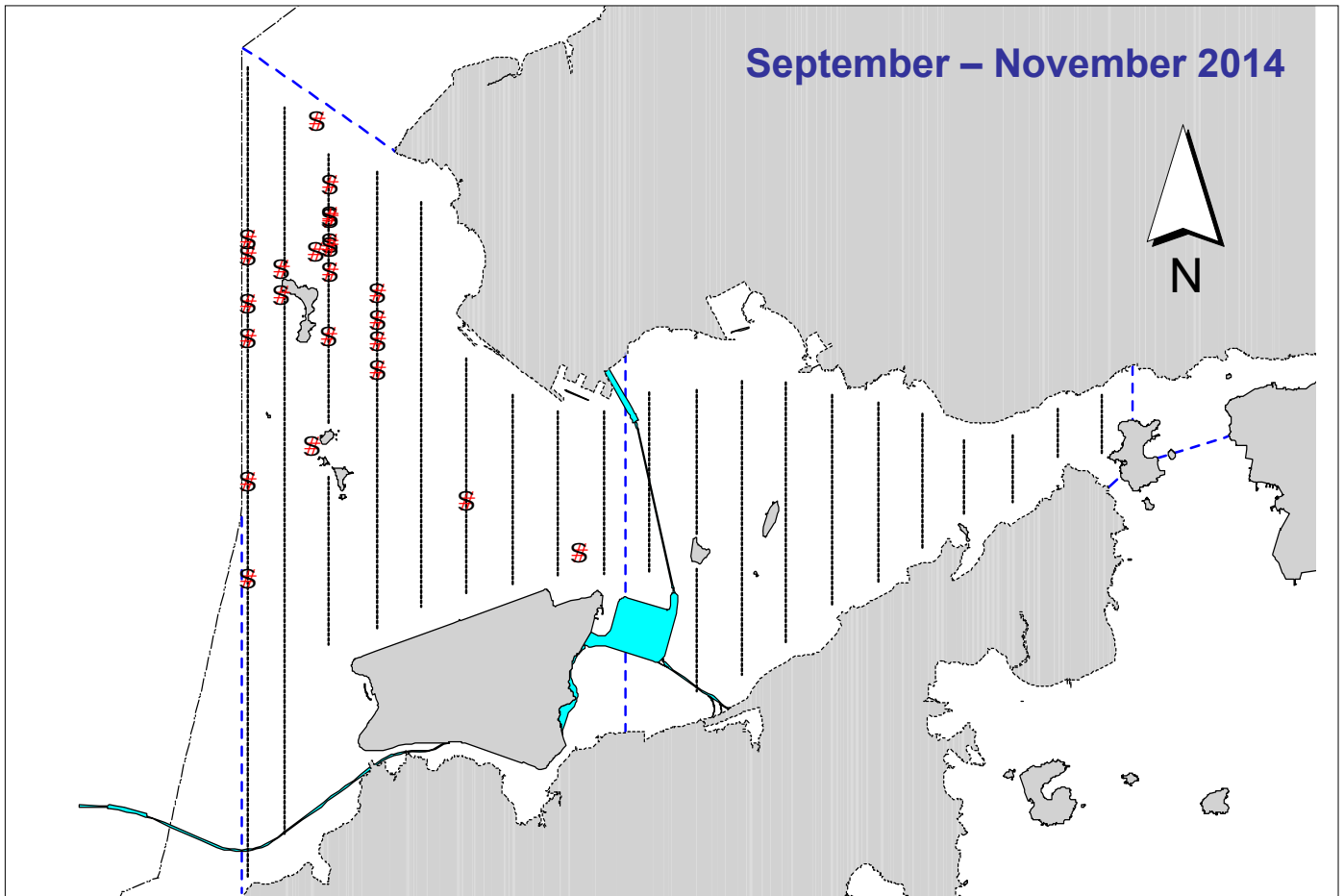


Figure 2. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during the same autumn quarters of HKLR03 impact phase in 2014 (top) and 2013 (bottom)

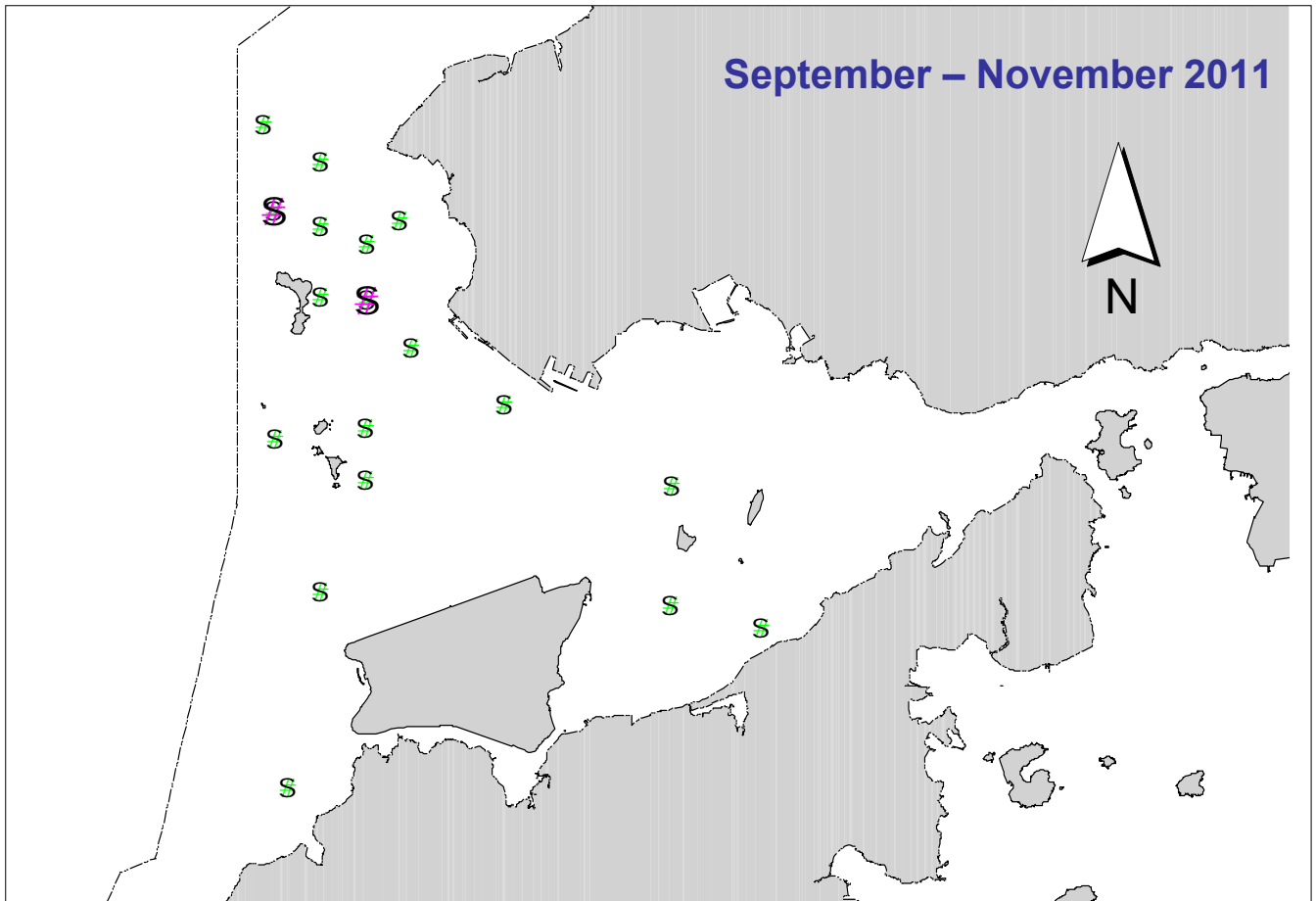
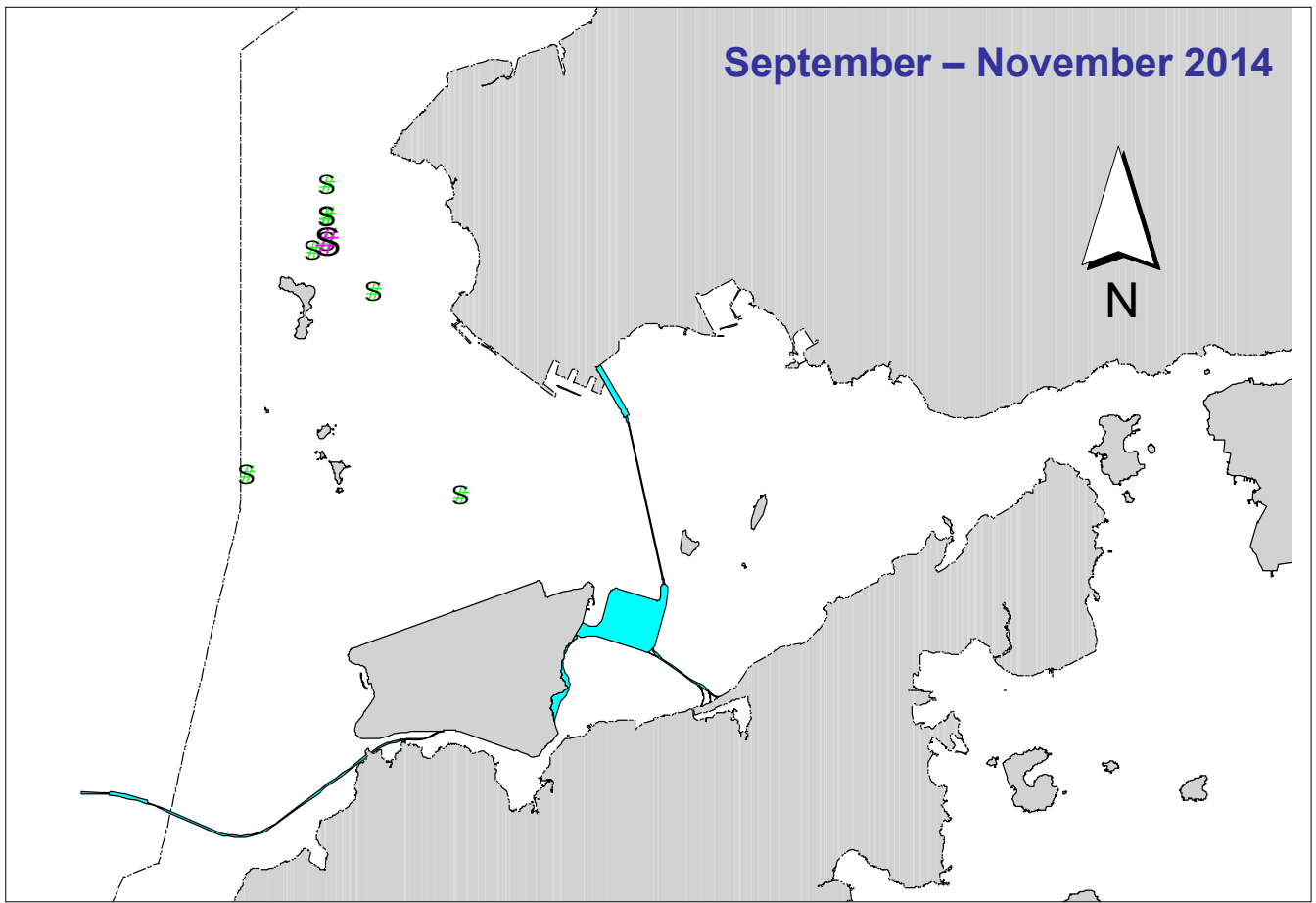


