

Dragages -China Harbour-VSL JV

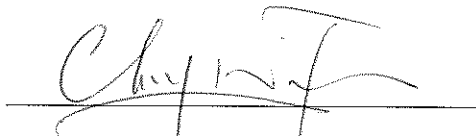
Contract HY/2011/09
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Link Road-Section between
HKSAR Boundary and Scenic Hill

Quarterly EM&A Report

June to August 2018

(Version 2.0)

Certified By


Dr. Priscilla Choy
Environmental Team Leader

REMARKS:

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

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

CINOTECH CONSULTANTS LTD

Room 1710, Technology Park,
18 On Lai Street,
Shatin, NT, Hong Kong
Tel: (852) 2151 2083 Fax: (852) 3107 1388
Email: info@cinotech.com.hk

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EXECUTIVE SUMMARY**Introduction**

1. This is the 22nd 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 June to August 2018.

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	6 th , 12 th , 15 th , 21 st and 27 th June 2018
24-hr TSP Monitoring	3 rd , 9 th , 13 th , 19 th , 25 th and 31 st July 2018 6 th , 10 th , 16 th , 22 nd and 28 th August 2018
Noise Monitoring	1 st , 7 th , 13 th , 22 nd and 28 th June 2018 4 th , 10 th , 20 th and 26 th July 2018 1 st , 7 th , 17 th , 23 rd and 29 th August 2018
Water Quality Monitoring	1 st , 4 th , 6 th , 9 th , 11 th , 13 th , 15 th , 18 th , 20 th , 22 nd , 25 th , 27 th and 29 th June 2018 2 nd , 4 th , 6 th , 9 th , 11 th , 13 th , 17 th , 19 th , 21 st , 23 rd , 25 th , 27 th and 30 th July 2018 1 st , 3 rd , 6 th , 8 th , 10 th , 13 th , 15 th , 17 th , 20 th , 22 nd , 24 th , 28 th and 30 th August 2018
Dolphin Monitoring (Line-transect Vessel Surveys)	4 th and 20 th June 2018 10 th and 19 th July 2018 2 nd and 9 th August 2018
Environmental Site Inspection	5 th , 12 th , 19 th and 26 th June 2018 3 rd , 10 th , 17 th , 24 th and 31 st July 2018 7 th , 14 th , 21 st and 28 th August 2018
Archaeological Site Inspection	19 th June 2018

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)	19	0	0	0
Dolphin Monitoring	Line-transect Vessel Surveys	0	0	0	0

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

Complaint Log

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

Notification of Summons and Successful Prosecutions

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

Reporting Changes

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

Future Key Issues

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

Marine Portion

- Installation of cat ladders at pile cap walls

Land Portion

- Reinstatement of South Perimeter Road

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 22nd Quarterly EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in the period between June to August 2018.

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. Dennis Leung	3767 5801	
ENPO/IEC (Ramboll Hong Kong Limited)	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 Hong Kong Limited 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:

June 2018:**Ancillary and Associated Facilities**

- (a) P115 & P114 interface area - Reinstatement of slope underneath the deck is in progress;
- (b) Hydroseeding at Portion A after reinstatement of the sloping seawall and the crest is in progress;
- (c) Installation of the remaining outstanding end panel utility trough covers at high mast and valve chambers locations completed in June;
- (d) Installation of stainless steel covers at P115 movement joint location was completed;
- (e) Installation of stainless steel hoppers and uPVC drainage pipes at movement joint locations is in progress;
- (f) Kiosks fabrication and construction of civil provision for the additional LEAs requirement at Turnaround;
- (g) Construction of U-channels at Turnaround;
- (h) Rehabilitation works for existing drains and sewerage at South Perimeter Road between P81 to P84 continues;
- (i) Site clearance/formation works to the reinstatement of South Perimeter Road between P84 to P81 are in progress;
- (j) Road lighting installation at Scenic Road in progress;
- (k) Road lighting installation at EVA of Ngong Ping 360 in progress.

E&M Works

- (a) Lightning installation in deck void from P0 to P113 substantially complete and minor touching up continues;
- (b) Deck void lighting installation at slip road of ML8 substantially complete;
- (c) Cable laying for power to the additional kiosks at turnaround in progress.

Temporary Works/ Works at P68

- (a) P68 Works - Removal of the temporary rock fill platform was completed.
- (b) P71, P72 & P77 Works -Removal of the temporary working platforms under LSSOP is in progress.

Stainless Steel Maintenance Platform

Installation of platforms was completed, minor modification and general cleaning works are in progress.

July 2018:**Ancillary and Associated Facilities**

- (a) P115 & P114 interface area - Reinstatement of slope underneath the deck is temporarily on hold pending for (1) agreed details of u-channel alignment and related slope profile, and (2) proposed left-in mini piles both with SOR & AAHK;
- (b) Hydroseeding at Portion A was completed;
- (c) Installation of the remaining outstanding end panel utility trough covers at high mast and valve chambers locations was completed except panels lifted up by others for cables installation;
- (d) Installation of stainless steel hoppers and uPVC drainage pipes at movement joint locations was completed;
- (e) Fabrication and construction of additional kiosks at Turnaround was completed;
- (f) Construction of U-channels at Turnaround was completed;
- (g) Rehabilitation works for existing sewerage at South Perimeter Road between P81 to P84 was completed;
- (h) Rehabilitation works for existing drains at South Perimeter Road between P81 to P84 continues;
- (i) Site clearance/formation works to the reinstatement of South Perimeter Road between P84 to P81 are in progress;
- (j) Road lighting installation at Scenic Road was completed;
- (k) Road lighting installation at EVA of Ngong Ping 360 is in progress.

E&M Works

- (a) Lightning installation in deck void from P0 to P113 was substantially completed and minor touching up continues;
- (b) Cable laying for kiosk at turnaround is in progress;
- (c) E&M installation works for additional kiosks and canopy at turnaround are in progress.

Temporary Works/ Works at P68

- (a) Removal of the temporary working platforms under LSSOP
 - P71, P72 & P73 – Completed
 - P76 & P77 – In Progress

Stainless Steel Maintenance Platform

- (a) Installation of platforms was completed, minor modification and general cleaning works was completed.

Proposed Maintenance Facilities

- (a) Type 1, 5 & 6 inside Long Span bridges
 - ML14 – Completed
 - ML3 & ML13 – In Progress

August 2018:

Ancillary and Associated Facilities

- (a) P115 & P114 interface area - Reinstatement of slope underneath the deck is temporarily on hold pending for (1) agreed details of u-channel alignment and related slope profile, and (2) proposed left-in mini piles both with SOR & AAHK;
- (b) Installation of the remaining outstanding end panel utility trough covers at high mast and valve chambers locations was completed except panels lifted up by others for cables installation;
- (c) Rehabilitation works for existing drains at South Perimeter Road between P81 to P84 was completed;
- (d) Site clearance/formation works to the reinstatement of South Perimeter Road between P84 to P81 are in progress;
- (e) Road lighting installation at EVA of Ngong Ping 360 was completed;
- (f) Modification of type II railings for navigation lights are in progress;
- (g) Grouting of base plate for lighting of navigation signs are in progress;
- (h) Painting outstanding road marking at top of turnaround was completed;
- (i) Installation of external uPVC drainage down pipes at P84 was completed.

E&M Works

- (a) Lightning installation in deck void from P0 to P113 was substantially completed and minor touching up continues;
- (b) Cable laying for additional kiosk at turnaround completed;
- (c) E&M installation works for additional kiosks and canopy at turnaround were completed.

Temporary Works/ Works at P68

- (a) Removal of the temporary working platforms under LSSOP
 - P76 – Completed
 - P77 - In progress

Proposed Maintenance Facilities

- (a) Type 1, 5 & 6 inside Long Span bridges
 - ML3, ML10, ML11 & ML12 - In progress

Installation of EIT monitoring system

- (a) ML10, ML11, ML12, ML13 & ML14 – Completed
- ML1, ML2, ML3 ML4, ML5, ML6, ML7, ML8 & ML9 - In progress

Painting & Epoxy Injection at P56

- (a) Painting works at soffit – Completed
- Painting works at wing slab – In progress
- (b) Epoxy injection at wing slab – Completed

Epoxy injection inside deck void – In progress

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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS1	381	500
AMS4	352	

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

Location	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
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	<u>5.0</u>	4.2 except 5 for FCZ
	Bottom	<u>4.7</u>	3.6
Turbidity (NTU)	Depth average	<u>27.5</u> and 120% of upstream control station's turbidity at the same tide of the same day	<u>47.0</u> and 130% of turbidity at the upstream control station at the same tide of same day
Suspended Solids (mg/L)	Depth average	<u>23.5</u> and 120% of upstream control station's SS at the same tide of the same day	<u>34.4</u> 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 than 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 (19th June 2018). 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 RESULTSAir 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/m ³)		Action Level, µg/m ³	Limit Level, µg/m ³
		Average	Range		
June 2018	AMS1	39	10 – 85	381	500
	AMS4	24	7 – 49	352	
July 2018	AMS1	41	4 – 198	381	
	AMS4	28	10 – 132	352	
August 2018	AMS1	34	4 – 79	381	
	AMS4	24	3 – 51	352	

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

Month	Monitoring Station	Concentration (µg/m ³)		Action Level, µg/m ³	Limit Level, µg/m ³
		Average	Range		
June 2018	AMS1	19	13 – 25	170	260
	AMS4	17	11 – 27	171	
July 2018	AMS1	19	9 – 28	170	
	AMS4	13	9 – 18	171	
August 2018	AMS1	17	13 – 21	170	
	AMS4	17	11 – 23	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	
June 2018	NMS1	69	65 – 72	75 dB(A)
	NMS4	62	55 – 64	
July 2018	NMS1	67	61 – 70	
	NMS4	63	54 – 67	
August 2018	NMS1	70	59 – 73	
	NMS4	60	54 – 63	

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 June to August 2018, 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 193.34 km of survey effort was collected, with 95.5% 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 127.25 km, while the effort on secondary lines was 66.09 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 of Appendix F**.

- 4.10 During the six sets of monitoring surveys in June to August 2018, a total of 35 groups of 133 Chinese White Dolphins were sighted. All except two dolphin sightings were made during on-effort search. Twenty-five on-effort sightings were made on primary lines, while the other eight on-effort sightings were made on secondary lines. A summary table of the dolphin sightings is shown in **Appendix II of Appendix F**.

Distribution

- 4.11 Distribution of dolphin sightings made during HKLR09 monitoring surveys from June to August 2018 is shown in **Figure 1 of Appendix F**. The dolphin groups were evenly distributed across the WL survey area, with slightly higher concentration near and to the north of Kai Kung Shan, near Peaked Hill and Fan Lau (**Figure 1 of Appendix F**). On the other hand, they appeared to avoid the waters near Tai O Peninsula as well as the southern end of the WL waters (**Figure 1 of Appendix F**).
- 4.12 Sighting distribution of dolphins in the present quarter was somewhat similar to the one during the baseline period in September to November 2011. However, there appeared to be fewer dolphin sightings made in the northern portion of the WL survey area during the present impact phase period when compared to the baseline period (**Figure 1 of Appendix F**).
- 4.13 Three of the 35 dolphin groups were sighted near the HKLR09 alignment in WL survey area during the present quarter (**Figure 2 of Appendix F**). When pooling the data from HKLR03 monitoring surveys from the same summer quarter of 2018, several dolphin groups were also observed near the bridge alignment in NWL waters, which was comparable to the dolphin distribution in this same area during the baseline phase (**Figure 2 of Appendix F**).
- 4.14 Dolphins appeared to occur more often near the HKLR09 alignment during the present quarterly period, which was also the case in the previous quarter. As the disturbance arisen from the HKLR09 construction activities on the dolphins have been completed, dolphins may start to utilize the waters in the vicinity of the bridge alignment. However, it may still be premature to conclude that the potential obstruction from the permanent physical structure of the bridge piers does not occur any more, and this critical issue should be continuously monitored in the upcoming quarters through boat surveys and land-based theodolite tracking surveys.
- 4.15 Distribution patterns of dolphin sightings in the past three summer quarters of 2015-17 were compared with the one in 2018. Level of dolphin occurrence throughout the WL waters during the summer period of 2018 was similar to the previous three years, but they appeared more often near the HKLR09 alignment and near Kai Kung Shan in 2018 (**Figure 3 of Appendix F**).

Encounter rate

- 4.16 During the present three-month impact phase monitoring period (June – August 2018),

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 (June to August 2018)

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 (June 4 th)	25.9	134.9
	Set 2 (June 20 th)	19.5	58.4
	Set 3 (July 10 th)	10.3	36.0
	Set 4 (July 19 th)	19.5	39.0
	Set 5 (August 2 nd)	9.3	101.9
	Set 6 (August 9 th)	34.3	132.2

Table 4.7 Comparison of average dolphin encounter rates from impact monitoring period (June to August 2018) 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)	
	June – August 2018	September-November 2011	June – August 2018	September-November 2011
West Lantau	19.78 ± 9.47	16.43± 7.70	83.71 ± 45.18	60.50± 38.47

4.17 Notably, the encounter rates of dolphin sightings (ER(STG)) and encounter rates of dolphins (ER(ANI)) in the present quarter (June to August 2018) were the fourth and third highest respectively during the entire construction period, and both were also the highest in the past four years (**Table 4 of Appendix F**). In fact, those encounter rates were noticeably higher than the baseline ones recorded in 2011 (**Table 4 of Appendix F**). Such dramatic rebound in the present quarter should be continuously monitored in the upcoming quarter, to confirm whether the increase in dolphin occurrence in WL survey area is temporary or persistent.

4.18 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 21st quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.517 and 0.361 respectively. Therefore, if the

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

- 4.19 Another Another comparison was made between the baseline period and the 21 cumulative quarters in the impact phase, and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.465 and 0.605 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

- 4.20 Group size of Chinese White Dolphins ranged from one to twenty individuals per group in WL survey area during June to August 2018. 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 (June to August 2018) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	June – August 2018	September – November 2011
West Lantau	3.80 ± 3.73 (n = 35)	3.63 ± 2.97 (n = 46)

- 4.21 The average dolphin group size in the WL region during the present quarter was slightly higher than the one recorded during the three-month baseline period (**Table 4.8**). Among the 35 groups, 26 of them were composed of only 1-4 dolphins, while there were seven groups in moderate size with 5-9 dolphins, and two large groups with 11 and 20 animals respectively.
- 4.22 Distribution of dolphins with larger group sizes (with five or more animals per group) during June to August 2018 is shown in **Figure 4 of Appendix F**. With the exception of a large group of 20 animals sighted to the north of the HKLR09 alignment, the other larger dolphin groups in the present impact phase period were mainly distributed in the central and southern portions of the WL survey area with slightly higher concentration to near Kai Kung Shan and Fan Lau. This was slightly different from the baseline phase when the large dolphin groups were also concentrated near Tai O Peninsula (**Figure 4 of Appendix F**).

Habitat use

- 4.23 From June to August 2018, the grids that recorded higher densities of dolphins were located near the HKLR09 alignment, near Kai Kung Shan, Peaked Hill and Fan Lau (**Figures 5a & 5b of Appendix F**). However, it should be cautioned that the amount of survey effort collected in each grid during the three-month period was fairly low (six units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will

be collected throughout the impact phase monitoring programme.

- 4.24 When compared with the habitat use pattern recorded during the baseline period in September-November 2011, it appears that the overall dolphin occurrence was slightly lower during the present impact phase monitoring period in summer 2018, especially near the Tai O Peninsula (**Figure 6 of Appendix F**).

Mother-calf pairs

- 4.25 During the three-month impact phase monitoring period, only three young calves (all were unspotted juveniles) were sighted in the WL survey area. These young calves comprised only 2.3% of all animals sighted, which was much lower than the percentage recorded during the baseline monitoring period (6.6%). All three young calves occurred at the southern end of the WL survey area during this quarter, and such occurrence was very different from the baseline period when calf occurrence was much more frequent and concentrated in the northern portion of WL waters near Tai O Peninsula (**Figure 7 of Appendix F**).

Activities and associations with fishing boats

- 4.26 During the three-month impact monitoring period, three dolphin groups were engaged in feeding activities to the north of HKLR09 alignment and between Kai Kung Shan and Tai O Peninsula respectively (**Figure 8 of Appendix F**), comprising 8.6% of the total number of dolphin sightings. This percentage was somewhat lower than the percentage recorded during the baseline period (13.0%). In addition, two dolphin groups were engaged in socializing activities to the north of HKLR09 alignment and near Kai Kung Shan respectively, while another group was engaged in traveling activities to the west of Peaked Hill near the territorial border (**Figure 8 of Appendix F**). Distribution of different activities engaged by the dolphins during the present impact phase monitoring period was quite different from the one during the baseline period, when the main concentration of the feeding and socializing activities occurred between Tai O Peninsula and Peaked Hill (**Figure 8 of Appendix F**). During the three-month monitoring period, one of the 35 dolphin groups was associated with an operating purse-seiner (**Appendix II of Appendix F**).

Summary of photo-identification works

- 4.27 From June to August 2018, over 3,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 4.28 In total, 65 individuals sighted 80 times altogether were identified (see the summary table in **Appendix III of Appendix F** and photographs of identified individuals in **Appendix IV of Appendix F**). The majority of these individuals were re-sighted only once during the three-month period. However, there were a total of nine individuals (NL269, NL279, NL330, WL68, WL137, WL218, WL245, WL267 and WL272) being re-sighted twice, and another three individuals being re-sighted thrice (NL212, WL98 and WL293) (**Appendix III of Appendix F**).
- 4.29 Among the 65 identified individual dolphin, nine of them (CH113, NL145, NL233,

NL317, NL327, NL329, WL188, WL207 and WL251) were also re-sighted in North Lantau waters during HKLR03/HKBCF monitoring surveys during the same three-month period. However, while some did show extensive movements across the HKLR09 alignment, a number of individuals actually just occurred near the alignment at the juncture of NWL/WL survey areas to the west of the airport (e.g. CH113, NL145, WL251).

- 4.30 Notably, many individuals (e.g. NL49, NL98, NL123, NL236) were consistently sighted in North Lantau waters in the past, but were re-sighted in WL waters during the present quarterly period.

Individual range use

- 4.31 Ranging patterns of the 65 individuals identified during the three-month study period were determined by fixed kernel method, as shown in **Appendix V of Appendix F**.
- 4.32 As in previous monitoring quarters, the majority of identified individuals that primarily centered their range use in West Lantau were still sighted within their normal ranges during the present quarterly period, while none of them has extended their range use from WL waters to the northern part of Lantau waters during the present quarterly period (**Appendix V of Appendix F**).

Conclusion

- 4.33 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.
- 4.34 Nevertheless, the dolphin usage in WL region should be continuously monitored, to further examine whether it has been significantly affected by the on-going construction activities in relation to the HZMB works.

Advice on the Solid and Liquid Waste Management Status

- 4.35 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.
- 4.36 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 No Action/Limit Level exceedance was recorded for air quality in the reporting period.

Noise

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

Water Quality

- 5.4 No Action/Limit Level exceedance for dissolved oxygen and turbidity was recorded in the reporting period.

- 5.5 There are nineteen Action Level exceedances were recorded for suspended solids.

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

- 1) No major marine construction activity was conducted;
- 2) No pollution discharge from construction activity was observed;
- 3) Sediment plume due to natural fluctuation of shallow water was observed;
- 4) Control station value already exceeded either the Baseline Action or Limit Level;
- 5) Localized sediment plume due to natural fluctuation of shallow water was observed; and
- 6) Dispersion of sediment plume to the monitoring station from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was observed

Dolphin Monitoring (Line-transect Vessel Survey)

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

Summary of Environmental Complaint

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

Summary of Notification of Summons and Successful Prosecution

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

6 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 6.1 This Quarterly Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken in the period between June to August 2018 in accordance with EM&A Manual.
- 6.2 No Action/Limit Level exceedance was recorded for air quality and noise.
- 6.3 There are nineteen Action Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity was recorded in the reporting period.
- 6.4 According to the investigation, all exceedances are considered not due to the Contract.
- 6.5 No Action/Limit Level exceedance of dolphin monitoring for the quarterly monitoring data.
- 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 5th, 12th, 19th and 26th June 2018, 3rd, 10th, 17th, 24th and 31st July 2018, 7th, 14th, 21st and 28th August 2018 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 19th June 2018. No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed.
- 6.9 There was no 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.

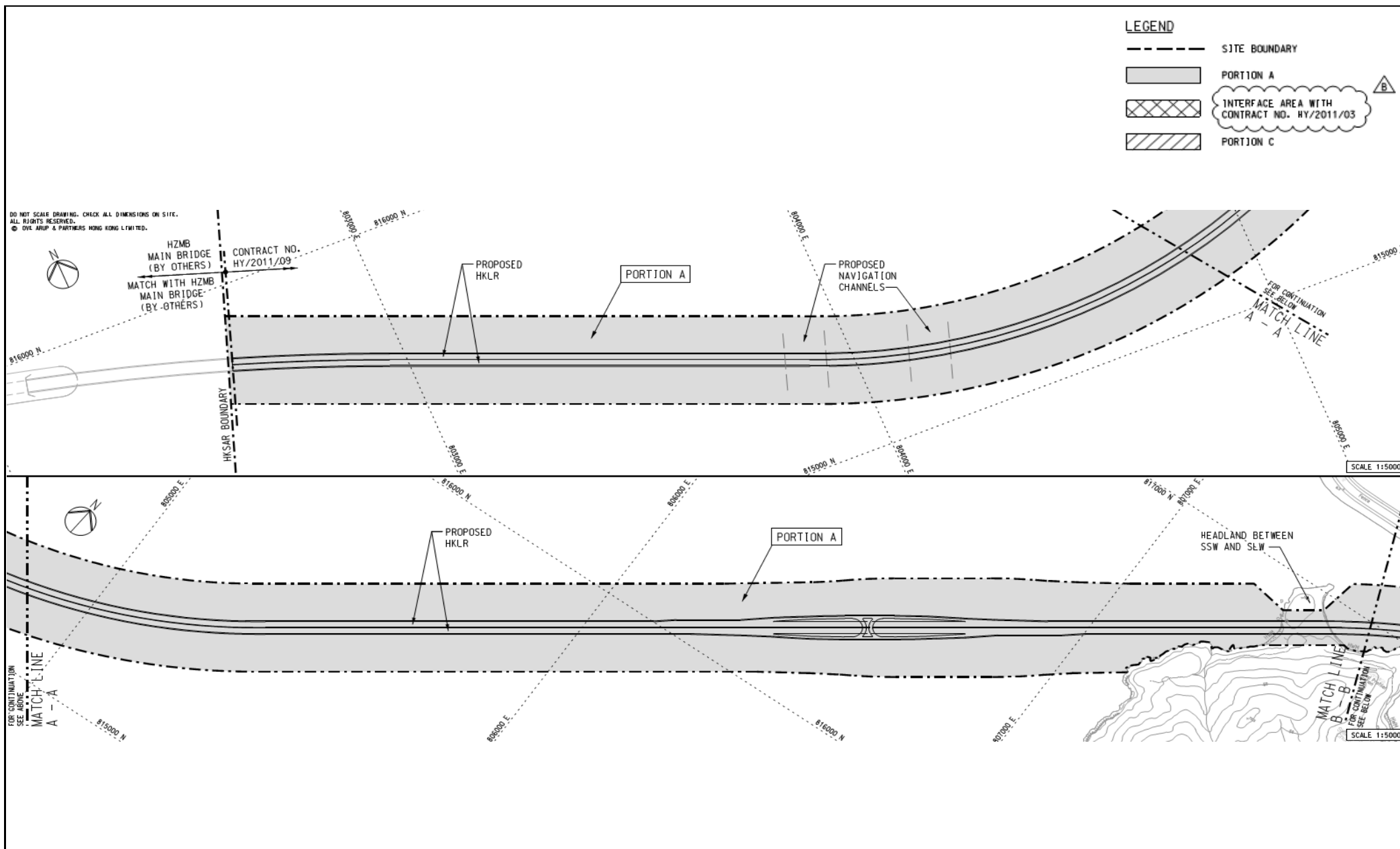
Ecology Impact

- To implement Spill Response Plan in the event of accidental spillage of or other hazardous 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.

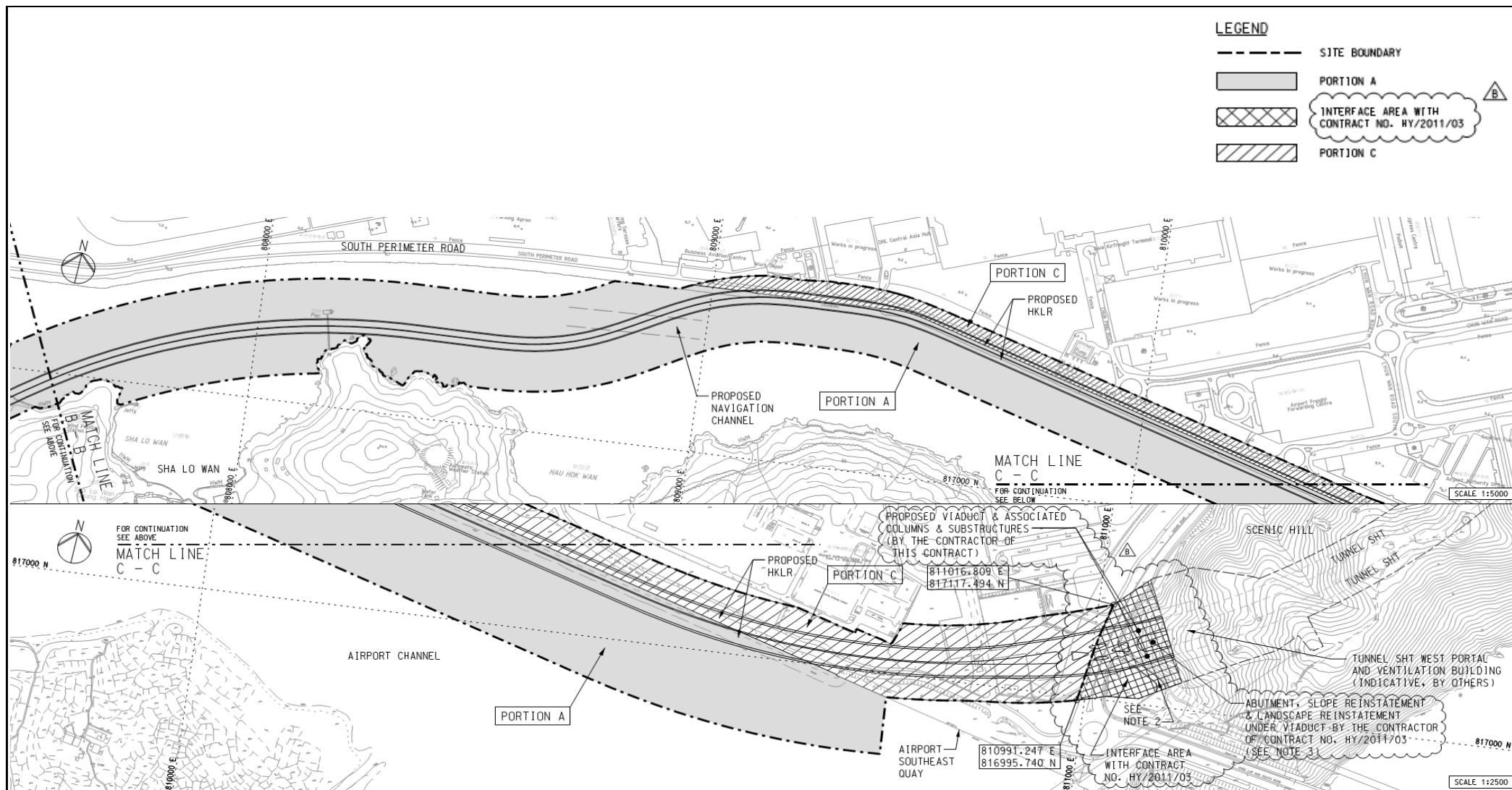
Waste/Chemical Management

- 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.

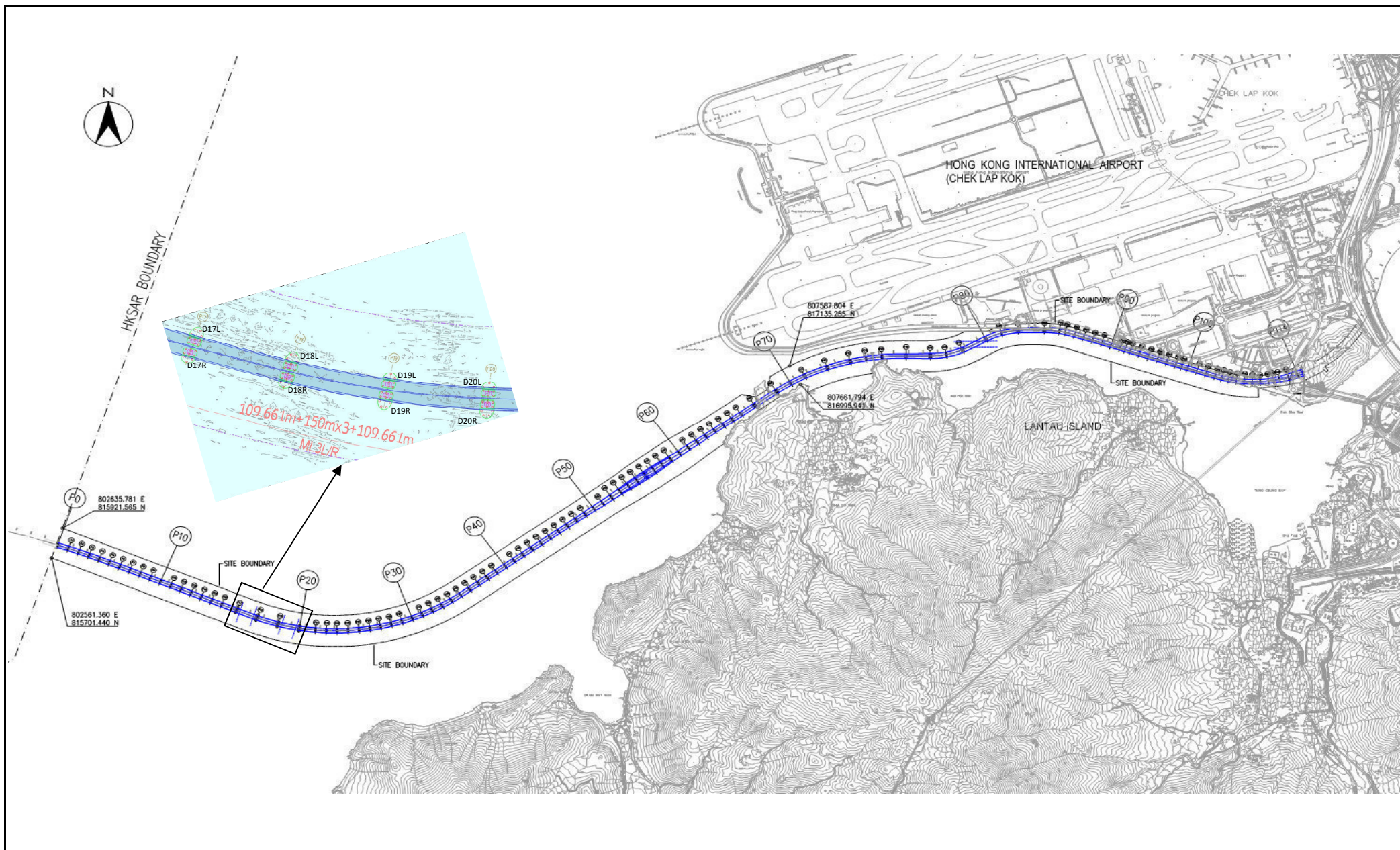
FIGURE(S)



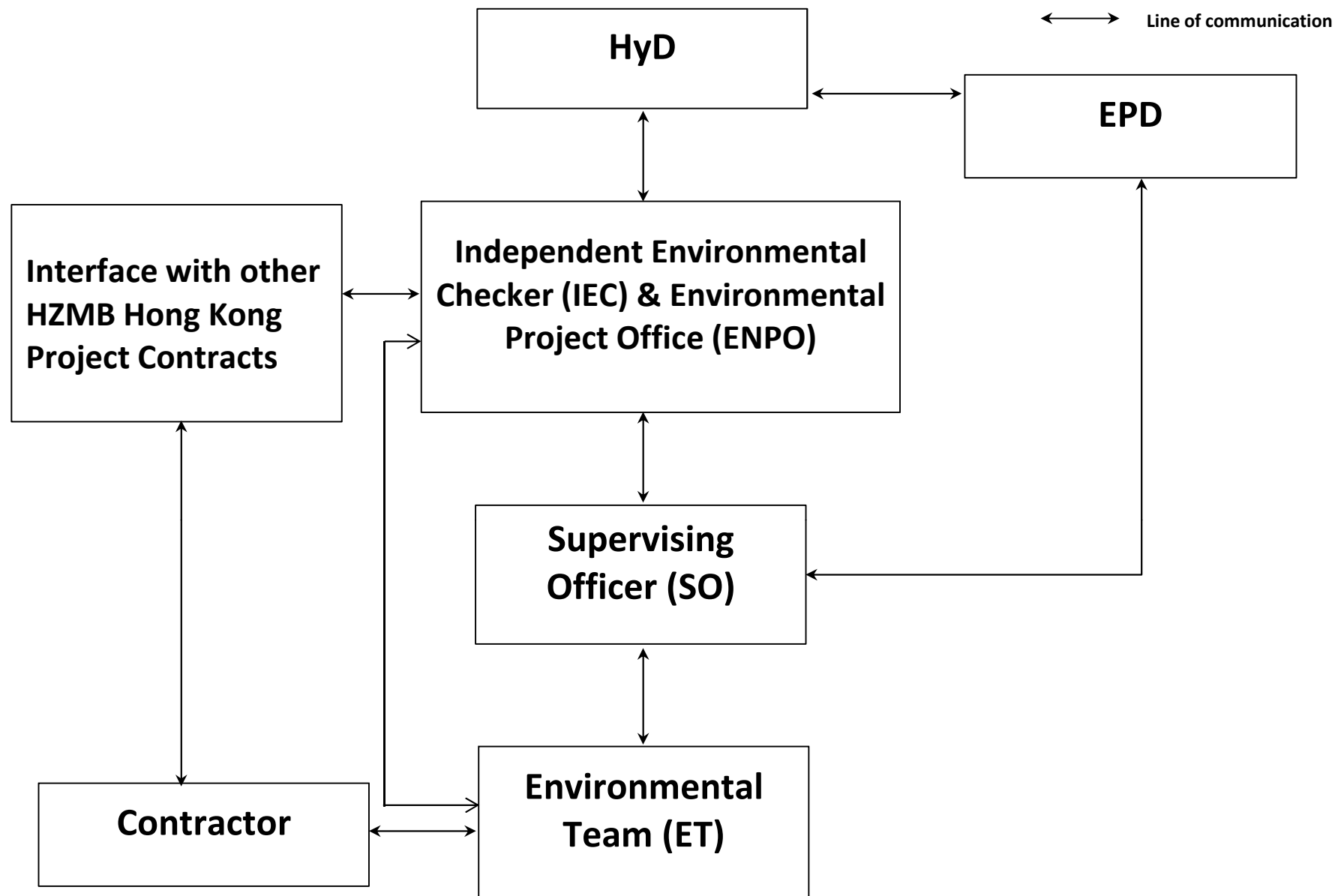
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	Hong Kong-Zhuhai-Macao Bridge		N.T.S	No. MA12014	
	Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill		Date	Figure	
	Site Layout Plan (Portion A)		Oct-15	1b	

