Your ref -
Our ref 214487/(HY/2011/09)/M45/630/B 26519

ARUP

Level 5 Festival Walk
80 Tat Chee Avenue
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BY HAND

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

B26519

For the attention of Mr LO Kam Wah, Alfred

28 December 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 – March 2017 to May 2017

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 March 2017 to May 2017 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 Y C Lam	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

JC/mw

RAMBOLL ENVIRON

Ref.: HYDHZMBEEM00_0_6117L.17

22 December 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. 17 for March to May 2017

Further to the captioned submission (version 2.0) certified by the ET Leader provided to us via email on 21 December 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. Vico Cheung	(By Fax: 3188 6614)
	HyD	Mr. K Y Yung	(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

March to May 2017

(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

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EXECUTIVE SUMMARY

Introduction

1. This is the 17th 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 March and May 2017.

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	1st, 7th, 13th, 17th, 23rd and 29th March 2017 3rd, 7th, 13th, 19th, 25th and 28th April 2017 4th, 10th, 16th, 22nd and 26th May 2017
24-hr TSP Monitoring	
Noise Monitoring	2nd, 8th, 14th, 24th and 30th March 2017 5nd, 11th, 20th and 26th April 2017 5th, 11th, 17th, 23rd and 29th May 2017
Water Quality Monitoring	1st, 3rd, 6th, 8th, 10th, 13th, 15th, 17th, 20th, 23rd, 25th, 27th, 29th and 31st March 2017 3rd, 6th, 8th, 10th, 12th, 14th, 18th, 20th, 22nd, 24th, 26th and 28th April 2017 2nd, 4th, 6th, 8th, 10th, 12th, 15th, 17th, 19th, 22nd, 24th, 26th and 29th and 31th May 2017
Dolphin Monitoring (Line-transect Vessel Surveys)	1st and 13th March 2017 5th and 13th April 2017 8th and 19th May 2017
Environmental Site Inspection	7th, 14th, 21st and 28th March 2017 6th, 11th, 18th and 25th April 2017 2nd, 9th, 16th, 23rd and 31st May 2017
Archaeological Site Inspection	14th March 2017

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)	13	6	0	0
Dolphin Monitoring	Line-transect Vessel Surveys	1	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

- Establishment for Asphalt Plant

Ancillary and Associated Facilities

- Sealing of deck openings and preparation deck surface for waterproofing
- Waterproofing and asphalt laying
- Watermain installation
- Installation of carrier drains
- Installation of precast parapet skins
- Construction of median and side barriers
- Construction of longitudinal stitching
- Erection of sign gantry
- Reinstatement of slope area and drainage works
- Reinstatement of sloping seawall
- Fill slope for CLK South Road realignment*
- Laying of asphalt pavement
- Sealing of gantry crane loading opening

Note:
*Minor Modification Works:-
·Shifting the bus stop location;
·Shifting the old alignment near P109 southward; and
·Re-instating the underground drainage with the new alignment due to the minor modification works above.

E&M Works

- E&M installation
- E&M ducting installation
- E&M works inside SHT building
- Street light cables and poles installation
- Cable hanger installation
- Construction of Lad Centre

Marine Viaduct (P0 to P80)

Deck Erection

- Segment erection

External Prestressing Tendon Installation

Internal Prestressing Grouting

Turnaround Facilities

- Stitching works
- Erection of I-beam supporting towers

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 17th Quarterly EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in the period between March to May 2017.

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:

March 2017:

Ancillary and Associated Facilities

(a) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing coupling with the additional maintenance path;
(b) Reinstatement of sloping seawall at P103, P104 and P101, P102 are in progress;
(c) The precast parapet progress is summarized as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to end of month)
Parapet Casting	788	4939
Parapet Installation	542	3174
In-situ concreting works	1296	7586

(d) The central barrier progress is summarized as follows:

Type	Item	Monthly Workdone	Cumulative Workdone (up to end of month)
Central barrier (precast method)	Precast	597	4885
	Installation	150	1144
Central barrier (precast + in-situ method)	In-fill concreting #	57	1414

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the central barrier shall be regarded as completed.

(e) The side barrier progress is summarized as follows:

Type	Item	Monthly Workdone	Cumulative Workdone (up to 28th of month)
Side barrier (precast method)	Precast	825	4786
	Installation	606	2240
Side barrier (precast + in-situ method)	In-fill concreting #	524	3070

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the side barrier shall be regarded as completed.

(f) Construction of the longitudinal stitching from P92 to P87 & P37 to P29 is in progress;
(g) Sealing of deck openings and preparation deck surface for waterproofing is in progress;
(h) Waterproofing and asphalt laying at ML16 to ML19 is in progress;
(i) Watermain installation from P99 to P97 and P44 to P37 & P29 to P21 is in progress;

(j) Sign gantry GW13, GE15, GE13, GE14, GE12 and GW12 were erected.

E&M Works

(a) E&M works from ML3 to ML1 is in progress;
(b) E&M ducting installation from ML5 to ML4 is in progress and E&M ducting installation from ML3 commenced;
(c) E&M works inside SHT building is in progress;
(d) Street light cables and poles installation in ML19 & ML18 is in progress;
(e) Cable hanger installation from ML19 to ML15 is in progress;
(f) Cable hanger installation from ML6 to ML4 continues;
(g) Cable hanger installation at ML2 and ML3 commenced;
(h) E&M ducting installation at radar platform completed;
(i) Construction of Load Centre 7 completed;
(j) Construction of Load Centre 8 to 10 commenced.

Deck Erection

(a) Segment erection in March 2017:

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)	All completed	0	1776
Lifting Frames 1 (LF1), Hanger Beam (HB) and Crane Barge	P67, P78 and P82	73	1214
Lifting Frames 1 (LF1), Hanger Beam (HB) and Crane Barge	All completed	0	842
Typical Span SOP	All completed	0	242
Long Span SOP	All completed	0	96
Movement Joint (MJ) SOP Airport Channel	All completed	0	20
Short Span (SS) and Movement Joint (MJ) SOP type B	All completed	0	16
Typical Span Segment type B	P55R, P56R&L, P59R&L	62	272
Segment Lifter / Crane Barge	P69	82	200

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3

Viaduct	Activities	Quantities	Unit
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3
ML15R	Threading Stressing Grouting	108.74 18 21.15	T U M3
ML15L	Threading Stressing Grouting	106.26 18 21.45	T U M3
ML14R	Threading Stressing Grouting	116.06 16 23.04	T U M3
ML14L	Threading Stressing Grouting	118.55 16 23.54	T U M3
ML13R	Threading Stressing Grouting	122.22 16 24.27	T U M3
ML13L	Threading Stressing Grouting	212.71 16 24.17	T U M3
ML12R	Threading Stressing Grouting	166.28 26 32.99	T U M3
ML12L	Threading Stressing Grouting	165.41 24 32.83	T U M3
ML11R	Threading Stressing Grouting	164.83 24 32.72	T U M3
ML11L	Threading Stressing Grouting	166.74 24 33.10	T U M3
ML10R	Threading Stressing Grouting	121.69 16 24.17	T U M3
ML10L	Threading Stressing Grouting	122.16 16 24.26	T U M3
ML09R	Threading	140.32	T

Viaduct	Activities	Quantities	Unit
	Stressing Grouting	32 27.73	U M3
ML09L	Threading Stressing Grouting	129.46 32 25.56	T U M3
ML08R	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML08L	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML06L	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML04L	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3
ML02L	Threading Stressing Grouting	113.73 24 22.49	T U M3
ML1R	Threading Stressing Grouting	113.72 24 22.49	T U M3
ML1L	Threading Stressing Grouting	113.73 24 22.49	T U M3

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit

Viaduct	Activities	Quantities	Unit
ML19C	Air test & Grouting	14.09	M3
ML19R	Air test & Grouting	14.90	M3
ML19L	Air test & Grouting	13.90	M3
ML18R	Air test & Grouting	25.24	M3
ML18L	Air test & Grouting	24.76	M3
ML17R	Air test & Grouting	23.47	M3
ML17L	Air test & Grouting	23.46	M3
ML16R	Air test & Grouting	36.54	M3
ML16L	Air test & Grouting	35.46	M3
ML15R	Air test & Grouting	39.34	M3
ML15L	Air test & Grouting	39.69	M3
ML14R	Air test & Grouting	104.9	M3
ML14L	Air test & Grouting	106.55	M3
ML13R	Air test & Grouting	108.28	M3
ML13L	Air test & Grouting	107.73	M3
ML12R	Air test & Grouting	121.77	M3
ML12L	Air test & Grouting	121.00	M3
ML11R	Air test & Grouting	111.47	M3
ML11L	Air test & Grouting	112.75	M3
ML10R	Air test & Grouting	89.33	M3
ML10L	Air test & Grouting	89.59	M3
ML09R	Air test & Grouting	63.27	M3
ML09L	Air test & Grouting	57.86	M3
ML08R	Air test & Grouting	36.58	M3
ML08L	Air test & Grouting	36.56	M3
ML07R	Air test & Grouting	59.61	M3
ML07L	Air test & Grouting	60.05	M3
ML06R	Air test & Grouting	58.31	M3
ML06L	Air test & Grouting	58.31	M3
ML05R	Air test & Grouting	58.62	M3
ML05L	Air test & Grouting	58.01	M3
ML04R	Air test & Grouting	57.64	M3
ML04L	Air test & Grouting	57.69	M3
ML03R	Air test & Grouting	126.65	M3
ML03L	Air test & Grouting	127.63	M3
ML02R	Air test & Grouting	62.74	M3
ML02L	Air test & Grouting	62.74	M3
ML01R	Air test & Grouting	53.80	M3
ML01L	Air test & Grouting	53.80	M3

Turnaround Facilities

(a) Erection of BG01 & BG02 were completed;

(b) Stitching works between 2 Box Girders BG01, BG02 and SOPs is in progress;

(c) Construction of I-beams in casting yard is in progress;

(d) Erection of I-beam supporting towers is in progress.

Delivery for Precast Concrete Elements (by barge)

(e) Precast Deck Segments:

- Number of barges engaged in this period: 11.
- Number of deck segment deliveries in this period:32 trips.
- Cumulative number of deck segment deliveries: 1114 trips.
- The last segment was completed loading successfully on last trip on 28 March 2017.

Segment Types	Segment Delivered in this reporting period	Cumulative No. of Precast Segment Delivered (up to end of month)
A	18	2480
B	56	304
C	98	1700
D	0	216
E	0	1014

April 2017:

Ancillary and Associated Facilities

(a) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing coupling with the additional maintenance path;
(b) Reinstatement of sloping seawall at P96 to P100 are in progress;
(c) The precast facial parapet progress is summarized as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to end of month)
Precast Parapet Facial Panel Casting	660	5599
Precast Parapet Facial Panel Installation	248	3422
In-situ concreting works	593	8179

(d) The central barrier progress is summarized as follows:

Type	Item	Monthly Workdone	Cumulative Workdone (up to end of month)
Central barrier (precast method)	Precast	461	5346
	Installation	236	1380
Central barrier (precast + in-situ method)	In-fill concreting #	413	1827

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the central barrier shall be regarded as completed.

(e) The side barrier progress is summarized as follows:

Type	Item	Monthly Workdone	Cumulative Workdone (up to 28th of month)
Side barrier (precast method)	Precast	457	5243
	Installation	469	2709
Side barrier (precast + in-situ method)	In-fill concreting #	1356	4426

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the side barrier shall be regarded as completed.

(f) Construction of the longitudinal stitching from P92 to P87 & P37 to P27 is in progress;
(g) Sealing of deck openings and preparation deck surface for waterproofing is in progress;
(h) Watermain installation from P88 to P94 and P44 to P26 & P19 to P21 is in progress;
(i) Sign gantry GW12, GW13, GE15, GE13, GE14, GE12 and GW12, GE5, were erected.

E&M Works

(a) E&M works from ML3 to ML1 is in progress;
(b) E&M ducting installation in ML3 is in progress and E&M ducting installation from ML1 to ML2 commenced;
(c) E&M works inside SHT building is in progress;
(d) Street light cables and poles installation in ML19 & ML18 is in progress;
(e) Cable hanger installation from ML19 to ML15 was completed;
(f) Cable hanger installation from ML6 to ML4 continues;
(g) Cable hanger installation at ML2 and ML3 continues;
(h) Construction of Load Centre 8, 9 and 10 commenced.

Deck Erection

(a) All segment erections were completed except 16 segments at turnaround facilities. A summary is shown below:

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to end of the month)
Launching Gantry 1 (LG1)	All completed	0	1020
Launching Gantry 2 (LG2)	All completed	0	1776
Lifting Frames 1 (LF1), Hanger Beam (HB) and Crane Barge	P67, P78 and P82	73	1214
Lifting Frames 1 (LF1), Hanger Beam (HB) and Crane Barge	All completed	0	842
Typical Span SOP	All completed	0	242

Type	Location of Segments erected in this reporting period	Number of Segments erected in this reporting period	Cumulative No. of Segments erected (up to end of the month)
Long Span SOP	All completed	0	96
Movement Joint (MJ) SOP Airport Channel	All completed	0	20
Short Span (SS) and Movement Joint (MJ) SOP type B	All completed	0	16
Typical Span Segment type B	P56R&L	0	272
Segment Lifter / Crane Barge	P69	82	200

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3
ML15R	Threading Stressing Grouting	108.74 18 21.15	T U M3
ML15L	Threading Stressing Grouting	106.26 18 21.45	T U M3
ML14R	Threading Stressing Grouting	116.06 16 23.04	T U M3
ML14L	Threading Stressing Grouting	118.55 16 23.54	T U M3
ML13R	Threading	122.22	T

Viaduct	Activities	Quantities	Unit
	Stressing Grouting	16 24.27	U M3
ML13L	Threading Stressing Grouting	212.71 16 24.17	T U M3
ML12R	Threading Stressing Grouting	166.28 26 32.99	T U M3
ML12L	Threading Stressing Grouting	165.41 24 32.83	T U M3
ML11R	Threading Stressing Grouting	164.83 24 32.72	T U M3
ML11L	Threading Stressing Grouting	166.74 24 33.10	T U M3
ML10R	Threading Stressing Grouting	121.69 16 24.17	T U M3
ML10L	Threading Stressing Grouting	122.16 16 24.26	T U M3
ML09R	Threading Stressing Grouting	140.32 32 27.73	T U M3
ML09L	Threading Stressing Grouting	129.46 32 25.56	T U M3
ML08R	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML08L	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML06L	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML04L	Threading Stressing	113.04 24	T U

Viaduct	Activities	Quantities	Unit
	Grouting	22.35	M3
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3
ML02L	Threading Stressing Grouting	113.73 24 22.49	T U M3
ML1R	Threading Stressing Grouting	113.72 24 22.49	T U M3
ML1L	Threading Stressing Grouting	113.73 24 22.49	T U M3

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit
ML19C	Air test & Grouting	14.09	M3
ML19R	Air test & Grouting	14.90	M3
ML19L	Air test & Grouting	13.90	M3
ML18R	Air test & Grouting	25.24	M3
ML18L	Air test & Grouting	24.76	M3
ML17R	Air test & Grouting	23.47	M3
ML17L	Air test & Grouting	23.46	M3
ML16R	Air test & Grouting	36.54	M3
ML16L	Air test & Grouting	35.46	M3
ML15R	Air test & Grouting	39.34	M3
ML15L	Air test & Grouting	39.69	M3
ML14R	Air test & Grouting	104.9	M3
ML14L	Air test & Grouting	106.55	M3
ML13R	Air test & Grouting	108.28	M3
ML13L	Air test & Grouting	107.73	M3
ML12R	Air test & Grouting	121.77	M3
ML12L	Air test & Grouting	121.00	M3
ML11R	Air test & Grouting	111.47	M3
ML11L	Air test & Grouting	112.75	M3
ML10R	Air test & Grouting	89.33	M3
ML10L	Air test & Grouting	89.59	M3
ML09R	Air test & Grouting	63.27	M3
ML09L	Air test & Grouting	57.86	M3
ML08R	Air test & Grouting	36.58	M3
ML08L	Air test & Grouting	36.56	M3
ML07R	Air test & Grouting	59.61	M3

Viaduct	Activities	Quantities	Unit
ML07L	Air test & Grouting	60.05	M3
ML06R	Air test & Grouting	58.31	M3
ML06L	Air test & Grouting	58.31	M3
ML05R	Air test & Grouting	58.62	M3
ML05L	Air test & Grouting	58.01	M3
ML04R	Air test & Grouting	57.64	M3
ML04L	Air test & Grouting	57.69	M3
ML03R	Air test & Grouting	126.65	M3
ML03L	Air test & Grouting	127.63	M3
ML02R	Air test & Grouting	62.74	M3
ML02L	Air test & Grouting	62.74	M3
ML01R	Air test & Grouting	53.80	M3
ML01L	Air test & Grouting	53.80	M3

Turnaround Facilities

(a) Mid-stitches between Box Girders and stitches between Box Girders and SOPs are completed except longitudinal stitch between box girders;
(b) Four I-beams were delivered on site.

Road Pavement

Road Pavement	Total (m^2)	Monthly Workdone (m^2)	Cumulative Workdone (m^2)
A	284440	0	34133
B	284440	0	25600
C	274688	0	0

May 2017:

Ancillary and Associated Facilities

(a) P115 & P114 interface area - Reinstatement of slope area temporarily on-hold pending for drainage and reinstatement detailing coupling with the additional maintenance path;
(b) Reinstatement of sloping seawall at P96 to P101 are in progress;
(c) The precast facial parapet progress is summarized as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to 28th of month)
Precast Parapet Facial Panel Casting	692	6340
Precast Parapet Facial Panel Installation	130	3577
In-situ concreting works	311	8549

(d) The central barrier progress is summarized as follows:

Type	Item	Monthly Workdone	Cumulative Workdone (up to 28th of month)
Central barrier (precast	Precast	248	5714

method)	Installation	224	1628
Central barrier (precast + in-situ method)	In-fill concreting #	168	2031

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the central barrier shall be regarded as completed.

(e) The side barrier progress is summarized as follows:

Type	**Item**	**Monthly Workdone**	**Cumulative Workdone (up to 28th of month)**
Side barrier (precast method)	Precast	285	5691
	Installation	188	2999
Side barrier (precast + in-situ method)	In-fill concreting #	561	5038

"In-fill concreting" will be carried out after installation of precast units or formworks for precast method and in-situ method respectively. After the in-fill concreting works, the side barrier shall be regarded as completed.

(f) Construction of the longitudinal stitching from P92 to P87 & P37 to P25 is in progress;
(g) Sealing of deck openings and preparation deck surface for waterproofing is in progress;
(h) Watermain installation from P44 to P4 is in progress;
(i) Sign gantry GW13, GW12, GW11, GE15, GE14, GE13, GE12, GE1 to GE5 and GW1 to GE4, were erected.
(j) Chek Lap Kok South Road realignment* is in progress.

Note:
*Minor Modification Works:-
·Shifting the bus stop location;
·Shifting the old alignment near P109 southward; and
·Re-instating the underground drainage with the new alignment due to the minor modification works above.

E&M Works

(a) E&M works from ML2 to ML1 is in progress;
(b) E&M ducting installation in ML1 to ML3 is in progress;
(c) E&M ducting installation from ML6 to ML1 commenced;
(d) E&M duct installation at deck void in ML7 and ML8 commenced;
(e) E&M works inside SHT building is in progress;
(f) Cable hanger installation from ML6 to ML4 completed;
(g) Cable hanger installation between ML1 and ML3 continues;
(h) Construction of Load Centre 8, 9 and 10 completed;
(i) Pillar box installation was completed for load centre 7 and load centre 8;
(j) Street light cables and poles installation in ML19 & ML18 is in progress;
(k) Completion of installation for TCSS's CCTV high mast at CH.12+600 and 13+190;
(l) Completion of installation for C&ED's CCTV high mast at CH12+280.

Deck Erection

(a) 6 segments were erected at P56 of the ramp at turnaround facilities. Last 10

segments are remaining to be erected.

(b) LF1-B launching from P82 to P80 were completed;

(c) Segment lifter dismantling has started at WA4.

External Prestressing Tendon Installation

Viaduct	Activities	Quantities	Unit
ML19C	Threading Stressing Grouting	47.55 12 9.42	T U M3
ML19R	Threading Stressing Grouting	48.65 12 9.64	T U M3
ML19L	Threading Stressing Grouting	46.91 12 9.29	T U M3
ML18R	Threading Stressing Grouting	77.90 18 15.38	T U M3
ML18L	Threading Stressing Grouting	76.40 18 15.08	T U M3
ML17R	Threading Stressing Grouting	63.09 16 12.44	T U M3
ML17L	Threading Stressing Grouting	62.86 16 12.39	T U M3
ML16R	Threading Stressing Grouting	56.69 15 9.91	T U M3
ML16L	Threading Stressing Grouting	87.34 18 17.2	T U M3
ML15R	Threading Stressing Grouting	108.74 18 21.15	T U M3
ML15L	Threading Stressing Grouting	106.26 18 21.45	T U M3
ML14R	Threading Stressing Grouting	116.06 16 23.04	T U M3
ML14L	Threading Stressing Grouting	118.55 16 23.54	T U M3
ML13R	Threading Stressing Grouting	122.22 16 24.27	T U M3
ML13L	Threading Stressing Grouting	212.71 16 24.17	T U M3
ML12R	Threading Stressing Grouting	166.28 26 32.99	T U M3
ML12L	Threading Stressing Grouting	165.41 24 32.83	T U M3

Viaduct	Activities	Quantities	Unit
ML11R	Threading Stressing Grouting	164.83 24 32.72	T U M3
ML11L	Threading Stressing Grouting	166.74 24 33.10	T U M3
ML10R	Threading Stressing Grouting	121.69 16 24.17	T U M3
ML10L	Threading Stressing Grouting	122.16 16 24.26	T U M3
ML09R	Threading Stressing Grouting	140.32 32 27.73	T U M3
ML09L	Threading Stressing Grouting	129.46 32 25.56	T U M3
ML08R	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML08L	Threading Stressing Grouting	85.72 24 16.89	T U M3
ML07R	Threading Stressing Grouting	129.58 32 25.59	T U M3
ML07L	Threading Stressing Grouting	140.43 32 27.76	T U M3
ML06R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML06L	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML05R	Threading Stressing Grouting	113.68 24 22.48	T U M3
ML05L	Threading Stressing Grouting	112.39 24 22.22	T U M3
ML04R	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML04L	Threading Stressing Grouting	113.04 24 22.35	T U M3
ML03R	Threading Stressing Grouting	199.65 32 39.615	T U M3
ML03L	Threading Stressing Grouting	201.13 32 29.9	T U M3
ML02R	Threading Stressing Grouting	113.72 24 22.49	T U M3
	Threading	113.73	T

Viaduct	Activities	Quantities	Unit
ML02L	Stressing Grouting	24 22.49	U M3
ML1R	Threading Stressing Grouting	113.72 24 22.49	T U M3
ML1L	Threading Stressing Grouting	113.73 24 22.49	T U M3

Internal Prestressing Grouting Progress

Viaduct	Activities	Quantities	Unit
ML19C	Air test & Grouting	14.09	M3
ML19R	Air test & Grouting	14.90	M3
ML19L	Air test & Grouting	13.90	M3
ML18R	Air test & Grouting	25.24	M3
ML18L	Air test & Grouting	24.76	M3
ML17R	Air test & Grouting	23.47	M3
ML17L	Air test & Grouting	23.46	M3
ML16R	Air test & Grouting	36.54	M3
ML16L	Air test & Grouting	35.46	M3
ML15R	Air test & Grouting	39.34	M3
ML15L	Air test & Grouting	39.69	M3
ML14R	Air test & Grouting	104.9	M3
ML14L	Air test & Grouting	106.55	M3
ML13R	Air test & Grouting	108.28	M3
ML13L	Air test & Grouting	107.73	M3
ML12R	Air test & Grouting	121.77	M3
ML12L	Air test & Grouting	121.00	M3
ML11R	Air test & Grouting	111.47	M3
ML11L	Air test & Grouting	112.75	M3
ML10R	Air test & Grouting	89.33	M3
ML10L	Air test & Grouting	89.59	M3
ML09R	Air test & Grouting	63.27	M3
ML09L	Air test & Grouting	57.86	M3
ML08R	Air test & Grouting	36.58	M3
ML08L	Air test & Grouting	36.56	M3
ML07R	Air test & Grouting	59.61	M3
ML07L	Air test & Grouting	60.05	M3
ML06R	Air test & Grouting	58.31	M3
ML06L	Air test & Grouting	58.31	M3
ML05R	Air test & Grouting	58.62	M3
ML05L	Air test & Grouting	58.01	M3
ML04R	Air test & Grouting	57.64	M3
ML04L	Air test & Grouting	57.69	M3
ML03R	Air test & Grouting	126.65	M3
ML03L	Air test & Grouting	127.63	M3

Viaduct	Activities	Quantities	Unit
ML02R	Air test & Grouting	62.74	M3
ML02L	Air test & Grouting	62.74	M3
ML01R	Air test & Grouting	53.80	M3
ML01L	Air test & Grouting	53.80	M3

Turnaround Facilities

(a) Mid-stitches between Box Girders and stitches between Box Girders and SOPs were completed. Longitudinal stitch between box girders is in progress;
(b) Strands installation and stressing for extended platforms are in progress.

Road Pavement

Road Pavement	Total (m^2)	Monthly Workdone (m^2)	Cumulative Workdone (m^2)
A	284440	0	34133
B	284440	0	25600
C	274688	0	0

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 (14th March 2017). 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		
March 2017	AMS1	89	39 – 193	381	500
	AMS4	74	22 – 198	352	
April 2017	AMS1	65	20 – 115	381	
	AMS4	62	24 – 146	352	
May 2017	AMS1	109	30 – 323	381	
	AMS4	115	41 – 291	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		
March 2017	AMS1	48	8 – 86	170	260
	AMS4	81	35 – 163	171	
April 2017	AMS1	43	16 – 73	170	
	AMS4	57	22 – 104	171	
May 2017	AMS1	44	13 – 92	170	
	AMS4	64	29 – 118	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	
March 2017	NMS1	65	61 – 68	75 dB(A)
	NMS4	59	57 – 61	
April 2017	NMS1	66	62 – 68	
	NMS4	55	50 – 58	
May 2017	NMS1	69	63 – 72	
	NMS4	65	53 – 67	

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 March to May 2017, 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 193.77 km of survey effort was collected, with 89.4% 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 126.92 km, while the effort on secondary lines was 66.85 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 March to May 2017, a total of 17 groups of 63 Chinese White Dolphins were sighted. All except five dolphin sightings were made during on-effort search. Nine on-effort sightings were made on primary lines, while the other three 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 March to May 2017 is shown in **Figure 1 of Appendix F**. The dolphin groups were mostly distributed in the central portion of the survey area (i.e. between Tai O Peninsula and Peaked Hill) during the quarterly period (**Figure 1 of Appendix F**). On the contrary, they did not occurr in the northern section of the survey area near HKLR09 alignment, and only a few sightings were made at the southern section near Fan Lau (**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 None of the 17 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 winter quarters of 2014-16 were also compared with the one in 2017. Such distribution patterns were similar across the four-year period, and the only obvious difference was their infrequent occurrence in the southern portion of the survey area in 2017 in comparison to the previous years (**Figure 3 of Appendix F**).

Encounter rate

4.15 During the present three-month impact phase monitoring period (March to May 2017), 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 (March-May 2017)

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 (March 1st)	5.6	11.2
	Set 2 (March 13th)	4.7	4.7
	Set 3 (April 5th)	0.0	0.0
	Set 4 (April 13th)	14.9	64.5
	Set 5 (May 8th)	9.7	19.4
	Set 6 (May 19th)	9.7	29.1

Table 4.7 Comparison of average dolphin encounter rates from impact monitoring period (March to May 2017) 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)	
	March –May 2017	September-November 2011	March –May 2017	September-November 2011
West Lantau	7.43± 5.13	16.43± 7.70	21.48± 23.49	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 spring quarter of 2017 dropped to the lowest since impact phase monitoring commenced in spring 2013, and were much lower than the baseline level (**Table 4 of Appendix F**). Moreover, the Action Level under the Event and Action Plan for this quarter was triggered for the first time during the four-year impact phase monitoring period. It is critical to continuously monitor such temporal trend, as the dolphin usage continued to diminish in recent quarters even though the HKLR09 construction works have been completed in 2016.

4.17 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. fifteenth quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.038 and 0.0600 respectively. Therefore, if the

alpha value is set at 0.05, significant difference in encounter rates of STG was detected between the baseline period and the present quarter, but not for the encounter rates of ANI.

4.18 Another comparison was made between the baseline period and the 16 cumulative quarters in the impact phase, and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.594 and 0.741 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 March to May 2017. 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 (March – May 2017) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	March – May 2017	**September – November 2011**
West Lantau	3.71 ± 2.95 (n = 17)	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 17 groups, 13 of them were composed of only 1-4 dolphins, while there were three groups in moderate size with 5-7 animals per group, and one large group with 13 animals.

4.21 Distribution of dolphins with the larger groups during March to May 2017 is shown in **Figure 4 of Appendix F**. The three medium-sized group of 5-7 animals were clustered near Kai Kung Shan and Peaked Hill in the central portion of the survey area, while the one large group of 13 animals was sighted near Fan Lau (**Figure 4 of Appendix F**).

4.22 Distribution of the larger dolphin groups in the present impact phase period was quite different from the baseline period, when these groups were sighted more often near Tai O Peninsula and Yi O (**Figure 4 of Appendix F**).

Habitat use

4.23 From March to May 2017, the grids that recorded higher densities of dolphins were found near Kai Kung Shan, while the waters to the southwest of Tai O Peninsula was also moderately used by them (**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 high density grids of dolphins were much less evenly distributed in the present impact phase monitoring period, and the overall dolphin densities were much lower in certain areas such as the waters just to the south of the HKLR09 alignment and near Fan Lau (**Figure 6 of Appendix F**).

Mother-calf pairs

4.25 During the three-month impact phase monitoring period, no young calf was sighted at all among the 17 groups of dolphins. In fact, this was the second consecutive quarters with no calf occurrence recorded in WL waters.

Activities and associations with fishing boats

4.26 During the three-month impact monitoring period, only one dolphin group was engaged in feeding activity near Fan Lau (**Figure 7 of Appendix F**), comprising 5.9% of the total number of dolphin sightings. Such percentage was much lower than the one recorded during the baseline period (13.0%).

4.27 On the other hand, no dolphin group was engaged in socializing, traveling or resting activity during the present quarter (**Figure 8 of Appendix F**).

4.28 Distribution of different activities during the present impact phase monitoring period was very different from the one during the baseline period, when the feeding activities were much more frequent and located in the central portion of the WL survey area (**Figure 7 of Appendix F**).

4.29 During the three-month monitoring period, four of the 17 dolphin groups was associated with any operating fishing vessel.

Summary of photo-identification works

4.30 From March to May 2017, over 2,500 digital photographs of Chinese White Dolphins

were taken during the impact phase monitoring surveys for the photo-identification work.

4.31 In total, 36 individuals sighted 45 times altogether were identified (see summary table in **Appendix III of Appendix F** and photographs of identified individuals in **Appendix IV of Appendix F**). The majority of them were sighted only once or twice during the three-month period, while three individuals (WL66, WL79 & WL211) were re-sighted thrice during the quarterly period (**Appendix III of Appendix F**).

Individual range use

4.32 Ranging patterns of the 36 individuals identified during the three-month study period were determined by fixed kernel method, as shown in **Appendix V of Appendix F**.

4.33 As in previous monitoring quarters, a few individual dolphins (NL226, NL259) that primarily centered their range use in North Lantau in the past were found extending their ranges to West Lantau waters (but to the north of the HKLR09 alignment), with some shifts and expansions of their range use away from North Lantau waters (**Appendix V of Appendix F**).

4.34 On the contrary, the majority of the identified individuals that primarily centered their range use in West Lantau were still sighted within their normal ranges during the present quarterly period (**Appendix V of Appendix F**).

Conclusion

4.35 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.

4.36 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.

4.37 There was an Action Level exceedance of dolphin monitoring for the quarterly monitoring data (between March to May 2017). According to the investigation report(**Appendix K**), the exceedance is considered not due to the Contract.

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 13 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 from construction activity was observed;
2) The exceeded results were similar or within the ranges baseline monitoring results;
3) Sediment plume due to natural fluctuation of shallow water was observed;
4) Monitoring station is situated at the upstream of the construction sites;
5) Control Station value already exceeded either the Baseline Action or Limit Levels;
6) Adverse water quality outside the site boundary was observed while no construction vessel for this Contract was travelling nearby.
7) Adverse water quality outside the site boundary was observed while no pollution source from this Contract was observed and no construction vessel for this Contract was travelling nearby. Dispersion of sediment plume to the monitoring stations from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was also observed.

Dolphin Monitoring (Line-transect Vessel Survey)

5.7 There was an Action Level exceedance of dolphin monitoring for the quarterly monitoring data (between March to May 2017). According to the investigation report(**Appendix K**), the exceedance is considered not due to the ContractSummary of Environmental Complaint

5.8 Two 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 March and May 2017 in accordance with EM&A Manual.

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

6.3 There are 13 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 There was an Action Level exceedance of dolphin monitoring for the quarterly monitoring data (between March to May 2017).

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

6.6 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.

6.7 Environmental site inspection was conducted on 7th, 14th, 21st and 28th March 2017, 6th, 11th, 18th and 25th April 2017, 2nd, 9th, 16th, 23rd and 31st May 2017 by ET in the reporting month. All deficiencies identified during the site inspection have already rectified / improved during the follow-up audit session.

6.8 The inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 14th March 2017. No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed.

6.9 There were two environmental complaint received in the reporting period. No notification of summons and successful prosecution received in the reporting period.

6.10 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

6.11 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.

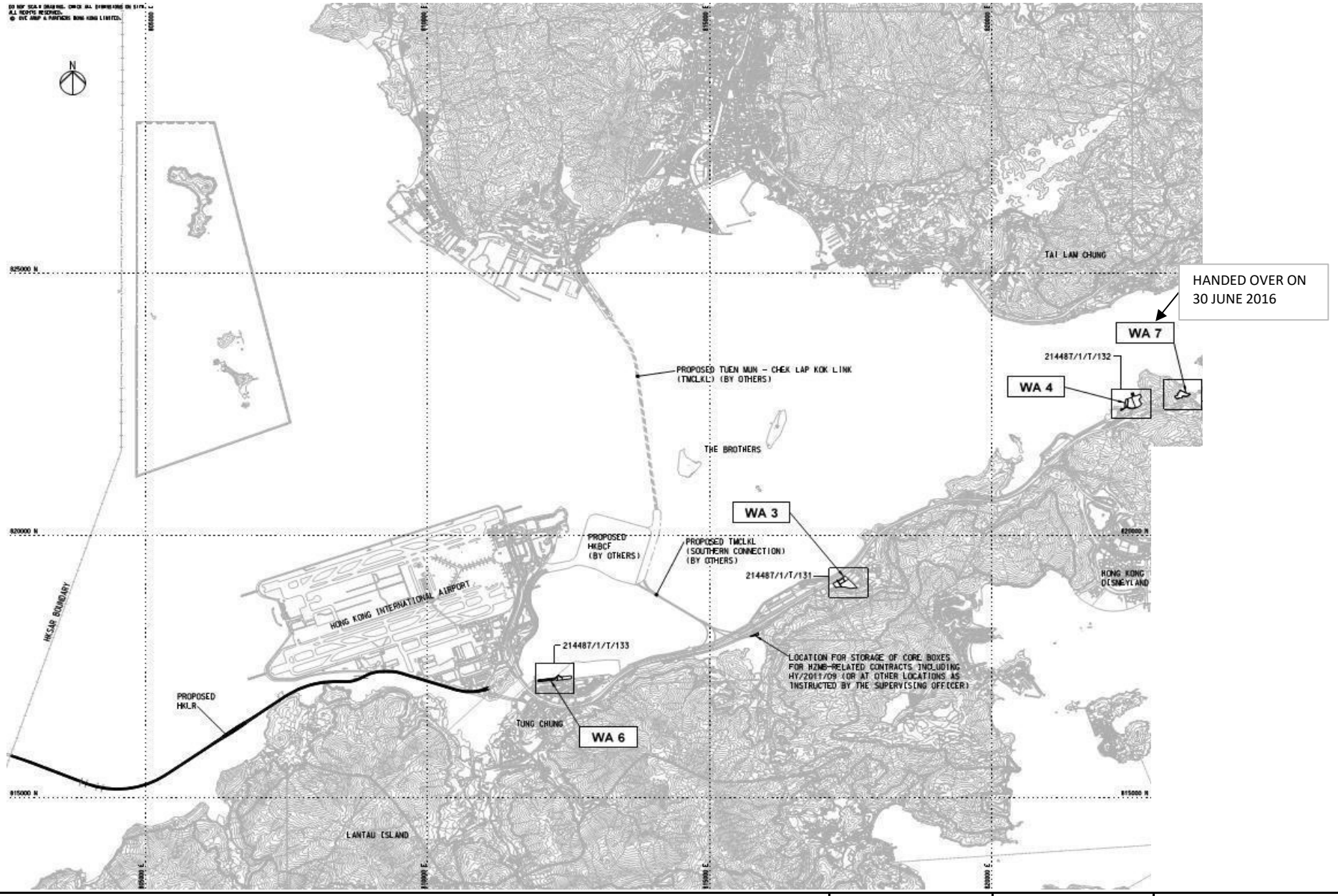
Ecology Impact

- 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)



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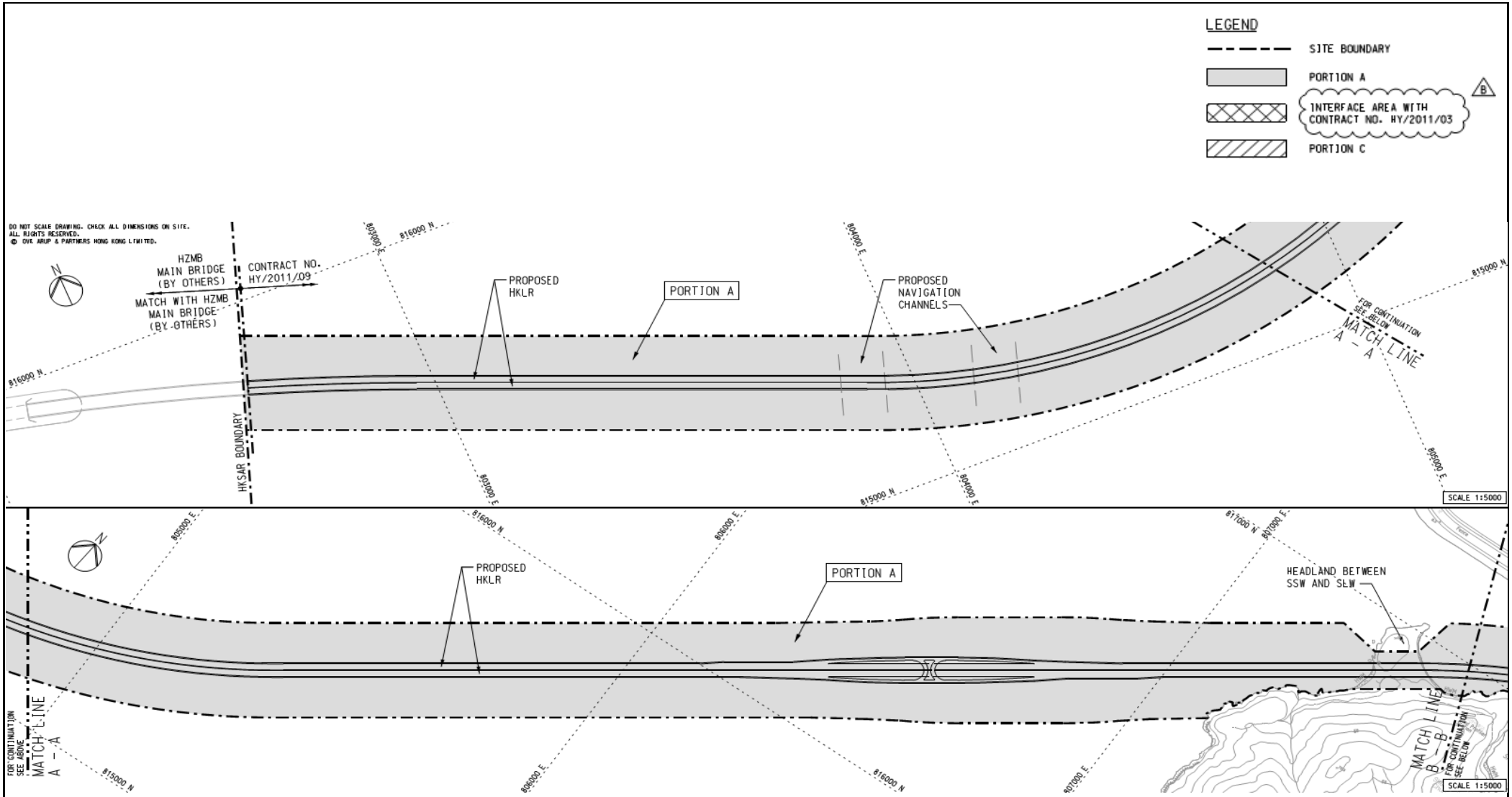

Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Portion A)	Scale: N.T.S Date: Oct-15	Proposa No.: MA12014 Figure: 1b

