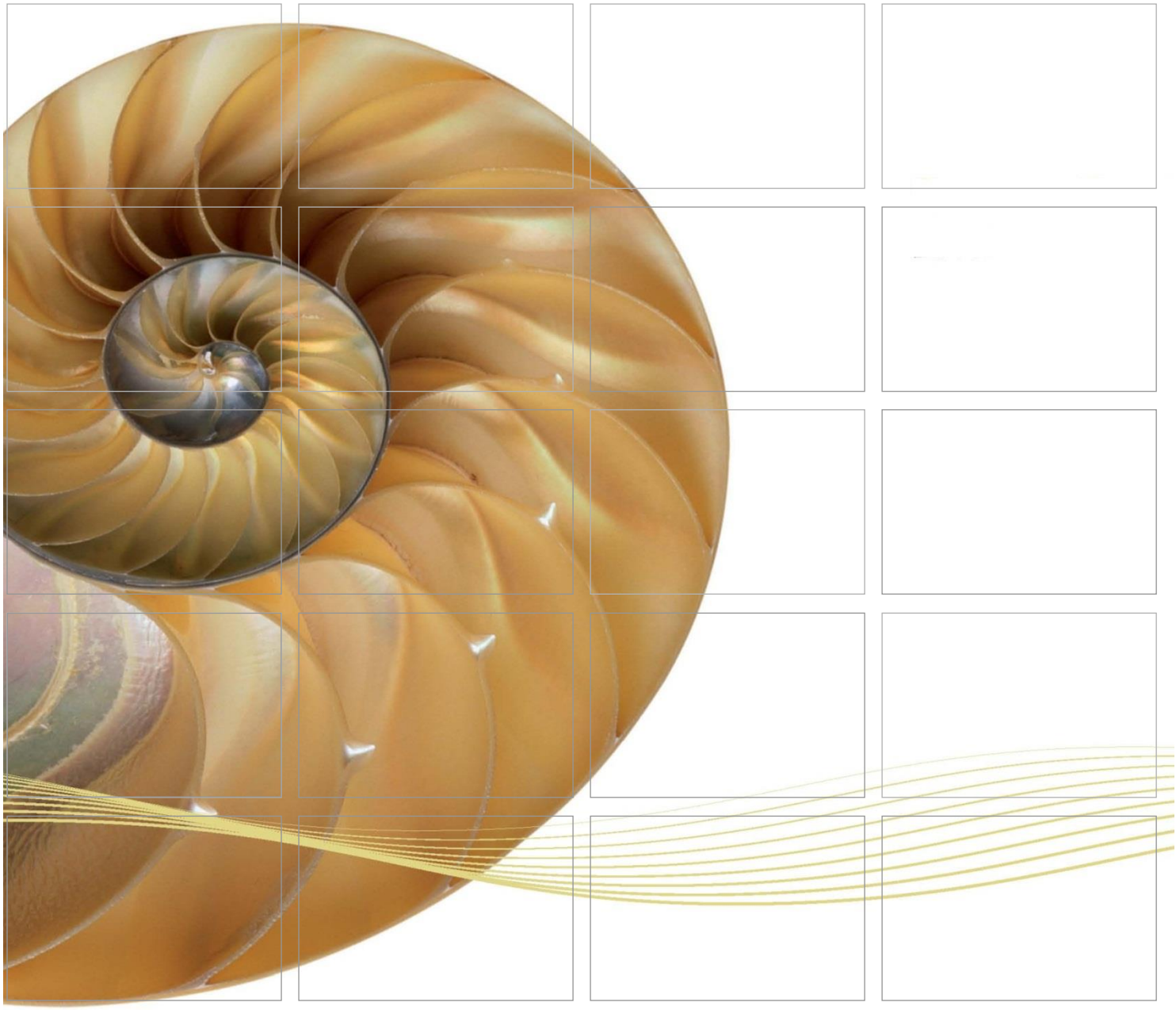
Report



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

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

12 February 2018

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

www.erm.com

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The business of sustainability

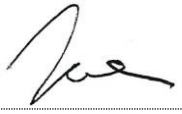
Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section

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

Document Code:
0215660_15th Qtr EM&A_20180212.doc

Environmental Resources Management

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

Client: Gammon	Project No: 0215660
Summary: This document presents the Fifteenth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.	Date: 12 February 2018 Approved by:  *Mr Craig Reid* *Partner* Certified by:  *Mr Jovy Tam* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	15th Quarterly EM&A Report	VAR	JT	CAR	12/02/18

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RAMBOLL

Ref.: HYDHZMBEEM00_0_6267L.18

23 February 2018

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

By Fax (3691 2899) and By Post

Attention: Mr. Daniel Ip

Dear Mr. Ip,

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

Contract No. HY/2012/07 TM-CLKL Southern Connection Viaduct Section
15th Quarterly EM&A Summary Report (June to August 2017)

Reference is made to the 15th Quarterly Environmental Monitoring and Audit (EM&A) Report (June to August 2017) (ET's ref.: "0215660_15th Qtr EM&A_20180212.doc" dated 12 February 2018) certified by the ET Leader and provided to us via e-mail on 12 February 2018.

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

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

Yours sincerely,

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

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

Internal: DY, YH, TMC, 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 Environ Hong Kong Ltd. was employed by the HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*. Further applications for variation of environmental permit (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

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

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

This is the Fifteenth Quarterly EM&A Report presenting the EM&A works carried out during the period from 1 June 2017 to 31 August 2017 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 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;

- Launching gantry operation;
- Installation of deck segment and pier head segment; and
- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

July 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation;
- Installation of deck segment and pier head segment; and
- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

August 2017

Marine Works

- Uninstallation of marine piling platform;
- Launching gantry operation;

- Installation of deck segment and pier head segment; and
- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

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

24-hour TSP monitoring	17 sessions
1-hour TSP monitoring	18 sessions
Noise monitoring	18 sessions
Water quality monitoring (1)	39 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 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 (30) Action Level and fourteen (14) Limit Level of Dissolved Oxygen (DO) exceedances and one (1) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period.

Impact Dolphin Monitoring

(1) Results of impact water quality monitoring were adopted from the published EM&A data of *Contract No. HY/2010/02 HKBCF- Reclamation Works*. Available at: http://www.hzmbenpo.com/

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June and August 2017. No unacceptable impact from the construction activities of the TM-CLKL Southern Connection Viaduct Section on Indo-Pacific humpback dolphin *Sousa chinensis* (i.e. Chinese White Dolphins) was noticeable from general observations during the dolphin monitoring in this reporting quarter. The exceedance is considered unlikely due to the works of this Project upon further investigation.

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

Environmental Complaints, Non-compliance & Summons

There was no environmental complaint, 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:

<u>September 2017</u>

Land-based Works

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

<u>October 2017</u>

Land-based Works

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

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

November 2017

Land-based Works

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

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 Environ Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) in accordance with *Environmental Permit No. EP-354/2009/A*.

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

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

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

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

1.2 SCOPE OF REPORT

This is the Fifteenth 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 2017.

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 Environ Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Gammon Construction Limited)	Environmental Manager	Brian Kam	3520 0387	3520 0486
	Environmental Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	

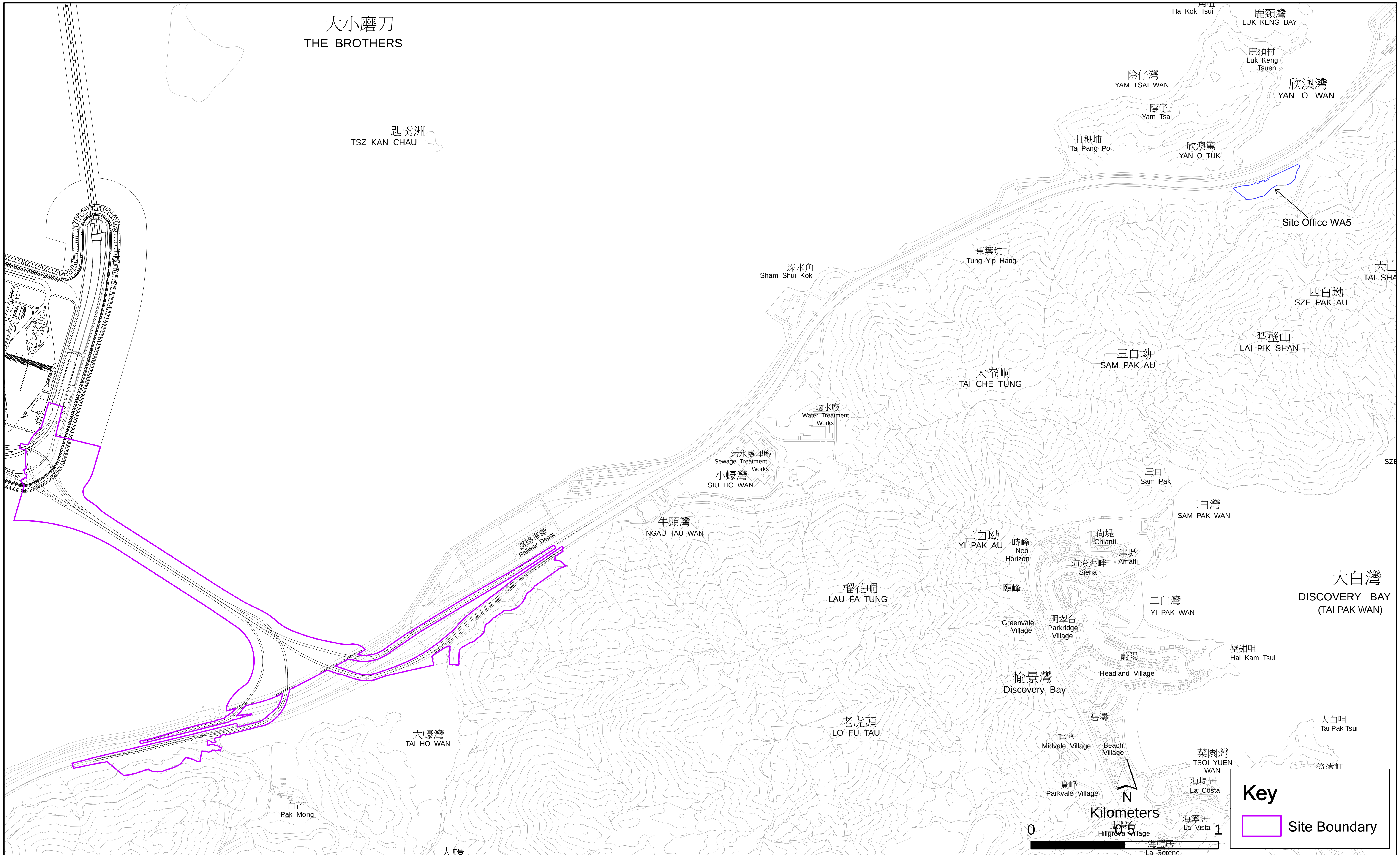

Figure 1.1

General Layout Plan of the Project

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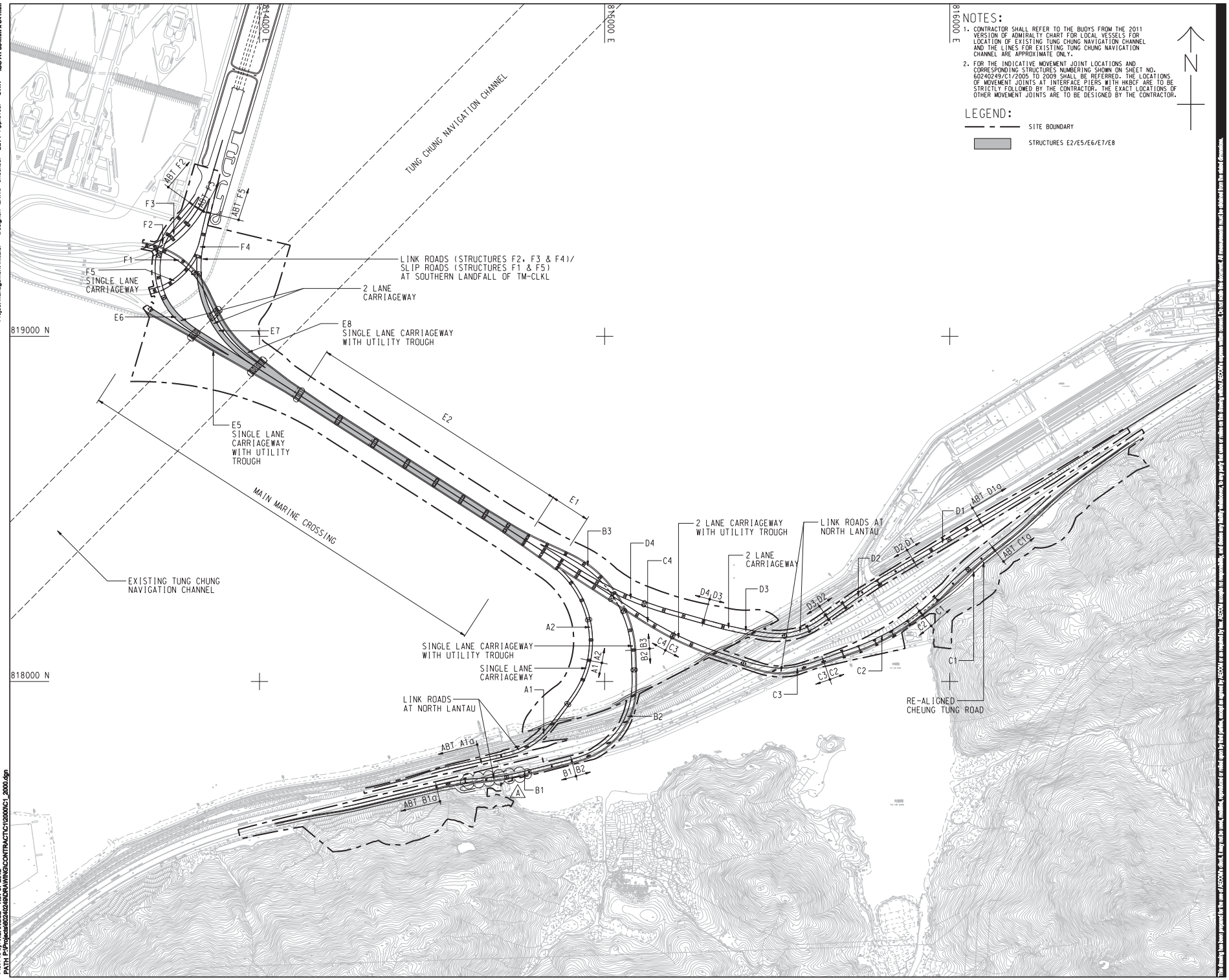
Environmental Resources Management

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

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-	OCT. 12	TENDER DRAWING	CWN

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CONTRACT NO.: HY/2012/07

SHEET TITLE
SOUTHERN CONNECTION GENERAL LAYOUT PLAN

SHEET NUMBER
60240249/C1/2000A

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**

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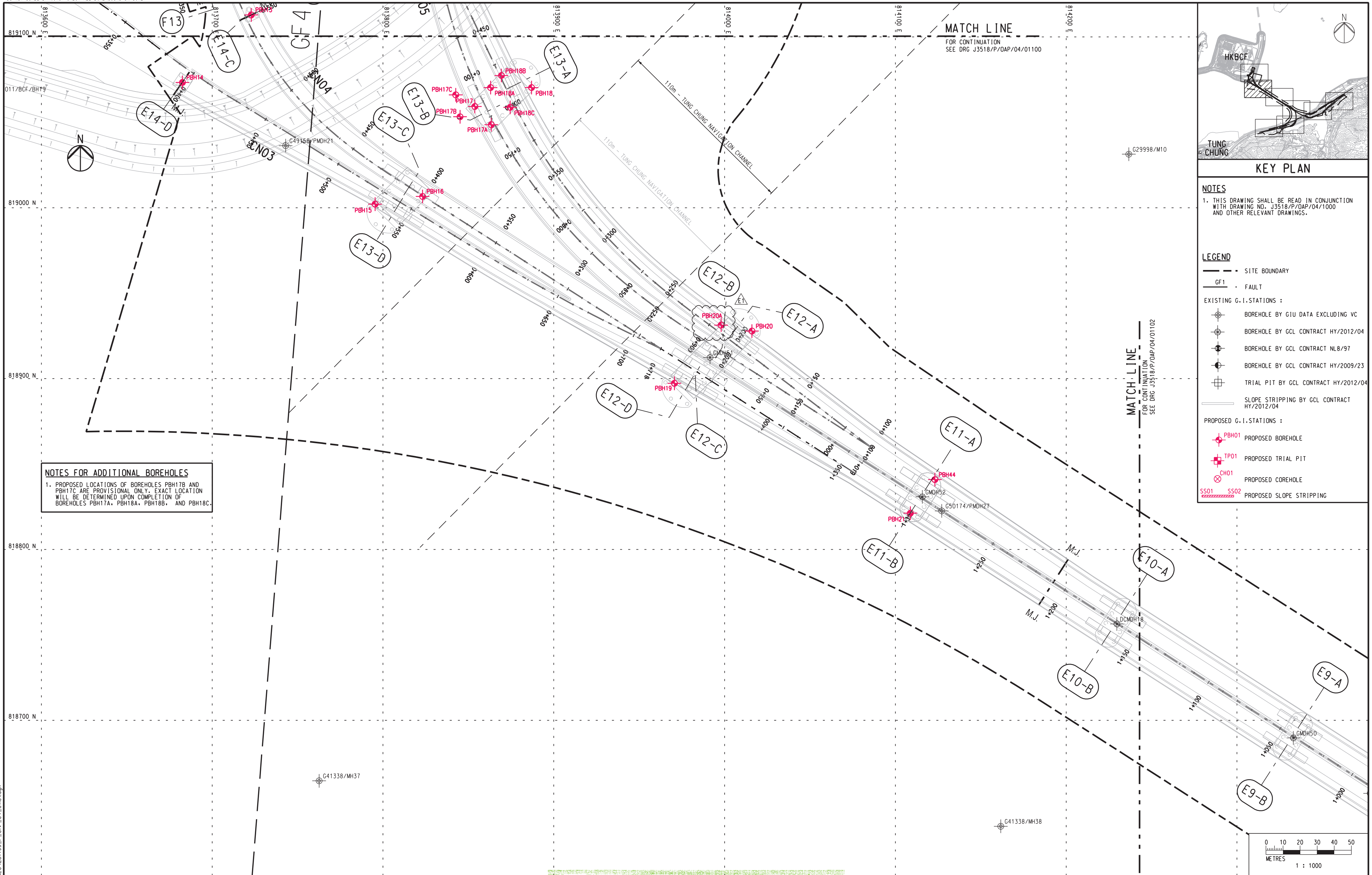

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C	SUBMISSION	RC	09/13
D	SUBMISSION	RC	10/13
E1	FOR INTERNAL REVIEW	RC	11/13

Drawn: RL | Date: 07/13
Checked: DS | Approved: DOP
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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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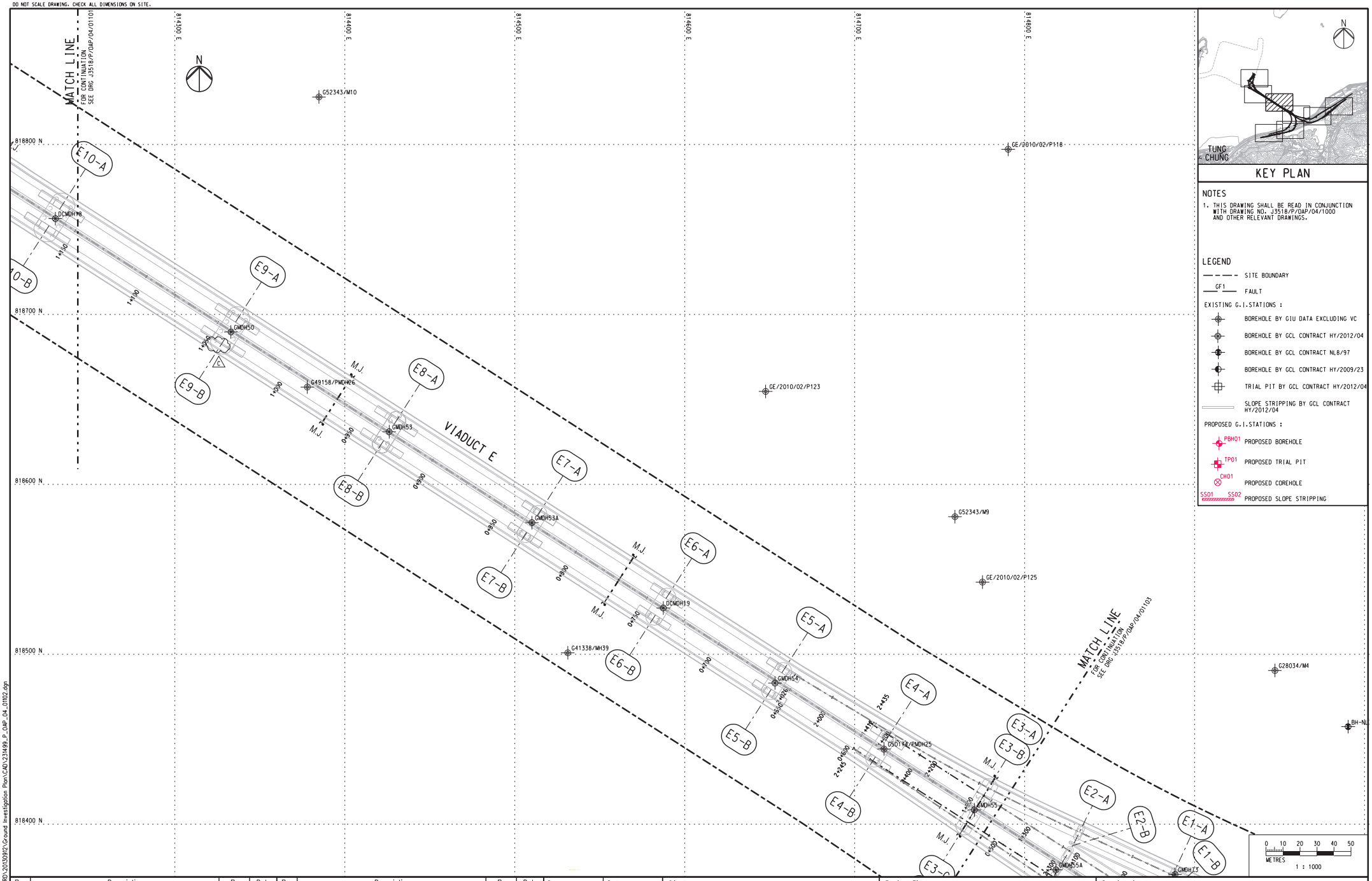

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong-Zhuhai-Macao Bridge Hong Kong Project Management Office

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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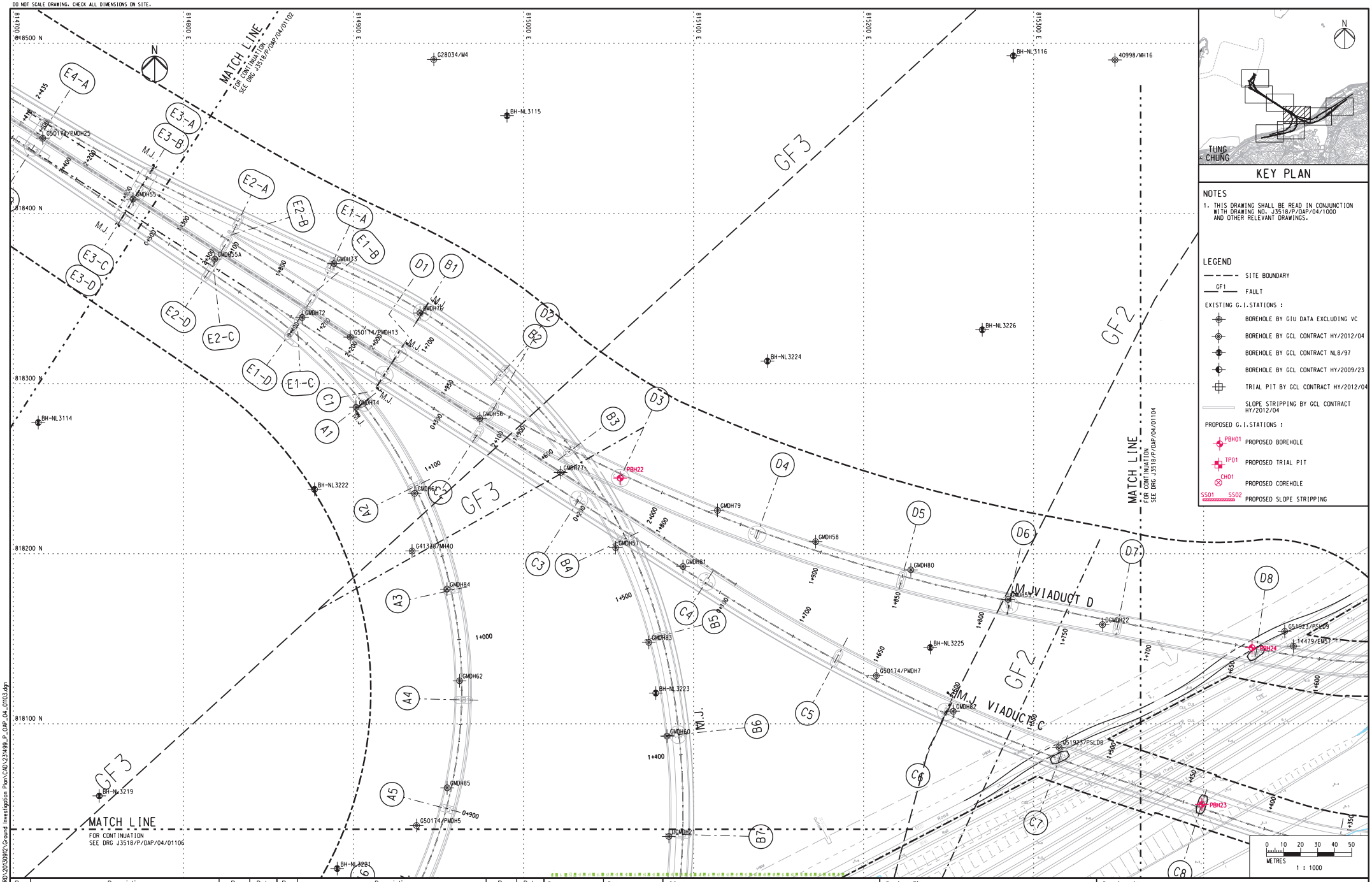

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Project Title: Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Supervising Officer: AECOM
Contractor: Gammon
Originator: ARUP

Drawing title: **Figure 1.2e**

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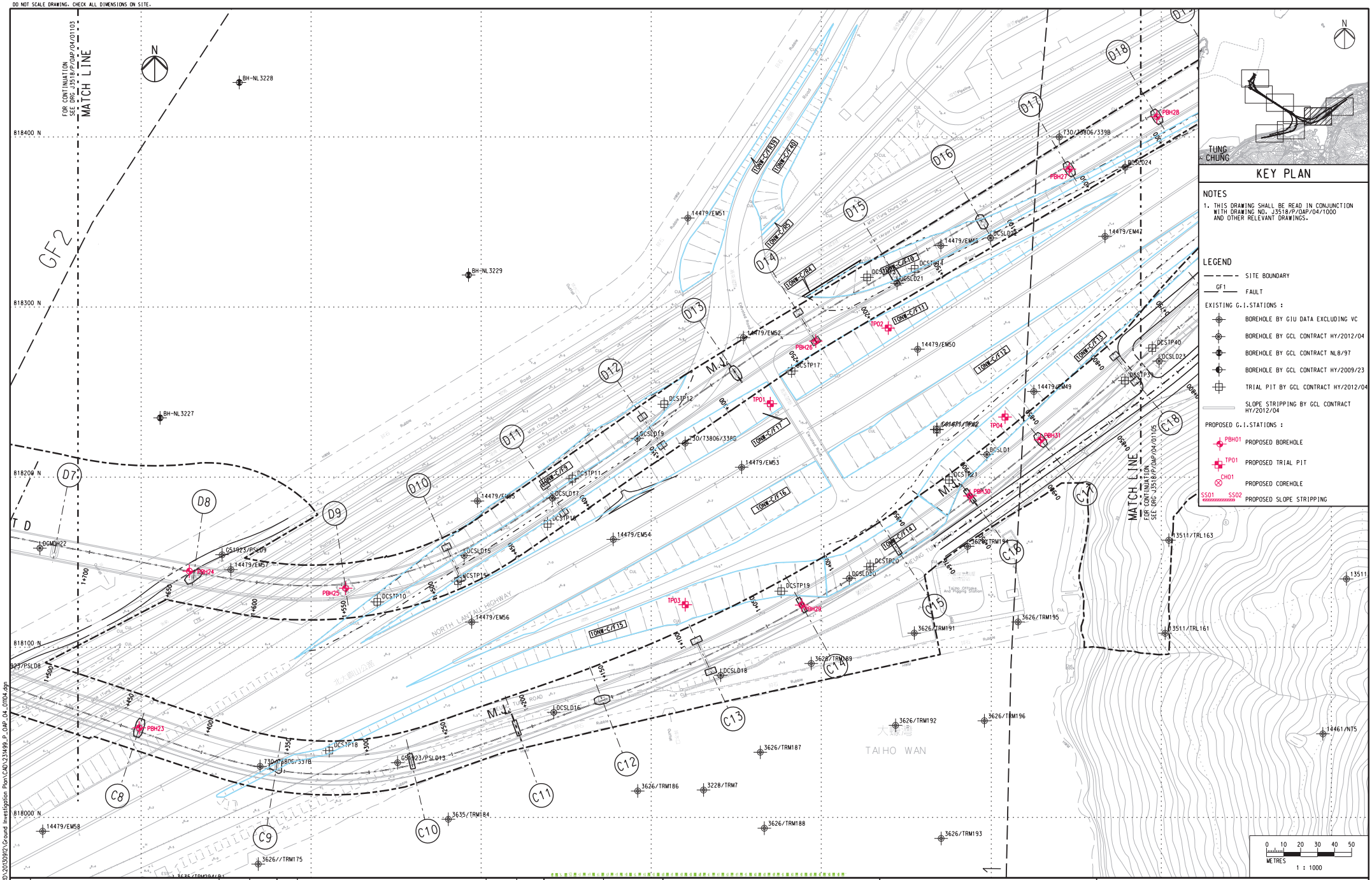

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Project Title: Contract No. HY/2012/07 Tuen Mun - Chek Lap Kok Link Southern Connection Viaduct Section

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2f**

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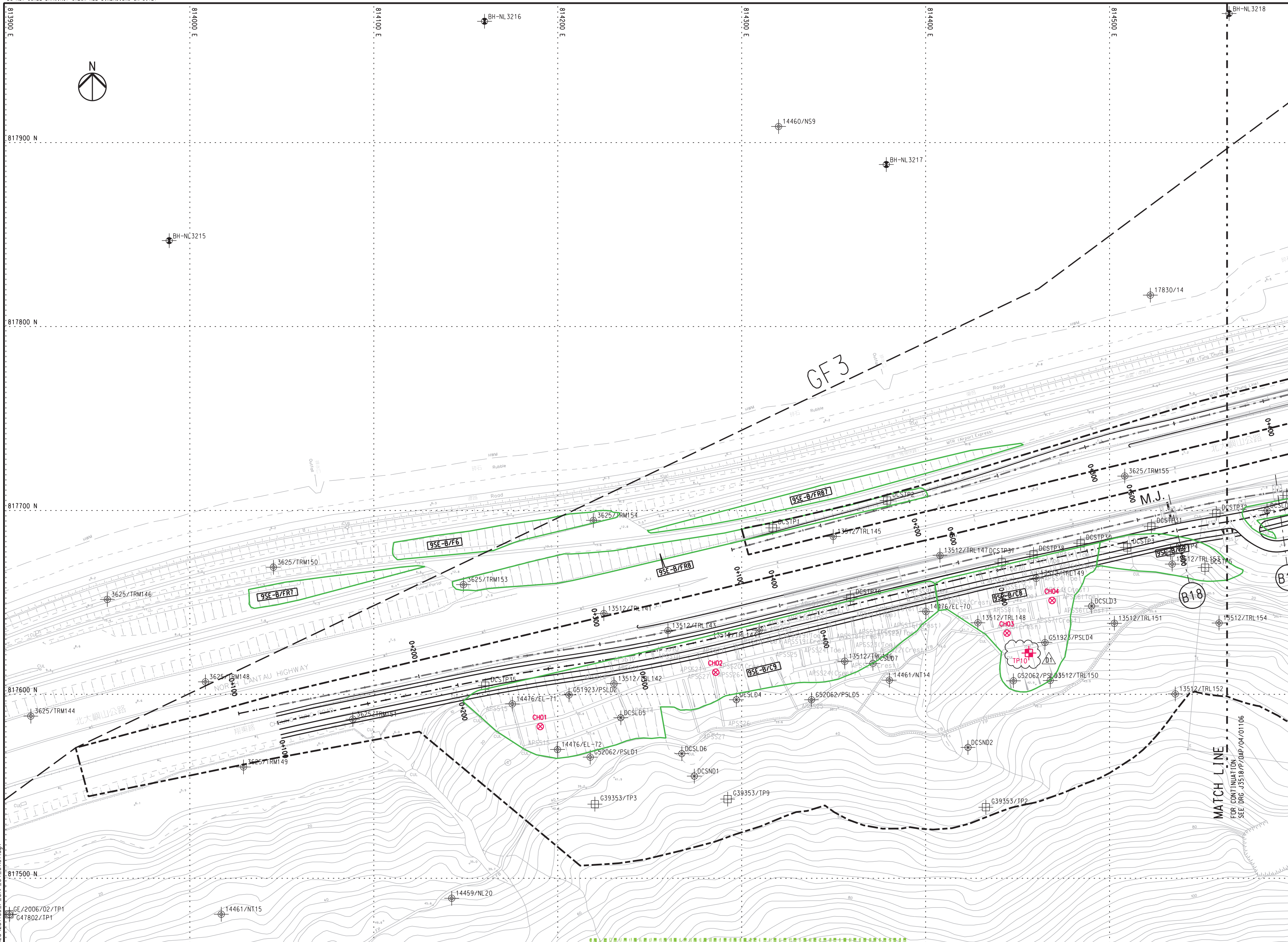

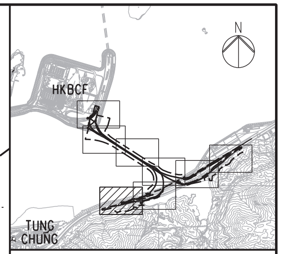

KEY PLAN

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

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: RL — Date: 07/13

Checked: DS — Approved: DOP

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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 1.2g

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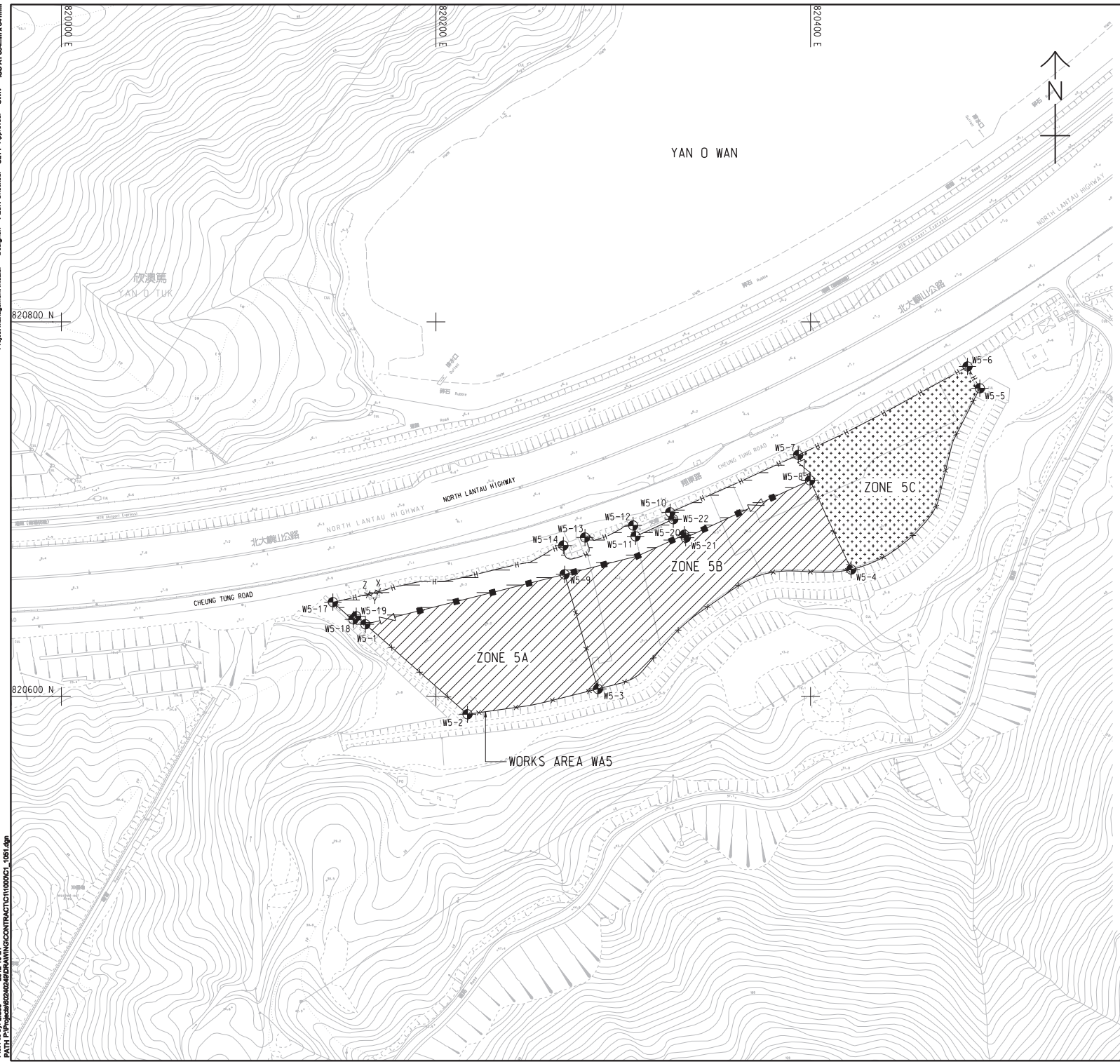

NOTES:

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. 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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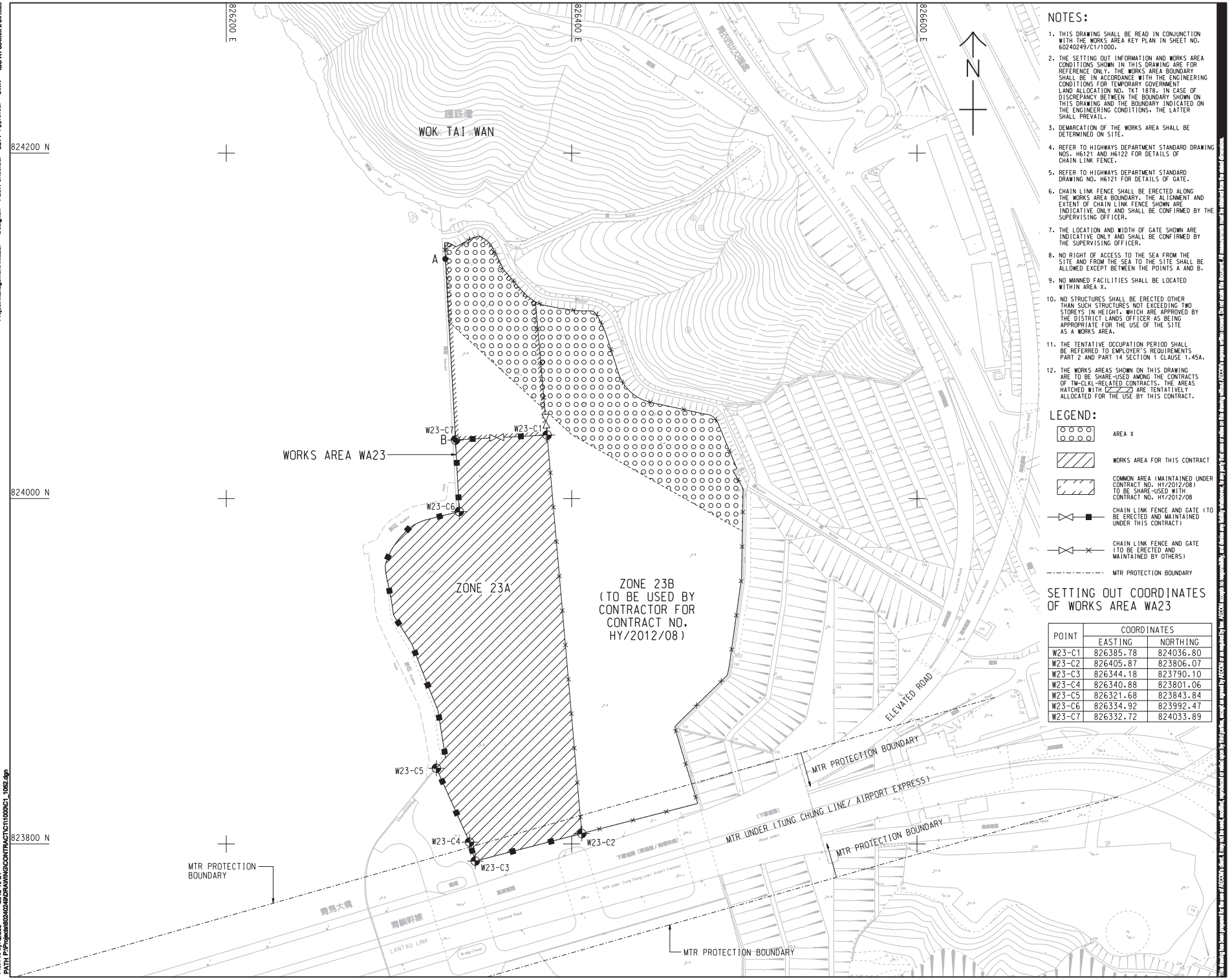

NOTES:

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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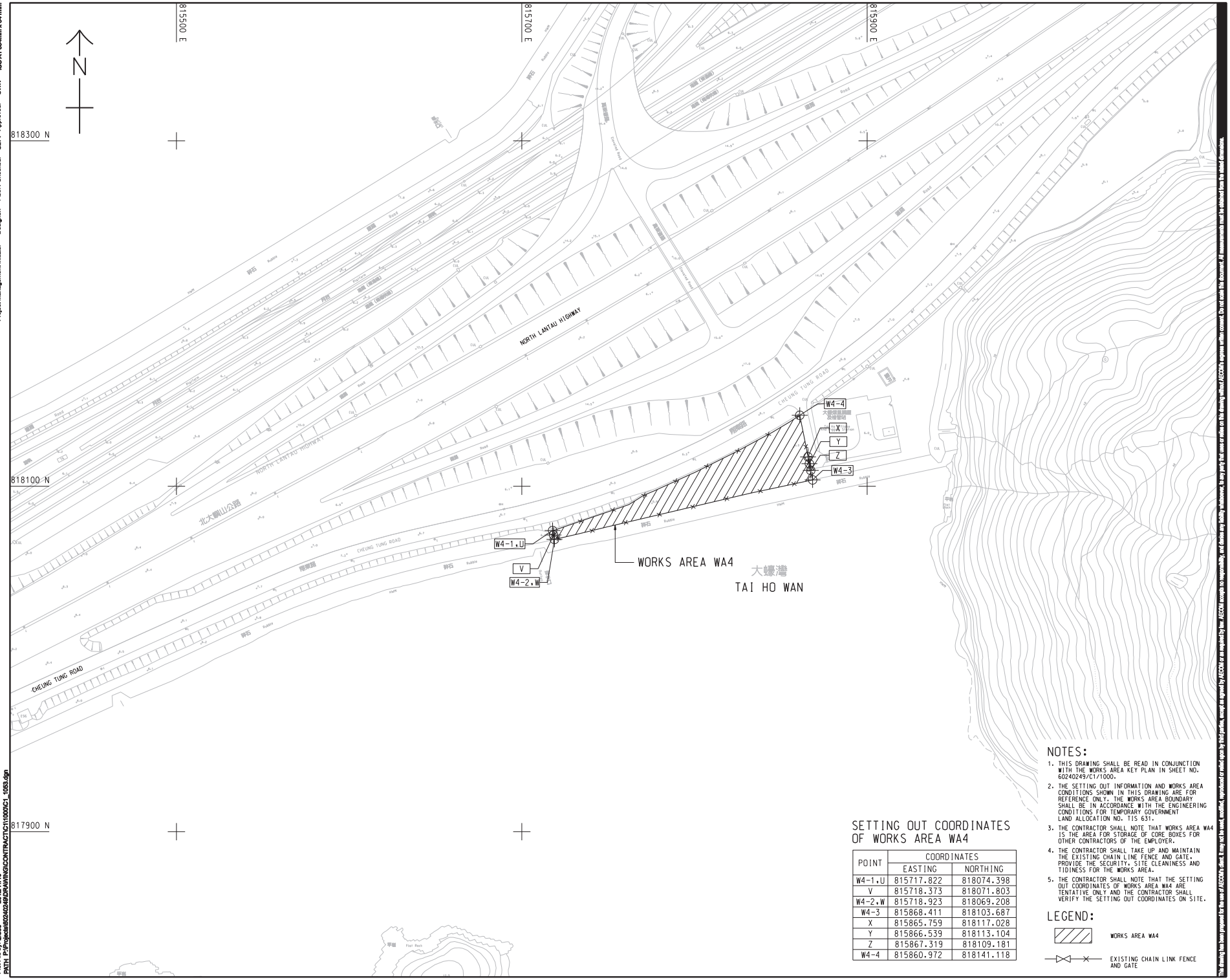

SETTING OUT COORDINATES OF WORKS AREA WA4

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.
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SUB-CONSULTANTS

Figure 1.2j

ISSUE/REVISION

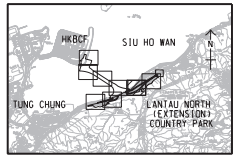
VR	DATE	DESCRIPTION	CHK.
-	NOV. 12	TENDER ADDENDUM NO. 1	CWN

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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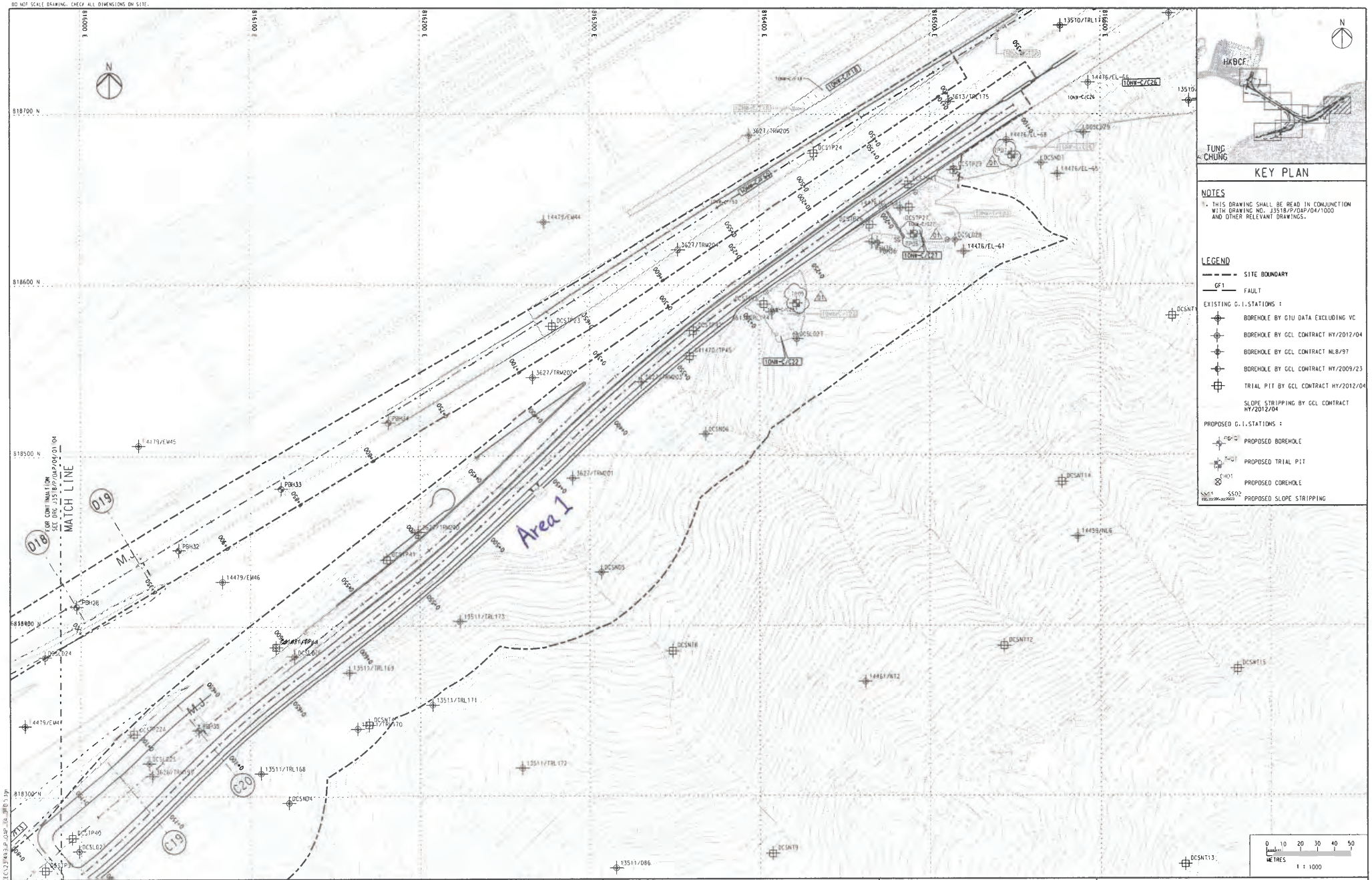


Rev.	Description	By	Date	Rev.	Description	By	Date
A	[illegible]	RL	07/13				
B	[illegible]	RL	07/13				
C	[illegible]	RL	09/13				
D1	ETA INTERNAL REVIEW	RL	10/13				

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

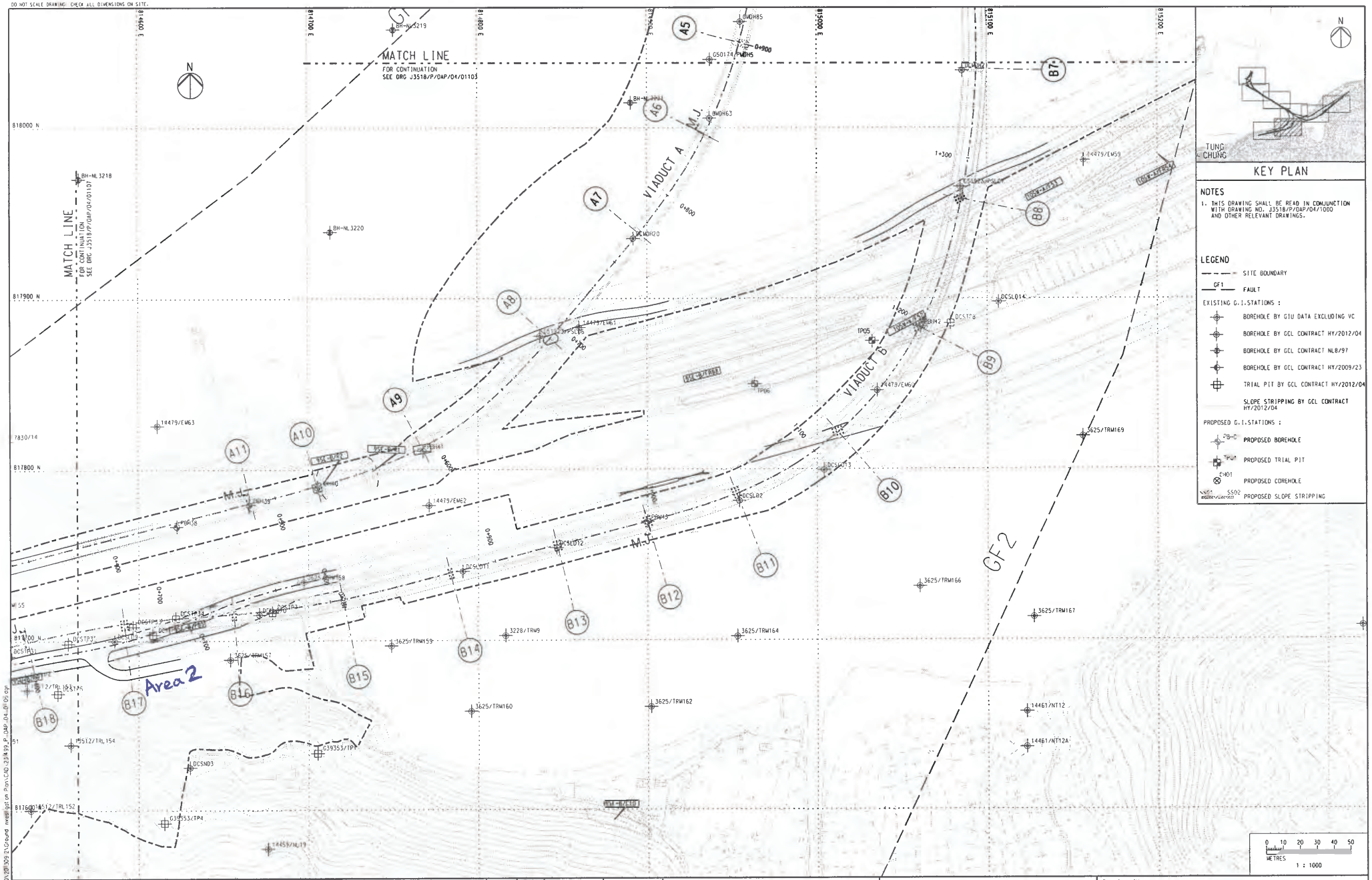
Supervising Officer: AECOM

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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Party	Position	Name	Telephone	Fax
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

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 2017 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 2017

Marine Works

- Uninstallation of marine piling platform;
- Pier construction;
- Launching gantry operation;
- Installation of deck segment and pier head segment; and
- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

July 2017

Marine Works

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

- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

August 2017

Marine Works

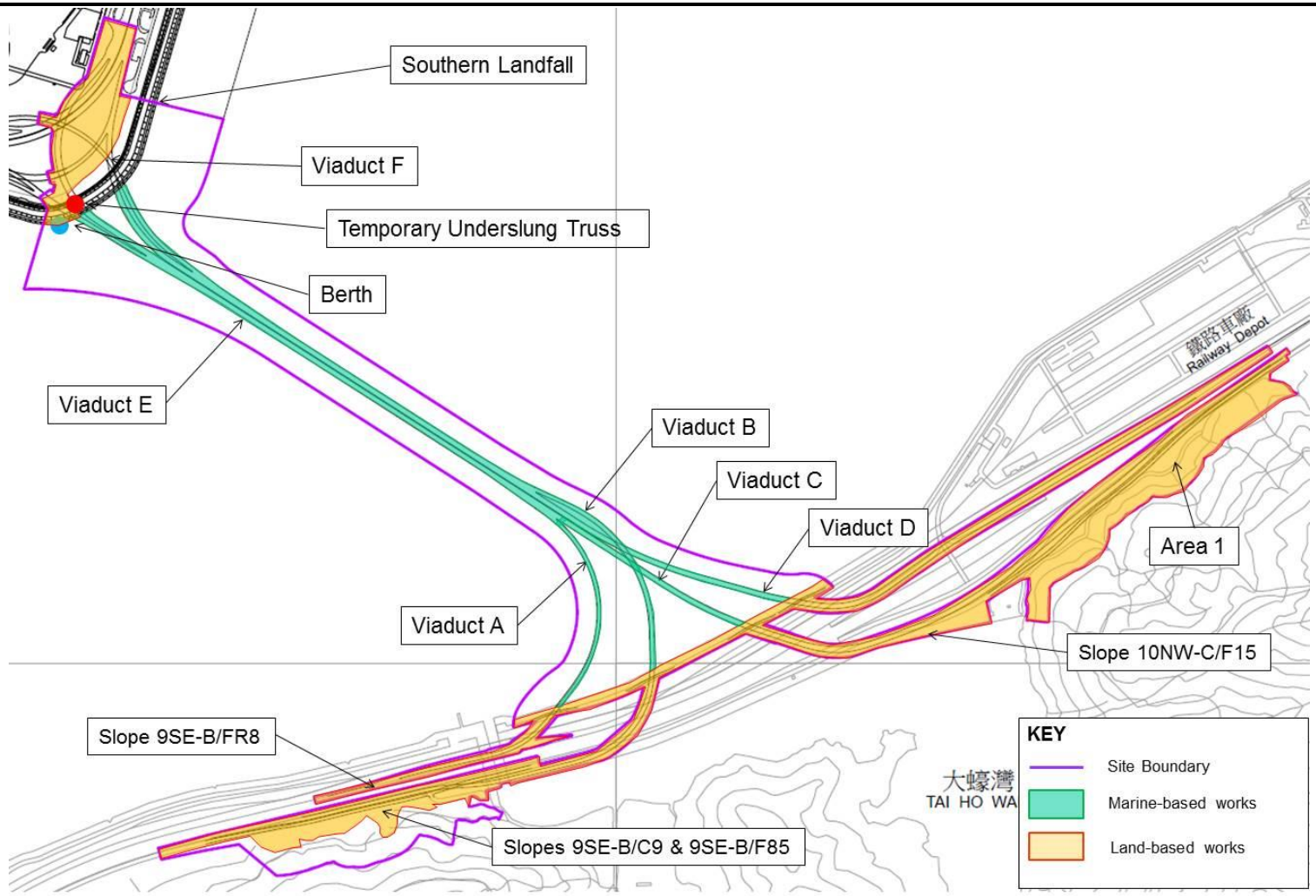
- Uninstallation of marine piling platform;
- Launching gantry operation;
- Installation of deck segment and pier head segment; and
- Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Land-based Works

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

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

Figure 1.3 Locations of Construction Activities in the Reporting Period



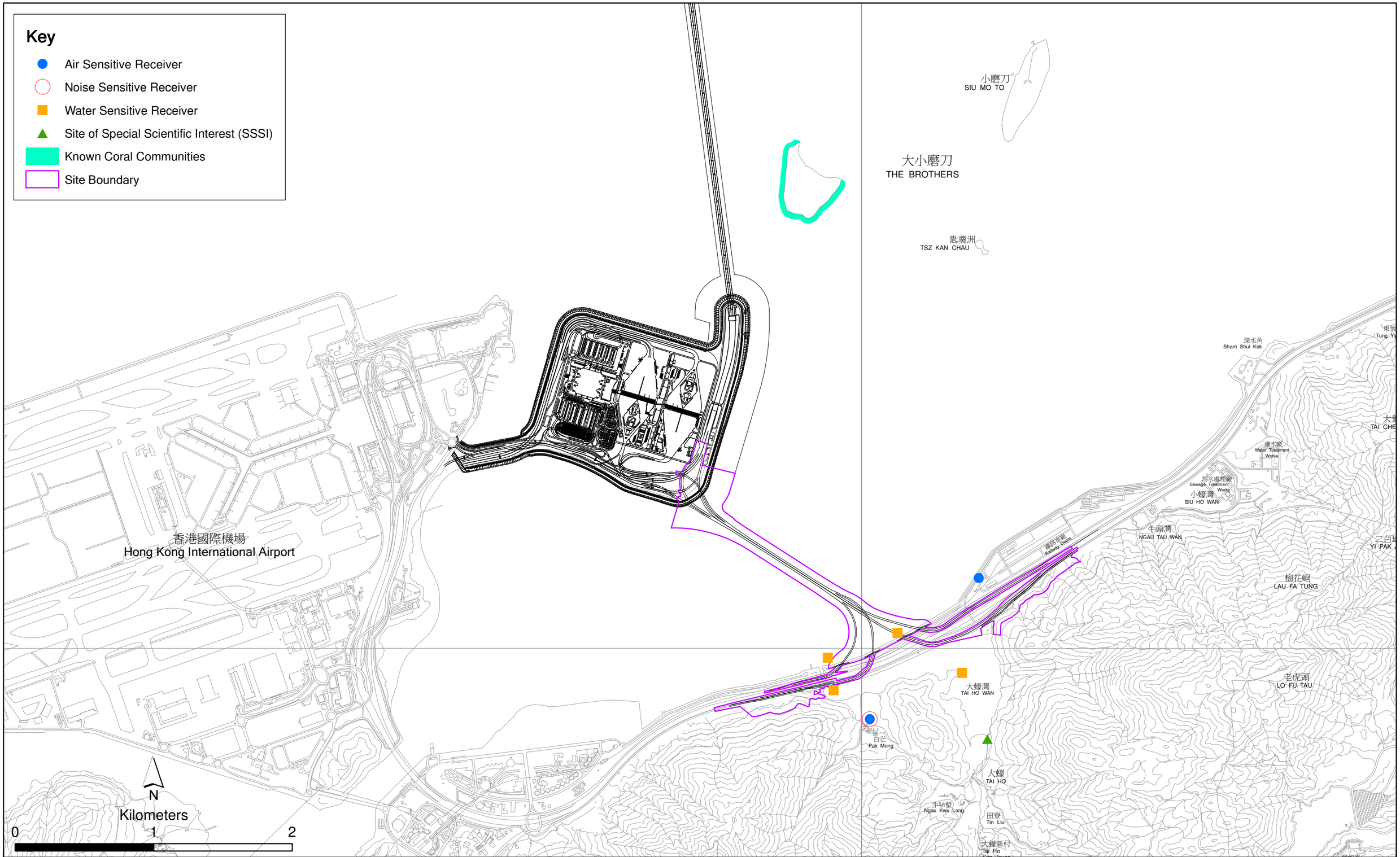


Figure 1.4

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

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

Environmental Resources Management

ERM

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.

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.

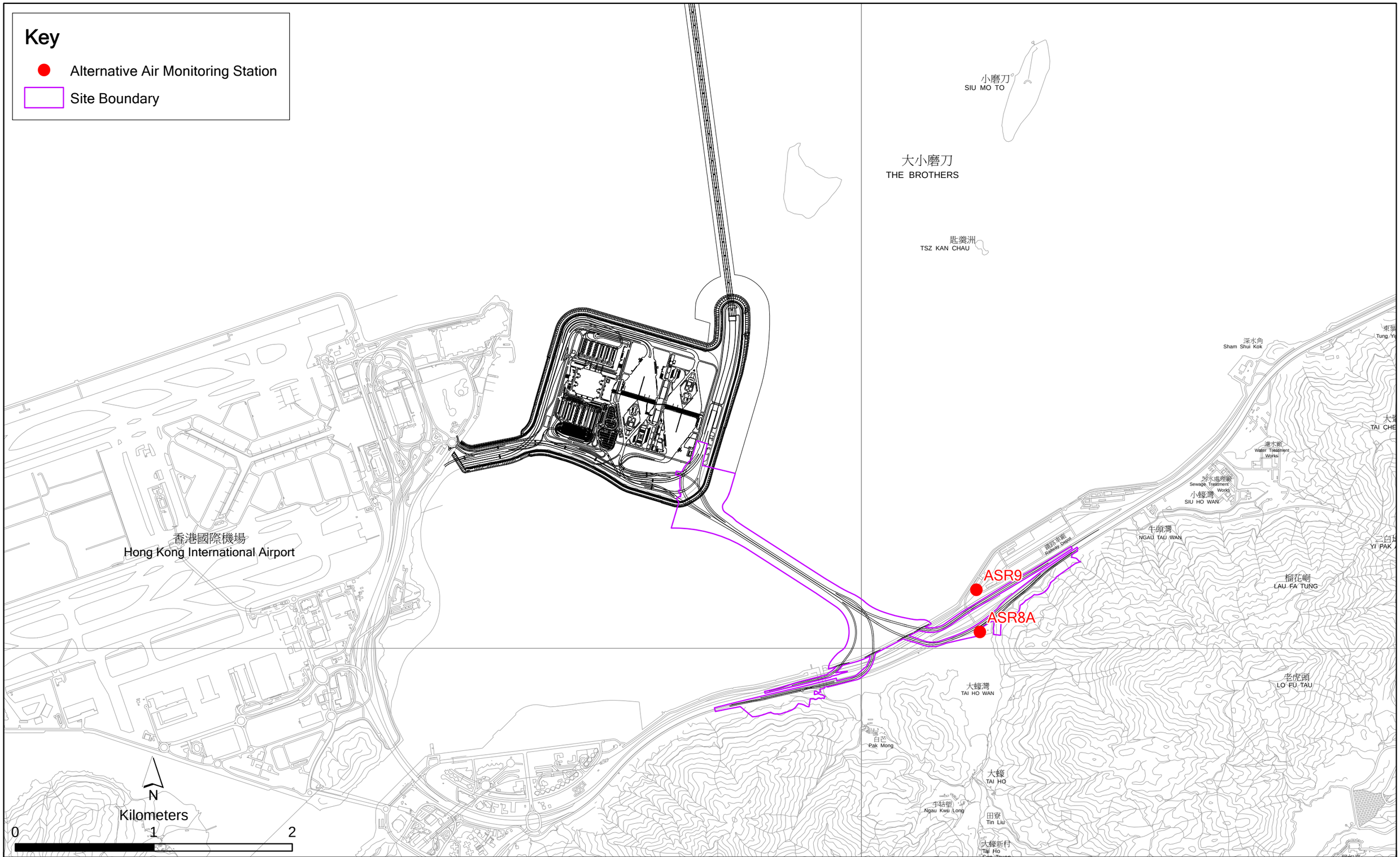


Figure 2.1

Locations of Air Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_AQMS.mxd
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 ASR9	2, 8, 14, 20, 26 and 29 June 2017 5, 11, 17, 20 and 26 July 2017 1, 7, 10, 16, 22, 28 and 31 August 2017	Area 4 MTR Depot	On ground at the works area, Area 4 On the ground nearby MTR Depot entrance	• 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times per day every 6 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour every 6 days

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.
(2) Changes in monitoring schedule are provided in Section 2.1.3.

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*. 24-hour TSP at ASR8A and ASR9 on 22 August 2017 was canceled due to adverse weather.

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 *Forty-fourth* to *Forty-sixth 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 2017	ASR 8A	60	38-97	394	500
	ASR 9	89	41-147	393	500

Month	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
July 2017	ASR 8A	49	41-61	394	500
	ASR 9	63	38-93	393	500
August 2017	ASR 8A	55	13-163	394	500
	ASR 9	74	15-212	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 2017	ASR 8A	42	38-45	178	260
	ASR 9	46	41-51	178	260
July 2017	ASR 8A	37	20-43	178	260
	ASR 9	41	30-54	178	260
August 2017	ASR 8A	30	15-71	178	260
	ASR 9	39	20-61	178	260

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

In this reporting period, a total of 18 monitoring events for 1-hour TSP and 17 monitoring events for 24-hour TSP were undertaken within the reporting period, in which no Action or Limit Level exceedance for 1-hour and 24-hour TSP for air quality was recorded during the reporting period.

2.2 NOISE MONITORING

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

2.2.1 *Monitoring Requirements and Equipment*

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

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

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

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

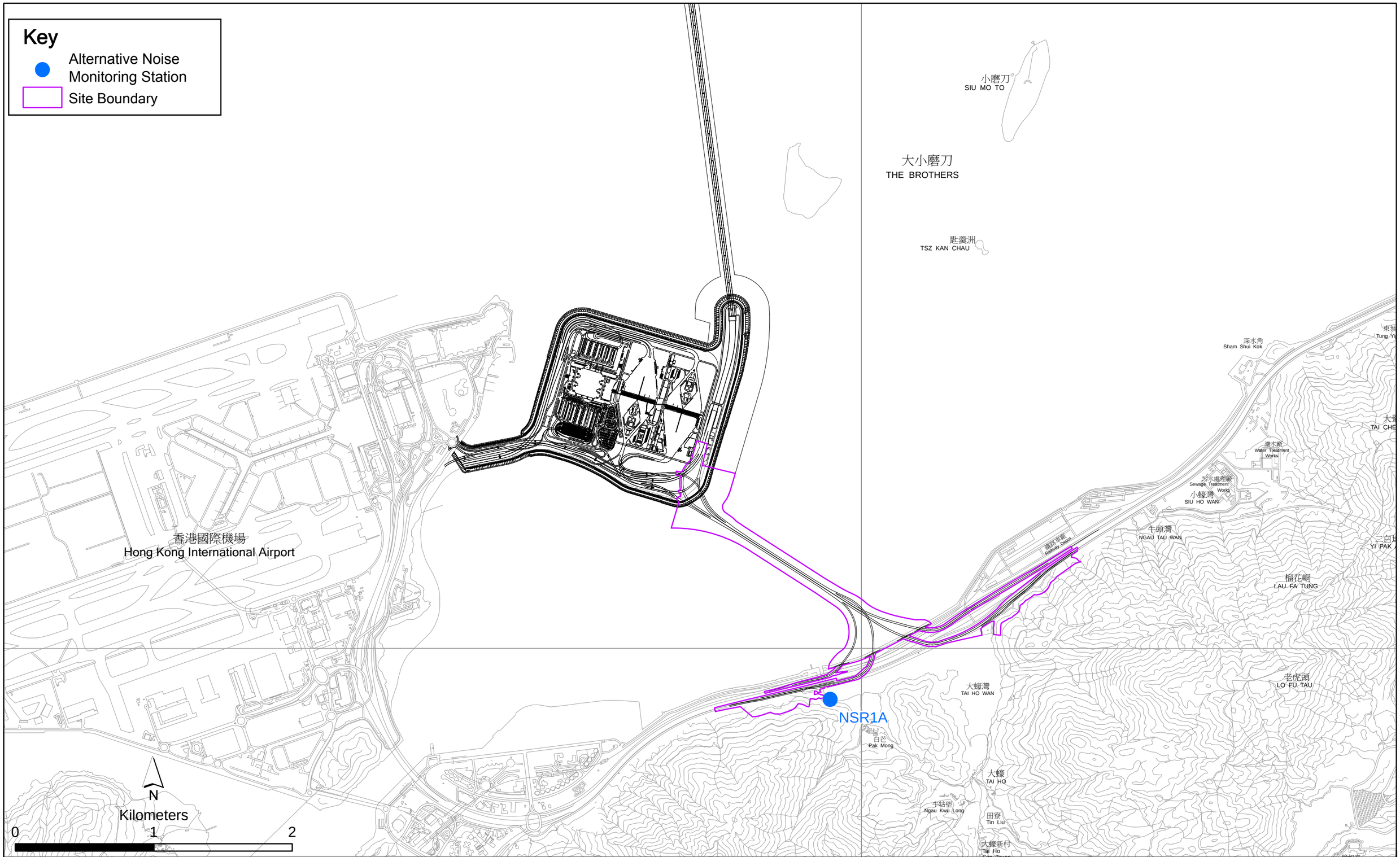


Figure 2.2

Location of Noise Monitoring Station

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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	2, 8, 14, 20, 26 and 29 June 2017 5, 11, 17, 20 and 26 July 2017 1, 7, 10, 16, 22, 28 and 31 August 2017	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 was relocated to NSR1A.

