Your ref -
Our ref 214487/(HY/2011/09)/M45/630/B 23573

BY HAND

Environmental Protection Department
Environmental Assessment Division
27th floor, Southorn Centre
130 Hennessy Road
Wan Chai
Hong Kong

B23573

ARUP

Level 5 Festival Walk
80 Tat Chee Avenue
Kowloon Tong
Kowloon
Hong Kong
t +852 3767 5800
f +852 3767 5922

www.arup.com

For the attention of Mr HO Ying Kwong, Anthony

13 February 2017

Dear Sir,

Contract No. HY/2011/09
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill

Submission under Environmental Permit (EP-352/2009/D – Condition 4.4)
Quarterly EM&A Report – September to November 2016

On behalf of HyD/HZMB Project Management Office (the Permit Holder) of the captioned Environmental Permit (EP), I submit herewith three hard copies and one electronic copy (two hard copies and one electronic copy to EPD Wanchai, one hard copy to EPD Quarry Bay) of the Quarterly EM&A Report for September to November 2016 as per Condition 4.4 of EP-352/2009/D.

I confirm that this submission package has been certified by Environmental Team Leader and verified by Independent Environmental Checker.

Yours faithfully

Michael Chan
CRE / Supervising Officer's Representative

cc	HyD/HZMBHKPMO	-	Mr K Y Yung	w/e – CD only
	EPD	-	Mr Alfred Lo	w/e – One hard copy
	AFCD	-	Mr C P Lam	w/e – One hard copy
	ENPO	-	Mr Y H Hui	w/e – One hard copy and one CD
	IEC	-	Mr Antony Wong	w/o – By fax only
	Arup	-	Mr Eric Chan	w/e – CD only

Response required : No, thank you
Date required : -
Attachments : Yes

KHW/DS/JC/mw

RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_5037L.17.doc

9 February 2017

By Fax (3767 5922) and By Post

ARUP
Level 5, Festival Walk
80 Tat Chee Avenue
Kowloon Tong, Kowloon

Attention: Mr. Colin Meadows / Mr. Michael Chan

Dear Sirs,

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/2011/09 HZMB Hong Kong Link Road –
Section between HKSAR Boundary and Scenic Hill
Quarterly EM&A Report No. 15 for September to November 2016

Further to the captioned submission (version 2) certified by the ET Leader provided to us via email on 01 February 2017, please be advised that we have no adverse comments on the captioned report.

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

Yours sincerely,
For and on behalf of
Ramboll Environ Hong Kong Limited

Antony Wong
Independent Environmental Checker
Hong Kong Link Road

c.c.	HyD	Mr. Matthew Fung	(By Fax: 3188 6614)
	HyD	Mr. Y K Lam	(By Fax: 3188 6614)
	ARUP	Mr. Eric Chan	(By Fax: 2268 3970)
	Cinotech	Dr. Priscilla Choy	(By Fax: 3107 1388)
	DCVJV	Mr. Chu Chung Sing	(By Fax: 3121 6688)

Internal: DY, YH, ENPO Site

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

Dragages -China Harbour-VSL JV

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

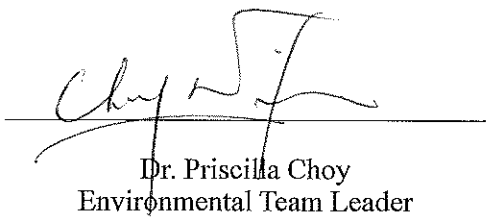
Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Quarterly EM&A Report

September to November 2016

(Version 2.0)

Certified By



Dr. Priscilla Choy
Environmental Team Leader

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties

CINOTECH CONSULTANTS LTD
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Email: info@cinotech.com.hk

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURE

LIST OF APPENDICES

EXECUTIVE SUMMARY

Introduction

1. This is the 15th Quarterly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the project "Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill" (hereinafter called the "Contract"). This report documents the findings of EM&A Works performed in the period between September to November 2016.

Environmental Monitoring and Audit Progress

2. A summary of the monitoring activities in this reporting period is listed in **Table I** below:

Table I Summary Table for Monitoring Activities in the Reporting Period

Parameter(s)	Monitoring Date(s)
1-hr TSP Monitoring	2nd, 8th, 14th, 20th, 26th and 30th September 2016 6th, 12th, 18th, 24th and 28th October 2016 3rd, 9th, 15th, 21st and 25th November 2016
24-hr TSP Monitoring	
Noise Monitoring	9th, 15th, 21st and 27th September 2016 7th, 13th, 19th and 25th October 2016 4th, 10th, 16th and 22nd November 2016
Water Quality Monitoring	2nd, 5th, 7th, 10th, 12th, 14th, 17th, 19th, 21st, 24th, 26th, 28th and 30th September 2016 3rd, 5th, 7th, 11th, 13th, 15th, 17th, 19th, 22nd, 24th, 26th, 28th and 31st October 2016 2nd, 4th, 8th, 10th, 12th, 14th, 16th, 18th, 22nd, 24th, 26th, 28th and 30th November 2016
Dolphin Monitoring (Line-transect Vessel Surveys)	9th and 20th September 2016 14th and 20th October 2016 4th and 11th November 2016
Environmental Site Inspection	6th, 13th, 20th and 27th September 2016 4th, 11th, 18th and 25th October 2016 1st, 8th, 15th, 22nd and 29th November 2016
Archaeological Site Inspection	20th September 2016

Breaches of Action and Limit Levels

3. Summary of the environmental exceedances of the reporting period is tabulated in **Table II**.

Table II Summary Table for Events Recorded in the Reporting Period

Environmental Monitoring	Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
		Action Level	Limit Level	Action Level	Limit Level
Air Quality	1-hr TSP	0	0	0	0
	24-hr TSP	0	0	0	0
Noise	$L_{eq(30min)}$	0	0	0	0
Water Quality	Dissolved Oxygen (DO) (Surface & Middle)	0	0	0	0
	Dissolved Oxygen (DO) (Bottom)	0	0	0	0
	Turbidity	0	0	0	0
	Suspended Solids (SS)	39	6	0	0
Dolphin Monitoring	Line-transect Vessel Surveys	0	0	0	0

4. Environmental monitoring works were performed in the reporting period and all monitoring results were checked and reviewed. The details of each exceedance were attached in the Monthly EM&A Reports.

Complaint Log

5. No environmental complaint was received in the reporting period.

Notification of Summons and Successful Prosecutions

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

Reporting Changes

7. This report has been developed in compliance with the reporting requirements for the quarterly EM&A Summary Report as required by the EM&A Manual for Hong Kong Link Road (EM&A Manual).

Future Key Issues

8. Major site activities for the coming reporting month will include:

WA4

- Cross Beam Precast Shell construction

Ancillary and Associated Facilities

- E&M installation
- E&M ducting installation
- Construction of Load Centre (CL1)
- Installation of carrier drains
- Installation of precast parapet skins
- Erection of Radar Platform
- Construction of median and side barriers
- Construction of longitudinal stitching
- Erection of gantry posts for Sign gantry
- Reinstatement of slope area and drainage works
- Reinstatement of sloping seawall

Marine Viaduct (P0 to P80)

Deck Erection

- Segment erection
- Erection of SOP segments
- Erection of cantilever
- Construction of cross beam precase shell
- In-situ RC works
- Erection of precase SOP unit to Turnaround
- Alignment and levels adjustment
- Construction of temporary platform

External Prestressing Tendon Installation

Internal Prestressing Grouting

1 INTRODUCTION

1.1 Cinotech Consultants Limited (Cinotech) was appointed by Dragages -China Harbour-VSL JV (hereinafter called "the Contractor") as the Environmental Team (ET) to undertake the Environmental Monitoring and Audit (EM&A) programme during construction phase of the Contract No. HY/2011/09 – Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill" (hereinafter called the "Contract") in accordance with EP Conditions 2.1.

Purpose of the report

1.2 This is the 15th Quarterly EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in the period between September and November 2016.

Structure of the report

1.3 The structure of the report is as follows:

Section 1: **Introduction -** purpose and structure of the report.

Section 2: **Contract Information** - summarises background and scope of the Contract, site description, project organization and contact details, construction programme, the construction works undertaken and the status of Environmental Permits/Licenses during the reporting month.

Section 3: **Environmental Monitoring and Audit Requirements -** summarises the monitoring parameters, monitoring frequency, monitoring locations, Action and Limit Levels, Event / Action Plans, site audit summary and environmental mitigation measures.

Section 4: **Environmental Monitoring Results -** summarises the environmental monitoring results in terms of air quality, noise, water quality, dolphin and waste management.

Section 5: **Environmental Non-conformance -** summarises any monitoring exceedance, environmental complaints, environmental summons and successful prosecutions within the reporting period.

Section 6: **Conclusions and Recommendation**

2 CONTRACT INFORMATION

Background

2.1 The proposed Hong Kong - Zhuhai - Macao Bridge Hong Kong Link Road (HKLR) is 12km long connecting the Hong Kong-Zhuhai-Macao Bridge (HZMB) at the HKSAR Boundary with the Hong Kong Boundary Crossing Facilities (HKBCF) situated at the north eastern waters of the Hong Kong International Airport, opening a new and direct connection route between Hong Kong, Macao and the Western Pearl River Delta.

2.2 The HKLR comprises a 9.4km long viaduct section from the HKSAR boundary to Scenic Hill on the Airport Island; a 1km tunnel section to the reclamation formed along the east coast of the Airport Island and a 1.6km long at-grade road section on the reclamation connecting to the HKBCF. The tunnel section of HKLR will pass under Scenic Hill, Airport Road and Airport Railway to minimize the environmental and visual impacts to Tung Chung residents.

2.3 An application (No ESB-110/2003) for an Environmental Impact Assessment (EIA) Study Brief under Section 5(1) of the Environmental Impact Assessment Ordinance (EIAO) was submitted by Highways Department (the Project Proponent) on 8 October 2003 with a Project Profile (No. No. PP-201/2003) for the Hong Kong - Zhuhai - Macao Bridge Hong Kong Section and North Lantau Highway Connection. The Hong Kong - Zhuhai - Macao Bridge Hong Kong Section and North Lantau Highway Connection has subsequently been renamed as HKLR. EPD issued an EIA Study Brief (No: ESB-110/2003) in November 2003 to the Project Proponent to carry out an EIA study.

2.4 An EIA Study (Reg. No. AEIAR-144/2009) has been undertaken to provide information on nature and extent of environmental impacts arising from the construction and operation of HKLR. The Environmental Permit was issued on 4 November 2009 (Permit No. EP-352/2009). Pursuant to Section 13 of the EIAO, the Director of Environmental Protection amends the Environmental Permit (No. EP-352/2009) based on the Application No. VEP-339/2011 and the environmental Permit (Permit No. EP-352/2009/A) was issued on 9 November 2011 for HKLR to the Highways Department as the Permit Holder. Subsequently, the Director of Environmental Protection amends the Environmental Permits (No. EP-352/2009/A, EP-352/2009/B, EP-352/2009/C) based on the Application No. VEP-409/2013, VEP-411/2013 and VEP-459/2014 respectively. The environmental Permit (Permit No. EP-352/2009/D) was then issued on 22 December 2014.

2.5 **Figure 1a-d** shows the layout of the Contract and the scope of the Contract works comprises the following major items:

- a dual 3-lane carriageway in the form of viaduct from the HKSAR boundary (connecting with the HZMB Main Bridge) to the Scenic Hill (connecting with the tunnel under separate Contract No. HY/2011/03), of approximately 9.4km in length with a hard shoulder for each bound of carriageway and a utilities trough on the outer edge of each bound of viaducts;
- a grade-separated turnaround facility located near San Shek Wan, composed of sliproads in the form of viaduct with single-lane carriageway bifurcated from the HKLR mainline with an elevated junction above the mainline;

- provision of ancillary facilities including, but not limited to, meteorological enhancement measures including the provisioning of anemometers and modification of the wind profiler station at hillside of Sha Lo Wan, provisioning of a compensatory marine radar, and provisioning of security systems; and
- associated civil, structural, geotechnical, marine, environmental protection, landscaping, drainage and highways electrical and mechanical (E&M) works, street lightings, traffic aids and sign gantries, marine navigational aids, ship impact protection system, water mains and fire hydrants, lightning protection system, structural health monitoring and maintenance management system (SHM&MMS), supervisory control and data acquisition (SCADA) system, as well as operation and maintenance provisions of viaducts, provisioning of facilities for installation of traffic control and surveillance system (TCSS), provisioning of facilities for installation of telecommunication cables/equipments and reprovisioning works of affected existing facilities/utilities.

Contract Organisation

2.6 Different parties with different levels of involvement in the Contract organization include:

- Supervising Officer's Representative (SOR) – Ove Arup & Partners Hong Kong Limited (ARUP)
- Contractor –Dragages -China Harbour-VSL JV (DCVJV)
- Environmental Team (ET) – Cinotech Consultants Ltd. (Cinotech)

2.7 The proposed project organization and lines of communication with respect to the on-site environmental management structure are shown in **Figure 2**. The key personnel contact names and numbers are summarized in **Table 2.1.**

Table 2.1 Key Contacts of the Contract

Party	Position	Name	Phone No.	Fax No.
SOR (ARUP)	CRE	Mr. Michael Chan	3767 5803	3767 5922
		Mr. Colin Meadows	3767 5801	
ENPO/IEC (Ramboll Environ)	Environmental Project Office Leader	Mr. Y. H Hui	3465 2888	3465 2899
	Independent Environmental Checker	Mr. Antony Wong	3465 2888	3465 2899
Contractor (DCVJV)	Deputy Project Director	Mr. W.K Poon	3121 6638	3121 6688
	Environmental Officer	Mr. CHU Chung Sing	3121 6672	
	24-hour Hotline	--	6898 6161	--
ET (Cinotech)	Environmental Team Leader	Dr. Priscilla Choy	2151 2089	3107 1388

2.8 Ramboll Environ Hong Kong Limited (Ramboll Environ) is employed by the Highways Department as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) for the Project.

Construction Programme

2.9 A copy of Contractor's construction programme is provided in **Appendix A**.

Summary of Construction Works Undertaken During Reporting Period

2.10 The major site activities undertaken in the reporting period included:

September 2016:

Ancillary and Associated Facilities

(a) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing;

(b) Installation of precast parapet skins between P44 to P38 is in progress. The Progress is as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to end of month)
Parapet Casting	345	1522
Parapet Installation	68	688

(c) Construction of side barriers from P103 to P113 is in progress, currently total 177m in-situ side barriers were cast and 51 m precast side barriers were installed;

(d) Construction of median barriers from P112 to P99 is in progress, currently total 165m of in-situ median barriers were cast and 96m precast median barriers were installed;

(e) Construction of longitudinal stitching between P99 to P102 (concrete planking) is in progress;

(f) E&M installation at ML6 continues;

(g) E&M ducting installation at ML15 to ML17;

(h) Construction of Load Centre 1 (LC1) commence;

(i) Installation of carrier drains from P113 to P106 is in progress;

(j) Erection of Radar Platform at P20 is in progress.

Deck Erection

(a) Segment erection in September 2016:

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)
Launching Gantry 1 (LG1)*	All completed	0	1020
Launching Gantry 2 (LG2)	P13 and P12	120	1316

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)
Lifting Frames 1 (LF1) and Hanger Beam (HB)	P71, P73, P76, P77 and P79	52	622
Lifting Frames 3 (LF3) and Hanger Beam (HB)	P52, P60 & P76	33	686
Typical Span SOP	P08, P07, P06 and P05	16	224
Long Span SOP	P68 & P82	10	82
Movement Joint (MJ) SOP Airport Channel	N/A	0	8
Short Span (SS) SOP type B	P57 & P58	4	12

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3	100% 100% 100%
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3	100% 100% 100%
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3	100% 100% 100%
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3	100% 100% 100%
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3	100% 100% 100%
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3	100% 100% 100%
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3	100% 100% 100%
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3	100% 100% 78%
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3	100% 100% 70%
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3	26% 17% 0%
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3	24% 16% 0%
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
	Threading	113.04	T	100%

Viaduct	Activities	Quantities	Unit	Done %
ML06L	Stressing Grouting	24 22.35	U M3	100% 100%
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3	100% 100% 70%
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3	100% 100% 70%
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3	30% 30% 0%
ML04L	Threading Stressing Grouting	113.04 24 22.35	T U M3	30% 30% 0%
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3	72% 31% 0%
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3	00% 00% 0%
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3	5% 8% 0%
ML02L	Threading Stressing Grouting	113.73 24 22.49	T U M3	5% 8% 0%

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Air test & Grouting	14.09	M3	100%
ML19R	Air test & Grouting	14.90	M3	100%
ML19L	Air test & Grouting	13.90	M3	100%
ML18R	Air test & Grouting	25.24	M3	100%
ML18L	Air test & Grouting	24.76	M3	96%
ML17R	Air test & Grouting	23.47	M3	100%
ML17L	Air test & Grouting	23.46	M3	100%
ML16R	Air test & Grouting	36.54	M3	99%
ML16L	Air test & Grouting	35.46	M3	99%
ML15R	Air test & Grouting	39.34	M3	45%
ML15L	Air test & Grouting	39.69	M3	44%
ML09R	Air test & Grouting	63.27	M3	24%
ML09L	Air test & Grouting	57.86	M3	32%
ML08R	Air test & Grouting	36.58	M3	31%
ML08L	Air test & Grouting	36.56	M3	31%
ML07R	Air test & Grouting	59.61	M3	46%
ML07L	Air test & Grouting	60.05	M3	55%
ML06R	Air test & Grouting	58.31	M3	100%
ML06L	Air test & Grouting	58.31	M3	100%
ML05R	Air test & Grouting	58.62	M3	55%
ML05L	Air test & Grouting	58.01	M3	91%

Viaduct	Activities	Quantities	Unit	Done %
ML04R	Air test & Grouting	57.64	M3	32%
ML04L	Air test & Grouting	57.69	M3	41%
ML03R	Air test & Grouting	126.65	M3	0%
ML03L	Air test & Grouting	127.63	M3	0%
ML02R	Air test & Grouting	62.74	M3	11%
ML02L	Air test & Grouting	62.74	M3	10%

Precast Segment

(a) Segment Casting:

- Production affected by inclement weather: 2.5 days.
- All new moulds are under full operation.
- 16 nos. of new Type B* segments were completed in early September 2016 for accommodating I-beam connection of turnaround facility.
- Mould no. 11 has been modifying from Type C production to Type A after casting P74. There are 10 nos moulds in operation for Type A segment production at the end of Sep 2016.
- All SOPs, type CH1 to 10 and type C casting were completed in mid-September 2016.

Item	Number in this reporting period	Cumulative No. of Precast Segment Completed (up to 28th of each month)
Segment Cast	306	5228

Remarks: Cumulative no. excludes the 7 nos. recast following damages to segments due to toppled incident at the casting yard.

(b) Off-site Storage:

Area	No. in Off-site Storage
A3	36

Delivery for Precast Concrete Elements (by barge)

(a) Precast Deck Segments:

- Number of barges engaged in this period: 18.
- Number of deck segment deliveries in this period: 42 trips.
- Cumulative number of deck segment deliveries: 818 trips.

Segment Types	Segment Delivered in this reporting period	Cumulative No. of Precast Segment Delivered (up to 28th of each month)
A	117	2001
B	12	42
C	80	794

Segment Types	Segment Delivered in this reporting period	Cumulative No. of Precast Segment Delivered (up to 28th of each month)
D	4	196
E	0	1014

October 2016:

Ancillary and Associated Facilities

(k) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing coupling with the additional maintenance path;

(l) Reinstatement of sloping seawall at P102 and P103;

(m) Installation of precast parapet skins between P44 to P38 is in progress. The Progress is as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to end of month)	Completion Percentage (%)
Parapet Casting	462	1984	29.5%
Parapet Installation	242	930	13.8%

(n) Construction of side barriers from P102 to P113 is in progress, currently total 229m in-situ side barriers were cast and 183m precast side barriers were installed;

(o) Construction of median barriers from P112 to P97 is in progress, currently total 218m of in-situ median barriers were cast and 274m precast median barriers were installed;

(p) Construction of longitudinal stitching between P96 to P102 (concrete planking) is in progress;

(q) E&M installation at ML4 continues;

(r) E&M ducting installation at ML6 continues;

(s) Construction of Load Centre 1 (LC1) was completed ;

(t) Installation of carrier drains from P113 to P98 is in progress ;

(u) Erection of Radar Platform at P20 is in progress.

Deck Erection

(b) Segment erection in October 2016:

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)
Launching Gantry 1 (LG1)	All completed	0	1020

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)
Launching Gantry 2 (LG2)	P11, P10 and P09	124	1440
Lifting Frames 1 (LF1) and Hanger Beam (HB)	P70, P71, P77 and P79	104	694
Lifting Frames 3 (LF3) and Hanger Beam (HB)	P52, P53, P60 & P76	44	762
Typical Span SOP	P3 and P4	8	232
Long Span SOP	P75 & P82	8	90
Movement Joint (MJ) SOP Airport Channel	P74	4	12
Short Span (SS) SOP type B	P59	4	16

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3	100% 100% 100%
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3	100% 100% 100%
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3	100% 100% 100%
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3	100% 100% 100%
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3	100% 100% 100%
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3	100% 100% 100%
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3	100% 100% 100%
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3	100% 100% 78%
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3	100% 100% 10%
ML08R	Threading Stressing Grouting	85.72 24 16.89	T U M3	100% 0% 0%
ML08L	Threading Stressing Grouting	85.72 24 16.89	T U M3	100% 0% 0%
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3	25% 17% 0%

Viaduct	Activities	Quantities	Unit	Done %
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3	23% 16% 0%
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
ML06L	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3	100% 100% 100%
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3	100% 100% 100%
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 0%
ML04L	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 0%
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3	100% 25% 0%
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3	33% 100% 0%
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3	5% 8% 0%
ML02L	Threading Stressing Grouting	113.73 24 22.49	T U M3	5% 8% 0%

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Air test & Grouting	14.09	M3	100%
ML19R	Air test & Grouting	14.90	M3	100%
ML19L	Air test & Grouting	13.90	M3	100%
ML18R	Air test & Grouting	25.24	M3	100%
ML18L	Air test & Grouting	24.76	M3	96%
ML17R	Air test & Grouting	23.47	M3	100%
ML17L	Air test & Grouting	23.46	M3	100%
ML16R	Air test & Grouting	36.54	M3	99%
ML16L	Air test & Grouting	35.46	M3	99%
ML15R	Air test & Grouting	39.34	M3	45%
ML15L	Air test & Grouting	39.69	M3	44%
ML09R	Air test & Grouting	63.27	M3	25%
ML09L	Air test & Grouting	57.86	M3	32%
ML08R	Air test & Grouting	36.58	M3	47%
ML08L	Air test & Grouting	36.56	M3	31%
ML07R	Air test & Grouting	59.61	M3	46%

Viaduct	Activities	Quantities	Unit	Done %
ML07L	Air test & Grouting	60.05	M3	55%
ML06R	Air test & Grouting	58.31	M3	100%
ML06L	Air test & Grouting	58.31	M3	100%
ML05R	Air test & Grouting	58.62	M3	68%
ML05L	Air test & Grouting	58.01	M3	91%
ML04R	Air test & Grouting	57.64	M3	74%
ML04L	Air test & Grouting	57.69	M3	61%
ML03R	Air test & Grouting	126.65	M3	0%
ML03L	Air test & Grouting	127.63	M3	0%
ML02R	Air test & Grouting	62.74	M3	11%
ML02L	Air test & Grouting	62.74	M3	10%

Turnaround Facilities

(a) 2 SOP based at Turnaround Facility were erected. Alignment and levels adjustment is in progress.

Precast Segment

(c) Segment Casting:

Item	Number in this reporting period	Cumulative No. of Precast Segment Completed (up to 28th of each month)	Completion Percentage (%)
Segment Cast	261	5489	96.1%

Remarks: Cumulative no. excludes the 7 nos. recast following damages to segments due to toppled incident at the casting yard.

(d) Production affected by inclement weather: 11 days

(e) All Type B* segments were completed in mid-October 2016.

(f) All SOPs, type CHV1 to 3, CH1 and type C casting were completed.

(g) 2 nos. wet-joint (2 nos. in total for CHV type) in between CHV07 &06 were completed.

(h) Wet joint (7 nos. in total for CH type) in between CH15 & 16 was commenced.

(i) All segments in off-yard storage A3 were transported back to CCCC2's precast yard in Zhongshan.

Delivery for Precast Concrete Elements (by barge)

(b) Precast Deck Segments:

- Number of barges engaged in this period: 18.
- Number of deck segment deliveries in this period: 62 trips.
- Cumulative number of deck segment deliveries: 880 trips.

Segment Types	Segment Delivered in this reporting period	Cumulative No. of Precast Segment Delivered (up to 28th of each month)
A	159	2160
B	8	50
C	146	940
D	6	202
E	0	1014

November 2016:

Ancillary and Associated Facilities

(v) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing coupling with the additional maintenance path;

(w) Reinstatement of sloping seawall at P81, P103 and P104 in progress;

(x) The precast parapet progress is summarized as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to end of month)	Completion Percentage (%)
Parapet Casting	530	n/a	2514
Parapet Installation	227	P29 - P44 P114-P115	1157

(y) Construction of side barriers from P100 to P113 is in progress, currently total 307m in-situ side barriers were cast and 837m precast side barriers were installed;

(z) Construction of median barriers from P33 & P43 and P112 to P96 is in progress, currently total 322m of in-situ median barriers were cast and 416m precast median barriers were installed;

(aa) Construction of stitching from P44 to P41 is in progress;

(bb) Construction of longitudinal stitching between P93 to P102 (concrete planking) is in progress;

(cc) E&M installation at ML9 continues;

(dd) E&M ducting installation at ML6 continues;

(ee) E&M installation in Transformer Room and HV Room in SHT building continues;

(ff) Installation of carrier drains from P115 to P93 is in progress;

(gg) Erection of Radar Platform at P20 is in progress;

(hh) Sealing of deck openings is in progress.

Deck Erection

(c) Segment erection in November 2016:

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)	Percentage (total no.)
LG1	All completed	0	1020	100% (1020)

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to 28th of each month)	Percentage (total no.)
LG2	P08, P07, P06 and P05	156	1596	91% (1749)
LF1 & HB	P68, P70, P74, P77, P79 and P80	133	827	62% (1340)
LF3 & HB	P60 and P76	35	798	89% (900)
Typical Span SOP	P2 and P1	8	240	99% (242)
Long Span SOP	-	0	90	94% (96)
MJ SOP Airport Channel	P78	4	16	80% (20)
SS & MJ SOP type B	All completed	0	16	100% (16)
Typical Span Segment type B	P54L	6	6	4% (148)
Segment Lifter	-	0	0	0% (183)

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3	100% 100% 100%
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3	100% 100% 100%
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3	100% 100% 100%
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3	100% 100% 100%
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3	100% 100% 100%
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3	100% 100% 100%
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3	100% 100% 100%
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3	100% 100% 100%
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3	100% 100% 100%
ML15R	Threading Stressing Grouting	108.74 18 21.15	T U M3	87.77% 0% 0%
ML15L	Threading Stressing Grouting	106.26 18 21.45	T U M3	87.78% 0% 0%
ML08R	Threading	85.72	T	100%

Viaduct	Activities	Quantities	Unit	Done %
	Stressing Grouting	24 16.89	U M3	0% 0%
ML08L	Threading Stressing Grouting	85.72 24 16.89	T U M3	100% 0% 0%
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3	25% 17% 0%
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3	23% 16% 0%
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
ML06L	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3	100% 100% 100%
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3	100% 100% 100%
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 100%
ML04L	Threading Stressing Grouting	113.04 24 22.35	T U M3	100% 100% 24%
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3	100% 81% 0%
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3	33% 75% 0%
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3	69% 8% 0%
ML02L	Threading Stressing Grouting	113.73 24 22.49	T U M3	64% 8% 0%

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit	Done %
ML19C	Air test & Grouting	14.09	M3	100%
ML19R	Air test & Grouting	14.90	M3	100%
ML19L	Air test & Grouting	13.90	M3	100%
ML18R	Air test & Grouting	25.24	M3	100%
ML18L	Air test & Grouting	24.76	M3	96%
ML17R	Air test & Grouting	23.47	M3	100%
ML17L	Air test & Grouting	23.46	M3	100%
ML16R	Air test & Grouting	36.54	M3	99%
ML16L	Air test & Grouting	35.46	M3	99%

Viaduct	Activities	Quantities	Unit	Done %
ML15R	Air test & Grouting	39.34	M3	45%
ML15L	Air test & Grouting	39.69	M3	44%
ML09R	Air test & Grouting	63.27	M3	25%
ML09L	Air test & Grouting	57.86	M3	32%
ML08R	Air test & Grouting	36.58	M3	31%
ML08L	Air test & Grouting	36.56	M3	31%
ML07R	Air test & Grouting	59.61	M3	46%
ML07L	Air test & Grouting	60.05	M3	55%
ML06R	Air test & Grouting	58.31	M3	100%
ML06L	Air test & Grouting	58.31	M3	100%
ML05R	Air test & Grouting	58.62	M3	91%
ML05L	Air test & Grouting	58.01	M3	91%
ML04R	Air test & Grouting	57.64	M3	83%
ML04L	Air test & Grouting	57.69	M3	83%
ML03R	Air test & Grouting	126.65	M3	0%
ML03L	Air test & Grouting	127.63	M3	0%
ML02R	Air test & Grouting	62.74	M3	0%
ML02L	Air test & Grouting	62.74	M3	0%

Turnaround Facilities

(b) Formwork erection and steel fixing for 2 nos. SOP in-situ part at Turnaround is in progress;
(c) Megashor towers assembly for box girder supports is in progress;
(d) BG01 and CB01 & 02 were cast at Pan Yu casting yard;
(e) Erection of formwork for BG02 and construction of CB03 is in progress.

Precast Segment

(j) Segment Casting:

Item	Number in this month	Cumulative No. of Precast Segment Completed (up to end of month)	Completion Percentage (%)
Segment Cast	203	5692	99.6% (5714)

Remarks: Cumulative no. excludes the 7 nos. recast following damages to segments due to toppled incident at the casting yard.

(k) Production affected by inclement weather: 2.5 days

(l) All Type B* segments were completed in mid-November 2016.

(m) All SOPs, type CHV1 to 4, CH1 to CH2, CH4 and type C casting were completed.

(n) 2 nos. wet-joint (2 nos. in total for CHV type) in between CHV07 &06 were completed.

(o) 6 nos. wet joint (7 nos. in total for CH type) in between CH15 & 16 were completed.

(p) All segments in off-yard storage A3 were transported back to CCCC2's precast yard in Zhongshan.

(q) The last segment is tentatively to be cast on 12 December 2016.

Delivery for Precast Concrete Elements (by barge)

(c) Precast Deck Segments:

- Number of barges engaged in this period: 18.
- Number of deck segment deliveries in this period: 72 trips.
- Cumulative number of deck segment deliveries: 952 trips.

Segment Types	Segment Delivered in this reporting period	Cumulative No. of Precast Segment Delivered (up to 28th of each month)	Percentage (total no.)
A	182	2342	94.4% (2480)
B	14	64	21.1% (304)
C	152	1092	64.2% (1700)
D	8	210	97.2% (216)
E	0	1014	100% (1014)

Status of Environmental Licences, Notification and Permits

2.11 The valid environmental licenses and permits were attached in the Monthly EM&A Reports.

3 ENVIRONMENTAL MONITORING AND AUDIT REQUIREMENTS

Monitoring Parameters and Monitoring Locations

3.1 The EM&A Manual designates locations for the ET to monitor environmental impacts in terms of air quality, noise, underwater noise, water quality and dolphin to the Contract. The monitoring locations are depicted in **Figures 3 to 6**. The details of monitoring requirements are presented in **Table 3.1**.

Table 3.1 Summary of Impact EM&A Requirements

Type of Monitoring	Parameter	Frequency	Location	Remarks
Air Quality	1-hr TSP	Three times / 6 days	AMS1 – Sha Lo Wan AMS4 – San Tau	While the highest dust impact was expected
	24-hr TSP	Once / 6 days		--
Noise	$L_{10(30\ min.)}$ dB(A) $L_{90(30\ min.)}$ dB(A) $L_{eq(30\ min.)}$ dB(A) (as six consecutive $L_{eq,\ 5min}$ readings)	Once per week	NMS1 – Sha Lo Wan NMS4 – San Tau	Daytime on normal weekdays (0700-1900 hrs)
Water Quality	• Temperature(°C) • pH(pH unit) • turbidity (NTU) • water depth (m) • salinity (ppt) • dissolved oxygen (DO) (mg/L and % of saturation) • suspended solids (SS) (mg/L)	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides (within ± 1.75 hour of the predicted time) during the construction period of the Contract	IS1, IS2, IS3 IS4, CS1, CS2, SR1, SR2, SR3, SR6, ST1, ST2, ST3, SRA	• 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.
Dolphin	Line-transect Methods	Twice per month	West Lantau	--

3.2 The wind speed and wind direction were recorded by the installed Wind Anemometer set at AMS4. The location is shown in **Figure 3**.

Monitoring Methodology and Calibration Details

3.3 Monitoring works/equipments were conducted/calibrated regularly in accordance with the EM&A Manual. Copies of calibration certificates are attached in the appendices of the Monthly EM&A Reports.

Environmental Quality Performance Limits (Action and Limit Levels)

3.4 The environmental quality performance limits, i.e. Action and Limit Levels were derived from the baseline monitoring results (except the Action and Limit Levels for underwater noise monitoring). Should the measured environmental quality parameters exceed the Action/Limit Levels, the respective action plans would be implemented. The Action/Limit Levels for each environmental parameter are given in **Table 3.2a-f**.

Table 3.2a Action and Limit Levels for 1-Hour TSP

Location	Action Level, µg/m^3	Limit Level, µg/m^3
AMS1	381	500
AMS4	352	

Table 3.2b Action and Limit Levels for 24-Hour TSP

Location	Action Level, µg/m^3	Limit Level, µg/m^3
AMS1	170	260
AMS4	171	

Table 3.2c Action and Limit Levels for Construction Noise

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

Noted: If works are to be carried during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.
(*) reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

Table 3.2d Action and Limit Levels for Water Quality

Parameter (unit)	Water Depth	Action Level	Limit Level
Dissolved Oxygen (mg/L) (surface, middle, bottom)	Surface and Middle	***5.0***	***4.2*** except 5 for FCZ
	Bottom	***4.7***	***3.6***
Turbidity (NTU)	Depth average	***27.5*** and 120% of upstream control station's turbidity at the same tide of the same day	***47.0*** and 130% of turbidity at the upstream control station at the same tide of same day
Suspended Solids (mg/L)	Depth average	***23.5*** and 120% of upstream control station's SS at the same tide of the same day	***34.4*** and 130% of SS at the upstream control station at the same tide of same day and 10mg/L for WSD Seawater Intakes

Note:
(1) Depth-averaged is calculated by taking the arithmetic means of reading of all three depths
(2) For DO, non-compliance of the water quality limit occurs when monitoring result is lower that the limit.
(3) For SS & turbidity non-compliance of the water quality limits occur when monitoring result is higher than the limits.
(4) All the figures given in the table are used for reference only and the EPD may amend the figures whenever it is considered as necessary.
(5) The 1%-ile of baseline data for dissolved oxygen (surface and middle) and dissolved oxygen (bottom) are 4.2mg/L and 3.6mg/L respectively.

Table 3.2e Action and Limit Levels for Dolphin Line Transect Monitoring

	West Lantau
Action Level	STG < 60% of baseline & ANI <60% of baseline
Limit Level	STG < 45% of baseline & ANI <45% of baseline

Derived Value of Action Level (AL) and Limit Level (LL):

	West Lantau
Action Level	STG < 9.8 & ANI <36.3
Limit Level	STG < 7.4 & ANI <27.2

Remarks:
1. STG means quarterly encounter rate of number of dolphin sightings
2. ANI means quarterly encounter rate of total number of dolphins
3. Baseline value: 16.4 for ER (STG) and 60.5 for ER (ANI)

Event and Action Plan

3.5 Should non-compliance of the criteria occur, action in accordance with the Action Plan in **Appendix G** shall be carried out.

Implementation Status of Environmental Mitigation Measures

3.6 Relevant mitigation measures as recommended in the EIA report have been stipulated in the EM&A Manual for the Contractor to implement. The implementation status of environmental mitigation measures (EMIS) is given in **Appendix H**.

3.7 Regular marine travel route for marine vessels were implemented properly in accordance with the submitted plan and relevant records were kept properly.

3.8 Acoustic decoupling measures for the stationary equipment (generators, winch generators and air compressors) mounted on boards were adopted according to EP Condition 3.7 and EM&A Manual, Section 10.2.18.

3.9 Dolphin exclusion zone and dolphin watching plan according to EM&A Manual, Section 10.2.12 and EP Condition 3.5 was implemented by DCVJV's trained dolphin watcher.

3.10 Spill kits and booms are ready on site for the event of accidental spillage of oil or other hazardous chemicals from construction activities including vessels operating for the Contract.

Site Audit Summary

3.11 Site audits were carried out by ET on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Contract site. The observations and recommendations made during the reporting period are summarized in **Appendix I**.

3.12 According to EP condition 4.7 and EM&A Manual, periodic monitoring (every three months) of construction works shall be conducted to ensure the avoidance of any impacts on Sha Lo Wan (West) Archaeological Site. Access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment is not allowed. One inspection to the Sha Lo Wan (West) Archaeological Site was conducted in the reporting period (20th September 2016). No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed. The photographic records of the inspection to the Sha Lo Wan (West) Archaeological Site are shown in the Monthly EM&A Reports**.**

Status of Waste Management

3.13 The amount of wastes generated by the activities of the Contract during the reporting month is shown in **Appendix J**.

4 ENVIRONMENTAL MONITORING RESULTS

Air Quality Monitoring Results

4.1 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 4.1 and 4.2** respectively. Graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices B and C** respectively.

Table 4.1 Summary Table of 1-hour TSP Monitoring Results during the Reporting Period

Month	Monitoring Station	Concentration (µg/m3)		Action Level, µg/m^3	Limit Level, µg/m^3
		Average	Range		
September 2016	AMS1	64	5 – 172	381	500
	AMS4	34	7 – 97	352	
October 2016	AMS1	33	14 – 75	381	
	AMS4	37	16 – 72	352	
November 2016	AMS1	53	20 – 148	381	
	AMS4	99	10 – 224	352	

Table 4.2 Summary Table of 24-hour TSP Monitoring Results during the Reporting Period

Month	Monitoring Station	Concentration (µg/m3)		Action Level, µg/m^3	Limit Level, µg/m^3
		Average	Range		
September 2016	AMS1	54	27 – 94	170	260
	AMS4	34	13 – 97	171	
October 2016	AMS1	27	10 – 49	170	
	AMS4	38	22 – 56	171	
November 2016	AMS1	48	26 – 62	170	
	AMS4	40	3 – 63	171	

4.2 According to our field observations, the major dust source identified at the designated air quality monitoring stations in the reporting period are as follows:

Table 4.3 Observation at Dust Monitoring Stations

Monitoring Station	Major Dust Source
AMS1	Exhaust from marine traffic
AMS4	N/A

4.3 The wind data monitoring results were attached in the Monthly EM&A Reports

Noise Monitoring Results

4.4 The noise monitoring results are summarized in **Table 4.4**. Graphical presentations of noise monitoring are shown in **Appendix D**.

Table 4.4 Summary Table of Noise Monitoring Results during the Reporting Period

Month	Monitoring Station	Noise Level, $L_{eq\ (30min)}$ dB(A)		Limit Level
		Average	Range	
September 2016	NMS1	66	61 – 70	75 dB(A)
	NMS4	58	57 – 59	
October 2016	NMS1	64	63 – 66	
	NMS4	57	57 – 58	
November 2016	NMS1	67	58 – 69	
	NMS4	59	57 – 61	

Remark: +3dB(A) Façade correction included

4.5 According to our field observations, the major noise source identified at the designated noise monitoring stations in the reporting period are as follows:

Table 4.5 Observation at Noise Monitoring Stations

Monitoring Station	Major Noise Source
NMS1	Air traffic & marine traffic noise
NMS4	Air traffic & marine traffic noise

Water Quality Monitoring Results

4.6 The graphical presentation of water quality at the monitoring stations is shown in **Appendix E**.

4.7 Water quality impact sources during the water quality monitoring were the construction activities of the Contract, nearby construction activities by other parties and nearby operating vessels by other parties.

Dolphin Monitoring (Line-transect Vessel Survey)

Summary of survey effort and dolphin sightings

4.8 During the period of September to November 2016, six sets of systematic line-transect vessel surveys were conducted to cover all transect lines in WL survey area twice per month.

4.9 From these surveys, a total of 201.26 km of survey effort was collected, with 96.0% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). The total survey effort conducted

on primary lines was 132.97 km, while the effort on secondary lines was 68.29 km. Survey effort conducted on primary and secondary lines were both considered as on-effort survey data. Summary table of the survey effort is shown in **Appendix I of Appendix F**.

4.10 During the six sets of monitoring surveys in September to November 2016, a total of 23 groups of 87 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort search. Seventeen on-effort sightings were made on primary lines, while the other six on-effort sightings were made on secondary lines. Summary table of the dolphin sightings is shown in **Appendix II of Appendix F**.

Distribution

4.11 Distribution of dolphin sightings made during monitoring surveys in September to November 2016 is shown in **Figure 1 of Appendix F**. The dolphin groups were evenly distributed throughout the survey area with the exception of the northern section (especially the waters adjacent to the HKLR09 alignment) where they rarely occurred during the quarterly period (**Figure 1 of Appendix F)**.

4.12 Sighting distribution of dolphins in the present quarter was quite different from the one during the baseline period in September to November 2011. When compared to the baseline period, dolphins occurred much less frequently in the to the north of Tai O Peninsula, but more frequently in waters between Peaked Hill and Fan Lau during the present impact phase period (**Figure 1 of Appendix F)**.

4.13 Only one of the 23 dolphin groups was sighted near the HKLR09 alignment in WL survey area during the present quarter (**Figure 2 of Appendix F)**.

4.14 Distribution patterns of dolphin sightings in the past three autumn quarters of 2013-15 were also compared with the one in 2016. Dolphins appeared to occur less frequently in the northern portion of the WL survey area but more often in the waters between Peaked Hill and Fan Lau in the autumn of 2016 when compared to the previous three autumn periods (**Figure 3 of Appendix F**).

Encounter rate

4.15 During the present three-month impact phase monitoring period (September to November 2016), the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) from West Lantau survey area are shown in **Table 4.6**. The average encounter rates deduced from the six sets of surveys from the

present quarter were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (**Table 4.7**).

Table 4.6 Dolphin encounter rates (sightings per 100 km of survey effort) during the impact monitoring period (September –November 2016)

Survey Area	Dolphin Monitoring	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
West Lantau	Set 1 (September 8th)	17.4	43.5
	Set 2 (September 20th)	14.2	71.0
	Set 3 (October 6th)	9.0	54.2
	Set 4 (October 13th)	5.2	21.0
	Set 5 (November 9th)	4.5	4.5
	Set 6 (November 16th)	28.6	128.8

Table 4.7 Comparison of average dolphin encounter rates from impact monitoring period (September to November 2016) and baseline monitoring period (September-November 2011)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	September-November 2016	**September-November 2011**	**September-November 2016**	**September-November 2011**
West Lantau	13.17 ± 9.08	16.43 ± 7.70	53.82 ± 43.64	60.50 ± 38.47

4.16 Notably, the encounter rates of dolphin sightings (ER(STG)) and encounter rates of dolphins (ER(ANI)) for the present autumn quarter of 2016 were both at a lower level among all quarters (**Table 4 of Appendix F**). Such temporal trend should be continuously monitoring to detect any further decline in the future, even though the Action or Limit Level still has not been triggered under the Event and Action Plan for this quarter.

4.17 A one-way ANOVA was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. For the comparison between the baseline period and the present quarter (i.e. fourteenth quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.517 and 0.784 respectively. Therefore, no significant difference in dolphin encounter rate was detected between the baseline period and the present quarter.

4.18 Another comparison was made between the baseline period and the cumulative quarters in the impact phase (i.e. first thirteen quarters of the impact phase), and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.686 and 0.848 respectively. As a result, no significant difference was found in the dolphin encounter rates between the baseline period and the cumulative quarters in the impact phase.

Group size

4.19 Group size of Chinese White Dolphins ranged from 1-13 individuals per group in WL survey area during September to November 2016. The average dolphin group size for the three-month period was compared with the one deduced from the baseline period in September to November 2011, as shown in **Table 4.8**.

Table 4.8 Comparison of average dolphin group sizes from impact monitoring period (September – November 2016) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	September – November 2016	**September – November 2011**
West Lantau	3.78 ± 2.56 (n = 23)	3.63 ± 2.97 (n = 46)

4.20 The average dolphin group size in the WL region during the present quarter was slightly higher than the one recorded in the three-month baseline period (**Table 4.8**). Among the 23 groups, 14 of them were composed of only 1-4 dolphins, while there were nine groups with five or more animals per group.

4.21 Distribution of dolphins with the larger groups during September to November 2016 is shown in **Figure 4 of Appendix F**. Most of these groups were scattered in the southern portion of the WL survey area, with slightly higher concentration to the north of Kai Kung Shan and near Fan Lau (**Figure 4 of Appendix F**).

4.22 Distribution of larger dolphin groups in the present impact phase period was very different from the baseline period, when they were more concentrated to the northwest of Tai O Peninsula as well as near Kai Kung Shan and Peaked Hill (**Figure 4 of Appendix F**).

Habitat use

4.23 From September to November 2016, the most heavily utilized habitats by the dolphins with higher densities were to the north of Kai Kung Shan, near Peaked Hill and Fan Lau (**Figures 5a and 5b of Appendix F**). However, it should be cautioned that the amount of survey effort collected in each grid during the three-month period was fairly low (six units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more

complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.

4.24 When compared with the habitat use pattern recorded during the baseline period in September-November 2011, it appears that the overall dolphin densities were less evenly distributed in the present impact phase monitoring period, and were much lower in certain areas such as the waters just to the south of the HKLR09 alignment and around Tai O Peninsula (**Figure 6 of Appendix F**).

Mother-calf pairs

4.25 During the three-month impact phase monitoring period, five young calves (all were unspotted juvenile) were sighted in WL survey area. These young calves comprised 5.7% of all animals sighted, which was slightly lower than the percentage recorded during the baseline monitoring period (6.6%).

4.26 The occurrence of these young calves was mainly located to the north of Kai Kung Shan, which was very different from the baseline period when calf occurrence was more frequent and concentrated near Tai O Peninsula at the northern portion of WL waters (**Figure 7 of Appendix F**).

Activities and associations with fishing boats

4.27 During the three-month impact monitoring period, three dolphin groups were engaged in feeding activities near Kai Kung Shan and to the offshore waters of Fan Lau (**Figure 8 of Appendix F**), comprising 13.0% of the total number of dolphin sightings. This percentage was exactly the same as the percentage recorded during the baseline period (13.0%).

4.28 On the other hand, only one dolphin group was engaged in socializing activity at the western territorial boundary off Kai Kung Shan during the present quarter (**Figure 8 of Appendix F**).

4.29 Distribution of different activities during the present impact phase monitoring period was quite different from the one during the baseline period, when the main concentration of the feeding and socializing activities occurred at the central portion of the survey area between Tai O Peninsula and Peaked Hill (**Figure 8 of Appendix F**).

4.30 During the three-month monitoring period, none of the 23 dolphin groups was associated with any operating fishing vessel.

Summary of photo-identification works

4.31 From September to November 2016, over 2,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

4.32 In total, 33 individuals sighted 42 times altogether were identified (see summary table in **Appendix III of Appendix F** and photographs of identified individuals in

Appendix IV of Appendix F). All except three identified individuals (WL123, WL168 and WL220) were sighted only once or twice during the three-month period.

Individual range use

4.33 Ranging patterns of the 33 individuals identified during the three-month study period were determined by fixed kernel method, as shown in **Appendix V of Appendix F**.

4.34 Notably, just a few individual dolphins (e.g. NL296, NL302) that primarily centered their range use in North Lantau in the past were found extending their ranges to West Lantau waters (further south of the HKLR09 alignment), with obvious shifts and expansions of their range use away from North Lantau waters (**Appendix V of Appendix F**).

4.35 On the contrary, the majority of these individuals that primarily centered their range use in West Lantau were still sighted within their normal range during the present quarterly period, with some extending their range use into Southwest Lantau waters (**Appendix V of Appendix F**).

Conclusion

4.36 During the present quarter of dolphin monitoring, no adverse impact from the activities of the HKLR09 construction project on Chinese White Dolphins was noticeable from general observations.

4.37 Nevertheless, the dolphin usage in WL region should be continuously monitored, to further examine whether it has been significantly affected by the on-going construction activities in relation to the HZMB works.

Advice on the Solid and Liquid Waste Management Status

4.38 The Contractor was advised to minimize the wastes generated through the recycling or reusing. All mitigation measures stipulated in approved waste management plan shall be fully implemented.

4.39 The amount of wastes generated by the activities of the Contract during the reporting month is shown in **Appendix J**.

5 ENVIRONMENTAL NON-CONFORMANCE (EXCEEDANCES)

Summary of Exceedances

5.1 Summary of exceedance is provided in **Appendix K**. The details of the exceedances were attached in the Monthly EM&A Report.

Air Quality

5.2 For 1-hour TSP monitoring, no Action/Limit Level exceedance was recorded in the reporting period.

5.3 For 24-hr TSP monitoring, no Action/Limit Level exceedance was recorded in the reporting period.

Noise

5.4 No Action/Limit Level exceedance was recorded in the reporting period.

Water Quality

5.5 There are 39 Action Level exceedances and 6 Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded in the reporting period.

5.6 According to the investigation, the exceedances are considered not due to the Contract due to the following reasons:

1) No pollution discharge was observed from the site;
2) Localized sediment plume due to the rough water condition was observed;
3) The exceeded result was similar to the ranges baseline monitoring results;
4) Monitoring station is situated at the upstream of the construction sites;
5) Sediment plume due to natural fluctuation of shallow water was observed;
6) Control Station value already exceeded either the Baseline Action or Limit Levels. (Please refer to table below);

Station(s)	Tide	Suspended Solids (mg/L)
CS1	Mid-Flood Tide	26.5

Dolphin Monitoring (Line-transect Vessel Survey)

5.7 No Action/Limit Level exceedance was recorded in the reporting period.

Summary of Environmental Complaint

5.8 No environmental related complaint was received in the reporting period. The Complaint Log is attached in **Appendix L**.

Summary of Notification of Summons and Successful Prosecution

5.9 There was one prosecution or notification of summons received since the Contract commencement. Summary of successful prosecution is attached in **Appendix M**.