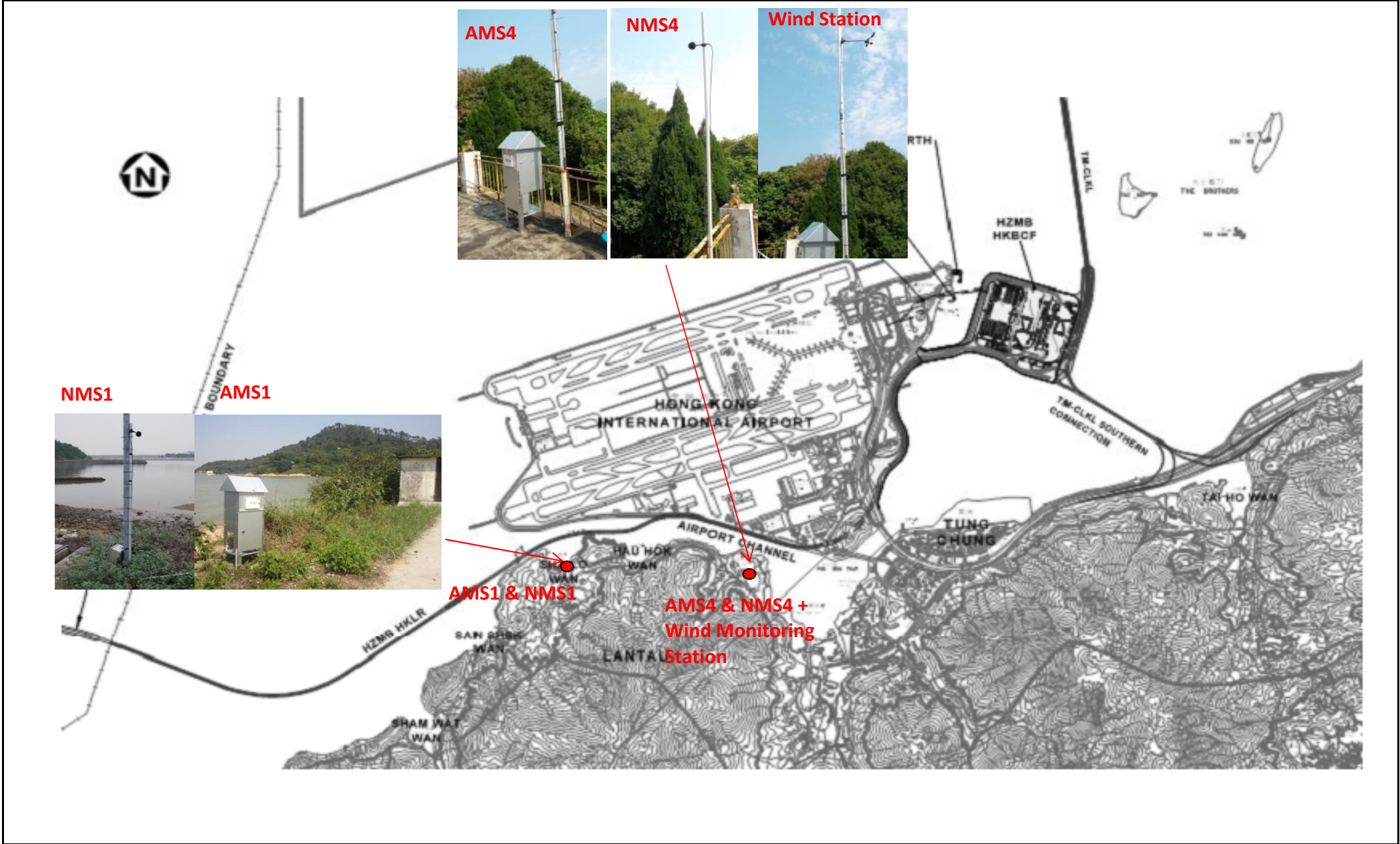


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	Hong Kong-Zhuhai-Macao Bridge	N.T.S	No. MA12014	
	Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill	Date	Figure	
	Site Layout Plan (Portion A and C)	五月-13	1c	

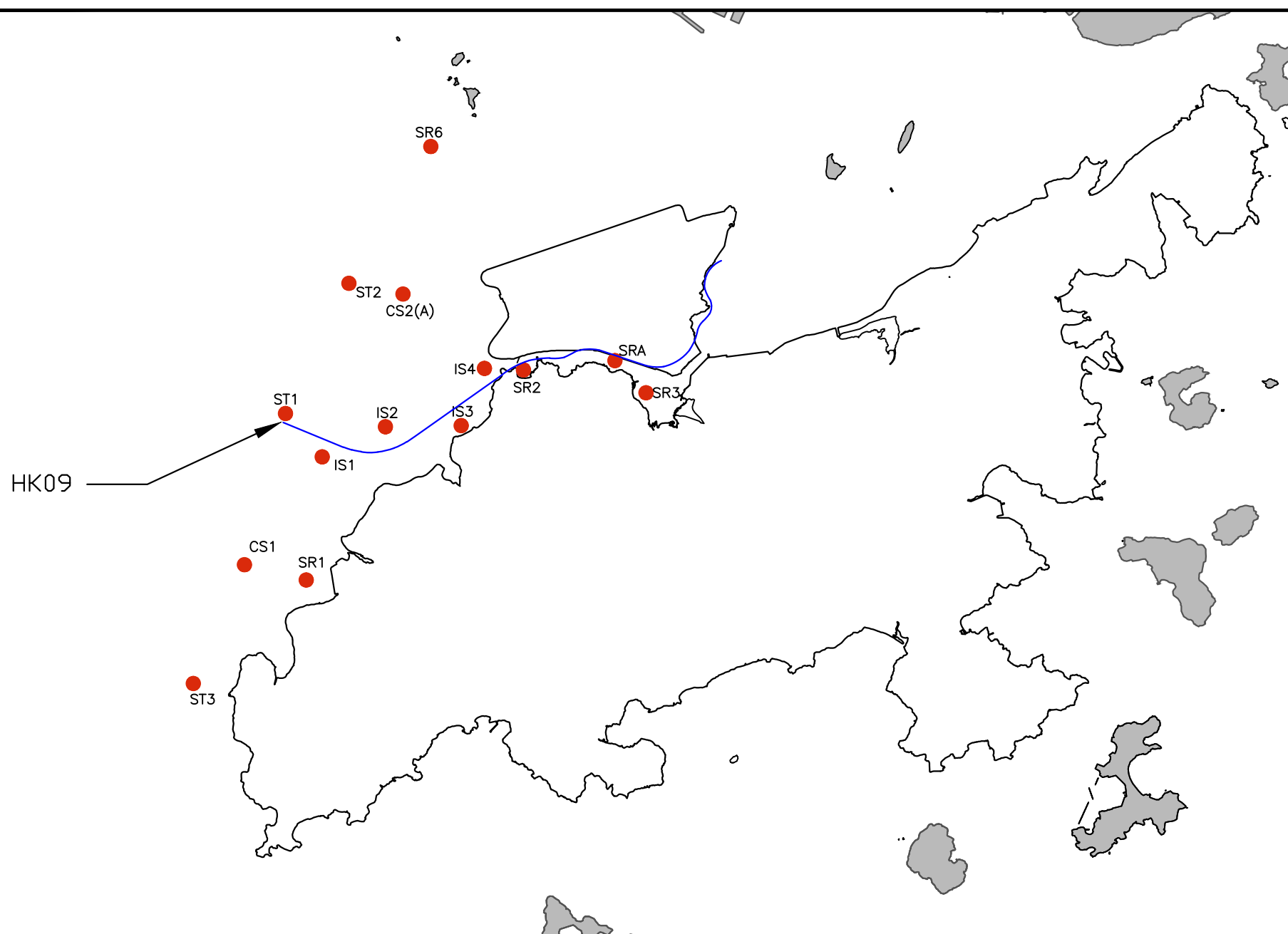


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Pier(s) Site)		Scale	N.T.S	Propose No.	MA12014	CINOTECH
			Date	Oct-15	Figure	1d	





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



APPENDIX A
CONSTRUCTION PROGRAMME



Dragages - China Harbour - VSL Joint Venture 寶嘉 - 中國港灣 - 威勝利聯營

CONTRACT NO. HY/2011/09

HONG KONG-ZHUHAI-MACAO BRIDGE

HONG KONG LINK ROAD

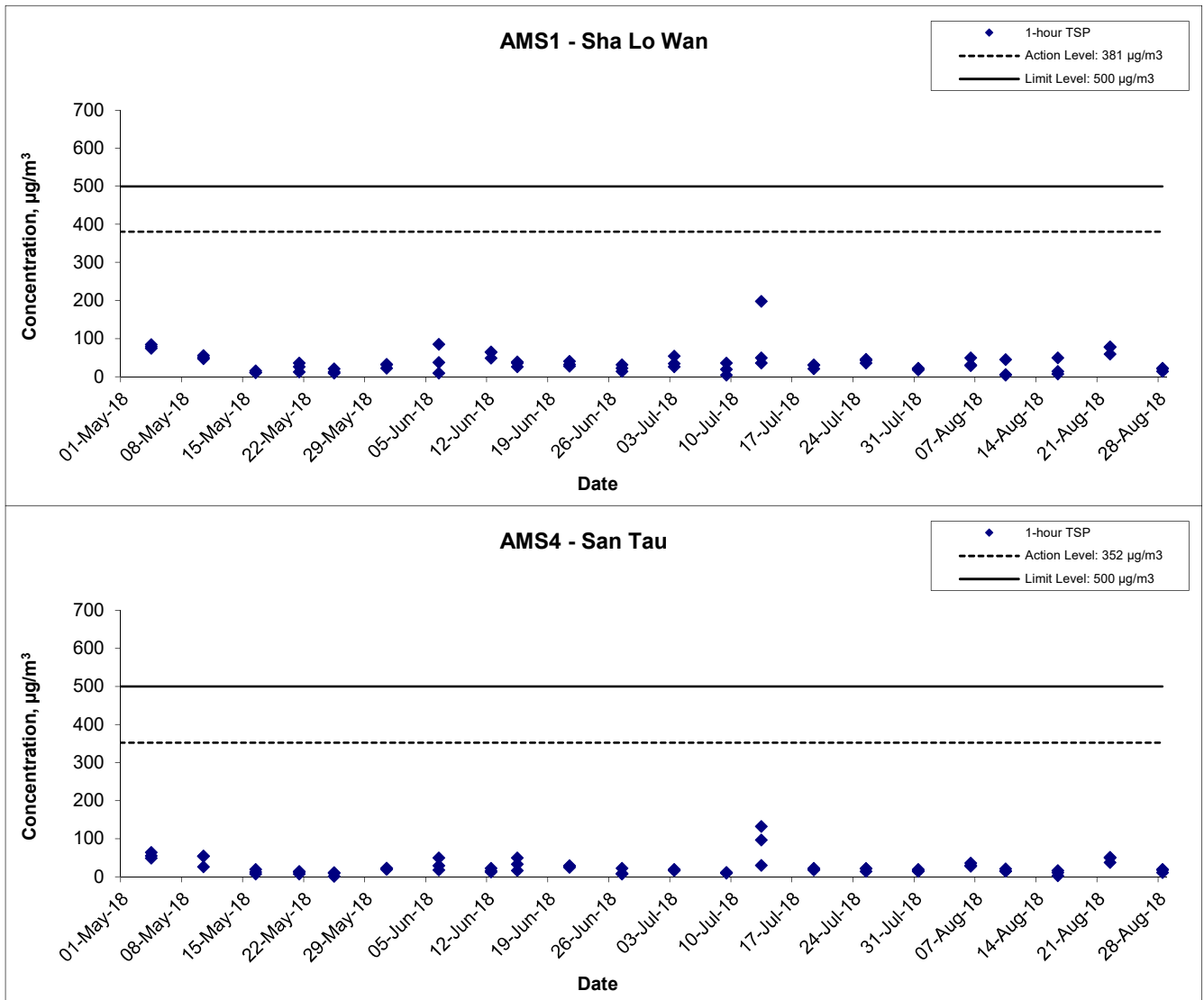
- SECTION BETWEEN HKSAR BOUNDARY SCENIC HILL

Activity ID	Activity Name	2018		
		Jun	Jul	Aug
		15	16	17
HKZB Hong Kong Link Road - 3 Months Rolling Programme				
Marine portion				
Installation of cat ladders at pile cap walls				
Dismantling NSS access platforms				
Land portion				
Reinstatement of South Perimeter Road				

Actual Work	HKLR EM&A report (Jun 18 to Aug 18) Page 1 of 1	Date	Revision	
			HKLR EM&A report (Jun 18 to Aug 18)	

APPENDIX B
GRAPHICAL PRESENTATION OF 1-
HOUR TSP MONITORING RESULTS

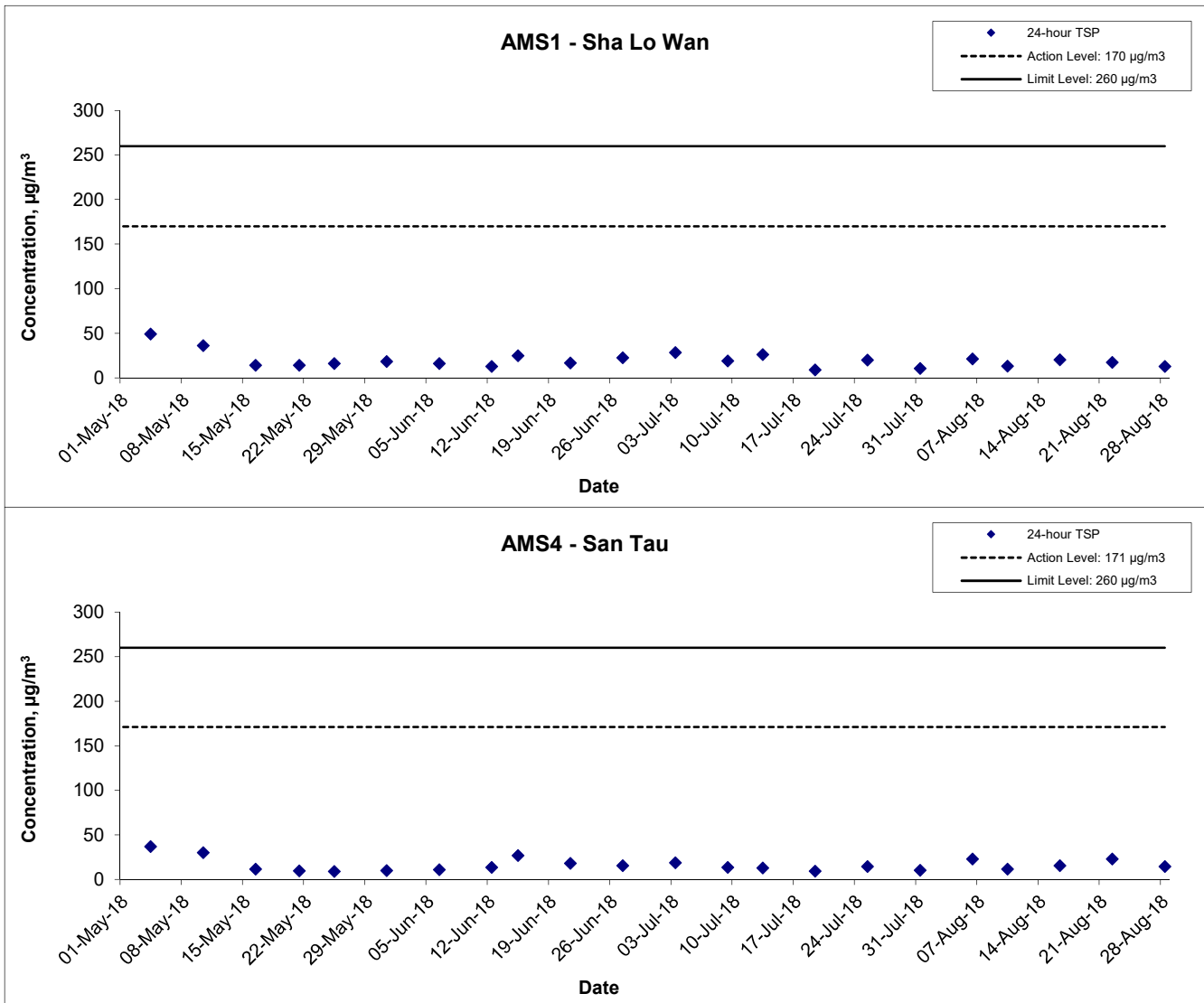
1-hour TSP Concentration Levels



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 Aug 18	Appendix E	

APPENDIX C
GRAPHICAL PRESENTATION OF 24-
HOUR TSP MONITORING RESULTS

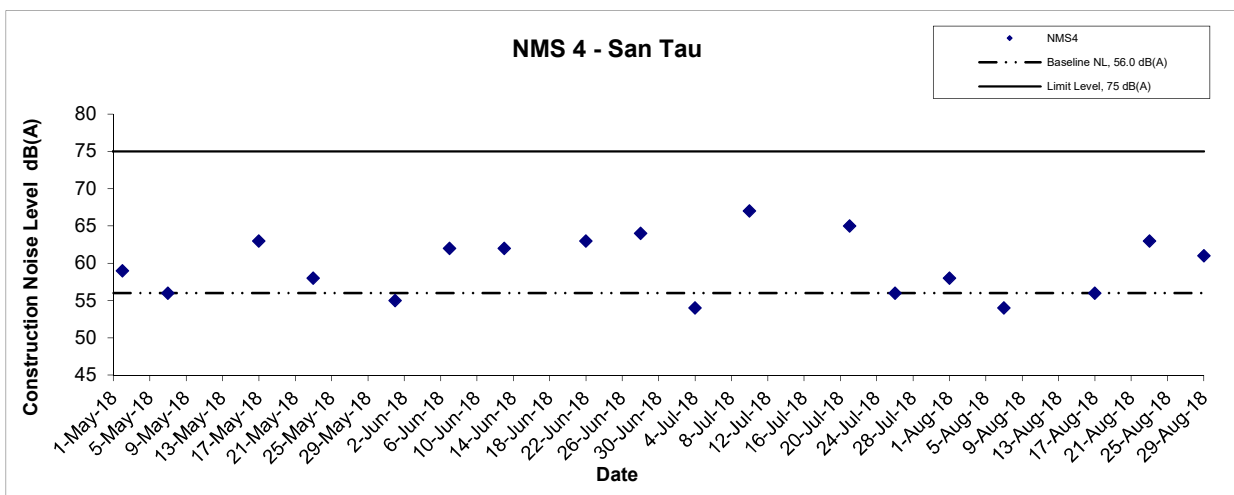
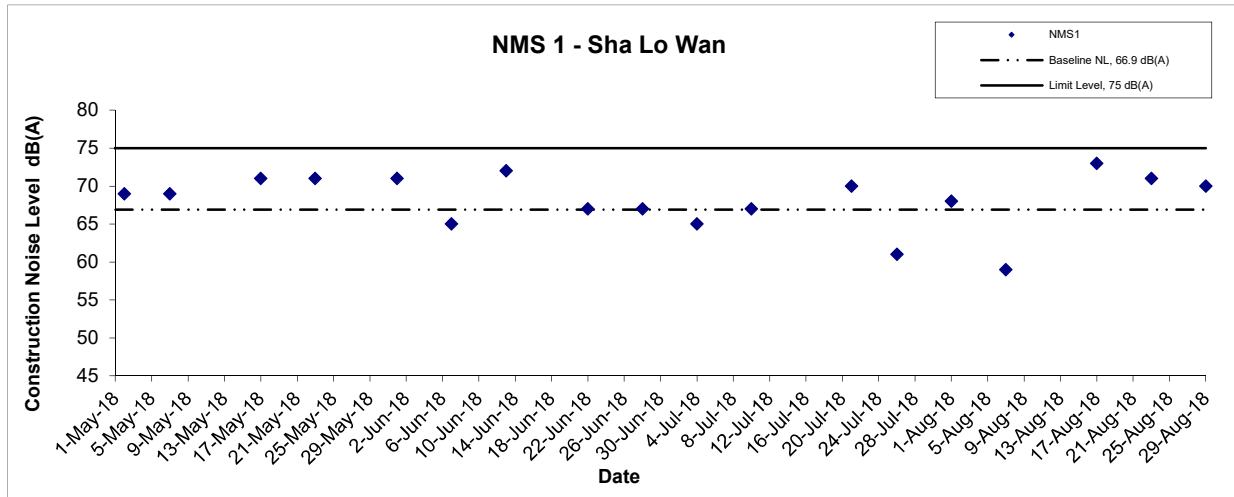
24-hour TSP Concentration Levels



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	Date Aug 18	Appendix F	

**APPENDIX D
GRAPHICAL PRESENTATION OF
NOISE MONITORING RESULTS**

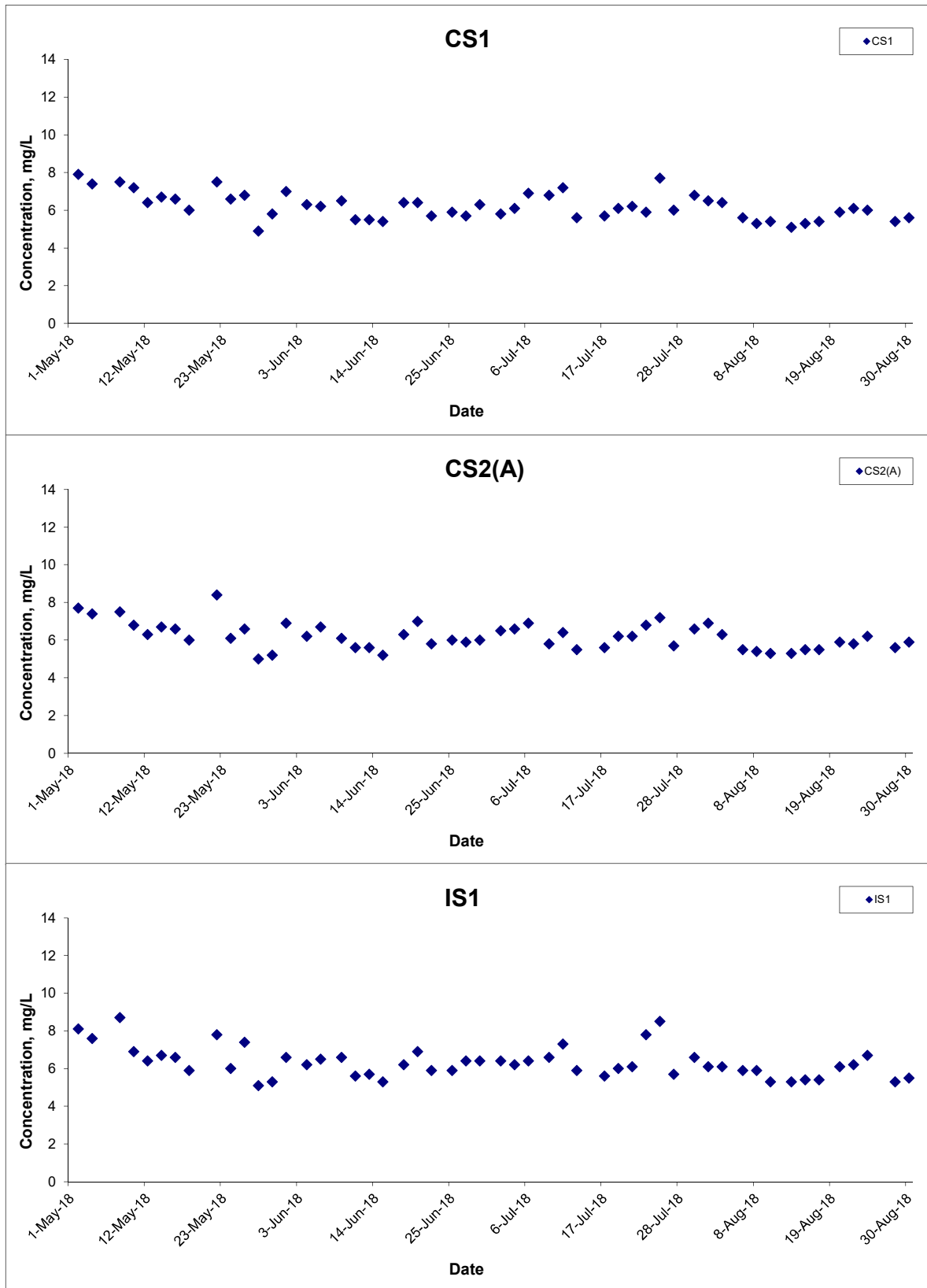
Noise Levels




Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge	Scale	Project No.	CINOTECH
	Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill	N.T.S	MA12014	
	Graphical Presentation of Construction Noise Monitoring Results	Aug-18	Appendix G	

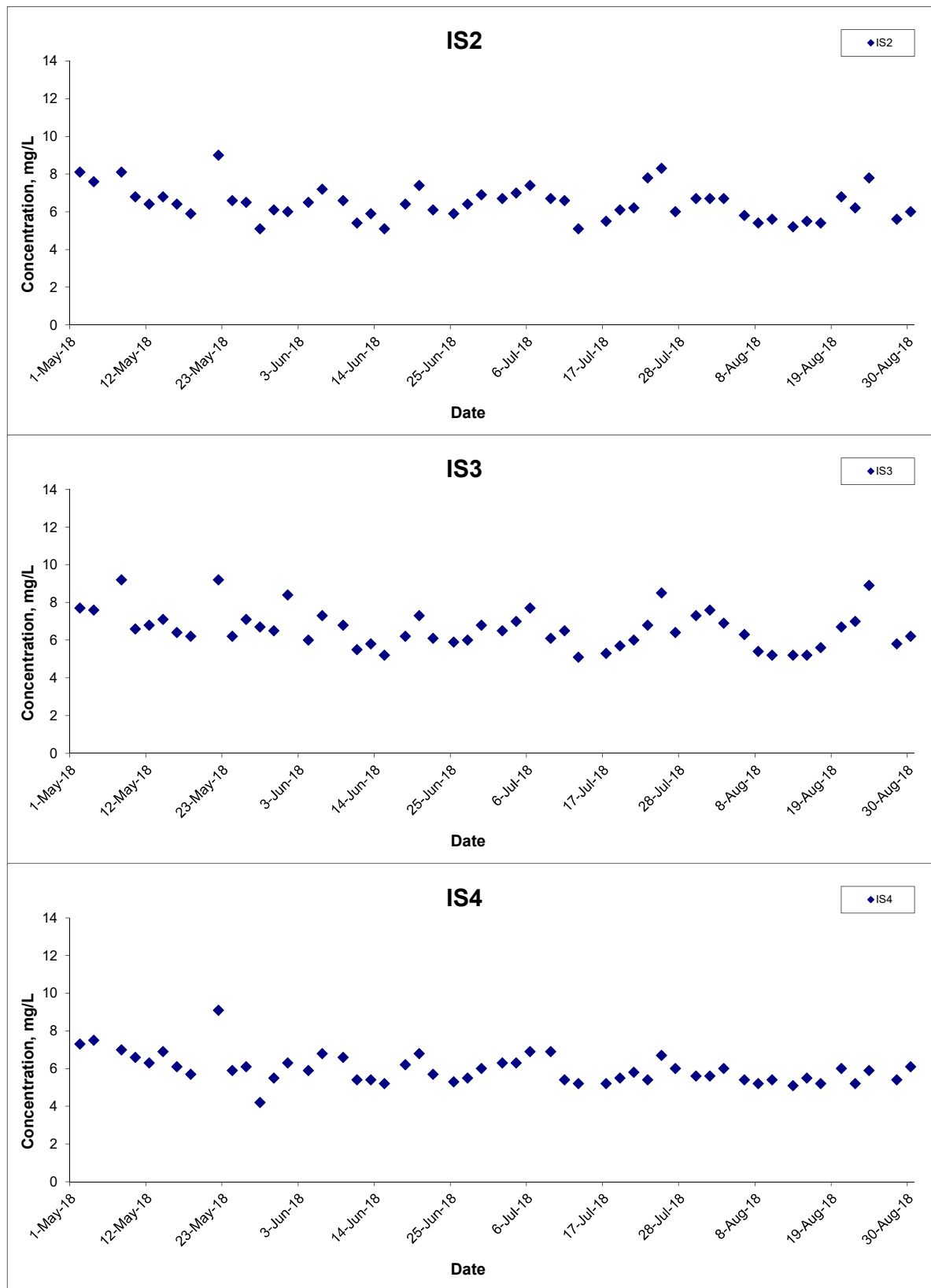
**APPENDIX E
GRAPHICAL PRESENTATION OF
WATER QUALITY MONITORING
RESULTS**

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



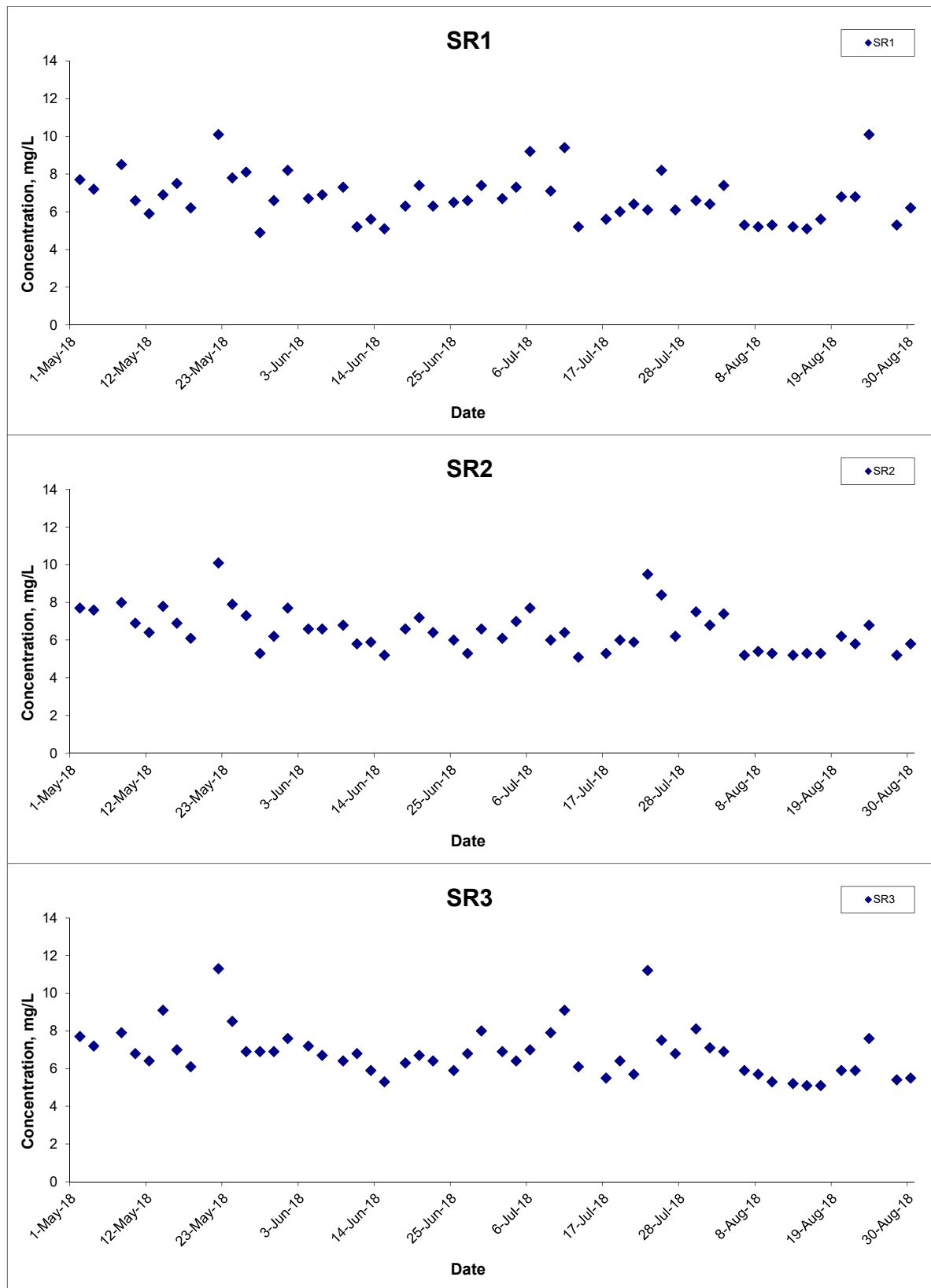
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	Date Aug18	Appendix H	

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



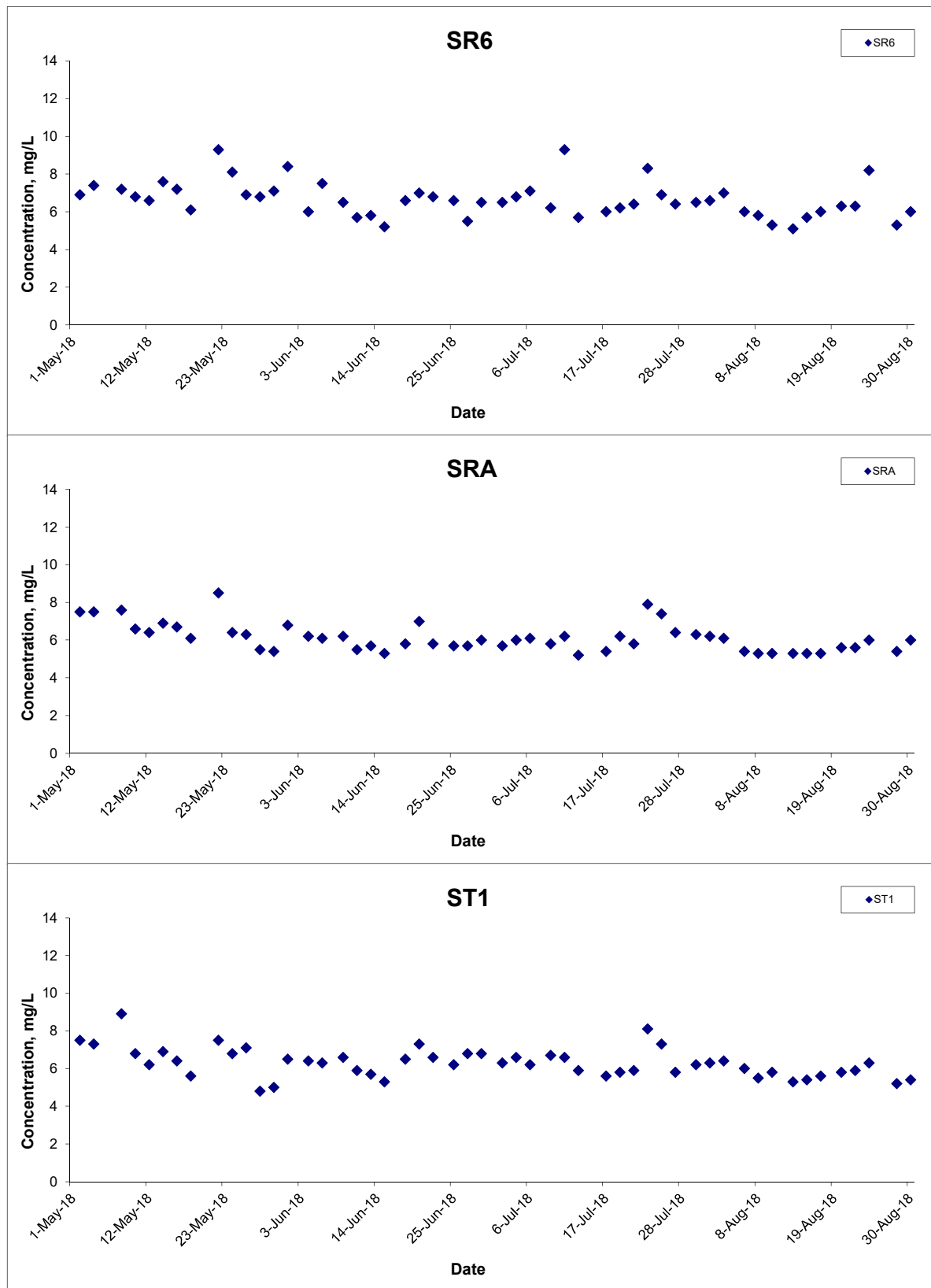
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	Graphical Presentation of Water Quality Monitoring Results		Date	Aug18	Appendix H	

