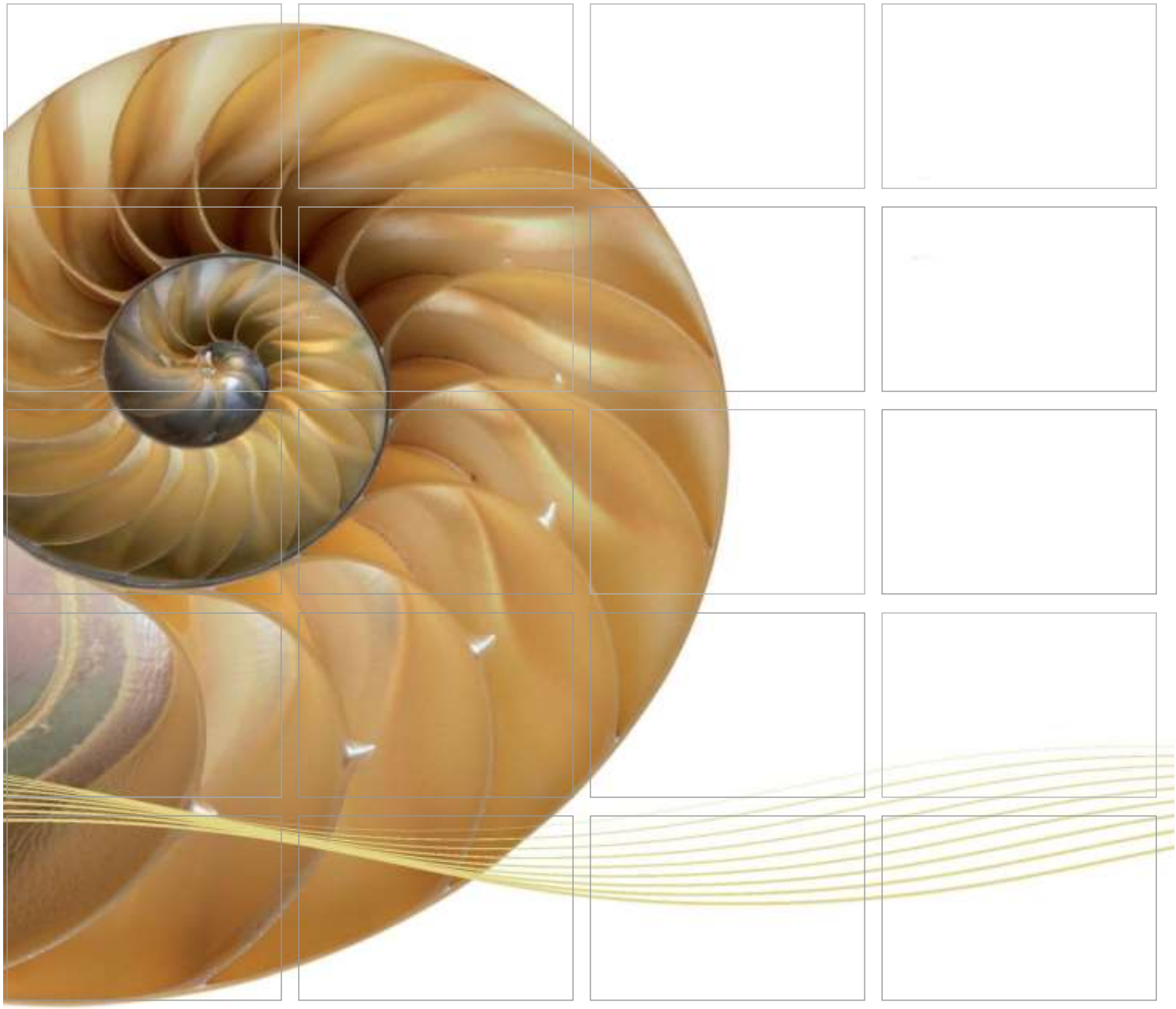
Report



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

First Annual Environmental Monitoring & Audit (EM&A) Report

25 April 2016

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

www.erm.com

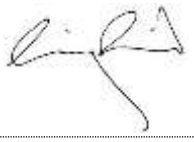
Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link – Southern Connection Viaduct Section

Environmental Resources Management

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

First Annual Environmental Monitoring & Audit (EM&A) Report

Document Code:
0215660_1st annual EM&A_20160422_v1.docx

Client: Gammon	Project No: 0215660
Summary: This document presents the First Annual EM&A Report for Tuen Mun – Chek Lap Kok Link Southern Connection Viaduct Section.	Date: 25 April 2016 Approved by:  *Mr Craig Reid* *Partner* Certified by:  *Mr Jovy Tam* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	1st Annual EM&A Report	VAR	JT	CAR	25/04/16

Distribution

☐ Internal

☒ Public

☐ Confidential

RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_4105L.16 25 April 2016

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

Attention: Mr. Daniel Ip

Dear Mr. Ip,

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

Contract No. HY/2012/07 TM-CLKL Southern Connection Viaduct Section
First Annual EM&A Report (October 2013 – October 2014)

Reference is made to the First Annual Environmental Monitoring and Audit (EM&A) Report (Oct. 2013 – Oct. 2014) (ET's ref.: 0215660_1st annual EM&A_20160422_v1.docx dated 25 Apr. 2016) certified by the ET Leader and provided to us via e-mail on 25 Apr. 2016.

Please be advised that we have no further comment on the captioned Annual EM&A Report at this stage. However, we would like to draw your attention that the ET shall supplement the Report with respect to the following observation:

1. Detailed review, analysis and evaluation of dolphin monitoring data covering annual period as per sections 1.5.1.6 and 12.9.1.1 (vi) of the EM&A Manual for TM-CLKL with level of details not less than the same part in your submitted quarterly EM&A Report and AFCD's annual marine mammal monitoring reports applicable to the dolphin monitoring.

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

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Ramboll Environ Hong Kong Limited 英環香港有限公司
Room 2403, 24/F., Jubilee Centre, 18 Fenwick Street, Wanchai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.Ramboll-Environ.com

RAMBOLL ENVIRON

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

Internal: DY, YH, CL, ENPO Site

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). 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*. Another application for variation of environmental permit (VEP) (*EP-354/2009/B*) was granted on 28 January 2014.

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 first annual EM&A report presenting the EM&A works carried out during the period from 31 October 2013 to 31 October 2014 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:

Marine-based Works

- Survey towers erection;
- Filling platform at seawall;
- Marine piling platform installation;
- Construction of rockfill platform;
- Marine piling;
- Construction of Pile caps; and
- Marine ground investigation (GI) and laboratory testing.

Land-based Works

- Tree felling and transplanting;
- Channel re-construction at Area 1;
- Site formation of workshop at Area 1;
- Site offices erection at Area 5;
- Construct temporary road at CEDD track for piling;
- Temporary access bridge (TAB);
- Fence installation and relocation at Area 2, Viaducts A, B, C & D;
- Satellite container offices erection along seawall;
- Land piling at Viaducts B, C & D;
- Construction of pile cap superstructure of Viaduct B;

- Piling platform installation at Viaducts B, C, D &E;
- Additional land GI, trial pits & lab testing;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

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

24-hour TSP monitoring	67 sessions
1-hour TSP monitoring	67 sessions
Noise monitoring	67 sessions
Water quality monitoring	154 sessions
Dolphin monitoring	24 sessions
Joint Environmental site inspection	52 sessions
Post-Translocation Coral monitoring	4 sessions
Bored piling monitoring	1 session

Breaches of Action and Limit Levels for Air Quality

Two (2) exceedances of Action Level in 24-hour TSP monitoring were recorded at ASR8A and ASR8 in the reporting period. No exceedance of Action and Limit Levels was recorded for 1-hour monitoring in the reporting period. The exceedances were considered not related to the construction works of this Contract upon further investigation.

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

One (1) exceedance of Action Level in depth-averaged SS was recorded for impact water quality monitoring in the reporting period. The exceedance was considered not related to the construction works of this Contract upon further investigation.

Impact Dolphin Monitoring

Five (5) Action Level exceedances were recorded for 3 sets of quarterly dolphin monitoring data between October 2013 and August 2014, whilst no unacceptable impact from the construction activities of the TM-CLKL Southern Connection Viaduct Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting period. The exceedances are considered to be the natural variation

of Chinese White Dolphin ranging pattern upon further investigation and not related to this Contract.

Daily marine mammal exclusion zone monitoring was undertaken during the period of marine works under this Contract. One (1) sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* was recorded on 23 January 2014 during the exclusion zone monitoring. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when marine works were carried out outside the daylight hours under this Contract.

Post-Translocation Coral Monitoring

Four (4) events of Quarterly Post-Translocation Coral Monitoring were conducted in the reporting period. No exceedance of Action and Limit Levels was recorded. The results were detailed in the *First to Fourth Quarterly Post-Translocation Coral Monitoring Report* and were submitted under separate covers.

Environmental Complaints, Non-compliance & Summons

Two (2) complaints were referred by EPD and followed-up timely in the monitoring period. No non-compliance was observed upon further investigation.

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

Reporting Change

There was no reporting change required in the reporting period.

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming annual 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. Another application for variation of environmental permit (VEP) (*EP-354/2009/B*) was granted on 28 January 2014.

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). 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 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.*

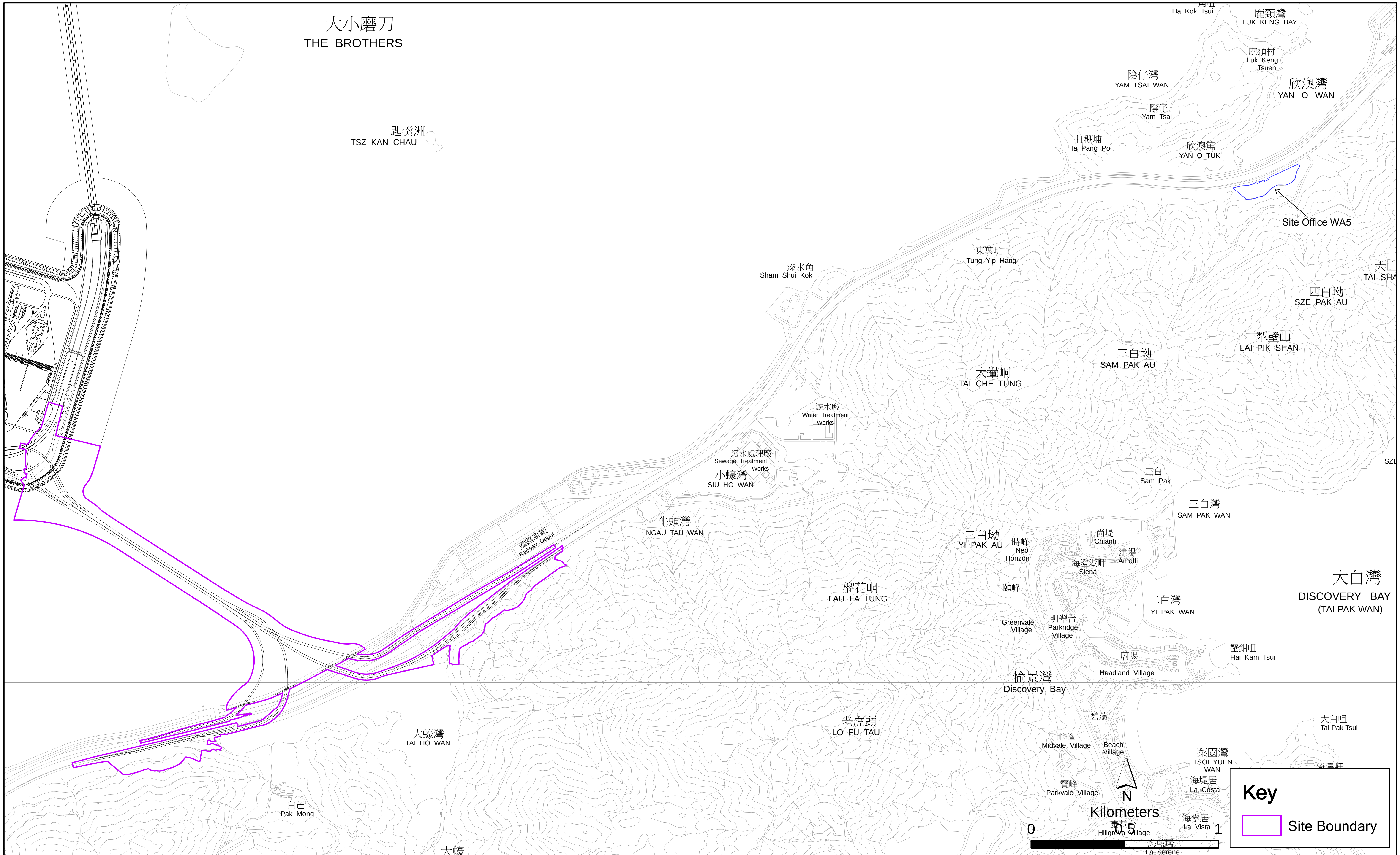

Figure 1.1

General Layout Plan of the Project

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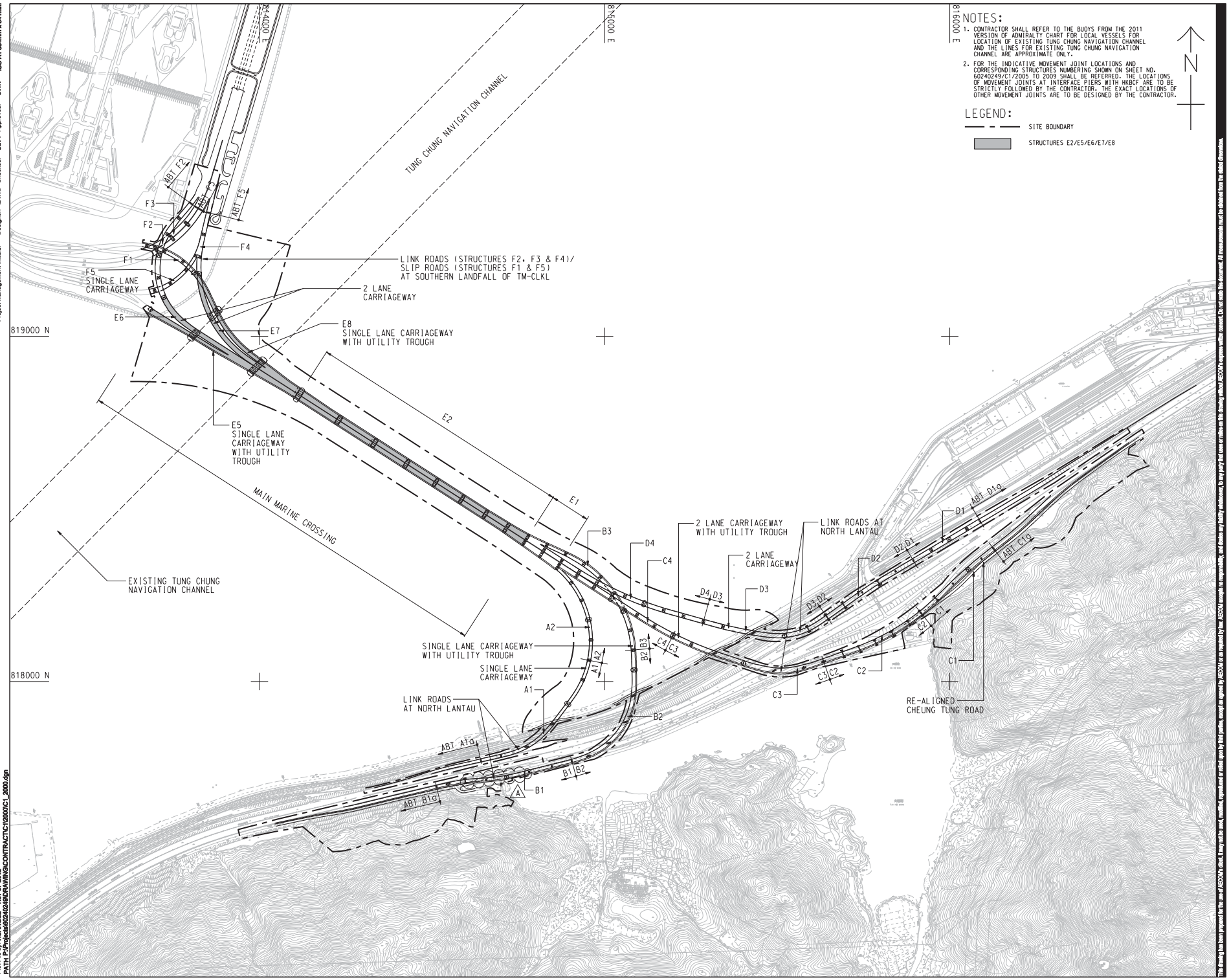
Environmental Resources Management

ERM



AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

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

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

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2a

ISSUE/REVISION

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

STATUS

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KEY PLAN

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CONTRACT NO.: HY/2012/07

SHEET TITLE
SOUTHERN CONNECTION GENERAL LAYOUT PLAN

SHEET NUMBER
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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B	SUBMISSION	RC	07/13				
C	SUBMISSION	RC	09/13				

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Checked: DS — Approved: DOP
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Client: 路政署 HIGHWAYS DEPARTMENT, Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

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

Drawing title: **Figure 1.2b**

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

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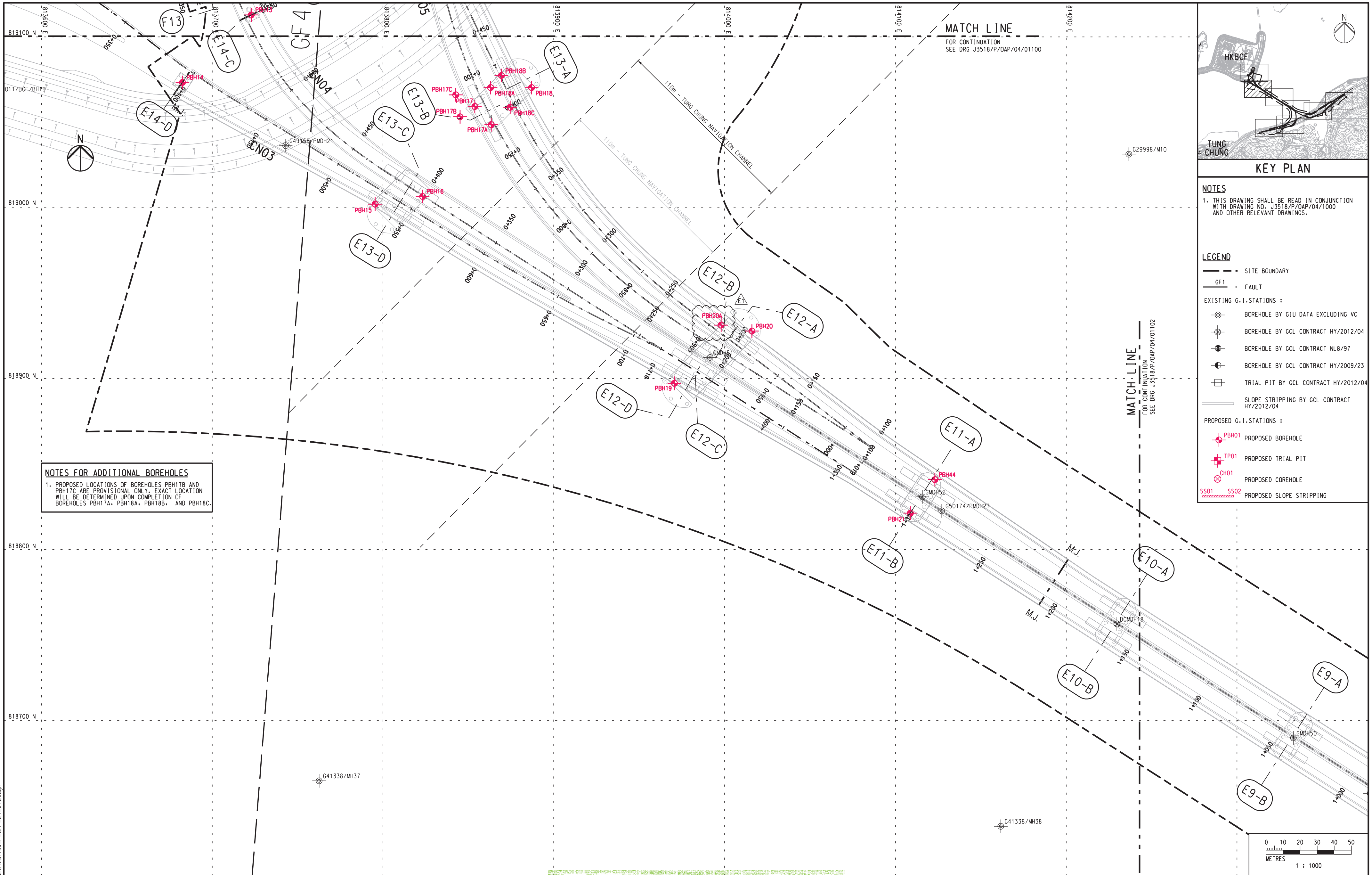

NOTES

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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

NOTES FOR ADDITIONAL BOREHOLES

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

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B	SUBMISSION	RC	07/13
C	SUBMISSION	RC	09/13
D	SUBMISSION	RC	10/13
E1	FOR INTERNAL REVIEW	RC	11/13

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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: **Figure 1.2c**

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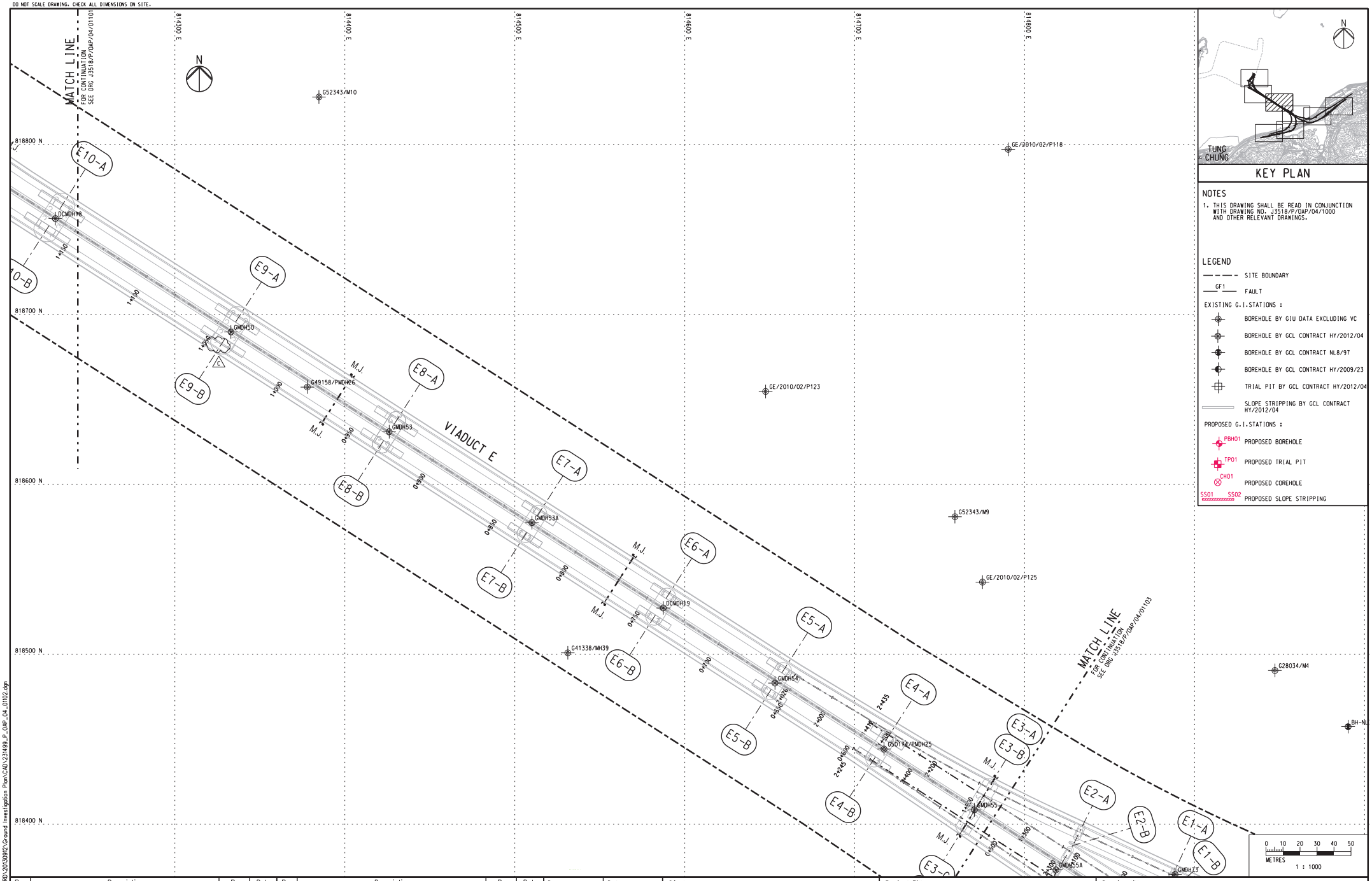

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong-Zhuhai-Macao Bridge Hong Kong Project Management Office

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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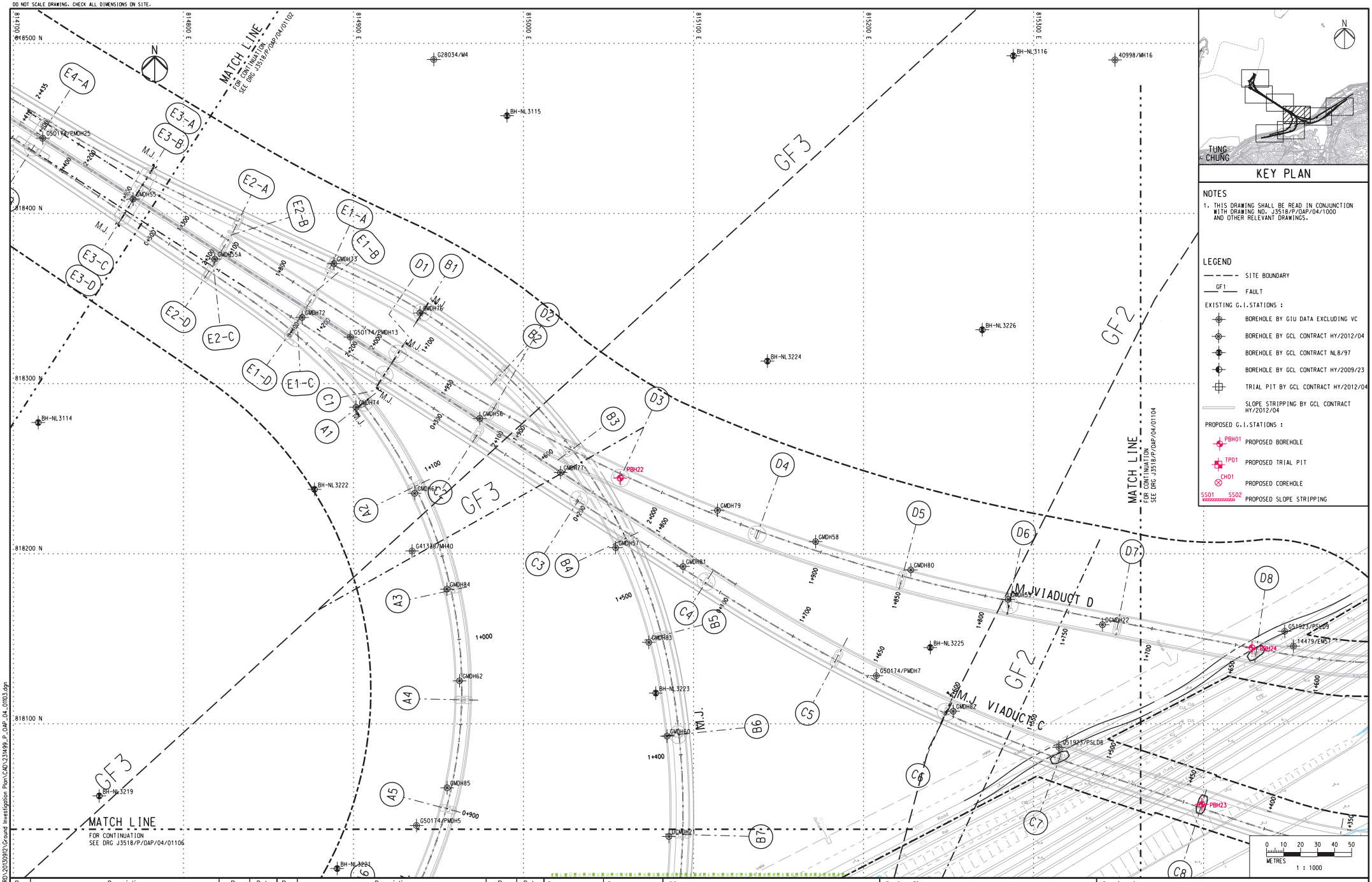

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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 1.2e**

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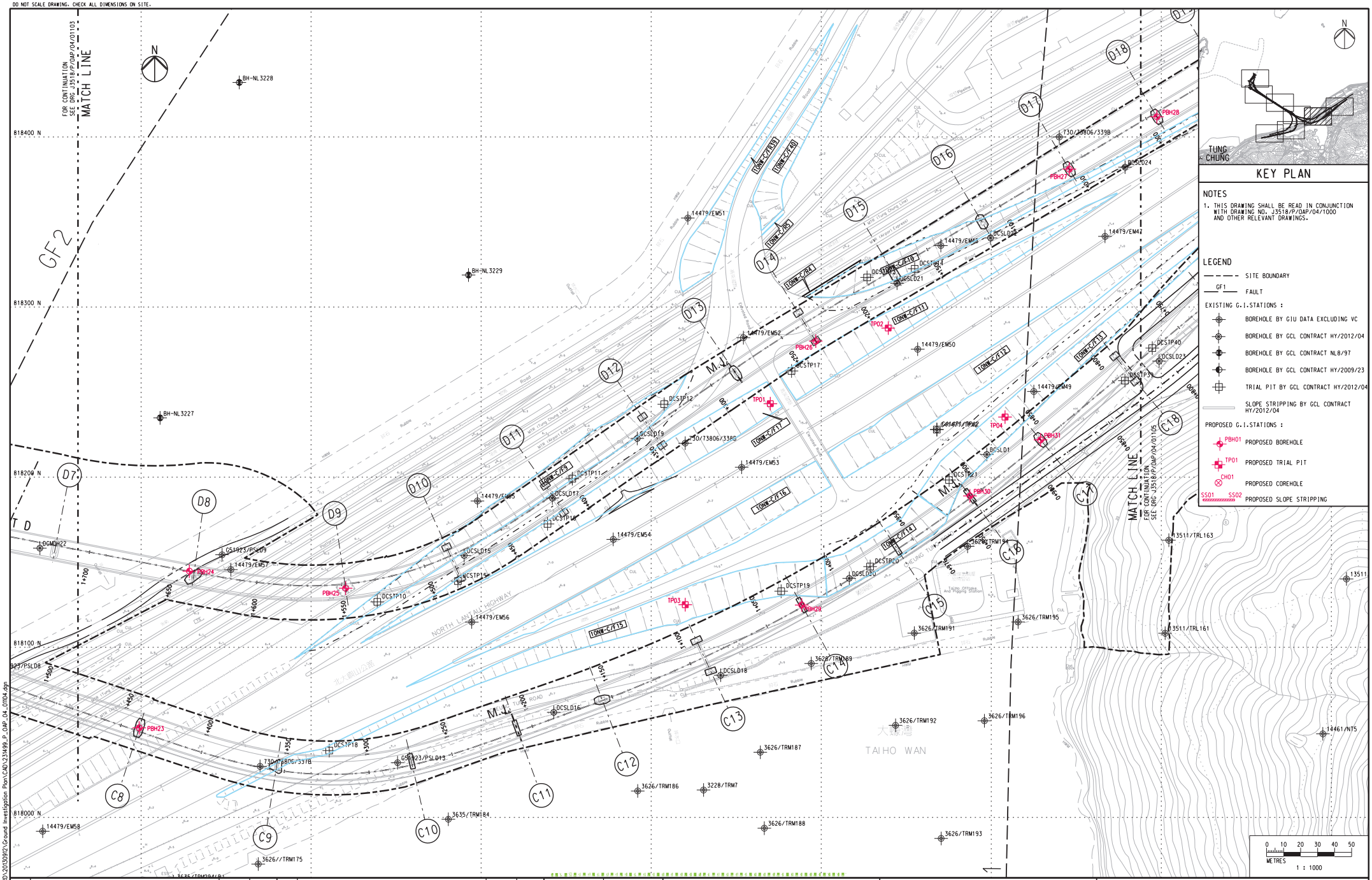

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Client: 路政署 HIGHWAYS DEPARTMENT 港珠澳大橋香港工程管理處 Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

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 1.2f**

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

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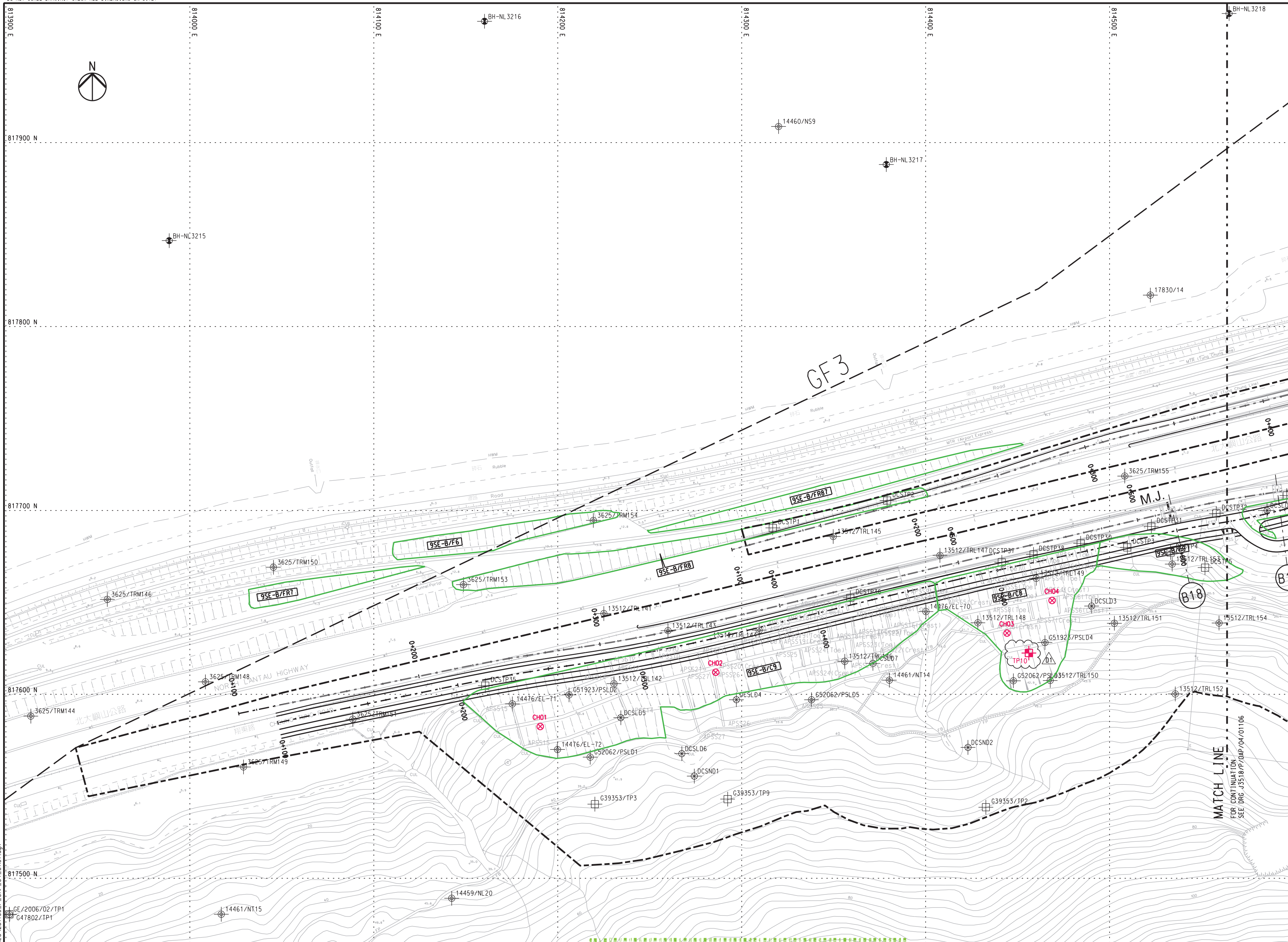

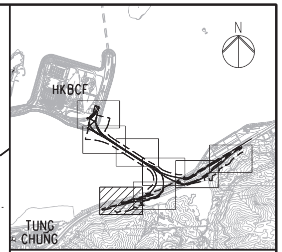

KEY PLAN

NOTES

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

LEGEND

- SITE BOUNDARY
- GF1 FAULT

EXISTING G.I. STATIONS :

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

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

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
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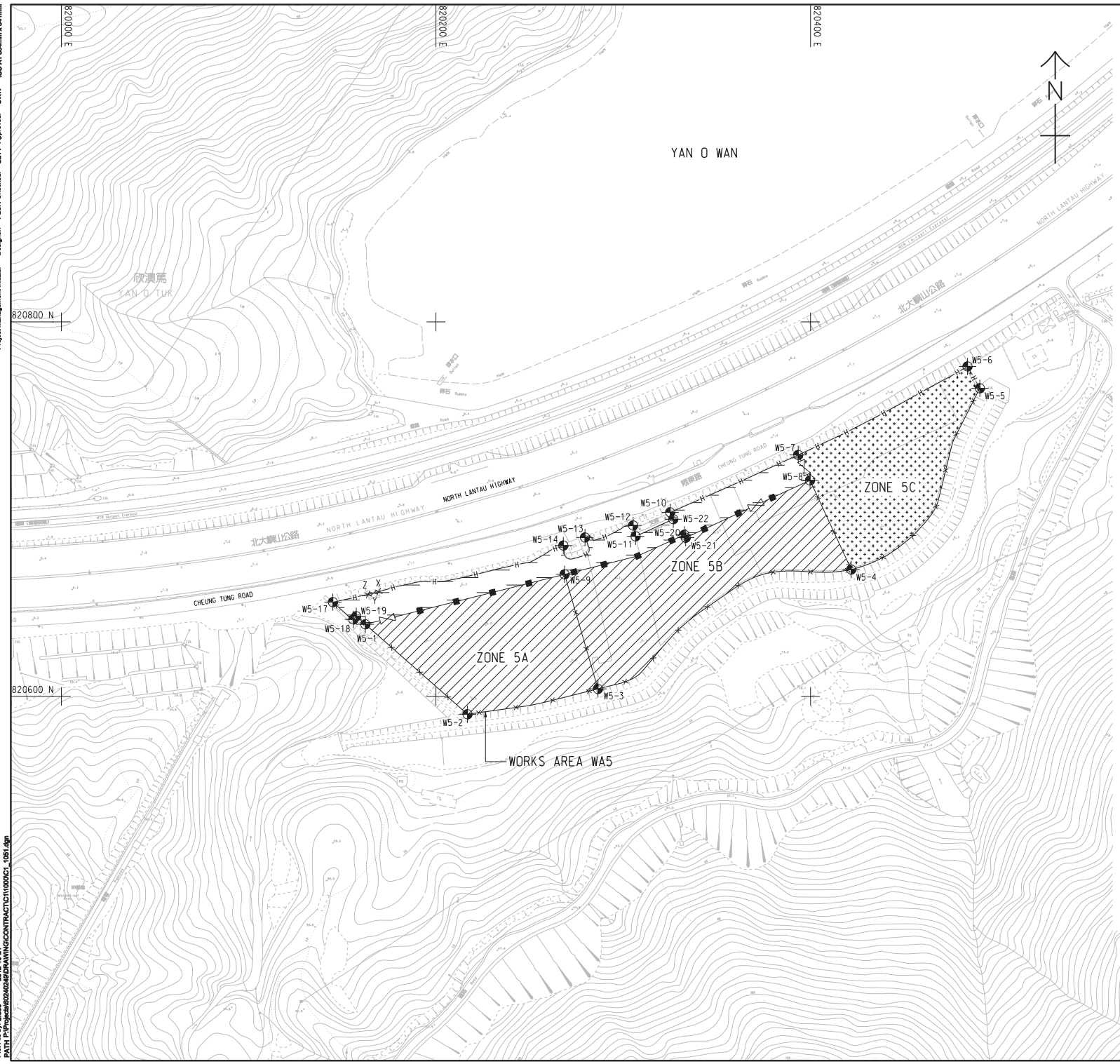

NOTES:

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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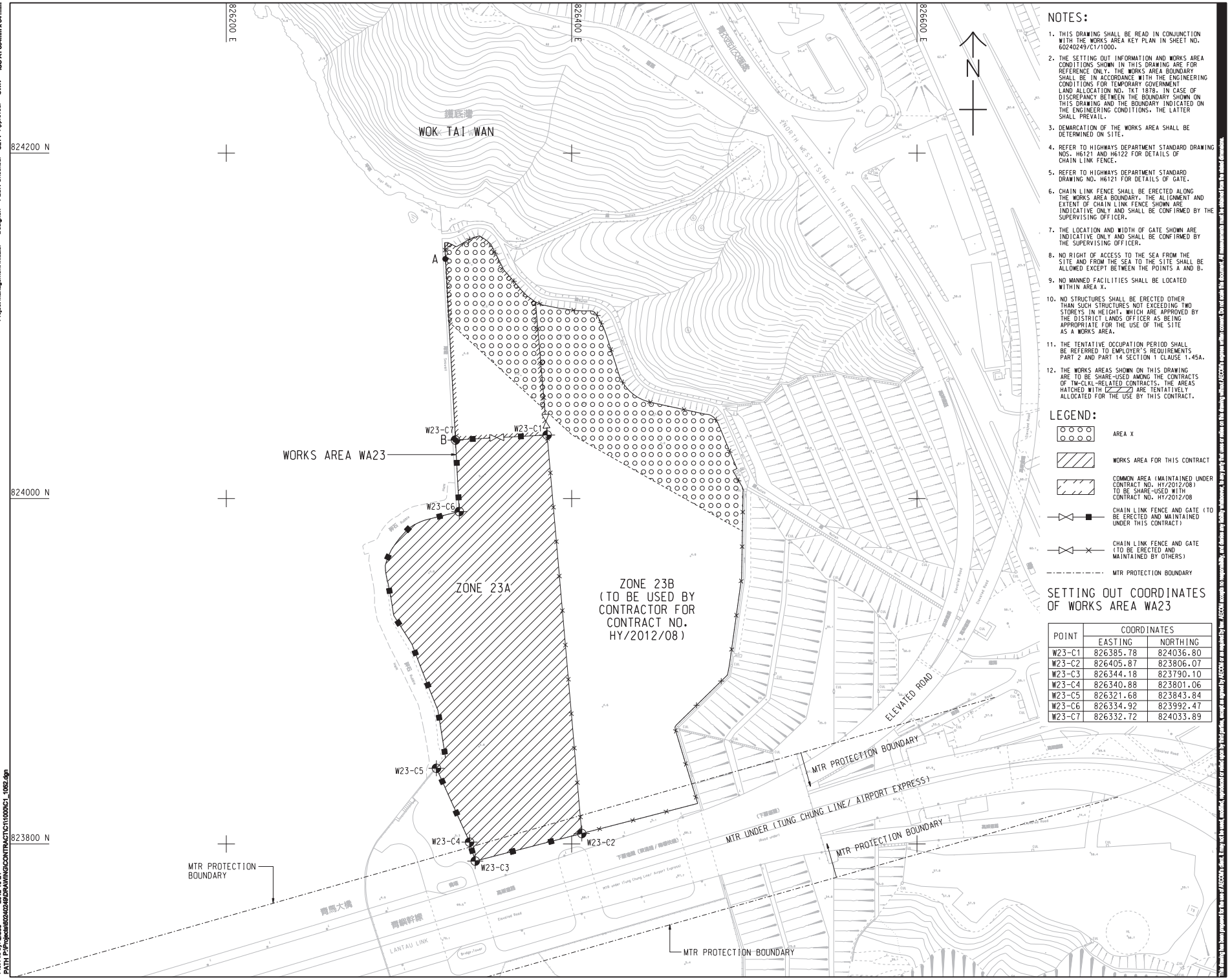

NOTES:

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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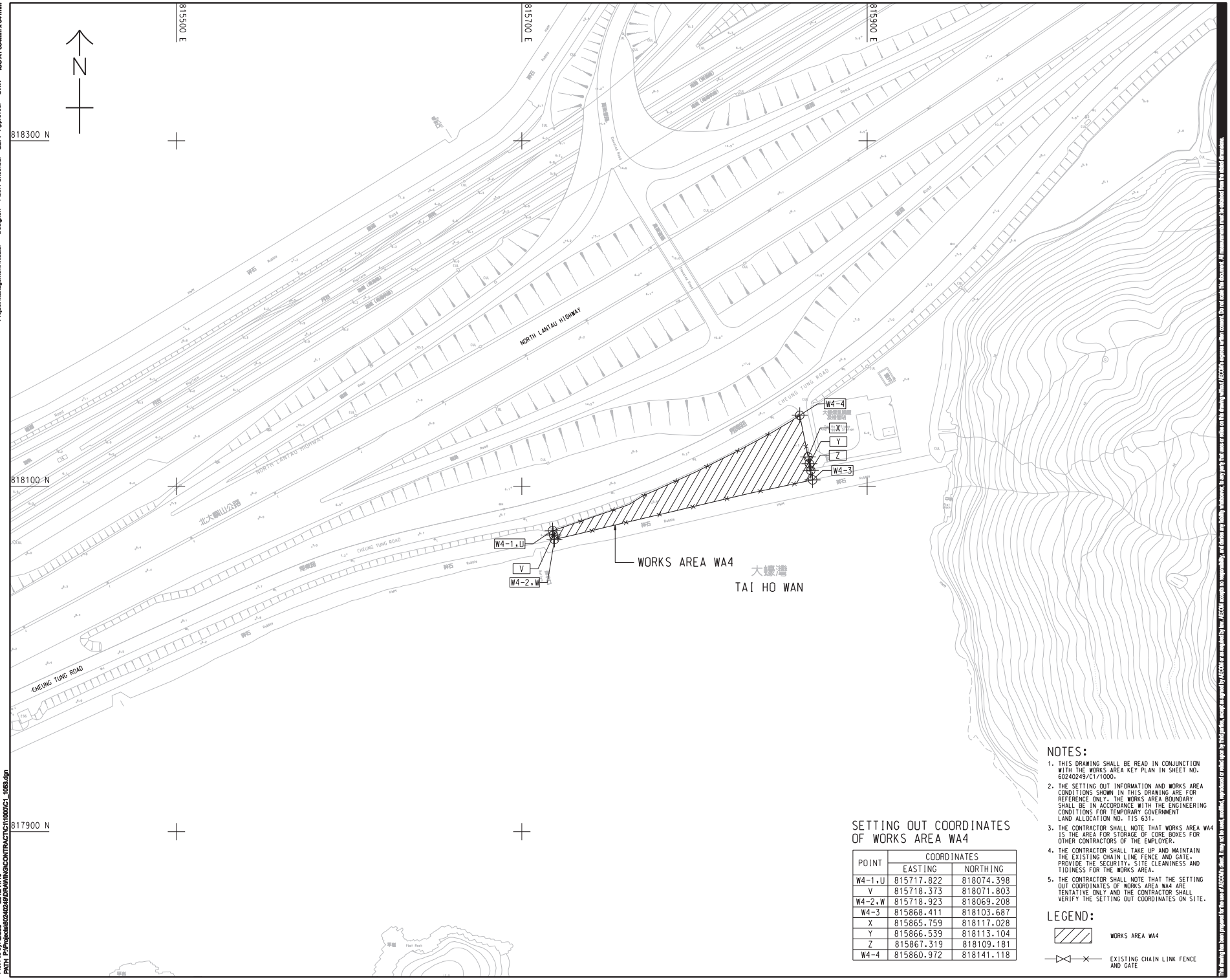

SETTING OUT COORDINATES OF WORKS AREA WA4

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

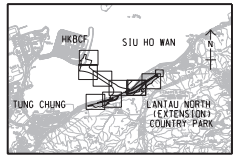
VR	DATE	DESCRIPTION	CHK.
-	NOV. 12	TENDER ADDENDUM NO. 1	CWN

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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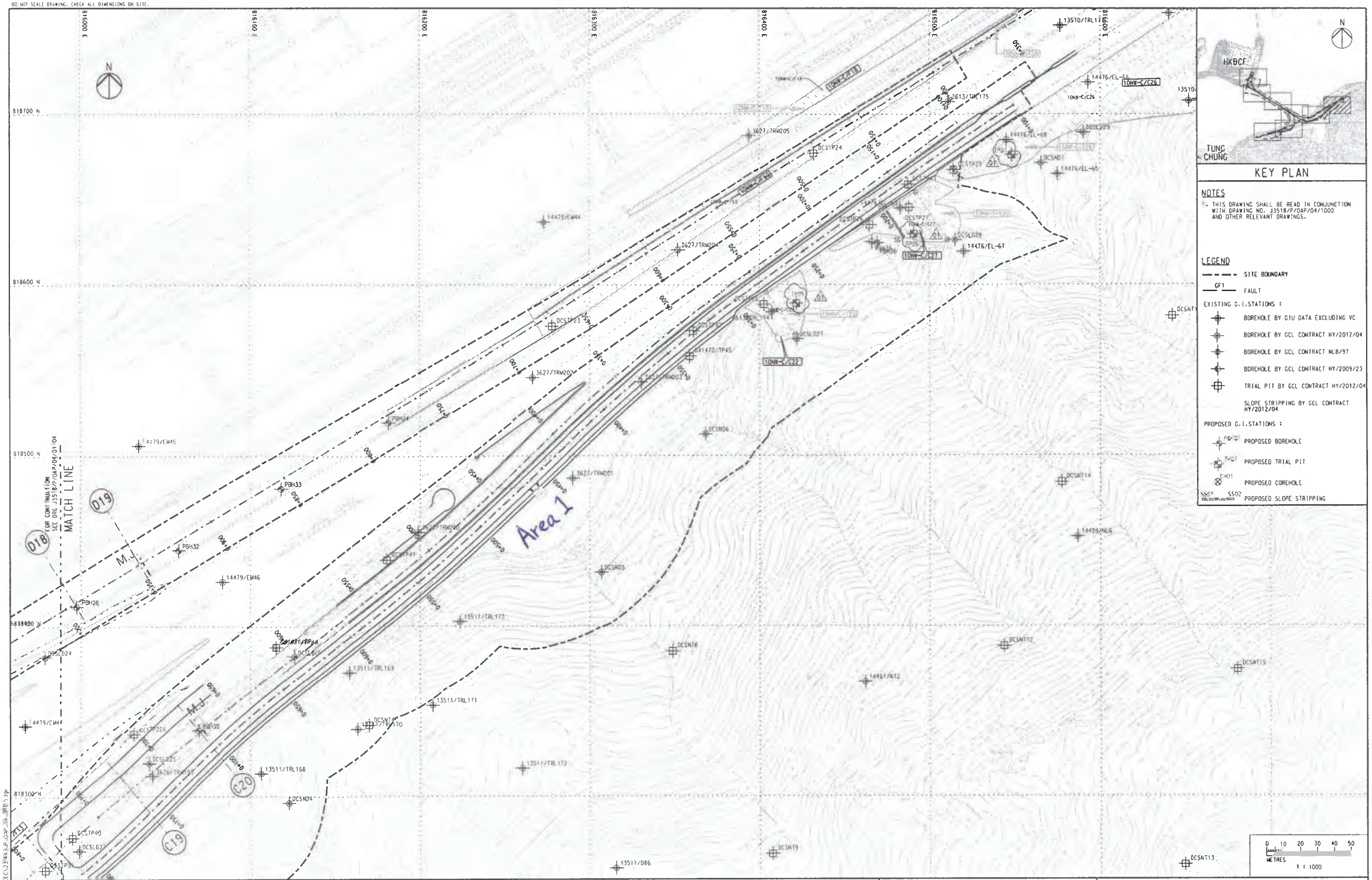


Rev.	Description	By	Date	Rev.	Description	By	Date
A	[illegible]	RL	07/13				
B	[illegible]	RL	07/13				
C	[illegible]	RL	09/13				
D1	ETA INTERNAL REVIEW	RL	10/13				

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

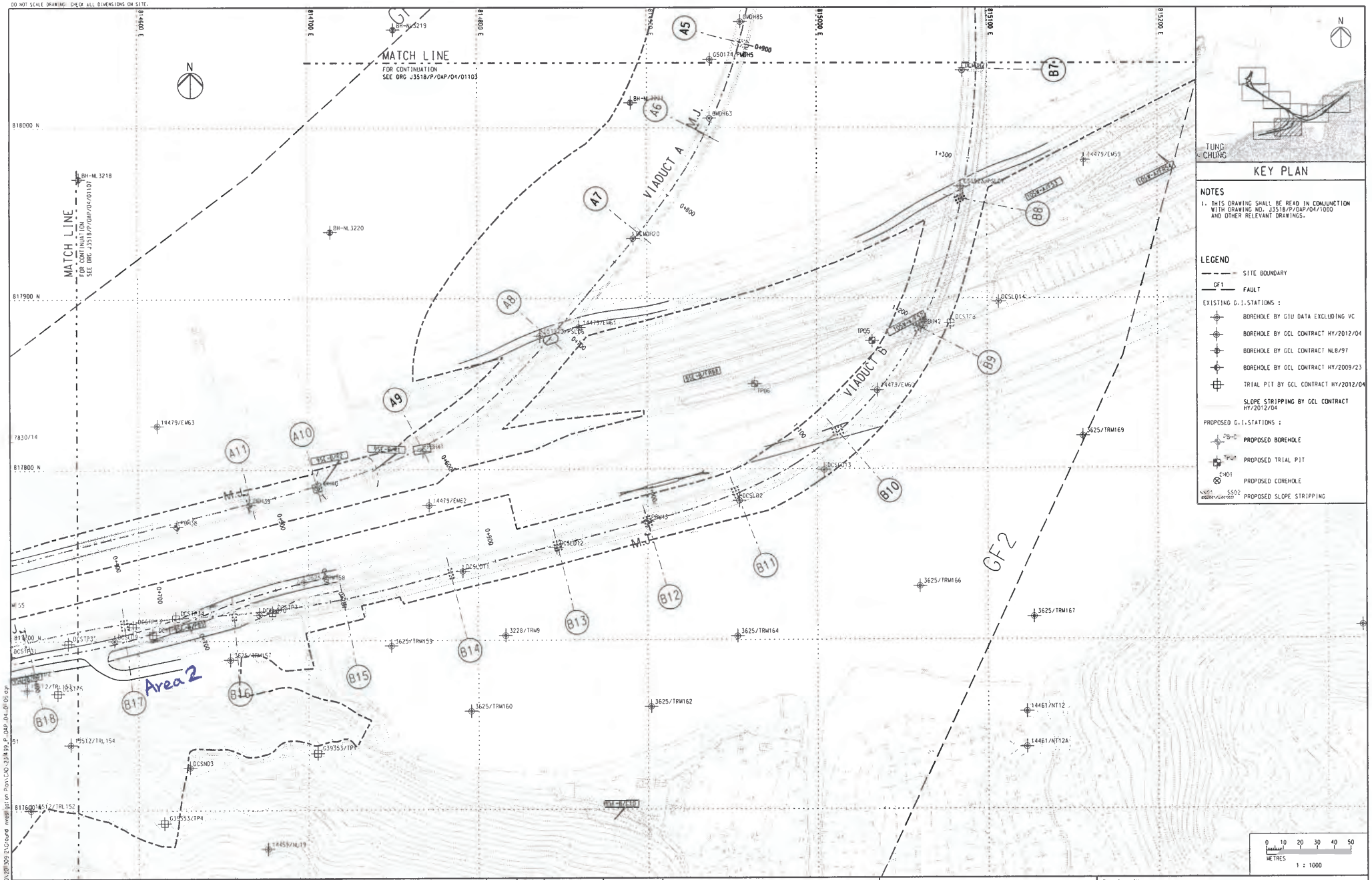
Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2k**

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



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

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

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

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

Supervising Officer: AECOM

Contractor: Gammon

Originator: ARUP

Drawing title: **Figure 1.2I**

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

Plotted by [illegible] on 19/07/2013
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1.2 SCOPE OF REPORT

This is the First Annual 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 31 October 2013 to 31 October 2014.

1.3 ORGANIZATION STRUCTURE

The organization structure of the Contract is shown in *Appendix A*. The key personnel contact names and contact details are summarized in *Table 1.1* below.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Daniel Ip	3553 3800	2492 2057
	Resident Engineer	Kingman Chan	3691 2950	3691 2899
ENPO / IEC (ENVIRON Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3547 2133	3465 2899
	IEC	Dr. F.C. Tsang	3547 2134	3465 2899
Contractor (Gammon Construction Limited)	Environmental Manager	Brian Kam	3520 0387	3520 0486
	Environmental Officer	Roy Leung	3520 0387	3520 0486
	24-hour Complaint Hotline		9738 4332	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

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

Marine-based Works

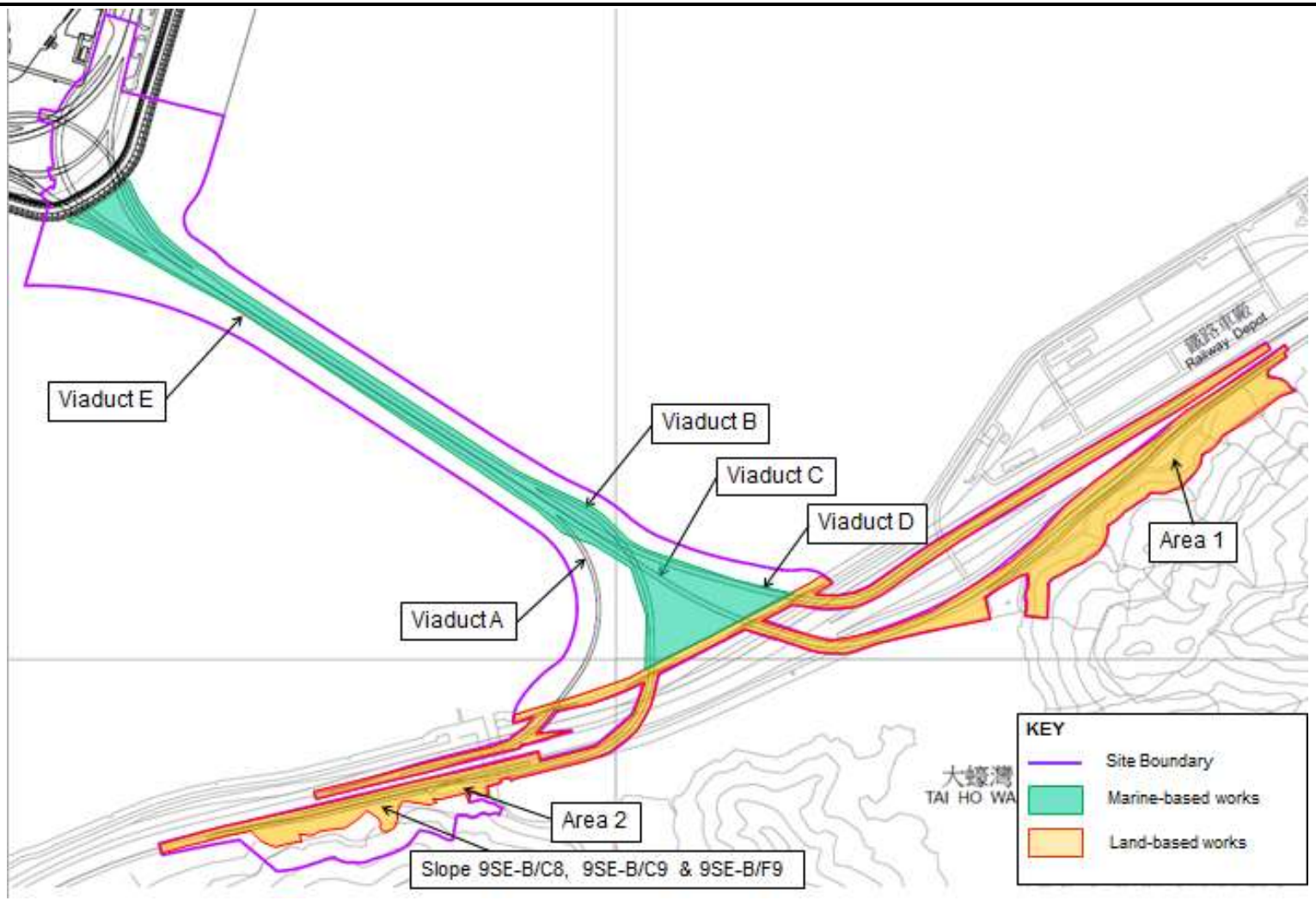
- Survey towers erection;
- Filling platform at seawall;
- Marine piling platform installation;
- Construction of rockfill platform;
- Marine piling;
- Construction of Pile caps; and
- Marine ground investigation (GI) and laboratory testing.

Land-based Works

- Tree felling and transplanting;
- Channel re-construction at Area 1;
- Site formation of workshop at Area 1;
- Site offices erection at Area 5;
- Construct temporary road at CEDD track for piling;
- Temporary access bridge (TAB);
- Fence installation and relocation at Area 2, Viaducts A, B, C & D;
- Satellite container offices erection along seawall;
- Land piling at Viaducts B, C & D;
- Construction of pile cap superstructure of Viaduct B;
- Piling platform installation at Viaducts B, C, D & E;
- Additional land GI, trial pits & lab testing;
- Utility surveys; and
- Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

The locations of the construction activities are shown in *Figure 1.3*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.4*. The environmental mitigation measures implementation schedule is presented in *Appendix B*.

Figure 1.3 Locations of Construction Activities in the Reporting Period



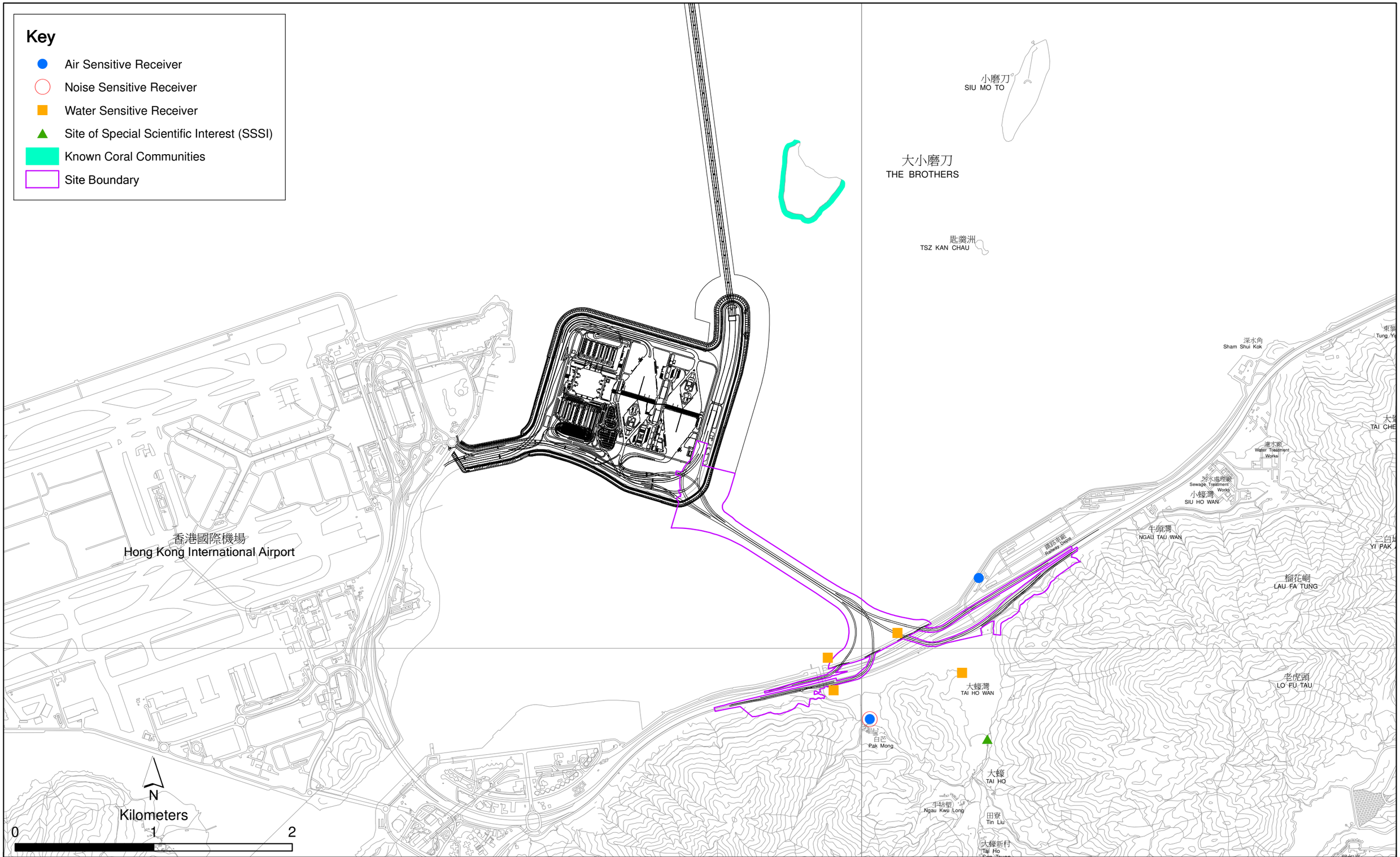


Figure 1.4

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

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Date: 18/5/2015

Environmental Resources Management

ERM

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;
- Action and Limit levels for all environmental parameters;
- Event Action Plan;
- Tested environmental impact hypotheses;
- 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 Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects (HKZMB) during October 2011 has included the two monitoring stations ASR9A and ASR9C for this project. Thus, the baseline monitoring results and Action/ Limit Level presented in HKZMB 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 are provided in *Appendix C*.

Air quality monitoring stations ASR9A and ASR9C in Siu Ho Wan MTRC Depot were the proposed locations in accordance with the Updated EM&A Manual. However, authorization of getting access into Siu Ho Wan MTRC Depot was not granted for the impact monitoring of the EM&A programme for the captioned Contract. Air quality monitoring stations in Siu Ho Wan MTRC Depot (ASR9A and ASR9C) were relocated to Area 4 (ASR8A) and rooftop of Pak Mong Village (ASR8) respectively since November 2013. A proposal for setting up alternative air quality monitoring stations at ASR8A

[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.

(Area 4) and ASR8 (Rooftop of Pak Mong Village Watch Tower) was submitted on 13 November 2013 which was subsequently approved. Same baseline and Action/Limit Level for air quality, as derived from the baseline monitoring data recorded at Siu Ho Wan MTRC Depot, were adopted for these temporary air quality monitoring locations (*Figure 2.1*; *Table 2.1*).

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

Wind data monitoring equipment was installed at fencing close to ASR9A (Siu Ho Wan MTRC Depot). Since the permission for access to MTRC premises was not granted, the equipment was relocated to the rooftop of Pak Mong Village Watch Tower on 15 November 2013 for logging wind speed and wind direction. The wind sensor was setup so that it was clear of obstructions or turbulence caused by building. The wind data monitoring equipment is recalibrated at least once every six months.

Key

- Original Monitoring Station
- Alternative Monitoring Station
- Site Boundary

AQMS	X	Y
ASR9A	815847.40	818508.64
ASR9C	816399.52	818946.65
ASR8	815059.45	817488.99
ASR8A	815856.14	818118.14

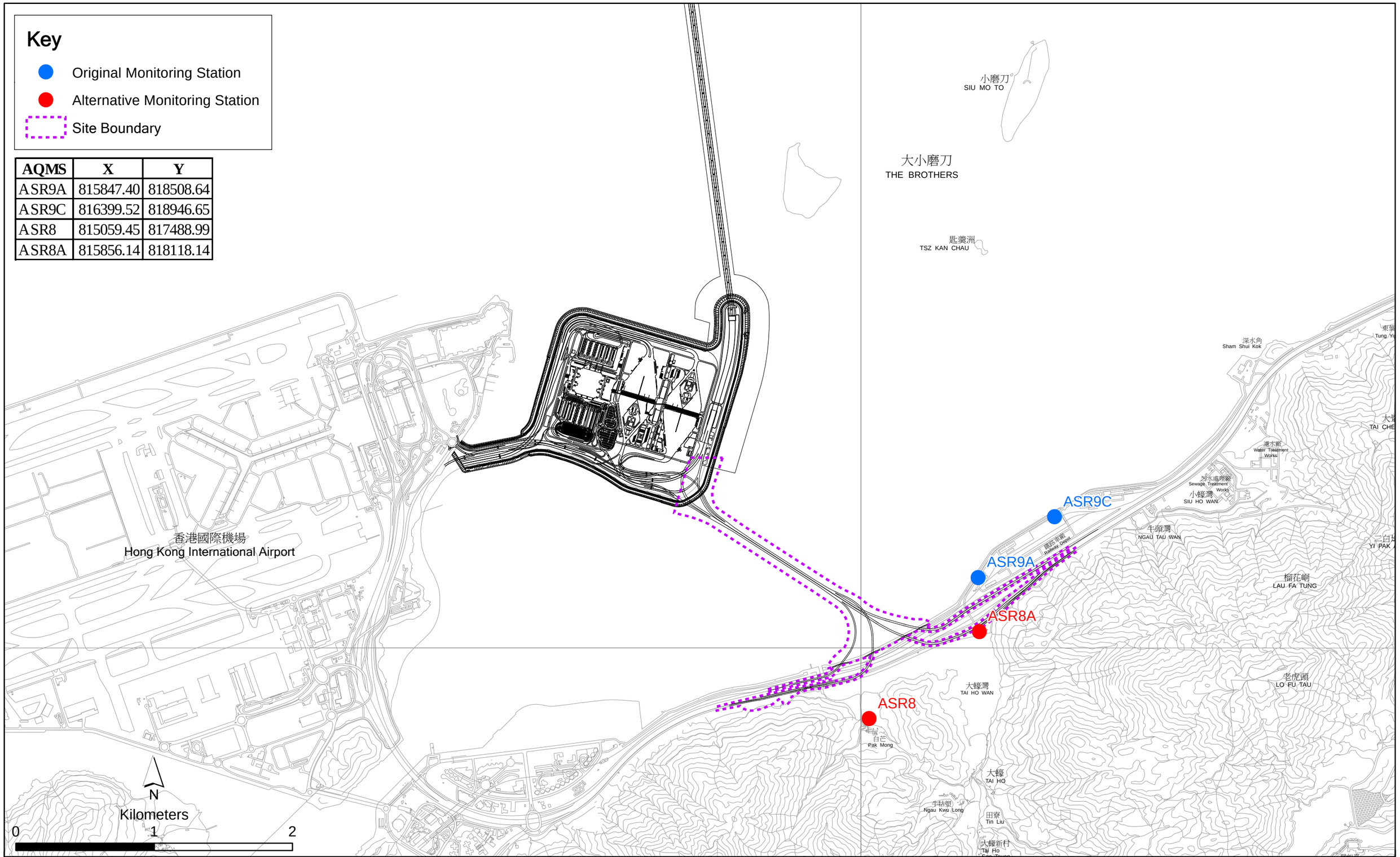

Figure 2.1

Locations of Air Quality Monitoring Stations

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Date: 6/12/2013

Remark: Air Quality Monitoring Stations ASR9A and ASR9C (Siu Ho Wan MTRC Depot) proposed in accordance with the Updated EM&A were temporarily relocated to ASR8A and ASR8, respectively.

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
ASR9A	From 31 October 2013 to 31 October 2014	Siu Ho Wan MTR Depot	On ground near security office	• 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
ASR9C		Siu Ho Wan MTR Depot	On ground near staff canteen	
ASR8A		Area 4	On ground at the Area 4	
ASR8		Pak Mong Village Watch Tower	Rooftop of the premise	

Note:

(1) Air Quality Monitoring Stations ASR9A and ASR9C at Siu Ho Wan MTRC Depot proposed in accordance with the Updated EM&A were temporarily relocated to ASR 8A and ASR8, respectively.

Table 2.2 ***Air Quality Monitoring Equipment***

Equipment	Brand and Model
High Volume Sampler (1-hour TSP and 24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Sampler (Model No. TE-5170)
Wind Sensor	Global Water (Wind Speed Sensor: WE550; Wind Direction Sensor: WE570)
Wind Anemometer for calibration	Lutron (Model No. AM-4201)

2.1.2 Action & Limit Levels

The Action and Limit Levels of the air quality monitoring are provided in *Appendix C*. The Event Action Plan is presented in *Appendix H*.

2.1.3 Monitoring Schedule for the Reporting Period

The schedules for air quality monitoring in the reporting period were presented in the approved *First to Twelfth Monthly EM&A Reports*.