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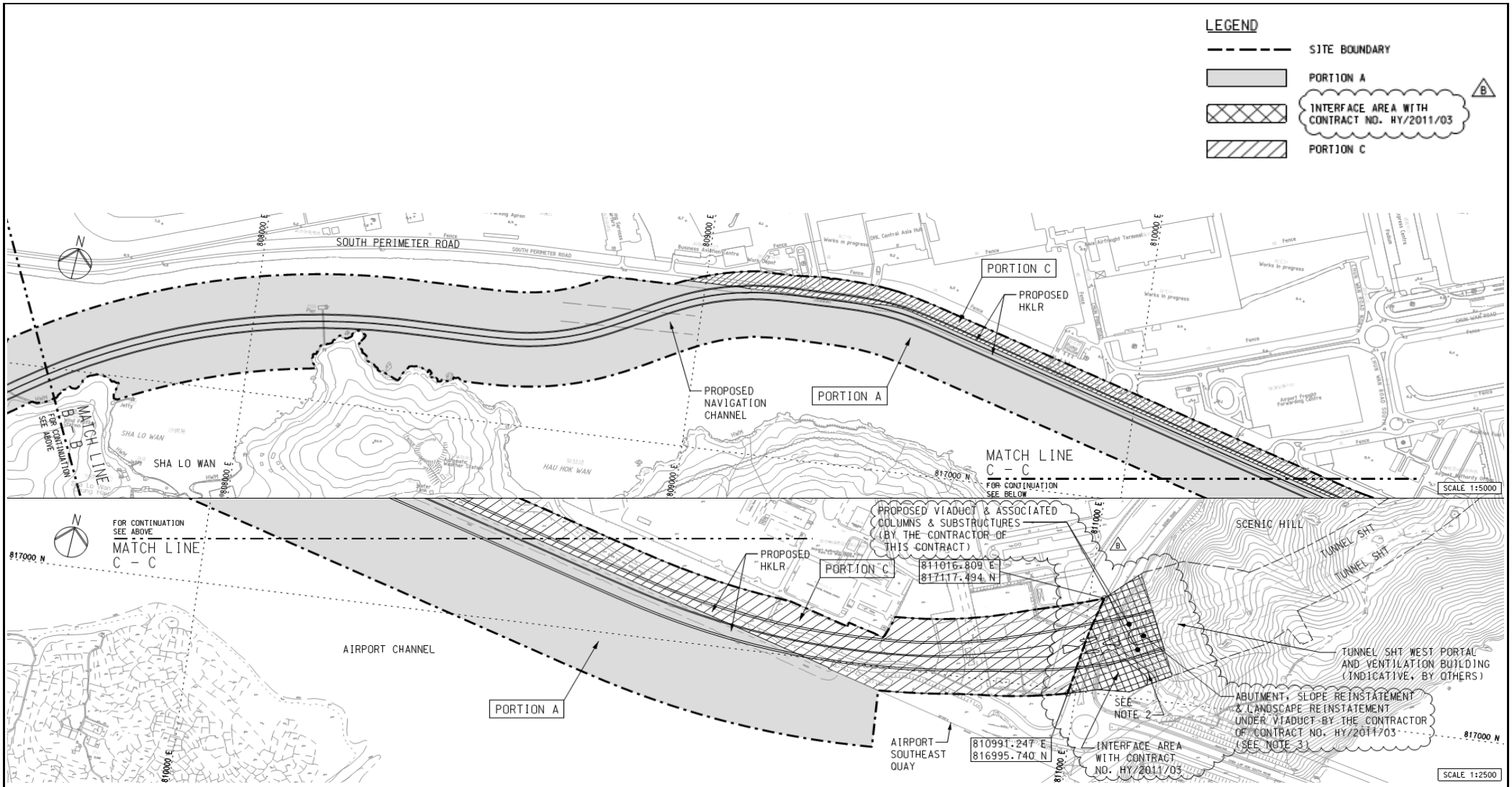

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		Date 五月-13	Figure 1c

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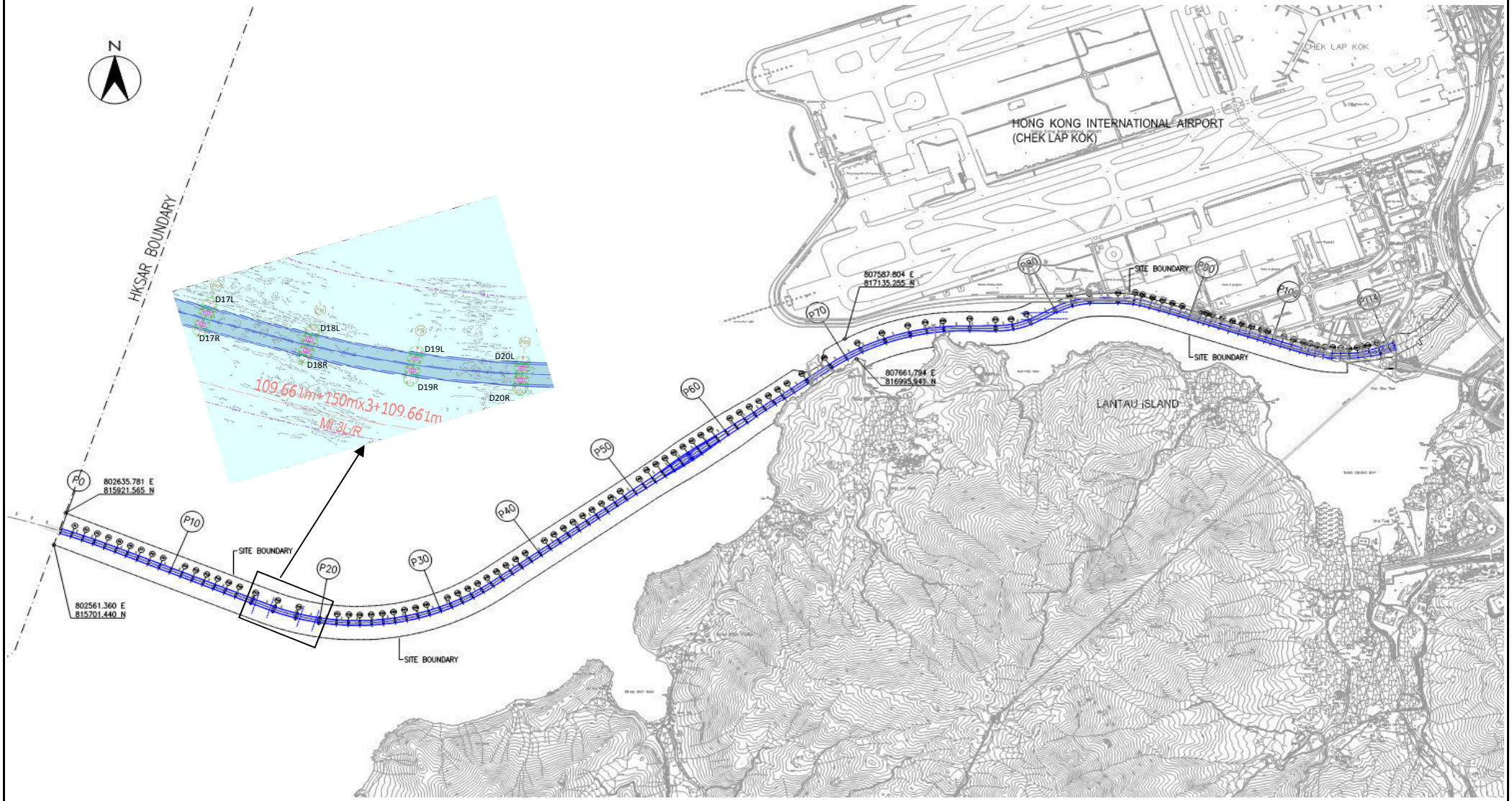

Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Pier(s) Site)	Scale: N.T.S Date: Oct-15	Proposa No. MA12014 Figure: 1d

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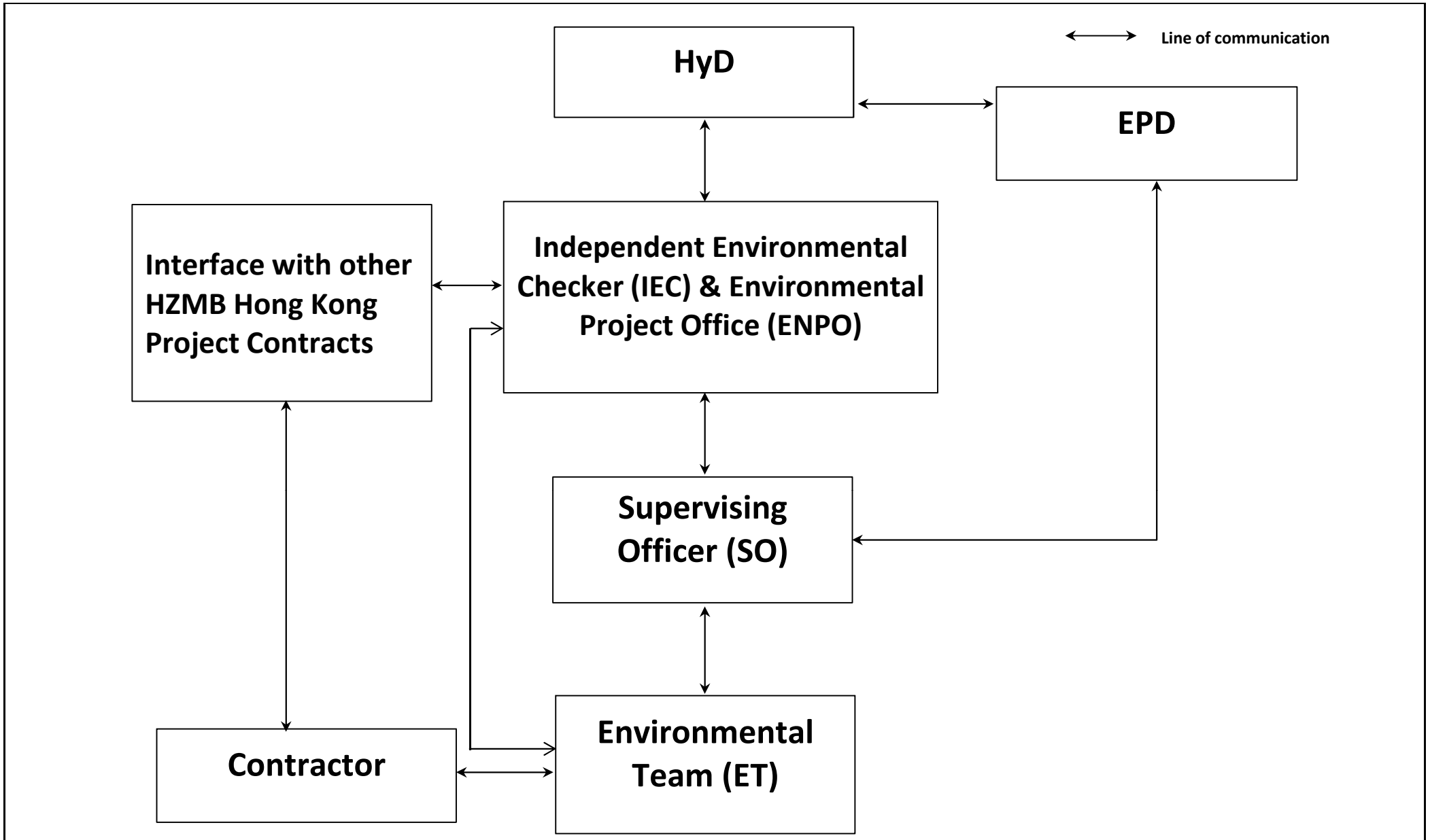
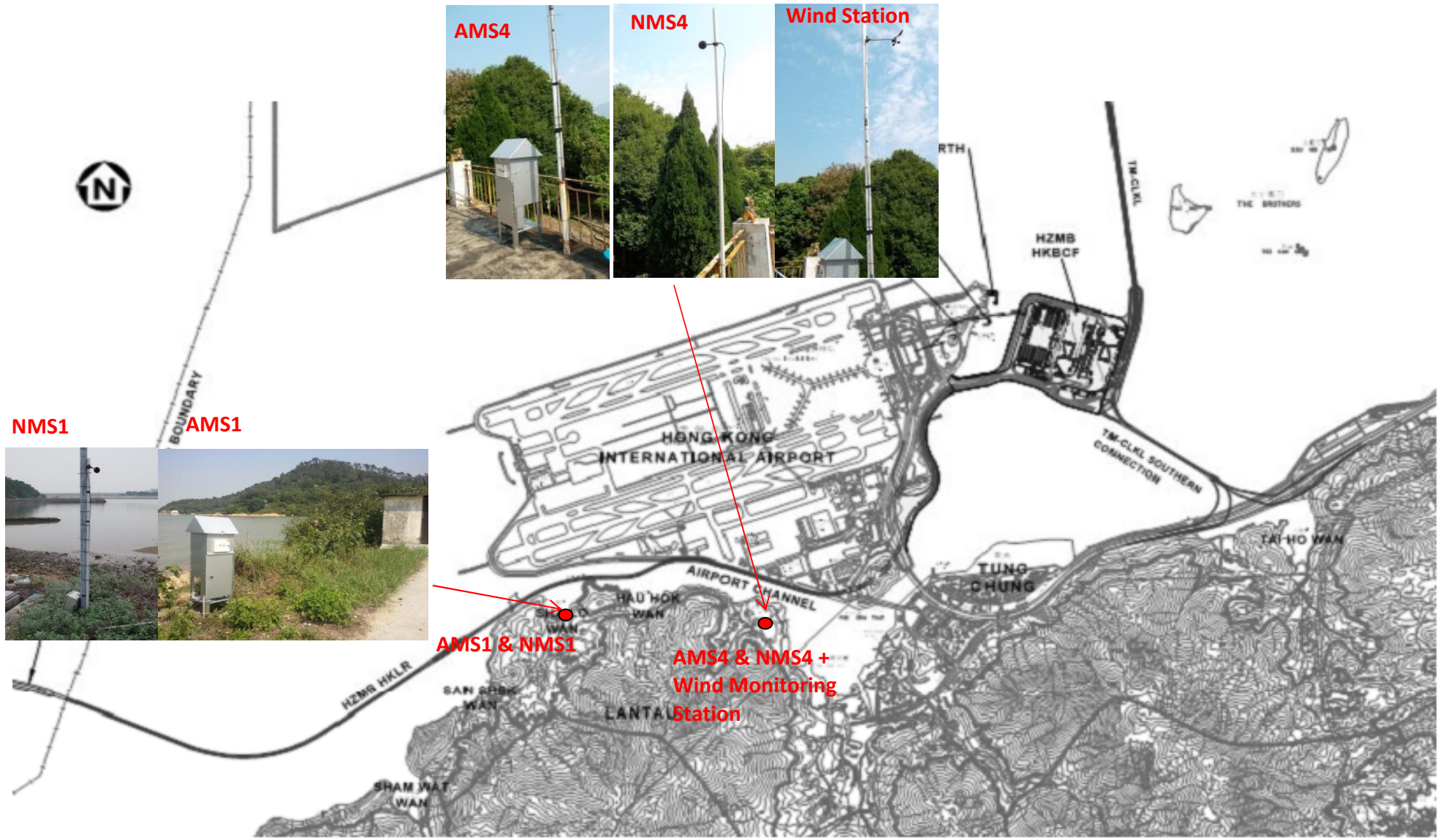


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Project Organisation for Environmental Works	Scale N.T.S Date Feb-13	Proposa No. MA12014 Figure 2	CINOTECH



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	Proposa No. MA12014 Figure: 3

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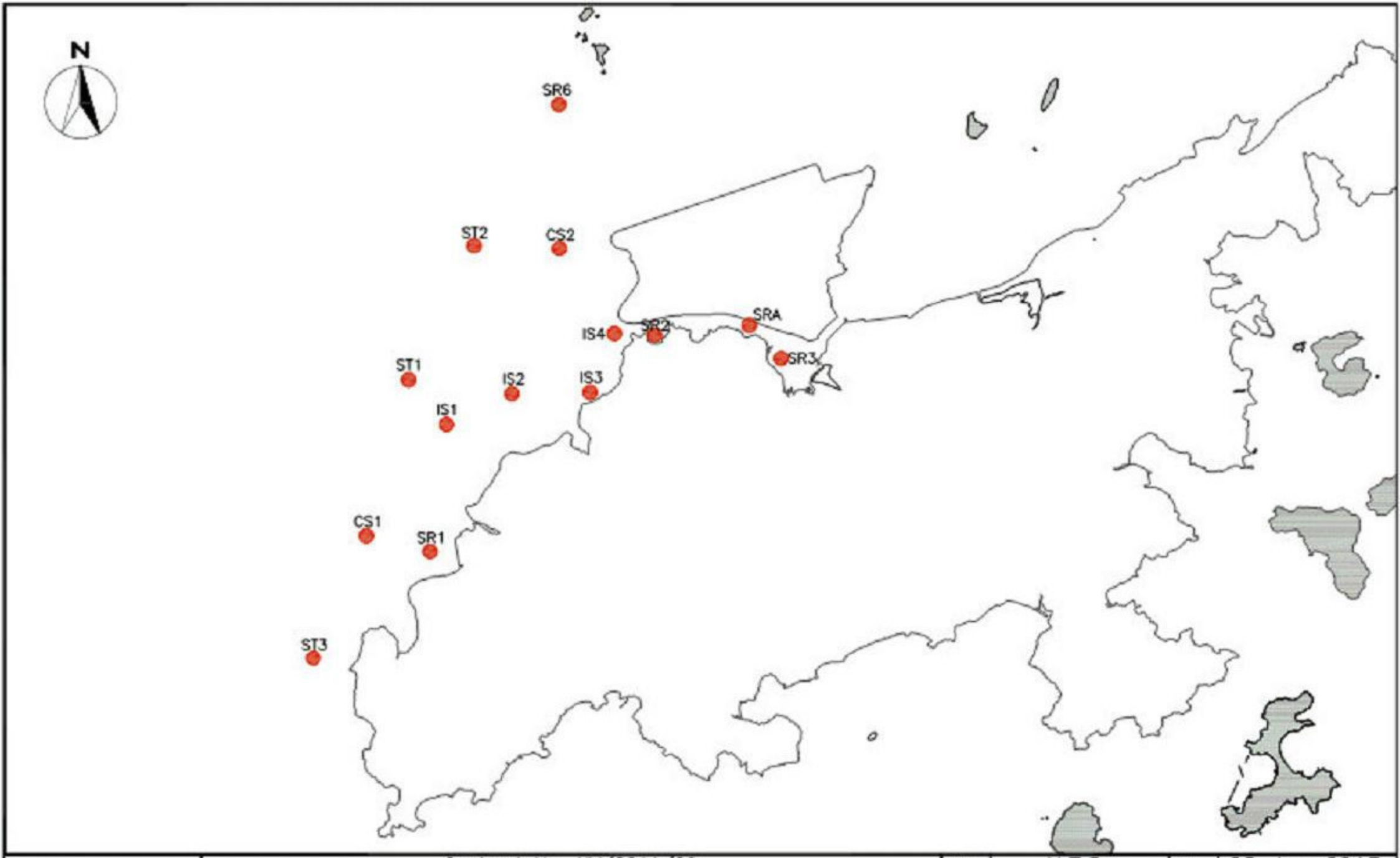


CINOTECH
Cinotech Consultants Limited

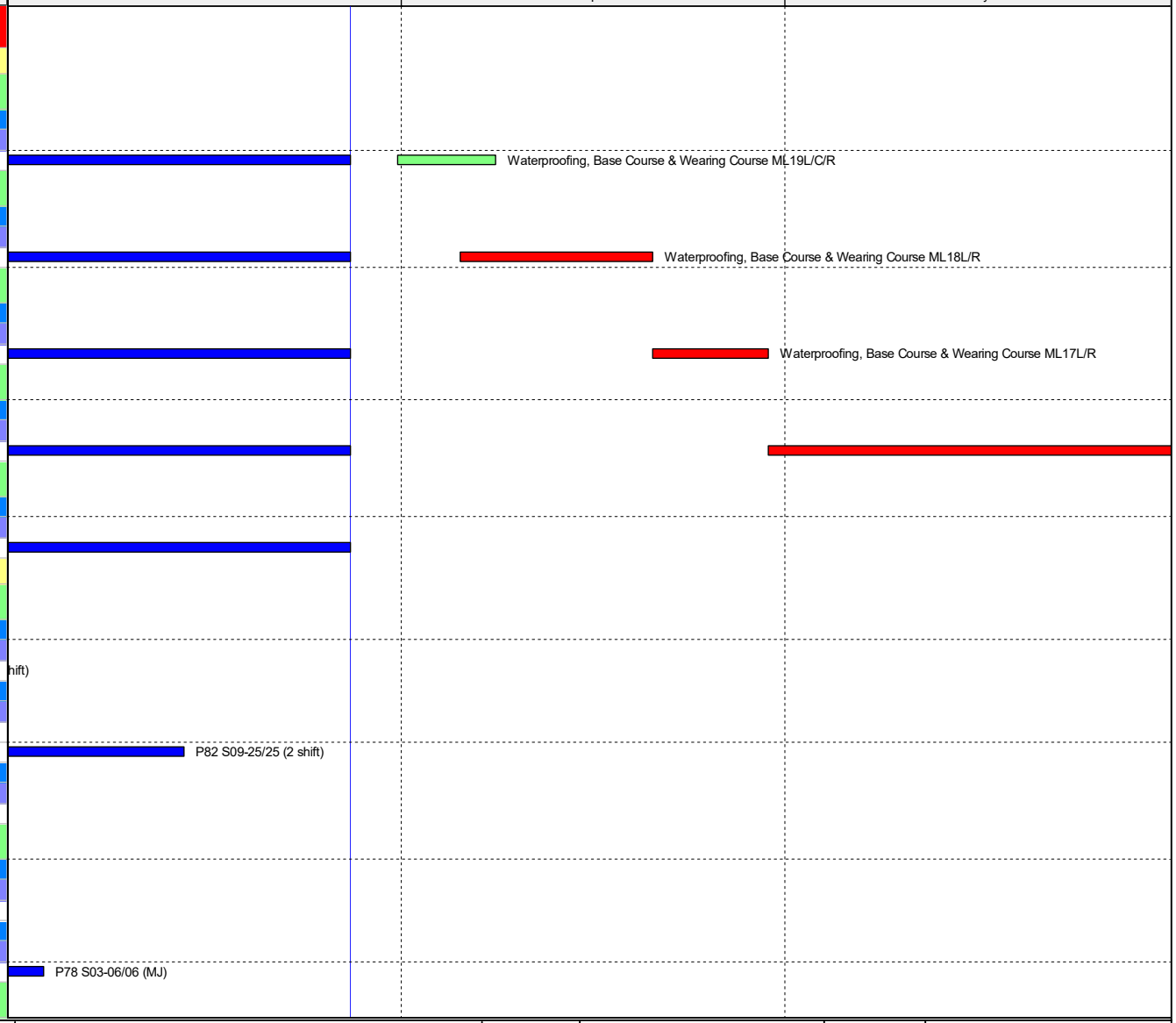
Contract No. HY/2011/09
Hong Kong–Zhuhai–Macao Bridge Hong Kong Link Road – Section Between HKSAR Boundary and Scenic Hill
Locations of Marine Water Quality Monitoring Stations

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 Rol
	LAND VIADUCT
	ML19
	DECK FINISHING WORKS
	E&M AND ROAD FINISHING WORKS
M19L_2030	Waterproofing, Base Course & Wearing Course ML19L/C/R
	ML18
	DECK FINISHING WORKS
	E&M AND ROAD FINISHING WORKS
M18L_2030	Waterproofing, Base Course & Wearing Course ML18L/R
	ML17
	DECK FINISHING WORKS
	E&M AND ROAD FINISHING WORKS
M17L_2030	Waterproofing, Base Course & Wearing Course ML17L/R
	ML16
	DECK FINISHING WORKS
	E&M AND ROAD FINISHING WORKS
M16L_2030	Waterproofing, Base Course & Wearing Course ML16L/R
	ML15
	DECK FINISHING WORKS
	E&M AND ROAD FINISHING WORKS
M15L_2020	Drainage works for ML15
	AIRPORT CHANNEL
	ML14
	P83
	DECK ERECTION WORKS
P083_1050	P83 S01-25/25 (2 shift)
	P82
	DECK ERECTION WORKS
P082_1030	P82 S01-08/25
P082_1050	P82 S09-25/25 (2 shift)
	P81 MJ
	DECK ERECTION WORKS
P081_1130	P81 S01-06/06 (MJ)
	ML13
	P81 MJ
	DECK ERECTION WORKS
P081_1020	P81 S01-06/06 (MJ)
	P78 MJ
	DECK ERECTION WORKS
P078_1120	P78 S03-06/06 (MJ)
	ML12

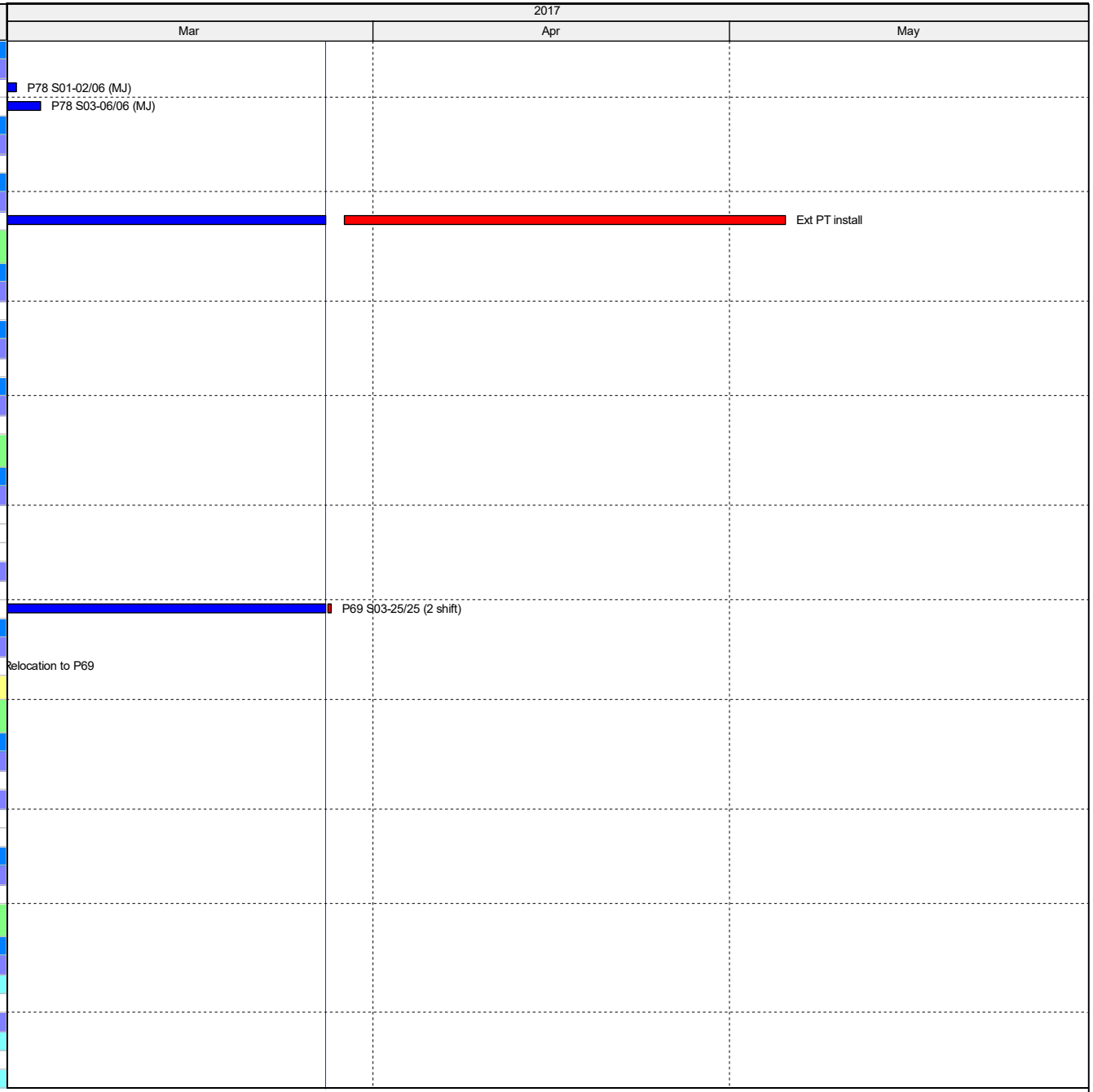


Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Mar 17 to May 17)
Page 1 of 4

Date	Revision	Checked	Approved
18/4/17	EM&A Report Mar 17 to Ma...	Tim	

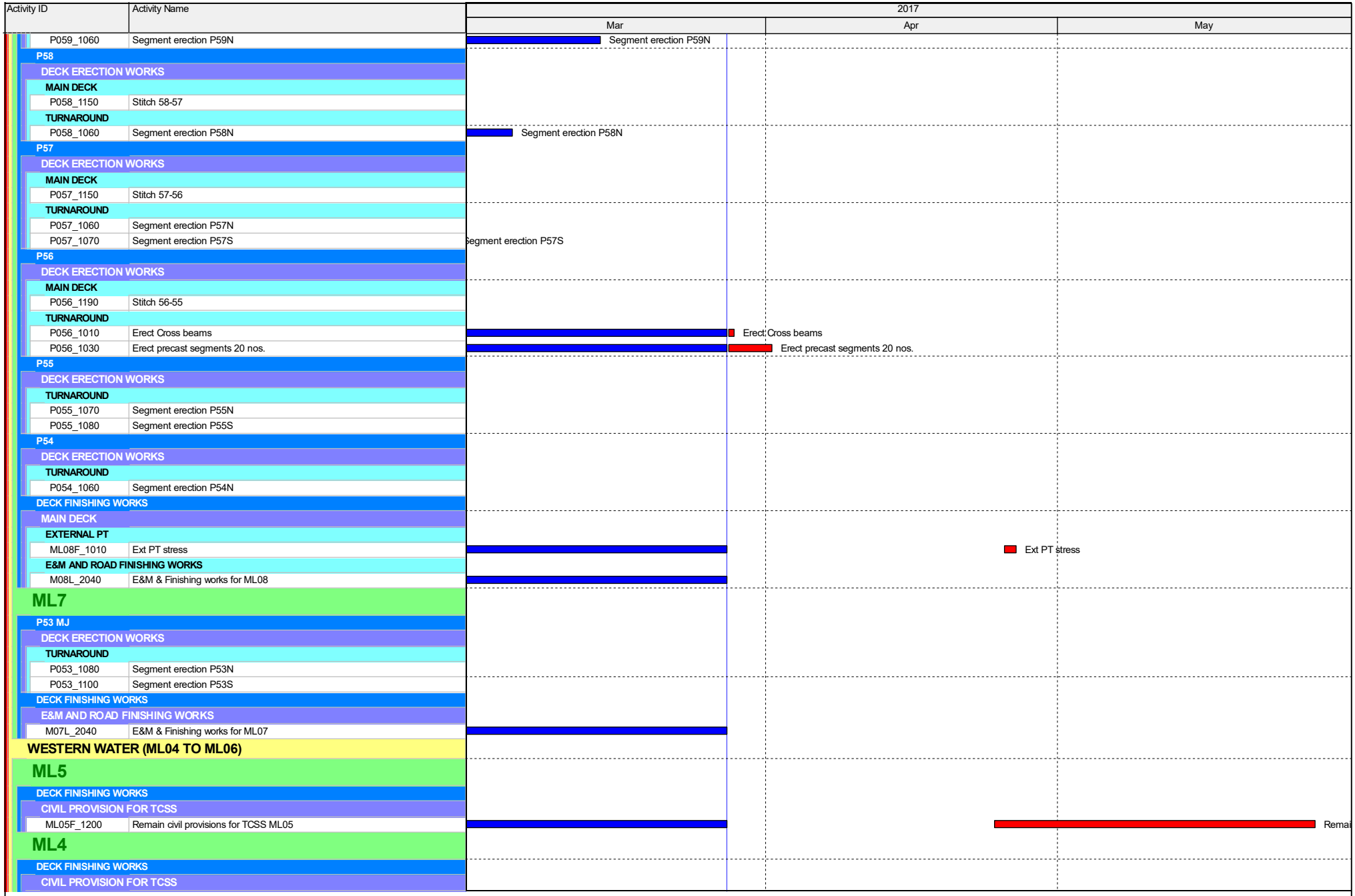
Activity ID	Activity Name
P78 MJ	
DECK ERECTION WORKS	
P078_1015	P78 S01-02/06 (MJ)
P078_1020	P78 S03-06/06 (MJ)
P75	
DECK ERECTION WORKS	
P075_1040	P75 S01-22/22 (2 shift)
DECK FINISHING WORKS	
EXTERNAL PT	
ML12F_1000	Ext PT install
ML11	
P74 MJ	
DECK ERECTION WORKS	
P074_1160	Stitch 74-73
P73	
DECK ERECTION WORKS	
P073_1120	Stitch 73-72
P72	
DECK ERECTION WORKS	
P072_1120	Stitch 72-71
ML10	
P69	
SOP AND PORTAL WORKS	
P069_1010	SOP Segments erection (2 shift)
P069_1020	SOP Completion (2 shift)
P069_1025	SOP In-situ cross beam
DECK ERECTION WORKS	
P069_1030	P69 S01-02/25
P069_1040	P69 S03-25/25 (2 shift)
P68	
DECK ERECTION WORKS	
P068_1090	Relocation to P69
WESTERN WATER (ML07 TO ML09)	
ML9	
P67 MJ	
COLUMN WORKS	
P067_1100	Bearing Installation - P67
SOP AND PORTAL WORKS	
P067_1000	SOP Preparation & Erection
P067_1010	SOP Completion
P59 MJ	
DECK ERECTION WORKS	
P059_1190	P59 - P60 S10/10 (MJ)
ML8	
P59 MJ	
SOP AND PORTAL WORKS	
TURNAROUND	
P059_1050	Insitu beam between main deck and tumaround at P59
DECK ERECTION WORKS	
MAIN DECK	
P059_1210	Stitch 59-58
TURNAROUND	



Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Mar 17 to May 17)
Page 2 of 4

Date	Revision	Checked	Approved
18/4/17	EM&A Report Mar 17 to Ma...	Tim	

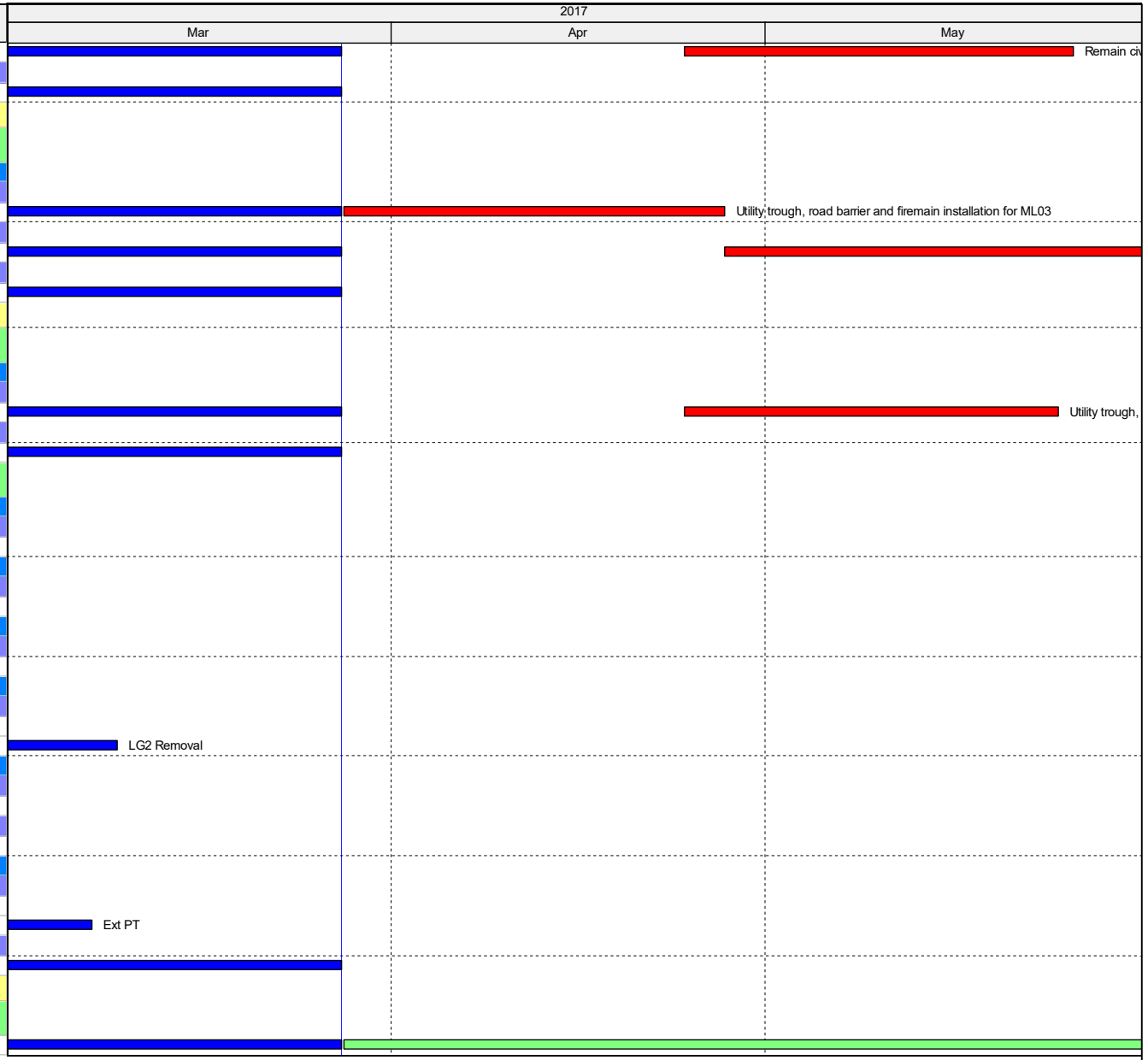


Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Mar 17 to May 17)
Page 3 of 4

Date	Revision	Checked	Approved
18/4/17	EM&A Report Mar 17 to Ma...	Tim	

Activity ID	Activity Name
ML04F_1200	Remain civil provisions for TCSS ML04
E&M AND ROAD FINISHING WORKS	
M04L_2050	E&M & Finishing works for ML04
NAVIGATION CHANNEL	
ML3	
DECK FINISHING WORKS	
UTILITY TROUGH & ROAD BARRIER	
ML03F_1020	Utility trough, road barrier and firemain installation for ML03
CIVIL PROVISION FOR TCSS	
ML03F_1200	Remain civil provisions for TCSS ML03
E&M AND ROAD FINISHING WORKS	
M03L_2070	E&M & Finishing works for ML03
WESTERN WATER (ML01 TO ML02)	
ML2	
DECK FINISHING WORKS	
UTILITY TROUGH & ROAD BARRIER	
ML02F_1020	Utility trough, road barrier and firemain installation for ML02
E&M AND ROAD FINISHING WORKS	
M02L_2040	E&M & Finishing works for ML02
ML1	
P4	
DECK ERECTION WORKS	
P004_1020	P04 S01-10/10
P3	
DECK ERECTION WORKS	
P003_1020	P03 S01-10/10
P2	
DECK ERECTION WORKS	
P002_1020	P02 S01-10/10
P1 SB	
DECK ERECTION WORKS	
P001_1020	P01 S01-10/10
P001_1090	LG2 Removal
P0 MJ	
COLUMN WORKS	
P000_1090	Bearing Installation - P0
DECK ERECTION WORKS	
P000_1100	P00 S00-10/10
DECK FINISHING WORKS	
EXTERNAL PT	
ML01F_1000	Ext PT install
ML01F_1010	Ext PT
E&M AND ROAD FINISHING WORKS	
M01L_2060	E&M & Finishing works for ML01
GROUND LEVEL ROAD WORKS	
GROUND LEVEL ROAD WORKS	
RD1090	Modification work for Sha Lo Wan wind profiler station (Wall extension)



Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Mar 17 to May 17)
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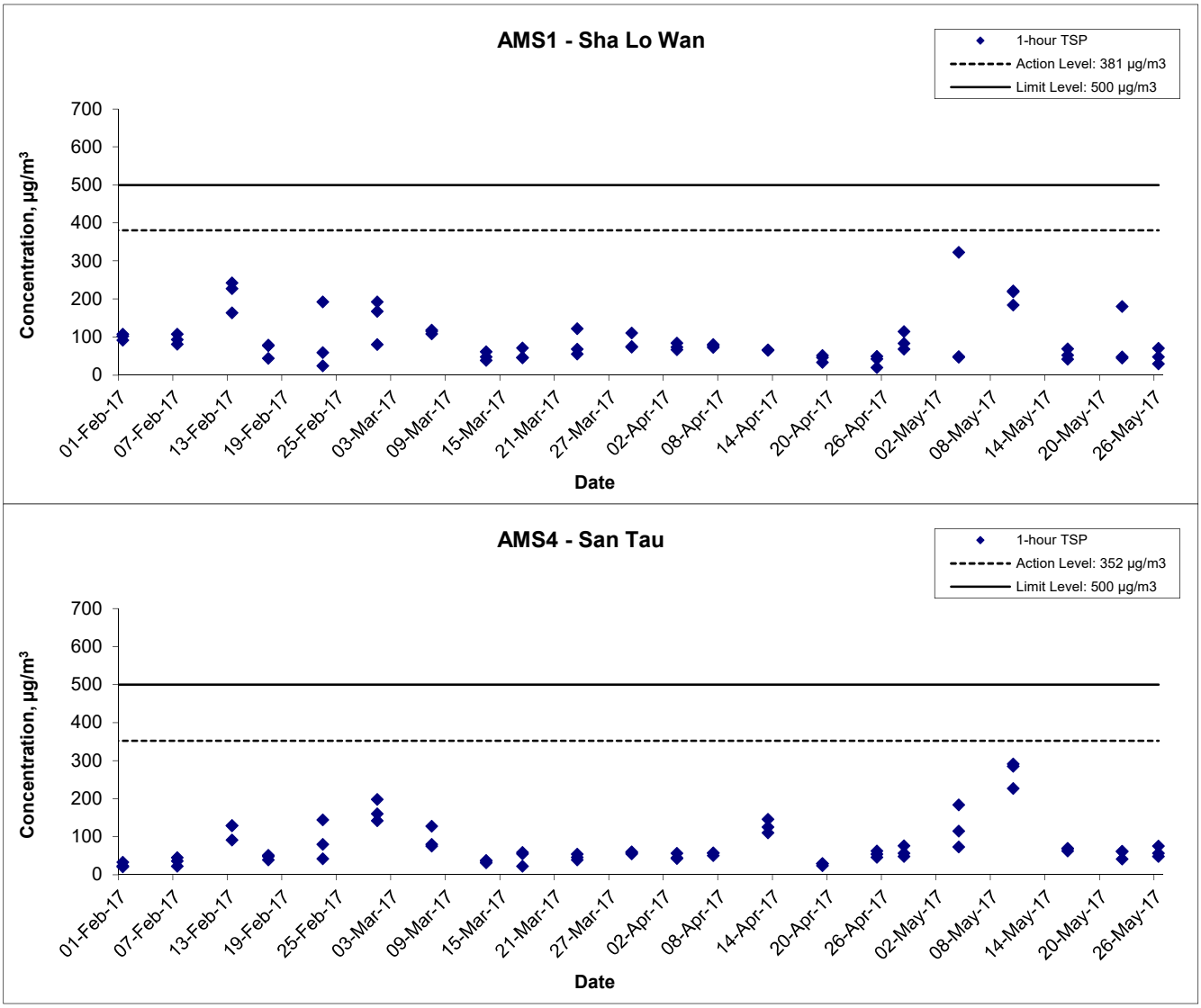
Date	Revision	Checked	Approved
18/4/17	EM&A Report Mar 17 to Ma...	Tim	

