

**Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link –
Southern Connection Viaduct Section**

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

27 April 2017

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Contract No. HY/2012/07


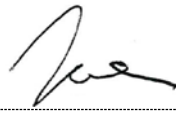


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Twelfth Quarterly Environmental Monitoring & Audit (EM&A) Report

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Client: Gammon		Project No: 0215660			
Summary: This document presents the Twelfth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.		Date: 27 April 2017			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	12 th Quarterly EM&A Report	VAR	JT	CAR	27/04/17
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>			
		 			

Ref.: HYDHZMBEEM00_0_5321L.17

02 May 2017

AECOM
Supervising Officer's Representative's Office
780 Cheung Tung Road, Lantau, N.T.

By Fax (3691 2899) and By Post

Attention: Mr. Daniel Ip

Dear Mr. Ip,

**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**

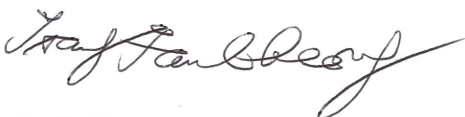
**Contract No. HY/2012/07 TM-CLKL Southern Connection Viaduct
Section
12th Quarterly EM&A Summary Report (Sep. 2016 to Nov. 2016)**

Reference is made to the 12th Quarterly Environmental Monitoring and Audit (EM&A) Report (September 2016 to November 2016) (ET's ref.: "0215660_12th Qtr EM&A_20170427.doc" dated 27 April 2017) certified by the ET Leader and provided to us via e-mail on 27 April 2017.

Please be informed that we have no adverse comments on the captioned report.

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

Yours sincerely,



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

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Vico Cheung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Gammon – Mr. Roy Leung (By Fax: 3520 0486)

Internal: DY, YH, PSC, ENPO Site

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EXECUTIVE SUMMARY

Under *Contract No. HY/2012/07*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Southern Connection Viaduct 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). Ramboll Environ Hong Kong Ltd. was employed by the HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*. Further applications for variation of environmental permit (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The southern landfall of TM-CLK Link lies alongside the Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) where a reclamation area is constructed by *Contract No. HY/2010/02* under *Environmental Permit No. EP-353/2009/K* and *EP-354/2009/D*. Upon the agreement and confirmation between the Supervising Officer Representatives and Contractors of *HY/2010/02* and *HY/2012/07* in September 2015, part of the reclamation area for southern landfall under *EP-353/2009/K* and *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07*. Another part of the southern landfall area under *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07* after completion of reclamation works by *Contract No. HY/2010/02* in June 2016.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively completed by 2018. The impact monitoring of the EM&A programme, including air quality, noise, water quality and marine ecological monitoring as well as environmental site inspections, commenced on 31 October 2013.

This is the Twelfth Quarterly EM&A Report presenting the EM&A works carried out during the period from 1 September to 30 November 2016 for the Southern Connection Viaduct Section in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, major activities in the reporting period included:

September 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;

- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

October 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

November 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;

- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

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

24-hour TSP monitoring	16 sessions
1-hour TSP monitoring	16 sessions
Noise monitoring	16 sessions
Water quality monitoring	38 sessions
Dolphin monitoring	6 sessions
Joint Environmental site inspection	14 sessions

Breaches of Action and Limit Levels for Air Quality

No exceedance of Action and Limit Levels was recorded for air quality monitoring in the reporting period.

Breaches of Action and Limit Levels for Noise

No exceedance of Action and Limit Levels was recorded for construction noise monitoring in the reporting period.

Breaches of Action and Limit Levels for Water Quality

No exceedance of Action and Limit Levels was recorded for water quality monitoring in the reporting period.

Impact Dolphin Monitoring

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 2016. No unacceptable impact from the construction activities of the TM-CLKL Southern Connection Viaduct Section on Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphins) was noticeable from general observations during the dolphin monitoring in this reporting quarter. The exceedances are considered unlikely due to the works of this Project upon further investigation.

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. No Passive Acoustic Monitoring (PAM) was implemented as the marine piling works were not carried out outside the daylight hours in this reporting period. No sighting of the

Chinese White Dolphin was recorded in the monitoring period during the exclusion zone monitoring.

Environmental Complaints, Non-compliance & Summons

There were two (2) complaints received in the reporting period. One complaint was received from Highways Department regarding improper wastewater discharge of two flattop barges on 22 September 2016. Another complaint was received from EPD with regard to muddy propeller wash by marine travel on 9 November 2016. Upon investigation, the two complaints are considered not related to this Project.

Reporting Change

There was no reporting change in this reporting period.

Upcoming Works for the Next Reporting Period

Works to be undertaken in the coming quarter include the following:

December 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

January 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and

- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

February 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are mainly associated with air quality, noise, marine water quality, marine ecology and waste management issue.

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 (*EP-354/2009A*) was issued on 8 December 2010. Further applications for variation of environmental permit (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

Under *Contract No. HY/2012/07*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Southern Connection Viaduct Section of TM-CLKL ("the Contract") 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). Ramboll Environ Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*.

The southern landfall of TM-CLK Link lies alongside the Hong Kong - Zhuhai - Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) where a reclamation area is constructed by *Contract No. HY/2010/02* under *Environmental Permit No. EP-353/2009/K* and *EP-354/2009/D*. Upon the agreement and confirmation between the Supervising Officer Representatives and Contractors of *HY/2010/02* and *HY/2012/07* in September 2015, part of the reclamation area for southern landfall under *EP-353/2009/K* and *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07*. Another part of the

southern landfall area under *EP-354/2009/D* was handed-over to *Contract No. HY/2012/07* after completion of reclamation works by *Contract No. HY/2010/02* in June 2016.

The construction phase of the Contract commenced on 31 October 2013 and will be tentatively be completed by 2018. The impact monitoring phase of the EM&A programme, including air quality, noise, water quality and marine ecological monitoring as well environmental site inspections, commenced on 31 October 2013.

The general layout plan of the Contract components is presented in *Figures 1.1 & 1.2a to l*.

1.2 SCOPE OF REPORT

This is the Twelfth Quarterly EM&A Report under the *Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section*. This report presents a summary of the environmental monitoring and audit works from 1 September to 30 November 2016.

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
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Daniel Ip	3553 3800	2492 2057
	Resident Engineer	Kingman Chan	3691 3950	3691 2899
ENPO / IEC (Ramboll Environ Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Gammon Construction Limited)	Environmental Manager	Brian Kam	3520 0387	3520 0486
	Environmental Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

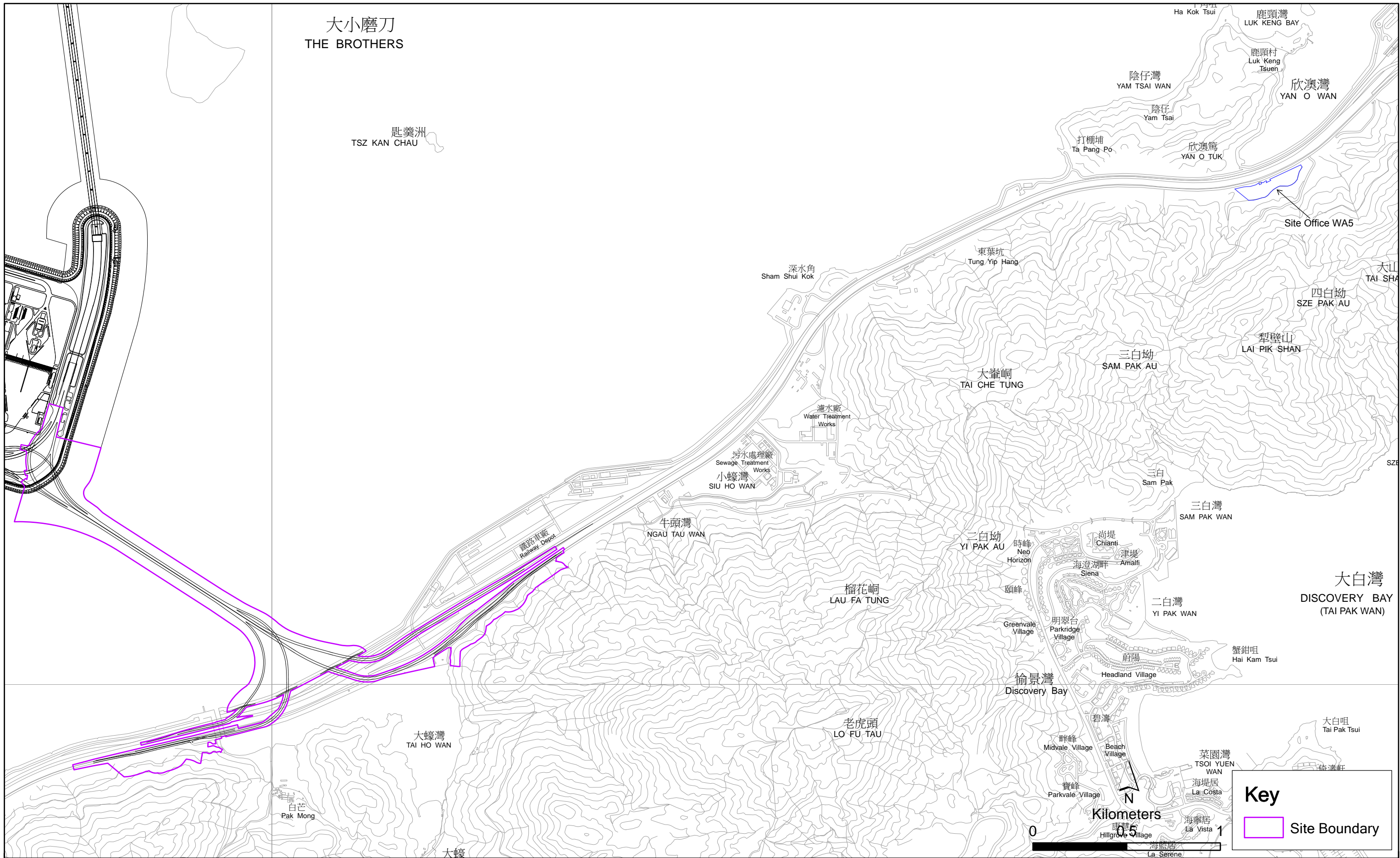
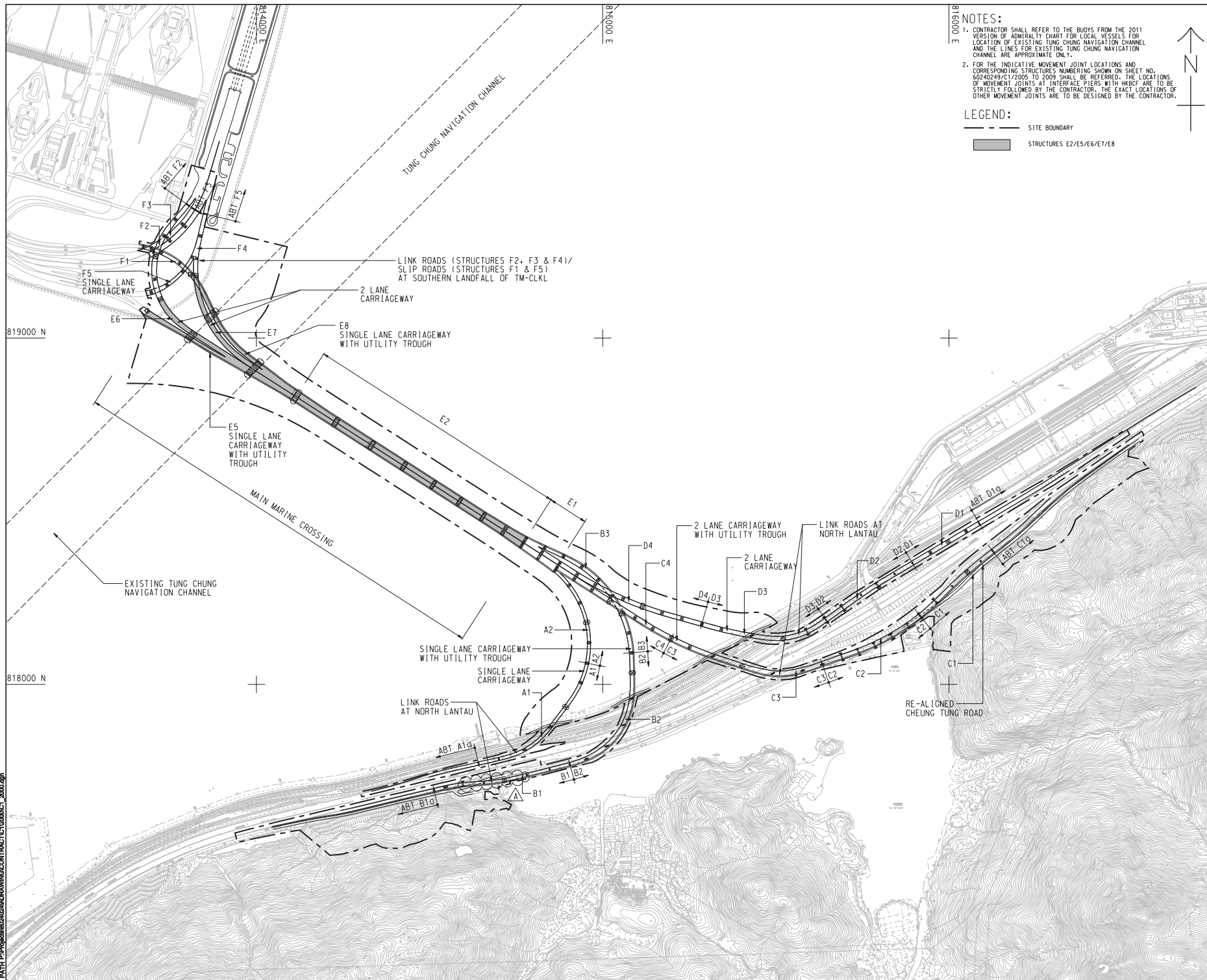


Figure 1.1

General Layout Plan of the Project



NOTES:

- CONTRACTOR SHALL REFER TO THE BUOYS FROM THE 2011 VERSION OF ADMIRALTY CHART FOR LOCAL VESSELS FOR LOCATION OF EXISTING TUNG CHUNG NAVIGATION CHANNEL AND THE LINES FOR EXISTING TUNG CHUNG NAVIGATION CHANNEL ARE APPROXIMATE ONLY.
- FOR THE INDICATIVE MOVEMENT JOINT LOCATIONS AND CORRESPONDING STRUCTURES NUMBERING SHOWN ON SHEET NO. 60240249/C1/2005 TO 2009 SHALL BE REFERRED. THE LOCATIONS OF MOVEMENT JOINTS AT INTERFACE PIERS WITH HKBCF ARE TO BE STRICTLY FOLLOWED BY THE CONTRACTOR. THE EXACT LOCATIONS OF OTHER MOVEMENT JOINTS ARE TO BE DESIGNED BY THE CONTRACTOR.

LEGEND:

- SITE BOUNDARY
- STRUCTURES E2/E5/E6/E7/E8



AECOM

PROJECT
 TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - SOUTHERN CONNECTION VIADUCT SECTION

CLIENT
 路政署
HIGHWAYS DEPARTMENT
 港務局大橋及港務工程處
 Hong Kong - Zhuhai - Hainan Bridge
 Hong Kong Project Management Office

CONSULTANT
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS

Figure 1.2a

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.

STATUS

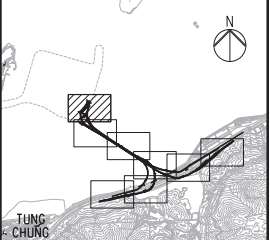
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A1 : 6000	METRES

KEY PLAN

PROJECT NO. 60240249	CONTRACT NO. HY/2012/07
SHEET TITLE SOUTHERN CONNECTION GENERAL LAYOUT PLAN	
SHEET NUMBER 60240249/C1/2000A	

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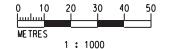


KEY PLAN

NOTES
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- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I.-STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I.-STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING

MATCH LINE
 FOR CONTINUATION
 SEE DRG. J3518/P/OAP/04/01101



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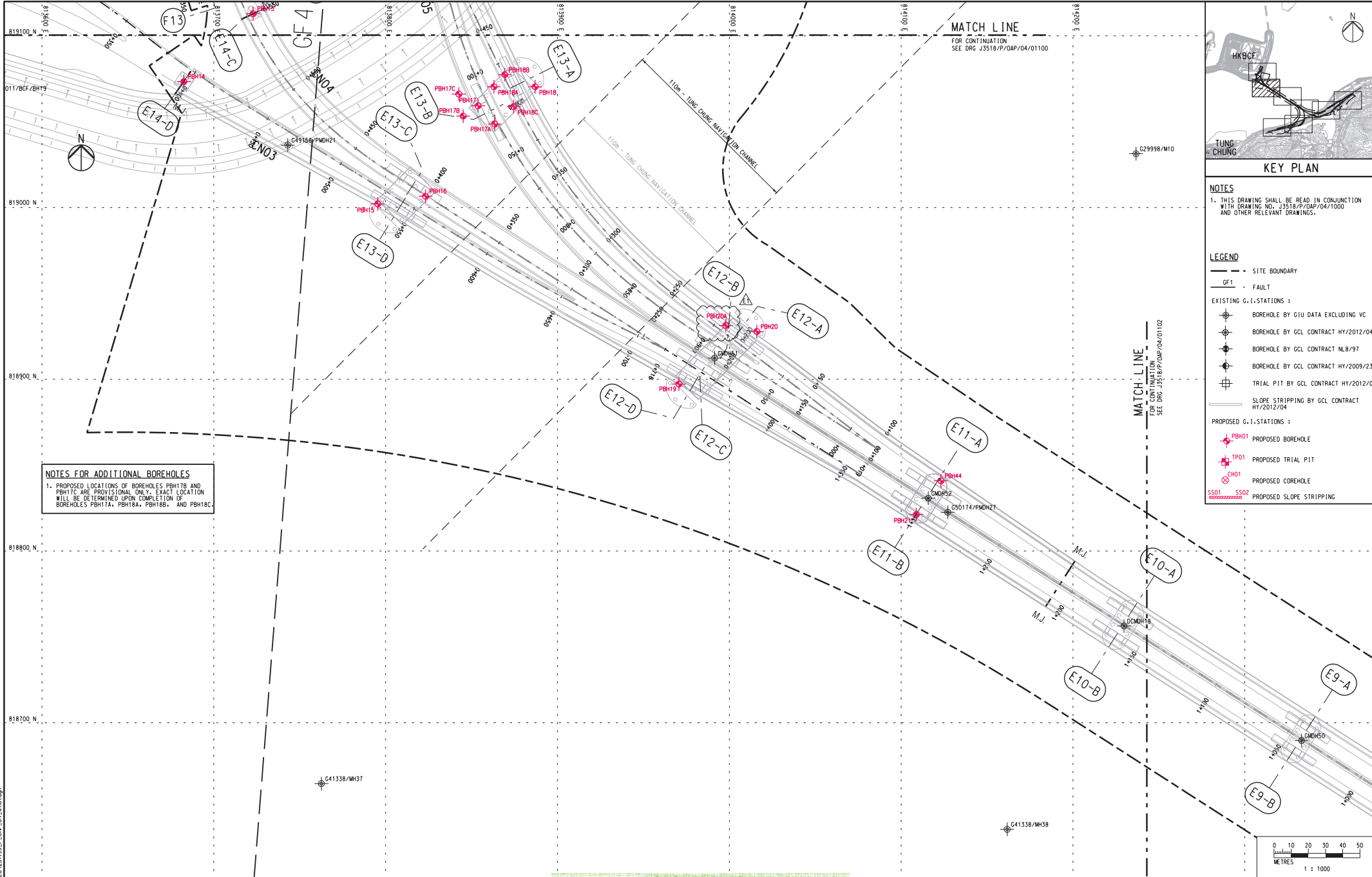
Drawn	Date	Client
RL	07/13	HONG KONG GOVERNMENT HIGHWAYS DEPARTMENT 香港政府 路政處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office
Checked	Approved	Supervising Officer
DS	DOP	Contractor
Scale	1:1000 @ A1 / 1:2000 @ A3	

Project Title
Contract No. HY/2012/07
Tuen Mun - Chek Lap Kok Link
Southern Connection Viaduct Section

Drawing title
Figure 1.2b

Drawing no. **J3518/P/OAP/04/01100** Rev. **C**

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NOTES FOR ADDITIONAL BOREHOLES
 1. PROPOSED LOCATIONS OF BOREHOLES PBH17B AND PBH17C ARE PROVISIONAL ONLY. EXACT LOCATION WILL BE DETERMINED UPON COMPLETION OF BOREHOLES PBH17A, PBH18A, PBH18B, AND PBH18C.

NOTES
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- SITE BOUNDARY
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 - EXISTING G.I. STATIONS:
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 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS:
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING

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Rev	Description	By	Date	Rev	Description	By	Date
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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				
D	SUBMISSION	RC	10/13				
E1	FOR INTERNAL REVIEW	RC	11/13				

Drawn	Date	Client
RL	07/13	HIGHWAYS DEPARTMENT

Checked	Approved	Scale
DS	DOP	1:1000 @ A1; 1:2000 @ A3

Client: **HIGHWAYS DEPARTMENT**
 香港路政處
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

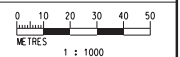
Supervising Officer: **AECOM**
 Contractor: **Gammon**

Project Title:
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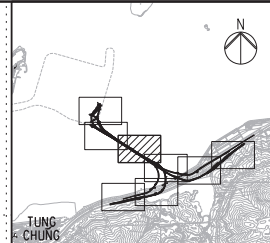
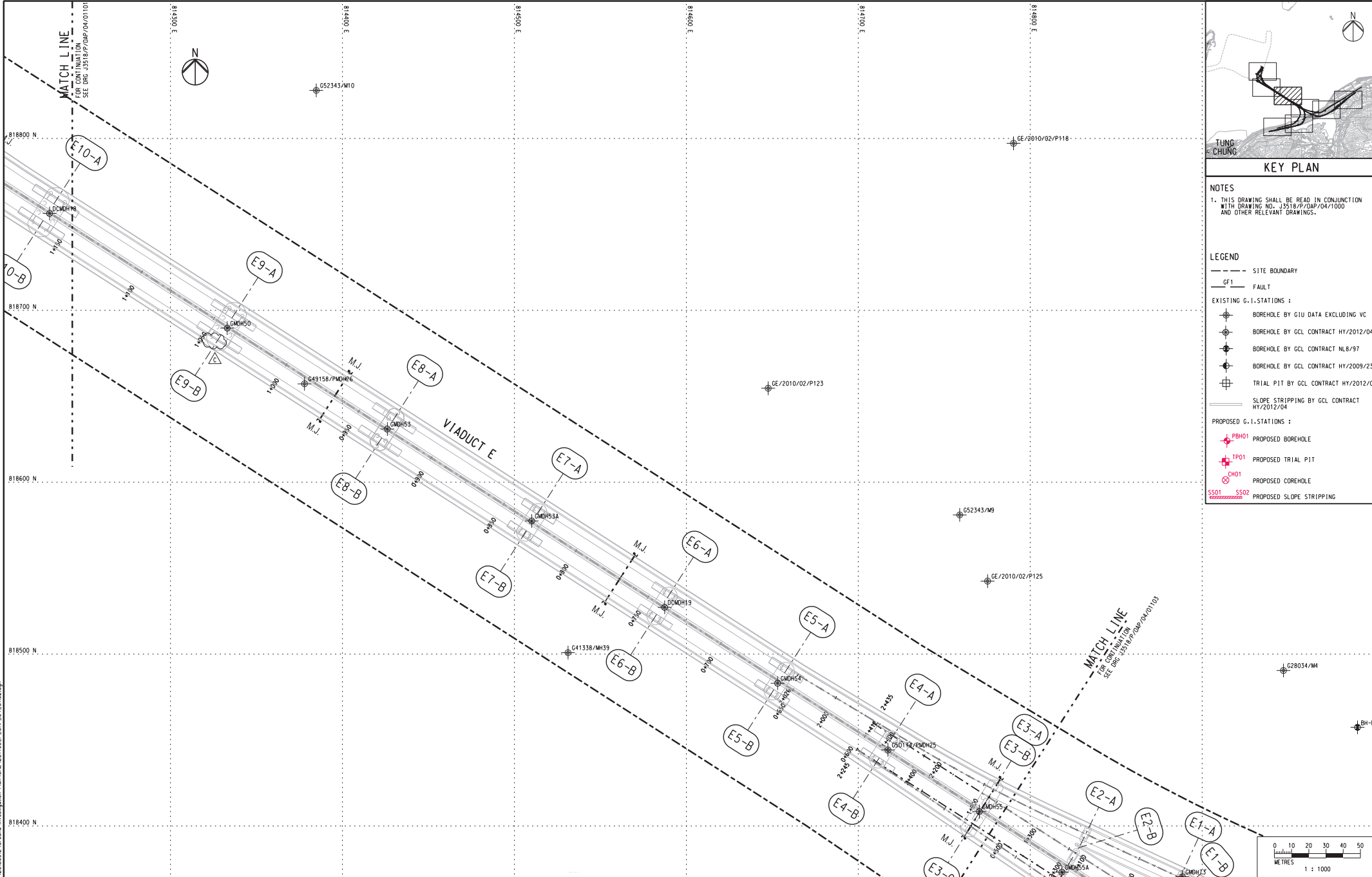
Originator: **ARUP**

Drawing title:
Figure 1.2c

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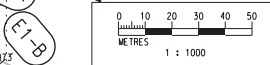
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 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING



Rev	Description	By	Date	Rev	Description	By	Date
A	SUBMISSION	RC	07/13				
B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

Checked	Approved
DS	DOP

Scale
1:1000 @ A1 / 1:2000 @ A3

Client

 路政署 HIGHWAYS DEPARTMENT
 香港港大聯合港工程管理局
 Hong Kong Project Management Office

Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

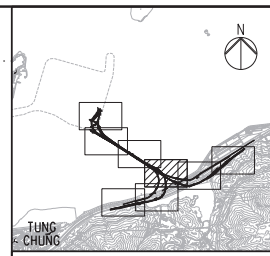
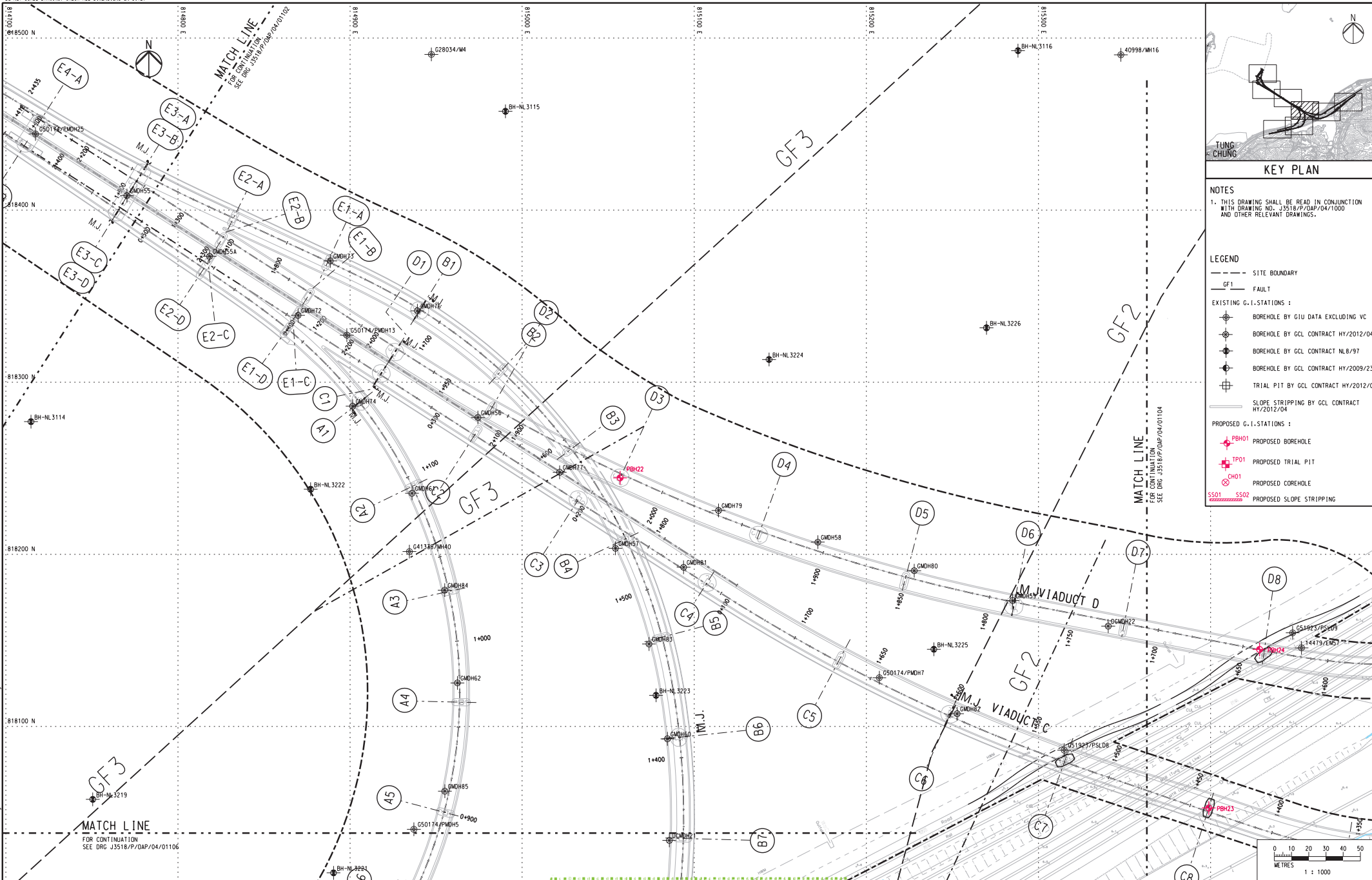
Drawing title
Figure 1.2d
 Drawing no. J3518/P/OAP/04/01102 Rev. C

Supervising Officer

 Contractor
 Originator

Printed by : 12/09/2013
 File name : J:\3518\9 Ground Investigation Plan\CAD\23498_P_OAP_04_01102.dgn

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



KEY PLAN

NOTES
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

LEGEND

---	SITE BOUNDARY
- - -	FAULT
---	EXISTING G.I.-STATIONS :
⊕	BOREHOLE BY GIU DATA EXCLUDING VC
⊕	BOREHOLE BY GCL CONTRACT HY/2012/04
⊕	BOREHOLE BY GCL CONTRACT NL8/97
⊕	BOREHOLE BY GCL CONTRACT HY/2009/23
⊕	TRIAL PIT BY GCL CONTRACT HY/2012/04
---	SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
---	PROPOSED G.I.-STATIONS :
⊕	PROPOSED BOREHOLE
⊕	PROPOSED TRIAL PIT
⊕	PROPOSED COREHOLE
---	PROPOSED SLOPE STRIPPING

Printed by : 13/9/2013
 File name : J:\3518\9\Ground Investigation Plan\CAD\23498_P_OAP_04_0103.dwg

Rev	Description	By	Date	Rev	Description	By	Date
A	SUBMISSION	RC	07/13				
B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

Checked	Approved
DS	DOP

Scale
1:1000 @ A1 / 1:2000 @ A3

Client
 路政署
 HIGHWAYS DEPARTMENT
 港珠澳大桥香港工程管理局
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Supervising Officer
 AECOM

Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

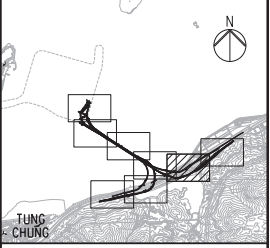
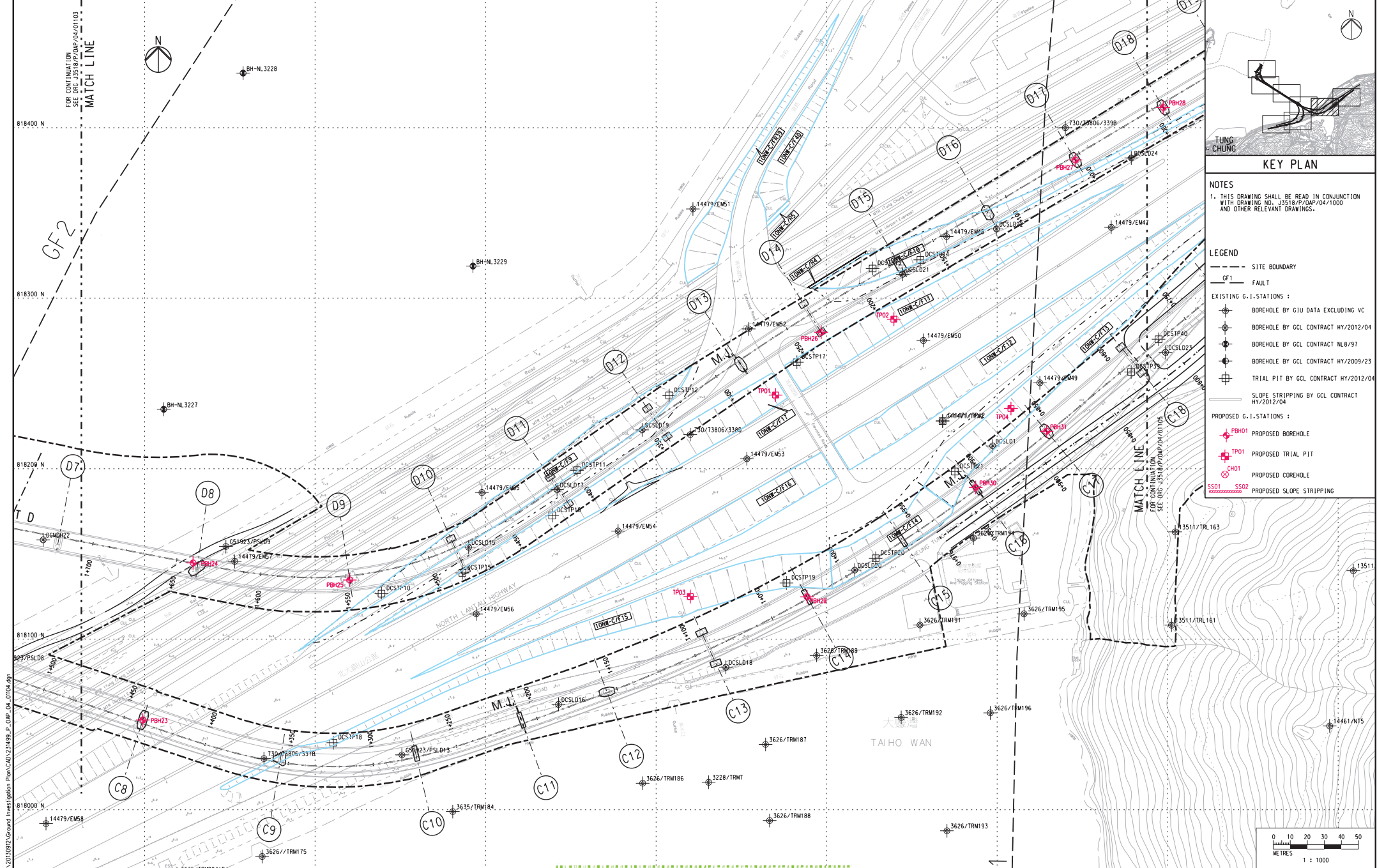
Contractor
 Gammon

Originator
 ARUP

Drawing title
Figure 1.2e

Drawing no. J3518/P/OAP/04/01103 Rev. c

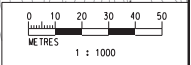
DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



KEY PLAN

NOTES
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- - - SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I. STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL6/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING



Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date
A	SUBMISSION	RC	07/13					RL	07/13
B	SUBMISSION	RC	07/13					Checked	Approved
C	SUBMISSION	RC	09/13					DS	DOP
								Scale	1:1000 @ A1 / 1:2000 @ A3

Client
 路政署
 HIGWAYS DEPARTMENT
 港珠澳大橋香港工程總處
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Supervising Officer
AECOM

Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Contractor
Gammon

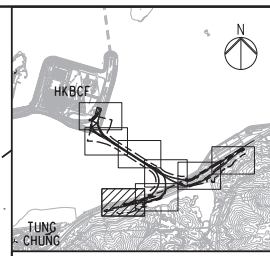
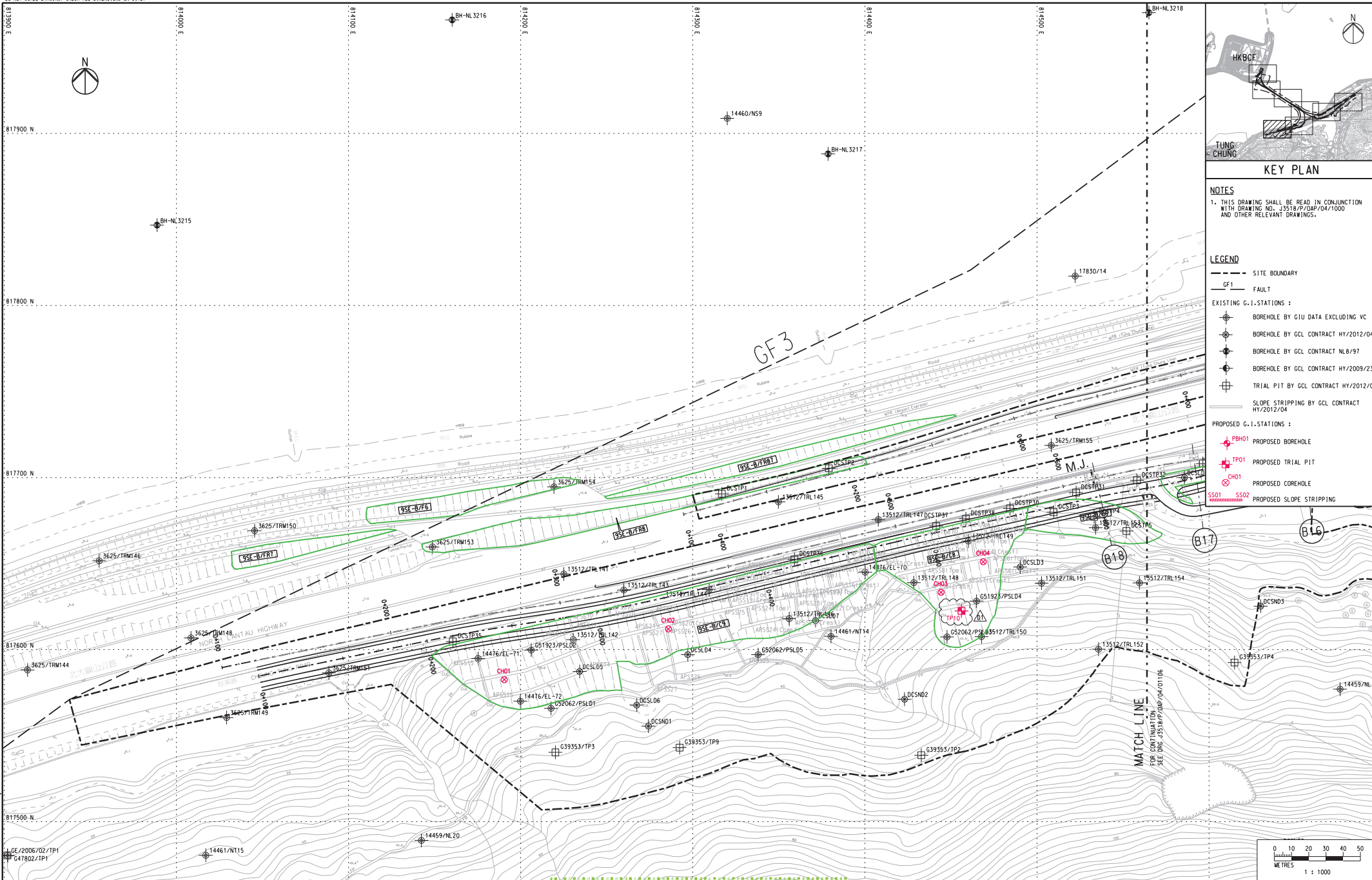
Originator
ARUP

Drawing title
Figure 1.2f

Drawing no. J3518/P/OAP/04/01104 Rev. C

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DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



KEY PLAN

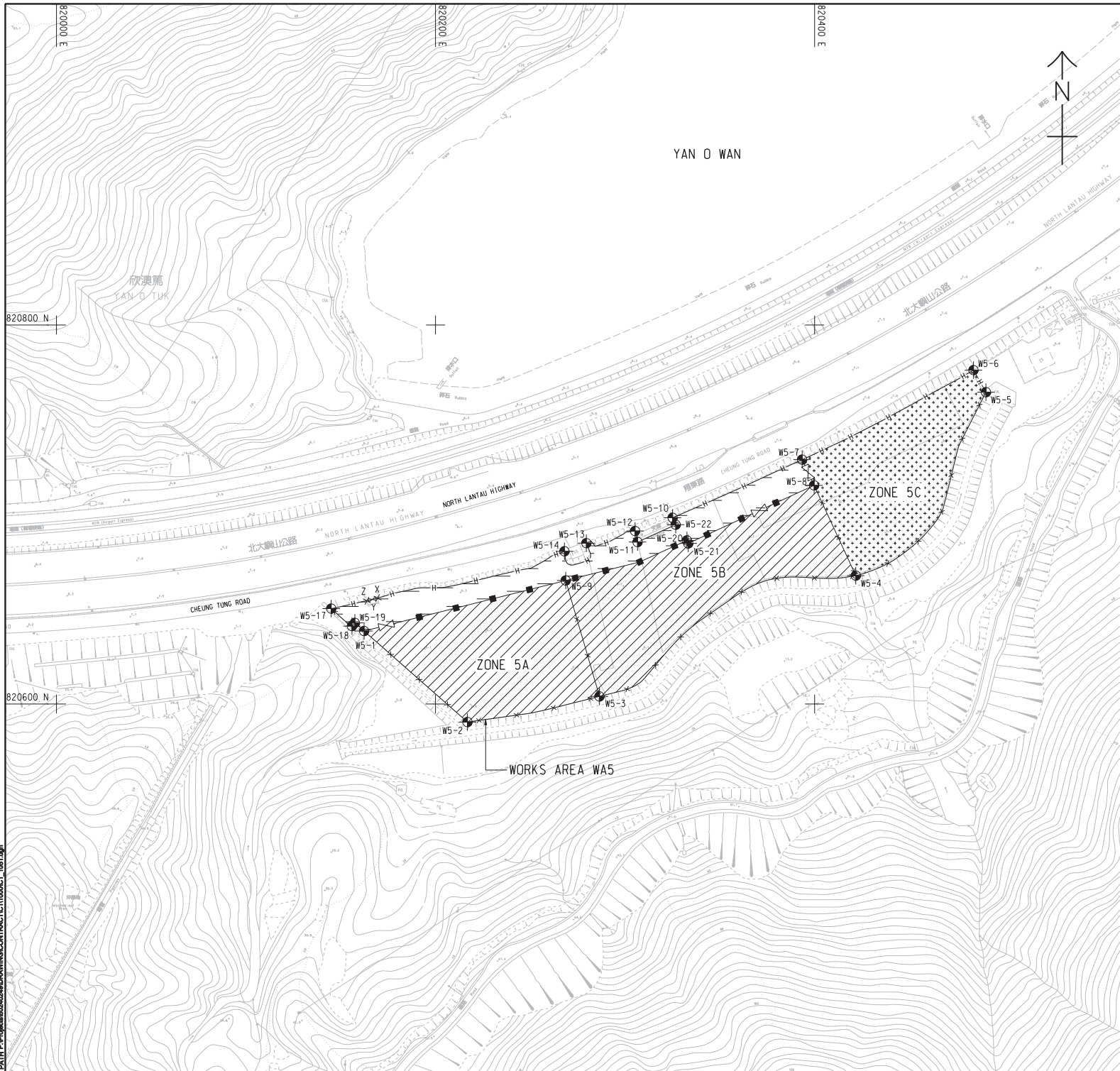
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- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I. STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL6/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS :
 - ⊕ PBH01 PROPOSED BOREHOLE
 - ⊕ TP01 PROPOSED TRIAL PIT
 - ⊕ CH01 PROPOSED COREHOLE
 - SS01 SS02 PROPOSED SLOPE STRIPPING


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 2. 2006/02/TP1







Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date	Client	Project Title	Drawing title
A	SUBMISSION	RC	07/13					RL	07/13		Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section	Figure 1.2g
B	SUBMISSION	RC	07/13				Checked	Approved				
C	SUBMISSION	RC	09/13				DS	DOP				
D1	FOR INTERNAL REVIEW	RC	11/13				Scale	1:1000 @ A1 / 1:2000 @ A3				
										Supervising Officer	Contractor	Originator
											Drawing no. J3518/P/OAP/04/01107	Rev. D1



NOTES:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/1000.
- THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. T15 619. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
- DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6110 AND H6111 FOR DETAILS OF HOARDING.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
- CHAIN LINK FENCE SHALL BE ERECTED ALONG THE WORKS AREA BOUNDARY. THE ALIGNMENT AND EXTENT OF CHAIN LINK FENCE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
- THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
- NO STRUCTURES SHALL BE ERECTED OTHER THAN SUCH STRUCTURES NOT EXCEEDING TWO STOREYS IN HEIGHT, WHICH ARE APPROVED BY THE DISTRICT LANDS OFFICER AS BEING APPROPRIATE FOR THE USE OF THE SITE AS A WORKS AREA.
- THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
- THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLK RELATED CONTRACTS. THE AREAS HATCHED WITH  ARE TENTATIVELY ALLOCATED FOR THE USE OF THIS CONTRACT.
- THE COMMON AREA SHALL BE CONCRETE PAVED BY THE CONTRACTOR.

LEGEND:

-  WORKS AREA UNDER THIS CONTRACT
-  COMMON AREA (MAINTAINED UNDER THIS CONTRACT) TO BE SHARE-USED WITH OTHER CONTRACTS
-  WORKS AREA FOR THIS CONTRACT TO BE EARLY HANDED OVER BY THE CONTRACTOR.
-  HOARDING AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED BY OTHERS)
-  CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)

SETTING OUT COORDINATES OF WORKS AREA W5

POINT	COORDINATES	
	EASTING	NORTHING
W5-1	820162.308	820638.492
W5-2	820216.839	820590.455
W5-3	820286.496	820603.985
W5-4	820421.757	820667.742
W5-5	820490.425	820764.554
W5-6	820483.839	820776.180
W5-7	820393.451	820728.958
W5-8	820399.746	820715.343
W5-9	820268.674	820665.173
W5-10	820325.075	820698.276
W5-11	820306.587	820685.458
W5-12	820305.269	820691.287
W5-13	820279.580	820684.863
W5-14	820268.027	820680.572
X	820169.407	820655.859
Y	820166.601	820655.172
Z	820163.794	820654.484
W5-17	820144.957	820650.334
W5-18	820155.899	820641.093
W5-19	820157.432	820642.788
W5-20	820332.642	820686.314
W5-21	820333.350	820684.738
W5-22	820326.723	820694.608

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.
1	OCT. 12	TENDER DRAWING	CWN

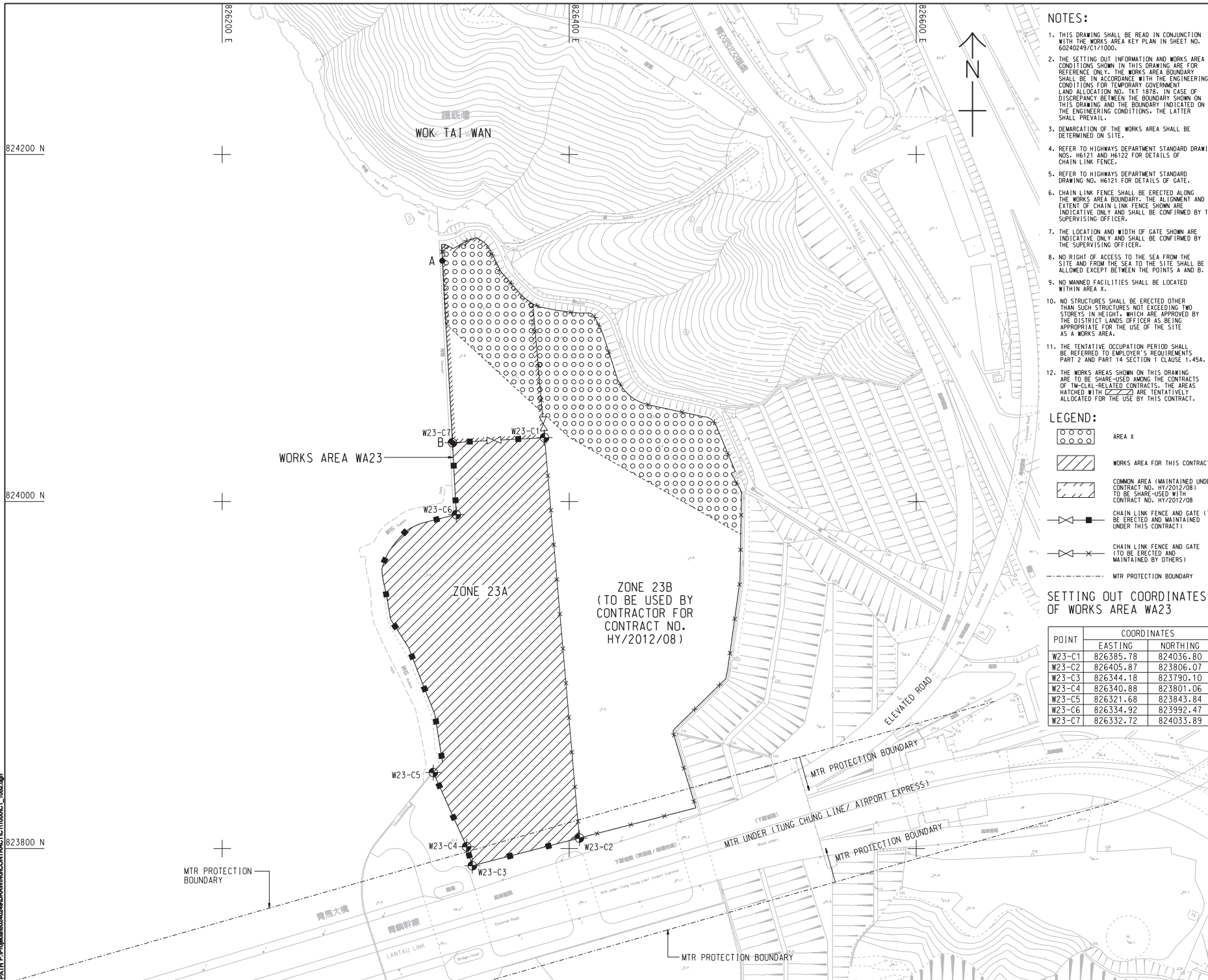
STATUS

SCALE	DIMENSION UNIT
A1:1000	METRES

KEY PLAN

Figure 1.2h

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NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/10E.
2. THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. TKT 1879. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
3. DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
4. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
5. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
6. CHAIN LINK FENCE SHALL BE ERECTED ALONG THE WORKS AREA BOUNDARY. THE ALIGNMENT AND EXTENT OF CHAIN LINK FENCE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
7. THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
8. NO RIGHT OF ACCESS TO THE SEA FROM THE SITE AND FROM THE SEA TO THE SITE SHALL BE ALLOWED EXCEPT BETWEEN THE POINTS A AND B.
9. NO MANNED FACILITIES SHALL BE LOCATED WITHIN AREA X.
10. NO STRUCTURES SHALL BE ERECTED OTHER THAN SUCH STRUCTURES NOT EXCEEDING TWO STOREYS IN HEIGHT, WHICH ARE APPROVED BY THE DISTRICT LANDS OFFICER AS BEING APPROPRIATE FOR THE USE OF THE SITE AS A WORKS AREA.
11. THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
12. THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARED-USED AMONG THE CONTRACTS OF TM-CLKL-RELATED CONTRACTS. THE AREAS HATCHED WITH [diagonal lines] ARE TENTATIVELY ALLOCATED FOR THE USE BY THIS CONTRACT.

LEGEND:

- [Symbol: Circles in a square] AREA X
- [Symbol: Diagonal lines] WORKS AREA FOR THIS CONTRACT
- [Symbol: Dotted pattern] COMMON AREA (MAINTAINED UNDER CONTRACT NO. HY/2012/08) TO BE SHARED-USED WITH CONTRACT NO. HY/2012/08
- [Symbol: Chain link fence and gate symbol] CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)
- [Symbol: Chain link fence and gate symbol] CHAIN LINK FENCE AND GATE (TO BE SHARED-USED AND MAINTAINED BY OTHERS)
- [Symbol: Dashed line] MTR PROTECTION BOUNDARY

SETTING OUT COORDINATES OF WORKS AREA WA23

POINT	COORDINATES	
	EASTING	NORTHING
W23-C1	826385.78	824036.80
W23-C2	826405.87	823806.07
W23-C3	826344.18	823790.10
W23-C4	826340.88	823801.06
W23-C5	826321.68	823843.84
W23-C6	826354.92	823992.47
W23-C7	826332.72	824033.89



PROJECT
TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK - SOUTHERN CONNECTION VIADUCT SECTION

CLIENT
 路政署
HIGHWAYS DEPARTMENT
 港務局
 港務局大橋管理工程處
 Hong Kong + Zhuhai + Hainan Bridge
 Hong Kong Project Management Office

CONSULTANT
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 2411000164

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.
1	OCT. 12	TENDER DRAWING	CWN

STATUS

SCALE: A1 1:1000 DIMENSION UNIT: METRES

KEY PLAN

PROJECT NO. 60240249 CONTRACT NO. HY/2012/07

Figure 1.2i

PROJECT NO. 60240249 CONTRACT NO. HY/2012/07

SHEET TITLE: WORKS AREA AND HOARDING PLAN

SHEET NUMBER: 60240249/C1/1052 SHEET 2 OF 2

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SETTING OUT COORDINATES OF WORKS AREA WA4

POINT	COORDINATES	
	EASTING	NORTHING
W4-1,U	815717.822	818074.398
V	815718.373	818071.803
W4-2,W	815718.923	818069.208
W4-3	815868.411	818103.687
X	815865.759	818117.028
Y	815866.539	818113.104
Z	815867.319	818109.181
W4-4	815860.972	818141.118

- NOTES:**
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/100.
 - THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. T15 631.
 - THE CONTRACTOR SHALL NOTE THAT WORKS AREA WA4 IS THE AREA FOR STORAGE OF CORE BOXES FOR OTHER CONTRACTORS OF THE EMPLOYER.
 - THE CONTRACTOR SHALL TAKE UP AND MAINTAIN THE EXISTING CHAIN LINK FENCE AND GATE. PROVIDE THE SECURITY, SITE CLEANLINESS AND TIDINESS FOR THE WORKS AREA.
 - THE CONTRACTOR SHALL NOTE THAT THE SETTING OUT COORDINATES OF WORKS AREA WA4 ARE TENTATIVE ONLY AND THE CONTRACTOR SHALL VERIFY THE SETTING OUT COORDINATES ON SITE.

LEGEND:

WORKS AREA WA4

EXISTING CHAIN LINK FENCE AND GATE

AECOM

PROJECT
 TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - SOUTHERN CONNECTION VIADUCT SECTION

CLIENT
 路政署 DEPARTMENT OF HIGHWAYS
 港務局 港務工程管理局
 Hong Kong + Zhuhai + Hainan Bridge
 Hong Kong Project Management Office

CONSULTANT
 AECOM Asia Company Ltd.
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SUB-CONSULTANTS
 2/11/2012/16

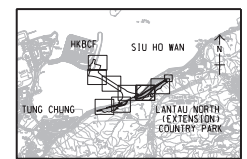
Figure 1.2j

ISSUE/REVISION

NO.	DATE	DESCRIPTION	CHK.
1	NOV. 12	TENDER ADDENDUM NO. 1	C/W

SCALE
 A1 : 1:1000

DIMENSION UNIT
 METRES



PROJECT NO.
 60240249

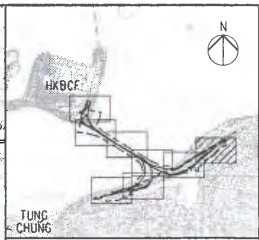
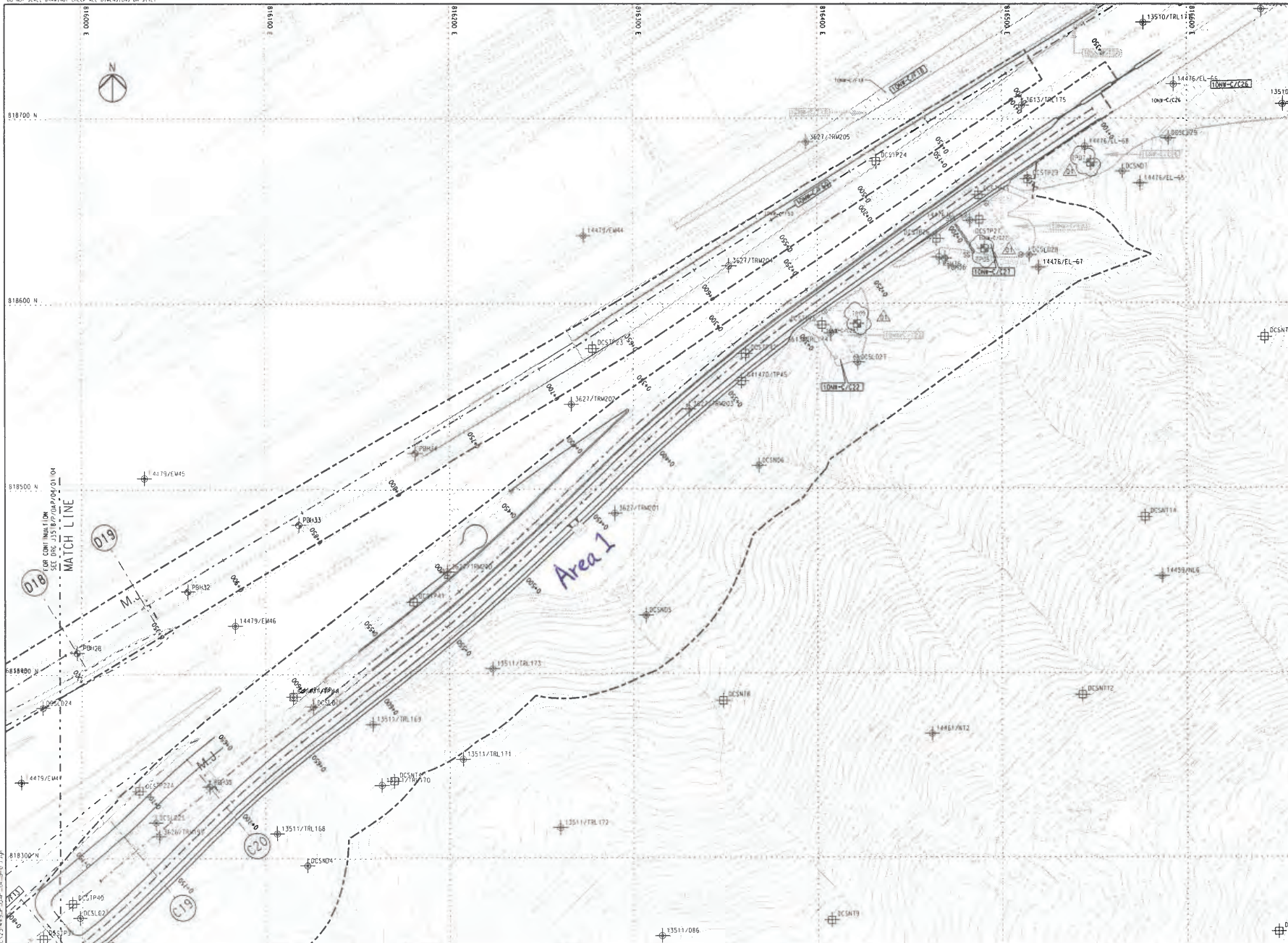
CONTRACT NO.
 HY/2012/07

SHEET TITLE
 WORKS AREA WA4

SHEET NUMBER
 60240249/C1/1053

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NOTES
 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
- EXISTING G.L. STATIONS :**
- ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT N6.8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - ⊕ SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
- PROPOSED G.L. STATIONS :**
- ⊕ P6-0 PROPOSED BOREHOLE
 - ⊕ T-01 PROPOSED TRIAL PIT
 - ⊕ C-01 PROPOSED COREHOLE
 - ⊕ S5-01 PROPOSED SLOPE STRIPPING

Rev	Description	By	Date	Rev	Description	By	Date
01	ISSUE FOR CONSTRUCTION	RL	31/03				
02	ISSUE FOR CONSTRUCTION	RL	07/13				
03	ISSUE FOR CONSTRUCTION	RL	29/13				
04	ISSUE FOR CONSTRUCTION	RL	19/12				

Drawn	Date	Client
RL	07/13	路政署 HIGHWAYS DEPARTMENT
Checked <td>Approved</td> <td>港珠澳大桥香港工程指挥部 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office</td>	Approved	港珠澳大桥香港工程指挥部 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office
DS	DOP	Supervising Officer

Scale	Contractor	Originator
1:1000 @ A1 / 1:2000 @ A3	AZCOM	GAMMON

Client
 路政署 HIGHWAYS DEPARTMENT
 港珠澳大桥香港工程指挥部
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

Project Title
 Contract No. HY/2012/07
 Tuen Mun - Chek Lap Kok Link
 Southern Connection Viaduct Section

Contractor
GAMMON

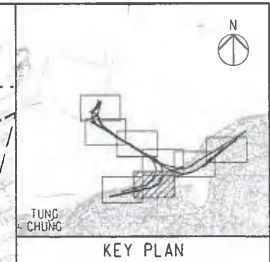
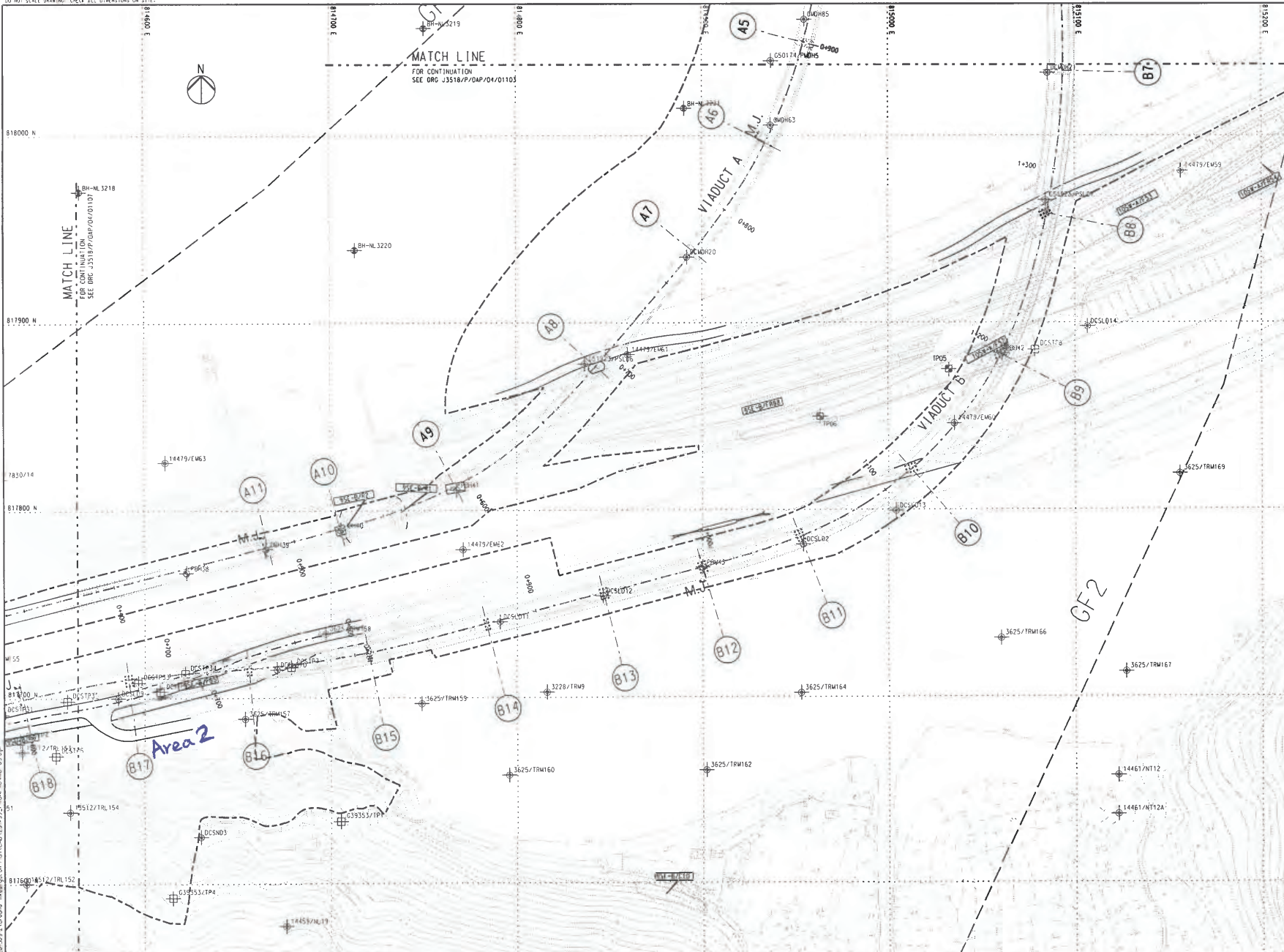
Originator
ARUP

Drawing title
Figure 1.2k

Drawing no. J3518/P/OAP/04/01105 **Rev.** D1

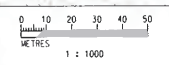
1:1000 @ A1 / 1:2000 @ A3
 07/13/2013
 J3518/P/OAP/04/01105

DO NOT SCALE DRAWING. CHECK ALL DIMENSIONS ON SITE.