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

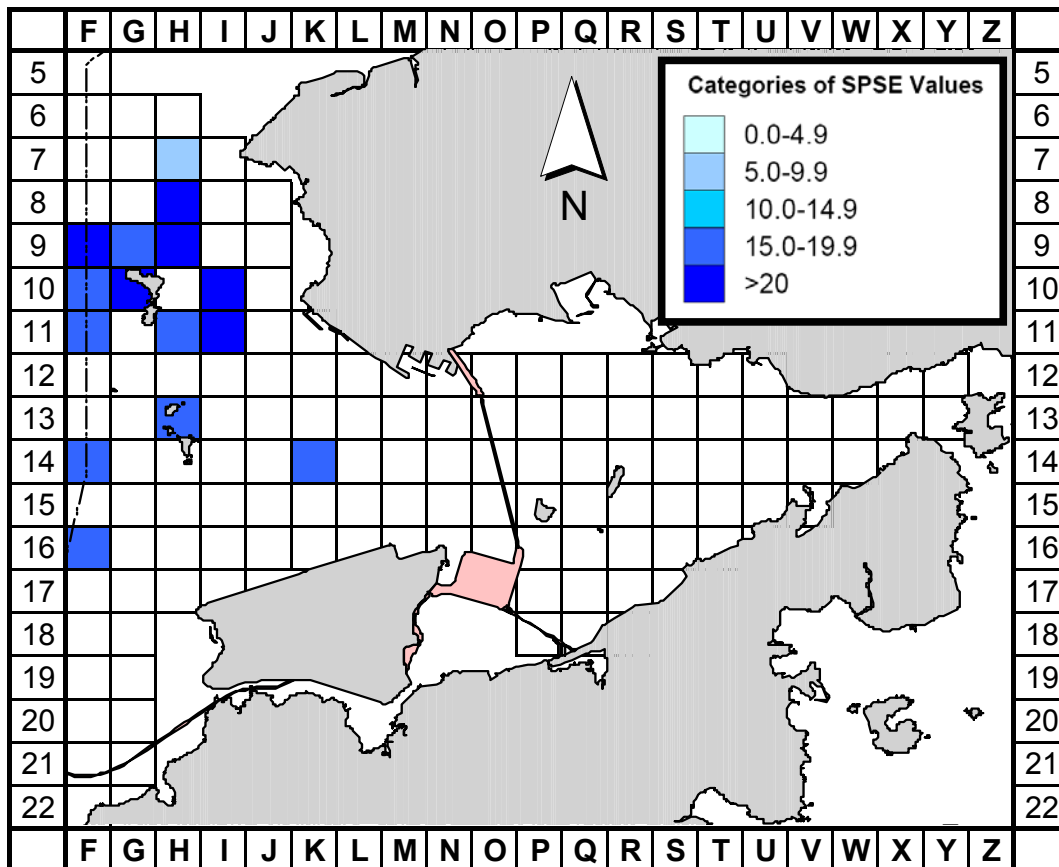


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 14) (SPSE = no. of on-effort sightings per 100 units of survey effort)

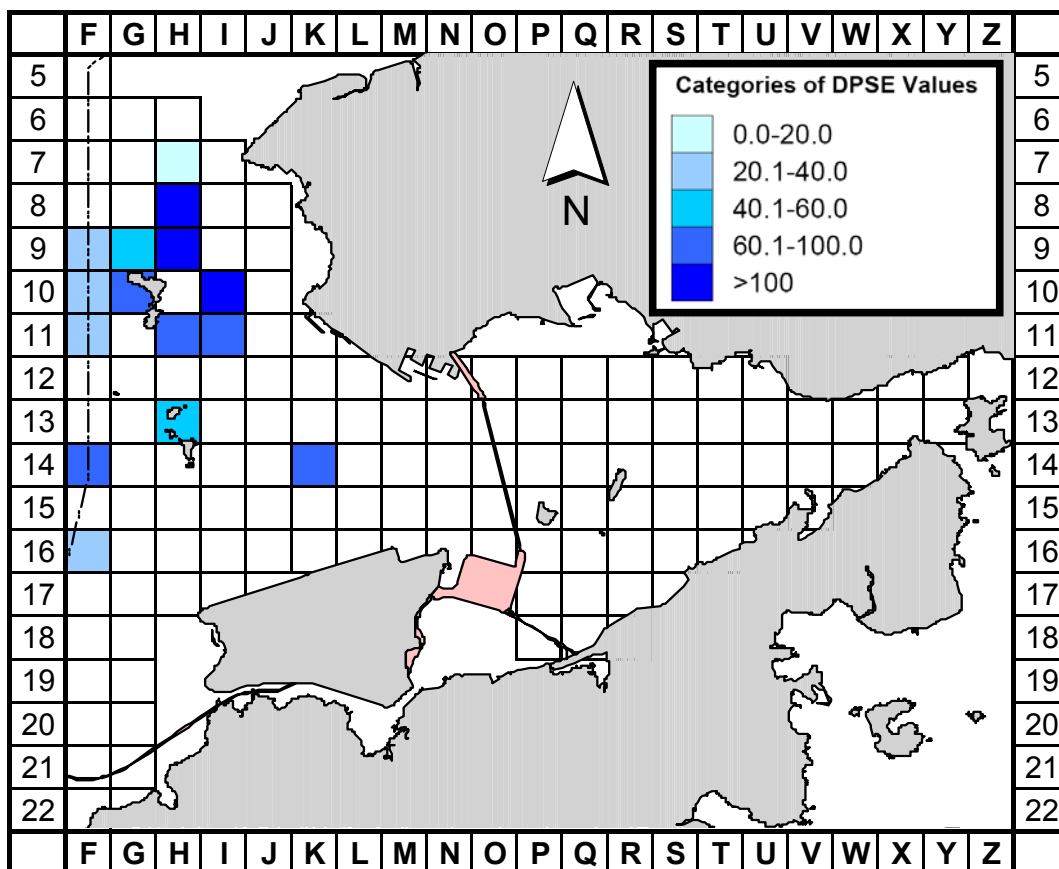


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 14) (DPSE = no. of dolphins per 100 units of survey effort)

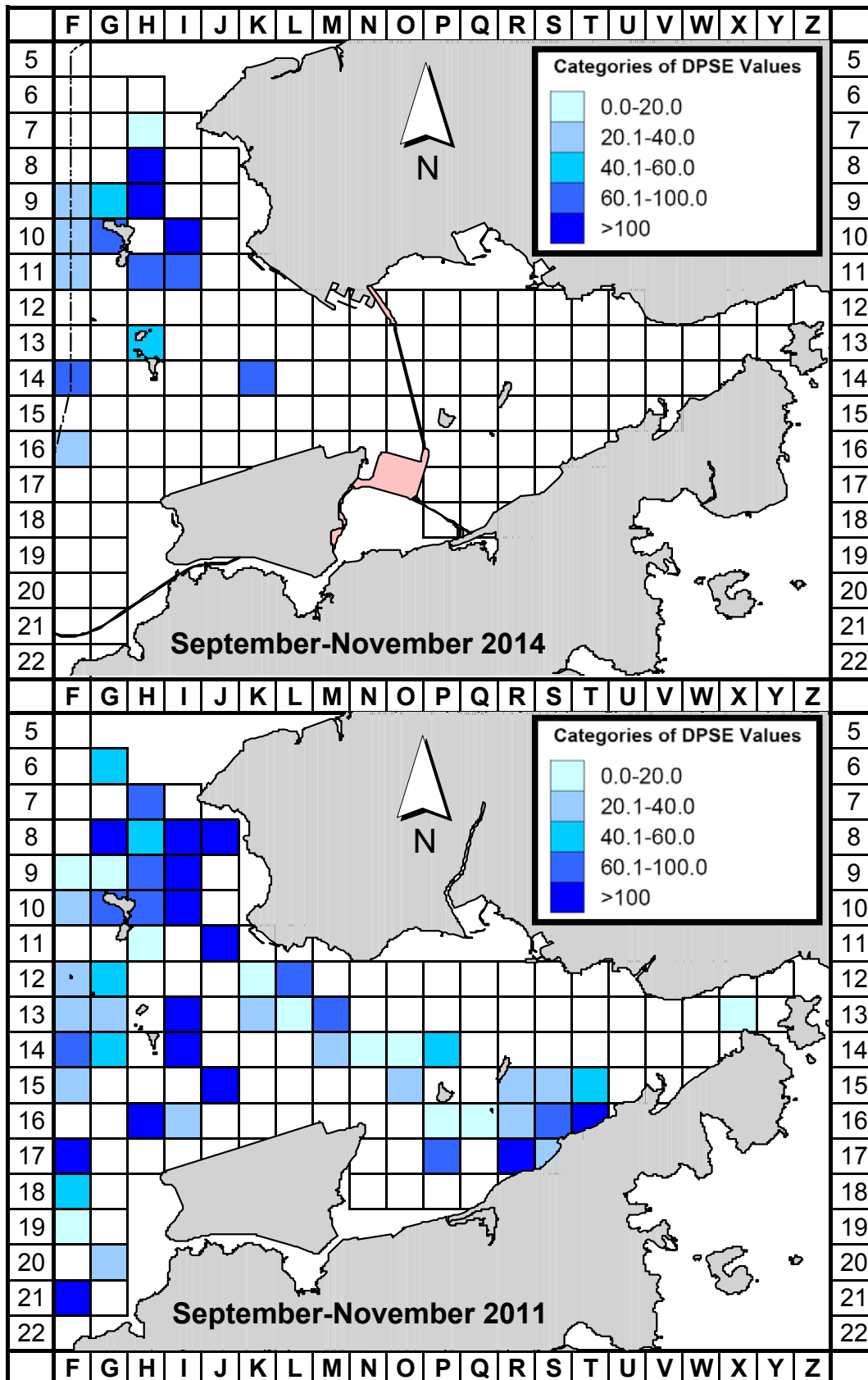


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (September-November 2014) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of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

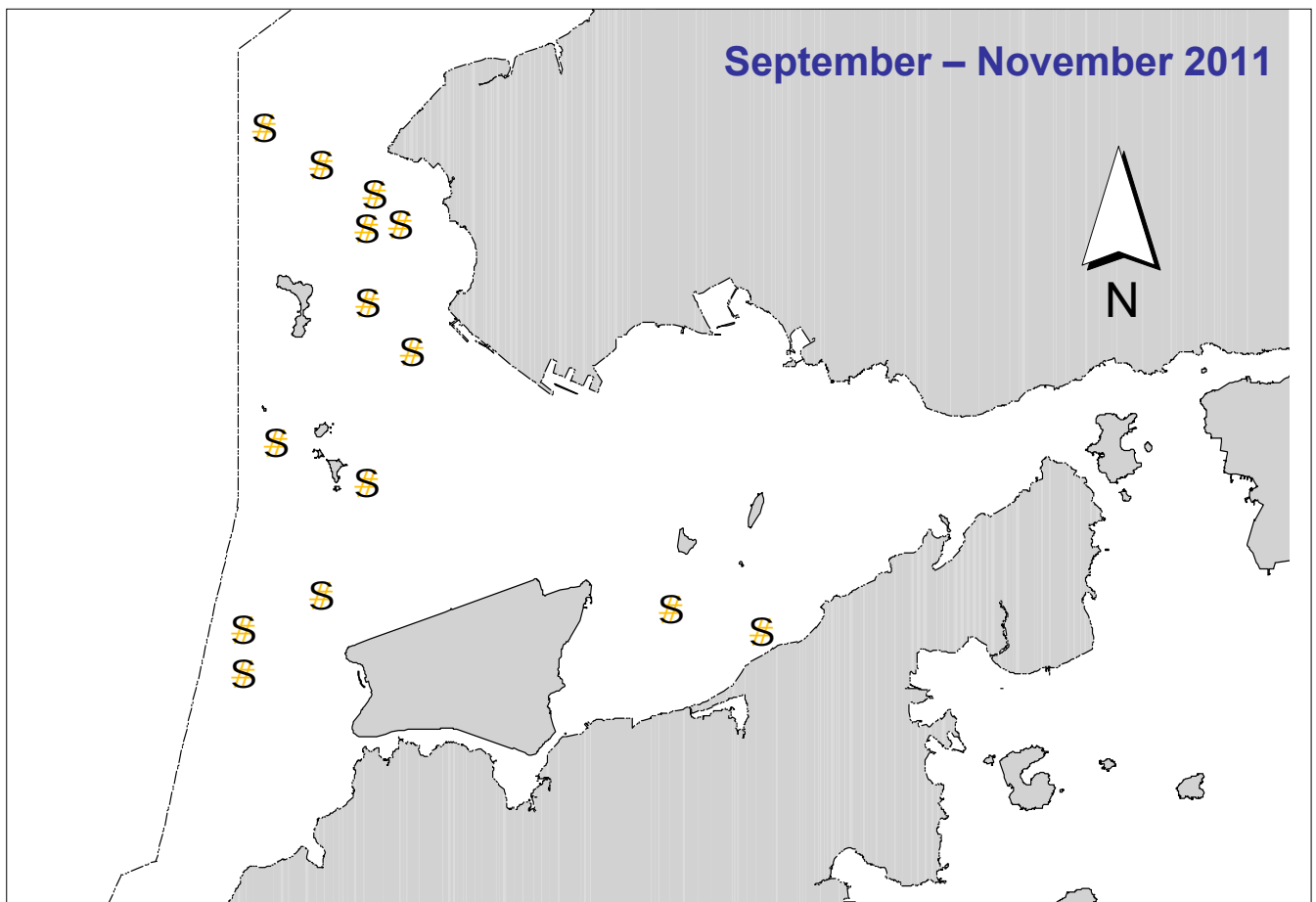
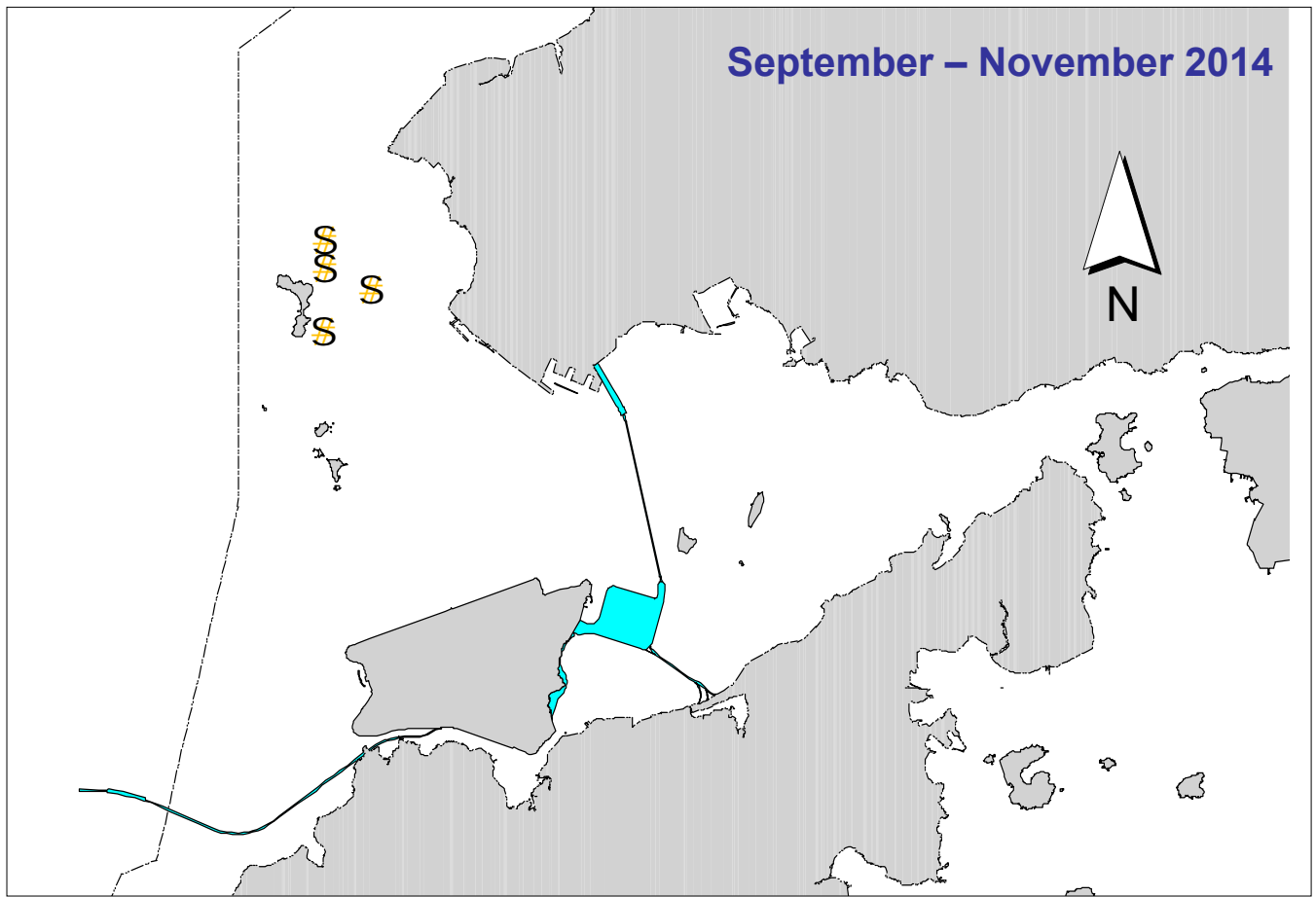


