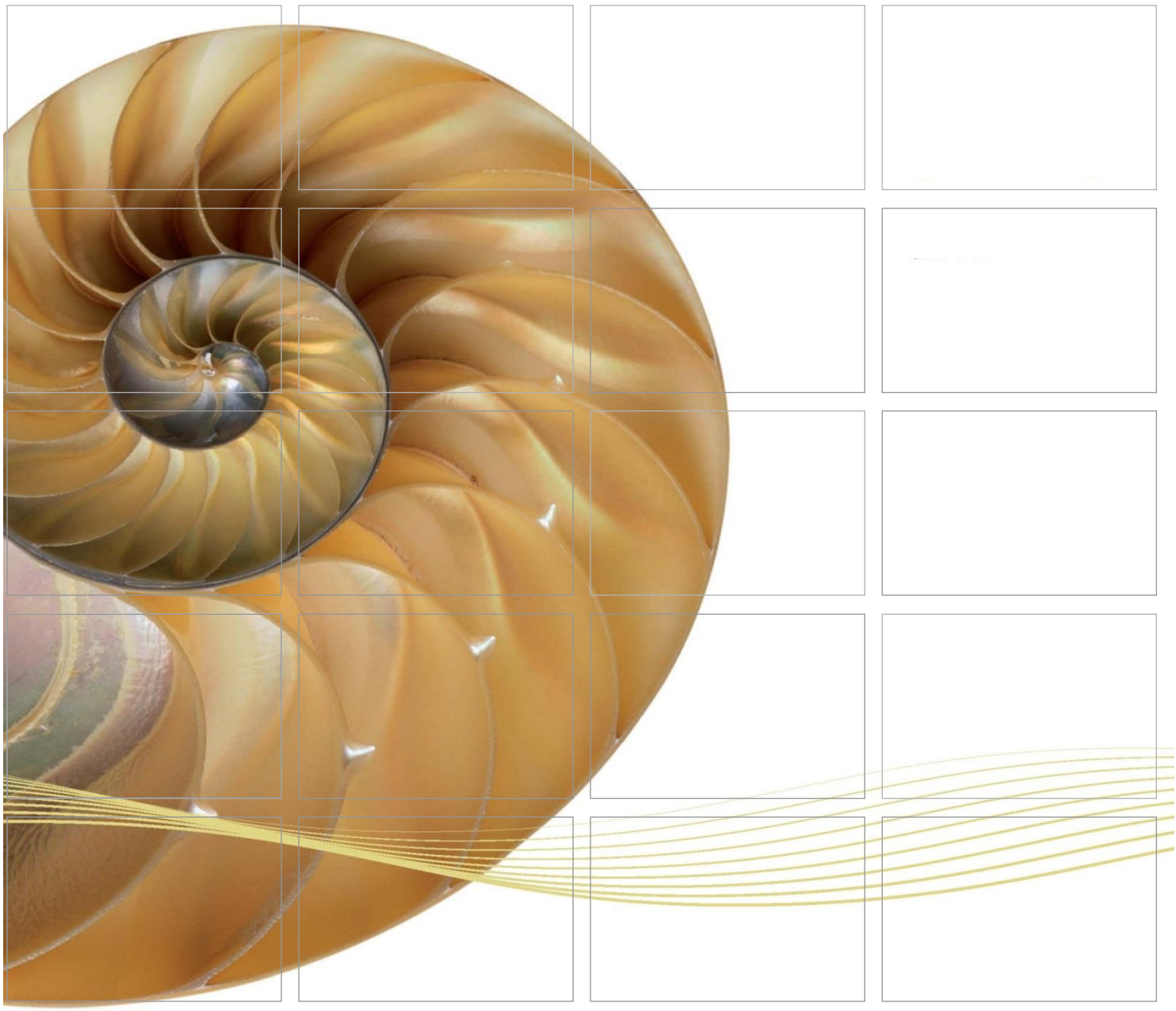
Report



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

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

31 Janaury 2019

Environmental Resources Management
2507, 25/F, One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon, Hong Kong
Telephone 2271 3000
Facsimile 2723 5660

www.erm.com

ERM

The business of sustainability

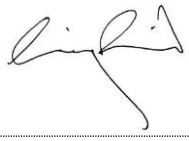
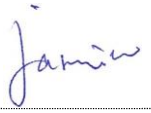
Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section

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

Environmental Resources Management

2507, 25/F, One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon,
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
E-mail: post.hk@erm.com
http://www.erm.com

Document Code:
0215660_19th Qtr EM&A_20190131.doc

Client:	Project No:
Gammon	0215660
Summary:	Date: 31 January 2019
This document presents the Nineteenth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.	Approved by:  *Mr Craig Reid* *Partner*
	Certified by:  *Dr Jasmine Ng* *ET Leader*

	19th Quarterly EM&A Report	VAR	JN	CAR	31/01/19
Revision	Description	By	Checked	Approved	Date

Distribution

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OHSAS 18001:2007 Certificate No. OHS 515956

ISO 9001 : 2008 Certificate No. FS 32515

RAMBOLL

Ref.: HYDHZMBEEM00_0_7153L.19 04 February 2019

AECOM By Fax (3691 2899) and By Post
Supervising Officer's Representative's Office
780 Cheung Tung Road, Lantau, N.T.

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
19th Quarterly EM&A Summary Report (June to August 2018)

Reference is made to the 19th Quarterly Environmental Monitoring and Audit (EM&A) Report (June to August 2018) (ET's ref.: "*0215660_19th Qtr EM&A_20181220.doc*" dated 31 January 2019) certified by the ET Leader and provided to us via e-mail on 31 January 2019.

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. Patrick Ng (By Fax: 3188 6614)
HyD – Mr. Tony Pang (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Dr. Jasmine Ng (By Fax: 2723 5660)
Gammon – Mr. Roy Leung (By Fax: 3520 0486)

Internal: DY, YH, DF, ENPO Site

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Ramboll Hong Kong Limited 英環香港有限公司
21/F, BEA Harbour View Centre, 56 Gloucester Road, Wan Chai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.ramboll.com

TABLE OF CONTENTS

List of Appendices

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 2019. 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 Nineteenth Quarterly EM&A Report presenting the EM&A works carried out during the period from 1 June to 31 August 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:

June 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

July 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

August 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers 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	38 sessions
Dolphin monitoring	6 sessions
Joint Environmental site inspection	13 sessions

Breaches of Action and Limit Levels for Air Quality

No exceedance of Action and Limit Levels was recorded for construction 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

Thirty-seven (37) Action Level and three (3) Limit Level of Dissolved Oxygen (DO) exceedances, one (1) Limit Level of Suspended Solids exceedance and one (1) Action Level of Turbidity exceedance were recorded for water quality impact monitoring in the reporting period.

Impact Dolphin Monitoring

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June and August 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 were two (2) complaints received by 1823 regarding discharge of muddy water nearby Hong Kong Boundary Crossing Facilities (HKBCF) on 13 June 2018 and construction noise nuisance nearby the Kowloon-bound lane of the North Lantau Highway on 16 June 2018 in the reporting period. There

was 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:

September 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

October 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Reinstatement works along Cheung Tung Road;
- Abutment construction;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

November 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Reinstatement works along Cheung Tung Road;
- Abutment construction;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers 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 INTRODUCTION

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 2019. 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 Nineteenth 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 June to 31 August 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 Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	
ET (ERM-HK)	ET Leader	Dr. Jasmine Ng	2271 3311	2723 5660

大小磨刀
THE BROTHERS

鹿頸灣
LUK KENG BAY

鹿頸村
Luk Keng Tsuen

陰仔灣
YAM TSAI WAN

欣澳灣
YAN O WAN

陰仔
Yam Tsai

打棚埔
Ta Pang Po

欣澳篤
YAN O TUK

Site Office WA5

匙羹洲
TSZ KAN CHAU

東葉坑
Tung Yip Hang

深水角
Sham Shui Kok

四白坳
SZE PAK AU

犁壁山
LAI PIK SHAN

三白坳
SAM PAK AU

大輋峒
TAI CHE TUNG

濾水廠
Water Treatment Works

污水處理廠
Sewage Treatment Works

小蠔灣
SIU HO WAN

三白
Sam Pak

三白灣
SAM PAK WAN

牛頭灣
NGAU TAU WAN

鐵路車廠
Railway Depot

二白坳
YI PAK AU

時峰
Neo Horizon

尚堤
Chianti

津堤
Amalfi

海澄湖畔
Siena

頤峰

大白灣
DISCOVERY BAY
(TAI PAK WAN)

榴花峒
LAU FA TUNG

二白灣
YI PAK WAN

Greenvale Village

明翠台
Parkridge Village

蟹鉗咀
Hai Kam Tsui

蔚陽
Headland Village

愉景灣
Discovery Bay

老虎頭
LO FU TAU

碧濤

畔峰
Midvale Village

Beach Village

大白咀
Tai Pak Tsui

菜園灣
TSOI YUEN WAN

海堤居
La Costa

寶峰
Parkvale Village

大蠔灣
TAI HO WAN

白芒
Pak Mong

大蠔

海蝶居
La Vista

Hillgrove Village

海鄰居
La Serene

N

Kilometers
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Key
Site Boundary

Figure 1.1

General Layout Plan of the Project

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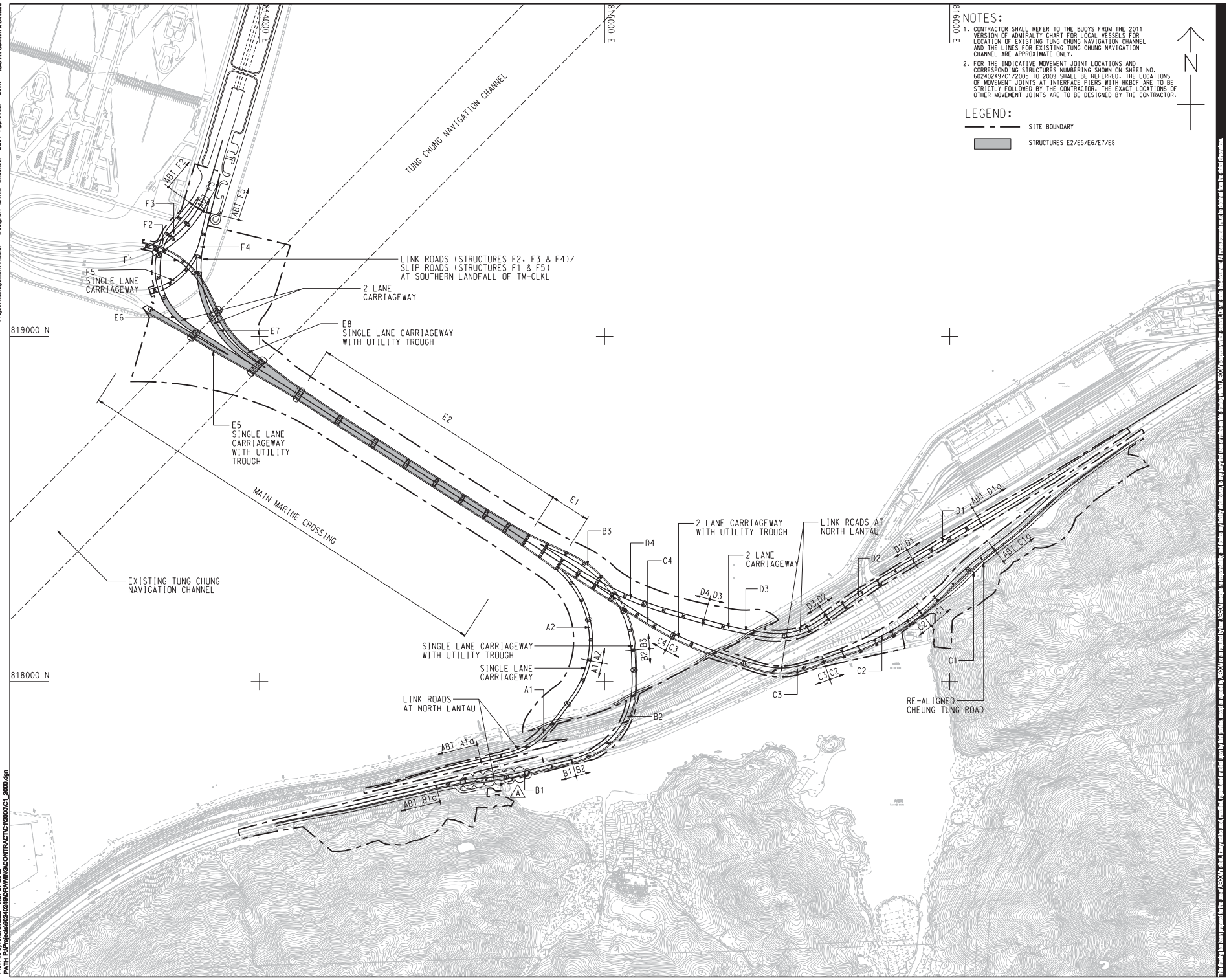
Environmental Resources Management

ERM



AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

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

CLIENT
路政署 HIGHWAYS DEPARTMENT
港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2a

ISSUE/REVISION

IR	DATE	DESCRIPTION	CHK.
A	NOV. 12	TENDER ADDENDUM NO. 1	CWN
-	OCT. 12	TENDER DRAWING	CWN

STATUS

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KEY PLAN

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CONTRACT NO.: HY/2012/07

SHEET TITLE
SOUTHERN CONNECTION GENERAL LAYOUT PLAN

SHEET NUMBER
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Project Management Initials: Designer: LKWB Checked: SLYY Approved: CWN ISO A1 594mm x 841mm CWN

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KEY PLAN

NOTES

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LEGEND

- SITE BOUNDARY
- GF1 FAULT

EXISTING G.I.STATIONS :

- BOREHOLE BY GIU DATA EXCLUDING VC
- BOREHOLE BY GCL CONTRACT HY/2012/04
- BOREHOLE BY GCL CONTRACT NL8/97
- BOREHOLE BY GCL CONTRACT HY/2009/23
- TRIAL PIT BY GCL CONTRACT HY/2012/04
- SLOPE STRIPPING BY GCL CONTRACT HY/2012/04

PROPOSED G.I.STATIONS :

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

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

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C	SUBMISSION	RC	09/13				

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Client: 路政署 HIGHWAYS DEPARTMENT, Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

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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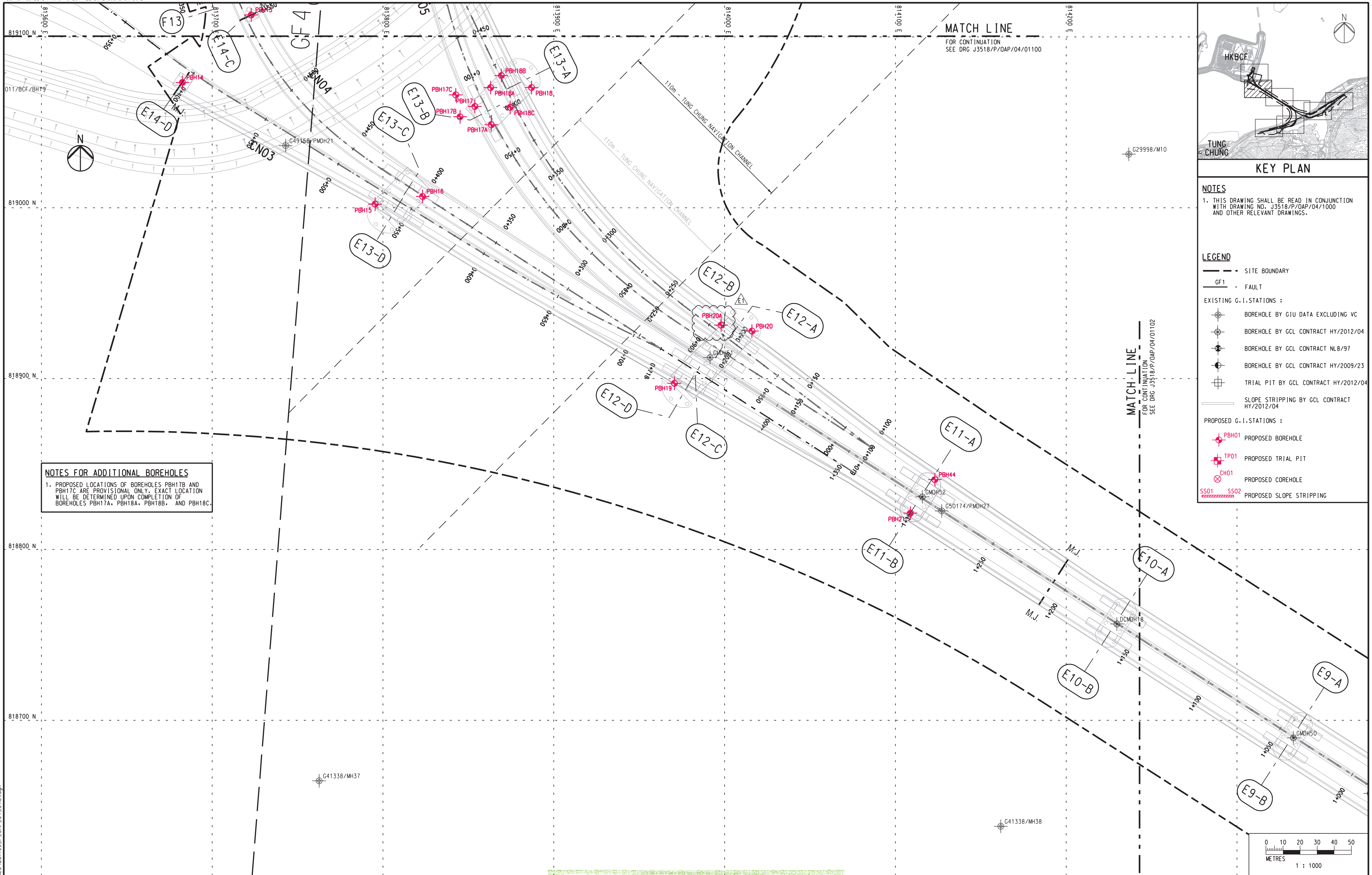

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E1	FOR INTERNAL REVIEW	RC	11/13

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

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

Drawing title:

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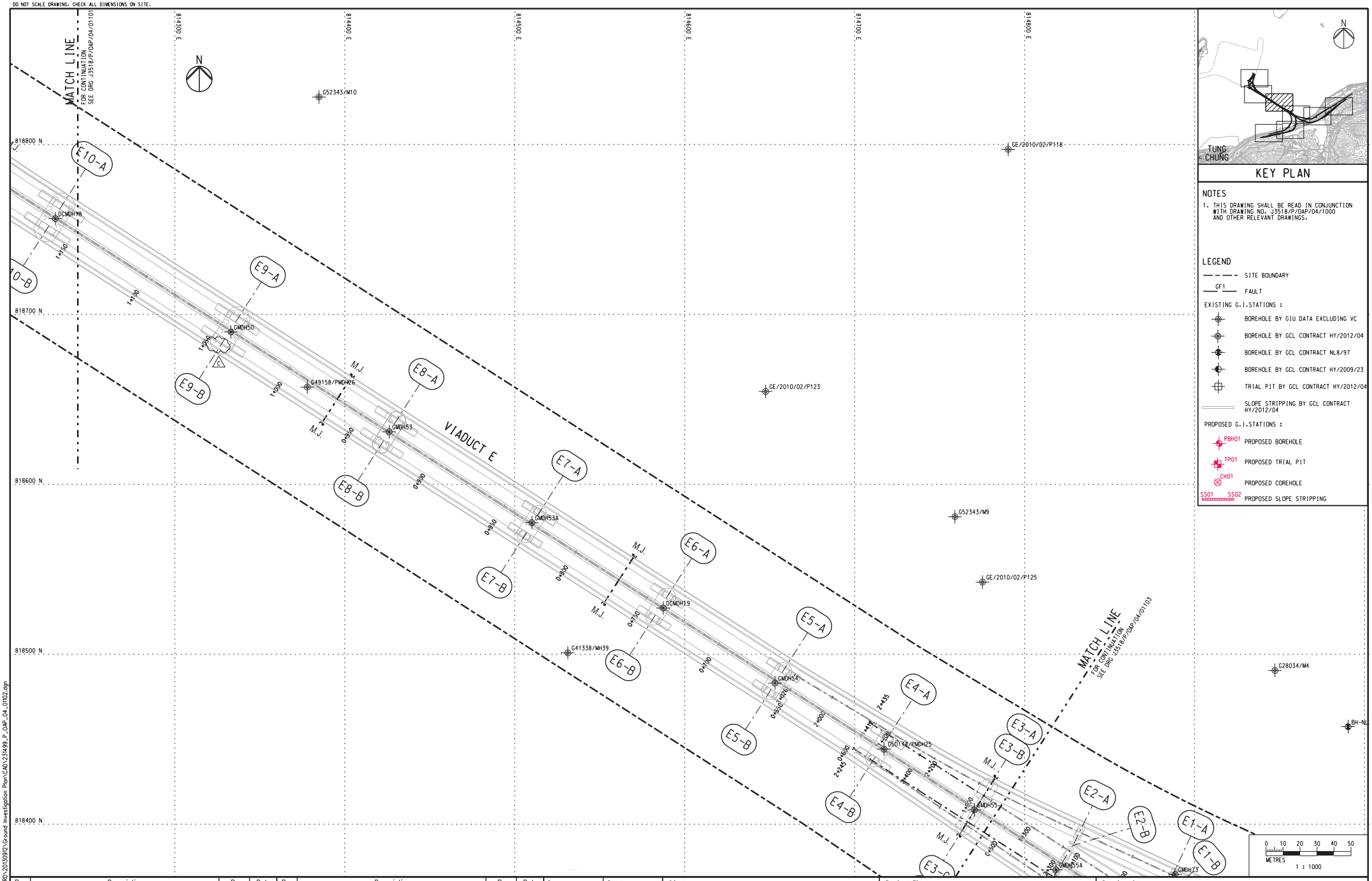

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong-Zhuhai-Macao Bridge Hong Kong Project Management Office

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

Supervising Officer: AECOM
Contractor: Gammon
Originator: ARUP

Drawing title: **Figure 1.2d**

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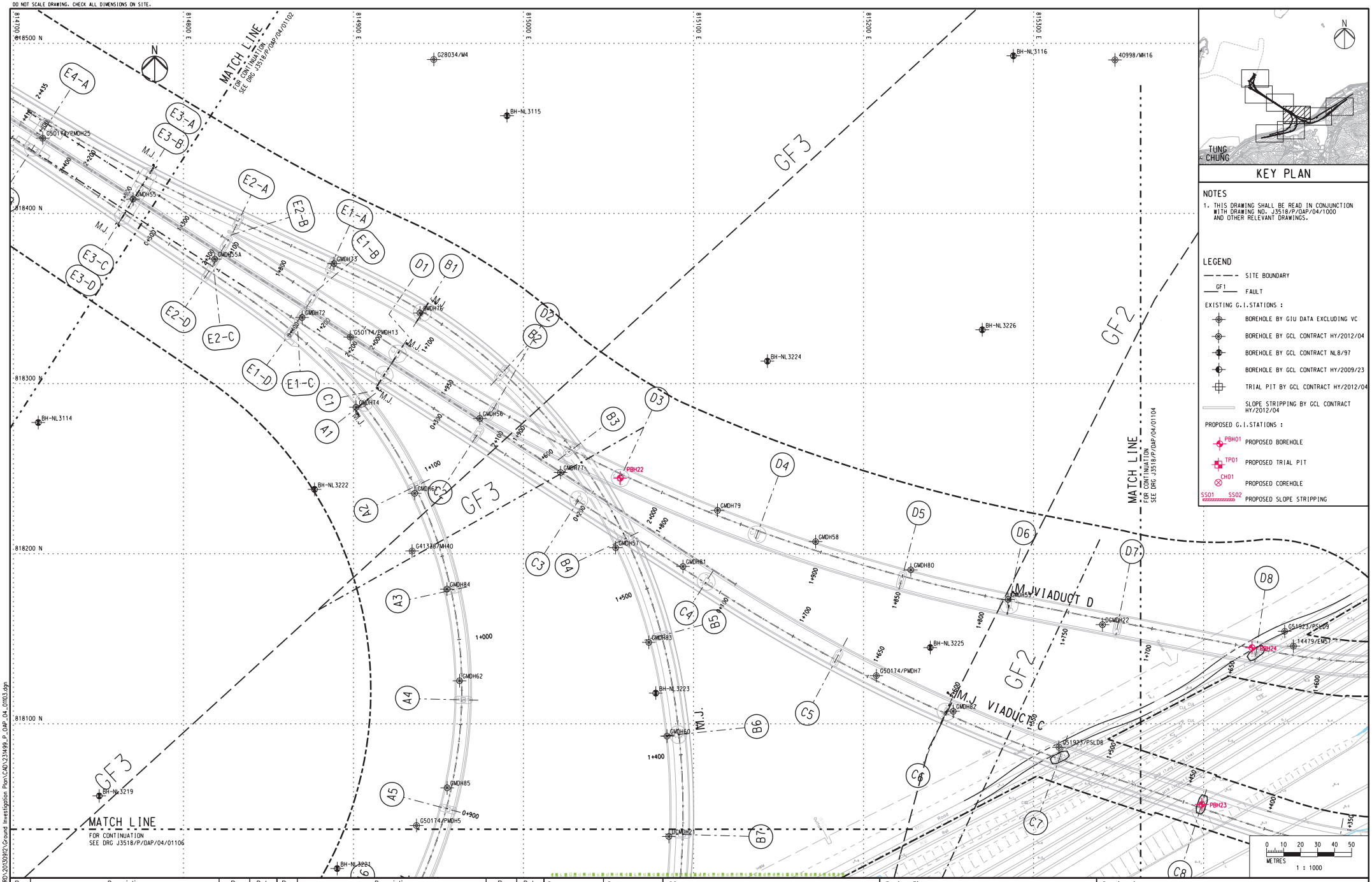

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Project Title: Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Supervising Officer: AECOM
Contractor: Gammon
Originator: ARUP

Drawing title: **Figure 1.2e**

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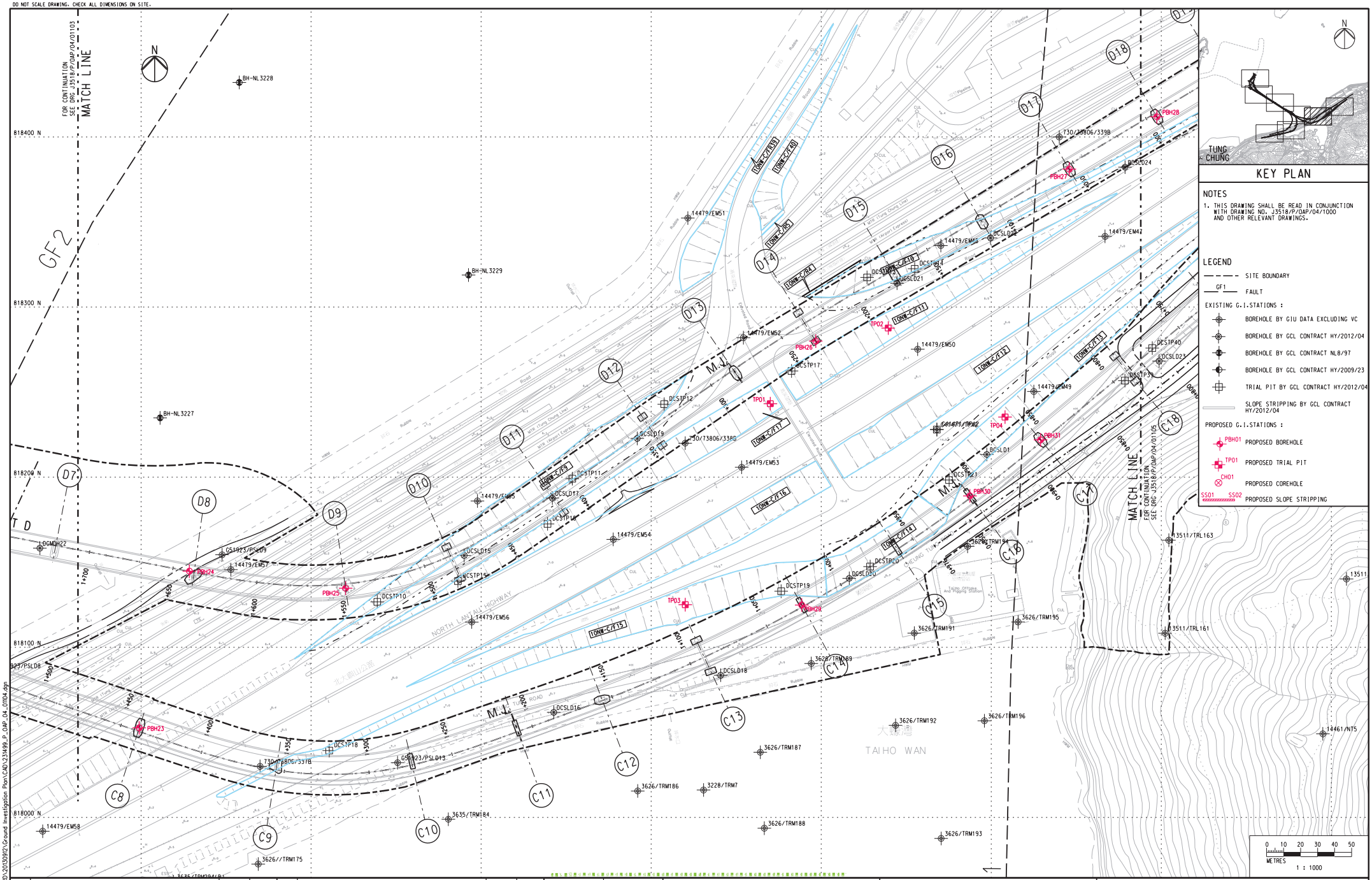

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B	SUBMISSION	RC	07/13				
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Project Title: Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2f**

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

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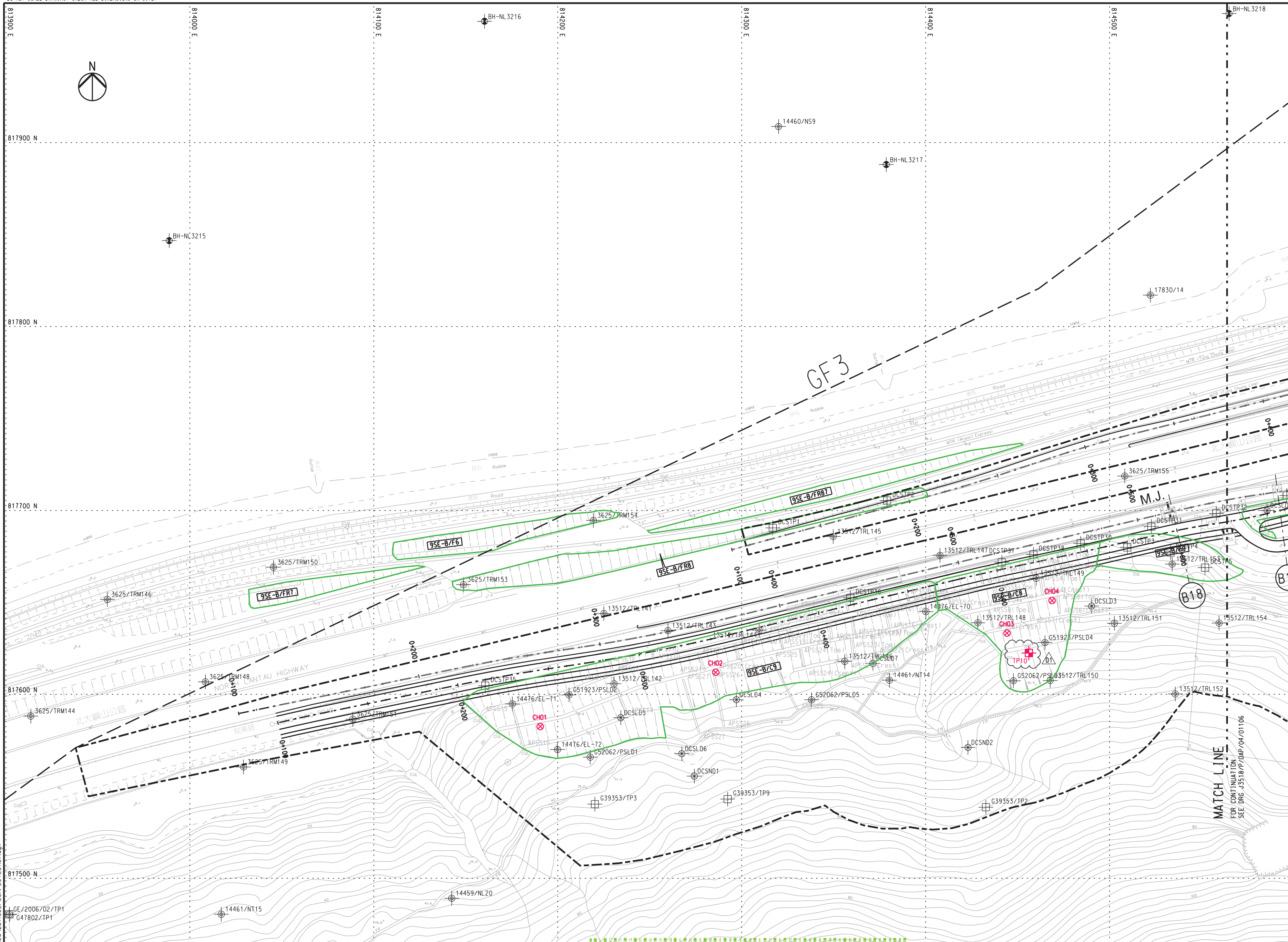
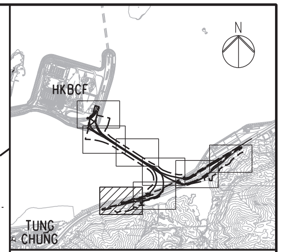




KEY PLAN

NOTES

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

LEGEND

- SITE BOUNDARY
- 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

Rev	Description	By	Date	Rev	Description	By	Date
A	SUBMISSION	RC	07/13				
B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				
D1	FOR INTERNAL REVIEW	RC	11/13				

Drawn	Date
RL	07/13
Checked	Approved
DS	DOP

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

Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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

Supervising Officer: AECOM

Contractor: Gammon

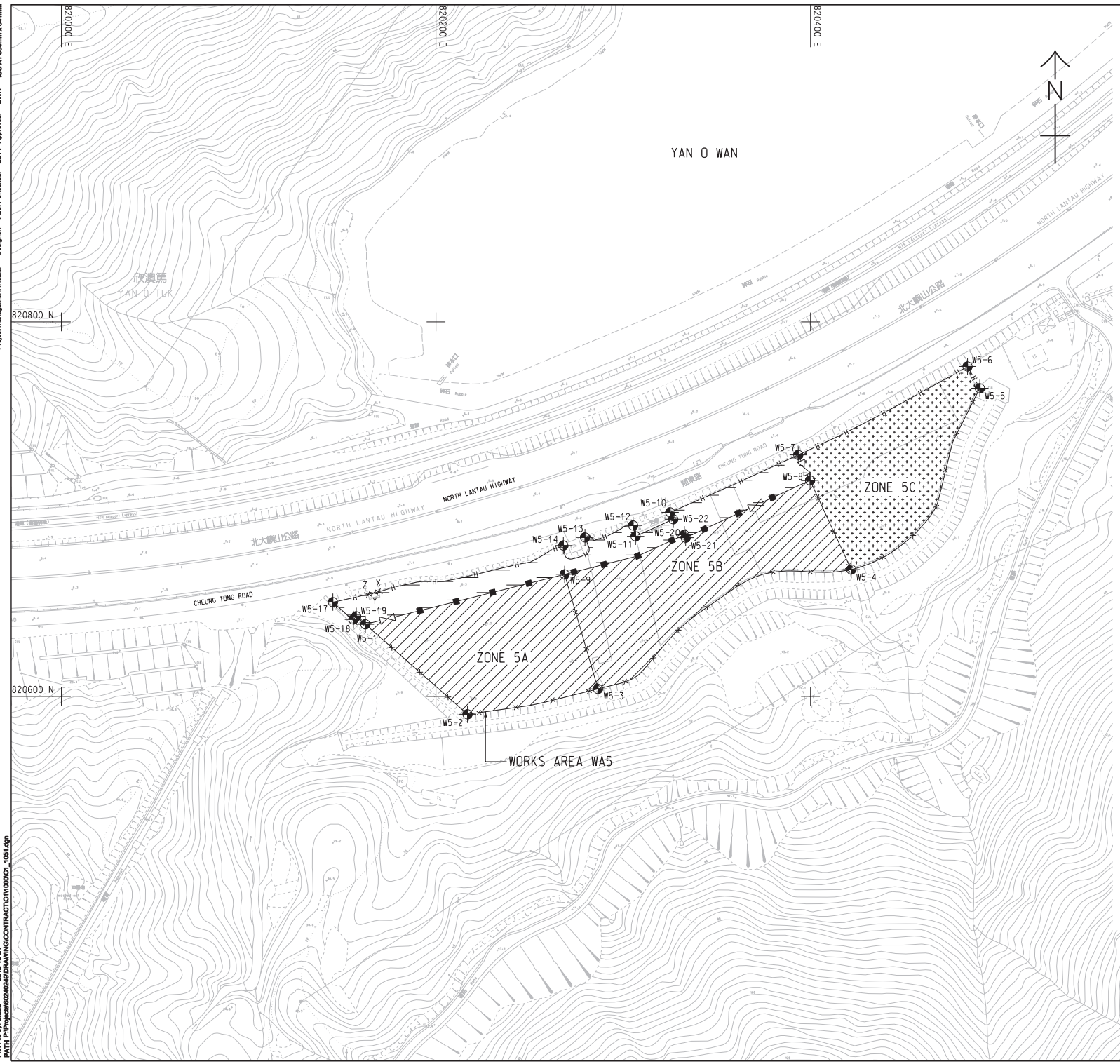
Originator: ARUP

Drawing title

Figure 1.2g

Drawing no. J3518/P/OAP/04/01107 Rev. D1

Printed by : 07/11/2013
Filename : J:\231499\ARUP\GEO\231499_P_OAP_04_01107.dgn



NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/1000.
2. THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. TIS 619. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
3. DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
4. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6110 AND H6111 FOR DETAILS OF HOARDING.
5. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
6. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
7. 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.
8. THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
9. 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.
10. THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
11. THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLKL RELATED CONTRACTS.THE AREAS HATCHED WITH ▨ ARE TENTATIVELY ALLOCATED FOR THE USE BY THIS CONTRACT.
12. 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.
- H — 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 WA5

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

AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

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

CLIENT
HIGHWAYS DEPARTMENT
路政署
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

VR	DATE	DESCRIPTION	CHK.
-	OCT. 12	TENDER DRAWING	CWN

STATUS

SCALE: A1 1 : 1000
DIMENSION UNIT: METRES

KEY PLAN

Figure 1.2h

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

SHEET TITLE
WORKS AREA AND HOARDING PLAN

SHEET 1 OF 2

SHEET NUMBER
60240249/C1/1051

Project Management Initials: Designer: PLCK Checked: SLYY Approved: CWN ISO A1 594mm x 841mm

Plot File by: LIUJ3 2012-10-24
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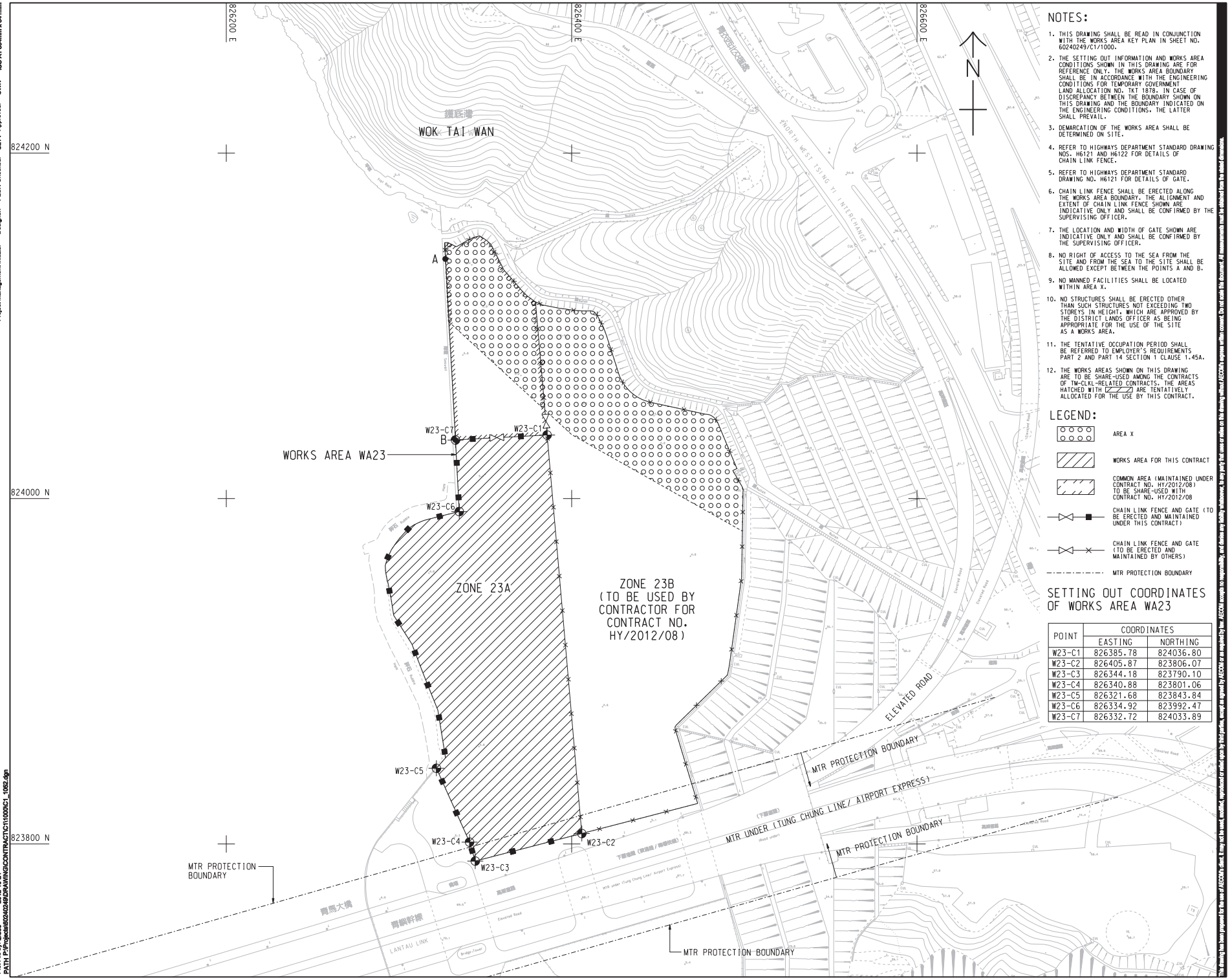

NOTES:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/1000.
2. THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. TKT 1878. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
3. DEMARCATION OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
4. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
5. REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
6. CHAIN LINK FENCE SHALL BE ERECTED ALONG THE WORKS AREA BOUNDARY. THE ALIGNMENT AND EXTENT OF CHAIN LINK FENCE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
7. THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE SUPERVISING OFFICER.
8. NO RIGHT OF ACCESS TO THE SEA FROM THE SITE AND FROM THE SEA TO THE SITE SHALL BE ALLOWED EXCEPT BETWEEN THE POINTS A AND B.
9. NO MANNED FACILITIES SHALL BE LOCATED WITHIN AREA X.
10. NO STRUCTURES SHALL BE ERECTED OTHER THAN SUCH STRUCTURES NOT EXCEEDING TWO STOREYS IN HEIGHT, WHICH ARE APPROVED BY THE DISTRICT LANDS OFFICER AS BEING APPROPRIATE FOR THE USE OF THE SITE AS A WORKS AREA.
11. THE TENTATIVE OCCUPATION PERIOD SHALL BE REFERRED TO EMPLOYER'S REQUIREMENTS PART 2 AND PART 14 SECTION 1 CLAUSE 1.45A.
12. THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARE-USED AMONG THE CONTRACTS OF TM-CLKL-RELATED CONTRACTS. THE AREAS HATCHED WITH ▨ ARE TENTATIVELY ALLOCATED FOR THE USE BY THIS CONTRACT.

LEGEND:

- AREA X
- WORKS AREA FOR THIS CONTRACT
- COMMON AREA (MAINTAINED UNDER CONTRACT NO. HY/2012/08) TO BE SHARE-USED WITH CONTRACT NO. HY/2012/08
- CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED UNDER THIS CONTRACT)
- CHAIN LINK FENCE AND GATE (TO BE ERECTED AND MAINTAINED BY OTHERS)
- MTR PROTECTION BOUNDARY

SETTING OUT COORDINATES OF WORKS AREA WA23

POINT	COORDINATES	
	EASTING	NORTHING
W23-C1	826385.78	824036.80
W23-C2	826405.87	823806.07
W23-C3	826344.18	823790.10
W23-C4	826340.88	823801.06
W23-C5	826321.68	823843.84
W23-C6	826334.92	823992.47
W23-C7	826332.72	824033.89

AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

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

CLIENT
HIGHWAYS DEPARTMENT
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

VR	DATE	DESCRIPTION	CHK.
-	OCT. 12	TENDER DRAWING	CWN

STATUS

SCALE: A1 1 : 1000
DIMENSION UNIT: METRES

KEY PLAN

Figure 1.2i

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

SHEET TITLE
WORKS AREA AND HOARDING PLAN

SHEET 2 OF 2

SHEET NUMBER
60240249/C1/1052

Project Management Initials: Designer: PLCK Checked: SLYY Approved: CWN ISO A1 594mm x 841mm

Plot File by: LIUJ3 2012-10-24
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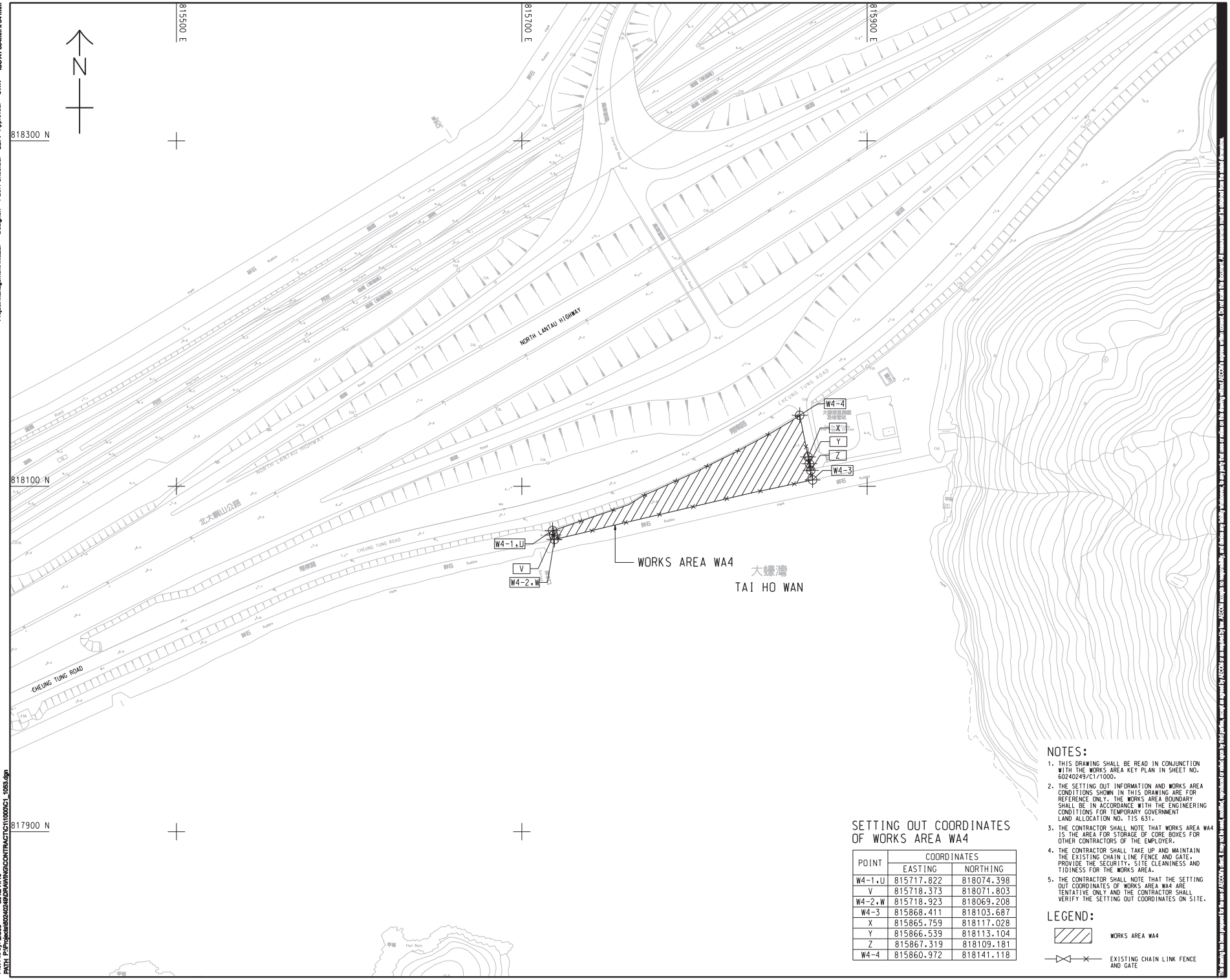


SETTING OUT COORDINATES OF WORKS AREA WA4

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:

1. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C1/1000.
2. THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. TIS 631.
3. THE CONTRACTOR SHALL NOTE THAT WORKS AREA WA4 IS THE AREA FOR STORAGE OF CORE BOXES FOR OTHER CONTRACTORS OF THE EMPLOYER.
4. THE CONTRACTOR SHALL TAKE UP AND MAINTAIN THE EXISTING CHAIN LINE FENCE AND GATE. PROVIDE THE SECURITY, SITE CLEANINESS AND TIDINESS FOR THE WORKS AREA.
5. 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
HIGHWAYS DEPARTMENT
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2j

ISSUE/REVISION

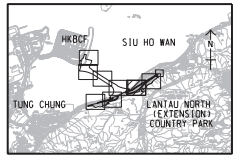
VR	DATE	DESCRIPTION	CHK.
-	NOV. 12	TENDER ADDENDUM NO. 1	CWN

STATUS

SCALE: A1 1 : 1000

DIMENSION UNIT: METRES

KEY PLAN



PROJECT NO.: 60240249

CONTRACT NO.: HY/2012/07

SHEET TITLE
WORKS AREA WA4

SHEET NUMBER
60240249/C1/1053

Project Management Initials: Designer: PLCK Checked: SLYY Approved: CWN ISO A1 594mm x 841mm

Plot File by: LIUJ3 2012/11/16
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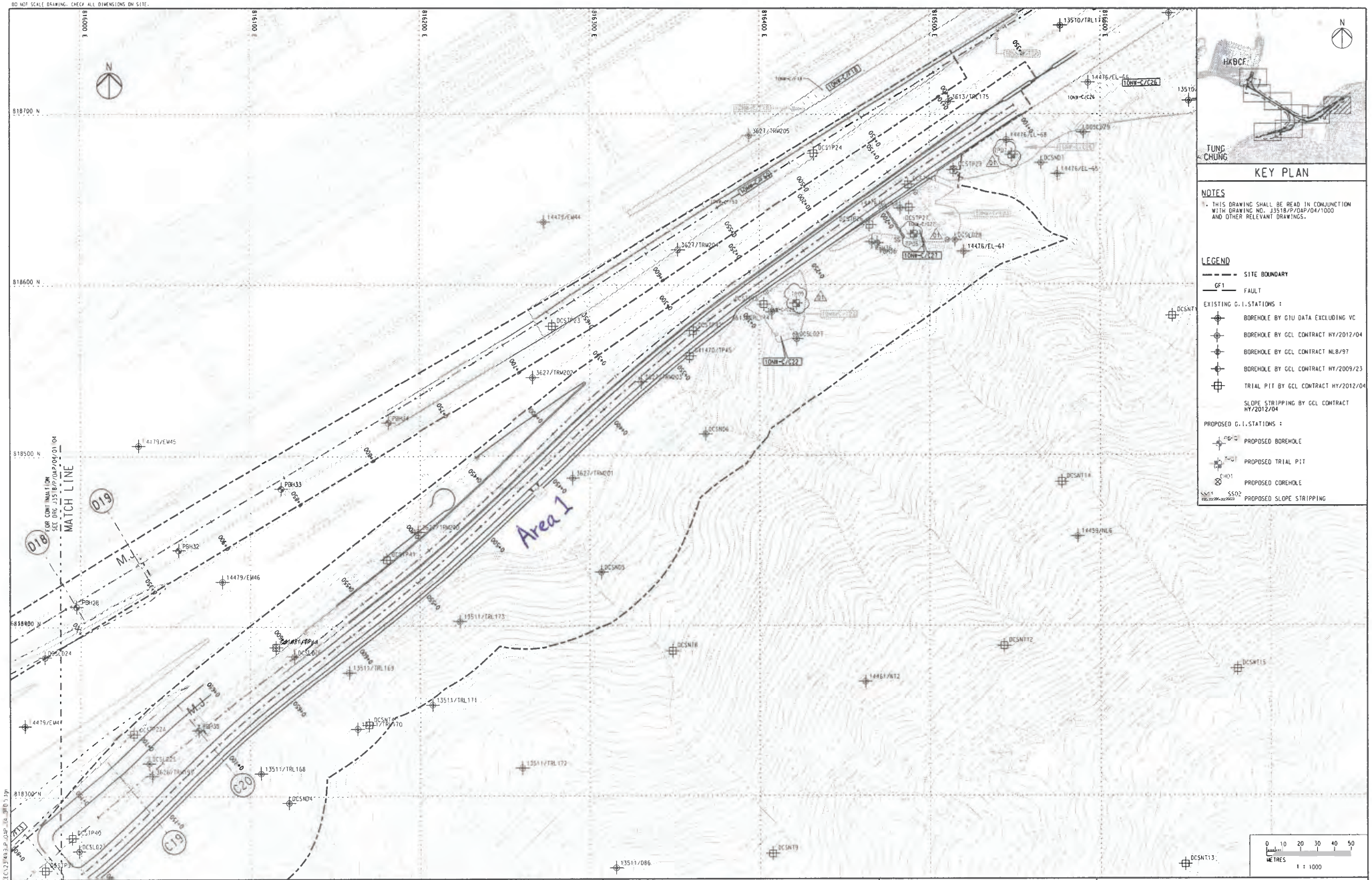


Rev.	Description	By	Date	Rev.	Description	By	Date
A	[illegible]	RL	07/13				
B	[illegible]	RL	07/13				
C	[illegible]	RL	09/13				
D1	ETA INTERNAL REVIEW	RL	10/13				

Drawn: RL	Date: 07/13
Checked: DS	Approved: DOP
Scale: 1:1000 @ A1 / 1:2000 @ A3	

Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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

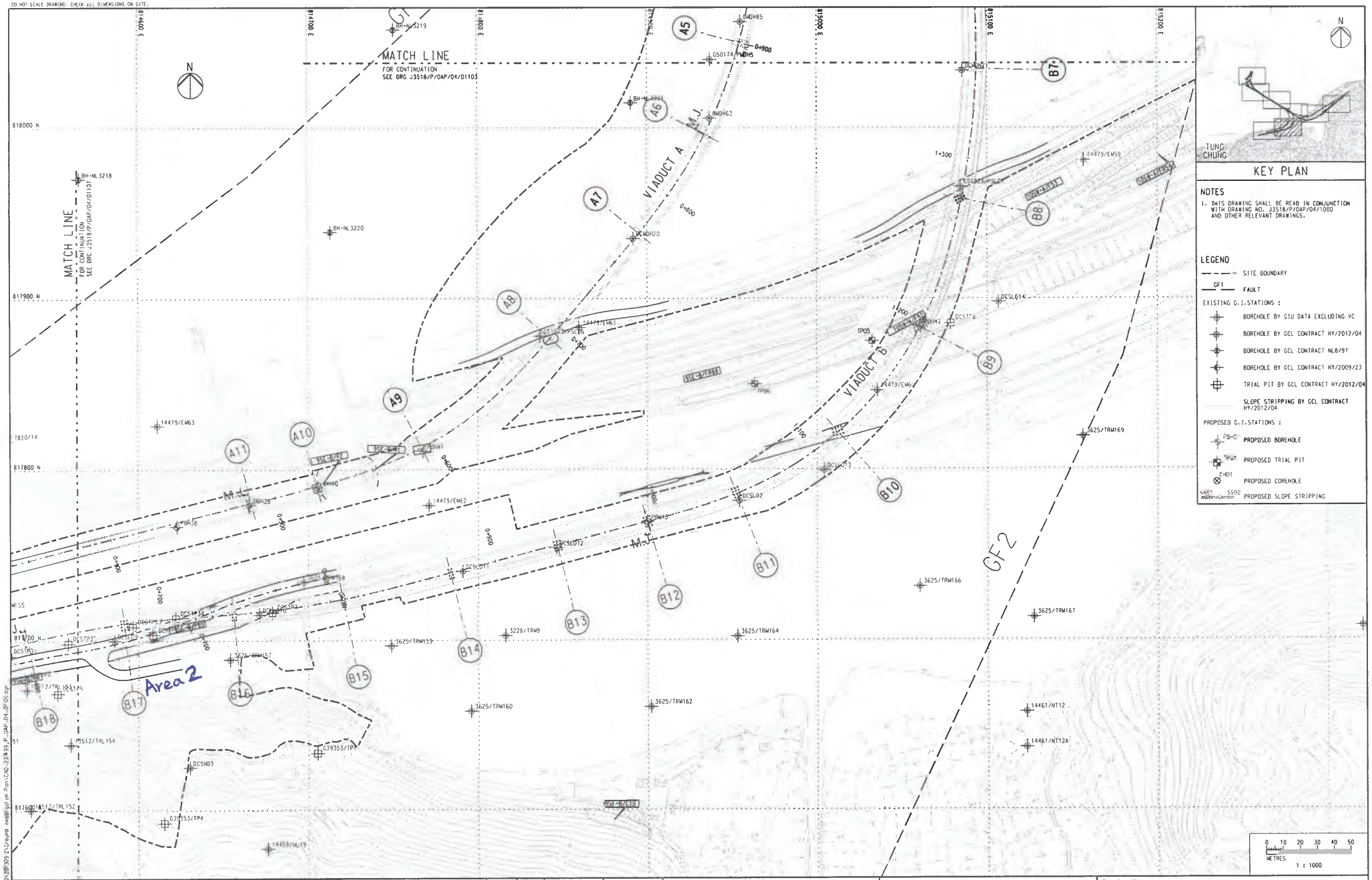
Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2k**

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



Rev	Description	By	Date
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B	[illegible]	RC	07/13
C	[illegible]	RC	09/13

Drawn	RL
Date	07/13
Checked	DS
Approved	DOP
Scale	1:1000 @ A1 / 1:2000 @ A3

Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2I**

Drawing no. J3518/P/OAP/04/01106 Rev C

Plotted by [illegible] on 19/07/2013
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1.4 SUMMARY OF CONSTRUCTION WORKS

The construction phase of the Contract commenced on 31 October 2013. The rolling construction programme for the period of June to August 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:

June 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

July 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

August 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;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers 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*.

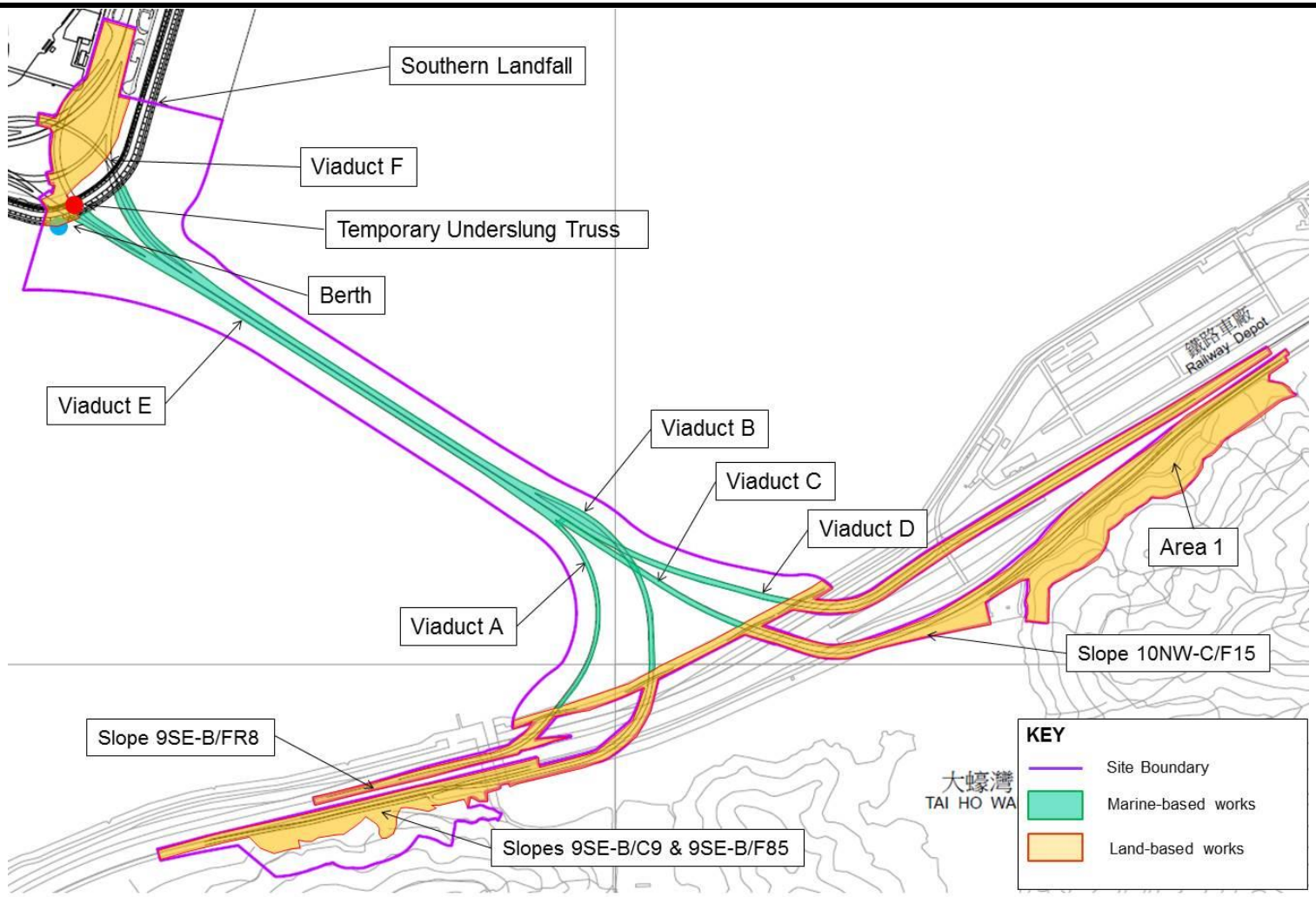
The environmental mitigation measures implementation schedule is presented in *Appendix C*.

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



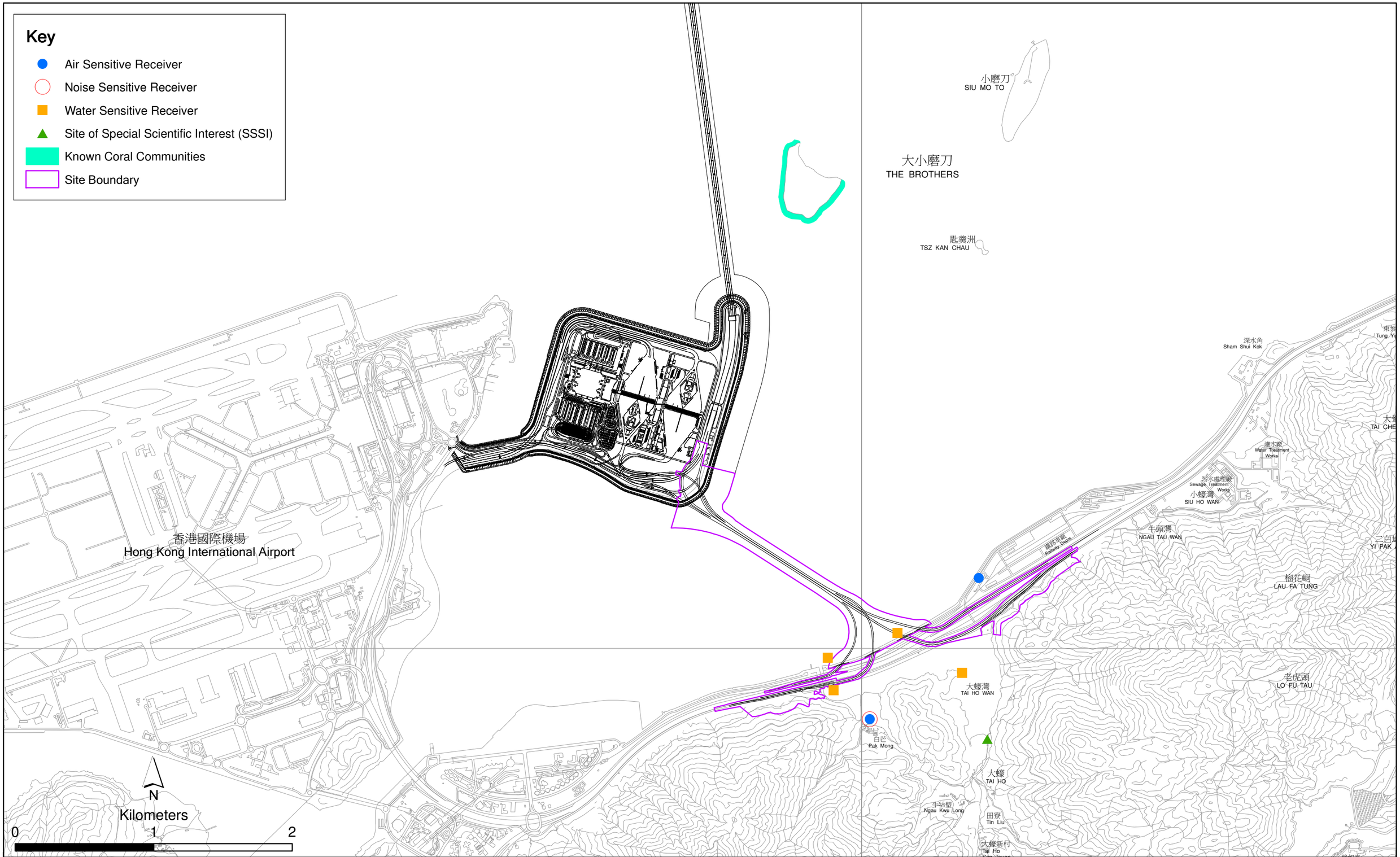


Figure 1.4

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

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_Environmental_Sensitive_Receiver.mxd
Date: 18/5/2015

Environmental Resources Management

ERM

2 EM&A RESULTS

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

2.1 AIR QUALITY

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

2.1.1 Monitoring Requirements and Equipment

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

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

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

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

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

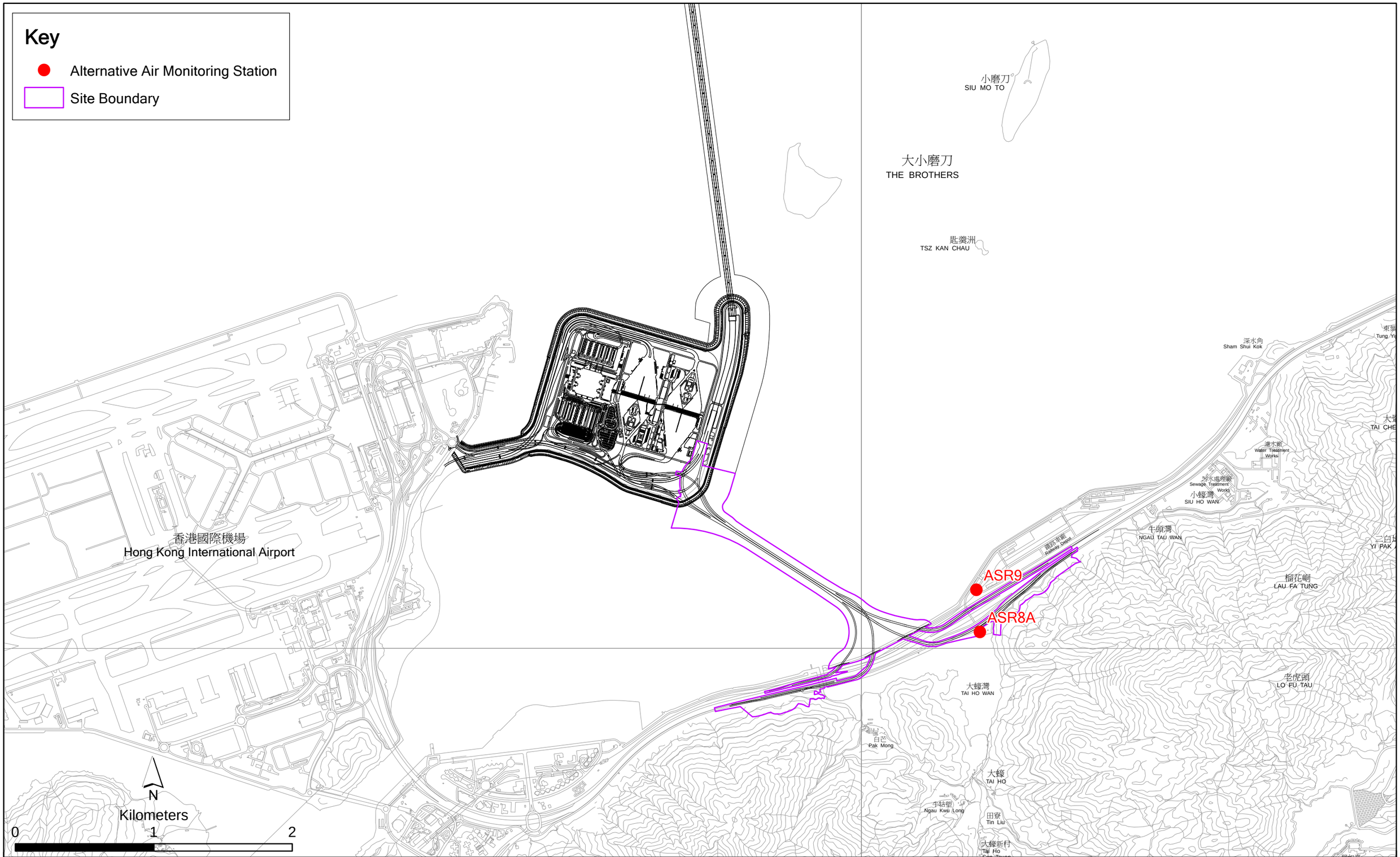


Figure 2.1

Locations of Air Quality Monitoring Stations

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Date: 7/1/2015

Environmental Resources Management

ERM

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

Monitoring Station (1)	Monitoring Period	Location	Description	Parameters & Frequency
ASR8A	6, 12, 15, 21 and 27 June 2018	Area 4	On ground at the works area, Area 4	• 1-hour Total Suspended Particulates (1-hour TSP, μg/m³), 3 times per day every 6 days
ASR9	3, 9, 12, 18, 24 and 30 July 2018 2, 8, 14, 23, 25 and 29 August 2018	MTR Depot	On the ground nearby MTR Depot entrance	• 24-hour Total Suspended Particulates (24-hour TSP, μg/m³), daily for 24-hour every 6 days

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 *Fifty-sixth* to *Fifty-eighth Monthly EM&A Reports*.