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



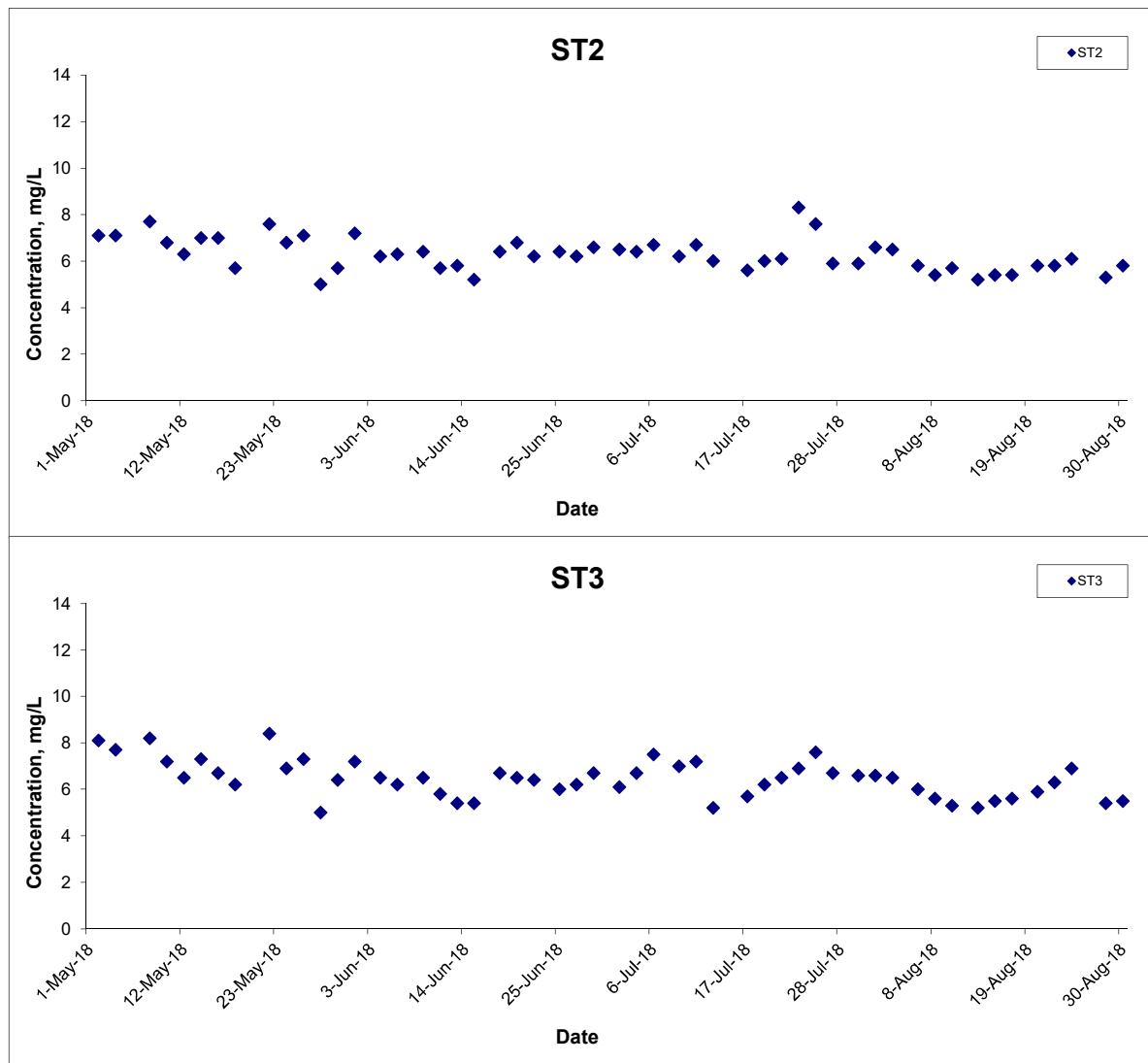
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	Graphical Presentation of Water Quality Monitoring Results	Date	Aug18	Appendix	H	

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



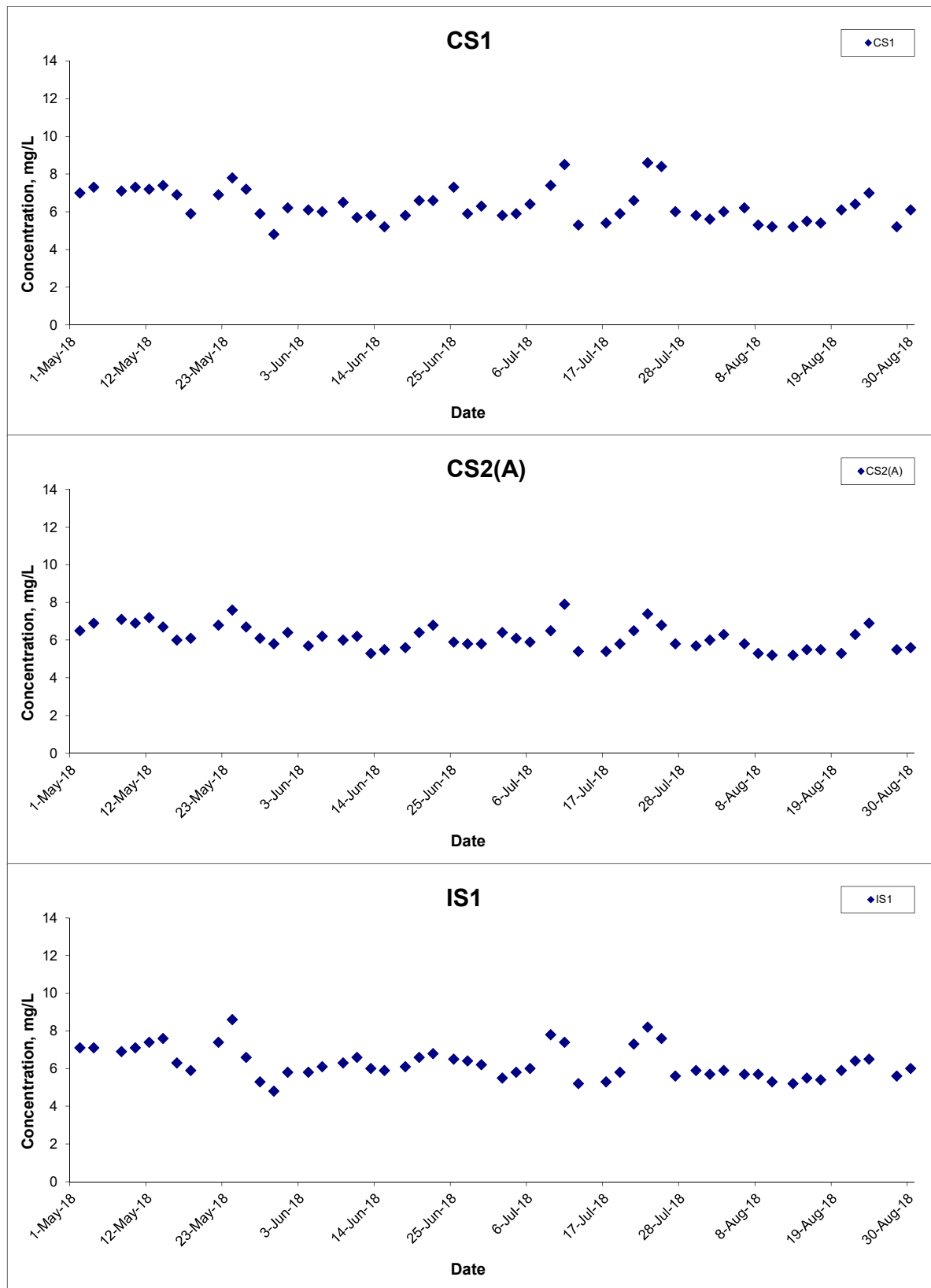
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		Date	Aug18	Appendix	H	

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



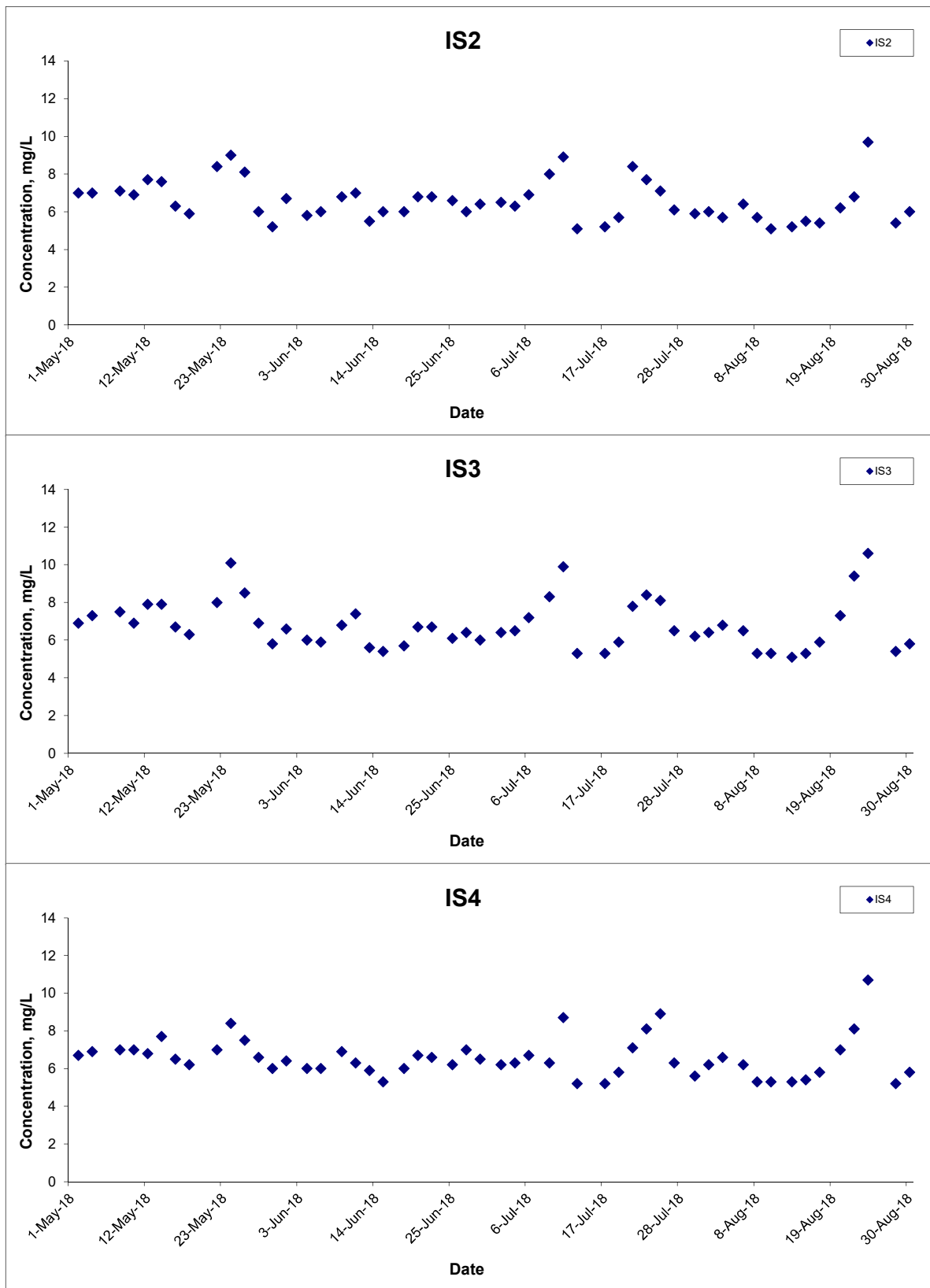
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		Date	Aug18	Appendix	H	

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



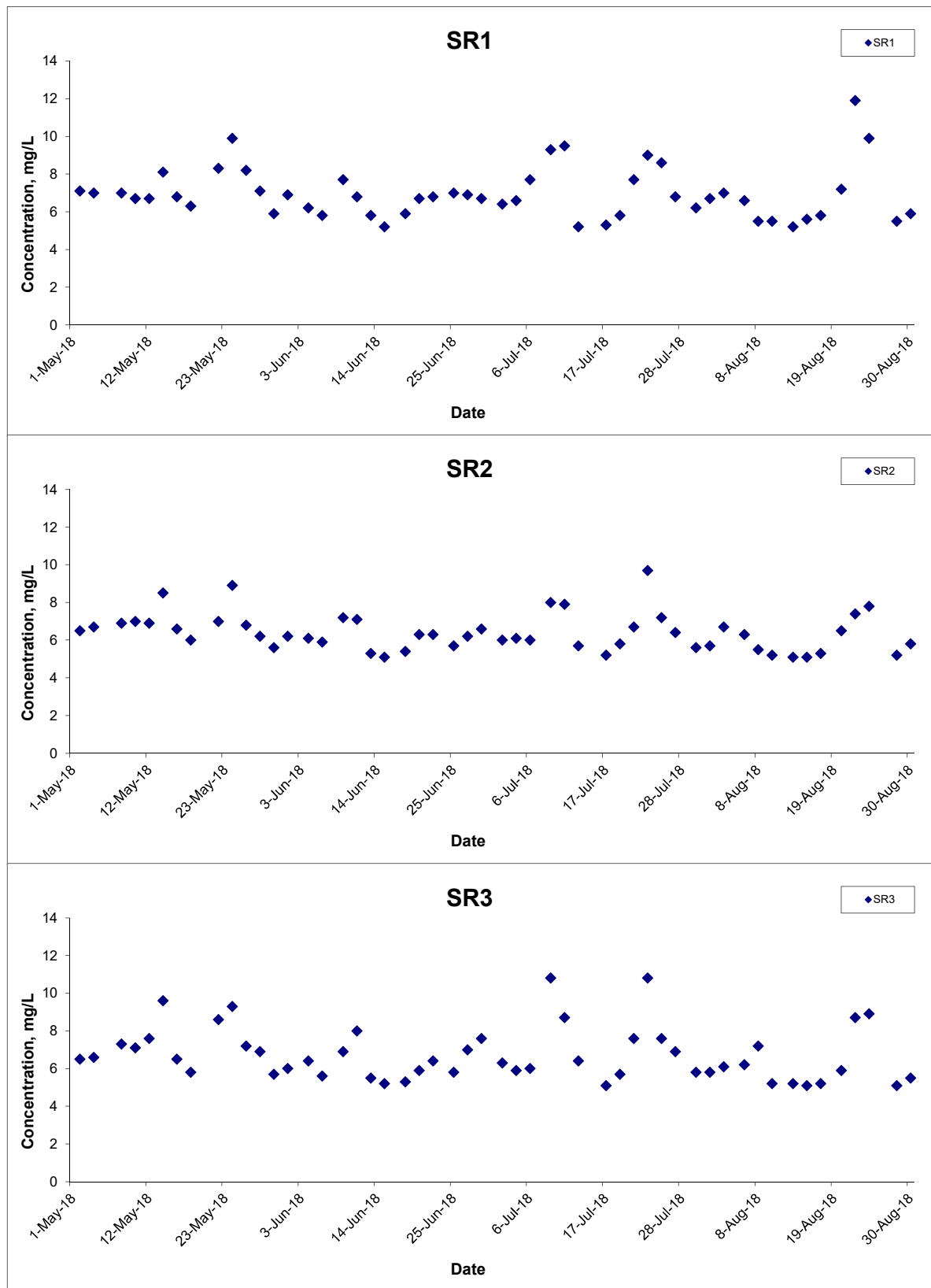
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	Graphical Presentation of Water Quality Monitoring Results		Date	Aug18	Appendix H	

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



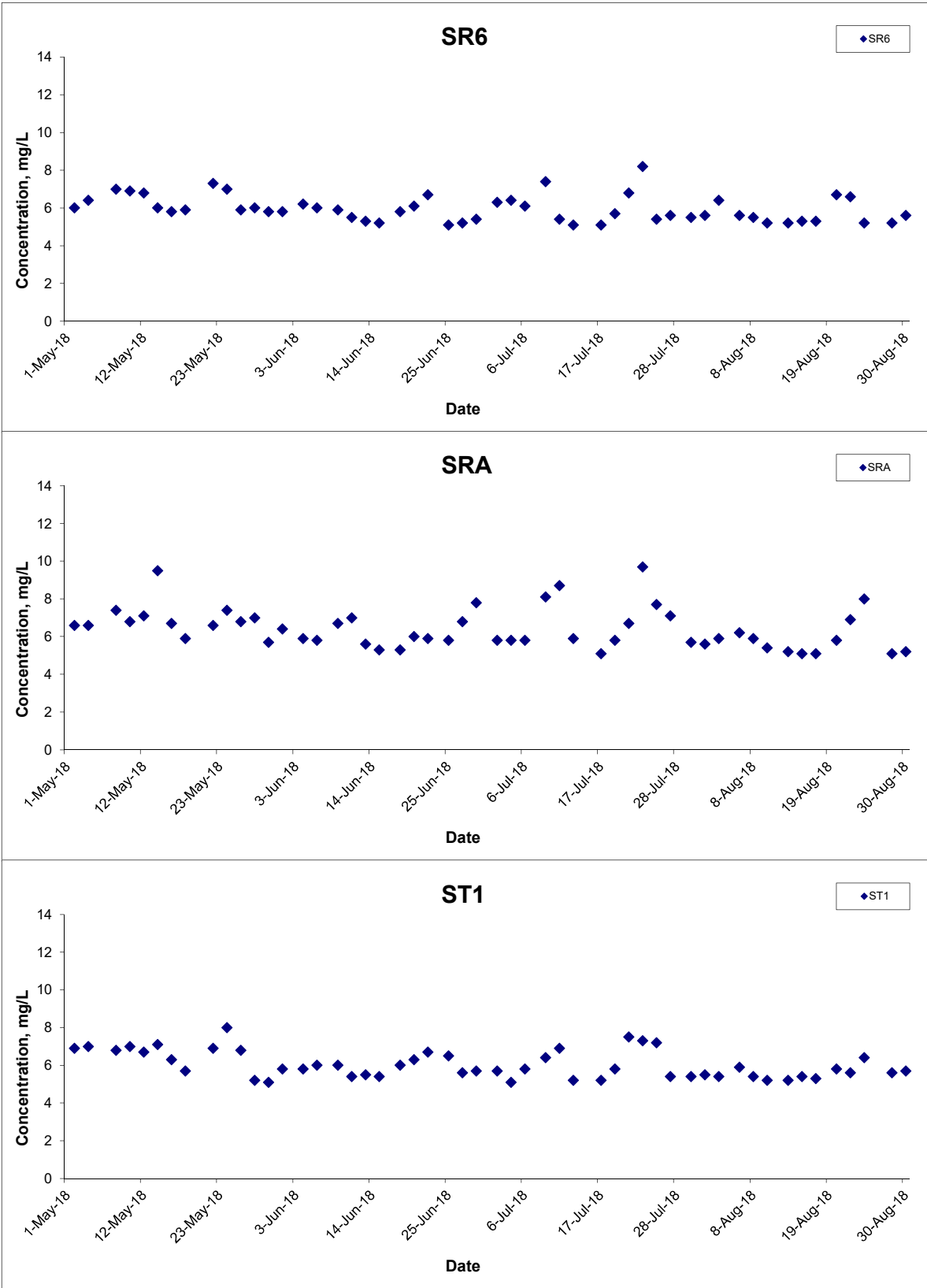
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	Graphical Presentation of Water Quality Monitoring Results		Date	Aug18	Appendix H	


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



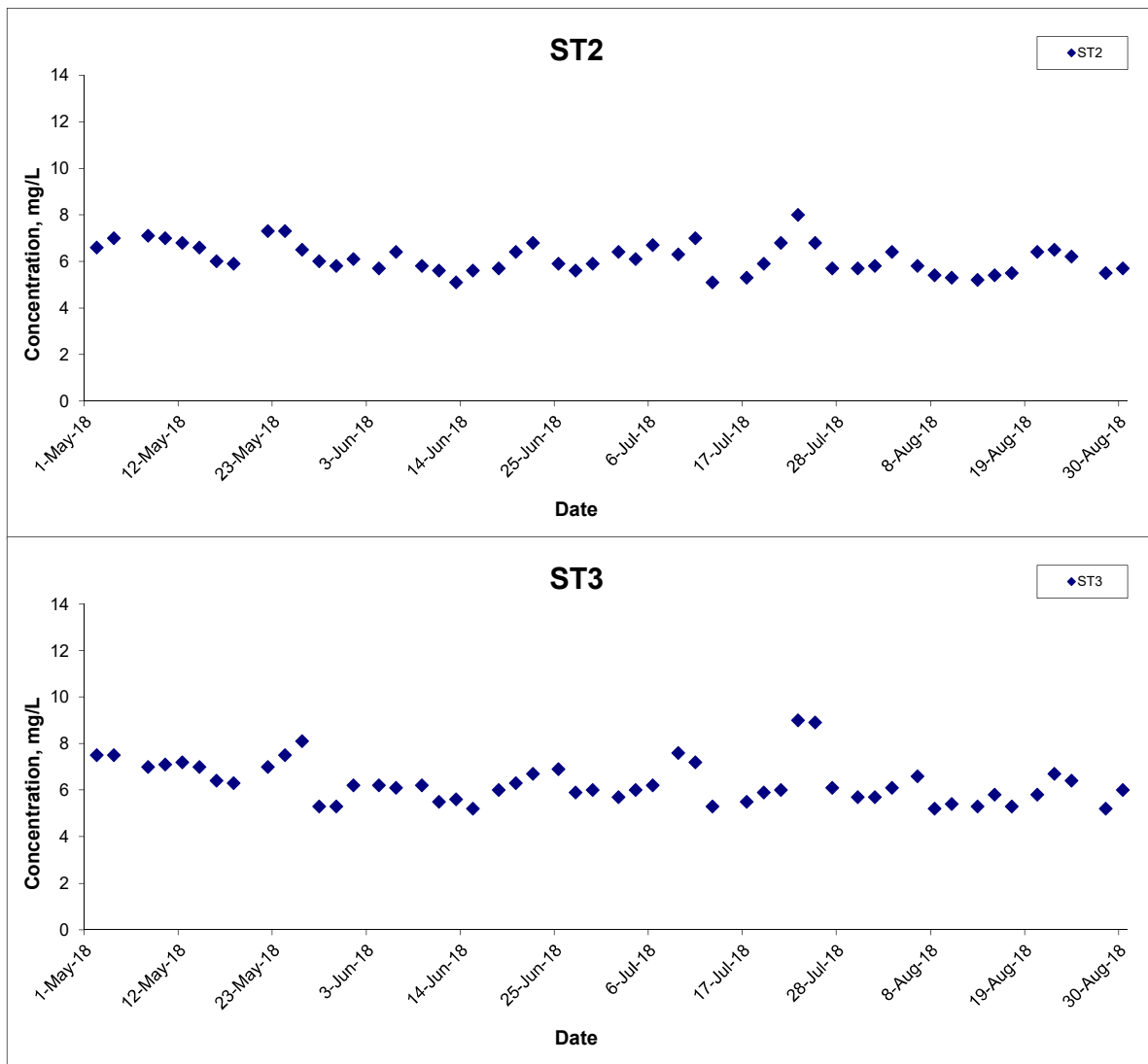
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	Graphical Presentation of Water Quality Monitoring Results		Date	Aug18	Appendix H	

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



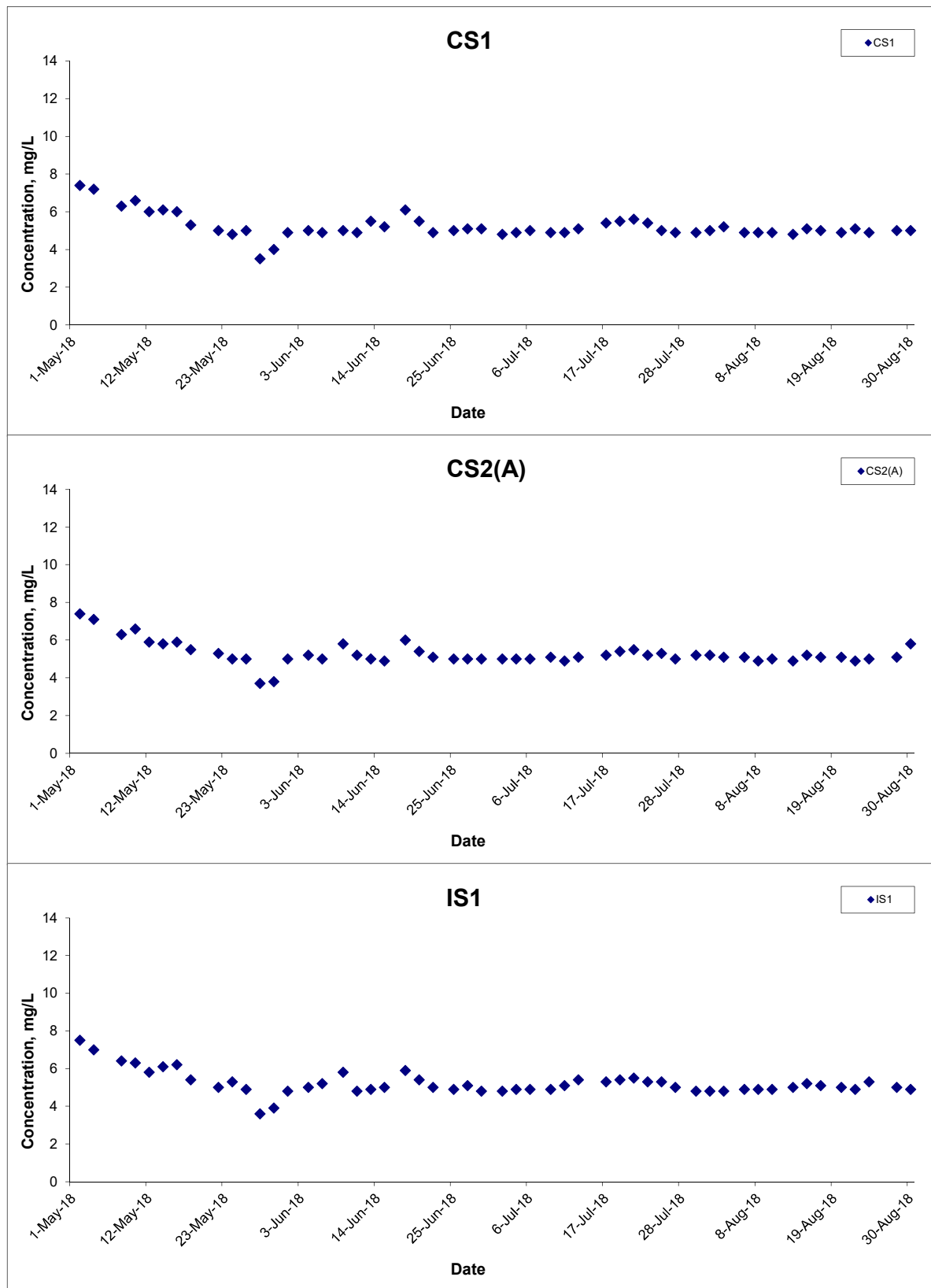
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Dissolved Oxygen (Surface & Middle) at Mid-Flood Tide



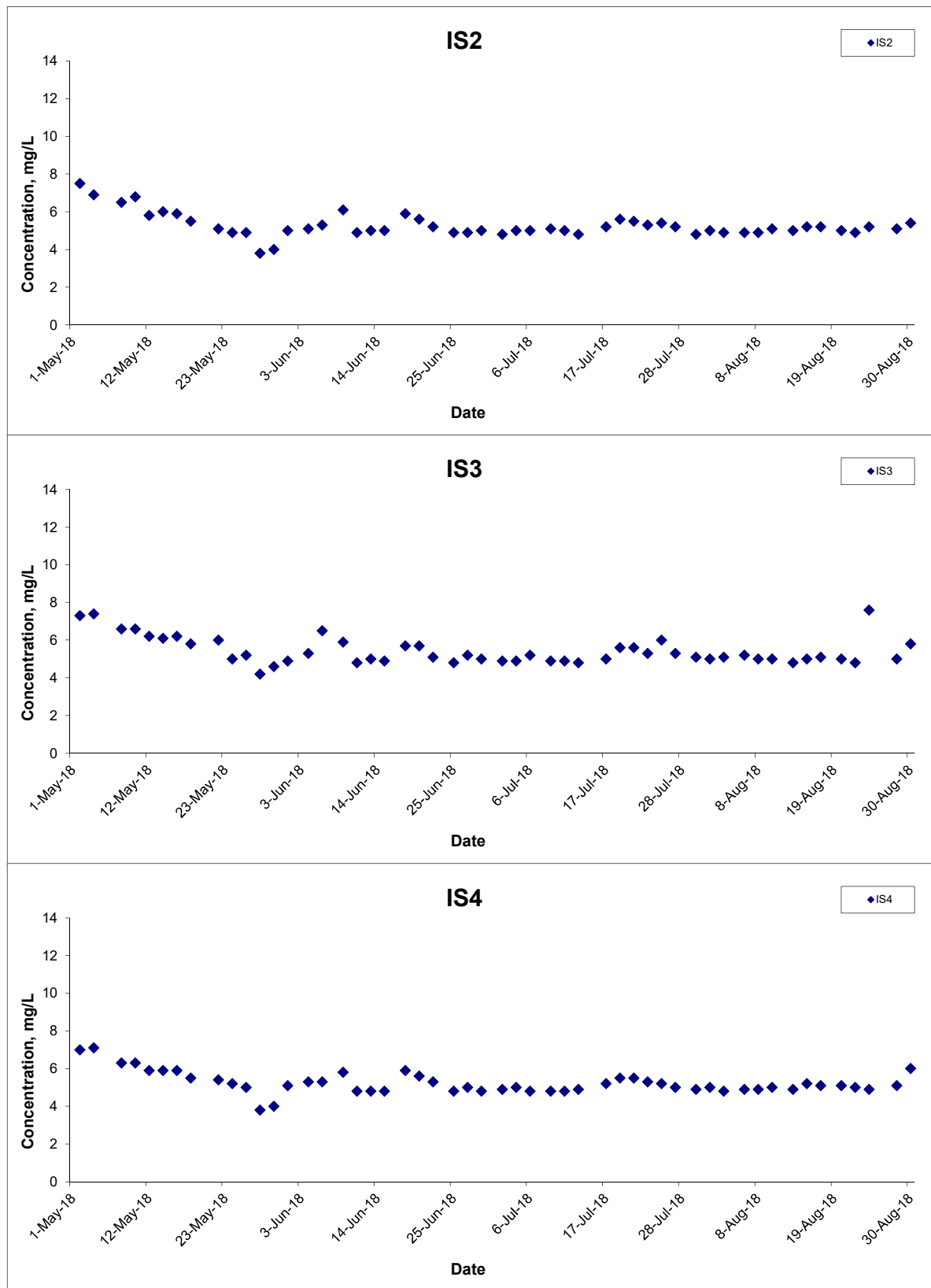
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



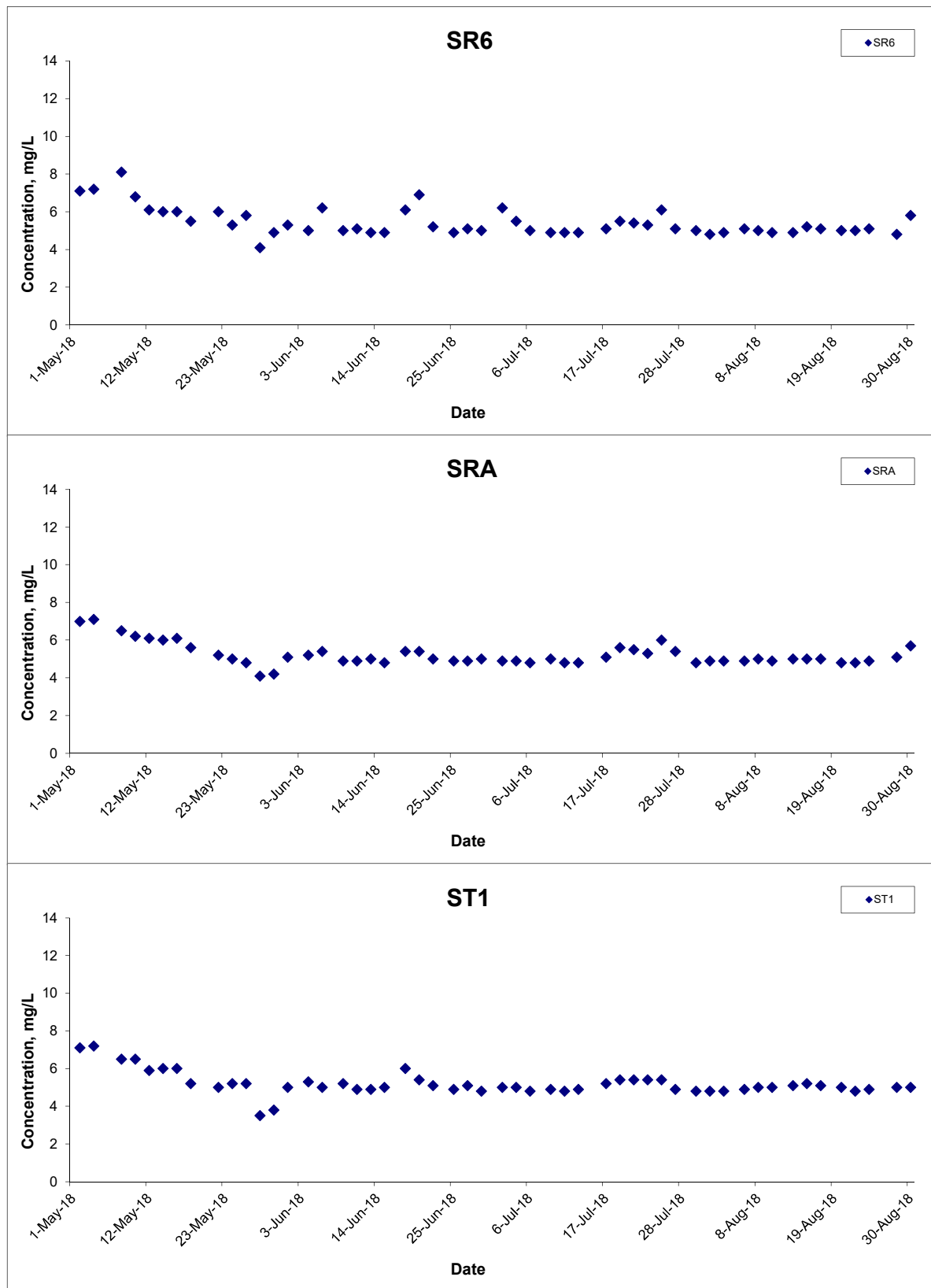
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



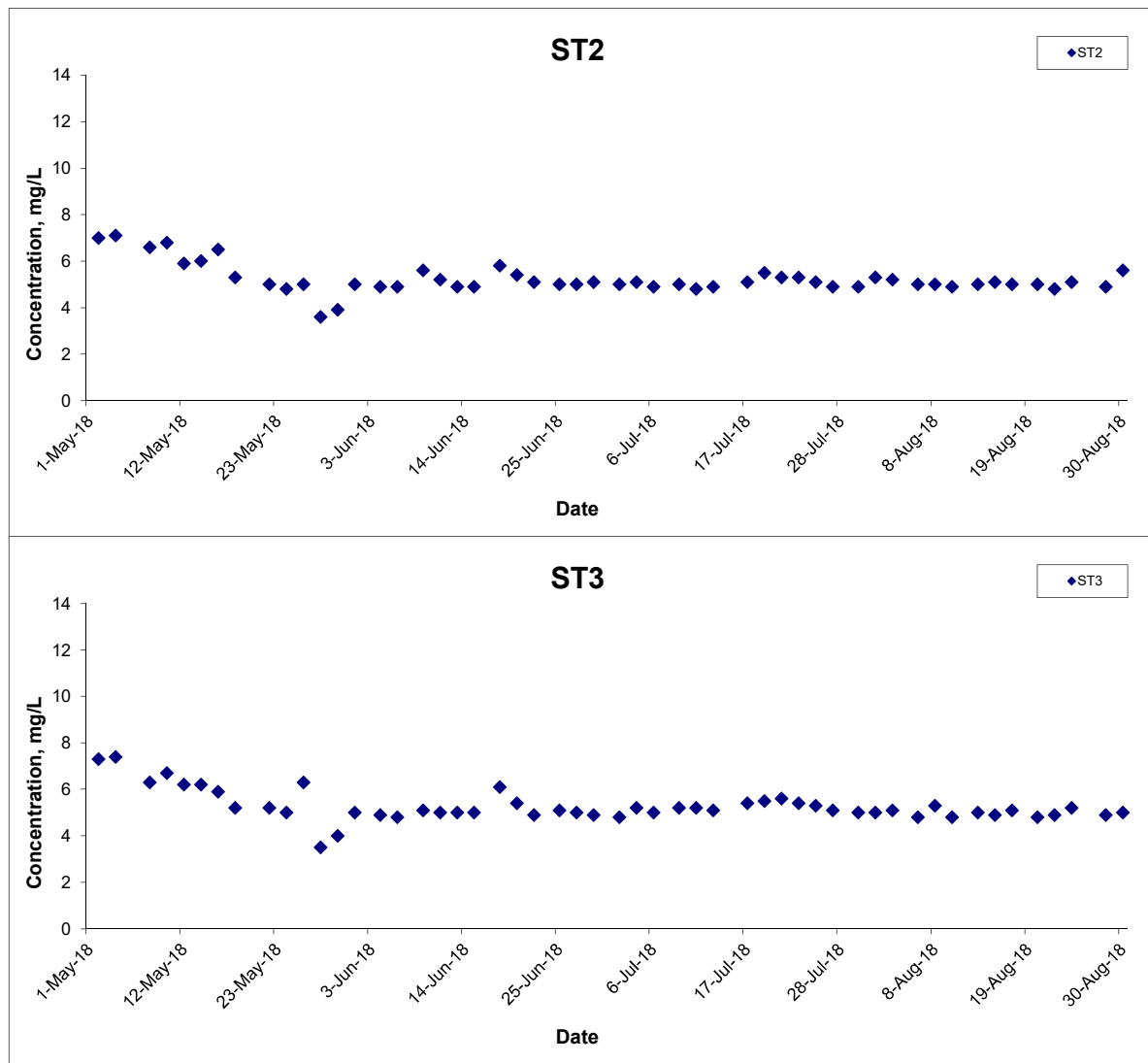
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