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 D.* The detailed monitoring result and meteorological information were reported in the *First* to *Twelfth 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)
Nov 2013	ASR9A/ASR8A	102	60 - 182	394	500
	ASR9C/ASR8	102	63 - 156	393	500
Dec 2013	ASR8A	145	42 - 275	394	500
	ASR8	157	63 - 319	393	500
Jan 2014	ASR8A	137	50 – 221	394	500
	ASR8	164	77 - 291	393	500
Feb 2014	ASR8A	105	47 – 306	394	500
	ASR8	110	42 - 361	393	500
Mar 2014	ASR8A	120	58 - 240	394	500
	ASR8	118	70 - 175	393	500
Apr 2014	ASR8A	101	61 – 165	394	500
	ASR8	106	66 - 173	393	500
May 2014	ASR8A	63	45 – 83	394	500
	ASR8	82	54 - 144	393	500
Jun 2014	ASR8A	73	47 - 131	394	500
	ASR8	70	49 - 115	393	500
Jul 2014	ASR8A	60	40 - 74	394	500
	ASR8	67	52 - 102	393	500
Aug 2014	ASR8A	69	43 - 113	394	500
	ASR8	67	43 - 116	393	500
Sept 2014	ASR8A	89	60 - 148	394	500
	ASR8	80	59 - 130	393	500
Oct 2014	ASR8A	106	54 - 175	394	500
	ASR8	130	67 - 243	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)
Nov 2013	ASR9A/ASR8A	69	52 – 91	178	260
	ASR9C/ASR8	83	65 - 121	178	260
Dec 2013	ASR8A	136	80 – 210	178	260
	ASR8	131	83 - 205	178	260
Jan 2014	ASR8A	88	35 – 164	178	260
	ASR8	93	52 - 152	178	260
Feb 2014	ASR8A	52	29 - 74	178	260
	ASR8	61	29 - 82	178	260
Mar 2014	ASR8A	56	37 – 83	178	260
	ASR8	64	45 - 83	178	260
Apr 2014	ASR8A	67	40 – 109	178	260
	ASR8	63	43 - 89	178	260
May 2014	ASR8A	43	35 – 48	178	260
	ASR8	47	36 - 60	178	260
Jun 2014	ASR 8A	54	39 - 69	178	260
	ASR 8	53	40 - 68	178	260
Jul 2014	ASR 8A	43	38 - 47	178	260
	ASR 8	42	36 - 47	178	260
Aug 2014	ASR 8A	41	40 - 43	178	260
	ASR 8	43	41 - 45	178	260
Sep 2014	ASR 8A	51	41 - 60	178	260
	ASR 8	49	39 - 65	178	260
Oct 2014	ASR 8A	60	46 - 79	178	260
	ASR 8	71	46 - 101	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 sixty-seven (67) sections of impact air quality monitoring were undertaken within the reporting period, in which no Action or Limit Level exceedances for 1-hour TSP. Two (2) Action Level exceedances for 24-hour TSP for air quality were recorded on 13 December 2013. The exceedances were considered not related to this Contract and thus no action is thus required to be undertaken in accordance with the Event Action Plan.

As shown in the graphical plot of *Appendix D*, the annual average 1-hour TSP and 24-hour TSP levels in the reporting period were lower than the corresponding average levels of baseline at all monitoring stations.

In order to determine any significant air quality impacts caused by construction activities from this Contract, One-way ANOVA (with α set at 0.05) was conducted to examine any significant difference in average TSP

levels between the impact monitoring in this reporting period and the baseline monitoring before commencement of construction activities. For 1-hour TSP, the average results of reporting period were significantly lower than the average results of baseline monitoring at both monitoring stations (ASR9A/ASR8A: $F_{1, 241} = 147$, $p < 0.01$ and ASR9C/ASR8: $F_{1, 241} = 109$, $p < 0.01$). However, the difference between baseline and impact monitoring of 24-hour TSP was not detected due to high variation of results at ASR9A/ASR8A ($F_{1, 79} = 1.01$, $p = 0.32$) and ASR9C/ASR8 ($F_{1, 79} = 0.61$, $p = 0.44$). In general, deterioration on 1-hour TSP or 24-hour TSP was not detected during the reporting period, whilst the results in the reporting period were comparable to the results obtained during the baseline monitoring period (*Table 2.5*). In the reporting period, 1-hour and 24-hour TSP were varied across sampling months (see *Appendix D*) and these variations were however not consistent throughout the reporting period.

Table 2.5 Summary of Average Levels of TSP Level of Baseline Monitoring and Reporting Period (in µg/m³)

Monitoring Station	Average Baseline Monitoring	Average Impact Monitoring
ASR8/ASR9C (1-hr TSP)	220	106
ASR8/ASR9C (24-hr TSP)	75	67
ASR9A/ASR8A (1-hr TSP)	222	99
ASR9A/ASR8A (24-hr TSP)	74	64

Furthermore, linear regression was conducted to examine any relationship between TSP levels and time (i.e. number of days after construction works commencement) during this yearly monitoring period at each monitoring station. Linear regression analysis makes assumptions of equal variance and normal distribution of data. Therefore, the significance level of the test was set at 1 % (i.e. p = 0.01) to reduce the chance of committing a Type 1 error. If a significant regression relationship was found between TSP level and time (i.e. $p < 0.01$), r^2 value from the analysis would be further assessed. This value represents the proportion of the total variation in the dependent variable (i.e. TSP level) that is accounted for by the fitted regression line and is

referred to as the coefficient of determination. An r^2 value of 1 indicates a perfect relationship (or fit) whereas a value of 0 indicates that there is no relationship (or no fit) between the dependent and independent variables. As there are no specific criteria to indicate how meaningful an r^2 value is, for the purposes of this EM&A programme a value of 0.60 was adopted to indicate a meaningful regression. If $r^2 < 0.60$ then it was considered that there was a weak relationship between TSP level and time or none at all. If the regression analysis indicated $r^2 > 0.60$ then it had been interpreted that there was in fact a strong relationship between the dependent and independent variables (i.e. a strong temporal trend of increasing / decreasing TSP level with time).

As shown in *Table 2.6*, results of the regression analysis indicated that there was no significant ($r^2 < 0.60$) relationship between TSP level and time during this yearly monitoring period. As such, it is considered that there is no apparent trend of increasing / decreasing TSP level since commencement of constructions works.

Table 2.6 Linear Regression Result of TSP Monitoring

Parameter	Station	R^2	F-ratio	p-value	Intercept	Coefficient
1-hour TSP	ASR9A/ ASR8A	0.102	$F_{1,199} = 22.5$	<0.001	125.6	-0.148
	ASR9C/ ASR8	0.092	$F_{1,198} = 20.1$	<0.001	134.8	-0.160
24-hour TSP	ASR9A/ ASR8A	0.212	$F_{1,65} = 17.5$	<0.001	91.7	-0.15
	ASR9C/ ASR8	0.255	$F_{1,65} = 22.2$	<0.001	95.7	-0.155

Note:

Dependent variable is set as TSP levels (in $\mu g/m^3$) and independent variable is set as number of day of construction works.

2.2 *NOISE MONITORING*

The baseline noise monitoring undertaken by the Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects (HKZMB) during the period of 18 October to 1 November 2011 has included the monitoring station NSR1 for this project. Thus, the baseline monitoring results and Action/ Limit Level presented in *HKZMB 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 was conducted once per week during the construction phase of the Contract at NSR1.

Monitoring location was setup at NSR1 in accordance with the Updated EM&A Manual. *Figure 2.2* shows the location of the monitoring station. *Table 2.7* describes the details of the monitoring station and parameters.

Noise monitoring was performed using sound level meter in compliance with the International Electrotechnical Commission Publications (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications at each designated monitoring station. Noise monitoring equipment is summarized in *Table 2.8.*

Table 2.7 Location of Impact Noise Monitoring Station and Monitoring Dates in this Reporting Period

Monitoring Station	Monitoring Period	Location	Parameters & Frequency
NSR1	From 31 October 2013 to 31 October 2014	Pak Mong Village Watch Tower	• 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

Table 2.8 Noise Monitoring Equipment

Equipment	Brand and Model

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

Key

- Noise Monitoring Station
- Site Boundary

NMS	X	Y
NSR1	815059.45	817488.99

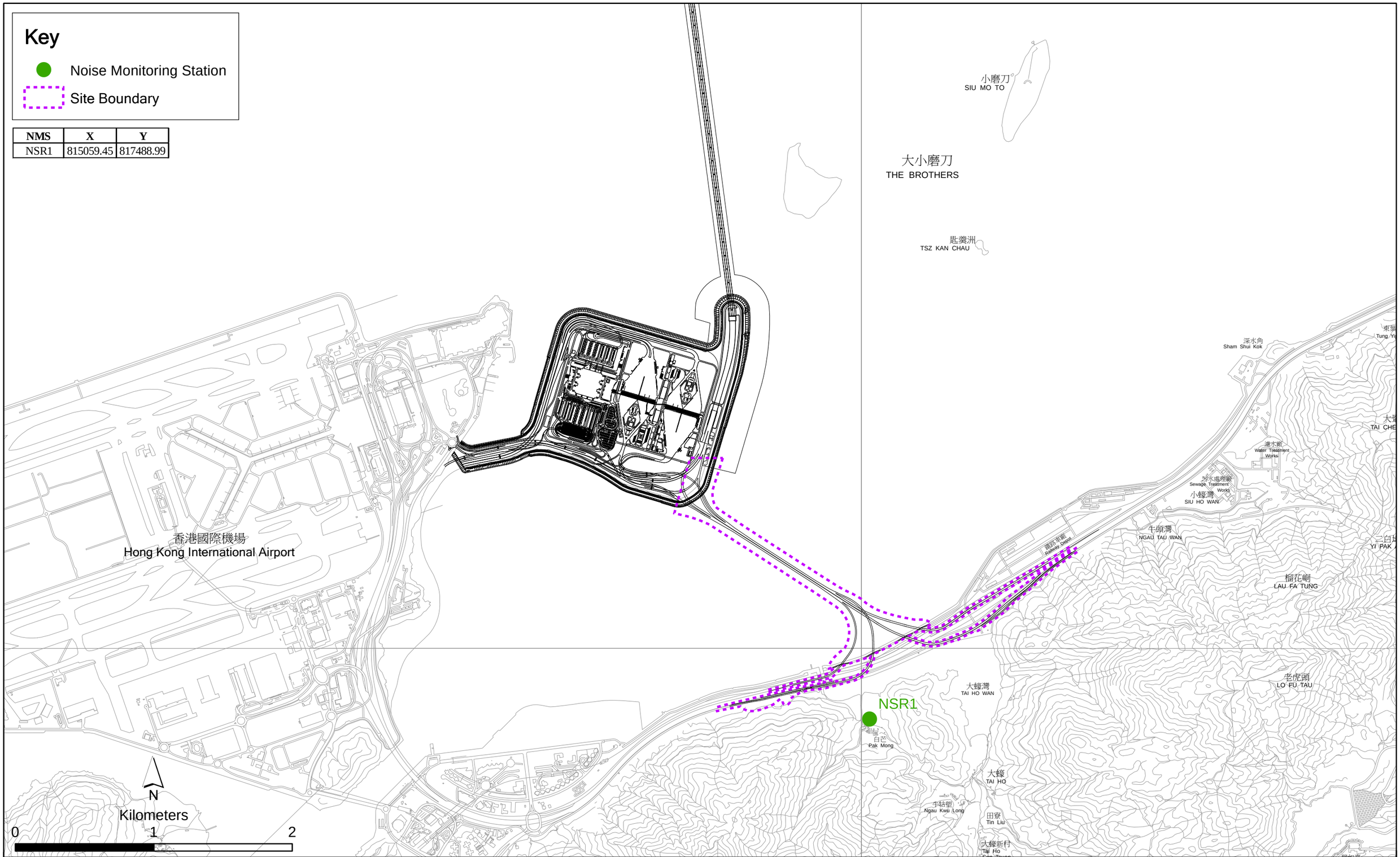

Figure 2.2

Locations of Noise Monitoring Stations

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Date: 10/12/2013

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

2.2.2 *Action and Limit Levels*

The Action and Limit levels of the noise monitoring are provided in *Appendix C*. The Event Action Plan is presented in *Appendix H*.

2.2.3 *Monitoring Schedule for the Reporting Period*

The schedules for noise monitoring in the reporting period are provided in the *First* to *Twelfth Monthly EM&A Reports.*

2.2.4 *Results and Observations*

The monitoring results for noise monitoring are summarized in *Table 2.9*. Monitoring results are presented graphically in *Appendix E.* Detailed impact noise monitoring results are reported in the *First* to *Twelfth Monthly EM&A Reports*.

Table 2.9 Summary of Construction Noise Monitoring Results at NSR1 in the Reporting Period

Month	Average , dB(A), L_{eq} (30mins)	Range, dB(A), L_{eq} (30mins)	Limit Level, dB(A), L_{eq} (30mins)
Nov 2013	58	56 – 59	75
Dec 2013	58	56 – 59	75
Jan 2014	59	57 – 60	75
Feb 2014	58	56 – 59	75
Mar 2014	59	58 – 60	75
Apr 2014	58	56 – 59	75
May 2014	56	52 – 59	75
Jun 2014	58	55 – 59	75
Jul 2014	57	56 – 58	75
Aug 2014	56	54 – 57	75
Sep 2014	57	55 – 59	75
Oct 2014	57	56 – 59	75

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

A total of sixty-seven (67) monitoring events were undertaken in the reporting period with no Action Level and Limit Level exceedance recorded at all monitoring stations in the reporting period.

In order to determine any significant noise impacts caused by construction activities from this Contract, One-way ANOVA (with α set at 0.05) was conducted to examine any significant difference in average noise levels between the impact monitoring in this reporting period and the baseline monitoring before commencement of construction activities. Difference of noise level between reporting and baseline monitoring periods was statistically significant ($F_{1, 353} = 8.1$, $p < 0.01$), in which the annual-averaged noise level in the reporting period was slightly higher than average baseline level (average results of baseline and reporting periods were 57dB(A) and 58dB(A) respectively), however all monitoring results in the reporting period are complied with the Action/Limit Levels. In general, noise levels recorded during the reporting period were mostly comparable to the results obtained during the baseline monitoring period. Noise level varied slightly across sampling months (see *Appendix E*) and these variations were however not consistent throughout the reporting period. The ET will keep track on the future noise monitoring results during construction phase.

Furthermore, linear regression was conducted to examine any relationship between noise levels and time (i.e. number of days after construction works commencement) during this yearly monitoring period. The method of data interpretation followed the same method as indicated in *Section 2.1.4* for TSP monitoring. As shown in *Table 2.10*, results of the regression analysis indicated that there was no significant ($r^2 < 0.60$) relationship between noise level and time during this yearly monitoring period. As such, it is considered that there is no apparent trend of increasing / decreasing noise level since commencement of constructions works.

Table 2.10 Linear Regression Result of Noise Monitoring

Parameter	Station	R^2	F-ratio	p-value	Intercept	Coefficient
$L_{eq\ 30min}$	NSR1	0.126	$F_{1,65} = 9.41$	0.003	58.455	-0.005

Note:

Dependent variable is set as $L_{eq\ 30min}$ (in dB(A)) and independent variable is set as number of day of construction works.

2.3 *WATER QUALITY MONITORING*

The baseline water quality monitoring undertaken by the Hong Kong – Zhuhai – Macao Bridge Hong Kong Projects (HKZMB) between 6 and 31 October 2011 has included all monitoring stations except SR4a for the Project. Thus, the baseline monitoring results except for station SR4a and Action/Limit Level presented in HKZMB 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.

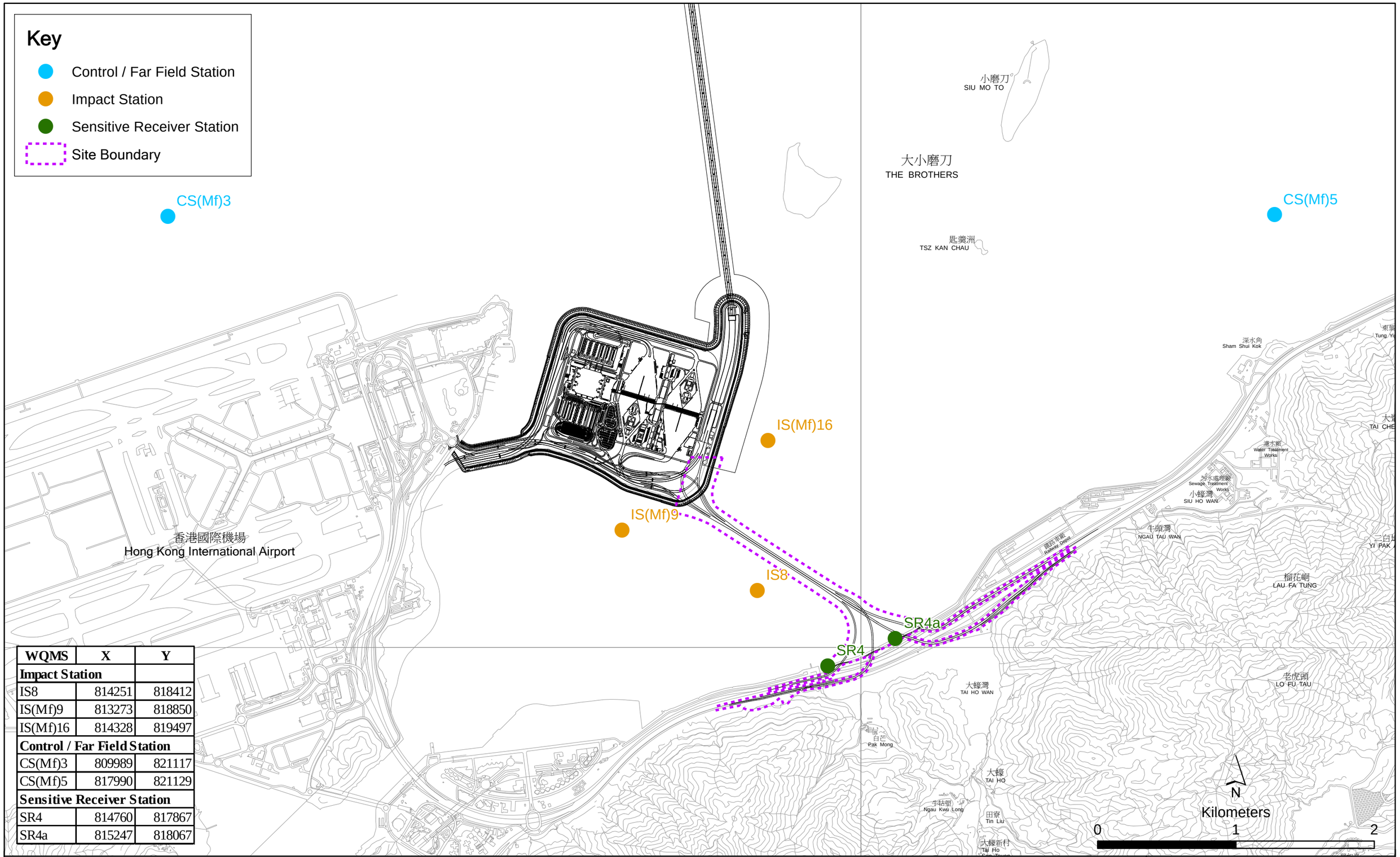
2.3.1 *Monitoring Requirements and Equipment*

Impact water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action could be taken to rectify the situation. Impact water quality monitoring was undertaken three days per week during the construction period at seven water quality monitoring stations in accordance with the Updated EM&A Manual (*Figure 2.3*; *Table 2.11*).

Table 2.11 Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			

[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.



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

Figure 2.3

Locations of Water Quality Monitoring Stations

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Date: 6/12/2013

Environmental Resources Management

ERM

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) • DO (mg/L and % of saturation) • 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			
CS(Mf)3	Control Station	809989	821117			
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.

Table 2.12 summarizes the equipment used in the impact water quality monitoring programme.

Table 2.12 Water Quality Monitoring Equipment

Equipment	Brand and Model
DO, Temperature meter and Salinity	YSI Pro2030
Turbidimeter	HACH Model 2100Q
pH meter	HANNA HI8314
Positioning Equipment	Koden913MK2 with KBG-3 DGPS antenna

Equipment	Brand and Model
Water Depth Detector	Speedtech Instrument SM-5
Water Sampler	Kemmerer 1520 (1520-C25) 2.2L with messenger

2.3.2 *Action & Limit Levels*

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

2.3.3 *Monitoring Schedule for the Reporting Period*

The schedules for water quality monitoring in the reporting period are provided in the *First* to *Twelfth Monthly EM&A Reports*.

2.3.4 *Results and Observations*

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting period. Monitoring results are presented graphically in *Appendix F*. Detailed impact water quality monitoring results were reported in the *First* to *Twelfth Monthly EM&A Reports*.

In this reporting period, a total of one hundred and fifty-four (154) monitoring events were undertaken in which one (1) depth-averaged SS Action Level exceedance was recorded on 26 November 2013. The corresponding *Notification of Exceedance* and investigation report were presented in *Appendix K* of the *First Monthly EM&A Report*. The exceedance was considered not related to this Contract and thus no action is required to be undertaken in accordance with the Event Action Plan presented in *Appendix H*.

In order to determine any significant water quality impacts caused by construction activities from this Contract, One-way ANOVA (with α set at 0.05) was conducted to examine any significant difference in average DO, turbidity and SS levels between the impact monitoring in this reporting period and the baseline monitoring before commencement of construction activities. The average levels of DO, turbidity and SS are presented in *Tables 2.13 to 2.15* and the statistical results are presented in *Tables 2.16* to *2.18*. In the reporting period, a total of eight (8) annual-averaged DO levels in three (3) monitoring stations (IS8 and IS(Mf)9 at surface level during mid-ebb tide, IS(Mf)9 at

surface during mid-flood tide, IS(Mf)16 at middle level during mid-ebb tide, IS8 and IS(Mf)9 at bottom level during both mid-ebb and mid-flood tides) were lower than the corresponding average baseline levels. However, there was no significant difference between impact and baseline periods in the corresponding statistical results due to high variation in monitoring results. The annual depth-averaged turbidity and SS levels at all impact stations in the reporting period were lower than the average levels in baseline monitoring. Except depth-averaged turbidity at SR4a during mid-flood tide, turbidity and SS levels between baseline and impact monitoring at all stations are significantly different. In general, deterioration on DO, turbidity and suspended solids levels was not detected during the reporting period, whilst the results in the reporting period were comparable to the results obtained during the baseline monitoring period. Whilst DO, turbidity and suspended solids levels were varied across sampling months (see *Appendix F*) and these variations were however not consistent throughout the reporting period.

Table 2.13 ***Summary of Average Levels of DO Level of Baseline Monitoring and Reporting Period (in mg/L)***

Tide	Station	Depth	Average DO of baseline monitoring	Average DO of reporting period
Mid-ebb	IS(Mf)16	Surface	6.3	6.4
	IS(Mf)9	Surface	6.6	6.4
	IS8	Surface	6.4	6.4
	SR4	Surface	6.1	6.3
	SR4a	Surface	5.5	6.4
Mid-flood	IS(Mf)16	Surface	6.3	6.4
	IS(Mf)9	Surface	6.5	6.5
	IS8	Surface	6.4	6.4
	SR4	Surface	6.3	6.4
	SR4a	Surface	5.5	6.4
Mid-ebb	IS(Mf)16	Middle	6.3	6.2
Mid-flood	IS(Mf)16	Middle	6.1	6.3
Mid-ebb	IS(Mf)16	Surface	5.9	6.1
	IS(Mf)9	Surface	6.6	6.2

Tide	Station	Depth	Average DO of baseline monitoring	Average DO of reporting period
	IS8	Surface	6.2	6.1
	SR4	Surface	6.0	6.2
	SR4a	Surface	5.3	6.2
Mid-flood	IS(Mf)16	Surface	6.0	6.1
	IS(Mf)9	Surface	6.7	6.3
	IS8	Surface	6.3	6.2
	SR4	Surface	6.2	6.3
	SR4a	Surface	5.2	6.2

Table 2.14 Summary of Average Levels of Depth-averaged Turbidity Level of Baseline Monitoring and Reporting Period (in NTU)

Station	Depth	Average depth-averaged turbidity of baseline monitoring	Average depth-averaged turbidity of reporting period
Mid-ebb	IS(Mf)16	8.9	5.8
	IS(Mf)9	8.2	5.9
	IS8	8.4	5.9
	SR4	8.9	5.9
	SR4a	8.9	5.8
Mid-flood	IS(Mf)16	11.3	5.8
	IS(Mf)9	10.2	5.8
	IS8	11.9	5.9
	SR4	10.3	5.9
	SR4a	7.8	5.8

Table 2.15 Summary of Average Levels of Depth-averaged SS Level of Baseline Monitoring and Reporting Period (in mg/L)

Station	Depth	Average depth-averaged SS of baseline monitoring	Average depth-averaged SS of reporting period

Station	Depth	Average depth-averaged SS of baseline monitoring	Average depth-averaged SS of reporting period
Mid-ebb	IS(Mf)16	11.3	6.3
	IS(Mf)9	10.9	6.3
	IS8	11.3	6.1
	SR4	11.1	6.3
	SR4a	9.1	6.2
Mid-flood	IS(Mf)16	10.4	6.1
	IS(Mf)9	14.7	6.2
	IS8	13.5	6.2
	SR4	12.2	6.2
	SR4a	9.8	6.1

Table 2.16 One-way ANOVA Results for DO Comparison between Impact and Baseline Periods

Tide	Station	Depth	F ratio	p-value
Mid-ebb	IS(Mf)16	Surface	$F_{1,162} = 0.03$	0.87
Mid-ebb	IS(Mf)9	Surface	$F_{1,162} = 0.97$	0.32
Mid-ebb	IS8	Surface	$F_{1,162} = 0.14$	0.71
Mid-ebb	SR4	Surface	$F_{1,162} = 1.10$	0.30
Mid-ebb	SR4a	Surface	$F_{1,162} = 21.7$	0.01
Mid-flood	IS(Mf)16	Surface	$F_{1,162} = 0.50$	0.48
Mid-flood	IS(Mf)9	Surface	$F_{1,160} = 0.10$	0.75
Mid-flood	IS8	Surface	$F_{1,162} = 0.06$	0.81
Mid-flood	SR4	Surface	$F_{1,162} = 0.23$	0.63
Mid-flood	SR4a	Surface	$F_{1,162} = 23.07$	0.01
Mid-ebb	IS(Mf)16	Middle	$F_{1,157} = 0.18$	0.67
Mid-flood	IS(Mf)16	Middle	$F_{1,158} = 0.94$	0.34
Mid-ebb	IS(Mf)16	Bottom	$F_{1,162} = 0.34$	0.56
Mid-ebb	IS(Mf)9	Bottom	$F_{1,162} = 2.06$	0.15
Mid-ebb	IS8	Bottom	$F_{1,162} = 0.16$	0.69
Mid-ebb	SR4	Bottom	$F_{1,159} = 0.74$	0.39

Tide	Station	Depth	F ratio	p-value
Mid-ebb	SR4a	Bottom	$F_{1,162} = 16.20$	0.01
Mid-flood	IS(Mf)16	Bottom	$F_{1,162} = 0.32$	0.58
Mid-flood	IS(Mf)9	Bottom	$F_{1,162} = 2.01$	0.16
Mid-flood	IS8	Bottom	$F_{1,162} = 0.10$	0.76
Mid-flood	SR4	Bottom	$F_{1,160} = 0.18$	0.67
Mid-flood	SR4a	Bottom	$F_{1,162} = 23.43$	0.01

Note:

By setting α at 0.05, insignificant differences (*p*-value < 0.05) are underlined.

Table 2.17 One-way ANOVA Results for Depth-averaged Turbidity Comparison between Impact and Baseline Periods

Tide	Station	F ratio	p-value
Mid-ebb	IS(Mf)16	$F_{1,162} = 9.81$	<0.01
Mid-ebb	IS(Mf)9	$F_{1,162} = 5.11$	0.03
Mid-ebb	IS8	$F_{1,162} = 6.19$	0.01
Mid-ebb	SR4	$F_{1,162} = 8.35$	<0.01
Mid-ebb	SR4a	$F_{1,162} = 8.27$	<0.01
Mid-flood	IS(Mf)16	$F_{1,162} = 30.79$	<0.01
Mid-flood	IS(Mf)9	$F_{1,162} = 16.75$	<0.01
Mid-flood	IS8	$F_{1,162} = 28.89$	<0.01
Mid-flood	SR4	$F_{1,162} = 15.71$	<0.01
Mid-flood	SR4a	$F_{1,162} = 3.19$	0.08

Note:

By setting α at 0.05, insignificant differences (*p*-value < 0.05) are underlined.

Table 2.18 One-way ANOVA Results for Depth-averaged SS Comparison between Impact and Baseline Periods

Tide	Station	F ratio	p-value
Mid-ebb	IS(Mf)16	$F_{1,162} = 16.66$	<0.01
Mid-ebb	IS(Mf)9	$F_{1,162} = 15.96$	<0.01
Mid-ebb	IS8	$F_{1,162} = 21.89$	<0.01
Mid-ebb	SR4	$F_{1,162} = 17.78$	<0.01
Mid-ebb	SR4a	$F_{1,162} = 5.08$	0.03

Tide	Station	F ratio	p-value
Mid-flood	IS(Mf)16	$F_{1,162} = 16.18$	<0.01
Mid-flood	IS(Mf)9	$F_{1,162} = 48.50$	<0.01
Mid-flood	IS8	$F_{1,162} = 37.12$	<0.01
Mid-flood	SR4	$F_{1,162} = 28.51$	<0.01
Mid-flood	SR4a	$F_{1,162} = 9.45$	<0.01

Note:

By setting α at 0.05, insignificant differences (p-value < 0.05) are underlined.

Furthermore, linear regression was conducted to examine any relationship between DO / Turbidity / SS levels and time (i.e. number of days after construction works commencement) during this yearly monitoring period at each monitoring station. The method of data interpretation followed the same method as indicated in *Section 2.1.4* for TSP monitoring. As shown in *Tables 2.19 to 2.21*, results of the regression analysis indicated that there was no significant ($r^2 < 0.60$) relationship between DO / Turbidity / SS level and time during this yearly monitoring period. As such, it is considered that there is no apparent trend of increasing or decreasing DO / Turbidity / SS level since commencement of constructions works.

Table 2.19 Linear Regression Result of DO

Parameter	Station	R^2	$F_{1,150}$	p-value	Intercept	Coefficient of days of construction
Mid-ebb	IS(Mf)16	0.429	112.8	<0.001	7.126	-0.004
Surface DO	IS(Mf)9	0.367	87.1	<0.001	7.083	-0.004
	IS8	0.389	95.4	<0.001	7.124	-0.004
	SR4	0.424	110.6	<0.001	7.106	-0.004
	SR4a	0.386	94.3	<0.001	7.061	-0.004
Mid-flood	IS(Mf)16	0.419	108.2	<0.001	7.179	-0.004
surface DO	IS(Mf)9	0.346	79.3	<0.001	7.114	-0.004
	IS8	0.408	103.4	<0.001	7.189	-0.004
	SR4	0.435	115.3	<0.001	7.150	-0.004
	SR4a	0.372	88.7	<0.001	7.092	-0.004
Mid-ebb middle DO	IS(Mf)16	0.455	125.2	<0.001	7.068	-0.005

Parameter	Station	R^2	$F_{1,150}$	p-value	Intercept	Coefficient of days of construction
Mid-flood middle DO	IS(Mf)16	0.458	127.0	<0.001	7.115	-0.005
Mid-ebb bottom DO	IS(Mf)16	0.511	157.0	<0.001	7.045	-0.005
	IS(Mf)9	0.486	141.8	<0.001	7.145	-0.005
	IS8	0.479	138.0	<0.001	7.064	-0.005
	SR4	0.494	146.4	<0.001	7.108	-0.005
	SR4a	0.489	143.5	<0.001	7.060	-0.005
Mid-flood bottom DO	IS(Mf)16	0.526	166.6	<0.001	7.084	-0.005
	IS(Mf)9	0.478	137.6	<0.001	7.169	-0.005
	IS8	0.474	135.4	<0.001	7.114	-0.005
	SR4	0.500	149.9	<0.001	7.156	-0.005
	SR4a	0.458	126.9	<0.001	7.060	-0.004

Note:

1. Dependent variable is set as DO (in mg/L) and independent variable is set as number of day of construction works.

2. By setting α at 0.05, insignificant intercepts and coefficients are underlined.

Table 2.20 Linear Regression Result of Turbidity

Parameter	Station	R^2	$F_{1,150}$	p-value	Intercept	Coefficient of days of construction
Mid-ebb depth -averaged turbidity	IS(Mf)16	0.038	5.9	0.017	6.915	-0.006
	IS(Mf)9	0.075	12.1	<0.001	7.486	-0.009
	IS8	0.068	10.9	0.001	7.415	-0.008
	SR4	0.057	9.0	0.003	7.346	-0.008
	SR4a	0.060	9.6	0.002	7.208	-0.008
Mid-flood depth -averaged turbidity	IS(Mf)16	0.055	8.8	0.004	7.092	-0.007
	IS(Mf)9	0.081	13.2	<0.001	7.523	-0.009
	IS8	0.087	14.3	<0.001	7.702	-0.010
	SR4	0.078	12.6	<0.001	7.611	-0.009
	SR4a	0.082	13.4	<0.001	7.577	-0.010

Note:

1. Dependent variable is set as turbidity (in NTU) and independent variable is set as number of day of construction works.

2. By setting α at 0.05, insignificant intercepts and coefficients are underlined.

Table 2.21 Linear Regression Result of SS

Parameter	Station	R^2	$F_{1,150}$	p-value	Intercept	Coefficient of days of construction
Mid-ebb	IS(Mf)16	0.006	1.0	0.32621	6.826	-0.003
depth	IS(Mf)9	0.009	1.3	0.25307	6.885	-0.003
-averaged	IS8	0.001	0.1	0.73798	6.238	-0.001
SS	SR4	0.006	1.0	0.32888	6.793	-0.003
	SR4a	0.009	1.4	0.23781	6.861	-0.004
Mid-flood	IS(Mf)16	0.001	0.2	0.66297	6.305	-0.001
depth	IS(Mf)9	0.012	1.8	0.17598	6.960	-0.004
-averaged	IS8	0.008	1.2	0.26555	6.787	-0.003
SS	SR4	0.008	1.2	0.27576	6.728	-0.003
	SR4a	0.006	0.9	0.33303	6.637	-0.003

Note:

1. Dependent variable is set as SS (in mg/L) and independent variable is set as number of day of construction works.

2. By setting α at 0.05, insignificant intercepts and coefficients are underlined.

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 dolphins. In order to fulfil the EM&A requirements and make good use of available resources, the on-going impact line transect dolphin monitoring data collected by HyD's *Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge. Hong Kong Link Road - Section between Scenic Hill and Hong Kong Boundary Crossing Facilities* on the monthly basis is adopted to avoid duplicates of survey effort.

2.4.2 *Monitoring Equipment*

Table 2.22 summarizes the equipment used for the impact dolphin monitoring.

Table 2.22 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
Vessel for Monitoring	and reticules
	65 foot single engine motor vessel with
	viewing platform 4.5m above water level

2.4.3 *Monitoring Parameter, Frequencies & Duration*

Dolphin monitoring should cover all transect lines in Northeast Lantau (NEL) and the Northwest Lantau (NWL) survey areas twice per month throughout the entire construction period. The monitoring data should be compatible with, and should be made available for, long-term studies of small cetacean ecology in Hong Kong. In order to provide a suitable long-term dataset for comparison, identical methodology and line transects employed in baseline dolphin monitoring was followed in the impact dolphin monitoring.

2.4.4 *Monitoring Location*

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.4*. The co-ordinates of all transect lines are shown in *Table 2.23* below.

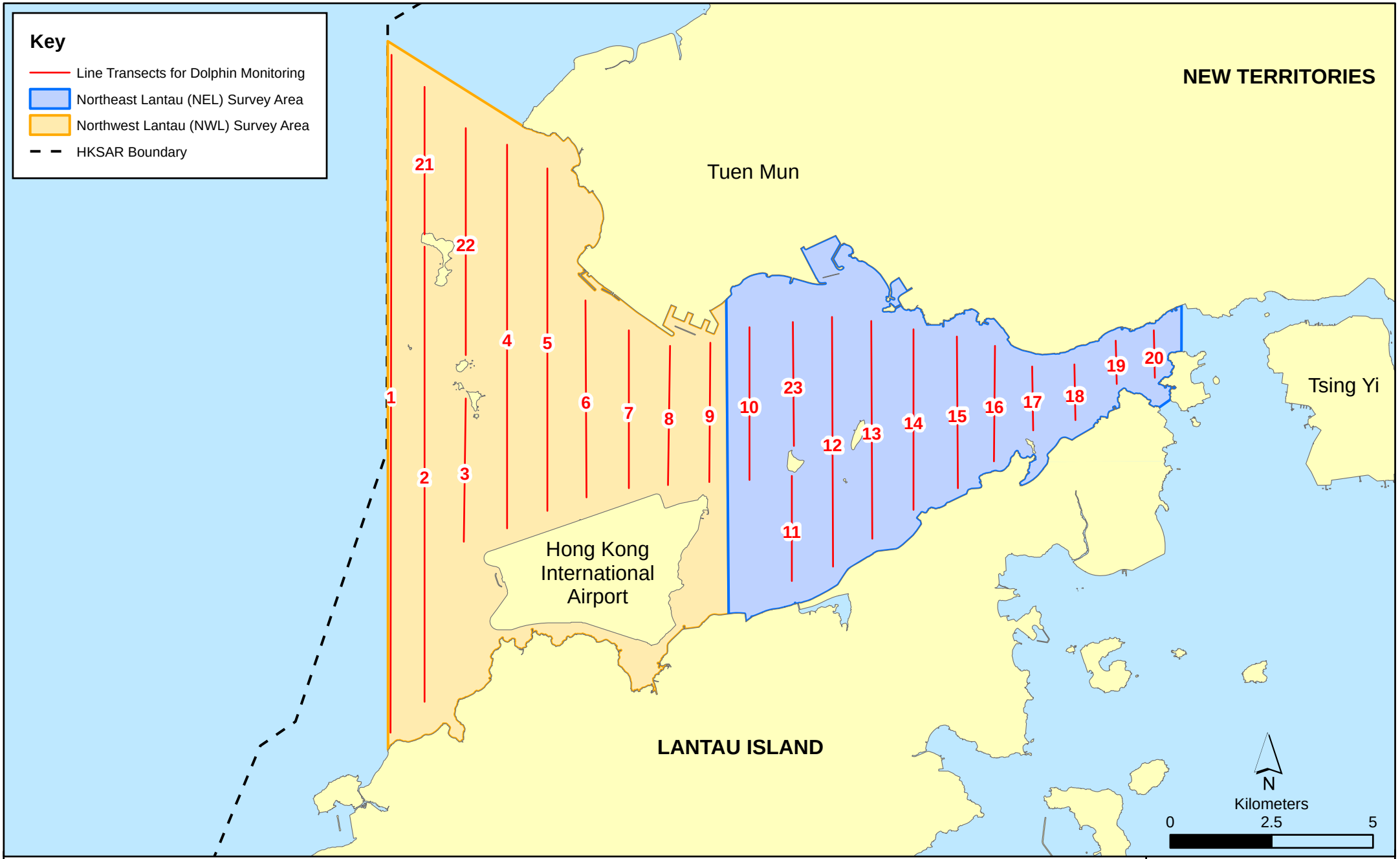

Figure 2.4

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

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Table 2.23 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	814577	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805475	815457	14	Start Point	817537	820220
2	End Point	805477	826654	14	End Point	817537	824613
3	Start Point	806464	819435	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	819771	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	820220	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	820466	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	820690	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321
8	Start Point	811508	820847	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	820892	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	820872	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818449	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807				
12	End Point	815542	824882				

2.4.5 *Action & Limit Levels*

The action and limit levels of dolphin impact monitoring are shown in *Appendix C*. The Event Action Plan is presented in *Appendix H*.

2.4.6 *Monitoring Schedule for the Reporting Period*

The dolphin monitoring schedules for the reporting period are provided in the *First* to *Twelfth Monthly EM&A Reports*.

2.4.7 *Results & Observations*

A total of 3,520.41 km of survey effort was collected, with 93.2% 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, 1,353.42 km and 2,166.99 km of survey effort were conducted in NEL and NWL survey areas respectively. The total survey effort conducted on primary lines was 2,569.49 km, while the effort on secondary lines was 950.92 km. Both survey efforts conducted on primary and secondary lines were considered as on-effort survey data. The survey efforts are summarized in *Appendix G*.

During the twenty-four sets of monitoring surveys from November 2013 to October 2014, a total of one hundred and thirty-six (136) groups of five hundred and twelve (512) Chinese White Dolphins (CWDs) were sighted. All except twenty-six (26) dolphin sightings were made during primary on-effort search. In this 12-month period, ninety-seven percent (97%) of the dolphin sightings were made in NWL, while only four (4) groups of twenty (20) dolphins were sighted in NEL. No sighting was made in the proximity of the Project's alignment. Summary table of the dolphin sightings is shown in Appendix II of *Appendix G*.

During the present 12-month impact phase monitoring period, the average daily encounter rates of Chinese White Dolphins were deduced in NEL and NWL survey areas, and compared to the ones deduced from the baseline and transitional phases as shown in *Table 2.24*.

Table 2.24 Average Dolphin 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)	
	Northeast Lantau	**Northwest Lantau**	**Northeast Lantau**	**Northwest Lantau**
Impact Phase (2013-14)	0.22 ± 0.74	6.93 ± 4.08	0.76 ± 2.59	26.31 ± 17.56
Transitional Phase (2012-13)	1.70 ± 2.26	7.68 ± 4.36	4.75 ± 7.61	27.51 ± 18.06
Baseline Phase (2011-12)	6.05 ± 5.04	7.75 ± 5.69	19.91 ± 21.30	29.57 ± 26.96

Comparison of average daily dolphin encounter rates from impact phase (November 2013 – October 2014), transitional phase (November 2012 – October 2013) and baseline phase monitoring periods (February 2011 – January 2012). (± denotes the standard deviation of the value)

Group size of Chinese White Dolphins ranged from one to thirteen (1-13) individuals per group in North Lantau region during November 2013 - October 2014. The average dolphin group sizes from the 12-month impact phase monitoring period were compared with the ones deduced from baseline and transitional phases, as shown in *Table 2.25*.

Table 2.25 Comparison of Average Dolphin Group Size

	Average Dolphin Group Size		
	Overall	**Northeast Lantau**	**Northwest Lantau**
Impact Phase (2013-14)	3.76 ± 2.57 (n = 136)	5.00 ± 2.71 (n = 4)	3.73 ± 2.57 (n = 132)
Transitional Phase (2012-13)	3.37 ± 2.98 (n = 186)	2.64 ± 2.38 (n = 22)	3.47 ± 3.05 (n = 164)
Baseline Phase (2011-12)	3.32 ± 2.86 (n = 288)	2.80 ± 2.35 (n = 79)	3.52 ± 3.01 (n = 209)

Comparison of average dolphin group sizes from impact phase (November 2013 – October 2014), transitional phase (November 2012 – October 2013) and baseline phase monitoring periods (February 2011 – January 2012) (± denotes the standard deviation of the average value)

Three (3) and two (2) Action Level exceedances for Northeast Lantau and Northwest Lantau were recorded in the reporting period respectively. No Limit Level exceedance was observed for the quarterly dolphin monitoring data between November 2013 and October 2014. In this reporting period, no

unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations. It is essential to continue monitoring the dolphin usage in North Lantau region for the rest of the impact phase monitoring period. Photos IDs of sighted dolphin are presented in *Appendix K* of the *First to Twelfth Monthly EM&A Report*.

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. Passive Acoustic Monitoring (PAM) was also implemented for the detection of marine mammal when marine works were carried out outside the daylight hours under this Contract. One sighting of the Indo-Pacific humpback dolphin *Sousa chinensis* within the 250 m marine mammal exclusion zone of the landing platform workfront nearby Viaduct D was recorded on 23 January 2014 by the marine mammal observer during the daylight hours, and the marine construction work was subsequently suspended. The *Dolphin Intrusion Report* is presented in the *Appendix K* of the *Third Monthly EM&A Report*.

2.5 BORED PILING MONITORING

Baseline bored piling monitoring, including land-based theodolite tracking, underwater noise monitoring and acoustic behavioural monitoring, were undertaken from September to October 2013 by qualified dolphin specialist. Detailed baseline monitoring results and Action/ Limit Level are presented in the Baseline Monitoring Report [1] under this Contract.

Impact monitoring of bored piling monitoring was conducted from 3 March to 25 April 2014. Schedule of bored piling monitoring are detailed in the *Fifth* and *Sixth Monthly EM&A Reports*. Due to rare occurrence of dolphin in the study area, no impact associated from bored piling works could be identified. Action and Limit Level Exceedances were however recorded in the Underwater Noise and Acoustic Behavioural Monitoring. Actions were taken according to the Event Action Plan. The detailed results of impact

[1] *Agreement No. CE 48/2011 (EP) Baseline Environmental Monitoring for Tuen Mun-Chek Lap Kok Link Southern Connection Viaduct Section*. Baseline Environmental Monitoring Report. Submitted on 19 February 2014 and subsequently accepted with no comment by EPD.

bored piling monitoring are presented in the *Impact Monitoring Report for Underwater Noise and Dolphin Acoustic Behavioural Monitoring* and *Impact Monitoring Report for Land-based Dolphin Behavioural and Movement Monitoring* submitted under separate covers.

2.6 POST-TRANSLOCATION CORAL MONITORING

Four (4) events of Post-Translocation Coral Monitoring were conducted on 17 January, 16 April, 24 July and 23 October 2014 and no exceedance of Action nor Limit Levels was recorded. The results were detailed in the *First* to *Fourth Quarterly Post-Translocation Coral Monitoring Reports.* The findings indicated that no Action or Limit Levels exceedances was recorded for coral monitoring as increase in percentage of partial mortality was not detected for both the tagged translocated and natural coral colonies when comparing to the pre-translocation dataset.

2.7 EM&A SITE INSPECTION

Site inspections were carried out on weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Fifty-two (52) site inspections were carried out in the reporting period. Key observations were summarized in the section of *EM&A Site Inspection* in the *First to Twelfth Monthly EM&A Reports*.

2.8 WASTE MANAGEMENT STATUS

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

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert), imported fill, recyclable materials, chemical waste and marine sediments. Reference has been made to the waste flow table prepared by the Contractor (*Appendix I*). The quantities of different types of wastes are summarized in *Table 2.26.*

Table 2.26 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] (tonnes)	Recyclable Materials [c] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)	
							Category L	Category M
Nov 2013	37	0	240	22.05	0	0	0	0
Dec 2013	94	0	20	28.04	0.02	0	0	0
Jan 2014	30	0	3	22.38	10.24	0	0	0
Feb 2014	10	4,674	31	10.67	0.78	0	0	0
Mar 2014	221	2,098	240	12.39	46.05	0.28	0	0
Apr 2014	118	914	20	87.65	15.76	0	0	0
May 2014	1,546	451	10	98.03	8.59	0	386	322
Jun 2014	357	2,457	2,503	77.29	25.48	0	338	0
Jul 2014	4,654	1,629	20	87.81	27.50	0	847	303
Aug 2014	2,441	288	2,094	98.22	22.28	0	391	164
Sep 2014	7,722	140	175	238.01	34.35	0	400	133
Oct 2014	13,860	109	943	268.18	0.11	0	441	222
Total	**31,090**	**12,760**	**6,299**	**1,050.72**	**191.15**	**0.28**	**2,803**	**1,144**

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*.

2.9 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.27* below.

Table 2.27 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/A	08-Dec-10	NA	HyD	Tuen Mun- Chek Lap Kok Link
Environmental Permit	EP-354/2009/B	28-Jan-14	NA	HyD	Tuen Mun- Chek Lap Kok Link
Construction Dust Notification	361571	05-Jul-13	NA	GCL	-
Construction Dust Notification	362093	17-Jul-13	NA	GCL	for Area 23
Billing Account for Disposal	7017735	10-Jul-13	End of Project	GCL	-
Chemical Waste Registration	5213-961-G2380-13	10-Oct-13	NA	GCL	Chemical waste produced in Contract HY/2012/07
Chemical Waste Registration	5213-961-G2380-14	10-Oct-13	NA	GCL	Chemical waste produced in Contract HY/2012/07
Chemical Waste Registration	5213-974-G2588-03	04-Nov-13	NA	GCL	Chemical waste produced in Contract HY/2012/07
Construction Noise Permit	GW-RW0660-13	27-Sep-13	02-Feb-14	GCL	For night works and works in general holidays
Construction Noise Permit	GW-RS1129-13	31-Oct-13	30-Apr-14	GCL	For night works and works in general holidays
Construction Noise Permit	GW-RS1186-13	23-Oct-13	24-Dec-13	GCL	For night works and works in general holidays
Construction Noise Permit	GW-RS1187-13	24-Oct-13	28-Feb-14	GCL	For night
Construction Noise Permit	GW-RW0925-13	19-Dec-13	17-Apr-14	GCL	Renewal of WA5 site office erection
Construction Noise Permit	GW-RS1423-13	11-Dec-13	30-Apr-14	GCL	Renewal for marine portion
Construction Noise Permit	GW-RS1413-13	17-Dec-13	26-Mar-14	GCL	For loading and unloading on NLH near viaduct A & B
Construction Noise Permit	GW-RS0034-14	14-Jan-14	29-Mar-14	GCL	For night works and works in general holiday
Construction Noise Permit	GW-RW0123-14	27-Feb-14	27-Aug-14	GCL	For night works and works in general holiday
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	GW-RS0419-14	15-May-14	13-Nov-14	GCL	For loading & unloading on NLH near Viaducts A & B
Construction Noise Permit	GW-RS0226-14	30-Mar-14	29-Sep-14	GCL	For loading & unloading on NLH near Viaduct D

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Construction Noise Permit	GW-RS0236-14	27-Mar-14	14-May-14	GCL	For loading & unloading on NLH near Viaducts A & B
Construction Noise Permit	GW-RS0280-14	31-Mar-14	31-May-14	GCL	For excavation at Pier B9
Construction Noise Permit	GW-RS0299-14	07-Apr-14	05-Jul-14	GCL	Pier B8 at CEDD Access Road
Construction Noise Permit	GW-RS0331-14	04-Apr-14	06-Jul-14	GCL	Broad permit for works at seafront & marine piers
Construction Noise Permit	GW-RS0338-14	04-Apr-14	03-Jun-14	GCL	For bored piling works between Pier E13 and HKBCF
Marine Dumping Permit	EP/MD/14-155	01-Apr-14	30-Apr-14	GCL	For dumping Type I (Dedicated Site) and Type II Sediment
Waste Water Discharge License	WT00019018-2014	13-May-14	31-May-19	GCL	Discharge for land portion
Marine Dumping Permit	EP/MD/14-075	28-Jan-14	27-Jul-14	GCL	For dumping Type I Sediment
Chemical Waste Registration	5213-951-G2380-17	12-Jun-14	NA	GCL	Viaducts A, B, C, D & E
Construction Noise Permit for night works and works in general holidays	GW-RS0646-14	27-Jun-14	26-Oct-14	GCL	Broad Permit for Works at Seafront & Marine Piers & Pier B9
Construction Noise Permit for night works and works in general holidays	GW-RS0647-14	28-Jun-14	26-Oct-14	GCL	Pier C7 & D8 at CEDD Access Road
Marine Dumping Permit	EP/MD/15-028	01-Jun-14	30-Jun-14	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Construction Noise Permit	GW-RS0792-14	31-Jul-14	24-Dec-14	GCL	Broad Permit for Works at Seafront & Marine Piers & Pier B9
Construction Noise Permit	GW-RS0700-14	21-Jul-14	31-Dec-14	GCL	For loading & unloading on NLH near Viaduct A & B
Construction Noise Permit	GW-RW0640-14	28-Aug-14	27-Feb-15	GCL	General works at WA5
Marine Dumping Permit	EP/MD/15-065	01-Aug-14	31-Aug-14	GCL	For dumping Type I (Dedicated Site) and Type II sediment
Construction Noise Permit for night works and works in general holidays	GW-RS0942-14	11-Sep-14	14-Mar-15	GCL	For Plant mobilization using tractor
Construction Noise Permit for night works and works in general holidays	GW-RS1032-14	25-Sep-14	28-Mar-15	GCL	For Load unload at NLH near Viaduct D
Marine Dumping Permit	EP/MD/15-098	01-Sep-14	30-Sep-14	GCL	For dumping Type I (Dedicated Site) and Type

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
					II sediment
Construction Noise Permit for night works and works in general holidays	GW-RS1129-14	17-Oct-14	31-Dec-14	GCL	For Safety Fences at Pier D9
Construction Noise Permit for night works and works in general holidays	GW-RS1130-14	20-Oct-14	22-Apr-15	GCL	For Plant mobilization using tractor
Construction Noise Permit for night works and works in general holidays	GW-RS1135-14	17-Oct-14	15-Dec-14	GCL	For TTA Case 60-2 Ch.1.3E-3.6E
Construction Noise Permit for night works and works in general holidays	GW-RS1188-14	30-Oct-14	31-Dec-14	GCL	For TTA Cases 50 Airport Road-5.3
Marine Dumping Permit	EP/MD/15-120	01-Oct-14	31-Oct-14	GCL	For dumping Type I (Dedicated Site) and Type II sediment

2.10 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

In response to the EM&A site audit findings mentioned in *Section 2.7* of this report, the Contractor has carried out the corrective actions.

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

2.11 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

Two (2) Action Level exceedances of 24-hour TSP were recorded at both ASR8 and ASR8a in the reporting period. The exceedances were considered unlikely related to the construction works of the Contract. A detailed investigation report was presented in *Appendix N* of the *Second Monthly EM&A Report*. Results for 1-hour TSP monitoring and construction noise monitoring complied with the Action/ Limit levels in the reporting period.

One (1) Action Level exceedance of averaged-depth SS was recorded at SR4a in the reporting period. The exceedance was considered not related to the construction works of this Contract. A detailed investigation report was presented in *Appendix N* of the *First Monthly EM&A Report*.

For the dolphin impact monitoring, three (3) and two (2) Action Level exceedances for Northeast Lantau and Northwest Lantau were recorded in the reporting period respectively. No Limit Level exceedance was observed for the quarterly dolphin monitoring data between November 2013 and October 2014. The exceedances were considered as natural variation of dolphin ranging pattern and not related to this Contract. The investigation reports were presented in *Appendix N* of *First to Third Quarterly EM&A Reports*.

2.12 *SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS*

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

Two (2) complaints were received in the reporting period. The first complaint was referred by EPD to various parties of the HZMB projects in November 2013 with regard to the noise nuisance. Another complaint was referred by EPD in June 2014 with regard to the discharge of muddy water to storm drains. The complaints were considered not related to this Contract upon further investigation. The detailed investigation reports were presented in the *Appendix N* of the *First* and *Ninth Monthly EM&A Reports*.

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

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

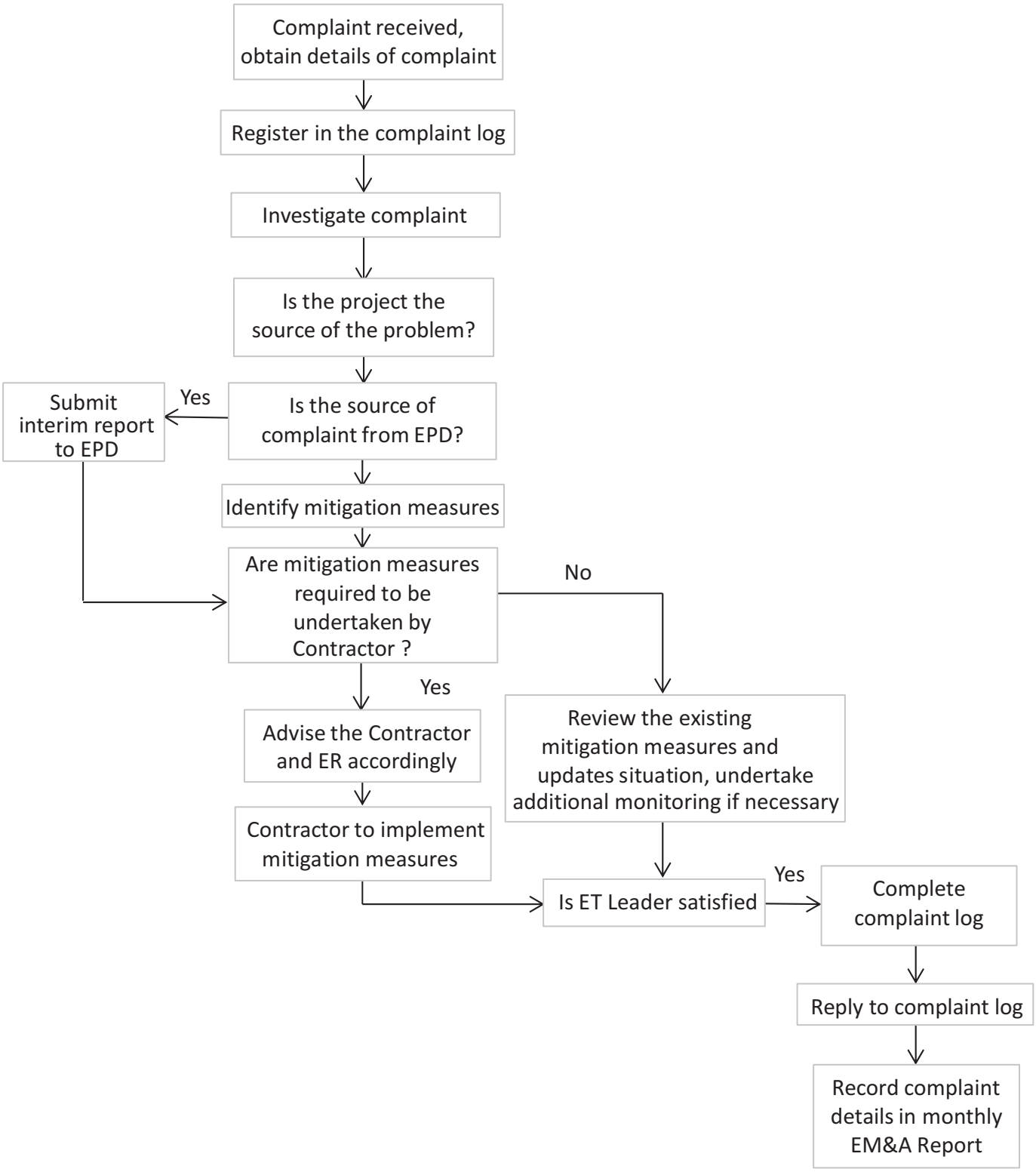

Figure 2.5 Environmental Complaint Handling Procedure

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3 COMPARISON OF EM&A RESULTS WITH EIA PREDICTIONS AND BASELINE MONITORING RESULTS

The EM&A results in the reporting period are compared to the predictions from EIA Report and baseline monitoring result for the sake of reviewing the validity of EIA predictions.

Land and marine based construction activities were conducted during the reporting period. At the same time, monitoring on air quality, noise, water quality, marine ecology and waste were undertaken per plan.

3.1 AIR QUALITY MONITORING

The construction activities may have impact on air quality as predicted in the EIA report, whilst excavation works, road works, slope works and foundation works were undertaken in the reporting period. Maximum TSP levels as predicted in the EIA and measured during the impact and baseline monitoring are presented in *Table 3.1*, with average TSP levels measured during both the baseline and impact monitoring shown as well. As shown in *Table 3.1,* average TSP levels measured during the impact monitoring are lower than those measured during the baseline monitoring at all stations. Maximum TSP levels are similar between baseline and impact monitoring, which are both higher than those predicted in the EIA. It thus appeared that the construction activities of the Contact did not cause significant impact on air quality with similar maximum TSP levels between the baseline and impact monitoring and lower average TPS levels during the impact monitoring.

Table 3.1 Comparison of Impacts on Air Quality (in µg/m³) between EIA Prediction and Impact Monitoring Period

Monitoring Station	EIA Predicted Maximum	Maximum Impact Monitoring	Maximum Baseline Monitoring	Average Baseline Monitoring	Average Impact Monitoring
ASR8/ASR9C (1-hr TSP)	205/240	361	462	220	106
ASR8/ASR9C (24-hr TSP)	83/108	205	113	75	67

Monitoring Station	EIA Predicted Maximum	Maximum Impact Monitoring	Maximum Baseline Monitoring	Average Baseline Monitoring	Average Impact Monitoring
ASR9A/ASR8A (1-hr TSP)	292.9	306	437	222	99
ASR9A/ASR8A (24-hr TSP)	105	210	128	74	64

Note:
Baseline monitoring results of ASR9A and ASR9C are applied to ASR8A and ASR8 respectively.

3.2 *NOISE IMPACT MONITORING*

In the reporting period, the Contractor undertook the construction works and used the Power Mechanical Equipment (PME) as predicted in EIA. The EIA predicted sound pressure level, average baseline and impact noise monitoring results are presented in *Table 3.2*. The EIA assessment has predicted that marginal impacts would be expected at the Pak Mong Village during construction phase. The monitoring results in the reporting period suggested that the Project has managed the construction noise, if any, to an acceptable level and thus monitoring results are considered to comply with the EIA prediction.

Table 3.2 Comparison of Impacts on Noise (in dB (A)) between EIA Prediction and Impact Monitoring Period

Monitoring Station	EIA Predicted Maximum	Average Baseline Monitoring	Average Impact Monitoring	Maximum Impact Monitoring
NSR1	74	56	58	60

Note:
EIA maximum noise level was predicted in SPL. Baseline and impact monitoring were measured in $Leq_{(30min)}$.

3.3 *WATER QUALITY MONITORING*

The marine platform erection and piling works were undertaken in the monitoring period. According to the EIA prediction, no SS exceedance is anticipated from this Project at the water sensitive receivers nearby the vicinity of Contract (WSR 22a, WSR 22b and WSR 22c). Although one (1) Action Level exceedance on depth-averaged SS was recorded in the reporting

period, the exceedance was considered not related to this Contract upon further investigation. The averaged baseline and impact monitoring results are presented in *Table 3.3*, in which the annual averaged SS monitoring results at all WQM monitoring stations in both tides are well below the averaged results of baseline monitoring. Thus, the impact monitoring results are considered to in line with the EIA prediction.

Table 3.3 ***Comparison of Depth-averaged SS (in mg/L) between Baseline and Impact Monitoring Period***

Monitoring Station	Tide	Baseline monitoring	Impact Monitoring
CS(Mf)3	Ebb	8.8	6.1
CS(Mf)5		9.2	5.9
IS(Mf)16		11.3	6.3
IS(Mf)9		10.9	6.3
IS8		11.3	6.1
SR4		11.1	6.3
SR4a		9.1	6.2
CS(Mf)3	Flood	12.4	6.0
CS(Mf)5		11.5	6.0
IS(Mf)16		10.4	6.1
IS(Mf)9		14.7	6.2
IS8		13.5	6.2
SR4		12.2	6.2
SR4a		9.8	6.2

3.4 MARINE ECOLOGY

Impact monitoring on marine ecology was undertaken during the monitoring period. No exceedance on post-translocation coral monitoring was recorded in the reporting period. The result is in a line with the EIA prediction as the impact on coral was predicted minor.

According to the baseline results in the *Appendix F* of the approved EIA Report, the dolphin groups were largely sighted near Lung Kwu Chau and the waters between Lung Kwu Chau and Black Points and infrequently along the alignment of this Contract. Two-way ANOVAs with repeated measures were conducted to compare results of average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) between baseline and impact periods. Although the STG and ANI in impact monitoring period were lower than that before the commencement of this Contract (see *Section 2.4.7*) and the differences between 2 periods are statistically significant (see

Section 3.3.6 of *Appendix G*), the distribution pattern was similar between the impact monitoring period and before the commencement (i.e. transition period in 2012 – 2013) of this Contract. In addition, the habitat use pattern between impact monitoring in this reporting period and before the commencement of this Contract is largely similar, in which dolphins are observed heavily utilized area around Lung Kwu Chau and less frequently in the North Lantau region where the works area of this Contract is situated. The monitoring results in this reporting period are considered to be in line with the EIA predictions, and the review of monitoring data suggested that no unacceptable impacts was noted from the marine works under this Contract. It is essential to monitor the dolphin usage in North Lantau region for the rest of impact monitoring period to keep track on the trend of dolphin ranging pattern.

3.5 WASTE MANAGEMENT

For wastes generated from the construction activities include C&D materials (inert and non-inert), chemical wastes, recyclable materials and marine sediments (both categories L and M), the wastes generated were in line with the EIA predictions. For dredged sediment, the quantity of sediments generated was in line with CEDD's allocated disposal volumes as per the marine dumping permit (see *Table 2.23*). The wastes were also disposed of in accordance with the recommendations of the EIA.

3.6 SUMMARY OF MONITORING METHODOLOGY AND EFFECTIVENESS

The EM&A monitoring programme has been reviewed and was considered effective and adequate to cater for the nature of works in progress. No change to the monitoring programme was considered to be necessary.

The EM&A programme will be evaluated as appropriate in the next reporting period and improvements in the EM&A programme will be recommended if deemed necessary.

3.7 *SUMMARY OF MITIGATION MEASURES*

The mitigation measures stipulated in the Updated EM&A Manual were undertaken by the Contractor in the reporting period. The mitigation measures were reviewed and considered effective. No addition or change on mitigation measures was considered to be necessary.

4 FUTURE KEY ISSUES

4.1 KEY ISSUES FOR THE COMING PERIOD

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.

5 CONCLUSION AND RECOMMENDATIONS

This First Annual EM&A Report presents the findings of the EM&A activities undertaken during the period from 31 October 2013 to 31 October 2014, in accordance with the Updated EM&A Manual and the requirements of the Environmental Permit (EP-354/2009/B).

Two (2) Action Level Exceedances in 24-hour TSP monitoring and one (1) Action Level Exceedance in depth-averaged SS were recorded in the reporting period. Neither Action Level nor Limit Level exceedances were observed for 1-hour TSP, noise and post-translocation coral monitoring in this reporting period.

A total of one hundred and thirty-six (136) groups of five hundred and twelve (512) Chinese White Dolphins (CWDs) were sighted. Whilst five (5) Action Level exceedances were recorded between November 2013 and October 2014, no unacceptable impact from the activities of this Contract on Chinese White Dolphins was noticeable from the general observations. It is essential to continue monitoring the dolphin usage in North Lantau region for the rest of the impact phase monitoring period.

Environmental site inspection was carried out fifty-two (52) times in the reporting period. Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site audits.

No environmental complaint, summons/ prosecution were received during the reporting period.

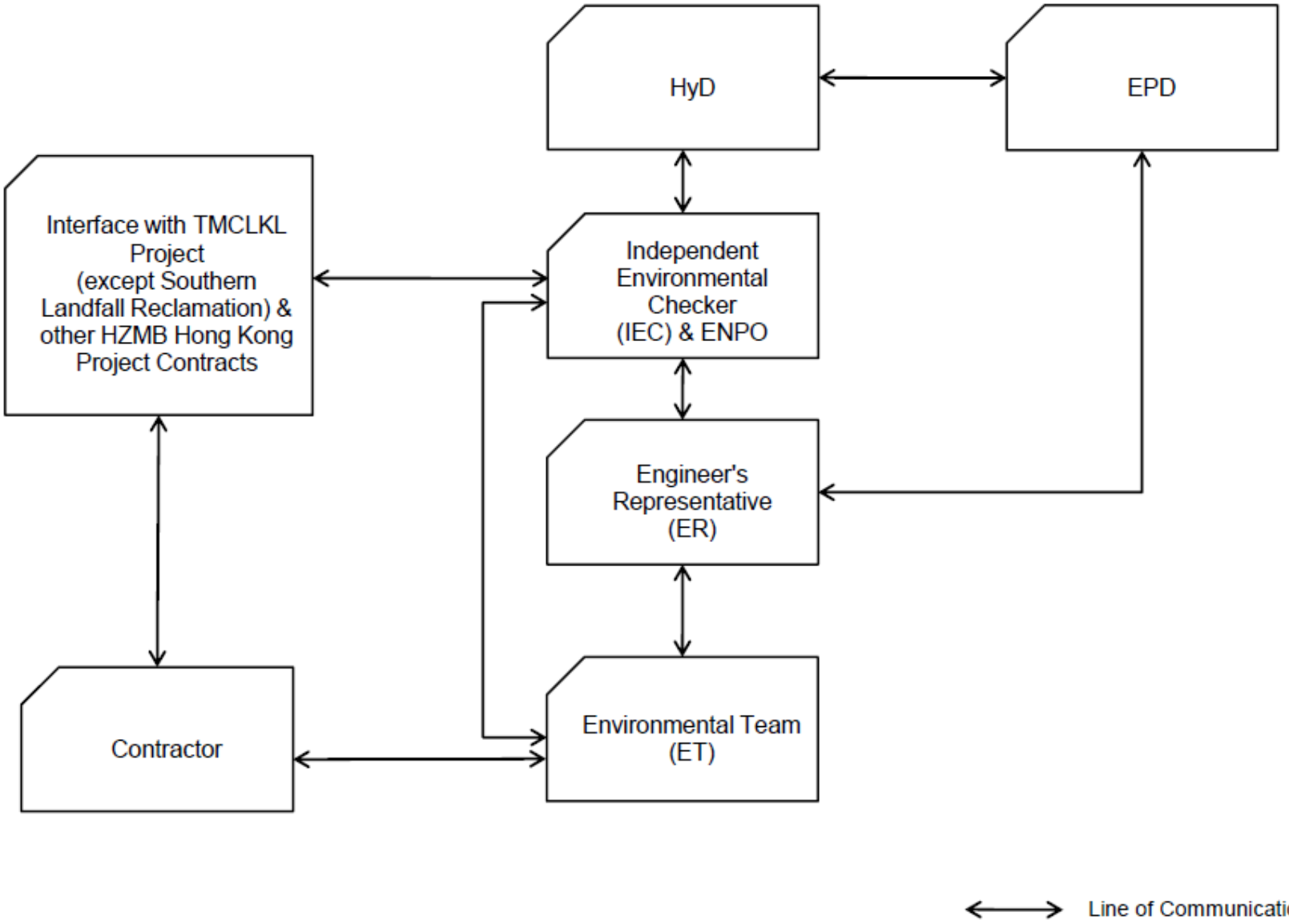
The review of monitoring data suggested that the construction works under this Contract have proceeded in an environmentally acceptable manner in this reporting period.

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

Environmental Mitigation and Enhancement Measure Implementation Schedules

(Adopted from: CINOTECH (2011) Agreement No. CE35/2011 EP Baseline Environmental Monitoring for Hong Kong-Zhuhai-Macao BridgeTuen Mun-Chep Lap Kok Link – Investigation. UpdatedEM&A Manual for Tuen Mun-Chek Lap Kok Link)

Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link
Southern Connection Viaduct Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

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

Contract No. HY/2012/07
Tuen Mun – Chek Lap Kok Link
Southern Connection Viaduct Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		<>
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
NOISE									
5.11	Section 4	Noise monitoring	All existing representative sensitive receivers / during North Lantau Viaduct construction	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
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			✓
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 m² 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		✓
7.13	6.5	Undertaken gabion wall works in Stream NL1 in the dry season	North Lantau slope works/dry	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	
			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		<>
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		n/a
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		<>
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Recycle/Reuse all felled trees and vegetation, e.g.	All areas/detailed	Design	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	
		mulching (CM9)	design/ during construction	Consultant/ Contractor					
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 (OM4)	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	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and	All areas/detailed design/ during	Design Consultant/	TMEIA	Y	Y	Y	n/a. To be

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
12.6	8.1	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			<>
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 materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The Contractor should recycle as many C&D	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	
		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.	construction period						
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; - Adequate ventilation; - Sufficiently covered to prevent rainfall entering	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	
		(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 hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local	Site Offices/ 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	
		collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.							
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 C

Summary of Action and Limit Levels

Table C1 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 = 178	260
1 Hour TSP Level in μg /m³	ASR9A/ASR8A = 394 ASR9C/ASR8 = 393	500

Table C2 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 C3 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 C4 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:

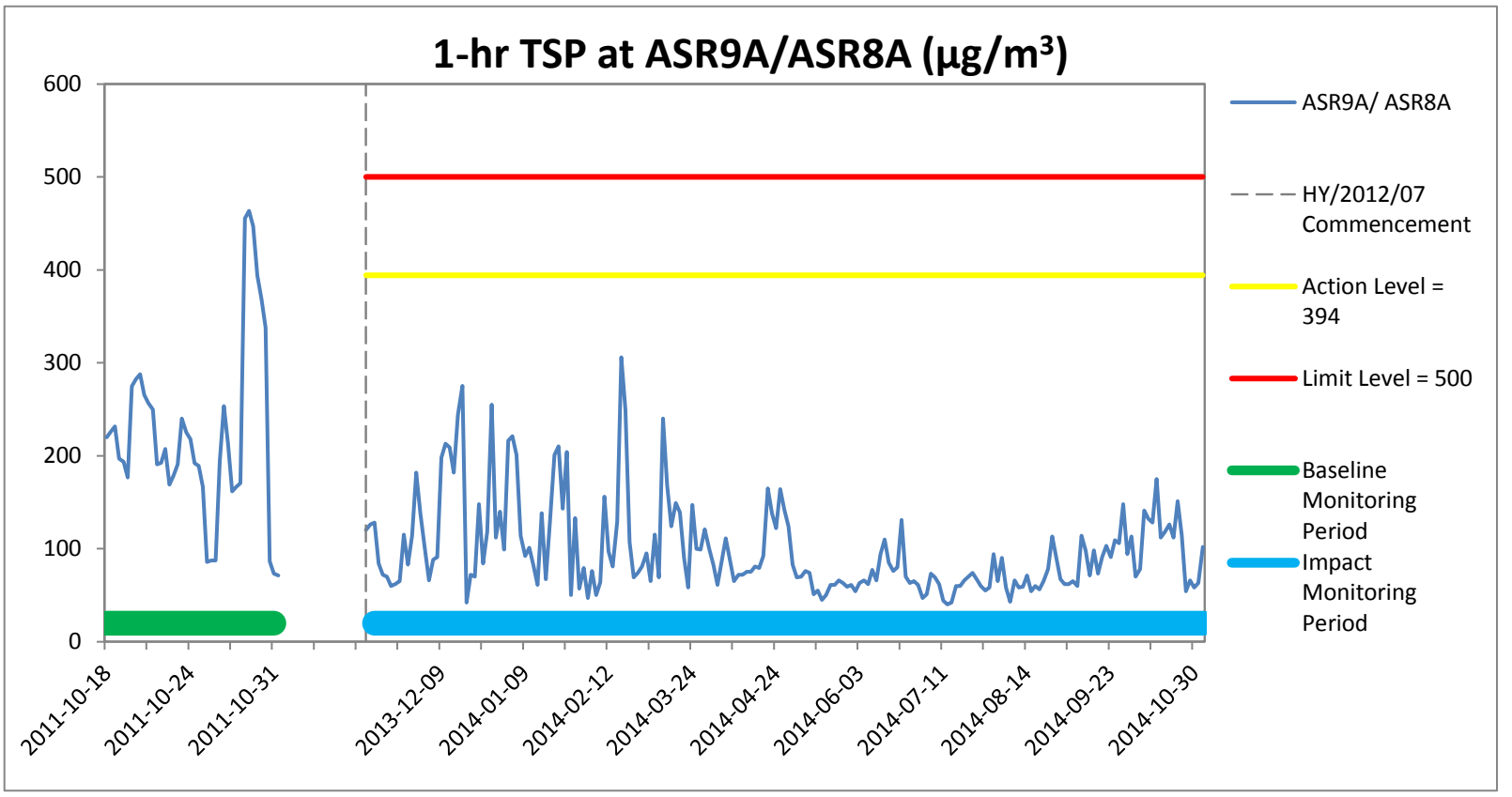
1. STG means quarterly encounter rate of number of dolphin sightings, which is **6.00 in NEL** and **9.85 in NWL** during the baseline monitoring period
2. ANI means quarterly encounter rate of total number of dolphins, which is **22.19 in NEL** and **44.66 in NWL** during the baseline monitoring period
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.