6 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

6.1 This Quarterly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken in the period between September and November 2016 in accordance with EM&A Manual.

6.2 No Action/Limit Level exceedance was recorded for air quality and noise.

6.3 There are 39 Action Level exceedances and 6 Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded in the reporting period.

6.4 According to the investigation, all exceedances are considered not due to the Contract.

6.5 During this quarter of dolphin monitoring, no adverse impact from the activities of the HKLR09 construction project on Chinese White Dolphins was noticeable from general observations.

6.6 Environmental site inspection was conducted on 6th, 13th, 20th and 27th September 2016, 4th, 11th, 18th and 25th October 2016, 1st, 8th, 15th, 22nd and 29th November 2016 by ET in the reporting month. All deficiencies identified during the site inspection have already rectified / improved during the follow-up audit session.

6.7 The inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 20th September 2016. No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed.

6.8 There was no environmental complaint, notification of summons and successful prosecution received in the reporting period.

6.9 The ET will keep track on the EM&A programme to ensure compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Recommendations

6.10 According to the environmental audit performed in the reporting month, the following recommendations were made:

Air Quality Impact

- To regularly maintain the quality of machinery and vehicles on site.
- To implement dust suppression measures on all haul roads, stockpiles, dry surfaces and excavation works.
- To provide hoarding along the entire length of that portion of the site boundary.

Noise Impact

- To inspect the noise sources inside the site.
- To space out noisy equipment and position the equipment as far away as possible

from sensitive receivers.

- To provide temporary noise barriers for operations of noisy equipment near the noise sensitive receivers, if necessary.

Water Impact

- To prevent any surface runoff discharge into any stream course and sea.
- To review and implement temporary drainage system.
- To identify any wastewater discharges from site.
- To ensure properly maintenance for de-silting facilities.
- To clear the silt and sediment in the sedimentation tanks.
- To review the capacity of de-silting facilities for discharge.
- To divert all the water generated from construction site to de-silting facilities with enough handling capacity before discharge.
- To avoid accumulation of stagnant and ponding water on site.

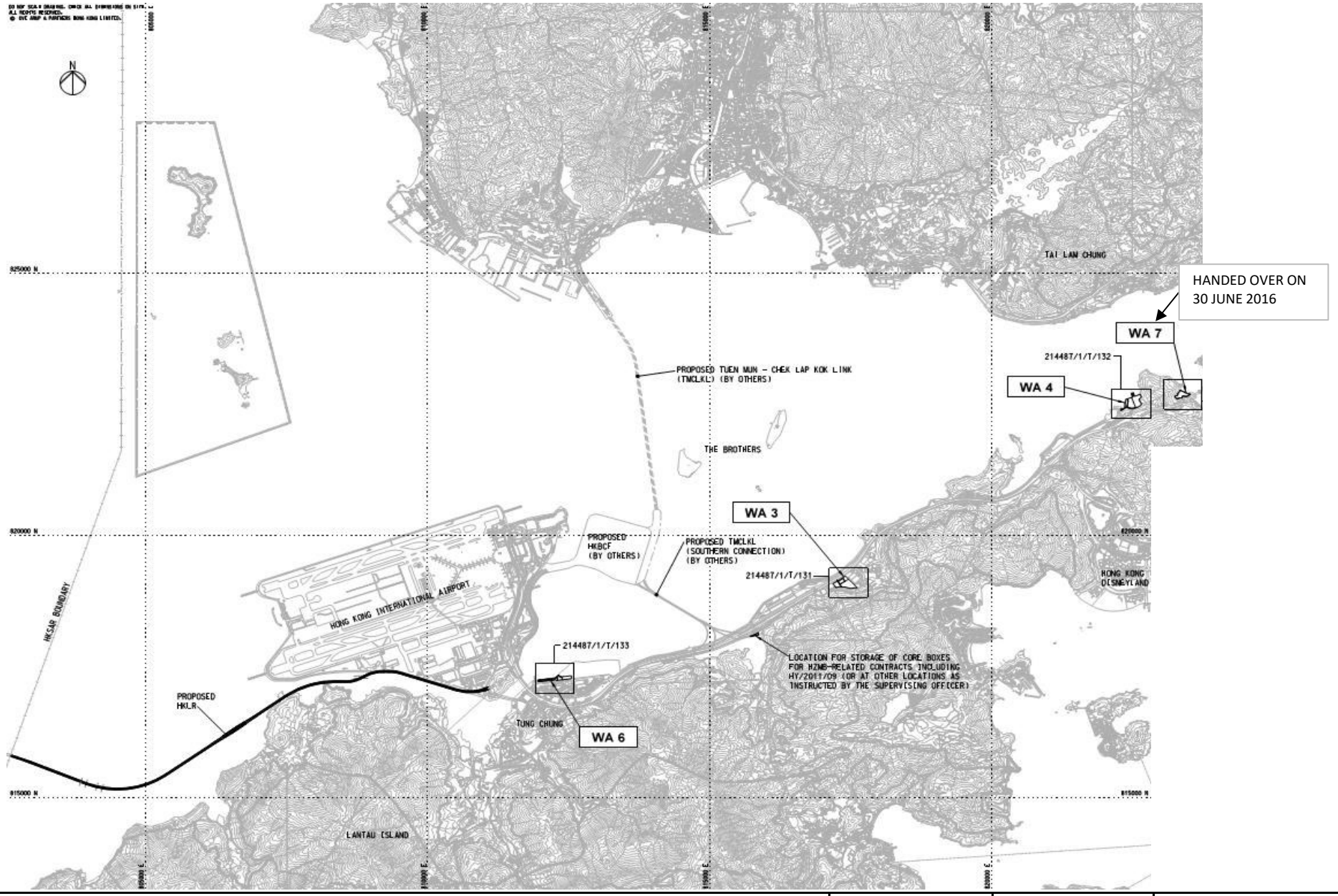
Ecology Impact

- To implement Spill Response Plan in the event of accidential spillage of or other hazardours chemicals.
- To implement Dolphin Exclusion Zone during the installation of bored pile casing located in the waters to the west of Airport.
- To implement Dolphin Watching Plan after the bored piling casing is installed.
- To ensure the acoustically-decoupled measures were implemented for air compressors and other noisy equipment mounted on construction vessels according to acoustic decoupling measures plan.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To ensure the performance of sorting of C&D materials at source (during generation);
- To carry out inspection of dump truck at site exit to ensure inert and non-inert C&D materials are properly segregated before removing off site.
- To avoid any discharge or accidental spillage of chemical waste or oil directly from the site.
- To avoid improper handling or storage of oil drum on site.

FIGURE(S)



Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (WA3, WA4, WA6 and WA7)	Scale: N.T.S Date: Jul-16	Proposal No.: MA12014 Figure: 1a

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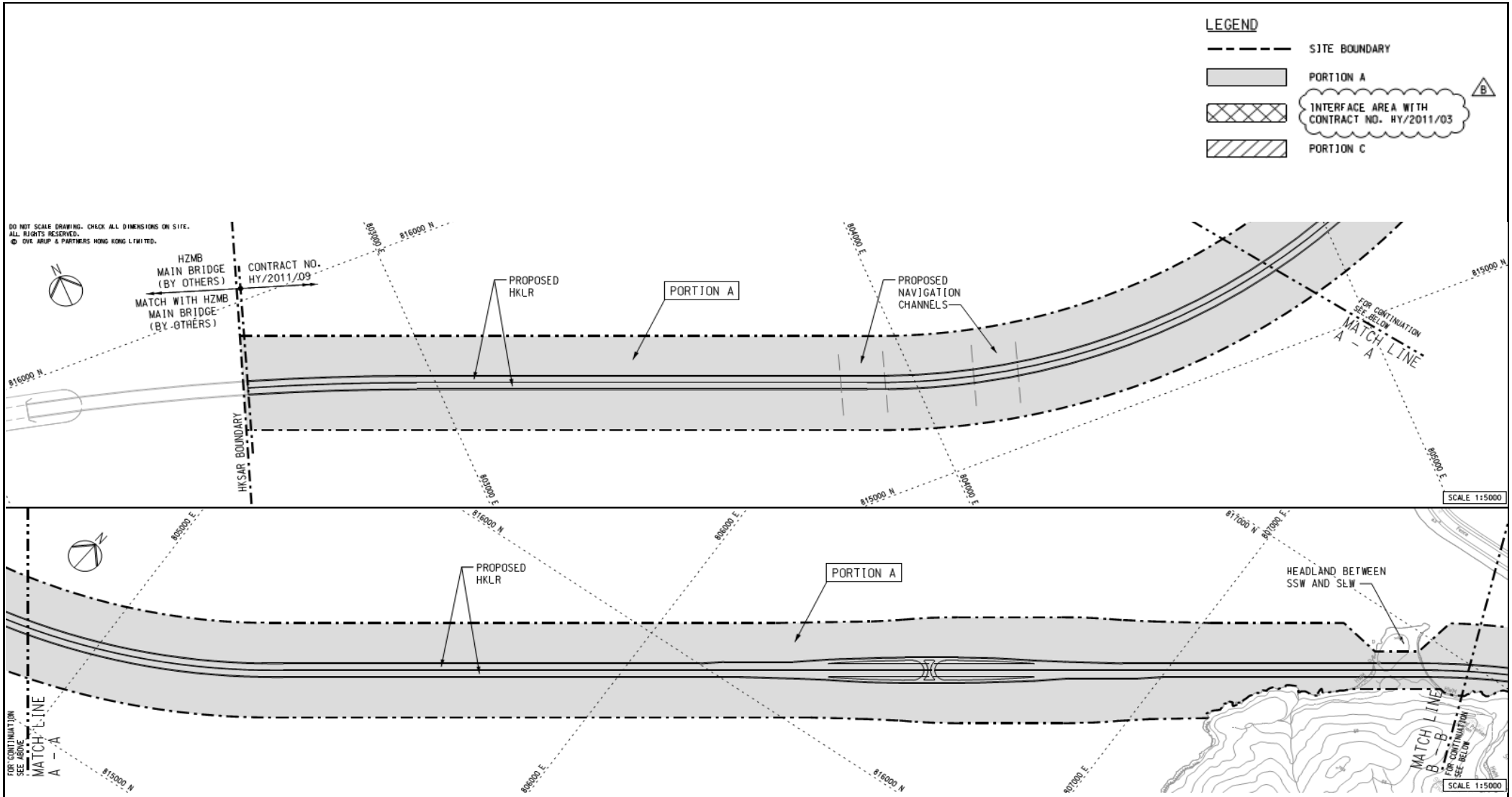
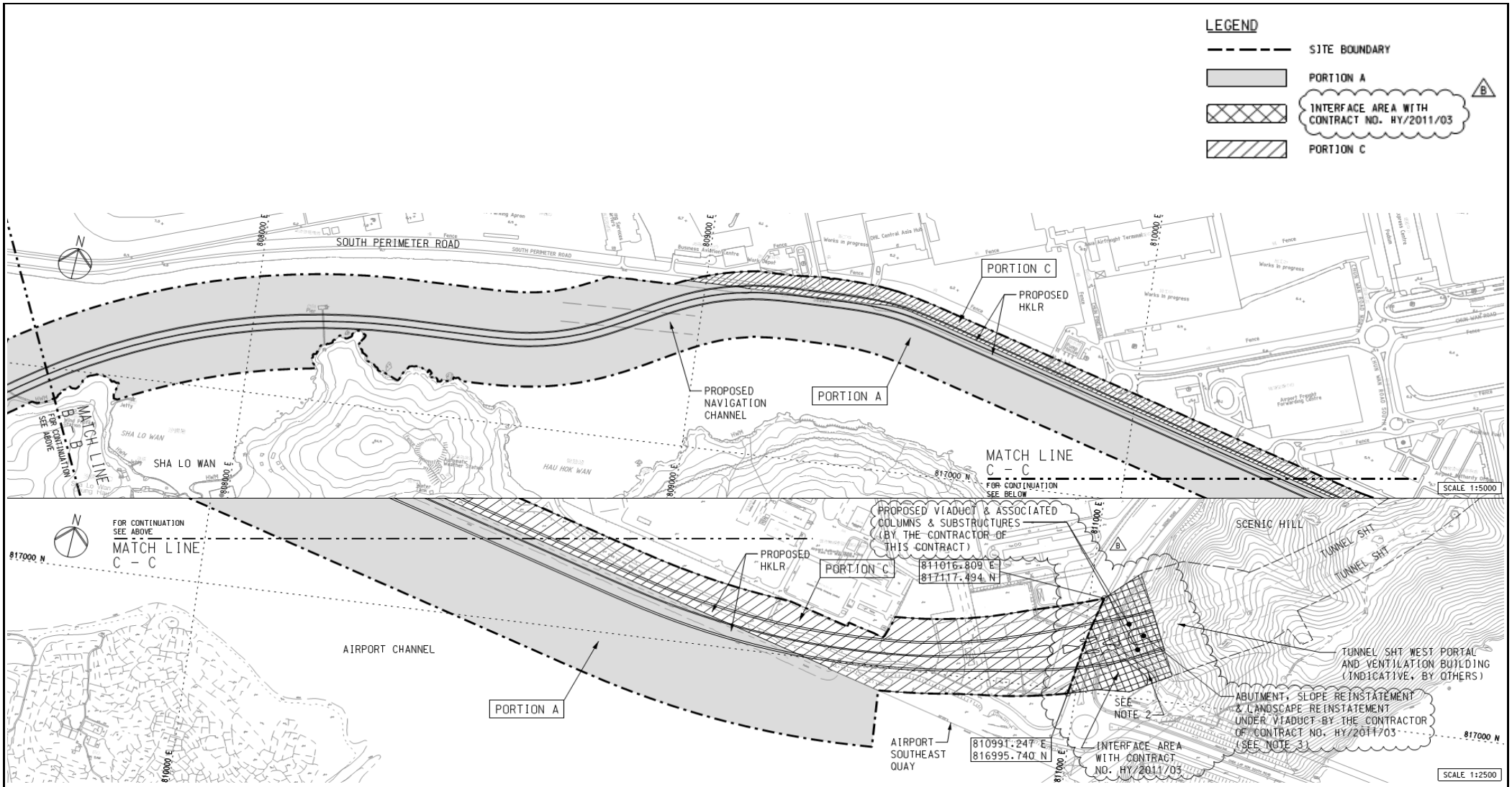


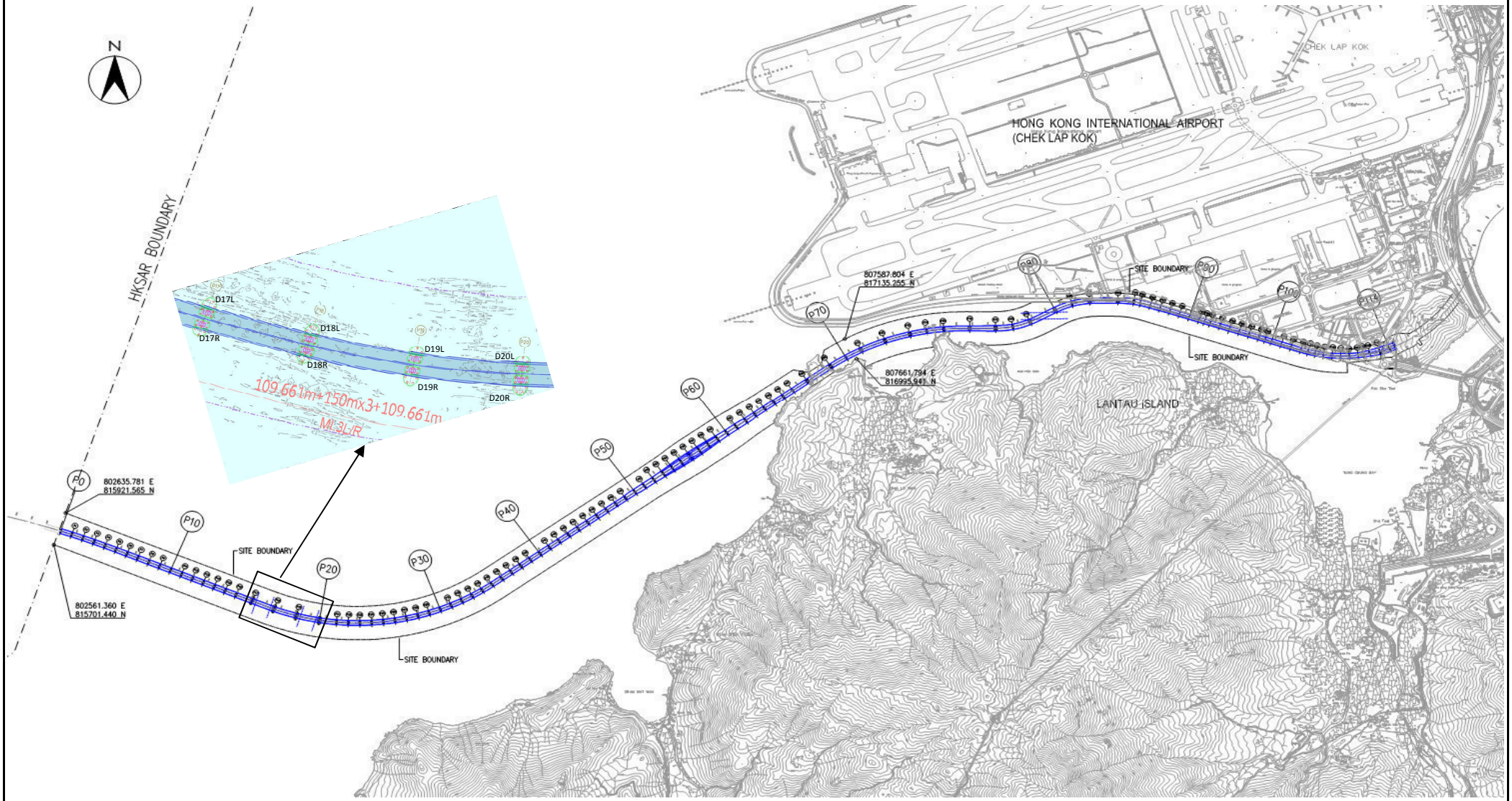
Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Portion A)	Scale: N.T.S Date: Oct-15	Proposa No.: MA12014 Figure: 1b

CINOTECH



Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Portion A and C)	Scale N.T.S	Proposa No. MA12014
		Date 五月-13	Figure 1c

CINOTECH



Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Pier(s) Site)	Scale: N.T.S Date: Oct-15	Proposa No. MA12014 Figure: 1d

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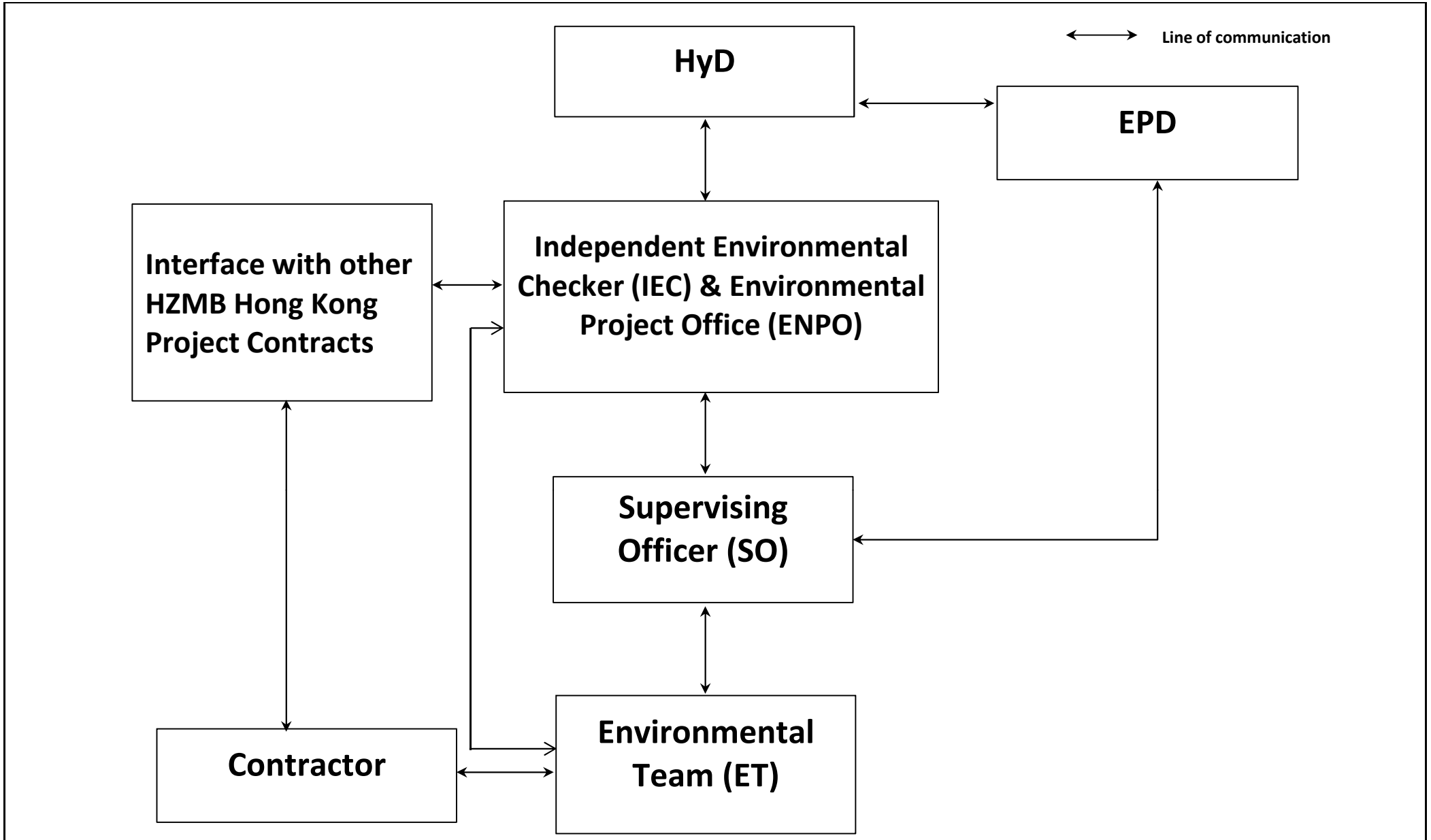
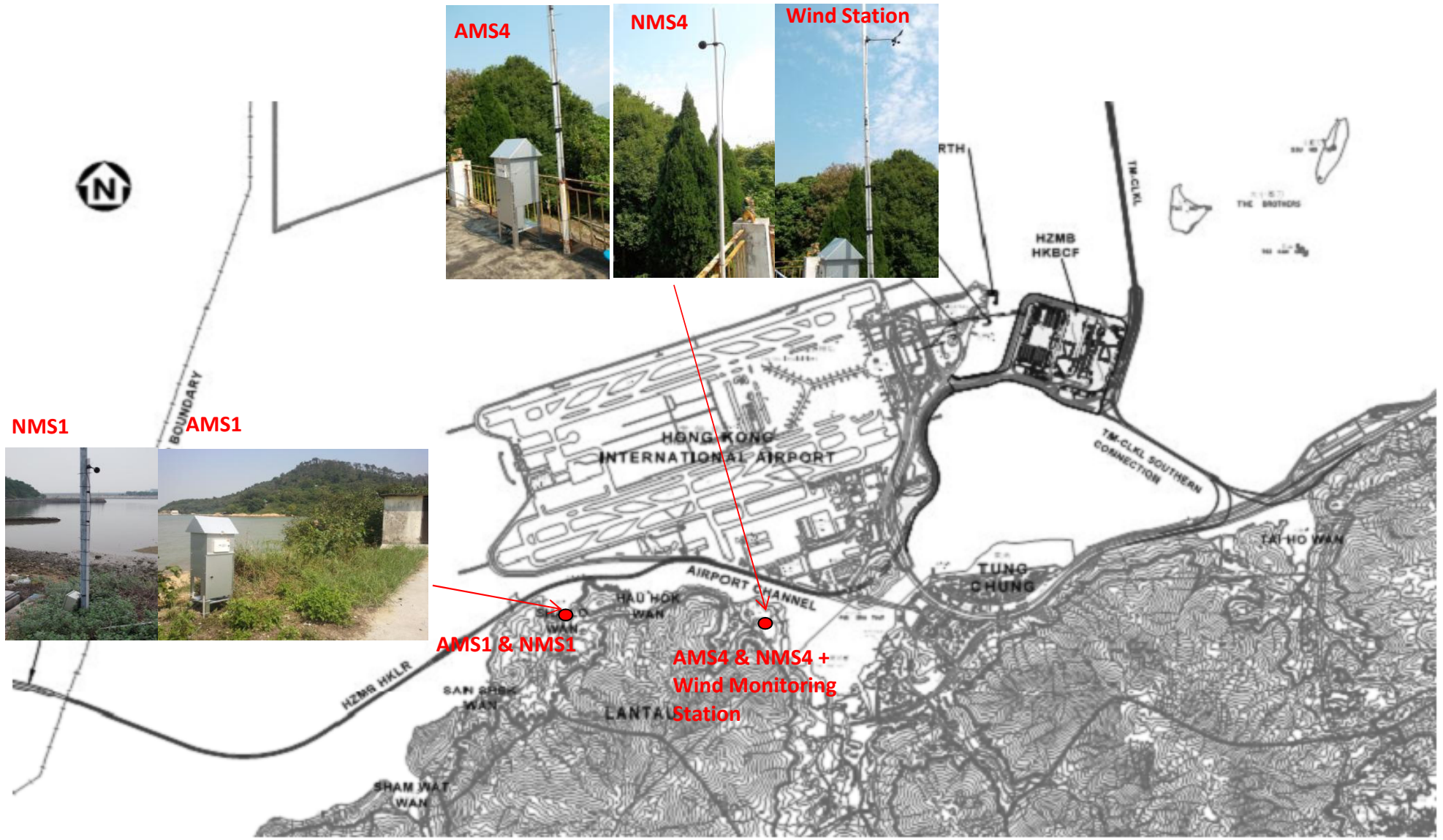
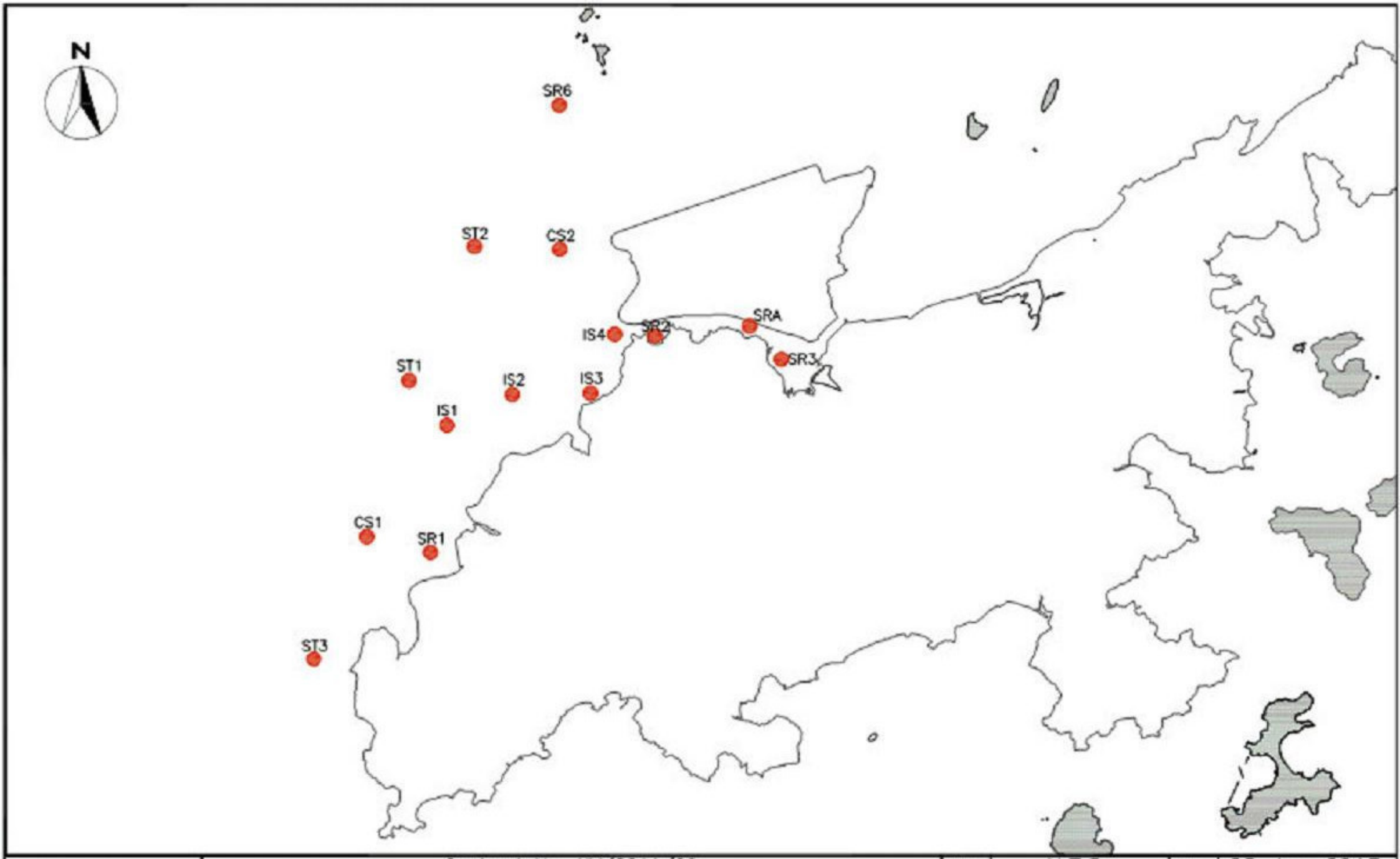


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Project Organisation for Environmental Works	Scale N.T.S Date Feb-13	Proposa No. MA12014 Figure 2	CINOTECH



Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Locations of Air Quality and Noise Monitoring Stations	Scale: N.T.S Date: Feb-13	Proposal No.: MA12014 Figure: 3

CINOTECH



CINOTECH
Cinotech Consultants Limited

Contract No. HY/2011/09
Hong Kong–Zhuhai–Macao Bridge Hong Kong Link Road – Section Between HKSAR Boundary and Scenic Hill
Locations of Marine Water Quality Monitoring Stations

SCALE	N.T.S	DATE	28 Jan 2013
CHECK	PC	DRAWN	IT
PROJECT NO.	MA12014	FIGURE NO. 4	REV –

APPENDIX A
CONSTRUCTION PROGRAMME

CONTRACT NO. HY/2011/09
HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG LINK ROAD
- SECTION BETWEEN HKSAR BOUNDARY AND SCENIC HILL

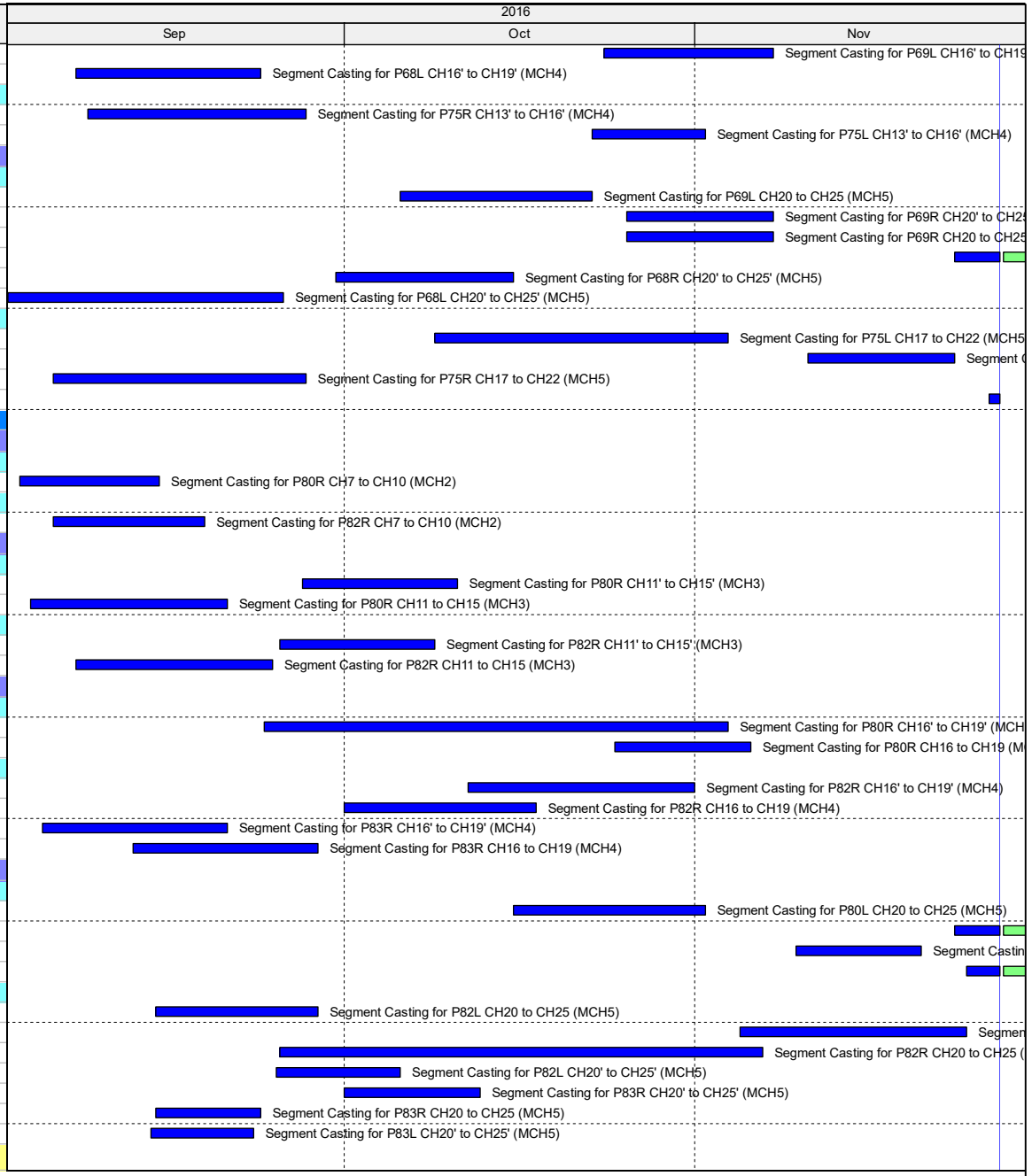
Activity ID	Activity Name
	HKZB Hong Kong Link Road - 3 Months Rolling Prog
	PROCUREMENT
PR1090	Delivery & Pre-assemble Straddle Carriers
	Segment Casting
	Type ASegment
	Field Segment
SCA1010	Segment Casting for P0 field segment
SCA1030	Segment Casting for P1 field segment
SCA1050	Segment Casting for P2 field segment
SCA1070	Segment Casting for P3 field segment
SCA1090	Segment Casting for P4 field segment
SCA1110	Segment Casting for P5 field segment
SCA2210	Segment Casting for P67 field segment
	Type B Segment
	Field Segment
SCB1070	Segment Casting for P56 field segment
	Type CH Segment
	Segment on Pier (SOP) CPA & CPB
	ML10 (P68 & P69) 180m span
SCH2500	Segment Casting for P69 CPB (MSOP)
	Type CH1 Segment (CH1 to CH6)
	ML10 (P68 & P69) 180m span
SCH2440	Segment Casting for P69R CH1' to CH6' (MCH1)
SCH2510	Segment Casting for P69R CH1 to CH6 (MCH1)
SCH2560	Segment Casting for P69L CH1' to CH6' (MCH1)
	Type CH2 Segment (CH7 to CH10)
	ML10 (P68 & P69) 180m span
SCH2400	Segment Casting for P69L CH7 to CH10 (MCH2)
SCH2450	Segment Casting for P69R CH7' to CH10' (MCH2)
SCH2520	Segment Casting for P69R CH7 to CH10 (MCH2)
SCH2570	Segment Casting for P69L CH7' to CH10' (MCH2)
SCH2630	Segment Casting for P68L CH7 to CH10 (MCH2)
SCH2800	Segment Casting for P68L CH7' to CH10' (MCH2)
	Type CH3 Segment (CH11 to CH15)
	ML10 (P68 & P69) 180m span
SCH2410	Segment Casting for P69L CH11 to CH15 (MCH3)
SCH2460	Segment Casting for P69R CH11' to CH15' (MCH3)
SCH2530	Segment Casting for P69R CH11 to CH15 (MCH3)
SCH2580	Segment Casting for P69L CH11' to CH15' (MCH3)
SCH2640	Segment Casting for P68L CH11 to CH15 (MCH3)
SCH2690	Segment Casting for P68R CH11' to CH15' (MCH3)
SCH2760	Segment Casting for P68R CH11 to CH15 (MCH3)
SCH2810	Segment Casting for P68L CH11' to CH15' (MCH3)
	Type CH4 Segment (CH16 to CH19)
	ML10 (P68 & P69) 180m span
SCH2470	Segment Casting for P69R CH16' to CH19' (MCH4)
SCH2540	Segment Casting for P69R CH16 to CH19 (MCH4)

Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 1 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
SCH2590	Segment Casting for P69L CH16' to CH19' (MCH4)
SCH2820	Segment Casting for P68L CH16' to CH19' (MCH4)
ML12 (P75 to P77) 165m span	
SCH2930	Segment Casting for P75R CH13' to CH16' (MCH4)
SCH3040	Segment Casting for P75L CH13' to CH16' (MCH4)
Type CH5 Segment (CH20 to CH25)	
ML10 (P68 & P69) 180m span	
SCH2430	Segment Casting for P69L CH20 to CH25 (MCH5)
SCH2480	Segment Casting for P69R CH20' to CH25' (MCH5)
SCH2550	Segment Casting for P69R CH20 to CH25 (MCH5)
SCH2600	Segment Casting for P69L CH20' to CH25' (MCH5)
SCH2710	Segment Casting for P68R CH20' to CH25' (MCH5)
SCH2830	Segment Casting for P68L CH20' to CH25' (MCH5)
ML12 (P75 to P77) 165m span	
SCH2890	Segment Casting for P75L CH17 to CH22 (MCH5)
SCH2940	Segment Casting for P75R CH17' to CH22' (MCH5)
SCH3000	Segment Casting for P75R CH17 to CH22 (MCH5)
SCH3050	Segment Casting for P75L CH17' to CH22' (MCH5)
Type CHV Segment	
Type CH2 Segment (CHV7 to CHV10)	
ML13 (P79 & P80) 180m span	
SCH4010	Segment Casting for P80R CH7 to CH10 (MCH2)
ML14 (P82 & P83) 180m span	
SCH4260	Segment Casting for P82R CH7 to CH10 (MCH2)
Type CH3 Segment (CHV11 to CHV15)	
ML13 (P79 & P80) 180m span	
SCH3940	Segment Casting for P80R CH11' to CH15' (MCH3)
SCH4020	Segment Casting for P80R CH11 to CH15 (MCH3)
ML14 (P82 & P83) 180m span	
SCH4200	Segment Casting for P82R CH11' to CH15' (MCH3)
SCH4270	Segment Casting for P82R CH11 to CH15 (MCH3)
Type CH4 Segment (CHV16 to CHV19)	
ML13 (P79 & P80) 180m span	
SCH3960	Segment Casting for P80R CH16' to CH19' (MCH4)
SCH4030	Segment Casting for P80R CH16 to CH19 (MCH4)
ML14 (P82 & P83) 180m span	
SCH4210	Segment Casting for P82R CH16' to CH19' (MCH4)
SCH4280	Segment Casting for P82R CH16 to CH19 (MCH4)
SCH4440	Segment Casting for P83R CH16' to CH19' (MCH4)
SCH4500	Segment Casting for P83R CH16 to CH19 (MCH4)
Type CH5 Segment (CHV20 to CHV25)	
ML13 (P79 & P80) 180m span	
SCH3900	Segment Casting for P80L CH20 to CH25 (MCH5)
SCH3970	Segment Casting for P80R CH20' to CH25' (MCH5)
SCH4040	Segment Casting for P80R CH20 to CH25 (MCH5)
SCH4100	Segment Casting for P80L CH20' to CH25' (MCH5)
ML14 (P82 & P83) 180m span	
SCH4160	Segment Casting for P82L CH20 to CH25 (MCH5)
SCH4220	Segment Casting for P82R CH20' to CH25' (MCH5)
SCH4290	Segment Casting for P82R CH20 to CH25 (MCH5)
SCH4340	Segment Casting for P82L CH20' to CH25' (MCH5)
SCH4450	Segment Casting for P83R CH20' to CH25' (MCH5)
SCH4510	Segment Casting for P83R CH20 to CH25 (MCH5)
SCH4560	Segment Casting for P83L CH20' to CH25' (MCH5)
LAND VIADUCT	

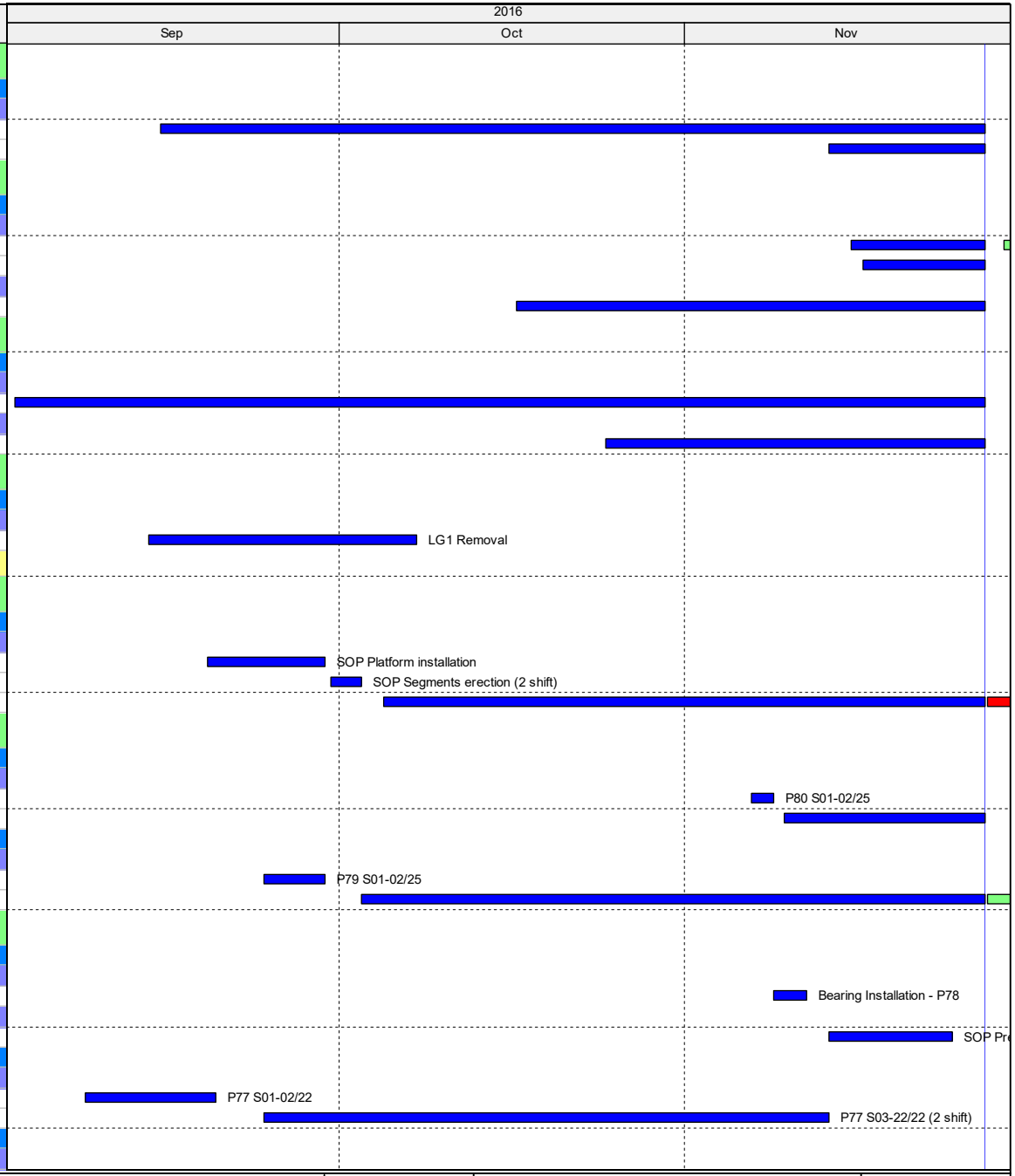


Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 2 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
ML18	
DECK FINISHING WORKS	
CIVIL PROVISION FOR TCSS	
ML18F_1060	Install sign gantry GE13
ML18F_1070	Install sign gantry GE14
ML17	
DECK FINISHING WORKS	
CIVIL PROVISION FOR TCSS	
ML17F_1060	Install sign gantry GE12
ML17F_1070	Install sign gantry GW12
E&M AND ROAD FINISHING WORKS	
M17L_2020	Drainage works for ML17
ML16	
DECK FINISHING WORKS	
CIVIL PROVISION FOR TCSS	
ML16F_1200	Remain civil provisions for TCSS ML16
E&M AND ROAD FINISHING WORKS	
M16L_2020	Drainage works for ML16
ML15	
P85	
DECK ERECTION WORKS	
P085_1080	LG1 Removal
AIRPORT CHANNEL	
ML14	
P82	
SOP AND PORTAL WORKS	
P082_1000	SOP Platform installation
P082_1010	SOP Segments erection (2 shift)
P082_1020	SOP Completion + cross beam (2 shift)
ML13	
P80	
DECK ERECTION WORKS	
P080_1030	P80 S01-02/25
P080_1040	P80 S03-25/25 (2 shift)
P79	
DECK ERECTION WORKS	
P079_1030	P79 S01-02/25
P079_1040	P79 S03-25/25 (2 shift)
ML12	
P78 MJ	
COLUMN WORKS	
P078_1090	Bearing Installation - P78
SOP AND PORTAL WORKS	
P078_1000	SOP Preparation & Erection
P77	
DECK ERECTION WORKS	
P077_1030	P77 S01-02/22
P077_1040	P77 S03-22/22 (2 shift)
P76	
DECK ERECTION WORKS	

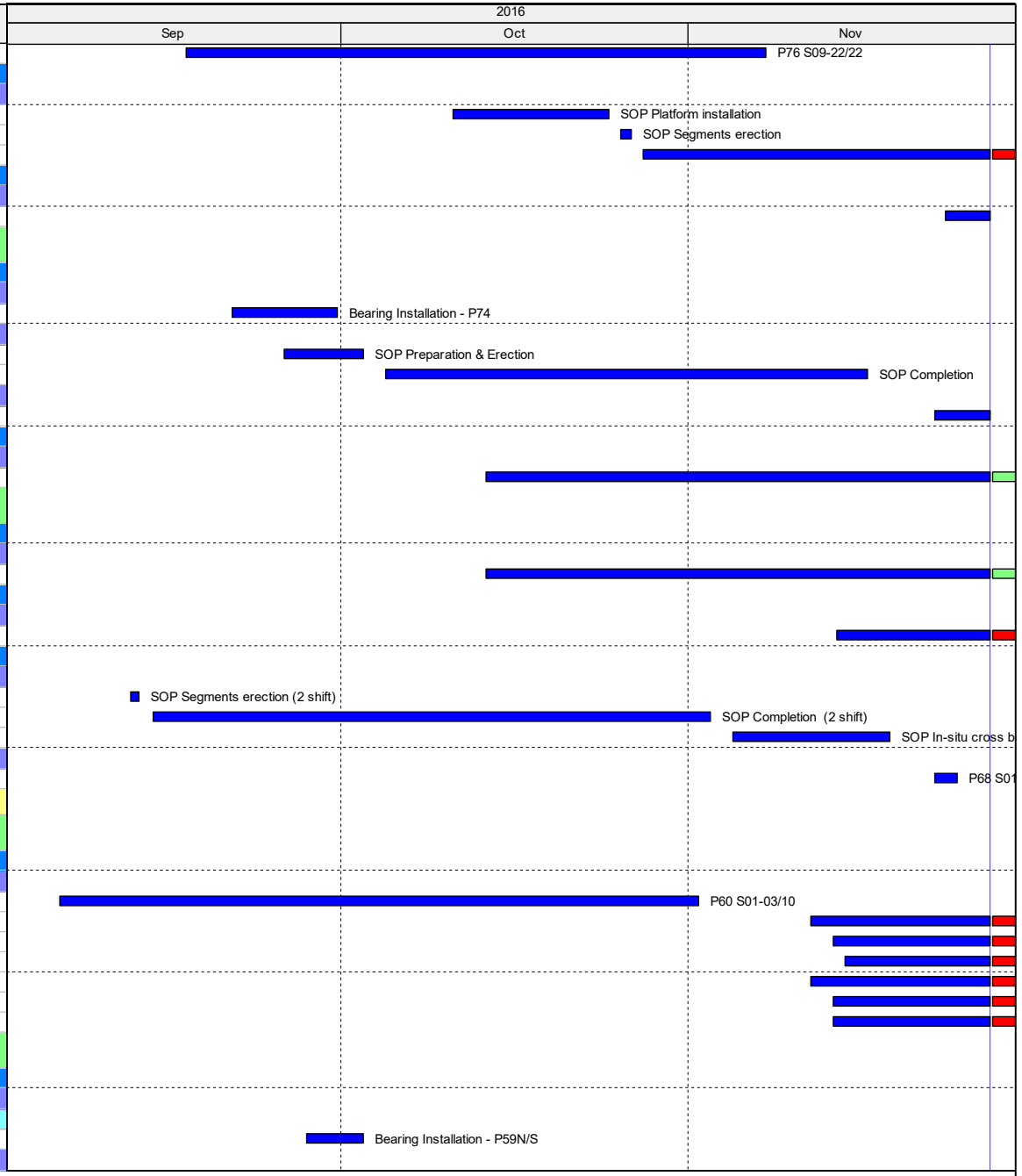


Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
P076_1040	P76 S09-22/22
P75	
SOP AND PORTAL WORKS	
P075_1000	SOP Platform installation
P075_1010	SOP Segments erection
P075_1020	SOP Completion
P74 MJ	
DECK ERECTION WORKS	
P074_1140	P74 S01-06/06 (MJ)
ML11	
P74 MJ	
COLUMN WORKS	
P074_1130	Bearing Installation - P74
SOP AND PORTAL WORKS	
P074_1000	SOP Preparation & Erection
P074_1010	SOP Completion
DECK ERECTION WORKS	
P074_1020	P74 S01-06/06 (MJ)
P70 MJ	
DECK ERECTION WORKS	
P070_1120	P70 S01-06/06 (MJ)
ML10	
P70 MJ	
DECK ERECTION WORKS	
P070_1020	P70 S01-06/06 (MJ)
P69	
SOP AND PORTAL WORKS	
P069_1000	SOP Platform installation
P68	
SOP AND PORTAL WORKS	
P068_1030	SOP Segments erection (2 shift)
P068_1040	SOP Completion (2 shift)
P068_1045	SOP In-situ cross beam
DECK ERECTION WORKS	
P068_1050	P68 S01-02/25
WESTERN WATER (ML07 TO ML09)	
ML9	
P60 SB (Portal)	
DECK ERECTION WORKS	
P060_1080	P60 S01-03/10
P060_1090	P60-P61 S04-10/10 L
P060_1100	P60-P59 S04-10/10 L
P060_1110	P60-P59 S04-10/10 RL
P060_1120	P60-P61 S04-10/10 R
P060_1130	P60-P59 S04-10/10 R
P060_1140	P60-P59 S04-10/10 RR
ML8	
P59 MJ	
COLUMN WORKS	
TURNAROUND	
P059_1160	Bearing Installation - P59N/S
SOP AND PORTAL WORKS	