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

Month	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
June 2018	ASR 8A	62	23-135	394	500
	ASR 9	72	13-103	393	500
July 2018	ASR 8A	48	19-78	394	500
	ASR 9	53	17-108	393	500
August 2018	ASR 8A	72	23-162	394	500
	ASR 9	77	38-180	393	500

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

Month	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
June 2018	ASR 8A	30	24-39	178	260
	ASR 9	31	16-44	178	260
July 2018	ASR 8A	28	18-32	178	260
	ASR 9	31	21-44	178	260
August 2018	ASR 8A	39	19-66	178	260
	ASR 9	42	20-70	178	260

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

All 1-hour and 24-hour TSP results were below the Action and Limit Levels at all monitoring locations in this reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in Appendix J.

2.2 NOISE MONITORING

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

2.2.1 *Monitoring Requirements and Equipment*

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

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

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

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

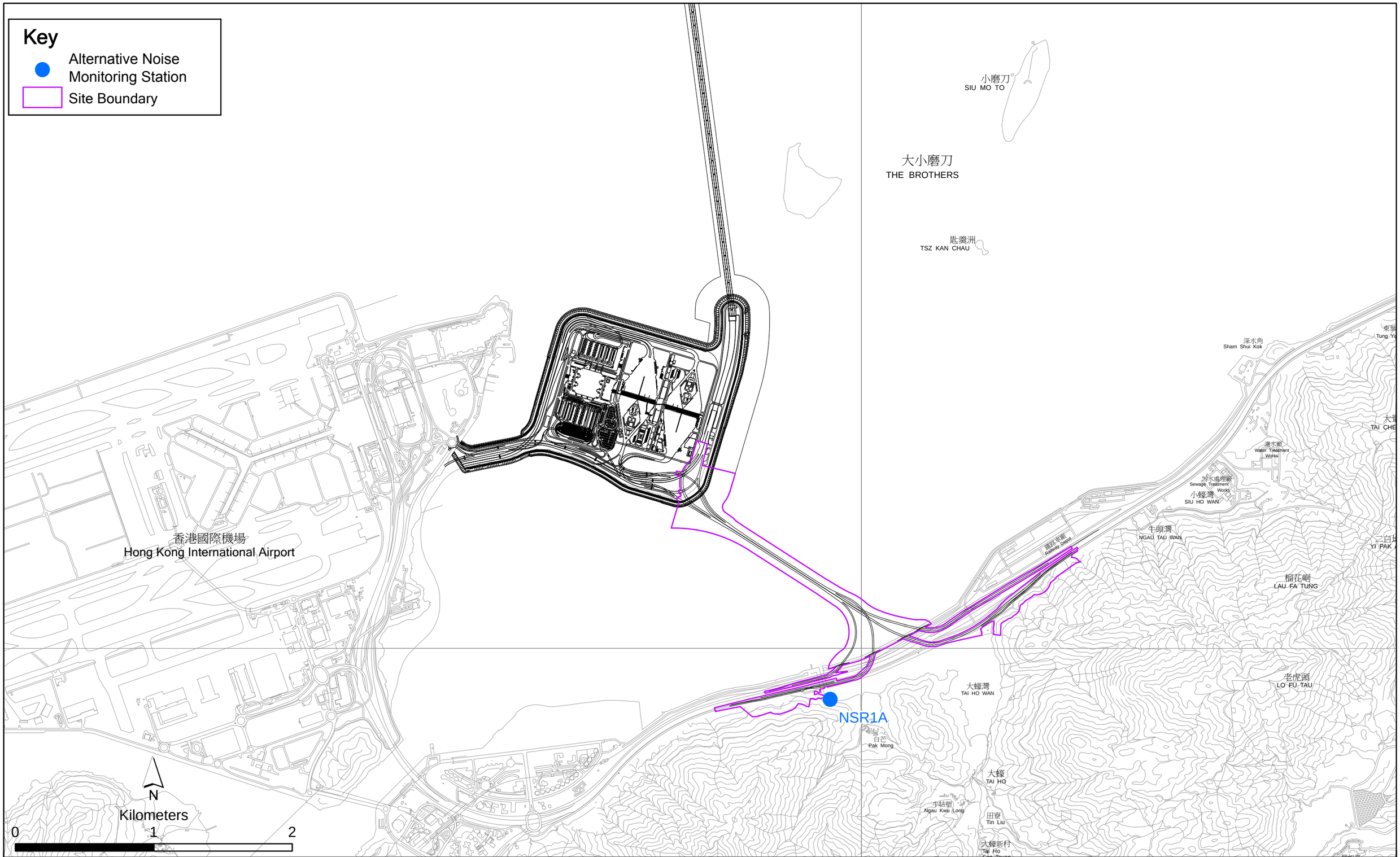

Figure 2.2

Location of Noise Monitoring Station

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Date: 7/1/2015

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

Monitoring Station	Monitoring Period	Location	Parameters & Frequency
NSR1A	6, 12, 15, 21 and 27 June 2018 3, 9, 12, 18, 24 and 30 July 2018 2, 8, 14, 23, 25 and 29 August 2018	Pak Mong Village Pavilion	• 30-mins measurement at each monitoring station between 0700 and 1900 on normal weekdays (Monday to Saturday). L_{eq}, L_{10} and L_{90} would be recorded. • At least once a week

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

Table 2.6 ***Noise Monitoring Equipment***

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

2.2.2 Action and Limit Levels

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

2.2.3 Monitoring Schedule for the Reporting Quarter

The schedule for construction noise monitoring in the reporting period is provided in *Appendix 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 *Fifty-sixth* to *Fifty-eighth 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} (30mins)	Range, dB(A), L_{eq} (30mins)	Limit Level, dB(A), L_{eq} (30mins)
June 2018	64	62-69	75
July 2018	64	62-65	75
August 2018	64	63-66	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 (1) are adopted for this Project. Baseline water quality monitoring was conducted at station SR4a from 29 August to 24 September 2013.

2.3.1 *Monitoring Requirements and Equipment*

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

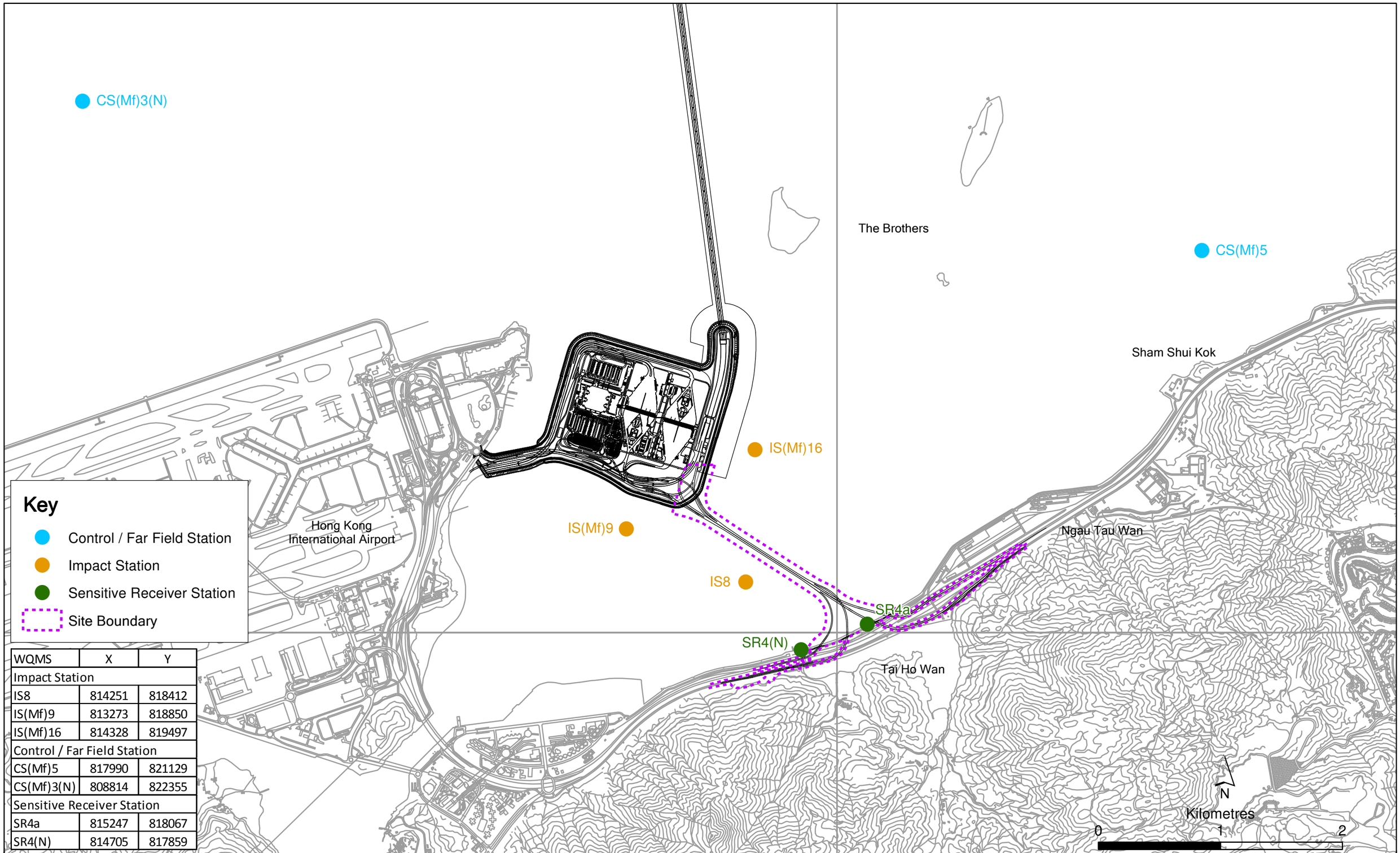
Due to Three-Runway System (3RS) marine construction works, an alternative water quality control station CS(Mf)3(N) was proposed to replace control station CS(Mf)3. The *Proposal of Alternative Water Quality Monitoring Station* (2) was submitted to EPD on 31 March 2017 and granted on 6 April 2017. Water 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	• Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) • Dissolved Oxygen (DO) (mg/L and % of saturation) • Suspended Solid (SS) (mg/L)	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. If the water depth is less than	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			

(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.

(2) *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.



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		
SR4a	815247	818067
SR4(N)	814705	817859

Figure 2.3

Locations of Water Quality Monitoring Stations

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Date: 20/3/2018

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Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS8	Impact Station(Close to HKBCF construction site)	814251	818412		3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	
SR4(N)	Sensitive receiver (Tai Ho Inlet)	814705	817859			
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.
Water Quality Monitoring Station SR4 was relocated to SR4(N) since 2 March 2018.

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 6920 V2
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 during mid-flood tide at all water quality monitoring stations, on 6 June 2018 and 18 July 2018, except CS(Mf)5 on 6 June and all monitoring stations during both mid-ebb and mid-flood tide on 8 June 2018 were cancelled due to adverse weather. Water quality monitoring on 18 June 2018 was cancelled due to suspension of works during holiday.

2.3.4 *Results and Observations*

In this reporting period, a total of 38 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 *Fifty-sixth* to *Fifty-eighth Monthly EM&A Reports*.

Thirty-seven (37) Action Level and three (3) Limit Level of Dissolved Oxygen (DO) exceedances, one (1) Limit Level of Suspended Solids exceedance and one (1) Action Level of Turbidity exceedance 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 (1).

(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).

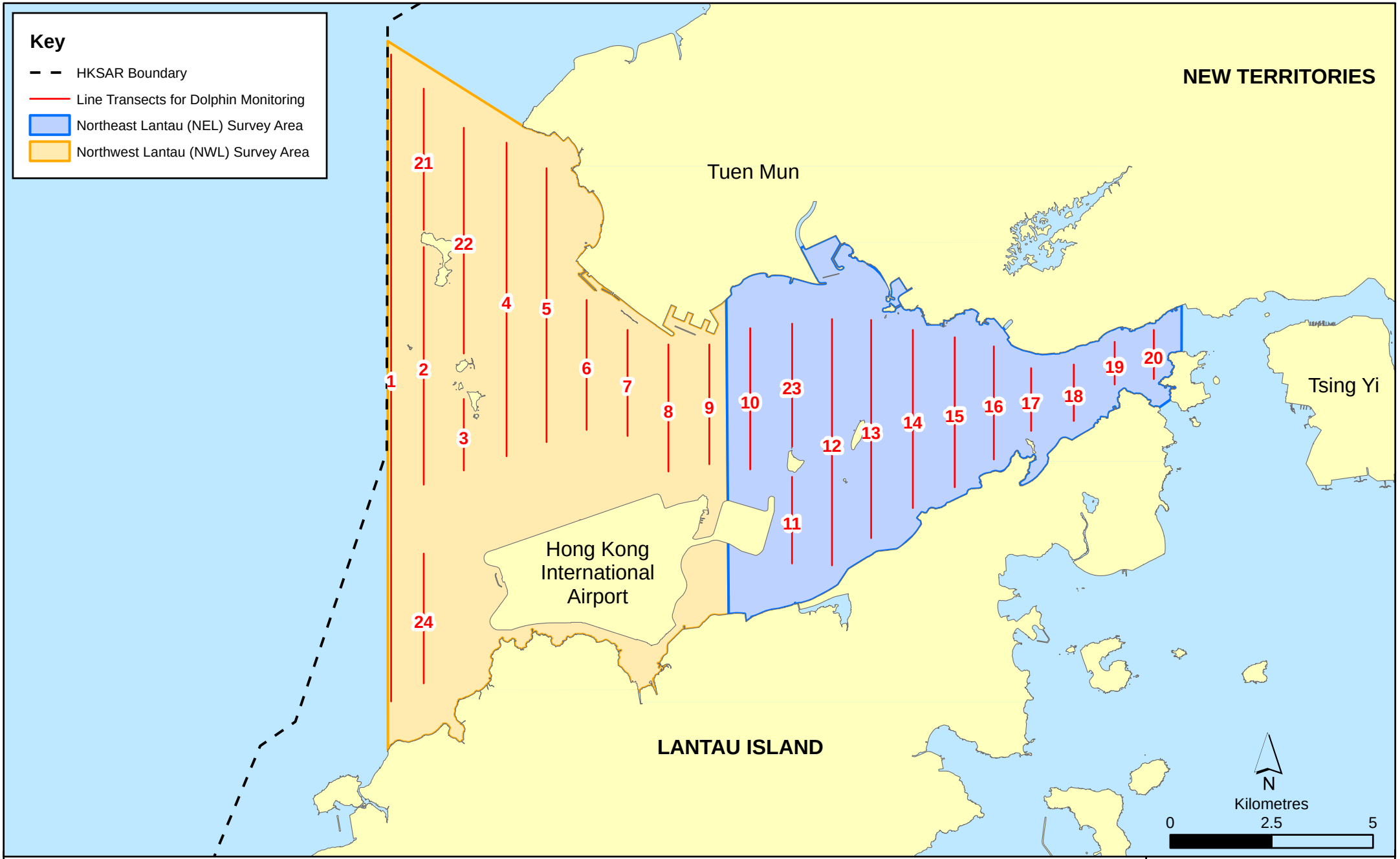

Figure 2.4

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

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Date: 21/9/2017

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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 771.98 km of survey effort was collected, with 96.8% 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, 287.18 km and 484.80 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 567.73 km, while the effort on secondary lines was 204.25 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 June to August 2018, a total of seven (7) groups of 17 Chinese White Dolphins were sighted. Six of the seven dolphin sightings were made during on-effort, while four of the six 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: (5th & 13th Jun 2018)	0.0	0.0
	Set 2: (19th & 27th Jun 2018)	0.0	0.0
	Set 3: (3rd & 9th Jul 2018)	0.0	0.0
	Set 4: (12th & 20th Jul 2018)	0.0	0.0
	Set 5: (1st & 8th Aug 2018)	0.0	0.0
	Set 6: (21st & 28th Aug 2018)	0.0	0.0
NWL	Set 1: (5th & 13th Jun 2018)	0.00	0.00
	Set 2: (19th & 27th Jun 2018)	1.91	3.81
	Set 3: (3rd & 9th Jul 2018)	0.00	0.00
	Set 4: (12th & 20th Jul 2018)	1.68	6.71
	Set 5: (1st & 8th Aug 2018)	3.36	6.72
	Set 6 (21st & 28th Aug 2018)	0.00	0.00

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)	
	June - August 2018	**September - November 2011**	**June - August 2018**	**September - November 2011**
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	1.16 ± 1.39	9.85 ± 5.85	2.87 ± 3.32	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 five (5) individuals per group in North Lantau region during June to August 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	
	June to August 2018	**September - November 2011**
Overall	2.43 ± 1.62 (n = 7)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.43 ± 1.62 (n = 7)	3.92 ± 3.40 (n = 49)

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June to August 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 BORED PILING MONITORING

Under the marine bored piling monitoring programme for dolphins, Post-construction Land-based Theodolite Tracking should be conducted for 30 days after the completion of the bored piling works. Post-construction Land-based Theodolite Tracking commenced on 5 June 2018 and will continue in September 2018.

2.6 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteen (13) site inspections were carried out in the reporting quarter on 6, 13, 20 and 27 June , 4, 12, 18 and 26 July, and 1, 8, 15, 23 and 30 August 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

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
6 June 2018	Southern Landfall (Pier F1) • Accumulated general refuse should be disposed of in the skip and cleared regularly. • Chemical containers were observed not placed in drip tray. Southern Landfall (Pier E14C) • Accumulated general refuse should be disposed of in the skip and cleared regularly. Seafront Office at Southern Landfall (Portion A)(Portion S-c) • Chemical containers were observed not placed in drip tray.	Southern Landfall (Pier F1) • The Contractor was reminded to clear accumulated general refuse. • The Contractor was reminded to place chemical containers in drip tray. Southern Landfall (Pier E14C) • The Contractor was reminded to clear accumulated general refuse. Seafront Office at Southern Landfall (Portion A)(Portion S-c) • The Contractor was reminded to place chemical containers in drip tray.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
13 June 2018	Viaduct E (Pier E4) • Chemical containers were observed not placed in drip tray. Viaduct E (Pier E5) • Stagnant water in the drip tray near chemical containers should be cleared. Viaduct E (Pier E12) • Stagnant water in the drip tray near the generator should be cleared.	Viaduct E (Pier E4) • The Contractor was reminded to place chemical containers in drip tray. Viaduct E (Pier E5) • The Contractor was reminded to clear stagnant water in the drip tray. Viaduct E (Pier E12) • The Contractor was reminded to clear stagnant water in the drip tray.
20 June 2018	Viaduct B • Chemical container was observed not placed in drip tray. Viaduct B (Pier B2) • Stagnant water was observed in the drip tray and nearby the generator. • Accumulated general refuse should be cleared.	Viaduct B • The Contractor was reminded to place chemical container in drip tray. Viaduct B (Pier B2) • The Contractor was reminded to clear stagnant water in the drip tray and nearby the generator. • The Contractor was reminded to clear accumulated general refuse.
28 June 2018	Viaduct C (Pier C16 and Gate 4A) • Accumulated general refuse should be cleared. Viaduct E (Pier E12) • Stagnant water in the drip tray should be cleared. • Absorption pad should be provided near the drip tray. Viaduct E • Accumulated general refuse should be disposed of in the skip and cleared regularly. Southern Landfall (Portion A)(Portion S-c) • Chemical containers were observed not placed in drip tray.	Viaduct C (Pier C16 and Gate 4A) • The Contractor was reminded to clear accumulated general refuse. Viaduct E (Pier E12) • The Contractor was reminded to clear stagnant water in the drip tray and nearby the generator. • The Contractor was reminded to provide absorption pad near the drip tray. Viaduct E • The Contractor was reminded to clear accumulated general refuse. Southern Landfall (Portion A)(Portion S-c) • The Contractor was reminded to place chemical containers in drip tray.
4 July 2018	Viaduct E (Pier E12) • Accumulated general refuse on the deck and in the gully should be cleared regularly. Viaduct E (Pier E13) • Chemical container was observed not placed in drip tray.	Viaduct E (Pier E12) • The Contractor was reminded to clear accumulated general refuse. Viaduct E (Pier E13) • The Contractor was reminded to place chemical container in drip tray.
12 July 2018	Viaduct F (Ramp F) • The drip tray was observed not properly plugged. Viaduct E (Pier E14A) • Accumulated general refuse should be cleared. Viaduct F (Pier F9) • The drip tray was observed not properly plugged.	Viaduct F (Ramp F) • The Contractor was reminded to plug the drip tray. Viaduct E (Pier E14A) • The Contractor was reminded to clear accumulated general refuse. Viaduct F (Pier F9) • The Contractor was reminded to plug the drip tray.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
18 July 2018	Viaduct E (Pier E10) • Stagnant water was observed in the drip tray. Viaduct E (Pier E6) • Accumulated general refuse should be cleared. Viaduct E (Pier E2) • Empty chemical container should be cleared.	Viaduct E (Pier E10) • The Contractor was reminded to clear stagnant water in drip tray. Viaduct E (Pier E6) • The Contractor was reminded to clear general refuse. Viaduct E (Pier E2) • The Contractor was reminded to clear empty chemical container.
26 July 2018	Viaduct E (Pier E12) • Stagnant water in the drip tray should be cleared. Viaduct E (Pier E11) • Chemical containers were observed not placed in drip tray	Viaduct C (Pier C16 and Gate 4A) • The Contractor was reminded to clear stagnant water in the drip tray. Viaduct E (Pier E12) • The Contractor was reminded to place chemical container in drip tray.
1 August 2018	Viaduct A (Pier A1) • Accumulated general refuse should be cleared regularly. Viaduct B (Pier B3-B6) • Chemical containers were observed not placed in drip tray.	Viaduct A (Pier A1) • The Contractor was reminded to clear accumulated general refuse. Viaduct B (Pier B3-B6) • The Contractor was reminded to place chemical containers in drip tray. •
8 August 2018	Viaduct E (Pier E13) • Chemical containers were observed not placed in drip tray. Viaduct E (Pier E12) • Oil stain was observed. • Empty chemical container should be removed off site.	Viaduct E (Pier E13) • The Contractor was reminded to place chemical containers in drip tray. Viaduct E (Pier E12) • The Contractor was reminded to clear oil stain. • The Contractor was reminded to clear empty chemical container.
15 August 2018	Southern Landfall • Accumulated general refuse should be cleared regularly. • NRMM label should be provided on the generator. • Sand inside the drip tray should be cleared.	Southern Landfall • The Contractor was reminded to clear general refuse. • The Contractor was reminded to provide NRMM label. • The Contractor was reminded to clear sand inside the drip tray.
23 August 2018	Viaduct E • Accumulated general refuse should be cleared regularly. Viaduct E (Pier E12) • Chemical containers were observed not placed in drip tray. • New NRMM label should be provided on the generator.	Viaduct E • The Contractor was reminded to clear general refuse. Viaduct E (Pier E12) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to provide new NRMM label.
30 August 2018	Viaduct E (Pier E13) • Chemical containers were observed not placed in drip tray. • Stagnant water in the drip tray should be cleared.	Viaduct E (Pier E13) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to clear stagnant water in drip tray.

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

2.7 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 [a] (m^3)	Imported Fill (m^3)	Inert Construction Waste Re-used (m^3)	Non-inert Construction Waste [b] (kg)	Recyclable Materials [c] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)		
							Category L	Category M (M_p & M_f)	Category H
June 2018	2,801	67	1,134	669,690	9,605	0	0	0	0
July 2018	1,361	181	208	639,210	13,316	0	0	0	0
August 2018	2,369	1,455	189	508,670	0	1,200	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*.

2.8 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-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-RW0235-18	21 Jun 2018	18 Dec 2018	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RS0244-18	30-Mar-18	29-Sep-18	GCL	Broad Permit for Whole Site Areas
Construction Noise Permit for night works and works in general holidays	GW-RS0328-18	30-Apr-18	29-Jun-18	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS0426-18	11 Jun 2018	31 Jul 2018	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS0654-18	1 Aug 2018	30 Sep 2018	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and	GW-RS0064-18	1-Feb-18	29-Jul-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
works in general holidays					
Construction Noise Permit for night works and works in general holidays	GW-RS0657-18	1 Aug 2018	31 Oct 2018	GCL	Cover Traffic Sign at Tung Chung
Construction Noise Permit for night works and works in general holidays	GW-RS0658-18	1 Aug 2018	22 Aug 2018	GCL	East Coast Road Street Light Repairing

2.9 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.

2.10 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

No Action or Limit Level exceedance for 1-hour TSP and 24-hour TSP for air quality and construction noise monitoring was recorded during the reporting period.

Thirty-seven (37) Action Level and three (3) Limit Level of Dissolved Oxygen (DO) exceedances, one (1) Limit Level of Suspended Solids exceedance and one (1) Action Level of Turbidity exceedance 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 [(a)]		Quarterly Mean (June to August 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	5.7	8.1
CS(Mf)5	9.2	11.5	11.9	14.9	7.2	6.4
SR4(N)	10.3	12.3	13.4	16.0	8.1	10.1
SR4a	9.1	9.8	11.9	12.7	7.8	9.7
IS8	11.3	13.5	14.6	17.6	7.2	9.0
IS(Mf)9	10.9	14.3	14.2	18.5	6.4	8.3
IS(Mf)16	11.4	10.3	14.8	13.4	7.0	7.3

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.
(c) Water Quality Monitoring Station SR4 was relocated to SR4(N) since 2 March 2018.

One (1) Limit Level exceedance was recorded for impact dolphin monitoring in this reporting quarter. Following the review of the monitoring data and marine works details as per the procedure stipulated in the Event and Action

Plan of the Updated EM&A Manual, no unacceptable impact was associated with the construction works under this Contract that may have affected the dolphin usage in the North Lantau region. Investigation findings were detailed in *Appendix L*.

2.11 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

There were two (2) complaints received by 1823 regarding discharge of muddy water nearby Hong Kong Boundary Crossing Facilities (HKBCF) on 13 June 2018 and construction noise nuisance nearby the Kowloon-bound lane of the North Lantau Highway on 16 June 2018 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*.

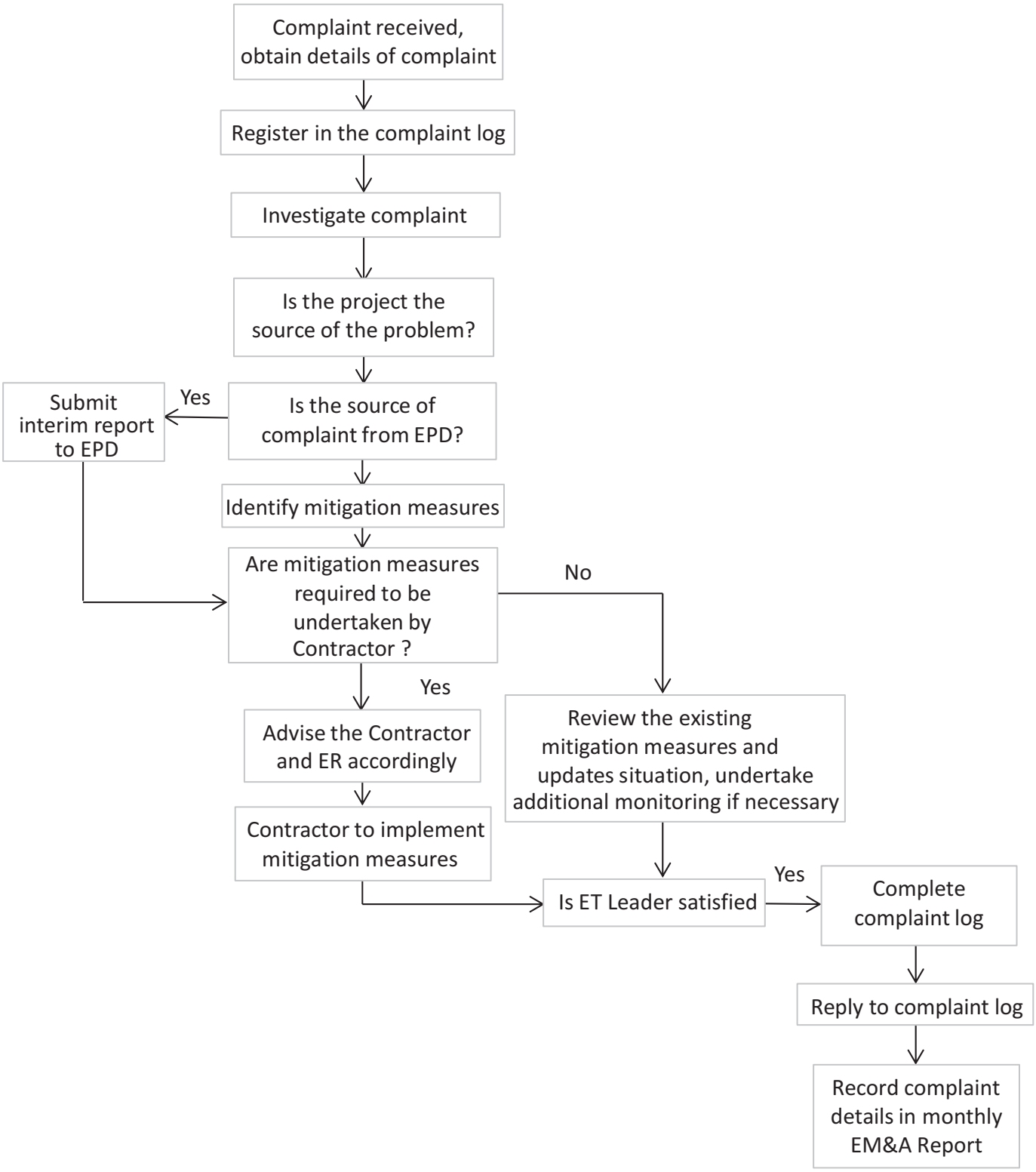

Figure 2.5 Environmental Complaint Handling Procedure

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DATE: 06/12/2013

Environmental Resources Management

ERM

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:

September 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Pier construction;
- Re-alignment of Cheung Tung Road;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

October 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Re-alignment of Cheung Tung Road;
- Abutment construction;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers installation; and
- Slope work of Viaducts A, B, C & D.

November 2018

Marine-based Works

- Uninstallation of marine piling platform

Land-based Works

- Reinstatement works along Cheung Tung Road;
- Abutment construction;
- Road works along North Lantau Highway;
- Asphalt paving;
- Construction of sign gantries, light poles and street furniture;
- Parapets and barriers 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 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

The Nineteenth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 June to 31 August 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*).

Neither Action Level nor Limit Level exceedances were observed for 1-hour and 24-hour TSP level and noise impact monitoring in this reporting period.

Thirty-seven (37) Action Level and three (3) Limit Level of Dissolved Oxygen (DO) exceedances, one (1) Limit Level of Suspended Solids exceedance and one (1) Action Level of Turbidity exceedance were recorded for water quality impact monitoring in the reporting period.

A total of seven (7) groups of seventeen (17) Chinese White Dolphins were sighted during the six sets of survey from June to August 2018. One (1) Limit Level exceedance was recorded for the quarterly dolphin monitoring data between June to August 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.

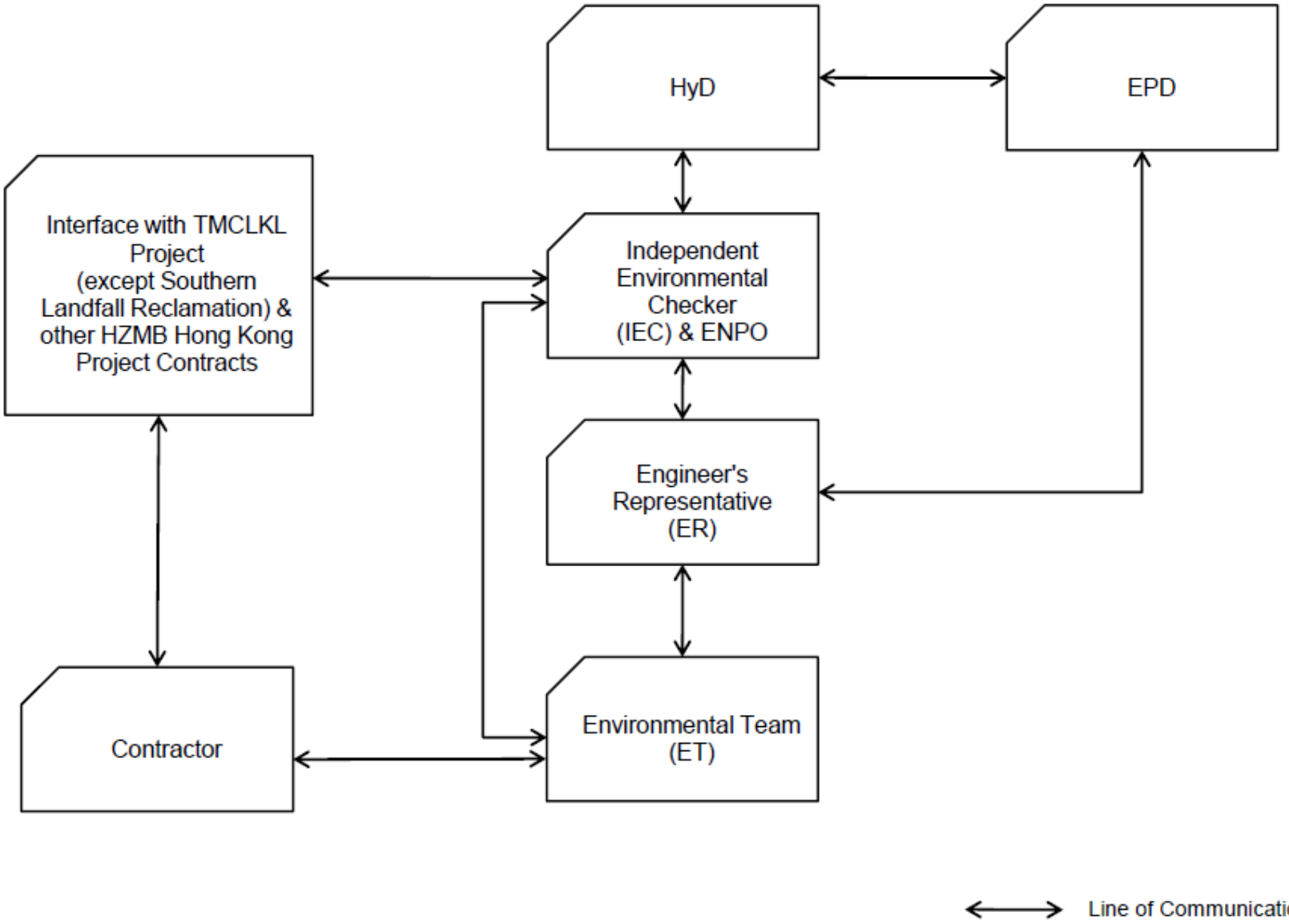
Environmental site inspection was carried out 13 times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

There were two (2) complaints received by 1823 regarding discharge of muddy water nearby Hong Kong Boundary Crossing Facilities (HKBCF) on 13 June 2018 and construction noise nuisance nearby the Kowloon-bound lane of the North Lantau Highway on 16 June 2018 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



Appendix A1

Contract No. HY/2012/07 Southern Connection Viaduct Section
Project Organization

DATE: 06/03/2013

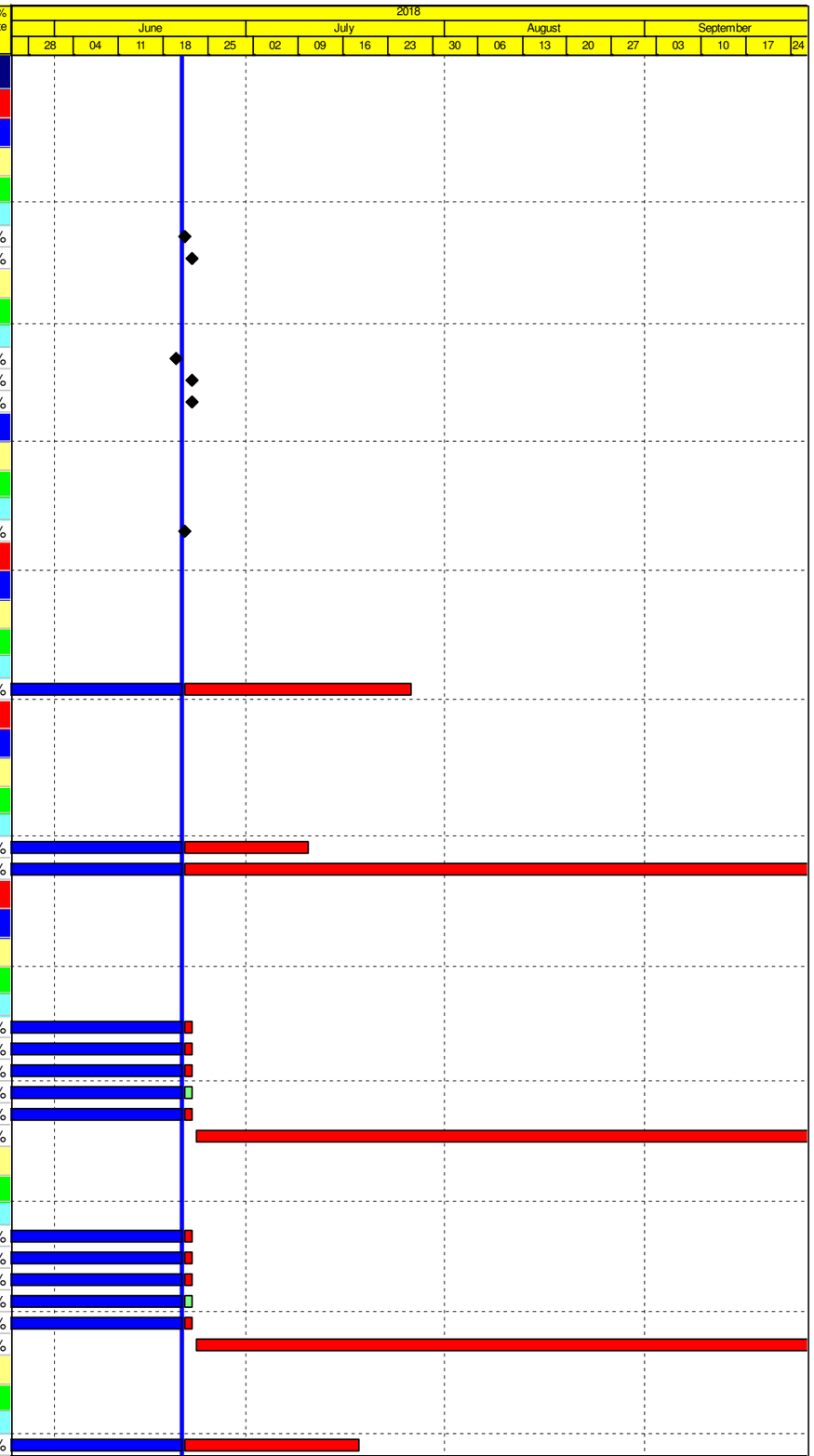
Environmental Resources Management

ERM

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
HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection									
Contract Milestones									
Key Dates for Completion									
Stage of the Works									
Completion Date									
General									
KD03	KD3 - Stage 3: TCSS Along NLH Near Viaduct C, D (EoT 8-Apr-16)	0		0	21-Jun-18*		08-Apr-16	-803	0%
KD05	KD5 - Stage 5: TCSS at Viaduct A, B (EoT 7-Dec-16)	0		0	22-Jun-18*		07-Dec-16	-562	0%
Section of the Works									
Completion Date									
General									
KD10	KD10 - Section 4: All Works at Viaduct E1 (EoT 7-Oct-16)	0		0	20-Jun-18 A				100%
KD11	KD11 - Section 5: All Works at Viaduct A (EoT 7-Apr-17)	0		0	22-Jun-18*		07-Apr-17	-441	0%
KD12	KD12 - Section 6: All Works at Viaduct B (EoT 8-Apr-17)	0		0	22-Jun-18*		08-Apr-17	-440	0%
Portion Handover Dates									
Possession of the Works Area									
Access Dates									
General									
POS02-6B	Portion A - Area 6B (To be confirmed)	0	21-Jun-18*	0		18-Sep-20		821	0%
Design									
Detailed Design									
Slope Works Near Viaduct A									
Feature 9SE-B/FR8, B/R1, B/R2									
Slope Works Design									
ARDD0596-1	IC/SO Approval of Slope Combined AIP/DDA - CP11.01	60	13-Jun-17 A	30	26-Jul-18	12-Sep-16	19-Oct-16	-522	95%
Procurement									
Precast Parapets & Barriers									
Viaduct A to F									
Precast Parapet Manufacture									
General									
PP6011-05	Viaduct E - Precast Parapets/Barriers Production	180	02-Jul-16 A	16	10-Jul-18	07-May-18	25-May-18	-37	98%
PP6011-06	Viaduct F - Precast Parapets/Barriers Production	198	05-Mar-18 A	148	14-Dec-18	21-Dec-17	26-Jun-18	-143	30%
Construction									
Foundation & Substructure Works									
Ramp A									
Abutment & Approach Ramp A									
Ramp Finishes, E&M & Roadworks									
ARA-C7710	Ramp A - Parapet Panels	66	27-Apr-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
ARA-C7720	Ramp A - Ducting, Gantry & TCSS Provisions (KD5)	30	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
ARA-C7810	Ramp A - Drainage, Fire Main & E&M Services	42	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
ARA-C7820	Ramp A - Railings, Light Poles, Signs & Street Furniture	24	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
ARA-C7830	Ramp A - Deck Paving & Roadmarking (KD11)	18	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
ARA-C7840	Ramp A - outstanding works	129	23-Jun-18	129	24-Nov-18	01-Nov-16	07-Apr-17	-484	0%
Ramp B									
Abutment & Approach Ramp B									
Ramp Finishes, E&M & Roadworks									
ARB-C7710	Ramp B - Parapet Panels	76	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
ARB-C7720	Ramp B - Ducting, Gantry & TCSS Provisions (KD5)	30	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
ARB-C7810	Ramp B - Drainage, Fire Main & E&M Services	42	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
ARB-C7820	Ramp B - Railings, Light Poles, Signs & Street Furniture	24	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
ARB-C7830	Ramp B - Deck Paving & Roadmarking (KD12)	18	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
ARB-C7840	Ramp B - Outstanding works	98	23-Jun-18	98	19-Oct-18	07-Dec-16	07-Apr-17	-453	0%
Ramp C									
Abutment & Approach Ramp C									
Ramp Finishes, E&M & Roadworks									
ARC-C7840	Ramp C - outstanding works	124	12-Feb-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPL-M61
Layout: J3518-DWP-3MRP Submission - M61
Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

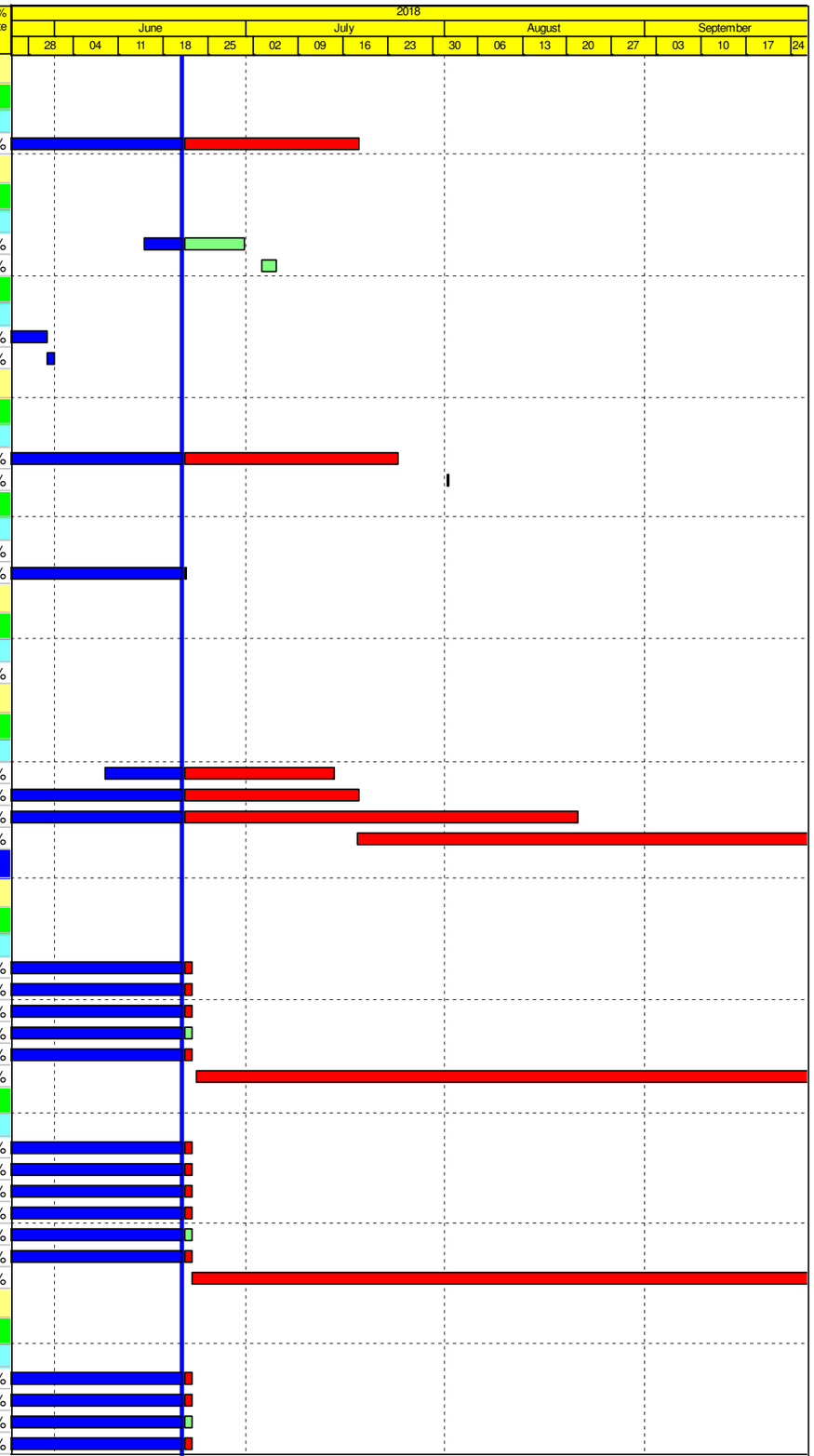
Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 1 of 6 Pages)
(Progress as of 21-Jun-18)

Date	Revision	Check...	Approved
28-May-...		PKN	HF
03-Jul-18		HF	HF

DWG. No.:

J3518/GCL/PGM/3MRP-M61

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
Ramp D									
Abutment & Approach Ramp D									
Ramp Finishes, E&M & Roadworks									
ARD-C7840	Ramp D - Outstanding works	66	28-Apr-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%
Viaduct E - Bridge E5, E6, E7, E8									
Pier E13A (E8c)									
Pile Cap Dolphin									
E13A-C3150	E13A Dolphin - Marine Pile Cap - Rebar, Concreting	5	15-Jun-18 A	9	30-Jun-18	30-Jul-18	08-Aug-18	32	25%
E13A-C3160	E13A Dolphin - Marine Pile Cap - CJ preparation & Curing	3	03-Jul-18	3	05-Jul-18	09-Aug-18	11-Aug-18	32	0%
Pier E13D (E5c)									
Pile Cap Dolphin									
E13D-C3150	E13D Dolphin - Marine Pile Cap - Rebar, Concreting	5	12-Apr-18 A	0	31-May-18 A				100%
E13D-C3160	E13D Dolphin - Marine Pile Cap - CJ preparation & Curing	3	31-May-18 A	0	01-Jun-18 A				100%
Viaduct F - Bridge F3									
Pier F10 (F3c)									
Pier Head Segment									
F10-C5110	F10 Pier Head - Scaffold, Temp Works	30	12-Sep-17 A	28	24-Jul-18	01-Feb-18	08-Mar-18	-110	40%
F10-C5210	F10 Pier Head - Erect last PH segment (1 nr)	1	01-Aug-18	1	01-Aug-18	16-Mar-18	16-Mar-18	-110	0%
Pier F11 (F3b)									
Pier Head Segment									
F11-C5110	F11 Pier Head - Scaffold, Temp Works	33	15-Mar-18 A	0	21-May-18 A				100%
F11-C5210	F11 Pier Head - Erect PH Segment (2 nr)	2	06-Apr-18 A	1	21-Jun-18	16-Mar-18	16-Mar-18	-76	90%
Viaduct F - Bridge F4									
Pier F16 (F5a/F4a)									
Pier Head Segment									
F16-C5410	F16 Pier Head - Curing, Remove Formwork	12	21-Mar-18 A	0	21-May-18 A				100%
Ramp F									
Abutment & Approach Ramp F									
Ramp Structure									
ARF-C6130	Ramp F -Abutment wall (RF-6)	14	09-Jun-18 A	20	14-Jul-18	23-Jan-18	14-Feb-18	-118	50%
ARF-C6140	Ramp F - Column and beam (FB2 & FB3)	54	14-Feb-18 A	23	18-Jul-18	01-Nov-17	27-Nov-17	-186	56%
ARF-C6150	Ramp F - Column and beam (FB1 & FB3)	86	26-Mar-18 A	52	21-Aug-18	20-Jan-18	24-Mar-18	-120	22%
ARF-C6160	Ramp F - Ramp deck	71	18-Jul-18	71	10-Oct-18	15-Feb-18	17-May-18	-120	0%
Superstructure & Associated Works									
Viaduct A									
Bridge A2									
Deck Fnishes, E&M and Roadworks									
VA2-C7710	Viaduct A2 - Parapet Panels	118	13-Feb-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
VA2-C7720	Viaduct A2 - Gantry & TCSS Provisions (KD5)	36	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
VA2-C7810	Viaduct A2 - Drainage, Fire Main & E&M Services	60	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
VA2-C7820	Viaduct A2 - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
VA2-C7830	Viaduct A2 - Deck Paving & Roadmarking (KD11)	18	21-May-18 A	2	22-Jun-18	29-Oct-16	31-Oct-16	-484	97%
VA2-C7840	New Activity	129	23-Jun-18	129	24-Nov-18	01-Nov-16	07-Apr-17	-484	0%
Bridge A1									
Deck Fnishes, E&M and Roadworks									
VA1-C7710	Viaduct A1 - Parapet Panels	220	10-Feb-18 A	2	22-Jun-18	01-Nov-16	03-Nov-16	-481	97%
VA1-C7715	Viaduct A1 - Parapet Panels (with MTR access)	51	21-May-18 A	2	22-Jun-18	01-Nov-16	03-Nov-16	-481	97%
VA1-C7720	Viaduct A1 - Gantry & TCSS Provisions (KD5)	36	21-May-18 A	2	22-Jun-18	01-Nov-16	03-Nov-16	-481	97%
VA1-C7810	Viaduct A1 - Drainage, Fire Main & E&M Services	48	21-May-18 A	2	22-Jun-18	01-Nov-16	03-Nov-16	-481	97%
VA1-C7820	Viaduct A1 - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
VA1-C7830	Viaduct A1 - Deck Paving & Roadmarking (KD11)	18	21-May-18 A	2	22-Jun-18	01-Nov-16	03-Nov-16	-481	97%
VA1-C7840	Viaduct A1 - Outstanding works	155	22-Jun-18	155	24-Nov-18	03-Nov-16	07-Apr-17	-596	0%
Viaduct B									
Bridge B3									
Deck Fnishes, E&M and Roadworks									
VB3-C7720	Viaduct B3 - Gantry & TCSS Provisions (KD5)	36	21-Mar-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB3-C7810	Viaduct B3 - Drainage, Fire Main & E&M Services	60	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB3-C7820	Viaduct B3 - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
VB3-C7830	Viaduct B3 - Deck Paving & Roadmarking (KD12)	18	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPL-M61
Layout: J3518-DWP-3MRP Submission - M61
Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

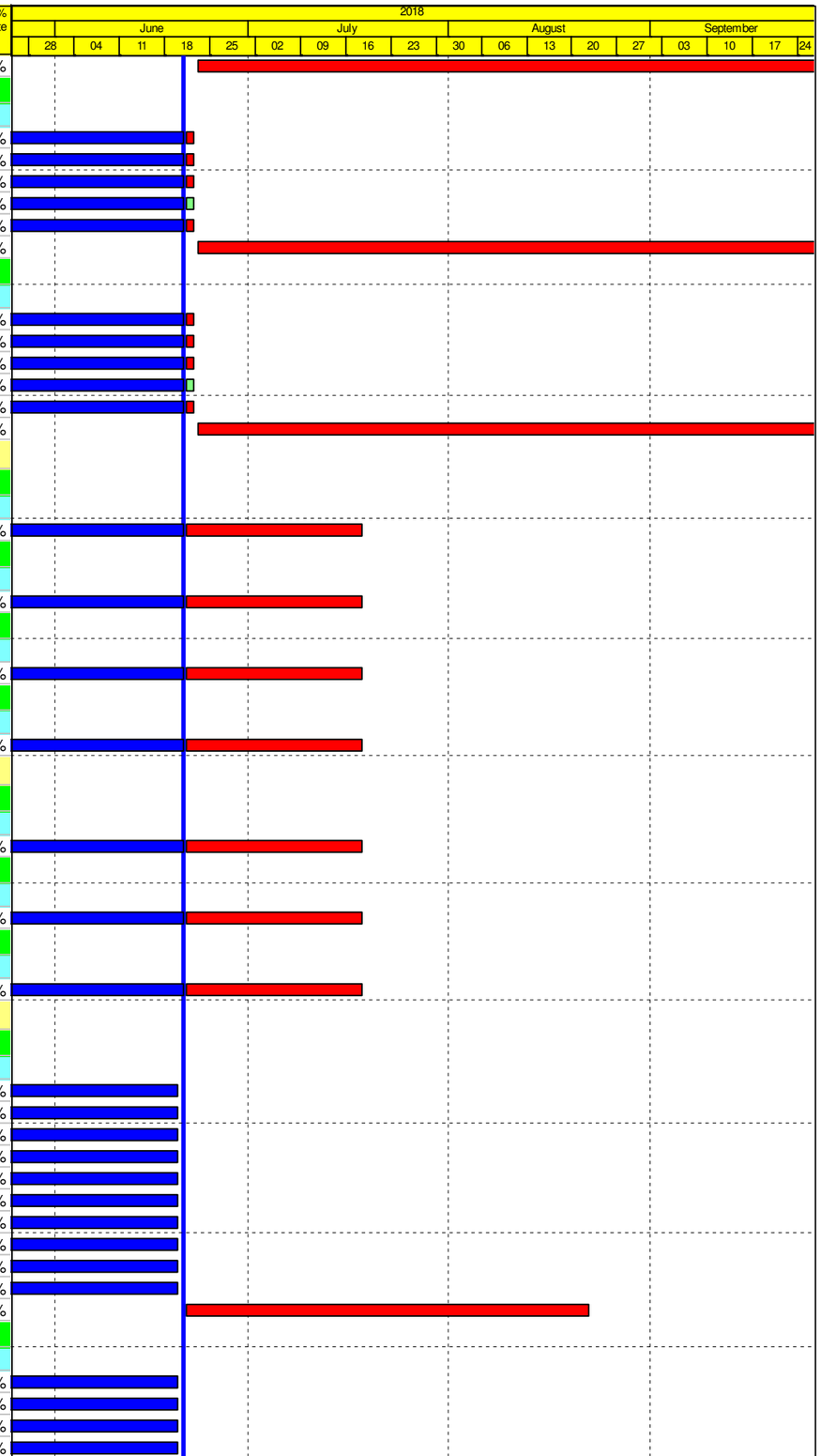
Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 2 of 6 Pages)
(Progress as of 21-Jun-18)

Date	Revision	Check...	Approved
28-May-...		PKN	HF
03-Jul-18		HF	HF

DWG. No.:

J3518/GCL/PGM/3MRP-M61

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
VB3-C7840	Viaduct B3 - Outstanding works	98	23-Jun-18	98	19-Oct-18	07-Dec-16	07-Apr-17	-453	0%
Bridge B2									
Deck Fnishes, E&M and Roadworks									
VB2-C7710	Viaduct B2 - Parapet Panels	60	15-Aug-17 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB2-C7720	Viaduct B2 - Gantry & TCSS Provisions (KD5)	36	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB2-C7810	Viaduct B2 - Drainage, Fire Main & E&M Services	48	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB2-C7820	Viaduct B2 - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
VB2-C7830	Viaduct B2 - Deck Paving & Roadmarking (KD12)	18	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB2-C7840	New Activity	98	23-Jun-18	98	19-Oct-18	07-Dec-16	07-Apr-17	-453	0%
Bridge B1									
Deck Fnishes, E&M and Roadworks									
VB1-C7710	Viaduct B1 - Parapet Panels	83	06-Nov-17 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB1-C7720	Viaduct B1 - Gantry & TCSS Provisions (KD5)	36	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB1-C7810	Viaduct B1 - Drainage, Fire Main & E&M Services	60	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB1-C7820	Viaduct B1 - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	2	22-Jun-18	17-Sep-20	18-Sep-20	667	97%
VB1-C7830	Viaduct B1 - Deck Paving & Roadmarking (KD12)	18	21-May-18 A	2	22-Jun-18	05-Dec-16	06-Dec-16	-453	97%
VB1-C7840	Viaduct B1 - Outstanding works	98	23-Jun-18	98	19-Oct-18	07-Dec-16	07-Apr-17	-453	0%
Viaduct C									
Bridge C4									
Deck Fnishes, E&M and Roadworks									
VC4-C7840	Viaduct C4 - Outstanding works	124	12-Feb-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%
Bridge C3									
Deck Fnishes, E&M and Roadworks									
VC3-C7840	Viaduct C3 - Outstanding works	124	12-Feb-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%
Bridge C2									
Deck Fnishes, E&M and Roadworks									
VC2-C7840	Viaduct C2 - Outstanding works	124	12-Feb-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	0%
Bridge C1									
Deck Fnishes, E&M and Roadworks									
VC1-C7840	Viaduct C1 - outstanding works	124	12-Feb-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%
Viaduct D									
Bridge D3									
Deck Fnishes, E&M and Roadworks									
VD3-C7840	Viaduct D3 - Outstanding works	66	28-Apr-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	90%
Bridge D2									
Deck Fnishes, E&M and Roadworks									
VD2-C7840	Viaduct D2 - Outstanding works	66	28-Apr-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	0%
Bridge D1									
Deck Fnishes, E&M and Roadworks									
VD1-C7840	Viaduct D1 - Outstanding works	66	28-Apr-18 A	23	18-Jul-18	11-Mar-17	07-Apr-17	-376	0%
Viaduct E									
Bridge E1									
Deck Fnishes, E&M and Roadworks									
VE1AB-C77	Viaduct E1A/B - Parapet Panels	48	27-Nov-17 A	0	20-Jun-18 A				100%
VE1AB-C77:	Viaduct E1A/B - Gantry & TCSS Provisions (KD4)	36	27-Apr-18 A	0	20-Jun-18 A				100%
VE1AB-C78	Viaduct E1A/B - Drainage, Fire Main & E&M Services	60	21-May-18 A	0	20-Jun-18 A				100%
VE1AB-C78:	Viaduct E1A/B - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	0	20-Jun-18 A				100%
VE1AB-C78:	Viaduct E1A/B - Deck Paving & Roadmarking (KD10)	18	21-May-18 A	0	20-Jun-18 A				100%
VE1CD-C77	Viaduct E1C/D - Parapet Panels	56	21-Dec-17 A	0	20-Jun-18 A				100%
VE1CD-C77	Viaduct E1C/D - Gantry & TCSS Provisions (KD4)	36	27-Apr-18 A	0	20-Jun-18 A				100%
VE1CD-C78	Viaduct E1C/D - Drainage, Fire Main & E&M Services	42	21-May-18 A	0	20-Jun-18 A				100%
VE1CD-C78	Viaduct E1C/D - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	0	20-Jun-18 A				100%
VE1CD-C78	Viaduct E1C/D - Deck Paving & Roadmarking (KD10)	18	21-May-18 A	0	20-Jun-18 A				100%
VE1CD-C78	Viaduct E1 - Outstanding works	53	21-Jun-18	53	22-Aug-18	04-Feb-17	07-Apr-17	-406	0%
Bridge E2									
Deck Fnishes, E&M and Roadworks									
VE21-C7710	Viaduct E2-1 (E3-E6) - Parapet Panels	48	15-Feb-18 A	0	20-Jun-18 A				100%
VE21-C7720	Viaduct E2-1 (E3-E6) - Gantry & TCSS Provisions (KD4)	36	21-May-18 A	0	20-Jun-18 A				100%
VE21-C7810	Viaduct E2-1 (E3-E6) - Drainage, Fire Main & E&M Services	60	21-May-18 A	0	20-Jun-18 A				100%
VE21-C7820	Viaduct E2-1 (E3-E6) - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	0	20-Jun-18 A				100%



Actual Work
Planned Bar
Critical Bar
Milestone

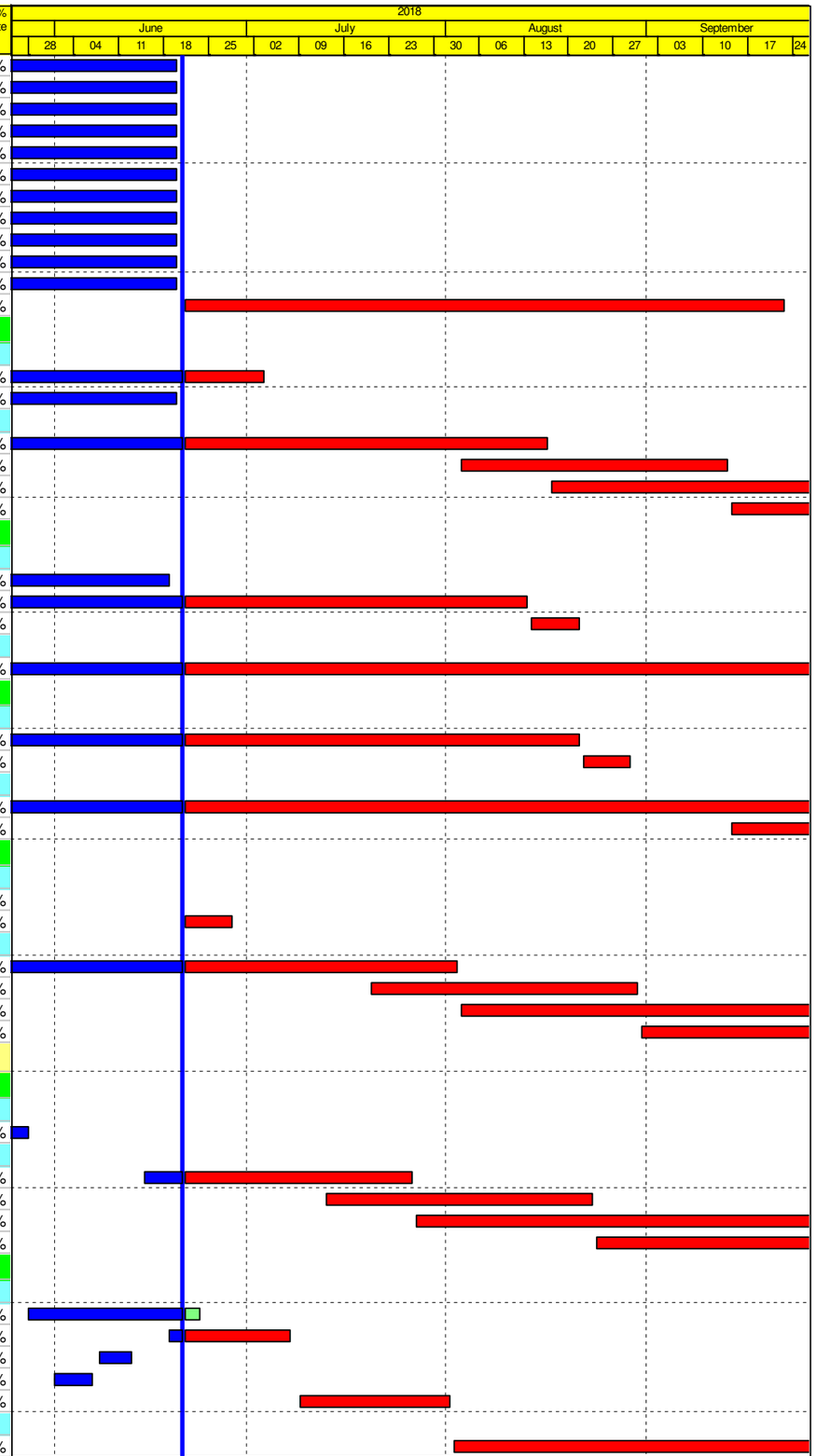
Project ID: TMCLK-DWPL-M61
Layout: J3518-DWP-3MRP Submission - M61
Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 3 of 6 Pages)
(Progress as of 21-Jun-18)

Date	Revision	Check...	Approved
28-May-...		PKN	HF
03-Jul-18		HF	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M61