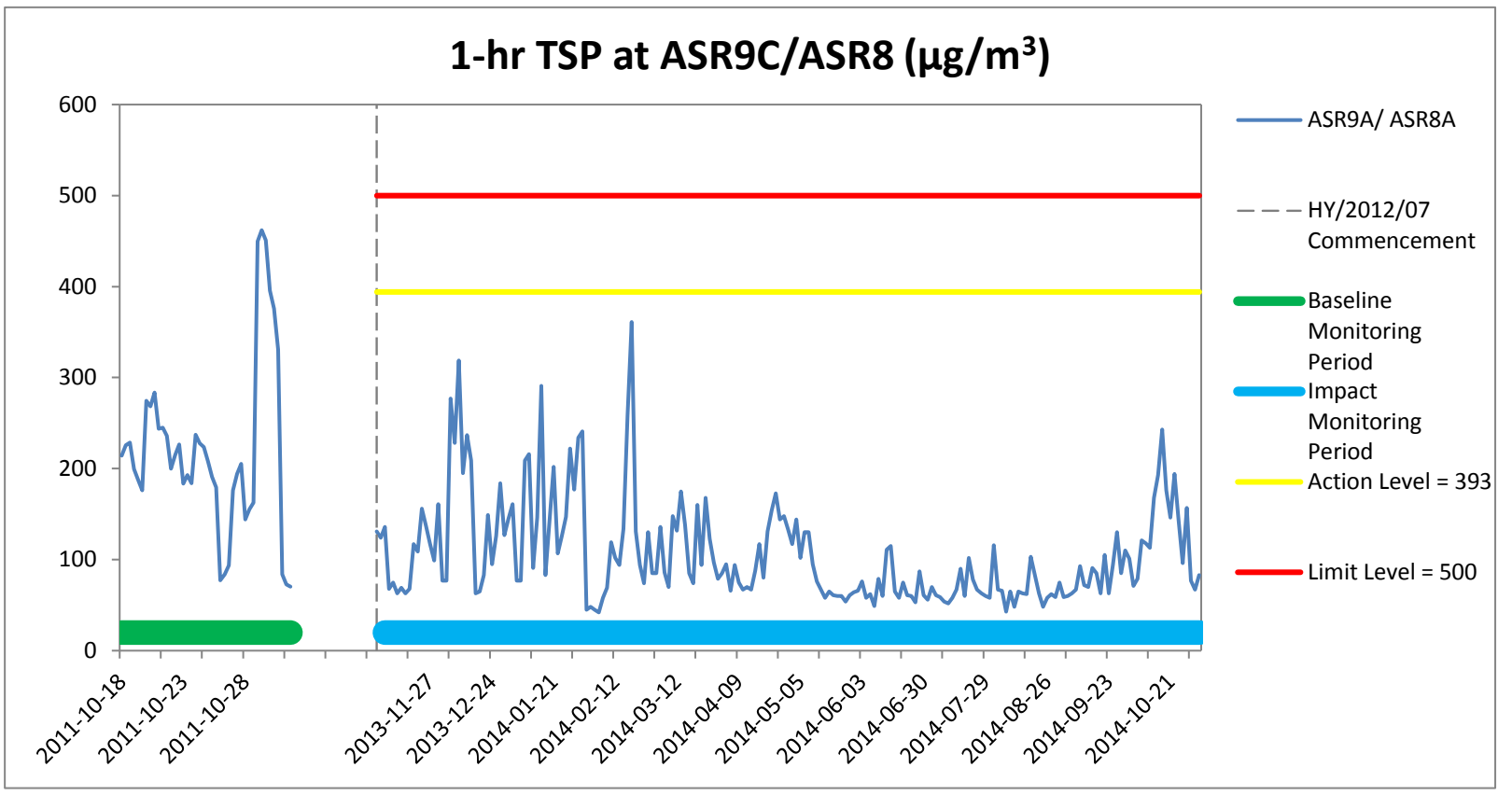
Table C5 Derived Value of Action Level (AL) and Limit Level (LL)

	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 D

Impact Air Quality Monitoring Graphical Presentation



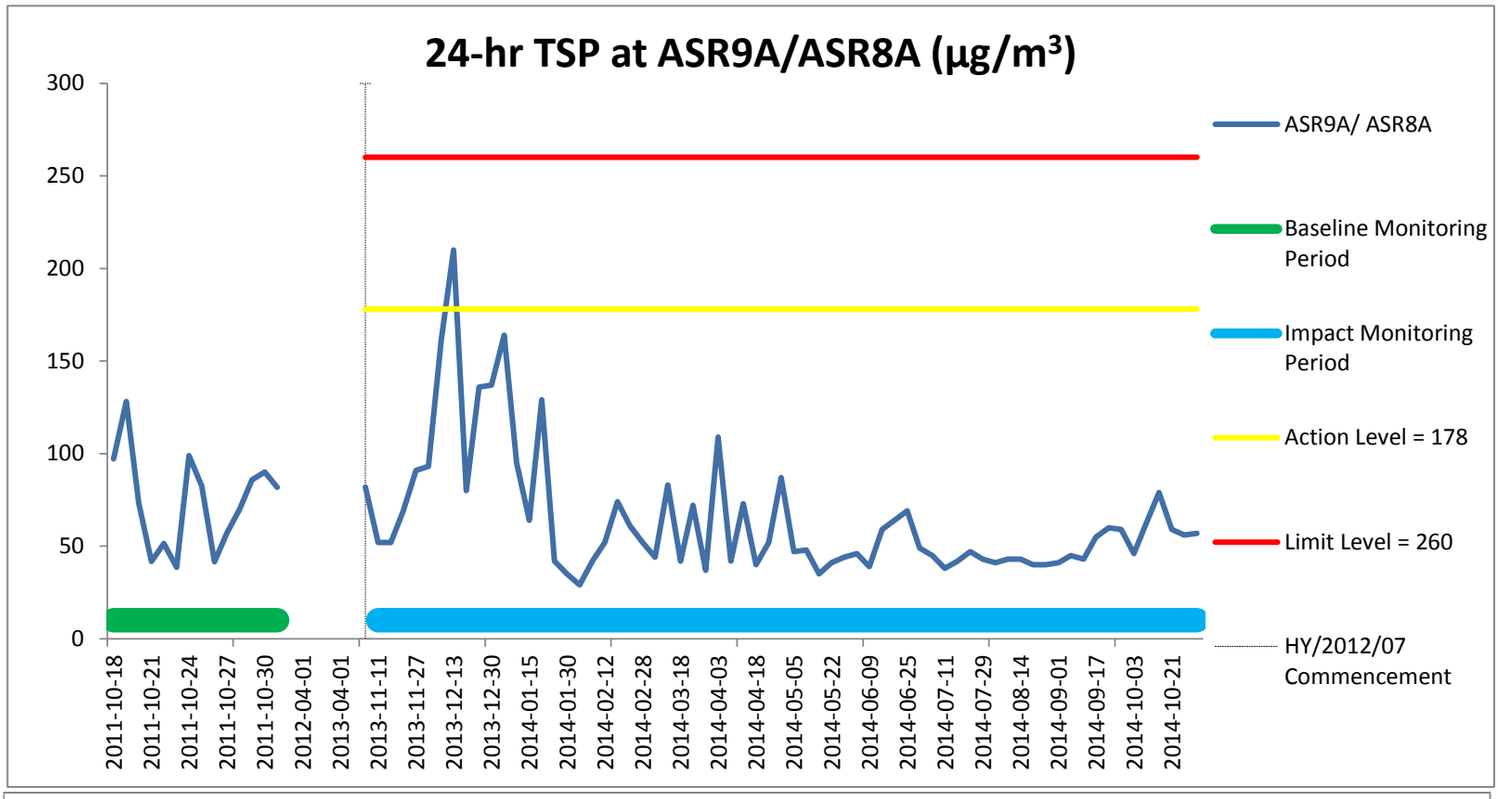


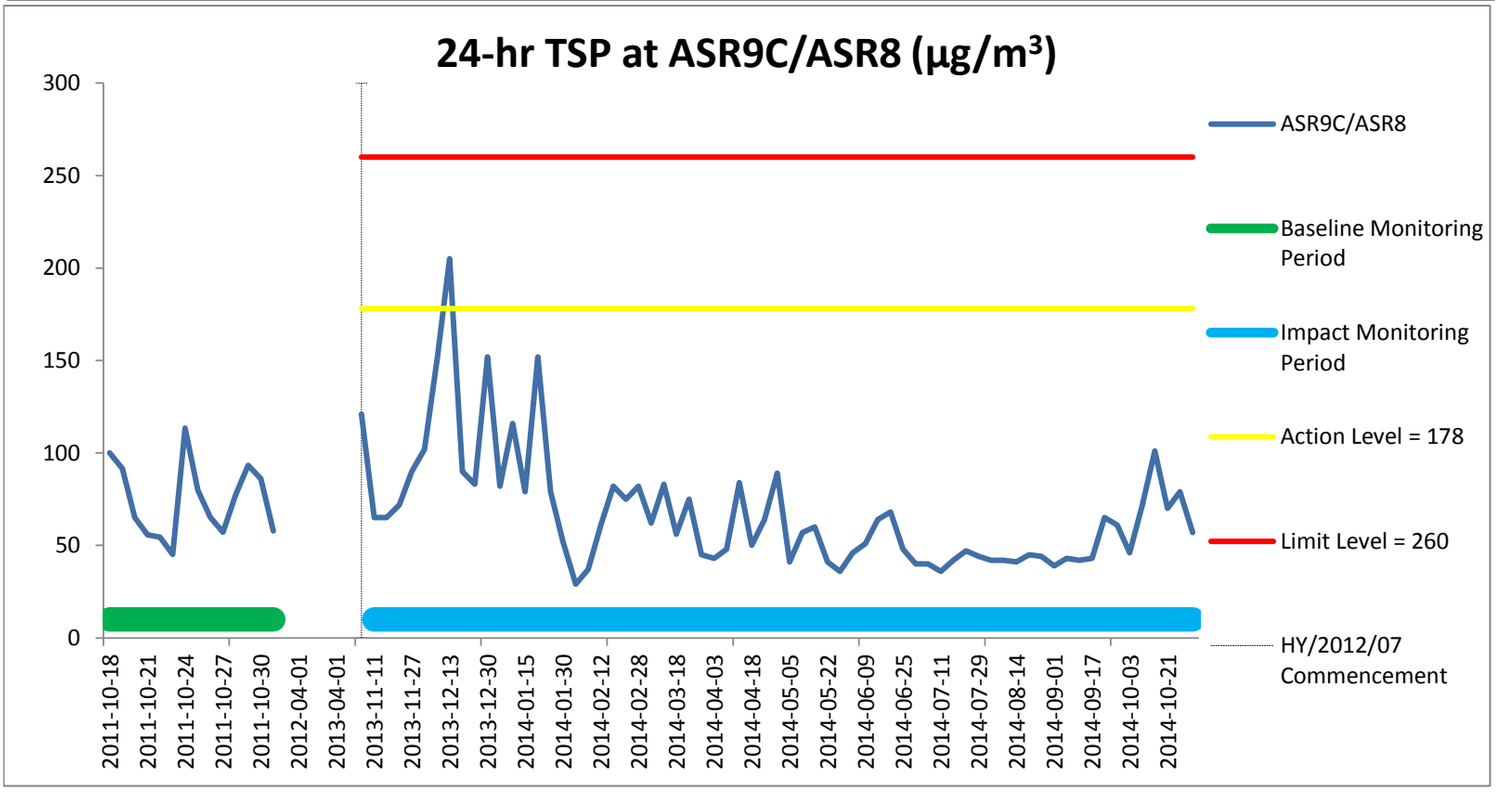
Weather condition within the reporting period varied between sunny to rainy. The overall monitoring results were not affected by weather conditions.

Major construction works undertaken within the reporting period include Tree felling and transplanting; Channel re-construction at Area 1; Site formation of workshop at Area 1; Site offices erection at Area 5; Construct temporary road at CEDD track for piling; Temporary access bridge (TAB); Fence installation and relocation at Area 2, Viaducts A, B, C & D; Satellite container offices erection along seawall; Land piling at Viaducts B, C & D; Construction of pile cap superstructure of Viaduct B; Piling platform installation at Viaducts B, C, D &E; Additional land GI, trial pits & lab testing; Utility surveys; and Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform;

Marine piling; Construction of Pile caps; and Marine ground investigation (GI) and laboratory testing.



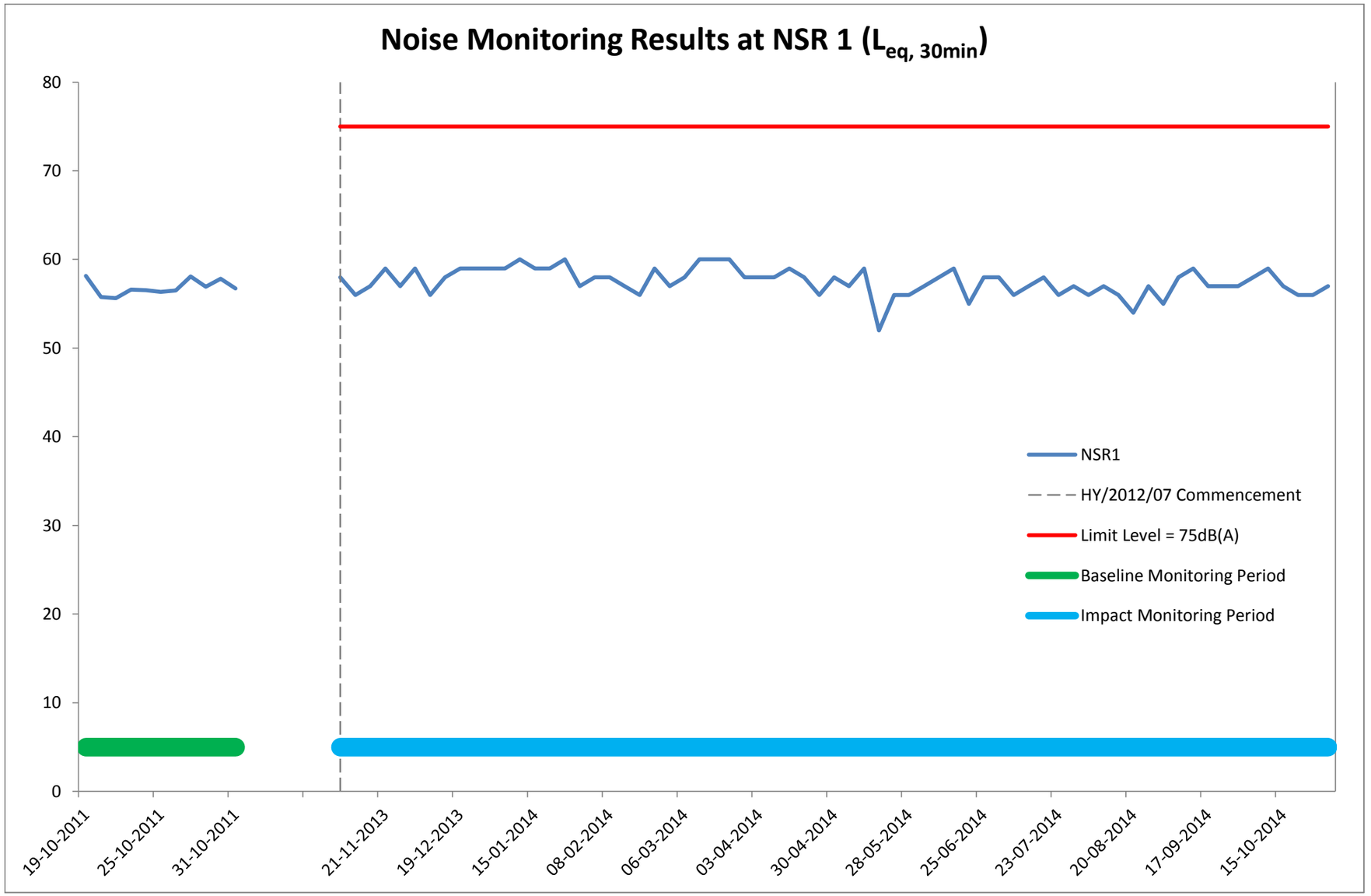


Weather condition within the reporting period varied between sunny to rainy. The overall monitoring results were not affected by weather conditions. Major construction works undertaken within the reporting period include Tree felling and transplanting; Channel re-construction at Area 1; Site formation of workshop at Area 1; Site offices erection at Area 5; Construct temporary road at CEDD track for piling; Temporary access bridge (TAB); Fence installation and relocation at Area 2, Viaducts A, B, C & D; Satellite container offices erection along seawall; Land piling at Viaducts B, C & D; Construction of pile cap superstructure of Viaduct B; Piling platform installation at Viaducts B, C, D &E; Additional land GI, trial pits & lab testing; Utility surveys; and Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.

Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Marine foundation at Viaducts B & E; Construction of rockfill platform; Marine piling at Viaducts B, C, D & E; Construction of Pile caps; and Marine ground investigation (GI) and laboratory testing.

Appendix E

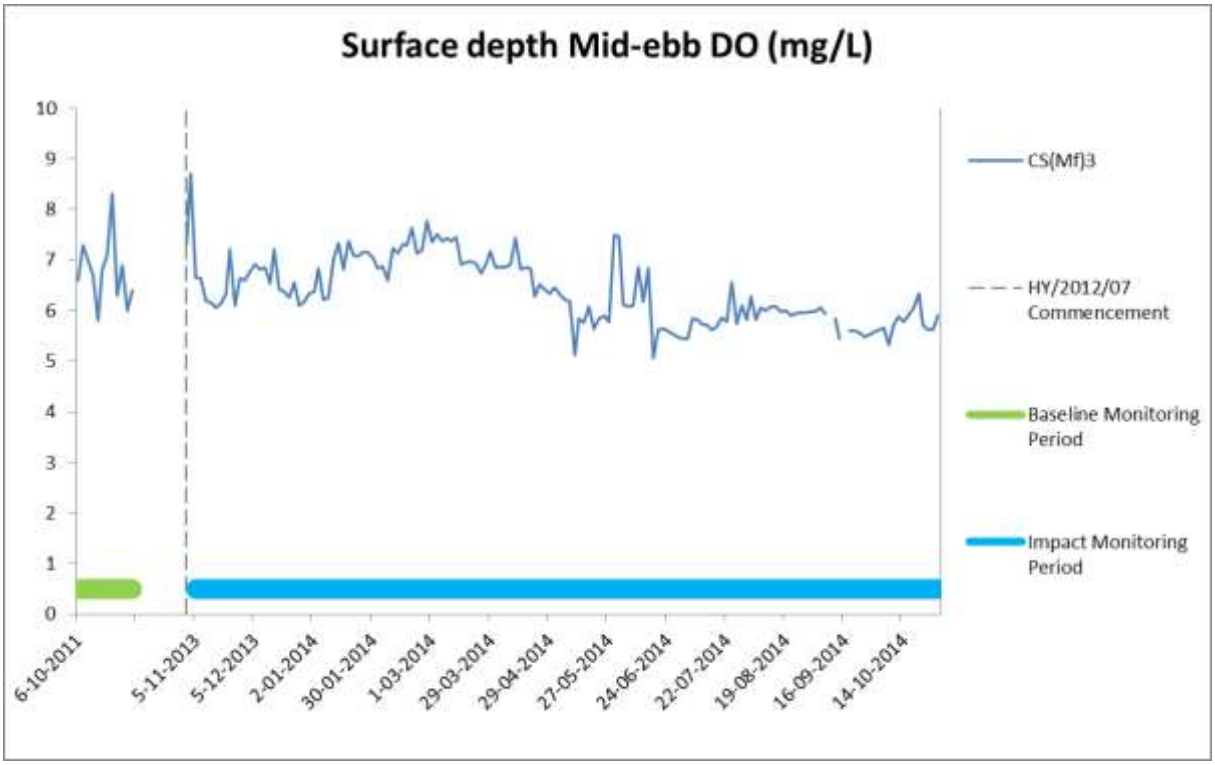
Impact Noise Monitoring Graphical Presentation



Weather condition within the reporting period varied between sunny to rainy. The overall monitoring results were not affected by weather conditions.
Major construction works undertaken within the reporting period include Tree felling and transplanting; Channel re-construction at Area 1; Site formation of workshop at Area 1; Site offices erection at Area 5; Construct temporary road at CEDD track for piling; Temporary access bridge (TAB); Fence installation and relocation at Area 2, Viaducts A, B, C & D; Satellite container offices erection along seawall; Land piling at Viaducts B, C & D; Construction of pile cap superstructure of Viaduct B; Piling platform installation at Viaducts B, C, D &E; Additional land GI, trial pits & lab testing; Utility surveys; and Slope work of Slopes 9SE-B/C8, 9SE-B/C9 & 9SE-B/F9.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps; and Marine ground investigation (GI) and laboratory testing.
* Baseline monitoring result presented in the graph is averaged to be daily.

Appendix F

Impact Water Quality Monitoring Graphical Presentation



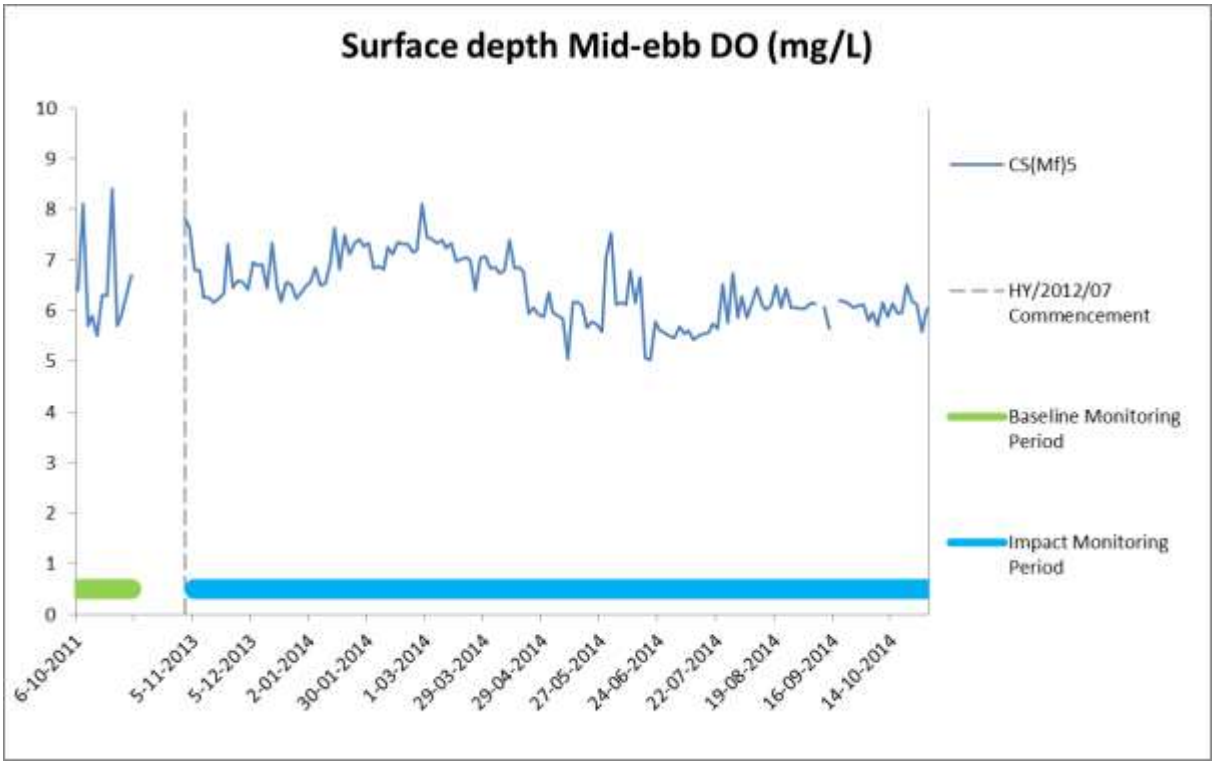
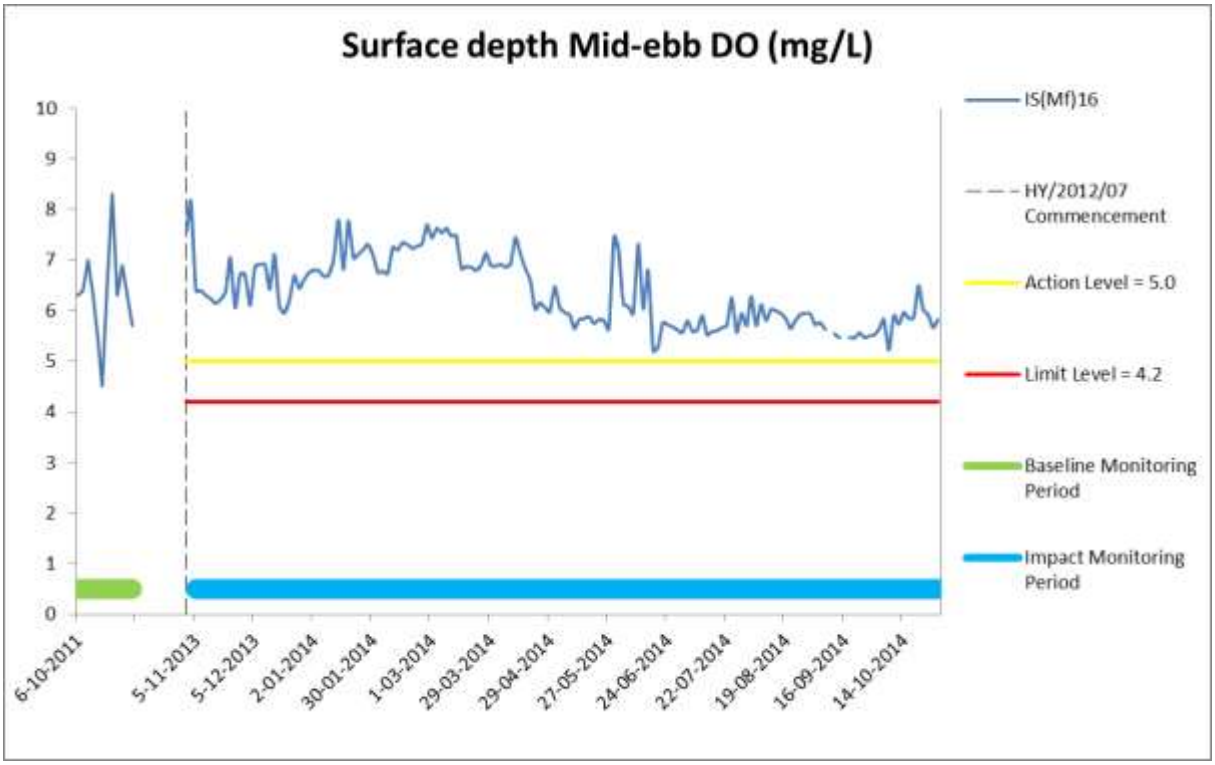
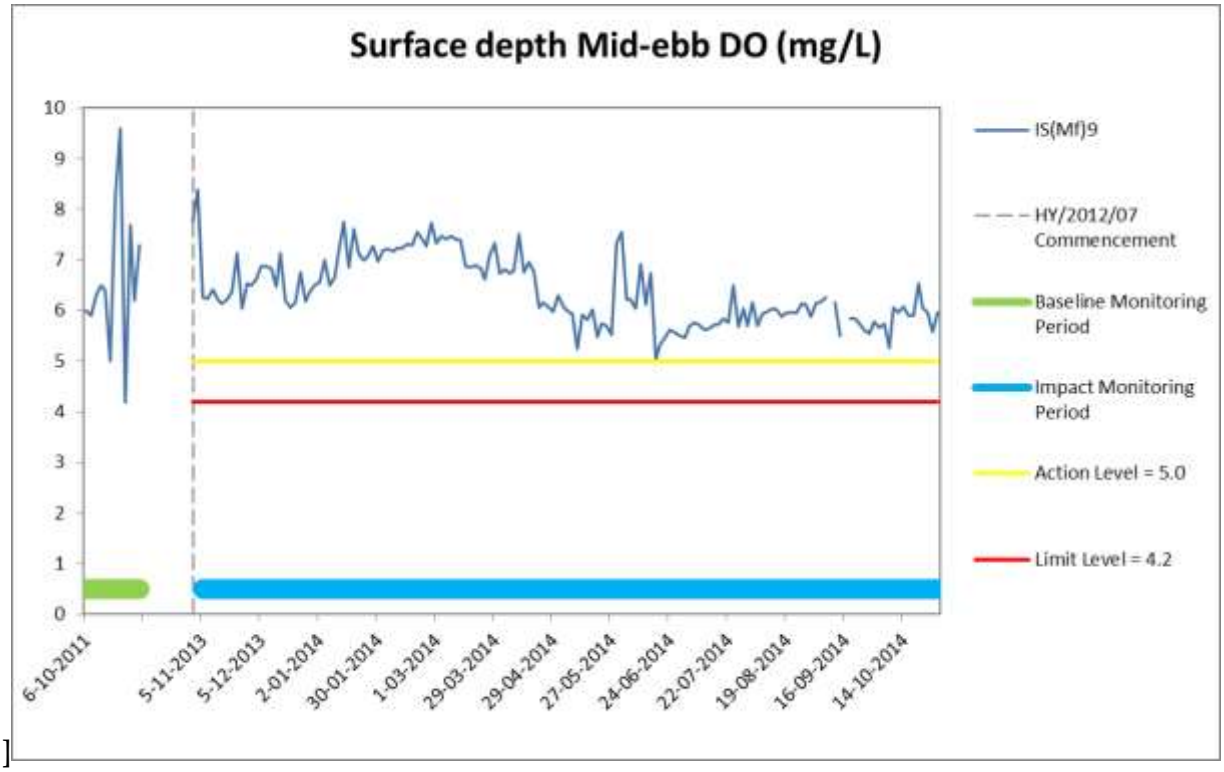


Figure F1 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)



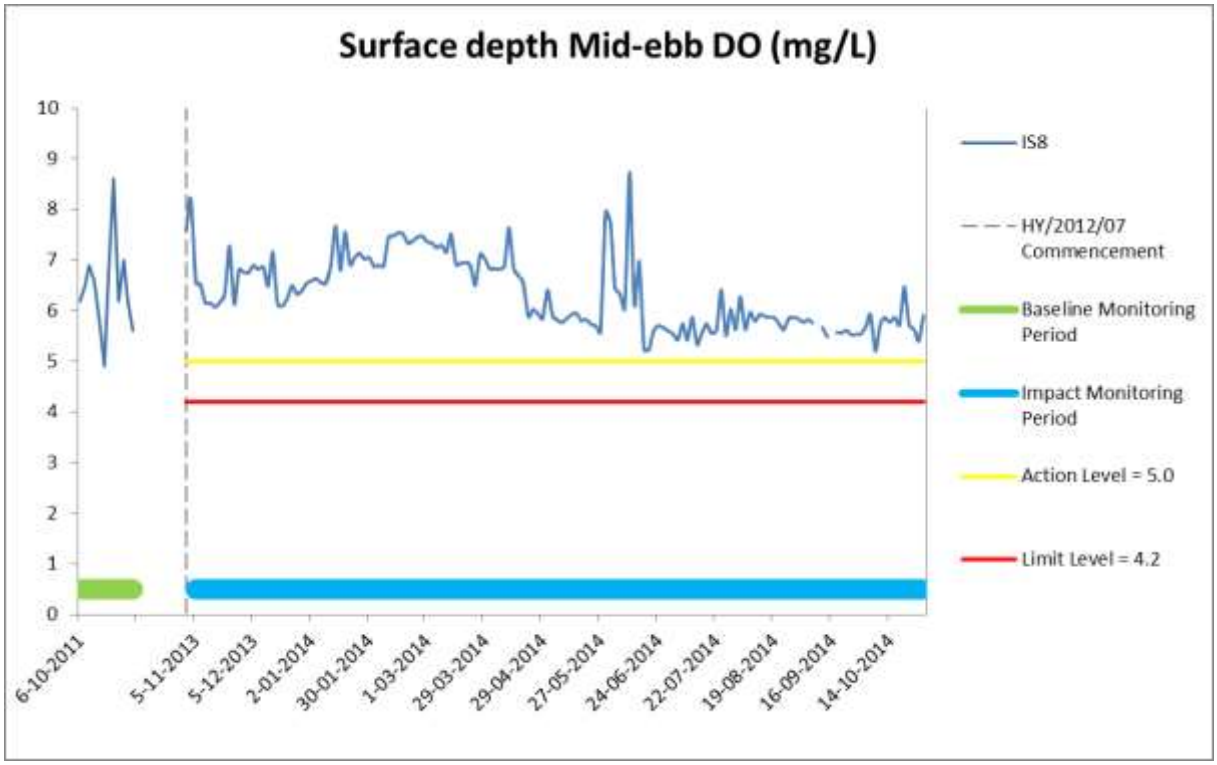


]

Figure F2 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.

Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



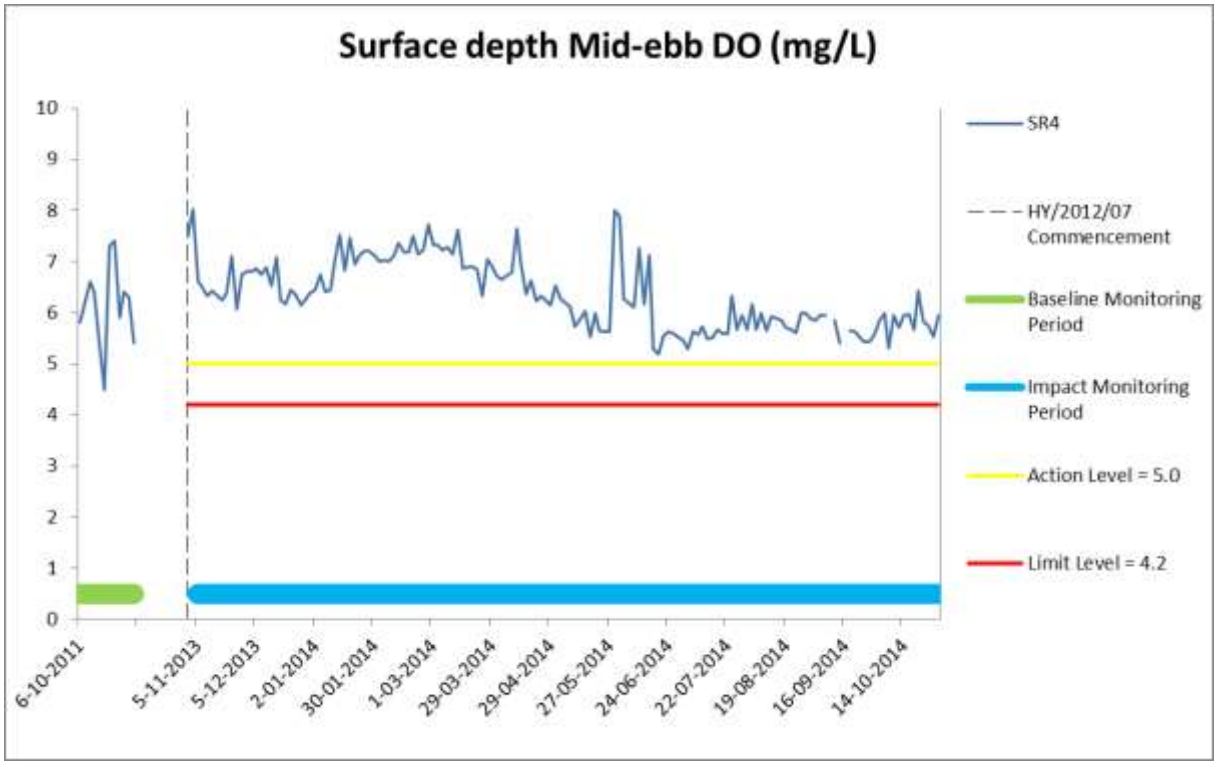


Figure F3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Environmental Resources Management

ERM

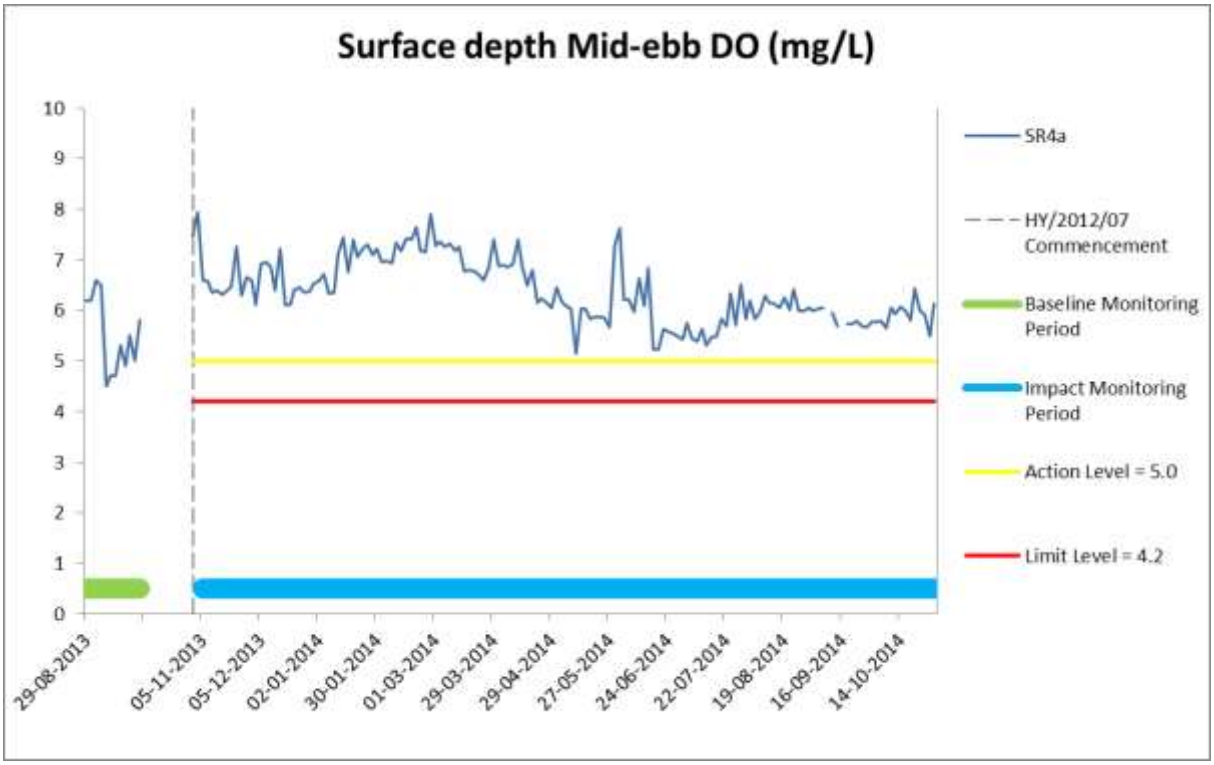
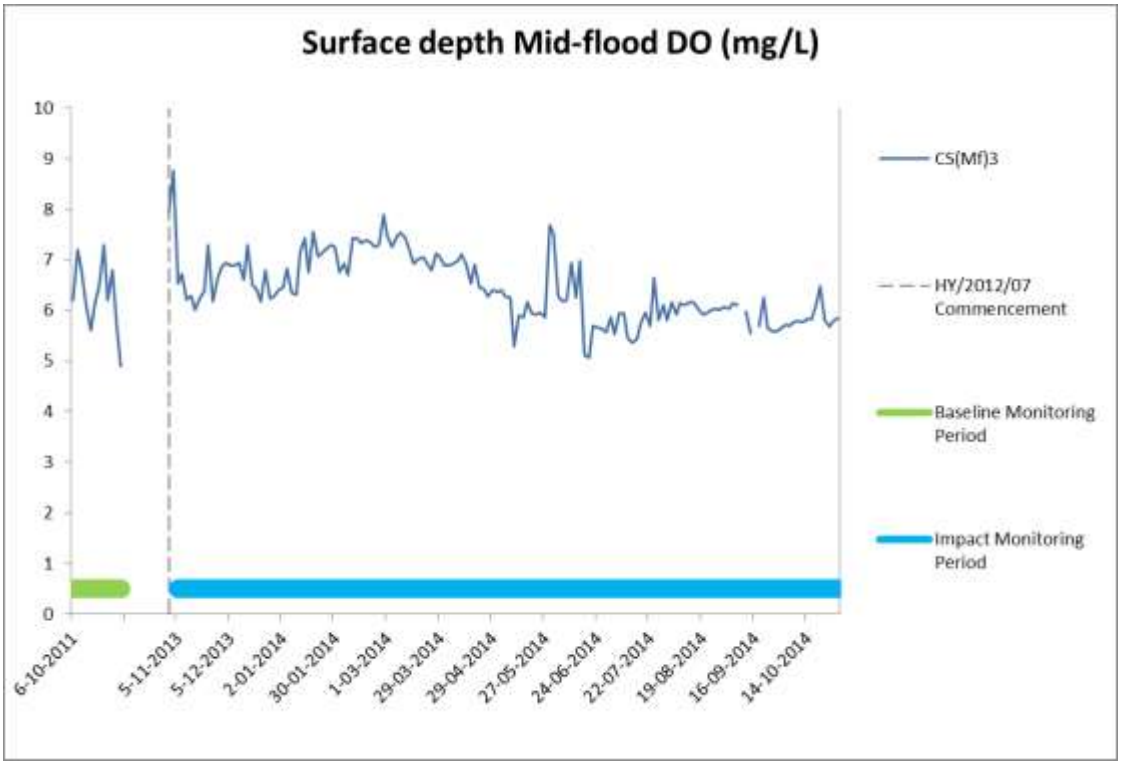


Figure F4 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Environmental Resources Management

ERM



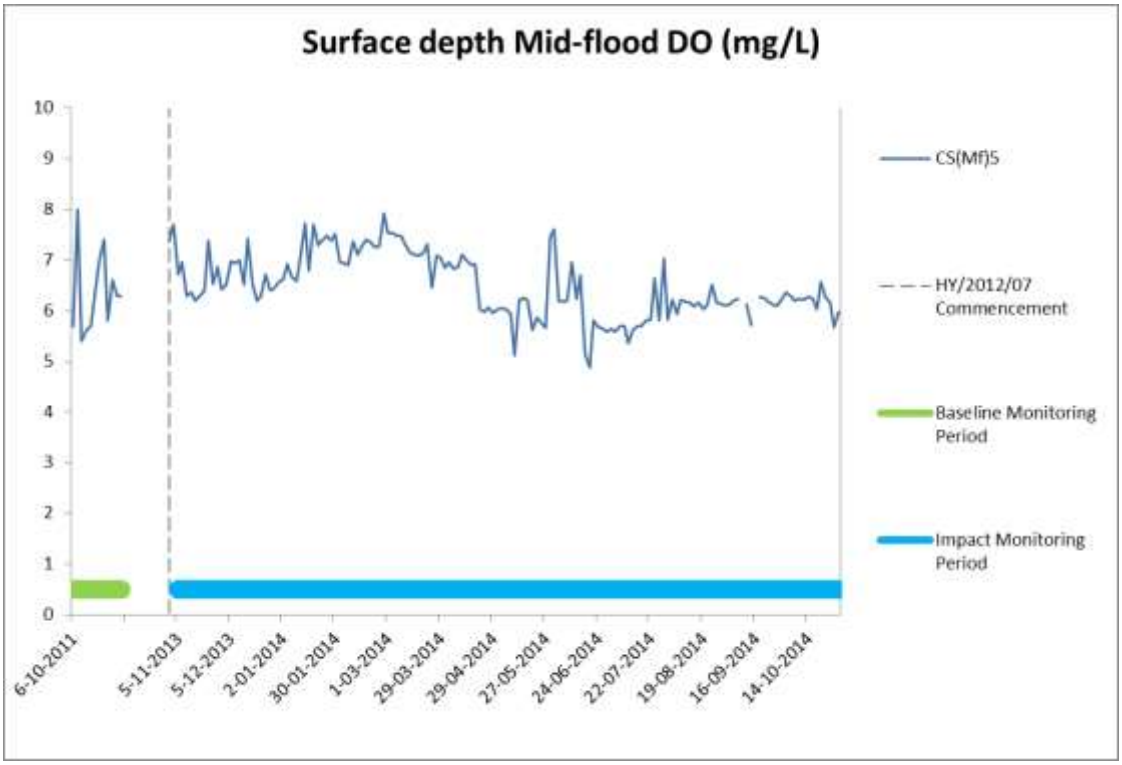
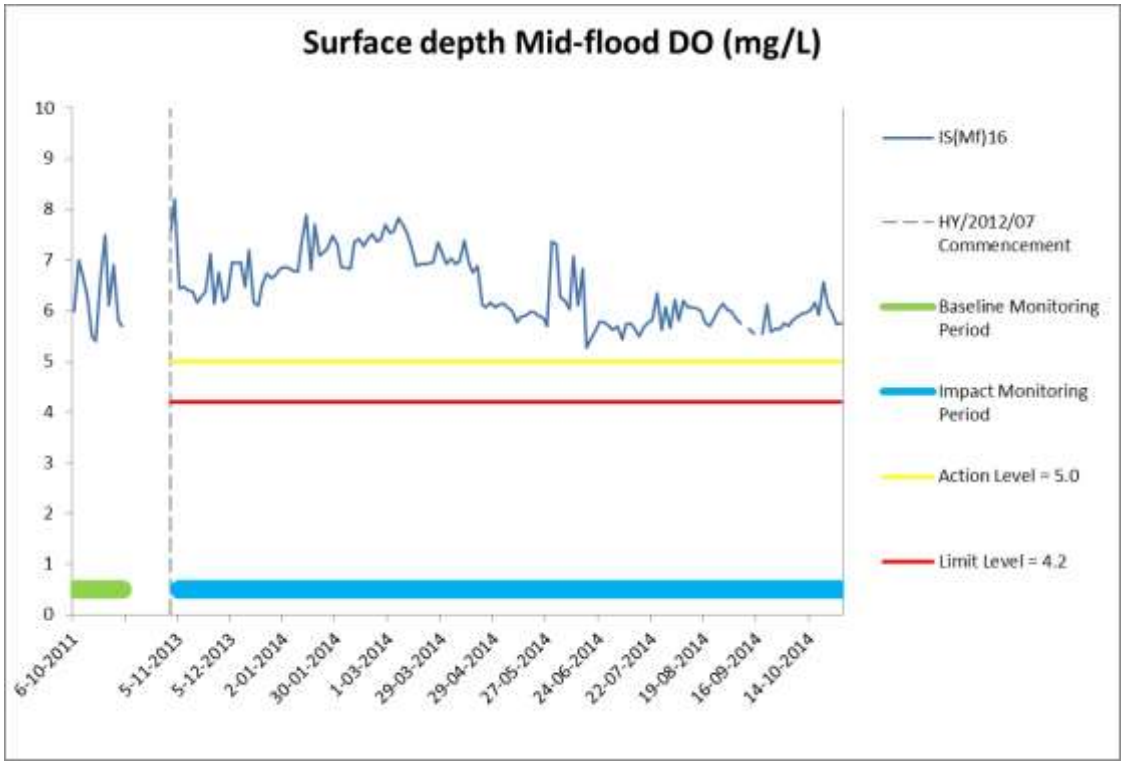


Figure F5 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)



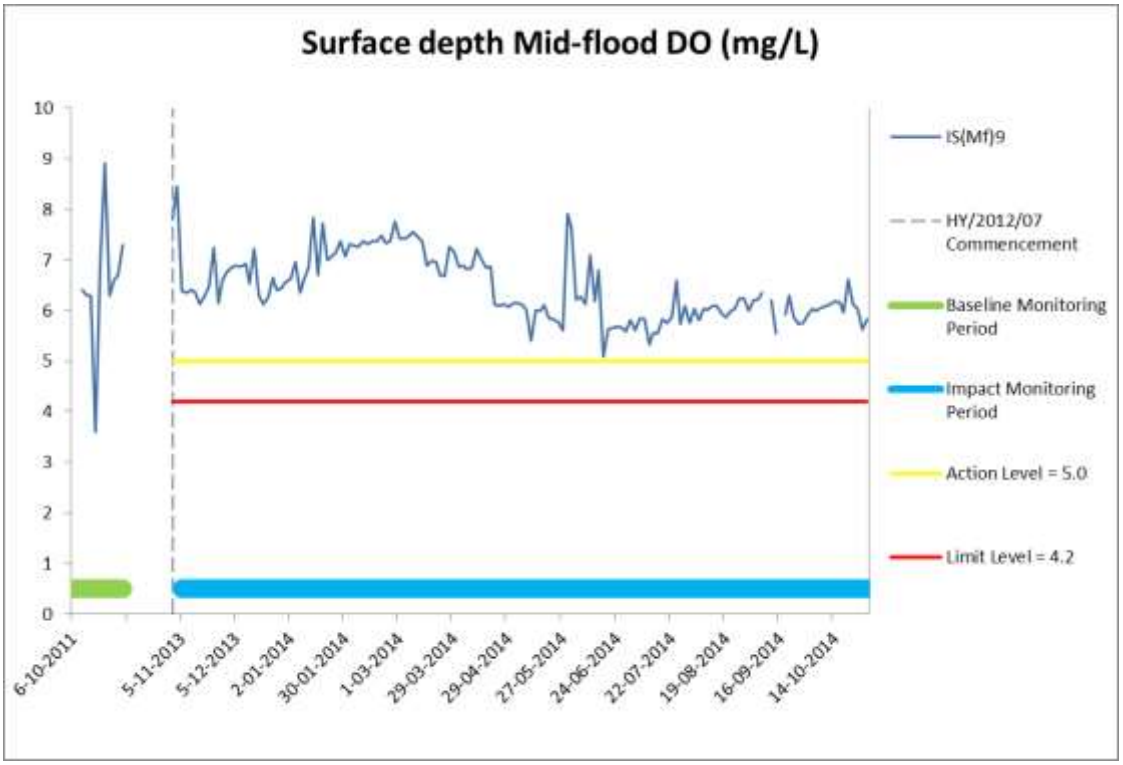
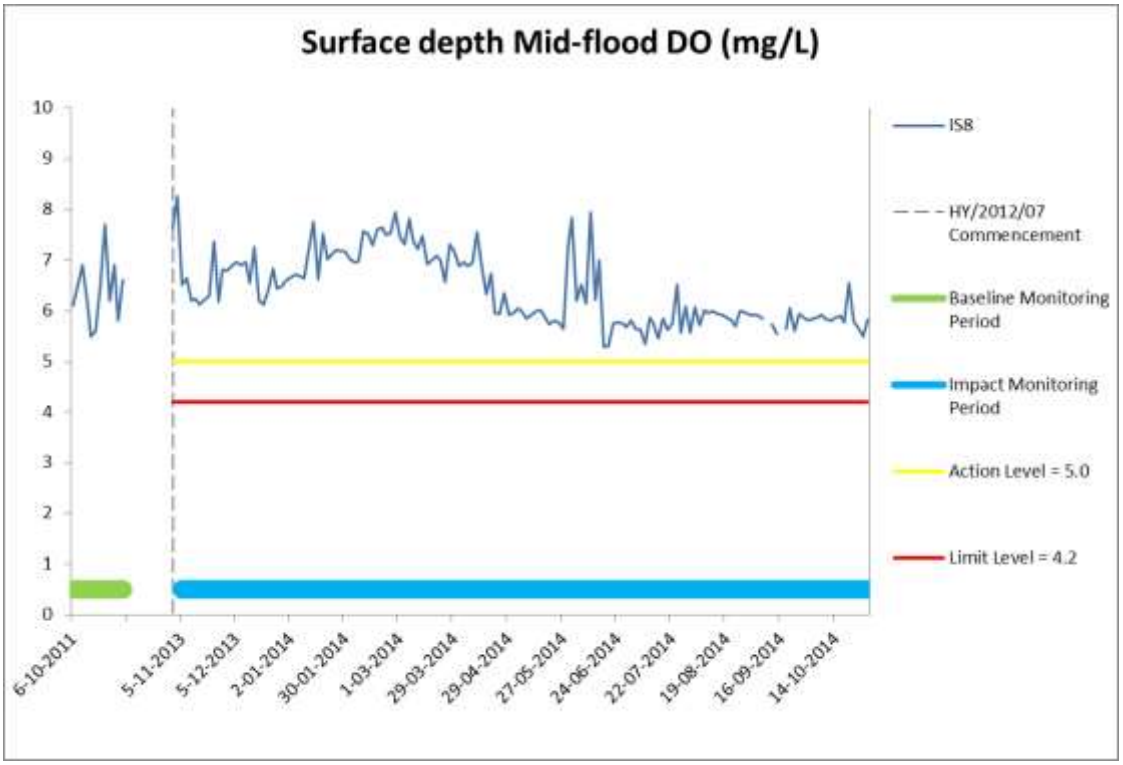


Figure F6 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Environmental Resources Management

ERM



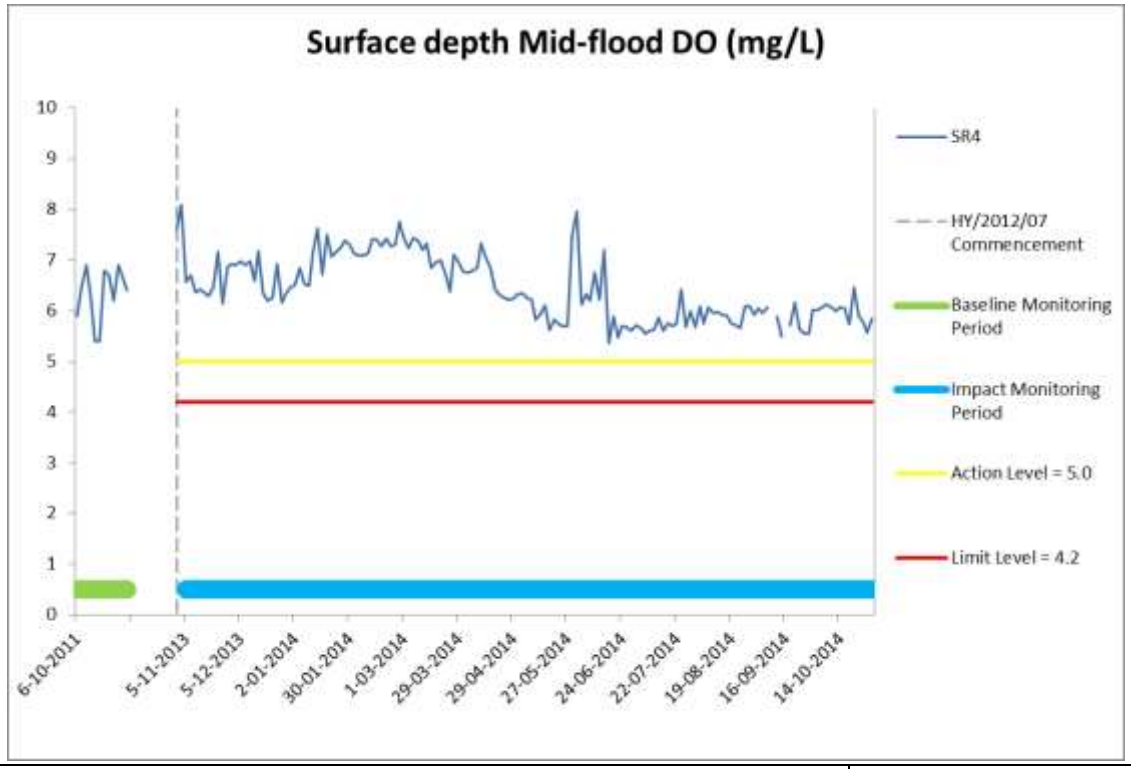


Figure F7 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

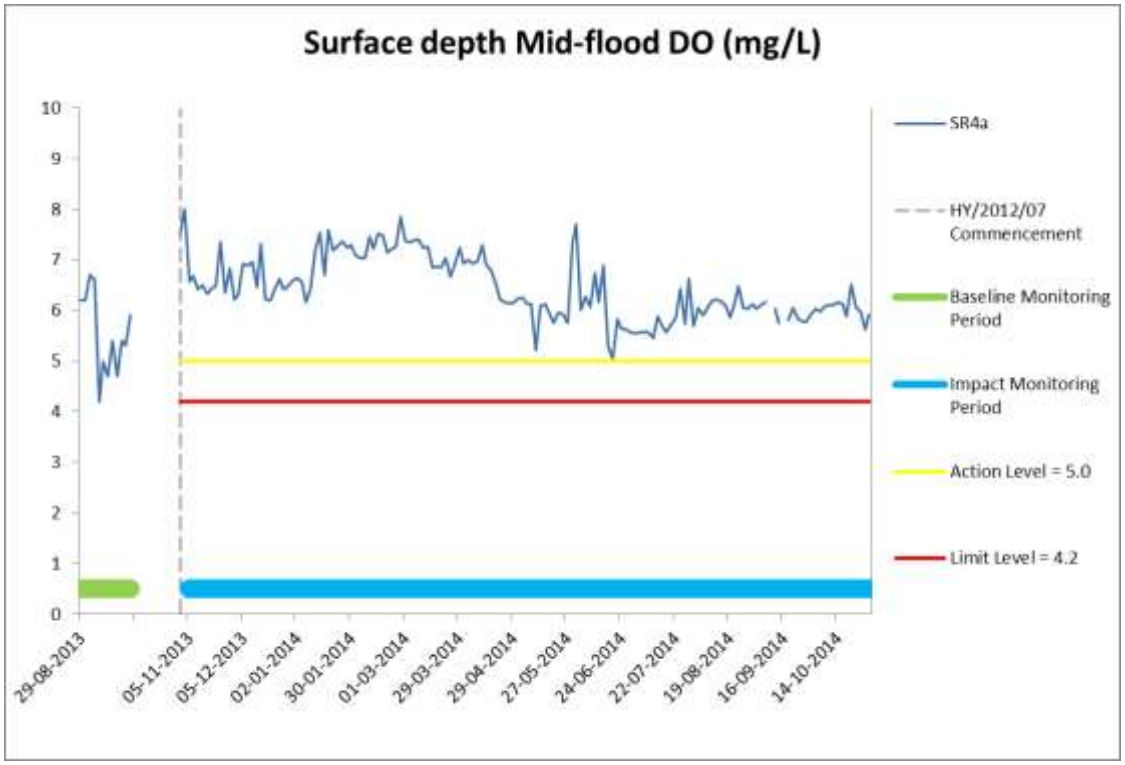
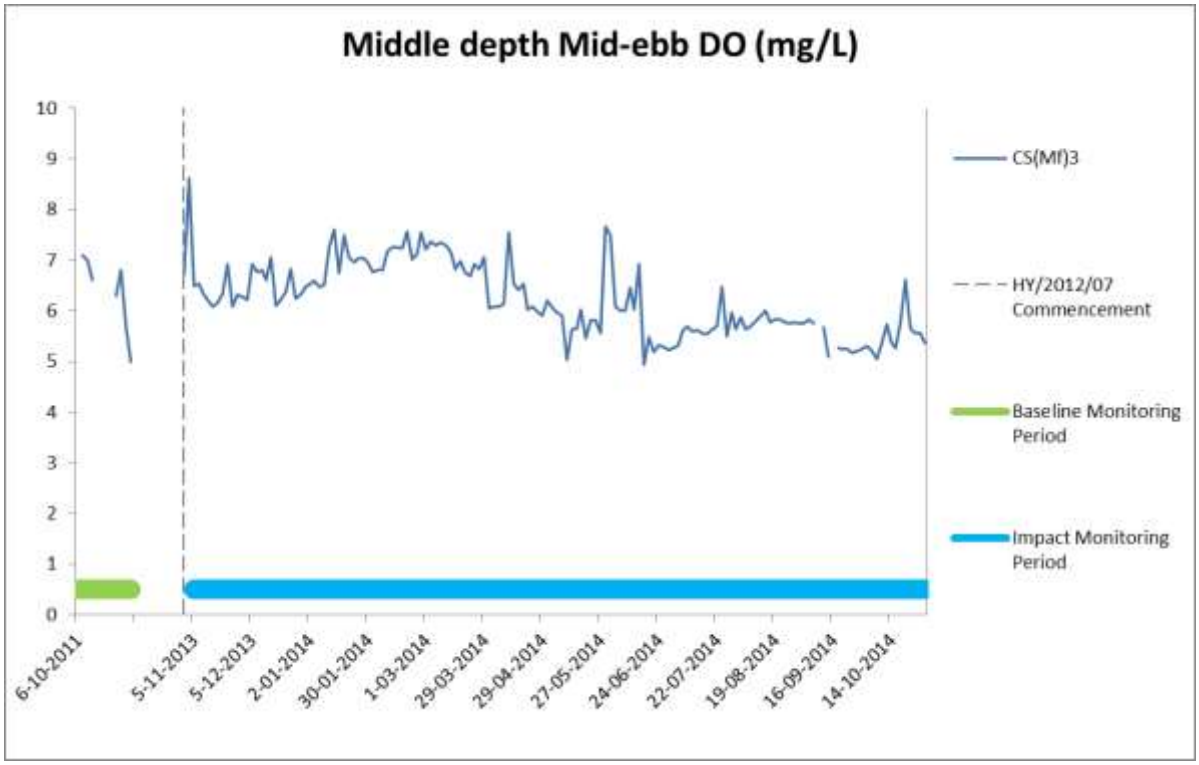


Figure F8 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters during mid-flood tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.

Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



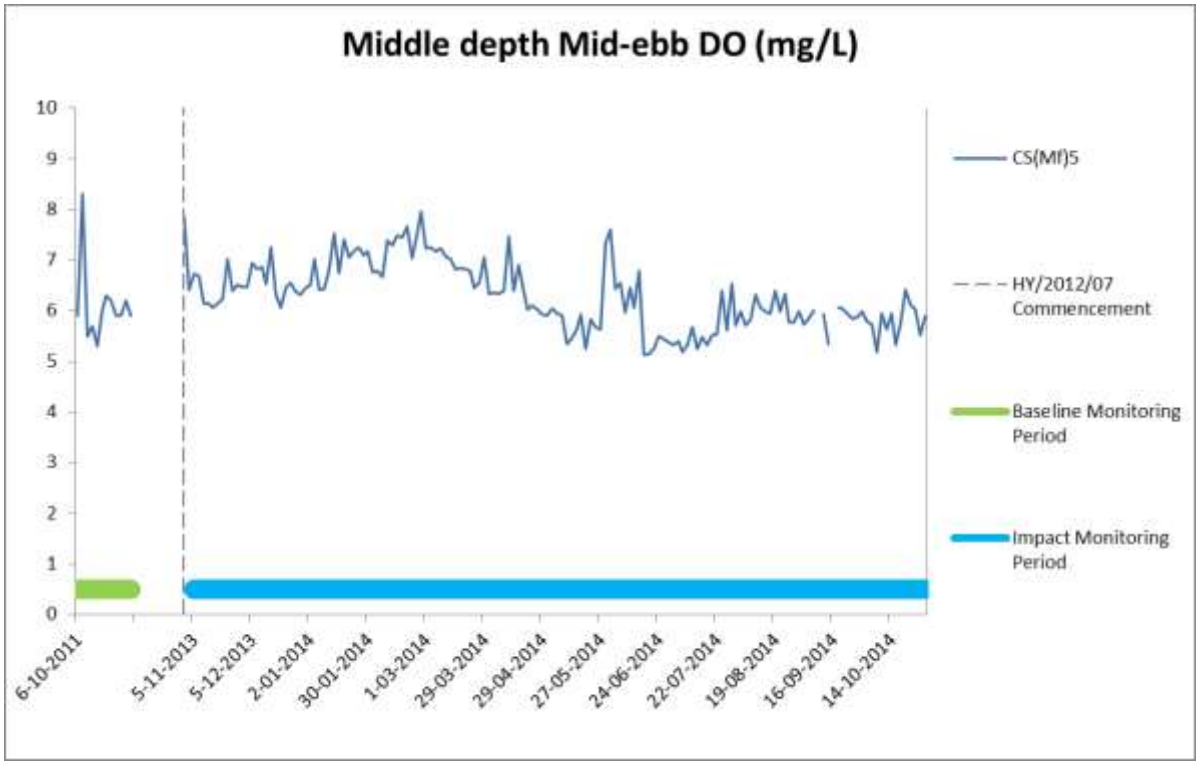


Figure F9 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and IS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)

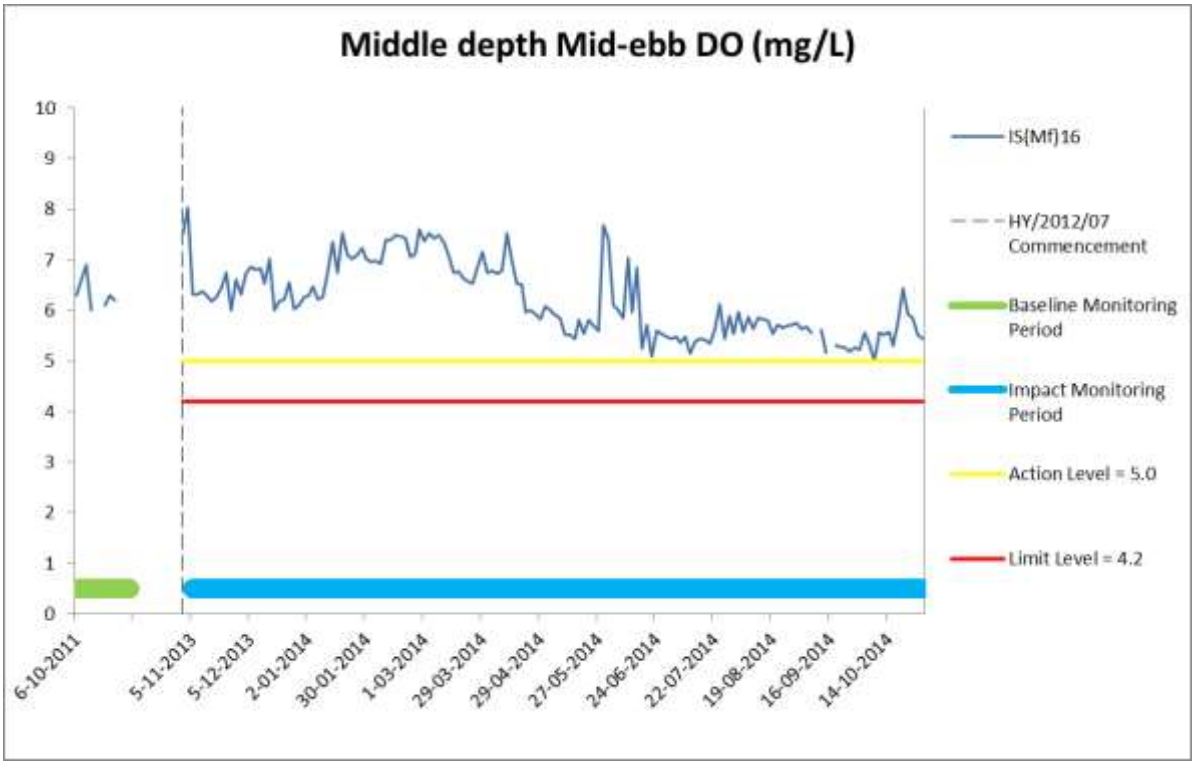
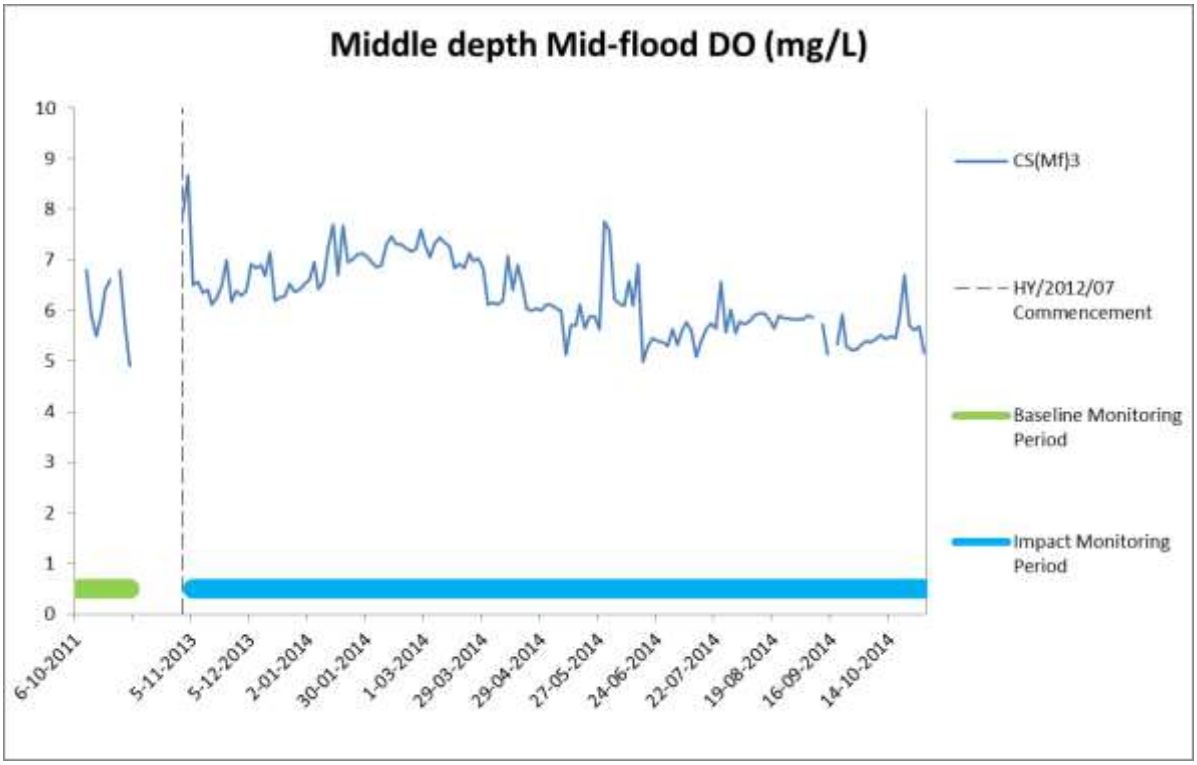


Figure F10 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS(Mf)16.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



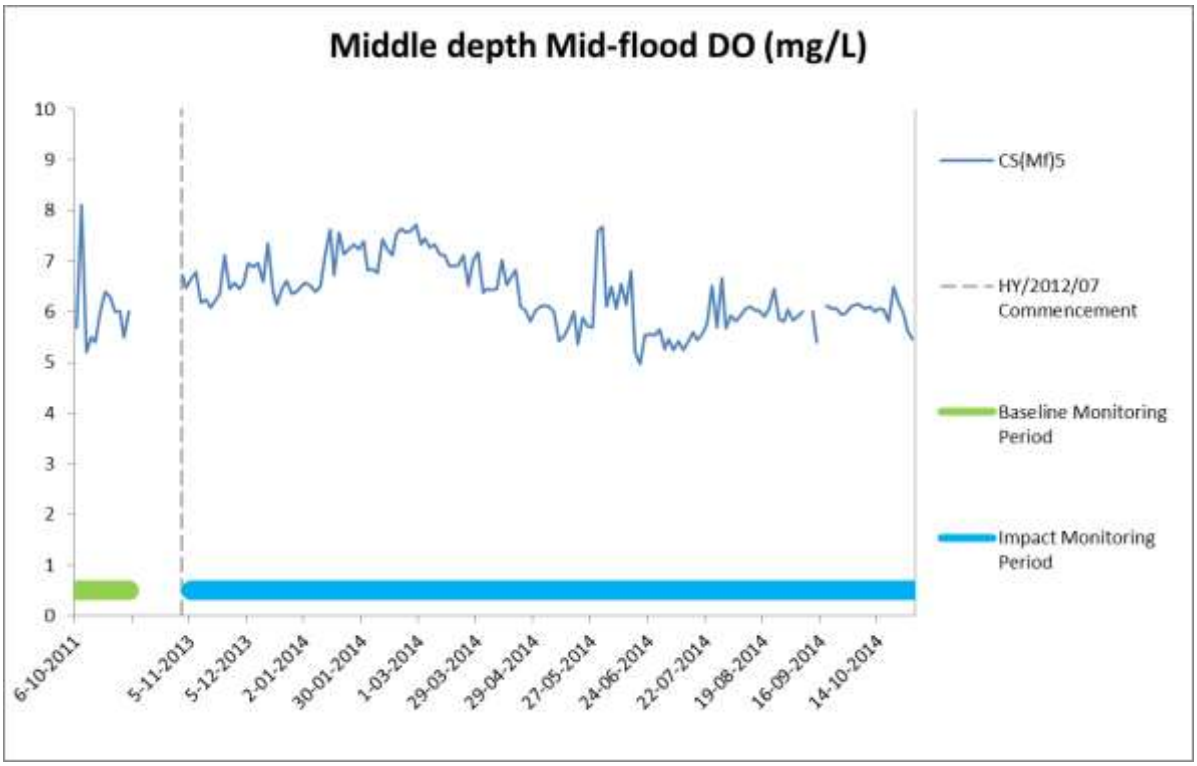


Figure F11 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and IS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)

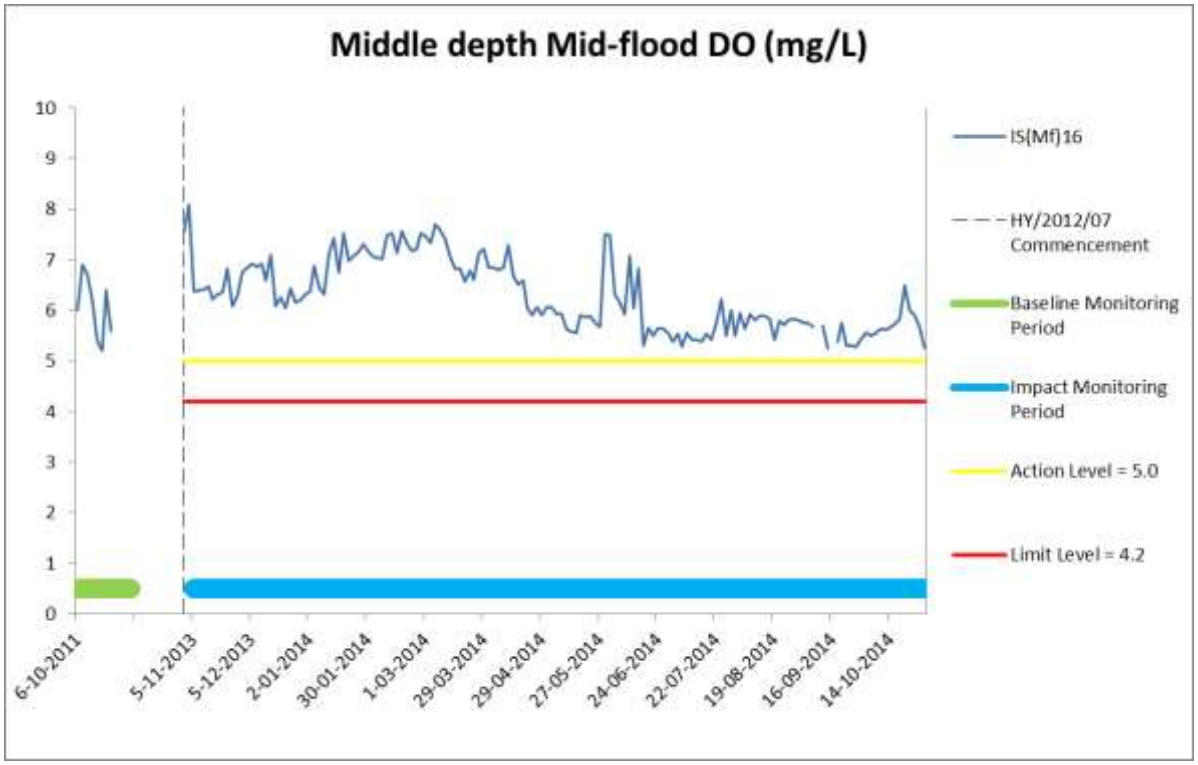
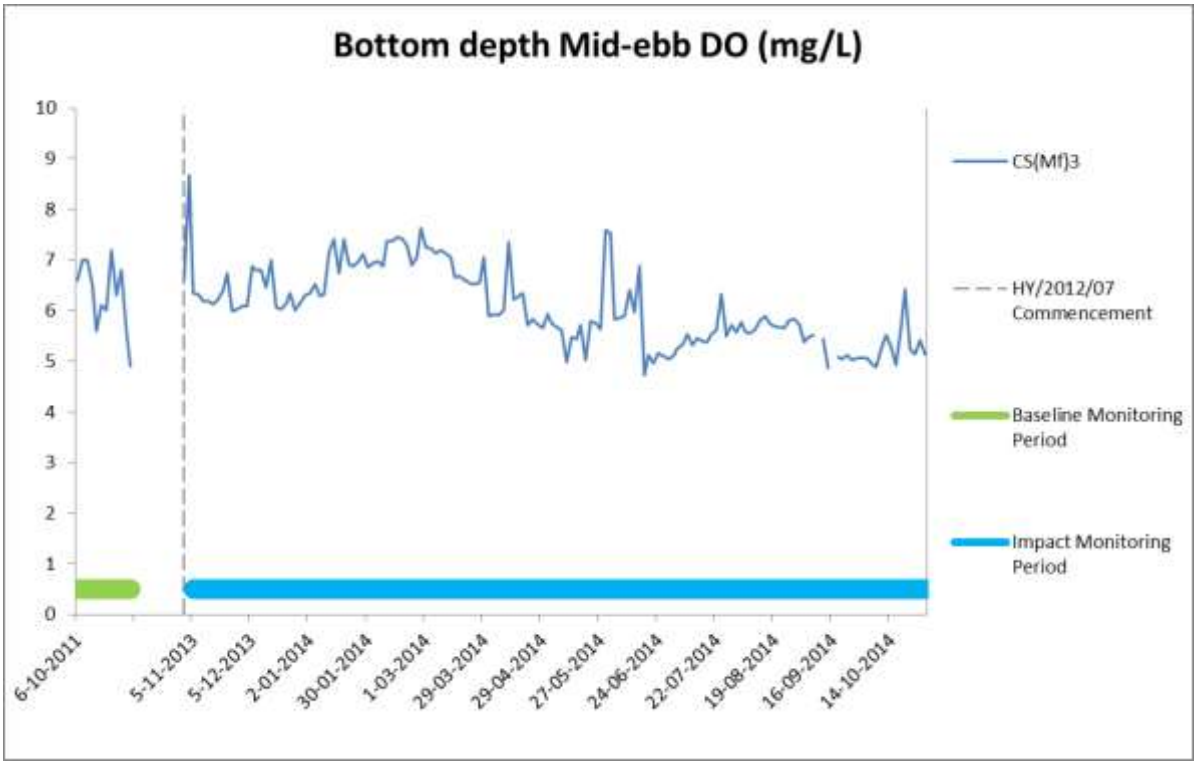


Figure F12 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters during mid-flood tide between 31 October 2013 and 31 October 2014 at IS(Mf)16.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Environmental Resources Management

ERM



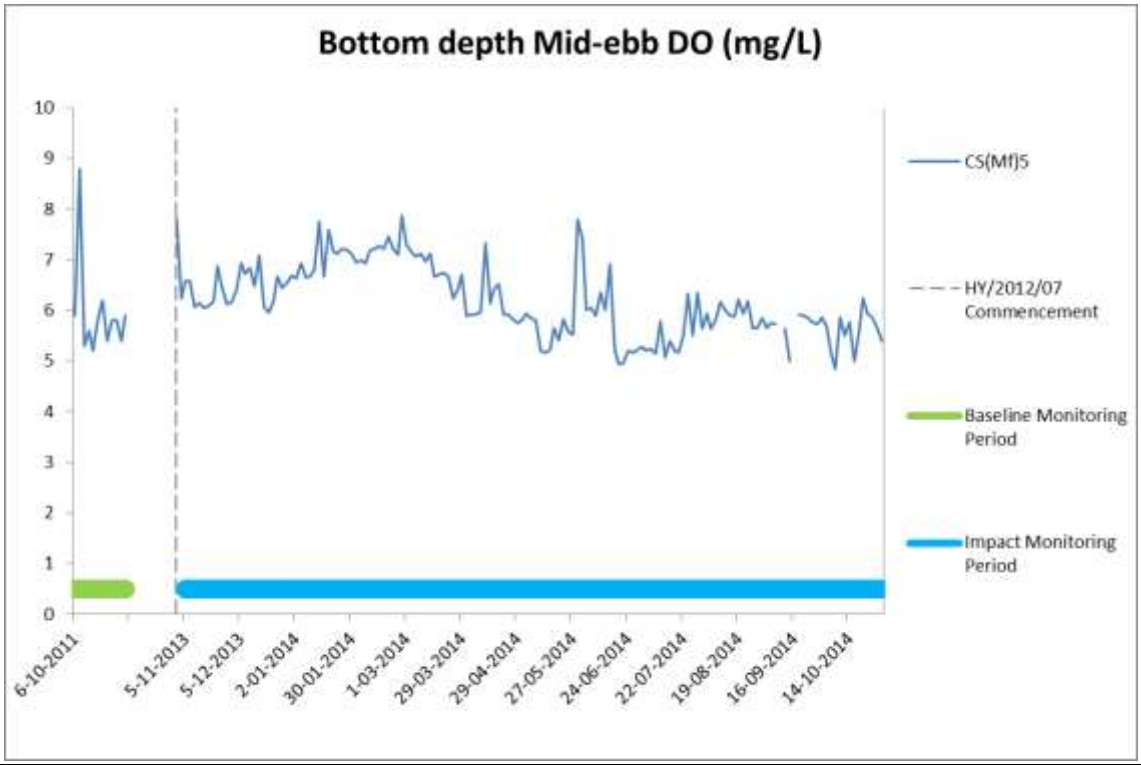
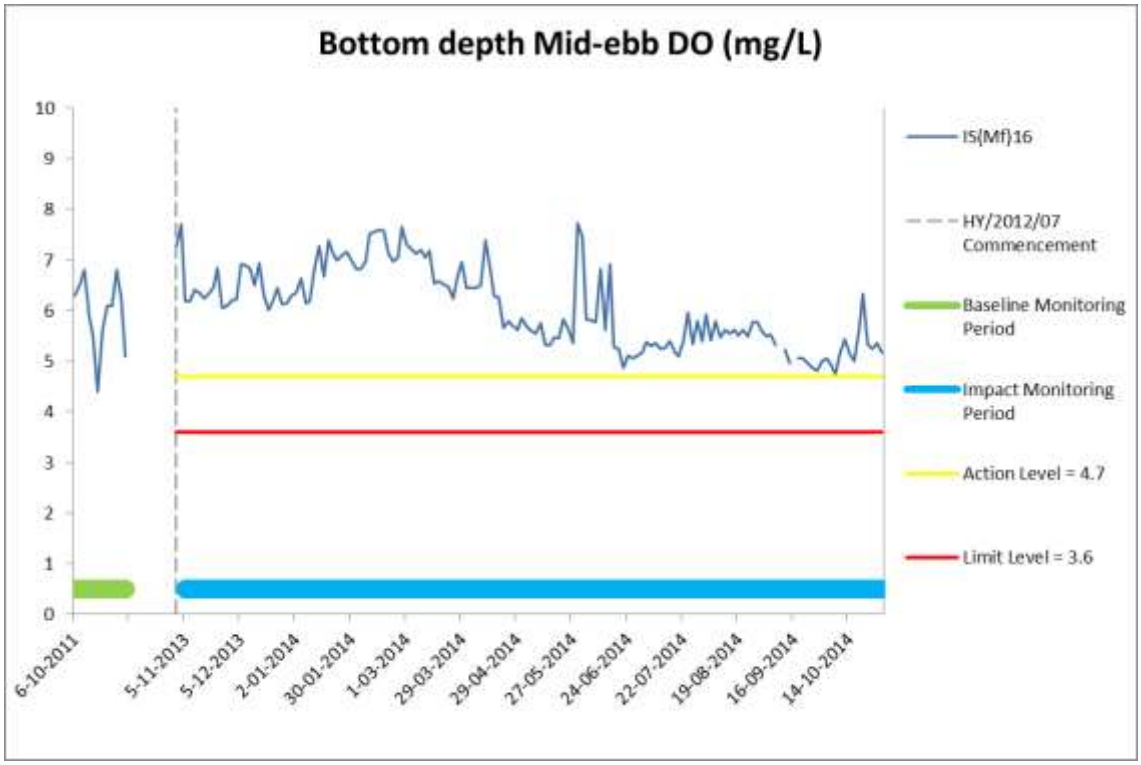


Figure F13 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



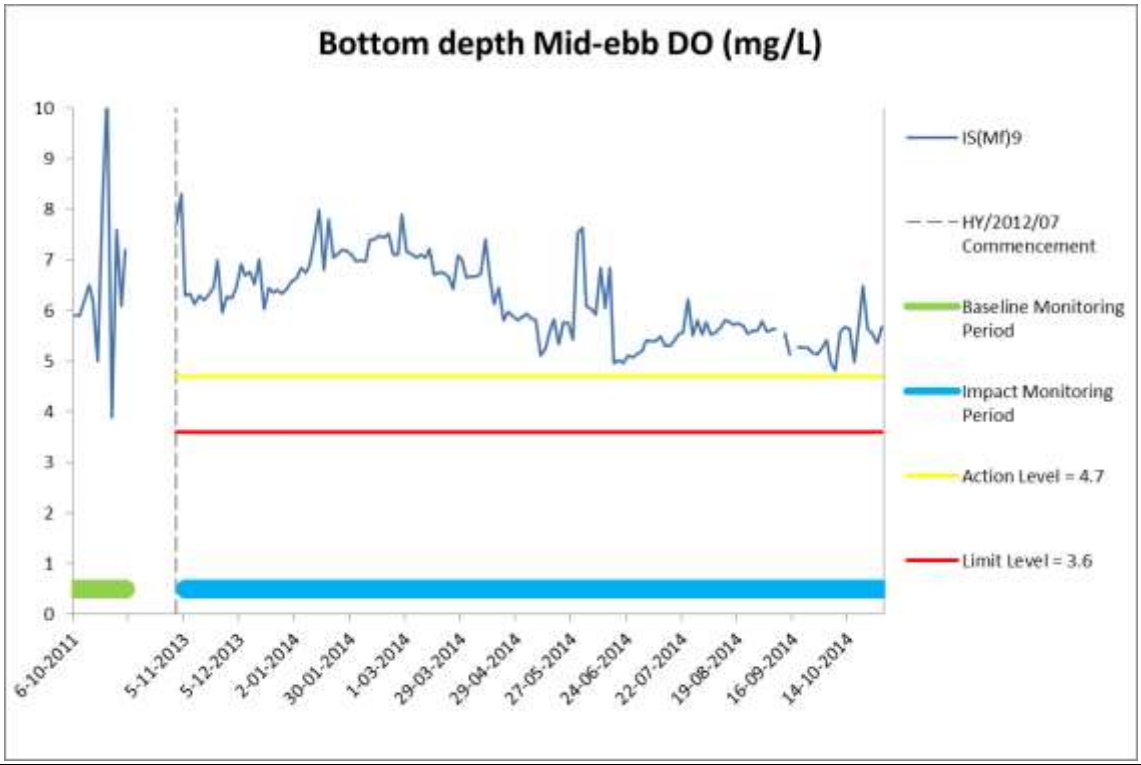
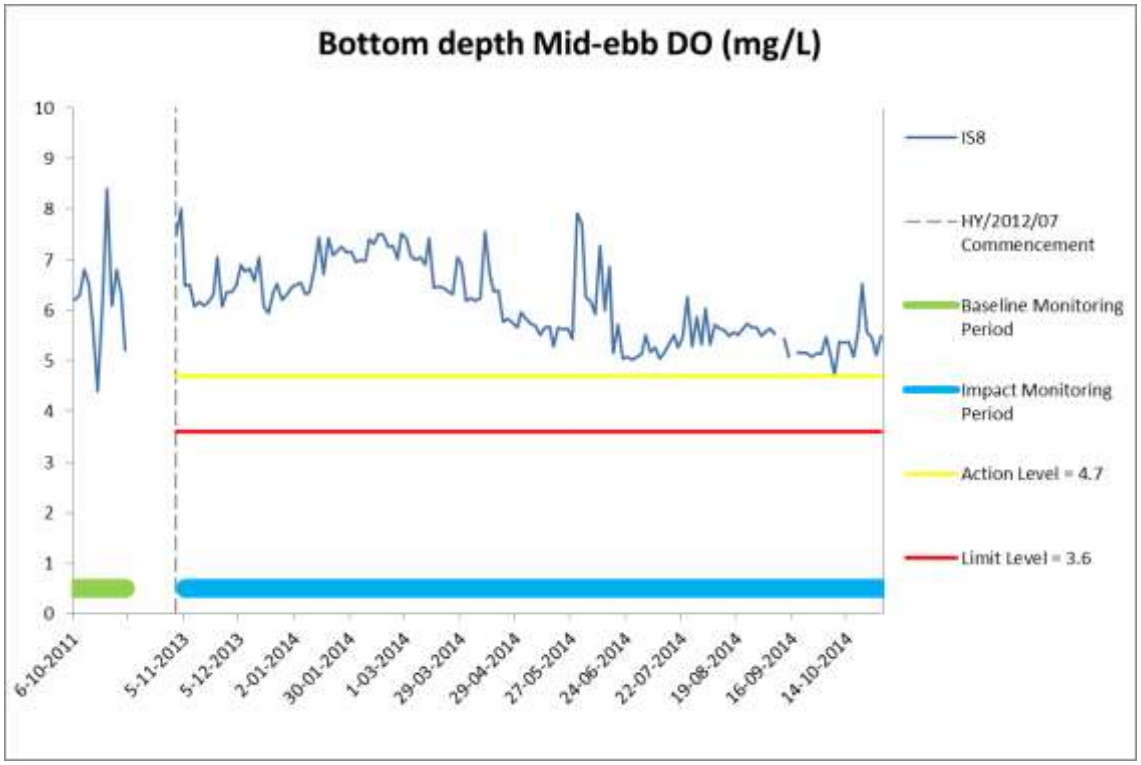


Figure F14 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



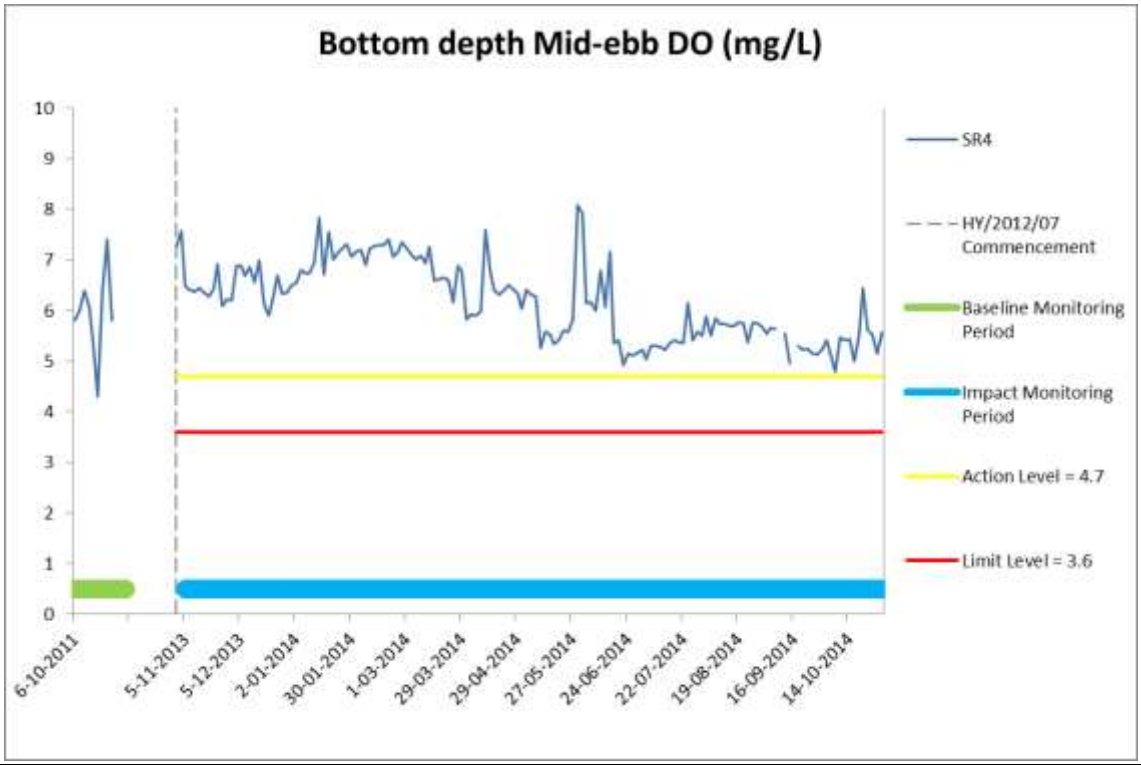


Figure F15 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

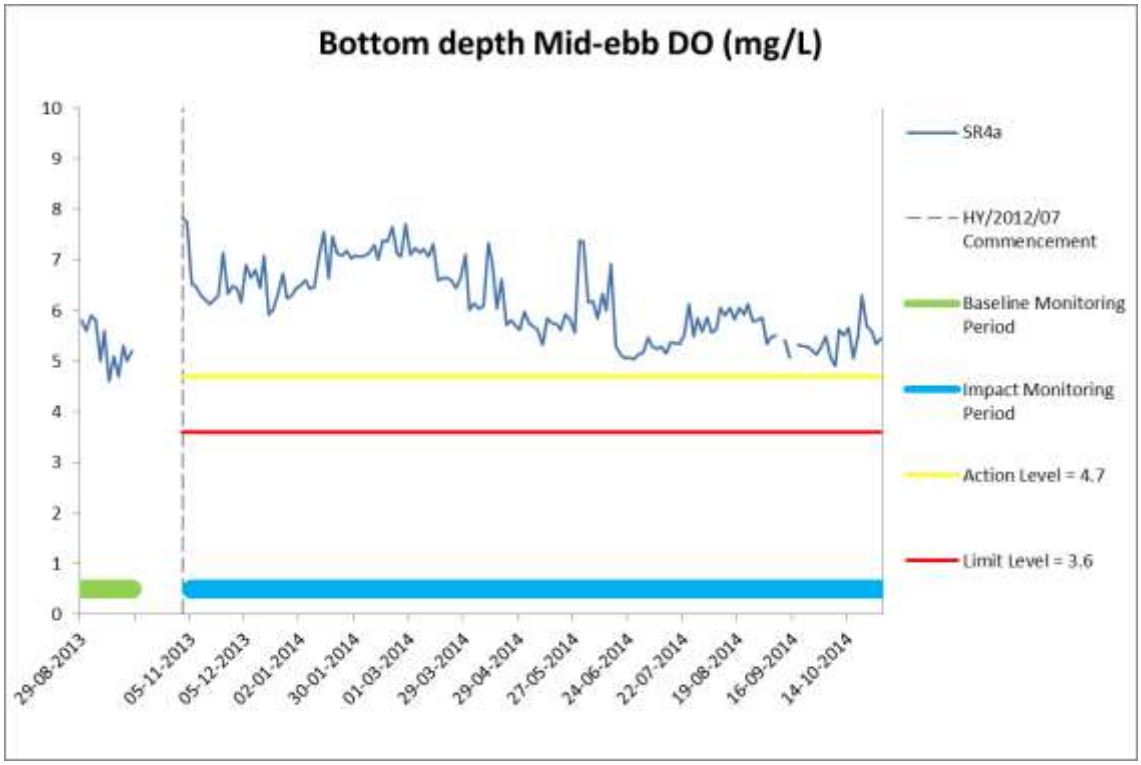
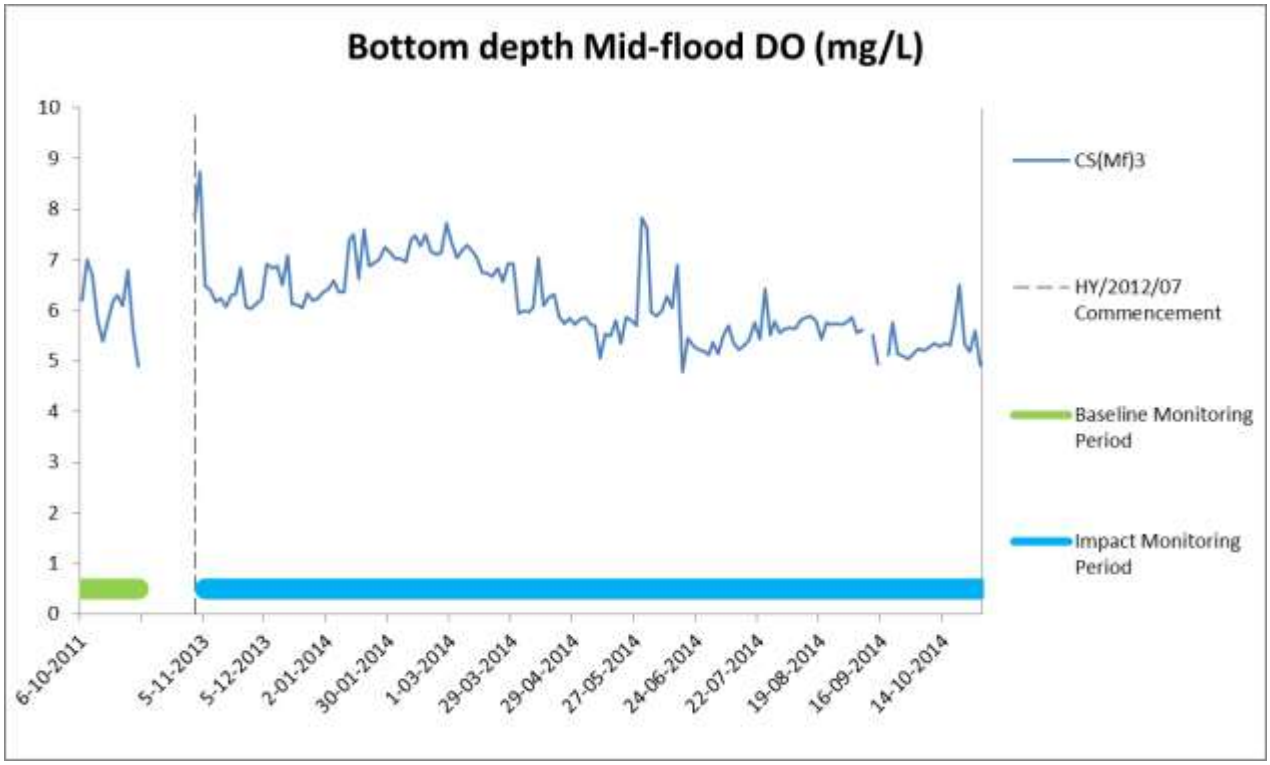


Figure F16 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-ebb tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



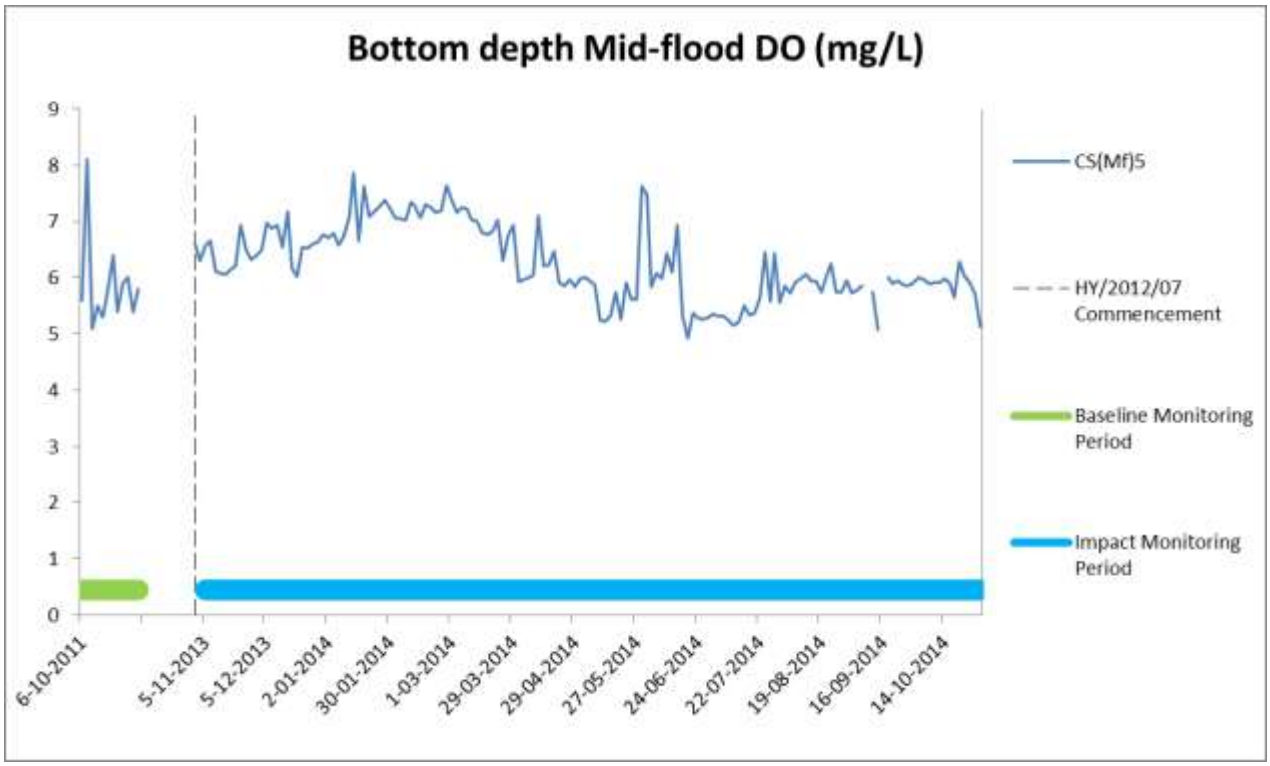
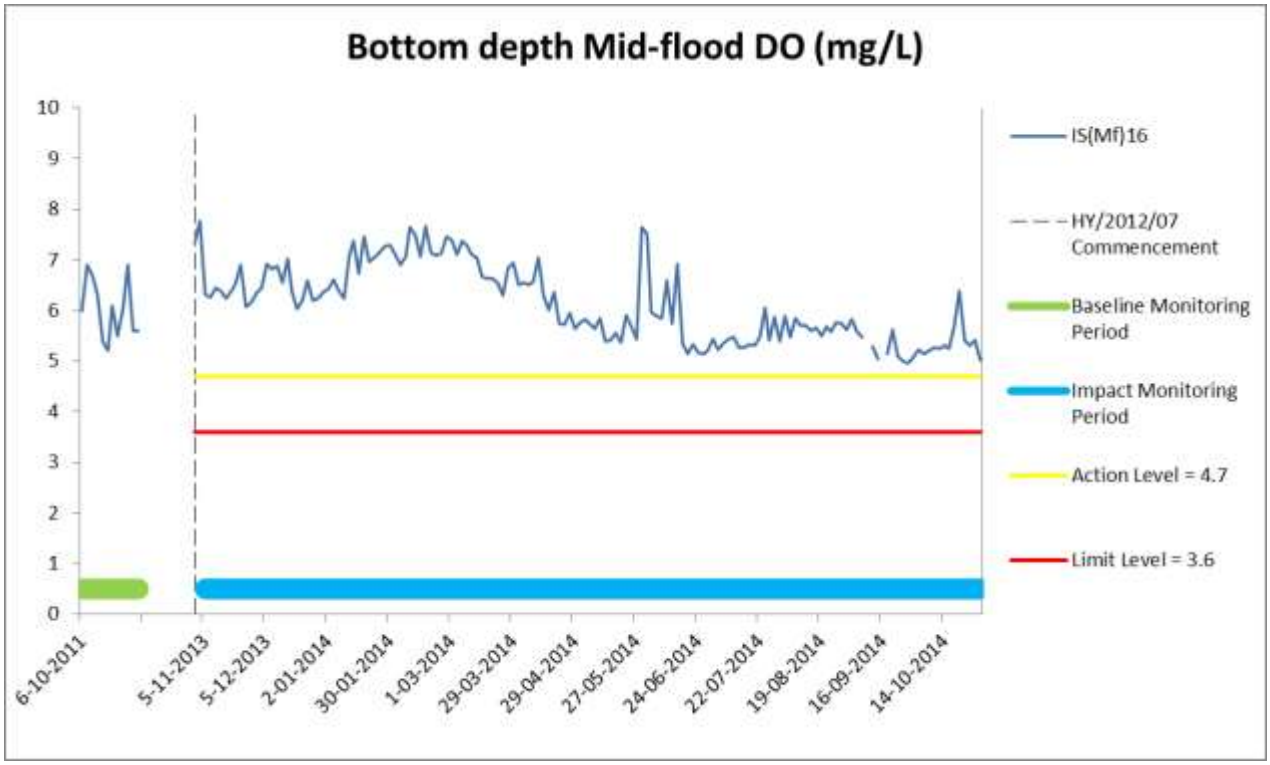


Figure F17 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)



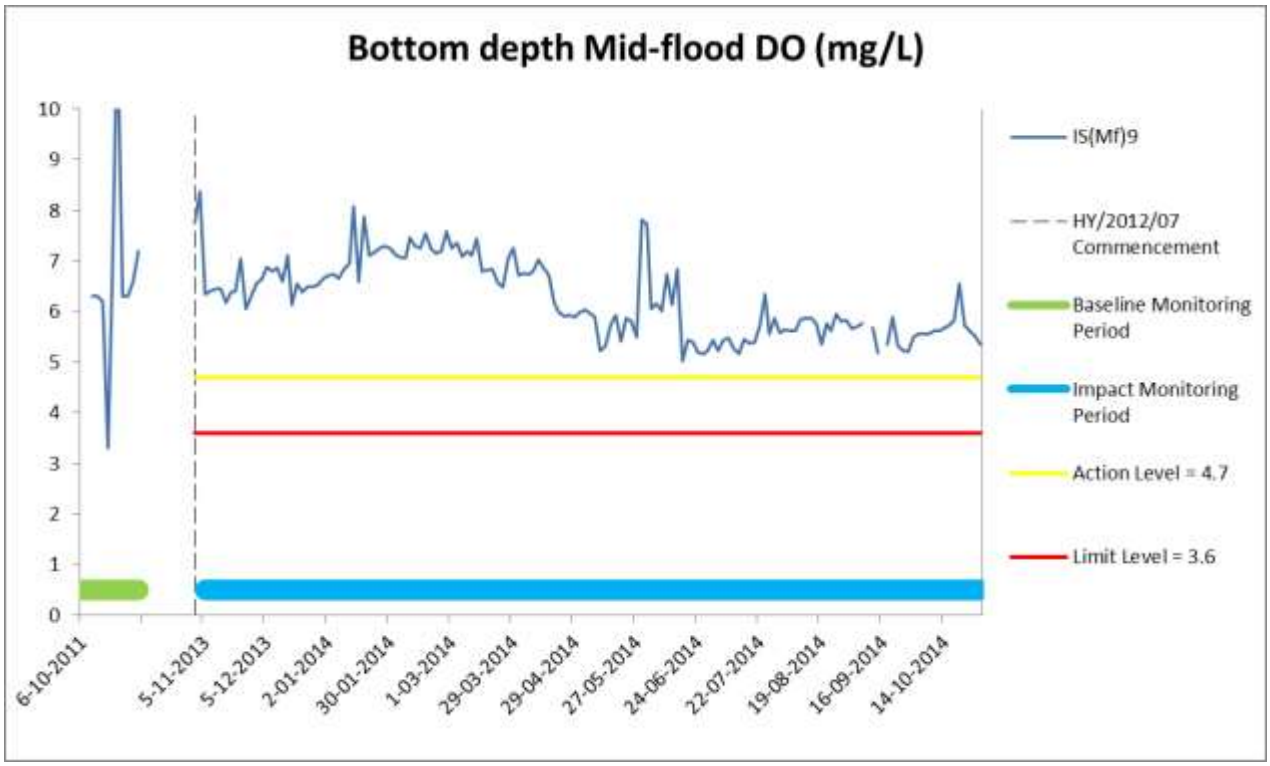
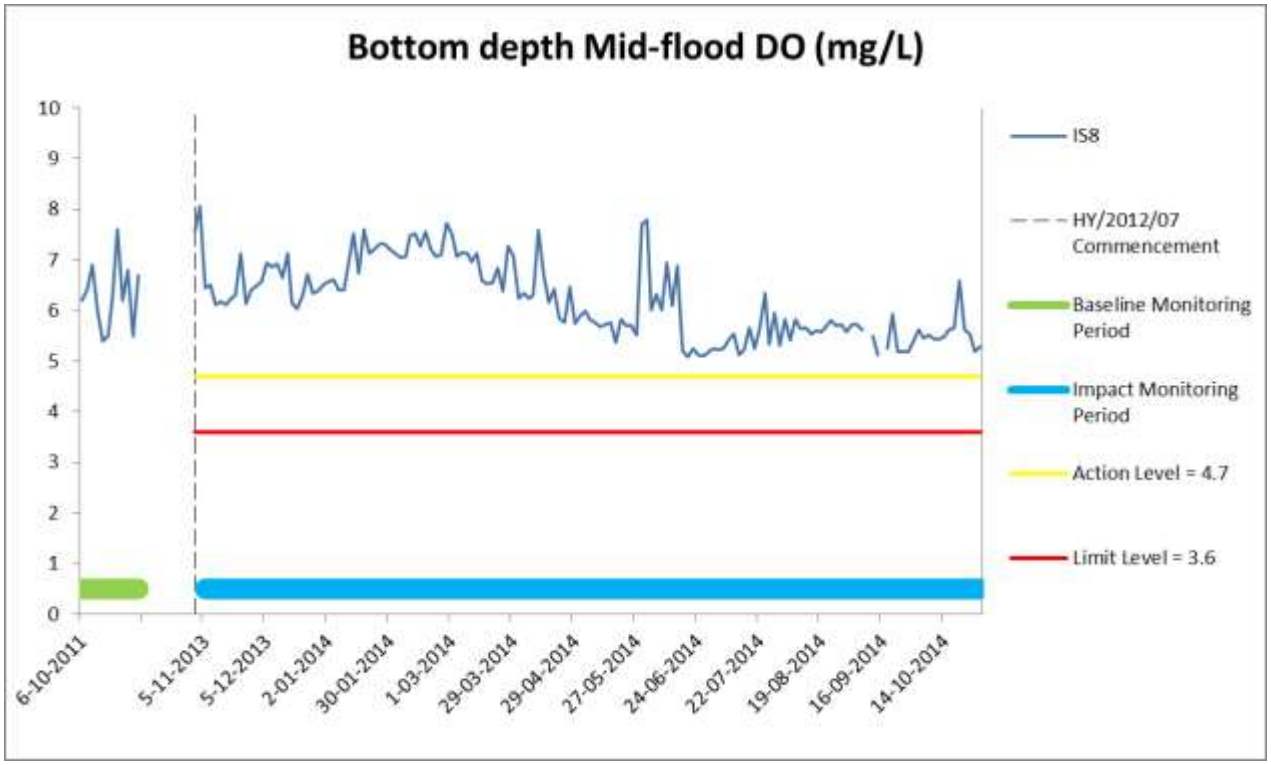


Figure F18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



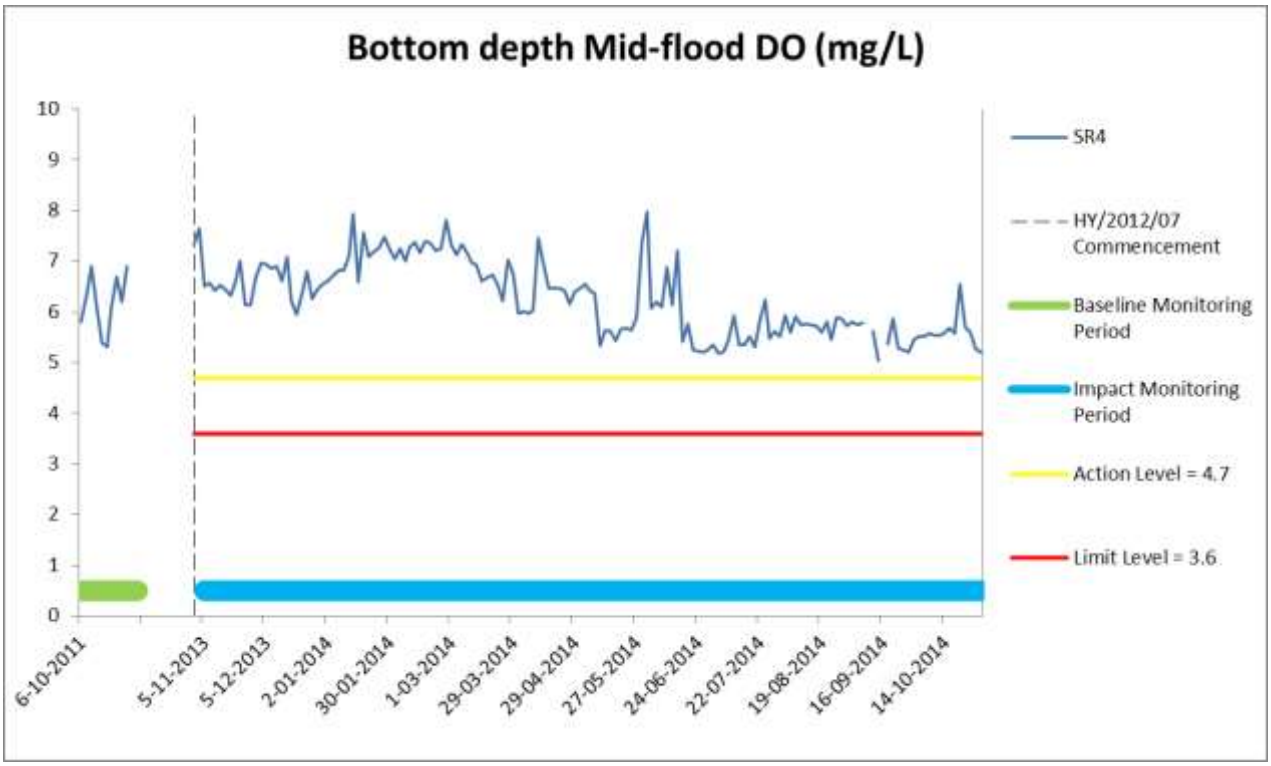


Figure F19 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

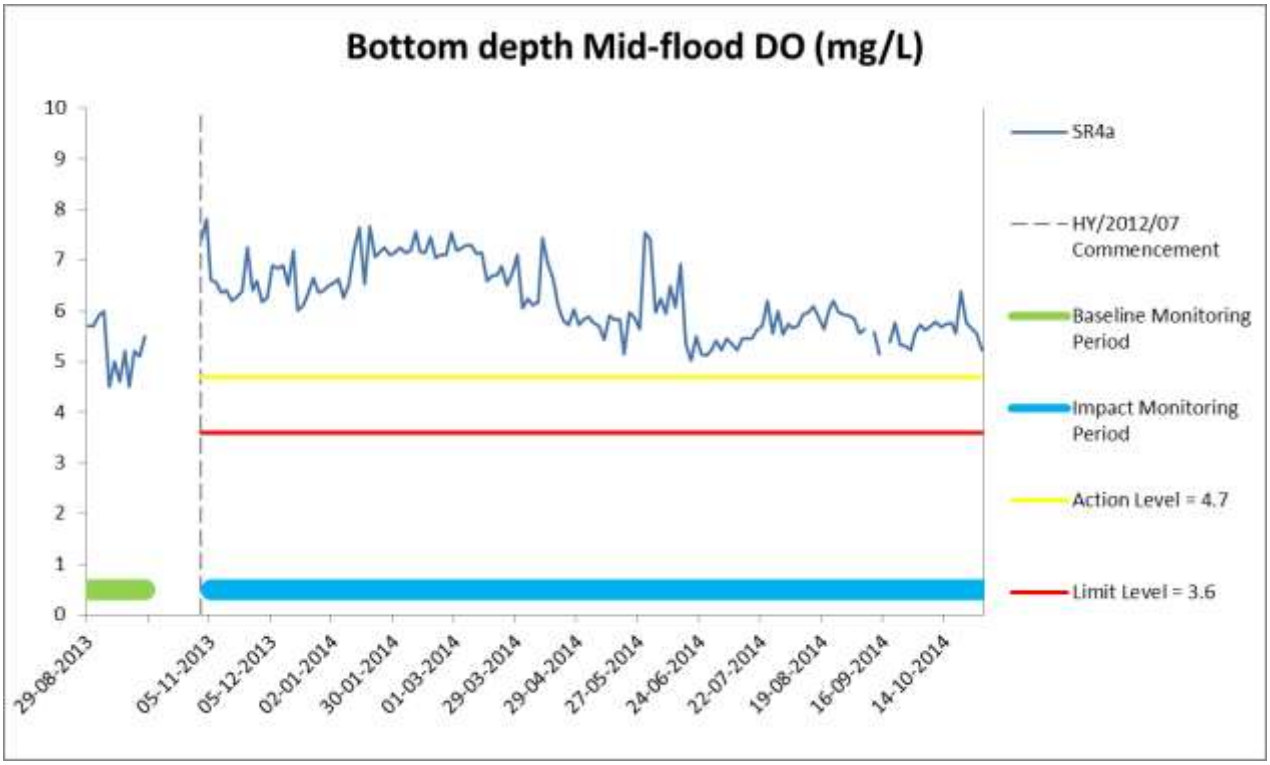
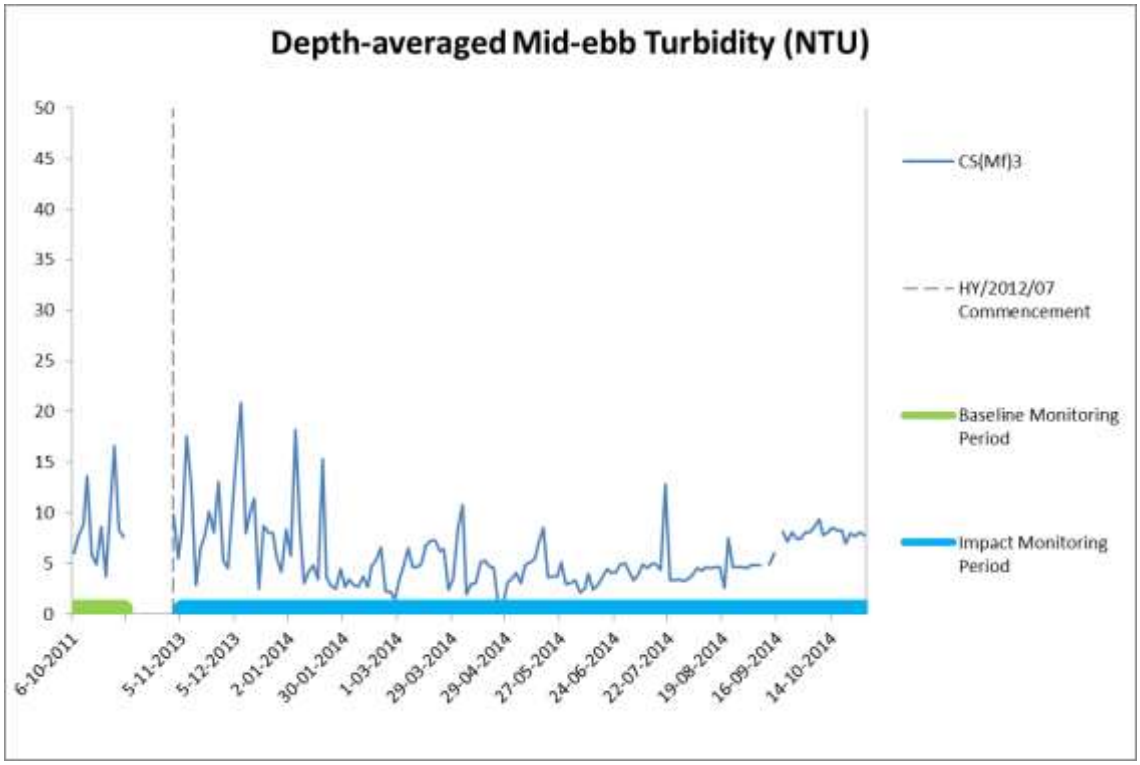


Figure F20 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters during mid-flood tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



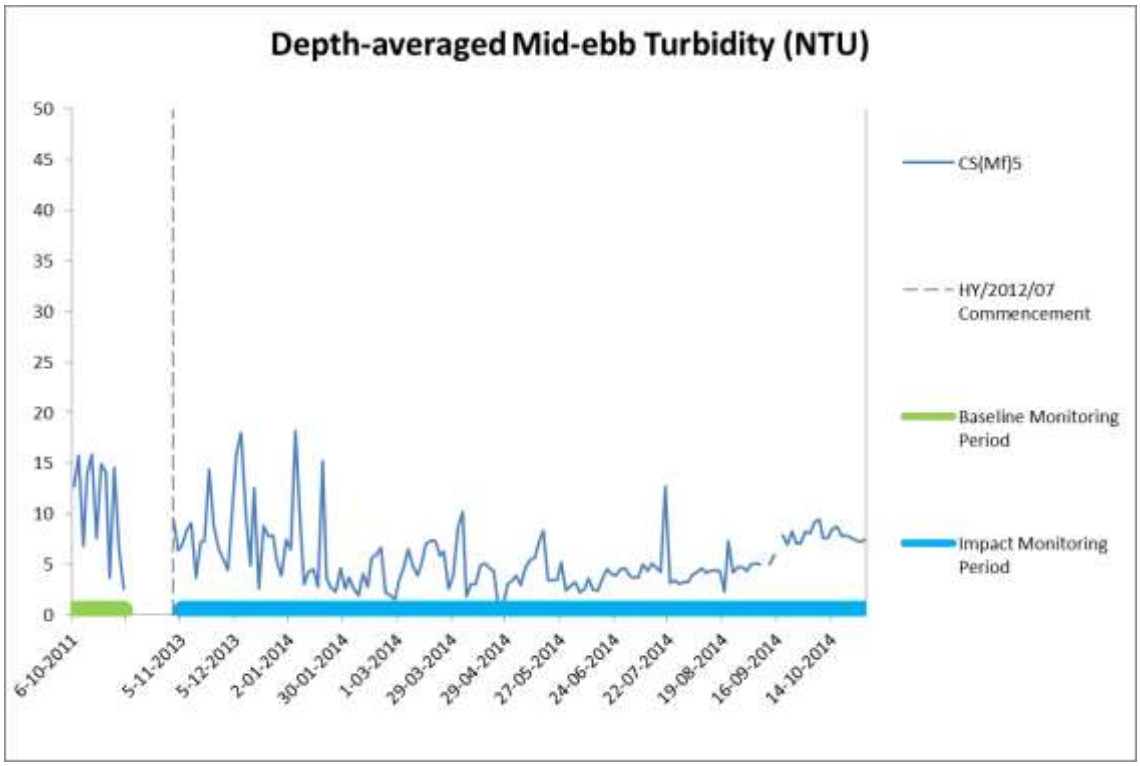
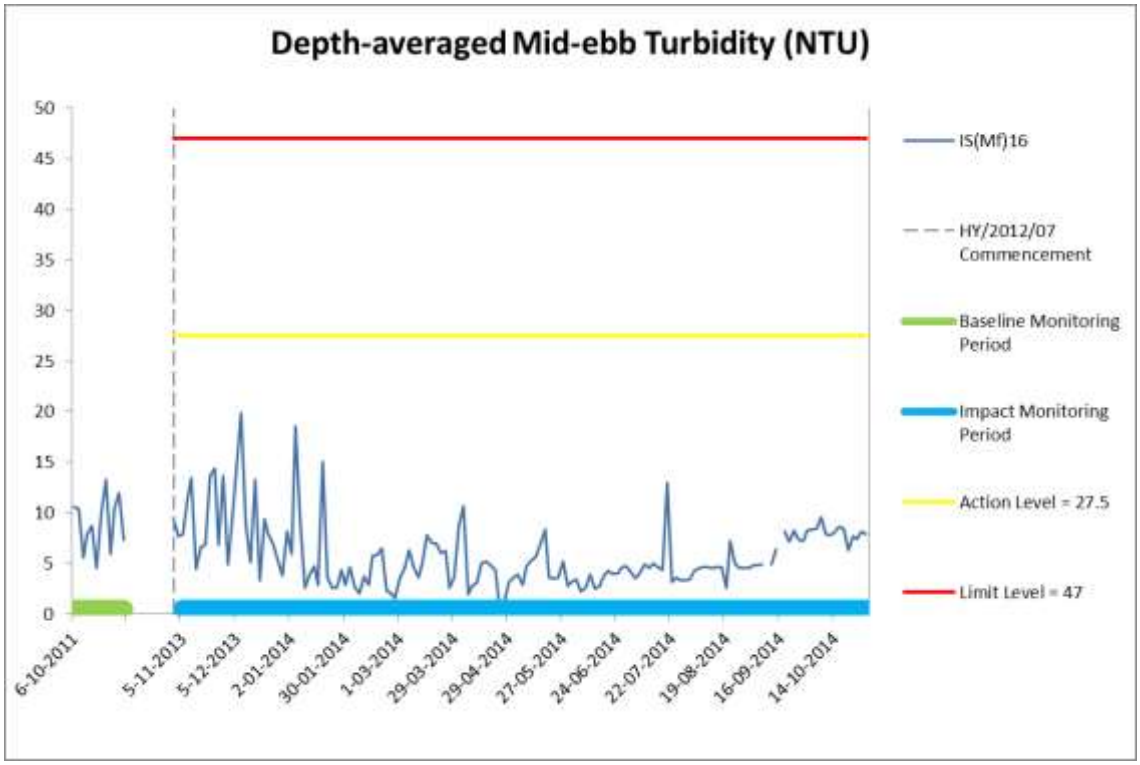


Figure F21 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

(Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.)



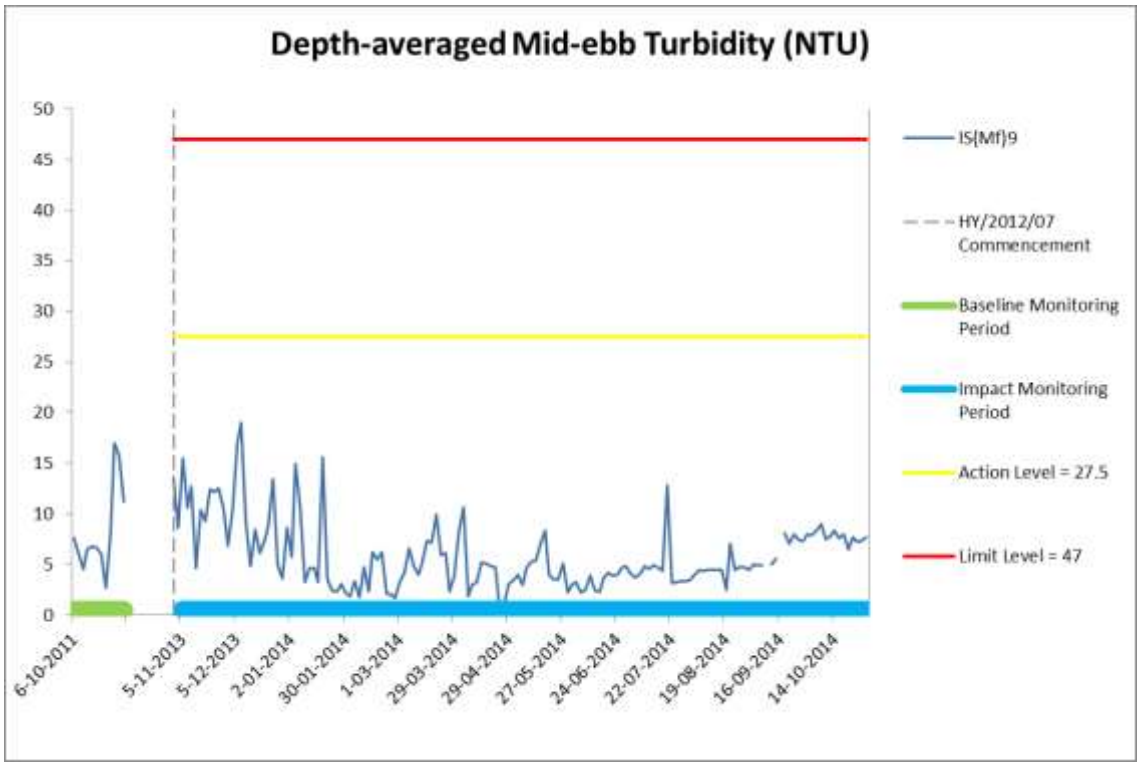
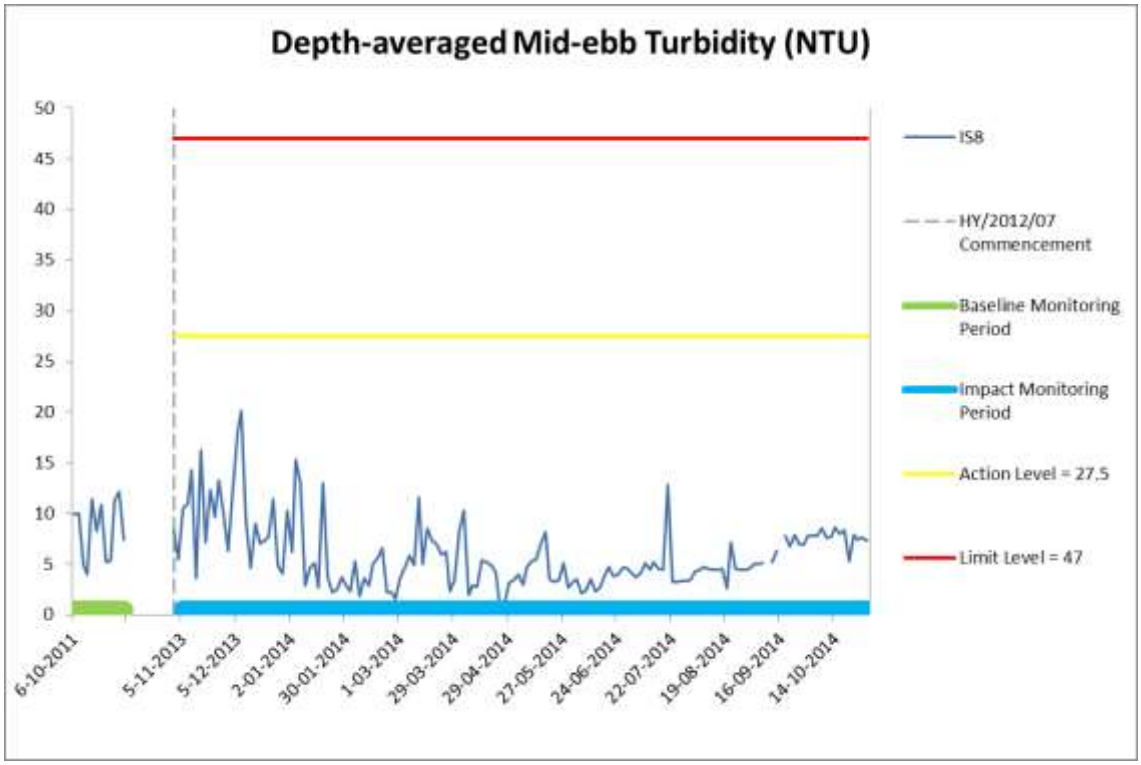


Figure F22 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



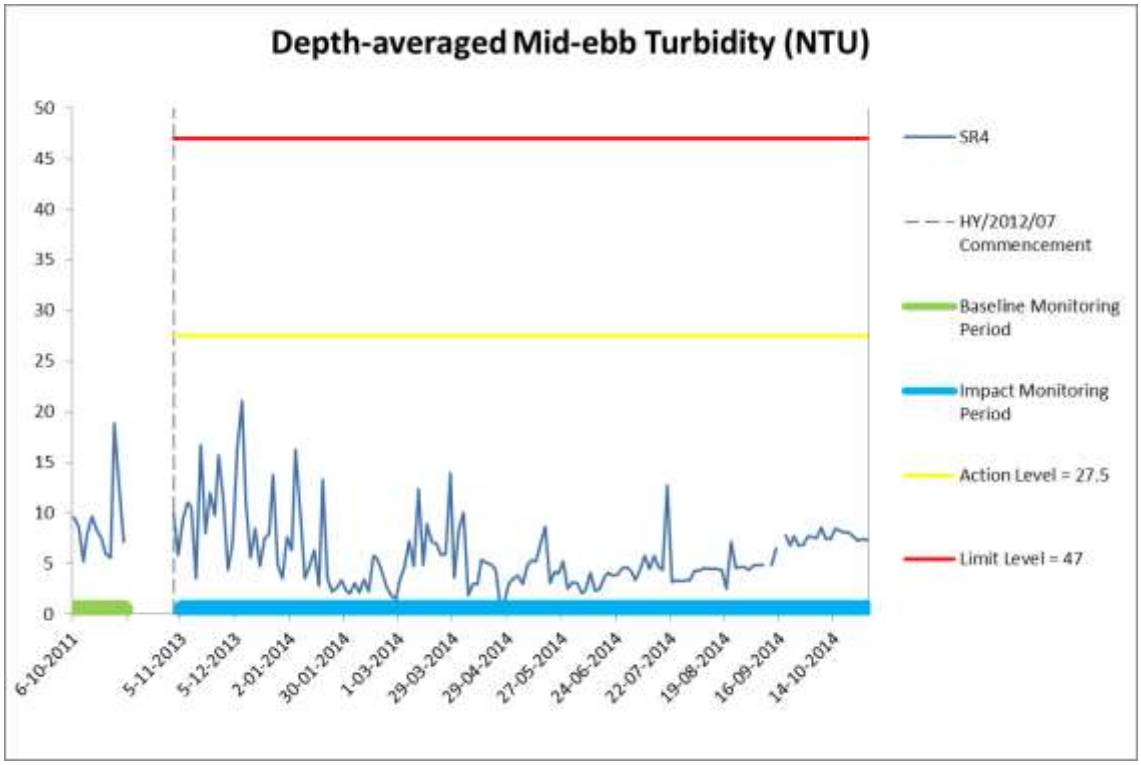


Figure F23 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

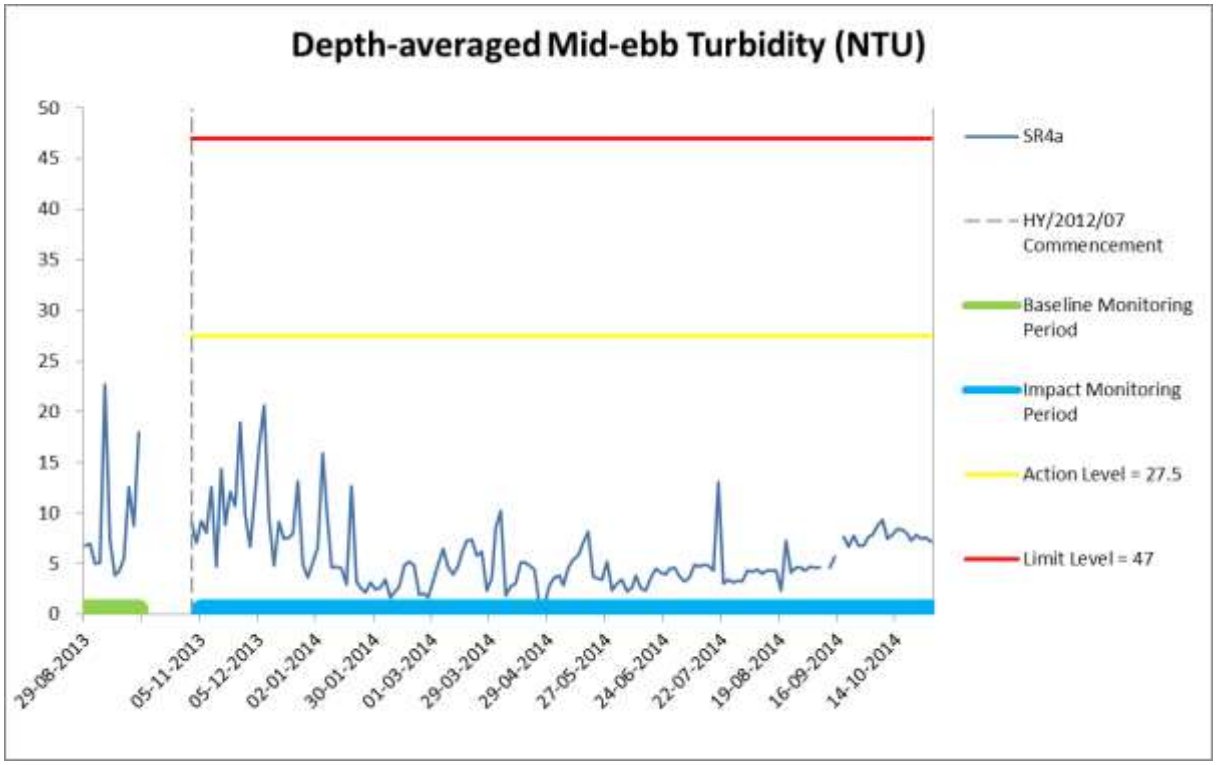
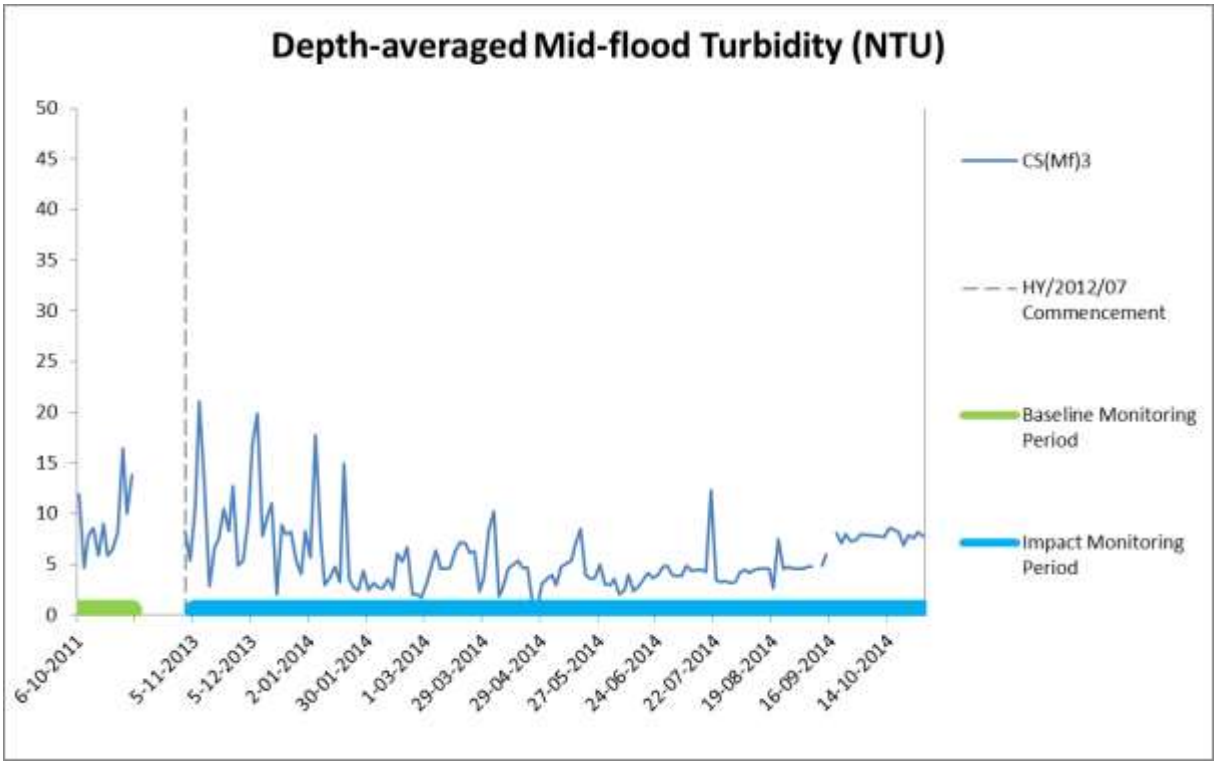


Figure F24 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-ebb tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



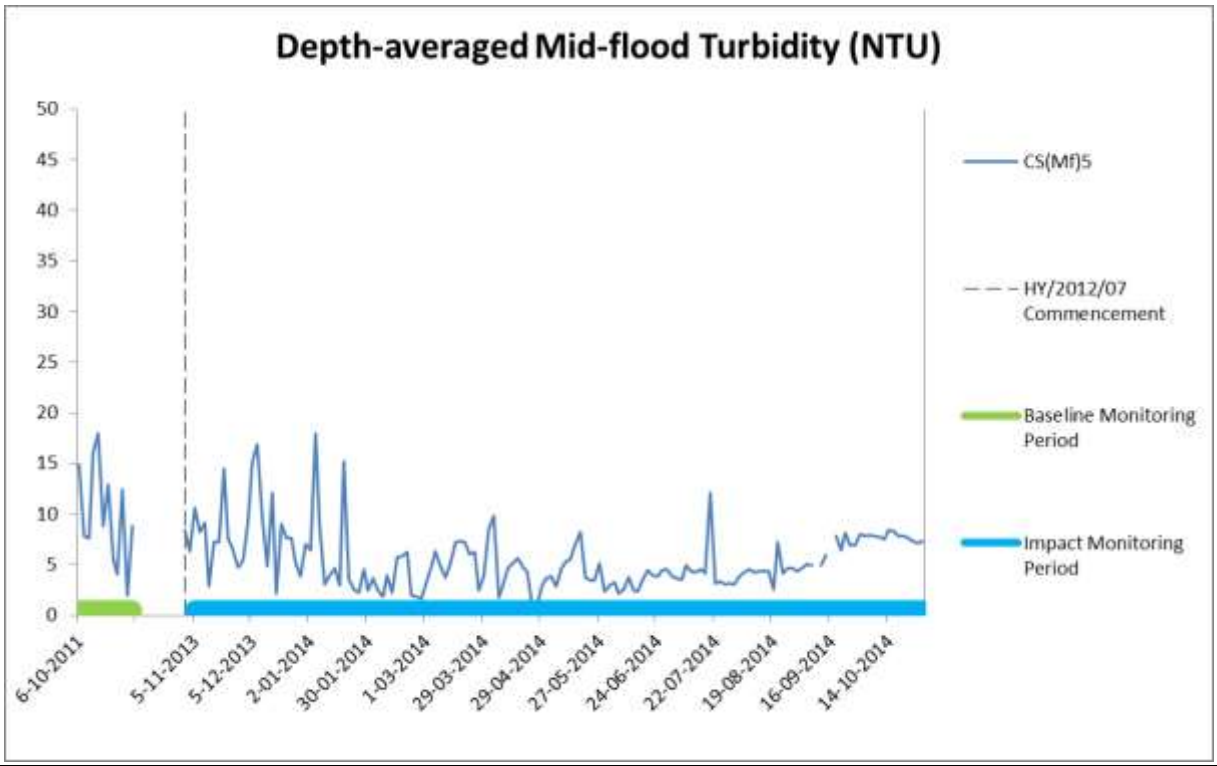
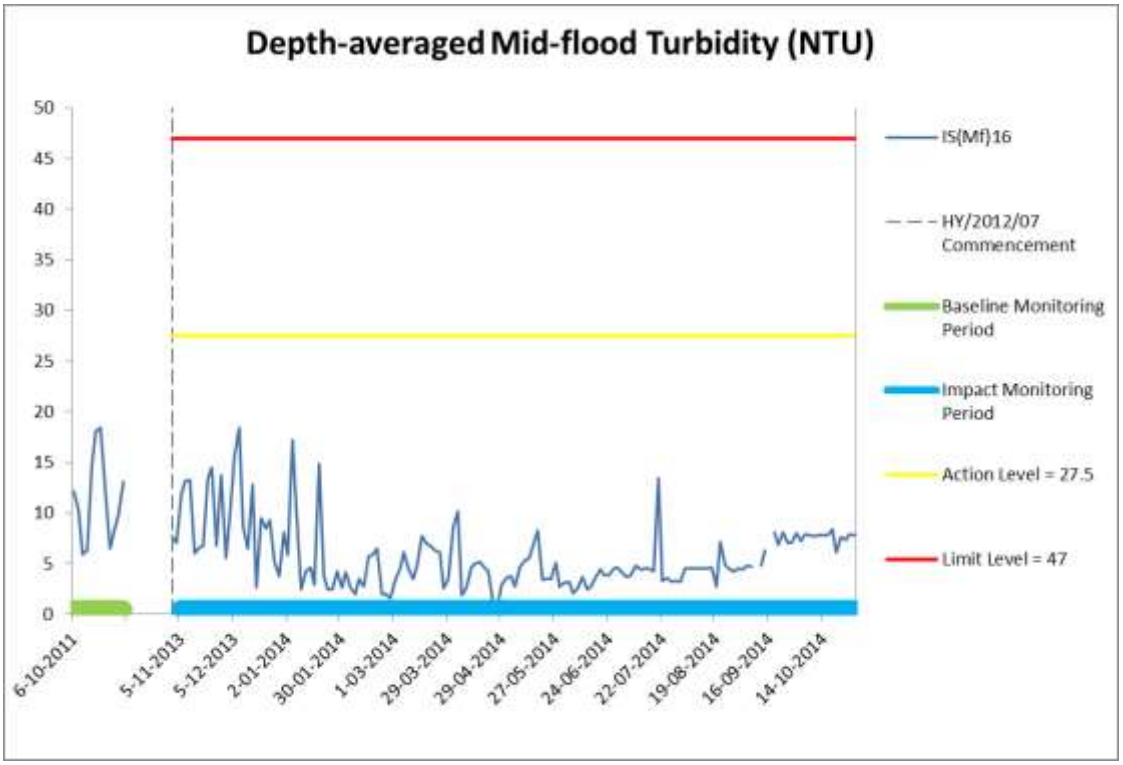