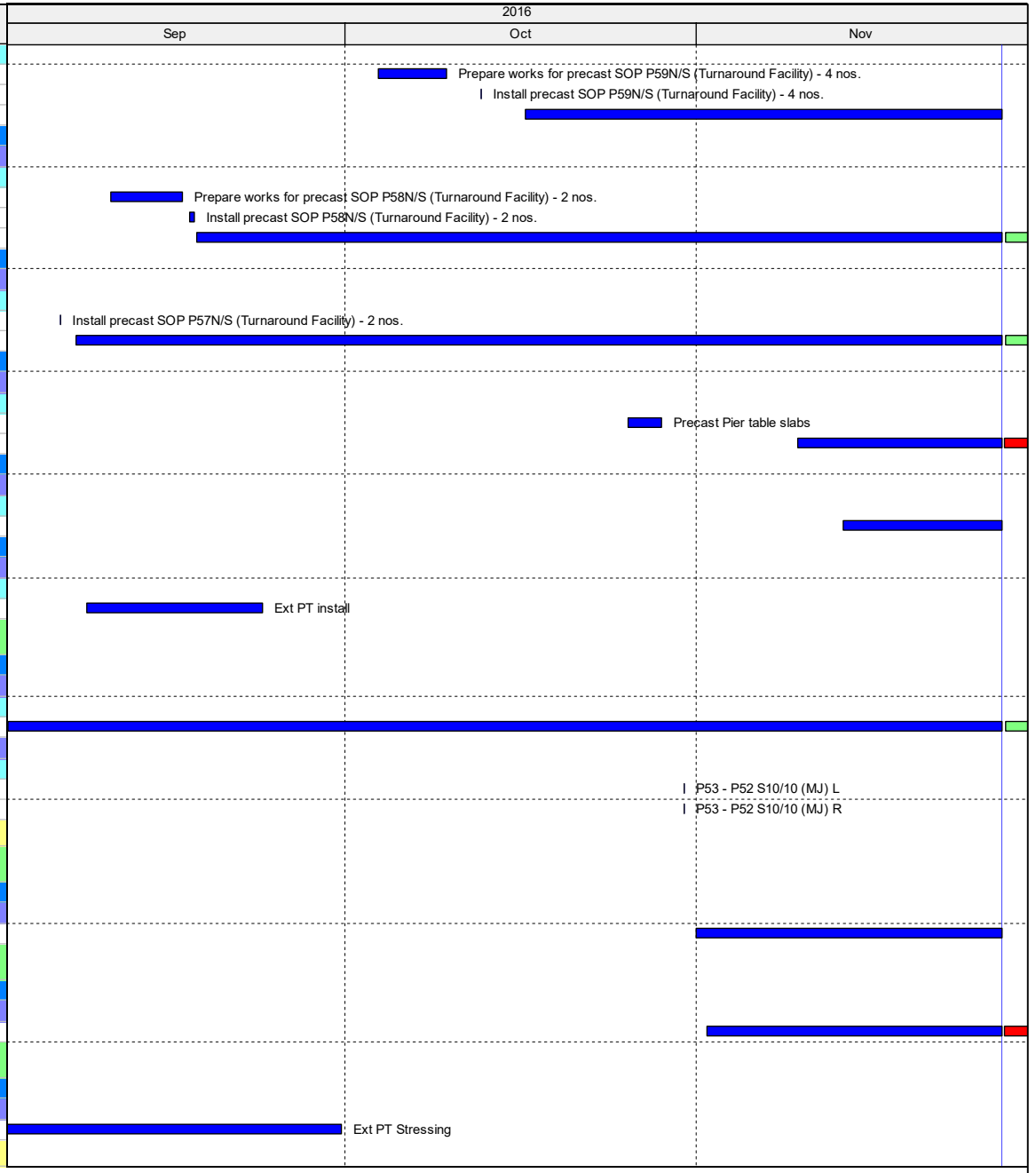


Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 4 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
	TURNAROUND
P059_1020	Prepare works for precast SOP P59N/S (Turnaround Facility) - 4 nos.
P059_1030	Install precast SOP P59N/S (Turnaround Facility) - 4 nos.
P059_1040	Insitu works for SOP P59N/S (Turnaround Facility) - 4 nos.
	P58
	SOP AND PORTAL WORKS
	TURNAROUND
P058_1030	Prepare works for precast SOP P58N/S (Turnaround Facility) - 2 nos.
P058_1040	Install precast SOP P58N/S (Turnaround Facility) - 2 nos.
P058_1050	Insitu works for SOP P58N/S (Turnaround Facility) - 2 nos.
	P57
	SOP AND PORTAL WORKS
	TURNAROUND
P057_1040	Install precast SOP P57N/S (Turnaround Facility) - 2 nos.
P057_1050	Insitu works for SOP P57N/S (Turnaround Facility) - 2 nos.
	P56
	DECK ERECTION WORKS
	TURNAROUND
P056_1000	Precast Pier table slabs
P056_1010	Erect Cross beams
	P54
	DECK ERECTION WORKS
	TURNAROUND
P054_1070	Segment erection P54S
	DECK FINISHING WORKS
	MAIN DECK
	EXTERNAL PT
ML08F_1000	Ext PT install
	ML7
	P53 MJ
	SOP AND PORTAL WORKS
	TURNAROUND
P053_1040	Insitu works for SOP P53N/S (Turnaround Facility) - 4 nos.
	DECK ERECTION WORKS
	MAIN DECK
P053_1070	P53 - P52 S10/10 (MJ) L
P053_1090	P53 - P52 S10/10 (MJ) R
	WESTERN WATER (ML04 TO ML06)
	ML6
	DECK FINISHING WORKS
	CIVIL PROVISION FOR TCSS
ML06F_1200	Remain civil provisions for TCSS ML06
	ML5
	DECK FINISHING WORKS
	UTILITY TROUGH & ROAD BARRIER
ML05F_1020	Utility trough, road barrier and firemain installation for ML05
	ML4
	DECK FINISHING WORKS
	EXTERNAL PT
ML04F_1010	Ext PT Stressing
	NAVIGATION CHANNEL

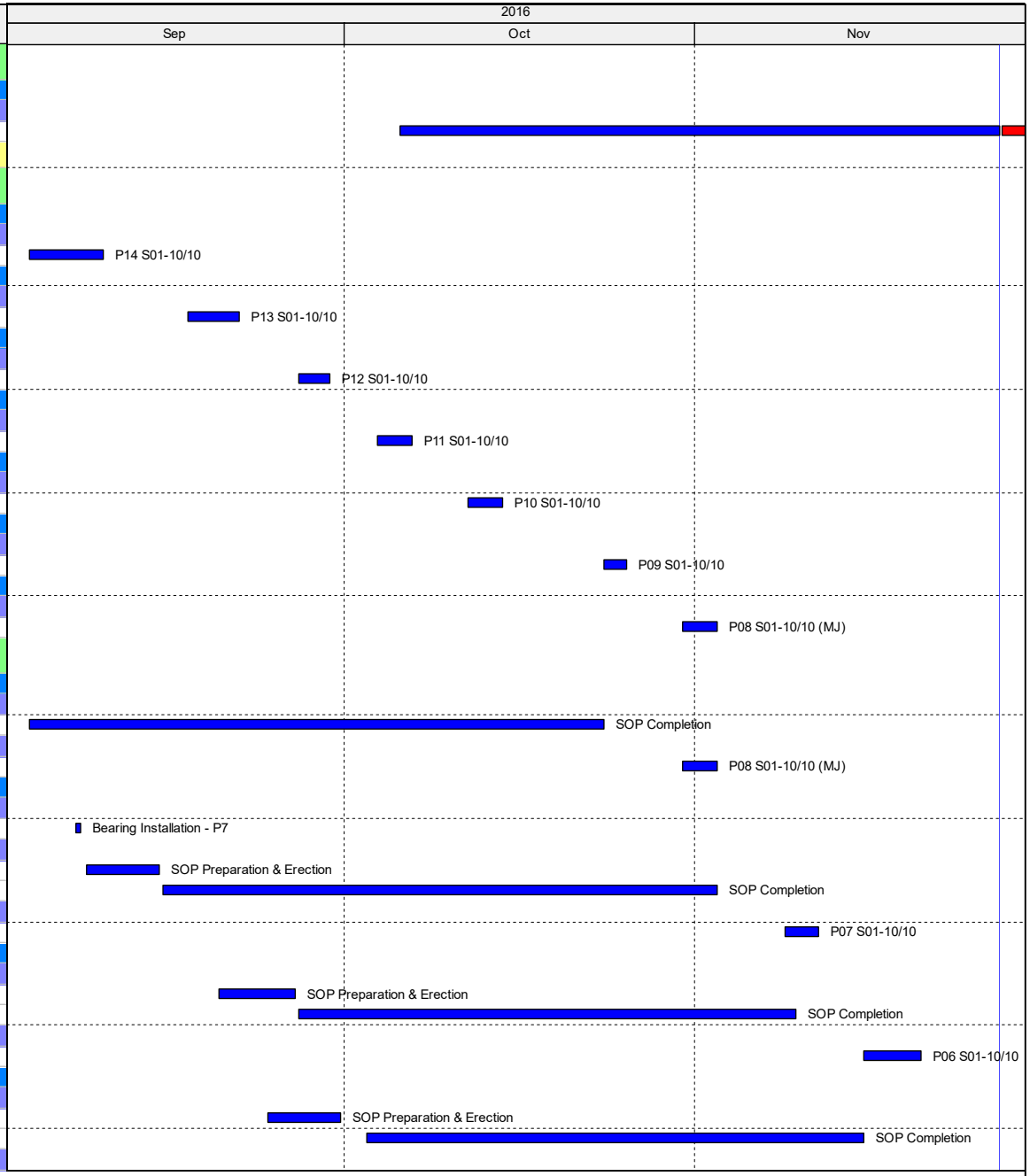


Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 5 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
ML3	
DECK FINISHING WORKS	
EXTERNAL PT	
ML03F_1010	Ext PT stress
WESTERN WATER (ML01 TO ML02)	
ML2	
P14	
DECK ERECTION WORKS	
P014_1020	P14 S01-10/10
P13	
DECK ERECTION WORKS	
P013_1020	P13 S01-10/10
P12	
DECK ERECTION WORKS	
P012_1020	P12 S01-10/10
P11	
DECK ERECTION WORKS	
P011_1020	P11 S01-10/10
P10	
DECK ERECTION WORKS	
P010_1020	P10 S01-10/10
P9 SB	
DECK ERECTION WORKS	
P009_1020	P09 S01-10/10
P8 MJ	
DECK ERECTION WORKS	
P008_1130	P08 S01-10/10 (MJ)
ML1	
P8 MJ	
SOP AND PORTAL WORKS	
P008_1010	SOP Completion
DECK ERECTION WORKS	
P008_1020	P08 S01-10/10 (MJ)
P7 SB	
COLUMN WORKS	
P007_1120	Bearing Installation - P7
SOP AND PORTAL WORKS	
P007_1000	SOP Preparation & Erection
P007_1010	SOP Completion
DECK ERECTION WORKS	
P007_1020	P07 S01-10/10
P6	
SOP AND PORTAL WORKS	
P006_1000	SOP Preparation & Erection
P006_1010	SOP Completion
DECK ERECTION WORKS	
P006_1020	P06 S01-10/10
P5	
SOP AND PORTAL WORKS	
P005_1000	SOP Preparation & Erection
P005_1010	SOP Completion
DECK ERECTION WORKS	

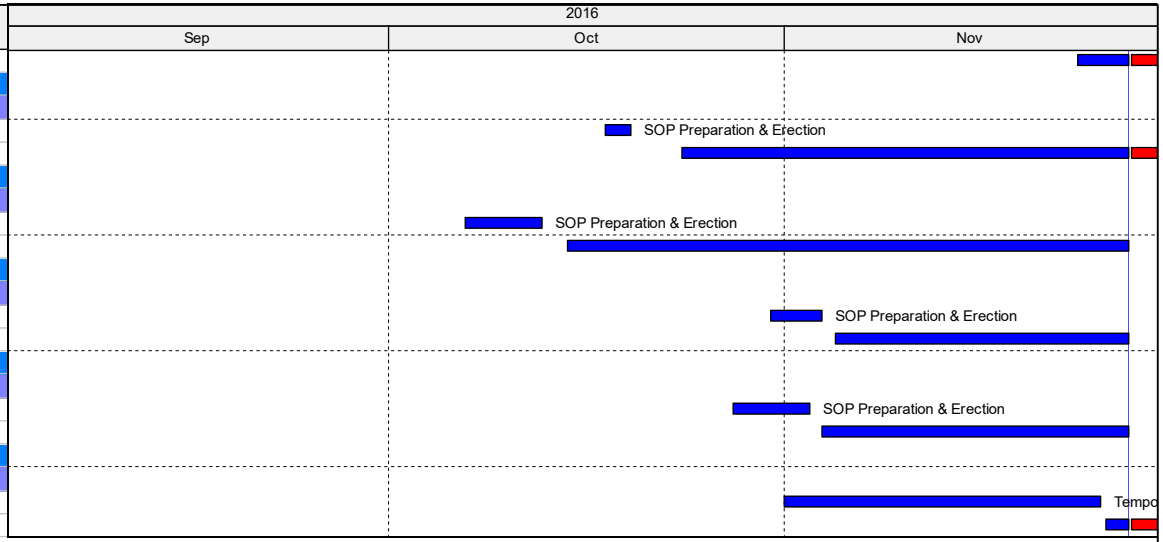


Actual Work | Critical Remaining Work | Remaining Work | Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 6 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

Activity ID	Activity Name
P005_1020	P05 S01-10/10
P4	
SOP AND PORTAL WORKS	
P004_1000	SOP Preparation & Erection
P004_1010	SOP Completion
P3	
SOP AND PORTAL WORKS	
P003_1000	SOP Preparation & Erection
P003_1010	SOP Completion
P2	
SOP AND PORTAL WORKS	
P002_1000	SOP Preparation & Erection
P002_1010	SOP Completion
P1 SB	
SOP AND PORTAL WORKS	
P001_1000	SOP Preparation & Erection
P001_1010	SOP Completion
P0 MJ	
TEMPORARY WORKS	
P000_1000	Temporary piles installation
P000_1010	Shoring installation



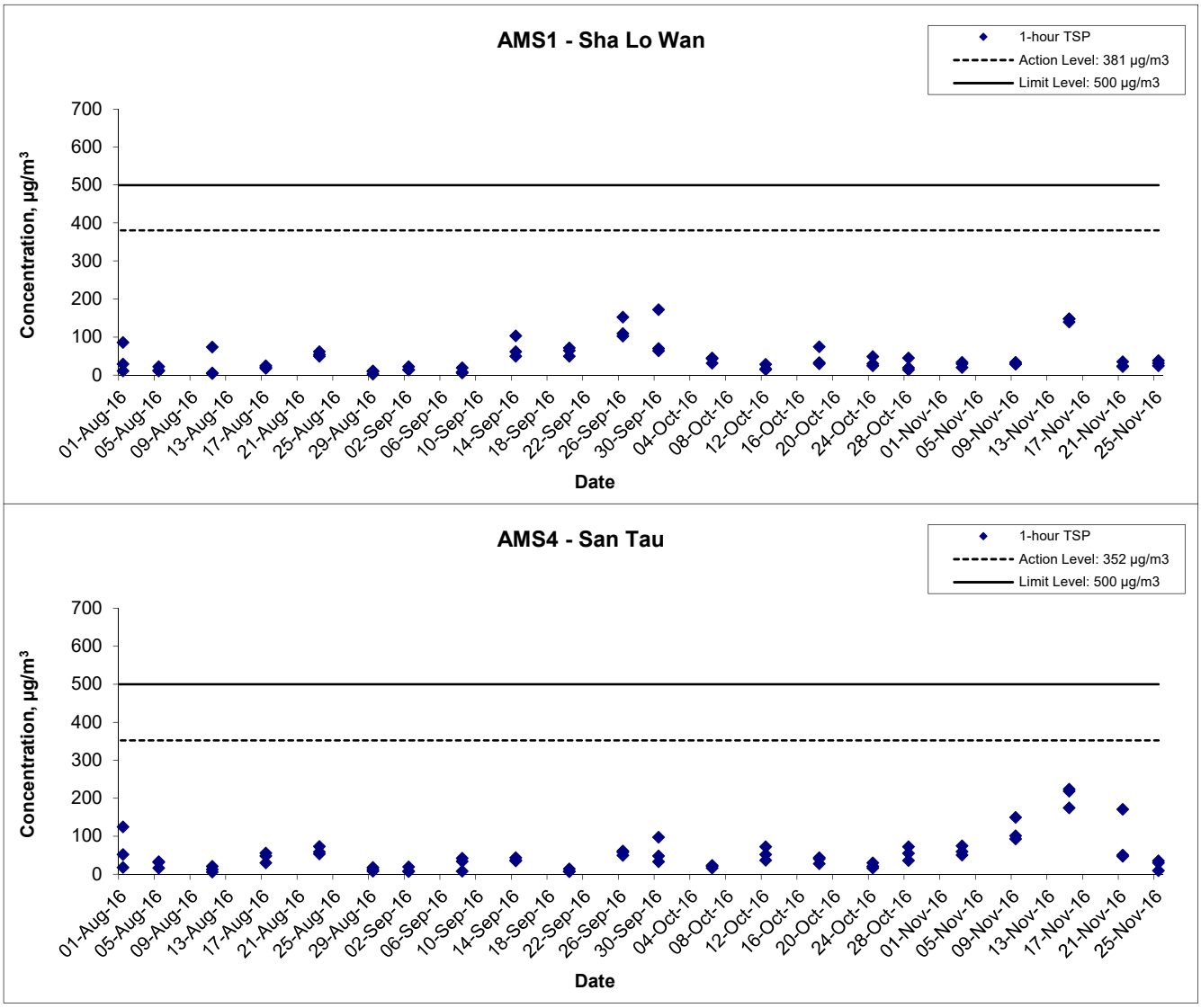
Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Sep 16 to Nov 16)
Page 7 of 7

Date	Revision	Checked
16/12/16	EM&A Report Sep 16 to Nov 16	Tim

APPENDIX B
GRAPHICAL PRESENTATION OF 1-HOUR TSP MONITORING RESULTS

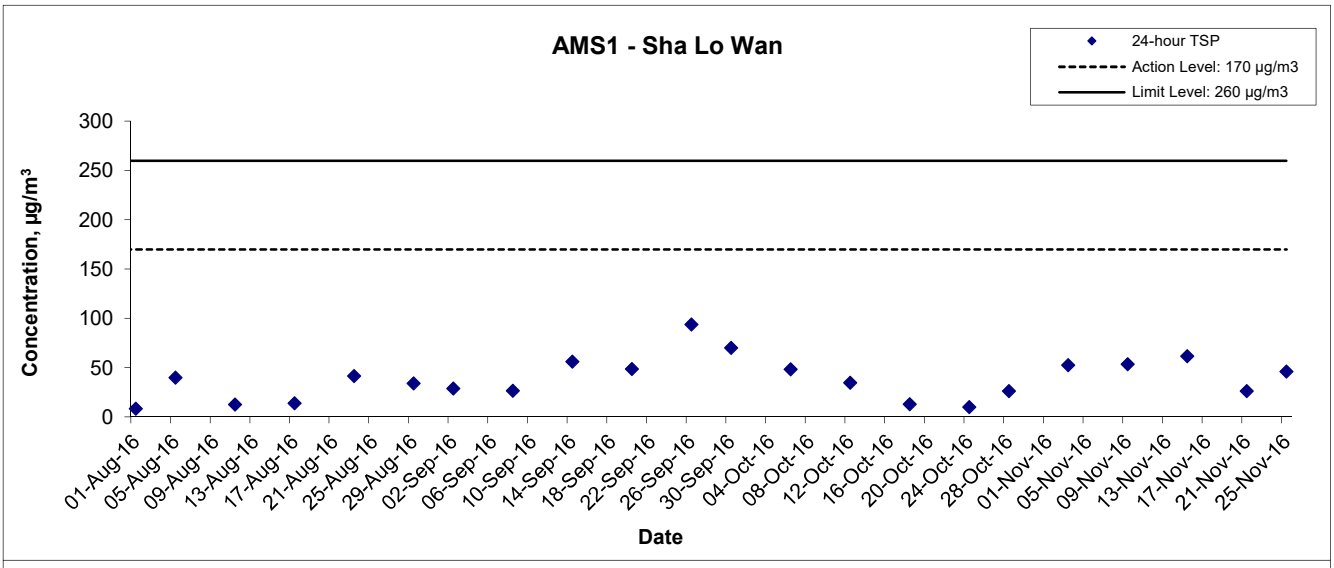
1-hour TSP Concentration Levels

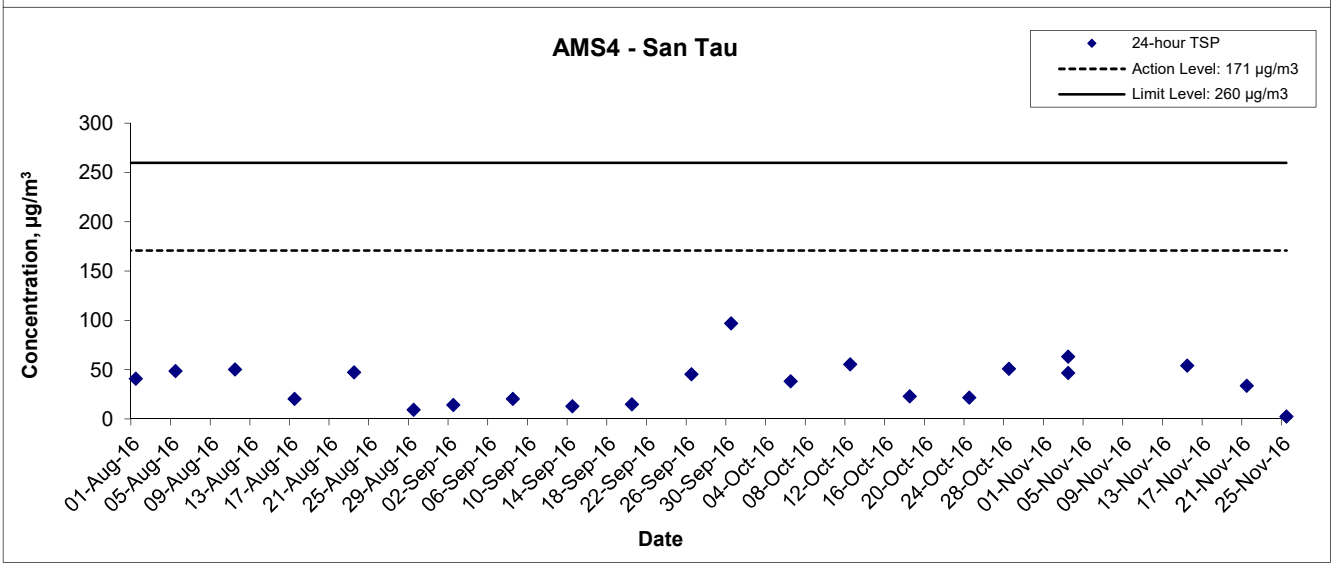


Title: Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 1-hour TSP Monitoring Results	Scale: N.T.S Date: Nov 16	Project No.: MA12014 Appendix: E	CINOTECH

APPENDIX C
GRAPHICAL PRESENTATION OF 24-HOUR TSP MONITORING RESULTS

24-hour TSP Concentration Levels

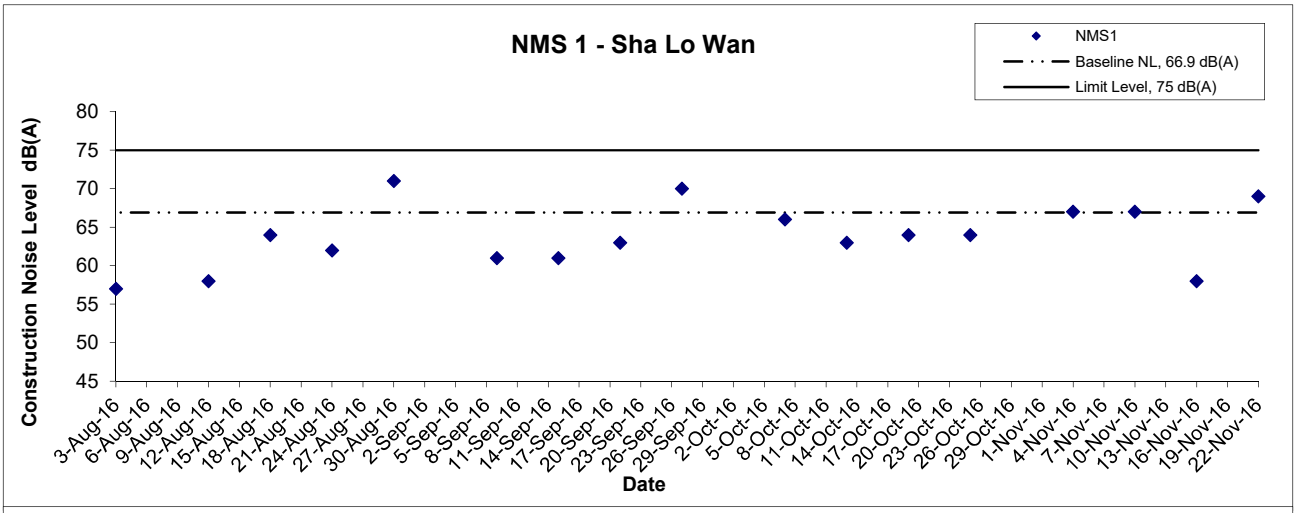


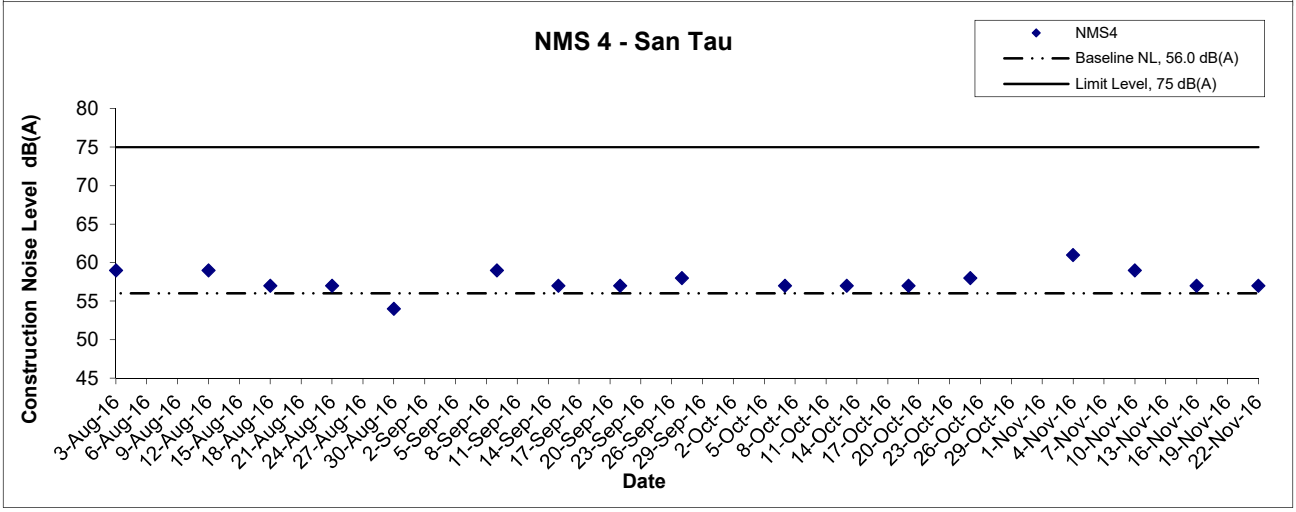


Title: Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 24-hour TSP Monitoring Results	Scale: N.T.S Date: Nov 16	Project No.: MA12014 Appendix: F	CINOTECH

APPENDIX D
GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS

Noise Levels

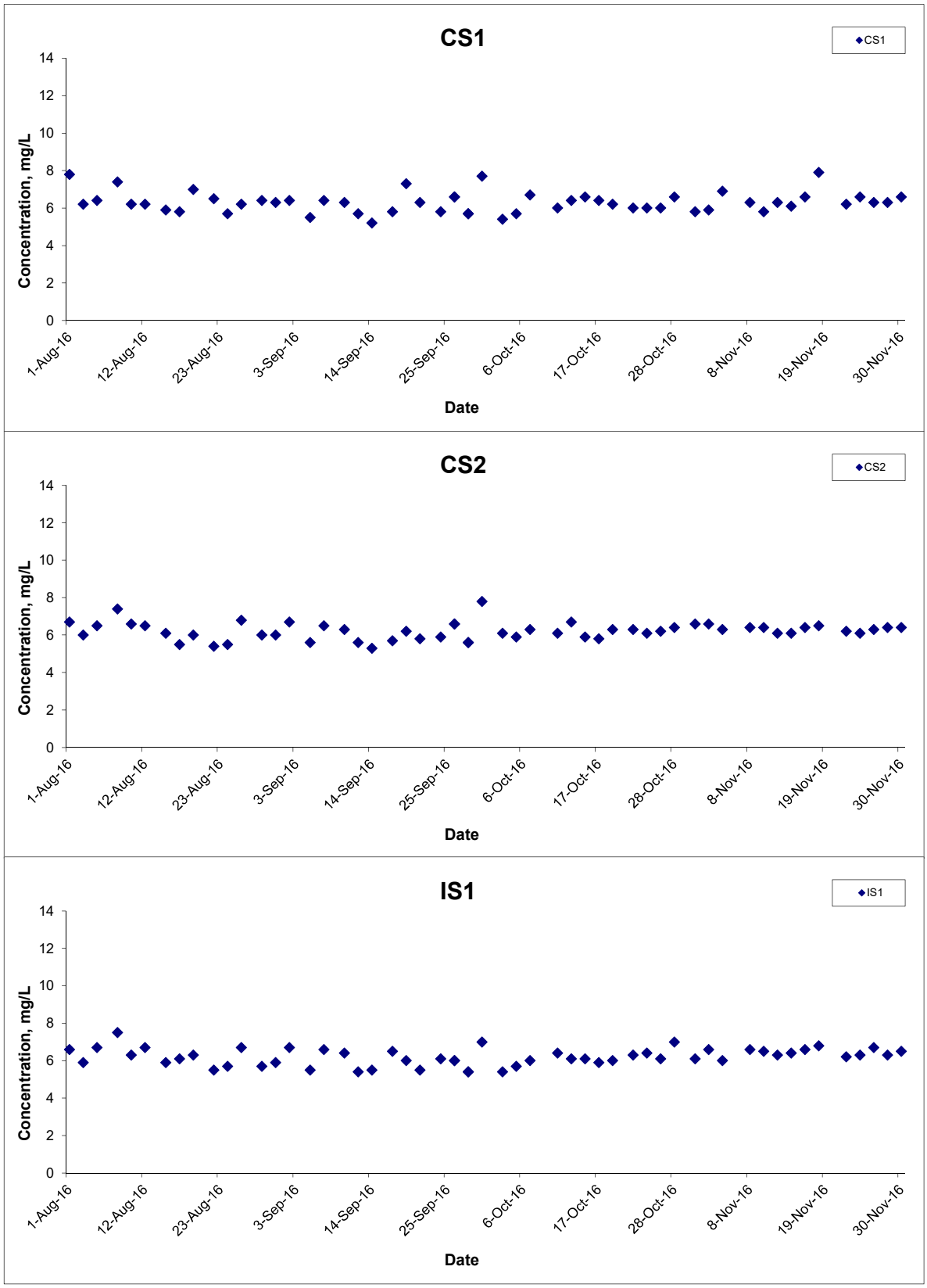




Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Construction Noise Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
		Date Nov 16	Appendix G	

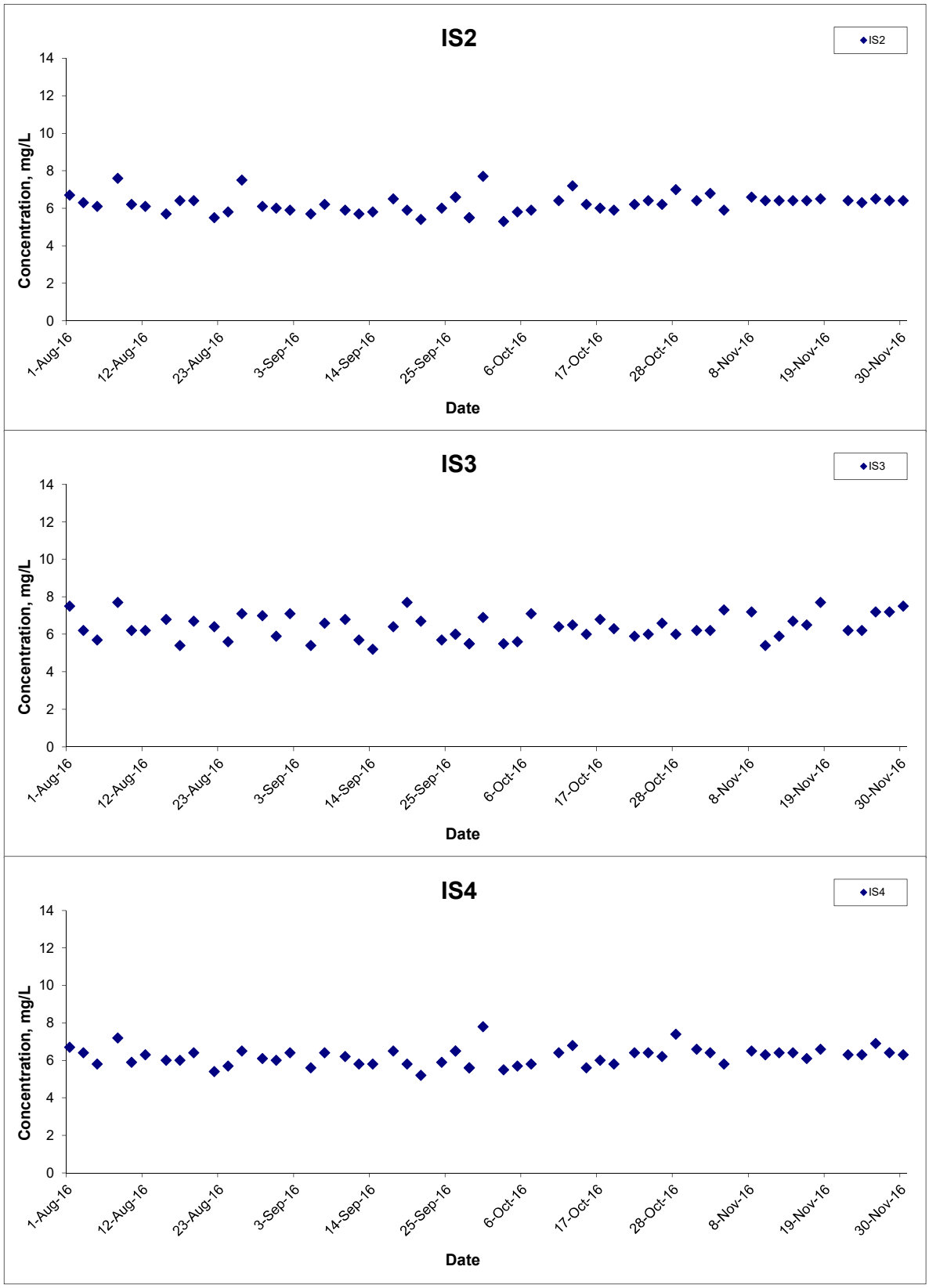
APPENDIX E
GRAPHICAL PRESENTATION OF WATER QUALITY MONITORING RESULTS

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



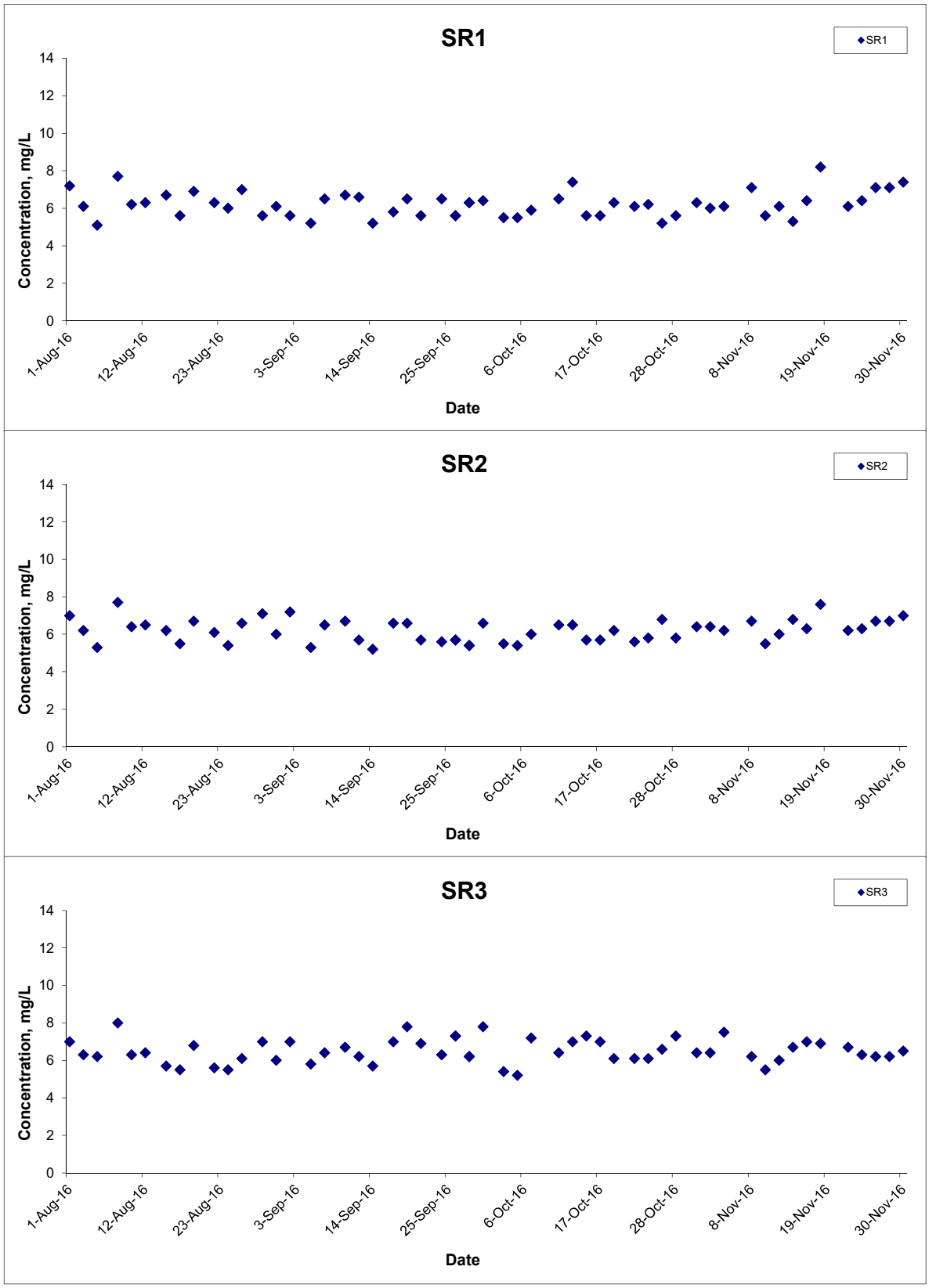
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



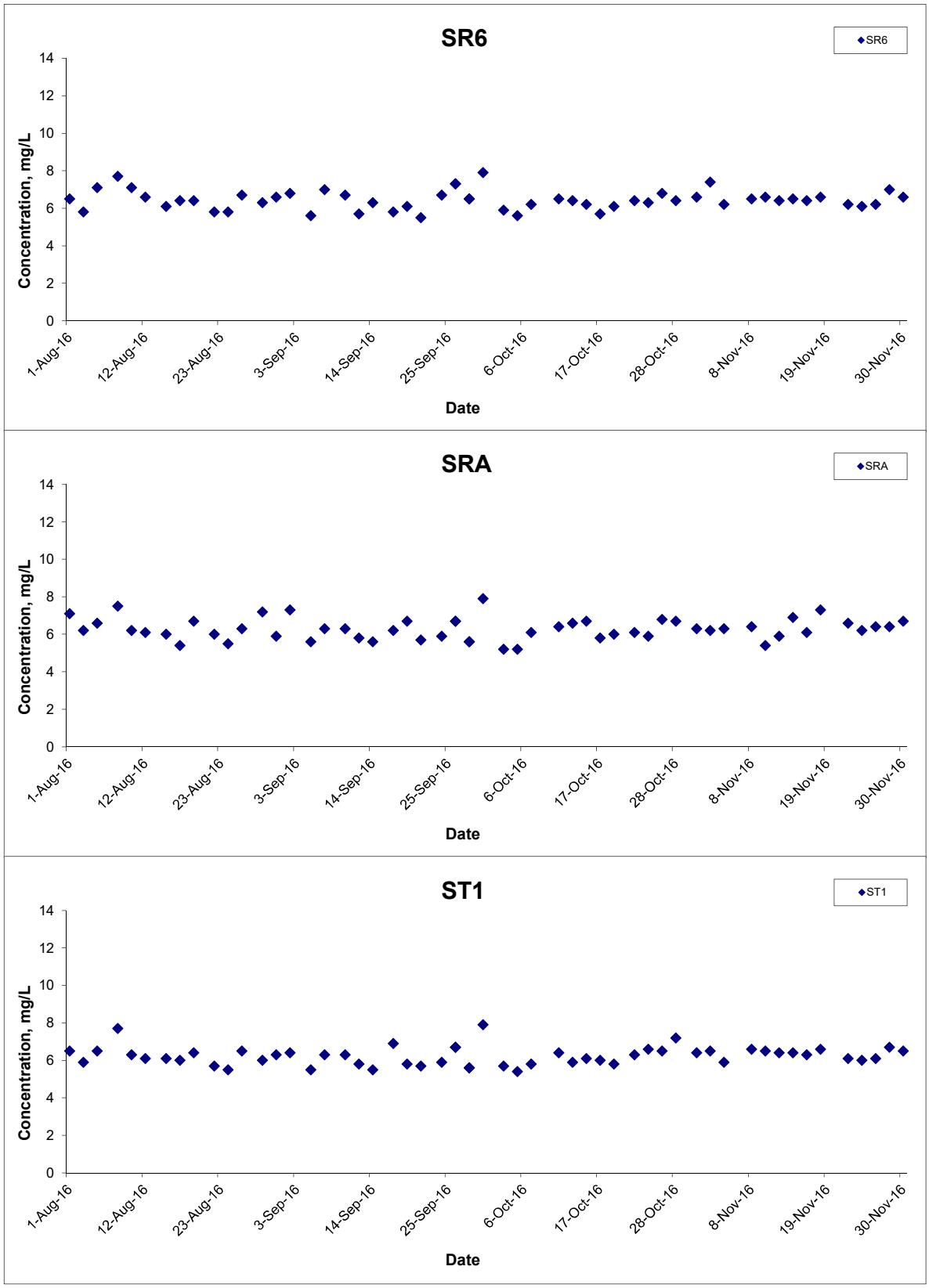
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



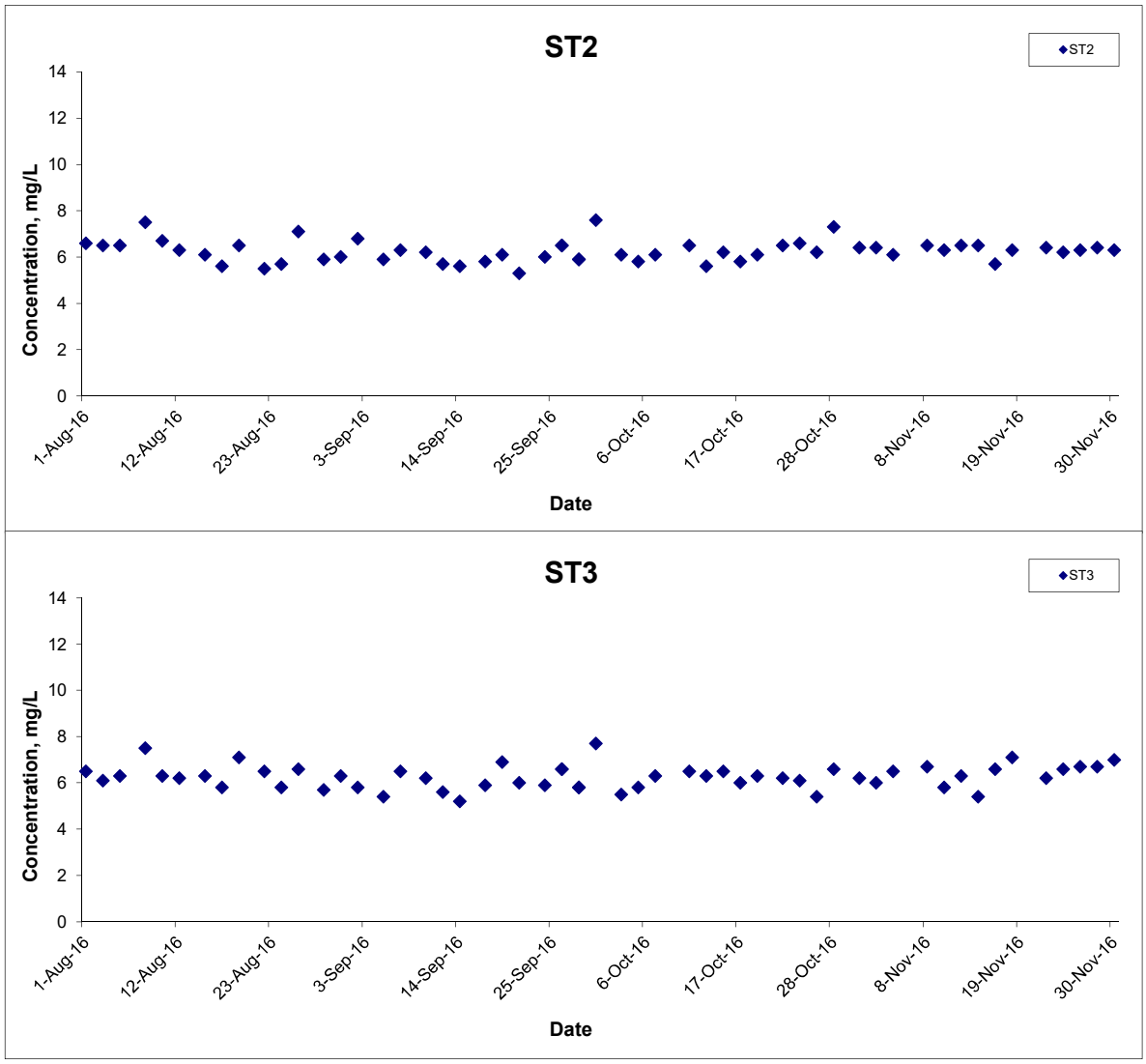
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



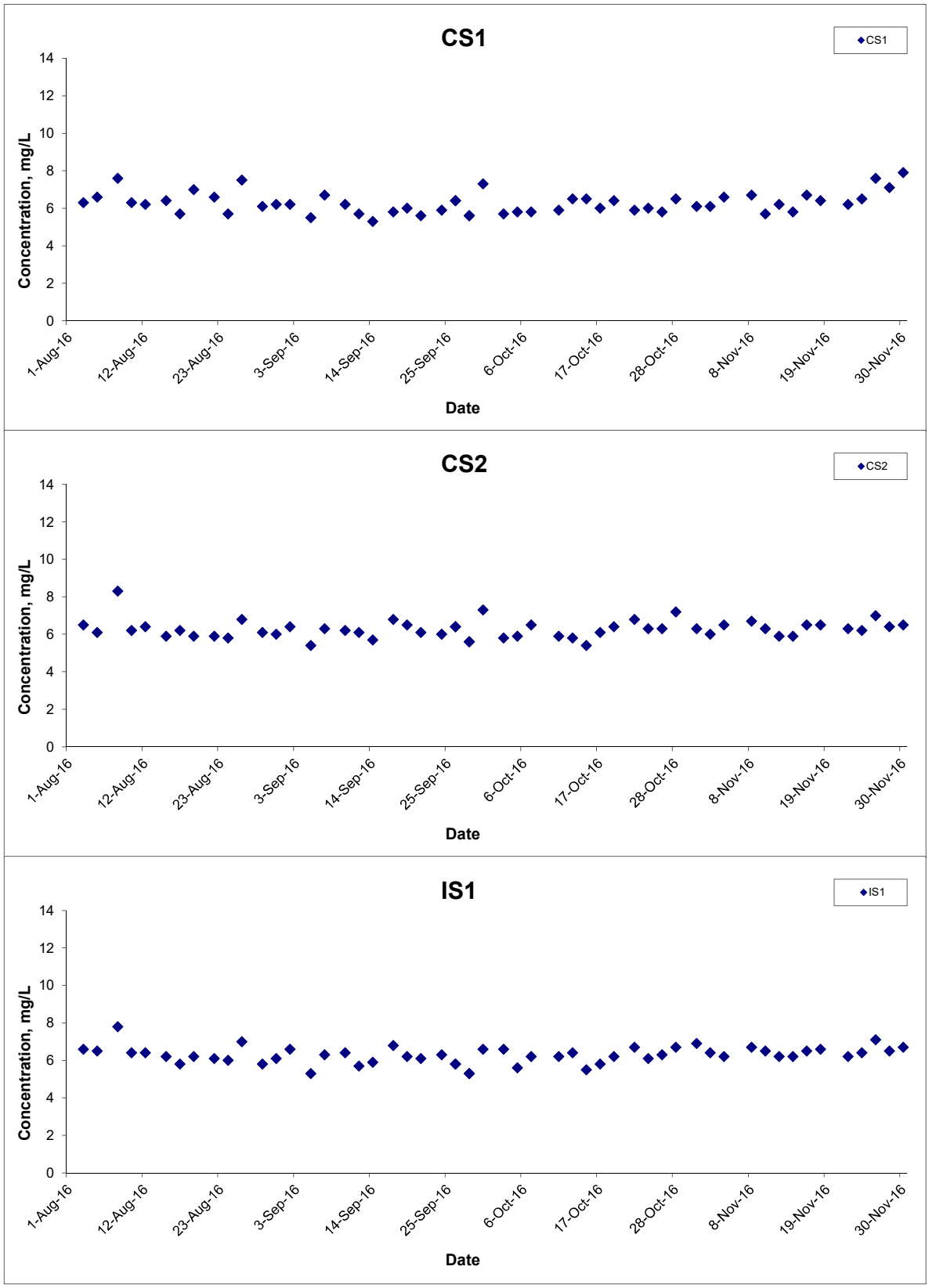
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