Figure 6. Distribution of young calves of Chinese white dolphins during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

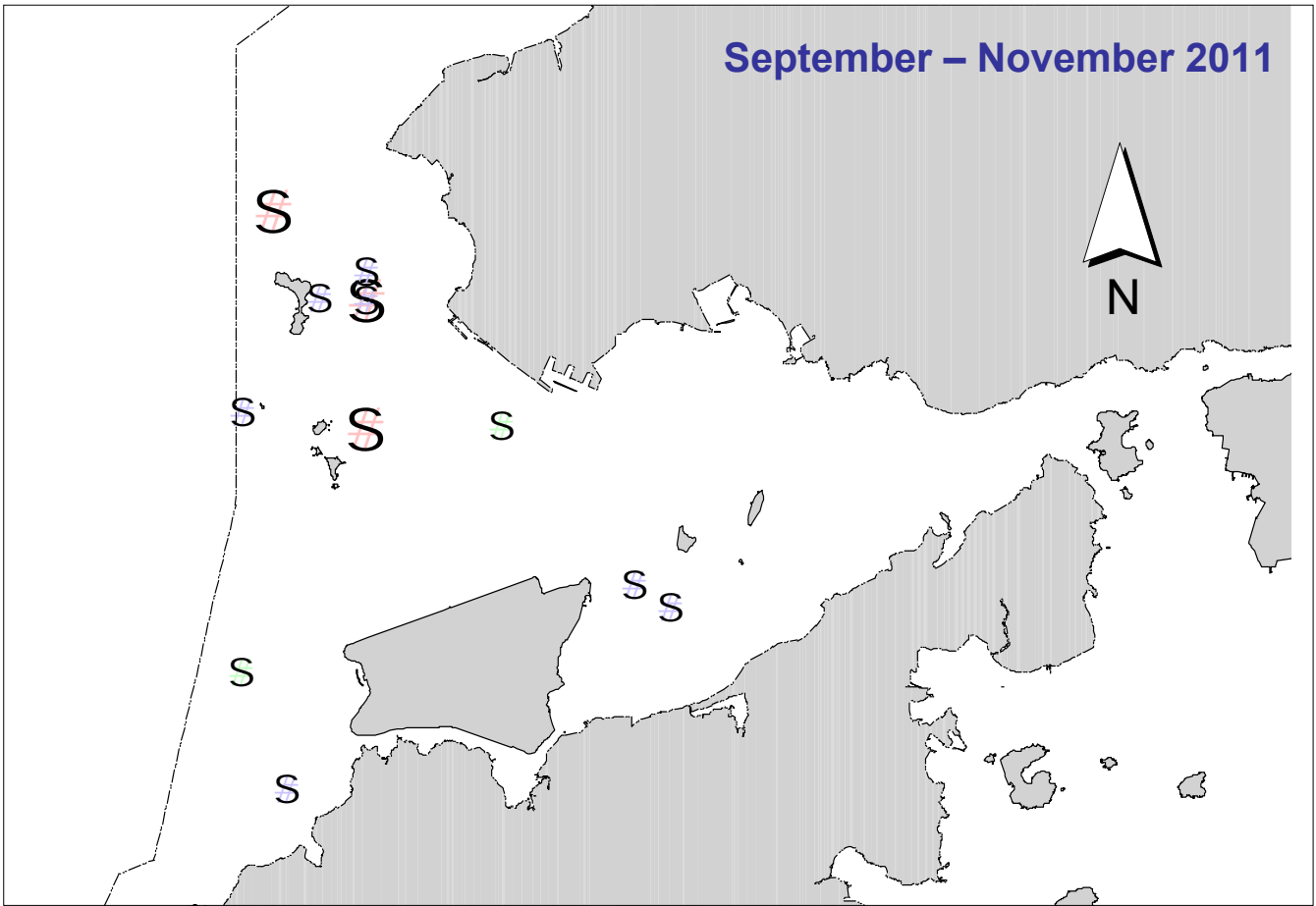
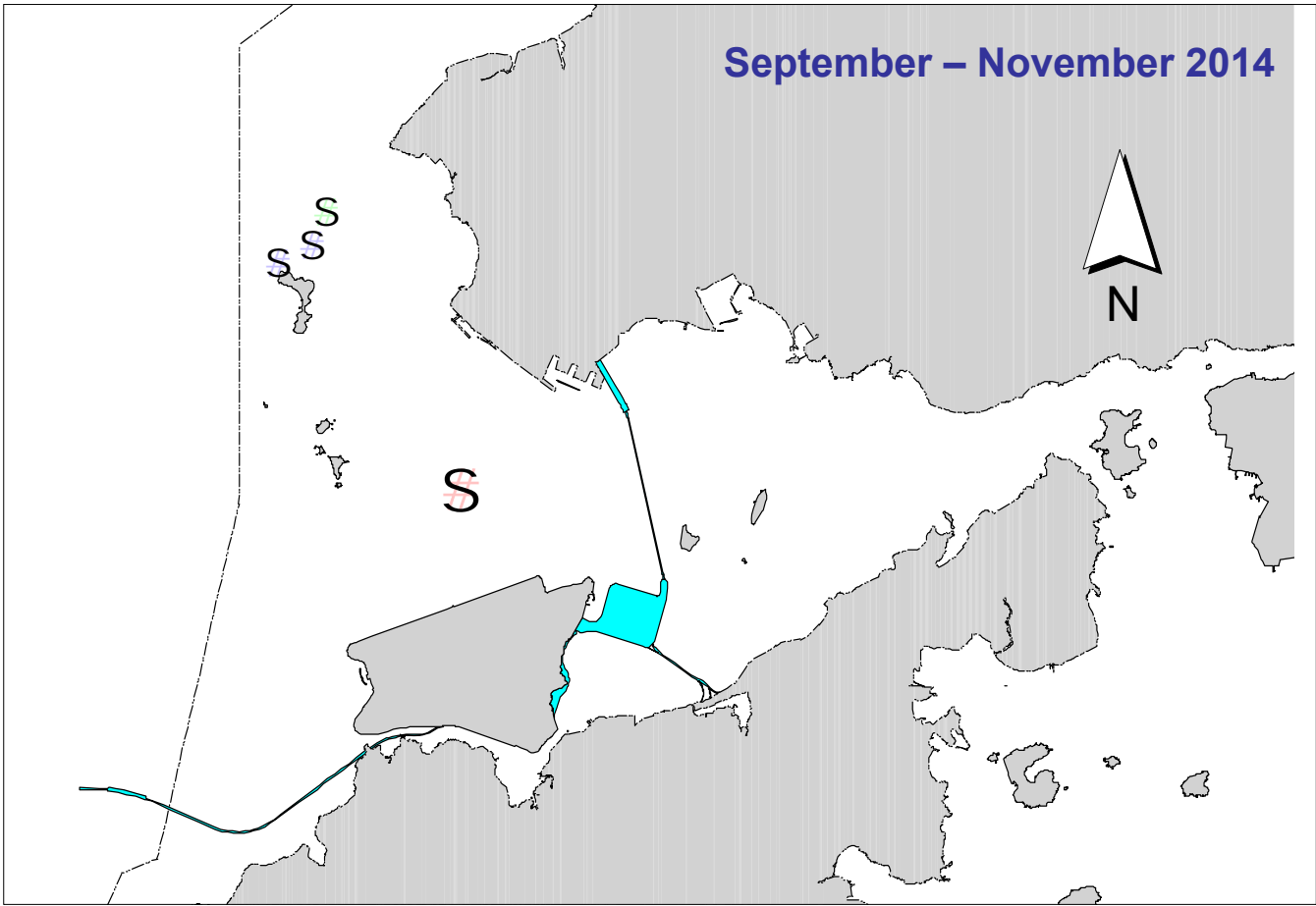