NOTES
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- SITE BOUNDARY
 - GF1 FAULT
 - EXISTING G.I. STATIONS :
 - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
 - ⊕ BOREHOLE BY GCL CONTRACT NL8/97
 - ⊕ BOREHOLE BY GCL CONTRACT HY/2009/23
 - ⊕ TRIAL PIT BY GCL CONTRACT HY/2012/04
 - ▭ SLOPE STRIPPING BY GCL CONTRACT HY/2012/04
 - PROPOSED G.I. STATIONS :
 - ⊕ PROPOSED BOREHOLE
 - ⊕ PROPOSED TRIAL PIT
 - ⊕ PROPOSED COREHOLE
 - ▭ PROPOSED SLOPE STRIPPING



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Rev	Description	By	Date	Rev	Description	By	Date
1	SUBMISSION	RL	07/13				
2	SUBMISSION	RL	07/13				
3	SUBMISSION	RL	07/13				

Drawn RL 07/13 Checked DS DOP Scale 1:1000 @ A1 / 1:2000 @ A3	Client 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理有限公司 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office	Project Title Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section	Drawing Title Figure 1.2I
	Supervising Officer AECOM	Contractor Gammon	Originator ARUP

SUMMARY OF CONSTRUCTION WORKS

The construction phase of the Contract commenced on 31 October 2013. The rolling construction programme for the period of September to November 2016 is shown in *Appendix B*.

As informed by the Contractor, details of the major works carried out in this reporting period are listed below:

September 2016***Marine Works***

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

October 2016***Marine Works***

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;

- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

November 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

The locations of the construction activities are shown in *Figure 1.3*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.4*.

Figure 1.3 Locations of Construction Activities in the Reporting Period

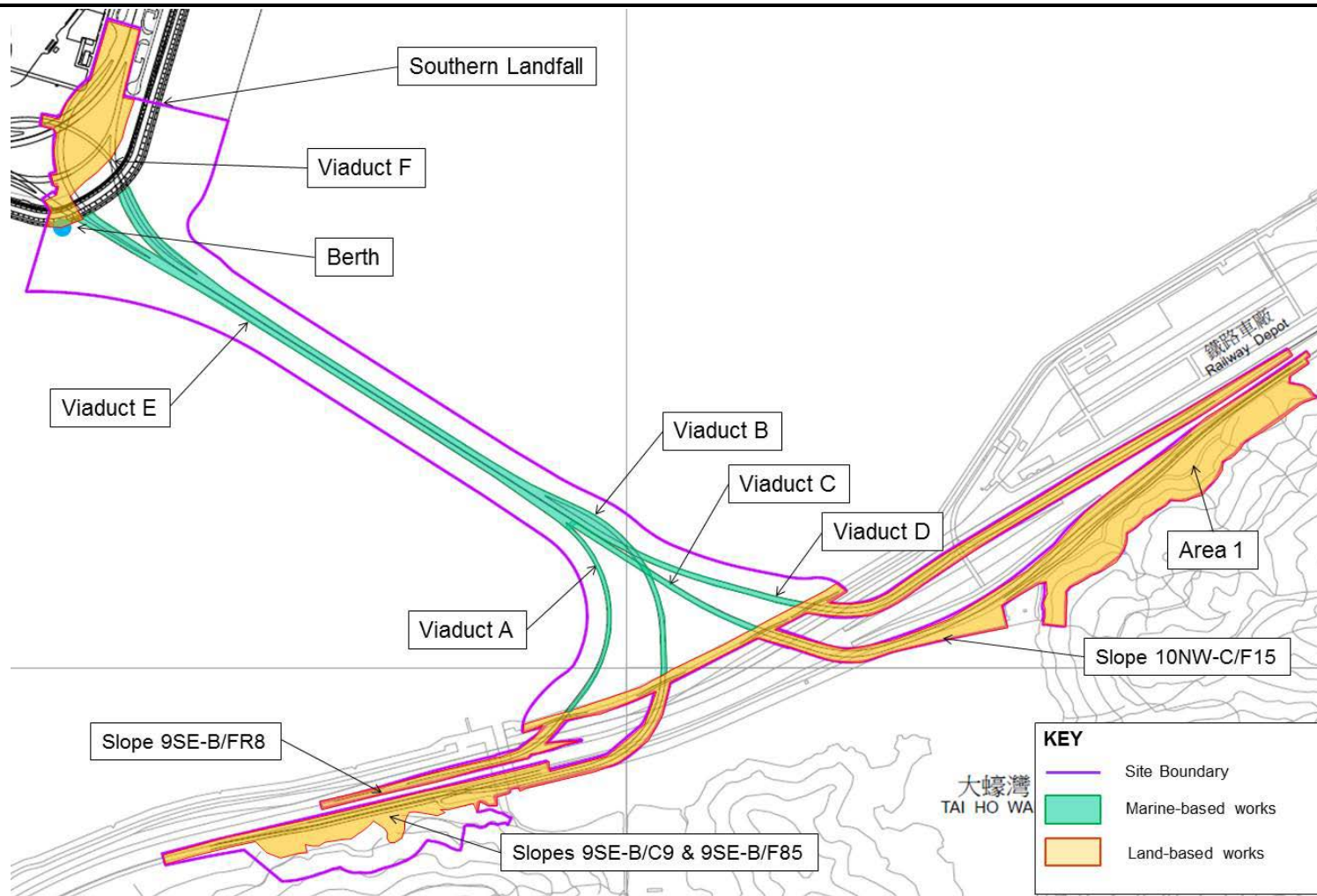




Figure 1.4

Environmental Sensitive Receivers in the Vicinity of Contract No. HY/2012/07
Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section

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

1.5

SUMMARY OF EM&A PROGRAMME REQUIREMENTS

The EM&A programme required environmental monitoring for air quality, noise, 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 described in the following sections, which include:

- Monitoring parameters;
- Monitoring schedules for the reporting months and forthcoming months;
- Action and Limit levels for all environmental parameters;
- Event Action Plan;
- Results and observations;
- Environmental mitigation measures, as recommended in the approved EIA Report; and
- Environmental requirement in contract documents.

The EM&A programme required environmental monitoring for air quality, noise, 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

The baseline air quality monitoring undertaken by the HZMB Projects during October 2011 included the two monitoring stations ASR9A and ASR9C for this Project. Thus, the baseline monitoring results and Action/Limit Level presented in HZMB Baseline Monitoring Report ⁽¹⁾ are adopted for this Project.

2.1.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual, impact 1-hour TSP monitoring was conducted three (3) times every six (6) days while the highest dust impact was expected. Impact 24-hour TSP monitoring was carried out once every six (6) days. The Action and Limit Levels of the air quality monitoring is provided in *Appendix D*.

1-hour TSP and 24-hour TSP monitoring were conducted at 2 alternative air quality monitoring stations, ASR8A (Area 4) and ASR9 (entrance of MTR Depot) during the reporting period in accordance with the requirement of the Updated EM&A Manual. The monitoring stations are indicated in *Figure 2.1* and details are presented in *Table 2.1*.

High Volume Samplers (HVSs) were used for carrying out 1-hour and 24-hour TSP monitoring during the reporting period. The HVSs meets all requirements of the Updated EM&A Manual. Brand and model of the equipment are given in *Table 2.2*.

Wind data monitoring equipment was installed at Area 4 during the reporting period for logging wind speed and wind direction. The wind sensor was setup such that it was clear of obstructions or turbulence caused by building. The wind data monitoring equipment is recalibrated at least once every six months.

⁽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.

Key

- Alternative Air Monitoring Station
- Site Boundary



Figure 2.1

Locations of Air Quality Monitoring Stations

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

Monitoring Station ⁽¹⁾	Monitoring Period	Location	Description	Parameters & Frequency
ASR8A	5, 8, 14, 20, 26 and 29	Area 4	On ground at the works area, Area 4	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times per day every 6 days 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour every 6 days
ASR9	September 2016 5, 11, 17 and 26 October 2016 1, 7, 10, 16, 22 and 28 November 2016	MTR Depot	On the ground nearby MTR Depot entrance	

Note:

(1) Air Quality Monitoring Stations ASR9A and ASR9C at Siu Ho Wan MTRC Depot proposed in accordance with the Updated EM&A were relocated to ASR9 and ASR8A respectively.

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 Sensor	Global Water (Wind Speed Sensor: WE550; Wind Direction Sensor: WE570)
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 are provided in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.1.3 *Monitoring Schedule for the Reporting Quarter*

The schedules for air quality monitoring in the reporting quarter are provided in *Appendix E*. Air Quality Monitoring on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

2.1.4 *Results and Observations*

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*. Detailed impact air quality monitoring results and meteorological information were reported in the *Thirty-fifth to Thirty-seventh Monthly EM&A Reports*.

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

Month	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 2016	ASR 8A	84	48 - 177	394	500
	ASR 9	110	53 - 205	393	500
October 2016	ASR 8A	77	43 - 107	394	500
	ASR 9	82	54 - 122	393	500
November 2016	ASR 8A	64	43 - 91	394	500
	ASR 9	101	56 - 172	393	500

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

Month	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 2016	ASR 8A	60	44 - 83	178	260
	ASR 9	71	50 - 106	178	260
October 2016	ASR 8A	49	43 - 52	178	260
	ASR 9	59	48 - 67	178	260
November 2016	ASR 8A	51	45 - 60	178	260
	ASR 9	62	54 - 66	178	260

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

In this reporting period, a total of 16 monitoring events were undertaken within the reporting period, in which no Action or Limit Level exceedance for 1-hour and 24-hour TSP for air quality was recorded during the reporting period.

2.2 NOISE MONITORING

The baseline noise monitoring undertaken by the HZMB Projects during the period of 18 October to 1 November 2011 included the monitoring station NSR1 for this Project. Thus, the baseline monitoring results and Action/Limit Level presented in *HZMB Baseline Monitoring Report* ⁽¹⁾ are adopted for this Project.

2.2.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual, impact noise monitoring should be conducted once per week during the construction phase of the Contract.

Noise monitoring was conducted at the alternative noise monitoring station, NSR1A (Pak Mong Village Pavilion) during the reporting period in accordance with the requirement of Updated EM&A Manual. *Figure 2.2* shows the location of the monitoring station. *Table 2.5* describes the details of the monitoring station.

Noise monitoring was performed using sound level meter at the designated monitoring station in the reporting quarter. The deployed sound level meter complies with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications. Acoustic calibrator was deployed to check the sound level meter at a known sound pressure level. Brand and model of the equipment is given in *Table 2.6*.

⁽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.

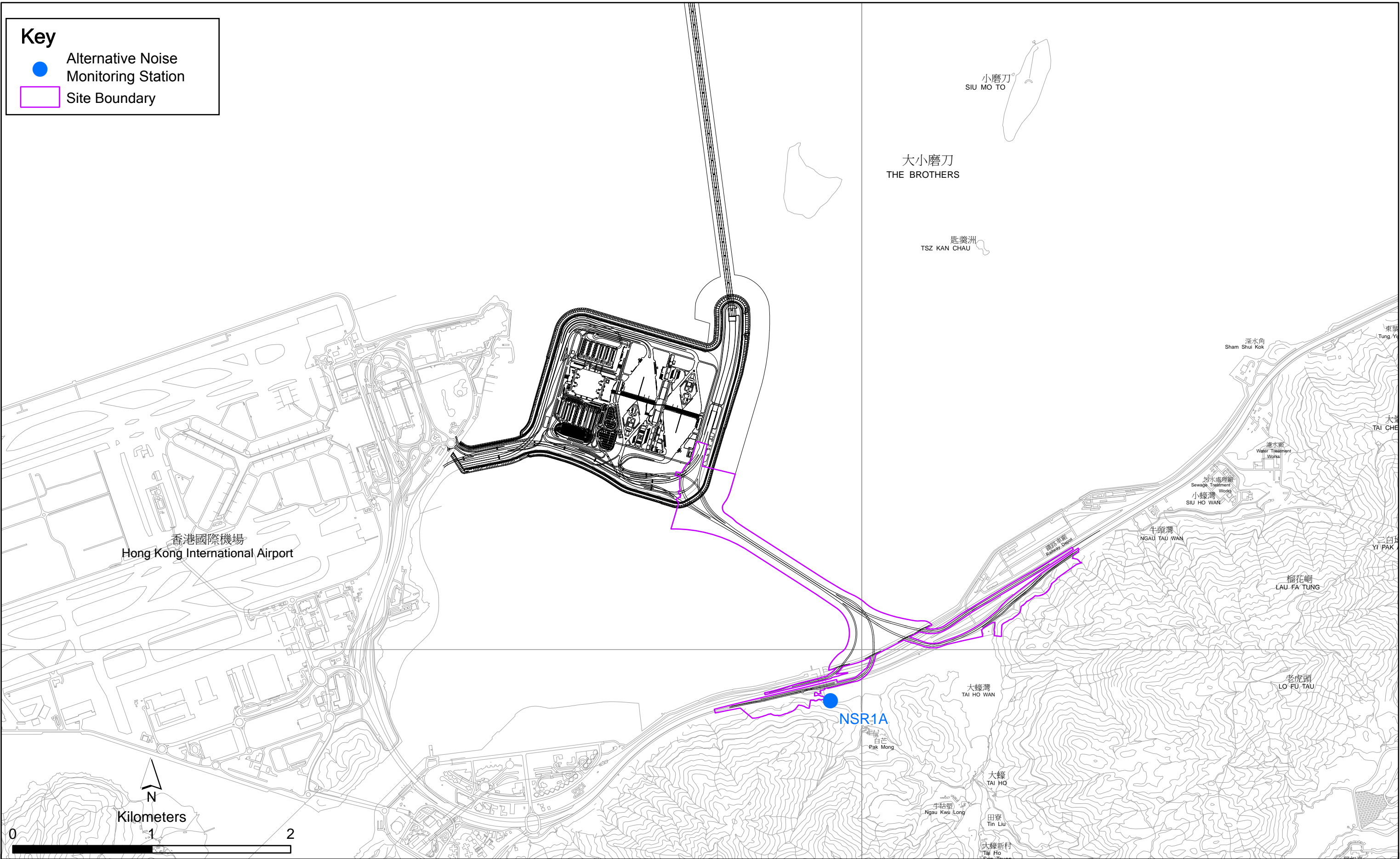


Figure 2.2

Location of Noise Monitoring Station

Table 2.5 *Location of Impact Noise Monitoring Station and Monitoring Dates in this Reporting Period*

Monitoring Station	Monitoring Period	Location	Parameters & Frequency
NSR1A	5, 8, 14, 20, 26 and 29 September 2016 5, 11, 17 and 26 October 2016 1, 7, 10, 16, 22 and 28 November 2016	Pak Mong Village Pavilion	<ul style="list-style-type: none"> 30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays (Monday to Saturday). L_{eq}, L_{10} and L_{90} would be recorded. At least once a week

Note:

- (1) Noise Monitoring Station NSR1 at Pak Mong Village proposed in accordance with the Updated EM&A was relocated to NSR1A.

Table 2.6 *Noise Monitoring Equipment*

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-31
Acoustic Calibrator	Rion NC-73

2.2.2 *Action and Limit Levels*

The Action and Limit levels of the noise monitoring are provided in *Appendix D*. The Event and Action plan is presented in *Appendix J*.

2.2.3 *Monitoring Schedule for the Reporting Quarter*

The schedule for construction noise monitoring in the reporting period is provided in *Appendix F*. Noise Monitoring on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

2.2.4 *Results and Observations*

The monitoring results for noise monitoring are summarized in *Table 2.7*. Monitoring results are presented graphically in *Appendix G* and detailed impact noise monitoring results are reported in the *Thirty-fifth to Thirty-seventh Monthly EM&A Reports*.

Table 2.7 *Summary of Construction Noise Monitoring Results at NSR1A in the Reporting Period*

Month	Average, dB(A), L_{eq}	Range, dB(A), L_{eq}	Limit Level, dB(A), L_{eq}
	(30mins)	(30mins)	(30mins)
September 2016	60	58 - 62	75
October 2016	61	60 - 62	75
November 2016	61	60 - 62	75

A total of 16 monitoring events were undertaken in the reporting period with no Action Level and Limit Level exceedance recorded at the monitoring station in the reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix J*.

Major noise sources during the noise monitoring included construction activities, nearby traffic noise and aircraft noise.

2.3

WATER QUALITY MONITORING

The baseline water quality monitoring undertaken by the HZMB Projects between 6 and 31 October 2011 included all monitoring stations except SR4a for the Project. Thus, the baseline monitoring results except for station SR4a and Action/Limit Level presented in HZMB Baseline Monitoring Report ⁽¹⁾ are adopted for this Project. Baseline water quality monitoring was conducted at station SR4a from 29 August to 24 September 2013.

2.3.1 Monitoring Requirements and Equipment

Impact water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. Impact water quality monitoring was undertaken three days per week during the construction period at seven water quality monitoring stations in accordance with the Updated EM&A Manual (Figure 2.3; Table 2.8).

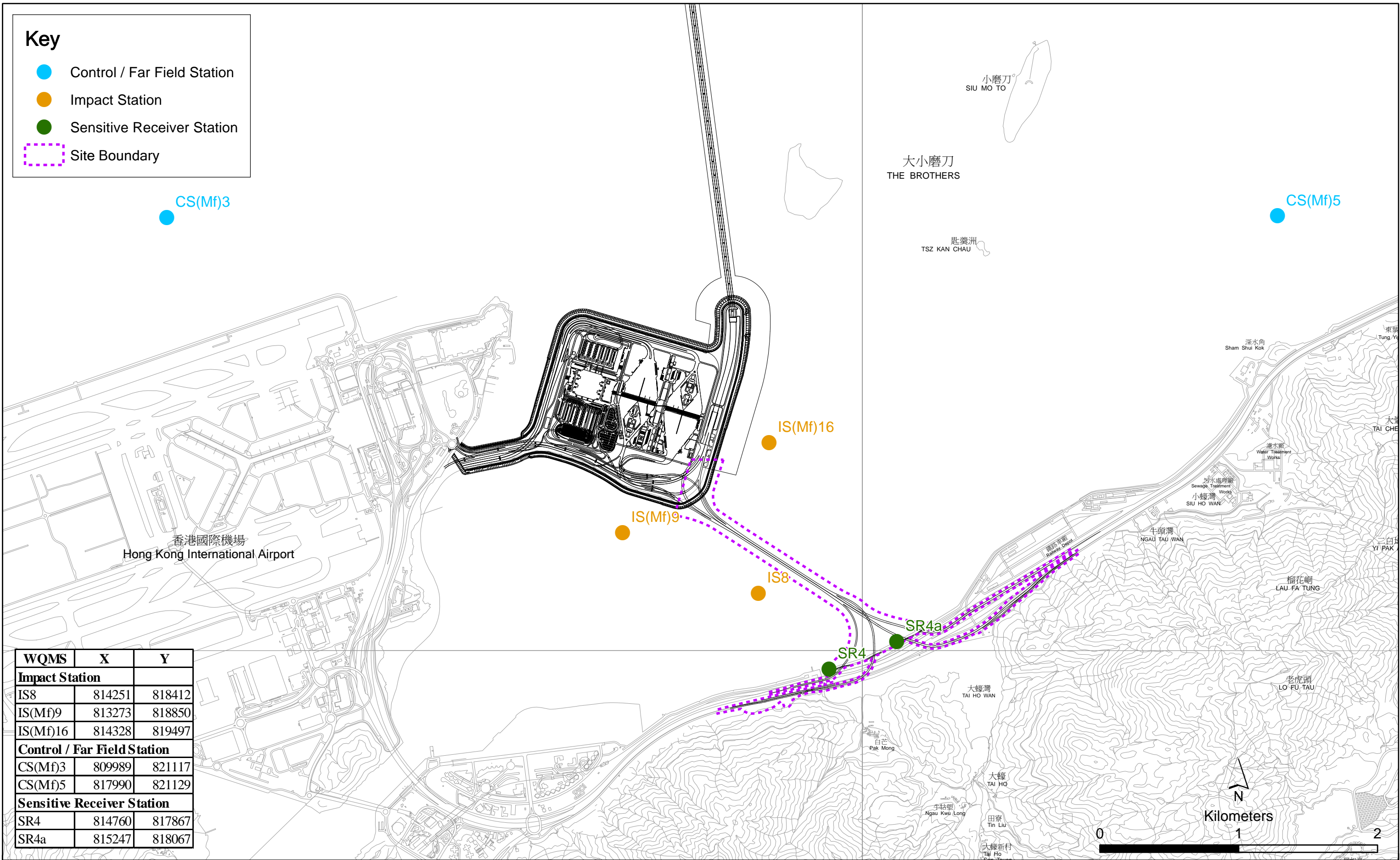
Table 2.8 *Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements*

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850	<ul style="list-style-type: none"> • Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) 	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497	<ul style="list-style-type: none"> • Dissolved Oxygen (DO) (mg/L and % of saturation) • Suspended Solid (SS) (mg/L) 		
IS8	Impact Station(Close to HKBCF construction site)	814251	818412			
SR4	Sensitive receiver (Tai Ho Inlet)	814760	817867			
SR4a	Sensitive receiver	815247	818067			
CS(Mf)3	Control Station	809989	821117			
CS(Mf)5	Control Station	817990	821129			

⁽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.

Key

- Control / Far Field Station
- Impact Station
- Sensitive Receiver Station
- Site Boundary



WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)3	809989	821117
CS(Mf)5	817990	821129
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

Figure 2.3

Locations of Water Quality Monitoring Stations

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
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 2.9 summarizes the equipment used in the impact water quality monitoring programme.

Table 2.9 Water Quality Monitoring Equipment

Equipment	Brand and Model
DO, Temperature meter and Salinity	YSI Pro2030
Turbidity meter	HACH Model 2100Q
pH meter	Thermo Scientific Orion 2 Star/ HANNA HI8314 / HANNA HI9125
Positioning Equipment	Koden913MK2 with KBG-3 DGPS antenna
Water Depth Detector	Speedtech Instrument SM-5
Water Sampler	Kemmerer 1520 (1520-C25) 2.2L with messenger

2.3.2 Action & Limit Levels

The Action and Limit Levels of the water quality monitoring are provided in *Appendix D*.

2.3.3 Monitoring Schedule for the Reporting Quarter

The schedules for water quality monitoring in the reporting quarter are provided in *Appendix E*. The water quality monitoring was canceled on 18 October 2016 due to adverse weather conditions.

2.3.4 Results and Observations

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting period. Monitoring results are presented graphically in *Appendix H* and detailed impact water quality monitoring results were reported in the *Thirty-fifth to Thirty-seventh Monthly EM&A Reports*.

In this reporting period, a total of 38 monitoring events were undertaken with no Action Level and Limit Level exceedance recorded at the monitoring station in the reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix J*.

2.4 DOLPHIN MONITORING

2.4.1 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 Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphin) from the Contract. 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.

2.4.2 Monitoring Equipment

Table 2.10 summarizes the equipment used for the impact dolphin monitoring.

Table 2.10 Dolphin Monitoring Equipment

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

2.4.3 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.

2.4.4 Monitoring Location

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in Figure 2.4. The co-ordinates of all transect lines are shown in Table 2.11 below.

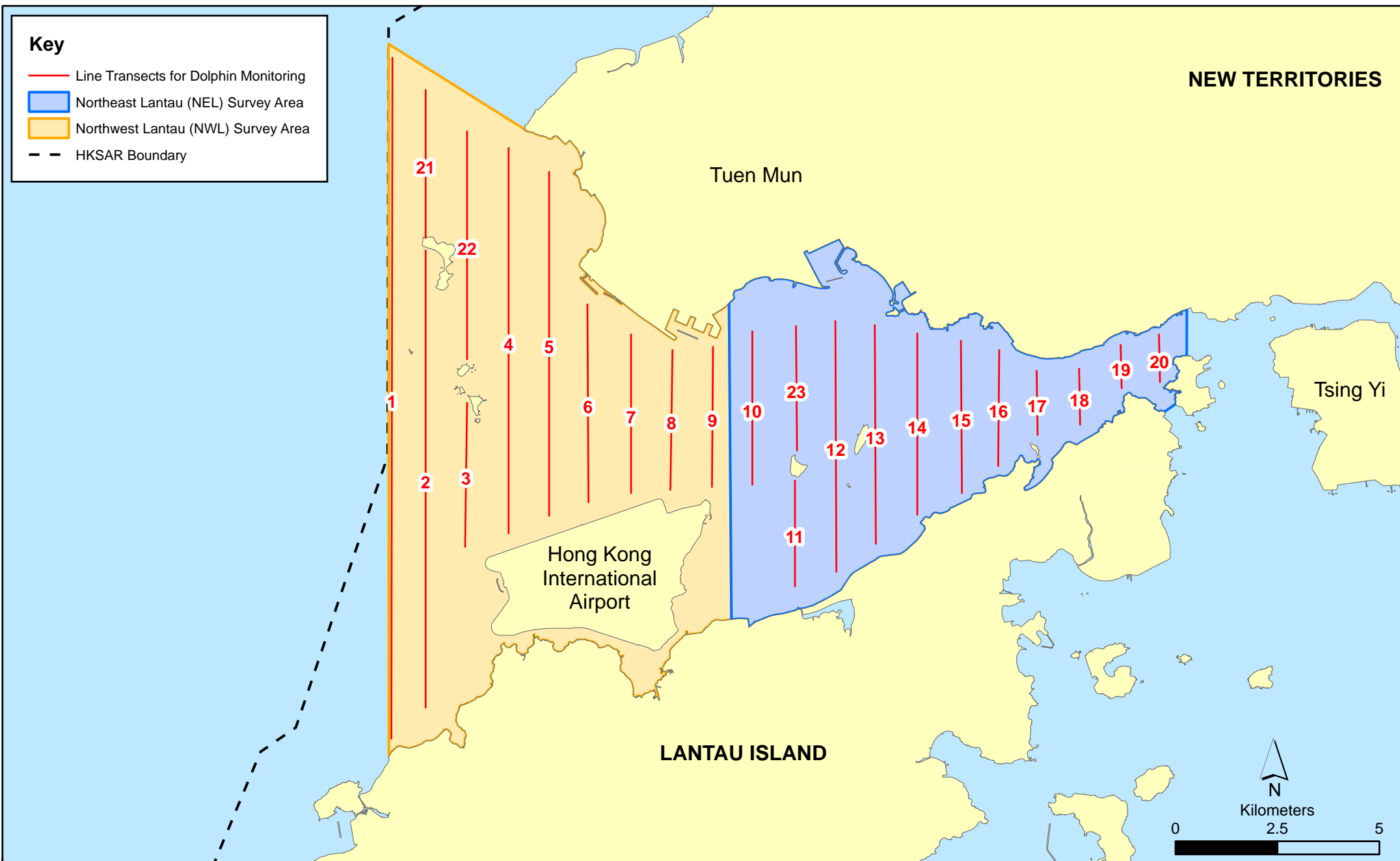


Figure 2.4

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

Table 2.11 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	814456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815913	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820880	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

2.4.5 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 J*.

2.4.6 Monitoring Schedule for the Reporting Period

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

2.4.7 Results & Observations

A total of 892.57 km of survey effort was collected, with 96.5% 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,

341.30 km and 551.27 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 640.35 km, while the effort on secondary lines was 252.22 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. The survey efforts are summarized in *Appendix I*.

During the six sets of monitoring surveys in September to November 2016, a total of thirteen (13) groups of 48 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort, while all except one dolphin sightings were made on primary lines. In this quarterly period, all dolphin groups were sighted in NWL, no sighting of dolphin was sighted in NEL. Summary table of the dolphin sightings is shown in *Appendix I*.

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) in the reporting period with the results presented in *Tables 2.12* and *2.13*.

Table 2.12 Individual Survey Event Encounter Rates

Survey Area	Survey period	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: 13 th / 14 th Sept 2016	0.0	0.0
	Set 2: 21 st / 23 th Sept 2016	0.0	0.0
	Set 3: 4 th / 7 th Oct 2016	0.0	0.0
	Set 4: 11 th / 13 th Oct 2016	0.0	0.0
	Set 5: 2 nd / 7 th Nov 2016	0.0	0.0
	Set 6: 18 th / 22 nd Nov 2016	0.0	0.0
NWL	Set 1: 13 th / 14 th Sept 2016	0.0	0.0
	Set 2: 21 st / 23 th Sept 2016	5.75	30.17
	Set 3: 4 th / 7 th Oct 2016	4.13	9.64
	Set 4: 11 th / 13 th Oct 2016	2.85	8.54
	Set 5: 2 nd / 7 th Nov 2016	1.66	1.66
	Set 6: 18 th / 22 nd Nov 2016	2.79	15.34

Note: Dolphin Encounter Rates are deduced from the six sets of surveys (two surveys in each set) in the reporting period in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.13 *Quarterly Average Encounter Rates*

Survey Area	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 2016	September - November 2011	September - November 2016	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	2.86 ± 1.98	9.85 ± 5.85	10.89 ± 10.98	44.66 ± 29.85

Note: encounter rates deduced from the baseline monitoring period (September - November 2011) 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 one (1) to eleven (11) individuals per group in North Lantau region during September to November 2016. 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 2.14*.

Table 2.14 *Comparison of Quarterly Average Group Sizes*

	Average Dolphin Group Size	
	September - November 2016	September - November 2011
Overall	3.69 ± 2.87 (n = 13)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	3.69 ± 2.87 (n = 13)	3.92 ± 3.40 (n = 49)

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between September and November 2016.

During this quarter of dolphin monitoring, no unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations.

Although the dolphins infrequently occurred along the alignment of TM-CLKL Southern Connection Viaduct 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.

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.

2.4.8 Marine Mammal Exclusion Zone Monitoring

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. No sighting of Chinese White Dolphin was recorded in the monitoring period during the exclusion zone monitoring.

Passive Acoustic Monitoring (PAM) was decommissioned in this reporting period as no marine piling works was carried out outside the daylight hours since September 2015. Daytime marine mammal exclusion zone was still in effect to cater for temporary staging installation and uninstalation works.

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. Fourteen (14) site inspections were carried out in the reporting quarter on 2, 7, 14, 21 and 29 September 2016, 5, 12, 19 and 27 October 2016, 2, 9, 17, 24 and 30 November 2016..

Key observations during the site inspections in this reporting period are summarized in *Table 2.15*.

Table 2.15 Specific Observations Identified during the Weekly Site Inspection in this Reporting Period

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
2 September 2016	Pier C15 <ul style="list-style-type: none"> Refuse was found in the tree protected area. Pier C13 <ul style="list-style-type: none"> Chemical container was not well labelled. The checklist for WetSep was not displayed. Abutment C <ul style="list-style-type: none"> Soil stockpile was not well covered. 	Pier C15 <ul style="list-style-type: none"> Refuse should be properly stored. Pier C13 <ul style="list-style-type: none"> Chemical container should be properly labelled. Checklist for WetSep should be displayed. Abutment C <ul style="list-style-type: none"> Soil stockpile should be well covered.
7 September 2016	Seafront <ul style="list-style-type: none"> Some chemical containers were not placed in drip tray. Pier E6 <ul style="list-style-type: none"> A chemical container was not placed in drip tray. A tarpaulin sheet for grouting enclosure was damaged. 	Seafront <ul style="list-style-type: none"> Chemical containers should be placed in drip tray. Pier E6 <ul style="list-style-type: none"> Chemical container should be placed in drip tray. The tarpaulin sheet for grouting enclosure should be repaired.
14 September 2016	Site Access 5A (nearby Pier D11) <ul style="list-style-type: none"> The unpaved area was dry. Dustbin was placed too close to retained tree. Refuse was not properly stored. 	Site Access 5A (nearby Pier D11) <ul style="list-style-type: none"> The unpaved area should be watered regularly. Dustbin should be placed away from natural habitat. Refuse should be properly stored.
21 September 2016	Area 2 <ul style="list-style-type: none"> Soil stockpile was not well covered. Viaduct B (Marine) <ul style="list-style-type: none"> Chemical containers were not placed in drip tray. 	Area 2 <ul style="list-style-type: none"> Soil stockpile should be well covered. Viaduct B (Marine) <ul style="list-style-type: none"> Chemical containers should be placed in drip tray.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
29 September 2016	Pier C13 <ul style="list-style-type: none"> A chemical container was not placed in drip tray. Soil stockpile was not well covered. Unpaved area was dry. 	Pier C13 <ul style="list-style-type: none"> Chemical container should be placed in drip tray. Soil stockpile should be well covered. Watering should be applied regularly.
5 October 2016	Slope BC9 <ul style="list-style-type: none"> Checklist for a Wetsep was not displayed. Pier B17 <ul style="list-style-type: none"> Soil stockpile was not well covered. Unpaved area was dry. 	Slope BC9 <ul style="list-style-type: none"> Checklist for Wetsep should be displayed. Pier B17 <ul style="list-style-type: none"> Soil stockpile should be well covered. Watering should be applied regularly.
12 October 2016	Pier E11 <ul style="list-style-type: none"> Chemical container should be placed in drip tray. Oily water in drip tray was observed. Sand bunds were missing on the perimeter at the pier. 	Pier E11 <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical container. The Contractor was reminded to clear the oil water. The Contractor was reminded to provide sand bunds on the perimeter at the pier.
19 October 2016	Viaduct D (D18) <ul style="list-style-type: none"> Exposed slope should be fully covered by tarpaulin. The Wetsep checklist should be updated. Chemical containers should be removed and placed in drip tray. 	Viaduct D (D18) <ul style="list-style-type: none"> The Contractor was reminded to fully cover the exposed slope. The Contractor was reminded to update the Wetsep checklist. The Contractor was reminded to remove the chemical containers and place in drip tray.
27 October 2016	Pier D7 <ul style="list-style-type: none"> Accumulated general refuse was observed. 	Pier D7 <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse.
2 November 2016	Pier E12 <ul style="list-style-type: none"> Chemical containers should be placed in drip tray. Water inside drip tray should be cleared. Air compressor was observed without NRMM labels displayed on site. 	Pier E12 <ul style="list-style-type: none"> The contractor was reminded to remove the chemical containers and place them in drip tray. The contractor was reminded to clear the water inside drip tray. The contractor was reminded to display the NRMM label on site.
9 November 2016	Viaduct C (C17) <ul style="list-style-type: none"> Accumulated general refuse was observed. Viaduct D (D13) <ul style="list-style-type: none"> Dusty materials near the wood chipping machine was observed 	Viaduct C (C17) <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse. Viaduct D (D13) <ul style="list-style-type: none"> The Contractor was reminded to clear the dusty materials.
17 November 2016	Viaduct D (D12) <ul style="list-style-type: none"> Unpaved area was dry. Viaduct D (D13) <ul style="list-style-type: none"> Chemical containers were not placed in drip tray. Viaduct D (D18 on the deck) <ul style="list-style-type: none"> Chemical containers were not placed in drip tray. Viaduct D (D19) <ul style="list-style-type: none"> Wetsep checklist was not displayed. 	Viaduct D (D12) <ul style="list-style-type: none"> Watering was applied immediately. Viaduct D (D13) <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical containers and placed them in drip tray. Viaduct D (D18 on the deck) <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical containers and placed them in drip tray. Viaduct D (D19) <ul style="list-style-type: none"> The Contractor was reminded to display the checklist on the Wetsep.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
24 November 2016	Pier E5 <ul style="list-style-type: none"> Accumulated general refuse was observed. Viaduct C (C17) <ul style="list-style-type: none"> Construction materials were placed too close to natural habitat. 	Pier E5 <ul style="list-style-type: none"> The Contractor was reminded to clear the accumulated general refuse. Viaduct C (C17) <ul style="list-style-type: none"> The Contractor was reminded to clear the construction materials from the natural habitat.
30 November 2016	Viaduct E (E6) <ul style="list-style-type: none"> Oily water inside drip tray was observed. Viaduct E (E12) <ul style="list-style-type: none"> Better housekeeping should be maintained. Seafront <ul style="list-style-type: none"> Chemical containers should be moved to storage area. 	Viaduct E (E6) <ul style="list-style-type: none"> Oily water was cleared immediately. Viaduct E (E12) <ul style="list-style-type: none"> The Contractor was reminded to keep tidy of the site and surroundings. Seafront <ul style="list-style-type: none"> The Contractor was reminded to move the chemical containers to chemical storage area.

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

2.6 WASTE MANAGEMENT STATUS

The Contractor has 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), recyclable materials, chemical waste and marine sediment. 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 2.16*.

Table 2.16 Quantities of Different Waste Generated in the Reporting Period

Month/ Year	Inert Constructio n Waste ^(a) (m ³)	Imported Fill (m ³)	Inert Construction Waste Re- used (m ³)	Non-inert Construction Waste ^(b) (kg)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)	
							Category L	Category M
September 2016	2,314	0	270	130,060	105	0	0	0
October 2016	2,183	0	156	141,300	28	0	0	0
November 2016	3,337	0	536	138,270	63	1,600	473	0
Total	7,834	0	962	409,630	196	1,600	473	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 2.17* below.

Table 2.17 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-353/2009/K	11-Apr-16	N/A	HyD	Hong Kong Boundary Crossing Facilities
Environmental Permit	EP-354/2009/D	13-Mar-15	N/A	HyD	Tuen Mun- Chek Lap Kok Link
Construction Dust Notification	361571	05-Jul-13	N/A	GCL	
Construction Dust Notification	362093	17-Jul-13	N/A	GCL	For Area 23
Chemical Waste Registration	5213-951-G2380-17	12-Jun-14	N/A	GCL	Viaducts A, B, C, D & E
Chemical Waste Registration	5213-961-G2380-13	10-Oct-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (Area 1 adjacent to Cheng Tung Road, Siu Ho Wan)
Chemical Waste Registration	5213-961-G2380-14	10-Oct-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (Area 2 adjacent to Cheung Tung Road, Pak Mong Village)
Chemical Waste Registration	5213-974-G2588-03	04-Nov-13	N/A	GCL	Chemical waste produced in Contract No. HY/2012/07 (WA5 adjacent to Cheung Tung Road, Yam O)
Construction Waste Disposal Account	7017735	10-Jul-13	N/A	GCL	-
Construction Waste Disposal Account	7019470	03-Mar-14	N/A	GCL	Vessel CHIT Account
Waste Water Discharge License	WT00019017-2014	13-May-14	31-May-19	GCL	Discharge for marine portion
Waste Water Discharge License	WT00019018-2014	13-May-14	31-May-19	GCL	Discharge for land portion
Construction Noise Permit for night works and works in general holidays	GW-RS0383-16	20-Apr-16	19-Oct-16	GCL	For Broad Permit
Construction Noise Permit for night works and works in general holidays	GW-RS1045-16	14-Oct-16	13-Apr-17	GCL	For Broad Permit
Construction Noise Permit for night works and works in general holidays	GW-RS0718-16	13-Jul-16	13-Jan-17	GCL	Pre-casted pile cap shell installation at E10-E13
Construction Noise Permit for night works and works in general holidays	GW-RS1044-16	14-Oct-16	13-Apr-17	GCL	Pre-casted pile cap shell installation at E8-E13
Construction Noise Permit for night works and works in general holidays	GW-RW0339-16	17-Jun-16	19-Dec-16	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RW0707-16	11-Jul-16	30-Sep-16	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS0958-16	15-Sep-16	30-Nov-16	GCL	Broad Permit for Segment Launching at Land Portion

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Marine Dumping Permit	EP/MD/17-037	14-Jun-16	13-Dec-16	GCL	For dumping Type I sediment
Marine Dumping Permit	EP/MD/17-115	20-Oct-16	31-Dec-16	GCL	For dumping Type I sediment
Marine Dumping Permit	EP/MD/17-084	22-Aug-16	30-Sep-16	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Marine Dumping Permit	EP/MD/17-102	28-Sep-16	31-Oct-16	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Marine Dumping Permit	EP/MD/17-120	1-Nov-16	30-Nov-16	GCL	For dumping Type I (Dedicated Site) and Type II sediment

2.8 **IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

In response to the site audit findings, the Contractor has carried out corrective actions.

A summary of the Environmental Mitigation and Enhancement Measure Implementation Schedules (EMIS) is presented in *Appendix C*. The necessary mitigation measures were implemented properly for this Contract.

2.9 **SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT**

Results for 1-hour TSP, 24-hour TSP, construction noise and water quality complied with the Action/ Limit levels in the reporting period.

The construction impact on depth-averaged SS was assessed by comparing the quarterly mean values of depth-averaged SS with the relevant ambient mean values (*Table 2.18*). The monitoring results showed that the quarterly means of depth-averaged SS at all sampling stations during both mid-ebb and mid-flood tides were well below the corresponding ambient means. The depth-averaged SS results suggest that the Project did not cause unacceptable impact on water quality in the reporting period.

Table 2.18 Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids

Station	Baseline Mean		Ambient Mean ^(a)		Quarterly Mean (September to November 2016)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS(Mf)3	9.2	12.8	12.0	16.6	10.9	10.8
CS(Mf)5	9.2	11.5	11.9	14.9	10.9	10.9
SR4	10.3	12.3	13.4	16.0	10.7	10.7
SR4a	9.1	9.8	11.9	12.7	10.7	10.7
IS8	11.3	13.5	14.6	17.6	10.7	10.7
IS(Mf)9	10.9	14.3	14.2	18.5	10.7	10.7
IS(Mf)16	11.4	10.3	14.8	13.4	10.7	10.7

Notes:

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

One (1) Limit Level exceedance was recorded for impact dolphin monitoring in this reporting quarter. Following the review of the monitoring data and marine works details as per the procedure stipulated in the Event and Action Plan of the Updated EM&A Manual, no unacceptable impact was associated with the construction works under this Contract that may have affected the dolphin usage in the North Lantau region. Investigation findings were detailed in *Appendix L*.

2.10

SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.5*.

There were two (2) complaints received in the reporting period. One complaint was received from Highways Department regarding improper wastewater discharge of two flattop barges on 22 September 2016. Another complaint was received from EPD with regard to muddy propeller wash by marine travel on 9 November 2016. Upon investigation, the two complaints are considered not related to this Project. Statistics on complaint, notification of summons of successful prosecution are summarized in *Appendix L*.

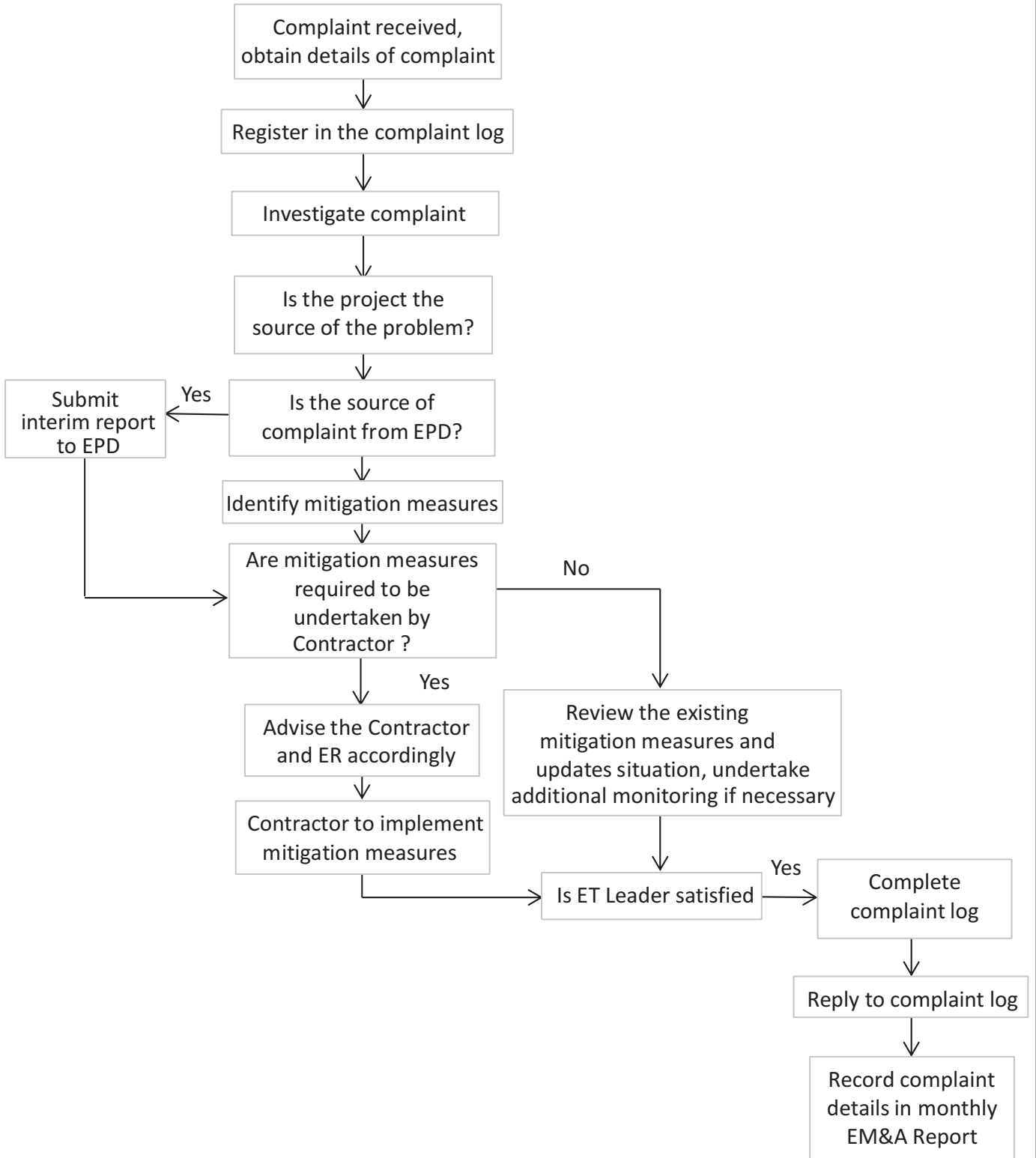


Figure 2.5

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 Contract in the coming quarter are summarized below:

December 2016

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

January 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;

- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

February 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation; and
- Installation of deck segment and pier head segment.

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments; and
- Slope work of Viaducts A, B & C.

3.2 *KEY ISSUES FOR THE COMING QUARTER*

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

3.3 *MONITORING SCHEDULE FOR THE COMING QUARTER*

Impact monitoring for air quality, noise, marine water quality and 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.

4.1 CONCLUSIONS

The Twelfth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 September to 30 November 2016, in accordance with the Updated EM&A Manual and the requirements of the *Environmental Permits (EP-354/2009/D and EP-353/2009/K)*.

Neither Action Level nor Limit Level exceedances were observed for air quality, noise and water quality monitoring in this reporting period.

A total of thirteen (13) groups of forty-eight (48) Chinese White Dolphins were sighted during the six sets of survey from September to November 2016. One (1) Limit Level exceedance was recorded for the quarterly dolphin monitoring data between September and November 2016, no unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations. 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.

Environmental site inspection was carried out 14 times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

There were two environmental complaints in the reporting period. Nonnotification of summon or successful prosecution in 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 for the Reporting Quarter

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
HY/2012/07 - TM-CLK Link-SC [DWP Revision G] - Status Update 21-09-2016																											
Contract Key Dates																											
Possession Dates / Access Period																											
POS02-6	Portion A - Area 6	0	21-Sep-16*	0%	0		25-Jun-16		-88	0	0%																
Section Completion Dates																											
Vacate Works Area																											
VAC05	Vacate Works Area WA5 (Zone 5C) (CoW + 758 days) - Letter D06850	0		0%	0	21-Sep-16*		29-Jun-16	-83	1325	0%																
General Submissions																											
General Requirements																											
Land Works																											
Land GI Works																											
PR02204	SQR Sampling & Testing and Approval	110	14-Aug-14 A	94.55%	6	27-Sep-16	30-Mar-15	09-Apr-15	-438	52	95%																
Design Submissions																											
Detailed Design (v18.8 18-08-14)																											
General Submissions																											
ARDD0037-2	IC/SO Approval of Seismic Performance Report Viaduct A,B,C,D - AP12.01	75	22-Feb-16 A	60%	30	02-Nov-16	25-May-16	07-Jul-16	-82	358	60%																
ARDD0037-5	IC/SO Approval of Seismic Performance Report Viaduct E - AP12.02	75	22-Feb-16 A	80%	15	12-Oct-16	16-Jun-16	07-Jul-16	-67	373	80%																
ARDD0037-7	Preparation of Seismic Performance Report Viaduct F - AP12.03	160	21-Aug-15 A	5%	152	05-May-17	06-Aug-15	16-Mar-16	-279	0	5%																
ARDD0040-1	Preparation of Operation and Maintenance Manual - AP08.00	30	01-Sep-15 A	5%	29	01-Nov-16	02-Feb-16	16-Mar-16	-156	5	0%																
ARDD0040-2	IC/SO Approval of Operation and Maintenance Manual - AP08.00	75	08-Nov-16	0%	75	28-Feb-17	17-Mar-16	07-Jul-16	-161	279	0%																
ARDD0042-2	IC/SO Approval of O&M Facility Provisions DDA - BP11.01	75	14-Jan-15 A	54.67%	34	08-Nov-16	26-Jan-16	16-Mar-16	-161	0	50%																
Viaduct A																											
Viaduct Design																											
ARDD0435-8	Viaduct A - IC/SO Consent of Supplemental Working Drawings Viaduct A	10	10-Sep-15 A	98%	0	21-Sep-16	30-May-16	30-May-16	-78	0	98%																
ARDD0435-9	Viaduct A - IC/SO Consent of Supplemental Working Drawings Viaduct A	0		0%	0	21-Sep-16		30-May-16	-78	0	0%																
Viaduct F1 & F3																											
Viaduct Design																											
ARDD0486-2	Viaduct F1 & F3 - Coordination and Further Issue of Construction Method :	60	02-Mar-15 A	16.67%	50	30-Nov-16	22-Dec-15	07-Mar-16	-184	0	16.7%																
ARDD0486-3	Viaduct F1 & F3 - Preparation of Draft Working Drawing Set	60	02-Mar-15 A	16.67%	50	30-Nov-16	22-Dec-15	07-Mar-16	-184	0	16.7%																
ARDD0486-5	Viaduct F1 & F3 - Preparation and Coordination of DDA/Working Drawing	10	01-Dec-16	0%	10	14-Dec-16	08-Mar-16	21-Mar-16	-184	0	0%																
ARDD0486-7	Viaduct F1 & F3 - IC/SO Consent of Supplemental Working Drawings Viad	10	15-Dec-16	0%	10	30-Dec-16	22-Mar-16	07-Apr-16	-184	0	0%																
Viaduct F2, F4 and F5																											
Viaduct Design																											
ARDD0530-2	Viaduct F2, F4 & F5 - GCL/FRE Issue of Construction Method/Temporary	0		0%	0	21-Sep-16		05-Nov-15	-216	0	0%																
ARDD0530-3	Viaduct F2, F4 & F5 - Coordination and Further Issue of Construction Mettr	60	21-Sep-16	0%	60	14-Dec-16	06-Nov-15	01-Feb-16	-216	0	0%																
ARDD0530-4	Viaduct F2, F4 & F5 - Preparation of Draft Working Drawing Set	60	21-Sep-16	0%	60	14-Dec-16	06-Nov-15	01-Feb-16	-216	0	0%																
ARDD0530-6	Viaduct F2, F4 & F5 - Preparation and Coordination of DDA/Working Draw	10	15-Dec-16	0%	10	30-Dec-16	02-Feb-16	18-Feb-16	-216	0	0%																
ARDD0530-8	Viaduct F2, F4 & F5 - IC/SO Consent of Supplemental Drawings of Viaduc	10	15-Dec-16	0%	10	30-Dec-16	22-Mar-16	07-Apr-16	-184	0	0%																
Parapet and Utility Trough																											
ARDD0562-4	IC/SO Approval of DDA -DP30.01	75	31-Jul-14 A	98%	2	22-Sep-16	15-Feb-16	16-Feb-16	-150	33	98%																
ARDD0566	IC/SO Approval of DDA -DP31.01	75	24-Oct-14 A	89.33%	8	30-Sep-16	02-Feb-16	16-Feb-16	-156	0	80%																
ARDD0566-1	IC/SO Approval of DDA -DP31.01	0		0%	0	30-Sep-16		16-Feb-16	-156	93	0%																
Slopeworks for Viaduct D: 10NW -C/R4, C/F9, C/F10, C/F11, C/F17, C/F50																											
ARDD0603	IC/SO Approval of Slope Combined AIP/DDA -CP14.01	75	16-Dec-14 A	78.67%	16	13-Oct-16	04-Jun-15	25-Jun-15	-323	0	95%																
ARDD0603-1	IC/SO Approval of Slope Combined AIP/DDA -CP14.01	0		0%	0	13-Oct-16		25-Jun-15	-323	0	0%																
ARDD0604-2	IC/SO Approval of Slope Combined AIP/DDA -CP14.02	75	23-May-15 A	78.67%	16	13-Oct-16	13-Oct-15	04-Nov-15	-233	0	75%																
ARDD0604-3	IC/SO Approval of Revised Slope Combined AIP/DDA -CP14.02	0		0%	0	13-Oct-16		04-Nov-15	-233	90	0%																
Waterworks, Drainage & Utility Diversions																											
ARDD0629	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	75	22-Jul-14 A	61.33%	29	01-Nov-16	22-Dec-15	02-Feb-16	-184	0	95%																
ARDD0629-1	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	0		0%	0	01-Nov-16		02-Feb-16	-184	273	0%																
ARDD0629-2	Gov't Approval of Submissions for Waterworks, Drainage & Utility Diversior	75	02-Jan-14 A	61.33%	29	01-Nov-16	22-Dec-15	02-Feb-16	-184	0	95%																
Viaduct Approach Ramp Retaining Walls																											
Approach Ramp B																											
ARDD0664	Approach B - IC/SO Approval of Approach Ramp B DDA -DP21.01	75	14-Oct-14 A	90%	8	30-Sep-16	21-Jan-16	01-Feb-16	-164	0	90%																
ARDD0664-1	Approach B - IC/SO Approval of Approach Ramp B DDA -DP21.01	0		0%	0	30-Sep-16		01-Feb-16	-164	24	0%																
Approach A																											
ARDD0670-1	Approach A - IC/SO Approval of Approach Ramp A DDA - DP20.01	0		0%	0	21-Sep-16		07-May-20	894	894	0%																

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

Project ID: J3518DWPrg-M40
 Layout: J3518-DWP-3MRP Submission - M40
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 1 of 12 Pages)
(Progress as of 21-Sep-16)

Date	Revision	Checked	Approved
29-Jul-16		PKN	HF
30-Aug-16		PKN	HF
03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016																							
												September				October				November				December											
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26					
Approach F																																			
ARDD0676	Approach F - IC/SO Approval of Approach Ramp F DDA -DP24.01	75	23-Dec-14 A	34.67%	49	29-Nov-16	16-Jan-15	27-Mar-15	-415	0	70%	[Gantt Bar: 16-Jan-15 to 27-Mar-15]																							
ARDD0676-1	Approach F - IC/SO Approval of Approach Ramp F DDA -DP24.01	0		0%	0	29-Nov-16		17-Mar-16	-175	191	0%	[Gantt Bar: 17-Mar-16 to 17-Mar-16]																							
Landscape																																			
ARDD0701	Water Supply Application to WSD	0		0%	0	21-Sep-16		17-Dec-15	-186	0	0%	[Milestone: 21-Sep-16]																							
ARDD0702	Gov't Approval of LVIA	40	21-Sep-16	0%	40	16-Nov-16	18-Dec-15	18-Feb-16	-186	137	0%	[Gantt Bar: 18-Dec-15 to 18-Feb-16]																							
Segment Target Geometry And Erection Engineering																																			
Viaduct A																																			
ARDD0717	Viaduct A - Erection Sequence Analysis	31	23-Jan-16 A	45.16%	17	14-Oct-16	15-Feb-16	08-Mar-16	-150	0	95%	[Gantt Bar: 15-Feb-16 to 08-Mar-16]																							
ARDD0718	Viaduct A - Target Geometry Analysis	20	17-Oct-16	0%	20	11-Nov-16	09-Mar-16	08-Apr-16	-150	0	0%	[Gantt Bar: 09-Mar-16 to 08-Apr-16]																							
ARDD0719	Viaduct A - Segment Geometry Schedules	10	14-Nov-16	0%	10	25-Nov-16	11-Apr-16	22-Apr-16	-150	0	0%	[Gantt Bar: 11-Apr-16 to 22-Apr-16]																							
ARDD0719-3	Viaduct A - Issue of Casting Data and Segment Catalogue Bridge A2	0		100%	0	30-Aug-16 A					100%	[Milestone: 30-Aug-16]																							
ARDD0719-5	Viaduct A - Issue Erection Manual	20	28-Nov-16	0%	20	23-Dec-16	25-Apr-16	23-May-16	-150	0	0%	[Gantt Bar: 25-Apr-16 to 23-May-16]																							
Viaduct E5 and E6																																			
ARDD0734	Viaduct E5 & E6 - Segment Geometry Schedules	10	05-May-14 A	60%	4	26-Sep-16	22-Mar-16	29-Mar-16	-124	3	90%	[Gantt Bar: 22-Mar-16 to 29-Mar-16]																							
TGP0570	Viaduct E5 & E6 - Issue of Optimised Casting Data and Segment Catalogue	40	30-Apr-15 A	82.5%	7	29-Sep-16	17-Mar-16	29-Mar-16	-127	0	90%	[Gantt Bar: 17-Mar-16 to 29-Mar-16]																							
TGP0590	Viaduct E5 & E6 - Issue Erection Manual	10	30-Sep-16	0%	10	14-Oct-16	30-Mar-16	13-Apr-16	-127	151	0%	[Gantt Bar: 30-Mar-16 to 13-Apr-16]																							
Viaduct E7 & E8																																			
ARDD0739	Viaduct E7 & E8 - Segment Geometry Schedules	10	05-May-14 A	60%	4	26-Sep-16	22-Mar-16	29-Mar-16	-124	3	90%	[Gantt Bar: 22-Mar-16 to 29-Mar-16]																							
TGP0760	Viaduct E7 & E8 - Issue of Optimised Casting Data and Segment Catalogue	40	31-Jul-15 A	82.5%	7	29-Sep-16	17-Mar-16	29-Mar-16	-127	0	90%	[Gantt Bar: 17-Mar-16 to 29-Mar-16]																							
TGP0790	Viaduct E7 & E8 - Issue Erection Manual	10	30-Sep-16	0%	10	14-Oct-16	30-Mar-16	13-Apr-16	-127	151	0%	[Gantt Bar: 30-Mar-16 to 13-Apr-16]																							
Viaduct F																																			
ARDD0752	Viaduct F - Erection Sequence Analysis	30	21-Sep-16	0%	30	02-Nov-16	06-Nov-15	17-Dec-15	-216	0	0%	[Gantt Bar: 06-Nov-15 to 17-Dec-15]																							
ARDD0753	Viaduct F - Target Geometry Analysis	30	03-Nov-16	0%	30	14-Dec-16	18-Dec-15	01-Feb-16	-216	0	0%	[Gantt Bar: 18-Dec-15 to 01-Feb-16]																							
ARDD0754	Viaduct F - Segment Geometry Schedules	10	15-Dec-16	0%	10	30-Dec-16	02-Feb-16	18-Feb-16	-216	0	0%	[Gantt Bar: 02-Feb-16 to 18-Feb-16]																							
Major Procurement																																			
Marine Permanent Navigaion Aids																																			
PR65011	Design & Approvals for Marine Navigation Aids	150	23-Oct-13 A	90%	15	08-Oct-16	30-Nov-15	16-Dec-15	-239	0	90%	[Gantt Bar: 30-Nov-15 to 16-Dec-15]																							
PR65012	Procure & Deliver Marine Navigation Aids	240	11-Oct-16	0%	240	02-Aug-17	17-Dec-15	11-Oct-16	-239	0	0%	[Gantt Bar: 17-Dec-15 to 11-Oct-16]																							
Deck Segment Installation Equipment																																			
Lifting Frames																																			
Lifting Frames 3 & 4																																			
PR68017	Lifting Frame 3&4 Fabrication	85	29-Sep-14 A	65.88%	29	26-Oct-16	06-Aug-15	08-Sep-15	-335	0	67%	[Gantt Bar: 06-Aug-15 to 08-Sep-15]																							
PR68018	Lifting Frame 3&4 Delivery	30	27-Oct-16	0%	30	30-Nov-16	09-Sep-15	15-Oct-15	-335	9	0%	[Gantt Bar: 09-Sep-15 to 15-Oct-15]																							
Unloading Frames																																			
Type 1 (at B6 and D6)																																			
PR69110	Unloading Frame Type 1 Fabrication	80	23-Feb-15 A	27.5%	58	29-Nov-16	25-Nov-16	07-Feb-17	54	0	28%	[Gantt Bar: 25-Nov-16 to 07-Feb-17]																							
PR69120	Unloading Frame Type 1 Delivery (UF-1A & UF-1B)	24	30-Nov-16	0%	24	29-Dec-16	08-Feb-17	07-Mar-17	54	0	0%	[Gantt Bar: 08-Feb-17 to 07-Mar-17]																							
Type 2 (at Bridge E1)																																			
PR69170	Unloading Frame Type 2 Design	50	21-Sep-16	0%	50	19-Nov-16	08-Nov-19	08-Jan-20	927	0	0%	[Gantt Bar: 08-Nov-19 to 08-Jan-20]																							
PR69180	Unloading Frame Type 2 Fabrication	80	28-Oct-16	0%	80	04-Feb-17	13-Dec-19	21-Mar-20	927	0	0%	[Gantt Bar: 04-Feb-17 to 21-Mar-20]																							
Deck Segments & Precast Pile Cap Shells																																			
Preliminaries																																			
MBBE0050	Precast Segment Mould Fabrication & Erection (Viaduct A)	52	24-Dec-14 A	92.31%	4	24-Sep-16	31-May-16	03-Jun-16	-94	1067	100%	[Gantt Bar: 31-May-16 to 03-Jun-16]																							
MBBE0054	Precast Segment Mould Design (Viaduct F1 to F5)	42	21-Sep-16*	0%	42	10-Nov-16	29-Feb-16	21-Apr-16	-167	0	0%	[Gantt Bar: 29-Feb-16 to 21-Apr-16]																							
MBBE0056	Precast Segment Mould Fabrication & Erection (Viaduct F1 to F5)	52	04-Oct-16	0%	52	03-Dec-16	11-Mar-16	17-May-16	-167	53	0%	[Gantt Bar: 11-Mar-16 to 17-May-16]																							
Viaduct B																																			
Precast Deck Segments																																			
MBBE130-1	B: Progressive Match Cast Segment Manufacture & Delivery remaining segments	597	24-Oct-14 A	98.83%	7	28-Sep-16	20-May-16	27-May-16	-103	157	99.4%	[Gantt Bar: 20-May-16 to 27-May-16]																							
Viaduct E																																			
Precast Deck Segments																																			
MBE00014	Viaduct E2 - Pier Head Segment Casting	0	21-Sep-16	0%	0		07-May-20		1071	1071	0%	[Milestone: 21-Sep-16]																							
Viaduct E1																																			
MBEE0130-5	E1: Progressive Segment Manufacture & Delivery remaining segments (18)	456	08-Apr-15 A	95.2%	22	18-Oct-16	08-Jun-16	05-Jul-16	-87	1049	95.2%	[Gantt Bar: 08-Jun-16 to 05-Jul-16]																							
Viaduct E2																																			
MBEE0130-7	E2: Progressive Segment Manufacture & Delivery remaining segments (41)	376	06-May-15 A	34.57%	246	22-Jul-17	17-Nov-15	14-Sep-16	-250	825	34.8%	[Gantt Bar: 17-Nov-15 to 14-Sep-16]																							
Viaduct E5, E6, E7 & E8																																			
MBEE0130-9	E5-6-7-8: Progressive Segment Manufacture & Delivery remaining segments	360	06-May-15 A	11.2%	320	19-Oct-17	06-Feb-16	08-Mar-17	-183	751	11.2%	[Gantt Bar: 06-Feb-16 to 08-Mar-17]																							

