



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

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

26 June 2018

**Environmental Resources Management**  
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18 Tak Fung Street  
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# Contract No. HY/2012/07





## Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section

**Environmental Resources Management**

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

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Client:  Gammon		Project No:  0215660			
Summary:  This document presents the Seventeenth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.		Date: 26 June 2018			
		Approved by:  			
		Mr Craig Reid Partner			
		Certified by:  			
		Mr Jovy Tam ET Leader			
	17 <sup>th</sup> Quarterly EM&A Report	VAR	JT	CAR	26/06/18
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>		Distribution <input type="checkbox"/> Internal <input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential			
		 			

Ref.: HYDZHMBEEM00\_0\_6606L.18

27 June 2018

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  
17th Quarterly EM&A Summary Report (Dec. 2017 to Feb. 2018)**

Reference is made to the 17th Quarterly Environmental Monitoring and Audit (EM&A) Report (December 2017 to February 2018) (ET's ref.: "0215660\_17th Qtr EM&A\_20180626.doc" dated 26 June 2018) certified by the ET Leader and provided to us via e-mail on 26 June 2018.

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, ENPO Site

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## TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>I</i>
<b>1</b>	<b><i>INTRODUCTION</i></b>	<b><i>1</i></b>
<b>1.1</b>	<b><i>BACKGROUND</i></b>	<b><i>1</i></b>
<b>1.2</b>	<b><i>SCOPE OF REPORT</i></b>	<b><i>2</i></b>
<b>1.3</b>	<b><i>ORGANIZATION STRUCTURE</i></b>	<b><i>2</i></b>
<b>1.4</b>	<b><i>SUMMARY OF CONSTRUCTION WORKS</i></b>	<b><i>3</i></b>
<b>1.5</b>	<b><i>SUMMARY OF EM&amp;A PROGRAMME REQUIREMENTS</i></b>	<b><i>4</i></b>
<b>2</b>	<b><i>EM&amp;A RESULTS</i></b>	<b><i>6</i></b>
<b>2.1</b>	<b><i>AIR QUALITY</i></b>	<b><i>6</i></b>
<b>2.2</b>	<b><i>NOISE MONITORING</i></b>	<b><i>9</i></b>
<b>2.3</b>	<b><i>WATER QUALITY MONITORING</i></b>	<b><i>12</i></b>
<b>2.4</b>	<b><i>DOLPHIN MONITORING</i></b>	<b><i>14</i></b>
<b>2.5</b>	<b><i>EM&amp;A SITE INSPECTION</i></b>	<b><i>19</i></b>
<b>2.6</b>	<b><i>WASTE MANAGEMENT STATUS</i></b>	<b><i>21</i></b>
<b>2.7</b>	<b><i>ENVIRONMENTAL LICENSES AND PERMITS</i></b>	<b><i>22</i></b>
<b>2.8</b>	<b><i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i></b>	<b><i>25</i></b>
<b>2.9</b>	<b><i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i></b>	<b><i>25</i></b>
<b>2.10</b>	<b><i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i></b>	<b><i>26</i></b>
<b>3</b>	<b><i>FUTURE KEY ISSUES</i></b>	<b><i>27</i></b>
<b>3.1</b>	<b><i>CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER</i></b>	<b><i>27</i></b>
<b>3.2</b>	<b><i>KEY ISSUES FOR THE COMING QUARTER</i></b>	<b><i>27</i></b>
<b>3.3</b>	<b><i>MONITORING SCHEDULE FOR THE COMING QUARTER</i></b>	<b><i>28</i></b>
<b>4</b>	<b><i>CONCLUSIONS AND RECOMMENDATIONS</i></b>	<b><i>29</i></b>
<b>4.1</b>	<b><i>CONCLUSIONS</i></b>	<b><i>29</i></b>



## **List of Appendices**

- Appendix A Project Organization for Environmental Works
- Appendix B Three Month Rolling Construction Programmes
- Appendix C Implementation Schedule of Environmental Mitigation Measures (EMIS)
- Appendix D Summary of Action and Limit Levels
- Appendix E EM&A Monitoring Schedules
- Appendix F Impact Air Quality Monitoring Results and Graphical Presentation
- Appendix G Impact Noise Monitoring Results and Graphical Presentation
- Appendix H Impact Water Quality Monitoring Results and Graphical Presentation
- Appendix I Impact Dolphin Monitoring Survey Results
- Appendix J Event Action Plan
- Appendix K Quarterly Summary of Waste Flow Table
- Appendix L Cumulative Statistics on Exceedances, Complaints, Notifications of Summons and Successful Prosecutions

## **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 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 Seventeenth Quarterly EM&A Report presenting the EM&A works carried out during the period from 1 December 2017 to 28 February 2018 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:

### December 2017

#### ***Land-based Works***

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

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

January 2018

*Land-based Works*

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

February 2018

*Land-based Works*

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

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

24-hour TSP monitoring	17 sessions
1-hour TSP monitoring	17 sessions
Noise monitoring	17 sessions

Water quality monitoring	37 sessions
Dolphin monitoring	6 sessions
Joint Environmental site inspection	12 sessions

### **Breaches of Action and Limit Levels for Air Quality**

One (1) Limit Level of 1-hour TSP 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**

Four (4) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period.

### **Impact Dolphin Monitoring**

Two (2) Action Level exceedances were observed for the quarterly dolphin monitoring data between December 2017 and February 2018. 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.

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 was one (1) complaint received by EPD regarding a suspected sighting of dolphin near the viaduct at Tai Ho Wan and construction materials falling from the nearby elevated structures in the reporting period.

No notification of summons or successful prosecution recorded in the reporting period.

### **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:

## March 2018

### *Land-based Works*

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

## April 2018

### *Land-based Works*

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

## May 2018

### *Land-based Works*

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Installation of pier head and deck segments;
- Asphalt paving;



- Sign gantries construction;
- Parapet installation; and
- Slope work of Viaducts A, B, C & D.

### **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 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 Seventeenth 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 December 2017 to 28 February 2018.

## 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
HyD (Highways Department)	Project Coordinator	Stanley Chan	2762 3406	3188 6614
	Senior Engineer	Steven Shum	2762 4133	3188 6614
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 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

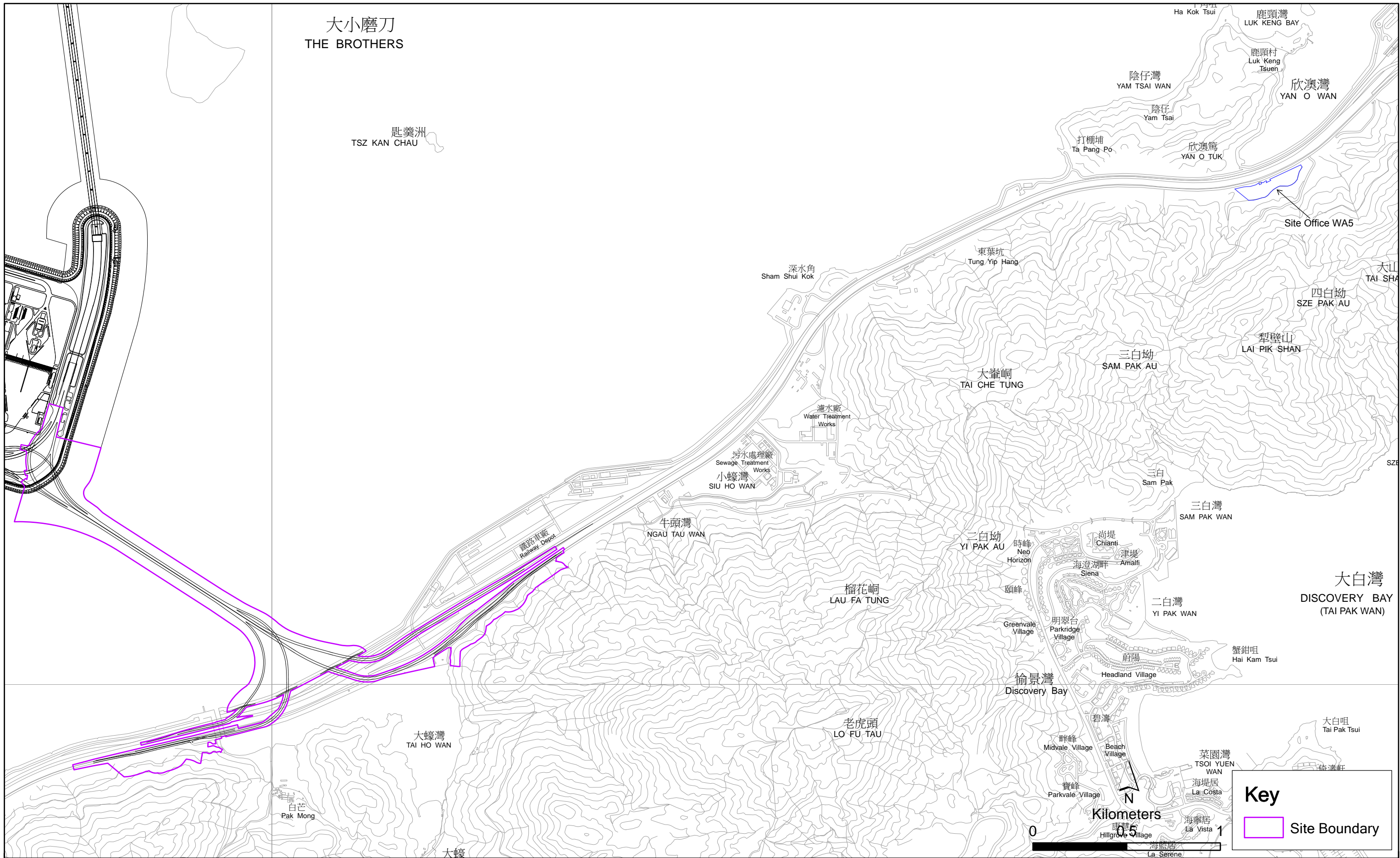


Figure 1.1

General Layout Plan of the Project

Environmental  
Resources  
Management





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 Project Management Initials: ISO AT 50mm x 61mm  
 Date: 12/11/2012



**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  
香港路政署工程管理部  
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**

**SCALE**  
A1 : 6000

**DIMENSION UNIT**  
METRES

**KEY PLAN**

**PROJECT NO.**  
60240249

**CONTRACT NO.**  
HY/2012/07

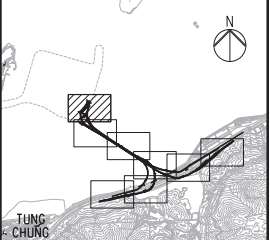
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SOUTHERN CONNECTION  
GENERAL LAYOUT PLAN

**SHEET NUMBER**  
60240249/C1/2000A

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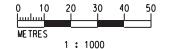


**KEY PLAN**

**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 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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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

Drawn	Date	Client
RL	07/13	HONG KONG GOVERNMENT HIGHWAYS DEPARTMENT
Checked	Approved	
DS	DOP	
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Supervising Officer: **AECOM**

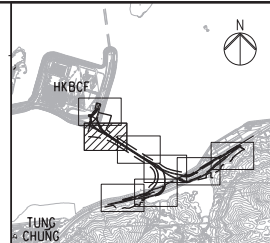
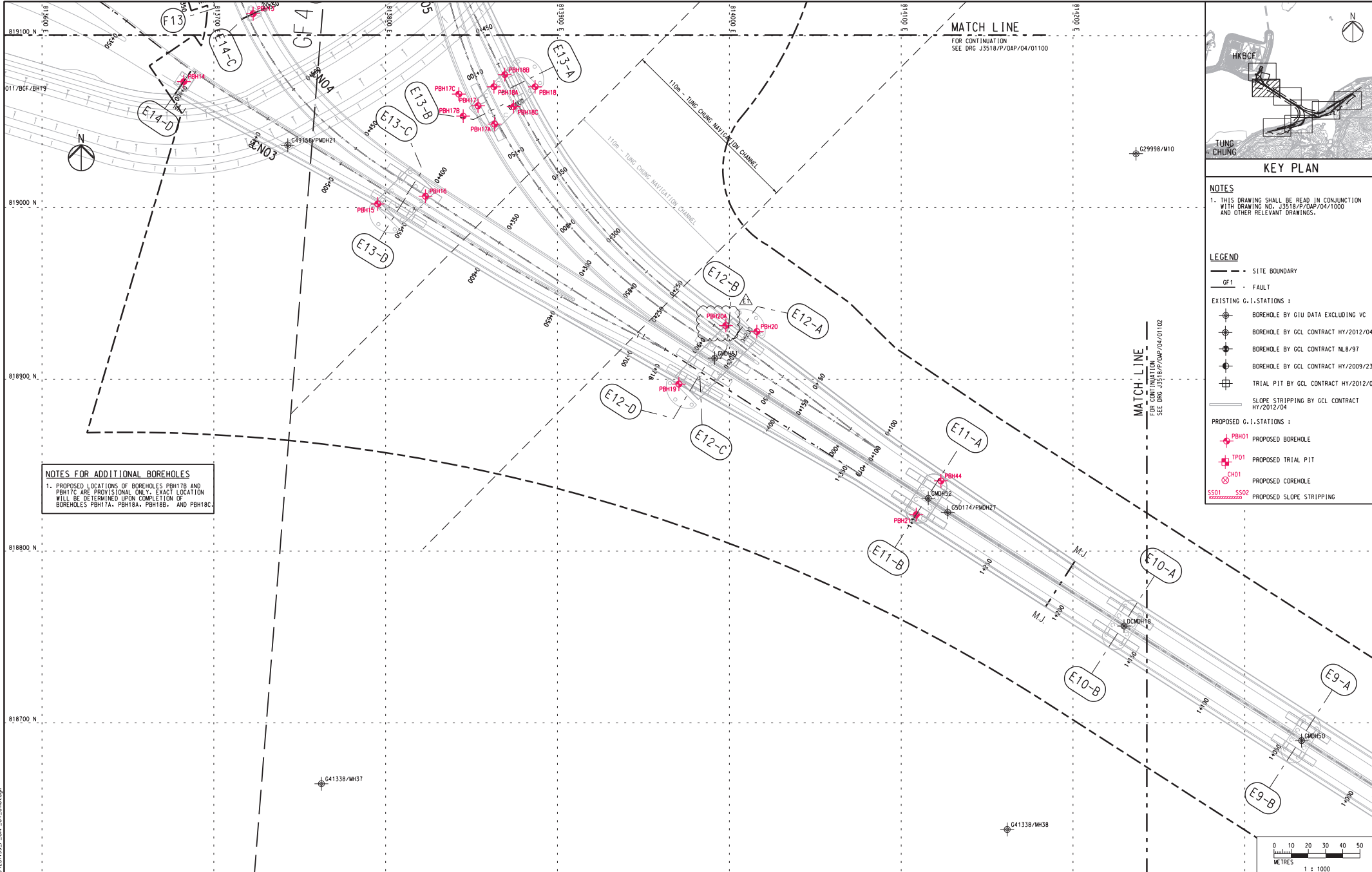
Contractor: **Gammon**

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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**KEY PLAN**

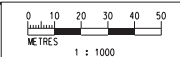
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 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- 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:
    - ⊕ PBH01 PROPOSED BOREHOLE
    - ⊕ TP01 PROPOSED TRIAL PIT
    - ⊕ CH01 PROPOSED COREHOLE
    - ▬ SS01 ▬ SS02 PROPOSED SLOPE STRIPPING

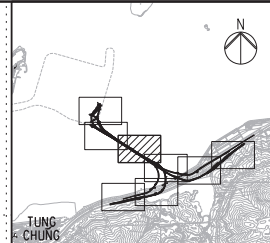
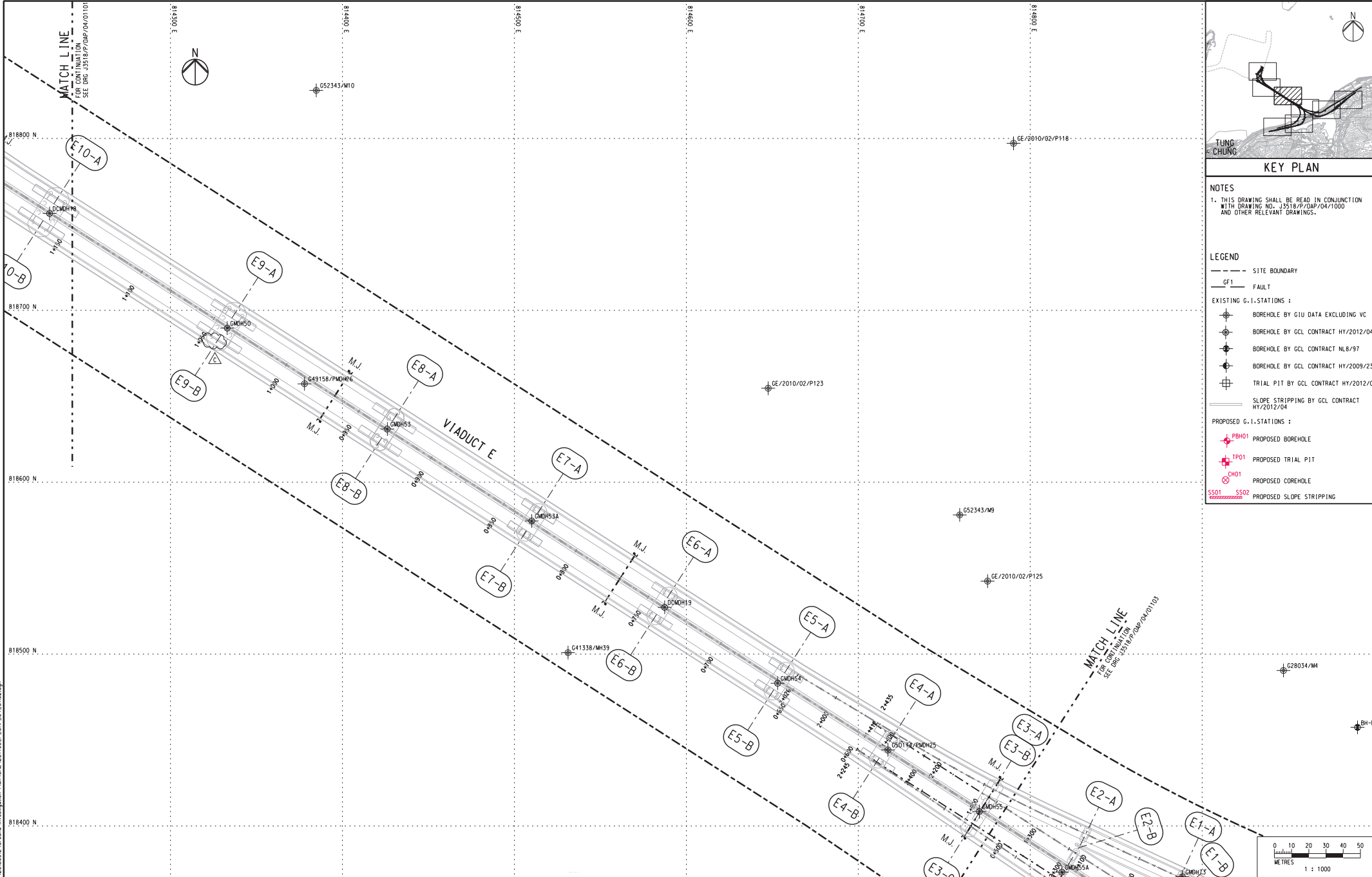
**NOTES FOR ADDITIONAL BOREHOLES**  
 1. PROPOSED LOCATIONS OF BOREHOLES PBH17B AND PBH17C ARE PROVISIONAL ONLY. EXACT LOCATION WILL BE DETERMINED UPON COMPLETION OF BOREHOLES PBH17A, PBH18A, PBH18B, AND PBH18C.

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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.

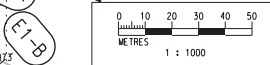
- LEGEND**
- SITE BOUNDARY
  - GF1- FAULT

EXISTING G.I.-STATIONS :

    - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
    - ⊕ BOREHOLE BY GCL CONTRACT HY/2012/04
    - ⊕ BOREHOLE BY GCL CONTRACT 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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C	SUBMISSION	RC	09/13				

Drawn	Date	Checked	Approved
RL	07/13		
DS		DOP	

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

Client

Supervising Officer

Project Title

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

Contractor

Originator

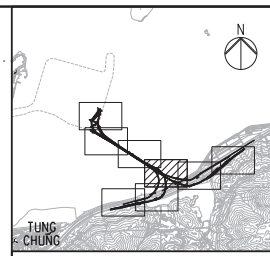
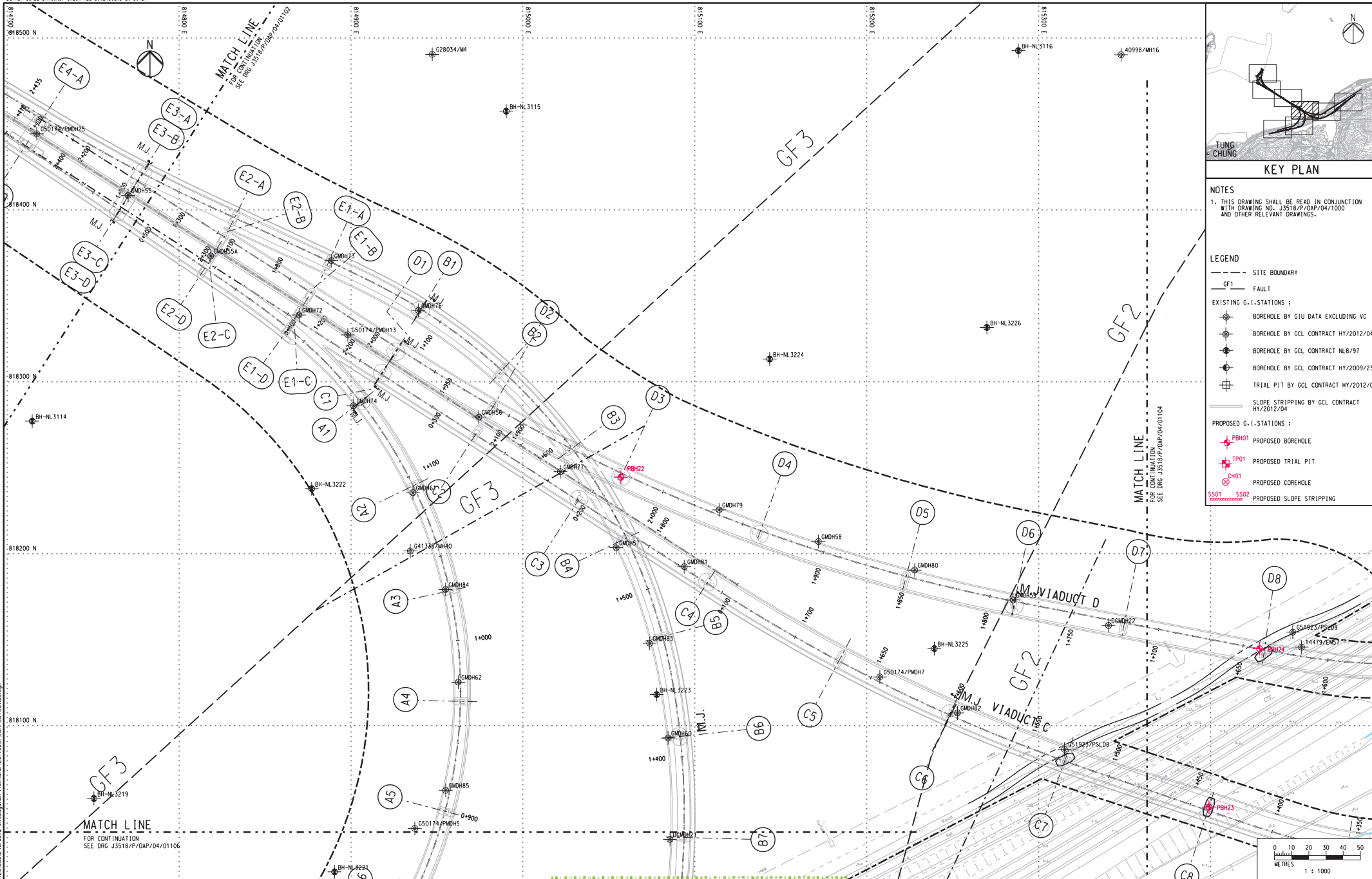
Drawing title

# Figure 1.2d

Drawing no. J3518/P/OAP/04/01102 Rev. C



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**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
PROPOSED G.I.-STATIONS :	
	PROPOSED BOREHOLE
	PROPOSED TRIAL PIT
	PROPOSED COREHOLE
	PROPOSED SLOPE STRIPPING

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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

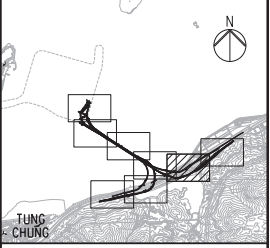
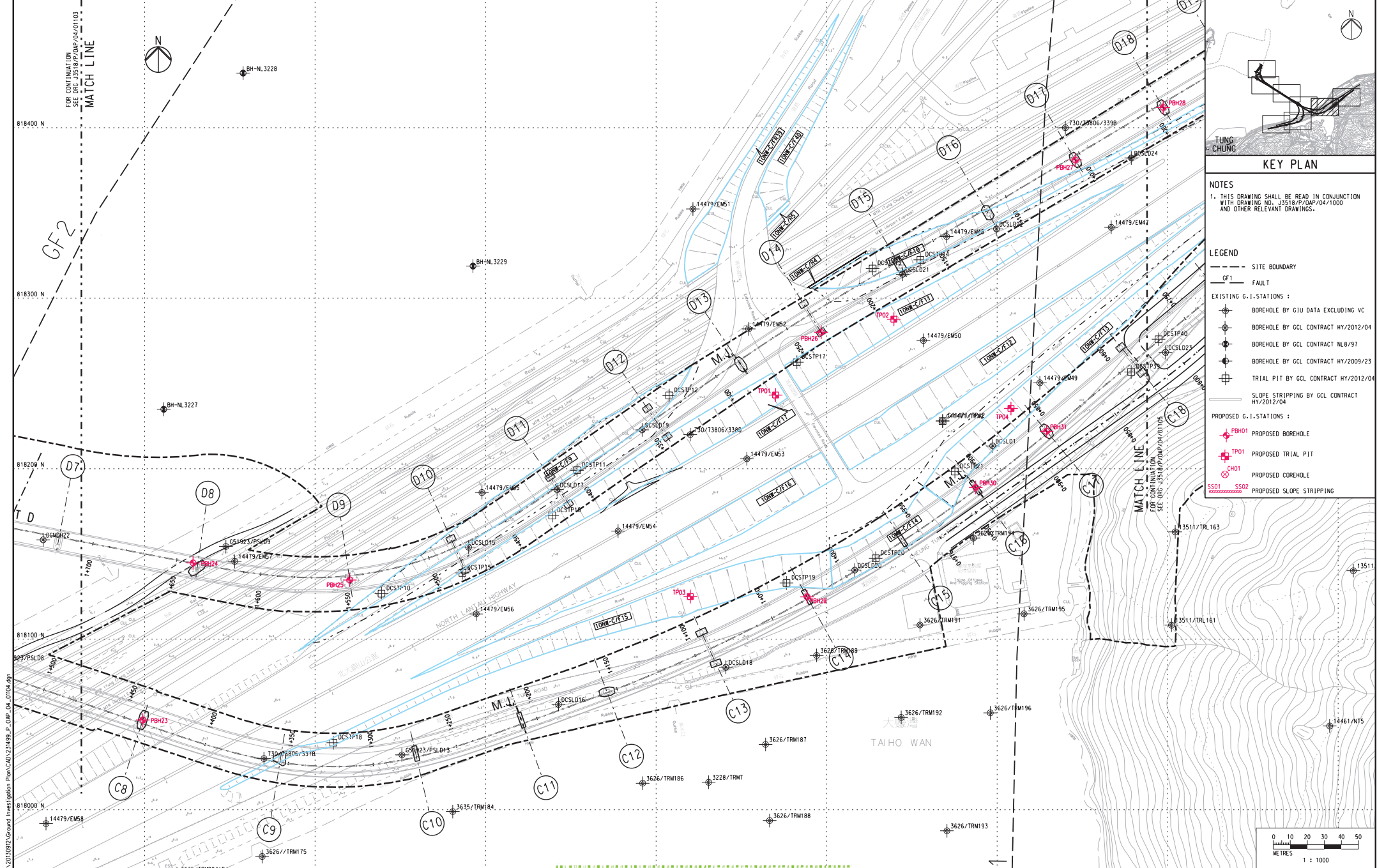
Contractor  
**Gammon**

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.



**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  
 --- 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



Rev	Description	By	Date	Rev	Description	By	Date	Drawn	Date
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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

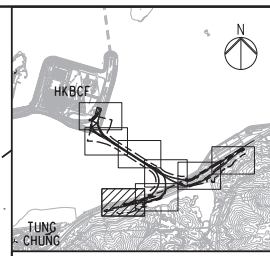
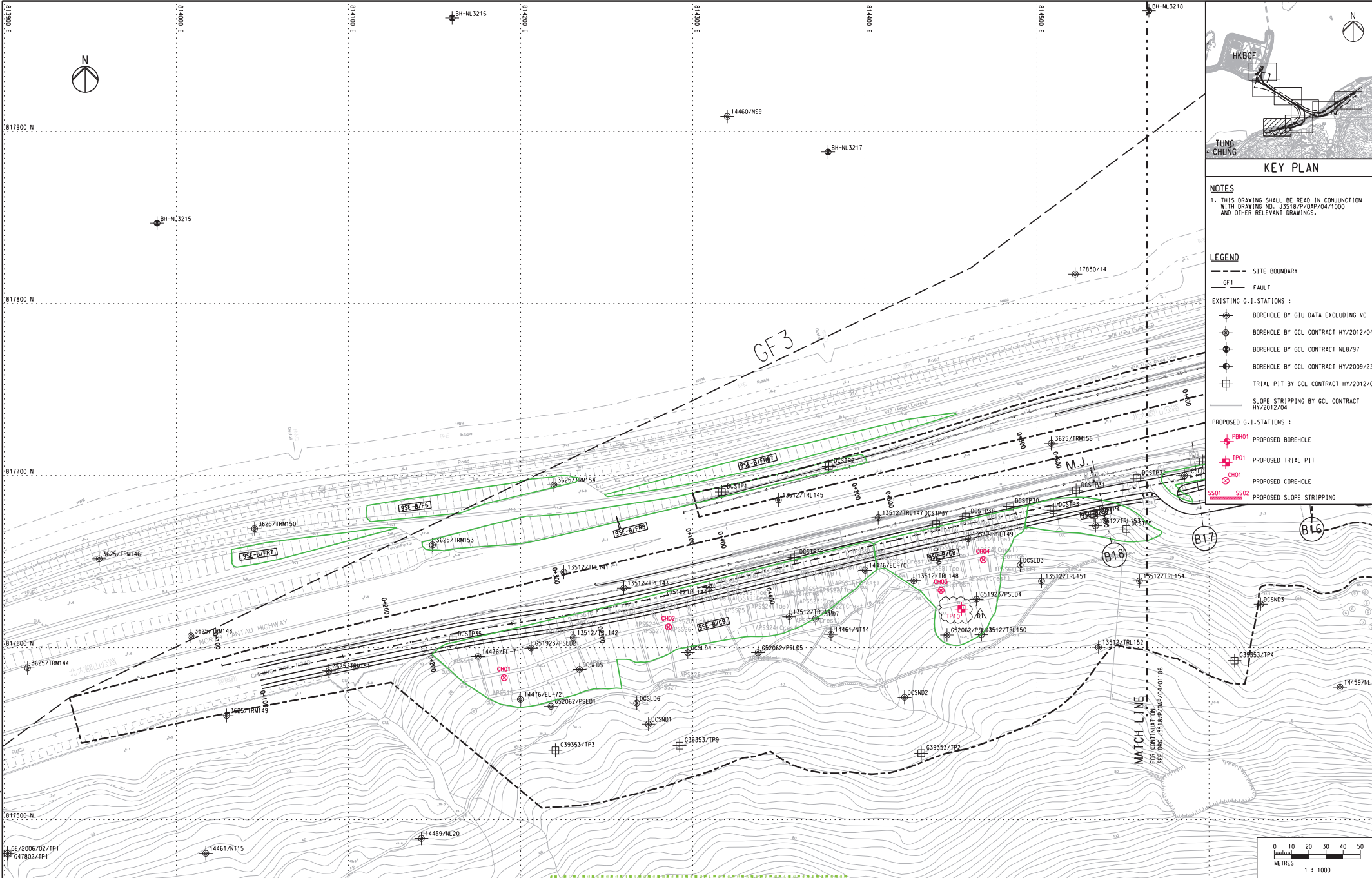
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Drawing no. J3518/P/OAP/04/01104 Rev. C

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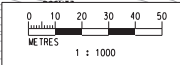
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**KEY PLAN**

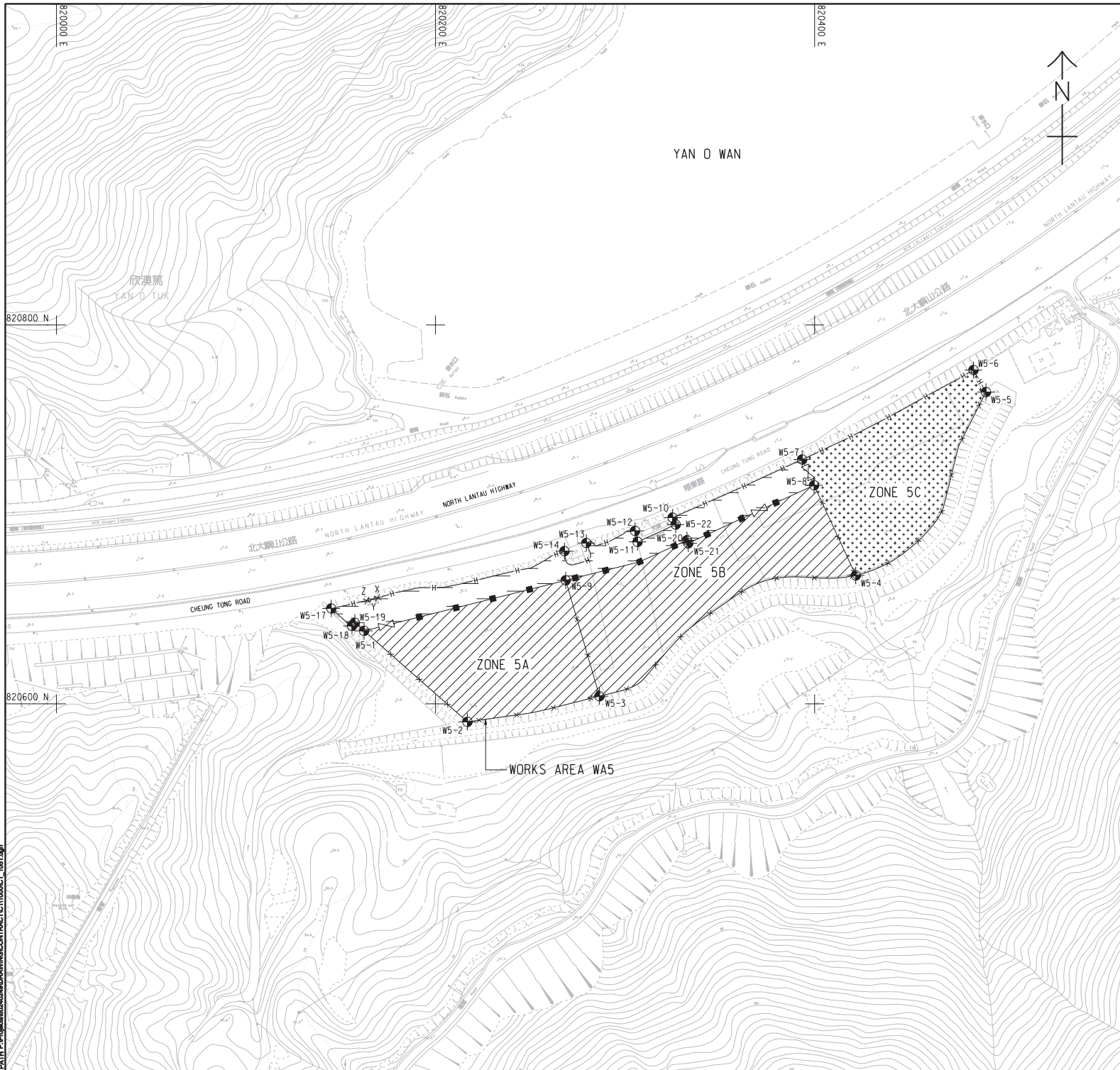
**NOTES**  
 1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- SITE BOUNDARY
  - GF1 FAULT
  - EXISTING G.I. STATIONS:
    - ⊕ BOREHOLE BY GIU DATA EXCLUDING VC
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  - PROPOSED G.I. STATIONS:
    - ⊕ PBH01 PROPOSED BOREHOLE
    - ⊕ TP01 PROPOSED TRIAL PIT
    - ⊕ CH01 PROPOSED COREHOLE
    - SS01 SS02 PROPOSED SLOPE STRIPPING




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





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Drawn	Date	Checked	Approved																																																	
RL	07/13	DS	DOP																																																	



**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
A1:1:1000	METRES

<b>KEY PLAN</b>
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**Figure 1.2h**

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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.  
 www.aecom.com

**SUB-CONSULTANTS**  
 2012110814

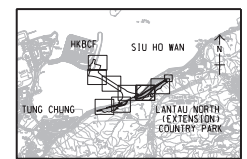
**Figure 1.2j**

**ISSUE/REVISION**

NO.	DATE	DESCRIPTION	CHK.
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**PROJECT NO.**  
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**CONTRACT NO.**  
 HY/2012/07

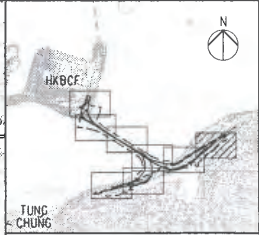
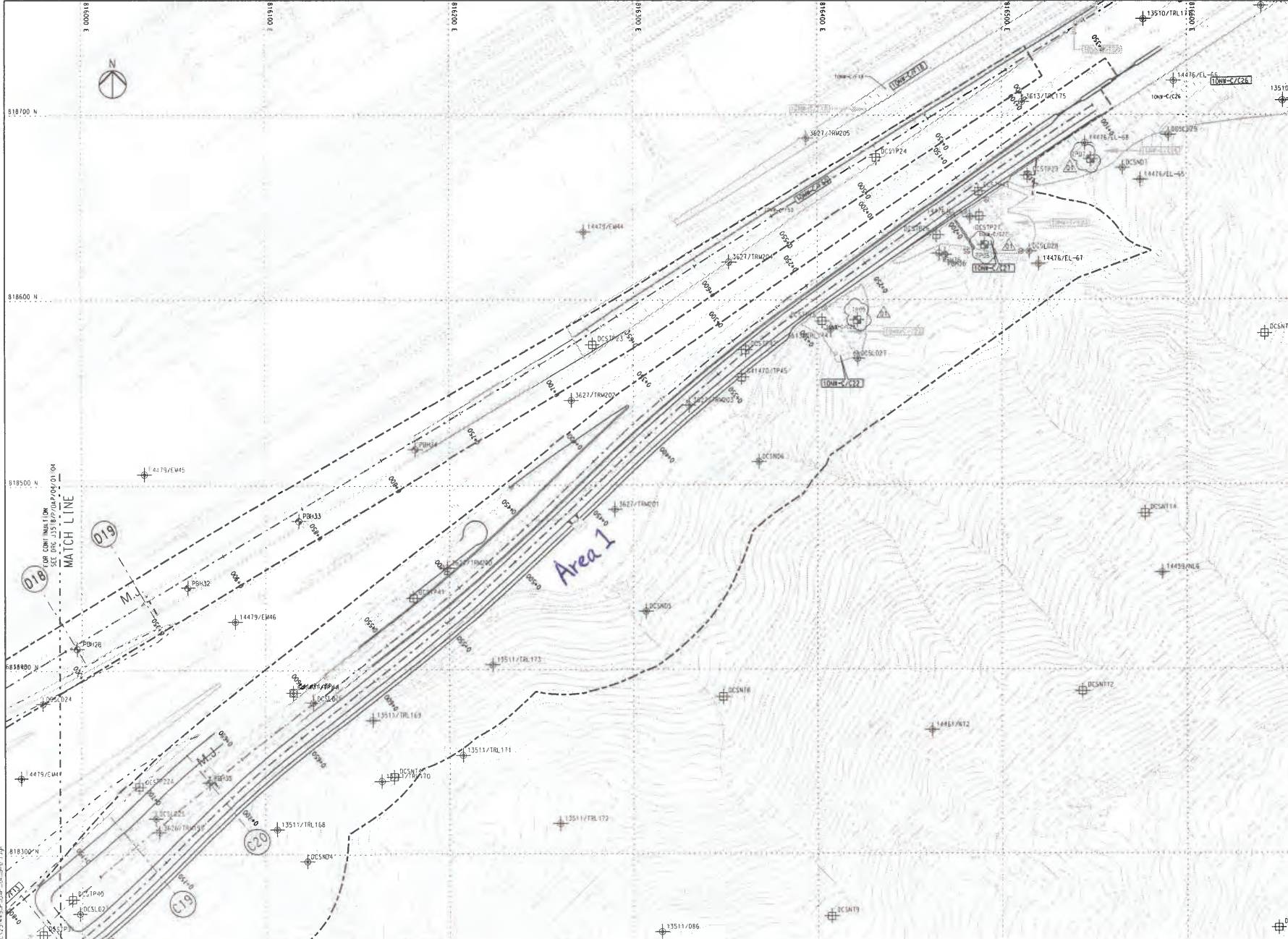
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 WORKS AREA WA4

**SHEET NUMBER**  
 60240249/C1/1053

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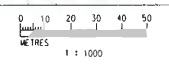


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**NOTES**  
 THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NO. J3518/P/OAP/04/1000 AND OTHER RELEVANT DRAWINGS.

- LEGEND**
- SITE BOUNDARY
  - GF1 FAULT
- EXISTING G.I. 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.I. STATIONS :**
- ⊕ BOREHOLE
  - ⊕ TRIAL PIT
  - ⊕ COREHOLE
  - ⊕ SLOPE STRIPPING



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

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: Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Contract No. HY/2012/07

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

Supervising Officer: **AZCOM**

Contractor: **Gammon**

Originator: **ARUP**

Drawing title: **Figure 1.2k**

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





**SUMMARY OF CONSTRUCTION WORKS**

The construction phase of the Contract commenced on 31 October 2013. The rolling construction programme for the period of December 2017 to February 2018 is shown in *Appendix B*.

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

December 2017***Land-based Works***

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

January 2018***Land-based Works***

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

February 2018***Land-based Works***

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

- Installation of pier head and deck segments;
- Asphalt paving;
- Sign gantries construction;
- Parapet installation; and
- Slope work of Viaducts A, B, C & D.

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*.

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.

Figure 1.3 Locations of Construction Activities in the Reporting Period

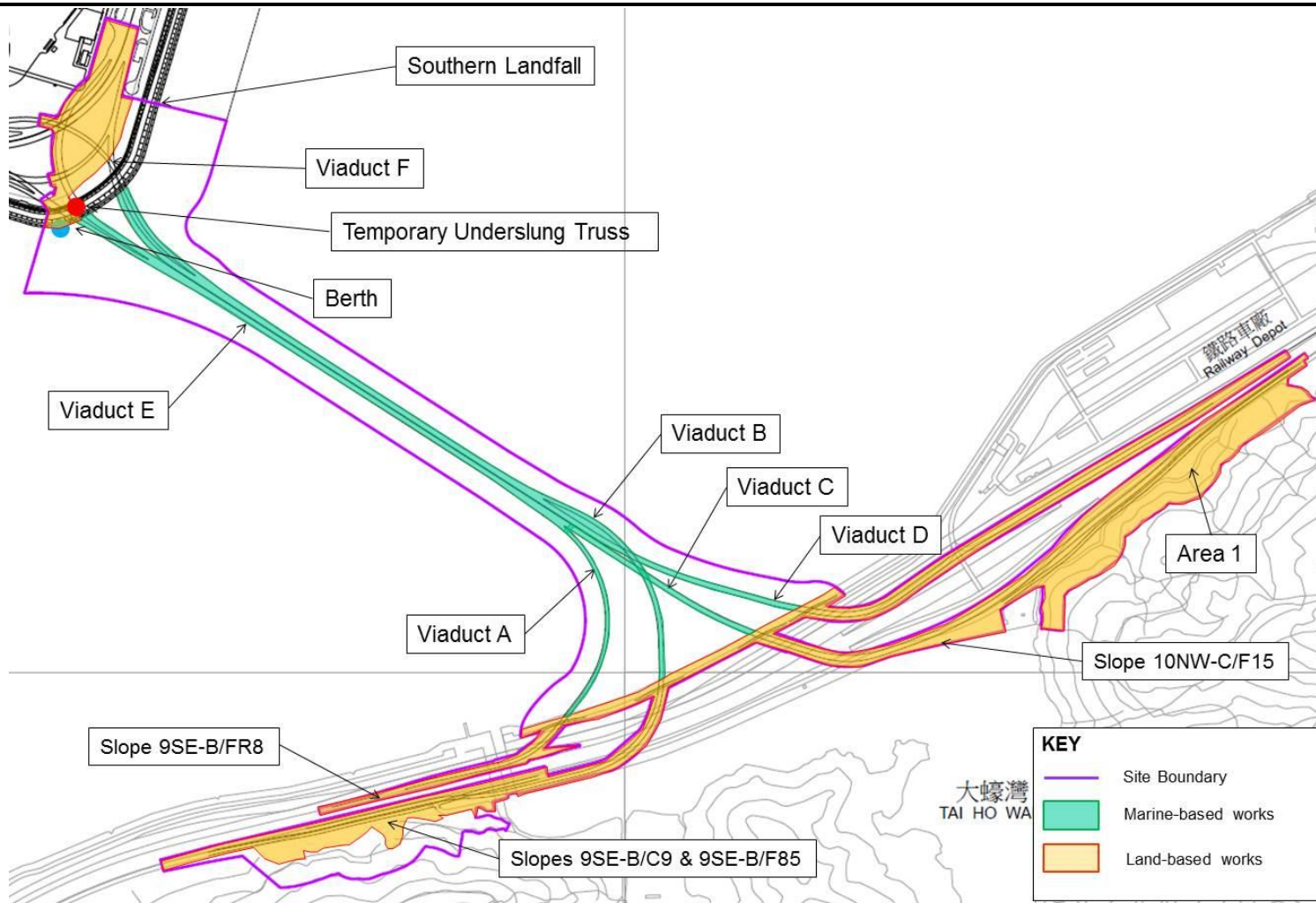






Figure 1.4

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

The 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 <sup>(1)</sup> 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.

<sup>(1)</sup> 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 <sup>(1)</sup>	Monitoring Period	Location	Description	Parameters & Frequency
ASR8A	5, 11, 14, 20, 23 and 29 December 2017	Area 4	On ground at the works area, Area 4	<ul style="list-style-type: none"> <li>1-hour Total Suspended Particulates (1-hour TSP, µg/m<sup>3</sup>), 3 times per day every 6 days</li> <li>24-hour Total Suspended Particulates (24-hour TSP, µg/m<sup>3</sup>), daily for 24-hour every 6 days</li> </ul>
ASR9	4, 10, 16, 22, 25 and 31 January 2018 6, 12, 15, 21 and 27 February 2018	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*.

### 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 *Fiftieth to Fifty-second 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 ( $\mu\text{g}/\text{m}^3$ )
December 2017	ASR 8A	90	31-149	394	500
	ASR 9	90	41-180	393	500
January 2018	ASR 8A	80	13-294	394	500
	ASR 9	93	16-263	393	500
February 2018	ASR 8A	100	21-183	394	500
	ASR 9	141	42-680	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 ( $\mu\text{g}/\text{m}^3$ )
December 2017	ASR 8A	86	38-151	178	260
	ASR 9	95	45-172	178	260
January 2018	ASR 8A	74	41-131	178	260
	ASR 9	75	42-150	178	260
February 2018	ASR 8A	65	38-95	178	260
	ASR 9	75	48-102	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 17 monitoring events for 1-hour TSP and 24-hour TSP were undertaken within the reporting period, in which one (1) Limit Level of 1-hour TSP level exceedance was recorded for air quality impact monitoring in the reporting period. Actions were taken in accordance with the Event Action Plan as presented in Appendix J.

No Action or Limit Level exceedance for 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* <sup>(1)</sup> 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.

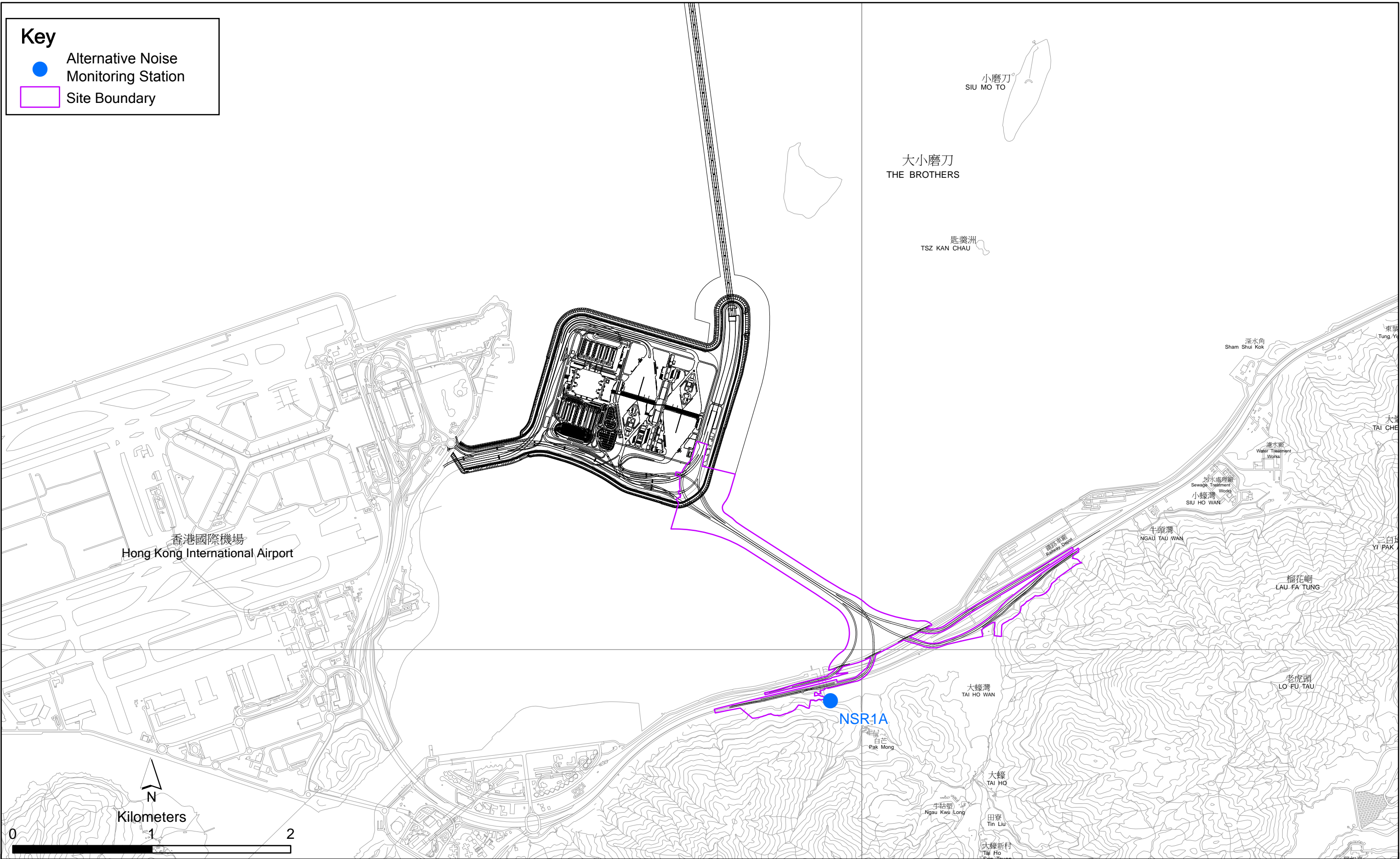


Figure 2.2

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, 11, 14, 20, 23 and 29 December 2017 4, 10, 16, 22, 25 and 31 January 2018 6, 12, 15, 21 and 27 February 2018	Pak Mong Village Pavilion	<ul style="list-style-type: none"> <li>30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays (Monday to Saturday). <math>L_{eq}</math>, <math>L_{10}</math> and <math>L_{90}</math> would be recorded.</li> <li>At least once a week</li> </ul>

Note:

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

**Table 2.6** *Noise Monitoring Equipment*

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-52
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 E*.