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
VE21-C7830	Viaduct E2-1 (E3-E6) - Deck Paving & Roadmarking (KD9)	18	21-May-18 A	0	20-Jun-18 A				100%
VE22-C7710	Viaduct E2-2 (E6-E8) - Parapet Panels	48	19-Mar-18 A	0	20-Jun-18 A				100%
VE22-C7720	Viaduct E2-2 (E6-E8) - Gantry & TCSS Provisions (KD4)	36	21-May-18 A	0	20-Jun-18 A				100%
VE22-C7810	Viaduct E2-2 (E6-E8) - Drainage, Fire Main & E&M Services	60	21-May-18 A	0	20-Jun-18 A				100%
VE22-C7820	Viaduct E2-2 (E6-E8) - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	0	20-Jun-18 A				100%
VE22-C7830	Viaduct E2-2 (E6-E8) - Deck Paving & Roadmarking (KD9)	18	21-May-18 A	0	20-Jun-18 A				100%
VE23-C7710	Viaduct E2-3 (E8-E10) - Parapet Panels	48	18-Apr-18 A	0	20-Jun-18 A				100%
VE23-C7720	Viaduct E2-3 (E8-E10) - Gantry & TCSS Provisions (KD4)	36	21-May-18 A	0	20-Jun-18 A				100%
VE23-C7810	Viaduct E2-3 (E8-E10) - Drainage, Fire Main & E&M Services	60	21-May-18 A	0	20-Jun-18 A				100%
VE23-C7820	Viaduct E2-3 (E8-E10) - Railings, Light Poles, Signs & Street Furniture	30	21-May-18 A	0	20-Jun-18 A				100%
VE23-C7830	Viaduct E2-3 (E8-E10) - Deck Paving & Roadmarking (KD9)	18	21-May-18 A	0	20-Jun-18 A				100%
VE23-C7840	Viaduct E2 - Outstanding works	80	21-Jun-18	80	22-Sep-18	30-Dec-16	07-Apr-17	-433	0%
Bridge E5									
Deck Span Segment									
E14D-C6610	E14D Deck - Dismantle Truss & Clear Deck (KD1)	15	03-May-18 A	10	03-Jul-18	07-Apr-18	18-Apr-18	-61	60%
VE5-C6910	Viaduct E5 - Final Stressing to Span	12	10-May-18 A	0	20-Jun-18 A				100%
Deck Fnishes, E&M and Roadworks									
VE5-C7710	Viaduct E5 - Parapet Panels	48	18-May-18 A	48	16-Aug-18	14-Feb-18	18-Apr-18	-99	45%
VE5-C7720	Viaduct E5 - Gantry & TCSS Provisions (KD4)	36	03-Aug-18	36	13-Sep-18	04-Apr-18	17-May-18	-99	0%
VE5-C7810	Viaduct E5 - Drainage, Fire Main & E&M Services	60	17-Aug-18	60	29-Oct-18	10-May-18	21-Jul-18	-82	0%
VE5-C7820	Viaduct E5 - Railings, Light Poles, Signs & Street Furniture	30	14-Sep-18	30	22-Oct-18	15-Jun-18	21-Jul-18	-76	0%
Bridge E6									
Deck Span Segment									
E13C-C6310	E13C Deck - Stitch between E12C and E13C	12	16-Mar-18 A	0	19-Jun-18 A				100%
VE6-C6910	Viaduct E6 - Final Stressing to Span	12	22-Mar-18 A	45	13-Aug-18	09-Feb-18	10-Apr-18	-103	92%
VE6-C6920	Viadcct E6 - Install, grout permanent bearing and load transfer at pier E14C	7	14-Aug-18	7	21-Aug-18	11-Apr-18	18-Apr-18	-103	0%
Deck Fnishes, E&M and Roadworks									
VE6-C7710	Viaduct E6 - Parapet Panels	48	21-May-18 A	90	06-Oct-18	23-Dec-17	18-Apr-18	-141	40%
Bridge E7									
Deck Span Segment									
VE7-C6910	Viaduct E7 - Final Stressing to Span	12	21-Apr-18 A	52	21-Aug-18	01-Feb-18	10-Apr-18	-110	95%
VE7-C6920	Viaduct E7 - Install, grout permanent bearing and load transfer to E14C	7	22-Aug-18	7	29-Aug-18	11-Apr-18	18-Apr-18	-110	0%
Deck Fnishes, E&M and Roadworks									
VE7-C7710	Viaduct E7 - Parapet Panels	48	12-May-18 A	84	28-Sep-18	03-Jan-18	18-Apr-18	-135	44%
VE7-C7720	Viaduct E7 - Gantry & TCSS Provisions (KD4)	36	14-Sep-18	36	29-Oct-18	04-Apr-18	17-May-18	-135	0%
Bridge E8									
Deck Span Segment									
VE8-C6910	Viaduct E8 - Final Stressing to Span	12	19-Apr-18 A	0	25-May-18 A				100%
VE8-C6920	Viaduct E8 - Install, grout permanent bearing and load transfer	7	21-Jun-18	7	28-Jun-18	11-Apr-18	18-Apr-18	-58	0%
Deck Fnishes, E&M and Roadworks									
VE8-C7710	Viaduct E8 - Parapet Panels	48	11-May-18 A	36	02-Aug-18	03-Mar-18	18-Apr-18	-87	92%
VE8-C7720	Viaduct E8 - Gantry & TCSS Provisions (KD4)	36	20-Jul-18	36	30-Aug-18	04-Apr-18	17-May-18	-87	0%
VE8-C7810	Viaduct E8 - Drainage, Fire Main & E&M Services	60	03-Aug-18	60	13-Oct-18	10-May-18	21-Jul-18	-70	0%
VE8-C7820	Viaduct E8 - Railings, Light Poles, Signs & Street Furniture	30	31-Aug-18	30	06-Oct-18	15-Jun-18	21-Jul-18	-64	0%
Viaduct F									
Bridge F1									
Deck Span Segment									
VF1-C6920	Viaduct F1 - Install, grout permanent bearing and load transfer at piers F3 &	7	05-Feb-18 A	0	28-May-18 A				100%
Deck Fnishes, E&M and Roadworks									
VF1-C7710	Viaduct F1 - Parapet Panels	48	15-Jun-18 A	30	26-Jul-18	10-Mar-18	18-Apr-18	-81	50%
VF1-C7720	Viaduct F1 - Gantry & TCSS Provisions (KD4)	36	13-Jul-18	36	23-Aug-18	04-Apr-18	17-May-18	-81	0%
VF1-C7810	Viaduct F1 - Drainage, Fire Main & E&M Services	60	27-Jul-18	60	06-Oct-18	12-May-18	24-Jul-18	-62	0%
VF1-C7820	Viaduct F1 - Railings, Light Poles, Signs & Street Furniture	30	24-Aug-18	30	28-Sep-18	11-Jun-18	17-Jul-18	-62	0%
Bridge F2									
Deck Span Segment									
F04-C6420	F4 Deck - release U tendon, stress bar & break up temp stitch @E14C	12	28-May-18 A	3	23-Jun-18	16-Sep-20	18-Sep-20	666	75%
F06-C6410	F6 Deck - Stitching to F5-F6 and remove proping	28	19-Jun-18 A	14	07-Jul-18	30-May-18	14-Jun-18	-18	50%
F07-C6410	F7 Deck - Stitching to F6-F7	12	08-Jun-18 A	0	13-Jun-18 A				100%
F08-C6410	F8 Deck - Stitching to F7-F8	12	01-Jun-18 A	0	07-Jun-18 A				100%
VF2-C6910	Viaduct F2 - Final Stressing	21	09-Jul-18	21	01-Aug-18	15-Jun-18	11-Jul-18	-18	0%
Deck Fnishes, E&M and Roadworks									
VF2-C7710	Viaduct F2 - Parapet Panels	60	02-Aug-18	60	12-Oct-18	12-Jul-18	19-Sep-18	-18	0%



Actual Work
Planned Bar
Critical Bar
Milestone

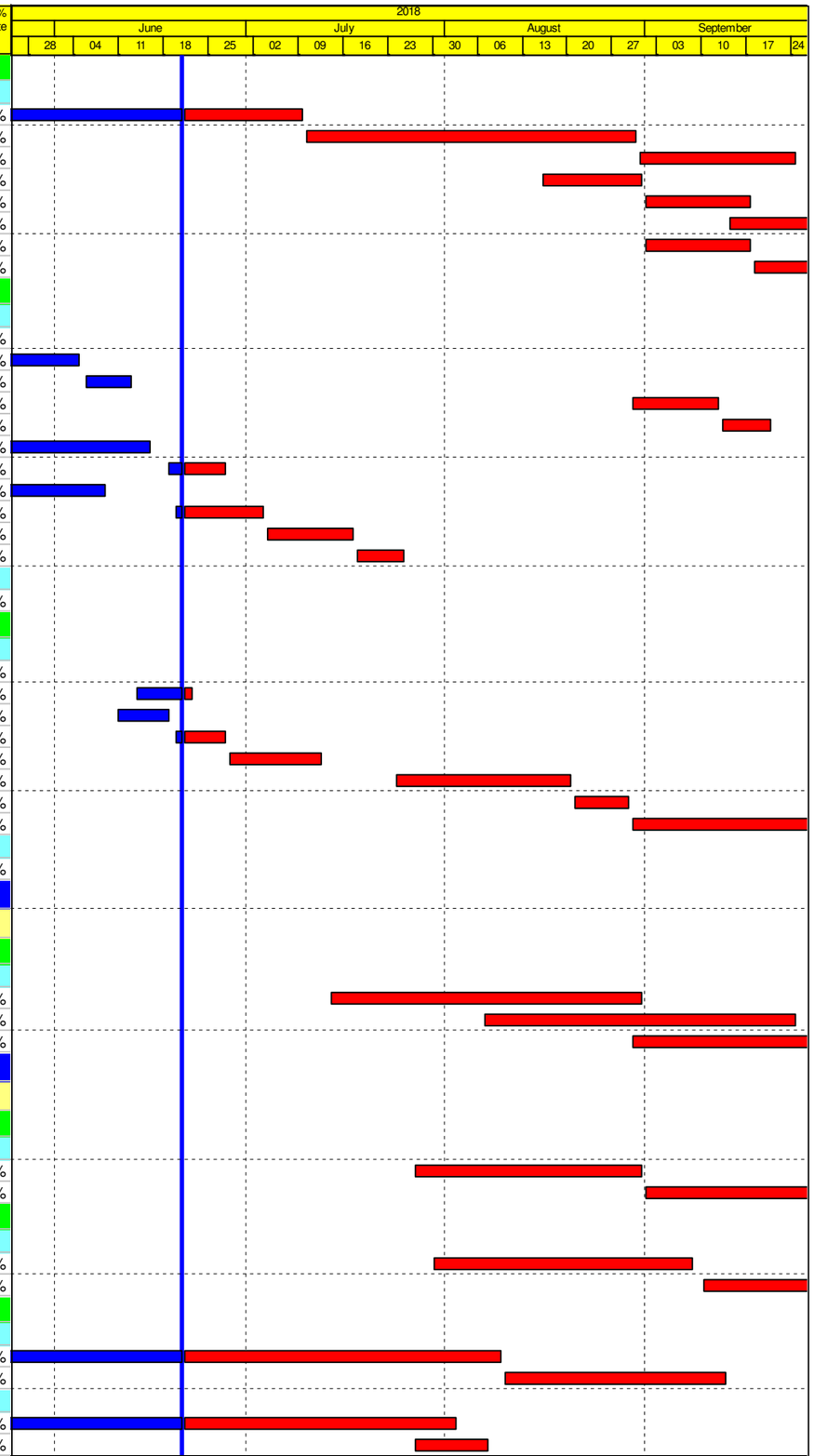
Project ID: TMCLK-DWPL-M61
Layout: J3518-DWP-3MRP Submission - M61
Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 4 of 6 Pages)
(Progress as of 21-Jun-18)

Date	Revision	Check...	Approved
28-May-...		PKN	HF
03-Jul-18		HF	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M61

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
Bridge F3									
Deck Span Segment									
F10-C6210	F9-F10 Deck - Erect Falsework (with Sliding System)	21	21-May-18 A	15	09-Jul-18	18-Jan-18	03-Feb-18	-122	25%
F10-C6310	F9-F10 Deck - Span Segment (33 nr) - Crane	45	10-Jul-18	45	30-Aug-18	06-Feb-18	06-Apr-18	-121	0%
F10-C6410	F9-F10 Deck - Stitching to F9 & Clear Deck (KD2)	21	31-Aug-18	21	24-Sep-18	11-Apr-18	05-May-18	-118	0%
F11-C6210	F10-F11 Deck - Erect Falsework (stage 1)	14	16-Aug-18	14	31-Aug-18	17-Mar-18	06-Apr-18	-122	0%
F11-C6310	F10-F11 Deck - Span Segment (15 nr)stage 1 - Crane	14	01-Sep-18	14	17-Sep-18	07-Apr-18	23-Apr-18	-122	0%
F11-C6320	F10-F11 - Erect Falsework (stage 2)	14	14-Sep-18	14	02-Oct-18	20-Apr-18	07-May-18	-122	0%
F12-C6210	F11-F12 Deck - Soil Platform, Concrete Blocks, I-Beam (stage 1)	14	01-Sep-18	14	17-Sep-18	07-Apr-18	23-Apr-18	-122	0%
F12-C6310	F11-F12 Deck - Span Segment (10 nr)stage 1 - Crane	11	18-Sep-18	11	02-Oct-18	24-Apr-18	07-May-18	-122	0%
Bridge F4									
Deck Span Segment									
F16-C6310	F16 Deck - Cantilever Span (5 nr) & stitches - crane	19	20-May-18 A	0	24-May-18 A				100%
F16-C6320	F16 Deck - Construct props with footing	24	25-May-18 A	0	05-Jun-18 A				100%
F16-C6330	F16 Deck - Cantilever Span (12 nr) - THB / crane	30	06-Jun-18 A	0	13-Jun-18 A				100%
F16B-C6410	F16 Deck - Stitching to F15-F16	12	30-Aug-18	12	12-Sep-18	15-May-18	29-May-18	-89	0%
F16B-C6420	F16 Deck - Grout bearing & load transfer at F15	7	13-Sep-18	7	20-Sep-18	30-May-18	06-Jun-18	-89	0%
F17-C6310	F17 Deck - Cantilever Span (12 nr) - crane (Props at 5th Pair)	23	26-Mar-18 A	0	16-Jun-18 A				100%
F17-C6410	F17 Deck - Stitching to F16-F17	12	19-Jun-18 A	6	27-Jun-18	14-Apr-18	20-Apr-18	-55	50%
F18-C6210	F18 Deck - Falsework for End Span to F17	24	21-May-18 A	0	09-Jun-18 A				100%
F18-C6310	F18 Deck - End Span to F17 (9 nr) - Crane	12	20-Jun-18 A	10	03-Jul-18	10-Apr-18	20-Apr-18	-59	10%
F18-C6410	F18 Deck - Stitching to F17-F18	12	04-Jul-18	12	17-Jul-18	21-Apr-18	05-May-18	-59	0%
F18-C6420	F18 Deck - Grout bearing & load transfer at F17 & F18	7	18-Jul-18	7	25-Jul-18	07-May-18	14-May-18	-59	0%
Deck Fnishes, E&M and Roadworks									
VF4-C7710	Viaduct F4 - Parapet Panels	48	10-Nov-18	48	08-Jan-19	26-Jul-18	19-Sep-18	-89	0%
Bridge F5									
Deck Span Segment									
F14-C6410	F14 Deck - Stitching to F13-F14 & Clear Deck (KD2)	12	18-May-18 A	0	23-May-18 A				100%
F14-C6420	F14 Deck - Install, grout permanent bearing and load transfer at F14	7	14-Jun-18 A	2	22-Jun-18	17-May-18	18-May-18	-28	75%
F15-C6210	F15 - Falsework for End Span to F14	24	11-Jun-18 A	0	19-Jun-18 A				100%
F15-C6310	F15 - End Span to F14 (7 nr) - Crane	7	20-Jun-18 A	6	27-Jun-18	12-May-18	18-May-18	-32	15%
F15-C6410	F15 Deck - Stitching to F14-F15	12	28-Jun-18	12	12-Jul-18	19-May-18	02-Jun-18	-32	0%
F15-C6510	F15 - Falsework for End Span to F16	24	24-Jul-18	24	20-Aug-18	22-Feb-18	21-Mar-18	-122	0%
F15-C6610	F15 - End Span to F16 (7 nr) - Crane	8	21-Aug-18	8	29-Aug-18	05-May-18	14-May-18	-89	0%
VF5-C6910	Viaduct F5 - Final Stressing and stitching to Span	36	30-Aug-18	36	12-Oct-18	04-Jun-18	17-Jul-18	-73	0%
Deck Fnishes, E&M and Roadworks									
VF5-C7710	Viaduct F5 - Parapet Panels	48	23-Oct-18	48	17-Dec-18	26-Jul-18	19-Sep-18	-73	0%
CEDD Access Track Re-Provisioning Works									
Viaduct A to D									
Access Tracks									
General									
PR30060	Construct perm. realignment of CEDD access track at Pier A8	42	14-Jul-18*	42	31-Aug-18	02-Dec-16	23-Jan-17	-474	0%
PR30070	Construct perm. realignment of CEDD access track at Pier B8	42	07-Aug-18	42	24-Sep-18	28-Dec-16	18-Feb-17	-474	0%
PR30080	Construct perm. realignment of CEDD access track at Pier C7	42	30-Aug-18	42	20-Oct-18	21-Jan-17	14-Mar-17	-474	0%
At-Grade Works & Miscellaneous Works									
At-Grade Works Along North Lantau Highway									
Slope Works Near Viaduct A									
Slope 9SE-B/FR8									
GFXX501	9SE-B/FR8 - Demolish existing wall stem	31	27-Jul-18	31	31-Aug-18	20-Oct-16	24-Nov-16	-522	0%
GFXX541	9SE-B/FR8 - Construct New Wall Stem	90	01-Sep-18	90	18-Dec-18	25-Nov-16	16-Mar-17	-522	0%
Slope Works Near Viaduct B									
Slope 10SW-A/F52									
GFXX495	10SW-A/F52 - Slopework - Phase 1	36	30-Jul-18	36	08-Sep-18	09-Nov-16	20-Dec-16	-507	0%
GFXX535	10SW-A/F52 - Slopework - Phase 2	68	10-Sep-18	68	30-Nov-18	21-Dec-16	16-Mar-17	-507	0%
Slope Works Near Viaduct D									
Slope 10NW-C/F9									
M201205	10NW-C/F9 - Fill and compact filled material	52	03-Apr-18 A	42	09-Aug-18	10-Jan-17	02-Mar-17	-425	10%
M201210	10NW-C/F9 - Install Geo. Instru. & Baseline Monitoring	30	10-Aug-18	30	13-Sep-18	03-Mar-17	07-Apr-17	-425	0%
Slope 10NW-C/F10									
M201230	10NW-C/F10 - Fill and compact filled material	160	16-Oct-17 A	36	02-Aug-18	20-Feb-17	01-Apr-17	-393	90%
M201300	10NW-C/F10 - Slope drainage	12	27-Jul-18	12	07-Aug-18	26-Mar-17	07-Apr-17	-487	0%



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Planned Bar
Critical Bar
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Tuen Mun - Chek Lap Kok Link - Southern Connection
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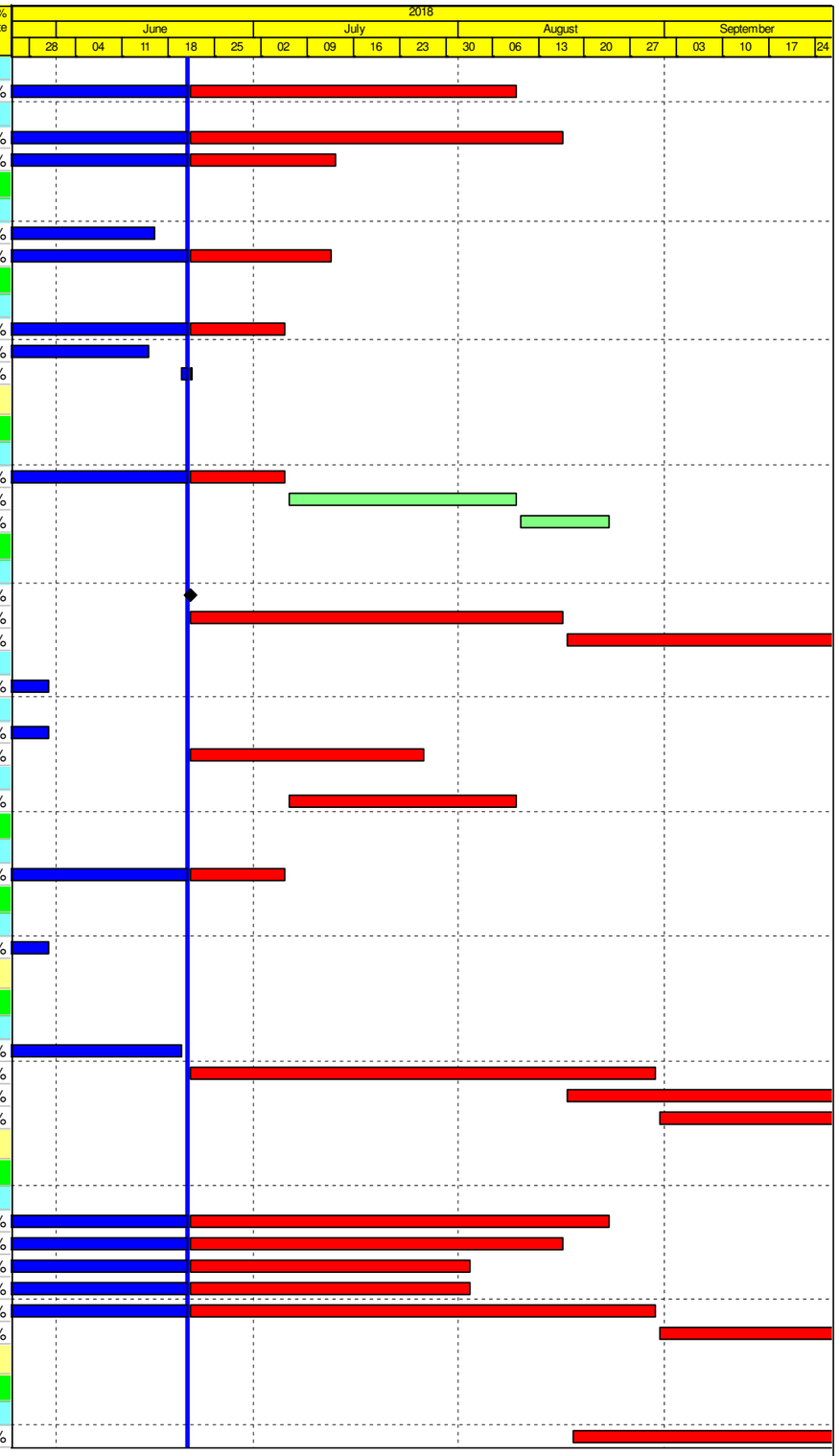
DWG. No.:

J3518/GCL/PGM/3MRP-M61

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
Slope 10NW-C/F11									
M201290	10NW-C/F11 - Fill and compact filled material - Phase 2	72	16-Apr-18 A	42	09-Aug-18	17-Feb-17	07-Apr-17	-395	85%
Slope 10NW-C/F17									
M201197	10NW-C/F17 - Fill and compact filled material	60	07-May-18 A	48	16-Aug-18	17-Mar-17	18-May-17	-371	40%
M201198	10NW-C/F17 - Construct POP	30	07-May-18 A	18	13-Jul-18	17-Mar-17	07-Apr-17	-371	80%
Road Works Along NLH Westbound									
General									
RW11010	NLH W/B (Viaduct B) - Drainage for ramp B tie out	48	15-Dec-17 A	0	16-Jun-18 A				100%
RW11020	NLH W/B (Viaduct B) - Profile Barrier and roadwork	36	23-Apr-18 A	18	12-Jul-18	17-Mar-17	07-Apr-17	-371	90%
Road Works Along NLH Eastbound									
General									
RW20084	NLH E/B Viaduct A - Ch200-388 Roadwork (SL & HS) & Reinstate NLH	127	17-Dec-16 A	12	05-Jul-18	24-Mar-17	07-Apr-17	-365	90%
RW2096	NLH E/B (Gantries 319 - 322) - Footing & A-Frame at NLH (Central Reser	55	12-Apr-18 A	0	15-Jun-18 A				100%
RW21008	NLH E/B (Gantries 319 - 322) - Erection of Gantry beams	6	20-Jun-18 A	1	21-Jun-18	07-Dec-16	07-Dec-16	-451	50%
At-Grade Works Along Cheung Tung Road									
Slope Works Near Viaduct B									
Slope 9SE-B/F85									
SWVB4020	9SE-B/F85 - Fill and compact filled material	60	16-Jan-18 A	12	05-Jul-18	06-Mar-18	19-Mar-18	-85	95%
SWVB4035	9SE-B/F85 - Install Geo. Instru. & Baseline Monitoring	30	06-Jul-18	30	09-Aug-18	13-Oct-18	17-Nov-18	83	0%
SWVB4040	9SE-B/F85 - Hydroseeding	12	10-Aug-18	12	23-Aug-18	19-Nov-18	01-Dec-18	83	0%
Slope Works Near Viaduct C									
Slope PF1 & PF2									
SWVC6990	10NW-PF1 & PF2 complete site site clearance	0	21-Jun-18*	0		21-Dec-17		-182	0%
SWVC7000	10NW - PF2 slope works	48	21-Jun-18	48	16-Aug-18	21-Dec-17	21-Feb-18	-143	0%
SWVC7010	10NW - PF2 slope works	52	17-Aug-18*	52	19-Oct-18	22-Feb-18	27-Apr-18	-143	0%
Slope 10NW-C/F13									
SWVC4000	10NW-C/F13 - Slope works	100	25-Jan-18 A	0	31-May-18 A				100%
Slope 10NW-C/F14									
SWVC5000	10NW-C/F14 - Slope works	100	01-Mar-18 A	0	31-May-18 A				100%
SWVC6010	10NW-C/F14 - Install Geo. Instru. & Baseline Monitoring	30	21-Jun-18	30	26-Jul-18	20-Mar-18	27-Apr-18	-73	0%
Slope 10NW-C/F15									
SWVC6005	10NW-C/F15 - Install Geo. Instru. & Baseline Monitoring	30	06-Jul-18*	30	09-Aug-18	20-Mar-18	27-Apr-18	-85	0%
Re-alignment of CTR Along Viaduct B									
General									
RP00077-1	Ch100-300: Street Lighting, thrie beam, bus stop & water point, etc	48	08-Dec-17 A	12	05-Jul-18	01-Jun-17	14-Jun-17	-313	85%
Re-alignment of CTR Along Viaduct C									
East Portion									
RW60080	CTR Tie in Works	116	18-May-17 A	0	31-May-18 A				100%
At-Grade Works at Southern Landfall									
HKBCF Area									
General									
RW30010	South Landfall - Mobilisation for Portion B Works	24	21-May-18 A	0	20-Jun-18 A				100%
RW30014	South Landfall - DN300 Fresh water main works installation & connection (I	60	21-Jun-18	60	30-Aug-18	07-Feb-18	25-Apr-18	-105	0%
RW30016	South Landfall - Stormwater drainage works (Portion B)	60	17-Aug-18	60	29-Oct-18	12-Apr-18	23-Jun-18	-105	0%
RW30030	South Landfall - Stormwater drainage works	60	31-Aug-18	60	12-Nov-18	06-Jul-18	13-Sep-18	-48	0%
Watermain from Tung Chung to Southern Landfall									
Watermain Works									
General									
WM00190	Viaduct B1 - Lay DN450 Fresh Water Main	42	21-Apr-18 A	54	23-Aug-18	30-May-18	02-Aug-18	-18	85%
WM00200	Viaduct B2 - Lay DN450 Fresh Water Main	48	30-Apr-18 A	48	16-Aug-18	06-Jun-18	02-Aug-18	-12	85%
WM00210	Viaduct B3 - Lay DN450 Fresh Water Main	36	07-May-18 A	36	02-Aug-18	21-Jun-18	02-Aug-18	0	85%
WM00220	Viaduct E1 - Lay DN450 Fresh Water Main	36	14-May-18 A	36	02-Aug-18	21-Jun-18	02-Aug-18	0	80%
WM00230	Viaduct E2 - Lay DN450 Fresh Water Main	60	21-May-18 A	60	30-Aug-18	23-May-18	02-Aug-18	-24	70%
WM00240	Viaduct E8 - Lay DN450 Fresh Water Main	48	31-Aug-18	48	29-Oct-18	03-Aug-18	28-Sep-18	-24	0%
Landscaping Works & Establishment Works									
Lanscape Softworks									
General									
LW00012	Deliver & Stockpile Top Soil (29,000 cu.m) to BCF Near Ramp F	180	18-Aug-18	180	26-Mar-19	28-Nov-17	11-Jul-18	-212	0%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPL-M61
Layout: J3518-DWP-3MRP Submission - M61
Filter: TASK filters: 3-Month Lookahead, No CC
Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 6 of 6 Pages)
(Progress as of 21-Jun-18)

Date	Revision	Check...	Approved
28-May-...		PKN	HF
03-Jul-18		HF	HF

DWG. No.:
J3518/GCL/PGM/3MRP-M61

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-Chep Lap Kok Link – Investigation. Updated EM&A Manual for Tuen Mun-Chek Lap Kok Link)

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
AIR QUALITY									
4.8.1	3.8	An effective watering programme of eight daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		<>
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		<>
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
NOISE									
5.11	Section 4	Noise monitoring	All existing representative sensitive receivers / during North Lantau Viaduct construction	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
General Marine Works									
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		✓
Temporary Staging work									
	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						
Land Works									
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		✓
Water Quality Monitoring									
6.10	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	✓
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3	Specification for bored piling monitoring	Detailed Design	Design Consultant	TMEIA	Y			n/a
8.14	6.3	Implement any recommendations of the bored piling monitoring	Southern marine viaduct/Throughout	Contractor	TMEIA		Y		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
			season/construction phase						
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		n/a. To be approved by AFCD/LCSD
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		<>
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		<>
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	Round angle, patterned finishes, and oval shaped pier were considered in the viaduct design, and further details will be developed under ACABAS submission (DM3)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Details of the street furniture will be developed in the detailed design stage (DM4)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			n/a
10.9	7.6	Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas. (Tree protection measures will be detailed at Tree Removal Application stage) (CM1)							
10.9	7.6	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme (CM2)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓ Tree transplanted as Contract Specification
10.9	7.6	Hillside and roadside screen planting to proposed roads, associated structures and slope works (CM3).	All areas/detailed design/ during construction/post construction	Design Consultant/	TMEIA	Y	Y		✓
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone) (CM4)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		<>
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		(OM4)							HyD/LCSD
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
12.6		The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established.	Contract mobilisation	Contractor	TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		Y		✓
12.6		The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised	All areas / throughout	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	construction period						
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			n/a
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction	All areas / throughout construction period	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		materials should avoid over-ordering and wastage.							
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: - suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; - Having a capacity of <450L unless the specifications have been approved by the EPD; and - Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. Clearly labelled and used solely for the storage of chemical wastes; - Enclosed with at least 3 sides; - Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest;	All areas / throughout construction period	Contractor	TMEIA		Y		<>

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		- Adequate ventilation; - Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and - Incompatible materials are adequately separated.							
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All waste containers shall be in a secure area on hard standing;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of	Site Offices/	Contractor	TMEIA		Y		✓

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
		paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	throughout construction period						
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		n/a

Notes:

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

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

Status:

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

Appendix D

Summary of Action and Limit Levels

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

Parameters	Action	Limit
24 Hour TSP Level in μg/m³	ASR9A/ASR8A = 178 ASR9C/ASR8/ASR9 = 178	260
1 Hour TSP Level in μg /m³	ASR9A/ASR8A = 394 ASR9C/ASR8/ASR9 = 393	500

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

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

Table D3 Action and Limit Levels for Water Quality

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

Notes:

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

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

(b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths

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

(d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary

Parameter	Action Level#	Limit Level#
(e) The 1%-ile of baseline data for surface and middle DO is 4.2 mg/L, whilst for bottom DO is 3.6 mg/L.		

Table D4 Action and Limit Levels for Impact Dolphin Monitoring

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

Notes:

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

Table D5 Derived Value of Action Level (AL) and Limit Level (LL)

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

Appendix E

EM&A Monitoring Schedules

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Noise Monitoring Schedule (1 to 30 June 2018)

Alternative Noise Monitoring at Pak Mong Village Entrance

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

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 30 June 2018)

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

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

Alternative Noise Monitoring at Pak Mong Village Entrance

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

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

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

Alternative Noise Monitoring at Pak Mong Village Entrance

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

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

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			01-Aug	02-Aug	03-Aug	04-Aug
				1-hr TSP Monitoring 24-hr TSP Monitoring		
05-Aug	06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug
			1-hr TSP Monitoring 24-hr TSP Monitoring			
12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug
		1-hr TSP Monitoring 24-hr TSP Monitoring				
19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug
	1-hr and 24-hr TSP were canceled due to power failure. Make up monitoring was arranged on 25 August 2018			1-hr TSP Monitoring 24-hr TSP Monitoring		1-hr TSP Monitoring 24-hr TSP Monitoring
26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	
			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 (June 2018)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jun	2-Jun
					ebb tide 12:57 - 16:27 flood tide 20:09 - 23:39	
3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
	ebb tide 14:49 - 18:19 flood tide 7:42 - 11:12		ebb tide 16:26 - 19:56 flood tide 9:37 - 13:07 WQM at all monitoring stations except CS(Mf)5 during mid-flood tide was canceled due to adverse		WQM at all monitoring stations during mid-flood and mid-ebb tides was canceled due to adverse weather.	
10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun
	ebb tide 9:29 - 12:59 flood tide 15:51 - 19:21		ebb tide 10:50 - 14:20 flood tide 17:43 - 21:13		ebb tide 12:20 - 15:50 flood tide 19:31 - 23:01	
17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun
	WQM at all monitoring stations during mid-flood and mid-ebb tides was canceled due to suspension of works during holiday.		ebb tide 16:55 - 19:40 flood tide 10:15 - 13:45		ebb tide 7:40 - 10:49 flood tide 13:11 - 16:41	
24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun
	ebb tide 9:42 - 13:12 flood tide 16:33 - 20:03		ebb tide 10:55 - 14:25 flood tide 18:01 - 21:31		ebb tide 12:05 - 15:35 flood tide 19:16 - 22:46	

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Jul	2-Jul	3-Jul	4-Jul	5-Jul	6-Jul	7-Jul
	ebb tide 13:47 - 17:17 flood tide 6:51 - 10:21		ebb tide 15:03 - 18:33 flood tide 8:17 - 11:47		ebb tide 16:41 - 20:11 flood tide 10:31 - 14:01	
8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
	ebb tide 8:10 - 11:40 flood tide 14:37 - 18:07		ebb tide 9:46 - 13:16 flood tide 16:45 - 20:15		ebb tide 11:21 - 14:51 flood tide 18:31 - 22:01	
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
	ebb tide 13:47 - 17:17 flood tide 6:50 - 10:20		ebb tide 15:27 - 18:57 flood tide 8:44 - 12:14 WQM during mid-flood tide was canceled due to adverse weather		ebb tide 17:26 - 20:56 flood tide 11:20 - 14:50	
22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
	ebb tide 8:38 - 12:08 flood tide 15:43 - 19:13		ebb tide 10:00 - 13:30 flood tide 17:13 - 20:43		ebb tide 11:12 - 14:42 flood tide 18:21 - 21:51	
29-Jul	30-Jul	31-Jul				
	ebb tide 12:51 - 16:21 flood tide 6:02 - 9:32					

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			1-Aug	2-Aug	3-Aug	4-Aug
			ebb tide 13:56 - 17:26 flood tide 7:21 - 10:51		ebb tide 15:11 - 18:41 flood tide 8:58 - 12:28	
5-Aug	6-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug
	ebb tide 6:27 - 9:57 flood tide 13:03 - 16:33		ebb tide 8:34 - 12:04 flood tide 15:46 - 19:16		ebb tide 10:20 - 13:50 flood tide 17:29 - 20:59	
12-Aug	13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug
	ebb tide 12:44 - 16:14 flood tide 5:55 - 9:25		ebb tide 14:13 - 17:43 flood tide 7:38 - 11:08		ebb tide 15:42 - 19:12 flood tide 9:35 - 13:05	
19-Aug	20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug
	ebb tide 6:58 - 10:28 flood tide 14:34 - 18:04		ebb tide 8:56 - 12:26 flood tide 16:24 - 19:54		ebb tide 10:14 - 13:44 flood tide 17:23 - 20:53	
26-Aug	27-Aug	28-Aug	29-Aug	30-Aug	31-Aug	
	ebb tide 11:55 - 15:25 flood tide 5:14 - 8:44		ebb tide 12:55 - 16:25 flood tide 6:32 - 10:02		ebb tide 14:03 - 17:33 flood tide 7:57 - 11:27	

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 June 2018)

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

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

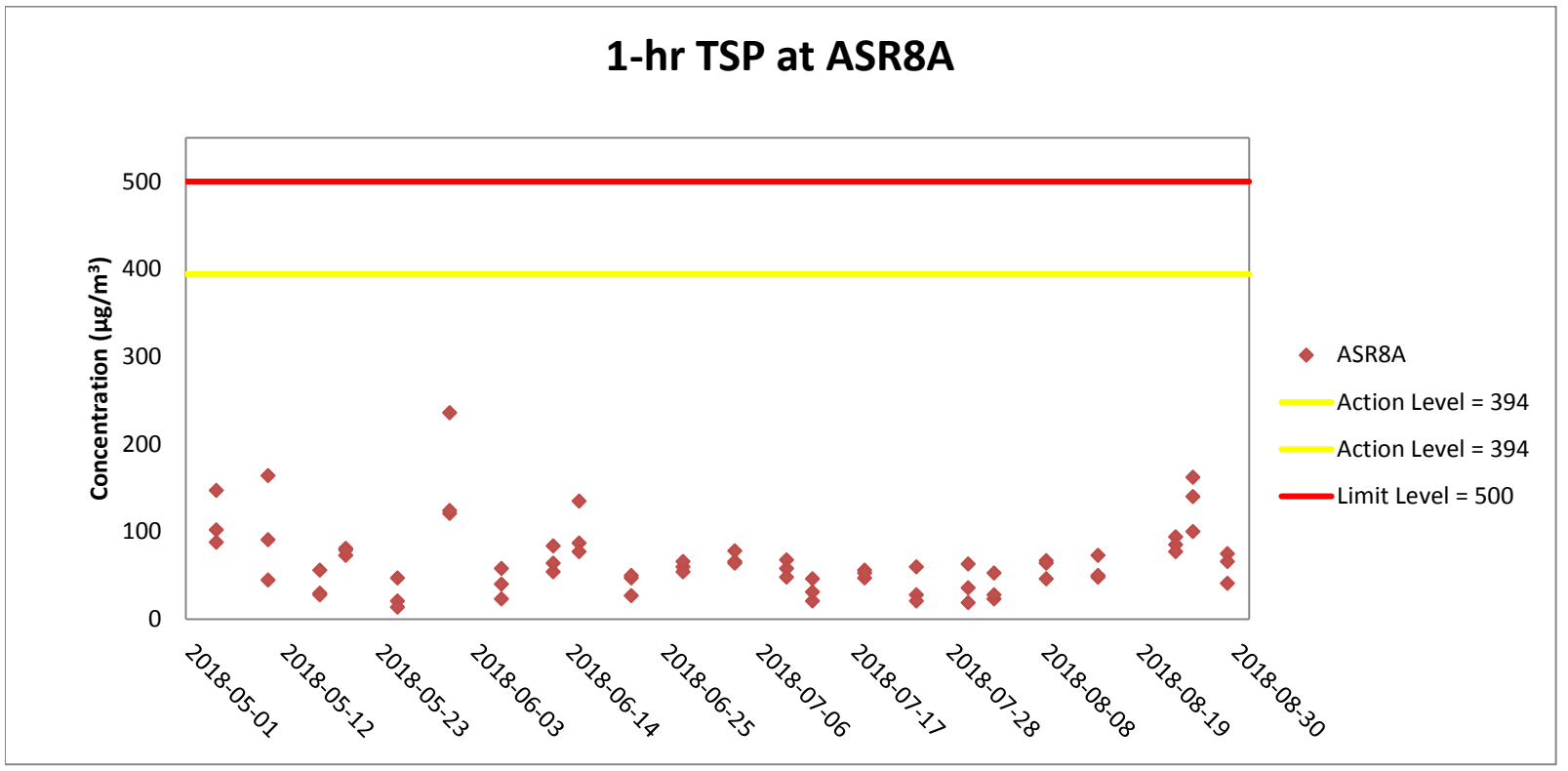
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Jul	02-Jul	03-Jul	04-Jul	05-Jul	06-Jul	07-Jul
		Impact Dolphin Monitoring				
08-Jul	09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
	Impact Dolphin Monitoring			Impact Dolphin Monitoring		
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
					Impact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

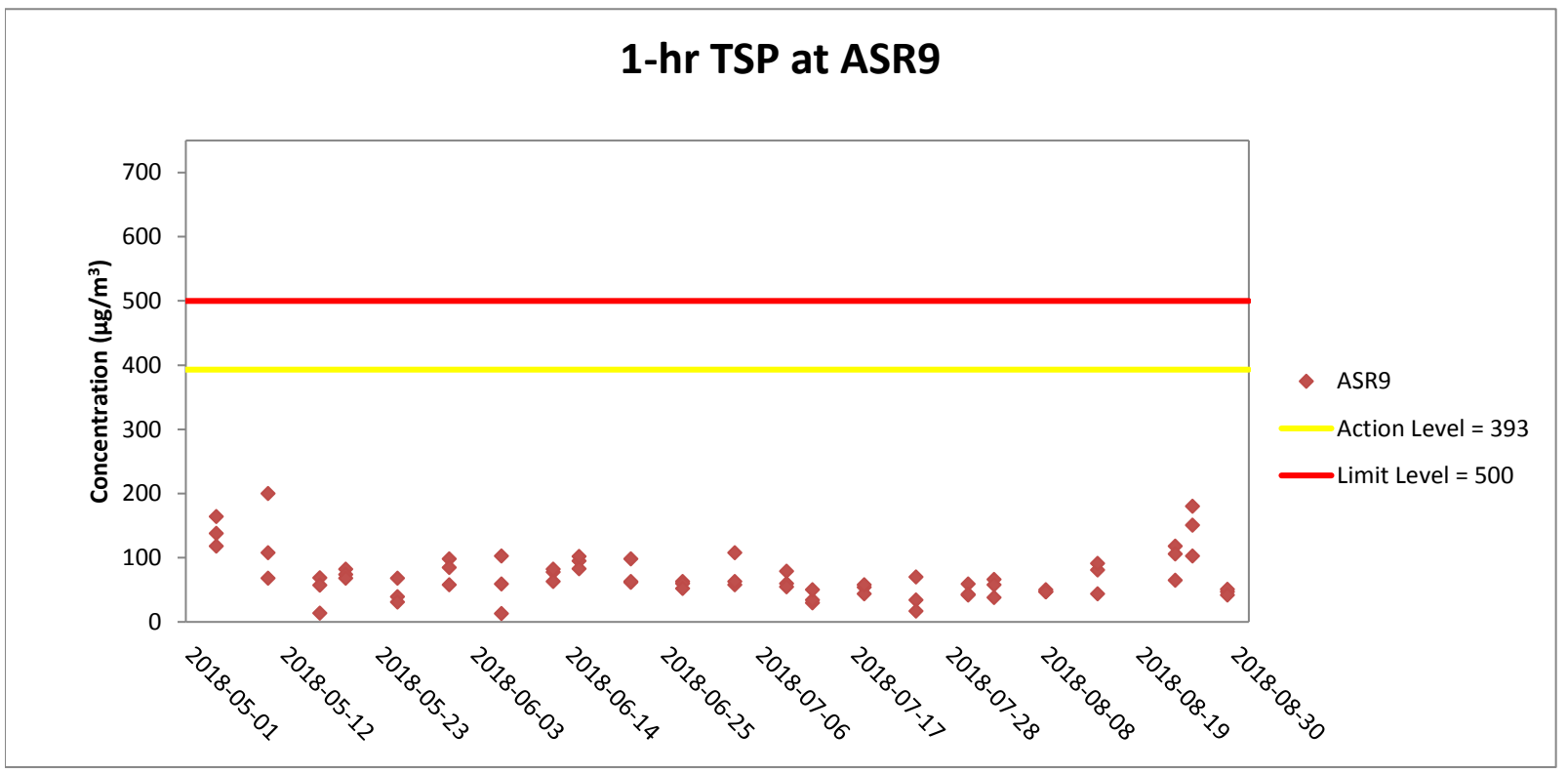
HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 August 2018)

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

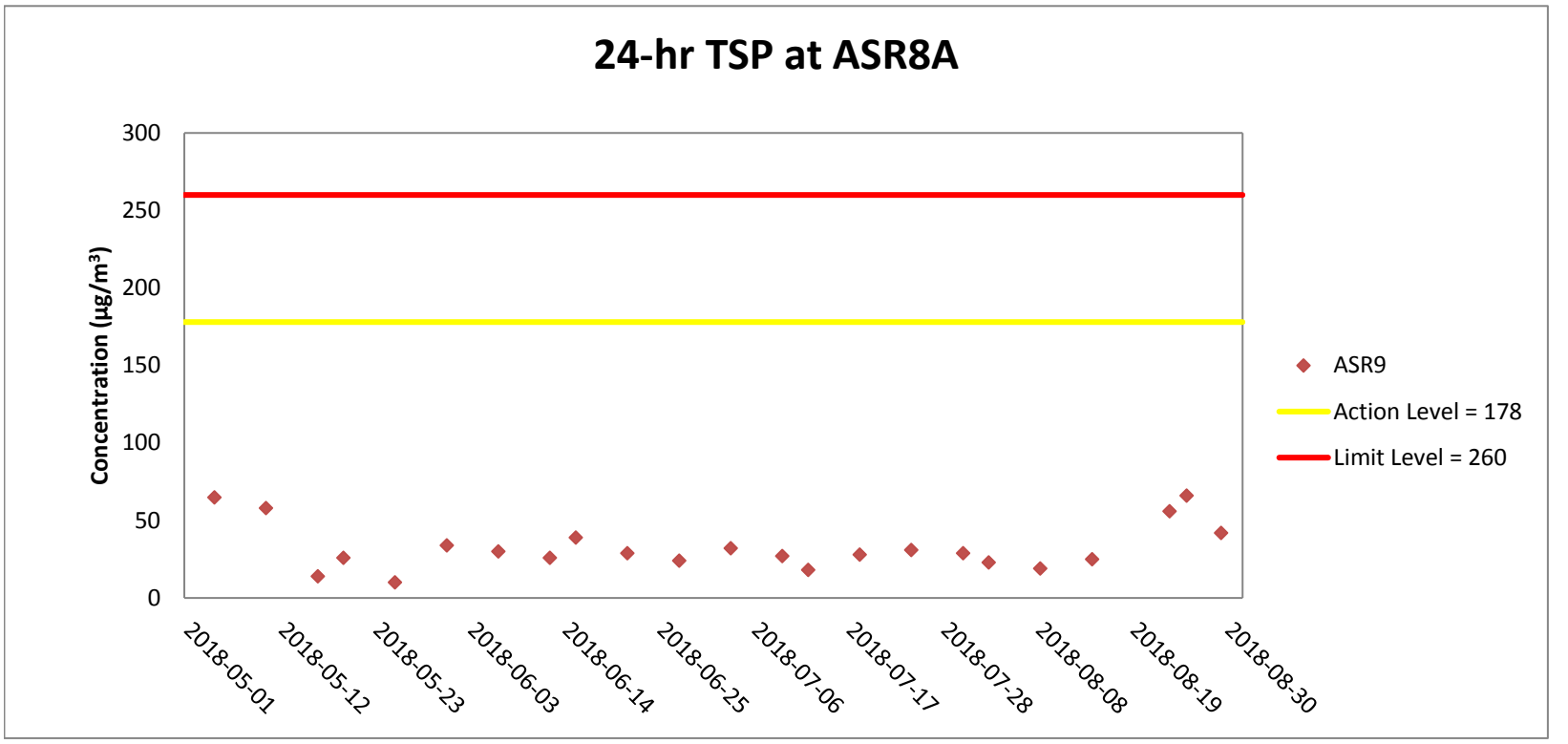
Appendix F

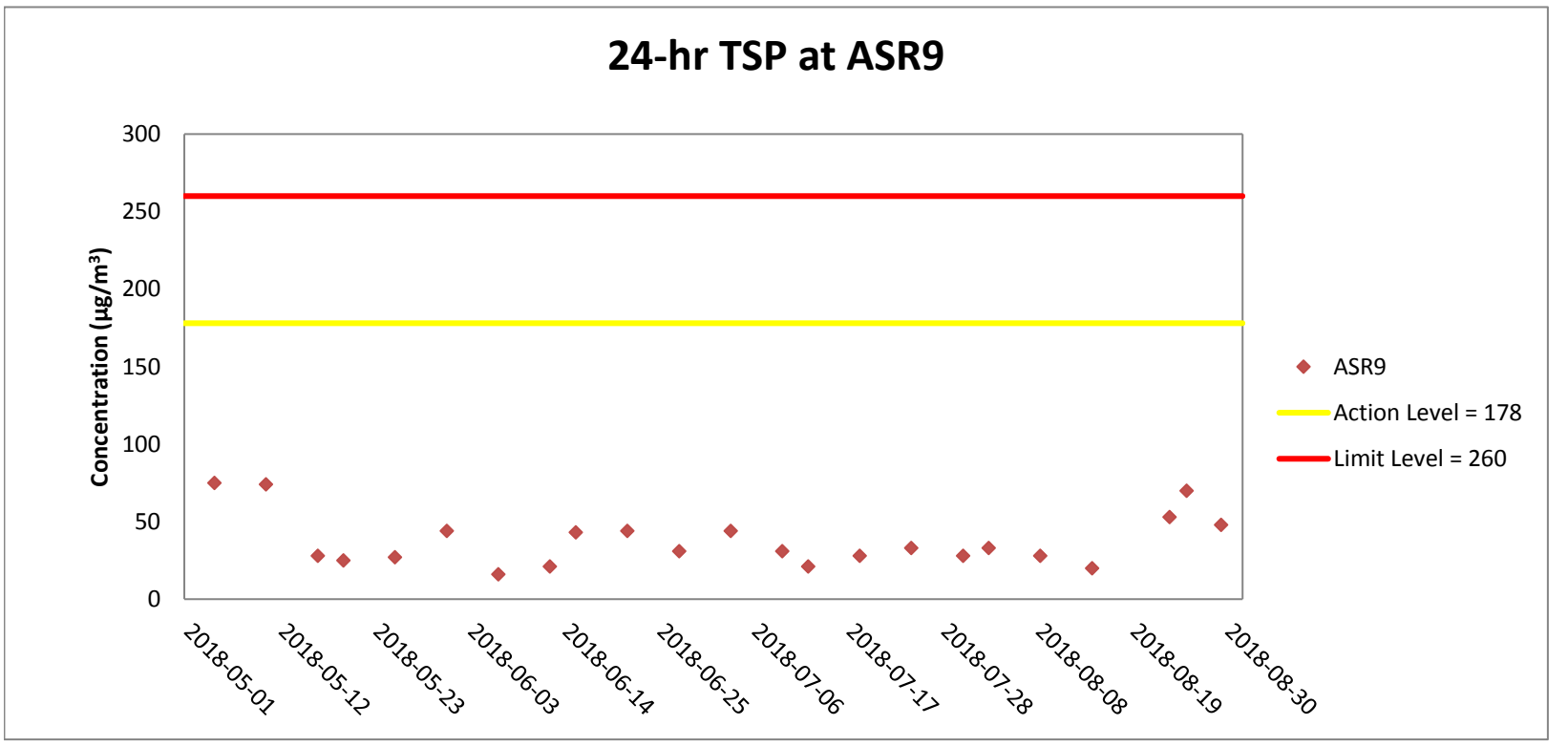
Impact Air Quality Monitoring Graphical Presentation





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.

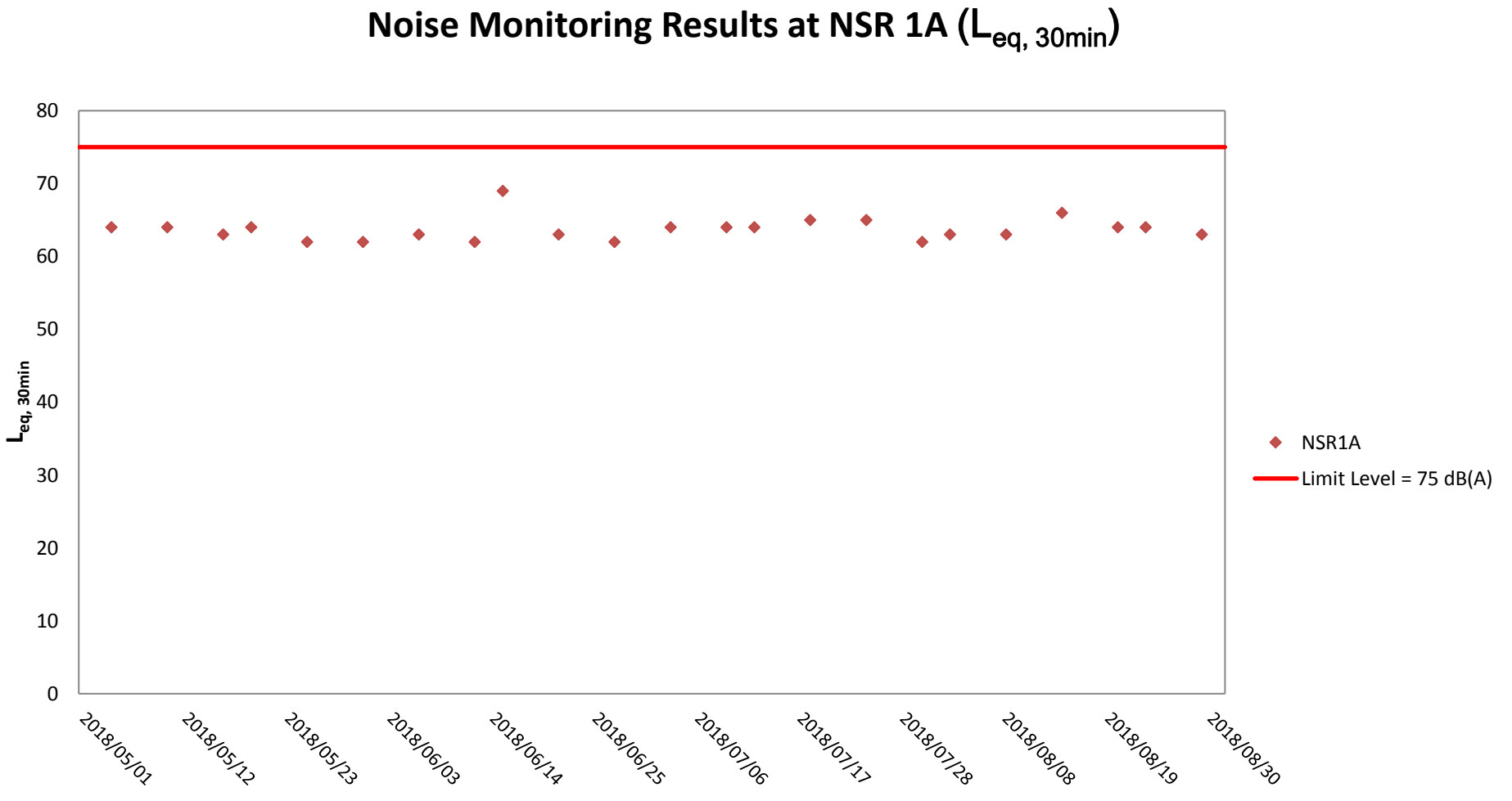




Weather condition within the reporting period varied between sunny to rainy.
Major construction works undertaken within the reporting period include Pier construction; Re-alignment of Cheung Tung Road; Road works along North Lantau Highway; Installation of pier head and deck segments; Asphalt paving; Sign gantries construction; Parapet installation; and Slope work of Viaducts A, B,C & D.

Appendix G

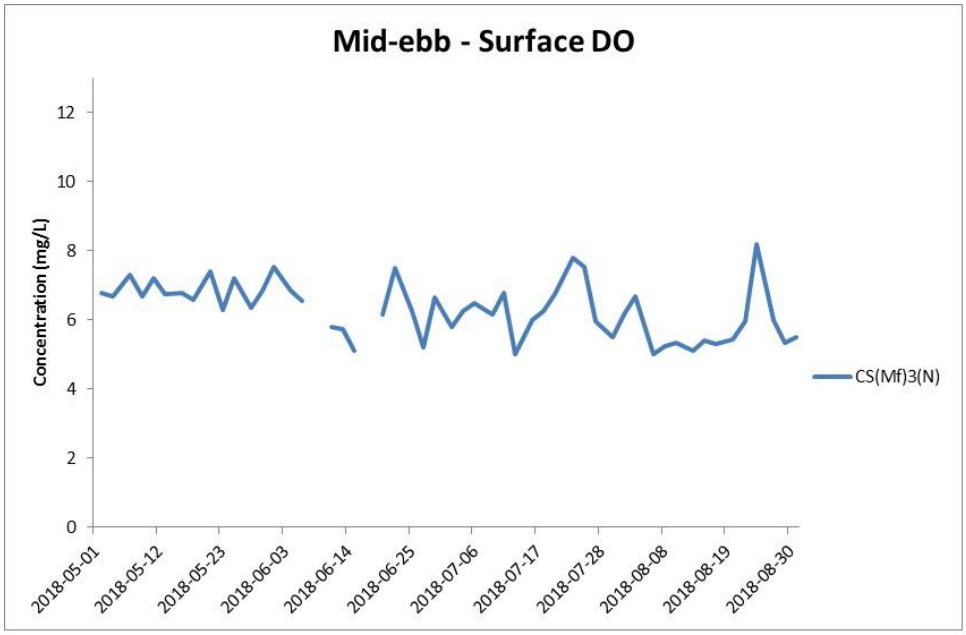
Impact Noise Monitoring Graphical Presentation



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



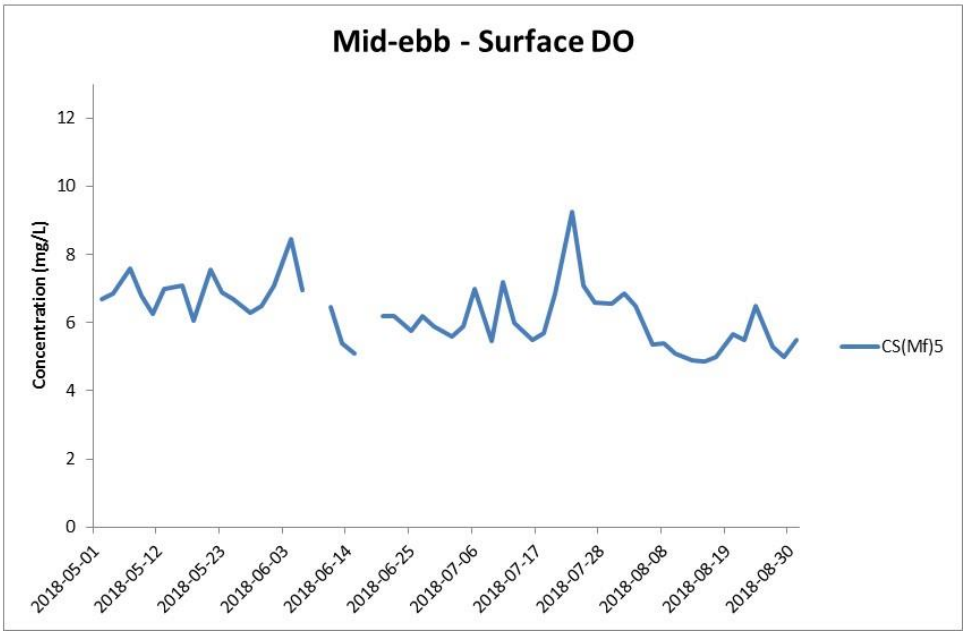
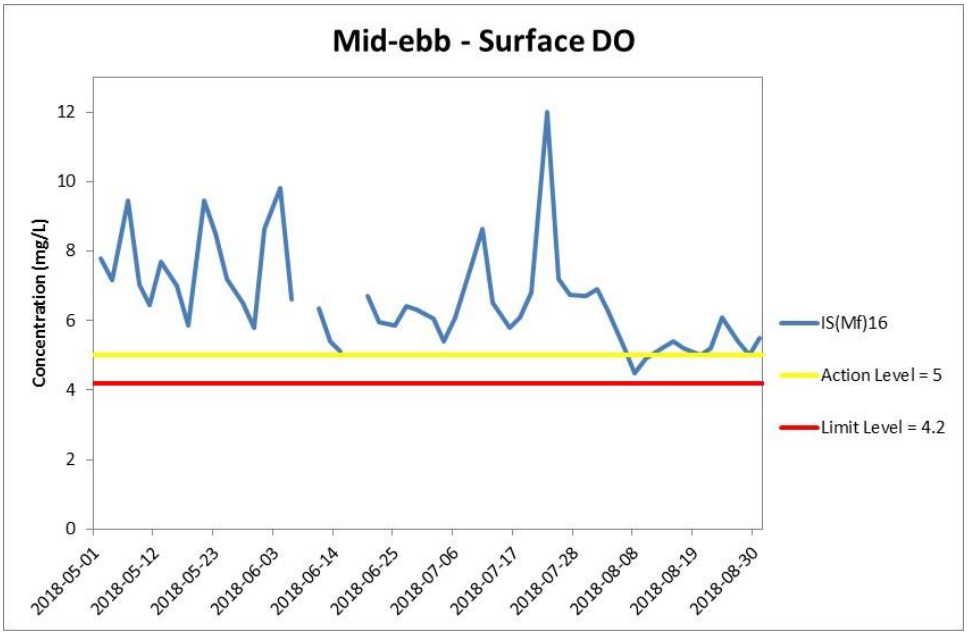


Figure H1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM



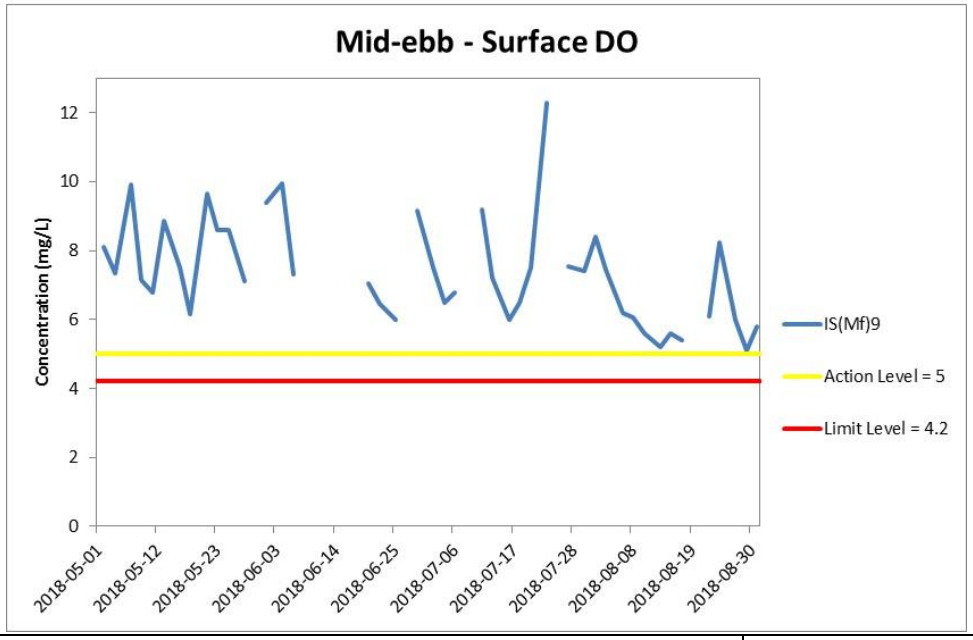
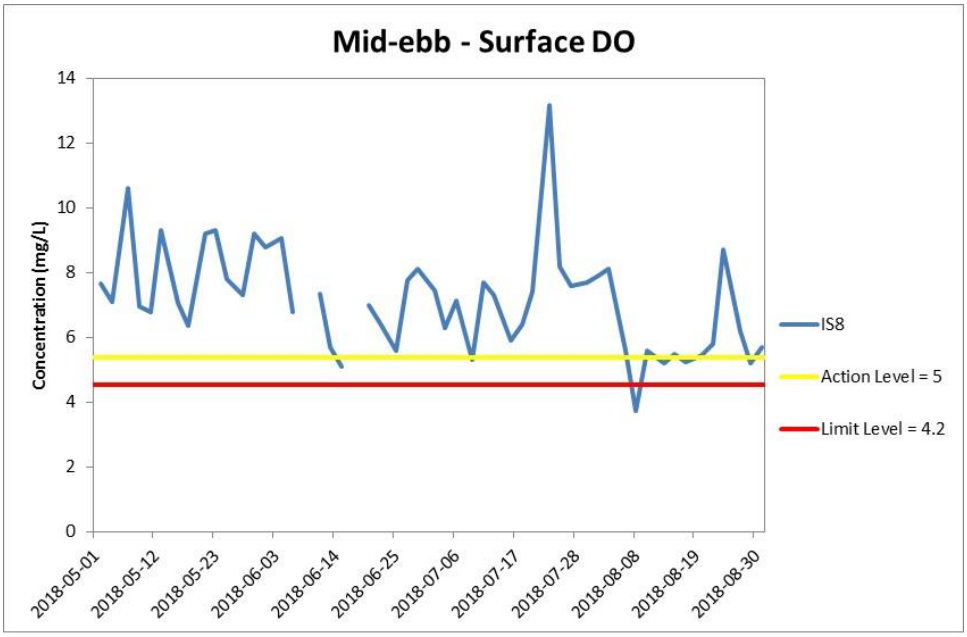


Figure H2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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



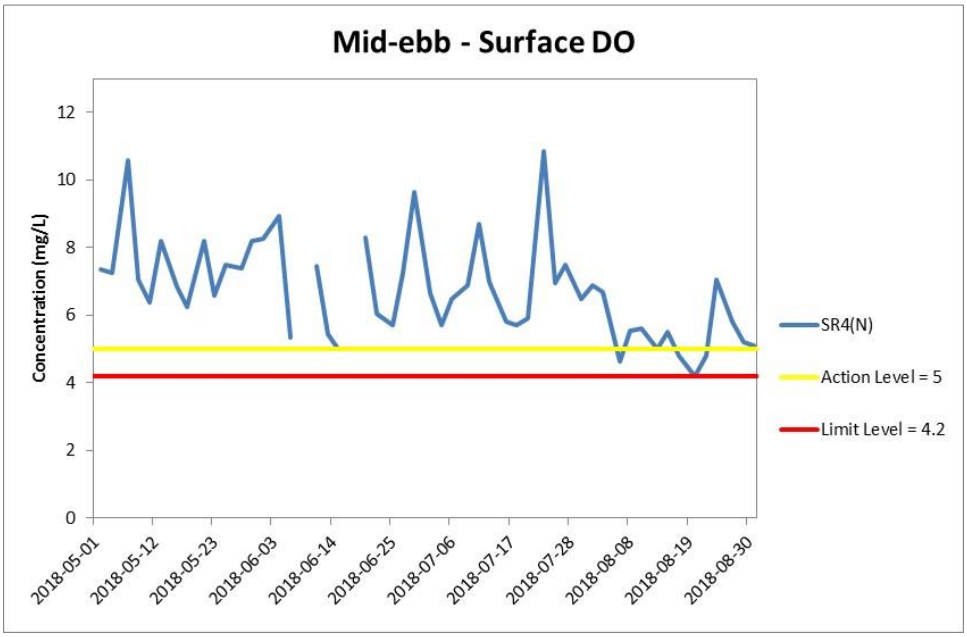


Figure H3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

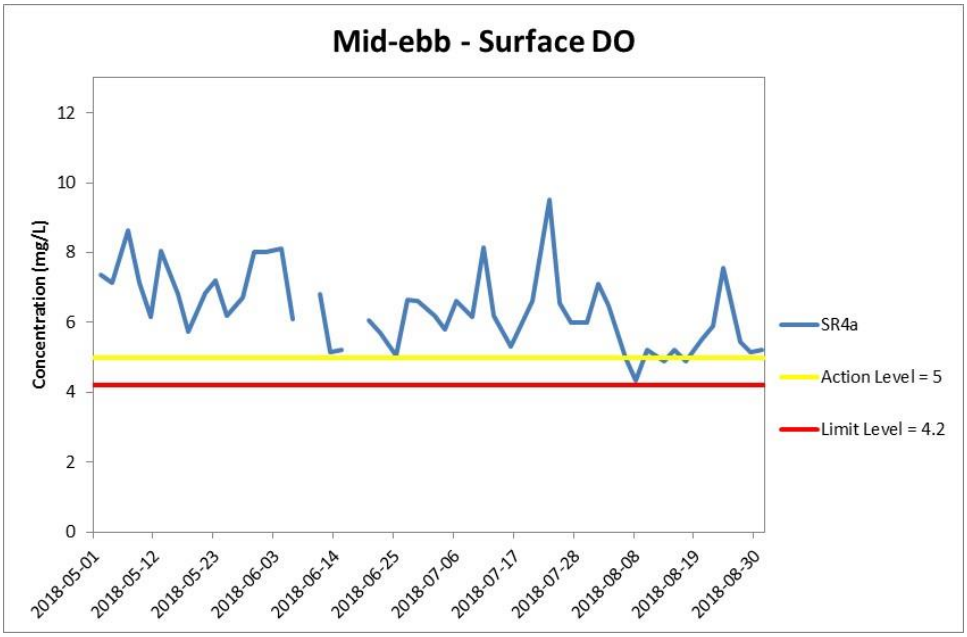
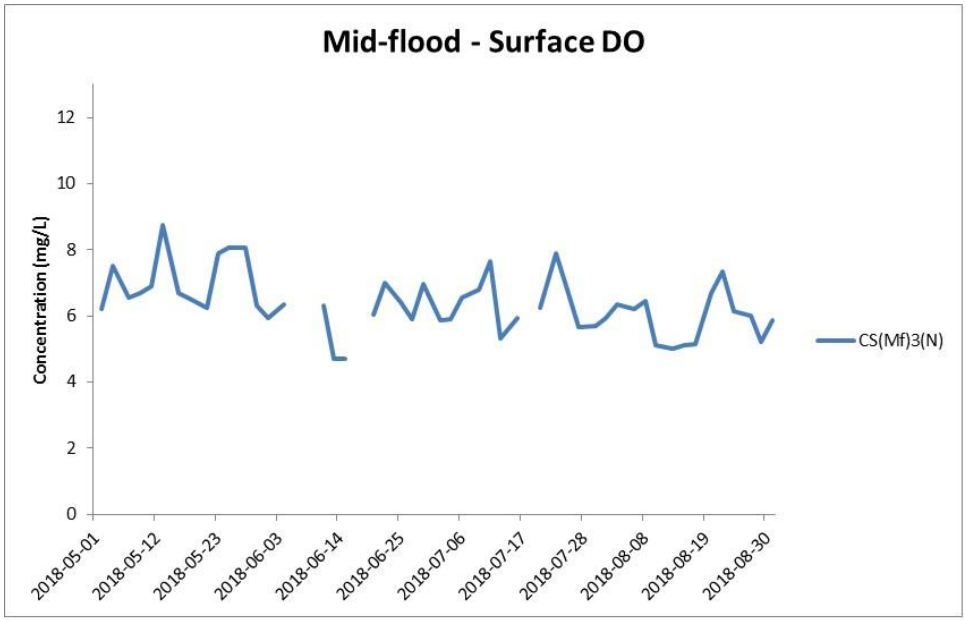


Figure H4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May and 31 August 2018 at SR4a.