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

Project ID: J3518DWPrg-M40
 Layout: J3518-DWP-3MRP Submission - M40
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 2 of 12 Pages)
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29-Jul-16		PKN	HF
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J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016																							
												September				October				November				December											
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26					
Viaduct D																																			
Precast Deck Segments																																			
MBDE0130-7	D: Progressive Match Cast Segment Manufacture & Delivery (311 Nr)	315	05-May-15 A	56.9%	136	07-Mar-17	11-Feb-16	27-Jul-16	-182	129	56.9%																								
Viaduct C																																			
Precast Deck Segments																																			
MBCE0130-1	C: Progressive Segment Manufacture & Delivery remaining segments (38E	265	19-May-15 A	41%	156	31-Mar-17	23-Nov-15	06-Jun-16	-245	90	41%																								
Viaduct A																																			
Precast Deck Segments																																			
MBAA1100	Viaduct A - Pier Head Segment Casting	0	21-Sep-16	0%	0		31-May-16		-94	0	0%																								
MBAE0120	A: Commence Segment Casting on Approval of DDA	0	21-Sep-16	0%	0		31-May-16		-94	0	0%																								
MBAE0130-1	A: Progressive Segment Manufacture & Delivery remaining segments (179	122	21-Sep-16	0%	122	20-Feb-17	31-May-16	25-Oct-16	-94	85	0%																								
Parapets																																			
PP6010	Procure Sub-Contractor for Precast Parapets/Barriers	40	21-Aug-15 A	0%	40	08-Nov-16	28-Dec-15	16-Feb-16	-217	80	37.5%																								
PP6011	Precast Parapets/Barriers Detail Design & Procure Moulds	120	06-Oct-15 A	0%	120	16-Feb-17	29-Jul-15	18-Dec-15	-342	0	37.5%																								
Materials																																			
Bearings																																			
Viaduct A																																			
PPBRA5	SO review & comment on design submission - Viaduct A	36	21-Sep-16	0%	36	03-Nov-16	22-Apr-16	04-Jun-16	-125	0	0%																								
PPBRA6	Bearing Design Amendment & re-issue - Viaduct A	12	04-Nov-16	0%	12	17-Nov-16	14-Jun-16	27-Jun-16	-119	6	0%																								
PPBRA7	Manufacture of Bearing - Viaduct A	54	21-Sep-16	0%	54	24-Nov-16	22-Apr-16	27-Jun-16	-125	0	0%																								
PPBRA8	Testing Bearing - Viaduct A	18	25-Nov-16	0%	18	15-Dec-16	28-Jun-16	19-Jul-16	-125	0	0%																								
PPBRA9	Bearing Delivery - Viaduct A	48	16-Dec-16	0%	48	16-Feb-17	20-Jul-16	13-Sep-16	-125	0	0%																								
Viaduct C																																			
PPBRC99	Site preparation Bearings for Viaduct C	6	21-Sep-16	0%	6	27-Sep-16	29-Apr-20	07-May-20	1065	1065	0%																								
Viaduct D																																			
PPBRD99	Site preparation Bearings for Viaduct D	38	21-Sep-16	0%	38	05-Nov-16	24-Feb-16	12-Apr-16	-171	21	0%																								
Viaduct E																																			
PPBRE3	Bearing design and submission - Viaduct E (E1, E2, E5, E6, E7 & E8)	12	28-Nov-13 A	75%	3	23-Sep-16	04-Jan-16	06-Jan-16	-212	0	100%																								
PPBRE4	Design check by ICE - Viaduct E (E1, E2, E5, E6, E7 & E8)	24	04-Apr-14 A	37.5%	15	08-Oct-16	04-Jan-16	20-Jan-16	-212	0	100%																								
PPBRE5	SO review & comment on design submission - Viaduct E (E1, E2, E5, E6, E	36	26-Sep-14 A	25%	27	24-Oct-16	04-Jan-16	03-Feb-16	-212	0	100%																								
PPBRE6	Bearing Design Amendment & re-issue - Viaduct E (E1, E2, E5, E6, E7 & E	12	25-Oct-16	0%	12	07-Nov-16	04-Feb-16	20-Feb-16	-212	0	0%																								
PPBRE7	Manufacture of Bearing - Viaduct E (E1, E2, E5, E6, E7 & E8)	54	02-Jun-14 A	27.78%	39	07-Nov-16	04-Jan-16	20-Feb-16	-212	0	100%																								
PPBRE8	Testing Bearing - Viaduct E (E1, E2, E5, E6, E7 & E8)	24	03-Aug-15 A	0%	51	21-Nov-16	04-Jan-16	05-Mar-16	-212	0	100%																								
PPBRE9	Bearing Delivery - Viaduct E (E1, E2, E5, E6, E7 & E8)	48	19-Nov-14 A	0%	87	05-Jan-17	04-Jan-16	21-Apr-16	-212	0	100%																								
Bridge E1																																			
PP7360	Site preparation Bearings for Viaduct E1	18	03-Oct-16	0%	18	25-Oct-16	23-Mar-16	16-Apr-16	-156	8	0%																								
Bridge E2																																			
PP7290	Site preparation Bearings for Viaduct E2	18	18-Oct-16	0%	18	07-Nov-16	31-Mar-16	21-Apr-16	-164	48	0%																								
Viaduct F																																			
PPBRF1	Preliminary Design of Bearings - Viaduct F	70	21-Sep-16	0%	70	13-Dec-16	07-Aug-15	30-Oct-15	-334	0	0%																								
PPBRF3	Bearing design and submission - Viaduct F	12	14-Dec-16	0%	12	29-Dec-16	31-Oct-15	13-Nov-15	-334	0	0%																								
Movement Joints																																			
PPMJ01	Design & Submission of MJ	138	08-Feb-14 A	75.36%	34	01-Nov-16	19-Oct-15	27-Nov-15	-274	1037	30%																								
PPMJ02-1	MJ Design Approval	96	26-May-14 A	39.58%	58	29-Nov-16	19-Oct-15	28-Dec-15	-274	0	40%																								
PPMJ02-2	Manufacture & delivery of MJ	188	21-Sep-16	0%	188	13-May-17	19-Oct-15	08-Jun-16	-274	0	0%																								
Other Sub-Contract Procurement																																			
Structural Health Monitoring System (SHMS)																																			
PP7778	SHMS - So approval of Final System Proposal	30	16-Dec-14 A	73.33%	8	29-Sep-16	30-Jul-15	07-Aug-15	-341	0	75%																								
PP7780	SHMS - Prepare Civil Work Provision	66	21-Sep-16	0%	66	08-Dec-16	30-Jul-15	16-Oct-15	-341	0	0%																								
PP7788	SHMS - FAT & Delivery for Bridge E5-E6-E7-E8 equipment	54	21-Oct-16	0%	54	22-Dec-16	27-Aug-15	31-Oct-15	-341	0	0%																								
Site Preparation / Mobilisations																																			
Tree Felling / Transplant																																			
Approved Trees in Contract																																			
TR00220	Tree transplant for Viaduct B - affecting Pier B18 & Abutment B	90	17-Feb-14 A	92.22%	7	28-Sep-16	02-Feb-16	12-Feb-16	-187	1064	96%																								
Unloading Jetty at HKBCF																																			
PR09070	Unloading Jetty at HKBCF - Install Unloading Frame incl. testing/commissio	56	26-Jul-16 A	70%	17	12-Oct-16	15-Mar-16	07-Apr-16	-154	234	70%																								

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												September				October				November				December										
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26				
PILING AND SUBSTRUCTURE																																		
Viaduct A																																		
Bridge A2																																		
Pier A1 (A2e)																																		
Pier Head Segments																																		
SA2E0382	A1 (A2e) - Pier Head Segment Lift & Temp Support (2 seg)	7	21-Sep-16	0%	7	28-Sep-16	19-Jul-16	26-Jul-16	-54	125	0%																							
Bridge A1																																		
Abutment & Approach Ramp A																																		
SA1A0250	AR-A - RE Walls - Excavation/formation/drainage filter & bottom layer to g	72	14-Mar-16 A	79.17%	15	08-Oct-16	18-Apr-20	07-May-20	1056	1056	10%																							
SA1A0290	AR-A - RC Walls construction	48	21-Sep-16	0%	48	17-Nov-16	08-Jul-16	01-Sep-16	-63	126	0%																							
Viaduct B																																		
Bridge B1																																		
Pier B17 (B1c)																																		
Socketted H-Pile Installation																																		
GFXX324-3	B17 (B1c) - Predrilling	6	03-Oct-16	0%	6	08-Oct-16	02-Mar-16	08-Mar-16	-174	0	0%																							
GFXX324-5	B17 (B1c) - Confirm Rockhead Levels	6	11-Oct-16	0%	6	17-Oct-16	09-Mar-16	15-Mar-16	-174	0	0%																							
GFXX325-3	B17 (B1c) - Install SH Pile (10 nr) (incl. proof drilling)	45	18-Oct-16	0%	45	08-Dec-16	16-Mar-16	12-May-16	-174	0	0%																							
Pile Cap Works																																		
SB1C0090	B17 (B1c) - Pile cap Excavation / ELS (incl. sheet piling)	18	09-Dec-16	0%	18	31-Dec-16	13-May-16	03-Jun-16	-174	0	0%																							
Pier B18 (B1b) & Abutment B																																		
Preliminary Works for Land Piling																																		
PB180030	B18 (B1b) - Install Geo. Instru. & Baseline Monitoring	36	21-Sep-16	0%	36	03-Nov-16	18-Dec-15	01-Feb-16	-223	0	0%																							
Socketted H-Pile Installation																																		
GFXX324-4	B18 (B1b) - Predrilling	6	04-Nov-16	0%	6	10-Nov-16	02-Feb-16	11-Feb-16	-223	0	0%																							
GFXX324-6	B18 (B1b) - Confirm Rockhead Levels	6	11-Nov-16	0%	6	17-Nov-16	12-Feb-16	18-Feb-16	-223	0	0%																							
GFXX325-4	B18 (B1b) - Install SH Pile (6 no.) (incl. proof drilling)	27	18-Nov-16	0%	27	19-Dec-16	19-Feb-16	21-Mar-16	-223	0	0%																							
Pile Cap Works																																		
SB1B0090	B18 (B1b) - Pile cap Excavation / ELS	18	20-Dec-16	0%	18	12-Jan-17	22-Mar-16	15-Apr-16	-223	0	0%																							
Viaduct C																																		
Bridge C3																																		
Pier C8 (C3d)																																		
Pier Head Segments																																		
SC3D0378	C8 (C3d) - Pier Head Segment Diaphragm - Rebar, Formwork, Concreting	19	27-Jul-16 A	0%	19	14-Oct-16	29-Dec-15	20-Jan-16	-216	0	30%																							
SC3D0380	C8 (C3d) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	15-Oct-16	0%	6	21-Oct-16	21-Jan-16	27-Jan-16	-216	59	0%																							
Pier C10 (C3b)																																		
Pier Head Segments																																		
SC3B0372	C10 (C3b) - Pier Head Segment Lift & Fix (1 seg)	2	27-Aug-16 A	100%	0	28-Aug-16 A					100%																							
SC3B0378	C10 (C3b) - Pier Head Segment Diaphragm - Rebar, Formwork, Concretir	24	21-Sep-16	0%	24	20-Oct-16	05-Apr-16	03-May-16	-140	0	0%																							
SC3B0380	C10 (C3b) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	21-Oct-16	0%	6	27-Oct-16	04-May-16	10-May-16	-140	135	0%																							
Pier C9 (C3c)																																		
Pier Head Segments																																		
SC3C0378	C9 (C3c) - Pier Head Segment Diaphragm - Rebar, Formwork, Concreting	30	17-Jun-16 A	100%	0	02-Sep-16 A					100%																							
SC3C0380	C9 (C3c) - Pier Head Segment Diaphragm - Curing & Striking of Forms	3	03-Sep-16 A	100%	0	06-Sep-16 A					100%																							
Pier C11 (C3a)																																		
Pier Head Segments																																		
SC3A382	C11 (C3a) - C11-B Diaphragm	24	30-Aug-16 A	33.33%	16	11-Oct-16	21-May-16	08-Jun-16	-102	173	50%																							
Bridge C2																																		
Pier C16 (C2b)																																		
Pier Head Segments																																		
SC2B380	C16 (C2b) - C16A Diaphragm	24	21-Sep-16	0%	24	20-Oct-16	15-Feb-16	12-Mar-16	-179	0	0%																							
SC2B382	C16 (C2b) - C16B Diaphragm	24	21-Oct-16	0%	24	17-Nov-16	14-Mar-16	14-Apr-16	-179	0	0%																							
Bridge C1																																		
Pier C18 (C3d) Portal																																		
Portal																																		
SC1ER280	C18 (C1e) - Portal Beam Scaffolding	12	23-Jun-16 A	100%	0	05-Sep-16 A					100%																							
SC1ER310	C18 (C1e) - Portal Beam Rebar, Formwork, Concreting	45	15-Jul-16 A	60%	18	13-Oct-16	29-Jan-16	22-Feb-16	-190	0	80%																							
SC1ER320	C18 (C1e) - Pier Head Curing/Striking of Forms/Remove Scaffolding	14	14-Oct-16	0%	14	29-Oct-16	23-Feb-16	09-Mar-16	-190	16	0%																							
Pier C17 (C2a)																																		
Pier Head Segments																																		
SC2A0370	C17 (C2a) - Pier Head Segment - Temporary Platform	6	19-Jul-16 A	0%	37	04-Nov-16	09-Nov-15	21-Dec-15	-257	0	1%																							

- Actual Work
- Planned Bar
- Critical Bar
- ◆ Milestone

Project ID: J3518DWPrg-M40
 Layout: J3518-DWP-3MRP Submission - M40
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 4 of 12 Pages)
(Progress as of 21-Sep-16)

Date	Revision	Checked	Approved
29-Jul-16		PKN	HF
30-Aug-16		PKN	HF
03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
SC2A0372	C17 (C2a) - Pier Head Segment Lift & Fix (1 seg)	2	05-Nov-16	0%	2	07-Nov-16	22-Dec-15	23-Dec-15	-257	0	0%																
SC2A0378	C17 (C2a) - Pier Head Segment Diaphragm - Rebar, Formwork, Concretir	23	08-Nov-16	0%	23	03-Dec-16	24-Dec-15	22-Jan-16	-257	0	0%																
SC2A0380	C17 (C2a) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	05-Dec-16	0%	6	10-Dec-16	23-Jan-16	29-Jan-16	-257	0	0%																
Pier C19 (C1d)																											
Pier Head Segments																											
SC1D0380	C19 (C1d) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	19-Mar-16 A	16.67%	5	26-Sep-16	05-Oct-16	11-Oct-16	11	103	16%																
Abutment & Approach Ramp C																											
SC1C0250	AR-C - RE Walls - Erect fencing, Excavation/formation/ drainage filter & bo	12	22-Apr-15 A	83.33%	2	22-Sep-16	04-Mar-20	05-Mar-20	1021	0	90%																
SC1C0251	AR-C - RE Walls - Upper layers with backfill in stages (exclude 800dia Tcc	48	23-Sep-16	0%	48	19-Nov-16	06-Mar-20	07-May-20	1021	1021	0%																
SC1C0254	AR-C - RC Walls - Backfill	12	16-May-16 A	90%	1	22-Sep-16	07-May-16	09-May-16	-112	0	90%																
SC1C0256	AR-C - RC Walls - Concrete Parapets	26	22-Sep-16	0%	26	25-Oct-16	10-May-16	10-Jun-16	-112	66	0%																
SC1C0257	ARC - Utility work - Termination of 800 dia Tcc	1	21-Sep-16*	0%	1	21-Sep-16	16-Feb-16	16-Feb-16	-178	0	0%																
SC1C0258	ARC - Utility work - Remove 800 dia Tcc and backfill	18	22-Sep-16	0%	18	14-Oct-16	17-Feb-16	08-Mar-16	-178	0	0%																
SC1C0259	ARC - RE Walls - Remaining bay @800 Tcc	38	15-Oct-16	0%	38	28-Nov-16	09-Mar-16	26-Apr-16	-178	0	0%																
SC1C0259A	ARC - RC Walls - Remaining bays @800Tcc	36	29-Nov-16	0%	36	12-Jan-17	27-Apr-16	10-Jun-16	-178	0	0%																
Viaduct D																											
Bridge D2																											
Pier D8 (D3d)																											
Pier Head Segments																											
SD3D0378	D8 (D3d) - Pier Head Segment Diaphragm - Rebar, Formwork, Concreting	23	21-Sep-16	0%	23	19-Oct-16	19-Jan-16	17-Feb-16	-199	0	0%																
SD3D0380	D8 (D3d) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	20-Oct-16	0%	6	26-Oct-16	18-Feb-16	25-Feb-16	-198	52	0%																
Pier D12 (D2e)																											
Portal																											
SD2ER320	D12 (D2e) - Pier Head Curing/Striking of Forms/Remove Scaffolding	14	09-May-16 A	0%	14	07-Oct-16	12-Apr-16	27-Apr-16	-134	0	0%																
SD2ER325	D12 (D2e) - Pier Backfilling Works	4	08-Oct-16	0%	4	13-Oct-16	13-Jun-16	16-Jun-16	-98	218	0%																
Pier D9 (D3c)																											
Pier Head Segments																											
SD3C0378	D9 (D3c) - Pier Head Segment Diaphragm - Rebar, Formwork, Concreting	22	06-Jul-16 A	0%	22	18-Oct-16	23-Feb-16	18-Mar-16	-172	0	20%																
SD3C0380	D9 (D3c) - Pier Head Segment Diaphragm - Curing & Striking of Forms	6	19-Oct-16	0%	6	25-Oct-16	19-Mar-16	29-Mar-16	-172	0	0%																
Pier D10 (D3b)																											
Portal																											
SD3BR300	D10 (D3b) - Portal Beam Rebarwork & Inserts	16	29-Apr-16 A	0%	16	11-Oct-16	09-Mar-16	30-Mar-16	-159	0	0%																
SD3BR305	D10 (D3b) - Portal Beam Side Formwork & Prep for Concreting	16	12-Oct-16	0%	16	29-Oct-16	31-Mar-16	19-Apr-16	-159	0	0%																
SD3BR310	D10 (D3b) - Portal Beam Concreting	1	31-Oct-16	0%	1	31-Oct-16	20-Apr-16	20-Apr-16	-159	0	0%																
SD3BR320	D10 (D3b) - Pier Head Curing/Striking of Forms/Remove Scaffolding	14	01-Nov-16	0%	14	16-Nov-16	21-Apr-16	07-May-16	-159	0	0%																
Pier D13 (D2d)																											
Pier Works																											
SD2D0360	D13 (D2d) - Type 5B-MJ Pier Backfilling Works	4	14-Jun-16 A	0%	4	24-Sep-16	29-Feb-16	03-Mar-16	-167	25	10%																
Pier Head Segments																											
SD2D0370	D13 (D2d) - Pier Head Segment - Temporary Platform	6	11-Jul-16 A	0%	27	24-Oct-16	27-Jan-16	01-Mar-16	-192	0	0%																
SD2D0371	D13 (D2d) - Pier Head Segment Bearings	2	25-Oct-16	0%	2	26-Oct-16	02-Mar-16	03-Mar-16	-192	0	0%																
SD2D0372	D13 (D2d) - D13A - Pier Head Segment Lift & Fix (1 seg)	1	27-Oct-16	0%	1	27-Oct-16	04-Mar-16	04-Mar-16	-192	0	0%																
SD2D380	D13 (D2d) - D13B - Pier Head Segment Lift & Fix (1 seg)	1	22-Nov-16	0%	1	22-Nov-16	02-Apr-16	02-Apr-16	-192	0	0%																
SD2D382	D13 (D2d) - D13A - Diaphragm	24	28-Oct-16	0%	24	24-Nov-16	05-Mar-16	06-Apr-16	-192	0	0%																
SD2D384	D13 (D2d) - D13B - Diaphragm	24	25-Nov-16	0%	24	22-Dec-16	07-Apr-16	05-May-16	-192	65	0%																
Pier D11 (D3a)																											
Portal																											
SD3AR310	D11 (D3a) - Portal Beam Rebar, Formwork, Concreting	45	08-Apr-16 A	27%	33	31-Oct-16	15-Apr-16	25-May-16	-131	0	27%																
SD3AR320	D11 (D3a) - Pier Head Curing/Striking of Forms/Remove Scaffolding	14	31-Oct-16	0%	14	16-Nov-16	26-May-16	11-Jun-16	-131	9	0%																
Bridge D1																											
Abutment & Approach Ramp D																											
SD1B0252	AR-D - Box structure - Bay 1 & Bay 8	55	07-Mar-16 A	30.91%	38	05-Nov-16	18-Apr-16	02-Jun-16	-129	0	30%																
SD1B0290	AR-D - Backfill embankment	90	02-Nov-15 A	33.33%	60	01-Dec-16	08-Oct-16	17-Dec-16	14	0	0%																
SD1B0300	AR-D - RC Walls - Concrete parapets / Profile barriers	24	07-Nov-16	0%	24	03-Dec-16	11-Aug-16	07-Sep-16	-72	0	0%																
SD1B0400	AR-D - Drainage	45	25-Nov-16	0%	45	19-Jan-17	12-Dec-16	08-Feb-17	14	0	0%																
SD1B0402	AR-D - Subbase	6	21-Nov-16	0%	6	26-Nov-16	18-Jun-16	24-Jun-16	-129	6	0%																
SD1B0420	AR-D - Ductings for TCSS civil work provisions (for KD4)	12	07-Nov-16	0%	12	19-Nov-16	03-Jun-16	17-Jun-16	-129	0	0%																
SD1B0430	AR-D - Parapet railings / Light poles / Traffic sign / Street furniture	12	05-Dec-16	0%	12	17-Dec-16	08-Sep-16	22-Sep-16	-72	0	0%																
SD1B0440	AR-D - Electrics / Comms	7	19-Dec-16	0%	7	28-Dec-16	23-Sep-16	30-Sep-16	-72	115	0%																
Viaduct E																											
Viaduct E2																											
Bridge E2 - Piling & Substructure																											

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

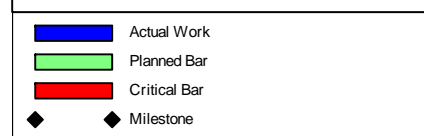
Project ID: J3518DWPrG-M40
 Layout: J3518-DWP-3MRP Submission - M40
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 5 of 12 Pages)
(Progress as of 21-Sep-16)

Date	Revision	Checked	Approved
29-Jul-16		PKN	HF
30-Aug-16		PKN	HF
03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
E3A, E3B, E3C & E3D (E2a - 1/2/3/4)																											
Pier Head Segements - E3A, E3B, E3C & E3D																											
Pier Head Segment - E3D (E2a1)																											
SE2A1372	E3D (E2a1) - Pier Head Segment Lift & Temp Support (2 seg)	7	21-Sep-16*	0%	7	28-Sep-16	16-May-16	24-May-16	-106	70	0%																
E4A & E4B (E2b - 1/2)																											
Pier Head Segements - E4A & E4B																											
Pier head Segment - E4A (E2b2)																											
E4A3130	E4A - Diaphragm of PHS - Formwork, Rebar, Concreting	52	02-Jul-16 A	35%	34	01-Nov-16	27-Jul-15	03-Sep-15	-344	0	35%																
E4A3140	E4A - Remove Rail Beams, Megashore Towers	13	01-Nov-16	0%	13	16-Nov-16	04-Sep-15	18-Sep-15	-344	0	0%																
E4A3150	E4A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	16-Nov-16	0%	21	10-Dec-16	19-Sep-15	15-Oct-15	-344	0	0%																
Pier head Segment - E4B (E2b1)																											
E4B3110	E4B - Temp. Work, Grillages, Megashore Towers, Rail Beams	19	12-Aug-16 A	100%	0	02-Sep-16 A					100%																
E4B3120	E4B - Install Pierhead Segments (4 nr)	2	03-Sep-16 A	100%	0	08-Sep-16 A					100%																
E4B3130	E4B - Diaphragm of PHS - Formwork, Rebar, Concreting	53	09-Sep-16 A	0%	53	23-Nov-16	22-Sep-15	25-Nov-15	-295	0	0%																
E4B3140	E4B - Remove Rail Beams, Megashore Towers	7	24-Nov-16	0%	7	01-Dec-16	26-Nov-15	03-Dec-15	-295	0	0%																
E4B3150	E4B - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	02-Dec-16	0%	21	28-Dec-16	04-Dec-15	30-Dec-15	-295	31	0%																
E5A & E5B (E2c - 1/2)																											
Pier Works - E5A & E5B																											
Pier Works - E5B (E2c1)																											
E5B2030	E5B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	19-Jul-16 A	100%	0	10-Sep-16 A					100%																
Pier Head Segements - E5A & E5B																											
Pier head Segment - E5A (E2c2)																											
E5A3130	E5A - Diaphragm of PHS - Formwork, Rebar, Concreting	41	12-Sep-16 A	10%	37	04-Nov-16	18-Feb-16	05-Apr-16	-176	0	10%																
E5A3140	E5A - Remove Rail Beams	14	04-Nov-16	0%	14	21-Nov-16	06-Apr-16	21-Apr-16	-176	0	0%																
E5A3150	E5A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	21-Nov-16	0%	21	15-Dec-16	22-Apr-16	18-May-16	-176	0	0%																
Pier head Segment - E5B (E2c1)																											
E5B3110	E5B - Temp. Work, Rail Beams	20	05-Aug-16 A	100%	0	29-Aug-16 A					100%																
E5B3120	E5B - Install Pierhead Segments (4 nr)	2	30-Aug-16 A	100%	0	31-Aug-16 A					100%																
E5B3130	E5B - Diaphragm of PHS - Formwork, Rebar, Concreting	41	01-Sep-16 A	0%	41	09-Nov-16	27-Jun-16	13-Aug-16	-72	0	0%																
E5B3140	E5B - Remove Rail Beams, Tower Crane	20	10-Nov-16	0%	20	02-Dec-16	15-Aug-16	06-Sep-16	-72	0	0%																
E5B3150	E5B - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	03-Dec-16	0%	21	29-Dec-16	07-Sep-16	03-Oct-16	-72	0	0%																
E6A & E6B (E2d - 1/2)																											
Pier head Segment - E6A & E6B																											
Pier head Segment - E6A (E2d2)																											
E6A3130	E6A - Diaphragm of PHS - Formwork, Rebar, Concreting	43	21-Sep-16	0%	43	11-Nov-16	04-Sep-15	27-Oct-15	-310	0	0%																
E6A3140	E6A - Remove Rail Beams	14	12-Nov-16	0%	14	28-Nov-16	28-Oct-15	12-Nov-15	-310	0	0%																
E6A3150	E6A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	29-Nov-16	0%	21	22-Dec-16	13-Nov-15	07-Dec-15	-310	34	0%																
Pier head Segment - E6B (E2d1)																											
E6B3110	E6B - Temp. Work, Rail Beams	20	11-Aug-16 A	100%	0	08-Sep-16 A					100%																
E6B3120	E6B - Install Pierhead Segments (4 nr)	6	09-Sep-16 A	100%	0	13-Sep-16 A					100%																
E6B3130	E6B - Diaphragm of PHS - Formwork, Rebar, Concreting	43	14-Sep-16 A	0%	43	11-Nov-16	22-Jun-16	11-Aug-16	-76	0	0%																
E6B3140	E6B - Remove Rail Beams, Tower Crane	20	12-Nov-16	0%	20	05-Dec-16	12-Aug-16	03-Sep-16	-76	0	0%																
E6B3150	E6B - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	06-Dec-16	0%	21	31-Dec-16	05-Sep-16	29-Sep-16	-76	49	0%																
E7A & E7B (E2e - 1/2)																											
Pier Works - E7A & E7B																											
Pier Works - E7B (E2e1)																											
E7B2030	E7B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Dia	24	29-Jul-16 A	100%	0	26-Aug-16 A					100%																
E7B2040	E7B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	20	27-Aug-16 A	100%	0	07-Sep-16 A					100%																
Pier head Segment - E7A & E7B																											
Pier head Segment - E7A (E2e2)																											
E7A3110	E7A - Temp. Work, Rail Beams	20	08-Sep-16 A	80%	4	24-Sep-16	10-Mar-16	14-Mar-16	-158	0	80%																
E7A3120	E7A - Install Pierhead Segments (4 nr)	6	26-Sep-16	0%	6	03-Oct-16	15-Mar-16	21-Mar-16	-158	0	0%																
E7A3130	E7A - Diaphragm of PHS - Formwork, Rebar, Concreting	47	04-Oct-16	0%	47	28-Nov-16	22-Mar-16	21-May-16	-158	0	0%																
E7A3140	E7A - Remove Rail Beams	14	29-Nov-16	0%	14	14-Dec-16	23-May-16	07-Jun-16	-158	0	0%																
E7A3150	E7A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	15-Dec-16	0%	21	11-Jan-17	08-Jun-16	04-Jul-16	-158	58	0%																
Pier head Segment - E7B (E2e1)																											
E7B3110	E7B - Temp. Work, Rail Beams	20	10-Sep-16 A	35%	13	06-Oct-16	12-Oct-15	27-Oct-15	-280	0	35%																
E7B3120	E7B - Install Pierhead Segments (4 nr)	6	07-Oct-16	0%	6	14-Oct-16	28-Oct-15	03-Nov-15	-280	0	0%																
E7B3130	E7B - Diaphragm of PHS - Formwork, Rebar, Concreting	44	15-Oct-16	0%	44	05-Dec-16	04-Nov-15	24-Dec-15	-280	0	0%																
E7B3140	E7B - Remove Rail Beams, Tower Crane	20	06-Dec-16	0%	20	30-Dec-16	28-Dec-15	20-Jan-16	-280	0	0%																
E8A & E8B (E2f - 1/2)																											
Pier Works - E8A & E8B																											



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Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 6 of 12 Pages)
(Progress as of 21-Sep-16)

Date	Revision	Checked	Approved
29-Jul-16		PKN	HF
30-Aug-16		PKN	HF
03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
Pier Works - E8B (E2f1)																											
E8B2020	E8B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Arm (Solid)	70	27-Apr-16 A	100%	0	29-Aug-16 A					100%																
E8B2030	E8B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	30-Aug-16 A	100%	0	19-Sep-16 A					100%																
Pier head Segment - E8A & E8B																											
Pier head Segment - E8A (E2f2)																											
E8A3110	E8A - Temp. Work, Rail Beams	21	26-Jul-16 A	100%	0	16-Sep-16 A					100%																
E8A3120	E8A - Install Pierhead Segments (4 nr)	6	17-Sep-16 A	100%	0	19-Sep-16 A					100%																
E8A3130	E8A - Diaphragm of PHS - Formwork, Rebar, Concreting	48	20-Sep-16 A	0%	48	17-Nov-16	16-Jun-16	11-Aug-16	-81	0	0%																
E8A3140	E8A - Remove Rail Beams	14	18-Nov-16	0%	14	03-Dec-16	12-Aug-16	27-Aug-16	-81	0	0%																
E8A3150	E8A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	05-Dec-16	0%	21	30-Dec-16	29-Aug-16	22-Sep-16	-81	0	0%																
Pier head Segment - E8B (E2f1)																											
E8B3110	E8B - Temp. Work, Rail Beams	21	20-Sep-16 A	19.05%	17	12-Oct-16	09-Apr-16	28-Apr-16	-136	0	5%																
E8B3120	E8B - Install Pierhead Segments (4 nr)	6	13-Oct-16	0%	6	19-Oct-16	29-Apr-16	06-May-16	-136	0	0%																
E8B3130	E8B - Diaphragm of PHS - Formwork, Rebar, Concreting	47	20-Oct-16	0%	47	13-Dec-16	07-May-16	04-Jul-16	-136	0	0%																
E8B3140	E8B - Remove Rail Beams, Tower Crane	20	14-Dec-16	0%	20	09-Jan-17	05-Jul-16	27-Jul-16	-136	0	0%																
E9A & E9B (E2g - 1/2)																											
Pier head Segment - E9A & E9B																											
Pier head Segment - E9A (E2g2)																											
E9A3110	E9A - Temp. Work, Rail Beams	21	25-Jul-16 A	100%	0	09-Sep-16 A					100%																
E9A3120	E9A - Install Pierhead Segments (4 nr)	6	10-Sep-16 A	100%	0	12-Sep-16 A					100%																
E9A3130	E9A - Diaphragm of PHS - Formwork, Rebar, Concreting	48	13-Sep-16 A	0%	48	17-Nov-16	10-May-16	07-Jul-16	-111	0	0%																
E9A3140	E9A - Remove Rail Beams	14	18-Nov-16	0%	14	03-Dec-16	08-Jul-16	23-Jul-16	-111	0	0%																
E9A3150	E9A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipm	21	05-Dec-16	0%	21	30-Dec-16	25-Jul-16	17-Aug-16	-111	0	0%																
Pier head Segment - E9B (E2g1)																											
E9B3110	E9B - Temp. Work, Rail Beams	20	16-Aug-16 A	70%	6	27-Sep-16	23-May-16	28-May-16	-101	0	0%																
E9B3120	E9B - Install Pierhead Segments (4 nr)	6	28-Sep-16	0%	6	05-Oct-16	30-May-16	04-Jun-16	-101	0	0%																
E9B3130	E9B - Diaphragm of PHS - Formwork, Rebar, Concreting	48	06-Oct-16	0%	48	01-Dec-16	06-Jun-16	02-Aug-16	-101	0	0%																
E9B3140	E9B - Remove Rail Beams, Tower Crane	20	02-Dec-16	0%	20	24-Dec-16	03-Aug-16	25-Aug-16	-101	0	0%																
E10A & E10B (E2h - 1/2)																											
Pier Works - E10A & E10B																											
Pier Works - E10A (E2h2)																											
E10A2050	E10A - Seagull Pier Curing, CJ, Remove Formwork & Falsework	20	13-Aug-16 A	100%	0	01-Sep-16 A					100%																
Pier Works - E10B (E2h1)																											
E10B2040	E10B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper D	24	30-Jul-16 A	100%	0	21-Sep-16 A					100%																
E10B2050	E10B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	20	21-Sep-16	0%	20	15-Oct-16	04-Feb-16	01-Mar-16	-185	0	0%																
Pier head Segments - E10A & E10B																											
Pier head Segments - E10A (E2h2)																											
E10A3110	E10A - Temp. Work, Rail Beams	20	02-Sep-16 A	90%	2	22-Sep-16	27-May-16	28-May-16	-97	0	90%																
E10A3120	E10A - Install Pierhead Segments (4 nr)	6	23-Sep-16	0%	6	29-Sep-16	30-May-16	04-Jun-16	-97	0	0%																
E10A3130	E10A - Diaphragm of PHS - Formwork, Rebar, Concreting	52	30-Sep-16	0%	52	01-Dec-16	06-Jun-16	06-Aug-16	-97	0	0%																
E10A3140	E10A - Remove Rail Beams	14	02-Dec-16	0%	14	17-Dec-16	08-Aug-16	23-Aug-16	-97	0	0%																
E10A3150	E10A - Install Infill Segments (4 nr), Adjust, Stress, Stitch & Remove Equipr	21	19-Dec-16	0%	21	14-Jan-17	24-Aug-16	17-Sep-16	-97	39	0%																
Pier head Segments - E10B (E2h1)																											
E10B3110	E10B - Temp. Work, Rail Beams	21	17-Oct-16	0%	21	09-Nov-16	02-Mar-16	29-Mar-16	-185	0	0%																
E10B3120	E10B - Install Pierhead Segments (4 nr)	7	10-Nov-16	0%	7	17-Nov-16	30-Mar-16	07-Apr-16	-185	0	0%																
E10B3130	E10B - Diaphragm of PHS - Formwork, Rebar, Concreting	52	18-Nov-16	0%	52	20-Jan-17	08-Apr-16	10-Jun-16	-185	0	0%																
Viaduct E5, E6, E7 & E8																											
E11A & E11B (E5E6a/E7E8a)																											
Pier Works - E11A & E11B																											
Pier Works - E11A (E7E8a)																											
E11A2040	E11A - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	30-Jul-16 A	40%	26	24-Oct-16	25-Jun-15	27-Jul-15	-369	0	40%																
E11A2050	E11A - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	24-Oct-16	0%	21	17-Nov-16	28-Jul-15	20-Aug-15	-369	0	0%																
Pier Works - E11B (E5E6a)																											
E11B2030	E11B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	13-May-16 A	100%	0	25-Aug-16 A					100%																
E11B2040	E11B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	64	26-Aug-16 A	10%	58	29-Nov-16	18-Jun-15	26-Aug-15	-375	0	10%																
E11B2050	E11B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	29-Nov-16	0%	21	23-Dec-16	27-Aug-15	19-Sep-15	-375	0	0%																
Pier Head Segments - E11A & E11B																											
Pier Head Segments - E11A (E7E8a)																											
E11A3110	E11A - Temp. Work, Grillages, Spreader Beams, Rail Beams	25	17-Nov-16	0%	25	16-Dec-16	21-Aug-15	18-Sep-15	-369	0	0%																
E11A3120	E11A - Install Pierhead Segments (4 nr)	6	16-Dec-16	0%	6	23-Dec-16	19-Sep-15	25-Sep-15	-369	0	0%																
E12A, E12B, E12C & E12D (E8b/E7b/E6b/E5b)																											
Pile Cap Works - E12A, E12B, E12C & E12D																											

■ Actual Work
■ Planned Bar
■ Critical Bar
◆ Milestone

Project ID: J3518DWPrG-M40
 Layout: J3518-DWP-3MRP Submission - M40
 Filter: TASK filters: 3-Month Lookahead, No CC
 Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 7 of 12 Pages)
(Progress as of 21-Sep-16)

Date	Revision	Checked	Approved
29-Jul-16		PKN	HF
30-Aug-16		PKN	HF
03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
Pile Cap Works - Dolphin E12A (E8b)																											
SE8BD130	E12A (E8b)- Dolphin - Marine Pile Cap - Fixings, Dewatering & Trimming o	11	21-Sep-16	0%	11	04-Oct-16	10-Feb-17	22-Feb-17	114	0	0%																
SE8BD150	E12A (E8b) - Dolphin - Marine Pile Cap - Rebar, Concreting	5	05-Oct-16	0%	5	11-Oct-16	23-Feb-17	28-Feb-17	114	255	0%																
Bridge E8 - Pier E12A (E8b)																											
Pier Works - E12A																											
Pier Works																											
E12A2030	E12A - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	04-Jul-16 A	30%	21	17-Oct-16	27-May-15	19-Jun-15	-394	0	30%																
E12A2040	E12A - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	18-Oct-16	0%	44	07-Dec-16	22-Jun-15	12-Aug-15	-394	0	0%																
E12A2050	E12A - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	08-Dec-16	0%	21	04-Jan-17	13-Aug-15	05-Sep-15	-394	0	0%																
Bridge E7 - Pier E12B (E7b)																											
Pier Head Segments - E12B																											
Pier Head Segments																											
E12B3110	E12B - Temp. Work, Grillages, Megashore Towers, Rail Beams	29	22-Nov-16	0%	29	28-Dec-16	23-Jul-15	25-Aug-15	-399	0	0%																
Pier Works - E12B																											
Pier Works																											
E12B2040	E12B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	26-May-16 A	100%	0	30-Aug-16 A					100%																
E12B2050	E12B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	31-Aug-16 A	30%	31	28-Oct-16	20-May-15	26-Jun-15	-399	0	30%																
E12B2060	E12B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	28-Oct-16	0%	21	22-Nov-16	27-Jun-15	22-Jul-15	-399	0	0%																
Bridge E6 - Pier E12C (E6b)																											
Pier Head Segments - E12C																											
Pier Head Segments																											
E12C3110	E12C - Temp. Work, Grillages, Megashore Towers, Rail Beams	29	08-Dec-16	0%	29	13-Jan-17	04-Dec-15	09-Jan-16	-300	0	0%																
Pier Works - E12C																											
Pier Works																											
E12C2030	E12C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	13-Jun-16 A	100%	0	21-Sep-16 A					100%																
E12C2040	E12C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	22-Sep-16 A	0%	44	12-Nov-16	16-Sep-15	09-Nov-15	-300	0	0%																
E12C2050	E12C - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	14-Nov-16	0%	21	07-Dec-16	10-Nov-15	03-Dec-15	-300	0	0%																
Bridge E5 - Pier E12D (E5b)																											
Pier Works - E12D																											
Pier Works																											
E12D2030	E12D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	19-Jul-16 A	10%	27	24-Oct-16	30-Sep-15	02-Nov-15	-289	0	10%																
E12D2040	E12D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	25-Oct-16	0%	44	14-Dec-16	03-Nov-15	23-Dec-15	-289	0	0%																
E12D2050	E12D - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	15-Dec-16	0%	21	11-Jan-17	24-Dec-15	20-Jan-16	-289	0	0%																
E13A, E13B, E13C & E13D (E8c/E7c/E6c/E5c)																											
Bridge E8 - Pier E13A (E8c)																											
Pier Works - E13A																											
Pier Works																											
E13A2030	E13A - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	31	27-Jul-16 A	35%	20	17-Oct-16	05-May-15	29-May-15	-411	0	35%																
E13A2040	E13A - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	17-Oct-16	0%	44	07-Dec-16	30-May-15	22-Jul-15	-411	0	0%																
E13A2050	E13A - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	07-Dec-16	0%	21	04-Jan-17	23-Jul-15	15-Aug-15	-411	0	0%																
Bridge E7 - Pier E13B (E7c)																											
Pier Works - E13B																											
Pier Works																											
E13B2020	E13B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	28	13-Aug-16 A	15%	24	20-Oct-16	27-Mar-15	28-Apr-15	-440	0	15%																
E13B2030	E13B - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	40	20-Oct-16	0%	40	06-Dec-16	29-Apr-15	16-Jun-15	-440	0	0%																
E13B2040	E13B - Seagull Pier Curing, CJ, Remove Formwork & Falsework	21	06-Dec-16	0%	21	03-Jan-17	17-Jun-15	13-Jul-15	-440	0	0%																
Bridge E6 - Pier E13C (E6c)																											
Pier Works - E13C																											
Pier Works																											
E13C2000	E13C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Stem	19	02-Jul-16 A	100%	0	01-Sep-16 A					100%																
E13C2010	E13C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower D	21	02-Sep-16 A	50%	11	04-Oct-16	20-May-15	02-Jun-15	-399	0	50%																
E13C2020	E13C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	04-Oct-16	0%	30	09-Nov-16	03-Jun-15	09-Jul-15	-399	0	0%																
E13C2030	E13C - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	09-Nov-16	0%	44	03-Jan-17	10-Jul-15	29-Aug-15	-399	0	0%																
Bridge E5 - Pier E13D (E5c)																											
Pier Works - E13D																											
Pier Works																											
E13D2000	E13D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Stem	30	02-Jul-16 A	100%	0	20-Sep-16 A					100%																
E13D2010	E13D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower D	21	21-Sep-16 A	0%	21	17-Oct-16	13-Jun-15	09-Jul-15	-379	0	0%																
E13D2020	E13D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Lower Ar	30	18-Oct-16	0%	30	21-Nov-16	10-Jul-15	13-Aug-15	-379	0	0%																
E13D2030	E13D - Seagull Pier Temp. Work, Rebar, Formwork, Concreting - Upper Ar	44	22-Nov-16	0%	44	14-Jan-17	14-Aug-15	06-Oct-15	-379	0	0%																
E14A, E14B, E14C & E14D (E8d/E7d/E6d/E5d)																											
Foundation Works - E14																											

<ul style="list-style-type: none"> ■ Actual Work ■ Planned Bar ■ Critical Bar ◆ Milestone 	<p>Project ID: J3518DWPrg-M40 Layout: J3518-DWP-3MRP Submission - M40 Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.</p>	<p>Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 8 of 12 Pages) (Progress as of 21-Sep-16)</p>	<table border="1"> <thead> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> </thead> <tbody> <tr> <td>29-Jul-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> <tr> <td>30-Aug-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> <tr> <td>03-Oct-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> </tbody> </table>	Date	Revision	Checked	Approved	29-Jul-16		PKN	HF	30-Aug-16		PKN	HF	03-Oct-16		PKN	HF	<p>DWG. No.: J3518/GCL/PGM/3MRP-M40</p>
Date	Revision	Checked	Approved																	
29-Jul-16		PKN	HF																	
30-Aug-16		PKN	HF																	
03-Oct-16		PKN	HF																	

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016																		
												September				October				November				December						
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19	26
GFXX540	Review BCF Foundation Design, Pile Test & Finalize Design	67	21-Sep-16	0%	67	09-Dec-16	17-Sep-14	05-Dec-14	-596	0	0%	[Gantt bar: 17-Sep-14 to 05-Dec-14]																		
GFXX545	Mobilization & Assembling Bored Pile Plant & Equipment for Viaducts in HKI	14	10-Dec-16	0%	14	28-Dec-16	06-Dec-14	22-Dec-14	-596	0	0%	[Gantt bar: 06-Dec-14 to 22-Dec-14]																		
Foundation Works - E14A (E8d)																														
GFXX549	E14A (E8d) - Bored Piles (2.20m dia. x 3 nos)	102	27-Jul-16 A	50%	51	21-Nov-16	17-Jun-15	17-Aug-15	-376	0	50%	[Gantt bar: 17-Jun-15 to 17-Aug-15]																		
GFXX598	E14A (E8d) - Sonic & Interface Coring	12	22-Nov-16	0%	12	05-Dec-16	11-Jan-16	23-Jan-16	-257	0	0%	[Gantt bar: 11-Jan-16 to 23-Jan-16]																		
Foundation Works - E14B (E7d)																														
GFXX548	E14B (E7d) - Bored Piles(2.20m dia. x 3 nos)	90	14-Sep-16 A	5%	86	04-Jan-17	07-Oct-15	19-Jan-16	-284	0	5%	[Gantt bar: 07-Oct-15 to 19-Jan-16]																		
Foundation Works - E14C (E6d)																														
GFXX547	E14C (E6d) - Bored Piles (2.20m dia. x 3 nos)	80	13-Sep-16 A	10%	72	15-Dec-16	29-Jul-15	23-Oct-15	-342	0	10%	[Gantt bar: 29-Jul-15 to 23-Oct-15]																		
GFXX598	E14C (E6d) - Sonic & Interface Coring	12	16-Dec-16	0%	12	31-Dec-16	24-Oct-15	06-Nov-15	-342	0	0%	[Gantt bar: 24-Oct-15 to 06-Nov-15]																		
Foundation Works - E14D (E5d)																														
GFXX546	E14D (E5d) - Bored Piles (2.20m dia. x 4 nos)	92	22-Nov-16	0%	92	15-Mar-17	18-Aug-15	05-Dec-15	-376	0	0%	[Gantt bar: 18-Aug-15 to 05-Dec-15]																		
Pile Cap Works - E14																														
Pile Cap Works - E14A (E8d)																														
SE8D0090	E14A (E8d) - Pile cap Excavation / ELS (Open cut)	7	06-Dec-16	0%	7	13-Dec-16	25-Jan-16	01-Feb-16	-257	20	0%	[Gantt bar: 25-Jan-16 to 01-Feb-16]																		
Viaduct F																														
Viaduct F2																														
F5 (F2c)																														
Foundation Works																														
GFXX564	F5 (F2c) - Bored Piles (1.80m dia. x 3 nos)	69	30-Nov-16	0%	69	25-Feb-17	28-Nov-15	23-Feb-16	-298	0	0%	[Gantt bar: 28-Nov-15 to 23-Feb-16]																		
Viaduct F3																														
F12 (F3a) & Abutment																														
Foundation Works																														
GFXX572	F12 (F3a) - Bored Piles (2.20m dia. x 2 nos)	68	16-Dec-16	0%	68	11-Mar-17	23-Dec-15	17-Mar-16	-291	0	0%	[Gantt bar: 23-Dec-15 to 17-Mar-16]																		
Viaduct F5																														
F13 (F5d)																														
Foundation Works																														
GFXX589	F13 (F5d) - Bored Piles (1.80m dia. x 3 nos)	97	09-Aug-16 A	40%	58	30-Nov-16	17-Sep-15	27-Nov-15	-298	0	40%	[Gantt bar: 17-Sep-15 to 27-Nov-15]																		
GFXX598-	F13 (F5d) - Sonic & interface Coring Tests	12	30-Nov-16	0%	12	14-Dec-16	20-May-16	02-Jun-16	-161	0	0%	[Gantt bar: 20-May-16 to 02-Jun-16]																		
GFXX599-	F13 (F5d) - Selection of bored pile for Full Depth Coring	24	30-Nov-16	0%	24	30-Dec-16	20-May-16	17-Jun-16	-161	0	0%	[Gantt bar: 20-May-16 to 17-Jun-16]																		
Approach Ramp F																														
Approach Ramp Land Foundation - HKBCF																														
Approach Ramp F Piling																														
GFXX593	AR-F - Pre-drilling for Piles (25 nos)	24	10-Dec-16	0%	24	10-Jan-17	17-Feb-15	19-Mar-15	-537	0	0%	[Gantt bar: 17-Feb-15 to 19-Mar-15]																		
SUPERSTRUCTURE																														
Assembling, relocation and dismantle of lifting equipment																														
Launching Gantry 2																														
FR000099	Assembly of Launching Gantry LG2 on Temp.Loading Platform	12	06-May-15 A	0%	12	05-Oct-16	22-Apr-20	07-May-20	1059	1059	0%	[Gantt bar: 22-Apr-20 to 07-May-20]																		
Viaduct B Superstructure																														
Bridge B3 Superstructure																														
Deck installation																														
FR000024	Viaduct B3 - End Span at Pier B6 (B3a) (dwn) (7 seg) - Crane	10	31-Oct-16*	0%	10	10-Nov-16	05-Jul-16	15-Jul-16	-98	198	0%	[Gantt bar: 05-Jul-16 to 15-Jul-16]																		
Bridge B2 Superstructure																														
Deck installation																														
FR000011B	Viaduct B2 - Cantilever at Pier B10 (B2c) (16 seg) - by crane	17	16-Jun-16 A	20%	14	07-Oct-16	20-Apr-20	07-May-20	1057	1057	43.8%	[Gantt bar: 20-Apr-20 to 07-May-20]																		
FR000011C	Viaduct B2 - Complete stitches and launch to B11	22	21-Sep-16	0%	22	18-Oct-16	22-Apr-16	19-May-16	-125	0	0%	[Gantt bar: 22-Apr-16 to 19-May-16]																		
FR000014	Viaduct B2 - Cantilever at Pier B11 (B2b) (16 seg) - LG1 (2 shifts)	4	19-Oct-16	0%	4	22-Oct-16	20-May-16	24-May-16	-125	0	0%	[Gantt bar: 20-May-16 to 24-May-16]																		
FR000014A	Viaduct B2 - Launching LG1 B11 to B12 - 2 shifts	1	24-Oct-16	0%	1	24-Oct-16	25-May-16	25-May-16	-125	0	0%	[Gantt bar: 25-May-16 to 25-May-16]																		
FR000015	Viaduct B2 - End Span at Pier B12 (B2a) (6 seg) - LG1 (2 shifts)	6	25-Oct-16	0%	6	31-Oct-16	26-May-16	01-Jun-16	-125	0	0%	[Gantt bar: 26-May-16 to 01-Jun-16]																		
FR0000211	Viaduct B2 - Complete B6/B7/B8 stitches & stressing & transport segments	49	13-Jan-16 A	52.58%	23	19-Oct-16	27-Aug-16	23-Sep-16	-20	156	100%	[Gantt bar: 27-Aug-16 to 23-Sep-16]																		
Bridge B1 Superstructure																														
Deck installation																														
FR000017	Viaduct B1 - End Span at Pier B12 (B2a) (6 seg) - LG1 (2 shifts)	14	01-Nov-16	0%	14	16-Nov-16	01-Aug-16	16-Aug-16	-76	0	0%	[Gantt bar: 01-Aug-16 to 16-Aug-16]																		
FR000017-T	Viaduct B1 - Launching LG1 B12 to B14 & 1st pair - 2 shifts	4	01-Nov-16	0%	4	04-Nov-16	11-Aug-16	15-Aug-16	-67	0	0%	[Gantt bar: 11-Aug-16 to 15-Aug-16]																		
FR000017A	Viaduct B1 - Launching B12 to B15 & 1st pair - 2 shifts	5	17-Nov-16	0%	5	22-Nov-16	17-Aug-16	22-Aug-16	-76	0	0%	[Gantt bar: 17-Aug-16 to 22-Aug-16]																		
FR000018	Viaduct B1 - Cantilever at Pier B14 (B1f) (24 seg) - LG1 (2 shifts)	6	05-Nov-16	0%	6	11-Nov-16	16-Aug-16	22-Aug-16	-67	9	0%	[Gantt bar: 16-Aug-16 to 22-Aug-16]																		
FR000018B	Viaduct B1 - Cantilever at B13 (24 seg) - 2 shifts	6	21-Sep-16	0%	6	27-Sep-16	25-Jul-16	30-Jul-16	-49	27	0%	[Gantt bar: 25-Jul-16 to 30-Jul-16]																		
FR000019	Viaduct B1 - Cantilever at Pier B15 (B1e) (26 seg) - LG1 (2 shifts)	7	23-Nov-16	0%	7	30-Nov-16	23-Aug-16	30-Aug-16	-76	0	0%	[Gantt bar: 23-Aug-16 to 30-Aug-16]																		
FR000019A	Viaduct B1 - Launching B15 to B16 & 1st pair - 2 shifts	3	01-Dec-16	0%	3	03-Dec-16	31-Aug-16	02-Sep-16	-76	0	0%	[Gantt bar: 31-Aug-16 to 02-Sep-16]																		
FR000020	Viaduct B1 - Cantilever at Pier B16 (B1d) (25 seg) - LG1	7	05-Dec-16	0%	7	12-Dec-16	03-Sep-16	10-Sep-16	-76	0	0%	[Gantt bar: 03-Sep-16 to 10-Sep-16]																		

<ul style="list-style-type: none"> █ Actual Work █ Planned Bar █ Critical Bar ◆ Milestone 	Project ID: J3518DWPrg-M40 Layout: J3518-DWP-3MRP Submission - M40 Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.	Tuen Mun - Chek Lap Kok Link - Southern Connection 3-Month Rolling Programme (Page 9 of 12 Pages) (Progress as of 21-Sep-16)	<table border="1"> <thead> <tr> <th>Date</th> <th>Revision</th> <th>Checked</th> <th>Approved</th> </tr> </thead> <tbody> <tr> <td>29-Jul-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> <tr> <td>30-Aug-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> <tr> <td>03-Oct-16</td> <td></td> <td>PKN</td> <td>HF</td> </tr> </tbody> </table>	Date	Revision	Checked	Approved	29-Jul-16		PKN	HF	30-Aug-16		PKN	HF	03-Oct-16		PKN	HF	DWG. No.: J3518/GCL/PGM/3MRP-M40
Date	Revision	Checked	Approved																	
29-Jul-16		PKN	HF																	
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03-Oct-16		PKN	HF																	

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016																					
												September				October				November				December									
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05	12	19				
Deck installation																																	
FR000073	Viaduct D1 - Cantilever at D16 (4 seg) - Crane	22	24-Sep-16	0%	22	21-Oct-16	28-Apr-16	25-May-16	-123	0	0%																						
FR000112	Viaduct D1 - Cantilever at Pier D14 (D2c) (12 seg) - THB	22	25-May-16 A	10%	20	15-Oct-16	31-Mar-16	23-Apr-16	-143	0	28.6%																						
FR000114	Viaduct D1 - Cantilever at Pier D15 (D2b) (14 seg) - Crane	25	22-Oct-16	0%	25	19-Nov-16	26-May-16	24-Jun-16	-123	54	0%																						
FR000115-1	Viaduct D1 - Cantilever at Pier D16 (D2a) (14 seg) - THB	22	04-Aug-16 A	10%	20	15-Oct-16	01-Jun-16	24-Jun-16	-93	176	28.6%																						
FR000116-1	Viaduct D1 - Relocate THB from Pier D17 to Pier D18	3	21-Sep-16	0%	3	23-Sep-16	05-May-20	07-May-20	1068	1068	0%																						
FR000117-1	Viaduct D1 - Relocate THB from Pier D18 to Pier D16	3	21-Sep-16	0%	3	23-Sep-16	25-Apr-16	27-Apr-16	-123	0	0%																						
Viaduct E																																	
Bridge E1 Superstructure																																	
Deck Installation																																	
FR000026A	Viaduct E1 - Launching LG2 B1 to E3A - 2 shifts	2	21-Sep-16	0%	2	22-Sep-16	21-Apr-20	22-Apr-20	1058	0	0%																						
FR000033	Viaduct E1 - End Span at Pier E3-A (E2a4) (5 seg) - LG2 (2 shifts)	6	23-Sep-16	0%	6	29-Sep-16	23-Apr-20	29-Apr-20	1058	0	0%																						
FR000033-T	Viaduct E1 - Launching LG2 E3A to E1B & 1st pair	5	30-Sep-16	0%	5	06-Oct-16	02-May-20	07-May-20	1058	1058	0%																						
FR000035-T	Viaduct E1 - Launching LG2 E3B to D1 - 2 shifts	2	21-Sep-16	0%	2	22-Sep-16	21-Apr-20	22-Apr-20	1058	0	0%																						
FR000035A	Viaduct E1 - Launching E1B to E2B & 1st pair - 2 shifts	3	21-Sep-16	0%	3	23-Sep-16	05-May-20	07-May-20	1068	1068	0%																						
FR000037A	Viaduct E1 - Launching LG2 E2B to E3B - 2 shifts	1	21-Sep-16	0%	1	21-Sep-16	07-May-20	07-May-20	1070	1070	0%																						
FR000040A	Viaduct E1 - Launching E2C to E1C - 2 shifts	1	21-Sep-16	0%	1	21-Sep-16	07-May-20	07-May-20	1070	1070	0%																						
FR000040C	Viaduct E1 - Launching LG2 E1C to E3C - 2 shifts	2	21-Sep-16	0%	2	22-Sep-16	27-Apr-20	28-Apr-20	1063	0	0%																						
FR000041	Viaduct E1 - End Span at Pier E3-C (E2a2) (6 seg) - LG2 (2 shifts)	6	23-Sep-16	0%	6	29-Sep-16	29-Apr-20	07-May-20	1063	1063	0%																						
FR000043	Viaduct E1 - Cantilever at Pier E2-D (E1b1) (16 seg) - THB	21	11-Aug-16 A	85.71%	3	23-Sep-16	16-Jun-16	18-Jun-16	-81	177	25%																						
FR000044	Viaduct E1 - Cantilever at Pier E1-D (E1a1) (13 seg) - THB	12	28-Jul-16 A	50%	6	27-Sep-16	13-Jun-16	18-Jun-16	-84	174	90%																						
FR000123	Viaduct E1 - End Span at Pier D1 (D4f) (dwn) (7 seg) - LG2 (2 shifts)	6	23-Sep-16	0%	6	29-Sep-16	23-Apr-20	29-Apr-20	1058	0	0%																						
FR000123A	Viaduct E1 - Launching LG2 D1 to E2C & 1st pair - 2 shifts	5	30-Sep-16	0%	5	06-Oct-16	02-May-20	07-May-20	1058	1058	0%																						
FR000128-2	Viaduct E1 - Launching LG2 E3B to E3A - 2 shifts	3	22-Sep-16	0%	3	24-Sep-16	20-Jun-16	22-Jun-16	-79	176	0%																						
FR000128-3	Viaduct E1 - End Span at Pier E3-C (E2a2) (6 seg) - LG2 (2 shifts)	6	28-Sep-16	0%	6	05-Oct-16	13-Jun-16	18-Jun-16	-90	168	0%																						
FR000128A	Viaduct E1 - Launching E3A to E3C - 2 shifts	6	21-Sep-16	0%	6	27-Sep-16	04-Jun-16	11-Jun-16	-90	0	0%																						
Bridge E2 Superstructure																																	
Deck installation																																	
FR000131-2	Viaduct E2 - Cantilever at Pier E5-A (E2c2) (14 seg) - THB	14	15-Dec-16	0%	14	04-Jan-17	19-May-16	03-Jun-16	-176	0	0%																						
FR000662	Viaduct E2 - Pier E4A - Assemble / Load Test Lifting Frame WLF 3/4	20	10-Dec-16	0%	20	06-Jan-17	16-Oct-15	09-Nov-15	-344	0	0%																						
At-Grade Roadworks & Other Works along NLH																																	
Viaduct B Slope Works																																	
Slope 10SW-A/F52																																	
GFXX483	10SW-A/F52 - Mobilization for soldier piling	3	21-Sep-16	0%	3	23-Sep-16	08-Oct-15	10-Oct-15	-283	0	0%																						
GFXX484	10SW-A/F52 - Installation of Soldier Pile (260nos., 2rigs)	126	24-Sep-16	0%	126	27-Feb-17	12-Oct-15	14-Mar-16	-283	0	0%																						
Viaduct A Slope Works																																	
Slope 9SE-B/FR8																																	
GFXX491	9SE-B/FR8 - New wall foundation	72	21-Sep-16	0%	72	15-Dec-16	22-Jun-16	14-Sep-16	-76	0	0%																						
M110010	9SE-B/FR8 - demolish existing Ret. wall	72	28-Sep-16	0%	72	22-Dec-16	29-Jun-16	22-Sep-16	-76	0	0%																						
M110020	9SE-B/FR8 - Wall construction	78	06-Oct-16	0%	78	09-Jan-17	07-Jul-16	07-Oct-16	-76	0	0%																						
At-Grade Roadworks along NLH Westbound																																	
RW10020	NLH W/B (Viaduct C) - Road Drainage Works for tie-in	90	06-Dec-16	0%	90	27-Mar-17	05-Nov-16	24-Feb-17	-26	6	0%																						
At-Grade Roadworks along NLH Eastbound																																	
RW20011	NLH E/B (Viaduct D) - Implement TTM for tie-in works	2	25-Nov-16	0%	2	26-Nov-16	12-Dec-16	13-Dec-16	14	50	0%																						
RW20072	NLH E/B (Gantries footing 324 - 328) - T&TC meeting	0	21-Sep-16*	0%	0		10-Nov-15		-256	0	0%																						
RW20074	NLH E/B (Gantries 324 - 328) - Gazette	48	21-Sep-16	0%	48	17-Nov-16	10-Nov-15	07-Jan-16	-256	0	0%																						
RW20076	NLH E/B (Gantries 324 - 328) - Implement TTA	4	18-Nov-16	0%	4	22-Nov-16	08-Jan-16	12-Jan-16	-256	0	0%																						
RW20078	NLH E/B (Gantries 324 - 328) - Construction footing (10am to 5pm)	60	23-Nov-16	0%	60	07-Feb-17	13-Jan-16	29-Mar-16	-256	0	0%																						
At-Grade Roadworks and Other Works along Cheung Tung Road																																	
Re-alignment of Cheung Tung Road adjacent to Viaduct B																																	
RP00057	Ch300-650: relocate street lighting pillar box	8	22-Jul-16 A	0%	8	29-Sep-16	27-Apr-20	07-May-20	1063	1063	50%																						
RP00058	Ch300-650: Roadwork new CTR with tie in	19	15-Feb-16 A	100%	0	12-Sep-16 A					100%																						
RP00059	Ch300-650: TTA to new CTR	1	30-Sep-16*	0%	1	30-Sep-16	01-Feb-16	01-Feb-16	-196	0	0%																						
RP00060	Ch300-650: towngas(DN250+DN400) connection	28	03-Oct-16	0%	28	04-Nov-16	03-Mar-17	04-Apr-17	123	389	0%																						
RP00063	Ch620-750: backfilling for roadwork	29	06-May-15 A	24.14%	22	18-Oct-16	07-Apr-20	07-May-20	1049	0	90%																						
RP00064	Ch620-750: telecom, 11KV & 132KV ducting	20	20-Aug-15 A	70%	6	27-Sep-16	29-Apr-20	07-May-20	1065	1065	80%																						
RP00065	Ch620-750: cross road duct for WM, 11KV, telecom & lighting	16	05-May-15 A	62.5%	6	27-Sep-16	29-Apr-20	07-May-20	1065	1065	90%																						
RP00066	Ch620-750: Towngas(DN250+DN400)	14	01-Feb-16 A	85.71%	2	22-Sep-16	06-May-20	07-May-20	1069	20	90%																						
RP00067	Ch620-750: road drainage	18	15-Aug-15 A	94.44%	1	18-Oct-16	07-May-20	07-May-20	1049	1049	90%																						
RP00069	Ch620-750: cross road duct for 11KV, telecom & street light cable	14	15-Feb-16 A	57.14%	6	27-Sep-16	29-Apr-20	07-May-20	1065	1065	90%																						