Table 2.6 ***Noise Monitoring Equipment***

Equipment	Brand and Model
Integrated Sound Level Meter	Rion NL-31 / NL-52
Acoustic Calibrator	Rion NC-73

2.2.2 Action and Limit Levels

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

2.2.3 Monitoring Schedule for the Reporting Quarter

The schedule for construction noise monitoring in the reporting period is provided in *Appendix E*.

2.2.4 Results and Observations

The monitoring results for noise monitoring are summarized in *Table 2.7*. Monitoring results are presented graphically in *Appendix G* and detailed impact noise monitoring results are reported in the *Forty-fourth* to *Forty-sixth 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 2017	62	61-62	75
July 2017	63	62-63	75
August 2017	63	61-64	75

A total of 18 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, insect noise 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 *Figures 2.3* and *2.4* and *Table 2.8*.

Results of water quality monitoring for the period between June and July 2017 were adopted from the published EM&A data of *Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works* [3][4].

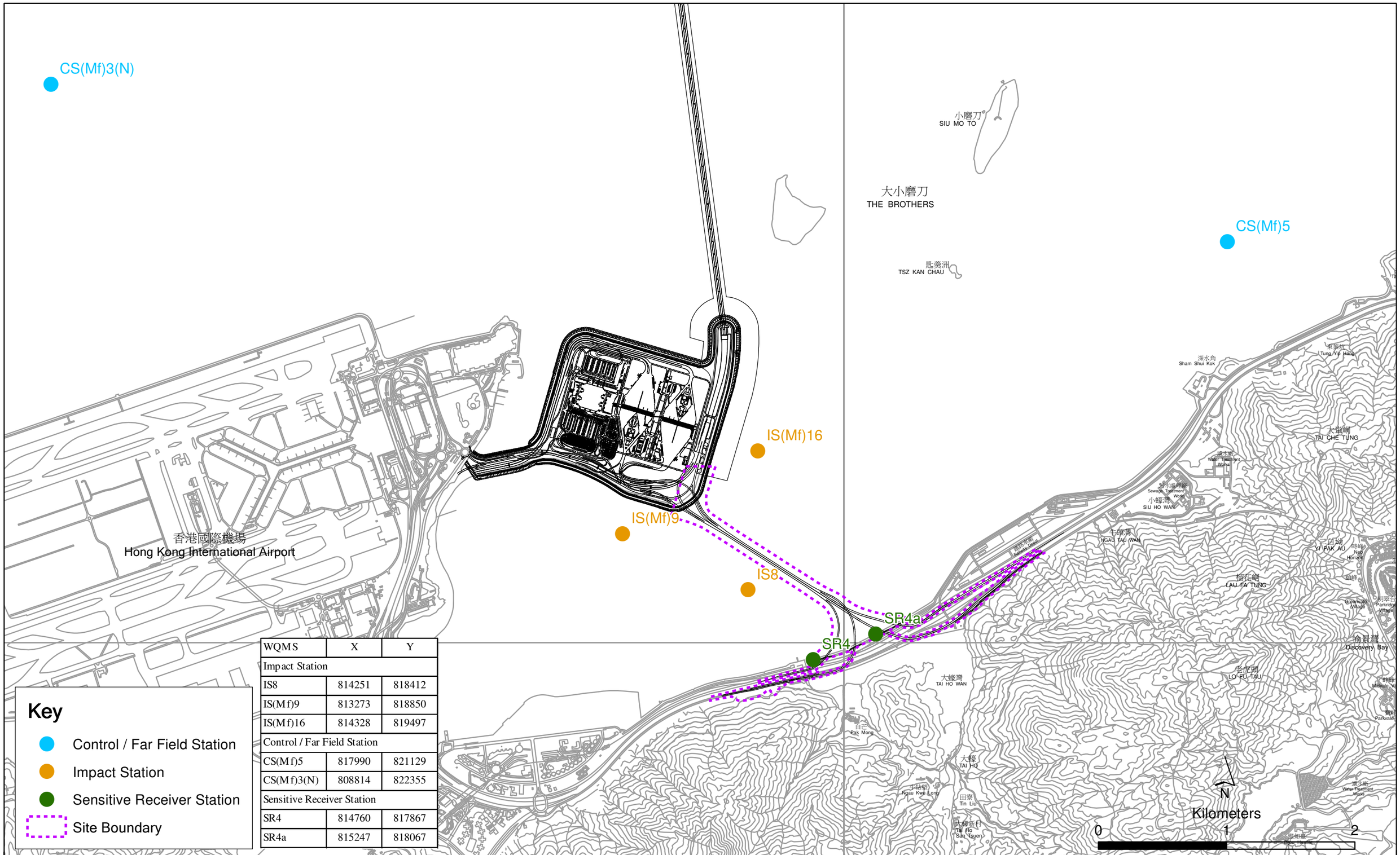
The locations of the monitoring stations covered by Contract No. HY/2010/02 with those overlapped with Contract No. HY/2012/07 are presented in Table 2.8.

(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.

(3) Published EM&A data for impact water quality monitoring by *Contract No. HY/2010/02* are available at: http://www.hzmbenpo.com/

(4) Technical issues have been observed from impact monitoring of the Contract and thus published information is adopted from Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works.



Key

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

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

Figure 2.3

Locations of Water Quality Monitoring Stations

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Date: 28/4/2017

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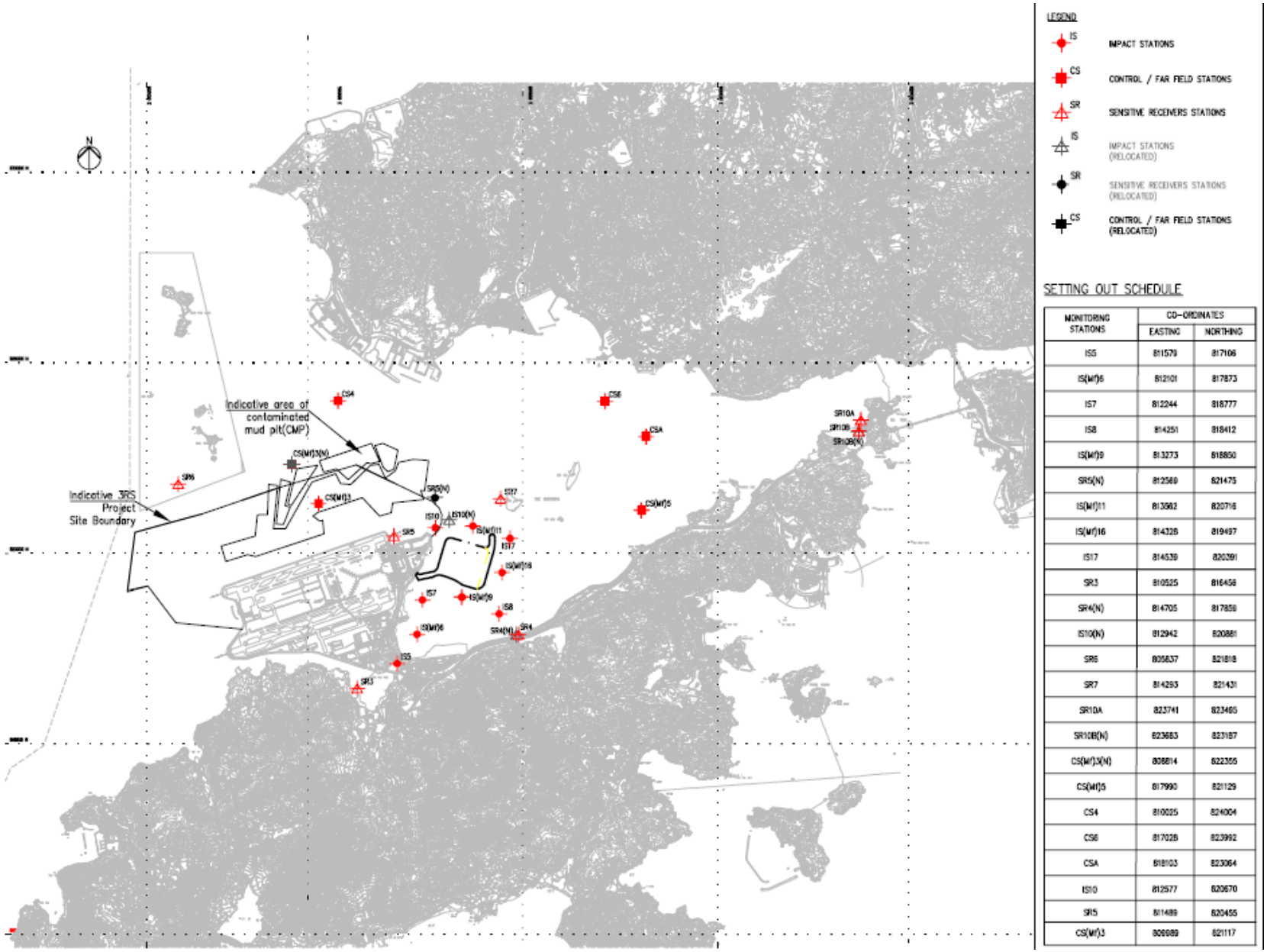

MONITORING STATIONS	CO-ORDINATES	
	EASTING	NORTHING
IS5	811579	817106
IS(Mf)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(Mf)9	813273	818850
SR5(N)	812569	821475
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820291
SR3	810525	816456
SR4(N)	814705	817859
IS10(N)	812942	820881
SR6	805837	821818
SR7	814293	821431
SR10A	823741	823465
SR10B(N)	823683	823187
CS(Mf)3(N)	808814	822355
CS(Mf)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064
IS10	812577	820670
SR5	811489	820455
CS(Mf)3	808989	821117

Figure 2.4

Locations of Water Quality Monitoring Stations
(Source: Adopted from Contract No. HY/2010/02 Hong Kong-Zhuhai-Macro Bridge Hong Kong Boundary Crossing Facilities - Reclamation Works)

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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 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497			
IS8	Impact Station(Close to HKBCF construction site)	814251	818412			
SR4	Sensitive receiver (Tai Ho Inlet)	814760	817867			
SR4a	Sensitive receiver	815247	818067			
SR4(N)	Sensitive receiver (Tai Ho)	814705	817859			
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.
Station SR4a is not covered by HY/2010/02. Data from Station SR4(N) is considered representative of those from SR4a since they are located 50m from each other and coral colonies, which is the SR concerned at SR4a, are also presented along the seawall nearby SR4(N).

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 V2 Sonde
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4

Equipment	Brand and Model
Water Sampler	WildCo Vertical Alpha Bottles 1120-2.2L /1120-3.2L Aquatic Research Instrument Vertical/Horizontal Point Water Sampler 2.2L / 3.0L

Notes:
Water quality monitoring equipment used for water quality monitoring for the period between June and July 2017 could be referred to the published Monthly EM&A Reports of *Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works.* Available at http://www.hzmbenpo.com/

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* (1). Water quality monitoring on 23 August 2017 was canceled due to adverse weather.

2.3.4 Results and Observations

In this reporting period, a total of 39 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 *Forty-fourth* to *Forty-sixth Monthly EM&A Reports*.

Results of water quality monitoring between 1 June 2017 and 31 July 2017 were adopted from the published EM&A data of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works (2) (3).

Thirty (30) Action Level and fourteen (14) Limit Level of Dissolved Oxygen (DO) exceedances and one (1) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period. Actions were taken in accordance with the Event Action Plan as presented in *Appendix J*.

(1) The schedules for water quality monitoring for the period between June and July 2017 could be referred to the published Monthly EM&A Reports of *Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works*. Available at http://www.hzmbenpo.com/

(2) Published EM&A data for impact water quality monitoring by *Contract No. HY/2010/02* are available at: http://www.hzmbenpo.com/

(3) Technical issues have been observed from impact monitoring of the Contract and thus published information is adopted from Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works.

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 2.5a and 2.5b.* The co-ordinates of all transect lines are shown in *Table 2.11* and *2.12* 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).

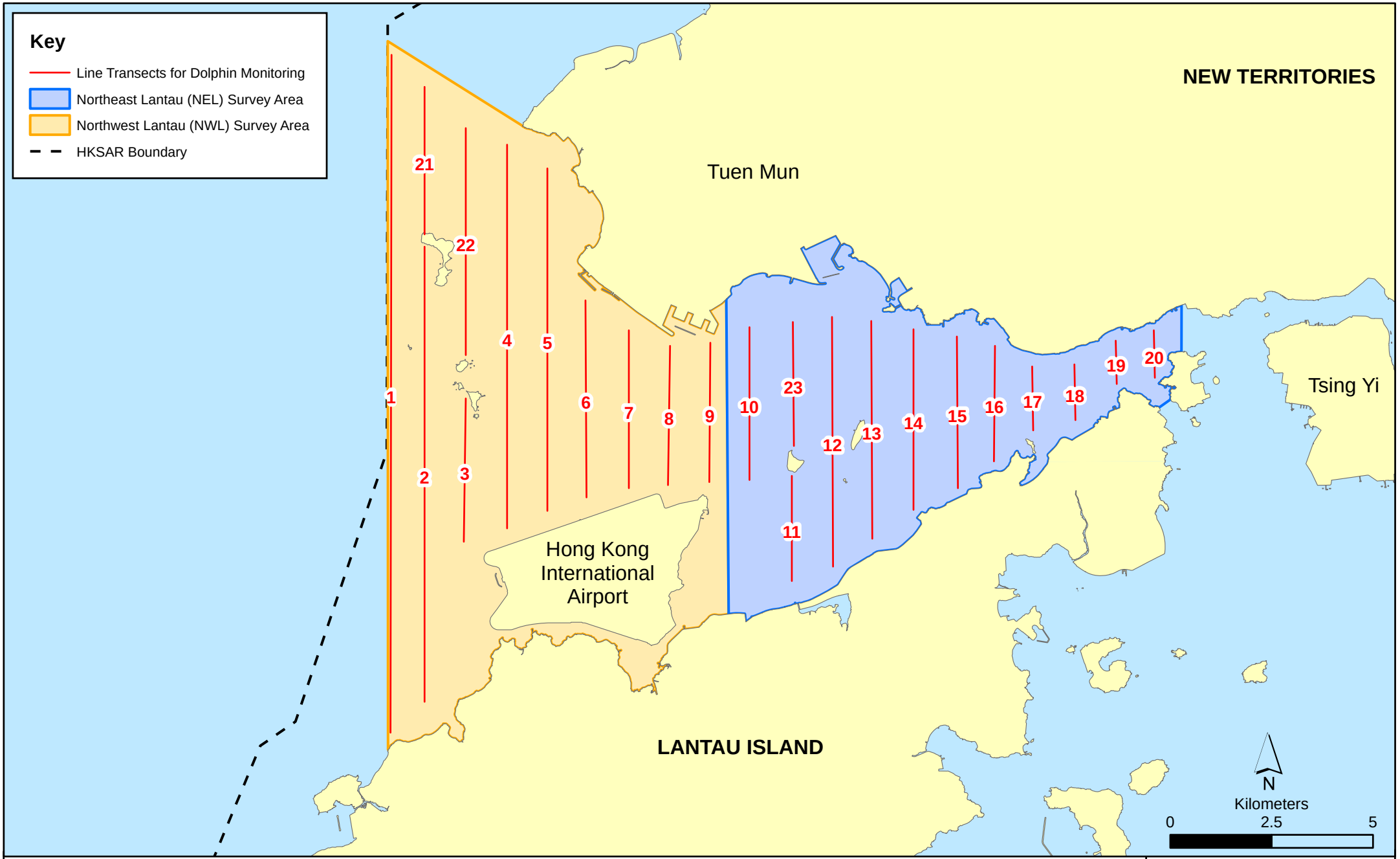

Figure 2.5a

Layout of Transect Lines of Dolphin Monitoring in Northwest and Northeast Lantau Areas (June - July 2017)

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Date: 10/12/2013

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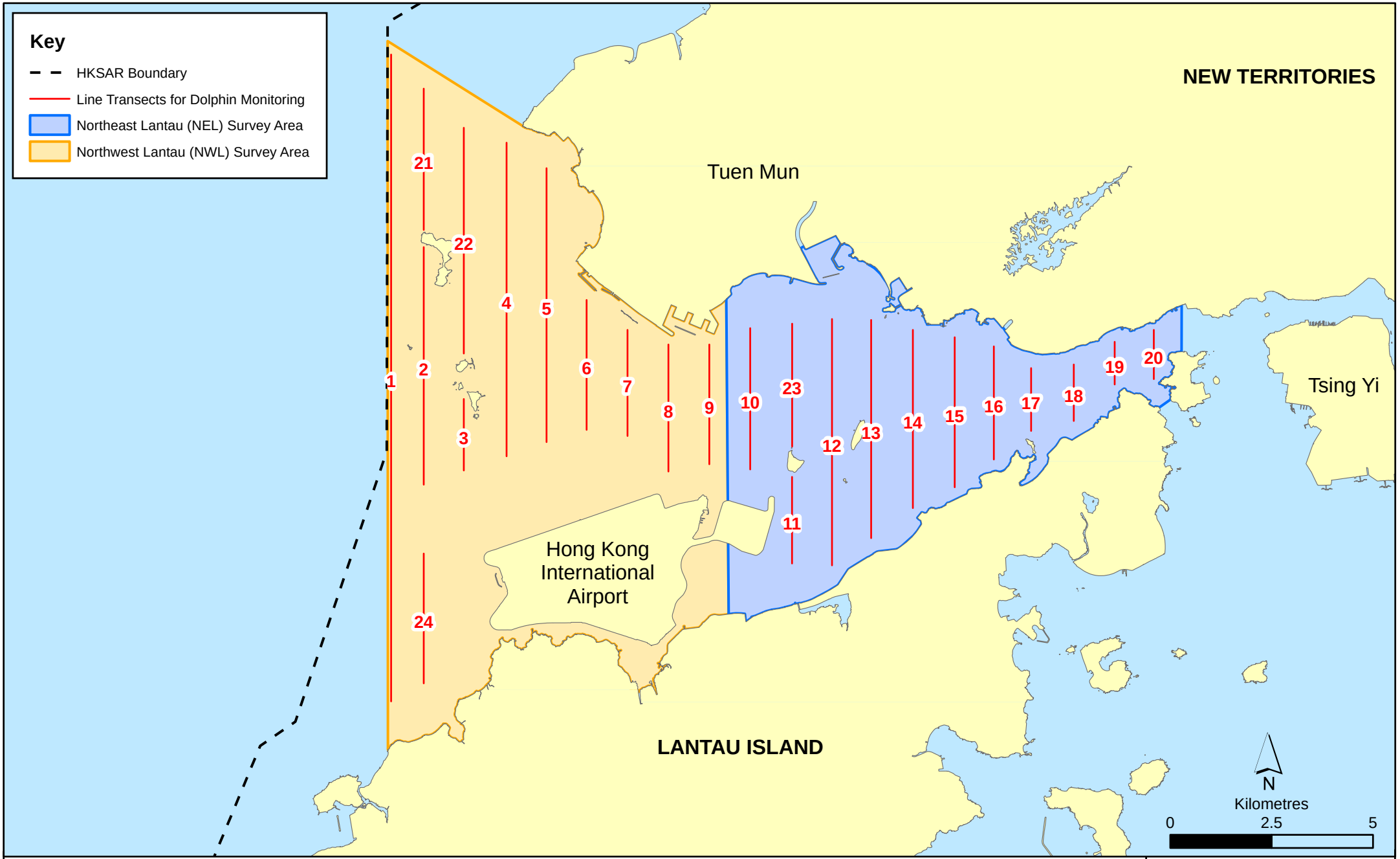

Figure 2.5b

Layout of Transect Lines of Dolphin Monitoring in Northwest and Northeast Lantau Areas (August 2017)

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Date: 21/9/2017

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Table 2.11 Impact Dolphin Monitoring Line Transect Co-ordinates (June –July 2017)

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815913	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820880	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

Table 2.12 Impact Dolphin Monitoring Line Transect Co-ordinates (August 2017)

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 793.06 km of survey effort was collected, with 97.8% 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, 290.58 km and 502.48 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 575.14 km, while the effort on secondary lines was 217.92 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 2017, a total of twelve (12) groups of 34 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort, while eight of the twelve 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*.

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 2.13* and *2.14*.

Table 2.13 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: 14th/ 15th Jun 2017	0.0	0.0
	Set 2: 20th / 26th Jun 2017	0.0	0.0
	Set 3: 20th /24th Jul 2017	0.0	0.0
	Set 4: 27th / 28th Jul 2017	0.0	0.0
	Set 5: 7th / 15th Aug 2017	0.0	0.0
	Set 6: 21st /31st Aug 2017	0.0	0.0
NWL	Set 1: 14th/ 15th Jun 2017	0.00	0.00
	Set 2: 20th / 26th Jun 2017	0.00	0.00
	Set 3: 20th /24th Jul 2017	1.64	14.79
	Set 4: 27th / 28th Jul 2017	0.00	0.00
	Set 5: 7th / 15th Aug 2017	4.95	6.61
	Set 6: 21st /31st Aug 2017	6.58	18.09

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 2.14 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 2017	**September - November 2011**	**June – August 2017**	**September - November 2011**
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	2.20 ± 2.88	9.85 ± 5.85	6.58 ± 8.12	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 nine (9) individuals per group in North Lantau region during June to August 2017. 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 2.15*.

Table 2.15 Comparison of Quarterly Average Group Sizes

	Average Dolphin Group Size	
	June – August 2017	**September - November 2011**
Overall	2.83 ± 2.33 (n = 12)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.83 ± 2.33 (n = 12)	3.92 ± 3.40 (n = 49)

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between June and August 2017.

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

Although the dolphins infrequently occurred along the alignment of TM-CLKL Southern Connection Viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in both NEL and NWL, and many individuals have shifted away from the important habitat around the Brothers Islands.

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

2.4.8 *Marine Mammal Exclusion Zone Monitoring*

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

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

2.5 *EM&A SITE INSPECTION*

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Thirteenth (13) site inspections were carried out in the reporting quarter on 7, 14, 21 and 29 June 2017, 5, 12, 19 and 27 July 2017, 2, 9, 16, 24 and 31 August 2017.

Key observations during the site inspections in this reporting period are summarized in *Table 2.16*.

Table 2.16 Specific Observations Identified during the Weekly Site Inspection in this Reporting Period

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
7 June 2017	Viaduct D (Pier D13) • Accumulated general refuse should be cleared regularly. Viaduct D (Pier D14) • Drip tray under the generator was observed not well plugged. Ramp D • Chemical containers were observed not placed in drip tray.	Viaduct D (Pier D13) • The Contractor was reminded to clear accumulated general refuse. Viaduct D (Pier D14) • The Contractor was reminded to plug drip tray under the generator. Ramp D • The Contractor was reminded to place chemical containers in drip tray.
14 June 2017	Southern Landfall Portion A (Portion S-b) • Chemical containers were observed not placed in drip tray. • Stagnant water inside drip tray nearby the chemical containers should be cleared.	Southern Landfall Portion A (Portion S-b) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to clear stagnant water inside drip tray nearby the chemical containers.
21 June 2017	Viaduct D (Pier D13) • NRMM label should be displayed clearly on the generator. • Stagnant water inside drip tray should be cleared. Viaduct B (Pier B16) • Exposed slope was observed not fully covered by tarpaulin. Viaduct C (Pier C12) • Exposed stockpile was observed not fully covered by tarpaulin.	Viaduct D (Pier D13) • The Contractor was reminded to display NRMM label clearly on the generator. • The Contractor was reminded to clear stagnant water inside drip tray. Viaduct B (Pier B16) • The Contractor was reminded to fully cover exposed slope by tarpaulin. Viaduct C (Pier C12) • The Contractor was reminded to fully cover exposed stockpile by tarpaulin.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
29 June 2017	Viaduct E (Pier E6) • Chemical containers were observed not placed in drip tray. • Stagnant water inside drip tray should be cleared. Viaduct E (Pier E10) • Chemical containers were observed not placed in drip tray.	Viaduct E (Pier E16) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to clear stagnant water inside drip tray. Viaduct E (Pier E10) • The Contractor was reminded to place chemical containers in drip tray.
5 July 2017	Viaduct E (Pier E4) • Chemical containers in the deck were observed not placed in drip tray. • NRMM label should be provided on the generator.	Viaduct E (Pier E4) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to provide NRMM label on the generator.
12 July 2017	Southern Landfall Portion A (Portion S-c) • Chemical container was observed not placed in drip tray.	Southern Landfall Portion A (Portion S-c) • The Contractor was reminded to place chemical container in drip tray.
19 July 2017	Viaduct E (Pier E12) • General refuse should be cleared regularly. Viaduct E (Pier E11) • Chemical containers were observed not placed in drip tray. • Air compressor was observed not fully placed in drip tray.	Viaduct E (Pier E12) • The Contractor was reminded to clear general refuse regularly. Viaduct E (Pier E11) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to fully place the air compressor in drip tray.
27 July 2017	Ramp C (Area I) • Chemical containers on the deck were observed not placed in drip tray. • General refuse should be cleared regularly. Viaduct C (Pier C15) • Stockpile was observed not being fully covered by tarpaulin. Ramp D (Area I) • Chemical containers were observed not placed in drip tray. • Watering should be provided on unpaved road.	Ramp C (Area I) • The Contractor was reminded to place chemical containers on the deck in drip tray. • The Contractor was reminded to clear general refuse regularly. Viaduct C (Pier C15) • The Contractor was reminded to fully cover stockpile by tarpaulin. Ramp D (Area I) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to provide watering on unpaved road.
2 August 2017	Viaduct B (Pier B16) • General refuse in the skip should be cleared. Viaduct B (Pier B11) • Chemical containers in the deck were observed not placed in drip tray.	Viaduct B (Pier B16) • The Contractor was reminded to clear general refuse in the skip. Viaduct B (Pier B11) • The Contractor was reminded to place chemical containers in drip tray.
9 August 2017	Viaduct E (Pier E11) • Chemical container was observed not placed in drip tray. • General refuse in the skip should be cleared.	Viaduct E (Pier E11) • The Contractor was reminded to place chemical container in drip tray. • The Contractor was reminded to clear general refuse in the skip.
16 August 2017	Southern Landfall Portion A (HKBCF Portion S-c) • Watering on exposed area should be applied more frequently. • Chemical labels should be provided to the chemical containers.	Southern Landfall Portion A (HKBCF Portion S-c) • The Contractor was reminded to apply watering on exposed area. • The Contractor was reminded to provide chemical labels to the chemical containers.

Inspection Date	Location & Environmental Observations	Recommendations/ Remarks
24 August 2017	Viaduct E (Pier E11) • Chemical container was observed not placed in drip tray. • Stagnant water was observed inside drip tray.	Viaduct E (Pier E11) • The Contractor was reminded to place chemical container in drip tray. • The Contractor was reminded to clear stagnant water inside drip tray.
31 August 2017	Viaduct E (Pier E4) • Chemical containers on the deck were observed not placed in drip tray. • General refuse should be cleared regularly. Southern Landfall Portion A (HKBCF Portion S-c) • General refuse should be cleared regularly.	Viaduct E (Pier E4) • The Contractor was reminded to place chemical containers on the deck in drip tray. • The Contractor was reminded to clear general refuse regularly. Southern Landfall Portion A (HKBCF Portion S-c) • The Contractor was reminded to clear general refuse regularly.

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

2.6 *WASTE MANAGEMENT STATUS*

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

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert), recyclable materials, chemical waste and marine sediment. Reference has been made to the waste flow table prepared by the Contractor (*Appendix K*). The quantities of different types of wastes are summarized in *Table 2.17.*

Table 2.17 Quantities of Different Waste Generated in the Reporting Period

Month/ Year	Inert Construction Waste [(a)] (m^3)	Imported Fill (m^3)	Inert Construction Waste Re-used (m^3)	Non-inert Construction Waste [(b)] (kg)	Recyclable Materials [(c)] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)	
							Category L	Category M
June 2017	4,394	0	98	148,600	63	0	0	0
July 2017	4,921	0	696	159,980	91	800	1,056	0
August 2017	3,897	0	0	159,230	56	0	0	0
Total	13,212	0	794	467,810	210	800	1,056	0

Notes:

(a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.

(b) Non-inert construction wastes include general refuse disposed at landfill.

(c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

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

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

2.7 *ENVIRONMENTAL LICENSES AND PERMITS*

The status of environmental licensing and permit is summarized in *Table 2.18* below.

Table 2.18 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-RW0708-16	20-Dec-16	18-Jun-17	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RW0294-17	19-Jun-17	18-Dec-17	GCL	General works at WA5
Construction Noise Permit for night works and works in general holidays	GW-RS1309-16	20-Dec-16	19-Jun-17	GCL	Broad Permit for Whole Site Areas
Construction Noise Permit for night works and works in general holidays	GW-RS0540-17	20-Jun-17	15-Dec-17	GCL	Broad Permit for Whole Site Areas
Construction Noise Permit for night works and works in general holidays	GW-RS0408-17	11-May-17	30-Sep-17	GCL	Pre-casted pile cap shell installation at E8-E13
Construction Noise Permit for night works and works in general holidays	GW-RS0668-17	7-Aug-17	6-Feb-18	GCL	Pre-casted pile cap shell installation at E8-E13
Construction Noise Permit for night works and works in general holidays	GW-RS0456-17	31-May-17	31-Jul-17	GCL	Broad Permit for Segment Launching at Land Portion

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Construction Noise Permit for night works and works in general holidays	GW-RS0639-17	31-Jul-17	29-Sep-17	GCL	Broad Permit for Segment Launching at Land Portion
Construction Noise Permit for night works and works in general holidays	GW-RS0688-17	17-Aug-17	31-Aug-17	GCL	Contingency plan for DN800T works at Tung Chung Seafront Road
Construction Noise Permit for percussive piling	PP-RS0010-17	12-Jun-17	15-Sep-17	GCL	Percussive piling at Portion A
Marine Dumping Permit	EP/MD/17-153	01-Jan-17	30-Jun-17	GCL	For dumping Type I sediment
Marine Dumping Permit	EP/MD/18-031	01-Jul-17	31-Dec-17	GCL	For dumping Type I sediment
Marine Dumping Permit	EP/MD/17-196	01-Jul-17	31-Jul-17	GCL	For dumping Type II sediment
Marine Dumping Permit	EP/MD/18-047	1-Aug-17	31-Aug-17	GCL	For dumping Type I and Type II sediment

2.8 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

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

2.9 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

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

Thirty (30) Action Level and fourteen (14) Limit Level of Dissolved Oxygen (DO) exceedances and one (1) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation report is 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 2.19*). 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 2.19 Comparison between Quarterly Mean and Ambient Mean Values of Depth-averaged Suspended Solids

Station	Baseline Mean		Ambient Mean [(a)]		Quarterly Mean (June to August 2017)	
	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
CS(Mf)3(N)	9.2	12.8	12.0	16.6	6.3	7.6
CS(Mf)5	9.2	11.5	11.9	14.9	6.0	5.3
SR4/SR4(N)	10.3	12.3	13.4	16.0	7.8	9.3
SR4a	9.1	9.8	11.9	12.7	9.2	9.9
IS8	11.3	13.5	14.6	17.6	6.9	8.3
IS(Mf)9	10.9	14.3	14.2	18.5	6.6	7.4
IS(Mf)16	11.4	10.3	14.8	13.4	7.6	6.1

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.

One (1) Limit Level exceedance was recorded for impact dolphin monitoring in this reporting quarter. Following the review of the monitoring data and marine works details as per the procedure stipulated in the Event and Action Plan of the Updated EM&A Manual, no unacceptable impact was associated

with the construction works under this Contract that may have affected the dolphin usage in the North Lantau region. Investigation findings were detailed in *Appendix L*.

2.10 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.6*.

There was no environmental complaint, 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*.

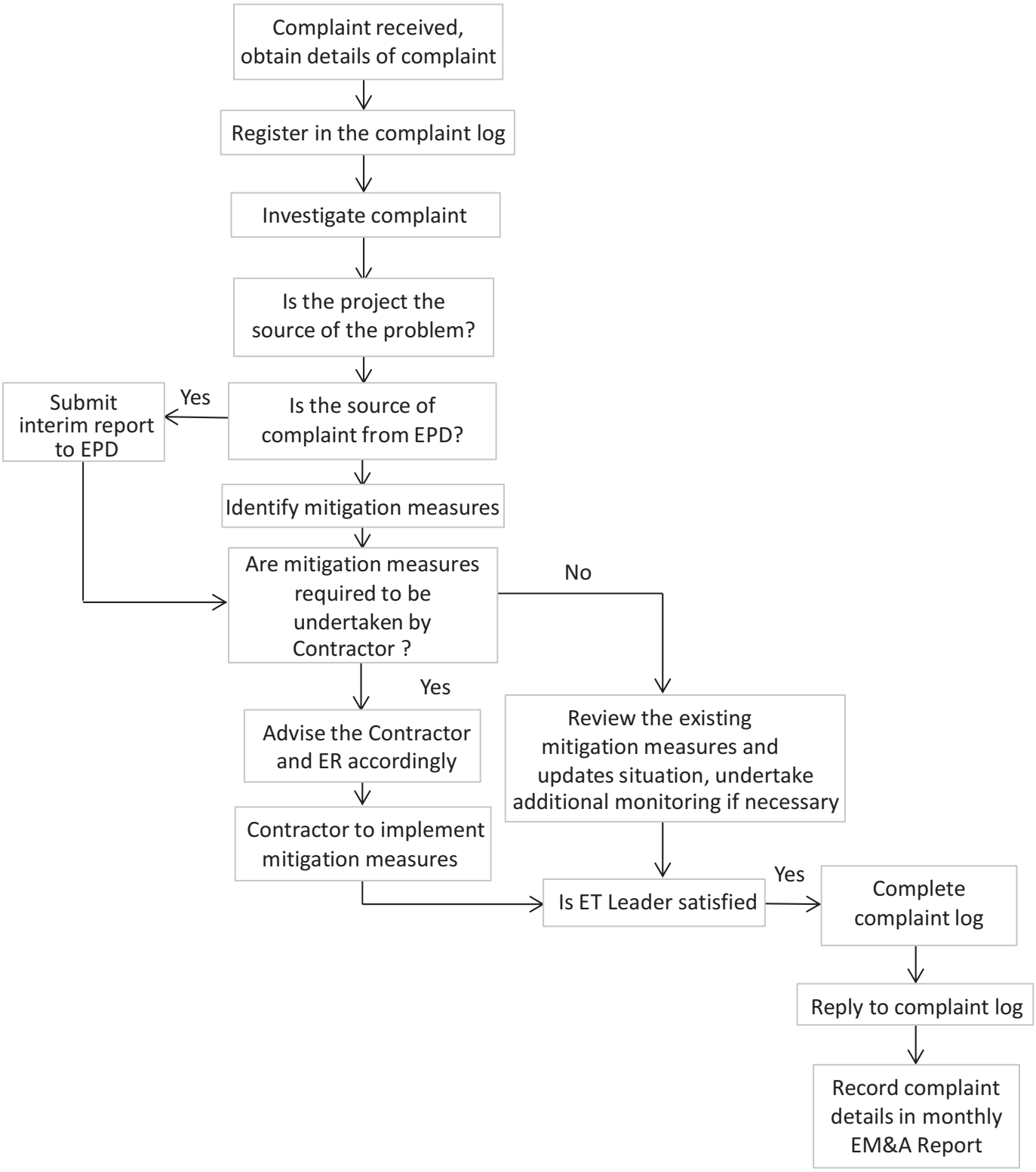

Figure 2.6 Environmental Complaint Handling Procedure

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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 2017

Land-based Works

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

October 2017

Land-based Works

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

November 2017

Land-based Works

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

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

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 Fifteenth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 June to 31 August 2017, in accordance with the Updated EM&A Manual and the requirements of the *Environmental Permits* (*EP-354/2009/D* and *EP-353/2009/K*).

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

Thirty (30) Action Level and fourteen (14) Limit Level of Dissolved Oxygen (DO) exceedances and one (1) Action Level of Suspended Solids (SS) exceedances were recorded for water quality impact monitoring in the reporting period. Investigation findings suggested the observed water quality exceedances were not related to the works under this Contract.

A total of twelve (12) groups of thirty-four (34) Chinese White Dolphins were sighted during the six sets of survey from June to August 2017. One (1) Limit Level exceedance was recorded for the quarterly dolphin monitoring data between June and August 2017, 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.

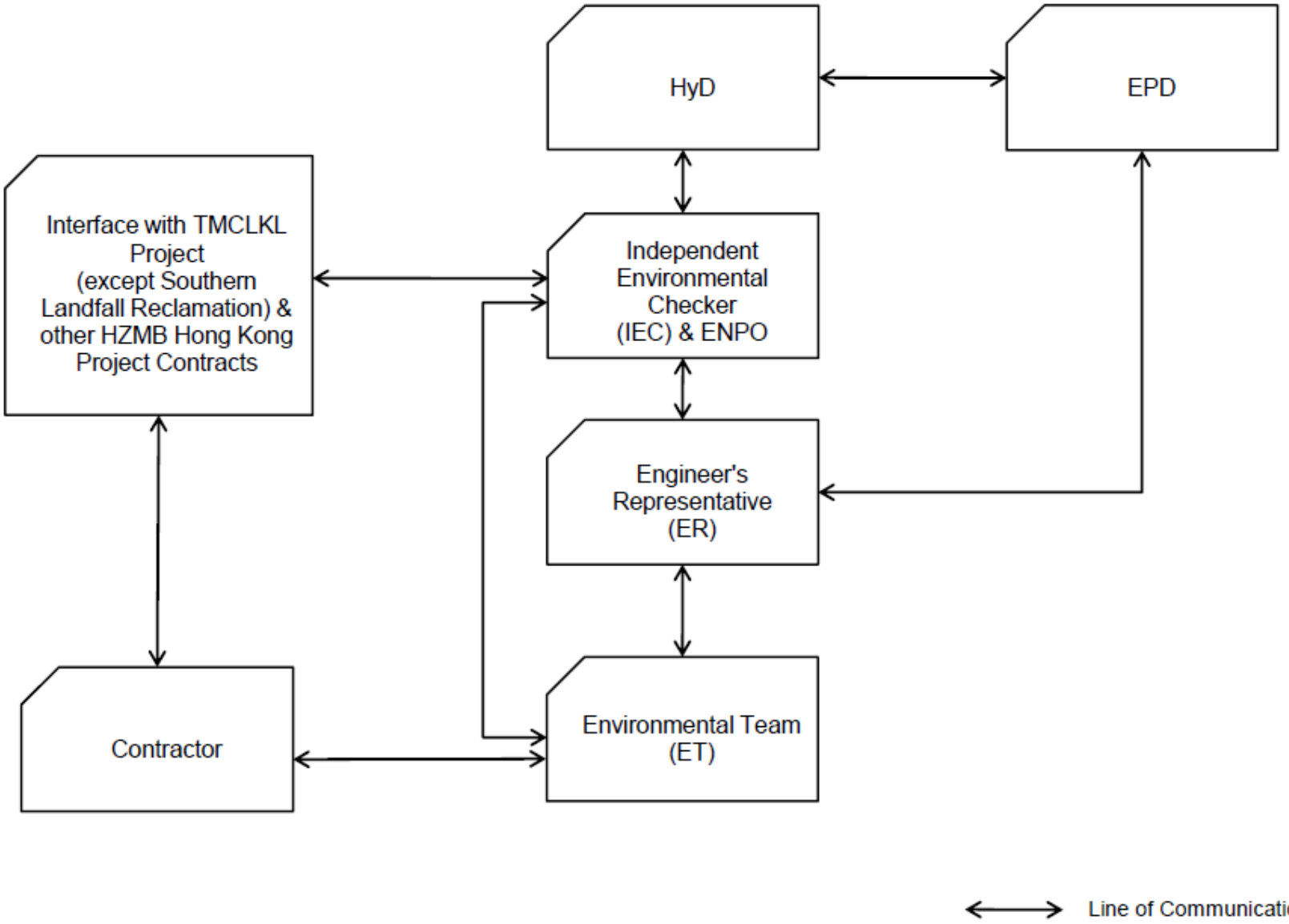
Environmental site inspection was carried out 13 times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

There was no environmental complaint, 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

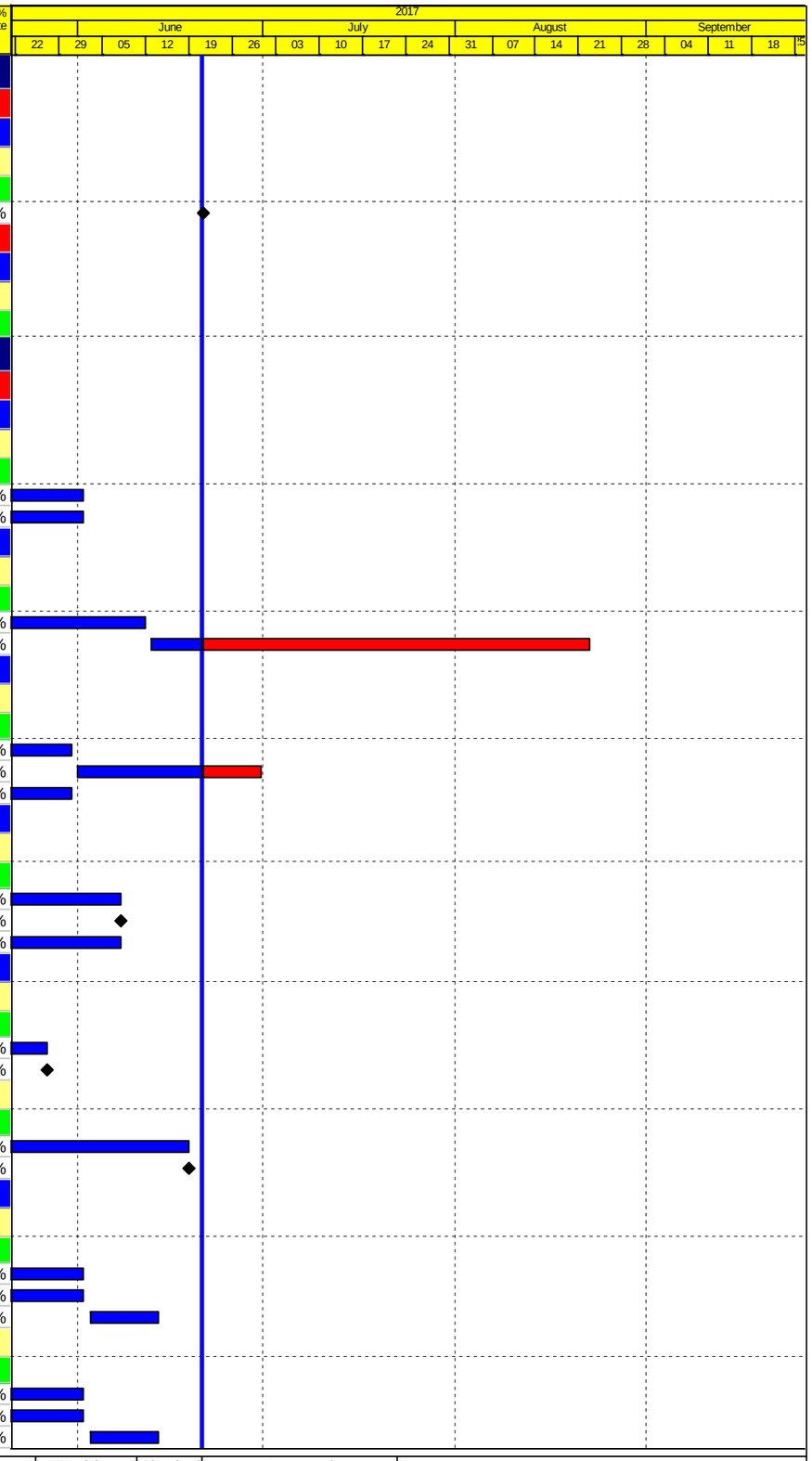
Environmental Resources Management

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
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-17*		08-Apr-16	-438	0%
Portion Handover Dates									
Possession of the Works Area									
Access Dates									
General									
Design									
Detailed Design									
General Submissions									
Reports & Manuals									
General									
ARDD0040-2	IC/SO Approval of Operation and Maintenance Manual - AP08.00	75	20-Oct-15 A	0	02-Jun-17 A				100%
ARDD0042-2	IC/SO Approval of O&M Facility Provisions DDA - BP11.01	75	14-Jan-15 A	0	02-Jun-17 A				100%
Slope Works Near Viaduct A									
Feature 9SE-B/FR8, B/R1, B/R2									
Slope Works Design									
ARDD0596	Preparation of remaining portion of Slope FR8 Combined AIP/DDA - CP11.	35	01-Apr-17 A	0	12-Jun-17 A				100%
ARDD0596-1	IC/SO Approval of Slope Combined AIP/DDA - CP11.01	60	13-Jun-17 A	53	22-Aug-17	16-May-16	18-Jul-16	-326	10%
Slope Works Near Viaduct C									
Feature 10NW-C/C22, C/C26, C/C27, C/F13, C/F14, C/F15									
Slope Works Design									
ARDD0589-1	Preparation of Slope Combined AIP/DDA - CP13.01	60	21-Jan-17 A	0	31-May-17 A				100%
ARDD0589-2	IC/SO Approval of Combined AIP/DDA - CP13.01	28	01-Jun-17 A	9	30-Jun-17	08-Aug-16	17-Aug-16	-256	70%
ARDD0590-1	New fill slopes PF1 & PF2 IC/SO Approval of combined AIP/DDA - CP13.0	28	06-Apr-17 A	0	31-May-17 A				100%
Watermain, Drainage & Utility Diversions									
General									
Design									
ARDD0629	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	75	22-Jul-14 A	0	08-Jun-17 A				100%
ARDD0629-1	IC/SO Approval of Waterworks, Drainage & Utility DDA - BP20.01	0		0	08-Jun-17 A				100%
ARDD0629-2	Gov't Approval of Submissions for Waterworks, Drainage & Utility Diversior	75	02-Jan-14 A	0	08-Jun-17 A				100%
Viaduct Approach Ramp Retaining Walls									
Abutment & Approach Ramp B									
Design									
ARDD0664	Approach B - IC/SO Approval of Approach Ramp B DDA -DP21.01	75	14-Oct-14 A	0	27-May-17 A				100%
ARDD0664-1	Approach B - IC/SO Approval of Approach Ramp B DDA -DP21.01	0		0	27-May-17 A				100%
Abutment & Approach Ramp F									
Design									
ARDD0676	Approach F - IC/SO Approval of Approach Ramp F DDA -DP24.01	75	23-Dec-14 A	0	19-Jun-17 A				100%
ARDD0676-1	Approach F - IC/SO Approval of Approach Ramp F DDA -DP24.01	0		0	19-Jun-17 A				100%
Segment Target Geometry & Erection Engineering									
Viaduct E5 & E6									
Design									
ARDD0734	Viaduct E5 & E6 - Segment Geometry Schedules	10	05-May-14 A	0	02-Jun-17 A				100%
TGP0570	Viaduct E5 & E6 - Issue of Optimised Casting Data and Segment Catalogu	40	30-Apr-15 A	0	02-Jun-17 A				100%
TGP0590	Viaduct E5 & E6 - Issue Erection Manual	10	03-Jun-17 A	0	14-Jun-17 A				100%
Viaduct E7 & E8									
Design									
ARDD0739	Viaduct E7 & E8 - Segment Geometry Schedules	10	05-May-14 A	0	02-Jun-17 A				100%
TGP0760	Viaduct E7 & E8 - Issue of Optimised Casting Data and Segment Catalogu	40	31-Jul-15 A	0	02-Jun-17 A				100%
TGP0790	Viaduct E7 & E8 - Issue Erection Manual	10	03-Jun-17 A	0	14-Jun-17 A				100%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.

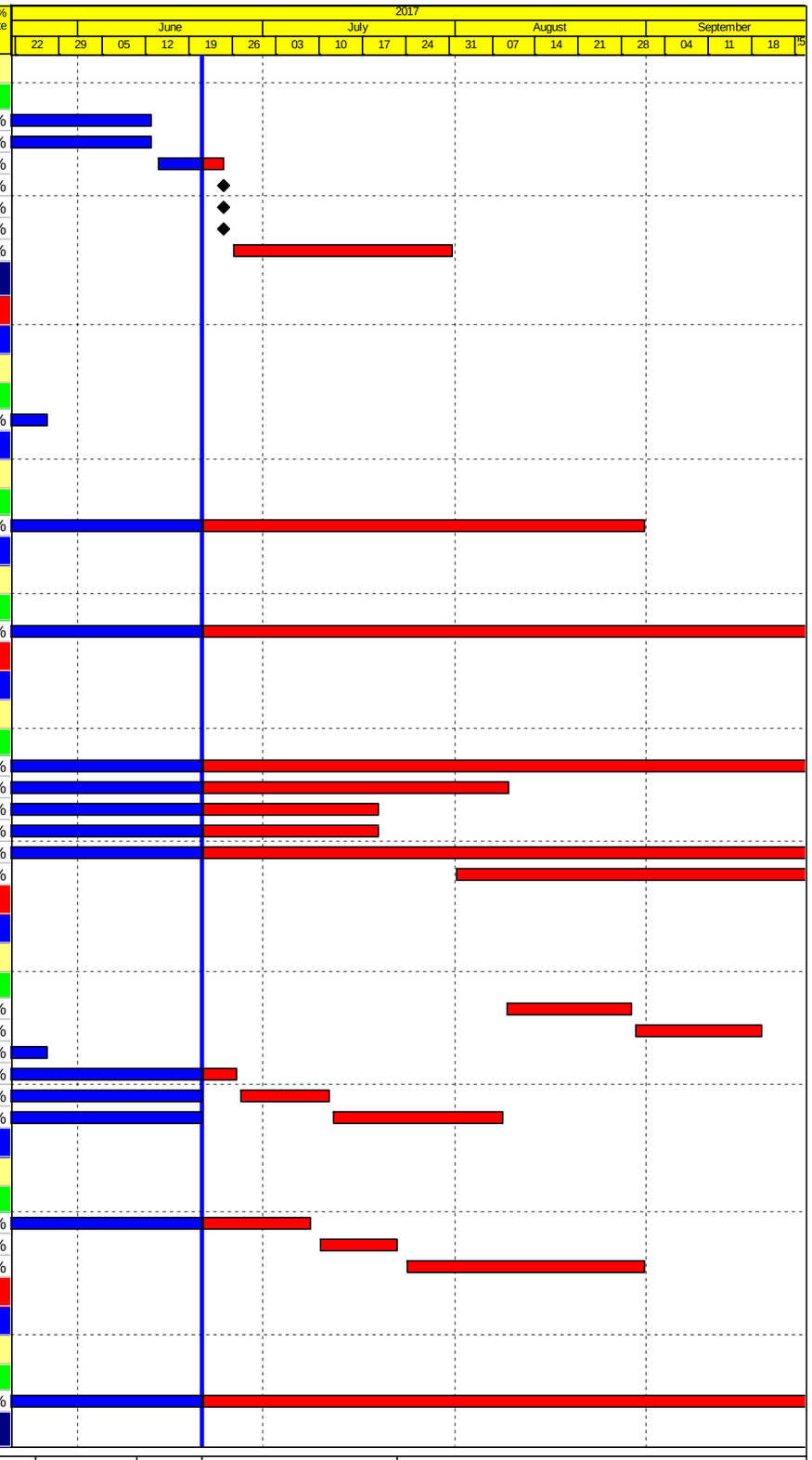
Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 1 of 12 Pages)
(Progress as of 21-Jun-17)

Date	Revision	Checked	Approved
28-Apr-17		PKN	GL
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
Viaduct F									
Design									
ARDD0752	Viaduct F - Erection Sequence Analysis	13	01-Mar-17 A	0	13-Jun-17 A				100%
ARDD0753	Viaduct F - Target Geometry Analysis	30	01-Apr-17 A	0	13-Jun-17 A				100%
ARDD0754	Viaduct F - Segment Geometry Schedules	10	14-Jun-17 A	4	24-Jun-17	12-Sep-16	15-Sep-16	-226	60%
ARDD0754-1	Viaduct F - Issue of Pierhead Segments Bridge F1, F2, F3, F4 & F5	0		0	24-Jun-17		15-Sep-16	-226	0%
ARDD0754-3	Viaduct F - Issue of Casting Data and Segment Catalogue Bridge F1, F3 (F	0		0	24-Jun-17		15-Sep-16	-226	0%
ARDD0754-4	Viaduct F - Issue of Casting Data and Segment Catalogue Bridge F2, F4, F	0		0	24-Jun-17		15-Sep-16	-226	0%
ARDD0754-5	Viaduct F - Issue Erection Manual	30	26-Jun-17	30	31-Jul-17	17-Sep-16	24-Oct-16	-226	0%
Procurement									
Precast Deck Segments									
Viaduct A - Bridge A2-A1									
Segment Manufacture									
General									
MBAE0130-1	A: Progressive Segment Manufacture (179 Nr)	180	13-Jun-16 A	0	27-May-17 A				100%
Viaduct E - Bridge E5, E6, E7, E8									
Segment Manufacture									
General									
MBEE0130-9	E5-6-7-8: Progressive Segment Manufacture (544Nr)	360	06-May-15 A	61	31-Aug-17	12-Nov-16	25-Jan-17	-176	92%
Viaduct F - Bridge F1-F5									
Segment Manufacture									
General									
MBFE0130-1	F: Progressive Segment Manufacture (300 Nr)	252	27-Oct-16 A	87	30-Sep-17	16-Jan-17	06-May-17	-124	66%
Precast Parapets & Barriers									
Viaduct A to F									
Precast Parapet Manufacture									
General									
PP6011-01	Viaduct A - Precast Parapets/Barriers Production	90	01-Sep-16 A	120	11-Nov-17	12-Sep-16	08-Feb-17	-226	50%
PP6011-02	Viaduct B - Precast Parapets/Barriers Production	120	03-May-16 A	42	09-Aug-17	12-Sep-16	02-Nov-16	-226	75%
PP6011-03	Viaduct C - Precast Parapets/Barriers Production	120	01-Apr-16 A	24	19-Jul-17	16-May-16	13-Jun-16	-326	85%
PP6011-04	Viaduct D - Precast Parapets/Barriers Production	120	01-Mar-16 A	24	19-Jul-17	16-May-16	13-Jun-16	-326	85%
PP6011-05	Viaduct E - Precast Parapets/Barriers Production	180	02-Jul-16 A	180	24-Jan-18	16-May-16	16-Dec-16	-326	40%
PP6011-06	Viaduct F - Precast Parapets/Barriers Production	198	01-Aug-17*	198	29-Mar-18	18-Feb-17	18-Oct-17	-132	0%
Bearings									
Viaduct E									
Bearing Design & Manufacture									
General									
PP7150	Site preparation Bearings for Viaduct E5 & E6	18	09-Aug-17	18	29-Aug-17	19-Dec-16	11-Jan-17	-186	0%
PP7220	Site preparation Bearings for Viaduct E7 & E8	18	30-Aug-17	18	19-Sep-17	12-Jan-17	04-Feb-17	-186	0%
PPBRE6	Bearing Design Amendment & re-issue - Viaduct E (E1, E2, E5, E6, E7 & E	12	15-Nov-16 A	0	27-May-17 A				100%
PPBRE7	Manufacture of Bearing - Viaduct E (E1, E2, E5, E6, E7 & E8)	54	02-Jun-14 A	5	26-Jun-17	01-Nov-16	05-Nov-16	-186	90%
PPBRE8	Testing Bearing - Viaduct E (E1, E2, E5, E6, E7 & E8)	24	03-Aug-15 A	12	11-Jul-17	07-Nov-16	19-Nov-16	-186	80%
PPBRE9	Bearing Delivery - Viaduct E (E1, E2, E5, E6, E7 & E8)	48	19-Nov-14 A	24	08-Aug-17	21-Nov-16	17-Dec-16	-186	70%
Viaduct F									
Bearing Design & Manufacture									
General									
PPBRF7	Manufacture of Bearing - Viaduct F	60	28-Mar-17 A	15	08-Jul-17	21-Sep-16	08-Oct-16	-219	80%
PPBRF8	Testing Bearing - Viaduct F	12	10-Jul-17	12	22-Jul-17	11-Oct-16	24-Oct-16	-219	0%
PPBRF9	Bearing Delivery - Viaduct F	34	24-Jul-17	34	31-Aug-17	25-Oct-16	02-Dec-16	-219	0%
Movement Joints									
Viaduct A to F									
MJ Design & Manufacture									
General									
PP6MJ02-2	Manufacture & delivery of MJ	180	01-Apr-17 A	100	18-Oct-17	11-Apr-16	09-Aug-16	-354	25%
Construction									



Actual Work
Planned Bar
Critical Bar
Milestone

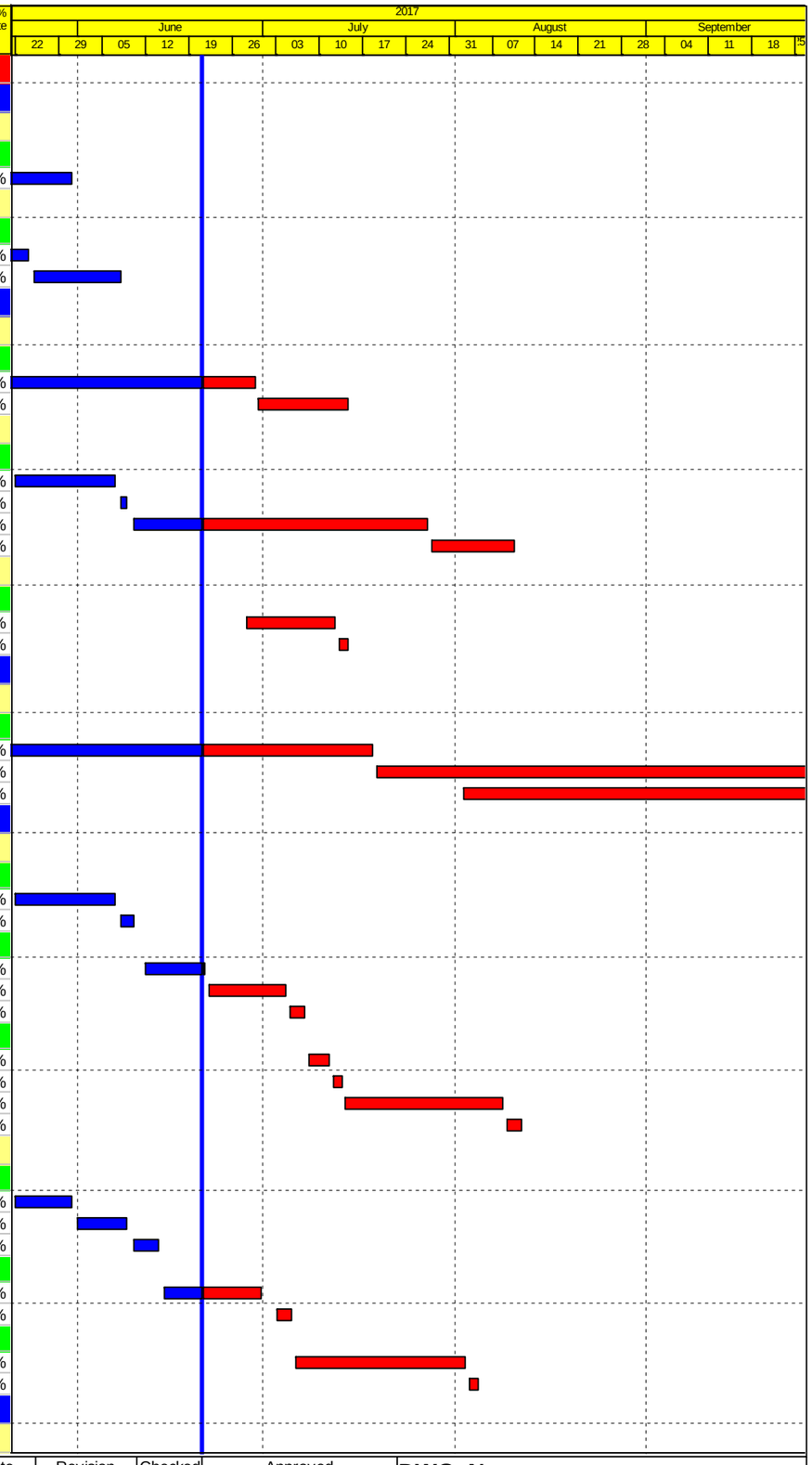
Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 2 of 12 Pages)
(Progress as of 21-Jun-17)

Date	Revision	Checked	Approved
28-Apr-17		PKN	GL
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:
J3518/GCL/PGM/3MRP-M49

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
Foundation & Substructure Works									
Viaduct A - Bridge A2									
Pier A2 (A2d)									
Pier Head Segment									
A02-C5420	A2 - PHS Diaphragm - Curing & Striking of Forms	12	17-May-17 A	0	31-May-17 A				100%
Pier A3 (A2c)									
Pier Head Segment									
A03-C5410	A3 - PHS Diaphragm - Rebar, Formwork, Concreting	30	31-Mar-17 A	0	24-May-17 A				100%
A03-C5420	A3 - PHS Diaphragm - Curing & Striking of Forms	12	25-May-17 A	0	08-Jun-17 A				100%
Viaduct A - Bridge A1									
Pier A9 (A1c)									
Pier Head Segment									
A09-C5410	A9 - PHS Diaphragm - Rebar, Formwork, Concreting	36	26-Apr-17 A	8	29-Jun-17	07-Apr-16	15-Apr-16	-357	85%
A09-C5420	A9 - PHS Diaphragm - Curing & Striking of Forms	12	30-Jun-17	12	14-Jul-17	16-Apr-16	29-Apr-16	-357	0%
Pier A10 (A1b)									
Pier Head Segment									
A10-C5210	A10 - PHS - Temporary Platform	12	22-May-17 A	0	07-Jun-17 A				100%
A10-C5310	A10 - Install PH Segment (1 nr)	2	08-Jun-17 A	0	09-Jun-17 A				100%
A10-C5410	A10 - PHS Diaphragm - Rebar, Formwork, Concreting	36	10-Jun-17 A	31	27-Jul-17	11-May-16	17-Jun-16	-329	20%
A10-C5420	A10 - PHS Diaphragm - Curing & Striking of Forms	12	28-Jul-17	12	10-Aug-17	18-Jun-16	02-Jul-16	-329	0%
Pier A11 (A1a)									
Pier Head Segment									
A11-C5210	A11 - PHS - Temporary Platform	12	28-Jun-17	12	12-Jul-17	21-Jun-16	05-Jul-16	-302	0%
A11-C5310	A11 - Install PH Segment (1nr)	2	13-Jul-17*	2	14-Jul-17	06-Jul-16	07-Jul-16	-302	0%
Ramp A									
Abutment & Approach Ramp A									
Ramp Structure									
ARA-C6140	Ramp A - Remaining RE Wall (Bay 7 to 11) with Backfill	111	02-Mar-17 A	23	18-Jul-17	20-Apr-16	18-May-16	-346	80%
ARA-C6142	Ramp A - Remaining RC Wall (Bay Wa2-Wa5 & Bay 9-12) with Backfill	120	19-Jul-17	120	08-Dec-17	24-May-16	15-Oct-16	-342	0%
ARA-C6150	Ramp A - Backfill to Walls	111	02-Aug-17	111	12-Dec-17	07-Jun-16	19-Oct-16	-342	0%
Viaduct B - Bridge B1									
Pier B17 (B1c)									
Pile Cap									
B17-C3210	B17 - Pile Cap Blinding, Rebar, Formwork, Concrete	10	22-May-17 A	0	07-Jun-17 A				100%
B17-C3310	B17 - Pile Cap Curing, Strike Formwork, CJ Prep	3	08-Jun-17 A	0	10-Jun-17 A				100%
Pier									
B17-C4110	B17 - Pier Scaffold, Rebar, Formwork, Concrete (1st Lift)	7	12-Jun-17 A	1	21-Jun-17	09-Apr-16	09-Apr-16	-355	85%
B17-C4210	B17 - Pier Scaffold, Rebar, Formwork, Concrete (2nd Lift)	10	22-Jun-17	10	04-Jul-17	11-Apr-16	21-Apr-16	-355	0%
B17-C4310	B17 - Pier Curing, Remove Formwork	3	05-Jul-17	3	07-Jul-17	22-Apr-16	25-Apr-16	-355	0%
Pier Head Segment									
B17-C5210	B17 - PHS - Temporary Platform	3	08-Jul-17	3	11-Jul-17	26-Apr-16	28-Apr-16	-355	0%
B17-C5310	B17 - Install PH Segment & Fix (1 nr)	2	12-Jul-17	2	13-Jul-17	29-Apr-16	30-Apr-16	-355	0%
B17-C5410	B17 - PHS Diaphragm - Rebar, Formwork, Concreting	22	14-Jul-17	22	08-Aug-17	03-May-16	28-May-16	-355	0%
B17-C5420	B17 - PHS Diaphragm - Curing & Striking of Forms	3	09-Aug-17	3	11-Aug-17	30-May-16	01-Jun-16	-355	0%
Pier B18 (B1b)									
Pile Cap									
B18-C3110	B18 - Pile Cap Break Pile Head & Weld Steel Plate	4	22-May-17 A	0	31-May-17 A				100%
B18-C3210	B18 - Pile Cap Blinding, Rebar, Formwork, Concrete	10	01-Jun-17 A	0	09-Jun-17 A				100%
B18-C3310	B18 - Pile Cap Curing, Strike Formwork, CJ Prep	3	10-Jun-17 A	0	14-Jun-17 A				100%
Pier									
B18-C4110	B18 - Pier Scaffold, Rebar, Formwork, Concrete	7	15-Jun-17 A	9	30-Jun-17	16-May-16	25-May-16	-326	30%
B18-C4210	B18 - Pier Curing, Remove Formwork	3	03-Jul-17	3	05-Jul-17	26-May-16	28-May-16	-326	0%
Pier Head Segment									
B18-C5210	B18 - PHS - Construct Abutment Wall	24	06-Jul-17	24	02-Aug-17	30-May-16	27-Jun-16	-326	0%
B18-C5310	B18 - PHS Lift & Temp Support (1 seg)	2	03-Aug-17	2	04-Aug-17	28-Jun-16	29-Jun-16	-326	0%
Ramp B									
Abutment & Approach Ramp B									



Actual Work
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Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
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Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 3 of 12 Pages)
(Progress as of 21-Jun-17)