Figure 7. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (September-November 2014)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
2-Sep-14	NW LANTAU	1	7.96	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	2	14.28	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	3	16.44	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	2	7.13	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NW LANTAU	3	5.72	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NE LANTAU	2	15.63	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NE LANTAU	3	2.18	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NE LANTAU	2	8.31	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NE LANTAU	3	1.28	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NW LANTAU	1	4.75	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	2	23.23	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	3	3.33	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	1	0.70	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NW LANTAU	2	5.11	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NW LANTAU	3	1.50	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NE LANTAU	1	1.64	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NE LANTAU	2	18.53	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NE LANTAU	2	10.73	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NW LANTAU	2	30.50	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NW LANTAU	3	0.60	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NW LANTAU	2	8.90	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NW LANTAU	3	0.80	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NE LANTAU	2	18.62	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NE LANTAU	3	1.43	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NE LANTAU	2	10.55	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NE LANTAU	2	14.44	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NE LANTAU	3	2.95	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NE LANTAU	2	10.11	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NW LANTAU	1	1.20	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NW LANTAU	2	36.86	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NW LANTAU	2	12.01	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NW LANTAU	3	1.10	AUTUMN	STANDARD31516	HKLR	S
7-Oct-14	NE LANTAU	2	11.15	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NE LANTAU	3	6.75	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NE LANTAU	2	8.44	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NE LANTAU	3	1.46	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NW LANTAU	1	1.90	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	2	25.80	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	3	11.94	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	2	9.13	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NW LANTAU	3	3.26	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NE LANTAU	2	10.59	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NE LANTAU	3	8.72	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NE LANTAU	2	7.91	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NE LANTAU	3	2.38	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	2	4.96	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	3	16.34	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	4	4.95	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	2	3.81	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	3	7.23	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	4	1.20	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NE LANTAU	2	12.51	AUTUMN	STANDARD 31516	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
16-Oct-14	NE LANTAU	3	6.72	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NE LANTAU	2	8.04	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NE LANTAU	3	2.53	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NW LANTAU	2	3.81	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	3	21.23	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	4	6.50	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	2	4.30	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NW LANTAU	3	3.56	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NE LANTAU	2	15.42	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NE LANTAU	3	1.90	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NE LANTAU	2	9.28	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NE LANTAU	3	0.70	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	2	30.11	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NW LANTAU	3	10.91	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NW LANTAU	1	1.60	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	2	9.19	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	3	1.99	AUTUMN	STANDARD 31516	HKLR	S
4-Nov-14	NE LANTAU	2	7.47	AUTUMN	STANDARD31516	HKLR	P
4-Nov-14	NE LANTAU	3	9.93	AUTUMN	STANDARD31516	HKLR	P
4-Nov-14	NE LANTAU	2	7.41	AUTUMN	STANDARD31516	HKLR	S
4-Nov-14	NE LANTAU	3	1.59	AUTUMN	STANDARD31516	HKLR	S
4-Nov-14	NW LANTAU	1	1.50	AUTUMN	STANDARD31516	HKLR	P
4-Nov-14	NW LANTAU	2	25.21	AUTUMN	STANDARD31516	HKLR	P
4-Nov-14	NW LANTAU	3	12.20	AUTUMN	STANDARD31516	HKLR	P
4-Nov-14	NW LANTAU	2	12.82	AUTUMN	STANDARD31516	HKLR	S
4-Nov-14	NW LANTAU	3	0.60	AUTUMN	STANDARD31516	HKLR	S
10-Nov-14	NE LANTAU	2	8.28	AUTUMN	STANDARD31516	HKLR	P
10-Nov-14	NE LANTAU	3	9.93	AUTUMN	STANDARD31516	HKLR	P
10-Nov-14	NE LANTAU	2	9.49	AUTUMN	STANDARD31516	HKLR	S
10-Nov-14	NE LANTAU	3	1.00	AUTUMN	STANDARD31516	HKLR	S
10-Nov-14	NW LANTAU	3	26.28	AUTUMN	STANDARD31516	HKLR	P
10-Nov-14	NW LANTAU	4	6.12	AUTUMN	STANDARD31516	HKLR	P
10-Nov-14	NW LANTAU	3	4.40	AUTUMN	STANDARD31516	HKLR	S
10-Nov-14	NW LANTAU	4	1.20	AUTUMN	STANDARD31516	HKLR	S
10-Nov-14	NW LANTAU	5	1.10	AUTUMN	STANDARD31516	HKLR	S
12-Nov-14	NW LANTAU	2	1.30	AUTUMN	STANDARD31516	HKLR	P
12-Nov-14	NW LANTAU	3	30.29	AUTUMN	STANDARD31516	HKLR	P
12-Nov-14	NW LANTAU	2	0.60	AUTUMN	STANDARD31516	HKLR	S
12-Nov-14	NW LANTAU	3	5.98	AUTUMN	STANDARD31516	HKLR	S
12-Nov-14	NW LANTAU	4	0.63	AUTUMN	STANDARD31516	HKLR	S
12-Nov-14	NE LANTAU	2	8.30	AUTUMN	STANDARD31516	HKLR	P
12-Nov-14	NE LANTAU	3	9.41	AUTUMN	STANDARD31516	HKLR	P
12-Nov-14	NE LANTAU	4	2.40	AUTUMN	STANDARD31516	HKLR	P
12-Nov-14	NE LANTAU	2	7.11	AUTUMN	STANDARD31516	HKLR	S
12-Nov-14	NE LANTAU	3	3.48	AUTUMN	STANDARD31516	HKLR	S
18-Nov-14	NW LANTAU	2	13.70	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NW LANTAU	3	25.02	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NW LANTAU	4	1.76	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NW LANTAU	2	2.19	AUTUMN	STANDARD31516	HKLR	S
18-Nov-14	NW LANTAU	3	10.43	AUTUMN	STANDARD31516	HKLR	S
18-Nov-14	NE LANTAU	1	1.78	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NE LANTAU	2	14.94	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NE LANTAU	3	2.00	AUTUMN	STANDARD31516	HKLR	P
18-Nov-14	NE LANTAU	1	1.20	AUTUMN	STANDARD31516	HKLR	S
18-Nov-14	NE LANTAU	2	7.09	AUTUMN	STANDARD31516	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (September-November 2014)

(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)

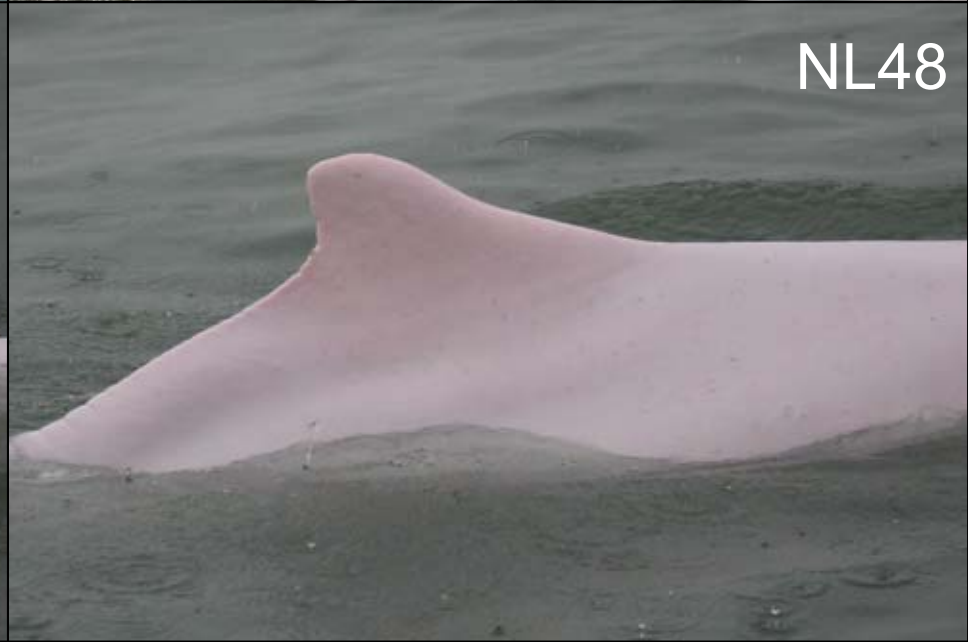
DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
2-Sep-14	1	1106	3	NW LANTAU	1	201	ON	HKLR	827206	805396	AUTUMN	NONE	P
2-Sep-14	2	1215	5	NW LANTAU	2	562	ON	HKLR	828278	806459	AUTUMN	NONE	P
11-Sep-14	1	1132	6	NW LANTAU	2	374	ON	HKLR	826693	807517	AUTUMN	NONE	P
11-Sep-14	2	1215	6	NW LANTAU	2	1742	ON	HKLR	822381	809476	AUTUMN	NONE	P
19-Sep-14	1	1336	1	NW LANTAU	2	ND	OFF	HKLR	821325	811947	AUTUMN	NONE	N/A
22-Sep-14	1	1432	5	NW LANTAU	2	198	ON	HKLR	828289	806480	AUTUMN	NONE	P
22-Sep-14	2	1559	6	NW LANTAU	2	955	ON	HKLR	822811	804656	AUTUMN	NONE	P
22-Sep-14	3	1612	2	NW LANTAU	2	153	ON	HKLR	820785	804662	AUTUMN	NONE	P
7-Oct-14	1	1403	3	NW LANTAU	2	284	ON	HKLR	823528	806089	AUTUMN	NONE	S
7-Oct-14	2	1423	4	NW LANTAU	2	130	ON	HKLR	825820	806454	AUTUMN	NONE	P
7-Oct-14	3	1445	4	NW LANTAU	2	75	ON	HKLR	827149	806457	AUTUMN	NONE	P
7-Oct-14	4	1515	6	NW LANTAU	2	125	ON	HKLR	828943	806471	AUTUMN	NONE	P
7-Oct-14	5	1556	1	NW LANTAU	2	300	ON	HKLR	827474	804666	AUTUMN	NONE	P
7-Oct-14	6	1603	2	NW LANTAU	2	707	ON	HKLR	826499	804664	AUTUMN	NONE	P
13-Oct-14	1	1207	4	NW LANTAU	3	116	ON	HKLR	825098	807514	AUTUMN	NONE	P
13-Oct-14	2	1220	2	NW LANTAU	3	252	ON	HKLR	825707	807525	AUTUMN	NONE	P
13-Oct-14	3	1232	3	NW LANTAU	3	335	ON	HKLR	826161	807516	AUTUMN	NONE	P
13-Oct-14	4	1258	1	NW LANTAU	2	311	ON	HKLR	830272	806185	AUTUMN	NONE	S
4-Nov-14	1	1435	13	NW LANTAU	1	73	ON	HKLR	827747	806468	AUTUMN	NONE	P
4-Nov-14	2	1539	1	NW LANTAU	2	0	ON	HKLR	827839	804666	AUTUMN	NONE	P
4-Nov-14	3	1558	2	NW LANTAU	2	118	ON	HKLR	825757	804662	AUTUMN	NONE	P
12-Nov-14	1	1050	4	NW LANTAU	3	105	ON	HKLR	826686	805385	AUTUMN	NONE	P
18-Nov-14	1	1255	2	NW LANTAU	2	334	ON	HKLR	827669	806479	AUTUMN	NONE	P
18-Nov-14	2	1307	7	NW LANTAU	3	ND	OFF	HKLR	827559	806149	AUTUMN	NONE	N/A

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in September-November 2014

ID#	DATE	STG#	AREA
CH34	13/10/14	4	NW LANTAU
	18/11/14	2	NW LANTAU
CH153	22/09/14	3	NW LANTAU
NL46	11/09/14	1	NW LANTAU
	04/11/14	1	NW LANTAU
NL48	19/09/14	1	NW LANTAU
	13/10/14	1	NW LANTAU
	04/11/14	1	NW LANTAU
	18/11/14	2	NW LANTAU
NL80	11/09/14	2	NW LANTAU
NL104	02/09/14	1	NW LANTAU
	04/11/14	1	NW LANTAU
NL136	07/10/14	1	NW LANTAU
	13/10/14	1	NW LANTAU
NL150	22/09/14	3	NW LANTAU
NL182	11/09/14	1	NW LANTAU
	07/10/14	1	NW LANTAU
	13/10/14	2	NW LANTAU
	18/11/14	2	NW LANTAU
NL202	12/11/14	1	NW LANTAU
	18/11/14	1	NW LANTAU
	18/11/14	2	NW LANTAU
NL210	11/09/14	2	NW LANTAU
	12/11/14	1	NW LANTAU
NL213	13/10/14	1	NW LANTAU
NL214	02/09/14	1	NW LANTAU
	07/10/14	3	NW LANTAU
	13/10/14	2	NW LANTAU
NL233	11/09/14	1	NW LANTAU
	22/09/14	1	NW LANTAU
	07/10/14	2	NW LANTAU
NL236	22/09/14	3	NW LANTAU
NL256	07/10/14	3	NW LANTAU
	04/11/14	1	NW LANTAU
NL259	13/10/14	1	NW LANTAU
	04/11/14	1	NW LANTAU

ID#	DATE	STG#	AREA
NL272	12/11/14	1	NW LANTAU
NL278	07/10/14	2	NW LANTAU
NL286	04/11/14	1	NW LANTAU
	18/11/14	1	NW LANTAU
	18/11/14	2	NW LANTAU
NL295	07/10/14	1	NW LANTAU
NL300	07/10/14	5	NW LANTAU
NL301	11/09/14	2	NW LANTAU
NL302	11/09/14	2	NW LANTAU
WL05	04/11/14	1	NW LANTAU
	04/11/14	3	NW LANTAU
	12/11/14	1	NW LANTAU
WL97	12/11/14	1	NW LANTAU