APPENDIX B
GRAPHICAL PRESENTATION OF 1-HOUR TSP MONITORING RESULTS

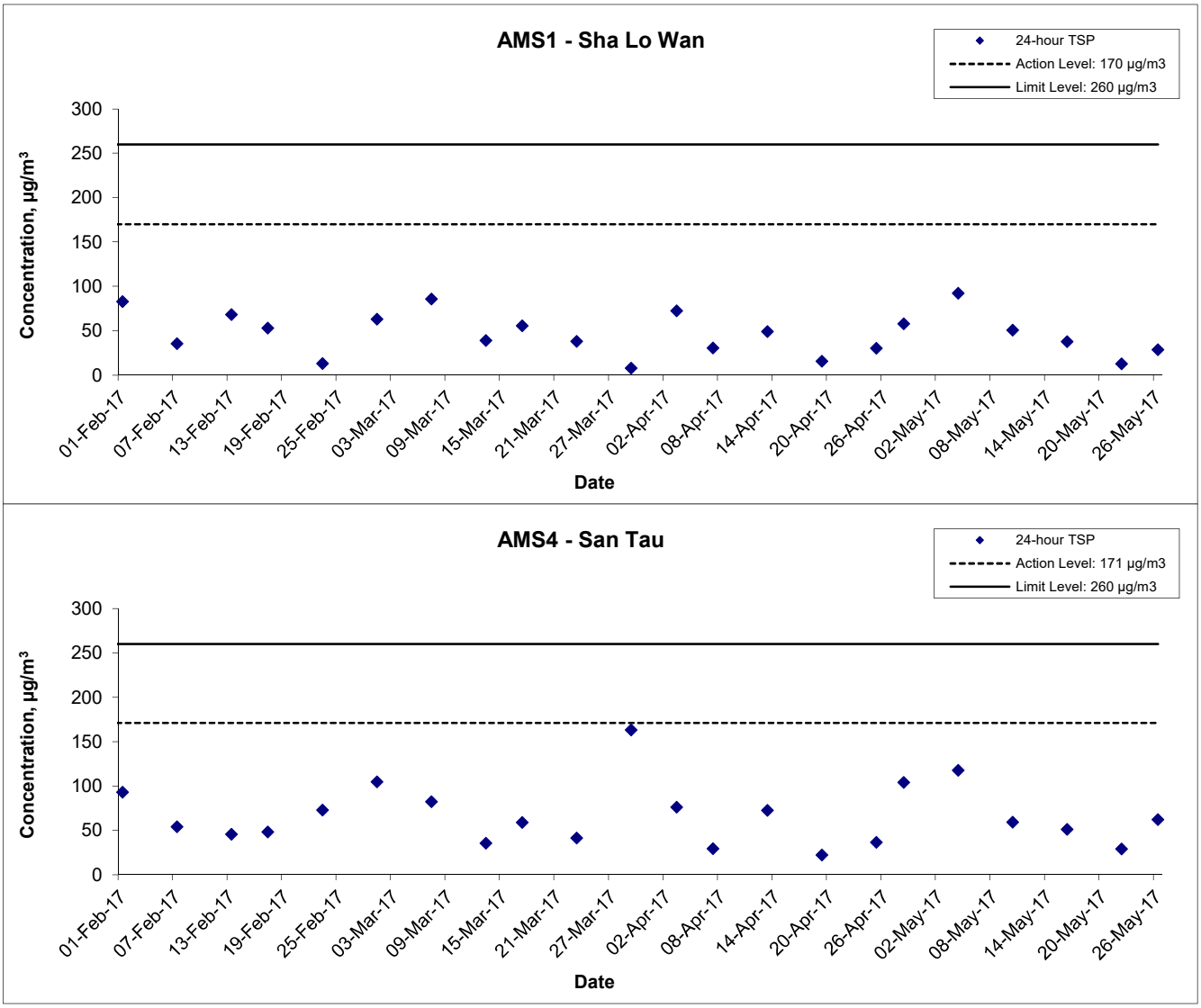
1-hour TSP Concentration Levels



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	Project No.: MA12014	CINOTECH
	Date: May 17	Appendix: E	

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	Project No.: MA12014	CINOTECH
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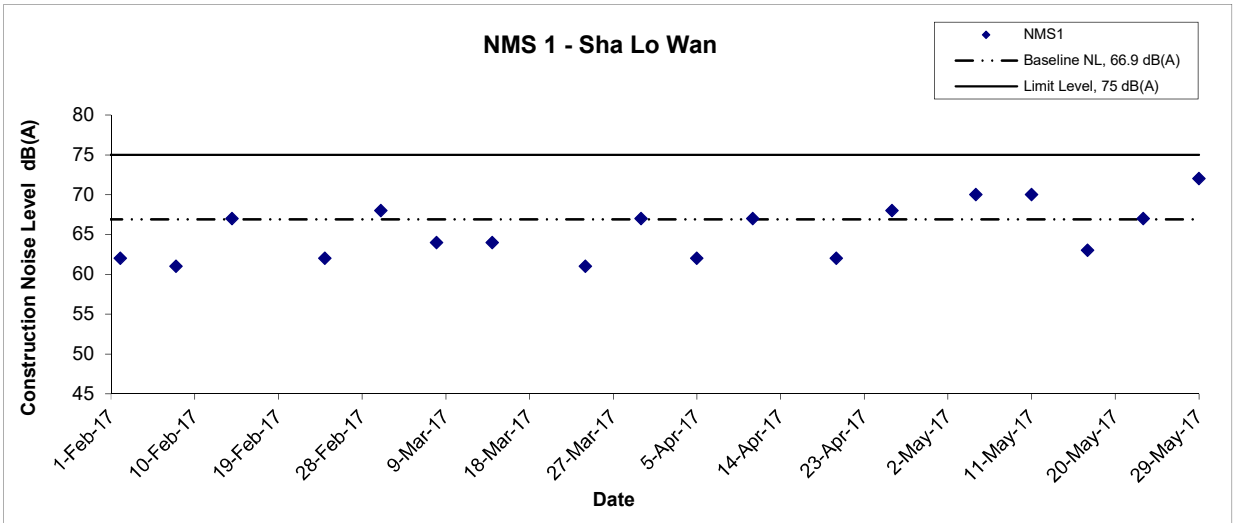
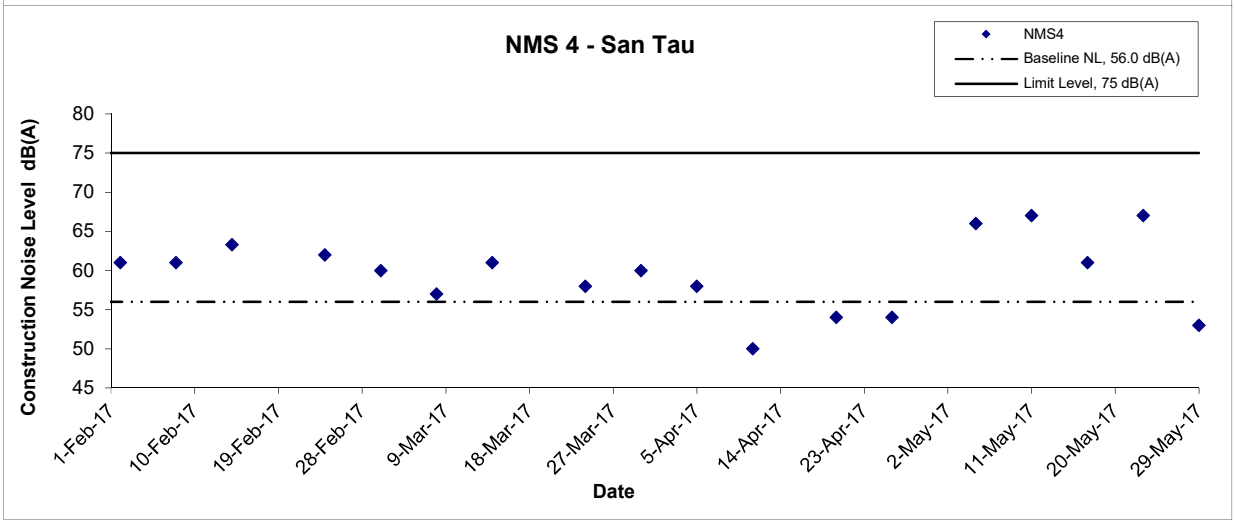
APPENDIX D
GRAPHICAL PRESENTATION OF NOISE MONITORING RESULTS

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
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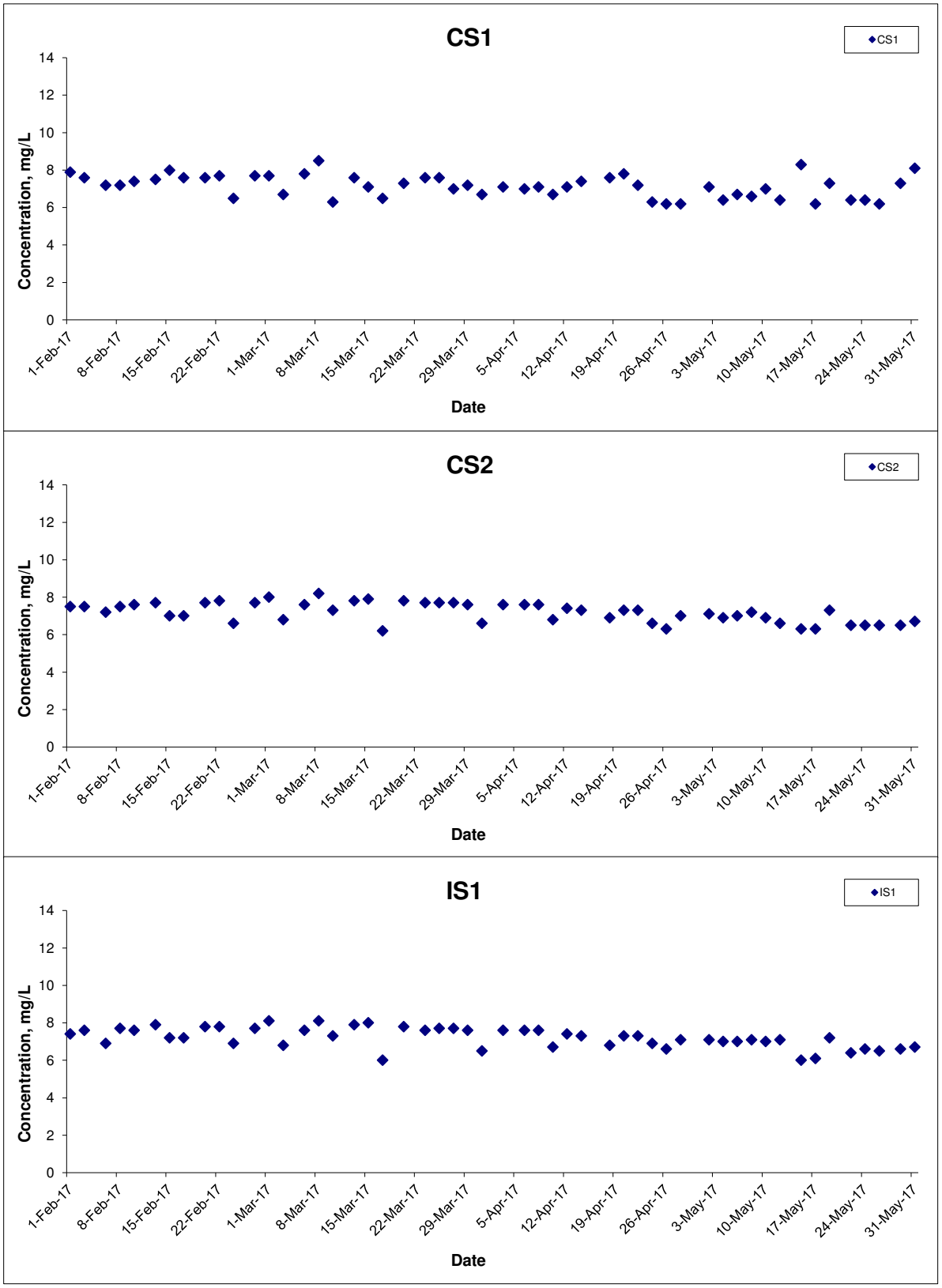
APPENDIX E
GRAPHICAL PRESENTATION OF WATER QUALITY MONITORING RESULTS

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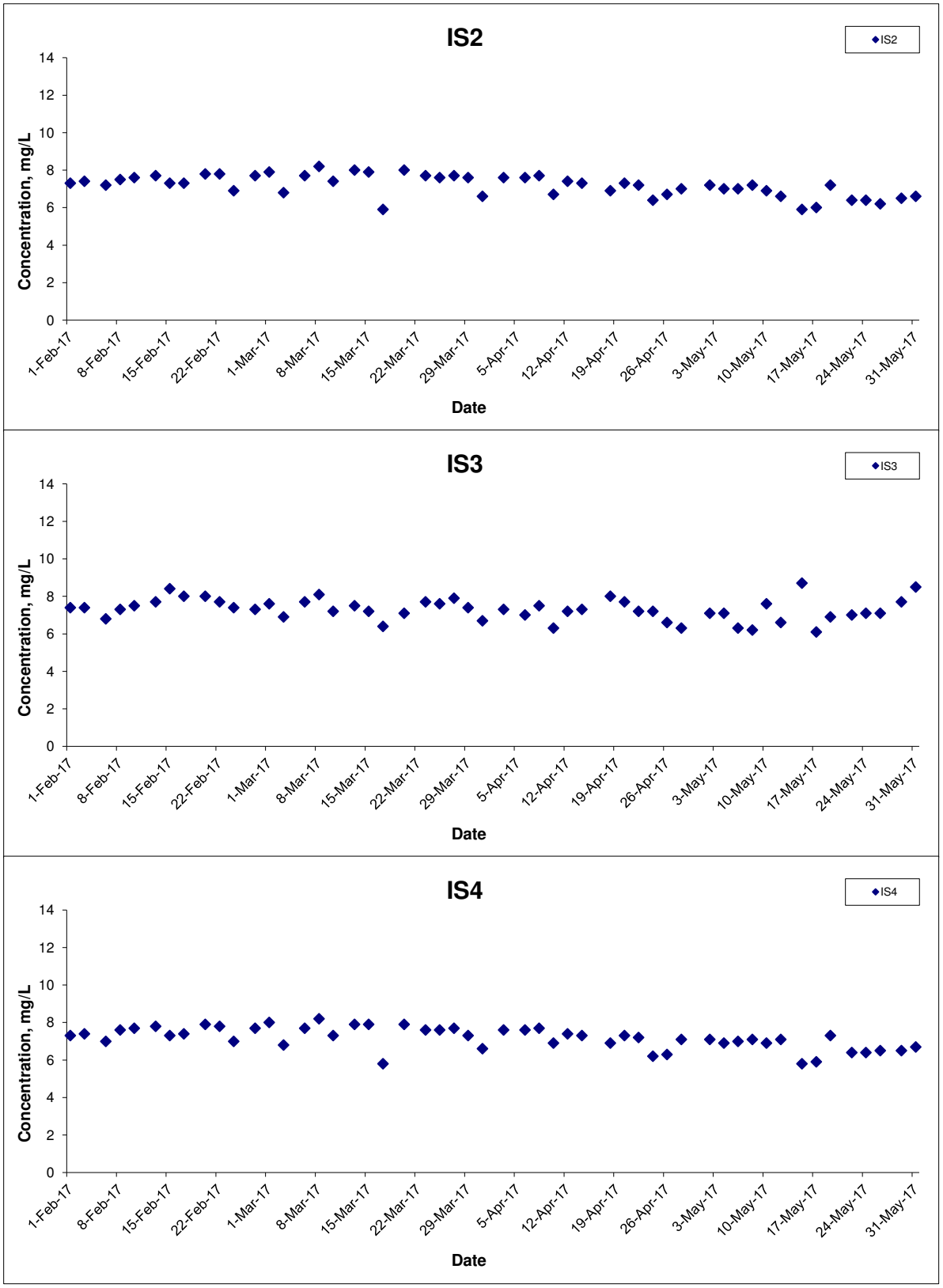
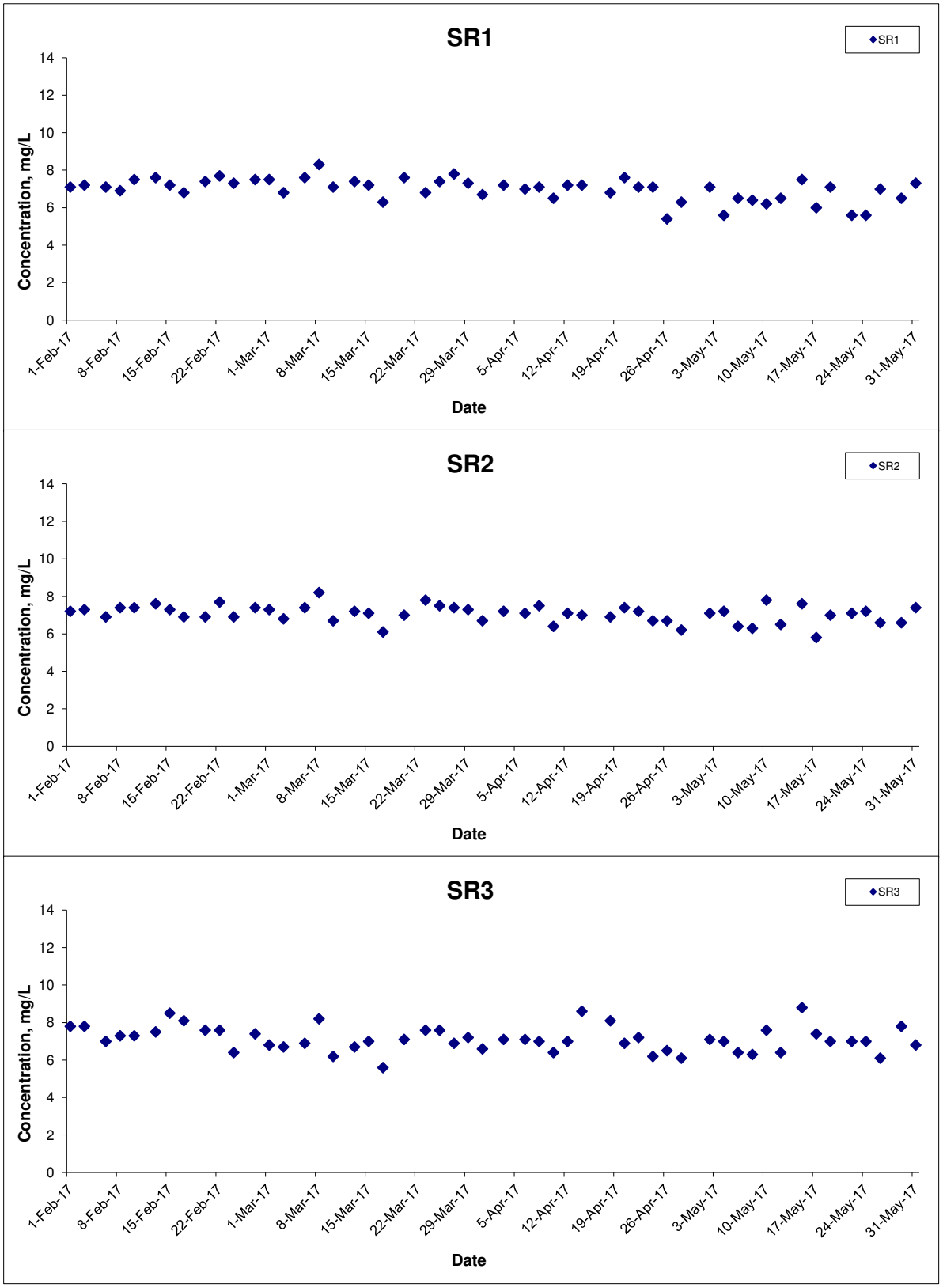
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



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 Date May 17	Project No. MA12014 Appendix H	CINOTECH

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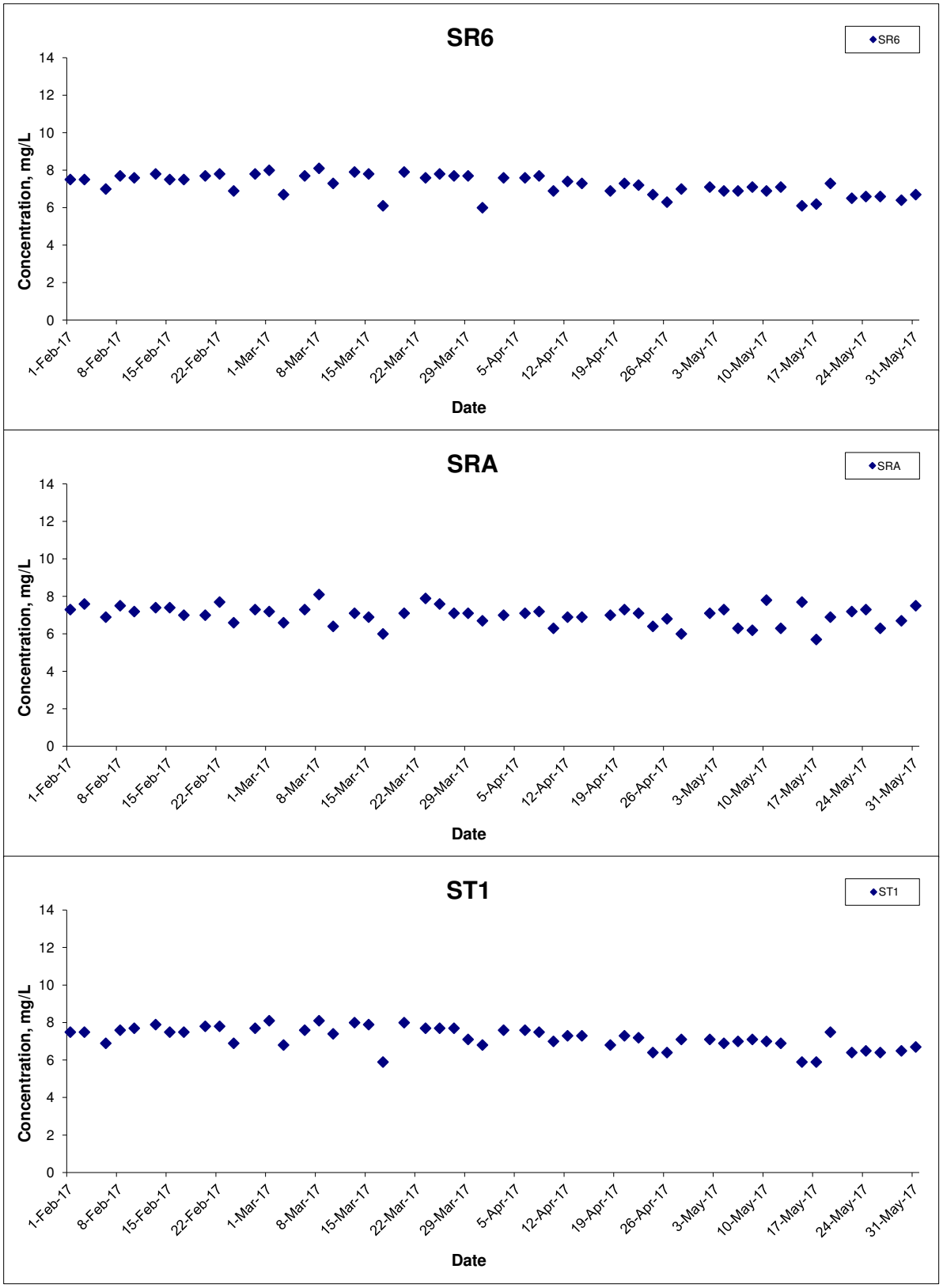
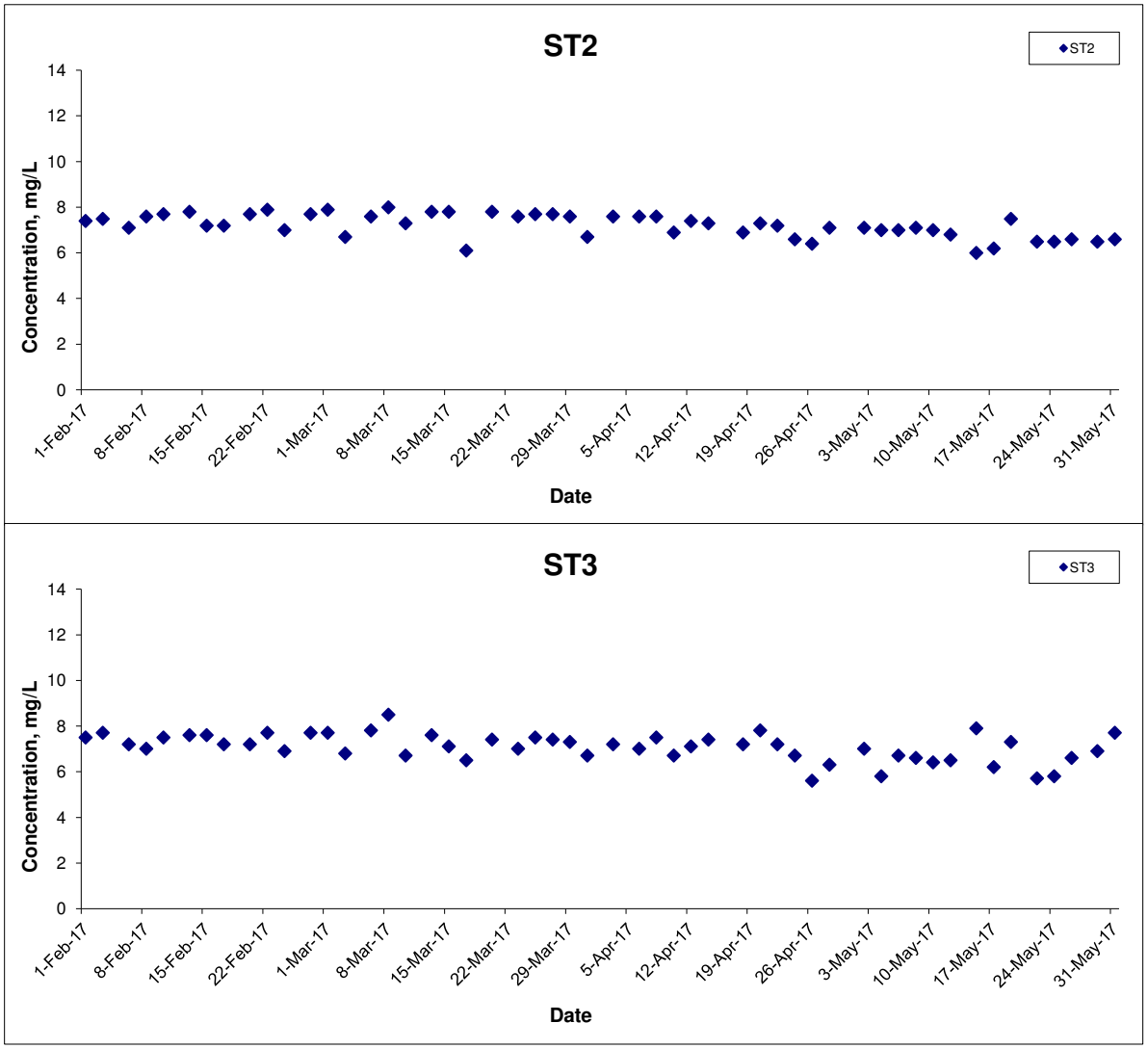
Dissolved Oxygen (Surface & Middle) at Mid-Ebb Tide



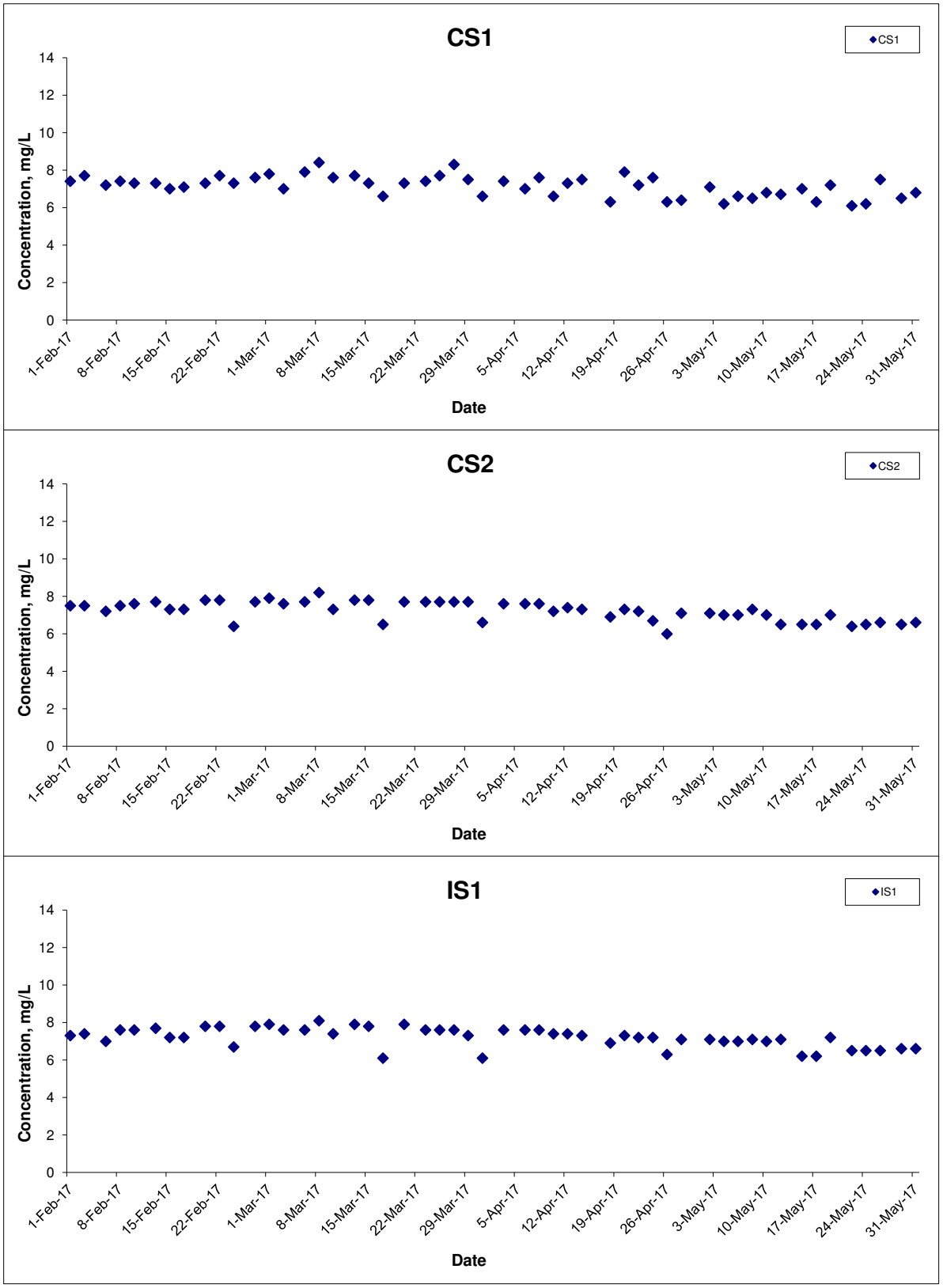
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S Date: May 17	Project No.: MA12014 Appendix: H	CINOTECH

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 Date May 17	Project No. MA12014 Appendix H	CINOTECH

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



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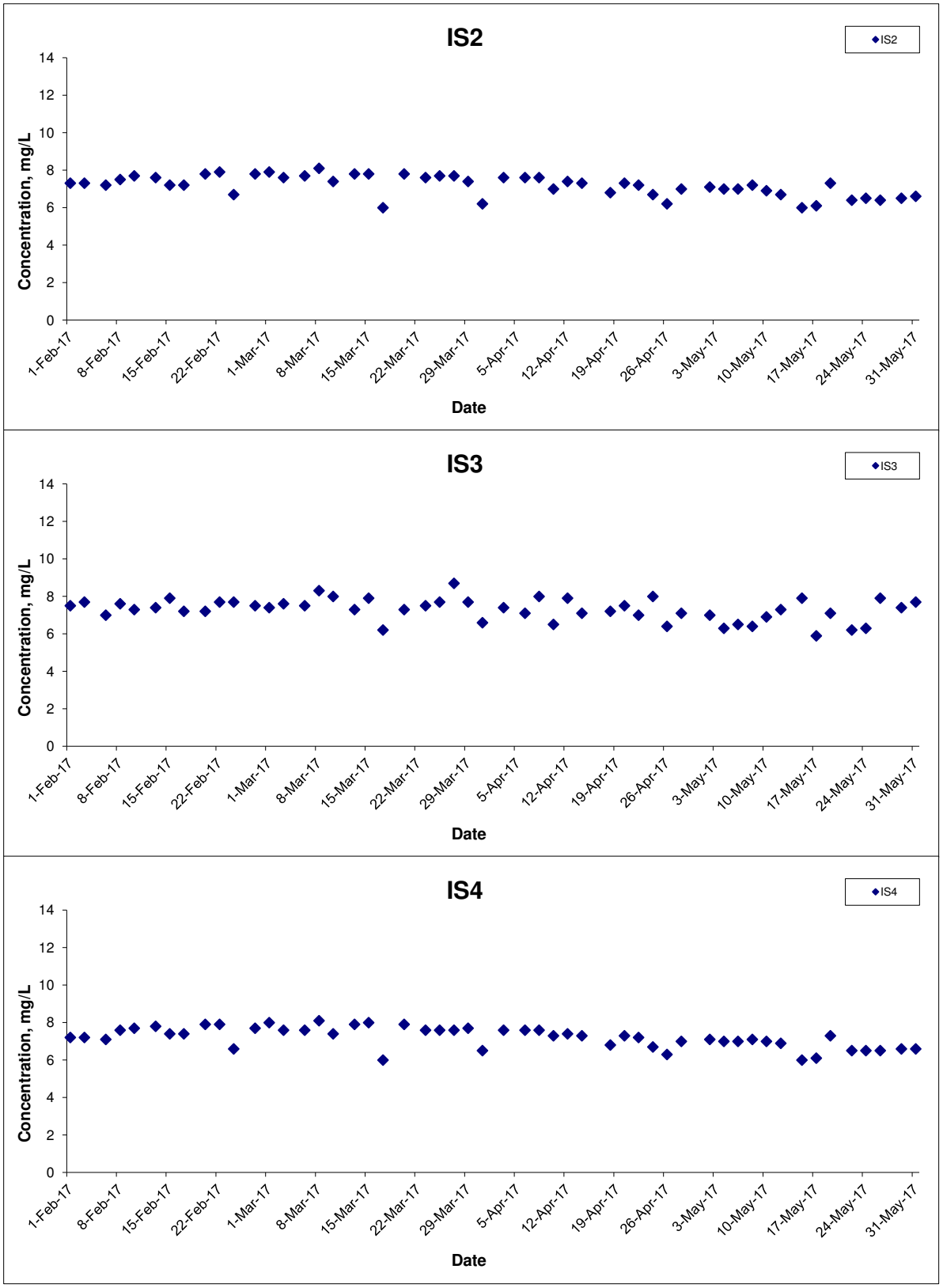
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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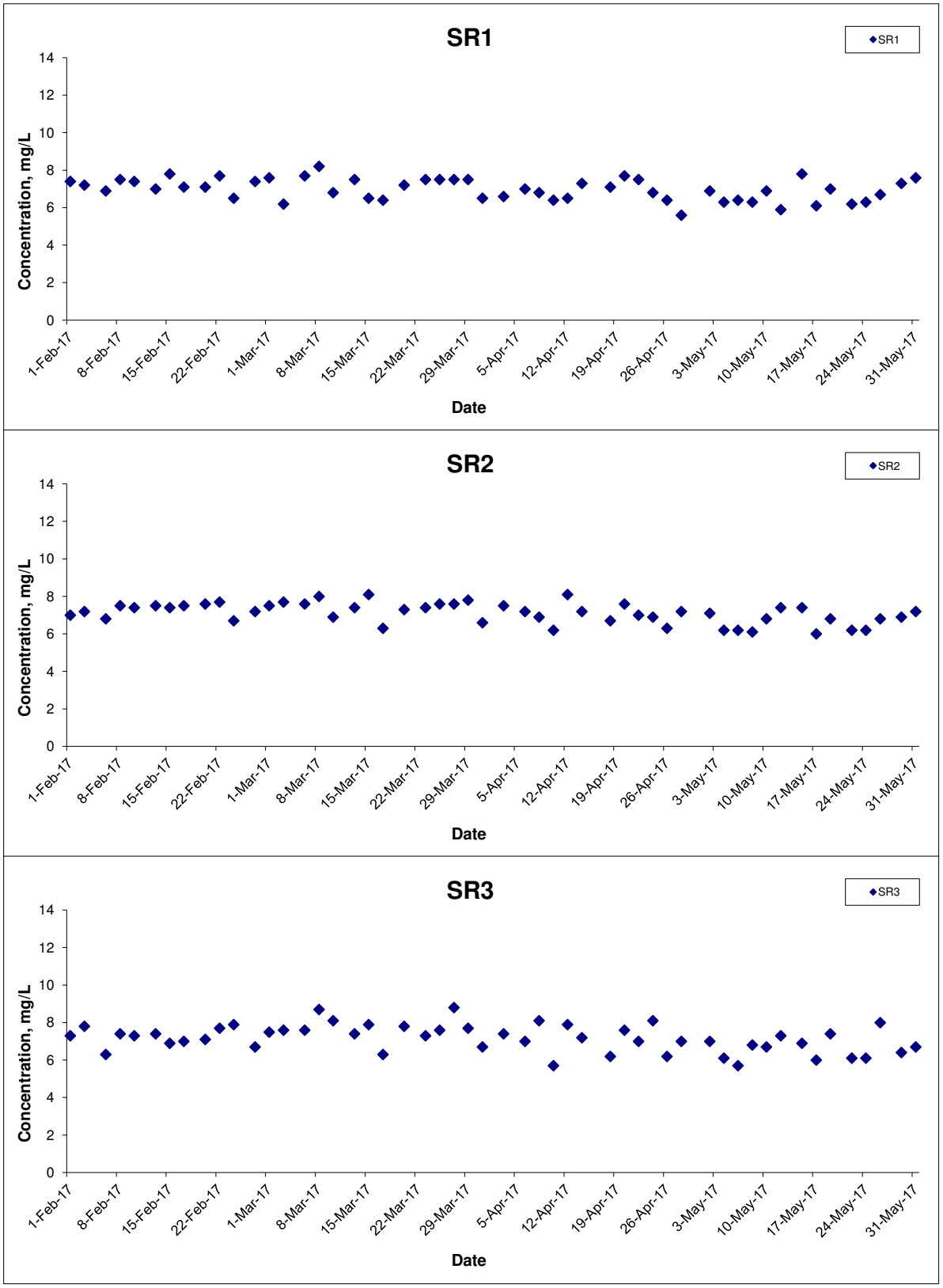

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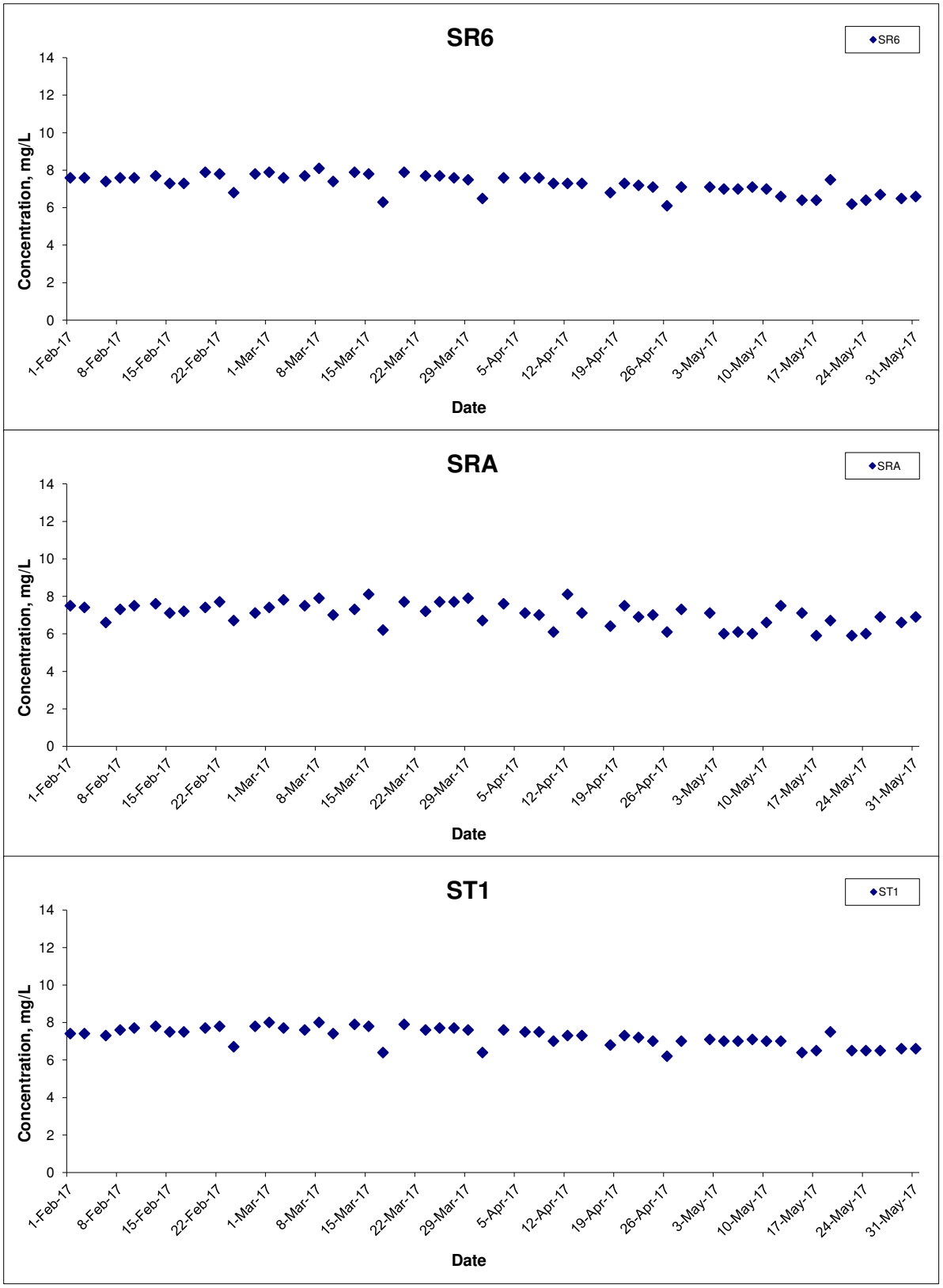
Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