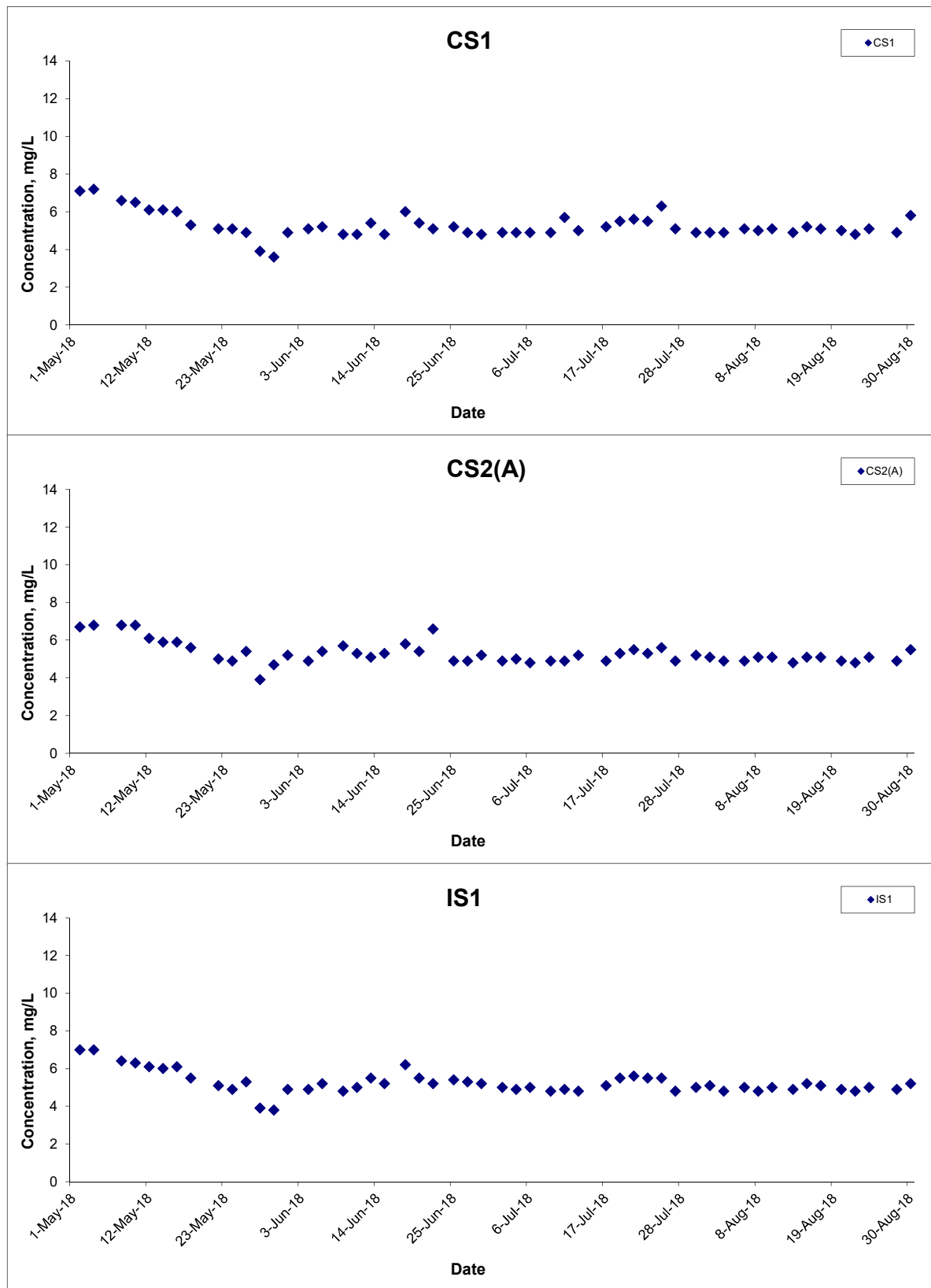
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Dissolved Oxygen (Bottom) at Mid-Ebb Tide



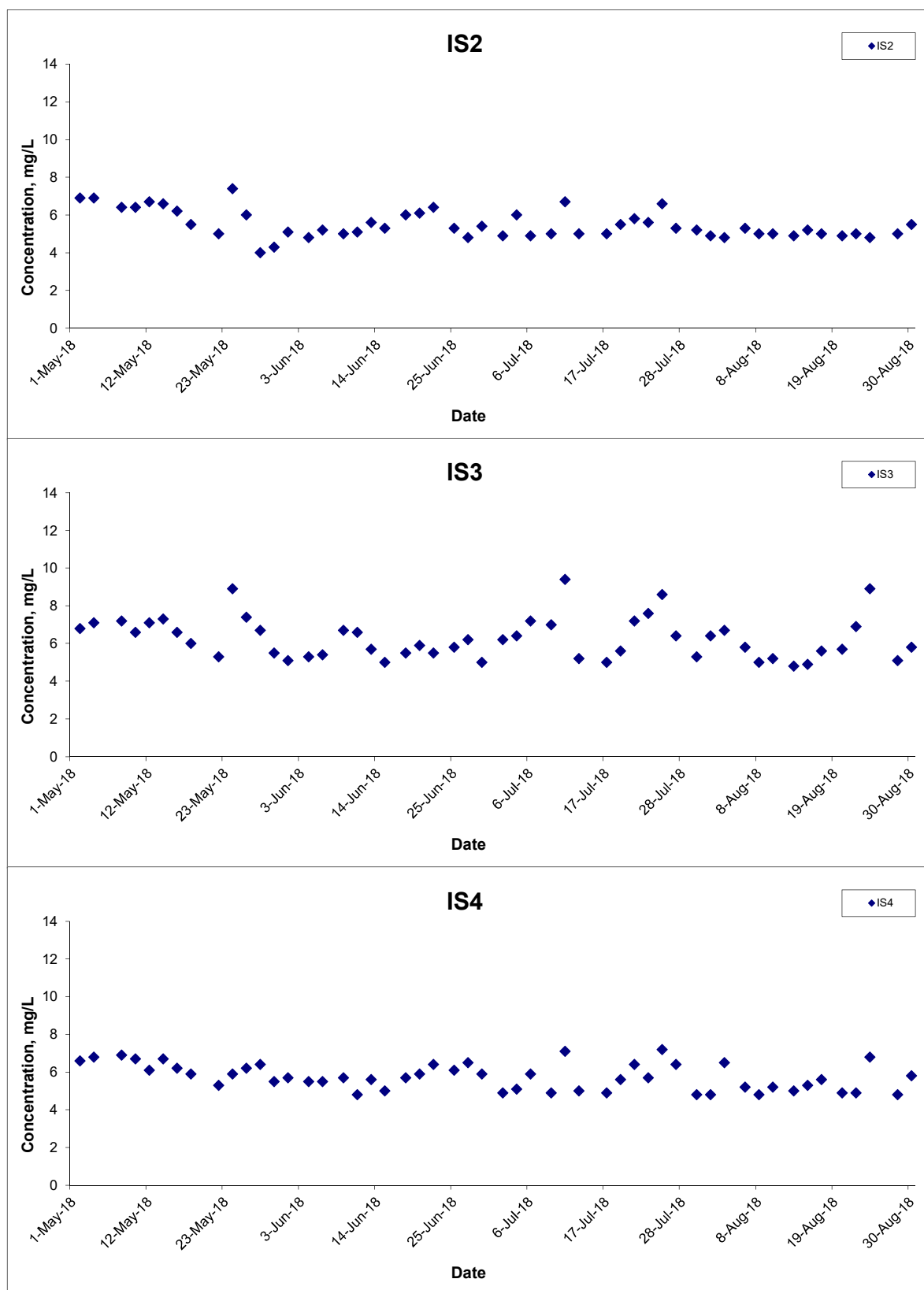
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



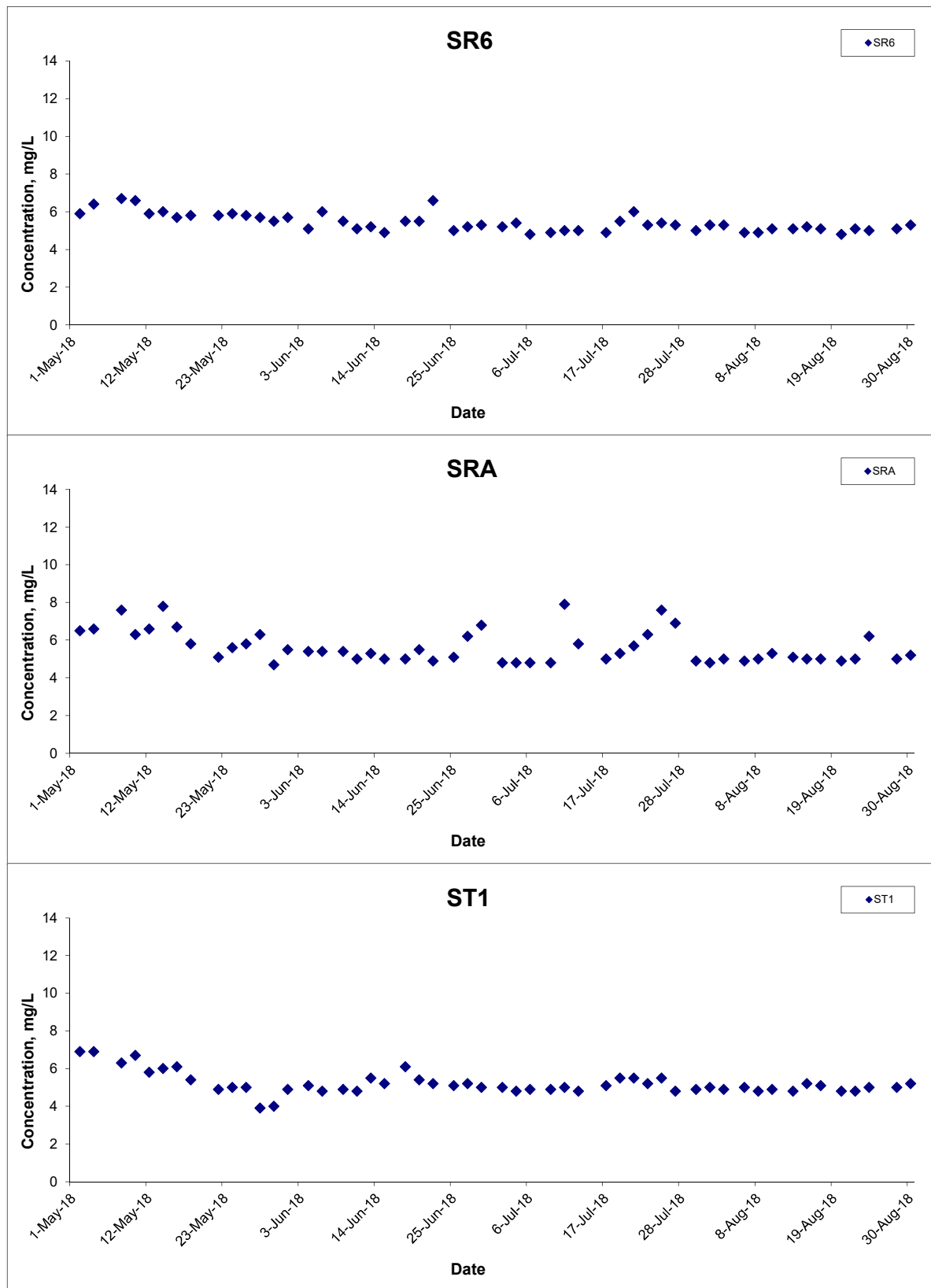
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



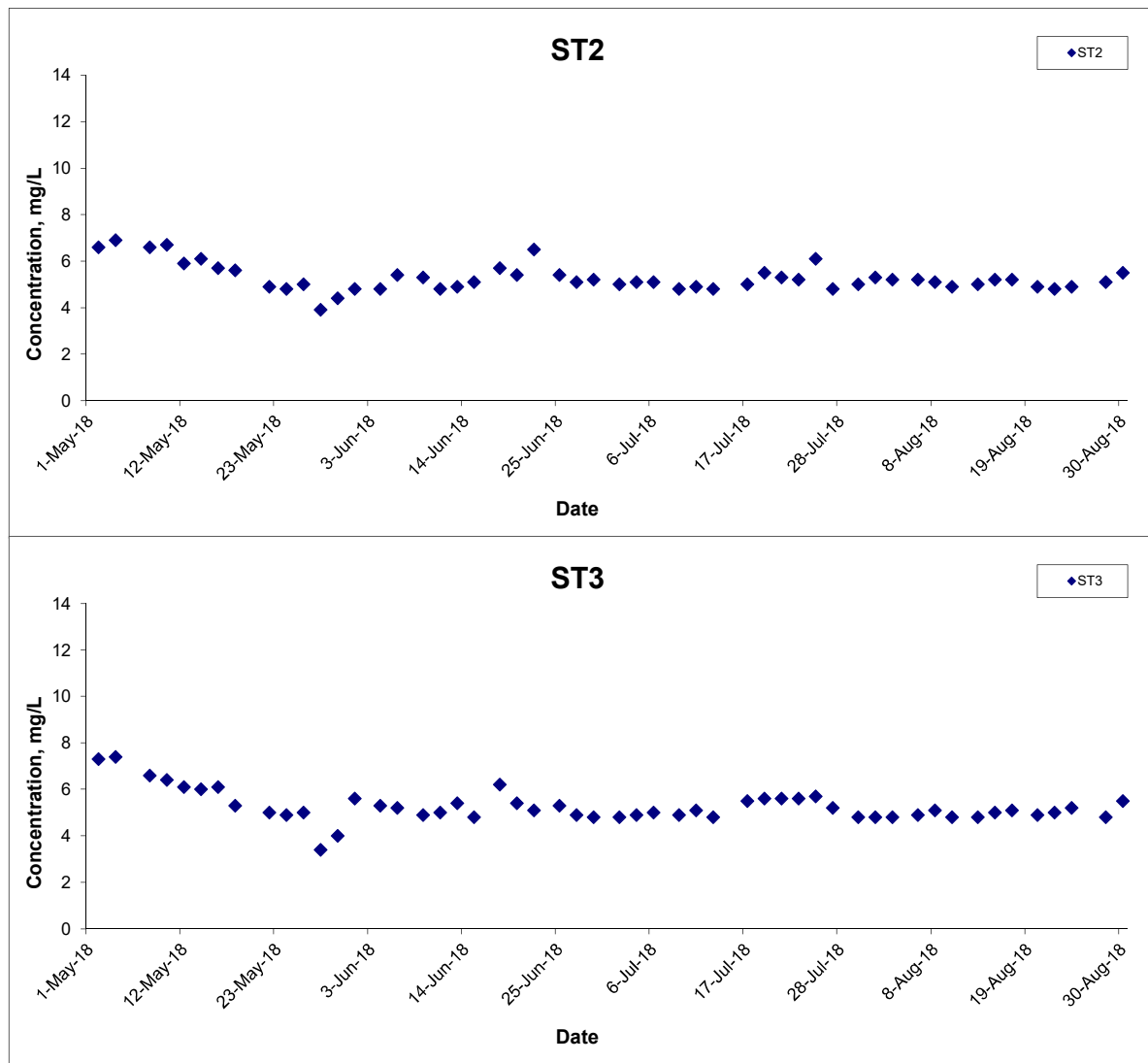
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



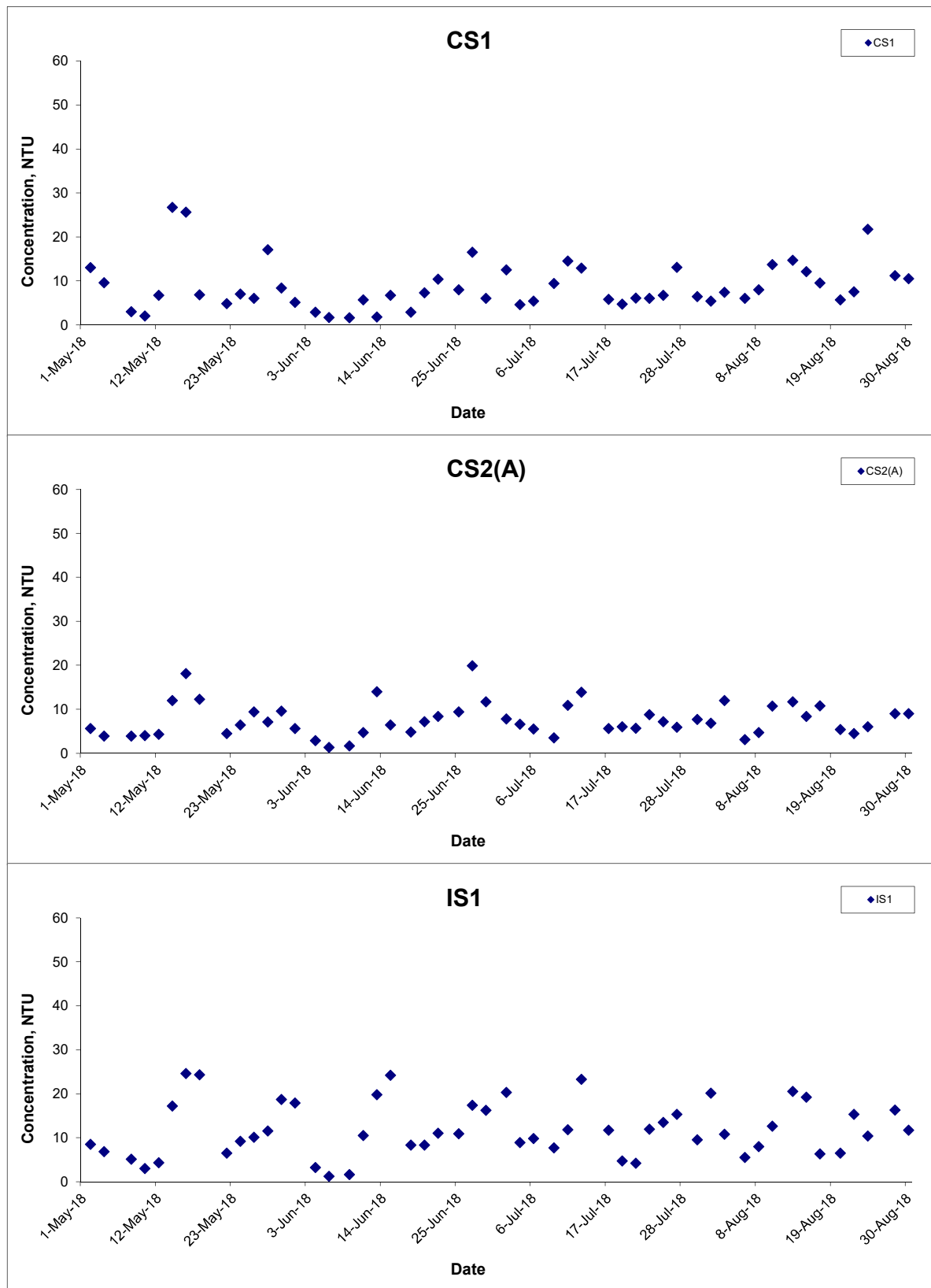
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Dissolved Oxygen (Bottom) at Mid-Flood Tide



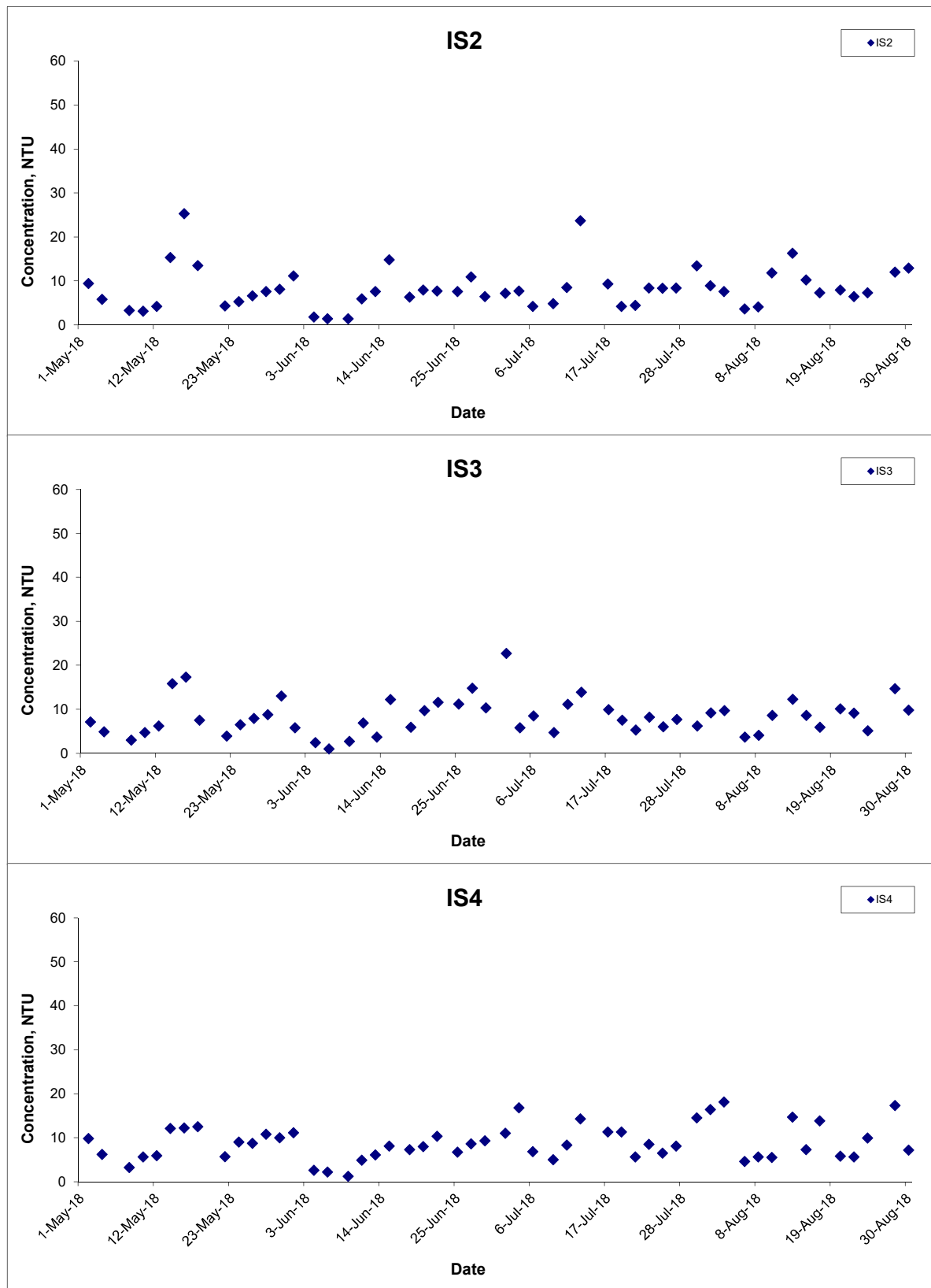
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Turbidity (Depth-averaged) at Mid-Ebb Tide



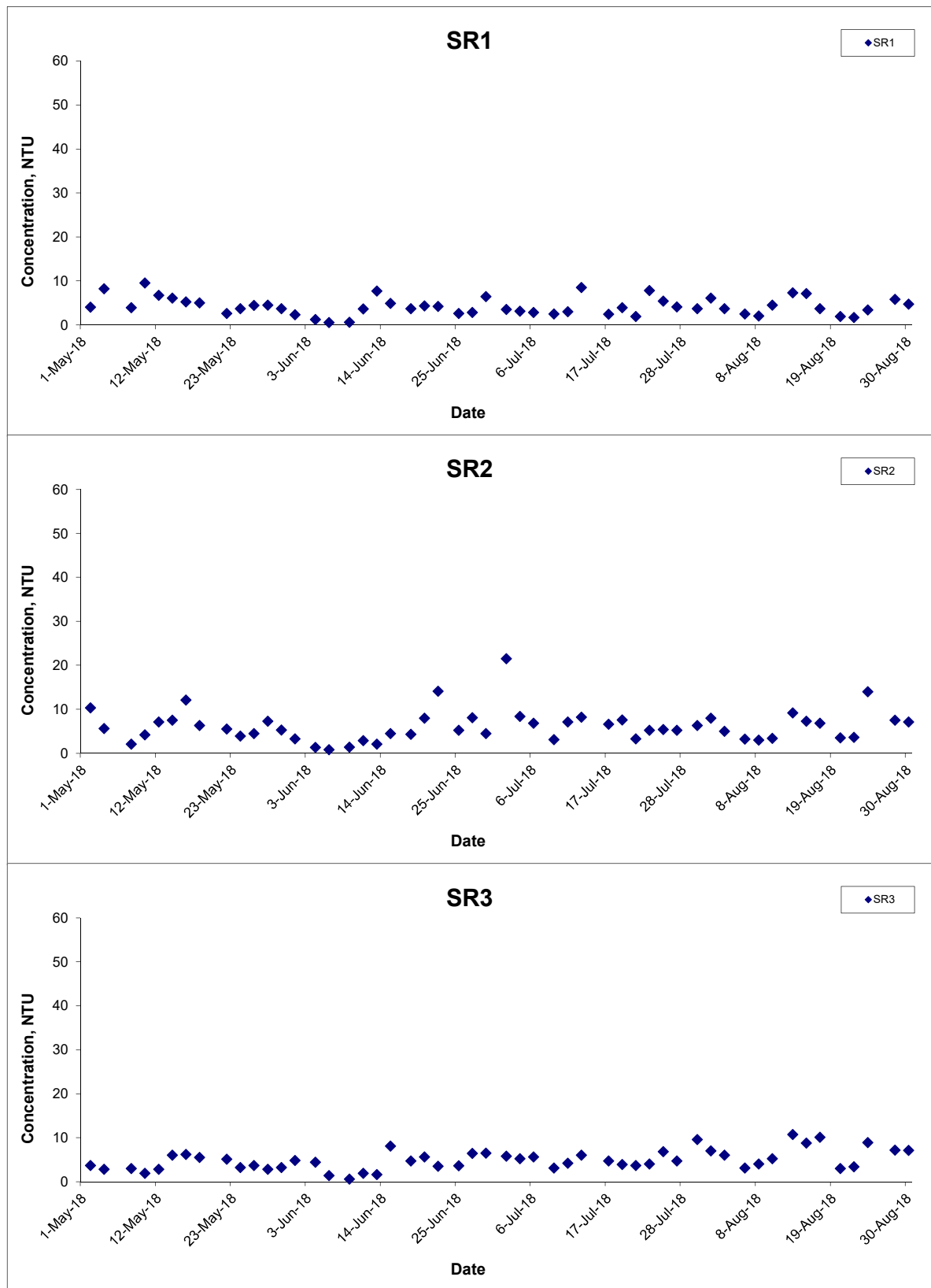
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Turbidity (Depth-averaged) at Mid-Ebb Tide



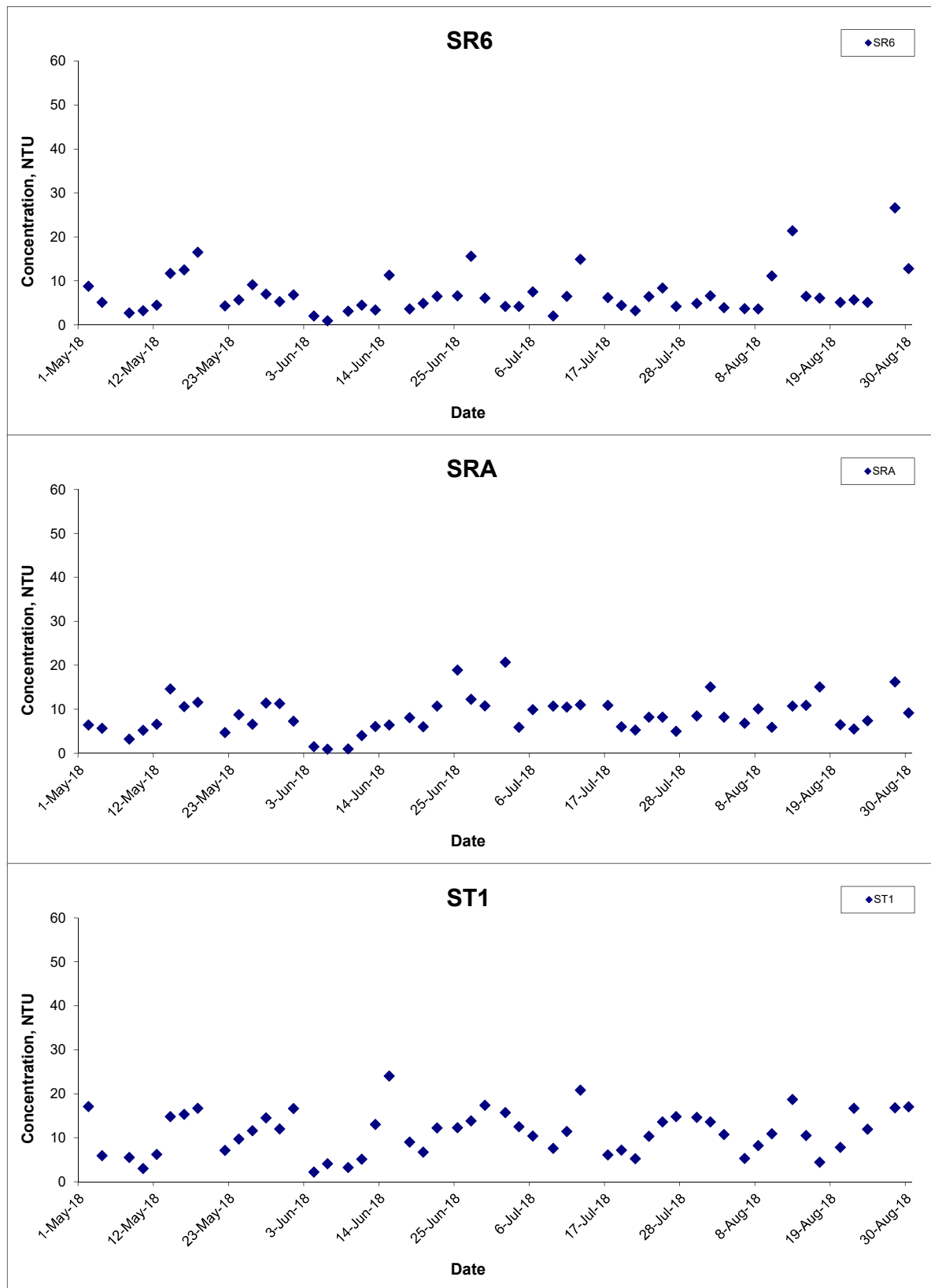
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Turbidity (Depth-averaged) at Mid-Ebb Tide



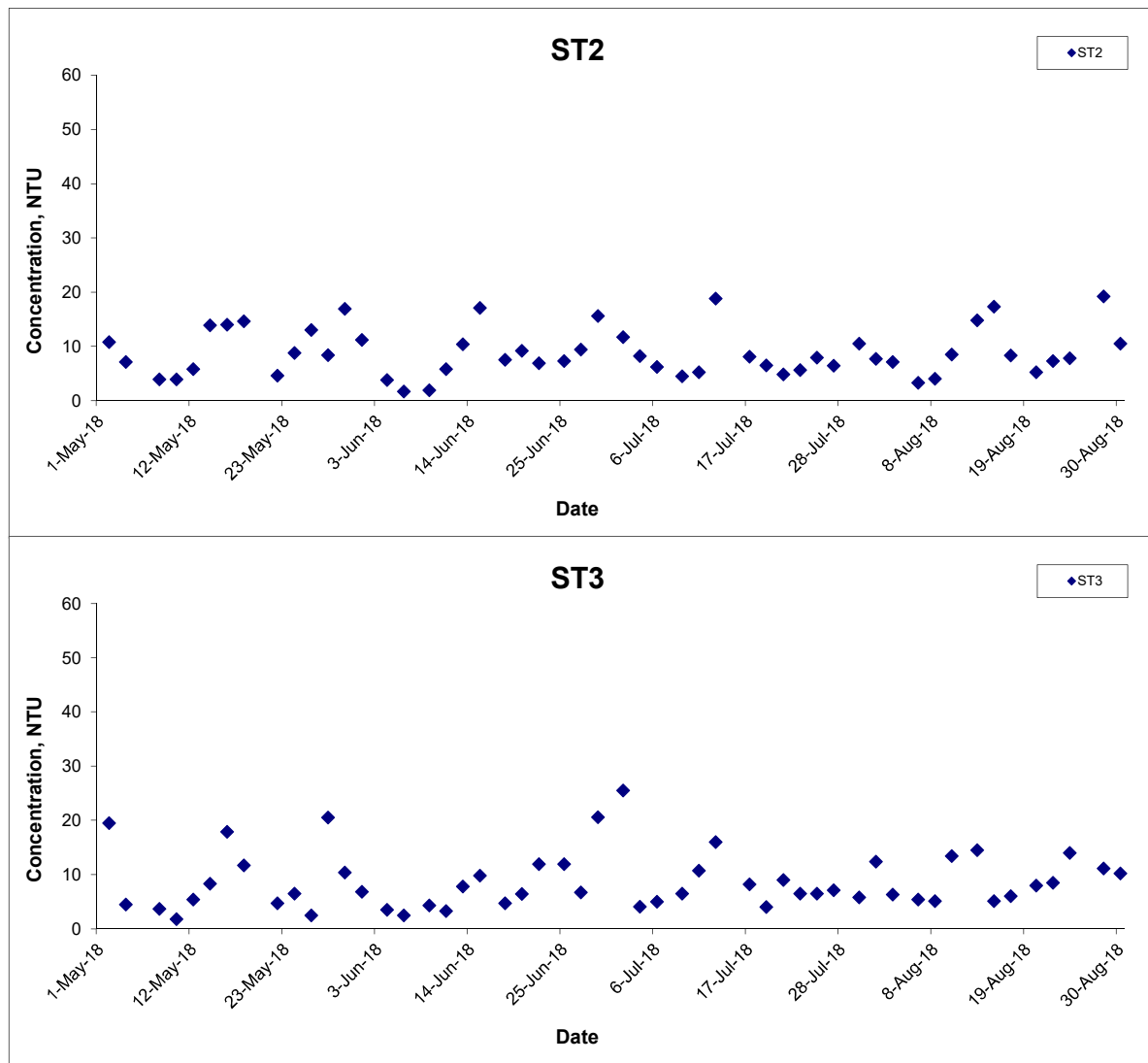
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Turbidity (Depth-averaged) at Mid-Ebb Tide