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



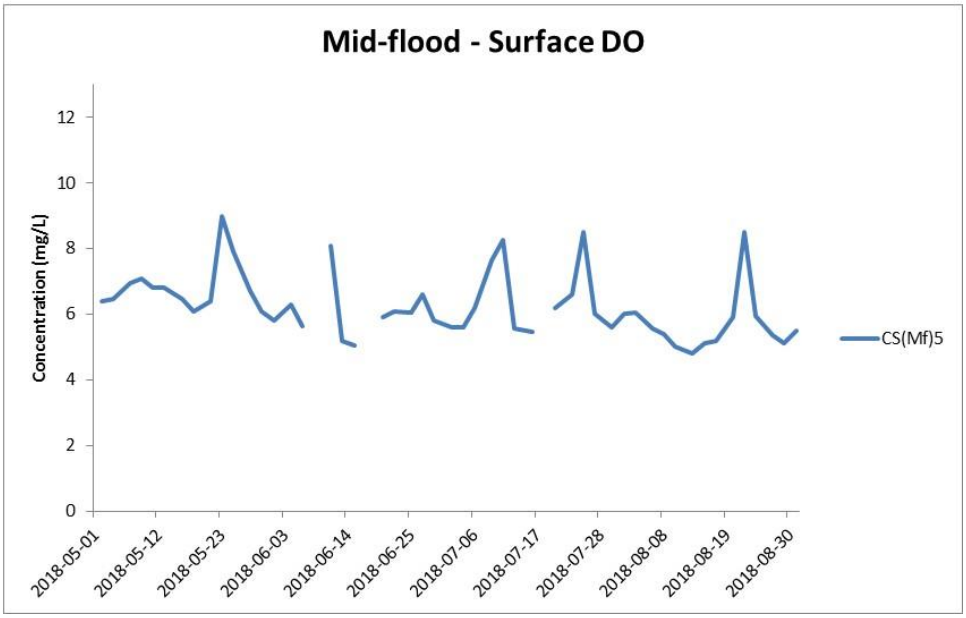
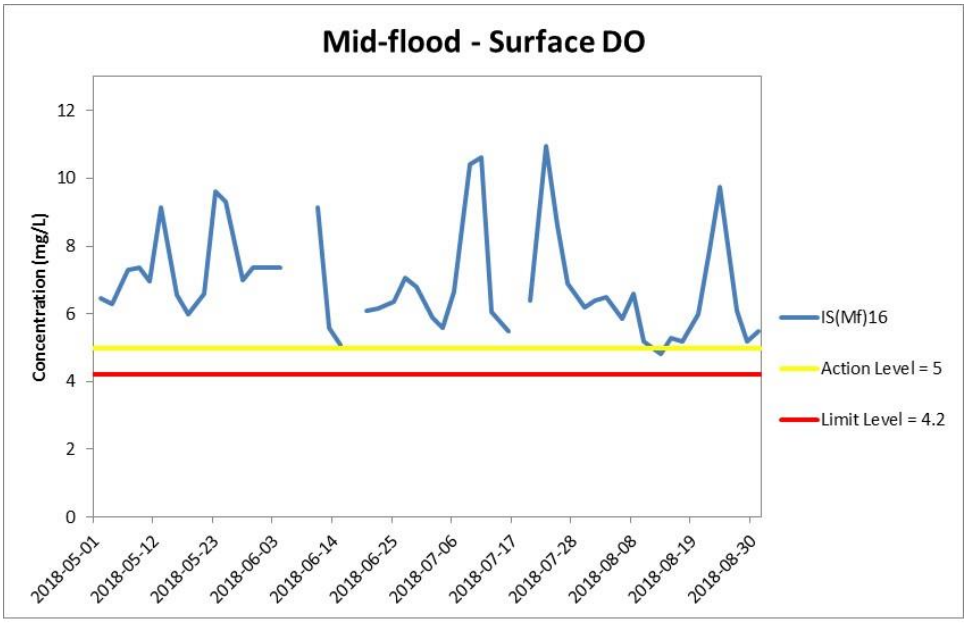


Figure H5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM



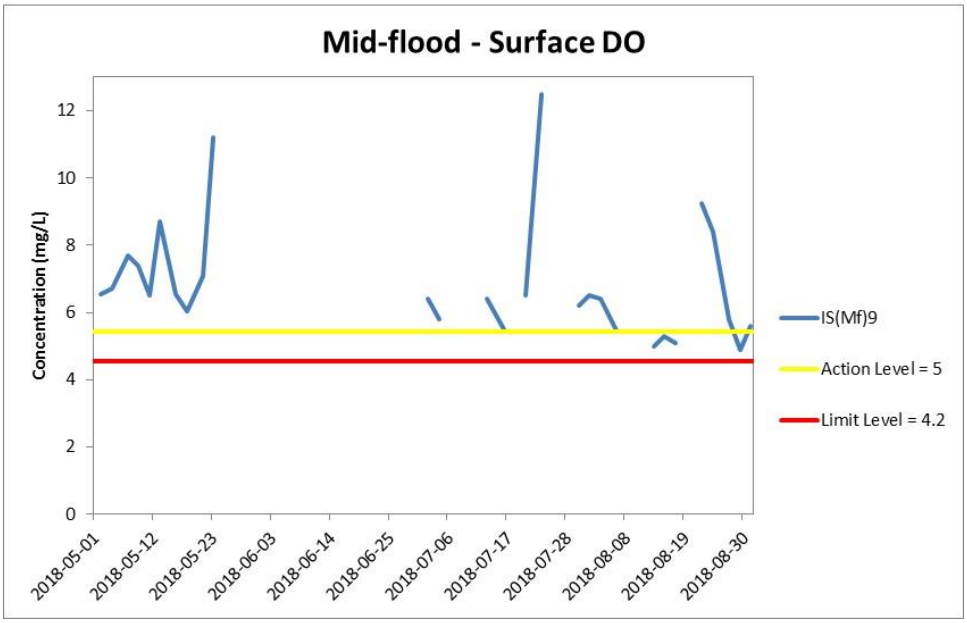
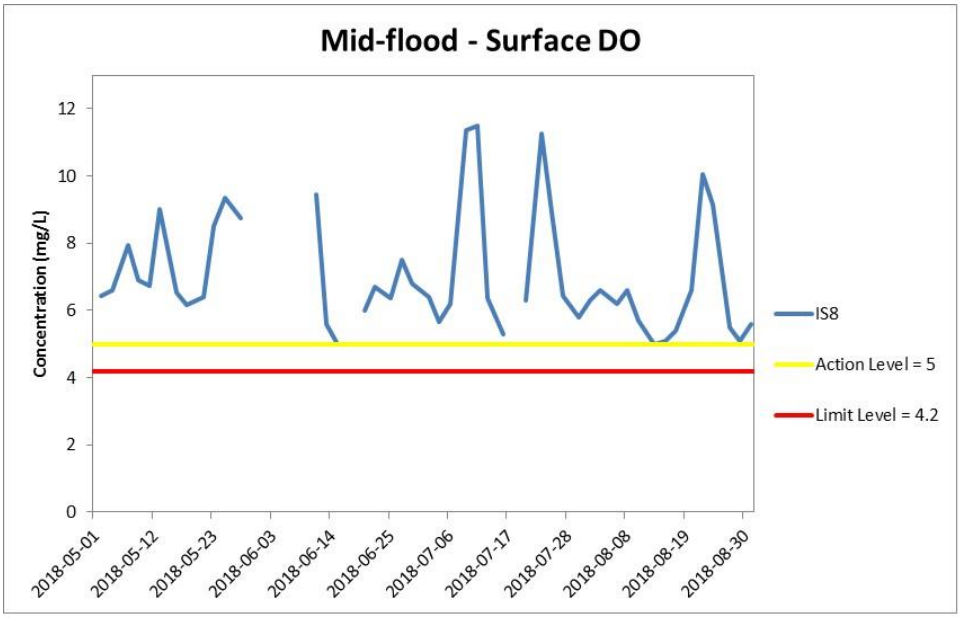


Figure H6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

ERM



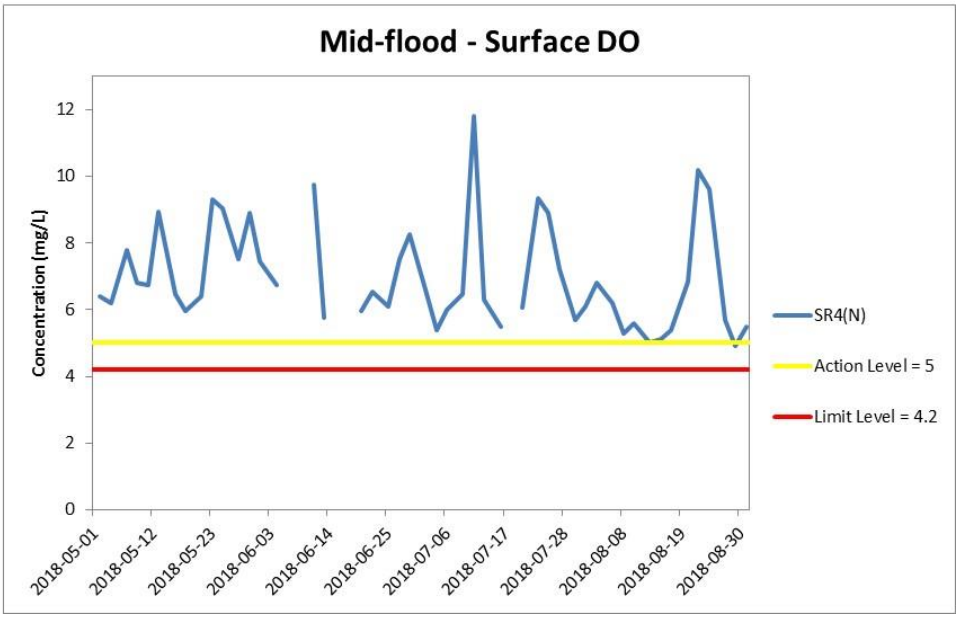


Figure H7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

ERM

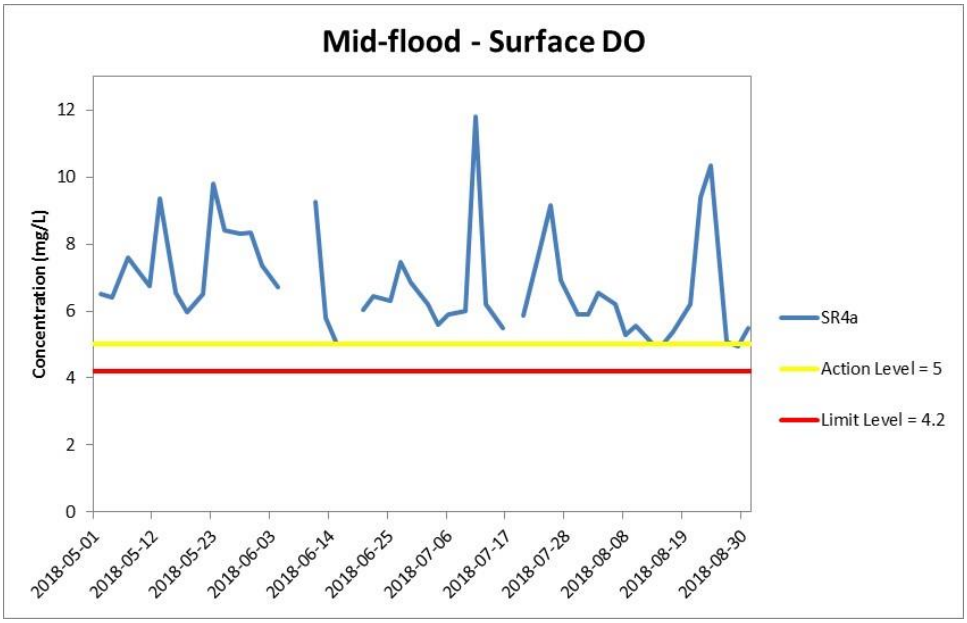
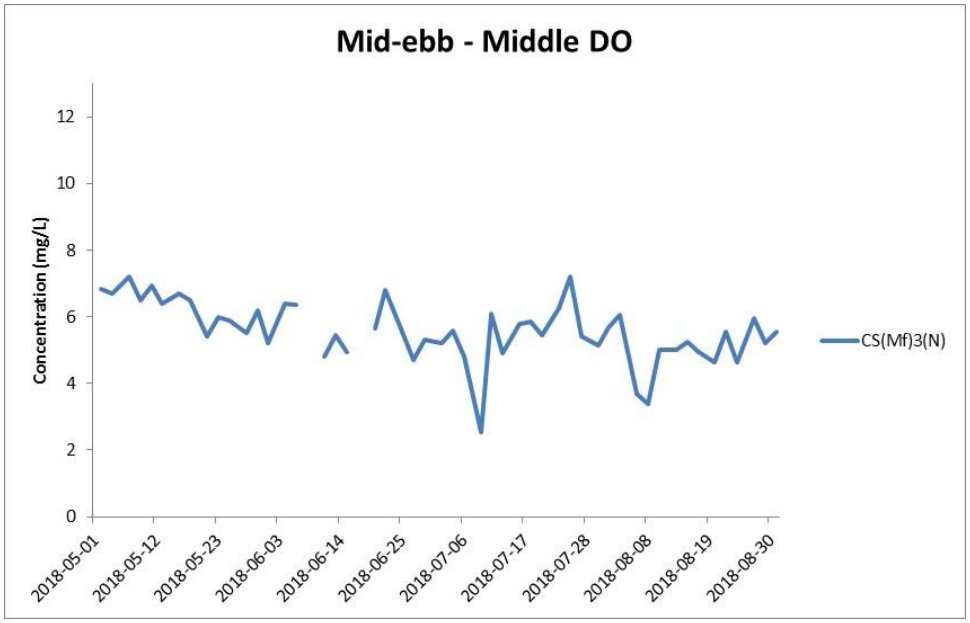


Figure H8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May and 31 August 2018 at SR4a.

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

ERM



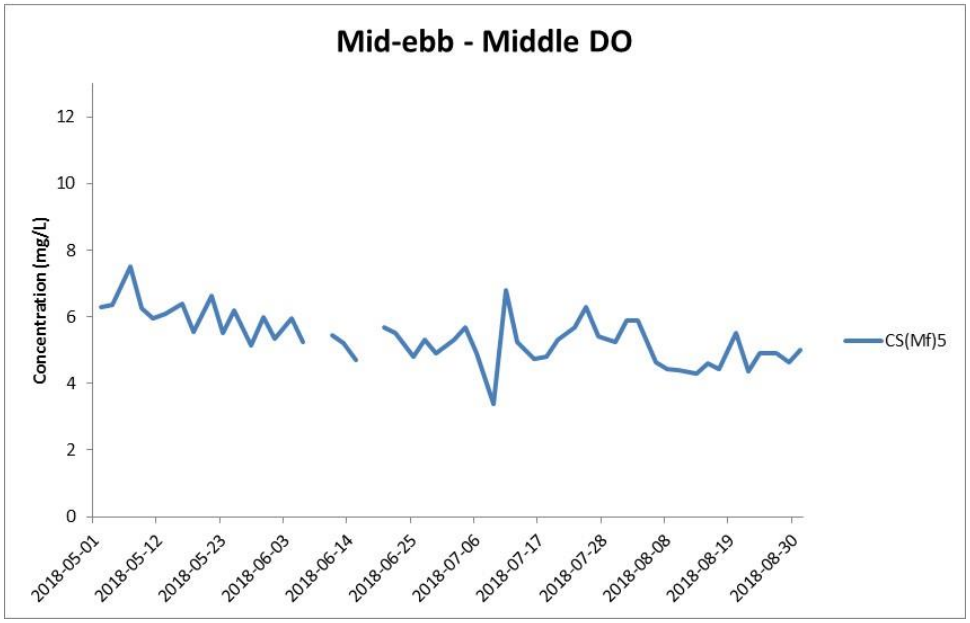
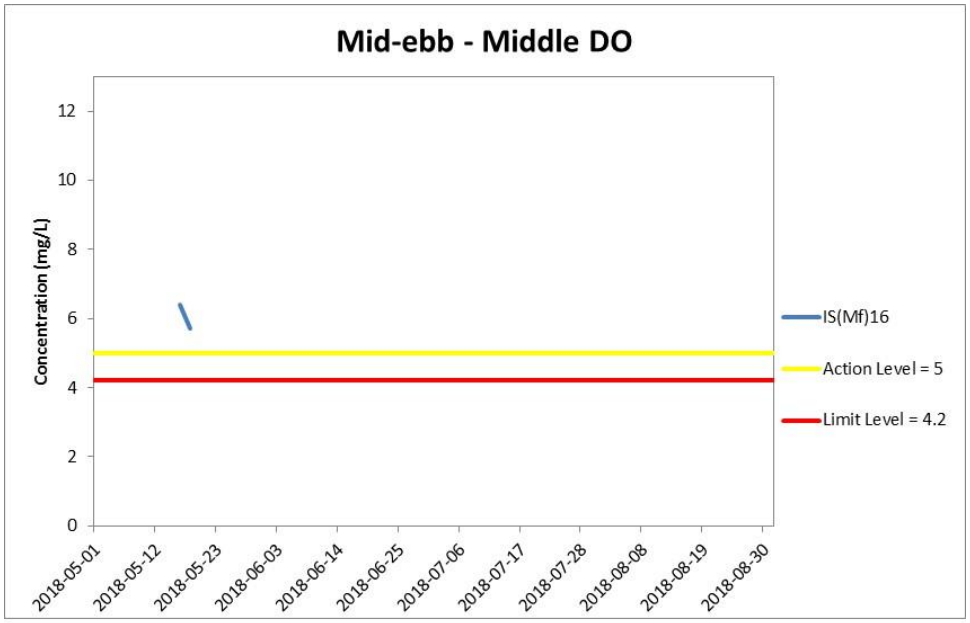


Figure H9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM



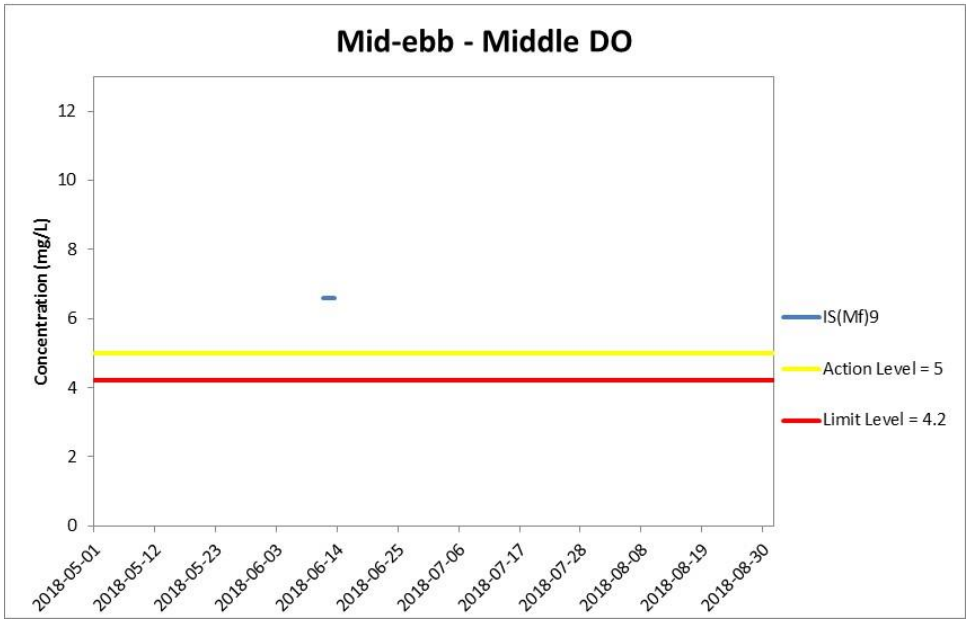
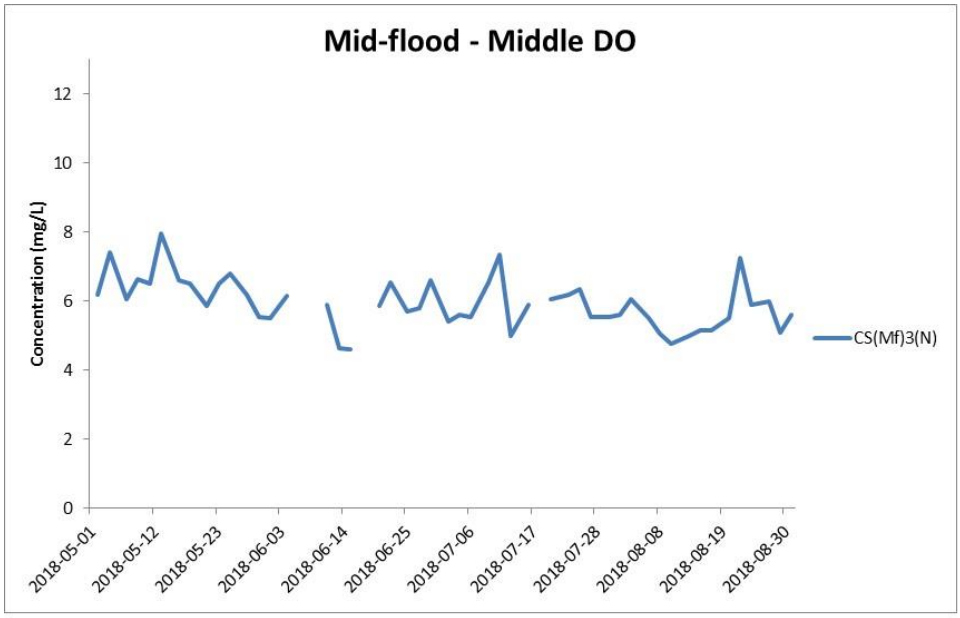


Figure H10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

ERM



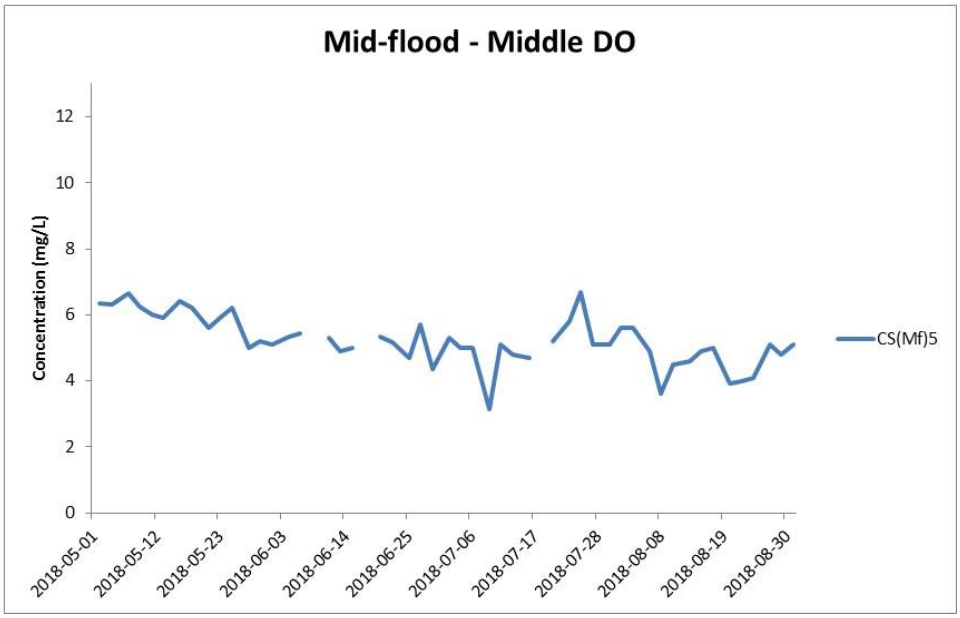


Figure H11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM

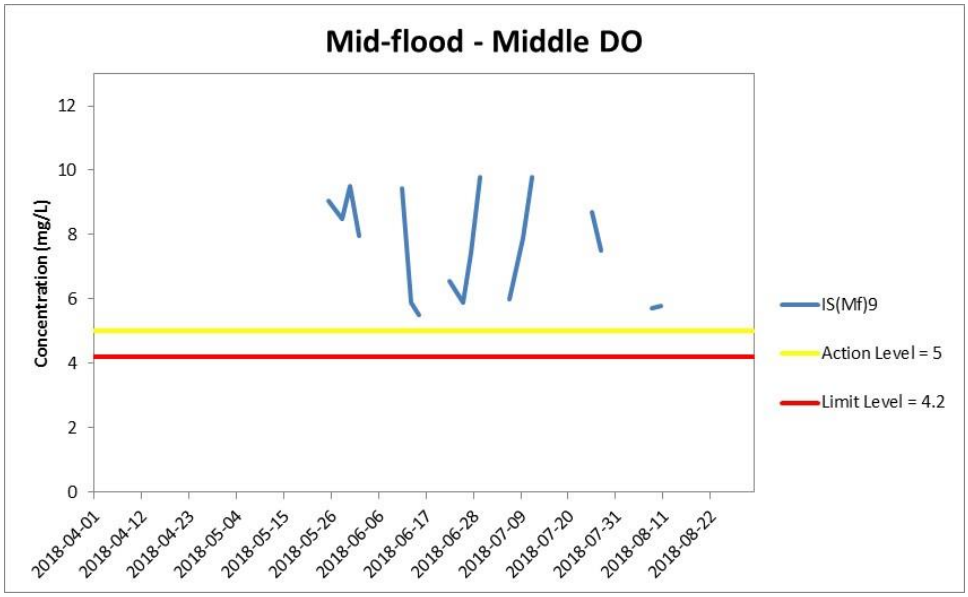
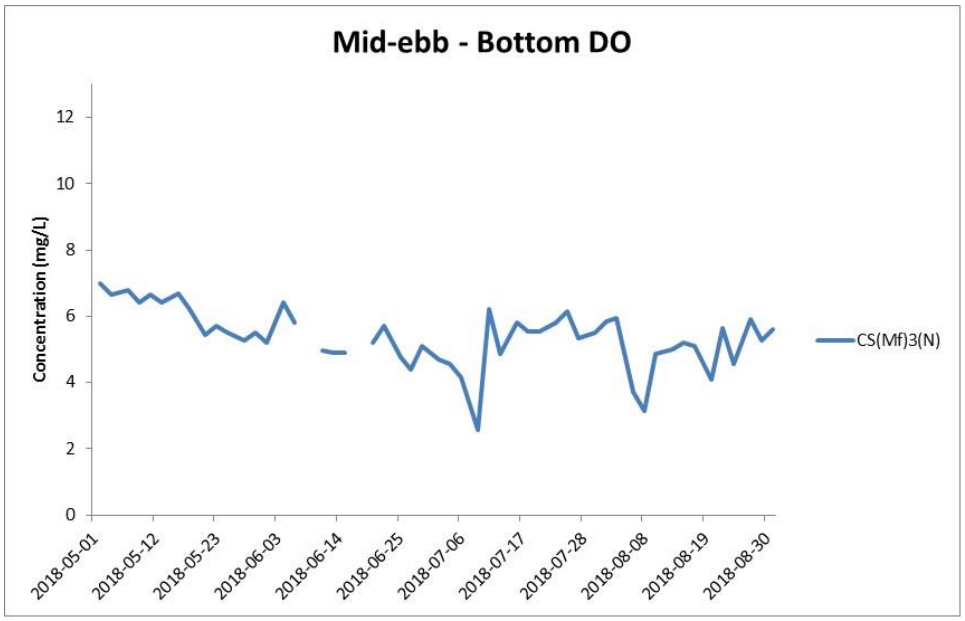


Figure H12 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 May and 31 August 2018 at IS(Mf)9.

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

ERM



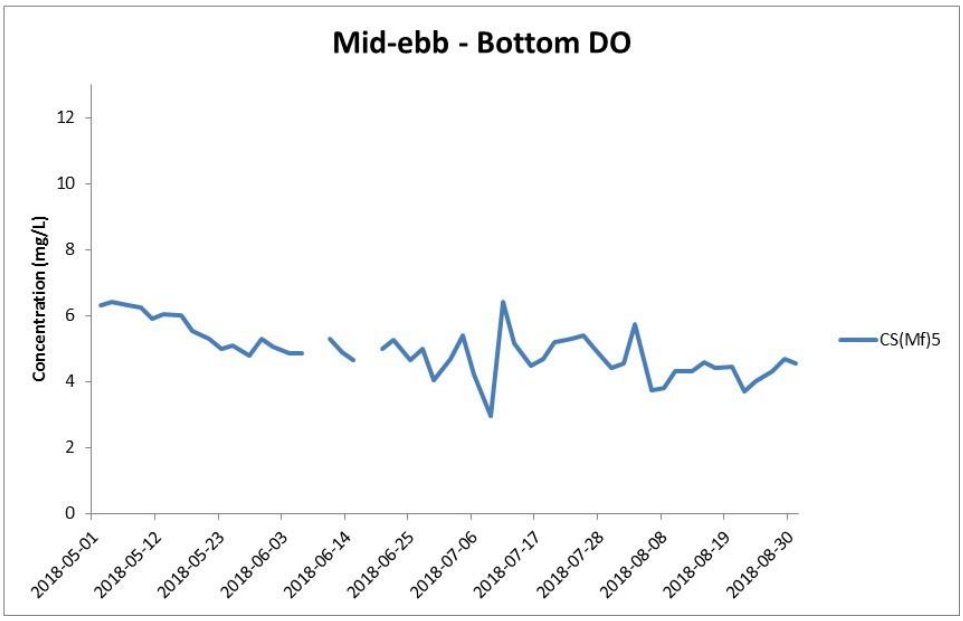
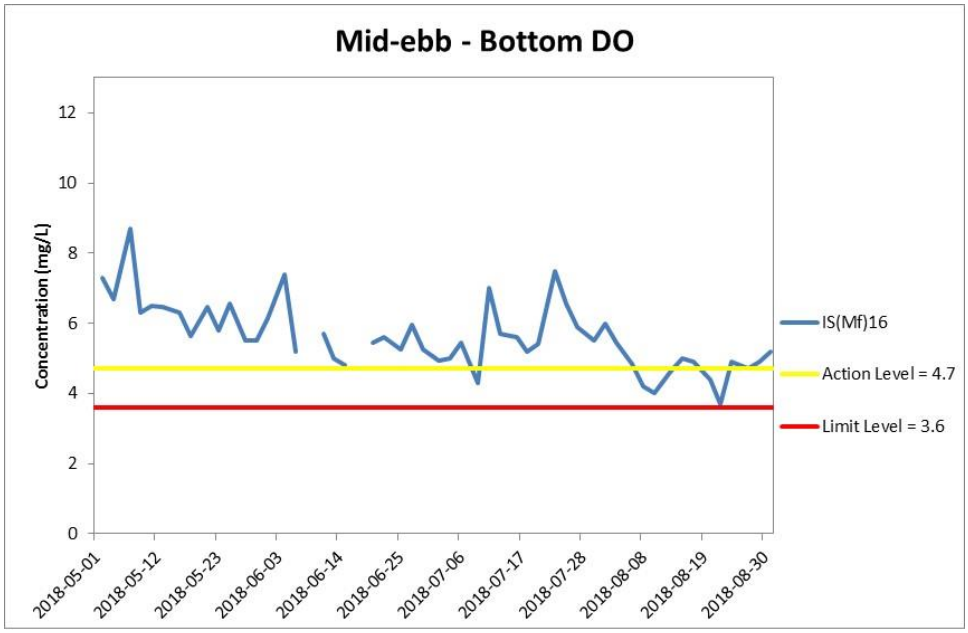


Figure H13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM



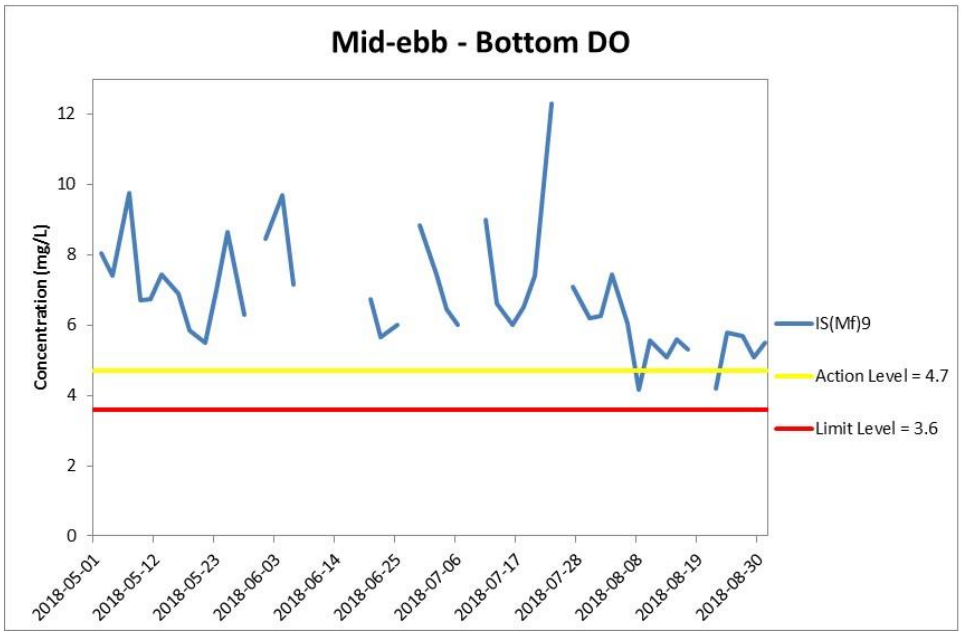
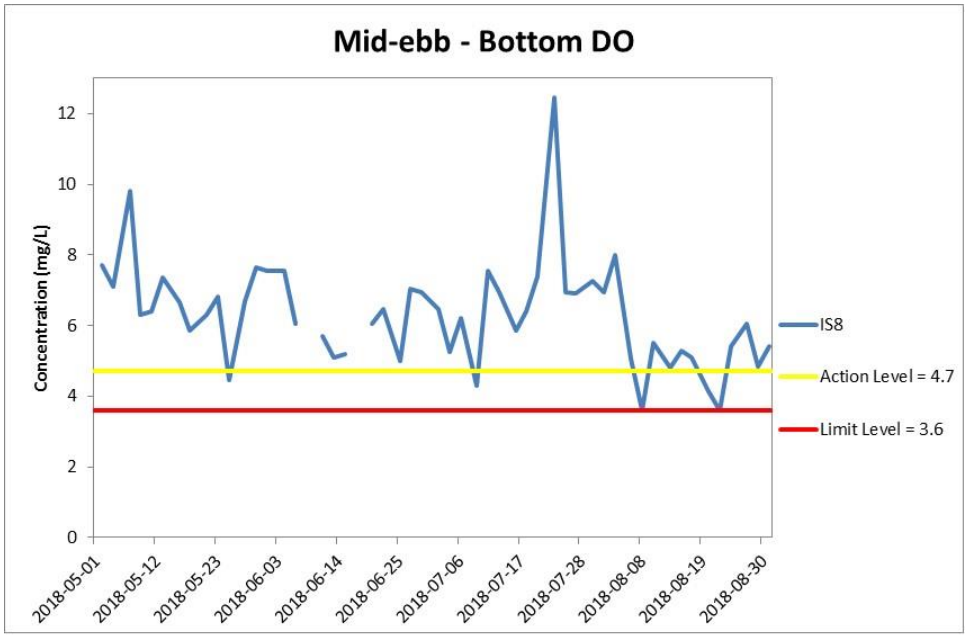


Figure H14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

ERM



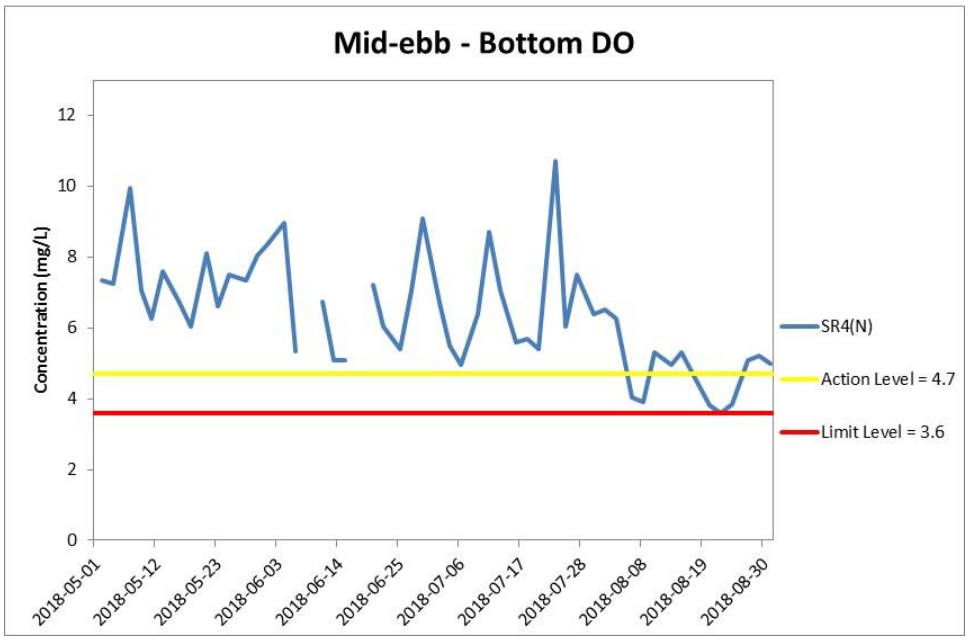


Figure H15 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

ERM

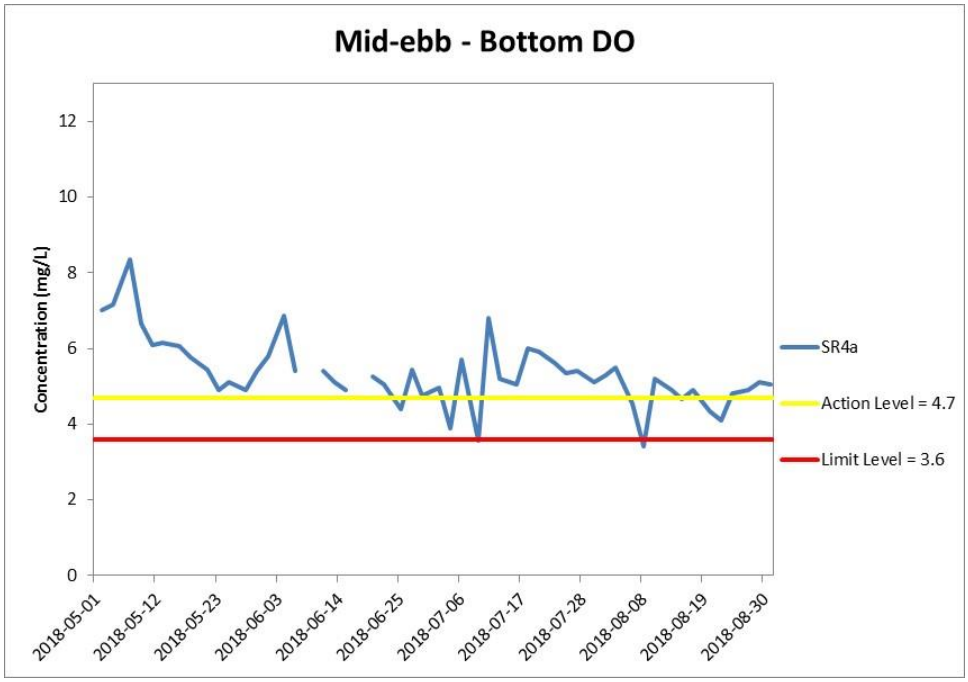
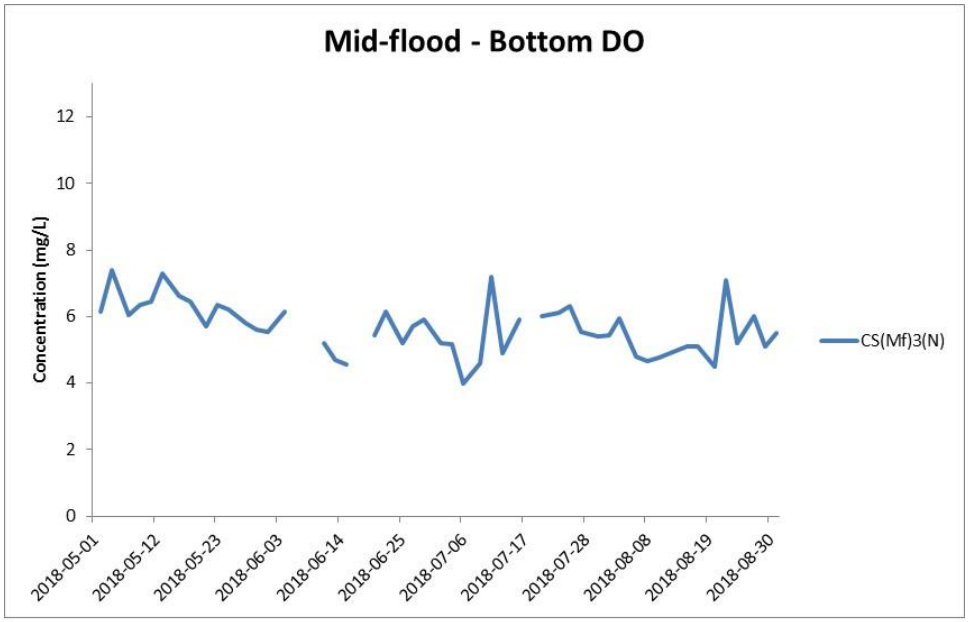


Figure H16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May and 31 August 2018 at SR4a.

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

ERM



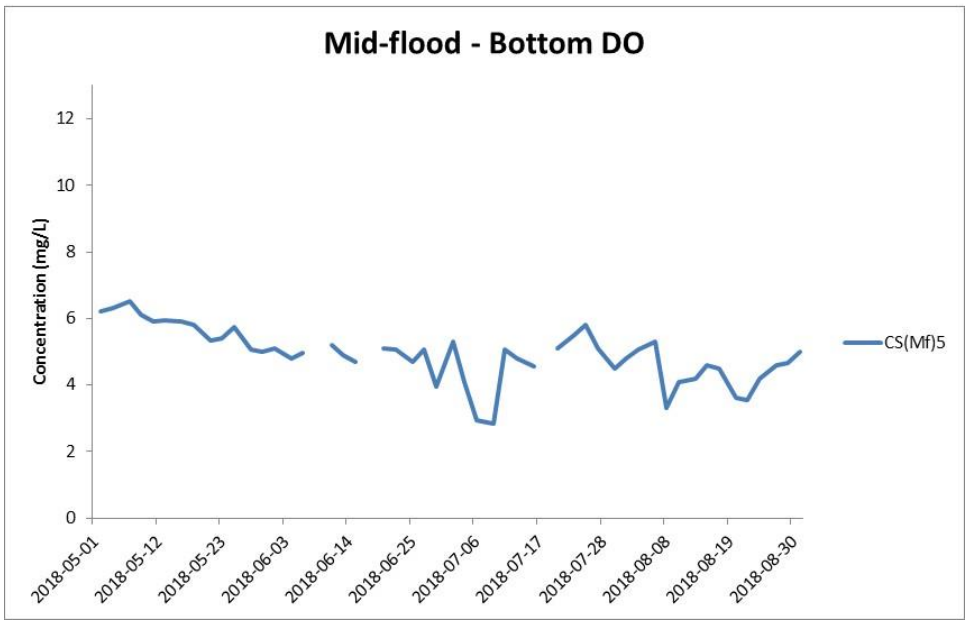
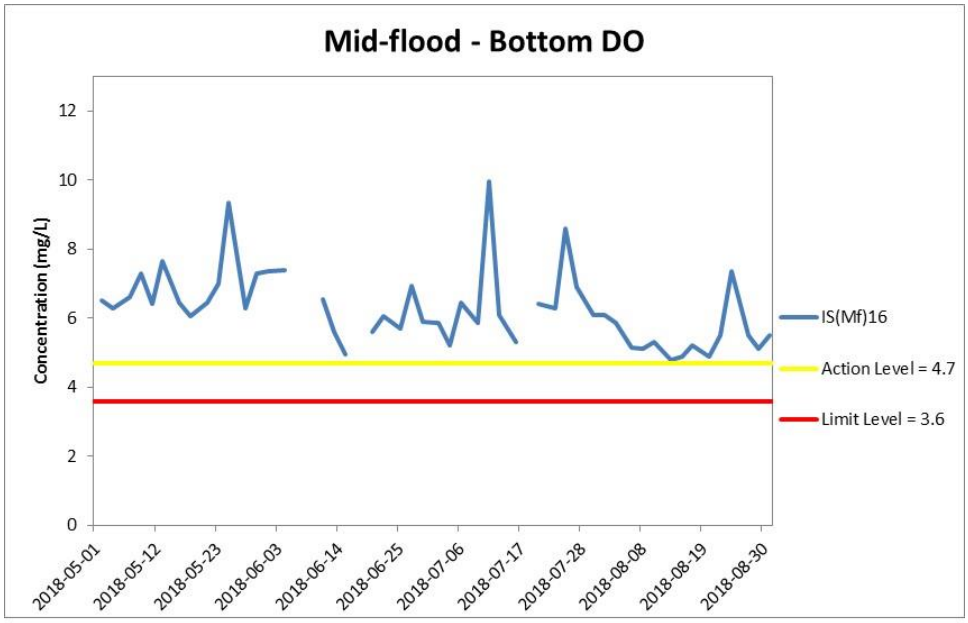


Figure H17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

ERM



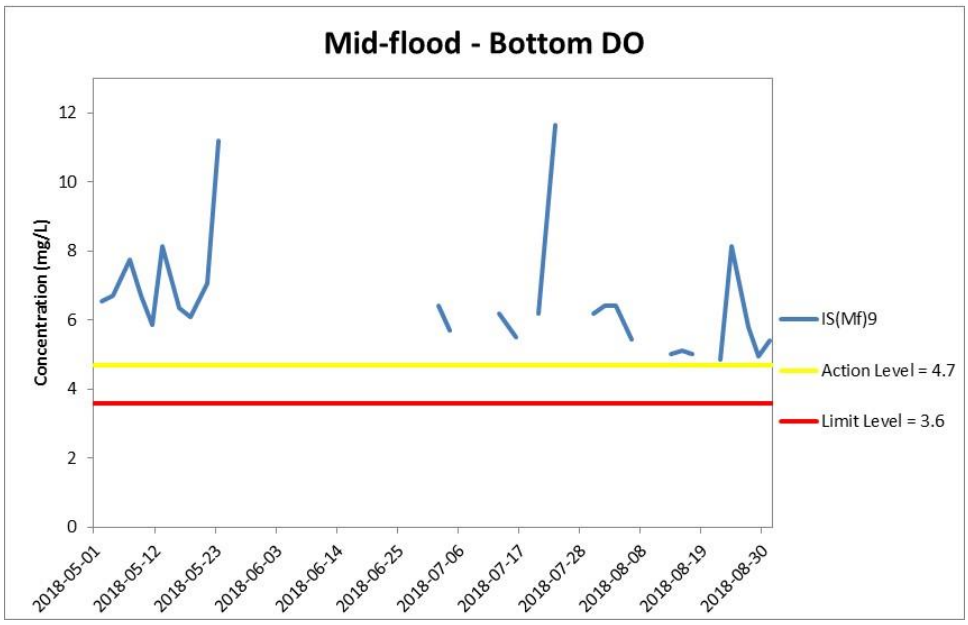
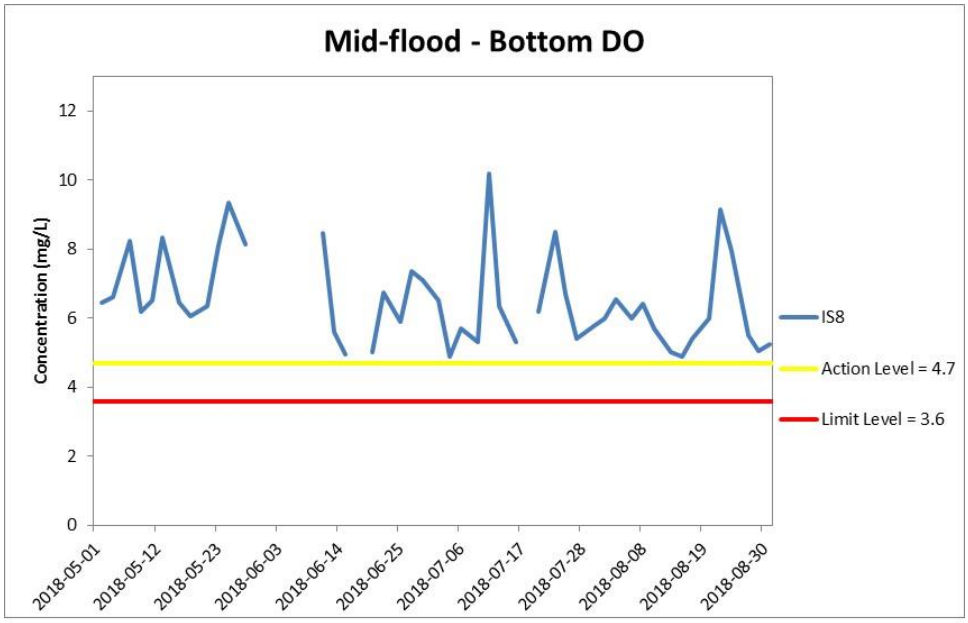


Figure H18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

ERM



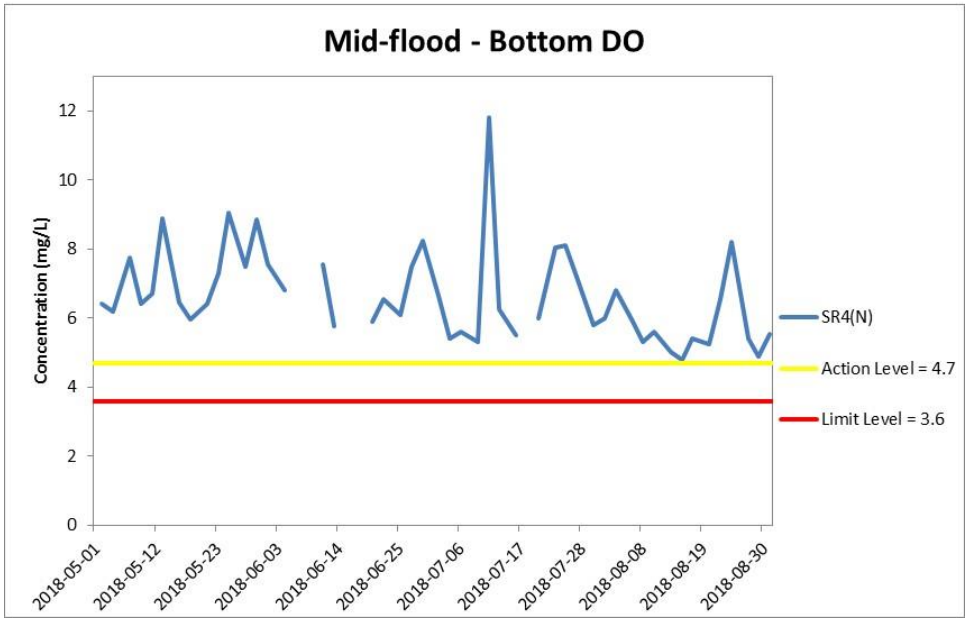


Figure H19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

ERM

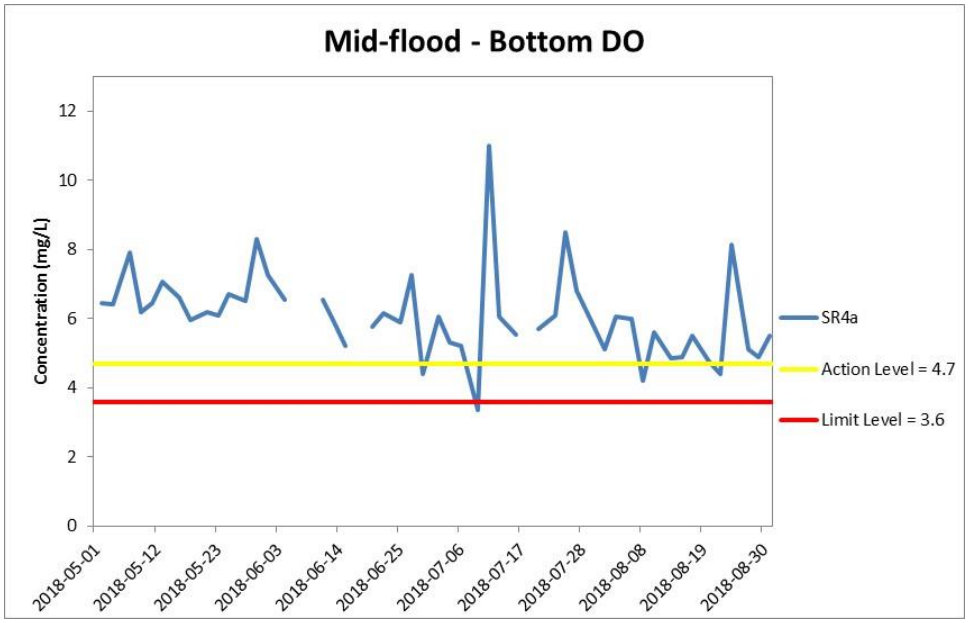


Figure H20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May and 31 August 2018 at SR4a.

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

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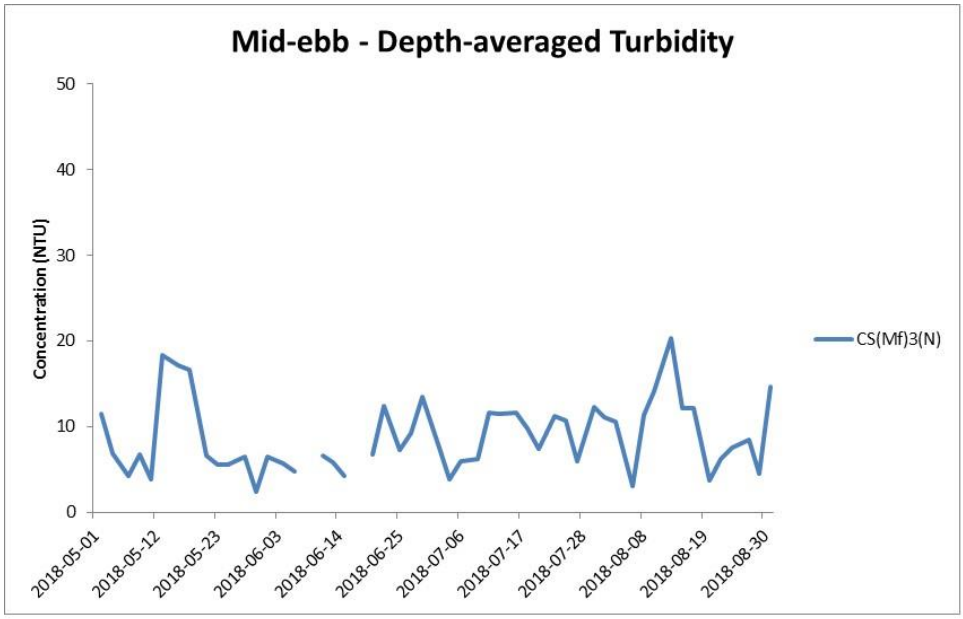

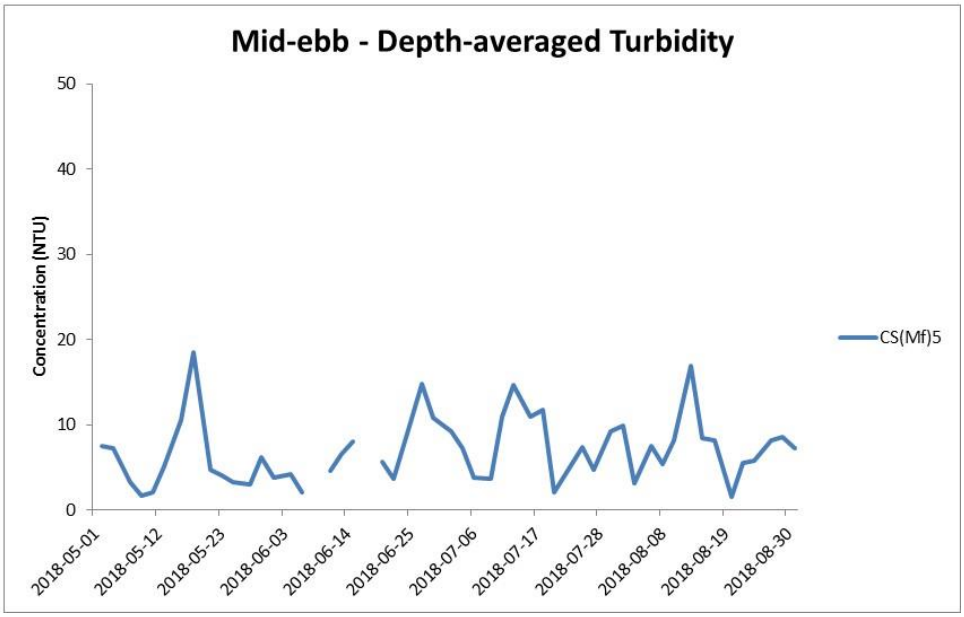

Figure H21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

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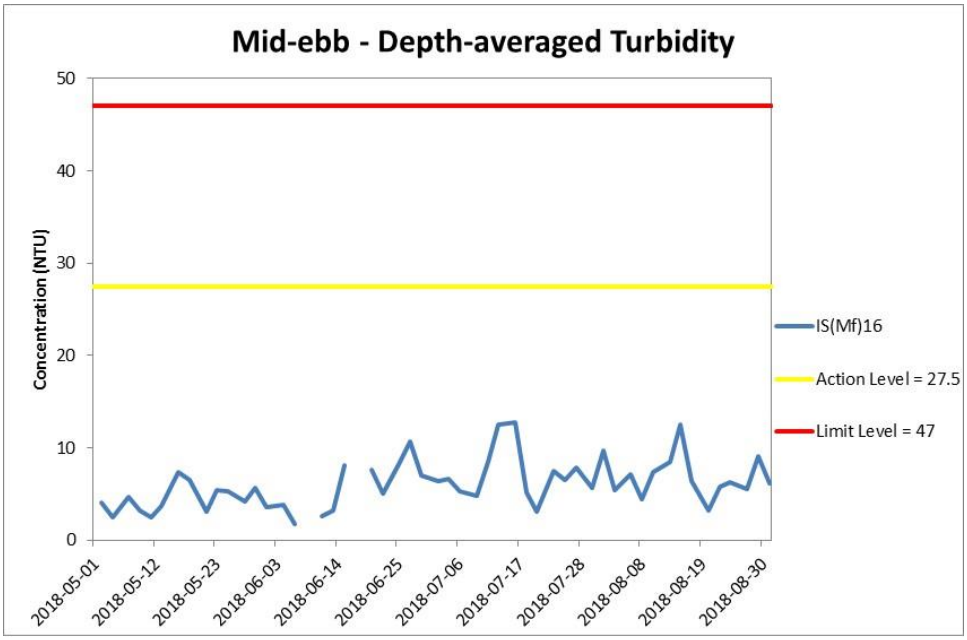

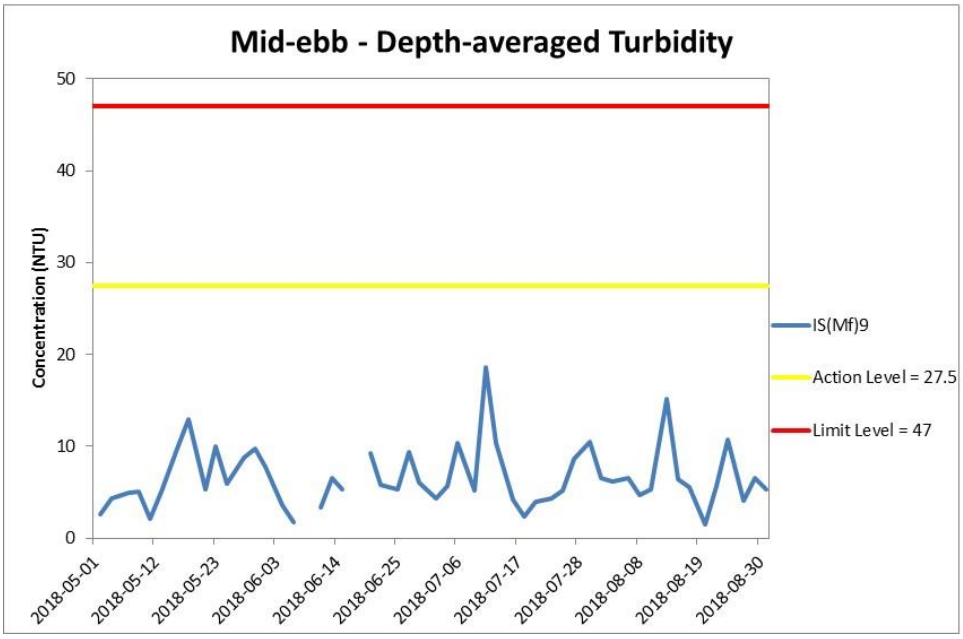

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Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

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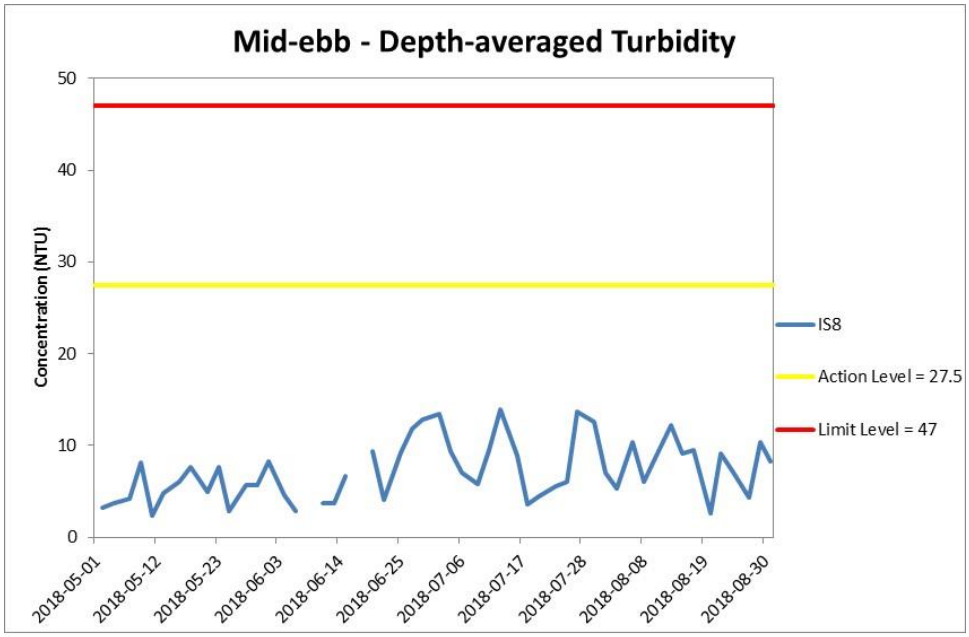

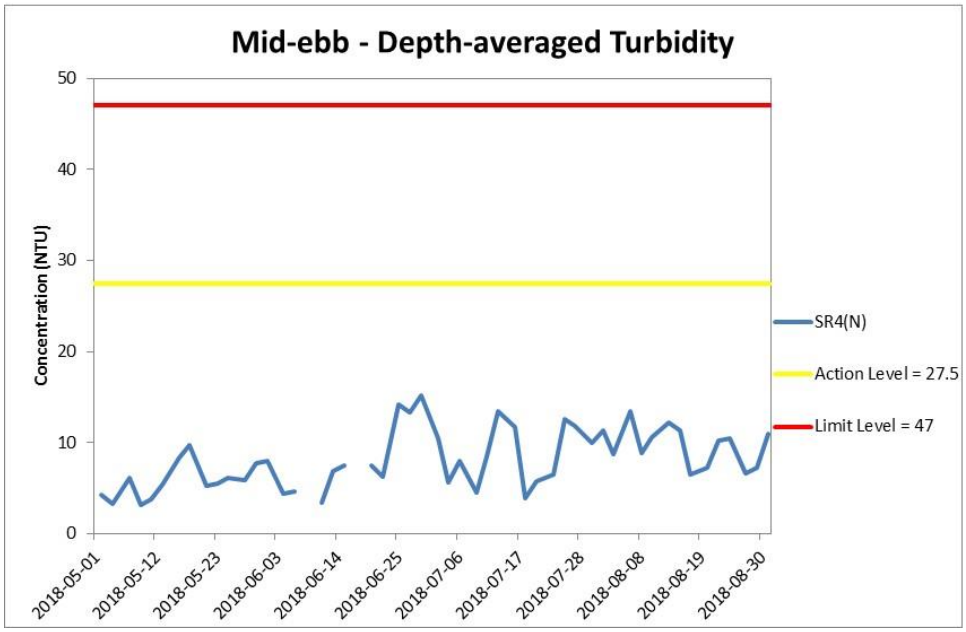

Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

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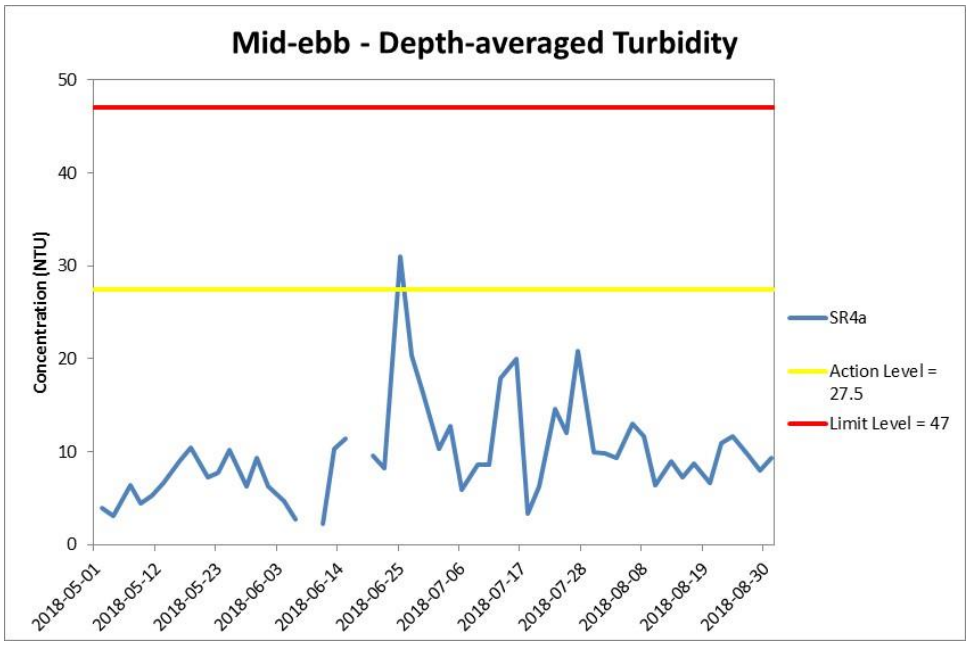

Figure H24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May and 31 August 2018 at SR4a.

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

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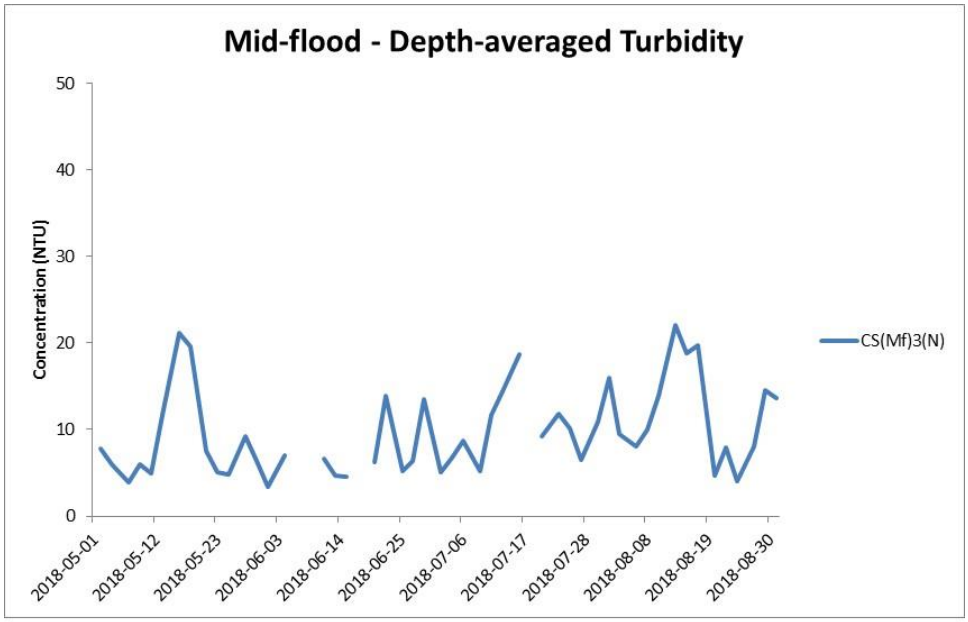

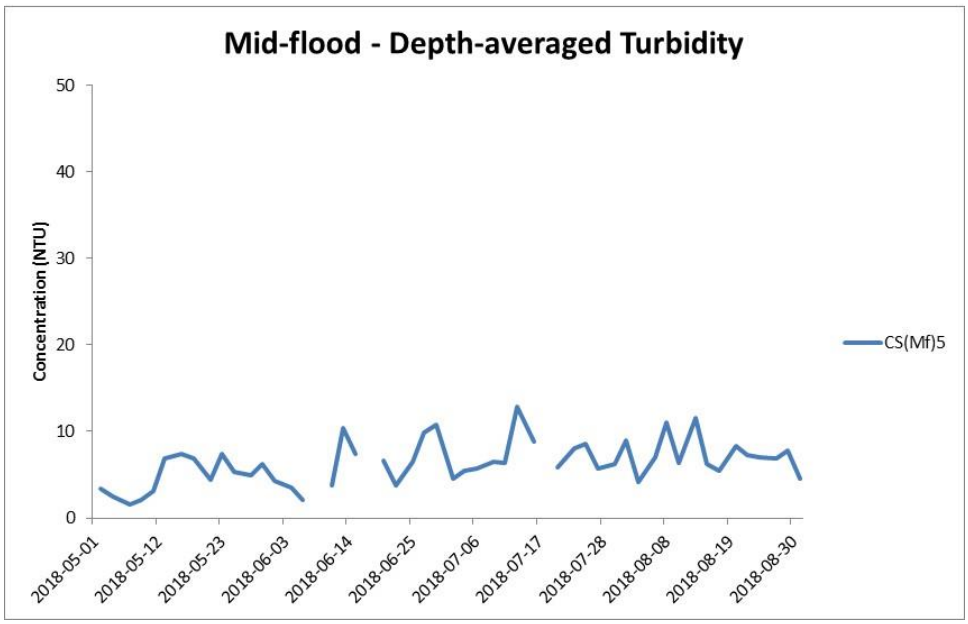

Figure H25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(MF)5.