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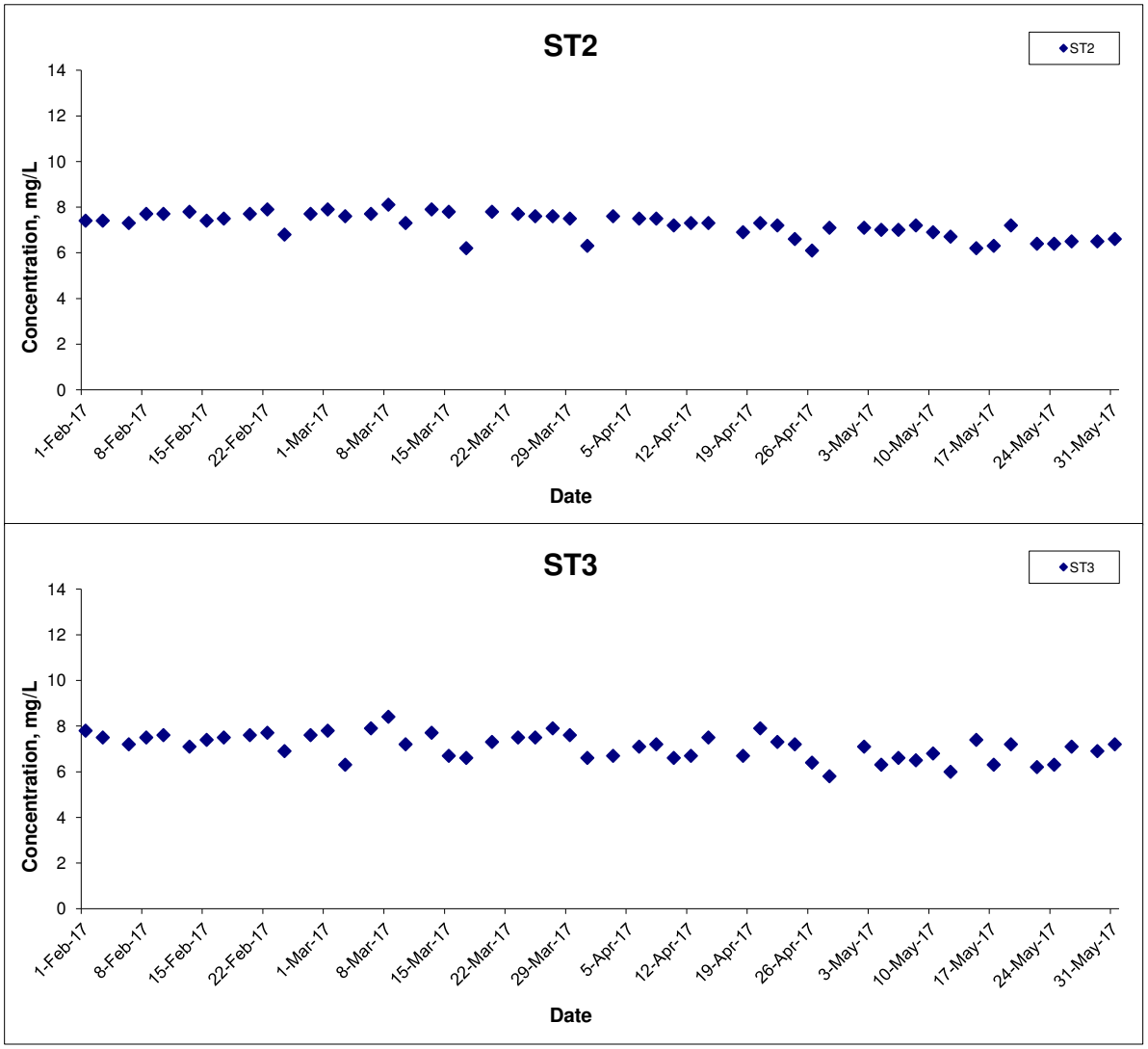

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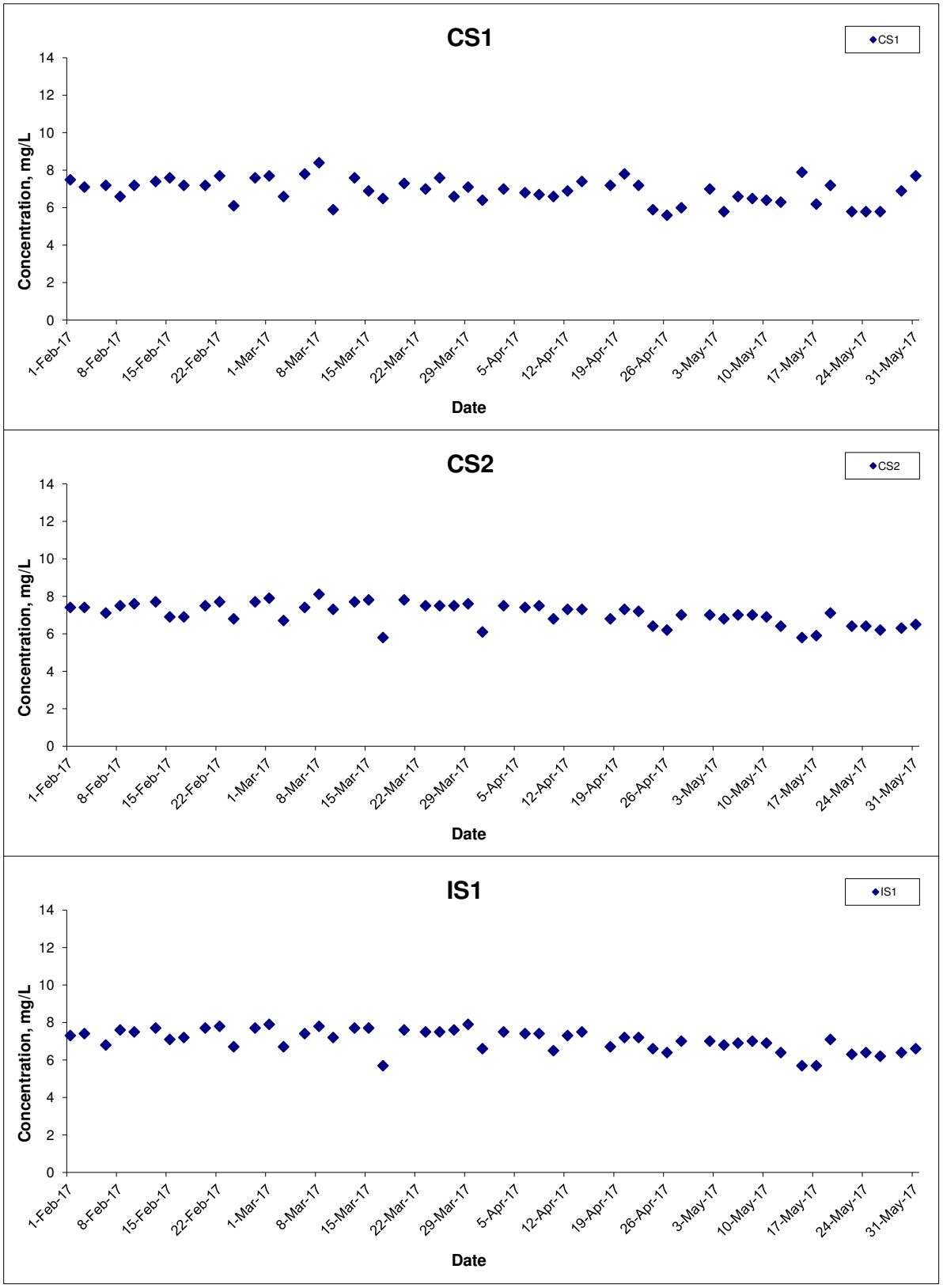
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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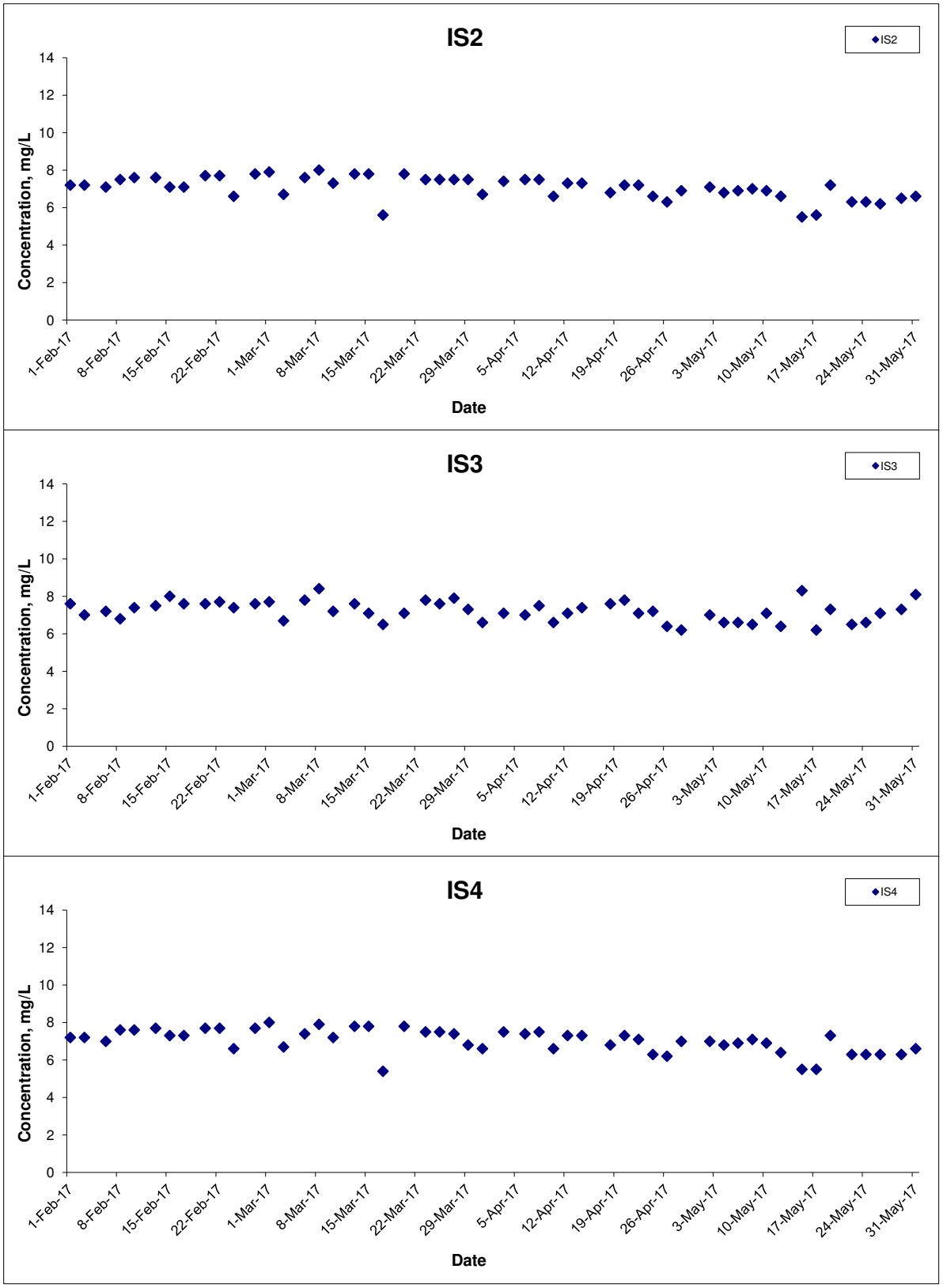
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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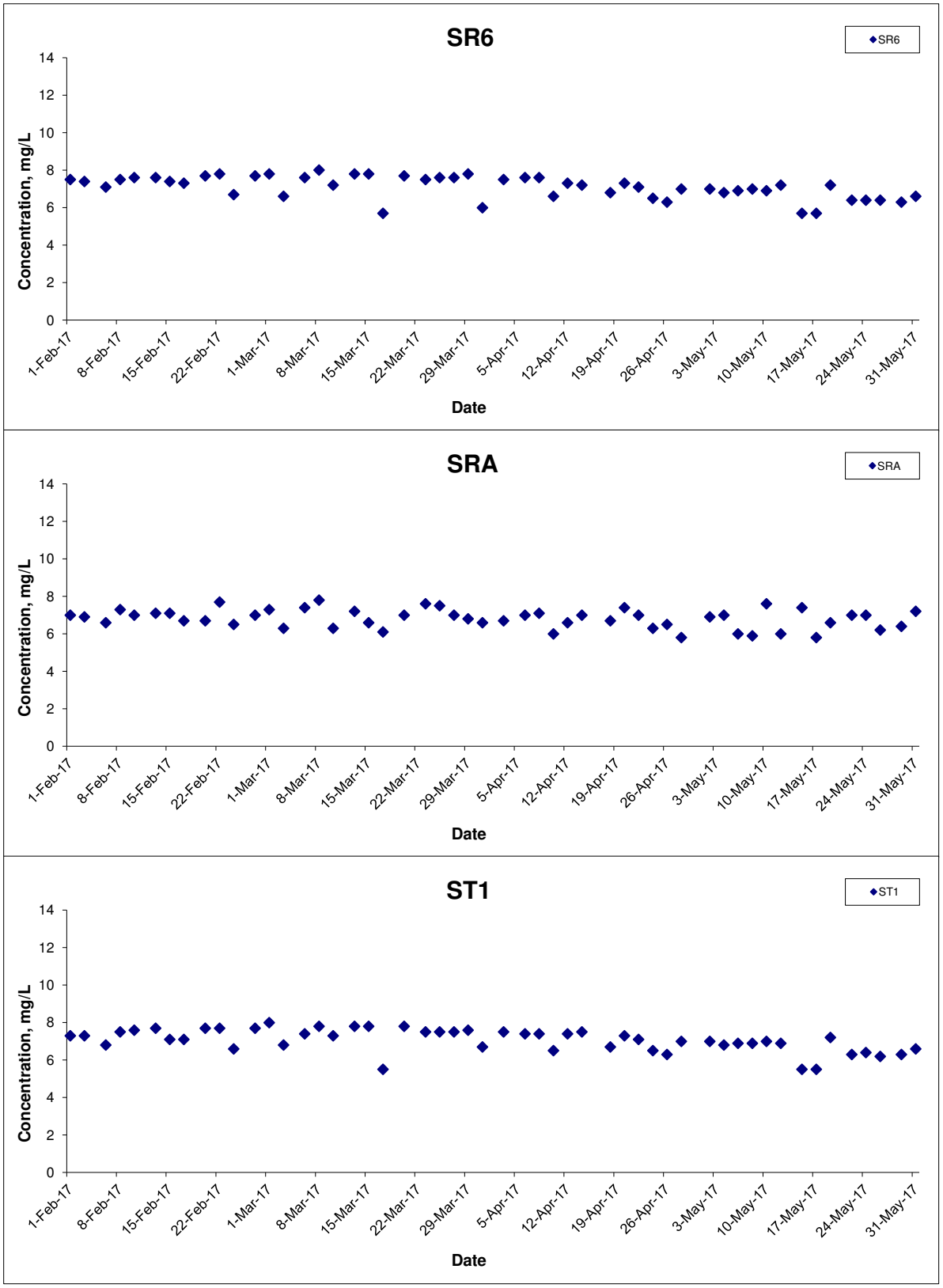
Dissolved Oxygen (Bottom) at Mid-Ebb Tide



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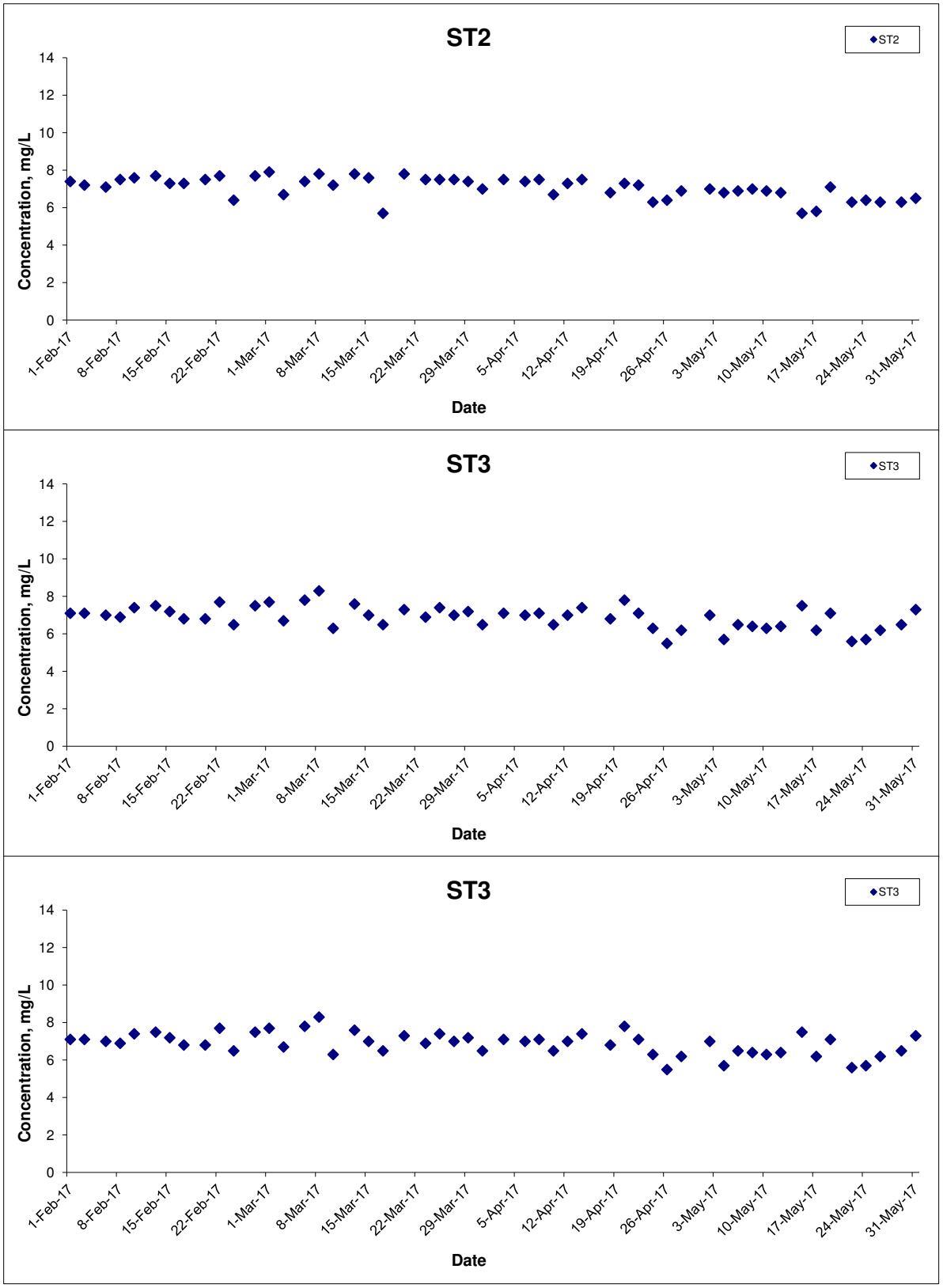

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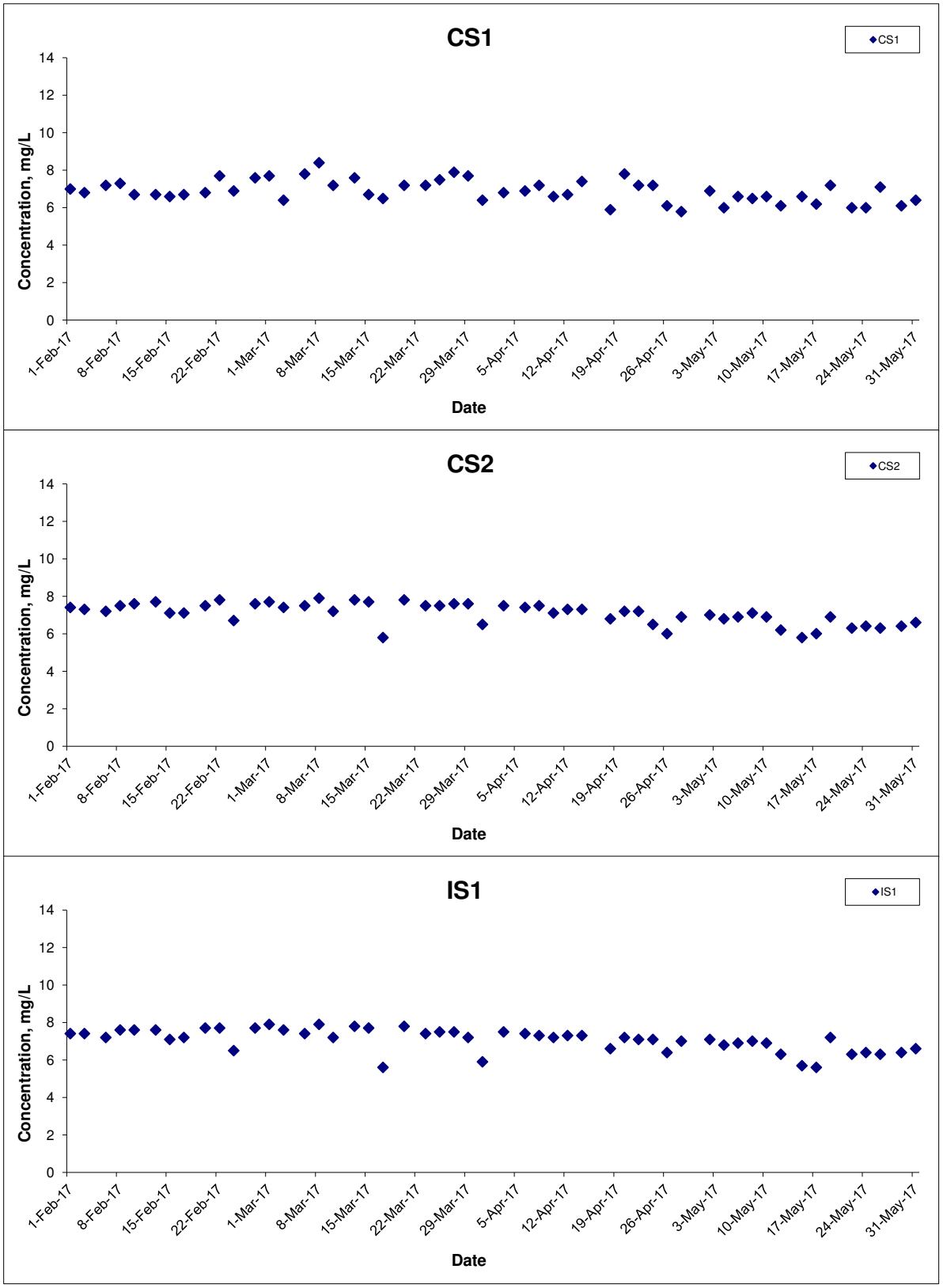
Dissolved Oxygen (Bottom) at Mid-Flood Tide



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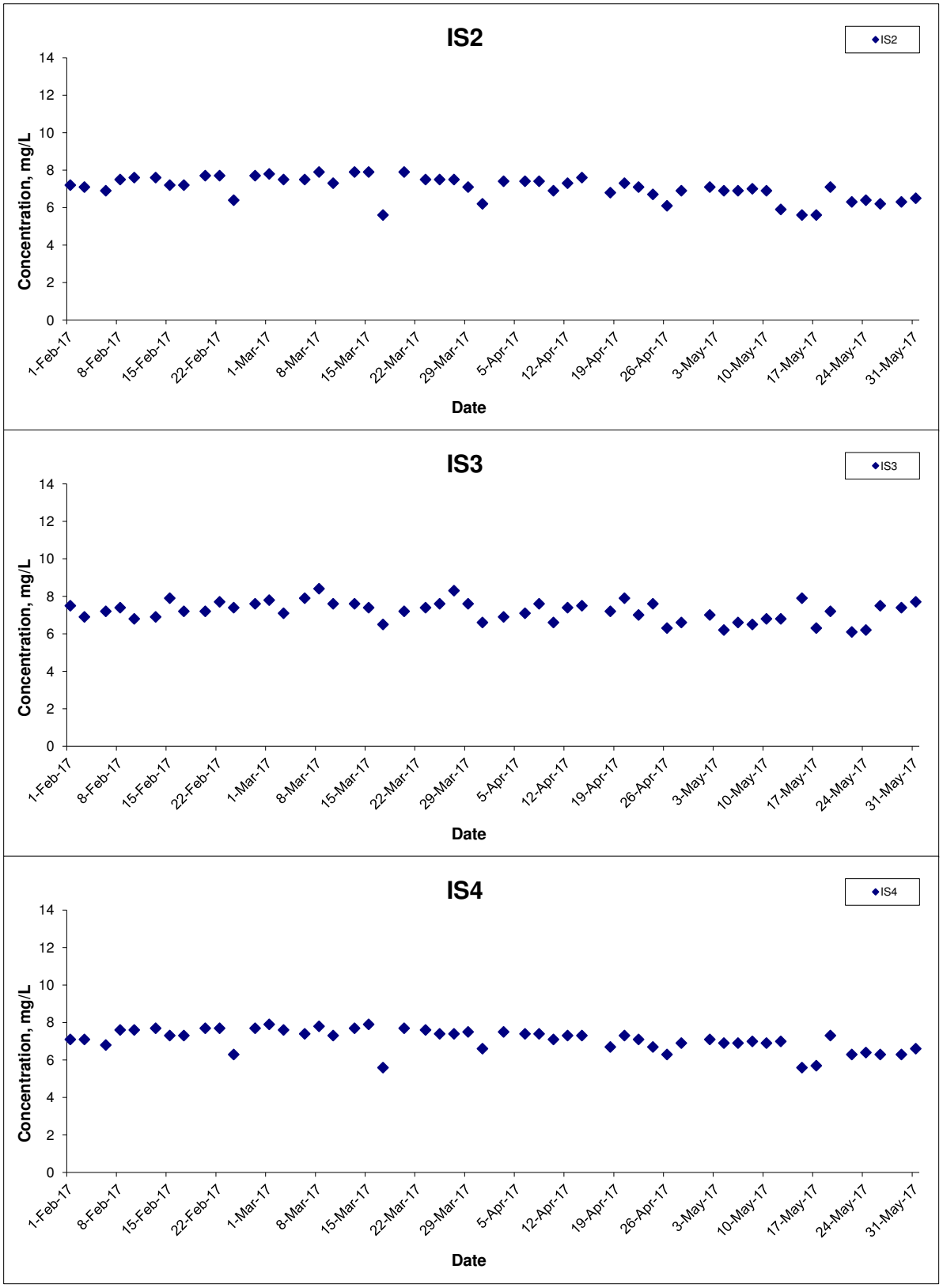

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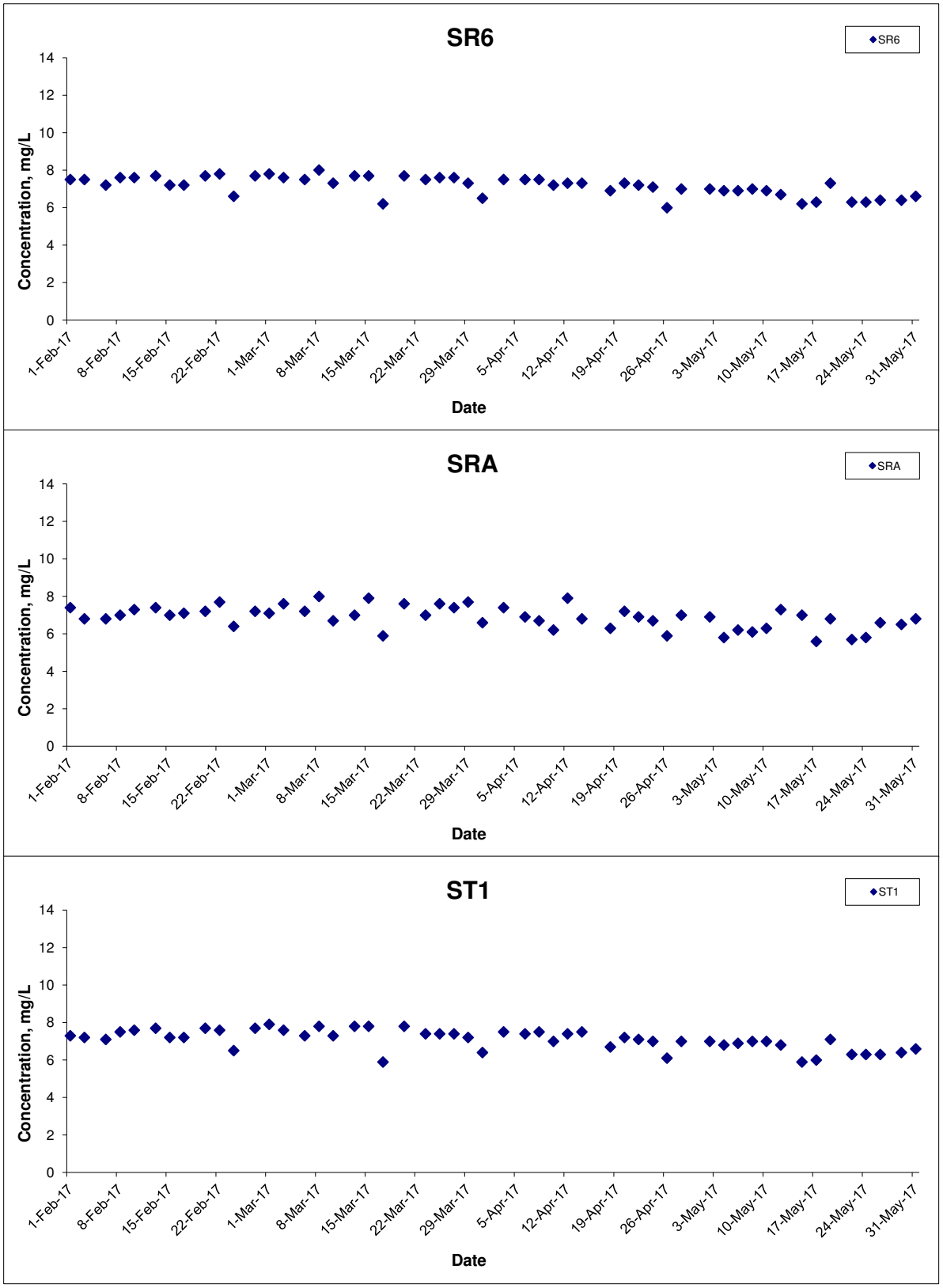

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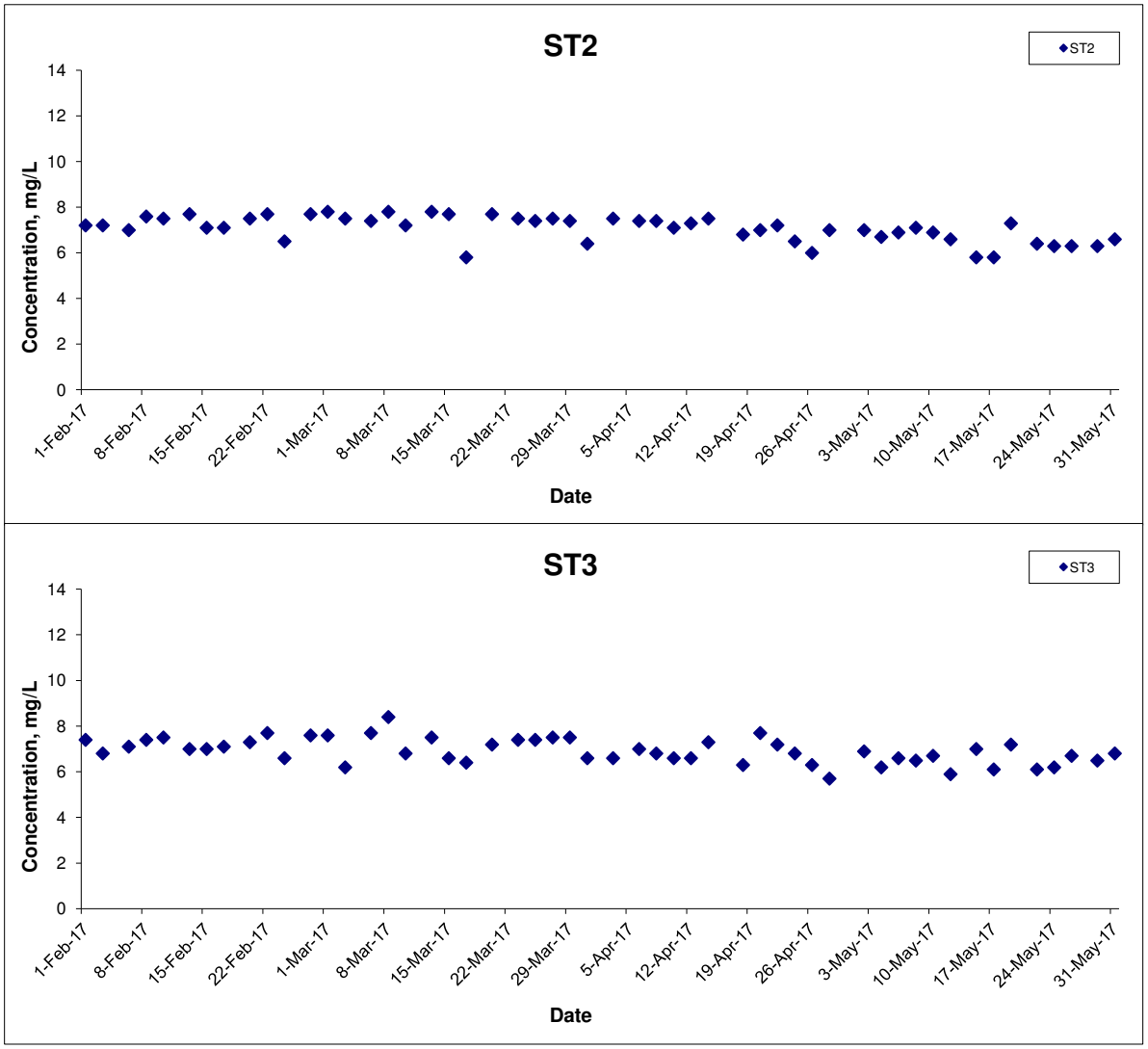

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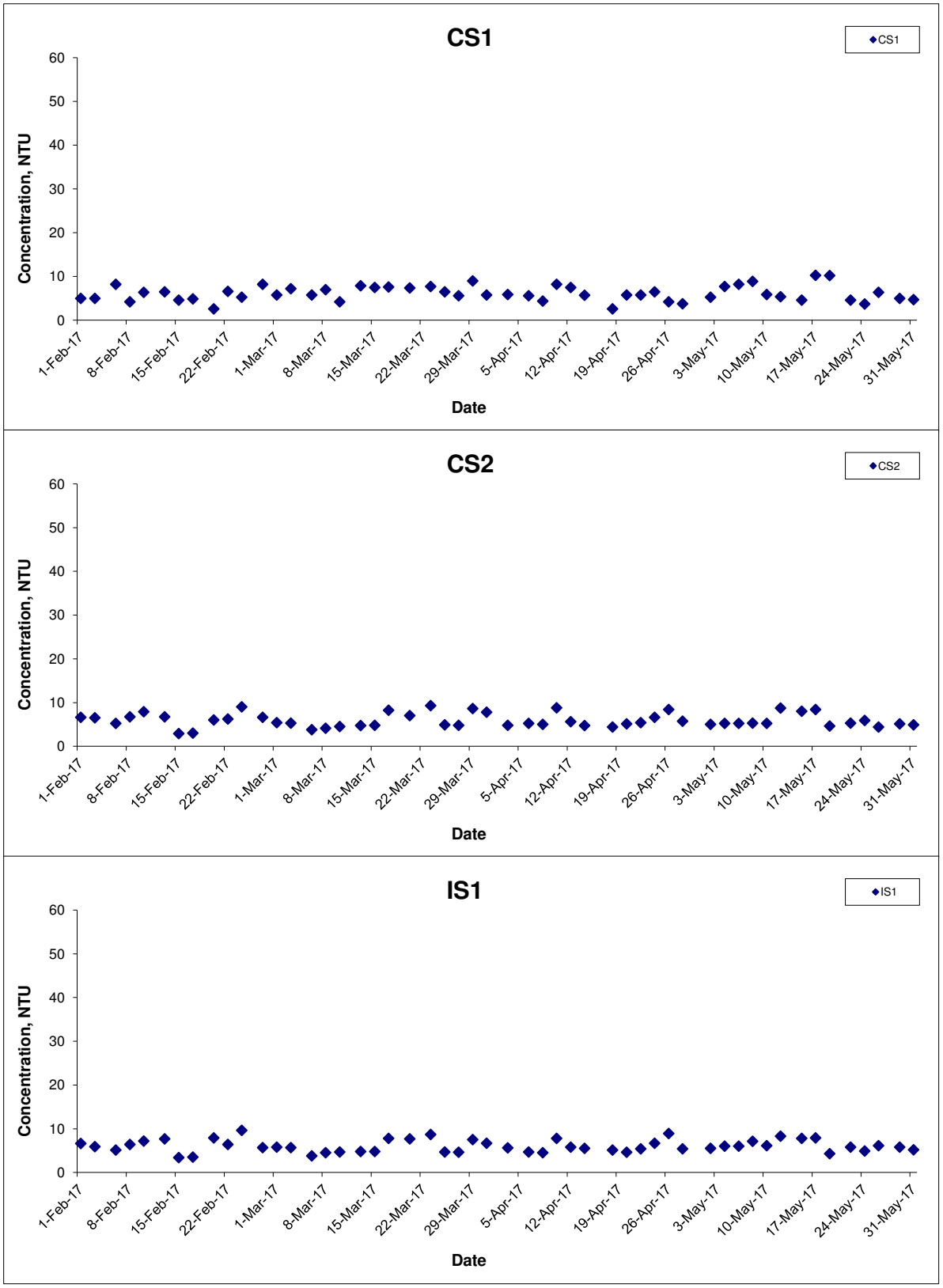
Turbidity (Depth-averaged) at Mid-Ebb Tide



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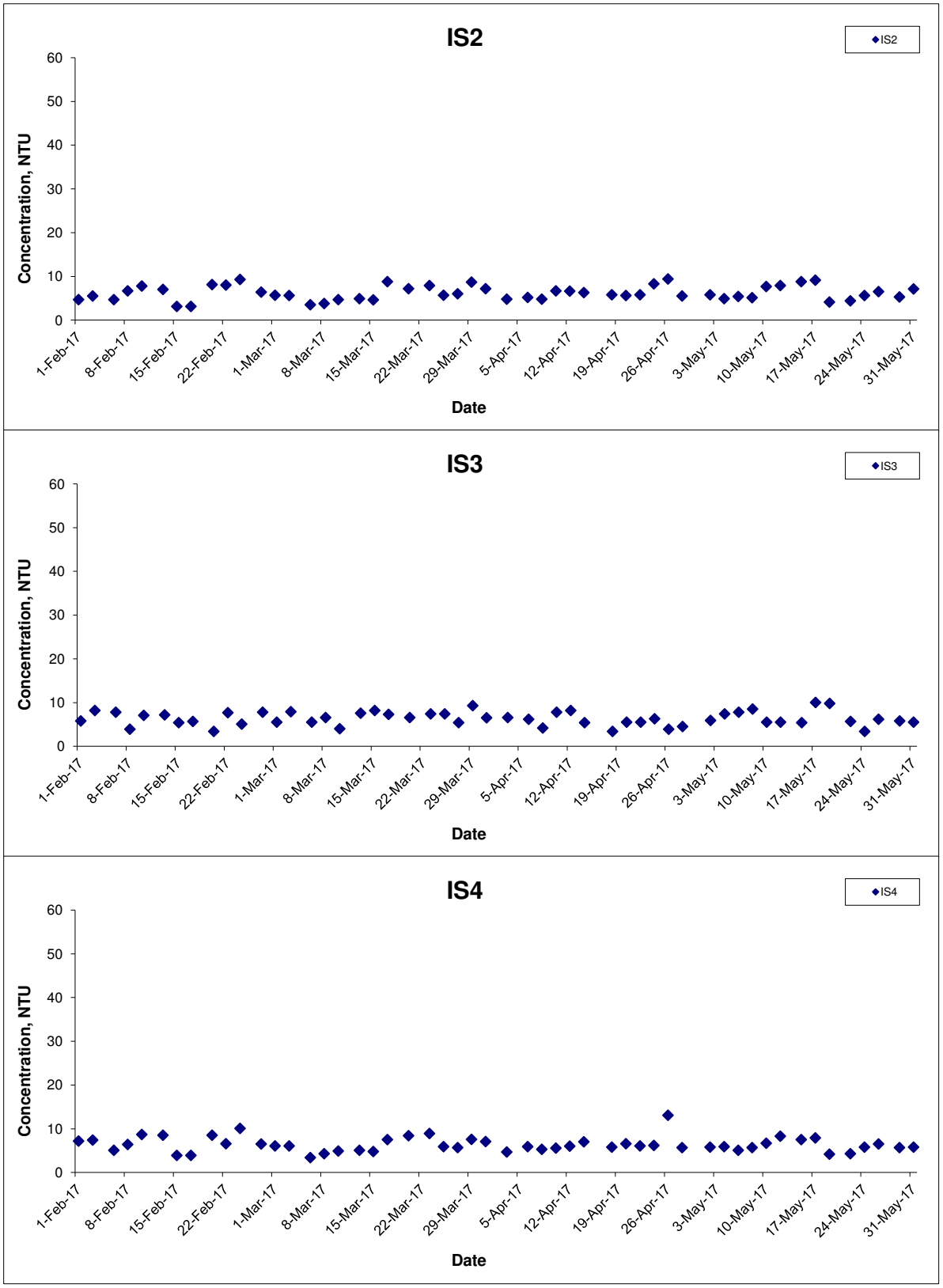