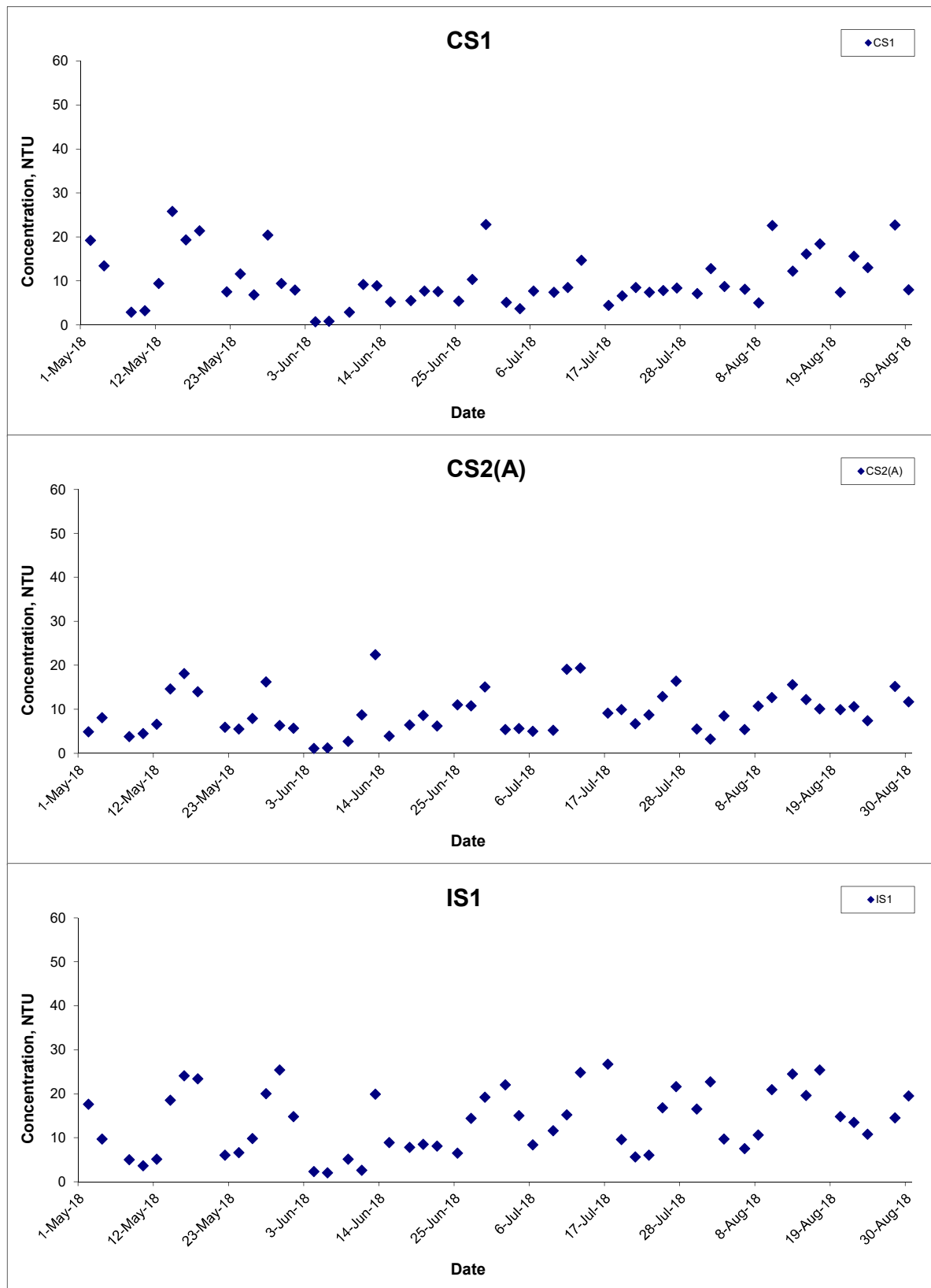
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Turbidity (Depth-averaged) at Mid-Ebb Tide



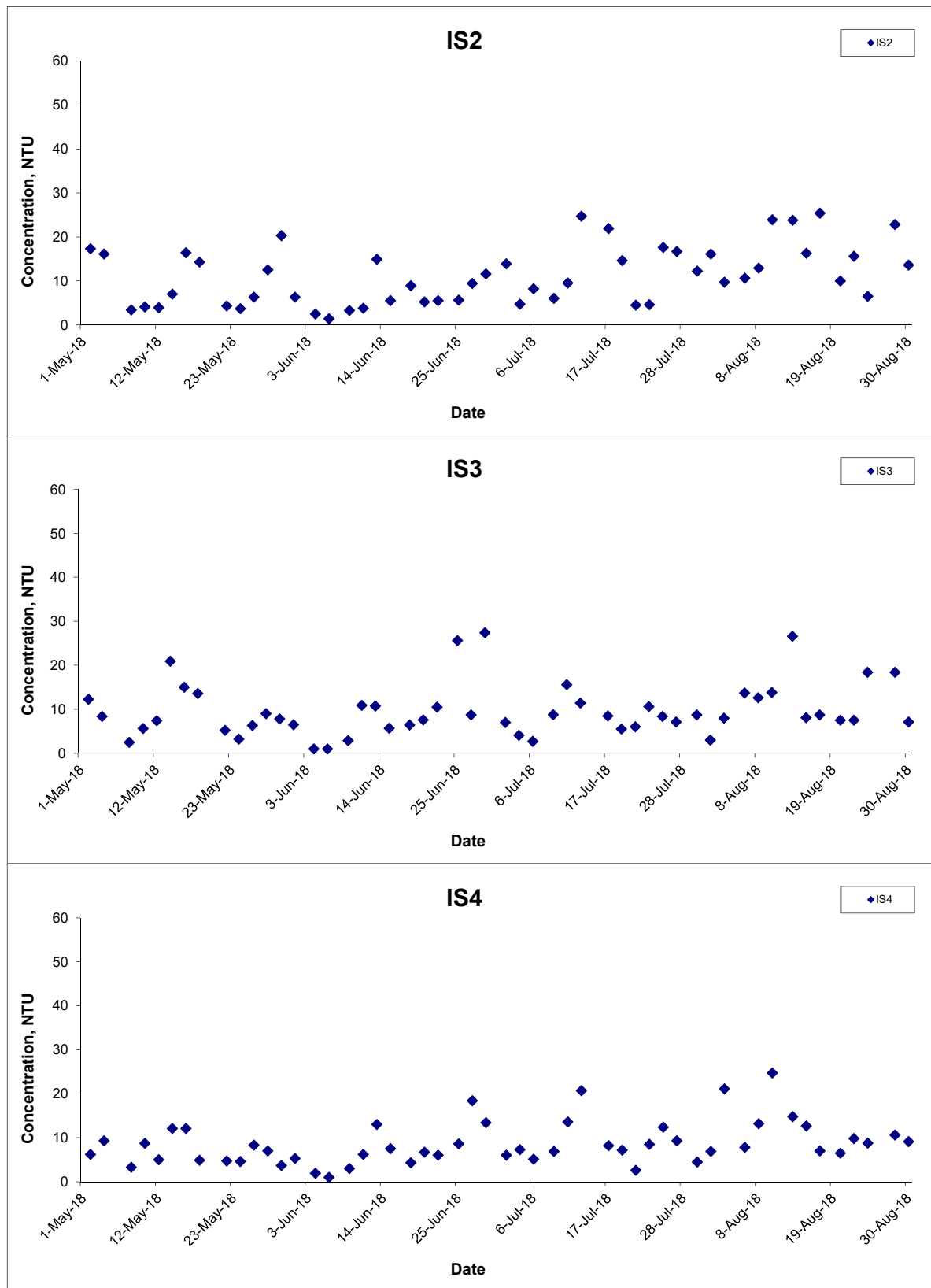
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Turbidity (Depth-averaged) at Mid-Flood Tide



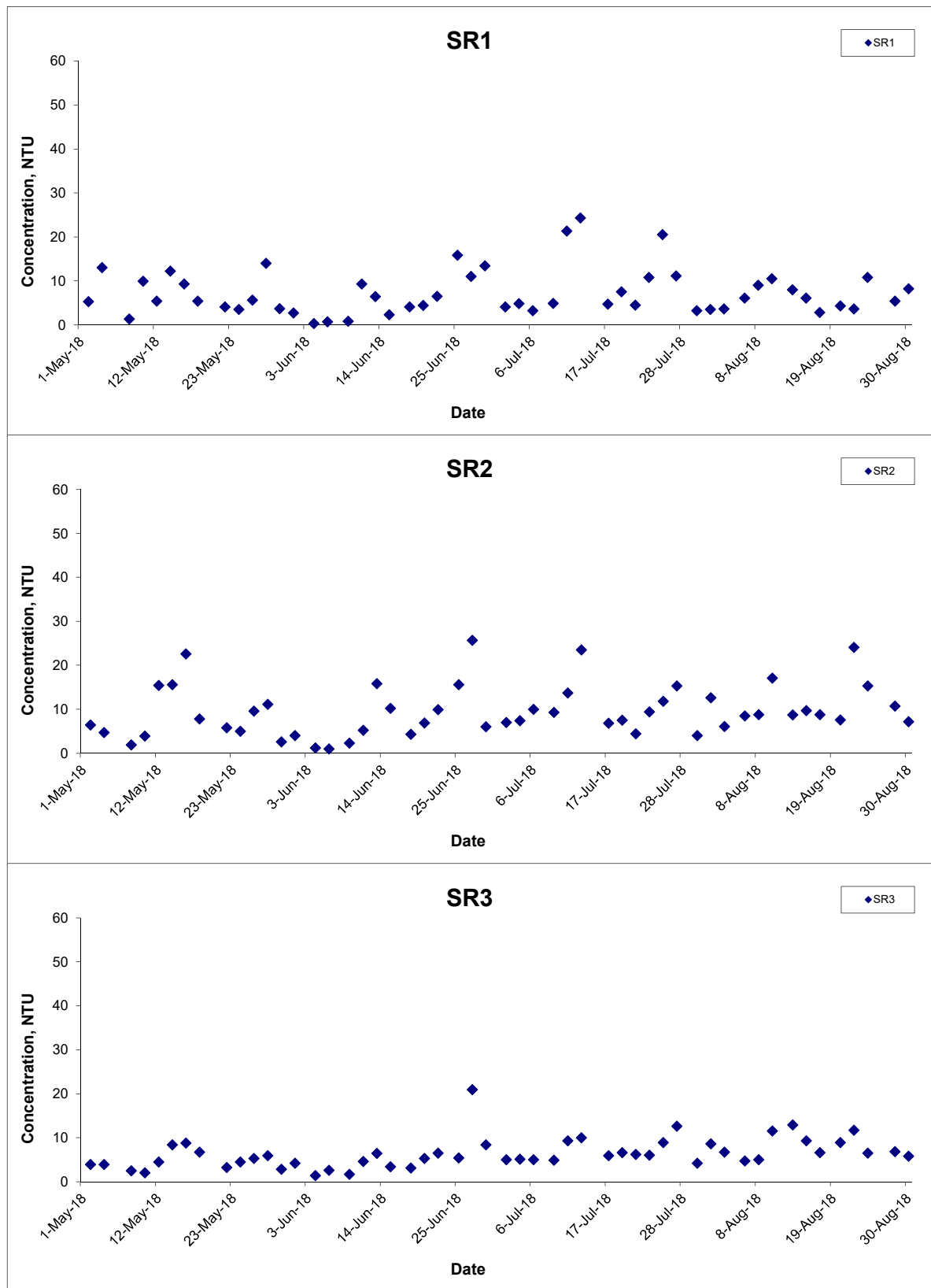
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Turbidity (Depth-averaged) at Mid-Flood Tide



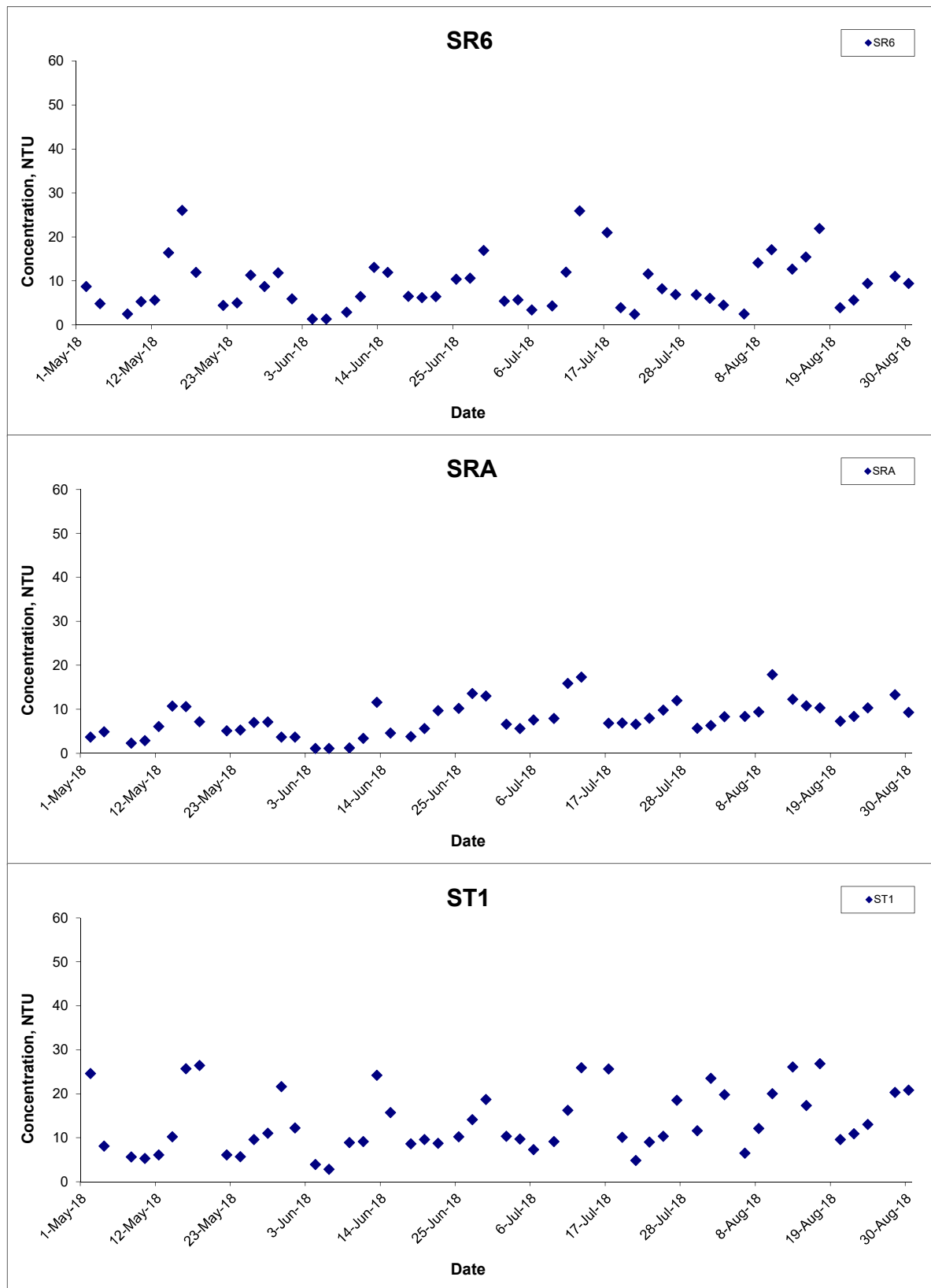
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Turbidity (Depth-averaged) at Mid-Flood Tide



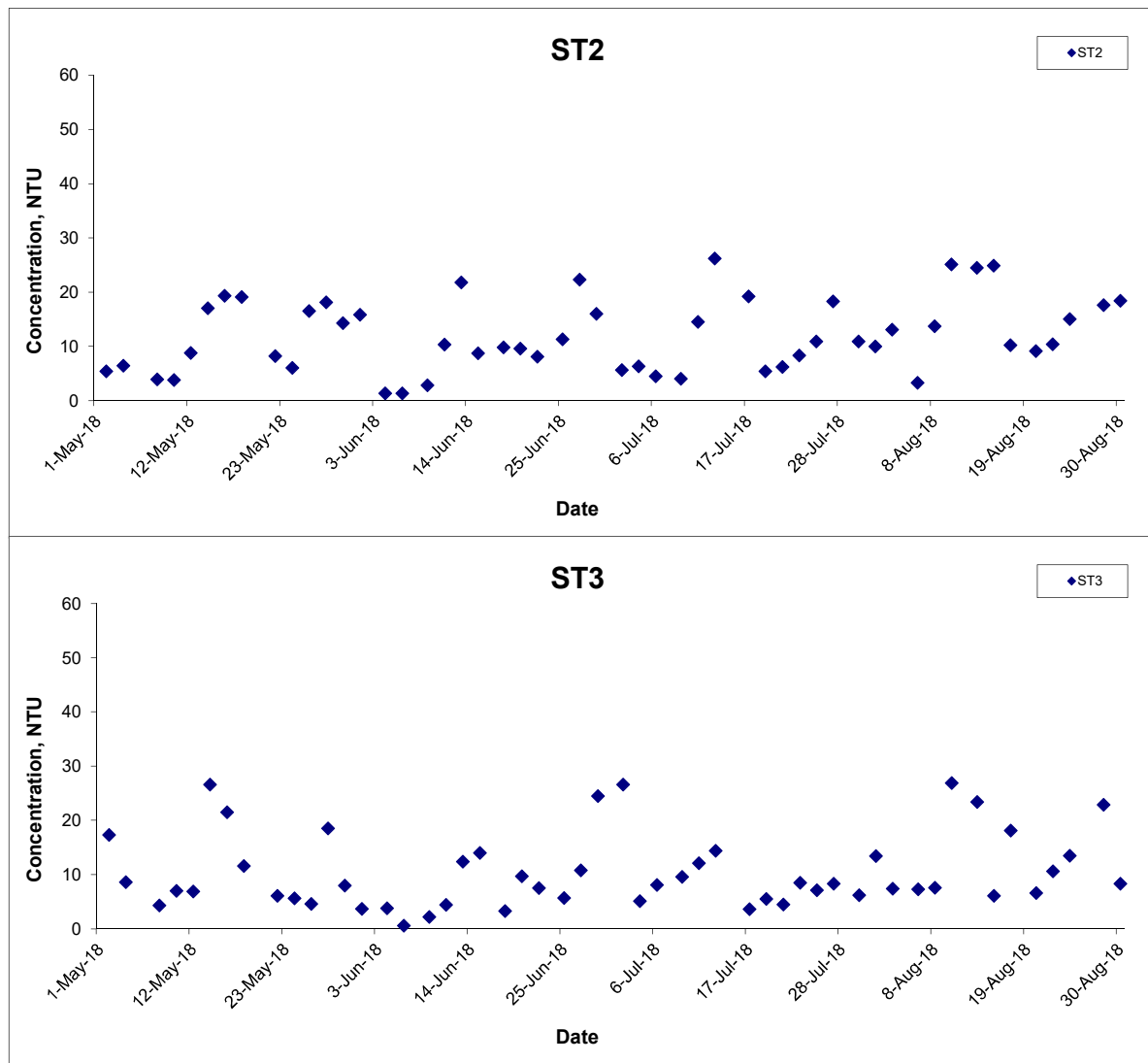
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Turbidity (Depth-averaged) at Mid-Flood Tide



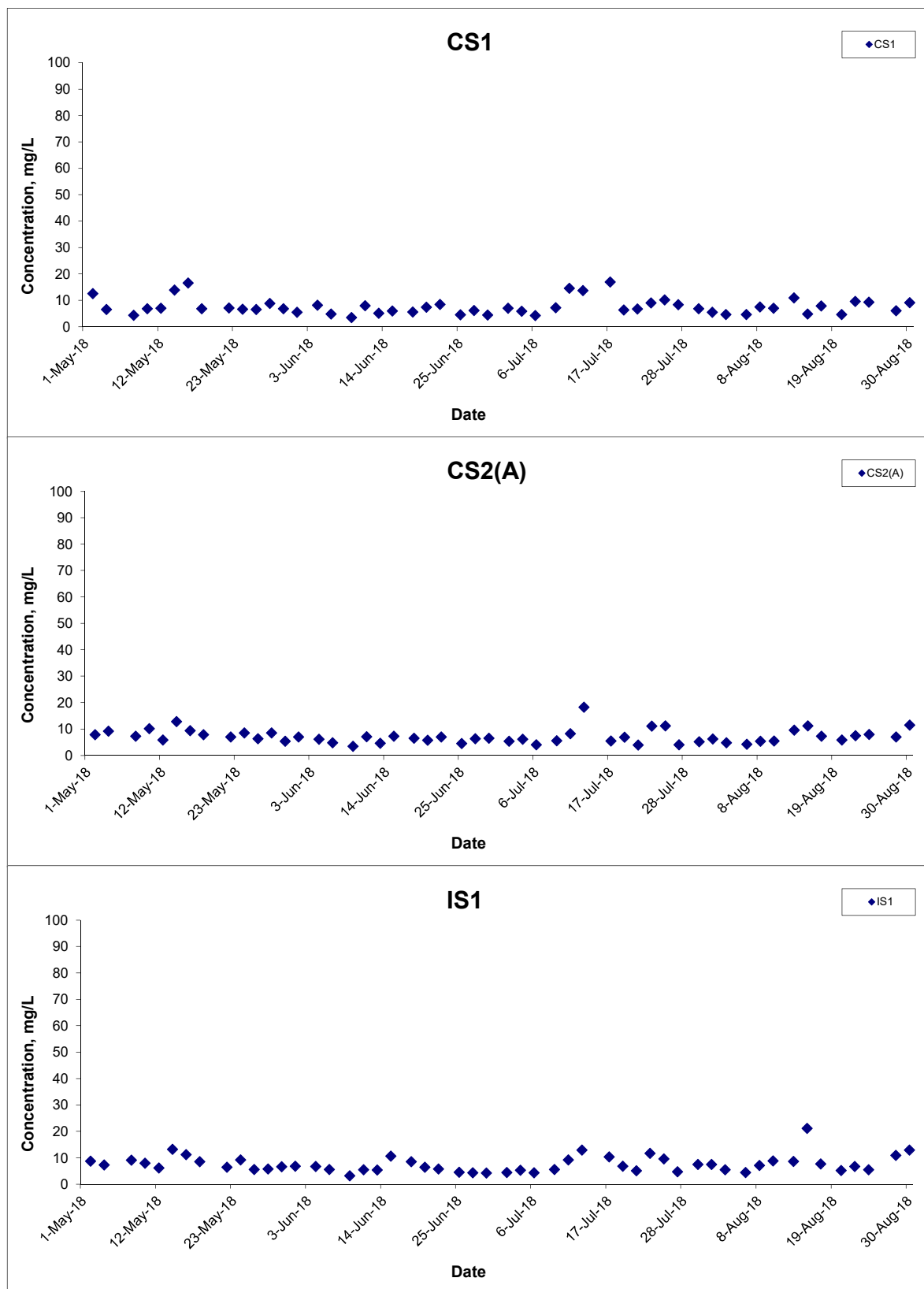
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Turbidity (Depth-averaged) at Mid-Flood Tide



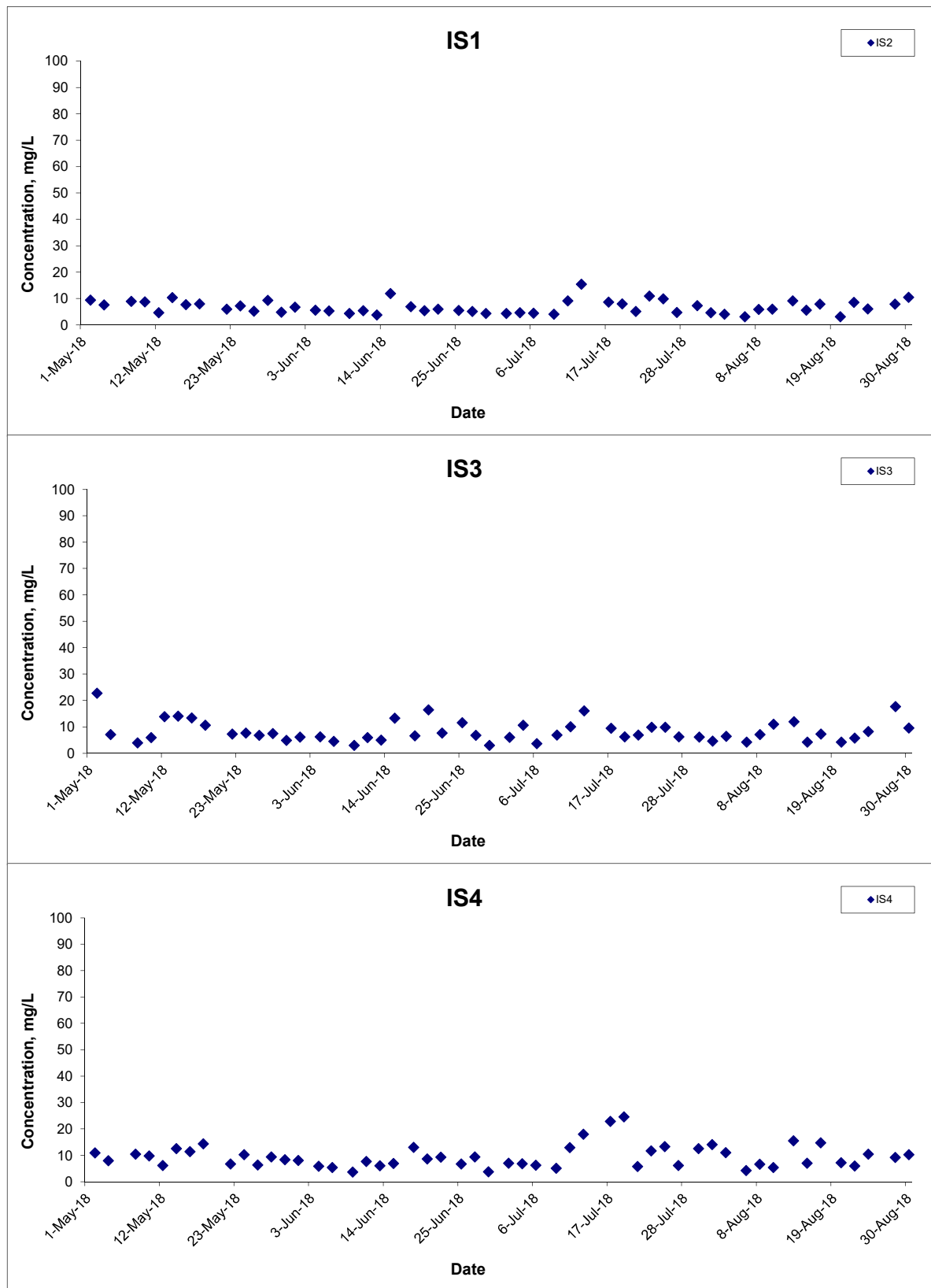
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Suspended Solids (Depth-averaged) at Mid-Ebb Tide



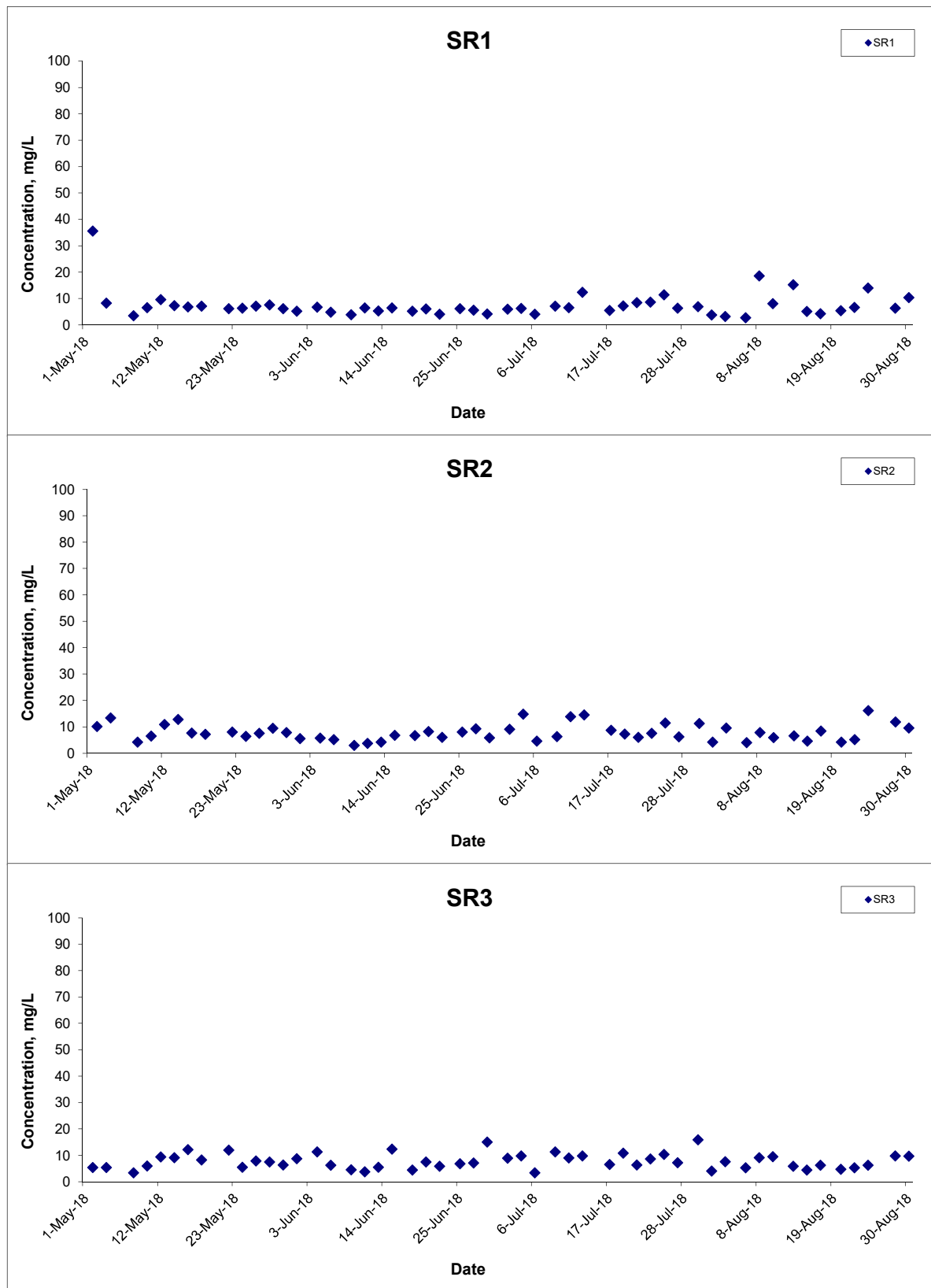
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Suspended Solids (Depth-averaged) at Mid-Ebb Tide



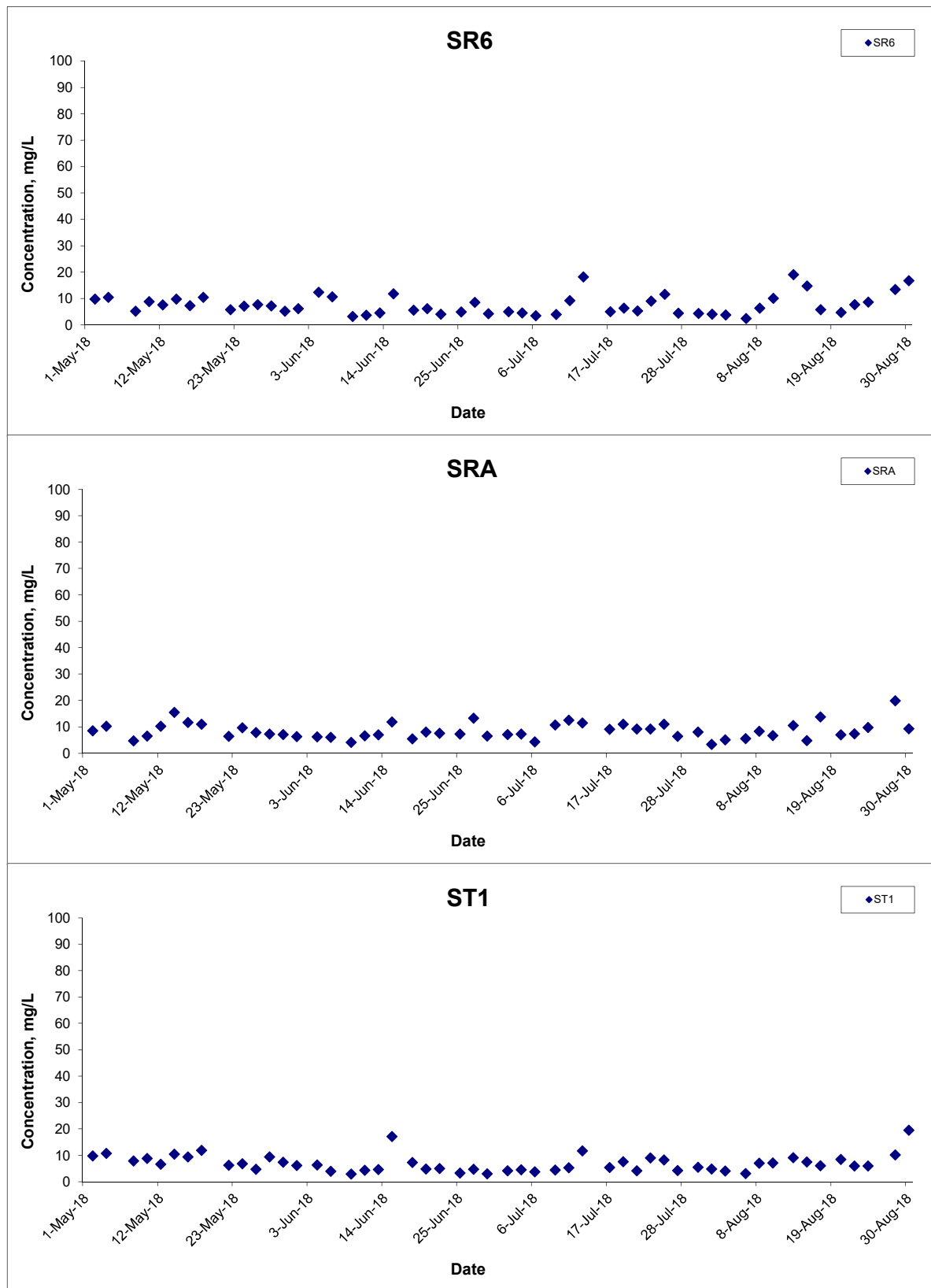
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Suspended Solids (Depth-averaged) at Mid-Ebb Tide