### 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 *Fiftieth to Fifty-second 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)
December 2017	63	61-64	75
January 2018	63	62-64	75
February 2018	63	62-64	75

A total of 17 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 construction works and 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 <sup>(1)</sup> 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.

Due to Three-Runway System (3RS) marine construction works, an alternative water quality control station CS(Mf)3(N) was proposed to replace control station CS(Mf)3. The *Proposal of Alternative Water Quality Monitoring Station* <sup>(2)</sup> was submitted to EPD on 31 March 2017 and granted on 6 April 2017. Water quality monitoring at CS(Mf)3(N) is undertaken since 2 May 2017. The locations of the monitoring stations under the Contract are shown in *Figure 2.3* and *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"> <li>• Temperature(°C)</li> <li>• pH(pH unit)</li> <li>• Turbidity (NTU)</li> <li>• Water depth (m)</li> <li>• Salinity (ppt)</li> <li>• Dissolved Oxygen (DO) (mg/L and % of saturation)</li> <li>• Suspended Solid (SS) (mg/L)</li> </ul>	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	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			
IS8	Impact Station(Close to HKBCF construction site)	814251	818412			

<sup>(1)</sup> 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.

<sup>(2)</sup> The Proposal of Alternative Water Quality Monitoring Station with the verification letter from IEC was submitted to EPD on 31 March 2017, and subsequently replied with no objection on 6 April 2017.

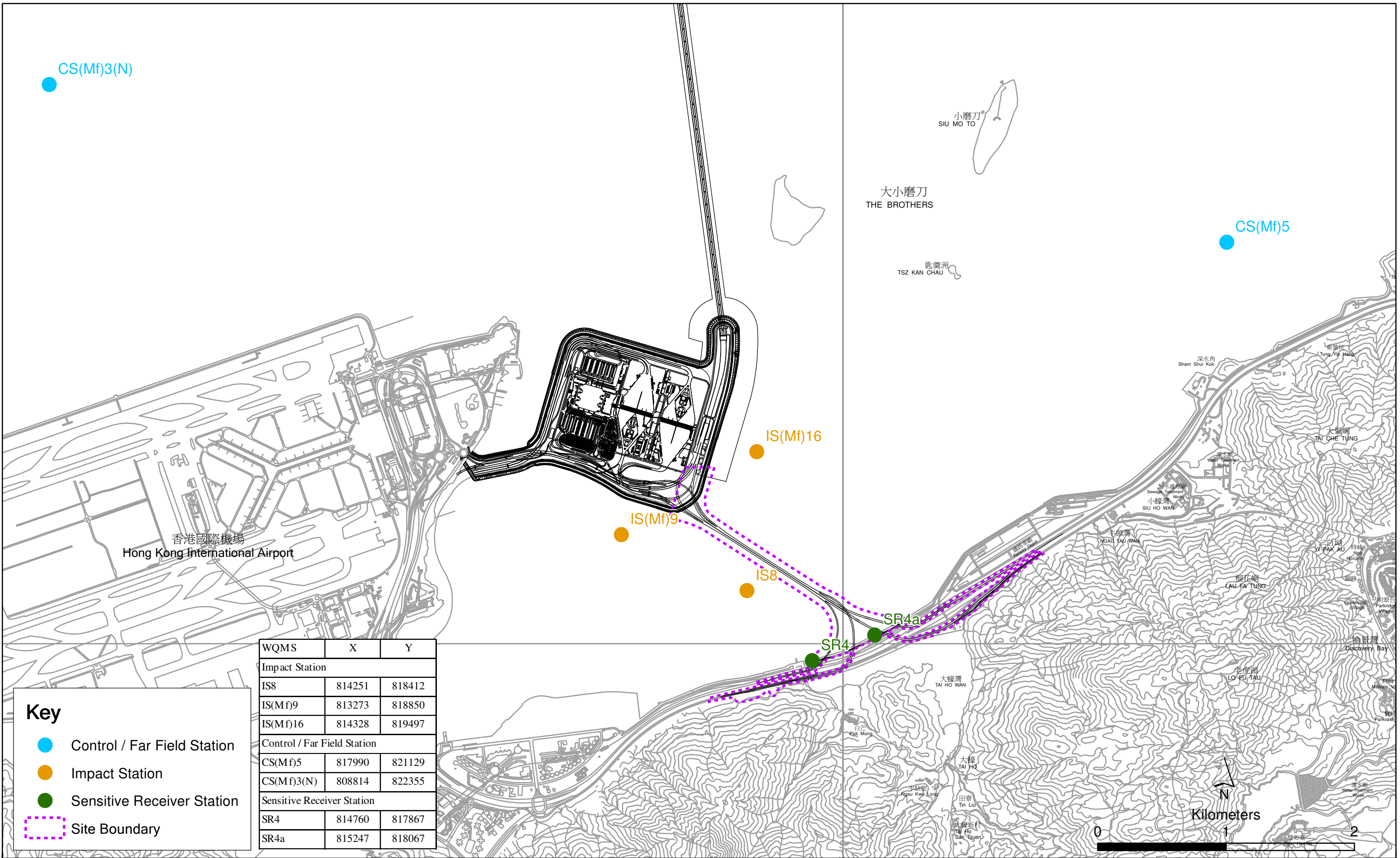


Figure 2.3

Locations of Water Quality Monitoring Stations

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
SR4	Sensitive receiver (Tai Ho Inlet)	814760	817867		depth less than 6m, mid-depth may be omitted.	
SR4a	Sensitive receiver	815247	818067			
CS(Mf)3(N)	Control Station	808814	822355			
CS(Mf)5	Control Station	817990	821129			

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.

Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

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
Multi-parameters (Dissolved Oxygen, Salinity, Turbidity, Temperature, pH)	YSI ProDSS / YSI 6920 / YSI 6920V2
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4
Water Sampler	WildCo Vertical Alpha Bottles 1120-2.2L / 1120-3.2L Aquatic Research Instrument Vertical/Horizontal Point Water Sampler 2.2L / 3.0L

### 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*. Water quality monitoring at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. Water quality monitoring on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays.

### 2.3.4 Results and Observations

In this reporting period, a total of 37 monitoring events for impact water quality monitoring were conducted at 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 *Fiftieth to Fifty-second Monthly EM&A Reports*.

Four (4) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period. Actions were taken in accordance with the Event Action Plan as 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 <sup>(1)</sup>.

(1) Proposal on the changes of transect lines for dolphin monitoring was approved by EPD on 28 July 2017 (Reference number: (19) in EP2/G/A/129 Pt. 8).



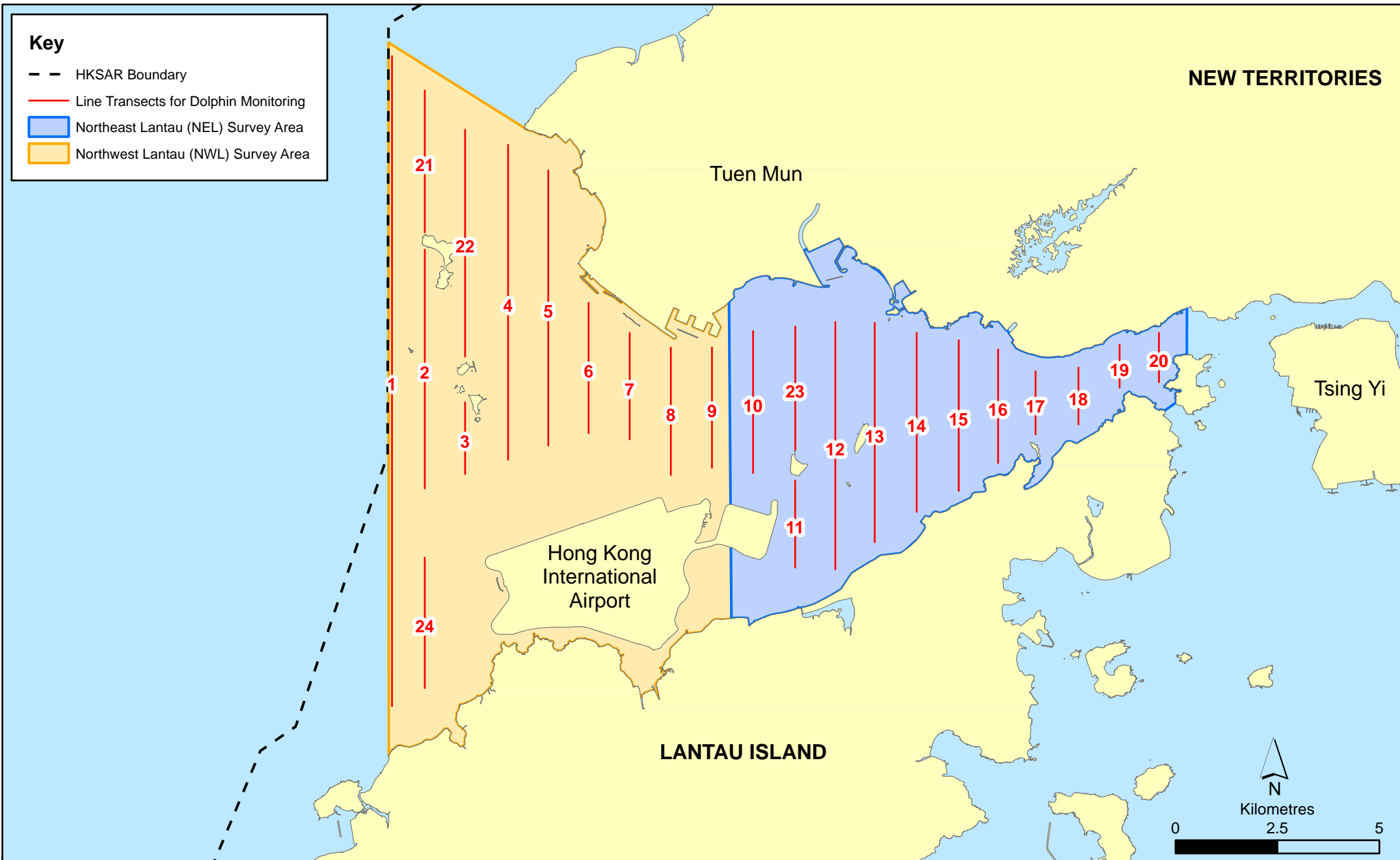


Figure 2.4

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	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805476	820800	14	Start Point	817537	820220
2	End Point	805476	826654	14	End Point	817537	824613
3	Start Point	806464	821150	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	821500	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	821850	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	822150	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	822000*	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	821176	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	24	Start Point	805476	815900
12	End Point	815542	824882	24	End Point	805476	819100

#### 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 797.53 km of survey effort was collected, with 88.8% 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,

296.70 km and 500.83 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 582.13 km, while the effort on secondary lines was 215.40 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 December 2017 to February 2018, a total of seventeen (17) groups of 45 Chinese White Dolphins were sighted. All except one dolphin sightings were made during on-effort, while fourteen of the sixteen on-effort 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 II of 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: 5 <sup>th</sup> / 12 <sup>th</sup> Dec 2017	0.0	0.0
	Set 2: 15 <sup>th</sup> / 20 <sup>th</sup> Dec 2017	0.0	0.0
	Set 3: 2 <sup>nd</sup> / 8 <sup>th</sup> Jan 2018	0.0	0.0
	Set 4: 16 <sup>th</sup> / 25 <sup>th</sup> Jan 2018	0.0	0.0
	Set 5: 2 <sup>nd</sup> / 9 <sup>th</sup> Feb 2018	0.0	0.0
	Set 6: 14 <sup>th</sup> / 22 <sup>nd</sup> Feb 2018	0.0	0.0
NWL	Set 1: 5 <sup>th</sup> / 12 <sup>th</sup> Dec 2017	1.66	8.32
	Set 2: 15 <sup>th</sup> / 20 <sup>th</sup> Dec 2017	8.39	22.37
	Set 3: 2 <sup>nd</sup> / 8 <sup>th</sup> Jan 2018	5.68	45.42
	Set 4: 16 <sup>th</sup> / 25 <sup>th</sup> Jan 2018	3.43	3.43
	Set 5: 2 <sup>nd</sup> / 9 <sup>th</sup> Feb 2018	4.38	6.56
	Set 6: 14 <sup>th</sup> / 22 <sup>nd</sup> Feb 2018	4.97	8.29

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)	
	December 2017 - February 2018	September - November 2011	December 2017 - February 2018	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	4.75 ± 2.26	9.85 ± 5.85	15.73 ± 15.94	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 eight (8) individuals per group in North Lantau region during December 2017 to February 2018. 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	
	December 2017 to February 2018	September - November 2011
Overall	2.65 ± 2.50 (n = 17)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.65 ± 2.50 (n = 17)	3.92 ± 3.40 (n = 49)

Two (2) Action Level exceedances were observed for the quarterly dolphin monitoring data between December 2017 to February 2018.

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 both NEL and NWL, 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 uninstallation 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. Twelve (12) site inspections were carried out in the reporting quarter on 6, 13, 20 and 28 December 2017, 3, 10, 17, 25 and 31 January 2018, and 7, 14 and 21 February 2018.

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*

<b>Inspection Date</b>	<b>Location &amp; Environmental Observations</b>	<b>Recommendations/ Remarks</b>
6 December 2017	Southern Landfall (Portion A) (Portion S-c) <ul style="list-style-type: none"> <li>• Accumulated general refuse should be cleared.</li> <li>• Frequent watering should be applied on partially dry area.</li> </ul> Viaduct B (Pier B16) <ul style="list-style-type: none"> <li>• Chemical containers were observed not placed in drip tray.</li> </ul>	Southern Landfall (Portion A) (Portion S-c) <ul style="list-style-type: none"> <li>• The Contractor was reminded to clear accumulated general refuse.</li> <li>• The Contractor was reminded to apply frequent watering on all unpaved area.</li> </ul> Viaduct B (Pier B16) <ul style="list-style-type: none"> <li>• The Contractor was reminded to place chemical containers in drip tray</li> </ul>
13 December 2017	Viaduct E (E12) <ul style="list-style-type: none"> <li>• Chemical container was observed not placed in drip tray.</li> <li>• Accumulated general refuse should be cleared.</li> <li>• Drip tray should be properly plugged.</li> </ul> Seafront (Area 2) <ul style="list-style-type: none"> <li>• Drip tray should be provided for chemical containers.</li> </ul>	Viaduct E (E12) <ul style="list-style-type: none"> <li>• The Contractor was reminded to place chemical container in drip tray.</li> <li>• The Contractor was reminded to clear accumulated general refuse.</li> <li>• The Contractor was reminded to plug drip tray properly.</li> </ul> Seafront (Area 2) <ul style="list-style-type: none"> <li>• The Contractor was reminded to provide drip tray for chemical containers.</li> </ul>

<b>Inspection Date</b>	<b>Location &amp; Environmental Observations</b>	<b>Recommendations/ Remarks</b>
20 December 2017	<p>Viaduct A (Ramp A) (Area A)</p> <ul style="list-style-type: none"> <li>Chemical containers were observed not placed in drip tray.</li> <li>Accumulated general refuse should be cleared.</li> </ul> <p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>Chemical containers were observed not placed in drip tray.</li> <li>Accumulated general refuse should be cleared.</li> <li>Watering should be applied on unpaved road for dust suppression.</li> </ul>	<p>Viaduct A (Ramp A) (Area A)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical containers in drip tray.</li> <li>The Contractor was reminded to clear accumulated general refuse.</li> </ul> <p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical containers in drip tray.</li> <li>The Contractor was reminded to clear accumulated general refuse.</li> <li>The Contractor was reminded to maintain watering on all unpaved area.</li> </ul>
28 December 2017	<p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> </ul> <p>Viaduct E (Pier E12)</p> <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> </ul>	<p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul> <p>Viaduct E (Pier E12)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul>
3 January 2018	<p>Viaduct E (Pier E13CD)</p> <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> <li>Noise isolation pad was observed not provided under the generator to reduce noise transmission to the sea.</li> </ul>	<p>Viaduct E (Pier E13CD)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> <li>The Contractor was reminded to provide noise isolation pad under the generator.</li> </ul>
10 January 2018	<p>Viaduct C (Ramp C)(Area I)</p> <ul style="list-style-type: none"> <li>Stagnant water in the drip tray (nearby the generator) should be cleared.</li> <li>Stagnant water in the drip tray (nearby chemical containers) should be cleared.</li> <li>Accumulated general refuse should be cleared.</li> <li>General refuse on the deck should be cleared.</li> </ul>	<p>Viaduct C (Ramp C)(Area I)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to clear stagnant water in the drip tray.</li> <li>The Contractor was reminded to clear stagnant water in the drip tray.</li> <li>The Contractor was reminded to clear accumulated general refuse.</li> <li>The Contractor was reminded to clear general refuse on the deck.</li> </ul>
17 January 2018	<p>Viaduct E (Pier E3)</p> <ul style="list-style-type: none"> <li>NRMM label should be provided on the air compressor.</li> <li>Drip tray should be provided to the air compressor.</li> </ul> <p>Viaduct E (Pier E4)</p> <ul style="list-style-type: none"> <li>Chemical containers were observed not placed in drip tray.</li> </ul>	<p>Viaduct E (Pier E3)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to provide NRMM label on the air compressor.</li> <li>The Contractor was reminded to provide drip tray to the air compressor.</li> </ul> <p>Viaduct E (Pier E4)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical containers in drip tray.</li> </ul>
25 January 2018	<p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>Accumulated general refuse should be cleared.</li> <li>Chemical container was observed not placed in drip tray.</li> </ul> <p>Viaduct E (Pier E13CD)</p> <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> </ul>	<p>Viaduct B (Ramp B) (Area A)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to clear accumulated general refuse.</li> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul> <p>Viaduct E (Pier E13CD)</p> <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul>

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
31 January 2018	Viaduct B (Ramp B) (Area A) <ul style="list-style-type: none"> <li>Accumulated general refuse should be cleared.</li> <li>Chemical container was observed not placed in drip tray.</li> <li>Refuse in U-channel should be cleared.</li> </ul> Viaduct C (Ramp C)(Area I) <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> </ul>	Viaduct B (Ramp B) (Area A) <ul style="list-style-type: none"> <li>The Contractor was reminded to clear accumulated general refuse.</li> <li>The Contractor was reminded to place chemical container in drip tray.</li> <li>The Contractor was reminded to clear refuse in U-channel.</li> </ul> Viaduct C (Ramp C)(Area I) <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul>
7 February 2018	Viaduct E (Pier E11) <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> <li>Stagnant water in the drip tray should be cleared.</li> <li>NRMM label should be provided on the generator.</li> </ul>	Viaduct E (Pier E11) <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> <li>The Contractor was reminded to clear stagnant water in the drip tray.</li> <li>The Contractor was reminded to provide NRMM label on the generator.</li> </ul>
14 February 2018	Viaduct B (Ramp B)(Area A) <ul style="list-style-type: none"> <li>Construction materials in the U-channel should be cleared.</li> <li>Empty drum should be removed from site.</li> </ul> Viaduct C (Ramp C)(Area I) <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> </ul>	Viaduct B (Ramp B)(Area A) <ul style="list-style-type: none"> <li>The Contractor was reminded to clear construction materials in the U-channel.</li> <li>The Contractor was reminded to clear empty drum.</li> </ul> Viaduct C (Ramp C)(Area I) <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> </ul>
21 February 2018	Viaduct E (Pier E10) <ul style="list-style-type: none"> <li>Chemical container was observed not placed in drip tray.</li> <li>A clear NRMM label should be provided on the generator.</li> </ul> Viaduct E (Pier E7) <ul style="list-style-type: none"> <li>Chemical containers were observed not placed in drip tray.</li> </ul> Viaduct E (Pier E6) <ul style="list-style-type: none"> <li>Oil stains were observed on the deck.</li> </ul>	Viaduct E (Pier E10) <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical container in drip tray.</li> <li>The Contractor was reminded to provide a clear NRMM label on the generator.</li> </ul> Viaduct E (Pier E7) <ul style="list-style-type: none"> <li>The Contractor was reminded to place chemical containers in drip tray.</li> </ul> Viaduct E (Pier E6) <ul style="list-style-type: none"> <li>The Contractor was reminded to clear oil stains on the deck.</li> </ul>

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 C&D Materials <sup>(a)</sup> (m <sup>3</sup> )	Imported Fill (m <sup>3</sup> )	Inert Constructio n Waste Re- used (m <sup>3</sup> )	Non-inert Constructio n Waste <sup>(b)</sup> (kg)	Recyclable Materials <sup>(c)</sup> (kg)	Chemical Wastes (kg)	Marine Sediment (m <sup>3</sup> )		
							Category L	Category M (M <sub>p</sub> & M <sub>f</sub> )	Category H
December 2017	3,054	0	164	181,710	15,636	2,400	0	0	0
January 2018	4,288	0	137	211,060	84	0	0	0	0
February 2018	2,662	0	826	184,880	28	0	0	0	0

**Notes:**

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber, felled trees 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-RW0294-17	19-Jun-17	18-Dec-17	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RW0650-17	19-Dec-17	18-Jun-18	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RS0540-17	20-Jun-17	15-Dec-17	GCL	Broad Permit for Whole Site Areas
Construction Noise Permit for night works and works in general holidays	GW-RS1112-17	14-Dec-17	31-Mar-18	GCL	Broad Permit for Whole Site Areas
Construction Noise Permit for night works and works in general holidays	GW-RS1025-17	30-Nov-17	31-Dec-17	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS1153-17	31-Dec-17	31-Mar-18	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS0668-17	7-Aug-17	6-Feb-18	GCL	Pre-casted pile cap shell installation at E8-E13

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Construction Noise Permit for night works and works in general holidays	GW-RS0064-18	1-Feb-18	29-Jul-18	GCL	Pre-casted pile cap shell installation at E8-E13
Marine Dumping Permit	EP/MD/18-031	01-Jul-17	31-Dec-17	GCL	For dumping Type I 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**

One (1) Limit Level of 1-hour TSP level exceedance was recorded for air quality impact monitoring in the reporting period. Actions were taken in accordance with the Event Action Plan as presented in *Appendix J*.

No Action or Limit Level exceedance for 24-hour TSP for air quality and construction noise monitoring was recorded during the reporting period.

Four (4) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation reports are presented in *Appendix L*.

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 <sup>(a)</sup>		Quarterly Mean (December 2017 to February 2018)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS(Mf)3(N)	9.2	12.8	12.0	16.6	9.6	10.5
CS(Mf)5	9.2	11.5	11.9	14.9	5.9	6.9
SR4	10.3	12.3	13.4	16.0	8.4	9.8
SR4a	9.1	9.8	11.9	12.7	8.6	11.7
IS8	11.3	13.5	14.6	17.6	9.8	12.1
IS(Mf)9	10.9	14.3	14.2	18.5	7.9	11.1
IS(Mf)16	11.4	10.3	14.8	13.4	7.1	8.4

**Notes:**

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

(b) Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

Two (2) Action Level exceedances were 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 was one (1) complaint received by EPD regarding a suspected sighting of dolphin near the viaduct at Tai Ho Wan and construction materials falling from the nearby elevated structures in the reporting period.

There was no notification of summons or successful prosecution recorded in the reporting period.

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:

##### March 2018

###### *Land-based Works*

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

##### April 2018

###### *Land-based Works*

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

##### May 2018

###### *Land-based Works*

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

### **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 Seventeenth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 December 2017 to 28 February 2018, in accordance with the Updated EM&A Manual and the requirements of the *Environmental Permits (EP-354/2009/D and EP-353/2009/K)*.

One (1) Limit Level of 1-hour TSP level exceedance was recorded for air quality impact monitoring in the reporting period.

Neither Action Level nor Limit Level exceedances were observed for 24-hour TSP level and noise impact monitoring in this reporting period.

Four (4) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period.

A total of seventeen (17) groups of forty-five (45) Chinese White Dolphins were sighted during the six sets of survey from December 2017 to February 2018. Two (2) Action Level exceedances were recorded for the quarterly dolphin monitoring data between December 2017 to February 2018, 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 12 times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

There was one (1) complaint received by EPD regarding a suspected sighting of dolphin near the viaduct at Tai Ho Wan and construction materials falling from the nearby elevated structures in the reporting period.

There was no notification of summons or successful prosecution recorded 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	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2017					2018														
										December					January					February					March				
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	02	09	16	23	30
<b>Contract Milestones</b>																													
<b>Key Dates for Completion</b>																													
<b>Stage of the Works</b>																													
<b>Completion Date</b>																													
<b>General</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
KD03	KD3 - Stage 3: TCSS Along NLH Near Viaduct C, D (EoT 8-Apr-16)		0		0	21-Dec-17*		08-Apr-16	-621	0%																			
<b>Portion Handover Dates</b>																													
<b>Possession of the Works Area</b>																													
<b>Access Dates</b>																													
<b>General</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
POS02-6B	Portion A - Area 6B (To be confirmed)		0	21-Dec-17*	0		31-Jul-20		954	0%																			
<b>Design</b>																													
<b>Detailed Design</b>																													
<b>Slope Works Near Viaduct A</b>																													
<b>Feature 9SE-B/FR8, B/R1, B/R2</b>																													
<b>Slope Works Design</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
ARDD0596-1	IC/SO Approval of Slope Combined AIP/DDA - CP11.01		60	13-Jun-17 A	30	27-Jan-18	13-Jun-16	18-Jul-16	-456	70%																			
<b>Slope Works Near Viaduct C</b>																													
<b>Feature 10NW-C/C22, C/C26, C/C27, C/F13, C/F14, C/F15</b>																													
<b>Slope Works Design</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
ARDD0589-2	IC/SO Approval of Combined AIP/DDA - CP13.01		28	01-Jun-17 A	20	16-Jan-18	26-Jul-16	17-Aug-16	-420	90%																			
<b>Procurement</b>																													
<b>Precast Parapets &amp; Barriers</b>																													
<b>Viaduct A to F</b>																													
<b>Precast Parapet Manufacture</b>																													
<b>General</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
PP6011-01	Viaduct A - Precast Parapets/Barriers Production		90	01-Sep-16 A	90	16-Apr-18	12-Sep-16	30-Dec-16	-379	55%																			
PP6011-02	Viaduct B - Precast Parapets/Barriers Production		120	03-May-16 A	30	27-Jan-18	20-Sep-16	26-Oct-16	-373	80%																			
PP6011-05	Viaduct E - Precast Parapets/Barriers Production		180	02-Jul-16 A	156	06-Jul-18	16-May-16	18-Nov-16	-479	40%																			
PP6011-06	Viaduct F - Precast Parapets/Barriers Production		198	21-Dec-17*	198	24-Aug-18	18-Feb-17	18-Oct-17	-251	0%																			
<b>Bearings</b>																													
<b>Viaduct F</b>																													
<b>Bearing Design &amp; Manufacture</b>																													
<b>General</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
PPBRF9	Bearing Delivery - Viaduct F		34	18-Jul-17 A	66	14-Mar-18	14-May-20	31-Jul-20	704	30%																			
<b>Movement Joints</b>																													
<b>Viaduct A to F</b>																													
<b>MJ Design &amp; Manufacture</b>																													
<b>General</b>																													
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection																													
PP6MJ02-2	Manufacture & delivery of MJ		180	01-Apr-17 A	90	16-Apr-18	07-May-16	23-Aug-16	-485	80%																			
PP7450	Site preparation of MJ for Viaduct D		12	22-Feb-18	12	07-Mar-18	10-Aug-16	23-Aug-16	-455	0%																			
PP7530	Site preparation of MJ for Viaduct C		12	07-Mar-18	12	20-Mar-18	07-Sep-16	21-Sep-16	-442	0%																			
<b>Construction</b>																													
<b>Foundation &amp; Substructure Works</b>																													
<b>Ramp A</b>																													

■ Actual Work  
■ Planned Bar  
■ Critical Bar  
◆ Milestone

Project ID: TMCLK-DWPI-1-M55  
 Layout: J3518-DWP-3MRP Submission - M55  
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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
**3-Month Rolling Programme (Page 1 of 11 Pages)**  
**(Progress as of 21-Dec-17)**

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30-Oct-17		PKN	HF
28-Nov-...		PKN	HF
03-Jan-18		PKN	HF

**DWG. No.:**  
**J3518/GCL/PGM/3MRP-M55**





Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2017					2018														
										December					January					February					March				
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	02	09	16	23	30
<b>Pier E14C (E6d)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
E14C-C5310	E14C Pier Head - Construct Diaphragm (2nd Cast) in PHS	65	04-Nov-17 A	0	11-Dec-17 A				100%	[Gantt bar: 04-Nov-17 to 11-Dec-17, 100% complete]																			
E14C-C5410	E14C Pier Head - Curing, Stitching, Remove Temp Works	17	12-Dec-17 A	10	04-Jan-18	12-Jul-17	22-Jul-17	-136	0%	[Gantt bar: 12-Dec-17 to 04-Jan-18, 0% complete]																			
<b>Pier E14D (E5d)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
E14D-C5210	E14D Pier Head - Erect PH Segment (1 nr)	2	20-Dec-17 A	0	20-Dec-17 A				100%	[Gantt bar: 20-Dec-17 to 20-Dec-17, 100% complete]																			
E14D-C5310	E14D Pier Head - Construct Diaphragm (2nd Cast) in PHS	50	21-Dec-17	50	23-Feb-18	26-Jan-17	28-Mar-17	-268	0%	[Gantt bar: 21-Dec-17 to 23-Feb-18, 0% complete]																			
E14D-C5410	E14D Pier Head - Curing, Stitching, Remove Temp Works	16	24-Feb-18	16	14-Mar-18	29-Mar-17	20-Apr-17	-268	0%	[Gantt bar: 24-Feb-18 to 14-Mar-18, 0% complete]																			
<b>Viaduct F - Bridge F1</b>																													
<b>Pier F2 (F1c)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F02-C5110	F2 Pier Head - Scaffold, Temp Works	17	30-Nov-17 A	0	20-Dec-17 A				100%	[Gantt bar: 30-Nov-17 to 20-Dec-17, 100% complete]																			
F02-C5210	F2 Pier Head - Erect PH Segment (1 nr)	2	21-Dec-17	2	22-Dec-17	09-Jan-17	10-Jan-17	-283	0%	[Gantt bar: 21-Dec-17 to 22-Dec-17, 0% complete]																			
F02-C5310	F2 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	23-Dec-17	41	12-Feb-18	11-Jan-17	02-Mar-17	-283	0%	[Gantt bar: 23-Dec-17 to 12-Feb-18, 0% complete]																			
F02-C5410	F2 Pier Head - Curing, Remove Temp Works	5	13-Feb-18	5	21-Feb-18	03-Mar-17	08-Mar-17	-283	0%	[Gantt bar: 13-Feb-18 to 21-Feb-18, 0% complete]																			
<b>Pier F3 (F1d)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F03-C5110	F3 Pier Head - Scaffold, Temp Works	17	06-Nov-17 A	0	25-Nov-17 A				100%	[Gantt bar: 06-Nov-17 to 25-Nov-17, 100% complete]																			
F03-C5210	F3 Pier Head - Erect PH Segment (1 nr)	2	27-Nov-17 A	0	27-Nov-17 A				100%	[Gantt bar: 27-Nov-17 to 27-Nov-17, 100% complete]																			
F03-C5310	F3 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	27-Nov-17 A	0	27-Nov-17 A				100%	[Gantt bar: 27-Nov-17 to 27-Nov-17, 100% complete]																			
F03-C5410	F3 Pier Head - Curing, Remove Temp Works	5	27-Nov-17 A	0	27-Nov-17 A				100%	[Gantt bar: 27-Nov-17 to 27-Nov-17, 100% complete]																			
<b>Viaduct F - Bridge F2</b>																													
<b>Pier F4 (F2b)</b>																													
<b>Pier</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F04-C4410	F4 Pier - Scaffold, Rebar, Formwork, Concrete (4th Lift)	18	04-Nov-17 A	0	30-Nov-17 A				100%	[Gantt bar: 04-Nov-17 to 30-Nov-17, 100% complete]																			
F04-C4510	F4 Pier - Curing, Remove Formwork	5	01-Dec-17 A	0	07-Dec-17 A				100%	[Gantt bar: 01-Dec-17 to 07-Dec-17, 100% complete]																			
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F04-C5110	F4 Pier Head - Scaffold, Temp Works	17	21-Dec-17	17	12-Jan-18	06-Dec-17	27-Dec-17	-13	0%	[Gantt bar: 21-Dec-17 to 12-Jan-18, 0% complete]																			
F04-C5210	F4 Pier Head - Erect PH Segment (1 nr)	2	13-Jan-18	2	15-Jan-18	28-Dec-17	29-Dec-17	-13	0%	[Gantt bar: 13-Jan-18 to 15-Jan-18, 0% complete]																			
F04-C5310	F4 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	30-Dec-17	20-Feb-18	-13	0%	[Gantt bar: 16-Jan-18 to 07-Mar-18, 0% complete]																			
F04-C5410	F4 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	21-Feb-18	26-Feb-18	-13	0%	[Gantt bar: 08-Mar-18 to 13-Mar-18, 0% complete]																			
<b>Pier F5 (F2c)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F05-C5410	F5 Pier Head - Curing, Remove Temp Works	5	17-Nov-17 A	0	22-Nov-17 A				100%	[Gantt bar: 17-Nov-17 to 22-Nov-17, 100% complete]																			
<b>Pier F6 (F2d)</b>																													
<b>Pier</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F06-C4310	F6 Pier - Curing, Remove Formwork	5	16-Nov-17 A	0	22-Nov-17 A				100%	[Gantt bar: 16-Nov-17 to 22-Nov-17, 100% complete]																			
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F06-C5110	F6 Pier Head - Scaffold, Temp Works	17	23-Nov-17 A	12	06-Jan-18	22-Jun-17	06-Jul-17	-152	70%	[Gantt bar: 23-Nov-17 to 06-Jan-18, 70% complete]																			
F06-C5210	F6 Pier Head - Erect PH Segment (1 nr)	2	08-Jan-18	2	09-Jan-18	07-Jul-17	08-Jul-17	-152	0%	[Gantt bar: 08-Jan-18 to 09-Jan-18, 0% complete]																			
F06-C5310	F6 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	10-Jan-18	41	01-Mar-18	10-Jul-17	25-Aug-17	-152	0%	[Gantt bar: 10-Jan-18 to 01-Mar-18, 0% complete]																			
F06-C5410	F6 Pier Head - Curing, Remove Temp Works	5	02-Mar-18	5	07-Mar-18	26-Aug-17	31-Aug-17	-152	0%	[Gantt bar: 02-Mar-18 to 07-Mar-18, 0% complete]																			
<b>Pier F7 (F2e)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F07-C5310	F7 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	27-Oct-17 A	0	02-Dec-17 A				100%	[Gantt bar: 27-Oct-17 to 02-Dec-17, 100% complete]																			
F07-C5410	F7 Pier Head - Curing, Remove Temp Works	5	04-Dec-17 A	0	08-Dec-17 A				100%	[Gantt bar: 04-Dec-17 to 08-Dec-17, 100% complete]																			
<b>Pier F8 (F2f)</b>																													

■ Actual Work  
■ Planned Bar  
■ Critical Bar  
◆ Milestone

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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
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										December					January				February			March		
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26
<b>Pile Cap</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F08-C3110	F8 Pile Cap - Excavate, Break Pile Head	15	15-Nov-17 A	0	08-Dec-17 A				100%	[Actual Work Bar]														
F08-C3210	F8 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	09-Dec-17 A	10	04-Jan-18	21-Sep-17	03-Oct-17	-75	90%	[Planned Bar]														
F08-C3310	F8 Pile Cap - Curing, Remove Formwork, Backfill	12	05-Jan-18	12	18-Jan-18	04-Oct-17	18-Oct-17	-75	0%	[Critical Bar]														
<b>Pier</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F08-C4110	F8 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	19-Jan-18*	13	02-Feb-18	22-Dec-17	09-Jan-18	-21	0%	[Critical Bar]														
F08-C4210	F8 Pier - Curing, Remove Formwork	5	03-Feb-18	5	08-Feb-18	10-Jan-18	15-Jan-18	-21	0%	[Critical Bar]														
<b>Pier Head Segment</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F08-C5110	F8 Pier Head - Scaffold, Temp Works	17	09-Feb-18	17	03-Mar-18	16-Jan-18	03-Feb-18	-21	0%	[Critical Bar]														
F08-C5210	F8 Pier Head - Erect PH Segment (1 nr)	2	05-Mar-18	2	06-Mar-18	05-Feb-18	06-Feb-18	-21	0%	[Critical Bar]														
F08-C5310	F8 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	07-Mar-18	41	27-Apr-18	07-Feb-18	29-Mar-18	-21	0%	[Critical Bar]														
<b>Viaduct F - Bridge F3</b>																								
<b>Pier F9 (F3d)</b>																								
<b>Pier Head Segment</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F09-C5110	F9 Pier Head - Scaffold, Temp Works	17	14-Nov-17 A	0	04-Dec-17 A				100%	[Actual Work Bar]														
F09-C5210	F9 Pier Head - Erect PH Segment (2 nr)	2	28-Nov-17 A	0	05-Dec-17 A				100%	[Actual Work Bar]														
F09-C5310	F9 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	05-Dec-17 A	0	05-Dec-17 A				100%	[Actual Work Bar]														
F09-C5410	F9 Pier Head - Curing, Remove Temp Works	5	05-Dec-17 A	0	05-Dec-17 A				100%	[Actual Work Bar]														
<b>Pier F10 (F3c)</b>																								
<b>Pier Head Segment</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F10-C5110	F10 Pier Head - Scaffold, Temp Works	17	21-Dec-17*	17	12-Jan-18	20-Sep-17	11-Oct-17	-76	0%	[Critical Bar]														
F10-C5210	F10 Pier Head - Erect PH Segment (2 nr)	2	13-Jan-18	2	15-Jan-18	12-Oct-17	13-Oct-17	-76	0%	[Critical Bar]														
F10-C5310	F10 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	14-Oct-17	01-Dec-17	-76	0%	[Critical Bar]														
F10-C5410	F10 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	02-Dec-17	07-Dec-17	-76	0%	[Critical Bar]														
<b>Pier F11 (F3b)</b>																								
<b>Pier Head Segment</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F11-C5110	F11 Pier Head - Scaffold, Temp Works	17	21-Dec-17	17	12-Jan-18	14-Dec-17	05-Jan-18	-6	0%	[Critical Bar]														
F11-C5210	F11 Pier Head - Erect PH Segment (2 nr)	2	13-Jan-18	2	15-Jan-18	06-Jan-18	08-Jan-18	-6	0%	[Critical Bar]														
F11-C5310	F11 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	09-Jan-18	28-Feb-18	-6	0%	[Critical Bar]														
F11-C5410	F11 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	01-Mar-18	06-Mar-18	-6	0%	[Critical Bar]														
<b>Pier F12 (F3a)</b>																								
<b>Pile Cap</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F12-C3310	F12 Pile Cap - Curing, Remove Formwork, Backfill	14	14-Nov-17 A	0	29-Nov-17 A				100%	[Actual Work Bar]														
<b>Pier</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F12-C4110	F12 Pier - Scaffold, Rebar, Formwork, Concrete (Pier A)	13	17-Nov-17 A	0	19-Dec-17 A				100%	[Actual Work Bar]														
F12-C4210	F12 Pier - Curing, Remove Formwork (Pier A)	5	20-Dec-17 A	5	28-Dec-17	27-Jul-20	31-Jul-20	765	0%	[Planned Bar]														
F12-C4230	F12 Pier - Scaffold, Rebar, Formwork, Concrete (Pier B)	13	17-Nov-17 A	0	19-Dec-17 A				100%	[Actual Work Bar]														
F12-C4410	F12 Pier - Curing, Remove Formwork (Pier B)	5	20-Dec-17 A	5	28-Dec-17	09-Feb-18	14-Feb-18	40	0%	[Planned Bar]														
<b>Pier Head Segment</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F12-C5110	F12 Pier Head - Scaffold, Temp Works	17	29-Dec-17	17	18-Jan-18	15-Feb-18	09-Mar-18	40	0%	[Planned Bar]														
F12-C5210	F12 Pier Head - Erect PH Segment (2 nr)	2	19-Jan-18	2	20-Jan-18	10-Mar-18	12-Mar-18	40	0%	[Planned Bar]														
F12-C5310	F12 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	22-Jan-18	41	13-Mar-18	13-Mar-18	04-May-18	40	0%	[Planned Bar]														
F12-C5410	F12 Pier Head - Curing, Remove Temp Works	5	14-Mar-18	5	19-Mar-18	05-May-18	10-May-18	40	0%	[Planned Bar]														
<b>Viaduct F - Bridge F4</b>																								
<b>Pier F16 (F5a/F4a)</b>																								
<b>Pier</b>																								
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																								
F16-C4210	F16 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	12-Oct-17 A	0	23-Nov-17 A				100%	[Actual Work Bar]														
F16-C4310	F16 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	23-Nov-17 A	0	23-Nov-17 A				100%	[Actual Work Bar]														
F16-C4410	F16 Pier - Curing, Remove Temp Works	5	23-Nov-17 A	0	23-Nov-17 A				100%	[Actual Work Bar]														

■ Actual Work  
■ Planned Bar  
■ Critical Bar  
◆ Milestone

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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
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										December					January					February					March				
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	02	09	16	23	30
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F16-C5110	F16 Pier Head - Construct Footing for Falsework	12	20-Nov-17 A	0	08-Dec-17 A				100%																				
F16-C5210	F16 Pier Head - Erect Falsework & Temp Platform	45	09-Dec-17 A	30	27-Jan-18	30-Aug-17	04-Oct-17	-94	0%																				
F16-C5310	F16 Pier Head - Construct In-Situ PH Segment & Span Segments	60	29-Jan-18	60	16-Apr-18	06-Oct-17	15-Dec-17	-94	0%																				
<b>Pier F17 (F4b)</b>																													
<b>Pier</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F17-C4210	F17 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	19-Oct-17 A	0	12-Dec-17 A				100%																				
F17-C4310	F17 Pier - Curing, Remove Temp Works	5	13-Dec-17 A	0	19-Dec-17 A				100%																				
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F17-C5110	F17 Pier Head - Scaffold, Temp Works	17	21-Dec-17	17	12-Jan-18	29-Dec-17	18-Jan-18	5	0%																				
F17-C5210	F17 Pier Head - Erect PH Segment (1 nr)	2	13-Jan-18	2	15-Jan-18	19-Jan-18	20-Jan-18	5	0%																				
F17-C5310	F17 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	22-Jan-18	13-Mar-18	5	0%																				
F17-C5410	F17 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	14-Mar-18	19-Mar-18	5	0%																				
<b>Pier F18 (F4c)</b>																													
<b>Pier</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F18-C4110	F18 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	11-Nov-17 A	0	07-Dec-17 A				100%																				
F18-C4210	F18 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	07-Dec-17 A	0	07-Dec-17 A				100%																				
F18-C4310	F18 Pier - Curing, Remove Temp Works	5	07-Dec-17 A	0	07-Dec-17 A				100%																				
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F18-C5110	F18 Pier Head - Scaffold, Temp Works	17	21-Dec-17	17	12-Jan-18	10-Feb-18	05-Mar-18	41	0%																				
F18-C5210	F18 Pier Head - Erect PH Segment (1 nr)	2	13-Jan-18	2	15-Jan-18	06-Mar-18	07-Mar-18	41	0%																				
F18-C5310	F18 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	08-Mar-18	28-Apr-18	41	0%																				
F18-C5410	F18 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	30-Apr-18	05-May-18	41	0%																				
<b>Viaduct F - Bridge F5</b>																													
<b>Pier F13 (F5d)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F13-C5110	F13 Pier Head - Scaffold, Temp Works	17	08-Nov-17 A	0	06-Dec-17 A				100%																				
F13-C5210	F13 Pier Head - Erect PH Segment (1 nr)	2	07-Dec-17 A	0	07-Dec-17 A				100%																				
F13-C5310	F13 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	08-Dec-17 A	30	27-Jan-18	25-Apr-17	01-Jun-17	-199	0%																				
F13-C5410	F13 Pier Head - Curing, Remove Temp Works	5	29-Jan-18	5	02-Feb-18	02-Jun-17	07-Jun-17	-199	0%																				
<b>Pier F14 (F5c)</b>																													
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F14-C5110	F14 Pier Head - Scaffold, Temp Works	17	21-Dec-17	17	12-Jan-18	29-Nov-17	18-Dec-17	-19	0%																				
F14-C5210	F14 Pier Head - Erect PH Segment (1 nr)	2	13-Jan-18	2	15-Jan-18	19-Dec-17	20-Dec-17	-19	0%																				
F14-C5310	F14 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	16-Jan-18	41	07-Mar-18	21-Dec-17	09-Feb-18	-19	0%																				
F14-C5410	F14 Pier Head - Curing, Remove Temp Works	5	08-Mar-18	5	13-Mar-18	10-Feb-18	15-Feb-18	-19	0%																				
<b>Pier F15 (F5b)</b>																													
<b>Pile Cap</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F15-C3210	F15 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	20-Nov-17 A	0	04-Dec-17 A				100%																				
F15-C3310	F15 Pile Cap - Curing, Remove Formwork, Backfill	12	05-Dec-17 A	0	08-Dec-17 A				100%																				
<b>Pier</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F15-C4110	F15 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	09-Dec-17 A	0	15-Dec-17 A				100%																				
F15-C4210	F15 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	16-Dec-17 A	12	06-Jan-18	18-Nov-17	01-Dec-17	-28	0%																				
F15-C4310	F15 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	08-Jan-18	18	27-Jan-18	02-Dec-17	22-Dec-17	-28	0%																				
F15-C4410	F15 Pier - Curing, Remove Temp Works	5	29-Jan-18	5	02-Feb-18	23-Dec-17	30-Dec-17	-28	0%																				
<b>Pier Head Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
F15-C5110	F15 Pier Head - Scaffold, Temp Works	17	03-Feb-18	17	26-Feb-18	02-Jan-18	20-Jan-18	-28	0%																				
F15-C5210	F15 Pier Head - Erect PH Segment (2 nr)	2	27-Feb-18	2	28-Feb-18	22-Jan-18	23-Jan-18	-28	0%																				
F15-C5310	F15 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	01-Mar-18	41	21-Apr-18	24-Jan-18	15-Mar-18	-28	0%																				

Actual Work  
 Planned Bar  
 Critical Bar  
 Milestone

Project ID: TMCLK-DWPI-1-M55  
 Layout: J3518-DWP-3MRP Submission - M55  
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 Milestones, No Level of Effort.