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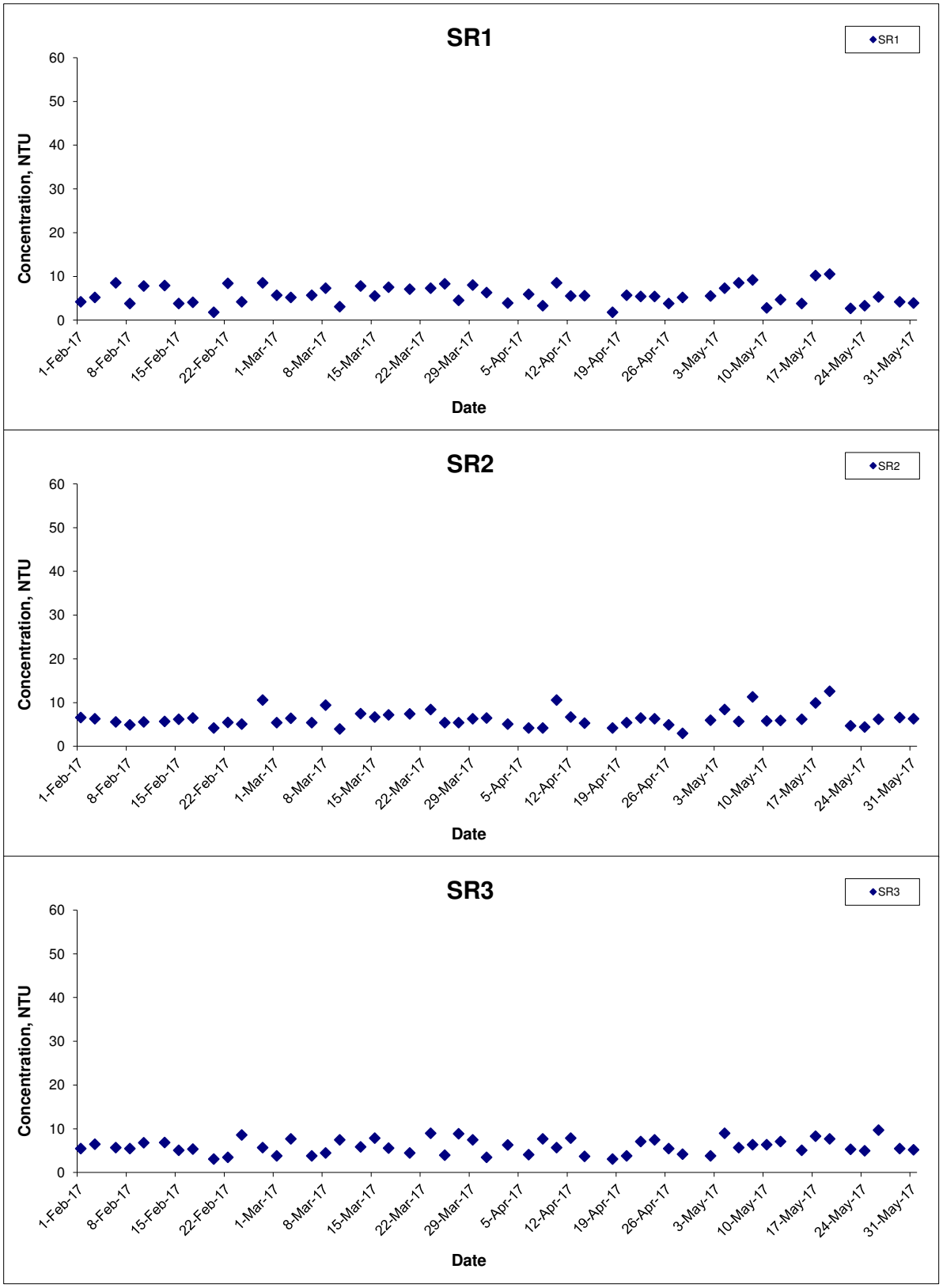

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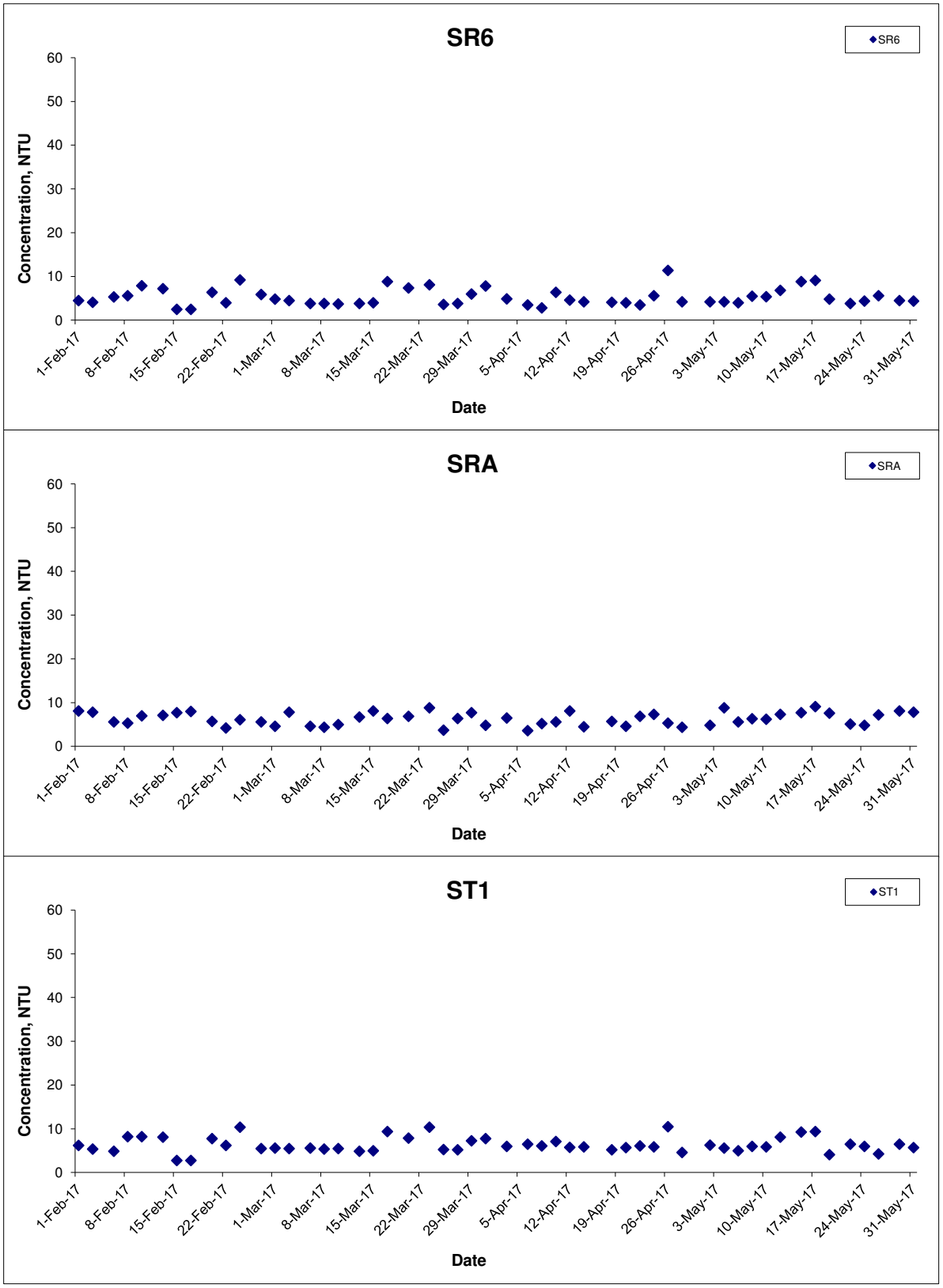

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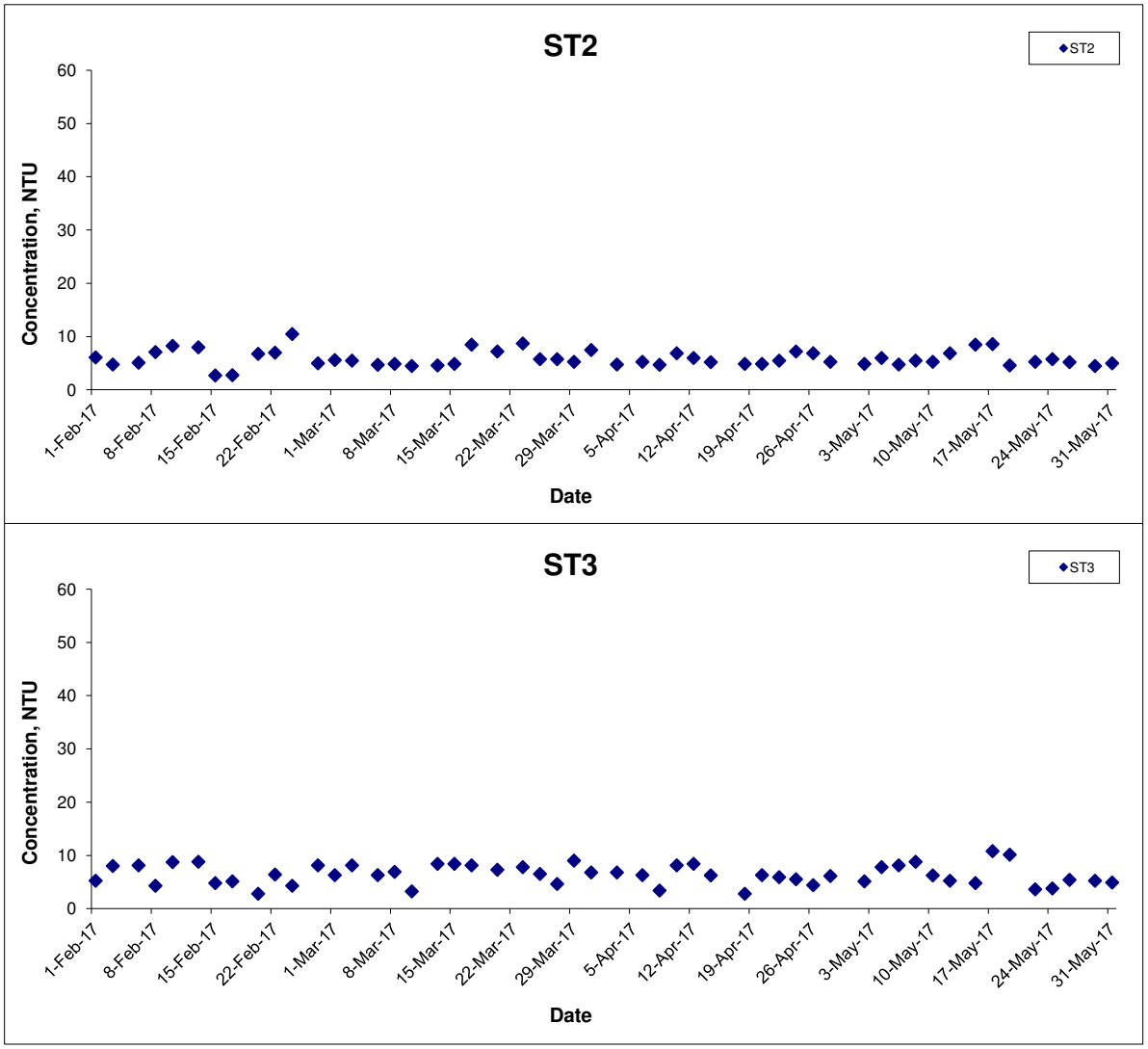
Turbidity (Depth-averaged) at Mid-Ebb Tide



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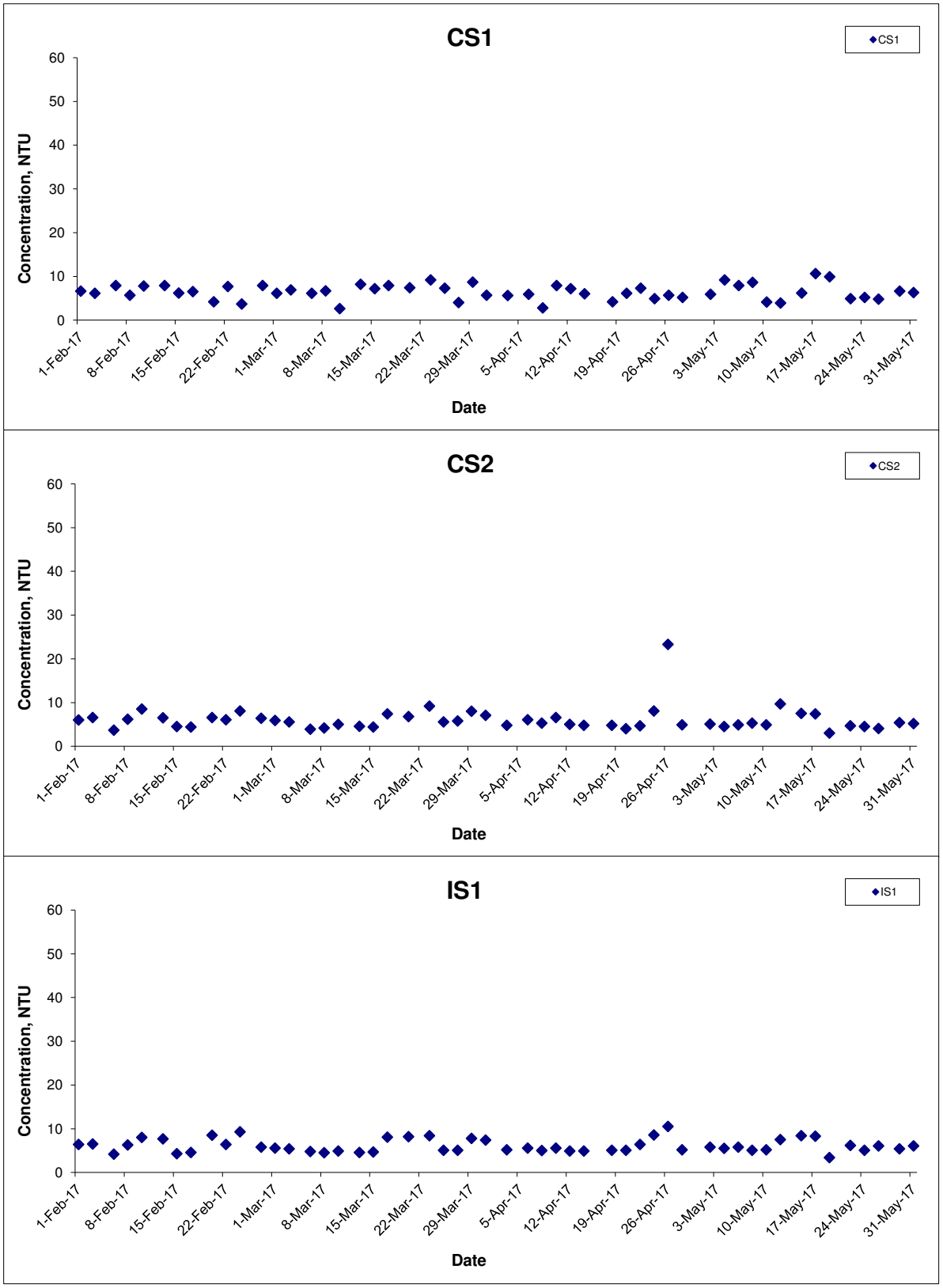
Turbidity (Depth-averaged) at Mid-Flood Tide



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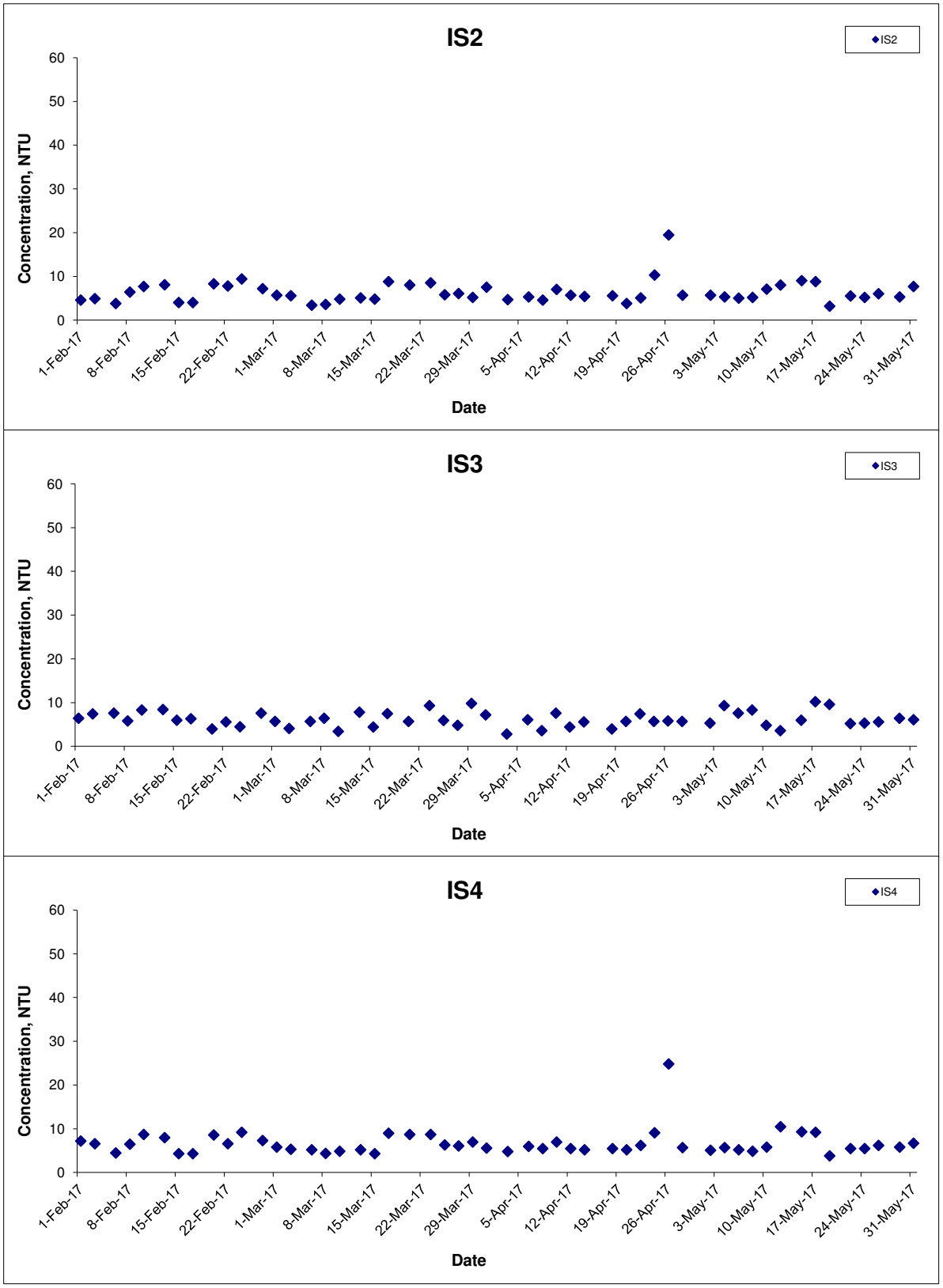

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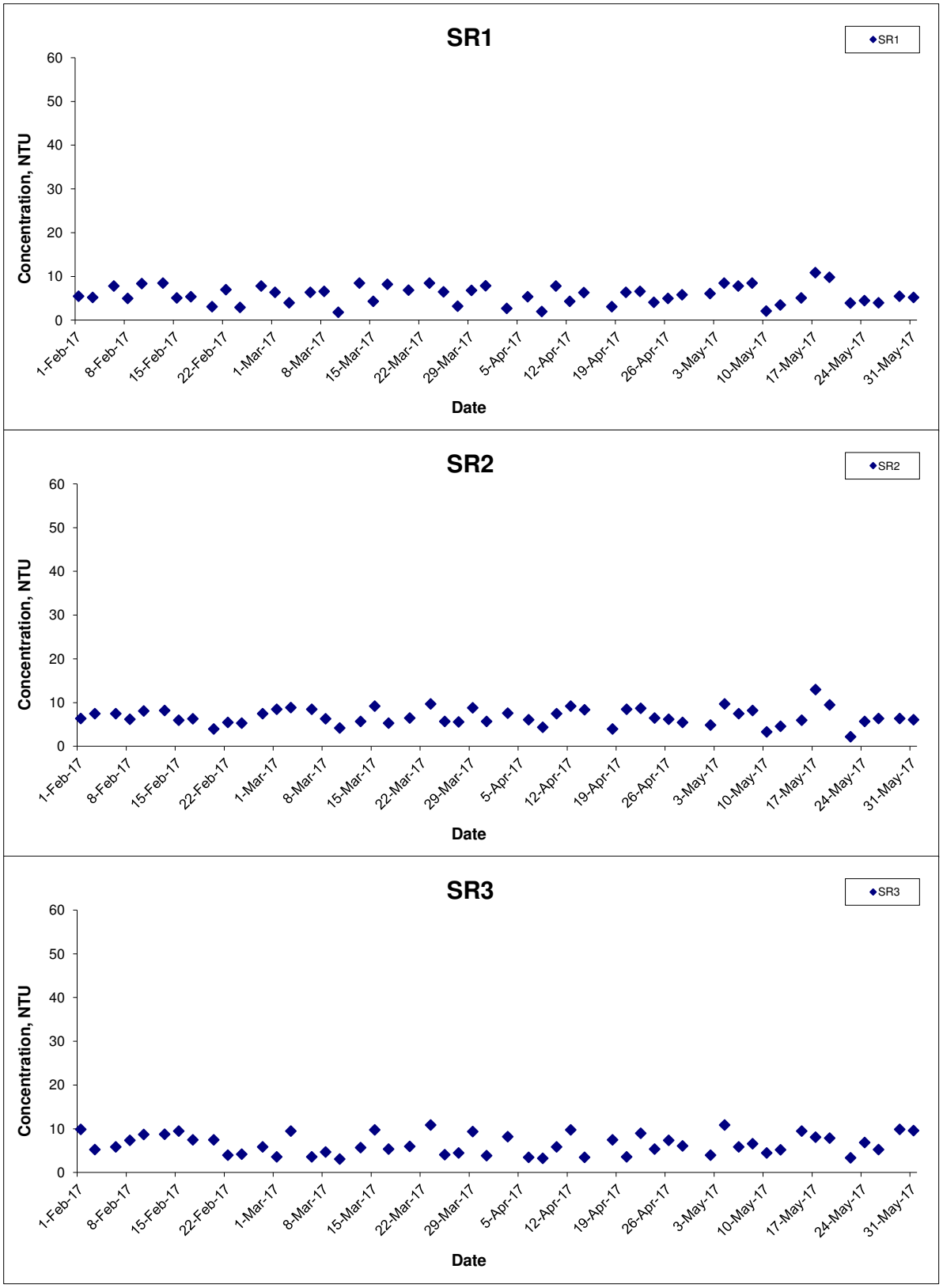
Turbidity (Depth-averaged) at Mid-Flood Tide



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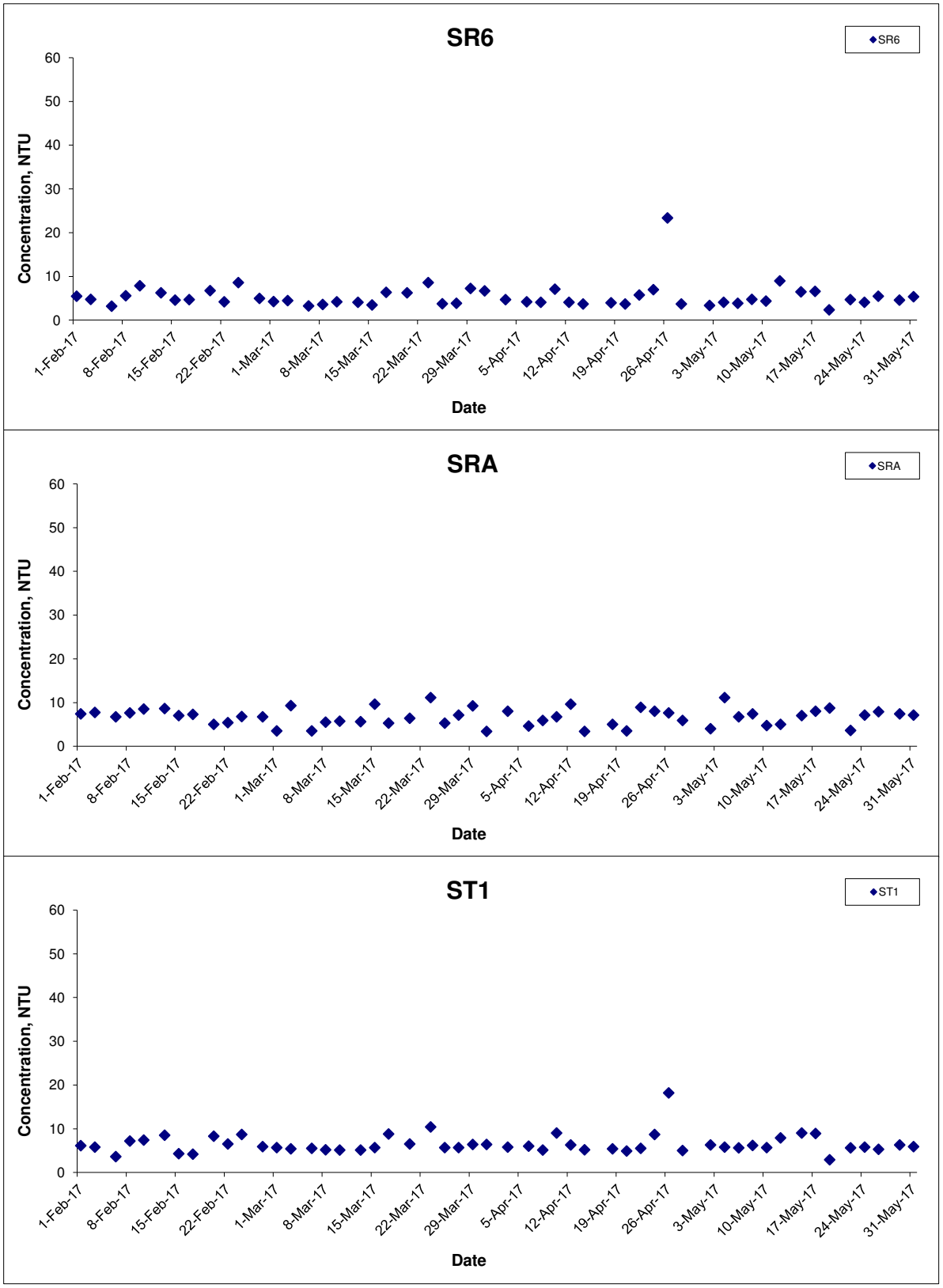
Turbidity (Depth-averaged) at Mid-Flood Tide



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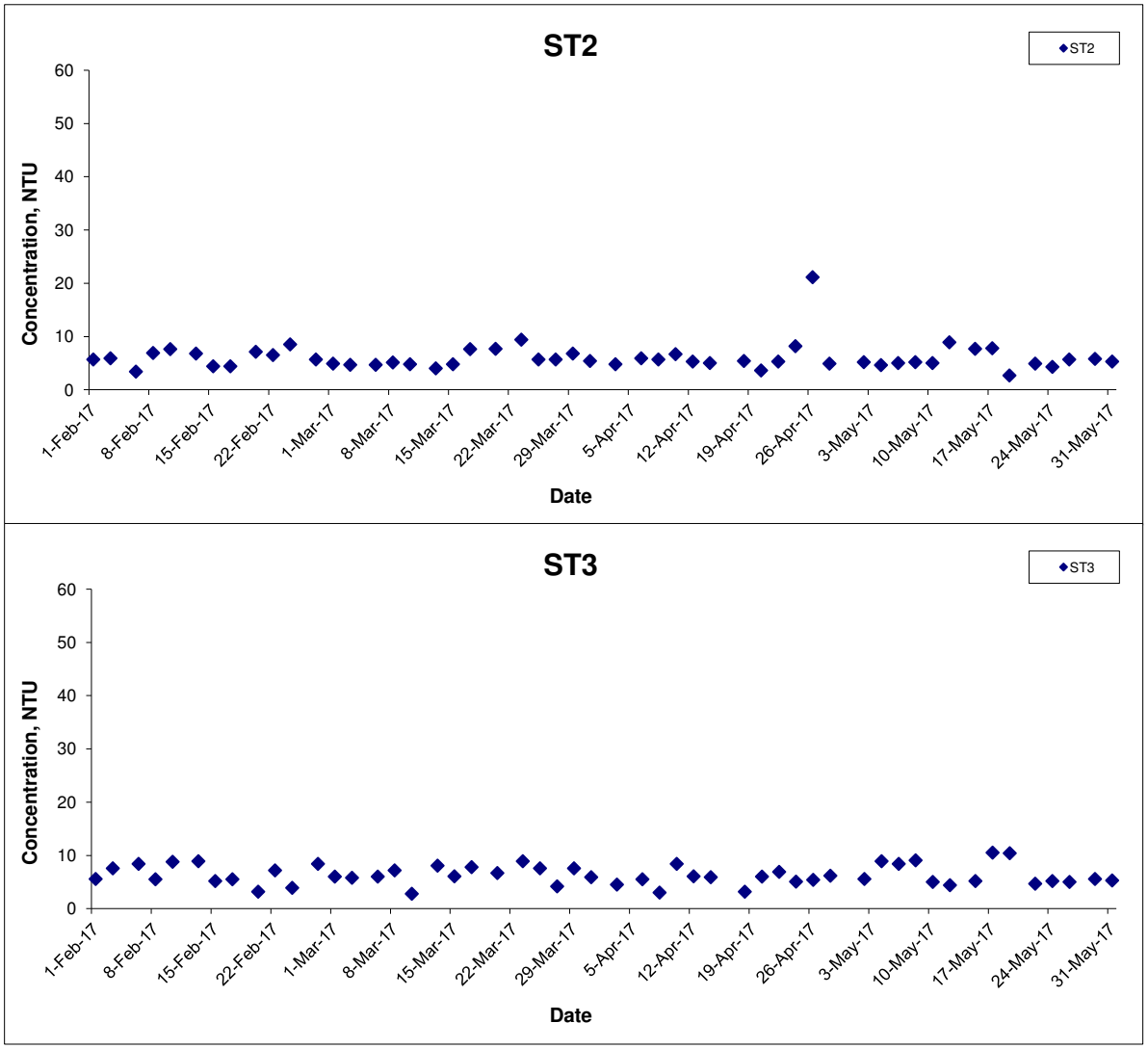
Turbidity (Depth-averaged) at Mid-Flood Tide



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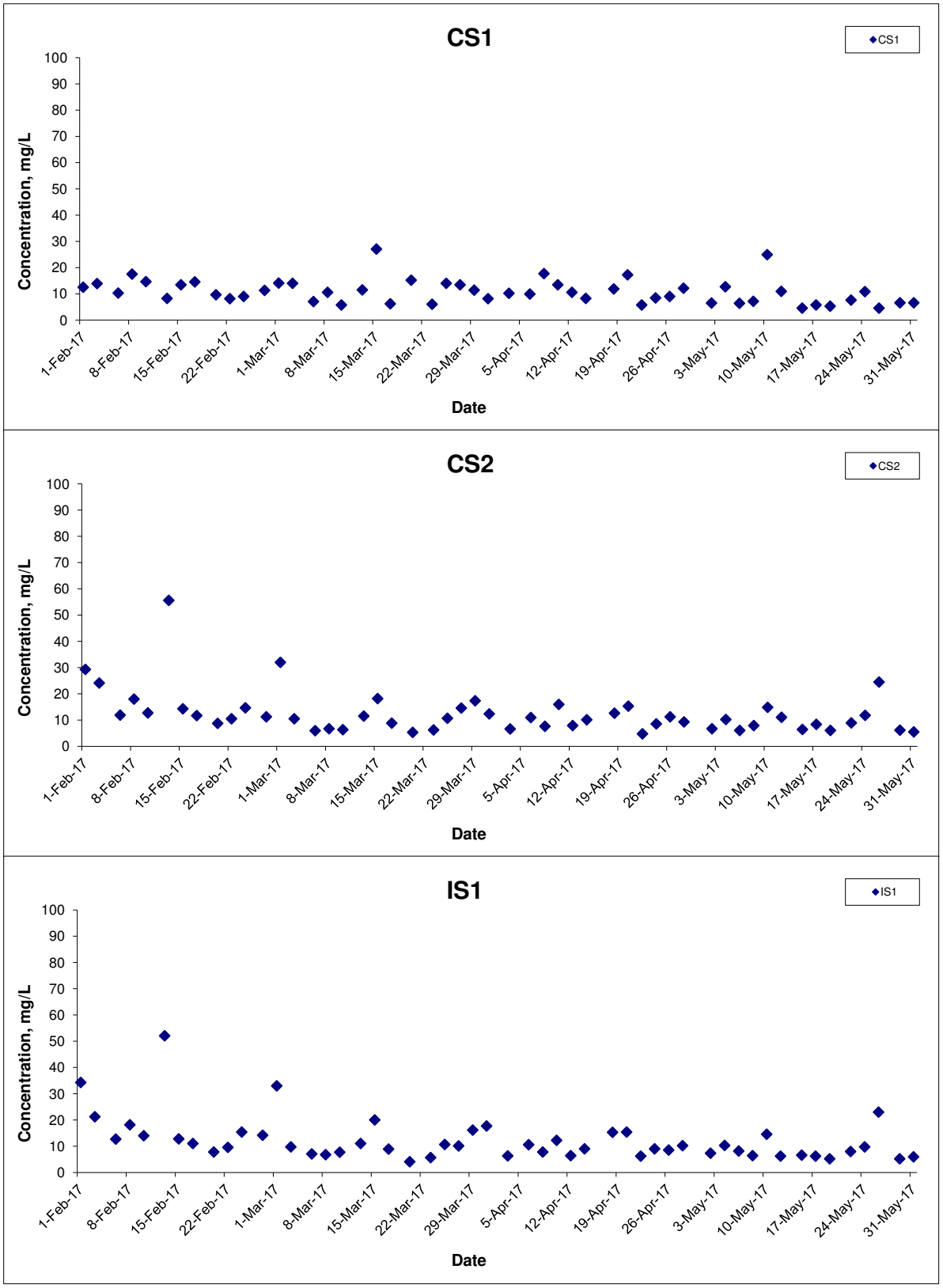
Suspended Solids (Depth-averaged) at Mid-Ebb Tide



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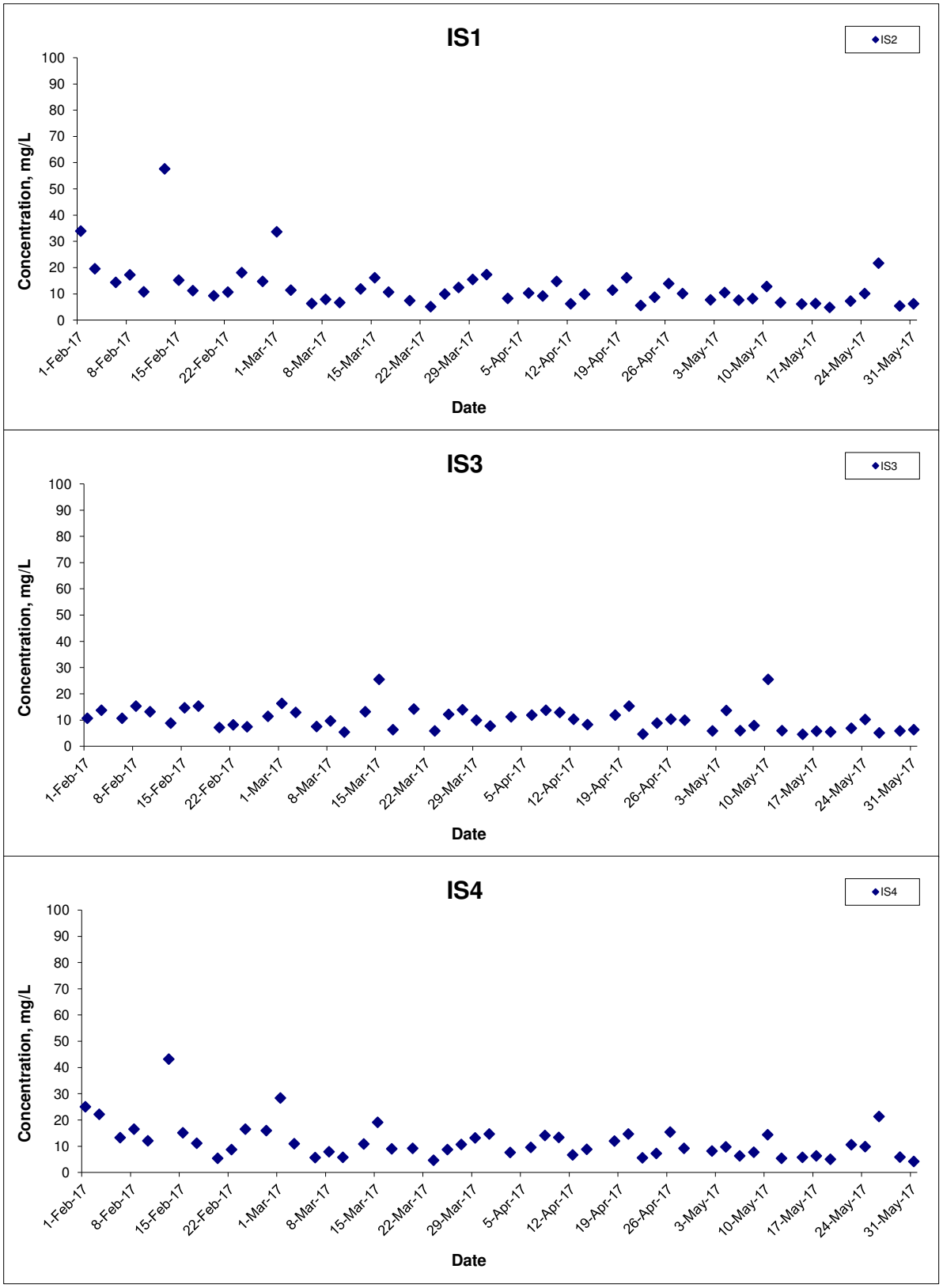

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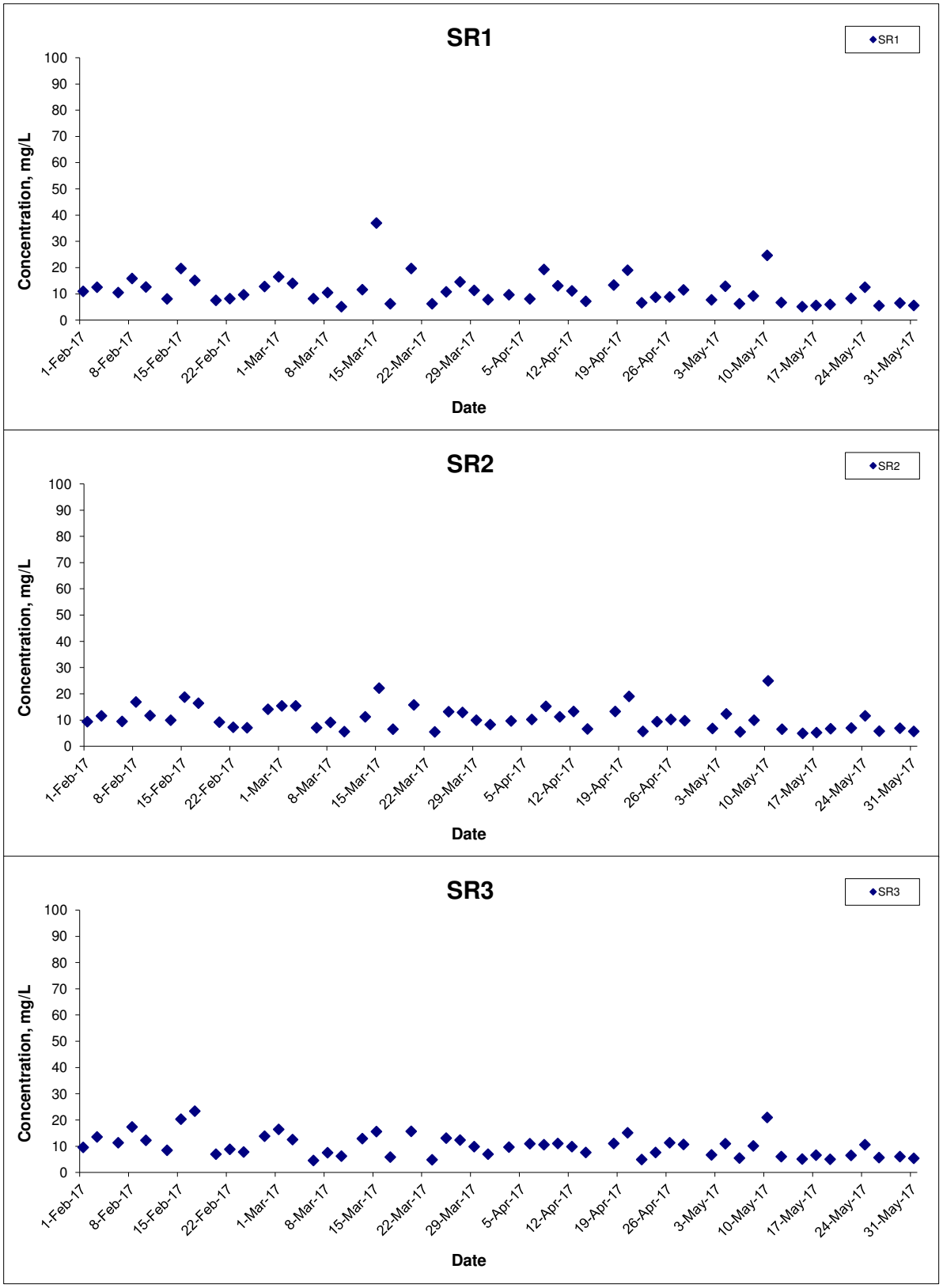