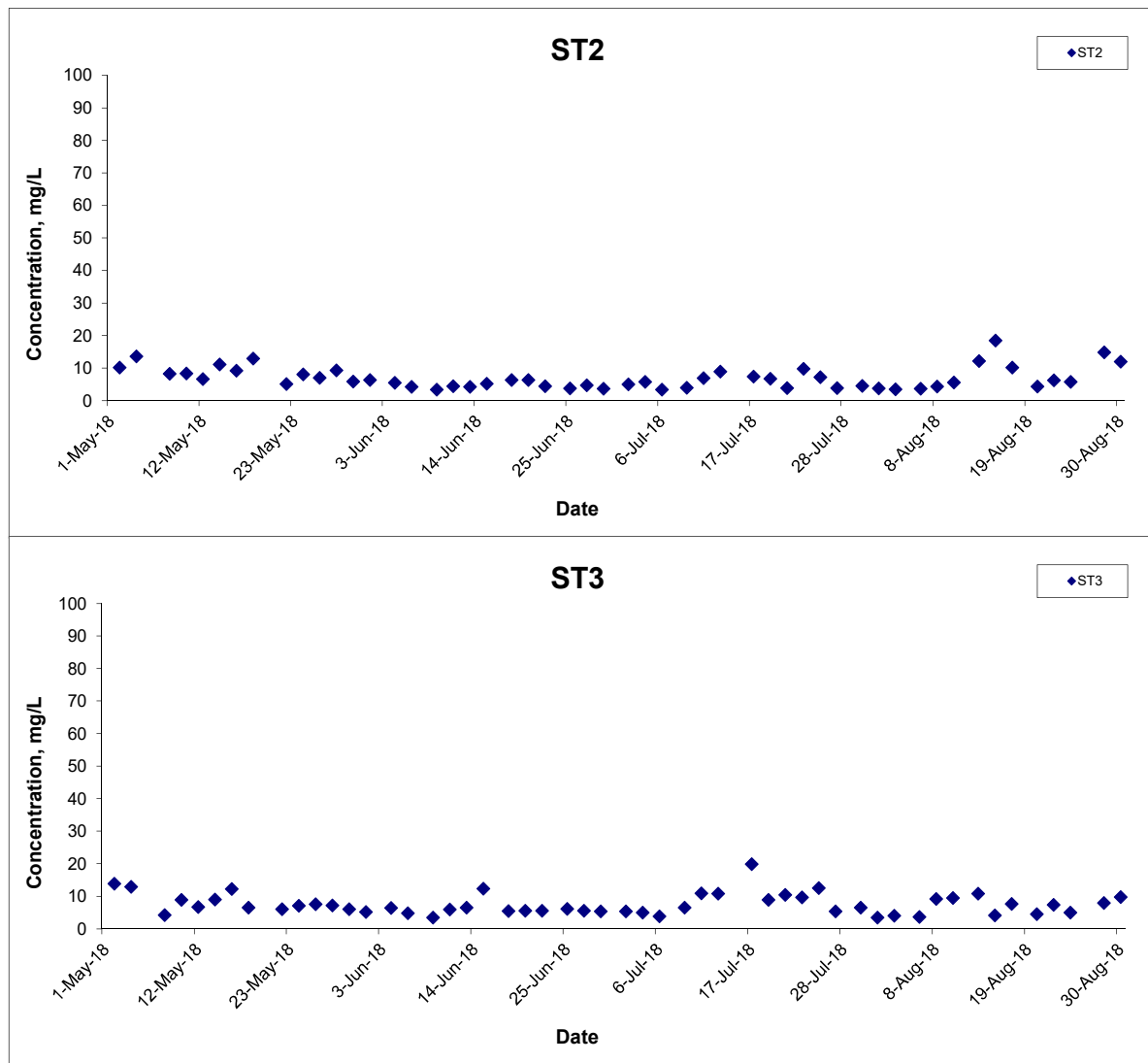
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Suspended Solids (Depth-averaged) at Mid-Ebb Tide



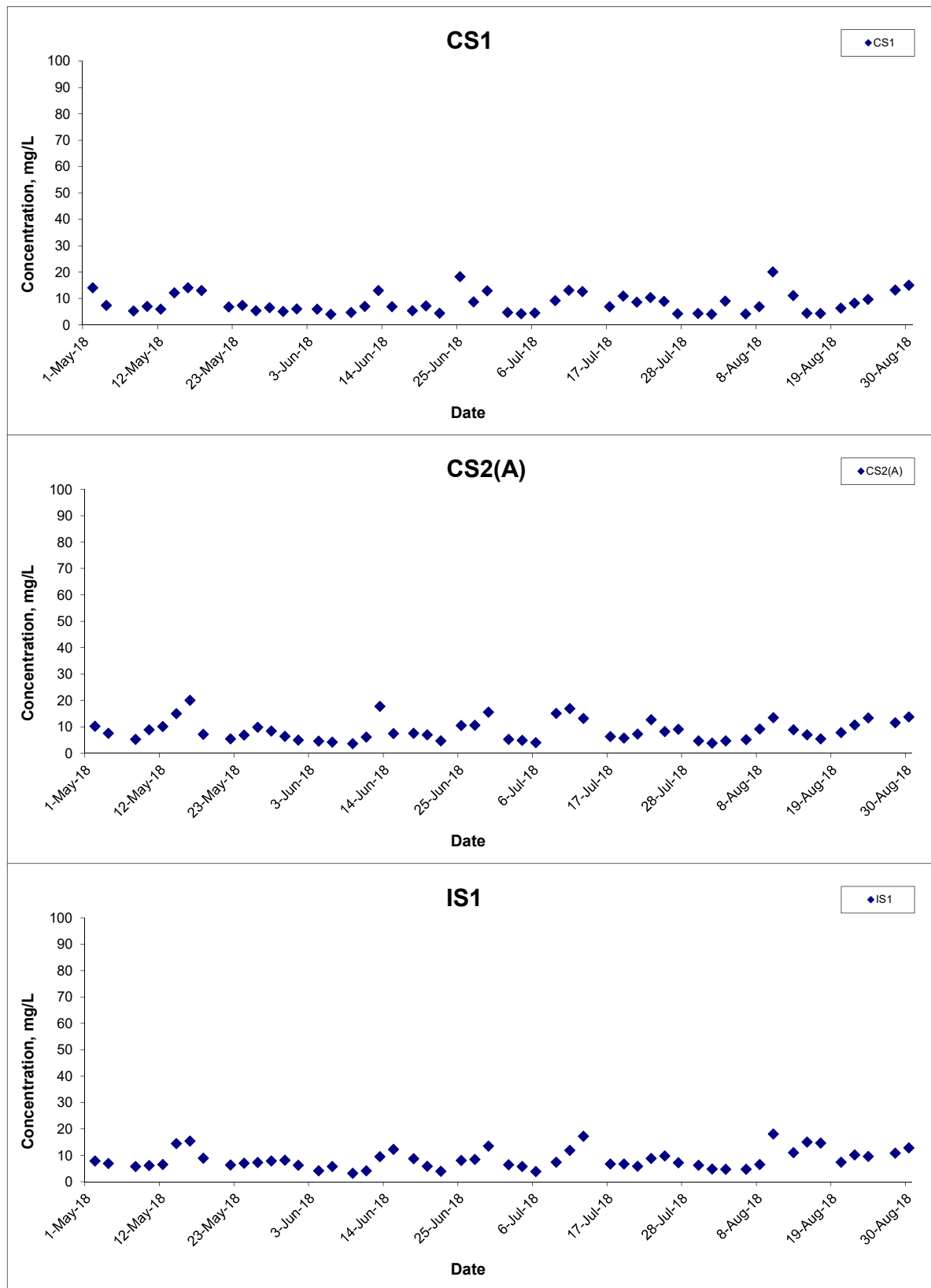
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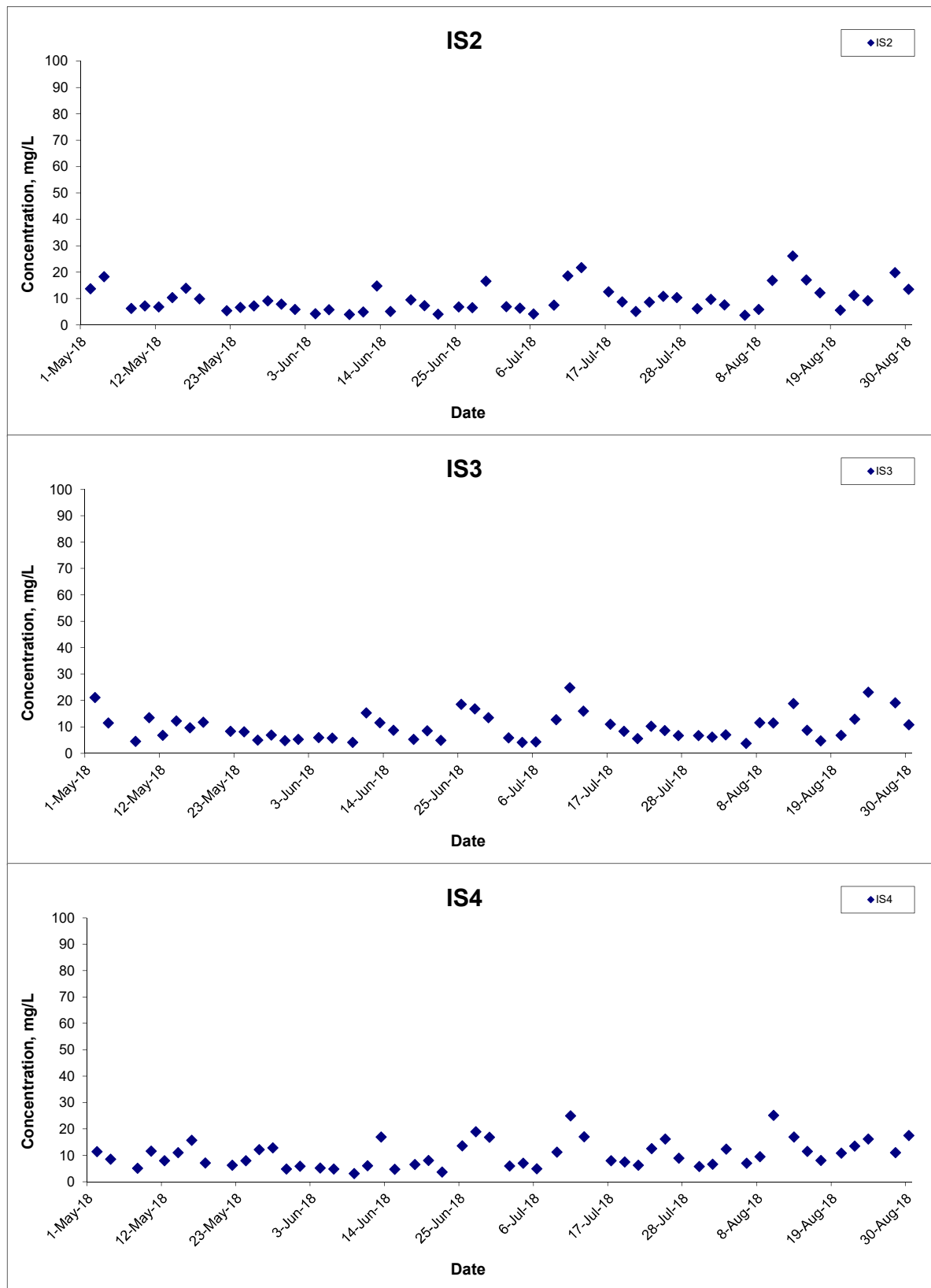
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Suspended Solids (Depth-averaged) at Mid-Flood Tide



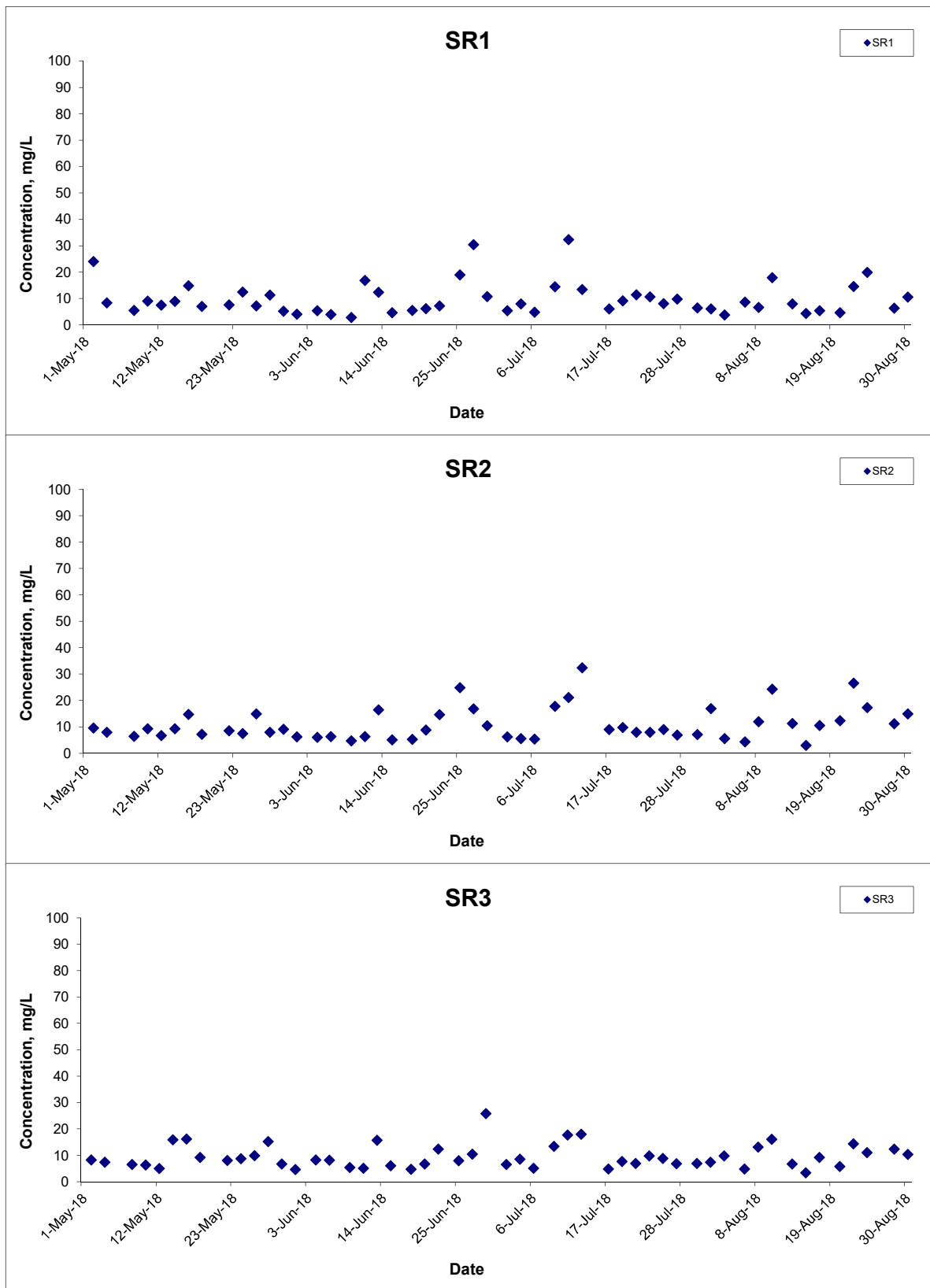
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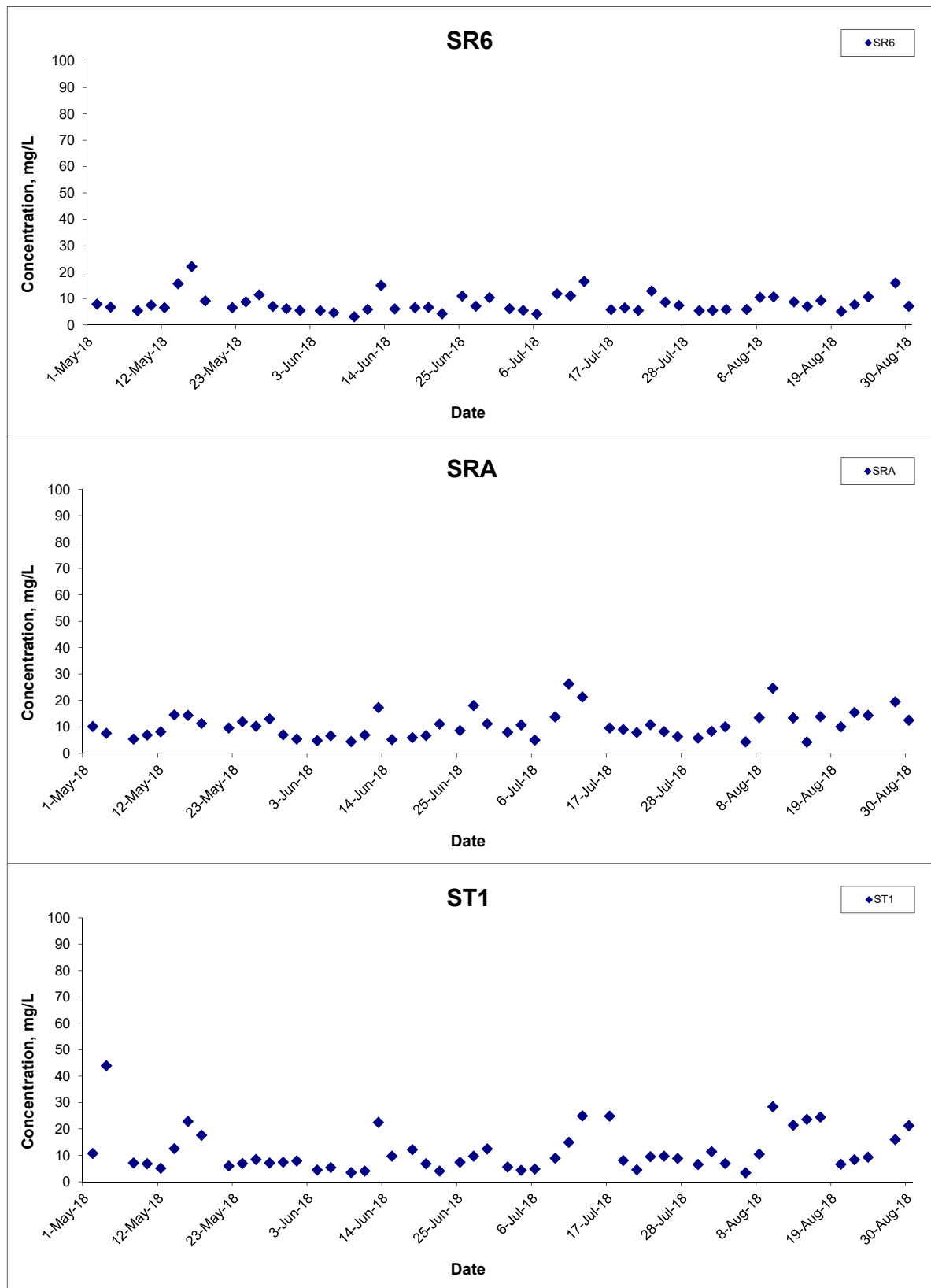
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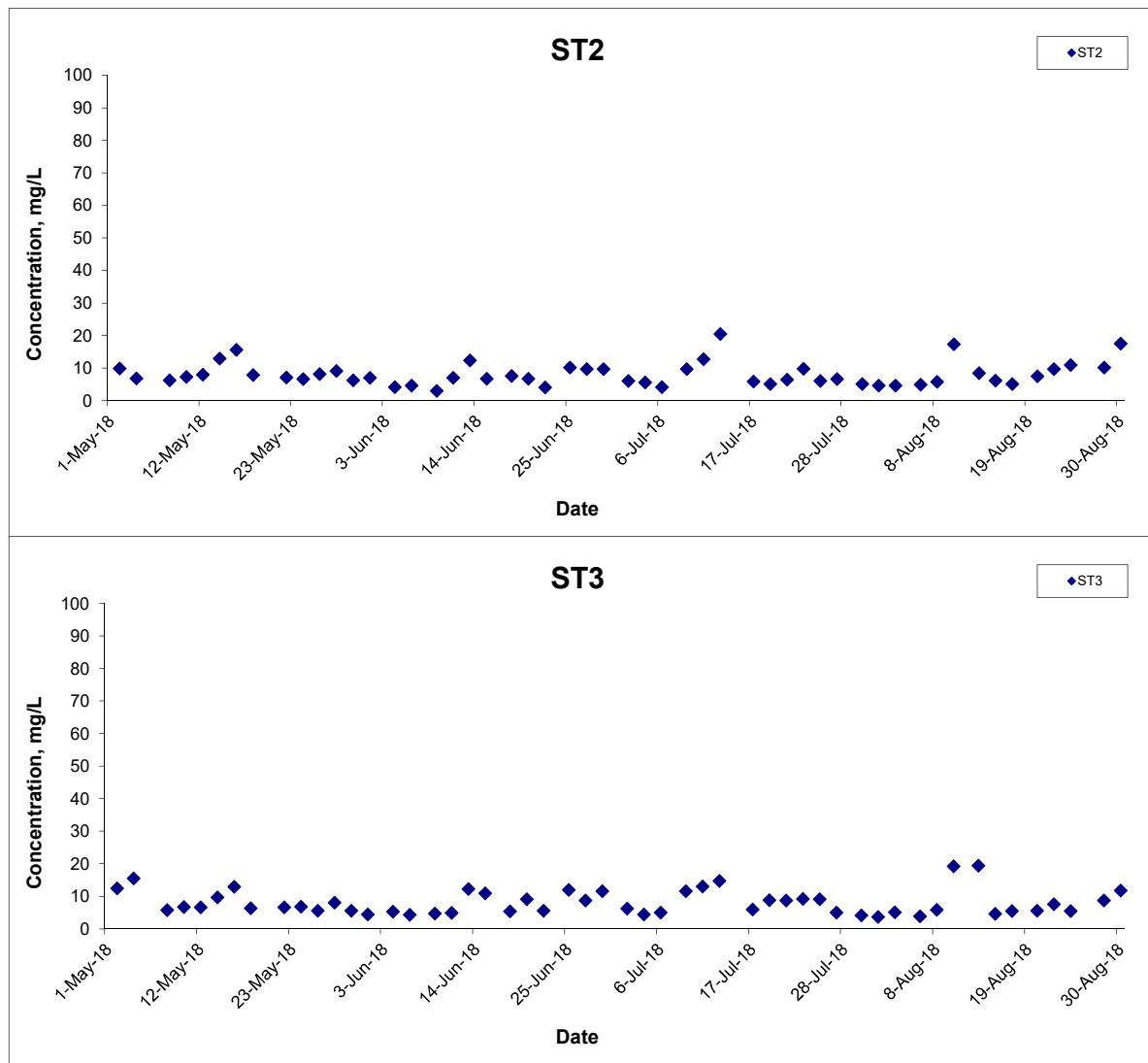
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APPENDIX F
DOLPHIN MONITORING REPORT
(LINE TRANSECT)

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

22nd Quarterly Progress Report (June-August 2018)

Submitted by

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

21 September 2018

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 22nd 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 June to August 2018.

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 2018). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched

for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). 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. 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-km² grids in WL survey area on GIS. Sighting densities (number of on-effort sightings per km²) and dolphin densities (total number of dolphins from on-effort sightings per km²) 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 sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km² 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-km² grid within the study area:

$$\text{SPSE} = ((S / E) \times 100) / \text{SA}\%$$

$$\text{DPSE} = ((D / E) \times 100) / \text{SA}\%$$

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 June to August 2018, 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 193.34 km of survey effort was collected, with 95.5% 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 127.25 km, while the effort on secondary lines was 66.09 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 June to August 2018, a total of 35 groups of 133 Chinese White Dolphins were sighted. All except two dolphin sightings were made during on-effort search. Twenty-five on-effort sightings were made on primary lines, while the other eight 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 June to August 2018 is shown in Figure 1. The dolphin groups were evenly distributed across the WL survey area, with slightly higher concentration near and to the north of Kai Kung Shan, near Peaked Hill and Fan Lau (Figure 1). On the other hand, they appeared to avoid the waters near Tai O Peninsula as well as the southern end of the WL waters (Figure 1).
- 3.2.2. Sighting distribution of dolphins in the present quarter was somewhat similar to the one during the baseline period in September to November 2011. However, there appeared to be fewer dolphin sightings made in the northern portion of the WL survey area during the present impact phase period when compared to the baseline period (Figure 1).
- 3.2.3. Notably, three of the 35 dolphin groups were 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 summer quarter of 2018, several dolphin groups were also observed near the bridge alignment in NWL waters, which was comparable to the dolphin distribution in this same area during the baseline phase (Figure 2).
- 3.2.4. Dolphins appeared to occur more often near the HKLR09 alignment during the present quarterly period, which was also the case in the previous quarter. As the disturbance arisen from the HKLR09 construction activities on the dolphins have been completed, dolphins may start to utilize the waters in the vicinity of the bridge alignment. However, it may still be premature to conclude that the potential obstruction from the permanent physical structure of the bridge piers does not occur any more, and this critical issue should be continuously monitored in the upcoming quarters through boat surveys and land-based theodolite tracking surveys.
- 3.2.5. Distribution patterns of dolphin sightings in the past three summer quarters of 2015-17 were compared with the one in 2018. Level of dolphin occurrence throughout the WL waters during the summer period of 2018 was similar to the previous three years, but they appeared more often near the HKLR09 alignment

and near Kai Kung Shan in 2018 (Figure 3).

3.3. Encounter rate

3.3.1. During the present three-month impact phase monitoring period (June – August 2018), 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 (June-August 2018)

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 (June 4 th)	25.9	134.9
	Set 2 (June 20 th)	19.5	58.4
	Set 3 (July 10 th)	10.3	36.0
	Set 4 (July 19 th)	19.5	39.0
	Set 5 (August 2 nd)	9.3	101.9
	Set 6 (August 9 th)	34.3	132.2

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (June to August 2018) 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)	
	June – August 2018	September – November 2011	June – August 2018	September – November 2011
West Lantau	19.78 ± 9.47	16.43 ± 7.70	83.71 ± 45.18	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 17.3 sightings and 67.7 dolphins per 100 km of survey effort respectively during the present quarter.

Table 4. Comparison of average dolphin encounter rates in West Lantau survey area from all quarters of impact monitoring period and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; the encounter rates in **summer** months were highlighted in **blue**; \pm 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 \pm 7.70	60.50 \pm 38.47
March-May 2013 (Impact)	16.70 \pm 8.00	58.59 \pm 30.37
June-August 2013 (Impact)	26.89 \pm 12.46	94.75 \pm 57.61
September-November 2013 (Impact)	20.51 \pm 12.34	60.68 \pm 37.60
December 2013-February 2014 (Impact)	18.01 \pm 7.24	60.12 \pm 40.18
March-May 2014 (Impact)	14.40 \pm 10.28	65.23 \pm 46.13
June-August 2014 (Impact)	22.90 \pm 15.88	101.41 \pm 97.90
September-November 2014 (Impact)	10.57 \pm 10.45	36.63 \pm 30.19
December 2014-February 2015 (Impact)	12.84 \pm 7.17	57.36 \pm 37.35
March-May 2015 (Impact)	12.42 \pm 4.42	45.32 \pm 38.14
June-August 2015 (Impact)	12.36 \pm 5.81	61.19 \pm 38.63
September-November 2015 (Impact)	11.71 \pm 4.43	43.30 \pm 21.38
December 2015-February 2016 (Impact)	13.86 \pm 6.78	63.40 \pm 35.77
March-May 2016 (Impact)	9.64 \pm 6.44	49.01 \pm 36.69
June-August 2016 (Impact)	14.14 \pm 7.66	34.91 \pm 19.69
September-November 2016 (Impact)	13.17 \pm 9.08	53.82 \pm 43.64
December 2016-February 2017 (Impact)	13.58 \pm 7.47	46.73 \pm 41.18
March-May 2017 (Impact)	7.43 \pm 5.13	21.48 \pm 23.49
June-August 2017 (Impact)	8.83 \pm 5.66	23.25 \pm 12.54
September-November 2017 (Impact)	8.84 \pm 8.07	24.47 \pm 22.09
December 2017-February 2018 (Impact)	6.22 \pm 7.79	20.99 \pm 25.64
March-May 2018 (Impact)	11.18 \pm 7.37	45.95 \pm 40.07
June-August 2018 (Impact)	19.78 \pm 9.47	83.71 \pm 45.18

3.3.3. Notably, the encounter rates of dolphin sightings (ER(STG)) and encounter rates of dolphins (ER(ANI)) in the present quarter (June to August 2018) were the fourth and third highest respectively during the entire construction period, and both were also the highest in the past four years (Table 4). In fact, those encounter rates were noticeably higher than the baseline ones recorded in 2011 (Table 4). Such dramatic rebound in the present quarter should be continuously monitored in the upcoming quarter, to confirm whether the

increase in dolphin occurrence in WL survey area is temporary or persistent.

- 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 21st quarter of the impact phase), the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.517 and 0.361 respectively. Therefore, if the alpha value is set at 0.05, significant difference was not detected between the baseline period and the present quarter in both encounter rates of STG and ANI.
- 3.3.5. Another comparison was made between the baseline period and the 21 cumulative quarters in the impact phase, and the p-value for the differences in average dolphin encounter rates of STG and ANI were 0.465 and 0.605 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 twenty individuals per group in WL survey area during June to August 2018. 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 (June-August 2018) and baseline monitoring period (September-November 2011)

	Average Dolphin Group Size	
	June – August 2018	September – November 2011
West Lantau	3.80 ± 3.73 (n = 35)	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 during the three-month baseline period (Table 5). Among the 35 groups, 26 of them were composed of only 1-4 dolphins, while there were seven groups in moderate size with 5-9 dolphins, and two large groups with 11 and 20 animals respectively.
- 3.4.3. Distribution of dolphins with larger group sizes (with five or more animals per group) during June to August 2018 is shown in Figure 4. With the exception

of a large group of 20 animals sighted to the north of the HKLR09 alignment, the other larger dolphin groups in the present impact phase period were mainly distributed in the central and southern portions of the WL survey area with slightly higher concentration to near Kai Kung Shan and Fan Lau. This was slightly different from the baseline phase when the large dolphin groups were also concentrated near Tai O Peninsula (Figure 4).

3.5. *Habitat use*

- 3.5.1. From June to August 2018, the grids that recorded higher densities of dolphins were located near the HKLR09 alignment, near Kai Kung Shan, Peaked Hill and Fan Lau (Figures 5a & 5b).
- 3.5.2. However, it should be cautioned that the amount of survey effort collected in each grid during the three-month period was fairly low (six units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern will be presented when more survey effort for each grid will be collected throughout the impact phase monitoring programme.
- 3.5.3. When compared with the habitat use pattern recorded during the baseline period in September-November 2011, it appears that the overall dolphin occurrence was slightly lower during the present impact phase monitoring period in summer 2018, especially near the Tai O Peninsula (Figure 6).

3.6. *Mother-calf pairs*

- 3.6.1. During the three-month impact phase monitoring period, only three young calves (all were unspotted juveniles) were sighted in the WL survey area. These young calves comprised only 2.3% of all animals sighted, which was much lower than the percentage recorded during the baseline monitoring period (6.6%).
- 3.6.2. All three young calves occurred at the southern end of the WL survey area during this quarter, and such occurrence was very different from the baseline period when calf occurrence was much more frequent and concentrated in the northern portion of WL waters near Tai O Peninsula (Figure 7).

3.7. *Activities and associations with fishing boats*

- 3.7.1. During the three-month impact monitoring period, three dolphin groups were engaged in feeding activities to the north of HKLR09 alignment and between Kai Kung Shan and Tai O Peninsula respectively (Figure 8), comprising 8.6% of the total number of dolphin sightings. This percentage was somewhat lower than the percentage recorded during the baseline period (13.0%).

- 3.7.2. In addition, two dolphin groups were engaged in socializing activities to the north of HKLR09 alignment and near Kai Kung Shan respectively, while another group was engaged in traveling activities to the west of Peaked Hill near the territorial border (Figure 8).
- 3.7.3. Distribution of different activities engaged by the dolphins during the present impact phase monitoring period was quite different from the one during the baseline period, when the main concentration of the feeding and socializing activities occurred between Tai O Peninsula and Peaked Hill (Figure 8).
- 3.7.4. During the three-month monitoring period, one of the 35 dolphin groups was associated with an operating purse-seiner (Appendix II).
- 3.8. *Summary of photo-identification works*
- 3.8.1. From June to August 2018, over 3,500 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.8.2. In total, 65 individuals sighted 80 times altogether were identified (see the summary table in Appendix III and photographs of identified individuals in Appendix IV). The majority of these individuals were re-sighted only once during the three-month period. However, there were a total of nine individuals (NL269, NL279, NL330, WL68, WL137, WL218, WL245, WL267 and WL272) being re-sighted twice, and another three individuals being re-sighted thrice (NL212, WL98 and WL293) (Appendix III).
- 3.8.3. Among the 65 identified individual dolphin, nine of them (CH113, NL145, NL233, NL317, NL327, NL329, WL188, WL207 and WL251) were also re-sighted in North Lantau waters during HKLR03/HKBCF monitoring surveys during the same three-month period. However, while some did show extensive movements across the HKLR09 alignment, a number of individuals actually just occurred near the alignment at the juncture of NWL/WL survey areas to the west of the airport (e.g. CH113, NL145, WL251).
- 3.8.4. Notably, many individuals (e.g. NL49, NL98, NL123, NL236) were consistently sighted in North Lantau waters in the past, but were re-sighted in WL waters during the present quarterly period.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 65 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, the majority of identified individuals that primarily centered their range use in West Lantau were still sighted within their normal ranges during the present quarterly period, while none of them has extended their range use from WL waters to the northern part of Lantau waters 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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- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

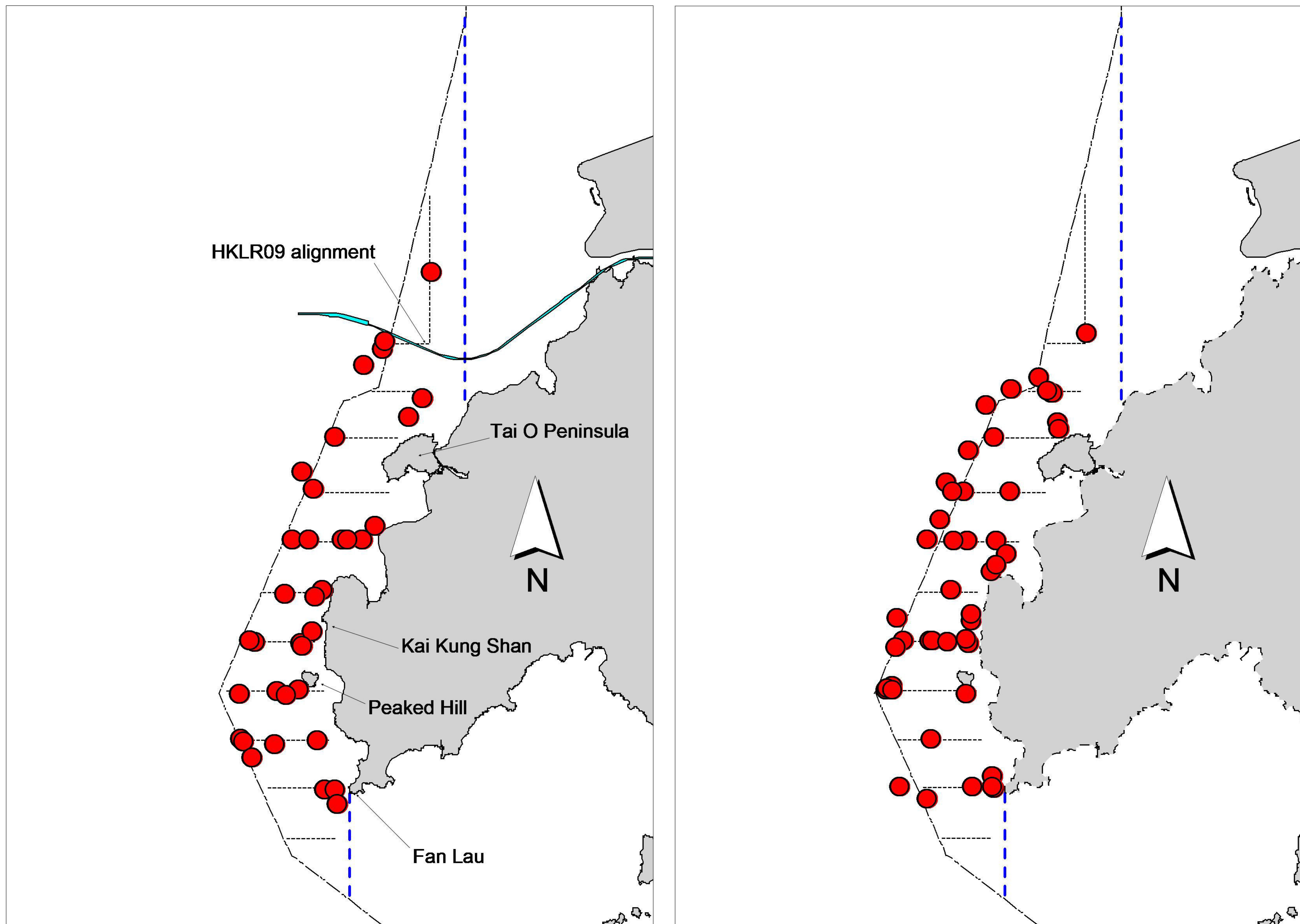


Figure 1. Distribution of Chinese white dolphin sightings in West Lantau during HKLR09 impact phase (left: June – August 2018) and baseline monitoring surveys (right: September – November 2011)