Appendix IV. Twenty-six individual dolphins that were identified during September – November 2014 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)



Appendix IV. (cont'd)

NL182



NL202



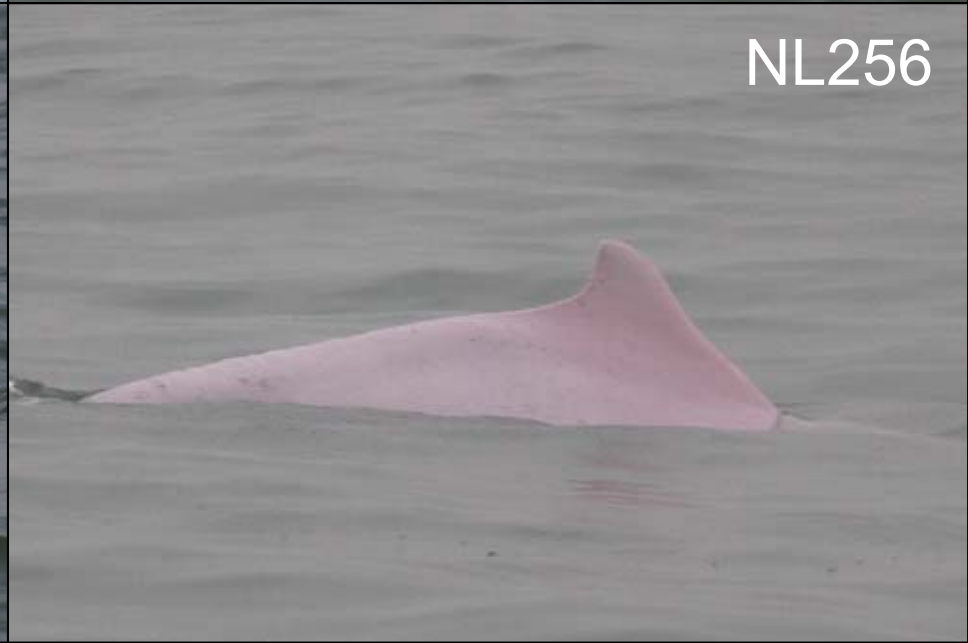
NL210



NL213



Appendix IV. (cont'd)



Appendix IV. (cont'd)



NL259



NL272



NL278



NL286

Appendix IV. (cont'd)

NL295



NL300



NL301



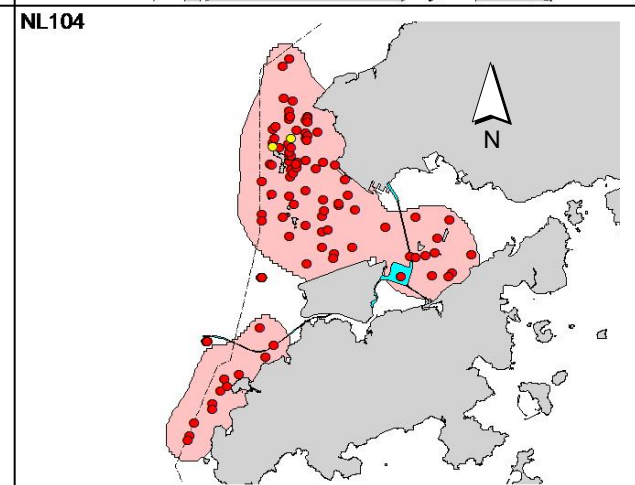
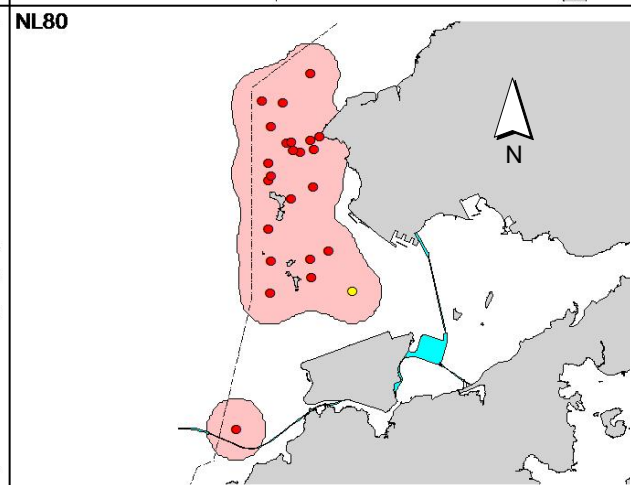
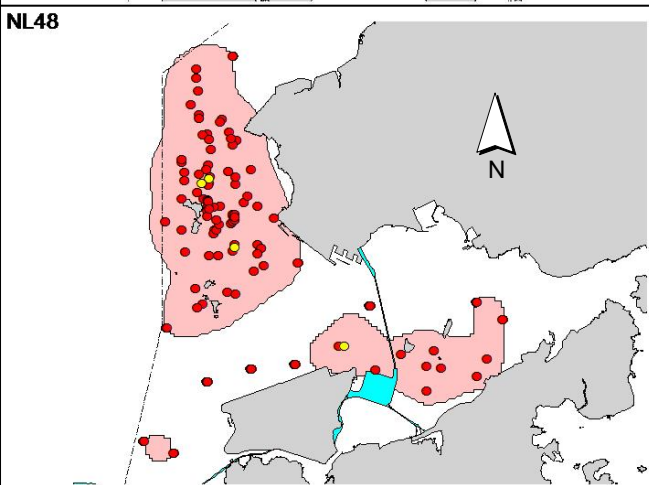
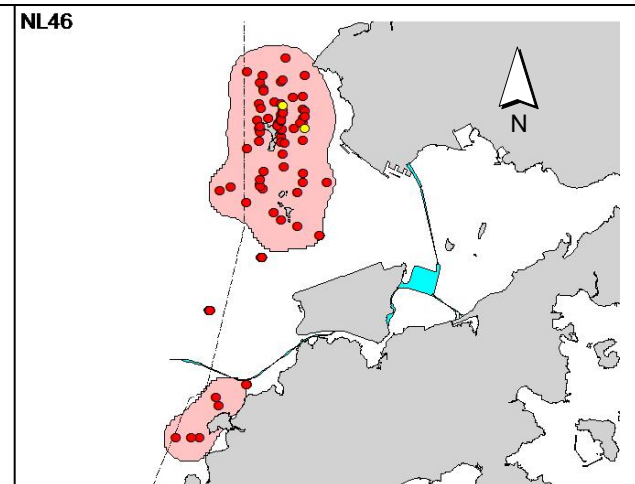
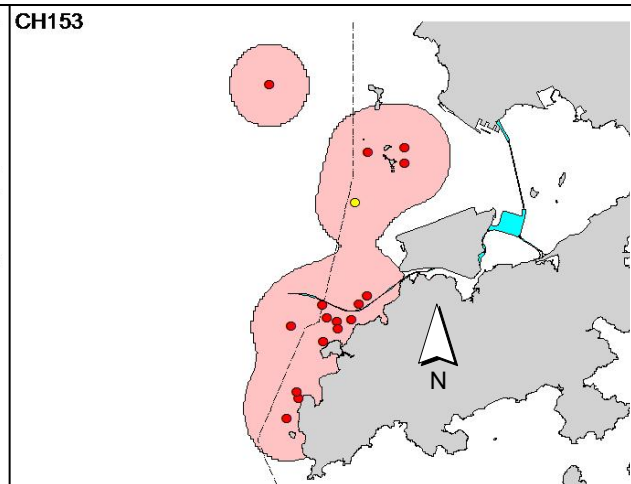
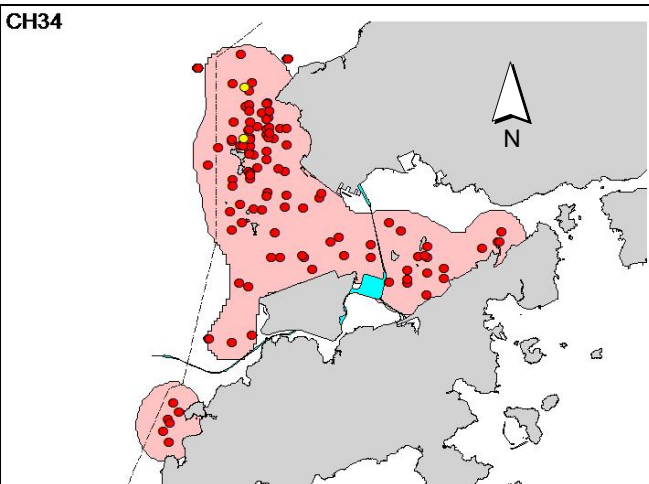
NL302



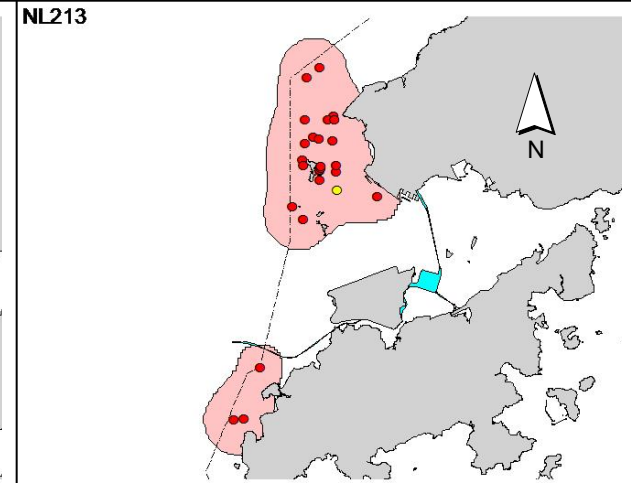
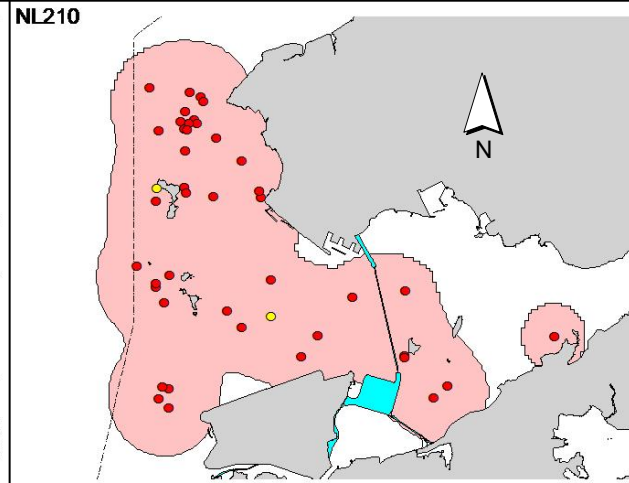
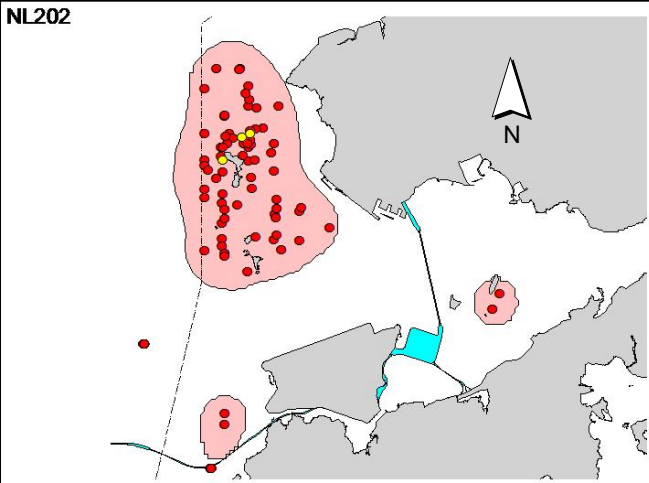
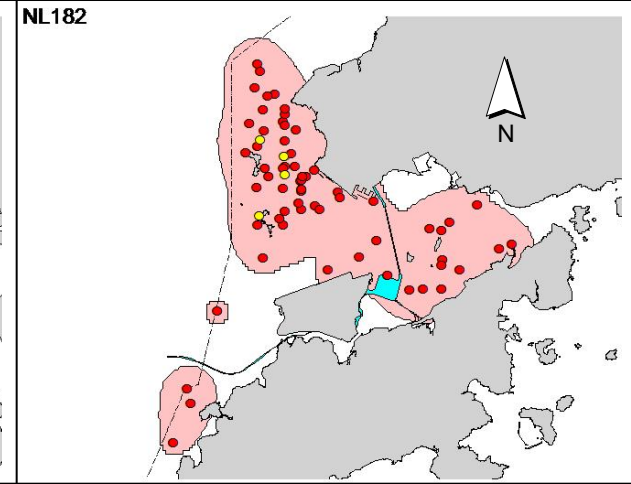
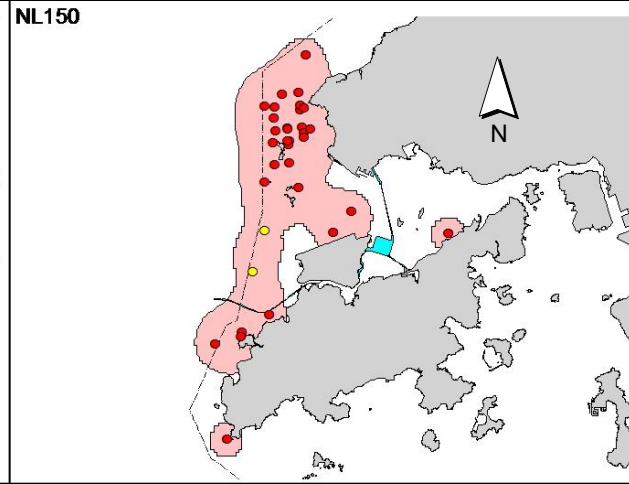
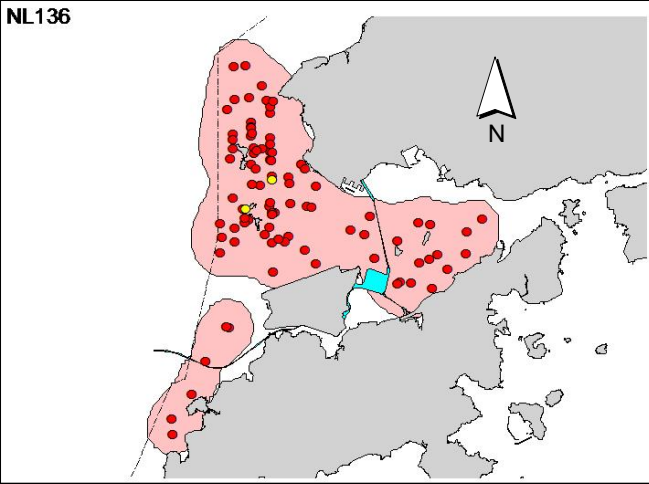
Appendix IV. (cont'd)