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

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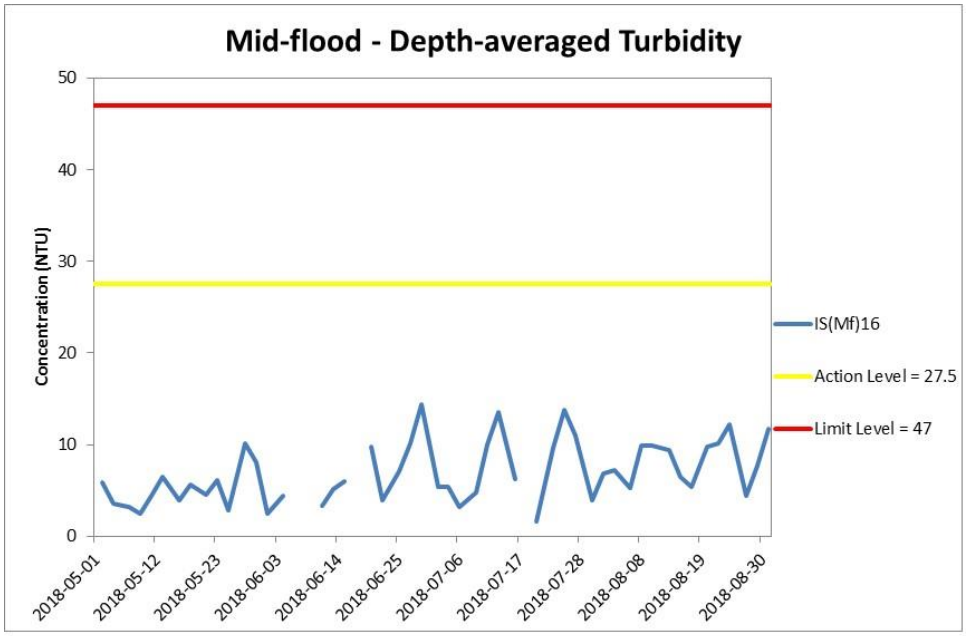

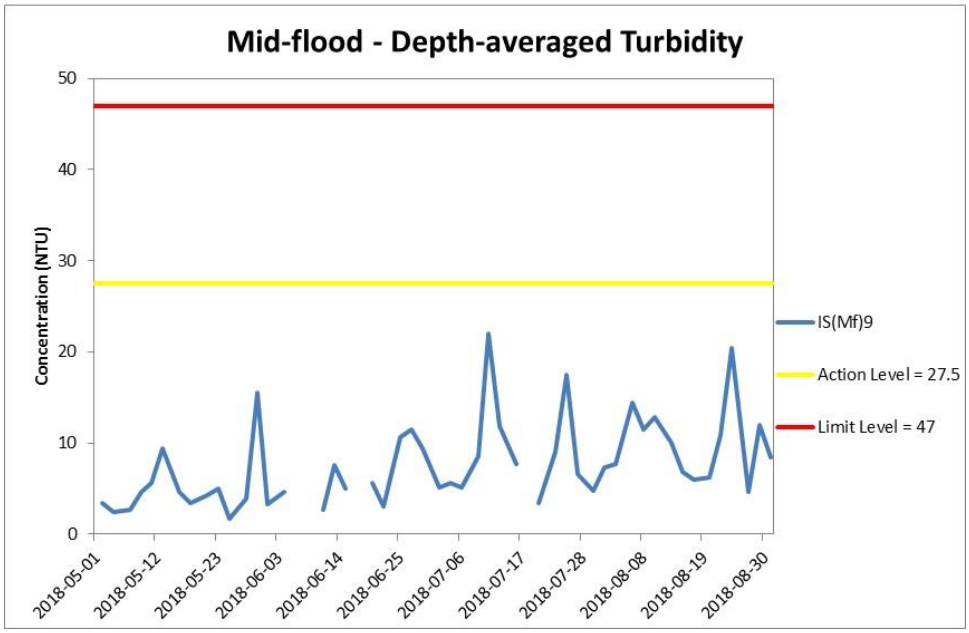

Figure H26 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

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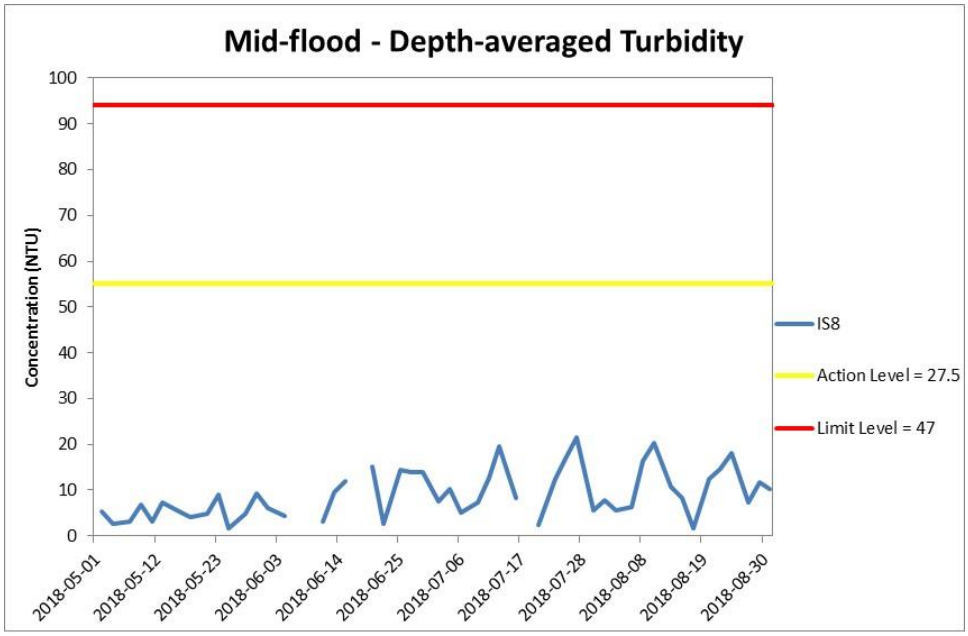

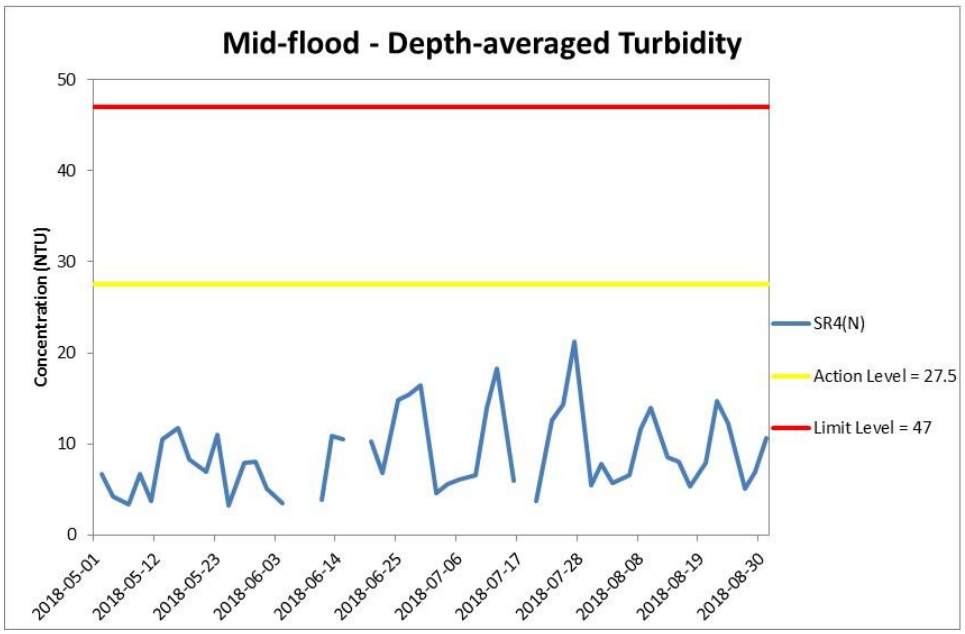

`Figure H27 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

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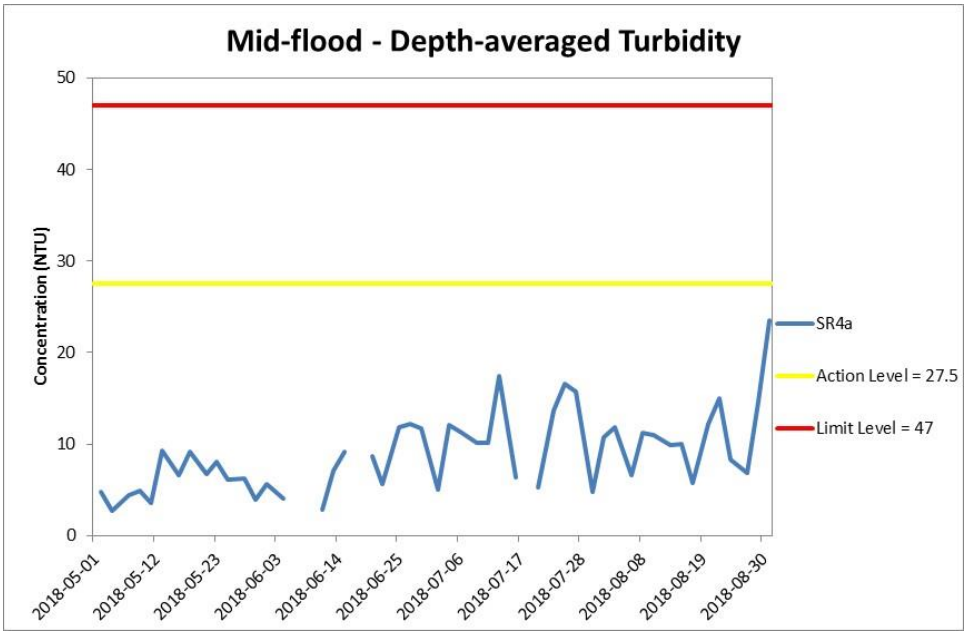

Figure H28 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May and 31 August 2018 at SR4a.

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

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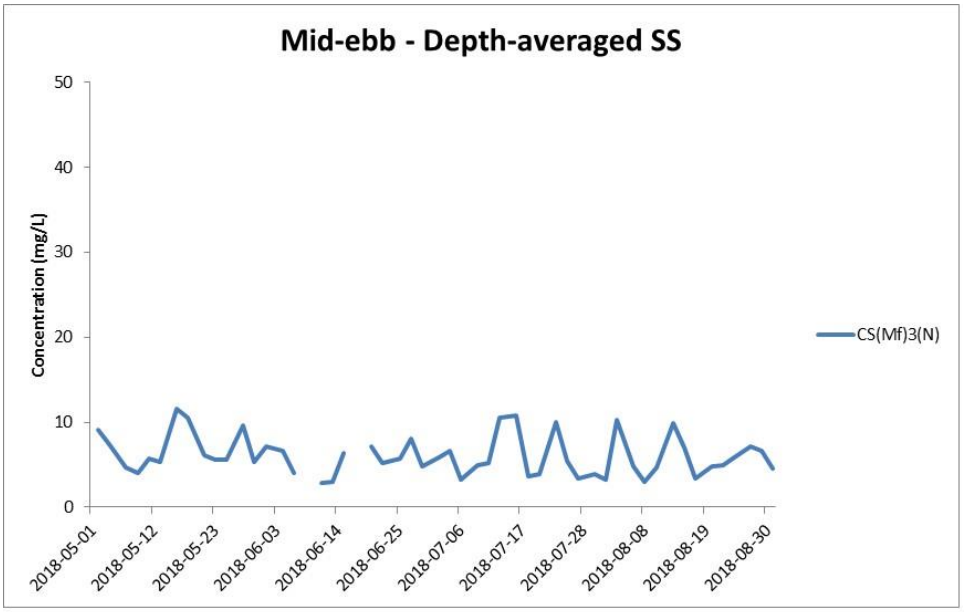

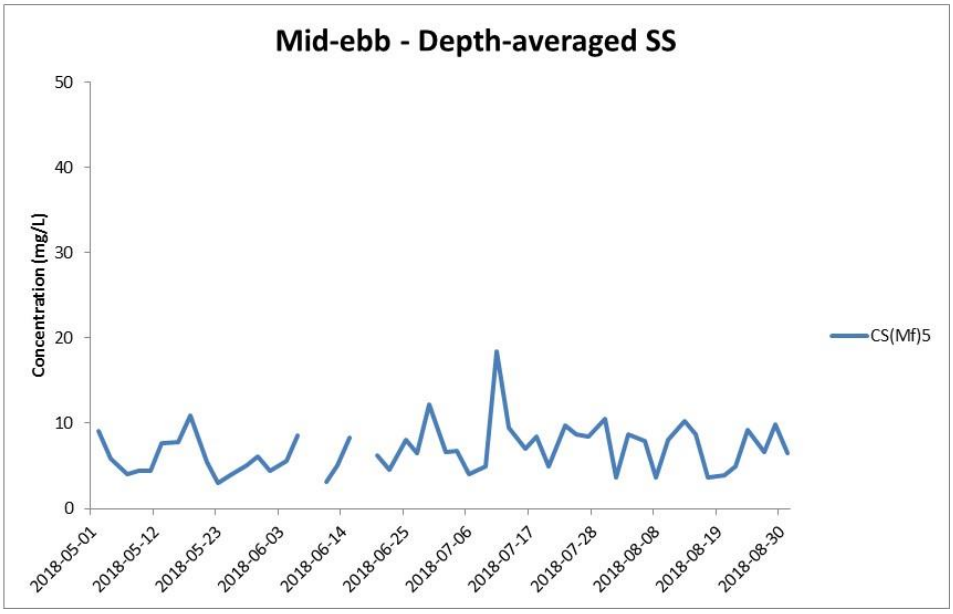

Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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

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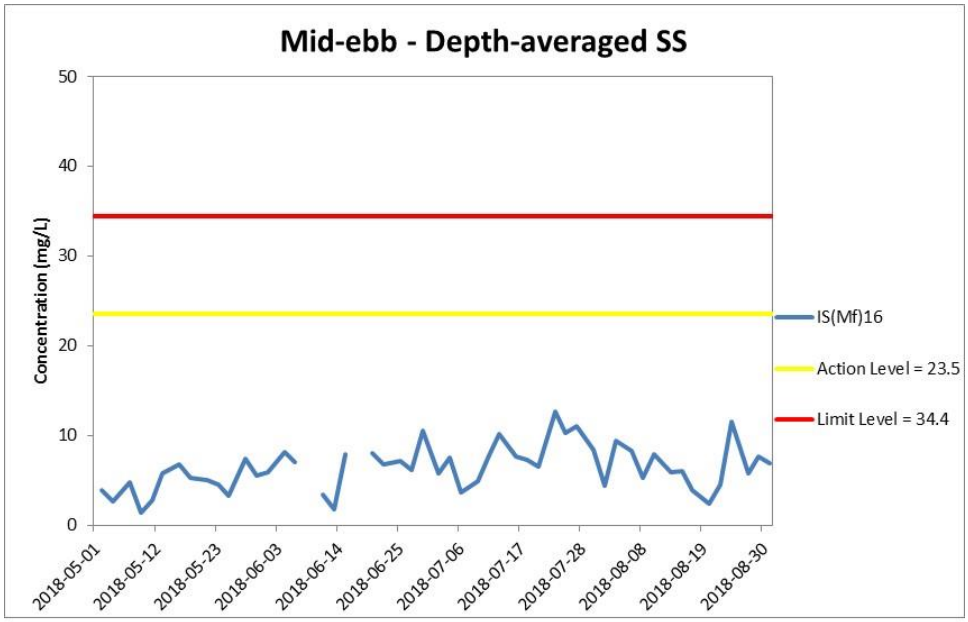

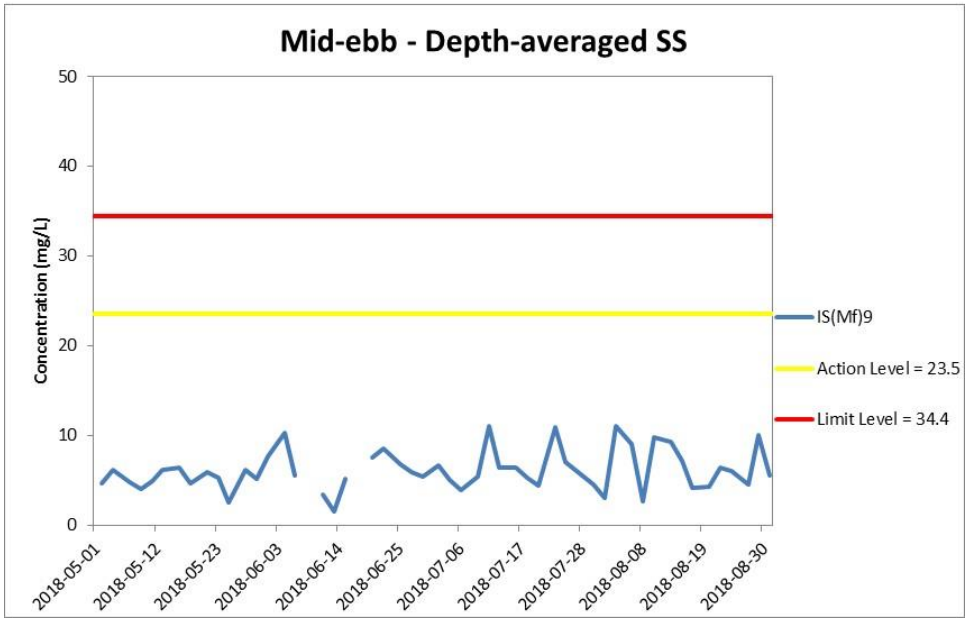

Figure H30 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

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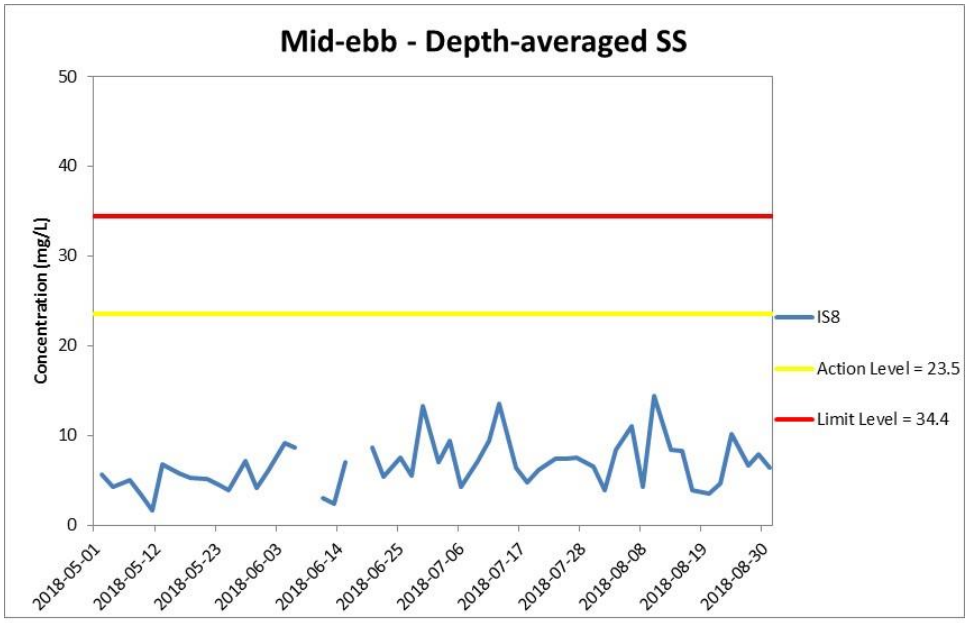

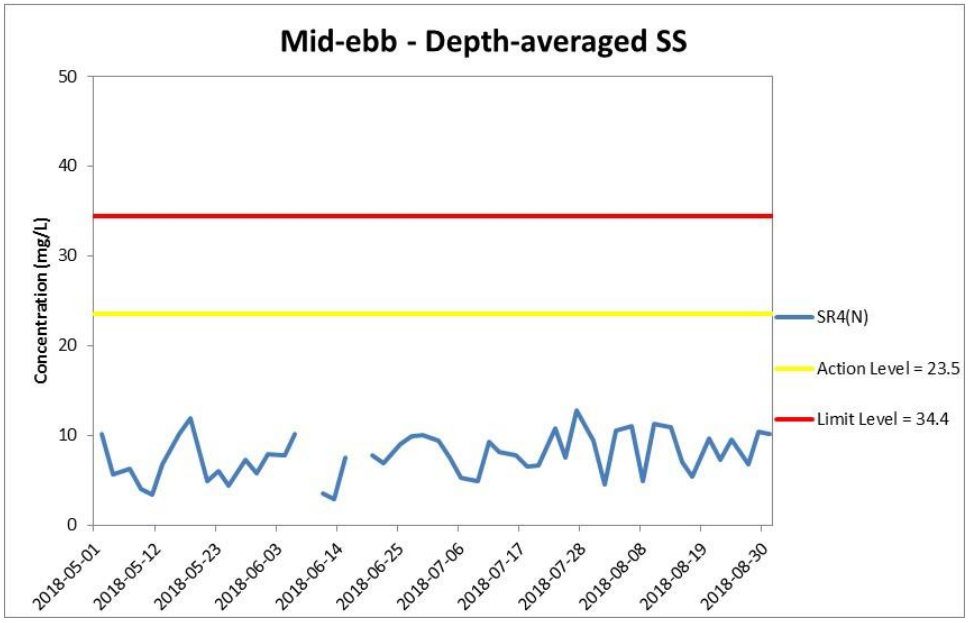

Figure H31 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

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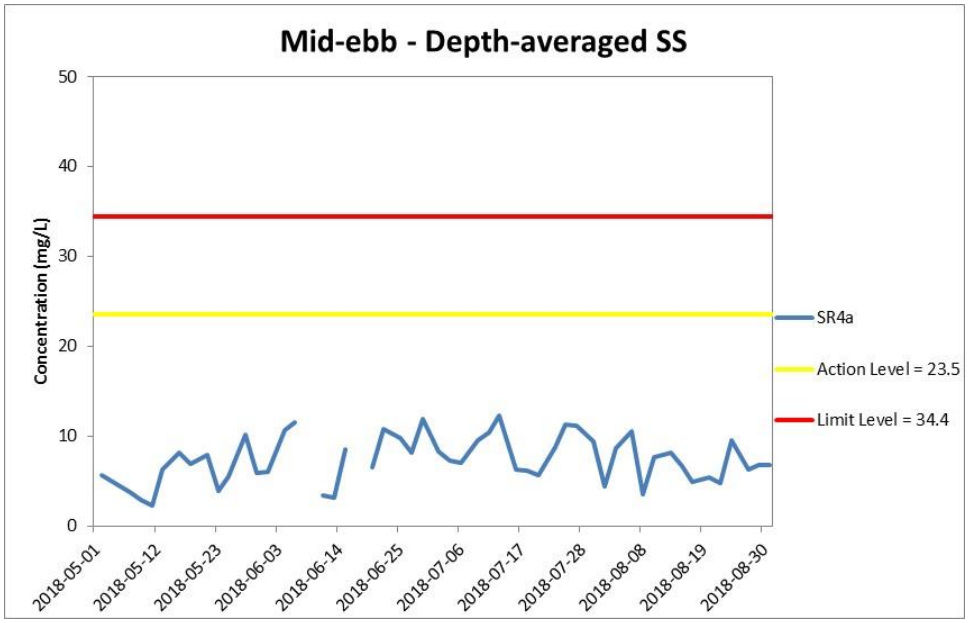

Figure H32 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May and 31 August 2018 at SR4a.

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

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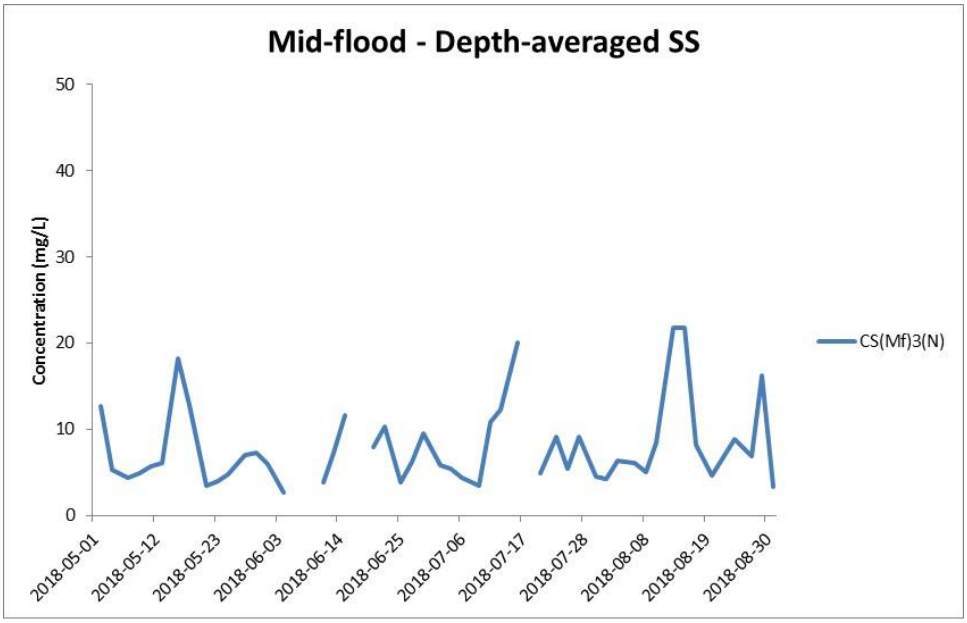


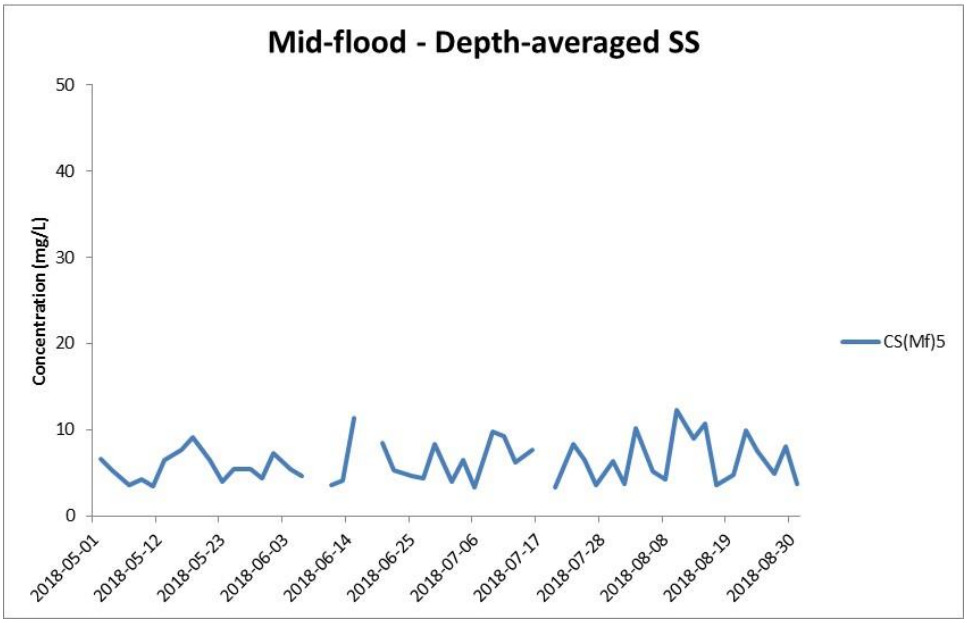
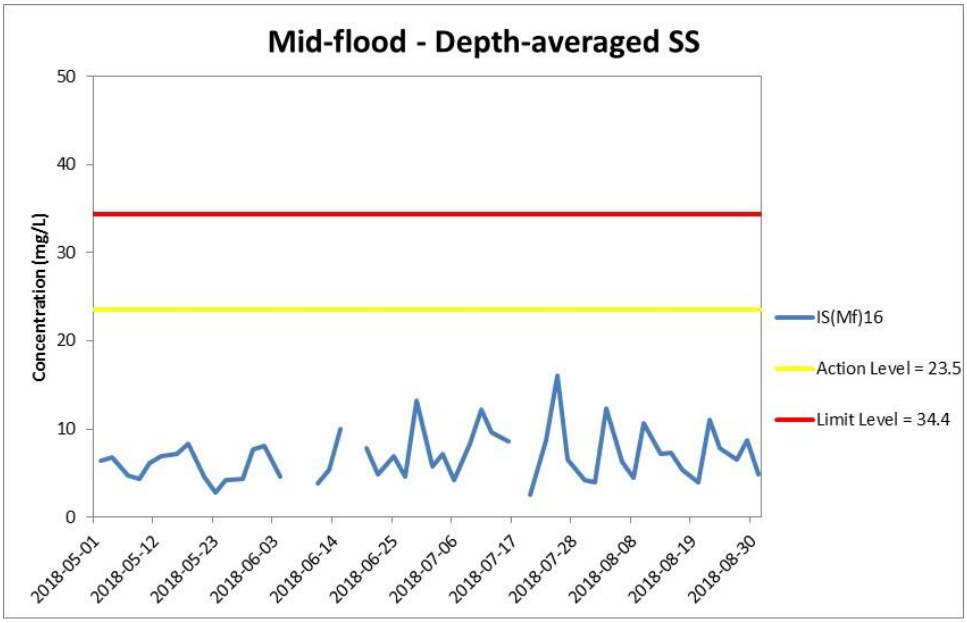


Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May and 31 August 2018 at CS(Mf)3(N) and CS(Mf)5.

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



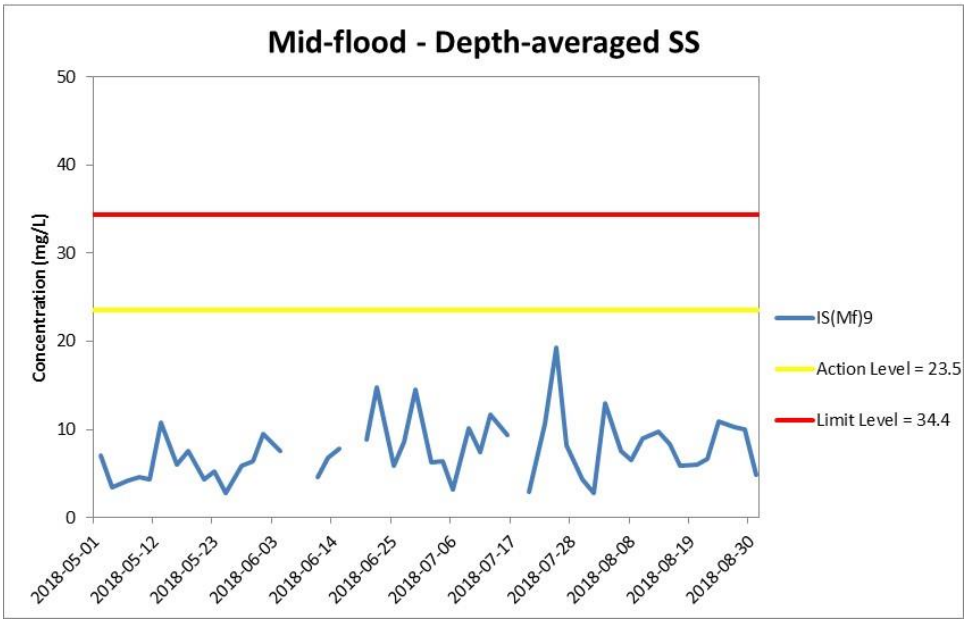


Figure H34 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May and 31 August 2018 at IS(Mf)16 and IS(Mf)9.

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

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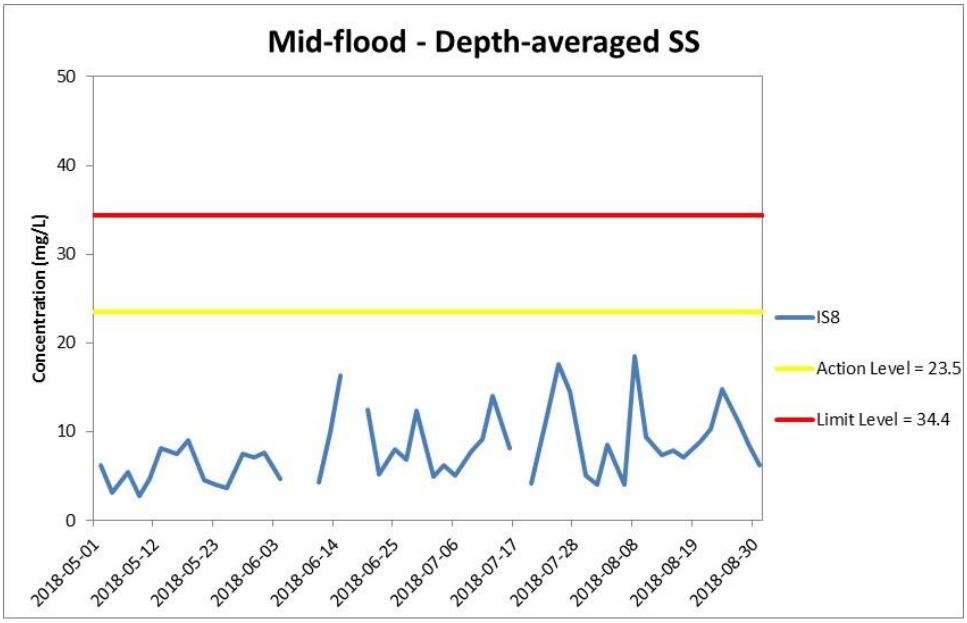

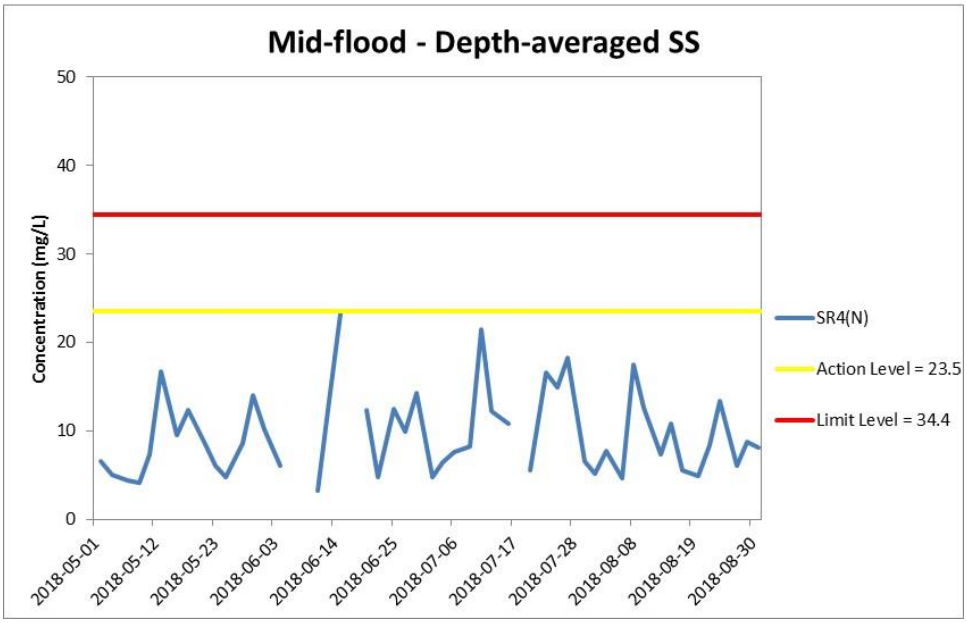

Figure H35 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May and 31 August 2018 at IS8 and SR4(N).

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

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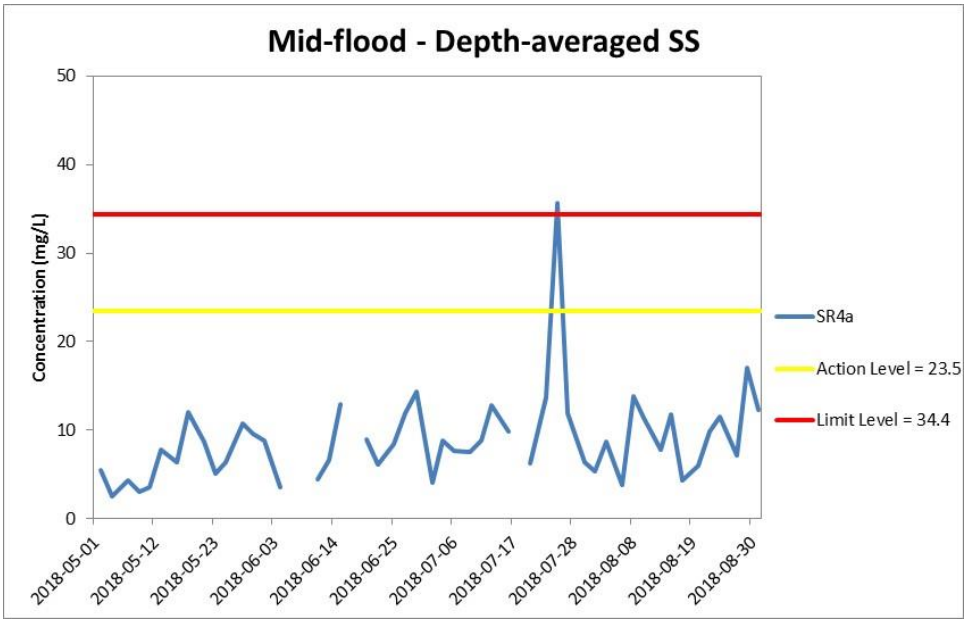

Figure H36 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May and 31 August 2018 at SR4a.

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

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Appendix I

Impact Dolphin Monitoring Survey Results

CONTRACT NO. HY/2012/07
Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link (Southern Connection Viaduct Section)
Dolphin Quarterly Monitoring

19th Quarterly Progress Report (June-August 2018)
submitted to Gammon Construction Limited

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

September 30, 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 19th 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 June to August 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 2018). 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^{o} and 90^{o} (in relation to the bow, which is defined as 0^{o}). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).

2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.

2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

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

2.2. Photo-identification Work

2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the HKLR03 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

2.2.2. A professional digital camera (*Canon* EOS 7D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.

2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).

2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. Data Analysis

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

2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort

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

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

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

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km^2 grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km^2) and dolphin densities (total number of dolphins from on-effort sightings per km^2) 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 **s**ightings **p**er 100 units of **s**urvey **e**ffort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of **d**olphins **p**er 100 units of **s**urvey **e**ffort. Among the 1-km^2 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^2 grid within the study area:

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

where S = total number of on-effort sightings

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

2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, socializing, traveling, and milling/resting) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.

2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView© 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

3.1.1. During the period of June to August 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 771.98 km of survey effort was collected, with 96.8% 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, 287.18 km and 484.80 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 567.73 km, while the effort on secondary lines was 204.25 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 June to August 2018, seven groups of 17 Chinese White Dolphins were sighted. Six of the seven dolphin sightings were made during on-effort search in this quarter, and four of the six 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, while no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during HKLR03 monitoring surveys.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from June to August 2018 is shown in Figure 1. All sightings were made at the northwestern and southwestern ends of the North Lantau region, especially near the mouth of Deep Bay and the HKLR09 alignment (Figure 1). Only one sighting was made near Lung Kwu Chau, even though this area was frequented by dolphins throughout the construction monitoring period in the past several years (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 TM-CLKL alignment as well as the HKBCF and HKLR03 reclamation sites (Figure 1).

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (June-August 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 21 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 seldom sighted here, and mainly at the northwestern and southwestern ends 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 summer months in 2013-18 (Figure 2). Among the six summer periods, dolphins were regularly sighted in NWL waters in 2013 and 2014, but their usage there was dramatically reduced in the four subsequent summer periods, with their only occurrences mostly concentrated at the western end of the survey area (Figure 2). Moreover, in the summer of 2018, dolphins were rarely sighted within the Sha Chau and Lung Kwu Chau Marine Park, which was very different from the previous five summer periods (Figure 2).

3.3. Encounter rate

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

monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during June-August 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 & 13 Jun 2018)	0.00	0.00
	Set 2 (19 & 27 Jun 2018)	0.00	0.00
	Set 3 (3 & 8 Jul 2018)	0.00	0.00
	Set 4 (12 & 20 Jul 2018)	0.00	0.00
	Set 5 (1 & 8 Aug 2018)	0.00	0.00
	Set 6 (21 & 28 Aug 2018)	0.00	0.00
Northwest Lantau	Set 1 (5 & 13 Jun 2018)	0.00	0.00
	Set 2 (19 & 27 Jun 2018)	1.91	3.81
	Set 3 (3 & 8 Jul 2018)	0.00	0.00
	Set 4 (12 & 20 Jul 2018)	1.68	6.71
	Set 5 (1 & 8 Aug 2018)	3.36	6.72
	Set 6 (21 & 28 Aug 2018)	0.00	0.00

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (June – August 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)	
	June – August 2018	September – November 2011	June – August 2018	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	1.16 ± 1.39	9.85 ± 5.85	2.87 ± 3.32	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 1.30 sightings and 3.48 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.

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

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

3.3.3 In NEL, the average dolphin encounter rates 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 21 quarters of HKLR03 monitoring (Table 4). This is a serious concern as the dolphin occurrence in NEL

in the past few years have remained exceptionally low when compared to the baseline period (Table 4). Dolphins have been virtually absent from NEL waters since January 2014, with only three groups of six dolphins sighted there since then despite consistent and intensive survey effort being conducted in this survey area.

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

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 ± 5.85	44.66 ± 29.85
December 2012-February 2013 (Impact)	8.36 ± 5.03	35.90 ± 23.10
March-May 2013 (Impact)	7.75 ± 3.96	24.23 ± 18.05
June-August 2013 (Impact)	6.56 ± 3.68	27.00 ± 18.71
September-November 2013 (Impact)	8.04 ± 1.10	32.48 ± 26.51
December 2013-February 2014 (Impact)	8.21 ± 2.21	32.58 ± 11.21
March-May 2014 (Impact)	6.51 ± 3.34	19.14 ± 7.19
June-August 2014 (Impact)	4.74 ± 3.84	17.52 ± 15.12
September-November 2014 (Impact)	5.10 ± 4.40	20.52 ± 15.10
December 2014-February 2015 (Impact)	2.91 ± 2.69	11.27 ± 15.19
March-May 2015 (Impact)	0.47 ± 0.73	2.36 ± 4.07
June-August 2015 (Impact)	2.53 ± 3.20	9.21 ± 11.57
September-November 2015 (Impact)	3.94 ± 1.57	21.05 ± 17.19
December 2015-February 2016 (Impact)	2.64 ± 1.52	10.98 ± 3.81
March-May 2016 (Impact)	0.98 ± 1.10	4.78 ± 6.85
June-August 2016 (Impact)	1.72 ± 2.17	7.48 ± 10.98
September-November 2016 (Impact)	2.86 ± 1.98	10.89 ± 10.98
December 2016-February 2017 (Impact)	3.80 ± 3.79	14.52 ± 17.21
March-May 2017 (Impact)	0.93 ± 1.03	5.25 ± 9.53
June-August 2017 (Impact)	2.20 ± 2.88	6.58 ± 8.12
September-November 2017 (Impact)	3.12 ± 1.91	10.35 ± 9.66
December 2017-February 2018 (Impact)	4.75 ± 2.26	15.73 ± 15.94
March-May 2018 (Impact)	2.88 ± 4.81	11.12 ± 22.46
June-August 2018 (Impact)	1.16 ± 1.39	2.87 ± 3.32

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 88.2% and 93.5% respectively) were only tiny fractions of the ones recorded during the three-month baseline period, indicating a dramatic decline in dolphin usage of this survey area as well during the present impact phase period (Table 5).

3.3.5. Notably, the ER(STG) and ER(ANI) in the present quarter were the fourth and second lowest respectively among all quarters during the entire HKLR03 construction period. Moreover, when comparing the quarterly periods in summer months, the quarterly encounter rates in the summer of 2018 were the lowest among all summer periods during the HKLR03 construction phase. The dramatic drop in dolphin occurrence during this quarter should raise some concerns, and 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.

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 (23rd quarter of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0022 and 0.0144 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 23 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 2018). Apparently there was very 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 five individuals per group in

North Lantau region during June to August 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 (June – August 2018) and baseline monitoring period (September – November 2011) (Note: ± denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	June – August 2018	**September – November 2011**
Overall	2.43 ± 1.62 (n = 7)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.43 ± 1.62 (n = 7)	3.92 ± 3.40 (n = 49)

3.4.2. The average dolphin group size in NWL waters during June to August 2018 was lower than the one recorded during the three-month baseline period, but it should be noted that the sample size of seven 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, with the exception of a medium-sized group with five animals, the other six dolphin groups were small and composed of 1-4 individuals only (Appendix II).

3.4.4. Distribution of the lone larger dolphin group with five individuals during the present quarter is shown in Figure 3, with comparison to the one in baseline period. That medium-sized dolphin group sighted in the present quarter was located at the mouth of Deep Bay near Black Point (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 (especially around the Sha Chau and Lung Kwu Chau Marine Park), and a few were also sighted in NEL waters (Figure 3).

3.5. Habitat use

3.5.1. From June to August 2018, only five grids recorded dolphin occurrence, and the grids with moderately high dolphin densities were located at the mouth of Deep Bay and near the HKLR09 alignment (Figures 4a and 4b).

3.5.2. Notably, all grids near TMCLKL alignment as well as HKLR03/HKBCF reclamation sites did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).

3.5.3. 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 drastically different in NWL between the baseline and impact phase monitoring periods, with high dolphin usage recorded throughout the area during the baseline period, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform. In contrast, only several grids with low to moderate dolphin densities were located at the northwestern and southwestern ends of NWL waters 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 seven groups of dolphins.

3.7. Activities and associations with fishing boats

3.7.1. Only one of the seven dolphin groups was 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 (14.3%) was comparable to 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 near the HKLR09 alignment at the southwestern corner of NWL waters (Figure 6). When compared to the baseline period, distribution of various dolphin activities during the present impact phase monitoring period was very different with a much more restricted area of occurrence (Figure 6).

3.7.4. Notably, none of the seven dolphin groups was found to be associated with any operating fishing vessel during the present impact phase period.

3.8. Summary of photo-identification works

3.8.1. From June to August 2018, about 500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, 13 individuals sighted 16 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. Only three individuals (CH34, NL12 and NL145) were re-sighted twice, while the rest were re-sighted once during the three-month period (Appendix III).

3.8.3. Notably, three of these 13 individuals (i.e. CH34, NL202 and NL317) were also sighted in NWL waters during the HKBCF monitoring surveys under the same three-month period. Moreover, seven individuals (i.e. NL145, NL233, NL302, NL317, NL327, NL329 and WL188) were also sighted in WL waters during the HKLR09 monitoring surveys from June to August 2018, showing their extensive movements across different survey areas.

3.9. Individual range use

3.9.1. Ranging patterns of the 13 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, in contrary to previous monitoring quarters, none of the individuals that consistently utilized WL waters in the past have extended their range use to NWL waters 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.

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.

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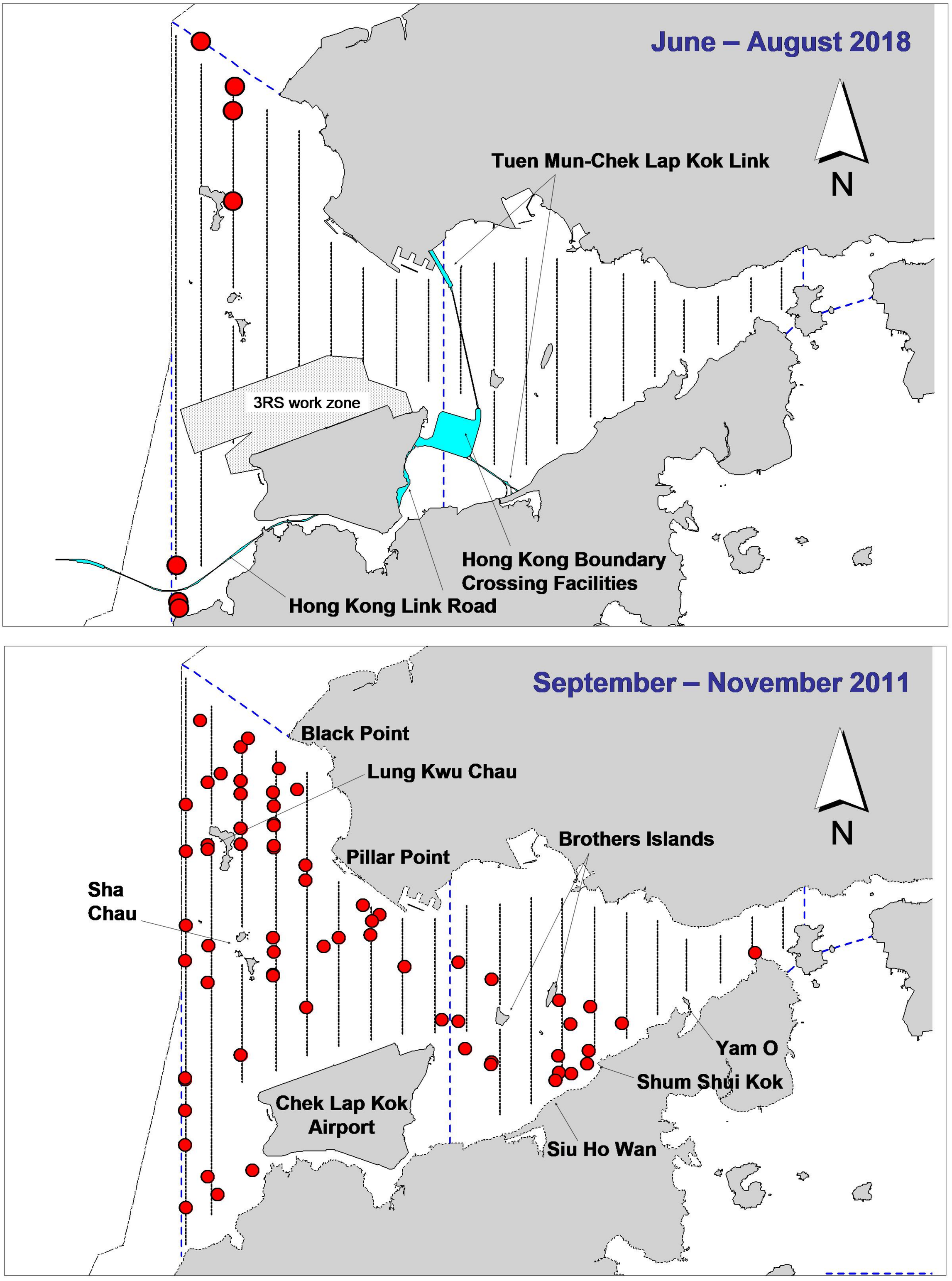


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

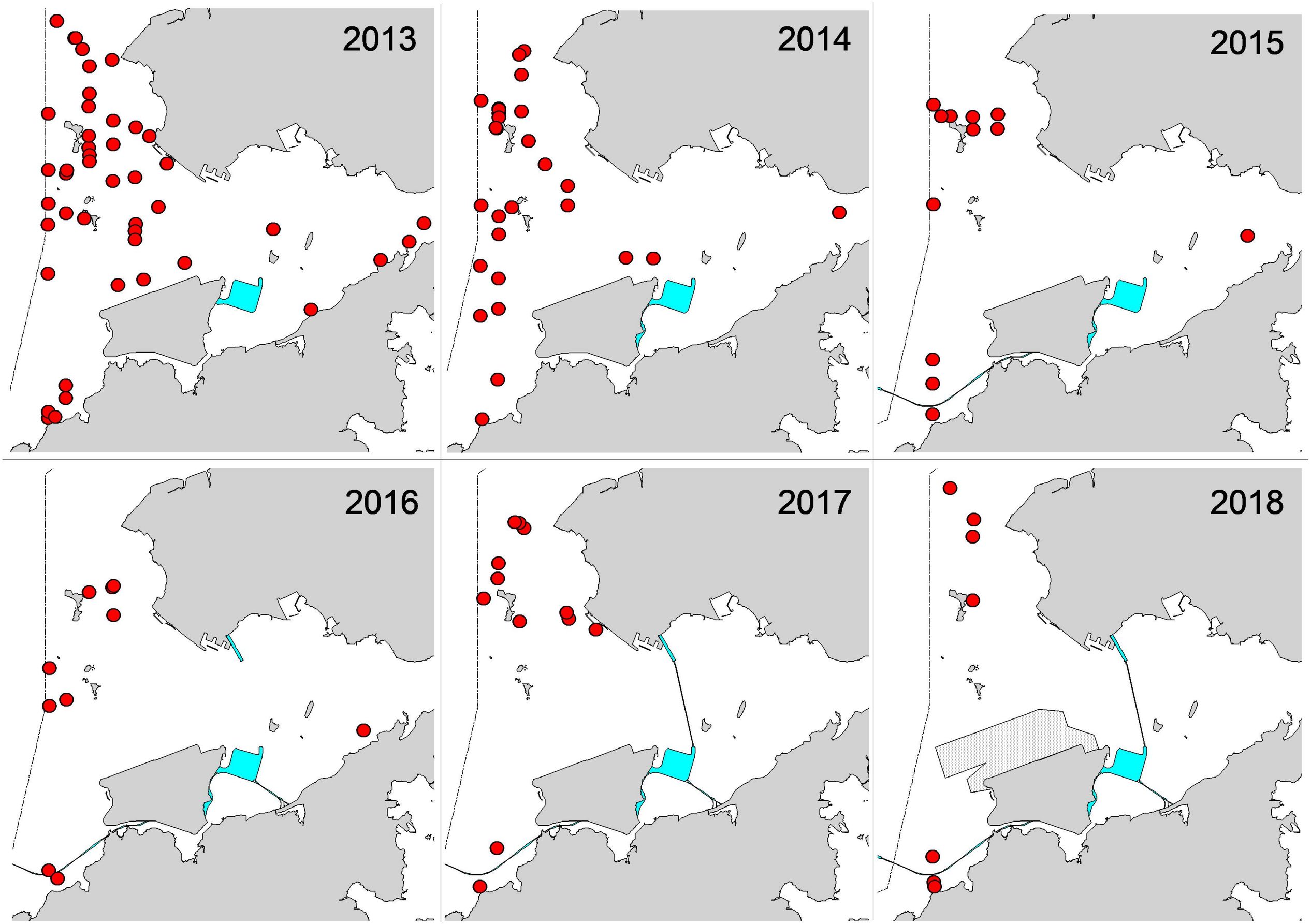


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six summer quarters (June-August) of HKLR03 impact phase in 2013-18

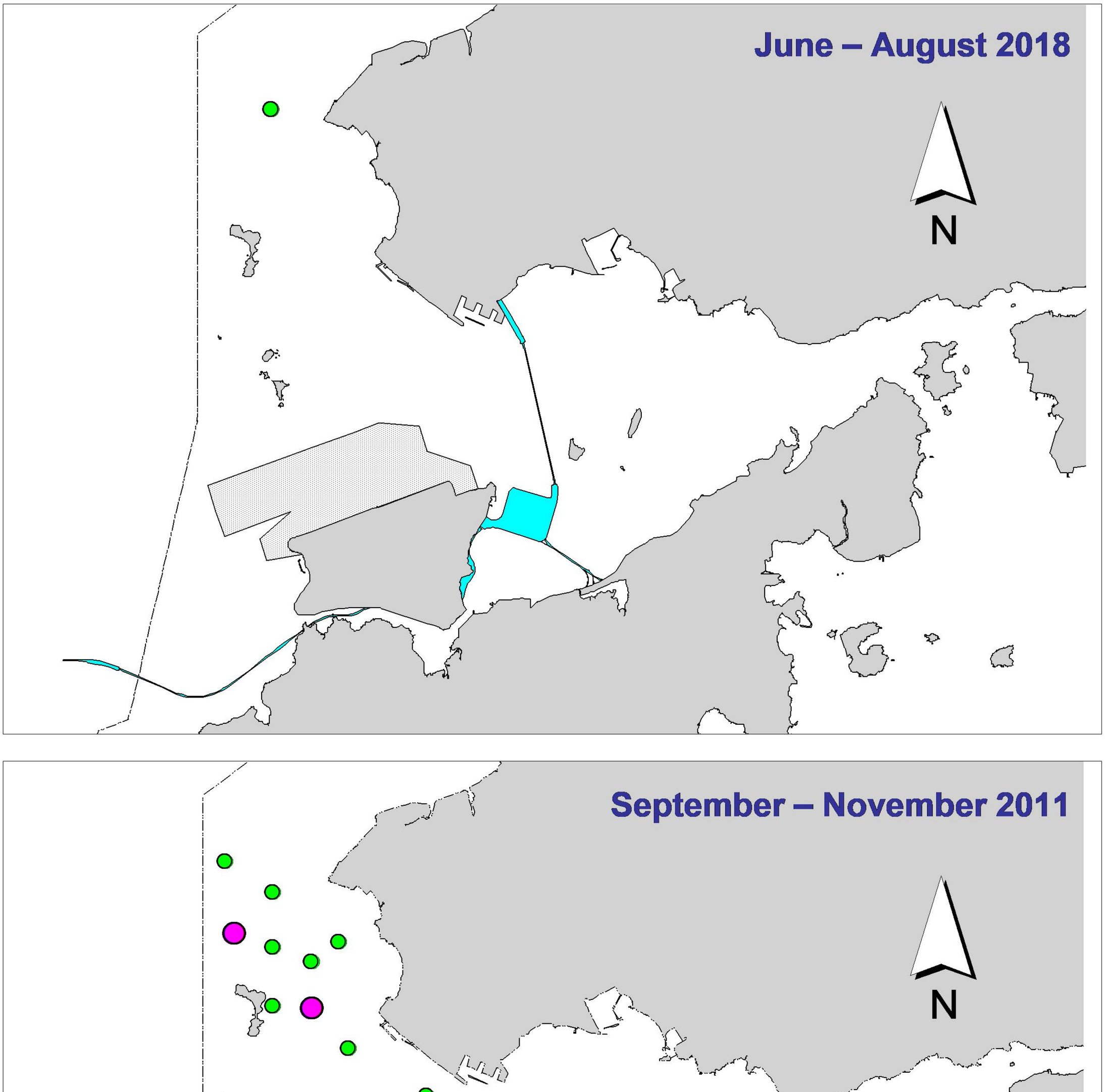


Figure 3. Distribution of Chinese white dolphins with larger group sizes during HKLR03 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

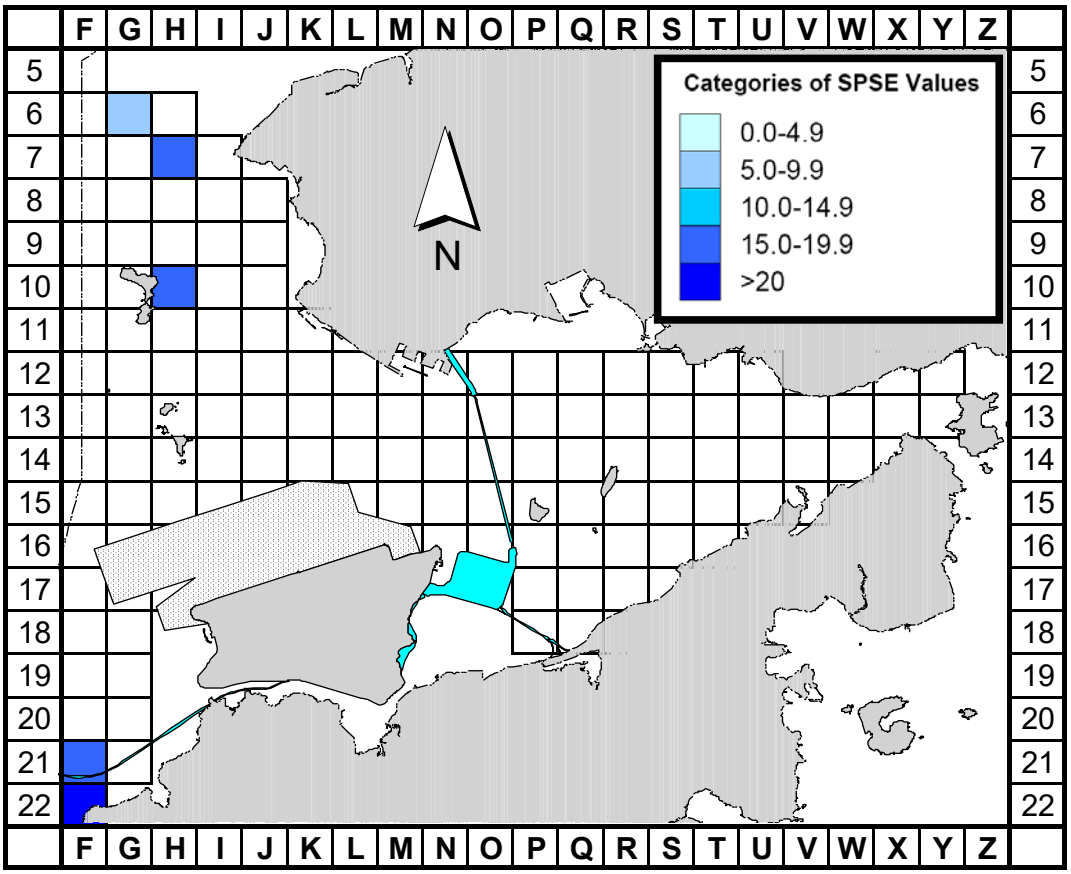


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period monitoring period (June-August 18) (SPSE = no. of on-effort sightings per 100 units of survey effort)

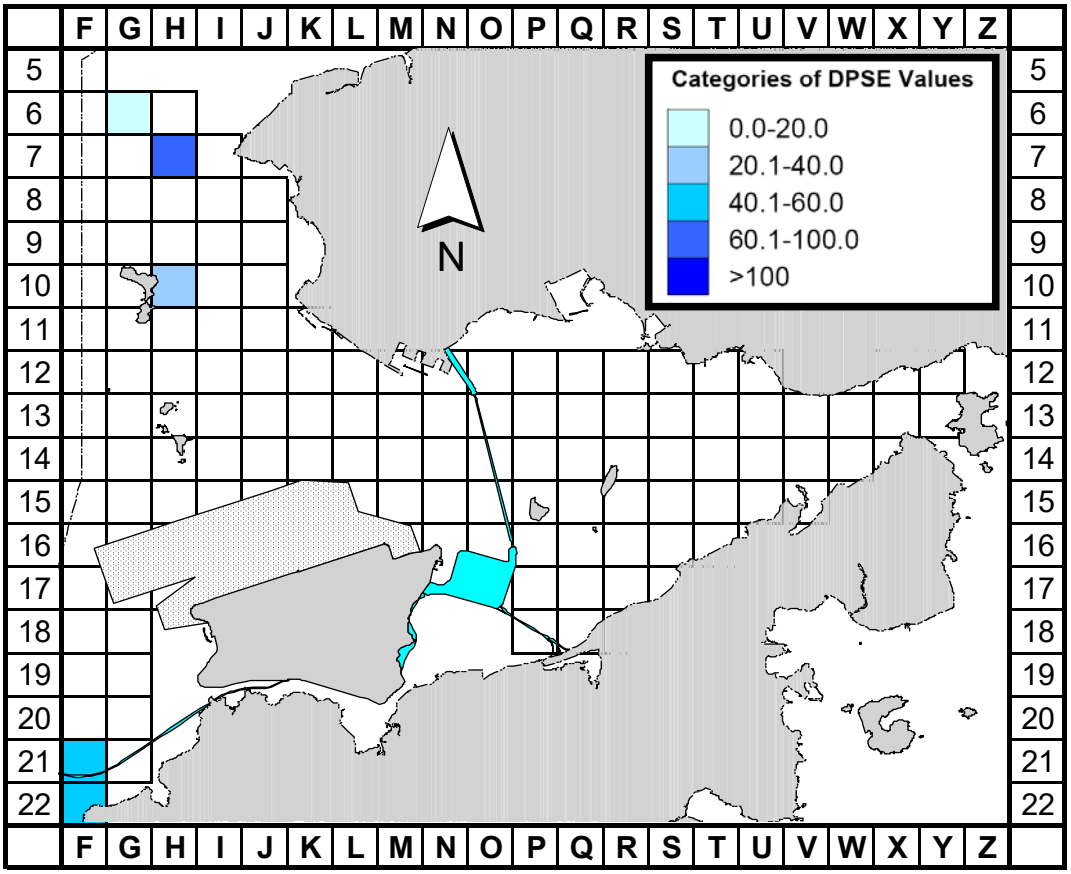


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (June-August 18) (DPSE = no. of dolphins per 100 units of survey effort)

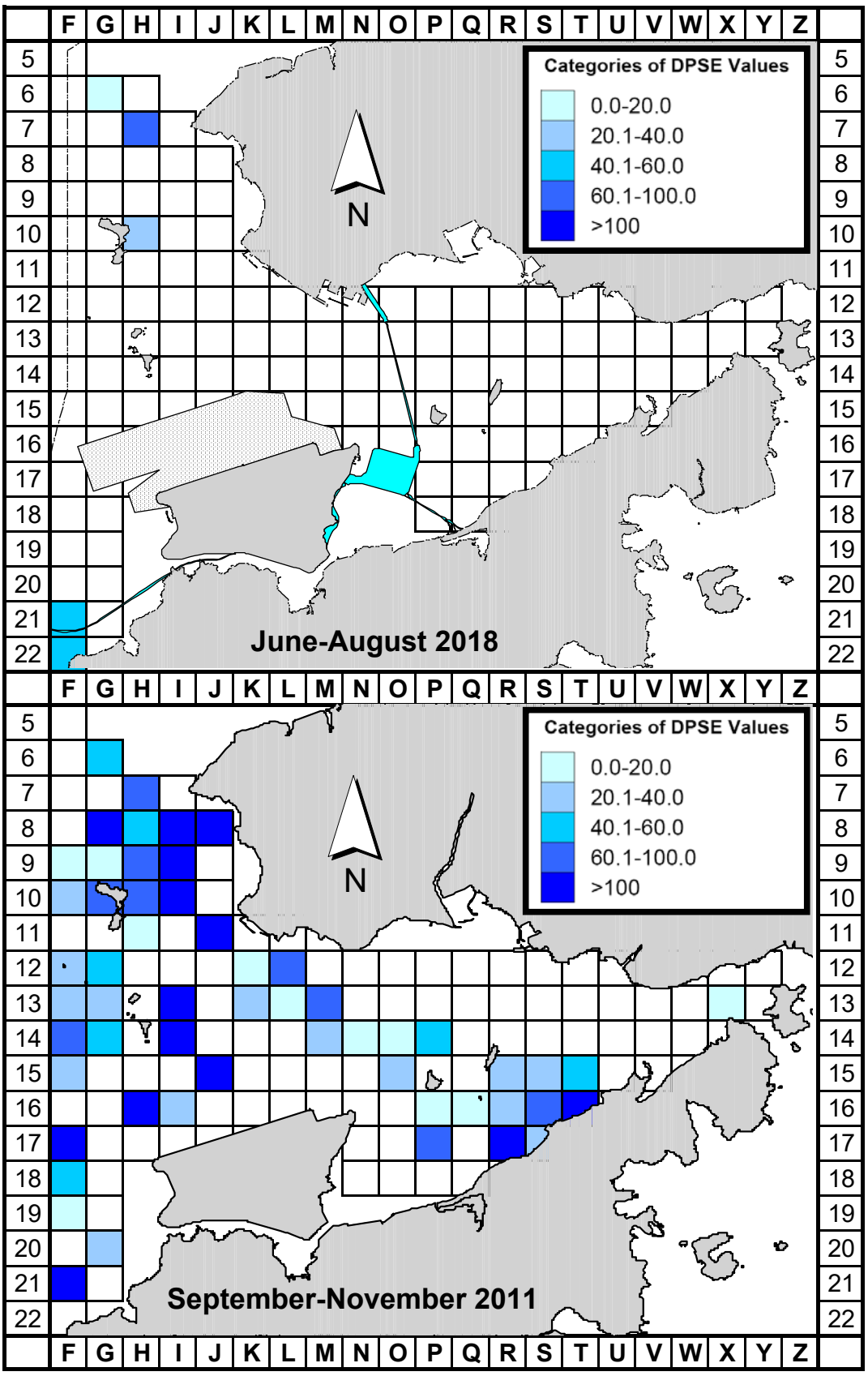


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in Northwest and Northeast Lantau survey area between the impact monitoring period (June - August 2018) and baseline monitoring period (September-November 2011)
(DPSE = no. of dolphins per 100 units of survey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