Figure F25 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(MF)5.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



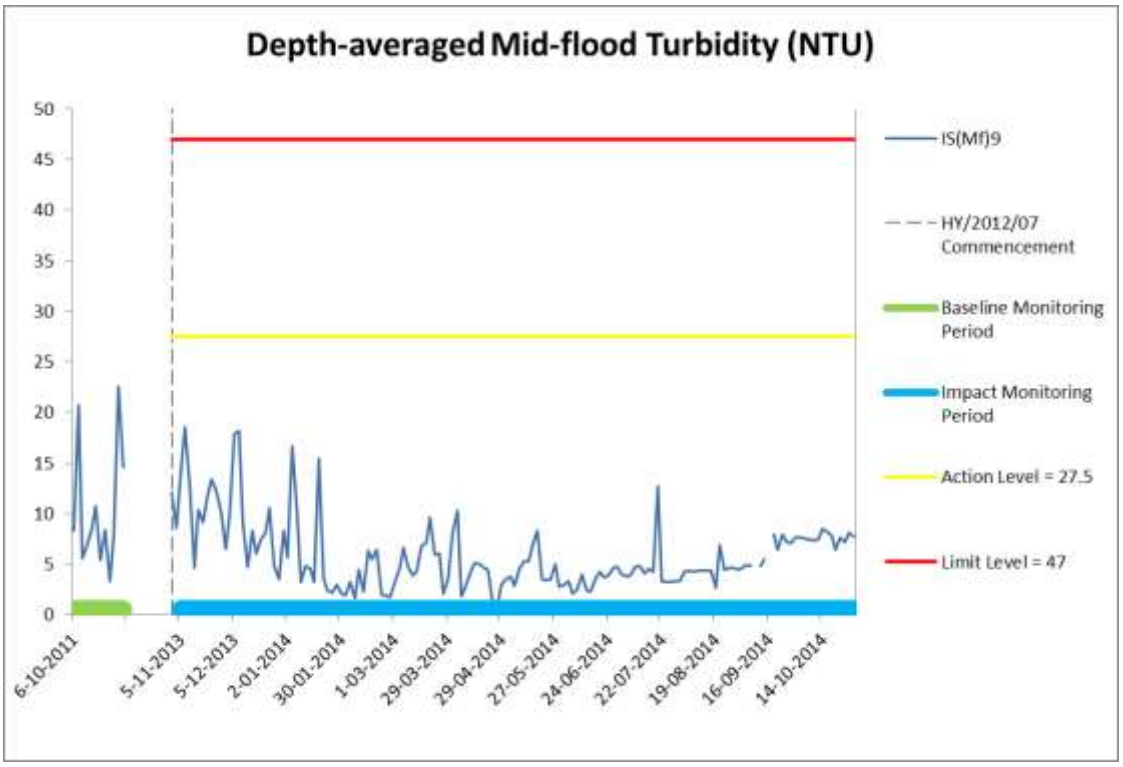
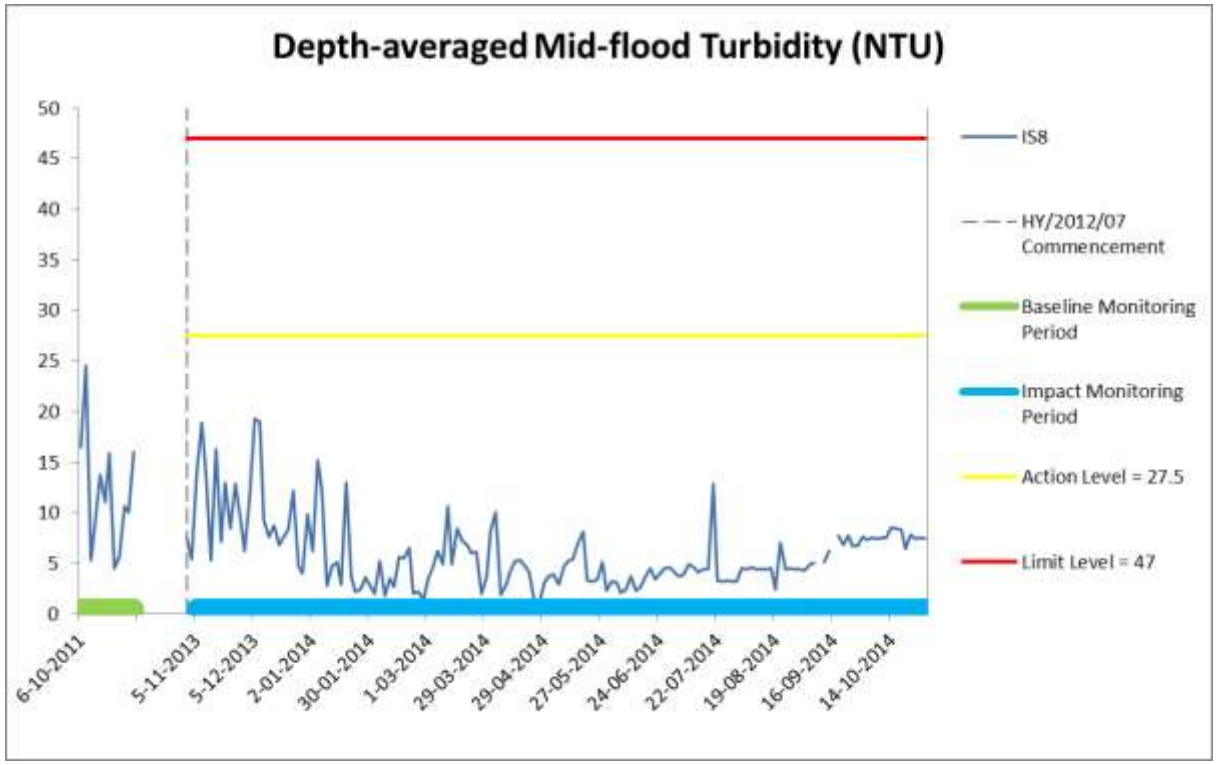


Figure F26 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



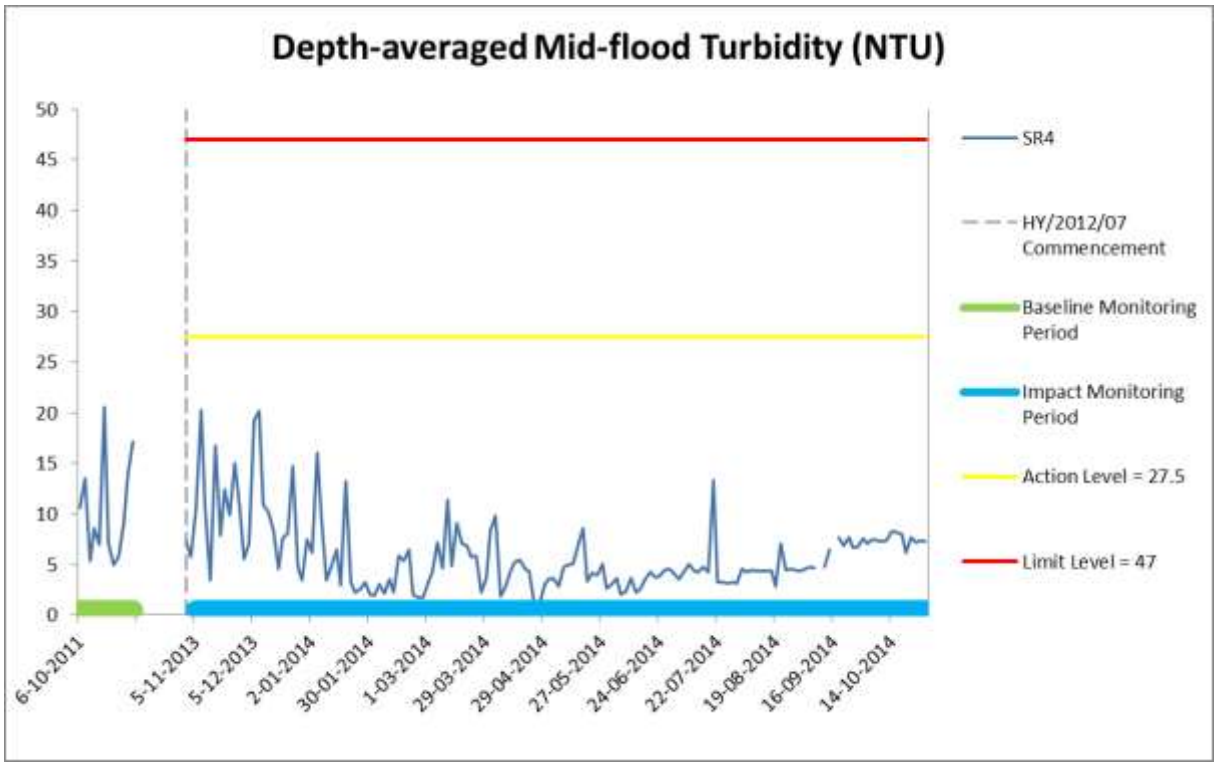


Figure F27 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

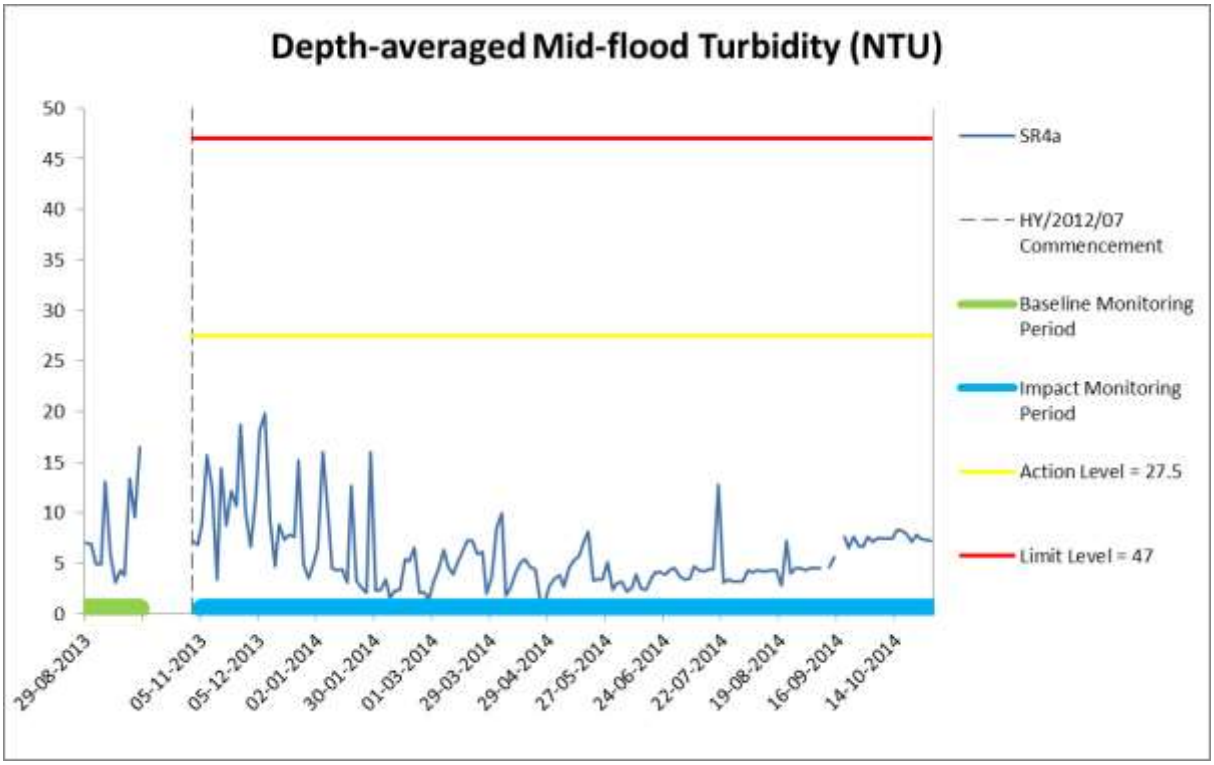
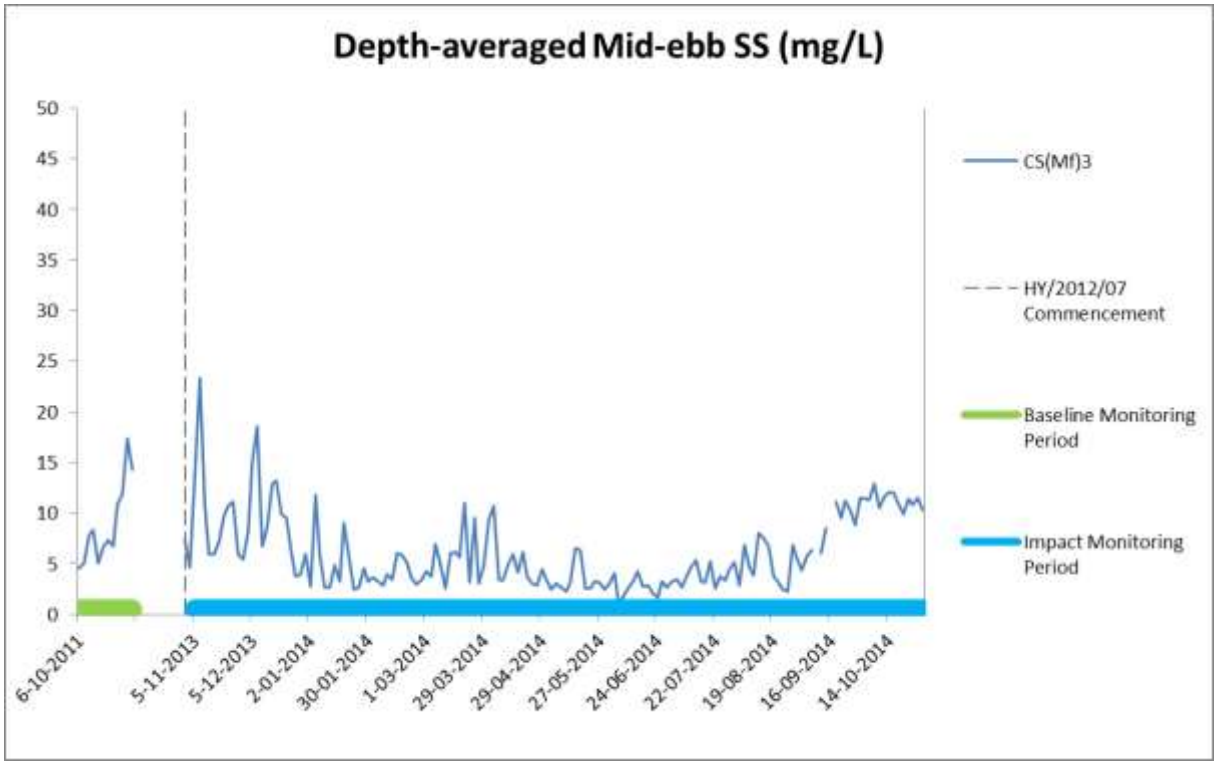


Figure F28 Impact Monitoring – Mean Level of depth-averaged Turbidity (NTU) during mid-flood tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



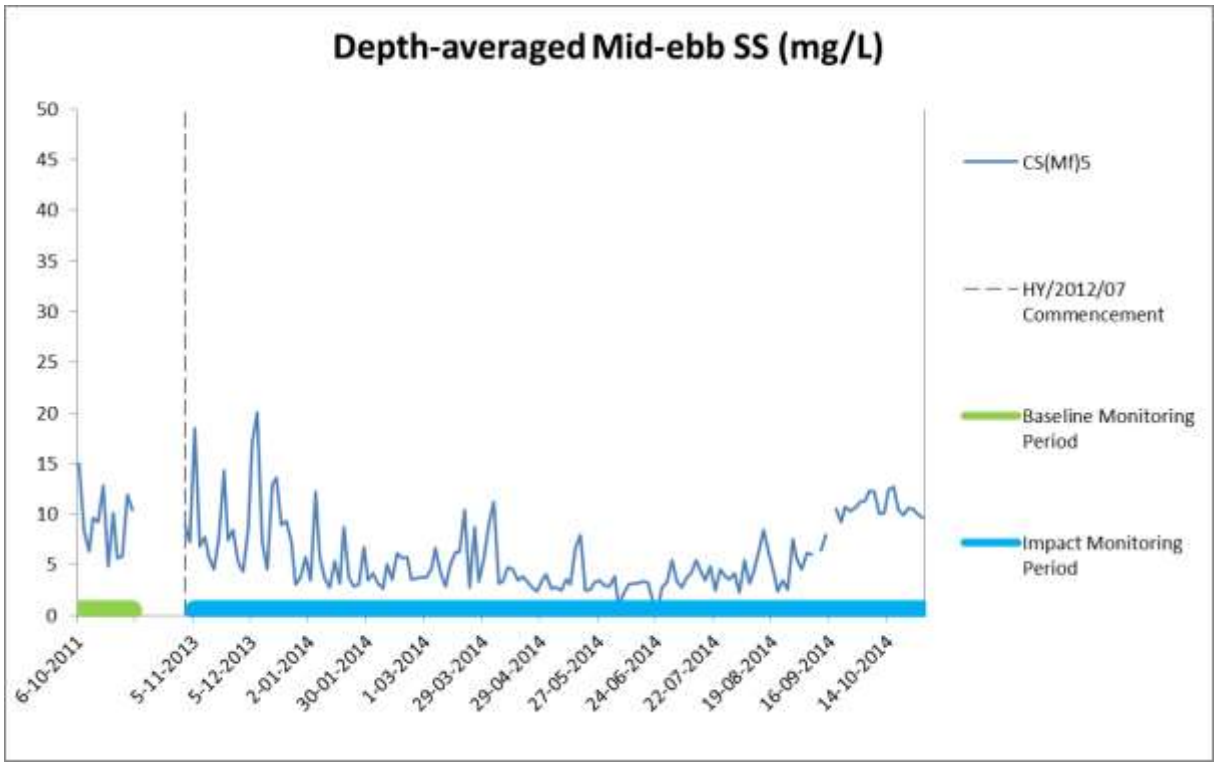
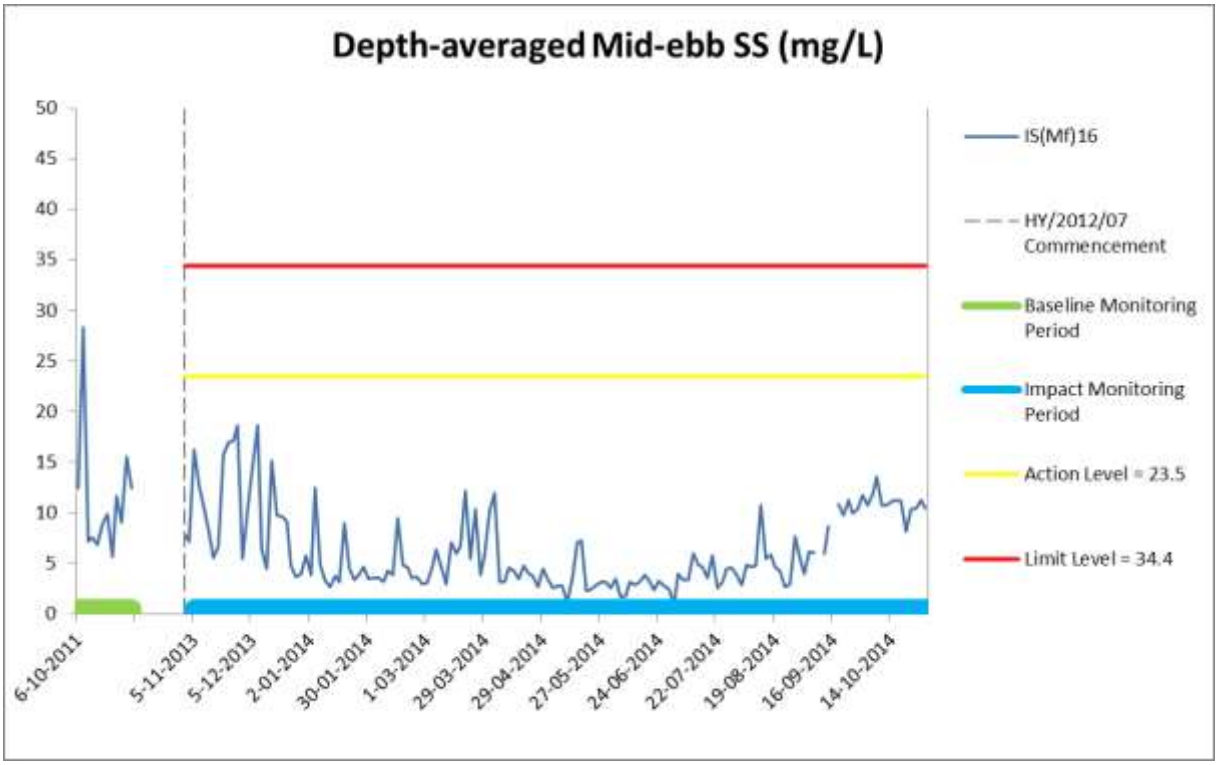


Figure F29 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-ebb tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



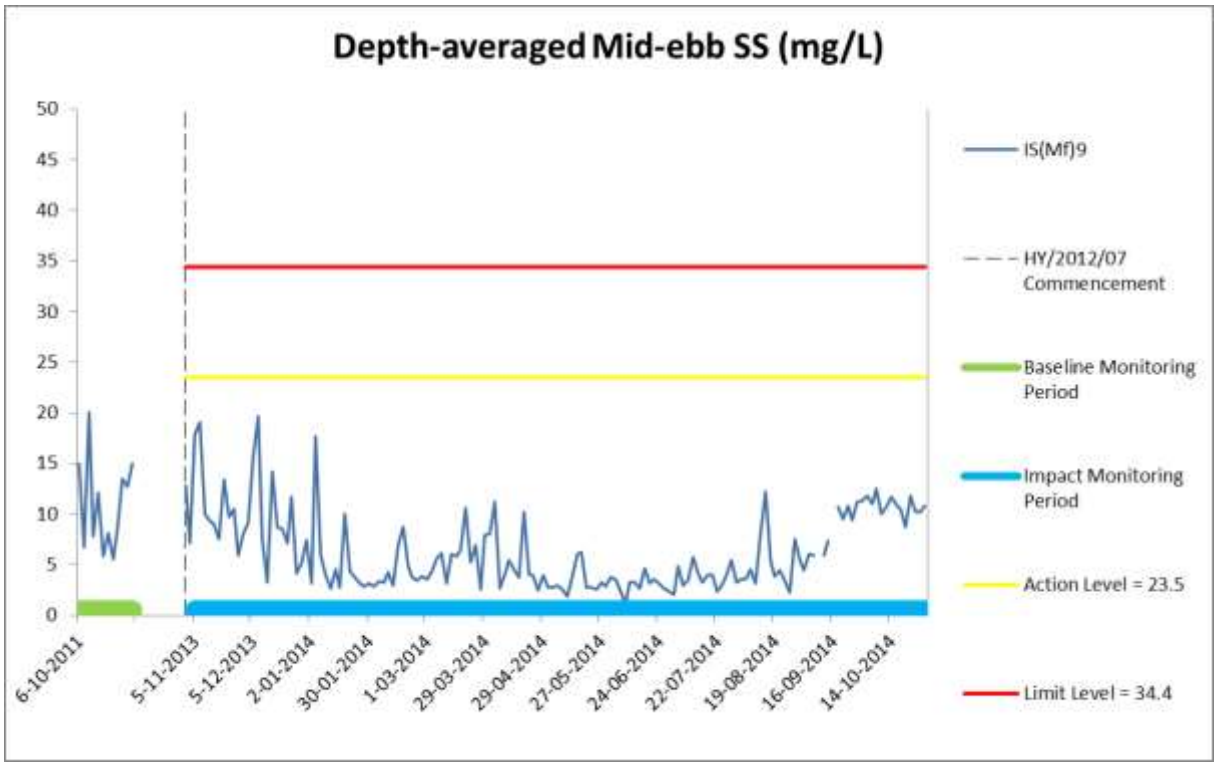
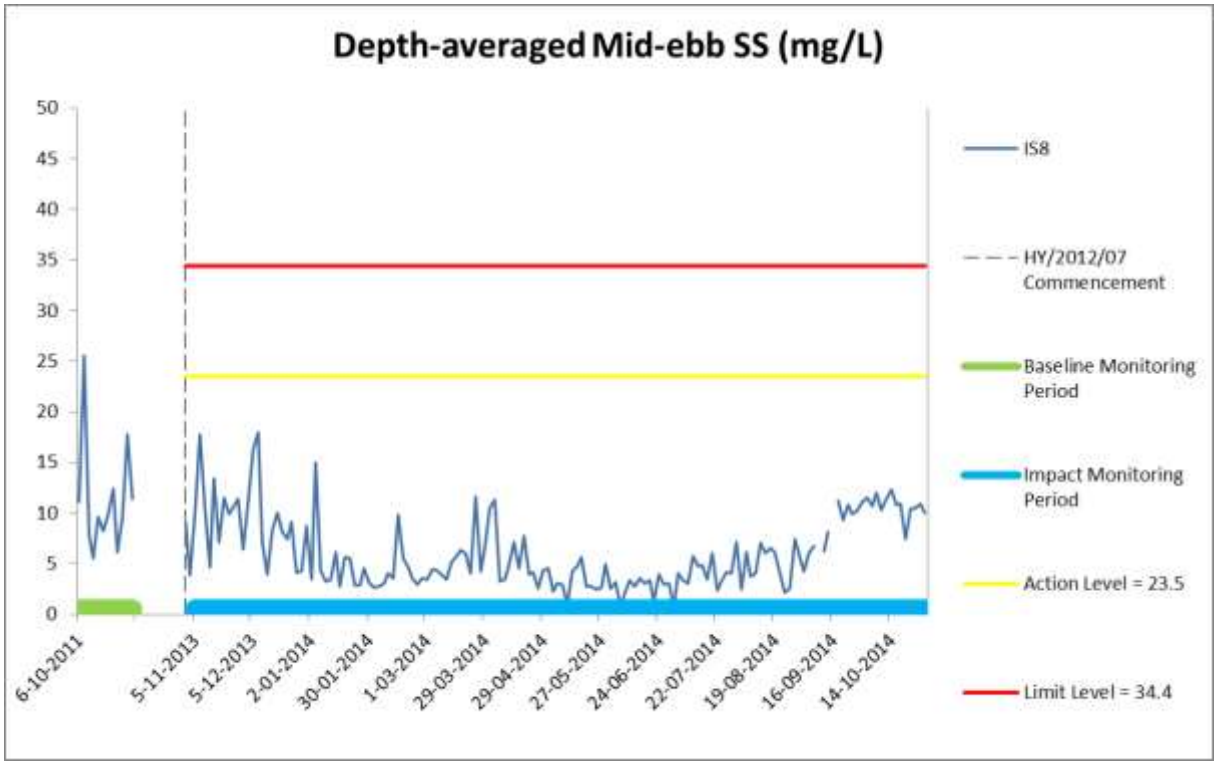


Figure F30 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



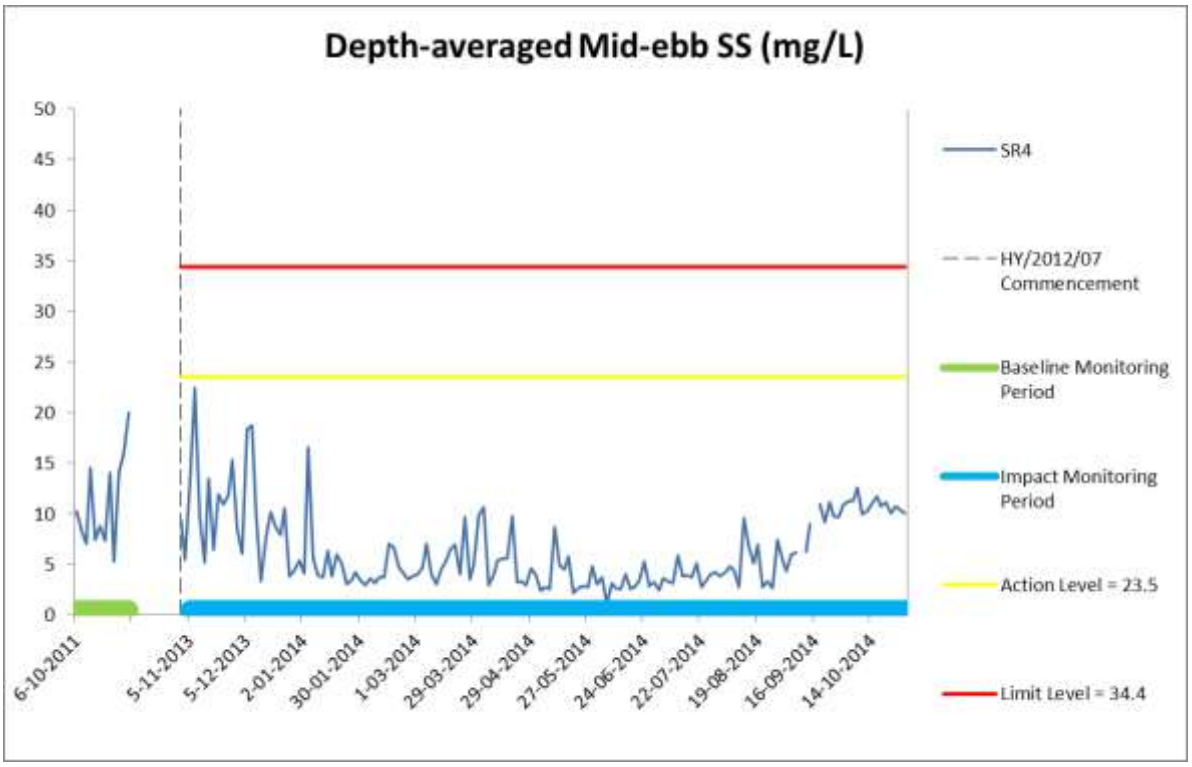


Figure F31 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-ebb tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

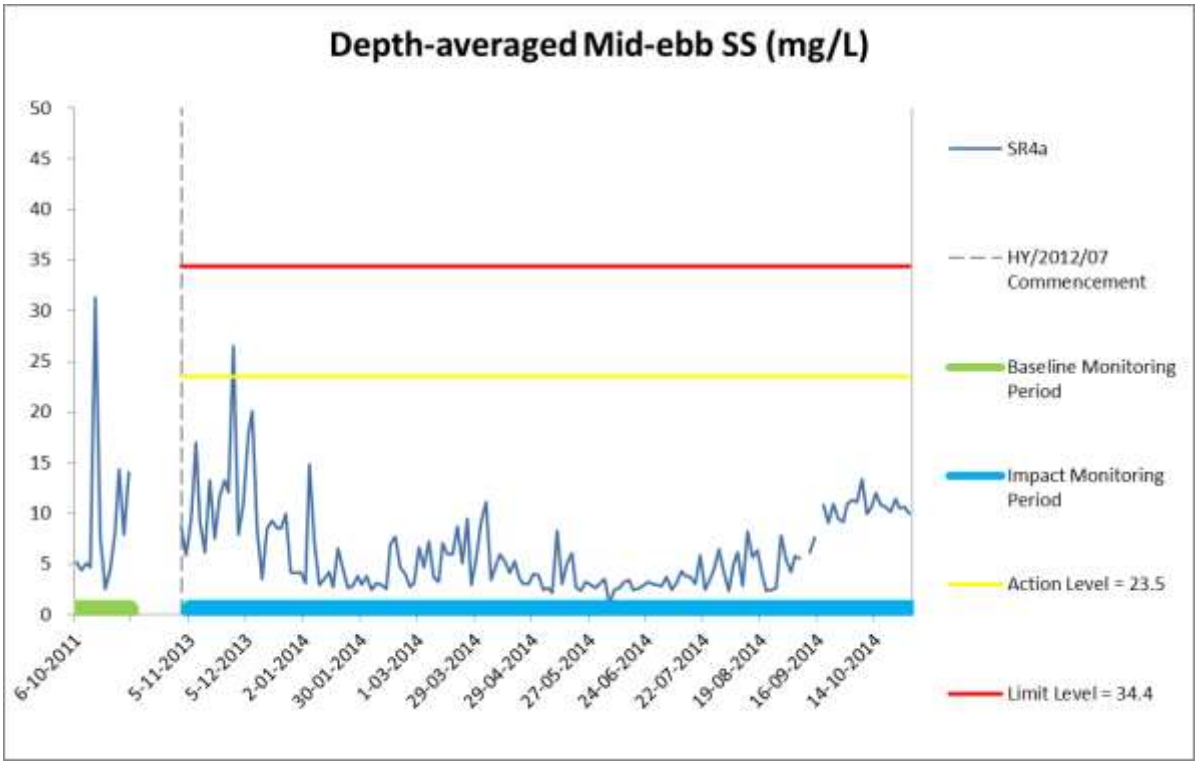
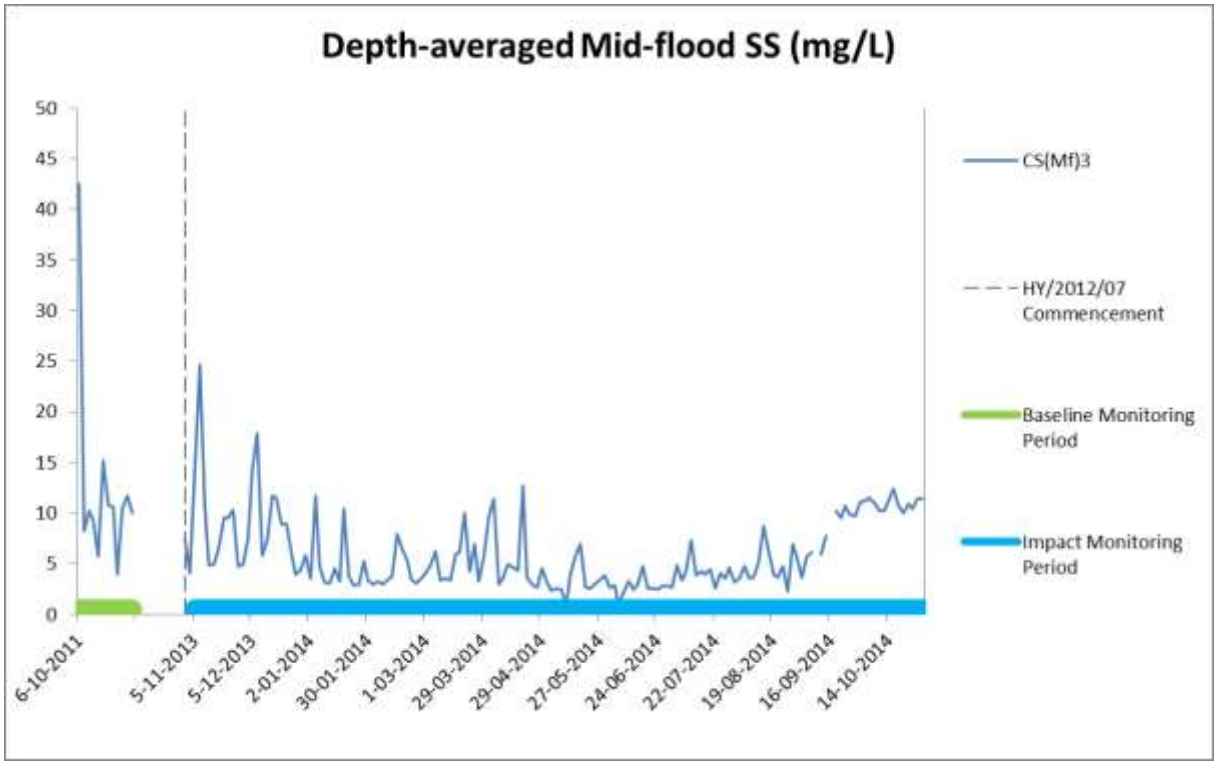


Figure F32 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-ebb tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



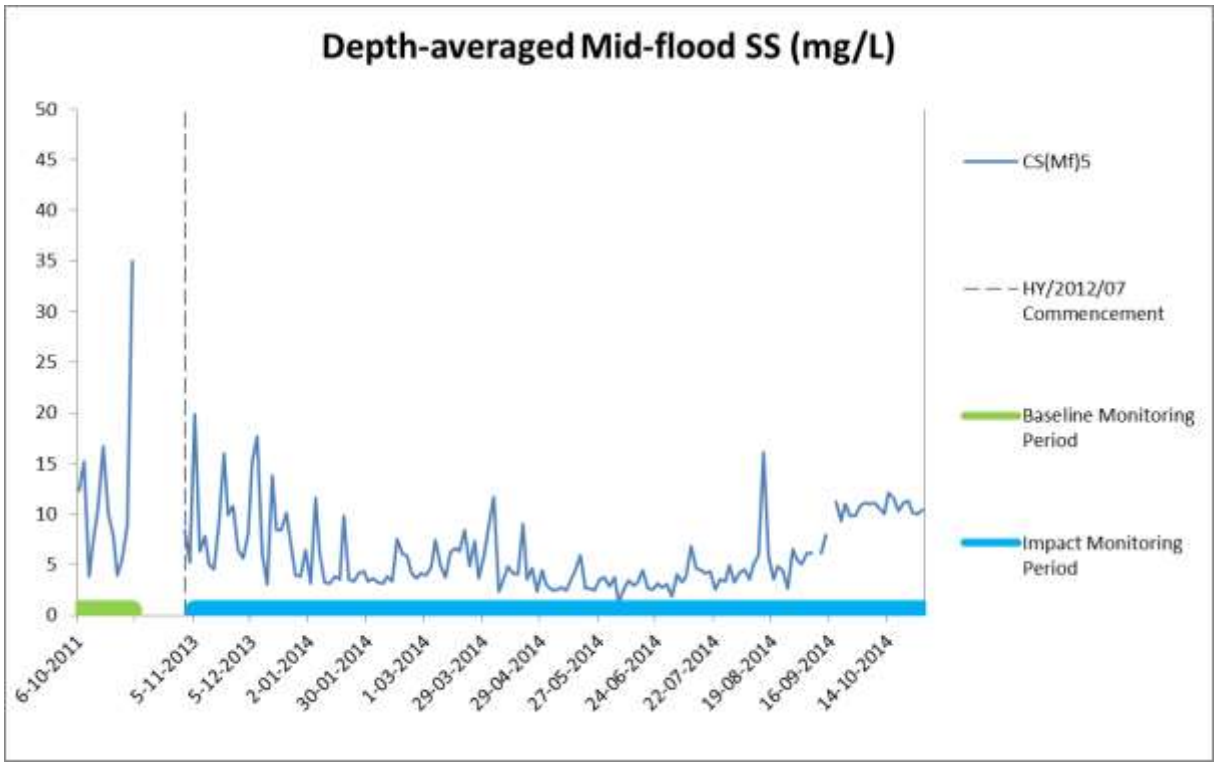
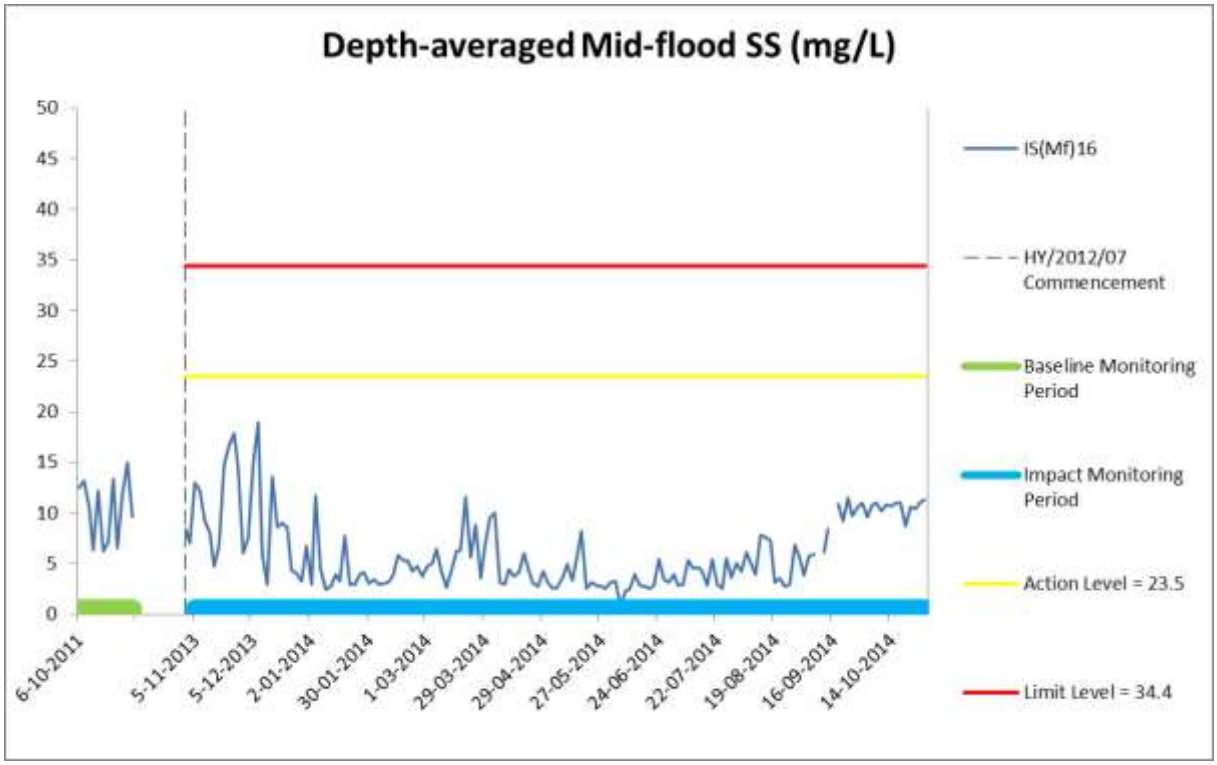


Figure F33 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-flood tide between 31 October 2013 and 31 October 2014 at CS(Mf)3 and CS(Mf)5.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.



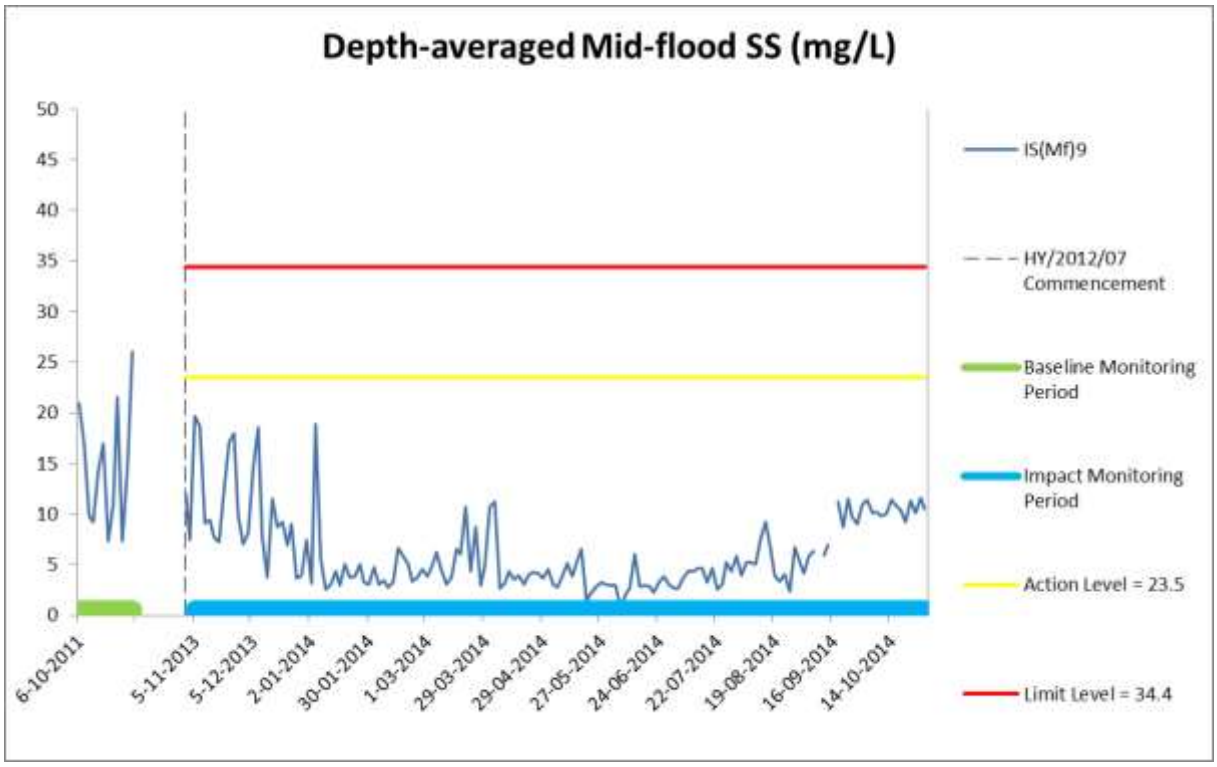
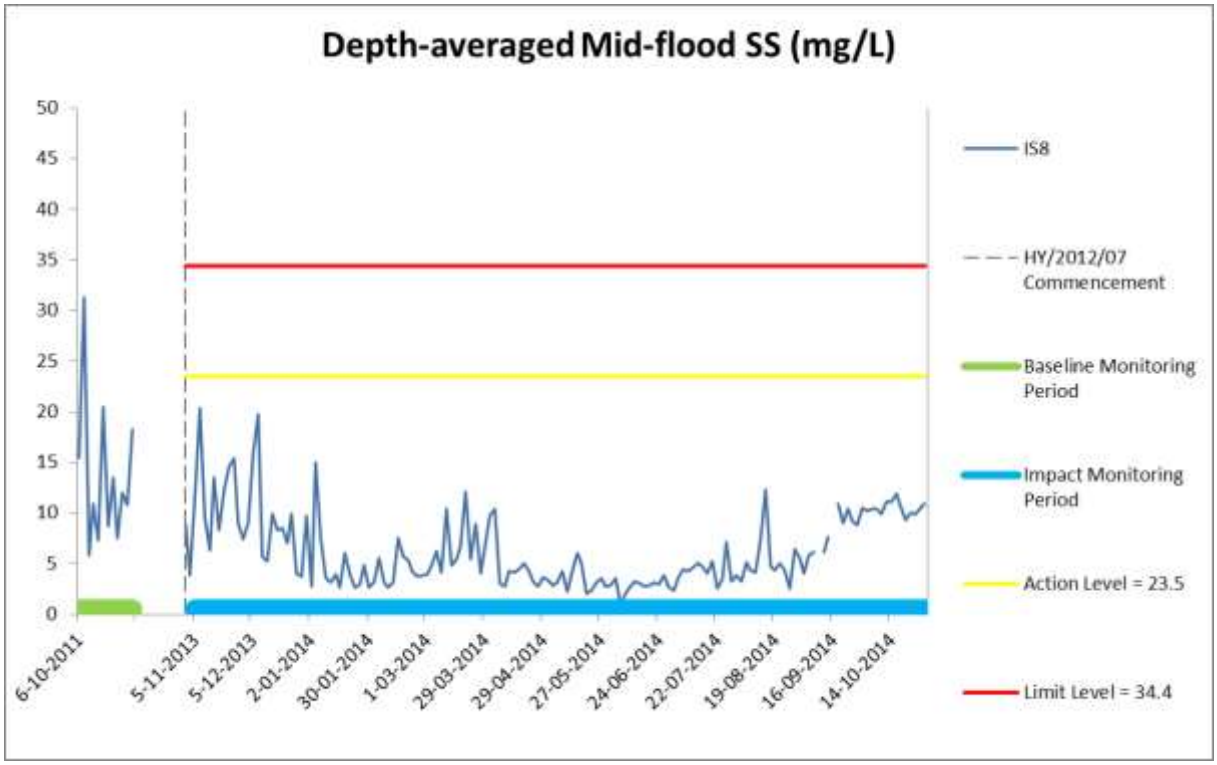


Figure F34 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-flood tide between 31 October 2013 and 31 October 2014 at IS(Mf)16 and IS(Mf)9 .

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Environmental Resources Management

ERM



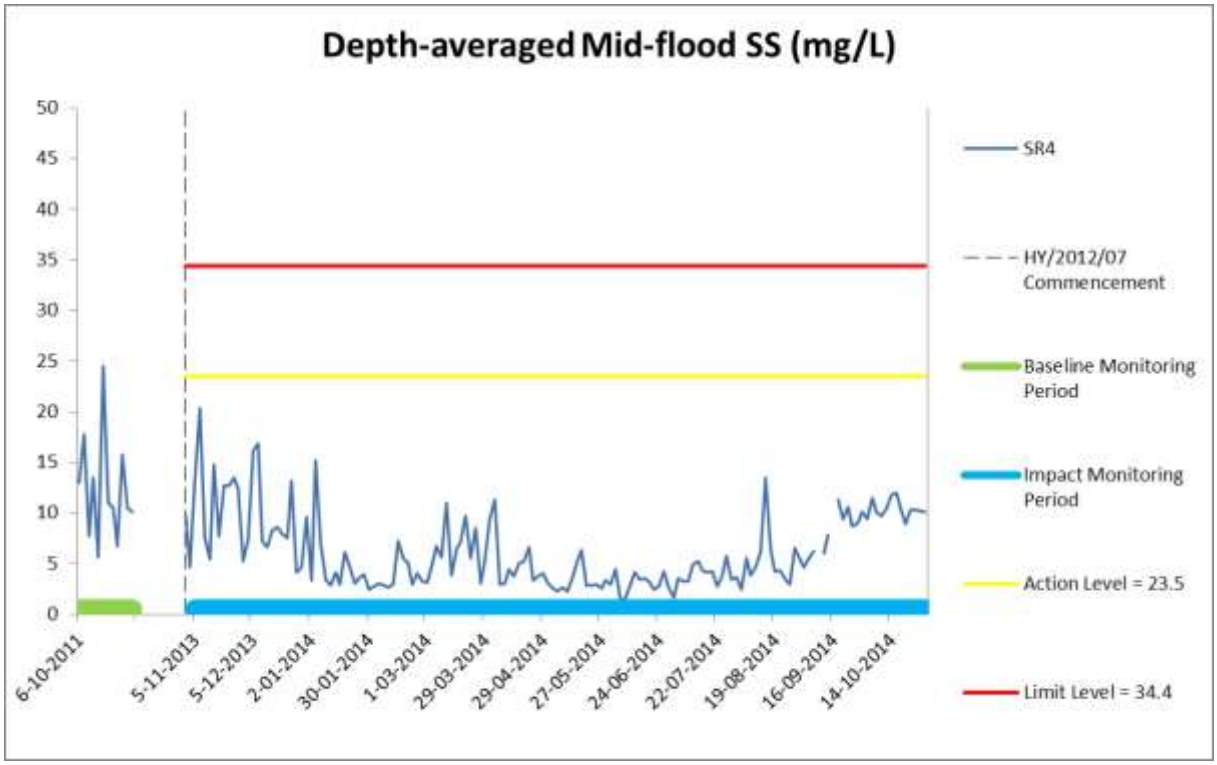


Figure F35 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-flood tide between 31 October 2013 and 31 October 2014 at IS8 and SR4.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

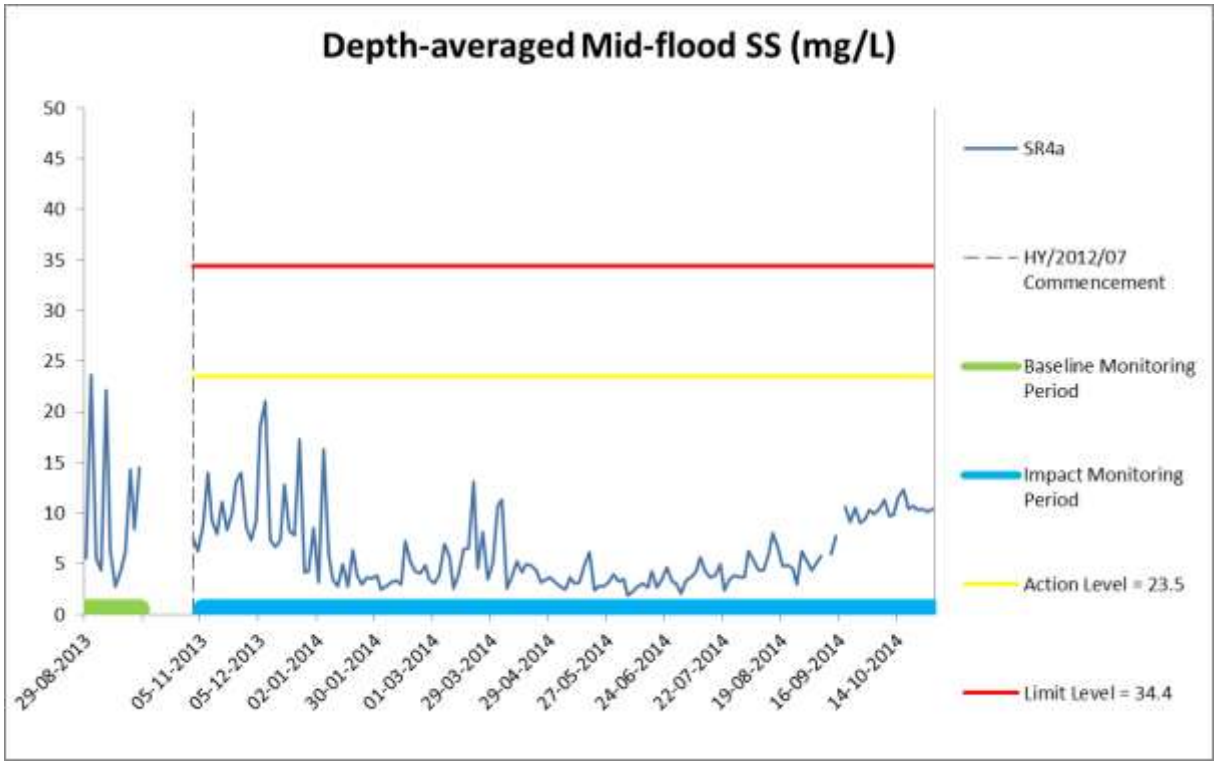


Figure F36 Impact Monitoring – Mean Level of depth-averaged Suspended Solids (mg/L) during mid-flood tide between 31 October 2013 and 31 October 2014 at SR4a.

Weather condition varied between sunny to rainy within the reporting period. Overall monitoring results were not affected by weather conditions.
Marine works within the reporting period include Survey towers erection; Filling platform at seawall; Marine piling platform installation; Construction of rockfill platform; Marine piling; Construction of Pile caps and Marine GI and laboratory testing. WQM on 1 Feb & 9 Sept and 16 Sept were cancelled due to suspension of marine works and adverse weather respectively.

Appendix G

Impact Dolphin Monitoring Survey Result

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

First Annual Progress Report (November 2013 - October 2014)
submitted to Gammon Construction Limited

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

24 January 2015

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 their 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 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 first annual 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 November 2013 to October 2014, utilizing the survey data collected by HKLR03 project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

2.1.1. According to the requirement of the updated EM&A manual, dolphin monitoring programme should cover all transect lines in NEL and NWL survey areas (see Figure 1) twice per month throughout the entire construction period of HZMB. The co-ordinates of all transect lines conducted during the HKLR03 dolphin monitoring surveys are shown in Table 1.

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

Line No.		Easting	Northing		Line No.		Easting	Northing
1	Start Point	804671	814577		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805475	815457		14	Start Point	817537	820220
2	End Point	805477	826654		14	End Point	817537	824613
3	Start Point	806464	819435		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	819771		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	820220		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	820466		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	820690		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	820847		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	820892		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562

10	Start Point	813525	820872		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818449		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807					
12	End Point	815542	824882					

2.1.2. The HKLR03 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 17 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2013, 2014). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270^{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 or 60D model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

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

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

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

2.3. Data Analysis

2.3.1. The following analyses were performed utilizing the HKLR03 dolphin monitoring data collected under the present impact phase (the first year of TMCLKL construction; i.e. November 2013 to October 2014). In addition, these analyses were also conducted for the one-year baseline phase (one year before any HZMB construction works have commenced; i.e. February 2011 to January 2012), as well as the one-year transitional phase (one year after the HZMB construction works (HKBCF and HKLR works) have commenced, but before the commencement of TMCLKL construction works; i.e. November 2012 to October 2013).

2.3.2. Along with the analyzed results from the baseline and transitional phases, results from the impact phase can then be interpreted from the examination of any temporal changes before and during the construction activities of TMCLKL on dolphin usage in North Lantau waters.

For the baseline phase, both baseline monitoring data collected under HZMB contract as well as the AFCD long-term dolphin monitoring data were included to increase the sample size in order to match the similar amount of survey effort in transitional and impact phases, both of which only HKLR03 monitoring data were included for the various analyses.

Distribution analysis

2.3.3. 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.

Encounter rate analysis

2.3.4. 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 collected under Beaufort 3 or below condition would be used for the encounter rate analyses. Dolphin encounter rates during the impact phase were calculated in two ways for comparisons with the HZMB baseline and transitional period monitoring results as well as to the AFCD long-term marine mammal monitoring results.

2.3.5. Firstly, for the comparison with the HZMB 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 the 24 set events during the present 12-month study period (i.e. 24 sets of line-transect surveys in North Lantau), which was also compared with the one deduced from the events during the transitional period and baseline period.

2.3.6. Secondly, the encounter rates were also calculated using both primary and secondary survey effort 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 12-month study period.

Quantitative grid analysis on habitat use

2.3.7. 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.

2.3.8. 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).

2.3.9. 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

Behavioural analysis

2.3.10. 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. Sighting distribution 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.

Ranging pattern analysis

2.3.11. Location data of individual dolphins that occurred during the 12-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 first year of TMCLKL impact phase monitoring (November 2013 to October

2014), a total of 24 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 3,520.41 km of survey effort was collected, with 93.2% 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, 1,353.42 km and 2,166.99 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 2,569.49 km, while the effort on secondary lines was 950.92 km. Both survey effort conducted on primary and secondary lines were considered as on-effort survey data. Summary table of the survey effort is shown in Appendix I.

3.1.4. During the 24 sets of HKLR03 monitoring surveys from November 2013 to October 2014, a total of 136 groups of 512 Chinese White Dolphins were sighted. All except eight dolphin sightings were made during on-effort search. Among the 128 on-effort sightings, 110 of them were made on primary lines, while the other 18 sightings were made on secondary lines. In this 12-month period, 97% of the dolphin sightings were made in NWL, while only four groups of 20 dolphins were sighted in NEL. A summary table of the dolphin sightings is shown in Appendix II.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the HKLR03 monitoring surveys in November 2013 to October 2014 is shown in Figure 1.

3.2.2. The majority of dolphin sightings made in the 12-month period were concentrated in the northwestern end of the North Lantau region, with higher concentration all around Lung Kwu Chau, to the west of Sha Chau, near Black Point as well as between Lung Kwu Chau and Pillar Point (Figure 1). Other dolphin sightings were scattered to the northeast and west of the airport. The few sightings made in NEL were located near Siu Ho Wan, Shum Shui Kok, Yam O and Tuen Mun (Figure 1).

3.2.3. Notably, none of the dolphin groups were sighted in the vicinity of TMCLKL southern viaduct, as well as the HKLR03 and HKBCF reclamation sites. One sighting was made near the TMCLKL northern landfall, and a few sightings were made in the vicinity of the HKLR09 alignment. Generally speaking, dolphin appeared to have avoided the five construction areas of HZMB works during the present impact phase monitoring period.

3.2.4. Dolphin sighting distribution of the present impact phase monitoring period (November 2013 to October 2014) was compared to the ones during the baseline phase (February 2011 to January 2012) and transitional phase (November 2012 to October 2013). In the present impact phase period, dolphins have nearly vacated from the NEL region, which was in stark contrast to their very frequent occurrence around the Brothers Islands, Shum Shui Kok, and the vicinity of HZMB-associated work sites during the baseline period (Figure 2). Even in the transitional phase, dolphins still utilized NEL waters in a

moderate extent, while they mostly avoided this area during the impact phase.

3.2.5. On the contrary, dolphin occurrence was similar across the three phases in NWL survey area, with the high concentration of dolphin sightings around Sha Chau and Lung Kwu Chau as well as near Black Point (Figure 2). However, there were two subtle differences observed among the three phases in NWL waters. Dolphins appeared to occur in much lower extent to the west of the airport platform and less frequently between Pillar Point and the airport platform during the impact phase when compared to the baseline and transitional phases (Figure 2).

3.3. Encounter rate

3.3.1. During the present 12-month impact phase monitoring period, the average daily encounter rates of Chinese White Dolphins were deduced in NEL and NWL survey areas, and compared to the ones deduced from the baseline and transitional phases (Table 2).

Table 2. Comparison of average daily dolphin encounter rates from impact phase (November 2013 – October 2014), transitional phase (November 2012 – October 2013) and baseline phase monitoring periods (February 2011 – January 2012) (Note: encounter rates deduced from the three periods were calculated based on survey 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)	
	Northeast Lantau	**Northwest Lantau**	**Northeast Lantau**	**Northwest Lantau**
Impact Phase (2013-14)	0.22 ± 0.74	6.93 ± 4.08	0.76 ± 2.59	26.31 ± 17.56
Transitional Phase (2012-13)	1.70 ± 2.26	7.68 ± 4.36	4.75 ± 7.61	27.51 ± 18.06
Baseline Phase (2011-12)	6.05 ± 5.04	7.75 ± 5.69	19.91 ± 21.30	29.57 ± 26.96

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present 12-month study period using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 6.24 sightings and 22.93 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were 0.23 sightings and 1.23 dolphins per 100 km of survey effort respectively.

3.3.3. In NEL, the dolphin encounter rates (both STG and ANI) in the present 12-month impact monitoring period were exceptionally low, which was only a small fraction of the averages during the baseline phase (Table 2). In fact, such decline already existed in this area during the transitional phase (i.e. well before the TMCLKL construction works commenced), with the averages in the transitional phase being much lower than the ones in the baseline phase (reductions of 71.9% for STG and 76.1% respectively). Since then,

dolphin occurrence has further diminished to a very low level after the construction works of TMCLKL have commenced.

3.3.4. In NWL, the average dolphin encounter rates (STG and ANI) during the present impact phase monitoring period were also slightly lower (reductions of 10.6% and 11.0% respectively) than the ones recorded in the baseline period, indicating a slight decline in dolphin usage of this survey area during the present impact phase monitoring period (Table 2). Such decline was persistent since the commencement of HZMB construction in 2012, with a slight decline in transitional phase followed by a further decline in the impact phase (Table 2).

3.3.5. 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 three monitoring periods (i.e. baseline, transitional and impact). The two variables that were examined included the two periods and the two locations (i.e. NEL and NWL).

3.3.6. For the comparison between the three periods, the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.0043 and 0.0426 respectively. If the alpha value is set at 0.05, significant differences were detected among the three periods in both dolphin encounter rates of STG and ANI.

3.4. Group size

3.4.1. Group size of Chinese White Dolphins ranged from one to 13 individuals per group in North Lantau region during November 2013 – October 2014. The average dolphin group sizes from the 12-month impact phase monitoring period were compared with the ones deduced from baseline and transitional phases, as shown in Table 3.

3.4.2. The average dolphin group sizes in the entire North Lantau region as well as in NWL waters during the present impact phase monitoring period were slightly higher than the ones recorded during the baseline and transitional phases (Table 3). Among the 136 dolphin groups sighted during the impact phase, 93 of them were composed of 1-4 individuals only, while there were only four dolphin groups with more than 10 individuals.

Table 3. Comparison of average dolphin group sizes from impact phase (November 2013 – October 2014), transitional phase (November 2012 – October 2013) and baseline phase monitoring periods (February 2011 – January 2012) (± denotes the standard deviation of the average group sizes)

	Average Dolphin Group Size		
	Overall	**Northeast Lantau**	**Northwest Lantau**
Impact Phase (2013-14)	3.76 ± 2.57 (n = 136)	5.00 ± 2.71 (n = 4)	3.73 ± 2.57 (n = 132)
Transitional Phase (2012-13)	3.37 ± 2.98 (n = 186)	2.64 ± 2.38 (n = 22)	3.47 ± 3.05 (n = 164)
Baseline Phase (2011-12)	3.32 ± 2.86 (n = 288)	2.80 ± 2.35 (n = 79)	3.52 ± 3.01 (n = 209)

3.4.3. Distribution of dolphins with larger group sizes (i.e. five individuals or more per group) during the present quarter is shown in Figure 3, with comparison to the ones in transitional phase and baseline phase. During the TMCLKL impact phase in 2013-14, distribution of the larger dolphin groups were mainly concentrated around Lung Kwu Chau, Sha Chau and near Black Point (Figure 3). This distribution pattern was similar to the one during the transitional phase, but was very different from the baseline phase, when the larger dolphin groups were distributed more evenly in NWL waters with many also sighted in NEL waters (Figure 3). Moreover, fewer large dolphin groups with more than 10 animals were sighted during the impact phase when compared with the transitional and baseline phases.

3.5. Habitat use

3.5.1. During the impact phase monitoring period in 2013-14, the most heavily utilized habitats by Chinese White Dolphins mainly concentrated around Lung Kwu Chau (Figures 4a and 4b). For the rest of North Lantau region, only a few grids in NEL as well as the eastern and southwestern sections of NWL recorded the presence of dolphins in very low density. Moreover, all grids near TMCLKL and HKLR09 alignments as well as the HKLR03/HKBCF reclamation sites rarely recorded the presence of dolphins in the present 12-month impact monitoring period (Figures 4a and 4b).

3.5.2. When compared with the habitat use patterns during the baseline phase, dolphin usage in NEL was dramatically different from the present impact monitoring period (Figure 5). During the baseline period, a number of grids between Siu Mo To and Shum Shui Kok recorded moderately high to high dolphin densities, which was in stark contrast to the rare dolphin usage during the present impact phase period (Figure 5).

3.5.3. On the other hand, the density patterns in NWL were similar between the baseline and impact phase monitoring periods, with the exception that dolphin rarely utilized the waters to the west of airport during the impact phase, while their densities were relatively much higher during the baseline phase in the same area.

3.5.4. Notably, the habitat use patterns between the present impact phase in 2013-14 and transitional phase in 2012-13 were largely similar, indicating that the declining usage by the dolphins in NEL have already persisted before the commencement of TMCLKL construction works. Nevertheless, the declining usage of NEL waters and the central portion of NL waters have further worsened during the present impact monitoring period with the on-going TMCLK construction works in addition to other HZMB-related construction activities.

3.6. Mother-calf pairs

3.6.1. During the present 12-month impact phase monitoring period, a total of two unspotted calves and 27 unspotted juveniles (UJ) were sighted in North Lantau waters. These young calves comprised of 5.7% of all animals sighted, which was slightly higher than the percentage recorded during the baseline period (4.5%) but slightly lower than the one during the transitional phase (6.7%).

3.6.2. In NWL, the young calves were mainly sighted within and in the vicinity of Lung Kwu Chau during the impact phase monitoring period, which was drastically different from the distribution patterns during the baseline and transitional phases when young calves were sighted throughout NWL waters (Figure 6). Moreover, only one young calf was sighted near Siu Ho Wan in NEL during the impact phase, but they were regularly sighted in this area during baseline and transitional phases (Figure 6).

3.6.3. Notably, none of the young calves were sighted in the vicinity of the TMCLKL/HKLR09 alignments and HKBCF/HKLR03 reclamation sites during the present impact phase monitoring period (Figure 6).

3.7. Activities and associations with fishing boats

3.7.1. Eight dolphin sightings of each were associated with feeding and socializing activities respectively during the 12-month impact phase monitoring period. The percentage of sightings associated with feeding activities during the present impact phase (5.9%) was much lower than the ones recorded during the baseline period (12.8%) as well as transitional phase (8.6%) On the contrary, the percentage of socializing activities during the present impact phase monitoring period (5.9%) was higher than the one recorded during the baseline period (3.8%), but slightly lower than the one during the transitional period (6.4%). Notably, four other groups were also engaged in traveling activity during the present impact phase monitoring period.

3.7.2. Distribution of dolphins engaged in feeding, socializing and traveling activities during the present impact phase monitoring period is shown in Figure 7. The sightings associated with feeding activities occurred near Lung Kwu Chau, Sha Chau, Pillar Point and Siu Ho Wan, while the ones associated with socializing activities could be found along the Urmston Road between Pillar Point and the marine park as well as near Lung Kwu Chau and Sha Chau (Figure 7). On the contrary, feeding activities were frequently sighted along the Urmston Road, within the marine park, to the west of airport platform and around the Brothers Islands during the baseline phase, while the socializing activities were more scattered throughout the North Lantau region in the same period as well as in the transitional phase (Figure 7).

3.7.3. Dolphin sightings associated with traveling activities were concentrated to the north and east of Lung Kwu Chau during the impact phase monitoring period (Figure 7). This was very different from the pattern observed in baseline phase when traveling activities were primarily found near Pillar Point and to the west of the airport platform (Figure 7).

3.7.4. During the impact phase monitoring period in 2013-14, only one of the 136 dolphin groups were found to be associated with an operating fishing vessel (a hang trawler) in North Lantau waters. The extremely rare event of fishing boat association in the impact phase as well as the transitional phase (3 of 186 groups associated with fishing boats) was quite different from the baseline period with 14 of 288 dolphin groups associated with fishing boats. This was likely related to the trawl ban being implemented in December 2012 in Hong Kong waters.

3.8. Summary of photo-identification works

3.8.1. During the 12-month impact phase monitoring period, a total of 77 individuals sighted 291 times altogether were identified (see Appendix III). Only 17 of the 291 re-sightings (from 11 individuals) were made in NEL, while the rest were made in NWL.

3.8.2. About half of the 77 identified individuals were sighted only once or twice, while many individuals were also sighted frequently during the 12-month period. For example, 17 individuals were sighted more than five times, while five individuals (NL24, NL48, NL136, NL261 and NL272) were sighted ten times or more. Their frequent occurrences indicated strong reliance of North Lantau waters as their home ranges during the impact phase monitoring period, which should be continuously monitored for the rest of the impact phase monitoring period.

3.8.3. Notably, fifteen recognized females (i.e. NL33, NL46, NL80, NL93, NL98, NL104, NL123, NL145, NL182, NL202, NL221, NL233, NL256, WL124 and WL172) were accompanied with their calves during their re-sightings.

3.9. Individual range use

3.9.1. Ranging patterns of the 77 individuals identified during the 12-month impact phase monitoring period in 2013-14 were determined by fixed kernel method, and are shown in Appendix IV.

3.9.2. All identified dolphins sighted in this 12-month period were utilizing their ranges primarily in NWL, while some have extended their range use to West Lantau waters (e.g. CH34, NL33, NL150, WL15, WL124) based on the HKLR09 monitoring data collected during the same period (Appendix IV). The majority of identified dolphins have avoided the NEL waters, the area where many of them have utilized as their core areas of activities in the past.

3.9.3. An examination on temporal changes in range use of individual dolphins across the baseline, transitional and impact phases revealed that a number of dolphins have gradually shifted their range use away from their previously important habitat in NEL (especially around the Brothers) (see examples in Appendix V). Several individuals have expanded their range use into West Lantau waters (e.g. CH34, EL01, NL33, NL37, NL49, NL98, NL136, NL188, NL259, NL272, NL296, WL05) during the impact phase, while others have either increased their utilization of NWL (e.g. NL48, NL123, NL165, NL284) or possibly moved away from Hong Kong waters more often with only a few sightings despite their frequent occurrence here in the past (e.g. NL191, NL244, WL11).

3.9.4. Such range shifts of identified individual dolphins were also documented in Hung (2014), and could be related to the disturbance of construction activities and other existing threats in the NEL region. This should be continuously monitored for the rest of the TMCLKL impact phase monitoring period, as the waters around the Brothers Islands is scheduled to be established as a marine park in 2016 as an important compensation measure for the dolphins.