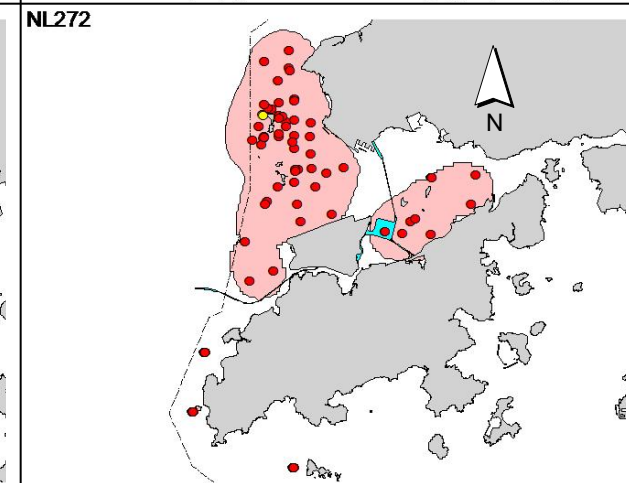
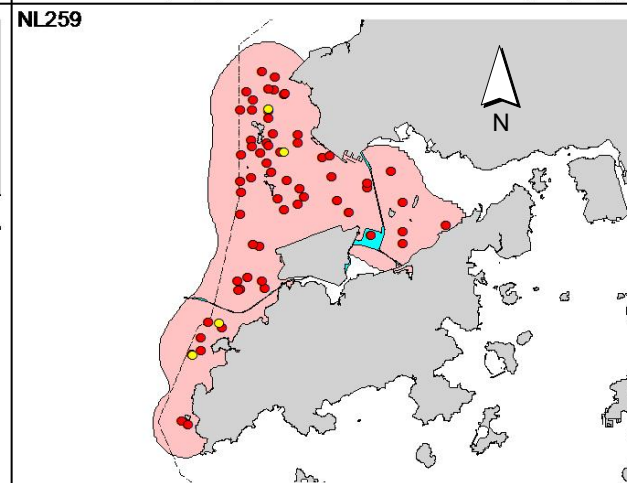
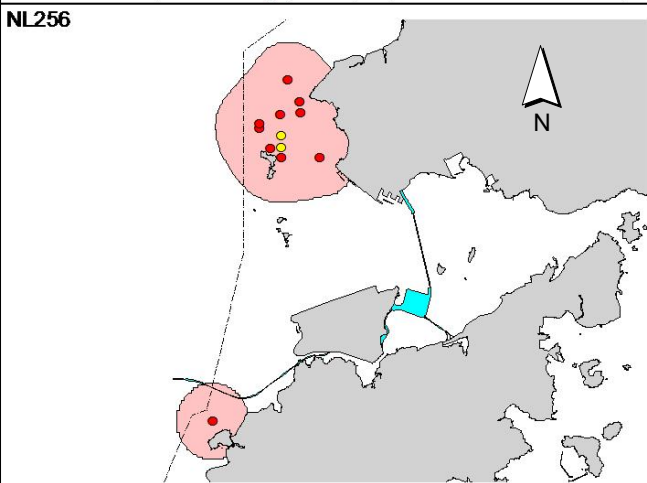
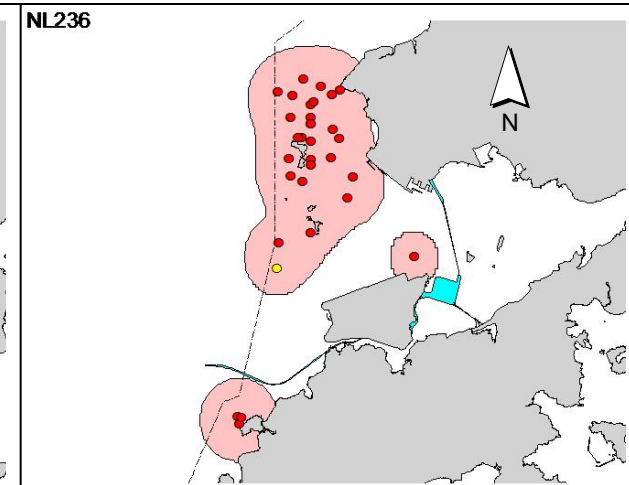
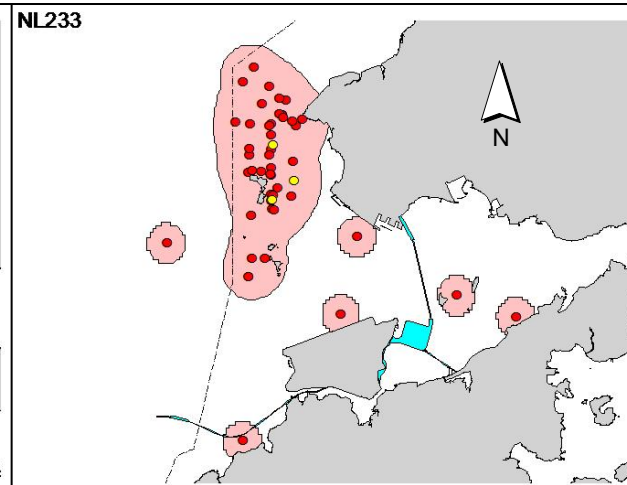
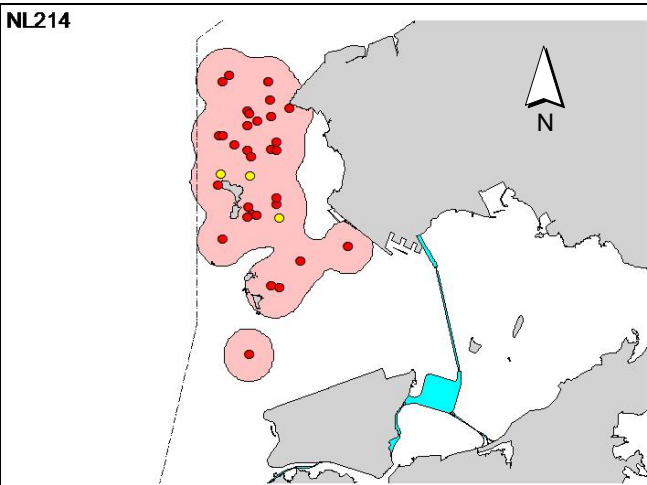
Appendix V. Ranging patterns (95% kernel ranges) of 26 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicates sightings made in September – November 2014)



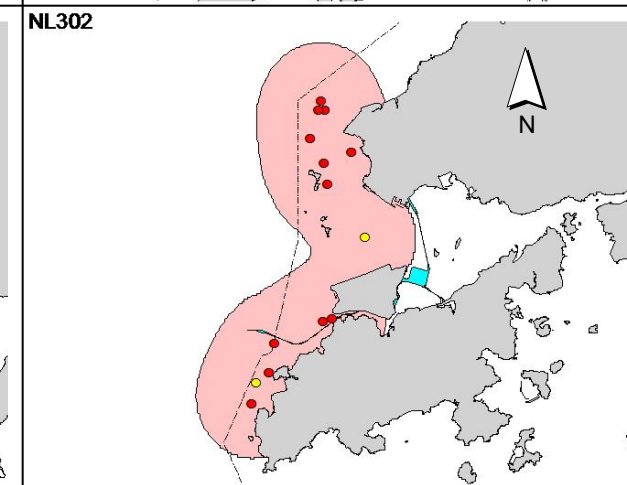
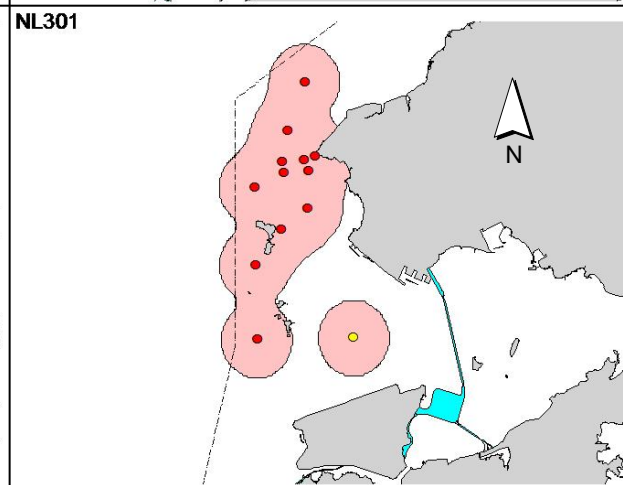
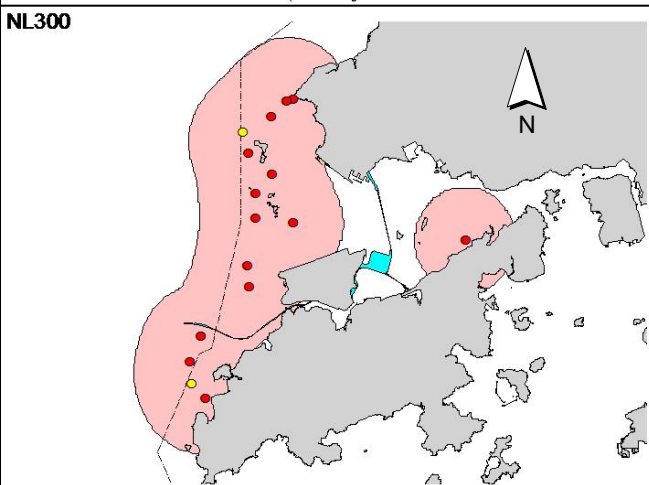
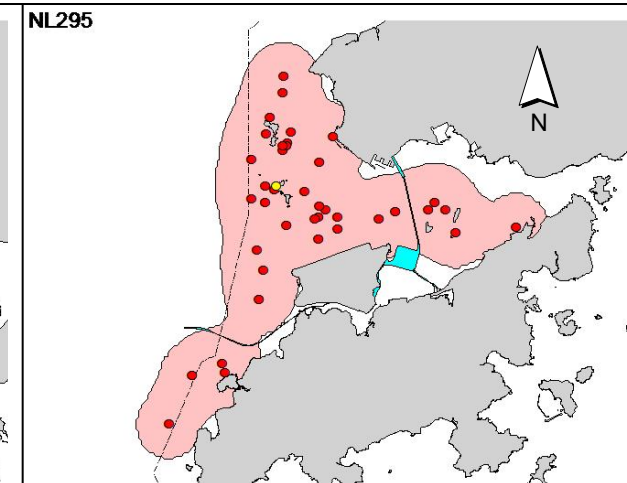
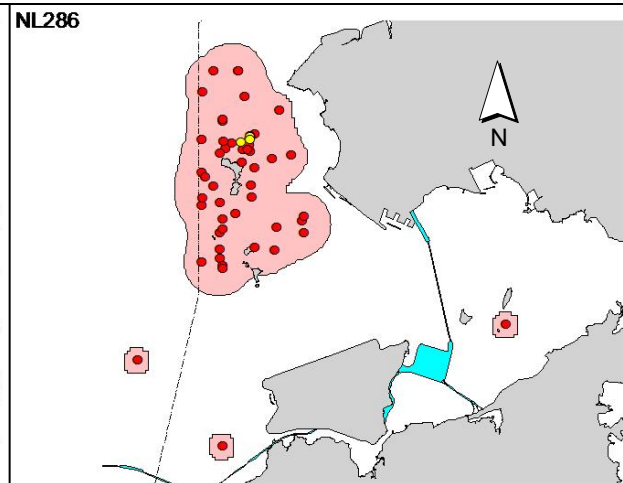
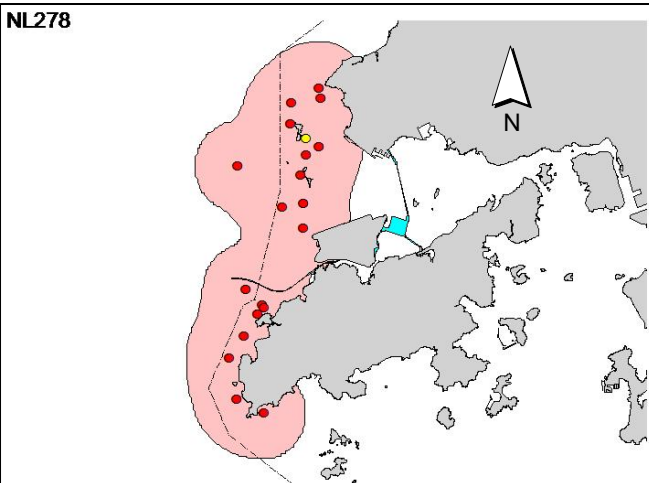
Appendix V. (cont'd)