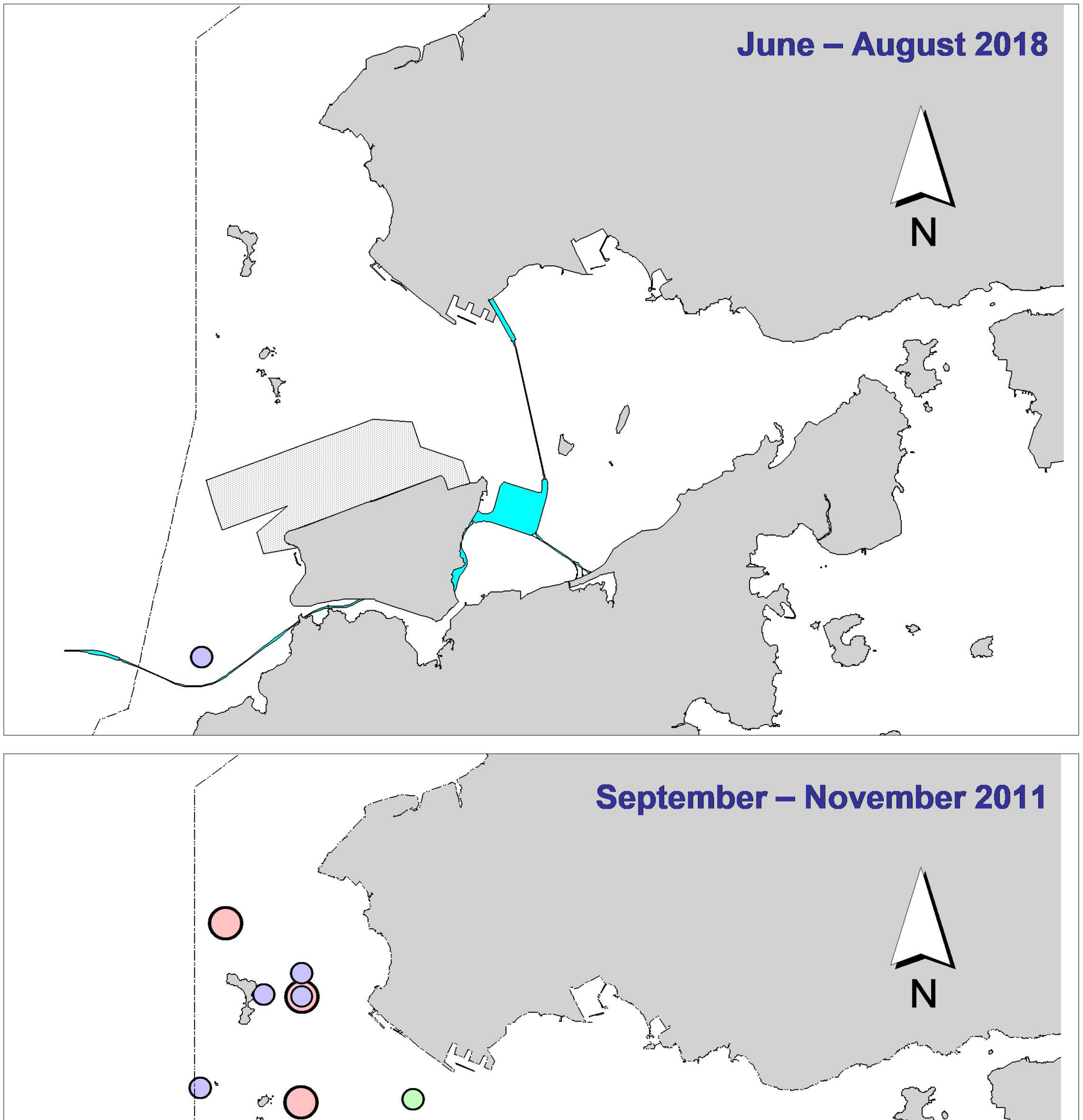


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during HKLR03 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. HKLR03 Survey Effort Database (June-August 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
5-Jun-18	NW LANTAU	2	3.73	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NW LANTAU	3	28.14	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NW LANTAU	2	3.46	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NW LANTAU	3	6.03	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NE LANTAU	2	10.32	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NE LANTAU	3	25.47	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NE LANTAU	2	6.68	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NE LANTAU	3	3.77	SUMMER	STANDARD36826	HKLR	S
13-Jun-18	NW LANTAU	2	23.63	SUMMER	STANDARD36826	HKLR	P
13-Jun-18	NW LANTAU	3	3.34	SUMMER	STANDARD36826	HKLR	P
13-Jun-18	NW LANTAU	2	8.49	SUMMER	STANDARD36826	HKLR	S
13-Jun-18	NW LANTAU	3	2.64	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NW LANTAU	3	23.85	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NW LANTAU	4	3.40	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NW LANTAU	3	7.85	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NW LANTAU	4	3.20	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NE LANTAU	2	24.33	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NE LANTAU	3	11.62	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NE LANTAU	2	9.72	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NE LANTAU	3	1.87	SUMMER	STANDARD36826	HKLR	S
27-Jun-18	NW LANTAU	2	16.07	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	3	12.56	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	4	4.20	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	2	10.57	SUMMER	STANDARD36826	HKLR	S
3-Jul-18	NW LANTAU	3	24.91	SUMMER	STANDARD36826	HKLR	P
3-Jul-18	NW LANTAU	4	10.69	SUMMER	STANDARD36826	HKLR	P
3-Jul-18	NW LANTAU	3	12.89	SUMMER	STANDARD36826	HKLR	S
3-Jul-18	NW LANTAU	4	0.81	SUMMER	STANDARD36826	HKLR	S
3-Jul-18	NE LANTAU	2	28.85	SUMMER	STANDARD36826	HKLR	P
3-Jul-18	NE LANTAU	3	7.29	SUMMER	STANDARD36826	HKLR	P
3-Jul-18	NE LANTAU	2	13.36	SUMMER	STANDARD36826	HKLR	S
3-Jul-18	NE LANTAU	3	0.80	SUMMER	STANDARD36826	HKLR	S
9-Jul-18	NW LANTAU	2	4.62	SUMMER	STANDARD36826	HKLR	P
9-Jul-18	NW LANTAU	3	17.99	SUMMER	STANDARD36826	HKLR	P
9-Jul-18	NW LANTAU	4	0.98	SUMMER	STANDARD36826	HKLR	P
9-Jul-18	NW LANTAU	2	0.90	SUMMER	STANDARD36826	HKLR	S
9-Jul-18	NW LANTAU	3	7.21	SUMMER	STANDARD36826	HKLR	S
12-Jul-18	NW LANTAU	2	19.42	SUMMER	STANDARD36826	HKLR	P
12-Jul-18	NW LANTAU	3	15.11	SUMMER	STANDARD36826	HKLR	P
12-Jul-18	NW LANTAU	2	3.70	SUMMER	STANDARD36826	HKLR	S
12-Jul-18	NW LANTAU	3	7.80	SUMMER	STANDARD36826	HKLR	S
12-Jul-18	NW LANTAU	4	1.30	SUMMER	STANDARD36826	HKLR	S
12-Jul-18	NE LANTAU	2	15.65	SUMMER	STANDARD36826	HKLR	P
12-Jul-18	NE LANTAU	3	18.42	SUMMER	STANDARD36826	HKLR	P
12-Jul-18	NE LANTAU	2	10.66	SUMMER	STANDARD36826	HKLR	S
12-Jul-18	NE LANTAU	3	2.77	SUMMER	STANDARD36826	HKLR	S
20-Jul-18	NW LANTAU	1	1.50	SUMMER	STANDARD36826	HKLR	P
20-Jul-18	NW LANTAU	2	18.66	SUMMER	STANDARD36826	HKLR	P
20-Jul-18	NW LANTAU	3	4.88	SUMMER	STANDARD36826	HKLR	P
20-Jul-18	NW LANTAU	1	0.90	SUMMER	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
20-Jul-18	NW LANTAU	2	2.82	SUMMER	STANDARD36826	HKLR	S
20-Jul-18	NW LANTAU	3	4.14	SUMMER	STANDARD36826	HKLR	S
1-Aug-18	NW LANTAU	2	28.28	SUMMER	STANDARD36826	HKLR	P
1-Aug-18	NW LANTAU	3	5.46	SUMMER	STANDARD36826	HKLR	P
1-Aug-18	NW LANTAU	2	7.13	SUMMER	STANDARD36826	HKLR	S
1-Aug-18	NW LANTAU	3	5.60	SUMMER	STANDARD36826	HKLR	S
1-Aug-18	NE LANTAU	2	34.52	SUMMER	STANDARD36826	HKLR	P
1-Aug-18	NE LANTAU	1	0.70	SUMMER	STANDARD36826	HKLR	S
1-Aug-18	NE LANTAU	2	11.98	SUMMER	STANDARD36826	HKLR	S
8-Aug-18	NW LANTAU	1	3.60	SUMMER	STANDARD36826	HKLR	P
8-Aug-18	NW LANTAU	2	14.70	SUMMER	STANDARD36826	HKLR	P
8-Aug-18	NW LANTAU	3	7.46	SUMMER	STANDARD36826	HKLR	P
8-Aug-18	NW LANTAU	2	5.34	SUMMER	STANDARD36826	HKLR	S
8-Aug-18	NW LANTAU	3	2.30	SUMMER	STANDARD36826	HKLR	S
21-Aug-18	NW LANTAU	1	1.50	SUMMER	STANDARD36826	HKLR	P
21-Aug-18	NW LANTAU	2	33.50	SUMMER	STANDARD36826	HKLR	P
21-Aug-18	NW LANTAU	2	13.30	SUMMER	STANDARD36826	HKLR	S
21-Aug-18	NE LANTAU	1	4.50	SUMMER	STANDARD36826	HKLR	P
21-Aug-18	NE LANTAU	2	27.89	SUMMER	STANDARD36826	HKLR	P
21-Aug-18	NE LANTAU	3	2.50	SUMMER	STANDARD36826	HKLR	P
21-Aug-18	NE LANTAU	1	1.10	SUMMER	STANDARD36826	HKLR	S
21-Aug-18	NE LANTAU	2	12.41	SUMMER	STANDARD36826	HKLR	S
28-Aug-18	NW LANTAU	2	21.50	SUMMER	STANDARD36826	HKLR	P
28-Aug-18	NW LANTAU	3	2.69	SUMMER	STANDARD36826	HKLR	P
28-Aug-18	NW LANTAU	2	7.60	SUMMER	STANDARD36826	HKLR	S
28-Aug-18	NW LANTAU	3	2.45	SUMMER	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (June-August 2018)

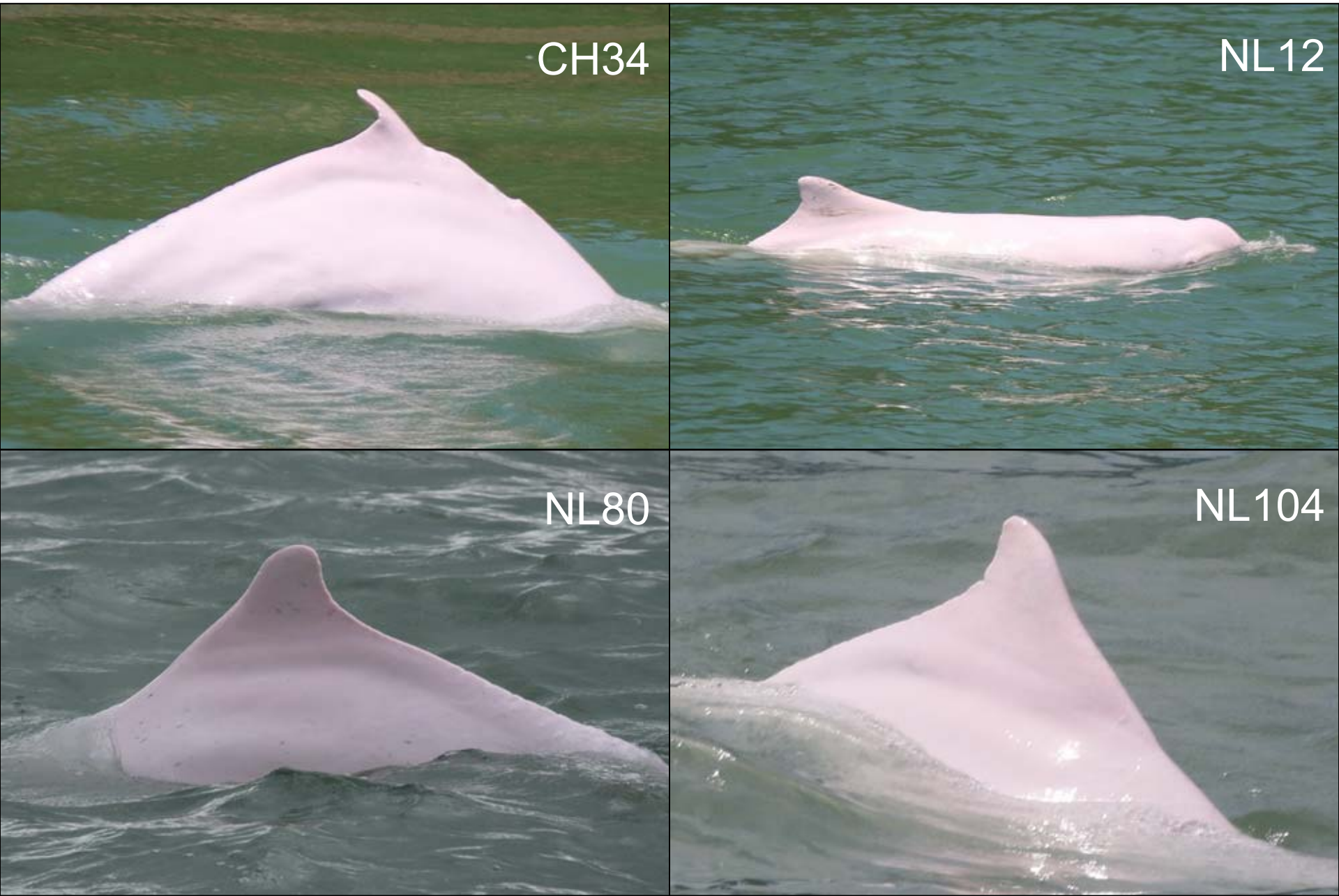
(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
13-Jun-18	1	1123	5	NW LANTAU	2	83	ON	HKLR	829917	806493	SUMMER	NONE	S
27-Jun-18	1	1144	2	NW LANTAU	2	73	ON	HKLR	826551	806435	SUMMER	NONE	P
12-Jul-18	1	1125	4	NW LANTAU	3	156	ON	HKLR	829186	806430	SUMMER	NONE	P
1-Aug-18	1	1009	1	NW LANTAU	2	55	ON	HKLR	814838	804712	SUMMER	NONE	P
1-Aug-18	2	1015	3	NW LANTAU	2	234	ON	HKLR	815923	804662	SUMMER	NONE	P
1-Aug-18	3	1131	1	NW LANTAU	2	79	ON	HKLR	831204	805435	SUMMER	NONE	S
21-Aug-18	1	1012	1	NW LANTAU	1	ND	OFF	HKLR	814661	804753	SUMMER	NONE	

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in June-August 2018

ID#	DATE	STG#	AREA
CH34	13/06/18	1	NW LANTAU
	27/06/18	1	NW LANTAU
NL12	27/06/18	1	NW LANTAU
	01/08/18	3	NW LANTAU
NL80	13/06/18	1	NW LANTAU
NL104	01/08/18	2	NW LANTAU
NL145	01/08/18	1	NW LANTAU
	21/08/18	1	NW LANTAU
NL202	13/06/18	1	NW LANTAU
NL233	12/07/18	1	NW LANTAU
NL301	13/06/18	1	NW LANTAU
NL302	01/08/18	2	NW LANTAU
NL317	12/07/18	1	NW LANTAU
NL327	01/08/18	2	NW LANTAU
NL329	12/07/18	1	NW LANTAU
WL188	12/07/18	1	NW LANTAU

Appendix IV. Thirteen individual dolphins that were identified during June to August 2018 under HKLR03 impact phase monitoring surveys

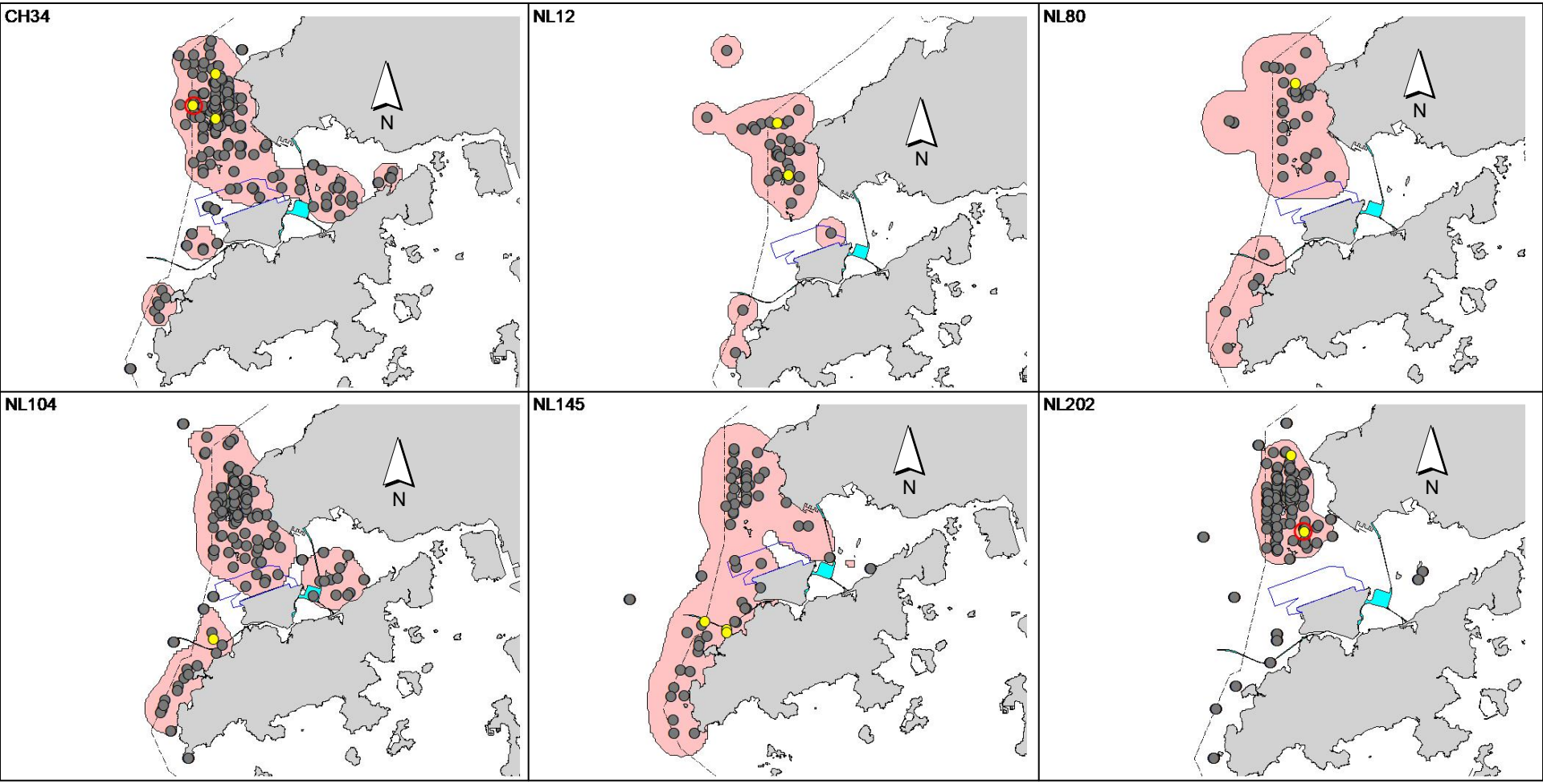


Appendix IV. (cont'd)

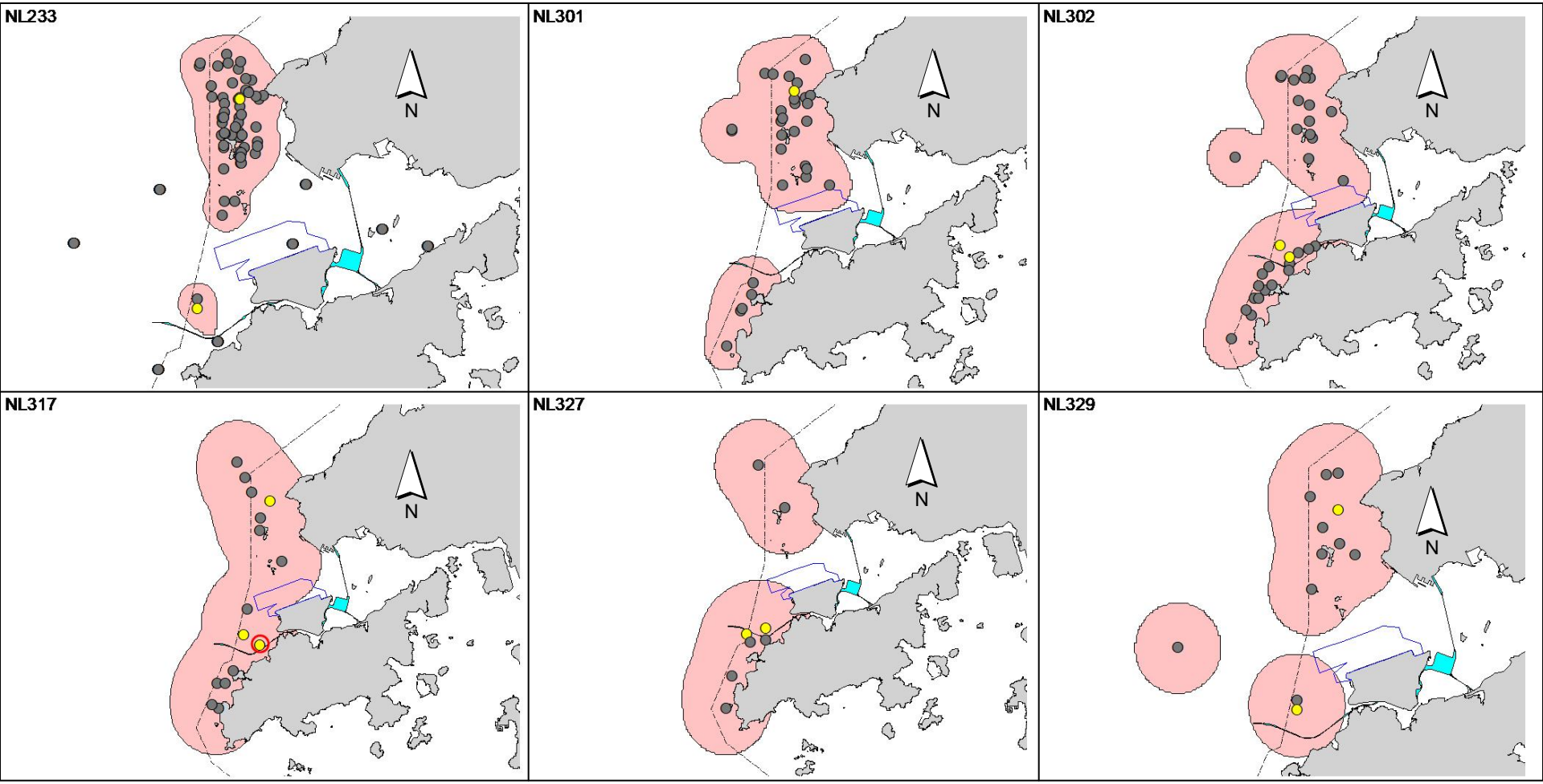
Appendix IV. (cont'd)

Appendix IV. (cont'd)

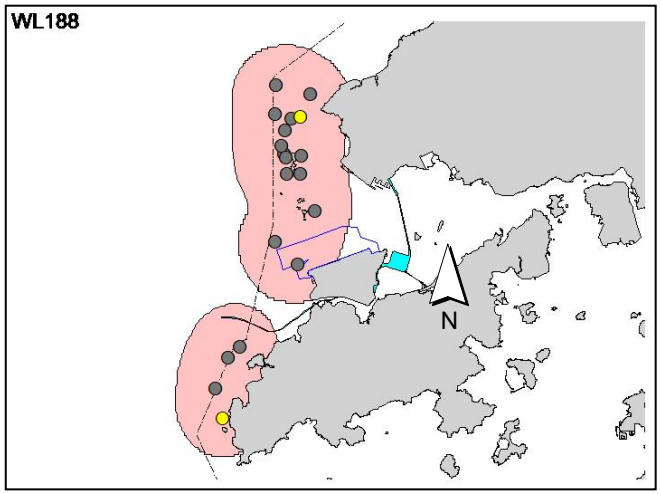
Appendix V. Ranging patterns (95% kernel ranges) of 13 individual dolphins that were sighted during HKLR03 impact phase monitoring period (note: yellow dots indicate sightings made in June-August 2018 during HKLR03 and HKLR09 monitoring surveys; the yellow dots with the red circles indicate the ones made during HKBCF monitoring surveys)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix J

Event Action Plan

Appendix J1 Event/ Action Plan for Air Quality

	ACTION			
EVENT	**ET** [(1)]	**IEC** [(1)]	**SOR** [(1)]	**Contractor**
Action Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method.	1. Notify Contractor.	1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	1. Identify the source. 2. Inform the IEC and the SOR. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Discuss with the IEC and the Contractor on remedial actions required. 6. If exceedance continues, arrange meeting with the IEC and the SOR. 7. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check the Contractor's working method. 3. Discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures properly implemented.	1. Submit proposals for remedial actions to IEC within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

	ACTION			
EVENT	**ET** [(1)]	**IEC** [(1)]	**SOR** [(1)]	**Contractor**
Limit Level				
1. Exceedance for one sample	1. Identify the source. 2. Inform the SOR and the DEP. 3. Repeat measurement to confirm finding. 4. Increase monitoring frequency to daily. 5. Assess effectiveness of Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. Discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervisor implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Ensure remedial measures are properly implemented.	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurements to confirm findings. 4. Increase monitoring frequency to daily. 5. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 6. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and	1. Discuss amongst the SOR, ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. Submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Resubmit proposals if problem still not under control. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

	the SOR informed of the results.
	8. If exceedance stops cease additional monitoring.

Appendix J2 Event/ Action Plan for Construction Noise

	ACTION			
EVENT	**ET**	**IEC**	**SOR**	**Contractor**
Action Level	1. Notify the IEC and the Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and the Contractor. 4. Discuss with the Contractor and formulate remedial measures. 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET. 2. Review the proposed remedial measures by the Contractor and advise the SOR accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented.	1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	1. Notify the IEC, the SOR, the DEP and the Contractor. 2. Identify the source. 3. Repeat measurement to confirm findings. 4. Increase monitoring frequency. 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented. 6. Inform the IEC, the SOR and the DEP the causes & actions taken for the exceedances. 7. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst the SOR, the ET and the Contractor on the potential remedial actions. 2. Review the Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SOR accordingly. 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. Require the Contractor to propose remedial measures for the analysed noise problem. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notification 3. Implement the agreed proposals 4. Resubmit proposals if problem still not under control 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

Appendix J3 Event/ Action Plan for Water Quality

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	1. Repeat in situ measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and SOR; 4. Check monitoring data, all plant, equipment and Contractor's working methods.	1. Check monitoring data submitted by ET and Contractor's working methods.	1. Confirm receipt of notification of non-compliance in writing; 2. Notify Contractor.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level;	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures.	1. Discuss with IEC on the proposed mitigation measures; 2. Ensure mitigation measures are properly implemented; 3. Assess the effectiveness of the implemented mitigation measures.	1. Inform the Supervising Officer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of additional mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 5. Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact;	1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor	1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice;

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

Appendix J4 Implementation of Event-Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	SOR	Contractor
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.

Event	ET Leader	IEC	SOR	Contractor
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary; 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures; 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly; 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures; 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures; 3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	1. Inform the ER/SOR and confirm notification of the non- compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures; 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary; 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

Appendix J5 Event and Action Plan on Dolphin Acoustic Behaviour

EVENT	ACTION			
	ET Leader	**IEC**	**SO**	**Contractor**
Action Level With the numerical values presented in *Table 5.7* of *Baseline Monitoring Report*, 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 *Table 5.8* of *Baseline Monitoring Report*), 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	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor;	1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented.	1. Inform the SO and confirm notification of the non- compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

EVENT	ACTION			
	ET Leader	**IEC**	**SO**	**Contractor**
Limit Level With the numerical values presented in *Table 5.7* of *Baseline Monitoring Report*, 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 *Table 5.8* of *Baseline Monitoring Report*), 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	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data to ascertain if differences are as a result of natural variation or seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SO and Contractor; 5. Check monitoring data; 6. Carry out audit to ensure all dolphin protective measures are implemented fully and additional measures be proposed if necessary 7. Discuss additional dolphin monitoring and any other potential mitigation measures (eg consider to temporarily stop relevant portion of construction activity) with the IEC and Contractor.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring with the ET and the Contractor; 3. Review proposals for additional monitoring and any other measures submitted by the Contractor and advise ER accordingly.	1. Discuss with the IEC the repeat monitoring and any other measures proposed by the ET; 2. Make agreement on measures to be implemented.	1. Inform the SO and confirm notification of the non- compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SO; 3. Implement the agreed measures.

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

Appendix K

Quarterly Summary of Waste Flow Table

Contract No. : HY/2012/07

Tuen Mun Chek Lap Kok Link – Southern Connection Viaduct Section

Monthly Summary Waste Flow Table for 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^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	4.288	0.405	0.137	-	4.151	-	-	-	-	-	-	211.060	-	2.540	0.084	-
Feb	2.662	0.241	0.826	-	1.836	-	-	-	-	-	-	184.880	-	12.280	0.028	-
Mar	5.916	0.289	2.503	-	1.536	1.877	-	-	-	-	1.200	307.670	-	30.190	0.161	-
Apr	6.103	0.352	0.852	-	1.274	3.977	-	-	-	-	-	349.640	-	19.150	0.112	-
May	4.492	0.616	1.333	0.148	1.676	1.336	-	-	-	-	-	438.160	-	-	0.056	-
Jun	2.801	0.763	1.134	-	1.600	0.067	-	-	-	-		669.690	-	9.570	0.035	-
SUB-TOTAL	**26.262**	**2.666**	**6.783**	**0.148**	**12.074**	**7.257**	**-**	**-**	**-**	**-**	**1.200**	**2161.100**	**-**	**73.730**	**0.476**	**-**
Jul	1.361	0.555	0.208	-	0.973	0.181	-	-	-	-	-	639.210	-	13.260	0.056	-
Aug	2.369	0.357	0.104	0.085	0.726	1.455	-	-	-	-	1.200	508.670	-	-	-	-
Sep	-	0.000	-	-	-	-	-	-	-	-			-			-
Oct	-	0.000	-	-	-	-	-	-	-	-			-			-
Nov	-	0.000	-	-	-	-	-	-	-	-			-			-
Dec	-	0.000	-	-	-	-	-	-	-	-			-			-
TOTAL	**29.992**	**3.577**	**7.095**	**0.233**	**13.772**	**8.893**	**-**	**-**	**-**	**-**	**2.400**	**3,308.980**	**-**	**86.990**	**0.532**	**-**

Notes :

1 - The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

2 - Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

3 - Broken concrete for recycling into aggregates.

4 - Assumed 5 kg per damaged water-filled barrier.

5 - Disposed as Public Fills includes Hard Rock and Large Broken Concrete.

Appendix L

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

Appendix L1 Cumulative Statistics on Exceedances

		Total No. recorded in this quarter	**Total No. recorded since project commencement**
1-Hr TSP	Action	0	0
	Limit	0	1
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	38	176
	Limit	4	19
Impact Dolphin Monitoring	Action	0	11
	Limit	1	13

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

Reporting Period	**Cumulative Statistics**		
	Complaints	Notifications of Summons	Successful Prosecutions
This quarter	2	0	0
Total No. received since project commencement	14	0	0

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	26 June 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_25 June 2018_ Bottom-depth DO_E_Station SR4a
0215660_25 June 2018_ Depth-averaged turbidity_E_Station SR4a

A total of two exceedances were recorded on 25 June 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

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.	**<u>Action Level Exceedance</u> 0215660_25 June 2018_ Bottom-depth DO_E_Station SR4a 0215660_25 June 2018_ Depth-averaged Turbidity_E_Station SR4a [Total No. of Exceedances = 2]**	
Date	25 June 2018 (Measured) 26 June 2018 (*In situ* results received by ERM) 04 July 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Bottom-depth Dissolved Oxygen (DO), Depth-averaged Turbidity	
Action Levels for DO	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Bottom-depth DO	3.6 mg/L
Action Levels for Turbidity	Depth-averaged Turbidity	27.5 NTU
Limit Levels for Turbidity	Depth-averaged Turbidity	47.0 NTU
Measured Levels	<u>Action Level Exceedance</u> 1. Mid-ebb at SR4a (Bottom-depth DO = 4.4mg/L); 2. Mid-ebb at SR4a (Depth-averaged Turbidity = 31.0 NTU)	
Works Undertaken (at the time of monitoring event)	No major marine works was undertaken under this Contract on 25 June 2018.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of bottom-depth DO and depth-averaged Turbidity are unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 25 June 2018. • Apart from DO exceedance at SR4a, levels of DO at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • DO levels were generally lower at water quality monitoring stations due to two possible reasons of natural variation: 1. Natural ability for water to hold dissolved oxygen is reduced due to higher water temperature in summer months. 2. The higher Salinity recorded at the bottom level of SR4a was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level. • Apart from SR4a, depth-averaged Turbidity 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. • Depth-averaged Suspended Solids (SS) 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. • No effluent discharge from platforms and work areas was observed and no malpractice was observed during the sampling process on 25 June 2018.
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 25 June 2018 and locations of water quality monitoring stations are attached. Site photo record on 25 June 2018 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	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Surface	1	28.8	7.9	20.8	5.7	5.3	6.4	10.2	4.5	8.1
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Surface	2	28.8	8.0	20.8	5.8		7.0		4.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Middle	1	28.3	7.9	25.4	4.8		9.8		9.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Middle	2	28.3	8.0	25.3	4.8		9.2		9.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Bottom	1	27.8	7.9	28.1	4.6	4.7	14.6		9.9	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)5	10:50	Bottom	2	27.9	7.9	28.0	4.7		14.4		10.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Surface	1	28.9	8.0	16.6	6.2	5.9	4.1	7.2	5.0	5.7
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Surface	2	28.9	8.1	16.5	6.3		4.7		5.8	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Middle	1	29.0	8.0	19.0	5.5		2.6		6.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Middle	2	28.9	8.0	18.9	5.6		3.3		6.5	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Bottom	1	28.8	8.0	22.6	4.7	4.8	13.3		5.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	CS(Mf)3(N)	12:17	Bottom	2	28.7	8.0	22.4	4.8		15.2		5.6	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Surface	1	28.5	7.9	20.1	5.8	5.6	7.4	9.1	6.0	7.1
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Surface	2	28.6	7.9	20.1	5.9		7.3		5.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Middle	1	28.5	7.9	22.7	5.2		10.3			
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Middle	2	28.6	7.9	22.6	5.3		10.9			
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Bottom	1	28.4	7.9	23.7	5.2	5.3	9.2		8.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)16	11:30	Bottom	2	28.5	8.0	23.7	5.3		9.3		9.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Surface	1	28.7	7.9	21.0	5.0	5.1	10.0	31.0	7.8	9.8
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Surface	2	28.8	7.9	20.9	5.1		10.5		8.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Bottom	1	28.5	7.9	23.9	4.4	4.4	56.9		11.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4a	11:42	Bottom	2	28.6	7.9	23.8	4.4		46.5		12.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Surface	1	28.7	7.8	18.2	5.7	5.7	10.5	14.2	8.0	9.0
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Surface	2	28.8	7.9	18.1	5.7		10.5		7.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Bottom	1	28.7	7.9	19.6	5.4	5.4	18.1		10.1	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	SR4(N)	11:51	Bottom	2	28.8	7.9	19.5	5.4		17.8		10.6	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Surface	1	28.7	7.8	20.5	5.6	5.6	7.4	9.3	6.5	7.6
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Surface	2	28.8	7.9	20.3	5.6		7.1		5.9	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Bottom	1	28.6	7.8	21.4	5.0	5.0	11.5		8.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS8	12:01	Bottom	2	28.7	7.9	21.2	5.0		11.1		9.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Surface	1	28.7	7.9	19.7	6.0	6.0	5.4	5.3	4.8	6.8
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Surface	2	28.8	8.0	19.6	6.0		5.5		5.8	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Bottom	1	28.7	7.9	19.7	6.0	6.0	5.1		8.4	
TMCLKL	HY/2012/07	2018-06-25	Mid-Ebb	IS(Mf)9	12:14	Bottom	2	28.8	8.0	19.6	6.0		5.2		8.0	

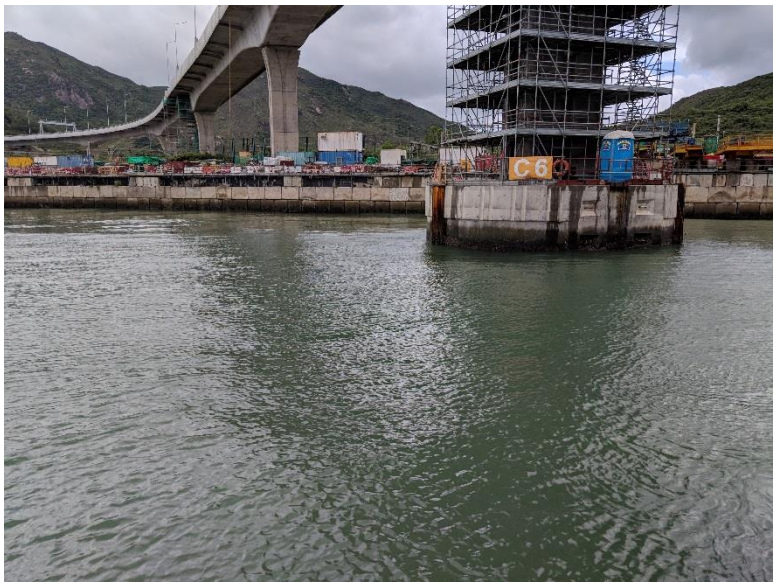
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Surface	1	28.8	8.0	19.5	6.0	5.4	3.5	6.5	4.0	4.7
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Surface	2	28.8	7.9	19.6	6.1		2.9		4.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Middle	1	28.3	8.0	25.6	4.7		7.5		4.5	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Middle	2	28.3	7.9	25.7	4.7		6.9		4.6	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Bottom	1	28.2	8.0	26.7	4.7	4.7	9.1		5.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)5	18:20	Bottom	2	28.1	7.9	26.8	4.7		8.8		4.8	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Surface	1	29.3	8.0	12.1	6.4	6.1	4.1	5.2	3.8	3.9
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Surface	2	29.3	8.0	12.1	6.4		4.1		3.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Middle	1	29.1	8.0	15.2	5.7		5.5		3.9	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Middle	2	29.1	8.0	15.2	5.7		5.5		3.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Bottom	1	29.0	8.0	18.4	5.2	5.2	5.9		3.8	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	CS(Mf)3(N)	17:27	Bottom	2	29.0	8.0	18.4	5.2		5.9		4.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Surface	1	28.9	8.0	19.4	6.4	6.4	4.7	7.1	9.7	7.0
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Surface	2	28.8	7.9	19.5	6.3		4.4		10.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Bottom	1	28.8	8.0	21.2	5.7	5.7	10.0		4.1	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)16	17:47	Bottom	2	28.7	7.9	21.3	5.7		9.4		4.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Surface	1	29.0	8.0	19.6	6.3	6.3	9.3	11.9	7.6	8.5
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Surface	2	28.9	7.9	19.8	6.3		8.2		7.3	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Bottom	1	29.0	8.0	20.5	5.9	5.9	15.6		9.2	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4a	17:36	Bottom	2	28.9	7.9	20.5	5.9		14.4		9.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Surface	1	29.0	8.0	20.5	6.1	6.1	15.2	14.9	11.9	12.5
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Surface	2	28.9	7.9	20.7	6.1		14.8		12.6	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Bottom	1	29.0	8.0	20.5	6.1	6.1	14.9		13.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	SR4(N)	17:29	Bottom	2	28.9	7.9	20.7	6.1		14.5		12.4	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Surface	1	29.0	8.0	20.0	6.4	6.4	8.9	14.4	6.7	8.0
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Surface	2	28.9	7.9	20.1	6.3		8.7		7.5	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Middle	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Middle	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Bottom	1	29.0	8.0	20.7	5.9	5.9	20.7		8.7	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS8	17:22	Bottom	2	28.9	7.9	20.8	5.9		19.3		9.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Surface	1					5.9		10.7		5.9
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Surface	2									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Middle	1	28.9	7.9	20.8	5.9		11.0		5.8	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Middle	2	28.8	7.9	20.9	5.9		10.3		6.0	
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Bottom	1									
TMCLKL	HY/2012/07	2018-06-25	Mid-Flood	IS(Mf)9	17:11	Bottom	2									

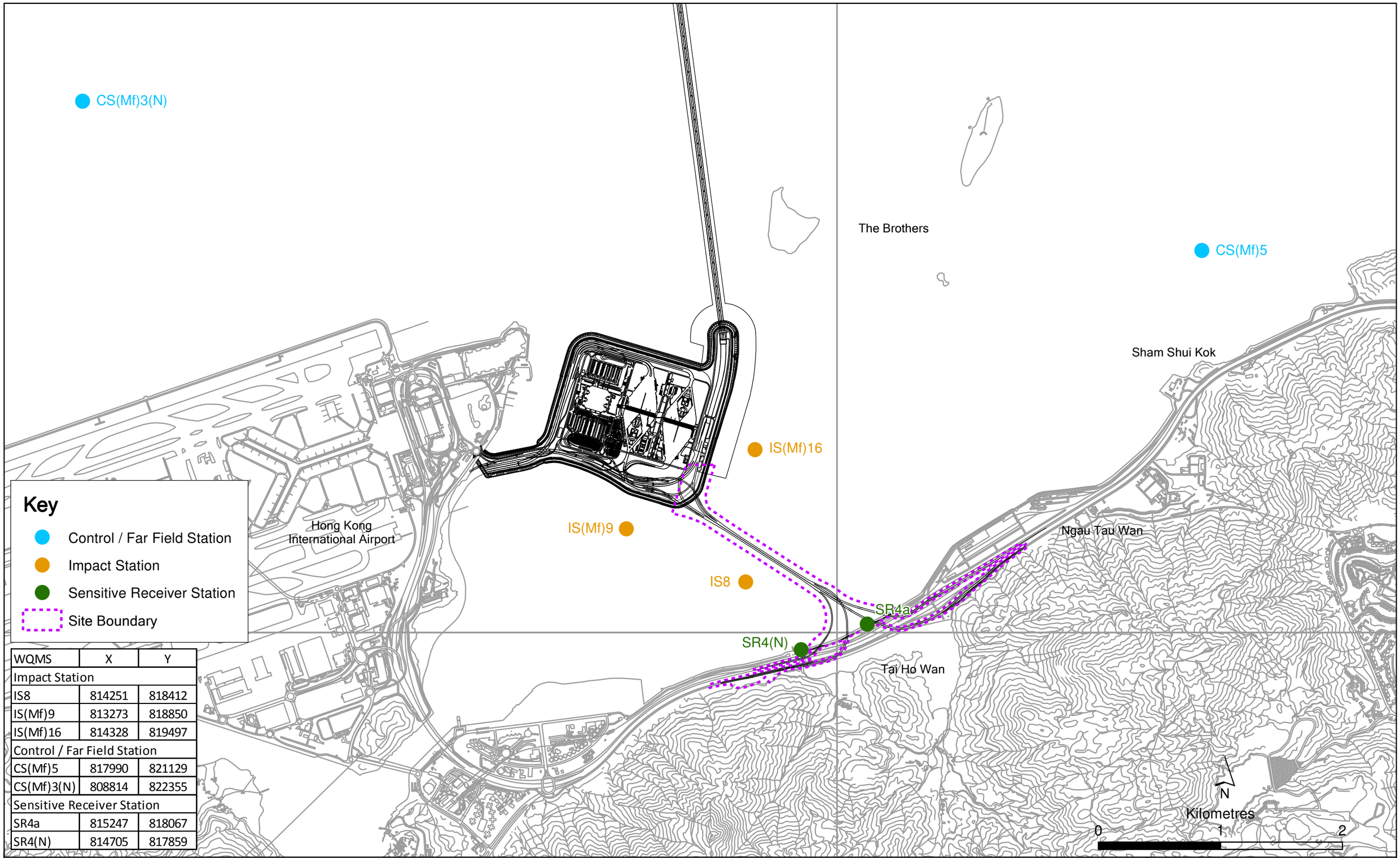
Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at SR4a on 25 June 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	3 July 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_29 June 2018_ Bottom-depth DO_E_Station SR4a

A total of one exceedance was recorded on 29 June 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_29 June 2018_ Bottom-depth DO_F_Station SR4a** **[Total No. of Exceedances = 1]**	
Date	29 June 2018 (Measured) 30 June 2018 (*In situ* results received by ERM) 09 July 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Bottom-depth Dissolved Oxygen (DO)	
Action Levels for DO	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-flood at SR4a (Bottom-depth DO = 4.4mg/L).	
Works Undertaken (at the time of monitoring event)	No major marine works was undertaken under this Contract on 29 June 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of bottom-depth DO is unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 29 June 2018. • Apart from DO exceedance at SR4a, levels of DO at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • The DO pattern at SR4a was similar to the control station where the bottom-depth DO levels were generally lower. DO levels were generally lower at water quality monitoring stations due to reduce in natural ability for water to hold dissolved oxygen under higher water temperature in summer months. In addition, lower bottom-depth DO levels may possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 29 June 2018 and locations of water quality monitoring stations are attached. Site photo record on 29 June 2018 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	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Surface	1	29.4	7.9	17.6	5.9	5.4	10.4	10.8	10.6	12.2
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Surface	2	29.6	7.9	17.4	5.9		10.2		11.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Middle	1	28.6	7.9	21.2	4.9		12.0		12.0	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Middle	2	28.7	7.9	21.1	4.9		11.4		11.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Bottom	1	27.0	7.9	27.3	4.1	4.1	10.7		13.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)5	13:11	Bottom	2	27.1	7.9	27.0	4.0		10.2		14.8	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Surface	1	30.2	8.0	14.0	6.7	6.0	8.1	13.5	4.7	4.8
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Surface	2	30.2	8.1	14.1	6.6		8.0		5.2	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Middle	1	29.2	8.0	17.8	5.3		11.8		5.2	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Middle	2	29.2	8.0	17.9	5.3		11.4		5.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Bottom	1	28.6	8.0	21.7	5.1	5.1	20.5		4.0	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	CS(Mf)3(N)	14:18	Bottom	2	28.6	8.0	21.8	5.1		21.3		4.6	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Surface	1	29.4	8.0	19.3	6.3	6.3	9.4	7.1	11.3	10.5
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Surface	2	29.5	8.0	19.1	6.3		9.4		10.6	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Bottom	1	28.6	7.9	21.4	5.3	5.3	4.9		10.0	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)16	13:50	Bottom	2	28.7	7.9	21.4	5.2		4.6		10.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Surface	1	29.9	8.0	17.6	6.6	6.6	9.9	16.3	11.7	11.9
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Surface	2	30.0	8.0	17.4	6.6		9.9		11.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Bottom	1	28.8	7.9	21.0	4.8	4.8	25.0		12.0	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4a	13:58	Bottom	2	28.9	7.9	20.8	4.7		20.4		12.7	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Surface	1	30.7	8.2	16.4	9.7	9.7	13.5	15.2	10.4	10.1
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Surface	2	30.8	8.2	16.3	9.6		13.1		9.9	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Bottom	1	30.5	8.2	16.5	9.2	9.1	17.3		10.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	SR4(N)	14:07	Bottom	2	30.6	8.2	16.4	9.0		17.0		9.8	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Surface	1	30.2	8.1	17.7	8.1	8.1	9.0	12.8	11.8	13.3
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Surface	2	30.3	8.1	17.6	8.1		9.0		12.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Bottom	1	29.6	8.1	18.1	6.9	7.0	16.6		14.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS8	14:16	Bottom	2	29.7	8.1	18.0	7.0		16.6		15.0	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Surface	1	30.2	8.2	17.2	9.2	9.2	5.4	6.1	5.6	5.4
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Surface	2	30.3	8.2	17.0	9.1		5.4		5.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Bottom	1	29.9	8.2	17.5	8.9	8.9	6.8		5.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Ebb	IS(Mf)9	14:30	Bottom	2	29.9	8.2	17.4	8.8		6.8		5.6	

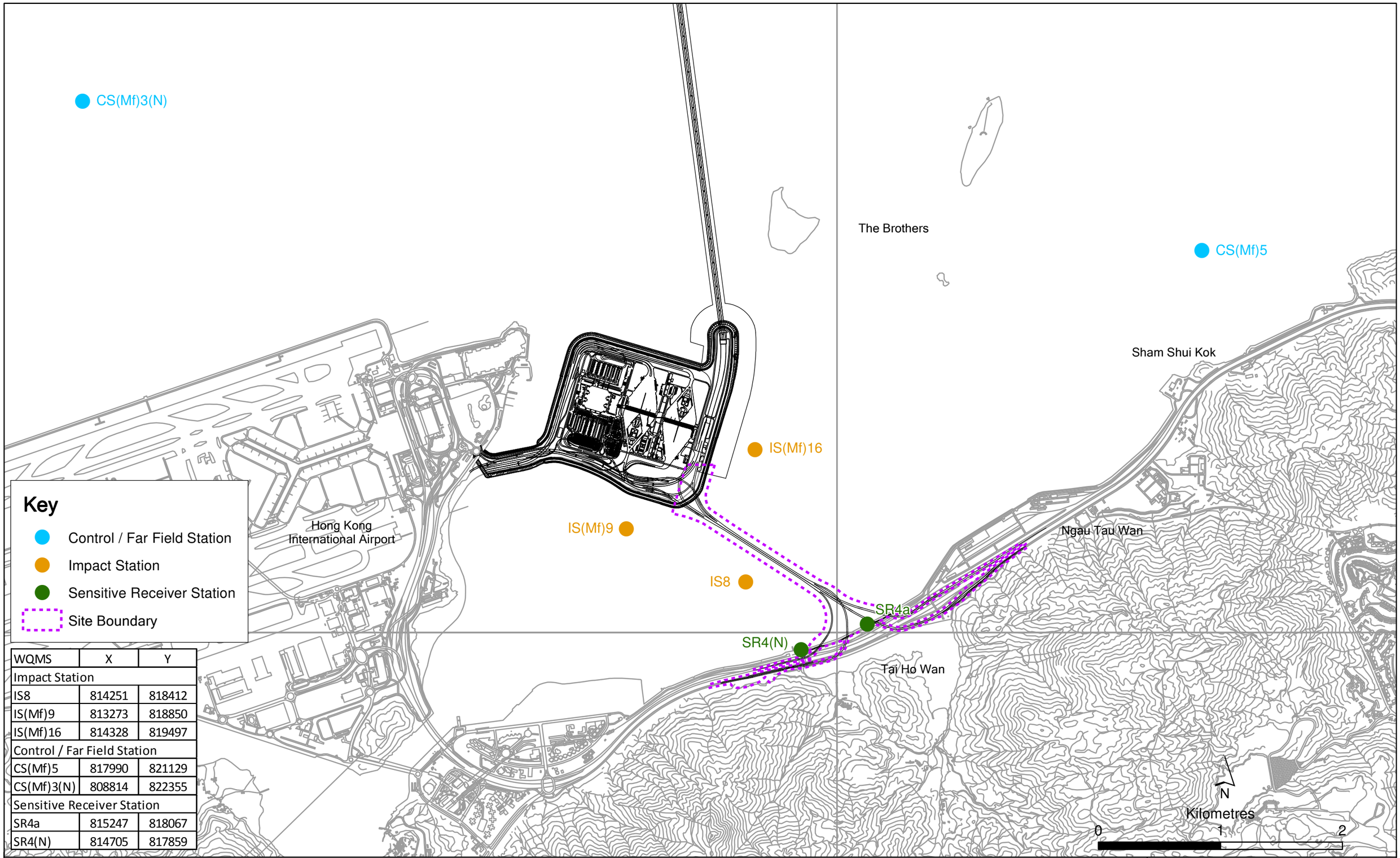
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Surface	1	29.6	7.9	16.5	5.8	5.1	3.7	10.8	5.8	8.4
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Surface	2	29.7	8.0	16.3	5.8		4.2		7.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Middle	1	27.8	7.9	22.9	4.4		6.4		8.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Middle	2	27.9	7.9	22.7	4.3		7.3		8.5	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Bottom	1	27.1	7.9	27.0	4.0	4.0	20.9		10.6	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)5	21:13	Bottom	2	27.2	7.9	26.7	3.9		22.0		9.5	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Surface	1	30.4	8.0	9.9	6.9	6.8	11.9	13.5	8.9	9.6
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Surface	2	30.4	8.0	9.7	7.0		11.6		9.2	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Middle	1	30.5	8.0	11.6	6.6		13.8		10.8	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Middle	2	30.5	7.9	11.4	6.6		12.7		10.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Bottom	1	29.8	8.0	14.1	5.9	5.9	15.3		9.5	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	CS(Mf)3(N)	20:09	Bottom	2	29.8	7.9	13.9	5.9		15.8		8.9	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Surface	1	29.6	8.1	17.8	6.8	6.8	11.2	14.4	10.3	13.2
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Surface	2	29.7	8.1	17.7	6.8		11.8		10.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Bottom	1	29.2	8.0	19.1	5.9	5.9	16.4		15.9	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)16	20:43	Bottom	2	29.3	8.0	18.9	5.9		18.1		16.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Surface	1	29.8	8.0	16.4	6.8	6.9	8.2	11.7	10.1	14.4
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Surface	2	29.9	8.1	16.3	6.9		9.1		10.5	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Bottom	1	28.8	7.9	21.1	4.4	4.4	15.3		18.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4a	20:33	Bottom	2	28.9	7.9	20.9	4.4		14.1		18.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Surface	1	29.9	8.2	17.3	8.3	8.3	15.6	16.4	13.8	14.3
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Surface	2	30.0	8.2	17.1	8.2		17.1		14.8	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Bottom	1	29.9	8.2	17.3	8.3	8.3	15.8		14.3	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	SR4(N)	20:26	Bottom	2	30.1	8.2	17.1	8.2		17.1		14.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Surface	1	29.6	8.1	17.1	6.8	6.8	12.2	14.0	10.2	12.4
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Surface	2	29.7	8.1	16.9	6.8		13.1		10.7	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Middle	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Middle	2									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Bottom	1	29.7	8.0	17.7	7.1	7.1	15.3		14.4	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS8	20:19	Bottom	2	29.8	8.0	17.4	7.1		15.2		14.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Surface	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Surface	2					9.8				
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Middle	1	30.1	8.3	17.8	9.8		9.0	9.4	15.0	14.6
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Middle	2	30.3	8.3	17.6	9.8		9.8		14.1	
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Bottom	1									
TMCLKL	HY/2012/07	2018-06-29	Mid-Flood	IS(Mf)9	20:08	Bottom	2									

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Flood at SR4a on 29 June 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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18 Tak Fung Street,
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Telephone: (852) 2271 3113
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E-mail: jovy.tam@erm.com

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	5 July 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_04 July 2018_ Bottom-depth DO_E_Station SR4a

A total of one exceedance was recorded on 04 July 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

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.	**<u>Action Level Exceedance</u> 0215660_04 July 2018_ Bottom-depth DO_E_Station SR4a [Total No. of Exceedances = 1]**	
Date	4 July 2018 (Measured) 5 July 2018 (*In situ* results received by ERM) 10 July 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Bottom-depth Dissolved Oxygen (DO)	
Action Levels for DO	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Bottom-depth DO	3.6 mg/L
Measured Levels	<u>Action Level Exceedance</u> 1. Mid-ebb at SR4a (Bottom-depth DO = 3.9mg/L)	
Works Undertaken (at the time of monitoring event)	No major marine works was undertaken under this Contract on 4 July 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of bottom-depth DO is unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 4 July 2018. • Apart from DO exceedance at SR4a, levels of DO at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • DO levels were generally lower at water quality monitoring stations due to two possible reasons of natural variation: 1. Natural ability for water to hold dissolved oxygen is reduced due to higher water temperature in summer months. 2. The higher Salinity recorded at the bottom level of SR4a was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 4 July 2018 and locations of water quality monitoring stations are attached. Site photo record on 4 July 2018 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	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Surface	1	29.0	7.9	17.8	5.9	5.8	7.9	7.2	6.5	6.8
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Surface	2	28.9	7.9	18.0	5.9		6.7		6.1	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Middle	1	28.8	7.9	18.3	5.7		7.2		7.7	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Middle	2	28.7	7.9	18.5	5.7		7.6		7.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Bottom	1	28.5	7.9	19.6	5.4	5.4	7.6		6.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)5	16:24	Bottom	2	28.4	7.9	19.9	5.4		6.1		6.0	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Surface	1	29.6	8.0	14.9	6.1	5.9	4.2	3.9	5.6	6.7
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Surface	2	29.5	8.1	14.8	6.4		4.4		6.2	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Middle	1	28.7	8.0	16.6	5.5		3.6		7.6	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Middle	2	28.6	8.0	16.6	5.7		3.8		6.3	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Bottom	1	28.8	7.9	21.4	4.4	4.6	3.5		6.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	CS(Mf)3(N)	15:20	Bottom	2	28.0	7.9	21.6	4.7		3.7		7.6	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Surface	1	28.9	7.8	18.7	5.4	5.4	8.2	6.6	6.9	7.5
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Surface	2	28.8	7.9	18.8	5.4		7.2		6.1	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Bottom	1	28.2	7.8	20.1	5.0	5.0	5.8		8.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)16	16:02	Bottom	2	28.1	7.9	20.3	5.0		5.3		8.3	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Surface	1	29.3	7.9	17.9	5.8	5.8	5.5	12.8	6.6	7.3
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Surface	2	29.2	7.9	18.1	5.8		4.6		6.9	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Bottom	1	28.4	7.7	20.4	3.9	3.9	21.1		7.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4a	15:51	Bottom	2	28.2	7.8	20.6	3.9		20.1		8.1	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Surface	1	29.2	7.8	18.0	5.7	5.7	6.6	5.6	7.2	7.5
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Surface	2	29.1	7.9	18.2	5.7		5.9		7.7	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Bottom	1	28.7	7.8	18.5	5.5	5.5	5.3		7.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	SR4(N)	15:47	Bottom	2	28.5	7.9	18.6	5.5		4.6		7.3	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Surface	1	29.8	7.9	17.7	6.3	6.3	5.7	9.4	9.4	9.4
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Surface	2	29.7	8.0	17.9	6.3		4.9		8.6	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Bottom	1	28.8	7.8	18.7	5.2	5.3	14.0		9.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS8	15:41	Bottom	2	28.6	7.9	18.9	5.3		13.0		9.9	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Surface	1	29.6	7.9	17.8	6.5	6.5	4.0	5.7	4.6	5.0
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Surface	2	29.5	8.0	18.0	6.5		3.7		5.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Bottom	1	29.7	7.9	18.4	6.4	6.5	7.6		5.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Ebb	IS(Mf)9	15:34	Bottom	2	29.6	8.0	18.6	6.5		7.6		4.7	

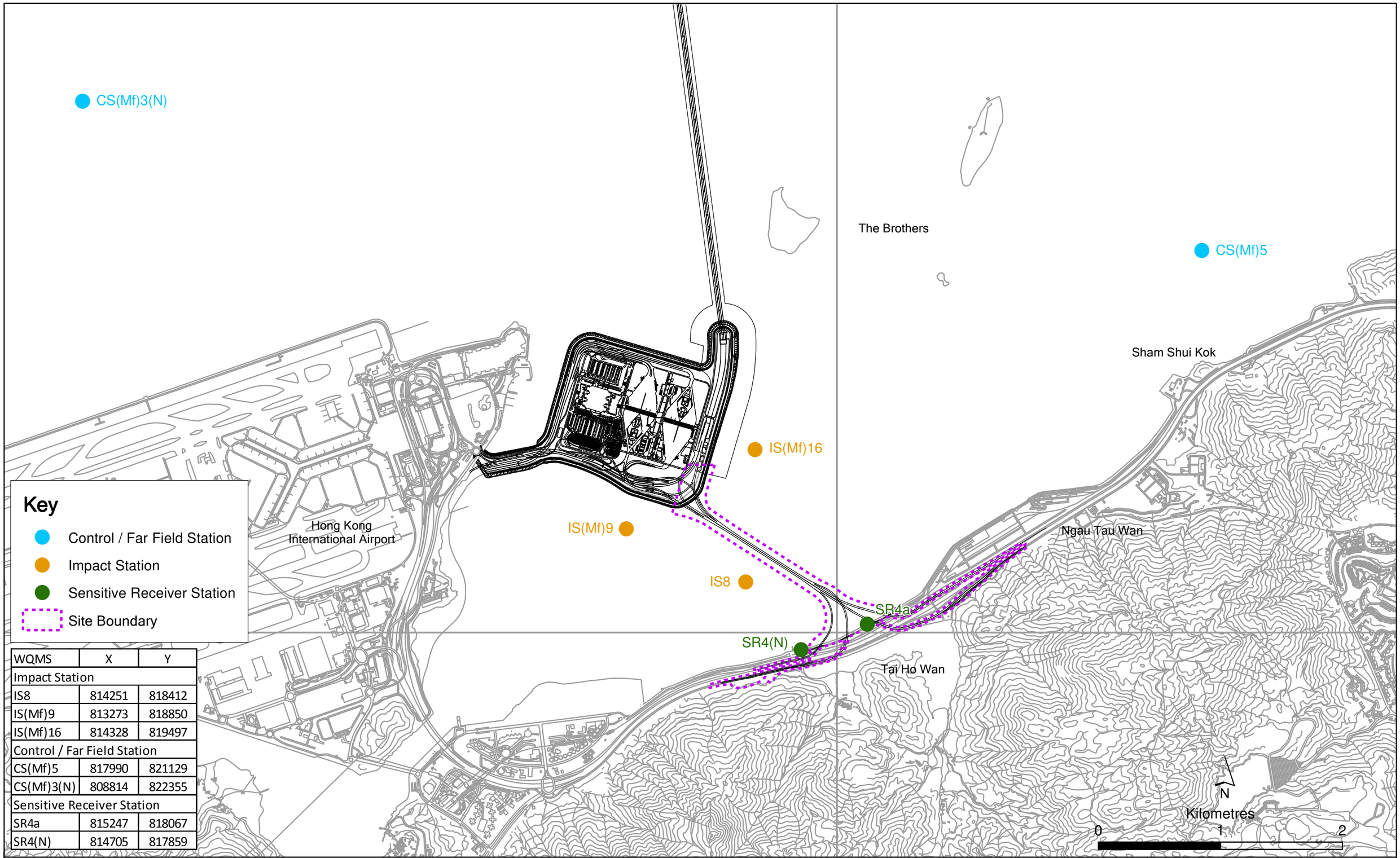
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Surface	1	28.6	7.8	16.4	5.6	5.3	4.6	5.4	6.7	6.5
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Surface	2	28.7	7.8	16.3	5.6		5.5		5.9	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Middle	1	28.2	7.9	19.5	5.0		3.8		7.0	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Middle	2	28.3	7.8	19.4	5.0		4.3		6.3	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Bottom	1	26.8	7.8	26.4	4.1	4.1	7.0		6.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)5	9:31	Bottom	2	26.9	7.8	26.2	4.1		7.3		6.3	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Surface	1	29.0	8.0	14.6	6.0	5.8	4.1	6.7	5.1	5.4
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Surface	2	29.1	7.9	14.8	5.8		4.6		4.6	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Middle	1	28.7	8.0	15.6	5.7		8.9		5.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Middle	2	28.8	7.9	15.8	5.5		8.0		5.1	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Bottom	1	28.9	8.0	17.9	5.3	5.2	7.5		6.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	CS(Mf)3(N)	10:38	Bottom	2	28.9	7.9	18.0	5.0		7.1		5.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Surface	1	28.5	7.9	18.0	5.6	5.6	4.4	5.5	6.8	7.2
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Surface	2	28.7	7.9	17.8	5.6		5.0		7.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Bottom	1	28.4	7.9	18.9	5.2	5.2	5.8		6.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)16	9:57	Bottom	2	28.5	7.8	18.8	5.2		6.6		7.9	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Surface	1	28.6	7.9	17.6	5.6	5.6	6.3	12.1	8.0	8.9
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Surface	2	28.7	7.9	17.4	5.6		6.7		9.0	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Bottom	1	28.4	7.8	17.9	5.3	5.3	16.2		8.9	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4a	10:06	Bottom	2	28.5	7.8	17.7	5.3		19.0		9.5	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Surface	1	28.5	7.9	17.8	5.4	5.4	5.7	5.7	6.1	6.4
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Surface	2	28.7	7.8	17.6	5.4		6.1		6.1	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Bottom	1	28.5	7.9	18.6	5.4	5.4	5.3		6.7	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	SR4(N)	10:11	Bottom	2	28.6	7.8	18.3	5.4		5.5		6.8	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Surface	1	28.7	7.9	17.1	5.6	5.7	5.3	10.2	5.8	6.3
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Surface	2	28.8	7.9	16.9	5.7		5.5		5.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Bottom	1	28.4	7.8	19.7	4.9	4.9	15.3		6.7	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS8	10:20	Bottom	2	28.5	7.8	19.3	4.9		14.6		7.2	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Surface	1	28.8	7.9	17.2	5.8	5.8	5.0	5.6	6.1	6.4
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Surface	2	28.9	7.9	17.0	5.8		5.4		6.4	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Middle	1									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Middle	2									
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Bottom	1	28.7	7.9	17.4	5.7	5.7	5.8		6.0	
TMCLKL	HY/2012/07	2018-07-04	Mid-Flood	IS(Mf)9	10:27	Bottom	2	28.8	7.9	17.2	5.7		6.2		7.2	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at SR4a on 4 July 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	10 July 2018

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_09 July 2018_ Bottom-depth DO_E_Station IS(Mf)16
0215660_09 July 2018_ Bottom-depth DO_E_Station SR4a
0215660_09 July 2018_ Bottom-depth DO_E_Station IS8

Limit Level Exceedance
0215660_09 July 2018_ Bottom-depth DO_F_Station SR4a

A total of four exceedances were recorded on 09 July 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

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.	**Action Level Exceedances** **0215660_09 July 2018_ Bottom-depth DO_E_Station IS(Mf)16** **0215660_09 July 2018_ Bottom-depth DO_E_Station SR4a** **0215660_09 July 2018_ Bottom-depth DO_E_Station IS8** **0215660_09 July 2018_ Bottom-depth DO_F_Station SR4a** **[Total No. of Exceedances = 4]**	
Date	09 July 2018 (Measured) 10 July 2018 (*In situ* results received by ERM) 16 July 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Bottom-depth Dissolved Oxygen (DO)	
Action Levels for DO	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)16 (Bottom-depth DO = 4.3mg/L); 2. Mid-ebb at SR4a (Bottom-depth DO = 3.6mg/L); 3. Mid-ebb at IS8 (Bottom-depth DO = 4.3mg/L); 4. Mid-flood at SR4a (Bottom-depth DO = 3.4mg/L).	
Works Undertaken (at the time of monitoring event)	No major marine works was undertaken under this Contract on 09 July 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of bottom-depth DO is unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 09 July 2018. • Apart from the DO exceedances at the bottom level, surface and middle levels of DO at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • The DO patterns at SR4a, IS(Mf)16 and IS8 were similar to the control station where the bottom-depth DO levels were generally lower. DO levels were generally lower at water quality monitoring stations due to reduce in natural ability for water to hold dissolved oxygen under higher water temperature in summer months. In addition, lower bottom-depth DO levels may possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 09 July 2018 and locations of water quality monitoring stations are attached. Site photo record on 09 July 2018 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	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Surface	1	27.5	8.2	22.4	5.4	4.4	3.0	3.7	4.8	5.0
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Surface	2	27.5	8.1	22.5	5.5		2.2		4.4	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Middle	1	25.3	8.0	29.6	3.4		4.3		4.5	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Middle	2	25.3	8.0	29.8	3.4		3.0		3.7	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Bottom	1	24.8	8.0	30.9	3.0	3.0	4.8		6.5	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)5	9:00	Bottom	2	24.8	8.0	31.2	2.9		5.0		5.8	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Surface	1	28.5	8.1	17.4	6.2	4.4	1.8	6.2	3.4	4.9
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Surface	2	28.3	8.0	17.4	6.1		1.5		3.8	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Middle	1	26.8	7.9	26.0	2.5		8.9		5.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Middle	2	26.7	7.8	26.2	2.6		8.0		5.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Bottom	1	26.7	7.9	26.3	2.5	2.6	9.0		5.3	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	CS(Mf)3(N)	10:07	Bottom	2	26.6	7.8	26.6	2.6		8.0		6.3	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Surface	1	28.5	8.4	19.6	7.5	7.6	4.9	4.9	3.8	4.9
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Surface	2	28.5	8.3	19.7	7.6		3.5		4.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Middle	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Bottom	1	26.1	8.1	26.9	4.4	4.3	5.5		5.1	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)16	9:37	Bottom	2	26.2	8.0	27.2	4.2		5.5		5.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Surface	1	28.5	8.2	19.9	6.1	6.2	4.6	8.6	7.4	9.5
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Surface	2	28.5	8.1	20.1	6.2		3.4		6.4	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Middle	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Bottom	1	26.6	8.0	26.1	3.6	3.6	13.2		12.2	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4a	9:46	Bottom	2	26.6	7.9	26.3	3.5		13.0		11.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Surface	1	28.9	8.2	16.8	6.9	6.9	4.7	4.5	5.4	4.9
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Surface	2	28.9	8.1	16.9	6.9		4.3		4.5	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Middle	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Bottom	1	28.7	8.2	18.7	6.4	6.4	4.7		4.7	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	SR4(N)	9:52	Bottom	2	28.8	8.2	19.0	6.4		4.4		4.8	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Surface	1	28.2	8.1	20.8	5.3	5.3	5.0	5.8	7.0	7.2
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Surface	2	28.2	8.1	20.8	5.3		3.8		6.7	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Middle	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Bottom	1	27.5	8.1	22.8	4.3	4.3	7.2		7.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS8	9:59	Bottom	2	27.6	8.0	23.0	4.3		7.3		7.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Surface	1					8.3		5.2		5.5
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Surface	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Middle	1	29.1	8.4	18.2	8.3		5.0		5.4	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Middle	2	29.1	8.3	18.3	8.2		5.3		5.5	
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Bottom	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Ebb	IS(Mf)9	10:05	Bottom	2									

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	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Surface	1	27.8	8.4	23.7	7.6		3.6		9.4	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Surface	2	27.8	8.3	23.8	7.7	5.4	3.3		10.1	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Middle	1	25.3	8.0	29.5	3.1		3.4	6.5	9.8	9.8
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Middle	2	25.3	7.9	29.7	3.2		3.9		10.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Bottom	1	24.7	8.0	31.3	2.9	2.9	12.4		9.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)5	16:13	Bottom	2	24.7	7.9	31.5	2.8		12.3		9.7	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Surface	1	28.8	8.0	17.7	6.8		3.9		3.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Surface	2	29.0	8.2	17.5	6.8	6.7	3.9		3.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Middle	1	28.8	8.0	17.7	6.5		8.0	5.2	3.0	3.5
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Middle	2	28.9	8.1	17.6	6.6		8.2		3.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Bottom	1	27.4	7.9	22.4	4.6	4.6	3.6		3.2	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	CS(Mf)3(N)	15:01	Bottom	2	27.6	8.0	22.1	4.6		3.6		3.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Surface	1	28.8	8.6	20.8	10.3		1.3		9.1	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Surface	2	28.8	8.5	21.0	10.5	10.4	3.4		8.4	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Middle	1							4.7		8.3
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Bottom	1	27.6	8.2	23.4	5.9	5.9	7.1		7.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)16	15:41	Bottom	2	27.6	8.1	23.6	5.8		7.1		8.1	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Surface	1	28.2	8.2	22.1	6.0		7.6		7.3	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Surface	2	28.2	8.1	22.2	6.0	6.0	6.1		6.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Middle	1							10.2		7.5
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Bottom	1	26.5	8.0	26.6	3.4	3.4	13.6		8.1	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4a	15:30	Bottom	2	26.6	7.9	26.8	3.3		13.3		7.7	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Surface	1	28.2	8.2	21.8	6.4		5.6		6.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Surface	2	28.2	8.1	22.0	6.5	6.5	5.6		7.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Middle	1							6.6		8.2
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Bottom	1	27.9	8.1	22.7	5.3	5.3	7.6		9.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	SR4(N)	15:25	Bottom	2	28.0	8.0	22.8	5.3		7.6		10.0	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Surface	1	29.6	8.6	19.8	11.3		3.8		7.2	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Surface	2	29.6	8.5	20.0	11.4	11.4	3.7		7.2	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Middle	1							7.4		7.8
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Middle	2									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Bottom	1	27.4	8.1	23.7	5.4	5.3	10.9		8.8	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS8	15:18	Bottom	2	27.4	8.0	24.1	5.2		11.0		7.9	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Surface	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Surface	2					7.9				
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Middle	1	28.3	8.4	22.3	7.9		8.5	8.5	10.7	10.2
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Middle	2	28.3	8.3	22.6	7.9		8.5		9.6	
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Bottom	1									
TMCLKL	HY/2012/07	2018/07/09	Mid-Flood	IS(Mf)9	15:11	Bottom	2									

Note:

Indicates Exceedance of Action Level

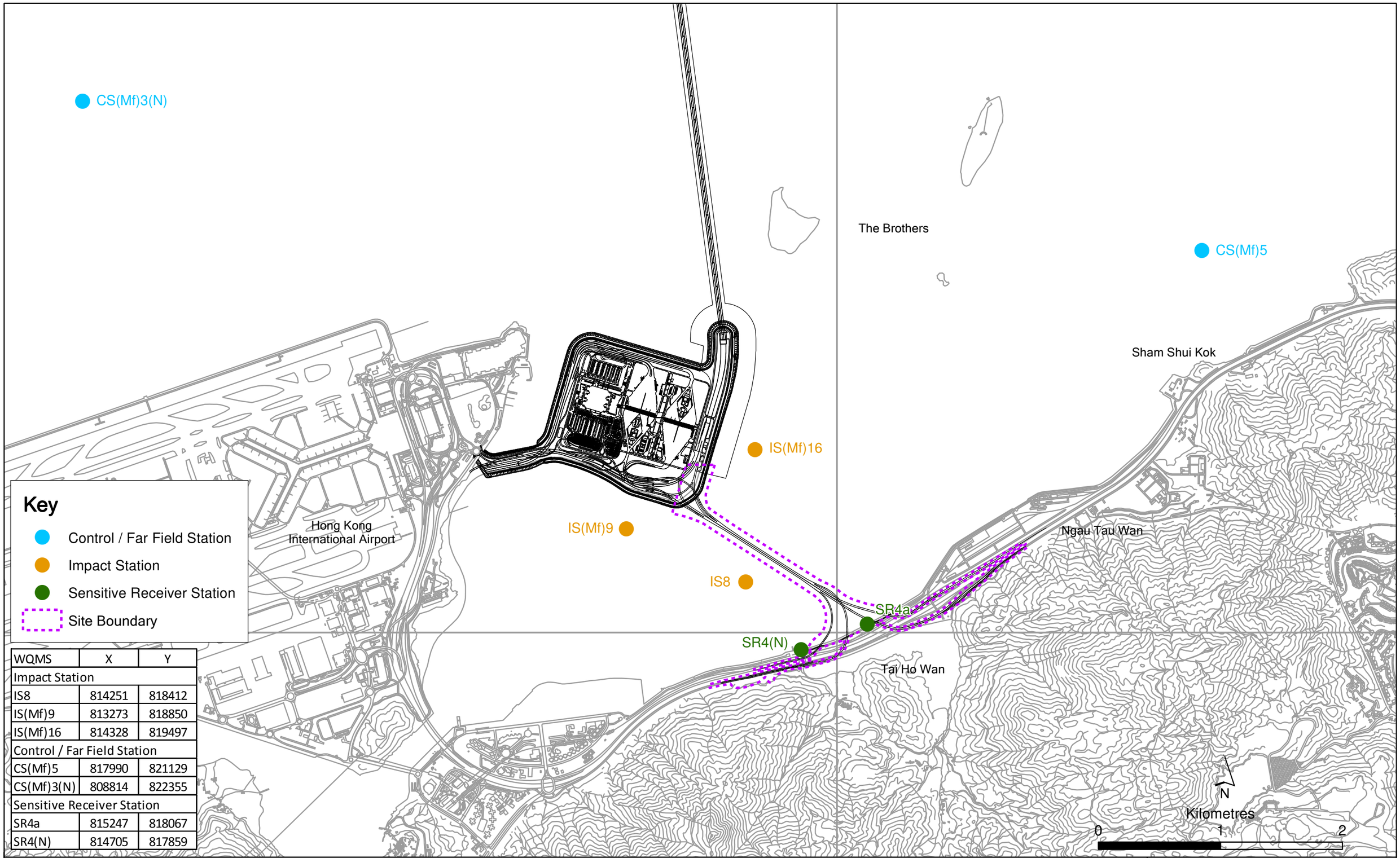
Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at IS(Mf)16 on 9 July 2018

Photo 2 - Mid-Ebb at SR4a on 9 July 2018

Photo 3 - Mid-Ebb at IS8 on 9 July 2018

Photo 4 - Mid-Flood at SR4a on 9 July 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	06 August 2018

Dear Sir/ Madam,

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

Limit Level Exceedance
0215660_25 July 2018_ Depth-averaged SS_F_Station SR4a

A total of one exceedance was recorded on 25 July 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	07 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_06 August 2018_ Bottom-depth DO_E_Station SR4a
0215660_06 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)
0215660_06 August 2018_ Bottom-depth DO_E_Station SR4(N)

A total of three exceedances were recorded on 06 August 2018.