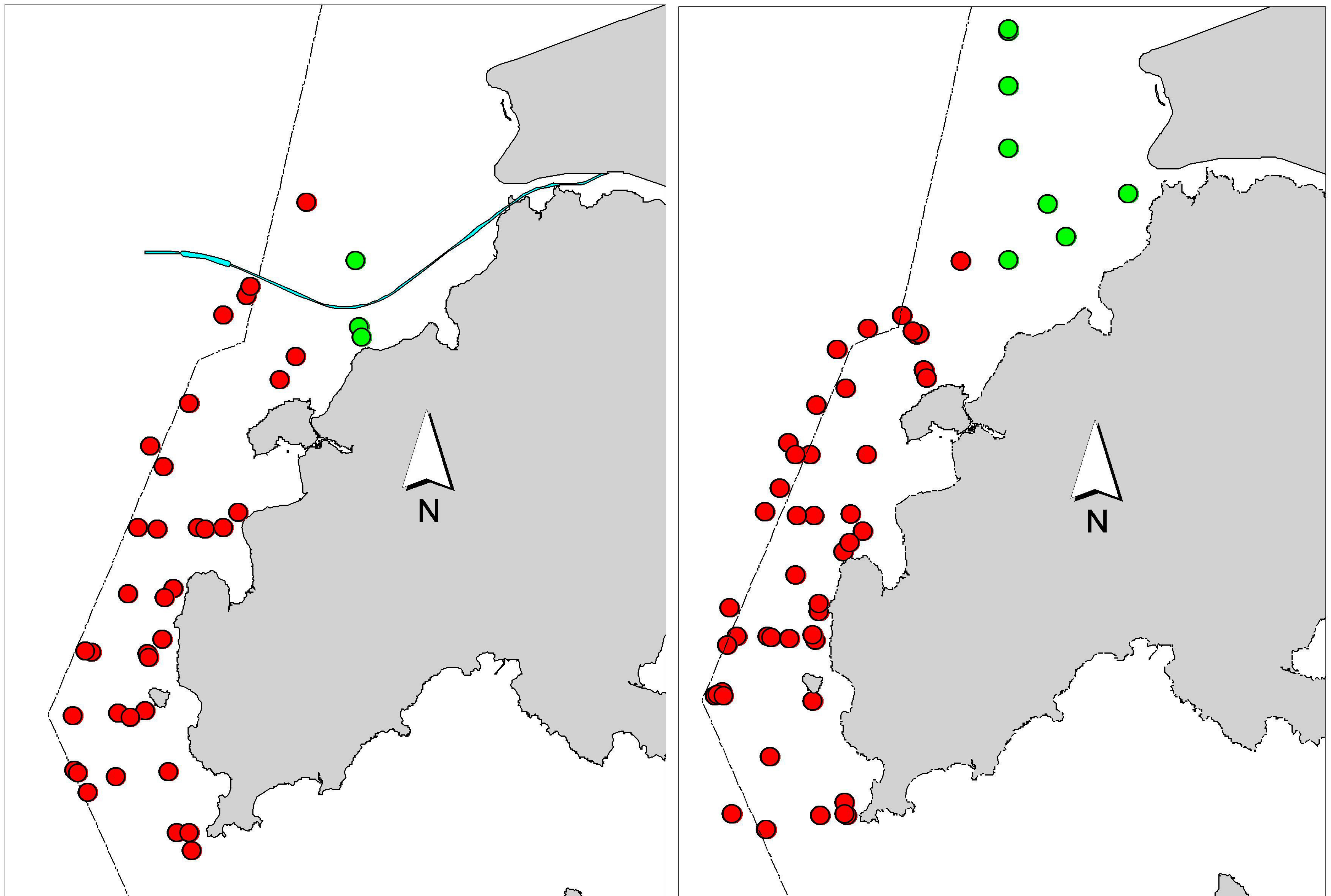


Figure 2. Distribution of Chinese white dolphin sightings from HKLR03 (in green) and HKLR09 surveys (in red) near the HKLR09 alignment during impact phase (left: June – August 2018) and baseline monitoring surveys (right: September – November 2011)

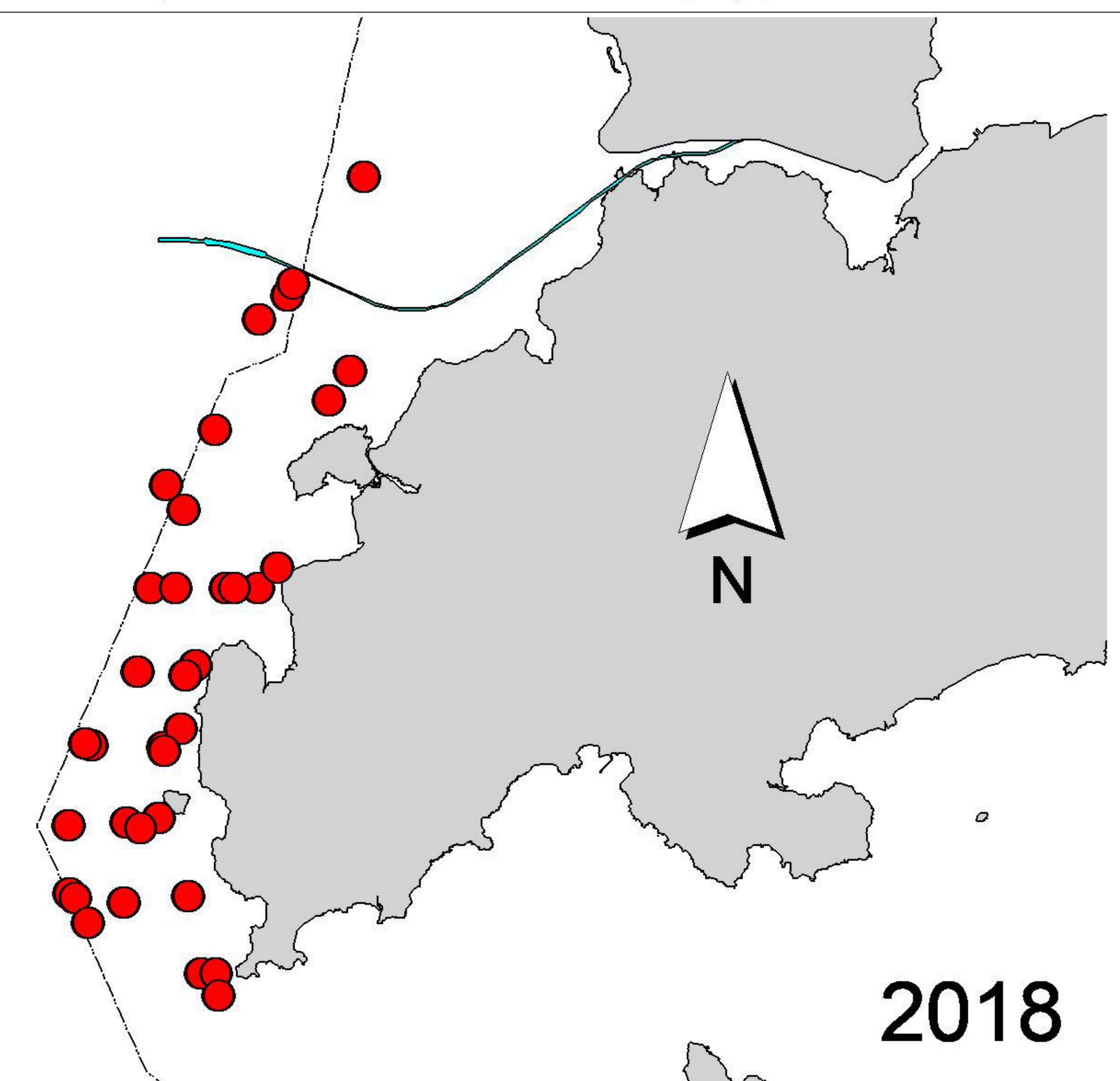
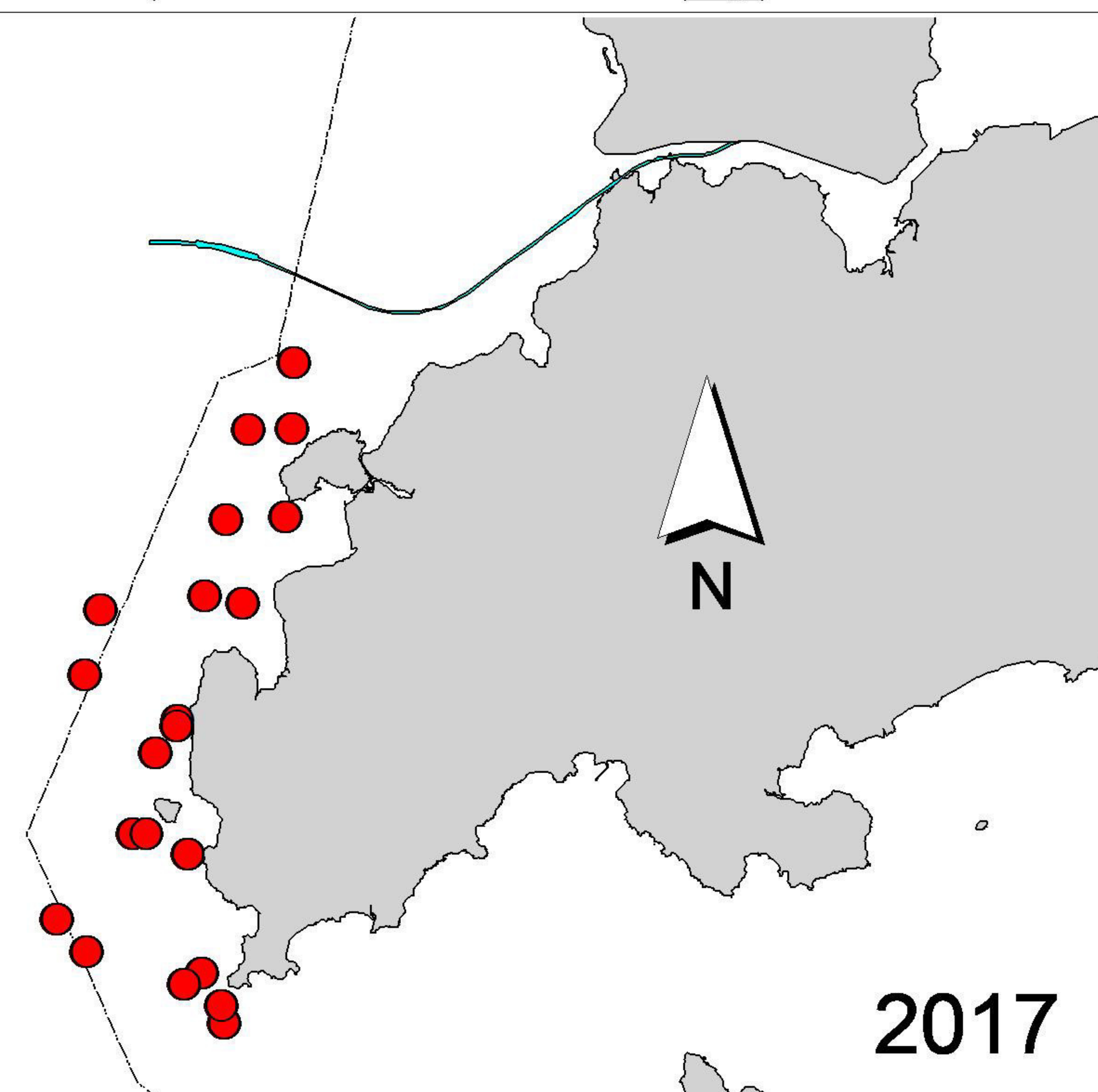
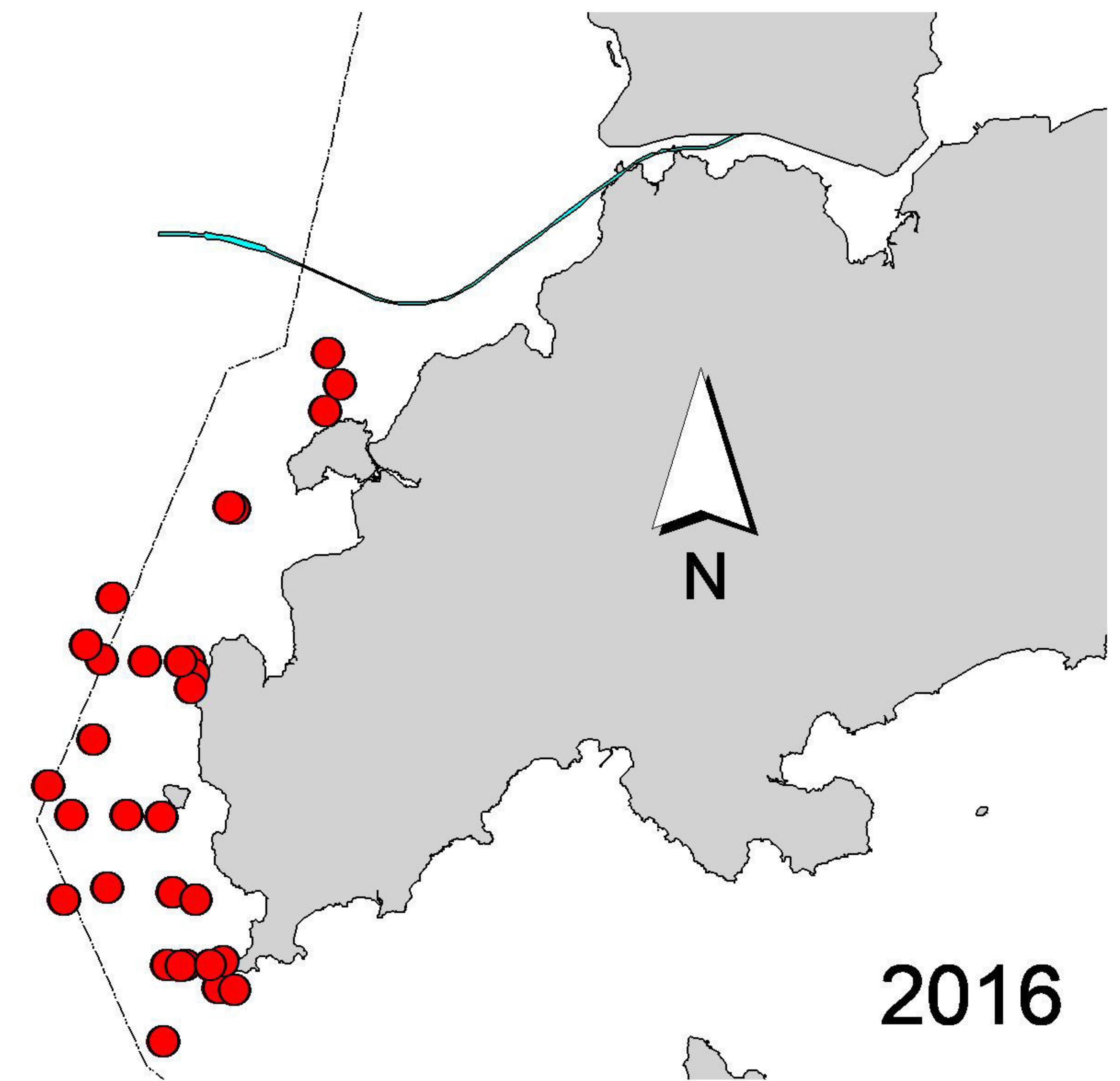
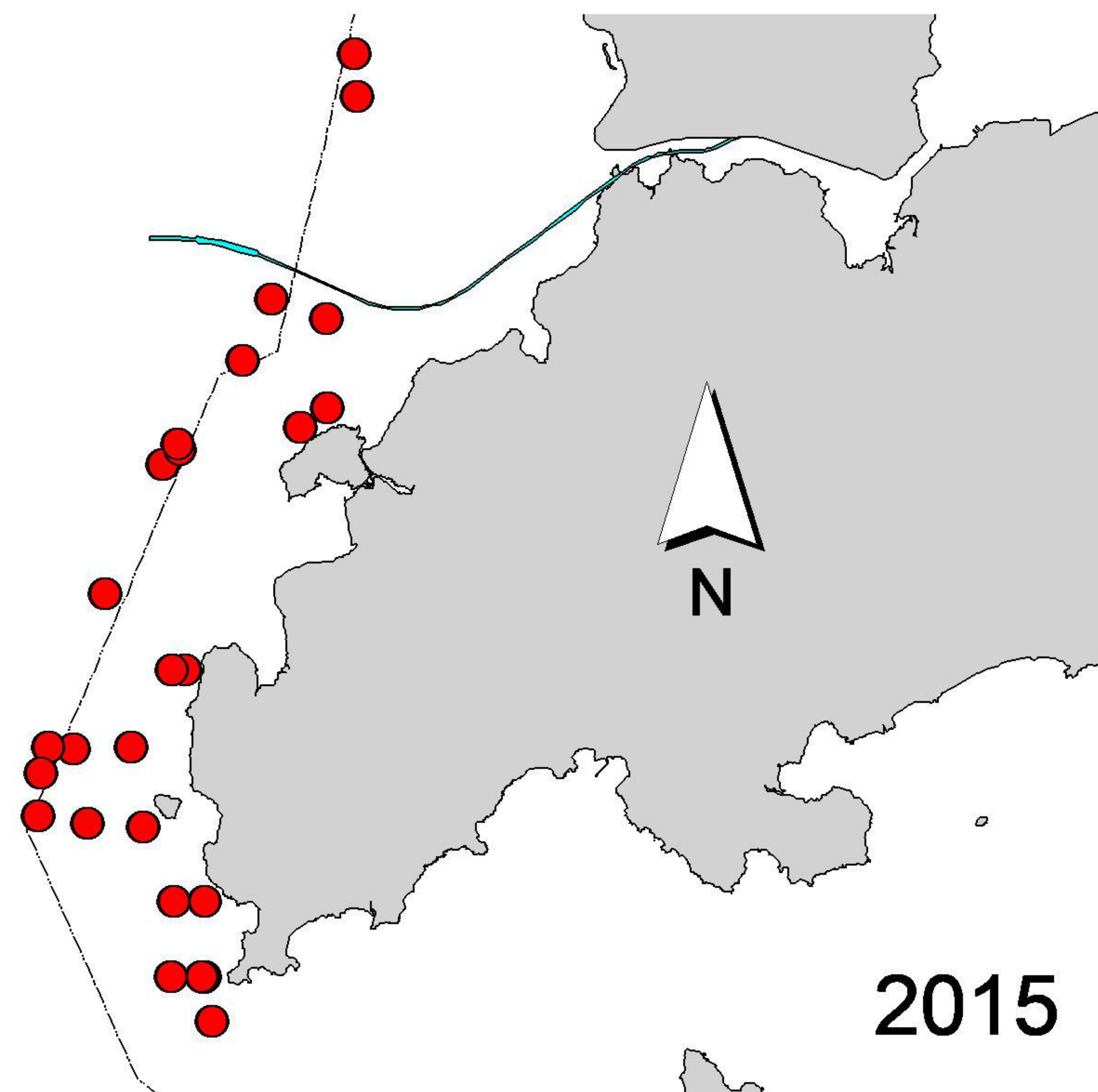


Figure 3. Comparisons on distribution of Chinese white dolphin sightings in West Lantau in the summer months (June-August) of 2015, 2016, 2017 and 2018 during HKLR09 impact phase

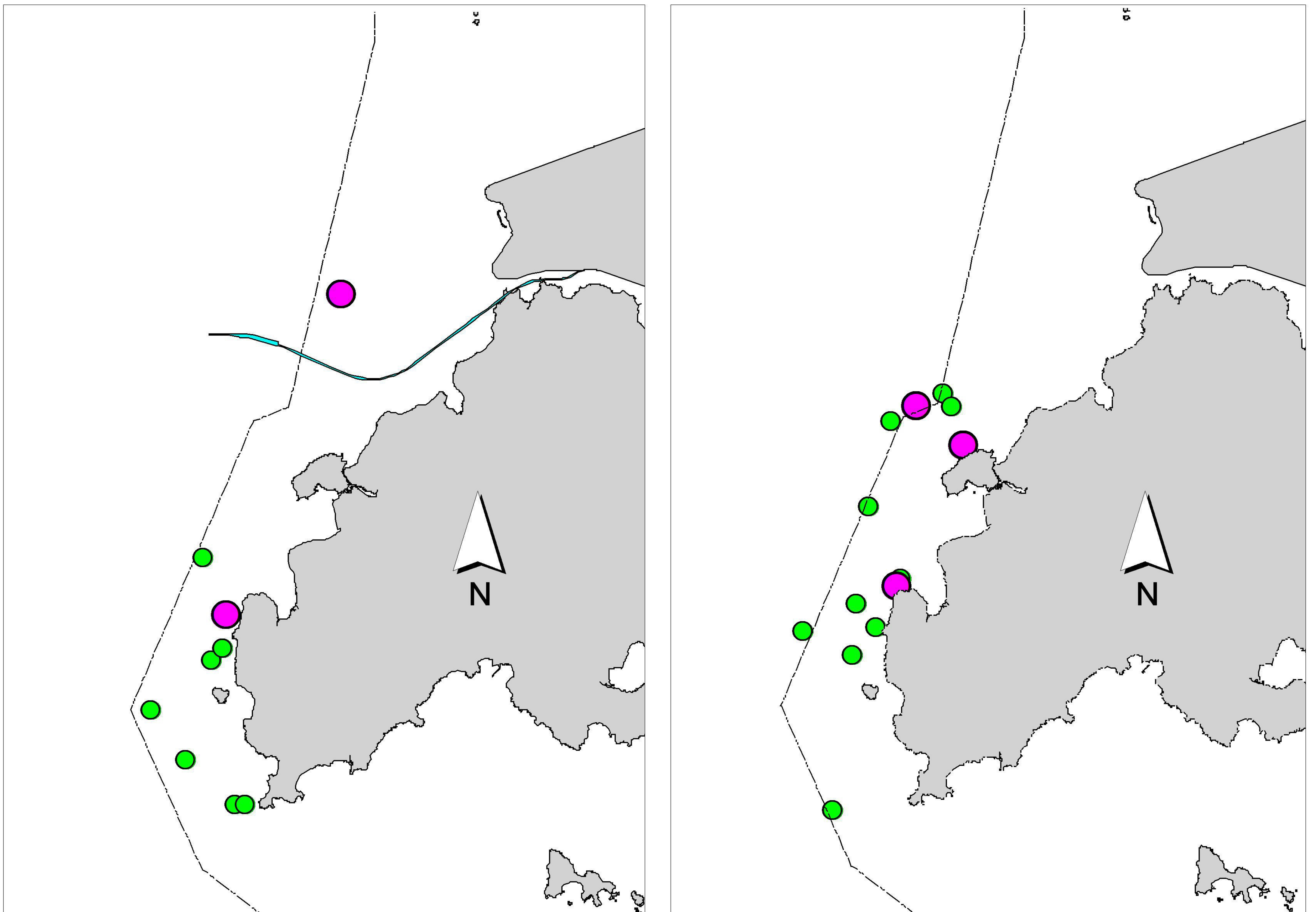


Figure 4. Distribution of Chinese white dolphins with larger group sizes during HKLR09 impact phase (left: June – August 2018) and baseline monitoring surveys (right: September – November 2011) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

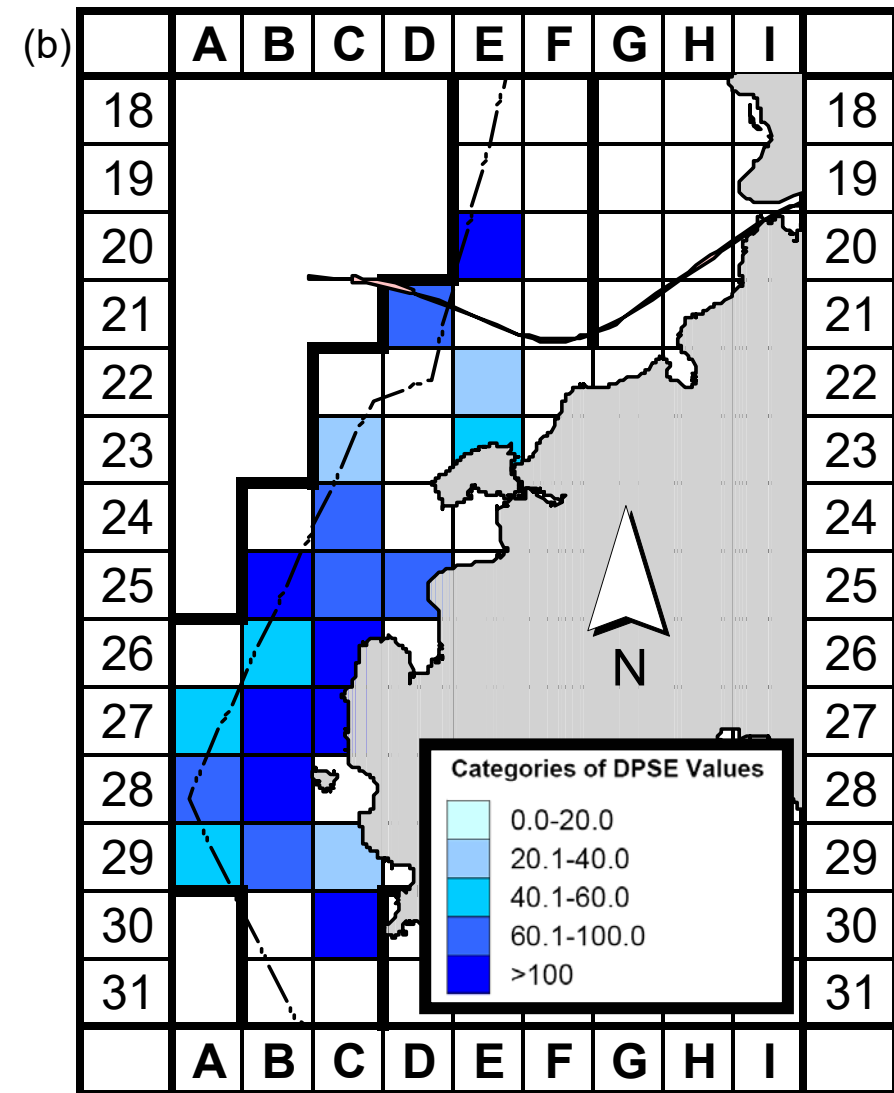
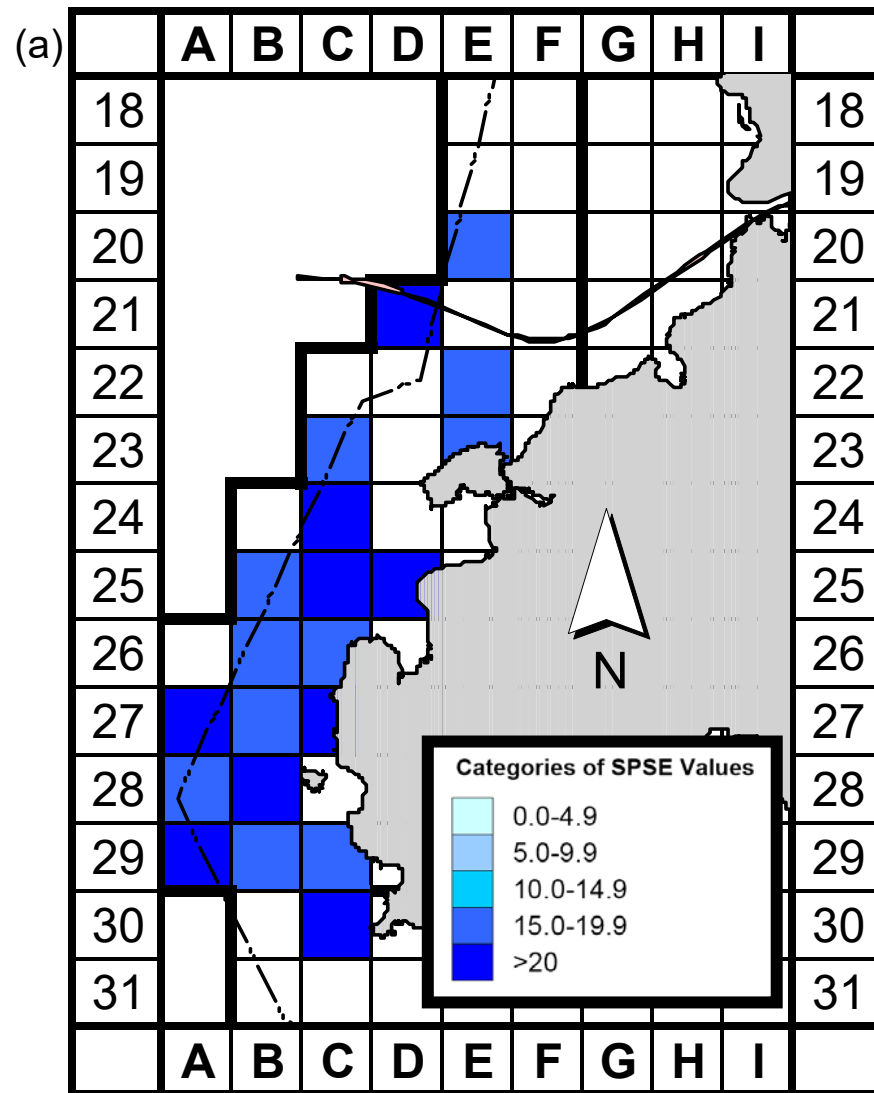


Figure 5a. Sighting density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area, using data collected during HKLR09 impact monitoring period (June-August 18) (SPSE = no. of on-effort sightings per 100 units of survey effort)

Figure 5b. Density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area, using data collected during HKLR09 impact monitoring period (June-August 18) (DPSE = no. of dolphins per 100 units of survey effort)

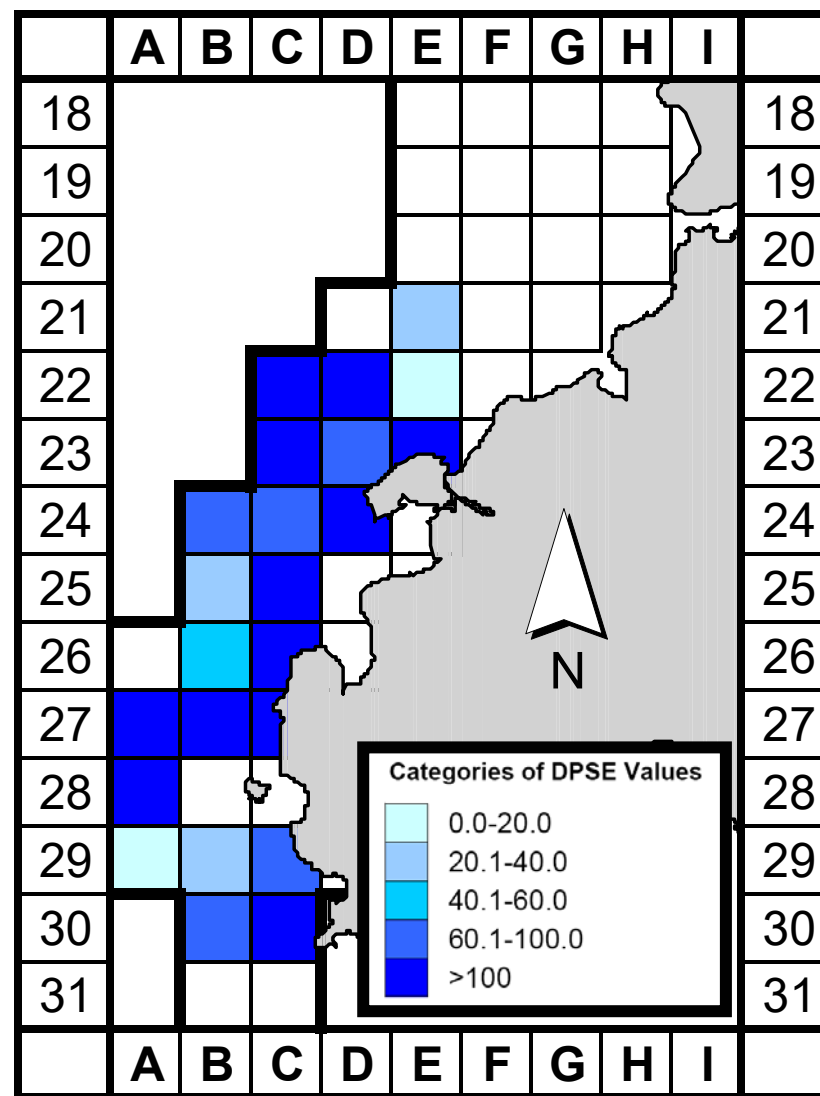
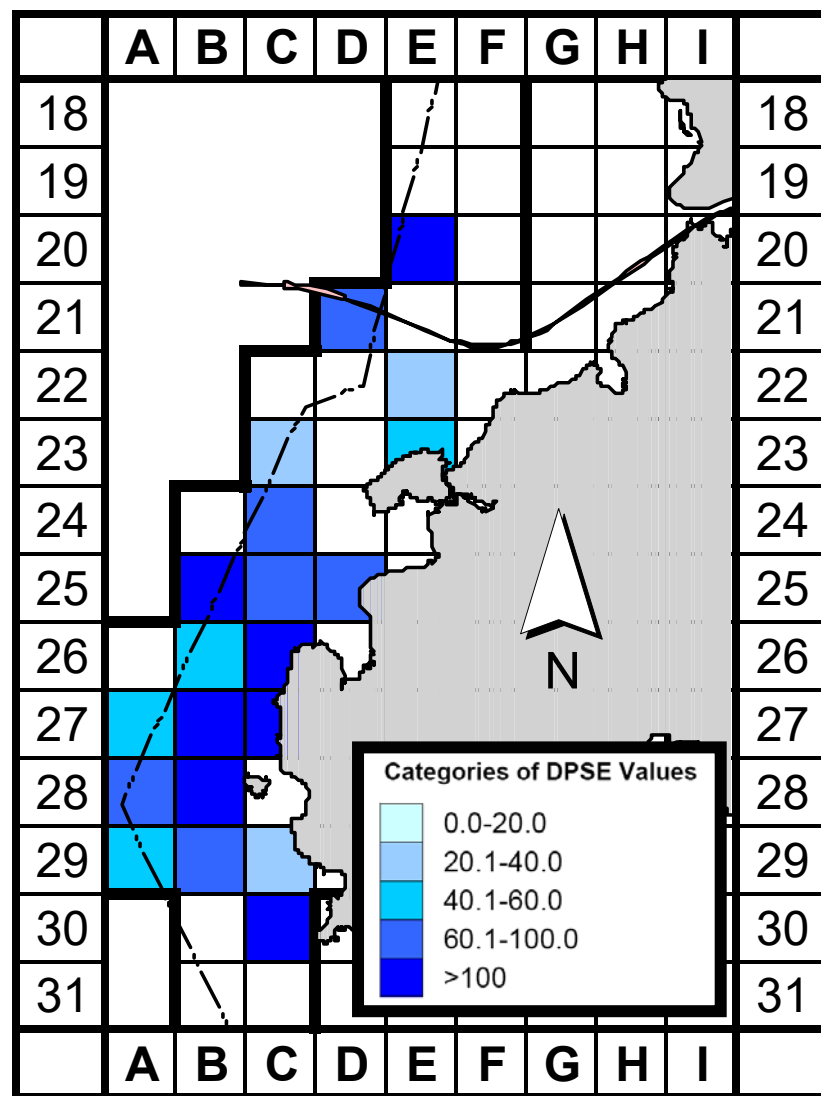


Figure 6. Comparison of density of Chinese white dolphins with corrected survey effort per km² in West Lantau survey area between the impact monitoring period (June-August 2018; left) and baseline monitoring period (September-November 2011; right)
(DPSE = no. of dolphins per 100 units of survey effort)