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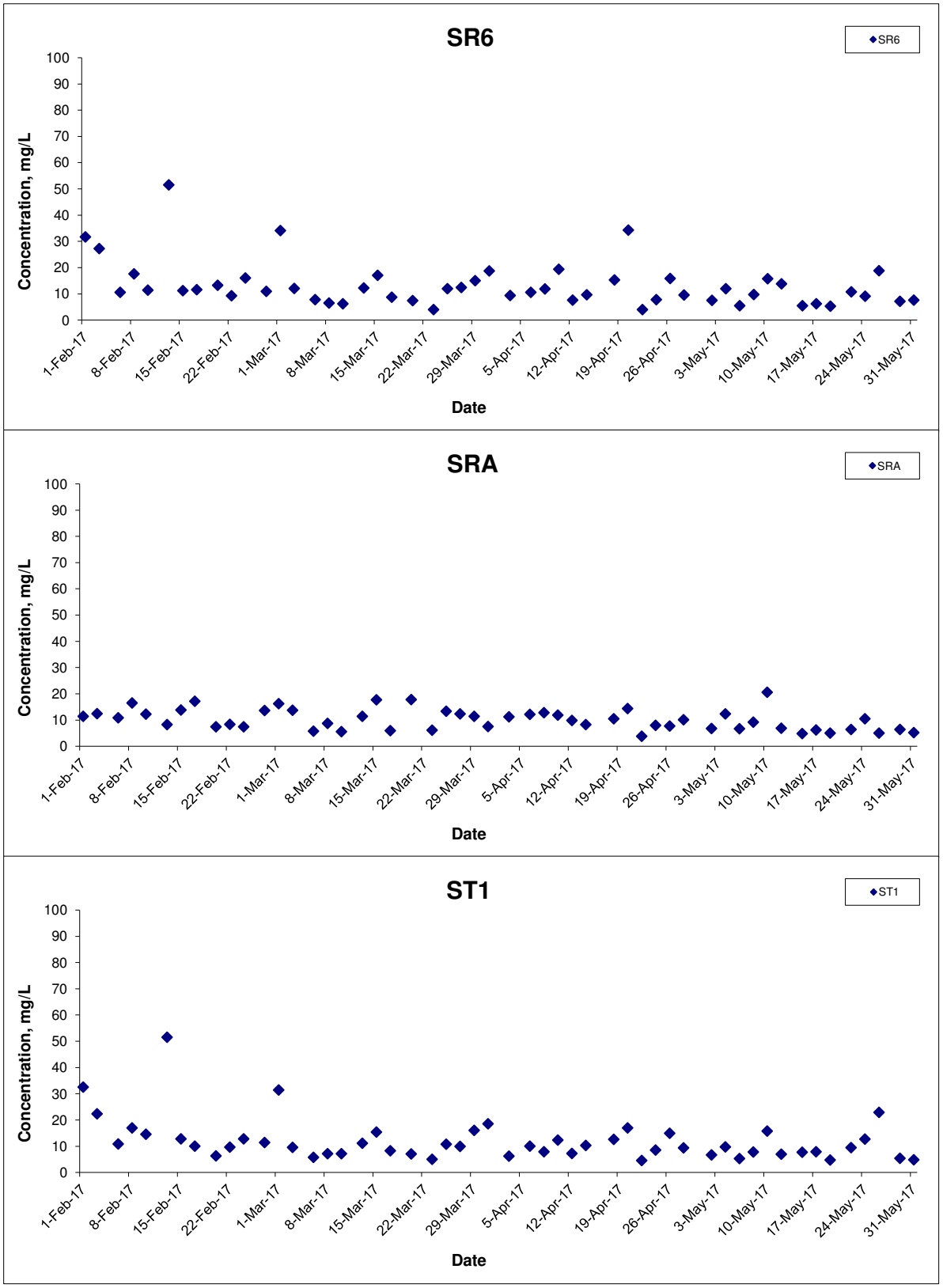

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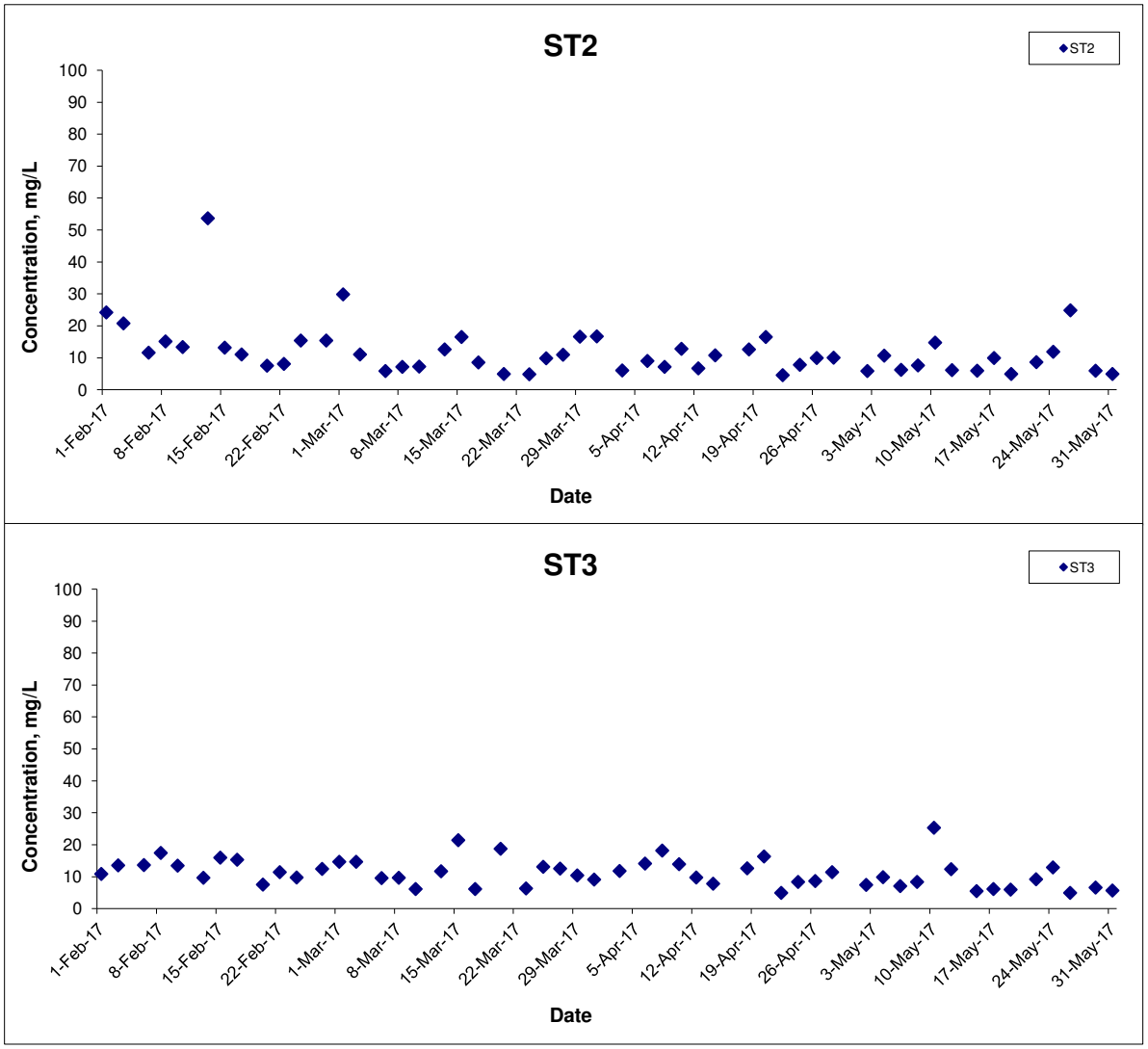
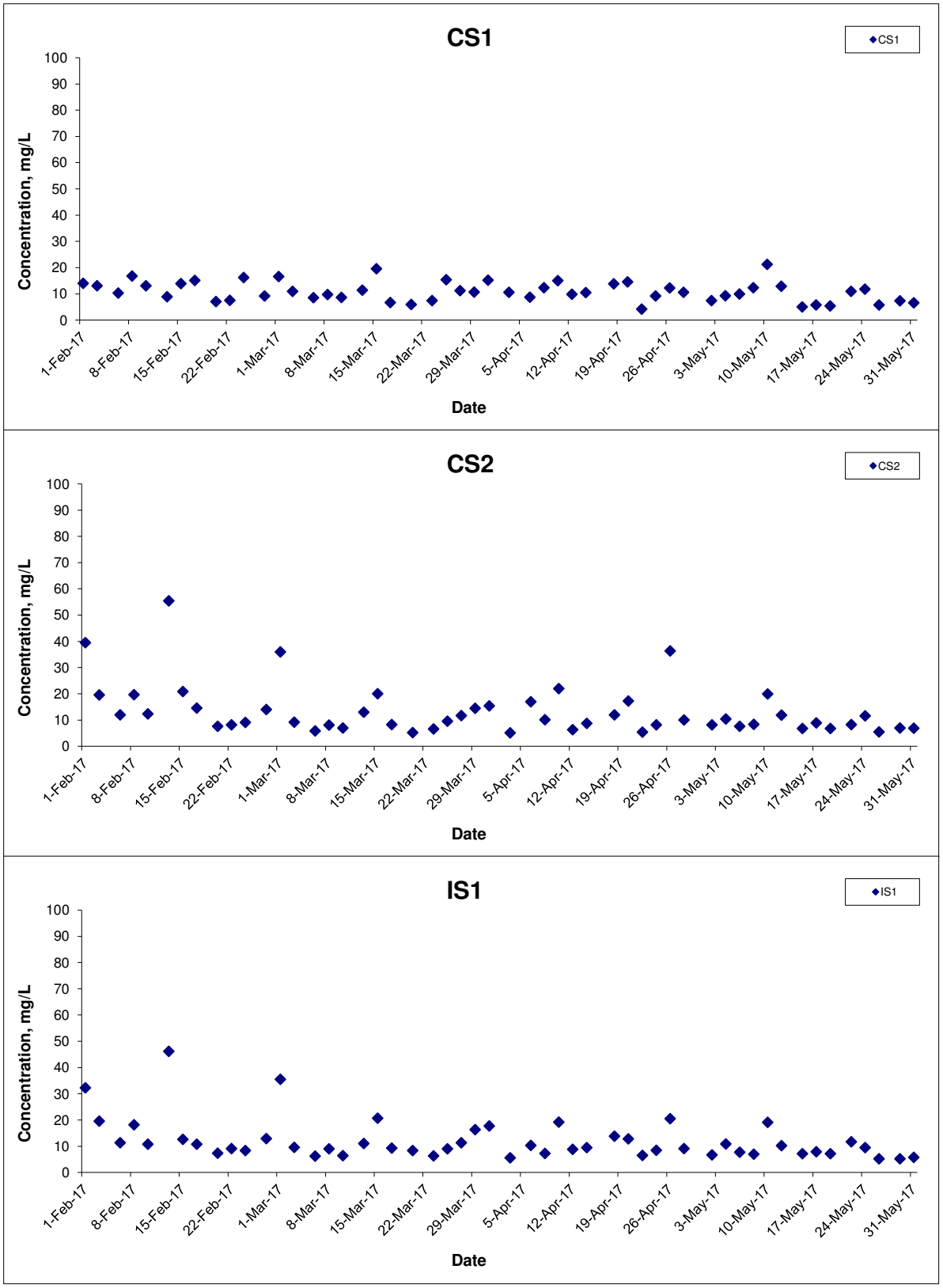
Suspended Solids (Depth-averaged) at Mid-Ebb Tide



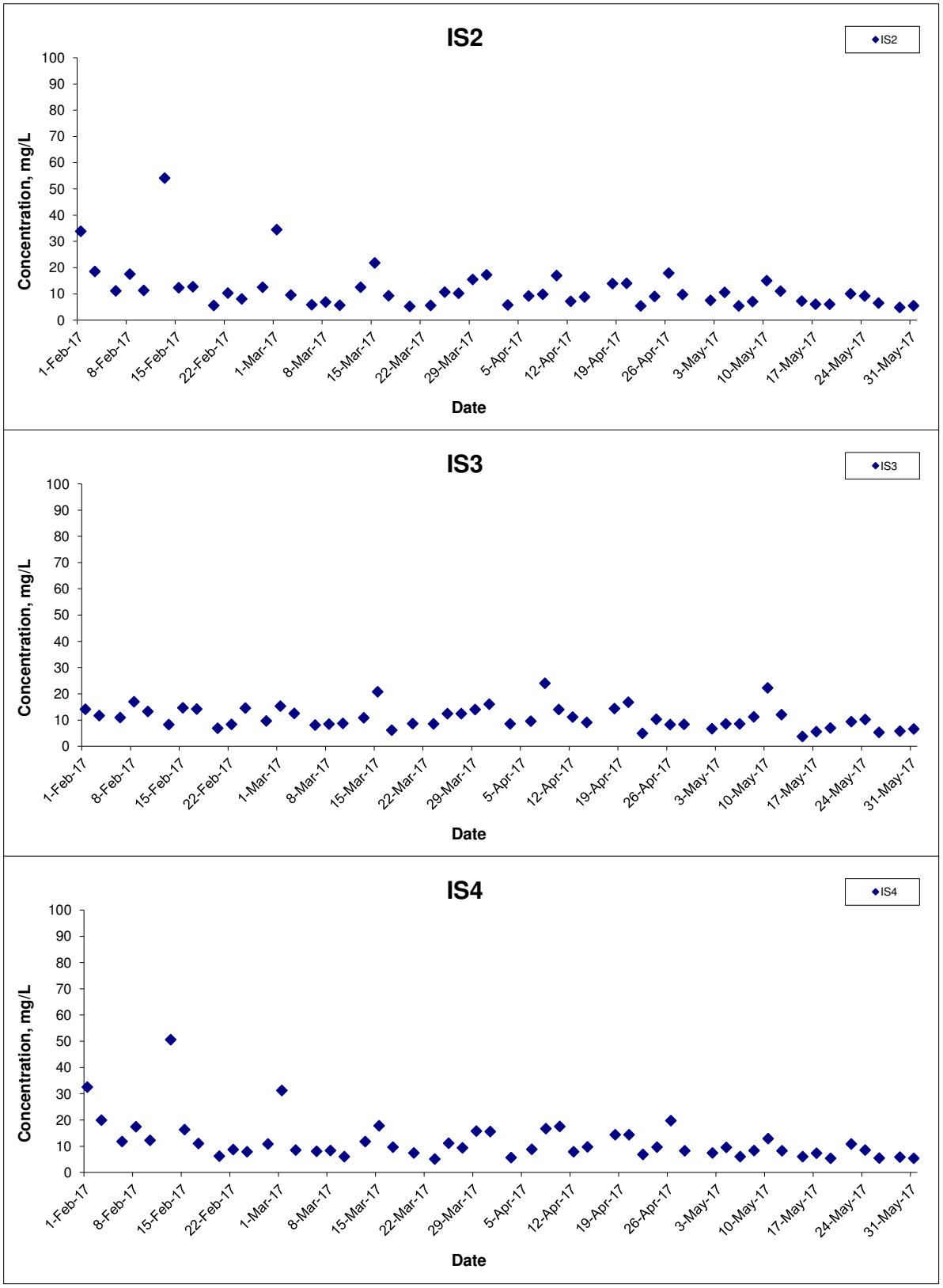
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S Date May 17	Project No. MA12014 Appendix H	CINOTECH

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



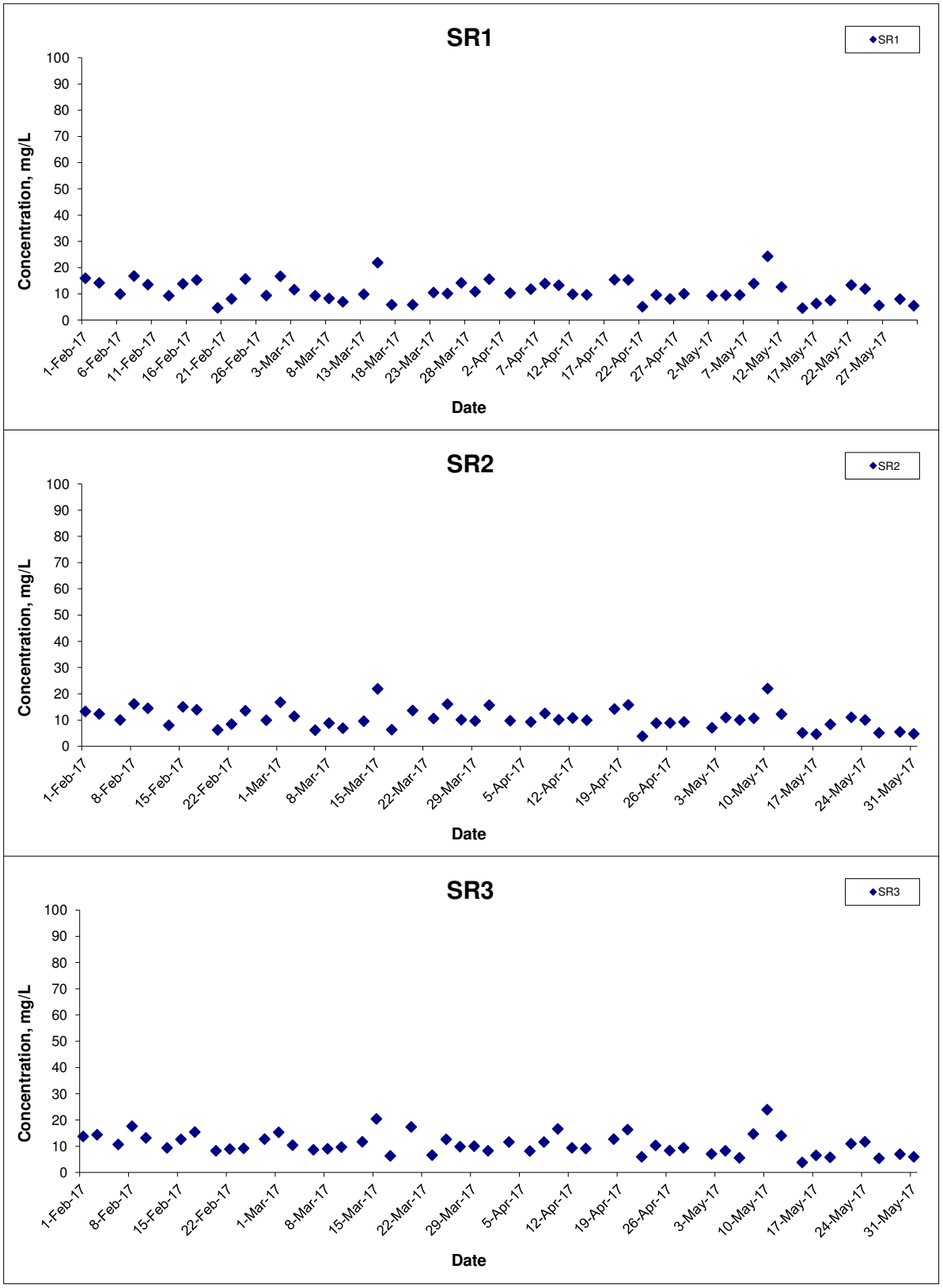
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S Date May 17	Project No. MA12014 Appendix H	CINOTECH

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



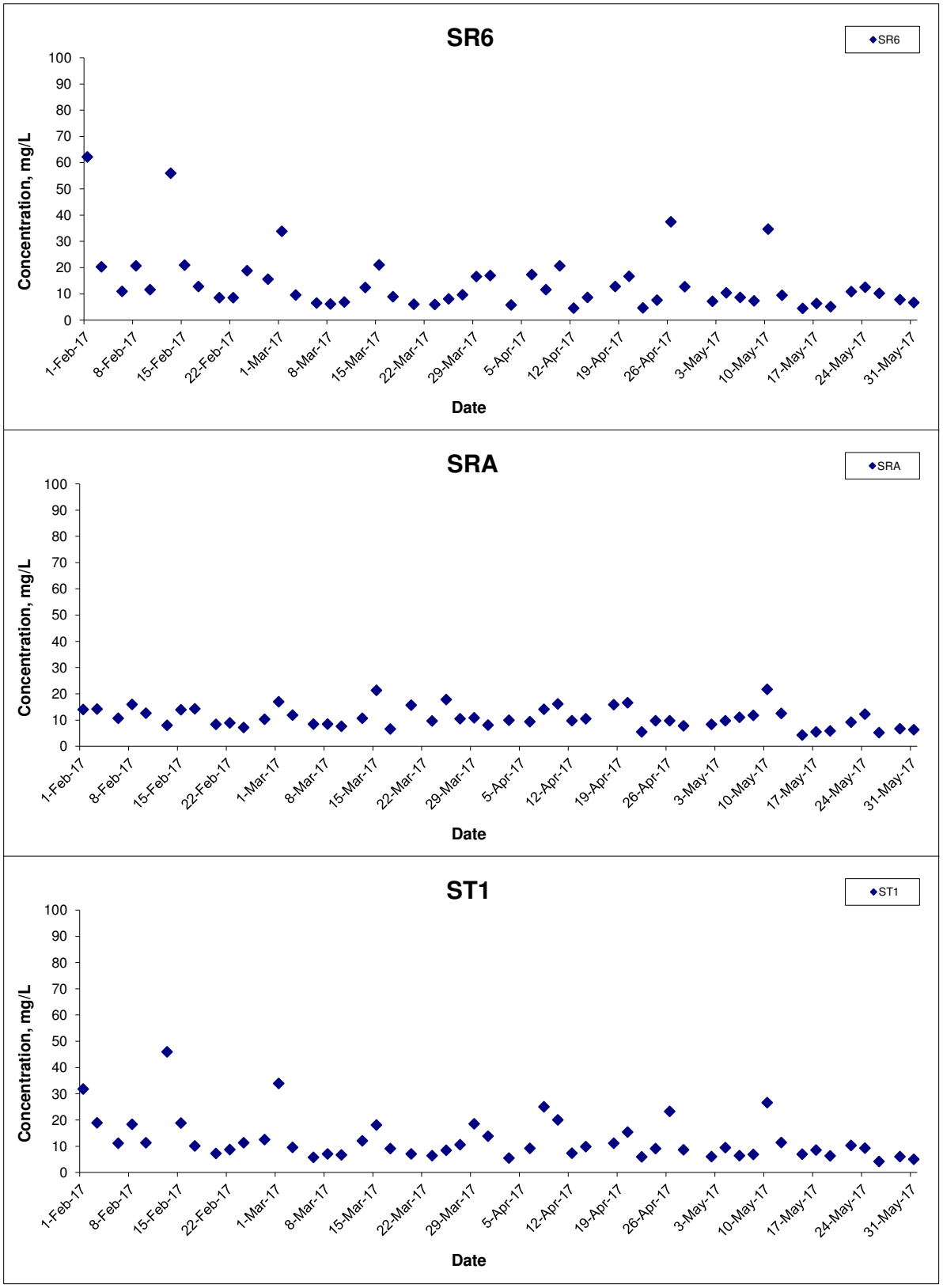
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: May 17	Appendix: H	

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



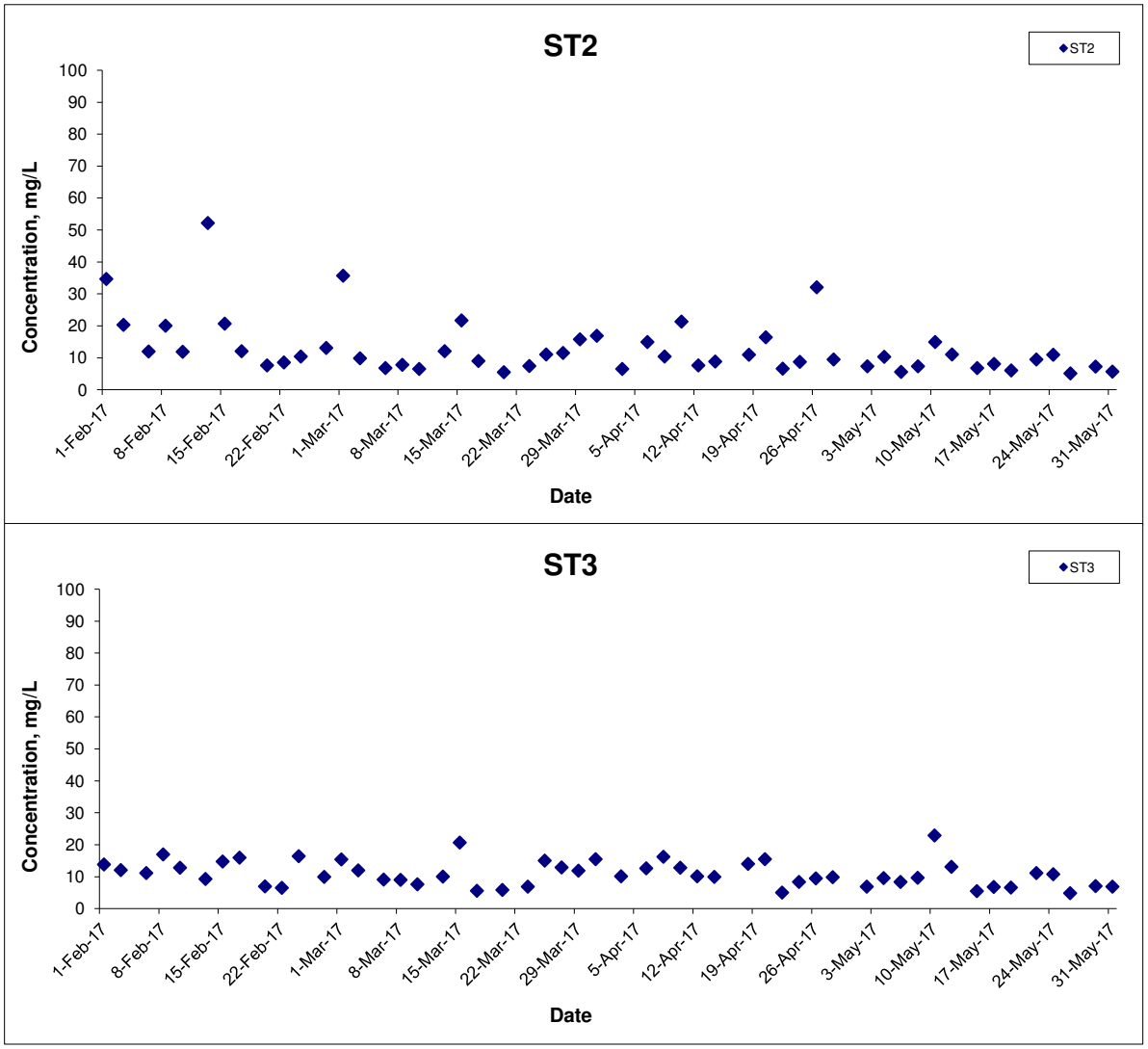
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: May 17	Appendix: H	

Suspended Solids (Depth-averaged) 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 May 17	Project No. MA12014 Appendix H	CINOTECH

Suspended Solids (Depth-averaged) 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 May 17	Project No. MA12014 Appendix H	CINOTECH

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

17th Quarterly Progress Report (March – May 2017)

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

22 June 2017

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 17th quarterly progress report under the HKLR09 construction

phase dolphin monitoring programme submitted to DCVJV, summarizing the results of the survey findings during the period of March to May 2017.

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 20 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2016). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched

for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270^{o} and 90^{o} (in relation to the bow, which is defined as 0^{o}). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

2.1.4. During on-effort survey periods, the survey team recorded effort data including time, 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*).

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 model), 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 March to May 2017, 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 193.77 km of survey effort was collected, with 89.4% 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 126.92 km, while the effort on secondary lines was 66.85 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 March to May 2017, a total of 17 groups of 63 Chinese White Dolphins were sighted. All except five dolphin sightings were made during on-effort search. Nine on-effort sightings were made on primary lines, while the other three 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 from March to May 2017 is shown in Figure 1. The dolphin groups were mostly distributed in the central portion of the survey area (i.e. between Tai O Peninsula and Peaked Hill) during the quarterly period (Figure 1). On the contrary, they did not occur at the northern section of the survey area near the HKLR09 alignment, and only a few sightings were made at the southern section near Fan Lau (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 to the north of Tai O Peninsula and near Fan Lau during the present impact phase period (Figure 1).

3.2.3. None of the 17 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 spring quarter of 2017, no dolphin was sighted at all in the proximity of the entire HKLR09 alignment during the same quarter, which is in stark contrast from such occurrence in the baseline phase in 2011 (Figure 2).

3.2.4. Similar to the previous monitoring quarters, dolphins have mostly avoided the HKLR09 alignment during the present quarterly period. Even though disturbance arisen from the HKLR09 construction activities on the dolphins have noticeably diminished since most piling works at sea have been completed in 2016, dolphins consistently did not utilize the waters in the vicinity of the bridge alignment. This could be related to the potential obstruction from the permanent physical structure of the bridge piers, which should be continuously monitored in the upcoming quarters through boat surveys and land-based theodolite tracking survey.

3.2.5. Distribution patterns of dolphin sightings in the past three spring quarters of 2014-16 were also compared with the one in 2017. Such distribution patterns were similar across the four-year period, and the only obvious difference was

their infrequent occurrence in the southern portion of the survey area in 2017 in comparison to the previous years (Figure 3).

3.3. Encounter rate

3.3.1. During the present three-month impact phase monitoring period (March to May 2017), 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 (March – May 2017)

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 (March 1st)	5.6	11.2
	Set 2 (March 13th)	4.7	4.7
	Set 3 (April 5th)	0.0	0.0
	Set 4 (April 13th)	14.9	64.5
	Set 5 (May 8th)	9.7	19.4
	Set 6 (May 19th)	9.7	29.1

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March to May 2017) 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)	
	March – May 2017	**September-November 2011**	**March – May 2017**	**September-November 2011**
West Lantau	7.43 ± 5.13	16.43 ± 7.70	21.48 ± 23.49	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 6.3 sightings and 20.8 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 spring quarter of 2017 dropped to the lowest since impact phase monitoring commenced in spring 2013, and were much lower than the baseline level (Table 4). Moreover, the Action Level under the Event and Action Plan for this quarter was triggered for the first time during the four-year impact phase monitoring period. It is critical to continuously monitor such temporal trend, as the dolphin usage continued to diminish in recent quarters even though the HKLR09 construction works have been completed in 2016.

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 spring 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
December 2016-February 2017 (Impact)	13.58 ± 7.47	46.73 ± 41.18
March-May 2017 (Impact)	7.43 ± 5.13	21.48 ± 23.49

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. the sixteenth quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.038 and 0.0600 respectively. Therefore, if the alpha value is set at 0.05, significant difference in encounter rates of STG was detected between the baseline period and the present quarter, but not for the encounter rates of ANI.

3.3.5. Another comparison was made between the baseline period and the 16 cumulative quarters in the impact phase, and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.594 and 0.741 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 13 individuals per group in WL survey area during March to May 2017. 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 (March-May 2017) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	March – May 2017	**September – November 2011**
West Lantau	3.71 ± 2.95 (n = 17)	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 17 groups, 13 of them were composed of only 1-4 dolphins, while there were three groups in moderate size with 5-7 animals per group, and one large group with 13 animals.

3.4.3. Distribution of dolphins with larger group sizes during March to May 2017 is shown in Figure 4. The three medium-sized group of 5-7 animals were clustered near Kai Kung Shan and Peaked Hill in the central portion of the survey area, while the one large group of 13 animals was sighted near Fan Lau (Figure 4).

3.4.4. Distribution of the larger dolphin groups in the present impact phase period was quite different from the baseline period, when these groups were sighted more often near Tai O Peninsula and Yi O (Figure 4).

3.5. Habitat use

3.5.1. From March to May 2017, the grids that recorded higher densities of dolphins were found near Kai Kung Shan, while the waters to the southwest of Tai O Peninsula was also moderately used by them (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 high density grids of dolphins were much less evenly distributed in the present impact phase monitoring period, and the overall dolphin densities were much lower in certain areas such as the waters just to the south of the HKLR09 alignment and near Fan Lau (Figure 6).

3.6. Mother-calf pairs

3.6.1. During the three-month impact phase monitoring period, no young calf was sighted at all among the 17 groups of dolphins. In fact, this was the second consecutive quarters with no calf occurrence recorded in WL waters.

3.7. Activities and associations with fishing boats

3.7.1. During the three-month impact monitoring period, only one dolphin group was engaged in feeding activity near Fan Lau (Figure 7), comprising 5.9% of the total number of dolphin sightings. Such percentage was much lower than the one recorded during the baseline period (13.0%).

3.7.2. Moreover, one dolphin group was engaged in socializing activity near Kai Kung Shan (Figure 7), comprising 5.9% of the total number of dolphin sightings. No dolphin group was engaged in traveling or milling/resting activity during the present quarter.

3.7.3. Distribution of different activities during the present impact phase monitoring period was very different from the one during the baseline period, when the feeding activities were much more frequent and located in the central portion of

the WL survey area (Figure 7).

3.7.4. During the three-month monitoring period, none of the 17 dolphin groups was associated with any operating fishing vessel.

3.8. Summary of photo-identification works

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

3.8.2. In total, 36 individuals sighted 45 times altogether were identified (see the summary table in Appendix III and photographs of identified individuals in Appendix IV). The majority of them were sighted only once or twice during the three-month period, while three individuals (WL66, WL79 & WL211) were re-sighted thrice during the quarterly period (Appendix III).

3.8.3. Notably, two of these individuals (i.e. NL226 and NL259) were also sighted in North Lantau waters during the HKLR03 monitoring surveys in the same three-month period, showing some level of individual movements across the HKLR09 bridge alignment. Moreover, one individual (SL60) sighted during the HKLR09 monitoring surveys in the present quarter were also found in SWL waters.

3.8.4. As in previous quarters, several individuals that were consistently sighted in North Lantau waters in the past were identified in West Lantau waters (e.g. NL226, NL259, NL299). 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 36 individuals identified during the three-month study period were determined by fixed kernel method, as shown in Appendix V.

3.9.2. As in previous monitoring quarters, a few individual dolphins (NL226, NL259) that primarily centered their range use in North Lantau in the past were found extending their ranges to West Lantau waters (but to the north of the HKLR09 alignment), with some shifts and expansions of their range use away from North Lantau waters (Appendix V).

3.9.3. On the contrary, the majority of the identified individuals that primarily centered their range use in West Lantau were still sighted within their normal

ranges during the present quarterly period (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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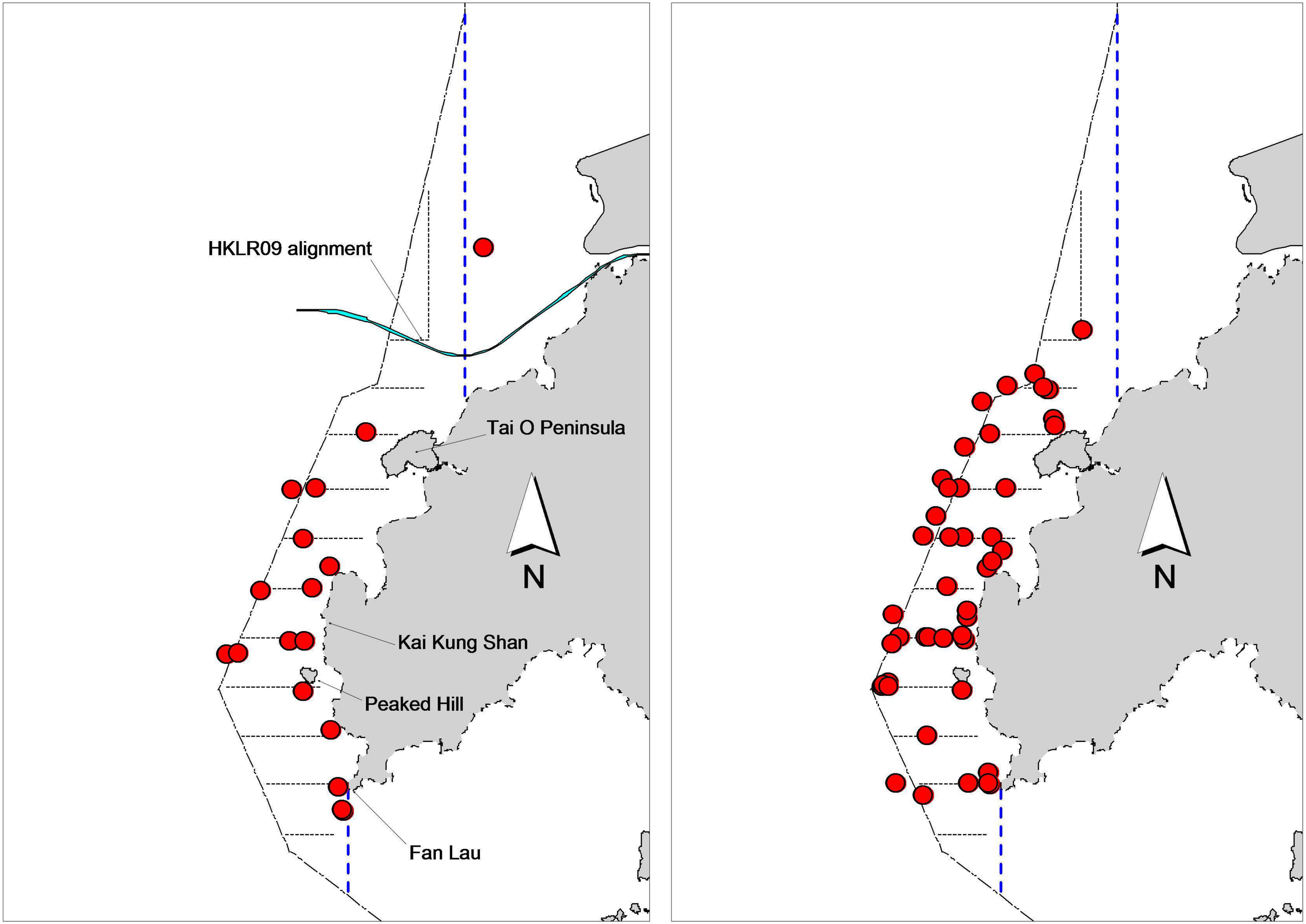


Figure 1. Distribution of Chinese white dolphin sightings in West Lantau during HKLR09 impact phase (left: March – May 2017) and baseline monitoring surveys (right: September – November 2011)