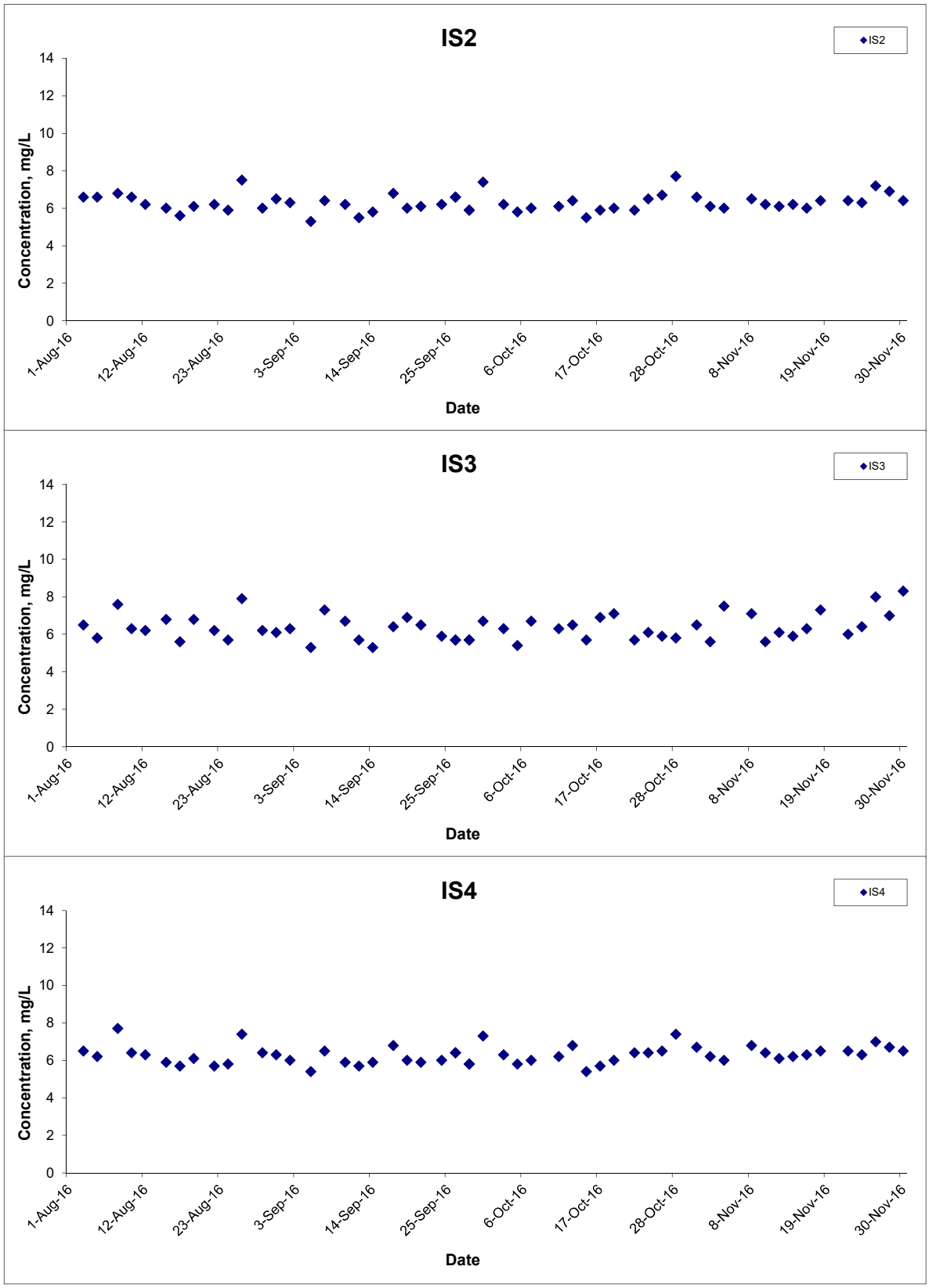
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



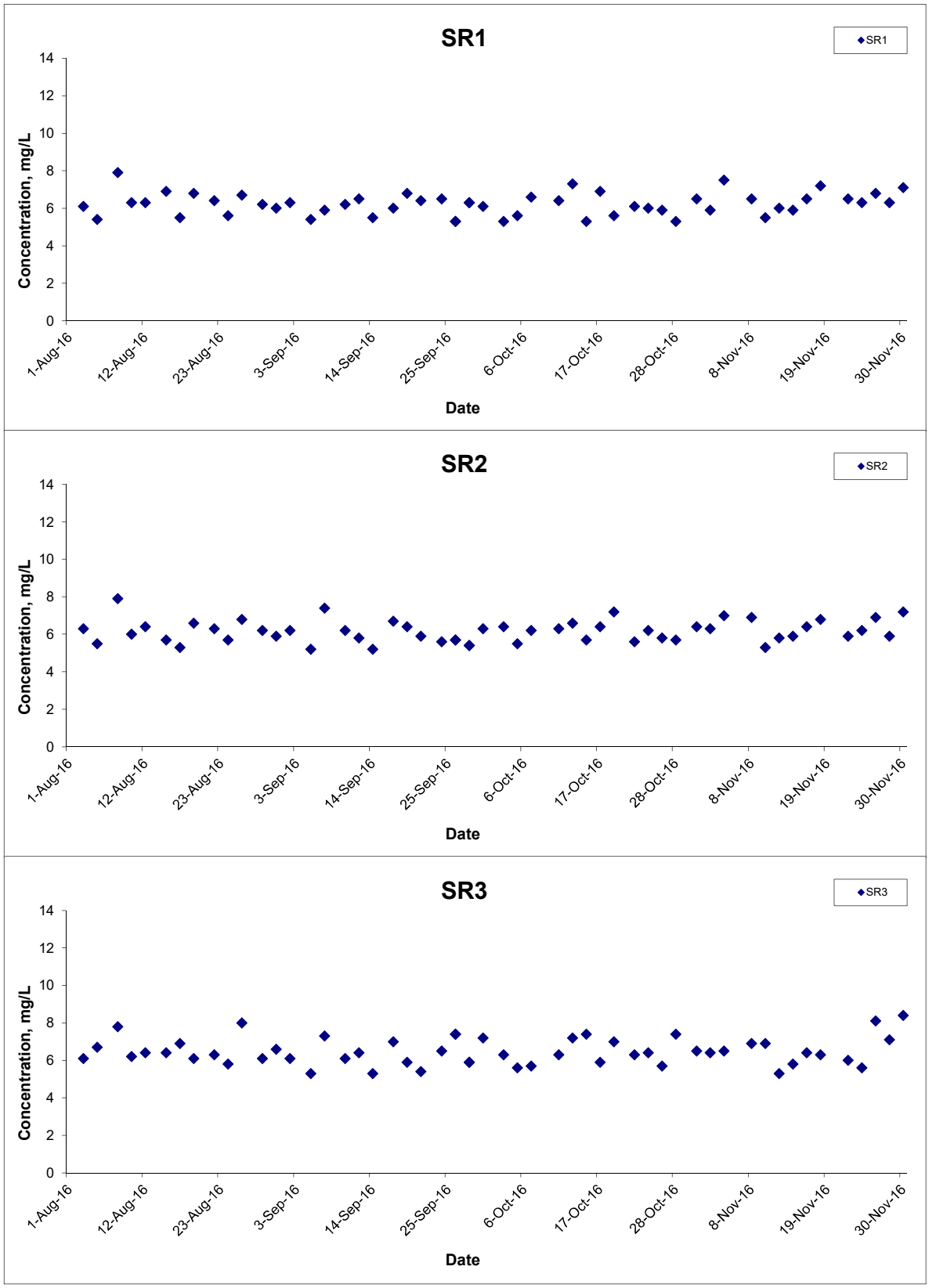
Title: Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
	Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



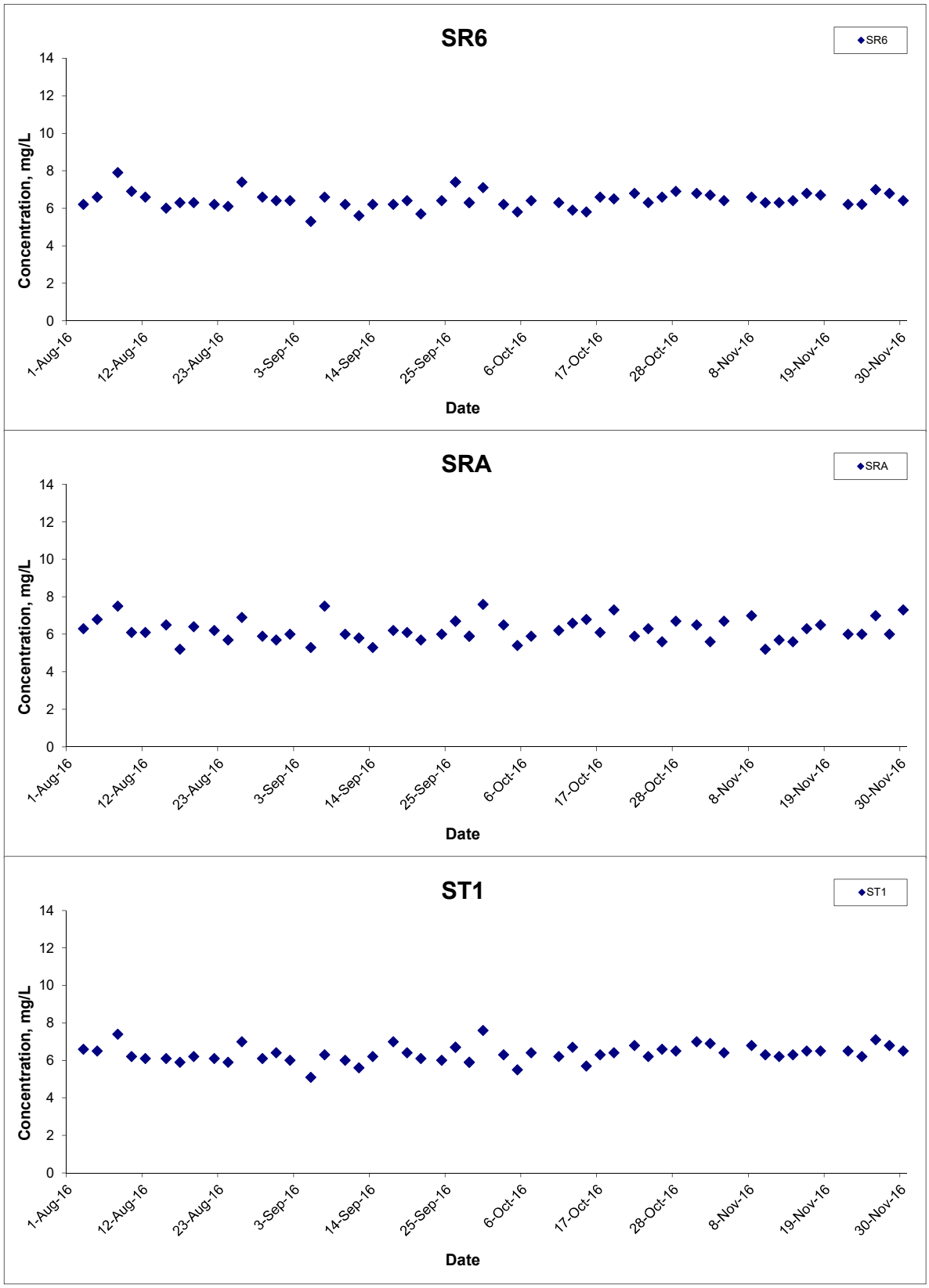
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



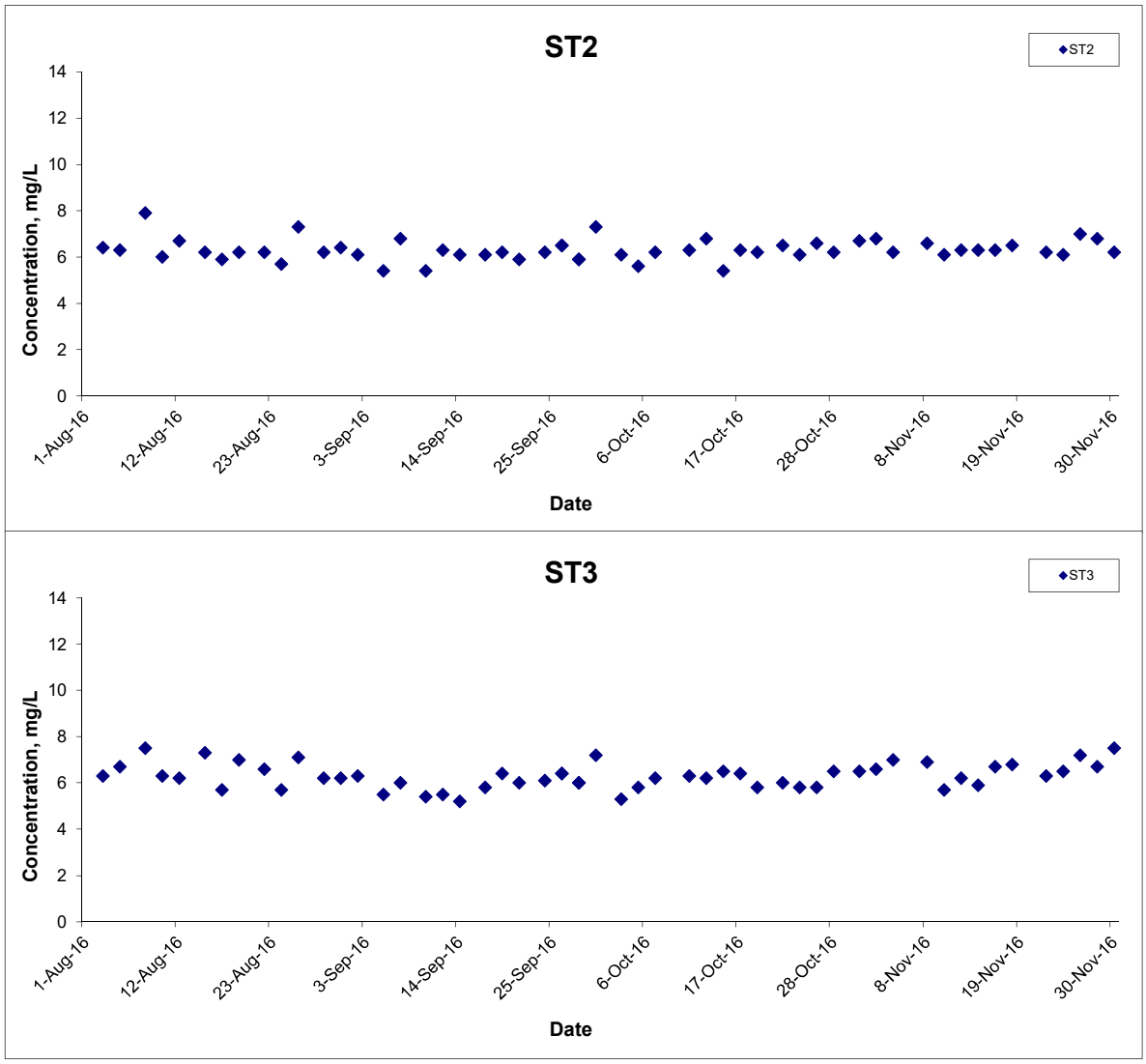
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



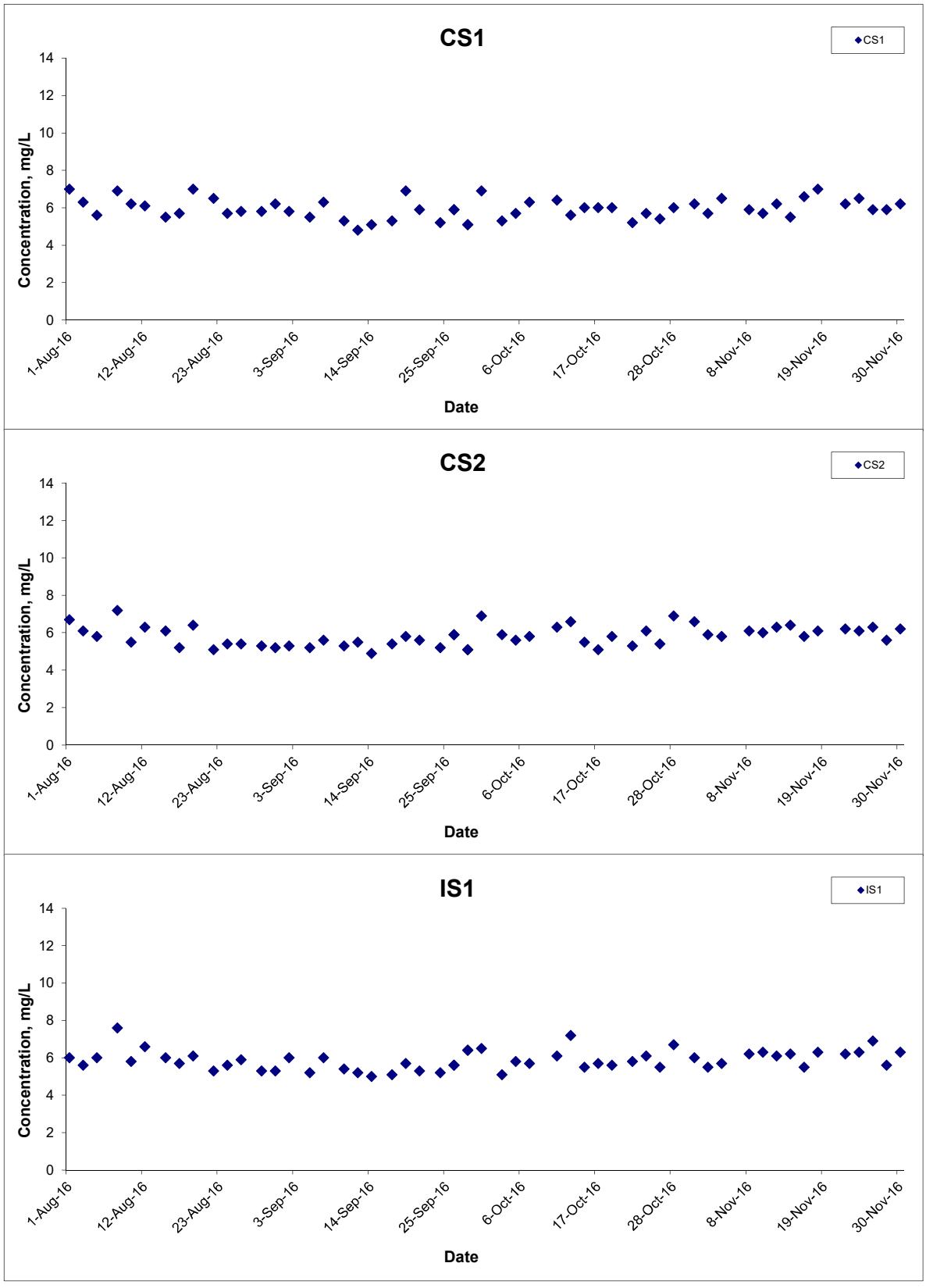
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



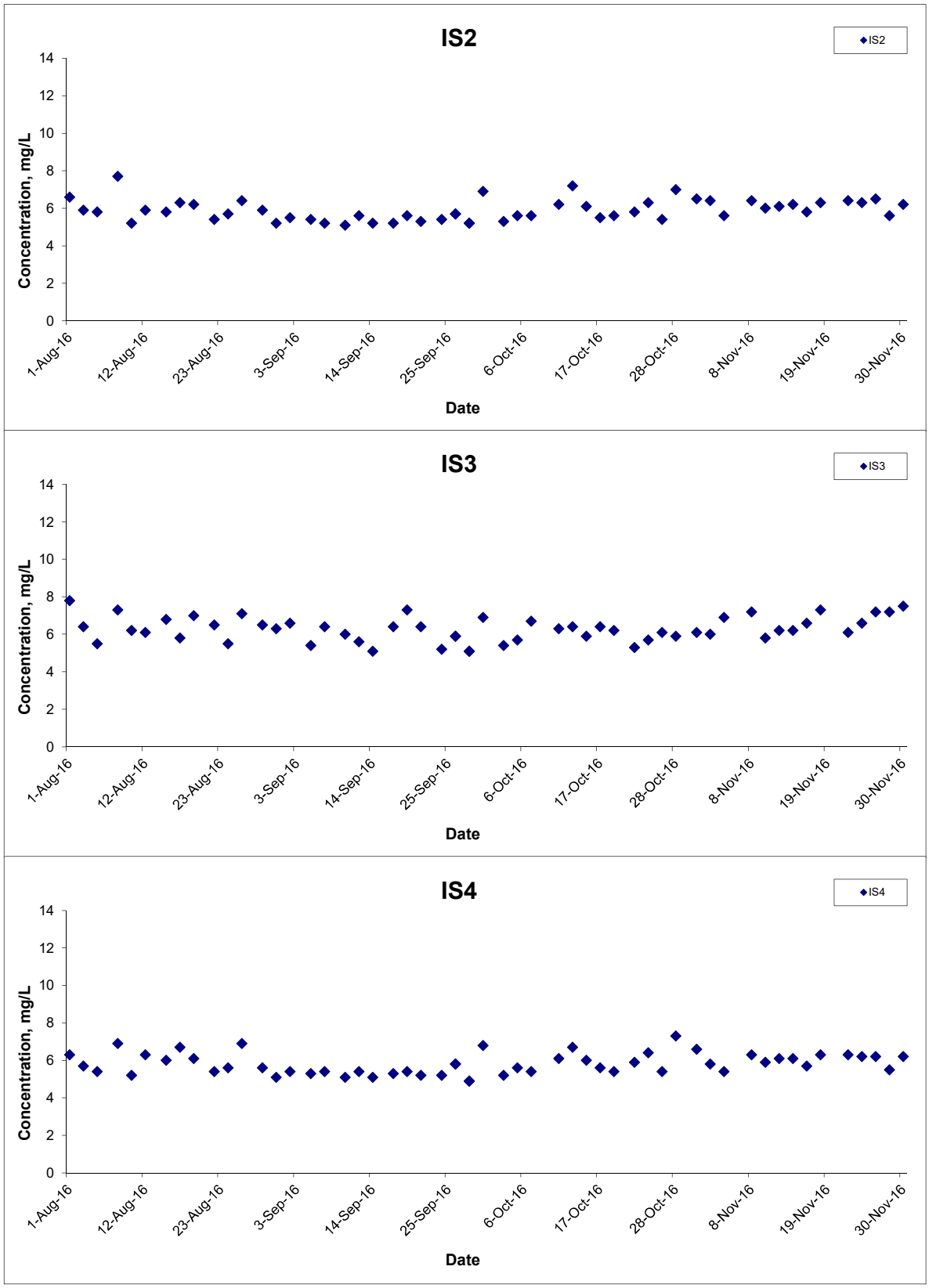
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



Title: Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
	Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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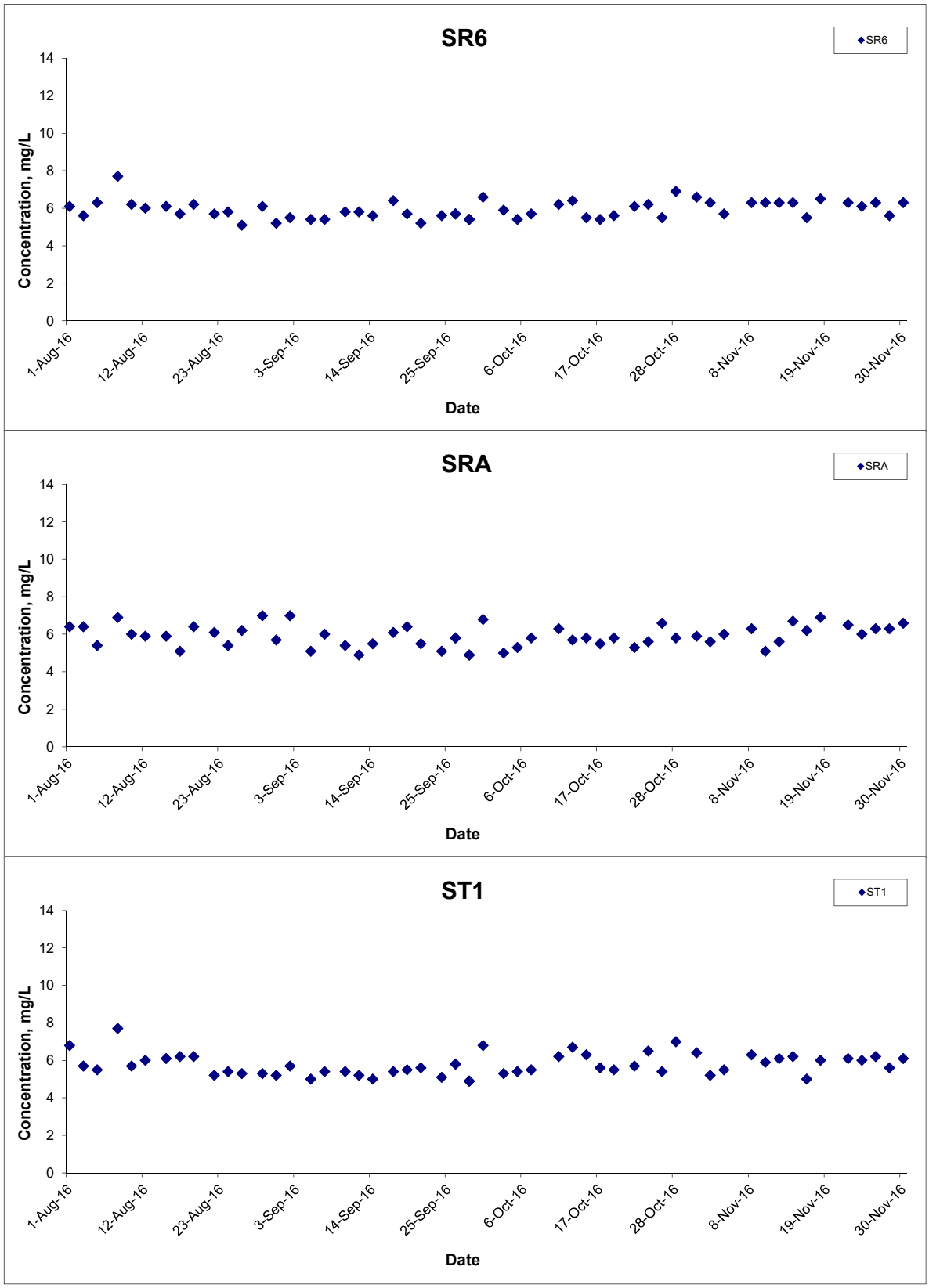
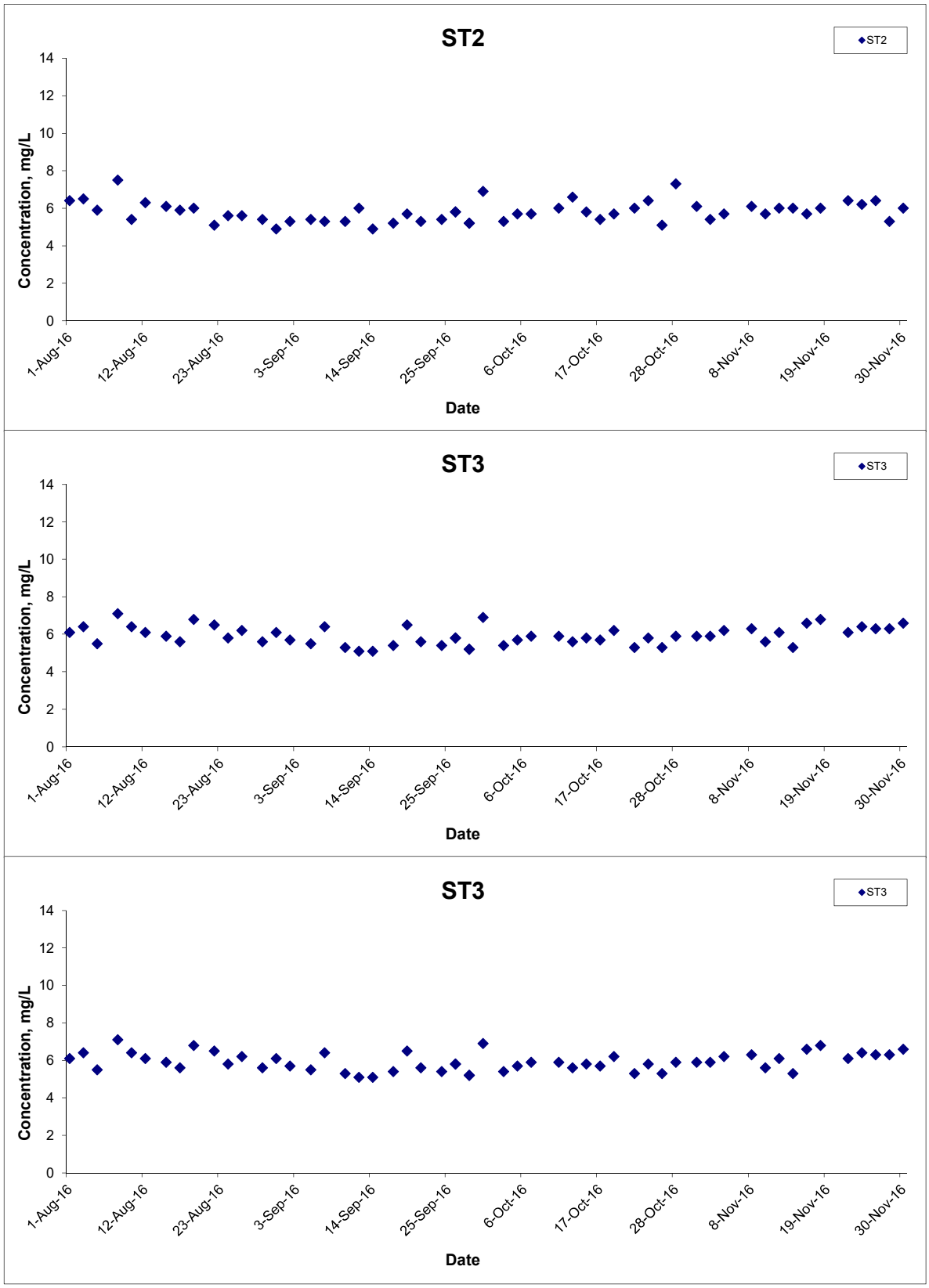
	Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



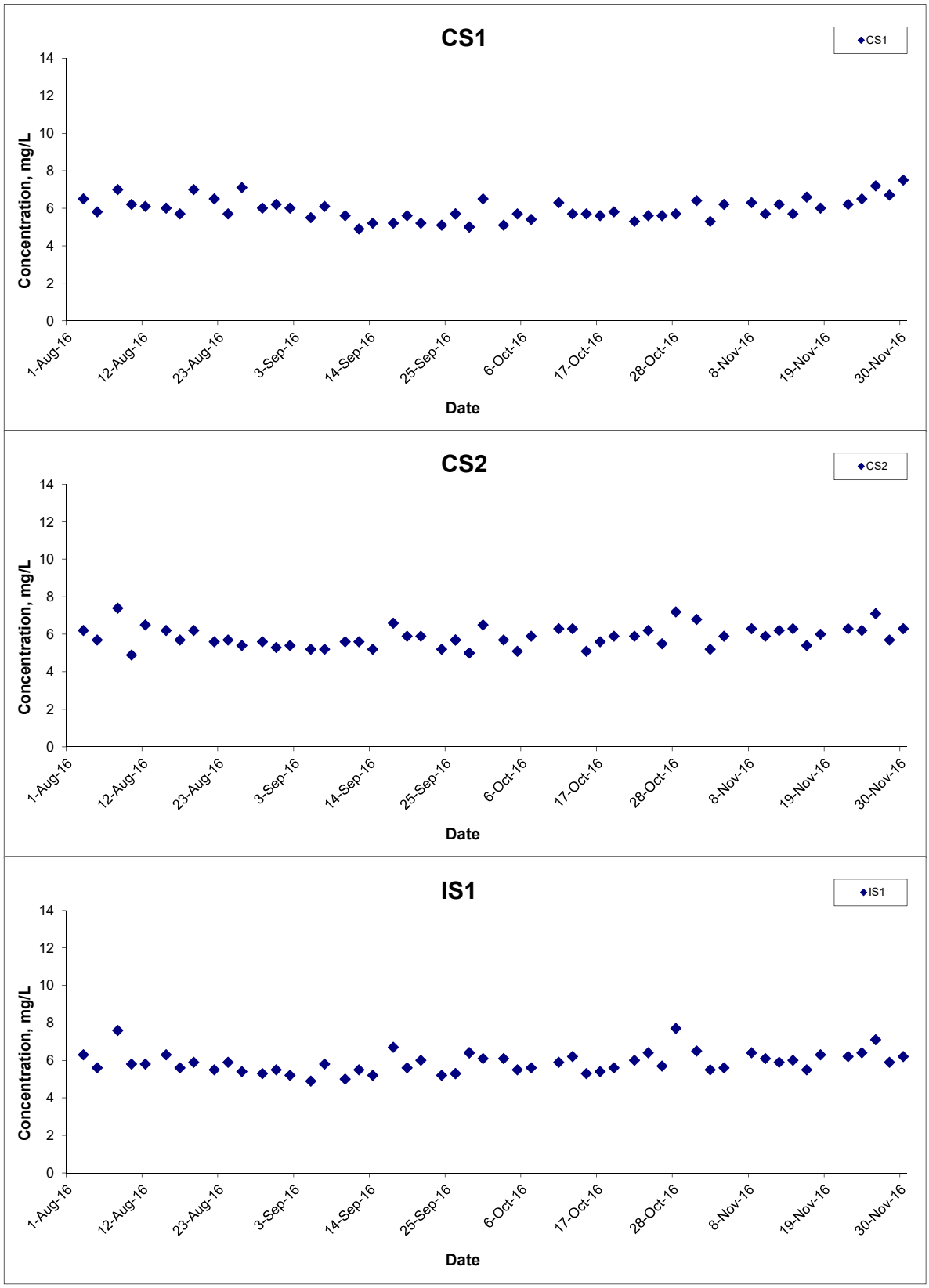
Title: Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
	Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



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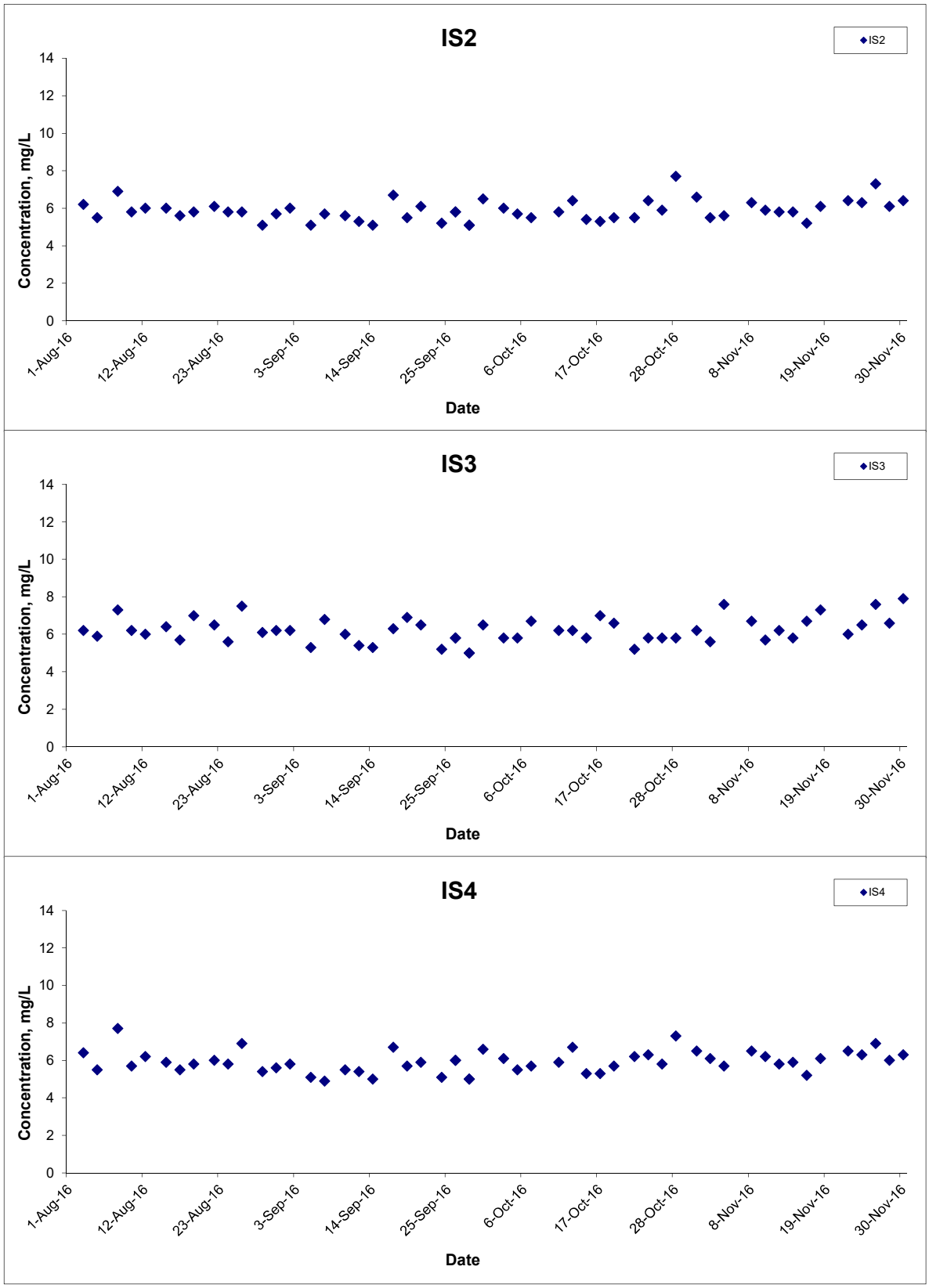
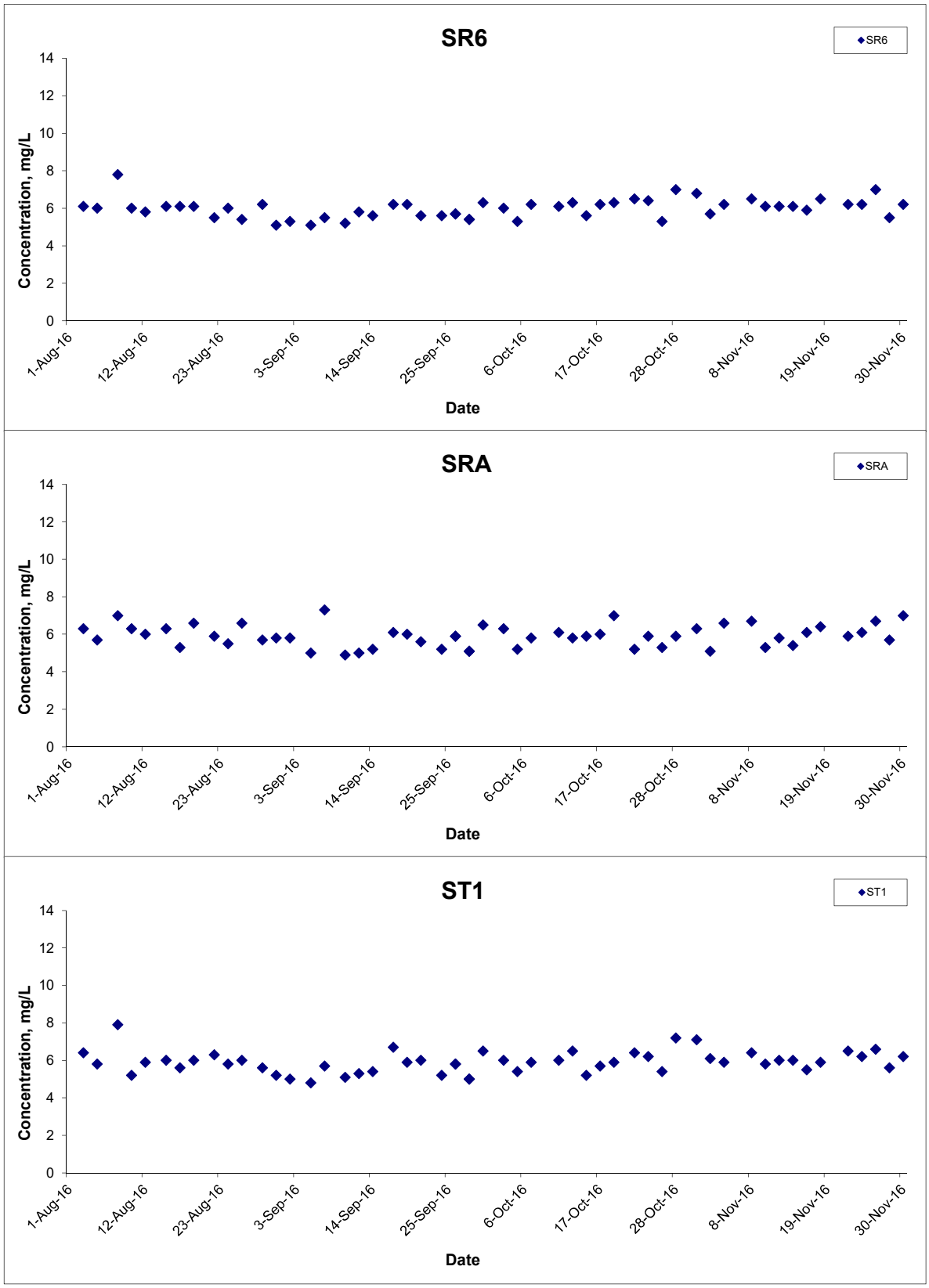
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



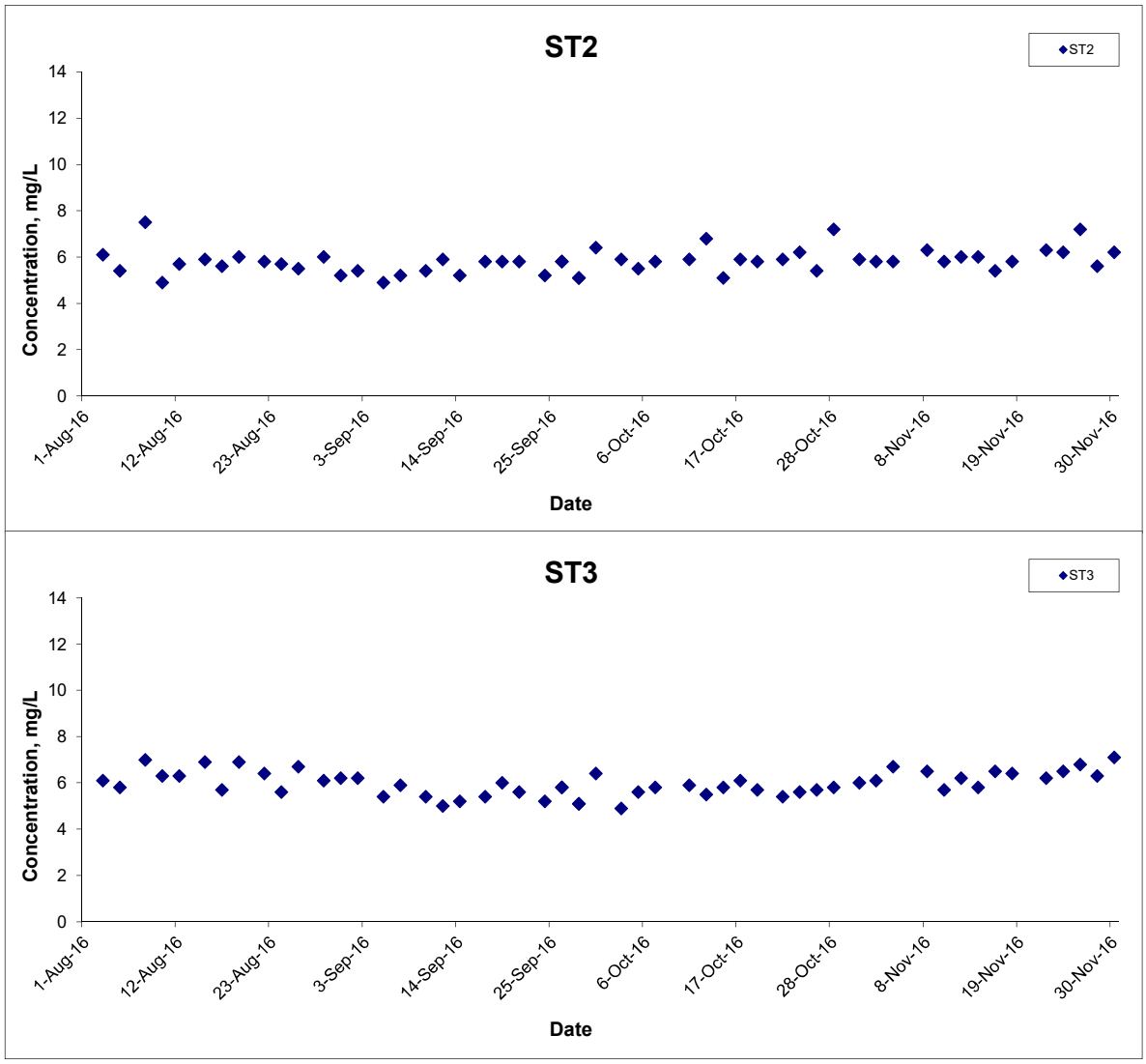
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S Date: Nov 16	Project No.: MA12014 Appendix: H	CINOTECH

Dissolved Oxygen (Bottom) at Mid-Flood Tide



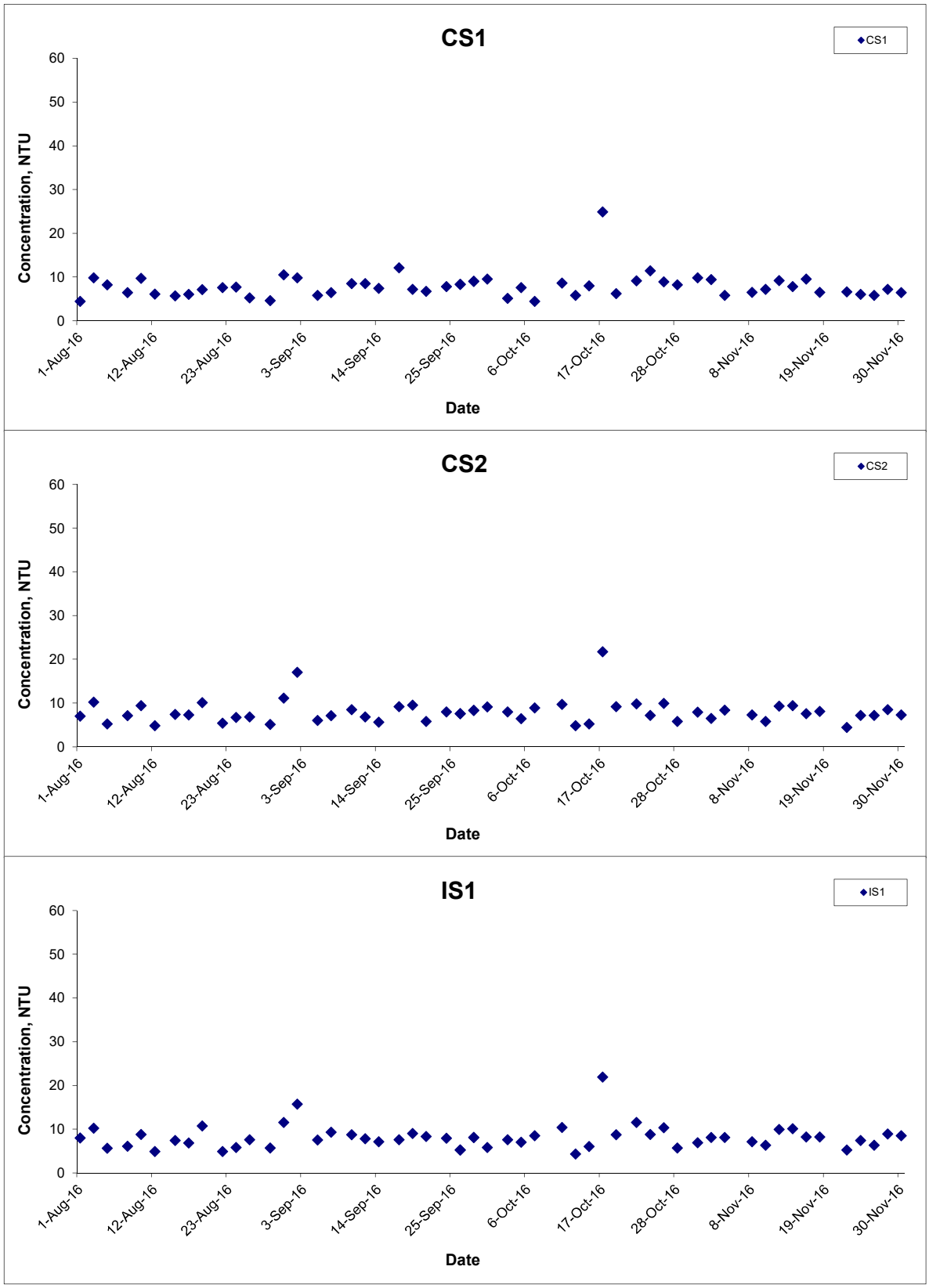
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