**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
**3-Month Rolling Programme (Page 5 of 11 Pages)**  
**(Progress as of 21-Dec-17)**

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28-Nov-...		PKN	HF
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**DWG. No.:**  
**J3518/GCL/PGM/3MRP-M55**





Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2017					2018														
										December					January					February					March				
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	02	09	16	23	30
VC4-C7810	Viaduct C4 - Drainage, Fire Main & E&M Services	60	08-Jan-18	60	21-Mar-18	13-Jul-16	21-Sep-16	-443	0%																				
VC4-C7820	Viaduct C4 - Railings, Light Poles, Signs & Street Furniture	30	05-Feb-18	30	14-Mar-18	10-Aug-16	13-Sep-16	-443	0%																				
VC4-C7830	Viaduct C4 - Deck Paving & Roadmarking (KD13)	18	15-Mar-18	18	09-Apr-18	14-Sep-16	06-Oct-16	-443	0%																				
<b>Bridge C3</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VC3-C7710	Viaduct C3 - Parapet Panels	60	16-Aug-17 A	48	21-Feb-18	30-May-16	26-Jul-16	-467	0%																				
VC3-C7720	Viaduct C3 - Gantry & TCSS Provisions (KD4)	36	22-Jan-18	36	07-Mar-18	28-Jun-16	09-Aug-16	-467	0%																				
VC3-C7810	Viaduct C3 - Drainage, Fire Main & E&M Services	48	22-Feb-18	48	23-Apr-18	27-Jul-16	21-Sep-16	-467	0%																				
VC3-C7820	Viaduct C3 - Railings, Light Poles, Signs & Street Furniture	30	08-Mar-18	30	16-Apr-18	10-Aug-16	13-Sep-16	-467	0%																				
<b>Bridge C2</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VC2-C7710	Viaduct C2 - Parapet Panels	48	13-Jun-17 A	54	28-Feb-18	07-May-16	12-Jul-16	-485	95%																				
VC2-C7720	Viaduct C2 - Gantry & TCSS Provisions (KD4)	36	12-Feb-18	36	28-Mar-18	28-Jun-16	09-Aug-16	-485	0%																				
VC2-C7810	Viaduct C2 - Drainage, Fire Main & E&M Services	60	01-Mar-18	60	15-May-18	13-Jul-16	21-Sep-16	-485	0%																				
<b>Bridge C1</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VC1-C7710	Viaduct C1 - Parapet Panels	48	31-May-17 A	4	27-Dec-17	08-Jul-16	12-Jul-16	-435	0%																				
VC1-C7720	Viaduct C1 - Gantry & TCSS Provisions (KD4)	36	21-Dec-17	36	03-Feb-18	28-Jun-16	09-Aug-16	-443	0%																				
VC1-C7810	Viaduct C1 - Drainage, Fire Main & E&M Services	60	08-Jan-18	60	21-Mar-18	13-Jul-16	21-Sep-16	-443	0%																				
VC1-C7820	Viaduct C1 - Railings, Light Poles, Signs & Street Furniture	30	05-Feb-18	30	14-Mar-18	10-Aug-16	13-Sep-16	-443	0%																				
VC1-C7830	Viaduct C1 - Deck Paving & Roadmarking (KD13)	18	15-Mar-18	18	09-Apr-18	14-Sep-16	06-Oct-16	-443	0%																				
<b>Viaduct D</b>																													
<b>Bridge D3</b>																													
<b>Deck Span Segment</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
D06-C6610	D6 - Launch LG1 from D6 to E2B for Dismantling	18	07-Aug-17 A	0	25-Nov-17 A				100%																				
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VD3-C7720	Viaduct D3 - Gantry & TCSS Provisions (KD4)	36	21-Dec-17	36	03-Feb-18	28-Jun-16	09-Aug-16	-443	0%																				
VD3-C7810	Viaduct D3 - Drainage, Fire Main & E&M Services	60	08-Jan-18	60	21-Mar-18	13-Jul-16	21-Sep-16	-443	0%																				
VD3-C7820	Viaduct D3 - Railings, Light Poles, Signs & Street Furniture	30	22-Feb-18	30	28-Mar-18	10-Aug-16	13-Sep-16	-455	0%																				
<b>Bridge D2</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VD2-C7710	Viaduct D2 - Parapet Panels	60	01-Sep-17 A	51	24-Feb-18	26-May-16	26-Jul-16	-470	0%																				
VD2-C7720	Viaduct D2 - Gantry & TCSS Provisions (KD4)	36	25-Jan-18	36	10-Mar-18	28-Jun-16	09-Aug-16	-470	0%																				
VD2-C7810	Viaduct D2 - Drainage, Fire Main & E&M Services	48	26-Feb-18	48	26-Apr-18	27-Jul-16	21-Sep-16	-470	0%																				
VD2-C7820	Viaduct D2 - Railings, Light Poles, Signs & Street Furniture	30	12-Mar-18	30	19-Apr-18	10-Aug-16	13-Sep-16	-470	0%																				
<b>Bridge D1</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VD1-C7710	Viaduct D1 - Parapet Panels	48	01-Jun-17 A	12	06-Jan-18	28-Jun-16	12-Jul-16	-443	0%																				
VD1-C7720	Viaduct D1 - Gantry & TCSS Provisions (KD4)	36	21-Dec-17	36	03-Feb-18	28-Jun-16	09-Aug-16	-443	0%																				
VD1-C7810	Viaduct D1 - Drainage, Fire Main & E&M Services	60	08-Jan-18	60	21-Mar-18	13-Jul-16	21-Sep-16	-443	0%																				
VD1-C7820	Viaduct D1 - Railings, Light Poles, Signs & Street Furniture	30	05-Feb-18	30	14-Mar-18	10-Aug-16	13-Sep-16	-443	0%																				
VD1-C7830	Viaduct D1 - Deck Paving & Roadmarking (KD14)	18	15-Mar-18	18	09-Apr-18	14-Sep-16	06-Oct-16	-443	0%																				
<b>Viaduct E</b>																													
<b>Bridge E1</b>																													
<b>Deck Finales, E&amp;M and Roadworks</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
VE1AB-C77	Viaduct E1A/B - Parapet Panels	48	05-Sep-17 A	24	20-Jan-18	14-Jun-16	12-Jul-16	-455	0%																				
VE1AB-C77	Viaduct E1A/B - Gantry & TCSS Provisions (KD4)	36	08-Jan-18	36	21-Feb-18	28-Jun-16	09-Aug-16	-455	0%																				
VE1AB-C78	Viaduct E1A/B - Drainage, Fire Main & E&M Services	60	22-Jan-18	60	09-Apr-18	13-Jul-16	21-Sep-16	-455	0%																				
VE1AB-C78	Viaduct E1A/B - Railings, Light Poles, Signs & Street Furniture	30	22-Feb-18	30	28-Mar-18	10-Aug-16	13-Sep-16	-455	0%																				
VE1CD-C77	Viaduct E1C/D - Parapet Panels	48	21-Dec-17	48	21-Feb-18	16-May-16	12-Jul-16	-479	0%																				
VE1CD-C77	Viaduct E1C/D - Gantry & TCSS Provisions (KD4)	36	05-Feb-18	36	21-Mar-18	28-Jun-16	09-Aug-16	-479	0%																				

■ Actual Work  
■ Planned Bar  
■ Critical Bar  
◆ Milestone

Project ID: TMCLK-DWPI-1-M55  
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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
**3-Month Rolling Programme (Page 7 of 11 Pages)**  
**(Progress as of 21-Dec-17)**

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**J3518/GCL/PGM/3MRP-M55**







Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2017					2018														
										December					January					February					March				
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	02	09	16	23	30
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
M201170	10NW-C/R4 - Slope works	80	21-Dec-17	80	03-Apr-18	06-Aug-16	10-Nov-16	-410	0%																				
<b>Slope 10NW-C/F50</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
M201150	10NW-C/F50 - Slope works	165	11-Jan-17 A	62	09-Mar-18	27-Aug-16	10-Nov-16	-392	5%																				
<b>Road Works Along NLH Westbound</b>																													
<b>General</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
RW10020	NLH W/B (Viaduct C) - Road Drainage Works for tie-in	104	26-Jun-17 A	24	20-Jan-18	10-Mar-17	07-Apr-17	-234	25%																				
<b>Road Works Along NLH Eastbound</b>																													
<b>General</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
RW20080-2	Ch475 - 650 Portion 5 (viaduct D area) : Roadwork	81	11-Jan-17 A	0	25-Nov-17 A				100%																				
RW20080-4	Ch157 - 275 Portion 7 (Viaduct D area) : Roadwork	98	11-Jan-17 A	10	04-Jan-18	27-Mar-17	07-Apr-17	-220	82%																				
RW20084	NLH E/B Viaduct A - Ch200-388 Roadwork (SL & HS) & Reinstate NLH	127	17-Dec-16 A	10	04-Jan-18	27-Mar-17	07-Apr-17	-220	80%																				
<b>At-Grade Works Along Cheung Tung Road</b>																													
<b>Slope Works Near Viaduct B</b>																													
<b>Slope 9SE-B/F85</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVB4020	9SE-B/F85 - Filling & forming slope	36	15-Jan-18	36	28-Feb-18	16-Aug-18	27-Sep-18	172	0%																				
SWVB4030	9SE-B/F85 - Form UC	12	01-Mar-18	12	14-Mar-18	28-Sep-18	12-Oct-18	172	0%																				
SWVB4035	9SE-B/F85 - Install Geo. Instru. & Baseline Monitoring	30	15-Mar-18	30	23-Apr-18	13-Oct-18	17-Nov-18	172	0%																				
<b>Slope Works Near Viaduct C</b>																													
<b>Slope 10NW-C/C26</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVC1995	TTA for closure of NLH HS	2	15-Jan-18	2	16-Jan-18	16-Aug-16	17-Aug-16	-420	0%																				
SWVC2000	10NW-C/C26 - Slope works	166	17-Jan-18	166	10-Aug-18	18-Aug-16	09-Mar-17	-420	0%																				
<b>Slope PF1 &amp; PF2</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVC7000	PF1 & PF2 slope works	18	21-Dec-17	18	13-Jan-18	26-Jul-16	15-Aug-16	-420	0%																				
<b>Slope 10NW-C/F13</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVC4000	10NW-C/F13 - Slope works	100	01-Sep-17 A	86	11-Apr-18	30-Jul-16	10-Nov-16	-416	0%																				
<b>Slope 10NW-C/F14</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVC5000	10NW-C/F14 - Slope works	100	01-Sep-17 A	95	21-Apr-18	14-Jun-16	05-Oct-16	-455	0%																				
<b>Slope 10NW-C/F15</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
SWVC6000	10NW-C/F15 - Slope works	108	01-Sep-17 A	78	28-Mar-18	05-Jul-16	05-Oct-16	-438	0%																				
<b>Re-alignment of CTR Along Viaduct B</b>																													
<b>General</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
RP00076	Ch100-300: Lay Telecom Cable	10	22-May-17 A	60	07-Mar-18	21-May-20	31-Jul-20	710	88%																				
RP00077	Ch100-300: Street Lighting & Draw Pit	13	27-Jun-17 A	60	07-Mar-18	21-May-20	31-Jul-20	710	30%																				
RP00078	Ch100-300: Relocation of Vent Pipe	18	13-May-17 A	60	07-Mar-18	21-May-20	31-Jul-20	710	60%																				
RP00083	Ch100-300: Drainage & Roadwork for New CTR	52	13-May-17 A	52	26-Feb-18	22-Oct-16	21-Dec-16	-347	40%																				
RP00084	Ch100-300: TTA to New CTR	1	27-Feb-18	1	27-Feb-18	22-Dec-16	22-Dec-16	-347	0%																				
<b>Re-alignment of CTR Along Viaduct C</b>																													
<b>East Portion</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
RW60060	CTR East (stage 3) TTA 090-6 : Roadwork	66	14-Jul-17 A	48	21-Feb-18	04-Jun-20	31-Jul-20	722	50%																				
RW60070	CTR East (stage 4) : Roadwork	55	28-Oct-17 A	48	21-Feb-18	10-Feb-17	07-Apr-17	-258	30%																				
RW60080	CTR Tie in Works	116	18-May-17 A	48	21-Feb-18	10-Feb-17	07-Apr-17	-258	30%																				
<b>Emergency Gates G6 &amp; G7</b>																													
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																													
RP10100	Open re-aligned CTR & activate new gates G6 & G7	0	21-Dec-17	0		10-Mar-17		-234	0%																				
RP10110	Remove old gates G6 & G7 and reprovision Expressway Fence	24	21-Dec-17	24	20-Jan-18	10-Mar-17	07-Apr-17	-234	0%																				
<b>At-Grade Works at Southern Landfall</b>																													

■ Actual Work  
■ Planned Bar  
■ Critical Bar  
◆ Milestone

Project ID: TMCLK-DWPI-1-M55  
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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
**3-Month Rolling Programme (Page 10 of 11 Pages)**  
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03-Jan-18		PKN	HF

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**J3518/GCL/PGM/3MRP-M55**



Activity ID	Activity Name	Orig. Durn.	Act. Start / FC Early Start	Rem. Durn.	Act. Finish / FC Early Finish	Late Start	Late Finish	Total Float	Physical % Complete	2017					2018												
										December					January					February					March		
										20	27	04	11	18	25	01	08	15	22	29	05	12	19	26	05	12	19
<b>HKBCF Area</b>																											
<b>General</b>																											
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																											
RW30005	South Landfall - Initial record survey	12	19-Jan-18	12	01-Feb-18	19-Oct-17	02-Nov-17	-75	0%																		
RW30010	South Landfall - Mobilisation for Portion B Works	24	02-Feb-18	24	05-Mar-18	03-Nov-17	30-Nov-17	-75	0%																		
RW30014	South Landfall - DN300 Fresh water main works installation & connection (l	60	06-Mar-18	60	19-May-18	01-Dec-17	12-Feb-18	-75	0%																		
RW30030	South Landfall - Stormwater drainage works	60	06-Mar-18	60	19-May-18	12-Jul-18	19-Sep-18	102	0%																		
<b>Watermain from Tung Chung to Southern Landfall</b>																											
<b>Watermain Works</b>																											
<b>General</b>																											
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																											
WM00120	Lay DN450 Fresh Water Main at Re-aligned CTR (approx. 500m)	48	22-Apr-15 A	12	06-Jan-18	29-Nov-17	12-Dec-17	-19	90%																		
<b>No TMCLK1 Work Phase</b>																											
<b>At-Grade Works &amp; Miscellaneous Works</b>																											
<b>At-Grade Works Along Cheung Tung Road</b>																											
<b>Re-alignment of CTR Along Viaduct B</b>																											
<b>General</b>																											
<b>HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection</b>																											
RP00074-3	Ch100-300: Road Drainage	38	06-May-17 A	7	30-Dec-17	24-Jul-20	31-Jul-20	763	88%																		

- Actual Work
- Planned Bar
- Critical Bar
- Milestone

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**Tuen Mun - Chek Lap Kok Link - Southern Connection**  
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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	
<b>AIR QUALITY</b>									
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		✓
<b>NOISE</b>									
5.11	Section 4	Noise monitoring	All existing representative sensitive receivers / during North Lantau Viaduct construction	Contractor	EM&A Manual		Y		✓
<b>WATER QUALITY</b>									
<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	✓
<b>ECOLOGY</b>									
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 <sup>2</sup> 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		<b>Completed in October 2014</b>
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		✓
<b>LANDSCAPE AND VISUAL</b>									
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
<b>WASTE</b>									
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"> <li>- suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed;</li> <li>- Having a capacity of &lt;450L unless the specifications have been approved by the EPD; and</li> <li>- 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;</li> <li>- Enclosed with at least 3 sides;</li> <li>- 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;</li> </ul>	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"> <li>- Adequate ventilation;</li> <li>- Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and</li> <li>- Incompatible materials are adequately separated.</li> </ul>							
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		✓
<b>CULTURAL HERITAGE</b>									
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*

<b>Parameters</b>	<b>Action</b>	<b>Limit</b>
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)*

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

**Table D3** *Action and Limit Levels for Water Quality*

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

**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	
<b>Notes:</b>		
1.	STG means quarterly encounter rate of number of dolphin sightings, which is <b>6.00 in NEL</b> and <b>9.85 in NWL</b> during the baseline monitoring period	
2.	ANI means quarterly encounter rate of total number of dolphins, which is <b>22.19 in NEL</b> and <b>44.66 in NWL</b> 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 31 December 2017)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Air Quality Monitoring Schedule (1 to 31 December 2017)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Noise Monitoring Schedule (1 to 31 January 2018)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Air Quality Monitoring Schedule (1 to 31 January 2018)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	01-Jan	02-Jan	03-Jan	04-Jan	05-Jan	06-Jan
				1-hr TSP Monitoring 24-hr TSP Monitoring		
07-Jan	08-Jan	09-Jan	10-Jan	11-Jan	12-Jan	13-Jan
			1-hr TSP Monitoring 24-hr TSP Monitoring			
14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
		1-hr TSP Monitoring 24-hr TSP Monitoring				
21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
28-Jan	29-Jan	30-Jan	31-Jan			
			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 28 February 2018)**

Alternative Noise Monitoring at Pak Mong Village Entrance

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Air Quality Monitoring Schedule (1 to 28 February 2018)**

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				01-Feb	02-Feb	03-Feb
04-Feb	05-Feb	06-Feb	07-Feb	08-Feb	09-Feb	10-Feb
		1-hr TSP Monitoring 24-hr TSP Monitoring				
11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb
			1-hr TSP Monitoring 24-hr TSP Monitoring			
25-Feb	26-Feb	27-Feb	28-Feb			
		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 (December 2017)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Dec	2-Dec
					ebb tide 9:02 - 12:32 flood tide 15:09 - 18:39	
3-Dec	4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec
	ebb tide 11:36 - 15:06 flood tide 6:04 - 9:34		ebb tide 13:16 - 16:46 flood tide 7:54 - 11:24		ebb tide 15:01 - 18:31 flood tide 9:44 - 13:14	
10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec
	ebb tide 5:19 - 8:49 flood tide 12:53 - 16:23		ebb tide 7:49 - 11:19 flood tide 14:12 - 17:42		ebb tide 9:39 - 13:09 flood tide 4:08 - 7:38	
17-Dec	18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec
	ebb tide 11:32 - 15:02 flood tide 6:15 - 9:45		ebb tide 12:40 - 16:10 flood tide 7:25 - 10:55		ebb tide 13:50 - 17:20 flood tide 8:34 - 12:04	
24-Dec	25-Dec	26-Dec	27-Dec	28-Dec	29-Dec	30-Dec
	ebb tide 16:29 - 19:59 flood tide 10:48 - 14:18		ebb tide 4:51 - 8:21 flood tide 12:24 - 15:54		ebb tide 7:27 - 10:57 flood tide 13:45 - 17:15	
31-Dec						



**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Marine Water Quality Monitoring (WQM) Schedule (January 2018)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan
	ebb tide 10:36 - 14:06 flood tide 5:11 - 8:41		ebb tide 12:17 - 15:47 flood tide 6:55 - 10:25		ebb tide 13:51 - 17:21 flood tide 8:29 - 11:59	
7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan
	WQM at the following monitoring stations are cancelled due to adverse weather: Flood tide: IS(Mf)9 and CS(Mf)3(N) Ebb tide: All monitoring stations		ebb tide 5:47 - 9:17 flood tide 12:33 - 16:03		ebb tide 8:25 - 11:55 flood tide 13:57 - 17:27	
14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
	ebb tide 10:40 - 14:10 flood tide 5:31 - 9:01		ebb tide 11:47 - 15:17 flood tide 6:35 - 10:05		ebb tide 12:52 - 16:22 flood tide 7:32 - 11:02	
21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan
	ebb tide 14:45 - 18:15 flood tide 9:00 - 12:30		ebb tide 16:45 - 20:15 flood tide 10:20 - 13:50		ebb tide 5:30 - 9:00 flood tide 11:58 - 15:28	
28-Jan	29-Jan	30-Jan	31-Jan			
	ebb tide 9:36 - 13:06 flood tide 4:16 - 7:46		ebb tide 11:19 - 14:49 flood tide 5:56 - 9:26			

**HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Marine Water Quality Monitoring (WQM) Schedule (February 2018)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
				1-Feb	2-Feb	3-Feb
					ebb tide 12:47 - 16:17 flood tide 7:19 - 10:49	
4-Feb	5-Feb	6-Feb	7-Feb	8-Feb	9-Feb	10-Feb
	ebb tide 14:54 - 18:24 flood tide 9:08 - 12:38		ebb tide 16:49 - 20:19 flood tide 10:16 - 13:46		ebb tide 6:15 - 9:45 flood tide 11:53 - 15:23	
11-Feb	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	17-Feb
	ebb tide 9:52 - 13:18 flood tide 4:46 - 8:16		ebb tide 10:57 - 14:27 flood tide 5:40 - 9:10			WQM is cancelled due to suspension of marine works during holidays
18-Feb	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	24-Feb
	WQM is cancelled due to suspension of marine works during holidays		ebb tide 14:51 - 18:21 flood tide 8:33 - 12:03		ebb tide 16:53 - 20:23 flood tide 9:50 - 13:20	
25-Feb	26-Feb	27-Feb	28-Feb			
	ebb tide 8:35 - 12:04 flood tide 13:37 - 17:07		ebb tide 10:25 - 13:55 flood tide 4:54 - 8:24			

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Dolphin Monitoring Survey Schedule (1 to 31 December 2017)**

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

**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Dolphin Monitoring Survey Schedule (1 to 31 January 2018)**

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

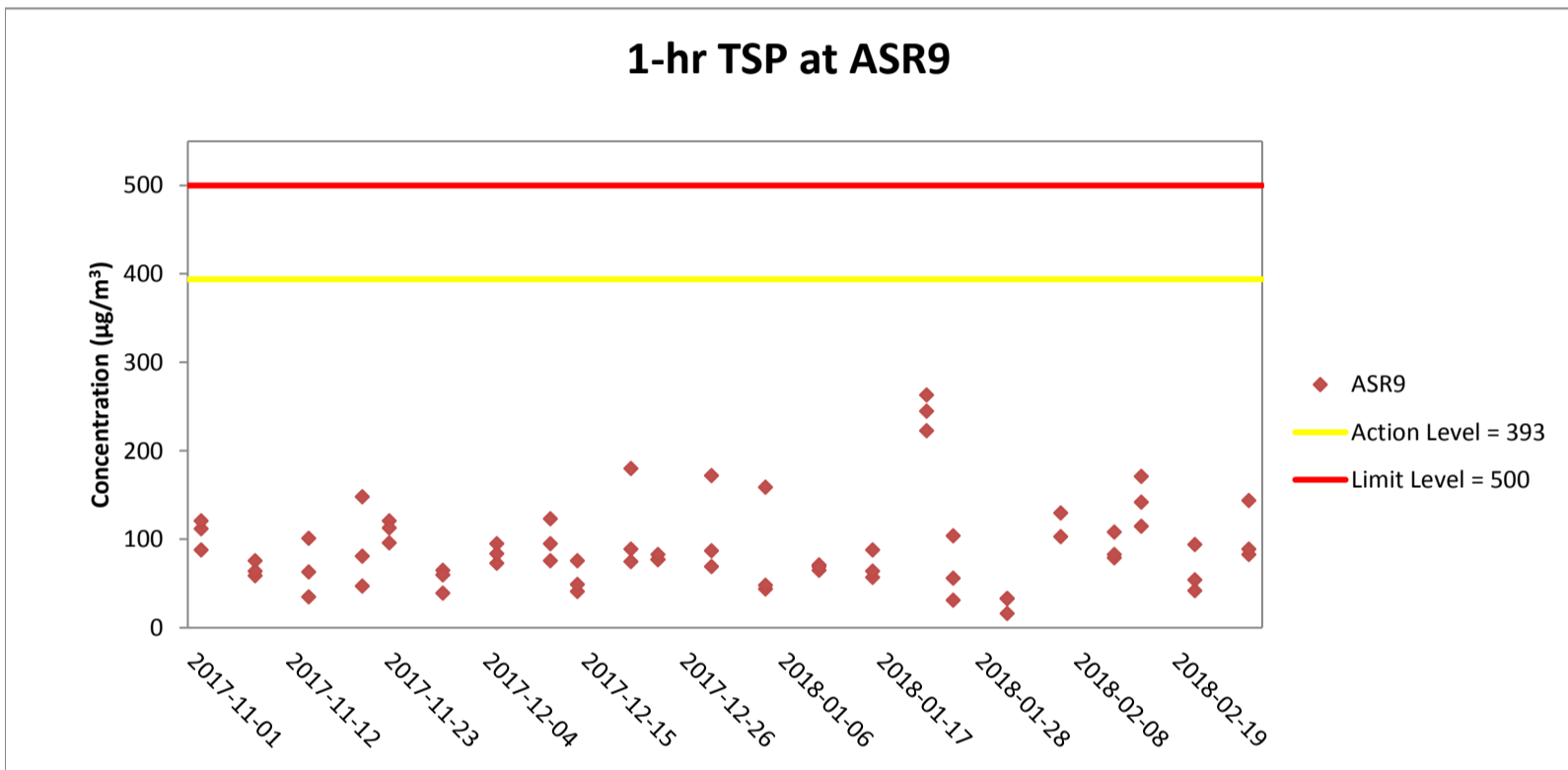
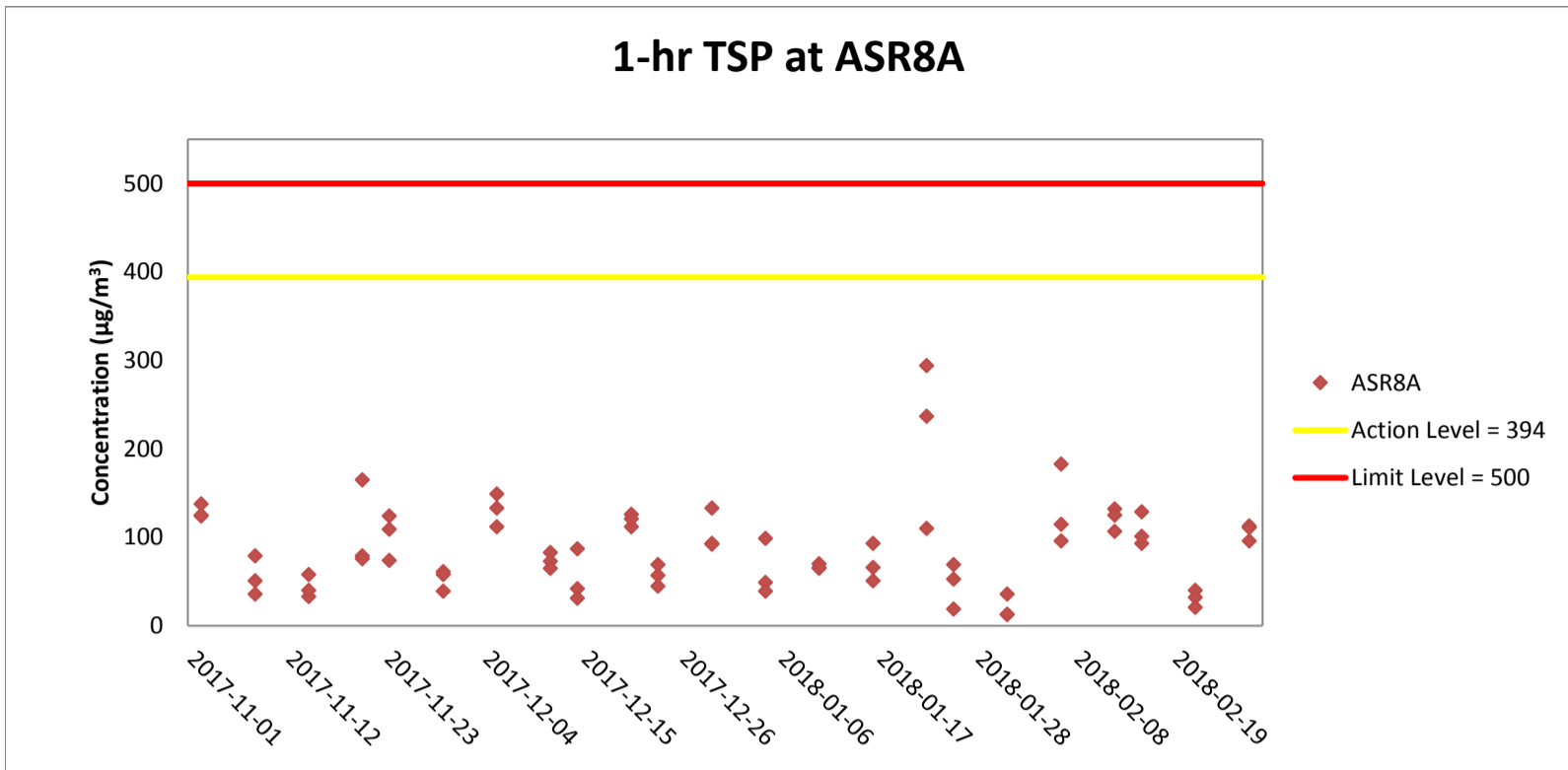
**HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section  
Impact Dolphin Monitoring Survey Schedule (1 to 28 February 2018)**

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

Appendix F

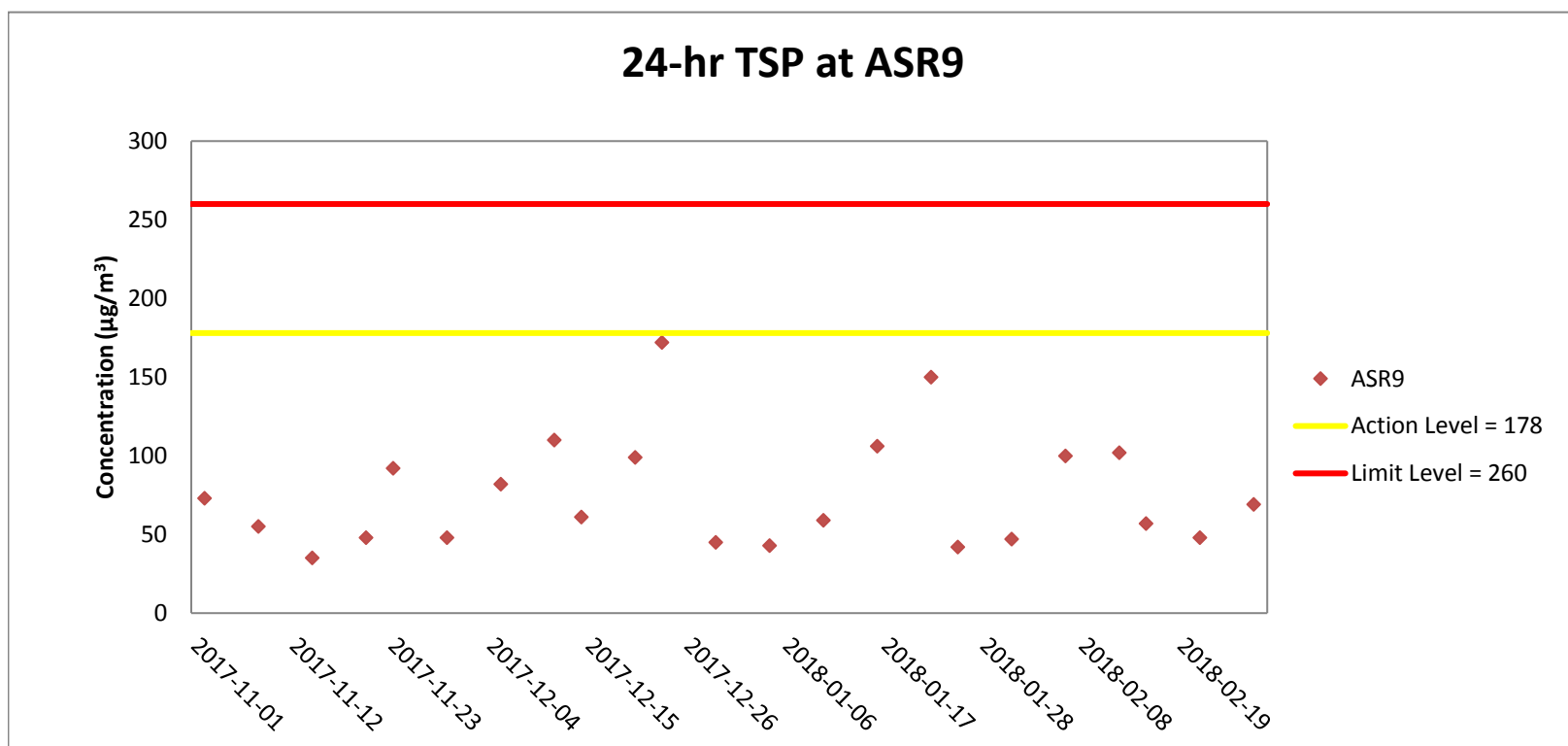
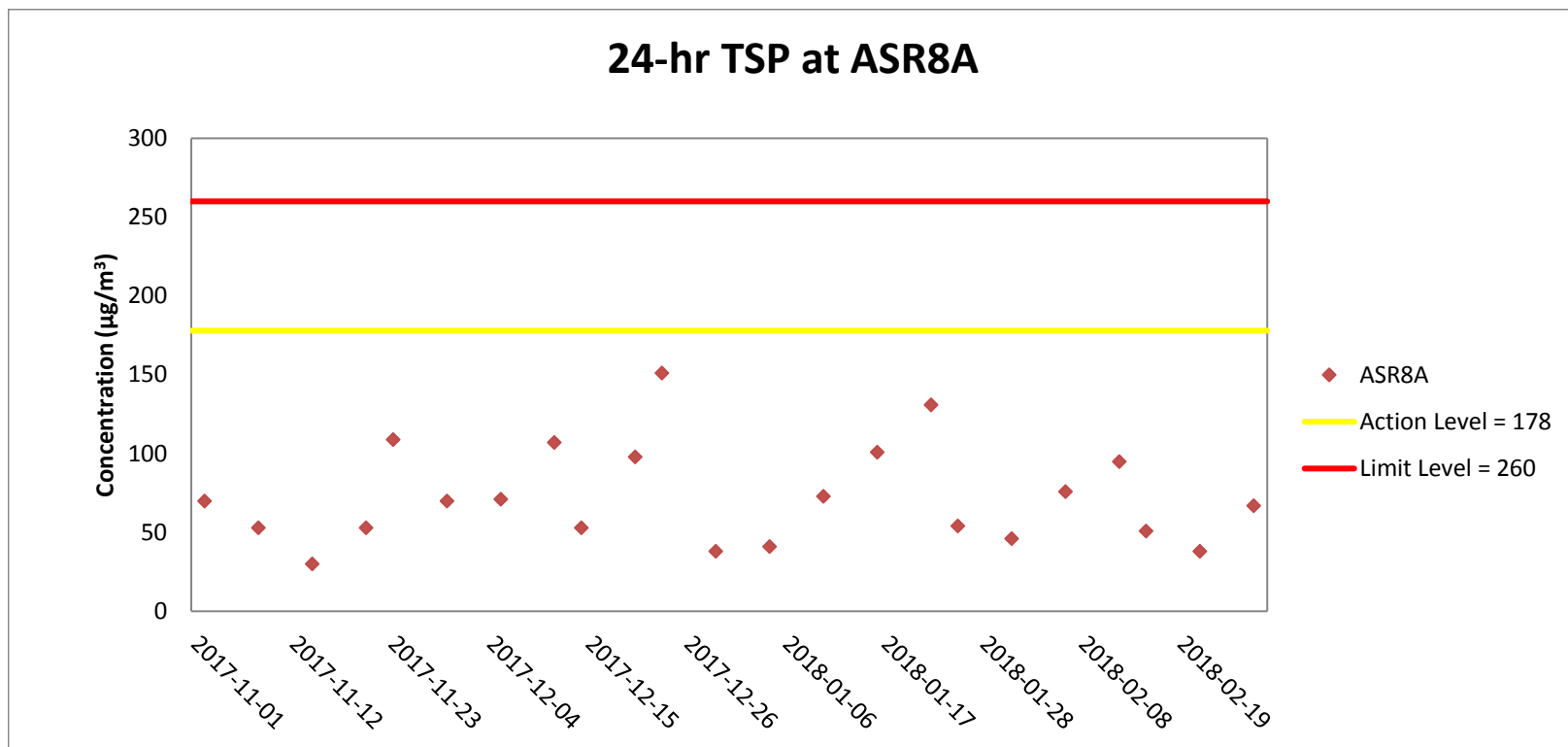
Impact Air Quality  
Monitoring Graphical  
Presentation





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; Asphalt paving; Sign gantries construction; Parapet installation; and Slope work of Viaducts A, B, C & D.



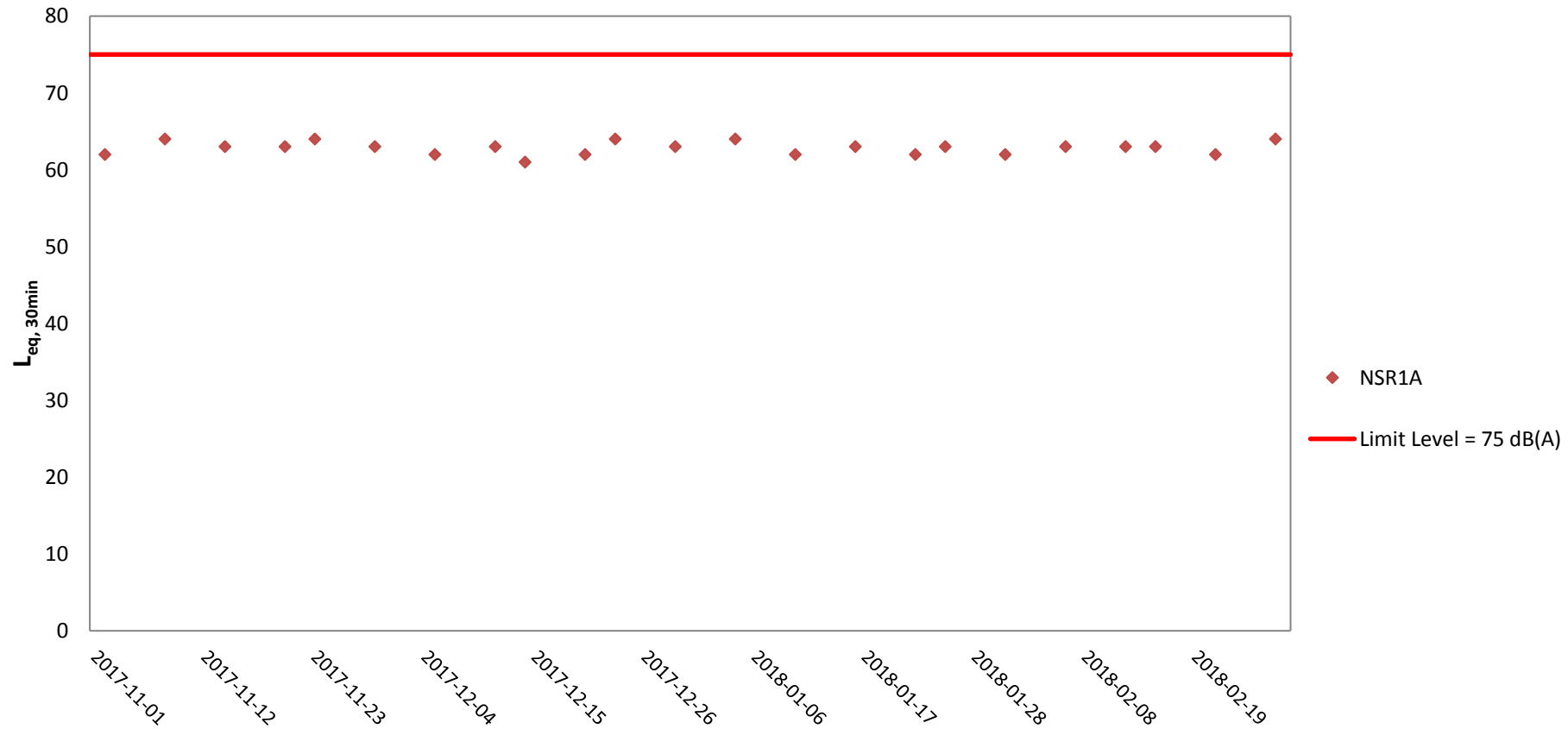
Weather condition within the reporting period varied between sunny to rainy.

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; Asphalt paving; Sign gantries construction; Parapet installation; and Slope work of Viaducts A, B, C & D.

Appendix G

## Impact Noise Monitoring Graphical Presentation

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

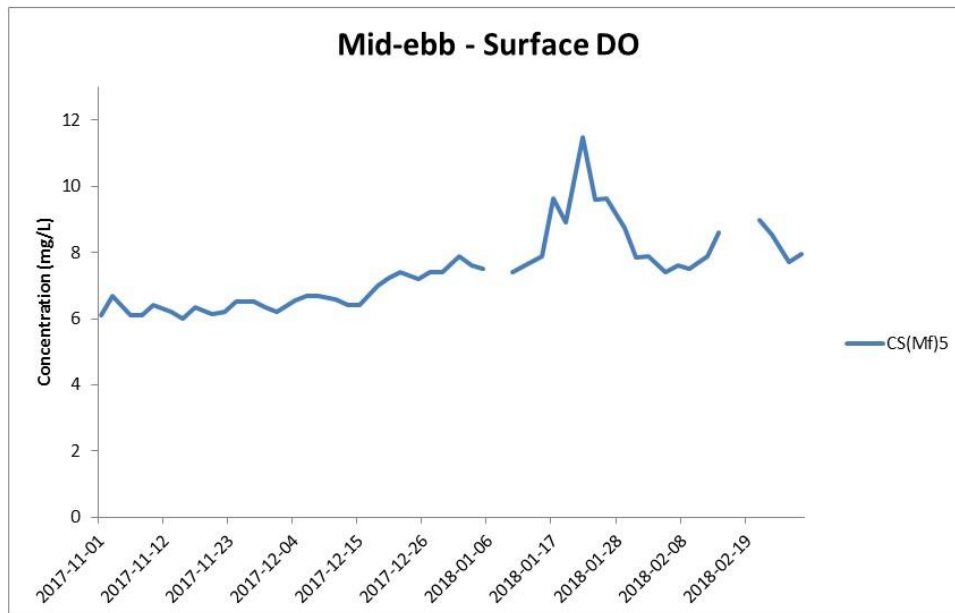
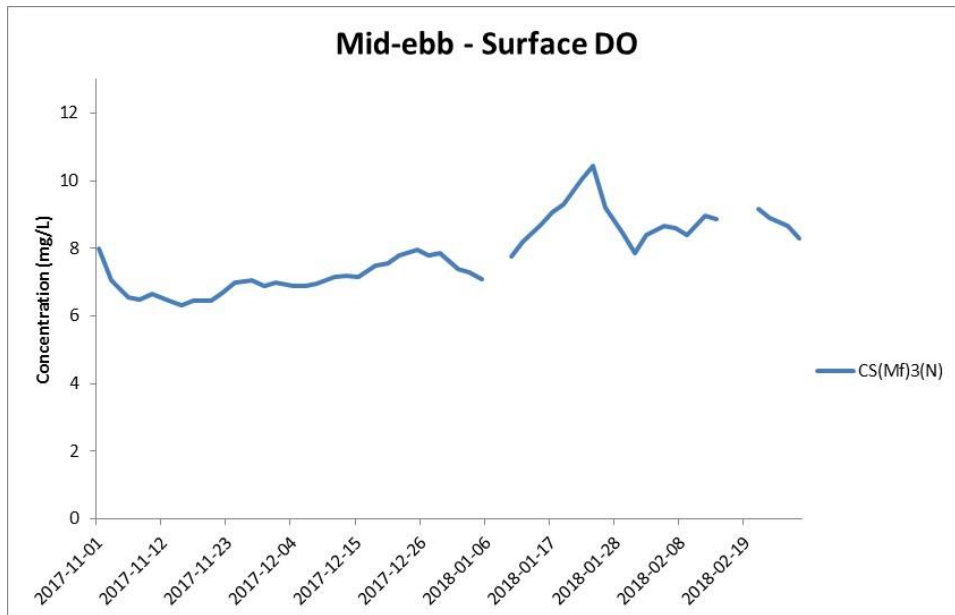


*Weather condition within the reporting period varied between sunny to rainy.*

*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; Asphalt paving; Sign gantries construction; Parapet installation; and Slope work of Viaducts A, B, C & D.*

Appendix H

# Impact Water Quality Monitoring Graphical Presentation



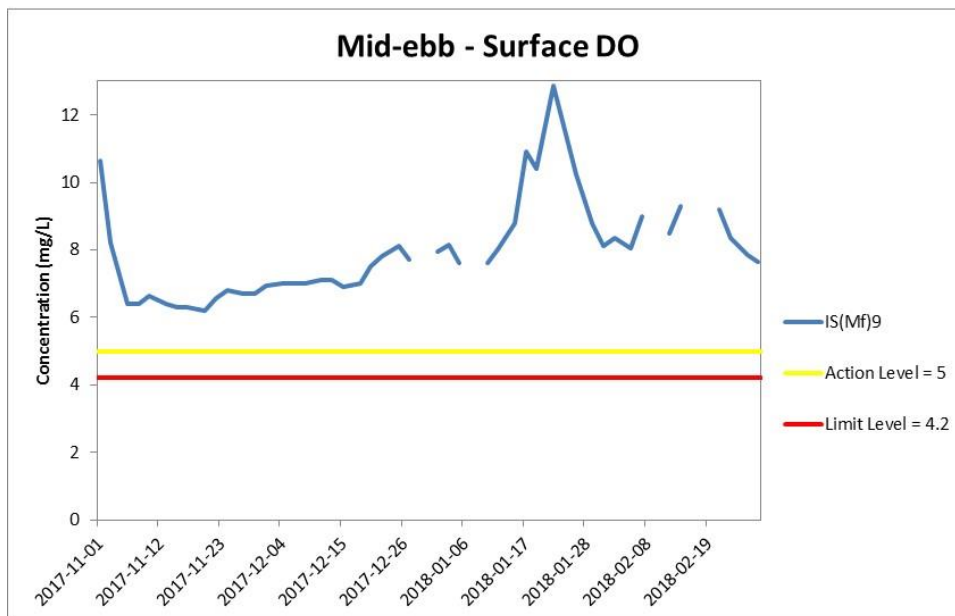
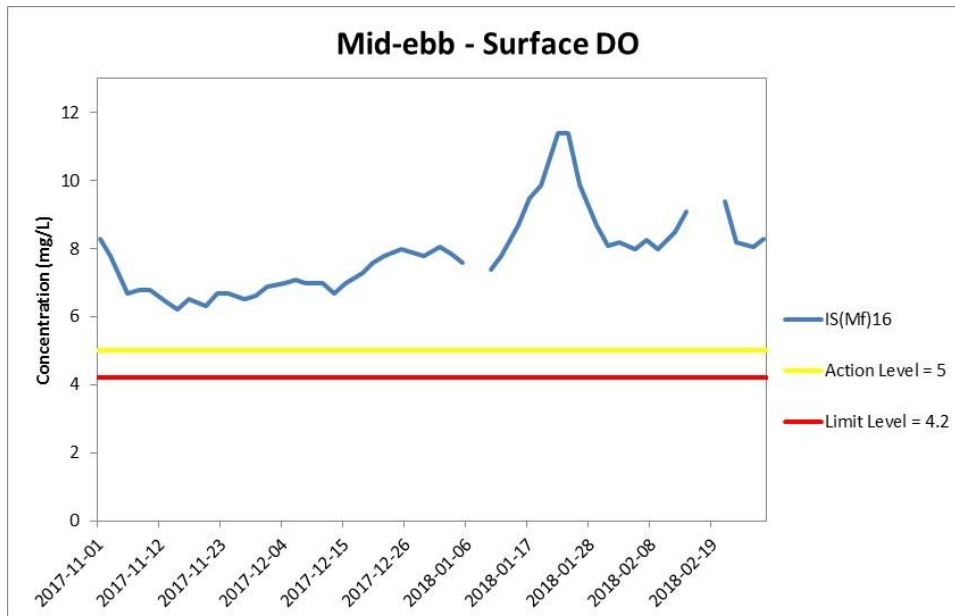
**Figure H1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





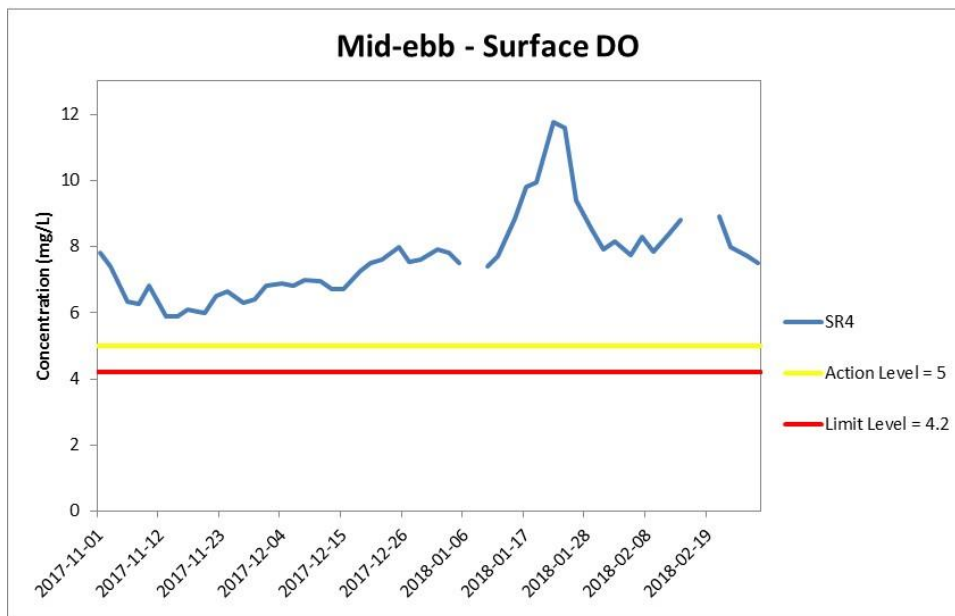
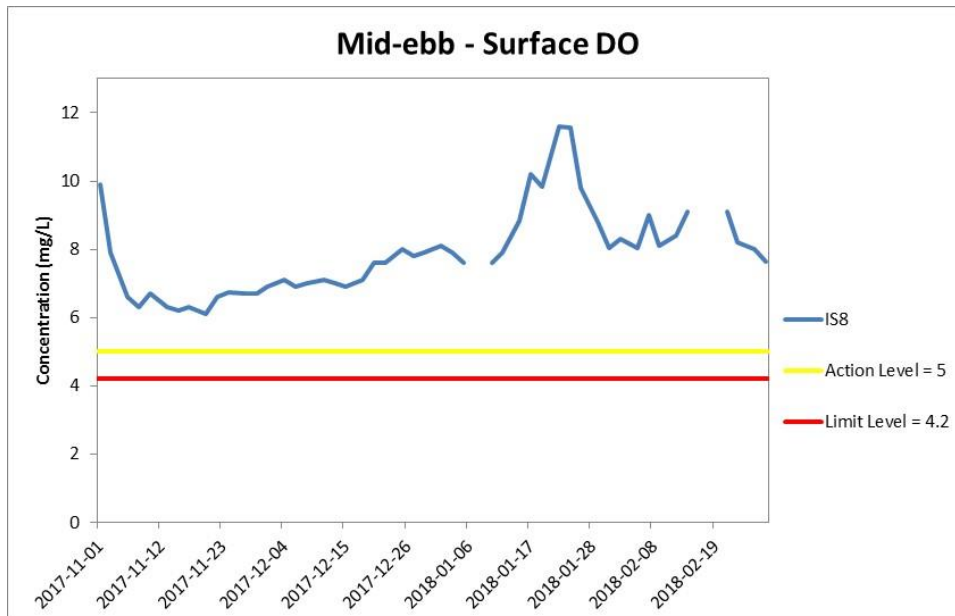


**Figure H2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)* WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



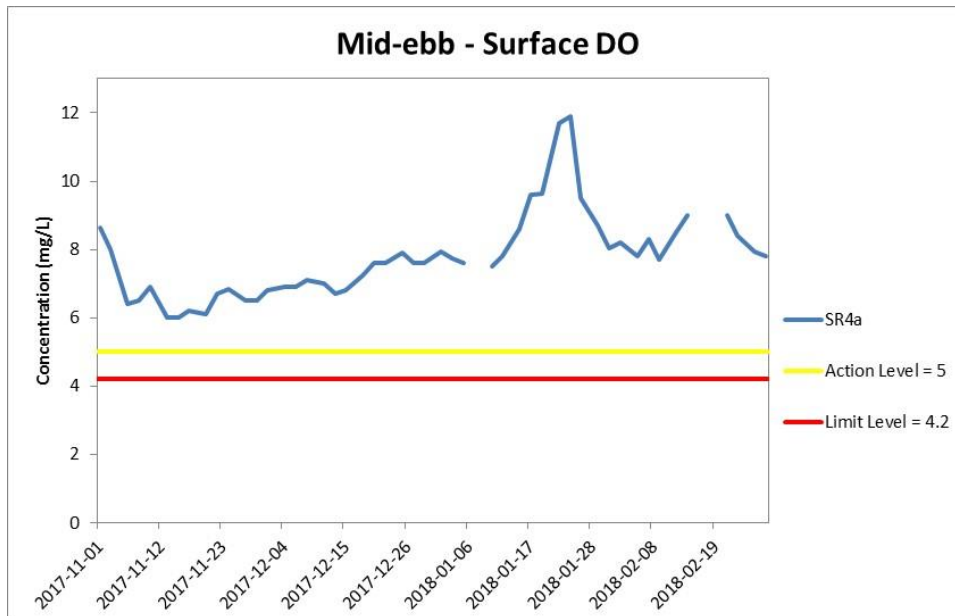


**Figure H3 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



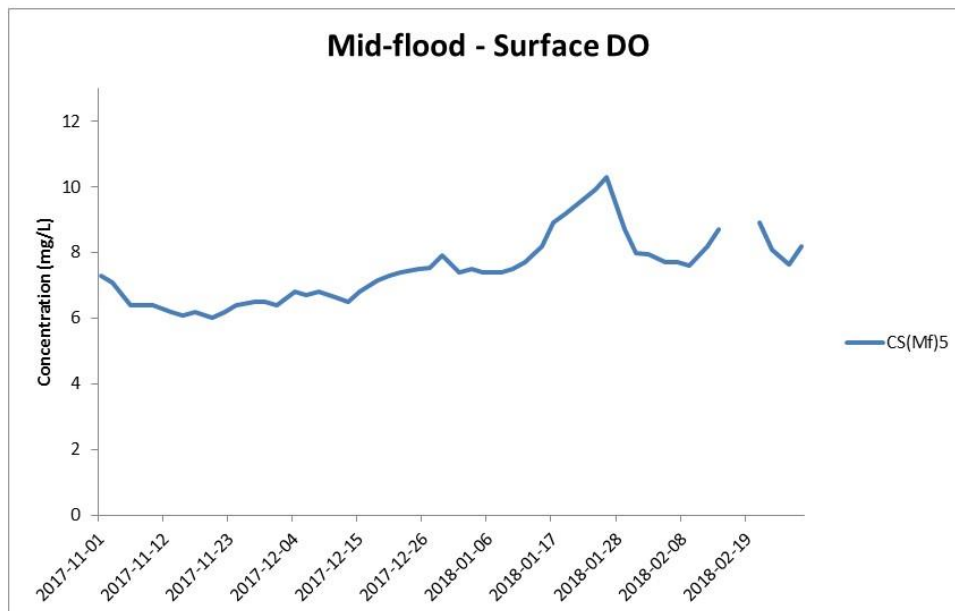
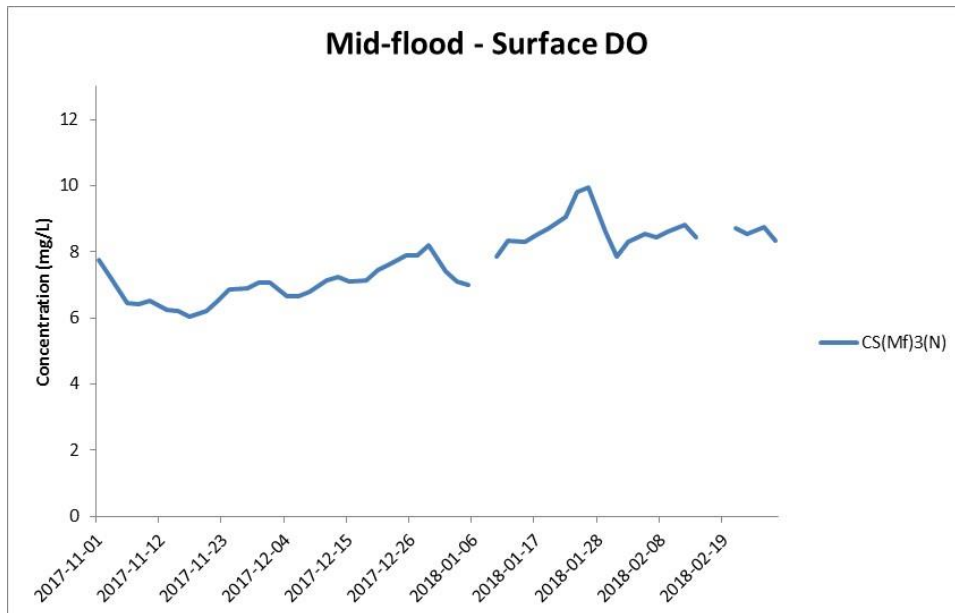


**Figure H4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



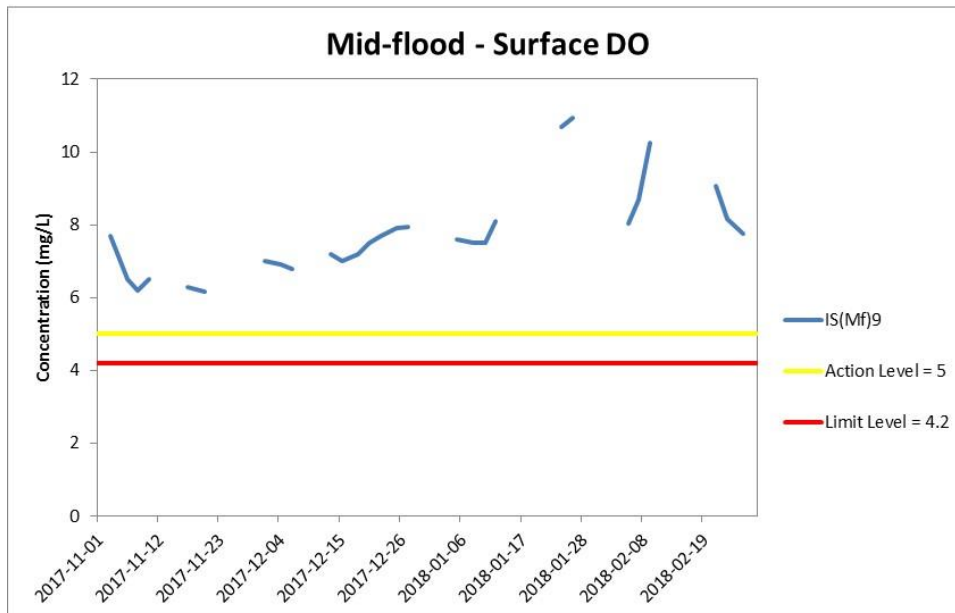
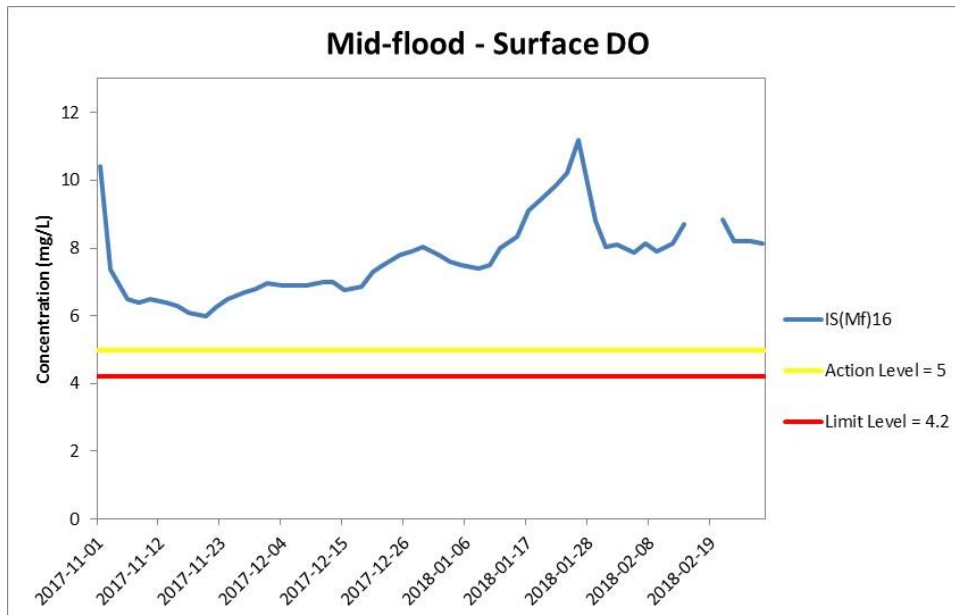