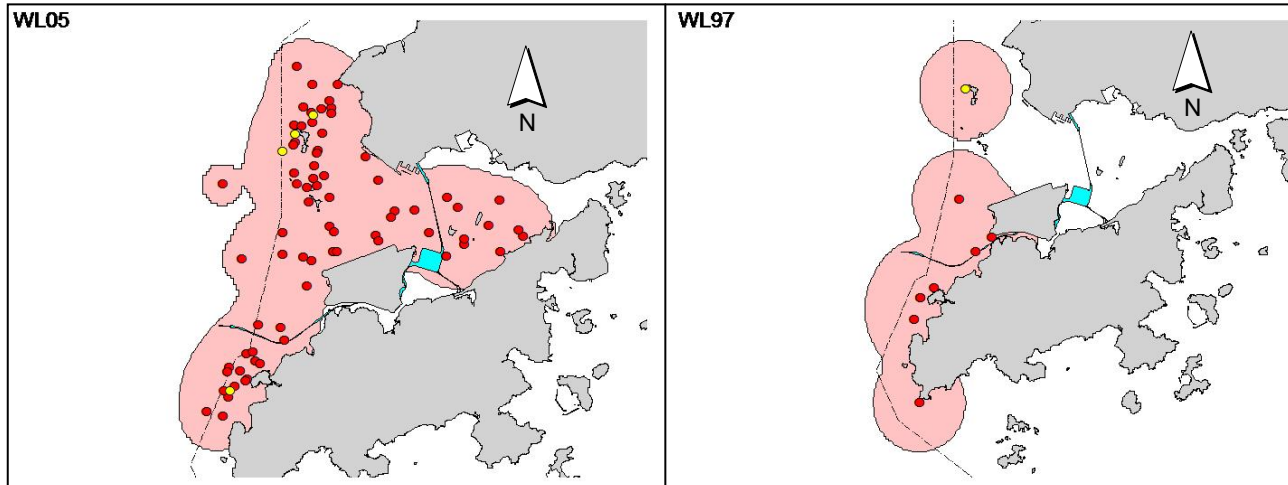
Appendix V. (cont'd)



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"> 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"> 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
	<ol style="list-style-type: none"> 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 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>Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <ol style="list-style-type: none"> 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. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly. 	<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> <ol style="list-style-type: none"> 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<p>potential mitigation measures.</p> <ol style="list-style-type: none"> 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

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	28
	Limit	0	2
24-Hr TSP	Action	0	5
	Limit	0	1
Water Quality	Action	0	6
	Limit	0	1
Impact Dolphin Monitoring	Action	2	7
	Limit	0	0

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 (Sep 2014 to Nov 2014)	3	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 27 November 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_14November2014_1hrTSP_Station ASR1
0212330_14November2014_1hrTSP_Station ASR1

A total of two Action Level Exceedances were recorded on 14 November
2014.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam', is positioned above the printed name.

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_14November2014_1hrTSP_Station ASR1 0212330_14November2014_1hrTSP_Station ASR1 [Total No. of Exceedances = 2]	
Date	14 November 2014 (Measured) 27 November 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 ($\mu\text{g}/\text{m}^3$)	ASR1 = 331
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 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 ASR1 ($404 \mu\text{g}/\text{m}^3$) during 0915 - 1015 hrs. Action Level Exceedance for 1-hr TSP is observed at ASR1 ($396 \mu\text{g}/\text{m}^3$) during 1017 - 1117 hrs.	
Works Undertaken (at the time of monitoring event)	On 14 November 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 0900 and 1130 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 ASR1 may represent sporadic event associated with traffic emissions and anthropogenic activities during morning rush hour at River Trade Terminal. • According to the construction information provided by the Contractor, the majority of construction works on 14 November 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; covering the idle stockpiles properly with tarpaulin; use of wheel washing facilities; hydro-seeding of area where works have been completed). • Whilst exceedances of Action Level were observed at ASR1, the 24-hr TSP level at the monitoring station (ASR1 = 115 µg/m³) on 14 November 2014 were in compliance with the Action and Limit Levels. The 1-hr TSP at ASR1 returned to level below the Action/Limit Levels on the same day. • Same level and extent of construction works were carried out at the same works area on 17th, 20th, 23rd and 26th November whilst no exceedance was recorded. • 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 19 November 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; covering the idle stockpiles properly with tarpaulin; 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>

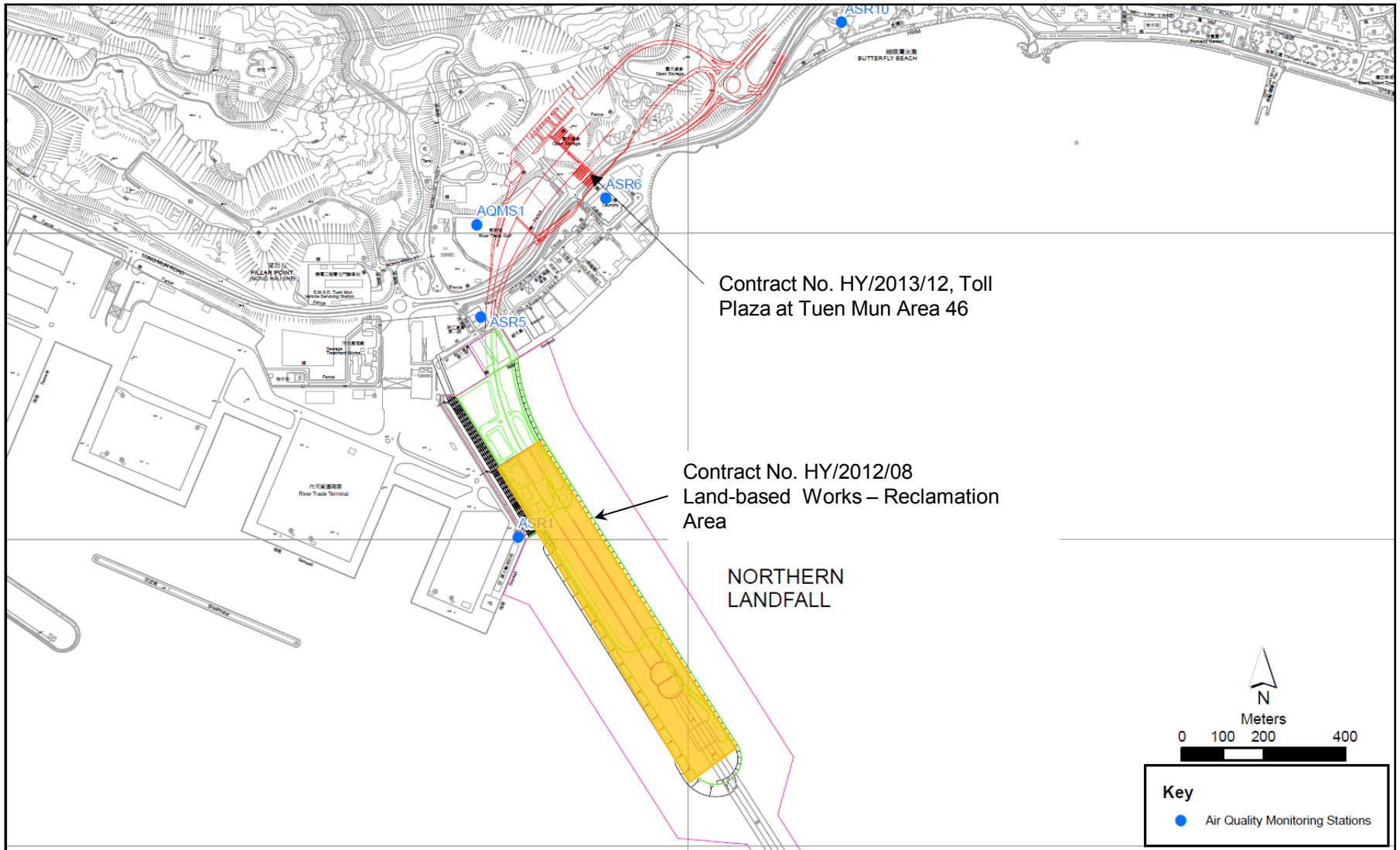


Figure 1

Indicative Construction Works Area on 14 November 2014

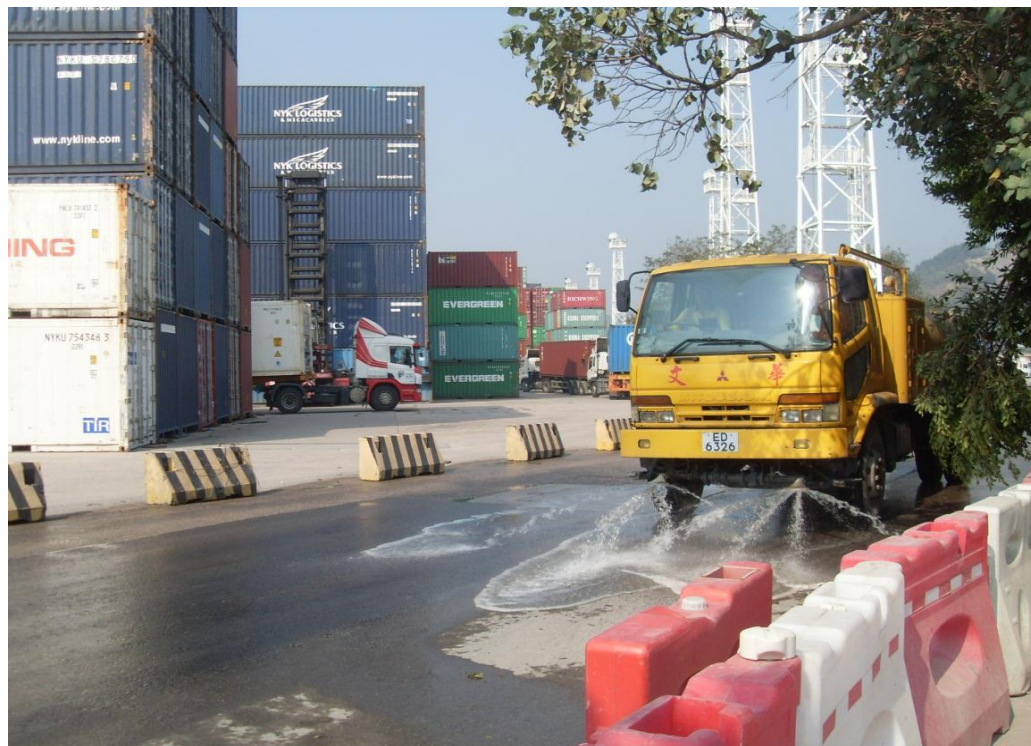


Annex A Photo Records taken during Weekly Site Inspection

*Note: Photos taken on 19/11/2014



Water truck was observed in used during site investigation. (Reclamation Works Area)



Water truck was observed in used during site investigation. (Haul road at River Trade Terminal)



ERM

Annex A Photo Records taken during Weekly Site Inspection

*Note: Photos taken on 19/11/2014



Wheel washing facilities is adequately maintained. (Site entrance at Reclamation Works Area)



Hydroseeding and access roads paved as soon as practicable after works have been completed on soil exposed area.
(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 22 June 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_Sep2014/Nov2014_dolphin_STG&ANI_NEL
0212330_Sep2014/Nov2014_dolphin_STG&ANI_NWL

A total of two action level exceedances were recorded in the quarterly impact
dolphin monitoring data between September 2014 and November 2014.