4. Conclusion

4.1. During the first year of TMCLKL impact phase monitoring of Chinese white dolphins, no adverse impact from the activities of the TMCLKL construction project on the 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 for the rest of the impact phase monitoring period, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

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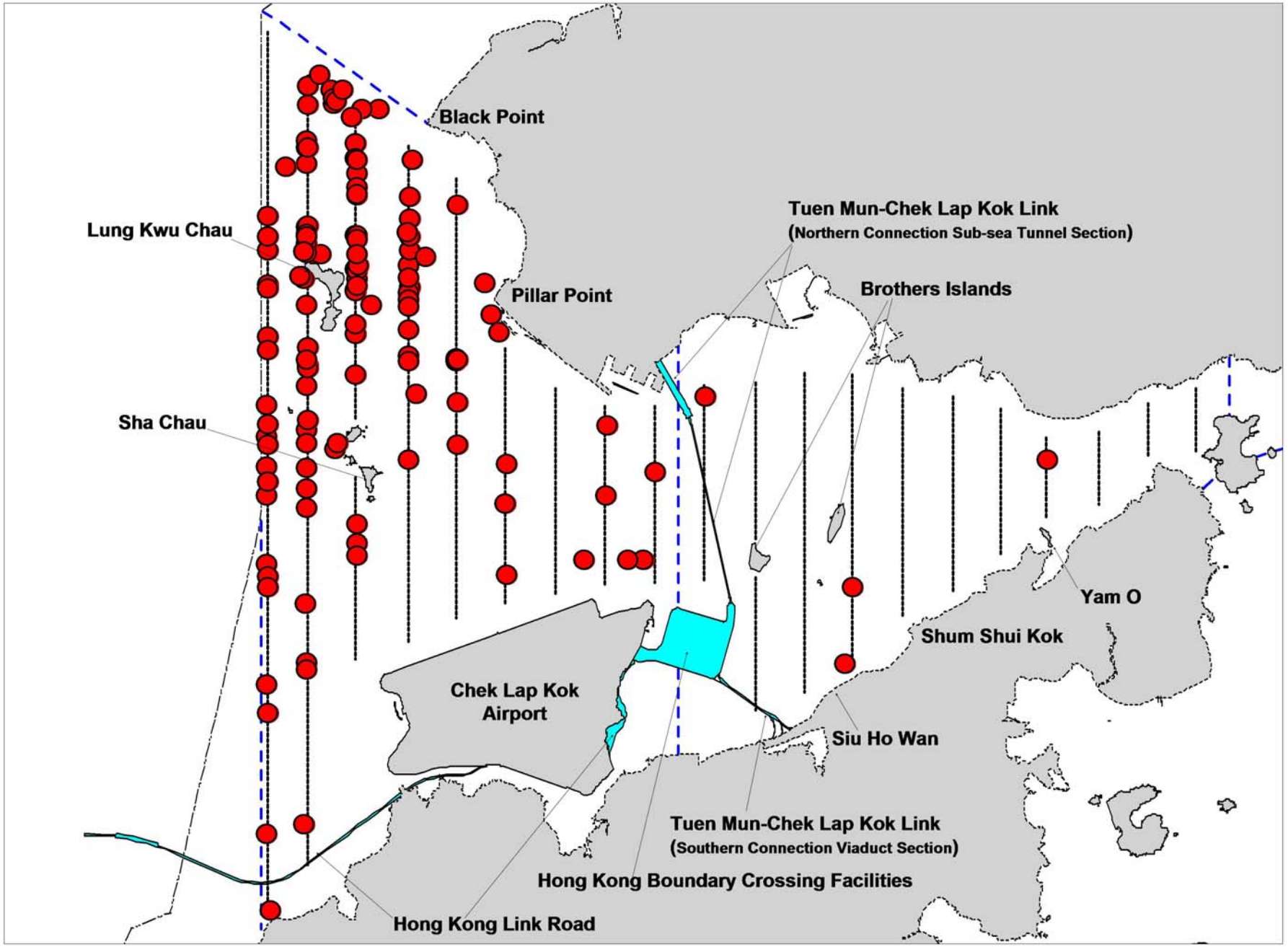


Figure 1. Distribution of Chinese white dolphin sightings in North Lantau region during the first year of TMCLKL construction works (November 2013 to October 2014), utilizing the HKLR03 monitoring data

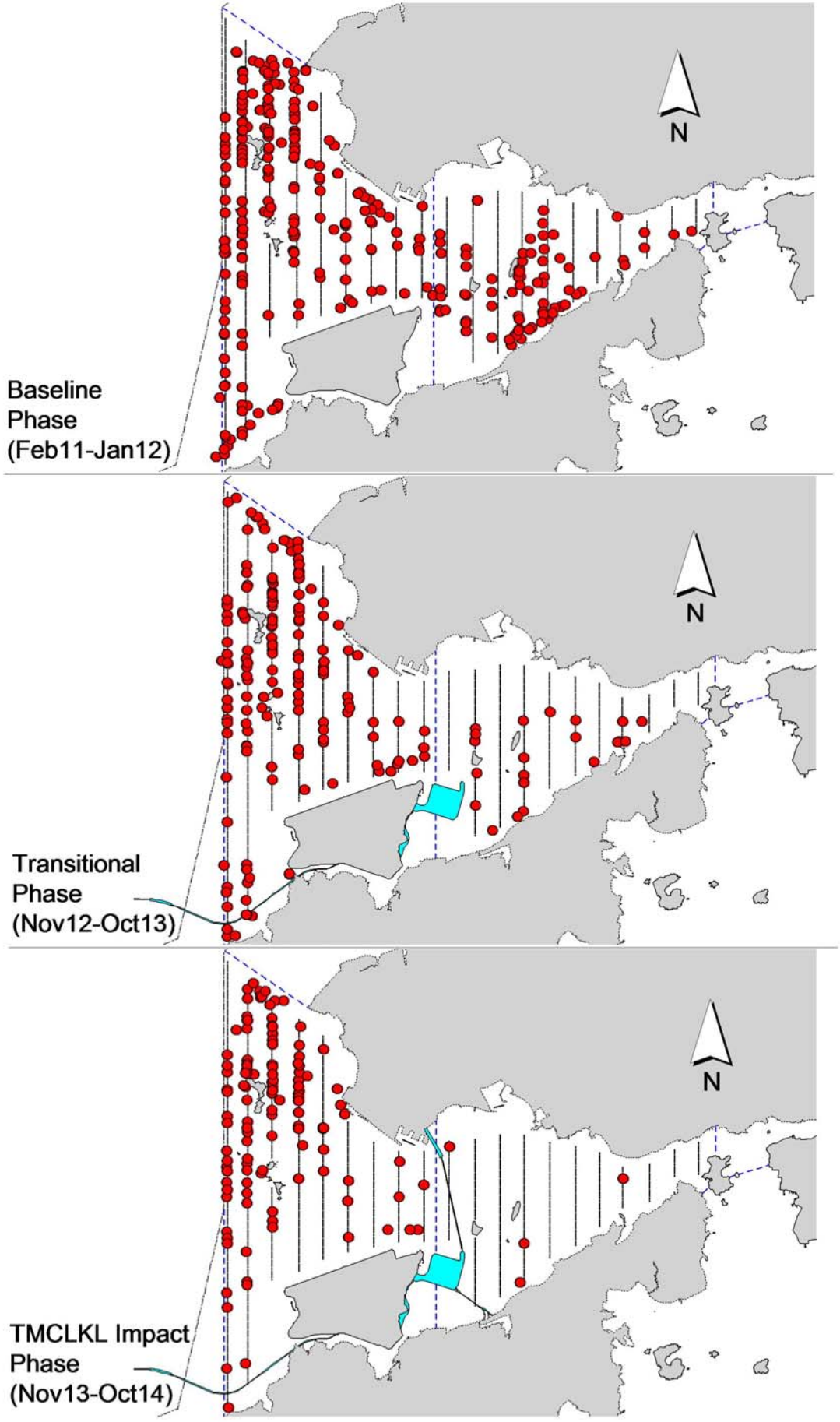


Figure 2. A comparison on distribution of Chinese white dolphin sightings in North Lantau region during the baseline, transitional and impact phases of TMCLKL construction works

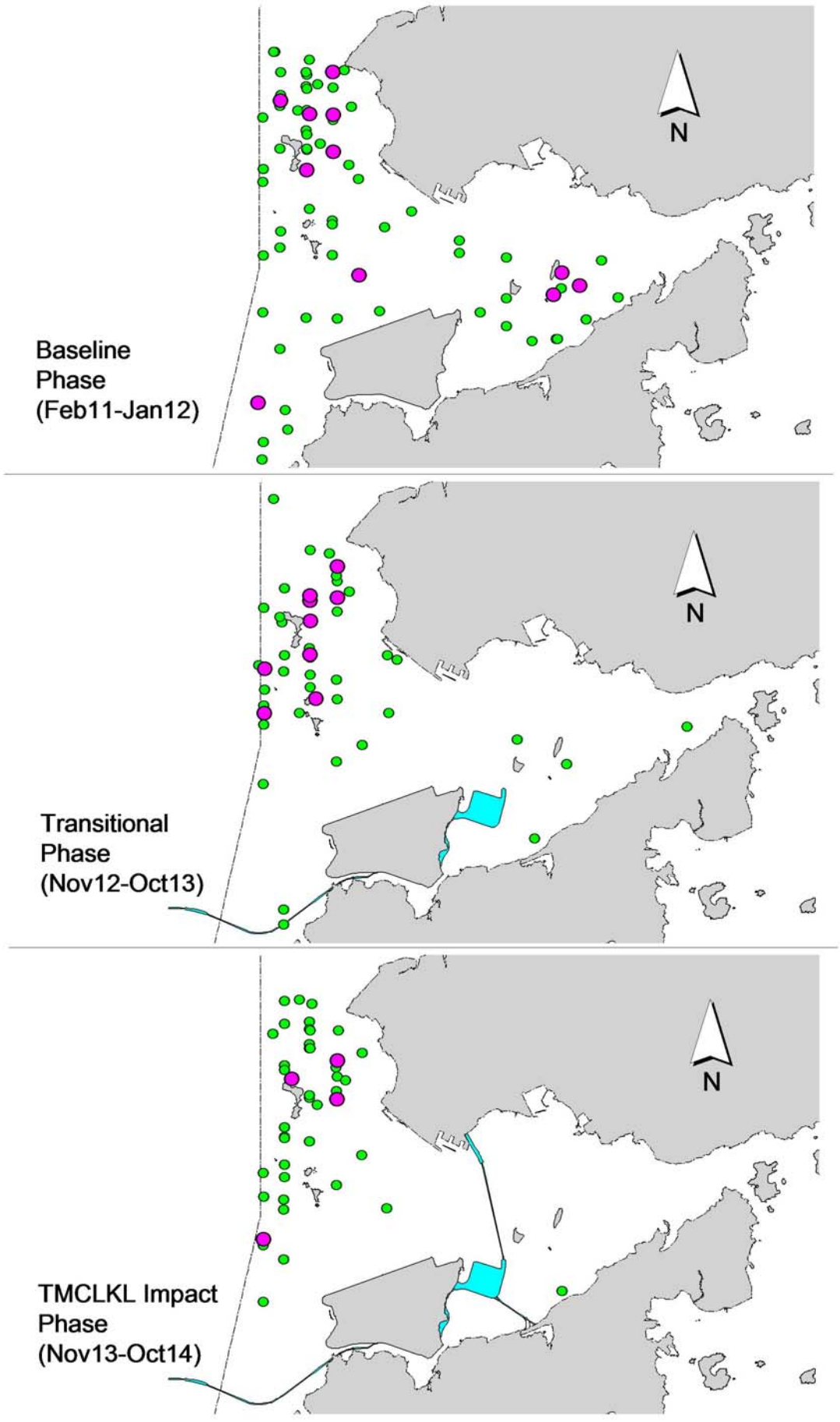


Figure 3. Distribution of dolphins with larger group sizes during different phases of TMCLKL construction works (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

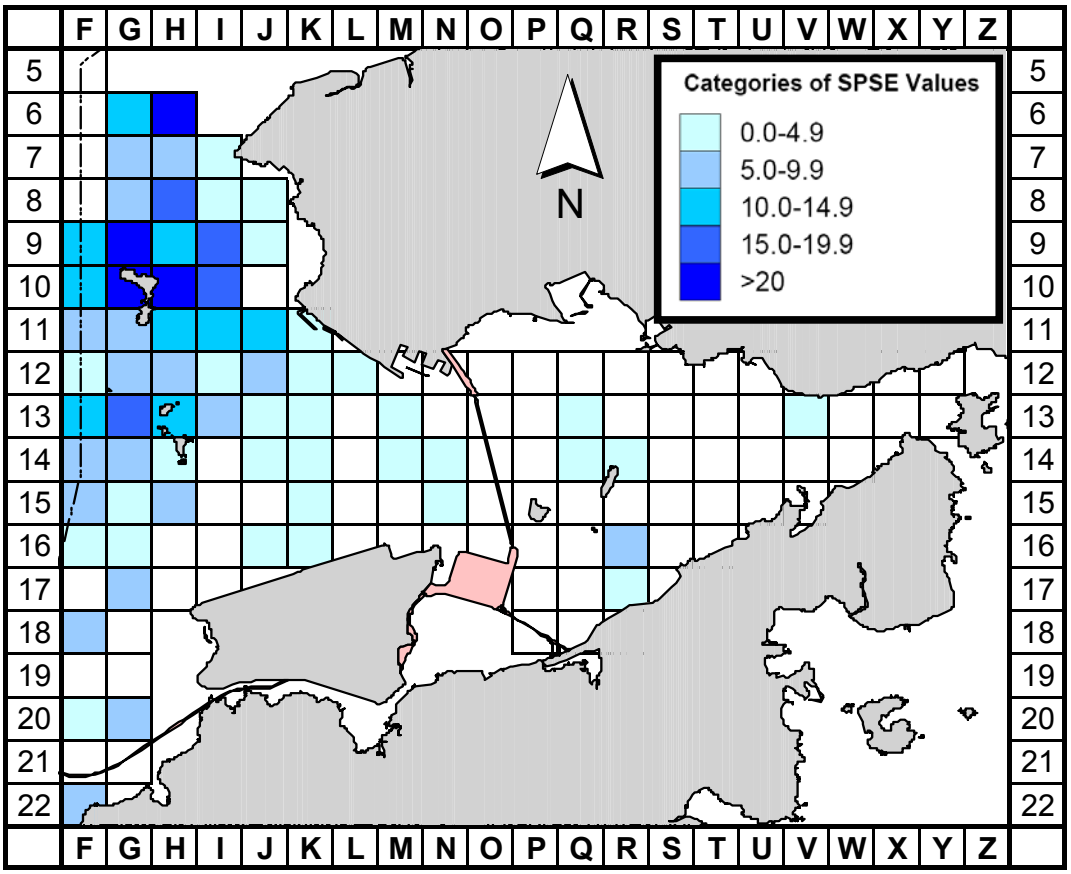


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period monitoring period (Nov13 - Oct14) (SPSE = no. of on-effort sightings per 100 units of survey effort)

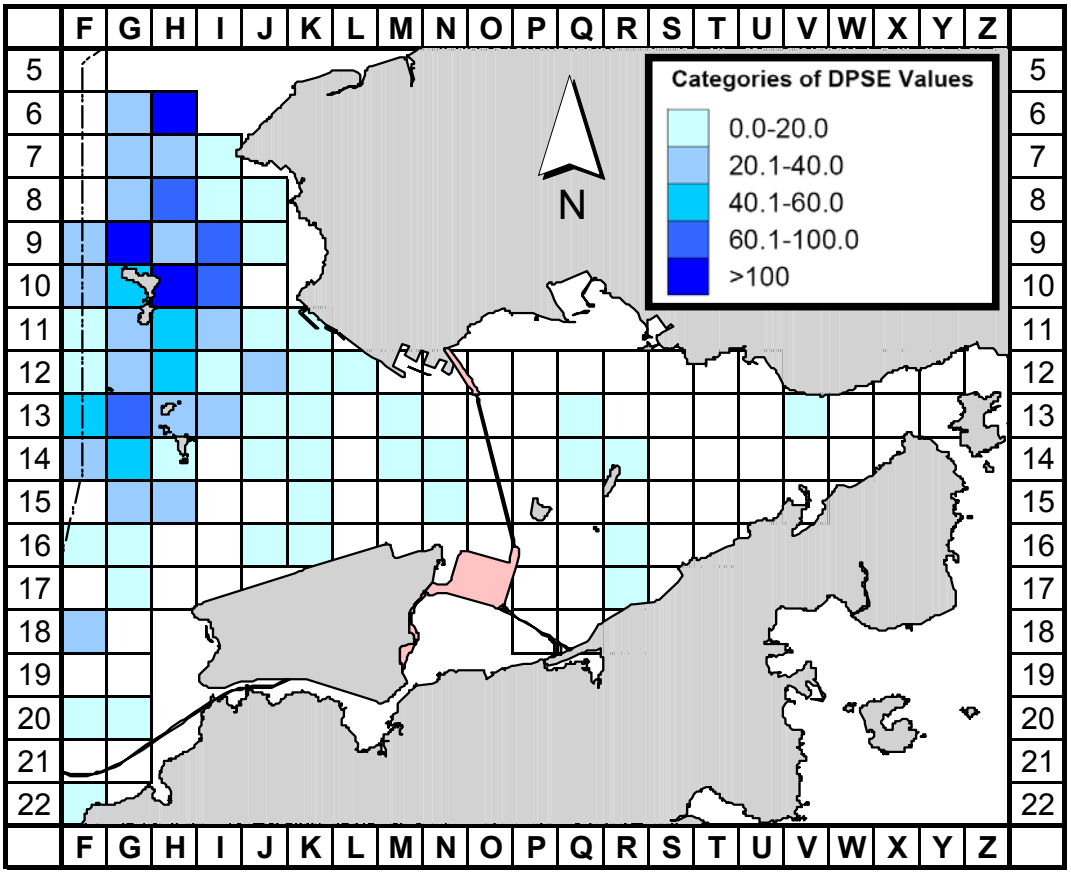


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during HKLR03 impact monitoring period (Nov13 -Oct14) (DPSE = no. of dolphins per 100 units of survey effort)

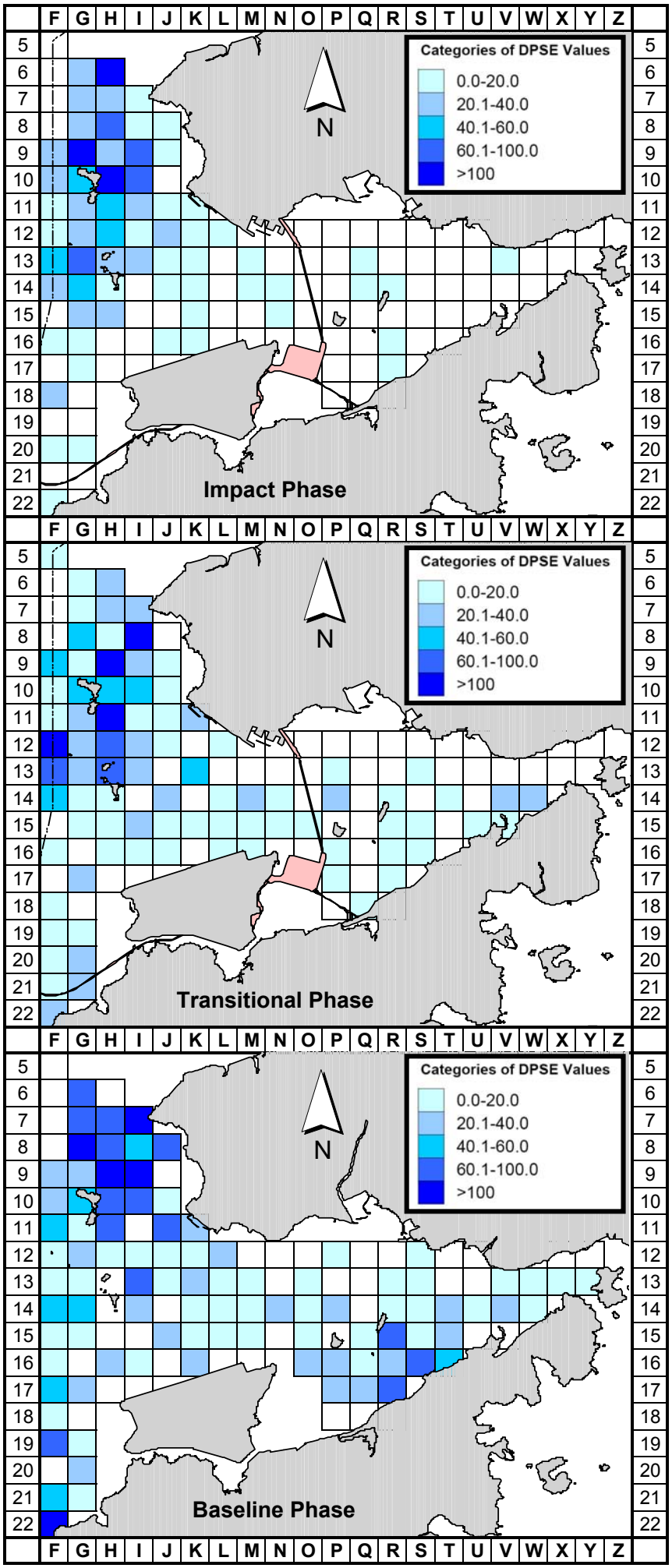


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in NWL and NEL survey areas between the impact phase (Nov13-Oct14), transitional phase (Nov12-Oct13) and baseline phase (Feb11-Jan12) monitoring periods (DPSE = no. of dolphins per 100 units of survey effort)

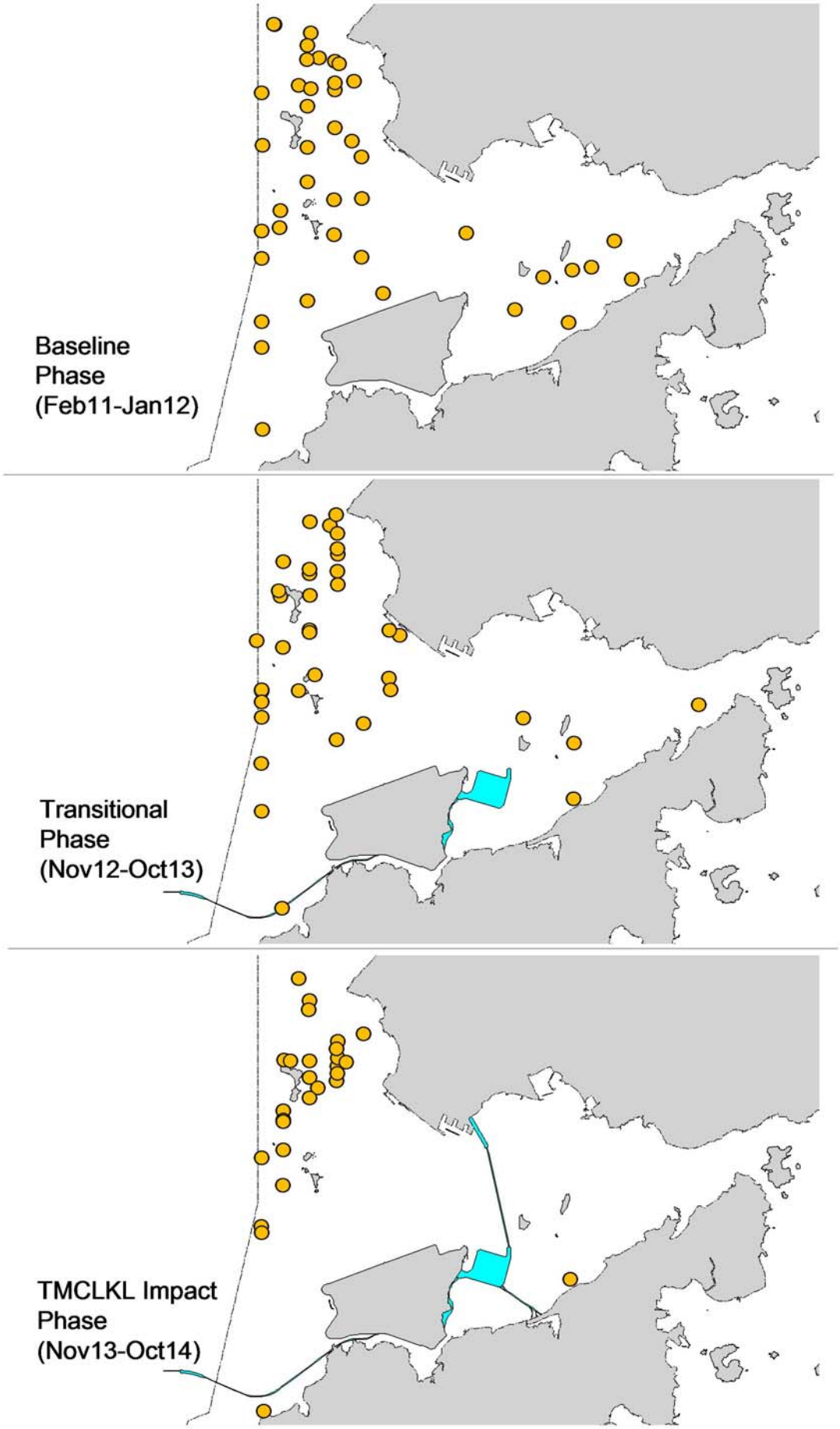


Figure 6. Distribution of young calves of Chinese white dolphins during different phases of TMCLKL construction works

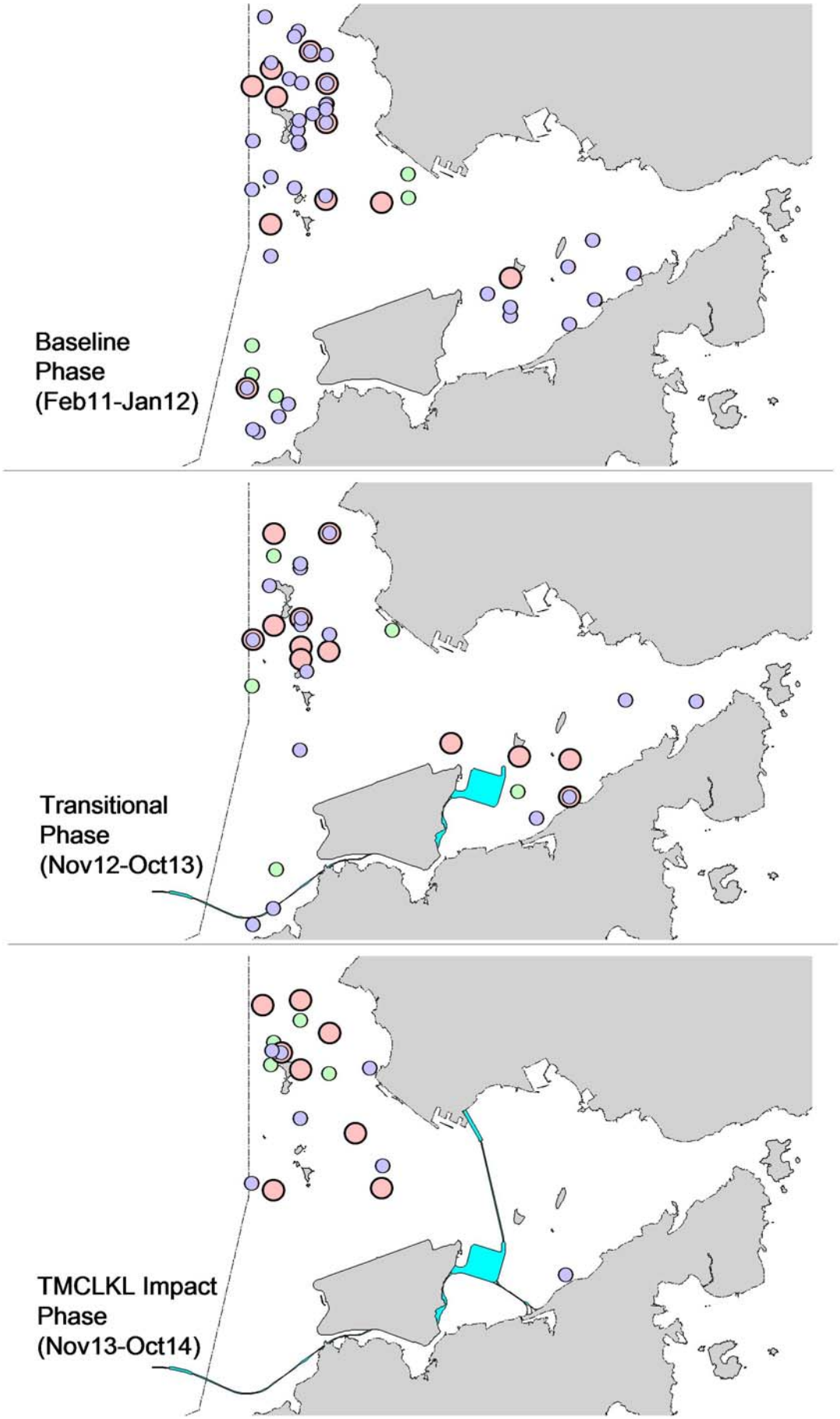


Figure 7. Distribution of dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during different phases of TMCLKL construction works

Appendix I. HKLR03 Survey Effort Database (November 2013 - October 201

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
1-Nov-13	NW LANTAU	1	6.43	AUTUMN	STANDARD31516	HKLR	P
1-Nov-13	NW LANTAU	2	28.32	AUTUMN	STANDARD31516	HKLR	P
1-Nov-13	NW LANTAU	3	19.23	AUTUMN	STANDARD31516	HKLR	P
1-Nov-13	NW LANTAU	1	2.25	AUTUMN	STANDARD31516	HKLR	S
1-Nov-13	NW LANTAU	2	5.73	AUTUMN	STANDARD31516	HKLR	S
1-Nov-13	NW LANTAU	3	4.87	AUTUMN	STANDARD31516	HKLR	S
1-Nov-13	NE LANTAU	2	3.67	AUTUMN	STANDARD31516	HKLR	P
5-Nov-13	NE LANTAU	2	34.75	AUTUMN	STANDARD31516	HKLR	P
5-Nov-13	NE LANTAU	2	10.65	AUTUMN	STANDARD31516	HKLR	S
5-Nov-13	NW LANTAU	2	13.99	AUTUMN	STANDARD31516	HKLR	P
5-Nov-13	NW LANTAU	2	6.61	AUTUMN	STANDARD31516	HKLR	S
8-Nov-13	NW LANTAU	0	1.73	AUTUMN	STANDARD31516	HKLR	P
8-Nov-13	NW LANTAU	1	10.57	AUTUMN	STANDARD31516	HKLR	P
8-Nov-13	NW LANTAU	2	39.88	AUTUMN	STANDARD31516	HKLR	P
8-Nov-13	NW LANTAU	3	1.50	AUTUMN	STANDARD31516	HKLR	P
8-Nov-13	NW LANTAU	1	1.29	AUTUMN	STANDARD31516	HKLR	S
8-Nov-13	NW LANTAU	2	5.53	AUTUMN	STANDARD31516	HKLR	S
8-Nov-13	NW LANTAU	3	2.36	AUTUMN	STANDARD31516	HKLR	S
13-Nov-13	NE LANTAU	1	5.70	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NE LANTAU	2	21.79	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NE LANTAU	3	9.60	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NE LANTAU	2	11.71	AUTUMN	STANDARD31516	HKLR	S
13-Nov-13	NE LANTAU	3	1.10	AUTUMN	STANDARD31516	HKLR	S
13-Nov-13	NW LANTAU	1	1.93	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NW LANTAU	2	5.89	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NW LANTAU	3	6.87	AUTUMN	STANDARD31516	HKLR	P
13-Nov-13	NW LANTAU	2	4.22	AUTUMN	STANDARD31516	HKLR	S
5-Dec-13	NE LANTAU	1	21.06	WINTER	STANDARD31516	HKLR	P
5-Dec-13	NE LANTAU	2	16.22	WINTER	STANDARD31516	HKLR	P
5-Dec-13	NE LANTAU	1	6.64	WINTER	STANDARD31516	HKLR	S
5-Dec-13	NE LANTAU	2	5.18	WINTER	STANDARD31516	HKLR	S
5-Dec-13	NW LANTAU	2	11.53	WINTER	STANDARD31516	HKLR	P
5-Dec-13	NW LANTAU	3	3.89	WINTER	STANDARD31516	HKLR	P
5-Dec-13	NW LANTAU	2	3.87	WINTER	STANDARD31516	HKLR	S
5-Dec-13	NW LANTAU	3	2.51	WINTER	STANDARD31516	HKLR	S
9-Dec-13	NW LANTAU	2	19.03	WINTER	STANDARD31516	HKLR	P
9-Dec-13	NW LANTAU	3	37.52	WINTER	STANDARD31516	HKLR	P
9-Dec-13	NW LANTAU	2	5.22	WINTER	STANDARD31516	HKLR	S
9-Dec-13	NW LANTAU	3	6.78	WINTER	STANDARD31516	HKLR	S
13-Dec-13	NE LANTAU	1	4.50	WINTER	STANDARD31516	HKLR	P
13-Dec-13	NE LANTAU	2	31.16	WINTER	STANDARD31516	HKLR	P
13-Dec-13	NE LANTAU	1	3.90	WINTER	STANDARD31516	HKLR	S
13-Dec-13	NE LANTAU	2	9.44	WINTER	STANDARD31516	HKLR	S
13-Dec-13	NW LANTAU	2	8.88	WINTER	STANDARD31516	HKLR	P
13-Dec-13	NW LANTAU	3	6.40	WINTER	STANDARD31516	HKLR	P
13-Dec-13	NW LANTAU	2	4.12	WINTER	STANDARD31516	HKLR	S
19-Dec-13	NW LANTAU	3	14.06	WINTER	STANDARD31516	HKLR	P
19-Dec-13	NW LANTAU	4	36.79	WINTER	STANDARD31516	HKLR	P
19-Dec-13	NW LANTAU	5	6.10	WINTER	STANDARD31516	HKLR	P
19-Dec-13	NW LANTAU	3	8.79	WINTER	STANDARD31516	HKLR	S
19-Dec-13	NW LANTAU	4	2.91	WINTER	STANDARD31516	HKLR	S
19-Dec-13	NW LANTAU	5	0.90	WINTER	STANDARD31516	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-Jan-14	NE LANTAU	2	1.09	WINTER	STANDARD31516	HKLR	P
7-Jan-14	NE LANTAU	3	14.05	WINTER	STANDARD31516	HKLR	P
7-Jan-14	NE LANTAU	4	1.01	WINTER	STANDARD31516	HKLR	P
7-Jan-14	NE LANTAU	2	3.39	WINTER	STANDARD31516	HKLR	**S**
7-Jan-14	NE LANTAU	3	7.60	WINTER	STANDARD31516	HKLR	S
7-Jan-14	NW LANTAU	2	9.81	WINTER	STANDARD31516	HKLR	P
7-Jan-14	NW LANTAU	3	28.88	WINTER	STANDARD31516	HKLR	P
7-Jan-14	NW LANTAU	2	8.13	WINTER	STANDARD31516	HKLR	S
7-Jan-14	NW LANTAU	3	3.43	WINTER	STANDARD31516	HKLR	S
9-Jan-14	NE LANTAU	1	4.79	WINTER	STANDARD31516	HKLR	P
9-Jan-14	NE LANTAU	2	14.76	WINTER	STANDARD31516	HKLR	P
9-Jan-14	NE LANTAU	1	2.30	WINTER	STANDARD31516	HKLR	S
9-Jan-14	NE LANTAU	2	8.28	WINTER	STANDARD31516	HKLR	S
9-Jan-14	NW LANTAU	2	10.13	WINTER	STANDARD31516	HKLR	P
9-Jan-14	NW LANTAU	3	21.20	WINTER	STANDARD31516	HKLR	P
9-Jan-14	NW LANTAU	2	5.02	WINTER	STANDARD31516	HKLR	S
9-Jan-14	NW LANTAU	3	2.06	WINTER	STANDARD31516	HKLR	S
21-Jan-14	NE LANTAU	2	4.00	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NE LANTAU	3	15.27	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NE LANTAU	4	1.50	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NE LANTAU	3	10.76	WINTER	STANDARD 31516	HKLR	S
21-Jan-14	NE LANTAU	4	0.40	WINTER	STANDARD 31516	HKLR	S
21-Jan-14	NW LANTAU	2	13.76	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NW LANTAU	3	14.44	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NW LANTAU	4	1.29	WINTER	STANDARD 31516	HKLR	P
21-Jan-14	NW LANTAU	2	4.95	WINTER	STANDARD 31516	HKLR	S
21-Jan-14	NW LANTAU	3	3.95	WINTER	STANDARD 31516	HKLR	S
23-Jan-14	NW LANTAU	1	4.93	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NW LANTAU	2	29.22	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NW LANTAU	3	5.21	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NW LANTAU	1	2.20	WINTER	STANDARD31516	HKLR	S
23-Jan-14	NW LANTAU	2	10.18	WINTER	STANDARD31516	HKLR	S
23-Jan-14	NE LANTAU	1	1.41	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NE LANTAU	2	12.52	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NE LANTAU	3	2.59	WINTER	STANDARD31516	HKLR	P
23-Jan-14	NE LANTAU	1	0.47	WINTER	STANDARD31516	HKLR	S
23-Jan-14	NE LANTAU	2	9.53	WINTER	STANDARD31516	HKLR	S
6-Feb-14	NW LANTAU	1	1.68	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NW LANTAU	2	35.03	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NW LANTAU	3	2.90	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NW LANTAU	2	11.99	WINTER	STANDARD 31516	HKLR	S
6-Feb-14	NW LANTAU	3	1.20	WINTER	STANDARD 31516	HKLR	S
6-Feb-14	NE LANTAU	1	5.59	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NE LANTAU	2	8.66	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NE LANTAU	3	2.60	WINTER	STANDARD 31516	HKLR	P
6-Feb-14	NE LANTAU	1	4.45	WINTER	STANDARD 31516	HKLR	S
6-Feb-14	NE LANTAU	2	6.50	WINTER	STANDARD 31516	HKLR	S
12-Feb-14	NE LANTAU	2	13.78	WINTER	STANDARD 31516	HKLR	P
12-Feb-14	NE LANTAU	3	5.91	WINTER	STANDARD 31516	HKLR	P
12-Feb-14	NE LANTAU	1	2.02	WINTER	STANDARD 31516	HKLR	S
12-Feb-14	NE LANTAU	2	5.36	WINTER	STANDARD 31516	HKLR	S
12-Feb-14	NE LANTAU	3	3.53	WINTER	STANDARD 31516	HKLR	S
12-Feb-14	NW LANTAU	2	11.72	WINTER	STANDARD 31516	HKLR	P
12-Feb-14	NW LANTAU	3	15.87	WINTER	STANDARD 31516	HKLR	P

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
12-Feb-14	NW LANTAU	2	3.67	WINTER	STANDARD 31516	HKLR	S
12-Feb-14	NW LANTAU	3	7.72	WINTER	STANDARD 31516	HKLR	S
14-Feb-14	NE LANTAU	2	11.72	WINTER	STANDARD 31516	HKLR	P
14-Feb-14	NE LANTAU	3	5.58	WINTER	STANDARD 31516	HKLR	P
14-Feb-14	NE LANTAU	2	7.68	WINTER	STANDARD 31516	HKLR	S
14-Feb-14	NE LANTAU	3	2.72	WINTER	STANDARD 31516	HKLR	S
14-Feb-14	NW LANTAU	2	17.02	WINTER	STANDARD 31516	HKLR	P
14-Feb-14	NW LANTAU	3	24.77	WINTER	STANDARD 31516	HKLR	P
14-Feb-14	NW LANTAU	2	9.82	WINTER	STANDARD 31516	HKLR	S
14-Feb-14	NW LANTAU	3	2.18	WINTER	STANDARD 31516	HKLR	S
20-Feb-14	NW LANTAU	3	22.68	WINTER	STANDARD 31516	HKLR	P
20-Feb-14	NW LANTAU	4	6.16	WINTER	STANDARD 31516	HKLR	P
20-Feb-14	NW LANTAU	3	7.31	WINTER	STANDARD 31516	HKLR	S
20-Feb-14	NE LANTAU	2	17.92	WINTER	STANDARD 31516	HKLR	P
20-Feb-14	NE LANTAU	3	2.19	WINTER	STANDARD 31516	HKLR	P
20-Feb-14	NE LANTAU	1	0.97	WINTER	STANDARD 31516	HKLR	S
20-Feb-14	NE LANTAU	2	8.94	WINTER	STANDARD 31516	HKLR	S
5-Mar-14	NW LANTAU	1	3.88	SPRING	STANDARD31516	HKLR	P
5-Mar-14	NW LANTAU	2	20.76	SPRING	STANDARD31516	HKLR	P
5-Mar-14	NW LANTAU	3	5.93	SPRING	STANDARD31516	HKLR	P
5-Mar-14	NW LANTAU	2	5.25	SPRING	STANDARD31516	HKLR	S
5-Mar-14	NW LANTAU	3	1.96	SPRING	STANDARD31516	HKLR	S
5-Mar-14	NE LANTAU	2	17.99	SPRING	STANDARD31516	HKLR	P
5-Mar-14	NE LANTAU	3	1.69	SPRING	STANDARD31516	HKLR	P
5-Mar-14	NE LANTAU	2	11.02	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NE LANTAU	2	1.40	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NE LANTAU	3	11.82	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NE LANTAU	4	2.90	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NE LANTAU	2	6.16	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NE LANTAU	3	4.12	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NE LANTAU	4	1.40	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NW LANTAU	1	1.70	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NW LANTAU	2	5.31	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NW LANTAU	3	9.08	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NW LANTAU	4	18.01	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NW LANTAU	5	6.14	SPRING	STANDARD31516	HKLR	P
11-Mar-14	NW LANTAU	2	6.91	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NW LANTAU	3	1.40	SPRING	STANDARD31516	HKLR	S
11-Mar-14	NW LANTAU	4	4.25	SPRING	STANDARD31516	HKLR	S
17-Mar-14	NW LANTAU	0	4.79	SPRING	STANDARD31516	HKLR	P
17-Mar-14	NW LANTAU	1	25.40	SPRING	STANDARD31516	HKLR	P
17-Mar-14	NW LANTAU	2	8.51	SPRING	STANDARD31516	HKLR	P
17-Mar-14	NW LANTAU	0	2.51	SPRING	STANDARD31516	HKLR	S
17-Mar-14	NW LANTAU	1	7.24	SPRING	STANDARD31516	HKLR	S
17-Mar-14	NW LANTAU	2	3.21	SPRING	STANDARD31516	HKLR	S
17-Mar-14	NE LANTAU	1	14.20	SPRING	STANDARD31516	HKLR	P
17-Mar-14	NE LANTAU	2	2.36	SPRING	STANDARD31516	HKLR	P
17-Mar-14	NE LANTAU	1	9.07	SPRING	STANDARD31516	HKLR	S
17-Mar-14	NE LANTAU	2	2.17	SPRING	STANDARD31516	HKLR	S
25-Mar-14	NE LANTAU	1	13.41	SPRING	STANDARD31516	HKLR	P
25-Mar-14	NE LANTAU	2	6.67	SPRING	STANDARD31516	HKLR	P
25-Mar-14	NE LANTAU	1	6.73	SPRING	STANDARD31516	HKLR	S
25-Mar-14	NE LANTAU	2	4.19	SPRING	STANDARD31516	HKLR	S
25-Mar-14	NW LANTAU	1	7.45	SPRING	STANDARD31516	HKLR	P

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
25-Mar-14	NW LANTAU	2	22.31	SPRING	STANDARD31516	HKLR	P
25-Mar-14	NW LANTAU	1	0.96	SPRING	STANDARD31516	HKLR	S
25-Mar-14	NW LANTAU	2	6.58	SPRING	STANDARD31516	HKLR	S
4-Apr-14	NW LANTAU	1	1.41	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NW LANTAU	2	8.57	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NW LANTAU	3	14.93	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NW LANTAU	4	3.00	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NW LANTAU	2	3.16	SPRING	STANDARD31516	HKLR	S
4-Apr-14	NW LANTAU	3	3.00	SPRING	STANDARD31516	HKLR	S
4-Apr-14	NW LANTAU	4	1.00	SPRING	STANDARD31516	HKLR	S
4-Apr-14	NE LANTAU	2	0.80	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NE LANTAU	3	15.53	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NE LANTAU	4	4.16	SPRING	STANDARD31516	HKLR	P
4-Apr-14	NE LANTAU	2	2.20	SPRING	STANDARD31516	HKLR	S
4-Apr-14	NE LANTAU	3	8.51	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NE LANTAU	2	0.90	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NE LANTAU	3	9.61	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NE LANTAU	4	6.20	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NE LANTAU	2	1.80	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NE LANTAU	3	6.39	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NE LANTAU	4	2.90	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NW LANTAU	2	1.40	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NW LANTAU	3	14.62	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NW LANTAU	4	23.91	SPRING	STANDARD31516	HKLR	P
14-Apr-14	NW LANTAU	2	2.10	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NW LANTAU	3	7.86	SPRING	STANDARD31516	HKLR	S
14-Apr-14	NW LANTAU	4	2.99	SPRING	STANDARD31516	HKLR	S
16-Apr-14	NW LANTAU	2	4.27	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NW LANTAU	3	24.56	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NW LANTAU	4	2.91	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NW LANTAU	2	2.45	SPRING	STANDARD31516	HKLR	S
16-Apr-14	NW LANTAU	3	4.20	SPRING	STANDARD31516	HKLR	S
16-Apr-14	NE LANTAU	2	3.94	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NE LANTAU	3	15.37	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NE LANTAU	4	1.10	SPRING	STANDARD31516	HKLR	P
16-Apr-14	NE LANTAU	2	1.20	SPRING	STANDARD31516	HKLR	S
16-Apr-14	NE LANTAU	3	9.49	SPRING	STANDARD31516	HKLR	S
24-Apr-14	NW LANTAU	2	1.91	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NW LANTAU	3	29.94	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NW LANTAU	4	8.44	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NW LANTAU	2	0.80	SPRING	STANDARD31516	HKLR	S
24-Apr-14	NW LANTAU	3	9.72	SPRING	STANDARD31516	HKLR	S
24-Apr-14	NW LANTAU	4	2.20	SPRING	STANDARD31516	HKLR	S
24-Apr-14	NE LANTAU	2	5.03	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NE LANTAU	3	10.14	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NE LANTAU	4	1.31	SPRING	STANDARD31516	HKLR	P
24-Apr-14	NE LANTAU	2	7.37	SPRING	STANDARD31516	HKLR	S
24-Apr-14	NE LANTAU	3	3.65	SPRING	STANDARD31516	HKLR	S
2-May-14	NW LANTAU	1	8.33	SPRING	STANDARD31516	HKLR	P
2-May-14	NW LANTAU	2	20.71	SPRING	STANDARD31516	HKLR	P
2-May-14	NW LANTAU	3	11.20	SPRING	STANDARD31516	HKLR	P
2-May-14	NW LANTAU	1	8.11	SPRING	STANDARD31516	HKLR	S
2-May-14	NW LANTAU	2	2.77	SPRING	STANDARD31516	HKLR	S
2-May-14	NW LANTAU	3	1.30	SPRING	STANDARD31516	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
2-May-14	NE LANTAU	2	8.93	SPRING	STANDARD31516	HKLR	P
2-May-14	NE LANTAU	3	8.38	SPRING	STANDARD31516	HKLR	P
2-May-14	NE LANTAU	2	7.68	SPRING	STANDARD31516	HKLR	S
2-May-14	NE LANTAU	3	2.51	SPRING	STANDARD31516	HKLR	S
19-May-14	NE LANTAU	1	2.45	SPRING	STANDARD31516	HKLR	P
19-May-14	NE LANTAU	2	13.17	SPRING	STANDARD31516	HKLR	P
19-May-14	NE LANTAU	3	2.63	SPRING	STANDARD31516	HKLR	P
19-May-14	NE LANTAU	4	1.40	SPRING	STANDARD31516	HKLR	P
19-May-14	NE LANTAU	1	1.44	SPRING	STANDARD31516	HKLR	S
19-May-14	NE LANTAU	2	4.97	SPRING	STANDARD31516	HKLR	S
19-May-14	NE LANTAU	3	3.94	SPRING	STANDARD31516	HKLR	S
19-May-14	NW LANTAU	3	14.57	SPRING	STANDARD31516	HKLR	P
19-May-14	NW LANTAU	4	16.43	SPRING	STANDARD31516	HKLR	P
19-May-14	NW LANTAU	3	4.87	SPRING	STANDARD31516	HKLR	S
19-May-14	NW LANTAU	4	2.01	SPRING	STANDARD31516	HKLR	S
21-May-14	NW LANTAU	1	1.40	SPRING	STANDARD31516	HKLR	P
21-May-14	NW LANTAU	2	13.43	SPRING	STANDARD31516	HKLR	P
21-May-14	NW LANTAU	3	16.59	SPRING	STANDARD31516	HKLR	P
21-May-14	NW LANTAU	1	0.60	SPRING	STANDARD31516	HKLR	S
21-May-14	NW LANTAU	2	4.20	SPRING	STANDARD31516	HKLR	S
21-May-14	NW LANTAU	3	2.50	SPRING	STANDARD31516	HKLR	S
21-May-14	NE LANTAU	2	13.25	SPRING	STANDARD31516	HKLR	P
21-May-14	NE LANTAU	3	6.78	SPRING	STANDARD31516	HKLR	P
21-May-14	NE LANTAU	2	9.07	SPRING	STANDARD31516	HKLR	S
21-May-14	NE LANTAU	3	1.50	SPRING	STANDARD31516	HKLR	S
26-May-14	NW LANTAU	2	21.21	SPRING	STANDARD31516	HKLR	P
26-May-14	NW LANTAU	3	19.14	SPRING	STANDARD31516	HKLR	P
26-May-14	NW LANTAU	2	3.70	SPRING	STANDARD31516	HKLR	S
26-May-14	NW LANTAU	3	9.05	SPRING	STANDARD31516	HKLR	S
26-May-14	NE LANTAU	1	3.10	SPRING	STANDARD31516	HKLR	P
26-May-14	NE LANTAU	2	13.43	SPRING	STANDARD31516	HKLR	P
26-May-14	NE LANTAU	2	10.87	SPRING	STANDARD31516	HKLR	S
3-Jun-14	NE LANTAU	2	14.31	SUMMER	STANDARD31516	HKLR	P
3-Jun-14	NE LANTAU	3	2.60	SUMMER	STANDARD31516	HKLR	P
3-Jun-14	NE LANTAU	2	10.89	SUMMER	STANDARD31516	HKLR	S
3-Jun-14	NW LANTAU	2	6.52	SUMMER	STANDARD31516	HKLR	P
3-Jun-14	NW LANTAU	3	23.00	SUMMER	STANDARD31516	HKLR	P
3-Jun-14	NW LANTAU	4	10.70	SUMMER	STANDARD31516	HKLR	P
3-Jun-14	NW LANTAU	2	3.78	SUMMER	STANDARD31516	HKLR	S
3-Jun-14	NW LANTAU	3	9.70	SUMMER	STANDARD31516	HKLR	S
5-Jun-14	NE LANTAU	1	5.65	SUMMER	STANDARD31516	HKLR	P
5-Jun-14	NE LANTAU	2	10.52	SUMMER	STANDARD31516	HKLR	P
5-Jun-14	NE LANTAU	3	4.20	SUMMER	STANDARD31516	HKLR	P
5-Jun-14	NE LANTAU	1	2.20	SUMMER	STANDARD31516	HKLR	S
5-Jun-14	NE LANTAU	2	6.23	SUMMER	STANDARD31516	HKLR	S
5-Jun-14	NE LANTAU	3	2.10	SUMMER	STANDARD31516	HKLR	S
5-Jun-14	NW LANTAU	2	13.90	SUMMER	STANDARD31516	HKLR	P
5-Jun-14	NW LANTAU	3	16.56	SUMMER	STANDARD31516	HKLR	P
5-Jun-14	NW LANTAU	2	3.70	SUMMER	STANDARD31516	HKLR	S
5-Jun-14	NW LANTAU	3	3.61	SUMMER	STANDARD31516	HKLR	S
10-Jun-14	NW LANTAU	2	6.21	SUMMER	STANDARD31516	HKLR	P
10-Jun-14	NW LANTAU	3	31.70	SUMMER	STANDARD31516	HKLR	P
10-Jun-14	NW LANTAU	4	2.50	SUMMER	STANDARD31516	HKLR	P
10-Jun-14	NW LANTAU	2	9.29	SUMMER	STANDARD31516	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
10-Jun-14	NW LANTAU	3	4.10	SUMMER	STANDARD31516	HKLR	S
10-Jun-14	NE LANTAU	2	12.34	SUMMER	STANDARD31516	HKLR	P
10-Jun-14	NE LANTAU	3	3.50	SUMMER	STANDARD31516	HKLR	P
10-Jun-14	NE LANTAU	2	10.53	SUMMER	STANDARD31516	HKLR	S
10-Jun-14	NE LANTAU	3	0.73	SUMMER	STANDARD31516	HKLR	S
16-Jun-14	NW LANTAU	2	3.11	SUMMER	STANDARD31516	HKLR	P
16-Jun-14	NW LANTAU	3	13.98	SUMMER	STANDARD31516	HKLR	P
16-Jun-14	NW LANTAU	4	14.31	SUMMER	STANDARD31516	HKLR	P
16-Jun-14	NW LANTAU	3	4.28	SUMMER	STANDARD31516	HKLR	S
16-Jun-14	NW LANTAU	4	3.43	SUMMER	STANDARD31516	HKLR	S
16-Jun-14	NE LANTAU	1	1.40	SUMMER	STANDARD31516	HKLR	P
16-Jun-14	NE LANTAU	2	18.35	SUMMER	STANDARD31516	HKLR	P
16-Jun-14	NE LANTAU	1	0.30	SUMMER	STANDARD31516	HKLR	S
16-Jun-14	NE LANTAU	2	10.55	SUMMER	STANDARD31516	HKLR	S
3-Jul-14	NE LANTAU	2	1.89	SUMMER	STANDARD31516	HKLR	P
3-Jul-14	NE LANTAU	2	2.14	SUMMER	STANDARD31516	HKLR	S
3-Jul-14	NW LANTAU	2	7.87	SUMMER	STANDARD31516	HKLR	P
3-Jul-14	NW LANTAU	3	23.09	SUMMER	STANDARD31516	HKLR	P
3-Jul-14	NW LANTAU	4	5.90	SUMMER	STANDARD31516	HKLR	P
3-Jul-14	NW LANTAU	2	2.90	SUMMER	STANDARD31516	HKLR	S
3-Jul-14	NW LANTAU	3	7.84	SUMMER	STANDARD31516	HKLR	S
3-Jul-14	NW LANTAU	4	0.60	SUMMER	STANDARD31516	HKLR	S
9-Jul-14	NW LANTAU	1	1.80	SUMMER	STANDARD31516	HKLR	P
9-Jul-14	NW LANTAU	2	9.28	SUMMER	STANDARD31516	HKLR	P
9-Jul-14	NW LANTAU	2	3.22	SUMMER	STANDARD31516	HKLR	S
10-Jul-14	NW LANTAU	1	8.81	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NW LANTAU	2	12.85	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NW LANTAU	3	2.29	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NW LANTAU	1	0.73	SUMMER	STANDARD31516	HKLR	S
10-Jul-14	NW LANTAU	2	6.69	SUMMER	STANDARD31516	HKLR	S
10-Jul-14	NE LANTAU	1	14.94	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NE LANTAU	2	16.33	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NE LANTAU	3	6.20	SUMMER	STANDARD31516	HKLR	P
10-Jul-14	NE LANTAU	1	3.93	SUMMER	STANDARD31516	HKLR	S
10-Jul-14	NE LANTAU	2	6.90	SUMMER	STANDARD31516	HKLR	S
10-Jul-14	NE LANTAU	3	0.80	SUMMER	STANDARD31516	HKLR	S
14-Jul-14	NW LANTAU	2	19.59	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NW LANTAU	3	11.09	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NW LANTAU	2	2.05	SUMMER	STANDARD31516	HKLR	S
14-Jul-14	NW LANTAU	3	3.80	SUMMER	STANDARD31516	HKLR	S
14-Jul-14	NW LANTAU	4	0.93	SUMMER	STANDARD31516	HKLR	S
14-Jul-14	NE LANTAU	1	2.00	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NE LANTAU	2	14.57	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NE LANTAU	3	2.40	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NE LANTAU	4	1.20	SUMMER	STANDARD31516	HKLR	P
14-Jul-14	NE LANTAU	2	10.51	SUMMER	STANDARD31516	HKLR	S
14-Jul-14	NE LANTAU	3	0.30	SUMMER	STANDARD31516	HKLR	S
21-Jul-14	NW LANTAU	1	5.90	SUMMER	STANDARD31516	HKLR	P
21-Jul-14	NW LANTAU	2	31.10	SUMMER	STANDARD31516	HKLR	P
21-Jul-14	NW LANTAU	3	3.70	SUMMER	STANDARD31516	HKLR	P
21-Jul-14	NW LANTAU	2	7.90	SUMMER	STANDARD31516	HKLR	S
21-Jul-14	NW LANTAU	3	4.90	SUMMER	STANDARD31516	HKLR	S
21-Jul-14	NE LANTAU	1	2.80	SUMMER	STANDARD31516	HKLR	P
21-Jul-14	NE LANTAU	2	13.70	SUMMER	STANDARD31516	HKLR	P

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
21-Jul-14	NE LANTAU	2	10.70	SUMMER	STANDARD31516	HKLR	S
5-Aug-14	NE LANTAU	1	8.40	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NE LANTAU	2	5.80	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NE LANTAU	3	2.10	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NE LANTAU	1	6.20	SUMMER	STANDARD31516	HKLR	S
5-Aug-14	NE LANTAU	2	4.80	SUMMER	STANDARD31516	HKLR	S
5-Aug-14	NW LANTAU	1	8.00	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NW LANTAU	2	30.30	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NW LANTAU	3	1.70	SUMMER	STANDARD31516	HKLR	P
5-Aug-14	NW LANTAU	1	1.50	SUMMER	STANDARD31516	HKLR	S
5-Aug-14	NW LANTAU	2	9.90	SUMMER	STANDARD31516	HKLR	S
6-Aug-14	NW LANTAU	1	4.30	SUMMER	STANDARD31516	HKLR	P
6-Aug-14	NW LANTAU	2	21.55	SUMMER	STANDARD31516	HKLR	P
6-Aug-14	NW LANTAU	3	5.21	SUMMER	STANDARD31516	HKLR	P
6-Aug-14	NW LANTAU	1	2.30	SUMMER	STANDARD31516	HKLR	S
6-Aug-14	NW LANTAU	2	4.05	SUMMER	STANDARD31516	HKLR	S
6-Aug-14	NW LANTAU	3	0.30	SUMMER	STANDARD31516	HKLR	S
6-Aug-14	NE LANTAU	1	17.62	SUMMER	STANDARD31516	HKLR	P
6-Aug-14	NE LANTAU	2	2.26	SUMMER	STANDARD31516	HKLR	P
6-Aug-14	NE LANTAU	1	10.52	SUMMER	STANDARD31516	HKLR	S
15-Aug-14	NW LANTAU	2	7.71	SUMMER	STANDARD31516	HKLR	P
15-Aug-14	NW LANTAU	3	29.93	SUMMER	STANDARD31516	HKLR	P
15-Aug-14	NW LANTAU	3	9.92	SUMMER	STANDARD31516	HKLR	S
15-Aug-14	NW LANTAU	4	2.64	SUMMER	STANDARD31516	HKLR	S
15-Aug-14	NE LANTAU	2	17.22	SUMMER	STANDARD31516	HKLR	P
15-Aug-14	NE LANTAU	3	0.58	SUMMER	STANDARD31516	HKLR	P
15-Aug-14	NE LANTAU	2	8.54	SUMMER	STANDARD31516	HKLR	S
15-Aug-14	NE LANTAU	3	1.26	SUMMER	STANDARD31516	HKLR	S
19-Aug-14	NE LANTAU	1	1.46	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NE LANTAU	2	11.20	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NE LANTAU	3	5.91	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NE LANTAU	4	0.80	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NE LANTAU	2	4.35	SUMMER	STANDARD31516	HKLR	S
19-Aug-14	NE LANTAU	3	6.48	SUMMER	STANDARD31516	HKLR	S
19-Aug-14	NW LANTAU	2	1.16	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NW LANTAU	3	23.08	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NW LANTAU	4	3.24	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NW LANTAU	5	3.69	SUMMER	STANDARD31516	HKLR	P
19-Aug-14	NW LANTAU	3	4.32	SUMMER	STANDARD31516	HKLR	S
19-Aug-14	NW LANTAU	4	7.12	SUMMER	STANDARD31516	HKLR	S
2-Sep-14	NW LANTAU	1	7.96	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	2	14.28	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	3	16.44	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NW LANTAU	2	7.13	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NW LANTAU	3	5.72	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NE LANTAU	2	15.63	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NE LANTAU	3	2.18	AUTUMN	STANDARD31516	HKLR	P
2-Sep-14	NE LANTAU	2	8.31	AUTUMN	STANDARD31516	HKLR	S
2-Sep-14	NE LANTAU	3	1.28	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NW LANTAU	1	4.75	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	2	23.23	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	3	3.33	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NW LANTAU	1	0.70	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NW LANTAU	2	5.11	AUTUMN	STANDARD31516	HKLR	S

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
11-Sep-14	NW LANTAU	3	1.50	AUTUMN	STANDARD31516	HKLR	S
11-Sep-14	NE LANTAU	1	1.64	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NE LANTAU	2	18.53	AUTUMN	STANDARD31516	HKLR	P
11-Sep-14	NE LANTAU	2	10.73	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NW LANTAU	2	30.50	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NW LANTAU	3	0.60	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NW LANTAU	2	8.90	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NW LANTAU	3	0.80	AUTUMN	STANDARD31516	HKLR	S
19-Sep-14	NE LANTAU	2	18.62	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NE LANTAU	3	1.43	AUTUMN	STANDARD31516	HKLR	P
19-Sep-14	NE LANTAU	2	10.55	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NE LANTAU	2	14.44	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NE LANTAU	3	2.95	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NE LANTAU	2	10.11	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NW LANTAU	1	1.20	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NW LANTAU	2	36.86	AUTUMN	STANDARD31516	HKLR	P
22-Sep-14	NW LANTAU	2	12.01	AUTUMN	STANDARD31516	HKLR	S
22-Sep-14	NW LANTAU	3	1.10	AUTUMN	STANDARD31516	HKLR	S
7-Oct-14	NE LANTAU	2	11.15	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NE LANTAU	3	6.75	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NE LANTAU	2	8.44	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NE LANTAU	3	1.46	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NW LANTAU	1	1.90	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	2	25.80	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	3	11.94	AUTUMN	STANDARD 31516	HKLR	P
7-Oct-14	NW LANTAU	2	9.13	AUTUMN	STANDARD 31516	HKLR	S
7-Oct-14	NW LANTAU	3	3.26	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NE LANTAU	2	10.59	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NE LANTAU	3	8.72	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NE LANTAU	2	7.91	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NE LANTAU	3	2.38	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	2	4.96	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	3	16.34	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	4	4.95	AUTUMN	STANDARD 31516	HKLR	P
13-Oct-14	NW LANTAU	2	3.81	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	3	7.23	AUTUMN	STANDARD 31516	HKLR	S
13-Oct-14	NW LANTAU	4	1.20	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NE LANTAU	2	12.51	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NE LANTAU	3	6.72	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NE LANTAU	2	8.04	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NE LANTAU	3	2.53	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NW LANTAU	2	3.81	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	3	21.23	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	4	6.50	AUTUMN	STANDARD 31516	HKLR	P
16-Oct-14	NW LANTAU	2	4.30	AUTUMN	STANDARD 31516	HKLR	S
16-Oct-14	NW LANTAU	3	3.56	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NE LANTAU	2	15.42	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NE LANTAU	3	1.90	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NE LANTAU	2	9.28	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NE LANTAU	3	0.70	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	2	30.11	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NW LANTAU	3	10.91	AUTUMN	STANDARD 31516	HKLR	P
23-Oct-14	NW LANTAU	1	1.60	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	2	9.19	AUTUMN	STANDARD 31516	HKLR	S
23-Oct-14	NW LANTAU	3	1.99	AUTUMN	STANDARD 31516	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (November 2013 - October 2014)

(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
1-Nov-13	1	1049	4	NW LANTAU	2	74	ON	HKLR	823145	809509	AUTUMN	NONE	P
1-Nov-13	2	1152	3	NW LANTAU	3	214	ON	HKLR	826947	807517	AUTUMN	NONE	P
1-Nov-13	3	1203	7	NW LANTAU	3	159	ON	HKLR	827235	807539	AUTUMN	NONE	P
1-Nov-13	4	1225	1	NW LANTAU	2	137	ON	HKLR	827490	807539	AUTUMN	NONE	P
1-Nov-13	5	1236	3	NW LANTAU	2	358	ON	HKLR	828232	807530	AUTUMN	NONE	P
1-Nov-13	6	1252	7	NW LANTAU	2	ND	OFF	HKLR	828941	807583	AUTUMN	NONE	
1-Nov-13	7	1312	4	NW LANTAU	2	72	ON	HKLR	830018	805999	AUTUMN	NONE	S
1-Nov-13	8	1458	11	NW LANTAU	3	60	ON	HKLR	821228	804642	AUTUMN	NONE	P
5-Nov-13	1	1421	5	NW LANTAU	2	378	ON	HKLR	828097	808508	AUTUMN	NONE	P
8-Nov-13	1	1041	4	NW LANTAU	1	302	ON	HKLR	824489	807678	AUTUMN	NONE	P
8-Nov-13	2	1103	8	NW LANTAU	2	694	ON	HKLR	827091	807858	AUTUMN	NONE	P
8-Nov-13	3	1152	7	NW LANTAU	3	299	ON	HKLR	827660	805459	AUTUMN	NONE	P
8-Nov-13	4	1215	9	NW LANTAU	2	756	ON	HKLR	825357	805465	AUTUMN	NONE	P
8-Nov-13	5	1232	5	NW LANTAU	2	ND	OFF	HKLR	825025	805464	AUTUMN	NONE	
8-Nov-13	6	1249	4	NW LANTAU	2	7	ON	HKLR	823806	805462	AUTUMN	NONE	P
8-Nov-13	7	1400	2	NW LANTAU	2	155	ON	HKLR	818382	804657	AUTUMN	NONE	P
8-Nov-13	8	1426	8	NW LANTAU	2	149	ON	HKLR	823675	804648	AUTUMN	NONE	P
8-Nov-13	9	1526	1	NW LANTAU	2	45	ON	HKLR	826872	806446	AUTUMN	NONE	P
8-Nov-13	10	1536	4	NW LANTAU	1	225	ON	HKLR	825643	806454	AUTUMN	NONE	P
8-Nov-13	11	1606	4	NW LANTAU	2	223	ON	HKLR	821988	806457	AUTUMN	NONE	P
13-Nov-13	1	1451	1	NW LANTAU	3	343	ON	HKLR	825118	808482	AUTUMN	NONE	P
5-Dec-13	1	1127	3	NE LANTAU	1	275	ON	HKLR	820787	816500	WINTER	NONE	P
9-Dec-13	1	1119	1	NW LANTAU	3	77	ON	HKLR	822544	811516	WINTER	NONE	P
9-Dec-13	2	1238	4	NW LANTAU	2	132	ON	HKLR	826515	807547	WINTER	NONE	P
9-Dec-13	3	1256	12	NW LANTAU	2	103	ON	HKLR	827833	807540	WINTER	NONE	P
9-Dec-13	4	1518	4	NW LANTAU	3	177	ON	HKLR	823088	804646	WINTER	NONE	P
9-Dec-13	5	1539	1	NW LANTAU	2	866	ON	HKLR	826577	804664	WINTER	NONE	P
19-Dec-13	1	1203	2	NW LANTAU	3	73	ON	HKLR	824648	805453	WINTER	NONE	P
19-Dec-13	2	1216	6	NW LANTAU	3	150	ON	HKLR	823972	805483	WINTER	NONE	P
7-Jan-14	1	1258	2	NW LANTAU	3	87	ON	HKLR	825659	809348	WINTER	NONE	S
7-Jan-14	2	1337	1	NW LANTAU	3	125	ON	HKLR	825152	808472	WINTER	NONE	P
7-Jan-14	3	1452	3	NW LANTAU	2	1171	ON	HKLR	826673	806456	WINTER	NONE	P

Appendix II. (cont'd)

(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
7-Jan-14	4	1515	6	NW LANTAU	2	5	ON	HKLR	829275	806451	WINTER	NONE	P
9-Jan-14	1	1336	6	NW LANTAU	3	24	ON	HKLR	823238	807510	WINTER	NONE	P
9-Jan-14	2	1407	10	NW LANTAU	2	62	ON	HKLR	826405	807506	WINTER	NONE	P
9-Jan-14	3	1435	1	NW LANTAU	3	56	ON	HKLR	826272	807526	WINTER	NONE	P
9-Jan-14	4	1534	3	NW LANTAU	2	131	ON	HKLR	826675	805395	WINTER	NONE	S
9-Jan-14	5	1546	1	NW LANTAU	2	113	ON	HKLR	826176	805446	WINTER	NONE	P
21-Jan-14	1	1407	2	NW LANTAU	2	99	ON	HKLR	829916	806916	WINTER	NONE	S
21-Jan-14	2	1426	7	NW LANTAU	2	260	ON	HKLR	830008	805474	WINTER	NONE	P
21-Jan-14	3	1444	2	NW LANTAU	2	84	ON	HKLR	829188	805452	WINTER	NONE	P
21-Jan-14	4	1521	9	NW LANTAU	2	434	ON	HKLR	824969	805464	WINTER	NONE	P
23-Jan-14	1	1015	2	NW LANTAU	2	977	ON	HKLR	816090	804642	WINTER	NONE	P
23-Jan-14	2	1101	4	NW LANTAU	2	329	ON	HKLR	826576	804674	WINTER	NONE	P
23-Jan-14	3	1133	3	NW LANTAU	1	957	ON	HKLR	830195	806061	WINTER	NONE	P
23-Jan-14	4	1202	5	NW LANTAU	1	199	ON	HKLR	828976	806450	WINTER	NONE	P
23-Jan-14	5	1250	2	NW LANTAU	2	372	ON	HKLR	821623	806467	WINTER	NONE	P
23-Jan-14	6	1538	9	NE LANTAU	2	365	ON	HKLR	819337	816344	WINTER	NONE	S
6-Feb-14	1	1040	2	NW LANTAU	2	895	ON	HKLR	822535	804645	WINTER	HANG	P
6-Feb-14	2	1049	4	NW LANTAU	2	515	ON	HKLR	823908	804658	WINTER	NONE	P
6-Feb-14	3	1109	2	NW LANTAU	2	422	ON	HKLR	825591	804672	WINTER	NONE	P
6-Feb-14	4	1204	3	NW LANTAU	1	888	ON	HKLR	826473	806445	WINTER	NONE	P
6-Feb-14	5	1428	4	NE LANTAU	2	ND	OFF	HKLR	824423	813528	WINTER	NONE	
12-Feb-14	1	1449	1	NW LANTAU	2	290	ON	HKLR	828878	805462	WINTER	NONE	P
14-Feb-14	1	1237	1	NW LANTAU	2	ND	OFF	HKLR	826601	809051	WINTER	NONE	
14-Feb-14	2	1348	4	NW LANTAU	3	133	ON	HKLR	821401	806466	WINTER	NONE	P
14-Feb-14	3	1525	1	NW LANTAU	3	112	ON	HKLR	824262	804649	WINTER	NONE	P
20-Feb-14	1	1046	7	NW LANTAU	3	72	ON	HKLR	822688	805449	WINTER	NONE	P
20-Feb-14	2	1135	7	NW LANTAU	3	648	ON	HKLR	828813	805029	WINTER	NONE	P
5-Mar-14	1	1053	3	NW LANTAU	2	64	ON	HKLR	827173	805499	SPRING	NONE	P
5-Mar-14	2	1126	13	NW LANTAU	2	ND	OFF	HKLR	827150	805736	SPRING	NONE	
5-Mar-14	3	1323	6	NW LANTAU	2	28	ON	HKLR	827568	807488	SPRING	NONE	P
11-Mar-14	1	1518	2	NW LANTAU	3	86	ON	HKLR	827525	806437	SPRING	NONE	P
17-Mar-14	1	1159	2	NW LANTAU	2	151	ON	HKLR	822985	812516	SPRING	NONE	P

Appendix II. (cont'd)