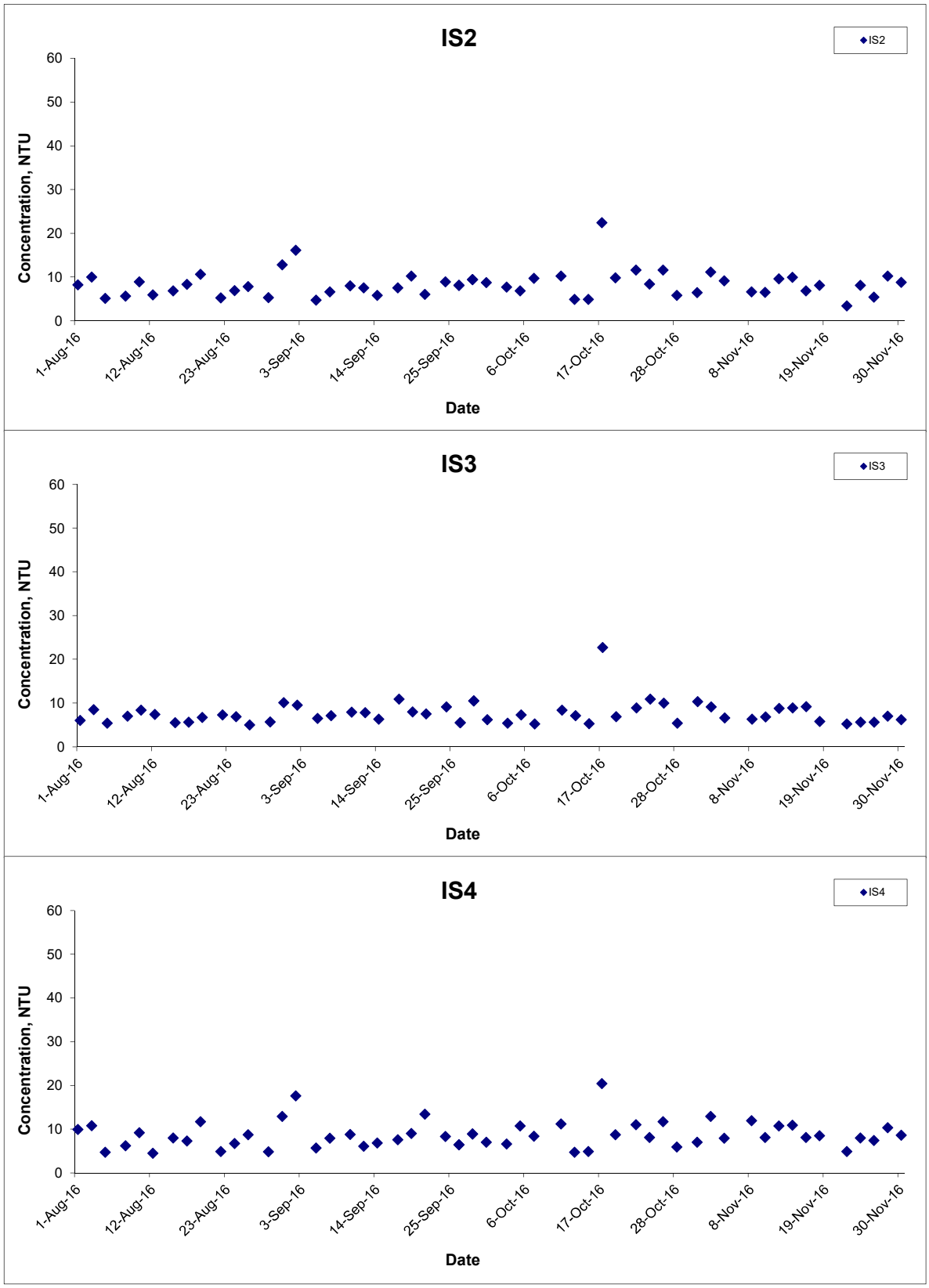
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S Date: Nov 16	Project No.: MA12014 Appendix: H	CINOTECH

Turbidity (Depth-averaged) at Mid-Ebb Tide



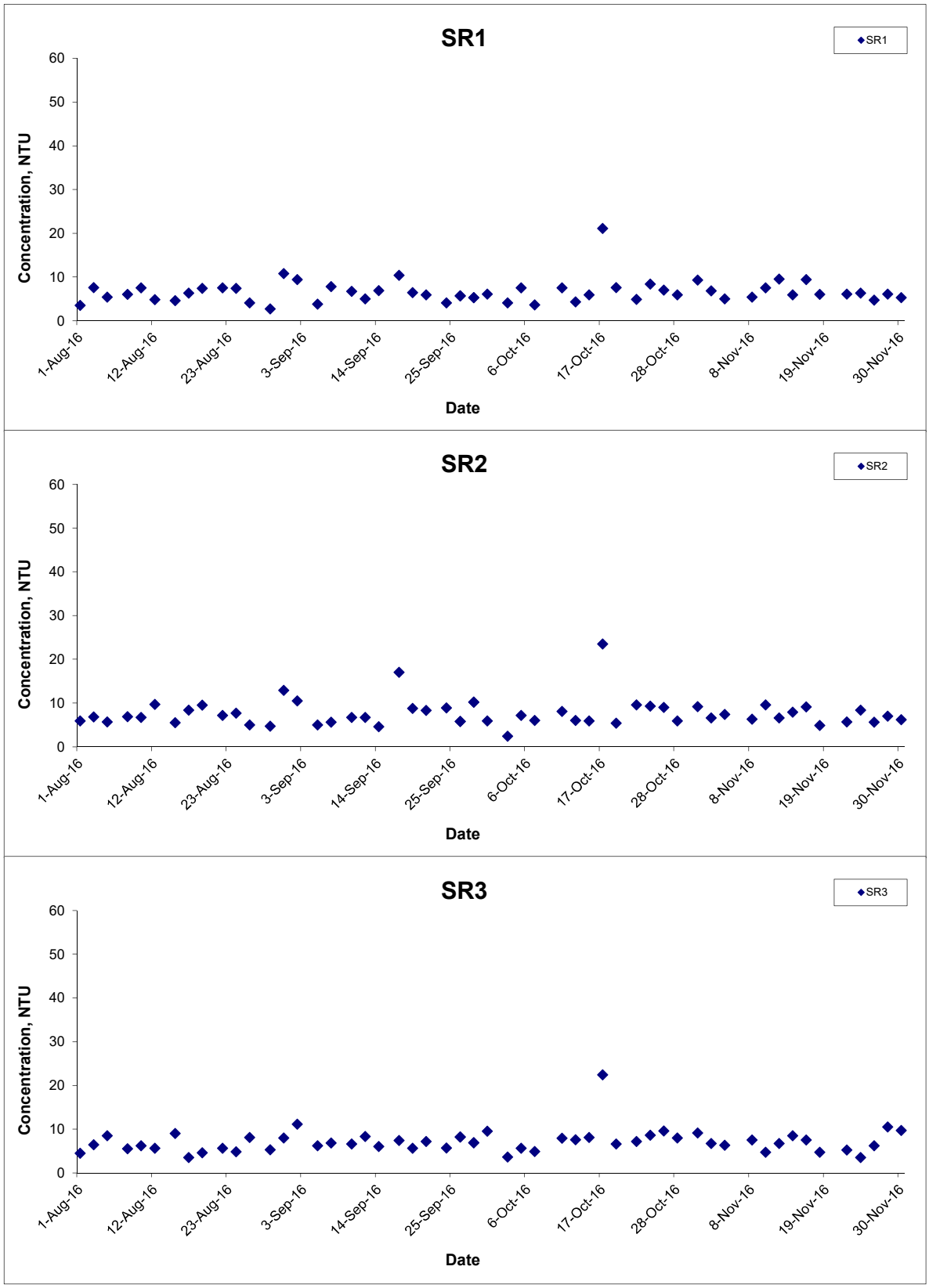
Title: Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
	Date: Nov 16	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



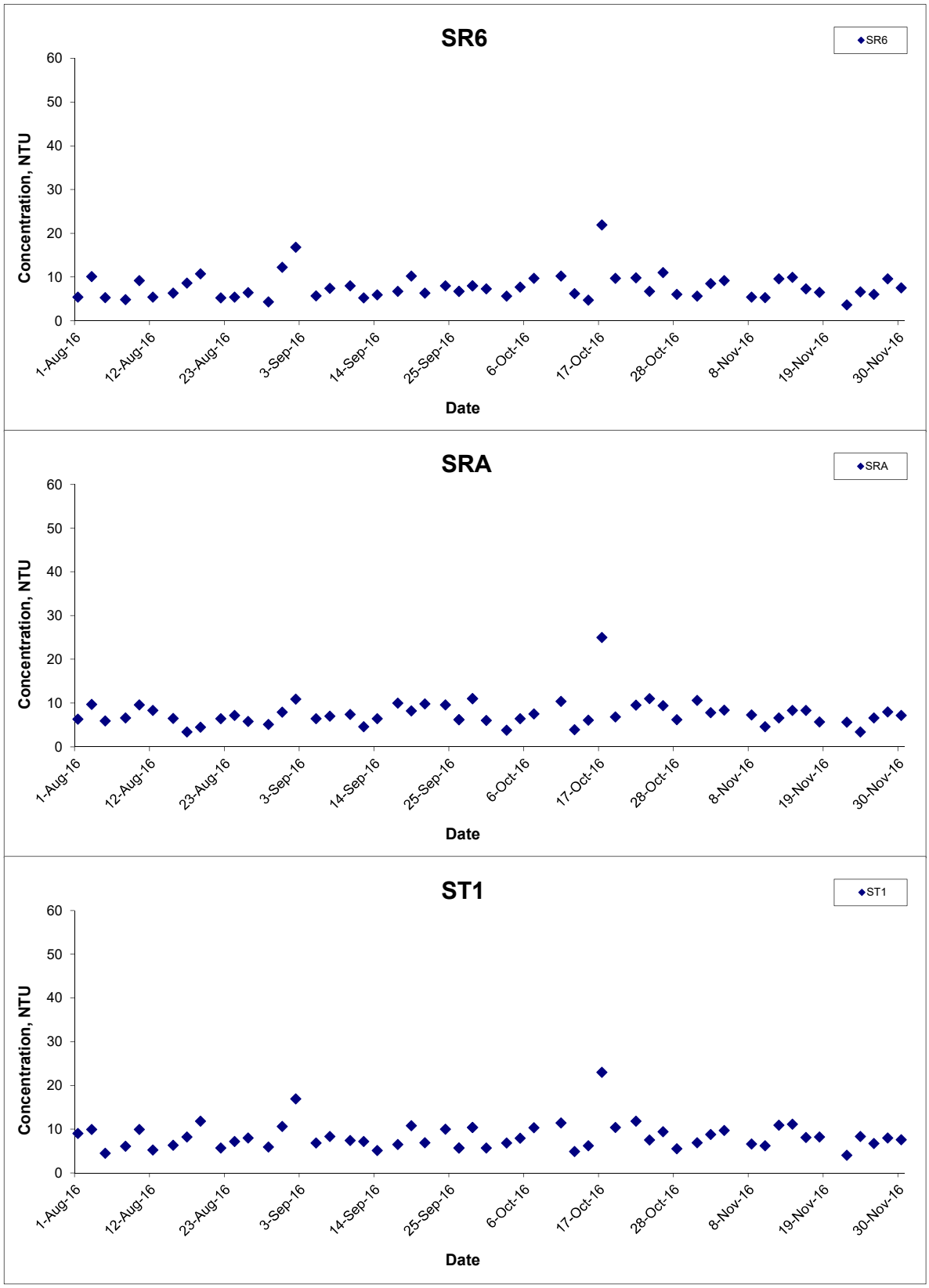
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



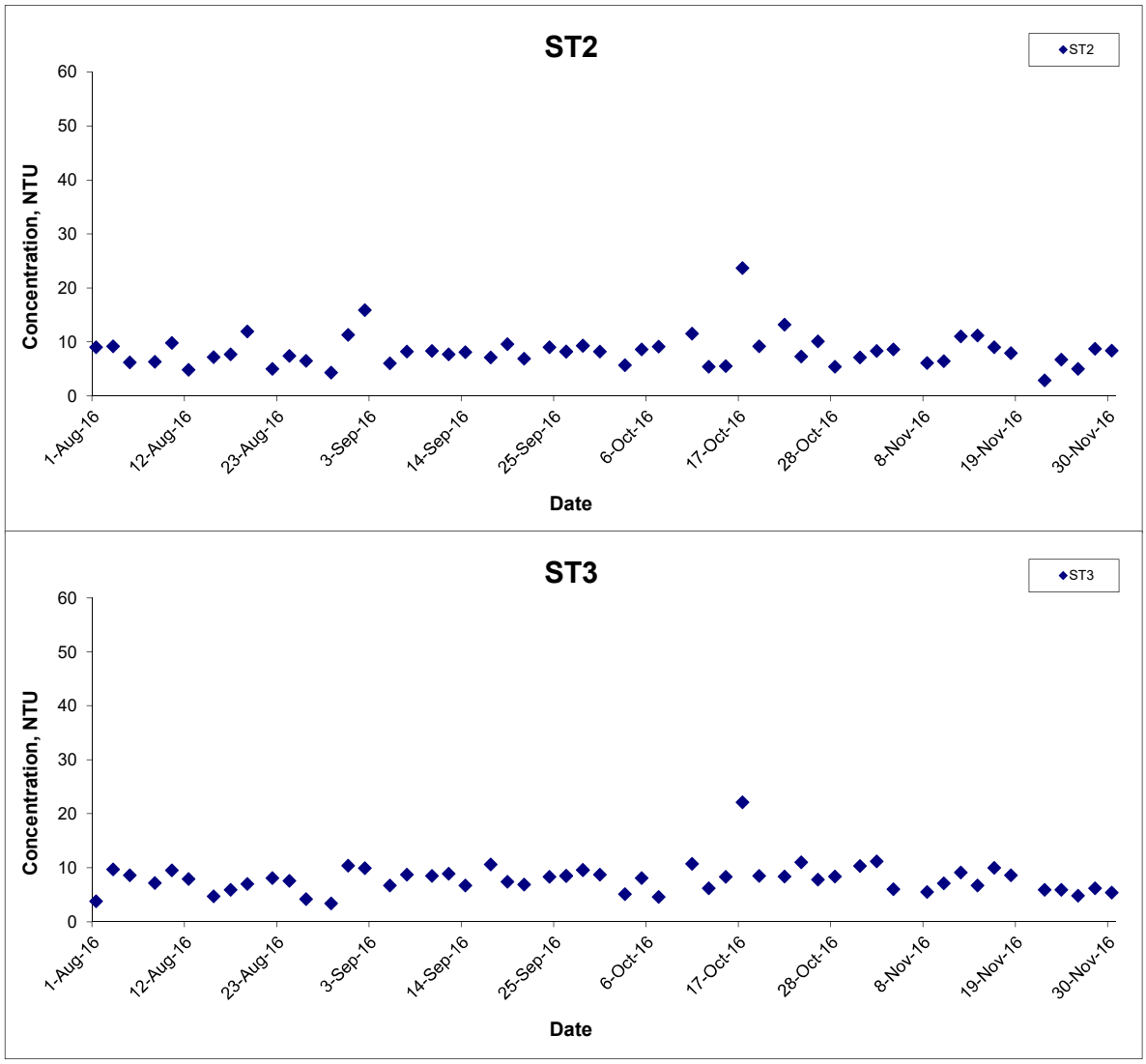
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



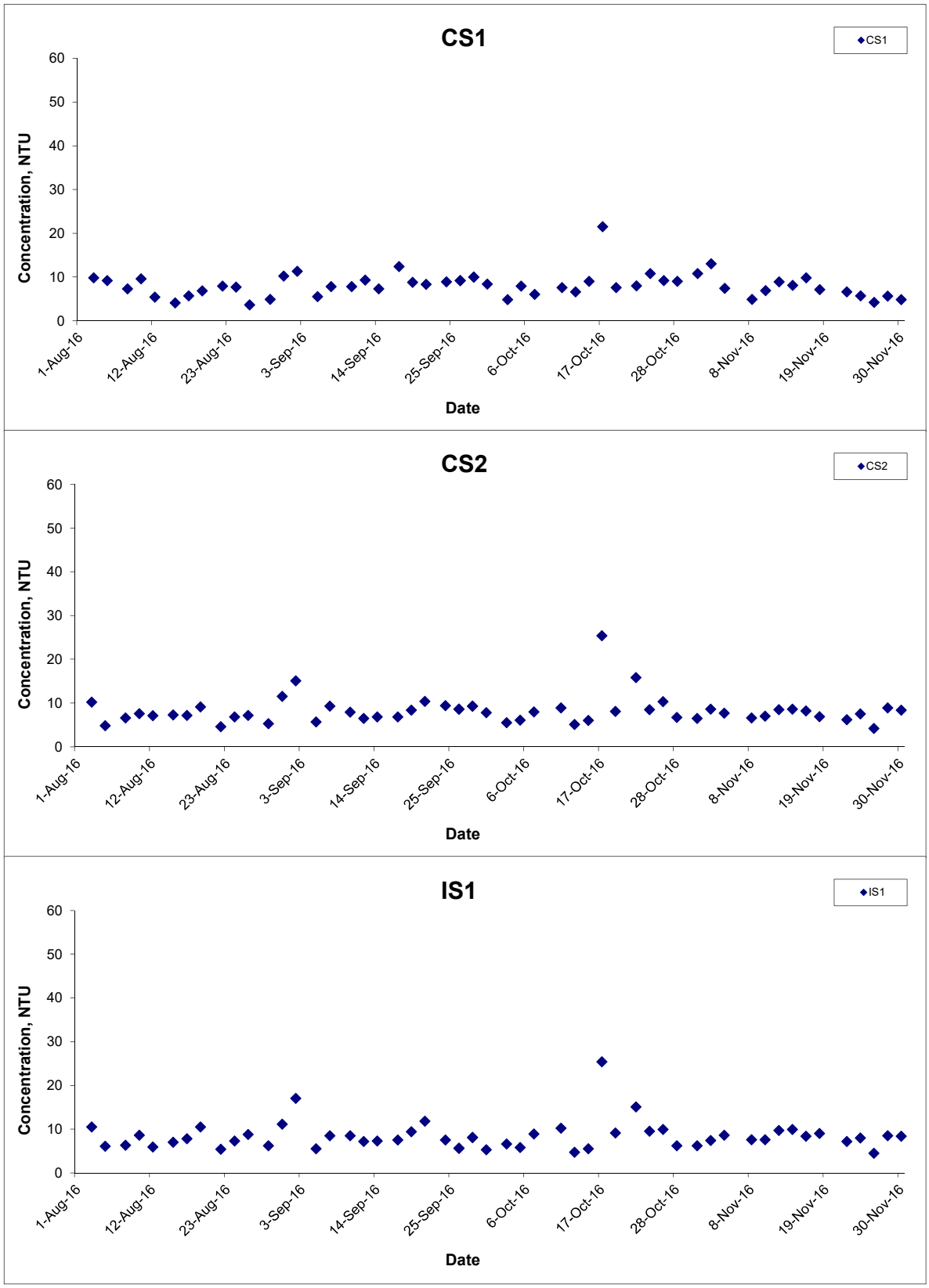
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Nov 16	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



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	Date: Nov 16	Appendix: H	

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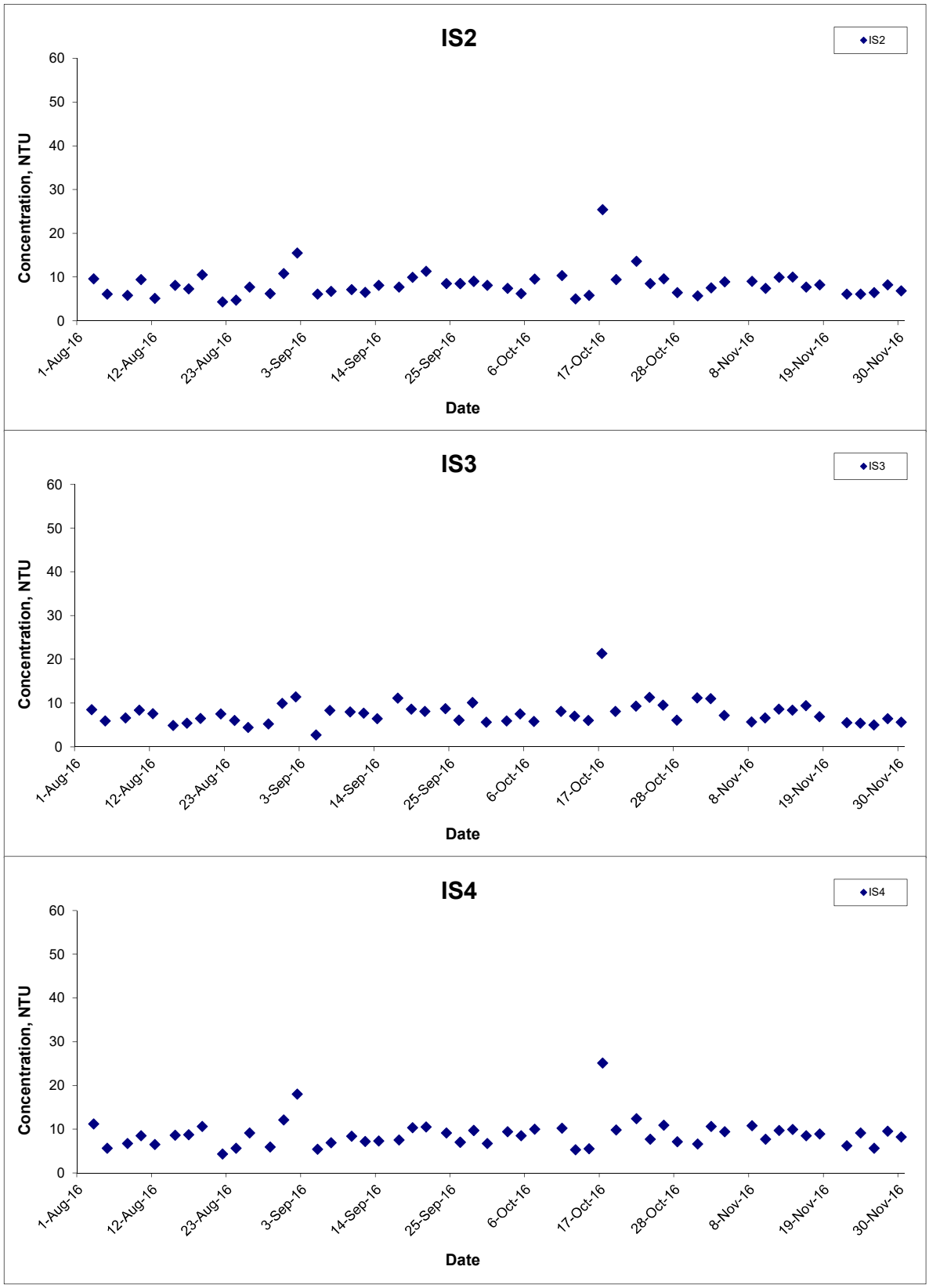

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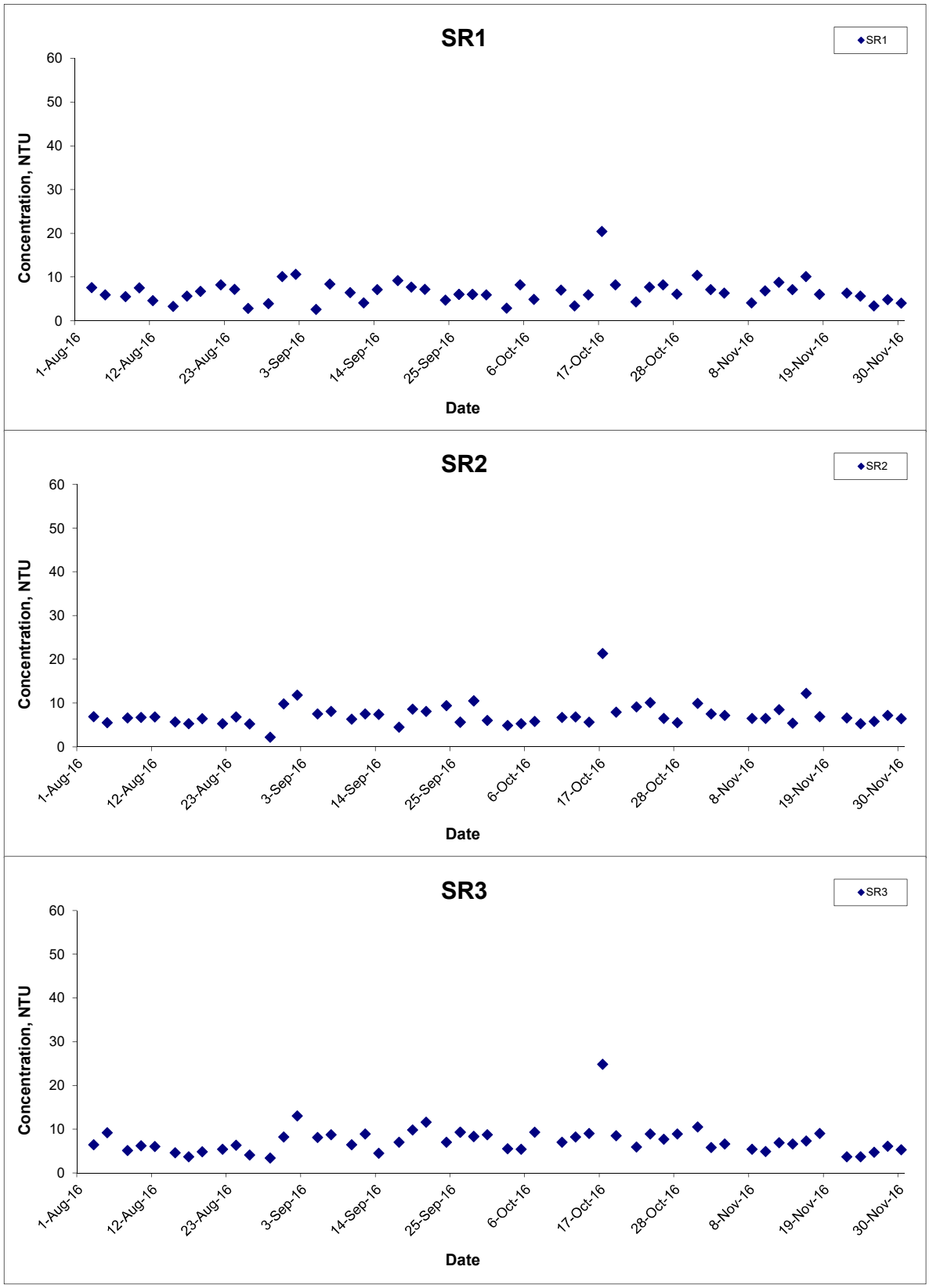

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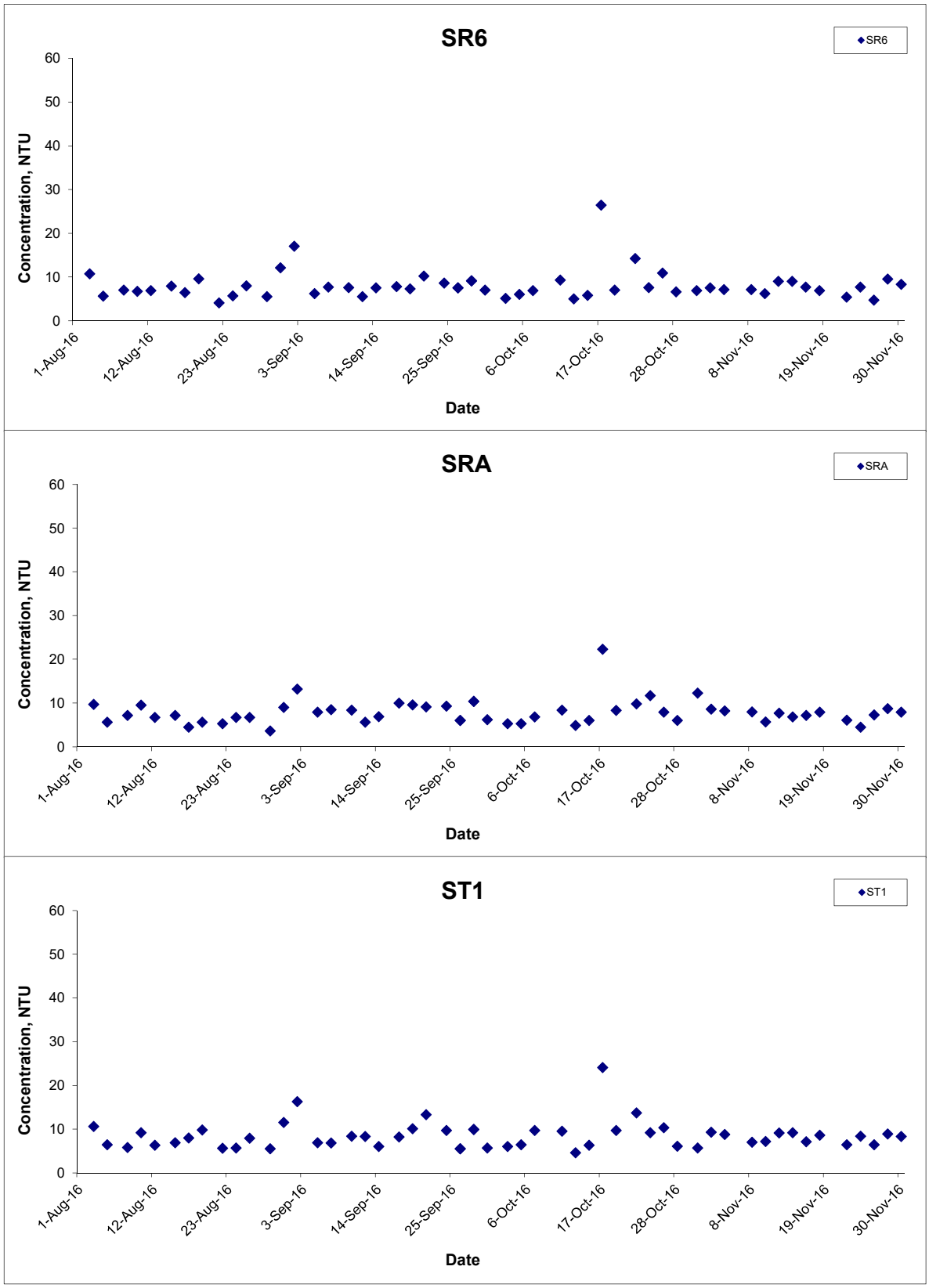

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	Date: Nov 16	Appendix: H	

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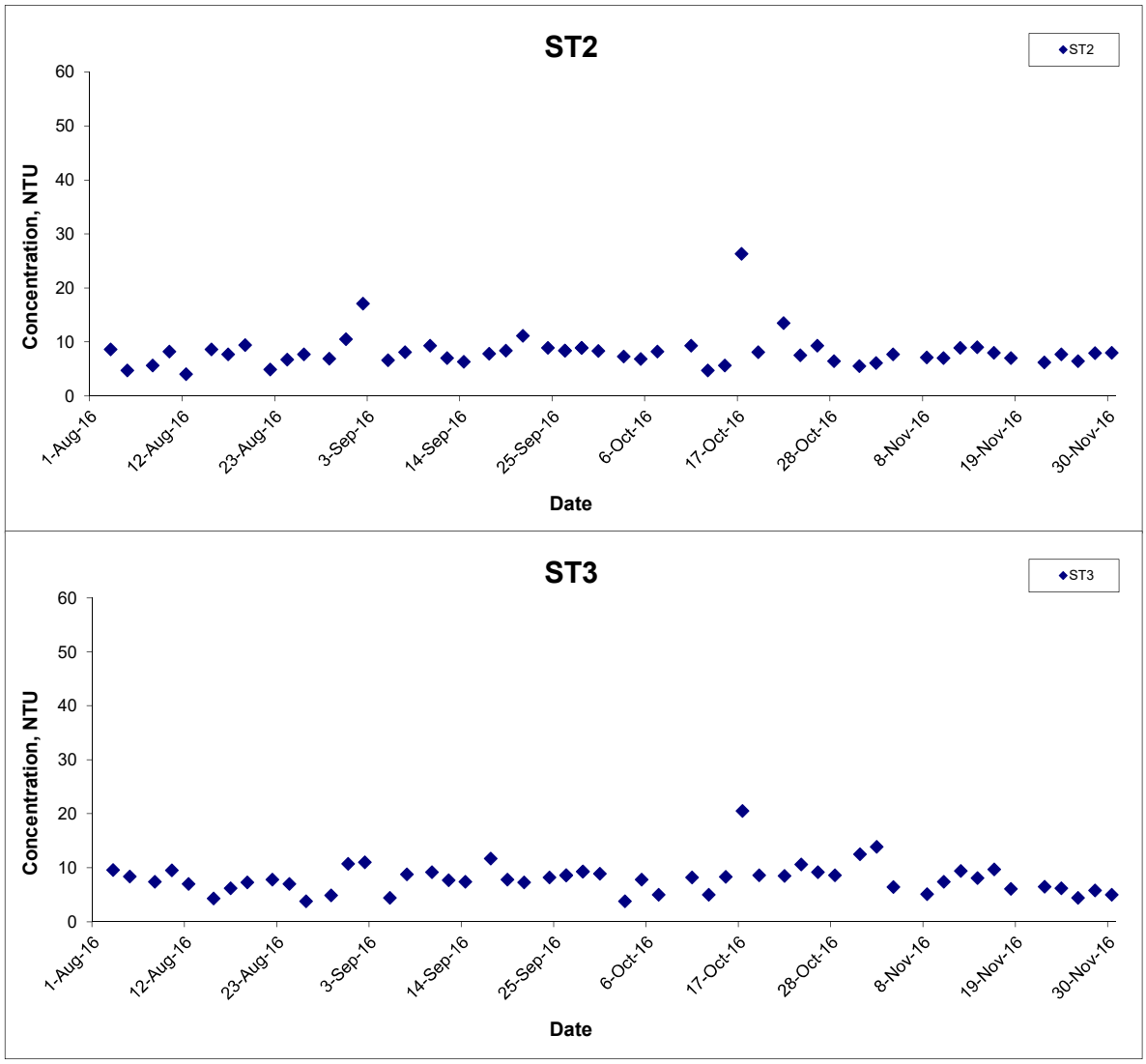

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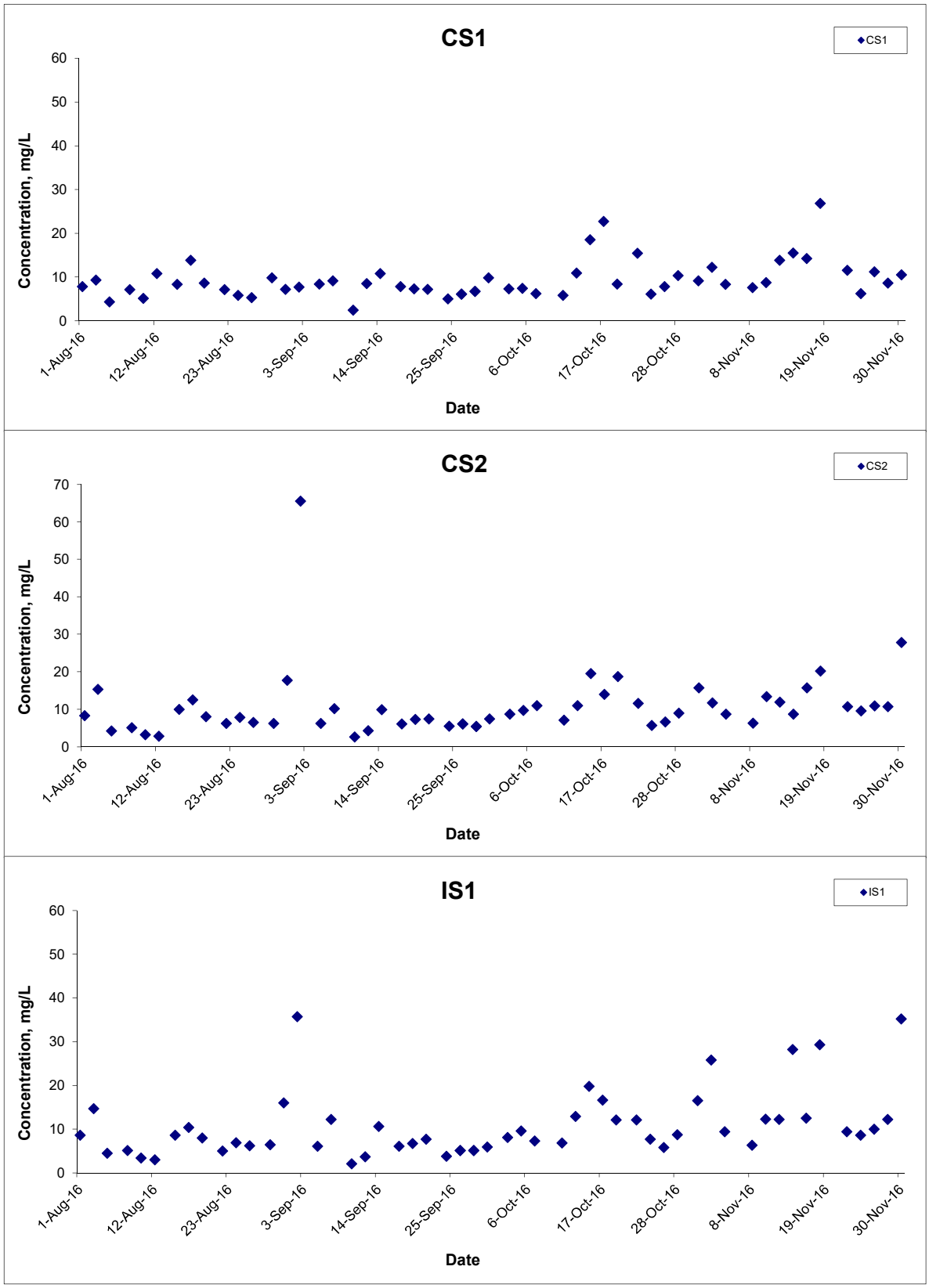
		Date: Nov 16	Appendix: H	

Suspended Solids (Depth-averaged) at Mid-Ebb Tide



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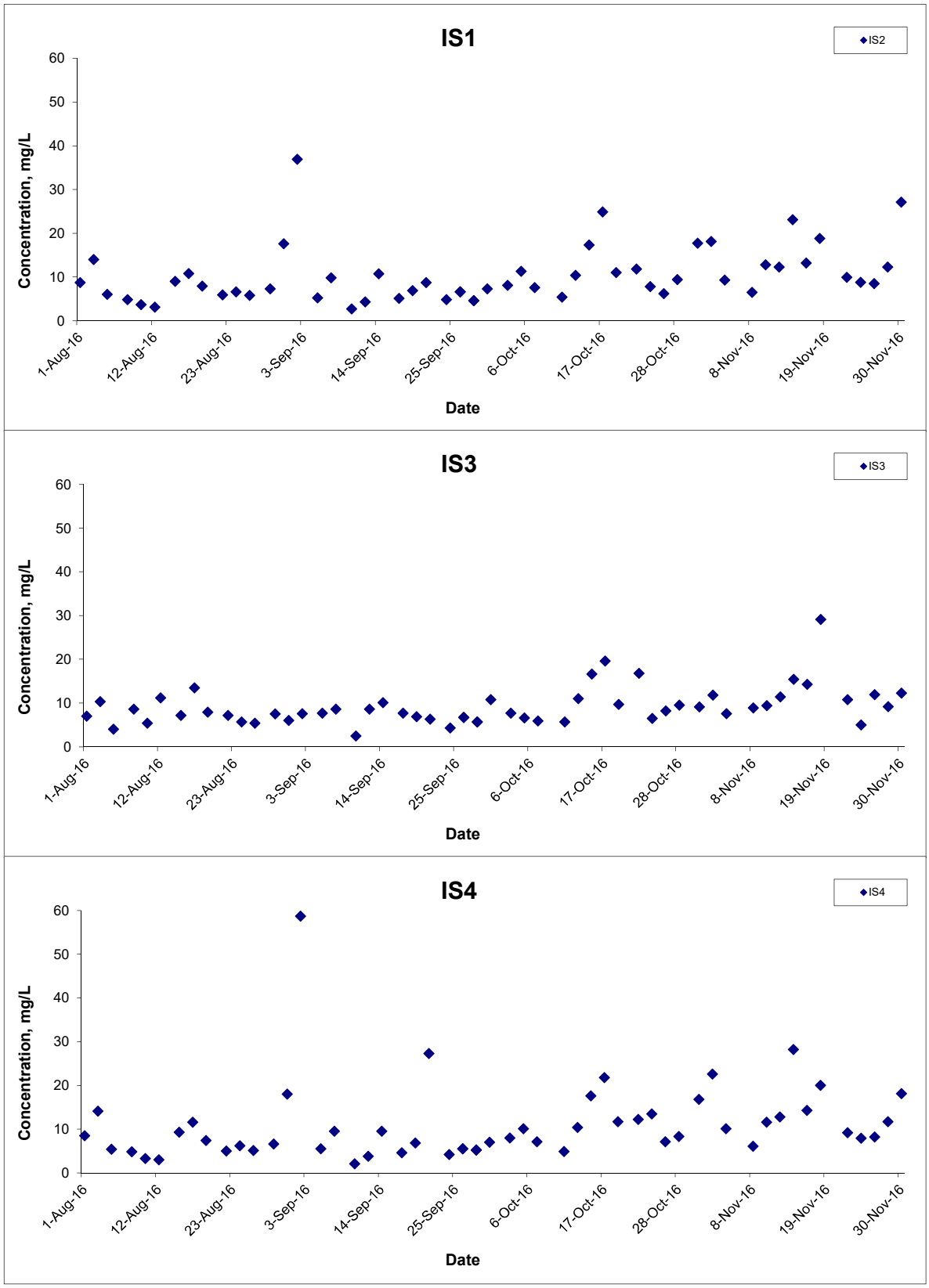

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	Date: Nov 16	Appendix: H	

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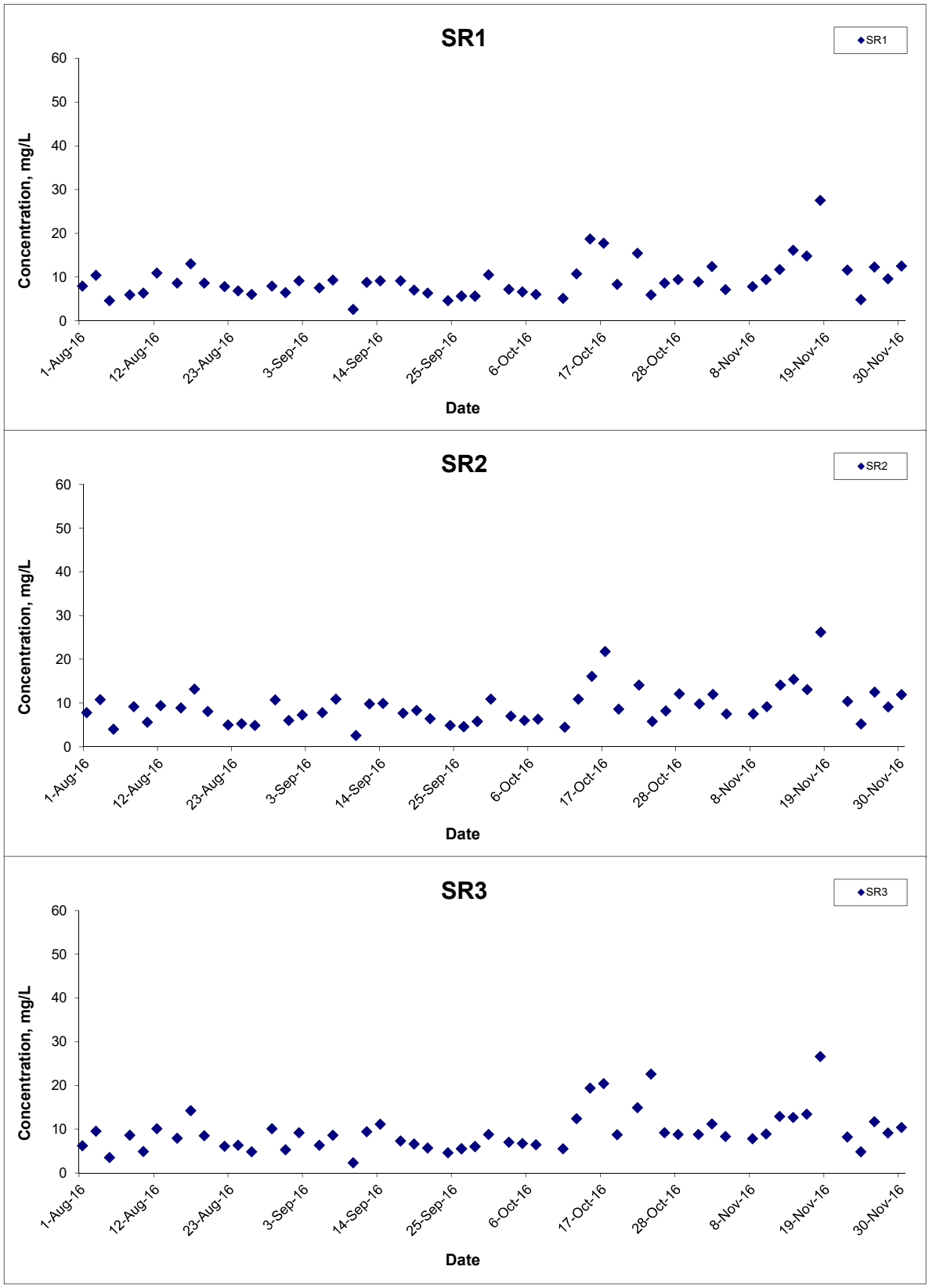

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	Date: Nov 16	Appendix: H	

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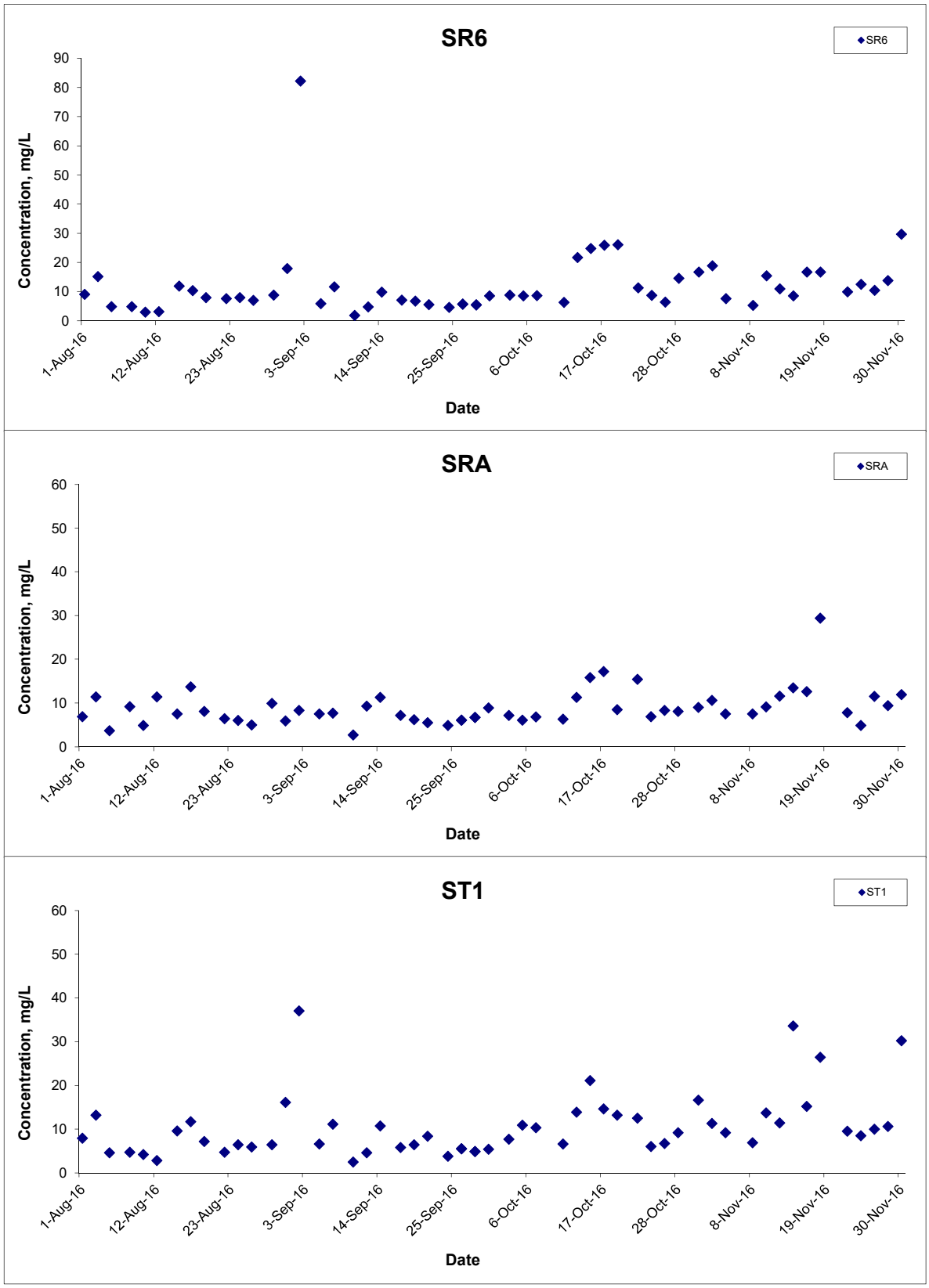

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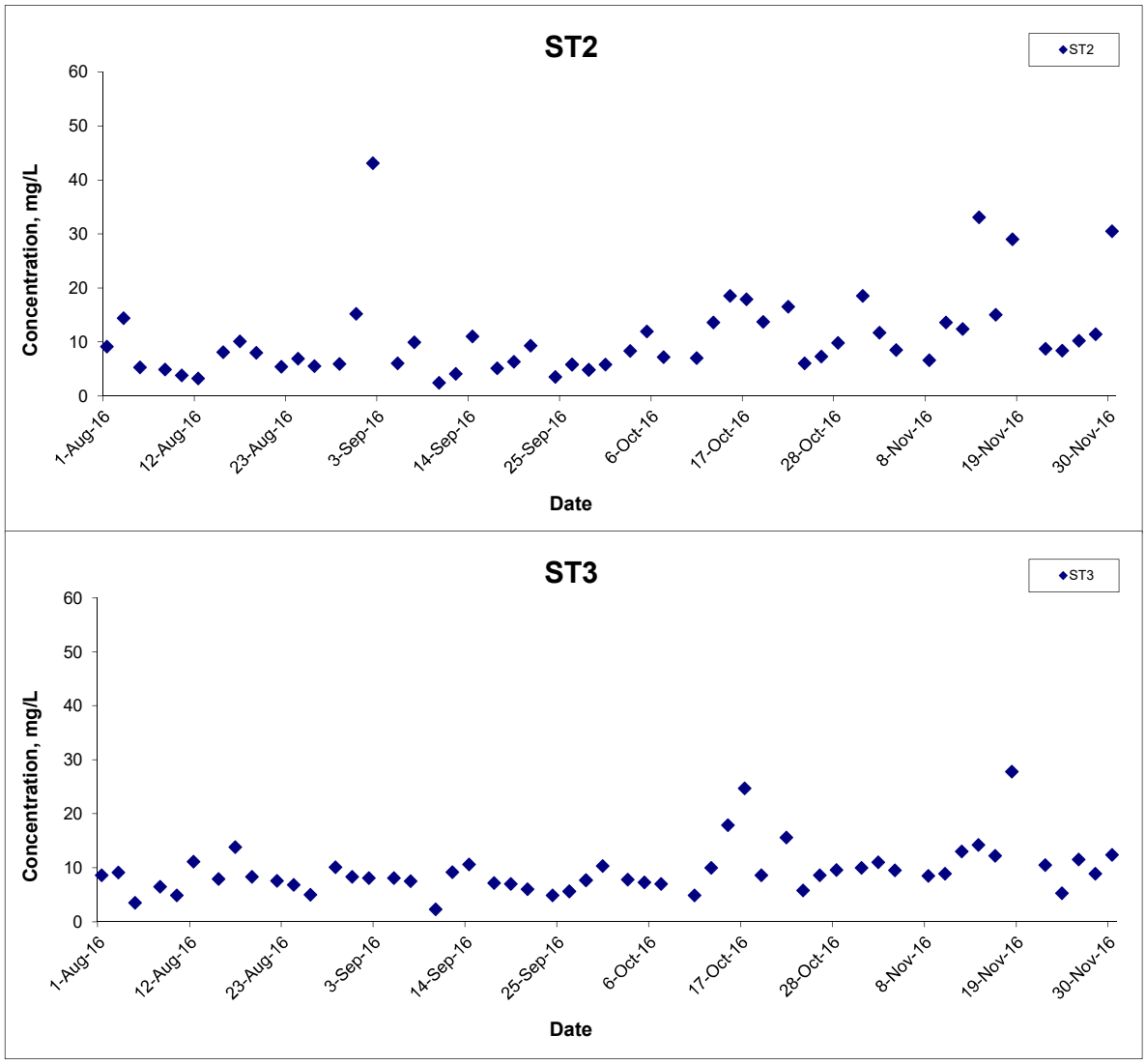