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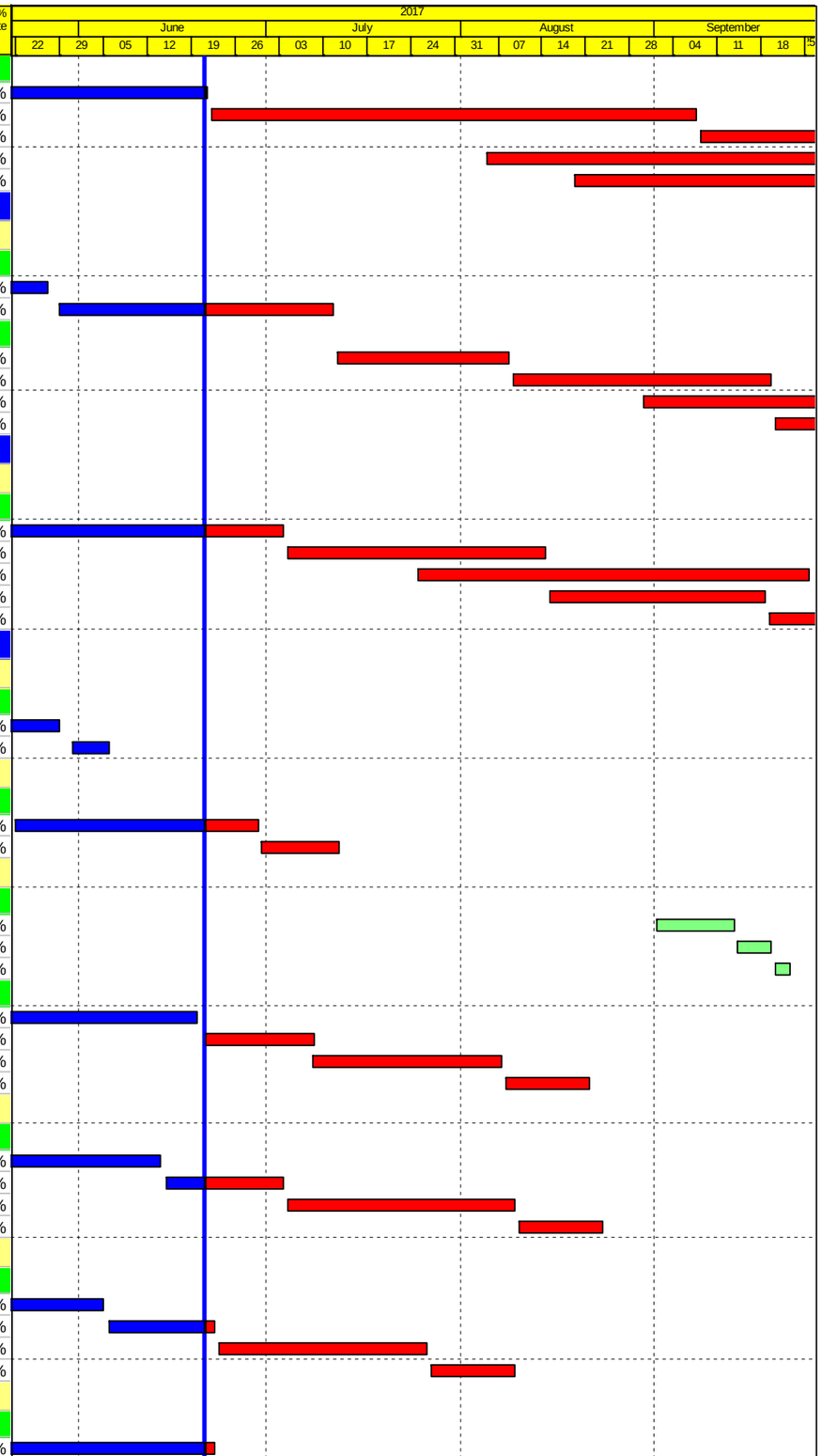
DWG. No.:

J3518/GCL/PGM/3MRP-M49

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 Structure									
ARB-C6120	Ramp B - RE Wall - Panel Installation from 1st Row to 3rd Row	66	29-Mar-17 A	1	21-Jun-17	19-Apr-16	19-Apr-16	-347	95%
ARB-C6130	Ramp B - RE Wall - Panel Installation from 4th Row to 6th Row	66	22-Jun-17	66	07-Sep-17	20-Apr-16	09-Jul-16	-347	0%
ARB-C6135	Ramp B - RE Wall - Panel installation from 7th Row to 11th Row	72	08-Sep-17	72	04-Dec-17	11-Jul-16	04-Oct-16	-347	0%
ARB-C6140	Ramp B - RC Wall - Base Slab	92	05-Aug-17	92	23-Nov-17	04-Jun-16	22-Sep-16	-347	0%
ARB-C6150	Ramp B - RC Wall - Side Wall	92	19-Aug-17	92	07-Dec-17	20-Jun-16	07-Oct-16	-347	0%
Ramp C									
Abutment & Approach Ramp C									
Ramp Structure									
ARC-C6170	Ramp C - RE Wall - Remaining Bays at 800 Tee	36	13-Mar-17 A	0	27-May-17 A				100%
ARC-C6180	Ramp C - RC Wall - Remaining Bays at 800 Tee	36	29-May-17 A	17	11-Jul-17	09-May-16	28-May-16	-331	50%
Ramp Finishes, E&M & Roadworks									
ARC-C7715	Ramp C - Parapet Panels (Remaining)	24	12-Jul-17	24	08-Aug-17	30-May-16	27-Jun-16	-331	0%
ARC-C7720	Ramp C - Ducting, Gantry & TCSS Provisions (KD4)	36	09-Aug-17	36	19-Sep-17	28-Jun-16	09-Aug-16	-331	0%
ARC-C7810	Ramp C - Drainage, Fire Main & E&M Services	54	30-Aug-17	54	03-Nov-17	20-Jul-16	21-Sep-16	-331	0%
ARC-C7820	Ramp C - Railings, Light Poles, Signs & Street Furniture	30	20-Sep-17	30	26-Oct-17	10-Aug-16	13-Sep-16	-331	0%
Ramp D									
Abutment & Approach Ramp D									
Ramp Finishes, E&M & Roadworks									
ARD-C7710	Ramp D - Parapet Panels	42	15-Oct-16 A	10	03-Jul-17	20-Jan-16	30-Jan-16	-417	90%
ARD-C7720	Ramp D - Ducting, Gantry & TCSS Provisions (KD4)	36	04-Jul-17	36	14-Aug-17	01-Feb-16	16-Mar-16	-417	0%
ARD-C7810	Ramp D - Drainage, Fire Main & E&M Services	54	25-Jul-17	54	25-Sep-17	25-Feb-16	03-May-16	-417	0%
ARD-C7820	Ramp D - Railings, Light Poles, Signs & Street Furniture	30	15-Aug-17	30	18-Sep-17	17-Mar-16	25-Apr-16	-417	0%
ARD-C7830	Ramp D - Deck Paving & Roadmarking (KD14)	18	19-Sep-17	18	11-Oct-17	26-Apr-16	18-May-16	-417	0%
Viaduct E - Bridge E5, E6, E7, E8									
Pier E11A (E7E8a)									
Pier Head Segment									
E11A-C5145	E11A - Install Infill Segments (6 nr) - THB	42	23-Apr-17 A	0	29-May-17 A				100%
E11A-C5150	E11A - IFS Stitch & Remove Equipment	12	31-May-17 A	0	06-Jun-17 A				100%
Pier E11B (E5e6a)									
Pier Head Segment									
E11B-C5145	E11B - Install Infill Segments (6 nr) - THB	24	22-May-17 A	8	29-Jun-17	20-Oct-16	28-Oct-16	-196	85%
E11B-C5150	E11B - IFS Stitch & Remove Equipment	10	30-Jun-17	10	12-Jul-17	29-Oct-16	09-Nov-16	-196	0%
Pier E12A (E8b)									
Pile Cap Dolphin									
E12A-C3130	E12A- Dolphin - Marine Pile Cap - Fixings, Dewatering & Trim Pile	11	01-Sep-17*	11	13-Sep-17	18-Sep-17	29-Sep-17	14	0%
E12A-C3150	E12A - Dolphin - Marine Pile Cap - Rebar, Concreting	5	14-Sep-17	5	19-Sep-17	30-Sep-17	07-Oct-17	14	0%
E12A-C3160	E12A - Dolphin - Marine Pile Cap - CJ preparation & Curing	3	20-Sep-17	3	22-Sep-17	09-Oct-17	11-Oct-17	14	0%
Pier Head Segment / Infill Segment									
E12A-C5130	E12A - Diaphragm of PHS - Formwork, Rebar, Concreting	74	28-Feb-17 A	0	20-Jun-17 A				100%
E12A-C5140	E12A - Remove Rail Beams, Spreader Beams, Brackets	15	21-Jun-17	15	08-Jul-17	09-Sep-16	27-Sep-16	-228	0%
E12A-C5145	E12A - Install Infill Segments (6 nr) - THB	26	08-Jul-17	26	07-Aug-17	27-Sep-16	28-Oct-16	-228	0%
E12A-C5150	E12A - IFS Stitch & Remove Equipment	12	08-Aug-17	12	21-Aug-17	29-Oct-16	11-Nov-16	-228	0%
Pier E12B (E7b)									
Pier Head Segment / Infill Segment									
E12B-C5130	E12B - Diaphragm of PHS - Formwork, Rebar, Concreting	76	10-Feb-17 A	0	14-Jun-17 A				100%
E12B-C5140	E12B - Remove Rail Beams, Spreader Beams, Brackets	15	15-Jun-17 A	10	03-Jul-17	08-Feb-17	18-Feb-17	-107	30%
E12B-C5145	E12B - Install Infill Segments (6 nr) - THB	32	04-Jul-17	32	09-Aug-17	20-Feb-17	28-Mar-17	-107	0%
E12B-C5150	E12B - IFS Stitch & Remove Equipment	12	10-Aug-17	12	23-Aug-17	29-Mar-17	12-Apr-17	-107	0%
Pier E12C (E6b)									
Pier Head Segment / Infill Segment									
E12C-C5130	E12C - Diaphragm of PHS - Formwork, Rebar, Concreting	76	24-Jan-17 A	0	05-Jun-17 A				100%
E12C-C5140	E12C - Remove Rail Beams, Spreader Beams, Brackets, Crane	5	06-Jun-17 A	2	22-Jun-17	12-Apr-17	13-Apr-17	-54	85%
E12C-C5145	E12C - Install Infill Segments (6 nr) - THB	28	23-Jun-17	28	26-Jul-17	18-Apr-17	22-May-17	-54	0%
E12C-C5150	E12C - IFS Stitch & Remove Equipment	12	27-Jul-17	12	09-Aug-17	23-May-17	06-Jun-17	-54	0%
Pier E12D (E5b)									
Pier Head Segment / Infill Segment									
E12D-C5130	E12D - Diaphragm of PHS - Formwork, Rebar, Concreting	76	07-Mar-17 A	2	22-Jun-17	01-Nov-16	02-Nov-16	-186	100%



Actual Work
Planned Bar
Critical Bar
Milestone

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Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 4 of 12 Pages)
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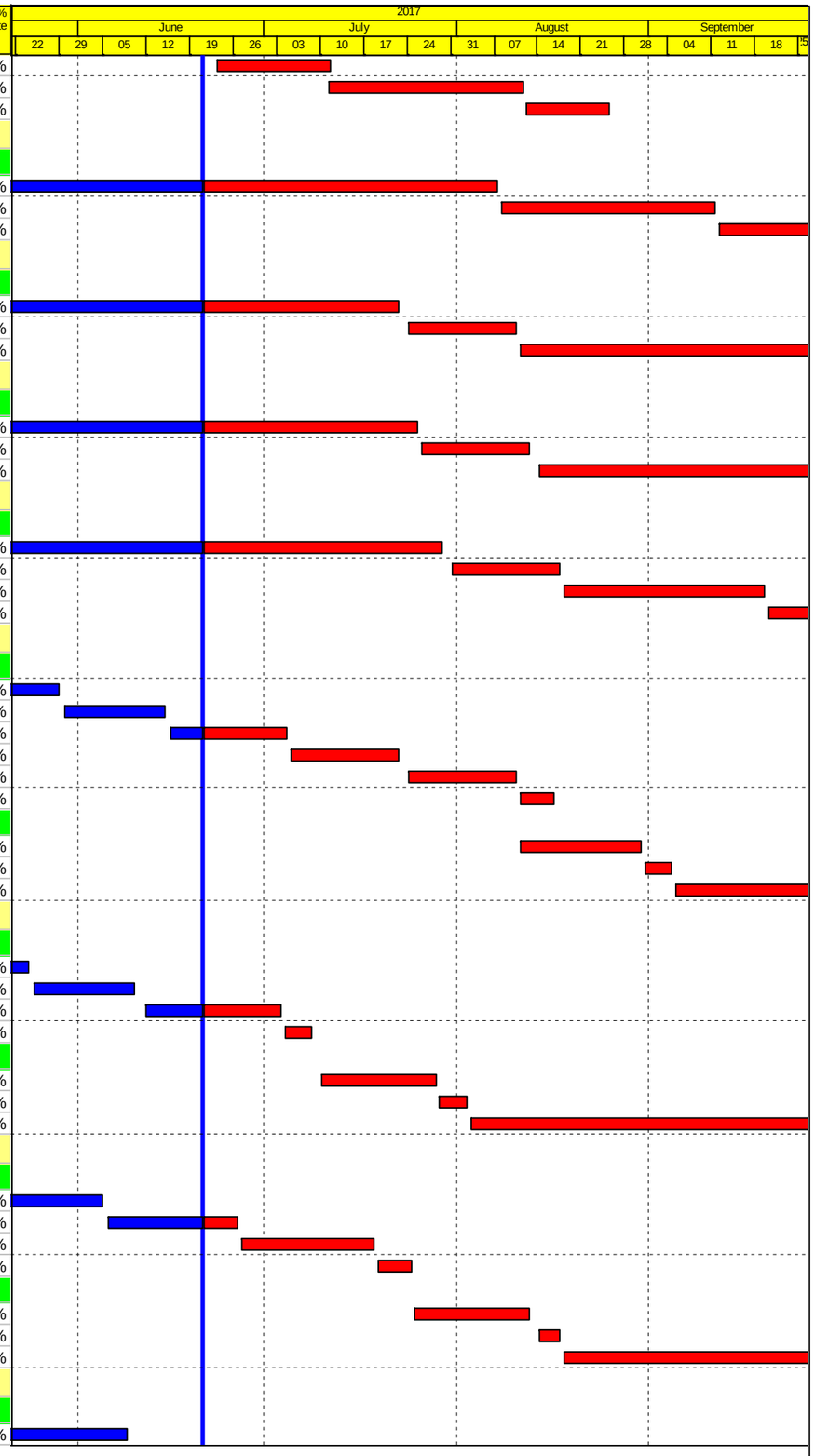
DWG. No.:
J3518/GCL/PGM/3MRP-M49

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
E12D-C5140	E12D - Remove Rail Beams, Spreader Beams, Brackets	15	23-Jun-17	15	11-Jul-17	03-Nov-16	19-Nov-16	-186	0%
E12D-C5145	E12D - Install Infill Segments (6 nr) - THB	28	11-Jul-17	28	11-Aug-17	19-Nov-16	21-Dec-16	-186	0%
E12D-C5150	E12D - IFS Stitch & Remove Equipment	12	12-Aug-17	12	25-Aug-17	22-Dec-16	07-Jan-17	-186	0%
Pier E13A (E8c)									
Pier Head Segment / Infill Segment									
E13A-C5130	E13A - Diaphragm of PHS - Formwork, Rebar, Concreting	76	01-Apr-17 A	40	07-Aug-17	07-Feb-17	24-Mar-17	-108	40%
E13A-C5140	E13A - Remove Rail Beams, Spreader Beams, Brackets, Crane	30	08-Aug-17	30	11-Sep-17	25-Mar-17	05-May-17	-108	0%
E13A-C5145	E13A - Install Infill Segments (6 nr) - THB	28	12-Sep-17	28	16-Oct-17	06-May-17	08-Jun-17	-108	0%
Pier E13B (E7c)									
Pier Head Segment / Infill Segment									
E13B-C5130	E13B - Diaphragm of PHS - Formwork, Rebar, Concreting	76	21-Mar-17 A	27	22-Jul-17	15-Sep-16	19-Oct-16	-223	50%
E13B-C5140	E13B - Remove Rail Beams, Spreader Beams, Brackets	16	24-Jul-17	16	10-Aug-17	20-Oct-16	07-Nov-16	-223	0%
E13B-C5145	E13B - Install Infill Segments (6 nr) - THB	42	11-Aug-17	42	28-Sep-17	08-Nov-16	28-Dec-16	-223	0%
Pier E13C (E6c)									
Pier Head Segment / Infill Segment									
E13C-C5130	E13C - Diaphragm of PHS - Formwork, Rebar, Concreting	76	28-Mar-17 A	29	25-Jul-17	05-Oct-16	08-Nov-16	-208	45%
E13C-C5140	E13C - Remove Rail Beams, Spreader Beams, Brackets	16	26-Jul-17	16	12-Aug-17	09-Nov-16	26-Nov-16	-208	0%
E13C-C5145	E13C - Install Infill Segments (6 nr) - THB	42	14-Aug-17	42	30-Sep-17	28-Nov-16	18-Jan-17	-208	0%
Pier E13D (E5c)									
Pier Head Segment / Infill Segment									
E13D-C5130	E13D - Diaphragm of PHS - Formwork, Rebar, Concreting	76	04-Apr-17 A	33	29-Jul-17	22-Oct-16	29-Nov-16	-194	40%
E13D-C5140	E13D - Remove Rail Beams, Spreader Beams, Brackets, Crane	16	31-Jul-17	16	17-Aug-17	30-Nov-16	17-Dec-16	-194	0%
E13D-C5145	E13D - Install Infill Segments (6 nr) - THB	28	18-Aug-17	28	19-Sep-17	19-Dec-16	23-Jan-17	-194	0%
E13D-C5150	E13D - IFS Stitch & Remove Equipment	12	20-Sep-17	12	04-Oct-17	24-Jan-17	09-Feb-17	-194	0%
Pier E14A (E8d)									
Pier									
E14A-C4110	E14A Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	13-May-17 A	0	29-May-17 A				100%
E14A-C4210	E14A Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	15	30-May-17 A	0	15-Jun-17 A				100%
E14A-C4310	E14A Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	15	16-Jun-17 A	11	04-Jul-17	08-Aug-16	19-Aug-16	-256	25%
E14A-C4410	E14A Pier - Scaffold, Rebar, Formwork, Concrete (4th Lift)	16	05-Jul-17	16	22-Jul-17	20-Aug-16	07-Sep-16	-256	0%
E14A-C4510	E14A Pier - Scaffold, Rebar, Formwork, Concrete (5th Lift)	16	24-Jul-17	16	10-Aug-17	08-Sep-16	27-Sep-16	-256	0%
E14A-C4610	E14A Pier - Curing, Remove Formwork	5	11-Aug-17	5	16-Aug-17	28-Sep-16	04-Oct-16	-256	0%
Pier Head Segment									
E14A-C5110	E14A Pier Head - Scaffold, Temp Works	17	11-Aug-17	17	30-Aug-17	28-Sep-16	19-Oct-16	-256	0%
E14A-C5210	E14A Pier Head - Erect PH Segment (2 nr)	4	31-Aug-17	4	04-Sep-17	20-Oct-16	24-Oct-16	-256	0%
E14A-C5310	E14A Pier Head - Construct Diaphragm (2nd Cast) in PHS	65	05-Sep-17	65	22-Nov-17	25-Oct-16	11-Jan-17	-256	0%
Pier E14B (E7d)									
Pier									
E14B-C4110	E14B Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	13-May-17 A	0	24-May-17 A				100%
E14B-C4210	E14B Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	25-May-17 A	0	10-Jun-17 A				100%
E14B-C4310	E14B Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	12-Jun-17 A	10	03-Jul-17	21-Sep-16	03-Oct-16	-219	40%
E14B-C4410	E14B Pier - Curing, Remove Formwork	5	04-Jul-17	5	08-Jul-17	04-Oct-16	08-Oct-16	-219	0%
Pier Head Segment									
E14B-C5110	E14B Pier Head - Scaffold, Temp Works	17	10-Jul-17	17	28-Jul-17	11-Oct-16	29-Oct-16	-219	0%
E14B-C5210	E14B Pier Head - Erect PH Segment (2 nr)	4	29-Jul-17	4	02-Aug-17	31-Oct-16	03-Nov-16	-219	0%
E14B-C5310	E14B Pier Head - Construct Diaphragm (2nd Cast) in PHS	65	03-Aug-17	65	19-Oct-17	04-Nov-16	21-Jan-17	-219	0%
Pier E14C (E6d)									
Pier									
E14C-C4210	E14C Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	16-May-17 A	0	05-Jun-17 A				100%
E14C-C4310	E14C Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	06-Jun-17 A	5	26-Jun-17	11-Feb-17	16-Feb-17	-104	70%
E14C-C4410	E14C Pier - Scaffold, Rebar, Formwork, Concrete (4th Lift)	18	27-Jun-17	18	18-Jul-17	17-Feb-17	09-Mar-17	-104	0%
E14C-C4510	E14C Pier - Curing, Remove Formwork	5	19-Jul-17	5	24-Jul-17	10-Mar-17	15-Mar-17	-104	0%
Pier Head Segment									
E14C-C5110	E14C Pier Head - Scaffold, Temp Works	17	25-Jul-17	17	12-Aug-17	16-Mar-17	05-Apr-17	-104	0%
E14C-C5210	E14C Pier Head - Erect PH Segment (2 nr)	4	14-Aug-17	4	17-Aug-17	06-Apr-17	10-Apr-17	-104	0%
E14C-C5310	E14C Pier Head - Construct Diaphragm (2nd Cast) in PHS	65	18-Aug-17	65	04-Nov-17	11-Apr-17	03-Jul-17	-104	0%
Pier E14D (E5d)									
Pile Cap									
E14D-C3210	E14D Pile Cap - Blinding, Formwork, Rebar, Concrete	19	04-May-17 A	0	09-Jun-17 A				100%



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Planned Bar
Critical Bar
Milestone

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

Tuen Mun - Chek Lap Kok Link - Southern Connection

3-Month Rolling Programme (Page 5 of 12 Pages)

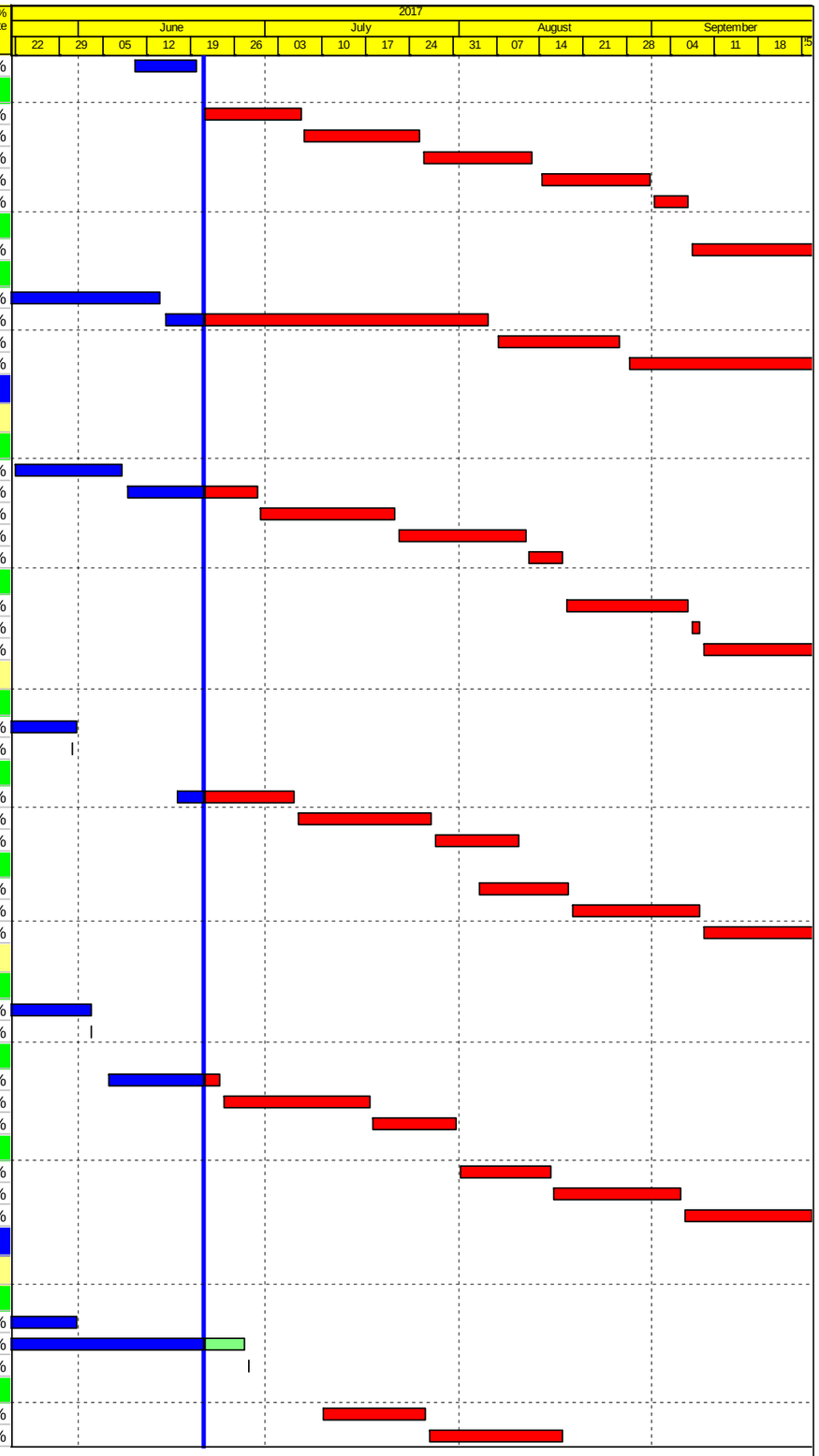
(Progress as of 21-Jun-17)

Date	Revision	Checked	Approved
28-Apr-17		PKN	GL
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
E14D-C3310	E14D Pile Cap - Curing, Remove Formwork, Backfill	12	10-Jun-17 A	0	20-Jun-17 A				100%
Pier									
E14D-C4110	E14D Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	21-Jun-17	13	06-Jul-17	27-Jul-16	10-Aug-16	-266	0%
E14D-C4210	E14D Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	16	07-Jul-17	16	25-Jul-17	11-Aug-16	29-Aug-16	-266	0%
E14D-C4310	E14D Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	16	26-Jul-17	16	12-Aug-17	30-Aug-16	17-Sep-16	-266	0%
E14D-C4410	E14D Pier - Scaffold, Rebar, Formwork, Concrete (4th Lift)	16	14-Aug-17	16	31-Aug-17	19-Sep-16	07-Oct-16	-266	0%
E14D-C4510	E14D Pier - Curing, Remove Formwork	5	01-Sep-17	5	06-Sep-17	08-Oct-16	14-Oct-16	-266	0%
Pier Head Segment									
E14D-C5110	E14D Pier Head - Erect Steel Temp Tower on E14D	26	07-Sep-17	26	09-Oct-17	15-Oct-16	14-Nov-16	-266	0%
Temporary Tower Between Pier E14D & E13D									
E14D-C5710	E14D-E13D Temp Tower - Remove Rock Armour	18	15-May-17 A	0	14-Jun-17 A				100%
E14D-C5720	E14D-E13D Temp Tower - Install Pipe Piles (8 nr)	45	15-Jun-17 A	39	05-Aug-17	15-Aug-16	29-Sep-16	-250	10%
E14D-C5730	E14D-E13D Temp Tower - Reinstate Rock Armour	18	07-Aug-17	18	26-Aug-17	30-Sep-16	22-Oct-16	-250	0%
E14D-C5740	E14D-E13D Temp Tower - Erect Steel Tower	28	28-Aug-17	28	28-Sep-17	24-Oct-16	24-Nov-16	-250	0%
Viaduct F - Bridge F1									
Pier F1 (F1b)									
Pier									
F01-C4210	F1 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	22-May-17 A	0	08-Jun-17 A				100%
F01-C4310	F1 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	09-Jun-17 A	8	29-Jun-17	25-Aug-16	02-Sep-16	-241	60%
F01-C4410	F1 Pier - Scaffold, Rebar, Formwork, Concrete (4th Lift)	18	30-Jun-17	18	21-Jul-17	03-Sep-16	24-Sep-16	-241	0%
F01-C4510	F1 Pier - Scaffold, Rebar, Formwork, Concrete (5th Lift)	18	22-Jul-17	18	11-Aug-17	26-Sep-16	18-Oct-16	-241	0%
F01-C4610	F1 Pier - Curing, Remove Formwork	5	12-Aug-17	5	17-Aug-17	19-Oct-16	24-Oct-16	-241	0%
Pier Head Segment									
F01-C5110	F1 Pier Head - Scaffold, Temp Works	17	18-Aug-17	17	06-Sep-17	25-Oct-16	12-Nov-16	-241	0%
F01-C5210	F1 Pier Head - Erect PH Segment (1 nr)	2	07-Sep-17	2	08-Sep-17	14-Nov-16	15-Nov-16	-241	0%
F01-C5310	F1 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	09-Sep-17	41	30-Oct-17	16-Nov-16	05-Jan-17	-241	0%
Pier F2 (F1c)									
Foundation - Bored Piles									
F02-C2210	F2 Fr PIle - Curing & Sonic Test	18	26-Apr-17 A	0	31-May-17 A				100%
F02-C2220	F2 Fr PIle - Full Depth Core & Test (N/A)	0	31-May-17 A	0	31-May-17 A				100%
Pile Cap									
F02-C3110	F2 Pile Cap - Excavate, Break Pile Head	15	17-Jun-17 A	12	05-Jul-17	18-Jul-16	30-Jul-16	-274	0%
F02-C3210	F2 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	06-Jul-17	19	27-Jul-17	01-Aug-16	22-Aug-16	-274	0%
F02-C3310	F2 Pile Cap - Curing, Remove Formwork, Backfill	12	28-Jul-17	12	10-Aug-17	23-Aug-16	05-Sep-16	-274	0%
Pier									
F02-C4110	F2 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	04-Aug-17	13	18-Aug-17	30-Aug-16	13-Sep-16	-274	0%
F02-C4210	F2 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	19-Aug-17	18	08-Sep-17	14-Sep-16	06-Oct-16	-274	0%
F02-C4310	F2 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	09-Sep-17	18	29-Sep-17	07-Oct-16	28-Oct-16	-274	0%
Pier F3 (F1d)									
Foundation - Bored Piles									
F03-C2210	F3 Fr PIle - Curing & Sonic Test	18	28-Apr-17 A	0	03-Jun-17 A				100%
F03-C2220	F3 Fr PIle - Full Depth Core & Test (N/A)	0	03-Jun-17 A	0	03-Jun-17 A				100%
Pile Cap									
F03-C3110	F3 Pile Cap - Excavate, Break Pile Head	15	06-Jun-17 A	3	23-Jun-17	17-Oct-16	19-Oct-16	-199	85%
F03-C3210	F3 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	24-Jun-17	19	17-Jul-17	20-Oct-16	10-Nov-16	-199	0%
F03-C3310	F3 Pile Cap - Curing, Remove Formwork, Backfill	12	18-Jul-17	12	31-Jul-17	11-Nov-16	24-Nov-16	-199	0%
Pier									
F03-C4110	F3 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	01-Aug-17	13	15-Aug-17	25-Nov-16	09-Dec-16	-199	0%
F03-C4210	F3 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	16-Aug-17	18	05-Sep-17	10-Dec-16	03-Jan-17	-199	0%
F03-C4310	F3 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	06-Sep-17	18	26-Sep-17	04-Jan-17	24-Jan-17	-199	0%
Viaduct F - Bridge F2									
Pier F4 (F2b)									
Foundation - Bored Piles									
F04-C2140	F4 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P2	16	24-Apr-17 A	0	31-May-17 A				100%
F04-C2210	F4 Fr PIle - Curing & Sonic Test	18	18-Apr-17 A	6	27-Jun-17	30-Jun-17	07-Jul-17	8	70%
F04-C2220	F4 Fr PIle - Full Depth Core & Test (N/A)	0	28-Jun-17	0	28-Jun-17	07-Jul-17	07-Jul-17	8	0%
Pile Cap									
F04-C3110	F4 Pile Cap - Excavate, Break Pile Head	15	10-Jul-17*	15	26-Jul-17	08-Jul-17	25-Jul-17	-1	0%
F04-C3210	F4 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	27-Jul-17	19	17-Aug-17	26-Jul-17	16-Aug-17	-1	0%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
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 12 Pages)
(Progress as of 21-Jun-17)

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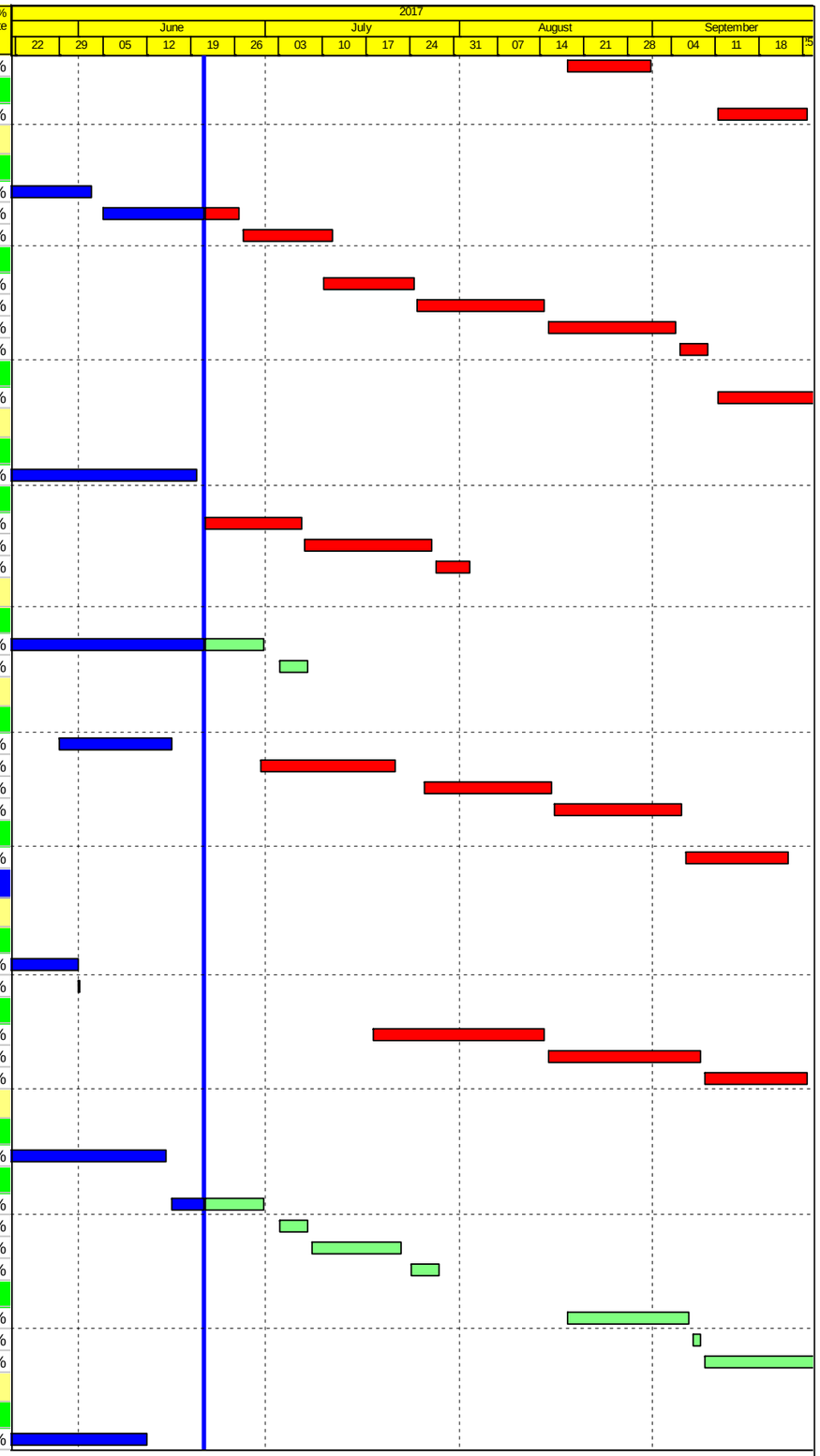
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:
J3518/GCL/PGM/3MRP-M49

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
F04-C3310	F4 Pile Cap - Curing, Remove Formwork, Backfill	12	18-Aug-17	12	31-Aug-17	17-Aug-17	30-Aug-17	-1	0%
Pier									
F04-C4110	F4 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	11-Sep-17*	13	25-Sep-17	09-Sep-17	23-Sep-17	-1	0%
Pier F5 (F2c)									
Pile Cap									
F05-C3110	F5 Pile Cap - Excavate, Break Pile Head	15	15-May-17 A	0	03-Jun-17 A				100%
F05-C3210	F5 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	05-Jun-17 A	5	26-Jun-17	02-Aug-16	06-Aug-16	-261	70%
F05-C3310	F5 Pile Cap - Curing, Remove Formwork, Backfill	12	27-Jun-17	12	11-Jul-17	08-Aug-16	20-Aug-16	-261	0%
Pier									
F05-C4110	F5 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	10-Jul-17	13	24-Jul-17	19-Aug-16	02-Sep-16	-261	0%
F05-C4210	F5 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	25-Jul-17	18	14-Aug-17	03-Sep-16	24-Sep-16	-261	0%
F05-C4310	F5 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	15-Aug-17	18	04-Sep-17	26-Sep-16	18-Oct-16	-261	0%
F05-C4410	F5 Pier - Curing, Remove Formwork	5	05-Sep-17	5	09-Sep-17	19-Oct-16	24-Oct-16	-261	0%
Pier Head Segment									
F05-C5110	F5 Pier Head - Scaffold, Temp Works	17	11-Sep-17	17	29-Sep-17	25-Oct-16	12-Nov-16	-261	0%
Pier F6 (F2d)									
Pile Cap									
F06-C3310	F6 Pile Cap - Curing, Remove Formwork, Backfill	12	06-May-17 A	0	20-Jun-17 A				100%
Pier									
F06-C4110	F6 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	21-Jun-17	13	06-Jul-17	04-May-17	18-May-17	-40	0%
F06-C4210	F6 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	07-Jul-17	18	27-Jul-17	19-May-17	09-Jun-17	-40	0%
F06-C4310	F6 Pier - Curing, Remove Formwork	5	28-Jul-17	5	02-Aug-17	10-Jun-17	15-Jun-17	-40	0%
Pier F7 (F2e)									
Pier									
F07-C4210	F7 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	18-May-17 A	9	30-Jun-17	31-Oct-17	09-Nov-17	109	75%
F07-C4310	F7 Pier - Curing, Remove Formwork	5	03-Jul-17	5	07-Jul-17	10-Nov-17	15-Nov-17	109	0%
Pier F8 (F2f)									
Foundation - Bored Piles									
F08-C2130	F8 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (2nd) P1	18	29-May-17 A	0	16-Jun-17 A				100%
F08-C2140	F8 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P3	18	30-Jun-17*	18	21-Jul-17	21-Jun-17	12-Jul-17	-8	0%
F08-C2150	F8 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P4	18	26-Jul-17*	18	15-Aug-17	13-Jul-17	02-Aug-17	-11	0%
F08-C2210	F8 Fr PIle - Curing & Sonic Test	18	16-Aug-17	18	05-Sep-17	03-Aug-17	23-Aug-17	-11	0%
Pile Cap									
F08-C3110	F8 Pile Cap - Excavate, Break Pile Head	15	06-Sep-17*	15	22-Sep-17	24-Aug-17	09-Sep-17	-11	0%
Viaduct F - Bridge F3									
Pier F9 (F3d)									
Foundation - Bored Piles									
F09-C2210	F9 Fr PIle - Curing & Sonic Test	18	18-Apr-17 A	0	01-Jun-17 A				100%
F09-C2220	F9 Fr PIle - Full Depth Core & Test (N/A)	0	01-Jun-17 A	0	01-Jun-17 A				100%
Pile Cap									
F09-C3110	F9 Pile Cap - Excavate, Break Pile Head	24	18-Jul-17*	24	14-Aug-17	29-May-17	26-Jun-17	-41	0%
F09-C3210	F9 Pile Cap - Blinding, Formwork, Rebar, Concrete	22	15-Aug-17	22	08-Sep-17	27-Jun-17	22-Jul-17	-41	0%
F09-C3310	F9 Pile Cap - Curing, Remove Formwork, Backfill	14	09-Sep-17	14	25-Sep-17	24-Jul-17	08-Aug-17	-41	0%
Pier F10 (F3c)									
Pile Cap									
F10-C3310	F10 Pile Cap - Curing, Remove Formwork, Backfill	14	20-May-17 A	0	15-Jun-17 A				100%
Pier									
F10-C4110	F10 Pier - Scaffold, Rebar, Formwork, Concrete (Pier A)	13	16-Jun-17 A	9	30-Jun-17	14-Aug-17	23-Aug-17	45	30%
F10-C4210	F10 Pier - Curing, Remove Formwork (Pier A)	5	03-Jul-17	5	07-Jul-17	24-Aug-17	29-Aug-17	45	0%
F10-C4310	F10 Pier - Scaffold, Rebar, Formwork, Concrete (Pier B)	13	08-Jul-17	13	22-Jul-17	30-Aug-17	13-Sep-17	45	0%
F10-C4410	F10 Pier - Curing, Remove Formwork (Pier B)	5	24-Jul-17	5	28-Jul-17	14-Sep-17	19-Sep-17	45	0%
Pier Head Segment									
F10-C5110	F10 Pier Head - Scaffold, Temp Works	17	18-Aug-17*	17	06-Sep-17	20-Sep-17	11-Oct-17	28	0%
F10-C5210	F10 Pier Head - Erect PH Segment (2 nr)	2	07-Sep-17	2	08-Sep-17	12-Oct-17	13-Oct-17	28	0%
F10-C5310	F10 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	09-Sep-17	41	30-Oct-17	14-Oct-17	01-Dec-17	28	0%
Pier F11 (F3b)									
Pile Cap									
F11-C3210	F11 Pile Cap - Blinding, Formwork, Rebar, Concrete	22	18-May-17 A	0	12-Jun-17 A				100%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 7 of 12 Pages)
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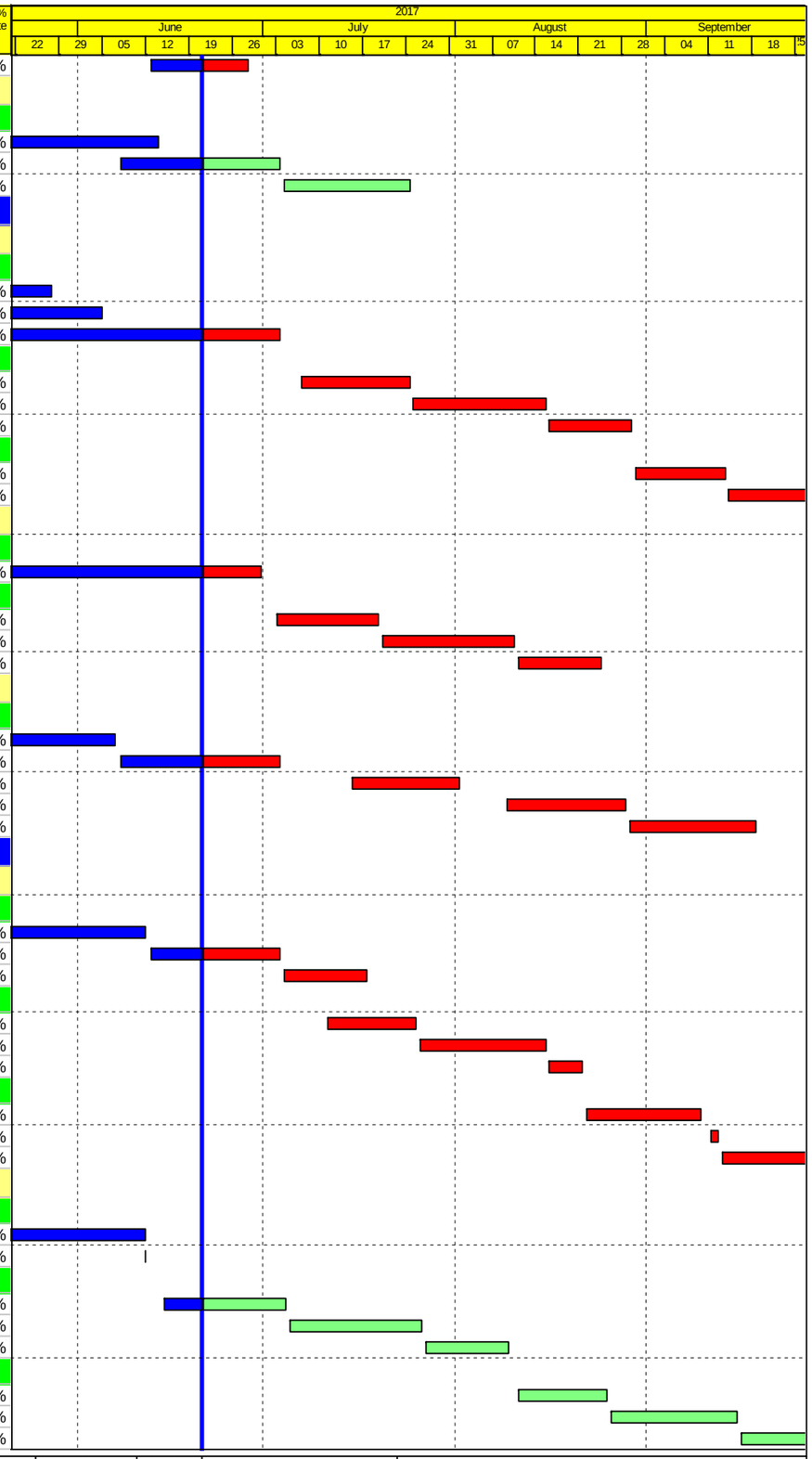
DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
F11-C3310	F11 Pile Cap - Curing, Remove Formwork, Backfill	14	13-Jun-17 A	7	28-Jun-17	03-Jun-17	10-Jun-17	-15	50%
Pier F12 (F3a)									
Foundation - Bored Piles									
F12-C2140	F12 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P2	16	17-May-17 A	0	14-Jun-17 A				100%
F12-C2150	F12 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P4	17	08-Jun-17 A	10	03-Jul-17	06-Jul-17	17-Jul-17	12	40%
F12-C2210	F12 Fr PIle - Curing & Sonic Test	18	04-Jul-17	18	24-Jul-17	18-Jul-17	07-Aug-17	12	0%
Viaduct F - Bridge F4									
Pier F16 (F5a/F4a)									
Foundation - Bored Piles									
F16-C2140	F16 EB Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P1	24	28-Apr-17 A	0	27-May-17 A				100%
F16-C2150	F16 EB Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P4	20	06-May-17 A	0	05-Jun-17 A				100%
F16-C2210	F16 EB PIle - Curing & Sonic Test	18	14-Mar-17 A	10	03-Jul-17	14-Mar-17	24-Mar-17	-78	40%
Pile Cap									
F16-C3110	F16 Pile Cap - Excavate, Break Pile Head	15	07-Jul-17*	15	24-Jul-17	25-Mar-17	12-Apr-17	-81	0%
F16-C3210	F16 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	25-Jul-17	19	15-Aug-17	13-Apr-17	10-May-17	-81	0%
F16-C3310	F16 Pile Cap - Curing, Remove Formwork, Backfill	12	16-Aug-17	12	29-Aug-17	11-May-17	24-May-17	-81	0%
Pier									
F16-C4110	F16 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	30-Aug-17*	13	13-Sep-17	25-May-17	09-Jun-17	-81	0%
F16-C4210	F16 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	14-Sep-17	18	06-Oct-17	10-Jun-17	30-Jun-17	-81	0%
Pier F17 (F4b)									
Foundation - Bored Piles									
F17-C2210	F17 EB PIle - Curing & Sonic Test	18	15-Mar-17 A	9	30-Jun-17	31-Mar-17	11-Apr-17	-63	75%
Pile Cap									
F17-C3110	F17 Pile Cap - Excavate, Break Pile Head	15	03-Jul-17	15	19-Jul-17	12-Apr-17	04-May-17	-63	0%
F17-C3210	F17 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	20-Jul-17	19	10-Aug-17	05-May-17	26-May-17	-63	0%
F17-C3310	F17 Pile Cap - Curing, Remove Formwork, Backfill	12	11-Aug-17	12	24-Aug-17	27-May-17	10-Jun-17	-63	0%
Pier F18 (F4c)									
Foundation - Bored Piles									
F18-C2120	F18 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (1st) P1	15	13-May-17 A	0	07-Jun-17 A				100%
F18-C2130	F18 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (2nd) P4	18	08-Jun-17 A	10	03-Jul-17	01-Feb-17	11-Feb-17	-113	45%
F18-C2140	F18 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P3	15	15-Jul-17*	15	01-Aug-17	13-Feb-17	01-Mar-17	-123	0%
F18-C2150	F18 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P2	17	09-Aug-17*	17	28-Aug-17	02-Mar-17	21-Mar-17	-129	0%
F18-C2210	F18 Fr PIle - Curing & Sonic Test	18	29-Aug-17	18	18-Sep-17	03-Aug-17	23-Aug-17	-22	0%
Viaduct F - Bridge F5									
Pier F13 (F5d)									
Pile Cap									
F13-C3110	F13 Pile Cap - ELS/Excavate, Break Pile Head	15	16-May-17 A	0	12-Jun-17 A				100%
F13-C3210	F13 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	13-Jun-17 A	10	03-Jul-17	11-Jan-17	21-Jan-17	-128	45%
F13-C3310	F13 Pile Cap - Curing, Remove Formwork, Backfill	12	04-Jul-17	12	17-Jul-17	23-Jan-17	08-Feb-17	-128	0%
Pier									
F13-C4110	F13 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	11-Jul-17	13	25-Jul-17	02-Feb-17	16-Feb-17	-128	0%
F13-C4210	F13 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	26-Jul-17	18	15-Aug-17	17-Feb-17	09-Mar-17	-128	0%
F13-C4310	F13 Pier - Curing, Remove Formwork	5	16-Aug-17	5	21-Aug-17	10-Mar-17	15-Mar-17	-128	0%
Pier Head Segment									
F13-C5110	F13 Pier Head - Scaffold, Temp Works	17	22-Aug-17	17	09-Sep-17	16-Mar-17	05-Apr-17	-128	0%
F13-C5210	F13 Pier Head - Erect PH Segment (1 nr)	2	11-Sep-17	2	12-Sep-17	06-Apr-17	07-Apr-17	-128	0%
F13-C5310	F13 Pier Head - Construct Diaphragm (2nd Cast) in PHS	41	13-Sep-17	41	02-Nov-17	08-Apr-17	01-Jun-17	-128	0%
Pier F14 (F5c)									
Foundation - Bored Piles									
F14-C2210	F14 Fr PIle - Curing & Sonic Test	18	30-Mar-17 A	0	12-Jun-17 A				100%
F14-C2220	F14 EB PIle - Full Depth Core & Test (N/A)	12	12-Jun-17 A	0	12-Jun-17 A				100%
Pile Cap									
F14-C3110	F14 Pile Cap - Excavate, Break Pile Head	15	15-Jun-17 A	11	04-Jul-17	05-Aug-17	17-Aug-17	38	25%
F14-C3210	F14 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	05-Jul-17	19	26-Jul-17	18-Aug-17	08-Sep-17	38	0%
F14-C3310	F14 Pile Cap - Curing, Remove Formwork, Backfill	12	27-Jul-17	12	09-Aug-17	09-Sep-17	22-Sep-17	38	0%
Pier									
F14-C4110	F14 Pier - Scaffold, Rebar, Formwork, Concrete (1st Lift)	13	11-Aug-17*	13	25-Aug-17	23-Sep-17	10-Oct-17	37	0%
F14-C4210	F14 Pier - Scaffold, Rebar, Formwork, Concrete (2nd Lift)	18	26-Aug-17	18	15-Sep-17	11-Oct-17	01-Nov-17	37	0%
F14-C4310	F14 Pier - Scaffold, Rebar, Formwork, Concrete (3rd Lift)	18	16-Sep-17	18	09-Oct-17	02-Nov-17	22-Nov-17	37	0%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
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 8 of 12 Pages)

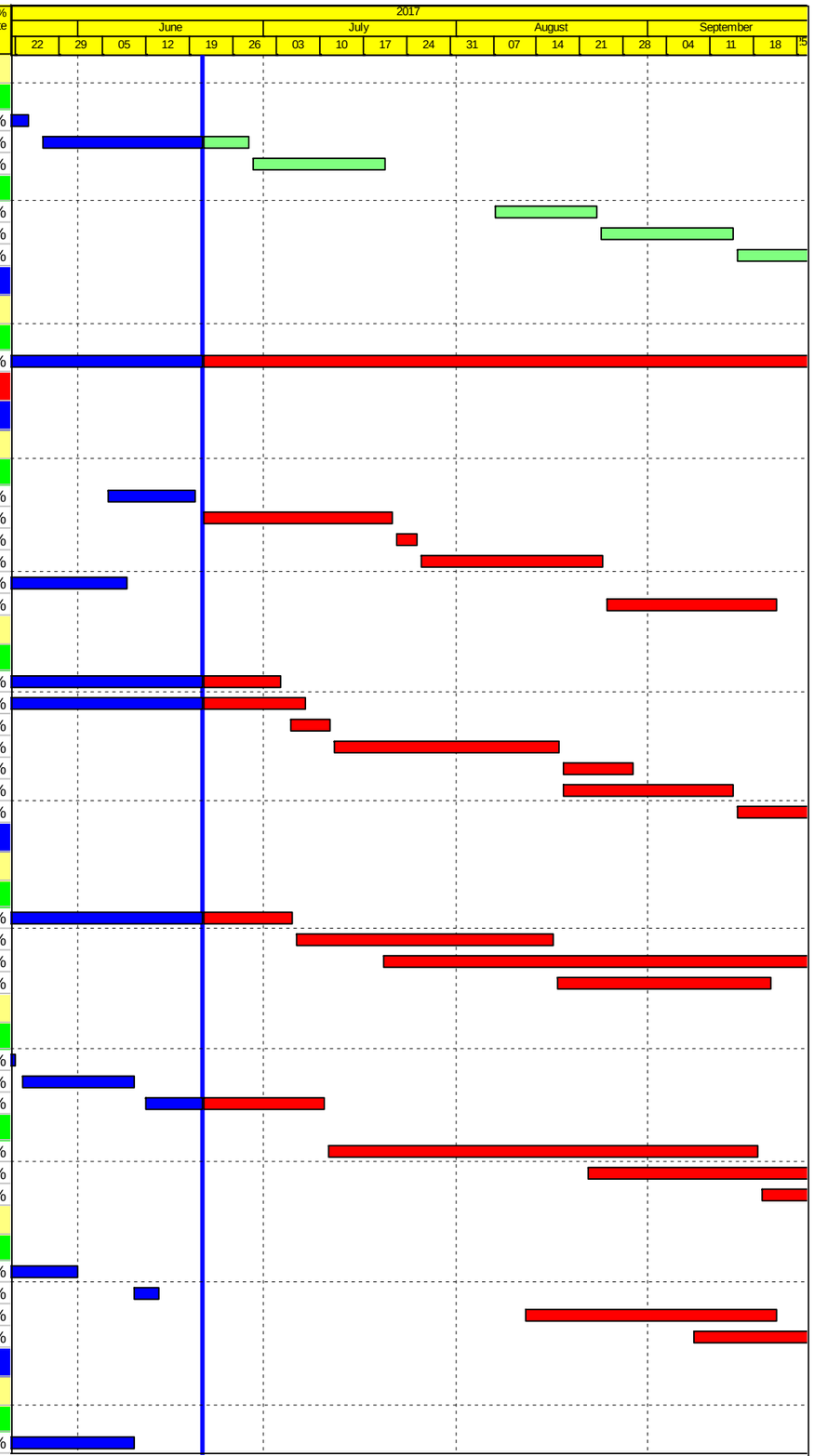
(Progress as of 21-Jun-17)

Date	Revision	Checked	Approved
28-Apr-17		PKN	GL
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
Pier F15 (F5b)									
Foundation - Bored Piles									
F15-C2130	F15 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (2nd) P1	17	31-Mar-17 A	0	24-May-17 A				100%
F15-C2140	F15 Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (3rd) P2	16	26-May-17 A	7	28-Jun-17	02-Aug-17	09-Aug-17	35	60%
F15-C2210	F15 Fr PIle - Curing & Sonic Test	18	29-Jun-17	18	20-Jul-17	10-Aug-17	30-Aug-17	35	0%
Pile Cap									
F15-C3110	F15 Pile Cap - Excavate, Break Pile Head	15	07-Aug-17*	15	23-Aug-17	31-Aug-17	16-Sep-17	21	0%
F15-C3210	F15 Pile Cap - Blinding, Formwork, Rebar, Concrete	19	24-Aug-17	19	14-Sep-17	18-Sep-17	11-Oct-17	21	0%
F15-C3310	F15 Pile Cap - Curing, Remove Formwork, Backfill	12	15-Sep-17	12	28-Sep-17	12-Oct-17	25-Oct-17	21	0%
Ramp F									
Abutment & Approach Ramp F									
Foundation - Bored Piles									
ARF-C2120	Ramp F Fr Pile - Sleeve, Casing, Excavate, Rebar, Concrete (20 nr)	126	19-May-17 A	103	21-Oct-17	29-Dec-16	09-May-17	-138	10%
Superstructure & Associated Works									
Viaduct A									
Bridge A2									
Deck Span Segment									
A02-C6210	A2 - Install (*Launch LG2 from E3C)	3	06-Jun-17 A	0	20-Jun-17 A				100%
A02-C6310	A2 - Cantilever Span (16 nr) - *LG2	26	21-Jun-17	26	21-Jul-17	10-Jun-16	11-Jul-16	-305	0%
A03-C6210	A3 - Install (*Launch LG2 from A2)	3	22-Jul-17	3	25-Jul-17	12-Jul-16	14-Jul-16	-305	0%
A03-C6310	A3 - Cantilever Span (16 nr) - *LG2	26	26-Jul-17	26	24-Aug-17	15-Jul-16	13-Aug-16	-305	0%
A05-C6310	A5 - Cantilever Span at A5 (16 nr) - THB	26	22-Apr-17 A	0	09-Jun-17 A				100%
VA2-C6510	Viaduct A2 - Final Stitch & Stressing to Span	24	25-Aug-17	24	21-Sep-17	15-Aug-16	10-Sep-16	-305	0%
Bridge A1									
Deck Span Segment									
A06-C6320	A6 - End Span to A7 (8 nr) - THB	34	24-Feb-17 A	10	03-Jul-17	03-Aug-16	13-Aug-16	-260	75%
A08-C6310	A8 - Cantilever Span (Initial 5 nr) - Crane	6	07-May-17 A	14	07-Jul-17	29-Feb-16	15-Mar-16	-386	40%
A08-C6410	A8 - Install KF (MTR)	6	05-Jul-17	6	11-Jul-17	12-Mar-16	18-Mar-16	-386	0%
A08-C6510	A8 - Cantilever Span (Remaining 21 nr) (MTR) - KF	32	12-Jul-17	32	17-Aug-17	19-Mar-16	29-Apr-16	-386	0%
A09-C6310	A9 - Cantilever Span (Initial 5 nr) - Crane	10	18-Aug-17	10	29-Aug-17	30-Apr-16	12-May-16	-386	0%
A09-C6410	A9 - Relocate & Install KF (MTR)	24	18-Aug-17	24	14-Sep-17	30-Apr-16	30-May-16	-386	0%
A09-C6510	A9 - Cantilever Span (Remaining 20 nr) (MTR) - KF	32	15-Sep-17	32	24-Oct-17	31-May-16	08-Jul-16	-386	0%
Viaduct B									
Bridge B3									
Deck Fnishes, E&M and Roadworks									
VB3-C7710	Viaduct B3 - Parapet Panels	48	16-Dec-16 A	12	05-Jul-17	13-Oct-16	26-Oct-16	-202	95%
VB3-C7720	Viaduct B3 - Gantry & TCSS Provisions (KD5)	36	06-Jul-17*	36	16-Aug-17	27-Oct-16	07-Dec-16	-202	0%
VB3-C7810	Viaduct B3 - Drainage, Fire Main & E&M Services	60	20-Jul-17	60	27-Sep-17	10-Jan-17	23-Mar-17	-153	0%
VB3-C7820	Viaduct B3 - Railings, Light Poles, Signs & Street Furniture	30	17-Aug-17	30	20-Sep-17	10-Feb-17	16-Mar-17	-153	0%
Bridge B2									
Deck Span Segment									
B12-C6410	B12 - Falsework for End Span to B11	24	19-Apr-17 A	0	22-May-17 A				100%
B12-C6510	B12 - End Span to B11 (5 nr) - Crane	8	23-May-17 A	0	10-Jun-17 A				100%
VB2-C6510	Viaduct B2 - Final Stitch & Stressing to Span	24	12-Jun-17 A	16	10-Jul-17	24-Aug-16	10-Sep-16	-242	30%
Deck Fnishes, E&M and Roadworks									
VB2-C7710	Viaduct B2 - Parapet Panels	60	11-Jul-17	60	18-Sep-17	12-Sep-16	23-Nov-16	-242	0%
VB2-C7720	Viaduct B2 - Gantry & TCSS Provisions (KD5)	36	22-Aug-17	36	03-Oct-17	27-Oct-16	07-Dec-16	-242	0%
VB2-C7810	Viaduct B2 - Drainage, Fire Main & E&M Services	48	19-Sep-17	48	16-Nov-17	24-Jan-17	23-Mar-17	-193	0%
Bridge B1									
Deck Span Segment									
B15-C6320	B15 - Cantilever Span (Remaining 11 nr) - Crane & THB	24	15-May-17 A	0	01-Jun-17 A				100%
B16-C6320	B16 - Cantilever Span (Remaining 3 nr) - Crane	6	10-Jun-17 A	0	14-Jun-17 A				100%
B17-C6310	B17 - Cantilever Span (26 nr) - Crane	35	12-Aug-17	35	21-Sep-17	02-Jun-16	14-Jul-16	-355	0%
B18-C6210	B18 - Falsework for End Span to B11	24	08-Sep-17	24	07-Oct-17	30-Jun-16	28-Jul-16	-355	0%
Viaduct C									
Bridge C4									
Deck Span Segment									
VC4-C6510	Viaduct C4 - Final Stitch & Stressing to Span	24	08-May-17 A	0	10-Jun-17 A				100%



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.

Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 9 of 12 Pages)
(Progress as of 21-Jun-17)

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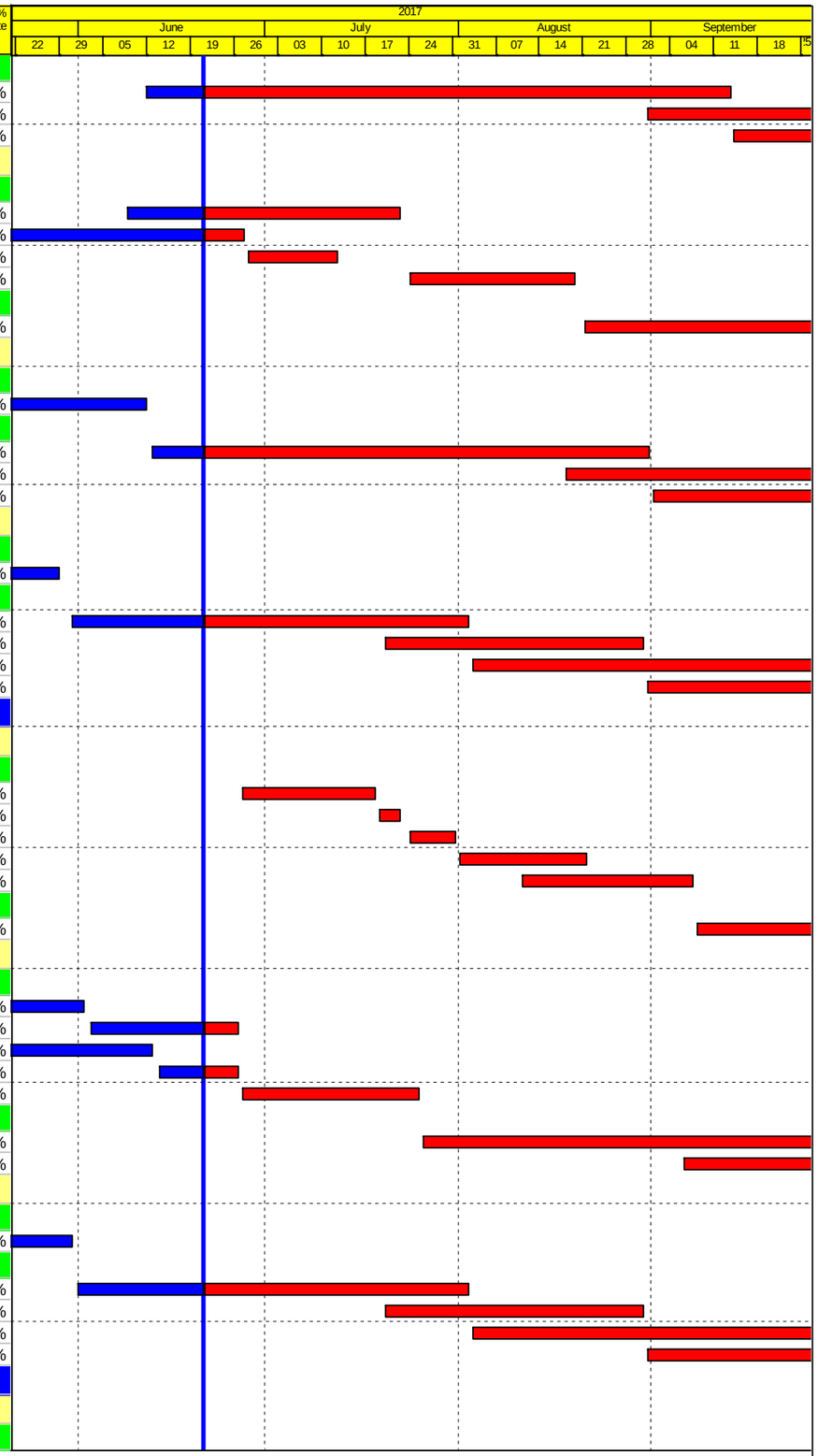
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
Deck Fnishes, E&M and Roadworks									
VC4-C7710	Viaduct C4 - Parapet Panels	48	12-Jun-17 A	72	13-Sep-17	15-Apr-16	12-Jul-16	-350	10%
VC4-C7720	Viaduct C4 - Gantry & TCSS Provisions (KD4)	36	31-Aug-17	36	13-Oct-17	28-Jun-16	09-Aug-16	-350	0%
VC4-C7810	Viaduct C4 - Drainage, Fire Main & E&M Services	60	14-Sep-17	60	25-Nov-17	13-Jul-16	21-Sep-16	-350	0%
Bridge C3									
Deck Span Segment									
C10-C6320	C10 - Cantilever Span (Remaining 12 nr) - THB & Crane	22	09-Jun-17 A	27	22-Jul-17	10-Mar-16	14-Apr-16	-377	25%
C11-C6410	C11 - Falsework for End Span to C10	24	15-May-17 A	6	27-Jun-17	10-Mar-16	16-Mar-16	-377	85%
C11-C6510	C11 - End Span to C10 (6 nr) - Crane	12	28-Jun-17	12	12-Jul-17	17-Mar-16	02-Apr-16	-377	0%
VC3-C6510	Viaduct C3 - Final Stitch & Stressing to Span	24	24-Jul-17	24	19-Aug-17	15-Apr-16	13-May-16	-377	0%
Deck Fnishes, E&M and Roadworks									
VC3-C7710	Viaduct C3 - Parapet Panels	60	21-Aug-17	60	01-Nov-17	16-May-16	26-Jul-16	-377	0%
Bridge C2									
Deck Span Segment									
VC2-C6510	Viaduct C2 - Final Stitch & Stressing to Span	24	15-May-17 A	0	12-Jun-17 A				100%
Deck Fnishes, E&M and Roadworks									
VC2-C7710	Viaduct C2 - Parapet Panels	48	13-Jun-17 A	61	31-Aug-17	28-Apr-16	12-Jul-16	-339	10%
VC2-C7720	Viaduct C2 - Gantry & TCSS Provisions (KD4)	36	18-Aug-17	36	28-Sep-17	28-Jun-16	09-Aug-16	-339	0%
VC2-C7810	Viaduct C2 - Drainage, Fire Main & E&M Services	60	01-Sep-17	60	13-Nov-17	13-Jul-16	21-Sep-16	-339	0%
Bridge C1									
Deck Span Segment									
VC1-C6510	Viaduct C1 - Final Stitch & Stressing to Span	24	29-Apr-17 A	0	29-May-17 A				100%
Deck Fnishes, E&M and Roadworks									
VC1-C7710	Viaduct C1 - Parapet Panels	48	31-May-17 A	36	02-Aug-17	30-May-16	12-Jul-16	-314	0%
VC1-C7720	Viaduct C1 - Gantry & TCSS Provisions (KD4)	36	20-Jul-17	36	30-Aug-17	28-Jun-16	09-Aug-16	-314	0%
VC1-C7810	Viaduct C1 - Drainage, Fire Main & E&M Services	60	03-Aug-17	60	13-Oct-17	13-Jul-16	21-Sep-16	-314	0%
VC1-C7820	Viaduct C1 - Railings, Light Poles, Signs & Street Furniture	30	31-Aug-17	30	06-Oct-17	10-Aug-16	13-Sep-16	-314	0%
Viaduct D									
Bridge D3									
Deck Span Segment									
D06-C6410	D6 - Launch LG1 from D9 to D6	18	27-Jun-17	18	18-Jul-17	13-Feb-16	04-Mar-16	-404	0%
D06-C6415	D6 - Launch LG1 from D6 to D5	4	19-Jul-17	4	22-Jul-17	05-Mar-16	09-Mar-16	-404	0%
D06-C6510	D6 - End Span to D5 (6 nr) - LG1	7	24-Jul-17	7	31-Jul-17	10-Mar-16	17-Mar-16	-404	0%
D06-C6610	D6 - Launch LG1 from D6 to E2B for Dismantling	18	01-Aug-17	18	21-Aug-17	18-Mar-16	12-Apr-16	-404	0%
VD3-C6510	Viaduct D3 - Final Stitch & Stressing to Span	24	11-Aug-17	24	07-Sep-17	15-Apr-16	13-May-16	-393	0%
Deck Fnishes, E&M and Roadworks									
VD3-C7710	Viaduct D3 - Parapet Panels	48	08-Sep-17	48	06-Nov-17	16-May-16	12-Jul-16	-393	0%
Bridge D2									
Deck Span Segment									
D09-C6310	D9 - Cantilever Span (Remaining 14 nr) (MTR/NLH) - LG1	28	23-Apr-17 A	0	02-Jun-17 A				100%
D09-C6410	D9 - Preparation & Drop in Segments D8-D9 (3 nr) (MTR) - LG1	23	03-Jun-17 A	5	26-Jun-17	04-Feb-16	12-Feb-16	-404	70%
D13-C6610	D13 - Falsework for End Span to D12	24	15-May-17 A	0	13-Jun-17 A				100%
D13-C6710	D13 - End Span to D12 (4 nr) - Crane	10	14-Jun-17 A	5	26-Jun-17	09-Apr-16	14-Apr-16	-355	75%
VD2-C6510	Viaduct D2 - Final Stitch & Stressing to Span	24	27-Jun-17	24	25-Jul-17	15-Apr-16	13-May-16	-355	0%
Deck Fnishes, E&M and Roadworks									
VD2-C7710	Viaduct D2 - Parapet Panels	60	26-Jul-17	60	04-Oct-17	16-May-16	26-Jul-16	-355	0%
VD2-C7720	Viaduct D2 - Gantry & TCSS Provisions (KD4)	36	06-Sep-17	36	19-Oct-17	28-Jun-16	09-Aug-16	-355	0%
Bridge D1									
Deck Span Segment									
VD1-C6510	Viaduct D1 - Final Stitch & Stressing to Span	24	02-May-17 A	0	31-May-17 A				100%
Deck Fnishes, E&M and Roadworks									
VD1-C7710	Viaduct D1 - Parapet Panels	48	01-Jun-17 A	36	02-Aug-17	30-May-16	12-Jul-16	-314	0%
VD1-C7720	Viaduct D1 - Gantry & TCSS Provisions (KD4)	36	20-Jul-17	36	30-Aug-17	28-Jun-16	09-Aug-16	-314	0%
VD1-C7810	Viaduct D1 - Drainage, Fire Main & E&M Services	60	03-Aug-17	60	13-Oct-17	13-Jul-16	21-Sep-16	-314	0%
VD1-C7820	Viaduct D1 - Railings, Light Poles, Signs & Street Furniture	30	31-Aug-17	30	06-Oct-17	10-Aug-16	13-Sep-16	-314	0%
Viaduct E									
Bridge E1									
Deck Span Segment									



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
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Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 10 of 12 Pages)
(Progress as of 21-Jun-17)

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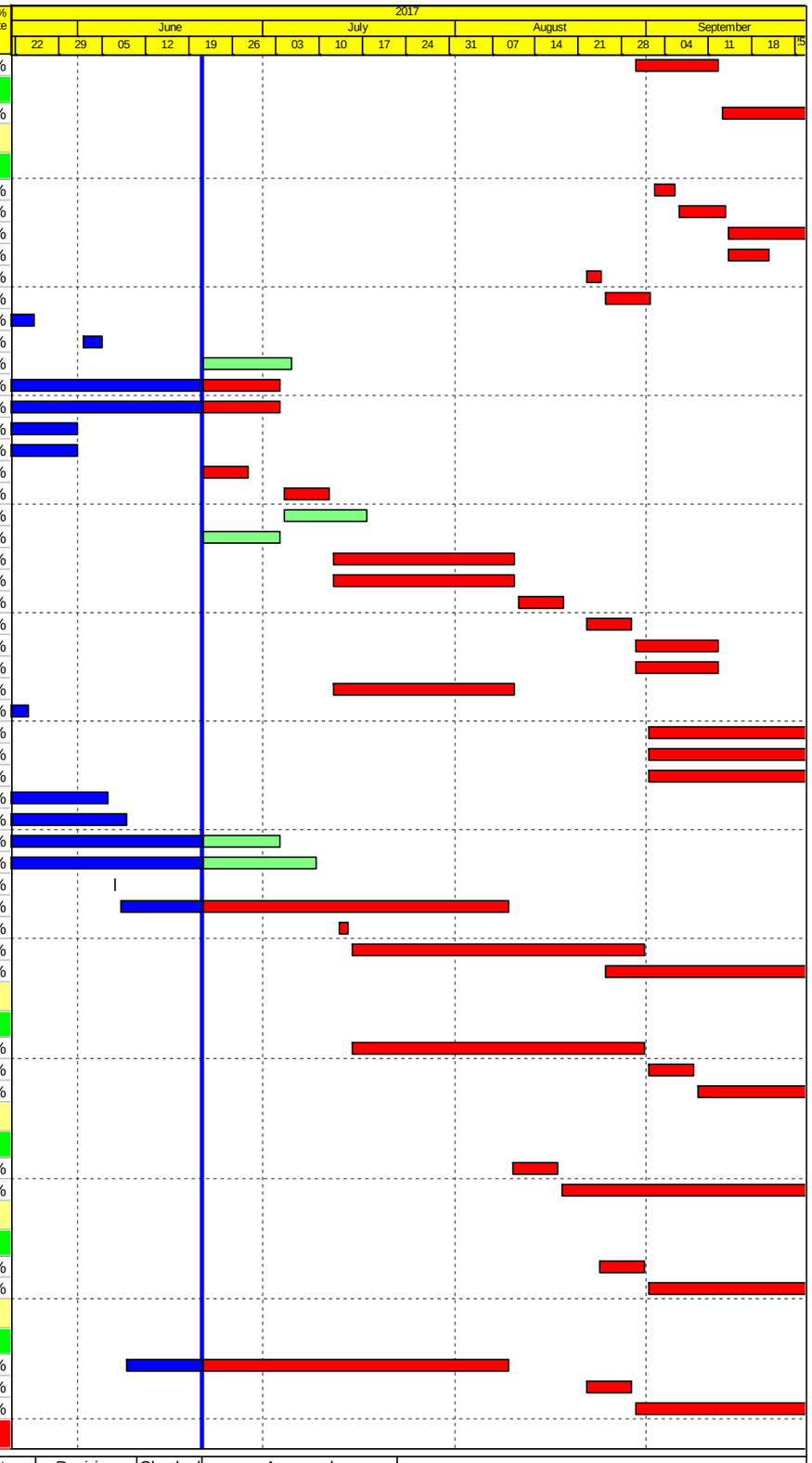
DWG. No.:
J3518/GCL/PGM/3MRP-M49

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
VE1-C6510	Viaduct E1 - E3A/E4A, E3B/E4A & E3C/E4B Stitches	12	30-Aug-17	12	12-Sep-17	29-Apr-16	13-May-16	-397	0%
Deck Fnishes, E&M and Roadworks									
VE1CD-C7710	Viaduct E1C/D - Parapet Panels	48	13-Sep-17	48	10-Nov-17	16-May-16	12-Jul-16	-397	0%
Bridge E2									
Deck Span Segment									
E03A-C6410	E3A - Launch LG1 from E3B to E3A - *LG1	3	02-Sep-17	3	05-Sep-17	25-Apr-16	27-Apr-16	-404	0%
E03A-C6510	E3A - End Span to E4A (7 nr) - *LG1	7	06-Sep-17	7	13-Sep-17	28-Apr-16	06-May-16	-404	0%
E03A-C6610	E3A/B - Stitch between E3A/B and E4A	12	14-Sep-17	12	27-Sep-17	08-Aug-17	21-Aug-17	-32	0%
E03A-C6710	E3A - Launch LG1 from E3A to E4/E5 for Dismanlting	6	14-Sep-17	6	20-Sep-17	07-May-16	13-May-16	-404	0%
E03B-C6410	E3B - Launch LG1 from E2B to E3B - *LG1	3	22-Aug-17*	3	24-Aug-17	13-Apr-16	15-Apr-16	-404	0%
E03B-C6510	E3B - End Span to E4A (7 nr) - *LG1	7	25-Aug-17	7	01-Sep-17	16-Apr-16	23-Apr-16	-404	0%
E03C-C6410	E3C - Launch LG2 from C6 to E3C {*E4B) - LG2	16	19-Apr-17 A	0	25-May-17 A				100%
E03C-C6510	E3C - End Span to E4B (7 nr) - LG2	7	02-Jun-17 A	0	05-Jun-17 A				100%
E03C-C6610	E3C/B - Stitch between E3C/D and E4B	12	21-Jun-17	12	05-Jul-17	08-Aug-17	21-Aug-17	40	0%
E04A-C6310	E4A - Bifurcation Span to E3A (12 nr) with 1st Stitch - THB	28	09-Mar-17 A	12	03-Jul-17	09-Feb-16	22-Feb-16	-443	70%
E04A-C6410	E4A - Bifurcation Span to E5A (6 nr) with 1st Stitch - THB	28	01-Mar-17 A	12	03-Jul-17	09-Feb-16	22-Feb-16	-443	70%
E04B-C6310	E4B - Bifurcation Span to E3B (12 nr) with 1st Stitch - THB & LG2*	28	13-May-17 A	0	01-Jun-17 A				100%
E04B-C6410	E4B - Bifurcation Span to E5B (6 nr) with 1st Stitch - THB & LG2*	28	20-Apr-17 A	0	01-Jun-17 A				100%
E04B-C6420	E4B - E3D/E4B Stitch	8	21-Jun-17	8	28-Jun-17	13-Feb-16	22-Feb-16	-439	0%
E04B-C6430	E4A & E4B - E4A/E5A & E4B/E5B Stitches	8	04-Jul-17	8	11-Jul-17	23-Feb-16	02-Mar-16	-443	0%
E05A-C6610	E5A - Stitch between E4A and E5A	12	04-Jul-17	12	17-Jul-17	08-Aug-17	21-Aug-17	30	0%
E05B-C6610	E5B - Stitch between E4B and E5B	12	21-Jun-17	12	03-Jul-17	10-Aug-17	21-Aug-17	49	0%
E06A-C6410	E6A - Drop in (E6A-E5A) - THB	30	12-Jul-17	30	10-Aug-17	03-Mar-16	06-Apr-16	-443	0%
E06A-C6510	E6A & E6B - Quarter Span (E6-E7) - TLB	30	12-Jul-17	30	10-Aug-17	03-Mar-16	06-Apr-16	-443	0%
E06A-C6520	E6A & E6B - E5A/E6A & E5B/E6B Stitches	8	11-Aug-17	8	18-Aug-17	07-Apr-16	15-Apr-16	-443	0%
E06A-C6530	E7A & E7B - E6A/E7A & E6B/E7B Stitches	8	22-Aug-17	8	29-Aug-17	20-Apr-16	28-Apr-16	-443	0%
E06A-C6610	E6A/E7A: Install Bearing & Stress Continuity Tendons	12	30-Aug-17	12	12-Sep-17	08-Aug-17	21-Aug-17	-19	0%
E06A-C6620	E6B/E7B: Install Bearing & Stress Continuity Tendons	12	30-Aug-17	12	12-Sep-17	08-Aug-17	21-Aug-17	-19	0%
E06B-C6510	E6B - Drop in (E6B-E5B) - THB	30	12-Jul-17	30	10-Aug-17	03-Mar-16	06-Apr-16	-443	0%
E07B-C6310	E7B - Cantilever Span (18 nr) with 1st Stitch - THB	37	17-Apr-17 A	0	24-May-17 A				100%
E08A-C6410	E8A - Drop in (E8A-E7A) - THB	30	01-Sep-17	30	30-Sep-17	17-Aug-17	15-Sep-17	-15	0%
E08A-C6510	E8A & E8B - Quarter Span (E8-E9) - TLB	30	01-Sep-17	30	30-Sep-17	18-Jul-17	16-Aug-17	-45	0%
E08B-C6510	E8B - Drop in (E8B-E7B) - THB	30	01-Sep-17	30	30-Sep-17	16-Aug-17	14-Sep-17	-16	0%
E09A-C6330	E9A - Cantilever span (20 nr) - K Frame	22	29-Apr-17 A	0	06-Jun-17 A				100%
E09B-C6330	E9B - Cantilever span (20 nr) - K Frame	22	18-May-17 A	0	09-Jun-17 A				100%
E10A-C6310	E10A - Cantilever Span (16 nr) with 1st Stitch - WLF	24	30-Apr-17 A	12	03-Jul-17	05-Aug-17	16-Aug-17	44	75%
E10B-C6310	E10B - Cantilever Span (16 nr) with 1st Stitch - WLF	26	04-May-17 A	18	09-Jul-17	30-Jul-17	16-Aug-17	38	45%
E11A-C6210	E11A - Install THB	5	07-Jun-17 A	0	07-Jun-17 A				100%
E11A-C6410	E11A - Bifurcation Span to E10A (12 nr) with 1st Stitch - THB	48	08-Jun-17 A	49	09-Aug-17	28-May-17	17-Jul-17	-23	10%
E11B-C6210	E11B - Install THB	2	13-Jul-17	2	14-Jul-17	10-Nov-16	11-Nov-16	-228	0%
E11B-C6410	E11B - Bifurcation Span to E10B (12 nr) with 1st Stitch - THB	48	15-Jul-17	48	31-Aug-17	12-Nov-16	07-Jan-17	-228	0%
VE2-C6620	Viaduct E2 - Dismantle LG2	48	25-Aug-17	48	21-Oct-17	26-Jun-17	21-Aug-17	-51	0%
Bridge E5									
Deck Span Segment									
E11B-C6310	E11B Deck - Bifurcation Span to E12B (18 nr) with 1st Stitch - THB	48	15-Jul-17	48	31-Aug-17	12-Nov-16	07-Jan-17	-228	0%
E12D-C6110	E12D Deck - Install THB	8	01-Sep-17	8	08-Sep-17	08-Jan-17	15-Jan-17	-228	0%
E12D-C6210	E12D Deck - Cantilever Span (16 seg) with 2 stitches - THB	45	09-Sep-17	45	26-Oct-17	16-Jan-17	05-Mar-17	-228	0%
Bridge E6									
Deck Span Segment									
E12C-C6110	E12C Deck - Install WLF	8	10-Aug-17	8	17-Aug-17	07-Jun-17	14-Jun-17	-63	0%
E12C-C6210	E12C Deck - Cantilever Span (42 seg) with 2 stitches - THB	67	18-Aug-17	67	26-Oct-17	15-Jun-17	21-Aug-17	-63	0%
Bridge E7									
Deck Span Segment									
E12B-C6110	E12B Deck - Install WLF	8	24-Aug-17*	8	31-Aug-17	13-Apr-17	20-Apr-17	-130	0%
E12B-C6210	E12B Deck - Cantilever Span (40 seg) with 3 stitches - WLF	66	01-Sep-17	66	09-Nov-17	21-Apr-17	27-Jun-17	-130	0%
Bridge E8									
Deck Span Segment									
E11A-C6310	E11A Deck - Bifurcation Span to E12A (18 nr) w/ 1st Stitch - THB	48	09-Jun-17 A	49	09-Aug-17	16-Sep-16	11-Nov-16	-254	0%
E12A-C6210	E12A Deck - Install THB	8	22-Aug-17	8	29-Aug-17	12-Nov-16	21-Nov-16	-266	0%
E12A-C6410	E12A Deck - Cantilever Span (22 nr) with 1st stitch - THB	45	30-Aug-17	45	16-Oct-17	22-Nov-16	12-Jan-17	-266	0%
At-Grade Works & Miscellaneous Works									



Actual Work
Planned Bar
Critical Bar
Milestone

Project ID: TMCLK-DWPI-1-M49
Layout: J3518-DWP-3MRP Submission - M49
Filter: TASK filters: 3-Month Lookahead, No CC Milestones, No Level of Effort.

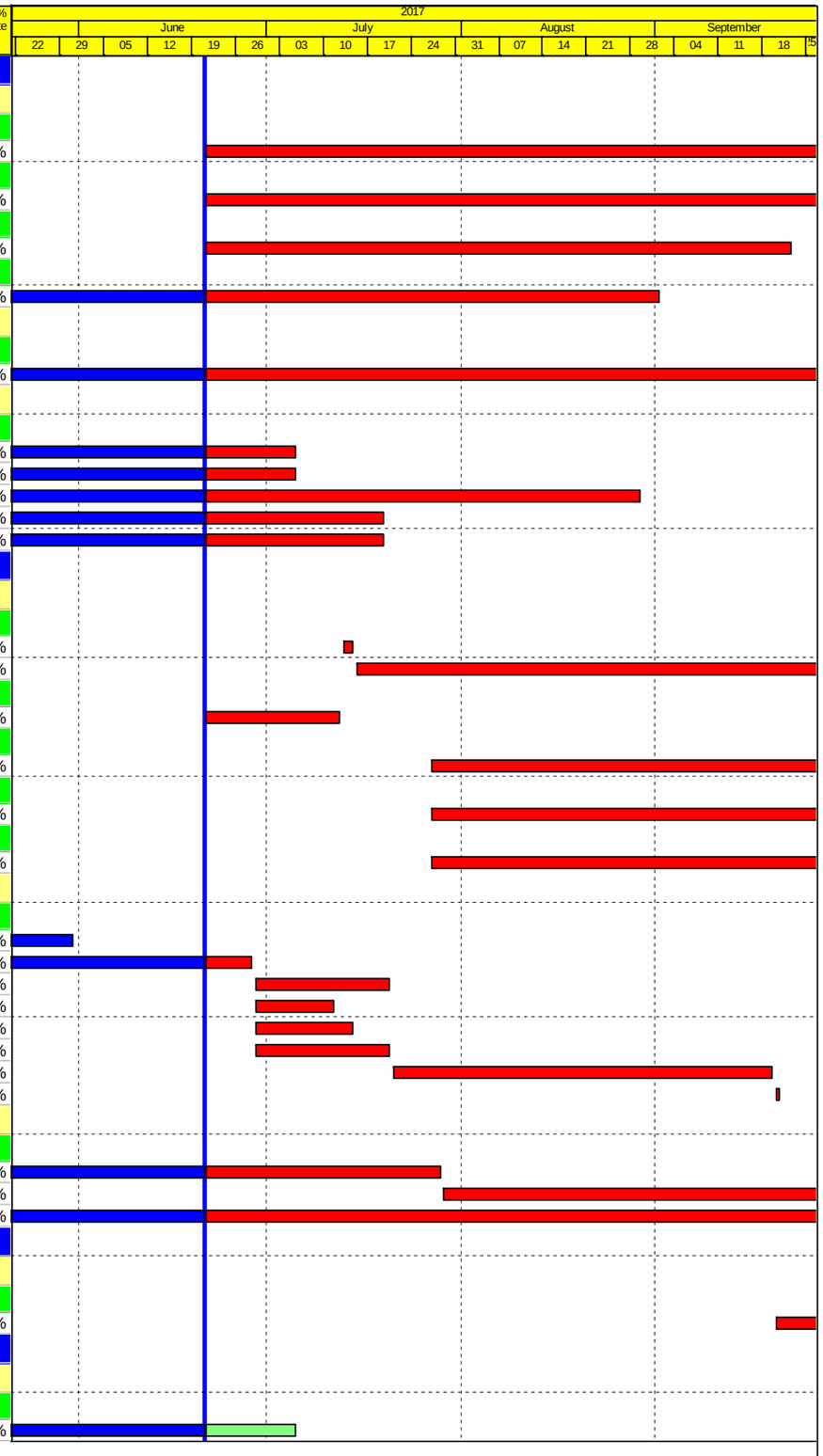
Tuen Mun - Chek Lap Kok Link - Southern Connection
3-Month Rolling Programme (Page 11 of 12 Pages)
(Progress as of 21-Jun-17)

Date	Revision	Checked	Approved
28-Apr-17		PKN	GL
31-May-...		PKN	GL
04-Jul-17		PKN	GL

DWG. No.:

J3518/GCL/PGM/3MRP-M49

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
At-Grade Works Along North Lantau Highway									
Slope Works Near Viaduct D									
Slope 10NW-C/F9									
M201200	10NW-C/F9 - Slope works (incl. L-Shape Ret. Walls)	110	21-Jun-17	110	31-Oct-17	19-Sep-16	02-Feb-17	-221	0%
Slope 10NW-C/F10									
M201160	10NW-C/F10 - Slope works (incl. L-Shape Ret. Walls)	110	21-Jun-17	110	31-Oct-17	02-Jul-16	10-Nov-16	-287	0%
Slope 10NW-C/R4									
M201170	10NW-C/R4 - Slope works	80	21-Jun-17	80	22-Sep-17	06-Aug-16	10-Nov-16	-257	0%
Slope 10NW-C/F50									
M201150	10NW-C/F50 - Slope works	165	11-Jan-17 A	62	01-Sep-17	27-Aug-16	10-Nov-16	-239	5%
Road Works Along NLH Westbound									
General									
RW10020	NLH W/B (Viaduct C) - Road Drainage Works for tie-in	104	18-May-17 A	101	19-Oct-17	03-Dec-16	07-Apr-17	-158	1%
Road Works Along NLH Eastbound									
General									
RW20080-1	Ch650 - 800 Portion 4 (viaduct D area): Roadwork	81	11-Jan-17 A	12	05-Jul-17	24-Mar-17	07-Apr-17	-69	85%
RW20080-2	Ch475 - 650 Portion 5 (viaduct D area) : Roadwork	81	11-Jan-17 A	12	05-Jul-17	24-Mar-17	07-Apr-17	-69	85%
RW20080-3	Ch275 - 475 Portion 6 (viaduct D area) ; Roadwork	162	11-Jan-17 A	59	29-Aug-17	25-Jan-17	07-Apr-17	-116	70%
RW20080-4	Ch157 - 275 Portion 7 (Viaduct D area) : Roadwork	98	11-Jan-17 A	24	19-Jul-17	10-Mar-17	07-Apr-17	-81	75%
RW20084	NLH E/B Viaduct A - Ch200-388 Roadwork (SL & HS) & Reinstate NLH	127	17-Dec-16 A	24	19-Jul-17	10-Mar-17	07-Apr-17	-81	75%
At-Grade Works Along Cheung Tung Road									
Slope Works Near Viaduct C									
Slope 10NW-C/C26									
SWVC1995	TTA for closure of NLH HS	2	13-Jul-17	2	14-Jul-17	16-Aug-16	17-Aug-16	-267	0%
SWVC2000	10NW-C/C26 - Slope works	166	15-Jul-17	166	31-Jan-18	18-Aug-16	09-Mar-17	-267	0%
Slope PF1 & PF2									
SWVC7000	PF1 & PF2 slope works	18	21-Jun-17	18	12-Jul-17	26-Jul-16	15-Aug-16	-267	0%
Slope 10NW-C/F13									
SWVC4000	10NW-C/F13 - Slope works	100	27-Jul-17*	100	23-Nov-17	14-Jul-16	10-Nov-16	-307	0%
Slope 10NW-C/F14									
SWVC5000	10NW-C/F14 - Slope works	100	27-Jul-17*	100	23-Nov-17	07-Jun-16	05-Oct-16	-337	0%
Slope 10NW-C/F15									
SWVC6000	10NW-C/F15 - Slope works	108	27-Jul-17*	108	02-Dec-17	28-May-16	05-Oct-16	-345	0%
Re-alignment of CTR Along Viaduct B									
General									
RP00064	Ch620-750: Telecom, 11KV & 132KV Ducting	20	20-Aug-15 A	0	31-May-17 A				100%
RP00074-3	Ch100-300: Road Drainage	38	06-May-17 A	7	28-Jun-17	21-Sep-16	28-Sep-16	-219	85%
RP00075	Ch100-300: Duct Laying for 11KV	18	29-Jun-17	18	20-Jul-17	29-Sep-16	21-Oct-16	-219	0%
RP00076	Ch100-300: Lay Telecom Cable	10	29-Jun-17	10	11-Jul-17	29-Sep-16	12-Oct-16	-219	0%
RP00077	Ch100-300: Street Lighting & Draw Pit	13	29-Jun-17	13	14-Jul-17	29-Sep-16	15-Oct-16	-219	0%
RP00078	Ch100-300: Relocation of Vent Pipe	18	29-Jun-17	18	20-Jul-17	29-Sep-16	21-Oct-16	-219	0%
RP00083	Ch100-300: Drainage & Roadwork for New CTR	52	21-Jul-17	52	19-Sep-17	22-Oct-16	21-Dec-16	-219	0%
RP00084	Ch100-300: TTA to New CTR	1	20-Sep-17	1	20-Sep-17	22-Dec-16	22-Dec-16	-219	0%
Re-alignment of CTR Along Viaduct C									
East Portion									
RW60050	CTR East (stage 2) TTA 090-5 : Roadwork	77	26-Apr-17 A	32	28-Jul-17	03-Oct-16	09-Nov-16	-210	60%
RW60060	CTR East (stage 3) TTA 090-6 : Roadwork	66	29-Jul-17	66	16-Oct-17	10-Nov-16	01-Feb-17	-210	0%
RW60080	CTR Tie in Works	116	18-May-17 A	88	03-Oct-17	19-Dec-16	07-Apr-17	-145	20%
At-Grade Works at Southern Landfall									
HKBCF Area									
General									
RW30028-2	Construct FMH2046 and Lay Pipe Work	14	20-Sep-17*	14	07-Oct-17	09-May-17	24-May-17	-113	0%
Watermain from Tung Chung to Southern Landfall									
Watermain Works									
General									
WM00120	Lay DN450 Fresh Water Main at Re-aligned CTR (approx. 500m)	48	22-Apr-15 A	12	05-Jul-17	29-Nov-17	12-Dec-17	134	90%



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Tuen Mun - Chek Lap Kok Link - Southern Connection
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Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

(In reference to CINOTECH (2011) Agreement No. CE35/2011 EP Baseline Environmental Monitoring for Hong Kong-Zhuhai-Macao Bridge Tuen Mun-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 2017)

Alternative Noise Monitoring at Pak Mong Village Entrance

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

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Air Quality Monitoring Schedule (1 to 30 June 2017)

Alternative Air Quality Monitoring at WA4 and MTRC Depot Entrance

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

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

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	08-Jul
			Noise Impact Monitoring			
09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul
		Noise Impact Monitoring				
16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul
	Noise Impact Monitoring			Noise Impact Monitoring		
23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
			Noise Impact Monitoring			
30-Jul	31-Jul					

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

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	08-Jul
			1-hr TSP Monitoring 24-hr TSP Monitoring			
09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul
		1-hr TSP Monitoring 24-hr TSP Monitoring				
16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
			1-hr TSP Monitoring 24-hr TSP Monitoring			
30-Jul	31-Jul					

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

Alternative Noise Monitoring at Pak Mong Village Entrance

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

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

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	05-Aug
		1-hr TSP Monitoring 24-hr TSP Monitoring				
06-Aug	07-Aug	08-Aug	09-Aug	10-Aug	11-Aug	12-Aug
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		
13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug
			1-hr TSP Monitoring 24-hr TSP Monitoring			
20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug
		1-hr TSP Monitoring (24-hr TSP Monitoring is canceled due to adverse weather)				
27-Aug	28-Aug	29-Aug	30-Aug	31-Aug		
	1-hr TSP Monitoring 24-hr TSP Monitoring			1-hr TSP Monitoring 24-hr TSP Monitoring		

HY/2012/07 - Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section

Impact Marine Water Quality Monitoring (WQM) Schedule (August 2017)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Aug	2-Aug	3-Aug	4-Aug	5-Aug
		ebb tide 6:45 - 10:15 flood tide 13:29 - 16:59		ebb tide 8:42 - 12:12 flood tide 15:57 - 19:27		ebb tide 10:00 - 13:30 flood tide 17:12 - 20:42
6-Aug	7-Aug	8-Aug	9-Aug	10-Aug	11-Aug	12-Aug
	ebb tide 11:12 - 14:42 flood tide 18:14 - 21:44		ebb tide 12:20 - 15:50 flood tide 5:36 - 9:06		ebb tide 13:29 - 16:59 flood tide 7:01 - 10:31	
13-Aug	14-Aug	15-Aug	16-Aug	17-Aug	18-Aug	19-Aug
	ebb tide 15:39 - 19:09 flood tide 9:44 - 13:14		ebb tide 5:58 - 9:28 flood tide 12:45 - 16:15		ebb tide 8:20 - 11:50 flood tide 15:37 - 19:07	
20-Aug	21-Aug	22-Aug	23-Aug	24-Aug	25-Aug	26-Aug
	ebb tide 10:57 - 14:27 flood tide 17:53 - 21:23		**WQM is canceled due to adverse weather**		ebb tide 13:39 - 17:09 flood tide 7:11 - 10:41	
27-Aug	28-Aug	29-Aug	30-Aug	31-Aug		
	ebb tide 15:27 - 18:57 flood tide 9:36 - 13:06		ebb tide 5:30 - 9:00 flood tide 13:05 - 16:35			

HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 30 June 2017)

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	10-Jun
11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun	17-Jun
			Impact Dolphin Monitoring	Impact Dolphin Monitoring		
18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun	24-Jun
		Impact Dolphin Monitoring				
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 2017)

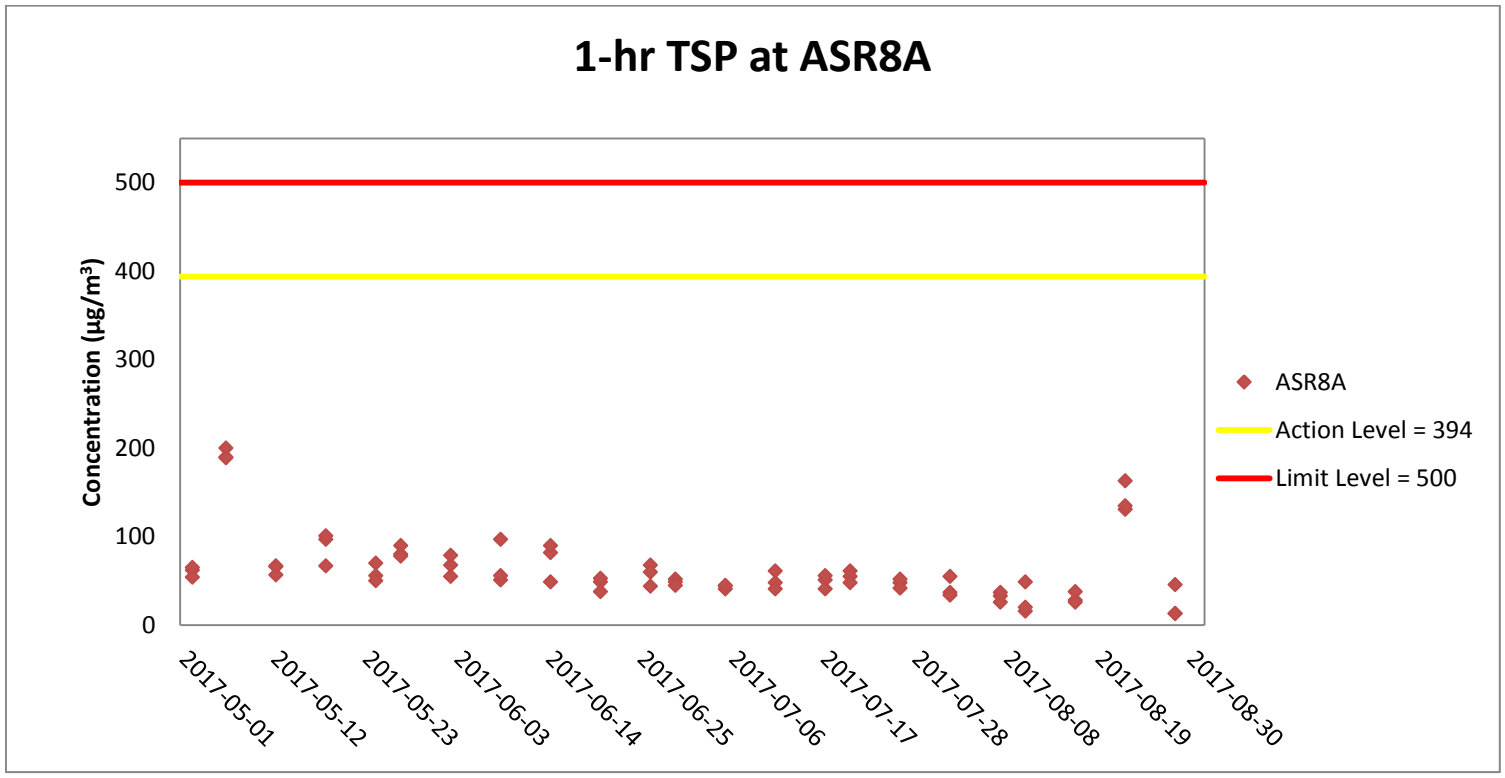
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Jul
02-Jul	03-Jul	04-Jul	05-Jul	06-Jul	07-Jul	08-Jul
09-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul	15-Jul
16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul	22-Jul
				Impact Dolphin Monitoring		
23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul	29-Jul
	Impact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

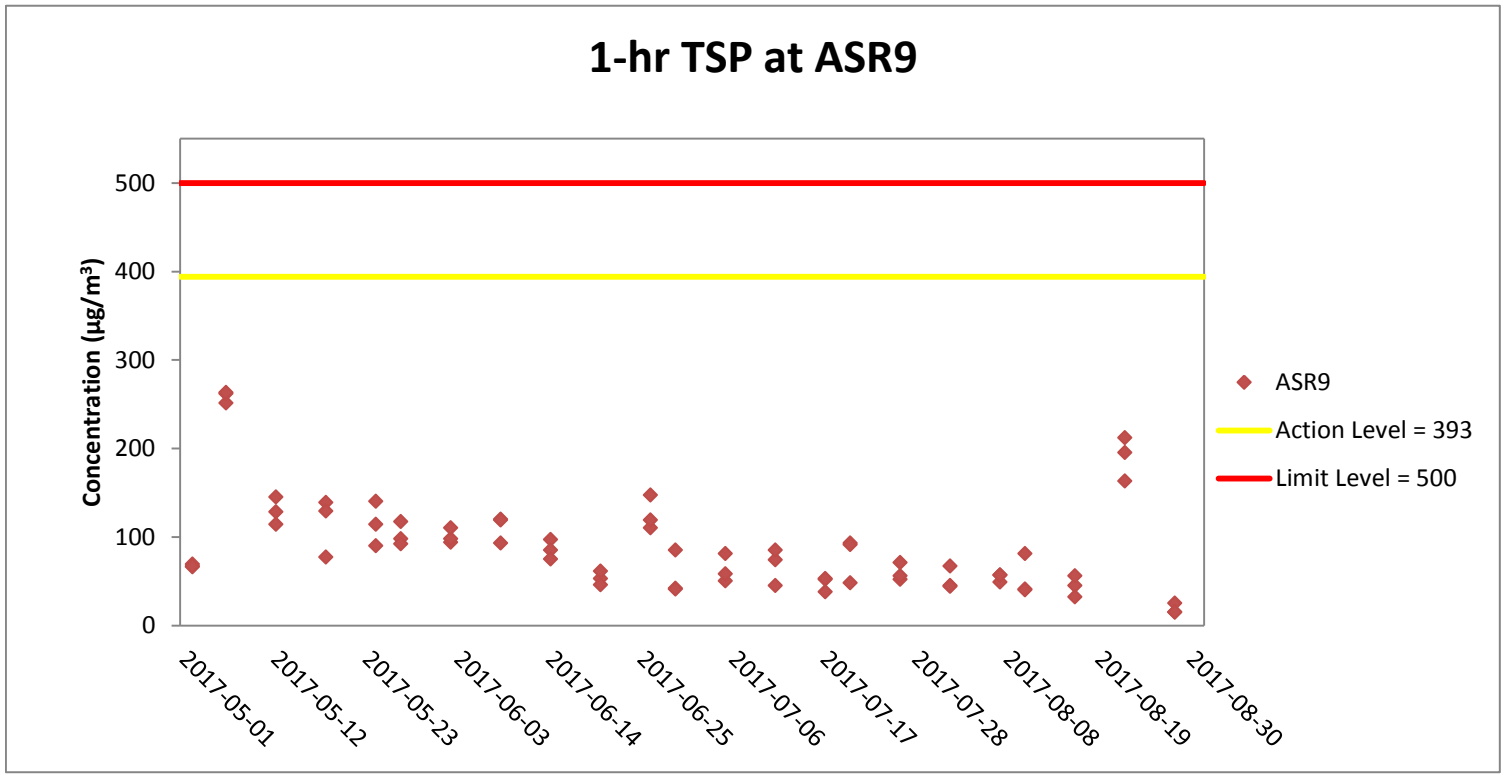
HY/2012/07 Tuen Mun - Chek Lap Kok Link - Southern Connection Viaduct Section
Impact Dolphin Monitoring Survey Schedule (1 to 31 August 2017)

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

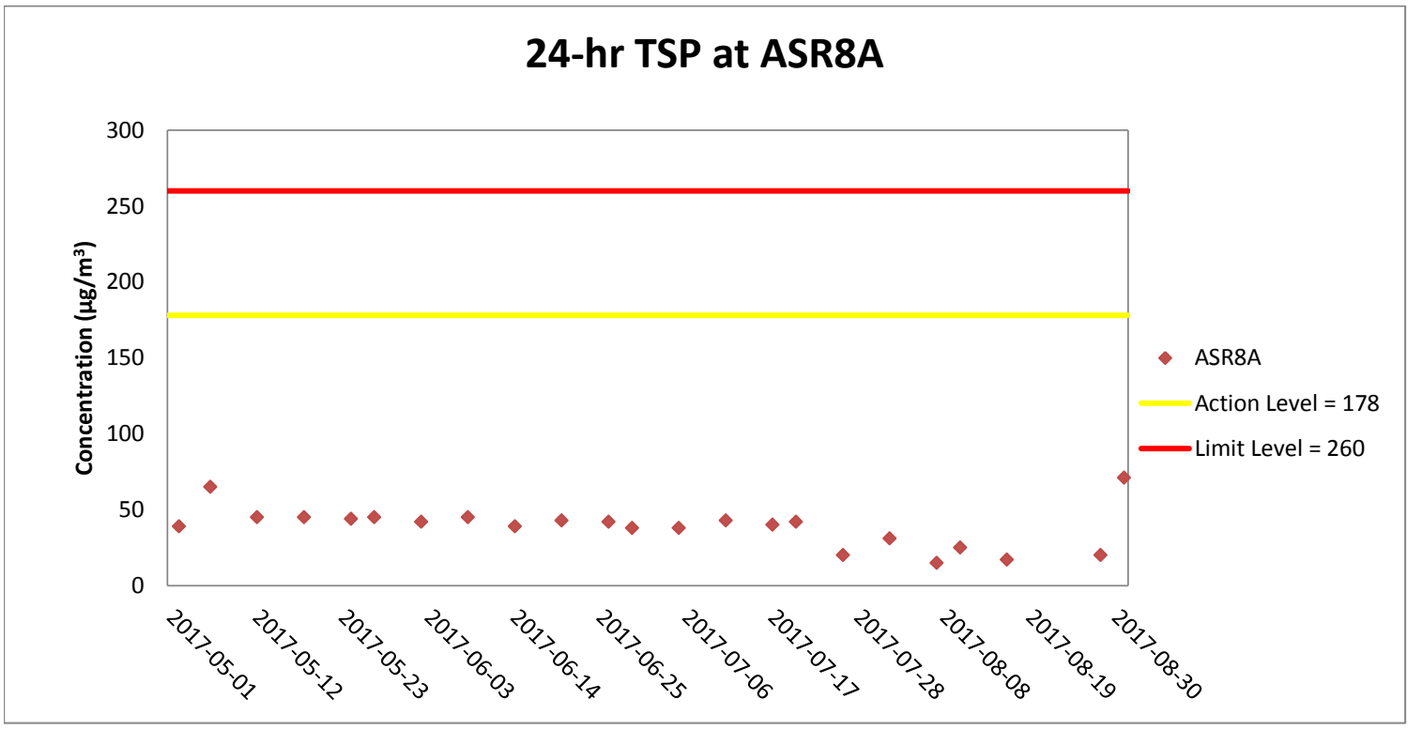
Appendix F

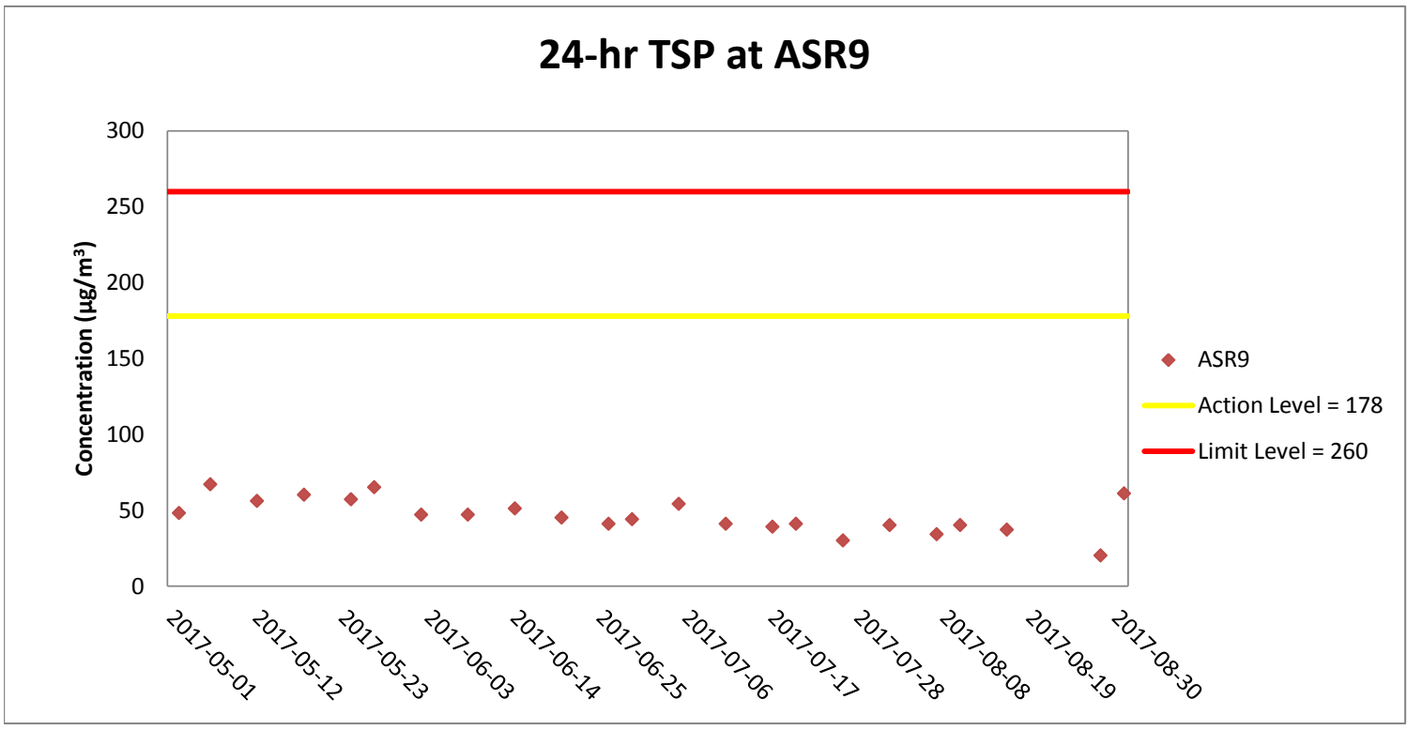
Impact Air Quality Monitoring Graphical Presentation





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; and Slope work of Viaducts A, B & C.
Marine works within the reporting period include Construction and installation of pile caps; Uninstallation of marine piling platform; Pier construction; Launching gantry operation; Installation of deck segment and pier head segment; and Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

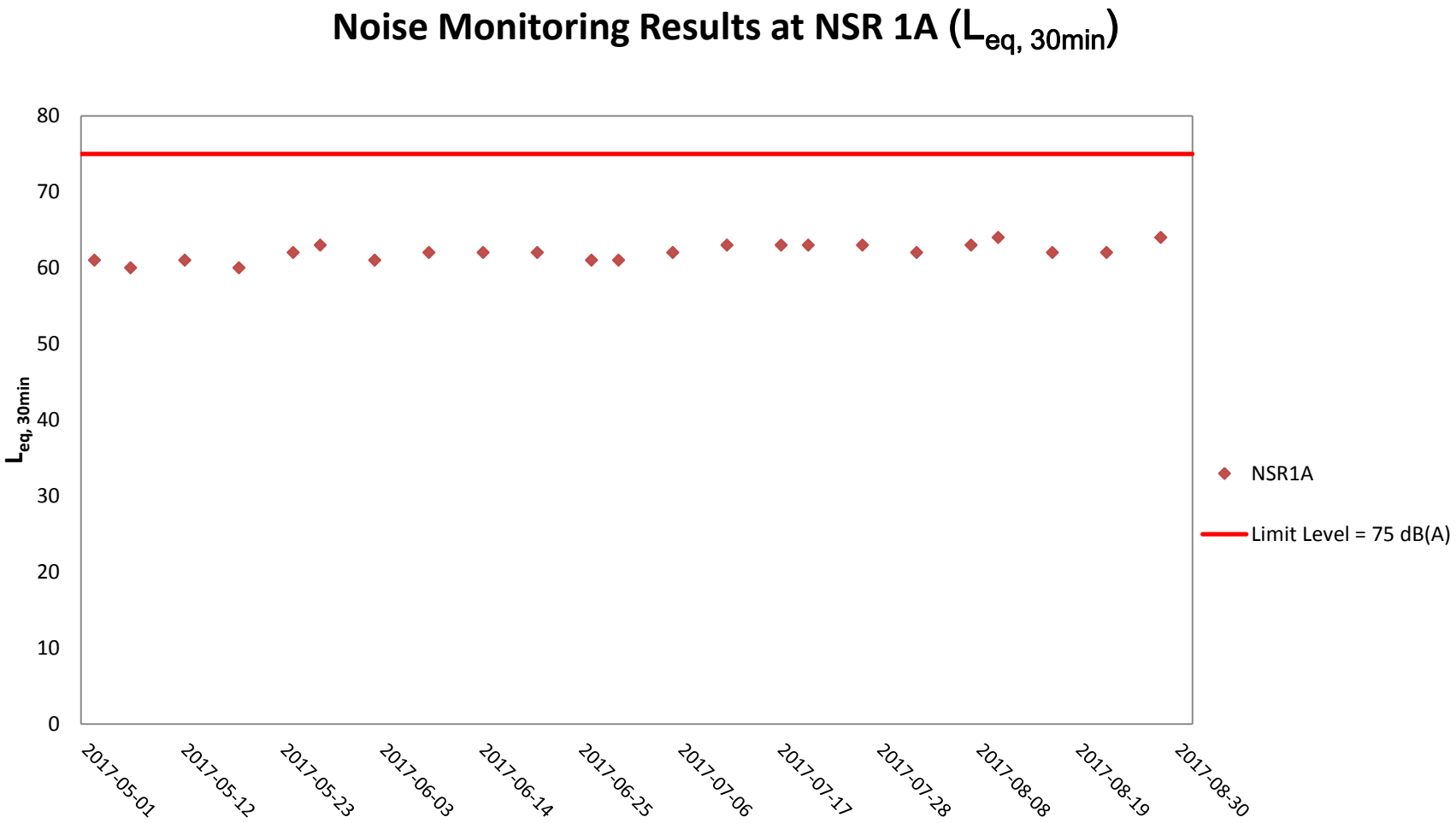




24-hour TSP at ASR8A and ASR9 on 22 August 2017 was canceled due to adverse weather.
Weather condition within the reporting period varied between sunny to rainy.
Major construction works undertaken within the reporting period include Pier construction; Re-alignment of Cheung Tung Road; Road works along North Lantau Highway;; Installation of pier head and deck segments; and Slope work of Viaducts A, B & C.
Marine works within the reporting period include Construction and installation of pile caps; Uninstallation of marine piling platform; Pier construction; Launching gantry operation; Installation of deck segment and pier head segment; and Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Appendix G

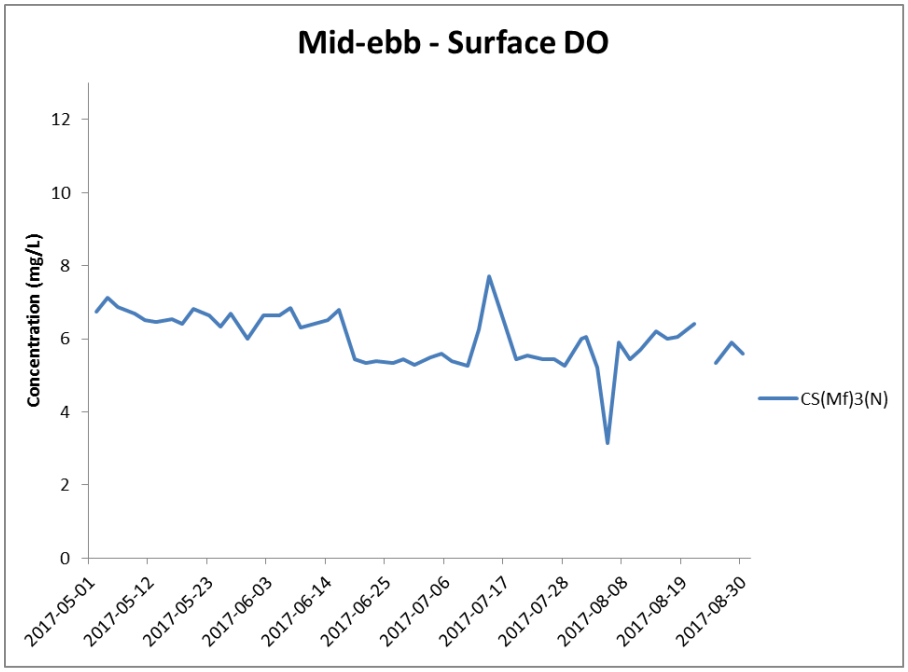
Impact Noise Monitoring Graphical Presentation



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; and Slope work of Viaducts A, B & C.
Marine works within the reporting period include Construction and installation of pile caps; Uninstallation of marine piling platform; Pier construction; Launching gantry operation; Installation of deck segment and pier head segment; and Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).

Appendix H

Impact Water Quality Monitoring Graphical Presentation



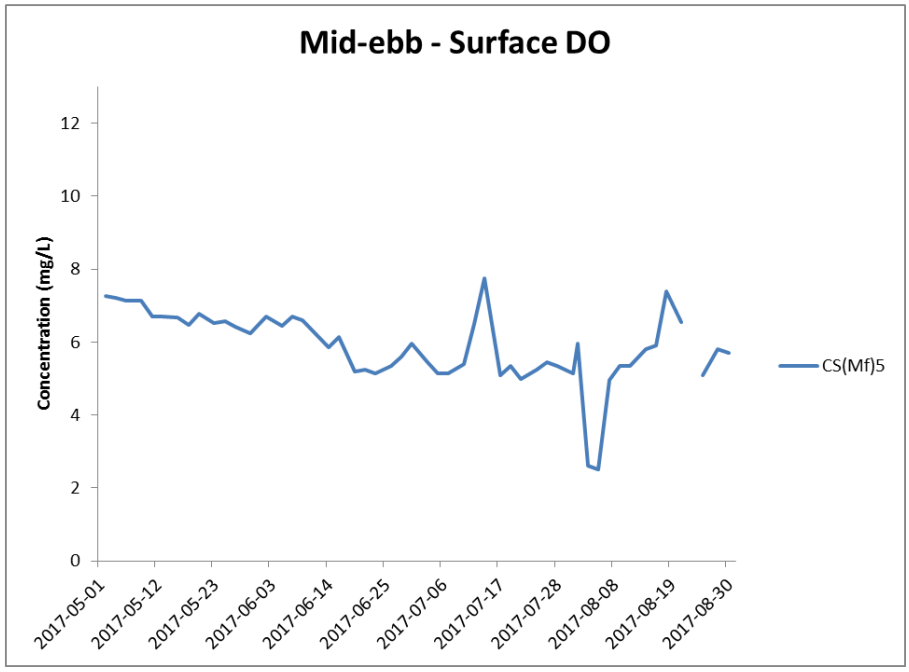
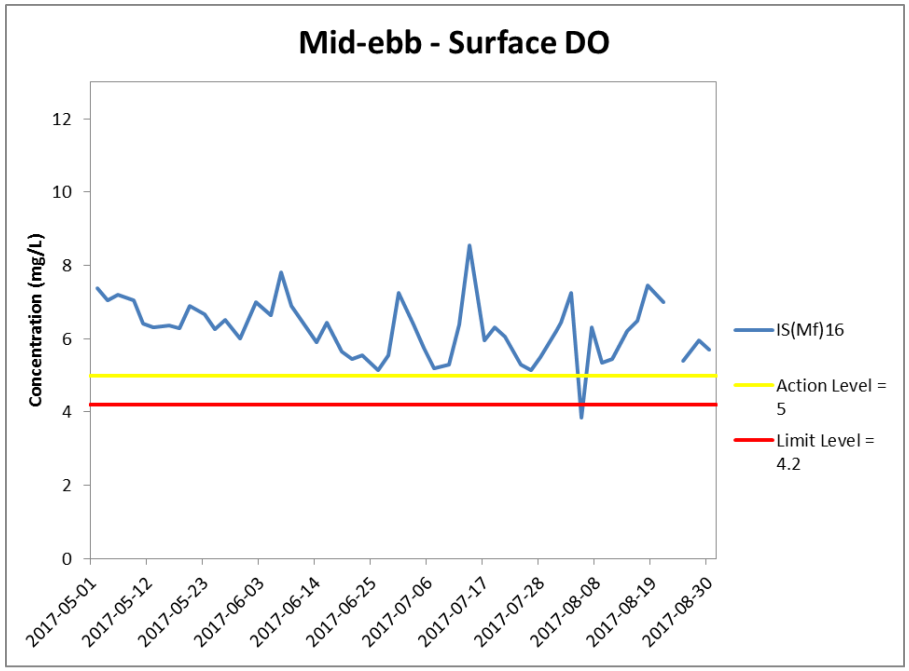


Figure H1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



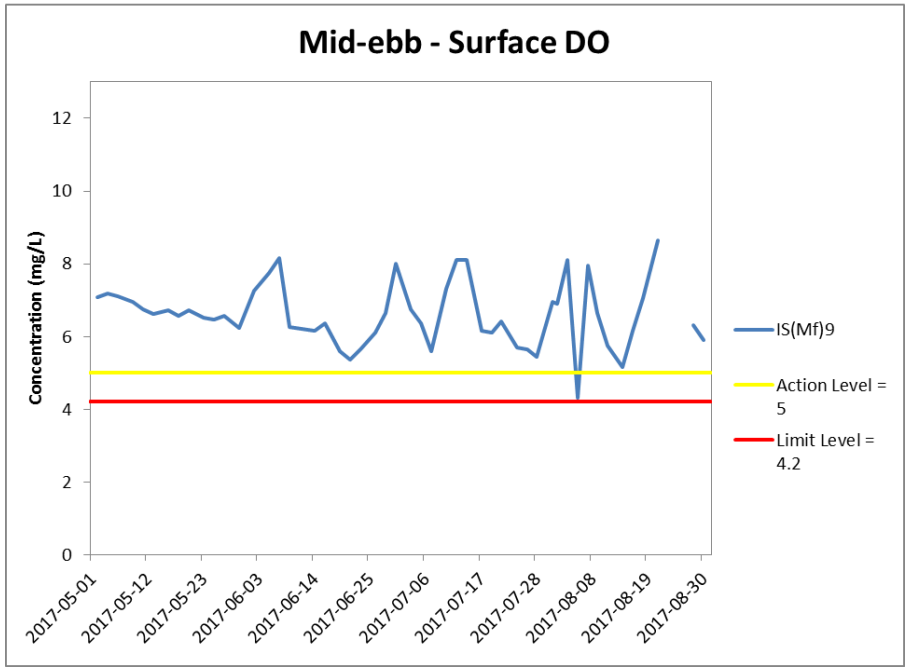
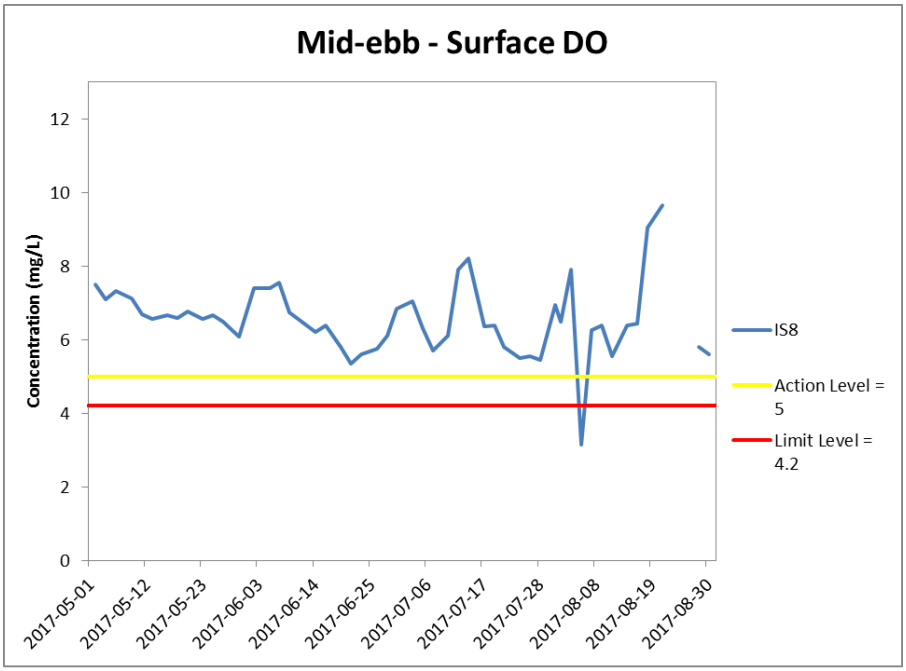


Figure H2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.



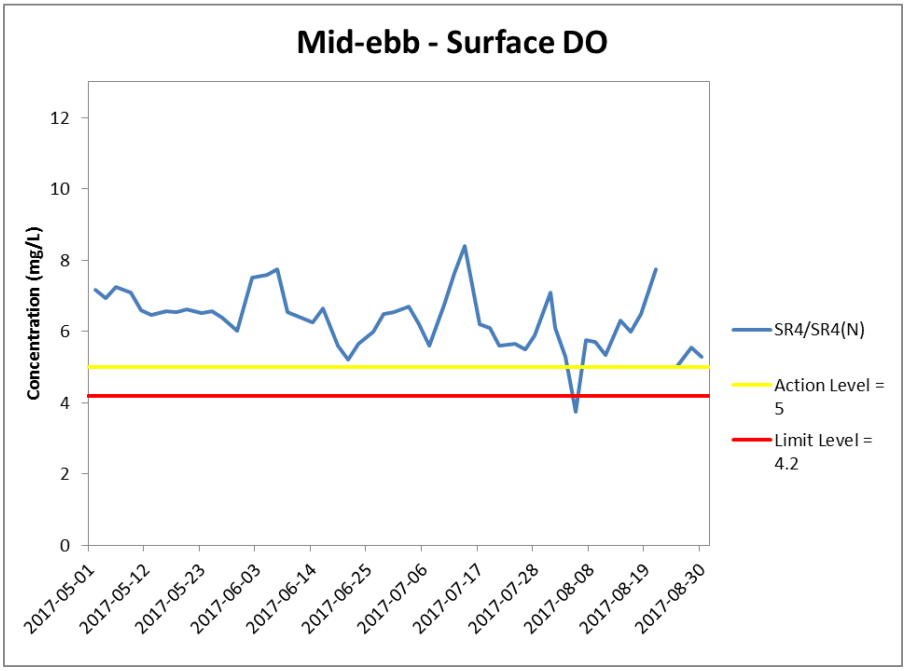


Figure H3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM

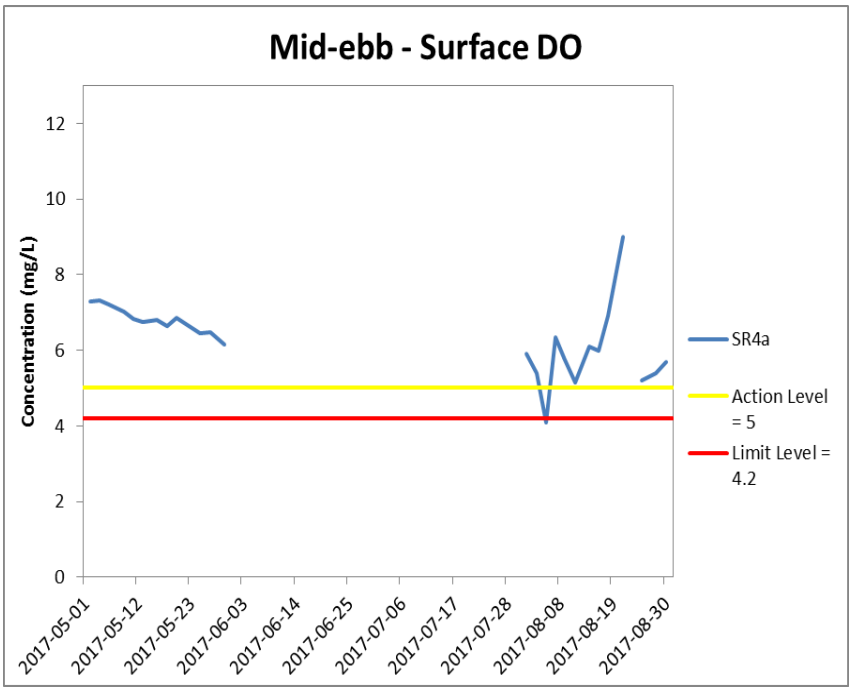
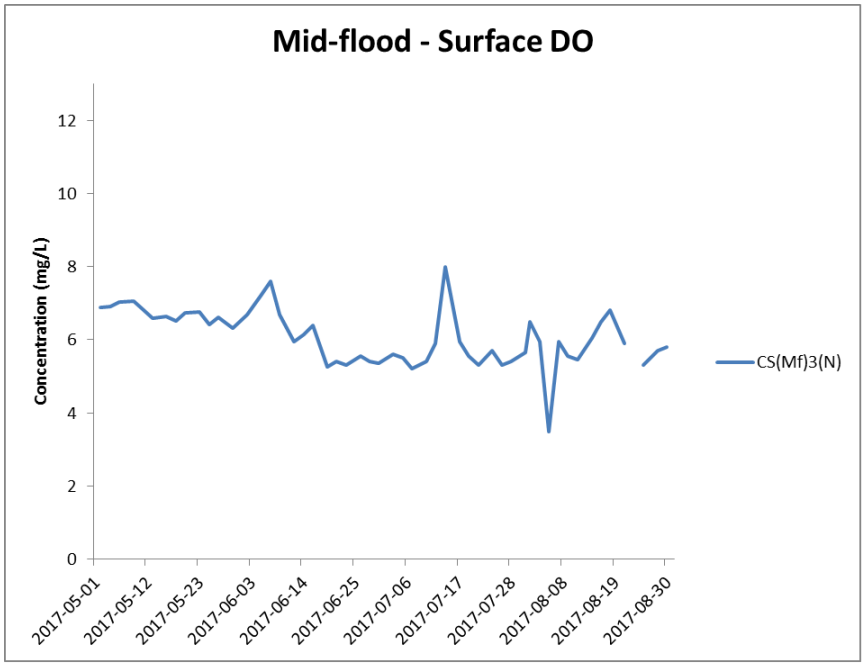


Figure H4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



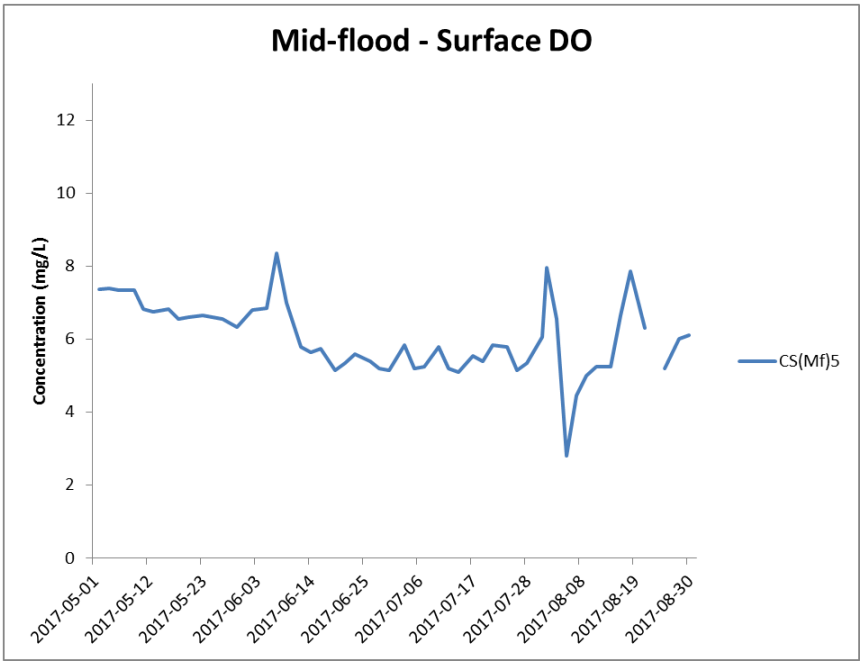
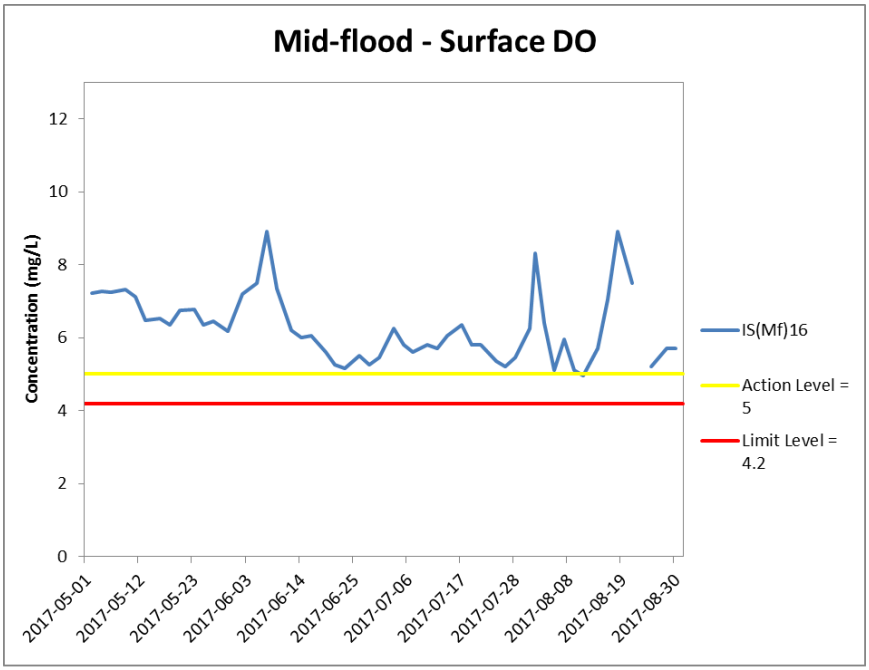


Figure H5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



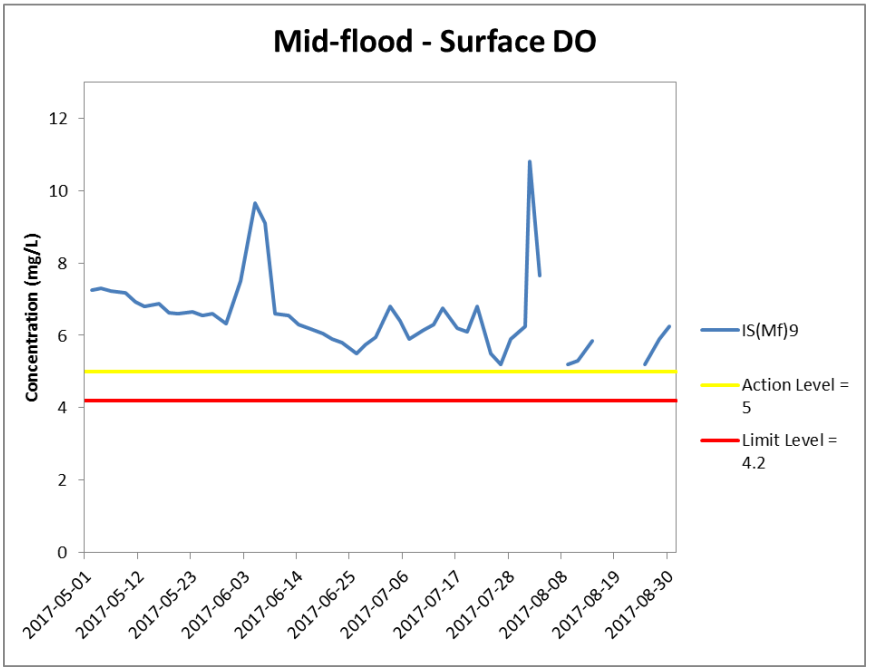
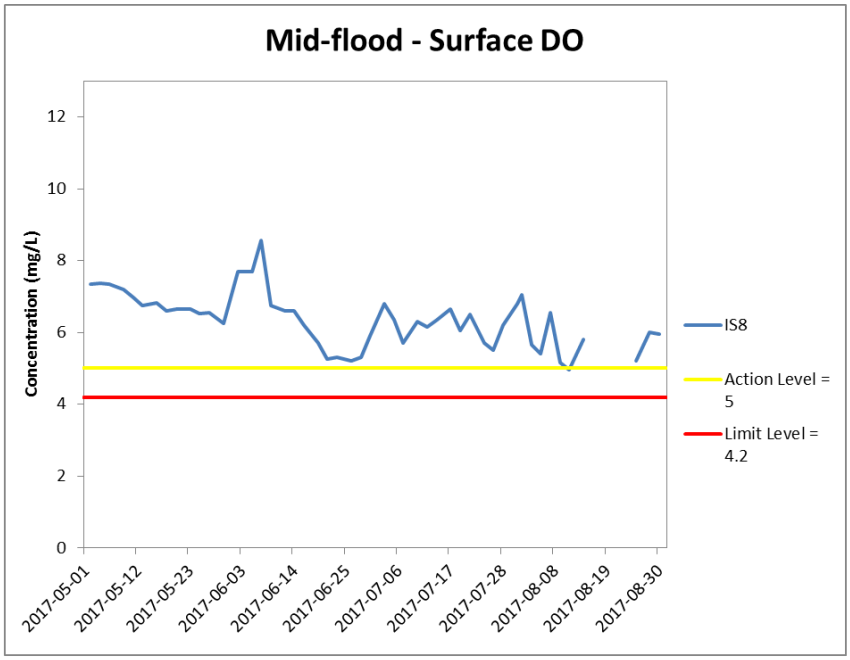