(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
17-Mar-14	2	1411	5	NW LANTAU	1	277	ON	HKLR	824834	806452	SPRING	NONE	P
17-Mar-14	3	1439	1	NW LANTAU	1	36	ON	HKLR	826839	806456	SPRING	NONE	P
17-Mar-14	4	1509	2	NW LANTAU	2	72	ON	HKLR	830273	805938	SPRING	NONE	S
17-Mar-14	5	1541	1	NW LANTAU	1	194	ON	HKLR	827219	804675	SPRING	NONE	P
17-Mar-14	6	1551	1	NW LANTAU	1	125	ON	HKLR	825325	804672	SPRING	NONE	P
25-Mar-14	1	1249	1	NW LANTAU	2	131	ON	HKLR	821041	809495	SPRING	NONE	P
25-Mar-14	2	1452	2	NW LANTAU	2	72	ON	HKLR	826927	806498	SPRING	NONE	P
25-Mar-14	3	1535	3	NW LANTAU	2	299	ON	HKLR	829321	805462	SPRING	NONE	P
25-Mar-14	4	1549	1	NW LANTAU	2	349	ON	HKLR	827693	805469	SPRING	NONE	P
4-Apr-14	1	1021	3	NW LANTAU	3	43	ON	HKLR	819355	805442	SPRING	NONE	P
14-Apr-14	1	1438	8	NW LANTAU	3	94	ON	HKLR	826451	806445	SPRING	NONE	P
14-Apr-14	2	1517	2	NW LANTAU	4	273	ON	HKLR	830117	806010	SPRING	NONE	S
16-Apr-14	1	1048	4	NW LANTAU	2	541	ON	HKLR	825124	805454	SPRING	NONE	P
16-Apr-14	2	1113	1	NW LANTAU	2	385	ON	HKLR	827306	805458	SPRING	NONE	P
16-Apr-14	3	1137	2	NW LANTAU	2	17	ON	HKLR	830362	805465	SPRING	NONE	P
16-Apr-14	4	1150	9	NW LANTAU	2	49	ON	HKLR	830073	806051	SPRING	NONE	S
24-Apr-14	1	1328	1	NW LANTAU	3	123	ON	HKLR	825992	809184	SPRING	NONE	S
2-May-14	1	1128	3	NW LANTAU	3	22	ON	HKLR	830572	805712	SPRING	NONE	S
2-May-14	2	1154	2	NW LANTAU	2	27	ON	HKLR	828677	806460	SPRING	NONE	P
2-May-14	3	1213	7	NW LANTAU	2	522	ON	HKLR	826540	806456	SPRING	NONE	P
2-May-14	4	1333	1	NW LANTAU	1	1233	ON	HKLR	825129	808503	SPRING	NONE	P
19-May-14	1	1405	5	NW LANTAU	4	177	ON	HKLR	829177	805472	SPRING	NONE	P
19-May-14	2	1451	5	NW LANTAU	4	28	ON	HKLR	823530	805461	SPRING	NONE	P
21-May-14	1	1257	1	NW LANTAU	2	242	ON	HKLR	823873	811529	SPRING	NONE	P
26-May-14	1	1209	5	NW LANTAU	3	362	ON	HKLR	828433	806460	SPRING	NONE	P
26-May-14	2	1232	1	NW LANTAU	3	1066	ON	HKLR	827514	806458	SPRING	NONE	P
5-Jun-14	1	1400	3	NW LANTAU	3	184	ON	HKLR	827350	805448	SUMMER	NONE	P
5-Jun-14	2	1413	3	NW LANTAU	3	20	ON	HKLR	826719	805344	SUMMER	NONE	S
16-Jun-14	1	1408	1	NW LANTAU	3	ND	OFF	HKLR	827538	805459	SUMMER	NONE	
3-Jul-14	1	958	4	NE LANTAU	2	317	ON	HKLR	823230	820459	SUMMER	NONE	P
3-Jul-14	2	1302	4	NW LANTAU	3	ND	OFF	HKLR	821327	811071	SUMMER	NONE	
3-Jul-14	3	1642	2	NW LANTAU	3	161	ON	HKLR	814628	804722	SUMMER	NONE	P

Appendix II. (cont'd)

(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
10-Jul-14	1	1110	5	NW LANTAU	2	588	ON	HKLR	827483	805459	SUMMER	NONE	P
10-Jul-14	2	1150	5	NW LANTAU	2	0	ON	HKLR	829928	806565	SUMMER	NONE	S
14-Jul-14	1	1022	3	NW LANTAU	2	572	ON	HKLR	816276	805395	SUMMER	NONE	P
14-Jul-14	2	1036	1	NW LANTAU	2	866	ON	HKLR	819222	805442	SUMMER	NONE	P
14-Jul-14	3	1044	5	NW LANTAU	2	118	ON	HKLR	820484	805434	SUMMER	NONE	P
14-Jul-14	4	1105	7	NW LANTAU	2	471	ON	HKLR	822311	805448	SUMMER	NONE	P
14-Jul-14	5	1144	2	NW LANTAU	2	819	ON	HKLR	827173	805448	SUMMER	NONE	P
21-Jul-14	1	1113	1	NW LANTAU	2	694	ON	HKLR	823509	804668	SUMMER	NONE	P
21-Jul-14	2	1436	2	NW LANTAU	2	325	ON	HKLR	821325	812267	SUMMER	NONE	S
5-Aug-14	1	1413	8	NW LANTAU	2	428	ON	HKLR	826185	806764	SUMMER	NONE	P
5-Aug-14	2	1435	4	NW LANTAU	2	0	ON	HKLR	827426	806458	SUMMER	NONE	P
5-Aug-14	3	1444	2	NW LANTAU	2	990	ON	HKLR	828943	806461	SUMMER	NONE	P
5-Aug-14	4	1515	2	NW LANTAU	2	452	ON	HKLR	827872	804667	SUMMER	NONE	P
6-Aug-14	1	1110	3	NW LANTAU	3	10	ON	HKLR	826730	805323	SUMMER	NONE	S
6-Aug-14	2	1151	1	NW LANTAU	2	17	ON	HKLR	829773	806359	SUMMER	NONE	S
15-Aug-14	1	1029	5	NW LANTAU	3	393	ON	HKLR	818936	804648	SUMMER	NONE	P
15-Aug-14	2	1041	7	NW LANTAU	3	15	ON	HKLR	821006	804652	SUMMER	NONE	P
15-Aug-14	3	1218	3	NW LANTAU	3	0	ON	HKLR	823429	806027	SUMMER	NONE	S
15-Aug-14	4	1305	2	NW LANTAU	2	749	ON	HKLR	823524	808510	SUMMER	NONE	P
15-Aug-14	5	1310	6	NW LANTAU	3	83	ON	HKLR	824321	808501	SUMMER	NONE	P
19-Aug-14	1	1338	2	NW LANTAU	3	105	ON	HKLR	825220	807514	SUMMER	NONE	P
19-Aug-14	2	1536	3	NW LANTAU	2	113	ON	HKLR	823076	805450	SUMMER	NONE	P
2-Sep-14	1	1106	3	NW LANTAU	1	201	ON	HKLR	827206	805396	AUTUMN	NONE	P
2-Sep-14	2	1215	5	NW LANTAU	2	562	ON	HKLR	828278	806459	AUTUMN	NONE	P
11-Sep-14	1	1132	6	NW LANTAU	2	374	ON	HKLR	826693	807517	AUTUMN	NONE	P
11-Sep-14	2	1215	6	NW LANTAU	2	1742	ON	HKLR	822381	809476	AUTUMN	NONE	P
19-Sep-14	1	1336	1	NW LANTAU	2	ND	OFF	HKLR	821325	811947	AUTUMN	NONE	
22-Sep-14	1	1432	5	NW LANTAU	2	198	ON	HKLR	828289	806480	AUTUMN	NONE	P
22-Sep-14	2	1559	6	NW LANTAU	2	955	ON	HKLR	822811	804656	AUTUMN	NONE	P
22-Sep-14	3	1612	2	NW LANTAU	2	153	ON	HKLR	820785	804662	AUTUMN	NONE	P
7-Oct-14	1	1403	3	NW LANTAU	2	284	ON	HKLR	823528	806089	AUTUMN	NONE	S
7-Oct-14	2	1423	4	NW LANTAU	2	130	ON	HKLR	825820	806454	AUTUMN	NONE	P

Appendix II. (cont'd)

(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
7-Oct-14	3	1445	4	NW LANTAU	2	75	ON	HKLR	827149	806457	AUTUMN	NONE	P
7-Oct-14	4	1515	6	NW LANTAU	2	125	ON	HKLR	828943	806471	AUTUMN	NONE	P
7-Oct-14	5	1556	1	NW LANTAU	2	300	ON	HKLR	827474	804666	AUTUMN	NONE	P
7-Oct-14	6	1603	2	NW LANTAU	2	707	ON	HKLR	826499	804664	AUTUMN	NONE	P
13-Oct-14	1	1207	4	NW LANTAU	3	116	ON	HKLR	825098	807514	AUTUMN	NONE	P
13-Oct-14	2	1220	2	NW LANTAU	3	252	ON	HKLR	825707	807525	AUTUMN	NONE	P
13-Oct-14	3	1232	3	NW LANTAU	3	335	ON	HKLR	826161	807516	AUTUMN	NONE	P
13-Oct-14	4	1258	1	NW LANTAU	2	311	ON	HKLR	830272	806185	AUTUMN	NONE	S

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in November 2013-October 2014

ID#	DATE	STG#	AREA
CH34	05/11/13	1	NW LANTAU
	08/11/13	4	NW LANTAU
	08/11/13	5	NW LANTAU
	09/12/13	3	NW LANTAU
	23/01/14	4	NW LANTAU
	20/02/14	1	NW LANTAU
	26/05/14	1	NW LANTAU
	10/07/14	1	NW LANTAU
	13/10/14	4	NW LANTAU
CH98	25/03/14	3	NW LANTAU
CH112	23/01/14	2	NW LANTAU
CH153	22/09/14	3	NW LANTAU
EL01	05/11/13	1	NW LANTAU
	05/12/13	1	NE LANTAU
	21/01/14	1	NW LANTAU
	23/01/14	6	NE LANTAU
	06/02/14	5	NE LANTAU
	17/03/14	1	NW LANTAU
	16/04/14	2	NW LANTAU
	21/05/14	1	NW LANTAU
NL11	23/01/14	3	NW LANTAU
NL24	08/11/13	4	NW LANTAU
	08/11/13	5	NW LANTAU
	05/12/13	1	NE LANTAU
	09/12/13	4	NW LANTAU
	19/12/13	2	NW LANTAU
	09/01/14	2	NW LANTAU
	23/01/14	6	NE LANTAU
	20/02/14	1	NW LANTAU
	05/03/14	3	NW LANTAU
	14/04/14	1	NW LANTAU
NL33	05/11/13	1	NW LANTAU
	08/11/13	4	NW LANTAU
	08/11/13	5	NW LANTAU
	08/11/13	11	NW LANTAU
	09/01/14	2	NW LANTAU
	23/01/14	6	NE LANTAU
	02/05/14	3	NW LANTAU
NL37	08/11/13	2	NW LANTAU

ID#	DATE	STG#	AREA
NL46	01/11/13	3	NW LANTAU
	23/01/14	4	NW LANTAU
	05/03/14	2	NW LANTAU
	19/05/14	1	NW LANTAU
	05/08/14	2	NW LANTAU
	11/09/14	1	NW LANTAU
NL48	08/11/13	9	NW LANTAU
	09/12/13	3	NW LANTAU
	07/01/14	4	NW LANTAU
	09/01/14	2	NW LANTAU
	09/01/14	3	NW LANTAU
	21/01/14	1	NW LANTAU
	23/01/14	3	NW LANTAU
	11/03/14	1	NW LANTAU
	25/03/14	4	NW LANTAU
	16/04/14	4	NW LANTAU
	02/05/14	1	NW LANTAU
	05/08/14	1	NW LANTAU
	19/08/14	1	NW LANTAU
	19/09/14	1	NW LANTAU
	13/10/14	1	NW LANTAU
NL49	08/11/13	2	NW LANTAU
	09/12/13	3	NW LANTAU
	05/03/14	2	NW LANTAU
NL80	01/11/13	3	NW LANTAU
	01/11/13	6	NW LANTAU
	08/11/13	6	NW LANTAU
	21/01/14	2	NW LANTAU
	14/07/14	4	NW LANTAU
	11/09/14	2	NW LANTAU
NL93	01/11/13	8	NW LANTAU
	20/02/14	2	NW LANTAU
	10/07/14	1	NW LANTAU
	05/08/14	1	NW LANTAU
NL98	01/11/13	2	NW LANTAU
	19/12/13	2	NW LANTAU
	09/01/14	2	NW LANTAU
	20/02/14	1	NW LANTAU
NL103	08/11/13	3	NW LANTAU
	07/01/14	4	NW LANTAU

Appendix III. (cont'd)

ID#	DATE	STG#	AREA
NL104	09/12/13	3	NW LANTAU
	23/01/14	4	NW LANTAU
	05/03/14	2	NW LANTAU
	05/03/14	3	NW LANTAU
	16/04/14	4	NW LANTAU
	05/08/14	1	NW LANTAU
	02/09/14	1	NW LANTAU
NL120	09/01/14	2	NW LANTAU
	23/01/14	6	NE LANTAU
	06/02/14	5	NE LANTAU
	14/04/14	1	NW LANTAU
NL123	08/11/13	11	NW LANTAU
	23/01/14	2	NW LANTAU
	23/01/14	5	NW LANTAU
	03/07/14	1	NE LANTAU
	15/08/14	5	NW LANTAU
NL136	01/11/13	8	NW LANTAU
	09/12/13	2	NW LANTAU
	07/01/14	1	NW LANTAU
	09/01/14	1	NW LANTAU
	20/02/14	2	NW LANTAU
	11/03/14	1	NW LANTAU
	17/03/14	2	NW LANTAU
	25/03/14	3	NW LANTAU
	05/06/14	2	NW LANTAU
	07/10/14	1	NW LANTAU
	13/10/14	1	NW LANTAU
NL139	01/11/13	8	NW LANTAU
	08/11/13	1	NW LANTAU
	09/12/13	2	NW LANTAU
	07/01/14	1	NW LANTAU
	09/01/14	1	NW LANTAU
	23/01/14	6	NE LANTAU
	20/02/14	1	NW LANTAU
	03/07/14	1	NE LANTAU
NL145	01/11/13	3	NW LANTAU
	16/04/14	1	NW LANTAU
	02/05/14	3	NW LANTAU
	14/07/14	3	NW LANTAU
NL150	08/11/13	3	NW LANTAU
	22/09/14	3	NW LANTAU

ID#	DATE	STG#	AREA
NL165	01/11/13	8	NW LANTAU
	08/11/13	1	NW LANTAU
	09/12/13	3	NW LANTAU
	20/02/14	1	NW LANTAU
	05/03/14	2	NW LANTAU
NL182	01/11/13	6	NW LANTAU
	24/04/14	1	NW LANTAU
	10/07/14	2	NW LANTAU
	11/09/14	1	NW LANTAU
	07/10/14	1	NW LANTAU
	13/10/14	2	NW LANTAU
NL188	08/11/13	8	NW LANTAU
NL191	25/03/14	1	NW LANTAU
NL202	06/02/14	3	NW LANTAU
	16/04/14	4	NW LANTAU
	19/08/14	1	NW LANTAU
	19/08/14	2	NW LANTAU
NL210	14/02/14	1	NW LANTAU
	02/05/14	2	NW LANTAU
	10/07/14	2	NW LANTAU
	11/09/14	2	NW LANTAU
NL212	08/11/13	3	NW LANTAU
NL213	25/03/14	3	NW LANTAU
	13/10/14	1	NW LANTAU
NL214	07/01/14	4	NW LANTAU
	21/01/14	4	NW LANTAU
	16/04/14	3	NW LANTAU
	02/05/14	1	NW LANTAU
	02/09/14	1	NW LANTAU
	07/10/14	3	NW LANTAU
	13/10/14	2	NW LANTAU
NL220	09/01/14	1	NW LANTAU
	05/03/14	3	NW LANTAU
NL221	07/01/14	4	NW LANTAU
	21/01/14	4	NW LANTAU
NL224	16/04/14	3	NW LANTAU
	02/05/14	1	NW LANTAU
	21/01/14	3	NW LANTAU
NL226	01/11/13	1	NW LANTAU
	05/12/13	1	NE LANTAU
	21/01/14	4	NW LANTAU
	04/04/14	1	NW LANTAU

Appendix III. (cont'd)

ID#	DATE	STG#	AREA
NL233	05/03/14	1	NW LANTAU
	11/09/14	1	NW LANTAU
	22/09/14	1	NW LANTAU
	07/10/14	2	NW LANTAU
NL236	01/11/13	7	NW LANTAU
	08/11/13	2	NW LANTAU
	21/01/14	3	NW LANTAU
	05/03/14	2	NW LANTAU
	22/09/14	3	NW LANTAU
NL242	08/11/13	4	NW LANTAU
	08/11/13	5	NW LANTAU
	19/12/13	2	NW LANTAU
	09/01/14	2	NW LANTAU
	23/01/14	6	NE LANTAU
	05/08/14	1	NW LANTAU
NL244	09/12/13	1	NW LANTAU
NL247	14/07/14	4	NW LANTAU
	15/08/14	2	NW LANTAU
NL256	07/10/14	3	NW LANTAU
NL259	01/11/13	8	NW LANTAU
	23/01/14	4	NW LANTAU
	20/02/14	2	NW LANTAU
	04/04/14	1	NW LANTAU
	16/04/14	4	NW LANTAU
	13/10/14	1	NW LANTAU
NL260	20/02/14	2	NW LANTAU
	19/05/14	2	NW LANTAU
NL261	01/11/13	1	NW LANTAU
	08/11/13	1	NW LANTAU
	08/11/13	10	NW LANTAU
	09/12/13	3	NW LANTAU
	23/01/14	4	NW LANTAU
	06/02/14	5	NE LANTAU
	05/03/14	3	NW LANTAU
	17/03/14	1	NW LANTAU
	16/04/14	4	NW LANTAU
	02/05/14	3	NW LANTAU
	19/05/14	1	NW LANTAU
	03/07/14	1	NE LANTAU
	05/08/14	1	NW LANTAU

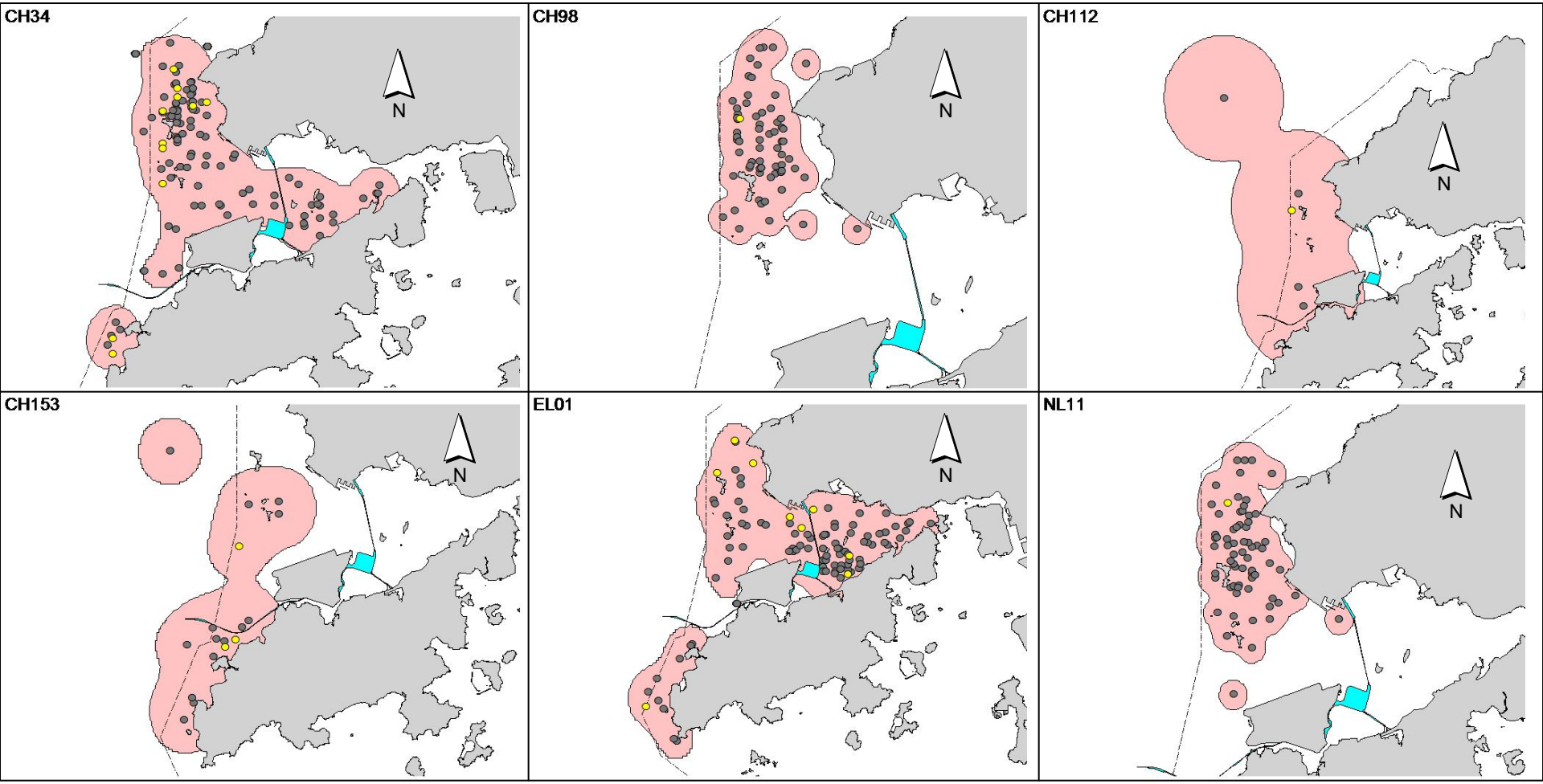
ID#	DATE	STG#	AREA
NL262	01/11/13	8	NW LANTAU
	09/12/13	3	NW LANTAU
	05/03/14	3	NW LANTAU
	16/04/14	4	NW LANTAU
	19/05/14	1	NW LANTAU
NL269	01/11/13	8	NW LANTAU
	19/05/14	2	NW LANTAU
NL272	01/11/13	1	NW LANTAU
	08/11/13	4	NW LANTAU
	09/01/14	1	NW LANTAU
	21/01/14	2	NW LANTAU
	23/01/14	6	NE LANTAU
	05/03/14	2	NW LANTAU
	02/05/14	3	NW LANTAU
	05/06/14	1	NW LANTAU
	05/06/14	2	NW LANTAU
	15/08/14	5	NW LANTAU
NL278	15/08/14	2	NW LANTAU
	07/10/14	2	NW LANTAU
NL284	01/11/13	1	NW LANTAU
	09/12/13	3	NW LANTAU
	21/01/14	4	NW LANTAU
	20/02/14	1	NW LANTAU
	17/03/14	2	NW LANTAU
	19/05/14	1	NW LANTAU
	15/08/14	5	NW LANTAU
NL285	08/11/13	11	NW LANTAU
	23/01/14	2	NW LANTAU
	03/07/14	1	NE LANTAU
	15/08/14	5	NW LANTAU
NL286	06/02/14	3	NW LANTAU
	16/04/14	4	NW LANTAU
	15/08/14	5	NW LANTAU
	19/08/14	2	NW LANTAU
NL287	16/04/14	1	NW LANTAU
	02/05/14	3	NW LANTAU
	14/07/14	3	NW LANTAU
	15/08/14	5	NW LANTAU
NL295	05/03/14	2	NW LANTAU
	19/05/14	2	NW LANTAU
	26/05/14	1	NW LANTAU
	07/10/14	1	NW LANTAU

Appendix III. (cont'd)

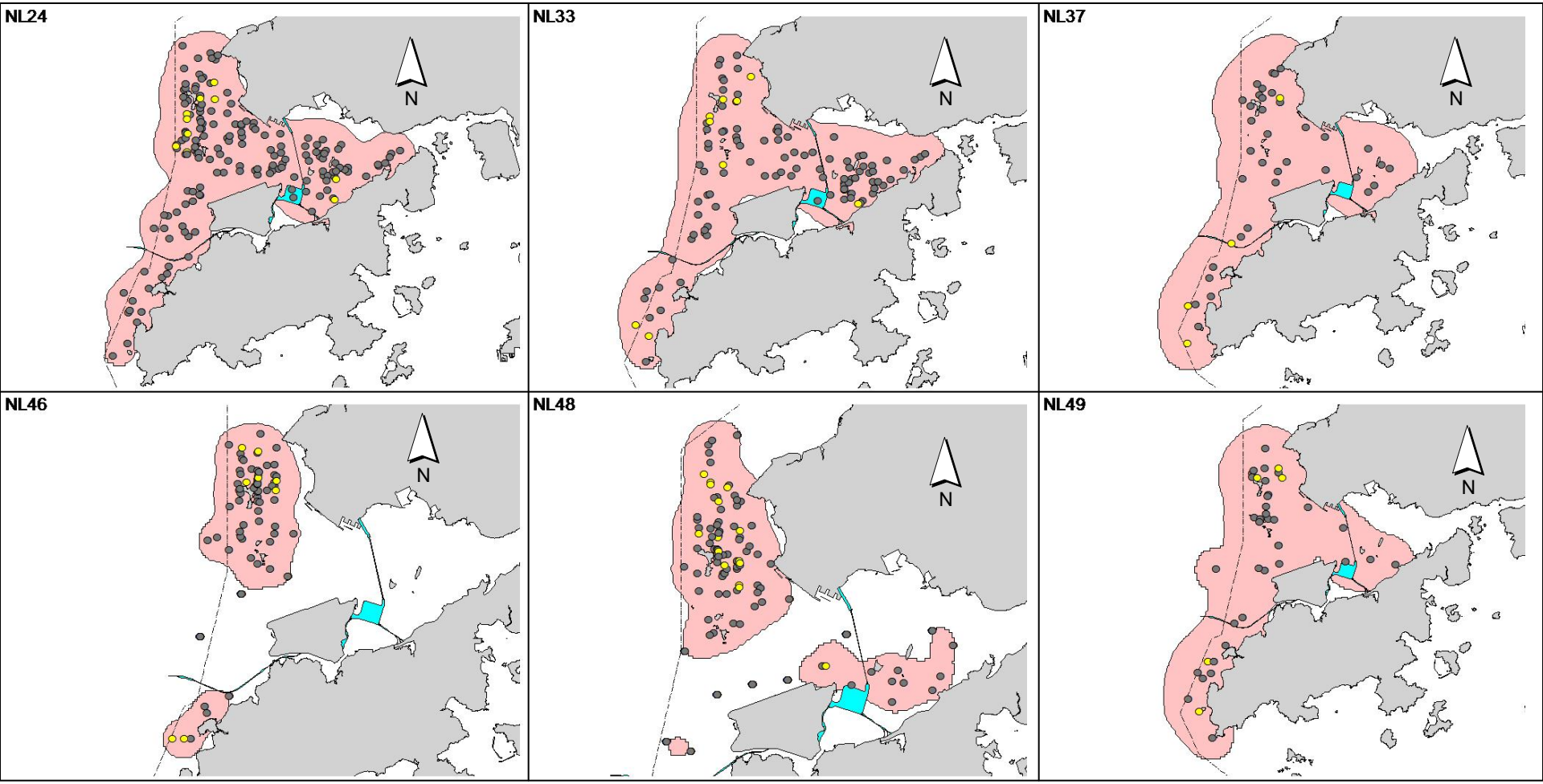
ID#	DATE	STG#	AREA
NL296	05/11/13	1	NW LANTAU
	20/02/14	2	NW LANTAU
	05/03/14	1	NW LANTAU
	05/03/14	2	NW LANTAU
	26/05/14	1	NW LANTAU
NL300	08/11/13	6	NW LANTAU
	26/05/14	1	NW LANTAU
	14/07/14	4	NW LANTAU
	07/10/14	5	NW LANTAU
NL301	01/11/13	4	NW LANTAU
	01/11/13	6	NW LANTAU
	14/07/14	4	NW LANTAU
	11/09/14	2	NW LANTAU
NL302	19/05/14	1	NW LANTAU
	11/09/14	2	NW LANTAU
NL303	19/05/14	1	NW LANTAU
NL306	16/04/14	1	NW LANTAU
NL307	17/03/14	2	NW LANTAU
	15/08/14	5	NW LANTAU
NL308	21/01/14	2	NW LANTAU
SL35	08/11/13	10	NW LANTAU
WL04	01/11/13	8	NW LANTAU
	09/12/13	2	NW LANTAU
	05/03/14	2	NW LANTAU
WL05	01/11/13	8	NW LANTAU
	09/12/13	3	NW LANTAU
	05/03/14	2	NW LANTAU
WL11	08/11/13	2	NW LANTAU
	05/03/14	2	NW LANTAU
WL15	08/11/13	10	NW LANTAU
WL28	15/08/14	2	NW LANTAU
WL30	10/07/14	1	NW LANTAU
WL46	09/12/13	3	NW LANTAU
	15/08/14	2	NW LANTAU
WL79	08/11/13	4	NW LANTAU
WL98	08/11/13	4	NW LANTAU
WL124	08/11/13	8	NW LANTAU
	03/07/14	3	NW LANTAU
	15/08/14	2	NW LANTAU
WL188	15/08/14	2	NW LANTAU

ID#	DATE	STG#	AREA
WL179	09/12/13	4	NW LANTAU
	17/03/14	2	NW LANTAU
	16/04/14	1	NW LANTAU
WL188	06/08/14	1	NW LANTAU
WL199	05/03/14	2	NW LANTAU
WL214	09/01/14	4	NW LANTAU
	15/08/14	2	NW LANTAU

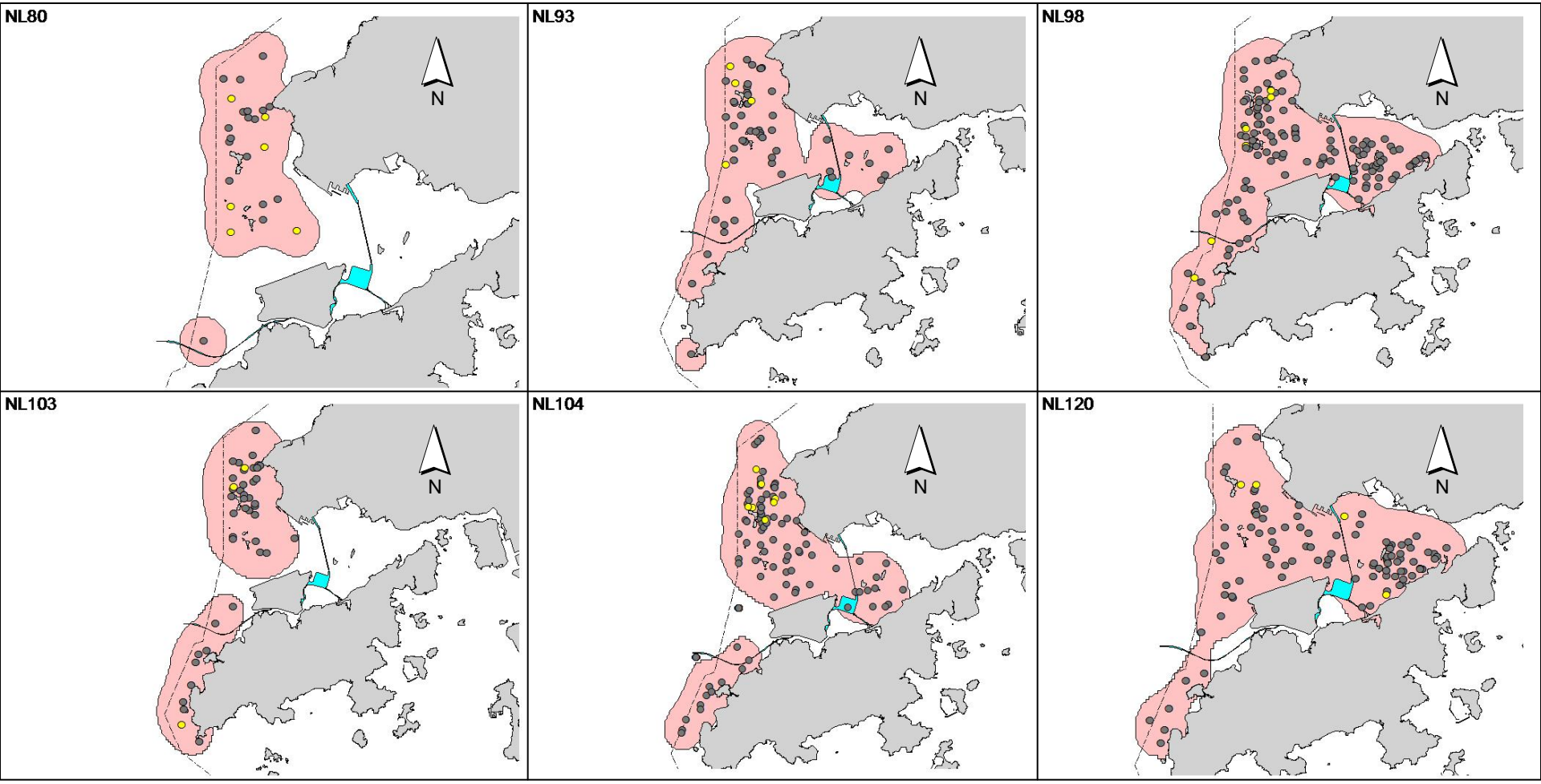
Appendix IV. Ranging patterns (95% kernel ranges) of 77 individual dolphins that were sighted during the first year of TMCLKL construction works, utilizing the HKLR03 monitoring data
(note: yellow dots indicates sightings made in November 2013 to October 2014)



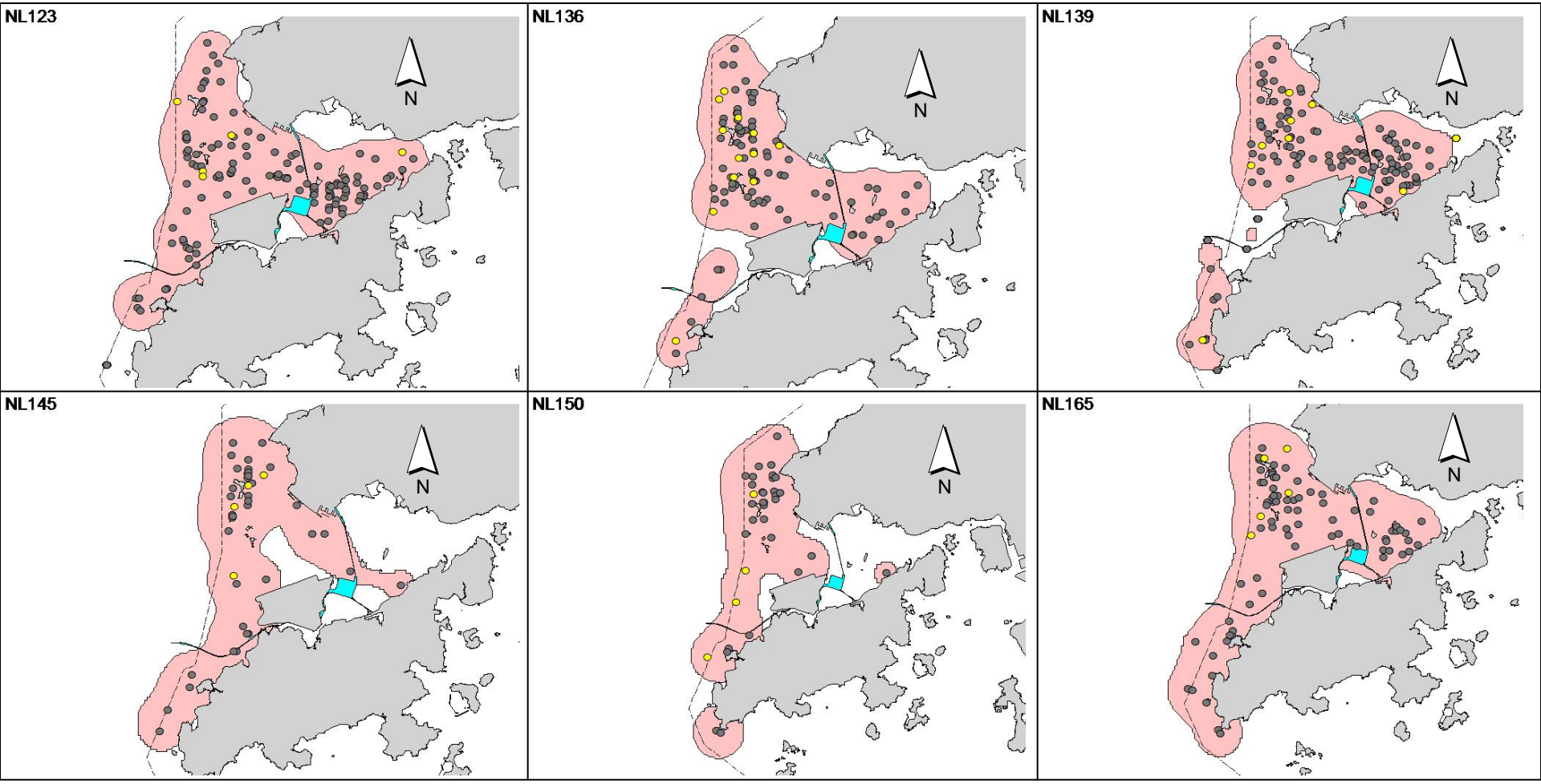
Appendix IV. (cont'd)



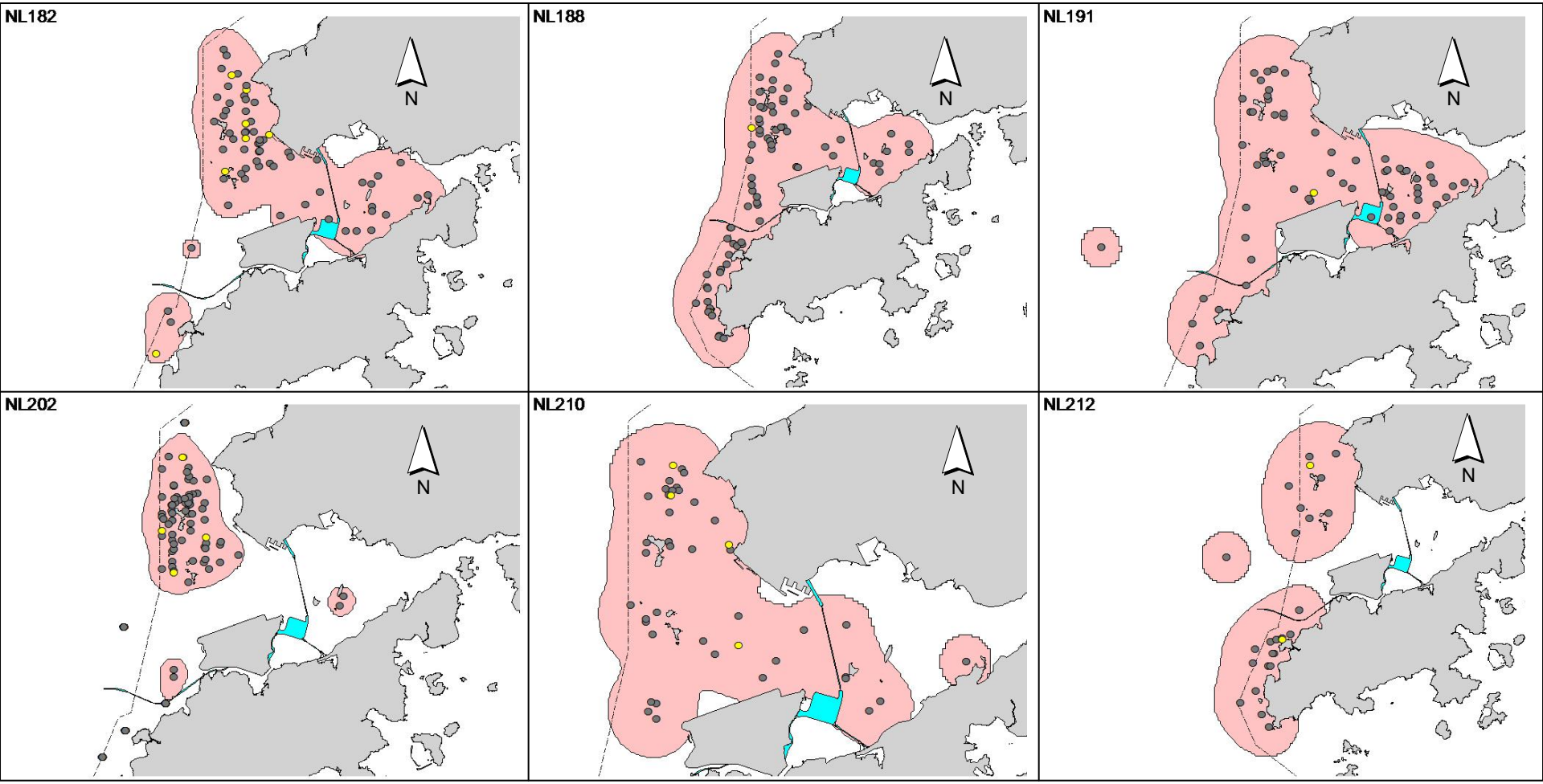
Appendix IV. (cont'd)



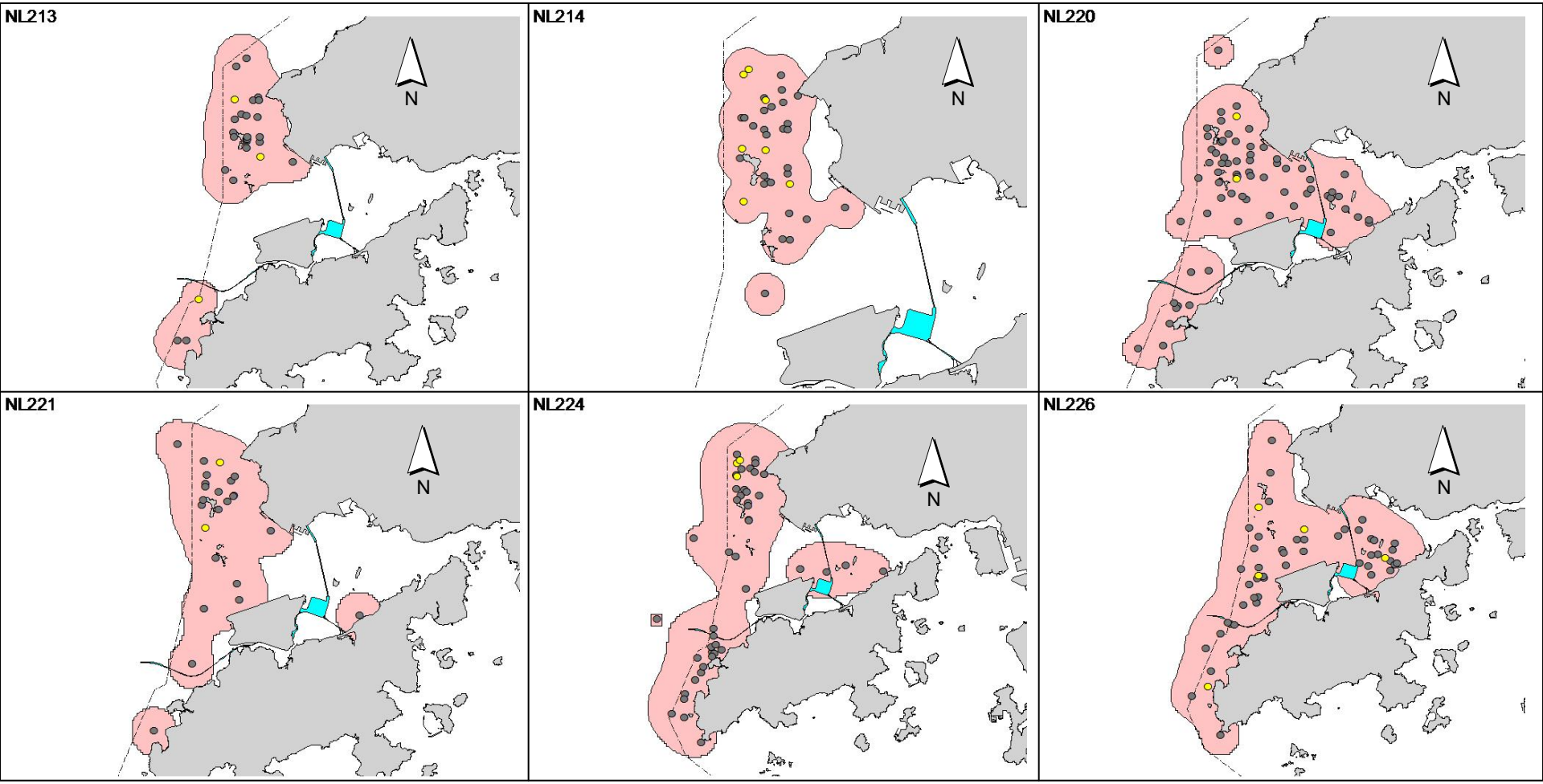
Appendix IV. (cont'd)



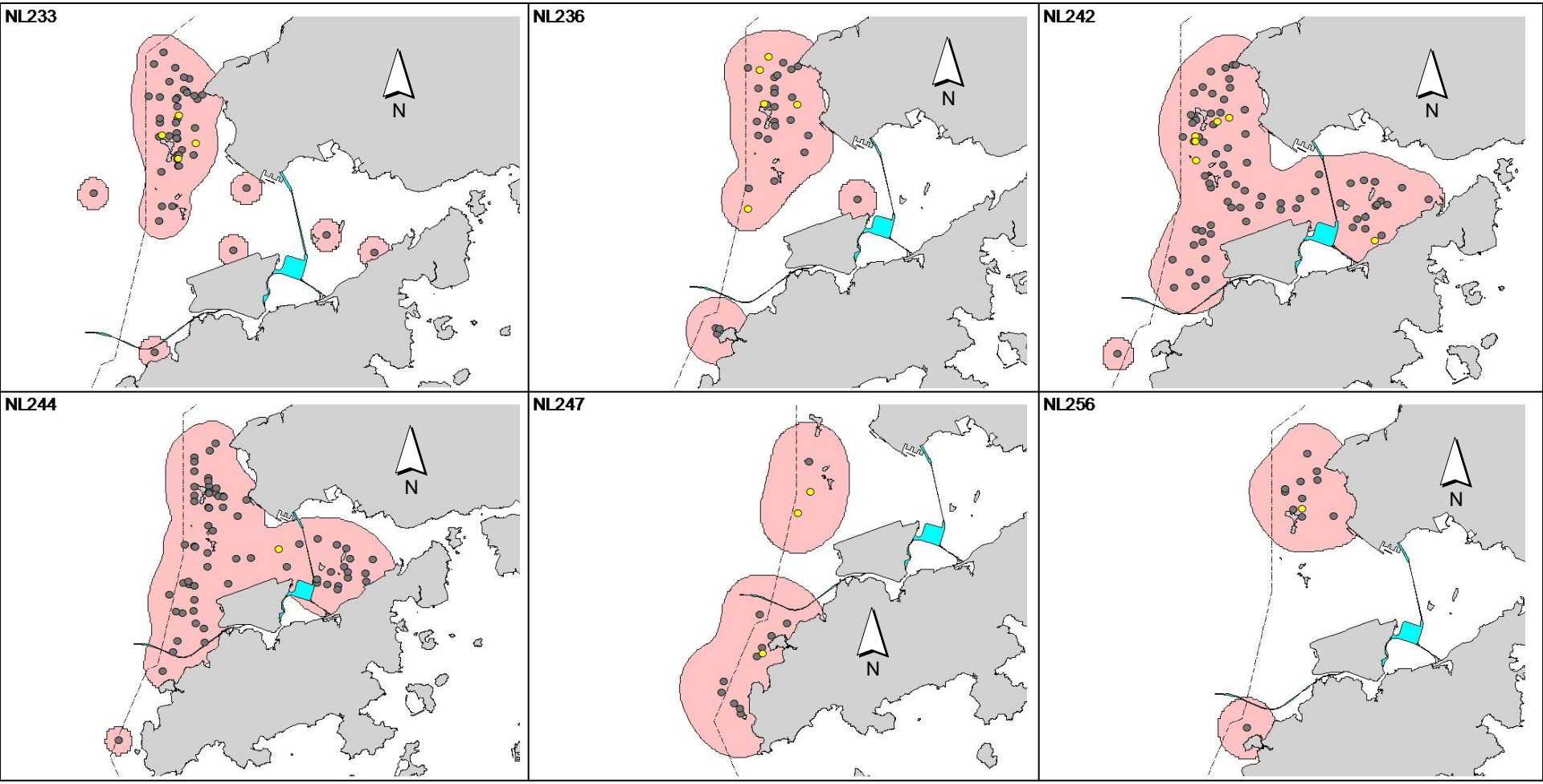
Appendix IV. (cont'd)



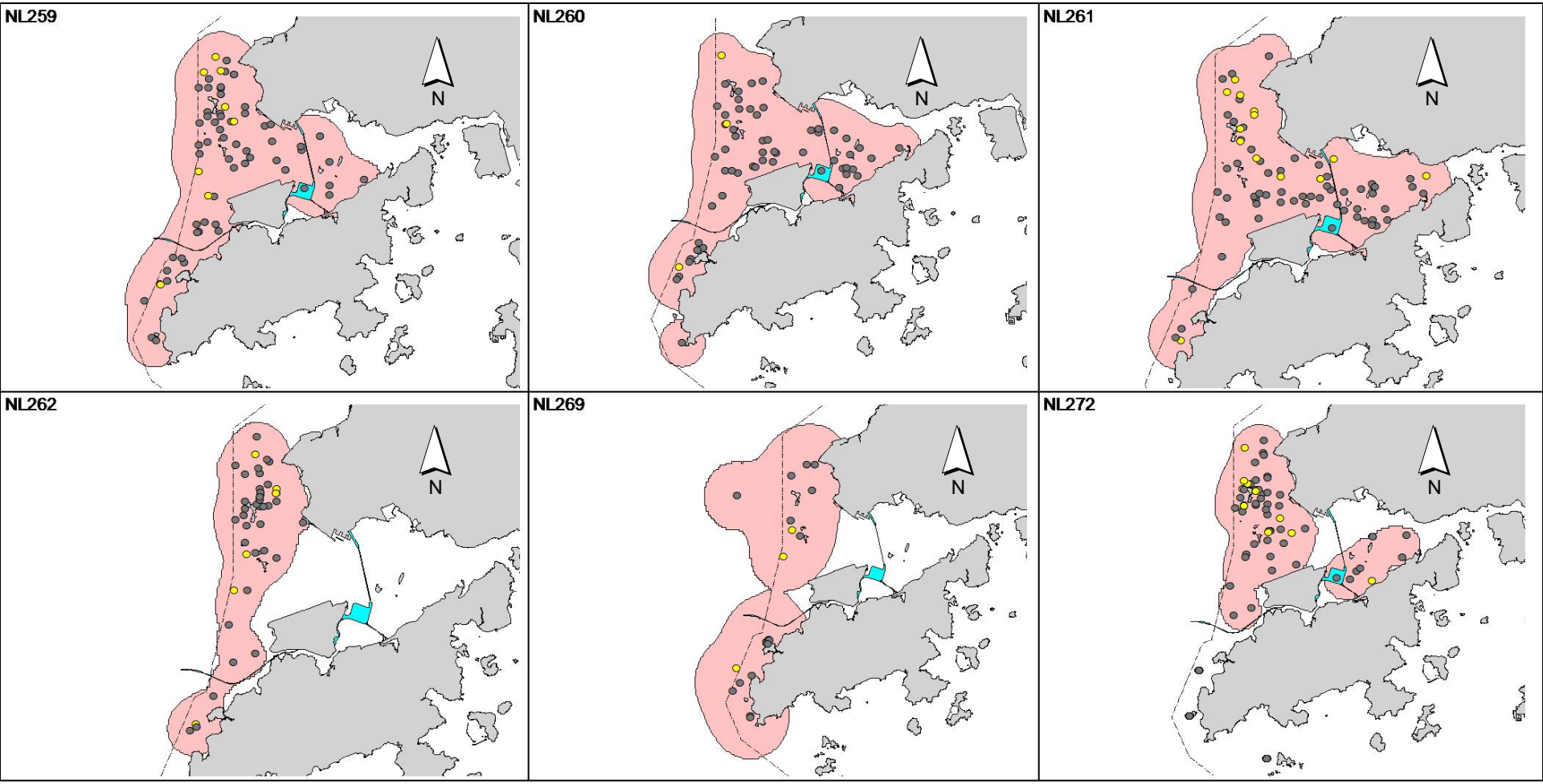
Appendix IV. (cont'd)



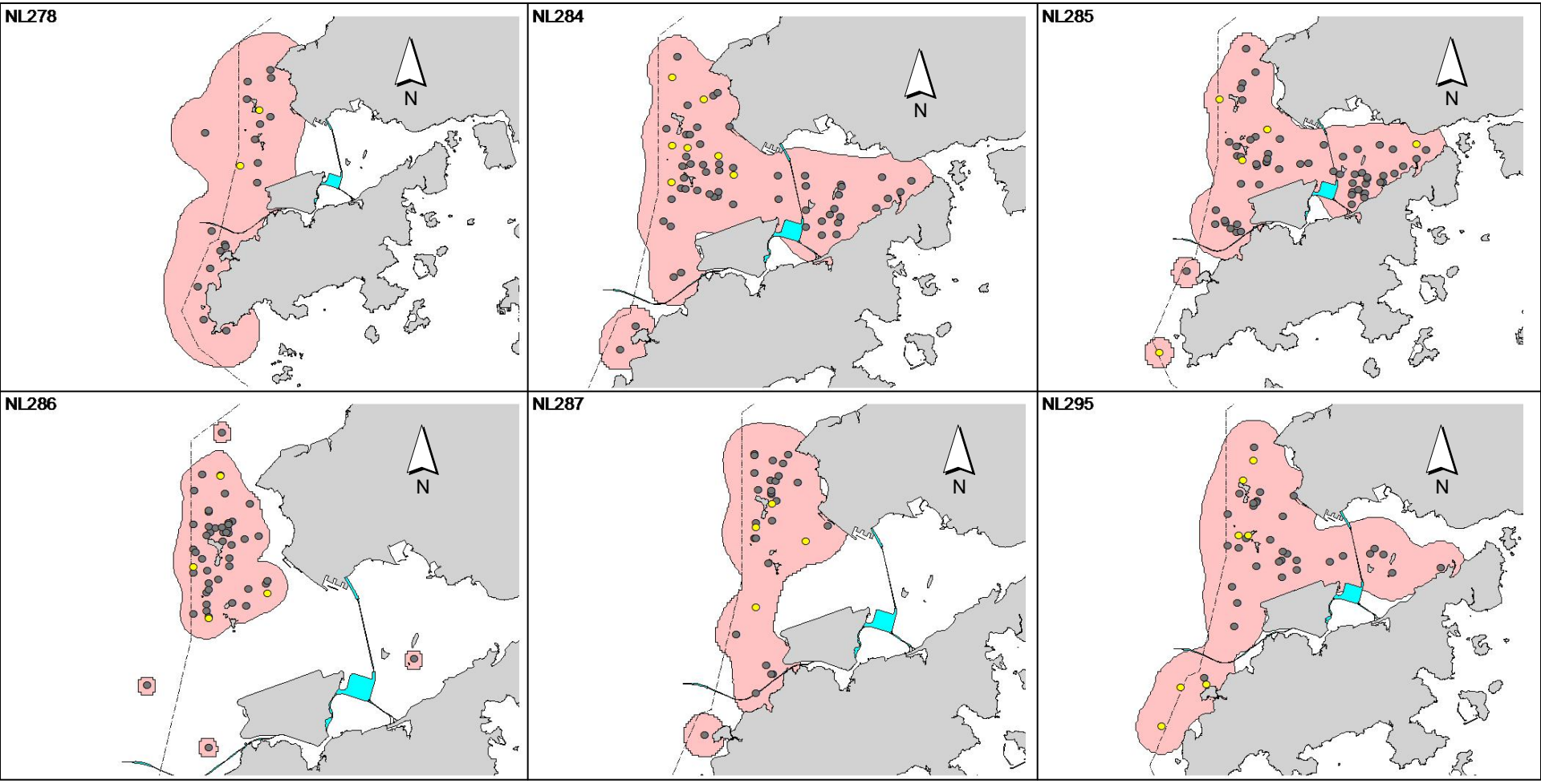
Appendix IV. (cont'd)



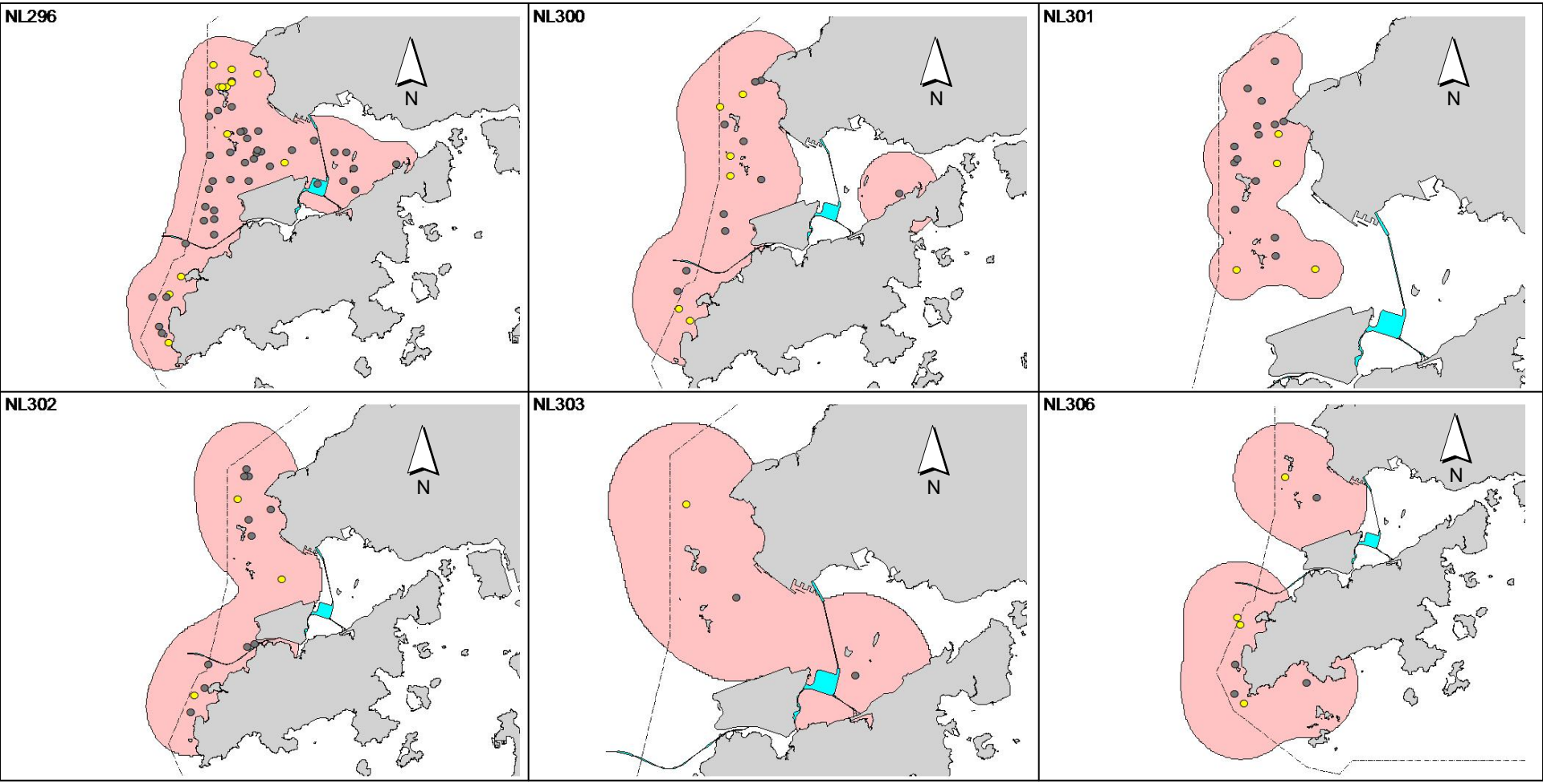
Appendix IV. (cont'd)



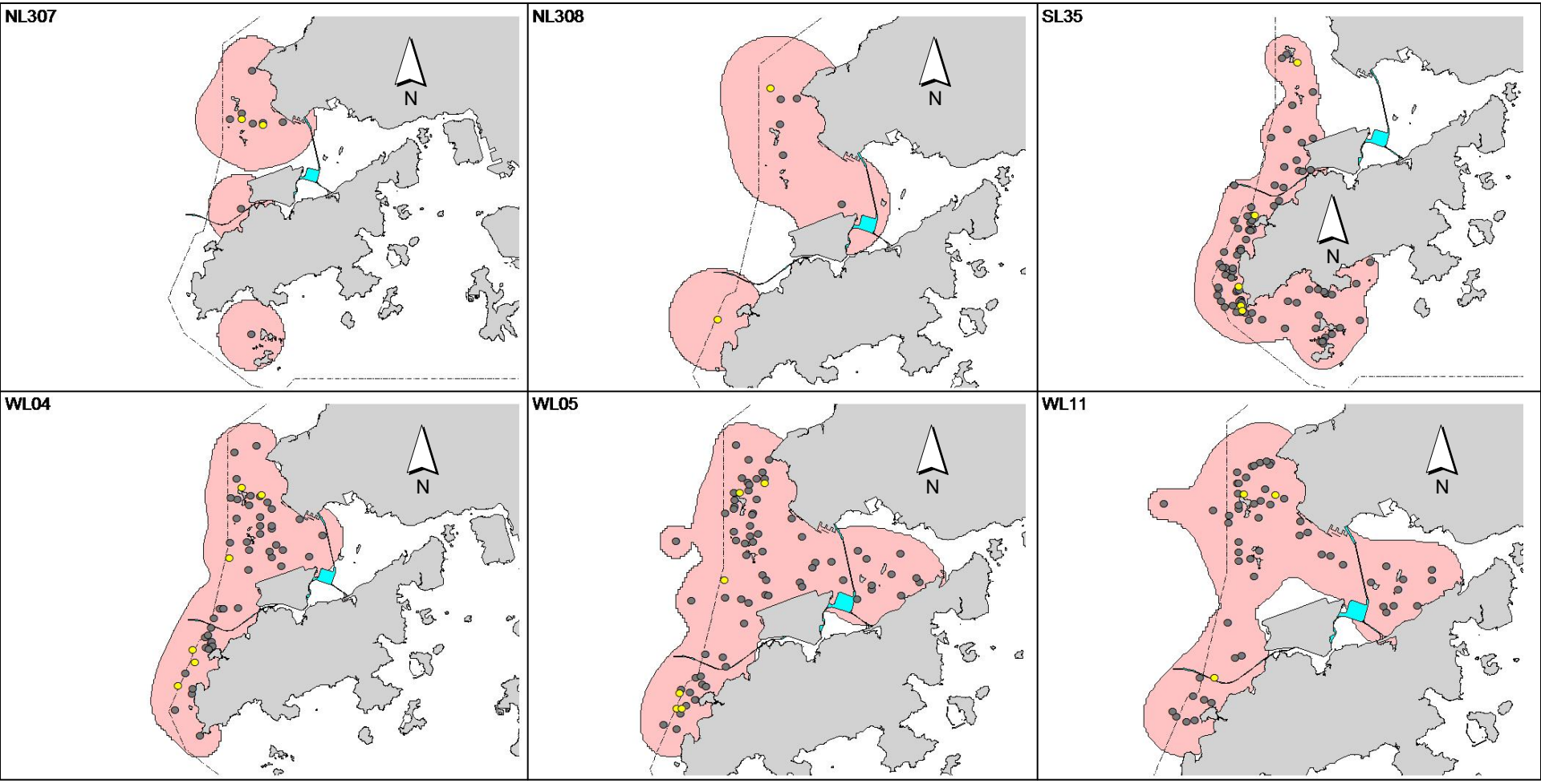
Appendix IV. (cont'd)



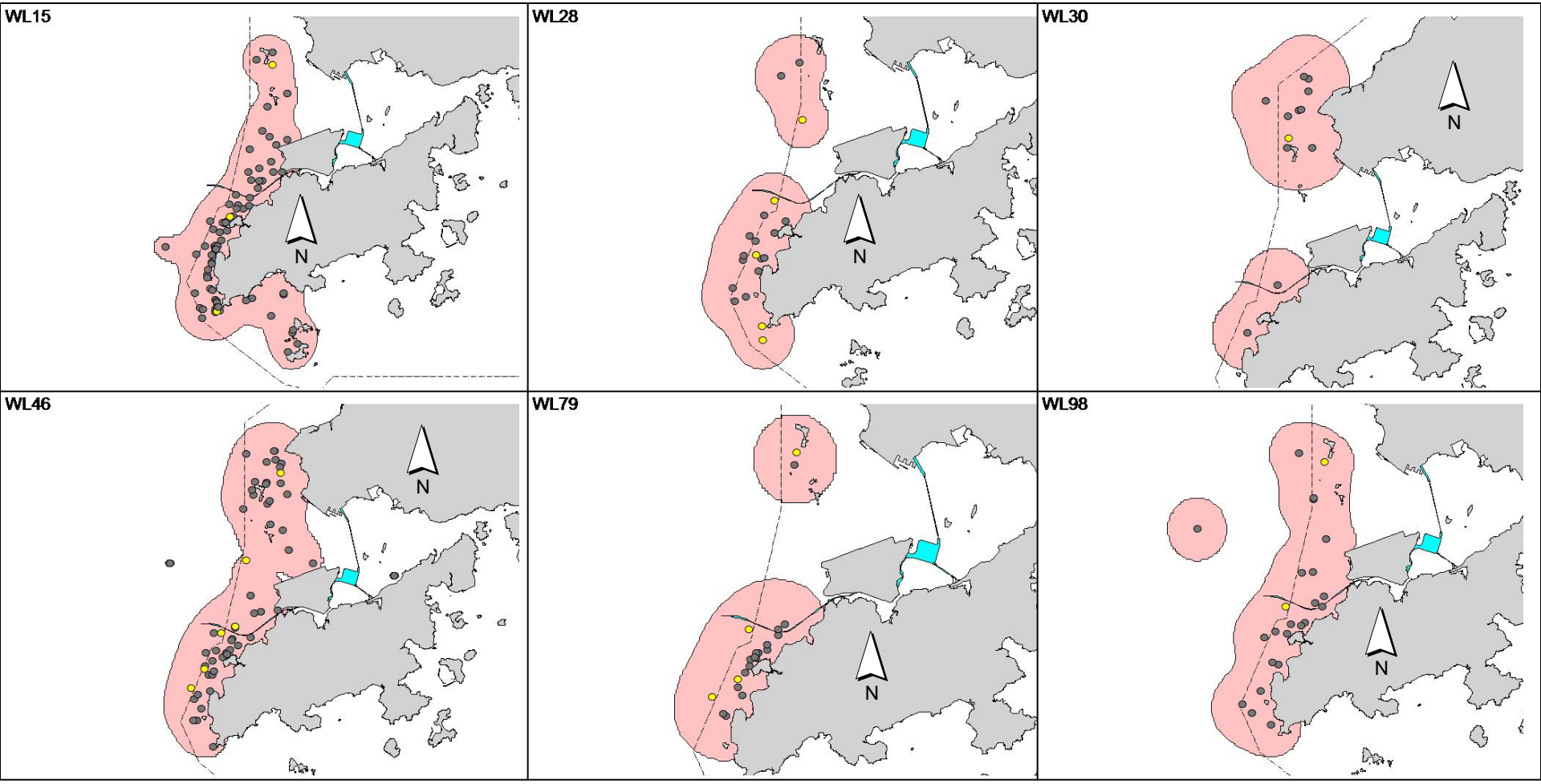
Appendix IV. (cont'd)



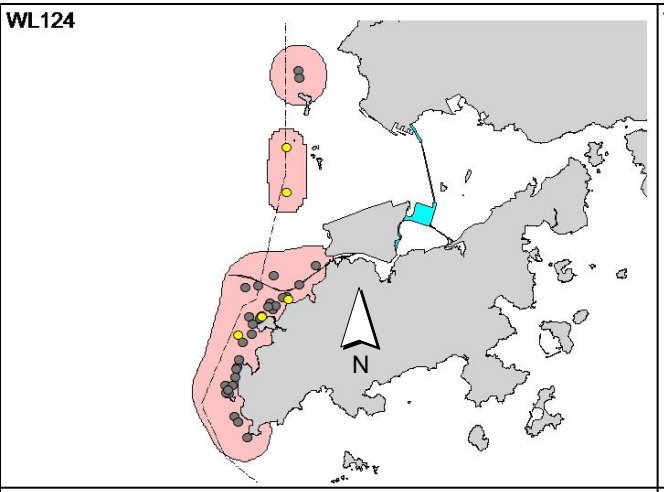
Appendix IV. (cont'd)

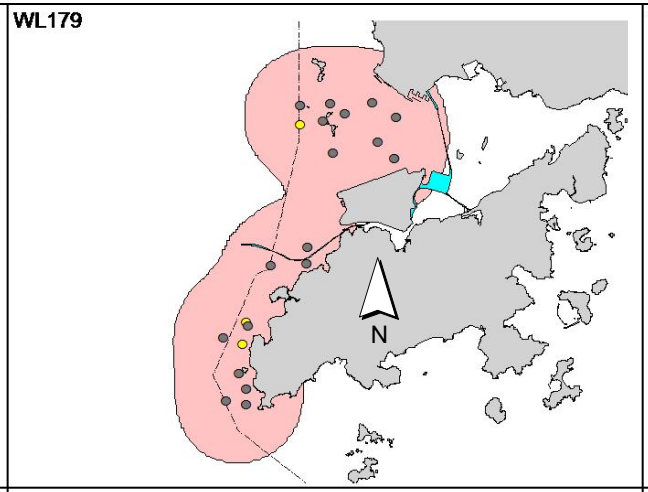


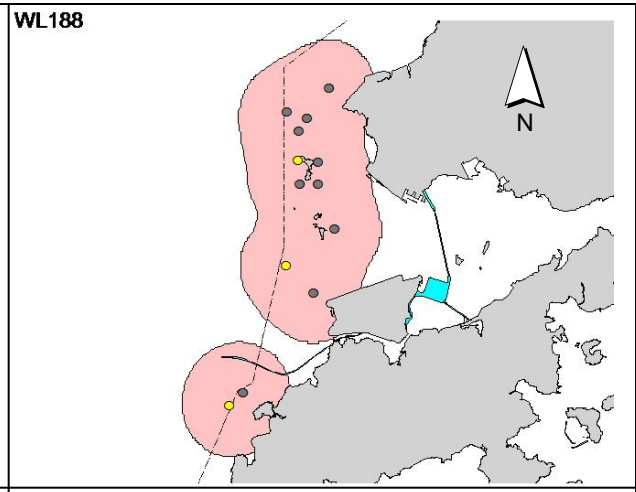
Appendix IV. (cont'd)

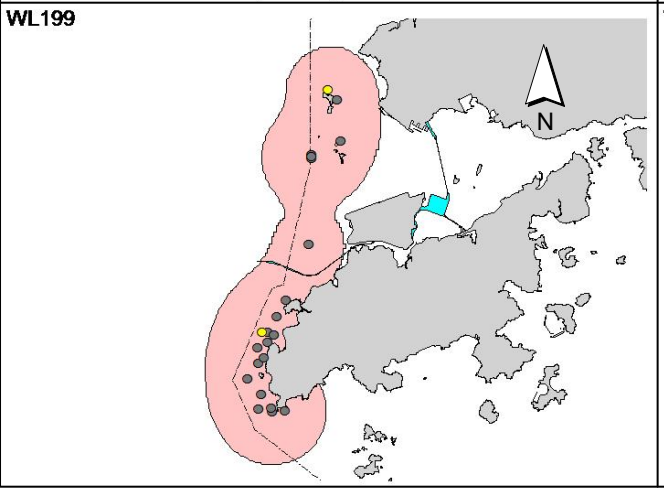


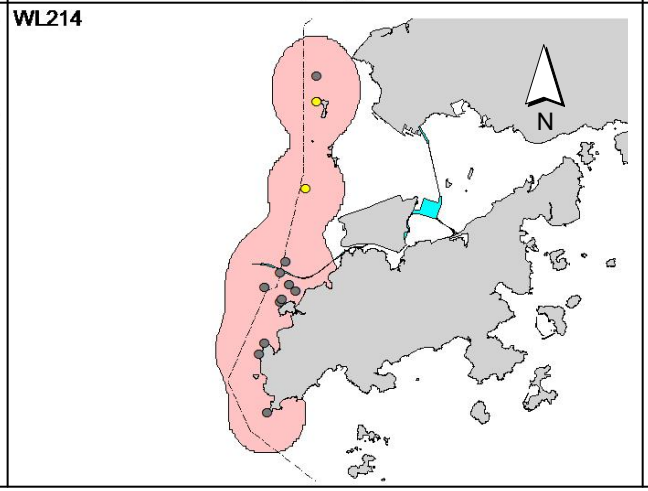
Appendix IV. (cont'd)