- █ Actual Work
- █ Planned Bar
- █ Critical Bar
- ◆ Milestone

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Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 11 of 12 Pages)
(Progress as of 21-Sep-16)

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03-Oct-16		PKN	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M40

Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Duration % Complete	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Free Float	Physical % Complete	2016															
												September				October				November				December			
												22	29	05	12	19	26	03	10	17	24	31	07	14	21	28	05
RP00070	Ch620-750: roadwork for new CTR	27	05-Sep-16 A	100%	0	30-Sep-16 A					100%																
RP00071	Ch620-750: towngas(DN250+DN400) connection	28	03-Oct-16	0%	28	04-Nov-16	03-Mar-17	04-Apr-17	123	389	0%																
RP00073	Ch100-300: trench excavation on footpath	13	21-Sep-16	0%	13	06-Oct-16	03-May-16	18-May-16	-117	0	0%																
RP00075	Ch100-300: duct laying for 11KV	14	07-Oct-16	0%	14	24-Oct-16	19-May-16	03-Jun-16	-117	0	0%																
RP00076	Ch100-300: lay telecom cable	10	25-Oct-16	0%	10	04-Nov-16	04-Jun-16	16-Jun-16	-117	0	0%																
RP00077	Ch100-300: street lighting & draw pit	13	05-Nov-16	0%	13	19-Nov-16	17-Jun-16	02-Jul-16	-117	0	0%																
RP00078	Ch100-300: relocation of vent pipe	19	21-Nov-16	0%	19	12-Dec-16	16-Jul-16	06-Aug-16	-106	11	0%																
RP00079	Ch100-300: watermain(DN450+DN1000)	142	29-Apr-15 A	84%	23	19-Oct-16	03-May-16	30-May-16	-117	0	84%																
RP00080	Ch100-300: towngas(DN250)	30	19-Oct-16	0%	30	23-Nov-16	31-May-16	06-Jul-16	-117	0	0%																
RP00081	Ch100-300: towngas(DN400)	27	23-Nov-16	0%	27	24-Dec-16	07-Jul-16	06-Aug-16	-117	0	0%																
RP00083	Ch100-300: roadwork for new CTR	52	17-Nov-16	0%	52	19-Jan-17	29-Jun-16	29-Aug-16	-117	0	0%																
Viaduct B Slope Works																											
Slope 9SE-B/F85																											
SWVB4020	9SE-B/F85 - Filling & forming slope	18	21-Sep-16	0%	18	13-Oct-16	07-Jan-17	27-Jan-17	88	0	0%																
SWVB4030	9SE-B/F85 - Form UC	12	14-Oct-16	0%	12	27-Oct-16	01-Feb-17	14-Feb-17	88	0	0%																
SWVB4035	9SE-B/F85 - Install Geo. Instru. & Baseline Monitoring	30	28-Oct-16	0%	30	01-Dec-16	15-Feb-17	21-Mar-17	88	0	0%																
SWVB4040	9SE-B/F85 - Hydroseeding	12	02-Dec-16	0%	12	15-Dec-16	22-Mar-17	04-Apr-17	88	684	0%																
Re-alignment of Cheung Tung Road adjacent to Viaduct C																											
West Portion																											
RW61000	Realign CTR (West of Abut. C) - Site Clearance	42	03-Sep-14 A	100%	0	21-Sep-16	06-Jan-17	06-Jan-17	88	0	100%																
RW61010	Realign CTR (West of Abut. C) - Road drainage works	60	15-Jan-15 A	66.67%	20	20-Oct-16	12-Jan-17	07-Feb-17	88	0	80%																
RW61020	Realign CTR (West of Abut. C) - Utility diversion	90	24-Mar-15 A	70%	27	15-Dec-16	04-Mar-17	04-Apr-17	88	354	90%																
RW61030	Realign CTR (West of Abut. C) - Sub-base work	48	15-Dec-15 A	0%	70	13-Dec-16	22-Oct-16	14-Jan-17	25	0	70%																
RW61050	Realign CTR (West of Abut. C) - Street Light Poles & street furniture	18	14-Dec-16	0%	18	06-Jan-17	16-Jan-17	08-Feb-17	25	0	0%																
East Portion																											
RW60005	Realign CTR (East of Abut. C) - Drainage & Road formation with temporar	66	02-Oct-15 A	51.52%	32	29-Oct-16	07-Oct-16	14-Nov-16	13	0	70%																
RW60010	Realign CTR (East of Abut. C) - GT325 footing + A frame erection	36	27-Apr-16 A	0%	58	29-Nov-16	21-Jan-16	05-Apr-16	-197	59	30%																
RW60020	Realign CTR (East of Abut. C) - Utility + TCSS ducting	70	02-Jan-16 A	28.57%	50	19-Nov-16	04-Mar-20	07-May-20	1021	1021	70%																
RW60030	Realign CTR (East of Abut. C) - Drainage and roadwork for permanent tie	24	31-Oct-16	0%	24	26-Nov-16	15-Nov-16	12-Dec-16	13	0	0%																
RW60050	Realign CTR (East of Abut. C) - Street Light Poles & street furniture	24	31-Oct-16	0%	24	26-Nov-16	15-Nov-16	12-Dec-16	13	0	0%																
RW60052	Realign CTR (East of Abut. C) - Divert traffic onto new CTR	1	28-Nov-16	0%	1	28-Nov-16	13-Dec-16	13-Dec-16	13	0	0%																
RW60054	Realign CTR (East of Abut. C) - 2nd phase drainage	12	29-Nov-16	0%	12	12-Dec-16	14-Dec-16	29-Dec-16	13	0	0%																
RW60056	Realign CTR (East of Abut. C) - 2nd phase TCSS duct from GT325	6	13-Dec-16	0%	6	19-Dec-16	30-Dec-16	06-Jan-17	13	0	0%																
RW60058	Realign CTR (East of Abut. C) - Roadwork and reinstatement	42	20-Dec-16	0%	42	13-Feb-17	07-Jan-17	28-Feb-17	13	0	0%																
Viaduct C Slope Works																											
Slope 10NW-C/F14																											
SWVC5000	10NW-C/F14 - Slope works	30	18-Nov-16	0%	30	22-Dec-16	30-Jul-16	02-Sep-16	-92	0	0%																
Slope 10NW-C/F15																											
SWVC6000	10NW-C/F15 - Slope works	24	21-Sep-16	0%	24	20-Oct-16	03-Sep-16	03-Oct-16	-14	0	0%																
SWVC6005	10NW-C/F15 - Install Geo. Instru. & Baseline Monitoring	30	21-Oct-16	0%	30	24-Nov-16	04-Oct-16	08-Nov-16	-14	372	0%																
Watermains & All Assoc Works from Tung Chung to Southern Landfall																											
WM00120	Lay DN450 Fresh Water Main along re-aligned CTR (app. 500 m at 12m/c)	48	22-Apr-15 A	0%	59	30-Nov-16	22-Feb-20	07-May-20	1012	1012	80%																
WM00170	Lay DN450 watermain from Tung Chung to realigned CTR (3rd 500m - 2 v)	50	31-May-16 A	100%	0	06-Sep-16 A					100%																
WM00180	Lay DN450 watermain from Tung Chung to realigned CTR (last 400m - 2 v)	40	06-Sep-16 A	10%	36	03-Nov-16	10-Apr-17	26-May-17	163	0	10%																
Pressure Testing																											
TC00010	Pressure Test DN450 Fresh Water Main along re-aligned CTR (app. 520 m)	12	18-Sep-15 A	0%	34	01-Nov-16	29-Apr-17	10-Jun-17	177	570	80%																
TC00020	Pressure Test DN450 Fresh Water Main from Tung Chung to re-aligned C	12	04-Nov-16	0%	12	17-Nov-16	27-May-17	10-Jun-17	163	556	0%																

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Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

(In reference to CINOTECH (2011) Agreement No. CE35/2011 EP Baseline Environmental Monitoring for Hong Kong-Zhuhai-Macao Bridge Tuen Mun-Chek Lap Kok Link - Investigation. Updated EM&A Manual for Tuen Mun-Chek Lap Kok Link)

*Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link
Southern Connection Viaduct 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 eight 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	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		✓

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 practicable.	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		✓
NOISE									
5.11	Section 4	Noise monitoring	All existing representative sensitive receivers / during North Lantau Viaduct construction	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
<i>General Marine Works</i>									
6.10	-	Bored piling to be undertaken within a metal casing.	Marine viaducts of TM-CLKL and HKLR/ bored piling	Contractor	TM-EIAO		Y		✓
6.10	-	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 Guidelines. DASO permit conditions.		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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 conditions.		Y		✓
<i>Temporary Staging work</i>									
	5.2	Regular inspection for the accumulation of floating refuse and collection of floating refuse if required	During temporary staging works	Contractor			Y		✓
	5.2	Provision of temporary drainage system on the temporary staging for collection of construction site runoff to allow appropriate treatment before discharge into the sea	During temporary staging works	Contractor			Y		↔
	5.2	Wastewater generated from construction works such as bored / drilling water will be collected, treated, neutralized and de-silted through silt trap or sedimentation tank before disposal	During temporary staging works	Contractor			Y		✓
	5.2	One additional water quality monitoring station is	During temporary	Contractor			Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		proposed at station SR4a In case elevated SS or turbidity is identified during the water quality monitoring, the source of pollution will be tracked down and be removed as soon as possible. In case depletion of dissolved oxygen is identified, artificial aeration will be arranged at the monitoring station SR4a,	staging works						
<i>Land Works</i>									
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	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		✓
6.10	-	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		↔

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	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		↔
6.10	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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 offsite disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	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		✓
6.10	-	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		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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	✓
6.10	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>									
6.10	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									
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	Specification for bored piling monitoring	Detailed Design	Design Consultant	TMEIA	Y			n/a
8.14	6.3	Implement any recommendations of the bored piling monitoring	Southern marine viaduct/ Throughout	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
			construction during bored piling						
8.14	6.3,6.5	Avoidance of peak CWD calving season in May and June for driving of metal caissons during bored piling works	Southern marine viaduct/ May and June during bored piling	Contractor	TMEIA		Y		n/a
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All marine bored piling and temporary staging works areas/Detailed Design/ during all marine bored piling and temporary staging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600 m ² 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 enforced 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 marine bored piling and the whole lifespan of temporary staging works.	All areas/ Detailed Design/ during marine bored piling and temporary staging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Tai Ho Wan (donor site) and Yam Tsui Wan (receptor site) /Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		n/a
8.15	6.5	Audit coral translocation success	Yam Tsui Wan (receptor site)/Post translocation	Contractor	TMEIA		Y		Completed in October 2014
7.13	6.5	Undertaken gabion wall works in Stream NL1 in the dry season	North Lantau slope works/dry	Contractor	TMEIA		Y		n/a

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
			season/construction phase						
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. To be approved by AFCD/LCSD
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		✓
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	Round angle, patterned finishes, and oval shaped pier were considered in the viaduct design, and further details will be developed under ACABAS submission (DM3)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Details of the street furniture will be developed in the detailed design stage (DM4)	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	Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at Tree Removal Application stage) (CM1)							
10.9	7.6	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme (CM2)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓ Tree transplanted as Contract Specification
10.9	7.6	Hillside and roadside screen planting to proposed roads, associated structures and slope works (CM3).	All areas/detailed design/ during construction/post construction	Design Consultant/	TMEIA	Y	Y		✓
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone) (CM4)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		↔
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		✓
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		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
10.9	7.6	Recycle/Reuse all felled trees and vegetation, e.g. mulching (CM9)	All areas/ detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		n/a No felled trees or vegetation suitable for recycle
10.9	7.6	Compensatory tree planting shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006 (CM10).	All areas/ detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Re-vegetation of affected woodland/shrubland with native species (OM1)	All areas/ detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by AFCD/HyD/ L CSD
10.9	7.6	Tall buffer screen tree / shrub / climber planting should be incorporated to soften hard engineering structures and facilities (OM2)	All areas/ detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a To be implemented by HyD/LCSD
10.9	7.6	Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units should be directional and minimise unnecessary light spill (OM3)	All areas/ detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD/LCSD
10.9	7.6	Structure, ornamental tree / shrub / climber planting should be provided along roadside amenity strips, central dividers and newly formed slopes to enhance the townscape quality and further greenery enhancement	All areas/ detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		(OM4)							HyD/LCSD
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes	All areas/ detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
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	All areas / throughout	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	construction period						
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		✓
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			n/a
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	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	All areas / throughout construction period	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		materials should avoid over-ordering and wastage.							
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: <ul style="list-style-type: none"> - suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; - Having a capacity of <450L unless the specifications have been approved by the EPD; and - Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. Clearly labelled and used solely for the storage of chemical wastes; - Enclosed with at least 3 sides; - 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; 	All areas / throughout construction period	Contractor	TMEIA		Y		↔

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		<ul style="list-style-type: none"> - Adequate ventilation; - Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and - 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			✓
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 hard standing;	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	Site Offices/	Contractor	TMEIA	Y			✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		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.	throughout construction period						
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

Notes:

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

Status:

- ✓ 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

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 $\mu\text{g}/\text{m}^3$	ASR9A/ASR8A = 178 ASR9C/ASR8/ASR9 = 178	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR9A/ASR8A = 394 ASR9C/ASR8/ASR9 = 393	500

Table D2 *Action and Limit Levels for Construction Noise (0700-1900 hrs of normal weekdays)*

Time Period	Action	Limit
0700-1900 hrs on normal weekdays	When one documented complaint is received	75* dB(A)

Table D3 *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

Parameter	Action Level#	Limit Level#
(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 D4 *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 D5 *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/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 30 September 2016)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 30 September 2016)**

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 31 October 2016)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

Note: Noise Monitoring on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 31 October 2016)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

Note: Air Quality Monitoring on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 30 November 2016)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 30 November 2016)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (September 2016)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				01-Sep	02-Sep	03-Sep
				WQM Mid-Ebb 13:06 (11:21 - 14:51) Mid-Flood 19:42 (17:57 - 21:27)		WQM Mid-Flood 7:47 (06:02 - 09:32) Mid-Ebb 14:16 (12:31 - 16:01)
04-Sep	05-Sep	06-Sep	07-Sep	08-Sep	09-Sep	10-Sep
		WQM Mid-Flood 9:42 (07:57 - 11:27) Mid-Ebb 15:47 (14:02 - 17:32)		WQM Mid-Flood 11:25 (09:40 - 13:10) Mid-Ebb 17:05 (15:20 - 18:50)		WQM Mid-Flood 14:59 (13:05 - 16:35) Mid-Ebb 20:07 (19:15 - 21:00)
11-Sep	12-Sep	13-Sep	14-Sep	15-Sep	16-Sep	17-Sep
		WQM Mid-Ebb 10:21 (08:36 - 12:06) Mid-Flood 17:41 (15:56 - 19:26)		WQM Mid-Ebb 11:52 (10:07 - 13:37) Mid-Flood 18:40 (16:55 - 20:25)		WQM Mid-Ebb 13:14 (11:29 - 14:59) Mid-Flood 19:37 (17:52 - 21:22)
18-Sep	19-Sep	20-Sep	21-Sep	22-Sep	23-Sep	24-Sep
		WQM Mid-Flood 9:22 (07:37 - 11:07) Mid-Ebb 15:21 (13:36 - 17:06)		WQM Mid-Flood 11:35 (09:50 - 13:20) Mid-Ebb 17:08 (15:23 - 18:53)		WQM Mid-Flood 14:47 (13:02 - 16:32) Mid-Ebb 20:08 (18:50 - 21:20)
25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Sep	
		WQM Mid-Ebb 10:39 (08:54 - 12:24) Mid-Flood 17:40 (15:55 - 19:25)		WQM Mid-Ebb 12:06 (10:21 - 13:51) Mid-Flood 18:34 (16:49 - 20:19)		

HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section Impact Marine Water Quality Monitoring (WQM) Schedule (October 2016)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
25-Sep	26-Sep	27-Sep	28-Sep	29-Sep	30-Sep	01-Oct
						WQM Mid-Ebb 13:16 (11:31 - 15:01) Mid-Flood 19:20 (17:35 - 21:05)
02-Oct	03-Oct	04-Oct	05-Oct	06-Oct	07-Oct	08-Oct
		WQM Mid-Flood 8:52 (07:07 - 10:37) Mid-Ebb 14:49 (13:04 - 16:34)		WQM Mid-Flood 10:17 (08:32 - 12:02) Mid-Ebb 15:58 (14:13 - 17:43)		WQM Mid-Flood 12:41 (10:56 - 14:26) Mid-Ebb 17:44 (16:20 - 19:00)
09-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct
		WQM Mid-Ebb 8:32 (06:47 - 10:17) Mid-Flood 16:18 (14:33 - 18:03)		WQM Mid-Ebb 10:31 (08:46 - 12:16) Mid-Flood 17:25 (15:40 - 19:10)		WQM Mid-Ebb 12:04 (10:19 - 13:49) Mid-Flood 18:23 (16:38 - 20:08)
16-Oct	17-Oct	18-Oct	19-Oct	20-Oct	21-Oct	22-Oct
				WQM Mid-Flood 10:31 (08:46 - 12:16) Mid-Ebb 16:02 (14:17 - 17:47)		WQM Mid-Flood 12:51 (11:06 - 14:36) Mid-Ebb 18:05 (16:30 - 19:40)
23-Oct	24-Oct	25-Oct	26-Oct	27-Oct	28-Oct	29-Oct
		WQM Mid-Ebb 9:11 (07:26 - 10:56) Mid-Flood 16:26 (14:41 - 18:11)		WQM Mid-Ebb 10:58 (09:13 - 12:43) Mid-Flood 17:25 (15:40 - 19:10)		WQM Mid-Ebb 12:16 (10:31 - 14:01) Mid-Flood 18:12 (16:27 - 19:57)
30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov
		WQM Mid-Flood 8:11 (06:26 - 09:56) Mid-Ebb 13:55 (12:10 - 15:40)		WQM Mid-Flood 9:27 (07:42 - 11:12) Mid-Ebb 15:02 (13:17 - 16:47)		WQM Mid-Flood 11:06 (09:21 - 12:51) Mid-Ebb 16:23 (14:38 - 18:08)

Remark: WQM scheduled on 18 October 2016 was canceled due to adverse weather conditions.

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Marine Water Quality Monitoring (WQM) Schedule (November 2016)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
30-Oct	31-Oct	01-Nov	02-Nov	03-Nov	04-Nov	05-Nov
		WQM Mid-Flood 8:11 (06:26 - 09:56) Mid-Ebb 13:55 (12:10 - 15:40)		WQM Mid-Flood 9:27 (07:42 - 11:12) Mid-Ebb 15:02 (13:17 - 16:47)		WQM Mid-Flood 11:06 (09:21 - 12:51) Mid-Ebb 16:23 (14:38 - 18:08)
06-Nov	07-Nov	08-Nov	09-Nov	10-Nov	11-Nov	12-Nov
		WQM Mid-Flood 14:43 (12:58 - 16:28) Mid-Ebb 20:43 (16:58 - 22:28)		WQM Mid-Ebb 8:50 (07:05 - 10:35) Mid-Flood 16:03 (14:18 - 17:48)		WQM Mid-Ebb 10:48 (09:03 - 12:33) Mid-Flood 17:08 (15:23 - 18:53)
13-Nov	14-Nov	15-Nov	16-Nov	17-Nov	18-Nov	19-Nov
		WQM Mid-Ebb 13:20 (11:35 - 15:05) Mid-Flood 18:54 (17:09 - 20:39)		WQM Mid-Flood 9:31 (07:46 - 11:16) Mid-Ebb 15:00 (13:45 - 16:45)		WQM Mid-Flood 11:25 (09:40 - 13:10) Mid-Ebb 16:41 (14:56 - 18:26)
20-Nov	21-Nov	22-Nov	23-Nov	24-Nov	25-Nov	26-Nov
		WQM Mid-Flood 14:55 (13:10 - 16:40) Mid-Ebb 21:09 (19:24 - 22:54)		WQM Mid-Ebb 9:31 (07:46 - 11:16) Mid-Flood 16:08 (14:23 - 17:53)		WQM Mid-Ebb 11:09 (09:24 - 12:54) Mid-Flood 17:04 (15:19 - 18:49)
27-Nov	28-Nov	29-Nov	30-Nov	01-Dec	02-Dec	03-Dec
		WQM Mid-Ebb 13:02 (11:17 - 14:47) Mid-Flood 18:22 (16:37 - 20:07)		WQM Mid-Flood 8:46 (07:01 - 10:31) Mid-Ebb 14:11 (12:26 - 15:56)		WQM Mid-Flood 10:02 (08:17 - 11:47) Mid-Ebb 15:25 (13:40 - 17:10)

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 September 2016)**

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 October 2016)**

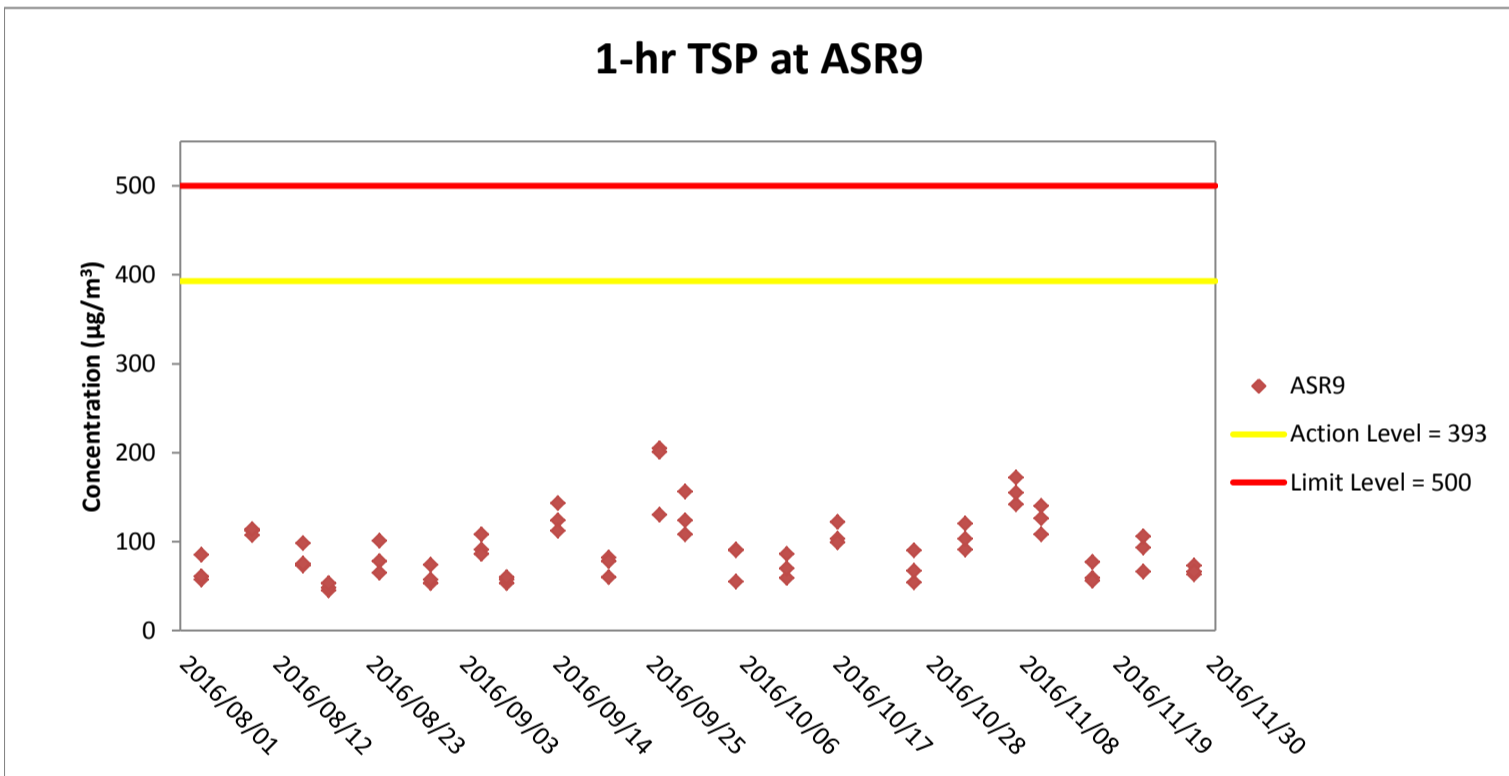
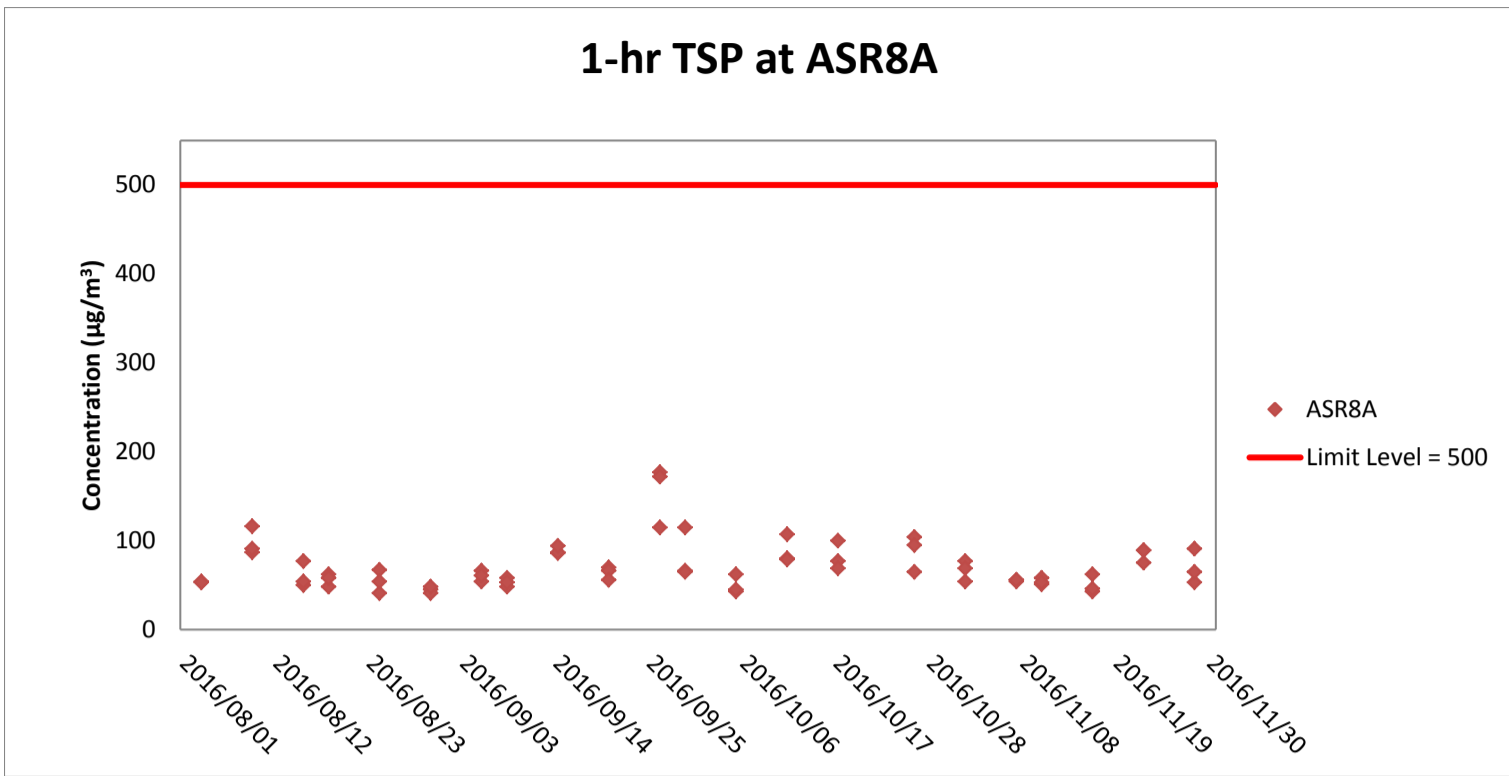
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						1-Oct
2-Oct	3-Oct	4-Oct	5-Oct	6-Oct	7-Oct	8-Oct
		Impact Dolphin Monitoring			Impact Dolphin Monitoring	
9-Oct	10-Oct	11-Oct	12-Oct	13-Oct	14-Oct	15-Oct
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		
16-Oct	17-Oct	18-Oct	19-Oct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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 November 2016)**

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

Appendix F

Impact Air Quality
Monitoring Graphical
Presentation

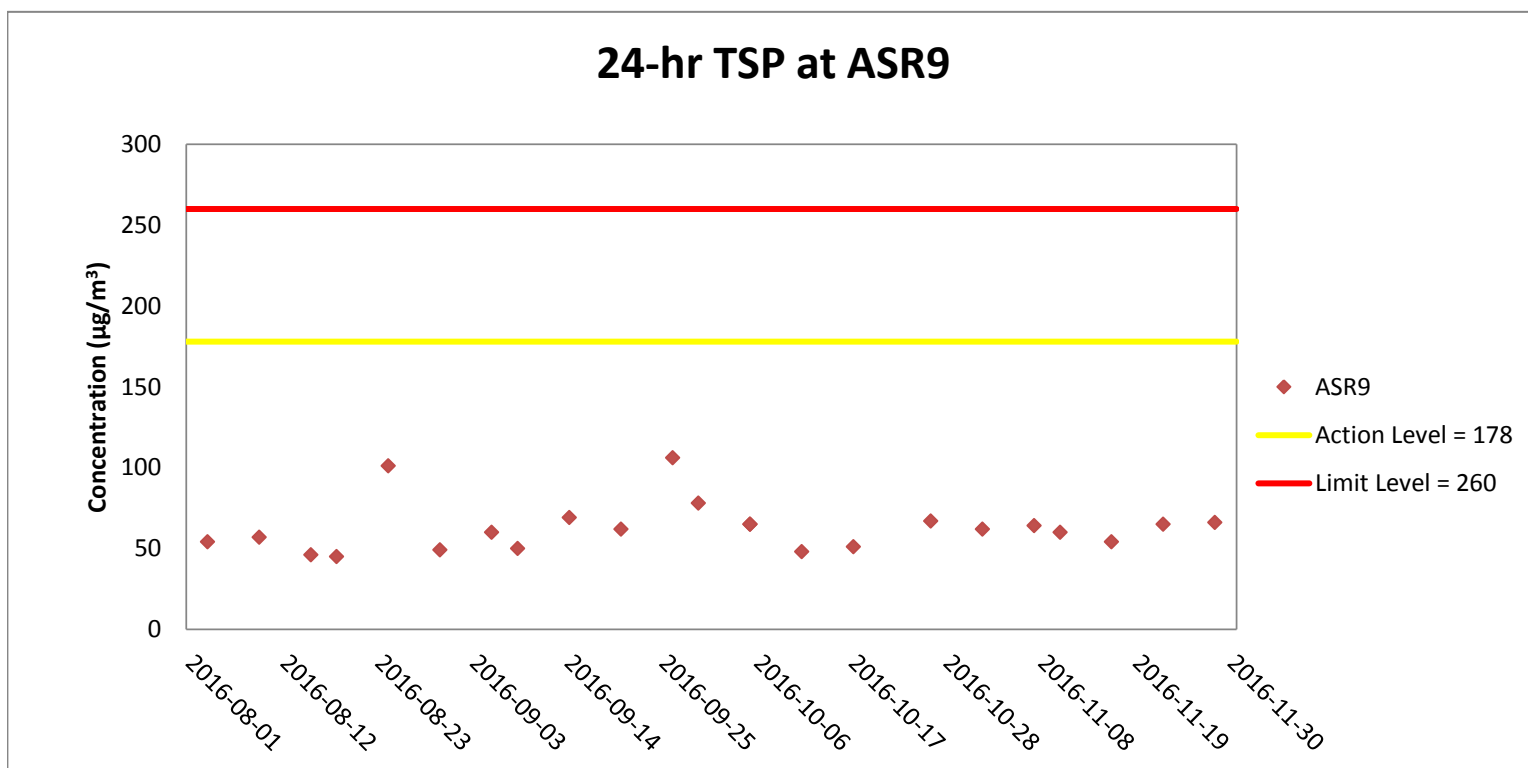
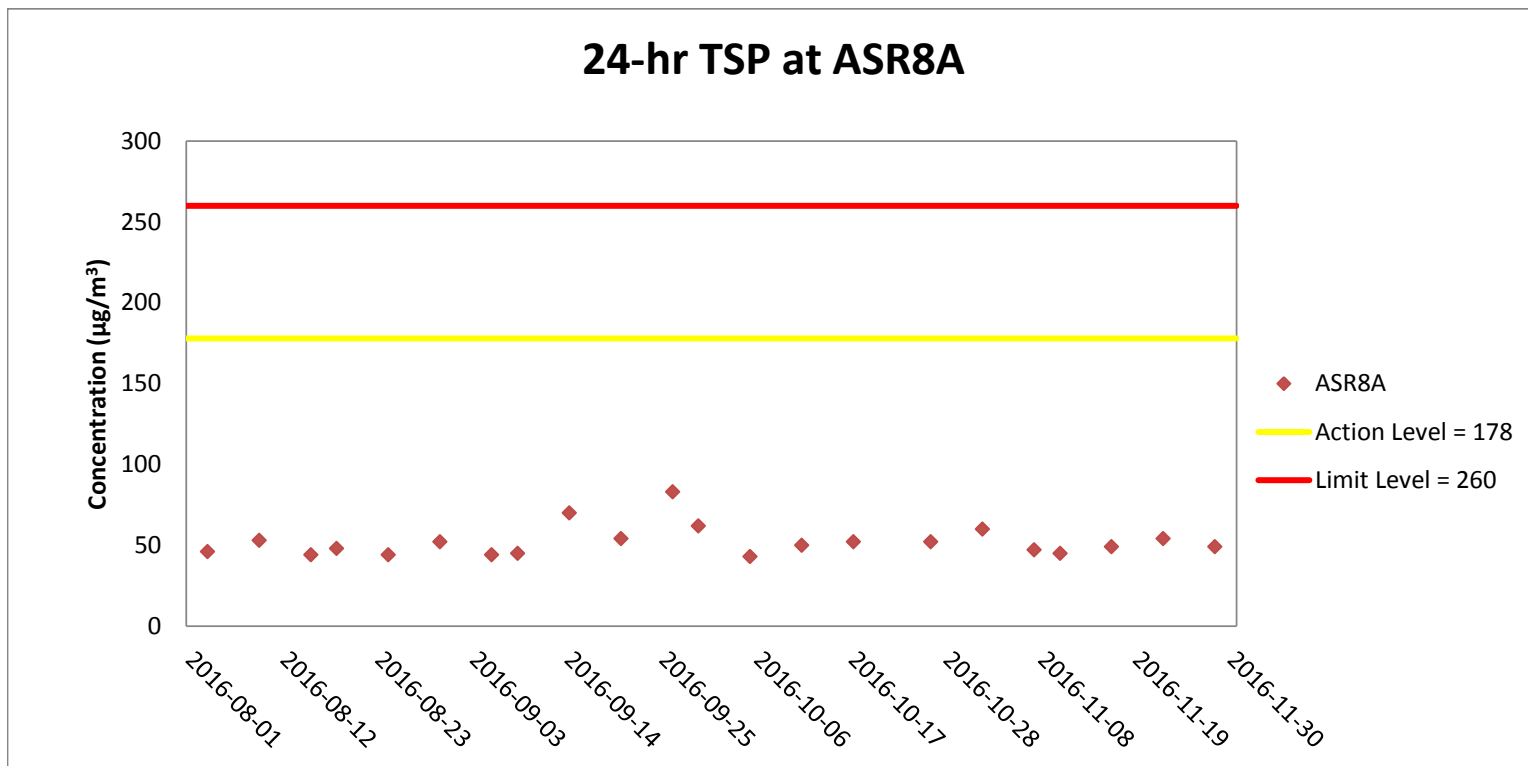


Weather condition within the reporting period varied between sunny to rainy.

Major construction works undertaken within the reporting period include Pier construction; Re-alignment of Cheung Tung Road; Road works along North Lantau Highway;; Installation of pier head and deck segments; and Slope work of Viaducts A, B & C.

Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

AQM on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.



Weather condition within the reporting period varied between sunny to rainy.

Major construction works undertaken within the reporting period include Pier construction; Re-alignment of Cheung Tung Road; Road works along North Lantau Highway; Installation of pier head and deck segments; and Slope work of Viaducts A, B & C.

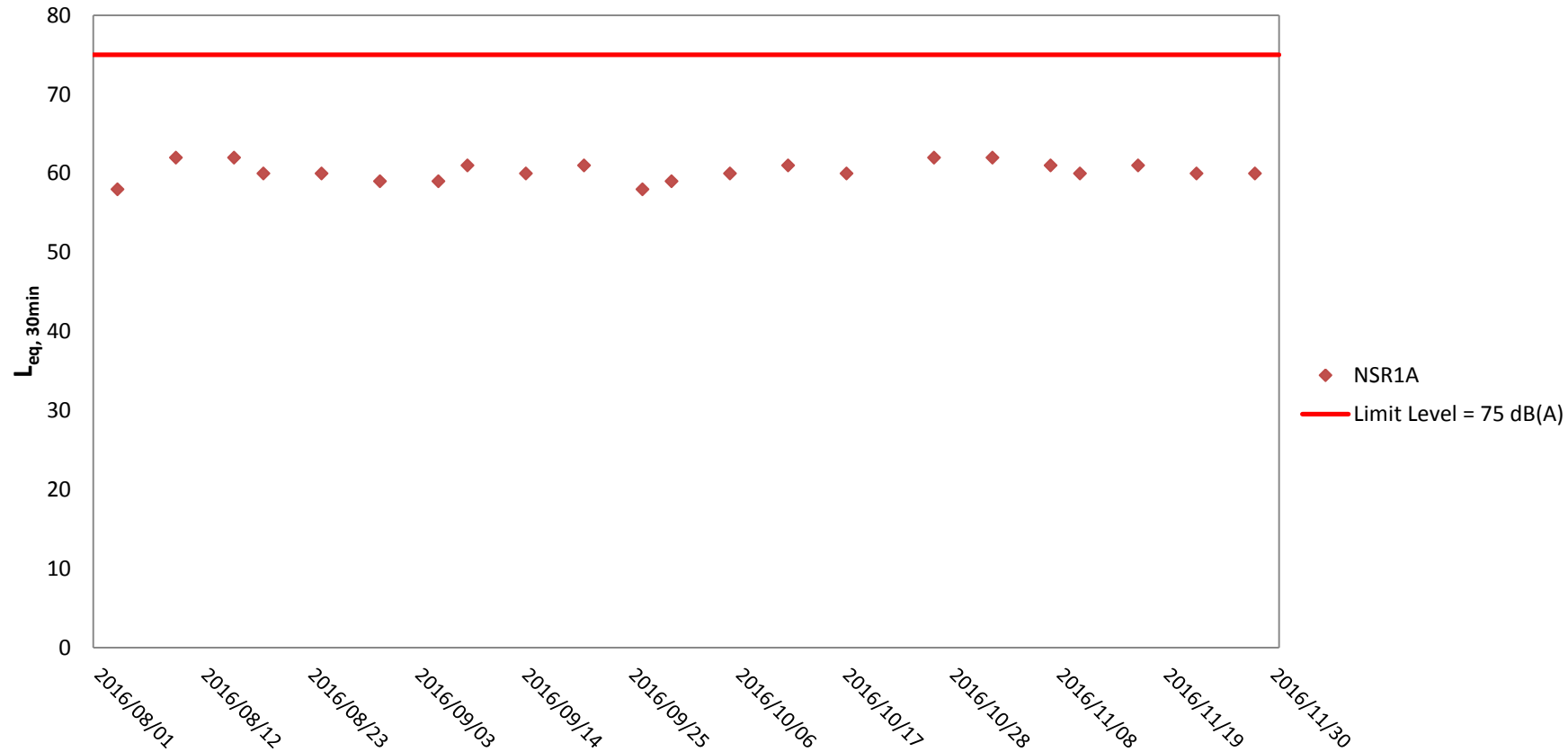
Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

AQM on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

Appendix G

Impact Noise Monitoring Graphical Presentation

Noise Monitoring Results at NSR 1A ($L_{eq, 30min}$)



Weather condition within the reporting period varied between sunny to rainy.

Major construction works undertaken within the reporting period include Pier construction; Re-alignment of Cheung Tung Road; Road works along North Lantau Highway; Installation of pier head and deck segments; and Slope work of Viaducts A, B & C.

Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

Noise Monitoring on 20 October 2016 was postponed to 26 October 2016 due to adverse weather conditions.

Appendix H

Impact Water Quality Monitoring Graphical Presentation

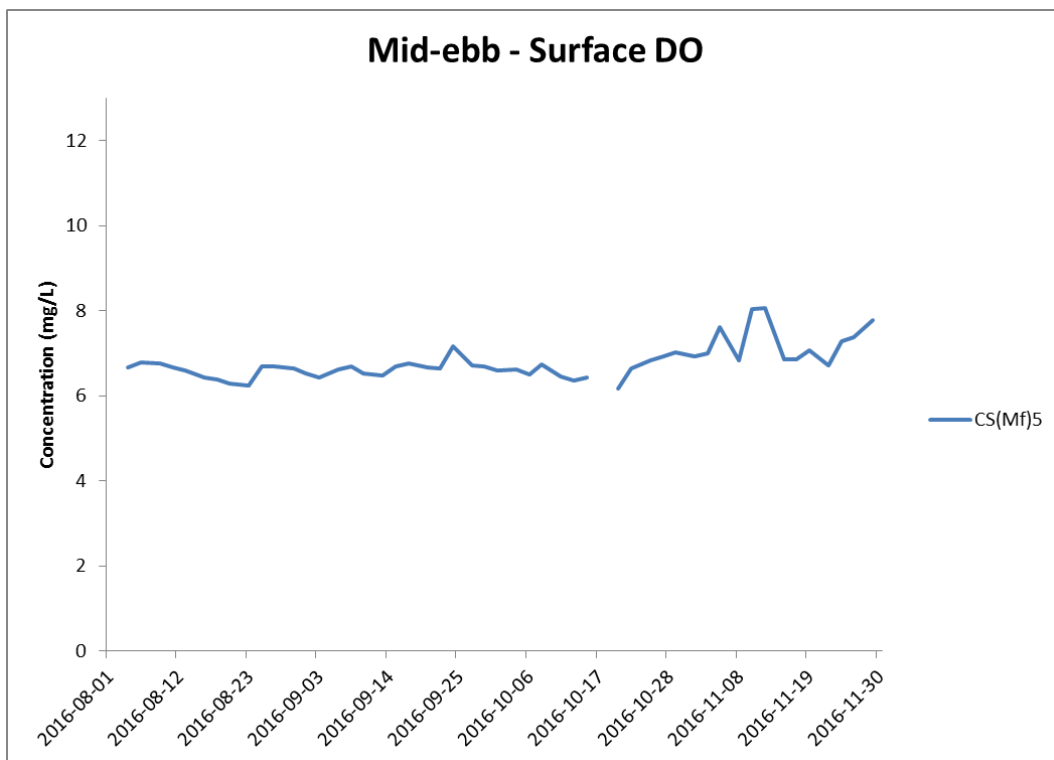
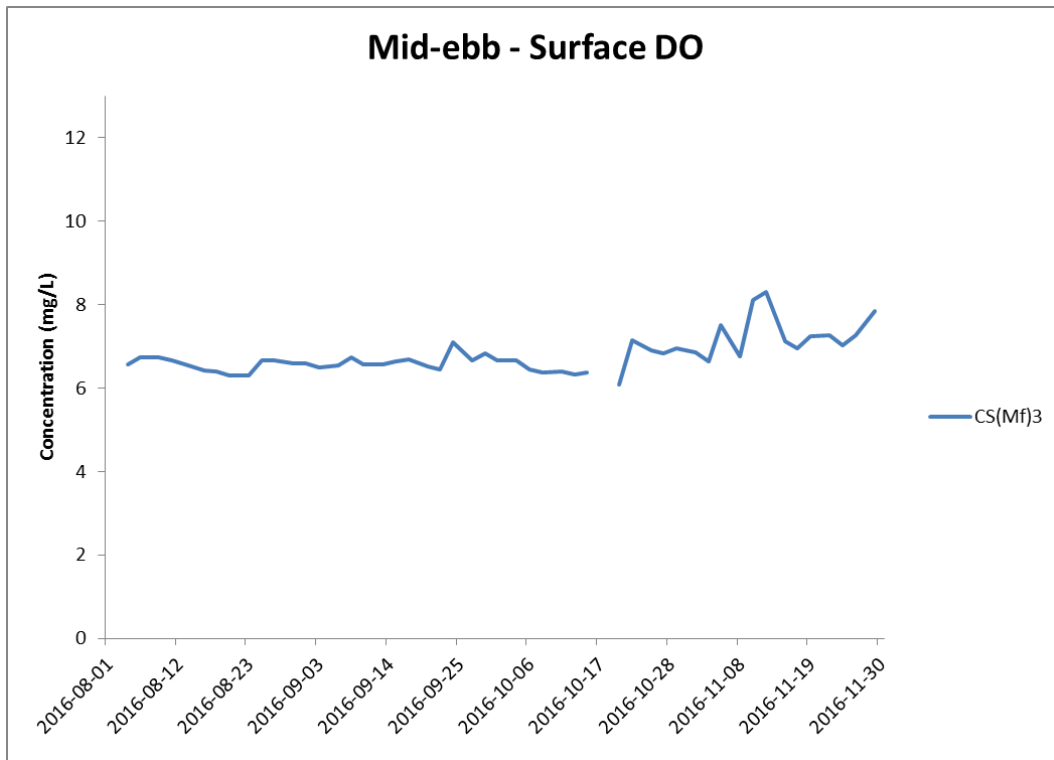
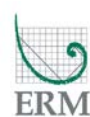


Figure H1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
Resources
Management**



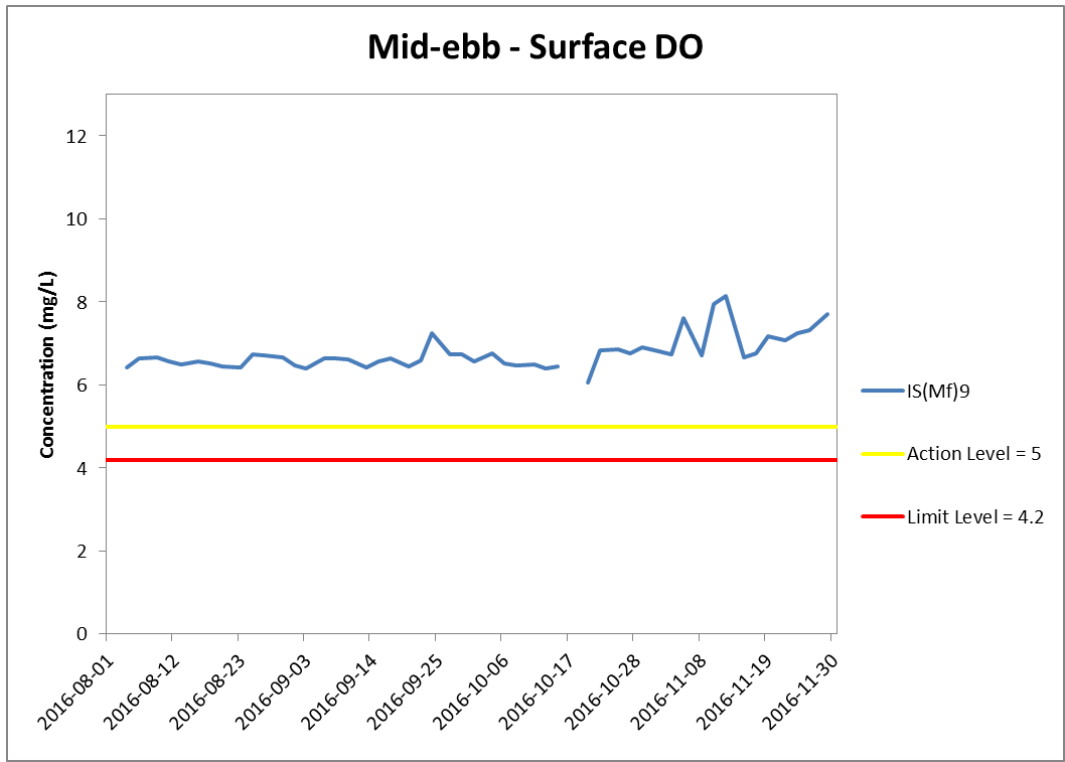
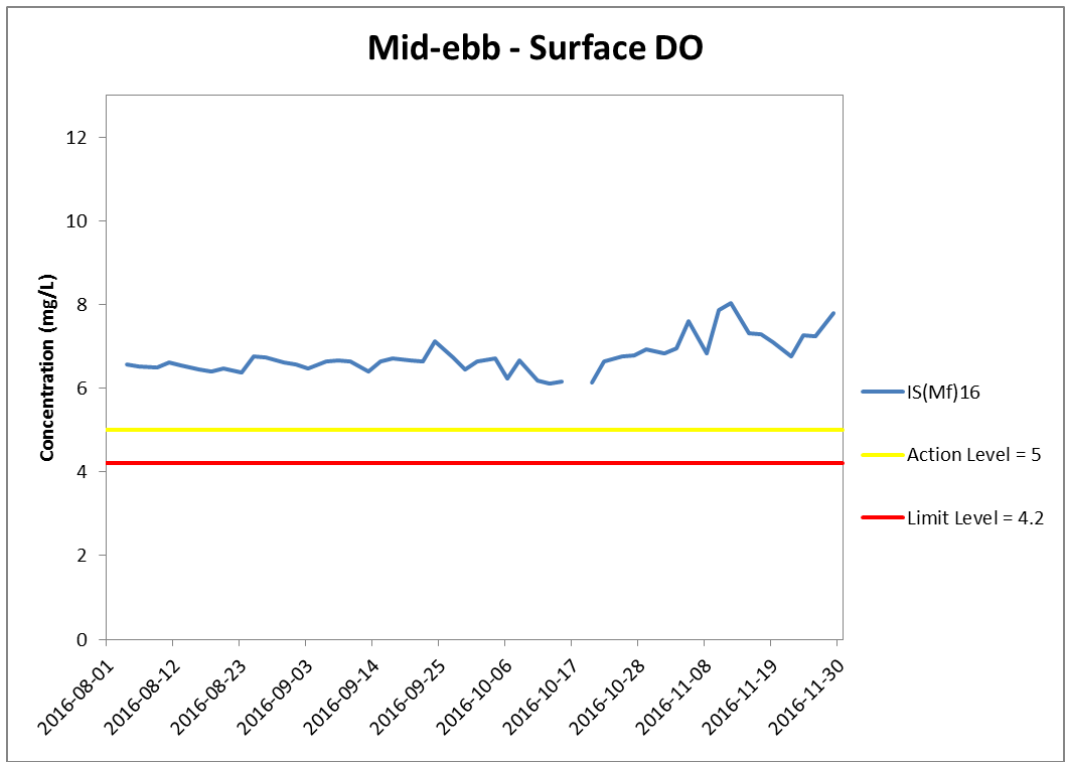


Figure H2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
 Resources
 Management**



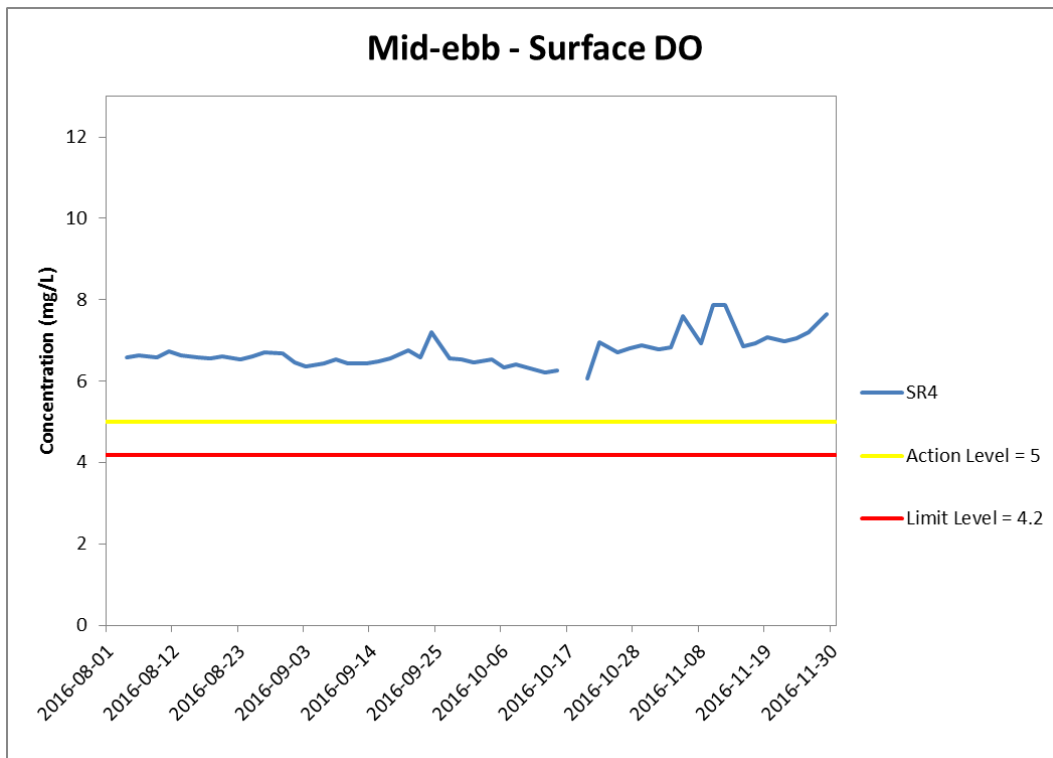
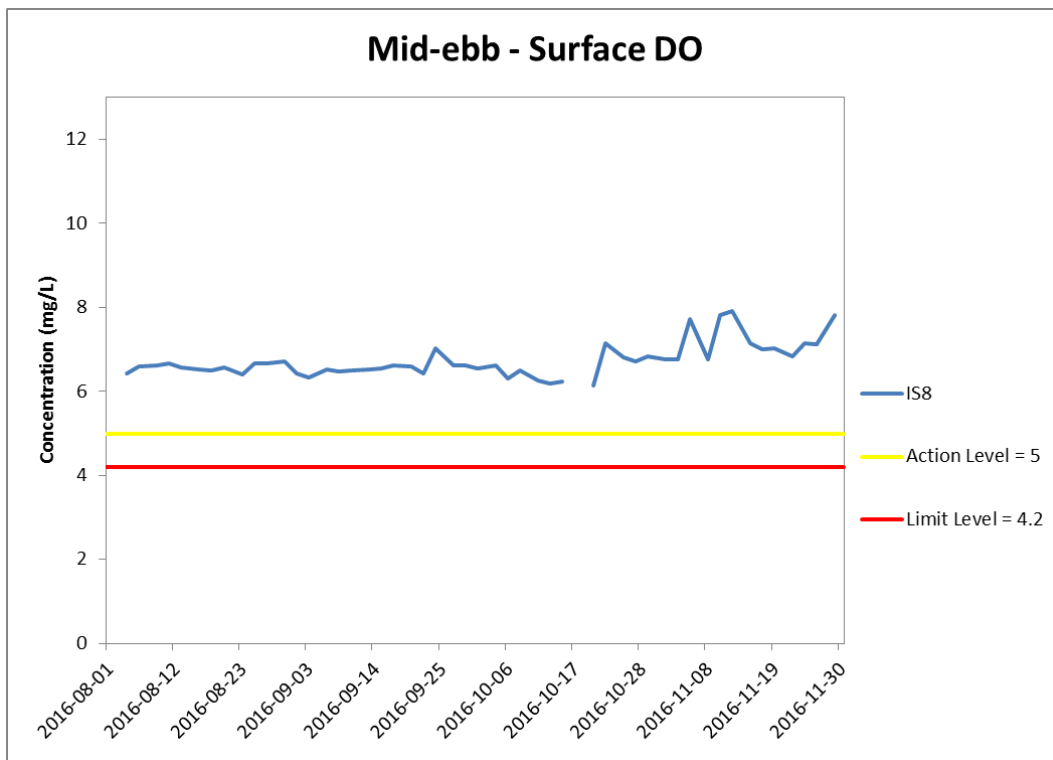


Figure H3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
 Resources
 Management**



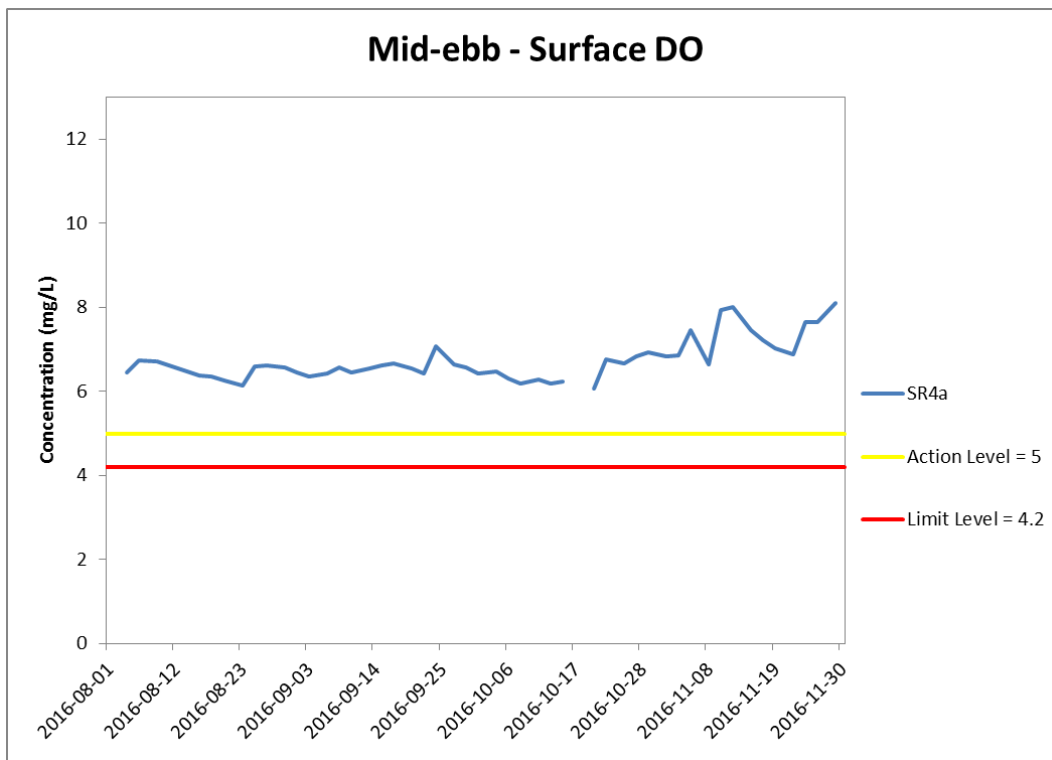


Figure H4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
 Resources
 Management**



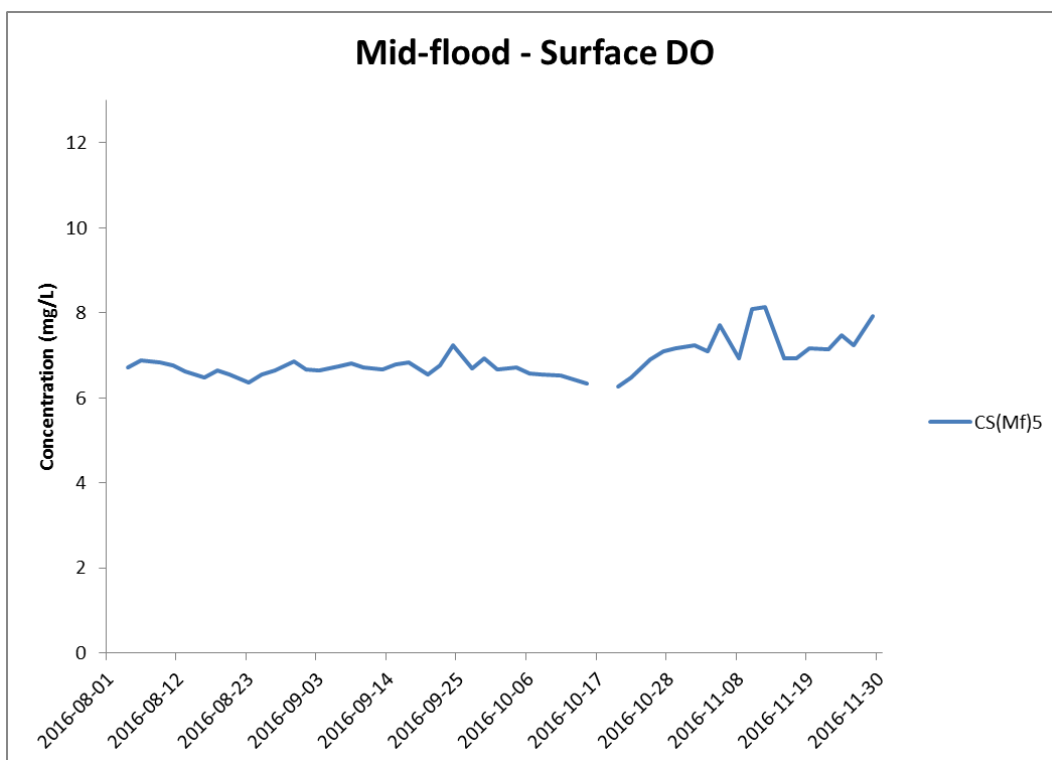
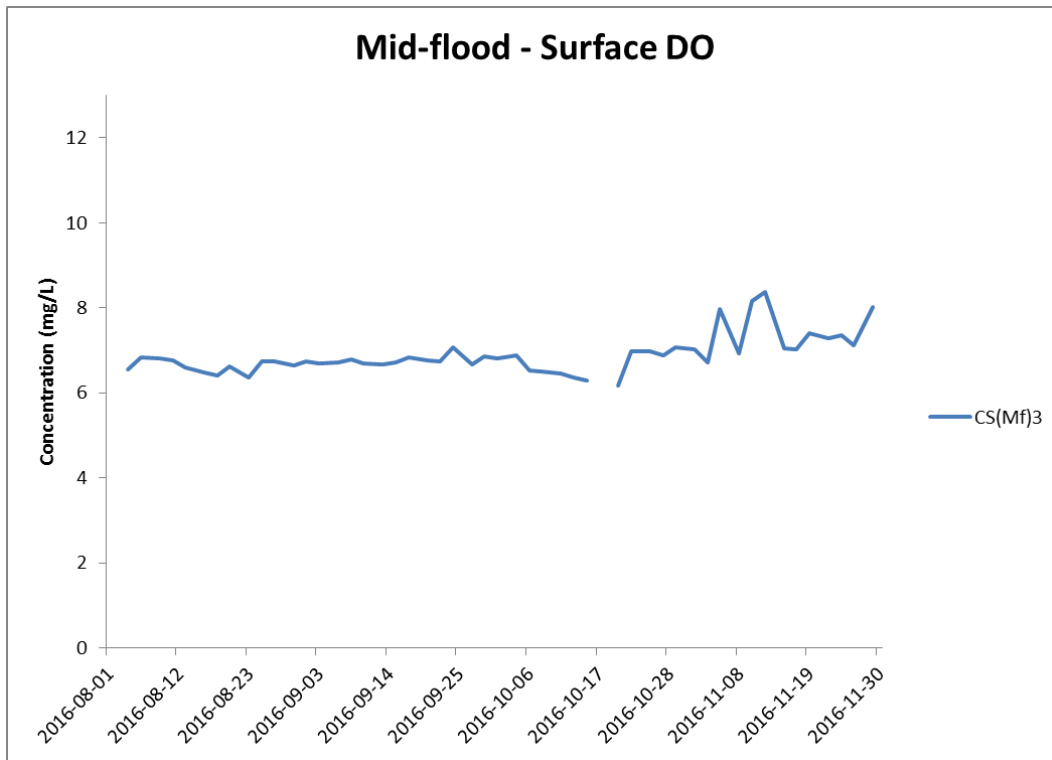


Figure H5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

**Environmental
Resources
Management**



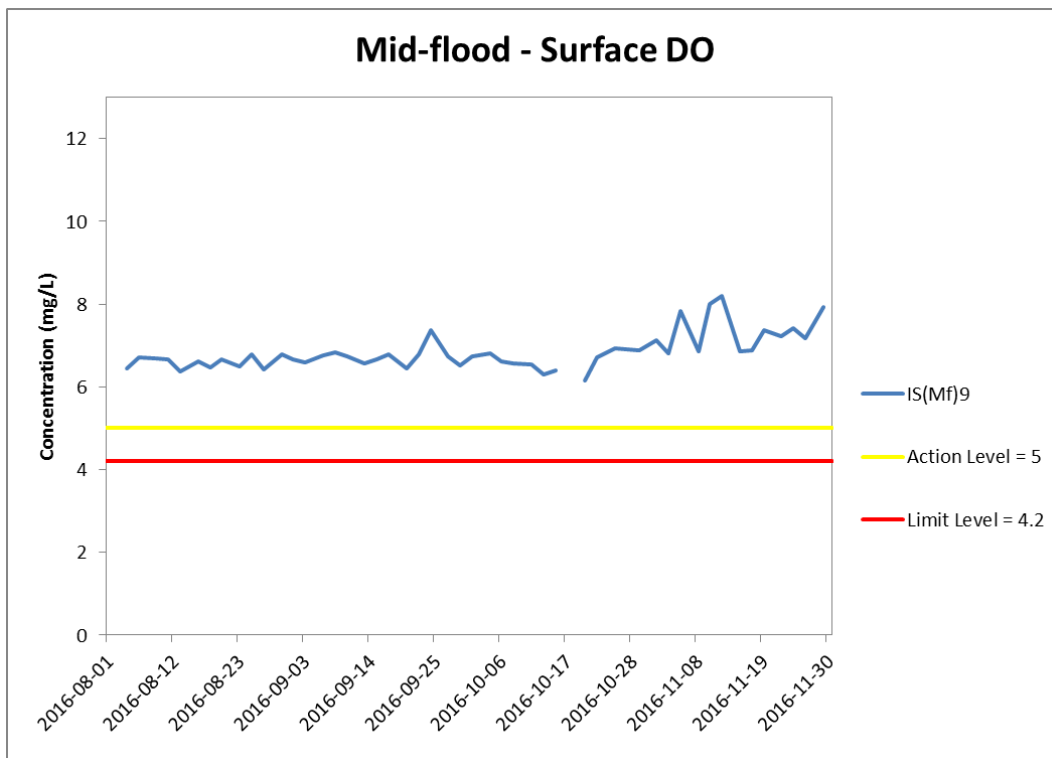
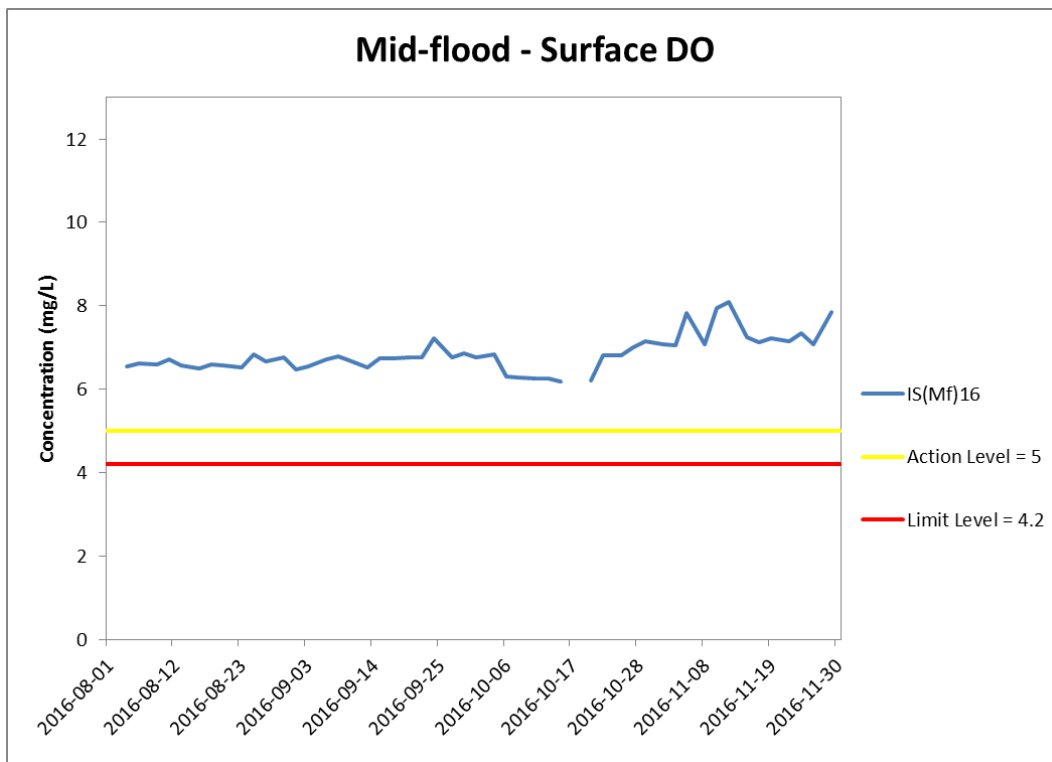


Figure H6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.)