Regards,

Mr Jovy Tam
Environmental Team Leader

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.	**Limit Level Exceedance** **0215660_06 August 2018_ Bottom-depth DO_E_Station SR4a** **0215660_06 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)** **0215660_06 August 2018_ Bottom-depth DO_E_Station SR4(N)** **[Total No. of Exceedance = 3]**	
Date	06 August 2018 (Measured) 07 August 2018 (*In situ* results received by ERM) 14 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at SR4a (Bottom-depth DO = 4.6 mg/L); 2. Mid-ebb at SR4(N) (Surface and Middle-depth DO = 4.7 mg/L); 3. Mid-ebb at SR4(N) (Bottom-depth DO = 4.1 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 06 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from SR4a and SR4(N), levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • The DO patterns at SR4a and SR4(N) were similar to the control station where the bottom-depth DO levels were generally lower. DO levels were generally lower at water quality monitoring stations due to reduce in natural ability for water to hold dissolved oxygen under higher water temperature in summer months. In addition, lower bottom-depth DO levels may possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 6 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 6 August 2018 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Surface	1	29.8	8.1	21.2	5.3	5.0	7.5	7.5	7.4	8.0
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Surface	2	29.5	8.1	20.6	5.4		6.1		7.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Middle	1	29.7	8.1	22.3	4.6		8.3		7.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Middle	2	29.4	8.1	21.9	4.7		6.7		8.2	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Bottom	1	27.3	8.1	29.6	3.7	3.8	9.0		8.2	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)5	7:58	Bottom	2	27.0	8.0	29.2	3.8		7.6		8.9	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Surface	1	29.8	7.7	19.0	5.0	4.4	2.4	3.0	4.0	4.9
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Surface	2	30.0	7.8	19.0	5.0		0.4		3.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Middle	1	28.7	7.7	24.9	3.7		4.7		3.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Middle	2	28.9	7.8	24.6	3.7		2.7		4.7	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Bottom	1	28.6	7.7	25.1	3.7	3.7	5.0		7.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	CS(Mf)3(N)	9:27	Bottom	2	28.8	7.8	24.9	3.7		2.8		5.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Surface	1	30.1	8.1	21.2	5.1	5.2	6.4	7.1	8.3	8.3
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Surface	2	29.7	8.1	20.9	5.3		6.8		7.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Bottom	1	29.3	8.1	23.9	4.8	4.9	7.9		9.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)16	8:30	Bottom	2	29.0	8.1	23.5	4.9		7.4		8.1	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Surface	1	30.2	8.1	20.4	4.9	5.0	10.1	13.1	10.6	10.6
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Surface	2	29.9	8.1	20.3	5.1		9.3		10.2	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Bottom	1	29.4	8.0	23.4	4.5	4.6	16.5		10.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4a	8:40	Bottom	2	29.1	8.0	23.0	4.6		16.3		11.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Surface	1	30.3	8.1	20.0	4.6	4.7	12.8	13.4	10.4	11.0
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Surface	2	30.0	8.1	19.6	4.7		12.2		10.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Bottom	1	29.8	7.9	22.2	4.0	4.1	14.7		10.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	SR4(N)	8:45	Bottom	2	29.5	8.0	21.9	4.1		14.0		12.1	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Surface	1	30.6	8.2	20.2	5.6	5.6	9.0	10.3	10.5	11.0
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Surface	2	30.3	8.2	19.9	5.6		9.5		10.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Bottom	1	30.1	8.0	21.5	5.0	5.1	11.1		11.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS8	8:52	Bottom	2	29.8	8.1	21.2	5.1		11.7		11.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Surface	1	30.6	8.2	19.7	6.1	6.2	6.9	6.6	8.1	9.1
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Surface	2	30.4	8.2	19.4	6.3		6.5		8.7	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Bottom	1	30.5	8.2	20.2	5.9	6.1	6.4		9.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Ebb	IS(Mf)9	9:01	Bottom	2	30.3	8.2	19.9	6.2		6.4		9.9	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Surface	1	30.0	8.2	19.9	5.6	5.2	6.3	7.0	4.6	5.2
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Surface	2	30.3	8.2	20.2	5.5		6.9		5.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Middle	1	29.2	8.1	22.3	4.9		6.6		4.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Middle	2	29.5	8.1	22.5	4.9		6.8		4.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Bottom	1	28.5	8.1	25.5	5.3	5.3	7.6		5.3	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)5	14:28	Bottom	2	29.0	8.1	25.2	5.3		7.9		6.4	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Surface	1	30.5	7.8	13.9	6.2	5.9	7.1	8.0	5.0	6.1
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Surface	2	30.3	7.8	14.0	6.2		7.1		4.2	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Middle	1	30.1	7.8	17.5	5.5		8.6		6.4	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Middle	2	29.9	7.8	17.7	5.5		8.1		6.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Bottom	1	29.6	7.7	21.2	4.8	4.8	8.5		7.7	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	CS(Mf)3(N)	13:25	Bottom	2	29.4	7.8	21.3	4.8		8.7		6.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Surface	1	30.1	8.2	19.7	5.9	5.9	5.3	5.3	5.5	6.2
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Surface	2	30.4	8.2	20.0	5.8		5.2		5.9	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Bottom	1	28.9	8.1	24.1	5.2	5.2	5.3		7.1	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)16	14:03	Bottom	2	29.2	8.1	24.2	5.1		5.3		6.4	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Surface	1	30.2	8.2	19.8	6.3	6.2	6.2	6.6	2.8	3.8
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Surface	2	30.4	8.2	20.0	6.1		7.1		4.0	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Bottom	1	29.9	8.1	20.6	6.1	6.0	6.3		3.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4a	13:51	Bottom	2	30.1	8.2	21.0	5.9		6.8		4.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Surface	1	30.2	8.2	19.7	6.3	6.2	6.3	6.6	4.3	4.6
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Surface	2	30.4	8.2	19.9	6.1		6.8		4.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Bottom	1	29.8	8.1	20.9	6.0	6.0	6.5		4.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	SR4(N)	13:48	Bottom	2	30.0	8.2	21.3	5.9		6.9		5.1	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Surface	1	30.2	8.2	19.6	6.3	6.2	6.2	6.3	3.7	4.1
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Surface	2	30.4	8.2	19.9	6.1		5.8		3.6	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Bottom	1	29.9	8.1	20.7	6.1	6.0	6.3		4.8	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS8	13:43	Bottom	2	30.1	8.2	21.0	5.9		6.8		4.1	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Surface	1	30.2	8.1	20.1	5.5	5.5	13.2	14.4	6.7	7.5
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Surface	2	30.5	8.1	20.6	5.4		12.8		6.4	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Bottom	1	29.8	8.1	22.0	5.5	5.5	15.8		8.5	
TMCLKL	HY/2012/07	2018-08-06	Mid-Flood	IS(Mf)9	13:35	Bottom	2	30.1	8.0	22.4	5.4		15.8		8.4	

Note:

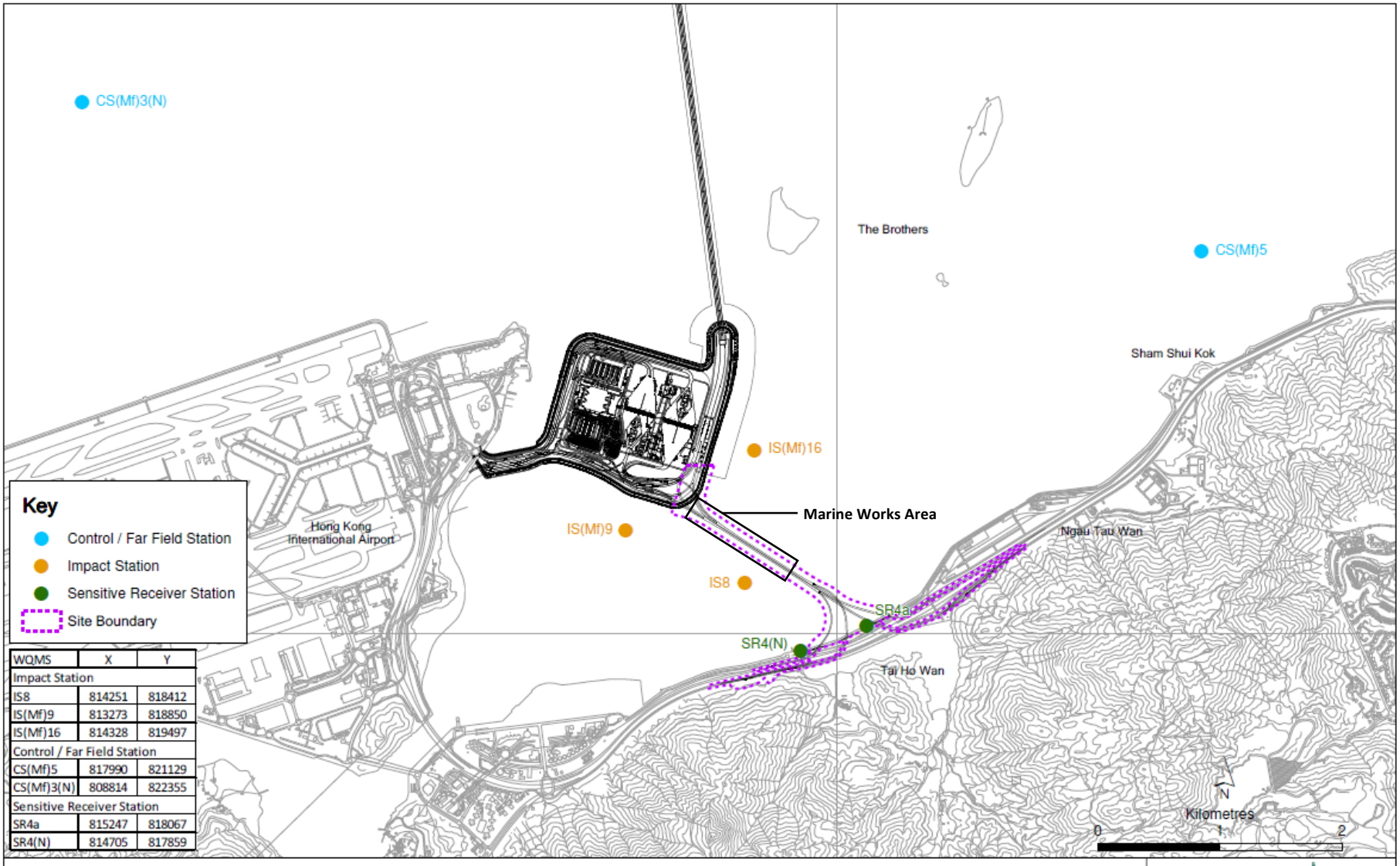
Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

CONTRACT NO. HY/2012/07 – WQM SITE PHOTOS AT SR4(A) AND SR4(N) ON 6 AUGUST 2018

Photo 1 - Mid-Ebb at SR4(a) on 6 August 2018

Photo 2 - Mid-Ebb at SR4(N) on 6 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	13 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_08 August 2018_ Surface and Middle-depth DO_E_Station IS(Mf)16
0215660_08 August 2018_ Bottom-depth DO_E_Station IS(Mf)16
0215660_08 August 2018_ Surface and Middle-depth DO_E_Station SR4a
0215660_08 August 2018_ Bottom-depth DO_E_Station SR4(N)
0215660_08 August 2018_ Bottom-depth DO_E_Station IS8
0215660_08 August 2018_ Bottom-depth DO_E_Station IS(Mf)9
0215660_08 August 2018_ Bottom-depth DO_F_Station SR4a

Limit Level Exceedance
0215660_08 August 2018_ Bottom-depth DO_E_Station SR4a
0215660_08 August 2018_ Surface and Middle-depth DO_E_Station IS8

A total of nine exceedances were recorded on 08 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**<u>Action Level Exceedance</u>** **0215660_08 August 2018_Surface and Middle-depth DO_E_Station IS(Mf)16** **0215660_08 August 2018_Bottom-depth DO_E_Station IS(Mf)16** **0215660_08 August 2018_Surface and Middle-depth DO_E_Station SR4a** **0215660_08 August 2018_Bottom-depth DO_E_Station SR4(N)** **0215660_08 August 2018_Bottom-depth DO_E_Station IS8** **0215660_08 August 2018_Bottom-depth DO_E_Station IS(Mf)9** **0215660_08 August 2018_Bottom-depth DO_F_Station SR4a** **<u>Limit Level Exceedance</u>** **0215660_08 August 2018_ Bottom-depth DO_E_Station SR4a** **0215660_08 August 2018_Surface and Middle-depth DO_E_Station IS8** **[Total No. of Exceedance = 9]**	
Date	08 August 2018 (Measured) 09 August 2018 (*In situ* results received by ERM) 15 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	<u>Action Level Exceedance</u> 1. Mid-ebb at IS(Mf)16 (Surface and Middle-depth DO = 4.5 mg/L); 2. Mid-ebb at IS(Mf)16 (Bottom-depth DO = 4.2 mg/L); 3. Mid-ebb at SR4a (Surface and Middle-depth DO = 4.4 mg/L); 4. Mid-ebb at SR4(N) (Bottom-depth DO = 3.9 mg/L); 5. Mid-ebb at IS8 (Bottom-depth DO = 3.6 mg/L); 6. Mid-ebb at IS(Mf)9 (Bottom-depth DO = 4.2 mg/L); 7. Mid-flood at SR4a (Bottom-depth DO = 4.2 mg/L); <u>Limit Level Exceedance</u> 8. Mid-ebb at SR4a (Bottom-depth DO = 3.4 mg/L); 9. Mid-ebb at IS8 (Surface and Middle-depth DO = 3.8 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 08 August 2018.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • The DO patterns at Sensitive Receiver Stations and Impact Stations were similar to the control station where surface and middle-depth and bottom-depth DO levels were low. • DO levels were generally lower at water quality monitoring stations due to two possible reasons of natural variation: 1. Natural ability for water to hold dissolved oxygen is reduced due to higher water body temperature in summer months. 2. The higher Salinity recorded at the bottom level of the water quality monitoring stations was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level as the DO exceedances recorded at the bottom level showed higher levels of Salinity than the middle and surface levels.
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 8 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 8 August 2018 is attached.

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Surface	1	29.0	7.9	22.6	5.4	4.9	1.7	5.4	1.7	3.6
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Surface	2	29.2	7.9	22.4	5.4		4.2		1.7	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Middle	1	27.9	7.9	26.2	4.5		3.8		3.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Middle	2	28.0	7.9	26.3	4.4		3.4		4.1	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Bottom	1	26.4	7.9	30.5	3.8	3.8	9.3		5.4	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)5	9:41	Bottom	2	26.6	7.8	30.3	3.8		9.7		4.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Surface	1	29.9	8.1	21.0	5.3	4.3	6.8	11.3	2.5	3.0
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Surface	2	29.6	8.1	20.9	5.2		6.1		1.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Middle	1	29.0	8.0	25.9	3.4		12.5		2.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Middle	2	28.7	8.0	25.8	3.4		12.9		3.5	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Bottom	1	28.8	8.0	26.7	3.3	3.2	15.0		3.0	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	CS(Mf)3(N)	11:21	Bottom	2	28.6	8.0	26.6	3.0		14.7		4.1	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Surface	1	29.1	7.9	23.6	4.5	4.5	4.7	4.5	3.8	5.2
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Surface	2	29.4	7.9	23.3	4.5		4.7		4.6	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Bottom	1	27.8	7.9	27.5	4.2	4.2	4.2		6.6	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)16	10:11	Bottom	2	28.1	7.9	27.1	4.2		4.2		5.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Surface	1	29.0	7.9	22.8	4.3	4.4	9.6	11.7	3.6	3.5
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Surface	2	29.1	7.8	22.5	4.4		9.9		2.5	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Bottom	1	28.3	7.9	25.4	3.3	3.4	13.6		3.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4a	10:21	Bottom	2	28.6	7.8	25.0	3.5		13.6		4.1	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Surface	1	29.8	7.9	21.8	5.5	5.6	6.1	8.8	5.0	4.9
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Surface	2	30.0	7.9	21.6	5.6		6.7		4.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Bottom	1	28.6	7.9	24.6	3.9	3.9	11.1		5.0	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	SR4(N)	10:30	Bottom	2	28.9	7.8	24.3	3.9		11.4		5.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Surface	1	29.4	7.9	23.6	3.8	3.8	5.2	6.1	3.8	4.3
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Surface	2	29.6	7.8	23.3	3.7		5.6		4.6	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Bottom	1	29.0	7.9	24.4	3.6	3.6	6.6		4.2	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS8	10:37	Bottom	2	29.3	7.8	24.2	3.6		6.9		4.6	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Surface	1	29.7	7.9	21.3	6.0	6.1	3.7	4.8	2.5	2.6
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Surface	2	29.9	8.0	21.0	6.1		0.9		1.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Bottom	1	29.5	7.9	22.8	4.1	4.2	7.2		3.0	
TMCLKL	HY/2012/07	2018-08-08	Mid-Ebb	IS(Mf)9	10:47	Bottom	2	29.8	7.8	22.5	4.2		7.2		3.2	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Surface	1	29.0	7.9	24.8	5.4	4.5	7.8	11.1	4.2	4.3
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Surface	2	28.7	7.8	25.1	5.4		7.8		3.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Middle	1	27.1	7.8	29.0	3.6		9.3		4.6	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Middle	2	26.9	7.8	29.3	3.6		9.9		3.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Bottom	1	26.7	7.8	29.8	3.3	3.3	15.8		4.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)5	17:26	Bottom	2	26.5	7.8	30.1	3.3		15.7		4.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Surface	1	31.1	8.1	16.6	6.4	5.8	8.9	10.0	4.4	5.1
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Surface	2	30.8	8.1	16.3	6.5		8.2		5.0	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Middle	1	30.2	7.9	20.0	5.0		10.5		4.5	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Middle	2	29.9	8.0	19.5	5.1		10.0		5.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Bottom	1	29.8	7.9	21.6	4.6	4.7	11.2		5.4	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	CS(Mf)3(N)	16:05	Bottom	2	29.4	8.0	21.1	4.7		11.3		5.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Surface	1	29.8	8.0	22.9	6.6	6.6	6.5	10.0	3.8	4.5
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Surface	2	29.6	7.8	23.1	6.6		6.0		3.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Bottom	1	29.0	7.9	24.5	5.1	5.1	13.5		5.7	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)16	16:57	Bottom	2	28.8	7.8	24.7	5.1		13.8		5.1	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Surface	1	29.5	8.0	23.7	5.3	5.3	9.1	11.2	11.0	13.9
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Surface	2	29.3	7.8	23.9	5.3		9.5		10.5	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Bottom	1	28.9	7.8	24.7	4.2	4.2	13.2		17.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4a	16:46	Bottom	2	28.6	7.8	24.9	4.2		13.0		16.7	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Surface	1	29.4	7.9	23.5	5.3	5.3	11.4	11.6	16.6	17.5
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Surface	2	29.2	7.8	23.7	5.3		12.0		16.7	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Bottom	1	29.4	7.9	23.5	5.3	5.3	11.3		18.5	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	SR4(N)	16:42	Bottom	2	29.2	7.8	23.7	5.3		11.8		18.0	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Surface	1	30.0	8.0	22.9	6.6	6.6	16.1	16.5	18.3	18.6
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Surface	2	29.8	7.9	23.2	6.6		16.0		17.3	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Bottom	1	30.0	8.0	23.0	6.4	6.4	17.0		19.9	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS8	16:35	Bottom	2	29.7	7.9	23.2	6.4		16.8		18.7	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Surface	1					5.7		11.5		6.5
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Surface	2									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Middle	1	29.6	7.9	23.3	5.7		11.4		6.2	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Middle	2	29.4	7.8	23.6	5.7		11.6		6.8	
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Bottom	1									
TMCLKL	HY/2012/07	2018-08-08	Mid-Flood	IS(Mf)9	16:26	Bottom	2									

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at IS(Mf)16 on 8 August 2018

Photo 2 - Mid-Ebb at SR4a on 8 August 2018

Photo 3 - Mid-Ebb at SR4(N) on 8 August 2018

Photo 4 - Mid-Ebb at IS8 on 8 August 2018

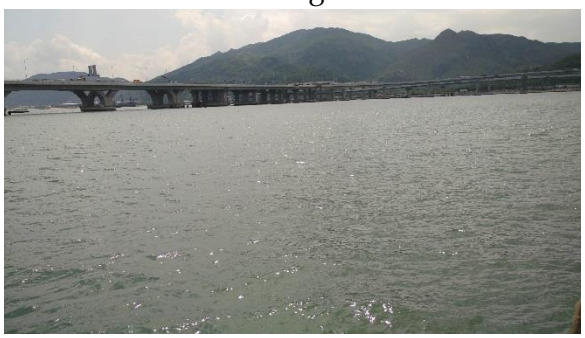
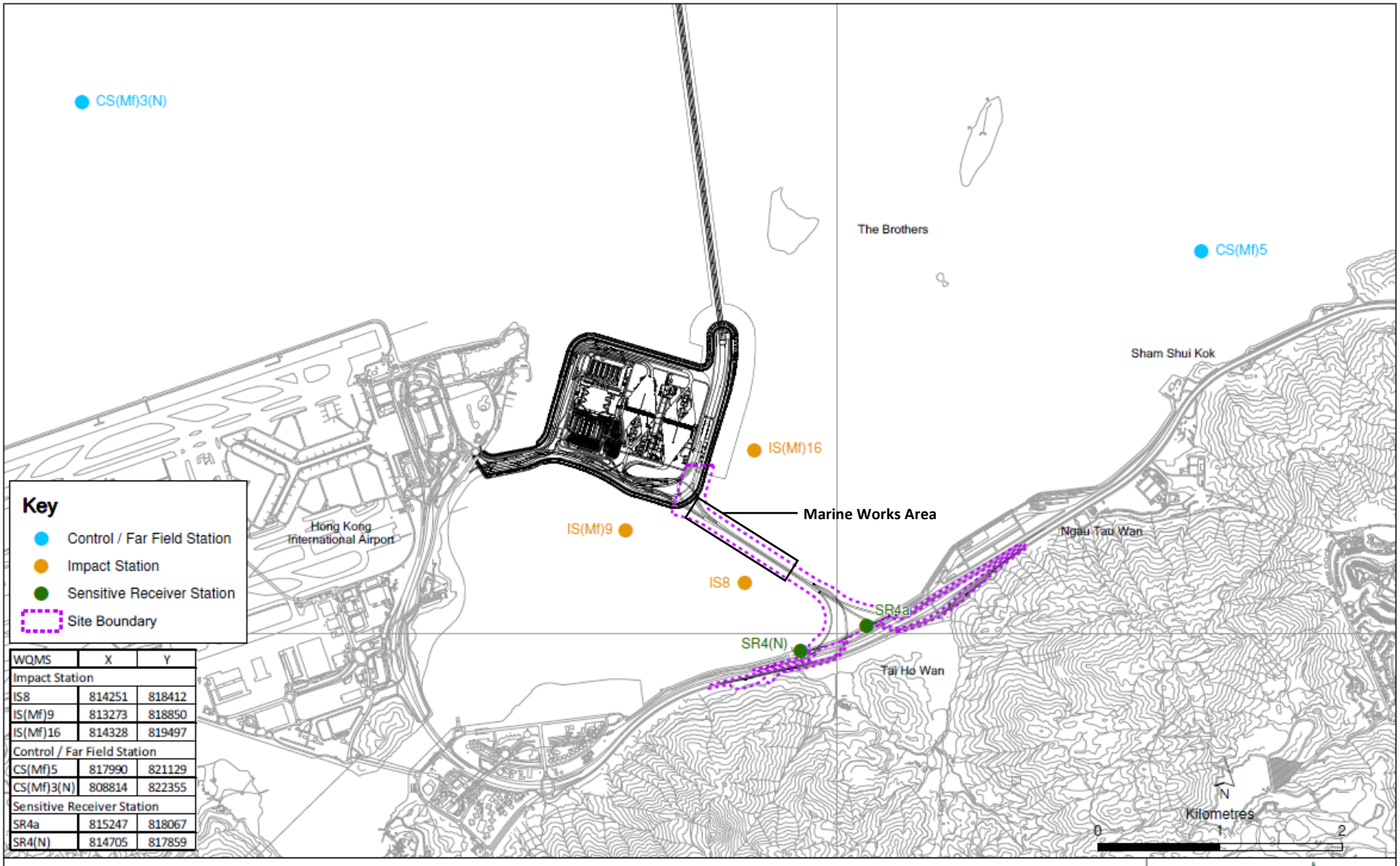


Photo 5 - Mid-Ebb at IS(Mf)9 on 8 August 2018

Photo 6 - Mid-Flood at SR4a on 8 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	13 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_10 August 2018_ Surface and Middle-depth DO_E_Station IS(Mf)16
0215660_10 August 2018_ Bottom-depth DO_E_Station IS(Mf)16

A total of two exceedances were recorded on 10 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_10 August 2018_Surface and Middle-depth DO_E_Station IS(Mf)16** **0215660_10 August 2018_Bottom-depth DO_E_Station IS(Mf)16** **[Total No. of Exceedance = 2]**	
Date	10 August 2018 (Measured) 11 August 2018 (*In situ* results received by ERM) 17 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)16 (Surface and Middle-depth DO = 4.9 mg/L); 2. Mid-ebb at IS(Mf)16 (Bottom-depth DO = 4.0 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 10 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from IS(Mf)16, levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • The DO patterns at IS(Mf)16 were similar to the control station where the bottom-depth DO levels were generally lower. DO levels were lower at IS(Mf)16 due to high Salinity recorded at the bottom level which was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level as the DO exceedances recorded at the bottom level showed higher levels of Salinity than the middle and surface levels.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 10 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 10 August 2018 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Surface	1	28.4	7.9	25.8	5.1	4.8	5.2	8.1	7.3	8.1
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Surface	2	28.6	7.9	25.6	5.1		5.5		6.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Middle	1	28.0	7.9	26.9	4.4		7.9		7.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Middle	2	28.2	7.9	26.7	4.4		8.2		8.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Bottom	1	27.8	7.9	27.2	4.3	4.3	10.6		8.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)5	11:12	Bottom	2	28.1	7.9	27.0	4.3		11.2		9.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Surface	1	29.1	8.1	23.3	5.3	5.2	8.1	14.2	3.6	4.7
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Surface	2	29.1	8.1	23.3	5.4		7.6		4.2	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Middle	1	29.1	8.1	23.6	5.0		15.5		5.2	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Middle	2	29.0	8.1	23.7	5.0		13.2		4.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Bottom	1	28.9	8.0	24.3	4.9	4.9	20.2		4.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	CS(Mf)3(N)	12:33	Bottom	2	28.9	8.0	24.3	4.8		20.3		5.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Surface	1	28.4	7.9	26.0	4.9	4.9	8.6	7.4	6.7	8.0
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Surface	2	28.7	7.9	25.8	4.9		8.2		7.2	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Bottom	1	27.7	7.9	27.7	4.0	4.0	6.6		8.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)16	11:45	Bottom	2	27.9	7.9	27.5	4.0		6.2		9.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Surface	1	28.8	7.9	25.0	5.2	5.2	6.2	6.5	7.0	7.7
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Surface	2	29.1	7.9	24.8	5.2		5.7		7.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Bottom	1	28.8	7.9	25.1	5.2	5.2	6.7		8.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4a	11:53	Bottom	2	29.0	7.9	24.9	5.2		7.2		7.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Surface	1	29.2	7.9	24.8	5.6	5.6	9.0	10.6	10.0	11.2
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Surface	2	29.4	7.9	24.6	5.6		9.5		10.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Bottom	1	29.0	7.9	25.1	5.3	5.3	12.2		11.5	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	SR4(N)	12:01	Bottom	2	29.3	7.9	24.9	5.3		11.6		12.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Surface	1	29.1	7.9	25.1	5.6	5.6	7.4	8.7	10.2	14.4
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Surface	2	29.3	7.9	24.9	5.6		7.5		9.4	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Bottom	1	29.0	7.9	25.2	5.5	5.5	10.2		19.5	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS8	12:07	Bottom	2	29.3	7.9	24.9	5.5		9.7		18.4	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Surface	1	29.0	7.9	25.2	5.6	5.6	5.0	5.4	9.5	9.7
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Surface	2	29.2	7.9	24.9	5.6		4.4		9.1	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Bottom	1	28.9	7.9	25.2	5.6	5.6	5.9		10.5	
TMCLKL	HY/2012/07	2018-08-10	Mid-Ebb	IS(Mf)9	12:15	Bottom	2	29.2	7.9	24.9	5.5		6.2		9.8	

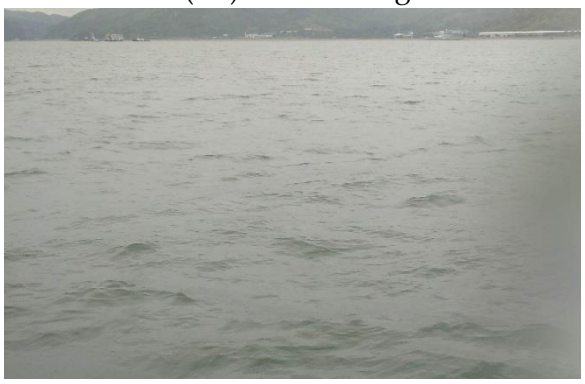
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Surface	1	28.4	7.8	25.4	5.0	4.8	5.2	6.4	9.6	12.3
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Surface	2	28.6	7.9	25.1	5.0		5.4		10.5	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Middle	1	28.3	7.8	26.2	4.5		6.6		11.2	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Middle	2	28.5	7.9	25.9	4.5		6.4		12.0	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Bottom	1	27.7	7.8	27.7	4.1	4.1	7.1		14.9	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)5	19:00	Bottom	2	27.9	7.8	27.4	4.1		7.4		15.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Surface	1	29.5	7.9	19.2	5.1	4.9	11.4	13.9	6.7	8.5
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Surface	2	29.5	7.9	19.2	5.1		11.5		7.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Middle	1	29.5	7.9	20.4	4.7		14.3		8.0	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Middle	2	29.5	7.9	20.4	4.8		14.1		7.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Bottom	1	29.3	7.9	21.0	4.8	4.8	15.5		10.2	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	CS(Mf)3(N)	17:48	Bottom	2	29.4	7.9	20.9	4.7		16.4		10.6	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Surface	1	28.6	7.8	24.8	5.2	5.2	7.8	9.9	10.0	10.7
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Surface	2	28.9	7.9	24.5	5.2		7.8		10.8	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Bottom	1	28.6	7.8	25.3	5.3	5.3	12.2		11.1	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)16	18:32	Bottom	2	28.8	7.9	25.1	5.3		11.9		10.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Surface	1	28.7	7.8	24.9	5.6	5.6	10.8	11.0	10.8	11.5
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Surface	2	28.9	7.9	24.6	5.5		11.5		11.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Bottom	1	28.7	7.8	24.9	5.6	5.6	10.3		11.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4a	18:20	Bottom	2	28.9	7.9	24.6	5.6		11.3		12.0	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Surface	1	28.6	7.8	25.2	5.6	5.6	13.2	13.9	12.2	12.7
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Surface	2	28.9	7.9	25.0	5.6		12.9		12.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Bottom	1	28.6	7.8	25.4	5.6	5.6	15.0		13.4	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	SR4(N)	18:16	Bottom	2	28.9	7.9	25.2	5.6		14.6		12.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Surface	1	28.6	7.8	25.3	5.7	5.7	19.0	20.4	12.8	9.4
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Surface	2	28.9	7.9	25.0	5.7		18.5		12.4	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Middle	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Middle	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Bottom	1	28.6	7.8	25.5	5.7	5.7	22.0		6.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS8	18:10	Bottom	2	28.9	7.9	25.3	5.7		21.9		6.1	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Surface	1					5.8		12.8		9.0
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Surface	2									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Middle	1	28.6	7.8	25.4	5.8		12.7		9.3	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Middle	2	28.9	7.9	25.1	5.8		12.9		8.7	
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Bottom	1									
TMCLKL	HY/2012/07	2018-08-10	Mid-Flood	IS(Mf)9	18:03	Bottom	2									

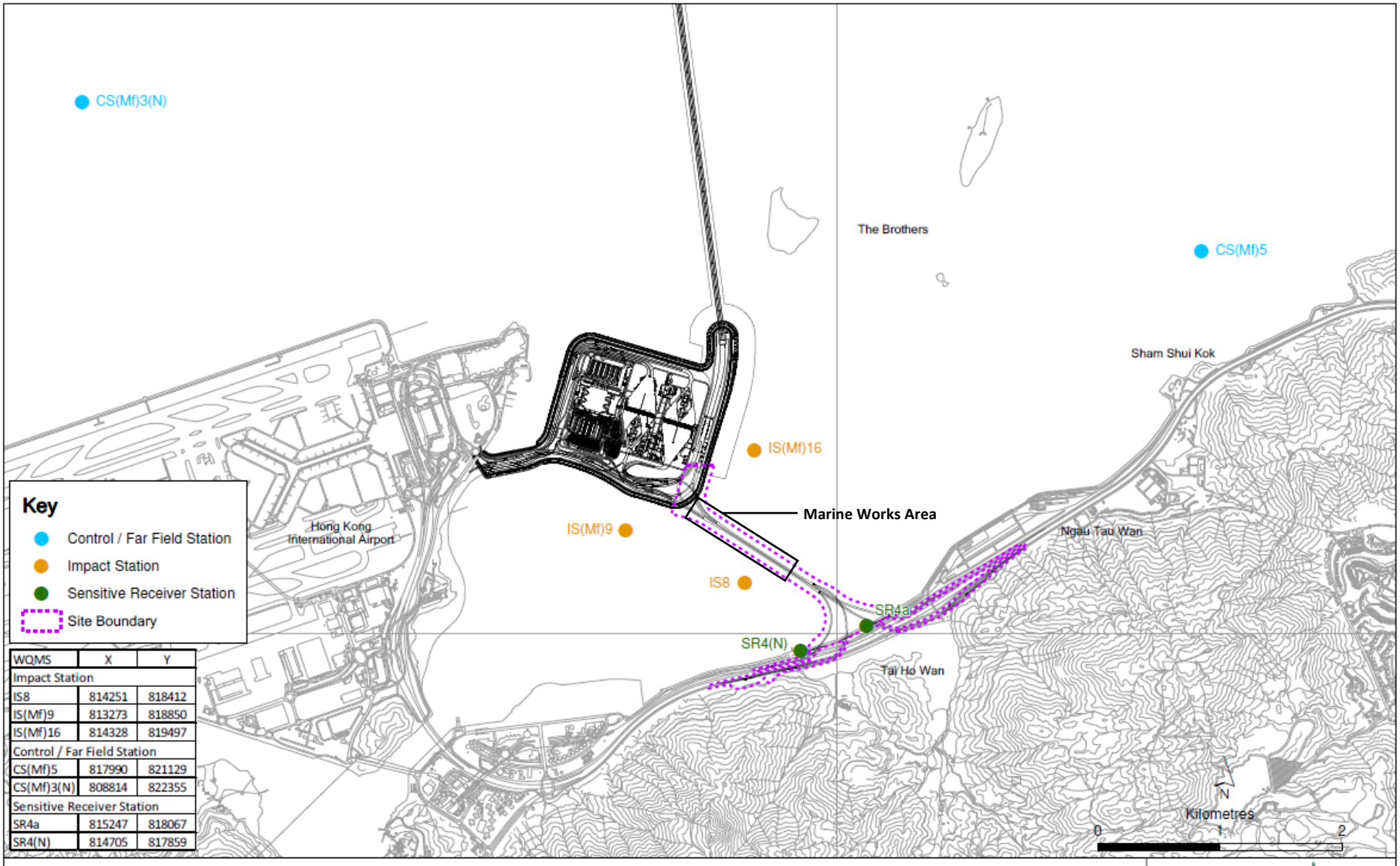
Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at IS(Mf)16 on 10 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

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Environmental Resources Management

2507,
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18 Tak Fung Street,
Hung Hom, Hong Kong
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Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	15 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_13 August 2018_ Surface and Middle-depth DO_E_Station SR4a
0215660_13 August 2018_ Surface and Middle-depth DO_F_Station IS(Mf)16

A total of two exceedances were recorded on 13 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Limit Level Exceedance** **0215660_13 August 2018_ Surface and Middle-depth DO_E_Station SR4a** **0215660_13 August 2018_ Surface and Middle-depth DO_F_Station IS(Mf)16** **[Total No. of Exceedance = 2]**	
Date	13 August 2018 (Measured) 14 August 2018 (*In situ* results received by ERM) 17 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at SR4a (Surface and Middle-depth DO = 4.9 mg/L); 2. Mid-flood at IS(Mf)16 (Surface and Middle-depth DO = 4.8 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 13 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from SR4a and IS(Mf)16, levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • The marginal DO exceedances at SR4a and IS(Mf)16 were similar to the control station where the surface and middle-depth DO were low. Low DO levels at water quality monitoring stations were likely due to reduce in natural ability for water to hold dissolved oxygen under higher water temperature in summer months.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 13 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 13 August 2018 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Surface	1	28.9	7.8	24.2	4.9	4.6	10.4	16.9	9.5	10.3
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Surface	2	28.7	7.8	24.5	4.9		11.0		9.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Middle	1	28.0	7.8	25.5	4.3		17.8		10.3	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Middle	2	27.8	7.8	25.7	4.3		16.7		10.0	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Bottom	1	27.9	7.8	25.9	4.3	4.3	22.6		11.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)5	14:08	Bottom	2	27.7	7.8	26.1	4.3		22.9		11.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Surface	1	29.1	8.0	22.7	5.1	5.1	15.1	20.4	8.5	9.9
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Surface	2	29.1	8.0	22.8	5.1		14.1		9.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Middle	1	28.8	8.1	24.4	5.0		23.2		8.9	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Middle	2	28.8	8.1	24.5	5.0		23.1		9.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Bottom	1	28.8	8.1	24.7	5.0	5.0	22.6		11.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	CS(Mf)3(N)	13:06	Bottom	2	28.8	8.1	24.7	5.0		24.0		11.8	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Surface	1	29.1	7.8	23.4	5.2	5.2	8.0	8.5	5.6	5.9
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Surface	2	28.8	7.8	23.7	5.2		8.6		5.3	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Bottom	1	28.1	7.8	25.2	4.6	4.7	8.7		6.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)16	13:46	Bottom	2	27.8	7.8	25.5	4.7		8.6		6.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Surface	1	28.5	7.8	23.4	4.9	4.9	8.8	9.0	7.6	8.2
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Surface	2	28.3	7.8	23.6	4.9		8.7		8.2	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Bottom	1	28.5	7.8	23.4	4.9	4.9	9.2		8.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4a	13:36	Bottom	2	28.3	7.8	23.7	4.9		9.2		8.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Surface	1	28.6	7.8	23.2	5.0	5.0	11.8	12.2	10.2	10.9
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Surface	2	28.3	7.8	23.4	5.0		10.8		10.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Bottom	1	28.5	7.8	23.5	4.9	5.0	13.1		11.8	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	SR4(N)	13:32	Bottom	2	28.3	7.8	23.8	5.0		13.0		11.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Surface	1	28.7	7.8	23.4	5.2	5.2	10.7	12.2	7.6	8.4
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Surface	2	28.4	7.9	23.6	5.2		11.0		8.0	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Bottom	1	28.5	7.8	23.7	4.8	4.8	13.3		8.5	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS8	13:27	Bottom	2	28.2	7.9	23.9	4.8		13.9		9.3	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Surface	1	29.1	7.8	23.4	5.2	5.2	13.4	15.2	8.6	9.3
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Surface	2	28.8	7.8	23.7	5.2		15.9		8.5	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Bottom	1	28.9	7.8	23.5	5.1	5.1	15.0		10.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Ebb	IS(Mf)9	13:21	Bottom	2	28.7	7.8	23.7	5.1		16.3		9.9	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Surface	1	28.1	7.8	23.7	4.8	4.7	7.1	11.5	7.7	8.9
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Surface	2	28.4	7.8	23.5	4.8		7.6		8.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Middle	1	27.9	7.8	24.6	4.6		8.9		8.8	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Middle	2	28.1	7.8	24.4	4.6		9.0		8.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Bottom	1	27.5	7.8	26.9	4.2	4.2	18.2		9.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)5	6:54	Bottom	2	27.8	7.8	26.6	4.2		18.3		10.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Surface	1	28.7	7.9	20.8	5.0	5.0	21.6	22.1	21.0	21.8
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Surface	2	28.7	7.9	20.8	5.0		21.5		20.8	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Middle	1	28.7	7.9	20.8	5.0		20.1		21.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Middle	2	28.7	7.9	20.8	5.0		19.9		22.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Bottom	1	28.7	7.9	20.8	5.0	5.0	24.7		22.5	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	CS(Mf)3(N)	8:09	Bottom	2	28.7	7.9	20.8	4.9		24.7		22.7	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Surface	1	28.1	7.7	23.4	4.8	4.8	8.2	9.4	7.5	7.2
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Surface	2	28.4	7.8	23.2	4.8		8.3		6.8	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Bottom	1	28.1	7.7	24.2	4.8	4.8	10.5		7.7	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)16	7:20	Bottom	2	28.4	7.8	23.9	4.8		10.4		6.9	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Surface	1	28.1	7.7	22.6	5.0	5.0	8.9	9.9	7.1	7.8
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Surface	2	28.4	7.8	22.3	5.0		8.5		8.0	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Bottom	1	28.1	7.7	23.0	4.9	4.9	11.1		7.7	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4a	7:28	Bottom	2	28.4	7.7	22.8	4.8		11.0		8.4	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Surface	1	28.1	7.7	22.7	5.0	5.0	7.8	8.6	6.8	7.4
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Surface	2	28.4	7.8	22.4	5.0		7.2		6.9	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Bottom	1	28.1	7.7	22.9	5.0	5.0	9.5		8.2	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	SR4(N)	7:35	Bottom	2	28.4	7.8	22.7	5.0		9.8		7.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Surface	1	28.1	7.7	23.2	5.0	5.0	9.6	10.8	5.7	7.4
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Surface	2	28.4	7.8	23.0	5.0		9.1		6.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Bottom	1	28.1	7.7	23.5	5.0	5.0	12.1		8.6	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS8	7:39	Bottom	2	28.4	7.8	23.2	5.0		12.2		9.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Surface	1	28.1	7.8	24.0	5.0	5.0	9.5	10.0	9.3	9.7
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Surface	2	28.3	7.8	23.7	5.0		9.8		9.0	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Middle	1									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Middle	2									
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Bottom	1	28.1	7.8	24.0	5.0	5.0	10.3		10.1	
TMCLKL	HY/2012/07	2018-08-13	Mid-Flood	IS(Mf)9	7:47	Bottom	2	28.3	7.8	23.7	5.0		10.5		10.5	

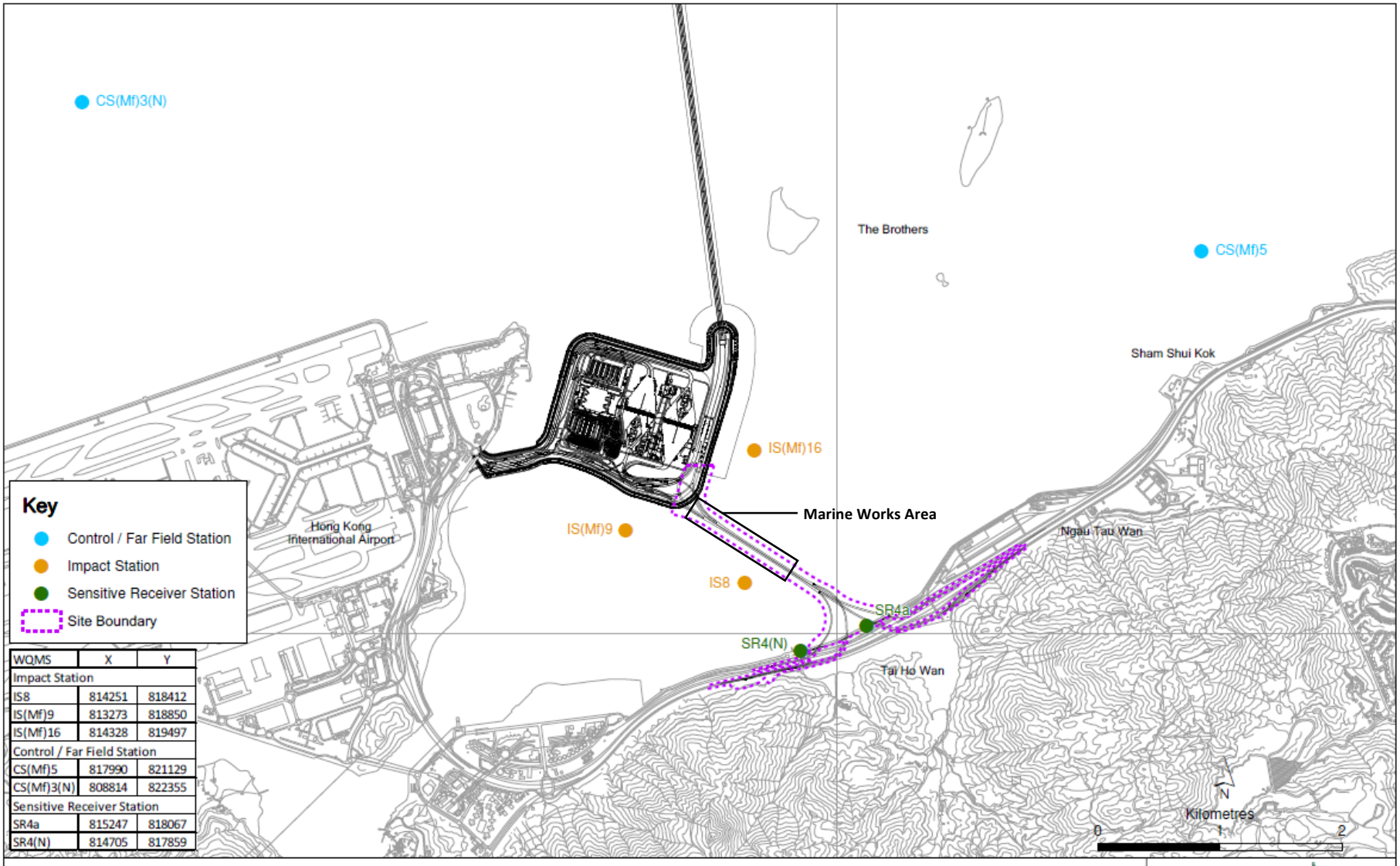
Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at SR4(a) on 13 August 2018

Photo 2 - Mid-Flood at IS(Mf)16 on 13 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

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Environmental Resources Management

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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	21 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_17 August 2018_ Surface and Middle-depth DO_E_Station SR4a
0215660_17 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)

A total of two exceedances were recorded on 17 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_17 August 2018_ Surface and Middle-depth DO_E_Station SR4a** **0215660_17 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)** **[Total No. of Exceedance = 2]**	
Date	17 August 2018 (Measured) 18 August 2018 (*In situ* results received by ERM) 29 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO)	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at SR4a (Surface and Middle-depth DO = 4.9 mg/L); 2. Mid-ebb at SR4(N) (Surface and Middle-depth DO = 4.8 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 17 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from marginal DO exceedances at SR4a and SR4(N), levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • SR4a and SR4(N) are relatively far from the works area. No DO exceedance was recorded at the monitoring stations nearby the works area i.e. IS(Mf)9, IS(Mf)16 and IS8. • No observation of construction works undertaken by this Project was reported at SR4a and SR4(N).	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 17 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 17 August 2018 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Surface	1	28.4	7.8	23.6	5.0	4.7	6.7	8.1	3.4	3.6
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Surface	2	28.7	7.9	23.4	5.0		6.9		3.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Middle	1	28.2	7.8	26.1	4.5		7.8		3.3	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Middle	2	28.4	7.9	25.9	4.4		8.0		3.4	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Bottom	1	28.0	7.8	27.5	4.4	4.4	9.6		4.4	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)5	17:00	Bottom	2	28.3	7.9	27.3	4.4		9.7		4.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Surface	1	29.0	8.1	20.4	5.3	5.1	8.2	12.1	2.7	3.4
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Surface	2	29.0	8.0	20.4	5.3		8.5		3.0	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Middle	1	29.1	8.1	21.3	4.9		12.7		3.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Middle	2	29.0	7.9	21.2	5.0		12.4		2.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Bottom	1	29.0	8.1	22.5	5.1	5.1	15.4		4.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	CS(Mf)3(N)	16:05	Bottom	2	28.9	8.0	22.3	5.1		15.4		4.4	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Surface	1	28.4	7.8	23.4	5.2	5.2	5.5	6.4	3.7	4.0
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Surface	2	28.7	7.8	23.1	5.2		5.2		3.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Bottom	1	28.3	7.8	24.8	4.9	4.9	7.3		4.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)16	16:36	Bottom	2	28.6	7.8	24.5	4.9		7.5		4.3	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Surface	1	28.5	7.8	22.8	4.9	4.9	7.4	8.7	4.0	4.9
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Surface	2	28.7	7.8	22.6	4.9		8.0		4.0	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Bottom	1	28.5	7.8	23.1	4.9	4.9	9.6		5.6	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4a	16:26	Bottom	2	28.7	7.8	22.8	4.9		9.8		6.0	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Surface	1	28.5	7.8	23.0	4.8	4.8	4.3	6.6	5.0	5.4
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Surface	2	28.8	7.8	22.7	4.8		4.7		4.5	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Bottom	1	28.5	7.8	23.1	4.7	4.7	8.6		6.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	SR4(N)	16:23	Bottom	2	28.8	7.8	22.9	4.7		8.6		5.9	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Surface	1	28.5	7.8	23.0	5.2	5.3	8.3	9.6	3.2	4.0
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Surface	2	28.7	7.8	22.8	5.3		8.1		3.3	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Bottom	1	28.4	7.8	23.6	5.1	5.1	10.9		4.6	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS8	16:17	Bottom	2	28.7	7.8	23.3	5.1		10.9		4.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Surface	1	28.5	7.8	22.9	5.4	5.4	5.2	5.6	2.8	4.2
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Surface	2	28.8	7.9	22.6	5.4		5.5		3.4	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Bottom	1	28.5	7.8	23.1	5.3	5.3	5.8		5.0	
TMCLKL	HY/2012/07	2018-08-17	Mid-Ebb	IS(Mf)9	16:09	Bottom	2	28.8	7.9	22.9	5.3		5.9		5.4	

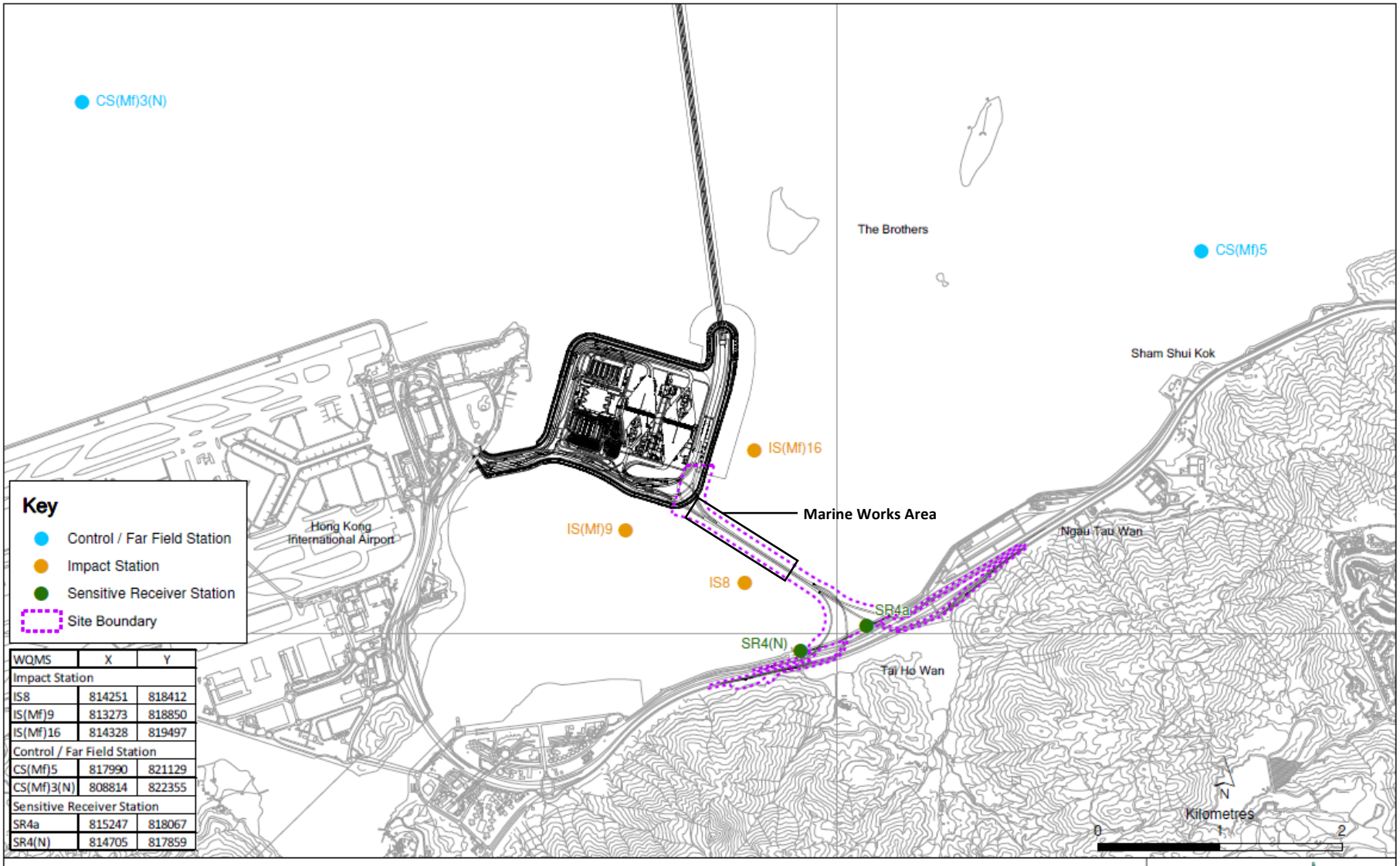
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Surface	1	28.8	7.9	22.2	5.2	5.1	1.2	5.5	2.2	3.5
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Surface	2	28.5	7.8	22.4	5.2		1.0		2.9	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Middle	1	28.7	7.9	23.1	5.0		6.9		4.3	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Middle	2	28.4	7.8	23.3	5.0		6.7		3.4	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Bottom	1	28.3	7.9	26.6	4.5	4.5	8.8		4.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)5	10:33	Bottom	2	28.1	7.8	26.9	4.5		8.5		4.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Surface	1	29.2	8.1	19.9	5.1	5.2	14.3	19.8	8.2	8.2
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Surface	2	29.0	8.0	19.9	5.2		14.7		7.3	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Middle	1	29.2	8.1	20.4	5.1		20.0		8.0	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Middle	2	29.0	8.0	20.4	5.2		20.1		8.6	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Bottom	1	29.2	8.1	20.6	5.1	5.1	24.9		8.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	CS(Mf)3(N)	11:54	Bottom	2	29.0	8.1	20.6	5.1		24.8		8.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Surface	1	28.8	7.9	22.4	5.2	5.2	4.3	5.4	4.9	5.3
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Surface	2	28.5	7.8	22.6	5.2		4.5		4.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Bottom	1	28.8	7.9	22.6	5.2	5.2	6.2		5.6	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)16	10:56	Bottom	2	28.5	7.8	22.8	5.2		6.5		6.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Surface	1	28.7	7.9	21.7	5.4	5.4	2.9	5.8	3.4	4.3
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Surface	2	28.4	7.8	22.0	5.4		2.9		3.8	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Bottom	1	28.7	7.9	21.8	5.5	5.5	8.6		4.8	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4a	11:07	Bottom	2	28.4	7.8	22.1	5.5		8.8		5.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Surface	1	28.7	7.9	21.7	5.4	5.4	3.0	5.4	5.3	5.6
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Surface	2	28.4	7.8	21.9	5.4		3.6		5.1	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Bottom	1	28.7	7.9	21.8	5.4	5.4	7.4		5.7	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	SR4(N)	11:14	Bottom	2	28.4	7.8	22.1	5.4		7.5		6.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Surface	1	28.7	7.9	21.7	5.4	5.4	1.0	1.8	6.2	7.1
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Surface	2	28.4	7.8	21.9	5.4		1.1		6.5	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Bottom	1	28.7	7.9	21.8	5.4	5.4	2.5		7.5	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS8	11:19	Bottom	2	28.4	7.8	22.0	5.4		2.4		8.2	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Surface	1	28.7	7.8	23.2	5.1	5.1	4.8	6.0	5.1	5.8
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Surface	2	28.4	7.8	23.4	5.1		4.5		4.8	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Middle	1									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Middle	2									
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Bottom	1	28.7	7.8	23.4	5.0	5.0	7.3		6.5	
TMCLKL	HY/2012/07	2018-08-17	Mid-Flood	IS(Mf)9	11:26	Bottom	2	28.5	7.8	23.6	5.0		7.2		6.9	

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

CONTRACT NO. HY/2012/07 – WQM SITE PHOTOS AT SR4(A) AND SR4(N) ON 17 AUGUST 2018

Photo 1 - Mid-Ebb at SR4(a) on 17 August 2018

Photo 2 - Mid-Ebb at SR4(N) on 17 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	21 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_20 August 2018_ Bottom-depth DO_E_Station IS(Mf)16
0215660_20 August 2018_ Bottom-depth DO_E_Station SR4a
0215660_20 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)
0215660_20 August 2018_ Bottom-depth DO_E_Station SR4(N)
0215660_20 August 2018_ Bottom-depth DO_E_Station IS8

A total of five exceedances were recorded on 20 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_20 August 2018_ Bottom-depth DO_E_Station IS(Mf)16** **0215660_20 August 2018_ Bottom-depth DO_E_Station SR4a** **0215660_20 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)** **0215660_20 August 2018_ Bottom-depth DO_E_Station SR4(N)** **0215660_20 August 2018_ Bottom-depth DO_E_Station IS8** **[Total No. of Exceedance = 5]**	
Date	20 August 2018 (Measured) 21 August 2018 (*In situ* results received by ERM) 29 August 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)16 (Bottom-depth DO = 4.4 mg/L); 2. Mid-ebb at SR4a (Bottom-depth DO = 4.4 mg/L); 3. Mid-ebb at SR4(N) (Surface and Middle-depth DO = 4.2 mg/L); 4. Mid-ebb at SR4(N) (Bottom-depth DO = 3.8 mg/L); 5. Mid-ebb at IS8 (Bottom-depth DO = 4.2 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 20 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • The bottom-level DO exceedances at IS(Mf)16, SR4a, SR4(N) and IS8 were similar to the control station where the bottom-depth DO were generally low. Low DO levels at water quality monitoring stations were likely due to high Salinity recorded at the bottom level which was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. The stratification of seawater in the water column is likely a contributing factor to the results of lower levels of DO at the bottom level as the DO exceedances recorded at the bottom level showed higher levels of Salinity than the middle and surface levels. • SR4(N) is relatively far from the works area. Apart from surface and middle-depth DO exceedance at SR4(N), levels of surface and middle- depth DO at all Impact stations, including those nearby the works area, were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • No particular observation was reported at IS(Mf)16, SR4a, SR4(N) and IS8.	

Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 20 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 20 August 2018 is attached.