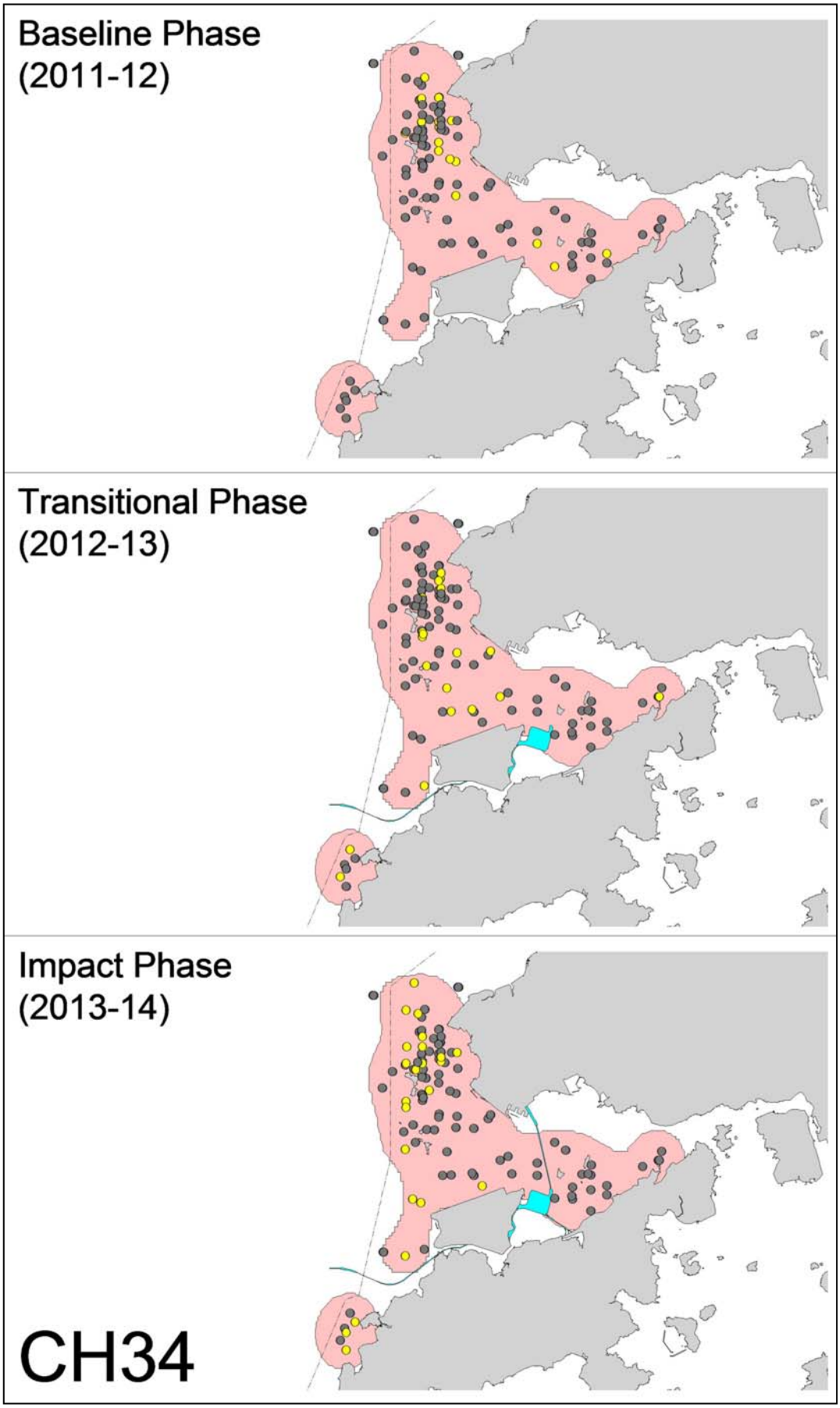




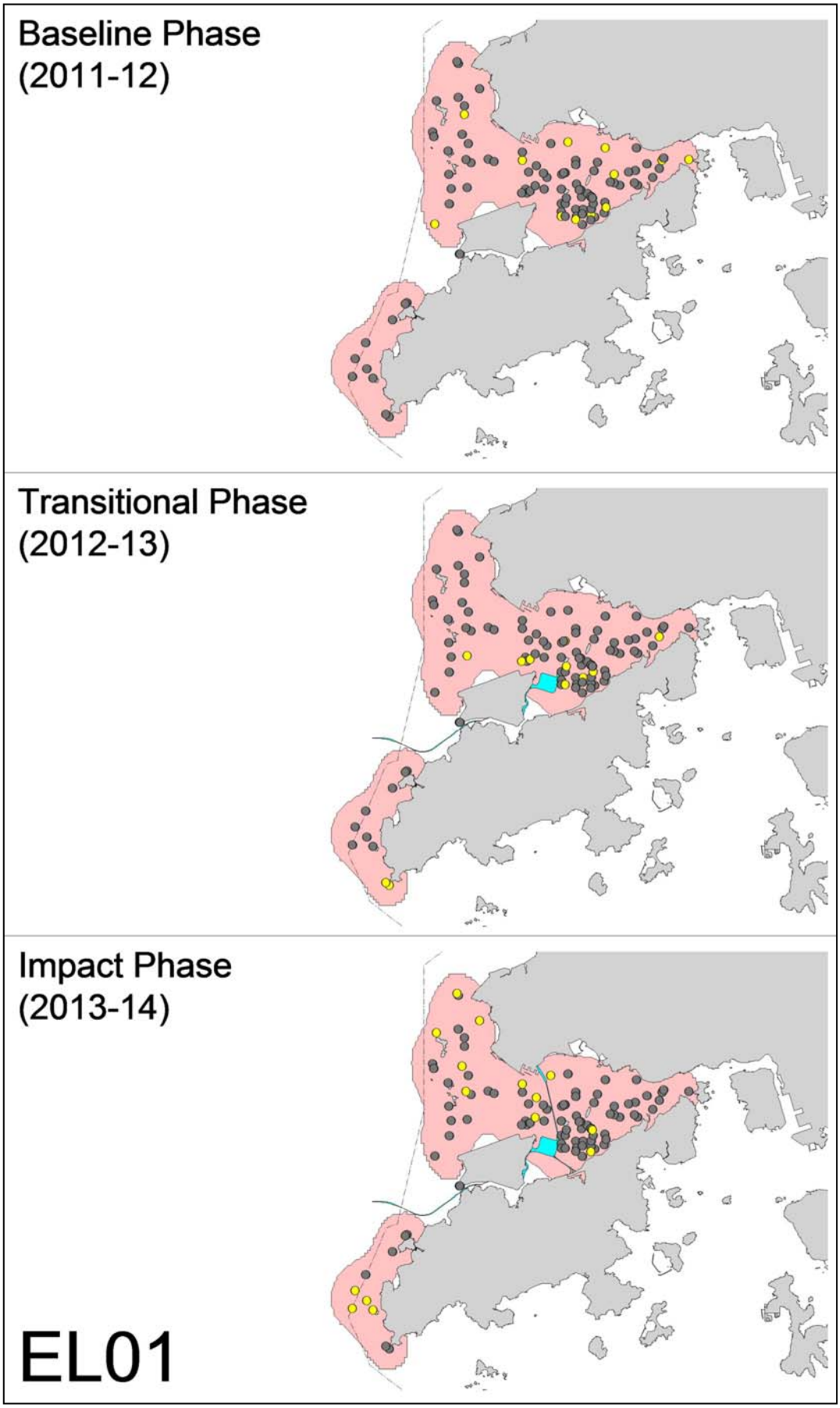








Appendix V. Temporal changes in range use of individual dolphins during baseline, transitional & impact phase of TMCLKL construction (note: yellow dots indicates sightings made in corresponding period)



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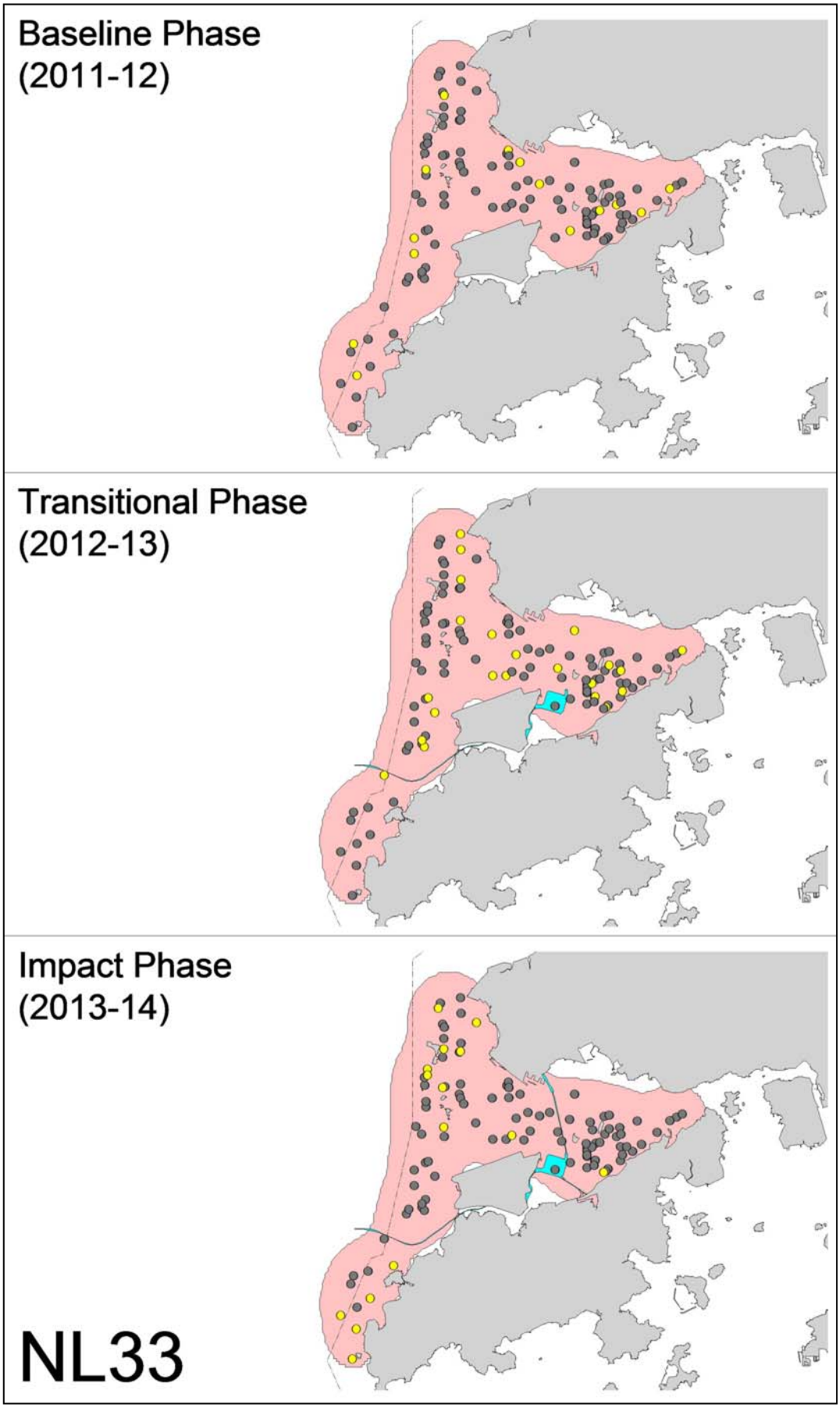

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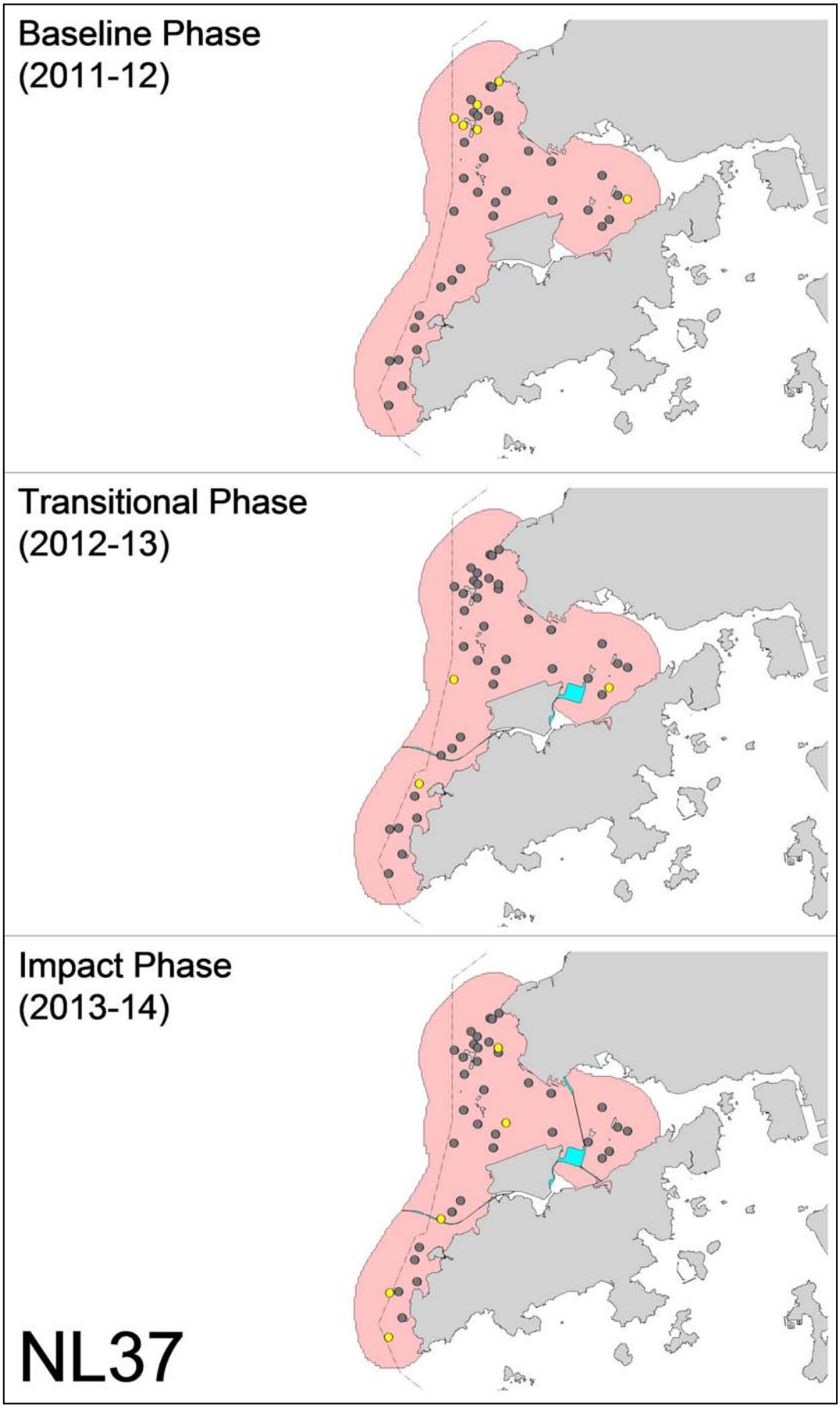

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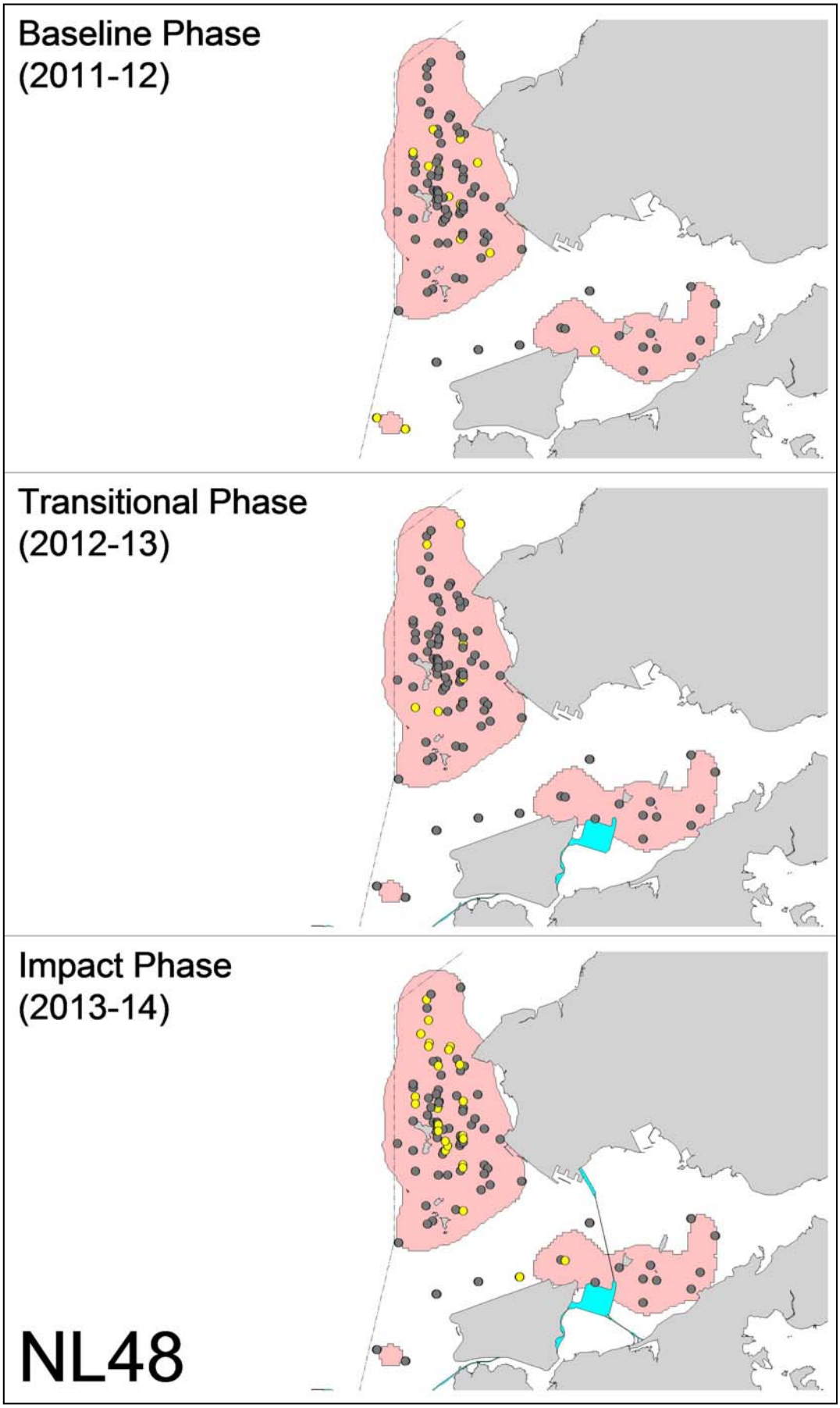

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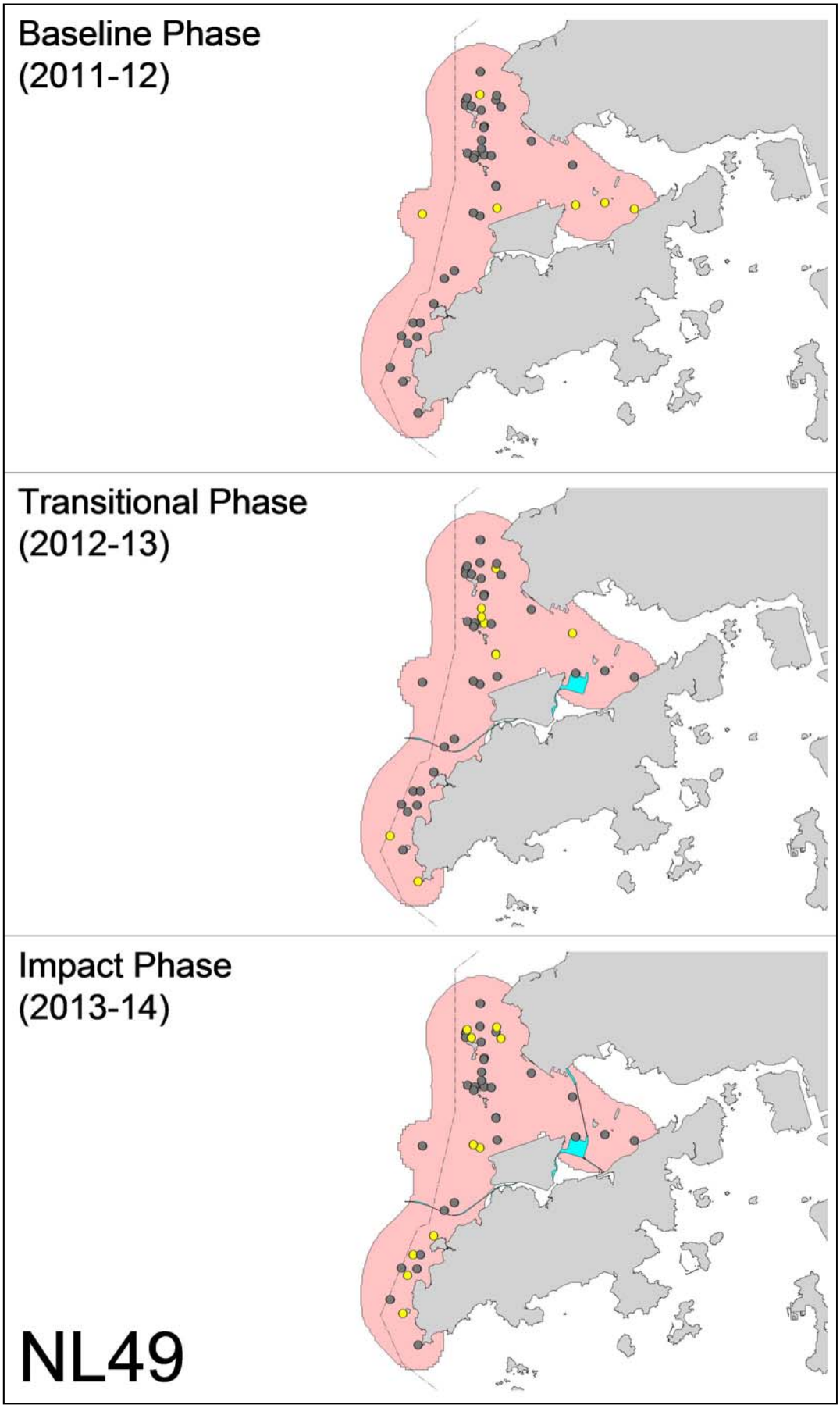

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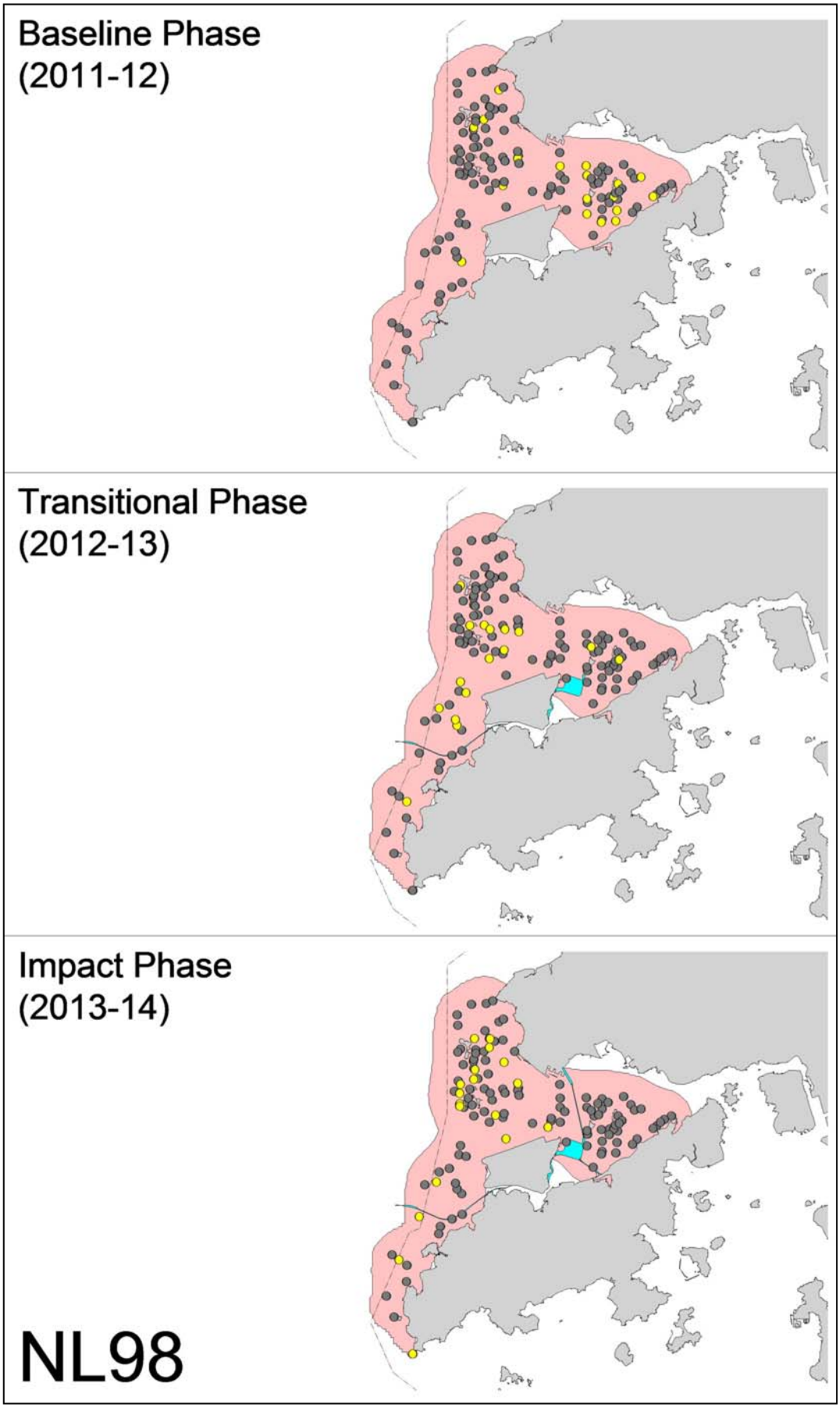

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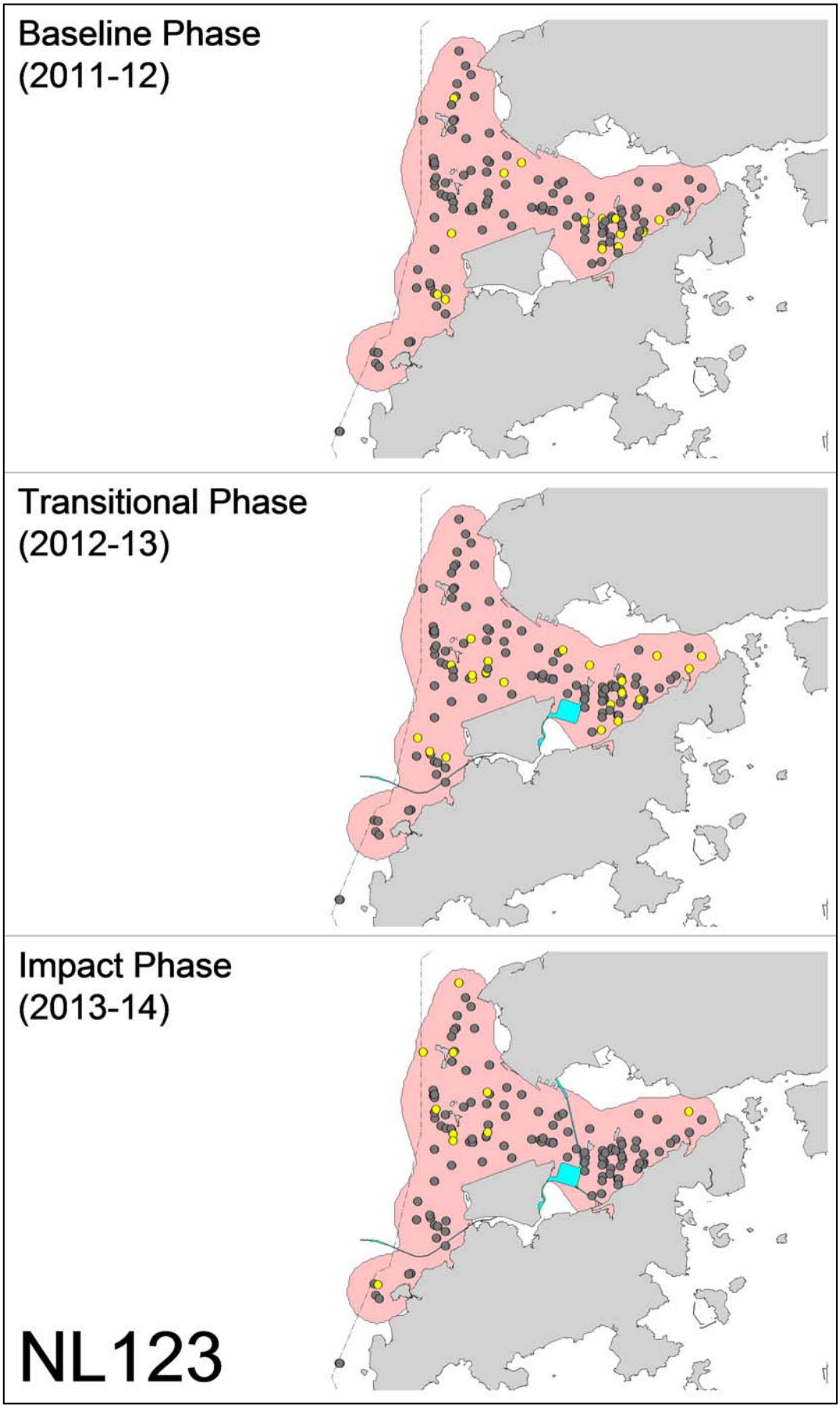

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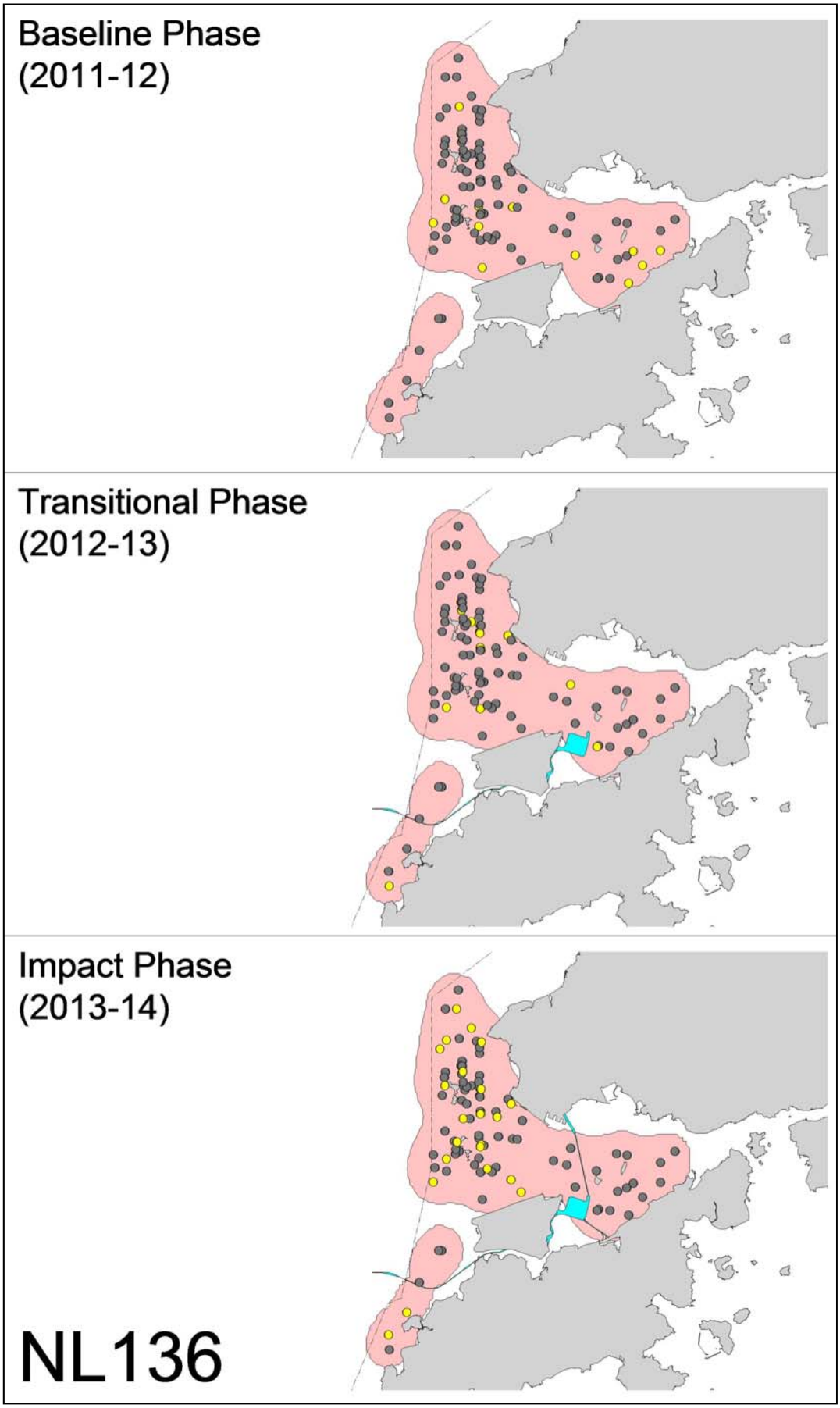

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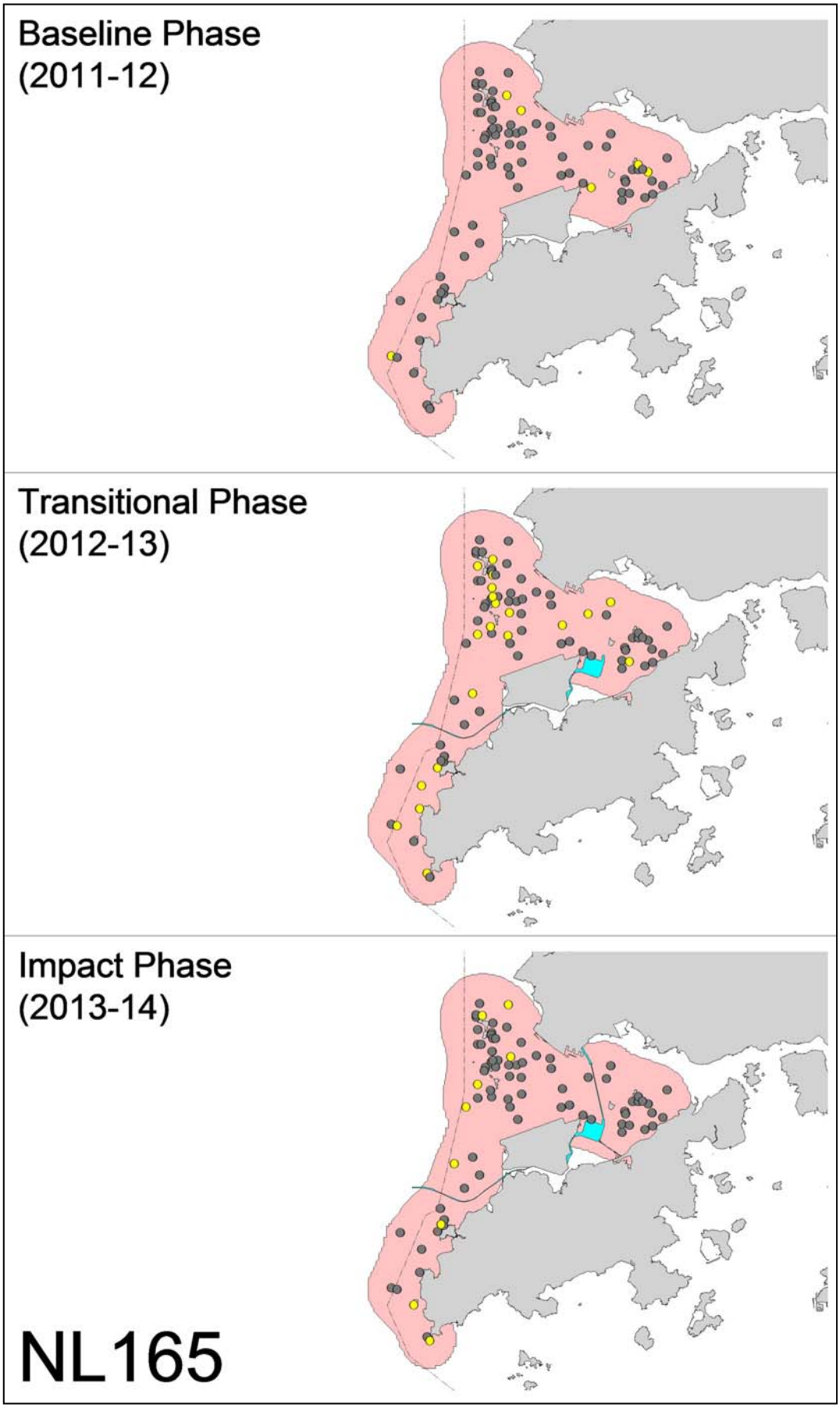

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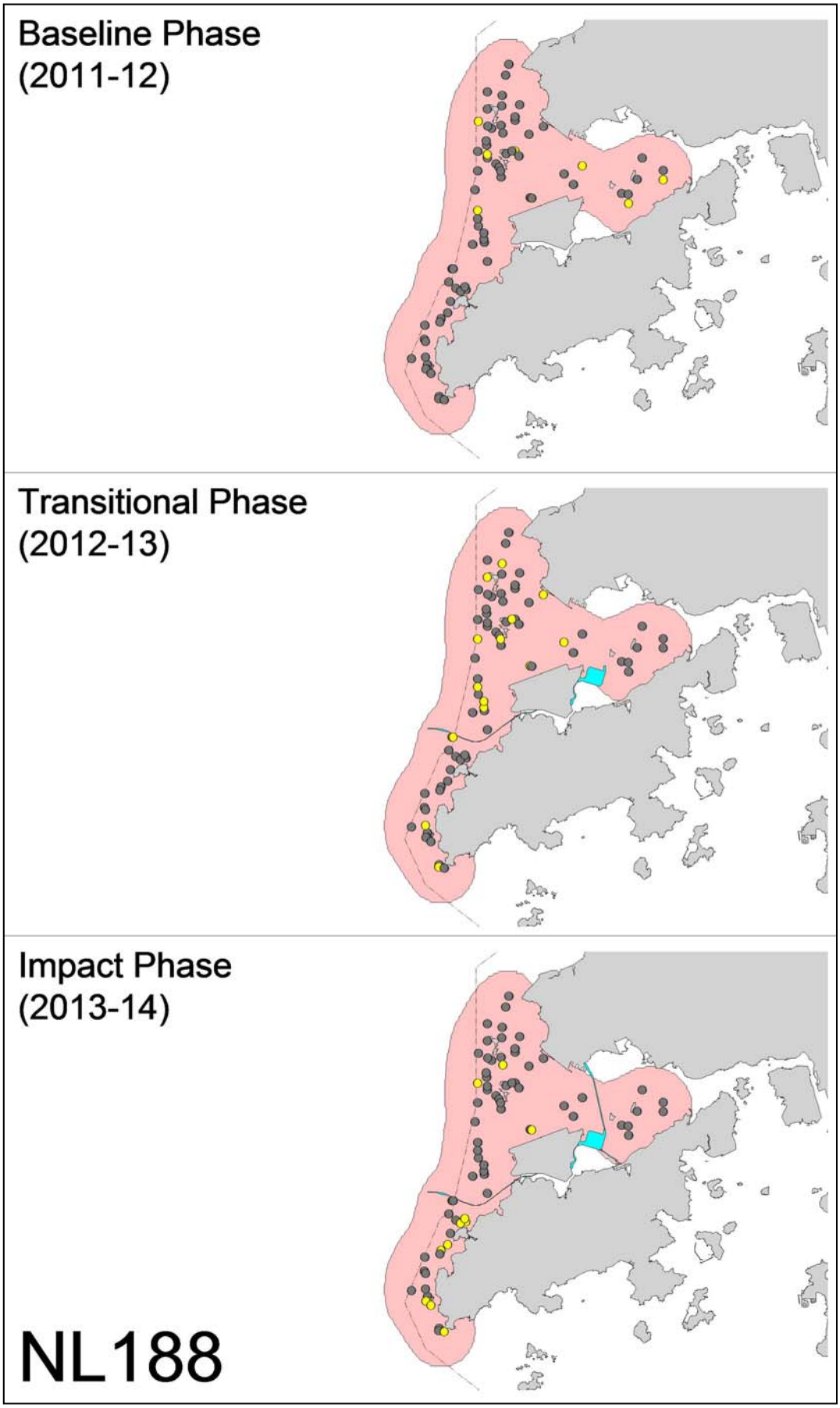

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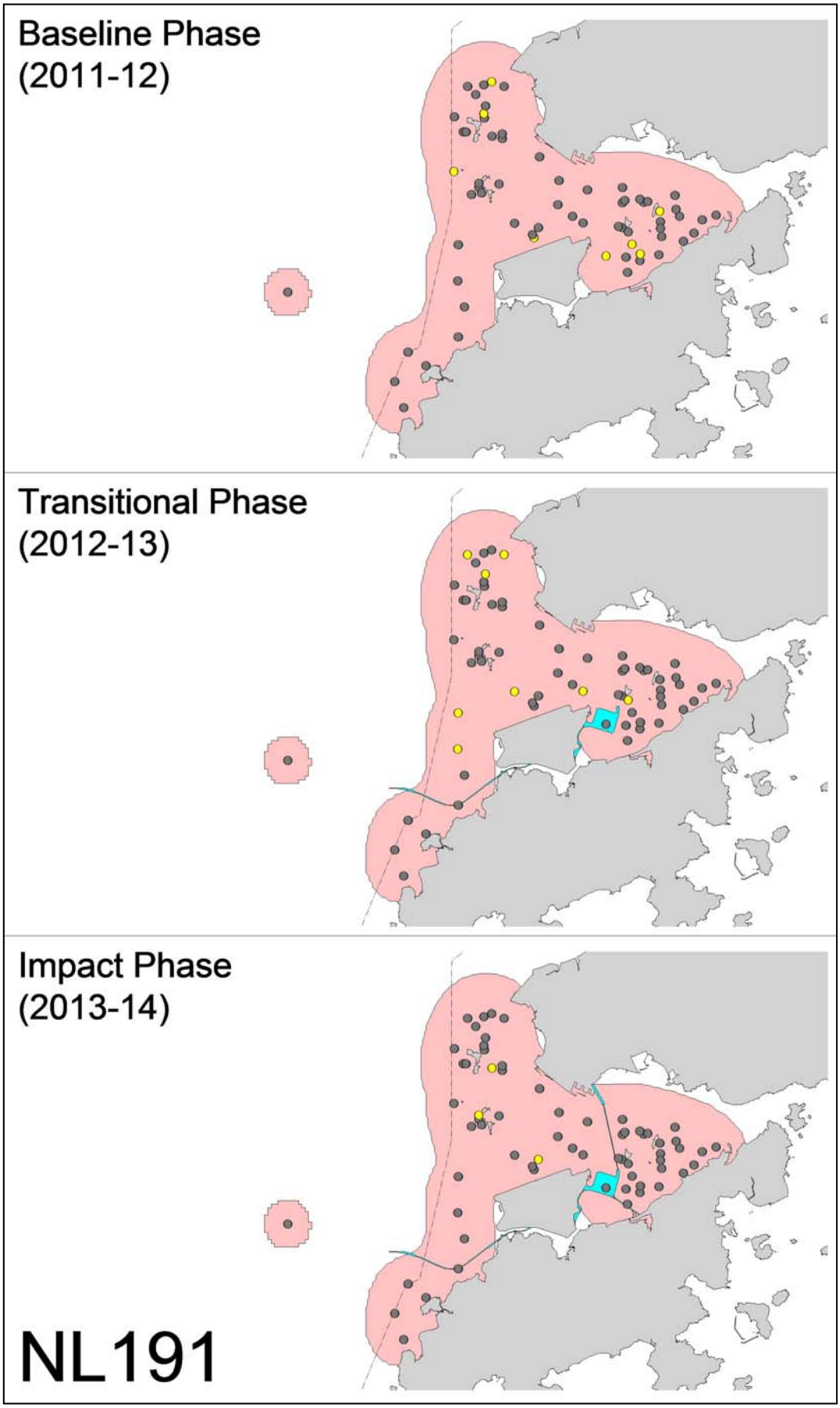

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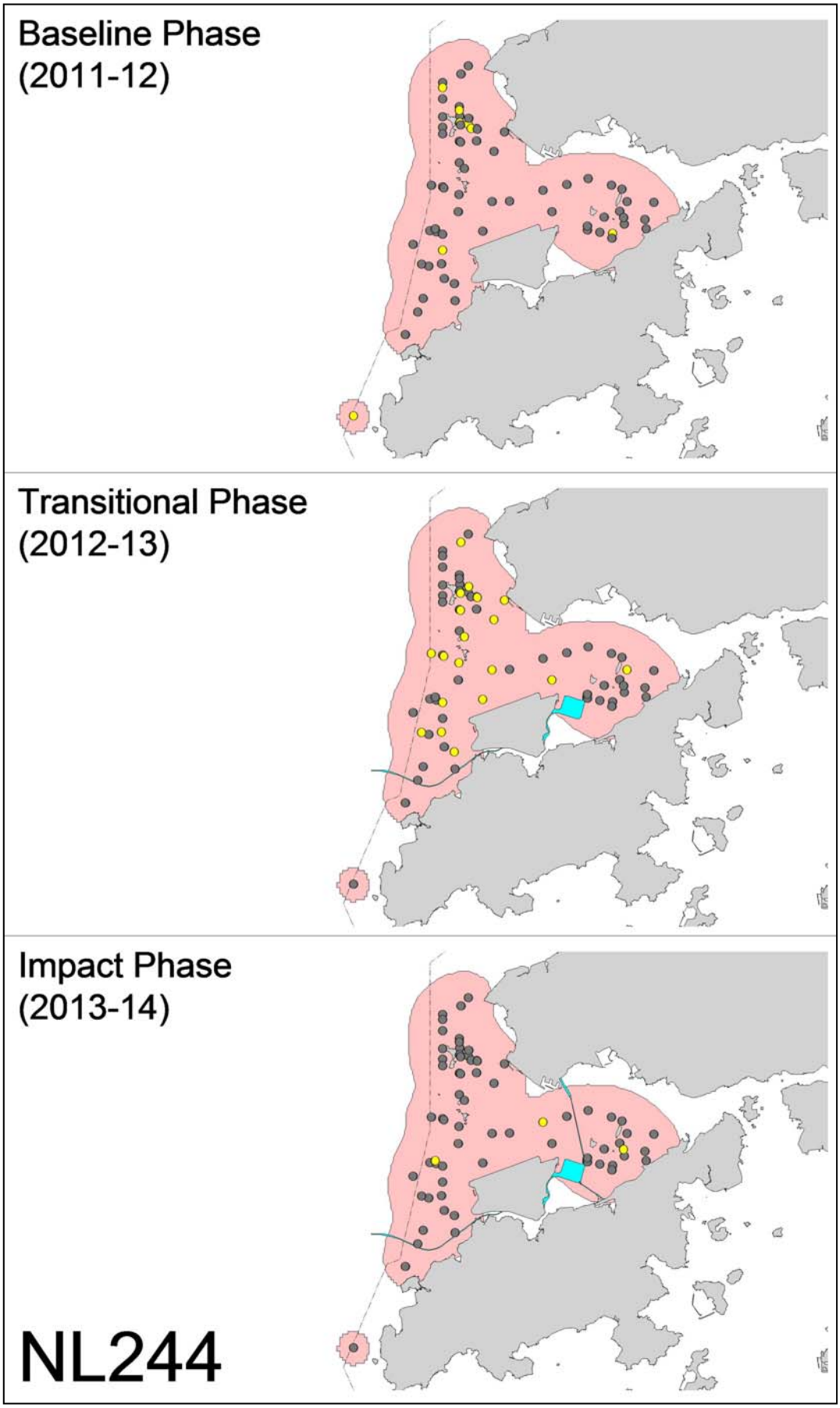

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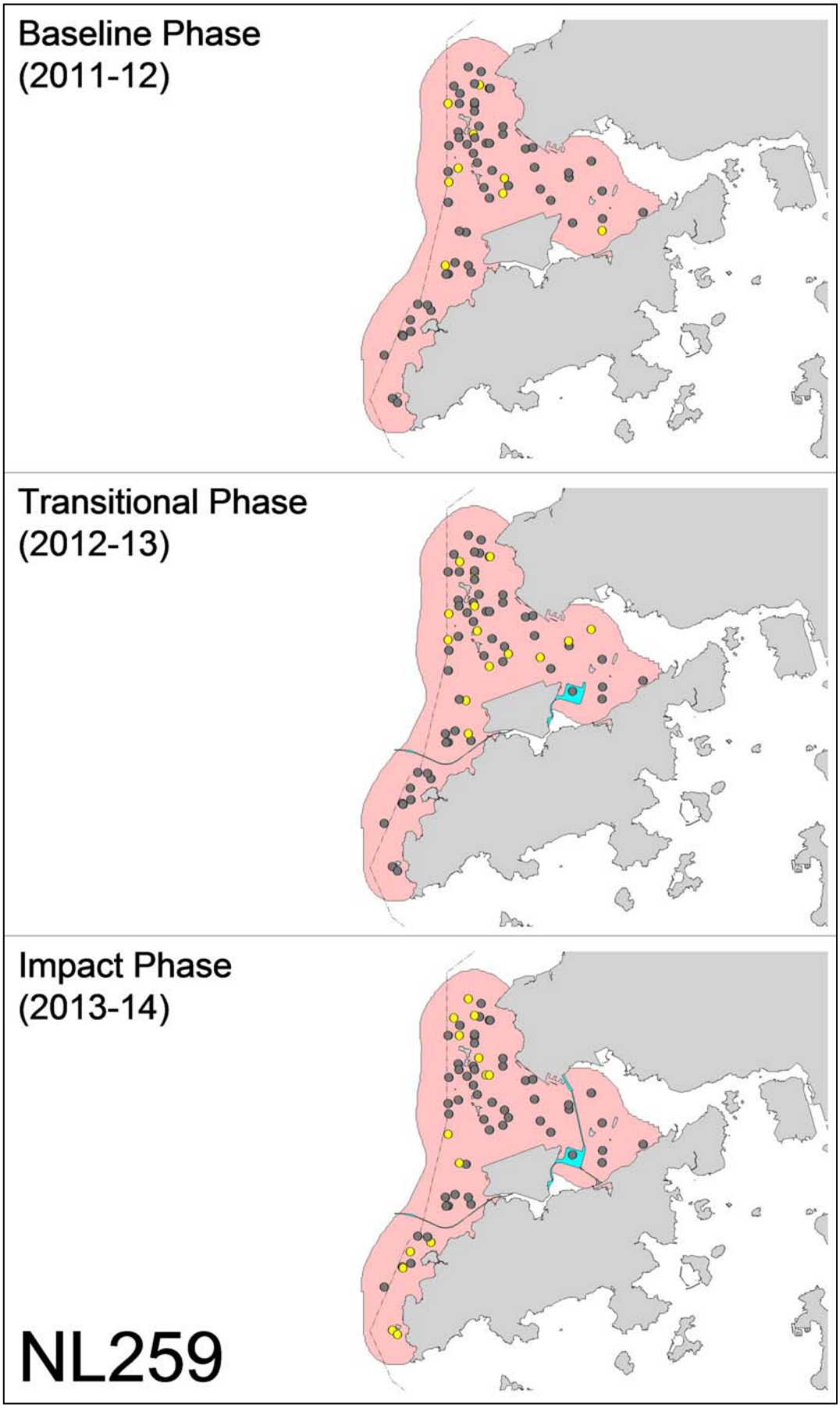

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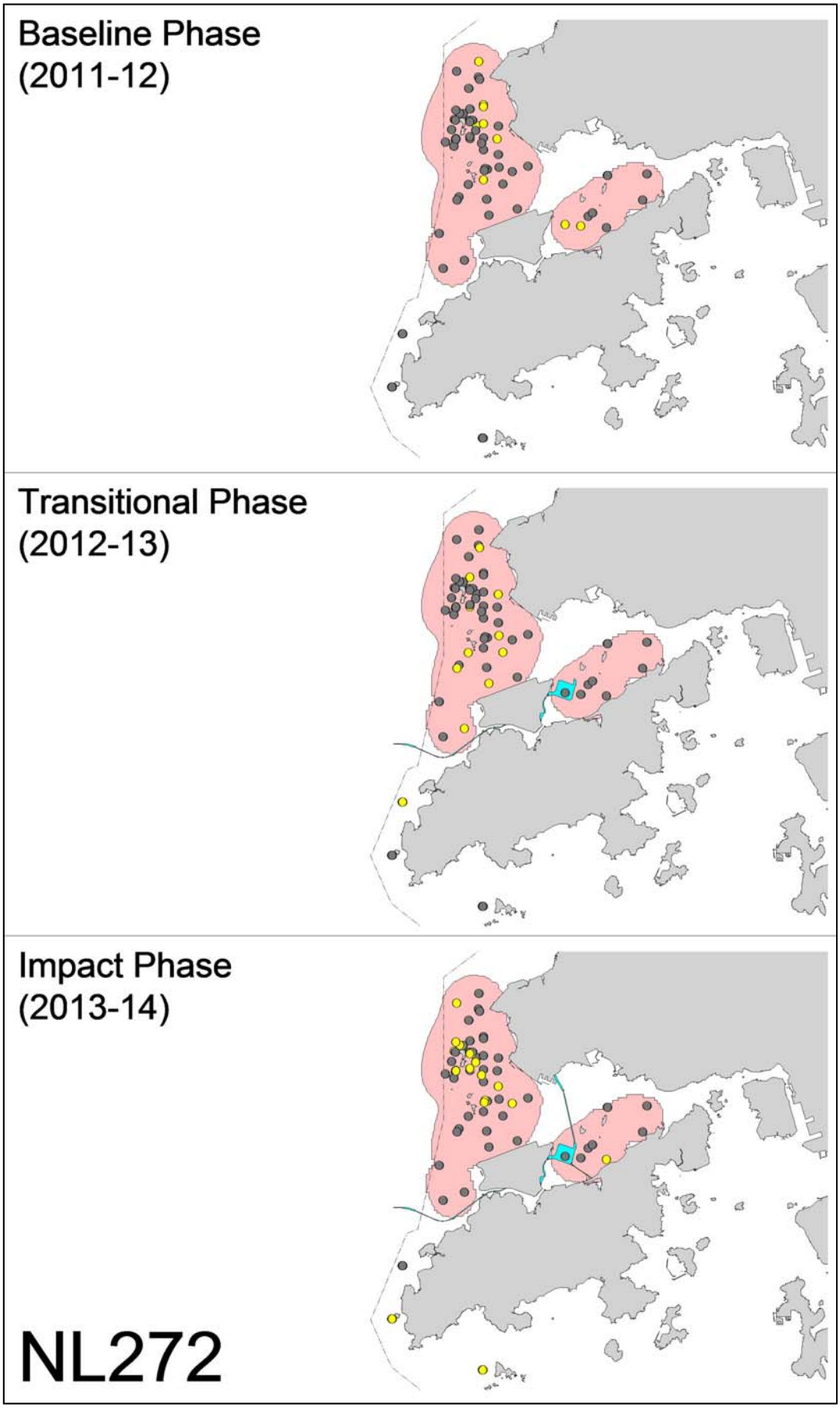

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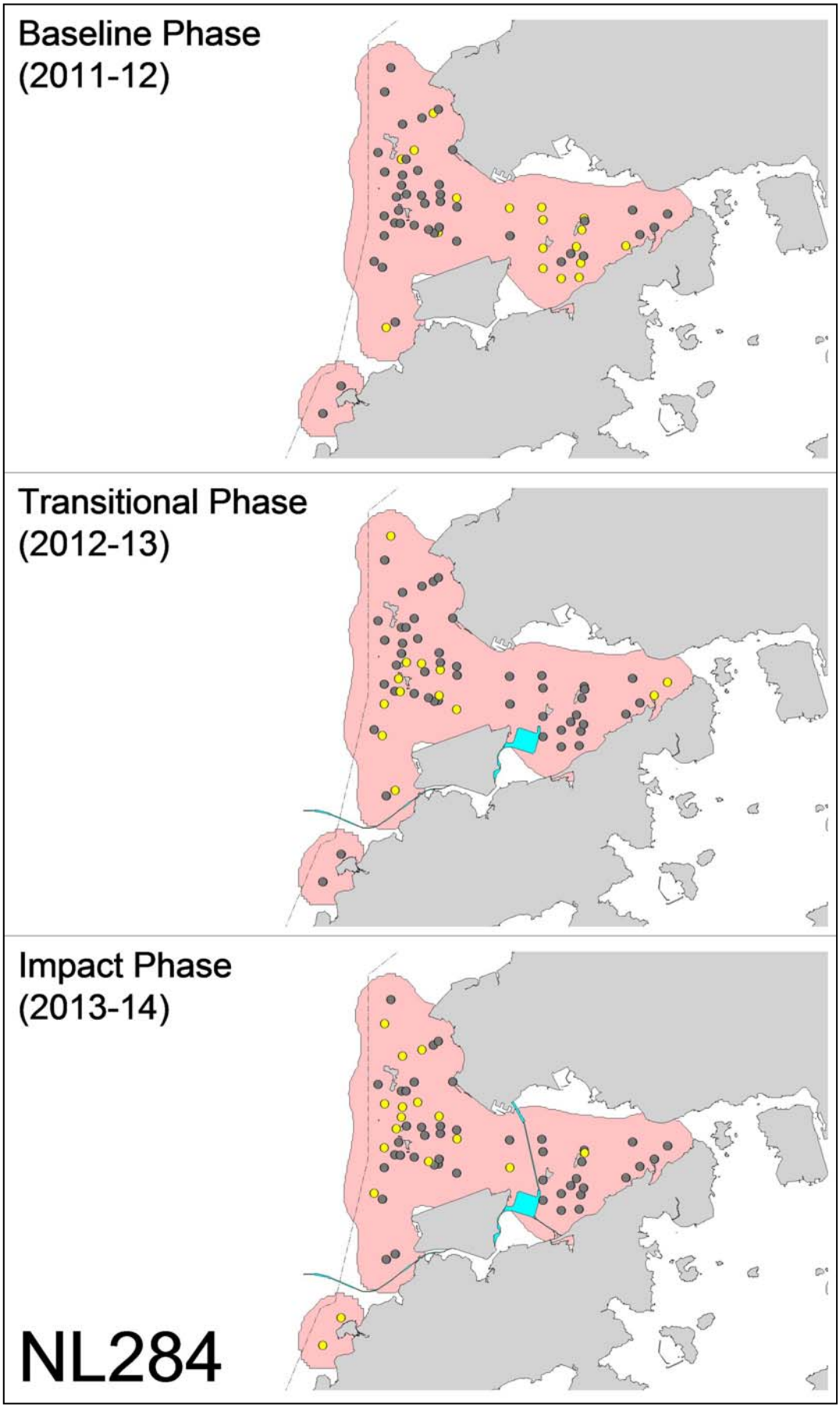

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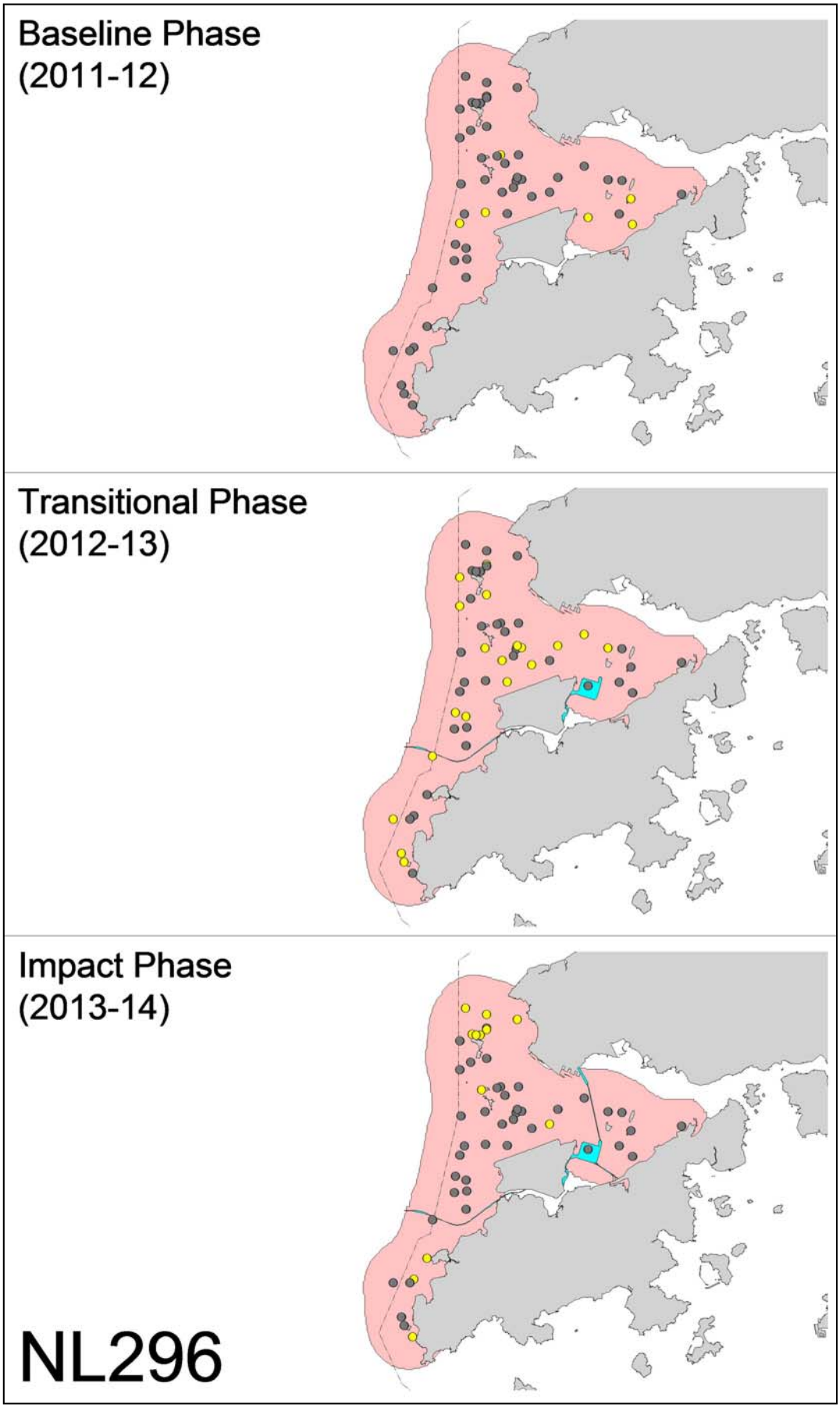

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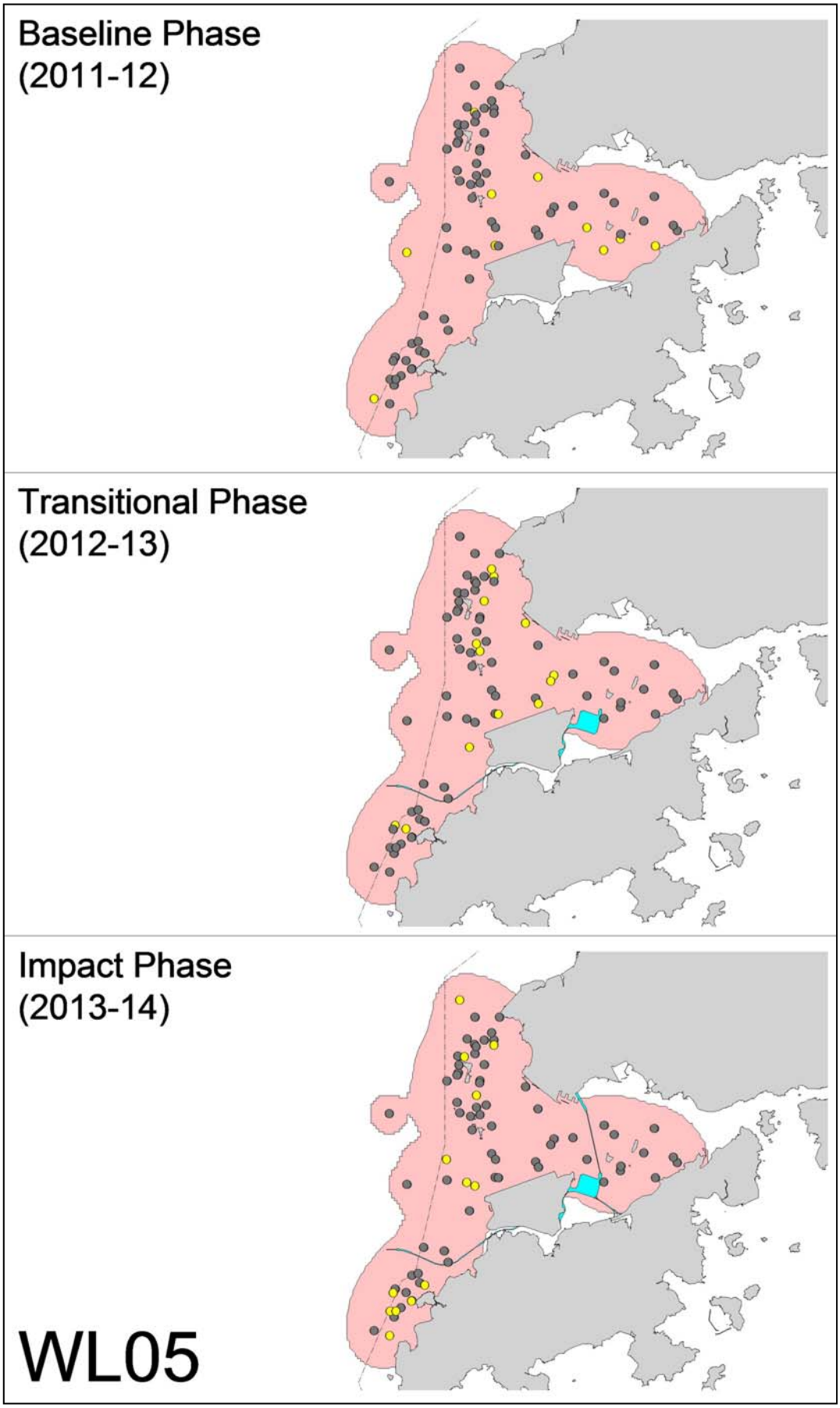

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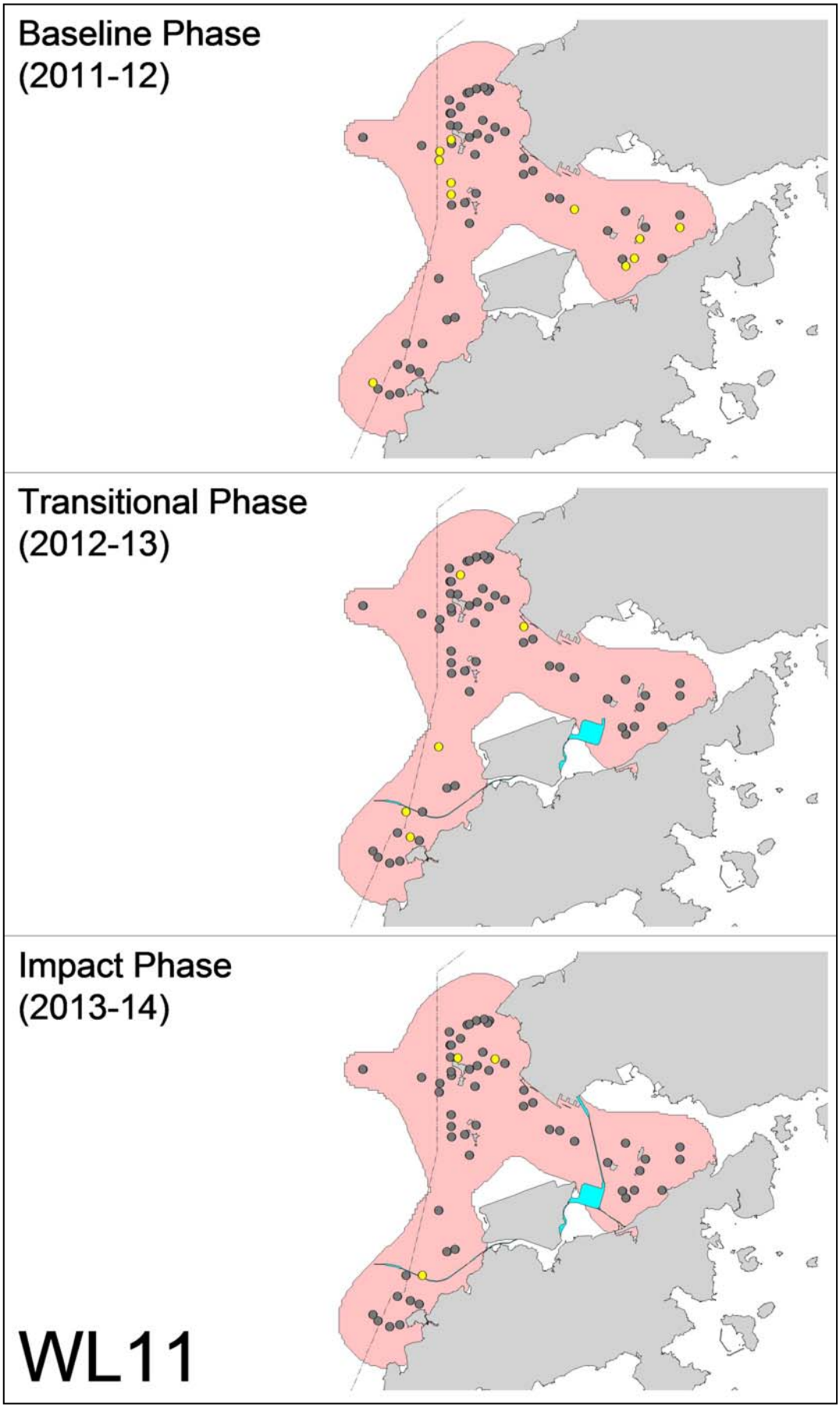

Appendix V. (cont'd)

Appendix H

Event Action Plan

AppendixH1 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	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.

and keep the IEC, the DEP and the SOR informed of the results.	
8. If the exceedance stops, cease additional monitoring.	

Appendix H2 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 H3 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;	1. Check monitoring data submitted by ET and Contractor's working method;	1. Confirm receipt of notification of failure in writing;	1. Inform the SOR and confirm notification of the non-compliance in writing;

Event	ET Leader	IEC	SOR	Contractor
	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;	2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly.	2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods.	2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR.
Limit level being exceeded by two or more consecutive sampling days	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 H4 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 H5 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 I

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 2013 (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	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
Unit	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Feb	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Mar	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Apr	-	-	-	-	-	-	-	-	-	-	-	-		-	-
May	-	-	-	-	-	-	-	-	-	-	-	-		-	-
Jun	-	-	0	0	0	0	-	-	-	0	0	0	0	0	0
SUB-TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Jul	-	-	0	0	0	0	0	0	0	0	0	0	0	0	0
Aug	-	-	0	0	0	0	0	0	0	0	322.89	0	0	0	0
Sep	0.004	0.004	0	0	0.004	0	0	0	0	0	412.86	0	0	0	0
Oct	0.044	0.018	0	0	0.044	0	0	0	0	0	27.63	0	0	0	0
Nov	0.277	0.000	0.240	0	0.037	0	0	0	0	0	22.05	0	0	0	0
Dec	0.114	0.027	0.020	0	0.094	0	0	0	0	0	28.04	0	0.019	0	0
TOTAL	**0.439**	**0.049**	**0.260**	**-**	**0.179**	**-**	**-**	**-**	**-**	**-**	**813.47**	**-**	**0.019**	**-**	**-**

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.

Contract No. : HY/2012/07

Tuen Mun Chek Lap Kok Link – Southern Connection Viaduct Section

Monthly Summary Waste Flow Table for 2014 (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	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
	sub-total	sub-total	sub-total	sub-total	sub-total	sub-total									
Location															
Density (ton/m^3)														7kg/bag	5kg/number
ID no.											(web record)				
Unit	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	0.033	0.011	0.003	-	0.030	-	-	-	-	-	22.380	-	10.240	-	-
Feb	4.716	0.010	0.031	-	0.010	4.674	-	-	-	-	10.670	-	0.780	-	-
Mar	2.559	0.009	0.240	-	0.221	2.098	-	-	-	0.275	12.390	-	46.050	-	-
Apr	1.051	0.000	0.020	-	0.118	0.914	-	-	-	-	87.650	-	15.760	-	-
May	2.008	-	0.010	-	1.546	0.451	0.386	0.267	0.055	-	98.030	-	8.460	0.126	-
Jun	5.318	0.025	0.030	2.473	0.357	2.457	0.338	-	-	-	77.290	-	25.340	0.140	-
SUB-TOTAL	**15.685**	**0.055**	**0.334**	**2.473**	**2.283**	**10.595**	**0.724**	**0.267**	**0.055**	**0.275**	**308.410**	**-**	**106.630**	**0.266**	**-**
Jul	6.303	0.129	0.020	-	4.654	1.629	0.847	0.252	0.051	-	87.810	-	27.370	0.126	-
Aug	4.824	0.003	0.265	1.829	2.441	0.288	0.391	0.131	0.033	-	98.220	-	21.680	0.126	0.475
Sep	8.037	0.213	0.175	-	7.722	0.140	0.400	0.073	0.060	-	238.01	-	34.190	0.161	-
Oct	14.912	0.075	0.943	-	13.860	0.109	0.441	0.118	0.104	-	268.18	-	-	0.105	-
Nov	-	-	-	-	-	-									
Dec	-	-	-	-	-	-									
TOTAL	**49.761**	**0.475**	**1.736**	**4.303**	**30.961**	**12.761**	**2.803**	**0.841**	**0.303**	**0.275**	**1,000.630**	**-**	**189.870**	**0.784**	**0.475**

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 J

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

Appendix J1 Cumulative Statistics on Exceedances

		Total No. recorded in this reporting period	Total No. recorded since project commencement
1-Hr TSP	Action	0	0
	Limit	0	0
24-Hr TSP	Action	2	2
	Limit	0	0
Noise	Action	0	0
	Limit	0	0
Water Quality	Action	1	1
	Limit	0	0
Impact Dolphin Monitoring	Action	5	5
	Limit	0	0

Appendix J2 Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (Oct 2013 – Oct 2014)	2	0	0
Total No. received since project commencement	2	0	0