WQM on 18 Oct 2016 was cancelled due to adverse weather conditions.

Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and

**Environmental
Resources
Management**



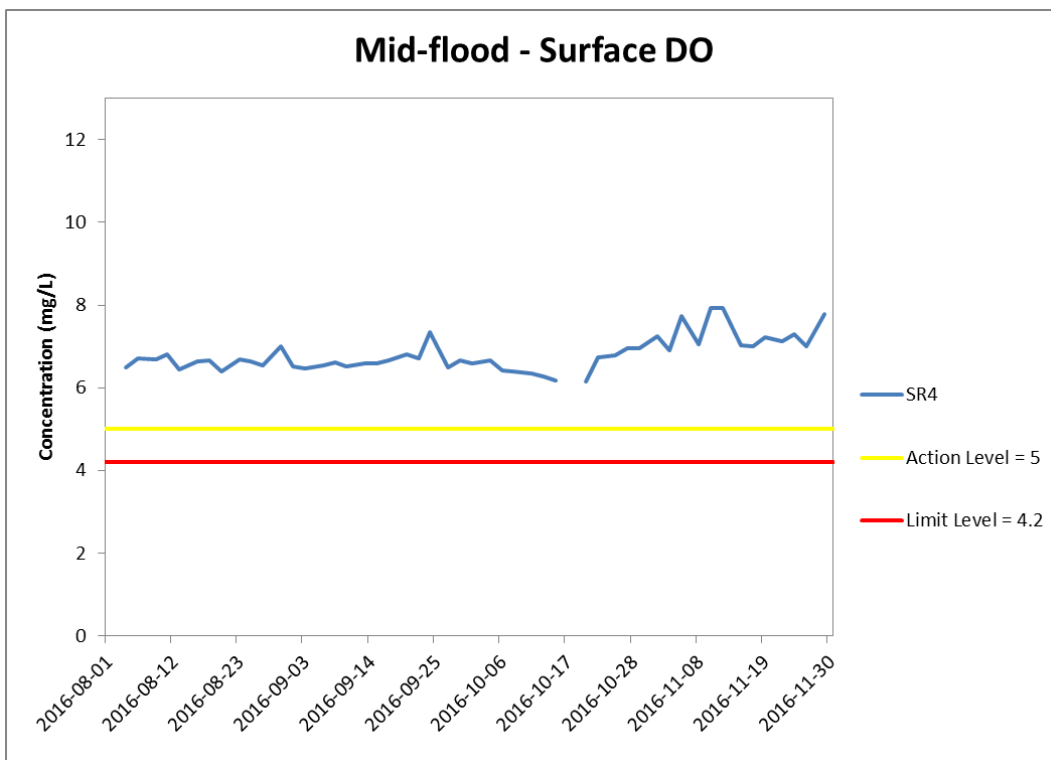
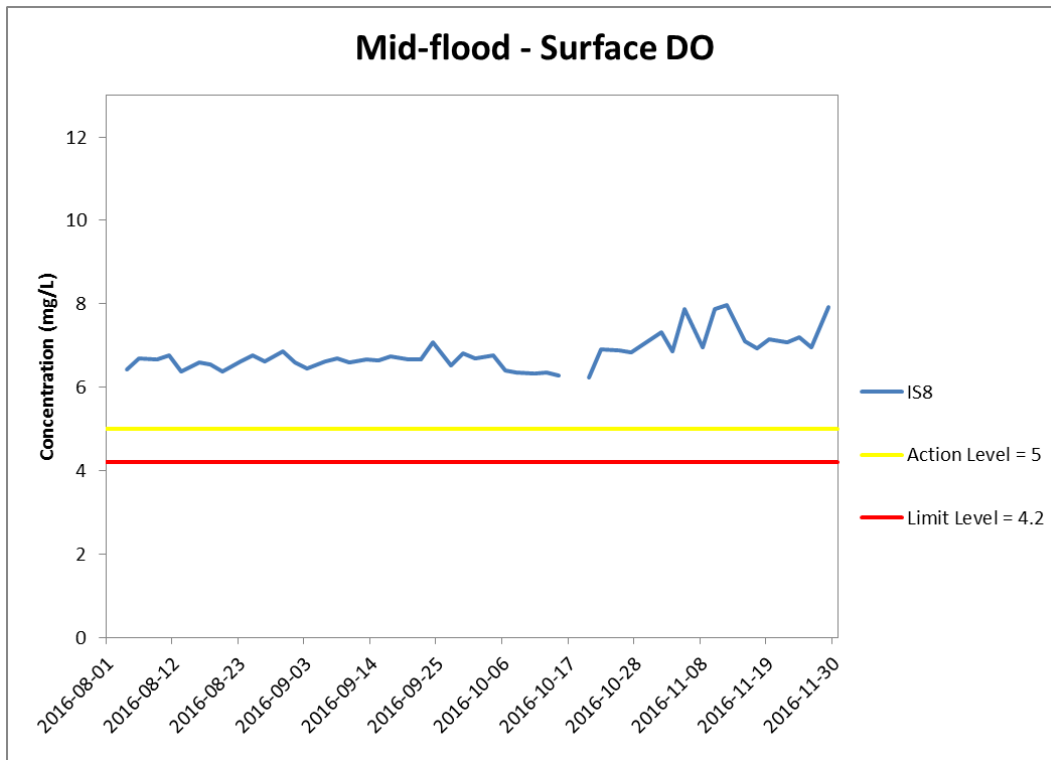


Figure H7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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Management**



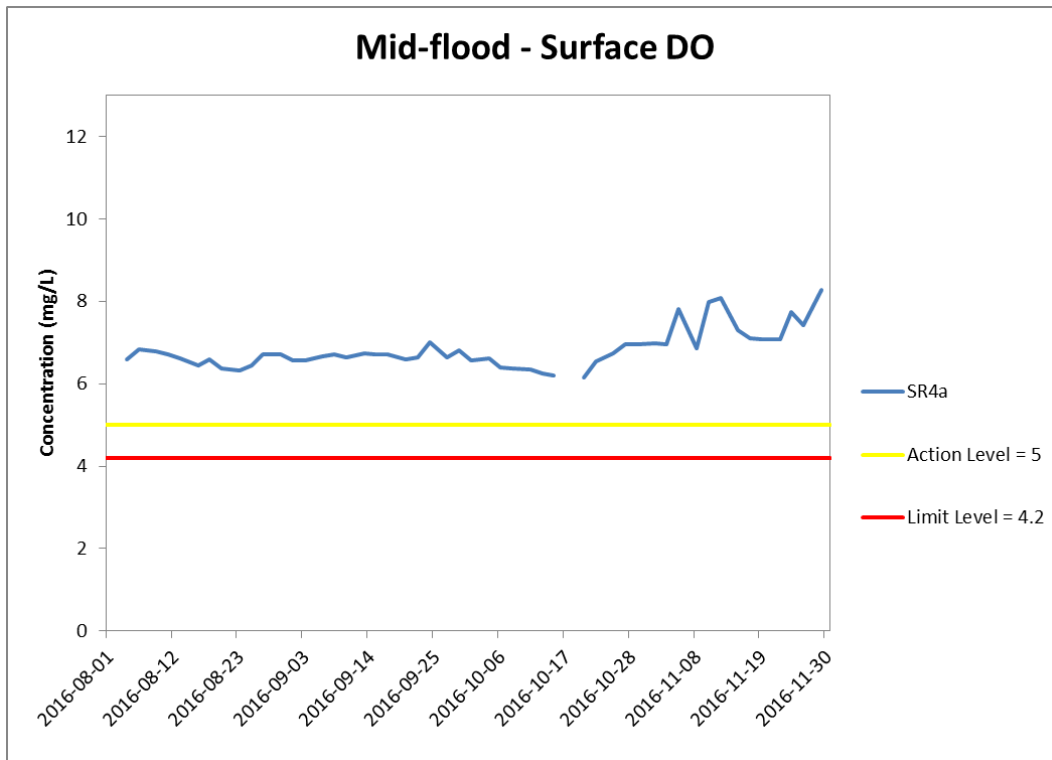
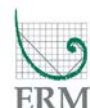


Figure H8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
 Resources
 Management**



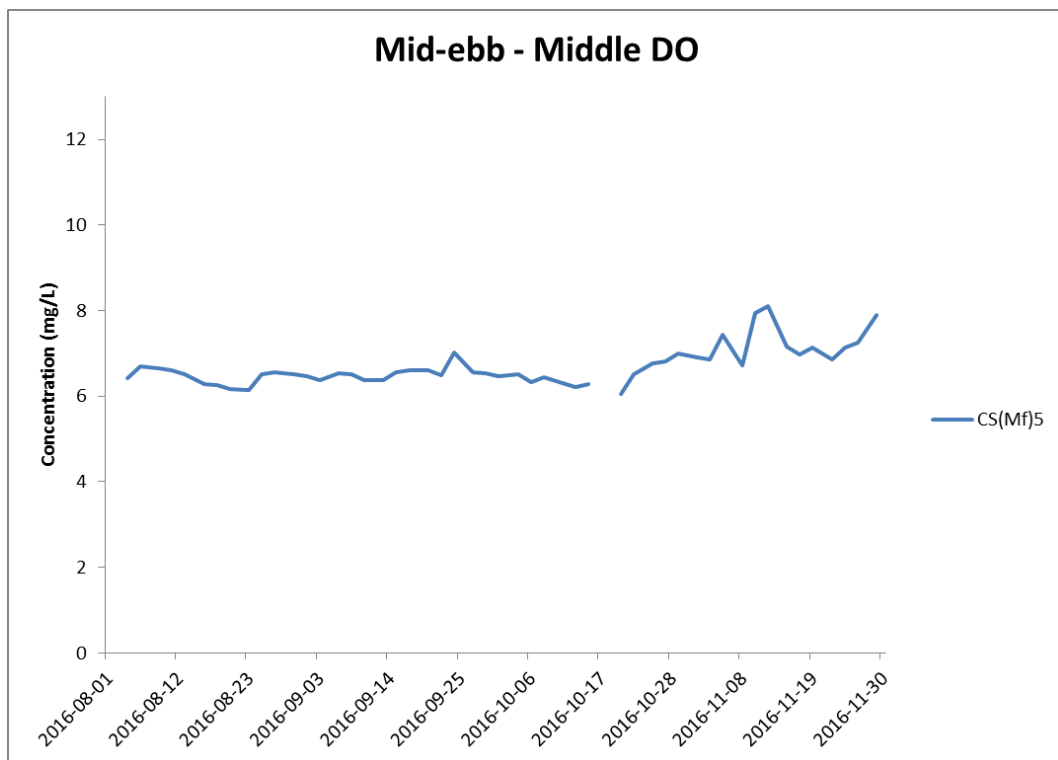
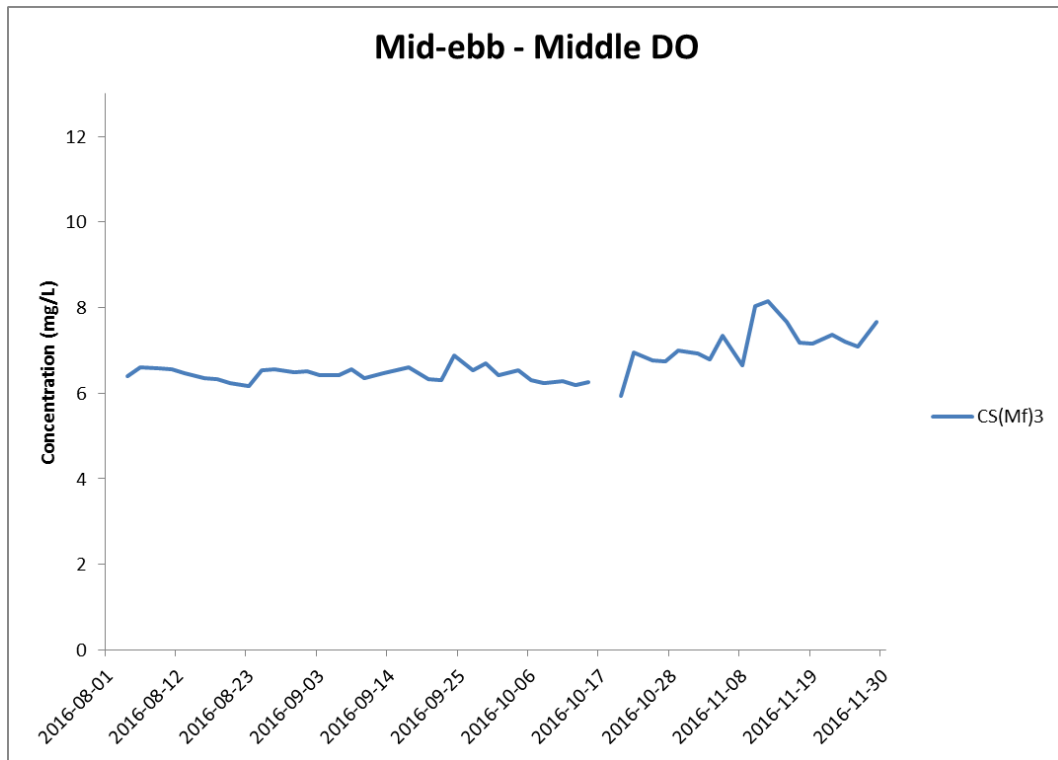


Figure H9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
 Resources
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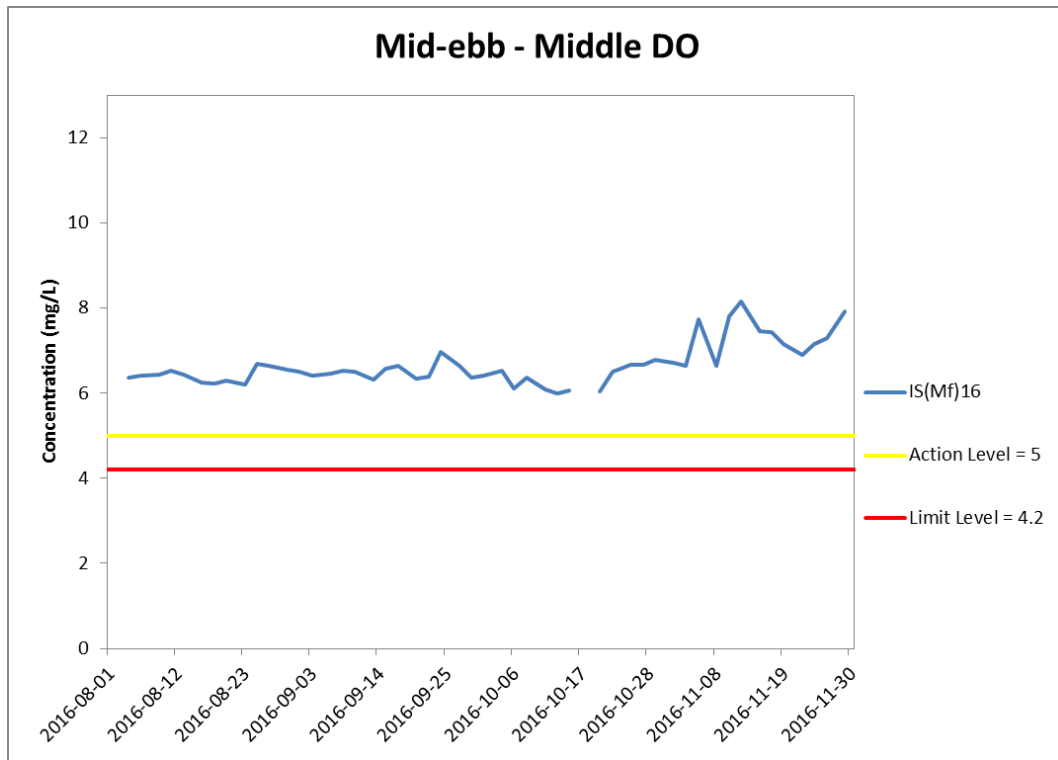
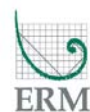


Figure H10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 August and 30 November 2016 at IS(Mf)16.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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 Resources
 Management**



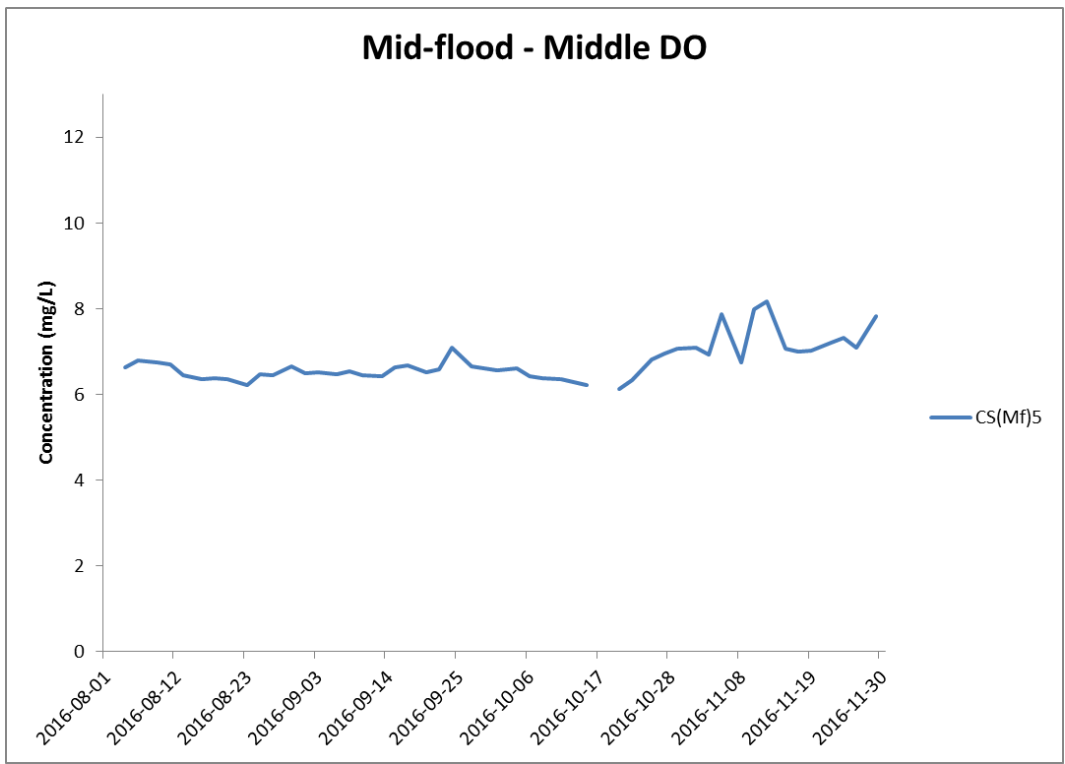
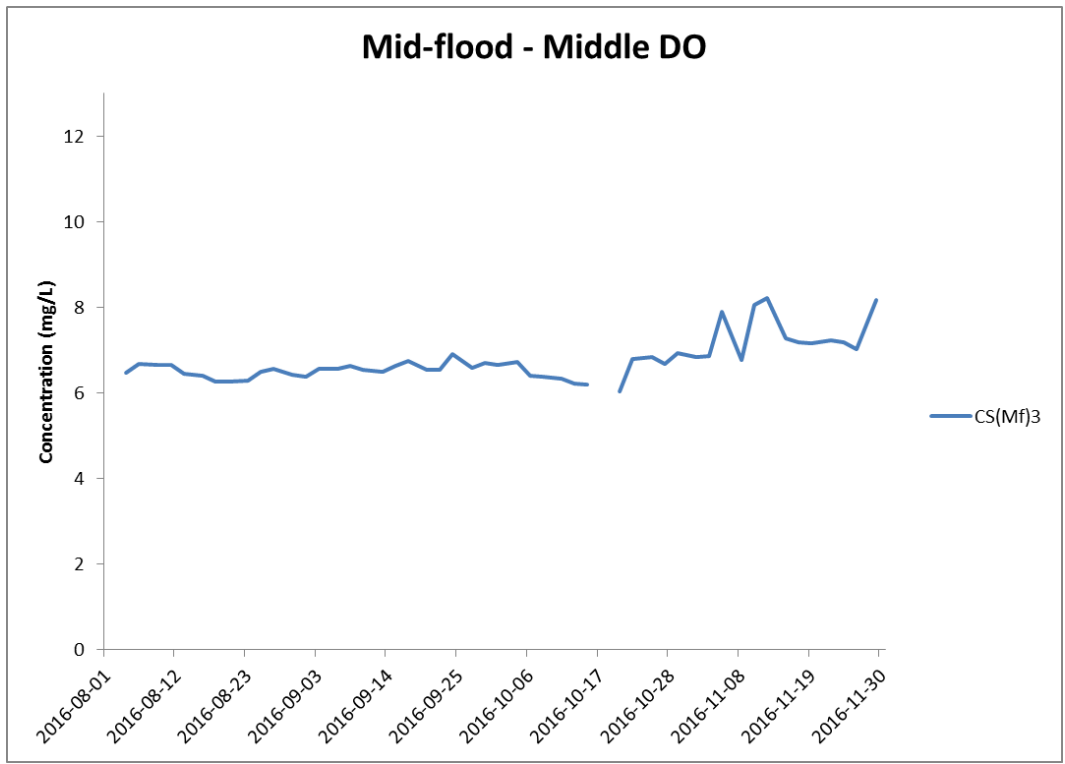


Figure H11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

Environmental Resources Management



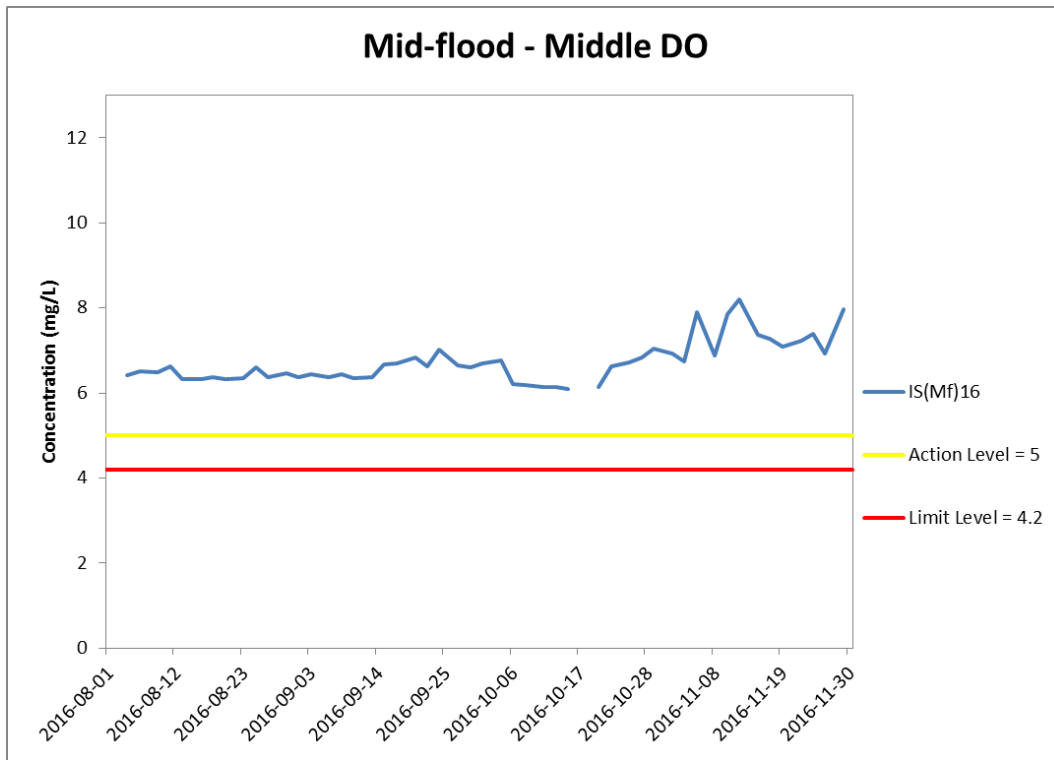
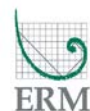


Figure H12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 August and 30 November 2016 at IS(Mf)16.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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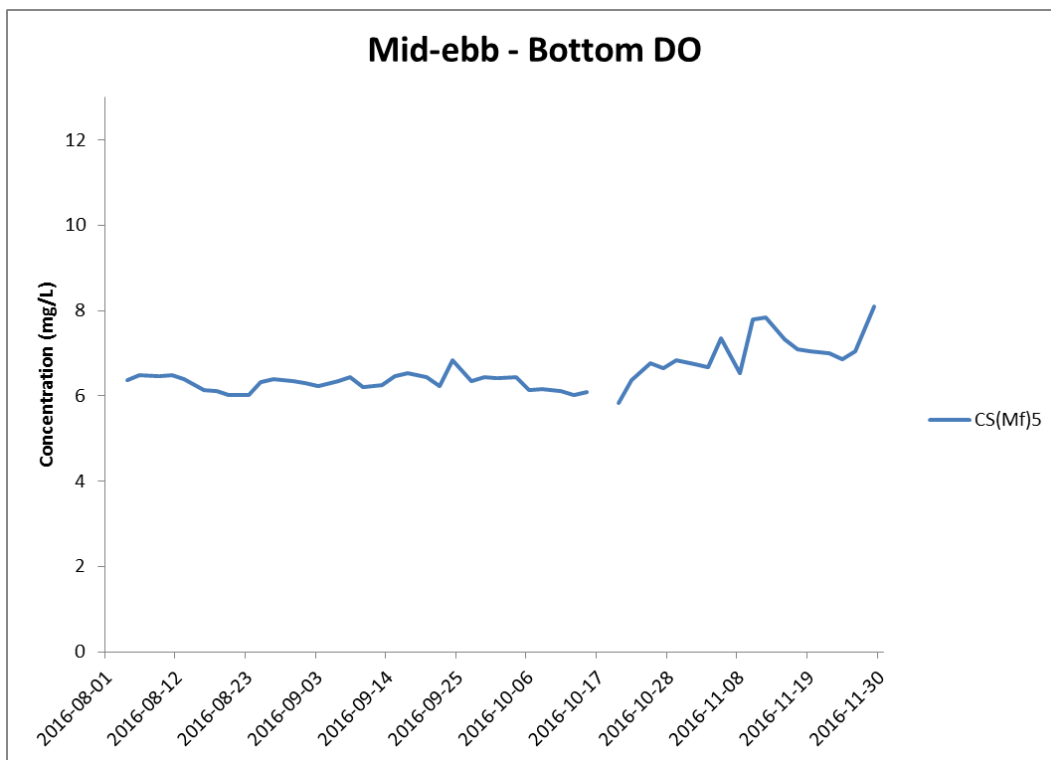
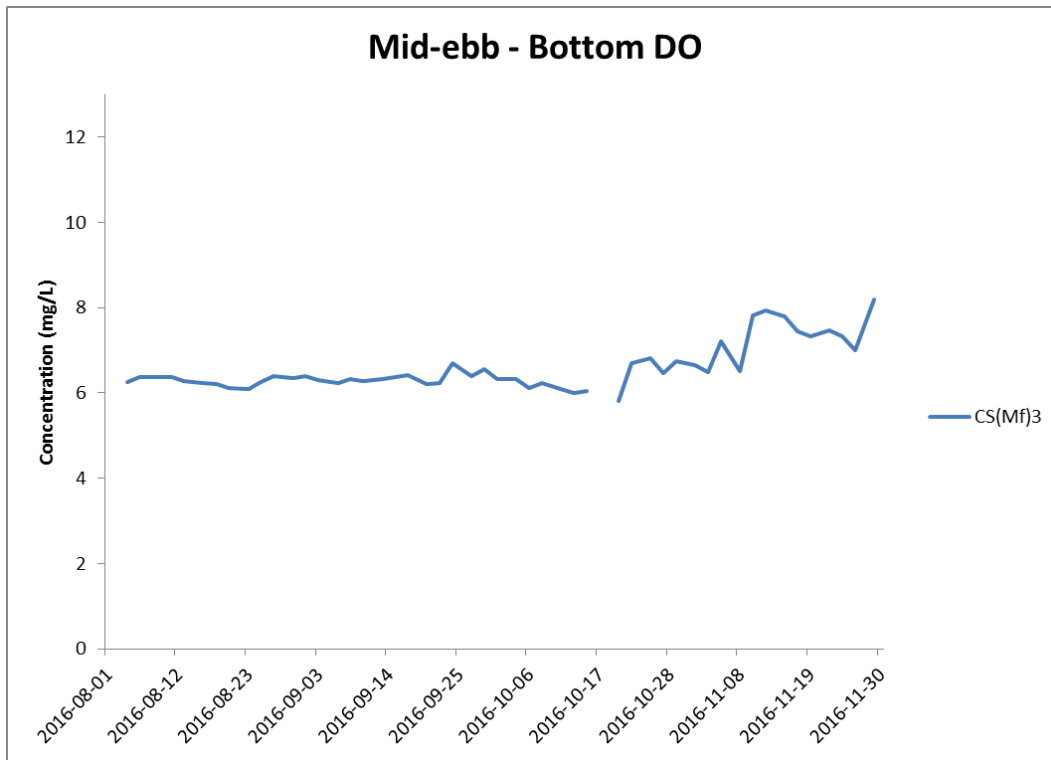
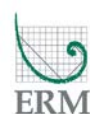


Figure H13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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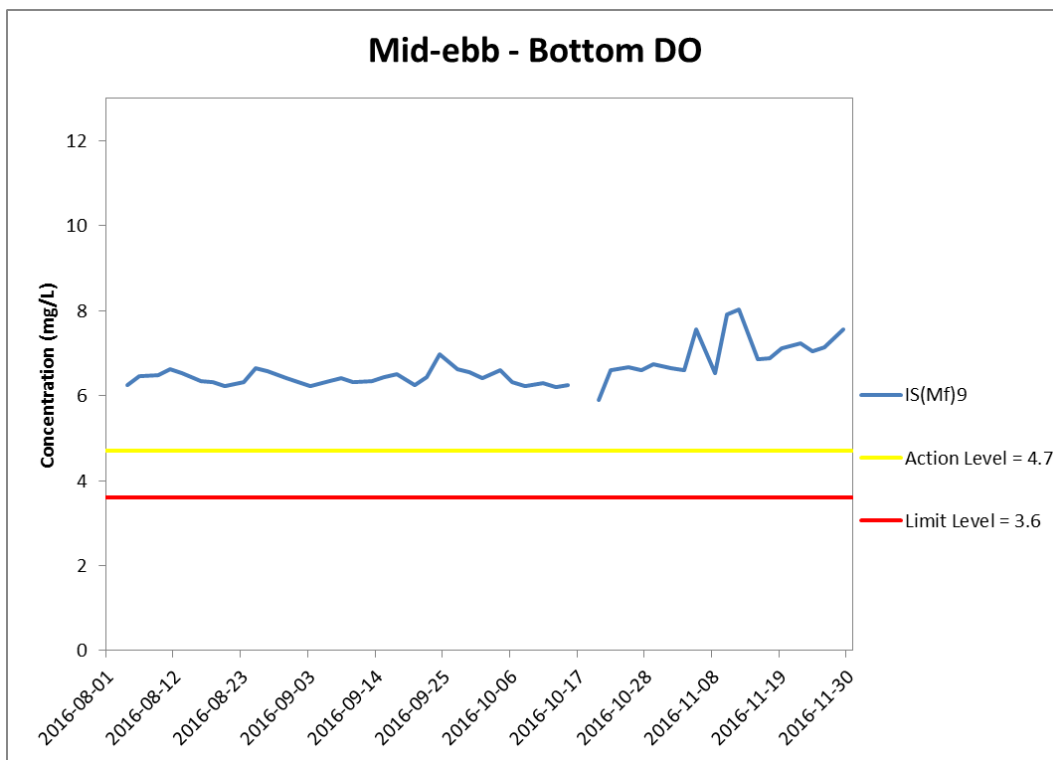
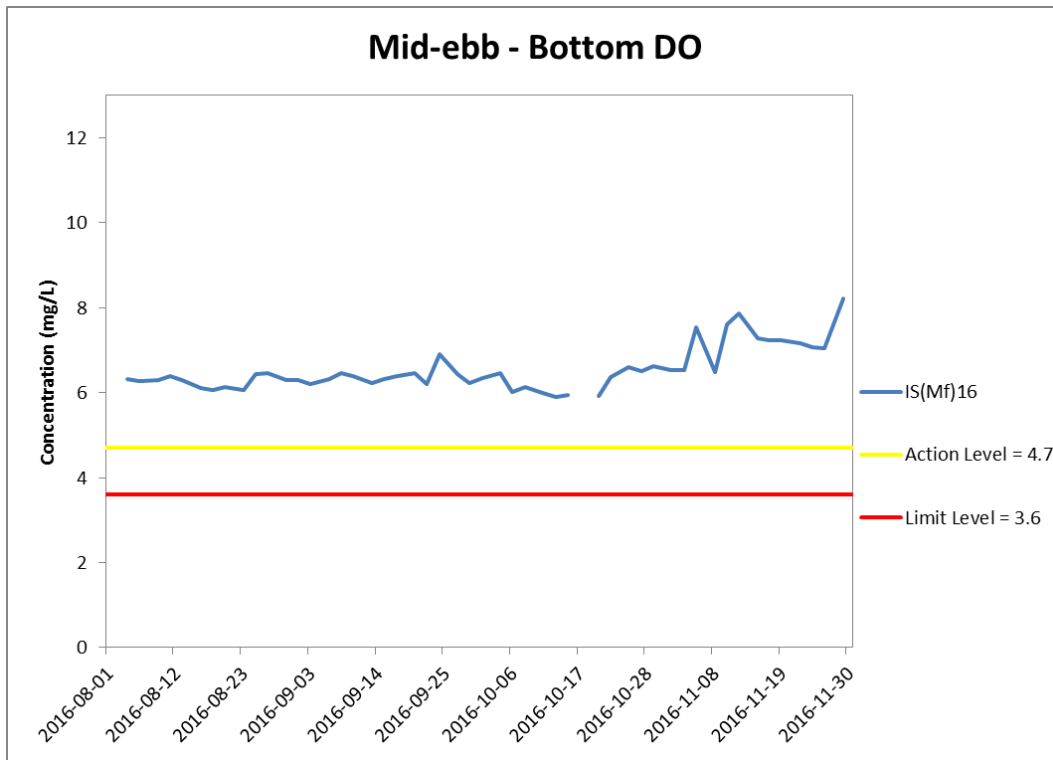
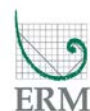


Figure H14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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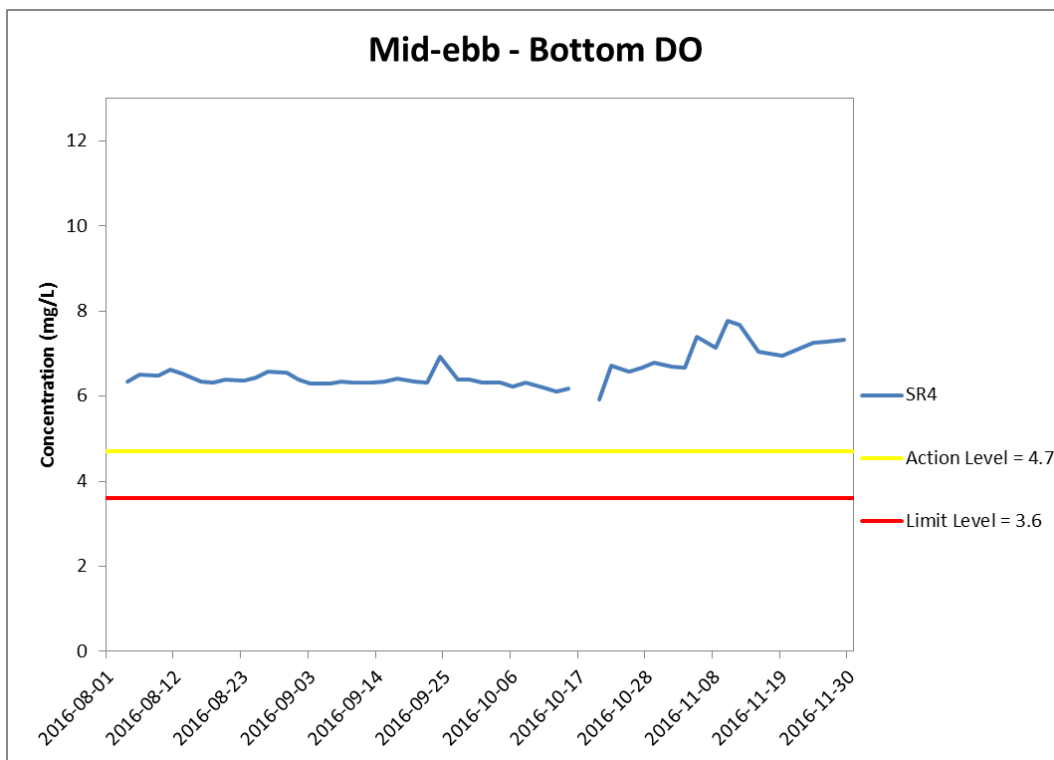
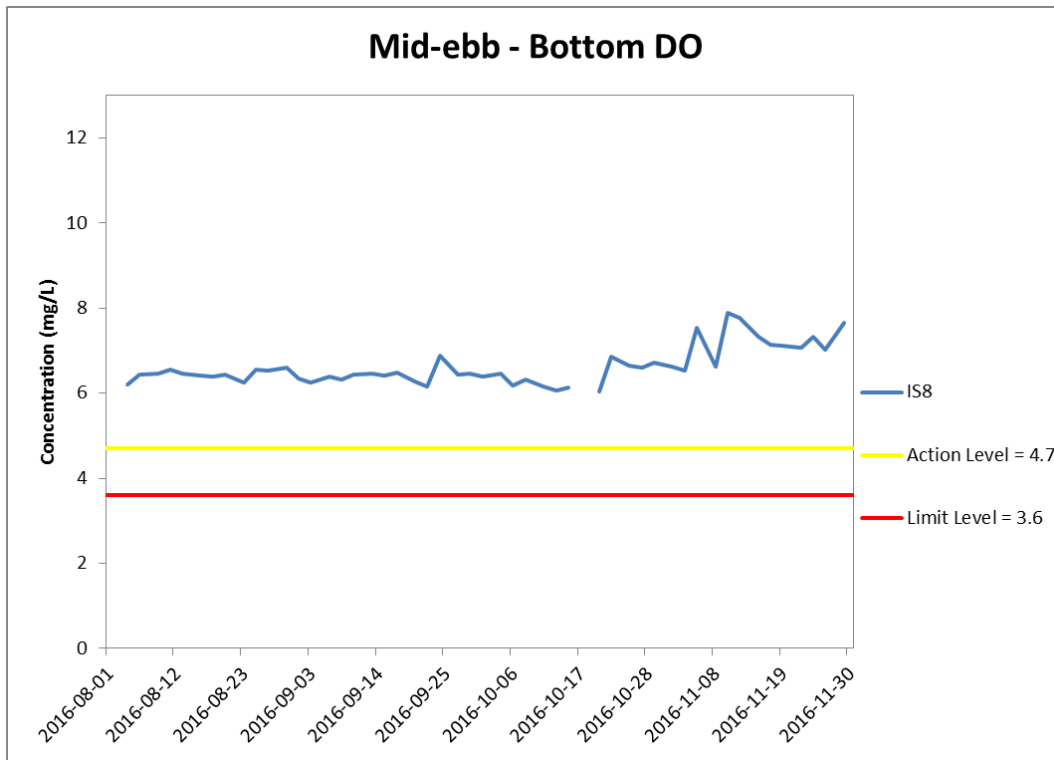
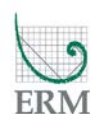


Figure H15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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 Resources
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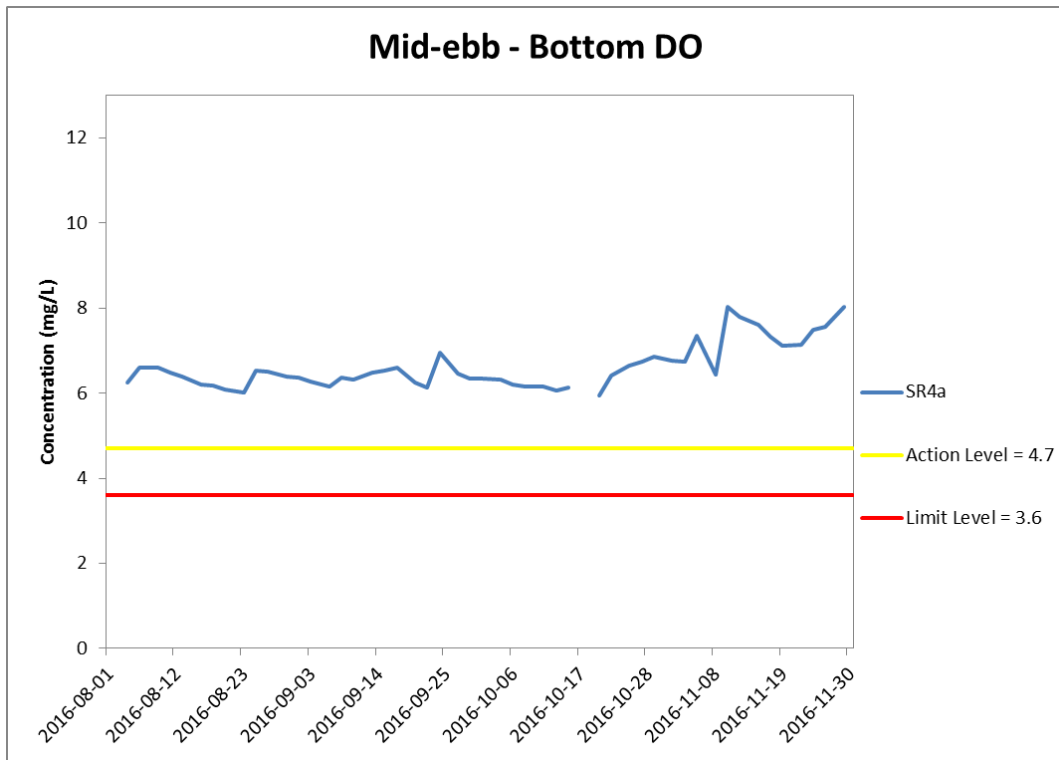


Figure H16 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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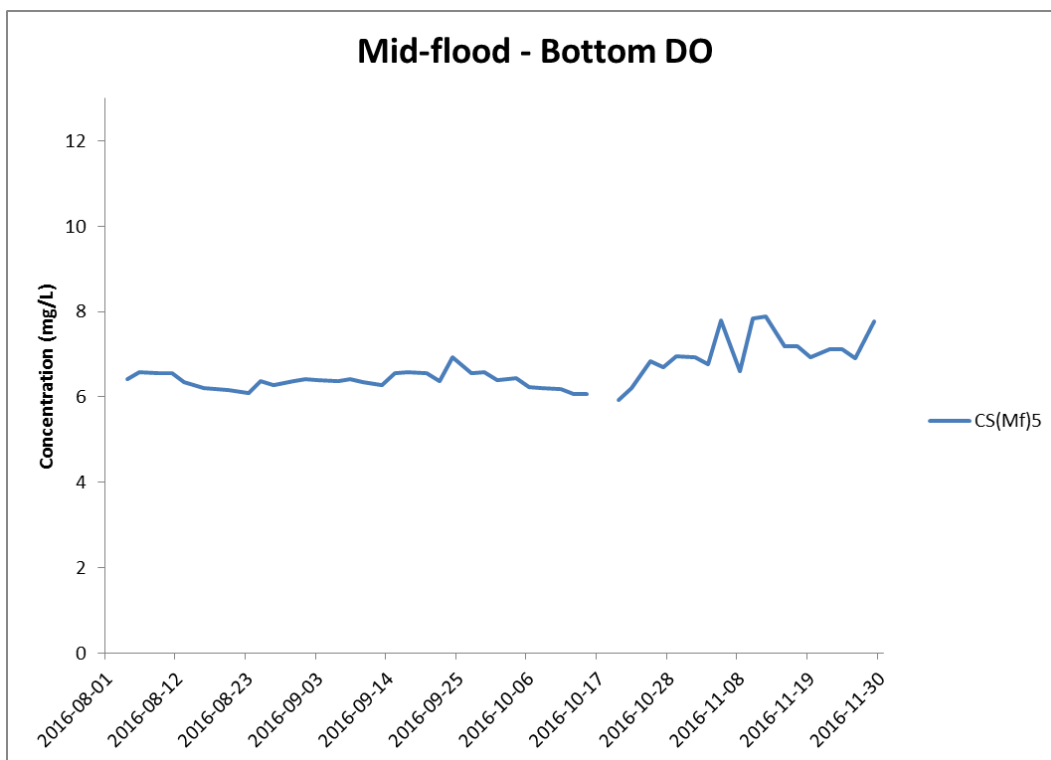
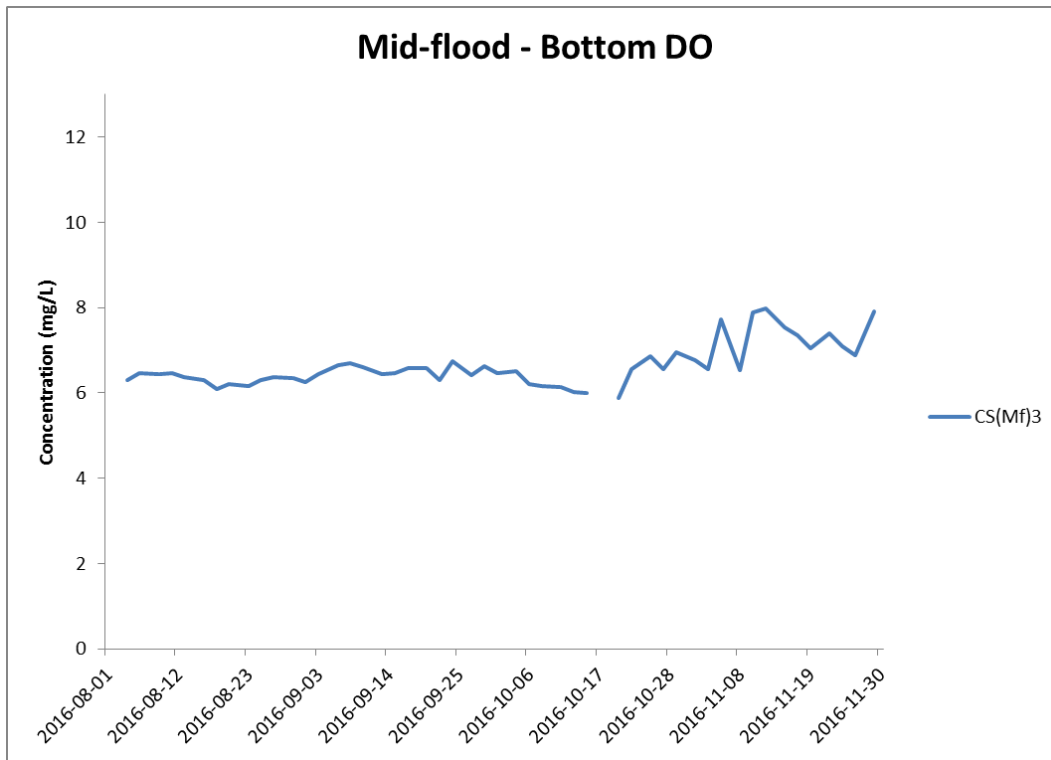
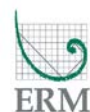


Figure H17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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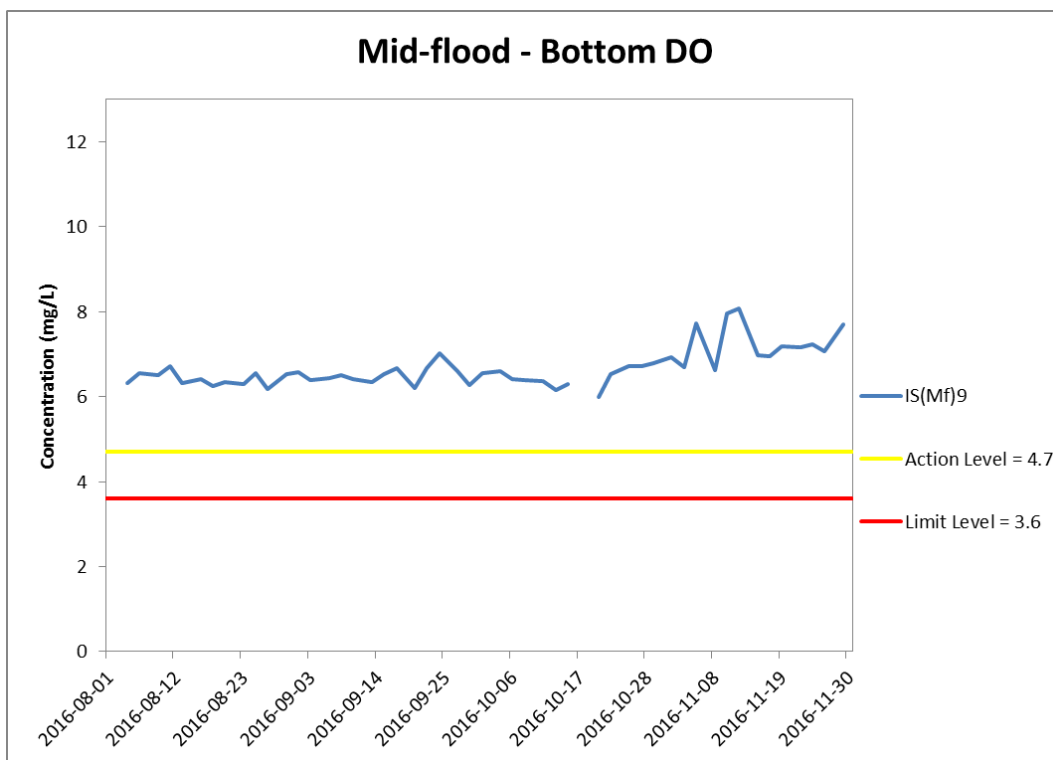
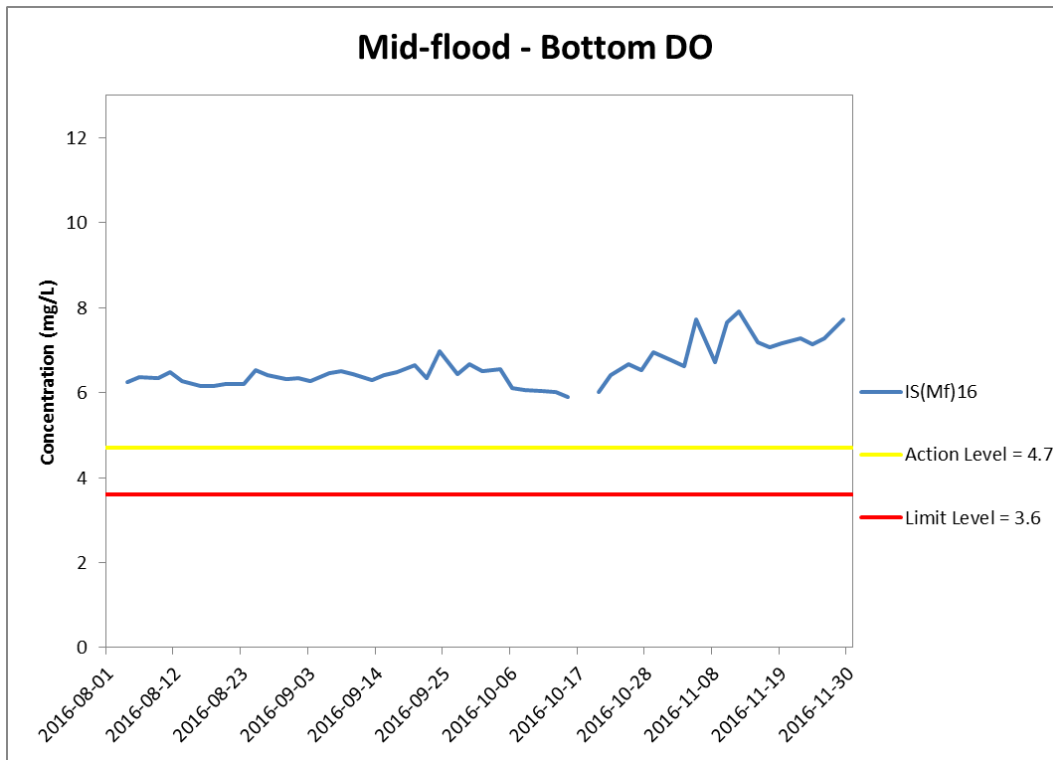
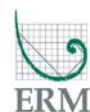


Figure H18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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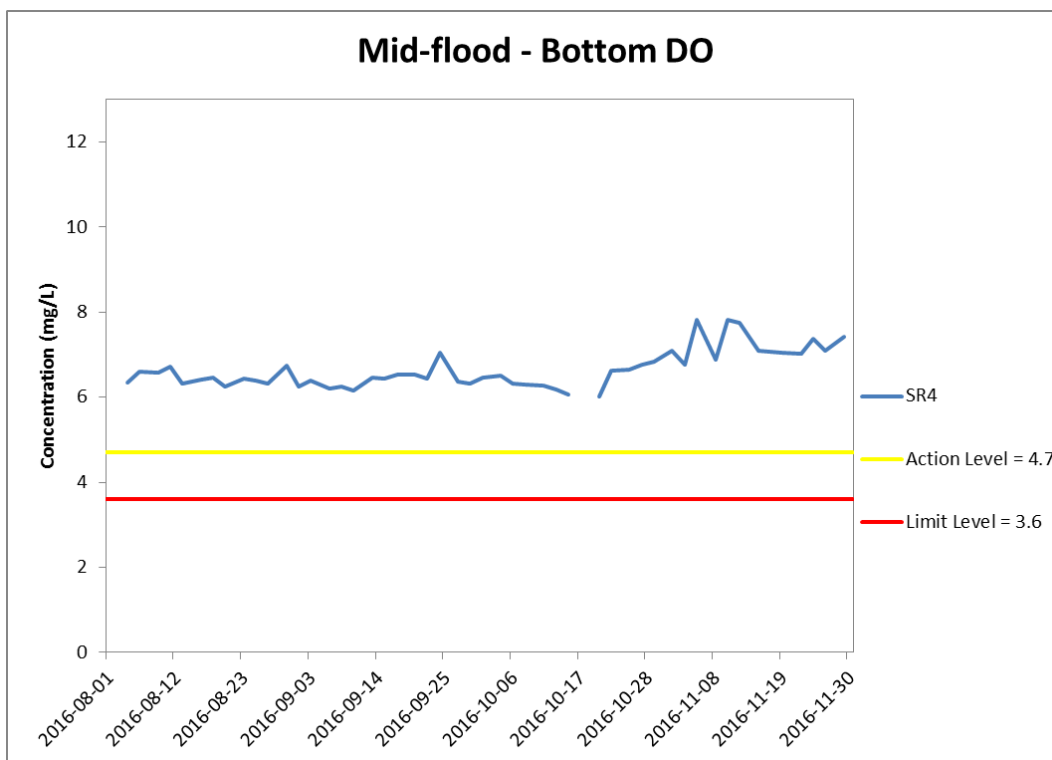
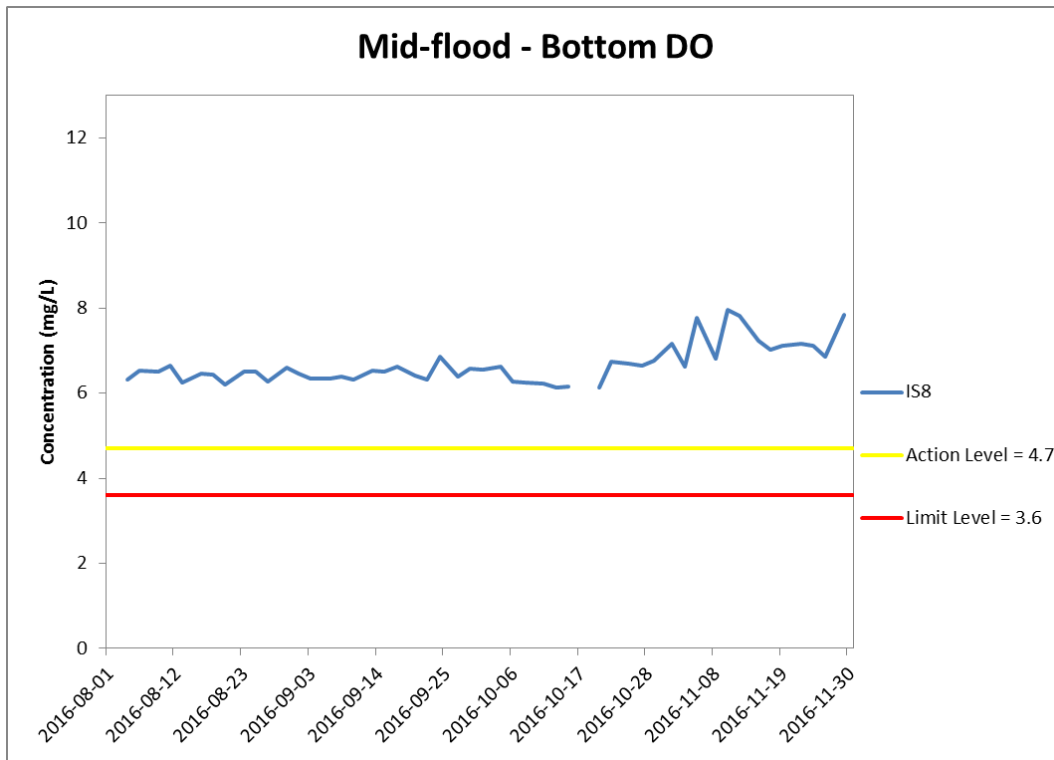
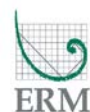