Figure H6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



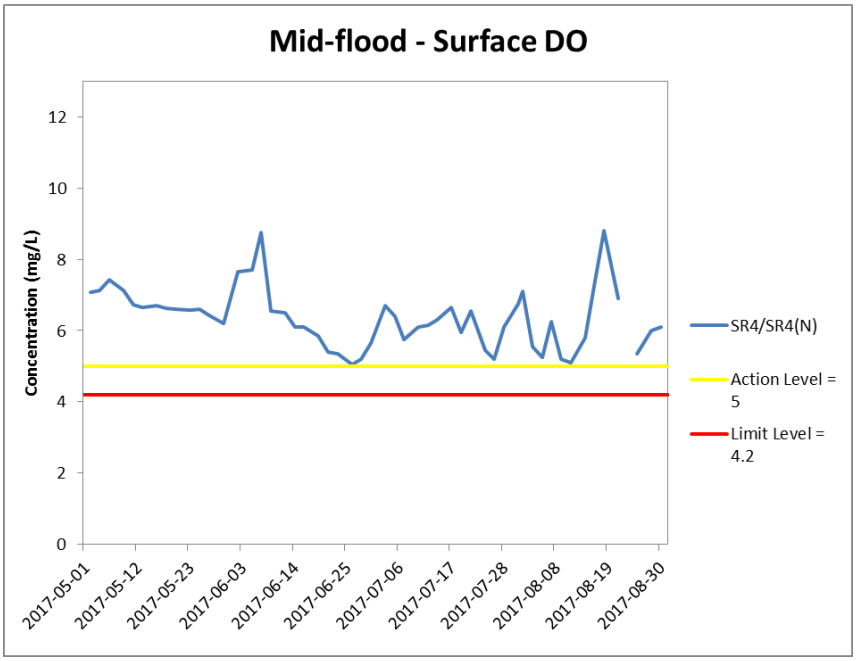


Figure H7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM

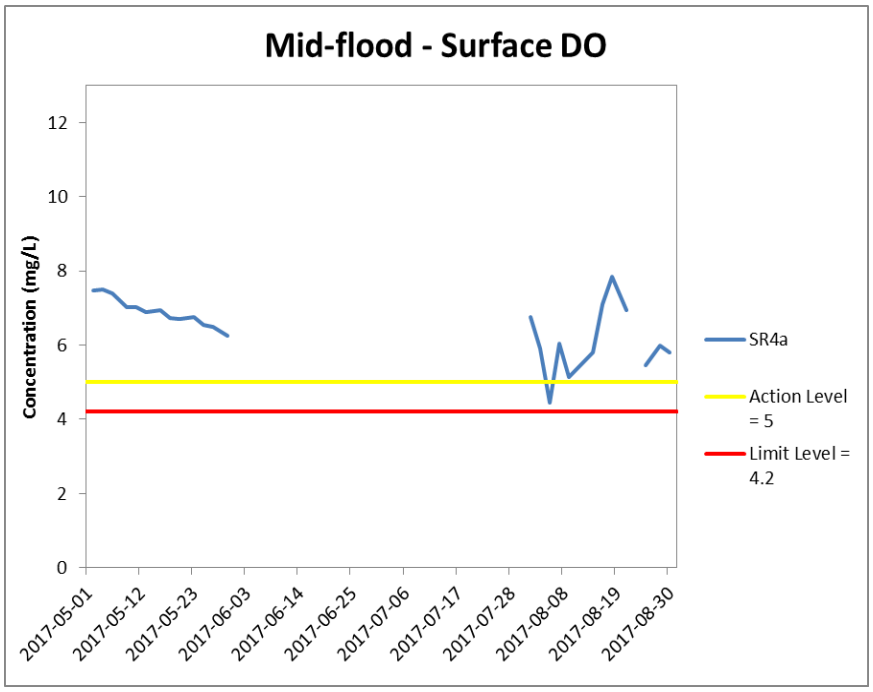
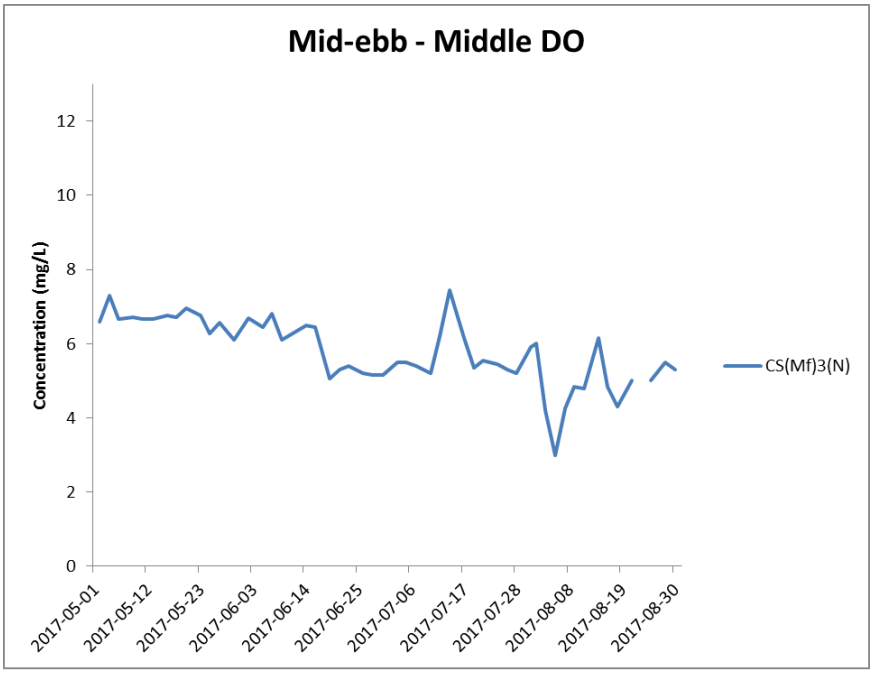


Figure H8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



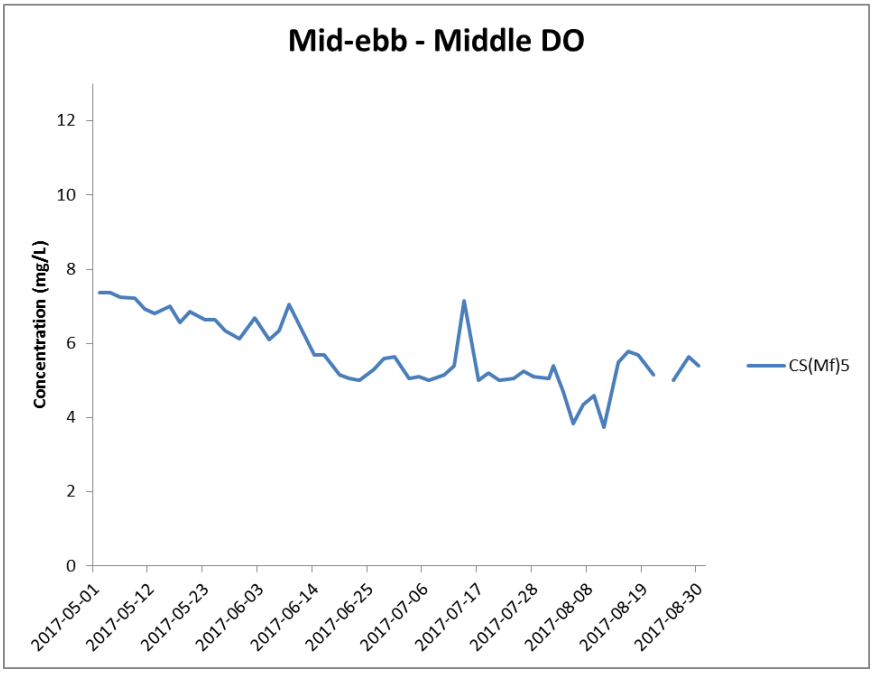


Figure H9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM

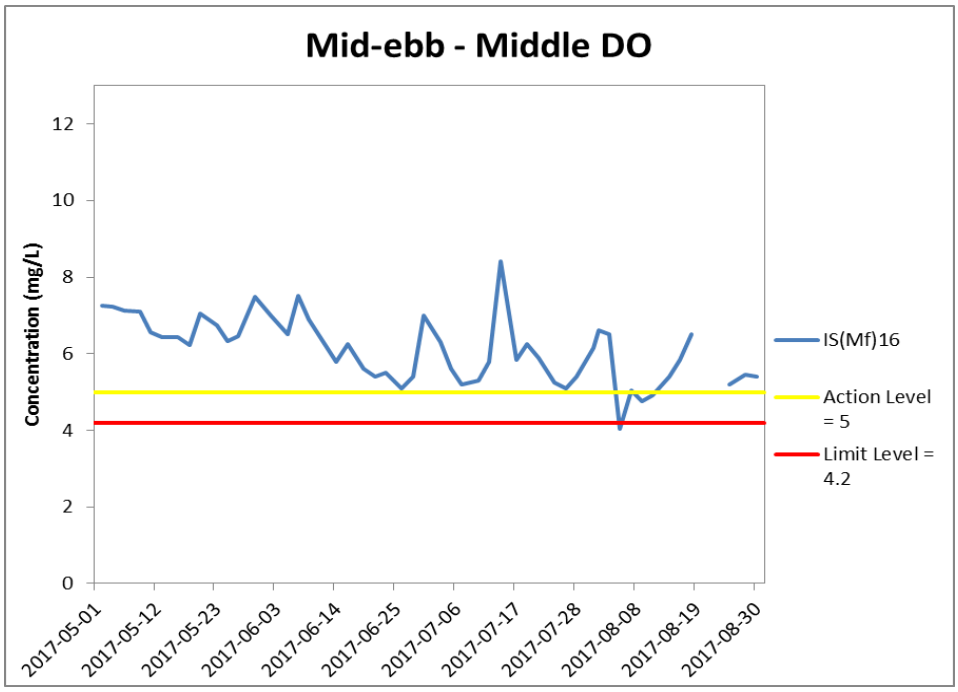
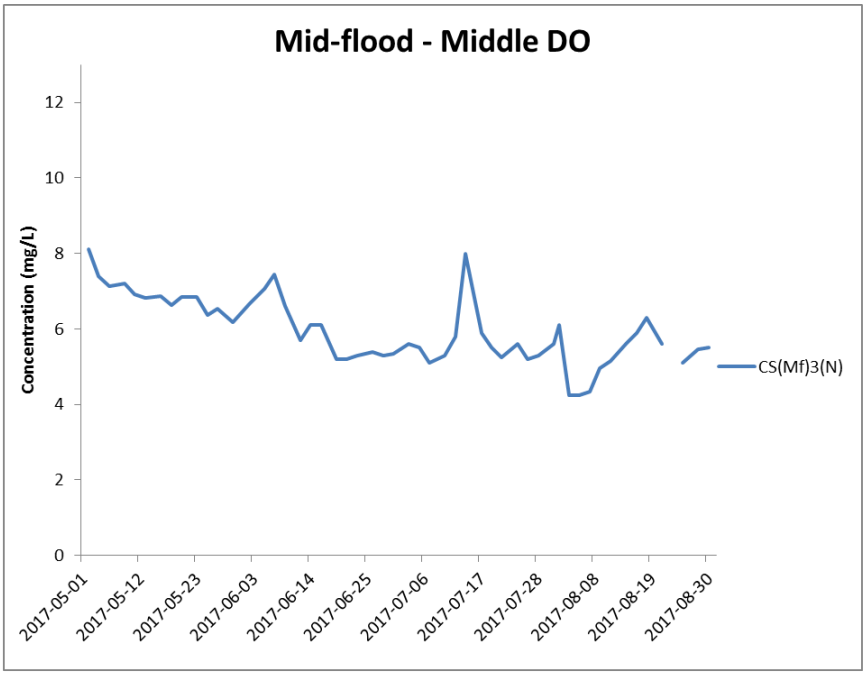


Figure H10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS(Mf)16.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.



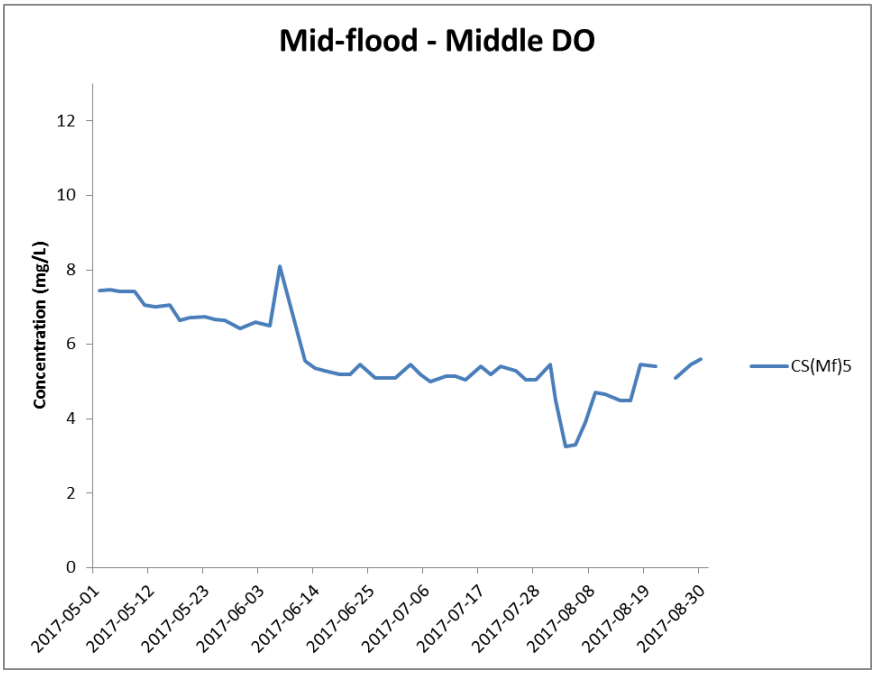
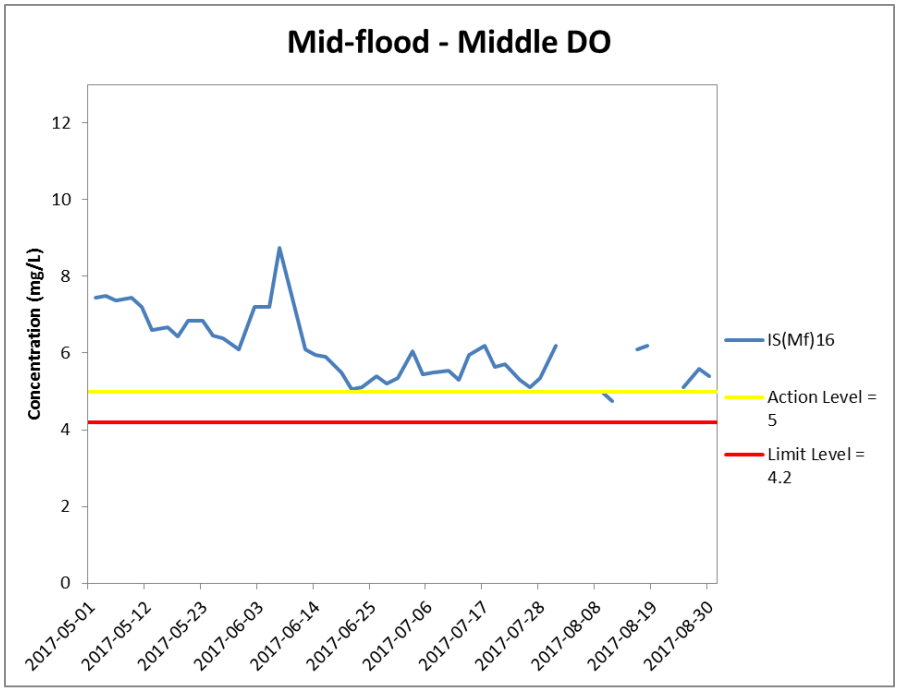


Figure H11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



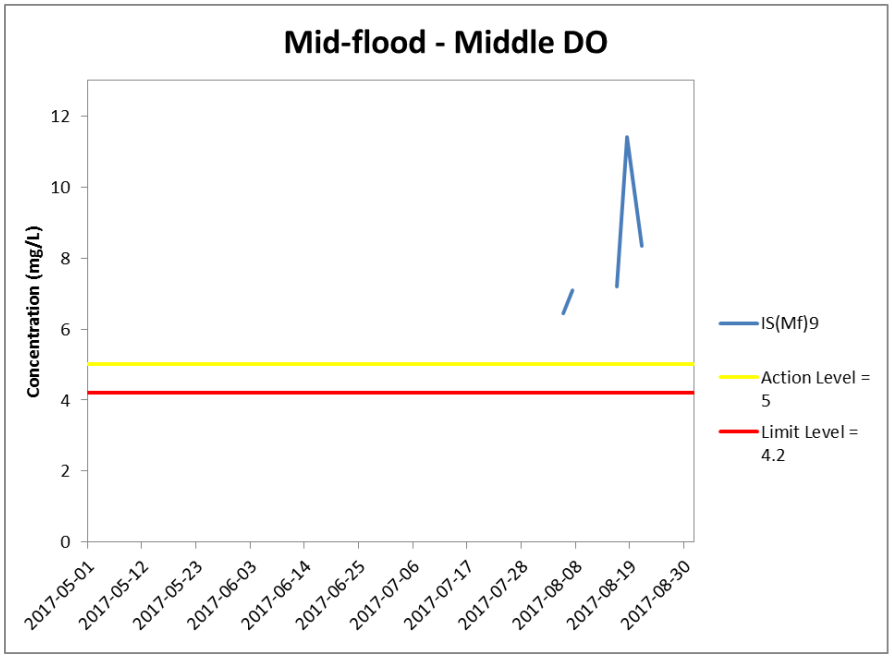
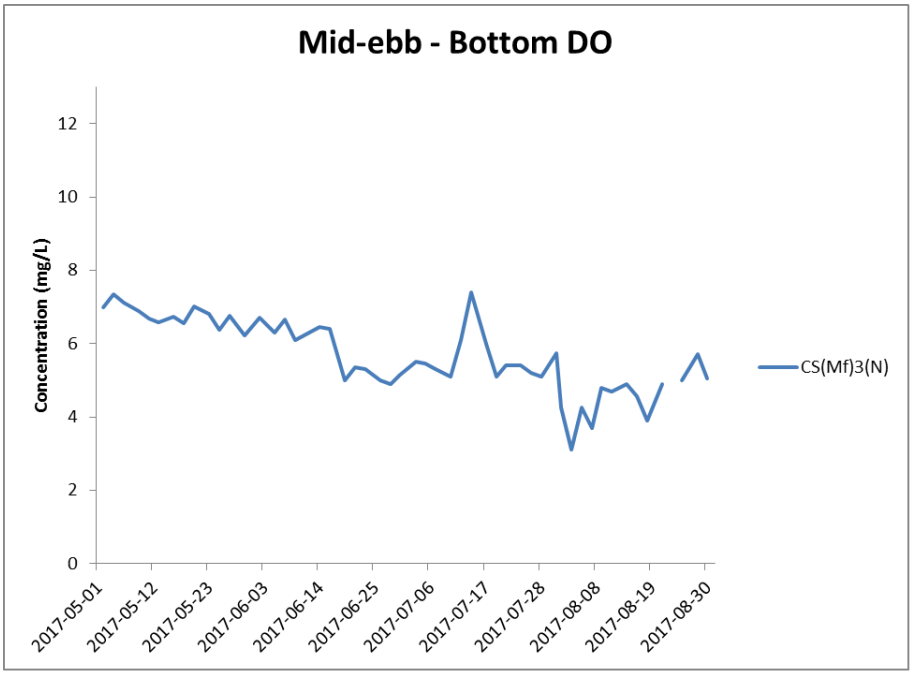


Figure H12 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



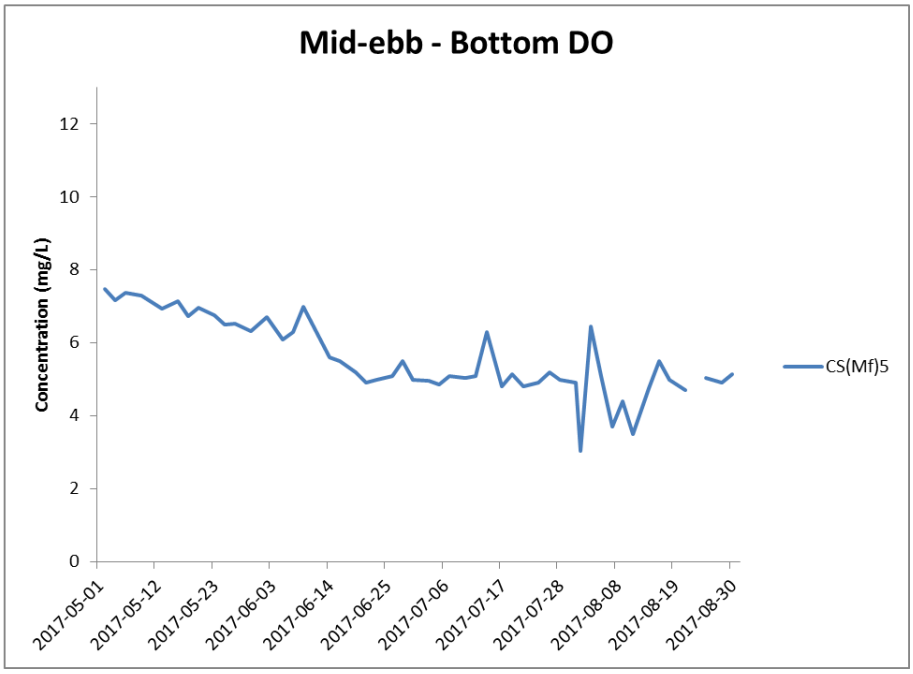
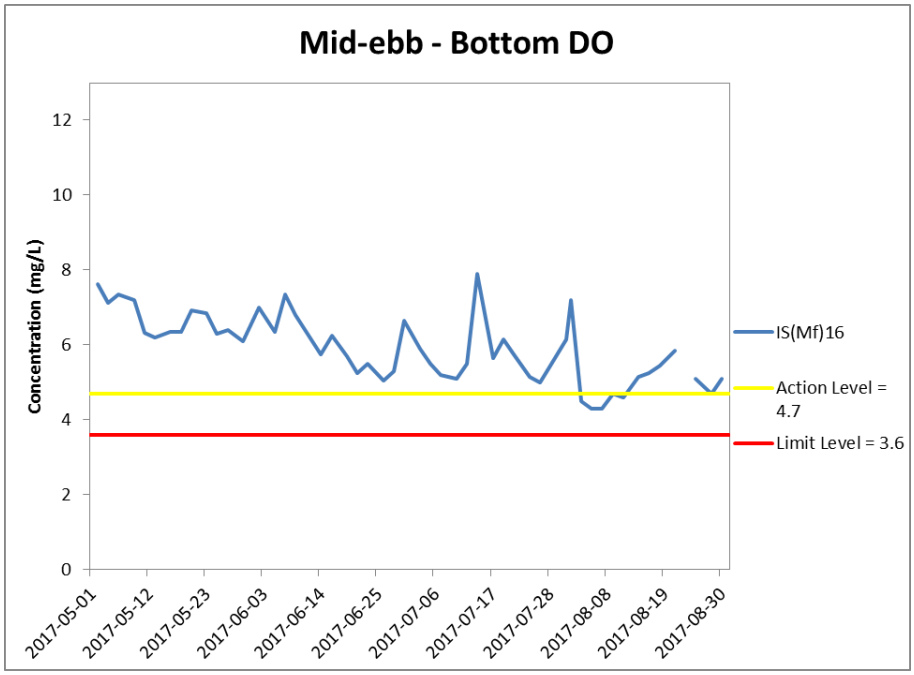


Figure H13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



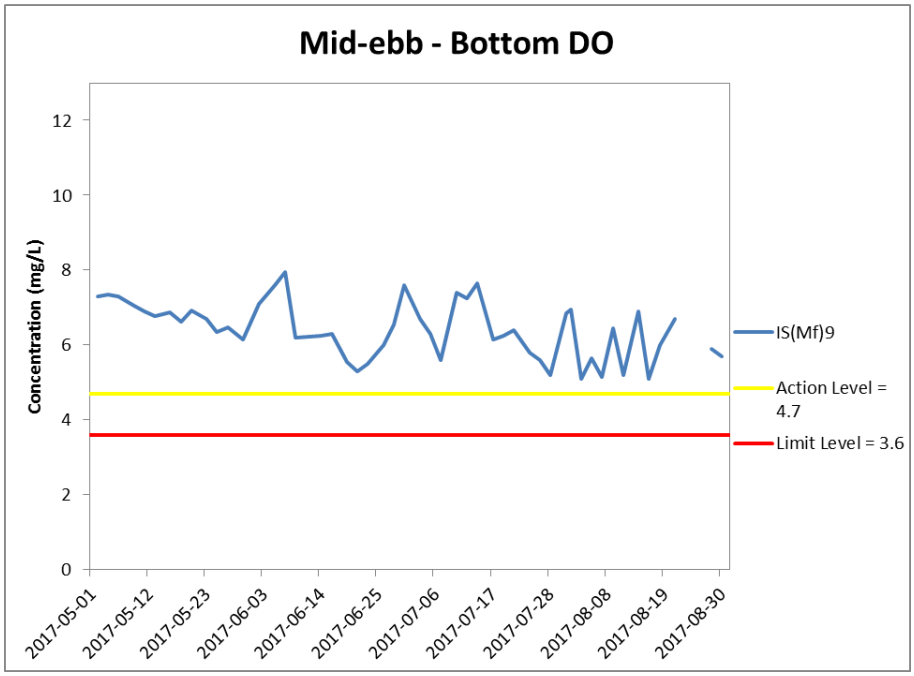
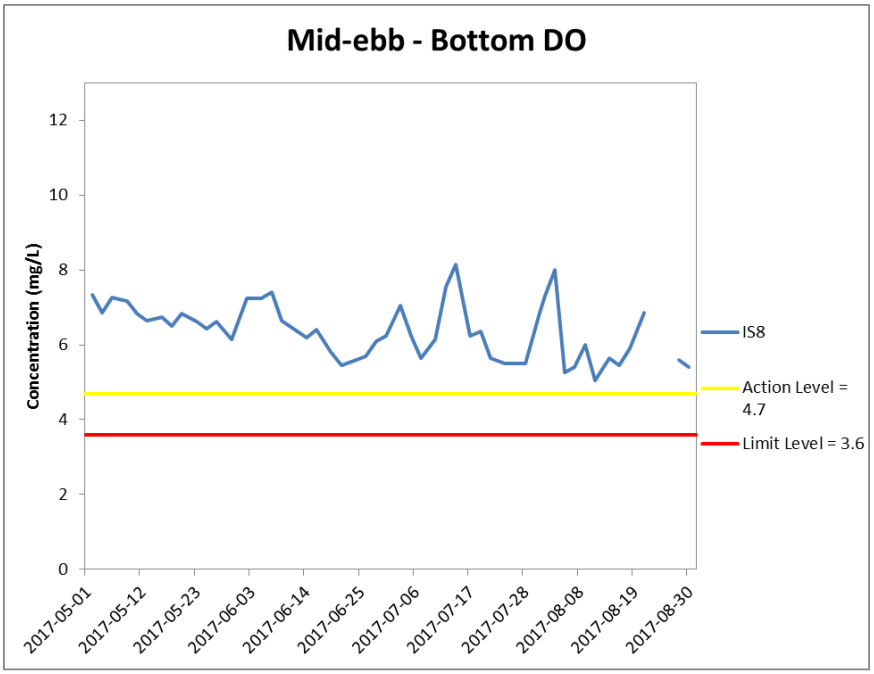


Figure H14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



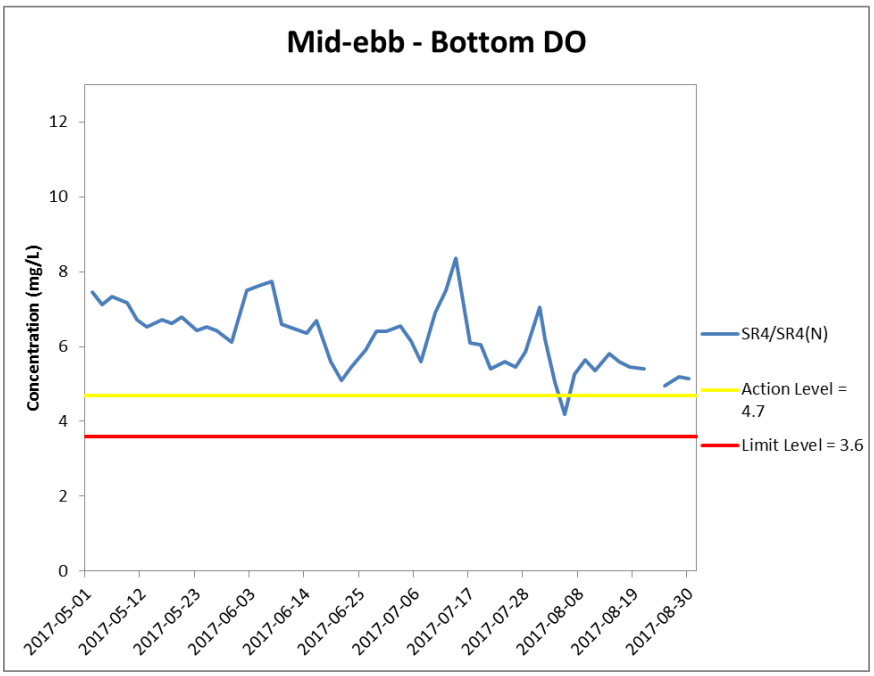


Figure H15 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM

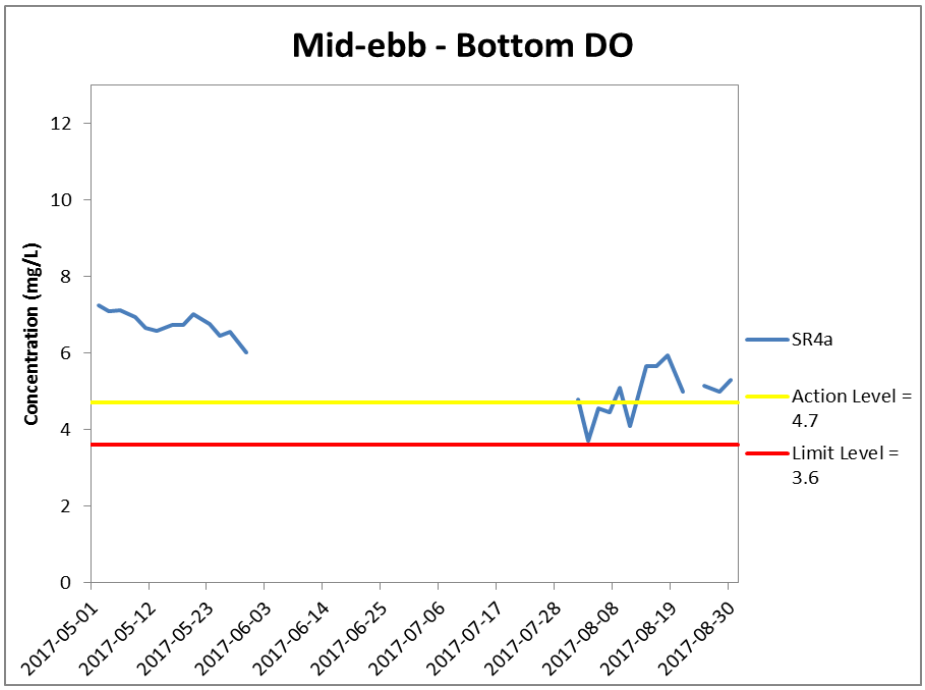
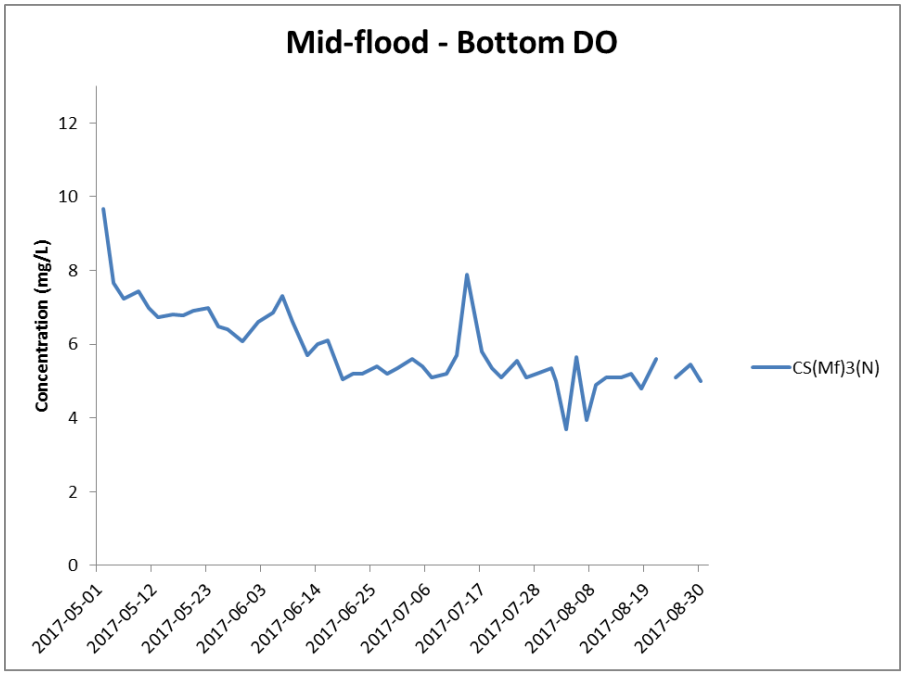


Figure H16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.



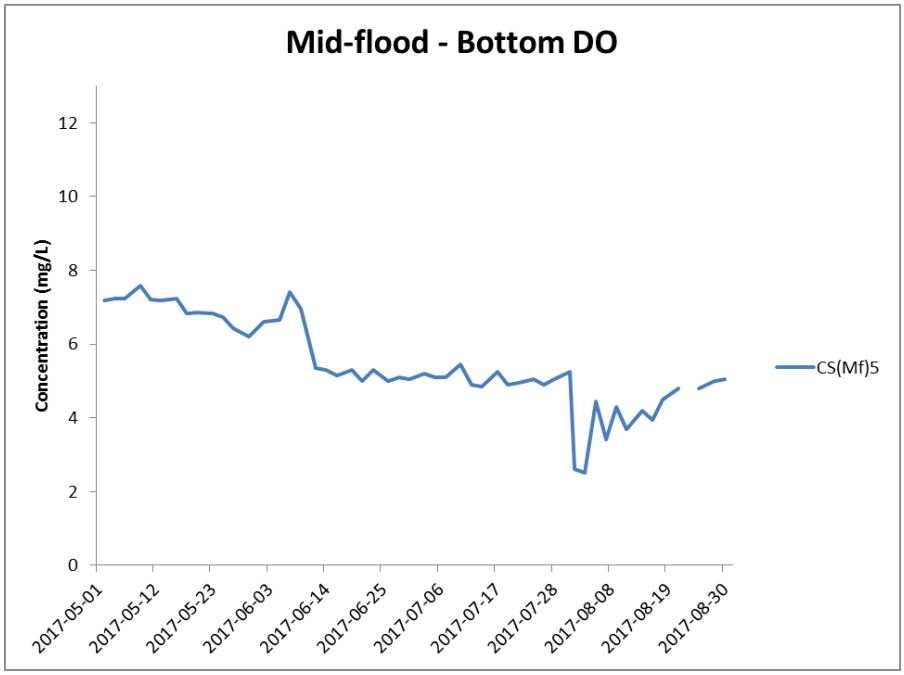
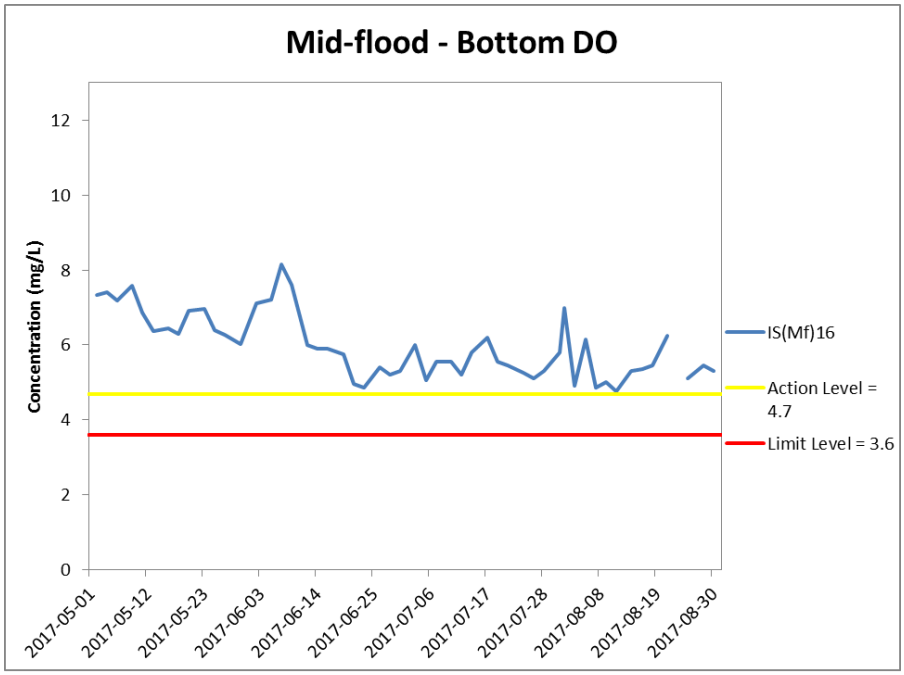


Figure H17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

ERM



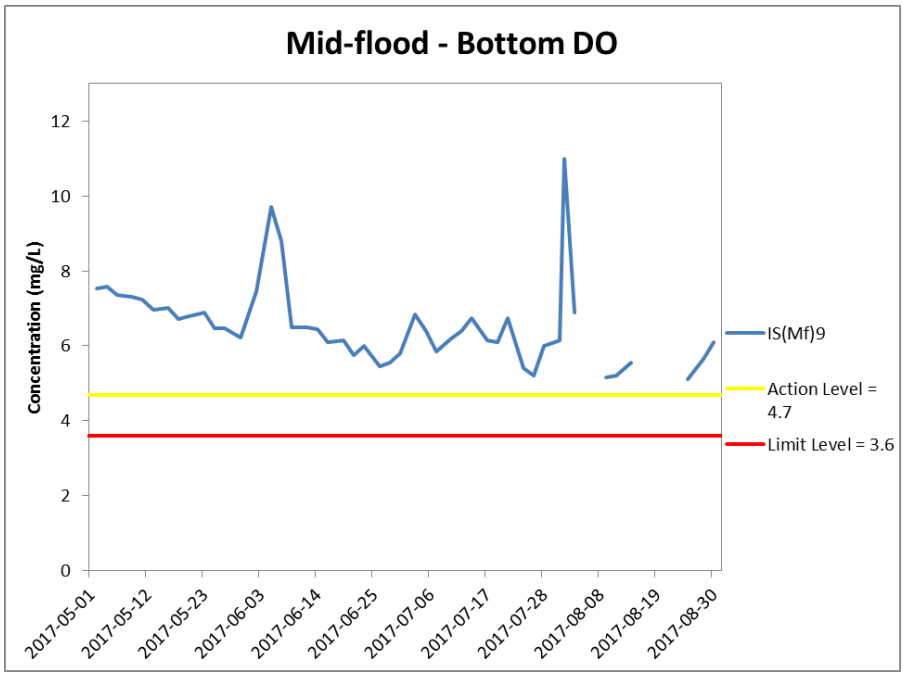


Figure H18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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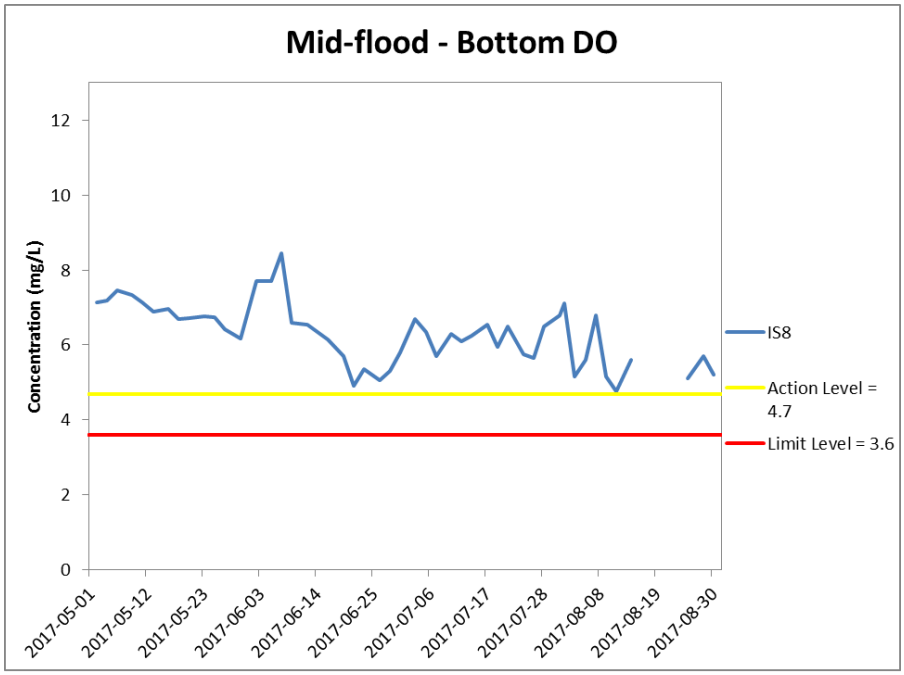

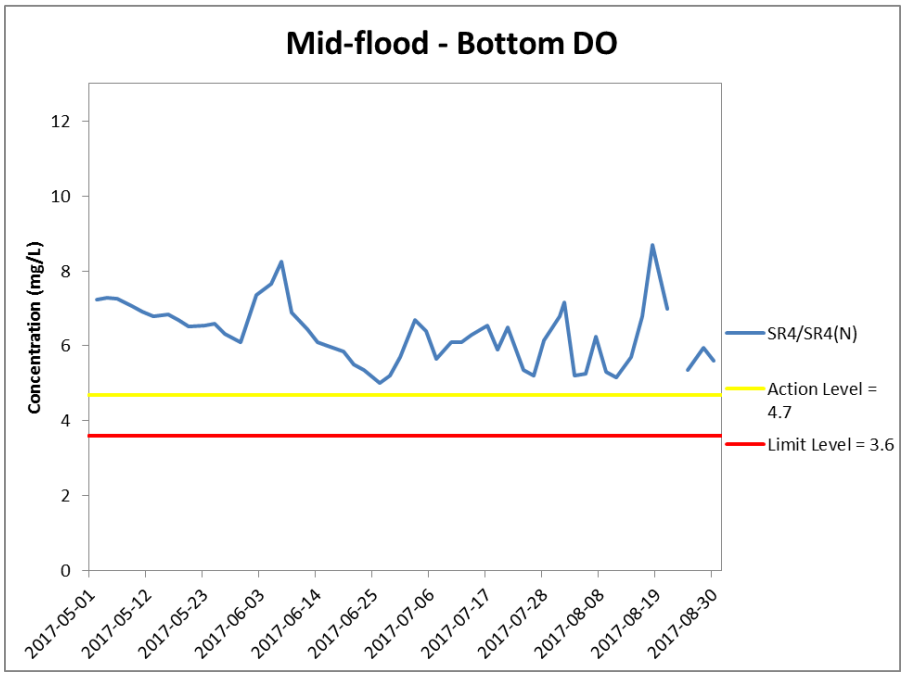

Figure H19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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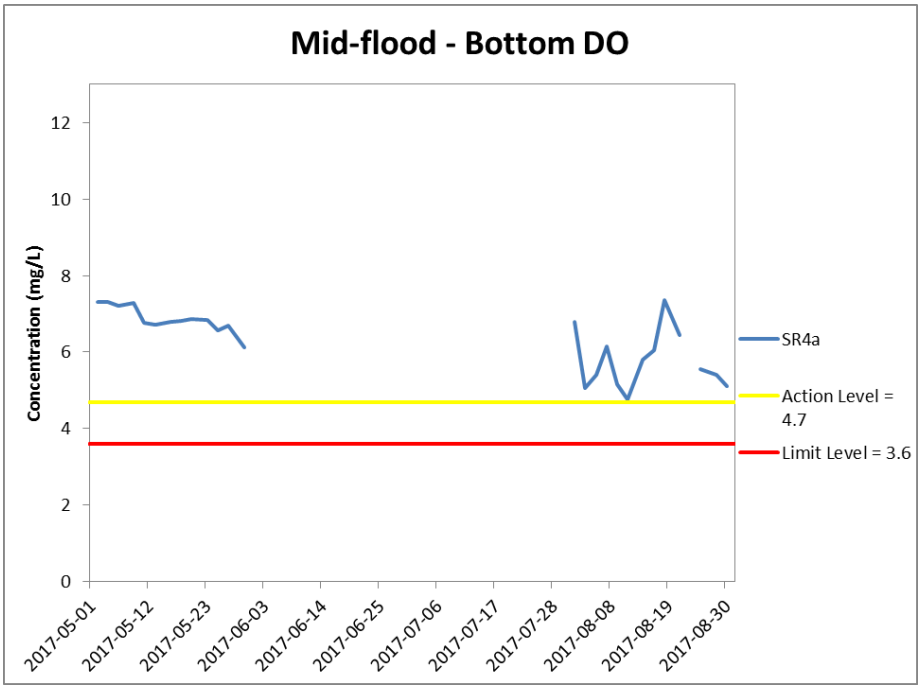

Figure H20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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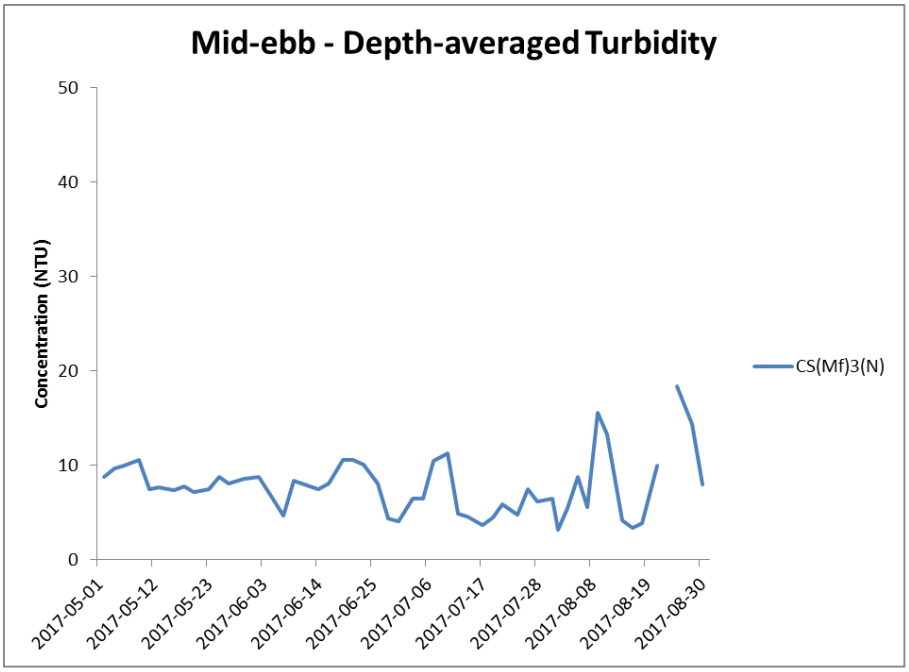

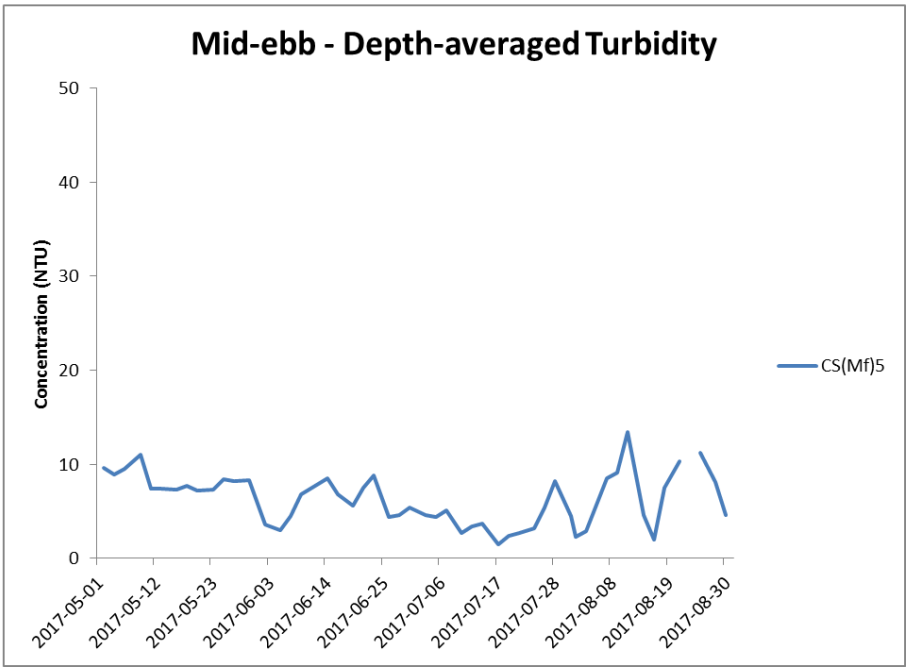

Figure H21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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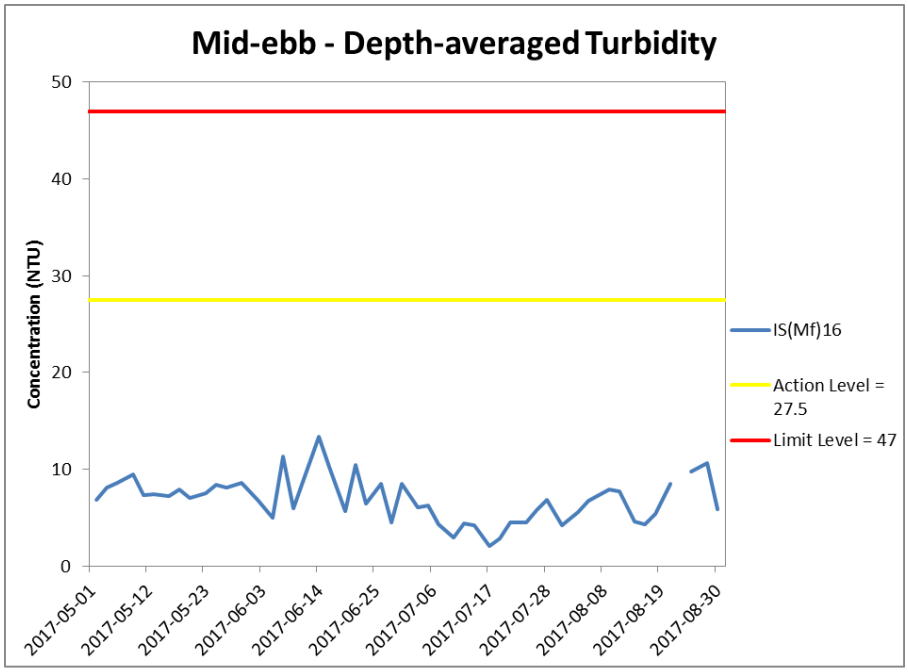


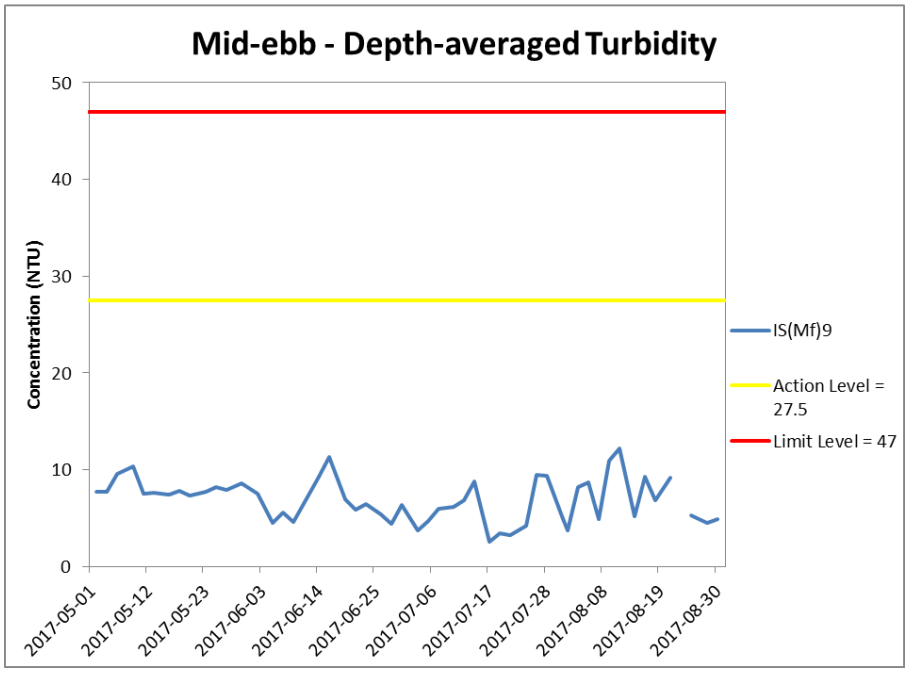
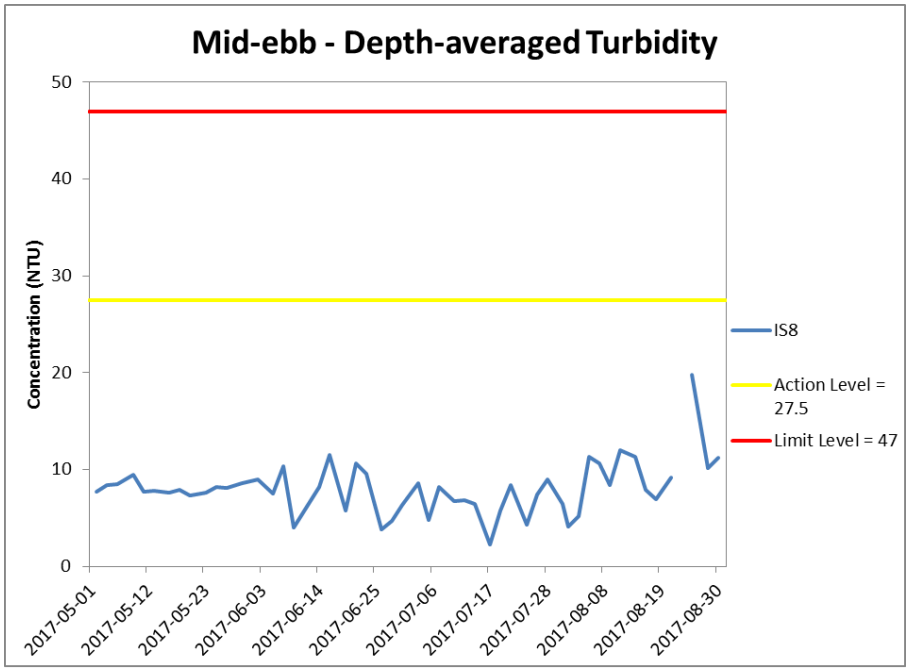


Figure H22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.



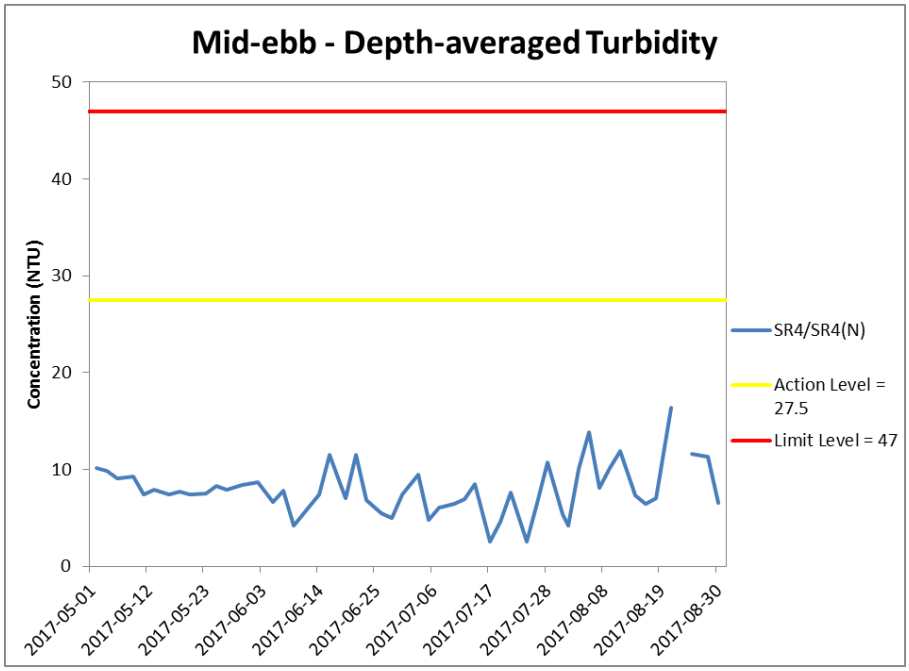


Figure H23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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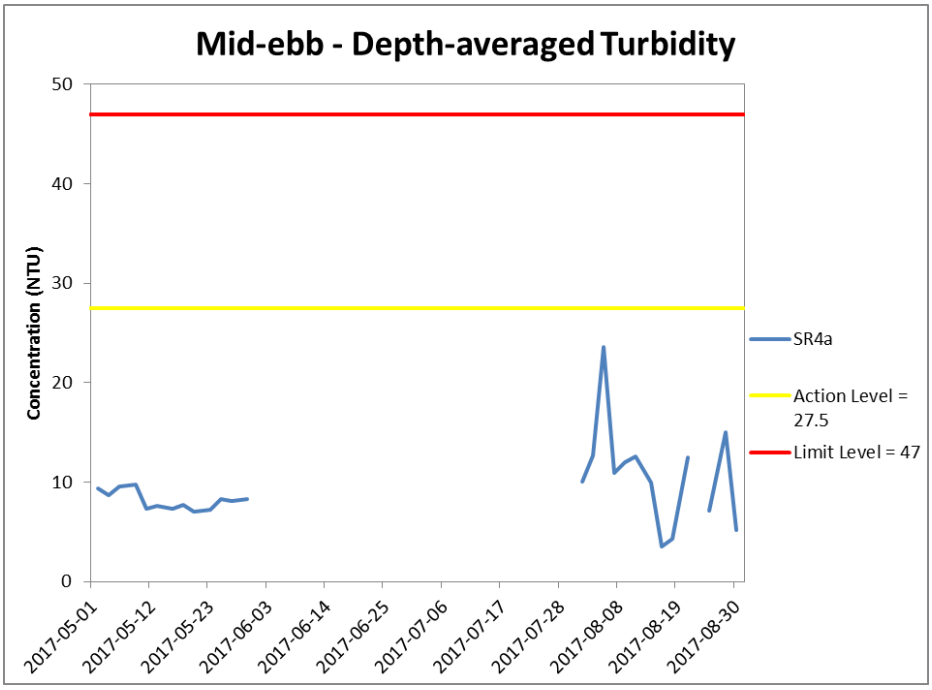

Figure H24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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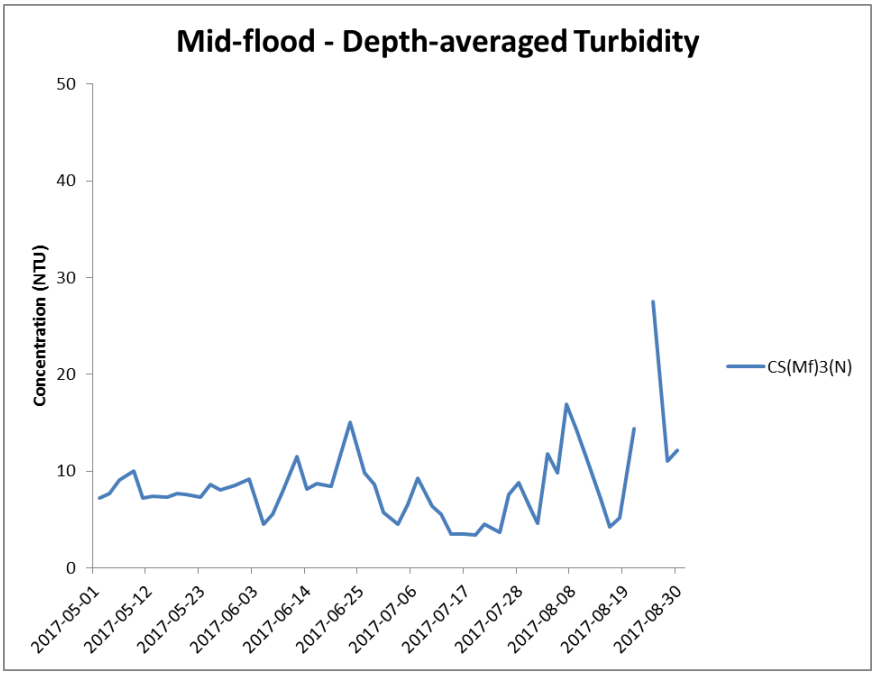

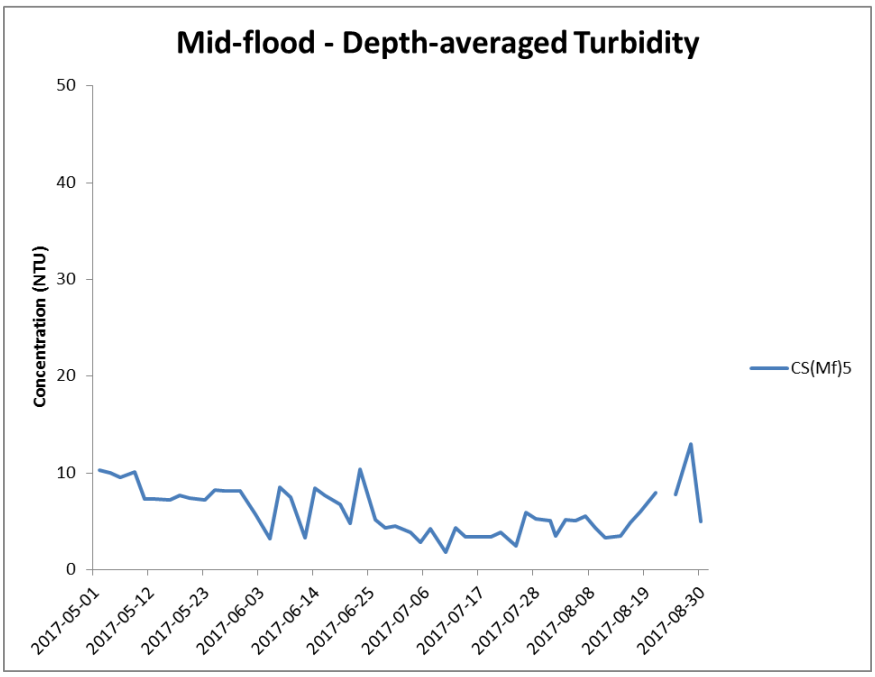

Figure H25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(MF)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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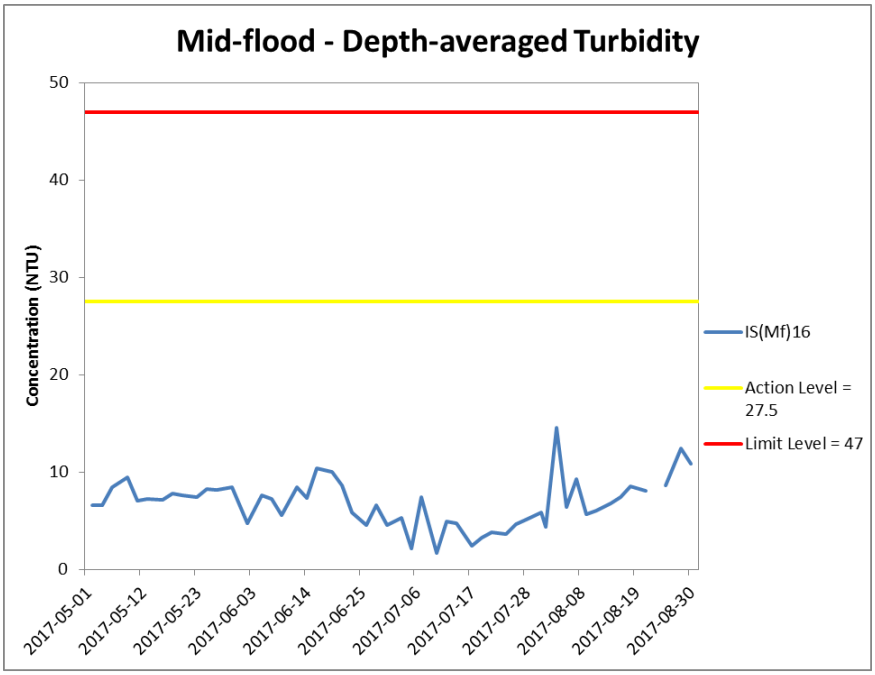


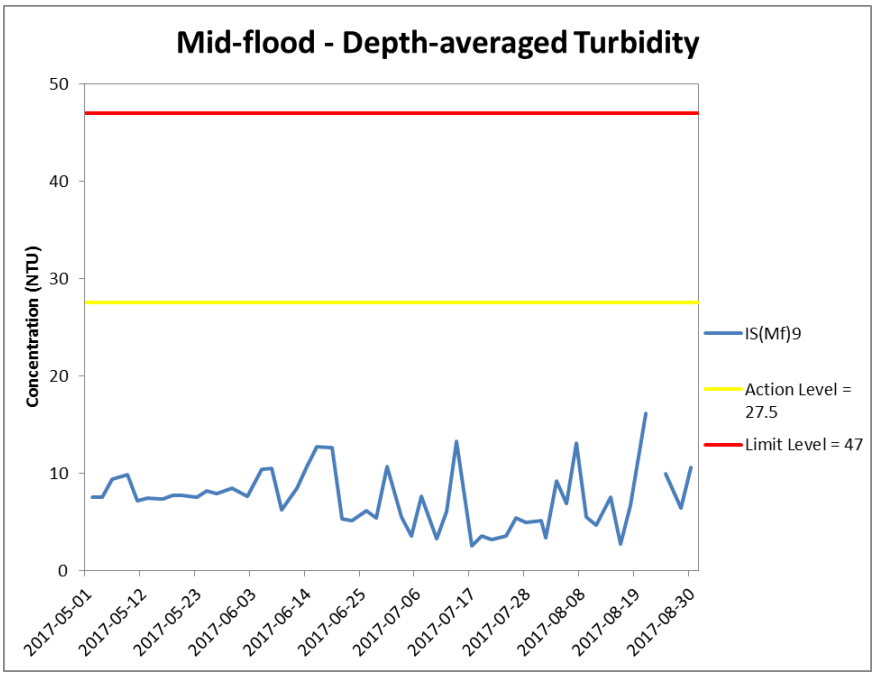
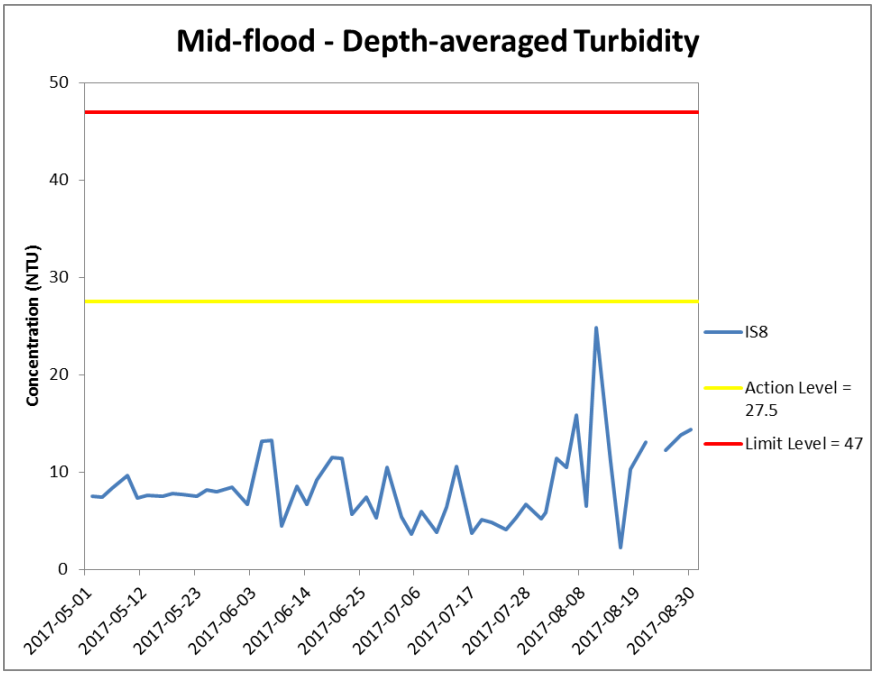
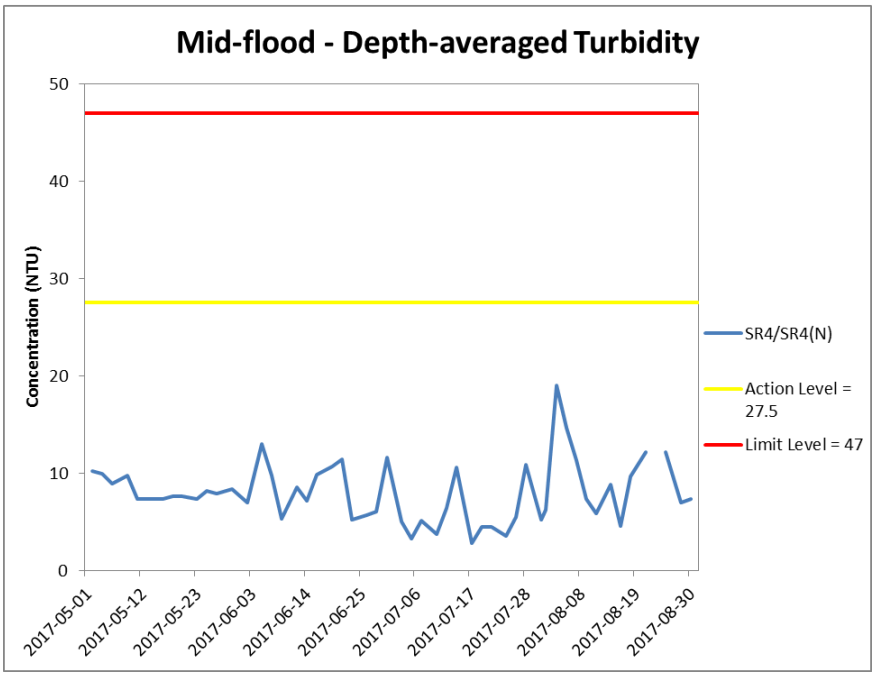


Figure H26 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.