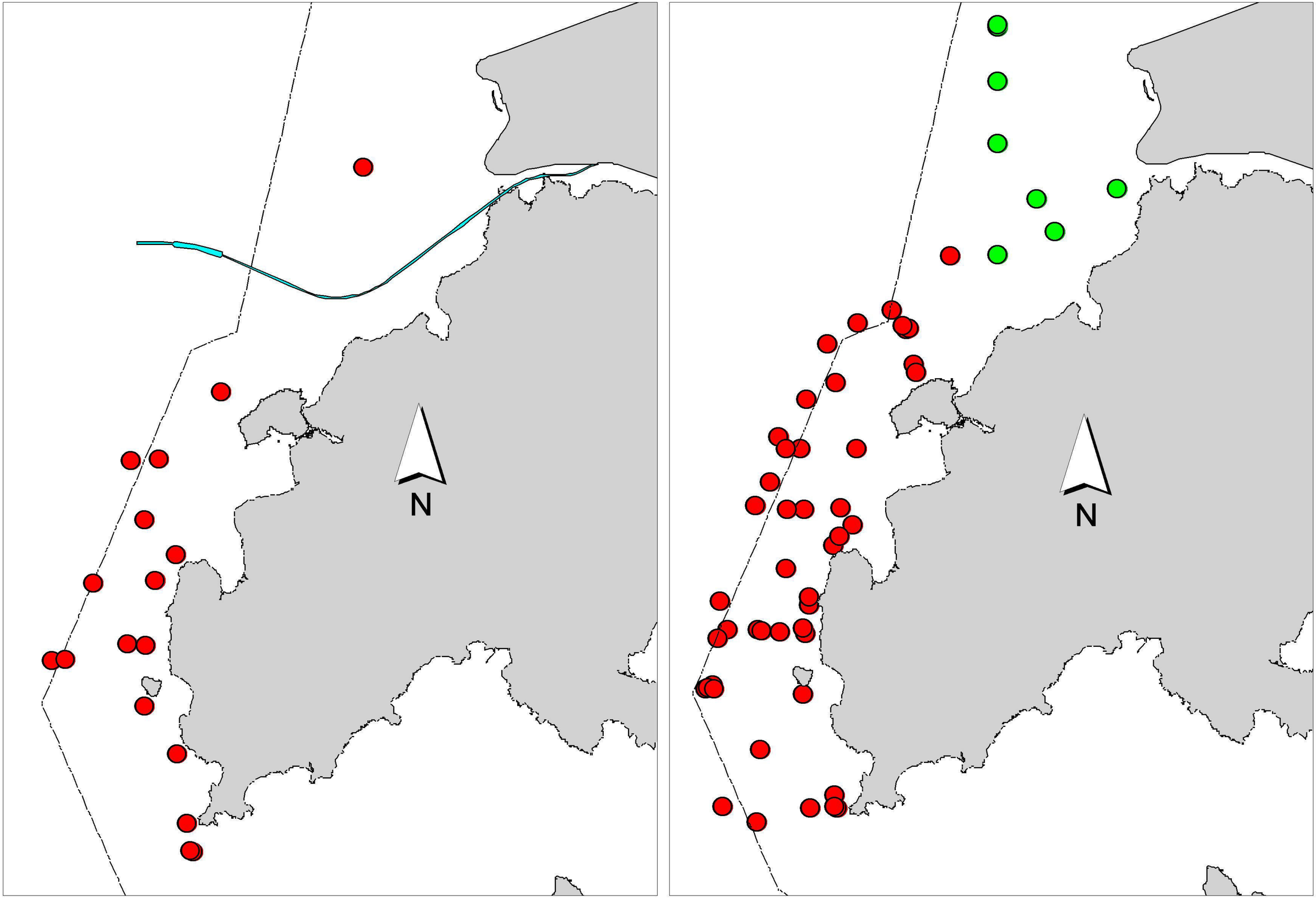
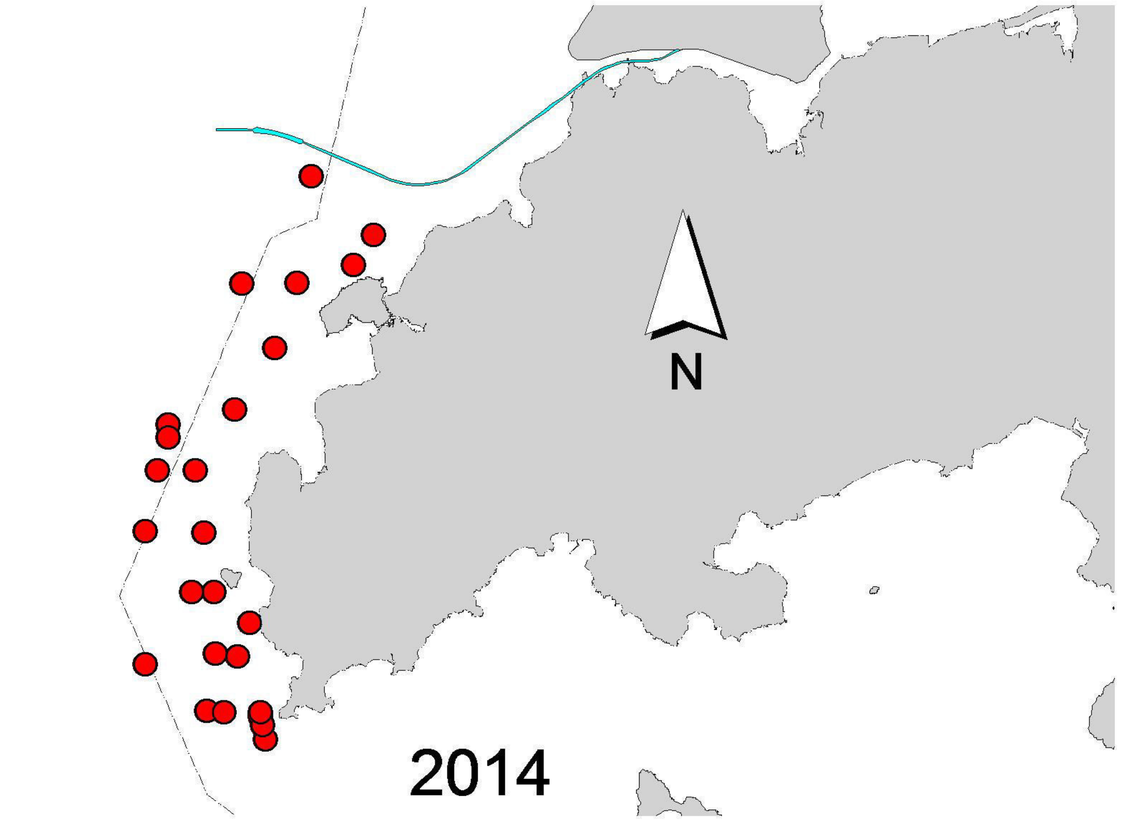
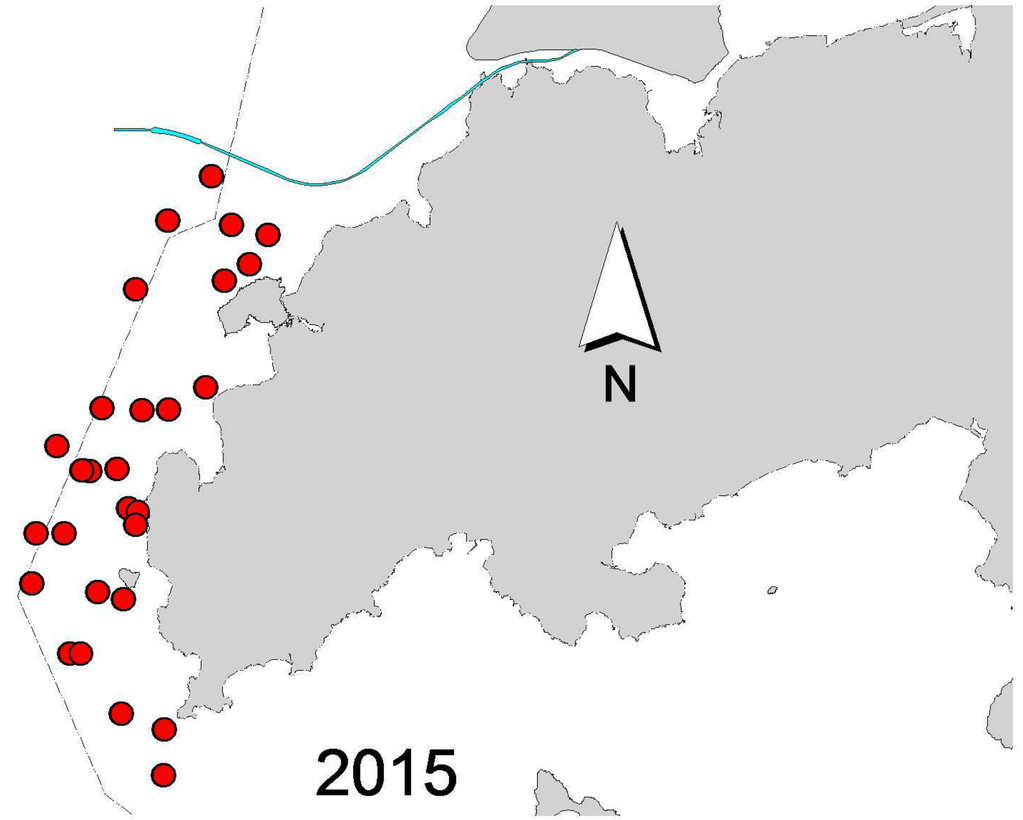
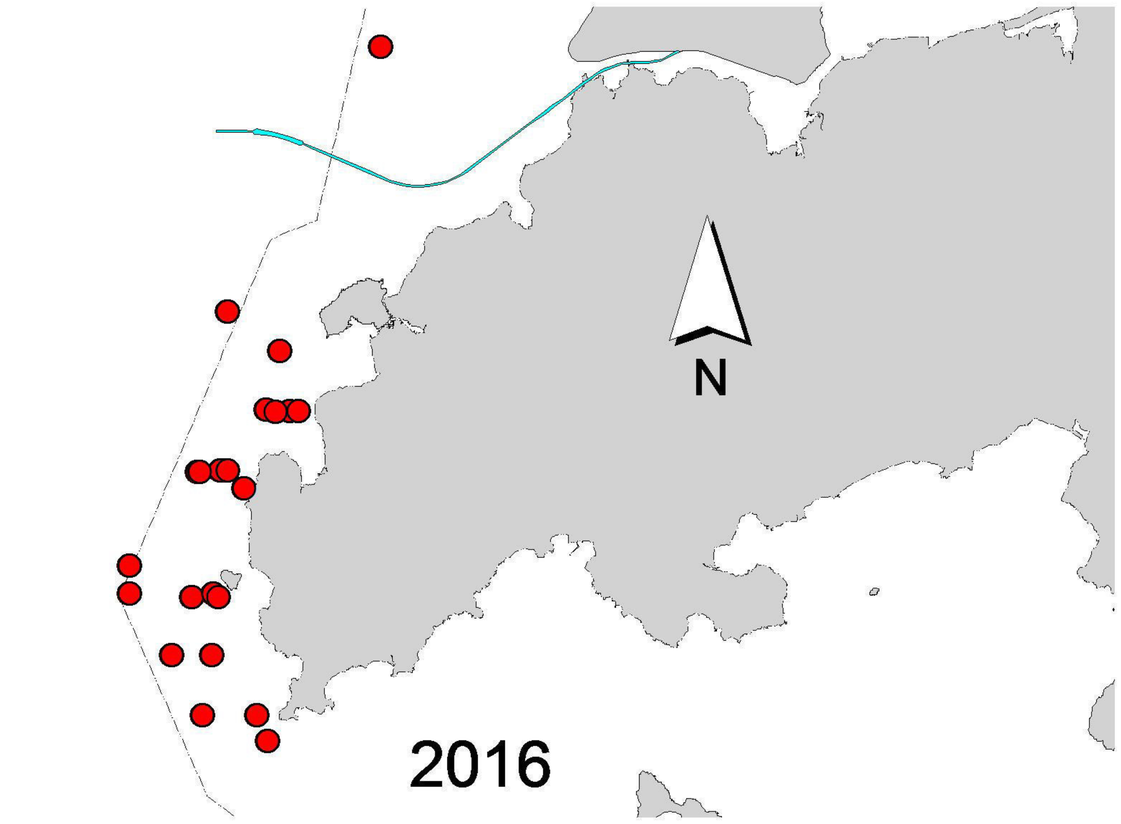


Figure 2. Distribution of Chinese white dolphin sightings from HKLR03 (in green) and HKLR09 surveys (in red) near the HKLR09 alignment during impact phase (left: March – May 2017) and baseline monitoring surveys (right: September – November 2011)







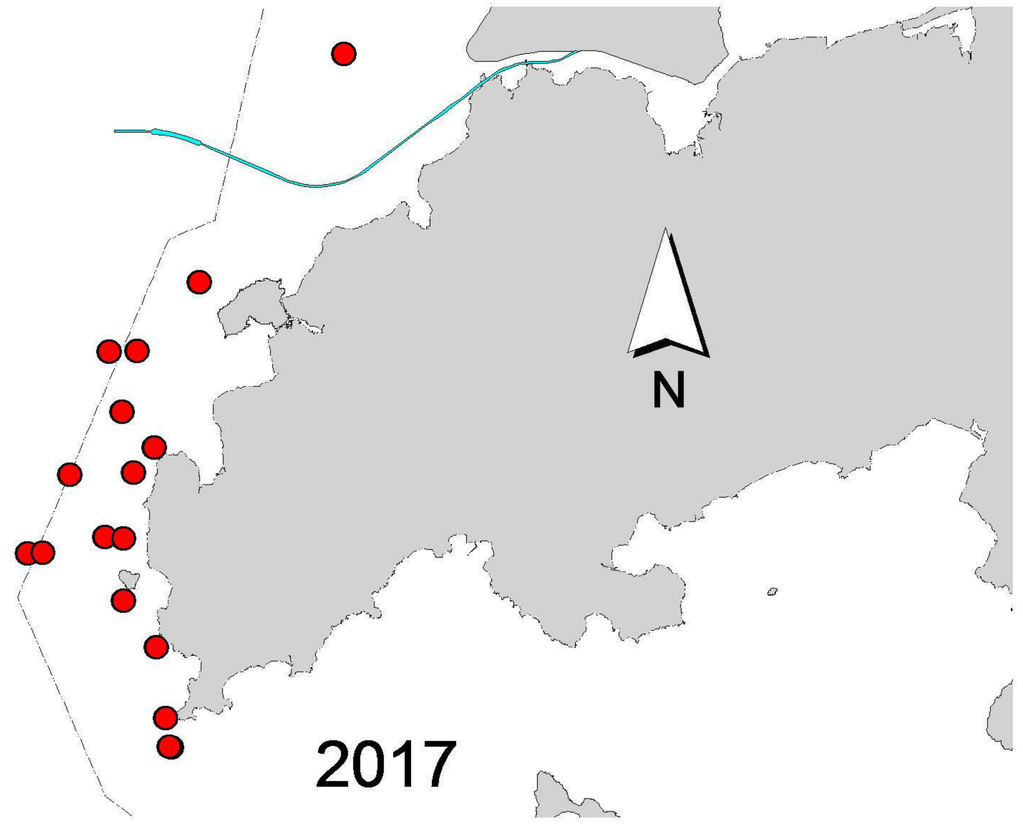


Figure 3. Comparisons on distribution of Chinese white dolphin sightings in West Lantau in the spring months (March-May) of 2014, 2015, 2016 and 2017 during HKLR09 impact phase

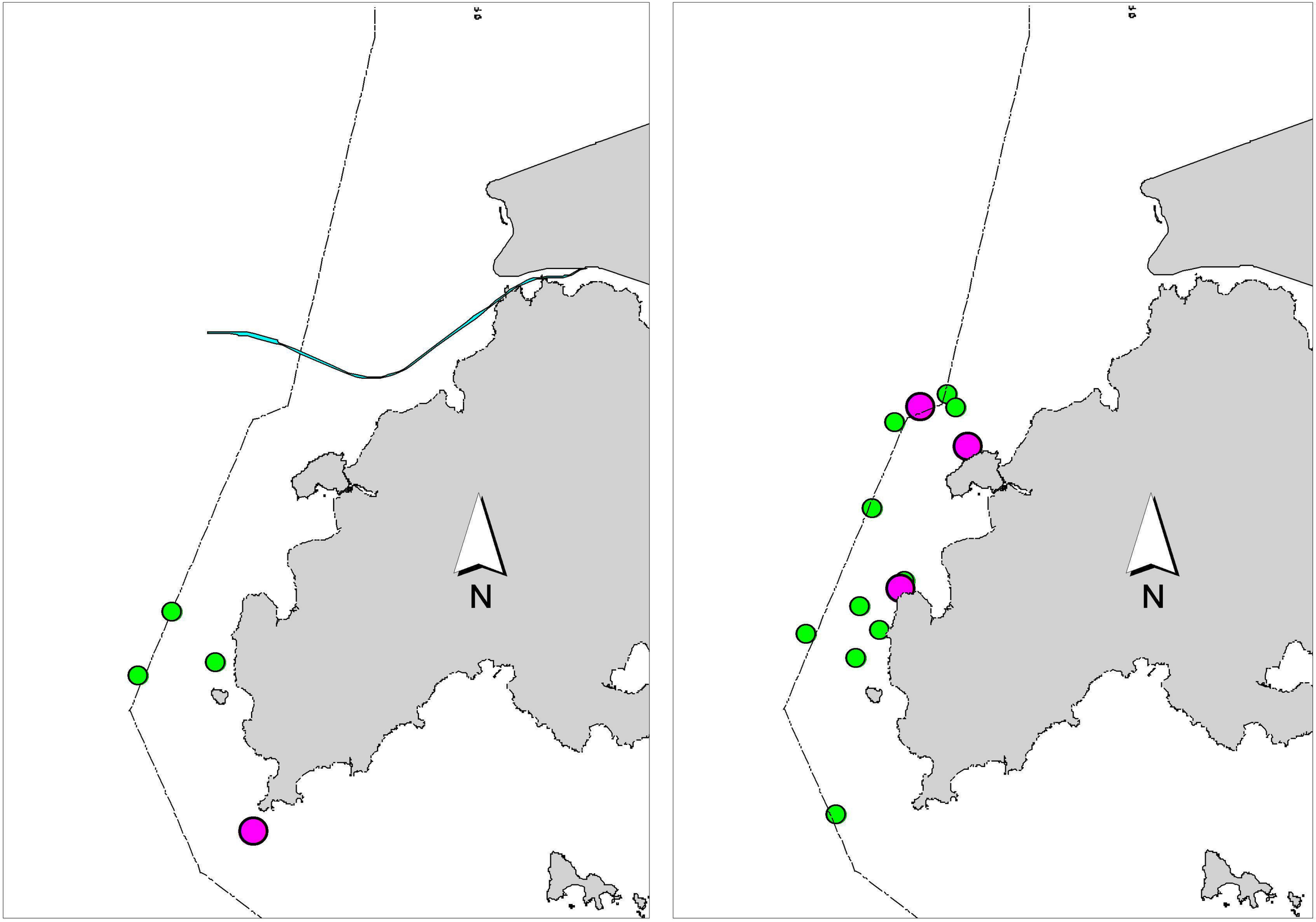


Figure 4. Distribution of Chinese white dolphins with larger group sizes during HKLR09 impact phase (left: March – May 2017) and baseline monitoring surveys (right: September – November 2011) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

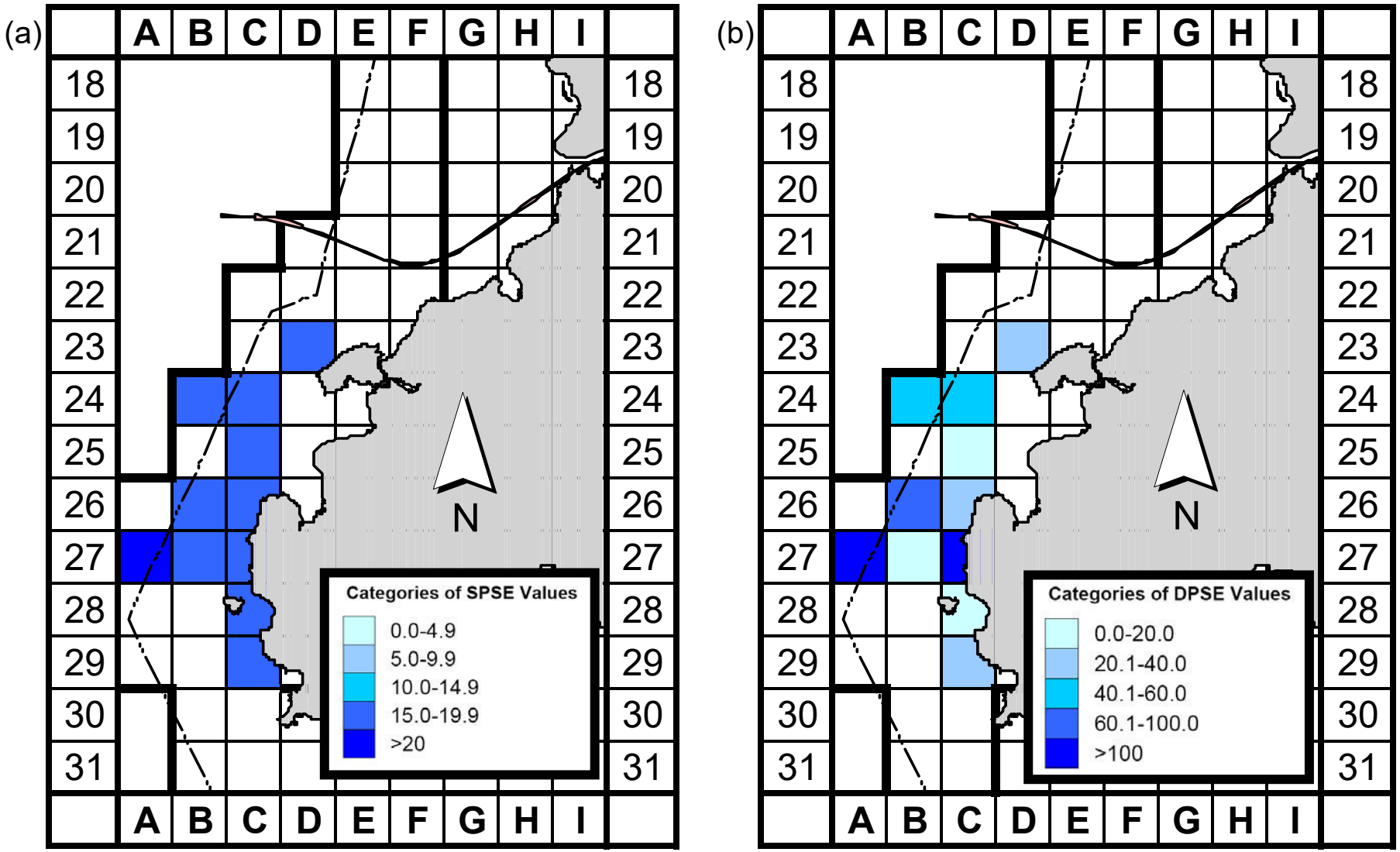


Figure 5a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in West Lantau survey area, using data collected during HKLR09 impact monitoring period (March-May 17) (SPSE = no. of on-effort sightings per 100 units of survey effort)

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 (March-May 17) (DPSE = no. of dolphins per 100 units of survey effort)

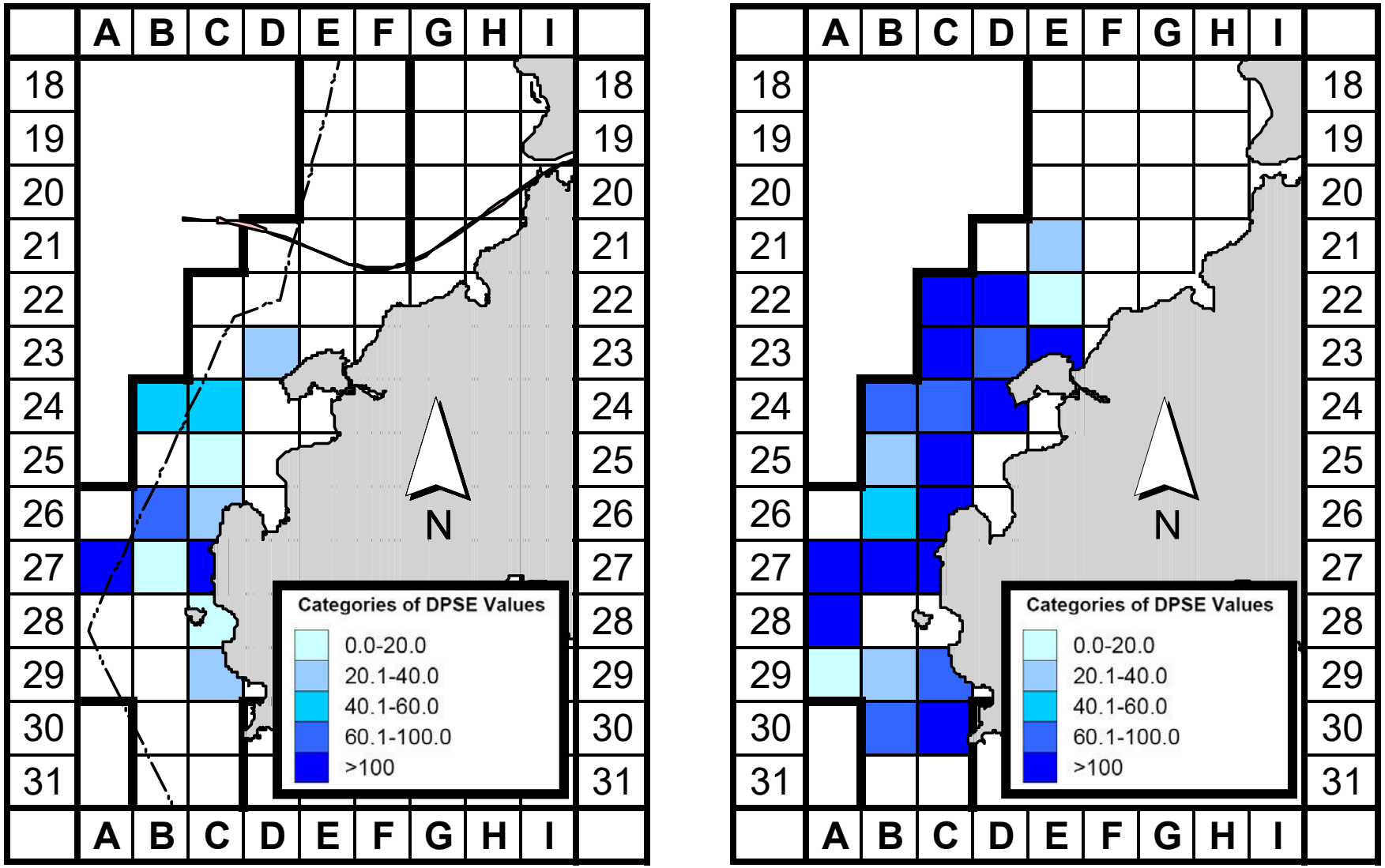


Figure 6. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in West Lantau survey area between the impact monitoring period (March-May 2017; left) and baseline monitoring period (September-November 2011; right)
(DPSE = no. of dolphins per 100 units of survey effort)

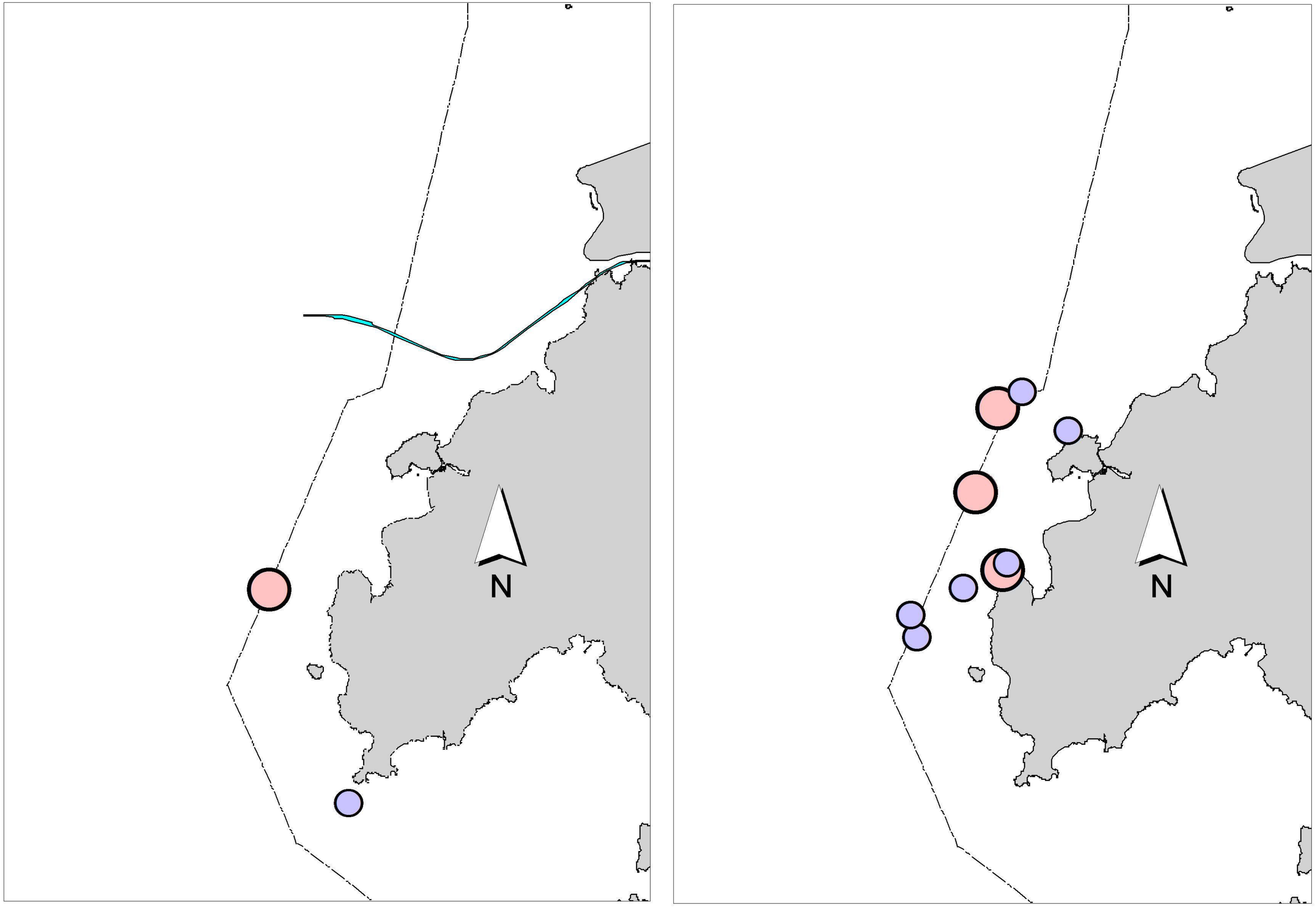


Figure 7. Distribution of dolphins engaged in feeding (in purple), socializing (in pink) and traveling (in green) activities during HKLR09 impact phase (left: March – May 2017) and baseline monitoring surveys (right: September – November 2011)

Appendix I. HKLR09 Survey Effort Database (March - May 2017)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
1-Mar-17	W LANTAU	1	0.74	SPRING	STANDARD36826	HKLR	P
1-Mar-17	W LANTAU	2	6.59	SPRING	STANDARD36826	HKLR	P
1-Mar-17	W LANTAU	3	10.46	SPRING	STANDARD36826	HKLR	P
1-Mar-17	W LANTAU	4	3.90	SPRING	STANDARD36826	HKLR	P
1-Mar-17	W LANTAU	2	3.73	SPRING	STANDARD36826	HKLR	S
1-Mar-17	W LANTAU	3	5.91	SPRING	STANDARD36826	HKLR	S
1-Mar-17	W LANTAU	4	2.30	SPRING	STANDARD36826	HKLR	S
13-Mar-17	W LANTAU	2	14.96	SPRING	STANDARD36826	HKLR	P
13-Mar-17	W LANTAU	3	6.32	SPRING	STANDARD36826	HKLR	P
13-Mar-17	W LANTAU	2	6.25	SPRING	STANDARD36826	HKLR	S
13-Mar-17	W LANTAU	3	5.50	SPRING	STANDARD36826	HKLR	S
5-Apr-17	W LANTAU	2	17.14	SPRING	STANDARD33706	HKLR	P
5-Apr-17	W LANTAU	3	4.80	SPRING	STANDARD33706	HKLR	P
5-Apr-17	W LANTAU	2	7.16	SPRING	STANDARD33706	HKLR	S
5-Apr-17	W LANTAU	3	4.30	SPRING	STANDARD33706	HKLR	S
13-Apr-17	W LANTAU	2	10.34	SPRING	STANDARD36826	HKLR	P
13-Apr-17	W LANTAU	3	9.82	SPRING	STANDARD36826	HKLR	P
13-Apr-17	W LANTAU	2	6.78	SPRING	STANDARD36826	HKLR	S
13-Apr-17	W LANTAU	3	3.84	SPRING	STANDARD36826	HKLR	S
8-May-17	W LANTAU	2	0.98	SPRING	STANDARD36826	HKLR	P
8-May-17	W LANTAU	3	9.35	SPRING	STANDARD36826	HKLR	P
8-May-17	W LANTAU	4	10.91	SPRING	STANDARD36826	HKLR	P
8-May-17	W LANTAU	3	7.30	SPRING	STANDARD36826	HKLR	S
8-May-17	W LANTAU	4	3.36	SPRING	STANDARD36826	HKLR	S
19-May-17	W LANTAU	1	0.92	SPRING	STANDARD36826	HKLR	P
19-May-17	W LANTAU	2	12.50	SPRING	STANDARD36826	HKLR	P
19-May-17	W LANTAU	3	7.19	SPRING	STANDARD36826	HKLR	P
19-May-17	W LANTAU	1	1.25	SPRING	STANDARD36826	HKLR	S
19-May-17	W LANTAU	2	7.74	SPRING	STANDARD36826	HKLR	S
19-May-17	W LANTAU	3	1.43	SPRING	STANDARD36826	HKLR	S

Appendix II. HKLR09 Chinese White Dolphin Sighting Database (March - May 2017)

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
1-Mar-17	1	1006	4	W LANTAU	2	ND	OFF	HKLR	817329	804944	SPRING	NONE	
1-Mar-17	2	1103	2	W LANTAU	2	102	ON	HKLR	813581	802421	SPRING	NONE	P
13-Mar-17	1	1155	1	W LANTAU	2	116	ON	HKLR	809376	800762	SPRING	NONE	P
13-Mar-17	2	1207	6	W LANTAU	3	616	ON	HKLR	809103	799421	SPRING	NONE	S
13-Apr-17	1	1127	5	W LANTAU	3	145	ON	HKLR	810397	800156	SPRING	NONE	P
13-Apr-17	2	1156	7	W LANTAU	2	7	ON	HKLR	809353	801081	SPRING	NONE	P
13-Apr-17	3	1231	1	W LANTAU	2	109	ON	HKLR	808335	801079	SPRING	NONE	P
13-Apr-17	4	1243	2	W LANTAU	2	410	ON	HKLR	807558	801655	SPRING	NONE	S
13-Apr-17	5	1329	4	W LANTAU	3	ND	OFF	HKLR	805908	801929	SPRING	NONE	
8-May-17	1	1119	1	W LANTAU	4	262	ON	HKLR	811446	801066	SPRING	NONE	P
8-May-17	2	1154	2	W LANTAU	3	93	ON	HKLR	810427	801259	SPRING	NONE	P
8-May-17	3	1247	3	W LANTAU	3	ND	OFF	HKLR	810858	801631	SPRING	NONE	
8-May-17	4	1349	13	W LANTAU	3	ND	OFF	HKLR	805930	801888	SPRING	NONE	
19-May-17	1	1056	2	W LANTAU	2	ND	OFF	HKLR	806395	801827	SPRING	NONE	
19-May-17	2	1140	4	W LANTAU	2	39	ON	HKLR	809124	799668	SPRING	NONE	S
19-May-17	3	1236	3	W LANTAU	2	875	ON	HKLR	812454	801326	SPRING	NONE	P
19-May-17	4	1254	3	W LANTAU	2	40	ON	HKLR	812433	800831	SPRING	NONE	P

Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in March - May 2017

ID#	DATE	STG#	AREA
CH12	13/04/17	4	W LANTAU
CH38	08/05/17	4	W LANTAU
NL226	01/03/17	1	W LANTAU
NL259	01/03/17	1	W LANTAU
NL299	19/05/17	4	W LANTAU
SL58	13/04/17	1	W LANTAU
SL60	08/05/17	4	W LANTAU
WL28	08/05/17	4	W LANTAU
WL42	13/04/17	2	W LANTAU
	08/05/17	4	W LANTAU
WL44	08/05/17	4	W LANTAU
WL46	19/05/17	3	W LANTAU
	19/05/17	4	W LANTAU
WL61	13/04/17	3	W LANTAU
WL66	08/05/17	2	W LANTAU
	08/05/17	3	W LANTAU
	19/05/17	2	W LANTAU
WL68	13/04/17	1	W LANTAU
WL72	13/03/17	1	W LANTAU
WL79	01/03/17	2	W LANTAU
	19/05/17	3	W LANTAU
	19/05/17	4	W LANTAU
WL92	08/05/17	4	W LANTAU
WL109	13/04/17	5	W LANTAU
WL114	08/05/17	4	W LANTAU
WL118	13/04/17	2	W LANTAU
WL120	01/03/17	2	W LANTAU
WL123	13/04/17	2	W LANTAU
WL130	08/05/17	4	W LANTAU

ID#	DATE	STG#	AREA
WL131	13/04/17	5	W LANTAU
WL142	08/05/17	4	W LANTAU
WL145	01/03/17	1	W LANTAU
WL152	13/04/17	5	W LANTAU
WL168	08/05/17	3	W LANTAU
WL171	08/05/17	4	W LANTAU
WL173	13/04/17	5	W LANTAU
	19/05/17	1	W LANTAU
WL180	13/04/17	2	W LANTAU
WL208	13/04/17	1	W LANTAU
WL211	13/04/17	1	W LANTAU
	13/04/17	2	W LANTAU
	08/05/17	4	W LANTAU
WL250	08/05/17	4	W LANTAU
WL257	13/04/17	1	W LANTAU
WL273	13/04/17	4	W LANTAU

Appendix IV. Thirty-six individual dolphins that were identified during March to May 2017 under HKLR09 impact phase monitoring surveys

Appendix IV. (cont'd)

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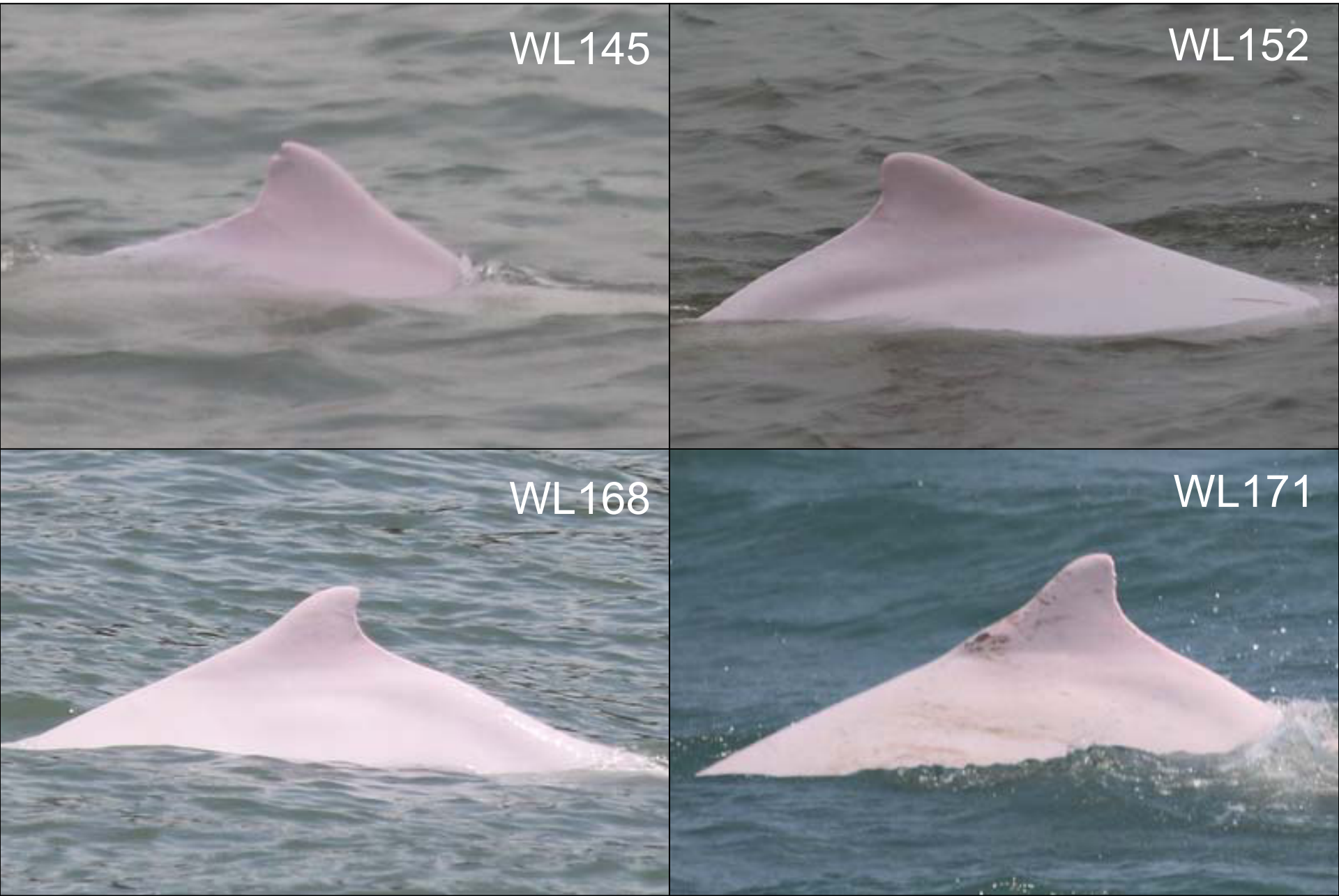

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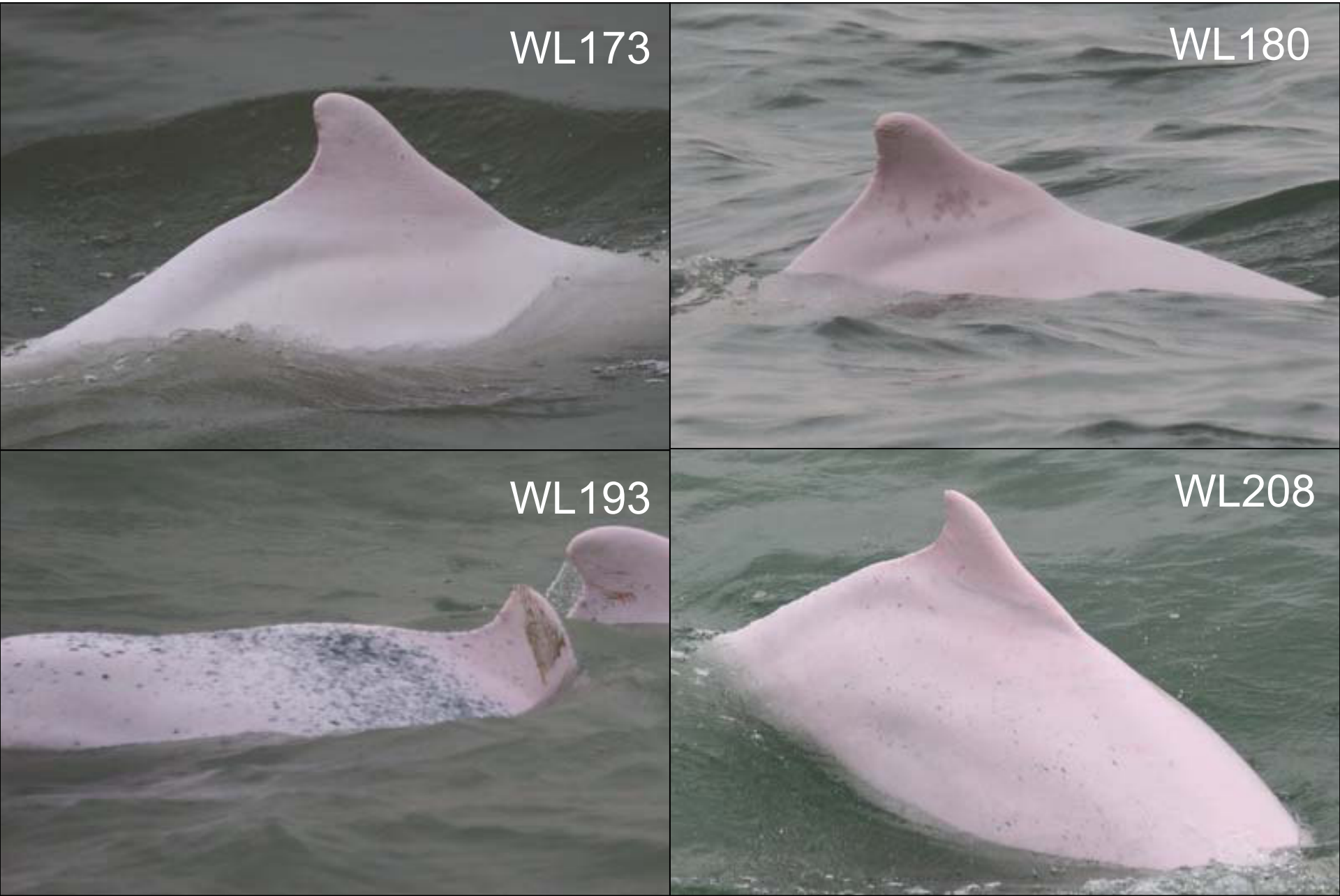
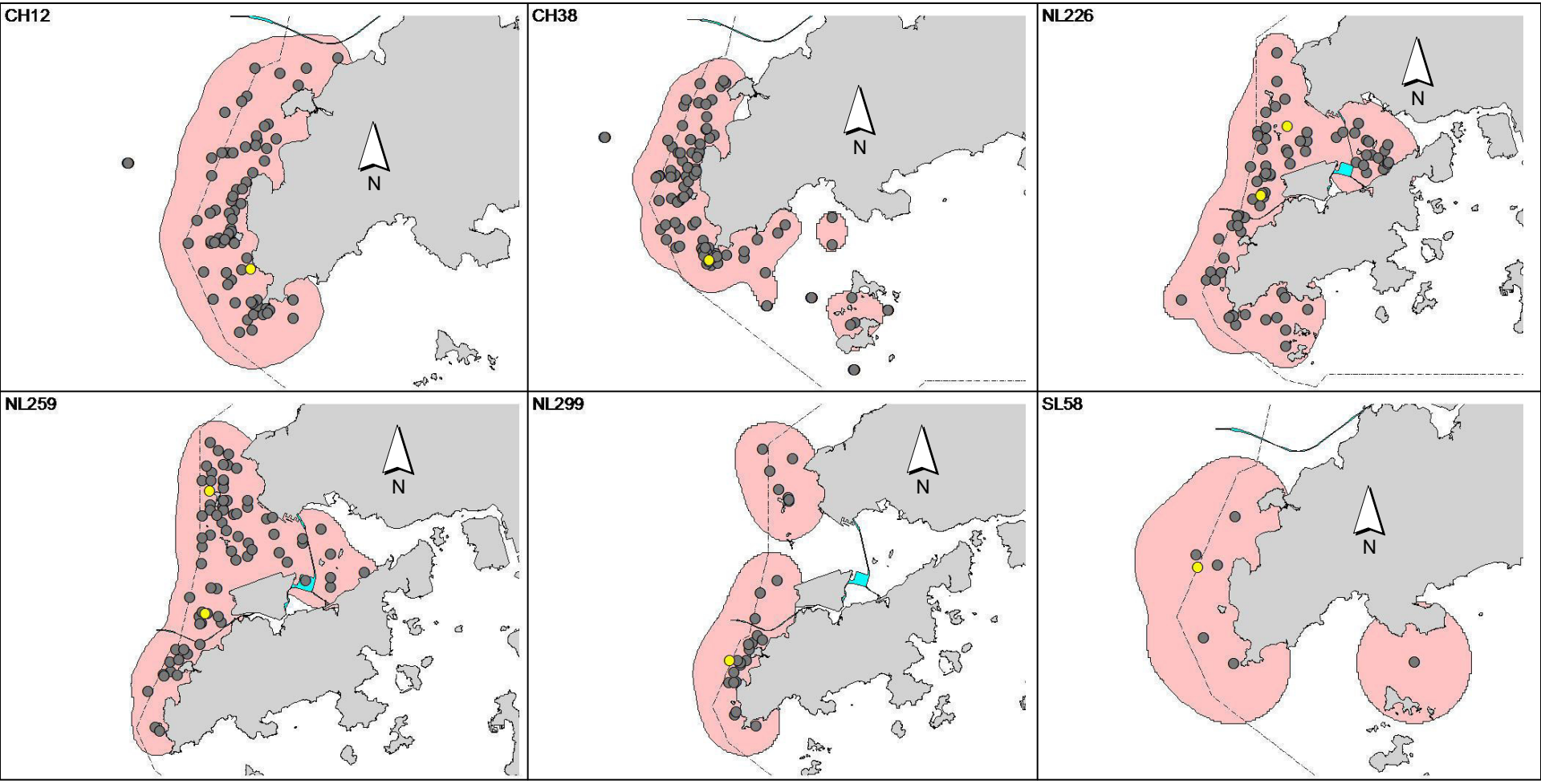