**Figure H5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





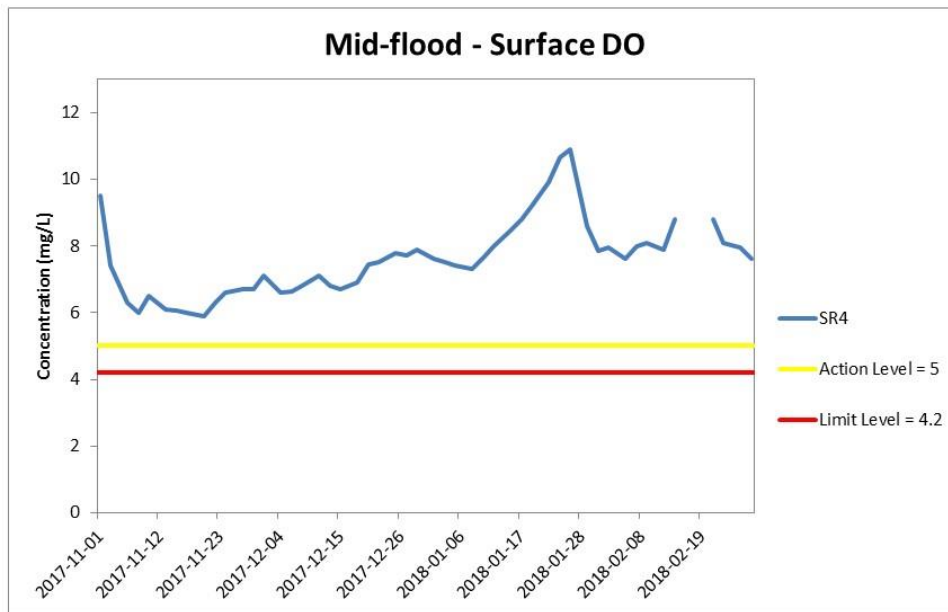
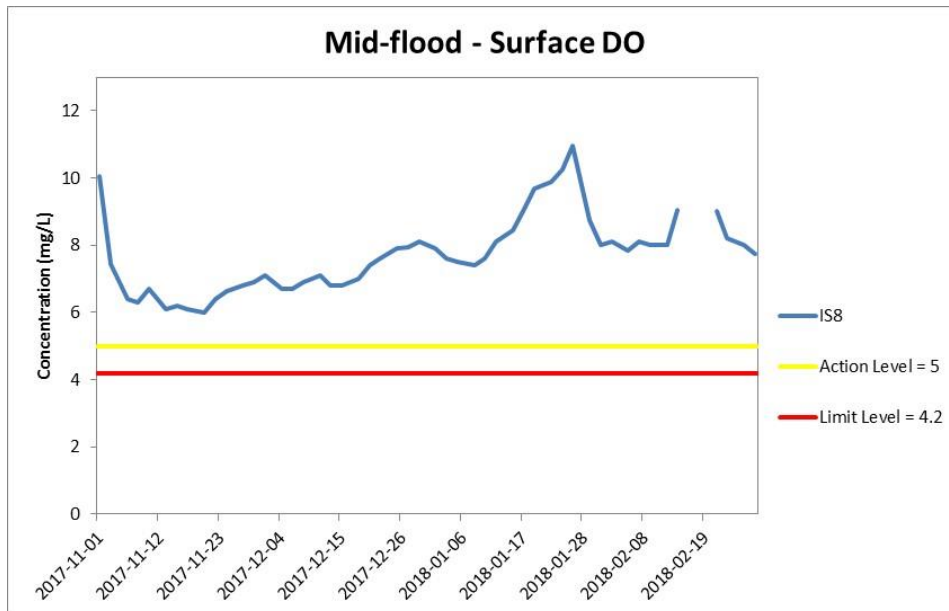
**Figure H6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

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

*WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.*

**Environmental  
Resources  
Management**





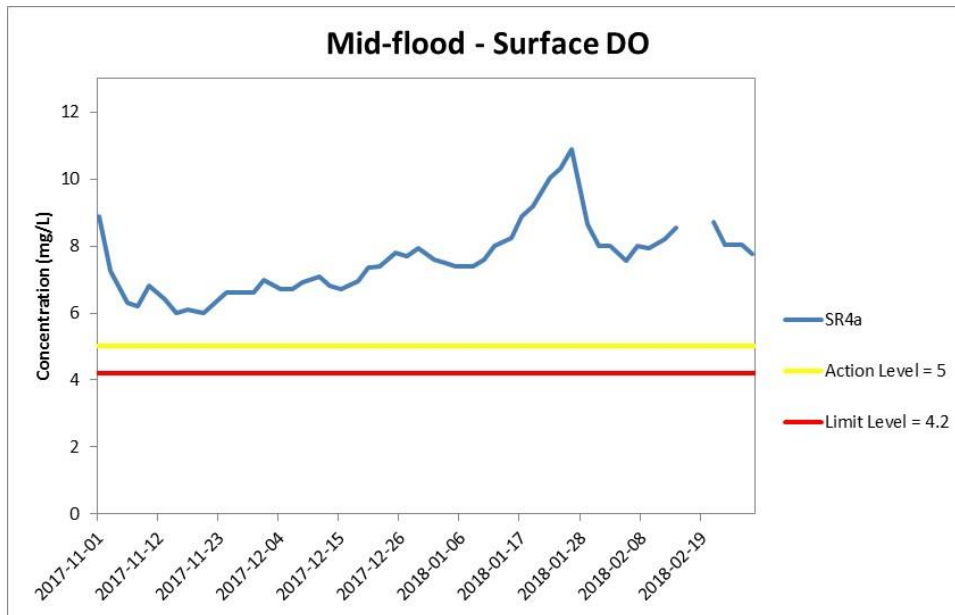
**Figure H7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)* WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





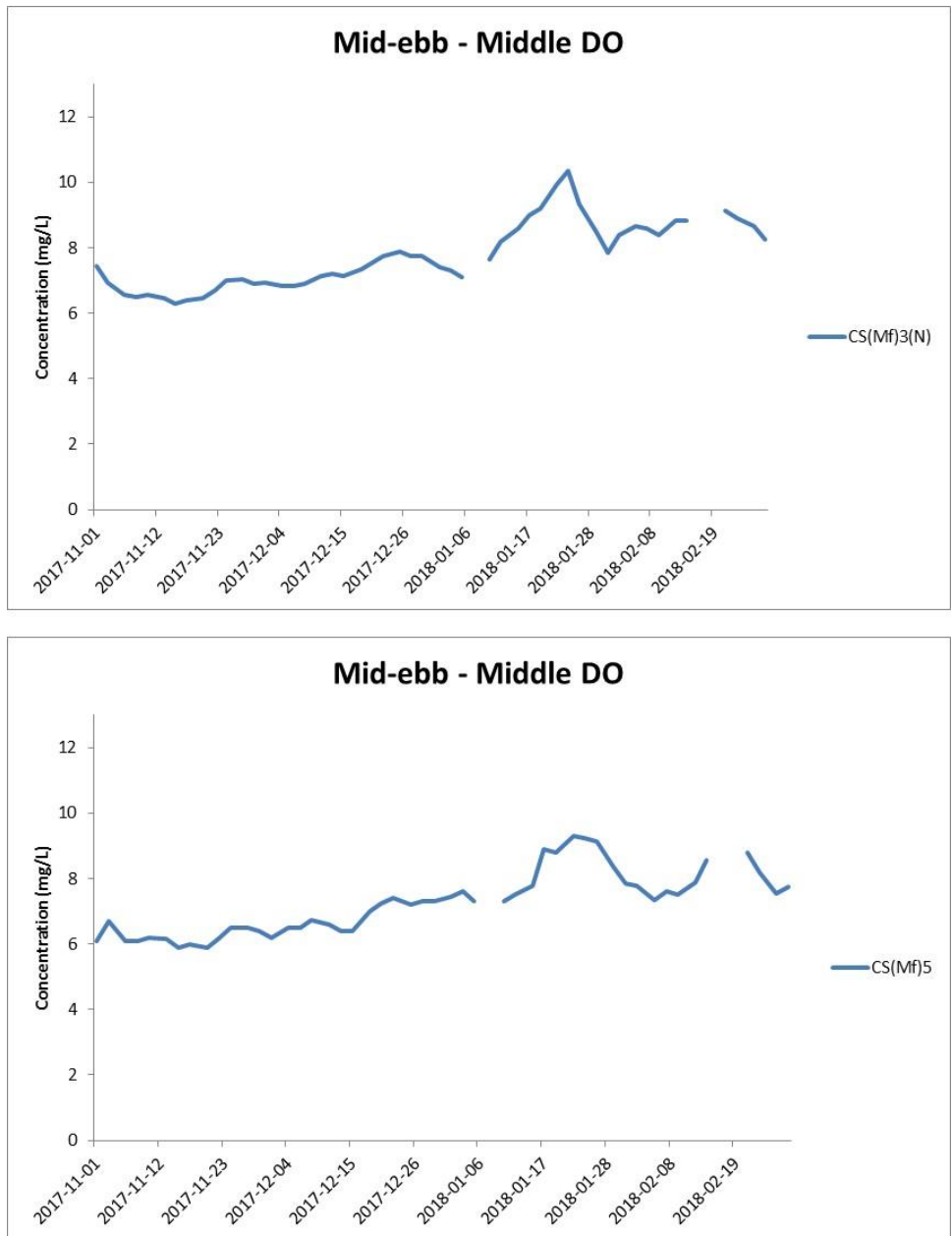


**Figure H8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



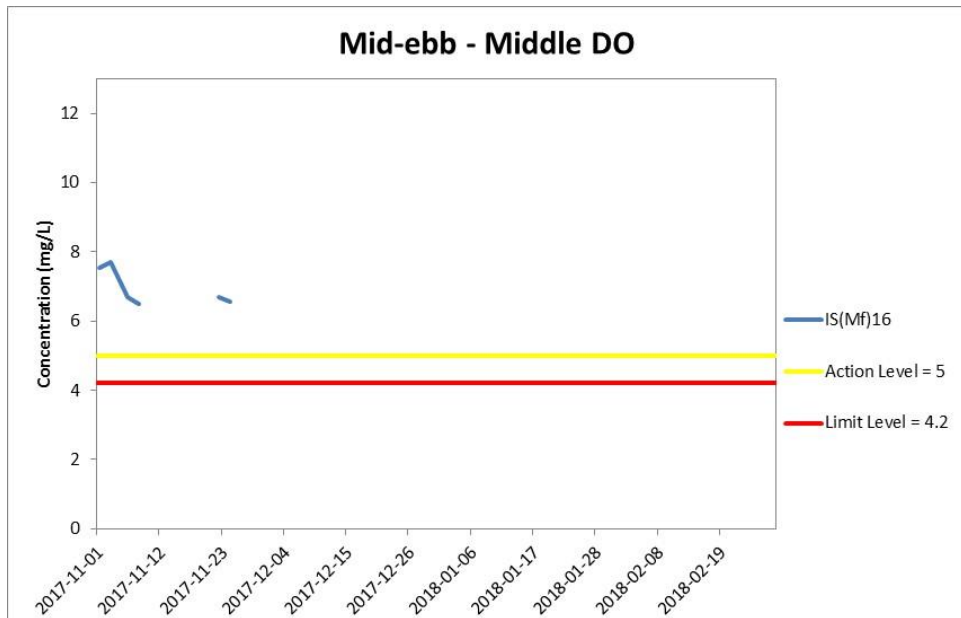


**Figure H9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



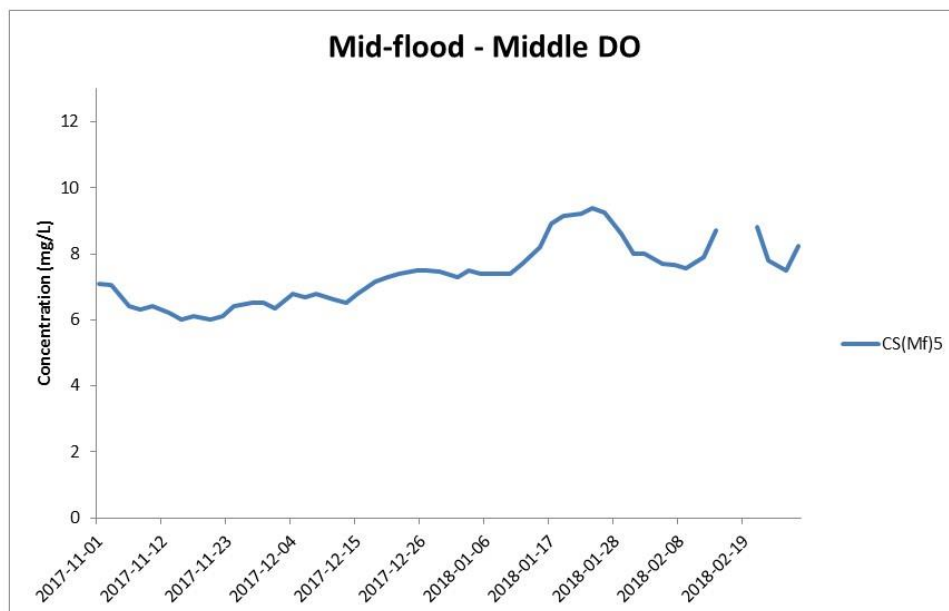
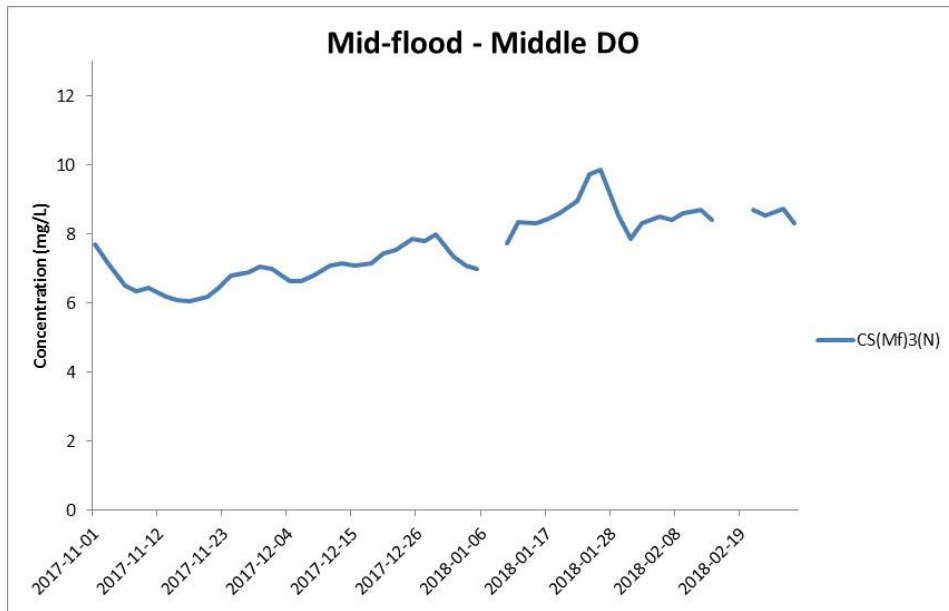


**Figure H10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS(Mf)16.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



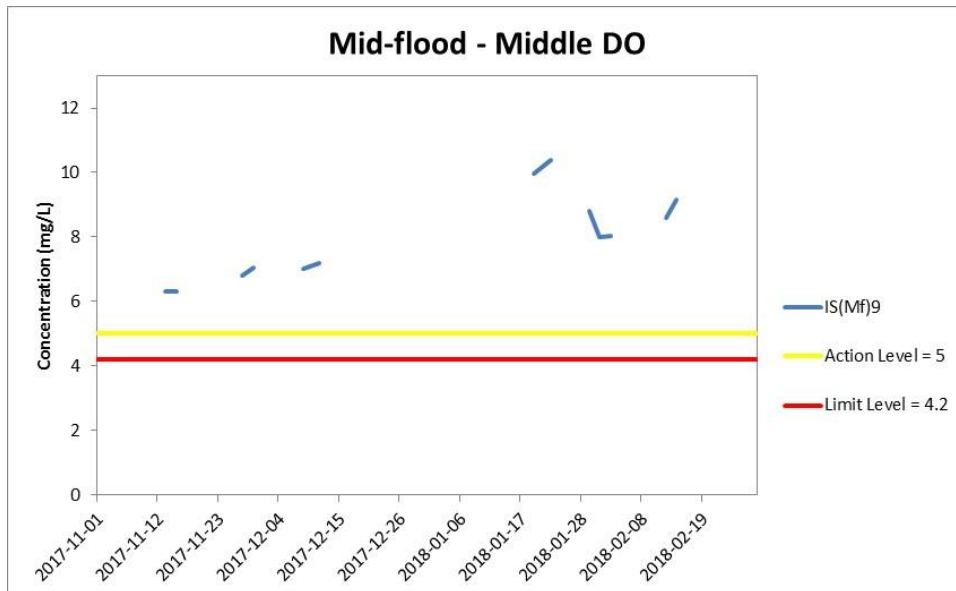


**Figure H11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



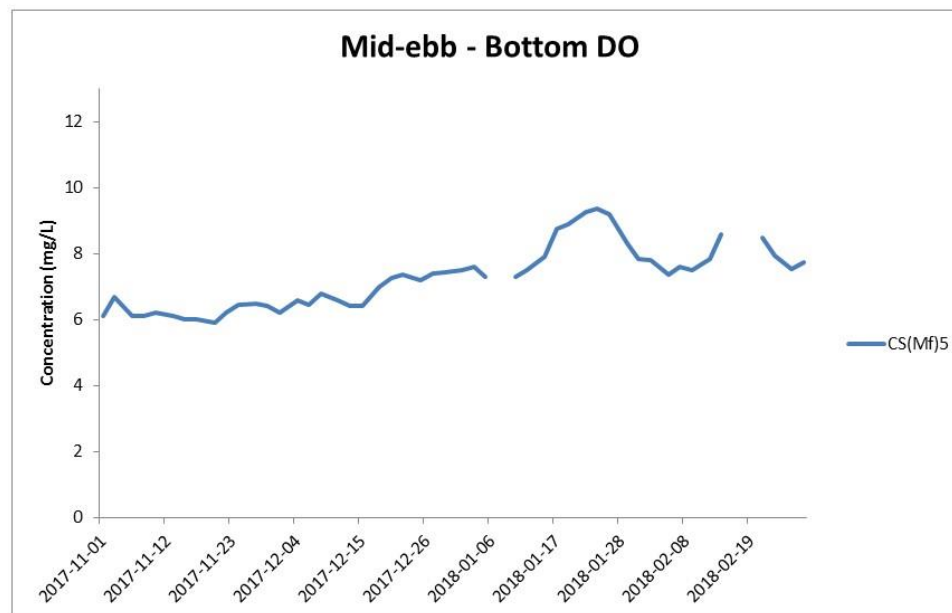
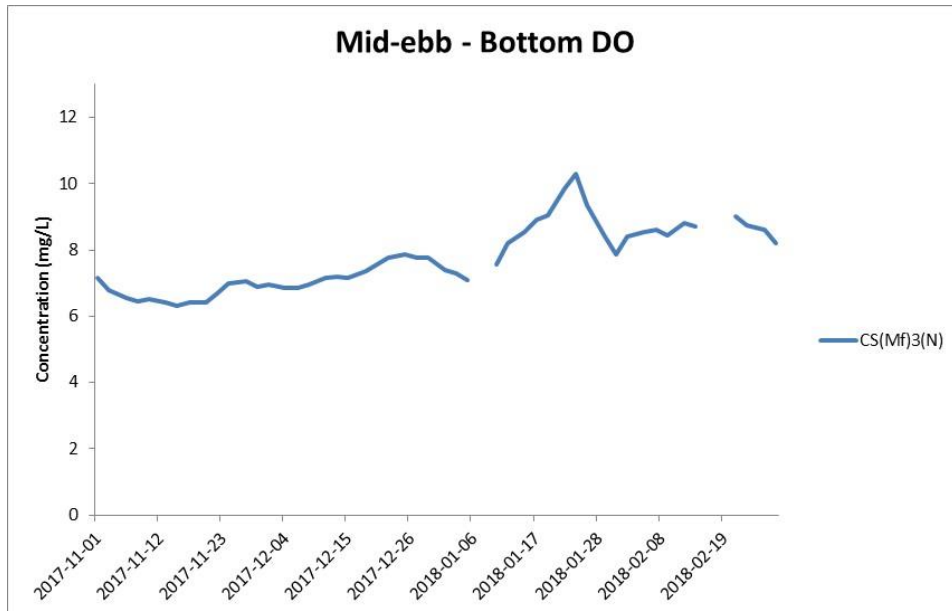


**Figure H12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 December 2017 and 28 February 2018 at IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





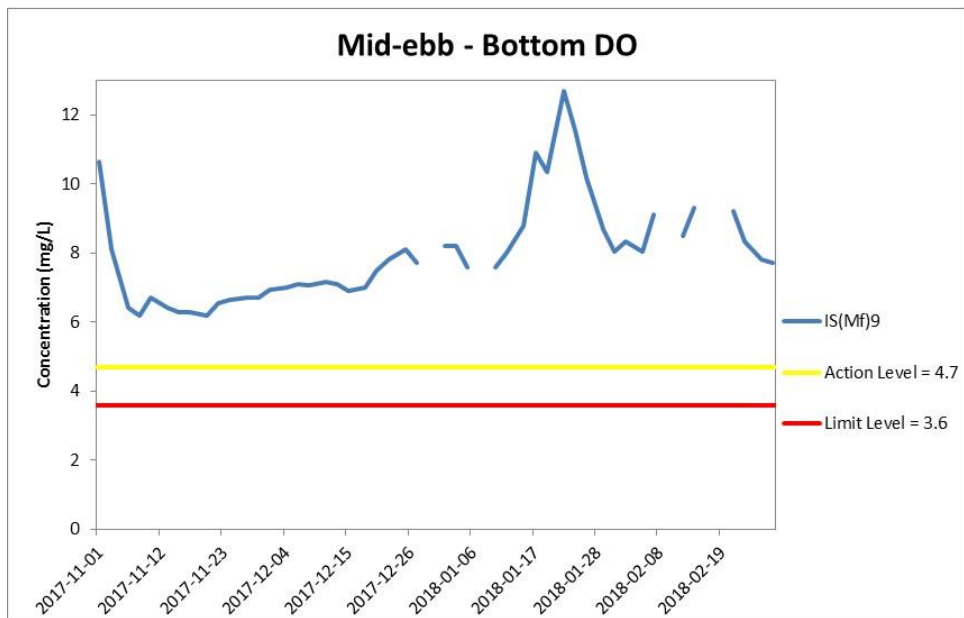
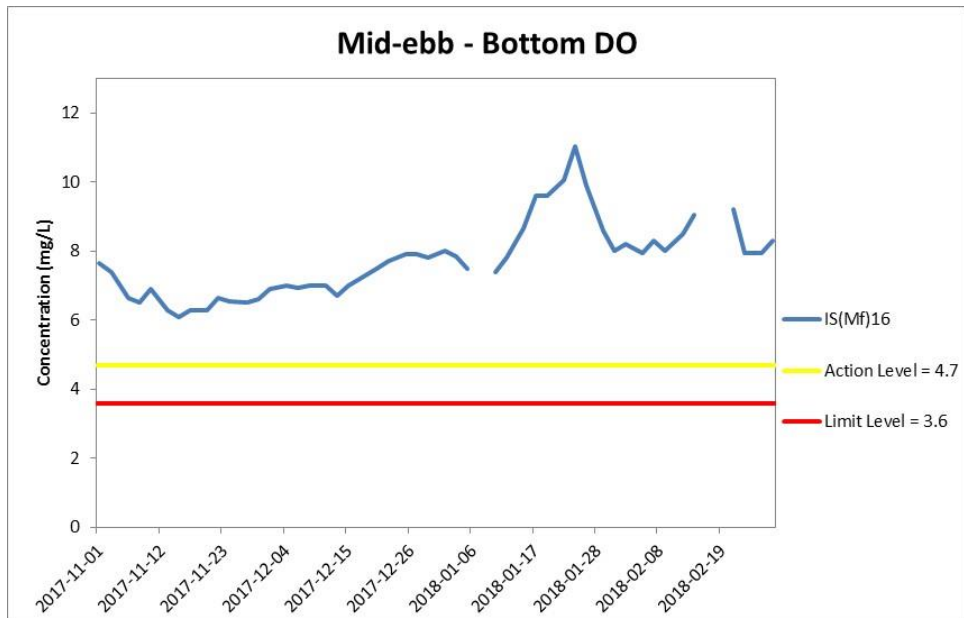
**Figure H13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





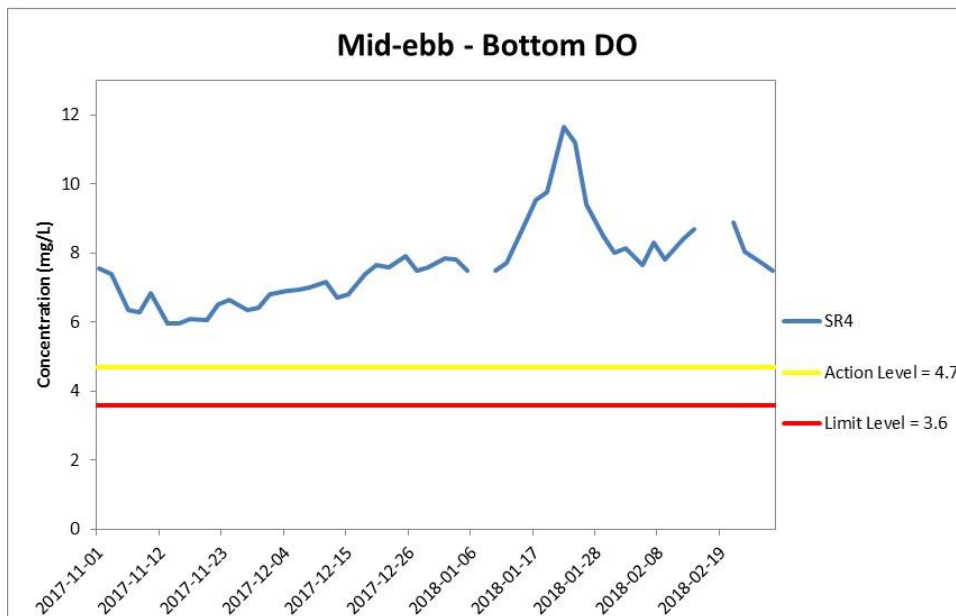
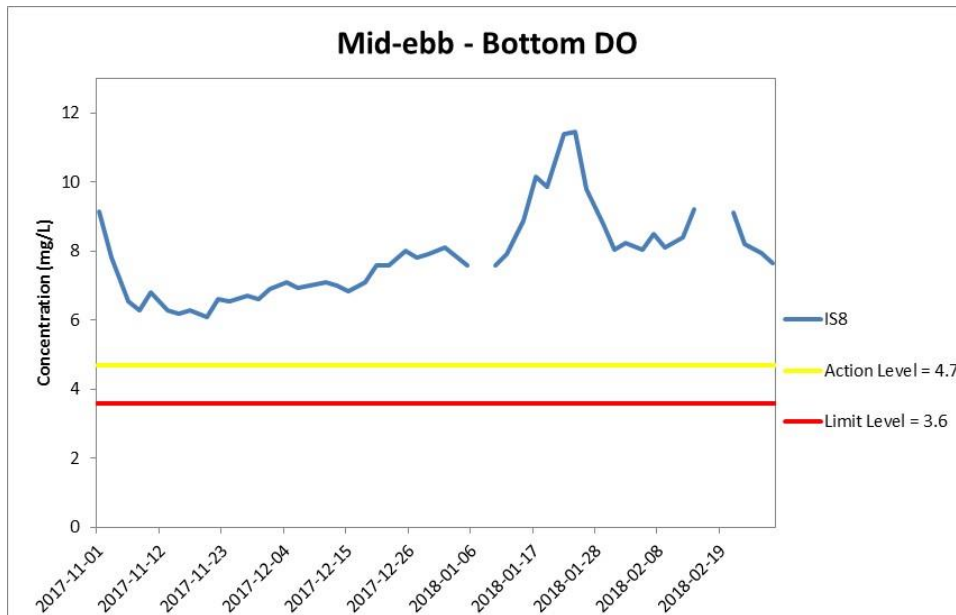


**Figure H14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



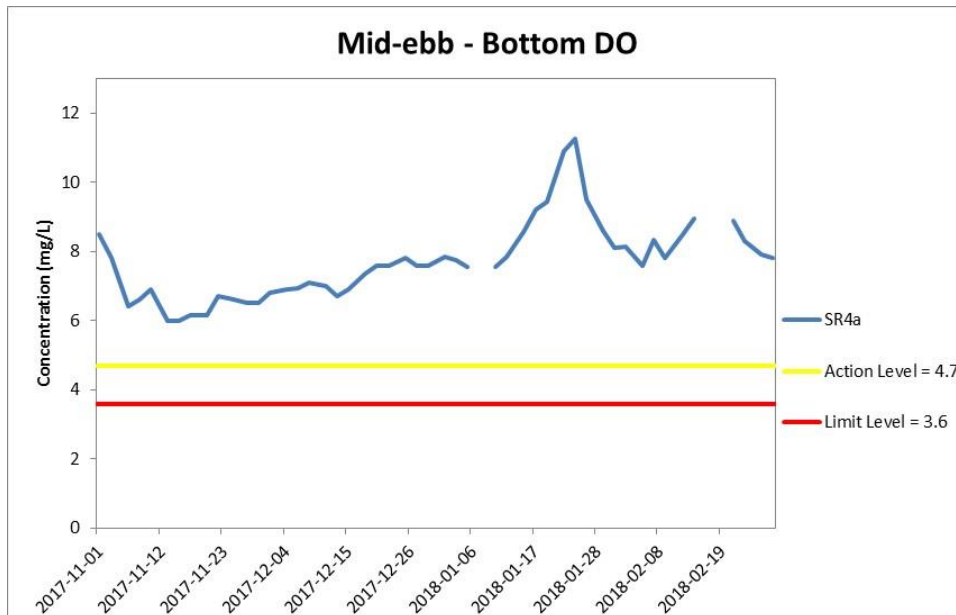


**Figure H15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



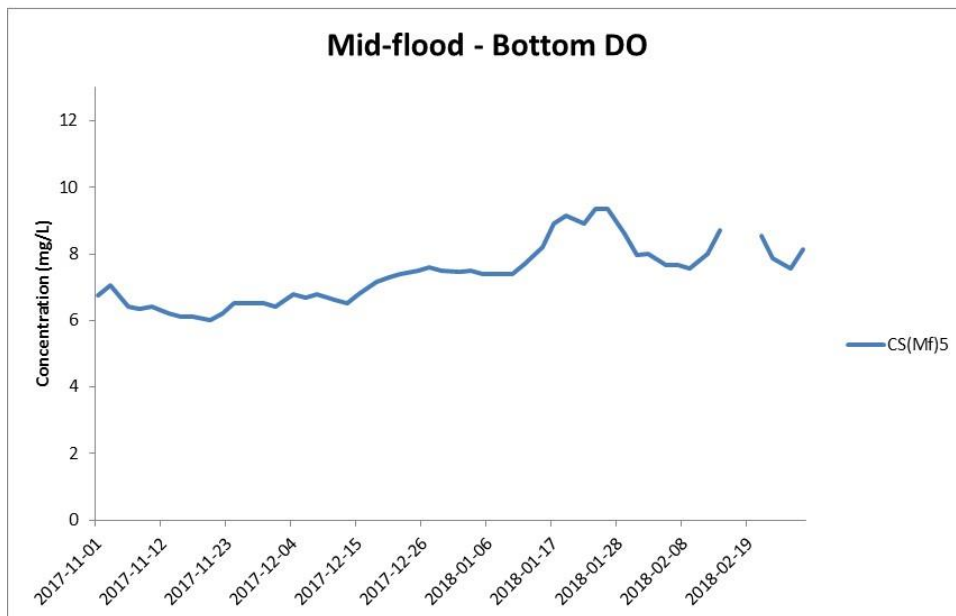
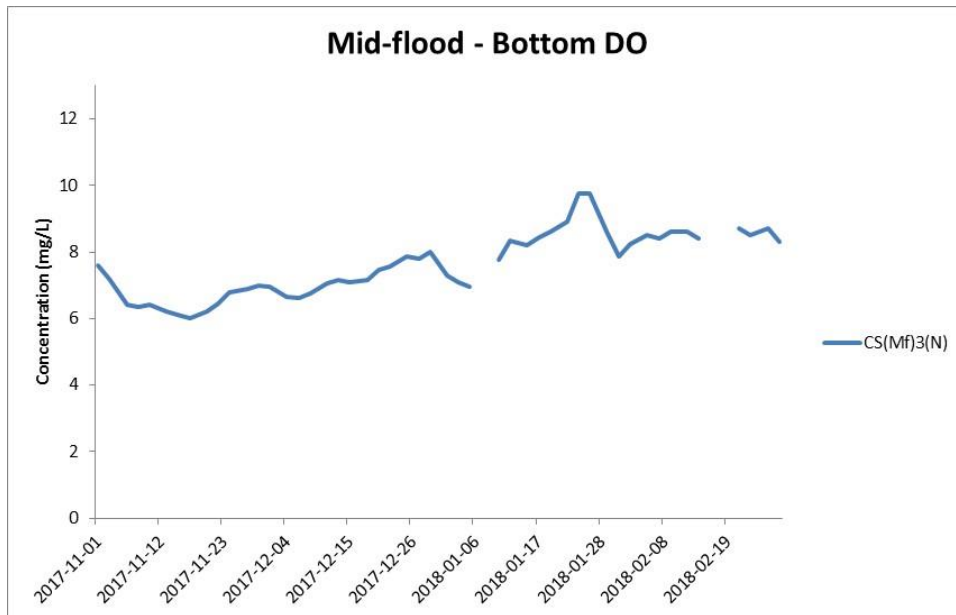


**Figure H16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



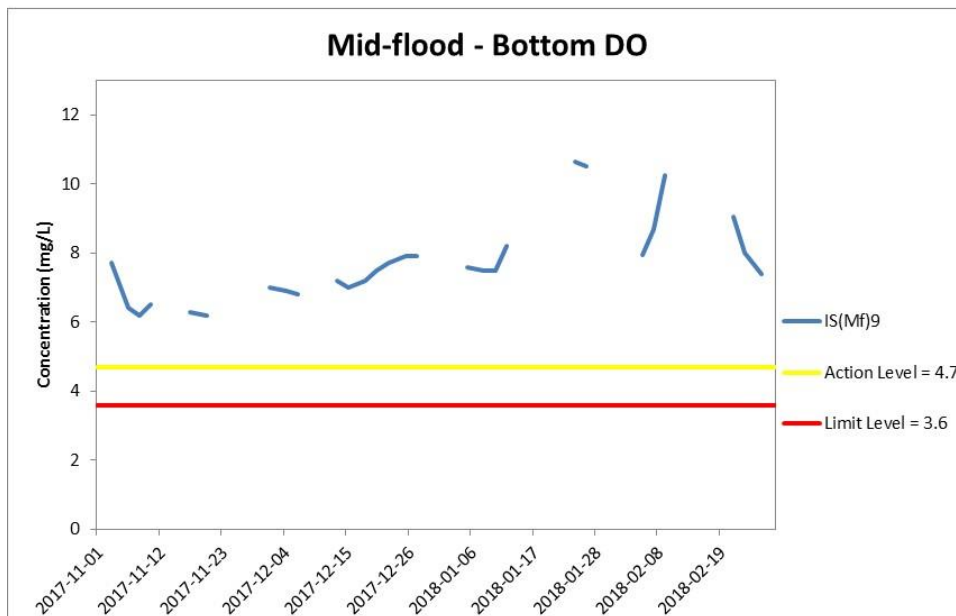
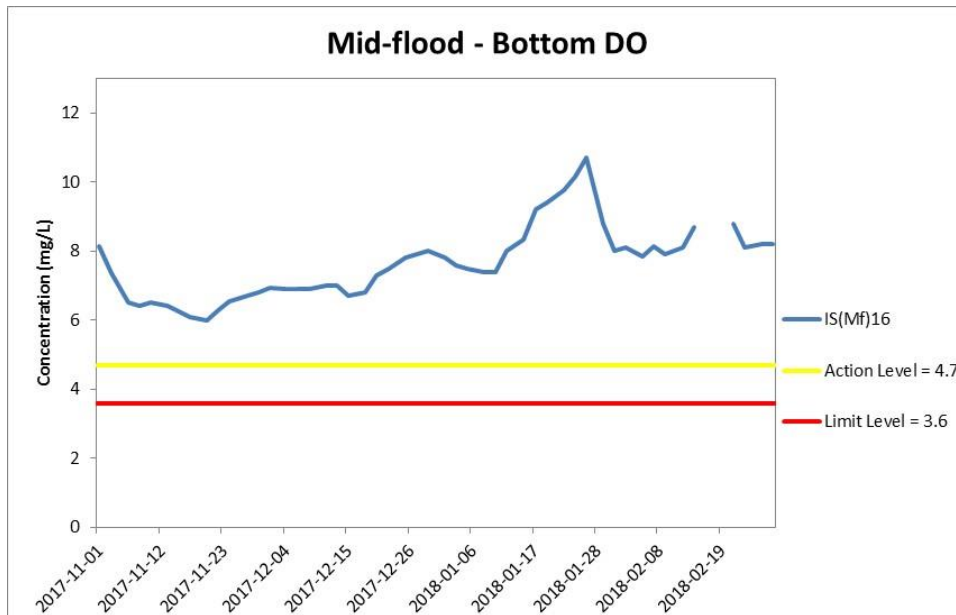


**Figure H17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



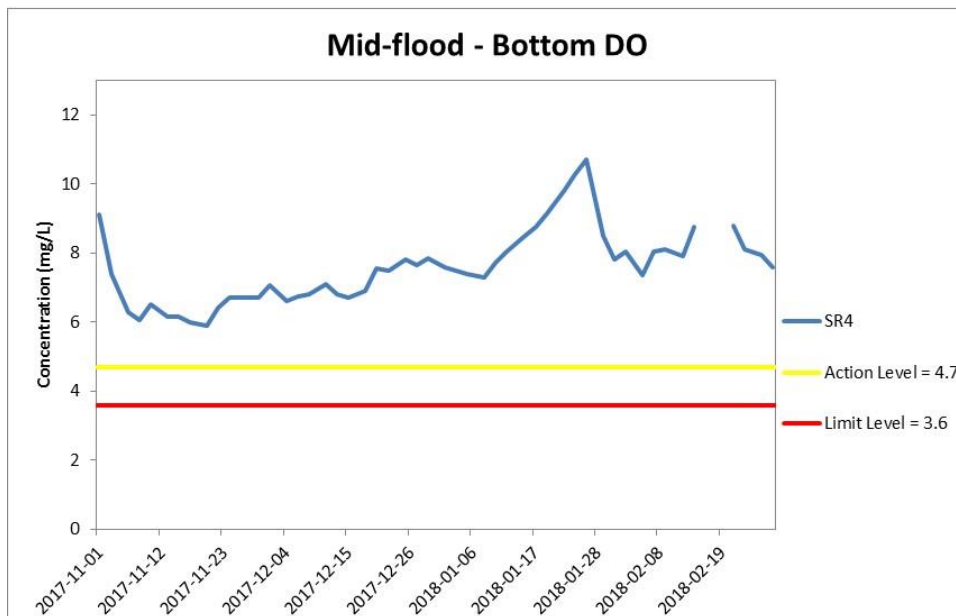
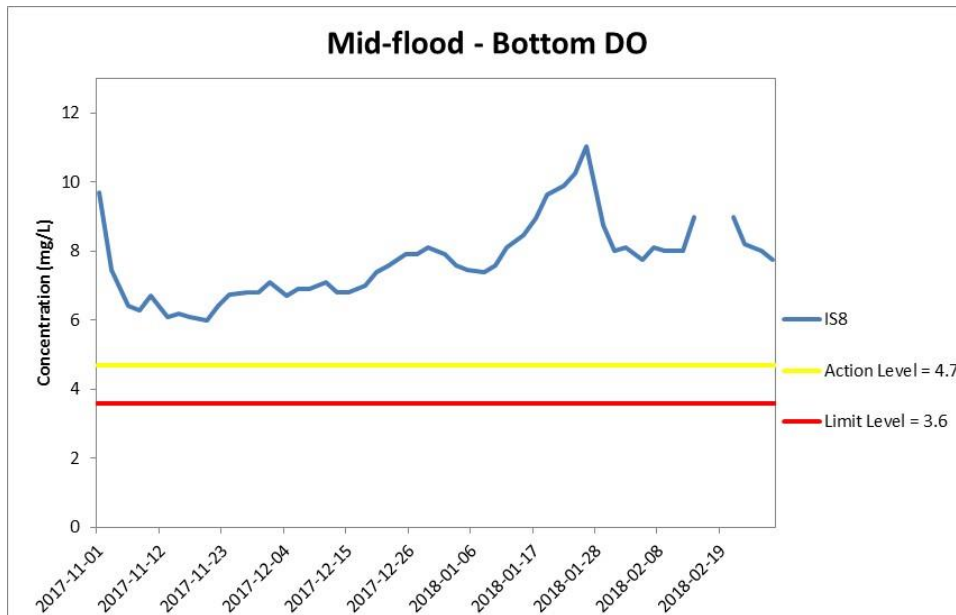


**Figure H18 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**





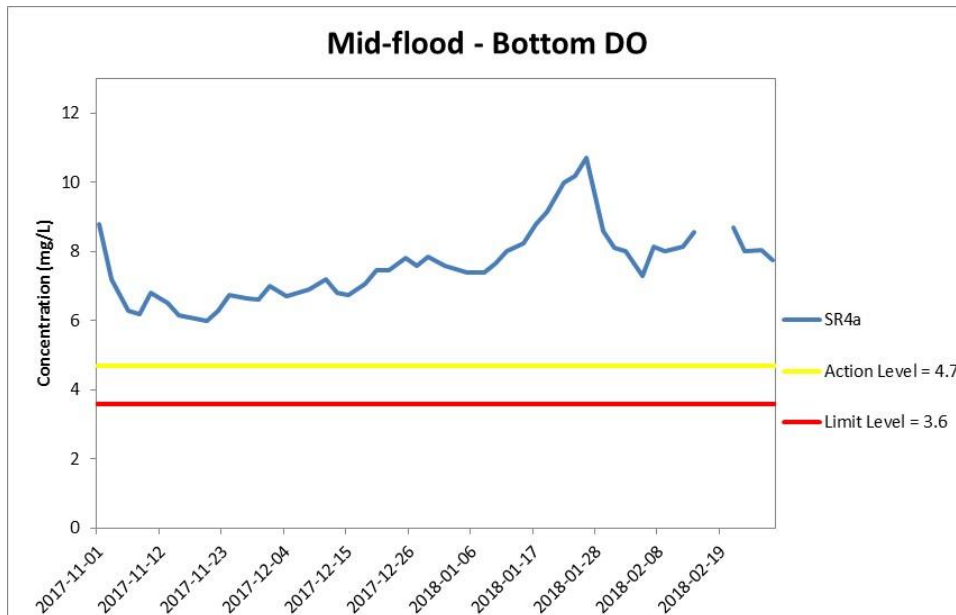
**Figure H19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





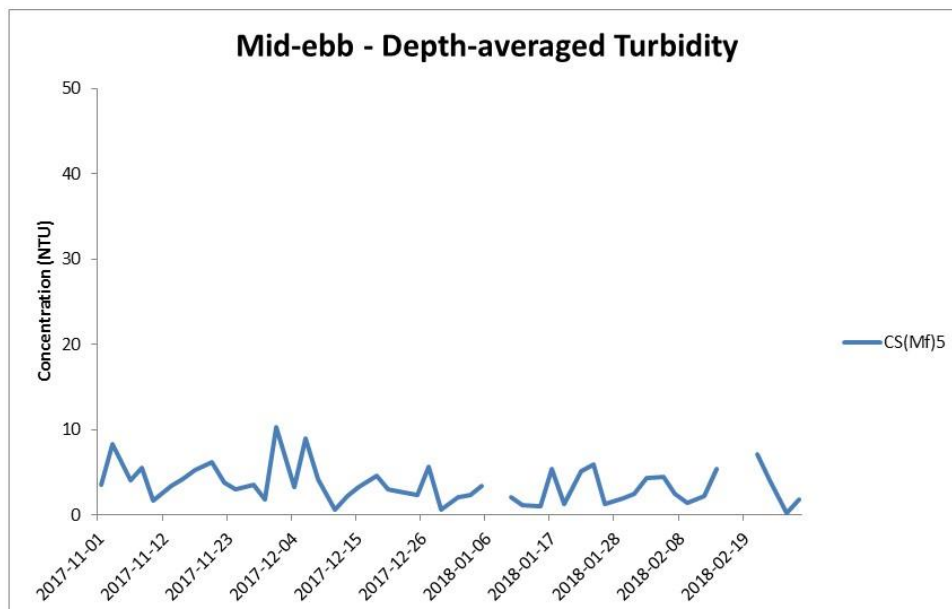
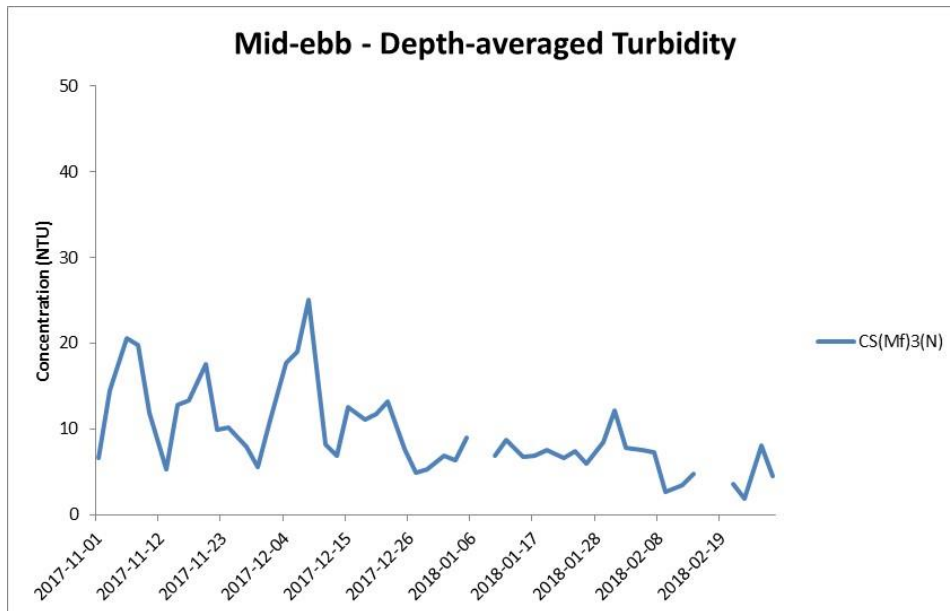


**Figure H20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



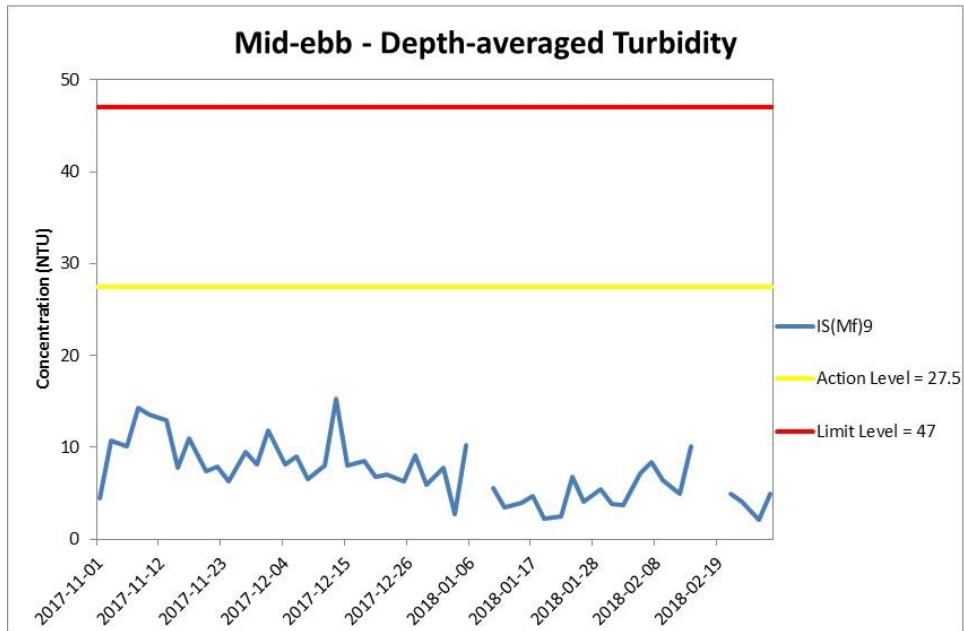
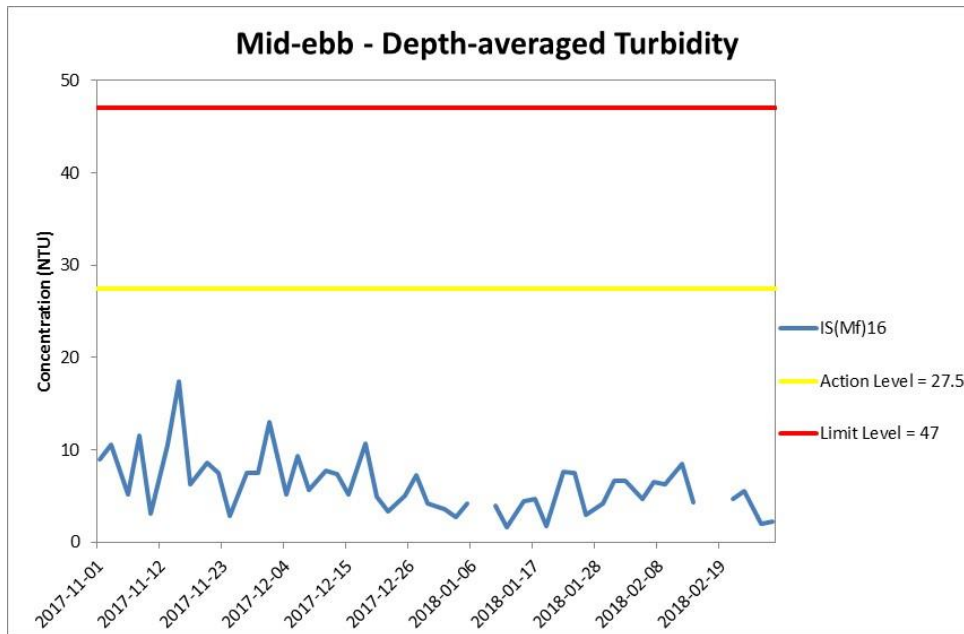