`Figure H27 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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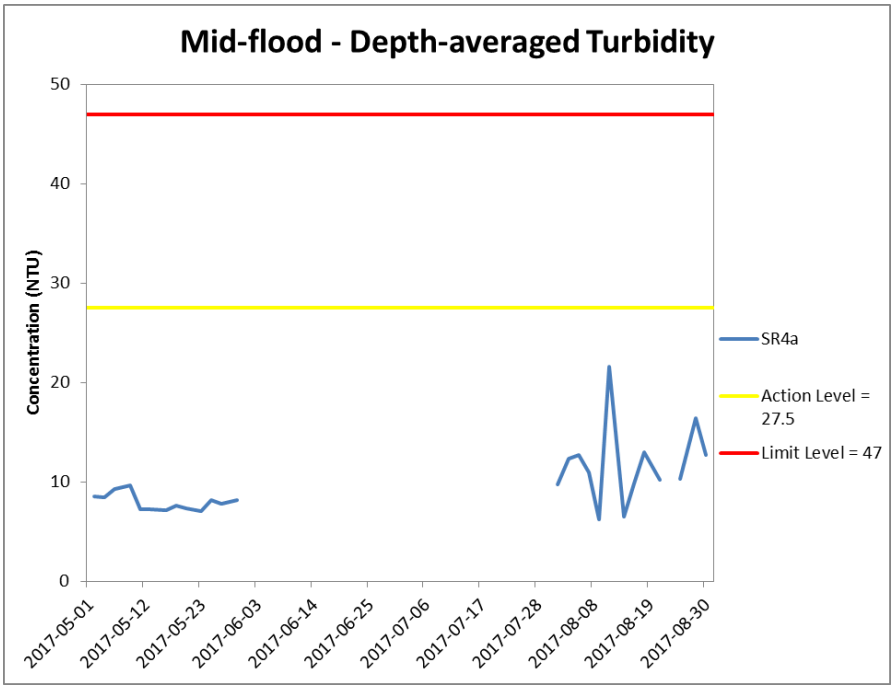

Figure H28 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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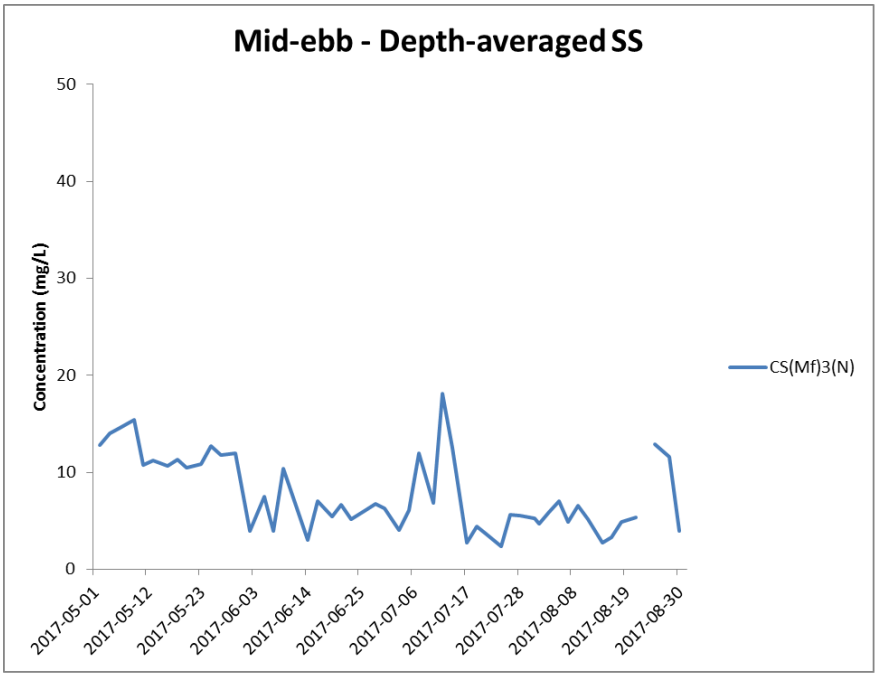

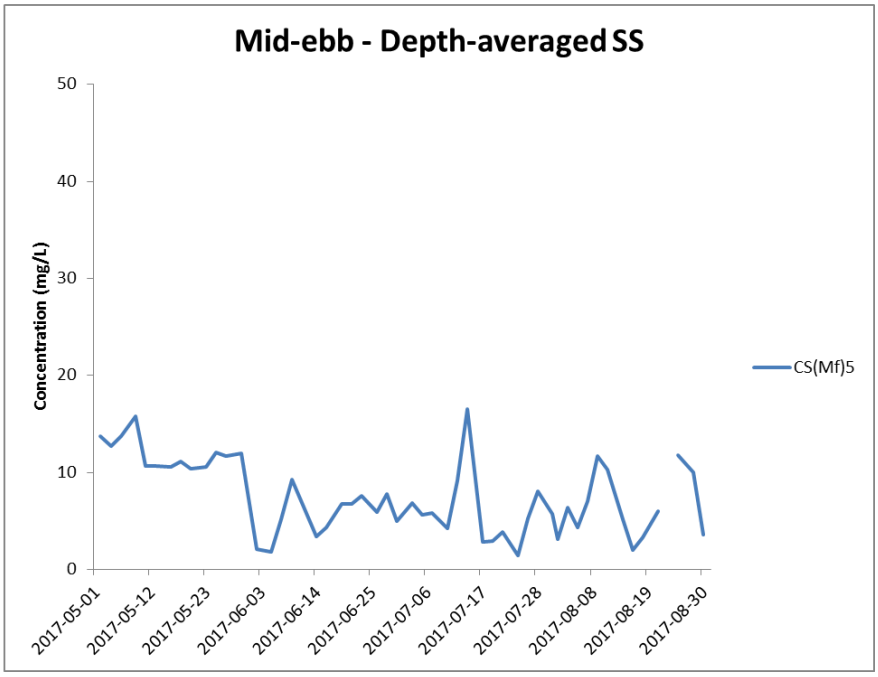

Figure H29 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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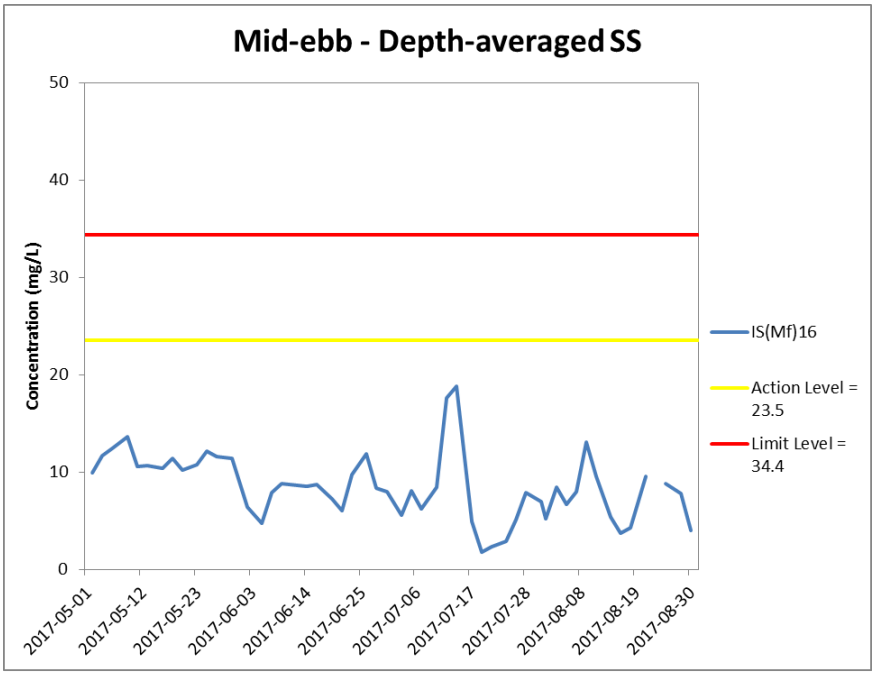

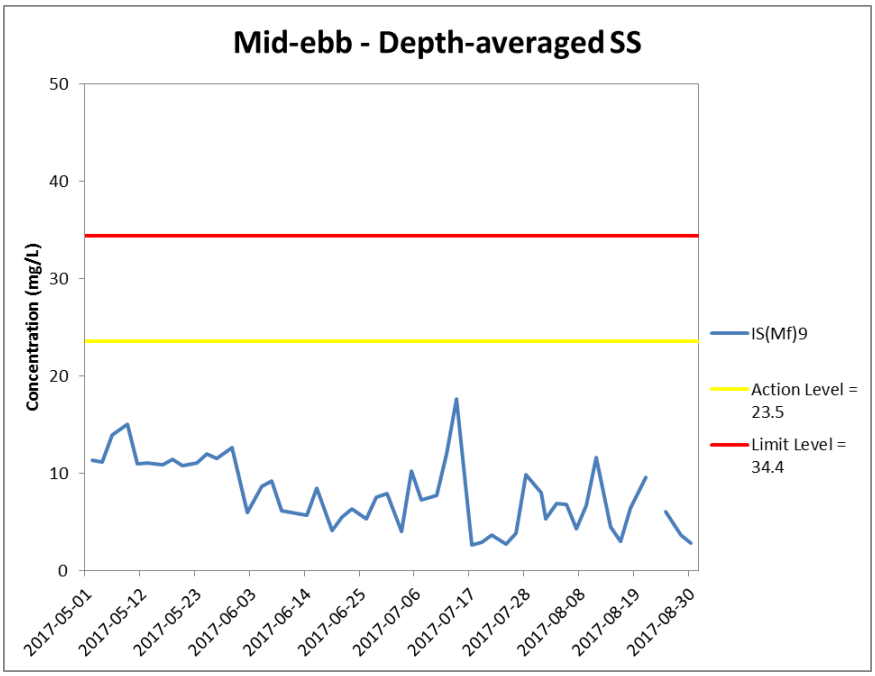

Figure H30 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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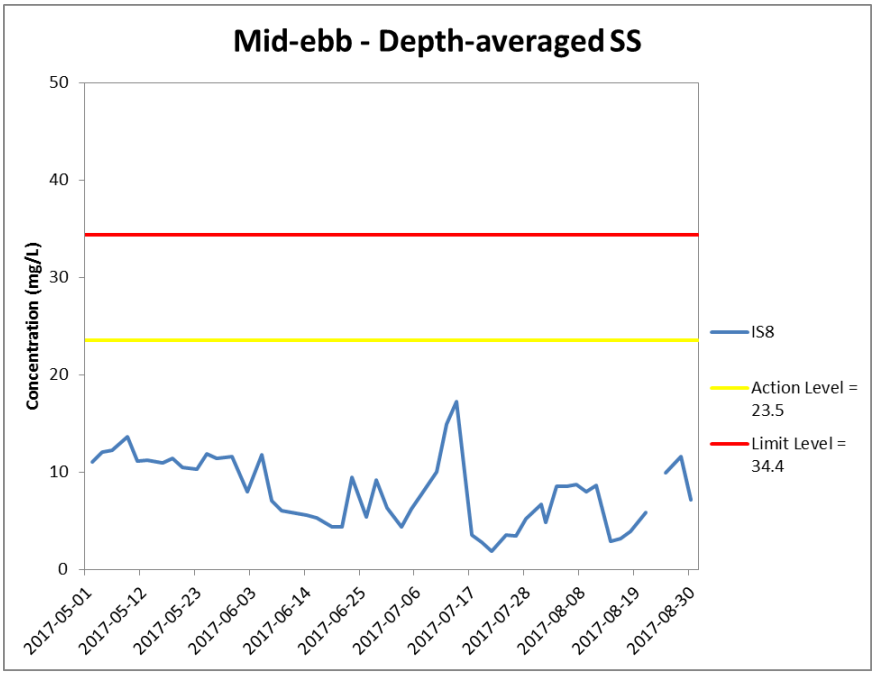

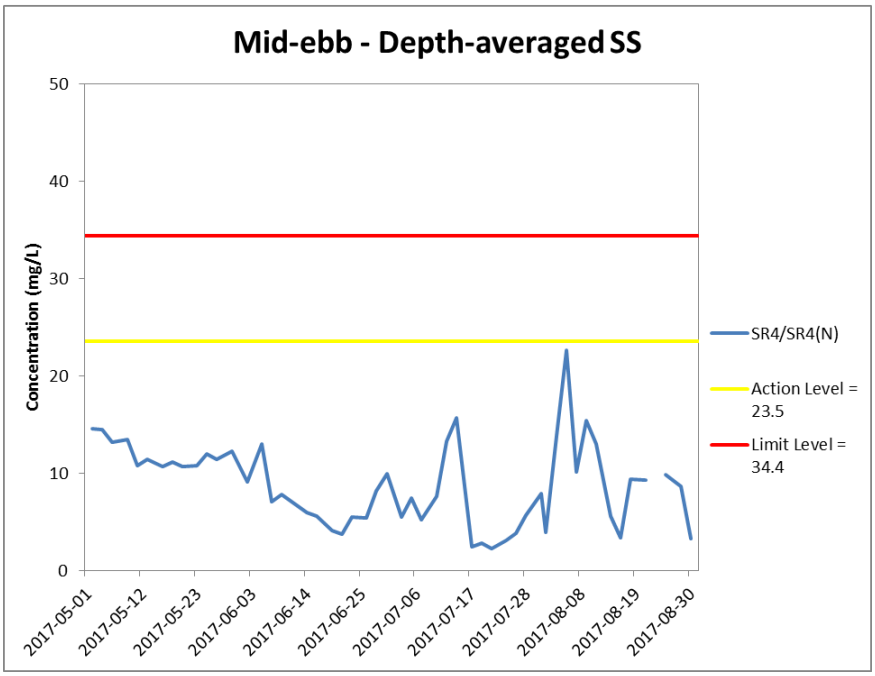

Figure H31 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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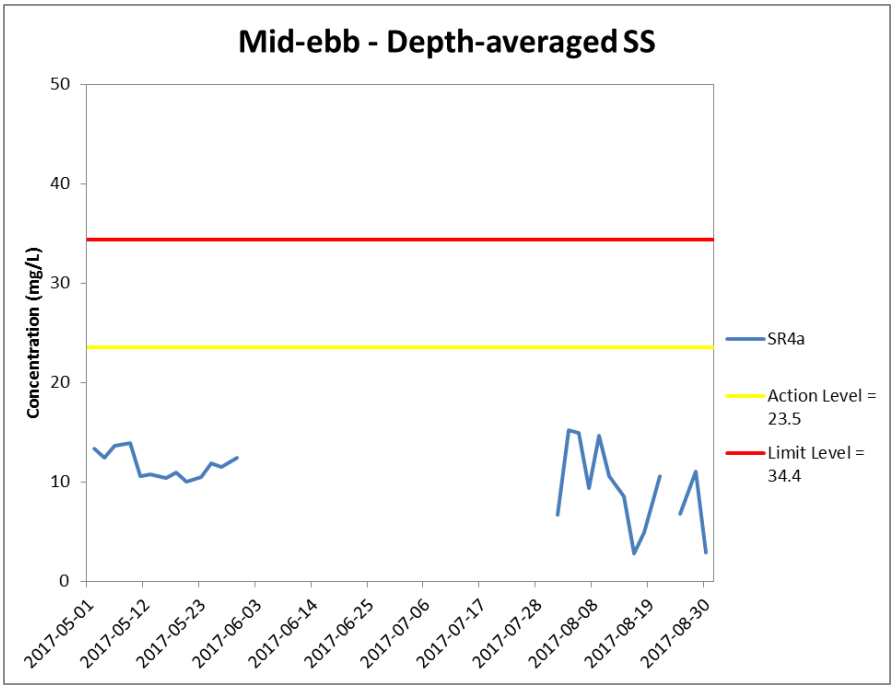

Figure H32 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-ebb tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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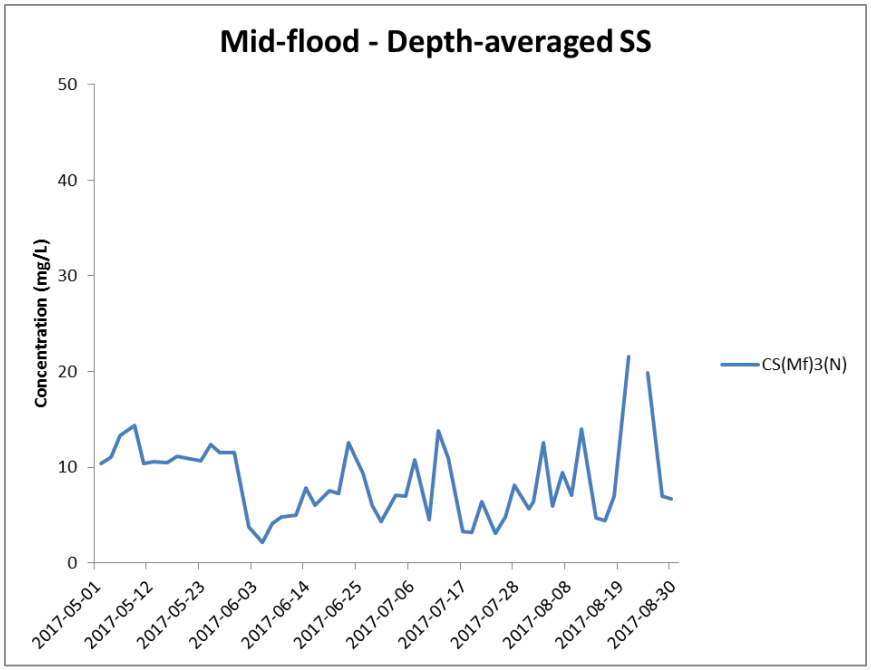

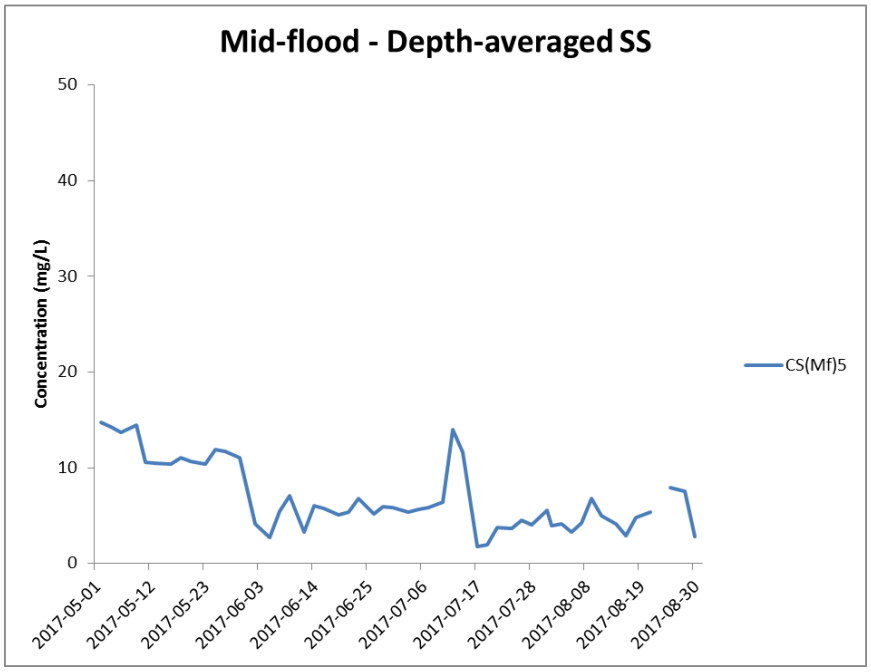

Figure H33 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May 2017 and 31 August 2017 at CS(Mf)3(N) and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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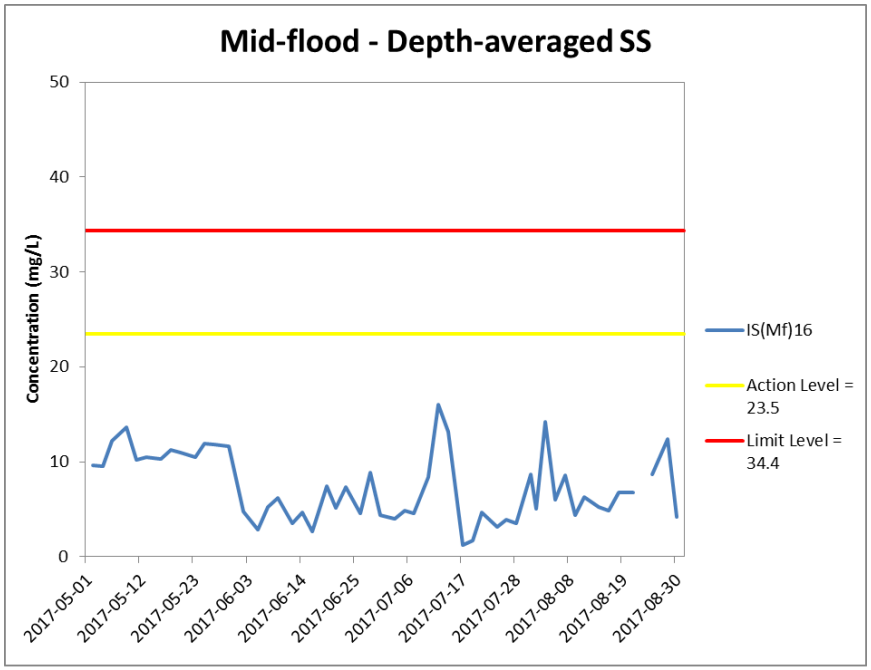

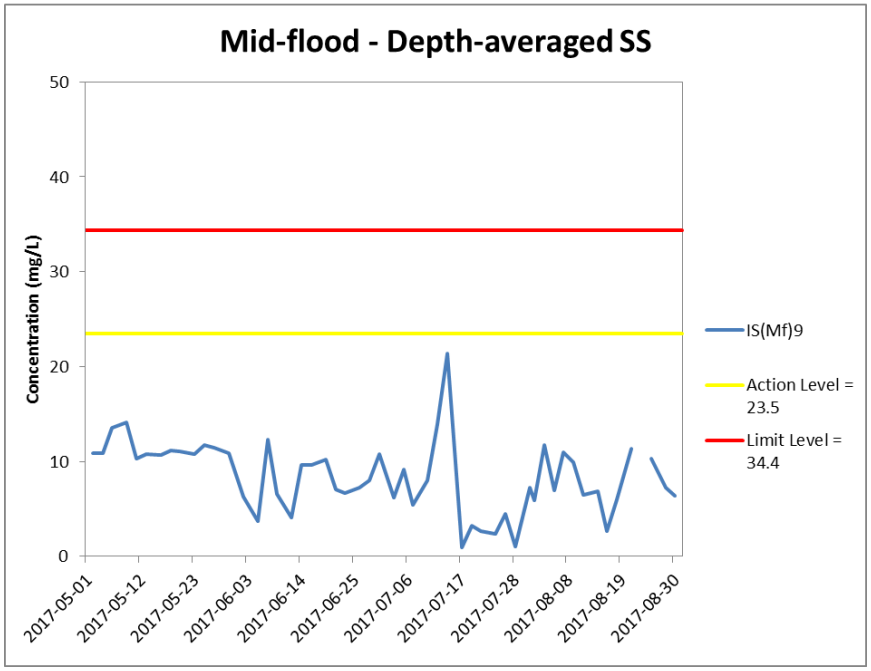

Figure H34 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May 2017 and 31 August 2017 at IS(Mf)16 and IS(Mf)9.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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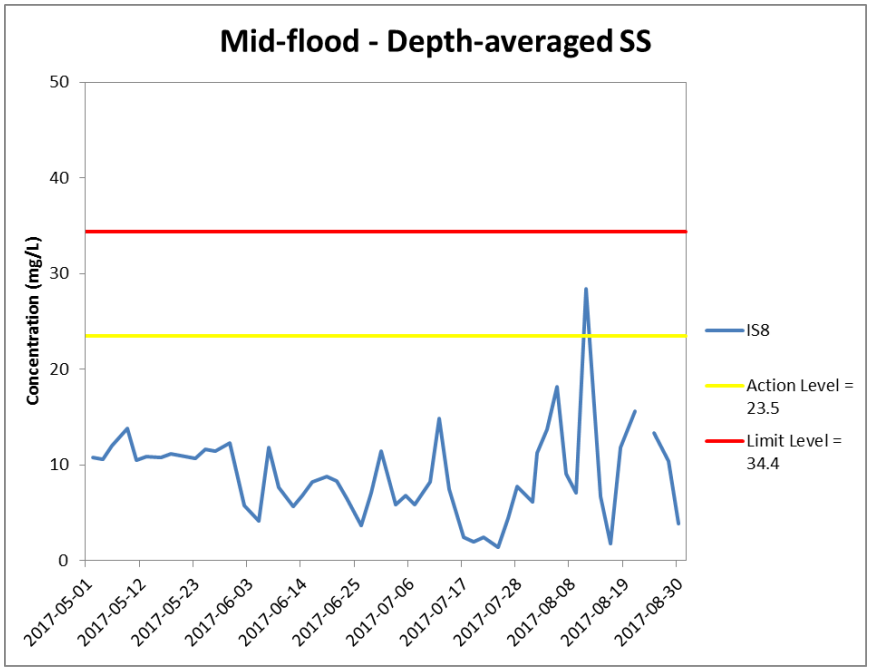

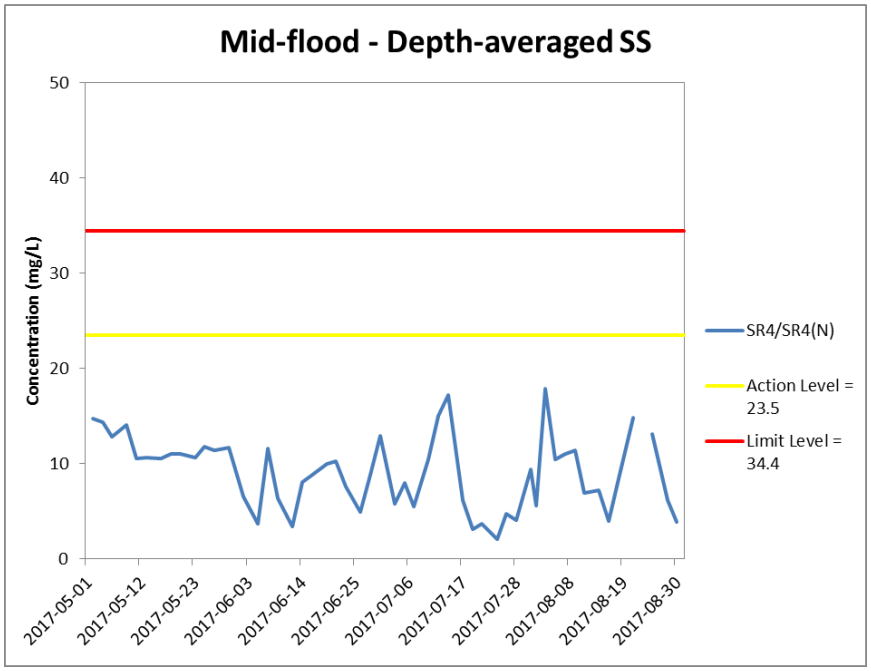

Figure H35 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May 2017 and 31 August 2017 at IS8 and SR4.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Results of WQM between 1 June 2017 and 31 July 2017 are sourced from the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

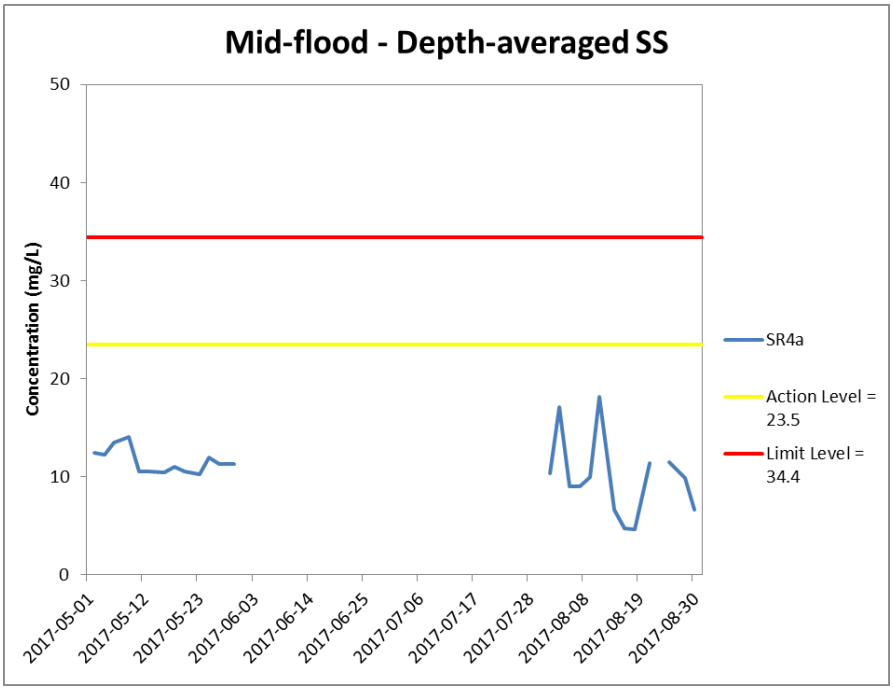

Figure H36 Impact Monitoring – Mean depth-averaged level of Suspended Solids (mg/L) during mid-flood tide between 1 May 2017 and 31 August 2017 at SR4a.

(Weather condition varied between sunny to rainy within the reporting period.) WQM on 23 August 2017 was canceled due to adverse weather. Station SR4a is not covered between 1 June 2017 and 31 July 2017 in the published EM&A data and published EM&A reports of Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Reclamation Works. Marine works within the reporting period include Uninstallation of marine piling platform; Pier construction; Installation of deck segment and pier head segment; Launching gantry operation and Construction of underslung truss scheme.

Environmental Resources Management

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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

15th Quarterly Progress Report (June-August 2017)
submitted to Gammon Construction Limited

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

29 October 2017

1. Introduction

1.1. The Tuen Mun-Chek Lap Kok Link (TM-CLKL) comprises a 1.6 km long dual 2-lane viaduct section between the Hong Kong Boundary Crossing Facilities (HKBCF) and the North Lantau Highway and associated roads at Tai Ho. Gammon Construction Limited (hereinafter called the "Contractor") was awarded as the main contractor of "Contract No. HY/2012/07 – Hong Kong-Zhuhai-Macao Bridge Tuen Mun-Chek Lap Kok Link – Southern Connection Viaduct Section".

1.2. According to the updated Environmental Monitoring and Audit (EM&A) Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. However, as such surveys have been undertaken by the HKLR03 and HKBCF projects in the same areas (i.e. NWL and NEL), a combined monitoring approach is recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring will end upon the completion of the dolphin monitoring carried out by HKLR03 contract as well as the TM-CLKL Northern Connection Sub-Sea Tunnel Section (HY/2012/08).

1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by Gammon Construction Limited as the dolphin specialist for the TM-CLKL Southern Viaduct Section EM&A project. He is responsible for the dolphin monitoring study, including the data collection on Chinese White Dolphins during the construction phase (i.e. impact period) of the TM-CLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.

1.4. During the construction period of HKLR, the dolphin specialist would be in charge of

reviewing and collating information collected by the HKLR03 dolphin monitoring programme to examine any potential impacts of TM-CLKL construction works on the dolphins.

1.5. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.

1.6. This report is the 15th 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 2017, utilizing the survey data collected by HKLR03 impact phase monitoring project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

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

Line No.		Easting	Northing		Line No.		Easting	Northing
1	Start Point	804671	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805475	815913		14	Start Point	817537	820220
2	End Point	805477	826654		14	End Point	817537	824613
3	Start Point	806464	819435		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	819771		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	820220		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	820466		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	820880		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	821123		20	Start Point	823477	823402

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

2.1.2. The HKLR03 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 19 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2015, 2016). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270^{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 2017, 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 793.06 km of survey effort was collected, with 97.8% 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, 290.58 km and 502.48 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 575.14 km, while the effort on secondary lines was 217.92 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 2017, 12 groups of 34 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort search in this quarter, and eight of the twelve on-effort dolphin sightings were made on primary lines. A summary table of dolphin sightings is shown in Appendix II.

3.1.5. In this quarterly period, all dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during HKLR03 monitoring surveys.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys from June to August 2017 is shown in Figure 1. The majority of these sightings were made at the northwestern portion of the North Lantau region, mainly around Lung Kwu Chau, near Castle Peak Power Station and at the mouth of Deep Bay near Black Point (Figure 1). Two dolphin groups were also sighted at the southwestern corner of NWL survey area, or near the HKLR09 alignment. 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. Notably, all dolphin sightings were located far away from the alignments of TM-CLKL as well as the HKBCF and HKLR reclamation sites (Figure 1). However, two dolphin groups were sighted near the alignment of HKLR09 as mentioned above.

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (June to August 2017) 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 17 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 only sighted infrequently at the northwestern and southwestern ends of the area, which was in stark contrast with their frequent occurrences throughout the area during the baseline period (Figure 1).

3.2.5. Another comparison in dolphin distribution was made between the five quarterly periods of summer months in 2013-17 (Figure 2). Among the five summer periods, dolphins were regularly sighted in NWL waters in 2013 and 2014, but their usage there was dramatically reduced in the three subsequent summer periods, with the only occurrences mostly concentrated near Lung Kwu Chau or near Shum Wat (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 2017

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 (14 & 15 Jun 2017)	0.00	0.00
	Set 2 (20 & 26 Jun 2017)	0.00	0.00
	Set 3 (20 & 24 Jul 2017)	0.00	0.00
	Set 4 (27 & 28 Jul 2017)	0.00	0.00
	Set 5 (7 & 15 Aug 2017)	0.00	0.00
	Set 6 (21 & 31 Aug 2017)	0.00	0.00
Northwest Lantau	Set 1 (14 & 15 Jun 2017)	0.00	0.00
	Set 2 (20 & 26 Jun 2017)	0.00	0.00
	Set 3 (20 & 24 Jul 2017)	1.64	14.79
	Set 4 (27 & 28 Jul 2017)	0.00	0.00
	Set 5 (7 & 15 Aug 2017)	4.95	6.61
	Set 6 (21 & 31 Aug 2017)	6.58	18.09

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (June – August 2017) 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 2017	September – November 2011	June – August 2017	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	2.20 ± 2.88	9.85 ± 5.85	6.58 ± 8.12	44.66 ± 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.3 sightings and 6.2 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have been consistently

recorded in the past 17 quarters of HKLR03 monitoring (Table 4). This is a serious concern as the dolphin occurrence in NEL in the past few years (0.0-1.0 for ER(STG) and 0.0-3.9 for ER(ANI)) have remained exceptionally low when compared to the baseline period (Table 4). Dolphins have been virtually absent from NEL waters since January 2014, with only three groups of six dolphins sighted there since then despite consistent and intensive survey effort being conducted in this survey area.

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

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 77.7% and 85.3% respectively)

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

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

3.3.5. During the same summer quarters, dolphin encounter rates in NWL during summer 2017 was similar to the previous two summer periods, but was much lower than the ones in the summer periods of 2013 and 2014 (Table 5). Such temporal trend should be closely monitored in the upcoming monitoring quarters whether the dolphin occurrence would continue to increase as the construction activities of HZMB works have been mostly

completed in coming months.

3.3.6 As discussed in Hung (2016), the dramatic decline in dolphin usage of NEL waters in the past several years (including the declines in abundance, encounter rate and habitat use in NEL, as well as shifts of individual core areas and ranges away from NEL waters) was partly related to the HZMB construction works that were commenced since 2012. Apparently such noticeable decline has already extended to NWL waters progressively in the past few years with no sign of recovery, even though the HZMB-related construction activities have well past the peak.

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

3.3.8. For the comparison between the baseline period and the present quarter (19th quarter of the HKLR03 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0044 and 0.0202 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarters in both the average dolphin encounter rates of STG and ANI.

3.3.9. For the comparison between the baseline period and the cumulative quarters in impact phase (i.e. the first 19 quarters of the HKLR03 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.000001 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).

3.3.10. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in previous quarters of the past several years.

3.3.11. 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 2016). Apparently there was no sign of recovery of dolphin usage even though most of the 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 nine individuals per group in North Lantau region during June to August 2017. 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.

3.4.2. The average dolphin group size in NWL waters during June to August 2017 was lower

than the one recorded during the three-month baseline period, but this could be partly related to the small sample size of 12 dolphin groups when compared to the 66 groups sighted during the baseline period (Table 6).

Table 6. Comparison of average dolphin group sizes from impact monitoring period (June – August 2017) and baseline monitoring period (September – November 2011) (Note: ± denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	June – August 2017	**September – November 2011**
Overall	2.83 ± 2.33 (n = 12)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.83 ± 2.33 (n = 12)	3.92 ± 3.40 (n = 49)

3.4.3. Notably, 10 of these 12 dolphin groups were composed of 1-4 individuals only, while the other two groups were medium in size with five and nine individuals respectively (Appendix II).

3.4.4. Distribution of the two large dolphin groups (i.e. five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the one in baseline period. Both groups were located near Lung Kwu Chau (Figure 3). Such distribution pattern was very different from the baseline period, when the larger dolphin groups were frequently sighted and evenly distributed in NWL waters, with a few also sighted in NEL waters (Figure 3).

3.5. Habitat use

3.5.1. From June to August 2017, the five grids with medium to high dolphin densities were located to the north and west of Lung Kwu Chau as well as near the Castle Peak Power Station (Figures 4a and 4b). All grids near the TMCLKL alignment as well as the HKLR03/HKBCF reclamation sites did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).

3.5.2. However, it should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern should be examined when more survey effort for each grid will be collected throughout the impact phase monitoring programme.

3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present impact monitoring period (Figure 5). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present impact phase period (Figure 5).

3.5.4. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. In contrast, only several grids with medium to high dolphin densities were located near Lung Kwu Chau and Pillar Point 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 twelve groups of dolphins.

3.7. Activities and associations with fishing boats

3.7.1. During the three-month study period, none of the 12 dolphin groups was observed to be engaged in feeding, socializing, traveling or milling/resting activity.

3.7.2. Moreover, none of the dolphin groups was found to be associated with any operating fishing boat during the present impact phase period.

3.8. Summary of photo-identification works

3.8.1. From June to August 2017, over 2,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, 21 individuals sighted 27 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these re-sightings were made in NWL. Six individuals (i.e. CH34, NL46, NL123, NL182, NL202 and WL05) were re-sighted twice, while the rest were only re-sighted once during the three-month period (Appendix III).

3.8.3. Notably, three of these 21 individuals (NL202, NL224 and NL236) were also sighted in West Lantau waters during the HKLR09 monitoring surveys from June to August 2017, showing their extensive individual movements across different survey areas.

3.9. Individual range use

3.9.1. Ranging patterns of the 21 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.

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

3.9.3. On the other hand, three individuals (NL202, NL224 and NL236) consistently utilized North Lantau waters in the past have extended their range use to WL during the present quarter. In particular, the re-sighting of NL202 in WL waters was notable, as this individual has been frequently observed in NWL in the past decade, but its appearance in WL was exceptionally rare (the last re-sighting of NL202 in WL was recorded in August

2008).

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, as such shift could possibly be related to the HZMB-related construction works (see Hung 2015, 2016).

4. Conclusion

4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of the TMCLKL construction project on Chinese White Dolphins was noticeable from general observations.

4.2. Although the dolphins infrequently occurred along the alignment of TMCLKL southern connection viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.

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

5. References

- Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.

- Hung, S. K. 2015. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2014-15). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 198 pp.

- Hung, S. K. 2016. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2015-16). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 163 pp.

- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

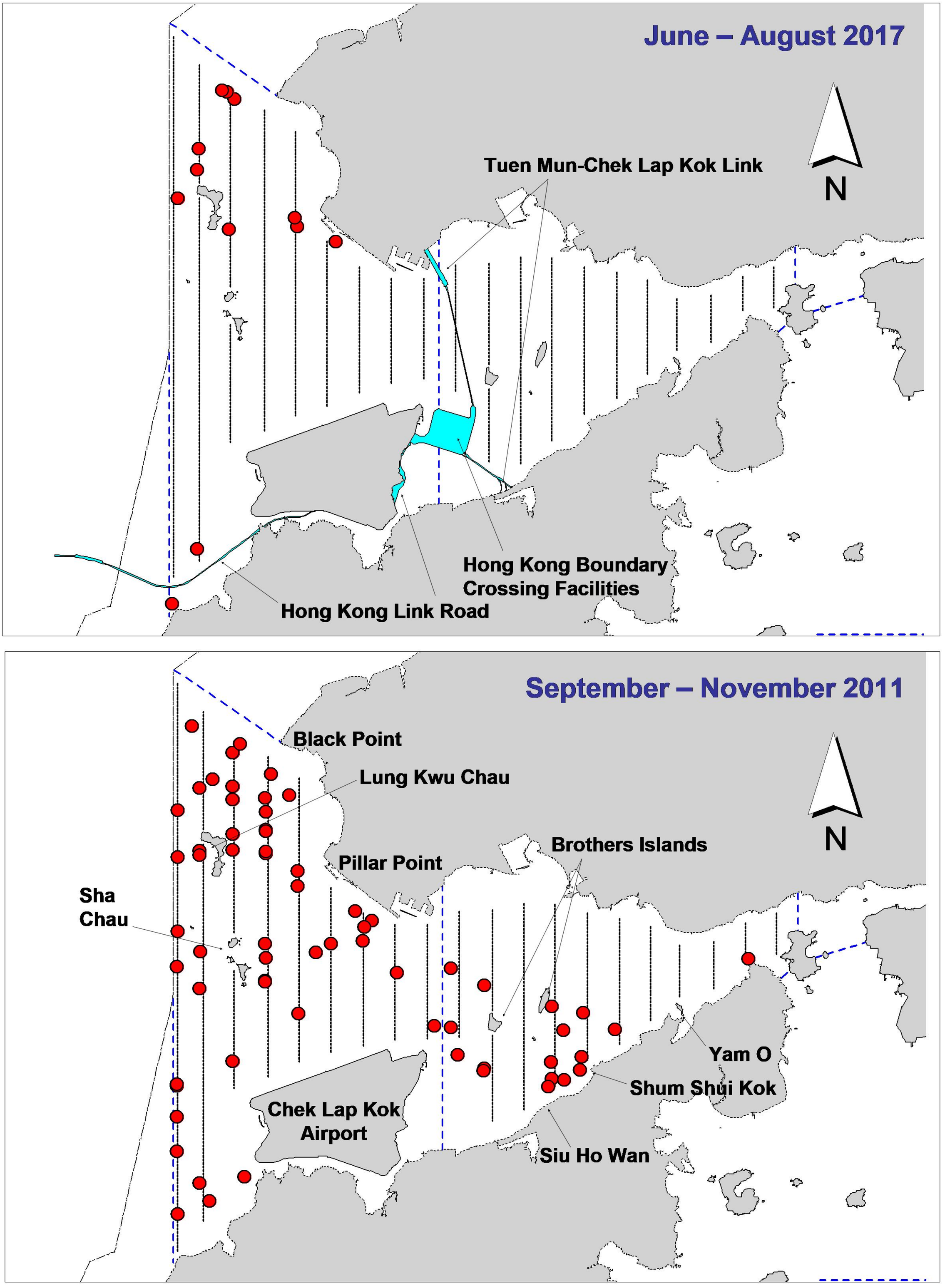


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during impact phase (top) and baseline monitoring surveys (bottom)

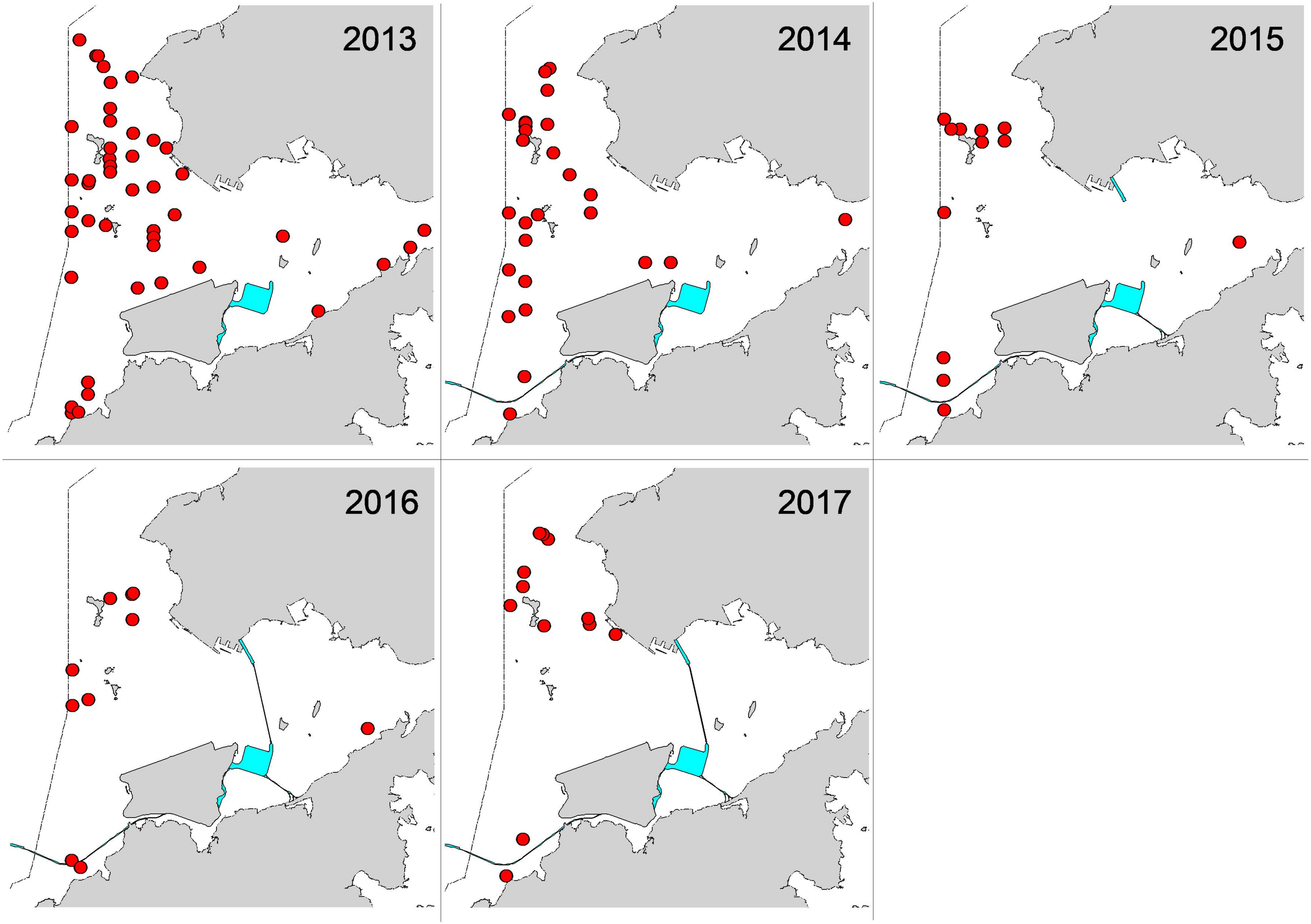


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past five summer quarters (June-August) of impact phase in 2013-17

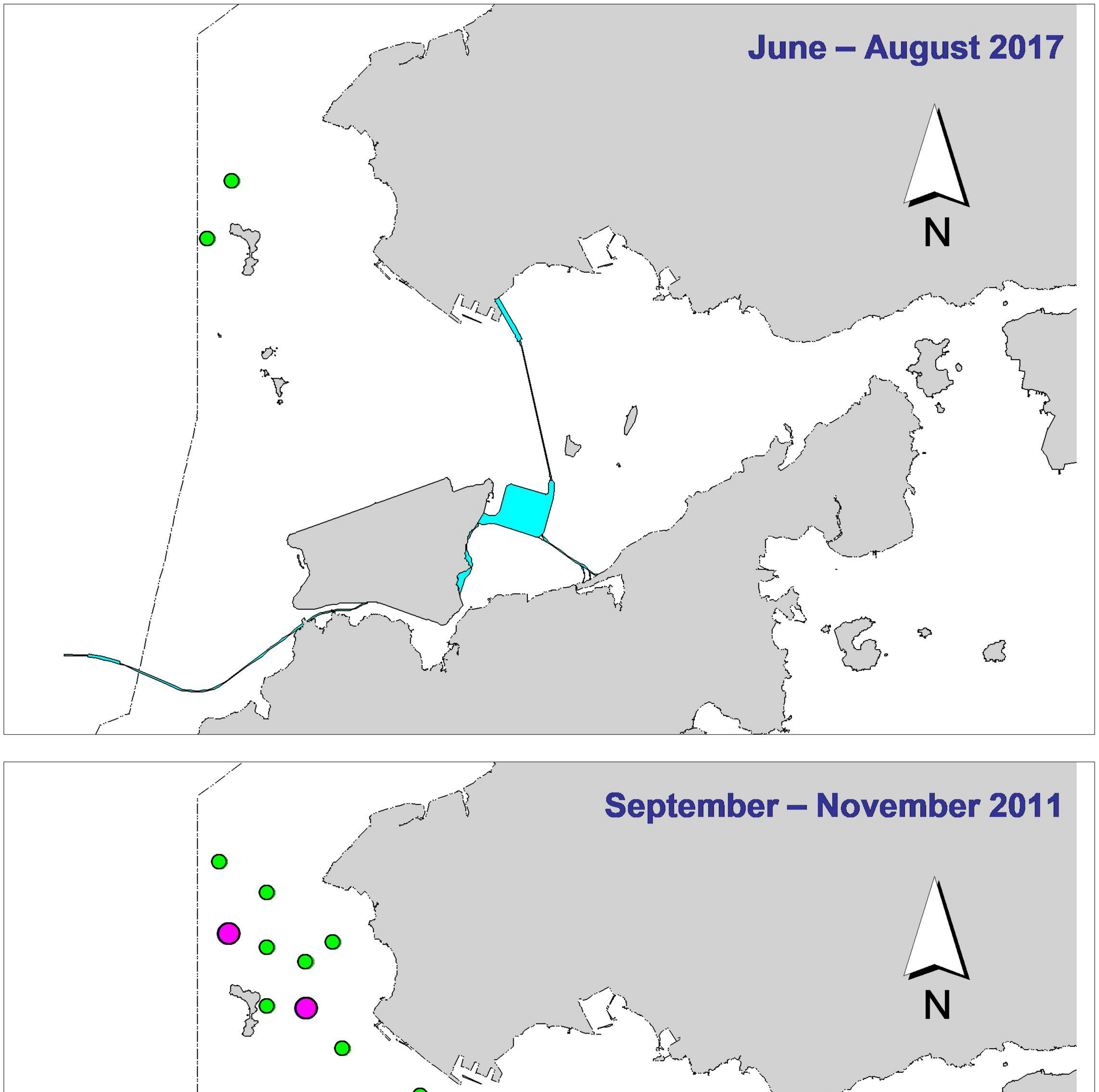


Figure 3. Distribution of Chinese white dolphins with larger group sizes during impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

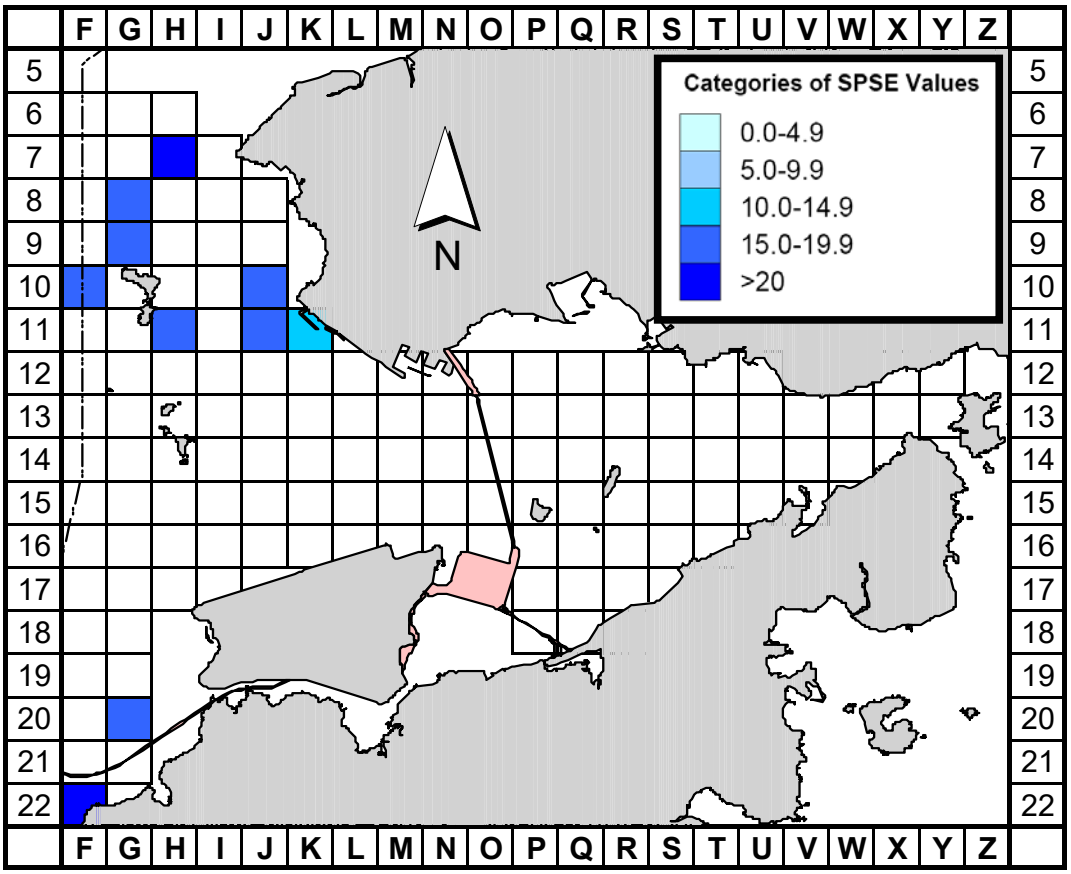


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during impact monitoring period (June-August 2017) (SPSE = no. of on-effort sightings per 100 units of survey effort)

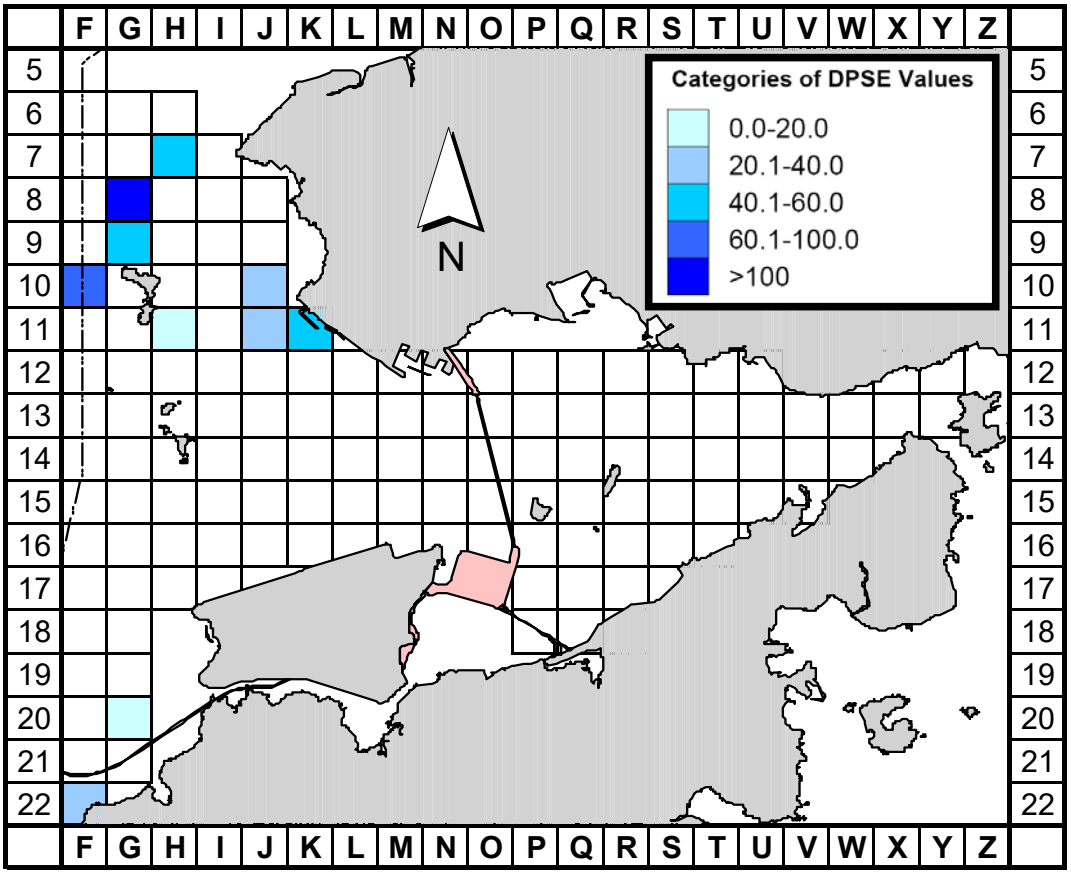


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during impact monitoring period (June-August 2017) (DPSE = no. of dolphins per 100 units of survey effort)

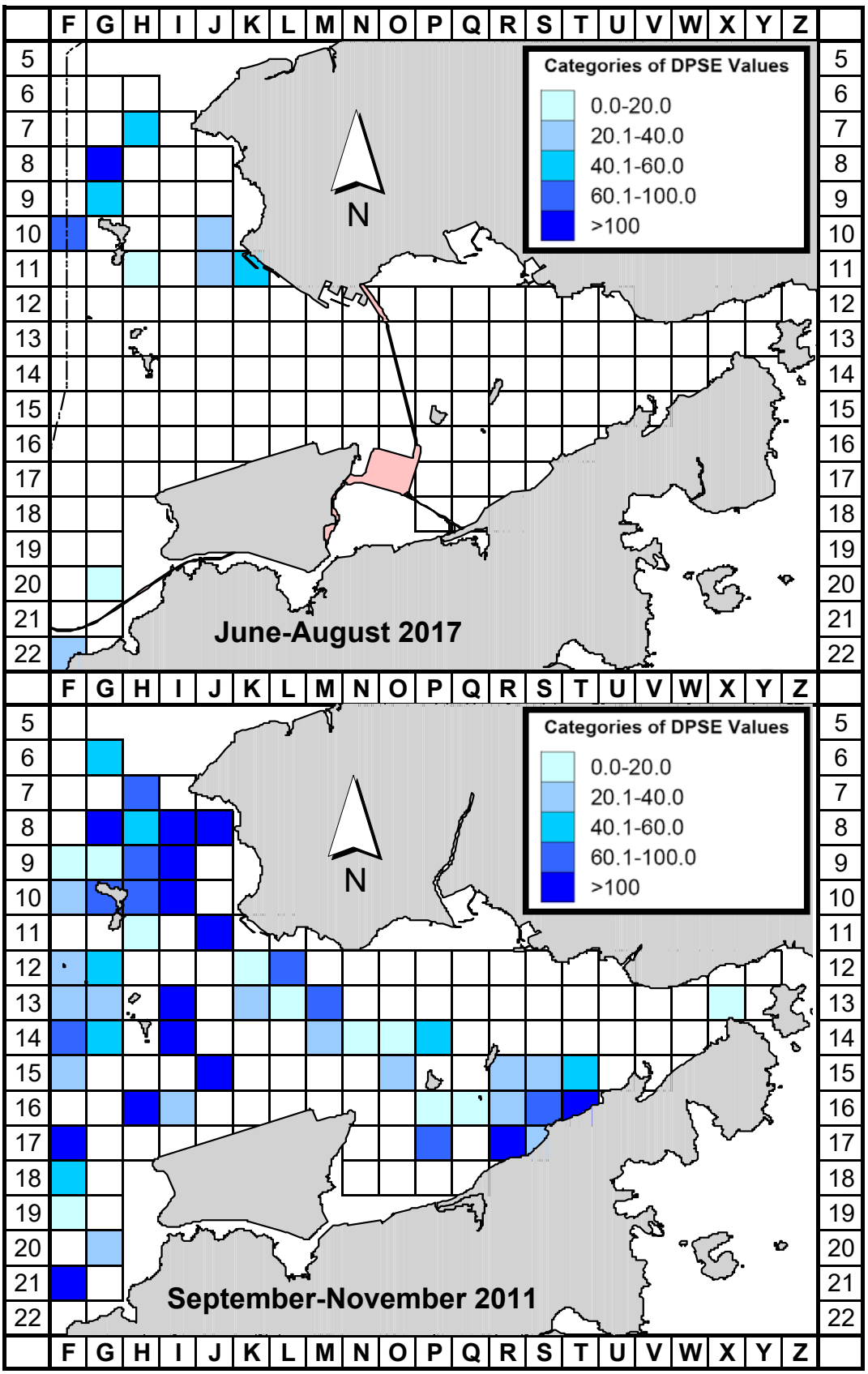


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in Northwest and Northeast Lantau survey area between the impact monitoring period (June-August 2017) and baseline monitoring period (September-November 2011)
(DPSE = no. of dolphins per 100 units of survey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

Appendix I. HKLR03 Survey Effort Database (June-August 2017)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
14-Jun-17	NW LANTAU	1	0.85	SUMMER	STANDARD36826	HKLR	P
14-Jun-17	NW LANTAU	2	25.80	SUMMER	STANDARD36826	HKLR	P
14-Jun-17	NW LANTAU	2	6.95	SUMMER	STANDARD36826	HKLR	S
14-Jun-17	NE LANTAU	1	8.30	SUMMER	STANDARD36826	HKLR	P
14-Jun-17	NE LANTAU	2	22.46	SUMMER	STANDARD36826	HKLR	P
14-Jun-17	NE LANTAU	3	0.39	SUMMER	STANDARD36826	HKLR	P
14-Jun-17	NE LANTAU	1	1.67	SUMMER	STANDARD36826	HKLR	S
14-Jun-17	NE LANTAU	2	10.28	SUMMER	STANDARD36826	HKLR	S
15-Jun-17	NW LANTAU	2	5.91	SUMMER	STANDARD36826	HKLR	P
15-Jun-17	NW LANTAU	3	25.98	SUMMER	STANDARD36826	HKLR	P
15-Jun-17	NW LANTAU	4	3.70	SUMMER	STANDARD36826	HKLR	P
15-Jun-17	NW LANTAU	3	13.14	SUMMER	STANDARD36826	HKLR	S
15-Jun-17	NW LANTAU	4	1.10	SUMMER	STANDARD36826	HKLR	S
20-Jun-17	NW LANTAU	2	7.20	SUMMER	STANDARD36826	HKLR	P
20-Jun-17	NW LANTAU	3	17.13	SUMMER	STANDARD36826	HKLR	P
20-Jun-17	NW LANTAU	4	1.50	SUMMER	STANDARD36826	HKLR	P
20-Jun-17	NW LANTAU	2	0.90	SUMMER	STANDARD36826	HKLR	S
20-Jun-17	NW LANTAU	3	11.18	SUMMER	STANDARD36826	HKLR	S
20-Jun-17	NE LANTAU	1	7.56	SUMMER	STANDARD36826	HKLR	P
20-Jun-17	NE LANTAU	2	28.41	SUMMER	STANDARD36826	HKLR	P
20-Jun-17	NE LANTAU	2	11.63	SUMMER	STANDARD36826	HKLR	S
26-Jun-17	NW LANTAU	2	2.07	SUMMER	STANDARD36826	HKLR	P
26-Jun-17	NW LANTAU	3	25.84	SUMMER	STANDARD36826	HKLR	P
26-Jun-17	NW LANTAU	4	6.35	SUMMER	STANDARD36826	HKLR	P
26-Jun-17	NW LANTAU	3	8.38	SUMMER	STANDARD36826	HKLR	S
26-Jun-17	NW LANTAU	4	3.36	SUMMER	STANDARD36826	HKLR	S
20-Jul-17	NW LANTAU	2	18.97	SUMMER	STANDARD36826	HKLR	P
20-Jul-17	NW LANTAU	3	18.23	SUMMER	STANDARD36826	HKLR	P
20-Jul-17	NW LANTAU	2	7.00	SUMMER	STANDARD36826	HKLR	S
20-Jul-17	NW LANTAU	3	5.70	SUMMER	STANDARD36826	HKLR	S
20-Jul-17	NW LANTAU	4	1.60	SUMMER	STANDARD36826	HKLR	S
20-Jul-17	NE LANTAU	1	3.80	SUMMER	STANDARD36826	HKLR	P
20-Jul-17	NE LANTAU	2	31.92	SUMMER	STANDARD36826	HKLR	P
20-Jul-17	NE LANTAU	1	1.20	SUMMER	STANDARD36826	HKLR	S
20-Jul-17	NE LANTAU	2	10.58	SUMMER	STANDARD36826	HKLR	S
24-Jul-17	NW LANTAU	2	20.28	SUMMER	STANDARD36826	HKLR	P
24-Jul-17	NW LANTAU	3	3.38	SUMMER	STANDARD36826	HKLR	P
24-Jul-17	NW LANTAU	2	6.35	SUMMER	STANDARD36826	HKLR	S
27-Jul-17	NW LANTAU	2	32.62	SUMMER	STANDARD36826	HKLR	P
27-Jul-17	NW LANTAU	3	3.79	SUMMER	STANDARD36826	HKLR	P
27-Jul-17	NW LANTAU	2	12.69	SUMMER	STANDARD36826	HKLR	S
27-Jul-17	NE LANTAU	2	22.18	SUMMER	STANDARD36826	HKLR	P
27-Jul-17	NE LANTAU	3	13.60	SUMMER	STANDARD36826	HKLR	P
27-Jul-17	NE LANTAU	2	11.02	SUMMER	STANDARD36826	HKLR	S
27-Jul-17	NE LANTAU	3	2.00	SUMMER	STANDARD36826	HKLR	S
28-Jul-17	NW LANTAU	1	2.10	SUMMER	STANDARD36826	HKLR	P
28-Jul-17	NW LANTAU	2	19.21	SUMMER	STANDARD36826	HKLR	P
28-Jul-17	NW LANTAU	3	4.53	SUMMER	STANDARD36826	HKLR	P
28-Jul-17	NW LANTAU	2	10.69	SUMMER	STANDARD36826	HKLR	S
28-Jul-17	NW LANTAU	3	1.77	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
7-Aug-17	NW LANTAU	2	20.96	SUMMER	STANDARD36826	HKLR	P
7-Aug-17	NW LANTAU	3	11.21	SUMMER	STANDARD36826	HKLR	P
7-Aug-17	NW LANTAU	2	2.10	SUMMER	STANDARD36826	HKLR	S
7-Aug-17	NW LANTAU	3	8.74	SUMMER	STANDARD36826	HKLR	S
7-Aug-17	NE LANTAU	2	30.03	SUMMER	STANDARD36826	HKLR	P
7-Aug-17	NE LANTAU	3	3.99	SUMMER	STANDARD36826	HKLR	P
7-Aug-17	NE LANTAU	2	12.29	SUMMER	STANDARD36826	HKLR	S
7-Aug-17	NE LANTAU	3	1.19	SUMMER	STANDARD36826	HKLR	S
15-Aug-17	NW LANTAU	2	0.92	SUMMER	STANDARD36826	HKLR	P
15-Aug-17	NW LANTAU	3	27.46	SUMMER	STANDARD36826	HKLR	P
15-Aug-17	NW LANTAU	3	9.12	SUMMER	STANDARD36826	HKLR	S
21-Aug-17	NW LANTAU	1	5.11	SUMMER	STANDARD36826	HKLR	P
21-Aug-17	NW LANTAU	2	19.03	SUMMER	STANDARD36826	HKLR	P
21-Aug-17	NW LANTAU	3	0.40	SUMMER	STANDARD36826	HKLR	P
21-Aug-17	NW LANTAU	1	4.43	SUMMER	STANDARD36826	HKLR	S
21-Aug-17	NW LANTAU	2	6.75	SUMMER	STANDARD36826	HKLR	S
21-Aug-17	NE LANTAU	2	18.25	SUMMER	STANDARD36826	HKLR	P
21-Aug-17	NE LANTAU	3	0.53	SUMMER	STANDARD36826	HKLR	P
21-Aug-17	NE LANTAU	2	9.99	SUMMER	STANDARD36826	HKLR	S
21-Aug-17	NE LANTAU	3	0.51	SUMMER	STANDARD36826	HKLR	S
31-Aug-17	NW LANTAU	2	36.26	SUMMER	STANDARD36826	HKLR	P
31-Aug-17	NW LANTAU	2	13.74	SUMMER	STANDARD36826	HKLR	S
31-Aug-17	NE LANTAU	2	16.93	SUMMER	STANDARD36826	HKLR	P
31-Aug-17	NE LANTAU	2	9.87	SUMMER	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (June - August 2017)