Figure H19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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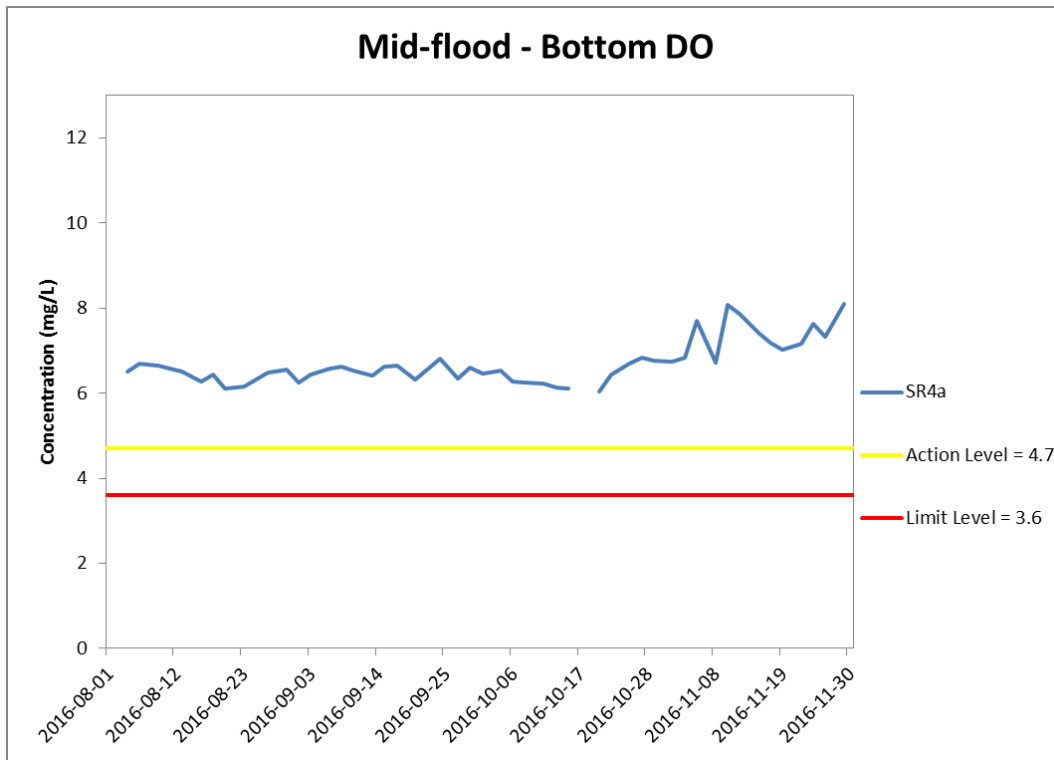


Figure H20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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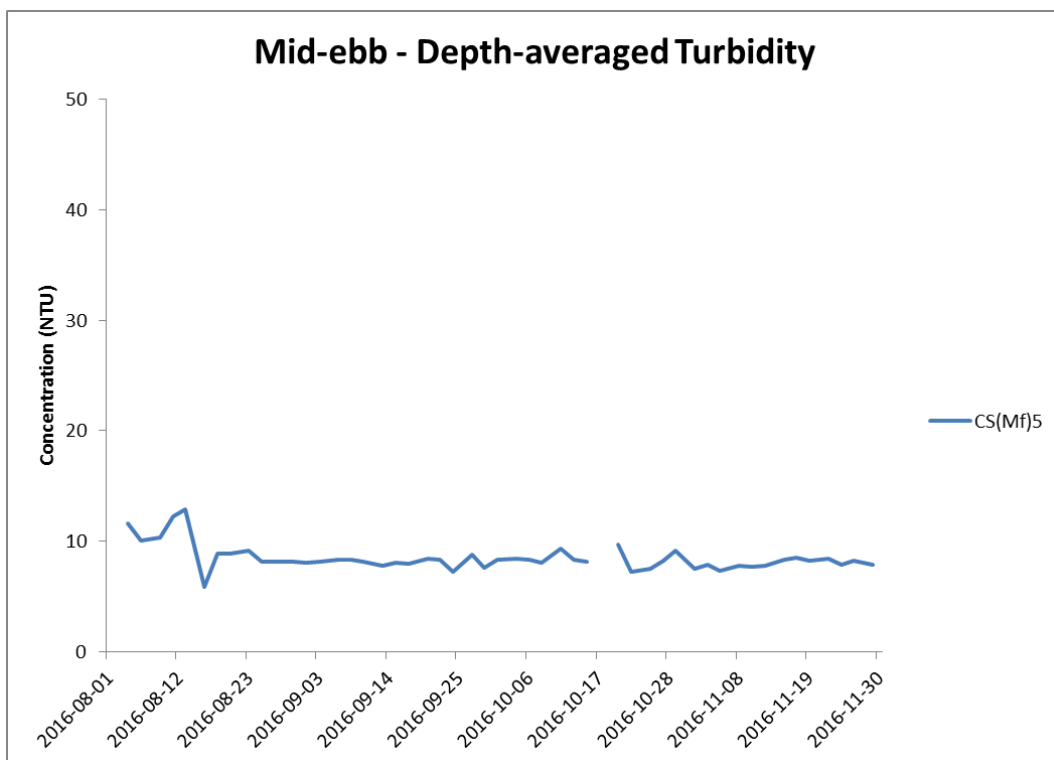
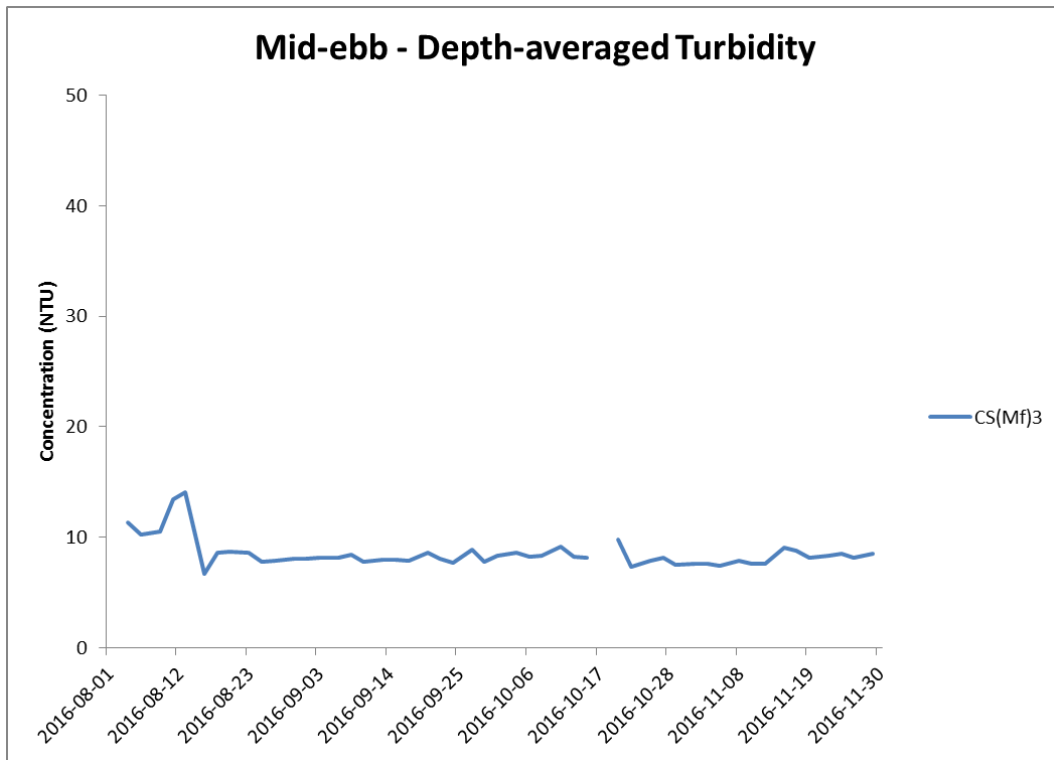


Figure H21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

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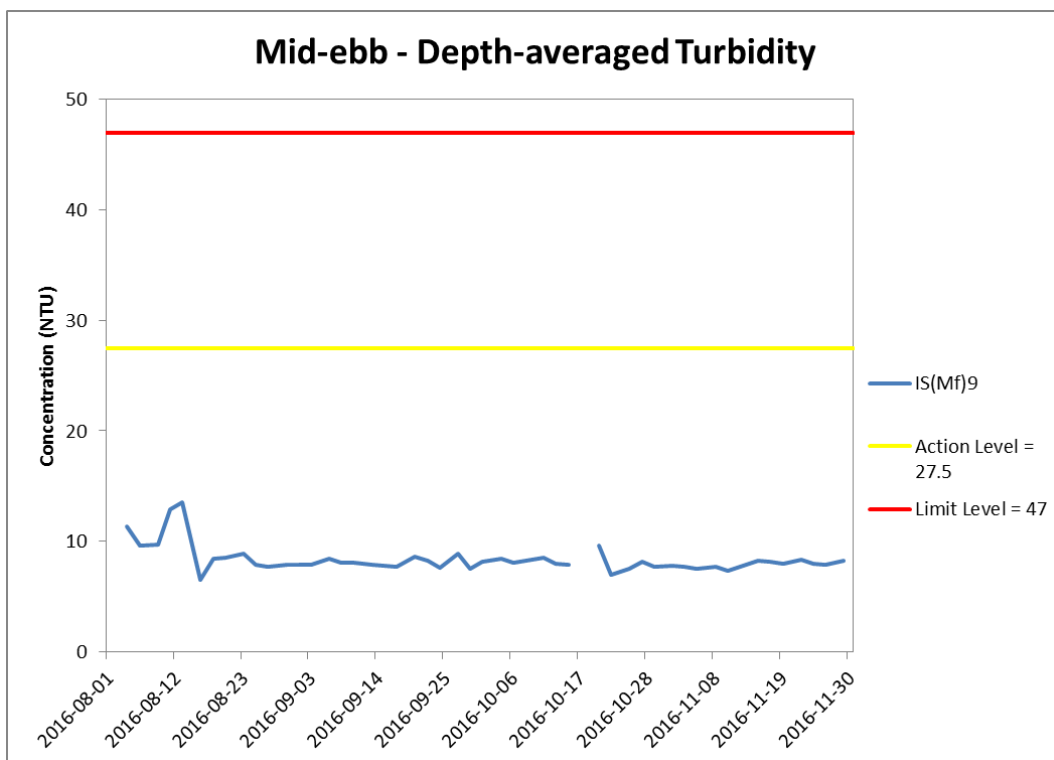
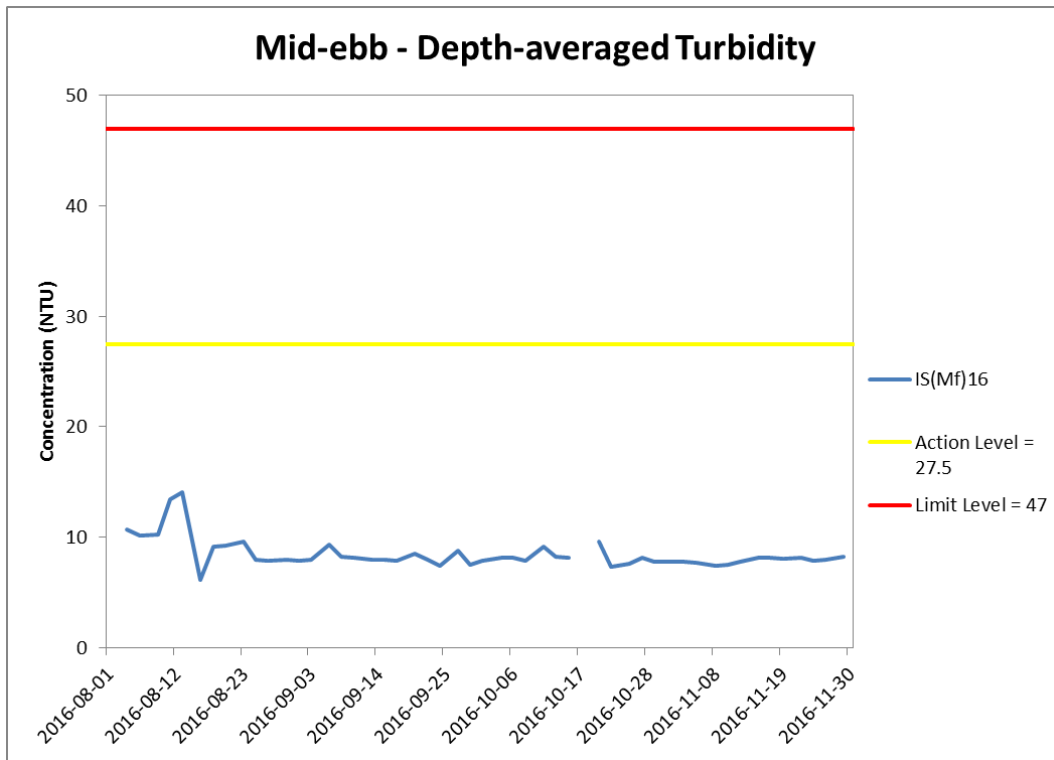


Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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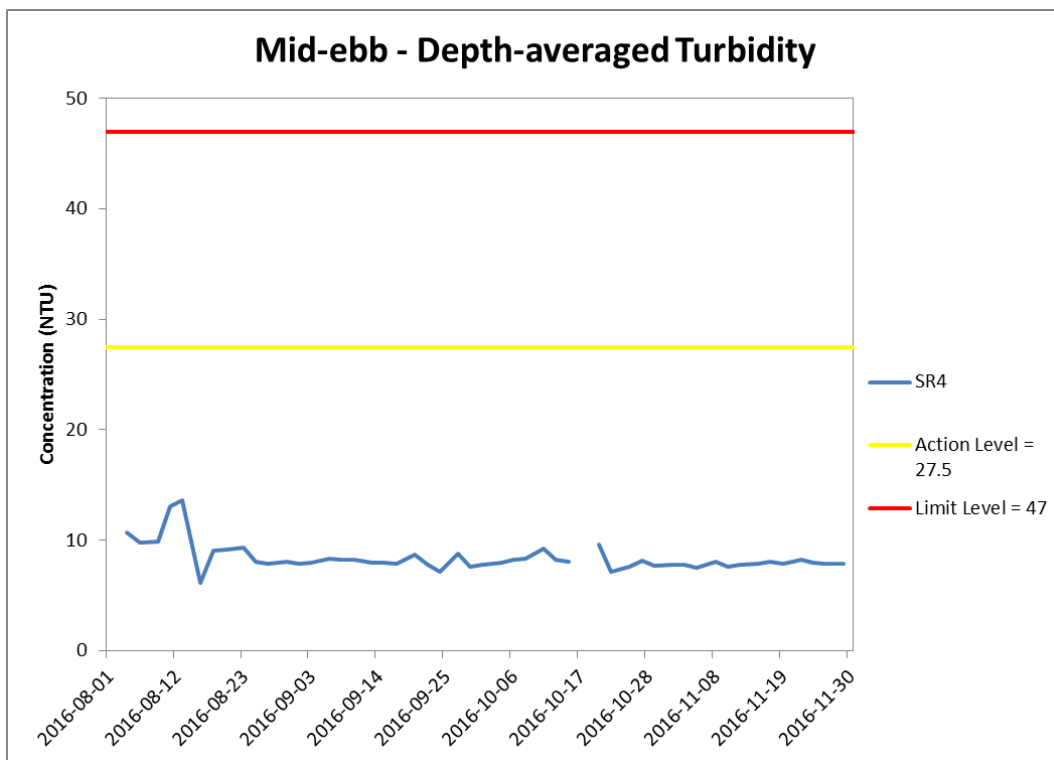
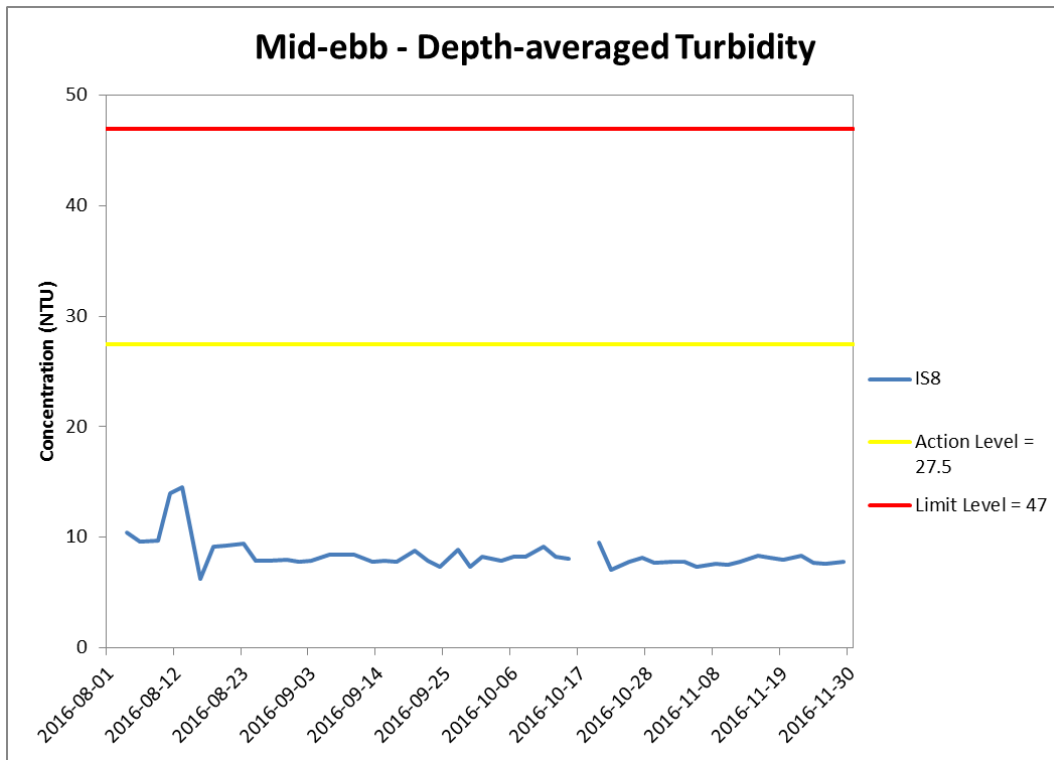


Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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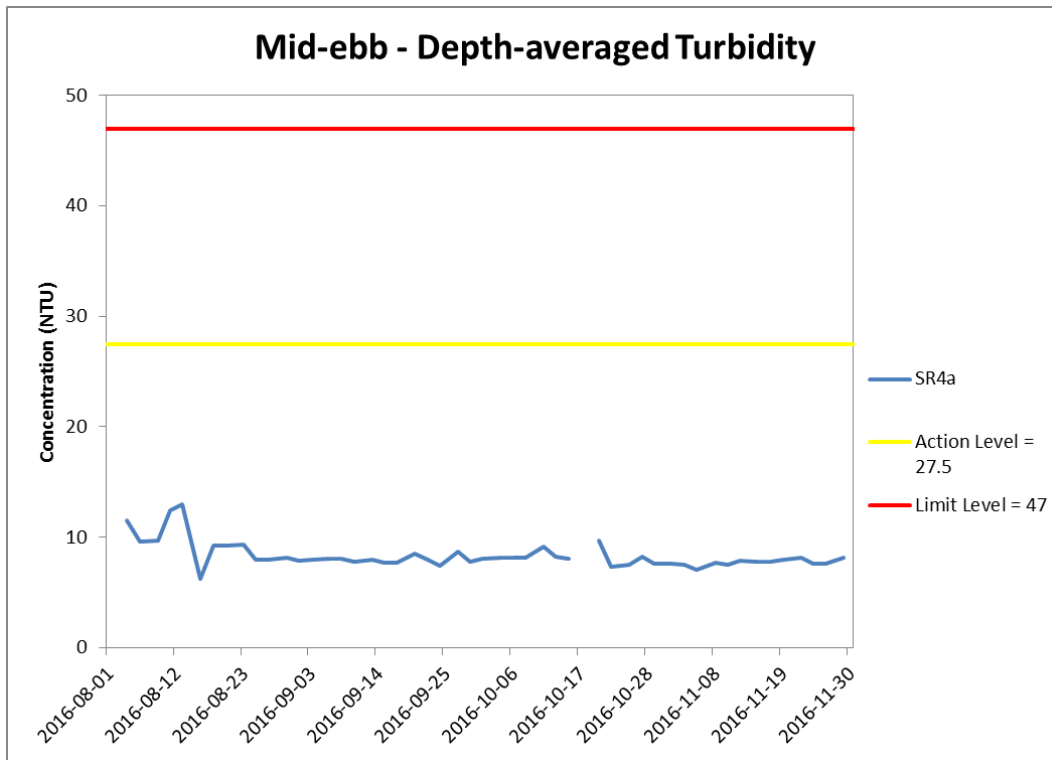
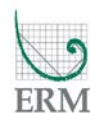


Figure H24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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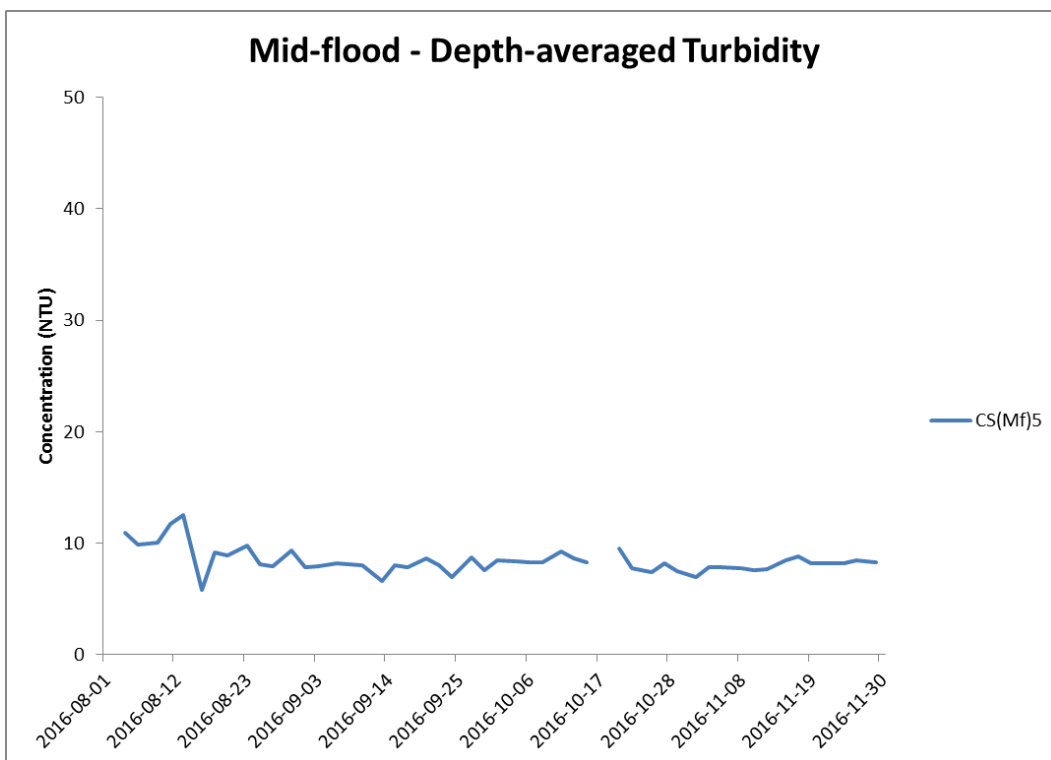
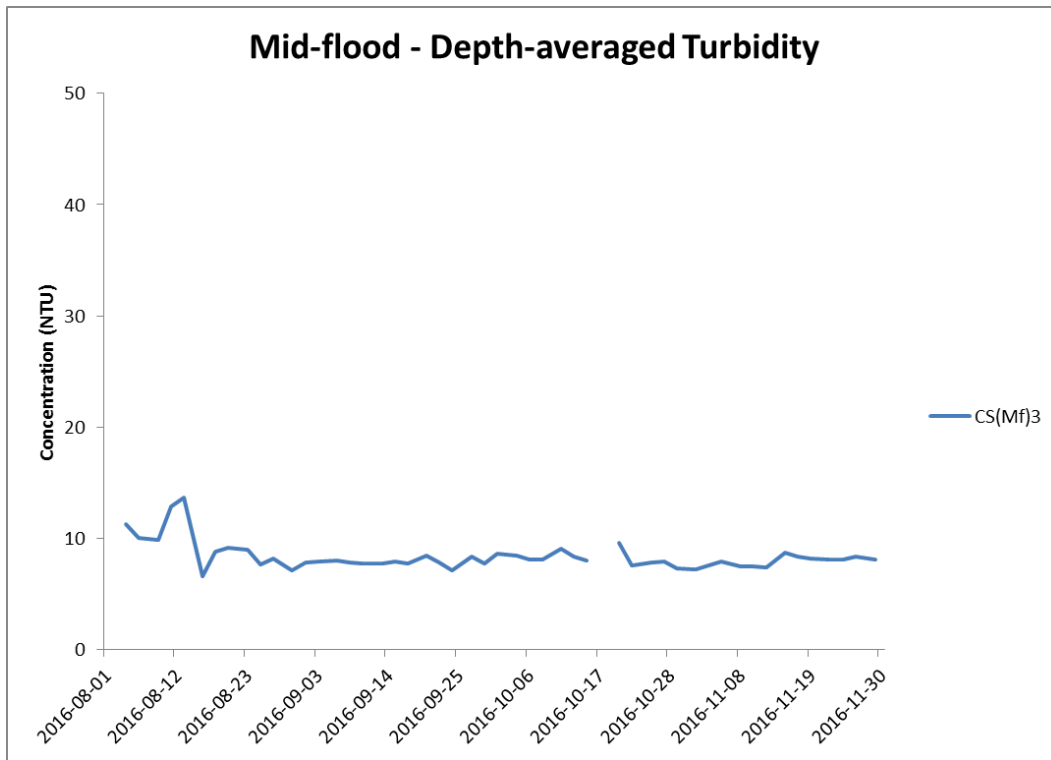
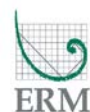


Figure H25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(MF)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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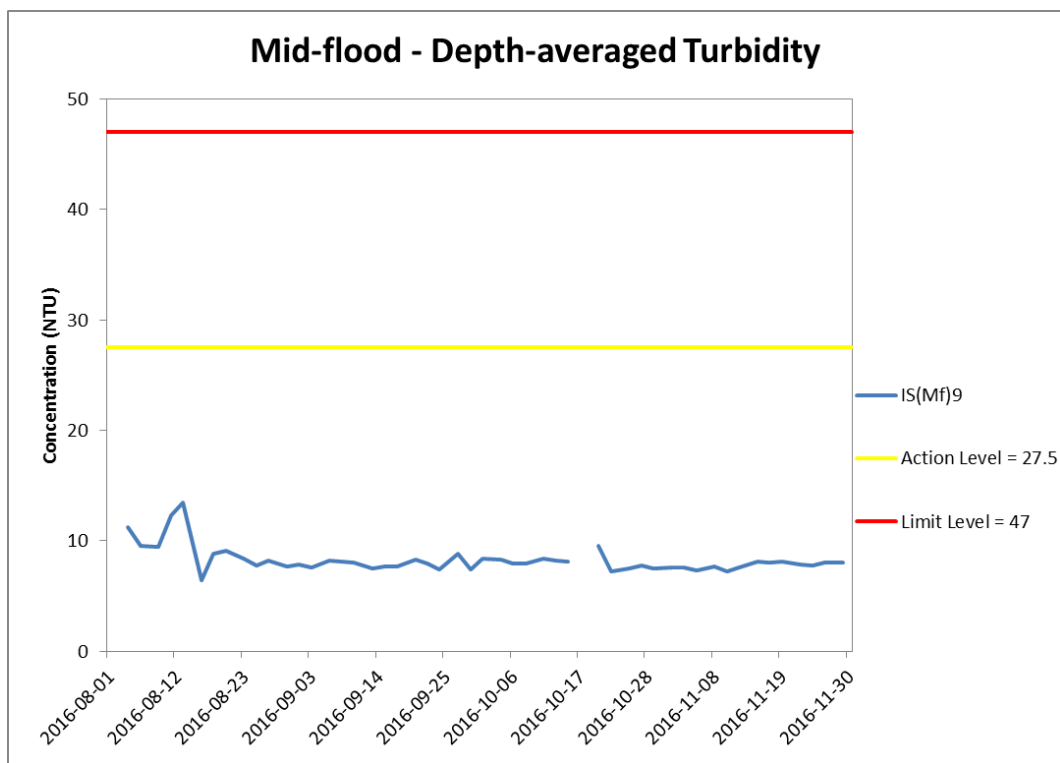
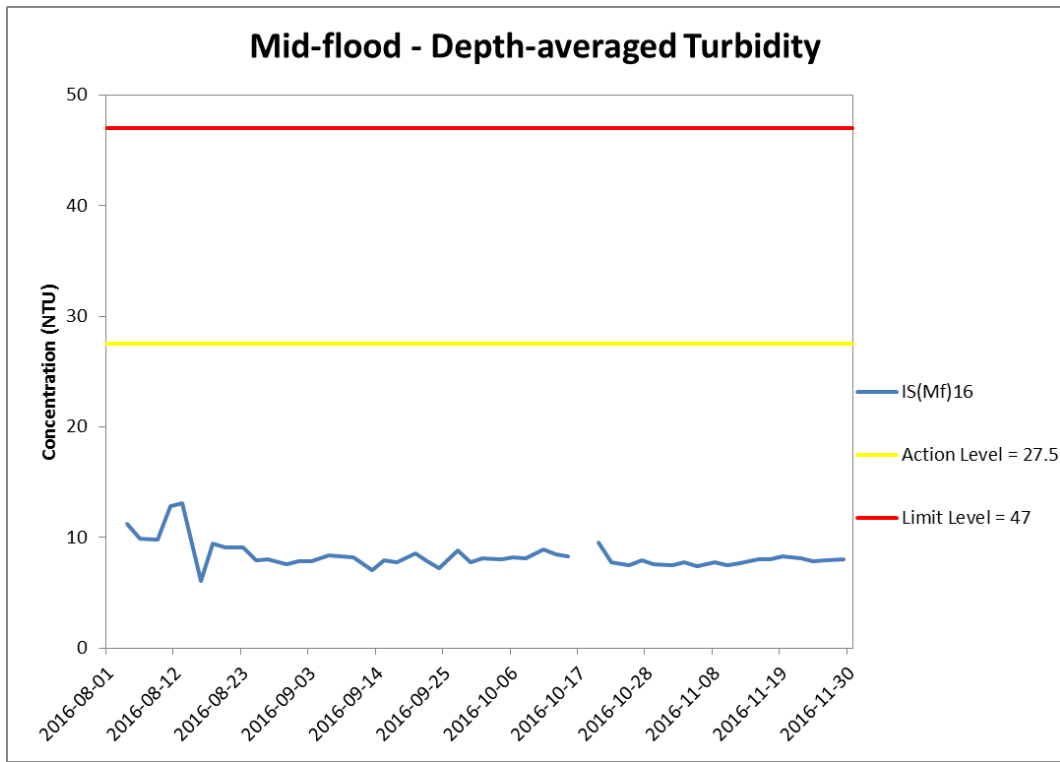


Figure H26 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

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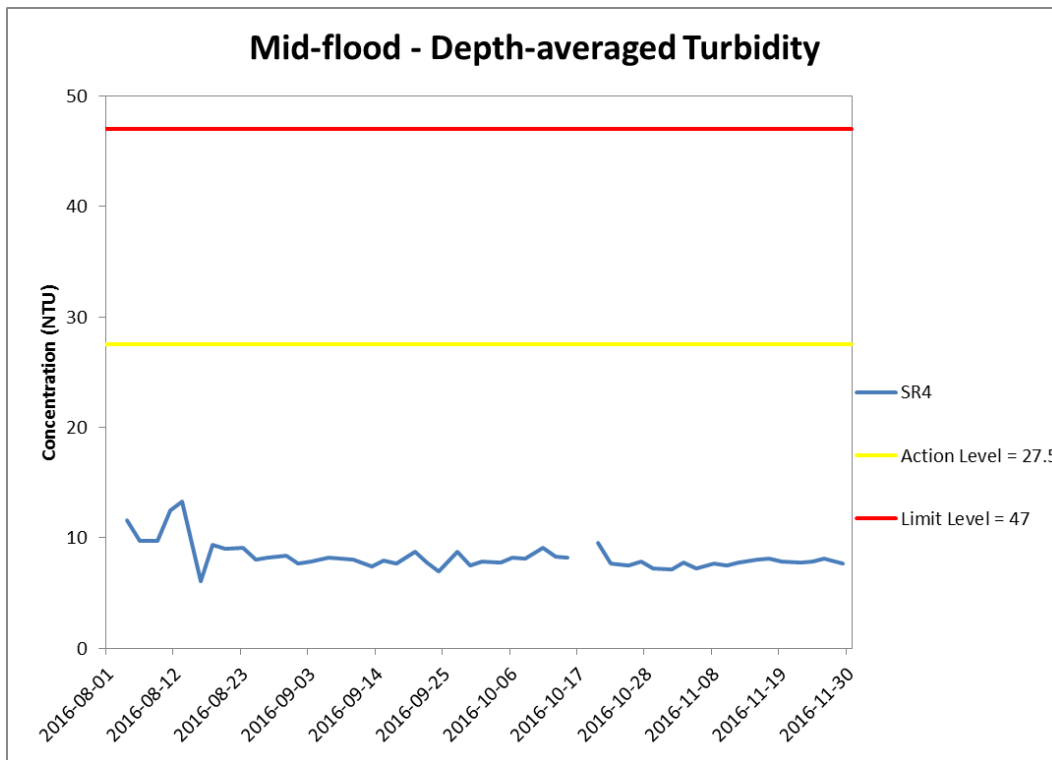
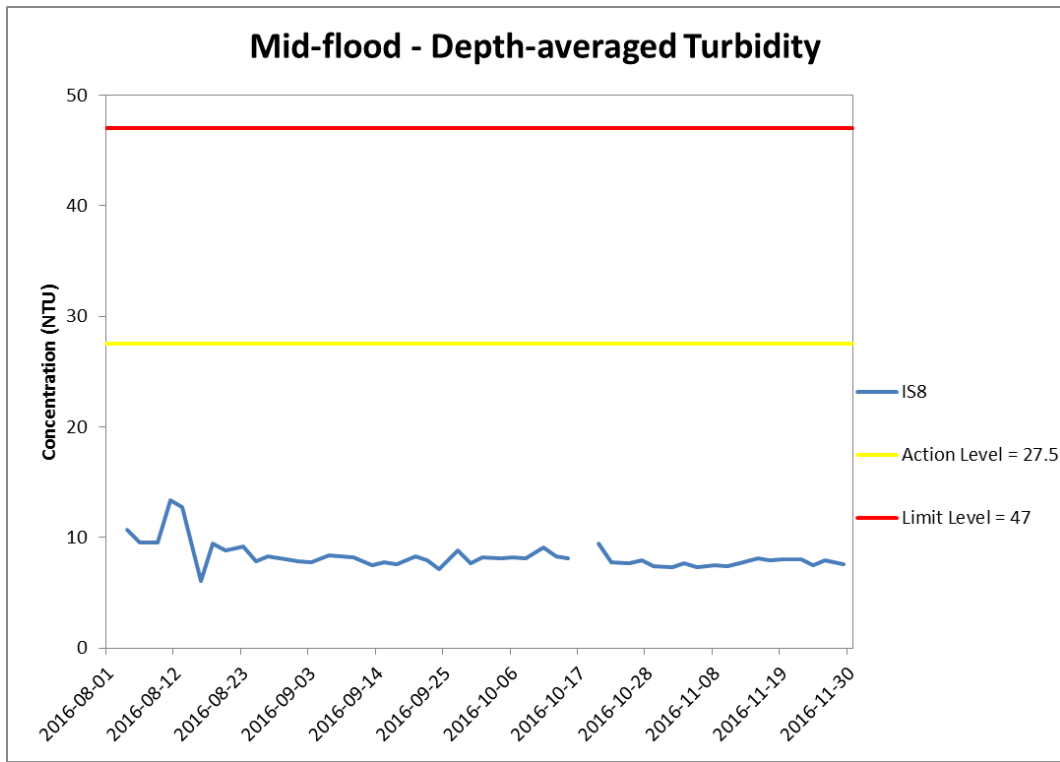


Figure H27 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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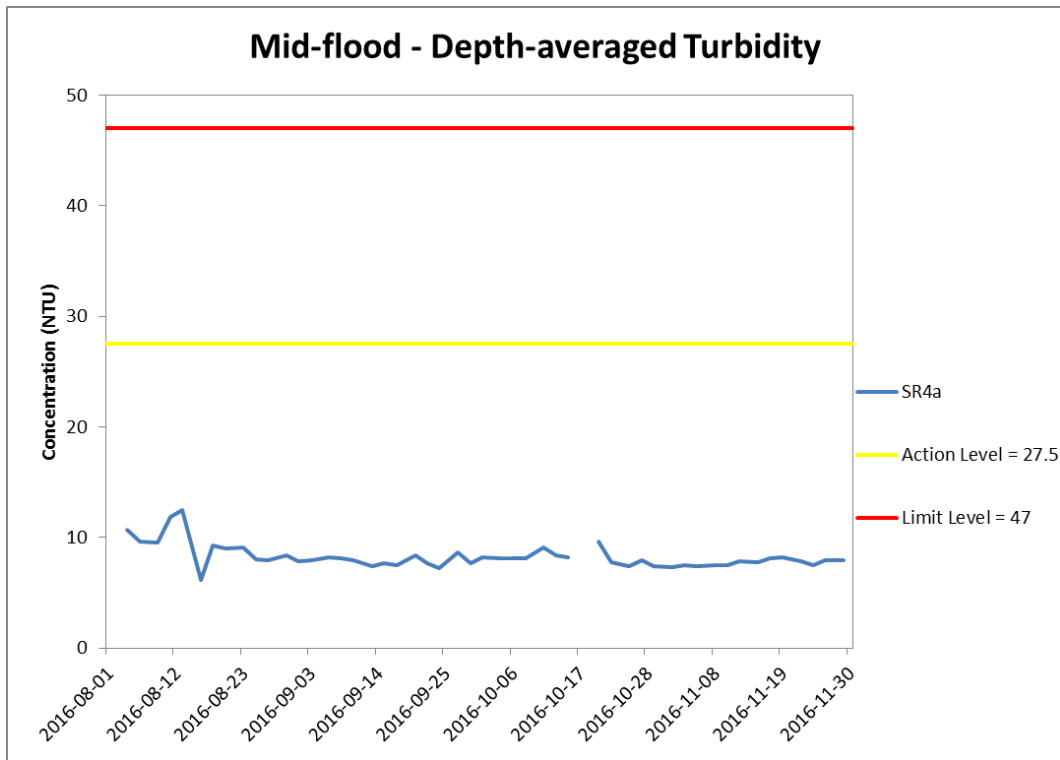


Figure H28 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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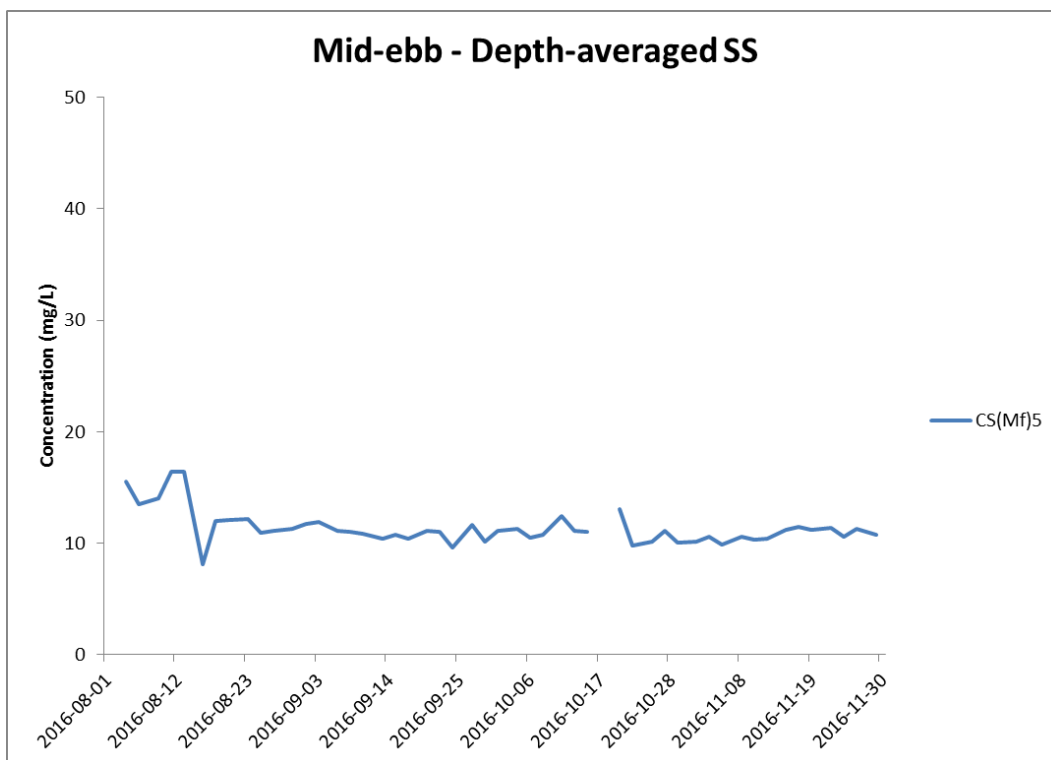
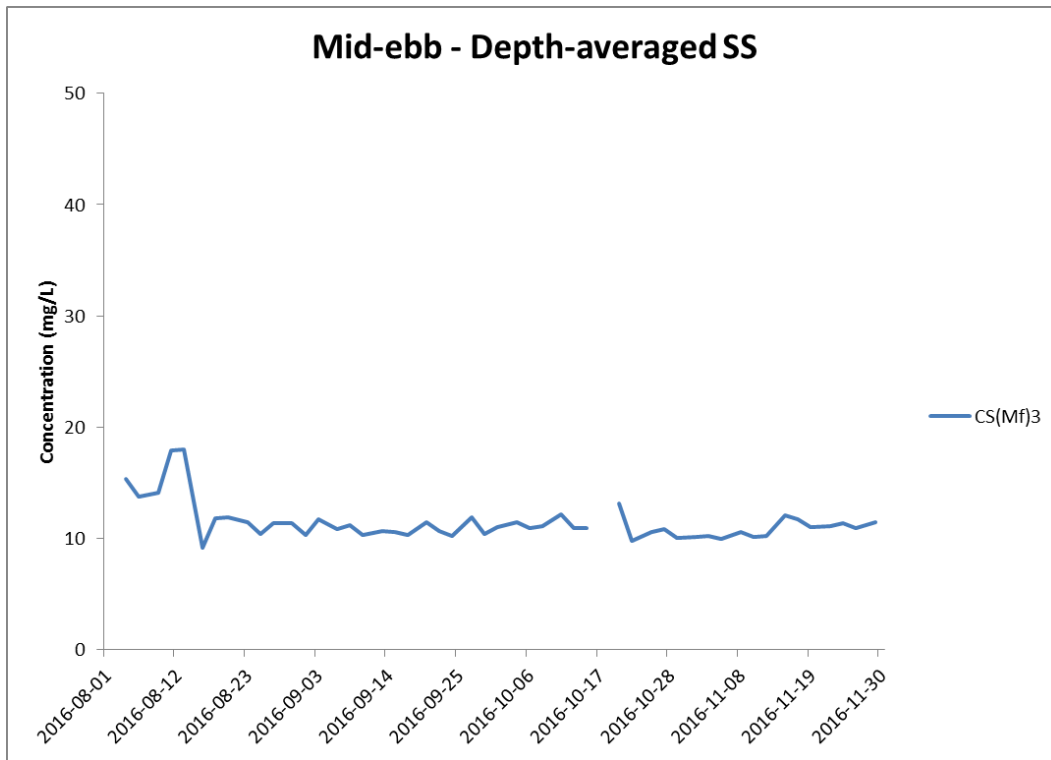
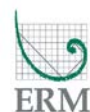


Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

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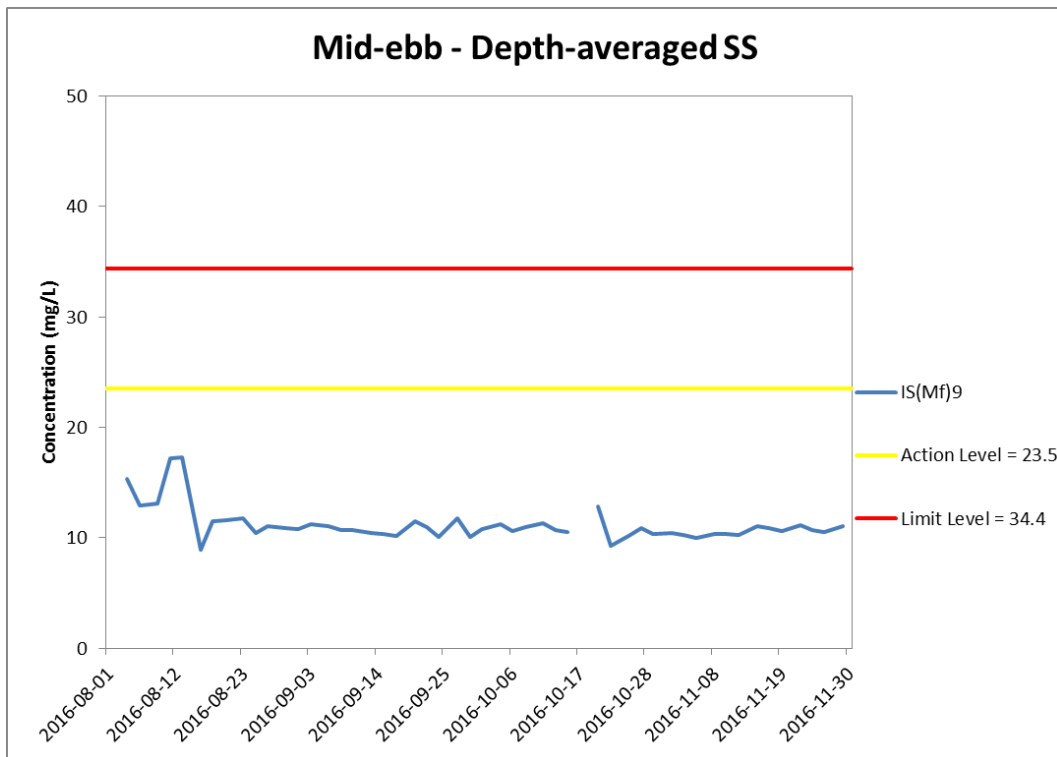
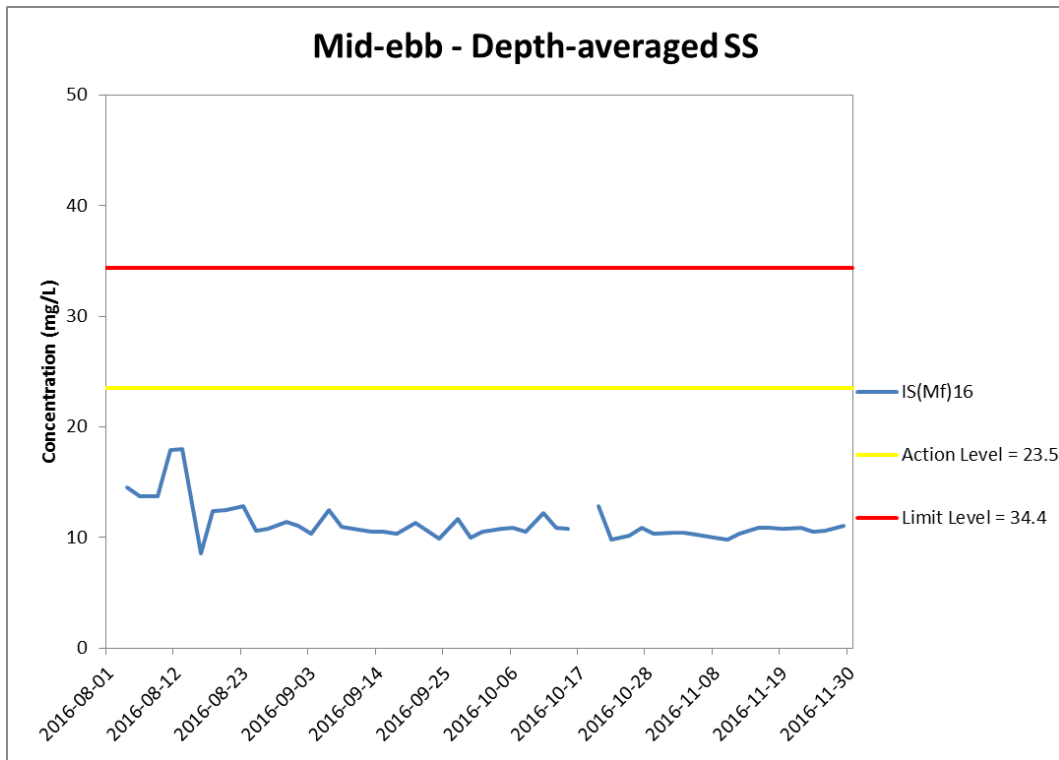


Figure H30 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

*(Weather condition varied between sunny to rainy within the reporting period.)
WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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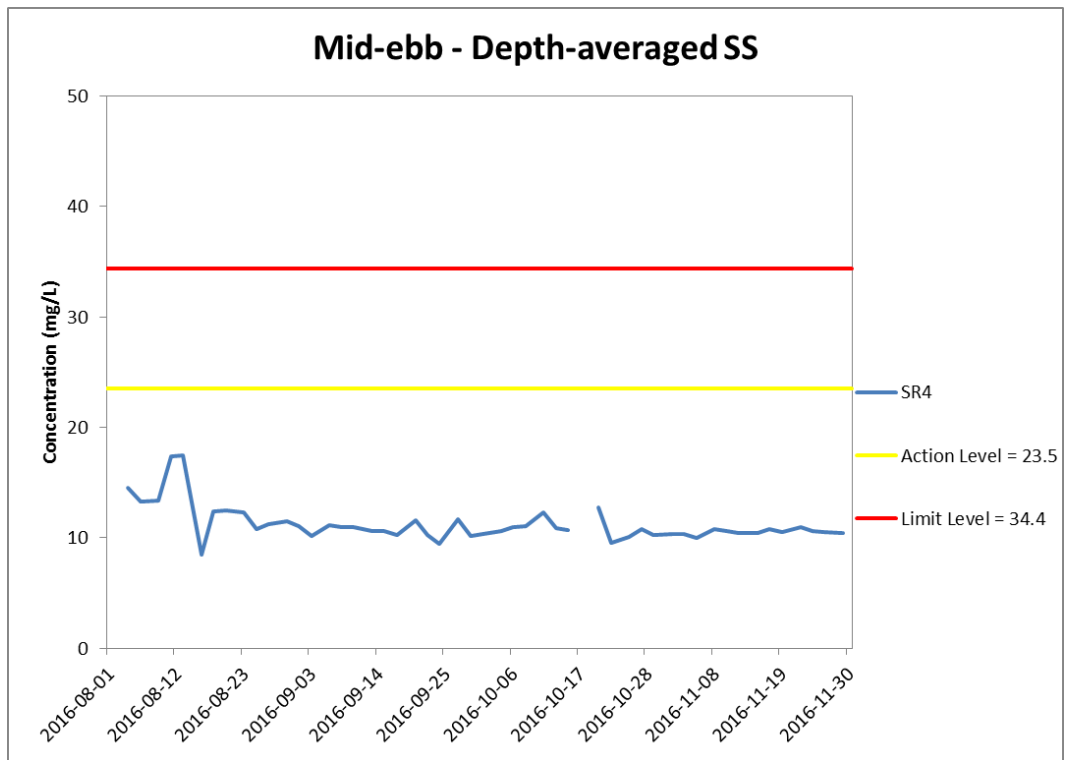
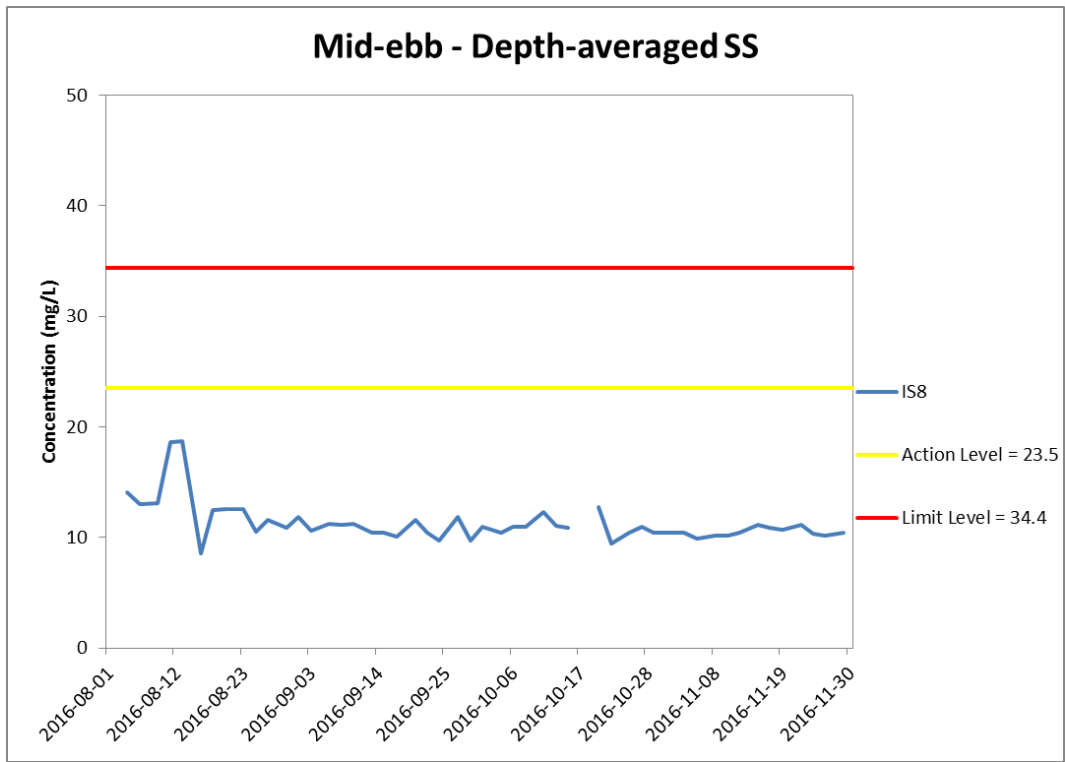


Figure H31 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 August and 30 November 2016 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

Environmental Resources Management



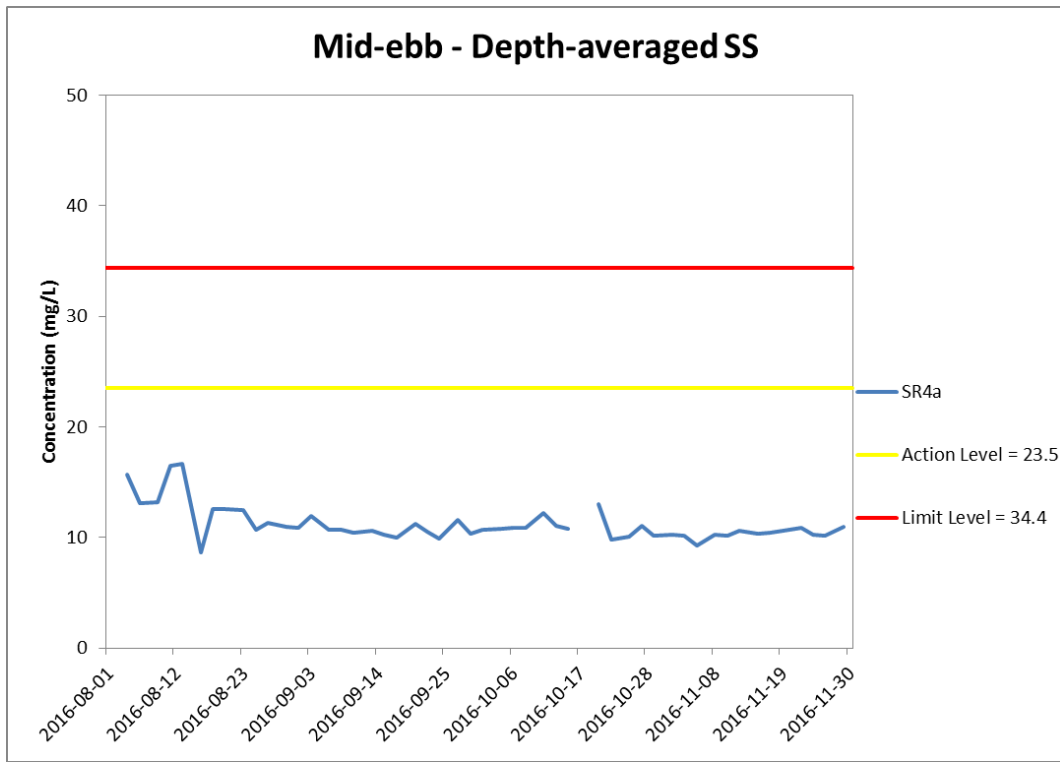


Figure H32 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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 Management**



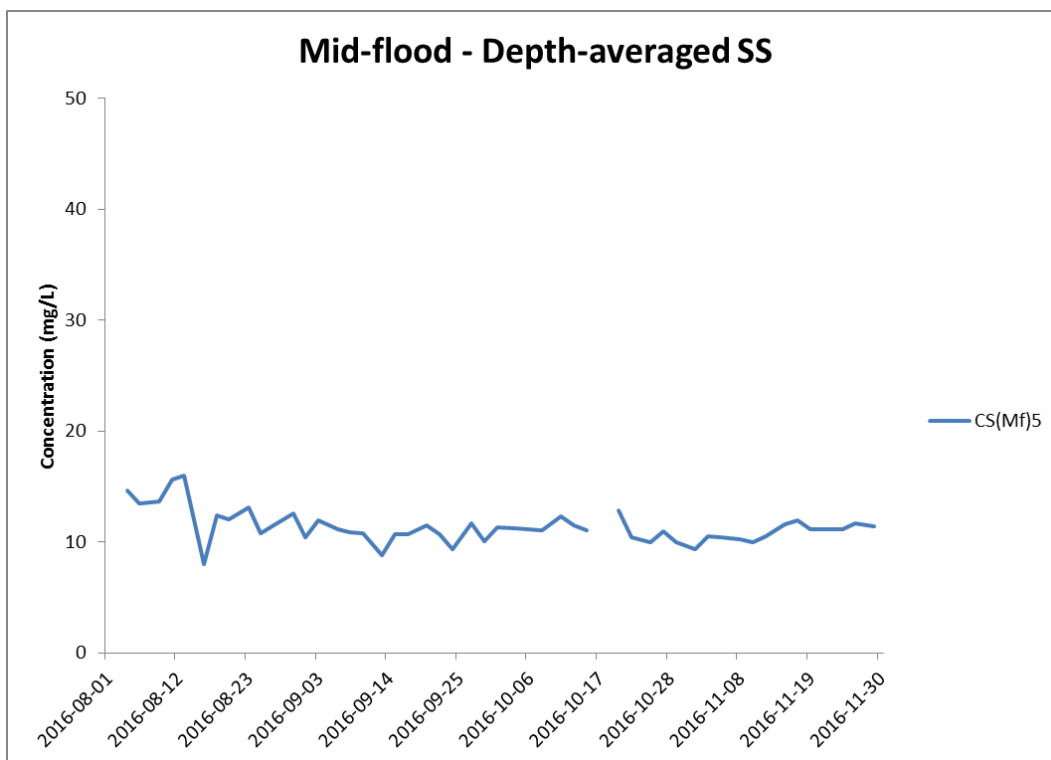
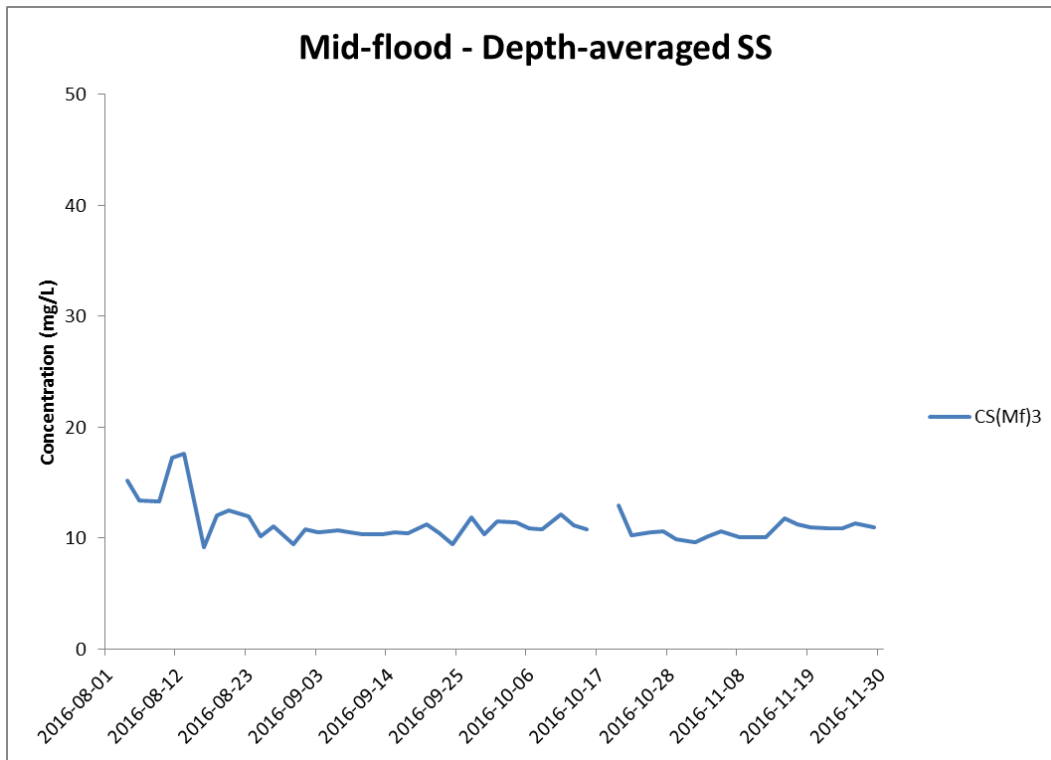


Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 August and 30 November 2016 at CS(Mf)3 and CS(Mf)5.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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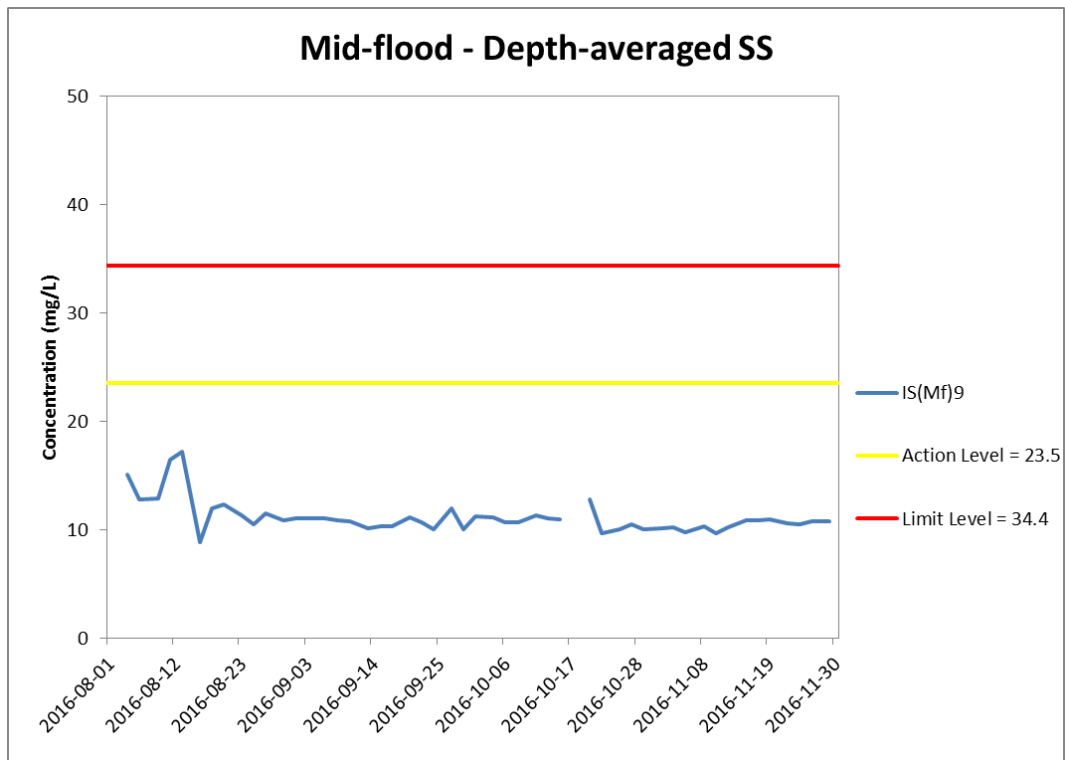
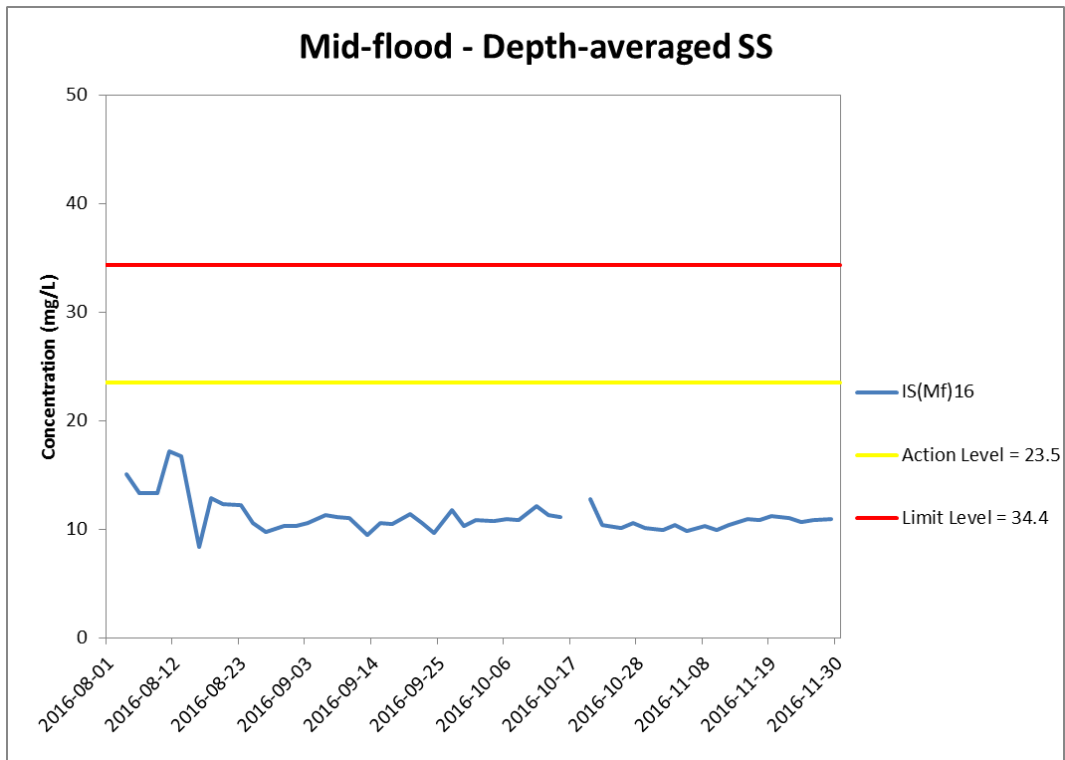


Figure H34 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 August and 30 November 2016 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.