**Figure H21 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



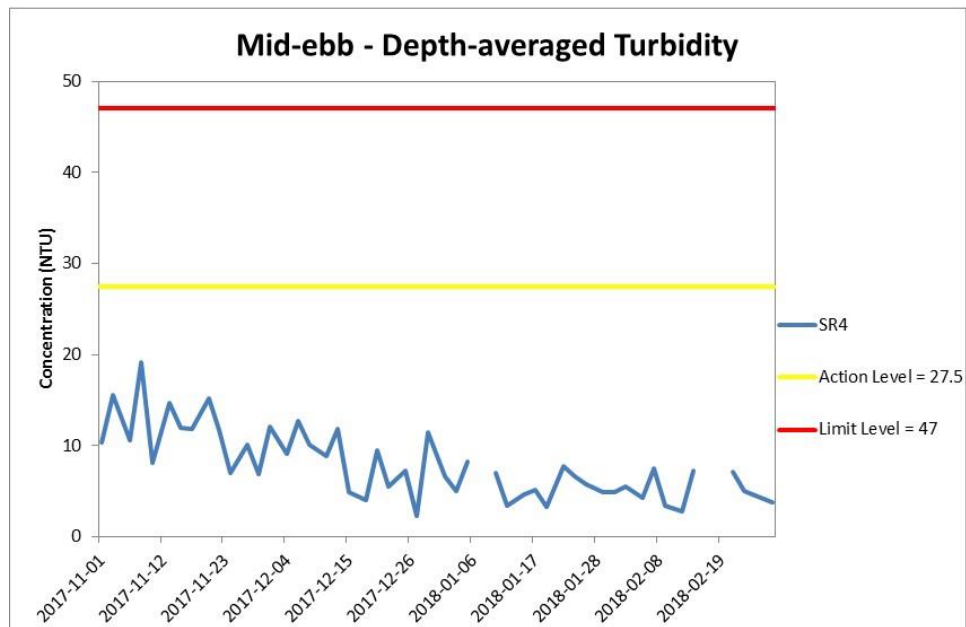
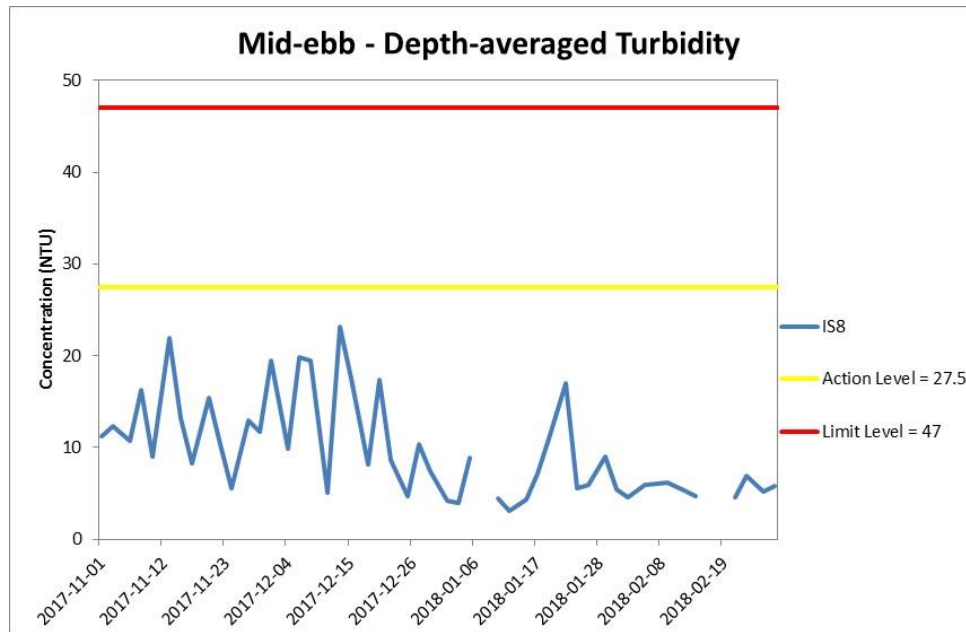


**Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)* WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



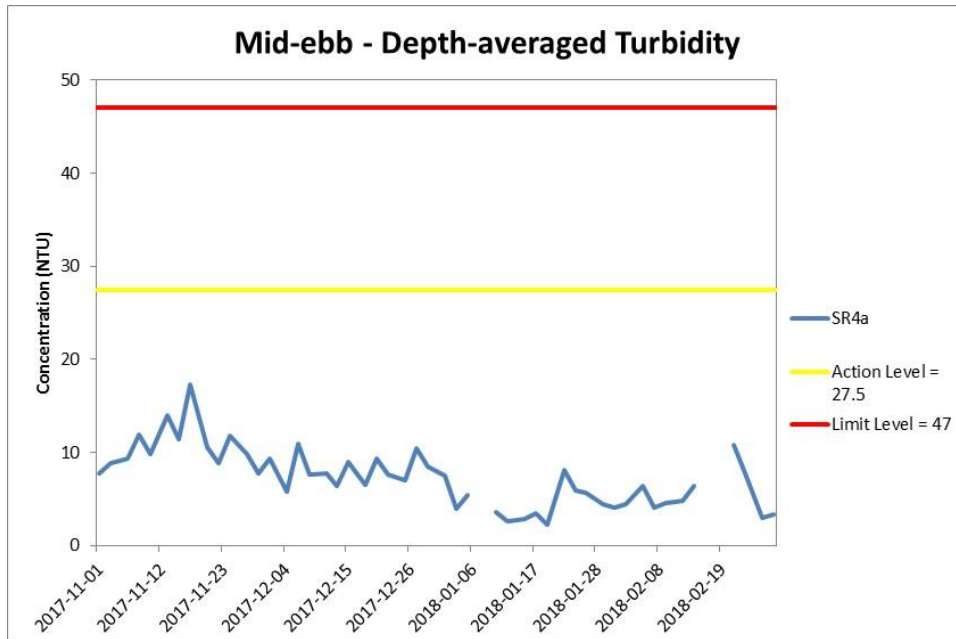


**Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)* WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



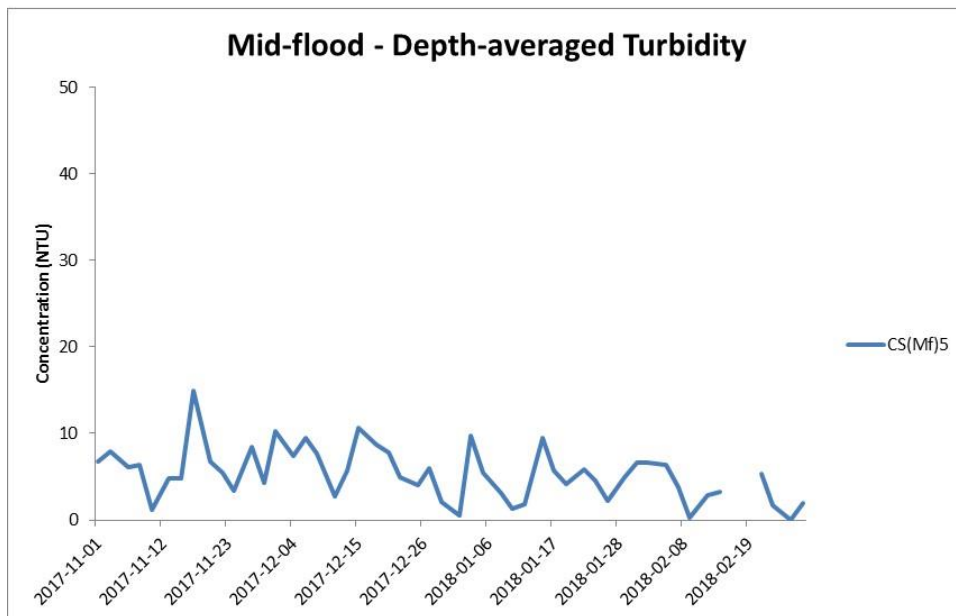
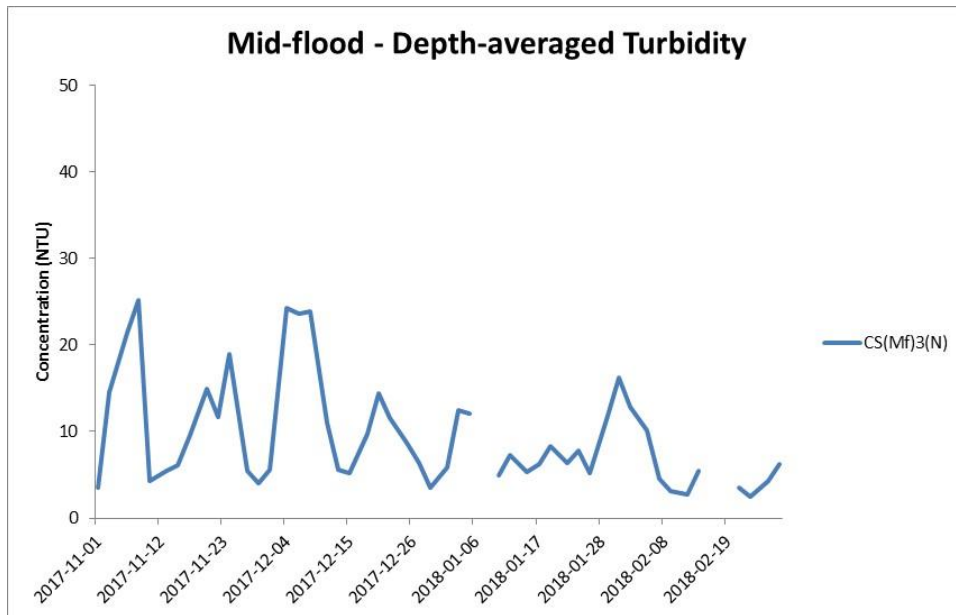


**Figure H24 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





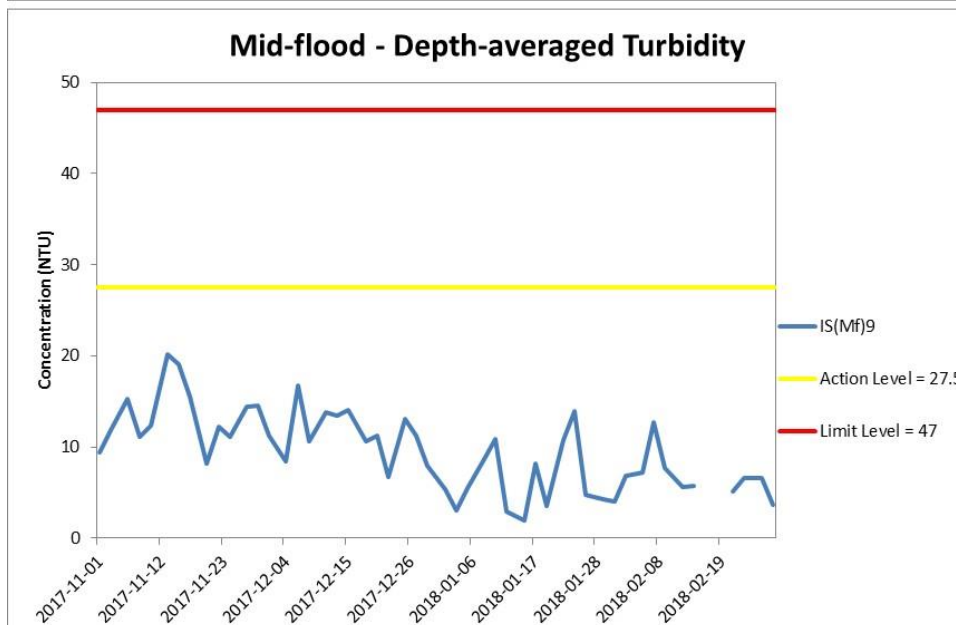
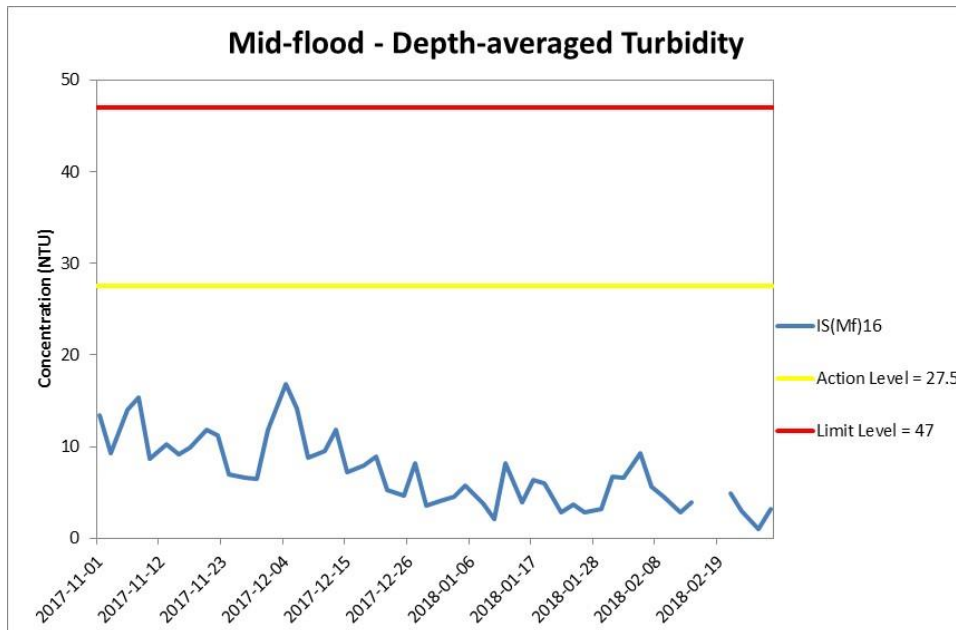
**Figure H25 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





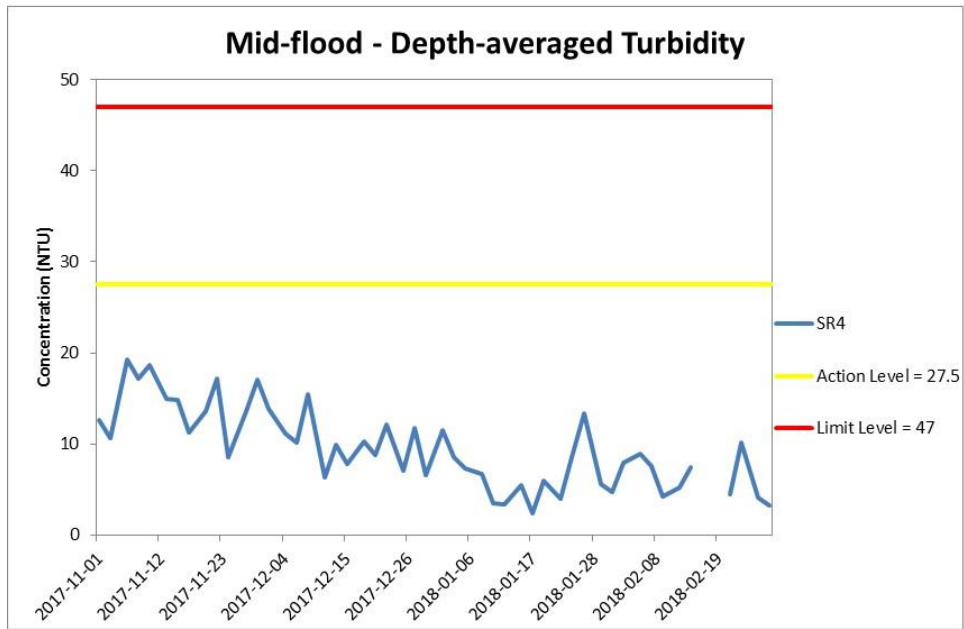
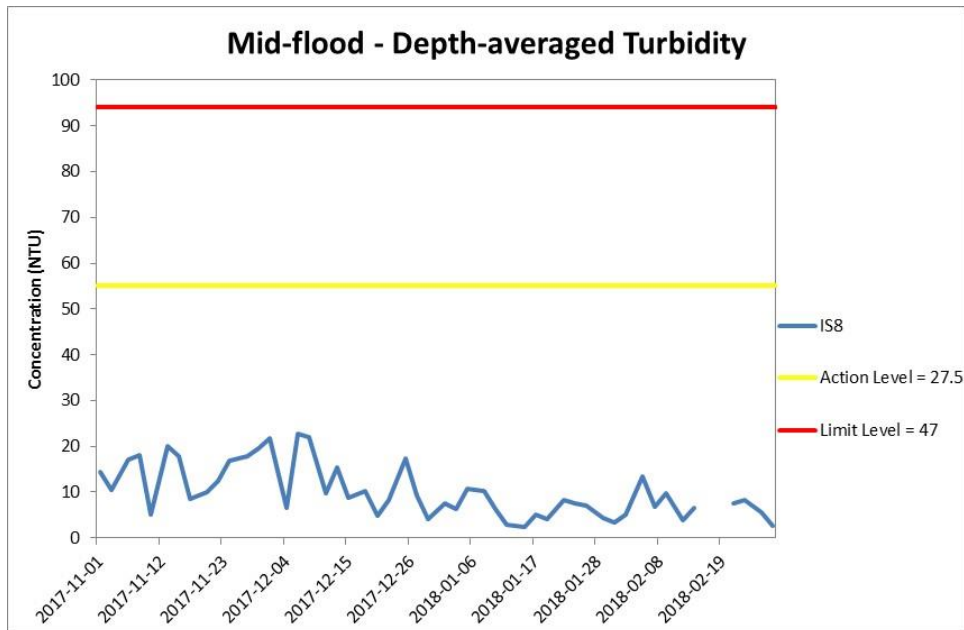


**Figure H26 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



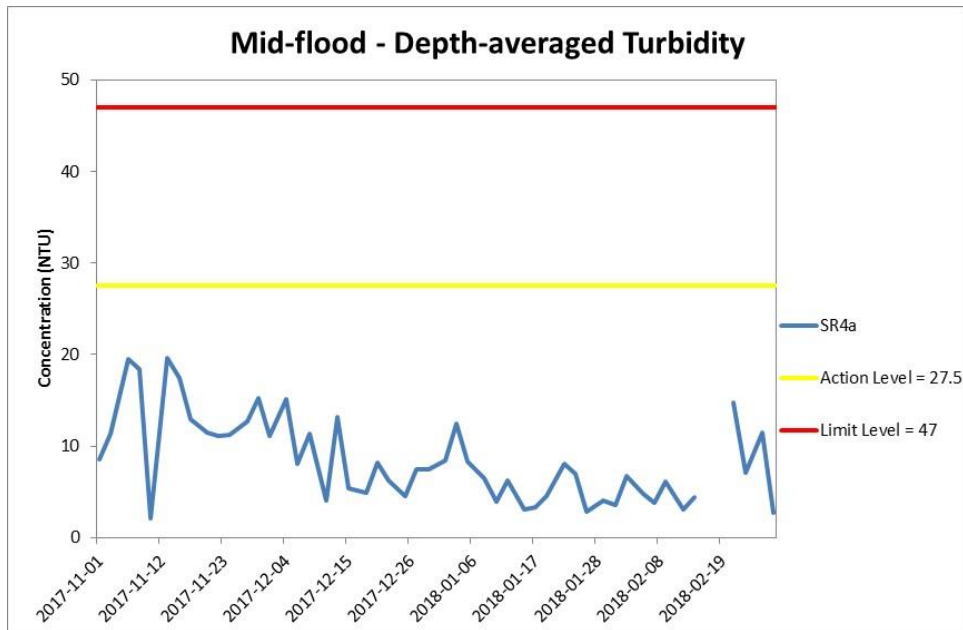


**Figure H27 Impact Monitoring - Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



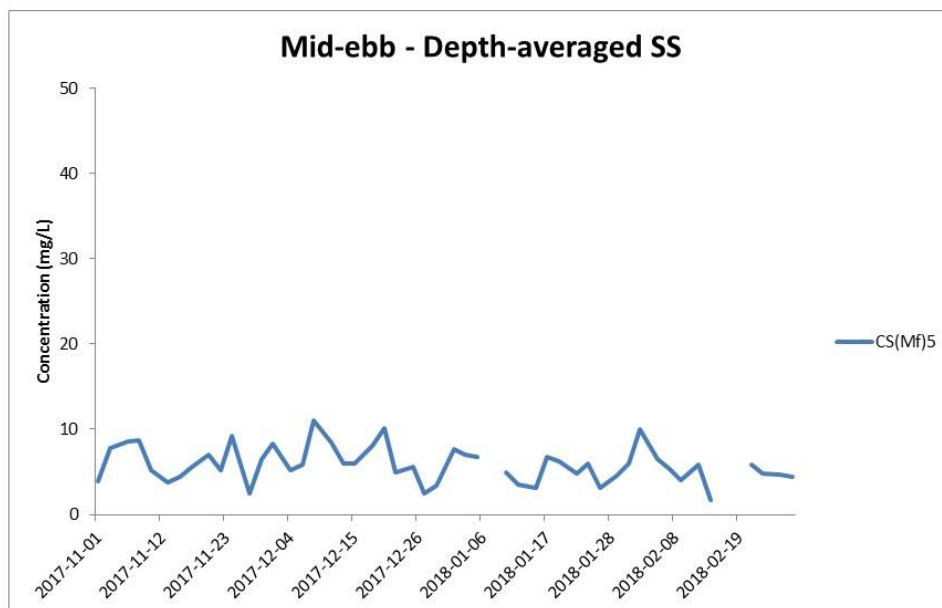
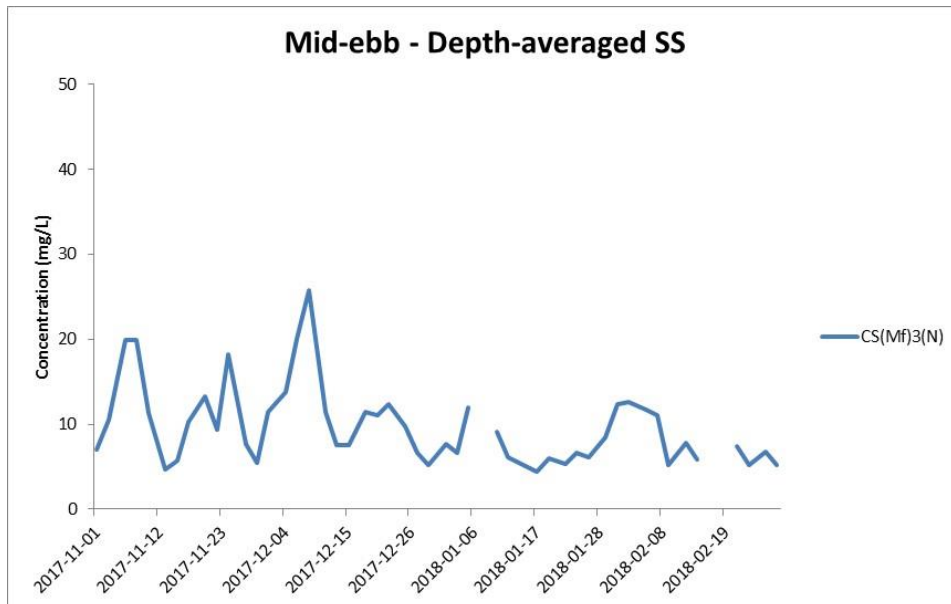


**Figure H28 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**

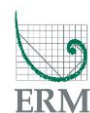


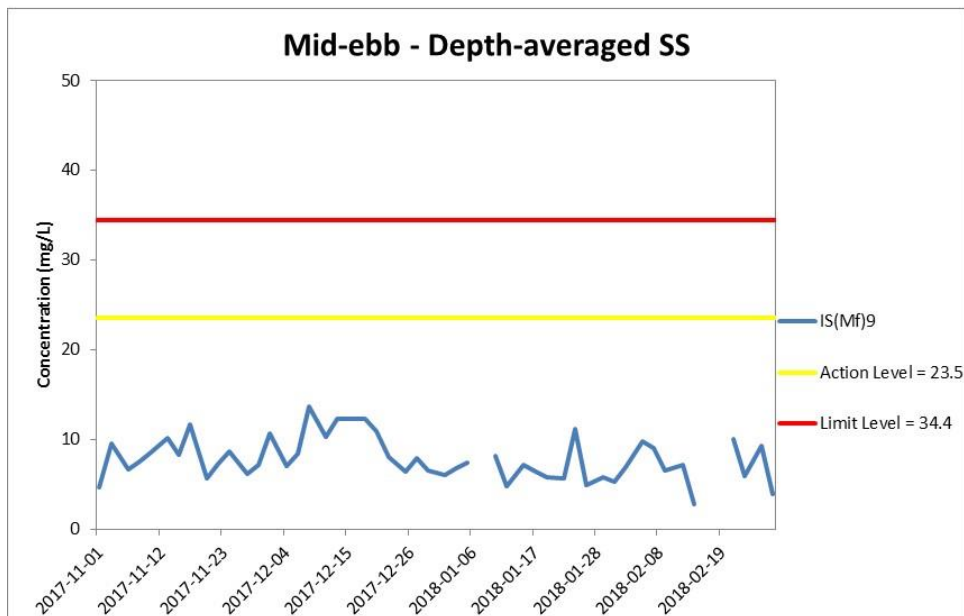
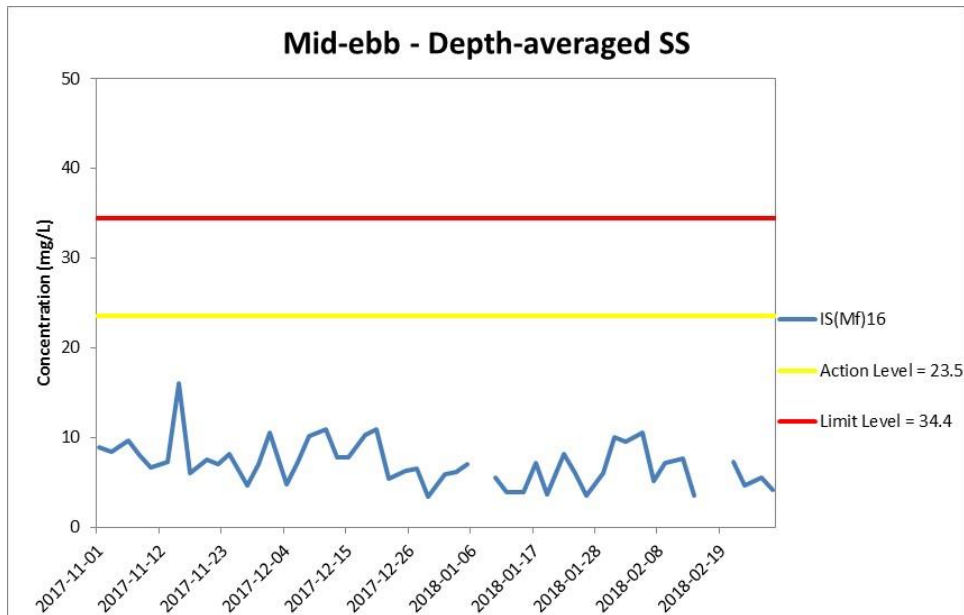


**Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



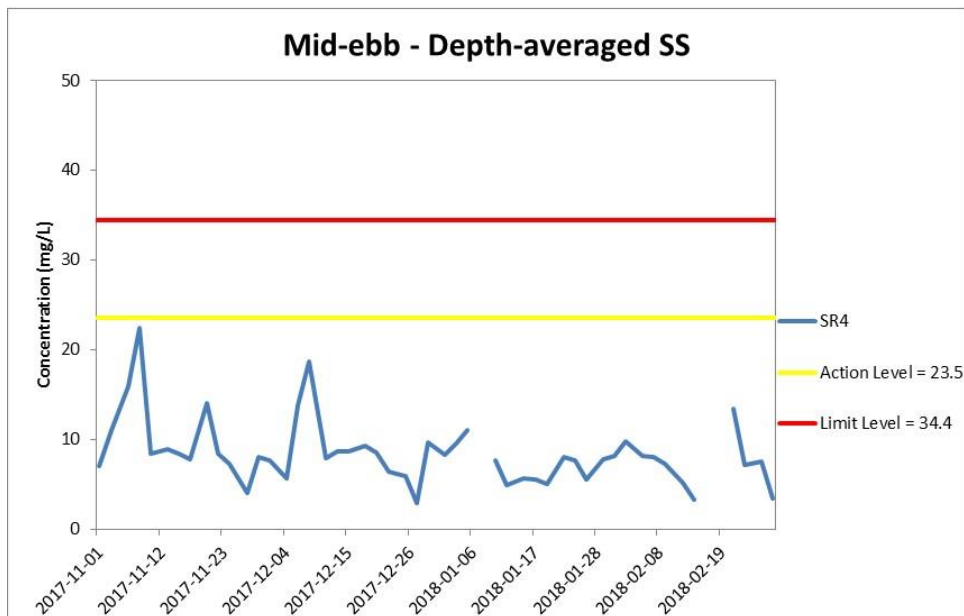
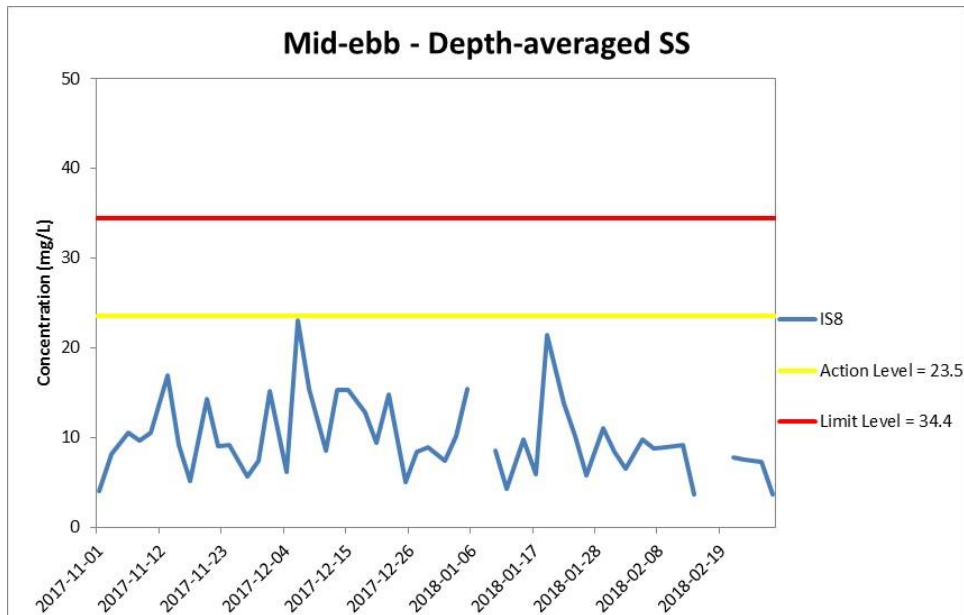


**Figure H30 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





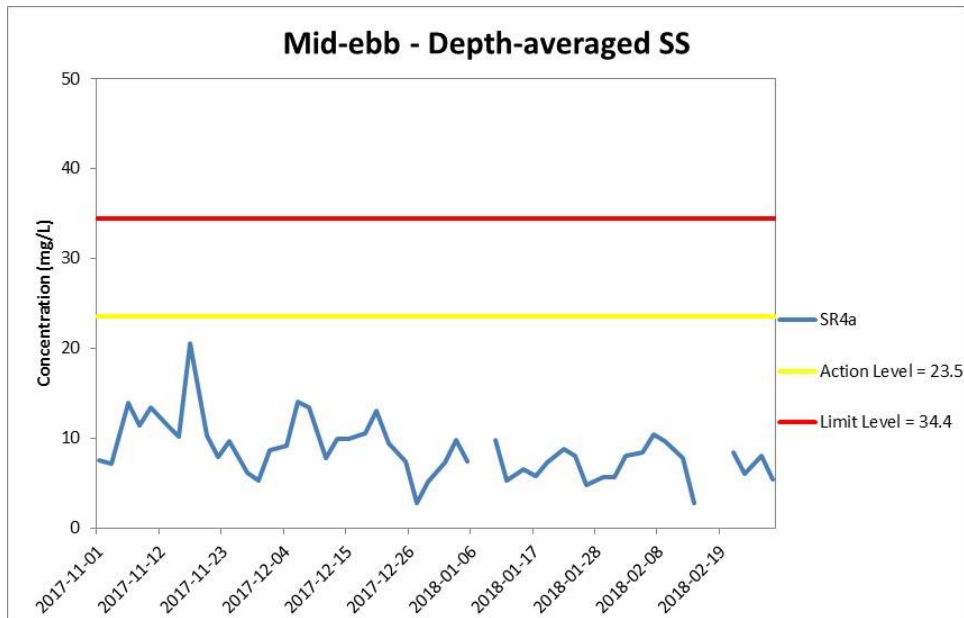
**Figure H31 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**





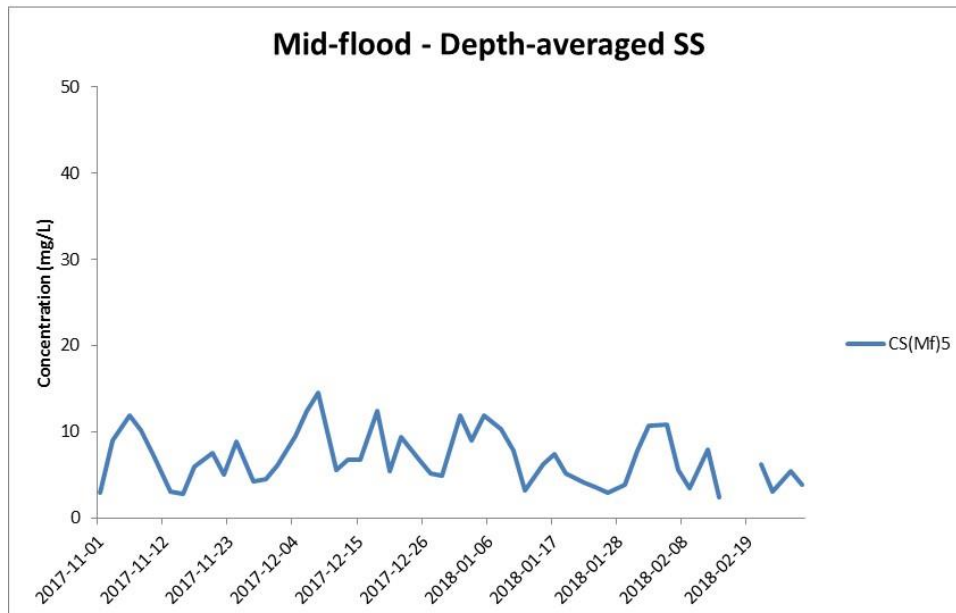
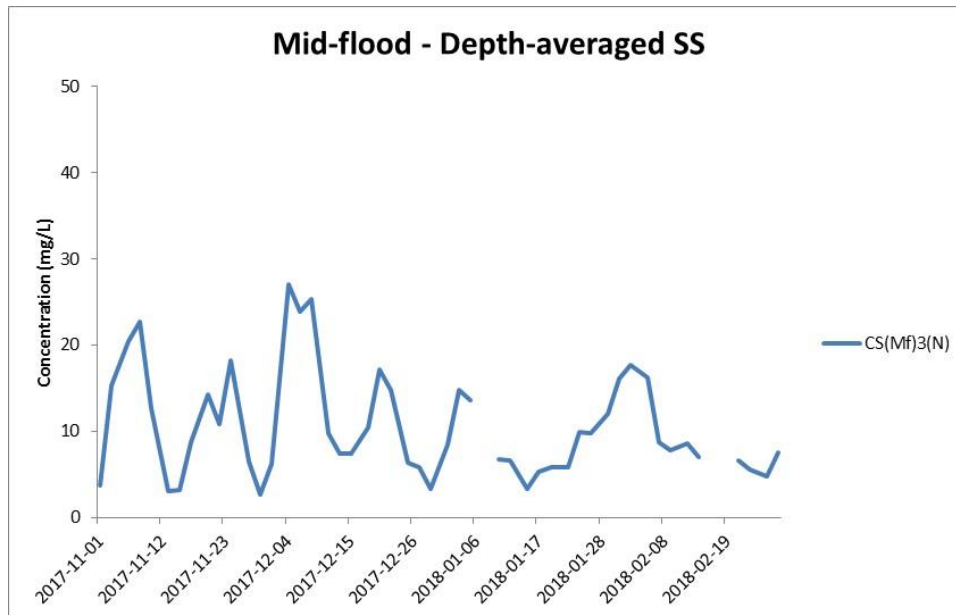


**Figure H32 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**



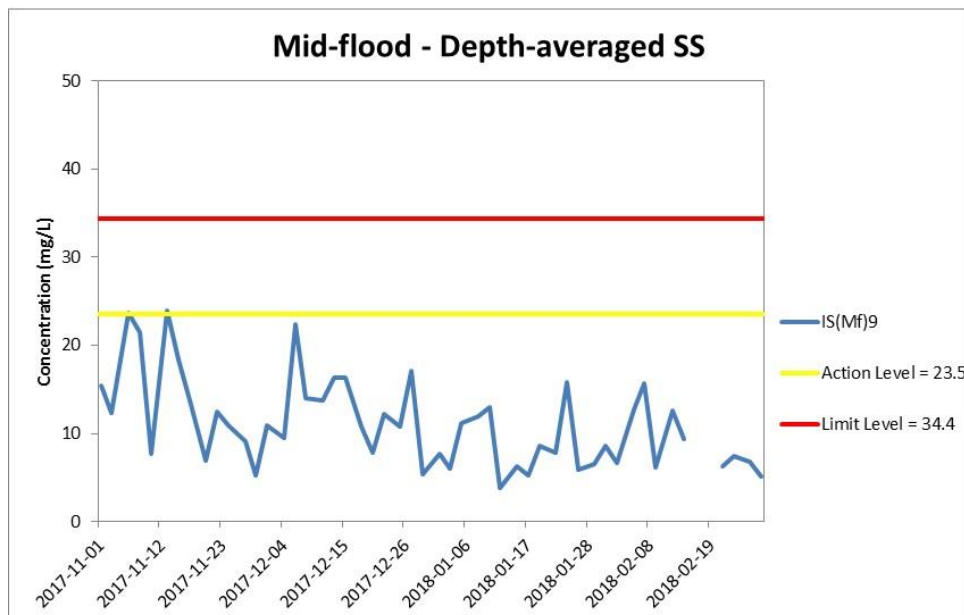
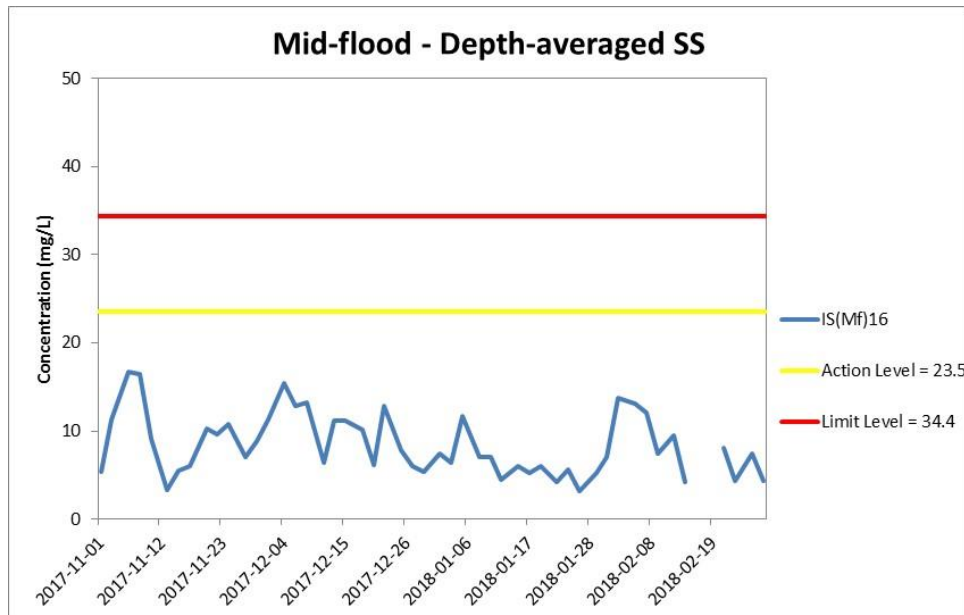


**Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 December 2017 and 28 February 2018 at CS(Mf)3(N) and CS(Mf)5.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



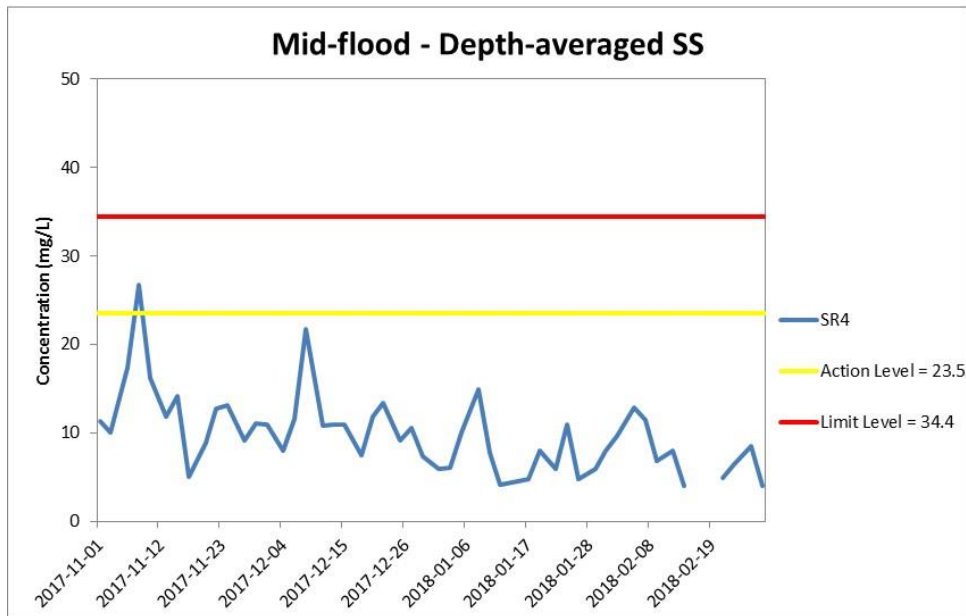
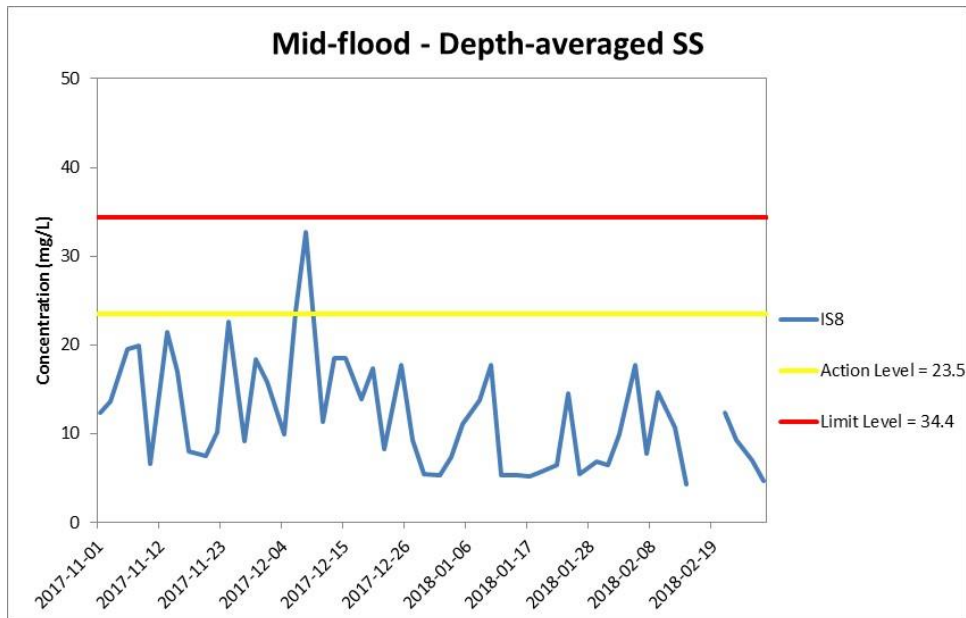


**Figure H34 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 December 2017 and 28 February 2018 at IS(Mf)16 and IS(Mf)9.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



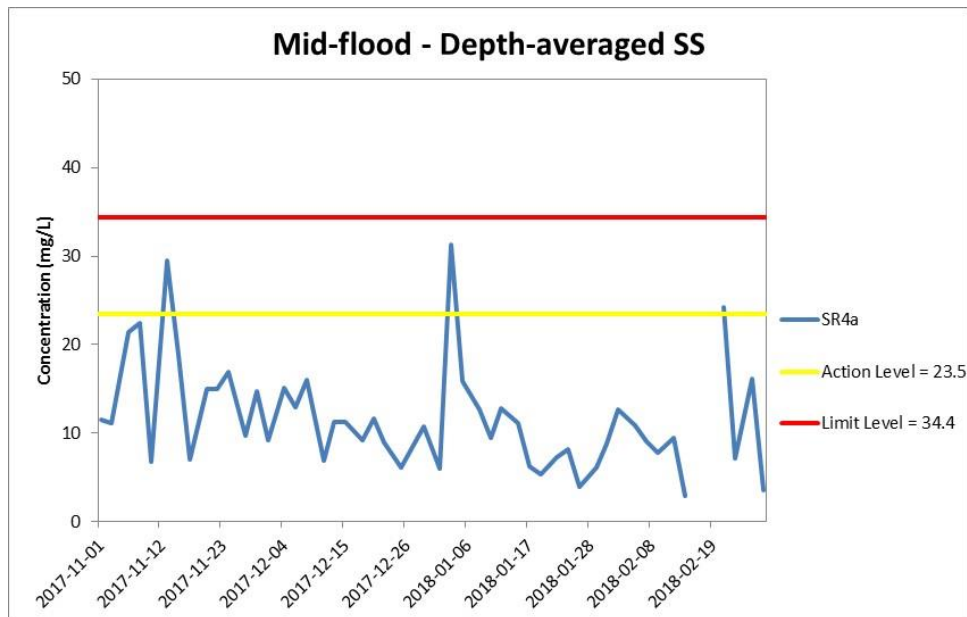


**Figure H35 Impact Monitoring - Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 December 2017 and 28 February 2018 at IS8 and SR4.**

*(Weather condition varied between sunny to rainy within the reporting period.)*  
 WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
 Resources  
 Management**





**Figure H36 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 December 2017 and 28 February 2018 at SR4a.**

*(Weather condition varied between sunny to rainy within the reporting period.)* WQM at monitoring stations, IS(Mf)9 and CS(Mf)3(N), at mid-flood tide and all monitoring stations at mid-ebb tide on 8 January 2018 was cancelled due to adverse weather. WQM on 17 and 19 February 2018 were cancelled due to suspension of marine works during holidays. In-situ monitoring is taken according to the requirement specified in the EM&A Manual, i.e. 3 water depth namely 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.

**Environmental  
Resources  
Management**



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**

*17<sup>th</sup> Quarterly Progress Report (December 2017 – February 2018)  
submitted to Gammon Construction Limited*

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

20 June 2018

**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 17<sup>th</sup> 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 December 2017 to February 2018, 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	805476	820800	14	Start Point	817537	820220
2	End Point	805476	826654	14	End Point	817537	824613
3	Start Point	806464	821150	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	821500	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	821850	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	822150	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	822000	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	821176		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		24	Start Point	805476	815900
12	End Point	815542	824882		24	End Point	805476	819100

- 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 20 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2017). 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<sup>®</sup> 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-km<sup>2</sup> grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km<sup>2</sup>) and dolphin densities (total number of dolphins from on-effort sightings per km<sup>2</sup>) 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-km<sup>2</sup> 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-km<sup>2</sup> 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<sup>®</sup> 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

### 3. Monitoring Results

- 3.1. *Summary of survey effort and dolphin sightings*
- 3.1.1. During the period of December 2017 to February 2018, 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 797.53 km of survey effort was collected, with 88.8% 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, 296.70 km and 500.83 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 582.13 km, while the effort on secondary lines was 215.40 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 December 2017 to February 2018, 17 groups of 45 Chinese White Dolphins were sighted. All except one dolphin sighting were made during on-effort search in this quarter, and 14 of the 16 on-effort dolphin sightings were made on primary lines. A summary table of dolphin sightings is shown in Appendix II.

- 3.1.5. 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. However, it should be noted that a rare dolphin sighting with five individuals was made recently in NEL in February 2018 during a HKBCF monitoring survey.
- 3.2. *Distribution*
- 3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from December 2017 to February 2018 is shown in Figure 1. The majority of sightings were made at the western end of the North Lantau region, with higher concentration of sightings to the west and northwest of Lung Kwu Chau (Figure 1). Several sightings were also made between Lung Kwu Chau and Sha Chau, to the west of the airport platform, near Lung Kwu Tan and Pillar Point (Figure 1). As consistently recorded in the previous monitoring quarters, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).
- 3.2.2. All dolphin sightings were located far away from the alignments of TM-CLKL as well as the HKBCF and HKLR03 reclamation sites (Figure 1). However, several dolphin groups were sighted near the alignment of HKLR09.
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (December 2017-February 2018) was drastically different from the one during the baseline monitoring period (Figure 1). 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 19 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, dolphins were less frequently sighted here, and mainly at the western end of the area, which was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the six quarterly periods of winter months in 2012-18 (Figure 2). Among the six winter periods, dolphins were sighted regularly in NWL waters in 2012-13 and 2013-14, but their usage there was progressively reduced in the four subsequent winter periods, with their only occurrences mostly concentrated at the western end of the survey area (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



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NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of HKLR03 surveys were also compared with the ones deduced from the baseline monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during December 2017 – February 2018

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 (5 & 12 Dec 2017)	0.00	0.00
	Set 2 (15 & 20 Dec 2017)	0.00	0.00
	Set 3 (2 & 8 Jan 2018)	0.00	0.00
	Set 4 (16 & 25 Jan 2018)	0.00	0.00
	Set 5 (2 & 9 Feb 2018)	0.00	0.00
	Set 6 (14 & 22 Feb 2018)	0.00	0.00
Northwest Lantau	Set 1 (5 & 12 Dec 2017)	1.66	8.32
	Set 2 (15 & 20 Dec 2017)	8.39	22.37
	Set 3 (2 & 8 Jan 2018)	5.68	45.42
	Set 4 (16 & 25 Jan 2018)	3.43	3.43
	Set 5 (2 & 9 Feb 2018)	4.38	6.56
	Set 6 (14 & 22 Feb 2018)	4.97	8.29

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (December 2017 – February 2018) 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)	
	December 2017 – February 2018	September – November 2011	December 2017 – February 2018	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	4.75 ± 2.26	9.85 ± 5.85	15.73 ± 15.94	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 3.6 sightings and 10.2 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 19 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.
- 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 68.3% and 76.8% respectively) were only a fraction 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).
- 3.3.5. However, it is important to note that the quarterly encounter rate in the present monitoring period appeared to have rebounded from the previous lows. Both ER(STG) and ER(ANI) in NWL survey area in the present quarter reached the highest in the past three years, and were higher than the previous three winter quarters in 2014-15, 2015-16 and 2016-17 (Table 5). It remained to be seen whether such rebound in dolphin occurrence in NWL waters would be persistent in upcoming quarters. Such temporal trend should be closely monitored in the upcoming monitoring quarters as the construction activities of HZMB works continue to diminish in coming months.