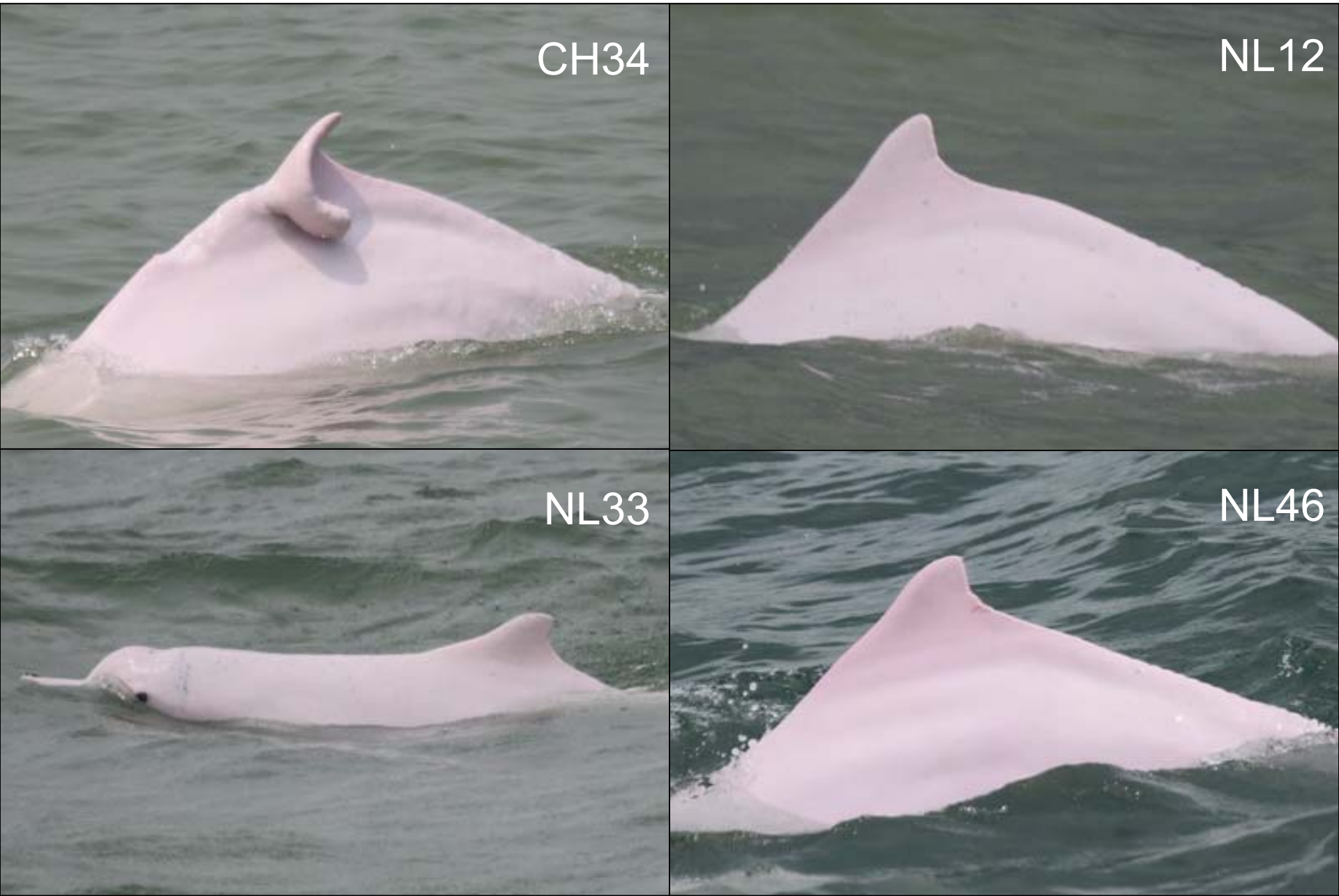
(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
15-Jun-17	1	1445	4	NW LANTAU	4	109	ON	HKLR	825338	809729	SUMMER	NONE	S
20-Jun-17	1	1131	1	NW LANTAU	3	15	ON	HKLR	829563	806565	SUMMER	NONE	S
24-Jul-17	1	1111	9	NW LANTAU	2	243	ON	HKLR	828092	805439	SUMMER	NONE	P
27-Jul-17	1	1131	2	NW LANTAU	2	16	ON	HKLR	829774	806339	SUMMER	NONE	S
7-Aug-17	1	1011	1	NW LANTAU	2	63	ON	HKLR	814661	804608	SUMMER	NONE	P
7-Aug-17	2	1143	3	NW LANTAU	2	146	ON	HKLR	829807	806174	SUMMER	NONE	S
7-Aug-17	3	1221	1	NW LANTAU	2	4	ON	HKLR	825698	806382	SUMMER	NONE	P
7-Aug-17	4	1324	2	NW LANTAU	3	18	ON	HKLR	825794	808545	SUMMER	NONE	P
21-Aug-17	1	1012	1	NW LANTAU	1	209	ON	HKLR	816265	805384	SUMMER	NONE	P
21-Aug-17	2	1132	3	NW LANTAU	2	326	ON	HKLR	827461	805407	SUMMER	NONE	P
31-Aug-17	1	1117	5	NW LANTAU	2	20	ON	HKLR	826621	804788	SUMMER	NONE	P
31-Aug-17	2	1314	2	NW LANTAU	2	262	ON	HKLR	826049	808443	SUMMER	NONE	P

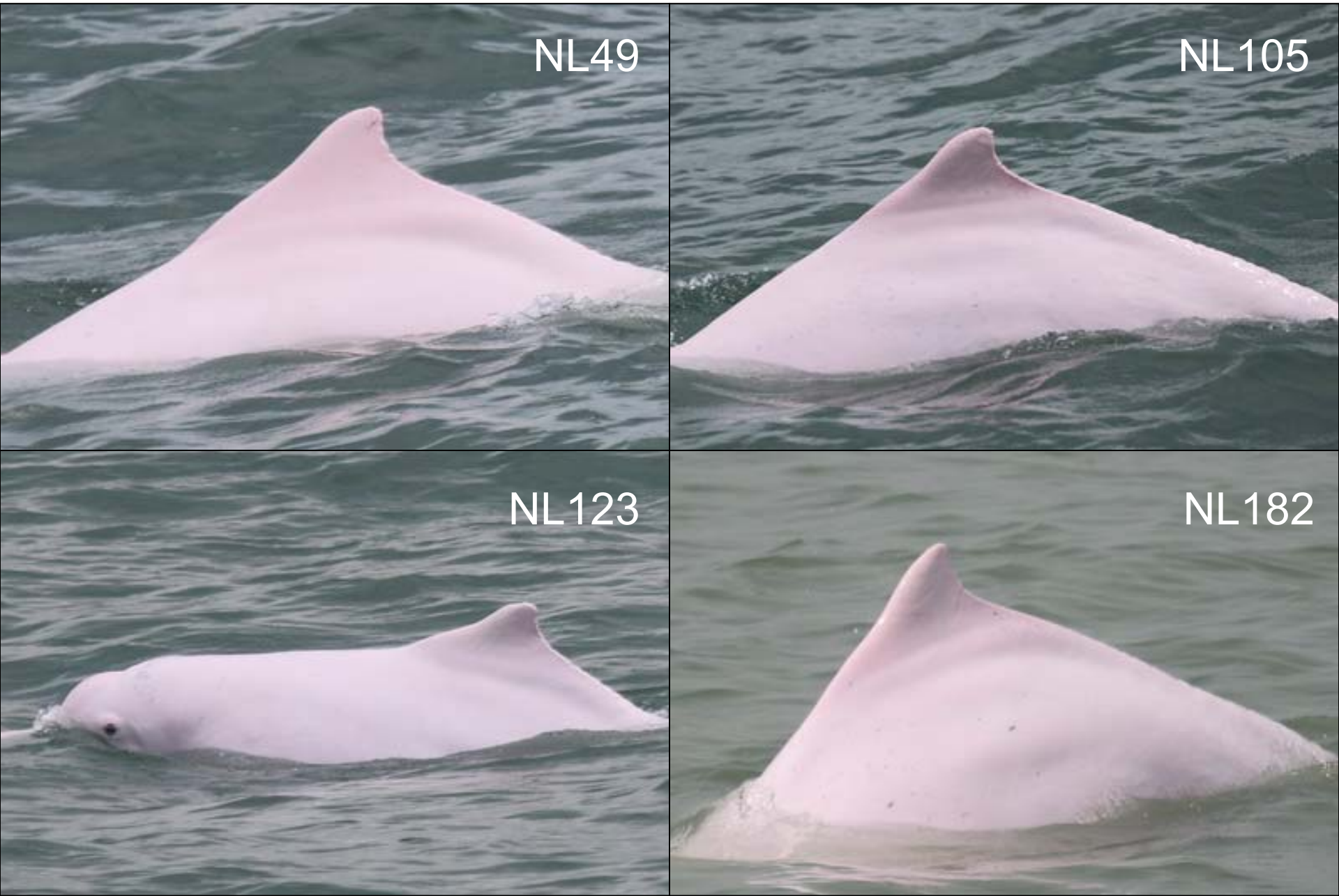
Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in June - August 2017

ID#	DATE	STG#	AREA
CH34	31/08/17	1	NW LANTAU
	31/08/17	2	NW LANTAU
NL12	20/06/17	1	NW LANTAU
NL33	15/06/17	1	NW LANTAU
NL46	24/07/17	1	NW LANTAU
	21/08/17	2	NW LANTAU
NL49	24/07/17	1	NW LANTAU
NL105	24/07/17	1	NW LANTAU
NL123	24/07/17	1	NW LANTAU
	21/08/17	2	NW LANTAU
NL182	31/08/17	1	NW LANTAU
	31/08/17	2	NW LANTAU
NL202	24/07/17	1	NW LANTAU
	31/08/17	1	NW LANTAU
NL210	15/06/17	1	NW LANTAU
NL224	07/08/17	3	NW LANTAU
NL236	07/08/17	2	NW LANTAU
NL286	24/07/17	1	NW LANTAU
NL293	07/08/17	1	NW LANTAU
NL320	31/08/17	1	NW LANTAU
NL322	15/06/17	1	NW LANTAU
NL328	15/06/17	1	NW LANTAU
WL05	27/07/17	1	NW LANTAU
	21/08/17	2	NW LANTAU
WL11	27/07/17	1	NW LANTAU
WL167	07/08/17	2	NW LANTAU
WL243	21/08/17	1	NW LANTAU

Appendix IV. Twenty-one individual dolphins that were identified during June to August 2017 during impact phase monitoring surveys



Appendix IV. (cont'd)



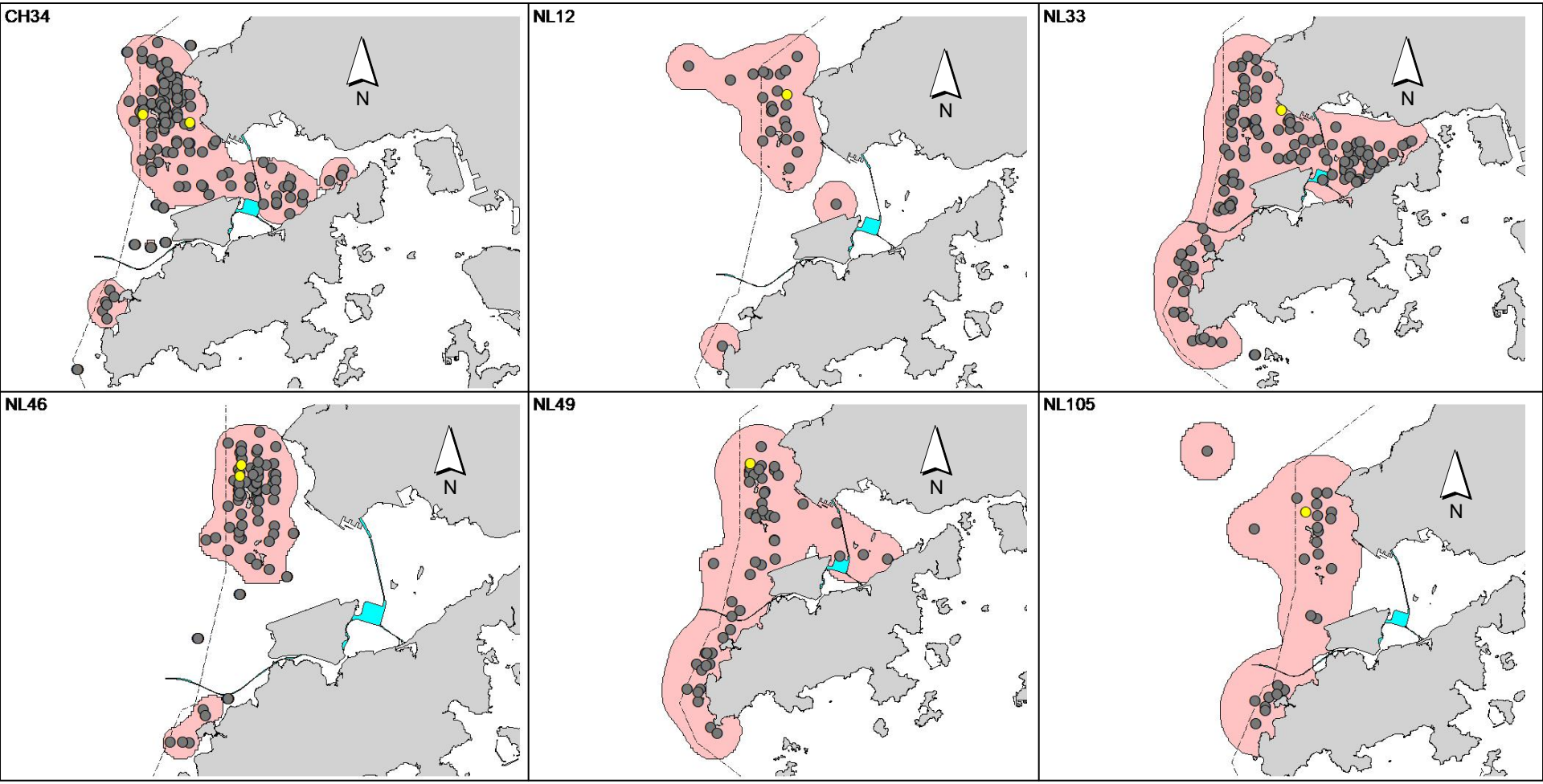
Appendix IV. (cont'd)

Appendix IV. (cont'd)

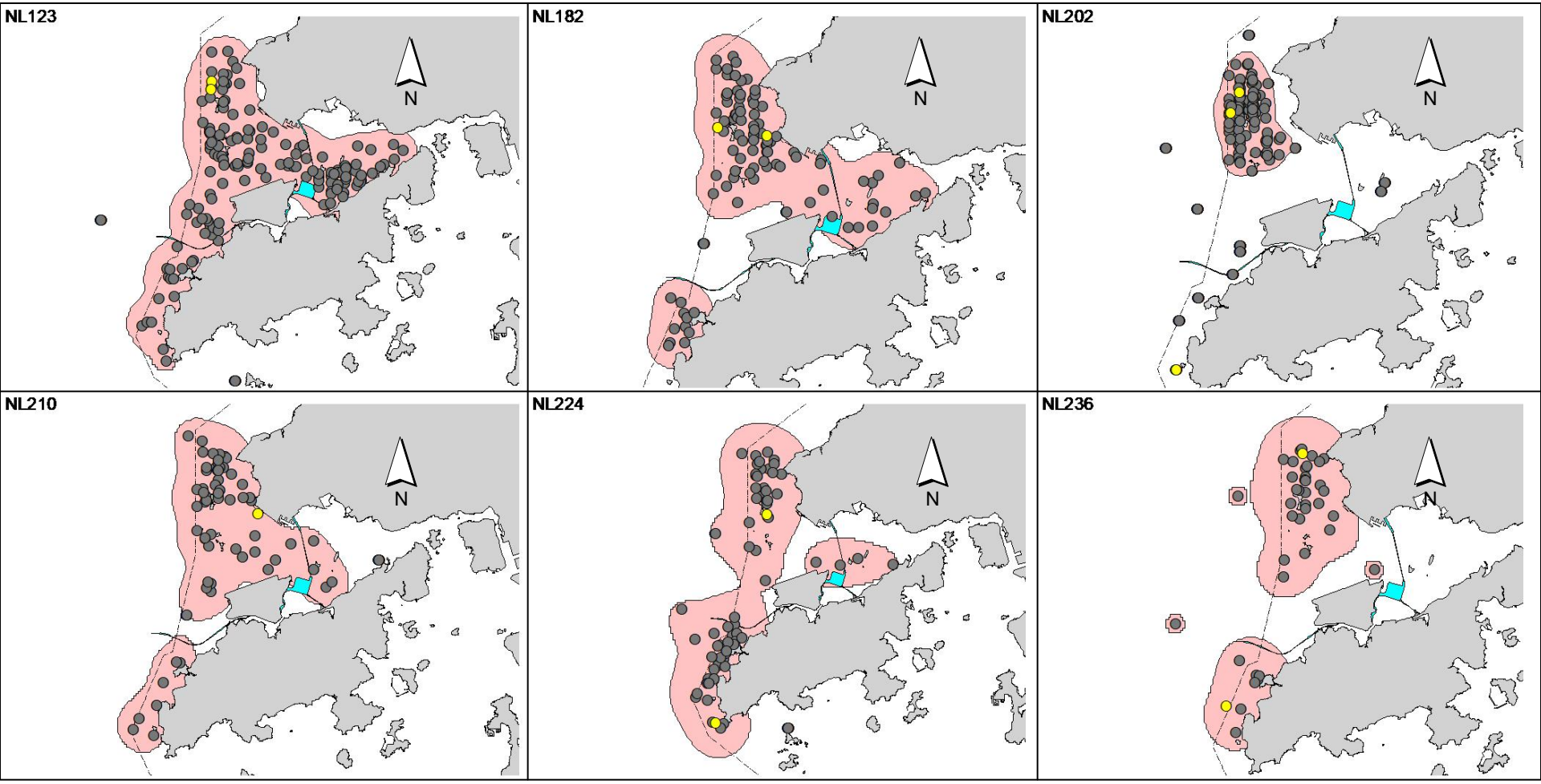
Appendix IV. (cont'd)

Appendix IV. (cont'd)

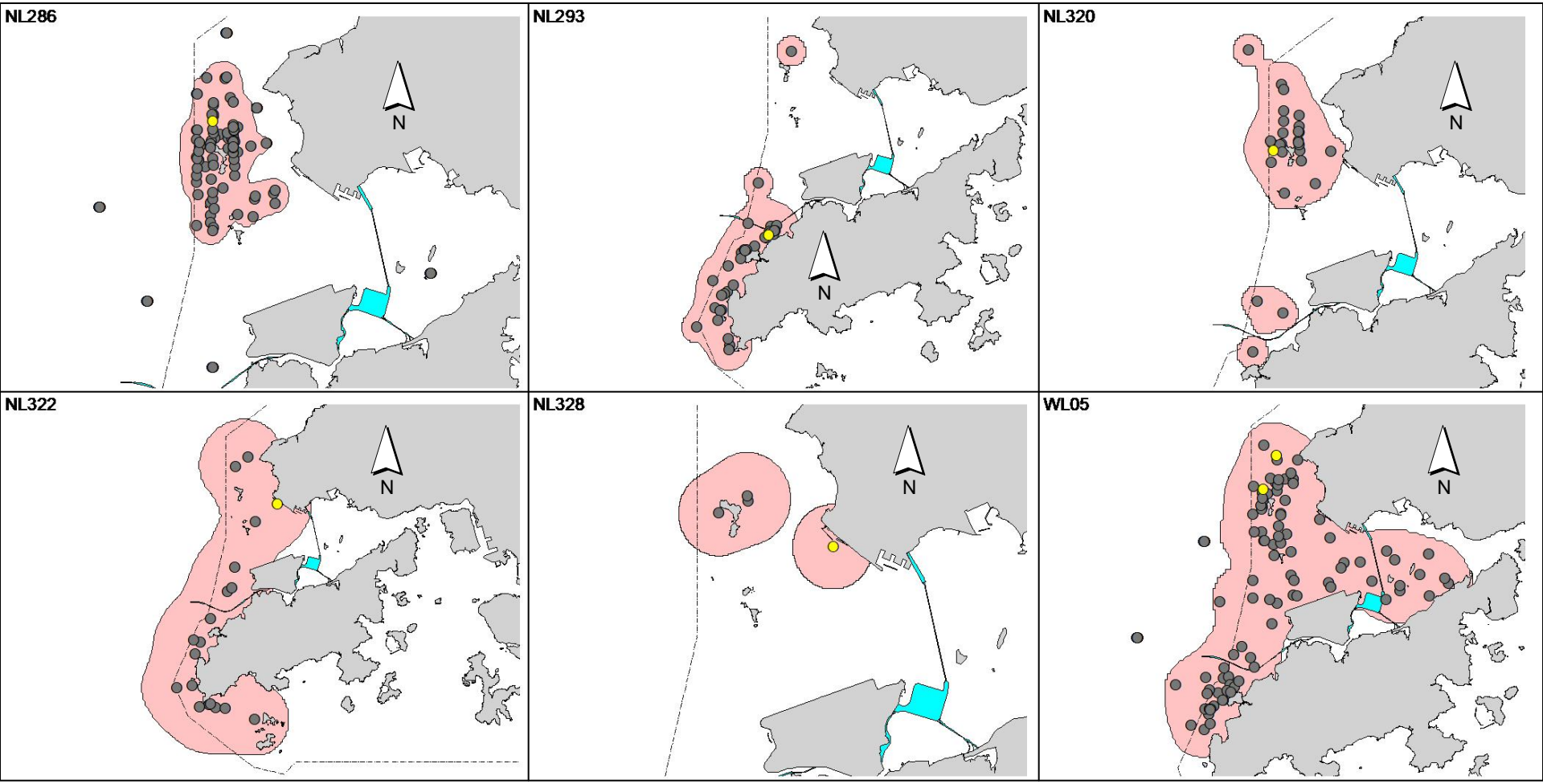
Appendix V. Ranging patterns (95% kernel ranges) of 21 individual dolphins that were sighted during impact phase monitoring period (note: yellow dots indicates sightings made in June – August 2017 during HZMB-related monitoring surveys)



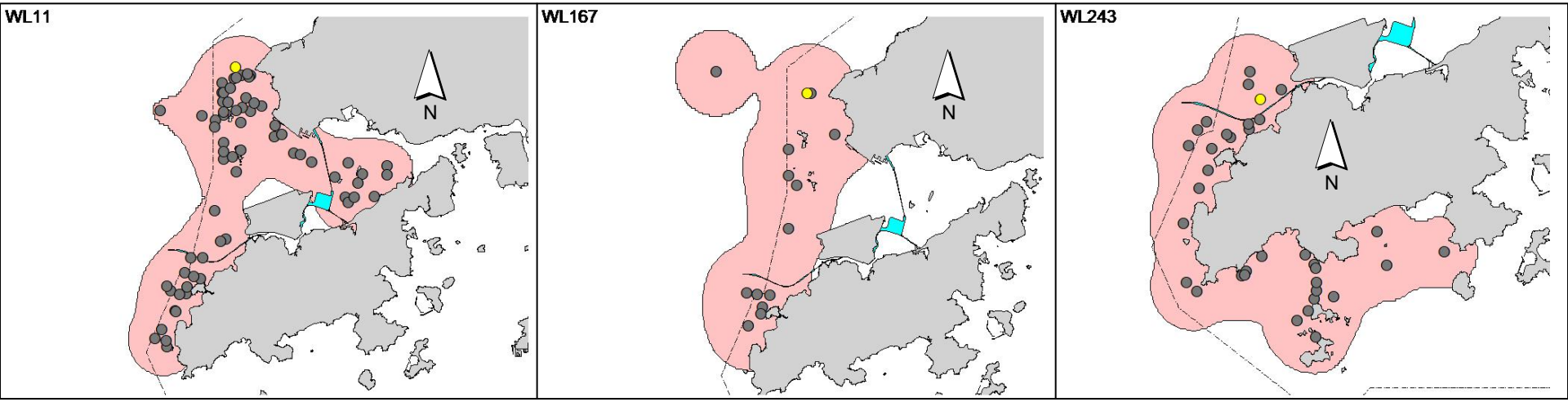
Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix J

Event Action Plan

Appendix J1 Event/ Action Plan for Air Quality

	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 2017 (Year)

Month\Material	Actual Quantities of Inert C&D Materials Generation						Actual Quantities of C&D wastes Generation						Actual Quantities of Recyclables Generation			
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fills	Imported Fill	Marine Sediment, Cat. L	Marine Sediment, Cat. Mp	Marine Sediment, Cat. Mf	Marine Sediment, Cat. H	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
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	4.591	0.717	0.474	-	4.118	-	-	-	-	-	3.521	99.840	-	-	0.140	-
Feb	5.034	1.585	0.166	-	4.869	-	0.857	-	-	-	-	127.720	-	-	0.091	-
Mar	6.575	0.937	0.498	-	6.077	-	0.771	-	-	-	6.000	87.910	-	-	0.077	-
Apr	5.467	0.791	1.058	-	4.409	-	-	-	-	-	-	130.680	-	5.170	0.063	-
May	4.960	0.537	0.826	-	4.134	-	0.672	-	-	-	-	171.870	-	-	0.056	-
Jun	4.491	0.567	0.098	-	4.394	-	-	-	-	-	-	148.600	-	-	0.063	-
SUB-TOTAL	**31.118**	**5.133**	**3.118**	**-**	**28.000**	**0.000**	**2.300**	**-**	**-**	**-**	**9.521**	**766.620**	**-**	**5.170**	**0.490**	**-**
Jul	5.618	0.426	0.696	0.002	4.921	-	1.056	-	-	-	0.800	159.980	-	-	0.091	-
Aug	3.897	0.232	-	-	3.897	-	-	-	-	-	-	159.230	-	-	0.056	-
Sep	-	0.000	-	-	-	-	-	-	-	-			-	-		-
Oct	-	0.000	-	-	-	-	-	-	-	-			-	-		-
Nov	-	0.000	-	-	-	-		-	-	-			-	-		-
Dec	-	0.000	-	-	-	-		-	-	-			-	-		-
TOTAL	**40.633**	**5.792**	**3.814**	**0.002**	**36.817**	**-**	**3.356**	**-**	**-**	**-**	**10.321**	**1,085.830**	**-**	**5.170**	**0.637**	**-**

Notes :

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

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

3 - Broken concrete for recycling into aggregates.

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

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

Appendix L

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

Appendix L1 Cumulative Statistics on Exceedances

		Total No. recorded in this quarter	**Total No. recorded since project commencement**
1-Hr TSP	Action	0	0
	Limit	0	0
24-Hr TSP	Action	0	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	31	33
	Limit	14	14
Impact Dolphin Monitoring	Action	0	9
	Limit	1	10

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

Reporting Period	**Cumulative Statistics**		
	Complaints	Notifications of Summons	Successful Prosecutions
This quarter	0	0	0
Total No. received since project commencement	10	0	0

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	8 August 2017

ERM

Dear Sir/ Madam,

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

Limit Level Exceedance
0215660_01August 2017_Bottom-depth DO_E_Station CS(Mf)5
0215660_01August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_01August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of three exceedances were recorded on 1 August 2017.

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_01August 2017_Bottom-depth DO_E_Station CS(Mf)5** **0215660_01August 2017_Bottom-depth DO_F_Station CS(Mf)5** **0215660_01August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)** **[Total No. of Exceedances = 3]**	
Date	1 August 2017 (Measured) 3 August 2017 (*In situ* results received by ERM) 10 August 2017 (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	Bottom-depth DO	4.7 mg/L
Limit Levels	Bottom-depth DO	3.6 mg/L
Measured Levels	Limit Level Exceedance was observed at CS(Mf)5 during mid-ebb tide (Bottom-depth DO= 3.1 mg/L). Limit Level Exceedance was observed at CS(Mf)3(N) during mid-ebb tide (Bottom-depth DO=4.3 mg/L). Limit Level Exceedance was observed at CS(Mf)5 during mid-flood tide (Bottom-depth DO=2.6 mg/L).	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 1 August 2017 included: • Pipe piling work for the construction of underslung truss scheme	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of bottom-depth DO at CS(Mf)5 during mid-ebb and mid-flood tide and at CS(Mf)3(N) during mid-ebb tide are unlikely to be due to the Project, in view of the following: • Apart from the Control stations CS(Mf)5 and CS(Mf)3(N), 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. • CS(Mf)5 and CS(Mf)3(N) are distant (>3km and >5km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality.	
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 1 August 2017 and locations of water quality monitoring stations are attached.	

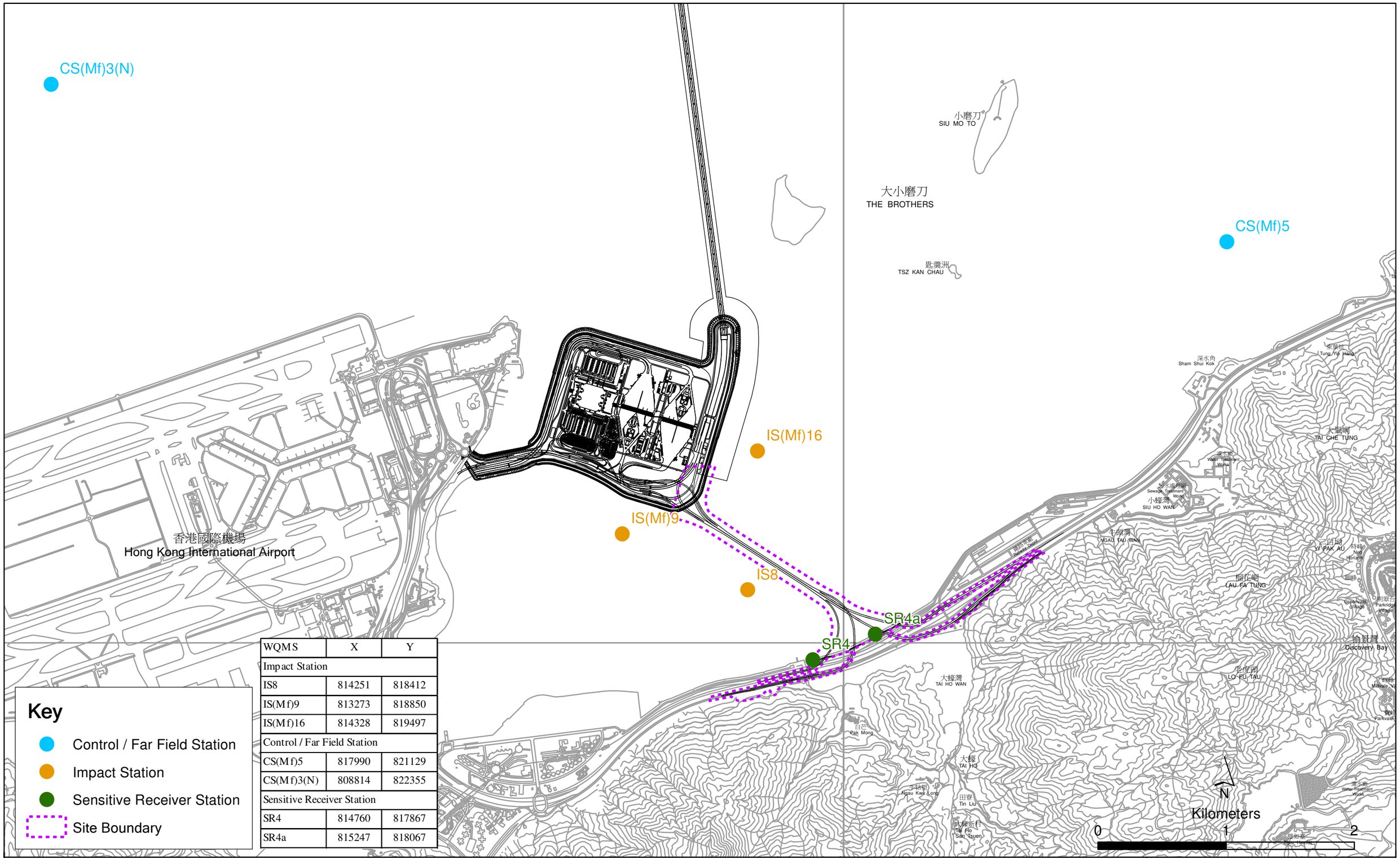
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Surface	1	29.5	7.9	16.8	6	5.7	1.7	2.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Surface	2	29.3	7.9	16.5	5.9		2.2	2.4
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Middle	1	29.1	7.9	21.2	5.4		1.7	2.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Middle	2	29	7.9	21.5	5.4		2.3	3.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Bottom	1	27.1	7.8	29.4	3	3.1	2.8	3.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)5	6:54	Bottom	2	27	7.9	29.3	3.1		3.2	3.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Surface	1	29.6	7.9	14.4	6.1	6.0	3.2	4.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Surface	2	29.5	7.9	14.1	6		3.5	4.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Middle	1	29.6	8	14.6	6		3.1	5
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Middle	2	29.5	7.9	14.3	6		2.8	4.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Bottom	1	28.7	7.8	21.8	4.2	4.3	3.4	4.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	CS(Mf)3(N)	7:52	Bottom	2	28.7	7.8	21.4	4.3		3.3	4.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Surface	1	29.7	8	17.1	6.4	6.5	2.3	2.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Surface	2	29.7	8	16.8	6.5		2.6	4.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Middle	1	29.7	8	17.7	6.6		3.3	4.1
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Middle	2	29.7	8	17.9	6.6		3.6	5.5
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Bottom	1	29.7	8	20.3	7.2	7.2	8.2	6.4
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)16	8:25	Bottom	2	29.7	8.1	20.2	7.2		8.1	7.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4a	8:37	Surface	1	29.6	7.9	18	5.9	5.9	4.5	5.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4a	8:37	Surface	2	29.5	7.9	18	5.9		4.7	6.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4a	8:37	Bottom	1	29.2	7.9	20.6	4.8	4.8	15.2	8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4a	8:37	Bottom	2	29.3	7.9	20.6	4.8		16	6.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4	8:47	Surface	1	29.6	7.9	17.7	6.1	6.1	3	3.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4	8:47	Surface	2	29.5	7.9	17.6	6.1		4.2	3.2
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4	8:47	Bottom	1	29.7	8	18.6	6.2	6.2	4.8	4.5
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	SR4	8:47	Bottom	2	29.6	8	18.6	6.2		4.7	4.2
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS8	8:55	Surface	1	29.6	8	17.6	6.5	6.5	2.9	5.2
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS8	8:55	Surface	2	29.6	8	17.6	6.5		3.1	5.1
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS8	8:55	Bottom	1	29.8	8	18.4	7.3	7.3	5.2	4.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS8	8:55	Bottom	2	29.7	8	18.5	7.3		5.1	4.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)9	9:02	Surface	1	29.6	8	17.5	6.9	6.9	3.3	4.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)9	9:02	Surface	2	29.5	8	17.4	6.9		3.2	5.4
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)9	9:02	Bottom	1	29.6	8	17.7	6.9	7.0	4.1	5.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Ebb	IS(Mf)9	9:02	Bottom	2	29.6	8	17.8	7		4.5	5.1

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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)9	13:32	Surface	1	30.1	8.4	17.2	10.8	10.8	3.3	2.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)9	13:32	Surface	2	30.1	8.4	17.3	10.8		3.2	4.2
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)9	13:32	Bottom	1	30.1	8.4	17.3	10.9	11.0	3.4	4
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)9	13:32	Bottom	2	30.1	8.4	17.3	11.1		3.6	2.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS8	13:40	Surface	1	30.1	8.1	16.1	7.1	7.1	5	5.3
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS8	13:40	Surface	2	30.1	8.1	16.1	7		4.6	4.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS8	13:40	Bottom	1	29.8	8	17.7	7.1	7.1	6.7	5.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS8	13:40	Bottom	2	29.8	8	17.6	7.1		7	5.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4	13:47	Surface	1	30	8.1	16.1	7.2	7.1	3.8	6.4
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4	13:47	Surface	2	29.9	8.1	16.1	7		4.2	6.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4	13:47	Bottom	1	30	8	16.9	7.1	7.2	8	6.6
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4	13:47	Bottom	2	30	8	17	7.2		8.8	7.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4a	13:55	Surface	1	29.9	8	16.3	6.8	6.8	7.2	4
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4a	13:55	Surface	2	29.9	8	16.2	6.7		7.1	3.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4a	13:55	Bottom	1	29.8	8	16.3	6.8	6.8	12.5	6
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	SR4a	13:55	Bottom	2	29.8	8	16.3	6.8		12.1	6.5
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)16	14:27	Surface	1	30.2	8.2	16.6	8.3	8.3	3.4	8.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)16	14:27	Surface	2	30.2	8.2	16.5	8.3		3.2	7
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)16	14:27	Bottom	1	29.7	8.1	17.2	7	7.0	5	12.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	IS(Mf)16	14:27	Bottom	2	29.7	8.1	17.3	7		6	12.5
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Surface	1	30	7.9	14	6.5	6.3	4.8	5.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Surface	2	30	7.9	14	6.5		4.4	4.1
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Middle	1	29.7	7.9	14.5	6.1		4.7	6.1
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Middle	2	29.7	7.9	14.5	6.1		4.5	6.2
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Bottom	1	29.3	7.8	17.6	5	5.0	4.7	4.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)3(N)	15:02	Bottom	2	29.3	7.8	17.7	5		4.5	5.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Surface	1	30.3	8.1	15.2	7.9	6.2	2.4	16.7
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Surface	2	30.4	8	15.4	8		2.6	17.9
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Middle	1	28.6	7.9	21.5	4.5		1.9	5.8
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Middle	2	28.6	7.9	21.6	4.5		2.3	5
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Bottom	1	26.3	7.8	32.3	2.6	2.6	5.5	6
TMCLKL	HY/2012/07	2017-08-01	Mid-Flood	CS(Mf)5	15:48	Bottom	2	26.3	7.8	32.2	2.6		6.3	6.8

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	9 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_03August 2017_Surface and Middle-depth DO_E_Station CS(Mf)3(N)
0215660_03August 2017_Bottom-depth DO_E_Station IS(Mf)16
0215660_03August 2017_Bottom-depth DO_E_Station SR4a
0215660_03August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)
0215660_03August 2017_Surface and Middle -depth DO_F_Station CS(Mf)5

Limit Level Exceedance
0215660_03August 2017_Surface and Middle-depth DO_E_Station CS(Mf)5
0215660_03August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_03August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of eight exceedances were recorded on 3 August 2017.

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_03August 2017_Surface and Middle-depth DO_E_Station CS(Mf)3(N)** **0215660_03August 2017_Bottom-depth DO_E_Station IS(Mf)16** **0215660_03August 2017_Bottom-depth DO_E_Station SR4a** **0215660_03August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)** **0215660_03August 2017_Surface and Middle -depth DO_F_Station CS(Mf)5** **<u>Limit Level Exceedance</u>** **0215660_03August 2017_Surface and Middle-depth DO_E_Station CS(Mf)5** **0215660_03August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)** **0215660_03August 2017_Bottom-depth DO_F_Station CS(Mf)5** **[Total No. of Exceedances = 8]**	
Date	3 August 2017 (Measured) 7 August 2017 (*In situ* results received by ERM) 14 August 2017 (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, Bottom-depth Dissolved Oxygen (DO)	
Action Levels	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels	Surface and Middle-depth DO	4.2 mg/L
	Bottom-depth DO	3.6 mg/L
Measured Levels	Action Level Exceedance was observed at CS(Mf)3(N) during mid-ebb tide (Surface and Middle-depth DO = 4.7 mg/L). Action Level Exceedance was observed at IS(Mf)16 during mid-ebb tide (Bottom-depth DO = 4.5 mg/L). Action Level Exceedance was observed at SR4a during mid-ebb tide (Bottom-depth DO = 3.7 mg/L). Action Level Exceedance was observed at CS(Mf)3(N) during mid-flood tide (Bottom-depth DO = 3.7 mg/L). Action Level Exceedance was observed at CS(Mf)5 during mid-flood tide (Surface and Middle-depth DO = 4.9 mg/L). Limit Level Exceedance was observed at CS(Mf)5 during mid-ebb tide (Surface and Middle-depth DO = 3.7 mg/L). Limit Level Exceedance was observed at CS(Mf)3(N) during mid-ebb tide (Bottom-depth DO = 3.1 mg/L). Limit Level Exceedance was observed at CS(Mf)5 during mid-flood tide (Bottom-depth DO = 2.5 mg/L)	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 3 August 2017 included: • Rock armour reinstatement and retrieval of pipe pile of working platform for the construction of underslung truss scheme	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of surface and middle-depth DO and bottom-depth 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. • CS(Mf)5 and CS(Mf)3(N) are distant (>3km and >5km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from IS(Mf)16 and SR4a, levels of DO at all other Impact stations and sensitive receiver monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • Surface and Middle DO levels at IS(Mf)16 and SR4a at both mid-flood and mid-ebb tides were in compliance with the Action and Limit Levels, except bottom DO levels during mid-ebb tide. DO pattern at bottom level of both stations followed similar DO pattern as the upstream control station, CS(Mf)3(N), in which limit level exceedance was observed during mid-ebb tide. Consequently the observed DO exceedance is considered within the natural range and is not considered to be caused by the Project. • 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 deeper CS(Mf)5 and CS(Mf)3(N) 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, which is a presence of natural variation, is likely a contributing factor to the results of lower levels of Dissolved Oxygen 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 3 August 2017 and locations of water quality monitoring stations are attached.

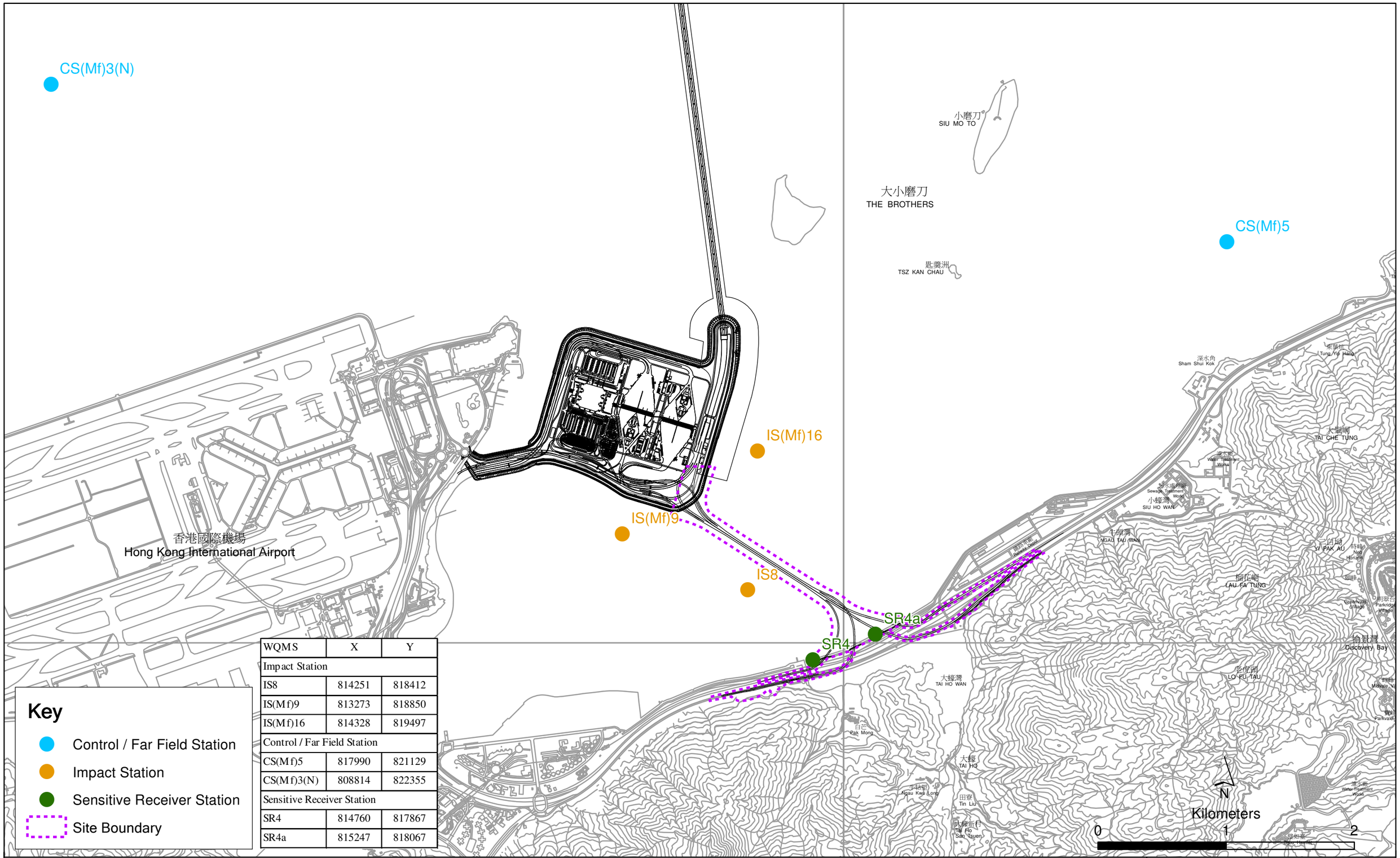
Project	Works	Date (yyyy-mm	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Surface	1	29	7.9	16.1	2.6	3.7	2.3	5.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Surface	2	29.1	8	16.1	2.6		2.3	5.5
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Middle	1	28.2	7.9	23.8	4.7		1.3	5.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Middle	2	28.2	7.9	23.8	4.7		1.2	6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Bottom	1	26.1	7.8	31.5	6.5	6.5	5.2	7.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)5	9:07	Bottom	2	26.2	7.8	31.5	6.4		5	7.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Surface	1	29	7.9	18.5	5.2	4.7	4	5.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Surface	2	29.1	7.9	18.5	5.2		4.2	5.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Middle	1	28.7	7.8	21.6	4.2		4.3	4
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Middle	2	28.7	7.8	21.6	4.2		4.4	5.1
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Bottom	1	27.9	7.8	26.6	3.1	3.1	7.9	8.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	CS(Mf)3(N)	9:54	Bottom	2	27.9	7.8	26.6	3.1		8	7.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Surface	1	29.5	8.1	17	7.3	6.9	4.6	8.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Surface	2	29.4	8.1	17	7.2		4.6	7.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Middle	1	29.3	8.1	17.4	6.5		4.9	7.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Middle	2	29.3	8.1	17.4	6.5		4.8	7.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Bottom	1	28.8	7.9	21.4	4.5	4.5	7.4	10.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)16	10:30	Bottom	2	28.8	7.9	21.4	4.5		7.3	9.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4a	10:42	Surface	1	29.4	7.9	18.3	5.4	5.4	10.1	15.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4a	10:42	Surface	2	29.3	7.9	18.3	5.4		10.1	15.8
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4a	10:42	Bottom	1	28.2	7.8	23.9	3.7	3.7	15.5	14.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4a	10:42	Bottom	2	28.2	7.8	23.9	3.7		15.2	15
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4	10:50	Surface	1	29.5	7.9	18.2	5.3	5.3	9	12
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4	10:50	Surface	2	29.4	7.9	18.1	5.3		9	12.8
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4	10:50	Bottom	1	29.2	7.9	18.7	5	5.1	11	15.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	SR4	10:50	Bottom	2	29.2	7.9	18.7	5.1		11.4	15.1
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS8	10:56	Surface	1	29.6	8.2	16.9	7.9	7.9	5	6.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS8	10:56	Surface	2	29.6	8.2	16.9	7.9		5.1	7.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS8	10:56	Bottom	1	29.6	8.2	16.9	8	8.0	5.3	9.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS8	10:56	Bottom	2	29.6	8.2	16.9	8		5.5	10.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)9	11:04	Surface	1	29.6	8.2	16.8	8.1	8.1	4.3	6.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)9	11:04	Surface	2	29.6	8.2	16.8	8.1		4.5	6.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)9	11:04	Bottom	1	29.4	8	18.4	5.1	5.1	11.9	6.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Ebb	IS(Mf)9	11:04	Bottom	2	29.4	8	18.4	5.1		12	7.7

Project	Works	Date (yyyy-mm	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)9	16:00	Surface	1	29.7	8.2	18.1	7.7	7.7	7.6	2.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)9	16:00	Surface	2	29.7	8.2	18.1	7.6		7.4	3
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)9	16:00	Bottom	1	29.6	8.1	19	6.9	6.9	11	4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)9	16:00	Bottom	2	29.5	8.1	19	6.9		10.8	3.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS8	16:07	Surface	1	29.5	7.9	19.2	5.7	5.7	7.6	5.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS8	16:07	Surface	2	29.4	7.9	19.2	5.6		7.7	6.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS8	16:07	Bottom	1	29.1	7.9	20.5	5.2	5.2	15.1	7
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS8	16:07	Bottom	2	29.1	7.9	20.5	5.1		15.4	6.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4	16:20	Surface	1	29.4	7.9	19.5	5.6	5.6	15	9.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4	16:20	Surface	2	29.4	8	19.5	5.5		15.2	9.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4	16:20	Bottom	1	29.2	7.9	20.3	5.2	5.2	23.1	20.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4	16:20	Bottom	2	29.2	7.9	20.3	5.2		22.7	22.3
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4a	16:31	Surface	1	29.6	8	19.4	5.9	5.9	8.5	5.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4a	16:31	Surface	2	29.6	8	19.4	5.9		8.7	5.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4a	16:31	Bottom	1	29.1	7.9	20.7	5.1	5.1	16	23.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	SR4a	16:31	Bottom	2	29.1	7.9	20.7	5		16.1	22.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)16	16:45	Surface	1	29.5	8	18.3	6.4	6.4	7.2	9.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)16	16:45	Surface	2	29.6	8	18.3	6.4		7.1	10.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)16	16:45	Bottom	1	29	7.9	20.7	4.9	4.9	21.6	24.4
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	IS(Mf)16	16:45	Bottom	2	29	7.9	20.9	4.9		22.5	23.8
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Surface	1	29.6	7.9	14.8	6	5.1	6.4	14.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Surface	2	29.7	7.9	14.7	5.9		6.5	16.1
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Middle	1	29	7.8	18.8	4.3		9.8	20.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Middle	2	29	7.8	18.8	4.2		9.8	20.6
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Bottom	1	28.7	7.8	20.8	3.7	3.7	19.4	13.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)3(N)	17:19	Bottom	2	28.7	7.8	20.8	3.7		19	12
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Surface	1	29.3	8	19.2	6.6	4.9	4.5	14.5
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Surface	2	29.3	8	19.2	6.5		4.7	15
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Middle	1	27	7.8	29.3	3.3		3.7	10.7
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Middle	2	27	7.9	29.3	3.2		3.6	10.2
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Bottom	1	25.9	7.8	32.5	2.5	2.5	7	12.9
TMCLKL	HY/2012/07	2017-08-03	Mid-Flood	CS(Mf)5	18:06	Bottom	2	25.9	7.8	32.5	2.5		7.2	13.1

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	18 August 2017

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_05 August 2017_Surface and Middle-depth DO_E_Station CS(Mf)5
0215660_05 August 2017_Surface and Middle-depth DO_E_Station IS(Mf)16
0215660_05 August 2017_Bottom-depth DO_E_Station IS(Mf)16
0215660_05 August 2017_Bottom-depth DO_E_Station IS(Mf)9

Limit Level Exceedance
0215660_05 August 2017_Bottom-depth DO_E_Station CS(Mf)5
0215660_05 August 2017_Surface and Middle-depth DO_E_Station CS(Mf)3(N)
0215660_05 August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_05 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5
0215660_05 August 2017_Bottom-depth DO_F_Station CS(Mf)5
0215660_05 August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)

A total of ten exceedances were recorded on 5 August 2017.

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_05 August 2017_Surface and Middle-depth DO_E_Station CS(Mf)5** **0215660_05 August 2017_Surface and Middle-depth DO_E_Station IS(Mf)16** **0215660_05 August 2017_Bottom-depth DO_E_Station IS(Mf)16** **0215660_05 August 2017_Bottom-depth DO_E_Station IS(Mf)9** **<u>Limit Level Exceedance</u>** **0215660_05 August 2017_Bottom-depth DO_E_Station CS(Mf)5** **0215660_05 August 2017_Surface and Middle-depth DO_E_Station CS(Mf)3(N)** **0215660_05 August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)** **0215660_05 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5** **0215660_05 August 2017_Bottom-depth DO_F_Station CS(Mf)5** **0215660_05 August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)** **[Total No. of Exceedances = 10]**	
Date	5 August 2017 (Measured) 10 August 2017 (*In situ* results received by ERM) 15 August 2017 (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, Bottom-depth Dissolved Oxygen (DO)	
Action Levels	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels	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 CS(Mf)5 (Surface and Middle-depth) (DO = 4.5mg/L); 2. Mid-Ebb at IS(Mf)16 (Surface and Middle-depth) (DO = 4.2mg/L); 3. Mid-Ebb at IS(Mf)16 (Bottom-depth) (DO = 3.9mg/L); 4. Mid-Ebb at IS(Mf)9 (Bottom-depth) (DO = 4.3mg/L); <u>Limit Level Exceedance</u> 5. Mid-Ebb at CS(Mf)5 (Bottom-depth) (DO = 2.5mg/L); 6. Mid-Ebb at CS(Mf)3(N) (Surface and Middle-depth) (DO = 3.6mg/L); 7. Mid-Ebb at CS(Mf)3(N) (Bottom-depth) (DO = 3.2mg/L); 8. Mid-Flood at CS(Mf)5 (Surface and Middle-depth) (DO = 3.9mg/L); 9. Mid-Flood at CS(Mf)5 (Bottom-depth) (DO = 2.8mg/L); 10. Mid-Flood at CS(Mf)3(N) (Bottom-depth) (DO = 3.5mg/L).	
Works Undertaken (at the time of monitoring event)	No marine works was undertaken under this Contract on 5 August 2017.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of surface and middle-depth DO and bottom-depth DO are unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 5 August 2017. • 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. • CS(Mf)5 and CS(Mf)3(N) are distant (>3km and >5km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from IS(Mf)16 and IS(Mf)9, levels of DO at all other Impact stations and sensitive receiver monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • DO pattern at three depth levels at IS(Mf)16 and bottom levels at IS(Mf)9 at mid-ebb tides followed similar DO pattern as the upstream control station, CS(Mf)3(N), in which limit level exceedances were observed at three depth levels during mid-ebb tide. Consequently the observed DO exceedance is considered within the natural range and is not considered to be caused by the Project. • 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 the deeper CS(Mf)5 and CS(Mf)3(N) 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 5 August 2017 and locations of water quality monitoring stations are attached.

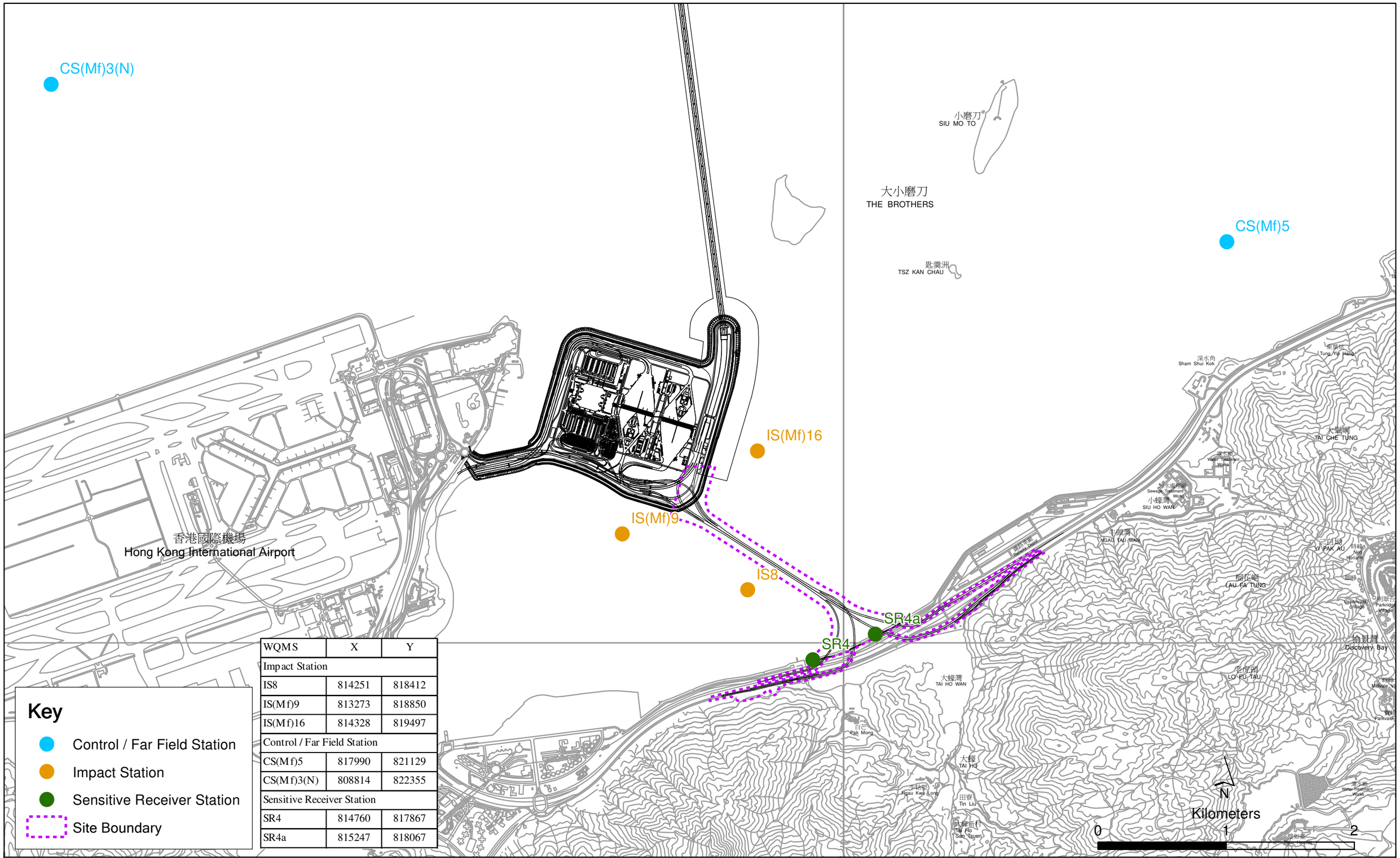
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Surface	1	28.8	7.9	19.9	5	4.5	4.0	4.2
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Surface	2	29.0	7.9	19.8	5.2		3.6	4.5
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Middle	1	27.0	7.9	27.0	3.8		2.1	3.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Middle	2	27.1	7.8	27.0	3.9		1.9	3.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Bottom	1	25.8	7.8	31.2	2.5	2.5	11.7	4.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)5	10:59	Bottom	2	25.9	7.8	31.2	2.5		11.0	5.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Surface	1	28.7	7.8	18.8	4.2	3.6	4.3	2.5
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Surface	2	28.8	7.8	18.7	4.3		4.1	3.7
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Middle	1	27.9	7.8	24.1	3.0		9.0	6.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Middle	2	28.0	7.8	24.1	3.0		8.3	6.5
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Bottom	1	27.9	7.8	25.2	3.2	3.2	14.2	12.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	CS(Mf)3(N)	10:00	Bottom	2	28.0	7.8	25.2	3.1		12.9	11.0
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Surface	1	28.9	7.8	21.0	4.3	4.2	6.8	5.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Surface	2	28.8	7.9	20.9	4.3		7.1	4.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Middle	1	28.6	7.8	22.0	4.1		6.5	6.7
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Middle	2	28.5	7.9	22.0	4.0		7.1	7.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Bottom	1	28.1	7.9	23.6	3.8	3.9	6.1	8.0
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)16	11:34	Bottom	2	28.0	7.9	23.6	3.9		6.8	8.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4a	11:48	Surface	1	29.1	7.8	20.0	4.6	4.6	18.1	13.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4a	11:48	Surface	2	29.0	7.8	20.0	4.5		20.0	13.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4a	11:48	Bottom	1	28.7	7.9	21.7	4.1	4.1	28.9	16.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4a	11:48	Bottom	2	28.6	7.8	21.7	4.1		27.4	16.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4	11:58	Surface	1	28.8	7.8	21.2	4.2	4.2	12.0	17.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4	11:58	Surface	2	28.7	7.8	21.2	4.2		12.8	19.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4	11:58	Bottom	1	28.3	7.8	23.2	3.8	3.8	14.9	26.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	SR4	11:58	Bottom	2	28.2	7.8	23.2	3.7		15.8	27.2
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS8	12:23	Surface	1	29.4	7.9	19.7	5.3	5.3	7.8	5.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS8	12:23	Surface	2	29.3	7.8	19.7	5.2		8.5	4.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS8	12:23	Bottom	1	28.8	7.9	22.3	3.1	3.2	14.0	12.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS8	12:23	Bottom	2	28.7	7.8	22.4	3.2		15.2	11.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)9	12:14	Surface	1	29.3	7.9	19.6	5.7	5.7	5.7	4.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)9	12:14	Surface	2	29.2	7.9	19.6	5.6		6.3	5.5
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)9	12:14	Bottom	1	29.0	7.9	20.7	4.3	4.3	10.8	8.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Ebb	IS(Mf)9	12:14	Bottom	2	28.9	7.9	20.9	4.3		11.9	9.0

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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Surface	1	28.7	7.9	21.3	4.5	3.9	2.9	3.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Surface	2	28.6	7.8	21.3	4.4		2.9	3.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Middle	1	27.2	7.8	26.9	3.3		3.4	3.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Middle	2	27.1	7.8	26.9	3.3		3.7	2.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Bottom	1	26.2	7.8	30.2	2.8	2.8	8.5	3.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)5	19:23	Bottom	2	26.1	7.8	30.2	2.8		8.8	3.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Surface	1	30.7	7.9	12.5	5.7	5.0	5.6	5.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Surface	2	30.6	7.8	12.6	5.6		6.1	5.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Middle	1	29.3	7.8	17.2	4.3		8.7	4.7
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Middle	2	29.2	7.7	17.2	4.2		9.3	4.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Bottom	1	28.5	7.8	20.9	3.5	3.5	14.3	8.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	CS(Mf)3(N)	18:33	Bottom	2	28.4	7.7	20.9	3.5		14.7	7.2
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)16	17:58	Surface	1	29.9	7.9	18.5	6.2	6.2	5.0	4.7
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)16	17:58	Surface	2	29.8	7.9	18.5	6.1		5.2	4.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)16	17:58	Bottom	1	29.2	7.9	20.3	5.1	5.1	7.5	6.8
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)16	17:58	Bottom	2	29.1	7.9	20.4	5.1		8.0	7.8
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4a	17:43	Surface	1	29.6	7.9	19.4	5.4	5.4	9.6	7.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4a	17:43	Surface	2	29.5	7.9	19.4	5.4		10.3	6.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4a	17:43	Bottom	1	28.9	7.9	21.5	4.4	4.5	14.7	11.8
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4a	17:43	Bottom	2	28.8	7.8	21.6	4.5		16.4	10.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4	17:34	Surface	1	29.6	7.9	19.6	5.3	5.3	13.5	9.4
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4	17:34	Surface	2	29.5	7.9	19.6	5.2		14.5	10.5
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4	17:34	Bottom	1	29.5	7.9	19.8	5.3	5.3	14.8	11.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	SR4	17:34	Bottom	2	29.4	7.9	19.8	5.2		15.8	10.0
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS8	17:22	Surface	1	29.6	7.9	19.4	5.6	5.6	9.7	8.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS8	17:22	Surface	2	29.7	7.9	19.4	5.6		8.9	8.3
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS8	17:22	Bottom	1	29.5	7.9	20.3	5.4	5.4	12.2	27.1
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS8	17:22	Bottom	2	29.6	7.9	20.3	5.4		11.2	28.6
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)9	17:12	Middle	1	29.9	8.0	20.1	6.4	6.5	7.2	6.9
TMCLKL	HY/2012/07	2017-08-05	Mid-Flood	IS(Mf)9	17:12	Middle	2	30.0	8.0	20.1	6.5		6.5	6.9

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	15 August 2017

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_07 August 2017_ Surface and Middle-depth DO_E_Station CS(Mf)5
0215660_07 August 2017_Bottom-depth DO_E_Station CS(Mf)5
0215660_07 August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_07 August 2017_Bottom-depth DO_E_Station IS(Mf)16
0215660_07 August 2017_Bottom-depth DO_E_Station SR4a
0215660_07 August 2017_ Surface and Middle-depth DO_F_Station CS(Mf)5
0215660_07 August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)

Limit Level Exceedance
0215660_07 August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of eight exceedances were recorded on 7 August 2017.

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_07 August 2017_ Surface and Middle-depth DO_E_Station CS(Mf)5** **0215660_07 August 2017_Bottom-depth DO_E_Station CS(Mf)5** **0215660_07 August 2017_Bottom-depth DO_E_Station CS(Mf)3(N)** **0215660_07 August 2017_Bottom-depth DO_E_Station IS(Mf)16** **0215660_07 August 2017_Bottom-depth DO_E_Station SR4a** **0215660_07 August 2017_ Surface and Middle-depth DO_F_Station CS(Mf)5** **0215660_07 August 2017_Bottom-depth DO_F_Station CS(Mf)3(N)** **<u>Limit Level Exceedance</u>** **0215660_07 August 2017_Bottom-depth DO_F_Station CS(Mf)5** **[Total No. of Exceedances = 8]**	
Date	7 August 2017 (Measured) 10 August 2017 (*In situ* results received by ERM) 16 August 2017 (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, Bottom-depth Dissolved Oxygen (DO)	
Action Levels	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels	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 CS(Mf)5 (Surface and Middle-depth) (DO = 4.7mg/L); 2. Mid-Ebb at CS(Mf)5 (Bottom-depth) (DO = 3.7mg/L); 3. Mid-Ebb at CS(Mf)3(N) (Bottom-depth) (DO = 3.7mg/L); 4. Mid-Ebb at IS(Mf)16 (Bottom-depth) (DO = 4.3mg/L); 5. Mid-Ebb at SR4a (Bottom-depth) (DO = 4.5mg/L); 6. Mid-Flood at CS(Mf)5 (Surface and Middle-depth) (DO = 4.2mg/L); 7. Mid-Flood at CS(Mf)3(N) (Bottom-depth) (DO = 4.0mg/L); <u>Limit Level Exceedance</u> 8. Mid-Flood at CS(Mf)5 (Bottom-depth) (DO = 3.4mg/L)	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 7 August 2017 included: • Rock armour reinstatement for the construction of underslung truss scheme	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of surface and middle-depth DO and bottom-depth 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. • CS(Mf)5 and CS(Mf)3(N) are distant (>3km and >5km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from IS(Mf)16 and SR4a, levels of DO at all other Impact stations and sensitive receiver monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. • Surface and Middle DO levels at IS(Mf)16 and SR4a at both mid-flood and mid-ebb tides and bottom DO levels at both stations at mid-flood tide were in compliance with the Action and Limit Levels, except marginal exceedances at bottom DO levels during mid-ebb tide. DO pattern at bottom level of both stations followed similar DO pattern as the upstream control station, CS(Mf)3(N), in which action level exceedance was observed during mid-ebb tide. Consequently the observed DO exceedance is considered within the natural range and is not considered to be caused by the Project. • 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 deeper CS(Mf)5 and CS(Mf)3(N) 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 7 August 2017 and locations of water quality monitoring stations are attached.