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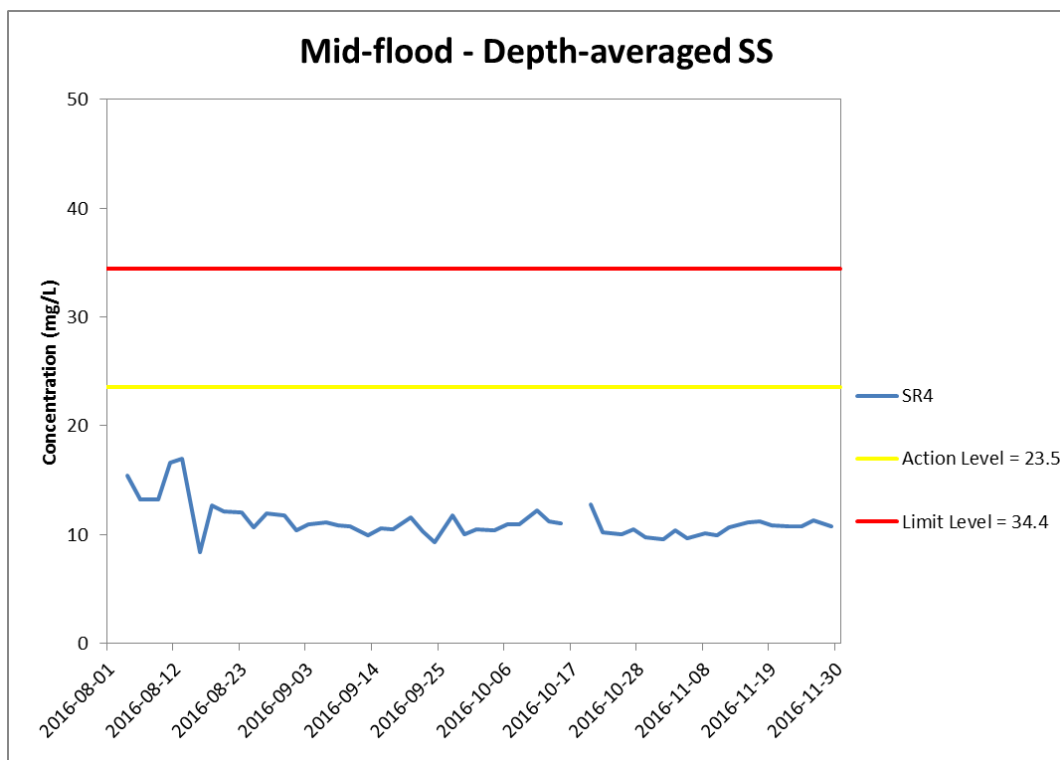
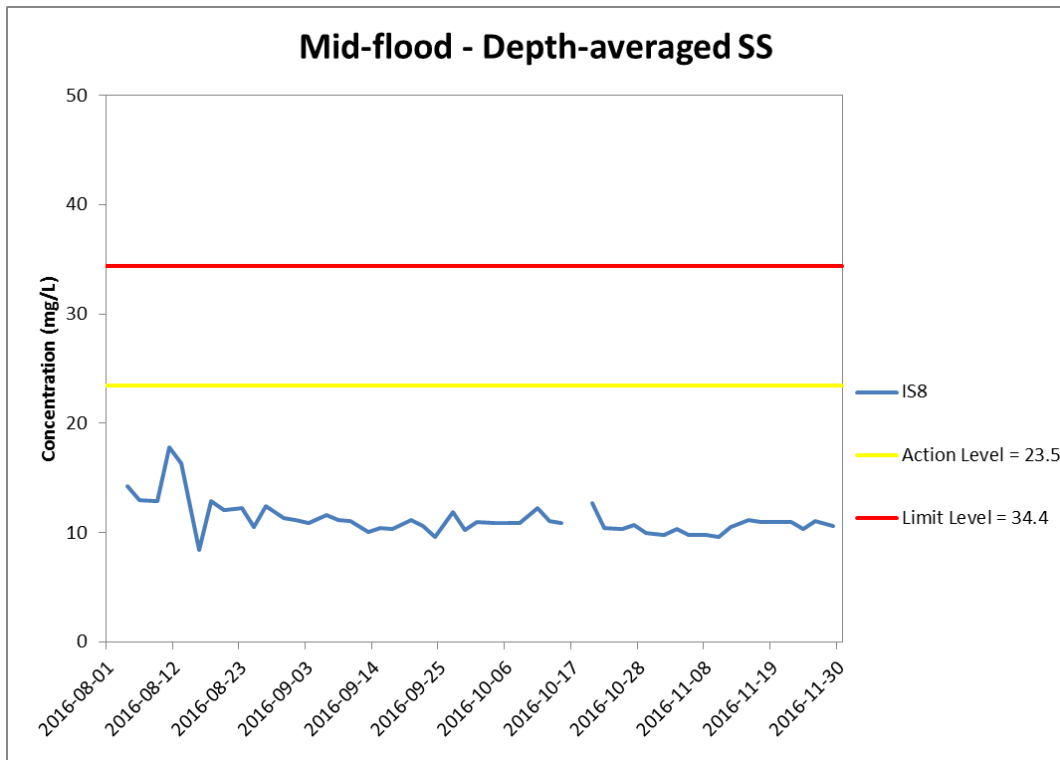


Figure H35 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 August and 30 November 2016 at IS8 and SR4.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

**Environmental
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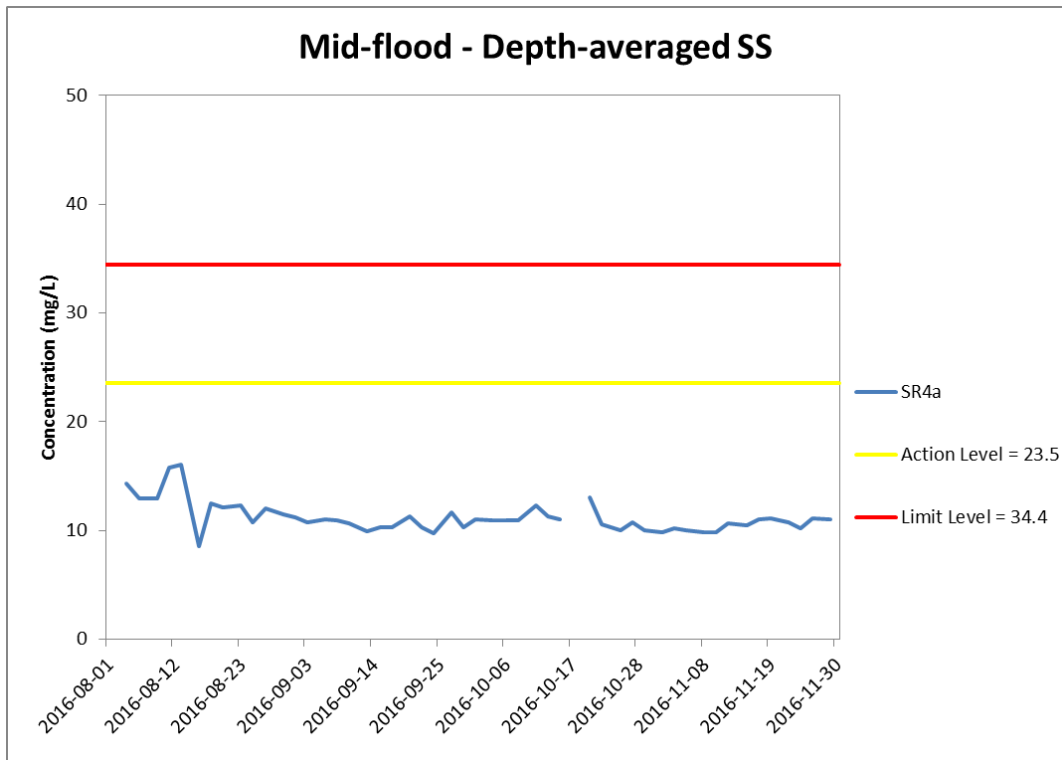


Figure H36 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 August and 30 November 2016 at SR4a.

*(Weather condition varied between sunny to rainy within the reporting period.)
 WQM on 18 Oct 2016 was cancelled due to adverse weather conditions. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment.*

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Appendix I

Impact Dolphin Monitoring Survey Results

CONTRACT NO. HY/2012/07

**Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link
(Southern Connection Viaduct Section)
Dolphin Quarterly Monitoring**

*12th Quarterly Progress Report (September-November 2016)
submitted to Gammon Construction Limited*

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

6 February 2017

1. Introduction

- 1.1. The Tuen Mun-Chek Lap Kok Link (TM-CLKL) comprises a 1.6 km long dual 2-lane viaduct section between the Hong Kong Boundary Crossing Facilities (HKBCF) and the North Lantau Highway and associated roads at Tai Ho. Gammon Construction Limited (hereinafter called the “Contractor”) was awarded as the main contractor of “Contract No. HY/2012/07 – Hong Kong-Zhuhai-Macao Bridge Tuen Mun-Chek Lap Kok Link – Southern Connection Viaduct Section”.
- 1.2. According to the updated Environmental Monitoring and Audit (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 as well as the TM-CLKL Northern Connection Sub-Sea Tunnel Section (HY/2012/08)
- 1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by Gammon Construction Limited as the dolphin specialist for the TM-CLKL Southern Viaduct 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 the 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 12th quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Gammon Construction Limited, summarizing the results of the surveys findings during the period of September to November 2016, utilizing the survey data collected by HKLR03 impact phase monitoring 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 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	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805475	815913		14	Start Point	817537	820220
2	End Point	805477	826654		14	End Point	817537	824613
3	Start Point	806464	819435		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	819771		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	820220		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	820466		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	820880		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	821123		20	Start Point	823477	823402

8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	821303		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	820872		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818853		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807					
12	End Point	815542	824882					

- 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 19 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2015, 2016). 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* 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 present quarterly period.

- 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:

$$\text{SPSE} = ((S / E) \times 100) / \text{SA}\%$$
$$\text{DPSE} = ((D / E) \times 100) / \text{SA}\%$$

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 2016, 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 892.57 km of survey effort was collected, with 96.5% 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, 341.30 km and 551.27 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 640.35 km, while the effort on secondary lines was 252.22 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. A 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 2016, a total of 13 groups of 48 Chinese White Dolphins were sighted. All dolphin sightings for this quarter were made during on-effort, while all except one on-effort dolphin sightings were made on primary lines. A summary table of dolphin sightings is shown in Appendix II. In this quarterly period, all dolphin groups were sighted in NWL, and no

dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during HKLR03 monitoring surveys.

3.2. *Distribution*

- 3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from September to November 2016 is shown in Figure 1. Dolphin sightings made in the present quarter were mainly located around Sha Chau and Lung Kwu Chau near western territorial boundary (Figure 1). A few sightings were also made near Black Point, Pillar Point and Sham Wat respectively (Figure 1). On the other hand, the dolphins were completely absent from the central and western portions of North Lantau waters (Figure 1).
- 3.2.2. Notably, all dolphin sightings were located far away from the alignment of TM-CLKL as well as the HKBCF and HKLR03 reclamation sites (Figure 1). On the other hand, one group of two dolphins was sighted adjacent to the HKLR09 alignment near Sham Wat (Figure 1).
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (September to November 2016) was drastically different from the one during the baseline monitoring period (September to November 2011). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok 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 15 quarters of HKLR03 monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.
- 3.2.4. In NWL survey area, dolphin occurrence was also significantly different between the baseline and impact phase periods. During the present impact monitoring period, much fewer dolphins occurred in this survey area (mostly around Lung Kwu Chau) than during the baseline period, when many dolphin groups were frequently sighted between Lung Kwu Chau and Black Point, around Sha Chau, near Pillar Point and to the west of the Chek Lap Kok Airport (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the four quarterly periods of autumn months in 2013-16 (Figure 2). Among the four autumn periods, dolphins were regularly sighted in NWL waters in 2013, but their usage there has gradually diminished in 2014 and subsequently to a very low level in 2015 and 2016 with only occurrences concentrated around the Sha Chau and Lung Kwu Chau Marine Park (Figure 2).
- ### 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 to November 2016

SURVEY AREA	DOLPHIN MONITORING DATES	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (13 & 14 Sep 2016)	0.00	0.00
	Set 2 (21 & 23 Sep 2016)	0.00	0.00
	Set 3 (4 & 7 Oct 2016)	0.00	0.00
	Set 4 (11 & 13 Oct 2016)	0.00	0.00
	Set 5 (2 & 7 Nov 2016)	0.00	0.00
	Set 6 (18 & 22 Nov 2016)	0.00	0.00
Northwest Lantau	Set 1 (13 & 14 Sep 2016)	0.00	0.00
	Set 2 (21 & 23 Sep 2016)	5.75	30.17
	Set 3 (4 & 7 Oct 2016)	4.13	9.64
	Set 4 (11 & 13 Oct 2016)	2.85	8.54
	Set 5 (2 & 7 Nov 2016)	1.66	1.66
	Set 6 (18 & 22 Nov 2016)	2.79	15.34

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (September – November 2016) 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; ± denotes the standard deviation of the 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 – November 2016	September – November 2011	September – November 2016	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	2.86 ± 1.98	9.85 ± 5.85	10.89 ± 10.98	44.66 ± 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.50 sightings and 9.21 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were both zero with no on-effort sighting being

made, and such extremely low occurrence of dolphins in NEL have been consistently recorded in the past 15 quarters of HKLR03 monitoring (Table 4). This is a serious concern as the dolphin occurrence in NEL in the past few years (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have remained exceptionally low when compared to the baseline period (Table 4). Dolphins have been virtually absent from NEL waters since January 2014, with only three groups of six dolphins sighted there since then despite consistent and intensive survey effort being conducted in this survey area.

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; the encounter rates in **autumn** months were highlighted in blue; \pm denotes the standard deviation of the 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-November 2011 (Baseline)	6.00 \pm 5.05	22.19 \pm 26.81
December 2012-February 2013 (Impact)	3.14 \pm 3.21	6.33 \pm 8.64
March-May 2013 (Impact)	0.42 \pm 1.03	0.42 \pm 1.03
June-August 2013 (Impact)	0.88 \pm 1.36	3.91 \pm 8.36
September-November 2013 (Impact)	1.01 \pm 1.59	3.77 \pm 6.49
December 2013-February 2014 (Impact)	0.45 \pm 1.10	1.34 \pm 3.29
March-May 2014 (Impact)	0.00	0.00
June-August 2014 (Impact)	0.42 \pm 1.04	1.69 \pm 4.15
September-November 2014 (Impact)	0.00	0.00
December 2014-February 2015 (Impact)	0.00	0.00
March-May 2015 (Impact)	0.00	0.00
June-August 2015 (Impact)	0.44 \pm 1.08	0.44 \pm 1.08
September-November 2015 (Impact)	0.00	0.00
December 2015-February 2016 (Impact)	0.00	0.00
March-May 2016 (Impact)	0.00	0.00
June-August 2016 (Impact)	0.00	0.00
September-November 2016 (Impact)	0.00	0.00

3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period (reductions of 71.0% and 75.6% respectively) were only small fractions of the ones recorded during the three-month baseline period, indicating a dramatic decline in dolphin usage of this survey area as well during the present impact phase period (Table 5).

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from all quarters of HKLR03 impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; the encounter rates in **autumn** months were highlighted in blue; \pm denotes the standard deviation of the 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-November 2011 (Baseline)	9.85 \pm 5.85	44.66 \pm 29.85
December 2012-February 2013 (Impact)	8.36 \pm 5.03	35.90 \pm 23.10
March-May 2013 (Impact)	7.75 \pm 3.96	24.23 \pm 18.05
June-August 2013 (Impact)	6.56 \pm 3.68	27.00 \pm 18.71
September-November 2013 (Impact)	8.04 \pm 1.10	32.48 \pm 26.51
December 2013-February 2014 (Impact)	8.21 \pm 2.21	32.58 \pm 11.21
March-May 2014 (Impact)	6.51 \pm 3.34	19.14 \pm 7.19
June-August 2014 (Impact)	4.74 \pm 3.84	17.52 \pm 15.12
September-November 2014 (Impact)	5.10 \pm 4.40	20.52 \pm 15.10
December 2014-February 2015 (Impact)	2.91 \pm 2.69	11.27 \pm 15.19
March-May 2015 (Impact)	0.47 \pm 0.73	2.36 \pm 4.07
June-August 2015 (Impact)	2.53 \pm 3.20	9.21 \pm 11.57
September-November 2015 (Impact)	3.94 \pm 1.57	21.05 \pm 17.19
December 2015-February 2016 (Impact)	2.64 \pm 1.52	10.98 \pm 3.81
March-May 2016 (Impact)	0.98 \pm 1.10	4.78 \pm 6.85
June-August 2016 (Impact)	1.72 \pm 2.17	7.48 \pm 10.98
September-November 2016 (Impact)	2.86 \pm 1.98	10.89 \pm 10.98

- 3.3.5. During the same autumn quarters, dolphin encounter rates in NWL during 2016 reached to the lowest point among the autumn periods, and were much lower than the ones recorded in 2013 and 2014 (Table 5). Such temporal trend should be closely monitored in the upcoming monitoring quarters.
- 3.3.6. As discussed recently in Hung (2016), the dramatic decline in dolphin usage of NEL waters in the past few years (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 since 2012. It appeared that such noticeable decline has already extended to NWL waters progressively in the past few years, and with no sign of recovery even when the HZMB-related construction activities has well past the peak.

- 3.3.7. 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).
- 3.3.8. For the comparison between the baseline period and the present quarter (16th quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0051 and 0.0296 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both the average dolphin encounter rates of STG and ANI.
- 3.3.9. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. first sixteen quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.000004 and 0.000001 respectively. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).
- 3.3.10. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in previous quarters. This raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2016).
- 3.3.11. To ensure the continuous usage of North Lantau waters by the dolphins, every possible measure should be implemented by the contractors and relevant authorities of HZMB-related works to minimize all disturbances to the dolphins.
- 3.4. *Group size*
- 3.4.1. Group sizes of Chinese White Dolphins ranged from one to eleven individuals per group in North Lantau region during September to November 2016. 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 2016) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	September – November 2016	September – November 2011
Overall	3.69 \pm 2.87 (n = 13)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	---	3.18 \pm 2.16 (n = 17)
Northwest Lantau	3.69 \pm 2.87 (n = 13)	3.92 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during September to November 2016 was slightly lower than the one recorded during the three-month baseline period (Table 6). Most of these dolphin groups were composed of 1-4 individuals only, while there were three medium-sized groups of 5-7 individuals respectively, and one large group of eleven individuals.
- 3.4.3. Distribution of the larger dolphin groups (i.e. five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the one in baseline period. During the autumn months of 2016, the three medium-sized groups were sighted adjacent to Lung Kwu Chau and to the north of the island, while the one large group of eleven individuals was sighted to at the northeast corner of Lung Kwu Chau as well (Figure 3). Such distribution pattern was very different from the baseline period, when the larger dolphin groups were more frequently sighted and more evenly distributed in NWL waters, with a few more sighted in NEL waters (Figure 3).
- 3.5. *Habitat use*
- 3.5.1. From September to November 2016, the more important habitats utilized by Chinese White Dolphins were mostly located around Lung Kwu Chau (Figures 4a and 4b). One grid located to the west of Shum Wat just to the south of the HKLR09 alignment also recorded moderate density of dolphins. On the contrary, all grids near TMCLKL alignment as well as HKLR03/HKBCF reclamation sites did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).
- 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 should be examined when more survey effort for each grid will be collected throughout the impact phase monitoring programme.
- 3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present impact monitoring period (Figure 5). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present impact phase period (Figure 5).
- 3.5.4. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with higher dolphin usage throughout the area, especially 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. In contrast, the only areas with moderate to high dolphin densities were restricted to the waters near Lung Kwu Chau during the present impact phase period (Figure 5).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, neither unspotted calf nor unspotted juvenile was sighted with any female in the North Lantau region.

- 3.6.2. The absence of young calves in the past four consecutive quarters was in stark contrast to their regular occurrence in North Lantau waters during the baseline period. This should be of a serious concern, and the occurrence of young calves in North Lantau waters should be closely monitored in the upcoming quarters.
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. Four of the thirteen dolphin groups were engaged in feeding activity, while none of them was engaged in socializing, traveling or milling/resting activity during the three-month study period.
- 3.7.2. The percentage of sightings associated with feeding activities (30.8%) was much higher than the one recorded during the baseline period (11.6%). However, it should be noted the sample size on total numbers of dolphin sightings during the present quarter (13 dolphin groups) was much lower than the baseline period (66 dolphin groups).
- 3.7.3. Distribution of dolphins engaged in various activities during the present impact phase period and the baseline period is shown in Figure 6. The four dolphin groups engaged in feeding activities were sighted around Lung Kwu Chau as well as to the west of Shum Wat near the HKLR09 alignment during the present quarterly period, which was very different from the baseline period when various dolphin activities occurred throughout the North Lantau region (Figure 6).
- 3.7.4. Notably, one group of seven dolphins was found to be associated with an operating gill-netter adjacent to Lung Kwu Chau within the marine park during the present impact phase period.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From September to November 2016, over 2,100 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 21 individuals sighted 34 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these re-sightings were made in NWL. Six individuals (CH34, NL136, NL202, NL269, NL286 and NL320) were re-sighted multiple times during the three-month period (Appendix III).
- 3.8.3. Notably, none of these 21 individuals was also sighted in West Lantau waters during the HKLR09 monitoring surveys from September to November 2016. However, one individual (NL269) was sighted in both NWL and SWL survey areas during the same quarter, showing its extensive individual movement between different survey areas.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 21 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 the present quarter were utilizing NWL waters only, but have completely avoided NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as the baseline period.
- 3.9.3. On the other hand, only one of these individuals consistently utilized both North Lantau waters in the past have extended its range use to SWL waters during the present quarter. In the upcoming quarters, individual range use and movements should be continuously monitored to examine whether there has been any consistent shifts of individual home ranges from North Lantau to West or Southwest Lantau, as such shift could possibly be related to the HZMB-related construction works (see Hung 2015, 2016).

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 southern connection viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.
- 4.3. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

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Kong waters. Wildlife Monographs 144:1-65.

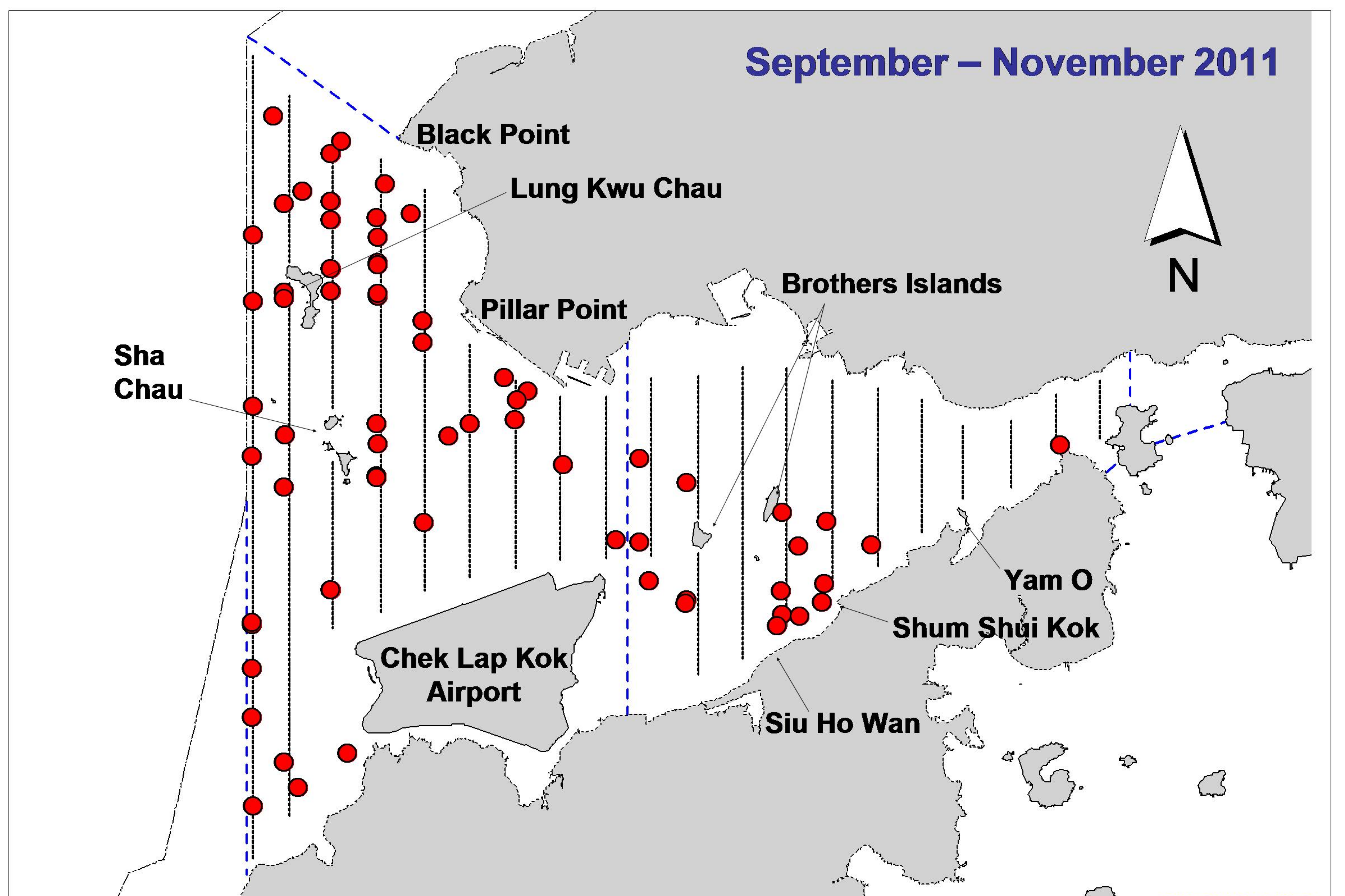
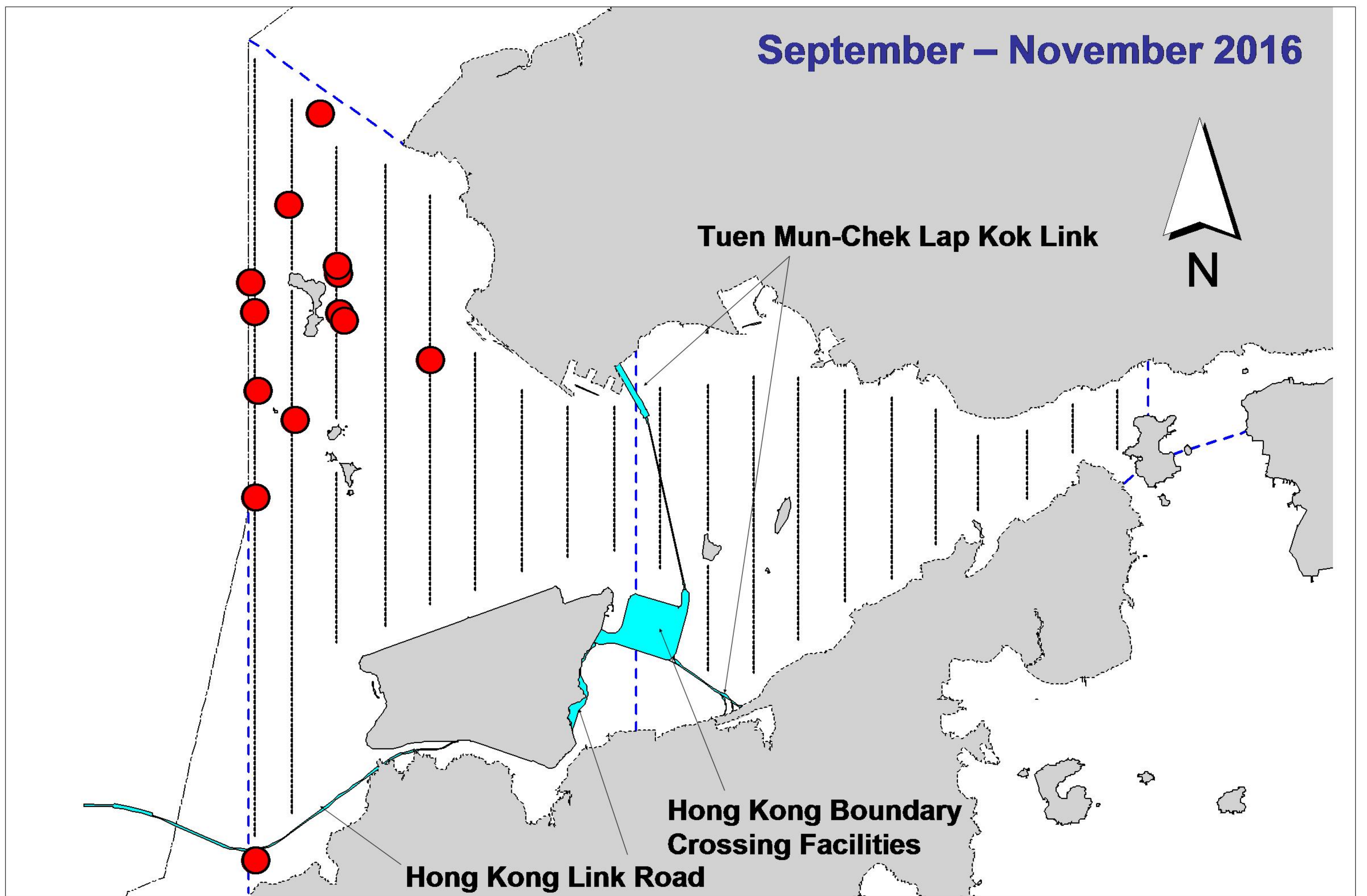


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

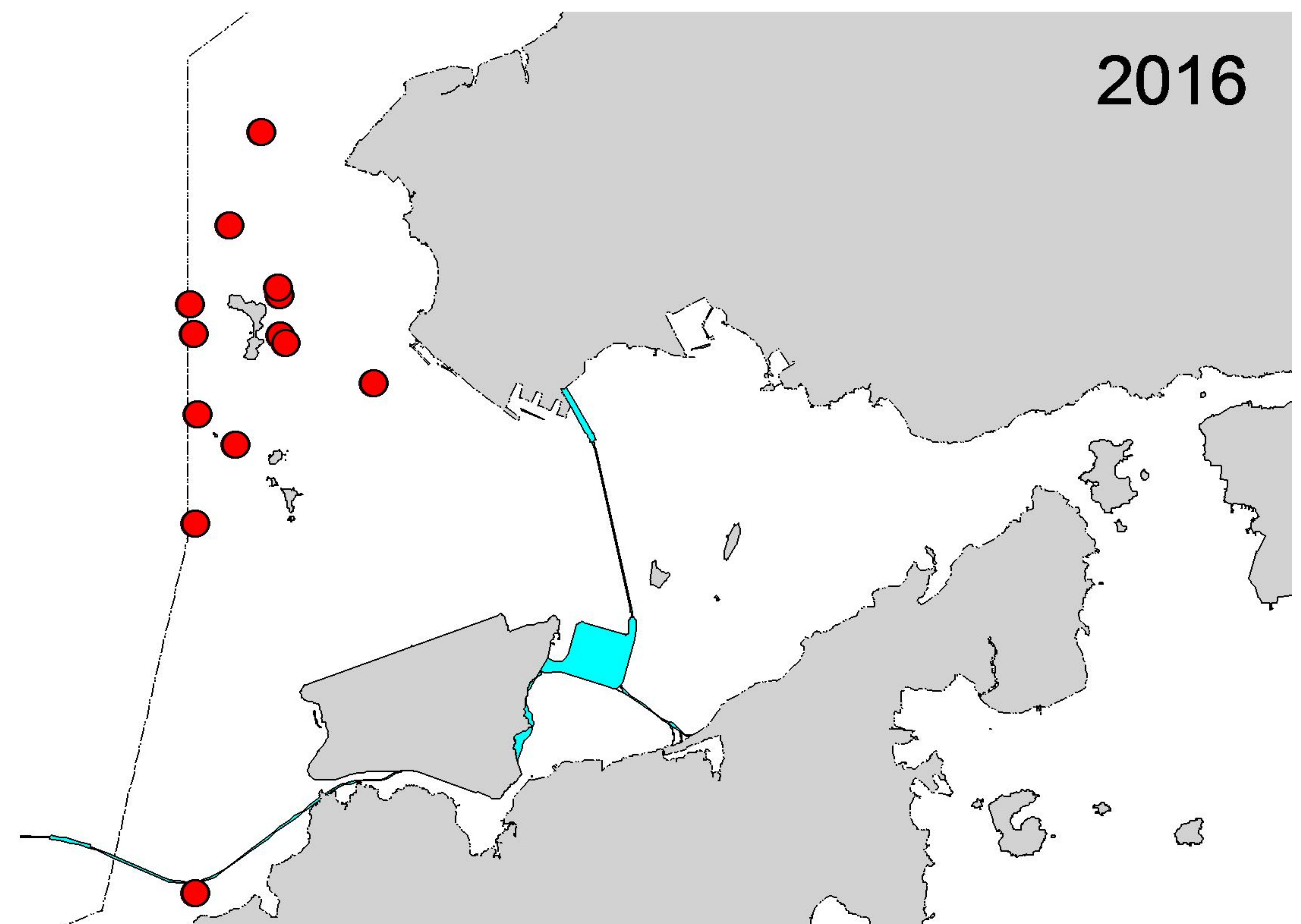
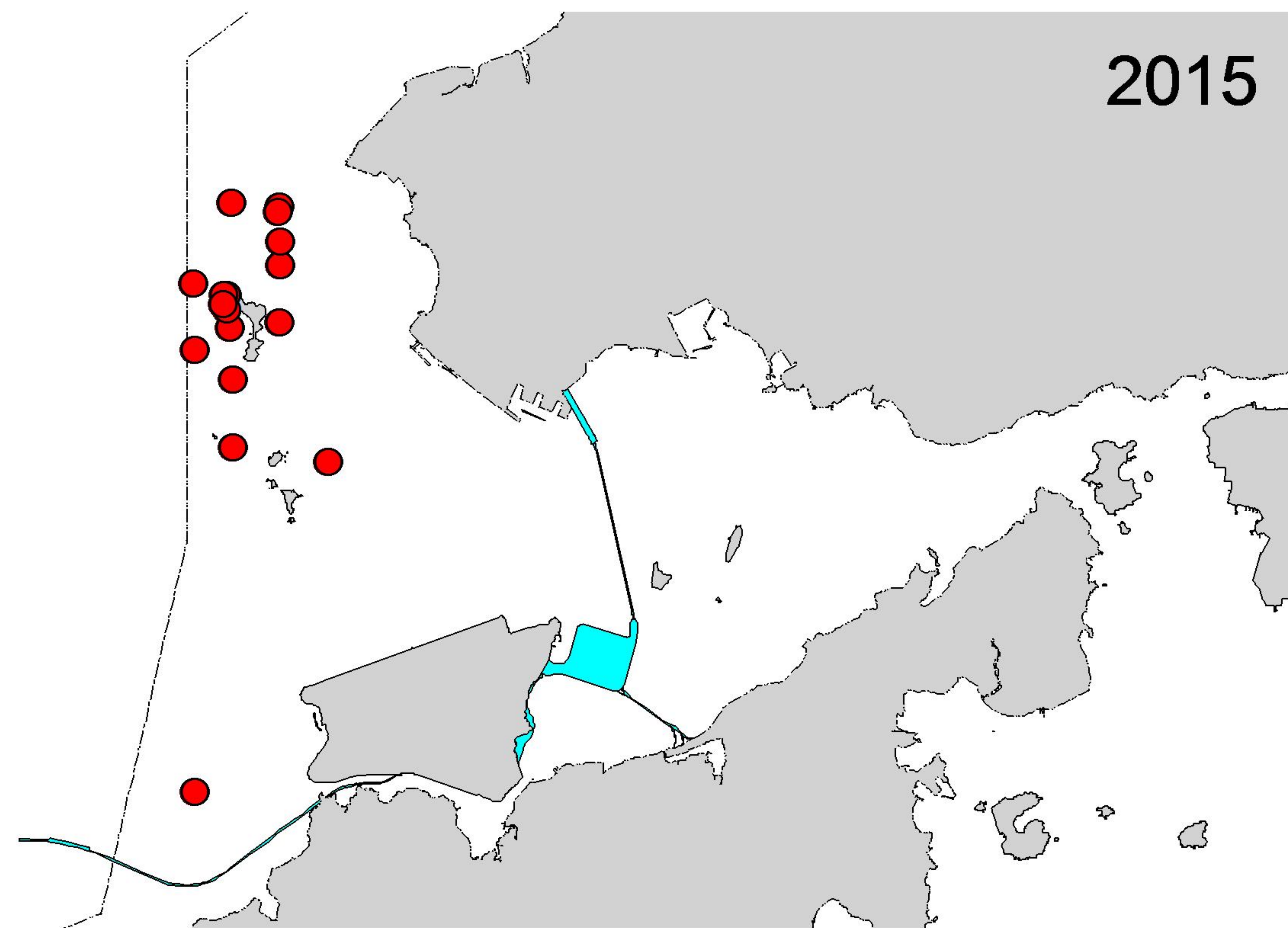
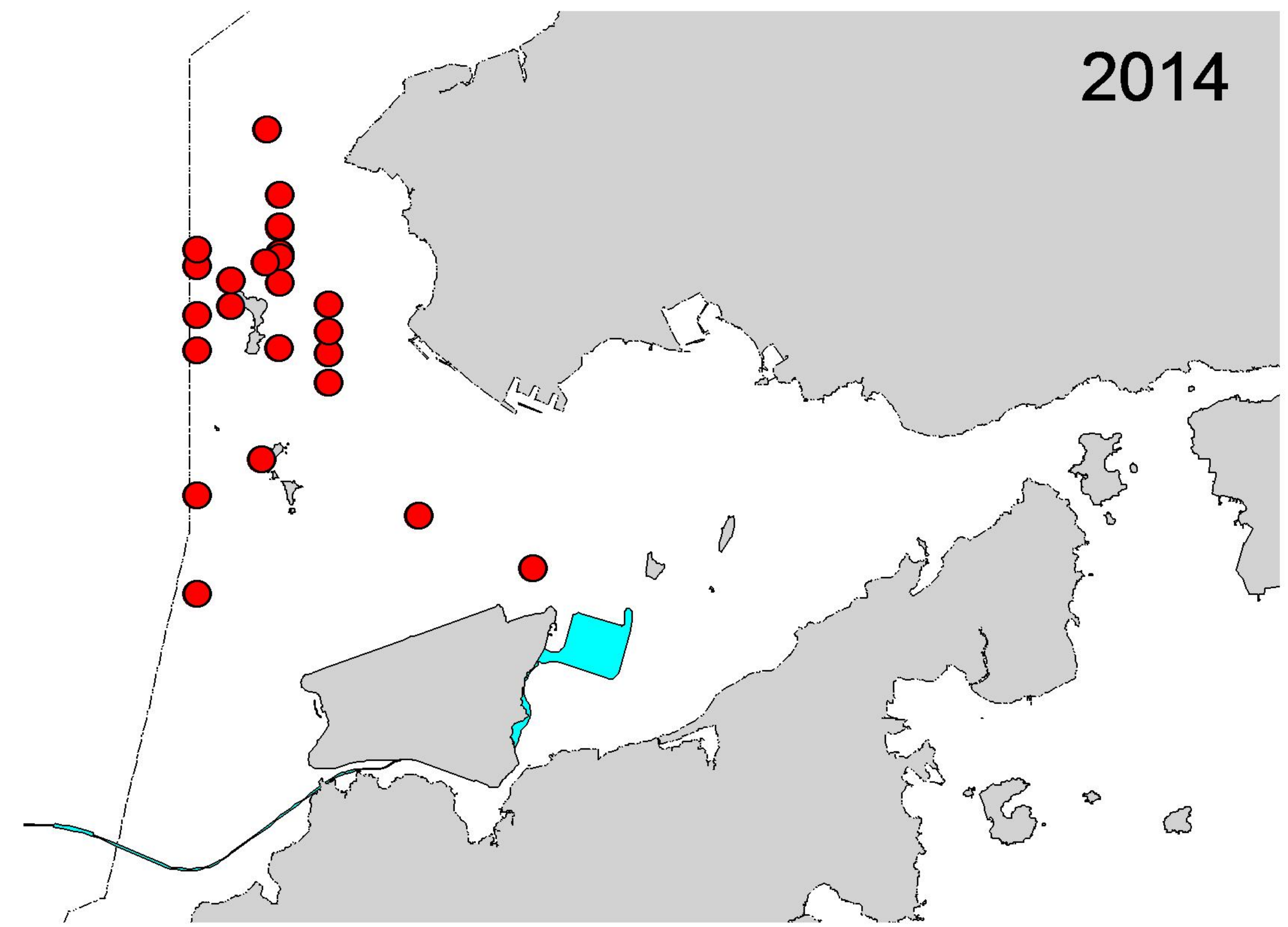
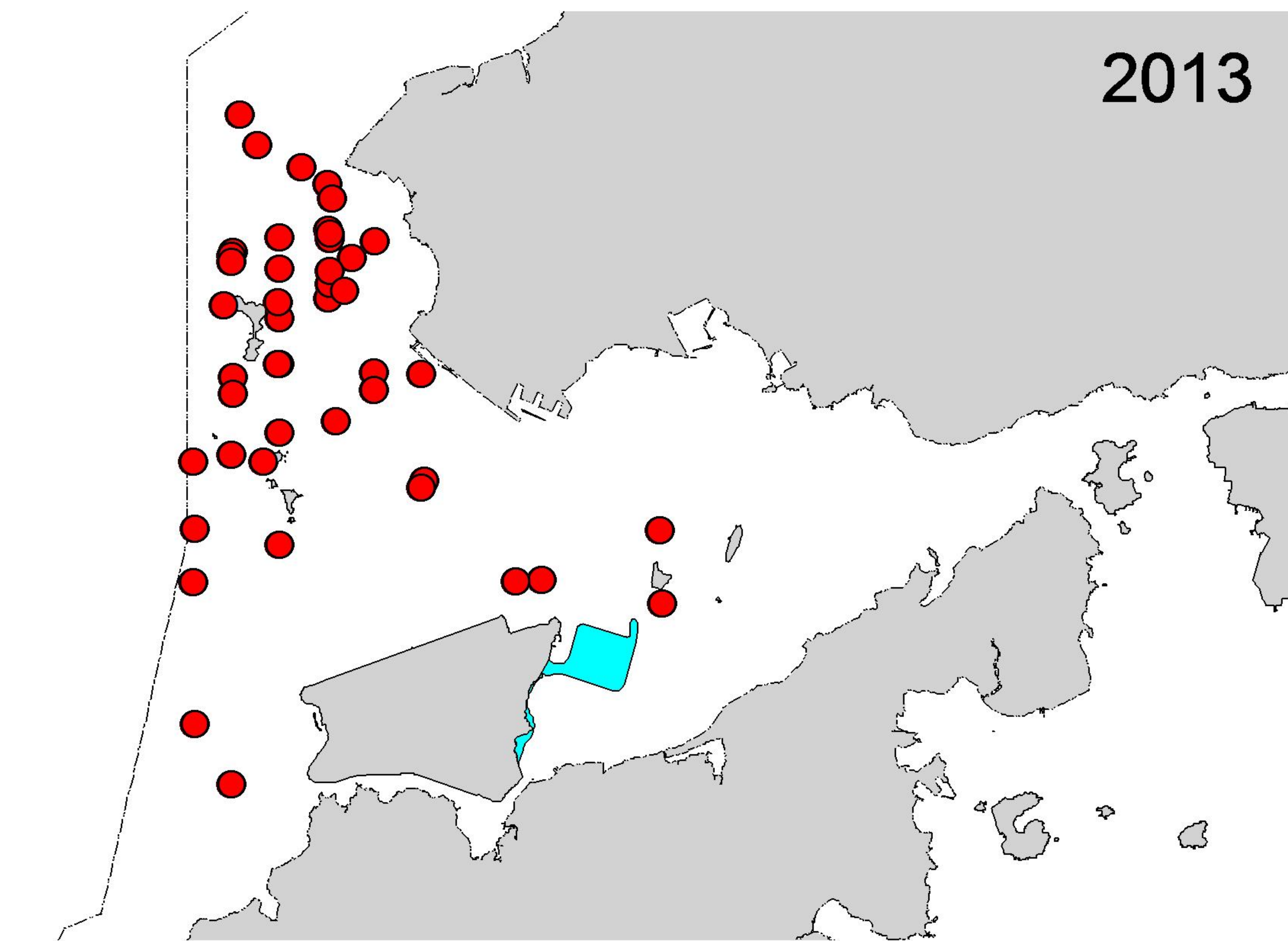


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the same autumn quarters (September-November) of HKLR03 impact phase in 2013-16

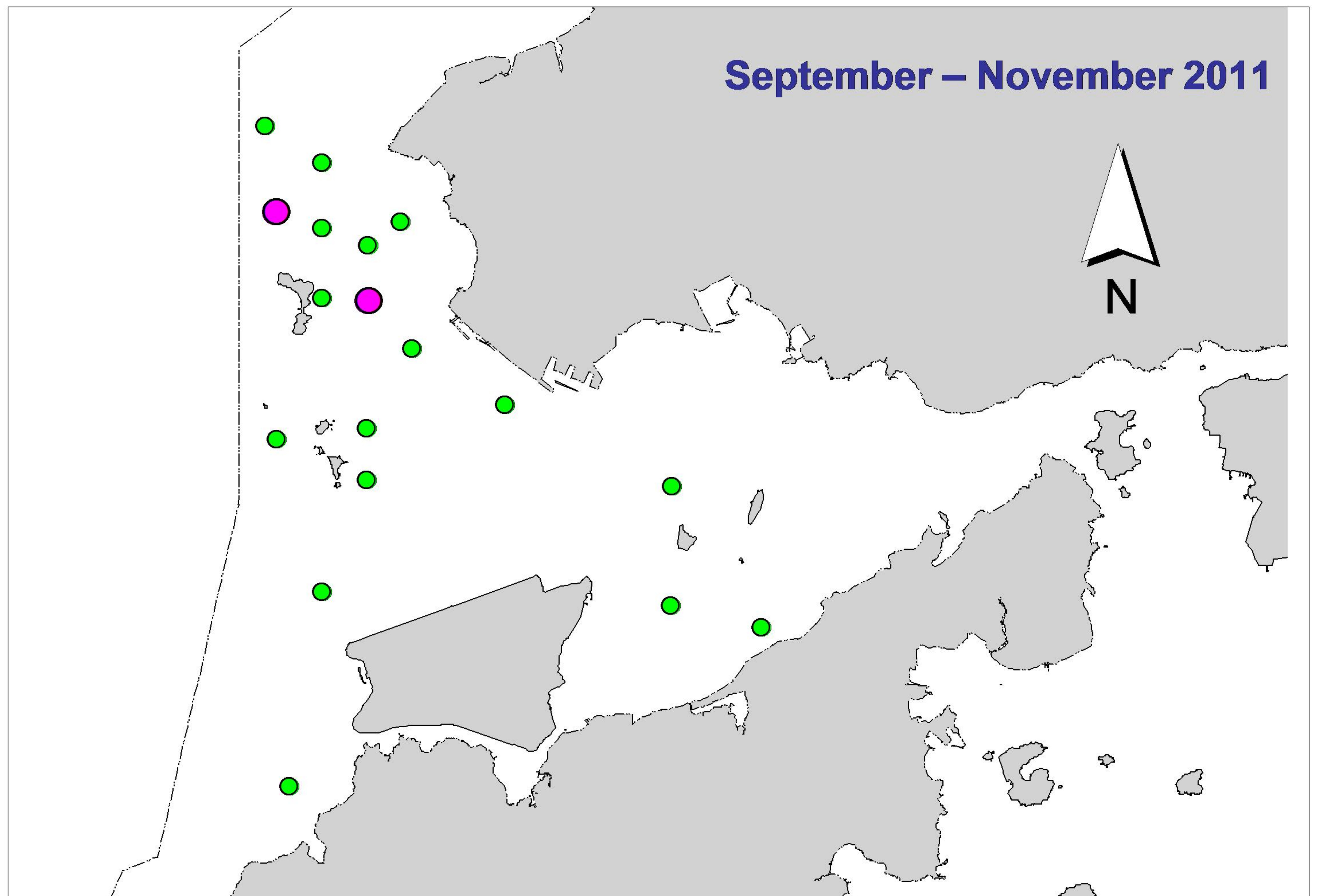
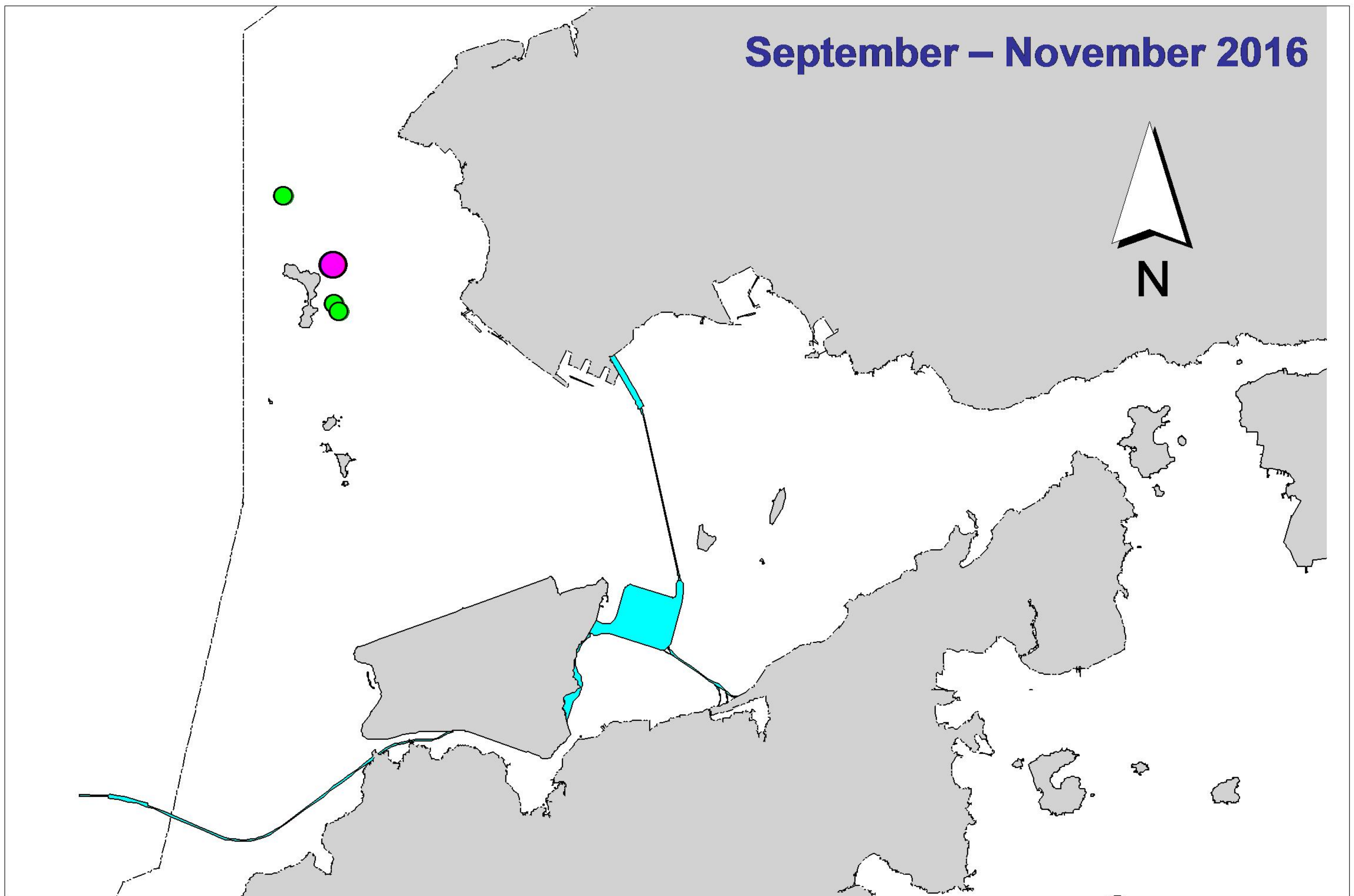


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

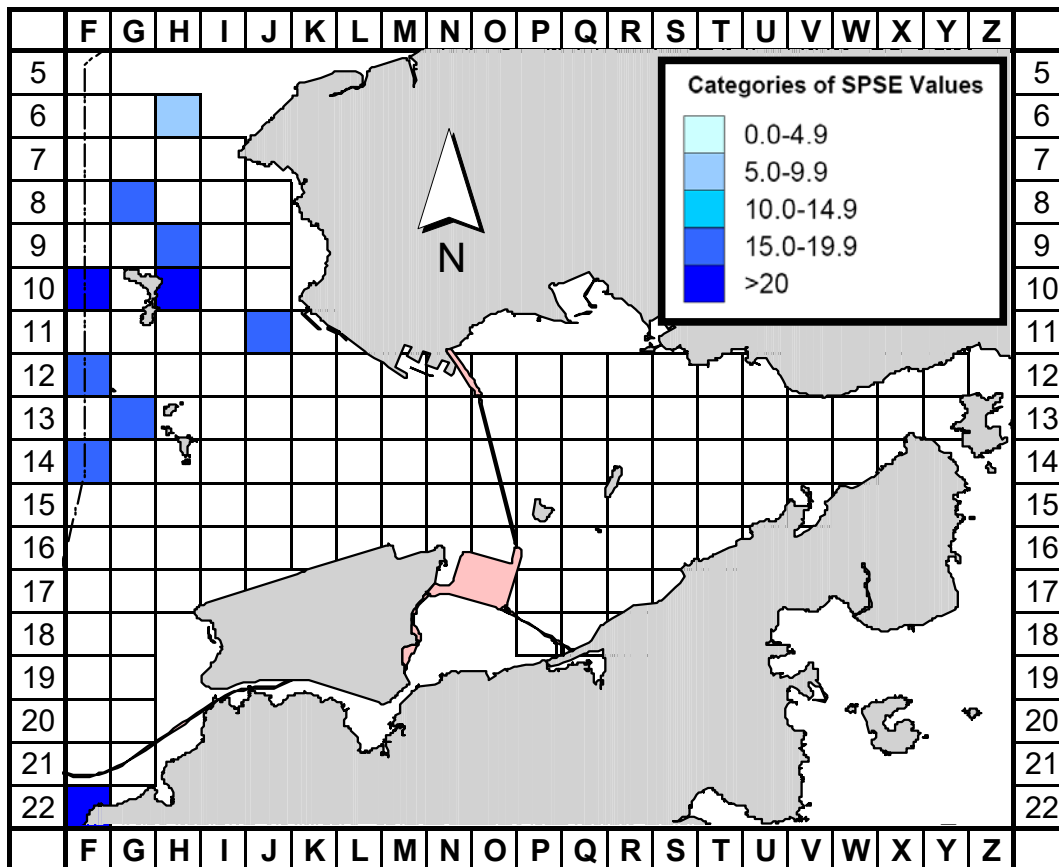


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 2016) (SPSE = no. of on-effort sightings per 100 units of survey effort)

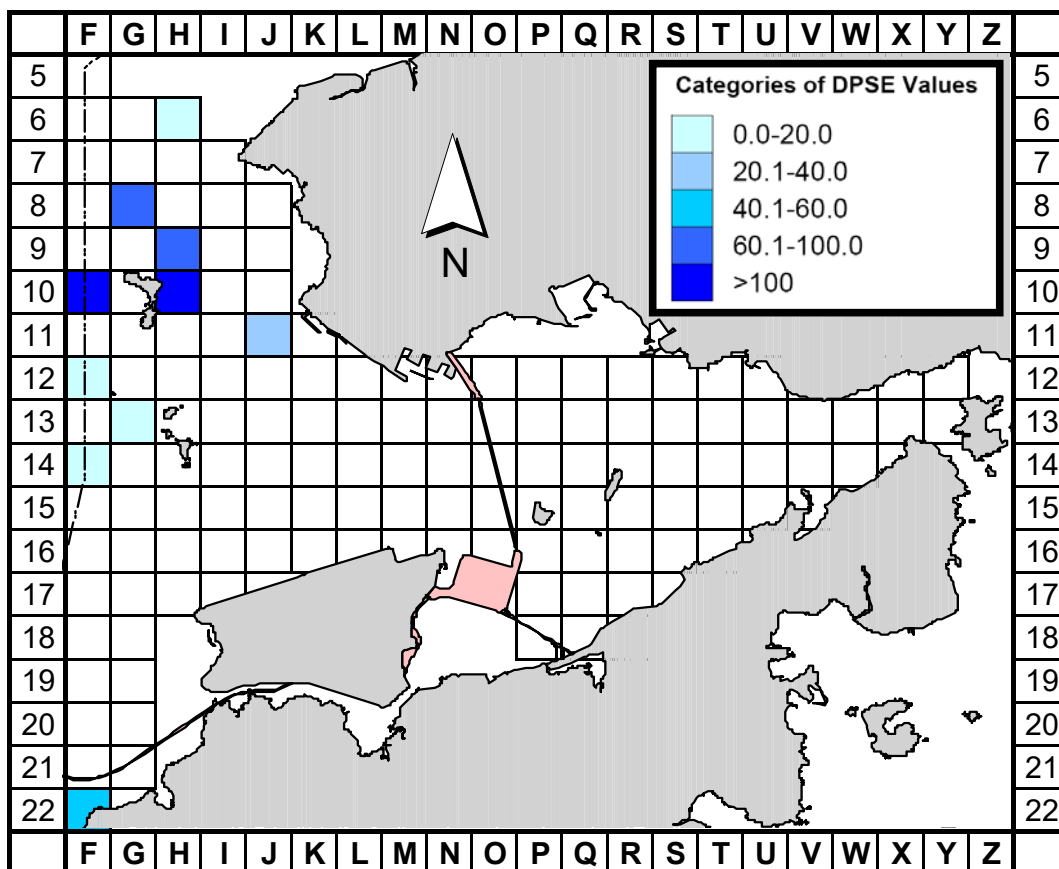


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Sep-Nov 2016) (DPSE = no. of dolphins per 100 units of survey effort)

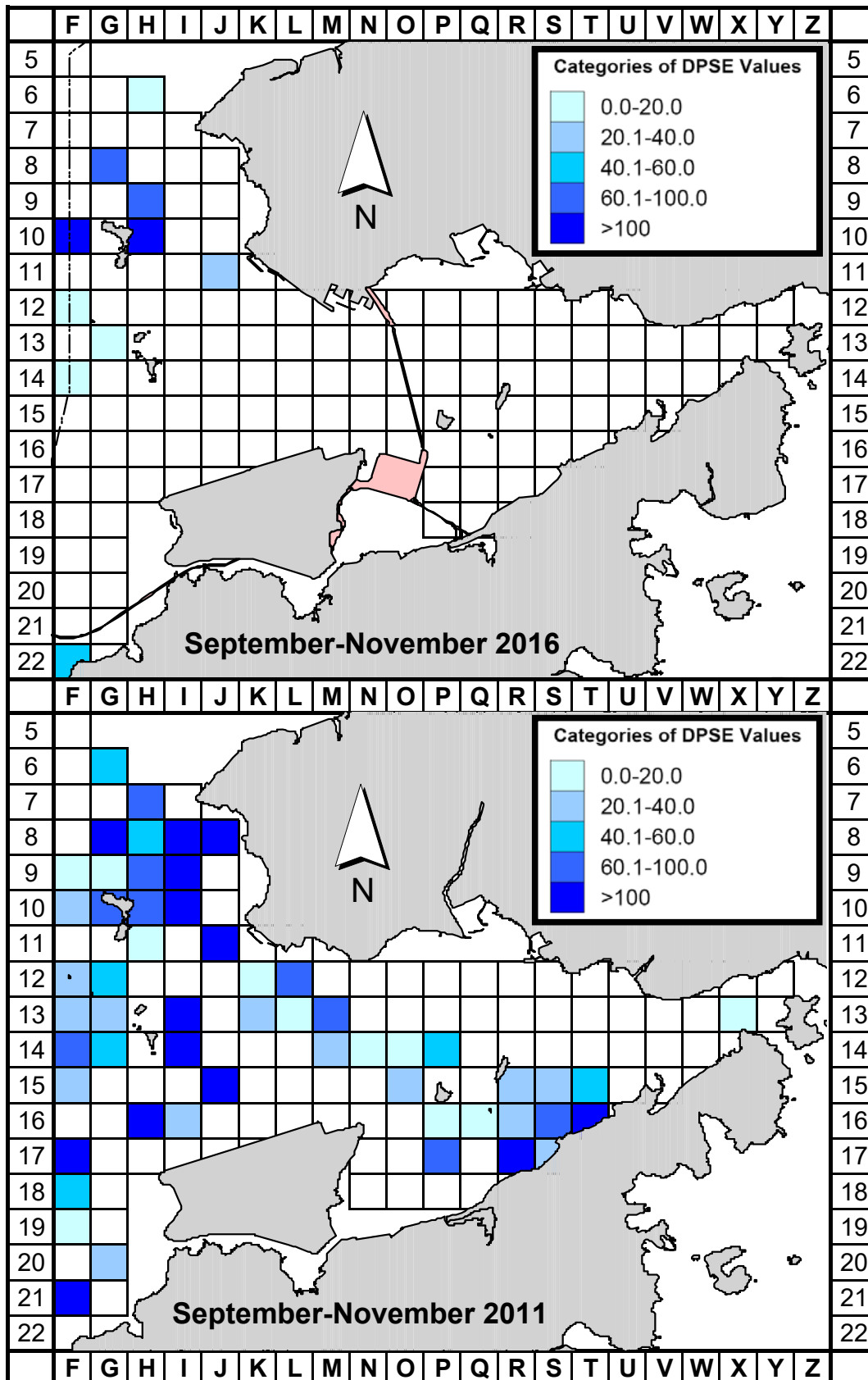


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the impact monitoring period (September-November 2016) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