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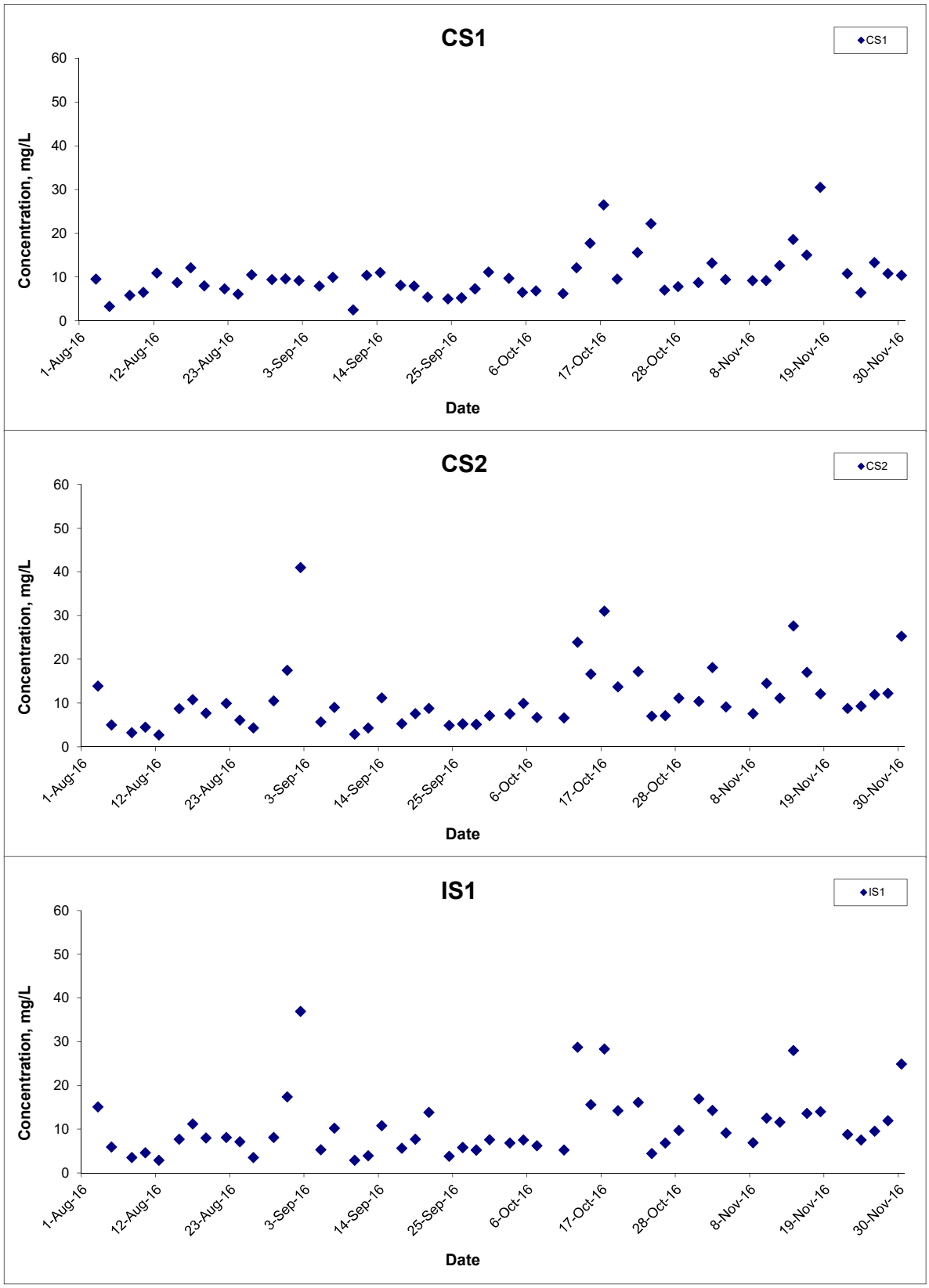
Suspended Solids (Depth-averaged) at Mid-Flood Tide



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		Date: Nov 16	Appendix: H	

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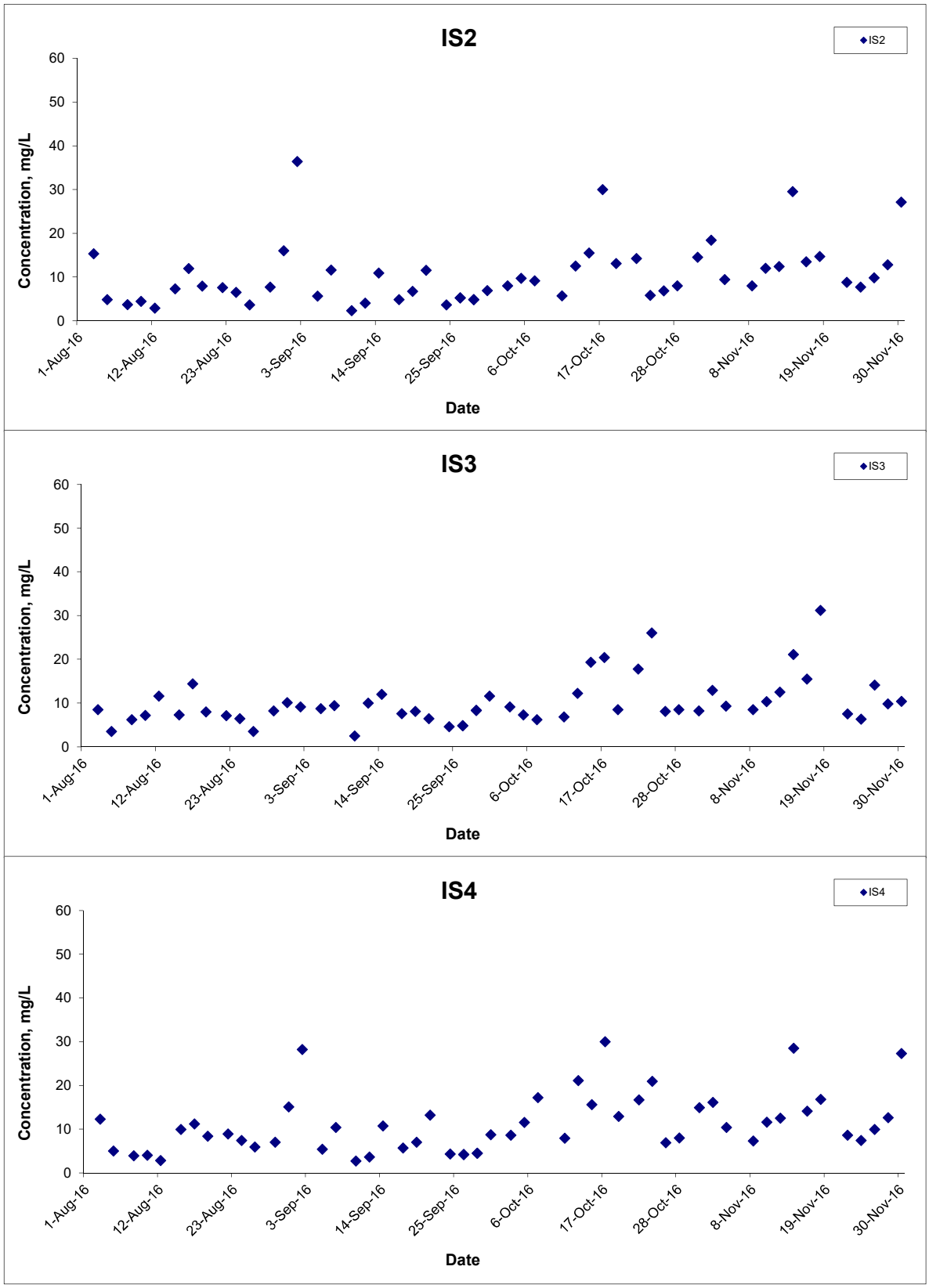

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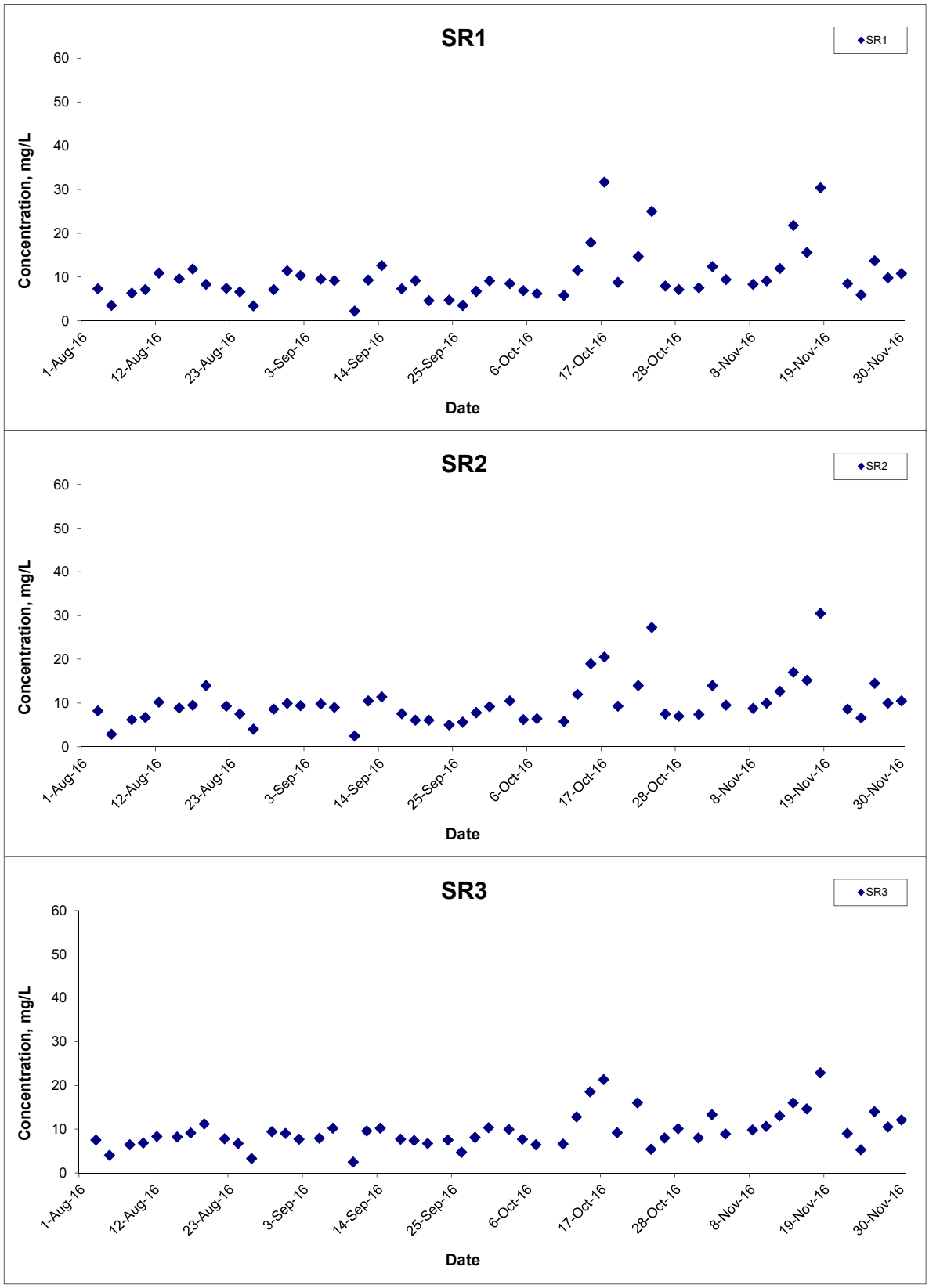
Suspended Solids (Depth-averaged) at Mid-Flood Tide



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		Date: Nov 16	Appendix: H	

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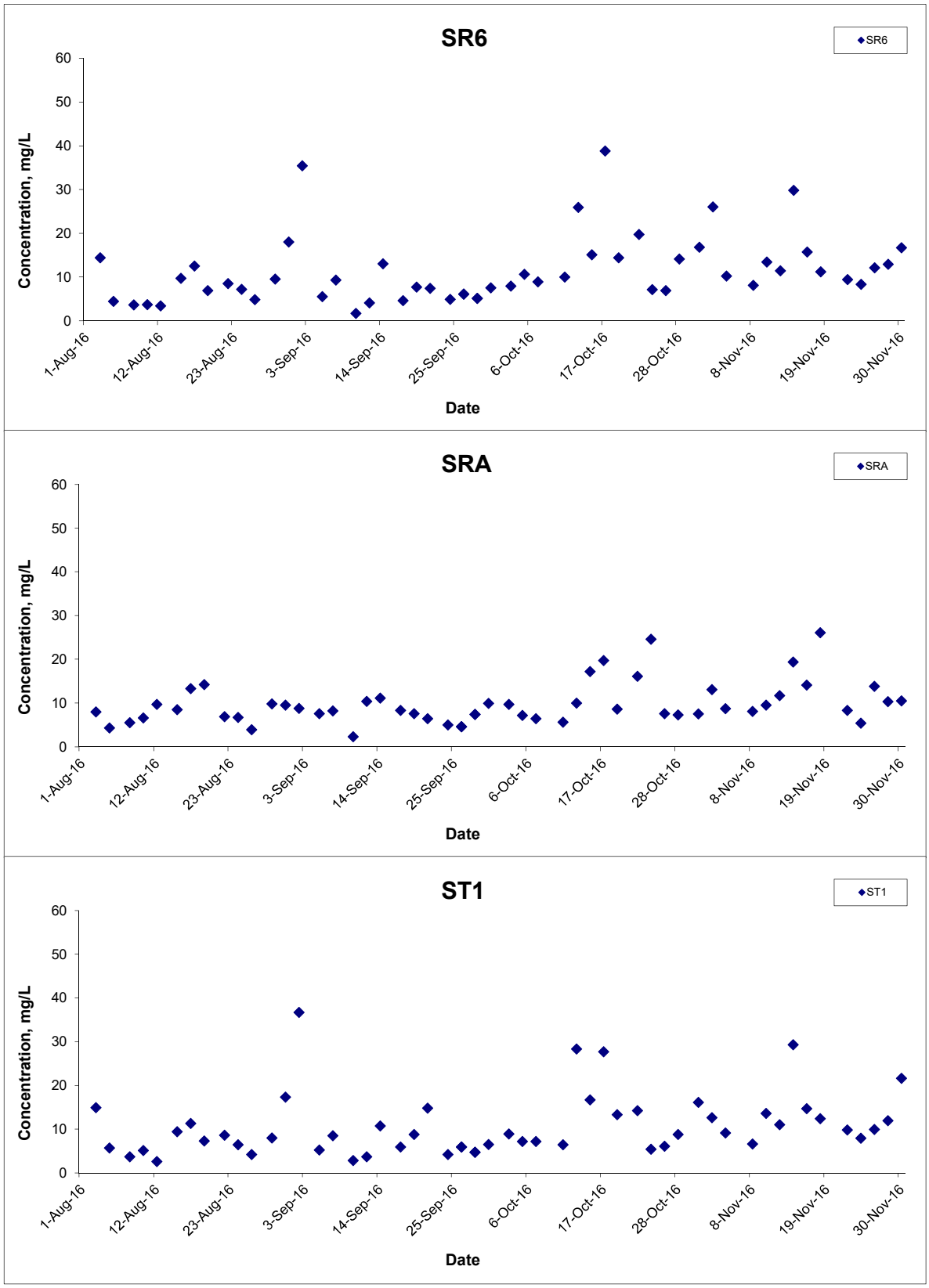

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	Date: Nov 16	Appendix: H	

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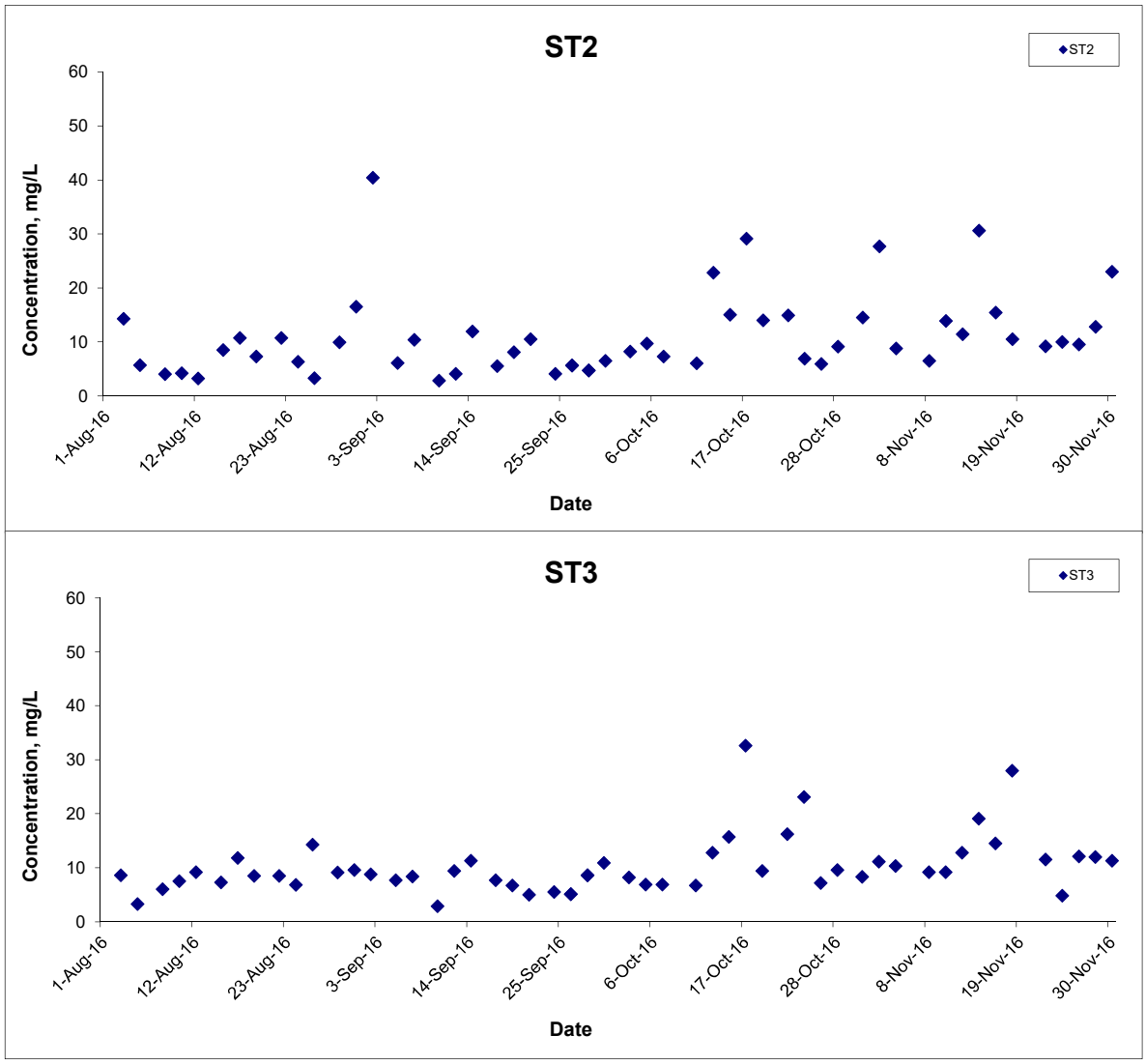

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APPENDIX F
DOLPHIN MONITORING REPORT
(LINE TRANSECT)

Contract No. HY/2011/09
Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Dolphin Monthly Monitoring

15th Quarterly Progress Report (September-November 2016)

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

24 December 2016

1. Introduction

1.1. The Hong Kong Link Road (HKLR) serves to connect the Hong Kong-Zhuhai-Macao Bridge (HZMB) Main Bridge at the Hong Kong Special Administrative Region (HKSAR) Boundary and the HZMB Hong Kong Boundary Crossing Facilities (HKBCF) located at the northeastern waters of the Hong Kong International Airport.

1.2. According to the updated Environmental Monitoring and Audit (EM&A) Manual (for HKLR), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the West Lantau survey area as in AFCD annual marine mammal monitoring programme.

1.3. Since November 2012, Hong Kong Cetacean Research Project (HKCRP) has been commissioned by Dragages – China Harbour – VSL JV (DCVJV) to conduct this 34-month dolphin monitoring study in order to collect data on Chinese White Dolphins during the construction phase (i.e. impact period) of the HKLR09 project in West Lantau (WL) survey area, and to analyze the collected survey data to monitor distribution, encounter rate, abundance, activities and occurrence of dolphin calves. Photo-identification will also be collected from individual Chinese White Dolphins to examine their individual range patterns and core area use.

1.4. 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.

1.5. This report is the 15th quarterly progress report under the HKLR09 construction

phase dolphin monitoring programme submitted to DCVJV, summarizing the results of the surveys findings during the period of September to November 2016.

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 WL survey area (see Figure 1) twice per month throughout the entire construction period. The co-ordinates of all transect lines are shown in Table 1.

Table 1. Co-ordinates of transect lines in WL survey area

Line No.		Easting	Northing		Line No.		Easting	Northing
1	Start Point	803750	818500		7	Start Point	800200	810450
1	End Point	803750	815500		7	End Point	801400	810450
2	Start Point	803750	815500		8	Start Point	801300	809450
2	End Point	802940	815500		8	End Point	799750	809450
3	Start Point	802550	814500		9	Start Point	799400	808450
3	End Point	803700	814500		9	End Point	801430	808450
4	Start Point	803120	813600		10	Start Point	801500	807450
4	End Point	801640	813600		10	End Point	799600	807450
5	Start Point	801100	812450		11	Start Point	800300	806500
5	End Point	802900	812450		11	End Point	801750	806500
6	Start Point	802400	811500		12	Start Point	801760	805450
6	End Point	800660	811500		12	End Point	800700	805450

2.1.2. The 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). 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, position (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 being 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 survey areas around Lantau Island (Hung 2013). Therefore, primary and secondary survey effort were both 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 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. One to two professional digital cameras (*Canon* EOS 7D and/or 60D models), each equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

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

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

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

2.3. Data analysis

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

2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in West Lantau (WL) survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone, and only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in West Lantau), which was also compared with the one deduced from the six events during the baseline period (i.e. six sets of line-transect surveys in West Lantau).

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

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km^2 grids in WL survey area on GIS. Sighting densities (number of on-effort sightings per km^2) and dolphin densities (total number of dolphins from on-effort sightings per km^2) were then calculated for each 1 km by 1 km grid with the aid of GIS. Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort **s**ightings **p**er 100 units of **s**urvey **e**ffort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of **d**olphins **p**er 100 units of **s**urvey **e**ffort. Among the 1-km^2 grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km^2 grid within the study area:

SPSE = ((S / E) x 100) / SA%
DPSE = ((D / E) x 100) / SA%

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

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

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

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

3.1.1. During the period of September to November 2016, six sets of systematic line-transect vessel surveys were conducted to cover all transect lines in WL survey area twice per month.

3.1.2. From these surveys, a total of 201.26 km of survey effort was collected, with 96.0% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). The total survey effort conducted on primary lines was 132.97 km, while the effort on secondary lines was 68.29 km. Survey effort conducted on primary and secondary lines were both considered as on-effort survey data. A summary table of the survey effort is shown in Appendix I.

3.1.3. During the six sets of monitoring surveys in September to November 2016, a total of 23 groups of 87 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort search. Seventeen on-effort sightings were made on primary lines, while the other six on-effort sightings were made on secondary lines. A summary table of the dolphin sightings is shown in Appendix II.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during HKLR09 monitoring surveys during September to November 2016 is shown in Figure 1. The dolphin groups were evenly distributed throughout the survey area with the exception of the northern section (especially the waters adjacent to the HKLR09 alignment) where they rarely occurred during the quarterly period (Figure 1).

3.2.2. Sighting distribution of dolphins in the present quarter was quite different from the one during the baseline period in September to November 2011. When compared to the baseline period, dolphins occurred much less frequently in the to the north of Tai O Peninsula, but more frequently in waters between Peaked Hill and Fan Lau during the present impact phase period (Figure 1).

3.2.3. Only one of the 23 dolphin groups was sighted near the HKLR09 alignment in WL survey area during the present quarter (Figure 2). When pooling the data from HKLR03 monitoring surveys from the same autumn quarter of 2016, another dolphin group also occurred adjacent to the HKLR09 alignment section in NWL survey area in the same quarter (Figure 2).

3.2.4. As in the past monitoring quarters, dolphins have mostly avoided the HKLR09 alignment during the present impact monitoring quarter. Even though disturbance arisen from the HKLR09 construction activities on the dolphins have progressively diminished in recent months since most piling works at sea have been completed, dolphins have not consistently utilized the water in the vicinity of the bridge alignment, which could be related to the potential obstruction from the permanent physical structure of the bridge piers. This should be continuously monitored in the upcoming quarters.

3.2.5. Distribution patterns of dolphin sightings in the past three autumn quarters of 2013-15 were also compared with the one in 2016. Dolphins appeared to occur less frequently in the northern portion of the WL survey area but more often in the waters between Peaked Hill and Fan Lau in the autumn of 2016 when compared to the previous three autumn periods (Figure 3).

3.3. Encounter rate

3.3.1. During the present three-month impact phase monitoring period (September to November 2016), the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) from West Lantau survey area are shown in Table 2. The average encounter rates deduced from the six sets of surveys from the present quarter were also compared with the ones deduced from the baseline monitoring period (September – November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during the impact monitoring period (September – November 2016)

Survey Area	Dolphin Monitoring	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
West Lantau	Set 1 (September 9th)	17.4	43.5
	Set 2 (September 20th)	14.2	71.0
	Set 3 (October 14th)	9.0	54.2
	Set 4 (October 20th)	5.2	21.0
	Set 5 (November 4th)	4.5	4.5
	Set 6 (November 11th)	28.6	128.8

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (September to November 2016) and baseline monitoring period (September to November 2011) (Note: the encounter rates deduced from the baseline monitoring period have been recalculated based only on the survey effort and on-effort sighting data made along the primary transect lines under favourable conditions)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	September – November 2016	September-November 2011	September – November 2016	September-November 2011
West Lantau	13.17 ± 9.08	16.43 ± 7.70	53.82 ± 43.64	60.50 ± 38.47

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in WL were 11.9 sightings and 45.0 dolphins per 100 km of survey effort respectively during the present quarter.

3.3.3. Notably, the encounter rates of dolphin sightings (ER(STG)) and encounter

rates of dolphins (ER(ANI)) for the present autumn quarter of 2016 were both at a lower level among all quarters (Table 4). Such temporal trend should be continuously monitoring to detect any further decline in the future, even though the Action or Limit Level still has not been triggered under the Event and Action Plan for this quarter.

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

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	16.43 ± 7.70	60.50 ± 38.47
March-May 2013 (Impact)	16.70 ± 8.00	58.59 ± 30.37
June-August 2013 (Impact)	26.89 ± 12.46	94.75 ± 57.61
September-November 2013 (Impact)	20.51 ± 12.34	60.68 ± 37.60
December 2013-February 2014 (Impact)	18.01 ± 7.24	60.12 ± 40.18
March-May 2014 (Impact)	14.40 ± 10.28	65.23 ± 46.13
June-August 2014 (Impact)	22.90 ± 15.88	101.41 ± 97.90
September-November 2014 (Impact)	10.57 ± 10.45	36.63 ± 30.19
December 2014-February 2015 (Impact)	12.84 ± 7.17	57.36 ± 37.35
March-May 2015 (Impact)	12.42 ± 4.42	45.32 ± 38.14
June-August 2015 (Impact)	12.36 ± 5.81	61.19 ± 38.63
September-November 2015 (Impact)	11.71 ± 4.43	43.30 ± 21.38
December 2015-February 2016 (Impact)	13.86 ± 6.78	63.40 ± 35.77
March-May 2016 (Impact)	9.64 ± 6.44	49.01 ± 36.69
June-August 2016 (Impact)	14.14 ± 7.66	34.91 ± 19.69
September-November 2016 (Impact)	13.17 ± 9.08	53.82 ± 43.64

3.3.4. A one-way ANOVA was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. For the comparison between the baseline period and the present quarter (i.e. fourteenth quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.517 and 0.784 respectively. Therefore, no significant difference in dolphin encounter rate was detected between the baseline period and the present quarter.

3.3.5. Another comparison was made between the baseline period and the cumulative quarters in the impact phase (i.e. first thirteen quarters of the impact phase), and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.686 and 0.848 respectively. As a result, no significant difference was found in the dolphin encounter rates between the baseline period and the cumulative quarters in the impact phase.

3.4. Group size

3.4.1. Group size of Chinese White Dolphins ranged from one to nine individuals per group in WL survey area during September to November 2016. The average dolphin group size for the three-month period was compared with the one deduced from the baseline period in September to November 2011, as shown in Table 5.

Table 5. Comparison of average dolphin group sizes from impact monitoring period (September-November 2016) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	September – November 2016	**September – November 2011**
West Lantau	3.78 ± 2.56 (n = 23)	3.63 ± 2.97 (n = 46)

3.4.2. The average dolphin group size in the WL region during the present quarter was slightly higher than the one recorded in the three-month baseline period (Table 5). Among the 23 groups, 14 of them were composed of only 1-4 dolphins, while there were nine groups in moderate size with five or more animals per group.

3.4.3. Distribution of dolphins with the larger group sizes during September to November 2016 is shown in Figure 4. Most of these groups were scattered in the southern portion of the WL survey area, with slightly higher concentration to the north of Kai Kung Shan and near Fan Lau (Figure 4).

3.4.4. Distribution of the larger dolphin groups in the present impact phase period was very different from the baseline period, when they were more concentrated to the northwest of Tai O Peninsula as well as near Kai Kung Shan and Peaked Hill (Figure 4).

3.5. Habitat use

3.5.1. From September to November 2016, the most heavily utilized habitats by the

dolphins with higher densities were to the north of Kai Kung Shan, near Peaked Hill and Fan Lau (Figures 5a & 5b).

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

3.5.3. When compared with the habitat use pattern recorded during the baseline period in September-November 2011, it appears that the overall dolphin densities were less evenly distributed in the present impact phase monitoring period, and were much lower in certain areas such as the waters just to the south of the HKLR09 alignment and around Tai O Peninsula (Figure 6).

3.6. Mother-calf pairs

3.6.1. During the three-month impact phase monitoring period, five young calves (all were unspotted juvenile) were sighted in WL survey area. These young calves comprised 5.7% of all animals sighted, which was slightly lower than the percentage recorded during the baseline monitoring period (6.6%).

3.6.2. The occurrence of these young calves was mainly located to the north of Kai Kung Shan, which was very different from the baseline period when calf occurrence was more frequent and concentrated near Tai O Peninsula at the northern portion of WL waters (Figure 7).

3.7. Activities and associations with fishing boats

3.7.1. During the three-month impact monitoring period, three dolphin groups were engaged in feeding activities near Kai Kung Shan and to the offshore waters of Fan Lau (Figure 8), comprising 13.0% of the total number of dolphin sightings. This percentage was exactly the same as the percentage recorded during the baseline period (13.0%).

3.7.2. On the other hand, only one dolphin group was engaged in socializing activity at the western territorial boundary off Kai Kung Shan during the present quarter (Figure 8).

3.7.3. Distribution of different activities during the present impact phase monitoring period was quite different from the one during the baseline period, when the main concentration of the feeding and socializing activities occurred at the central portion of the survey area between Tai O Peninsula and Peaked Hill

(Figure 8).

3.7.4. During the three-month monitoring period, none of the 23 dolphin groups was associated with any operating fishing vessel.

3.8. Summary of photo-identification works

3.8.1. From September to November 2016, over 2,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, 33 individuals sighted 42 times altogether were identified (see the summary table in Appendix III and photographs of identified individuals in Appendix IV). All except three identified individuals (WL123, WL168 and WL220) were sighted only once or twice during the three-month period.

3.8.3. Notably, none of these individuals was also sighted in North Lantau waters during the HKLR03 monitoring surveys in the same three-month period, showing a very low level of individual movements across the HKLR09 bridge alignment. Notably, three other individuals (WL69, WL123 and WL230) sighted during the HKLR09 monitoring surveys in the present quarter were also found in SWL waters.

3.8.4. As in previous quarters, a few individuals that were consistently sighted in North Lantau waters in the past were identified in West Lantau waters (e.g. NL296, NL302, WL46 etc.). It is likely that some of these identified dolphins have either shifted or expanded their range use into West Lantau due to the increased disturbance of HZMB-related construction works in North Lantau region, as documented in Hung (2015, 2016).

3.9. Individual range use

3.9.1. Ranging patterns of the 33 individuals identified during the three-month study period were determined by fixed kernel method, as shown in Appendix V.

3.9.2. Notably, just a few individual dolphins (e.g. NL296, NL302) that primarily centered their range use in North Lantau in the past were found extending their ranges to West Lantau waters (further south of the HKLR09 alignment), with obvious shifts and expansions of their range use away from North Lantau waters (Appendix V).

3.9.3. On the contrary, the majority of these individuals that primarily centered their range use in West Lantau were still sighted within their normal ranges during the present quarterly period, with some extending their range use into

Southwest Lantau waters (Appendix V).

4. Conclusion

4.1. During the present quarter of dolphin monitoring, no adverse impact from the activities of the HKLR09 construction project on Chinese White Dolphins was noticeable from general observations.

4.2. Nevertheless, the dolphin usage in WL region should be continuously monitored, to further examine whether it has been significantly affected by the on-going construction activities in relation to the HZMB works.

5. References

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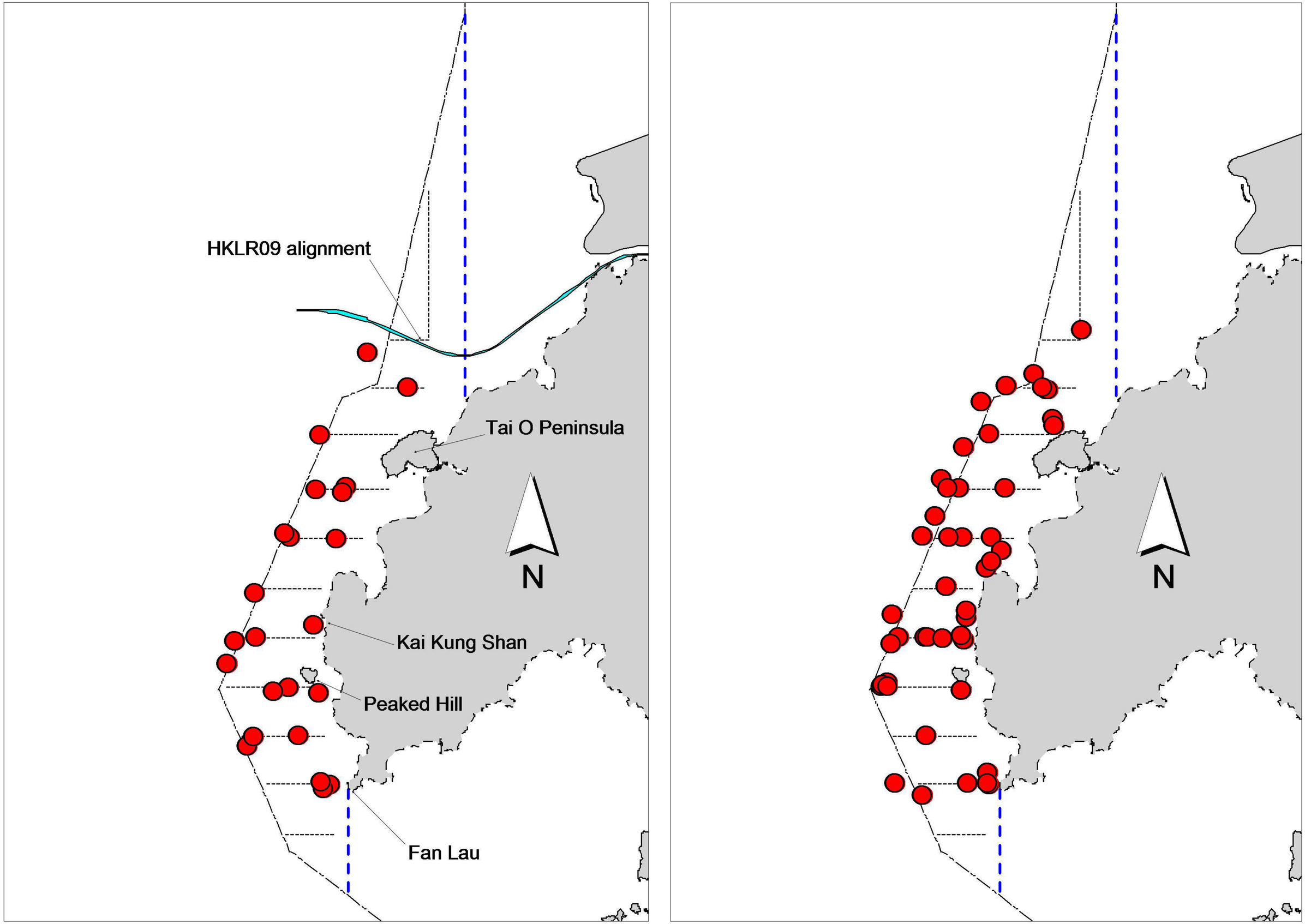
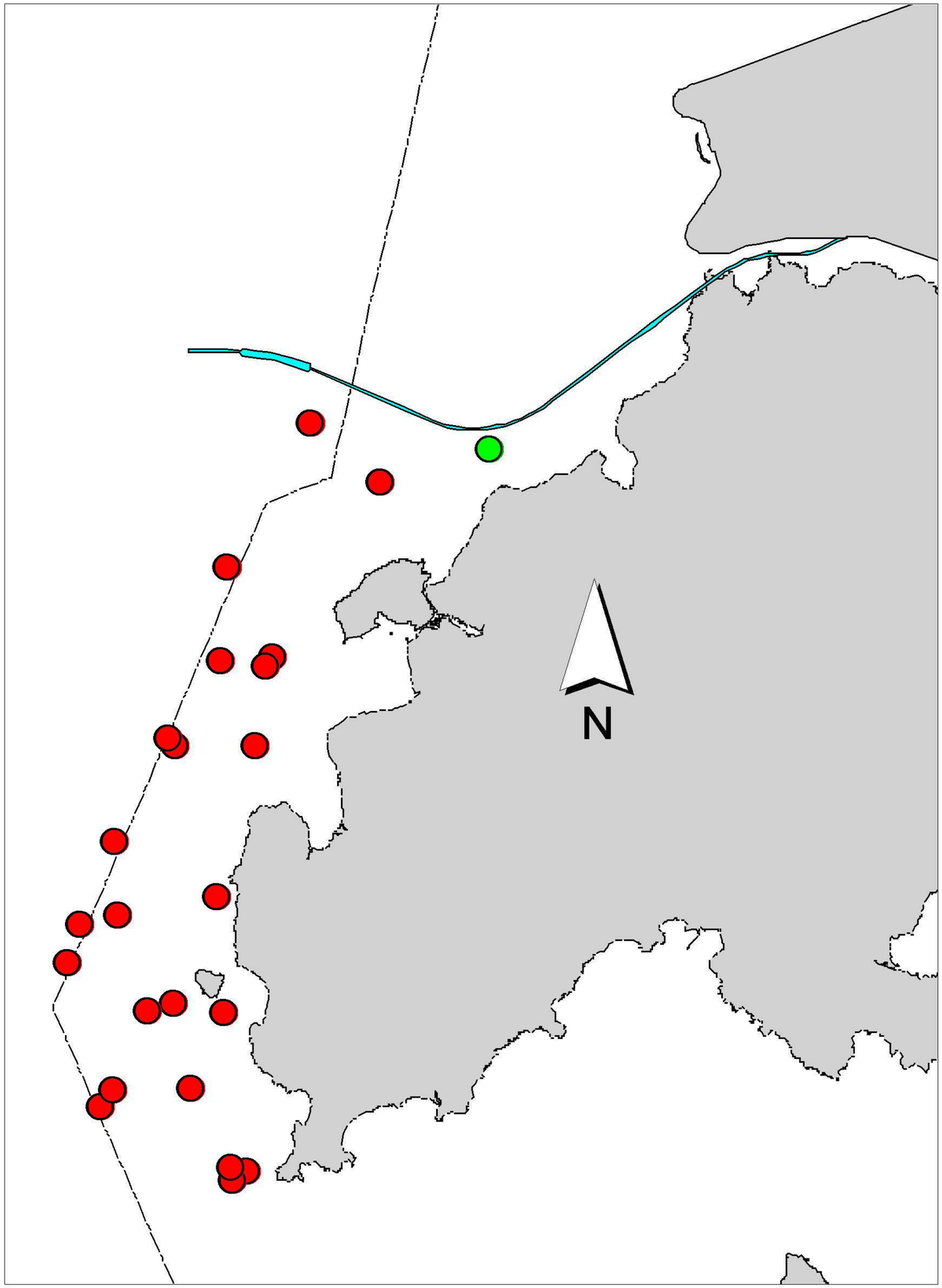


Figure 1. Distribution of Chinese white dolphin sightings in West Lantau during HKLR09 impact phase (left: September – November 2016) and baseline monitoring surveys (right: September – November 2011)



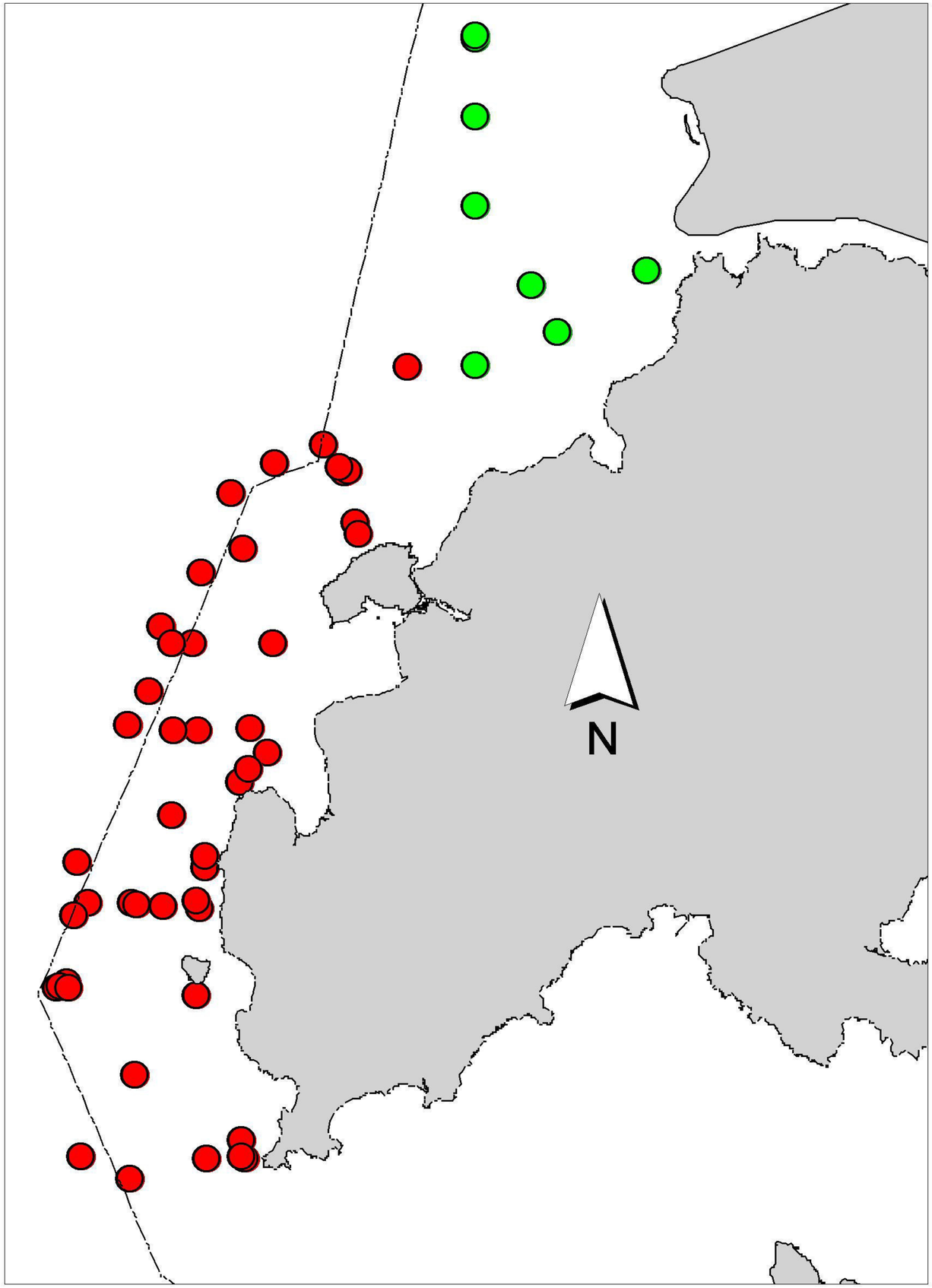


Figure 2. Distribution of Chinese white dolphin sightings from HKLR03 (in green) and HKLR09 surveys (in red) near the HKLR09 alignment during impact phase (left: June – August 2016) and baseline monitoring surveys (right: September – November 2011)

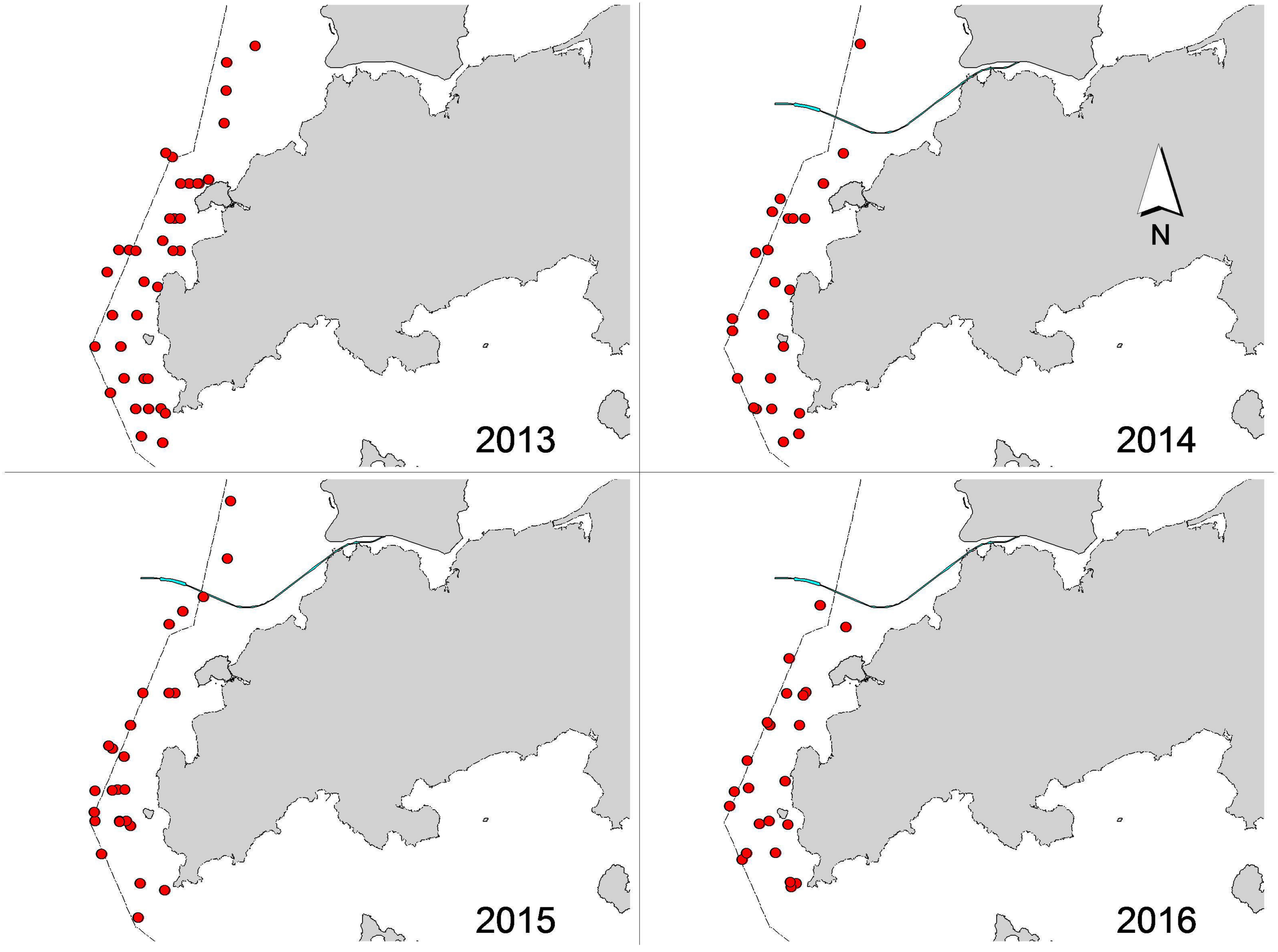


Figure 3. Comparisons on distribution of Chinese white dolphin sightings in West Lantau in the autumn months (September-November) of 2013, 2014, 2015 and 2016 during HKLR09 impact phase