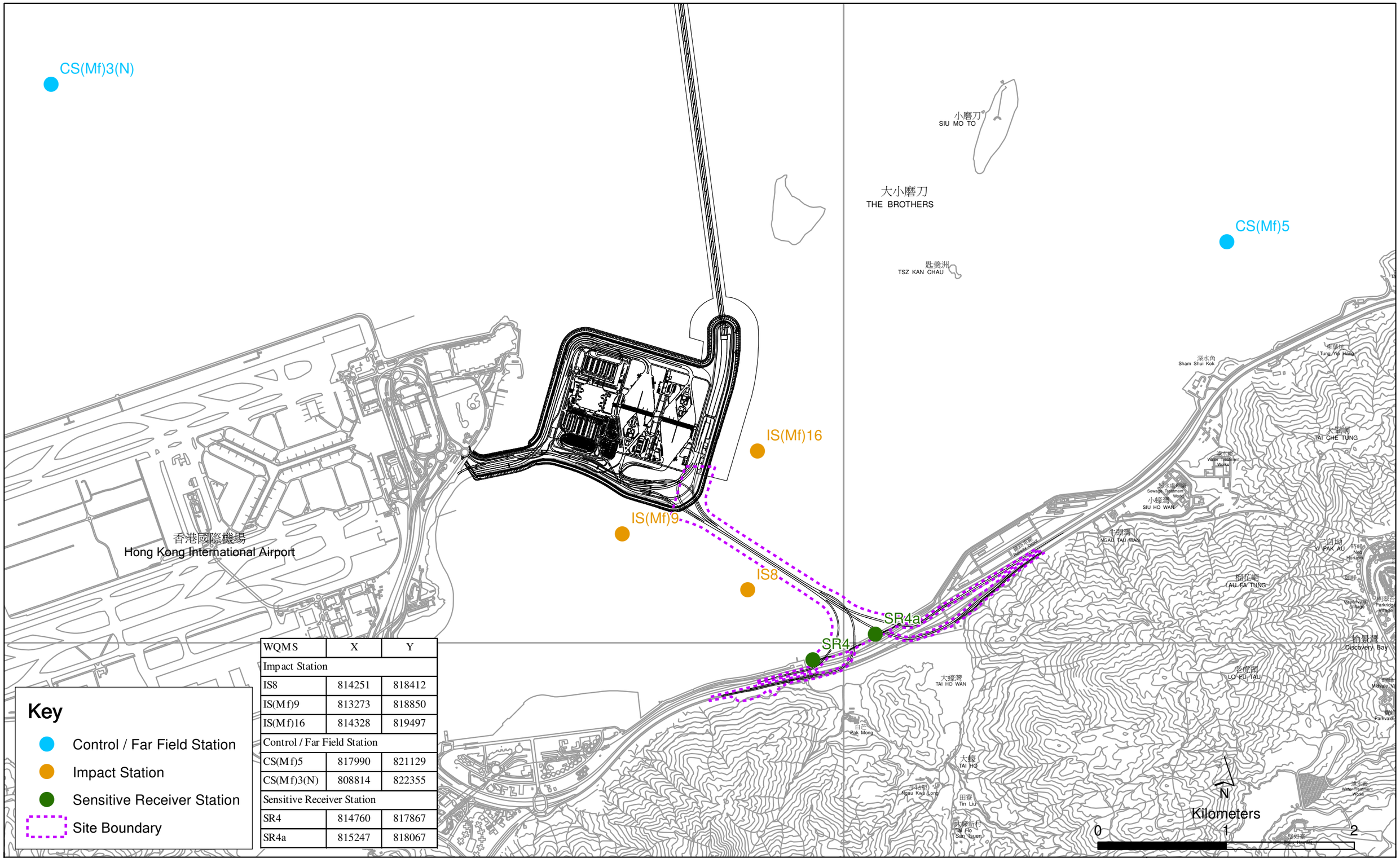
Project	Works	Date (yyyy-mm-dd)	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Surface	1	29.4	7.8	18.6	5	4.7	6.7	4.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Surface	2	29.3	7.8	18.6	4.9		6.3	4.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Middle	1	28.9	7.8	21.5	4.4		5.9	5.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Middle	2	28.8	7.8	21.6	4.3		5.8	6.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Bottom	1	27	7.7	27.2	3.7	3.7	12.8	9.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)5	12:10	Bottom	2	26.9	7.8	27	3.7		13.6	10.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Surface	1	30.7	8.1	15.8	5.8	5.1	5.5	4.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Surface	2	30.6	8.1	15.8	6		5.2	4.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Middle	1	29.2	8	19.5	4.4		5.3	5.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Middle	2	28.5	8	23.4	4.1		5.3	4.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Bottom	1	28.3	8	23.9	3.7	3.7	6.2	5.1
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	CS(Mf)3(N)	13:22	Bottom	2	28.2	8	24	3.7		5.9	4.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Surface	1	30	7.9	19.9	6.3	5.7	7.6	6.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Surface	2	29.9	7.9	19.9	6.3		7.0	6.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Middle	1	29.4	7.8	21.2	5.1		8.8	6.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Middle	2	29.3	7.9	21.2	5		8.4	8.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Bottom	1	28.7	7.8	22.5	4.3	4.3	6.6	10.0
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)16	12:55	Bottom	2	28.6	7.8	22.5	4.3		5.9	9.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4a	13:07	Surface	1	30.3	7.8	19.5	6.4	6.4	8.2	8.0
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4a	13:07	Surface	2	30.2	7.9	19.5	6.3		7.9	9.0
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4a	13:07	Bottom	1	28.8	7.8	22.4	4.4	4.5	13.4	9.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4a	13:07	Bottom	2	28.7	7.8	22.4	4.5		14.1	10.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4	13:14	Surface	1	30.1	7.9	19.5	5.8	5.8	8.2	9.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4	13:14	Surface	2	30	7.9	19.5	5.7		7.5	10.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4	13:14	Bottom	1	29.8	7.9	20.1	5.2	5.3	8.3	10.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	SR4	13:14	Bottom	2	29.7	7.9	20.1	5.3		8.4	9.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS8	13:26	Surface	1	30.3	7.9	19.5	6.4	6.3	7.3	5.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS8	13:26	Surface	2	30.1	7.9	19.6	6.1		7.0	4.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS8	13:26	Bottom	1	29.8	7.9	20.3	5.4	5.4	14.3	12.3
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS8	13:26	Bottom	2	29.6	7.9	20.3	5.4		14.1	11.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)9	13:37	Surface	1	30.7	8	18.8	8	8.0	4.7	3.1
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)9	13:37	Surface	2	30.6	8.1	18.9	7.9		3.9	3.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)9	13:37	Bottom	1	29.3	7.9	20.7	5.1	5.2	5.9	4.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Ebb	IS(Mf)9	13:37	Bottom	2	29.2	7.9	21	5.2		5.2	5.4

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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Surface	1	28.5	7.8	22.3	4.4	4.2	4.1	4.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Surface	2	28.6	7.8	22.3	4.5		4.7	3.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Middle	1	27.8	7.8	24.9	3.9		3.7	4.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Middle	2	27.9	7.8	24.9	3.9		4.4	4.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Bottom	1	26.7	7.8	28.1	3.4	3.4	7.9	3.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)5	20:18	Bottom	2	26.8	7.8	28.1	3.4		8.2	4.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Surface	1	30.6	7.8	13.3	6.2	5.2	9.6	8.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Surface	2	30.8	7.8	13.1	5.7		10.8	9.3
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Middle	1	29	7.6	19	4.1		17.3	9.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Middle	2	30.1	7.7	16.7	4.6		17.7	10.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Bottom	1	29	7.6	19	4	4.0	24.2	9.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	CS(Mf)3(N)	19:00	Bottom	2	29.3	7.7	18.8	3.9		22.0	9.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)16	19:44	Surface	1	29.9	7.9	19.1	5.9	6.0	6.4	3.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)16	19:44	Surface	2	30	7.9	19	6		6.7	4.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)16	19:44	Bottom	1	29.2	7.8	20.6	4.8	4.9	12.1	13.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)16	19:44	Bottom	2	29.3	7.9	20.5	4.9		12.0	12.9
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4a	19:30	Surface	1	30	7.9	18	6	6.1	8.6	8.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4a	19:30	Surface	2	30.2	7.9	17.9	6.1		9.2	8.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4a	19:30	Bottom	1	30.1	7.9	18.3	6.1	6.2	12.9	9.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4a	19:30	Bottom	2	30.2	7.9	18.3	6.2		13.2	9.6
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4	19:22	Surface	1	30	7.9	18.7	6.2	6.3	10.6	9.7
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4	19:22	Surface	2	30.2	7.9	18.7	6.3		11.5	9.8
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4	19:22	Bottom	1	30.1	7.9	18.7	6.2	6.3	11.4	12.3
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	SR4	19:22	Bottom	2	30.2	7.9	18.7	6.3		11.6	12.3
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS8	19:09	Surface	1	30.1	8	18.8	6.5	6.6	11.1	8.5
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS8	19:09	Surface	2	30.2	7.9	18.7	6.6		11.1	8.4
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS8	19:09	Bottom	1	30.2	8	19.3	6.7	6.8	21.0	10.2
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS8	19:09	Bottom	2	30.3	8	19.3	6.9		20.3	9.1
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)9	18:56	Middle	1	30.3	8	19.3	7	7.1	13.1	11.0
TMCLKL	HY/2012/07	2017-08-07	Mid-Flood	IS(Mf)9	18:56	Middle	2	30.4	8	19.3	7.2		13.1	11.0

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	16 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_09 August 2017_ Bottom-depth DO_E_Station CS(Mf)5
0215660_09 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5
0215660_09 August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of three exceedances were recorded on 9 August 2017.

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_09 August 2017_ Bottom-depth DO_E_Station CS(Mf)5 0215660_09 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5 0215660_09 August 2017_Bottom-depth DO_F_Station CS(Mf)5 [Total No. of Exceedances = 3]**	
Date	9 August 2017 (Measured) 13 August 2017 (*In situ* results received by ERM) 18 August 2017 (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, Bottom-depth Dissolved Oxygen (DO)	
Action Levels	Surface and Middle-depth DO	5.0 mg/L
	Bottom-depth DO	4.7 mg/L
Limit Levels	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 CS(Mf)5 (Bottom-depth) (DO = 4.4mg/L); 2. Mid-Flood at CS(Mf)5 (Surface and Middle-depth) (DO = 4.9mg/L); 3. Mid-Flood at CS(Mf)5 (Bottom-depth) (DO = 4.3mg/L).	
Works Undertaken (at the time of monitoring event)	No marine works was undertaken under this Contract on 9 August 2017.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of surface and middle-depth DO during mid-flood tide and bottom-depth DO during both mid-flood and mid-ebb tides at CS(Mf)5 are unlikely to be due to the Project, in view of the following: • Apart from CS(Mf)5, 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. • CS(Mf)5 is distant (>3km) from the marine works area under this Contract, thus the observed exceedances should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • DO levels at CS(Mf)5 were generally lower 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. Higher Salinity recorded at the bottom level and lower Salinity recorded at the surface and middle level of CS(Mf)5 were observed during both mid-flood and mid-ebb tides on 7 August 2017. Record of higher Salinity at the bottom level of CS(Mf)5 was likely caused by stratification of water column where freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, resulted in lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring station. Higher Salinity limits the solubility of oxygen in the seawater, which contribute to a lower DO at the bottom level at CS(Mf)5.	

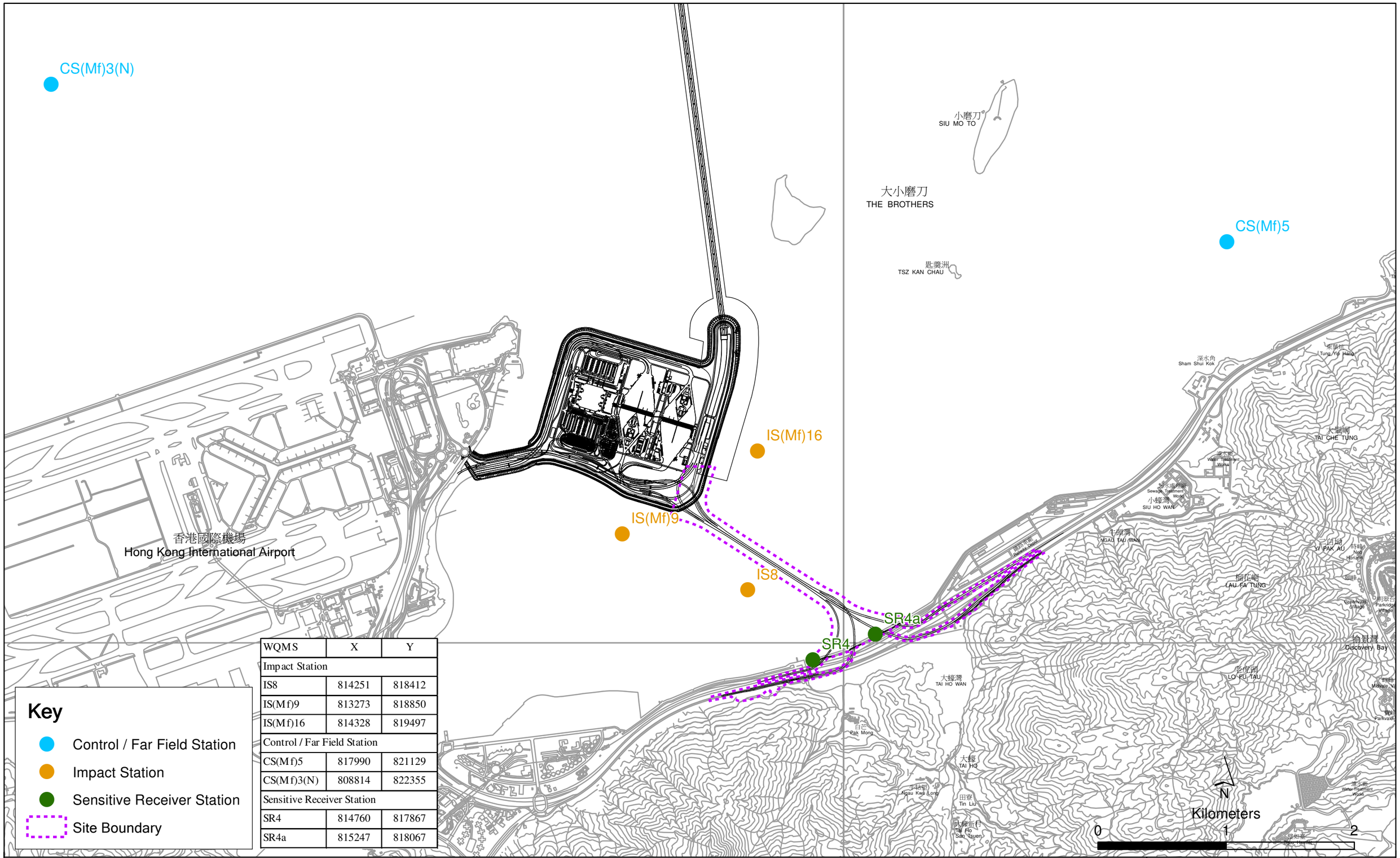
Actions Taken / To Be Taken	No immediate action is considered necessary. The ET will monitor for future trends in exceedances.
Remarks	The monitoring results on 9 August 2017 and locations of water quality monitoring stations are attached.

Project	Works	Date (yyyy-mm	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Surface	1	29.5	7.9	18.8	5.3	5.0	6.5	6.9
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Surface	2	29.7	7.8	18.8	5.4		6.3	8.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Middle	1	28.7	7.9	21.3	4.6		8.8	13.9
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Middle	2	28.8	7.8	21.3	4.6		9.7	13.8
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Bottom	1	28.1	7.9	24.3	4.4	4.4	11.3	13.9
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)5	14:24	Bottom	2	28.3	7.8	24.3	4.4		12.2	13.1
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Surface	1	29.3	7.7	19.1	5.5	5.2	6.7	5.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Surface	2	29.6	7.8	18.7	5.4		7.5	4.9
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Middle	1	29	7.7	20.6	4.9		18.0	6.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Middle	2	29.2	7.8	20.2	4.8		18.5	7.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Bottom	1	29	7.7	20.7	4.9	4.8	21.2	7.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	CS(Mf)3(N)	12:39	Bottom	2	29.2	7.8	20.3	4.7		21.8	8.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Surface	1	29.2	7.9	20.8	5.3	5.1	10.1	11.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Surface	2	29.4	7.8	20.8	5.4		9.9	12.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Middle	1	28.9	7.9	21.4	4.7		8.6	13.1
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Middle	2	29	7.8	21.4	4.8		8.2	14.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Bottom	1	28.5	7.9	22.4	4.7	4.7	5.3	13.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)16	13:55	Bottom	2	28.6	7.8	22.5	4.7		5.4	13.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4a	13:40	Surface	1	29.7	8.1	19.6	5.7	5.8	8.0	12.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4a	13:40	Surface	2	29.8	7.9	19.6	5.8		7.8	11.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4a	13:40	Bottom	1	29.1	8.1	21.1	5.1	5.1	16.4	16.9
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4a	13:40	Bottom	2	29.2	7.8	21.1	5.1		15.9	18.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4	13:12	Surface	1	29.7	8	19.1	5.7	5.7	8.3	10.8
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4	13:12	Surface	2	29.8	7.9	19.1	5.7		8.0	10.7
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4	13:12	Bottom	1	29.7	8	20	5.6	5.7	12.5	20.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	SR4	13:12	Bottom	2	29.8	7.9	20	5.7		12.0	19.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS8	12:57	Surface	1	29.8	8	19.5	6.4	6.4	5.4	6.7
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS8	12:57	Surface	2	29.9	7.9	19.5	6.4		5.9	5.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS8	12:57	Bottom	1	29.6	8	20	6	6.0	11.2	10.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS8	12:57	Bottom	2	29.7	7.9	20	6		11.2	9.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)9	12:50	Surface	1	29.6	8	19.5	6.6	6.7	5.2	6.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)9	12:50	Surface	2	29.8	7.9	19.5	6.7		5.7	5.8
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)9	12:50	Bottom	1	29.6	8	19.5	6.4	6.5	16.6	7.1
TMCLKL	HY/2012/07	2017-08-09	Mid-Ebb	IS(Mf)9	12:50	Bottom	2	29.7	7.9	19.5	6.5		16.2	7.6

Project	Works	Date (yyyy-mm	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Surface	1	29.4	7.9	17.6	5	4.9	4.8	5.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Surface	2	29.5	7.8	17.6	5		4.2	6.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Middle	1	28.9	7.9	20.7	4.7		4.1	7.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Middle	2	29	7.8	20.7	4.7		3.6	7.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Bottom	1	28.3	7.9	24.2	4.3	4.3	4.8	7.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)5	6:34	Bottom	2	28.4	7.8	24.3	4.3		4.3	6.7
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Surface	1	29.7	7.8	16.3	5.5	5.3	8.2	6.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Surface	2	29.5	7.6	16.6	5.6		7.7	5.8
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Middle	1	29.6	7.8	18.1	4.9		12.5	7.7
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Middle	2	29.4	7.6	18.4	5		11.6	7.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Bottom	1	29.4	7.6	18.6	5	4.9	22.7	7
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	CS(Mf)3(N)	7:21	Bottom	2	29.6	7.8	18.3	4.8		23.2	7.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Surface	1	29.2	8	19.7	5.1	5.1	3.8	2.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Surface	2	29.3	7.8	19.7	5.1		3.1	3.1
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Middle	1	29.2	8	19.8	5		4.4	4.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Middle	2	29.3	7.8	19.7	5		3.3	4.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Bottom	1	29.1	8	20.3	5	5.0	10.0	5.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)16	7:09	Bottom	2	29.2	7.8	20.3	5		9.2	6.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4a	7:21	Surface	1	29.3	8	18.1	5.1	5.2	5.0	8.7
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4a	7:21	Surface	2	29.5	7.8	18.1	5.2		4.4	9.3
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4a	7:21	Bottom	1	29.3	8	18.6	5.1	5.2	8.2	11.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4a	7:21	Bottom	2	29.4	7.8	18.7	5.2		7.4	10.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4	7:27	Surface	1	29.3	8	18.7	5.2	5.2	6.7	10
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4	7:27	Surface	2	29.4	7.8	18.7	5.2		6.6	10.5
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4	7:27	Bottom	1	29.3	8	18.7	5.3	5.3	8.2	13.1
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	SR4	7:27	Bottom	2	29.4	7.8	18.7	5.3		7.9	12
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS8	7:48	Surface	1	29.3	8	19	5.1	5.2	5.7	5.8
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS8	7:48	Surface	2	29.4	7.8	19	5.2		5.4	6.4
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS8	7:48	Bottom	1	29.3	8	19.2	5.1	5.2	7.2	8
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS8	7:48	Bottom	2	29.4	7.8	19.2	5.2		7.6	8.2
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)9	7:56	Surface	1	29.3	8	19.3	5.2	5.2	5.3	6.6
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)9	7:56	Surface	2	29.4	7.8	19.3	5.2		5.0	7
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)9	7:56	Bottom	1	29.3	8	19.5	5.1	5.2	6.5	13
TMCLKL	HY/2012/07	2017-08-09	Mid-Flood	IS(Mf)9	7:56	Bottom	2	29.4	7.8	19.4	5.2		5.3	13

Note: Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	22 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_11 August 2017_ Surface and Middle-depth DO_E_Station CS(Mf)5
0215660_11 August 2017_ Bottom-depth DO_E_Station IS(Mf)16
0215660_11 August 2017_ Bottom-depth DO_E_Station SR4a
0215660_11 August 2017_ Bottom-depth DO_F_Station CS(Mf)5
0215660_11 August 2017_ Surface and Middle-depth DO_F_Station IS(Mf)16
0215660_11 August 2017_Depth-averaged SS_F_Station IS8

Limit Level Exceedance
0215660_11 August 2017_ Bottom-depth DO_E_Station CS(Mf)5

A total of seven exceedances were recorded on 11 August 2017.

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_11 August 2017_ Surface and Middle-depth DO_E_Station CS(Mf)5** **0215660_11 August 2017_ Bottom-depth DO_E_Station IS(Mf)16** **0215660_11 August 2017_ Bottom-depth DO_E_Station SR4a** **0215660_11 August 2017_ Bottom-depth DO_F_Station CS(Mf)5** **0215660_11 August 2017_ Surface and Middle-depth DO_F_Station IS(Mf)16** **0215660_11 August 2017_Depth-averaged SS_F_Station IS8** **Limit Level Exceedance** **0215660_11 August 2017_ Bottom-depth DO_E_Station CS(Mf)5** **[Total No. of Exceedances = 7]**	
Date	11 August 2017 (Measured) 13 August 2017 (*In situ* results received by ERM) 22 August 2017 (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, Depth-averaged Suspended Solids (SS)	
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
Action Levels for SS	SS	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data (i.e., 23.5 mg/L).
Limit Levels for SS	SS	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data. (i.e., 34.4 mg/L)
Measured Levels	Action Level Exceedance 1. Mid-Ebb at CS(Mf)5 (Surface and Middle-depth DO = 4.6 mg/L); 2. Mid-Ebb at IS(Mf)16 (Bottom-depth DO = 4.6 mg/L); 3. Mid-Ebb at SR4a (Bottom-depth DO = 4.1 mg/L); 4. Mid-Flood at CS(Mf)5 (Bottom-depth DO = 3.7 mg/L); 5. Mid-Flood at IS(Mf)16 (Surface and Middle-depth DO = 4.9 mg/L); 6. Mid-Flood at IS8 (depth-averaged SS = 28.4 mg/L); Limit Level Exceedance 7. Mid-Ebb at CS(Mf)5 (Bottom-depth DO = 3.5 mg/L).	
Works Undertaken (at the time of monitoring event)	No marine works was undertaken under this Contract on 11 August 2017.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance of surface and middle-depth DO, bottom-depth DO and depth-averaged SS are unlikely to be due to the Project, in view of the following: • No marine works was undertaken under this Contract on 11 August 2017. • Depth-averaged Turbidity 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. • Apart from IS8, depth-averaged SS levels at all other monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb tides on the same day. Depth-averaged SS levels at IS8 at mid-ebb tides were similar to those at other stations apart from the exceedance observed at mid-flood tide. • CS(Mf)5 is distant (>3km) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from marginal exceedances at IS(Mf)16 and SR4a, levels of DO at all other Impact stations and sensitive receiver monitoring stations were in compliance with the Action and Limit Levels during both mid-flood and mid-ebb 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. Higher Salinity recorded at the bottom level and lower Salinity recorded at the surface and middle level of CS(Mf)5 were observed during both mid-flood and mid-ebb tides on 11 August 2017. Record of higher Salinity at the bottom level of CS(Mf)5 was likely caused by stratification of water column where freshwater discharged from the Pearl River tended to form a surface layer of lower salinity water, resulted in lower Salinity recorded at the surface and middle levels compared to the higher Salinity recorded at the bottom level of the monitoring station. Higher Salinity limits the solubility of oxygen in the seawater, which contribute to a lower DO at the bottom level at CS(Mf)5.
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 11 August 2017 and locations of water quality monitoring stations are attached.

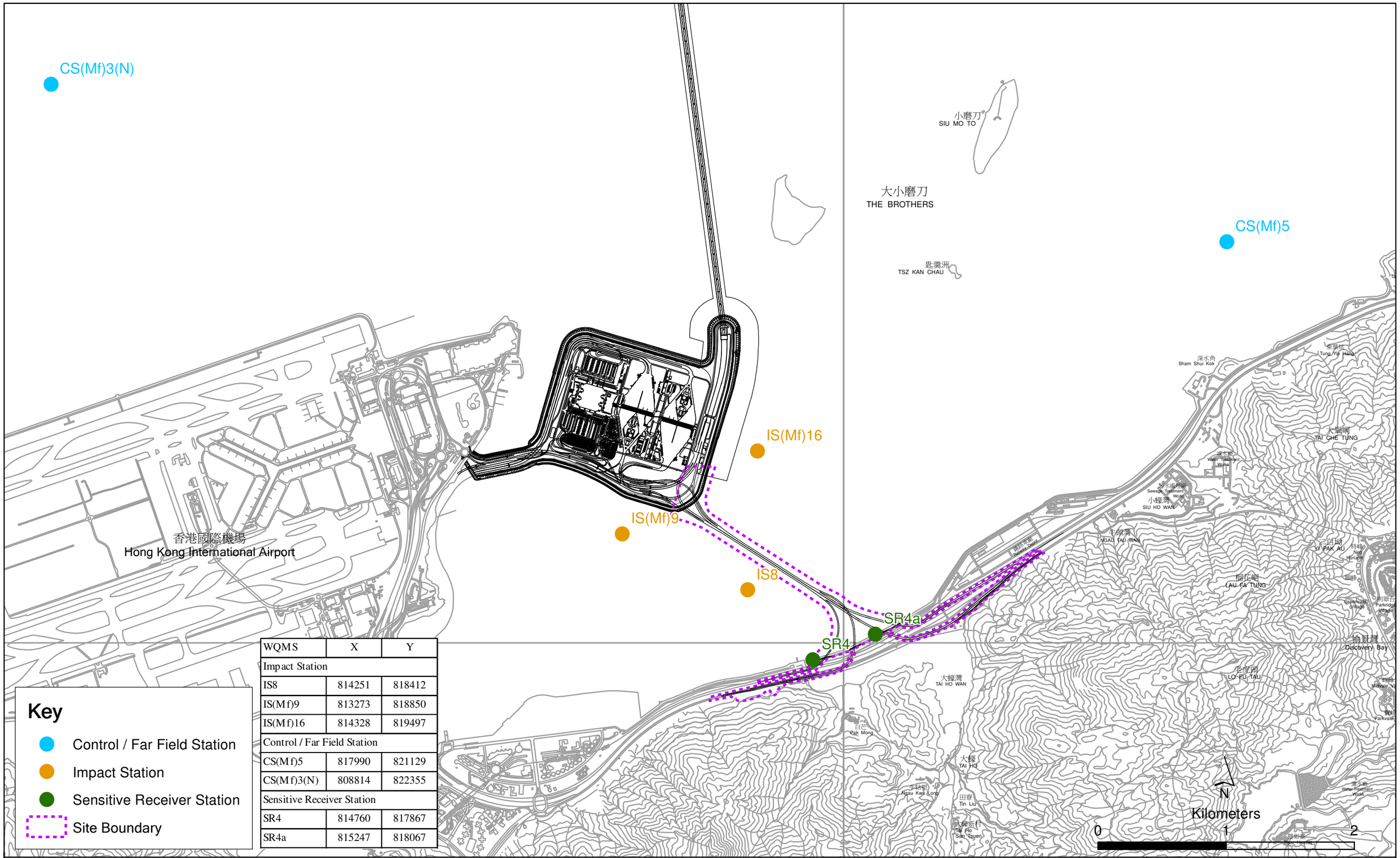
Project	Works	Date (yyyy-mm-dd	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	Depth-averaged Turbidity (mg/L)	SS (mg/L)	Depth-averaged SS (mg/L)
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Surface	1	29.4	7.8	19.3	5.3	4.6	7.9	13.4	9.6	10.3
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Surface	2	29.5	7.8	19.3	5.4		7.9		9.6	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Middle	1	27.7	7.9	24.1	3.7		9.6		8.4	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Middle	2	27.8	7.8	24.1	3.8		9.7		8.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Bottom	1	26.7	7.9	27.3	3.5	3.5	22.7		13.2	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)5	15:33	Bottom	2	26.8	7.8	27.3	3.5		22.7		12.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Surface	1	30.1	7.8	17.7	5.6	5.3	4.9	13.3	5.3	5.1
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Surface	2	29.9	7.7	18.0	5.8		5.3		4.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Middle	1	28.8	7.8	21.0	4.7		13.7		3.8	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Middle	2	28.6	7.7	21.3	4.9		14.0		4.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Bottom	1	28.6	7.9	21.9	4.6	4.7	20.7		6.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	CS(Mf)3(N)	13:55	Bottom	2	28.4	7.7	22.2	4.8		20.9		6.2	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Surface	1	29.4	7.8	20.5	5.4	5.2	5.9	7.7	6.7	9.6
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Surface	2	29.5	7.8	20.5	5.5		6.8		7.6	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Middle	1	28.7	7.8	21.7	4.9		7.5		11.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Middle	2	28.8	7.8	21.7	4.9		8.2		10.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Bottom	1	28.5	7.8	22.1	4.6	4.6	9.0		11.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)16	14:58	Bottom	2	28.6	7.8	22.1	4.6		8.9		10.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4a	14:40	Surface	1	29.3	7.8	20.0	5.1	5.2	7.7	12.6	8.5	10.6
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4a	14:40	Surface	2	29.4	7.8	20.0	5.2		8.8		9.4	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4a	14:40	Bottom	1	28.0	7.8	23.4	4.1	4.1	16.5		12.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4a	14:40	Bottom	2	28.1	7.8	23.4	4.1		17.3		12.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4	14:31	Surface	1	29.4	7.9	19.7	5.3	5.4	10.8	12.0	11.8	13.0
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4	14:31	Surface	2	29.5	7.8	19.7	5.4		11.8		10.9	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4	14:31	Bottom	1	29.2	7.9	20.4	5.3	5.4	12.2		15.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	SR4	14:31	Bottom	2	29.4	7.8	20.3	5.4		13.0		14.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS8	14:19	Surface	1	29.3	7.9	20.1	5.5	5.6	8.2	12.0	7.1	8.7
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS8	14:19	Surface	2	29.5	7.8	20.0	5.6		8.4		6.4	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS8	14:19	Bottom	1	29.0	7.9	20.5	5.0	5.1	15.8		11.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS8	14:19	Bottom	2	29.1	7.8	20.5	5.1		15.7		10.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)9	14:08	Surface	1	29.8	7.8	19.2	5.7	5.8	6.2	12.3	4.8	11.6
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)9	14:08	Surface	2	29.9	7.8	19.1	5.8		5.0		5.9	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)9	14:08	Bottom	1	29.2	7.8	20.4	5.2	5.2	18.7		17.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Ebb	IS(Mf)9	14:08	Bottom	2	29.3	7.8	20.4	5.2		19.1		18.8	

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 (mg/L)	SS (mg/L)	Depth-averaged SS (mg/L)
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Surface	1	29.1	8.3	17.5	5.2	5.0	3.4	3.3	3.8	5.0
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Surface	2	29.2	8.3	17.5	5.3		2.9		5.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Middle	1	28.6	8.2	19.9	4.6		3.6		4.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Middle	2	28.8	8.3	19.9	4.7		2.5		6.2	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Bottom	1	27.2	8.1	25.9	3.7	3.7	4.4		4.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)5	8:02	Bottom	2	27.4	8.2	25.6	3.7		3.1		5.3	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Surface	1	29.5	7.8	15.4	5.5	5.3	6.7	11.4	6.4	14.0
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Surface	2	29.2	7.6	15.9	5.4		6.9		7.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Middle	1	29.4	7.8	17.2	5.1		9.7		9.8	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Middle	2	29.2	7.6	17.5	5.2		9.4		9.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Bottom	1	29.2	7.8	18.6	5.0	5.1	17.1		24.4	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	CS(Mf)3(N)	9:11	Bottom	2	28.9	7.7	18.9	5.2		18.4		26.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Surface	1	28.9	7.9	19.2	4.9	4.9	6.1	6.0	5.2	6.3
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Surface	2	29.0	8.0	19.2	5.0		5.6		4.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Middle	1	28.8	7.9	20.2	4.7		4.9		6.8	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Middle	2	28.9	8.0	20.1	4.8		3.6		5.6	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Bottom	1	28.7	7.9	20.2	4.7	4.8	8.1		7.6	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)16	8:37	Bottom	2	28.9	8.0	20.2	4.8		7.8		8.2	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4a	8:50	Surface	1	28.9	8.0	19.1	5.4	5.4	26.5	21.6	18.8	18.1
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4a	8:50	Surface	2	29.0	8.0	19.1	5.4		26.3		18.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4a	8:50	Bottom	1	28.8	7.9	19.5	4.7	4.8	16.3		17.3	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4a	8:50	Bottom	2	28.9	7.9	19.4	4.8		17.2		17.7	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4	9:04	Surface	1	29.0	7.9	18.5	5.1	5.1	5.5	5.9	6.9	6.9
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4	9:04	Surface	2	29.1	8.0	18.5	5.1		5.2		7.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4	9:04	Bottom	1	29.0	8.0	18.6	5.1	5.2	6.6		6.2	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	SR4	9:04	Bottom	2	29.1	8.0	18.6	5.2		6.2		7.6	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS8	9:18	Surface	1	28.9	7.9	18.8	4.9	5.0	23.1	24.9	22.9	28.4
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS8	9:18	Surface	2	29.1	8.0	18.8	5.0		24.0		24.4	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS8	9:18	Bottom	1	28.9	7.9	20.1	4.7	4.8	26.7		32.5	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS8	9:18	Bottom	2	29.0	7.9	20.1	4.8		25.6		33.9	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)9	9:33	Surface	1	29.1	7.9	19.1	5.3	5.3	3.6	4.7	4.2	6.4
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)9	9:33	Surface	2	29.2	8.0	19.1	5.3		2.7		4.0	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)9	9:33	Bottom	1	28.9	7.9	20.5	5.2	5.2	6.4		8.1	
TMCLKL	HY/2012/07	2017-08-11	Mid-Flood	IS(Mf)9	9:33	Bottom	2	29.0	8.0	20.4	5.2		5.9		9.4	

Note:

Indicates Exceedance of Action Level

Indicates Exceedance of Limit Level



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	18 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_14 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5
0215660_14 August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of two exceedances were recorded on 14 August 2017.

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

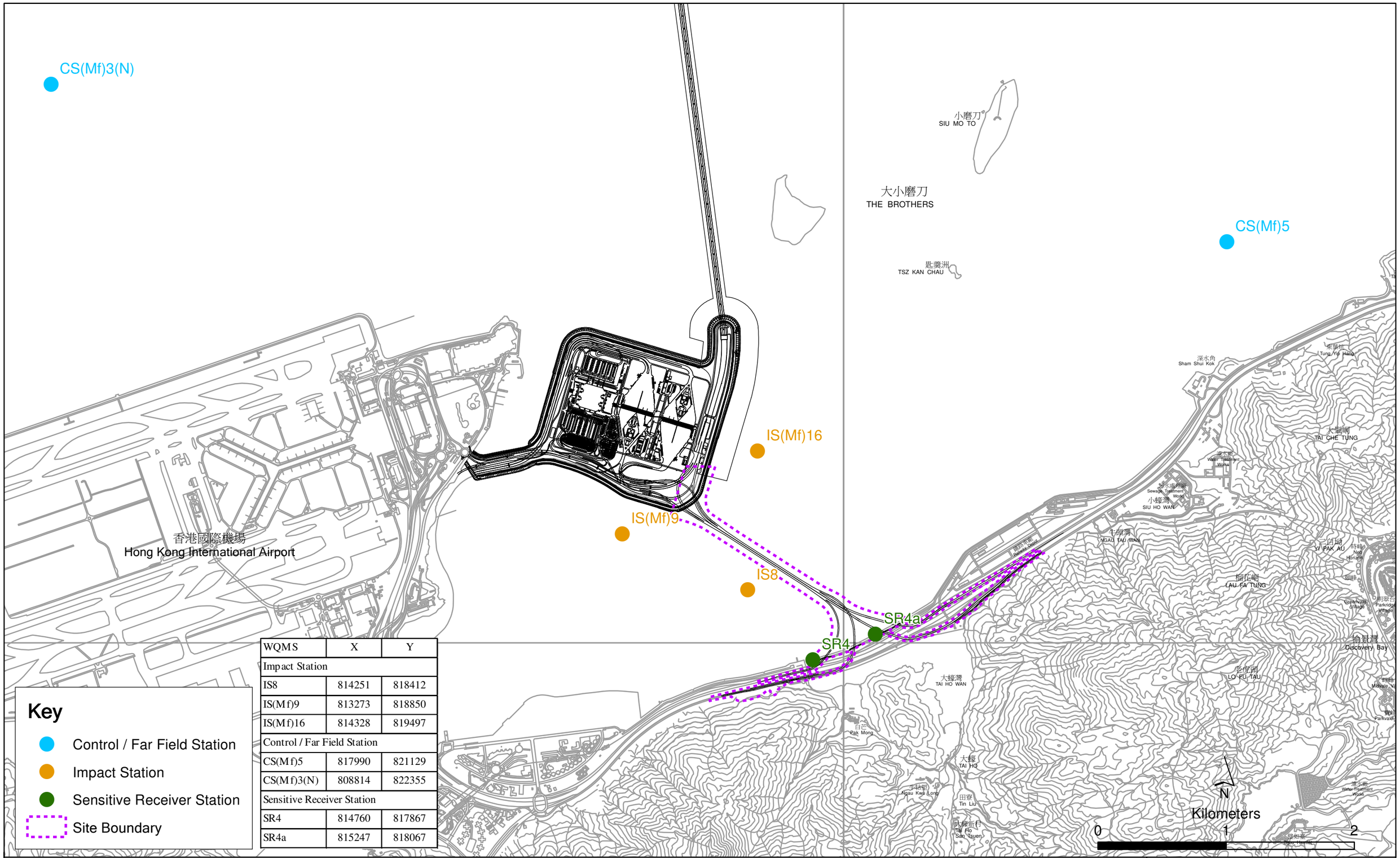
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0215660_14 August 2017_Surface and Middle-depth DO_F_Station CS(Mf)5 0215660_14 August 2017_Bottom-depth DO_F_Station CS(Mf)5 [Total No. of Exceedances = 2]**	
Date	14 August 2017 (Measured) 16 August 2017 (*In situ* results received by ERM) 24 August 2017 (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 Dissolved Oxygen	
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-Flood at CS(Mf)5 (Surface and Middle-depth DO = 4.9 mg/L); 2. Mid-Flood at CS(Mf)5 (Bottom-depth DO = 4.2 mg/L).	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 14 August 2017 included: • Rock armour reinstatement for the construction of underslung truss scheme	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of surface and middle-depth DO and bottom-depth DO at CS(Mf)5 are unlikely to be due to the Project, in view of the following: • CS(Mf)5 is distant (>3km) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from the Control station CS(Mf)5, 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.	
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 14 August 2017 and locations of water quality monitoring stations are 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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Surface	1	29.6	7.8	18.3	5.8	5.7	4.4	5.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Surface	2	29.7	8.0	18.3	5.8		4.6	5.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Middle	1	29.4	8.0	19.7	5.5		4.7	5.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Middle	2	29.5	8.1	19.7	5.5		4.9	4.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Bottom	1	27.3	8.0	27.3	4.8	4.8	4.2	4.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)5	17:19	Bottom	2	27.4	8.1	27.4	4.7		4.5	4.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Surface	1	30.0	7.9	16.4	6.1	6.2	3.0	2.5
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Surface	2	29.8	7.7	17.8	6.3		2.4	3.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Middle	1	30.0	7.9	16.4	6.1		3.0	2.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Middle	2	29.8	7.7	17.8	6.2		2.4	3.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Bottom	1	29.2	7.8	18.8	4.8	4.9	7.3	2.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	CS(Mf)3(N)	16:09	Bottom	2	29.0	7.6	20.4	5.0		7.0	3.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Surface	1	29.8	7.8	20.9	6.2	5.8	5.3	6.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Surface	2	29.9	7.9	20.9	6.2		5.2	5.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Middle	1	29.1	7.8	21.5	5.4		5.5	4.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Middle	2	29.2	7.9	21.5	5.4		5.5	5.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Bottom	1	28.5	7.8	22.8	5.2	5.2	3.0	5.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)16	16:52	Bottom	2	28.6	7.9	22.6	5.1		3.4	5.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4a	16:41	Surface	1	29.7	7.8	20.2	6.1	6.1	8.6	8.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4a	16:41	Surface	2	29.9	7.9	20.2	6.1		8.2	7.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4a	16:41	Bottom	1	29.5	7.8	20.5	5.7	5.7	11.7	9.5
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4a	16:41	Bottom	2	29.7	7.9	20.5	5.6		11.2	8.5
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4	16:35	Surface	1	29.9	7.8	20.1	6.3	6.3	6.3	5.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4	16:35	Surface	2	30.0	7.9	20.1	6.3		5.8	5.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4	16:35	Bottom	1	29.6	7.8	21.2	5.8	5.8	8.9	5.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	SR4	16:35	Bottom	2	29.7	7.9	21.2	5.8		8.5	6.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS8	16:28	Surface	1	30.1	7.8	20.2	6.4	6.4	9.8	2.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS8	16:28	Surface	2	30.2	7.9	20.2	6.4		10.0	3.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS8	16:28	Bottom	1	29.7	7.8	20.8	5.7	5.7	13.0	3.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS8	16:28	Bottom	2	29.8	7.9	20.8	5.6		12.5	2.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)9	16:19	Surface	1	30.5	8.0	20.5	5.1	5.2	5.1	2.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)9	16:19	Surface	2	30.5	8.0	20.5	5.2		5.1	3.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)9	16:19	Bottom	1	30.3	7.9	20.6	7.0	6.9	5.2	5.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Ebb	IS(Mf)9	16:19	Bottom	2	30.3	7.9	20.6	6.8		5.2	6.4

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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Surface	1	29.1	7.7	19.4	5.2	4.9	3.0	2.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Surface	2	29.2	7.7	19.4	5.3		2.5	2.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Middle	1	28.2	7.7	23.9	4.5		3.4	4.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Middle	2	28.3	7.7	23.9	4.5		3.1	3.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Bottom	1	27.7	7.7	25.8	4.2	4.2	4.5	5.4
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)5	10:45	Bottom	2	27.8	7.7	25.9	4.2		4.3	6.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Surface	1	30.3	7.8	12.9	6.0	5.8	5.7	4.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Surface	2	30.0	7.7	14.2	6.1		5.1	4.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Middle	1	29.4	8.0	17.2	5.6		7.6	4.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Middle	2	29.4	7.9	17.2	5.6		7.5	5.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Bottom	1	28.8	7.8	21.5	5.1	5.1	8.1	4.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	CS(Mf)3(N)	12:28	Bottom	2	28.8	7.7	21.6	5.1		8.5	4.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)16	11:19	Surface	1	29.4	7.7	19.9	5.7	5.7	3.5	4.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)16	11:19	Surface	2	29.6	7.7	19.9	5.7		3.4	4.0
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)16	11:19	Bottom	1	29.1	7.7	20.9	5.3	5.3	9.8	6.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)16	11:19	Bottom	2	29.3	7.7	20.9	5.3		10.3	6.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4a	11:32	Surface	1	29.7	7.7	18.2	5.8	5.8	5.5	5.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4a	11:32	Surface	2	29.8	7.7	18.2	5.8		5.4	6.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4a	11:32	Bottom	1	29.6	7.7	18.4	5.8	5.8	7.8	7.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4a	11:32	Bottom	2	29.7	7.7	18.4	5.8		7.2	6.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4	11:39	Surface	1	29.6	7.7	18.8	5.8	5.8	6.1	3.1
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4	11:39	Surface	2	29.7	7.7	18.8	5.8		6.0	3.7
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4	11:39	Bottom	1	29.5	7.7	19.0	5.7	5.7	11.3	11.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	SR4	11:39	Bottom	2	29.6	7.7	19.0	5.7		11.8	10.3
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS8	11:54	Surface	1	29.7	7.7	19.0	5.8	5.8	5.7	5.9
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS8	11:54	Surface	2	29.8	7.7	19.0	5.8		5.6	4.8
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS8	11:54	Bottom	1	29.4	7.7	20.1	5.6	5.6	16.1	8.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS8	11:54	Bottom	2	29.5	7.7	20.1	5.6		16.7	7.5
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)9	12:05	Surface	1	29.6	7.8	20.3	5.8	5.9	6.0	7.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)9	12:05	Surface	2	29.8	7.8	20.3	5.9		5.6	6.2
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)9	12:05	Bottom	1	29.3	7.8	21.5	5.6	5.6	9.3	7.6
TMCLKL	HY/2012/07	2017-08-14	Mid-Flood	IS(Mf)9	12:05	Bottom	2	29.4	7.8	21.5	5.5		9.3	6.0

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



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	18 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_16 August 2017_ Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_16 August 2017_ Bottom-depth DO_F_Station CS(Mf)5

A total of two exceedances were recorded on 16 August 2017.

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

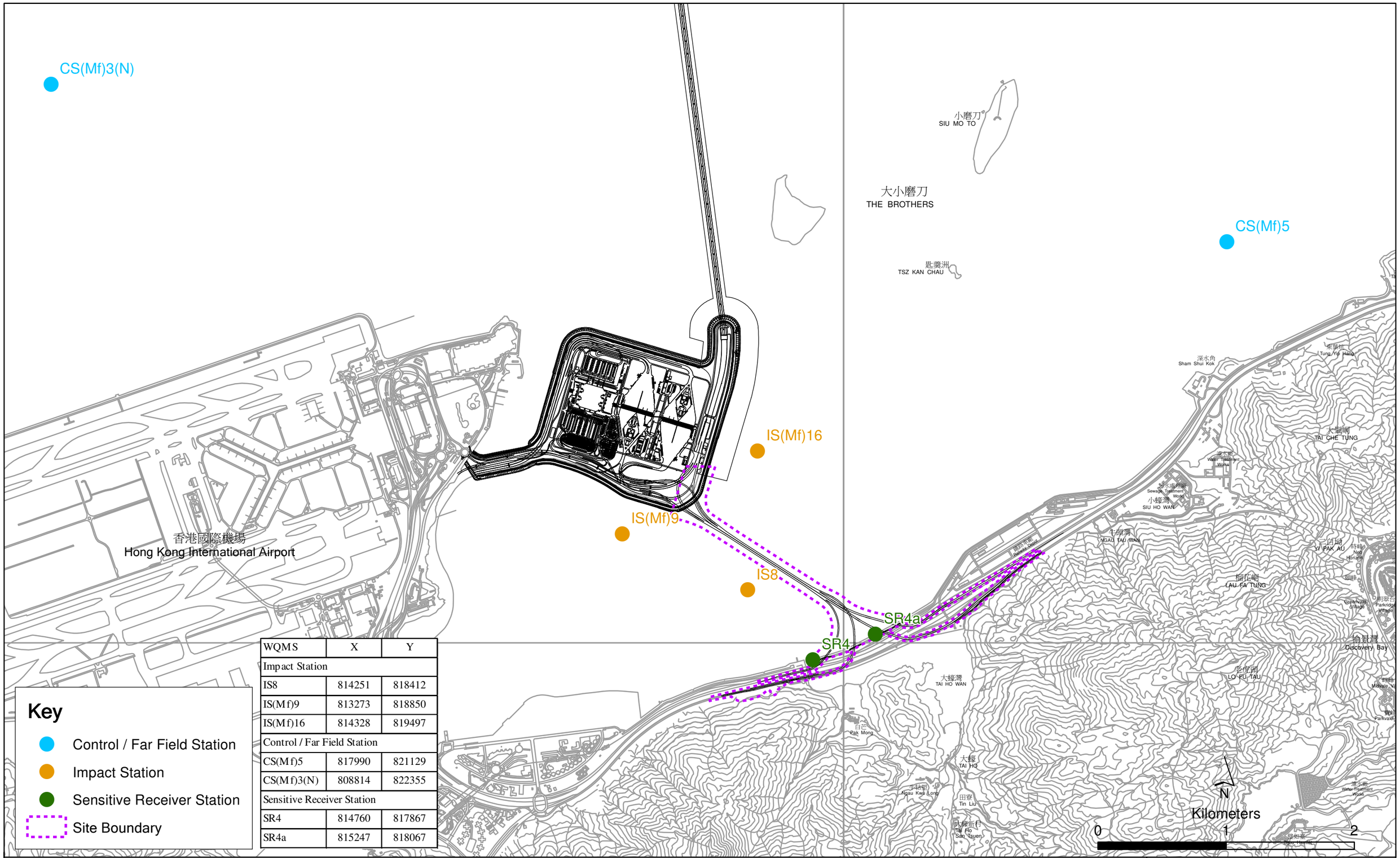
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0215660_16 August 2017_ Bottom-depth DO_E_Station CS(Mf)3(N) 0215660_16 August 2017_ Bottom-depth DO_F_Station CS(Mf)5 [Total No. of Exceedances = 2]**	
Date	16 August 2017 (Measured) 18 August 2017 (*In situ* results received by ERM) 25 August 2017 (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	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 CS(Mf)3(N) (Bottom-depth DO = 4.6 mg/L); 2. Mid-Flood at CS(Mf)5 (Bottom-depth DO = 4.0 mg/L).	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 16 August 2017 included: • Rock armour reinstatement for the construction of underslung truss scheme	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of bottom-depth DO at CS(Mf)3(N) and CS(Mf)5 are unlikely to be due to the Project, in view of the following: • CS(Mf)3(N) and CS(Mf)5 are distant (>5km and >3km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from the Control stations, CS(Mf)3(N) and CS(Mf)5, 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.	
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 18 August 2017 and locations of water quality monitoring stations are attached.	

Project	Works	ate (yyyy-mm-d	Tide	Station	Start Time	Level	Replicate	Temperature (°C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Surface	1	29.1	7.8	18.4	5.9	5.9	2.0	1.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Surface	2	29.1	7.8	18.4	5.9		2.2	1.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Middle	1	29.1	7.8	19.4	5.8		2.0	2.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Middle	2	29.0	7.8	19.4	5.8		2.2	2.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Bottom	1	28.0	7.8	23.8	5.5	5.5	1.7	2.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)5	07:10	Bottom	2	28.0	7.8	24.6	5.5		1.7	2.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Surface	1	29.4	7.8	13.1	6.1	5.4	3.5	2.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Surface	2	29.6	7.7	13.2	5.9		3.5	3.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Middle	1	28.8	7.7	19.4	5.0		3.0	2.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Middle	2	29.0	7.6	19.9	4.7		3.6	2.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Bottom	1	28.1	7.7	22.3	4.7	4.6	3.2	4.7
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	CS(Mf)3(N)	09:08	Bottom	2	28.3	7.6	22.5	4.4		3.7	4.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Surface	1	29.9	7.9	19.1	6.5	6.2	4.3	3.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Surface	2	29.8	7.9	19.1	6.5		4.8	3.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Middle	1	29.4	7.8	20.6	5.8		4.9	4.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Middle	2	29.4	7.8	20.6	5.9		4.9	3.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Bottom	1	28.9	7.8	21.8	5.2	5.3	3.3	4.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)16	07:44	Bottom	2	28.8	7.8	21.8	5.3		3.5	4.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4a	07:54	Surface	1	29.5	7.9	19.1	6.0	6.0	3.6	3.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4a	07:54	Surface	2	29.4	7.9	19.2	6.0		4.2	3.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4a	07:54	Bottom	1	29.1	7.8	20.1	5.6	5.7	3.0	2.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4a	07:54	Bottom	2	29.2	7.8	20.8	5.7		3.3	3.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4	08:00	Surface	1	29.6	7.9	18.6	6.0	6.0	4.0	3.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4	08:00	Surface	2	29.5	7.9	18.6	6.0		4.5	3.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4	08:00	Bottom	1	29.5	7.8	20.6	5.6	5.6	8.6	3.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	SR4	08:00	Bottom	2	29.3	7.8	20.7	5.6		8.6	3.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS8	08:12	Surface	1	29.4	7.9	18.9	6.6	6.5	6.2	3.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS8	08:12	Surface	2	29.6	7.9	18.7	6.3		6.2	3.5
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS8	08:12	Bottom	1	29.1	7.8	21.6	5.5	5.5	9.6	3.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS8	08:12	Bottom	2	29.2	7.8	21.4	5.4		9.6	2.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)9	08:22	Surface	1	29.7	7.8	18.2	6.2	6.2	4.8	3.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)9	08:22	Surface	2	29.5	7.8	18.2	6.1		5.7	3.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)9	08:22	Bottom	1	29.7	7.8	21.0	5.1	5.1	13.3	3.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Ebb	IS(Mf)9	08:22	Bottom	2	29.5	7.8	21.1	5.1		13.5	2.2

Project	Works	ate (yyyy-mm-d	Tide	Station	Start Time	Level	Replicate	Temperature (^{o}C)	pH	Salinity (ppt)	DO (mg/L)	Average DO (mg/L)	Turbidity (NTU)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Surface	1	29.7	7.9	17.2	6.6	5.6	1.7	1.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Surface	2	29.9	7.9	17.2	6.7		2.0	1.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Middle	1	27.6	7.9	25.9	4.6		3.5	1.7
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Middle	2	27.6	7.9	25.8	4.4		3.3	1.5
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Bottom	1	25.1	7.8	33.9	4.0	4.0	9.1	5.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)5	14:47	Bottom	2	25.1	7.8	34.0	3.9		9.5	6.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Surface	1	30.5	7.9	8.4	6.6	6.2	5.1	4.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Surface	2	30.7	7.7	8.5	6.4		5.8	4.5
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Middle	1	30.0	7.8	13.5	6.0		3.8	4.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Middle	2	30.2	7.7	13.5	5.8		4.4	4.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Bottom	1	29.0	7.8	17.3	5.3	5.2	2.7	4.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	CS(Mf)3(N)	13:16	Bottom	2	29.2	7.6	17.3	5.1		3.6	4.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Surface	1	29.6	7.9	18.3	7.1	6.6	3.5	5.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Surface	2	29.7	7.9	18.3	7.0		2.5	4.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Middle	1	29.1	7.9	19.4	6.1		7.0	5.7
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Middle	2	29.1	7.9	19.4	6.1		6.4	4.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Bottom	1	28.4	7.8	23.0	5.4	5.4	12.9	5.4
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)16	14:20	Bottom	2	28.5	7.8	23.0	5.3		12.5	4.5
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4a	14:00	Surface	1	29.7	7.9	16.0	7.1	7.1	3.1	4.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4a	14:00	Surface	2	29.9	7.9	16.0	7.1		2.5	3.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4a	14:00	Bottom	1	29.1	7.8	19.7	6.1	6.1	16.5	6.0
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4a	14:00	Bottom	2	29.3	7.8	19.7	6.0		17.4	4.7
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4	13:55	Surface	1	29.7	7.9	15.8	7.2	7.3	2.9	2.9
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4	13:55	Surface	2	29.9	7.9	15.9	7.3		2.2	3.1
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4	13:55	Bottom	1	29.6	7.9	17.5	6.9	6.8	6.6	4.6
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	SR4	13:55	Bottom	2	29.7	7.9	17.6	6.7		6.6	5.3
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS8	13:45	Middle	1	29.7	7.9	16.6	7.2	7.2	2.5	1.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS8	13:45	Middle	2	29.8	7.9	16.6	7.2		1.9	1.8
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)9	13:36	Middle	1	29.6	8.0	18.0	7.2	7.2	2.9	2.2
TMCLKL	HY/2012/07	2017-08-16	Mid-Flood	IS(Mf)9	13:36	Middle	2	29.8	8.0	18.0	7.2		2.5	3.0

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



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ – Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section
Subject	Notification of Exceedance for Marine Water Quality Impact Monitoring
Date	24 August 2017

ERM

Dear Sir/ Madam,

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

Action Level Exceedance
0215660_18 August 2017_ Bottom-depth DO_E_Station CS(Mf)3(N)
0215660_18 August 2017_Bottom-depth DO_F_Station CS(Mf)5

A total of two exceedances were recorded on 18 August 2017.

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

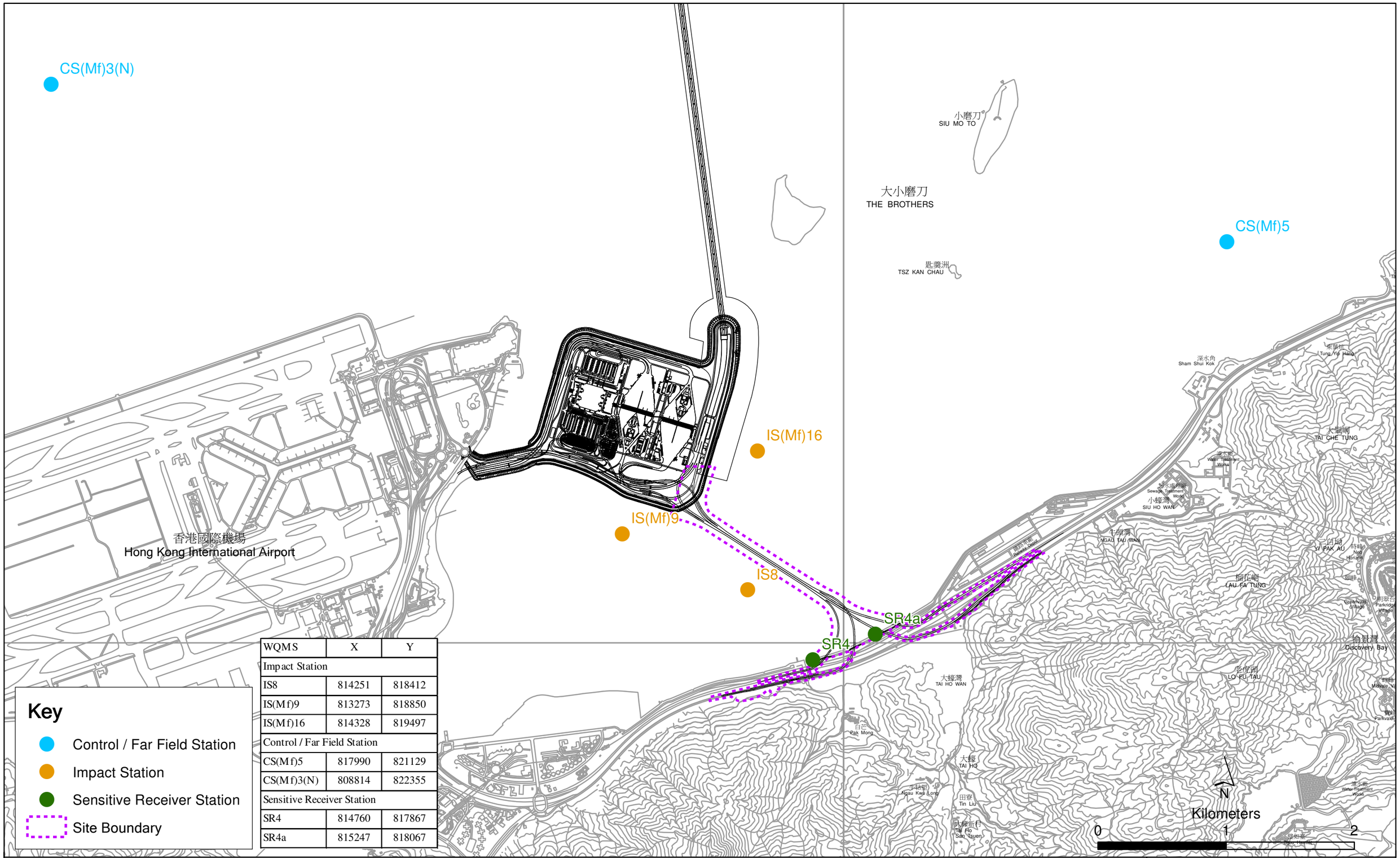
Notification of Exceedance

Log No.	**Action Level Exceedance** **0215660_18 August 2017_ Bottom-depth DO_E_Station CS(Mf)3(N)** **0215660_18 August 2017_Bottom-depth DO_F_Station CS(Mf)5** **[Total No. of Exceedances = 2]**	
Date	18 August 2017 (Measured) 20 August 2017 (*In situ* results received by ERM) 28 August 2017 (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	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 CS(Mf)3(N) (Bottom-depth DO = 3.9 mg/L); 2. Mid-Flood at CS(Mf)5 (Bottom-depth DO = 4.5 mg/L).	
Works Undertaken (at the time of monitoring event)	Major marine works undertaken under this Contract on 18 August 2017 included: • Rock armour reinstatement for the construction of underslung truss scheme	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedances of bottom-depth DO at CS(Mf)3(N) and CS(Mf)5 are unlikely to be due to the Project, in view of the following: • CS(Mf)3(N) and CS(Mf)5 are distant (>5km and >3km respectively) from the marine works area under this Contract, thus the observed exceedance should not be affected by the marine works under this Contract and it is considered to be natural fluctuation in water quality. • Apart from the Control stations, CS(Mf)3(N) and CS(Mf)5, 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.	
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 18 August 2017 and locations of water quality monitoring stations are 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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Surface	1	28.0	8.1	17.2	7.4	6.6	6.9	3.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Surface	2	29.4	8.0	17.2	7.4		6.7	2.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Middle	1	28.0	7.9	23.6	5.7		7.8	2.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Middle	2	28.1	8.0	23.6	5.7		7.4	3.5
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Bottom	1	26.0	7.9	31.5	5.1	5.0	8.5	3.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)5	09:20	Bottom	2	25.9	7.9	31.9	4.9		8.0	4.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Surface	1	29.3	7.7	15.1	6.1	5.2	2.4	4.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Surface	2	29.5	7.8	15.0	6.0		2.6	3.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Middle	1	27.4	7.6	24.2	4.4		3.6	5.5
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Middle	2	27.6	7.7	24.2	4.2		4.1	6.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Bottom	1	26.9	7.6	25.8	4.0	3.9	5.2	5.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	CS(Mf)3(N)	10:59	Bottom	2	27.2	7.7	25.8	3.8		5.6	5.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Surface	1	29.5	8.0	19.5	7.4	7.0	4.6	3.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Surface	2	29.6	8.0	19.5	7.5		4.1	3.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Middle	1	29.0	7.9	20.7	6.4		5.4	3.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Middle	2	28.9	8.0	20.8	6.6		5.2	4.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Bottom	1	28.1	7.9	25.2	5.5	5.5	6.1	5.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)16	09:58	Bottom	2	28.3	7.9	25.0	5.4		6.7	5.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4a	10:10	Surface	1	29.2	8.0	19.4	6.9	6.9	4.3	5.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4a	10:10	Surface	2	29.3	8.0	19.4	6.9		4.0	4.7
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4a	10:10	Bottom	1	28.8	7.9	22.6	6.0	6.0	4.3	4.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4a	10:10	Bottom	2	28.9	8.0	22.6	5.9		4.6	5.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4	10:15	Surface	1	29.3	8.0	19.3	6.5	6.5	4.9	4.7
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4	10:15	Surface	2	29.4	8.0	19.3	6.5		5.1	5.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4	10:15	Bottom	1	28.6	7.9	22.4	5.5	5.5	8.8	14.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	SR4	10:15	Bottom	2	28.8	7.9	22.3	5.4		9.4	13.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS8	10:32	Surface	1	29.8	8.2	17.9	9.0	9.1	2.9	3.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS8	10:32	Surface	2	29.9	8.1	17.9	9.1		2.7	2.9
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS8	10:32	Bottom	1	28.8	7.9	21.9	5.9	5.9	10.8	4.9
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS8	10:32	Bottom	2	29.0	8.0	21.8	5.9		11.5	4.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)9	10:46	Surface	1	29.5	8.0	19.1	7.0	7.1	5.4	5.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)9	10:46	Surface	2	29.6	8.0	19.2	7.1		5.3	3.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)9	10:46	Bottom	1	28.9	7.9	22.1	6.0	6.0	8.4	8.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Ebb	IS(Mf)9	10:46	Bottom	2	29.1	8.0	22.1	6.0		8.3	8.1

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)	SS (mg/L)
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Surface	1	28.4	8.1	22.9	7.8	6.7	3.7	3.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Surface	2	28.5	8.2	22.8	7.9		3.3	3.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Middle	1	26.8	7.9	28.3	5.4		4.4	4.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Middle	2	26.9	8.1	28.3	5.5		4.6	5.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Bottom	1	25.2	7.9	33.3	4.6	4.5	9.5	6.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)5	17:29	Bottom	2	25.3	8.2	33.3	4.4		10.7	6.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Surface	1	30.5	7.7	11.3	6.9	6.6	5.4	5.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Surface	2	30.7	7.8	11.2	6.7		5.4	5.9
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Middle	1	30.1	7.7	12.8	6.4		4.7	6.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Middle	2	30.3	7.7	12.7	6.2		5.3	6.9
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Bottom	1	28.5	7.6	19.4	4.9	4.8	4.7	8.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	CS(Mf)3(N)	16:01	Bottom	2	28.7	7.6	19.5	4.7		5.2	8.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Surface	1	29.6	8.1	18.3	8.8	7.6	6.9	4.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Surface	2	29.8	8.2	18.1	9.0		7.3	5.7
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Middle	1	28.1	7.9	22.5	6.2		7.8	5.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Middle	2	28.2	8.1	22.5	6.2		7.3	4.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Bottom	1	27.7	7.9	24.9	5.5	5.5	11.1	9.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)16	17:00	Bottom	2	27.8	8.1	24.9	5.4		11.0	11.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4a	16:47	Surface	1	29.6	8.0	17.6	7.9	7.9	13.5	4.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4a	16:47	Surface	2	29.7	8.2	17.7	7.8		14.8	4.2
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4a	16:47	Bottom	1	29.4	8.0	18.0	7.4	7.4	11.7	5.1
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4a	16:47	Bottom	2	29.6	8.2	18.0	7.3		12.0	4.8
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4	16:42	Surface	1	30.1	8.1	16.6	8.8	8.8	8.7	7.7
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4	16:42	Surface	2	30.2	8.3	16.6	8.8		9.0	8.7
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4	16:42	Bottom	1	30.1	8.1	16.6	8.7	8.7	10.6	8.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	SR4	16:42	Bottom	2	30.2	8.3	16.6	8.7		10.4	9.4
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS8	16:32	Surface	1	29.9	8.1	17.1	8.8	8.8	9.0	11.5
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS8	16:32	Surface	2	30.0	8.2	17.2	8.7		9.3	11.3
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS8	16:32	Bottom	1	29.8	8.1	17.6	8.7	8.7	11.5	12.6
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS8	16:32	Bottom	2	30.0	8.2	17.6	8.7		11.4	11.9
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)9	16:20	Middle	1	30.1	8.3	18.5	11.5	11.4	6.8	6.0
TMCLKL	HY/2012/07	2017-08-18	Mid-Flood	IS(Mf)9	16:20	Middle	2	30.2	8.4	18.6	11.3		6.6	5.9

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



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

Key

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

Locations of Water Quality Monitoring Stations

File: T:\GIS\CONTRACT\0215660\Mxd\0215660_WQMS.mxd
Date: 28/4/2017

Environmental Resources Management

ERM

Email message

Environmental Resources Management

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

To	Ramboll Environ - Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/07 Tuen Mun–Chek Lap Kok Link–Southern Connection Viaduct Section
Subject	Notification of Exceedance for Impact Dolphin Monitoring
Date	30 October 2017

Dear Sir or Madam,

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

0215660_Jun2017/Aug2017_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 2017.

Regards,

Mr Jovy Tam
Environmental Team Leader

ERM-Hong K1ong, 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_Jun2017/Aug2017_dolphin_STG&ANI_NEL&NWL** **[Total No. of Exceedance = 1]**	
Date	June to August 2017 (monitored) 29 October 2017 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0 & ANI = 0
	NWL	STG = 2.2 & ANI = 6.58
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between June and August 2017. The exceedance was reported in the approved *Forty-sixth Monthly EM&A Report* dated 11 September 2017.	
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 2017) 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 ($p = 0.0044$) and ANI ($p = 0.0202$) 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 2017) 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 ($p = 0.000001$) 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 2017, the major marine works under *Contract No. HY/2012/07* included: • Uninstallation of marine piling platform; • Pier construction; • Launching gantry operation; • Installation of deck segment and pier head segment; and • Construction of underslung truss scheme (no additional seabed will be occupied other than those assumed in the approved EIA Report).	

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 (2016 – 17)* (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 (2016-2017)* also reported that CWD decline were likely influenced by reclamation works, bored piling and intensive marine traffic from construction activities. Based on these possible reasons, the corresponding marine works and implementation of mitigation measures are reviewed. This Contract does not have any reclamation works, thus no habitat loss was caused by reclamation. In the reporting period, the Contractor implemented the marine traffic control as per the requirements in the *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 in this reporting period when comparing to the previous quarters. During dolphin monitoring in this quarter, no unacceptable impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations between June and August 2017, there were thirty (30) Action Level and fourteen (14) Limit Level of Dissolved Oxygen (DO) exceedances and one (1) Action Level of Suspended Solids (SS) exceedances for water quality impact monitoring in the reporting period. The exceedances were considered not related to this Contract upon further investigation and the investigation report is presented in *Appendix L*. 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 and proposed marine park boundaries; 5. Vessels speed limited at 5 knots and 10 knots within existing and proposed marine park boundaries and site boundary respectively; 6. Idling and mooring of working vessels within site boundary; 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 9 October 2017 for discussion on CWD trend, with attendance of ENPO, Representatives of Resident Site Staff (RSS), Representatives of Environmental Team (ET) for Contract No. HY/2010/02, 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. ENPO presented the interim CWD survey results in mainland waters obtained from Hong Kong-Zhuhai-Macao Bridge Authority that some CWDs that previously more often sighted in Hong Kong waters have expanded their ranges into mainland waters, and some with reduced usage in Hong Kong waters, while they are partially accounted for the local decline. It was reminded that the ETs shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractor to ensure the relevant measures are fully implemented. The ETs were also reminded to update the BMP boundary in the Regular Marine Travel Route Plan. 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 Brothers Marine Park (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 *Forty-fourth* to *Forty-sixth Monthly EM&A Reports*. Comparison on water quality between impact and baseline periods is elaborated in the *15th Quarterly EM&A Report*.