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 **winter** months were highlighted in **blue**; ± denotes the standard deviation of the average encounter rates)

	<b>Encounter rate (STG)</b> (no. of on-effort dolphin sightings per 100 km of survey effort)	<b>Encounter rate (ANI)</b> (no. of dolphins from all on-effort sightings per 100 km of survey effort)
<b>September-November 2011 (Baseline)</b>	6.00 ± 5.05	22.19 ± 26.81
<b>December 2012-February 2013 (Impact)</b>	<b>3.14 ± 3.21</b>	<b>6.33 ± 8.64</b>
<b>March-May 2013 (Impact)</b>	0.42 ± 1.03	0.42 ± 1.03
<b>June-August 2013 (Impact)</b>	0.88 ± 1.36	3.91 ± 8.36
<b>September-November 2013 (Impact)</b>	1.01 ± 1.59	3.77 ± 6.49
<b>December 2013-February 2014 (Impact)</b>	<b>0.45 ± 1.10</b>	<b>1.34 ± 3.29</b>
<b>March-May 2014 (Impact)</b>	0.00	0.00
<b>June-August 2014 (Impact)</b>	0.42 ± 1.04	1.69 ± 4.15
<b>September-November 2014 (Impact)</b>	0.00	0.00
<b>December 2014-February 2015 (Impact)</b>	<b>0.00</b>	<b>0.00</b>
<b>March-May 2015 (Impact)</b>	0.00	0.00
<b>June-August 2015 (Impact)</b>	0.44 ± 1.08	0.44 ± 1.08
<b>September-November 2015 (Impact)</b>	0.00	0.00
<b>December 2015-February 2016 (Impact)</b>	<b>0.00</b>	<b>0.00</b>
<b>March-May 2016 (Impact)</b>	0.00	0.00
<b>June-August 2016 (Impact)</b>	0.00	0.00
<b>September-November 2016 (Impact)</b>	0.00	0.00
<b>December 2016-February 2017 (Impact)</b>	<b>0.00</b>	<b>0.00</b>
<b>March-May 2017 (Impact)</b>	0.00	0.00
<b>June-August 2017 (Impact)</b>	0.00	0.00
<b>September-November 2017 (Impact)</b>	0.00	0.00
<b>December 2017-February 2018 (Impact)</b>	<b>0.00</b>	<b>0.00</b>

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 **winter** months were highlighted in **blue**; ± denotes the standard deviation of the average encounter rates)

	<b>Encounter rate (STG)</b> (no. of on-effort dolphin sightings per 100 km of survey effort)	<b>Encounter rate (ANI)</b> (no. of dolphins from all on-effort sightings per 100 km of survey effort)
<b>September-November 2011 (Baseline)</b>	9.85 ± 5.85	44.66 ± 29.85
<b>December 2012-February 2013 (Impact)</b>	<b>8.36 ± 5.03</b>	<b>35.90 ± 23.10</b>
<b>March-May 2013 (Impact)</b>	7.75 ± 3.96	24.23 ± 18.05
<b>June-August 2013 (Impact)</b>	6.56 ± 3.68	27.00 ± 18.71
<b>September-November 2013 (Impact)</b>	8.04 ± 1.10	32.48 ± 26.51
<b>December 2013-February 2014 (Impact)</b>	<b>8.21 ± 2.21</b>	<b>32.58 ± 11.21</b>
<b>March-May 2014 (Impact)</b>	6.51 ± 3.34	19.14 ± 7.19
<b>June-August 2014 (Impact)</b>	4.74 ± 3.84	17.52 ± 15.12
<b>September-November 2014 (Impact)</b>	5.10 ± 4.40	20.52 ± 15.10
<b>December 2014-February 2015 (Impact)</b>	<b>2.91 ± 2.69</b>	<b>11.27 ± 15.19</b>
<b>March-May 2015 (Impact)</b>	0.47 ± 0.73	2.36 ± 4.07
<b>June-August 2015 (Impact)</b>	2.53 ± 3.20	9.21 ± 11.57
<b>September-November 2015 (Impact)</b>	3.94 ± 1.57	21.05 ± 17.19
<b>December 2015-February 2016 (Impact)</b>	<b>2.64 ± 1.52</b>	<b>10.98 ± 3.81</b>
<b>March-May 2016 (Impact)</b>	0.98 ± 1.10	4.78 ± 6.85
<b>June-August 2016 (Impact)</b>	1.72 ± 2.17	7.48 ± 10.98
<b>September-November 2016 (Impact)</b>	2.86 ± 1.98	10.89 ± 10.98
<b>December 2016-February 2017 (Impact)</b>	<b>3.80 ± 3.79</b>	<b>14.52 ± 17.21</b>
<b>March-May 2017 (Impact)</b>	0.93 ± 1.03	5.25 ± 9.53
<b>June-August 2017 (Impact)</b>	2.20 ± 2.88	6.58 ± 8.12
<b>September-November 2017 (Impact)</b>	3.12 ± 1.91	10.35 ± 9.66
<b>December 2017-February 2018 (Impact)</b>	<b>4.75 ± 2.26</b>	<b>15.73 ± 15.94</b>

3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).

3.3.7. For the comparison between the baseline period and the present quarter (21<sup>st</sup> quarter of

the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0127 and 0.0470 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.

- 3.3.8. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. the first 21 quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.000000 and 0.000000 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).
- 3.3.9. 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 of the past few years.
- 3.3.10. The dramatic decline in dolphin usage of North Lantau region 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 2017). Apparently there was little sign of recovery of dolphin usage even though almost all marine works associated with the HZMB construction have been completed.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to eight individuals per group in North Lantau region during December 2017 to February 2018. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from impact monitoring period (December 2017 – February 2018) and baseline monitoring period (September – November 2011) (Note:  $\pm$  denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	December 2017 – February 2018	September – November 2011
<b>Overall</b>	2.65 $\pm$ 2.50 (n = 17)	3.72 $\pm$ 3.13 (n = 66)
<b>Northeast Lantau</b>	---	3.18 $\pm$ 2.16 (n = 17)
<b>Northwest Lantau</b>	2.65 $\pm$ 2.50 (n = 17)	3.92 $\pm$ 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during December 2017 to February 2018 was noticeably lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of 17 dolphin groups in the present quarter was very small when compared to the 66 groups sighted during the baseline period (Table 6).
- 3.4.3. Notably, 13 of these 17 dolphin groups were composed of 1-3 individuals only, while

there were only four medium-sized groups with 5-8 dolphins per group (Appendix II).

- 3.4.4. Distribution of the larger dolphin groups with five individuals or more per group during the present quarter is shown in Figure 3, with comparison to the one in baseline period. The four medium-sized groups with 5-8 dolphins were all distributed around Lung Kwu Chau (Figure 3). Such distribution pattern was very different from the baseline period, when the larger dolphin groups were frequently sighted and evenly distributed in NWL waters, and a few were also sighted in NEL waters (Figure 3).
- 3.5. *Habitat use*
- 3.5.1. From December 2017 to February 2018, the grids that recorded moderately high to high dolphin densities were all located around Lung Kwu Chau (Figures 4a and 4b). The rest of the grids that recorded dolphin occurrence were low in densities, and scattered near Lung Kwu Tan, Pillar Point and to the northwest and southwest of the airport platform (Figures 4a and 4b).
- 3.5.2. Notably, all grids near HKLR03/HKBCF reclamation sites as well as TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b). However, one grid (i.e. Grid G21) overlapped with the HKLR09 alignment recorded very low dolphin density (Figure 4b).
- 3.5.3. 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 is collected throughout the impact phase monitoring programme.
- 3.5.4. 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).
- 3.5.5. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with high 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, only several grids with moderately high to high dolphin densities were located around Lung Kwu Chau during the present impact phase period (Figure 5).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, no young calf was sighted at all among the 17 groups of dolphins.



3.7. *Activities and associations with fishing boats*

- 3.7.1. Only one of the 17 dolphin groups were engaged in feeding activity, while no group 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 activity (5.9%) was much lower than the one recorded during the baseline period (11.6%). However, it should be noted the sample sizes on total numbers of dolphin sightings were very different between the two periods.
- 3.7.3. Distribution of dolphins engaged in various activities during the present three-month period and baseline period is shown in Figure 6. The only dolphin group engaged in feeding activity was sighted to the north of Lung Kwu Chau (Figure 6). When compared to the baseline period, distribution of various dolphin activities during the present impact phase monitoring period was drastically different with a much more restricted area of occurrences (Figure 6).
- 3.7.4. Notably, one group of eight dolphins was found to be associated with an operating purse-seiner to the north of Lung Kwu Chau during the present impact phase period.

3.8. *Summary of photo-identification works*

- 3.8.1. From December 2017 to February 2018, over 2,000 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 23 individuals sighted 32 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. Seven individuals (i.e. NL33, NL123, NL136, NL269, NL272, NL286 and NL322) were re-sighted twice, while another individual (NL182) were re-sighted thrice during the three-month period (Appendix III).
- 3.8.3. Notably, eight of these 23 individuals (i.e. CH34, NL123, NL136, NL182, NL226, NL261, NL272 and NL296) were also sighted in Northwest Lantau during the HKBCF monitoring surveys under the same three-month period. Moreover, only one individual (WL273) was also sighted in West Lantau waters during the HKLR09 monitoring surveys from December 2017 to February 2018, showing its extensive individual movements across different survey areas.

3.9. *Individual range use*

- 3.9.1. Ranging patterns of the 23 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, several individuals, including WL62, WL251, WL273 and WL288, have consistently utilized WL waters in the past, but have extended their range use to NWL during the present quarter.
- 3.9.4. 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 and vice versa, as such shift could possibly be related to the HZMB-related construction works (see Hung 2017).

#### 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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- Hung, S. K. 2017. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2016-17). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 162 pp.
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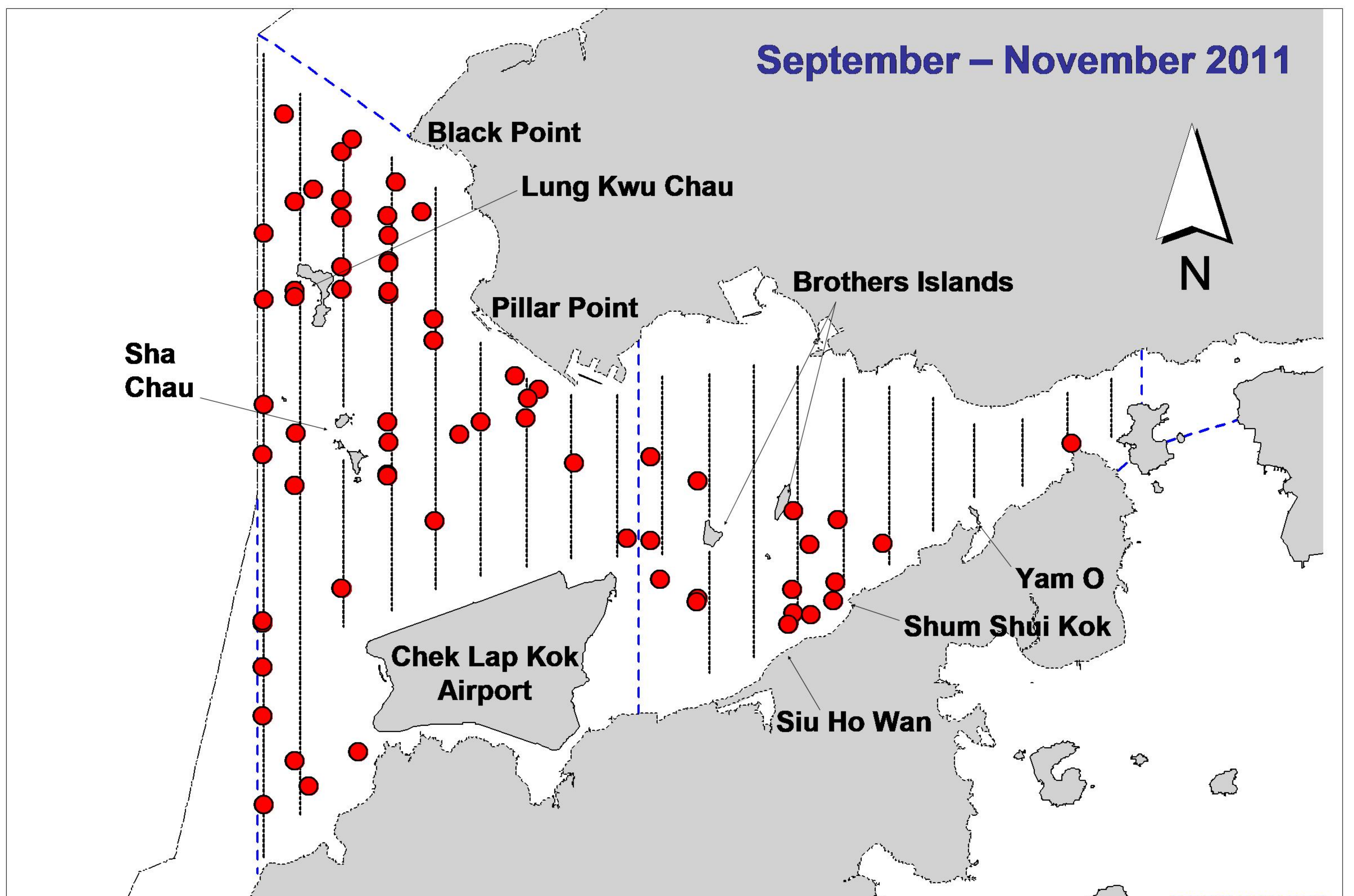
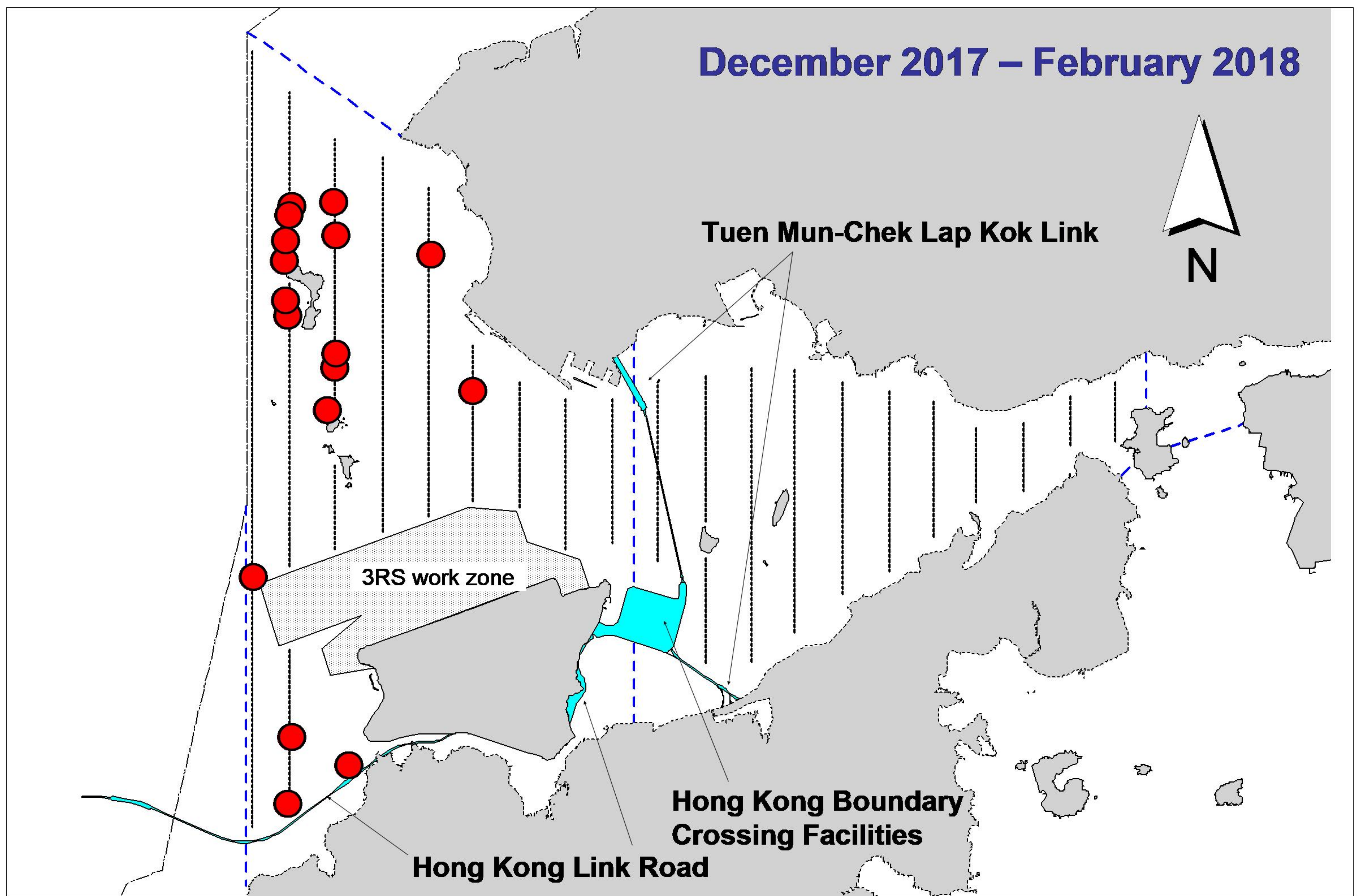


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)



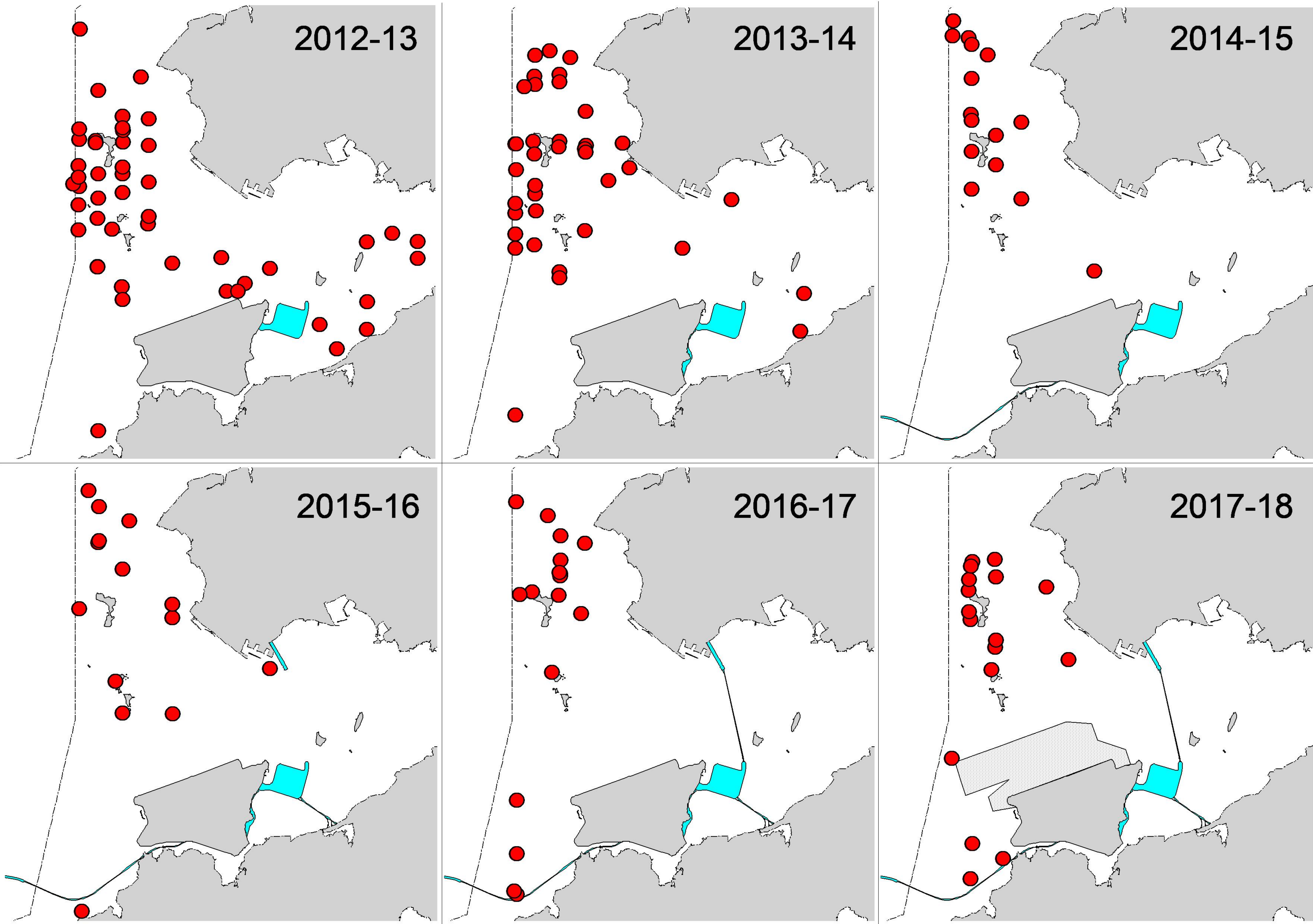


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six winter quarters (December-February) of HKLR03 impact phase in 2012-18



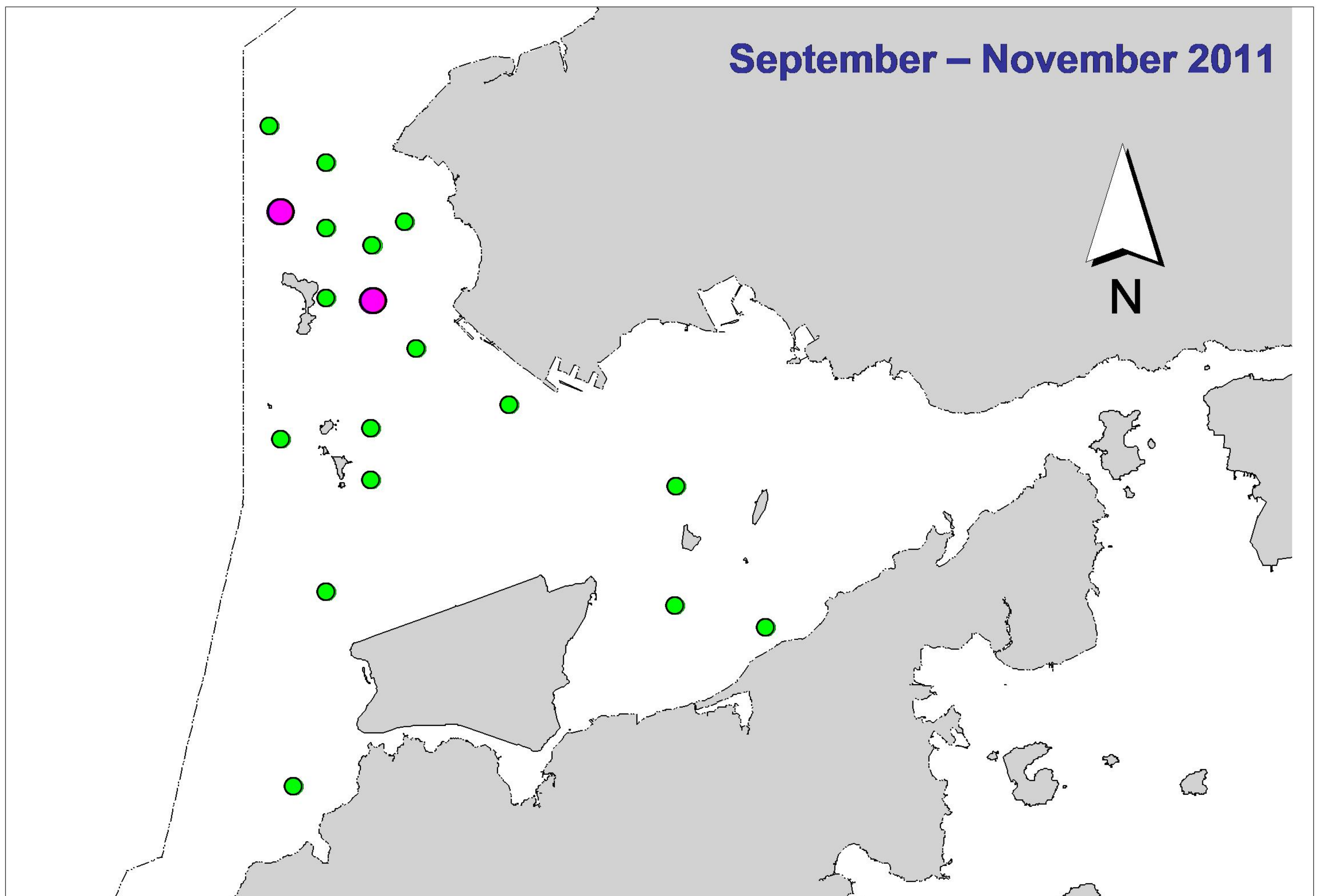
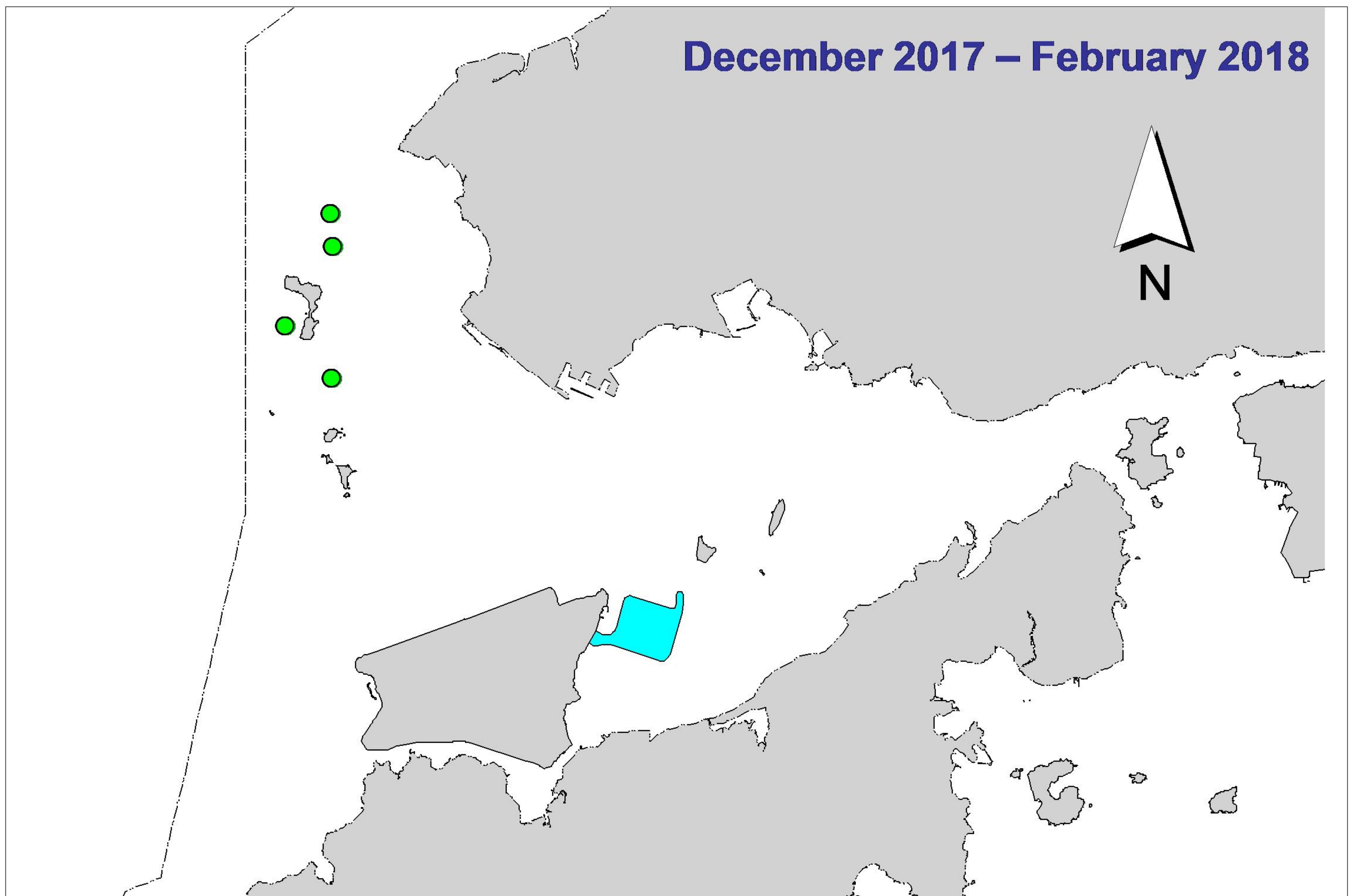


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)



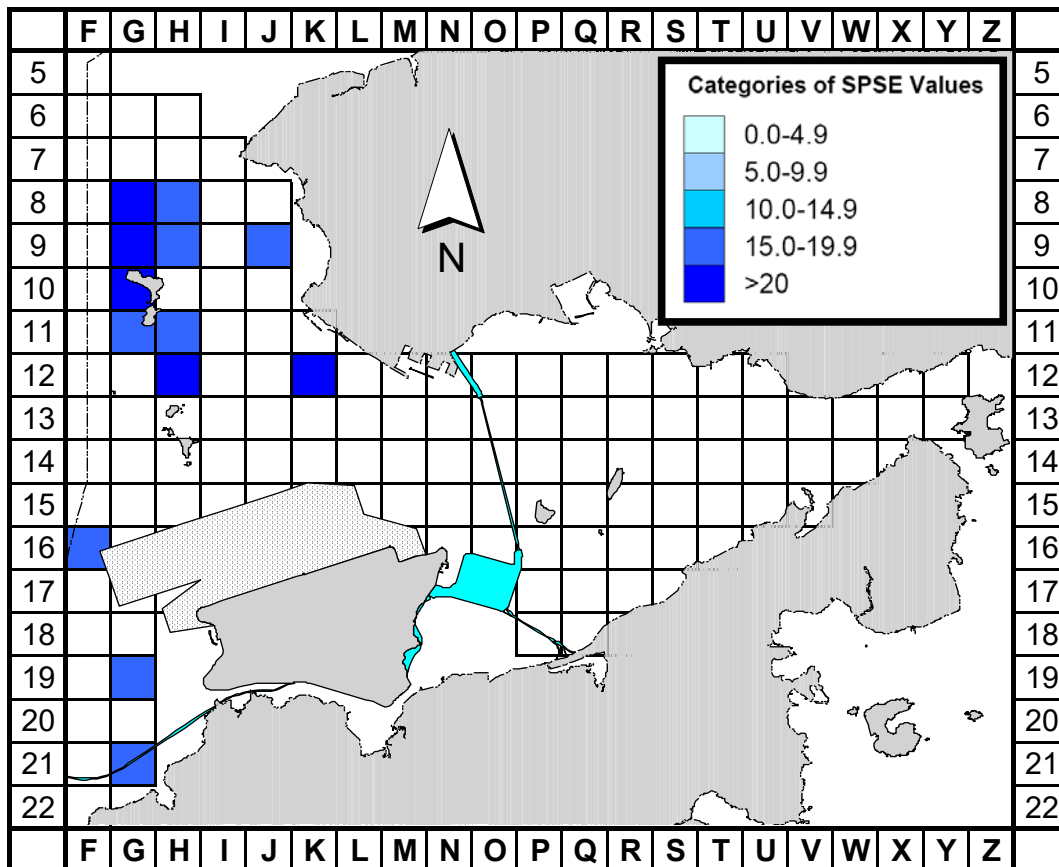


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec 17-Feb 18) (SPSE = no. of on-effort sightings per 100 units of survey effort)

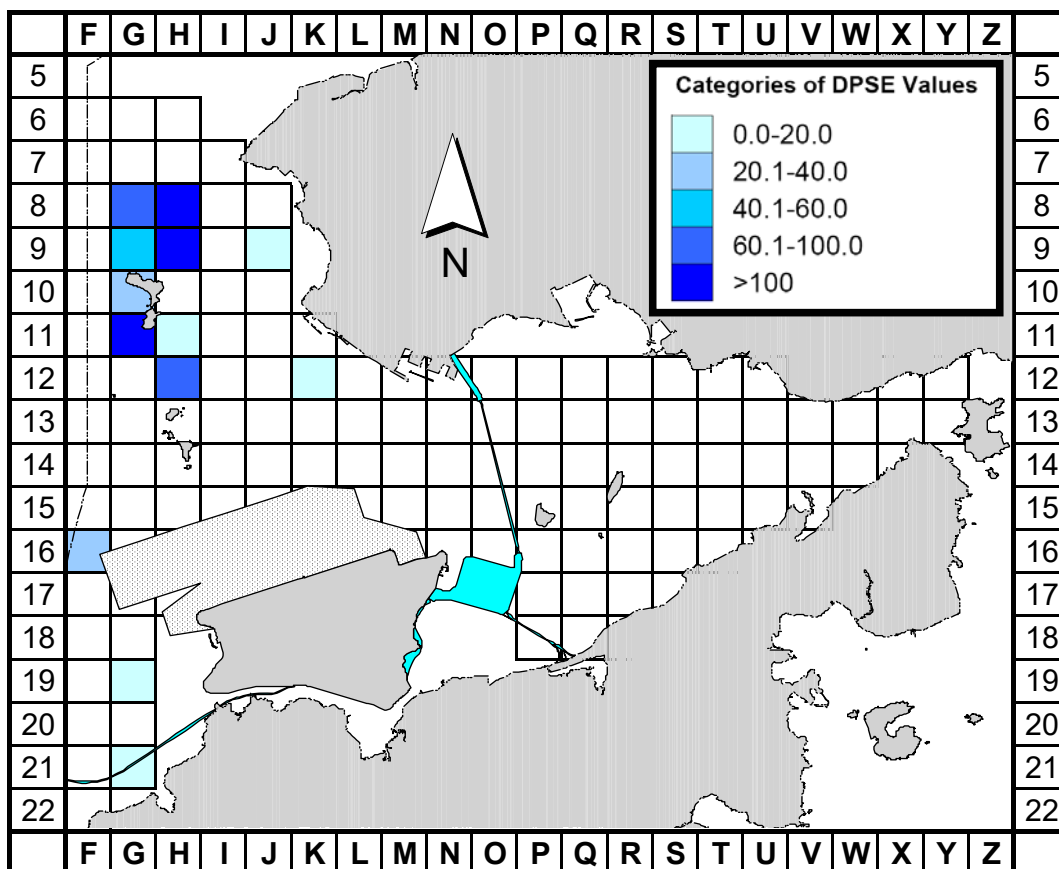


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Dec 17- Feb 18) (DPSE = no. of dolphins per 100 units of survey effort)



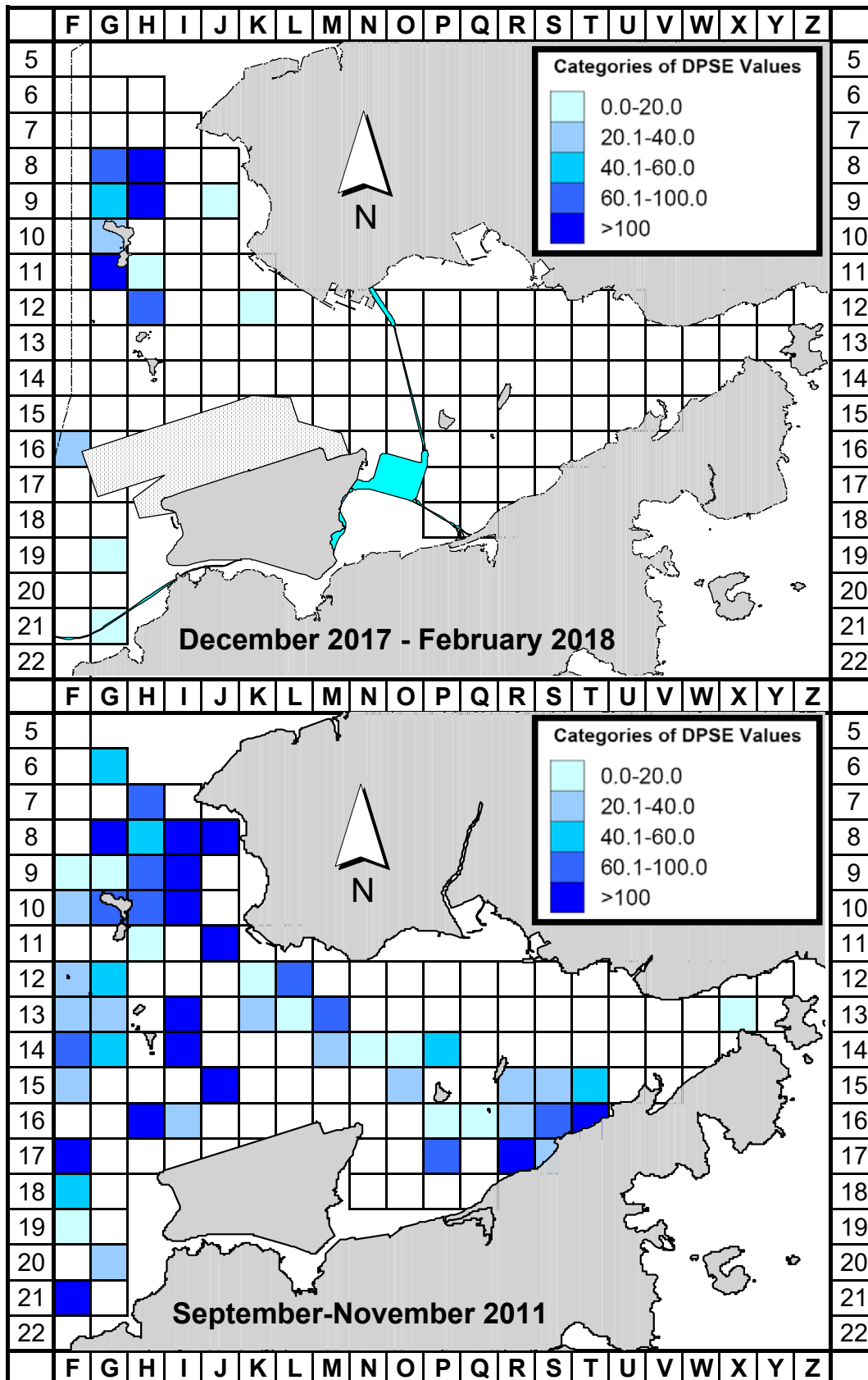


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northwest and Northeast Lantau survey area between the impact monitoring period (December 2017 - February 2018) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)



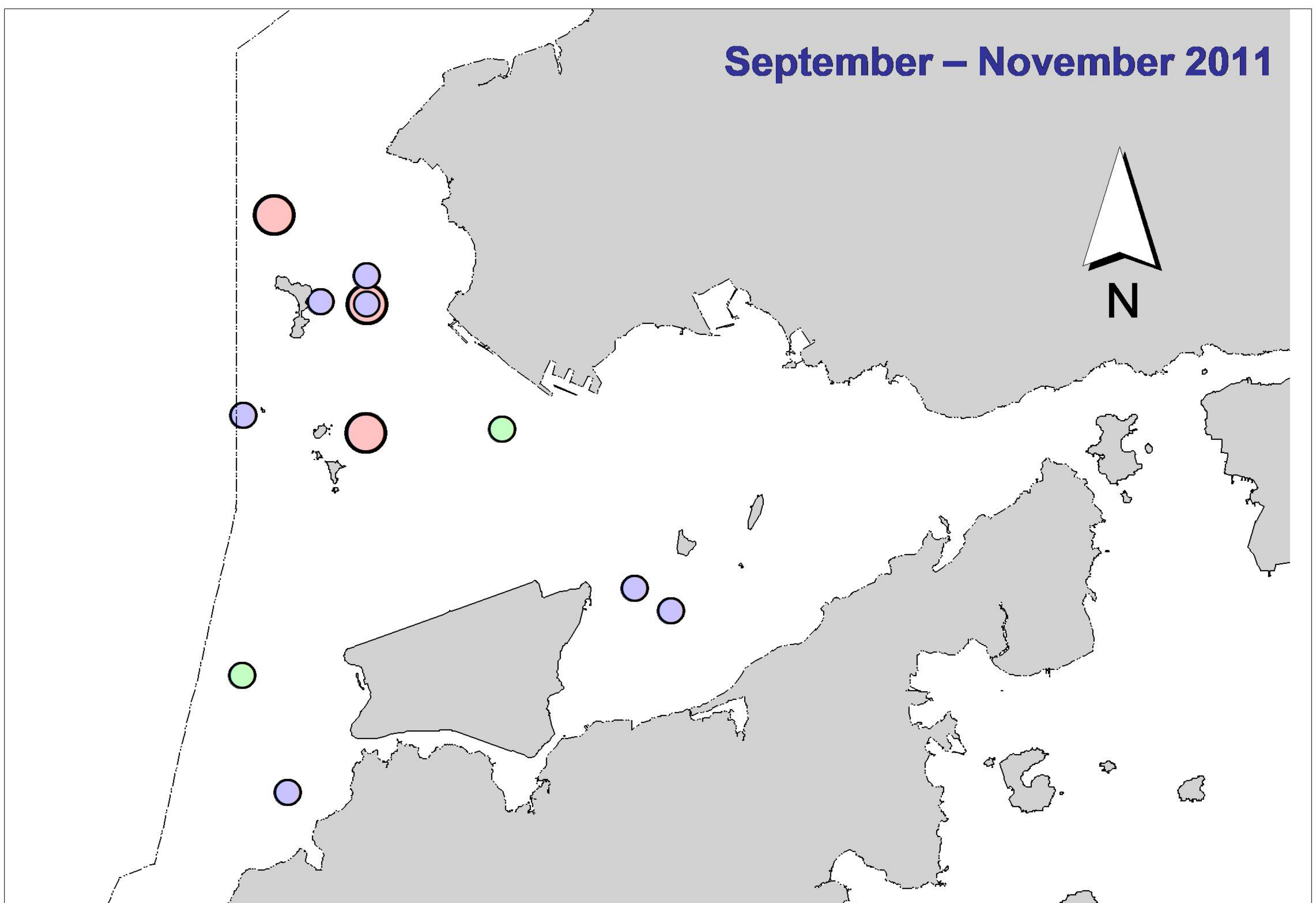
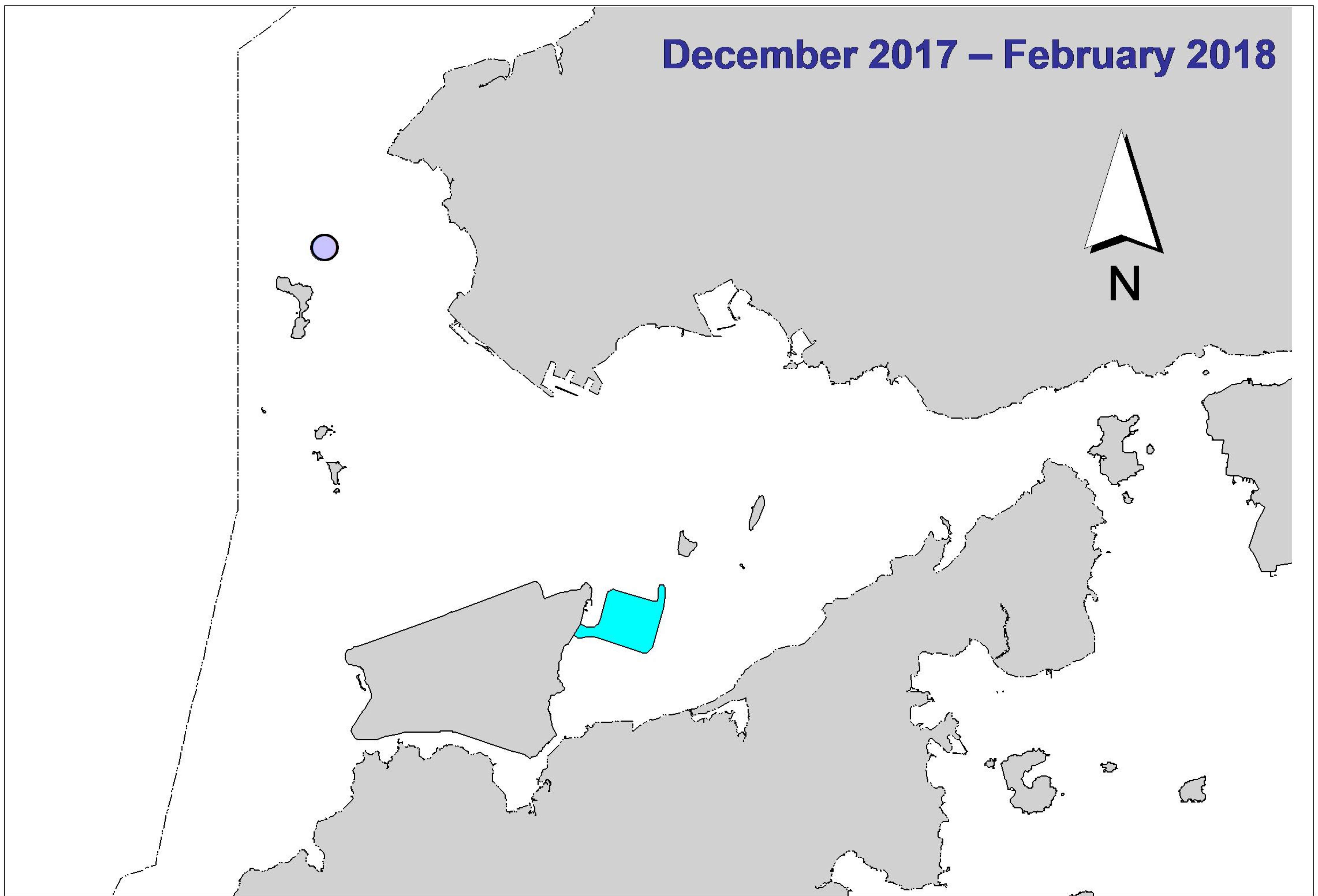


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)



## Appendix I. HKLR03 Survey Effort Database (Dec 2017 - Feb 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
5-Dec-17	NW LANTAU	2	17.27	WINTER	STANDARD36826	HKLR	P
5-Dec-17	NW LANTAU	3	15.02	WINTER	STANDARD36826	HKLR	P
5-Dec-17	NW LANTAU	2	7.80	WINTER	STANDARD36826	HKLR	S
5-Dec-17	NW LANTAU	3	3.81	WINTER	STANDARD36826	HKLR	S
5-Dec-17	NE LANTAU	2	33.41	WINTER	STANDARD36826	HKLR	P
5-Dec-17	NE LANTAU	3	2.11	WINTER	STANDARD36826	HKLR	P
5-Dec-17	NE LANTAU	2	13.18	WINTER	STANDARD36826	HKLR	S
5-Dec-17	NE LANTAU	3	0.60	WINTER	STANDARD36826	HKLR	S
12-Dec-17	NW LANTAU	2	24.51	WINTER	STANDARD36826	HKLR	P
12-Dec-17	NW LANTAU	3	3.30	WINTER	STANDARD36826	HKLR	P
12-Dec-17	NW LANTAU	2	11.89	WINTER	STANDARD36826	HKLR	S
12-Dec-17	NW LANTAU	3	0.90	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NW LANTAU	1	3.85	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NW LANTAU	2	21.86	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NW LANTAU	3	2.68	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NW LANTAU	1	2.79	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NW LANTAU	2	6.92	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NW LANTAU	3	2.43	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NE LANTAU	1	11.59	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NE LANTAU	2	21.70	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NE LANTAU	3	4.60	WINTER	STANDARD36826	HKLR	P
15-Dec-17	NE LANTAU	1	3.31	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NE LANTAU	2	6.80	WINTER	STANDARD36826	HKLR	S
15-Dec-17	NE LANTAU	3	1.90	WINTER	STANDARD36826	HKLR	S
20-Dec-17	NW LANTAU	2	1.39	WINTER	STANDARD36826	HKLR	P
20-Dec-17	NW LANTAU	3	5.99	WINTER	STANDARD36826	HKLR	P
20-Dec-17	NW LANTAU	4	25.69	WINTER	STANDARD36826	HKLR	P
20-Dec-17	NW LANTAU	3	5.43	WINTER	STANDARD36826	HKLR	S
20-Dec-17	NW LANTAU	4	5.50	WINTER	STANDARD36826	HKLR	S
2-Jan-18	NW LANTAU	2	27.79	WINTER	STANDARD36826	HKLR	P
2-Jan-18	NW LANTAU	3	3.97	WINTER	STANDARD36826	HKLR	P
2-Jan-18	NW LANTAU	2	10.12	WINTER	STANDARD36826	HKLR	S
2-Jan-18	NW LANTAU	3	0.60	WINTER	STANDARD36826	HKLR	S
8-Jan-18	NW LANTAU	3	3.47	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NW LANTAU	4	9.99	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NW LANTAU	5	14.91	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NW LANTAU	4	6.80	WINTER	STANDARD36826	HKLR	S
8-Jan-18	NW LANTAU	5	3.73	WINTER	STANDARD36826	HKLR	S
8-Jan-18	NE LANTAU	2	6.71	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NE LANTAU	3	29.79	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NE LANTAU	4	0.64	WINTER	STANDARD36826	HKLR	P
8-Jan-18	NE LANTAU	2	5.70	WINTER	STANDARD36826	HKLR	S
8-Jan-18	NE LANTAU	3	7.36	WINTER	STANDARD36826	HKLR	S
16-Jan-18	NW LANTAU	2	27.70	WINTER	STANDARD36826	HKLR	P
16-Jan-18	NW LANTAU	3	5.45	WINTER	STANDARD36826	HKLR	P
16-Jan-18	NW LANTAU	2	8.15	WINTER	STANDARD36826	HKLR	S
16-Jan-18	NW LANTAU	3	2.70	WINTER	STANDARD36826	HKLR	S
25-Jan-18	NE LANTAU	2	17.96	WINTER	STANDARD36826	HKLR	P
25-Jan-18	NE LANTAU	3	18.90	WINTER	STANDARD36826	HKLR	P
25-Jan-18	NE LANTAU	2	7.54	WINTER	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
25-Jan-18	NE LANTAU	3	4.20	WINTER	STANDARD36826	HKLR	S
25-Jan-18	NE LANTAU	4	1.40	WINTER	STANDARD36826	HKLR	S
25-Jan-18	NW LANTAU	2	7.23	WINTER	STANDARD36826	HKLR	P
25-Jan-18	NW LANTAU	3	17.92	WINTER	STANDARD36826	HKLR	P
25-Jan-18	NW LANTAU	4	2.72	WINTER	STANDARD36826	HKLR	P
25-Jan-18	NW LANTAU	2	4.02	WINTER	STANDARD36826	HKLR	S
25-Jan-18	NW LANTAU	3	6.52	WINTER	STANDARD36826	HKLR	S
25-Jan-18	NW LANTAU	4	1.95	WINTER	STANDARD36826	HKLR	S
2-Feb-18	NW LANTAU	2	2.34	WINTER	STANDARD36826	HKLR	P
2-Feb-18	NW LANTAU	3	16.30	WINTER	STANDARD36826	HKLR	P
2-Feb-18	NW LANTAU	4	15.00	WINTER	STANDARD36826	HKLR	P
2-Feb-18	NW LANTAU	2	2.86	WINTER	STANDARD36826	HKLR	S
2-Feb-18	NW LANTAU	3	6.78	WINTER	STANDARD36826	HKLR	S
2-Feb-18	NW LANTAU	4	1.12	WINTER	STANDARD36826	HKLR	S
9-Feb-18	NE LANTAU	1	4.00	WINTER	STANDARD36826	HKLR	P
9-Feb-18	NE LANTAU	2	30.78	WINTER	STANDARD36826	HKLR	P
9-Feb-18	NE LANTAU	1	1.00	WINTER	STANDARD36826	HKLR	S
9-Feb-18	NE LANTAU	2	12.02	WINTER	STANDARD36826	HKLR	S
9-Feb-18	NW LANTAU	1	5.87	WINTER	STANDARD36826	HKLR	P
9-Feb-18	NW LANTAU	2	21.20	WINTER	STANDARD36826	HKLR	P
9-Feb-18	NW LANTAU	1	2.32	WINTER	STANDARD36826	HKLR	S
9-Feb-18	NW LANTAU	2	8.91	WINTER	STANDARD36826	HKLR	S
14-Feb-18	NW LANTAU	1	2.80	WINTER	STANDARD36826	HKLR	P
14-Feb-18	NW LANTAU	2	24.71	WINTER	STANDARD36826	HKLR	P
14-Feb-18	NW LANTAU	2	12.25	WINTER	STANDARD36826	HKLR	S
14-Feb-18	NE LANTAU	1	3.84	WINTER	STANDARD36826	HKLR	P
14-Feb-18	NE LANTAU	2	22.25	WINTER	STANDARD36826	HKLR	P
14-Feb-18	NE LANTAU	3	10.09	WINTER	STANDARD36826	HKLR	P
14-Feb-18	NE LANTAU	2	12.04	WINTER	STANDARD36826	HKLR	S
14-Feb-18	NE LANTAU	3	1.28	WINTER	STANDARD36826	HKLR	S
22-Feb-18	NW LANTAU	2	11.27	WINTER	STANDARD36826	HKLR	P
22-Feb-18	NW LANTAU	3	21.56	WINTER	STANDARD36826	HKLR	P
22-Feb-18	NW LANTAU	2	5.32	WINTER	STANDARD36826	HKLR	S
22-Feb-18	NW LANTAU	3	5.45	WINTER	STANDARD36826	HKLR	S

## Appendix II. HKLR03 Chinese White Dolphin Sighting Database (December 2017 - February 2018)

(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 Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
5-Dec-17	1	1150	5	NW LANTAU	3	155	ON	HKLR	824890	806432	WINTER	NONE	P
15-Dec-17	1	1011	1	NW LANTAU	2	7	ON	HKLR	815955	805415	WINTER	NONE	P
15-Dec-17	2	1106	6	NW LANTAU	2	151	ON	HKLR	825966	805414	WINTER	NONE	P
15-Dec-17	3	1242	1	NW LANTAU	1	176	ON	HKLR	824441	809449	WINTER	NONE	P
2-Jan-18	1	1141	8	NW LANTAU	2	93	ON	HKLR	827614	806458	WINTER	PURSE-SEINE	P
2-Jan-18	2	1204	8	NW LANTAU	2	285	ON	HKLR	828301	806418	WINTER	NONE	P
8-Jan-18	1	1105	2	NW LANTAU	5	42	ON	HKLR	827107	805345	WINTER	NONE	P
16-Jan-18	1	1137	1	NW LANTAU	2	309	ON	HKLR	825178	806453	WINTER	NONE	P
25-Jan-18	1	1440	1	NW LANTAU	3	237	ON	HKLR	827516	805356	WINTER	NONE	P
2-Feb-18	1	1134	1	NW LANTAU	3	33	ON	HKLR	824048	806286	WINTER	NONE	S
9-Feb-18	1	956	1	NW LANTAU	1	ND	OFF	HKLR	816739	806756	WINTER	NONE	
9-Feb-18	2	1013	1	NW LANTAU	1	99	ON	HKLR	817306	805490	WINTER	NONE	P
9-Feb-18	3	1031	2	NW LANTAU	2	687	ON	HKLR	820619	804662	WINTER	NONE	P
9-Feb-18	4	1116	2	NW LANTAU	1	387	ON	HKLR	828225	805491	WINTER	NONE	S
14-Feb-18	1	1052	1	NW LANTAU	2	55	ON	HKLR	826276	805353	WINTER	NONE	P
14-Feb-18	2	1107	3	NW LANTAU	2	1047	ON	HKLR	828037	805429	WINTER	NONE	P
22-Feb-18	1	1040	1	NW LANTAU	3	137	ON	HKLR	827222	808537	WINTER	NONE	P

**Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in December 2017 - February 2018**

<b>ID#</b>	<b>DATE</b>	<b>STG#</b>	<b>AREA</b>
CH34	15/12/17	2	NW LANTAU
NL33	15/12/17	2	NW LANTAU
	02/01/18	2	NW LANTAU
NL46	05/12/17	1	NW LANTAU
NL98	02/01/18	1	NW LANTAU
NL123	02/01/18	2	NW LANTAU
	25/01/18	1	NW LANTAU
NL136	15/12/17	2	NW LANTAU
	02/01/18	1	NW LANTAU
NL182	15/12/17	2	NW LANTAU
	02/01/18	1	NW LANTAU
	22/02/18	1	NW LANTAU
NL202	09/02/18	4	NW LANTAU
NL226	02/01/18	1	NW LANTAU
NL242	05/12/17	1	NW LANTAU
NL261	15/12/17	2	NW LANTAU
NL269	05/12/17	1	NW LANTAU
	02/01/18	1	NW LANTAU
NL272	02/01/18	1	NW LANTAU
	16/01/18	1	NW LANTAU
NL286	02/01/18	2	NW LANTAU
	09/02/18	4	NW LANTAU
NL296	05/12/17	1	NW LANTAU
NL311	02/01/18	1	NW LANTAU
NL322	15/12/17	2	NW LANTAU
	02/01/18	2	NW LANTAU
WL11	14/02/18	1	NW LANTAU
WL28	09/02/18	3	NW LANTAU
WL62	15/12/17	3	NW LANTAU
WL251	02/01/18	2	NW LANTAU
WL273	05/12/17	1	NW LANTAU
WL288	09/02/18	3	NW LANTAU



Appendix IV. Twenty-three individual dolphins that were identified during December 2017 to February 2018 under HKLR03 impact phase monitoring surveys



Appendix IV. (cont'd)

NL123



NL136



NL182



NL202



Appendix IV. (cont'd)

NL226



NL242



NL261



NL269





Appendix IV. (cont'd)

NL272



NL286



NL296



NL311



Appendix IV. (cont'd)

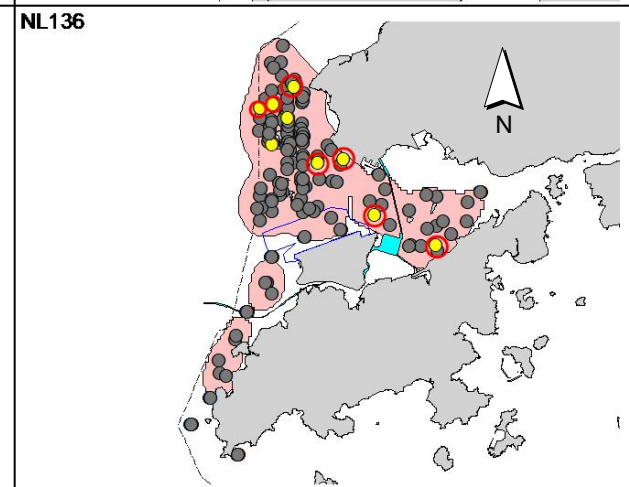
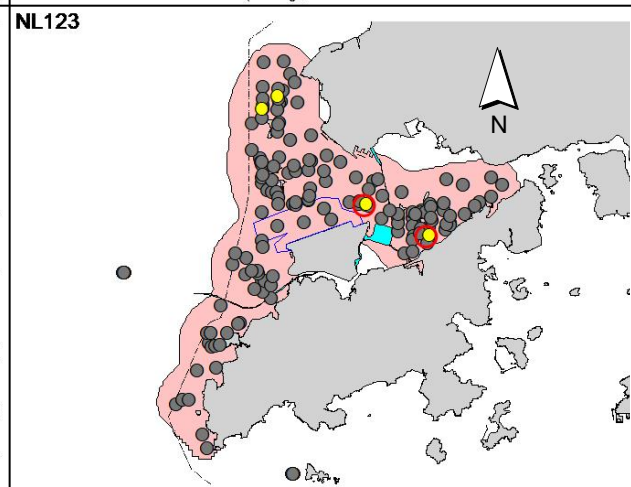
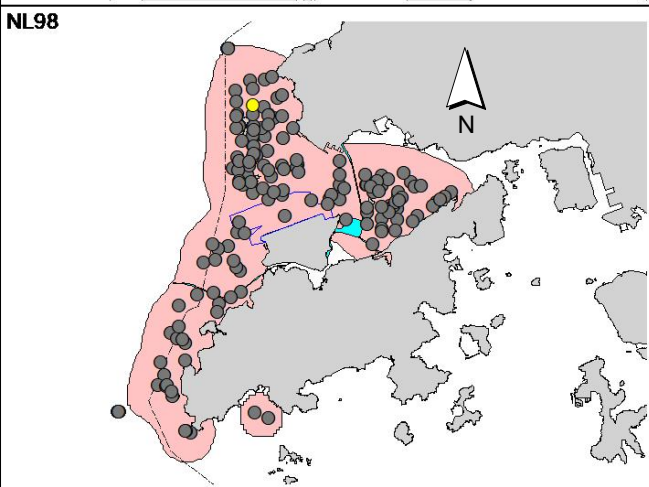
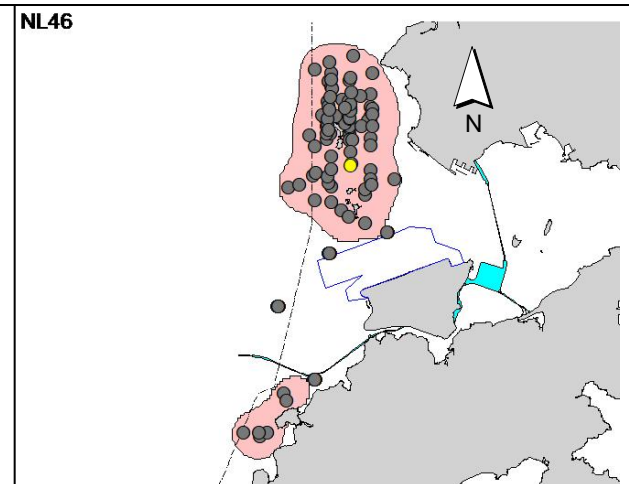
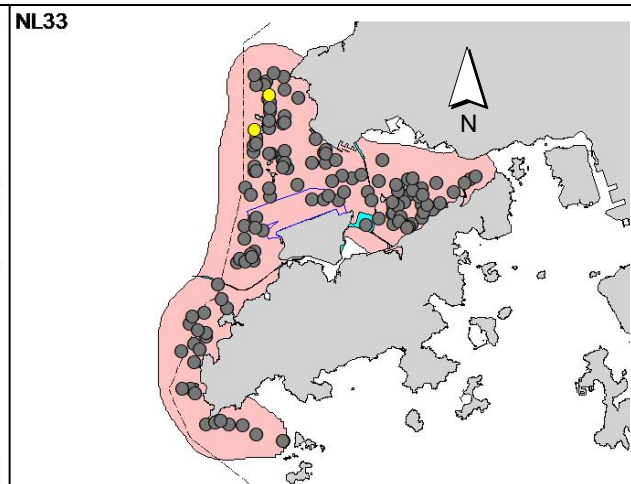
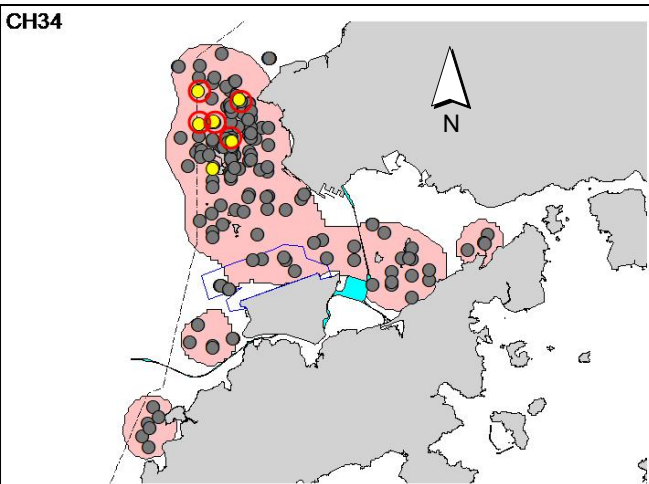




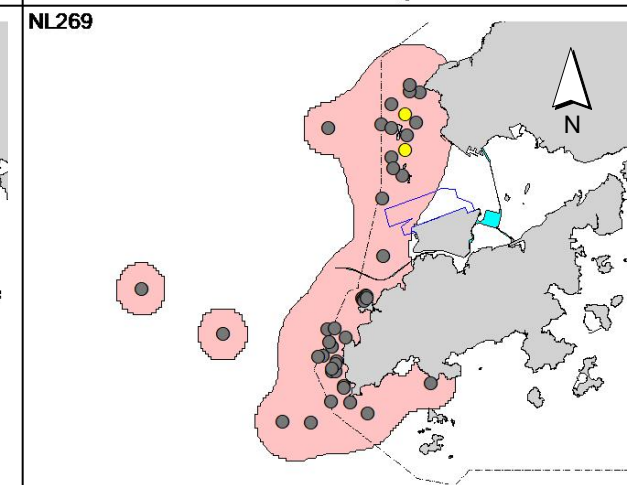
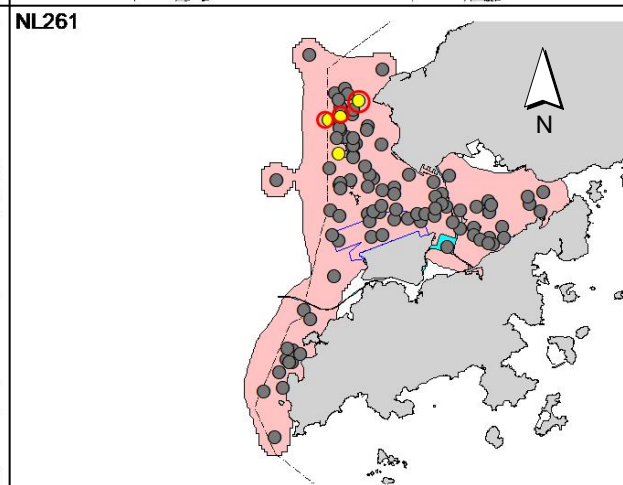
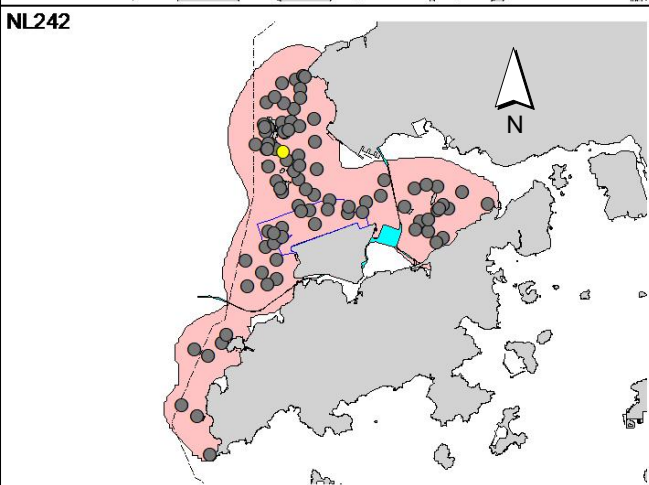
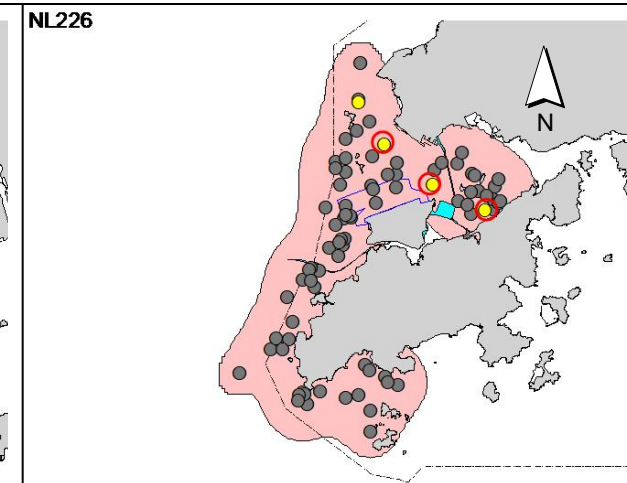
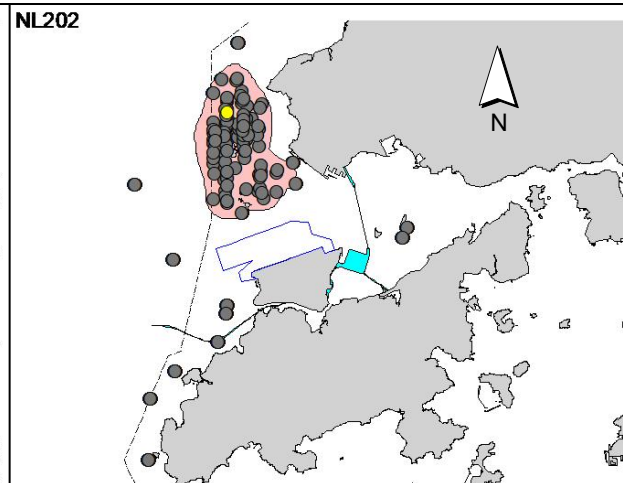
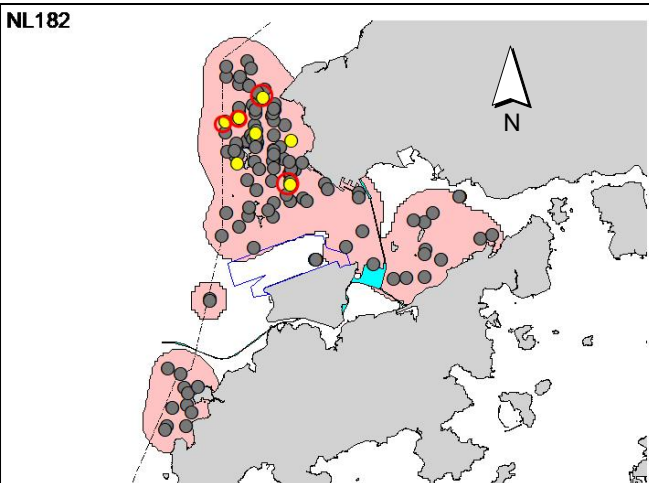
Appendix IV. (cont'd)



Appendix V. Ranging patterns (95% kernel ranges) of 23 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicate sightings made in Dec 2017 – Feb 2018 during HKLR03 and HKLR09 monitoring surveys; the yellow dots with the red circles indicate the ones made during HKBCF monitoring surveys)

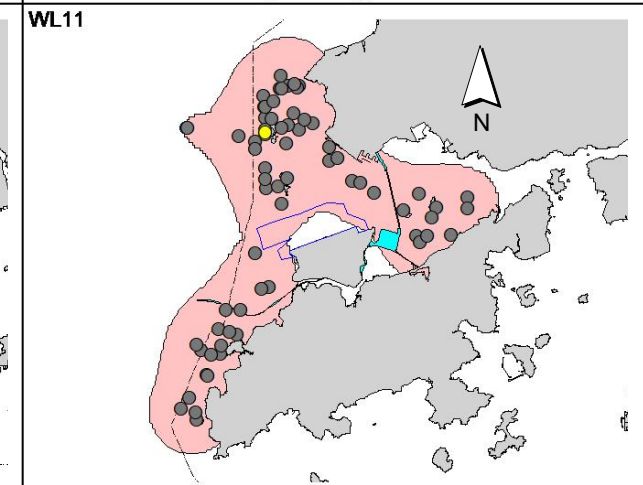
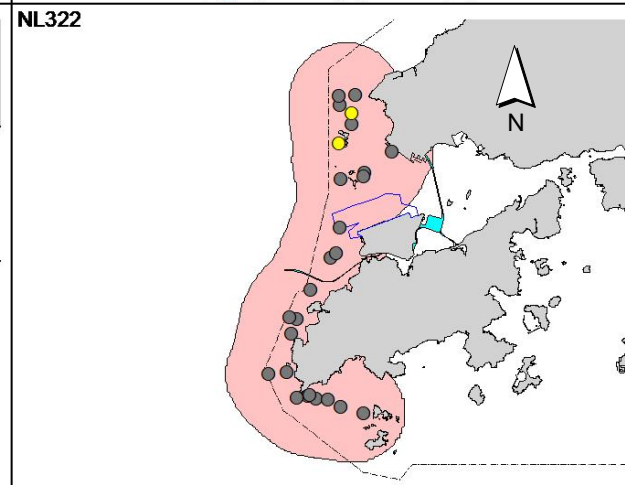
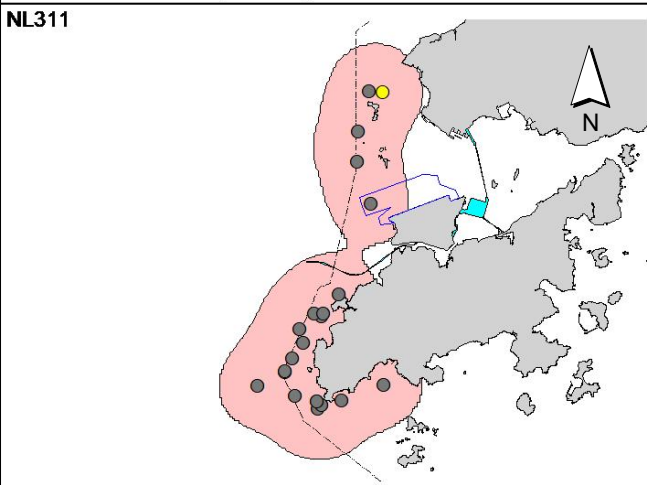
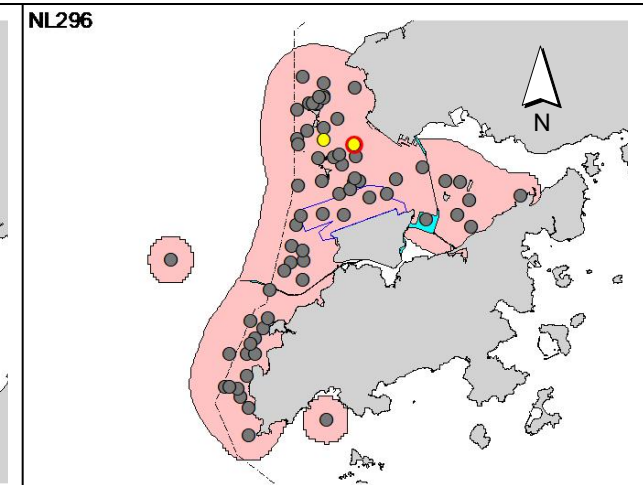
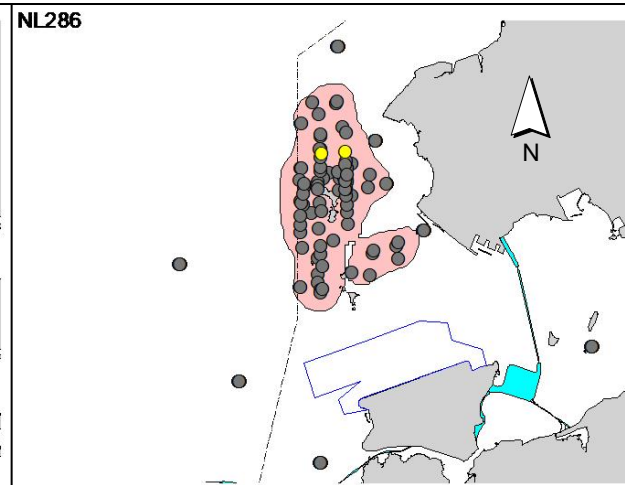
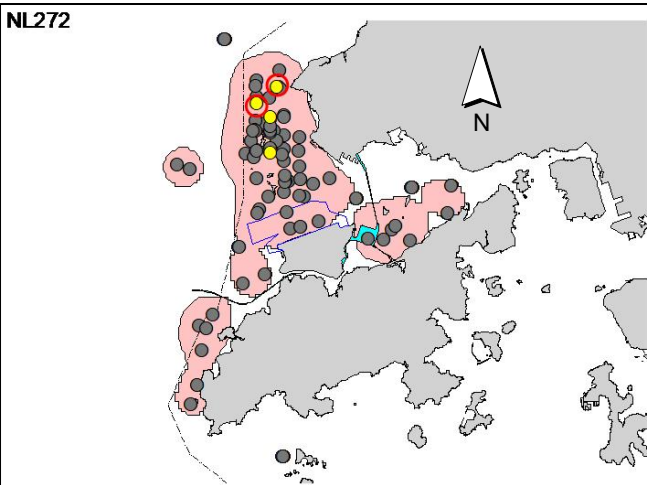


Appendix V. (cont'd)

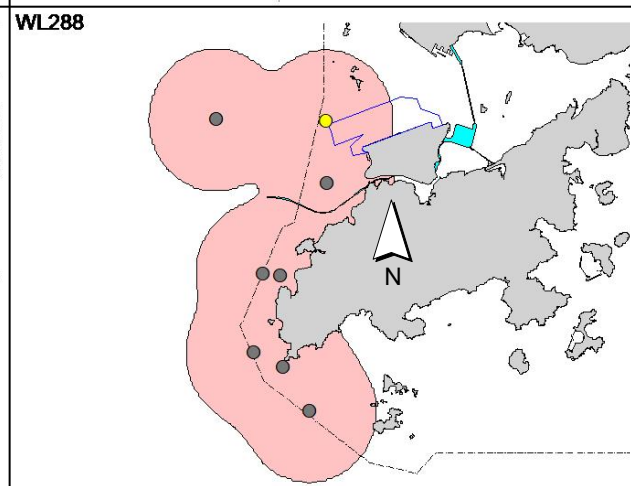
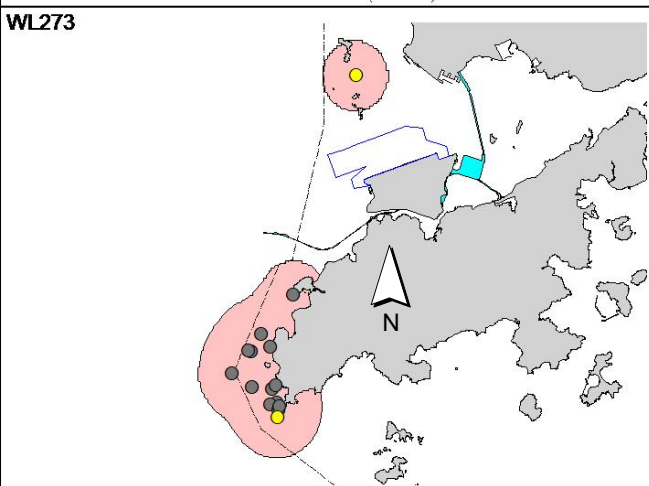
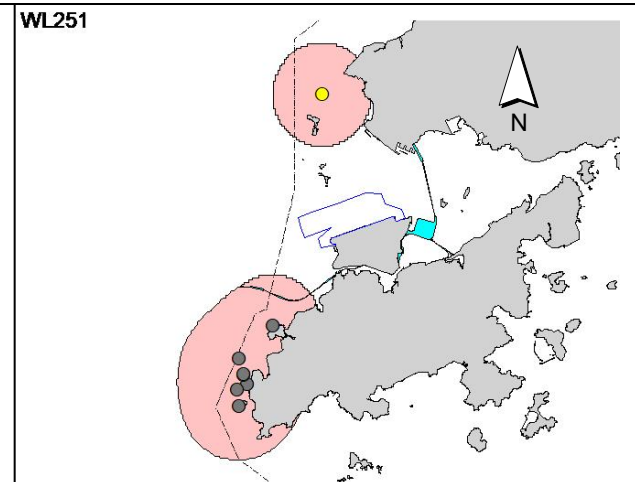
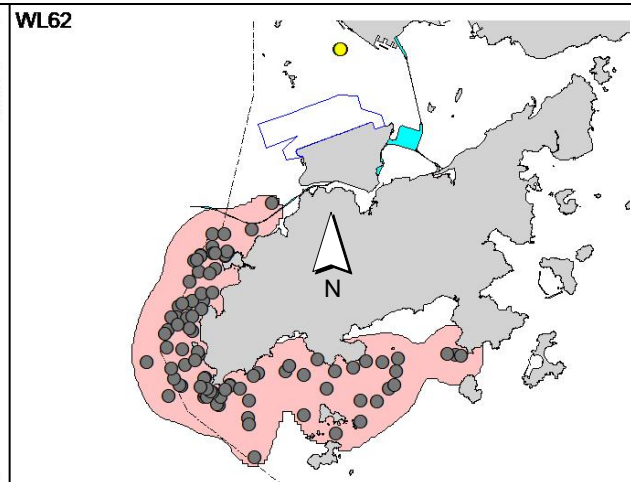
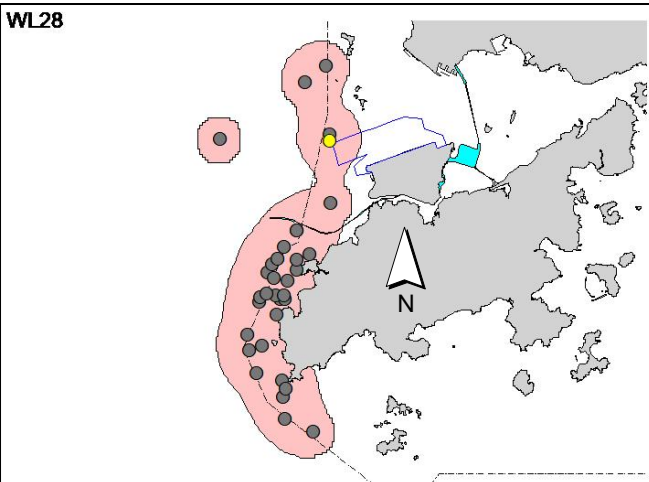




Appendix V. (cont'd)



Appendix V. (cont'd)





Appendix J

## Event Action Plan

*Appendix J1 Event/ Action Plan for Air Quality*

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

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

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the SOR informed of the results.

8. If exceedance stops cease  
additional monitoring.

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*Appendix J2 Event/ Action Plan for Construction Noise*

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



**Appendix J3**      *Event/ Action Plan for Water Quality*

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

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.
	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;
Limit level being exceeded by two or more consecutive sampling days	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. 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;	3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly;	4.	4. Resubmit proposals of mitigation measures if problem still not under control;
	5. Discuss mitigation measures with IEC, SOR and Contractor;	4. Supervise the implementation of mitigation measures.	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**

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

<b>Event</b>	<b>ET Leader</b>	<b>IEC</b>	<b>SOR</b>	<b>Contractor</b>
Limit Level	<ol style="list-style-type: none"> <li>1. Repeat statistical data analysis to confirm findings;</li> <li>2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&amp;A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences;</li> <li>3. Identify source(s) of impact;</li> <li>4. Inform the IEC, ER/SOR and Contractor of findings;</li> <li>5. Check monitoring data;</li> <li>6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary;</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET and Contractor;</li> <li>2. Discuss monitoring results and findings with the ET and the Contractor;</li> <li>3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures;</li> <li>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;</li> <li>5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures;</li> <li>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;</li> <li>3. Supervise the implementation of additional monitoring and/or any other mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER/SOR and confirm notification of the non-compliance in writing;</li> <li>2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures;</li> <li>3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary;</li> <li>4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.</li> </ol>

**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"> <li>1. Repeat statistical data analysis to confirm findings;</li> <li>2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences;</li> <li>3. Identify source(s) of impact;</li> <li>4. Inform the IEC, SO and Contractor;</li> <li>5. Check monitoring data;</li> <li>6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET and Contractor;</li> <li>2. Discuss monitoring with the ET and the Contractor;</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET;</li> <li>2. Make agreement on measures to be implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the SO and confirm notification of the non-compliance in writing;</li> <li>2. Discuss with the ET and the IEC and propose measures to the IEC and the SO;</li> <li>3. Implement the agreed measures.</li> </ol>



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"> <li>1. Repeat statistical data analysis to confirm findings;</li> <li>2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences;</li> <li>3. Identify source(s) of impact;</li> <li>4. Inform the IEC, SO and Contractor;</li> <li>5. Check monitoring data;</li> <li>6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary</li> <li>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.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET and Contractor;</li> <li>2. Discuss monitoring with the ET and the Contractor;</li> <li>3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET;</li> <li>2. Make agreement on measures to be implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the SO and confirm notification of the non-compliance in writing;</li> <li>2. Discuss with the ET and the IEC and propose measures to the IEC and the SO;</li> <li>3. Implement the agreed measures.</li> </ol>

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 2017 (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
	sub-total	sub-total	sub-total	sub-total	sub-total	sub-total									7kg/bag	5kg/number
Location																
Density (ton/m <sup>3</sup> )																
ID no.											(web record)					
Unit	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	4.591	0.717	0.474	-	4.118	-	-	-	-	3.521	99.840	-	-	0.140	-	-
Feb	5.034	1.585	0.166	-	4.869	-	0.857	-	-	-	127.720	-	-	0.091	-	-
Mar	6.575	0.937	0.498	-	6.077	-	0.771	-	-	6.000	87.910	-	-	0.077	-	-
Apr	5.467	0.791	1.058	-	4.409	-	-	-	-	-	130.680	-	5.170	0.063	-	-
May	4.960	0.537	0.826	-	4.134	-	0.672	-	-	-	171.870	-	-	0.056	-	-
Jun	4.491	0.567	0.098	-	4.394	-	-	-	-	-	148.600	-	-	0.063	-	-
<b>SUB-TOTAL</b>	<b>31.118</b>	<b>5.133</b>	<b>3.118</b>	<b>-</b>	<b>28.000</b>	<b>0.000</b>	<b>2.300</b>	<b>-</b>	<b>-</b>	<b>9.521</b>	<b>766.620</b>	<b>-</b>	<b>5.170</b>	<b>0.490</b>	<b>-</b>	<b>-</b>
Jul	5.618	0.426	0.696	0.002	4.921	-	1.056	-	-	0.800	159.980	-	-	0.091	-	-
Aug	3.897	0.232	-	-	3.897	-	-	-	-	-	159.230	-	-	0.056	-	-
Sep	3.142	0.676	-	-	3.142	-	1.517	1.047	0.127	-	185.420	-	18.030	0.070	-	-
Oct	3.239	0.385	0.559	-	2.680	-	-	-	-	-	172.690	-	-	0.063	-	-
Nov	3.354	0.814	0.023	-	3.331	-	-	-	-	5.400	159.650	-	5.840	0.028	-	-
Dec	3.054	0.755	0.160	0.004	2.890	-	-	-	-	2.400	181.710	-	15.580	0.056	-	-
<b>TOTAL</b>	<b>53.422</b>	<b>8.422</b>	<b>4.555</b>	<b>0.006</b>	<b>48.861</b>	<b>-</b>	<b>4.873</b>	<b>1.047</b>	<b>-</b>	<b>0.127</b>	<b>18.121</b>	<b>1,785.300</b>	<b>-</b>	<b>44.620</b>	<b>0.854</b>	<b>-</b>

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.

Contract No. : HY/2012/07

Tuen Mun Chek Lap Kok Link – Southern Connection Viaduct Section

Monthly Summary Waste Flow Table for 2018 (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 <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000m <sup>3</sup> )	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	4.288	0.405	0.137	-	4.151	-	-	-	-	-	-	211.060	-	-	0.084	-
Feb	2.662	0.241	0.826	-	1.836	-	-	-	-	-	-	184.880	-	-	0.028	-
Mar	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Apr	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
May	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Jun	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>SUB-TOTAL</b>	<b>6.950</b>	<b>0.646</b>	<b>0.962</b>	<b>-</b>	<b>5.988</b>	<b>0.000</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>395.940</b>	<b>-</b>	<b>0.000</b>	<b>0.112</b>	<b>-</b>
Jul	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Aug	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sep	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Oct	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Nov	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Dec	-	0.000	-	-	-	-	-	-	-	-	-	-	-	-	-	-
<b>TOTAL</b>	<b>6.950</b>	<b>0.646</b>	<b>0.962</b>	<b>-</b>	<b>5.988</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>395.940</b>	<b>-</b>	<b>-</b>	<b>0.112</b>	<b>-</b>

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	1	1
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	4	136
	Limit	0	15
Impact Dolphin Monitoring	Action	2	11
	Limit	0	11

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

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This quarter	1	0	0
Total No. received since project commencement	12	0	0



ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/07

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

*Marine Water Quality Impact Monitoring*

**Notification of Exceedance**

<b>Log No.</b>	<p><u>Action Level Exceedance</u> 0215660_6 December 2017_Depth-averaged SS_F_Station IS8</p> <p>[Total No. of Exceedances = 1]</p>	
<b>Date</b>	<p>6 December 2017 (Measured) 7 December 2017 (<i>In situ</i> results received by ERM) 12 December 2017 (Laboratory results received by ERM)</p>	
<b>Monitoring Station</b>	<p>CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)</p>	
<b>Parameter(s) with Exceedance(s)</b>	<p>Depth-averaged Suspended Solids (SS)</p>	
<b>Action Levels for SS</b>	<p>SS</p>	<p>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).</p>
<b>Limit Levels for SS</b>	<p>SS</p>	<p>130% of upstream control station at the same tide of the same day and 99%-ile of baseline data. (i.e., 34.4 mg/L)</p>
<b>Measured Levels</b>	<p><u>Action Level Exceedance</u> 1. Mid-flood at IS8 (Depth-averaged SS = 23.8mg/L).</p>	
<b>Works Undertaken (at the time of monitoring event)</b>	<p>No major marine works was undertaken under this Contract on 6 December 2017.</p>	
<b>Possible Reason for Action or Limit Level Exceedance(s)</b>	<p>The exceedances of depth-averaged SS are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> <li>• No marine works was undertaken under this Contract on 6 December 2017.</li> <li>• Apart from IS8, depth-averaged SS levels at all other monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day.</li> <li>• Depth-averaged Turbidity levels and average DO levels at all stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day.</li> </ul>	
<b>Actions Taken/ To Be Taken</b>	<p>No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>	
<b>Remarks</b>	<p>The monitoring results on 6 December 2017 and locations of water quality monitoring stations are attached. Site photo record on 6 December 2017 is attached.</p>	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Surface	1	22.4	8.1	32.6	6.7	6.6	4.6	8.9	4.3	5.8
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Surface	2	22.5	8.0	32.4	6.7		4.6		4.2	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Middle	1	22.0	8.1	32.6	6.5		3.3		6.1	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Middle	2	22.1	8.0	32.4	6.5		3.3		5.7	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Bottom	1	21.9	8.1	32.6	6.5	6.5	18.9	19.0	6.5	20.1
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)5	14:56	Bottom	2	22.0	8.0	32.5	6.4		18.9		8.1	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Surface	1	21.6	8.2	32.1	6.9	6.9	13.7	19.0	13.9	20.1
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Surface	2	21.9	8.0	30.3	6.9		14.0		12.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Middle	1	21.4	8.2	32.1	6.8		20.6		15.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Middle	2	21.7	8.0	30.3	6.9	6.9	20.6	19.0	15.2	20.1
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Bottom	1	21.4	8.2	32.1	6.8		22.5		31.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	CS(Mf)3(N)	13:38	Bottom	2	21.6	8.0	30.2	6.9	6.9	22.8	19.0	32.3	20.1
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Surface	1	22.0	8.1	32.4	7.1		3.8		6.1	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Surface	2	22.1	8.0	32.2	7.1	7.0	3.8	9.4	5.7	7.3
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Middle	1	21.6	8.1	32.4	6.9		6.2		8.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Middle	2	21.7	8.0	32.2	6.9		6.2		6.4	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Bottom	1	21.5	8.1	32.4	7.0		18.2		7.9	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)16	14:24	Bottom	2	21.6	8.0	32.2	6.9	7.0	18.2	10.9	9.2	14.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a	14:11	Surface	1	21.8	8.1	32.5	6.9		9.3		13.7	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a	14:11	Surface	2	21.9	8.0	32.3	6.9	6.9	10.8	10.9	12.2	14.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a	14:11	Bottom	1	21.7	8.1	32.5	7.0	7.0	10.5	10.9	15.9	13.8
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4a	14:11	Bottom	2	21.8	8.0	32.3	6.9		13.0		14.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4	14:06	Surface	1	21.9	8.1	32.5	6.8	6.8	10.9	12.7	10.8	13.8
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4	14:06	Surface	2	22.0	8.0	32.3	6.8		10.0		10.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4	14:06	Bottom	1	21.8	8.1	32.5	7.0	7.0	14.3	19.9	17.0	23.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	SR4	14:06	Bottom	2	21.9	8.0	32.3	6.9		15.5		17.0	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8	13:57	Surface	1	21.7	8.1	32.4	6.9	6.9	19.6	19.9	22.7	23.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8	13:57	Surface	2	21.8	8.0	32.2	6.9		20.1		20.8	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8		Middle	2					7.0		19.9		23.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8	13:57	Bottom	1	21.6	8.1	32.4	7.0		19.3		24.0	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS8	13:57	Bottom	2	21.7	8.0	32.3	6.9	7.0	20.4	19.9	24.6	23.0
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9	13:47	Surface	1	21.8	8.1	32.5	7.0		8.2		8.1	
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9	13:47	Surface	2	21.9	8.1	32.3	7.0	7.0	8.9	9.1	9.4	8.4
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9	13:47	Bottom	1	21.7	8.1	32.5	7.1	7.1	9.7	9.1	8.4	8.4
TMCLKL	HY/2012/07	2017-12-06	Mid-Ebb	IS(Mf)9	13:47	Bottom	2	21.9	8.1	32.3	7.1		9.5		7.7	

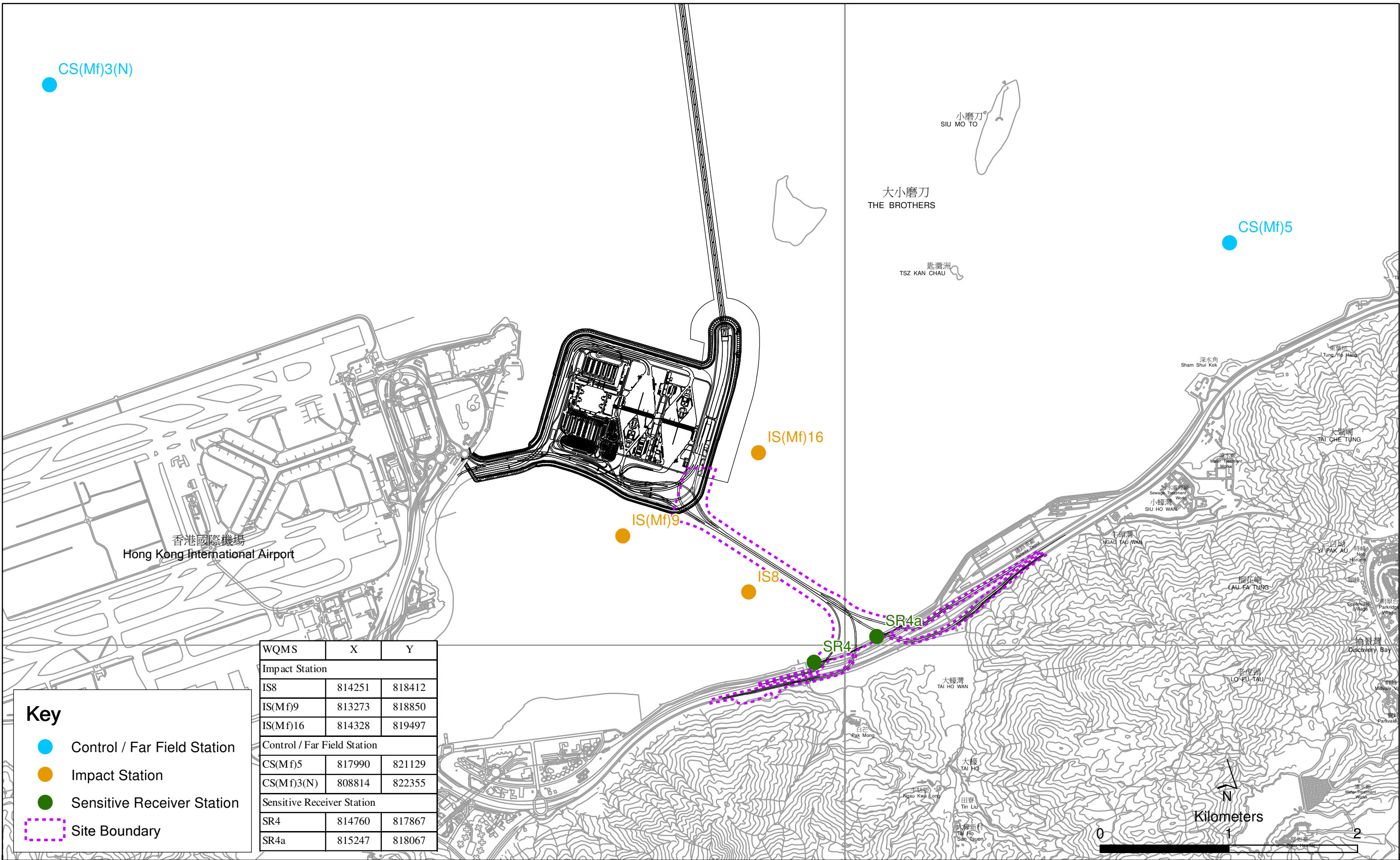
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Surface	1	21.8	8.1	32.4	6.7	6.7	5.4	9.4	11.9	12.4
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Surface	2	21.9	8.0	32.2	6.7		5.8		12.4	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Middle	1	21.7	8.1	32.4	6.7		7.0		12.2	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Middle	2	21.8	8.1	32.3	6.7		7.7		11.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Bottom	1	21.6	8.1	32.4	6.7		15.2		12.2	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)5	8:56	Bottom	2	21.7	8.1	32.3	6.7		15.4		14.2	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Surface	1	21.6	8.0	31.6	6.6	6.7	22.4	23.6	24.4	23.9
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Surface	2	21.8	7.9	30.1	6.7		22.7		22.4	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Middle	1	21.6	8.0	31.6	6.6		23.7		24.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Middle	2	21.8	7.9	30.1	6.7		23.6		22.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Bottom	1	21.6	8.0	31.6	6.6		24.8		25.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	CS(Mf)3(N)	9:48	Bottom	2	21.8	7.9	30.1	6.6		24.5		24.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16	9:20	Surface	1	21.4	8.1	32.3	6.9	6.9	11.3	14.2	11.8	12.8
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16	9:20	Surface	2	21.5	8.1	32.2	6.9		12.4		11.7	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16	9:20	Bottom	1	21.4	8.1	32.4	6.9		16.0		14.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)16	9:20	Bottom	2	21.5	8.1	32.2	6.9		17.1		13.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a	9:29	Surface	1	21.5	8.1	32.5	6.7	6.7	8.9	8.1	11.3	12.9
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a	9:29	Surface	2	21.6	8.0	32.3	6.7		8.9		10.9	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a	9:29	Bottom	1	21.5	8.1	32.5	6.8		7.3		14.7	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4a	9:29	Bottom	2	21.6	8.0	32.3	6.8		7.3		14.8	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4	9:34	Surface	1	21.5	8.1	32.5	6.7	6.7	9.2	10.2	10.6	11.6
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4	9:34	Surface	2	21.6	8.0	32.3	6.6		10.1		10.9	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4	9:34	Bottom	1	21.5	8.1	32.5	6.8		10.3		11.7	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	SR4	9:34	Bottom	2	21.6	8.0	32.3	6.7		11.0		13.0	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8	9:43	Surface	1	21.5	8.1	32.5	6.7	6.7	19.7	22.9	22.4	23.8
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8	9:43	Surface	2	21.6	8.0	32.3	6.7		19.8		23.3	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8	9:43	Bottom	1	21.5	8.1	32.5	6.9		26.1		24.5	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS8	9:43	Bottom	2	21.6	8.0	32.3	6.9		25.8		25.0	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9	9:53	Surface	1	21.5	8.1	32.5	6.8	6.8	15.2	16.8	22.7	22.4
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9	9:53	Surface	2	21.6	8.0	32.3	6.8		17.2		22.6	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9		Middle	1									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9		Middle	2									
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9	9:53	Bottom	1	21.5	8.1	32.5	6.8		17.2		21.6	
TMCLKL	HY/2012/07	2017-12-06	Mid-Flood	IS(Mf)9	9:53	Bottom	2	21.6	8.0	32.3	6.8		17.5		22.7	

Note: Indicates Exceedance of Action Level  
Indicates Exceedance of Limit Level

Photo 1 - Mid-Flood at IS8 on 6 December 2017







WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

**Key**

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

Locations of Water Quality Monitoring Stations

Email  
message

Environmental  
Resources  
Management

*To* Ramboll Environ – Hong Kong, Limited (ENPO)

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

*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 Marine Water  
Quality Impact Monitoring



**ERM**

*Date* 15 December 2017

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Dear Sir/ Madam,

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

Action Level Exceedance  
0215660\_8 December 2017\_Depth-averaged SS\_F\_Station IS8

A total of one (1) exceedance was recorded on 8 December 2017.

Regards,

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

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

*Marine Water Quality Impact Monitoring*

**Notification of Exceedance**

<b>Log No.</b>	<u>Action Level Exceedance</u> <b>0215660_8 December 2017_Depth-averaged SS_F_Station IS8</b>  <b>[Total No. of Exceedances = 1]</b>	
<b>Date</b>	8 December 2017 (Measured) 9 December 2017 ( <i>In situ</i> results received by ERM) 14 December 2017 (Laboratory results received by ERM)	
<b>Monitoring Station</b>	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
<b>Parameter(s) with Exceedance(s)</b>	Depth-averaged Suspended Solids (SS)	
<b>Action Levels for SS</b>	SS	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).
<b>Limit Levels for SS</b>	SS	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data. (i.e., 34.4 mg/L)
<b>Measured Levels</b>	<u>Action Level Exceedance</u> 1. Mid-flood at IS8 (Depth-averaged SS = 32.8mg/L).	
<b>Works Undertaken (at the time of monitoring event)</b>	No major marine works was undertaken under this Contract on 8 December 2017.	
<b>Possible Reason for Action or Limit Level Exceedance(s)</b>	The exceedances of depth-averaged SS are unlikely to be due to the Project, in view of the following: <ul style="list-style-type: none"> <li>• No marine works was undertaken under this Contract on 8 December 2017.</li> <li>• Apart from IS8, depth-averaged SS levels at all other sensitive receiver stations and impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day.</li> <li>• Depth-averaged Turbidity levels and average DO levels at all stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day.</li> </ul>	
<b>Actions Taken/ To Be Taken</b>	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
<b>Remarks</b>	The monitoring results on 8 December 2017 and locations of water quality monitoring stations are attached. Site photo record on 8 December 2017 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Surface	1	21.6	8.1	32.1	6.7	6.7	4.1	4.2	10.9	11.0
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Surface	2	21.5	8.1	32.3	6.7		4.1		9.5	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Middle	1	21.6	8.1	32.2	6.7		4.2		9.0	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Middle	2	21.5	8.1	32.4	6.8	6.8	4.2	4.2	9.1	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Bottom	1	21.5	8.1	32.1	6.8		4.1		14.5	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)5	16:28	Bottom	2	21.4	8.1	32.2	6.8	6.9	4.2	25.1	13.2	25.8
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Surface	1	21.1	8.2	31.2	6.9		22.5		24.6	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Surface	2	21.3	8.0	29.4	7.0		22.9		23.9	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Middle	1	21.0	8.2	31.3	6.9	7.0	23.1	25.1	25.3	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Middle	2	21.3	8.1	29.5	6.9		24.3		25.8	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Bottom	1	20.9	8.0	31.4	6.9	7.0	27.9	25.1	27.7	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	CS(Mf)3(N)	15:19	Bottom	2	21.1	8.0	29.5	7.0		29.7		27.5	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16	16:04	Surface	1	21.3	8.1	31.6	7.0	7.0	5.8	5.7	9.4	10.2
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16	16:04	Surface	2	21.2	8.1	31.8	7.0		5.8		8.9	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16		Middle	2					7.0		5.7		10.2
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16	16:04	Bottom	1	21.3	8.1	31.6	7.0		5.5		11.6	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)16	16:04	Bottom	2	21.2	8.1	31.8	7.0		5.6		10.9	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a	15:53	Surface	1	21.2	8.1	31.6	7.1	7.1	7.6	7.6	13.0	13.4
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a	15:53	Surface	2	21.1	8.1	31.8	7.1		7.6		13.3	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a		Middle	2					7.1		7.6		13.4
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a	15:53	Bottom	1	21.2	8.1	31.6	7.1		7.6		13.9	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4a	15:53	Bottom	2	21.1	8.1	31.7	7.1		7.6		13.2	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4	15:48	Surface	1	21.4	8.1	31.8	7.0	7.0	10.0	10.1	19.3	18.7
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4	15:48	Surface	2	21.3	8.1	31.9	7.0		10.0		18.3	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4		Middle	2					7.0		10.1		18.7
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4	15:48	Bottom	1	21.4	8.1	31.8	7.0		10.1		19.2	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	SR4	15:48	Bottom	2	21.3	8.1	31.9	7.0		10.1		17.8	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8	15:41	Surface	1	21.4	8.1	31.7	7.0	7.0	19.3	19.5	13.9	15.4
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8	15:41	Surface	2	21.3	8.1	31.8	7.0		19.4		12.1	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8		Middle	2					7.0		19.5		15.4
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8	15:41	Bottom	1	21.4	8.1	31.6	7.0		19.6		17.1	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS8	15:41	Bottom	2	21.3	8.1	31.8	7.0		19.6		18.5	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9	15:31	Surface	1	21.3	8.1	31.8	7.0	7.0	6.5	6.6	12.9	13.7
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9	15:31	Surface	2	21.2	8.1	32.0	7.0		6.5		13.0	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9		Middle	2					7.1		6.6		13.7
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9	15:31	Bottom	1	21.3	8.1	31.9	7.1		6.6		14.0	
TMCLKL	HY/2012/07	2017-12-08	Mid-Ebb	IS(Mf)9	15:31	Bottom	2	21.2	8.1	32.0	7.0		6.7		14.8	



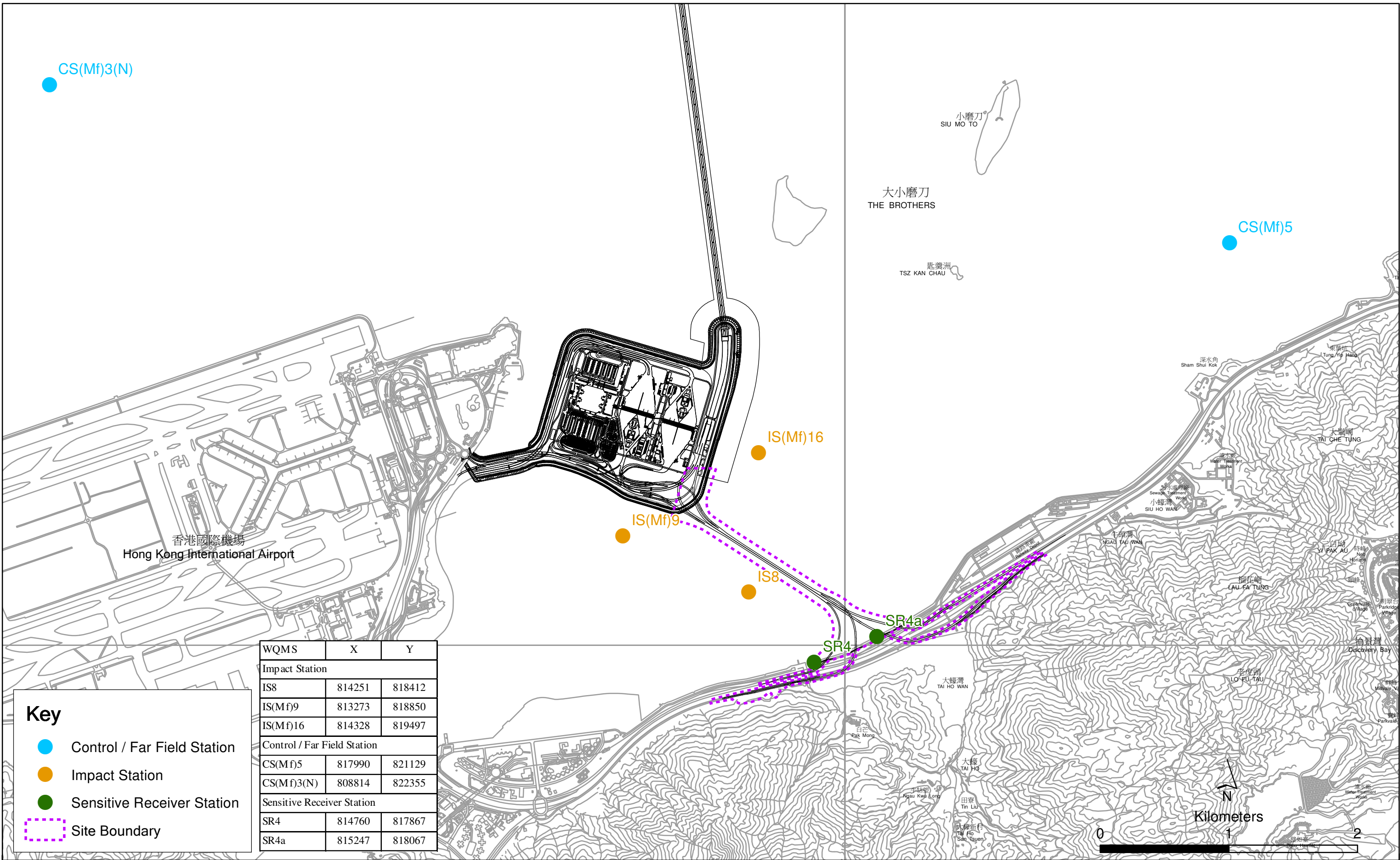
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Surface	1	21.4	8.2	31.7	6.8	6.8	8.0	7.6	14.0	14.5
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Surface	2	21.3	8.1	31.9	6.8		7.4		15.2	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Middle	1	21.4	8.2	31.7	6.8	8.2	14.9			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Middle	2	21.3	8.1	31.9	6.8	7.4	14.2			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Bottom	1	21.4	8.2	31.7	6.8	7.7	14.6			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)5	10:22	Bottom	2	21.3	8.1	31.9	6.8	7.1	13.8			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Surface	1	21.1	8.1	31.1	6.8	6.8	21.6	23.9	24.7	25.3
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Surface	2	21.4	7.9	30.1	6.8		21.2		25.6	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Middle	1	21.1	8.1	31.2	6.8	24.1	24.8			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Middle	2	21.4	7.9	30.1	6.8	23.1	25.0			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Bottom	1	21.1	8.1	31.2	6.7	27.1	25.3			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	CS(Mf)3(N)	12:16	Bottom	2	21.4	7.9	30.1	6.8	26.4	26.2			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16	10:48	Surface	1	21.2	8.1	31.6	6.9	6.9	9.0	8.8	11.2	13.2
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16	10:48	Surface	2	21.1	8.1	31.8	6.9		9.0		10.4	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16		Middle	2									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16	10:48	Bottom	1	21.2	8.1	31.6	6.9	8.5	15.9			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)16	10:48	Bottom	2	21.1	8.1	31.8	6.9	8.8	15.2			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a	10:56	Surface	1	21.2	8.1	31.8	6.9	6.9	11.4	11.4	15.4	16.0
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a	10:56	Surface	2	21.1	8.1	32.0	6.9		11.8		15.2	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a		Middle	2									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a	10:56	Bottom	1	21.2	8.1	31.8	6.9	11.1	16.9			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4a	10:56	Bottom	2	21.1	8.1	32.0	6.9	11.1	16.3			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4	11:00	Surface	1	21.1	8.1	32.0	6.8	6.8	15.5	15.4	21.1	21.7
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4	11:00	Surface	2	21.0	8.1	32.1	6.8		15.5		21.3	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4		Middle	2									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4	11:00	Bottom	1	21.1	8.1	32.0	6.8	15.3	22.4			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	SR4	11:00	Bottom	2	21.0	8.1	32.1	6.8	15.3	22.1			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8	11:12	Surface	1	21.2	8.1	32.0	6.9	6.9	21.8	22.0	32.7	32.8
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8	11:12	Surface	2	21.1	8.1	32.2	6.9		21.8		32.3	
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8		Middle	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8		Middle	2									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8	11:12	Bottom	1	21.2	8.1	32.0	6.9	22.1	33.5			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS8	11:12	Bottom	2	21.1	8.1	32.2	6.9	22.1	32.5			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9		Surface	1					7.0		10.6		14.0
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9		Surface	2									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9	11:20	Middle	1	21.2	8.1	32.1	7.0	10.6	14.4			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9	11:20	Middle	2	21.1	8.1	32.2	7.0	10.6	13.6			
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9		Bottom	1									
TMCLKL	HY/2012/07	2017-12-08	Mid-Flood	IS(Mf)9		Bottom	2									

Note: Indicates Exceedance of Action Level  
Indicates Exceedance of Limit Level



Photo 1 - Mid-Flood at IS8 on 8 December 2017





WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

**Key**

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

Locations of Water Quality Monitoring Stations

Email  
message

Environmental  
Resources  
Management

**To** Ramboll Environ – Hong Kong, Limited (ENPO)

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

**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 Marine Water  
Quality Impact Monitoring



**ERM**

**Date** 15 January 2018

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Dear Sir/ Madam,

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

Action Level Exceedance  
0215660\_3 January 2018\_Depth-averaged SS\_F\_Station SR4a

A total of one (1) exceedance was recorded on 3 January 2018.