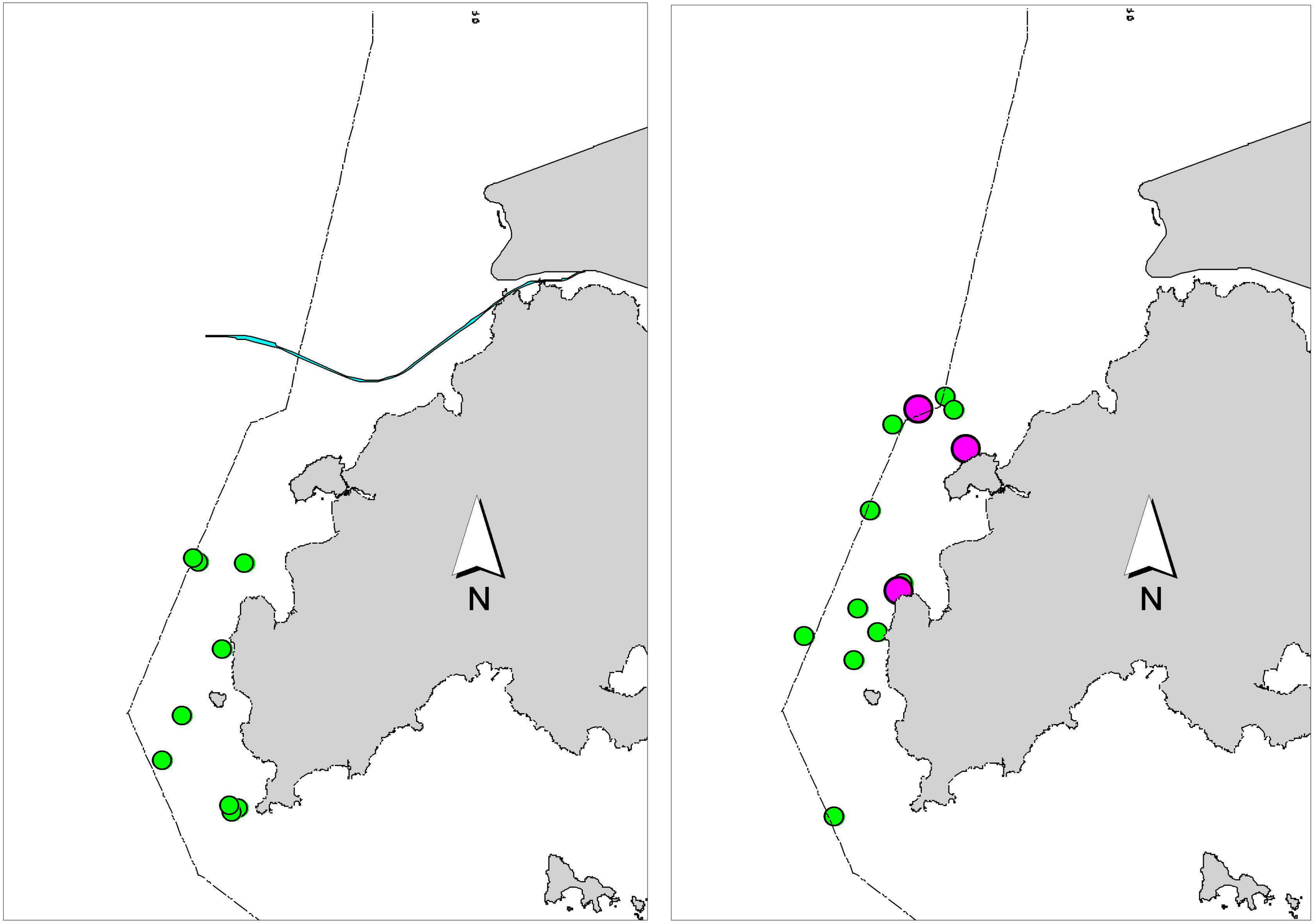


Figure 4. Distribution of Chinese white dolphins with larger group sizes during HKLR09 impact phase (left: September – November 2016) and baseline monitoring surveys (right: September – November 2011) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

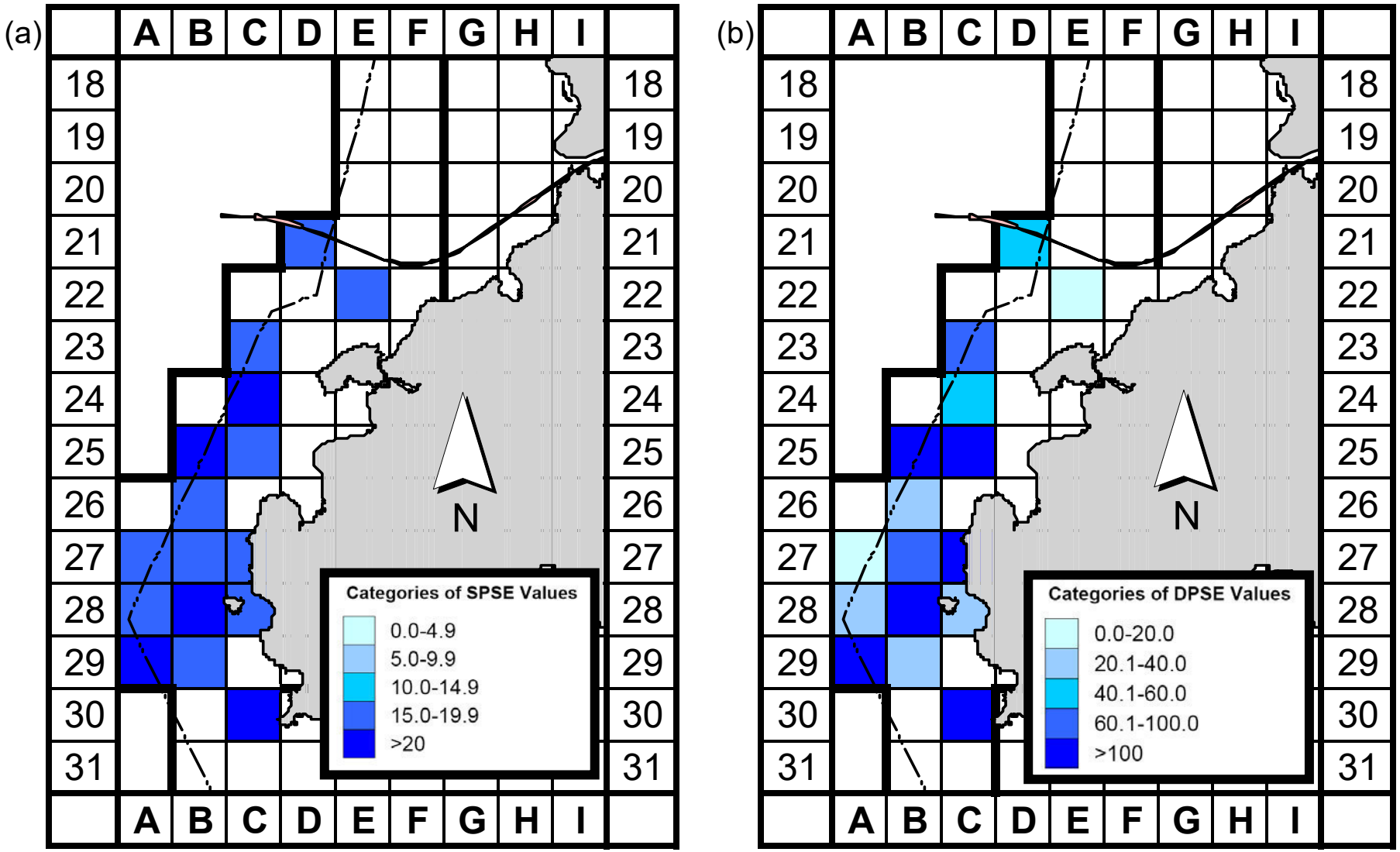


Figure 5a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in West Lantau survey area, using data collected during HKLR09 impact monitoring period (Sep-Nov 16) (SPSE = no. of on-effort sightings per 100 units of survey effort)

Figure 5b. Density of Chinese white dolphins with corrected survey effort per km^2 in West Lantau survey area, using data collected during HKLR09 impact monitoring period (Sep-Nov 16) (DPSE = no. of dolphins per 100 units of survey effort)

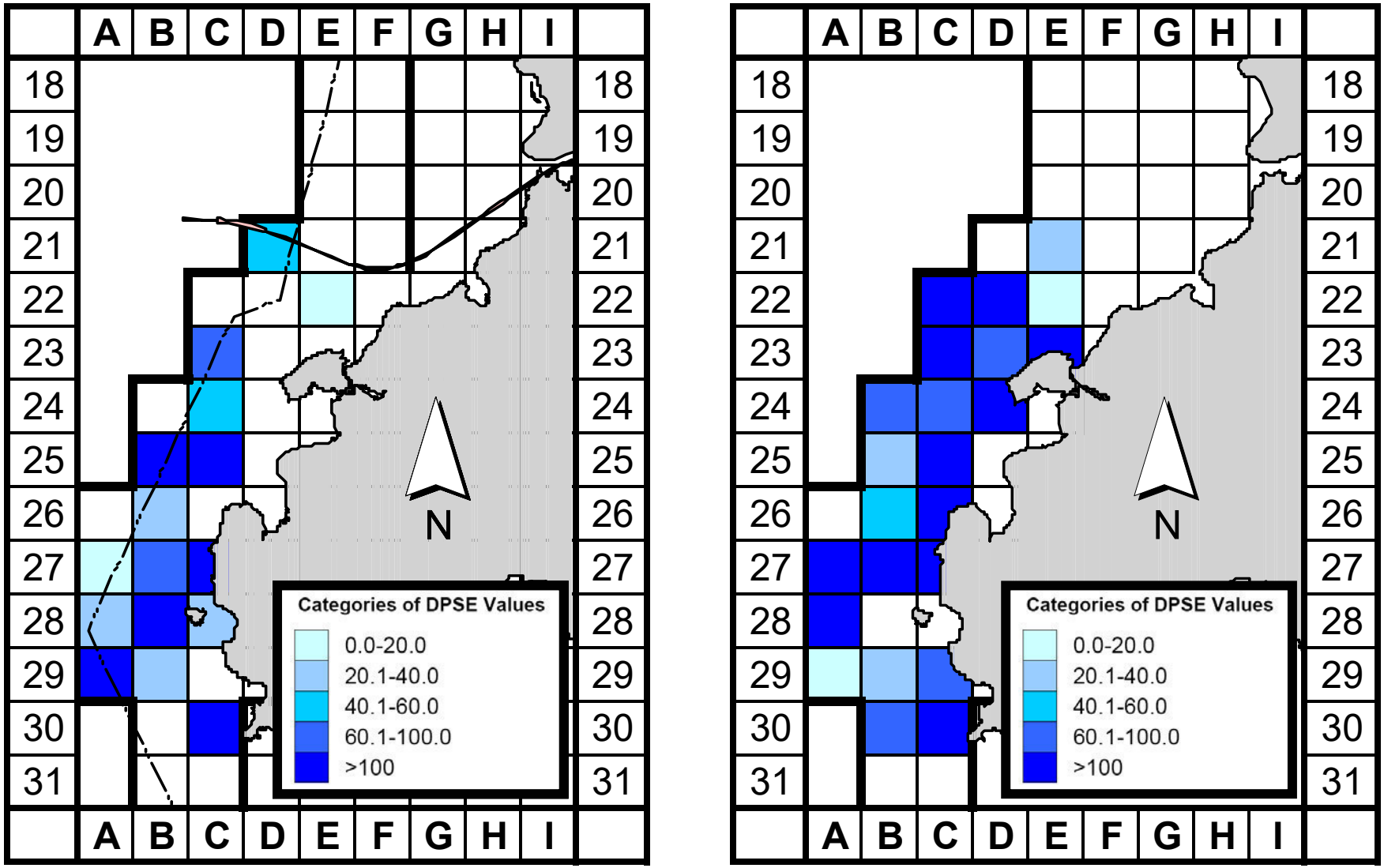
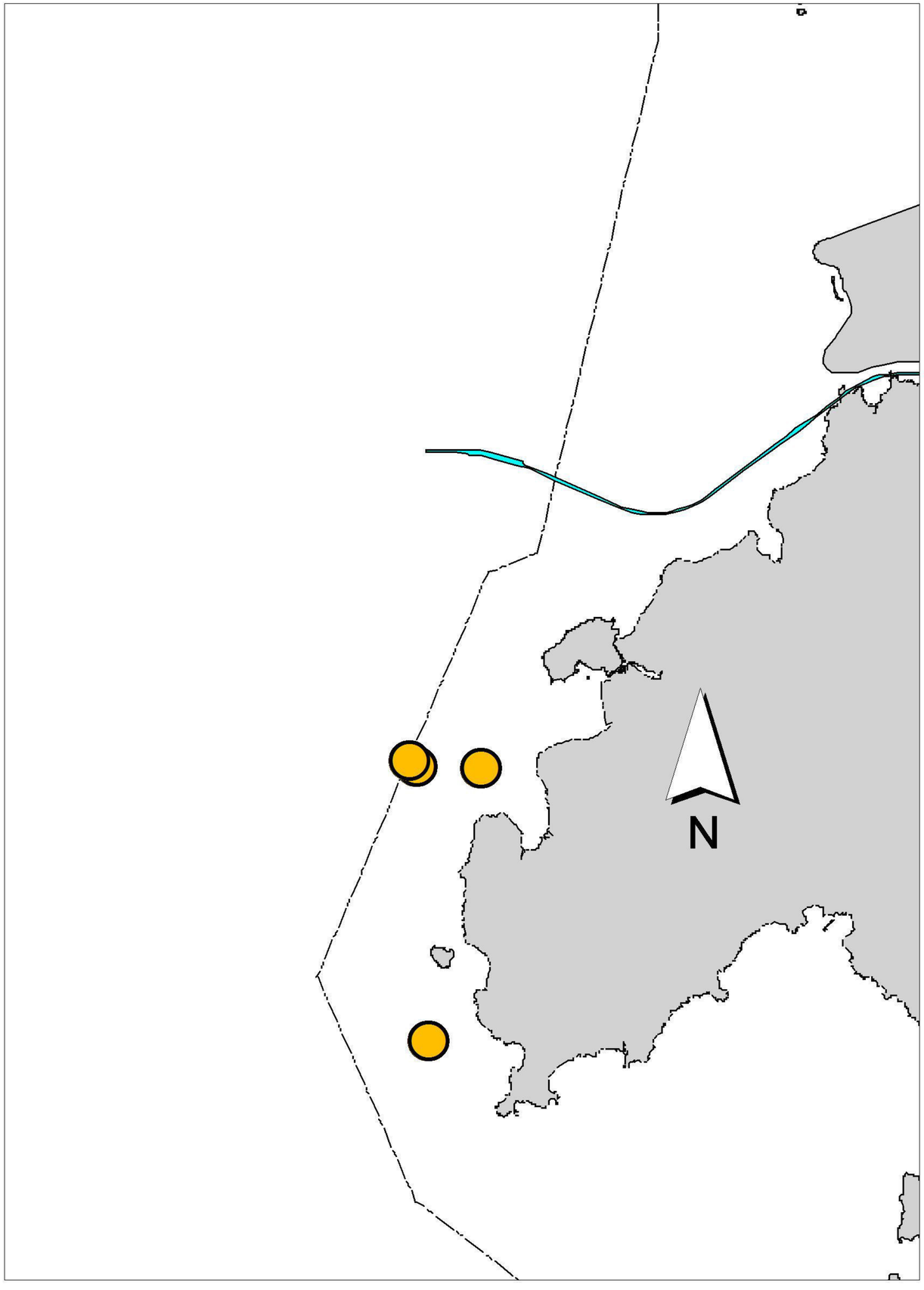


Figure 6. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in West Lantau survey area between the impact monitoring period (September-November 2016; left) and baseline monitoring period (September-November 2011; right) (DPSE = no. of dolphins per 100 units of survey effort)



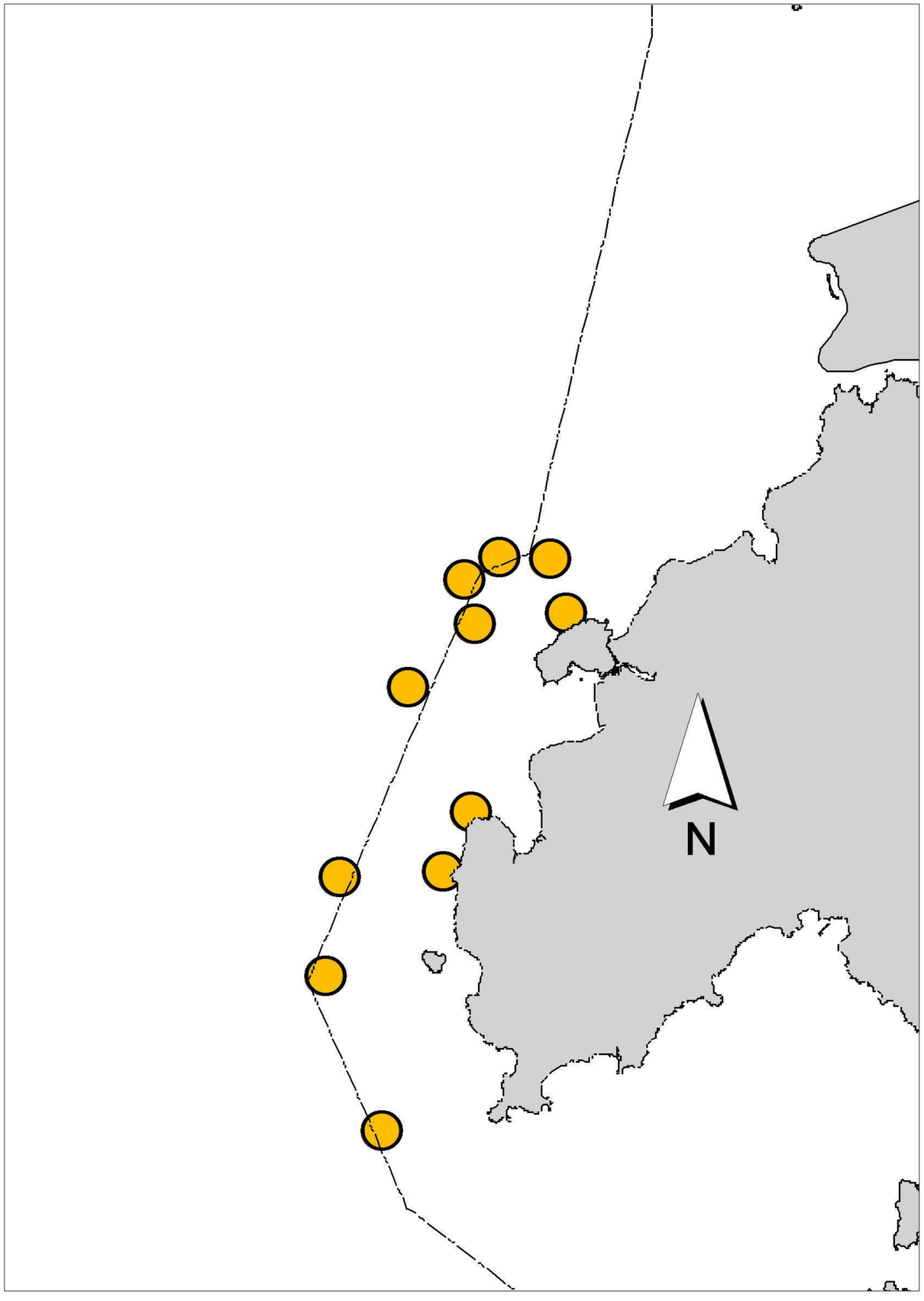


Figure 7. Distribution of young calves of Chinese white dolphins during HKLR09 impact phase (left: September – November 2016) and baseline monitoring surveys (right: September – November 2011)

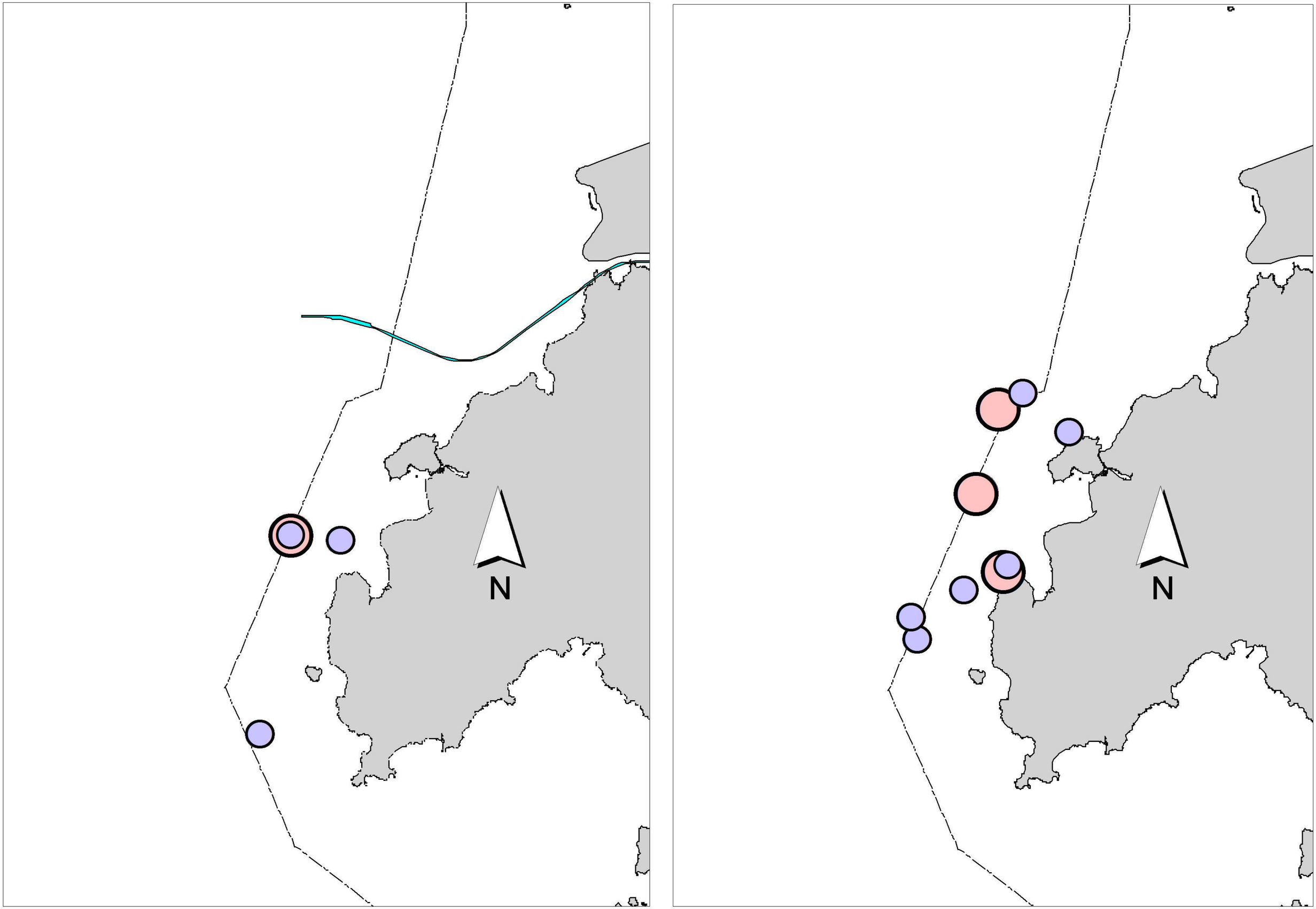


Figure 8. Distribution of dolphins engaged in feeding (in purple), socializing (in pink) and traveling (in green) activities during HKLR09 impact phase (left: September – November 2016) and baseline monitoring surveys (right: September – November 2011)

Appendix I. HKLR09 Survey Effort Database (September-November 2016)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
9-Sep-16	W LANTAU	2	20.04	AUTUMN	STANDARD31516	HKLR	P
9-Sep-16	W LANTAU	3	2.96	AUTUMN	STANDARD31516	HKLR	P
9-Sep-16	W LANTAU	2	11.56	AUTUMN	STANDARD31516	HKLR	S
20-Sep-16	W LANTAU	2	15.89	AUTUMN	STANDARD31516	HKLR	P
20-Sep-16	W LANTAU	3	5.25	AUTUMN	STANDARD31516	HKLR	P
20-Sep-16	W LANTAU	2	7.05	AUTUMN	STANDARD31516	HKLR	S
20-Sep-16	W LANTAU	3	4.22	AUTUMN	STANDARD31516	HKLR	S
14-Oct-16	W LANTAU	2	15.09	AUTUMN	STANDARD36826	HKLR	P
14-Oct-16	W LANTAU	3	7.04	AUTUMN	STANDARD36826	HKLR	P
14-Oct-16	W LANTAU	2	6.65	AUTUMN	STANDARD36826	HKLR	S
14-Oct-16	W LANTAU	3	4.21	AUTUMN	STANDARD36826	HKLR	S
20-Oct-16	W LANTAU	2	4.65	AUTUMN	STANDARD31516	HKLR	P
20-Oct-16	W LANTAU	3	14.41	AUTUMN	STANDARD31516	HKLR	P
20-Oct-16	W LANTAU	4	3.10	AUTUMN	STANDARD31516	HKLR	P
20-Oct-16	W LANTAU	2	3.97	AUTUMN	STANDARD31516	HKLR	S
20-Oct-16	W LANTAU	3	4.77	AUTUMN	STANDARD31516	HKLR	S
20-Oct-16	W LANTAU	4	2.20	AUTUMN	STANDARD31516	HKLR	S
4-Nov-16	W LANTAU	2	3.63	AUTUMN	STANDARD36826	HKLR	P
4-Nov-16	W LANTAU	3	18.45	AUTUMN	STANDARD36826	HKLR	P
4-Nov-16	W LANTAU	2	7.02	AUTUMN	STANDARD36826	HKLR	S
4-Nov-16	W LANTAU	3	4.93	AUTUMN	STANDARD36826	HKLR	S
11-Nov-16	W LANTAU	2	8.83	AUTUMN	STANDARD36826	HKLR	P
11-Nov-16	W LANTAU	3	12.14	AUTUMN	STANDARD36826	HKLR	P
11-Nov-16	W LANTAU	4	1.49	AUTUMN	STANDARD36826	HKLR	P
11-Nov-16	W LANTAU	2	7.09	AUTUMN	STANDARD36826	HKLR	S
11-Nov-16	W LANTAU	3	3.45	AUTUMN	STANDARD36826	HKLR	S
11-Nov-16	W LANTAU	4	1.17	AUTUMN	STANDARD36826	HKLR	S

Appendix II. HKLR09 Chinese White Dolphin Sighting Database (September-November 2016)

(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
9-Sep-16	1	1328	1	W LANTAU	3	49	ON	HKLR	812485	801975	AUTUMN	NONE	P
9-Sep-16	2	1417	2	W LANTAU	2	154	ON	HKLR	808914	799431	AUTUMN	NONE	S
9-Sep-16	3	1434	1	W LANTAU	2	60	ON	HKLR	808424	800749	AUTUMN	NONE	P
9-Sep-16	4	1449	2	W LANTAU	2	4	ON	HKLR	807438	800964	AUTUMN	NONE	P
9-Sep-16	5	1505	6	W LANTAU	2	59	ON	HKLR	806462	801642	AUTUMN	NONE	P
20-Sep-16	1	1232	7	W LANTAU	2	113	ON	HKLR	809674	801288	AUTUMN	NONE	S
20-Sep-16	2	1303	5	W LANTAU	2	968	ON	HKLR	811458	800767	AUTUMN	NONE	P
20-Sep-16	3	1314	9	W LANTAU	2	106	ON	HKLR	811445	801767	AUTUMN	NONE	P
20-Sep-16	4	1341	1	W LANTAU	2	43	ON	HKLR	812442	801336	AUTUMN	NONE	P
14-Oct-16	1	1126	5	W LANTAU	3	38	ON	HKLR	806363	801487	AUTUMN	NONE	P
14-Oct-16	2	1147	3	W LANTAU	3	563	ON	HKLR	807230	799849	AUTUMN	NONE	S
14-Oct-16	3	1201	2	W LANTAU	2	450	ON	HKLR	808323	801378	AUTUMN	NONE	S
14-Oct-16	4	1207	7	W LANTAU	2	928	ON	HKLR	808347	800419	AUTUMN	NONE	P
14-Oct-16	5	1223	1	W LANTAU	2	414	ON	HKLR	809357	799586	AUTUMN	NONE	S
20-Oct-16	1	1109	4	W LANTAU	3	94	ON	HKLR	813539	801410	AUTUMN	NONE	P
4-Nov-16	1	1047	1	W LANTAU	3	27	ON	HKLR	814520	803299	AUTUMN	NONE	P
11-Nov-16	1	1054	3	W LANTAU	2	455	ON	HKLR	815219	802445	AUTUMN	NONE	S
11-Nov-16	2	1139	1	W LANTAU	3	13	ON	HKLR	812375	801892	AUTUMN	NONE	P
11-Nov-16	3	1201	8	W LANTAU	3	55	ON	HKLR	811536	800674	AUTUMN	NONE	P
11-Nov-16	4	1224	2	W LANTAU	3	27	ON	HKLR	810319	800011	AUTUMN	NONE	P
11-Nov-16	5	1245	4	W LANTAU	2	120	ON	HKLR	809456	800051	AUTUMN	NONE	P
11-Nov-16	6	1324	6	W LANTAU	3	0	ON	HKLR	807418	799984	AUTUMN	NONE	P
11-Nov-16	7	1410	6	W LANTAU	3	237	ON	HKLR	806518	801446	AUTUMN	NONE	P

Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in September-November 2016

ID#	DATE	STG#	AREA
CH38	11/11/16	6	W LANTAU
CH108	09/09/16	5	W LANTAU
CH153	20/09/16	3	W LANTAU
NL296	14/10/16	1	W LANTAU
NL302	20/09/16	2	W LANTAU
SL40	11/11/16	6	W LANTAU
SL59	09/09/16	5	W LANTAU
WL15	11/11/16	5	W LANTAU
WL28	20/09/16	3	W LANTAU
	11/11/16	3	W LANTAU
WL29	20/10/16	1	W LANTAU
WL42	20/09/16	1	W LANTAU
WL44	11/11/16	6	W LANTAU
	11/11/16	7	W LANTAU
WL46	20/09/16	2	W LANTAU
WL61	20/09/16	1	W LANTAU
WL69	14/10/16	1	W LANTAU
WL94	11/11/16	4	W LANTAU
WL109	09/09/16	5	W LANTAU
WL123	14/10/16	1	W LANTAU
	11/11/16	6	W LANTAU
	11/11/16	7	W LANTAU
WL128	20/09/16	3	W LANTAU
WL142	11/11/16	5	W LANTAU
WL145	20/09/16	3	W LANTAU
WL168	20/10/16	1	W LANTAU
	11/11/16	6	W LANTAU
	11/11/16	7	W LANTAU
WL179	11/11/16	3	W LANTAU
WL180	11/11/16	6	W LANTAU
	11/11/16	7	W LANTAU

ID#	DATE	STG#	AREA
WL206	11/11/16	3	W LANTAU
WL215	09/09/16	5	W LANTAU
WL220	20/09/16	1	W LANTAU
	11/11/16	6	W LANTAU
	11/11/16	7	W LANTAU
WL230	11/11/16	2	W LANTAU
WL251	20/09/16	2	W LANTAU
WL260	11/11/16	4	W LANTAU
WL268	04/11/16	1	W LANTAU
WL272	11/11/16	3	W LANTAU
WL273	11/11/16	5	W LANTAU

Appendix IV. Thirty-three individual dolphins that were identified during September to November 2016 under HKLR09 impact phase monitoring surveys

Appendix IV. (cont'd)

Appendix IV. (cont'd)

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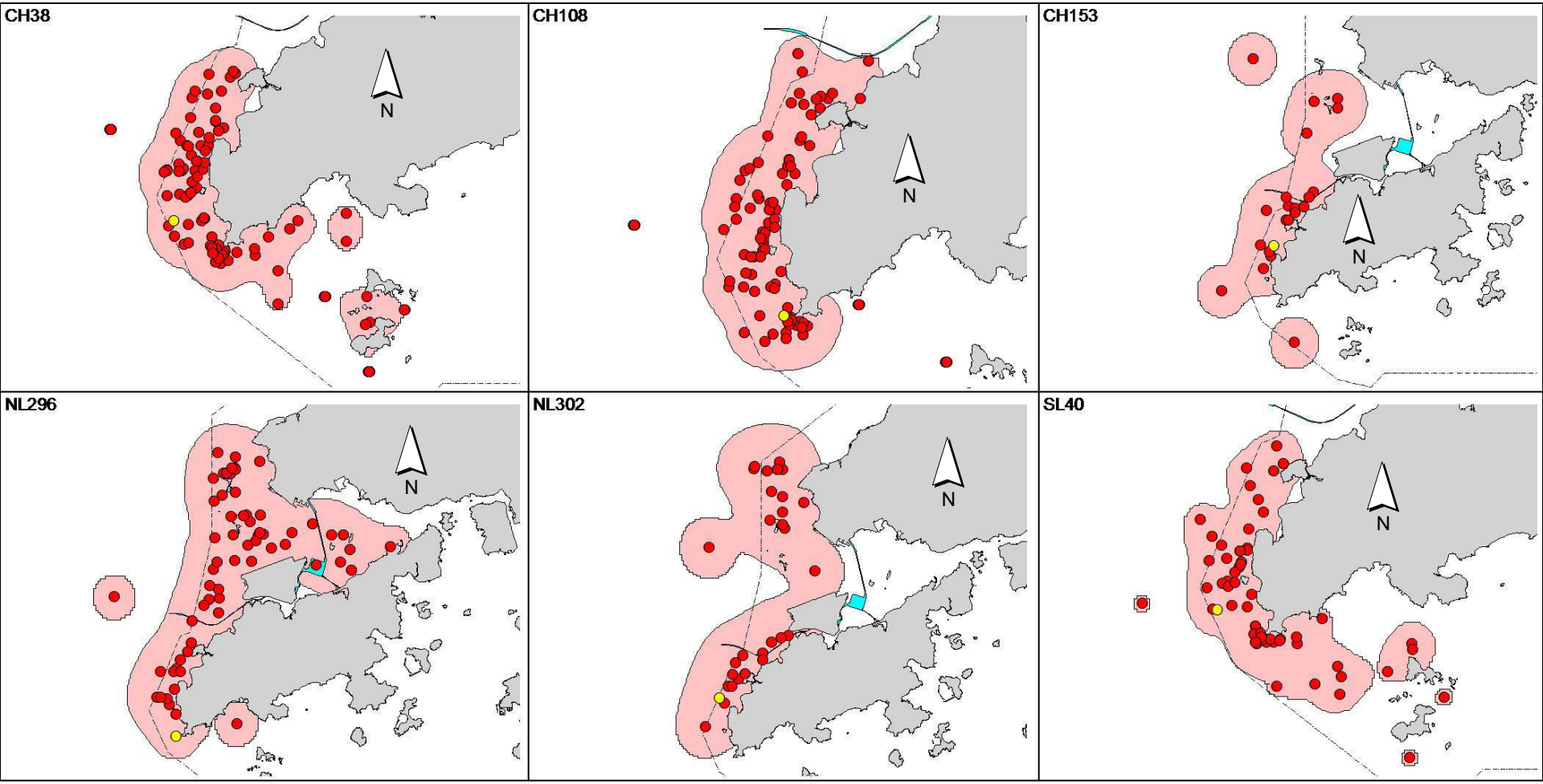
Appendix IV. (cont'd)

Appendix IV. (cont'd)

Appendix V. Ranging patterns (95% kernel ranges) of 33 individual dolphins that were sighted during HKLR09 impact phase monitoring period (note: yellow dots indicates sightings made in September – November 2016 during HZMB-related monitoring surveys)



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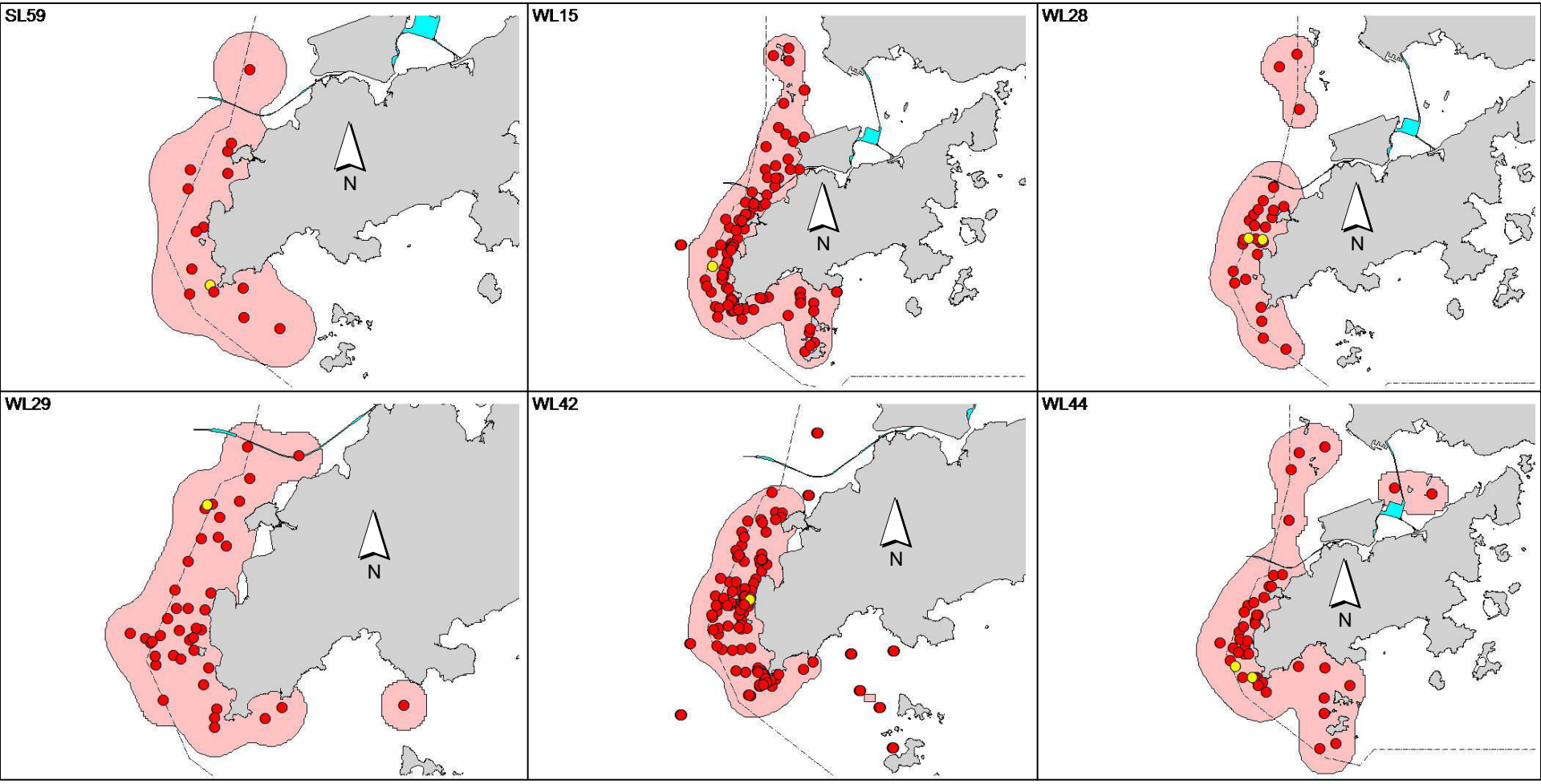

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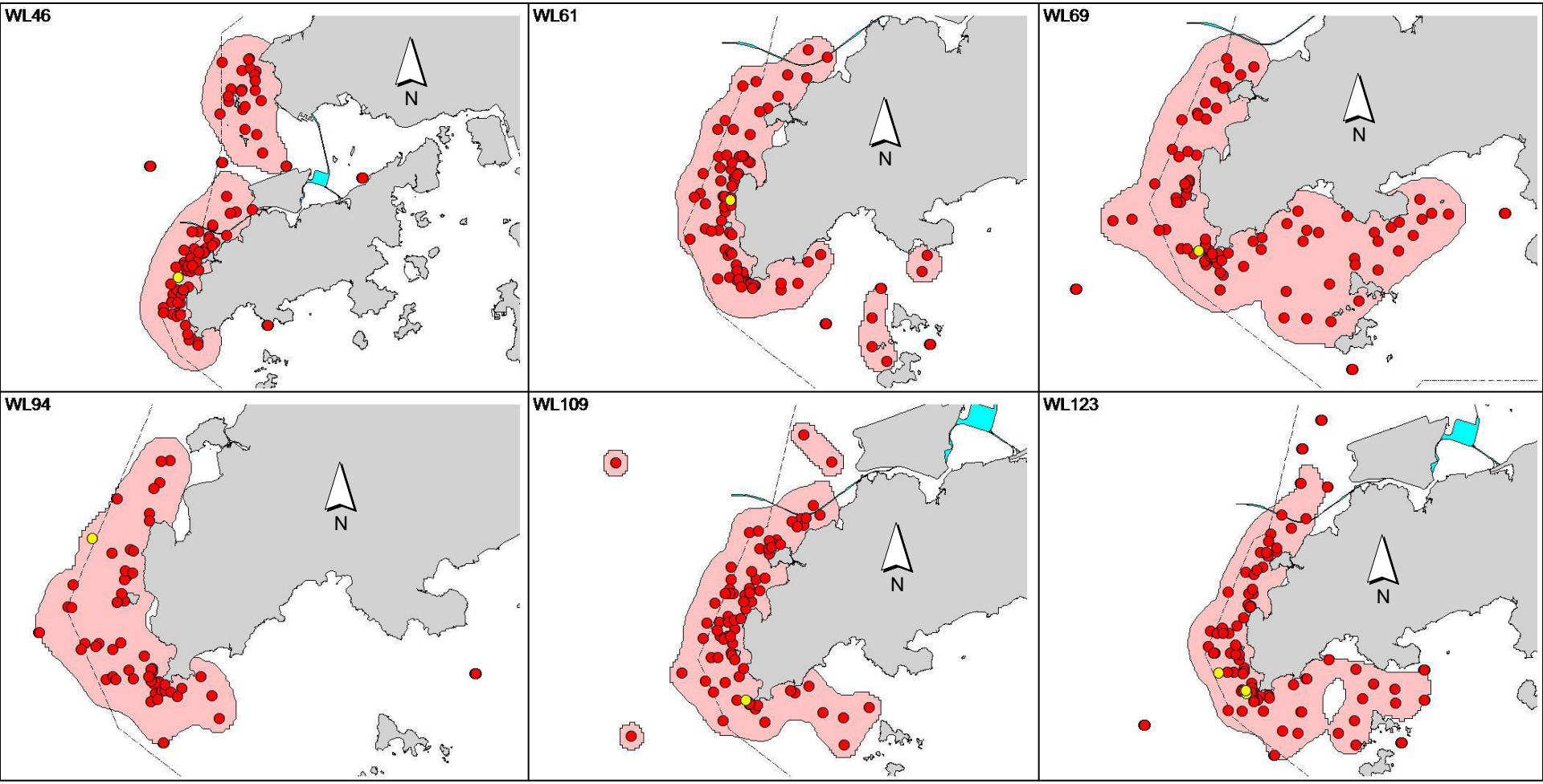

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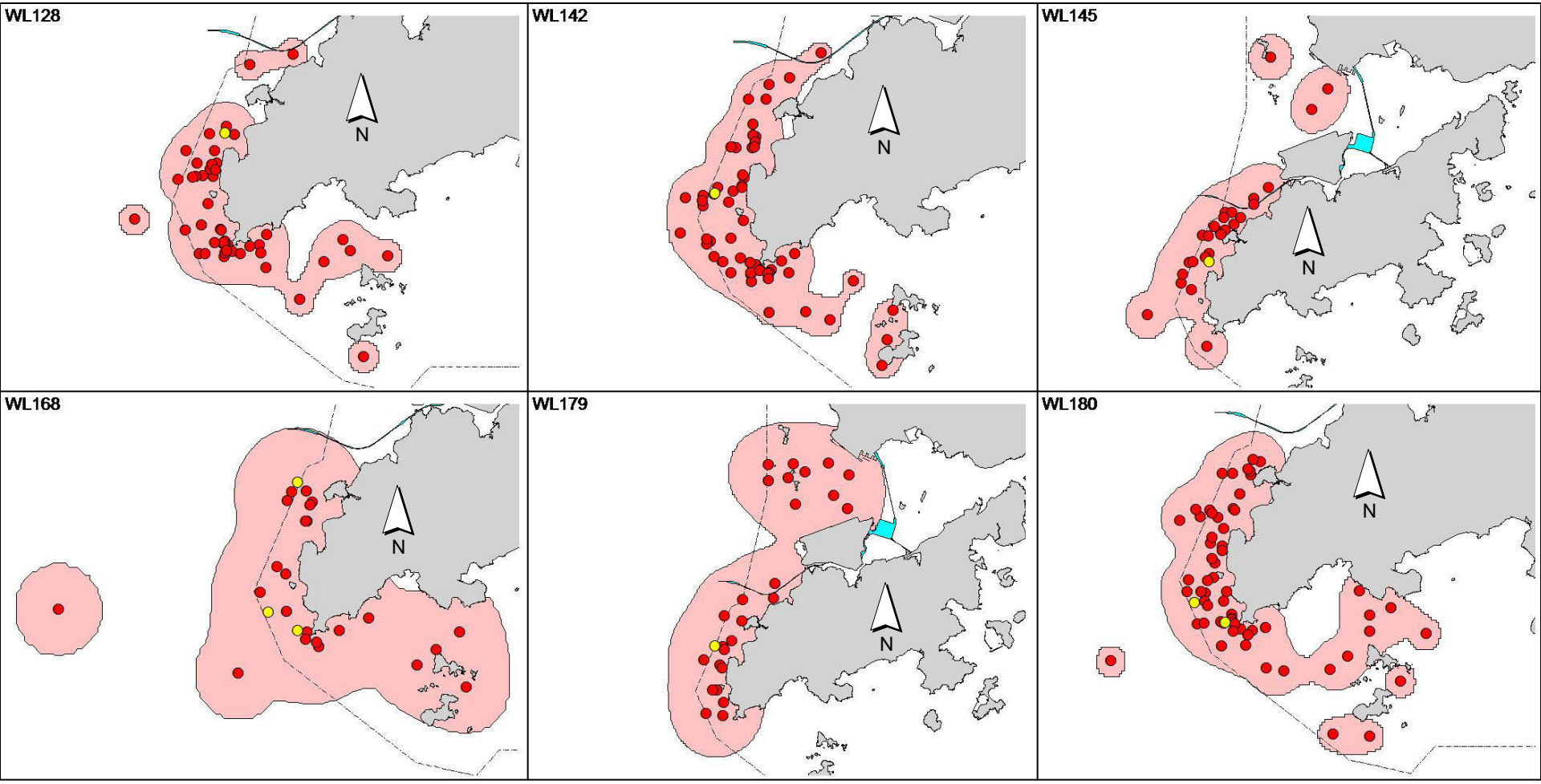
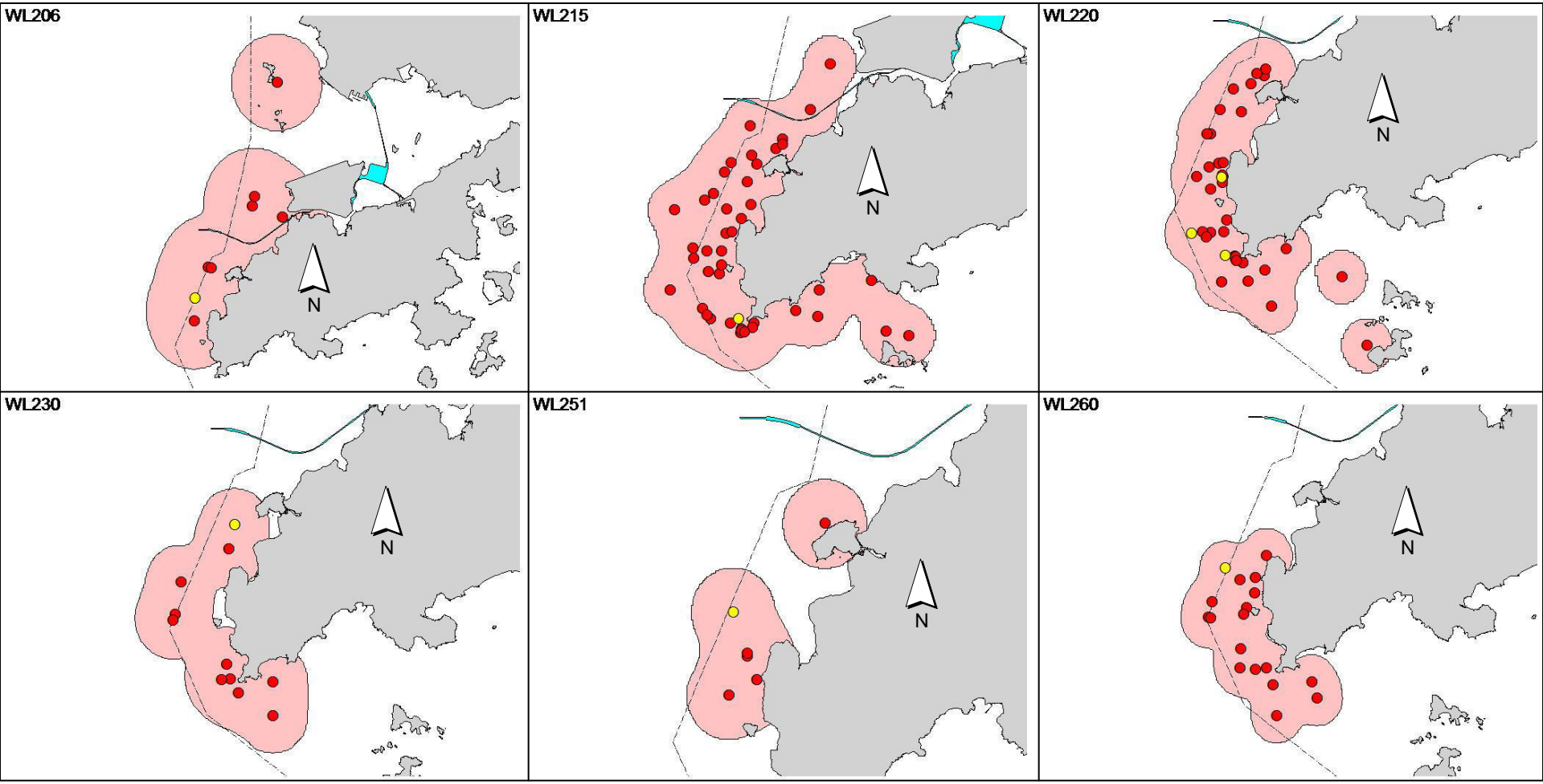
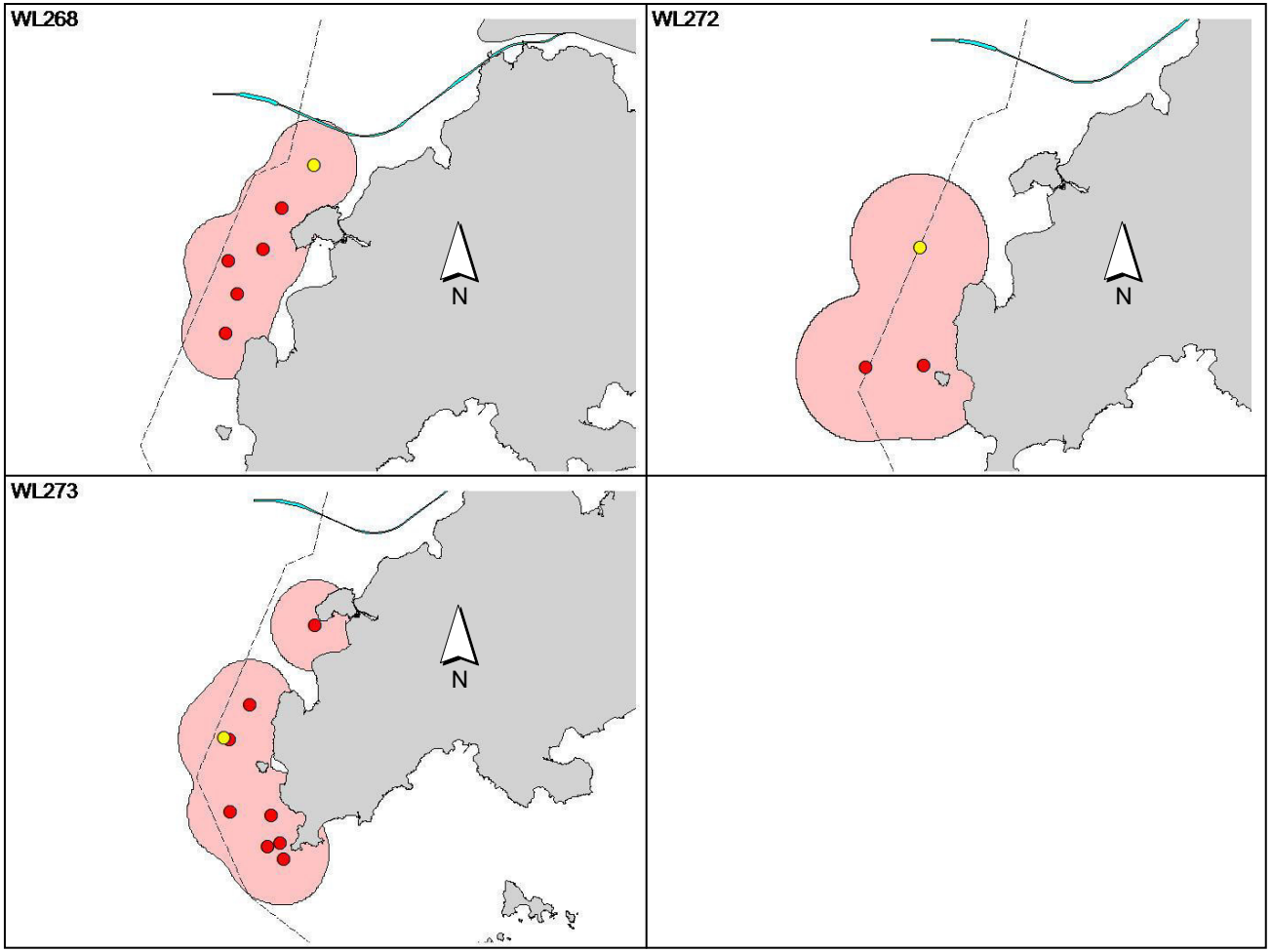


Appendix V. (cont'd)



Appendix V. (cont'd)



APPENDIX G
EVENT ACTION PLANS

Event / Action Plan for Air Quality

EVENT	ACTION			
	ET	IEC	SO	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and SO; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily.	1. Check monitoring data submitted by 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 source; 2. Inform IEC and SO; 3. Advise the SO on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and SO; 8. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor;	1. Submit proposals for remedial to SO within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

LIMIT LEVEL				
1.Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform SO, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the SO on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures 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 IEC, SO, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and SO to discuss	1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; 3. Supervise the implementation of	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures 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. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the SO until the exceedance

	the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results; 8. If exceedance stops, cease additional monitoring.	remedial measures.	5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	is abated.

Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Office

Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	**IEC**	**SO**	**CONTRACTOR**
Action Level	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Notify IEC and Contractor; 3. Report the results of investigation to the IEC, SO and 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 SO accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require 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. Identify source; 2. Inform IEC, SO, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;	1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; 3. Supervise the implementation of	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed	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;

EVENT	ACTION			
	ET	**IEC**	**SO**	**CONTRACTOR**
	6. Inform IEC, SO and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results; 8. If exceedance stops, cease additional monitoring.	remedial measures.	noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the SO until the exceedance is abated.

Event and Action Plan for Water Quality

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

Event	ET Leader	IEC	SO	Contractor
				IEC and SO.
Limit level being exceeded by two or more consecutive sampling days	Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor, SO and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SO and Contractor; Ensure mitigation measures are implemented;	Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor on possible remedial actions; Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SO accordingly; Supervise the implementation of mitigation measures.	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Ensure mitigation measures are properly implemented; 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.	Take immediate action to avoid further exceedance; Submit proposal of mitigation measures to SO within 3 working days of notification and discuss with ET, IEC and SO; Implement the agreed mitigation measures; Resubmit proposals of mitigation measures if problem still not under control; 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.

Event Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	ER / 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, ER/SOR and Contractor, 5. Check monitoring data. 6. Review to ensure all the dolphin protective measure 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 data with the IEC and any other measures proposed by the ET. 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing. 2. Discuss with the ET and the IEC to propose measures to the IEC and the ER/SOR. 3. Implement the agreed measures.

Event	ET Leader	IEC	ER / 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 reviewing to ensure all the dolphin protective measure are fully and properly implemented and advise on additional measures if necessary. 7. If the ET proves that the source of impact is caused by any of the construction activity by the works contract, the ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor for necessity of additional dolphin monitoring, and/or any other potential mitigation measures (eg, consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activities…etc), and submit to the IEC a proposal of additional dolphin monitoring and/or	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 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 of 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 proposals for additional dolphin monitoring and/or any other mitigation measures submitted by the ET and Contractor and verified by the 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.

	mitigation measures where necessary.			

APPENDIX H
UPDATED ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE (EMIS)

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
Air Quality							
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	^
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	^ ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
S5.5.6.2	A2	• When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; • Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; • Any skip hoist for material transport should be totally enclosed by impervious sheeting; • Every stock of more than 20 bags of cement or dry pulverised fuel	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	^ ^ * ^ N/A ^ *

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides;					
S5.5.6.2	A2	• Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies.	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	N/A N/A N/A
S5.5.6.3	A3	3) The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	^
S5.5.6.4	A5	5) Implement regular dust monitoring under EM&A programme during the construction stage.	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	^
S5.5.7.1	A6	The following mitigation measures should be adopted to prevent fugitive	Monitor the 24 hr and 1hr	Contractor	Selected	Construction	

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		dust emissions for concrete batching plant: • Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; • All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; • Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; • The materials which may generate airborne dusty emissions should be wetted by water spray system; • All receiving hoppers should be enclosed on three sides up to 3m above unloading point; • All conveyor transfer points should be totally enclosed; • All access and route roads within the premises should be paved and wetted; and • Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.	TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.		representative dust monitoring station	stage	^ ^ ^ ^ ^ ^ ^ ^
S5.5.2.7	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; • Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points.	Control construction dust	Contractor	All construction sites	Construction stage	N/A N/A N/A N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
Construction Noise (Air borne)							
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the following: • only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; • machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; • plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; • silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; • mobile plant should be sited as far away from NSRs as possible and practicable; • material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.	Control construction airborne noise by means of good site practices	Contractor	All construction sites	Construction stage	^ ^ ^ ^ ^ ^
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites	Construction stage	^
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m^2), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all	Construction stage	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
					construction sites		
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	Reduce the noise levels of plant items	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	^
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	^
	N6	6) Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction stage	^
Waste Management (Construction Waste)							
S8.3.8	WM1	<u>*Construction and Demolition Material*</u> The following mitigation measures should be implemented in handling the waste: • Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; • Carry out on-site sorting; • Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; • Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	^ ^ ^ N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		effectively for recycling purpose, where possible; • Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and • Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 – "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. • In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation					^ ^ ^
S8.3.9 - S8.3.11	WM2	*C&D Waste* • Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. • The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.					
S8.2.12-S8.3.15	WM3	*Chemical Waste* • Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. • Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. • The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. • Disposal of chemical waste should be via a licensed waste	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage	* ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.					^
S8.3.16	WM4	*Sewage* • Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	Proper handling of sewage from worker to avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	^
S8.3.17	WM5	*General Refuse* • General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. • A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. • Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. • Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	* * ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. • Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.					^ ^
Water Quality (Construction Phase)							
S9.11.1 – S9.11.1.2	W1	• Mitigation during the marine works to reduce impacts to within acceptable levels have been recommended and will comprise a series of measures that restrict the method and sequencing of dredging/backfilling, as well as protection measures. Details of the measures are provided below and summarised in the Environmental Mitigation Implementation Schedule in EM&A Manual. • Export for dredged spoils from NWWCZ avoiding exerting high demand on the disposal facilities in the NWWCZ and, hence, minimise potential cumulative impacts; • For the marine viaducts of HKLR, the bored piling will be undertaken within a metal casing; • where public fill is proposed for filling below -2.5mPD, the fine content in the public fill will be controlled to 25%; • single layer silt curtains will be applied around all works; • during the first two months of dredging work for HKLR, the silt-removal efficiency of the silt-curtains shall be verified by examining the results of water quality monitoring points. The water quality	To control construction water quality	Contractor	During seawall dredging and filling	Construction stage	^ ^ ^ N/A ^ N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		monitoring points to be selected for the above shall be those close to the locations of the initial period of dredging work. Details in this regard shall be determined by the ENPO to be established, taking account of the Contractor's proposed actual locations of his initial period of dredging work. • silt curtain shall be fully maintained throughout the works. In addition, dredging operations should be undertaken in such a manner as to minimise resuspension of sediments. Standard good dredging practice measures should, therefore, be implemented including the following requirements which should be written into the dredging contract. • trailer suction hopper dredgers shall not allow mud to overflow; • use of Lean Material Overboard (LMOB) systems shall be prohibited; • mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted; • barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material; • any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes; • 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;					* N/A N/A ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved; • adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; • 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; and • 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.					^ ^ ^
S9.11.1.3	W2	*Land Works* General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: • wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • 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; • 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	To control construction water quality	Contractor	During seawall dredging and filling	Construction stage	* N/A *

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • 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; • temporary access roads should be surfaced with crushed stone or gravel; • rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; • open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; • 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; • discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; • 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;					^ ^ ^ ^ * ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; • the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • 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 off site disposal; • the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • 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; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.					^ ^ ^ N/A * ^ ^ ^
S9.14	W3	Implement a water quality monitoring programme	Control water quality	Contractor	At identified	During	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
					monitoring location	construction period	
Ecology (Construction Phase)							
S10.7	E1	• Good site practices to avoid runoff entering woodland habitats in Scenic Hill • Reinstate works areas in Scenic Hill • Avoid stream modification in Scenic Hill	Avoid potential disturbance on habitat of Romer's Tree Frog in Scenic Hill	Designer; Contractor	Scenic Hill	During construction	^ N/A ^
S10.7	E2	• Use closed grab in dredging works. • Install silt curtain during the construction. • Limit dredging and works fronts. • Good site practices • Strict enforcement of no marine dumping. • Site runoff control • Spill response plan	Minimise marine water quality impacts	Contractor	Seawall,	During construction	^ ^ ^ ^ ^ ^ ^
S10.7	E3	• Reprovision of replacement Artificial Reefs (of the same volume as the existing ARs inside Marine Exclusion Zone)	Mitigate water quality impacts on the existing ARs	Project proponent	To be determined	Construction phase or operation phase	N/A
S10.7	E4	Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater	Prevent Sedimentation from Land-based works areas	Contractor	Land-based works areas	During construction	^
S10.7	E5	Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time	Prevent disturbance to terrestrial fauna and habitats	Contractor	Land-based works areas	During construction	^
S10.7	E6	• Dolphin Exclusion Zone;	Minimize temporary marine	Contractor	Marine works	During marine	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Dolphin watching plan	habitat loss impact to dolphins			works	^
S10.7	E7	• Decouple compressors and other equipment on working vessels • Avoidance of percussive piling • Marine underwater noise monitoring • Temporal suspension of drilling bored pile casing in rock during peak dolphin calving season in May and June	Minimise marine noise impacts on dolphins	Contractor	Marine works	During marine works	^ ^ ^ N/A
S10.7	E8	• Control vessel speed • Skipper training. • Predefined and regular routes for working vessels; avoid Brothers Islands.	Minimise marine traffic disturbance on dolphins	Contractor	Marine traffic	During marine works	^ ^ ^
S10.10	E9	• Dolphin vessel monitoring	Minimise marine traffic disturbance on dolphins	Contractor	North Lantau and West Lantau	Prior to construction, during construction, and 1 year after operation	^
Fisheries							
S11.7	F1	• Reprovision of replacement Artificial Reefs(of the same volume as the existing ARs inside Marine Exclusion Zone)	Mitigate water quality impacts on the existing ARs	Project proponent	To be determined	Construction phase or operation phase	N/A
S11.7	F2	• Reduce re-suspension of sediments • Limit dredging and works fronts. • Good site practices	Minimise marine water quality impacts	Contractor	Seawall,	During construction	^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• Strict enforcement of no marine dumping • Spill response plan					^ ^
Landscape & Visual (Construction Phase)							
S14.3.3.3	LV2	Mitigate both Landscape and Visual Impacts • G1. Grass-hydroseed bare soil surface and stock pile areas. • G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. • G3. For HKLR, providing aesthetic design on the viaduct, tunnel portals, at-grade roads (e.g. subtle colour tone and slim form for viaduct, featured form of tunnel portals, roadside planting along at-grade roads and landscape berm on) to beautify the HKLR alignment. • G5. Vegetation reinstatement and upgrading to disturbed areas. • G6. Maximize new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed. • G7. Provide planting area around peripheral of and within HKLR for tree screening buffer effect. • G8. Plant salt tolerant native tree and shrubs etc along the planter strip at affected seawall. • G9. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt “natural-look” by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance “natural-look” of the new coastline (see Figure 14.4.2 for example).	Minimise visual & landscape impact	Contractor	HKLR	Construction stage	N/A N/A N/A N/A N/A N/A N/A N/A N/A
S14.3.3.3	LV3	<u>Mitigate Visual Impacts</u>					

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• V1.Minimize time for construction activities during construction period. • V2.Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKLR construction.					^ ^
EM&A							
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Project Proponent	All construction sites	Construction stage	^
S15.5 - S15.6	EM2	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	Perform environmental monitoring & auditing	Contractor	All construction sites	Construction stage	^ ^ ^

Remarks: ^ Compliance of mitigation measure

* Recommendation was made during site audit but improved/rectified by the contractor

N/A Not Applicable at this stage as no such site activities were conducted in the reporting month (e.g. concrete batching plan, barging point, seawall dredging and filling, bored piling, landscaping works etc)

APPENDIX I
SITE AUDIT SUMMARY

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	160906
Date	6 September 2016 (Tuesday)
Time	9:15 – 12:30 and 13:30 – 16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
160906-R04	• Cement bags should be covered properly near P107.	D20
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
160906-R01	• To properly clear the oil leakage as chemical waste and provide drip trays for oil containers near P47, P34 and P30.	F8, 9
160906-R02	• Waste water inside drip trays near P44 and P37 should be cleared as chemical waste.	F2i, 2ii
160906-R03	• Chemical material should be properly stored in chemical storage area at Portion C.	F2i, 2ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 160830), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Kevin Lam		6 September 2016
Checked by	Dr. Priscilla Choy		6 Septmeber 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	160913
Date	13 September 2016 (Tuesday)
Time	9:15 – 12:30 and 13:30 – 16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
160913-R01	• Drip trays should be provided to oil containers at P47 to prevent oil leakage.	F8, 9
160913-R02	• General refuse near P82 should be cleared to avoid accumulation.	F1i, 1ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 160906), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		13 September 2016
Checked by	Dr. Priscilla Choy		13 Septmeber 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	160920
Date	20 September 2016 (Tuesday)
Time	9:15 – 11:30 and 13:30 – 15:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
160920-R01	• Silt curtain near P68 should be repaired properly.	B25
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
	• No environmental deficiency was identified during site inspection.	
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 160913), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		20 September 2016
Checked by	Dr. Priscilla Choy		20 Septmeber 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	160927
Date	27 September 2016 (Tuesday)
Time	9:15 – 11:30 and 13:30 – 15:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
160927-R01	• Sandbag bunds should be provided before kicking plates to prevent leakage from grouting works for P53 to P58.	B22
160927-R02	• Stagnant water in the deck holes of the bridge should be cleared properly at P53 to P59.	B8
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
160927-R03	• Drip trays for chemical containers should be plugged and suitable labels should be provided to chemical containers of P57.	F8 & F9
160927-R04	• House-keeping should be enhanced at P58 and P80.	F1i & 1ii & 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 160920), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

	Name	Signature	Date
Recorded by	Ivy Tam		27 September 2016
Checked by	Dr. Priscilla Choy		27 Septmeber 2016

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

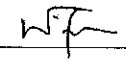
Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	161004
Date	4 October 2016 (Tuesday)
Time	9:30 – 11:30 and 13:30 – 16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
161004-R01	• NRMM labels should be provided for equipment at Portion C (P112).	D26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161004-R02	• Chemical containers should be provided with drip tray or removed at Portion C(P106).	F8 & F9
161004-R03	• Accumulated waste at P83 should be cleared properly.	F1i & 1ii & 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 160927), all environmental deficiencies were improved/rectified by contractor during the site inspection.	

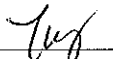
	Name	Signature	Date
Recorded by	Ivy Tam		4 October 2016
Checked by	Dr. Priscilla Choy		4 October 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	161011
Date	11 October 2016 (Tuesday)
Time	9:30 – 11:45

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161004-R01	• Drip tray for the chemical containers at P72 (deck-surface) should be plugged properly.	F8 &9
161004-R02	• Provide drip tray for the chemical containers at near the power pack at P72 (deck-surface).	F3i
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:161004), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Ivy Tam		11 October 2016
Checked by	Dr. Priscilla Choy		11 October 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	161018
Date	18 October 2016 (Tuesday)
Time	9:15 – 11:45

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
161018-O01	• Muddy water was discharging to the sea at WA4 during the heavy rainstorm. The contractor was reminded to enhance the sand bag bund and divert the muddy water for treatment before discharging out.	B11i, ii
161018-R03	• Provide designated concrete washout area to avoid the concrete wash water discharging to the nearby marine water at between P82 and P83.	B28
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161018-R02	• To remove the oil drum at near the sedimentation tank at WA4.	F4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161011), all identified environmental deficiency was observed improved/rectified by the Contractor.	

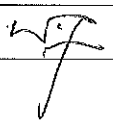
	Name	Signature	Date
Recorded by	Ivy Tam		18 October 2016
Checked by	Dr. Priscilla Choy		18 October 2016

Weekly Site Inspection Record Summary

Inspection Information

Checklist Reference Number	161025
Date	25 October 2016 (Tuesday)
Time	9:30 – 11:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
161025-R02	• Silt curtain should be properly maintained (P109).	B25
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
161025-R03	• Dusty material on the deck should be cleared (P83).	D7
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161025-R01	• Oily water in the drip tray should be removed (P83 platform, P109 portion C).	F8 & F9
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161018), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang		25 October 2016
Checked by	Dr. Priscilla Choy		25 October 2016

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Checklist Reference Number	161101_v2
Date	1 November 2016 (Tuesday)
Time	9:15 – 11:00; 13:30-16:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
161101-R04	• No wastewater should be discharged to sea at P82.	B28
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161101-R01	• Oil stain at P47 should be cleared.	F8
161101-R02	• Accumulated waste at P52 should be cleared.	F1i
161101-R03	• Chemical containers should be provided with drip tray or removed at P52, P106 Portion c and with proper chemical labels.	F9
161101-R05	• General waste should be cleared in the drainage at Portion a.	F1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161025), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	ceci	1 November 2016
Checked by	Dr. Priscilla Choy		1 November 2016

Contract HY/2011/09

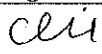
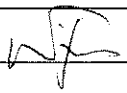
Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Checklist Reference Number	161108
Date	8 November 2016 (Tuesday)
Time	9:15 – 11:30; 13:30-15:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161108-R01	• The oily water in the drip tray and oil stain should be cleared. (WA4)	F8&9
161108-R02	• The chemical containers should be properly stored or removed. (WA4, P47)	F2i
161108-R03	• The chemical container should be properly labelled. (P47)	F2iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161101), item 161101-R04 needed follow-up during next audit section.	

	Name	Signature	Date
Recorded by	Cecilia Yang		8 November 2016
Checked by	Dr. Priscilla Choy		8 November 2016

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Checklist Reference Number	161115
Date	15 November 2016 (Tuesday)
Time	9:15 – 11:30; 14:30-16:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
161115-R02	• Cement bags should be covered with impervious sheet. (Portion C)	D20
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161115-R01	• Chemical containers should be provided with drip trays and with proper chemical labels. (Portion C P106)	F2iii&8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161108), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Clei	15 November 2016
Checked by	Dr. Priscilla Choy		15 November 2016

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Checklist Reference Number	161122
Date	22 November 2016 (Tuesday)
Time	9:30-12:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161122-R01	• Chemical containers should be stored properly with drip tray and away from the deck edge to prevent discharge to sea. (P60, P79)	F8,9
161122-R02	• Chemical labels should be provided for all chemical containers. (P79)	F2iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161115), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Cecil	22 November 2016
Checked by	Dr. Priscilla Choy		22 November 2016

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill

Weekly Site Inspection Record Summary

Checklist Reference Number	161129
Date	29 November 2016 (Tuesday)
Time	9:15-11:00: 13:30-16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
161129-R03	• Silt curtain should be maintained at Portion a (P101).	B25
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
161129-R01	• Drip tray should be provided for the chemical containers at P80.	F8,9
161129-R02	• Accumulated waste should be cleared regularly at Portion a (P82).	F1i,iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous site audit session (Ref. No. 161122), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Ceci	29 November 2016
Checked by	Dr. Priscilla Choy		29 November 2016

APPENDIX J
WASTE GENERATION IN THE REPORTING PERIOD

Appendix: C6 Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No.: HY/2011/09

Monthly Summary Waste Flow Table for 2016 (Year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated[9]	Hard Rock and Large Broken Concrete[6]	Reused in the Contract[7]	Reused in other Projects[5,7,11]	Disposed as Public Fill[7]	Imported Fill[6,7]	Metals[10]	Paper/ cardboard packaging	Plastics[3]	Chemical Waste	Others, e.g. general refuse[7]
	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
Jan	1.095	0.000	0.000	0.000	0.283	0.812	0.020	1.145	0.000	0.000	0.241
Feb	0.209	0.000	0.000	0.000	0.209	0.000	0.113	0.811	0.000	4.099	0.241
Mar	0.388	0.000	0.086	0.000	0.302	0.000	0.023	1.201	0.000	1.387	0.260
Apr	2.094	0.000	0.286	1.512	0.297	0.000	0.131	0.818	0.000	0.000	0.208
May	4.436	0.000	0.000	3.982	0.454	0.000	0.078	0.917	0.000	1.586	0.189
Jun	6.100	0.000	0.000	5.777	0.322	0.000	0.025	0.626	0.000	2.973	0.202
Sub-Total	14.323	0.000	0.372	11.270	1.869	0.812	0.390	5.518	0.000	10.045	1.339
Jul	0.431	0.000	0.000	0.122	0.310	0.000	0.062	0.626	0.000	0.991	0.189
Aug	1.366	0.000	1.103	0.000	0.262	0.000	0.111	0.936	0.000	2.775	0.195
Sep	1.889	0.000	0.000	0.000	0.445	1.444	0.033	0.651	0.000	0.000	0.189
Oct	1.916	0.000	0.000	1.633	0.282	0.000	0.090	0.604	0.000	0.000	0.228
Nov	8.704	0.000	0.000	6.116	2.588	0.000	0.171	0.603	0.000	2.180	0.267
Dec											
Total	28.628	0.000	1.475	19.141	5.756	2.257	0.857	8.938	0.000	15.991	2.405

Forecast of Total Quantities of C&D Materials to be Generated from the Contract [8]										
Total Quantity Generated[9]	Hard Rock and Large Broken Concrete[6]	Reused in the Contract[7]	Reused in other Projects[5,7]	Disposed as Public Fill[6]	Imported Fill[6,7]	Metals[10]	Paper/ cardboard packaging	Plastics[3]	Chemical Waste	Others, e.g. general refuse[7]
(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
232.111	0.000	5.000	73.111	100.000	54.000	5.500	40.000	0.000	35.000	20.000

Notes:

(1) The performance targets are given in ER Appendix 8J Clause 14 and the EM&A Manual.

(2) The waste flow table shall also include C&D materials to be imported for use at the Site.

(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m^3. (ER Part 8 Clause 8.8.5 (d) (ii) refers).

(5) The materials reused in other Project shall not be treated as waste under the Waste Disposal Ordinance (CAP354).

(6) According to the EIA Appendix 8B, the density of rock (bulked) and soil (bulked) are 2.0 tonnes/m^3 and 1.8 tonnes/m^3 respectively.

(7) Assuming the loading quantities of a 30-tonne truck and a 24-tonne truck are 8.0m^3 and 6.5m^3 respectively.

(8) The forcast of C&D materials to be generated from the Contract is sourced from the works program in May 2016.

(9) The volume of Total Quantity Generated means the volume of Hard Rock and Large Broken Concrete+Disposed as Public Fill+Imported Fill-Reused in the Contract-Reused in other Projects.

(10) The density of metal is 7,850 kg/m^3.

(11) The C&D materials were delivered to TM-CLKL and HK/2009/02 Projects.

APPENDIX K
SUMMARY OF EXCEEDANCE

Contract No. HY/2011/09
Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road –
Section between HKSAR Boundary and Scenic Hill

Exceedance Report

(A) Exceedance Report for Air Quality

Environmental Monitoring	Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
		Action Level	Limit Level	Action Level	Limit Level
Air Quality	1-hr TSP	0	0	0	0
	24-hr TSP	0	0	0	0

(B) Exceedance Report for Construction Noise
(NIL in the reporting period)

(C) Exceedance Report for Water Quality

Environmental Monitoring	Parameter	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
		Action Level	Limit Level	Action Level	Limit Level
Water Quality	Dissolved Oxygen (DO) (Surface & Middle)	0	0	0	0
	Dissolved Oxygen (DO) (Bottom)	0	0	0	0
	Turbidity	0	0	0	0
	Suspended Solids (SS)	39	6	0	0

(D) Exceedance Report for Line-transect Vessel Surveys
(NIL in the reporting period)

APPENDIX L
COMPLAINT LOG

Appendix L - Complaint Log

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
Com-2013-04-001	Near Tung Chung New Development Pier	8 April 2013	EPD received the complaint on 8 April 2013. The complainant complained about oil was dumped from various vessels operating for Hong Kong-Zhuhai-Macao Bridge Hong Kong (HZMB HK) Projects near Tung Chung New Development Pier over the past few months.	1) The vessels photos in the complainant's photo are not the working vessels under Contract No. HK/2011/09. 2) No oil dumped from Contract No. HK/2011/09's working vessels was observed according to ET's site inspection conducted on 9 April 2013 at near Tung Chung New Development Ferry Pier. 3) Joint site inspection (DCVJV and ARUP) was conducted on 10 April 2013 and confirmed that Contract No. HY/2011/09's vessels are not involved the complaint case. 4) DCVJV will keep remind their boat crews not discharging contaminated effluent directly into the sea.	Closed
Com-2013-05-001	WA6	2 May 2013	ARUP received the complaint on 2 May 2013. The complainant alleged the noise nuisance was generated from the Works Area WA6 at around 13:00 on 1 May 2013 (Wednesday).	The site diary report was reviewed and confirmed that no works were carried out at WA6 on 1 May 2013. In addition, no noise was heard from WA6 according to the security guard who on duty at WA6 on 1 May 2013. Based on the information provided, the complaint regarding the construction noise at WA6 is not considered justifiable.	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
Com-2013-05-002	WA6	18 May 2013	ARUP received the complaint on 18 May 2013. The complainant advised that the noise nuisance due to loading of metal parts at barge near the seawall of Works Area WA6 early morning (around8:45a.m) on 18 May 2013 (Saturday).	Based on the record of site activities at WA6 on 18 May 2013, 4 metal plates and 2 oxygen-acetylene set were lifted onto a derrick boat "Chiu Kee" by a crane near seawall at WA6 in the morning on that day. Such operation was commenced around 8:40a.m and completed in 10 minutes during the normal construction working hour (0700 – 1900 Monday to Saturday). However, the duration of aforesaid activities is very short and infrequent. Nevertheless, the Contractor was reminded to strengthen their site supervision and provide training for the workers regularly to increase awareness of their environmental responsibilities to minimize the noise impact to the nearby residents and the specific mitigation measures for the complaint including but not limited to:- •To place wooden planks or rubber mats on ground for loading and unloading heavy or metal objects; and •To deploy professional personnel to supervise the works.	Closed
Com-2013-05-003	Near Tung Chung New Development Pier	18 May 2013	EPD received the public complaint on 18 May 2013. This complaint was a follow-up of a previous complaint received by EPD on 8	After receiving the complaint, additional site inspection was conducted at near Tung Chung New Development Pier on 30 May 2013 to investigate whether oil	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			April 2013 (Com-2013-04-001). The complainant complained again about the oil was dumped from various vessels operating for Hong Kong-Zhuhai-Macao Bridge Hong Kong (HZMB HK) Projects near Tung Chung New Development Pier over the past months.	dumped was due to Contract No. HY/2011/09's vessels. During the site inspection, three working vessels under Contract No.HY/2011/09 was anchored off near Tung Chung New Development Pier. No oil dumped from Contract No. HY/2011/09's vessels were observed and the water around the vessels was clear. The following mitigation measures have been implemented by DCVJV: • DCVJV has sent the letter to the shipping agent to remind them to ensure the vessels under Contract No. HY/2011/09 are in good condition and any oil dumped to sea should be avoided to prevent water pollution. • Provide training to the vessel skippers for prevention of pollution from ships. • DCVJV requested vessel skippers to provide engine oil disposal records The vessel skippers assured to us that all waste lubricants were sent to waste collectors regularly and no oil discharge into seawater.	
Com-2013-07-001	Southeast Quay of Chek Lap Kok near the junction of Chek Lap Kok South Road and Scenic Road	17 July 2013	The complaint was received by EPD on 17th July 2013. According to the EPD's letter, the complainant was concerned for the noise nuisance generated from the	In response to the complaint, ET conducted two times site inspections at Southeast Quay at Chek Lap Kok between 18:45 and 20:30 hours on 23 July 2013 and 20:30 to 22:30 hours on 30 July 2013.	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			operation of concrete lorry mixers during evening and night-time period at Southeast Quay of Chek Lap Kok.	During the inspections, the Ro-Ro barge was observed anchored off Southeast Quay at Chek Lap Kok but no concrete lorry mixer was observed throughout the inspection. On 23 July 2013, at about 19:35, one tug boat was observed travelling to Southeast Quay, Chek Lap Kok and left at about 19:40. On 30 July 2013, no tug boat and concrete lorry mixers were observed during the inspection. According to the Contractor, there was no concreting works for the pier sites on 23 July 2013 and therefore no loading and unloading operation at Southeast Quay at Chek Lap Kok. Concreting works were performed at Pier 0 on 30 July 2013. As the Contractor anticipated the arrival time of tug boat and flap-top barge at Southeast Quay will exceed 23:00 hours after the concreting works, they decided to arrange the tug boat and flap-top barge with concrete	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				lorry mixers anchored off around Pier 66 after 23:00 hours. So, no loading and unloading operation at Southeast Quay at Chek Lap Kok was observed. Further night time site inspection was conducted on 22 August 2013 during the loading and unloading operation at Southeast Quay of Chek Lap Kok, the construction works conducted under Contract No. HY/2011/09 complied with the conditions in the CNP No. GW-RS0895-13.	
Com-2013-11-001	Chek Lap Kok (CLK) South Road	16 November 2013	The complaint was received by project customer services on 16th November 2013 regarding the dust problem at Chek Lap Kok (CLK) South Road.	After receiving the complaint, ET conducted the site inspection on 19 and 29 November 2013 to check the appropriate environmental protection and pollution control measures which are properly implemented by the Contractor under HY/2011/09 (DCVJV). The observation are summarized as below:- • Dust generation works was conducted by the other Contractor at South East Quay • Proper watering of haul road to avoid dust generation during vehicle / plant equipment movement. • Vehicle washing facilities provided	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				at every site exit at CLK South Road and South Perimeter Road. • No dark smoke was observed emitting from the plant equipments. Based on the information collected, the complaint of dust problem at Check Lap Kok South Road is considered not related to Contract No. HY/2011/09 as dust suppression measures has been properly implemented by the Contractor on site to prevent dust nuisance from the construction activities.	
Com-2014-01-001	Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill (Contract No. HY/2011/09	3 January 2014	The complaint was received by EPD on 3rd January 2014. According to the EPD's letter, a resident in Tai O District was concerned for the noise nuisance occasionally arising from the hammering or hitting of metals from Contract No. HY/2011/09.	In response to the complaint, ET conducted an ad hoc night time site inspection at P0, P18 and P19 on 14 January 2014 between around 23:00 and 00:30 hours of 15 January 2014. In accordance with the site activities record and site inspections, the construction works conducted under Contract No. HY/2011/09 complied with the conditions in the CNP No. GW-RS1108-13. Nevertheless, the Contractor was advised to strictly follow the conditions of the permit because any deviation from the	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				conditions may lead to cancellation of the permit, subsequent prosecution action and the Authority's refusal to issue further permit. In addition, the following environmental mitigation measures were recommended: • Review and adjust the lighting directions of the barge, under safety consideration, to avoid potential visual impacts to residents in vicinities; • To ensure the equipment are maintaining in good operation condition; and • To strengthen site supervision and provide training for the workers regularly to increase awareness of their environmental responsibilities to minimize the noise impact to the nearby residents and the specific mitigation measures.	
Com-2014-01-002	Hong Kong-Zhuhai-Macao Bridge	16 January 2014	The complaint was received by HyD's PR Team on 16 January 2014 that the complainant advised that the heavy exhaust fume affecting Tung Chung Crescent.	After receiving the complaint, ET conducted the site inspection on 21 January 2014 to check all the plant equipments which were operated for the construction works and air quality	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				mitigation measures. Based on the information collected, the complaint of heavy exhausts affecting Tung Chung Crescent is considered not related to Contract No. HY/2011/09 due to the following reason(s):- 1) The work sites at Portion C and South East Quay at Portion A under Contract No. HY/2011/09 are approximately 800m from Tung Chung Crescent. Any unpleasant smell of exhaust fume would not be anticipated. 2) No heavy smoke was observed emitting from plants / equipment during the site inspection on 21 January 2014. 3) The vehicles and equipments were switched off while not in use. 4) All plant and equipment were well maintained and in good operating condition. 5) Air quality mitigation measures has been properly implemented by the Contractor on site to prevent dust nuisance from the construction activities.	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
Com-2014-03-001	Oil Spillage at near Sha Lo Wan	5 March 2014	The complaint was received by EPD on 5 March 2014. The complainant suspected the oil leakage from the works area of Contract No. HY/2011/09 near Sha Lo Wan	Based on ET site inspection, no oil spillage from the works area under Contract No. HY/2011/09 at near Sha Lo Wan was observed. In addition, spill kits are ready on site in order to dealing with spillage cases promptly. Nevertheless, DCVJV was also recommended the mitigation measures as below: • Provide training for the workers regularly regarding the mitigation measures on waste / chemical management. • Provide sufficient chemical spillage kit (e.g. oil absorbent) to all vessels and working platform. • Regular check the condition of vessels and plant equipments to ensure no leakage of oil.	Closed
Com-2014-03-002	Construction Noise in the vicinity of the waters outside Sha Lo Wan	11 March 2014	The complaint was received by EPD on 11 March 2014. According to the EPD's letter, the complainant was concerned for the mobile crane which operating in the vicinity of the waters outside Sha Lo Wan after 23:00.	In accordance with an ad hoc site inspection on 18 March 2014, no construction works were conducted during the restricted hours. The 1st investigation report has been submitted to EPD on 21 March 2014 and the 2nd investigation report was submitted to EPD on 26 June 2014. The Contractor was advised to strictly	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				follow the conditions of the permit because any deviation from the conditions may lead to cancellation of the permit, subsequent prosecution action and the Authority's refusal to issue further permit. Nevertheless, the Contractor was reminded to take sufficient noise mitigation measures to minimize the environmental impact on the nearby community: · To space out noisy equipment and position it as far away as possible from the sensitive receivers; · To avoid concurrent uses of noisy equipment near the sensitive area; · To ensure the equipment are maintaining in good operation condition; · To turned off any idle equipment on site; and · To enclose the noisy part of the machine by acoustic insulation material if feasible. · To arrange tailor-made training for the Production Team including the management and foremen to explain to them the conditions and requirements listed on the CNP. · To delegate one Engineer for ensuring that all construction activities and PMEs used are in full compliance with the CNP	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				and legislative requirements.	
Com-2014-04-001	Construction marine works by the company Bauer Hong Kong in Tung Chung	14 April 2014	The complaint was received by Agriculture, Fisheries and Conservation Department (AFCD) on 14 April 2014, the complainant complained that the dead dolphin was found under a platform at construction marine works by the company Bauer Hong Kong in Tung Chung (Macau Bridge Piling Works)	In accordance with the photos showing a date of 27 November 2013 (08:00 – 08:25a.m.) which provided by the complainant, the dolphin was observed has been dead for some time and shows signs of decomposition. It was difficult to determine the cause of death of the deceased dolphin based on the photographs and the dead dolphin was found a few months ago. By examining the photos, it is found that the body was beside a barge, not under a working platform. In addition, the dead dolphin was found in the early morning in which the marine construction works have not been commenced. Therefore, from the above information the dead dolphin is considered to be washed to the work site. However, there is no significant increase of cetacean stranding were found in Hong Kong since the commencement of Contact No. HY/2011/09. In regard to the complaint, the following recommendations were made:	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				➢ In case stranded cetaceans are found, the AFCD shall be contacted immediately and provide the following information to facilitate AFCD's investigation: 1. Name and telephone number; 2. Date and time of discovery; 3. Location (as specific as possible); 4. Status of the stranded animal (i.e. alive, freshly dead, slightly decomposed, rotten, mummified); 5. Type and size of the stranded animal. ➢ To implement Dolphin Exclusion Zone during the installation of bored pile casing located in the waters to the west of Airport. ➢ To implement Dolphin Watching Plan after the bored piling casing is installed.	
Com-2014-05-001	At the shore of Sha Lo Wan	13 May 2014	The complaint was received by EPD on 13 May 2014. According to the EPD's email, the complainant was concerned about the sand material that was excavated on the shore of Sha Lo Wan for the construction of Hong Kong -	After receiving the complaint from a Sha Lo Wan's village resident, the sub-contractor was instructed to stop the sand excavation and leave immediately. In addition, all sands excavated from the shore of Sha Lo Wan were returned back to the original area on 13 May 2014.	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			Zhuhai - Macao Bridge (HZMB) Project on 11 May 2014.	Nevertheless, the Contractor was advised to arrange tailor-made training for Production Team including the management and foremen to explain to them the conditions and requirements listed on the Environmental Permit. In addition, indicative poles and flags are recommended to put within the site boundary to identify the extent of land areas in Sha Lo Wan / Sha Lo Wan (West) Archaeological site.	
Com-2014-05-002	At the shore of Sha Lo Wan	27 May 2014	The complaint was received by EPD on 27 May 2014. According to the EPD's email, the complainant was concerned about the dumping rubbles along the shore area of Sha Lo Wan on 27 May 2014.	The complaint investigation report for the complaint of dumping rubbles along the shore area of Sha Lo Wan was submitted to EPD on 4 June 2014. EPD and AFCD provided their comments on 5 and 9 June 2014 respectively. A meeting among DCVJV, ARUP, IEC, ET, EPD and AFCD was held on 17 June 2014. According to the meeting, further information is required to include in the complaint investigation report and the report was submitted to EPD on 4 March 2015.	Complaint investigation report is under review by EPD

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
Com-2014-05-003	Pier 39 to 50	29 May 2014	ARUP received the complaint on 29 May 2013. The complainant advised that the workers disposed hundreds of kg of waste spoils (concrete and earth) into the sea every day in the existing locations of HZMB site area.	Based on the investigation findings, the waste spoils (concrete and earth) were disposed to HY/2010/02 Project according to approved WMP. The following recommendations were made: • To check for any accumulation of waste spoils (concrete and earth) on site. • To cover the wastes skip with waste spoils before removing from site. • To carry out inspection of pier(s) regularly to ensure the frontline staff loads inert materials to approved barge properly. • To clean the waste storage areas regularly and do not cause dust nuisance.	Closed
Com-2014-08-001	Near Sha Lo Wan	27 August 2014	ARUP received the complaint on 27 August 2013. The complainant was concerned about the dust on the surface of the roro-barge.	Based on the investigation findings, dusty materials at the ro-ro barge at P63 and dust generation when vehicles passing by at the roro-barge at Southeast Quay were observed. The following recommendations were made: • To check for any accumulation of dusty materials at roro-barge. • To cover the stockpile of dusty materials before removing from site. • To clean the surface of roro-barge	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				regularly and do not cause dust and water quality nuisance. • To maintain the surface of roro-barge wet especially during the vehicle movements. Water misting is considered an acceptable measure to control dust emissions. • To check and replace the worn sand bags at the surface of roro-barge to prevent the turbid water from entering to the sea when watering the barge surface.	
Com-2014-11-001	HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill (Contract No. HY/2011/09)	11 November 2014	The complaint was received by EPD on 11 November 2014. According to the EPD's email, the complaint was received from one of the green groups Sea Shepherd. They complained that the residual concrete had been washed off from the deck surface of a flat-top barge into the sea, and marine littering had been spotted by a worker of HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill (Contract No. HY/2011/09)	Based on the investigation findings, residue concrete or wastewater contaminated with concrete overflowing/spilling into the sea from the roro barge and marine littering were suspected. The following recommendations were made: ➢ Properly clear the concrete stains on the three ro-ro barges (e.g. hand-held equipments such as shovel etc). Tarpaulin sheet is also recommended to provide when clearing the concrete stains at the edge of roro barge to prevent these removed materials from getting into the sea. The worker should also pay special care to remove the concrete stains to	Closed
Com-2014-11-002	HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill	18 November 2014	The complaint was received by EPD on 18 November 2014. According to the EPD's email, it was alleged that residual concrete		Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
	(Contract No. HY/2011/09)		had been poured out directly from the concrete lorry mixers on a roro barge into the sea during night-time by the workers of HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill (Contract No. HY/2011/09)	minimize the water quality nuisance. ➢ Keep cleanliness of the surface of roro-barge and do not cause water quality nuisance. ➢ To check and reinforce the concrete / sand bag bund between baffles erected near the edge of the three ro-ro barges to avoid accidental leakage of wastewater from the deck regularly. ➢ Keep all debris/ aggregate away from the edge of ro-ro barge to prevent them from falling into the sea. ➢ Provide sufficient skips for temporary storage of concrete residue/wastewater. ➢ To check for any accumulation of residual waste concrete at the waste skip on roro-barge. ➢ Provide spare and sufficient sand bags at each roro barges to confine the concerned area in the event of accidental spillage of concrete when discharge the concrete from the concrete lorry mixers to pump truck. ➢ Provide absorptive materials to absorb the wastewater in case of accidental spillage of wastewater	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				during washing concrete lorry mixers or other equipments. ➢ Assign trained staff to ensure proper management of environmental matters on each of the ro-ro barges in particular the handling of concrete residue/wastewater generated during operation. ➢ Keep record for collection of skip or temporary storage tank for wastewater and excess concrete. ➢ Ensure sufficient garbage bag / rubbish bin are provided at working barge / pier site. ➢ Provide training for the workers regularly regarding the water quality mitigation measures and waste management to increase their awareness of environmental protection.	
Com-2014-11-003	Floating Concrete Batching Plant (FCBP)	28 November 2014	The complaint was received by EPD on 28 November 2014. The complaint was received from one of the green groups Green Lantau Association. They complained about the hauling of the floating concrete batching plant (FCBP) by the tug boat to the site of Contract No. HY/2011/09 from the north-	Based on the information collected, the following conclusions were drawn: 1) It is suspected that the wake following the FCBP was resulted from disturbance to the bottom sediment when it was traveling during the lowest tide on that day. 2) The FCBP was traveling within the	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			east side had disturbed the seabed causing an increase of turbidity in marine waters at around noon of 15 November 2014.	site area and the maximum number of movement of a floating plant (and therefore tug boat) is two times per day. Average duration of each movement is around 1 hour/day. Therefore, the disturbance to the bottom sediment is considered temporary, localized and infrequent. 3) No illegally discharge of wastewater or domestic wastewater to the sea from FCBP. 4) Relevant environmental mitigation measures as shown in EP-352/2009/C were properly implemented. 5) No deterioration of marine water quality based on the marine water quality monitoring results on 15 November 2014. Nevertheless, DCVJV was also recommended the mitigation measures as below: • The vessel skipper should pay special care about the movement of deep draught vessel to avoid seabed disturbance. (e.g. speed restrictions) • In case of sediment plume was found behind vessel, the vessel skipper	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				should further reduce vessel speed. • Minimum clearance of 0.6m should be maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash. (Reference: EIA-081/2002 - Construction of Lung Kwu Chau Jetty)	
Com-2014-12-001	Shores of Po Chue Tam and Shek Tsai Po, Tai O	7 December 2014	The complaint was received from one of the green groups Green Lantau Association. They complained about some waste materials (including a number of grey plastic mats and buoys) suspected in relation to the HZMB works have recently washed up on the shores of Po Chue Tam and Shek Tsai Po, Tai O	The owner of objects found on the shores could not be identified. DCVJV has taken initiative to remove these materials after receiving the complaint. Nevertheless, DCVJV was also recommended the mitigation measures as below: • Gather up and remove debris to keep the work site orderly. • Maintain site housekeeping. Designate areas for waste materials and provide containers. • Secure loose or light material that is stored on open floors. • Do not permit rubbish to fall freely from any level of the pier sites. • Provide training for the workers	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				regularly regarding the water quality mitigation measures and waste management to increase their awareness of environmental protection.	
Com-2014-12-002	Site Office of HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill	2 December 2014	Highways Department (HyD) received a public complaint from a resident of Le Bleu Duex on 2 December 2014. According to the email from ARUP dated 3 December 2014, the complainant advised that the noise nuisance due to the metal parts were dropped onto the ground by people repetitively and loading or unloading a boat at the pier. The complaint was quoted, "*A resident living in Le Bleu Duex addressed a complaint to CE of HyD at about 20:04 hrs last night. He complained about the noise nuisance coming from site office since 19:30 hrs last night. Repetitively metal parts had been dropped on the ground by people who seem to*	Based on the information collected, the noise generated is considered due to the metal parts were dropped onto the ground at the seashore area near Le Bleu Duex. The metal pipe was unloaded at non-designated area and no powered mechanical equipment was used for unloading works at WA6 during restricted hour. The Contractor was reminded to take sufficient noise mitigation measures to minimize the environmental impact on the nearby community as recommended in the approved EIA report and the specific mitigation measures for the complaint including but not limited to:- • To place wooden planks or rubber mats on ground for loading and unloading heavy or metal objects; and • To deploy professional personnel to	Closed

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			be loading or unloading a boat at the pier. Noise was still going on right now at 20:04."	supervise the works.	
Com-2014-12-003	Along the shore from Yat Tung to Tai O	24 December 2014	The complainant was concerned about the increase of marine refuse (water bottles and debris) along the shore from Yat Tung to Tai O suspected in relation to the HZMB works.	The owner of marine refuse found on the shores could not be identified. DCVJV has taken initiative to remove these wastes after receiving the complaint. DCVJV will also take the initiative to clear the marine refuse along the shore from Yat Tung to Tai O, if necessary. Nevertheless, DCVJV was also recommended the mitigation measures as below: • Gather up and remove debris to keep the work site orderly. • Maintain site housekeeping. Designate areas for waste materials and provide containers. • Secure loose or light material that is stored on open floors. • Do not permit rubbish to fall freely from any level of the pier sites. • Provide training for the workers regularly regarding the water quality mitigation measures and waste management to increase their awareness of environmental	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				protection.	
Com-2015-06-001	The sea side at WA6 vertical seawall	6 June 2015	A resident living in Le Bleu Duex complained about noise from a barge which unloading materials at about 21:00 hrs last Saturday i.e. 6 June 2015	Based on the information collected, the noise generated is considered due to the unloading of steel casings to the seashore area opposite to the China State Site Office. The person-in-charge of the barge has been reprimanded by the Contractor for causing noise nuisance to resident nearby. In addition, the Contractor had also reminded their subcontractors to avoid unloading of materials during restricted hours (i.e. 19:00 to 07:00 hours on any day and any time on public holidays including Sundays) without Construction Noise Permit (CNP). The Contractor was reminded to obtain Construction Noise Permit (CNP) for PME use in restricted hours. The Contractor was reminded again to take sufficient noise mitigation measures to minimize the environmental impact on the nearby community as recommended in the approved EIA report and the specific mitigation measures for the complaint including but not limited to:- • To place wooden planks or rubber	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				mats on ground for loading and unloading heavy or metal objects; and • To deploy professional personnel to supervise the works.	

APPENDIX M
SUMMARY OF SUCCESSFUL PROSECUTION

Appendix M - Summary of Successful Prosecution

Date of Successful Prosecution	Details of the Successful Prosecution	Status	Follow Up
20 October 2014	The non-compliance of construction noise permit (CNP) numbered GW-RS1217-13 that use of powered mechanical equipment not permitted in the CNP on 15 March 2014 between the hours of 7p.m. and 7a.m. at Pier 72.	The subcontractor was fined.	To ensure the construction works would comply with the CNP during restricted hours, a Permit-to-work system was formulated to control daily operation of the CNPs.