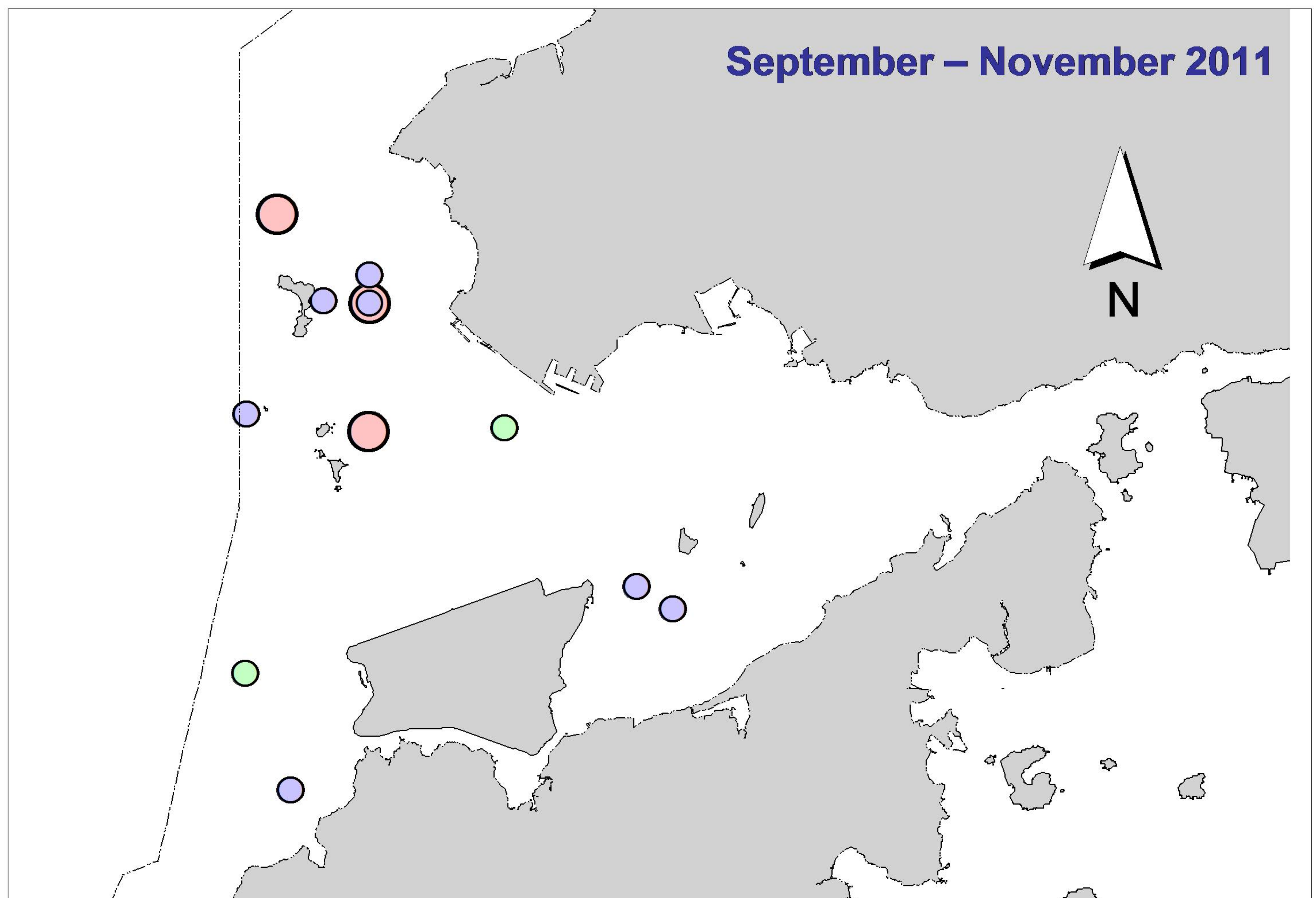
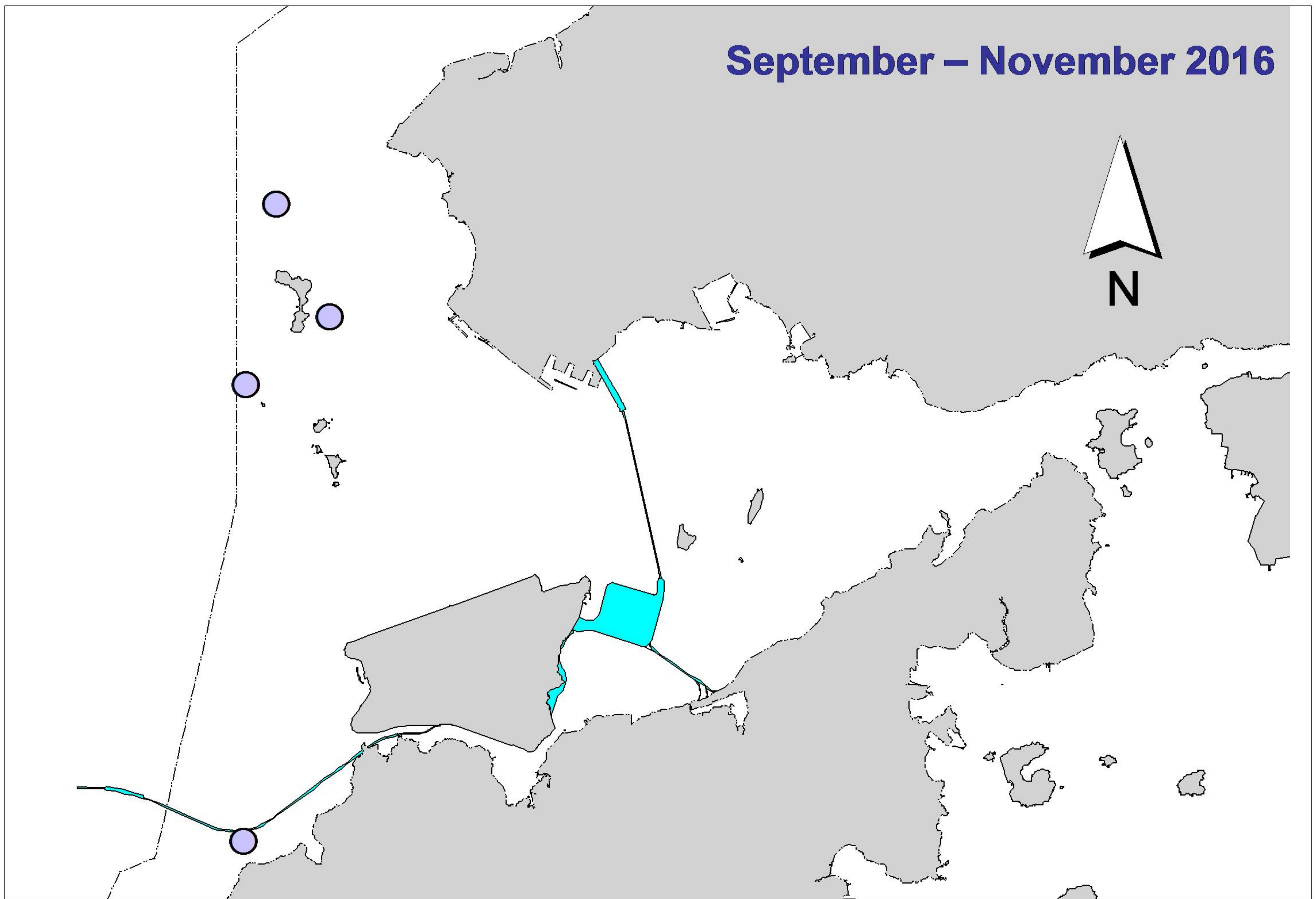


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (September-November 2016)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
13-Sep-16	NE LANTAU	2	15.97	AUTUMN	STANDARD31516	HKLR	P
13-Sep-16	NE LANTAU	2	10.03	AUTUMN	STANDARD31516	HKLR	S
13-Sep-16	NW LANTAU	2	36.84	AUTUMN	STANDARD31516	HKLR	P
13-Sep-16	NW LANTAU	3	2.60	AUTUMN	STANDARD31516	HKLR	P
13-Sep-16	NW LANTAU	2	15.06	AUTUMN	STANDARD31516	HKLR	S
14-Sep-16	NW LANTAU	3	16.30	AUTUMN	STANDARD36826	HKLR	P
14-Sep-16	NW LANTAU	4	14.20	AUTUMN	STANDARD36826	HKLR	P
14-Sep-16	NW LANTAU	3	2.30	AUTUMN	STANDARD36826	HKLR	S
14-Sep-16	NW LANTAU	4	5.30	AUTUMN	STANDARD36826	HKLR	S
14-Sep-16	NW LANTAU	5	0.50	AUTUMN	STANDARD36826	HKLR	S
14-Sep-16	NE LANTAU	2	2.79	AUTUMN	STANDARD36826	HKLR	P
14-Sep-16	NE LANTAU	3	16.35	AUTUMN	STANDARD36826	HKLR	P
14-Sep-16	NE LANTAU	4	0.76	AUTUMN	STANDARD36826	HKLR	P
14-Sep-16	NE LANTAU	2	2.40	AUTUMN	STANDARD36826	HKLR	S
14-Sep-16	NE LANTAU	3	9.00	AUTUMN	STANDARD36826	HKLR	S
21-Sep-16	NW LANTAU	2	30.13	AUTUMN	STANDARD36826	HKLR	P
21-Sep-16	NW LANTAU	3	9.42	AUTUMN	STANDARD36826	HKLR	P
21-Sep-16	NW LANTAU	2	10.37	AUTUMN	STANDARD36826	HKLR	S
21-Sep-16	NW LANTAU	3	2.31	AUTUMN	STANDARD36826	HKLR	S
21-Sep-16	NE LANTAU	1	1.80	AUTUMN	STANDARD36826	HKLR	P
21-Sep-16	NE LANTAU	2	14.60	AUTUMN	STANDARD36826	HKLR	P
21-Sep-16	NE LANTAU	1	2.10	AUTUMN	STANDARD36826	HKLR	S
21-Sep-16	NE LANTAU	2	8.10	AUTUMN	STANDARD36826	HKLR	S
23-Sep-16	NE LANTAU	2	18.82	AUTUMN	STANDARD36826	HKLR	P
23-Sep-16	NE LANTAU	3	0.81	AUTUMN	STANDARD36826	HKLR	P
23-Sep-16	NE LANTAU	2	10.07	AUTUMN	STANDARD36826	HKLR	S
23-Sep-16	NW LANTAU	2	1.25	AUTUMN	STANDARD36826	HKLR	P
23-Sep-16	NW LANTAU	3	28.81	AUTUMN	STANDARD36826	HKLR	P
23-Sep-16	NW LANTAU	4	0.80	AUTUMN	STANDARD36826	HKLR	P
23-Sep-16	NW LANTAU	3	7.34	AUTUMN	STANDARD36826	HKLR	S
4-Oct-16	NW LANTAU	2	25.94	AUTUMN	STANDARD36826	HKLR	P
4-Oct-16	NW LANTAU	3	5.70	AUTUMN	STANDARD36826	HKLR	P
4-Oct-16	NW LANTAU	2	6.60	AUTUMN	STANDARD36826	HKLR	S
4-Oct-16	NE LANTAU	2	15.22	AUTUMN	STANDARD36826	HKLR	P
4-Oct-16	NE LANTAU	3	4.57	AUTUMN	STANDARD36826	HKLR	P
4-Oct-16	NE LANTAU	2	10.41	AUTUMN	STANDARD36826	HKLR	S
7-Oct-16	NE LANTAU	2	16.19	AUTUMN	STANDARD36826	HKLR	P
7-Oct-16	NE LANTAU	2	10.71	AUTUMN	STANDARD36826	HKLR	S
7-Oct-16	NW LANTAU	1	4.54	AUTUMN	STANDARD36826	HKLR	P
7-Oct-16	NW LANTAU	2	36.45	AUTUMN	STANDARD36826	HKLR	P
7-Oct-16	NW LANTAU	1	1.03	AUTUMN	STANDARD36826	HKLR	S
7-Oct-16	NW LANTAU	2	11.81	AUTUMN	STANDARD36826	HKLR	S
7-Oct-16	NW LANTAU	3	0.40	AUTUMN	STANDARD36826	HKLR	S
11-Oct-16	NW LANTAU	2	29.01	AUTUMN	STANDARD36826	HKLR	P
11-Oct-16	NW LANTAU	3	10.75	AUTUMN	STANDARD36826	HKLR	P
11-Oct-16	NW LANTAU	2	12.21	AUTUMN	STANDARD36826	HKLR	S
11-Oct-16	NW LANTAU	3	1.40	AUTUMN	STANDARD36826	HKLR	S
11-Oct-16	NE LANTAU	2	15.82	AUTUMN	STANDARD36826	HKLR	P
11-Oct-16	NE LANTAU	3	0.80	AUTUMN	STANDARD36826	HKLR	P
11-Oct-16	NE LANTAU	2	7.48	AUTUMN	STANDARD36826	HKLR	S
11-Oct-16	NE LANTAU	3	2.40	AUTUMN	STANDARD36826	HKLR	S

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
13-Oct-16	NW LANTAU	2	14.72	AUTUMN	STANDARD36826	HKLR	P
13-Oct-16	NW LANTAU	3	15.81	AUTUMN	STANDARD36826	HKLR	P
13-Oct-16	NW LANTAU	2	3.21	AUTUMN	STANDARD36826	HKLR	S
13-Oct-16	NW LANTAU	3	5.06	AUTUMN	STANDARD36826	HKLR	S
13-Oct-16	NE LANTAU	2	20.06	AUTUMN	STANDARD36826	HKLR	P
13-Oct-16	NE LANTAU	2	11.14	AUTUMN	STANDARD36826	HKLR	S
2-Nov-16	NW LANTAU	2	3.00	AUTUMN	STANDARD36826	HKLR	P
2-Nov-16	NW LANTAU	3	19.06	AUTUMN	STANDARD36826	HKLR	P
2-Nov-16	NW LANTAU	4	9.44	AUTUMN	STANDARD36826	HKLR	P
2-Nov-16	NW LANTAU	2	2.50	AUTUMN	STANDARD36826	HKLR	S
2-Nov-16	NW LANTAU	3	5.40	AUTUMN	STANDARD36826	HKLR	S
2-Nov-16	NE LANTAU	2	4.13	AUTUMN	STANDARD36826	HKLR	P
2-Nov-16	NE LANTAU	3	15.46	AUTUMN	STANDARD36826	HKLR	P
2-Nov-16	NE LANTAU	2	4.21	AUTUMN	STANDARD36826	HKLR	S
2-Nov-16	NE LANTAU	3	7.40	AUTUMN	STANDARD36826	HKLR	S
7-Nov-16	NW LANTAU	2	37.21	AUTUMN	STANDARD31516	HKLR	P
7-Nov-16	NW LANTAU	3	0.90	AUTUMN	STANDARD31516	HKLR	P
7-Nov-16	NW LANTAU	2	13.39	AUTUMN	STANDARD31516	HKLR	S
7-Nov-16	NE LANTAU	2	14.34	AUTUMN	STANDARD31516	HKLR	P
7-Nov-16	NE LANTAU	3	1.00	AUTUMN	STANDARD31516	HKLR	P
7-Nov-16	NE LANTAU	2	7.66	AUTUMN	STANDARD31516	HKLR	S
7-Nov-16	NE LANTAU	3	0.80	AUTUMN	STANDARD31516	HKLR	S
18-Nov-16	NW LANTAU	1	1.90	AUTUMN	STANDARD31516	HKLR	P
18-Nov-16	NW LANTAU	2	38.57	AUTUMN	STANDARD31516	HKLR	P
18-Nov-16	NW LANTAU	1	1.70	AUTUMN	STANDARD31516	HKLR	S
18-Nov-16	NW LANTAU	2	11.23	AUTUMN	STANDARD31516	HKLR	S
18-Nov-16	NE LANTAU	2	17.54	AUTUMN	STANDARD31516	HKLR	P
18-Nov-16	NE LANTAU	2	10.66	AUTUMN	STANDARD31516	HKLR	S
22-Nov-16	NE LANTAU	2	17.43	AUTUMN	STANDARD36826	HKLR	P
22-Nov-16	NE LANTAU	3	1.32	AUTUMN	STANDARD36826	HKLR	P
22-Nov-16	NE LANTAU	2	10.95	AUTUMN	STANDARD36826	HKLR	S
22-Nov-16	NW LANTAU	2	29.12	AUTUMN	STANDARD36826	HKLR	P
22-Nov-16	NW LANTAU	3	2.10	AUTUMN	STANDARD36826	HKLR	P
22-Nov-16	NW LANTAU	2	7.58	AUTUMN	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (September-November 2016)

(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
21-Sep-16	1	1057	3	NW LANTAU	2	0	ON	HKLR	826211	804642	AUTUMN	NONE	P
21-Sep-16	2	1155	11	NW LANTAU	2	664	ON	HKLR	826983	806467	AUTUMN	NONE	P
21-Sep-16	3	1229	5	NW LANTAU	2	0	ON	HKLR	826185	806496	AUTUMN	NONE	P
21-Sep-16	4	1341	2	NW LANTAU	2	79	ON	HKLR	825218	808472	AUTUMN	NONE	P
4-Oct-16	1	1039	1	NW LANTAU	2	14	ON	HKLR	823995	805534	AUTUMN	NONE	P
4-Oct-16	2	1114	2	NW LANTAU	2	377	ON	HKLR	830283	806082	AUTUMN	NONE	S
7-Oct-16	1	1419	4	NW LANTAU	1	103	ON	HKLR	827149	806447	AUTUMN	NONE	P
7-Oct-16	2	1553	2	NW LANTAU	2	8	ON	HKLR	814927	804671	AUTUMN	NONE	P
11-Oct-16	1	1049	1	NW LANTAU	2	243	ON	HKLR	822391	804655	AUTUMN	NONE	P
13-Oct-16	1	1104	5	NW LANTAU	3	69	ON	HKLR	828391	805399	AUTUMN	NONE	P
7-Nov-16	1	1103	1	NW LANTAU	2	211	ON	HKLR	824583	804711	AUTUMN	NONE	P
18-Nov-16	1	1352	7	NW LANTAU	1	99	ON	HKLR	826019	806609	AUTUMN	GILLNET	P
18-Nov-16	2	1459	4	NW LANTAU	2	440	ON	HKLR	826820	804551	AUTUMN	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in September-November 2016

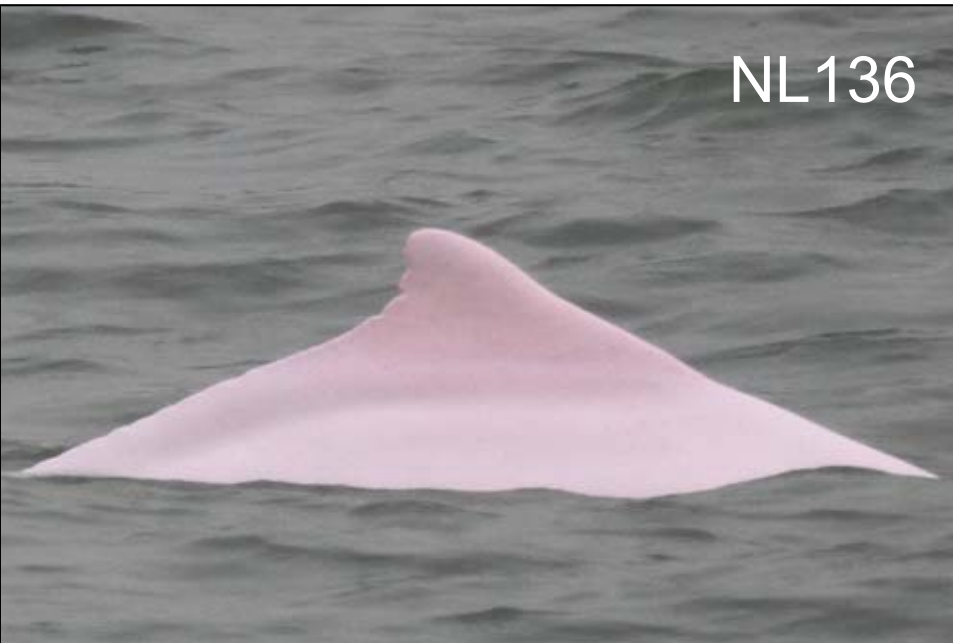
ID#	DATE	STG#	AREA
CH34	13/10/16	1	NW LANTAU
	18/11/16	1	NW LANTAU
	18/11/16	2	NW LANTAU
NL12	21/09/16	3	NW LANTAU
NL103	21/09/16	3	NW LANTAU
NL104	13/10/16	1	NW LANTAU
NL136	21/09/16	3	NW LANTAU
	04/10/16	2	NW LANTAU
	18/11/16	1	NW LANTAU
	18/11/16	2	NW LANTAU
NL182	04/10/16	2	NW LANTAU
NL202	21/09/16	2	NW LANTAU
	07/10/16	1	NW LANTAU
	13/10/16	1	NW LANTAU
	18/11/16	1	NW LANTAU
NL220	18/11/16	1	NW LANTAU
NL224	21/09/16	2	NW LANTAU
NL259	21/09/16	3	NW LANTAU
NL261	21/09/16	2	NW LANTAU
NL264	21/09/16	3	NW LANTAU
NL269	18/11/16	1	NW LANTAU
	18/11/16	2	NW LANTAU
NL272	21/09/16	2	NW LANTAU
NL286	21/09/16	2	NW LANTAU
	07/10/16	1	NW LANTAU
	13/10/16	1	NW LANTAU
NL288	21/09/16	3	NW LANTAU
NL307	21/09/16	2	NW LANTAU
NL319	21/09/16	2	NW LANTAU
NL320	21/09/16	2	NW LANTAU
	07/10/16	1	NW LANTAU
	18/11/16	1	NW LANTAU
NL321	13/10/16	1	NW LANTAU
WL243	07/10/16	2	NW LANTAU

Appendix IV. Twenty-one individual dolphins that were identified during September-November 2016 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL136



NL182



NL202



NL220



Appendix IV. (cont'd)

NL224



NL259



NL261



NL264



Appendix IV. (cont'd)



NL269



NL272



NL286



NL288

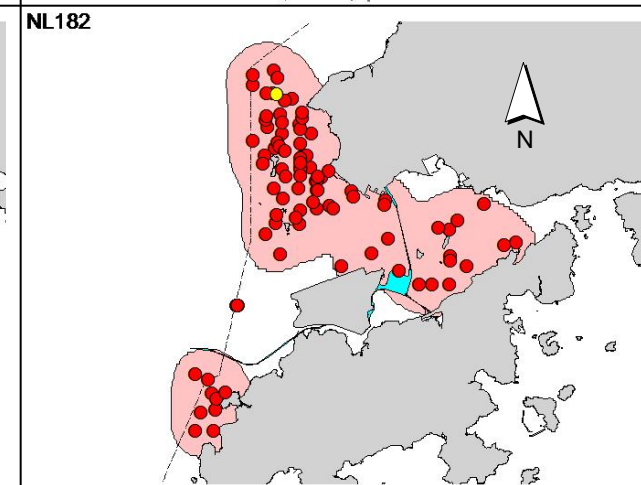
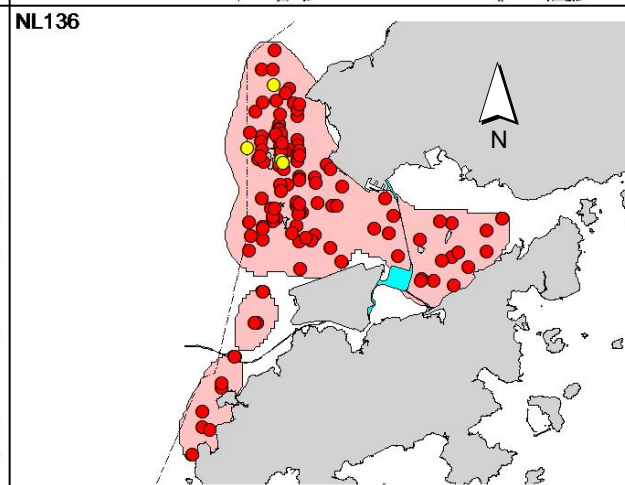
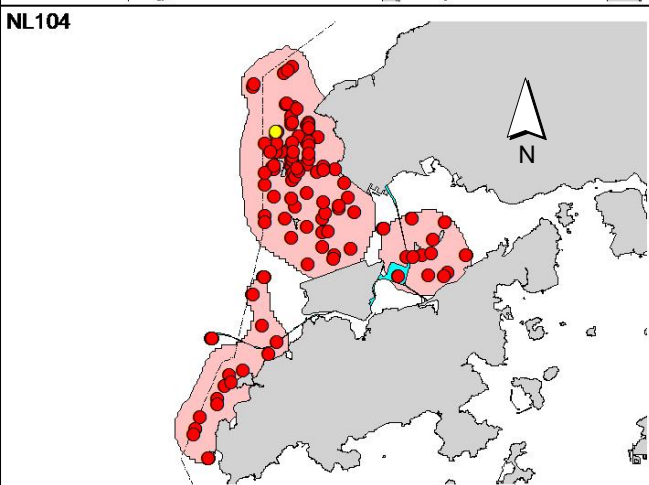
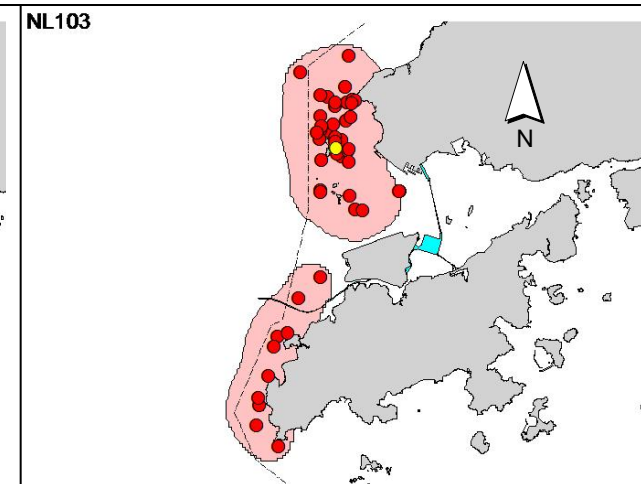
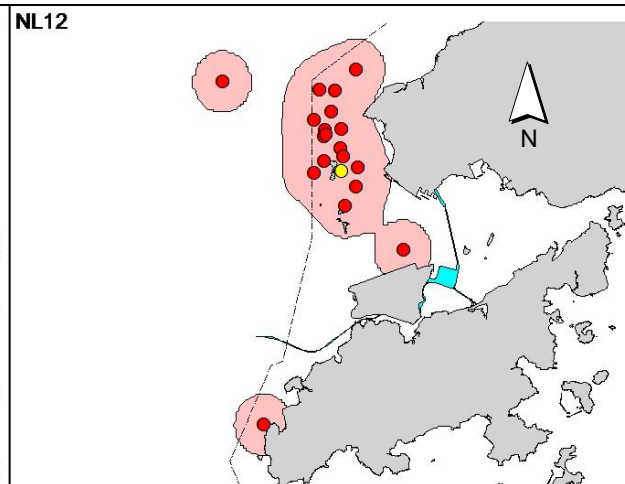
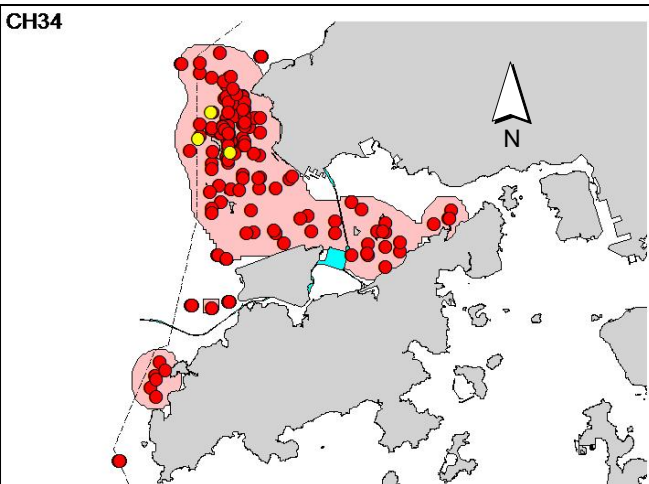
Appendix IV. (cont'd)



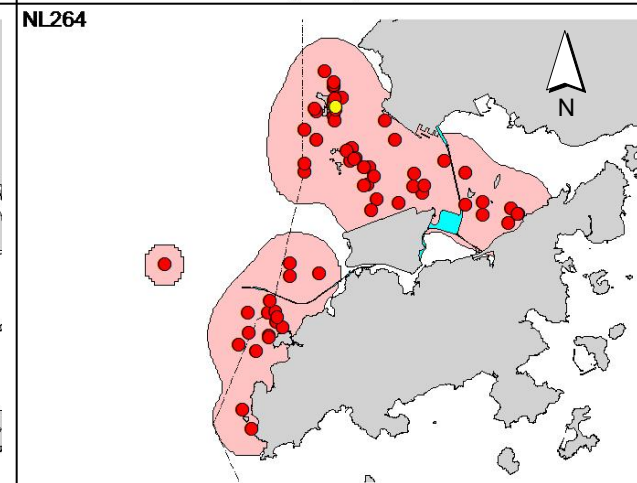
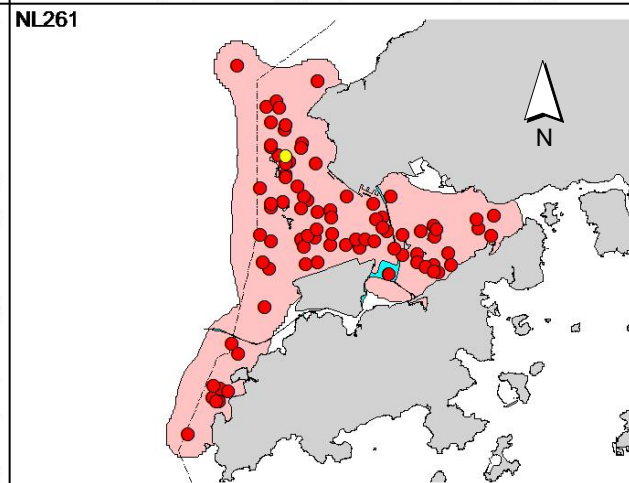
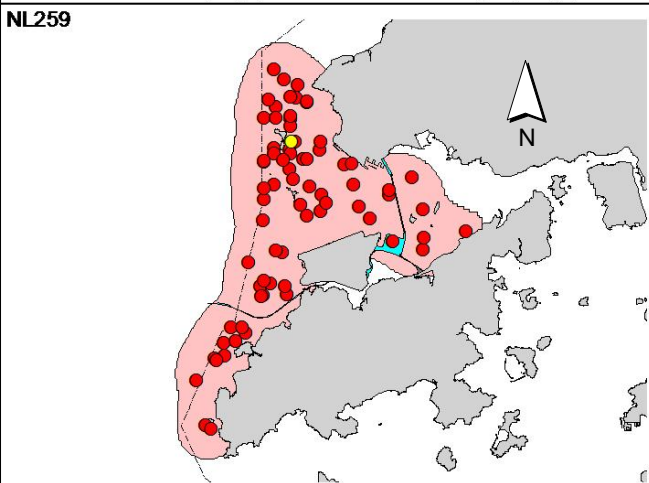
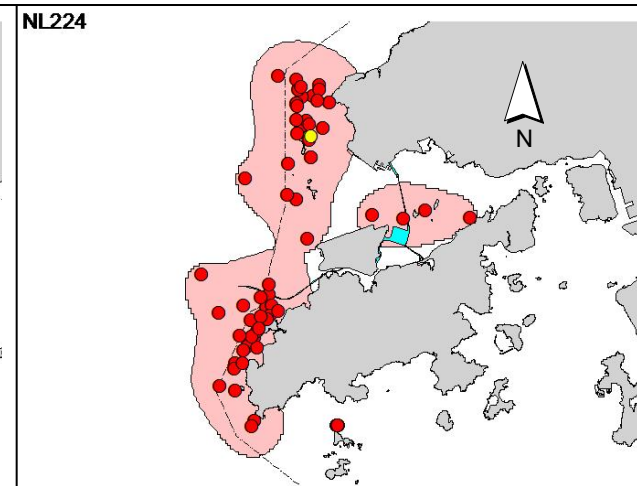
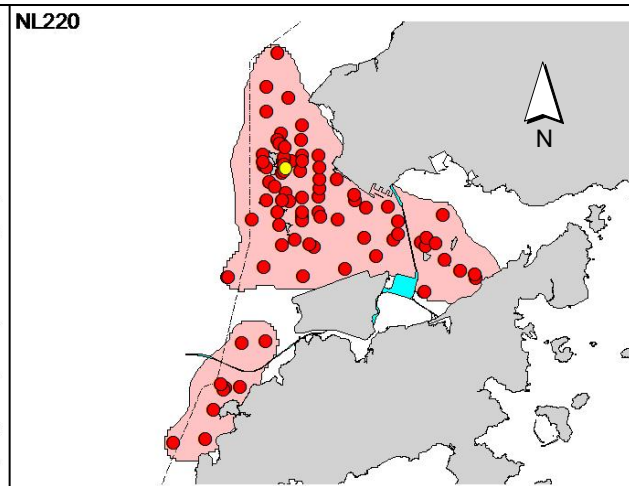
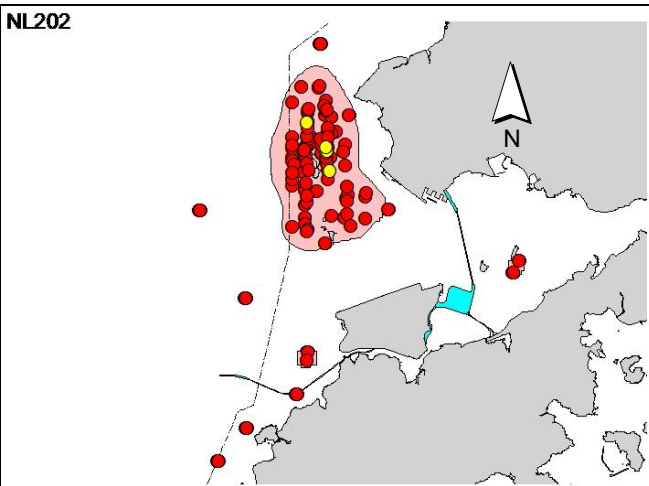
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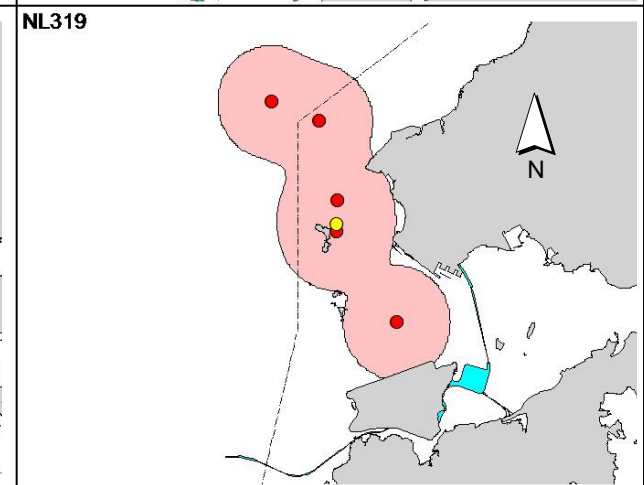
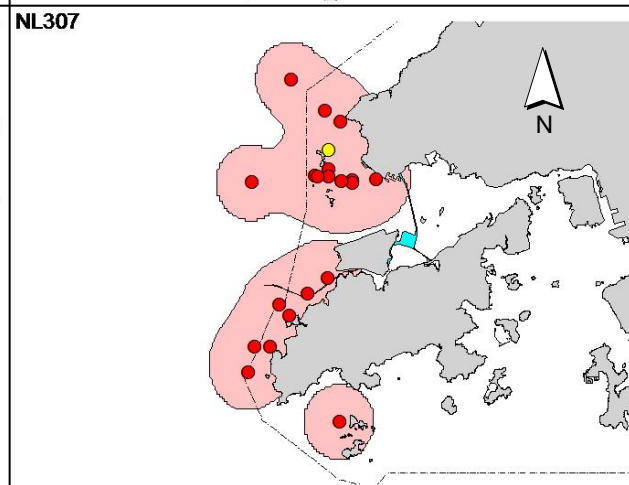
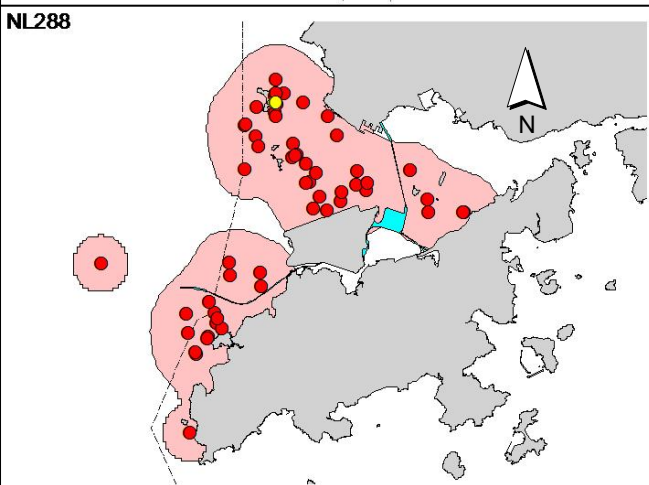
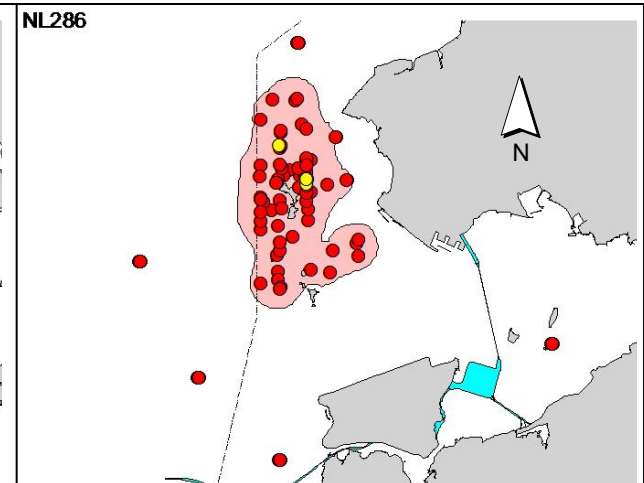
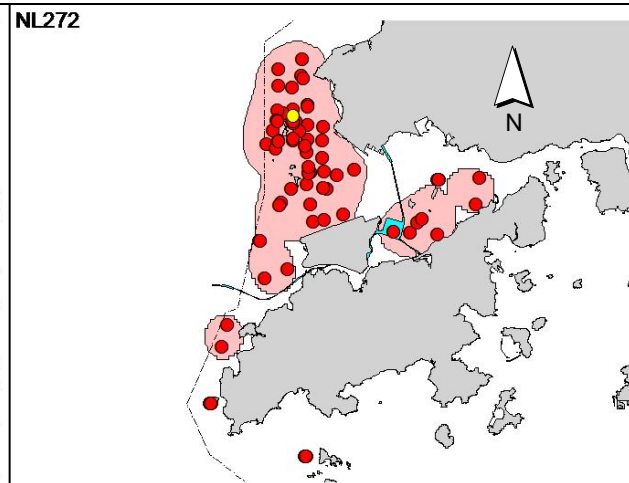
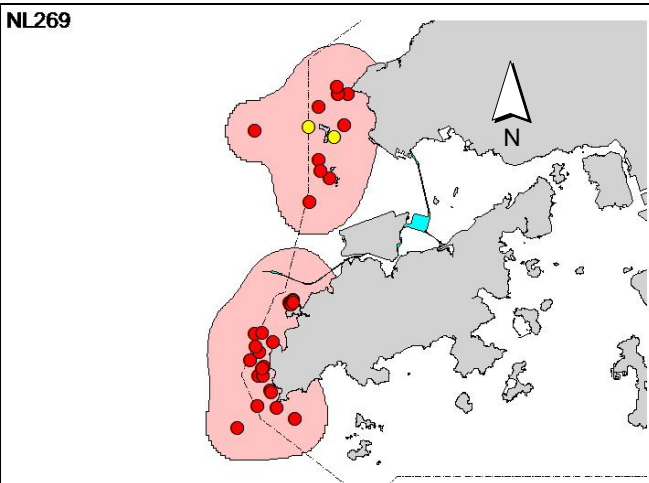
Appendix V. Ranging patterns (95% kernel ranges) of 21 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicates sightings made in September-November 2016 during HZMB-related monitoring surveys)



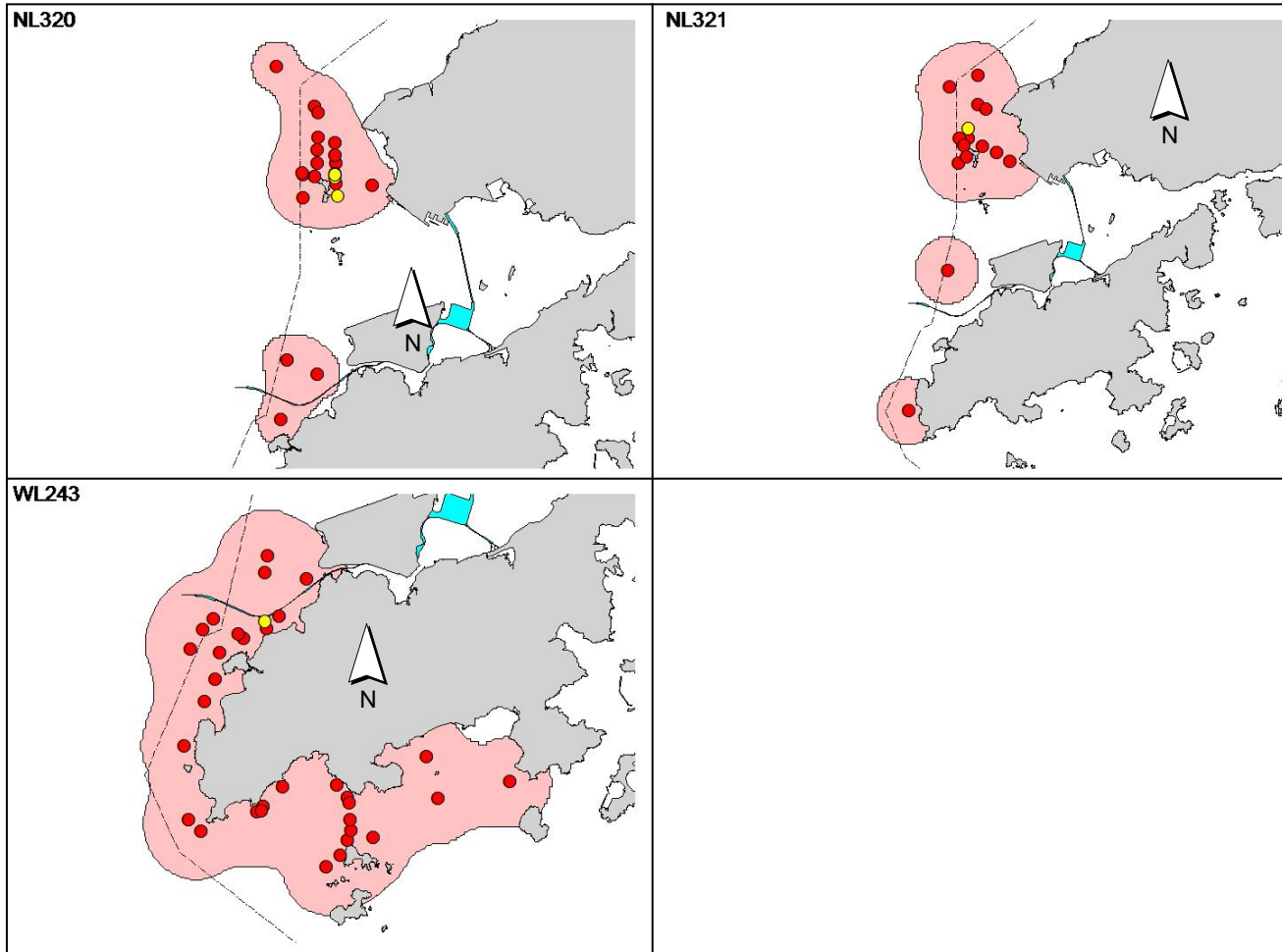
Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix J

Event Action Plan

Appendix J1 Event/ Action Plan for Air Quality

EVENT	ET ⁽¹⁾	ACTION		
		IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor
Action Level				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with the IEC and the Contractor on remedial actions required. 6. If exceedance continues, arrange meeting with the IEC and the SOR. 7. 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. 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. Submit proposals for remedial actions to IEC within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

ACTION				
EVENT	ET ⁽¹⁾	IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor
Limit Level				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify the source. 2. Inform the SOR and the DEP. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. 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 are properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and 	<ol style="list-style-type: none"> 1. Discuss amongst the SOR, ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. 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. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

the SOR informed of the results.

8. If exceedance stops cease
additional monitoring.

Appendix J2 Event/ Action Plan for Construction Noise

ACTION					
EVENT	ET	IEC	SOR	Contractor	
Action Level	<ol style="list-style-type: none"> 1. Notify the IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the SOR accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals 	
Limit Level	<ol style="list-style-type: none"> 1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IEC, the SOR and the DEP the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst the SOR, the ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 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. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated. 	

Appendix J3 **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 in situ 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; Identify source(s) of impact; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in writing; Discuss with IEC, ET and Contractor on the proposed 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the non-compliance in writing; Rectify unacceptable practice;

Event	ET Leader	IEC	SOR	Contractor
	3. Inform IEC, contractor, SOR and EPD;	on possible remedial actions;	mitigation measures;	
	4. Check monitoring data, all plant, equipment and Contractor's working methods;	3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly.	3. Request Contractor to review the working methods.	3. Check all plant and equipment and consider changes of working methods;
	5. Discuss mitigation measures with IEC, SOR and Contractor;			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	1. Repeat measurement on next day of exceedance to confirm findings;	1. Check monitoring data submitted by ET and Contractor's working method;	1. Discuss with IEC, ET and Contractor on the proposed mitigation measures;	1. Take immediate action to avoid further exceedance;
	2. Identify source(s) of impact;	2. Discuss with ET and Contractor on possible remedial actions;	2. Request Contractor to critically review the working methods;	2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR;
	3. Inform IEC, contractor, SOR and EPD;	3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly;	3. Make agreement on the mitigation measures to be implemented;	3. Implement the agreed mitigation measures;
	4. Check monitoring data, all plant, equipment and Contractor's working methods;	4. Supervise the implementation of mitigation measures.	4.	4. Resubmit proposals of mitigation measures if problem still not under control;
	5. Discuss mitigation measures with IEC, SOR and Contractor;		5. Ensure mitigation measures are properly implemented;	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.
	6. Ensure mitigation measures are implemented;		6.	
	7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days;		7. 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.	

Appendix J4 **Implementation of Event-Action Plan for Dolphin Monitoring**

Event	ET Leader	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 findings 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.

Event	ET Leader	IEC	SOR	Contractor
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; 3. Identify source(s) of impact; 4. Inform the IEC, ER/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, ER/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. 	<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, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures; 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly; 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly. 	<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 ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures; 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures; 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 J5 *Event and Action Plan on Dolphin Acoustic Behaviour*

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<u>Action Level</u>				
With the numerical values presented in <i>Table 5.7 of Baseline Monitoring Report</i> , when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 20% lower or higher than that recorded in the baseline monitoring (see <i>Table 5.8 of Baseline Monitoring Report</i>), or when there is a difference of 20% in dolphin acoustic signal detection at nighttime period at Site C1 only, the action level should be triggered	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO 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 SO; 3. Implement the agreed measures.

EVENT	ACTION			
	ET Leader	IEC	SO	Contractor
<p><u>Limit Level</u></p> <p>With the numerical values presented in <i>Table 5.7 of Baseline Monitoring Report</i>, when any of the response variable for dolphin acoustic behaviour recorded in the construction phase monitoring is 40% lower or higher than that recorded in the baseline monitoring (see <i>Table 5.8 of Baseline Monitoring Report</i>), or when there is a difference of 40% in dolphin acoustic signal detection at nighttime at Site C1 only, the limit level should be triggered</p>	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 7. Discuss additional dolphin monitoring and any other potential mitigation measures (eg consider to temporarily stop relevant portion of construction activity) with the IEC and Contractor. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly. 	<ol style="list-style-type: none"> 1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SO 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 SO; 3. Implement the agreed measures.

Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Office, DEP – Director of Environmental Protection

Appendix K

Quarterly Summary of Waste Flow Table

Contract No. : HY/2012/07

**Tuen Mun Chek Lap Kok Link – Southern Connection Viaduct Section
Monthly Summary Waste Flow Table for 2016 (Year)**

Month/Material	Actual Quantities of Inert C&D Materials Generation						Actual Quantities of C&D wastes Generation						Actual Quantities of Recyclables Generation			
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fills	Imported Fill	Marine Sediment, Cat. L	Marine Sediment, Cat. Mp	Marine Sediment, Cat. Mf	Marine Sediment, Cat. H	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
Unit	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000m ³)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	
Jan	1.941	0.263	0.606	-	1.334	-	-	-	-	-	69.400	-	-	0.105	-	
Feb	0.783	0.185	0.092	-	0.692	-	-	-	-	-	85.890	-	-	0.112	-	
Mar	1.502	0.429	0.537	-	0.965	-	-	-	-	2.000	88.360	-	-	-	-	
Apr	1.354	0.402	0.789	-	0.565	-	-	-	-	3.000	79.580	-	8.640	0.084	-	
May	1.057	0.192	0.617	-	0.440	-	-	-	-	3.000	75.620	-	-	-	-	
Jun	0.499	0.277	0.116	-	0.383	-	-	-	-	-	103.270	-	-	0.105	-	
SUB-TOTAL	7.136	1.747	2.757	-	4.379	0.000	-	-	-	8.000	502.120	-	8.640	0.406	-	
Jul	0.507	0.211	0.230	-	0.277	-	-	-	-	2.200	94.760	-	1.540	0.350	-	
Aug	1.294	0.144	0.684	-	0.610	-	-	-	-	-	116.990	-	9.790	0.098	-	
Sep	2.584	0.155	0.270	-	2.314	-	-	-	-	-	130.060	-	-	0.105	-	
Oct	2.338	0.180	0.156	-	2.183	-	-	-	-	-	141.300	-	-	0.028	-	
Nov	3.873	0.328	0.536	-	3.337	-	0.473	-	-	1.600	138.270	-	-	0.063	-	
Dec				-		-	-	-	-	-		-	-		-	
TOTAL	17.731	2.765	4.632	-	13.099	-	0.473	-	-	11.800	1,123.500	-	19.970	1.050	-	

Notes :

- 1 - The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- 2 - Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- 3 - Broken concrete for recycling into aggregates.
- 4 - Assumed 5 kg per damaged water-filled barrier.
- 5 - Disposed as Public Fills includes Hard Rock and Large Broken Concrete.

Appendix L

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

Appendix L1 Cumulative Statistics on Exceedances

		Total No. recorded in this quarter	Total No. recorded since project commencement
1-Hr TSP	Action	0	0
	Limit	0	0
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	0	2
	Limit	0	0
Impact Dolphin Monitoring	Action	0	9
	Limit	1	7

Appendix L2 Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This quarter	2	0	0
Total No. received since project commencement	6	0	0



ENVIRONMENTAL COMPLAINT/ ENQUIRY FORM

Complaint/ Enquiry Received*
Date: 22 September 2016 Time: Undisclosed From: Highways Department (HyD) Via: Email
Complainant/ Enquirer *: Name: Undisclosed Tel: Undisclosed Address: Undisclosed Media: Dust Noise Water Quality Other Description: Two flattop barges departing from Tuen Mun everyday were complained discharging whitish effluent outside sea area of cells C054 and C055 of Hong Kong Boundary Crossing Facilities (HKBCF) and causing pollution during 6pm to 4am next day.

Investigation Report & Response

The Contractor reviewed the vessel and operation records upon receiving the complaint. The location under complaint is confirmed far away from the project area of this Contract. This Contract also has no flattop barge mooring at or delivered from Tuen Mun in September 2016. Furthermore, the Contract has no discharge activity during the concerned time.

According to ET's weekly site inspection record, Pier E13 (the works area adjacent to southern landfall, HKBCF) was visited on 21 September 2016. The construction activities were conducted within project site boundary. Improper discharge was not observed during the site audit. The corresponding mitigation measures were also properly implemented.

Upon reviewing the Contractor's records and ET's site inspection record. The flattop barges under complaint are considered not related to this Contract and the location under complaint is not in the project area of this Contract. The corresponding mitigation measures are properly implemented by the Contractor. Thus, the complaint is considered not related to this Contract. The project boundary and the area under complaint are shown in a layout provided by SOR of this Contract for easy reference (Figure 1).

Mitigation Measures and Follow-Up Actions Recommended to Contractor

Since the complaint is considered not related to this Contract, no further action is required. The ET will keep checking whether the mitigation measures are properly implemented. Improvement actions will be advised if necessary.

Date of File Closed : 11 October 2016

Approved and Filed by:

A handwritten signature in black ink, appearing to read 'Jovy Tam', is written over a horizontal line.

(Jovy Tam, ET Leader)
Date: 11 October 2016

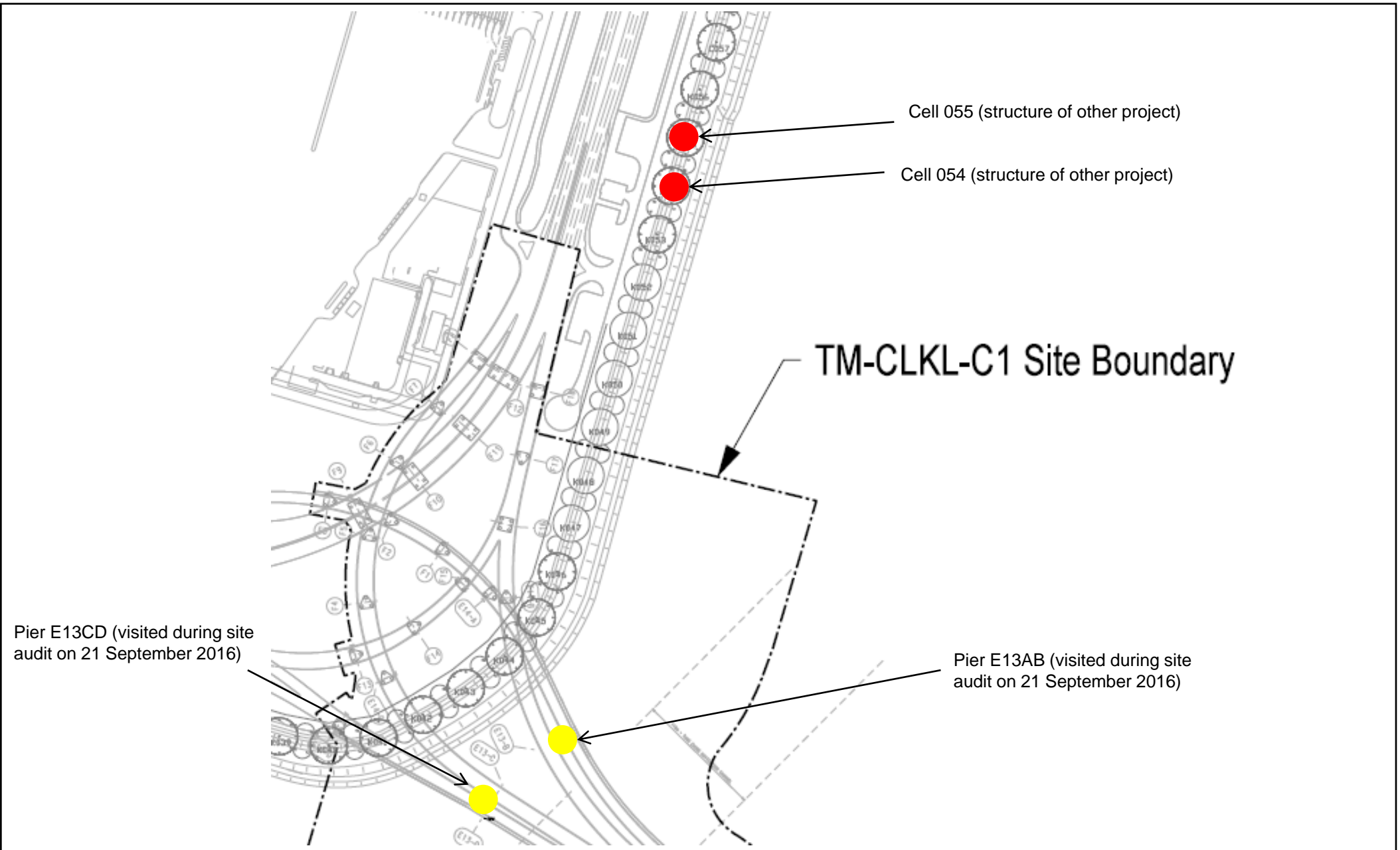


Figure 1 – HY/2012/07 Project Boundary at Southern Landfall



ENVIRONMENTAL COMPLAINT/ ENQUIRY FORM

Complaint/ Enquiry Received*
Date: 9 November 2016 Time: 14:49 From: Environmental Protection Department (EPD) Via: Email
Complainant/ Enquirer *: Name: Undisclosed Tel: Undisclosed Address: Undisclosed Media: Dust Noise Water Quality Other Description: One barge in travel was complained causing muddy plume by the barge's propeller wash near Tung Chung New Development Ferry Pier at 09:26am on 7 November 2016.

Investigation Report & Response

<p>The Contractor reviewed the vessel and operation records upon receiving the complaint. The location under complaint is confirmed far away from the project area of this Contract and the concerned barge is not from this Contract. This Contract also has no barge travelling from the area near Tung Chung New Development Ferry Pier in November 2016.</p> <p>According to ET's weekly site inspection record, Piers E12 and E13 where is the navigation channel (the works area adjacent to southern landfall, HKBCF) was visited on 2 November 2016. The construction activities were conducted within project site boundary. No muddy plume was observed in association with the construction activities during the site audit on 2 November 2016.</p> <p>Upon reviewing the Contractor's records and ET's site inspection record. The barge under complaint is considered not related to this Contract and the location under complaint is not in the project area of this Contract. Thus, the complaint is considered not related to this Contract.</p>
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Mitigation Measures and Follow-Up Actions Recommended to Contractor

<p>Since the complaint is considered not related to this Contract, no further action is required. EPD has reminded all Contractors of HKZMB Projects to avoid marine travel in the waters around Tung Chung town and south of Hong Kong International Airport during low tide (email dated 9/11/2016). The ET will keep checking whether the mitigation measures are properly implemented. Improvement actions will be advised if necessary.</p>
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Date of File Closed : 18 November 2016

Approved and Filed by:

(Jovy Tam, ET Leader)
Date: 18 November 2016

Email
message

Environmental
Resources
Management

To Ramboll Environ - Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/07 Tuen Mun–Chek Lap
Kok Link–Southern Connection Viaduct Section

Subject Notification of Exceedance for Impact Dolphin
Monitoring

Date 06 February 2017

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



Dear Sir or Madam,

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

0215660_Sep2016/Nov2016_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between September and November 2016.

Regards,

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

Mr Jovy Tam
Environmental Team Leader

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ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/07

TUEN MUN – CHEK LAP KOK LINK –
SOUTHERN CONNECTION VIADUCT SECTION

Impact Dolphin Monitoring
Notification of Exceedance

Log No.	0215660_Sep2016/Nov2016_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedance = 1]	
Date	September to November 2016 (monitored) 06 February 2017 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0 & ANI = 0
	NWL	STG = 2.86 & ANI = 10.89
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between September and November 2016. The exceedance was reported in the approved <i>Thirty-Seventh Monthly EM&A Report</i> dated 13 December 2016.	
Statistical Analyses	<p>Further to the review of the available and relevant dolphin monitoring data in the EM&A 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 impact quarter, September to November 2016) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0051$) and ANI ($p = 0.0296$) were detected between Periods. 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 2016) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative impact monitoring quarter. By setting $\alpha = 0.00005$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000004$) and in ANI ($p = 0.000001$) between Cumulative Period and Location were detected. <p>* Note: The commencement date under <i>Contract No. HY/2012/07</i> is 31 October 2013.</p>	
Works Undertaken (in the monitoring quarter)	<p>In the quarter between September 2016 and November 2016, the major marine works under <i>Contract No. HY/2012/07</i> included:</p> <ul style="list-style-type: none"> Uninstallation of marine piling platform; Pier construction; Launching gantry operation; and Installation of deck segment and pier head segment. 	

<p>Possible Reason for Action or Limit Level Exceedance(s)</p>	<p>The potential factors that may have contributed to the observed exceedance are reviewed below:</p> <ul style="list-style-type: none"> • Blocking of CWD travelling corridor: The <i>Monitoring of Marine Mammals in Hong Kong Waters (2015 – 16)</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 Contract), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: As per the findings from the EIA report (<i>Section 8.11.9</i>), the major influences on the Chinese White Dolphin (CWD) <i>Sousa chinensis</i> under this Contract are marine traffics and bored piling works. The <i>Monitoring of Marine Mammals in Hong Kong Waters (2015-2016)</i> also reported that CWD decline were likely influenced by reclamation works, bored piling and intensive marine traffic from construction activities. Based on these possible reasons, the corresponding marine works and implementation of mitigation measures are reviewed. This Contract does not have any reclamation works, thus no habitat loss was caused by reclamation. In the reporting period, the Contractor implemented the marine traffic control as per the requirements in the <i>EP-354/2009/D</i> and the updated <i>EM&A Manual</i>. Most of the vessels of this Contract also worked within the site boundary, in which the area is seldom used by CWD. Disturbance from vessels of this Contract is considered minor. All of the marine bored piling works of this Contract was completed in September 2015. Thus, underwater noise emission from this Contract had been substantially reduced in this reporting period when comparing to the previous quarters. During dolphin monitoring in this quarter, no unacceptable impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between September 2016 and November 2016, there was no exceedance on WQM. Impact mean levels of depth-averaged SS at all sampling stations during both mid-ebb and mid-flood tides were well below the corresponding ambient levels. The WQM results imply that no unacceptable impact on water quality 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. <p>In view of the above, marine ecological mitigation measures were considered properly implemented, and thus no unacceptable impact on CWD or its habitat was associated with this Contract in this quarter.</p>
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(1) Hung SKY (2016). Prepared for AFCD. Available at: https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2015_16.pdf

<p>Actions Taken/ To Be Taken</p>	<p>With reference to the site inspection records in this quarter, the respective marine ecological mitigation measures have been implemented properly by the Contractor throughout the marine works period, including:</p> <ol style="list-style-type: none"> 1. 250m dolphin exclusion zone; 2. Acoustic decoupling plan; 3. Training to workers; 4. Offsite vessel routing control in accordance with Regular Marine Travel Routes Plan, including routing control within existing and proposed marine park boundaries; 5. Vessels speed limited at 5 knots and 10 knots within existing and proposed marine park boundaries and site boundary respectively; 6. Idling and mooring of working vessels within site boundary; <p>The existing mitigation measures are recommended to be continuously implemented. Furthermore, it is also recommended to reduce the vessels for marine works as much as possible. The ET will monitor for future trends in exceedance(s).</p> <p>A joint team meeting was held on 10 February 2017 for discussion on CWD trend, with attendance of ENPO, HyD, Representatives of Resident Site Staff (RSS), Representatives of Environmental Team (ET) for Contract No. HY/2010/02, HY2011/03, HY/2012/07 and HY/2012/08. 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 or separate from the other stress factors. ENPO presented the interim CWD survey results in mainland waters obtained from Hong Kong-Zhuhai-Macao Bridge Authority that some CWDs that previously more often sighted in Hong Kong waters have expanded their ranges into mainland waters, and some with reduced usage in Hong Kong waters, while they are partially accounted for the local decline. 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 are fully implemented. The ETs were also reminded to update the BMP boundary in the Regular Marine Travel Route Plan. The participants were requested by ENPO to collect and report the marine traffic statistics. It was recommended that the marine works of HZMB projects should be completed as soon as possible to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible. It was also suggested that the protection measures (e.g., speed limit control) for the proposed Brothers Marine Park (BMP) shall be brought forward as soon as possible before its establishment so as to provide a better habitat for dolphin recovery.</p>
<p>Remarks</p>	<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>Thirty-Fifth to Thirty-Seventh Monthly EM&A Reports</i>. Comparison on water quality between impact and baseline periods is elaborated in the <i>12th Quarterly EM&A Report</i>.</p>