Regards,

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

Marine Water Quality Impact Monitoring

Notification of Exceedance

Log No.	<p><b><u>Action Level Exceedance</u></b>  <b>0215660_3 January 2018_Depth-averaged SS_F_Station SR4a</b></p> <p><b>[Total No. of Exceedances = 1]</b></p>	
Date	<p>3 January 2018 (Measured)  4 January 2018 (<i>In situ</i> results received by ERM)  12 January 2018 (Laboratory results received by ERM)</p>	
Monitoring Station	<p>CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)</p>	
Parameter(s) with Exceedance(s)	<p>Depth-averaged Suspended Solids (SS)</p>	
Action Levels for SS	<p>SS</p>	<p>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).</p>
Limit Levels for SS	<p>SS</p>	<p>130% of upstream control station at the same tide of the same day and 99%-ile of baseline data. (i.e., 34.4 mg/L)</p>
Measured Levels	<p><u>Action Level Exceedance</u>  1. Mid-flood at SR4a (Depth-averaged SS = 31.3mg/L).</p>	
Works Undertaken (at the time of monitoring event)	<p>No major marine works was undertaken under this Contract on 3 January 2018.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances of depth-averaged SS are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> <li>• No marine works was undertaken under this Contract on 3 January 2018.</li> <li>• Apart from SR4a, depth-averaged SS levels at all other sensitive receiver stations and impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day.</li> <li>• Depth-averaged Turbidity levels and average DO levels at all stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day.</li> <li>• According to ET's site inspection on 3 January 2018, no particular finding was observed at SR4a (see <i>site photo record</i>).</li> </ul>	
Actions Taken/ To Be Taken	<p>No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>	
Remarks	<p>The monitoring results on 3 January 2018 and locations of water quality monitoring stations are attached. Site photo record on 3 January 2018 is attached.</p>	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Surface	1	18.8	8.2	31.1	7.6	7.6	2.3	2.3	6.2	7.0
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Surface	2	18.8	8.2	31.0	7.6		2.3		8.1	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Middle	1	18.6	8.2	31.2	7.6	2.2	7.6			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Middle	2	18.7	8.2	31.1	7.6	2.3	7.4			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Bottom	1	18.7	8.2	31.2	7.6	2.4	5.7			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)5	13:45	Bottom	2	18.7	8.2	31.1	7.6	2.4	6.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Surface	1	18.6	8.0	30.8	7.3	7.3	6.2	6.3	7.9	6.6
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Surface	2	18.6	8.1	30.8	7.3		5.9		5.6	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Middle	1	18.5	8.0	30.9	7.3	6.6	5.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Middle	2	18.6	8.1	30.9	7.3	6.3	5.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Bottom	1	18.6	8.0	30.8	7.3	6.4	7.0			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	CS(Mf)3(N)	12:41	Bottom	2	18.6	8.0	30.8	7.3	6.4	7.1			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Surface	1	18.7	8.2	31.0	7.8	7.9	2.4	2.8	6.1	6.2
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Surface	2	18.7	8.2	30.9	7.9		2.4		7.3	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Bottom	1	18.6	8.2	31.0	7.8	3.1	5.4			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)16	13:19	Bottom	2	18.7	8.2	30.9	7.9	3.1	5.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Surface	1	18.5	8.2	31.1	7.7	7.8	3.7	4.0	10.2	9.7
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Surface	2	18.5	8.2	31.0	7.8		3.9		9.8	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Bottom	1	18.5	8.2	31.1	7.7	4.2	9.2			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4a	13:08	Bottom	2	18.5	8.2	31.0	7.8	4.2	9.7			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Surface	1	18.7	8.2	31.1	7.8	7.8	4.7	5.0	10.5	9.6
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Surface	2	18.7	8.2	31.0	7.8		4.9		8.8	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Bottom	1	18.7	8.2	31.1	7.8	5.1	9.4			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	SR4	13:03	Bottom	2	18.7	8.2	31.0	7.8	5.1	9.6			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Surface	1	18.7	8.2	31.0	7.9	7.9	3.5	4.0	7.9	10.2
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Surface	2	18.7	8.2	30.9	7.9		3.5		9.0	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Bottom	1	18.6	8.2	31.1	7.8	4.4	12.2			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS8	12:55	Bottom	2	18.6	8.2	31.0	7.9	4.4	11.7			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Surface	1	18.8	8.2	31.2	8.1	8.2	2.7	2.8	6.6	6.8
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Surface	2	18.8	8.2	31.1	8.2		2.7		6.8	
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Bottom	1	18.8	8.2	31.2	8.2	2.9	6.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Ebb	IS(Mf)9	12:47	Bottom	2	18.8	8.2	31.1	8.2	2.9	6.8			

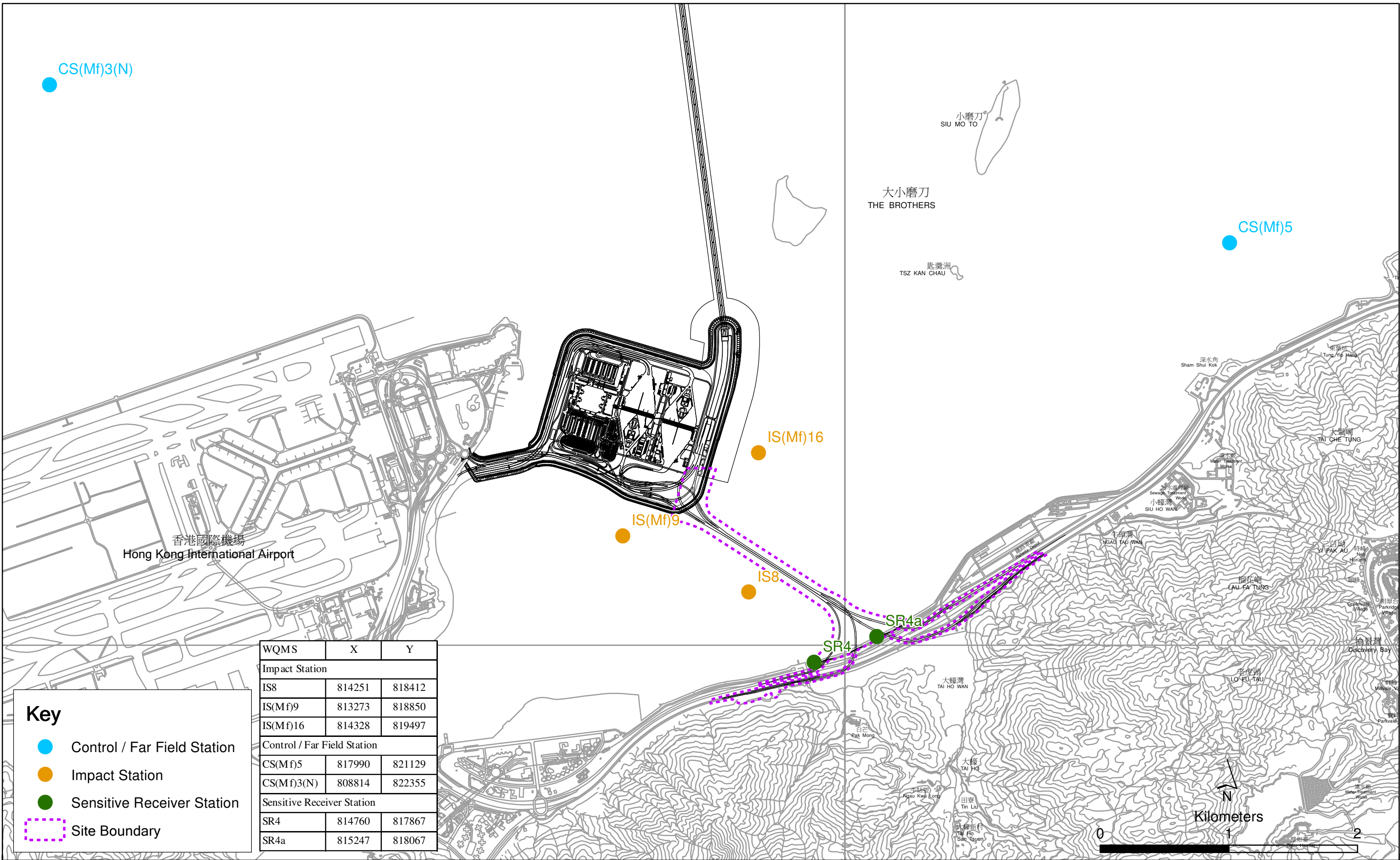


Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Surface	1	18.5	8.1	31.0	7.5	7.5	6.6	9.7	9.5	9.0
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Surface	2	18.5	8.2	30.9	7.5		6.8		9.2	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Middle	1	18.5	8.1	31.0	7.5	10.7	8.4			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Middle	2	18.5	8.2	30.9	7.5	10.7	9.4			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Bottom	1	18.5	8.1	31.0	7.5	11.7	8.7			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)5	7:44	Bottom	2	18.5	8.2	30.9	7.5	11.9	8.9			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Surface	1	18.7	7.9	30.2	7.1	7.1	11.8	12.5	14.6	14.8
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Surface	2	18.7	8.0	30.2	7.1		11.8		14.3	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Middle	1	18.7	7.9	30.2	7.1	11.5	13.3			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Middle	2	18.7	8.0	30.2	7.1	11.5	14.0			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Bottom	1	18.7	7.9	30.2	7.1	14.2	17.2			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	CS(Mf)3(N)	9:53	Bottom	2	18.7	8.0	30.2	7.1	14.2	15.1			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Surface	1	18.4	8.2	30.9	7.6	7.6	4.3	4.5	7.0	6.5
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Surface	2	18.4	8.2	30.8	7.6		4.3		6.3	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Bottom	1	18.4	8.2	31.1	7.6	4.7	5.7			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)16	8:08	Bottom	2	18.4	8.2	31.0	7.6	4.7	6.8			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Surface	1	18.3	8.2	31.1	7.5	7.5	11.8	12.4	32.7	31.3
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Surface	2	18.3	8.2	31.0	7.5		11.8		30.9	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Bottom	1	18.3	8.2	31.1	7.5	13.0	31.1			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4a	8:18	Bottom	2	18.3	8.2	31.0	7.5	13.0	30.6			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Surface	1	18.3	8.2	31.2	7.5	7.5	4.3	8.6	4.6	6.0
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Surface	2	18.3	8.2	31.1	7.5		4.3		5.2	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Bottom	1	18.3	8.2	31.2	7.5	12.8	7.2			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	SR4	8:21	Bottom	2	18.3	8.2	31.1	7.5	12.9	7.1			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Surface	1	18.3	8.2	31.2	7.6	7.6	6.4	6.4	8.2	7.4
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Surface	2	18.4	8.2	31.1	7.6		6.4		7.6	
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Middle	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Middle	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Bottom	1	18.3	8.2	31.2	7.6	6.3	6.3			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS8	8:30	Bottom	2	18.4	8.2	31.1	7.6	6.3	7.6			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Surface	1					7.8		3.0		6.0
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Surface	2									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Middle	1	18.4	8.2	31.4	7.8	3.0	6.8			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Middle	2	18.4	8.2	31.2	7.8	3.0	5.2			
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Bottom	1									
TMCLKL	HY/2012/07	2018-01-03	Mid-Flood	IS(Mf)9	8:38	Bottom	2									

Note: Indicates Exceedance of Action Level  
Indicates Exceedance of Limit Level

Photo 1 - Mid-Flood at SR4a on 3 January 2018





WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

**Key**

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

Locations of Water Quality Monitoring Stations





**ERM-Hong Kong, Limited**

**CONTRACT NO. HY/2012/07**

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

***Air Quality Impact Monitoring***

**Notification of Exceedance**

<b>Log No.</b>	<u><b>Limit Level Exceedance</b></u> <b>0215660_6 February 2018_1hrTSP_Station ASR9</b>  <b>[Total No. of Exceedances = 1]</b>	
<b>Date</b>	6 February 2018 (Measured) 20 February 2018 (Results received by ERM)	
<b>Monitoring Station</b>	ASR8A, ASR9	
<b>Parameter(s) with Exceedance(s)</b>	1-hr TSP	
<b>Action Levels</b>	1-hr TSP ( $\mu\text{g}/\text{m}^3$ )	ASR8A = 394 ASR9 = 393
<b>Limit Levels</b>	1-hr TSP ( $\mu\text{g}/\text{m}^3$ )	ASR8A and ASR9 = 500
<b>Measured Levels</b>	<u>Limit Level Exceedance</u> 1. 1-hr TSP at ASR9 ( $680 \mu\text{g}/\text{m}^3$ ) during 09:42a.m.-10:42a.m.	
<b>Works Undertaken (at the time of monitoring event)</b>	Works undertaken under this Contract on 06 February 2018 included: <ul style="list-style-type: none"> <li>• Parapet installation at Viaduct B and Viaduct C, and</li> <li>• Slope work at Viaduct D</li> </ul>	
<b>Possible Reason for Action or Limit Level Exceedance(s)</b>	<p>The exceedance is unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> <li>• According to the work record provided by the Contractor, major land-based works on 6 February 2018 included parapet installation at Viaduct B and Viaduct C and slope work at Viaduct D (see <i>Figure 1</i>). During the period of land-based construction works, the Contractor has implemented the required mitigation measures as per the EP, approved EIA and Updated EM&amp;A Manual (e.g. water spraying on exposed soil within the Project site and associated works areas; exposed soil covered by tarpaulin sheets).</li> <li>• In addition, with reference to the recorded wind direction (ranged between <math>167^\circ</math> and <math>205^\circ</math>, blowing from a southerly direction) and low wind speed (ranged from 0.02 to 0.03 m/s) during the period of the observed 1-hr TSP exceedance, it is considered that the observed exceedance should not be due to the dust, if any, generated by the construction activities under this Contract.</li> <li>• Apart from one 1hr-TSP (09:42a.m.-10:42a.m.) at ASR9, other 1-hr TSP levels and all 24-hr TSP at ASR8A and ASR9 were in compliance with the Action and Limit Levels on the same day.</li> <li>• According to SOR &amp; ET joint inspection on air quality monitoring on 6 February 2018, no particular observation was reported regarding the sampling procedures and monitoring area (see <i>Annex A</i>).</li> <li>• According to ET's weekly inspection on 7 and 14 February 2018, no particular finding was observed. Dust mitigation measures were observed at the site areas (see <i>Annex B</i>).</li> </ul> <p>Based on the above, the exceedance is unlikely to be due to the Project.</p>	
<b>Actions Taken / To Be Taken</b>	The Contractor has been reminded to ensure all dust suppression measures are implemented at the site area including water spraying at unpaved road/stockpiles and use of tarpaulin for stockpiles covering. The ET will monitor for future trends in exceedances.	
<b>Remarks</b>	The monitoring results and meteorological information on 6 February 2018 and locations of air quality monitoring stations are attached.	

Results of Air Quality Monitoring

Project	Works	Date (yyyy-mm-dd)	Station	Time (hh:mm, 24hour)	Parameter	Results	Unit
TMCLKL	HY/2012/07	2018-02-06	ASR8A	8:30	1-hr TSP	183	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR8A	9:32	1-hr TSP	115	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR8A	10:45	1-hr TSP	96	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR8A	11:47	24-hr TSP	76	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR9	8:40	1-hr TSP	130	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR9	9:42	1-hr TSP	680	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR9	10:56	1-hr TSP	103	ug/m3
TMCLKL	HY/2012/07	2018-02-06	ASR9	11:58	24-hr TSP	100	ug/m3

Note: Indicates Exceedance of Action Level  
Indicates Exceedance of Limit Level



Meteorological Information

Date	Time (HH)	Wind speed (m/s)	Wind direction (deg)
2018/2/6	0	0.02	155
2018/2/6	1	0.04	154
2018/2/6	2	0.02	139
2018/2/6	3	0.06	175
2018/2/6	4	0.02	174
2018/2/6	5	0.03	183
2018/2/6	6	0.03	185
2018/2/6	7	0.03	189
2018/2/6	8	0.08	129
2018/2/6	9	0.03	167
2018/2/6	10	0.03	205
2018/2/6	11	0.02	201
2018/2/6	12	0.03	199
2018/2/6	13	0.21	148
2018/2/6	14	0.87	128
2018/2/6	15	0.20	206
2018/2/6	16	0.09	189
2018/2/6	17	0.35	153
2018/2/6	18	0.43	183
2018/2/6	19	0.18	177
2018/2/6	20	0.17	179
2018/2/6	21	0.10	152
2018/2/6	22	0.17	153
2018/2/6	23	0.36	147

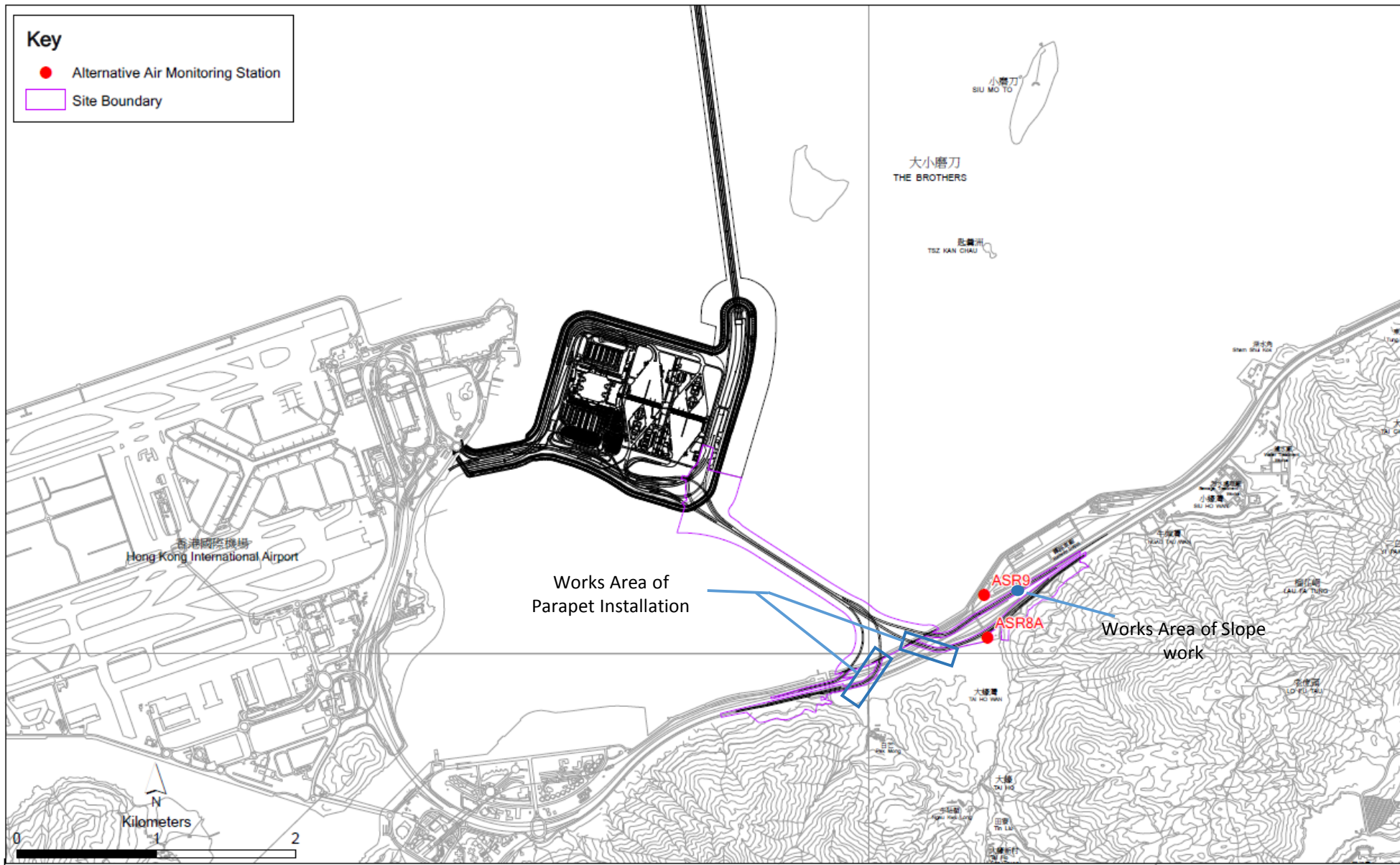


Figure 1  
 Locations of Air Quality Monitoring Stations

Environmental Resources Management  
 ERM

File: T:\GIS\CONTRACT\0215660\Mxd\0215660\_AQMS.mxd  
 Date: 7/1/2015

Annex A

Photo of AQM Inspection at  
ASR9 on 6 February 2018

Photo 1 - ASR9 on 06 February 2018



Annex B

Photos of Site Inspection on  
7 and 14 February 2018



Photo 1 - No debris or other materials were burnt on the works area (7 February 2018).



Photo 2 - Areas of exposed soil were covered by tarpaulin (14 February 2018).



Photo 3 - Watering programme was maintained on unpaved areas (14 February 2018).



Email  
message

Environmental  
Resources  
Management

**To** Ramboll 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 Marine Water  
Quality Impact Monitoring

**Date** 01 March 2018

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



**ERM**

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Dear Sir/ Madam,

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

**Action Level Exceedance**

**0215660\_21 February 2018\_Depth-averaged SS\_F\_Station SR4a**

A total of one (1) exceedance was recorded on 21 February 2018.

Regards,

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

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

Marine Water Quality Impact Monitoring

Notification of Exceedance

Log No.	<p style="text-align: center;"><b>Action Level Exceedance</b> 0215660_21 February 2018_Depth-averaged SS_F_Station SR4a</p> <p style="text-align: center;">[Total No. of Exceedances = 1]</p>	
Date	<p style="text-align: center;">21 February 2018 (Measured) 22 February 2018 (<i>In situ</i> results received by ERM) 01 March 2018 (Laboratory results received by ERM)</p>	
Monitoring Station	<p style="text-align: center;">CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)</p>	
Parameter(s) with Exceedance(s)	<p style="text-align: center;">Depth-averaged Suspended Solids (SS)</p>	
Action Levels for SS	SS	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).
Limit Levels for SS	SS	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data. (i.e., 34.4 mg/L)
Measured Levels	<p><u>Action Level Exceedance</u> 1. Mid-flood at SR4a (Depth-averaged SS = 24.2mg/L).</p>	
Works Undertaken (at the time of monitoring event)	<p>No major marine works was undertaken under this Contract on 21 February 2018.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedances of depth-averaged SS are unlikely to be due to the Project, in view of the following:</p> <ul style="list-style-type: none"> <li>• No marine works was undertaken under this Contract on 21 February 2018.</li> <li>• Apart from SR4a, depth-averaged SS levels at all other sensitive receiver stations and impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day.</li> <li>• Depth-averaged Turbidity levels and average DO levels at all stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day.</li> <li>• According to ET's site inspection on 21 February 2018, no particular finding was observed at SR4a (see <i>site photo record</i>).</li> </ul>	
Actions Taken/ To Be Taken	<p>No immediate action is considered necessary. The ET will monitor for future trends in exceedances.</p>	
Remarks	<p>The monitoring results on 21 February 2018 and locations of water quality monitoring stations are attached. Site photo record on 21 February 2018 is attached.</p>	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Surface	1	17.3	8.2	30.1	9.0	8.9	7.1	7.1	5.9	5.9
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Surface	2	17.3	8.2	30.1	9.0		7.1		5.2	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Middle	1	17.2	8.2	30.2	8.7		7.4		5.3	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Middle	2	17.2	8.1	30.2	8.9		7.2		6.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Bottom	1	17.0	8.2	30.5	8.5		6.9		5.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)5	16:38	Bottom	2	17.0	8.1	30.5	8.5	8.5	6.9	5.9		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Surface	1	17.4	8.2	29.0	9.1	9.2	2.7	3.6	7.0	7.4
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Surface	2	17.3	8.2	29.0	9.2		2.5		8.1	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Middle	1	17.2	8.2	30.1	9.1		2.7		6.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Middle	2	17.1	8.2	30.1	9.2		2.5		7.0	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Bottom	1	17.1	8.2	30.6	9.0		5.8		7.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	CS(Mf)3(N)	15:13	Bottom	2	17.0	8.2	30.6	9.0	9.0	5.5	7.8		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16	16:11	Surface	1	17.5	8.2	30.0	9.4	9.4	3.7	4.7	7.4	7.3
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16	16:11	Surface	2	17.5	8.2	30.0	9.4		3.7		7.4	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16	16:11	Bottom	1	17.7	8.2	30.2	9.2		9.2		5.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)16	16:11	Bottom	2	17.7	8.2	30.2	9.2	9.2	5.7	7.0		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a	15:59	Surface	1	17.4	8.2	30.0	9.0	9.0	10.7	10.8	8.6	8.5
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a	15:59	Surface	2	17.4	8.2	30.0	9.0		10.7		8.2	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a	15:59	Bottom	1	17.4	8.2	30.0	8.9		8.9		11.0	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4a	15:59	Bottom	2	17.4	8.2	30.0	8.9	8.9	10.9	9.1		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4	15:54	Surface	1	17.6	8.2	30.1	8.9	8.9	7.0	7.1	11.1	13.4
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4	15:54	Surface	2	17.6	8.2	30.1	8.9		7.0		12.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4	15:54	Bottom	1	17.6	8.2	30.1	8.9		8.9		7.4	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	SR4	15:54	Bottom	2	17.6	8.2	30.2	8.9	8.9	7.0	14.2		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8	15:47	Surface	1	17.8	8.2	30.3	9.1	9.1	4.4	4.6	7.9	7.8
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8	15:47	Surface	2	17.8	8.2	30.3	9.1		4.4		7.1	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8	15:47	Bottom	1	17.8	8.2	30.3	9.1		9.1		4.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS8	15:47	Bottom	2	17.8	8.3	30.3	9.1	9.1	4.7	8.1		
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9	15:39	Surface	1	17.7	8.2	30.2	9.2	9.2	5.1	5.0	8.8	10.1
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9	15:39	Surface	2	17.7	8.3	30.2	9.2		5.0		7.5	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9	15:39	Bottom	1	17.7	8.2	30.2	9.2		9.2		4.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Ebb	IS(Mf)9	15:39	Bottom	2	17.7	8.3	30.2	9.2	9.2	4.9	12.9		

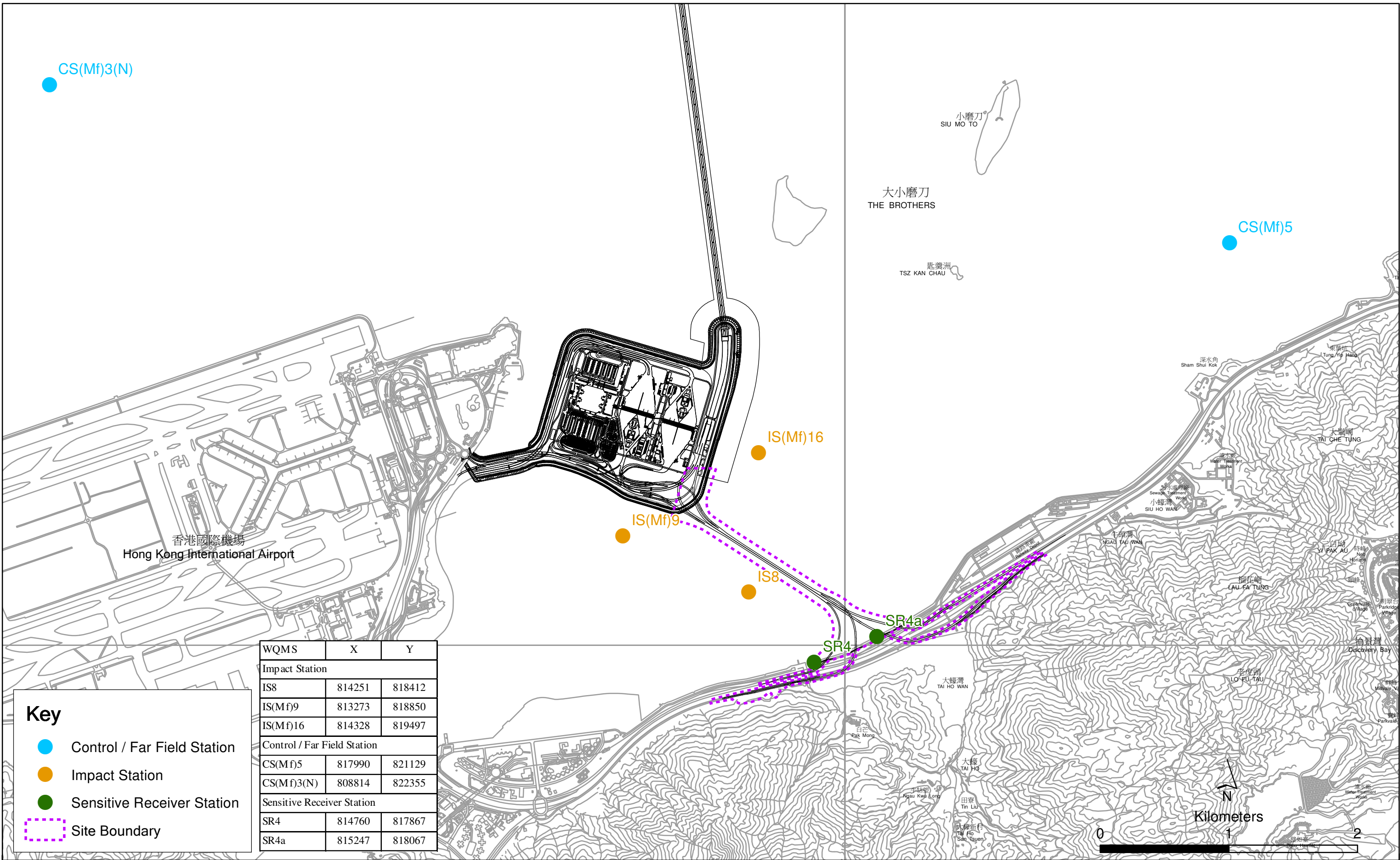
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Surface	1	17.3	8.2	29.8	8.9	8.9	2.9	5.3	7.2	6.2
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Surface	2	17.3	8.2	29.8	8.9		2.7		6.6	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Middle	1	17.3	8.2	29.9	8.8		3.4		5.8	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Middle	2	17.3	8.2	29.9	8.8	8.6	3.2	5.3	5.9	6.2
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Bottom	1	17.1	8.2	30.3	8.5		9.8		5.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)5	9:12	Bottom	2	17.1	8.2	30.3	8.6	8.7	9.6	3.6	6.2	6.7
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Surface	1	17.5	8.2	29.2	8.7		2.9		6.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Surface	2	17.4	8.2	29.2	8.7		3.0		6.1	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Middle	1	17.5	8.2	29.2	8.7	8.7	3.2	3.6	6.8	6.7
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Middle	2	17.3	8.2	29.2	8.7		3.1		5.8	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Bottom	1	17.5	8.2	29.3	8.7	8.7	4.6	3.6	7.3	6.7
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	CS(Mf)3(N)	11:07	Bottom	2	17.3	8.2	29.3	8.7		4.5		7.0	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16	9:39	Surface	1	17.4	8.2	30.1	8.8	8.9	4.8	4.9	5.2	8.1
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16	9:39	Surface	2	17.4	8.2	30.1	8.9		4.8		6.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16		Middle	2					8.8		4.9		8.1
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16	9:39	Bottom	1	17.5	8.2	30.2	8.8		5.0		10.3	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)16	9:39	Bottom	2	17.5	8.2	30.2	8.8	8.7	5.1	14.8	10.0	24.2
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a	9:48	Surface	1	17.3	8.2	30.0	8.7		15.8		23.4	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a	9:48	Surface	2	17.3	8.2	30.0	8.7		15.5		23.0	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a		Middle	1					8.7		14.8		24.2
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a	9:48	Bottom	1	17.3	8.2	30.0	8.7	8.7	14.1	14.8	24.7	24.2
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4a	9:48	Bottom	2	17.3	8.2	30.0	8.7		13.8		25.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4	9:52	Surface	1	17.4	8.2	30.0	8.8	8.8	4.3	4.5	6.0	4.9
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4	9:52	Surface	2	17.4	8.2	30.0	8.8		4.6		4.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4		Middle	2					8.8		4.5		4.9
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4	9:52	Bottom	1	17.4	8.2	30.0	8.8		4.3		4.7	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	SR4	9:52	Bottom	2	17.4	8.2	30.0	8.8	9.0	4.7	7.6	4.3	12.4
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8	10:06	Surface	1	17.5	8.2	30.1	9.0		7.3		12.2	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8	10:06	Surface	2	17.5	8.2	30.1	9.0		7.3		11.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8		Middle	1					9.0		7.6		12.4
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8		Middle	2									
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8	10:06	Bottom	1	17.5	8.2	30.1	9.0	9.0	7.9	7.6	13.2	12.4
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS8	10:06	Bottom	2	17.4	8.2	30.0	9.0		8.0		12.2	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9	10:14	Surface	1	17.6	8.2	30.2	9.0	9.1	5.3	5.2	5.4	6.3
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9	10:14	Surface	2	17.6	8.2	30.2	9.1		4.9		6.4	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9		Middle	1									
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9		Middle	2					9.1		5.2		6.3
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9	10:14	Bottom	1	17.6	8.2	30.2	9.0		5.3		6.9	
TMCLKL	HY/2012/07	2018-02-21	Mid-Flood	IS(Mf)9	10:14	Bottom	2	17.6	8.2	30.2	9.1	9.1	5.2	5.2	6.3	

Note: Indicates Exceedance of Action Level  
Indicates Exceedance of Limit Level



Photo 1 - Mid-Flood at SR4a on 21 February 2018





WQMS	X	Y
Impact Station		
IS8	814251	818412
IS(Mf)9	813273	818850
IS(Mf)16	814328	819497
Control / Far Field Station		
CS(Mf)5	817990	821129
CS(Mf)3(N)	808814	822355
Sensitive Receiver Station		
SR4	814760	817867
SR4a	815247	818067

**Key**

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

Locations of Water Quality Monitoring Stations



**ENVIRONMENTAL COMPLAINT/ ENQUIRY FORM**

**Complaint/ ~~Enquiry~~ Received\***

Date: 26 January 2018

Time: Undisclosed

From: Environmental Protection Department (EPD)

Via: Email

**Complainant/ ~~Enquirer~~\*:**

Name: Undisclosed

Tel: Undisclosed

Address: Undisclosed

Media: ~~Dust~~ / ~~Noise~~ / ~~Water Quality~~ / Other

Description: A complaint was received by EPD regarding a suspected sighting of dolphin near the viaduct at Tai Ho Wan and construction materials falling from the nearby elevated structures in the previous week of the complaint log date. The complainant expressed concern on the potential impact on dolphin caused by the construction activities. In addition, the complainant made inquiries with reference to environmental legislation regarding the implementation of dolphin monitoring measures i.e. allocation of marine mammal observers at the concerned area. The Environmental Team (ET) received the complaint notification from the Environmental Project Office (ENPO) on 26 January 2018.

Work records of the concerned period were reviewed upon receiving the complaint. Based on the work records provided by the Contractor, works nearby Tai Ho Wan during the previous week of the complaint log date was mainly parapet installation at Viaduct B (Pier B6-B8) and Viaduct C (Pier C4-C6) (Figure 1). No record of falling objects from height was reported during the concerned period.

According to ET's site inspection records on 10<sup>th</sup> and 17<sup>th</sup> January 2018, no observation of falling objects from elevated structures/sighting of dolphins was recorded. Construction and demolition (C&D) materials were observed stored at the designated areas. General refuses were observed stored in the waste skips/containers and disposed of on a regular basis by trucks or vessels. The construction waste disposal records of public fill reception facilities and designated landfill were properly recorded through the trip-ticket system and reported in the Environmental Monitoring and Audit (EM&A) Reports. Weekly inspections of waste management performance and physical conditions of the Project Site were maintained (Annex A). Additionally, workers' training records provided by the Contractor were reviewed. It is considered that adequate training on waste management was provided for the frontline workers.

According to the latest Environmental Permit of the Tuen Mun-Chek Lap Kok Link Project (EP-354/2009/D), a dolphin exclusion zone (DEZ) of 250m shall be implemented around the work areas of dredging, reclamation or sheet piling works. According to the work records, no dredging, reclamation or sheet piling works were undertaken in the previous week of the complaint log date. It is considered that the on-site implementation of DEZ is an additional mitigation measure for dolphin monitoring at the current stage. Based on the review of the Contractor's construction programme, a DEZ was implemented around the major work area where main construction activities (i.e. segments installation) were located (Figure 2). According to the monitoring records provided by the marine mammal observers, no sighting of dolphin was reported between 15<sup>th</sup>-20<sup>th</sup> and 22<sup>nd</sup>-25<sup>th</sup> January 2018.

A joint site inspection amongst ENPO, Supervising Officer's Representative (SOR) and ET was held on 29 January 2018. During the joint site inspection, it was observed that majority of the parapets were completely installed as safety barrier at the edge of viaducts. For small gaps and openings, 200mm high toe-board and erected guard-rails (450-600mm for mid rail and 900-1150mm for top rail) were installed to prevent falling objects (Annex B).

A joint investigation was conducted on 30 January 2018 by ET, EPD, the Contractor, and SOR. Construction works and corresponding safety measures at the Project areas nearby Tai Ho Wan were inspected. On-site implementation of DEZ was reviewed. No falling objects from elevated structures/sighting of dolphins were observed during the joint investigation (Annex C).

Upon investigation, there is no adequate evidence to ascertain the causes of the incident.

#### Mitigation Measures and Follow-Up Actions Recommended to Contractor

The Contractor has been reminded to maintain waste management practices and increase training frequency for the workers. In addition, the Contractor has been reminded to review the safety measures in all construction areas under this Contract to prevent falling objects from height. Moreover, the Contractor has been reminded to implement relevant environmental protection measures specified in the Environmental Permits and EM&A Manual of the Tuen Mun-Chek Lap Kok Link Project to mitigate the impacts on dolphins.

Date of File Closed : 2 February 2018

Approved and Filed by:



(Jovy Tam, ET Leader)

Date: 2 February 2018



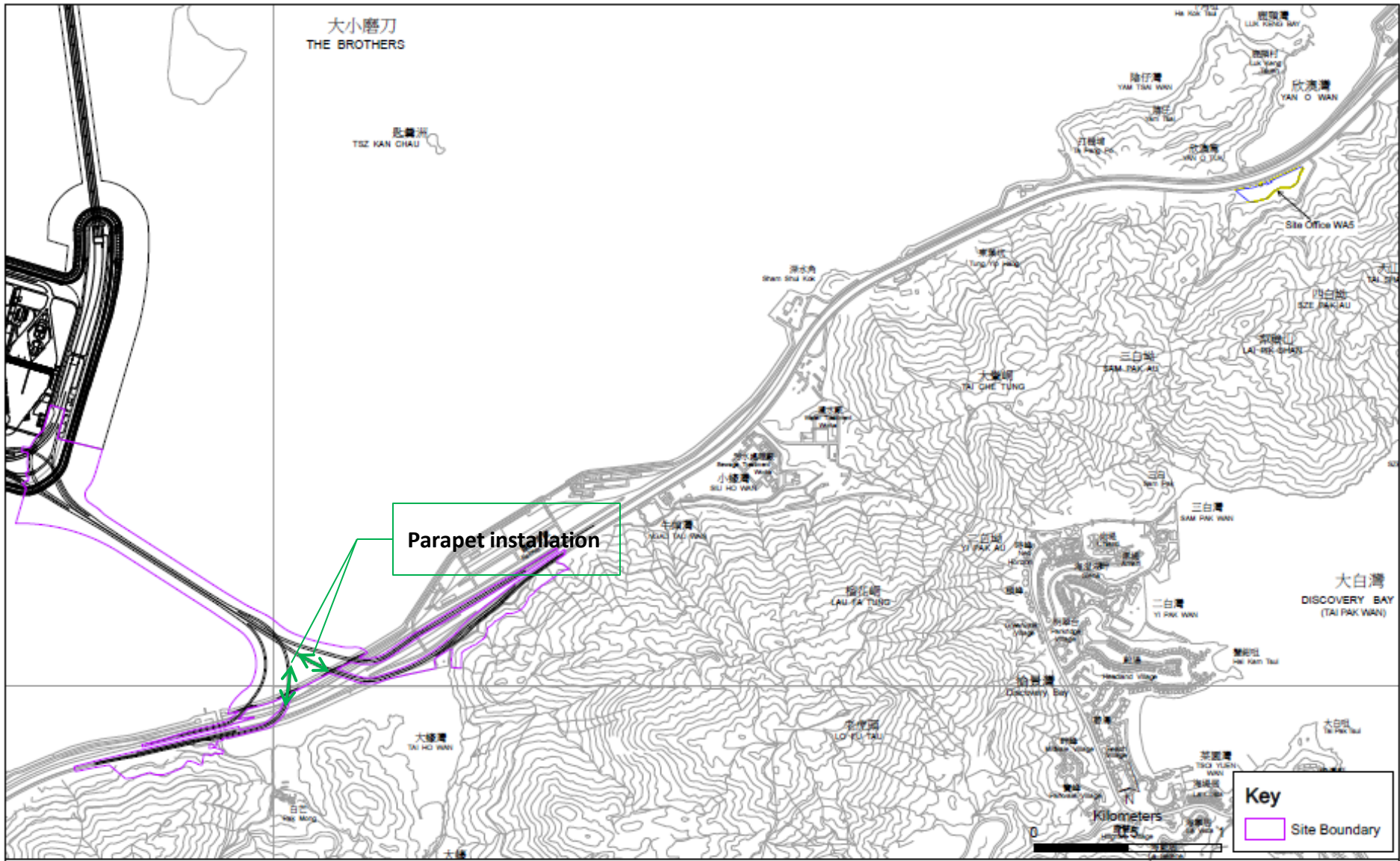


Figure 1

General Layout Plan of the Project

Environmental  
Resources  
Management







Annex A

Photos of ET site inspection  
on 10 and 17 January 2018

Photo 1 - Adequate housekeeping was maintained at site  
(10 January 2018)



Photo 2 - Construction materials were stored at the designated areas  
(17 January 2018)



Annex B

Photos of joint site inspection  
on 29 January 2018

Photo 1 - Parapet installation at Viaduct B and C



Photo 2 - Land portion of Viaduct B (near Tai Ho Wan)



Photo 3 - Land portion of Viaduct C (near Tai Ho Wan)





Photo 4 - High toe-board and erected guard-rails were installed between gaps



Annex C

Photos of joint site inspection  
on 30 January 2018

Photo 1 - Overview of the Project area (near Tai Ho Wan)



Photo 2 - Land portion of Viaduct D (near Tai Ho Wan)



Email  
message

Environmental  
Resources  
Management

**To** Ramboll 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** 15 March 2018

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



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Dear Sir or Madam,

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

0215660\_Dec2017/Feb2018\_dolphin\_STG&ANI\_NEL&NWL

A total of two action level exceedances were recorded in the quarterly impact  
dolphin monitoring data between December 2017 and February 2018.

Regards,

A handwritten signature in black ink, appearing to read 'Jovy Tam', is positioned above the printed 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_Dec2017/Feb2017_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedance = 1]	
Date	December 2017 to February 2018 (monitored) 19 June 2018 (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 = 4.75 & ANI = 15.73
	Two Action Level Exceedances were recorded in the quarterly impact dolphin monitoring at NEL and NWL between December 2017 and February 2018. The exceedances were reported in the approved <i>Fifty-second Monthly EM&amp;A Report</i> dated 13 March 2018.	
Statistical Analyses	<p>Further to the review of the available and relevant dolphin monitoring data in the EM&amp;A under this Contract, statistical analyses were conducted as follows:</p> <ul style="list-style-type: none"> <li>A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present impact quarter, December 2017 to February 2018) 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 <math>\alpha = 0.05</math> as the significance level in the statistical tests, significant differences in STG (<math>p = 0.0127</math>) and ANI (<math>p = 0.0470</math>) were detected between Periods.</li> <li>A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters, December 2012 to February 2018) 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 <math>\alpha = 0.00001</math> as the significance level in the statistical tests, significant difference in STG (<math>p = 0.000000</math>) and in ANI (<math>p = 0.000000</math>) between Cumulative Period (baseline and impact phases) and Location (NEL and NWL) were detected. * Note: The commencement date under <i>Contract No. HY/2012/07</i> is 31 October 2013.</li> </ul>	
Works Undertaken (in the monitoring quarter)	In the quarter between December 2017 and February 2018, no marine works was undertaken under <i>Contract No. HY/2012/07</i> .	



<p><b>Possible Reason for Action or Limit Level Exceedance(s)</b></p>	<p>The potential factors that may have contributed to the observed exceedance are reviewed below:</p> <ul style="list-style-type: none"> <li>• Blocking of CWD travelling corridor: The <i>Monitoring of Marine Mammals in Hong Kong Waters (2016 – 17)</i> <sup>(1)</sup> 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 one of the factors resulting in the decrease in dolphin abundances in North Lantau.</li> <li>• 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 (2016-2017)</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, 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&amp;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. During dolphin monitoring in this quarter, no unacceptable impact on CWD due to the activities under this Contract was observed.</li> <li>• Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between December 2017 and February 2018, there were four (4) Action Level of Suspended Solids (SS) exceedances for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation reports are presented in <i>Appendix L</i> of the <i>17<sup>th</sup> Quarterly EM&amp;A Report (December 2017 – February 2018)</i>.</li> </ul> <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 (2017). Prepared for AFCD. Available at: [https://www.afcd.gov.hk/english/conservation/con\\_mar/con\\_mar\\_chi/con\\_mar\\_chi\\_chi\\_chi/files/Final\\_Report\\_2016\\_17.pdf](https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2016_17.pdf)

<p><b>Actions Taken/ To Be Taken</b></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"> <li>1. 250m dolphin exclusion zone;</li> <li>2. Acoustic decoupling plan;</li> <li>3. Training to workers;</li> <li>4. Offsite vessel routing control in accordance with Regular Marine Travel Routes Plan, including routing control within existing marine park boundaries;</li> <li>5. Vessels speed limited at 5 knots and 10 knots within existing marine park boundaries and site boundary respectively;</li> <li>6. Idling and mooring of working vessels within site boundary</li> </ol> <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 7 March 2018 for discussion on CWD trend, with attendance of ENPO, Representatives of Resident Site Staff (RSS), Representatives of Environmental Teams (ETs) for Contract No. HY/2013/01, HY/2011/03, HY/2011/09, 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 contractors to ensure the relevant measures are fully implemented. The ETs were also reminded to update the Brothers Marine Park (BMP) boundary in the Regular Marine Travel Route Plan. 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. The participants were also reminded that the protection measures (e.g. speed limit control) for the BMP shall be implemented so as to provide a better habitat for dolphin recovery. It is noted that even though marine vessels may moor within the mooring site of BMP, commercial activities including loading / unloading / transshipment are not allowed except a permit is obtained. The HZMB works vessels were recommended to avoid the BMP. It was also recommended that the marine works footprint and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible.</p> <p>Dolphin specialists of the Projects confirmed that the CWD sighting nearby north of Sha Chau and Lung Kwu Chau Marine Park has significantly declined. The reason for the decline was likely related to the re-routing of high-speed ferry from Skypier.</p>
<p><b>Remarks</b></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>fiftieth to Fifty-second Monthly EM&amp;A Reports</i>. Comparison on water quality between impact and baseline periods is elaborated in the <i>17<sup>th</sup> Quarterly EM&amp;A Report</i>.</p>