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Surface	1	28.9	7.8	20.3	5.7	5.6	1.2	1.5	3.2	3.9
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Surface	2	29.1	7.9	20.1	5.6		2.0		3.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Middle	1	28.9	7.8	20.5	5.5		1.0		4.0	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Middle	2	29.1	7.9	20.3	5.5		2.0		3.9	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Bottom	1	27.7	7.8	29.0	4.5	4.5	1.0		4.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)5	8:16	Bottom	2	28.0	7.9	28.7	4.4		1.7		4.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Surface	1	29.2	8.1	18.9	5.4	5.1	2.3	3.7	4.0	4.8
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Surface	2	29.3	8.1	18.8	5.5		2.4		3.9	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Middle	1	28.9	8.1	23.5	4.7		3.6		4.6	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Middle	2	28.9	8.1	23.5	4.6		3.3		4.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Bottom	1	28.7	8.1	25.9	4.1	4.1	5.1		5.9	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	CS(Mf)3(N)	9:34	Bottom	2	28.7	8.1	25.9	4.1		5.2		5.7	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Surface	1	28.7	7.7	20.8	5.0	5.0	3.5	3.3	2.1	2.4
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Surface	2	28.9	7.8	20.5	5.0		4.2		2.6	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Bottom	1	28.4	7.7	24.9	4.4	4.4	2.7		2.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)16	8:46	Bottom	2	28.6	7.7	24.9	4.4		2.7		2.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Surface	1	29.1	7.7	19.4	5.5	5.5	3.4	6.6	3.7	5.4
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Surface	2	29.4	7.8	19.2	5.5		4.5		3.9	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Bottom	1	28.5	7.7	24.7	4.4	4.4	9.4		6.8	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4a	8:54	Bottom	2	28.8	7.6	24.2	4.3		9.1		7.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Surface	1	28.8	7.7	21.2	4.2	4.2	7.0	7.2	9.2	9.7
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Surface	2	29.0	7.7	21.0	4.2		6.3		9.6	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Bottom	1	28.7	7.7	22.8	3.8	3.8	7.7		10.0	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	SR4(N)	9:00	Bottom	2	29.0	7.7	22.5	3.8		7.7		9.8	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Surface	1	28.9	7.7	19.1	5.6	5.5	3.0	2.7	2.9	3.5
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Surface	2	29.1	7.9	19.2	5.3		1.7		3.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Bottom	1	28.8	7.7	23.7	4.2	4.2	3.7		4.3	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS8	9:05	Bottom	2	29.1	7.7	23.3	4.1		2.2		3.8	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Surface	1					6.2		1.6		4.3
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Surface	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Middle	1	29.3	7.8	19.0	6.2		1.6		4.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Middle	2	29.5	7.9	18.7	6.2		1.5		4.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Bottom	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Ebb	IS(Mf)9	9:13	Bottom	2									

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Surface	1	28.6	7.8	19.9	5.9	4.9	3.4	8.3	4.4	4.7
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Surface	2	28.8	8.0	19.9	5.9		4.3		3.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Middle	1	27.7	7.8	28.2	3.9		6.7		4.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Middle	2	27.9	7.9	27.9	3.9		6.8		4.8	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Bottom	1	27.0	7.8	31.1	3.6	3.6	14.4		5.8	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)5	16:00	Bottom	2	27.3	7.9	30.8	3.6		14.2		5.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Surface	1	29.8	8.1	15.6	6.7	6.1	3.4	4.7	4.6	4.7
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Surface	2	29.9	8.1	15.6	6.7		3.5		4.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Middle	1	29.4	8.0	19.0	5.5		3.3		4.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Middle	2	29.5	8.0	19.0	5.5		3.1		5.0	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Bottom	1	29.3	8.0	24.1	4.5	4.5	7.4		4.7	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	CS(Mf)3(N)	14:58	Bottom	2	29.1	8.0	24.2	4.5		7.4		4.6	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Surface	1	28.9	7.8	19.5	6.0	6.0	5.4	9.8	3.5	4.0
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Surface	2	29.1	8.0	19.2	6.0		5.2		3.7	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Bottom	1	28.7	7.8	21.4	4.9	4.9	14.2		4.3	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)16	15:35	Bottom	2	29.0	7.8	21.3	4.9		14.5		4.5	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Surface	1	29.1	7.8	18.0	6.2	6.2	9.7	12.2	5.2	6.1
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Surface	2	29.3	8.0	17.8	6.2		9.6		5.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Bottom	1	28.8	7.8	23.5	4.8	4.8	14.6		6.9	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4a	15:23	Bottom	2	29.0	7.8	23.2	4.7		14.7		7.0	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Surface	1	29.4	7.8	17.6	6.9	6.9	1.5	7.9	4.6	4.9
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Surface	2	29.6	8.0	17.4	6.8		1.0		4.4	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Bottom	1	29.0	7.8	21.4	5.3	5.3	14.6		5.3	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	SR4(N)	15:19	Bottom	2	29.3	7.8	21.3	5.2		14.6		5.2	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Surface	1	29.2	7.8	18.4	6.6	6.6	12.4	12.4	8.7	8.9
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Surface	2	29.5	8.0	18.1	6.6		12.3		8.2	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Middle	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Middle	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Bottom	1	29.1	7.8	20.6	6.0	6.0	12.5		9.6	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS8	15:14	Bottom	2	29.4	8.0	20.3	6.0		12.4		9.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Surface	1					6.8		6.3		6.1
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Surface	2									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Middle	1	29.3	7.8	18.3	6.8		6.4		6.1	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Middle	2	29.6	8.0	18.1	6.8		6.1		6.0	
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Bottom	1									
TMCLKL	HY/2012/07	2018-08-20	Mid-Flood	IS(Mf)9	15:05	Bottom	2									

Note: Indicates Exceedance of Action Level

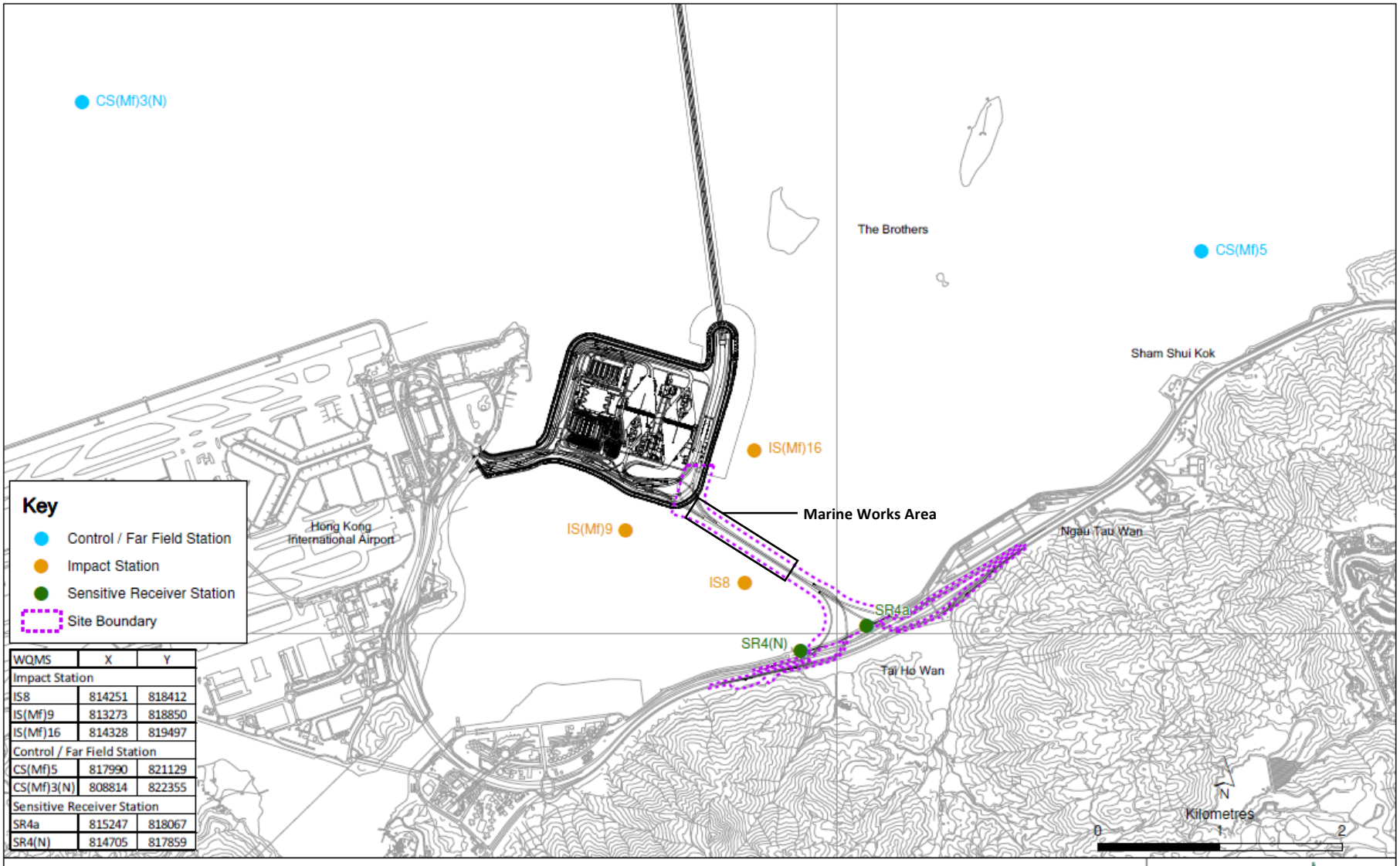
Indicates Exceedance of Limit Level

Photo 1 - Mid-Ebb at IS(Mf)16 on 20 August 2018

Photo 2 - Mid-Ebb at SR4a on 20 August 2018

Photo 3 - Mid-Ebb at SR4(N) on 20 August 2018

Photo 4 - Mid-Ebb at IS8 on 20 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
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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	27 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_22 August 2018_ Bottom-depth DO_E_Station IS(Mf)16
0215660_22 August 2018_ Bottom-depth DO_E_Station SR4a
0215660_22 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)
0215660_22 August 2018_ Bottom-depth DO_E_Station SR4(N)
0215660_22 August 2018_ Bottom-depth DO_E_Station IS8
0215660_22 August 2018_ Bottom-depth DO_E_Station IS(Mf)9
0215660_22 August 2018_ Bottom-depth DO_F_Station SR4a

A total of seven exceedances were recorded on 22 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_22 August 2018_ Bottom-depth DO_E_Station IS(Mf)16** **0215660_22 August 2018_ Bottom-depth DO_E_Station SR4a** **0215660_22 August 2018_ Surface and Middle-depth DO_E_Station SR4(N)** **0215660_22 August 2018_ Bottom-depth DO_E_Station SR4(N)** **0215660_22 August 2018_ Bottom-depth DO_E_Station IS8** **0215660_22 August 2018_ Bottom-depth DO_E_Station IS(Mf)9** **0215660_22 August 2018_ Bottom-depth DO_F_Station SR4a** **[Total No. of Exceedance = 7]**	
Date	22 August 2018 (Measured) 23 August 2018 (*In situ* results received by ERM) 03 September 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth Dissolved Oxygen (DO), Bottom-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance 1. Mid-ebb at IS(Mf)16 (Bottom-depth DO = 3.7 mg/L); 2. Mid-ebb at SR4a (Bottom-depth DO = 4.1 mg/L); 3. Mid-ebb at SR4(N) (Surface and Middle-depth DO = 4.8 mg/L); 4. Mid-ebb at SR4(N) (Bottom-depth DO = 3.6 mg/L); 5. Mid-ebb at IS8 (Bottom-depth DO = 3.6 mg/L); 6. Mid-ebb at IS(Mf)9 (Bottom-depth DO = 4.2 mg/L); 7. Mid-flood at SR4a (Bottom-depth DO = 4.4 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 22 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Low DO levels at IS(Mf)16, IS8 and IS(Mf)9 were likely due to high Salinity recorded at the bottom level which was possibly caused by the stratification of seawater during summer when the freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, which is probably responsible for the lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring stations. • SR4a and SR4(N) are relatively far from the works area. The low DO levels at SR4a and SR4(N) were likely due to stratification of seawater during summer, in which Salinity level at the bottom level was relatively higher than the surface and middle level. • No particular observation was reported at IS(Mf)16, SR4a, SR4(N), IS8 and IS(Mf)9.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	

Remarks	The monitoring results on 22 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 22 August 2018 is attached.

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Surface	1	28.6	7.8	23.7	5.5	4.9	3.9	5.5	4.2	4.9
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Surface	2	28.8	8.0	23.5	5.5		4.0		4.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Middle	1	28.1	7.8	26.1	4.3		5.3		4.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Middle	2	28.3	7.9	25.8	4.4		5.3		5.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Bottom	1	27.0	7.8	29.8	3.7	3.7	7.3		5.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)5	10:00	Bottom	2	27.3	7.9	29.5	3.7		6.9		4.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Surface	1	29.5	8.0	19.5	5.9	5.8	4.2	6.2	3.9	4.9
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Surface	2	29.6	8.0	19.5	6.0		4.0		3.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Middle	1	29.4	8.0	26.3	5.6		5.8		4.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Middle	2	29.3	8.0	26.3	5.5		6.1		5.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Bottom	1	29.6	8.0	25.7	5.7	5.7	8.4		6.2	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	CS(Mf)3(N)	11:28	Bottom	2	29.7	8.0	25.6	5.6		8.5		5.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Surface	1	28.9	7.8	22.9	5.2	5.2	4.0	5.8	3.9	4.5
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Surface	2	29.1	7.9	22.7	5.2		3.8		4.1	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Bottom	1	28.4	7.7	26.3	3.7	3.7	7.8		5.2	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)16	10:31	Bottom	2	28.7	7.8	26.0	3.7		7.6		4.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Surface	1	29.0	7.8	21.3	5.9	5.9	5.7	10.9	4.2	4.8
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Surface	2	29.3	8.0	21.0	5.9		5.7		3.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Bottom	1	28.3	7.8	25.4	4.1	4.1	16.4		5.6	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4a	10:37	Bottom	2	28.6	7.9	25.1	4.1		15.7		5.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Surface	1	29.0	7.8	21.0	4.8	4.8	7.5	10.2	6.5	7.3
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Surface	2	29.3	7.9	19.6	4.8		7.0		6.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Bottom	1	28.3	7.7	25.4	3.6	3.6	12.4		8.0	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	SR4(N)	10:45	Bottom	2	28.6	7.8	25.1	3.6		13.7		7.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Surface	1	29.4	7.8	21.7	5.8	5.8	6.0	9.1	4.0	4.6
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Surface	2	29.7	8.0	21.5	5.8		5.7		4.6	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Bottom	1	28.3	7.7	25.9	3.6	3.6	12.0		4.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS8	10:52	Bottom	2	28.6	7.8	25.6	3.6		12.8		5.0	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Surface	1	29.3	7.8	21.3	6.1	6.1	3.6	5.8	4.7	6.4
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Surface	2	29.6	8.0	21.0	6.1		3.4		5.2	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Bottom	1	28.6	7.7	24.2	4.2	4.2	8.0		7.5	
TMCLKL	HY/2012/07	2018-08-22	Mid-Ebb	IS(Mf)9	11:00	Bottom	2	28.9	7.9	24.0	4.2		8.0		8.0	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Surface	1	29.4	7.9	22.6	8.5	6.3	4.7	7.3	7.5	9.9
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Surface	2	29.7	8.0	22.4	8.5		4.4		7.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Middle	1	27.2	7.8	28.9	4.0		6.8		9.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Middle	2	27.5	7.7	28.6	4.0		7.0		10.0	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Bottom	1	26.5	7.8	31.0	3.6	3.6	10.1		11.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)5	18:00	Bottom	2	26.8	7.7	30.8	3.5		10.8		12.4	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Surface	1	30.7	8.1	17.0	7.3	7.3	6.8	7.9	5.7	6.7
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Surface	2	30.7	8.1	17.0	7.4		6.3		6.0	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Middle	1	30.7	8.1	16.9	7.2		8.1		6.8	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Middle	2	30.7	8.1	16.9	7.3		8.4		6.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Bottom	1	30.7	8.1	18.4	7.1	7.1	9.1		7.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	CS(Mf)3(N)	16:44	Bottom	2	30.7	8.0	18.4	7.1		8.9		7.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Surface	1	29.4	7.9	22.4	7.9	7.9	9.0	10.1	9.6	11.0
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Surface	2	29.7	8.0	22.2	7.9		8.4		9.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Bottom	1	28.5	7.9	24.8	5.5	5.5	11.7		12.0	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)16	17:34	Bottom	2	28.8	7.8	24.6	5.5		11.2		12.7	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Surface	1	30.1	7.9	21.3	9.5	9.4	11.3	15.1	9.2	9.9
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Surface	2	30.3	8.1	21.1	9.3		11.5		9.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Bottom	1	28.6	7.9	24.8	4.4	4.4	18.8		10.1	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4a	17:23	Bottom	2	28.8	7.7	24.6	4.4		18.6		10.4	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Surface	1	30.1	7.9	21.0	10.2	10.2	12.7	14.7	5.8	8.4
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Surface	2	30.3	8.1	20.8	10.2		12.8		6.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Bottom	1	29.1	7.9	23.5	6.6	6.6	16.6		10.9	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	SR4(N)	17:18	Bottom	2	29.4	7.9	23.2	6.5		16.7		10.5	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Surface	1	29.9	7.9	21.2	10.0	10.1	11.3	14.6	10.2	10.3
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Surface	2	30.2	8.1	20.9	10.1		11.4		10.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Bottom	1	29.7	7.9	21.7	9.2	9.2	18.0		10.2	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS8	17:12	Bottom	2	30.0	8.0	21.5	9.1		17.8		10.4	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Surface	1	29.9	7.9	22.0	9.2	9.3	8.2	10.9	5.7	6.6
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Surface	2	30.1	8.1	21.8	9.3		8.9		6.4	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Middle	1									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Middle	2									
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Bottom	1	28.9	7.9	24.8	4.9	4.9	13.1		7.3	
TMCLKL	HY/2012/07	2018-08-22	Mid-Flood	IS(Mf)9	17:04	Bottom	2	29.1	7.7	24.7	4.8		13.3		7.0	

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

Photo 1 - Mid-Ebb at IS(Mf)16 on 22 August 2018

Photo 2 - Mid-Ebb at SR4a on 22 August 2018

Photo 3 - Mid-Ebb at SR4(N) on 22 August 2018

Photo 4 - Mid-Ebb at IS8 on 22 August 2018

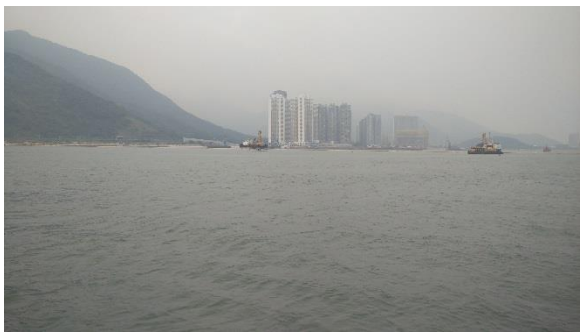
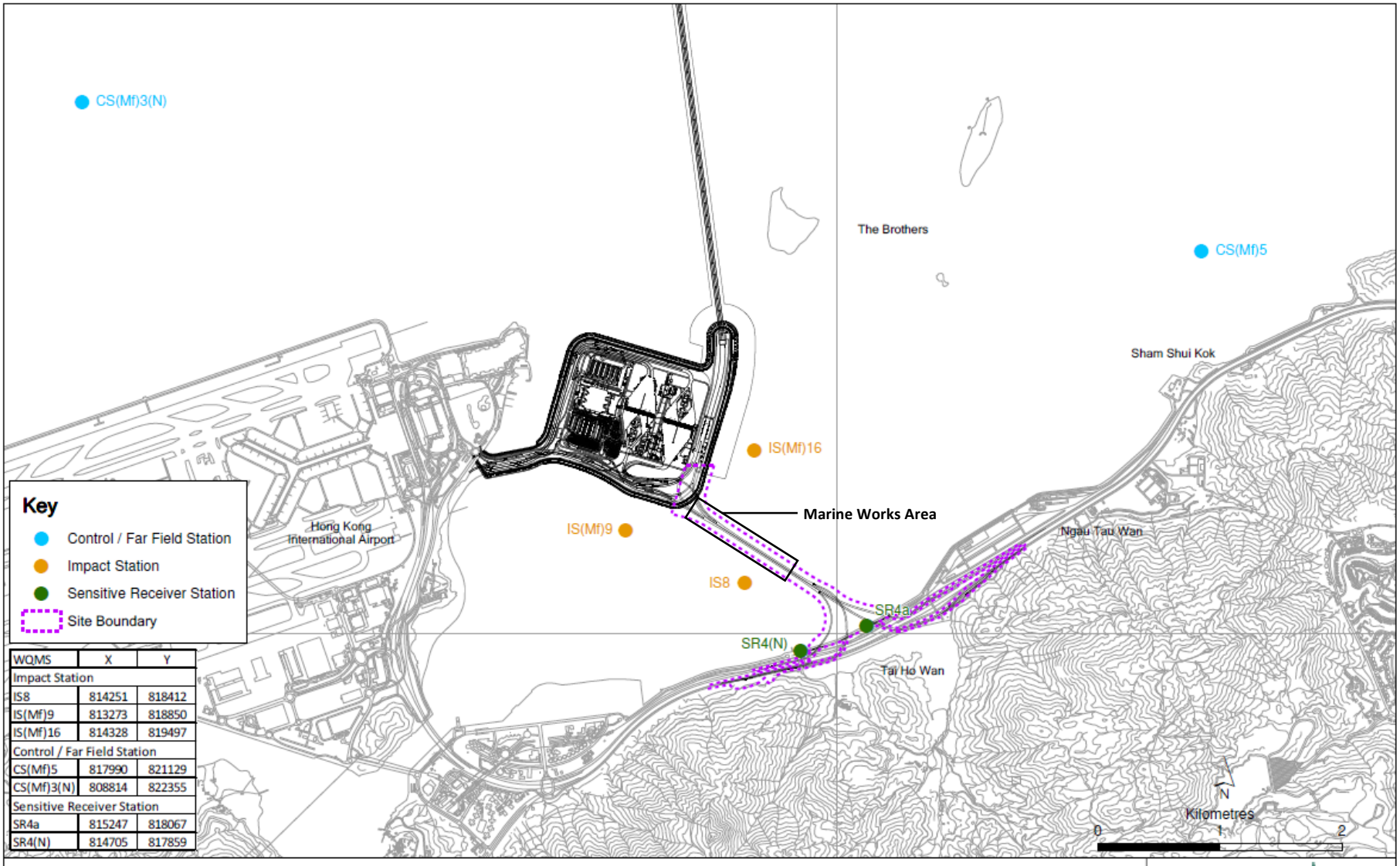


Photo 5 - Mid-Ebb at IS(Mf)9 on 22 August 2018

Photo 6 - Mid-Flood at SR4a on 22 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail:
jasmine.ng@erm.com

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	27 August 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_24 August 2018_ Bottom-depth DO_E_Station SR4(N)

A total of one exceedance was recorded on 24 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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

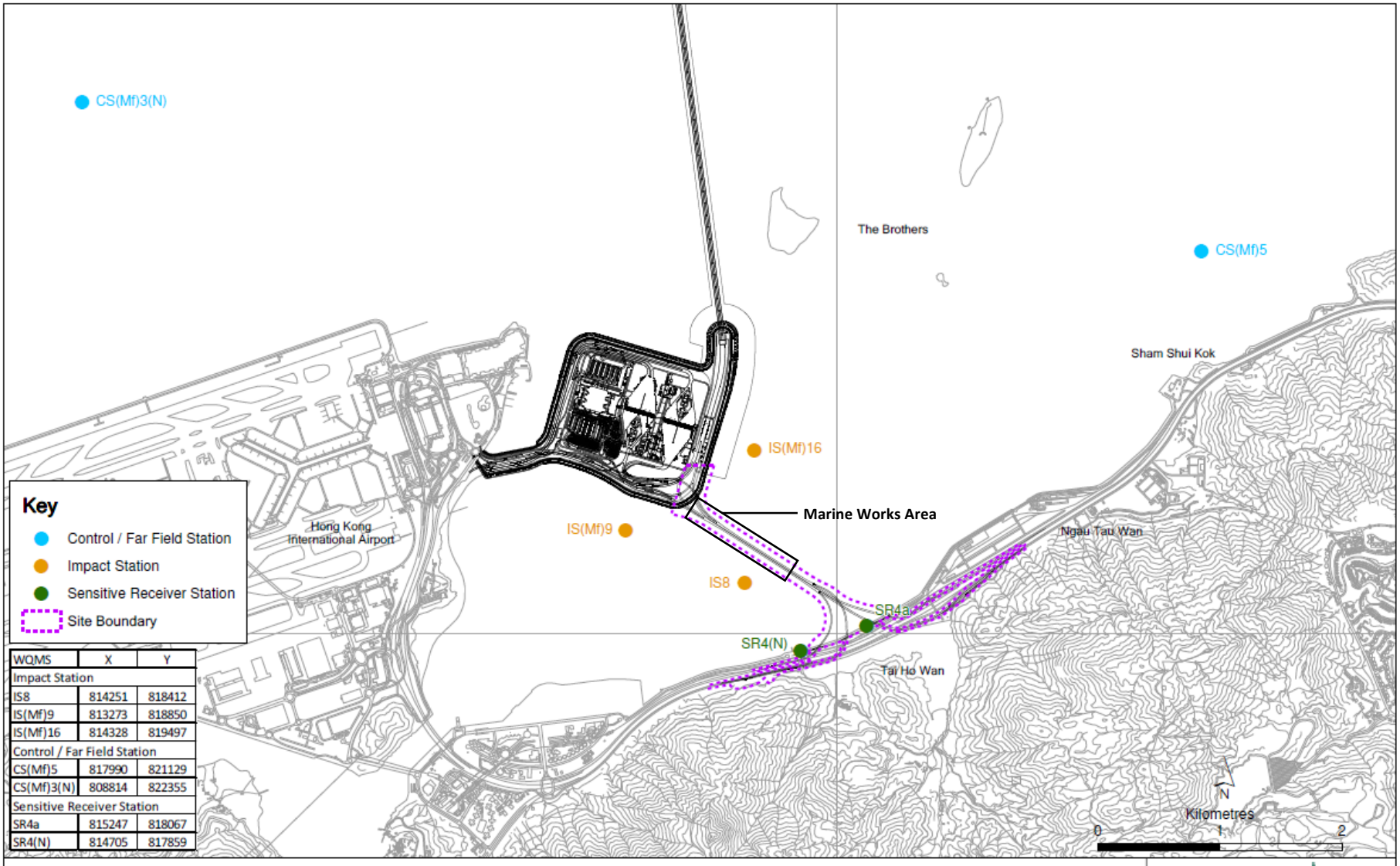
Log No.	**<u>Action Level Exceedance</u> 0215660_24 August 2018_ Bottom-depth DO_E_Station SR4(N) [Total No. of Exceedance = 1]**	
Date	24 August 2018 (Measured) 25 August 2018 (*In situ* results received by ERM) 05 September 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Bottom-depth DO	
Action Levels for DO	Bottom-depth DO	4.7 mg/L
Limit Levels for DO	Bottom-depth DO	3.6 mg/L
Measured Levels	<u>Action Level Exceedance</u> 1. Mid-ebb at SR4(N) (Bottom-depth DO = 3.9 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 24 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from SR4(N), levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • SR4(N) is relatively far from the works area. The low bottom-level DO at SR4(N) was likely due to stratification of seawater during summer, in which Salinity level at the bottom level was relatively higher than the surface and middle level. • No particular observation was reported at SR4(N).	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 24 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 24 August 2018 is attached.	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Surface	1	28.3	7.8	24.7	6.5	5.7	4.5	5.8	7.2	9.2
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Surface	2	28.6	7.9	24.4	6.5		4.4		7.4	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Middle	1	27.7	7.8	27.5	4.9		5.5		8.8	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Middle	2	27.9	7.8	27.2	4.9		5.4		9.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Bottom	1	26.3	7.8	31.0	4.0	4.0	7.8		11.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)5	11:26	Bottom	2	26.5	7.8	30.7	4.0		7.4		11.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Surface	1	29.4	8.2	21.8	8.2	6.4	2.2	7.5	5.1	5.9
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Surface	2	29.6	8.2	21.8	8.2		2.2		4.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Middle	1	28.7	8.0	27.3	4.7		7.9		5.5	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Middle	2	29.0	8.0	27.2	4.6		7.4		5.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Bottom	1	28.7	8.0	28.1	4.6	4.6	12.4		6.9	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	CS(Mf)3(N)	13:03	Bottom	2	28.9	8.0	28.1	4.5		12.9		7.4	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Surface	1	28.1	7.8	25.1	6.1	6.1	5.8	6.3	11.1	11.5
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Surface	2	28.4	7.9	24.7	6.1		5.9		10.8	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Bottom	1	27.5	7.8	27.8	4.9	4.9	6.4		12.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)16	11:59	Bottom	2	27.8	7.8	27.6	4.9		6.9		11.9	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Surface	1	28.9	7.8	22.4	7.5	7.6	4.6	11.7	7.6	9.6
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Surface	2	29.2	8.0	22.2	7.6		5.0		7.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Bottom	1	28.1	7.8	25.9	4.8	4.8	18.9		11.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4a	12:09	Bottom	2	28.3	7.8	25.6	4.8		18.4		12.3	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Surface	1	28.9	7.8	22.8	7.0	7.1	5.1	10.4	8.3	9.5
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Surface	2	29.2	8.0	22.6	7.1		5.0		8.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Bottom	1	28.2	7.7	25.4	3.9	3.9	15.8		10.8	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	SR4(N)	12:16	Bottom	2	28.5	7.7	25.1	3.8		15.7		10.3	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Surface	1	29.3	7.8	22.8	8.7	8.7	4.6	7.4	8.6	10.1
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Surface	2	29.6	8.1	22.6	8.7		5.1		8.3	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Bottom	1	28.6	7.8	25.3	5.5	5.4	9.7		11.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS8	12:23	Bottom	2	28.9	7.8	24.9	5.3		10.0		11.9	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Surface	1	28.7	7.8	23.2	8.2	8.3	8.2	10.8	4.4	6.1
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Surface	2	29.0	8.1	22.9	8.3		8.0		4.5	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Bottom	1	28.3	7.8	25.7	5.8	5.8	13.1		7.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Ebb	IS(Mf)9	12:33	Bottom	2	28.6	7.8	25.4	5.8		13.7		7.7	

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Surface	1	28.2	7.8	25.7	5.9	5.0	4.5	7.0	5.6	7.6
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Surface	2	28.5	7.9	25.3	6.0		5.0		5.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Middle	1	26.7	7.8	29.8	4.1		6.2		7.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Middle	2	27.0	7.8	29.5	4.1		6.0		7.5	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Bottom	1	26.4	7.8	30.5	4.2	4.2	10.4		9.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)5	19:03	Bottom	2	26.7	7.8	30.1	4.2		9.6		10.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Surface	1	30.2	8.0	18.7	6.1	6.0	3.1	4.0	6.0	8.9
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Surface	2	30.0	7.9	18.7	6.2		3.2		7.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Middle	1	30.1	8.0	19.4	5.9		3.6		9.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Middle	2	29.9	7.9	19.3	5.9		3.4		9.3	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Bottom	1	29.1	7.9	24.9	5.2	5.2	5.4		11.1	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	CS(Mf)3(N)	17:41	Bottom	2	28.9	7.9	24.6	5.2		5.2		11.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Surface	1	29.0	7.9	23.6	9.7	9.8	8.8	12.2	6.3	7.8
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Surface	2	29.3	8.2	23.4	9.8		9.5		5.9	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Bottom	1	28.6	7.9	24.8	7.4	7.4	14.9		9.8	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)16	18:35	Bottom	2	28.9	8.0	24.5	7.3		15.6		9.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Surface	1	29.3	7.9	22.7	10.3	10.4	7.2	8.3	9.6	11.6
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Surface	2	29.5	8.2	22.5	10.4		7.7		9.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Bottom	1	28.9	7.9	23.6	8.1	8.2	9.2		13.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4a	18:24	Bottom	2	29.1	8.0	23.3	8.2		9.1		13.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Surface	1	29.2	7.9	22.8	9.6	9.6	8.8	12.3	11.2	13.4
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Surface	2	29.5	8.1	22.6	9.6		9.2		11.8	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Bottom	1	28.8	7.9	24.1	8.3	8.2	15.4		15.4	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	SR4(N)	18:19	Bottom	2	29.1	8.0	23.8	8.1		15.6		15.0	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Surface	1	29.0	7.9	23.6	9.1	9.2	16.3	18.1	11.4	14.9
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Surface	2	29.3	8.1	23.3	9.2		16.9		10.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Bottom	1	28.8	7.9	24.1	7.9	8.0	19.3		18.7	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS8	18:12	Bottom	2	29.1	8.0	23.8	8.0		19.7		18.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Surface	1	28.9	7.9	24.3	8.4	8.4	19.9	20.5	10.1	11.0
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Surface	2	29.2	8.1	24.1	8.4		19.3		10.2	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Middle	1									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Middle	2									
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Bottom	1	28.9	7.9	24.4	8.1	8.2	21.0		11.6	
TMCLKL	HY/2012/07	2018-08-24	Mid-Flood	IS(Mf)9	18:03	Bottom	2	29.1	8.0	24.1	8.2		21.6		12.0	

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

Photo 1 - Mid-Ebb at SR4(N) on 24 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507,
25/F One Harbourfront,
18 Tak Fung Street,
Hung Hom, Hong Kong
Telephone: (852) 2271 3113
Facsimile: (852) 2723 5660
E-mail: jovy.tam@erm.com

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	03 September 2018

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_29 August 2018_ Surface and Middle-depth DO_F_Station SR4(N)
0215660_29 August 2018_ Surface and Middle-depth DO_F_Station IS(Mf)9

A total of two exceedances were recorded on 29 August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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.	**Action Level Exceedance** **0215660_29 August 2018_ Surface and Middle-depth DO_F_Station SR4(N)** **0215660_29 August 2018_ Surface and Middle-depth DO_F_Station IS(Mf)9** **[Total No. of Exceedance = 2]**	
Date	29 August 2018 (Measured) 30 August 2018 (*In situ* results received by ERM) 07 September 2018 (Laboratory results received by ERM)	
Monitoring Station	CS(Mf)5, SR4a, SR4, IS8, IS(Mf)16, IS(Mf)9, CS(Mf)3(N)	
Parameter(s) with Exceedance(s)	Surface and Middle-depth DO	
Action Levels for DO	Surface and Middle-depth DO	5.0 mg/L
Limit Levels for DO	Surface and Middle-depth DO	4.2 mg/L
Measured Levels	Action Level Exceedance 1. Mid-flood at SR4(N) (Surface and Middle-depth DO = 4.9 mg/L); 2. Mid-flood at IS(Mf)9 (Surface and Middle-depth DO = 4.9 mg/L)	
Works Undertaken (at the time of monitoring event)	Demolition of marine platform was undertaken at Viaduct E under this Contract on 29 August 2018.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of DO are unlikely to be due to the Project, in view of the following • All monitored parameters, except DO, at all monitoring stations were in compliance with the Action and Limit Levels during both mid-ebb and mid-flood tides on the same day. • Apart from marginal DO exceedances at SR4(N) and IS(Mf)9, levels of DO at all Impact stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • DO levels at SR4(N) and IS(Mf)9 are similar to the control station CS(Mf)5 where surface and middle-depth DO is relatively low during summer period. • No particular observation was reported at SR4(N) and IS(Mf)9.	
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.	
Remarks	The monitoring results on 29 August 2018 and locations of water quality monitoring stations are attached. Site photo record on 29 August 2018 is attached.	

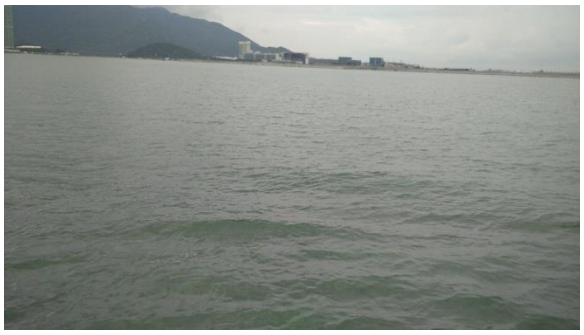
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Surface	1	27.8	8.2	25.5	5.0	4.8	7.4	8.6	9.5	9.9
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Surface	2	27.8	8.1	25.7	5.0		7.5		9.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Middle	1	27.5	8.2	26.6	4.7		9.9		9.5	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Middle	2	27.5	8.1	26.9	4.6		10.0		9.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Bottom	1	27.7	8.2	26.0	4.7	4.7	8.3		10.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)5	14:11	Bottom	2	27.7	8.1	26.3	4.7		8.4		10.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Surface	1	28.6	7.9	21.7	5.4	5.3	4.1	4.4	4.5	6.6
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Surface	2	28.6	7.8	21.5	5.3		4.3		4.8	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Middle	1	28.3	7.9	23.0	5.2		4.6		6.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Middle	2	28.3	7.9	22.9	5.2		4.2		5.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Bottom	1	28.2	7.9	23.2	5.3	5.3	4.9		9.1	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	CS(Mf)3(N)	13:16	Bottom	2	28.2	7.9	23.1	5.2		4.5		9.1	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Surface	1	28.0	8.2	24.9	5.0	5.0	8.0	9.2	5.8	7.7
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Surface	2	28.0	8.1	25.2	5.0		8.1		5.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Bottom	1	28.0	8.2	25.1	5.0	4.9	10.2		9.5	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)16	13:48	Bottom	2	28.0	8.1	25.4	4.8		10.3		9.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Surface	1	28.0	8.2	24.9	5.2	5.2	7.9	8.0	5.8	6.8
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Surface	2	28.0	8.1	25.2	5.1		8.0		5.6	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Bottom	1	28.0	8.2	25.0	5.1	5.1	7.9		7.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4a	13:35	Bottom	2	28.0	8.1	25.3	5.1		8.0		8.2	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Surface	1	28.1	8.2	24.8	5.2	5.2	7.1	7.2	9.5	10.4
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Surface	2	28.1	8.1	25.1	5.2		7.2		10.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Bottom	1	28.1	8.2	24.9	5.2	5.2	7.2		11.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	SR4(N)	13:32	Bottom	2	28.1	8.1	25.1	5.2		7.3		10.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Surface	1	28.0	8.2	25.2	5.2	5.2	10.3	10.4	6.5	7.9
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Surface	2	28.0	8.1	25.4	5.2		10.4		6.8	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Bottom	1	28.0	8.2	25.2	4.9	4.9	10.3		8.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS8	13:27	Bottom	2	28.0	8.1	25.5	4.8		10.4		9.2	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Surface	1	28.1	8.2	24.8	5.1	5.1	6.5	6.6	9.0	10.0
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Surface	2	28.1	8.1	25.0	5.1		6.6		9.1	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Bottom	1	28.1	8.2	24.7	5.1	5.1	6.6		10.8	
TMCLKL	HY/2012/07	2018-08-29	Mid-Ebb	IS(Mf)9	13:22	Bottom	2	28.1	8.1	25.0	5.1		6.7		11.2	

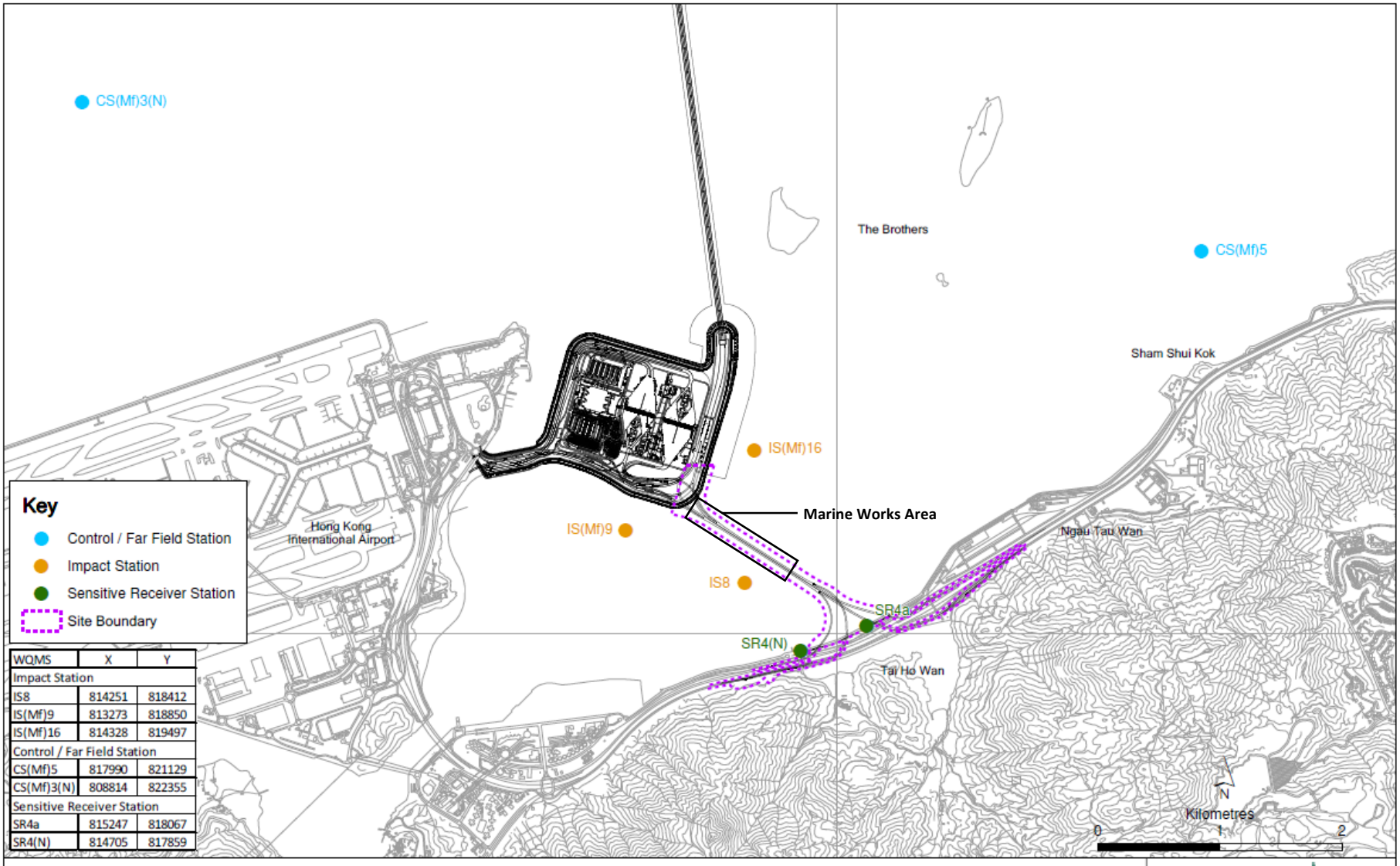
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-Averaged Turbidity	SS (mg/L)	Depth-Averaged SS
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Surface	1	28.0	8.2	24.5	5.1	5.0	6.5	7.8	7.4	8.1
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Surface	2	28.0	8.1	24.8	5.1		6.7		7.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Middle	1	27.7	8.2	25.7	4.8		8.5		8.5	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Middle	2	27.7	8.1	26.0	4.8		8.7		7.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Bottom	1	27.6	8.1	27.0	4.7	4.7	8.1		8.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)5	7:39	Bottom	2	27.6	8.1	27.4	4.6		8.3		8.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Surface	1	28.3	8.0	22.4	5.2	5.2	10.0	14.6	13.6	16.2
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Surface	2	28.4	8.0	22.2	5.2		10.1		13.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Middle	1	28.3	8.0	22.5	5.1		13.2		14.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Middle	2	28.4	8.0	22.3	5.1		13.2		15.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Bottom	1	28.2	7.9	22.8	5.1	5.1	20.4		19.5	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	CS(Mf)3(N)	8:50	Bottom	2	28.3	7.9	22.6	5.1		20.6		20.1	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Surface	1	27.8	8.2	23.1	5.2	5.2	6.3	7.7	7.8	8.7
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Surface	2	27.8	8.1	25.0	5.2		6.4		8.1	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Bottom	1	27.8	8.2	25.2	5.1	5.1	9.0		9.0	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)16	8:02	Bottom	2	27.8	8.1	25.6	5.1		9.2		9.9	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Surface	1	27.8	8.2	25.1	5.0	5.0	14.3	14.7	9.8	17.0
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Surface	2	27.8	8.1	25.4	4.9		14.4		10.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Bottom	1	27.8	8.2	25.2	4.9	4.9	14.9		24.0	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4a	8:11	Bottom	2	27.8	8.1	25.5	4.9		15.0		23.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Surface	1	27.8	8.1	25.3	4.9	4.9	6.8	7.0	8.4	8.8
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Surface	2	27.9	8.1	25.6	4.9		6.9		8.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Bottom	1	27.8	8.1	25.4	4.9	4.9	7.0		9.4	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	SR4(N)	8:18	Bottom	2	27.8	8.1	25.8	4.9		7.1		9.0	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Surface	1	27.8	8.2	25.0	5.1	5.1	10.9	11.8	7.0	8.4
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Surface	2	27.9	8.1	25.3	5.1		11.0		7.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Bottom	1	27.8	8.2	25.2	5.1	5.1	12.6		9.3	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS8	8:23	Bottom	2	27.8	8.1	25.5	5.0		12.7		9.7	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Surface	1	27.8	8.1	25.5	4.9	4.9	12.7	12.0	7.0	10.0
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Surface	2	27.8	8.1	25.8	4.9		12.8		7.8	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Middle	1									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Middle	2									
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Bottom	1	27.8	8.1	25.4	5.0	5.0	11.2		12.8	
TMCLKL	HY/2012/07	2018-08-29	Mid-Flood	IS(Mf)9	8:29	Bottom	2	27.8	8.1	25.7	4.9		11.3		12.2	

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

Photo 1 - Mid-Flood at SR4(N) on 29 August 2018

Photo 2 - Mid-Flood at IS(Mf)9 on 29 August 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2507
25/F
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18 Tak Fung Street
Hunghom
Kowloon
Hong Kong
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E-mail: jasmine.ng@erm.com

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	13 September 2018

Dear Sir or Madam,

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

0215660_June/August2018_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact dolphin monitoring data between June and August 2018.

Regards,

Dr Jasmine Ng
Environmental Team Leader

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_Jun/Aug2018_dolphin_STG&ANI_NEL&NWL** **[Total No. of Exceedance = 1]**	
Date	June to August 2018 (monitored) 2 October 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 = 1.16 & ANI = 2.87
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between June and August 2018. The exceedance was reported in the approved *Fifty-eighth Monthly EM&A Report* dated 12 September 2018.	
Statistical Analyses	Further to the review of the available and relevant dolphin monitoring data in the EM&A under this Contract, statistical analyses were conducted as follows: • A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present impact quarter, June to August 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 $\alpha = 0.05$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0022$) and ANI ($p = 0.0144$) were detected between Periods. • A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters, December 2012 to August 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 $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.000000$) between Cumulative Period (baseline and impact phases) and Location (NEL and NWL) were detected. * Note: The commencement date under *Contract No. HY/2012/07* is 31 October 2013.	
Works Undertaken (in the monitoring quarter)	In the quarter between June and August 2018, no marine works was undertaken under *Contract No. HY/2012/07*.	

Possible Reason for Action or Limit Level Exceedance(s)	The potential factors that may have contributed to the observed exceedance are reviewed below: • Blocking of CWD travelling corridor: The *Monitoring of Marine Mammals in Hong Kong Waters (2017 – 18)* (1) reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this Contract), which is likely one of the factors resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: As per the findings from the EIA report (*Section 8.11.9*), the major influences on the Chinese White Dolphin (CWD) *Sousa chinensis* under this Contract are marine traffics and bored piling works. The *Monitoring of Marine Mammals in Hong Kong Waters (2017-2018)* 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 *EP-354/2009/D* and the updated *EM&A Manual*. 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. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between June and August 2018, there were one (1) Limit Level of Suspended Solids (SS) exceedances, one (1) Action Level of Turbidity, thirty-seven (37) Action Level of Dissolved Oxygen (DO) and three (3) Limit Level of DO 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* of the *19th Quarterly EM&A Report (June – August 2018).* 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.

(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/files/Final_Report_2016_17.pdf

Actions Taken / To Be Taken	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: 1. 250m dolphin exclusion zone; 2. Acoustic decoupling plan; 3. Training to workers; 4. Offsite vessel routing control in accordance with Regular Marine Travel Routes Plan, including routing control within existing marine park boundaries; 5. Vessels speed limited at 5 knots and 10 knots within existing marine park boundaries and site boundary respectively; 6. Idling and mooring of working vessels within site boundary 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). A joint team meeting was held on 4 September 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/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. 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. 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 / transhipment 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. 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.
Remarks	The results of impact water quality and impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved *Fifty-sixth* to *Fifty-eighth Monthly EM&A Reports*. Comparison on water quality between impact and baseline periods is elaborated in the *19th Quarterly EM&A Report*.

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

ENVIRONMENTAL COMPLAINT/ ENQUIRY FORM

Complaint/ ~~Enquiry~~ Received*
Date: 16 June 2018 Time: Undisclosed From: 1823 Via: Email
Complainant/ ~~**Enquirer***~~: Name: Undisclosed Tel: Undisclosed Address: Undisclosed Media: ~~Dust~~ / Noise / ~~Water Quality~~ / ~~Other~~ Description: A complaint case was received on 16 June 2018 regarding road construction noise nuisance nearby the Kowloon-bound lane of the North Lantau Highway. The complainant lived in Tower 11 of Caribbean Coast. The complainant added the road construction works undertaken nearby have caused noise nuisance over half year. The complainant enquired the completion period of the relevant construction works and any mitigation measures to lower the noise nuisance caused by the construction works. The Environmental Team (ET) received the complaint notification from the Supervising Officer's Representative (SOR) on 27 June 2018.

Investigation Report & Response

Construction Noise Permit (CNP) for night-time works (CNP no. GW-RS0462-18) and work records were reviewed immediately upon receiving the complaint. According to the work records provided by the Contractor, construction works nearby the Kowloon-bound lane of the North Lantau Highway under this Contract included temporary traffic arrangement in vicinity of Tai Ho Wan for installation of sign gantries (*Figure 1*). Relevant construction works commenced on 26 April 2018. As informed by the Contractor, quiet powered mechanical equipment (QPME) was deployed for night-time works during the concerned period. It is considered that the Contractor has complied with the corresponding conditions outlined in the CNP no. GW-RS0462-18. No non-compliance was identified.

Other concurrent contracts (other than this Contract) in the past six months were examined. According to the information provided by Highways Department, works nearby Caribbean Coast included Contract No. 03/HY/2015 and DC/2016/01 which involved road maintenance works in vicinity of Siu Ho Wan and construction of additional sewage rising main between Tung Chung and Siu Ho Wan, respectively. In view of other concurrent contracts nearby and the large distance between the work area under this Contract and Caribbean Coast (over 500m), we considered that noise source from works under this Contract was not dominant in comparison with those two adjacent projects mentioned above.

In addition, Impact Noise Monitoring results between 25 April 2018 and 21 June 2018 were reviewed (*refer below*). No exceedance on noise monitoring was recorded. The recorded levels of noise level on 25 April 2018 and 21 June 2018 were well below the Limit Level of the corresponding construction noise level (75 dB(A) for 0700-1900 hours on normal weekdays) (*refer to Noise Monitoring results below*).

Based on the above, this complaint was considered not related to this Contract.

Nevertheless, the Contractor has been reminded to lower communication voice between workers during the construction works. Relevant construction works ended on 22 June 2018.

Mitigation Measures and Follow-Up Actions Recommended to Contractor

The Contractor has been reminded to strictly comply with all conditions stipulated in the CNP undertaken during restricted hours.

Date of File Closed : 09 July 2018

Approved and Filed by:

(Jovy Tam, ET Leader)
Date: 09 July 2018

HY/2012/07 Noise Monitoring

Project	Works	Date (yyyy-mm-dd)	Station	Time (hh:mm, 24hour)	Parameter	Results	Unit
TMCLKL	HY/2012/07	2018-04-25	NSR1A	13:45	Leq 30 min	63	dB(A)
TMCLKL	HY/2012/07	2018-04-28	NSR1A	9:31	Leq 30 min	64	dB(A)
TMCLKL	HY/2012/07	2018-05-04	NSR1A	9:32	Leq 30 min	64	dB(A)
TMCLKL	HY/2012/07	2018-05-10	NSR1A	10:04	Leq 30 min	64	dB(A)
TMCLKL	HY/2012/07	2018-05-16	NSR1A	10:25	Leq 30 min	63	dB(A)
TMCLKL	HY/2012/07	2018-05-19	NSR1A	9:29	Leq 30 min	64	dB(A)
TMCLKL	HY/2012/07	2018-05-25	NSR1A	9:30	Leq 30 min	62	dB(A)
TMCLKL	HY/2012/07	2018-05-31	NSR1A	9:54	Leq 30 min	62	dB(A)
TMCLKL	HY/2012/07	2018-06-06	NSR1A	10:33	Leq 30 min	63	dB(A)
TMCLKL	HY/2012/07	2018-06-12	NSR1A	10:15	Leq 30 min	62	dB(A)
TMCLKL	HY/2012/07	2018-06-15	NSR1A	9:25	Leq 30 min	69	dB(A)
TMCLKL	HY/2012/07	2018-06-21	NSR1A	10:00	Leq 30 min	63	dB(A)

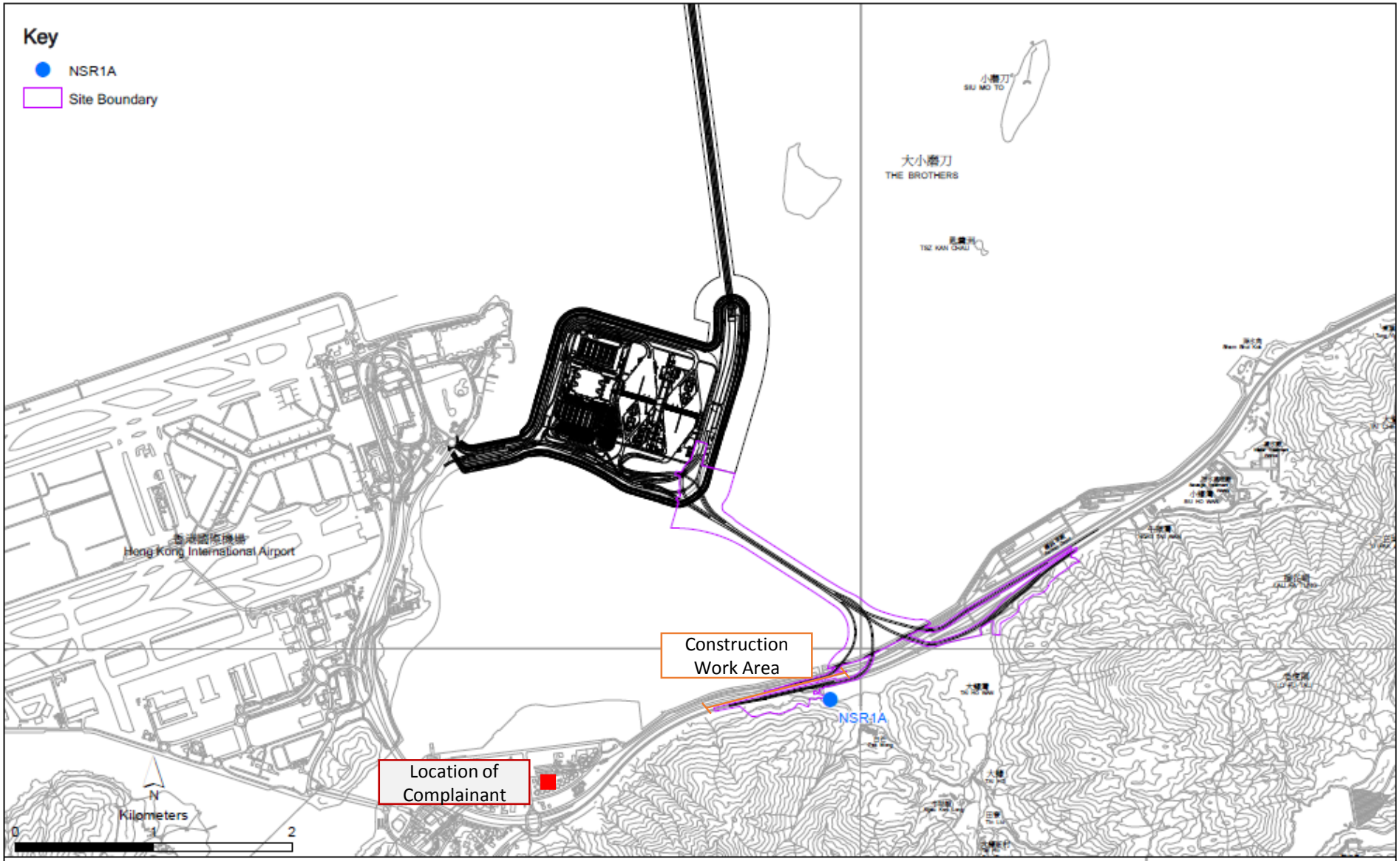

Figure 1

Locations of Noise Monitoring Stations

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Date: 7/1/2015

Environmental Resources Management

ERM

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

ENVIRONMENTAL COMPLAINT/ ENQUIRY FORM

Complaint/ ~~Enquiry~~ Received*
Date: 22 June 2018 Time: Undisclosed From: 1823 Via: Email
Complainant/ ~~**Enquirer***~~: Name: Undisclosed Tel: Undisclosed Address: Undisclosed Media: ~~Dust~~ / ~~Noise~~ / Water Quality / ~~Other~~ Description: A complaint case was received regarding discharge of muddy water from Hong Kong Boundary Crossing Facilities (HKBCF) of Hong Kong–Zhuhai–Macao Bridge (HZMB) Projects on 13 June 2018. The complainant added the discharge of muddy water was observed nearby HKBCF facing the Century Link. The Environmental Team (ET) received the complaint notification from the Supervising Officer's Representative (SOR) on 22 June 2018.

Investigation Report & Response

Based on the work records provided by the Contractor, no marine works i.e. excavation works was undertaken under this Contract on 13 June 2018. Major works on the same day included land-based works i.e. segment erection within the Site boundary of HKBCF (*Figure 1*).

According to ET's weekly site inspection records on 13th June 2018, no discharge of surface run-off and muddy water observed in the sea adjacent to the works area. Open stockpiles of aggregates and soil in HKBCF were observed being covered with tarpaulin and sand bags were observed being provided to prevent the washout of sand and other construction materials to the nearby water body (*Annex A*).

Water Quality Monitoring results on 13 June 2018 were reviewed (*refer below*). No exceedance on water quality parameters was observed. The recorded levels of depth-averaged turbidity and suspended solids at all water quality stations during the concerned period were well below the Action Level of the corresponding water quality parameters (Action Level of turbidity and suspended solid are 27.5 NTU and 23.5 mg/L respectively). In addition, no particular observation was noticed nearby the water quality monitoring stations on 13 June 2018.

Based on the above, there is no evidence to prove that the complaint case is related to this Contract.

Mitigation Measures and Follow-Up Actions Recommended to Contractor

Based on the findings of the investigation, there is no evidence to prove that the complaint case is related to this Contract and thus no further action is required. The Contractor has been reminded that wastewater generated from construction works should be collected, treated, neutralized, and desilted before discharge. In addition, the Contractor has been reminded to cover stockpiles with tarpaulin and place sand bags to avoid washout of construction materials where necessary in order to ensure the compliance with all the conditions under the Effluent Discharge License.

Date of File Closed : 09 July 2018

Approved and Filed by:

(Jovy Tam, ET Leader)
Date: 09 July 2018

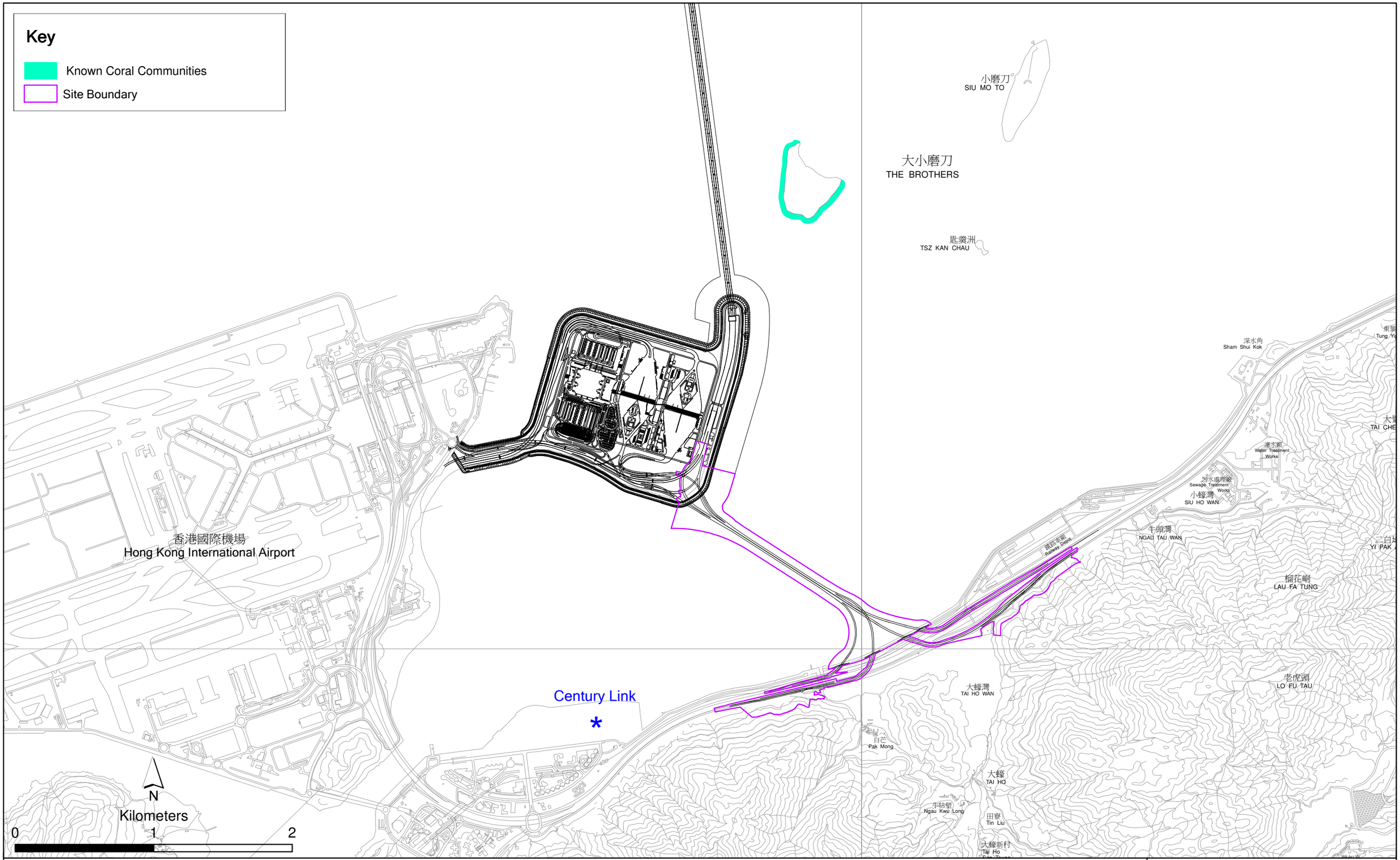


Figure 1

General Site Layout

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_Environmental_Sensitive_Receiver.mxd
Date: 18/5/2015

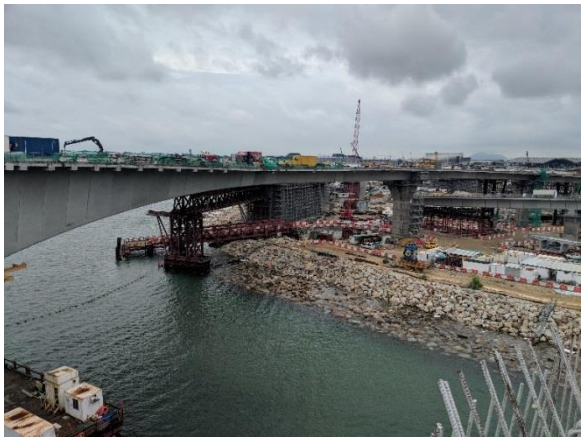
Environmental Resources Management

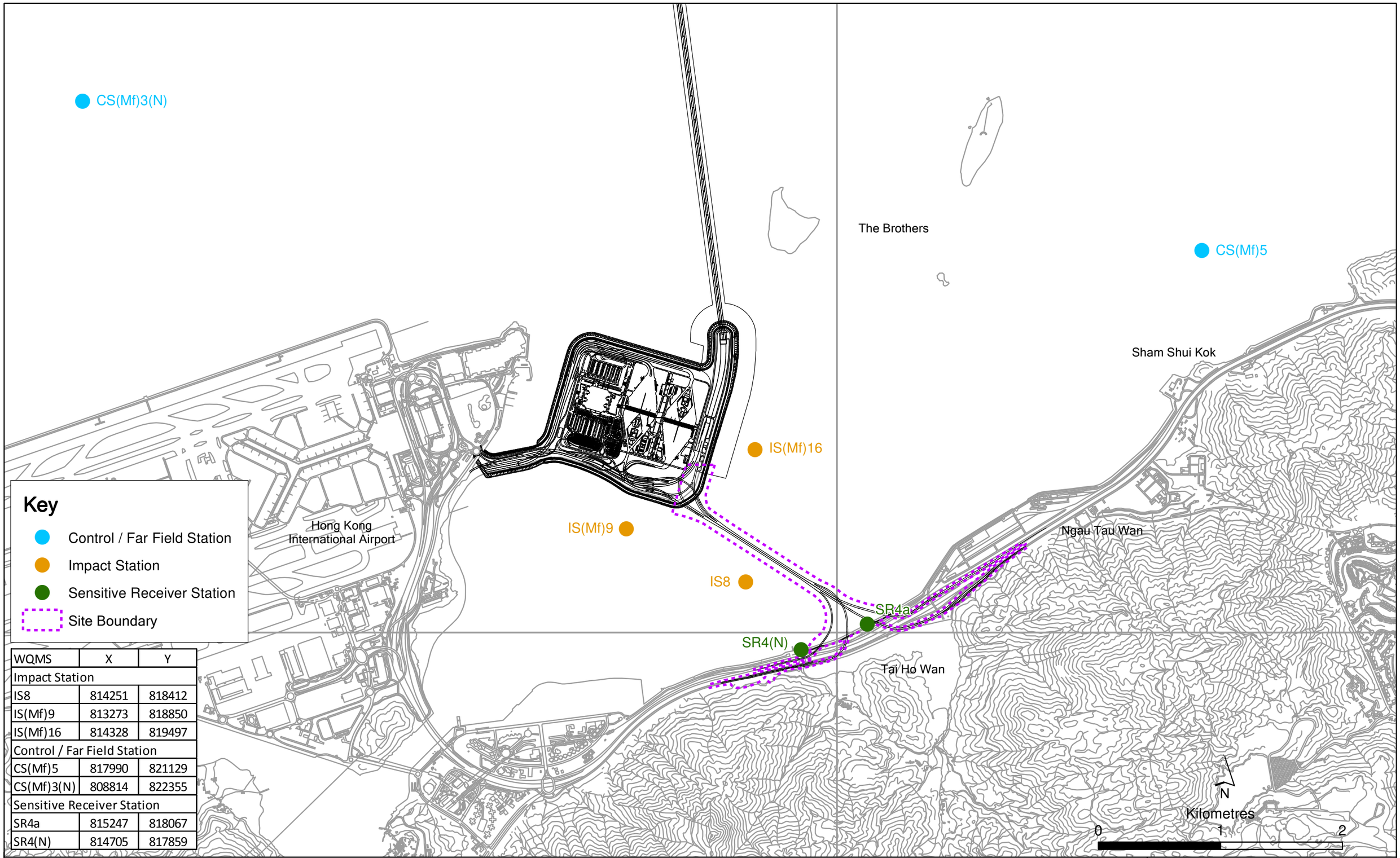
ERM

Annex A

Photos of ET weekly site inspection on 13 June 2018

Photo 1– No discharge of surface run-off and muddy water observed in the sea adjacent to the works area on 13 June 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		
SR4a	815247	818067
SR4(N)	814705	817859

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 20/3/2018

Environmental Resources Management

ERM

Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}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	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Surface	1	28.2	7.8	21.1	5.4	5.3	5.0	6.6	3.8	5.1
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Surface	2	28.3	7.9	21.3	5.4		4.7		5.1	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Middle	1	28.2	7.8	21.7	5.2		5.3		6.3	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Middle	2	28.2	7.9	21.9	5.2		5.3		4.1	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Bottom	1	28.2	7.8	24.4	4.9	4.9	9.5		5.2	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)5	11:56	Bottom	2	28.2	7.9	24.8	4.9		9.5		5.8	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Surface	1	28.5	7.9	17.1	5.7	5.6	2.0	5.8	2.6	3.0
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Surface	2	28.7	8.1	17.1	5.8		2.2		3.3	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Middle	1	28.4	7.9	18.0	5.4		5.7		3.0	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Middle	2	28.6	8.0	18.0	5.5		5.4		2.9	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Bottom	1	28.3	7.9	20.5	4.9	4.9	9.9		3.0	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	CS(Mf)3(N)	13:21	Bottom	2	28.6	8.0	20.6	4.9		9.6		3.4	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Surface	1	28.4	7.8	21.4	5.4	5.4	4.0	3.2	1.2	1.8
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Surface	2	28.4	7.9	21.7	5.4		4.4		1.9	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Middle	1									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Middle	2									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Bottom	1	28.2	7.8	23.8	5.0	5.0	2.2		1.8	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)16	12:37	Bottom	2	28.2	7.9	24.2	5.0		2.2		2.1	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Surface	1	28.3	7.8	20.7	5.1	5.2	7.7	10.4	3.5	3.2
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Surface	2	28.3	7.9	21.0	5.2		8.2		3.9	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Middle	1									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Middle	2									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Bottom	1	28.3	7.8	23.5	5.1	5.1	12.9		3.0	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4a	12:46	Bottom	2	28.3	7.8	23.8	5.1		12.7		2.4	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Surface	1	28.2	7.7	19.4	5.5	5.5	6.8	6.8	2.4	2.9
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Surface	2	28.2	7.8	19.7	5.4		6.5		2.8	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Middle	1									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Middle	2									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Bottom	1	28.4	7.7	19.8	5.1	5.1	7.2		2.8	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	SR4(N)	12:53	Bottom	2	28.4	7.8	20.0	5.1		6.7		3.6	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Surface	1	28.4	7.8	20.8	5.7	5.7	2.2	3.7	2.3	2.4
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Surface	2	28.4	7.9	21.0	5.7		2.5		2.2	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Middle	1									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Middle	2									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Bottom	1	28.4	7.8	21.4	5.1	5.1	4.9		2.7	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS8	13:00	Bottom	2	28.4	7.8	21.7	5.1		5.2		2.4	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Surface	1					6.6		6.6		1.6
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Surface	2									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Middle	1	28.3	7.8	20.2	6.6		6.6		1.8	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Middle	2	28.3	7.8	20.6	6.6		6.5		1.3	
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Bottom	1									
TMCLKL	HY/2012/07	2018-06-13	Mid-Ebb	IS(Mf)9	13:08	Bottom	2									