Regards,

A handwritten signature in black ink, appearing to be 'Jovy Tam', written in a cursive style.

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

Impact Dolphin Monitoring
Notification of Exceedance

Log No.	0212330_Sep2014/Nov2014_dolphin_STG&ANI_NEL 0212330_Sep2014/Nov2014_dolphin_STG&ANI_NWL [Total No. of Exceedances = 2]	
Date	September 2014 to November 2014 (monitored) 8 January 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 = 5.1 & ANI = 20.5
	Two Action Level Exceedances are recorded in the quarterly impact dolphin monitoring at NEL and NWL between September 2014 and November 2014. The exceedances were reported in the approved <i>Thirteenth Monthly EM&A Report</i> dated 12 December 2014.	
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, September to November 2014) 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 $\alpha = 0.1$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0222$) and in ANI ($p = 0.0662$) 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 November 2014) 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 $\alpha = 0.1$ as the significance level in the statistical tests, significant difference in STG ($p = 0.0019$) and in ANI ($p = 0.0006$) 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 September 2014 and November 2014, the major marine works under <i>Contract No. HY/2012/08</i> included:</p> <ul style="list-style-type: none"> Vertical seawall and sloping seawall constructions at Portion N-C Reclamation Filling at Portion N-C Marine sheet piling for box culvert extension at Portion N-A 	

Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances are 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 20 November 2014, seawall (+2.5mPD) at Northern Landfall has been fully enclosed and marine sheet pile has also been completed. There will be no dredging, reclamation or marine sheet piling works in open waters. 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 September and November 2014, the impact mean level of SS (Mid-ebb: 7.9 mg/L; Mid-flood: 7.8 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 9 December 2014 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>Eleventh to Thirteenth 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

ENVIRONMENTAL COMPLAINT INVESTIGATION REPORT

Our Reference: 0212330_29October2014_Complaint LOG_02_20141107

Basic Information of Complaint

Reference Number	N04/RW/00026784-14
Date of Complaint Received	27 October 2014
Location of Complaint	Block 7, Melody Garden
Nature of Complaint	Noise nuisance
Complaint Received by	Environmental Protection Department (EPD)
Via	Email
Complainant	A resident of Melody Garden

Details of Complaint

On 27 October 2014, an environmental case was received by EPD regarding to the noise nuisance generated at 01:00-02:00 on 23 October 2014 and 23:15 on 24 October 2014 from derrick lighter near Melody Garden. The Contractor received the complaint notification on 29 October 2014. Subsequently, the ET was informed that the case is categorized as a public concern upon the investigation, discussion and agreement between different parties (i.e. the Contractor (DBJV) and SOR).

Investigation Report

Upon receiving the case notification from EPD on 29 October 2014, the Contractor had promptly checked the works summary.

Based on the works summary from the Contractor on 23 October 2014 and 24 October 2014, no derrick lighter activities near Melody Garden was recorded from this Contract. According to the information provided by the Contractor, during the complaint period only two derrick lighters from this Contract were working within the project site area and site activities conducted under this Contract strictly followed the conditions stated in the approved Construction Noise Permits (CNPs). In addition, the project site area is distant (> 1.5km) from the concerned location the complaint referred to (see Figure 1). Therefore, any noise generated from this Contract's work should be insignificant after distance attenuation.

In addition, the record of subsequent joint weekly site audit on 5 November 2014 further confirmed that all derrick lighters for this Contract were within the project site area.

Based on the above, this case is considered to be not related to this Contract's work and is thus invalid.

Mitigation Measures and Follow-Up Actions Recommended to/Undertaken by Contractor

The Contractor was reminded to adhere strictly to the conditions of Construction Noise Permit and to implement all relevant noise mitigation measures recommended or specified in the EIA Report, EM&A Manual, EMP, Method Statements, General and Particular Specifications of this Contract to avoid causing noise nuisance.

The Contractor is also reminded to ensure that the construction plant deployed for the works during restricted hours is in strict compliance with the relevant CNP granted.

Date of File Closed : 7 November 2014

Approved and Filed by:

A handwritten signature in black ink, appearing to be 'Jovy Tam', written in a cursive style.

(Jovy Tam, ET Leader)
Date: 14 November 2014

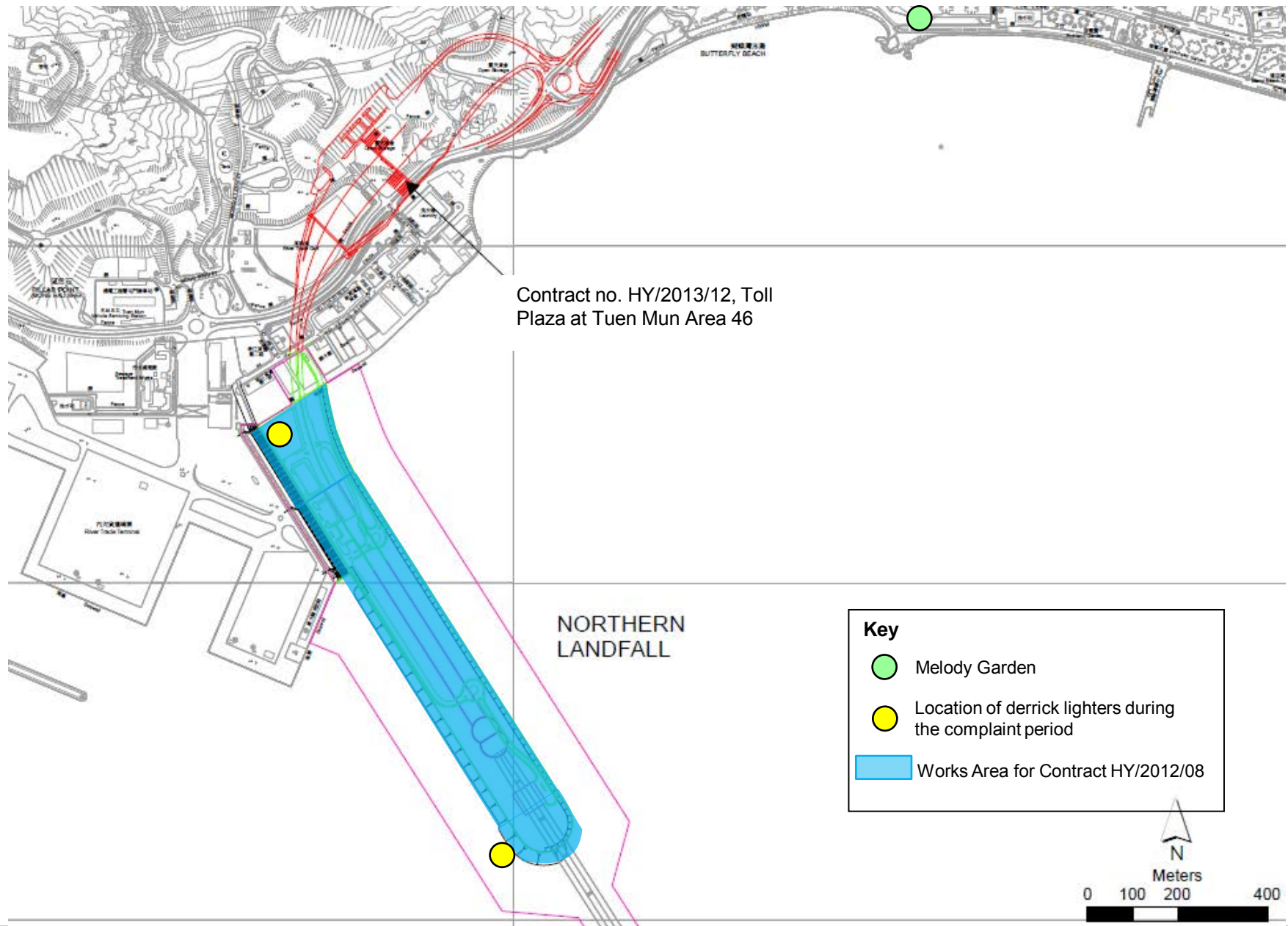
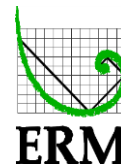


Figure 1

HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
Noise Complaint Investigation – Project Site Layout

Environmental
Resources
Management





ENVIRONMENTAL COMPLAINT INVESTIGATION REPORT

Our Reference: 0212330_11November2014_CompLog_03

Basic Information of Complaints

Reference Numbers:	N04/RW/00028104-14 N04/RW/00028199-14
Date of Complaints Received	11 November 2014
Location of Complaints	Tuen Mun River Trade Terminal
Nature of Complaints	Dust emission
Complaints Received by	Environmental Protection Department (EPD)
Via	Email
Complainants	Worker at River Trade Terminal

Details of Complaints

On 11 November 2014, two potential complaint cases were received by EPD regarding to the dust emission by works area nearby the River Trade Terminal. The Contractor received the complaint notification on 12 November 2014. On 12 November 2014, The ET was informed that the two cases are categorized as complaints in nature upon the investigation, discussion and agreement between different parties (i.e. the Contractor (DBJV) and SOR).

Investigation Report

Upon receiving the case notification from EPD on 11 November 2014, the Contractor had promptly checked the works summary.

Based on the record of subsequent joint site investigation with the Contractor and EPD on 19 November 2014, no dust nuisance was recorded at the entrance of 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 *Annex A*). According to the construction information provided by the Contractor, the majority of construction works during the complaint period 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. The major construction activities undertaken during the complaint period are considered to have minor effect on dust emission. 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.

According to the impact air quality monitoring results during the complaint period in November 2014 at the close vicinity of Reclamation Works Area (ASR1 & ASR5), no exceedance was recorded. This implies that no unacceptable adverse impact on air quality was resulting from the land-based works under this Contract during the period of complaint, and the implemented mitigation measures are considered sufficient.

It is considered that the observed dust emission may represent sporadic event associated with traffic emissions and anthropogenic activities during rush hour at River Trade Terminal.

Based on the above, the two complaint cases are considered to be not related to this Contract’s work and are thus invalid.

Mitigation Measures and Follow-Up Actions Recommended to/Undertaken by Contractor

During construction, the Contractor is in accordance with the requirements of the relevant environmental regulations and the implementation of mitigation measures which included regular water spraying within the construction site area; use of wheel washing facilities; covering of idle stockpiles.

The Contractor has been reminded to adhere strictly to implement all relevant dust mitigation measures recommended or specified in the EP (EP-354/2009/B), the approved EIA and the Updated EM&A Manual of this Project to avoid causing dust nuisance. No additional action is required.

Date of File Closed : 5 December 2014

Approved and Filed by:



(Jovy Tam, ET Leader)

Date: 5 December 2014



Annex A Photo Records taken during Site Investigation

*Note: Photos taken on 19/11/2014



Water truck was observed in used during site investigation. (Reclamation Works Area)



Water truck was observed in used during site investigation. (Haul road at River Trade Terminal)



Annex A Photo Records taken during Site Investigation

*Note: Photos taken on 19/11/2014



Wheel washing facilities is adequately maintained. (Site entrance at Reclamation Works Area)



Hydroseeding and access roads paved as soon as practicable after works have been completed on soil exposed area.
(Reclamation Works Area)



Annex A Photo Records taken during Site Investigation

*Note: Photos taken on 19/11/2014



Stockpile was observed wet. (Reclamation Works Area - Portion N-C)

Appendix K

Waste Flow Table

Appendix D – Monthly Summary Waste Flow Table

Name of Department: HyD

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

Monthly Summary Waste Flow Table for November 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					
Project Total Quantities	54.065	0.000	0.000	0.000	54.065

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								
Project Total Quantities	1983.453	202.898	361.570	2211.769	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									
Project Total Quantities	0.000	0.000	1.050	1.050	0.000	0.000	0.110	0.110	0.556

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).