Appendix IV. (cont'd)

Appendix V. Ranging patterns (95% kernel ranges) of 36 individual dolphins that were sighted during HKLR09 impact phase monitoring period (note: yellow dots indicates sightings made in March – May 2017 during HZMB-related monitoring surveys)



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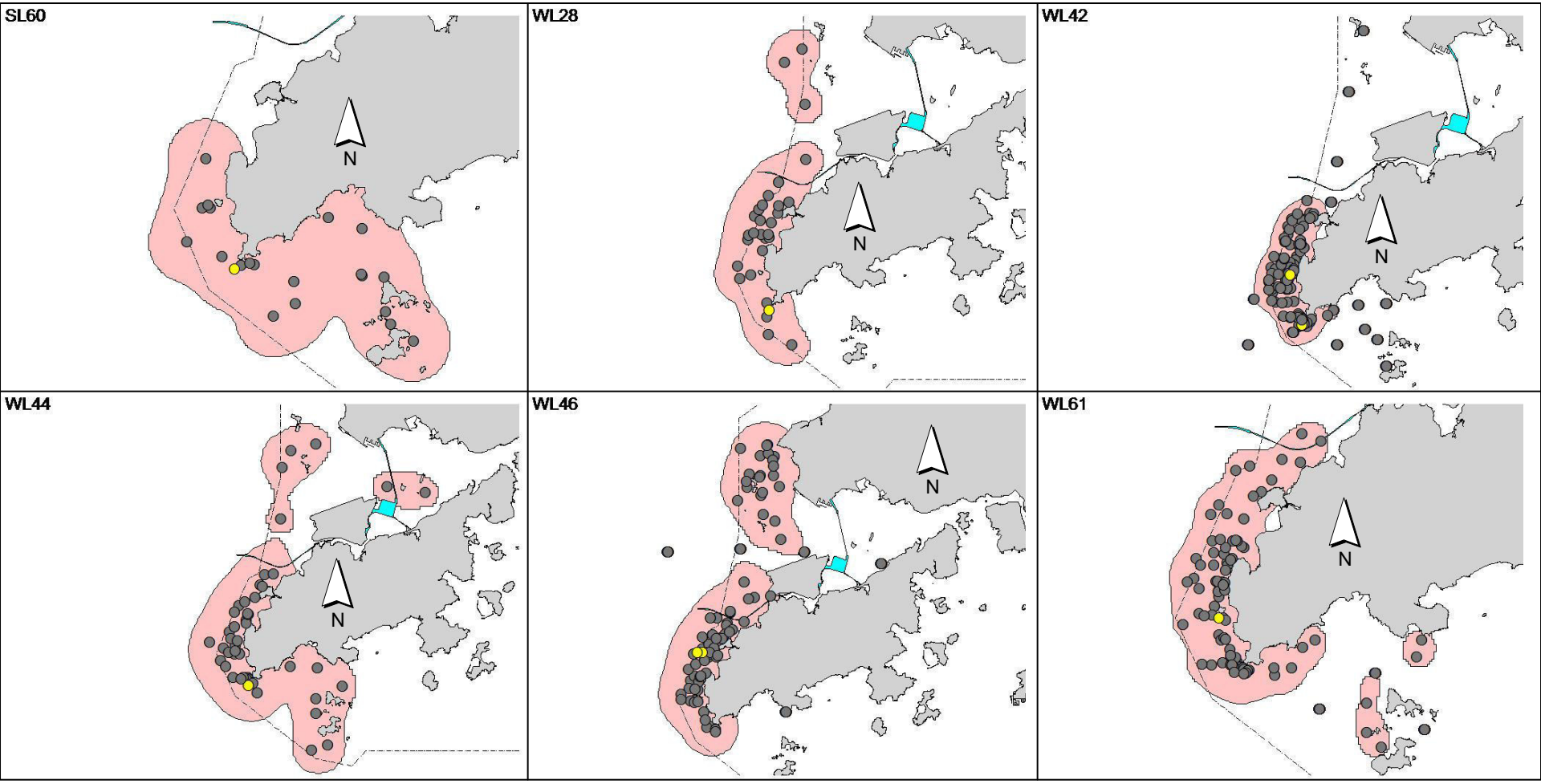

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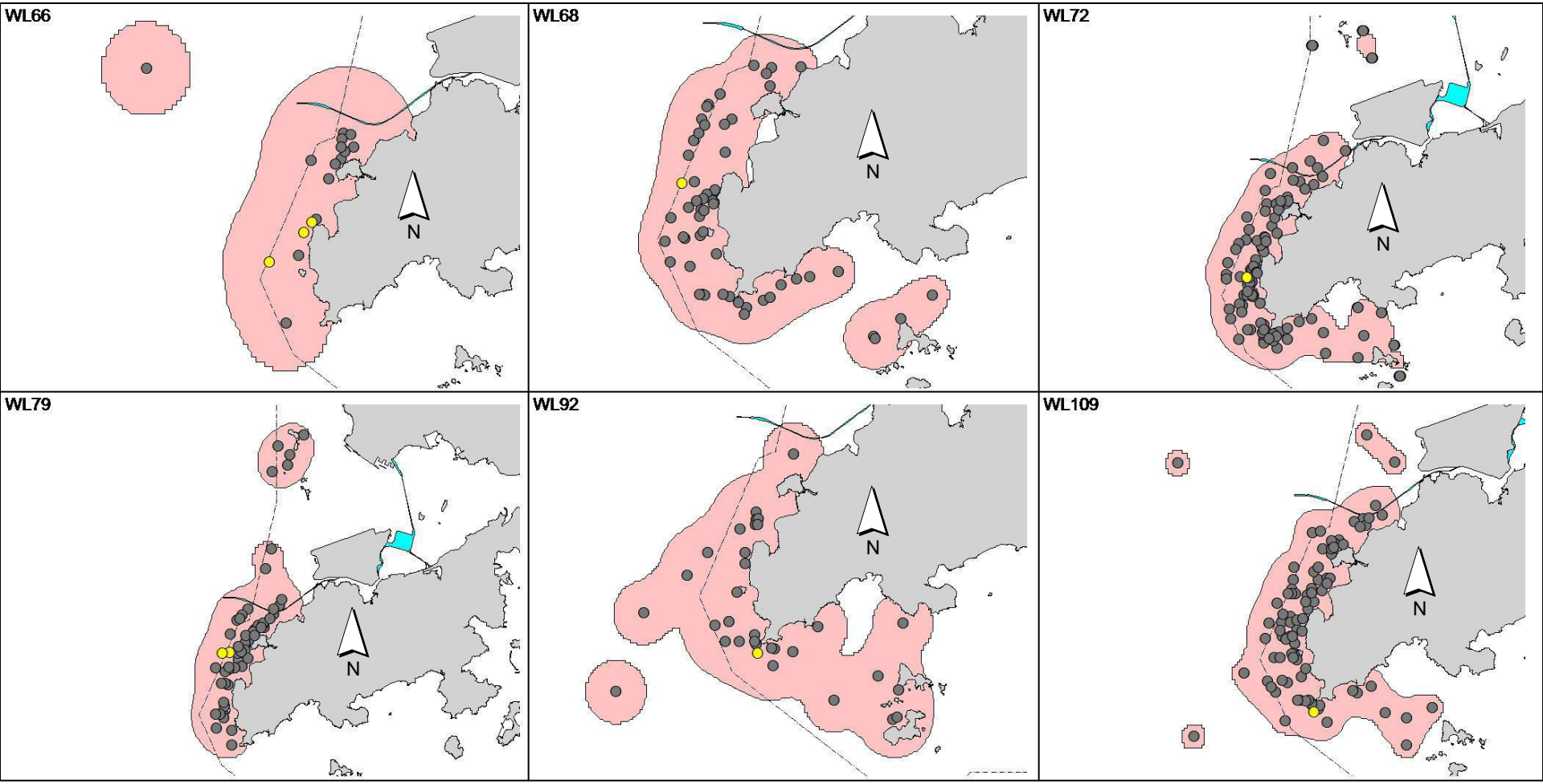

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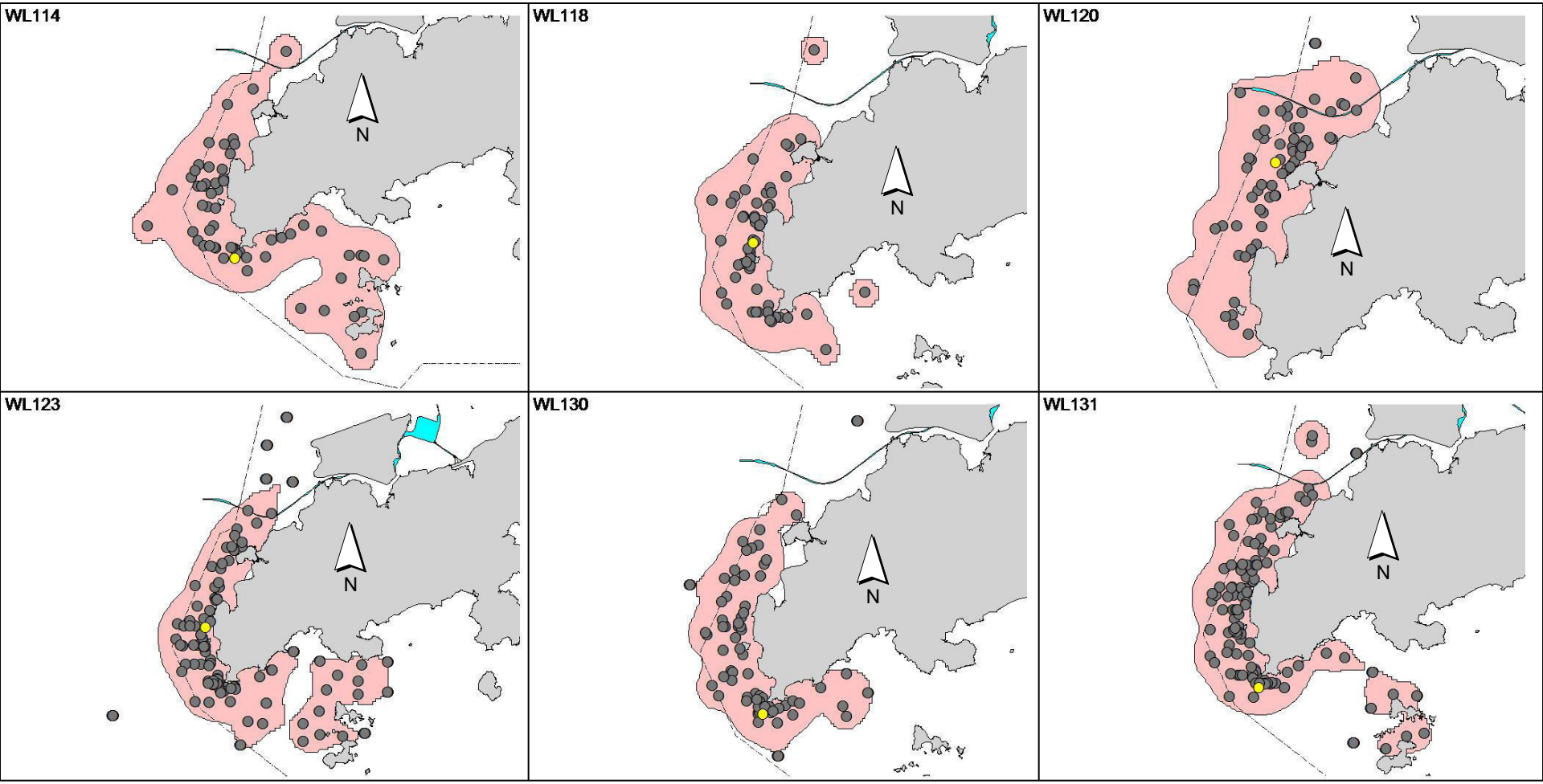

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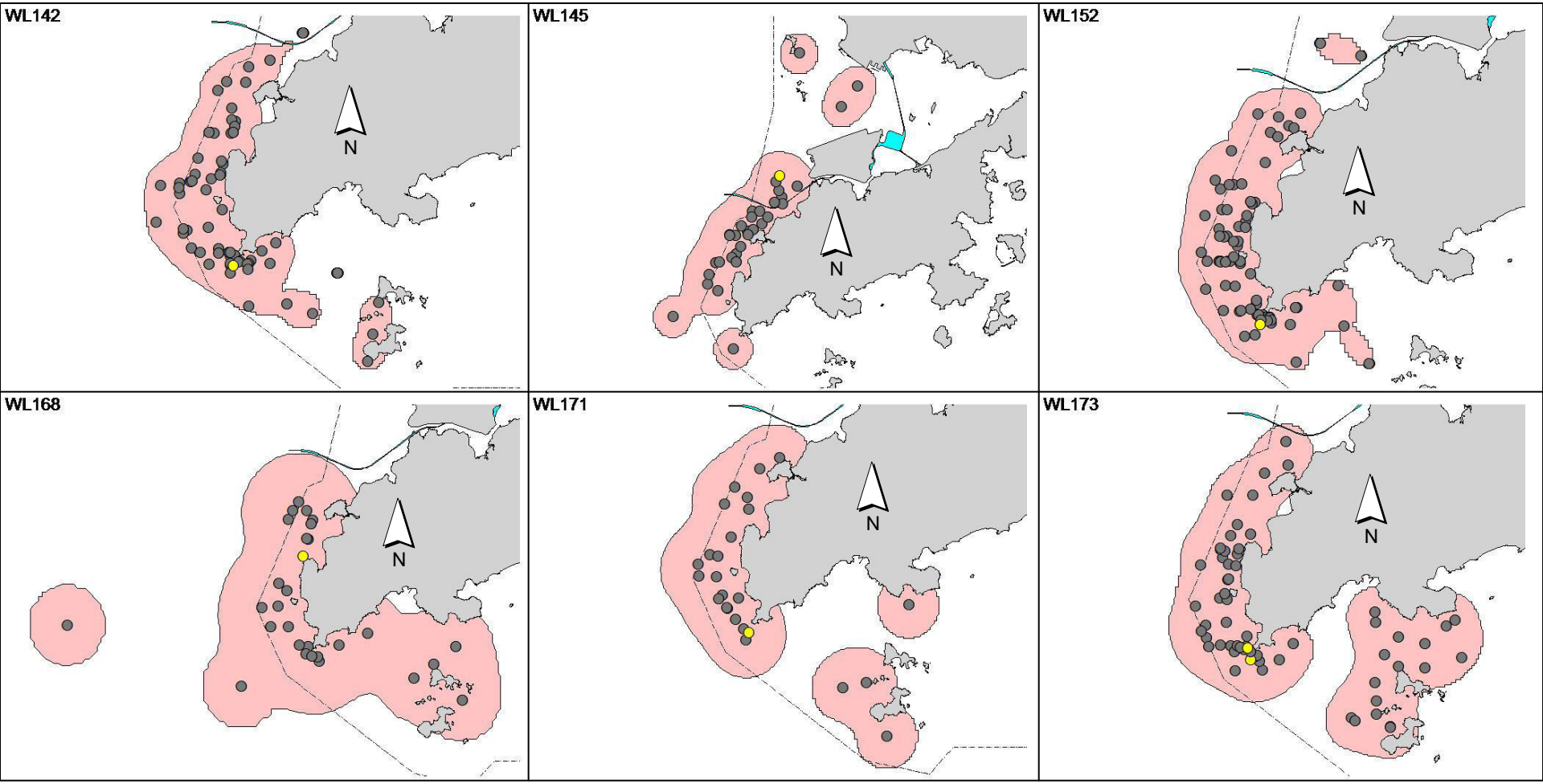

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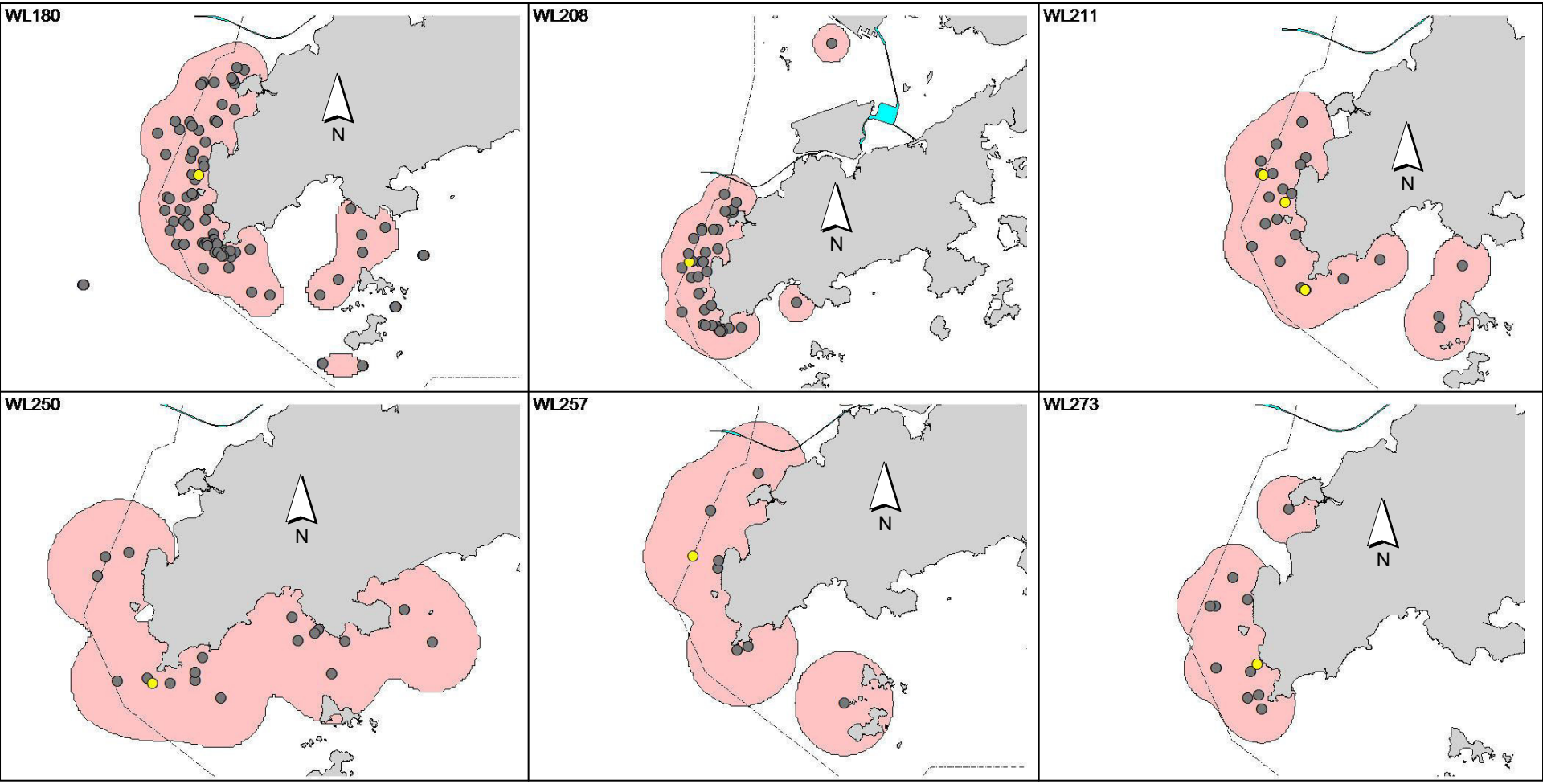


APPENDIX G
EVENT ACTION PLANS

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	*Construction and Demolition Material* 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	<u>*Land Works*</u> 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;					N/A
		• 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.					^
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
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

Checklist Reference Number	170307
Date	7 March 2017 (Tuesday)
Time	9:15-11:30; 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	
170307-R01	• Chemical containers at P56 should be provided with drip tray and oil stain should be removed.	F8,9
170307-R02	• General refuse at P56 should be cleared.	F1i,iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170228), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Ceci	7 March 2017
Checked by	Dr. Priscilla Choy		7 March 2017

Contract HY/2011/09

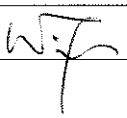
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	170314
Date	14 March 2017 (Tuesday)
Time	9:15-11:30; 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	
170314-R01	• Chemical containers at P69 should be provided with drip tray.	F8,9
170314-R02	• Oil stain at P69 should be cleared.	F8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170307), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang		14 March 2017
Checked by	Dr. Priscilla Choy		14 March 2017

Weekly Site Inspection Record Summary

Checklist Reference Number	170321
Date	21 March 2017 (Tuesday)
Time	9:30-12:00

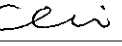
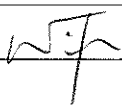
Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170321-R01	• Accumulated waste at P67 should be sorted properly.	F1iii
170321-R02	• Oil stain at P67 and P68 should be cleared.	F8
170321-R03	• Secondary oil containment at P72 should be maintained properly to avoid oil leakage and oily water inside should be cleared.	F8,9
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170314), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Ceci	21 March 2017
Checked by	Dr. Priscilla Choy	NJ	21 March 2017

Weekly Site Inspection Record Summary

Checklist Reference Number	170328
Date	28 March 2017 (Tuesday)
Time	9:30-11:30; 13:30-16:00

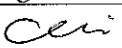
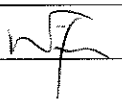
Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
170328-R03	• Silt curtain at P98-99 should be well maintained.	B25
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
170328-R02	• Cement bags (>20) at P48 should be covered by impervious sheet.	D20
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170328-R01	• Accumulated constrction waste at P59 pile cap and general waste at P45 and P49 should be cleared..	F1i,iii
170328-R04	• Oil stain at P68 should be cleared.	F8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170321), item 170321-R02 was found outstanding and remarked as 170328-R04. Review will be needed during next audit section.	

	Name	Signature	Date
Recorded by	Cecilia Yang		28 March 2017
Checked by	Dr. Priscilla Choy		28 March 2017

Weekly Site Inspection Record Summary

Checklist Reference Number	170406
Date	6 April 2017 (Thursday)
Time	9:15-11:15

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
170406-R01	• Silt curtain at P89 should be well maintained when caerrying out the excavation works.	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 audit section (Ref. No.:170328), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang		6 April 2017
Checked by	Dr. Priscilla Choy		6 April 2017

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	170411
Date	11 April 2017 (Tuesday)
Time	9:30-11:30; 13:30-16:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
170411-R02	• Silt curtain at P97-98 should be well maintained.	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	
170411-R01	• Oil containers at WA4 should be provided with drip tray or removed.	F8,9
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170406), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	ceci	11 April 2017
Checked by	Dr. Priscilla Choy		11 April 2017

Weekly Site Inspection Record Summary

Checklist Reference Number	170418
Date	18 April 2017 (Tuesday)
Time	9:15-11:30; 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	
170418-R01	• General waste at P47, 51 and construction waste at P52 pile cap should be cleared.	F1i,iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170411), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang		18 April 2017
Checked by	Dr. Priscilla Choy		18 April 2017

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	170425
Date	25 April 2017 (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	
170425-R03	• NRMM label should be provided to the equipment at P44.	D26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170425-R01	• Housekeeping at P44 and P52 should be enhanced.	F1i,iii
170425-R02	• Chemical containers at P44 and P49 should be provided with drip tray or removed.	F8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170418), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang	Ceci	25 April 2017
Checked by	Dr. Priscilla Choy		25 April 2017

Weekly Site Inspection Record Summary

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Checklist Reference Number	170502
Date	2 May 2017 (Tuesday)
Time	13:30-16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
170502-R01	• Silt curtain at P84-85 should be well maintained.	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	
170502-R02	• The chemical waste storage area at Portion C should be improved, including the size and wording of label and proper secondary containment.	F3i,ii,iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170425), all identified environmental deficiency was observed improved/rectified by the Contractor.	

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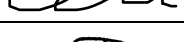
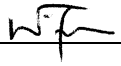
	Name	Signature	Date
Recorded by	Cecilia Yang		2 May 2017
Checked by	Dr. Priscilla Choy		2 May 2017

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	170509
Date	9 May 2017 (Tuesday)
Time	9:15-11:00; 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	
170509-R02	• NRMM label should be provided to the equipment at P45.	D26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170509-R01	• Oil stain and oily water at P44 should be removed and hole on the drip tray should be plugged to prevent oil leakage.	F8,9
170509-R03	• Housekeeping should be enhanced at P44, 47.	F1i,iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170502), follow up action is required for the item 170502-R02.	

	Name	Signature	Date
Recorded by	Cecilia Yang		9 May 2017
Checked by	Dr. Priscilla Choy		9 May 2017

Contract HY/2011/09

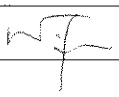
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	170516
Date	16 May 2017 (Tuesday)
Time	9:15-10:30

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	
170516-R02	• Water spraying should be provided to the concrete breaking works at P90 for dust suppression.	D15
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170516-R01	• Construction waste at P86 should be properly cleared.	F4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170509), follow up action is required for the item 170502-R02, 170509-R01 and 170509-R03.	

	Name	Signature	Date
Recorded by	Cecilia Yang		16 May 2017
Checked by	Dr. Priscilla Choy		16 May 2017

Contract HY/2011/09

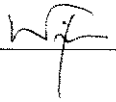
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	170523
Date	23 May 2017 (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	
	• 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	
170523-R01	• Oil stain at P65, 67 should be removed and oil absorbent should be cleared as chemical waste.	F8,9
170523-R02	• Drip tray should be provided to the chemical containers at P57.	F8,9
170523-R03	• The chemical waste store at P57 should be provided with lock.	F3iii
170523-R04	• Proper chemical label should be provided to the chemical container at P59.	F2iii
170523-R05	• Housekeeping should be enhanced at P61.	F4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170516), follow up action is required for the item 170509-R01 and 170509-R03.	

	Name	Signature	Date
Recorded by	Cecilia Yang		23 May 2017
Checked by	Dr. Priscilla Choy		23 May 2017

Contract HY/2011/09

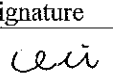
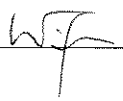
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	170531
Date	31 May 2017 (Wednesday)
Time	9:15-11:30; 14:00-16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
170531-R04	• Silt curtain at P82 should be properly maintained.	B25
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
170531-R01	• Dusty material at P70 should be removed or covered with impervious sheet.	D7
170531-R02	• The three side enclosure for the grouting machine at P76 should be maintained to ensure enclosing fully.	D13
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
170531-R03	• Oil stain at P77 should be removed as chemical waste.	F8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:170523),follow up action is required the item 170509-R01, 170509-R03 and 170523-R01 to 170523-R05.	

	Name	Signature	Date
Recorded by	Cecilia Yang		31 May 2017
Checked by	Dr. Priscilla Choy		31 May 2017

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 2017 (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	0.355	0.000	0.000	0.000	0.355	0.000	0.069	0.746	0.000	0.000	0.286
Feb	7.781	0.000	0.000	0.000	7.781	0.000	0.026	1.153	0.000	0.000	0.306
Mar	7.807	0.000	0.000	2.565	5.242	0.000	0.456	0.704	0.000	0.000	0.325
Apr	8.177	0.000	0.000	5.778	2.400	0.000	0.017	0.838	0.000	0.000	0.325
May	7.075	0.000	0.000	6.094	0.982	0.000	0.036	To be updated	0.000	1.982	0.358
Jun											
Sub-Total	31.195	0.000	0.000	14.436	16.759	0.000	0.604	3.441	0.000	1.982	1.599
Jul											
Aug											
Sep											
Oct											
Nov											
Dec											
Total	31.195	0.000	0.000	14.436	16.759	0.000	0.604	3.441	0.000	1.982	1.599

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)
269.000	0.000	5.000	90.000	120.000	54.000	6.000	45.000	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 December 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 XRL 8217, HY/2012/08 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)	13	6	0	0

(D) Exceedance Report for Line-transect Vessel Surveys

Environmental Monitoring	No. of Exceedance		No. of Exceedance related to the Construction Activities of this Contract	
	Action Level	Limit Level	Action Level	Limit Level
Dolphin Monitoring	1	0	0	0

Contract No. HY/2011/09

Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill - Notification of Environmental Quality Limit Exceedances

Period of Line Transect Vessel Survey: March to May 2017

Part A – Exceedance Summary Tables

Table I: Parameter(s) - Ecology (Chinese White Dolphin Monitoring)

Survey Area	Action Level	Limit Level	Monitoring Result (March to May 2017)
West Lantau	STG<9.8 & ANI<36.3	STG<7.4 & ANI<27.2	***STG=7.43; ANI=21.48***

Note: STG means quarterly encounter rate of number of dolphin sightings (no. of on-effort dolphin sightings per 100 km of survey effort)
ANI means quarterly encounter rate of total number of dolphins (no. of dolphins from all on-effort sightings per 100 km of survey effort)
Bold Italic means Action Level exceedance
Bold Italic with underline means Limit Level exceedance

Part B – Action and Mitigation Measures taken:

(1) – Repeat statistical data analysis to confirm findings and check monitoring data:

All monitoring data for the dolphin monitoring in the period between March and May 2017 was checked. Statistical data analysis (A one-way ANOVA) was conducted repeatedly to examine whether there were any significant differences in the average encounter rates between the baseline and impact monitoring periods. The p-value for the difference in average dolphin encounter rates of STG and ANI were 0.038 and 0.0600 respectively. Therefore, if the alpha value is set at 0.05, significant difference in encounter rates of STG was detected between the baseline period and the present quarter, but not for the encounter rates of ANI. Another comparison was made between baseline period and the 16 cumulative quarters in the impact phase, and the p-value for the differences in average dolphin encounter rate of STG and ANI were 0.594 and 0.741 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.

(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 results of natural variation or previously observed seasonal differences and identify source(s) of impact :

a) No marine construction activity in the western waters including bored piling works, construction of pile cap and column under the Contract HY/2011/09 was conducted in the reporting quarter (Mar – May 17) and no change of Contractor's marine works in the reporting quarter when compared with the previous months without record of exceedances.

b) According to the 17th Quarterly Progress Report(March-May 2017) by the dolphin specialist, it is concluded in Section 4 that during the quarter (March-May 2017) of dolphin monitoring, no adverse impact from the activities of the HKLR09 construction project on Chinese White Dolphins was noticeable from general observations.

c) Relatively lower dolphin encounter rates of STG and ANI during the same quarter when compare with other quarter. (Table II)

Table II– Summary of average dolphin encounter rates in West Lantau survey in all quarters of impact monitoring period

	Encounter rate (STG)	Encounter rate (ANI)
March-May 2013 (Impact)	**16.7**	**58.59**
June-August 2013 (Impact)	26.89	94.745
September-November 2013 (Impact)	20.51	60.68
December 2013-February 2014 (Impact)	18.01	60.12
March-May 2014 (Impact)	**14.4**	**65.23**
June-August 2014 (Impact)	22.9	101.41
September-November 2014 (Impact)	10.57	36.63
December 2014-February 2015 (Impact)	12.84	57.36
March-May 2015 (Impact)	**12.42**	**45.32**
June-August 2015 (Impact)	12.36	61.19
September-November 2015 (Impact)	11.71	43.3
December 2015-February 2016 (Impact)	13.86	63.4
March-May 2016 (Impact)	**9.64**	**49.01**
June-August 2016 (Impact)	14.14	34.91
September-November 2016 (Impact)	13.17	53.82
December 2016-February 2017 (Impact)	13.58	46.73
March-May 2017 (Impact)	**7.43**	**21.48**

(3) - Informed IEC/ENPO, ER/SOR and Contractor:

IEC/ENPO, ER/SOR and Contractor were informed of the exceedance via email on 10th June 2017.

(4) - Review to ensure all the dolphin protective measure are fully and properly implemented and advise on additional measures if necessary.

The mitigation measures required by the EM&A Manual are properly implemented or no longer required due to completion of relevant construction works i.e. bored piling under the Contract HY/2011/09. (For the detail, please refer to Table III). Continue monitoring is recommended to ensure the proper implementation of the existing measures in the EM&A manual.

Table III– Summary of Ecology (Chinese White Dolphin) Mitigation Measures Implementation Status in Environmental Permit (EP-352/2009/D)/ EM&A Manual

EP / EM&A	Phase/ Construction Activities	Description of Mitigation Measures	Mitigation Measures implemented by the Contractor	Implementation Status
EM&A Section 10.2.5	During the construction phase	Strict enforcement on No-dumping to avoid degrading the Chinese White Dolphin habitat	-Waste Management Plan (WMP) has been developed in the early stages of the Contract and can be accessed from the website (www.hzmbenpo.com) -Trip-ticket system has been implemented by the Contractor since the commencement of the Contract for the disposal of C&D materials. -Tool box talks were conducted by the Contractor to the site workers periodically to brief for waste collection, handling and disposal. -There was no non-compliance of waste management recorded since the commencement of the construction works.	^
EM&A Section 10.2.7	During the construction phase	Spill response plan for protecting marine ecology and Chinese White Dolphin	-The Spill Response Plan has been developed by the Contractor and described the actions to be taken in the event of accidental spillage of oil or other hazardous chemicals from construction activities including vessels operating for the Contract, with specific provisions for protecting marine ecology and the Chinese White Dolphins. The precaution measures are implemented by the Contractor and inspected during the weekly site inspection and records kept by the Contractor including: 1) The storage areas of chemicals and chemical wastes on land were located remote from the coast and any other water bodies as far as practicable; 2) Drip trays were used for storage containers, provide tightly closed lids and suitably sized container of chemical oil fuel tanks and / or generators to avoid	^

			leakage of chemicals or overfilling 3) The emergency response procedure were developed in case of spill incident. Emergency preparedness drill was conducted in a frequency of 6 months and incorporated into the drill programme of DCVJV safety plan. The emergency drill was taken in April during the period (March- May 2017). 4) Sufficient spill kits were available in site areas where marine access is feasible to load spill kits on boards for spillage in water; 5) Tool box talks were conducted by Contractor to the site workers periodically to brief for handling and storage of chemicals, chemical waste and handling of chemical spillage. -The Spill Response Plan can be accessed from the website (www.hzmbenpo.com)	
EP Section 3.3/ EM&A Section 10.2.11	Bored piling	Avoidance of percussive piling	-The bored piling work in western water was completed in March 2015, mitigation measures were not required during the period (March to May 2017).	N/A
EP Section 3.4/ EM&A Section 10.2.12		Dolphin Exclusion Zone		
EP Section 3.1/ EM&A Section 10.2.13		Temporal suspension of installation of bored pile casing at marine pier sites during May and June (i.e. the peak months of the dolphin calving season).		
EP Section 3.6/ EM&A Section 10.2.19-21	Marine Traffic	-Speed limit of 10 knots will be strictly enforced within the work areas as fast-moving vessels are a threat to dolphins and porpoises; -Skipper training to the Captains of construction vessels working in the West Lantau waters and near the Brothers Islands	-Marine Travel Route Plan was prepared by the Contractor in accordance with Condition 2.9 of the Environmental Permit (EP-352/2009/D) to plan for routes taken by contractor's vessel moving to and from work area to minimize risk of collision with the Chinese White Dolphins during the construction period and with appropriate controlling measures on the marine traffic to minimize impacts on the Chinese White Dolphins. As	^

		-Predefined and regular routes for working vessels in order to minimize the chance of vessel collision. And the routes would not go through the dolphin hotspot in Brothers Islands.	there is no marine works, there is no working barges on site. The shipman of the passenger boats were trained by the Contractor to ensure the precaution measures are implemented including: 1) When entering into a distance of 250m from silt curtains of HY/2011/09 sites, all vessels will travel at a speed no greater than 5 knots, and at a speed no greater than 10 knots for a distance of at least 1.5km away. Vessels can then increase speed after that distance unless other restrictions apply; 2) If any dolphins are sighted within 250m of a vessel then the vessel will slow to a speed no greater than 5 knots for at least 3 minutes after the last sighting; 3) Concerning the travelling route for fill materials to the HKLR03 site passing dolphin hotspots, it is agreed that prolonged marine travel route to be adopted – to go further east until pass over proposed marine park in Brothers Island and turn back to HKLR03. The speed will keep below 5 knots when crossing the edge of the proposed marine park. -The Marine Travel Route Plan can be accessed from the website (www.hzmbenpo.com)	

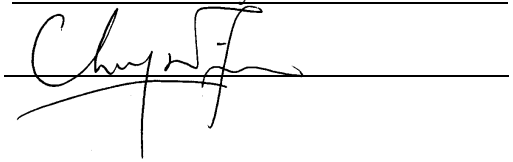
Remarks: ^ Compliance of mitigation measure

Part C – Conclusion:

No direct evidence that the exceedances were due to the construction works of HKR09 (where the marine works for HKLR09 such as bored piling works have been completed and no exceedances were recorded in the previous quarter with the marine construction works), therefore the exceedances are considered due to the other external factors rather than the contract works. Environmental mitigation measures for Ecology (CWD) in EP and EM&A Manual were implemented during the construction phase.

Part D – Recommendation: As the exceedances were not related to the contract works, no further action / additional mitigation measures to be required.

Reviewed by: Dr. Priscilla Choy



Title: Environmental Team Leader

Date: 3 November 2017

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

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	(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	

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				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

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			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	

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				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

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				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.	
Com-2017-05-001	Pier 86-87	2 May 2017	The complainant mentioned about foul water leakage from the construction site of Hong Kong - Zhuhai - Macao Bridge (under Contract No. HY/2011/09) onto South Perimeter Road at 14:00-16:00 of 2 May 2017.	Based on the investigation findings, foul water mentioned in the complaint that leak to South Perimeter Road was being used for dust suppression during grinding work. The Contractor will temporarily suspend construction activities of the same nature at the surface of the left deck until a side barrier has been constructed completely to confine excessive water and to ensure no re-occurrence. In addition, sandbags would be laid along the edge where side barrier was not installed around. The excessive water used for dust suppression will be diverted along the deck piles or nearby plugged gully and finally carried to wastewater treatment facility for sedimentation which is in accordance with the requirement for water discharge mentioned in EIA Report and the EM&A Manual. Nevertheless, DCVJV was also recommended the mitigation measures as below:	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				•No grinding works should be done until the side barrier has been constructed completely; •Laying sandbag along the edge where side barrier could not be installed to divert the excessive water used for dust suppression will be diverted along the deck piles within the site area or nearby plugged gully and finally carried to wastewater treatment facility for sedimentation and clean effluent discharge.	
Com-2017-05-002	Tai O Po Chue Tam Outer Beach	5 May 2017	The complainant mentioned about there has been a consistent increase in the incidence of floating refuse landing around Tai O, and particularly at Po Chue Tam Outer Beach which covered with bamboo poles, as it has been for a number of months in spite of cleanings having taken place.	According to the weekly site inspections conducted since the commencement of the construction works under Contract HY/2011/09 and DCVJV's confirmation, bamboos pole has never been used for the construction works under HY/2011/09. So, the abandoned bamboos on the beach as shown in the photos as attached to the email of complaint are not originated from the work sites of HY/2011/09. Nevertheless, for other floating refuses, Waste Management Plan (WMP) has been developed in the early stages of the Contract. Based on our observation during the weekly site inspection, waste collection facilities such as refuse collection bins and recyclable bins have	Closed

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				been provided by DCVJV on site according to WMP. Trip-ticket system has also been implemented since the commencement of the Contract to ensure the disposal of C&D materials as well as the C&D waste are properly documented and verified. In addition, monthly summary waste flow table (WFT) had also be prepared and submitted in the Monthly EM&A Report to record the quantities of surplus materials and wastes generated each month. No non-compliance of waste management was recorded since the commencement of the construction 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.