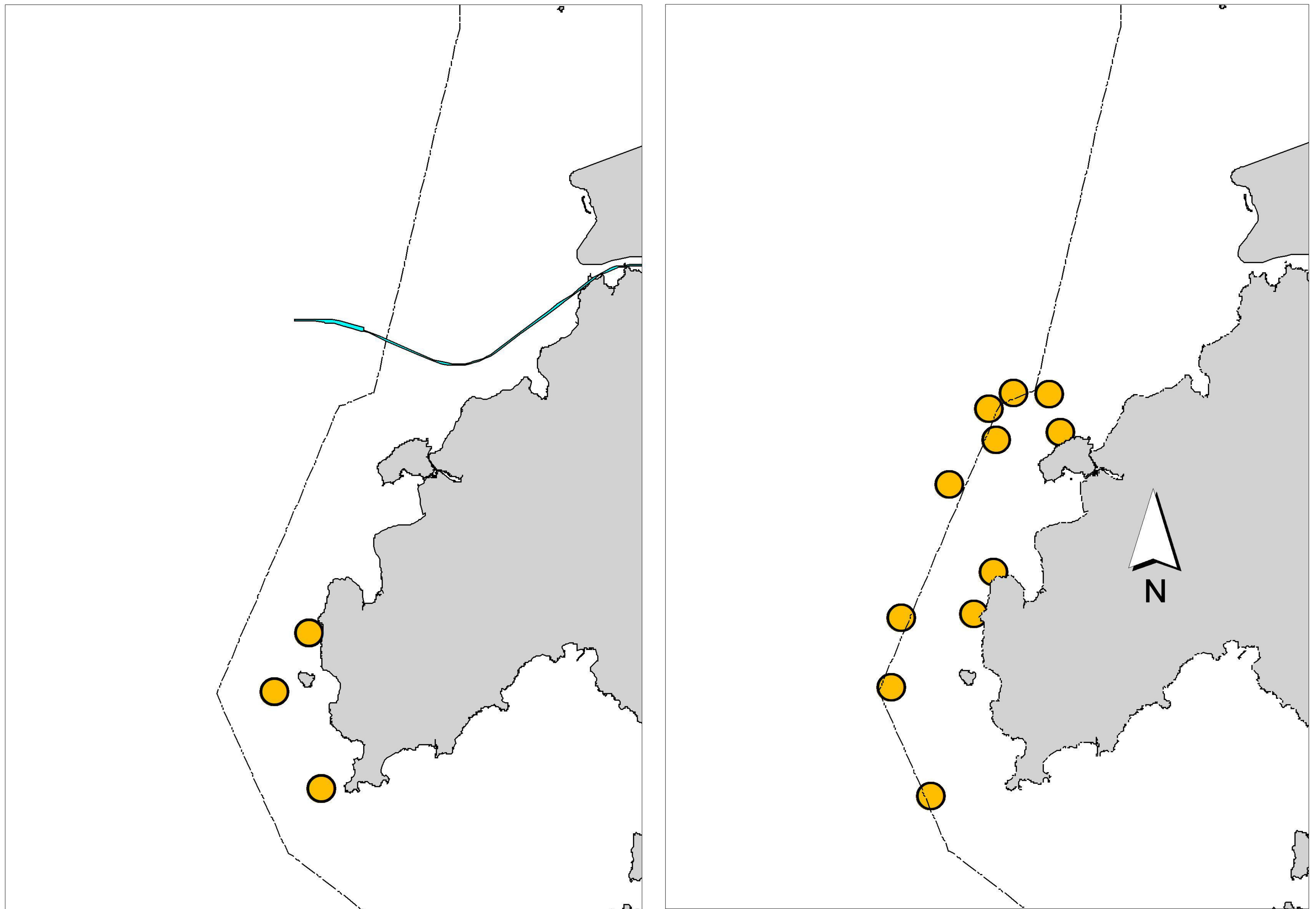


Figure 7. Distribution of young calves of Chinese white dolphins during HKLR09 impact phase (left: June – August 2018) and baseline monitoring surveys (right: September – November 2011)

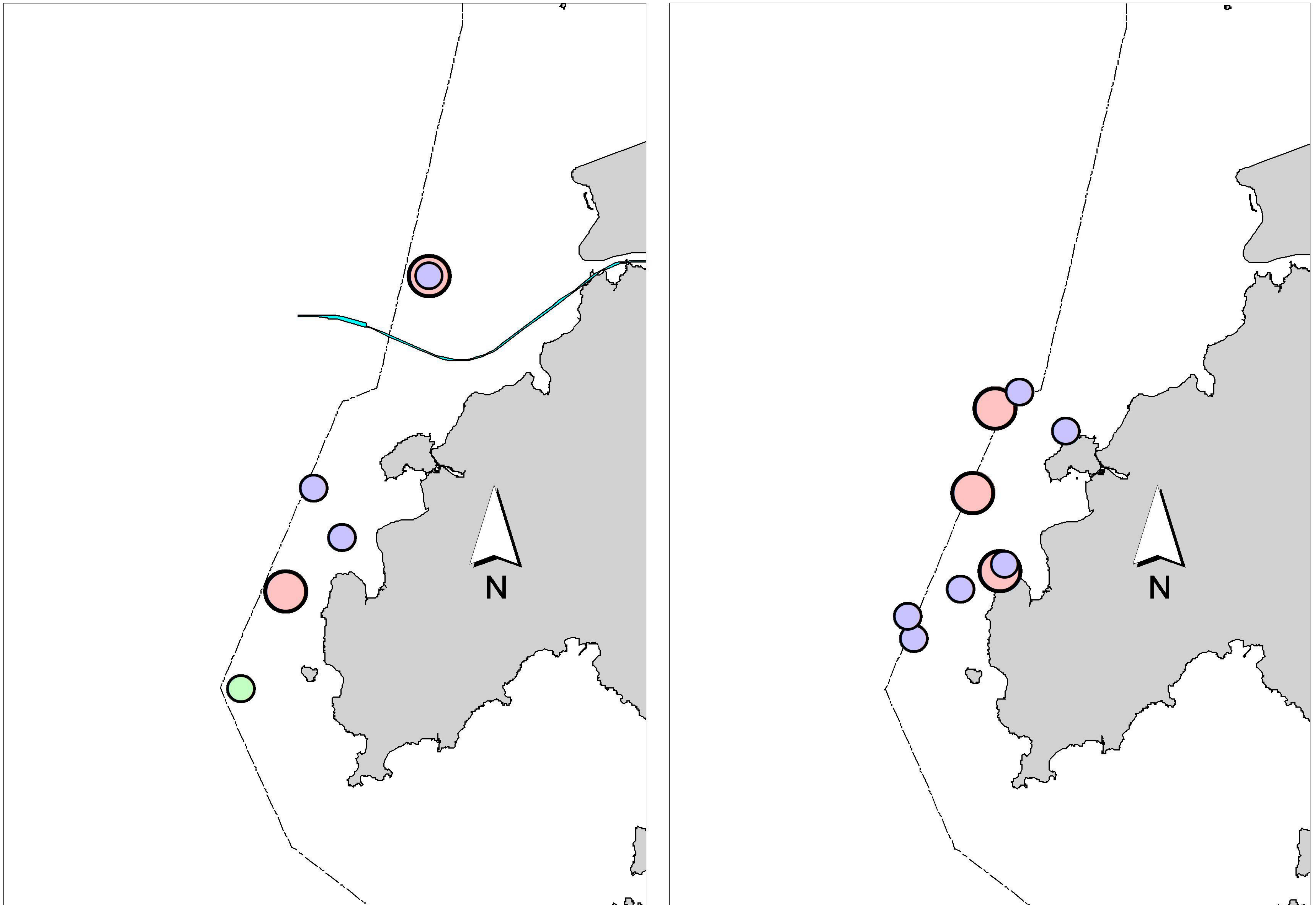


Figure 8. Distribution of dolphins engaged in feeding (in purple), socializing (in pink) and traveling (in green) activities during HKLR09 impact phase (left: June – August 2018) and baseline monitoring surveys (right: September – November 2011)

Appendix I. HKLR09 Survey Effort Database (June-August 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Jun-18	W LANTAU	2	5.48	SUMMER	STANDARD36826	HKLR	P
4-Jun-18	W LANTAU	3	13.80	SUMMER	STANDARD36826	HKLR	P
4-Jun-18	W LANTAU	4	1.72	SUMMER	STANDARD36826	HKLR	P
4-Jun-18	W LANTAU	2	0.92	SUMMER	STANDARD36826	HKLR	S
4-Jun-18	W LANTAU	3	9.44	SUMMER	STANDARD36826	HKLR	S
20-Jun-18	W LANTAU	3	20.56	SUMMER	STANDARD36826	HKLR	P
20-Jun-18	W LANTAU	4	0.32	SUMMER	STANDARD36826	HKLR	P
20-Jun-18	W LANTAU	3	9.08	SUMMER	STANDARD36826	HKLR	S
20-Jun-18	W LANTAU	4	2.55	SUMMER	STANDARD36826	HKLR	S
10-Jul-18	W LANTAU	2	14.57	SUMMER	STANDARD36826	HKLR	P
10-Jul-18	W LANTAU	3	4.85	SUMMER	STANDARD36826	HKLR	P
10-Jul-18	W LANTAU	4	2.16	SUMMER	STANDARD36826	HKLR	P
10-Jul-18	W LANTAU	2	6.78	SUMMER	STANDARD36826	HKLR	S
10-Jul-18	W LANTAU	3	2.91	SUMMER	STANDARD36826	HKLR	S
10-Jul-18	W LANTAU	4	0.66	SUMMER	STANDARD36826	HKLR	S
19-Jul-18	W LANTAU	2	12.24	SUMMER	STANDARD36826	HKLR	P
19-Jul-18	W LANTAU	3	8.28	SUMMER	STANDARD36826	HKLR	P
19-Jul-18	W LANTAU	2	7.43	SUMMER	STANDARD36826	HKLR	S
19-Jul-18	W LANTAU	3	3.07	SUMMER	STANDARD36826	HKLR	S
2-Aug-18	W LANTAU	2	2.48	SUMMER	STANDARD36826	HKLR	P
2-Aug-18	W LANTAU	3	19.12	SUMMER	STANDARD36826	HKLR	P
2-Aug-18	W LANTAU	3	12.68	SUMMER	STANDARD36826	HKLR	S
9-Aug-18	W LANTAU	2	2.66	SUMMER	STANDARD36826	HKLR	P
9-Aug-18	W LANTAU	3	17.77	SUMMER	STANDARD36826	HKLR	P
9-Aug-18	W LANTAU	4	1.24	SUMMER	STANDARD36826	HKLR	P
9-Aug-18	W LANTAU	2	2.91	SUMMER	STANDARD36826	HKLR	S
9-Aug-18	W LANTAU	3	7.66	SUMMER	STANDARD36826	HKLR	S

Appendix II. HKLR09 Chinese White Dolphin Sighting Database (June-August 2018)

(Abbreviations: 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 Line§

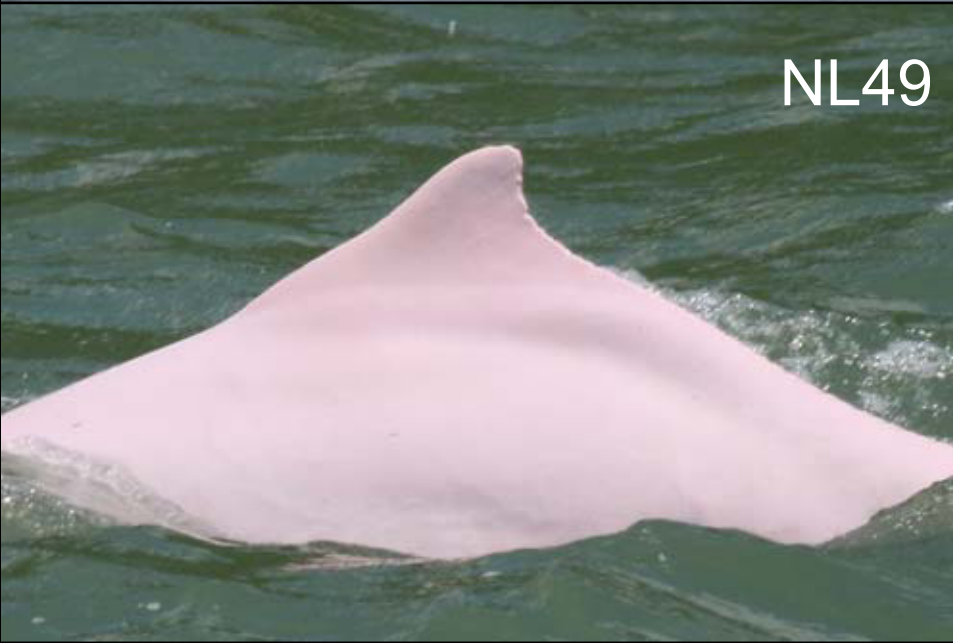
DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
4-Jun-18	1	1119	9	W LANTAU	2	122	ON	HKLR	811480	800808	SUMMER	NONE	P
4-Jun-18	2	1153	8	W LANTAU	2	160	ON	HKLR	809398	800989	SUMMER	NONE	P
4-Jun-18	3	1236	2	W LANTAU	2	99	ON	HKLR	807437	801345	SUMMER	NONE	P
4-Jun-18	4	1252	1	W LANTAU	2	192	ON	HKLR	807463	799695	SUMMER	NONE	P
4-Jun-18	5	1309	6	W LANTAU	2	138	ON	HKLR	806418	801508	SUMMER	NONE	P
20-Jun-18	1	1143	1	W LANTAU	3	104	ON	HKLR	809422	799999	SUMMER	NONE	P
20-Jun-18	2	1156	6	W LANTAU	3	36	ON	HKLR	808360	799666	SUMMER	NONE	P
20-Jun-18	3	1220	3	W LANTAU	3	29	ON	HKLR	808457	800935	SUMMER	NONE	P
20-Jun-18	4	1248	2	W LANTAU	3	827	ON	HKLR	807408	799757	SUMMER	NONE	P
10-Jul-18	1	1138	3	W LANTAU	2	53	ON	HKLR	810395	800640	SUMMER	NONE	P
10-Jul-18	2	1155	7	W LANTAU	2	580	ON	HKLR	809630	801247	SUMMER	NONE	S
10-Jul-18	3	1235	4	W LANTAU	3	71	ON	HKLR	808414	800481	SUMMER	NONE	P
10-Jul-18	4	1305	5	W LANTAU	4	21	ON	HKLR	806417	801724	SUMMER	NONE	P
19-Jul-18	1	1033	2	W LANTAU	3	58	ON	HKLR	815341	802734	SUMMER	NONE	P
19-Jul-18	2	1109	2	W LANTAU	2	1279	ON	HKLR	813560	801720	SUMMER	NONE	P
19-Jul-18	3	1117	1	W LANTAU	2	523	ON	HKLR	812853	801028	SUMMER	NONE	S
19-Jul-18	4	1122	3	W LANTAU	2	33	ON	HKLR	812509	801274	SUMMER	PURSE-SEINE	P
19-Jul-18	5	1153	2	W LANTAU	2	63	ON	HKLR	811488	802323	SUMMER	NONE	S
19-Jul-18	6	1202	1	W LANTAU	2	4	ON	HKLR	811479	801158	SUMMER	NONE	P
2-Aug-18	1	1023	20	W LANTAU	3	96	ON	HKLR	816900	803788	SUMMER	NONE	P
2-Aug-18	2	1115	1	W LANTAU	3	263	ON	HKLR	815031	802331	SUMMER	NONE	S
2-Aug-18	3	1131	2	W LANTAU	3	200	ON	HKLR	814342	803597	SUMMER	NONE	S
2-Aug-18	4	1215	2	W LANTAU	3	188	ON	HKLR	811489	801870	SUMMER	NONE	P
2-Aug-18	5	1243	1	W LANTAU	3	ND	OFF	HKLR	810471	801445	SUMMER	NONE	
2-Aug-18	6	1329	2	W LANTAU	3	ND	OFF	HKLR	807086	799931	SUMMER	NONE	
9-Aug-18	1	1029	3	W LANTAU	3	139	ON	HKLR	815496	802806	SUMMER	NONE	P
9-Aug-18	2	1055	3	W LANTAU	3	71	ON	HKLR	813955	803308	SUMMER	NONE	S
9-Aug-18	3	1125	4	W LANTAU	2	192	ON	HKLR	811753	802592	SUMMER	NONE	S
9-Aug-18	4	1130	2	W LANTAU	3	218	ON	HKLR	811478	801993	SUMMER	NONE	P
9-Aug-18	5	1158	11	W LANTAU	3	78	ON	HKLR	810327	801300	SUMMER	NONE	P
9-Aug-18	6	1238	1	W LANTAU	2	101	ON	HKLR	809343	801009	SUMMER	NONE	P
9-Aug-18	7	1250	2	W LANTAU	2	366	ON	HKLR	809445	799896	SUMMER	NONE	P
9-Aug-18	8	1311	3	W LANTAU	2	40	ON	HKLR	808336	800677	SUMMER	NONE	P
9-Aug-18	9	1334	5	W LANTAU	3	131	ON	HKLR	807351	800437	SUMMER	NONE	P
9-Aug-18	10	1404	3	W LANTAU	3	118	ON	HKLR	806118	801775	SUMMER	NONE	S

Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in June-August 2018

ID#	DATE	STG#	AREA
CH113	04/06/18	1	W LANTAU
CH238	04/06/18	2	W LANTAU
NL49	02/08/18	5	W LANTAU
NL98	09/08/18	2	W LANTAU
NL123	09/08/18	9	W LANTAU
NL145	09/08/18	1	W LANTAU
NL156	09/08/18	9	W LANTAU
NL210	09/08/18	4	W LANTAU
NL212	10/07/18	2	W LANTAU
	09/08/18	6	W LANTAU
	09/08/18	8	W LANTAU
NL226	20/06/18	2	W LANTAU
NL233	02/08/18	1	W LANTAU
NL236	10/07/18	1	W LANTAU
NL269	19/07/18	5	W LANTAU
	09/08/18	5	W LANTAU
NL279	04/06/18	1	W LANTAU
	02/08/18	1	W LANTAU
NL280	02/08/18	1	W LANTAU
NL299	10/07/18	1	W LANTAU
NL302	02/08/18	1	W LANTAU
NL303	09/08/18	2	W LANTAU
NL313	04/06/18	1	W LANTAU
NL317	02/08/18	1	W LANTAU
NL327	19/07/18	1	W LANTAU
NL329	02/08/18	1	W LANTAU
NL330	04/06/18	2	W LANTAU
	10/07/18	1	W LANTAU
SL60	09/08/18	5	W LANTAU
WL28	02/08/18	3	W LANTAU
WL42	04/06/18	1	W LANTAU
WL58	04/06/18	2	W LANTAU
WL61	10/07/18	4	W LANTAU
WL68	04/06/18	1	W LANTAU
	04/06/18	2	W LANTAU
WL69	04/06/18	2	W LANTAU
WL79	02/08/18	1	W LANTAU
WL94	02/08/18	1	W LANTAU
WL98	04/06/18	5	W LANTAU
	10/07/18	2	W LANTAU
	09/08/18	5	W LANTAU
WL100	09/08/18	8	W LANTAU
WL109	04/06/18	1	W LANTAU
WL118	02/08/18	1	W LANTAU
WL120	19/07/18	4	W LANTAU

ID#	DATE	STG#	AREA
WL123	04/06/18	5	W LANTAU
WL128	20/06/18	2	W LANTAU
WL137	10/07/18	4	W LANTAU
	19/07/18	5	W LANTAU
WL152	04/06/18	2	W LANTAU
WL159	02/08/18	1	W LANTAU
WL179	10/07/18	4	W LANTAU
WL188	04/06/18	2	W LANTAU
WL190	19/07/18	4	W LANTAU
WL207	20/06/18	3	W LANTAU
WL211	04/06/18	5	W LANTAU
WL213	10/07/18	3	W LANTAU
WL214	02/08/18	1	W LANTAU
WL218	02/08/18	1	W LANTAU
	09/08/18	4	W LANTAU
WL226	19/07/18	4	W LANTAU
WL227	09/08/18	5	W LANTAU
WL229	09/08/18	5	W LANTAU
WL233	04/06/18	2	W LANTAU
WL245	10/07/18	2	W LANTAU
	09/08/18	9	W LANTAU
WL246	20/06/18	2	W LANTAU
WL250	19/07/18	4	W LANTAU
WL251	02/08/18	1	W LANTAU
WL257	04/06/18	1	W LANTAU
WL267	19/07/18	4	W LANTAU
	02/08/18	1	W LANTAU
WL272	04/06/18	3	W LANTAU
	09/08/18	5	W LANTAU
WL281	02/08/18	5	W LANTAU
WL286	02/08/18	1	W LANTAU
WL288	02/08/18	3	W LANTAU
WL293	19/07/18	1	W LANTAU
	02/08/18	1	W LANTAU
	09/08/18	4	W LANTAU

Appendix IV. Sixty-five individual dolphins that were identified during June to August 2018 under HKLR09 impact phase monitoring surveys



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)

NL269



NL279



NL280



NL299



Appendix IV. (cont'd)



Appendix IV. (cont'd)

NL327



NL329



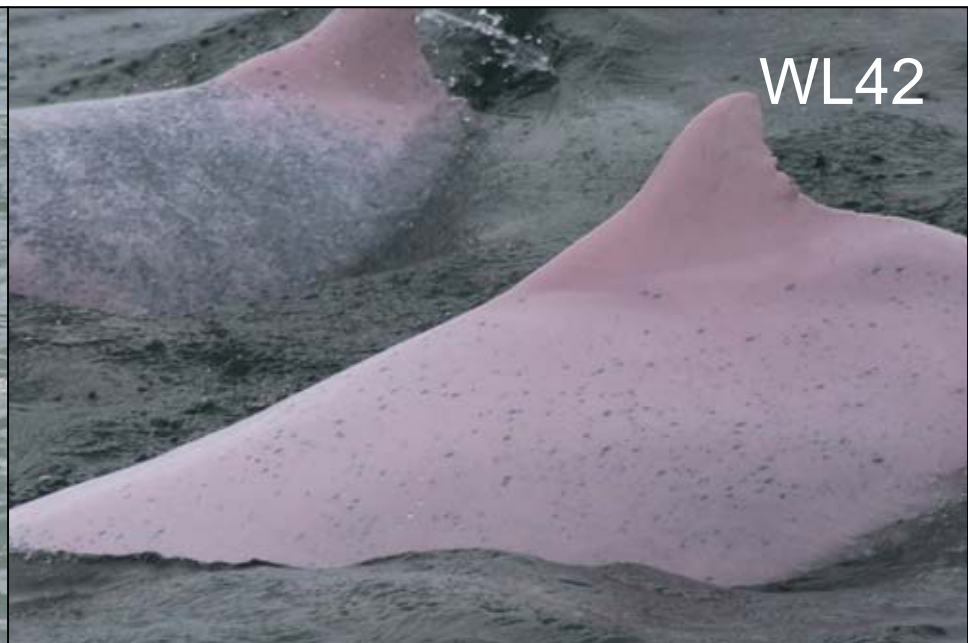
NL330



SL60



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)

WL152



WL159



WL179



WL188



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)



Appendix IV. (cont'd)

WL250



WL251



WL257



WL267



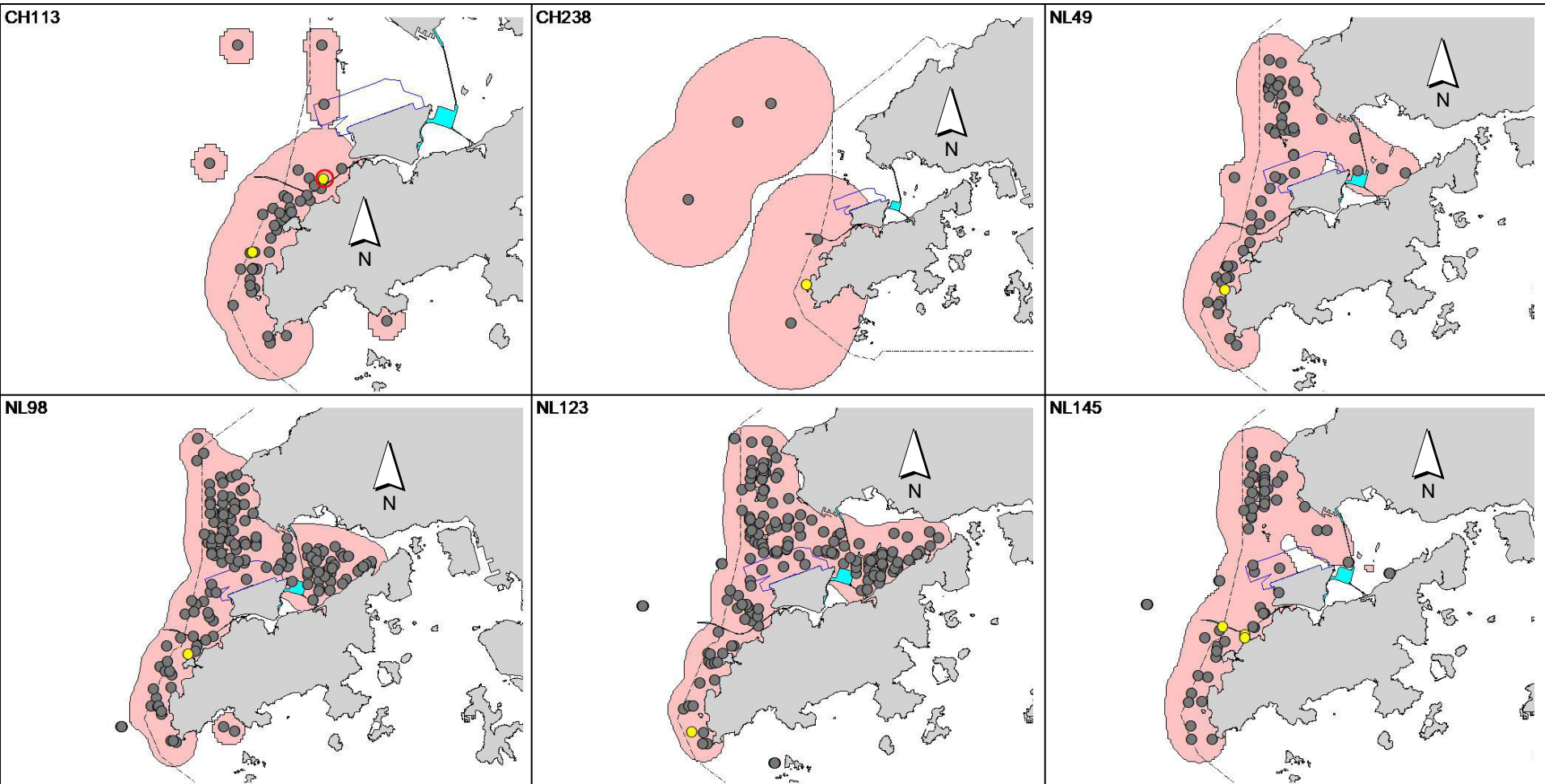
Appendix IV. (cont'd)



Appendix IV. (cont'd)

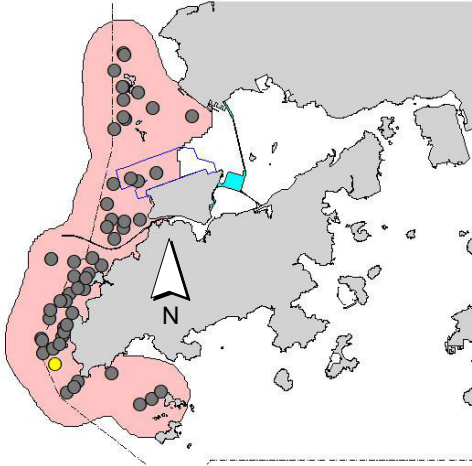


Appendix V. Ranging patterns (95% kernel ranges) of 65 individual dolphins that were sighted during HKLR09 impact phase monitoring period (note: yellow dots indicate sightings made in June-August 2018 during HKLR09 and HKLR03 monitoring surveys; yellow dots with red circles indicate the ones made during HKBCF monitoring surveys)

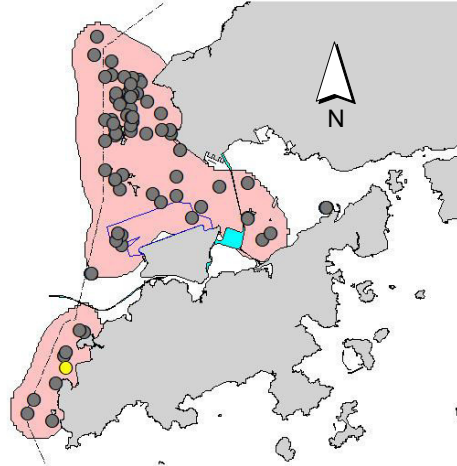


Appendix V. (cont'd)

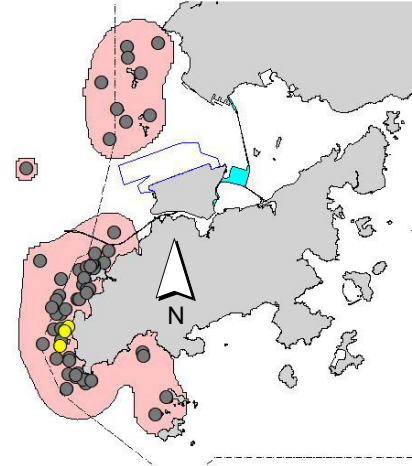
NL156



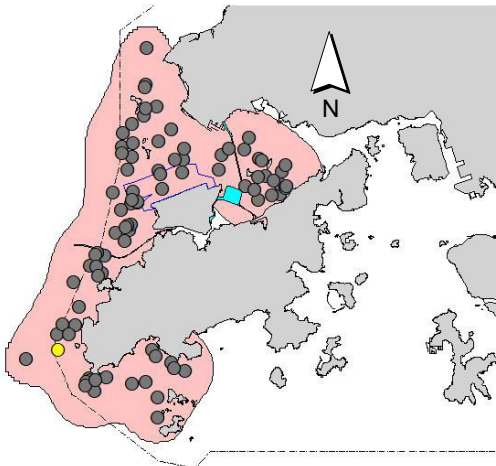
NL210



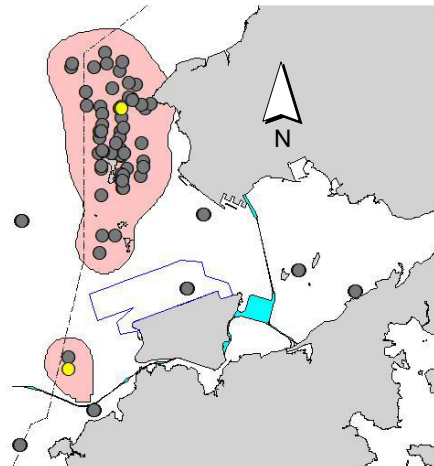
NL212



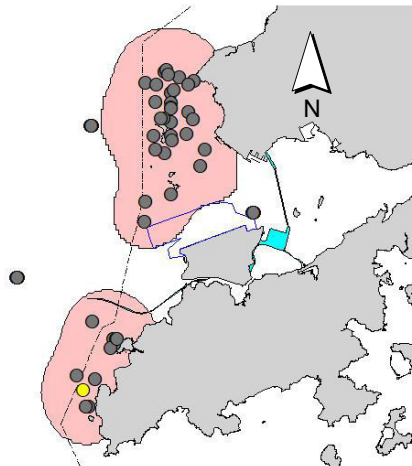
NL226



NL233

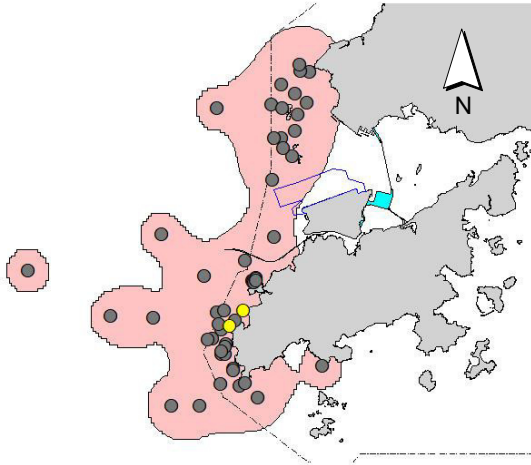


NL236

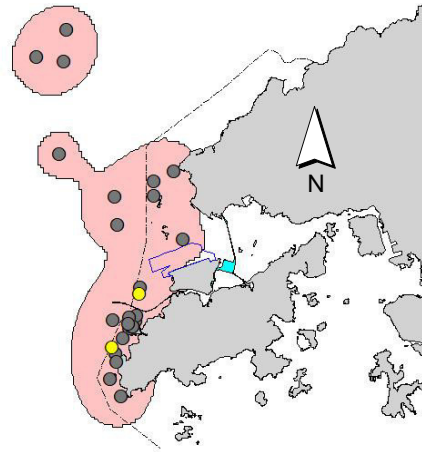


Appendix V. (cont'd)

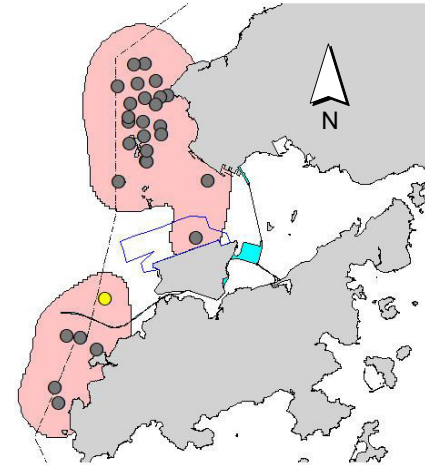
NL269



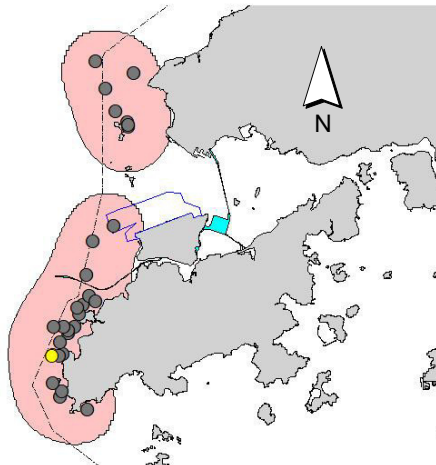
NL279



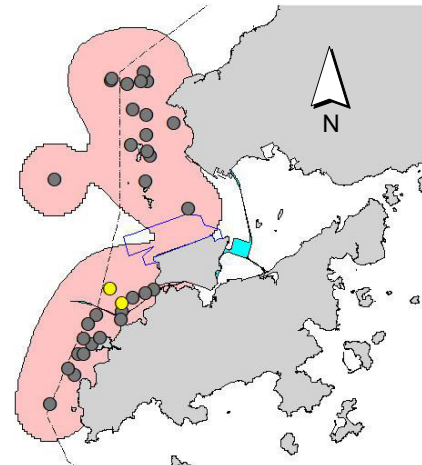
NL280



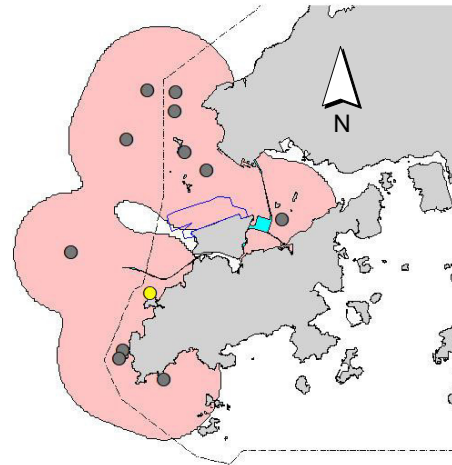
NL299



NL302

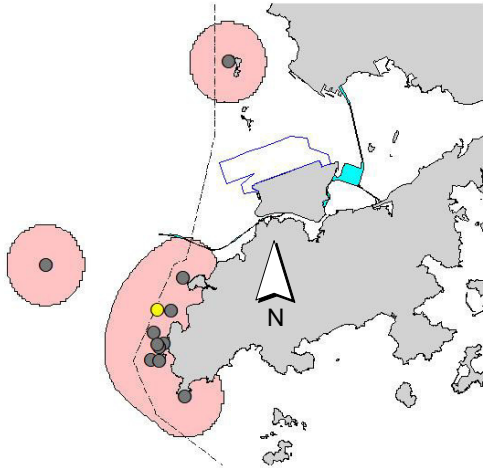


NL303

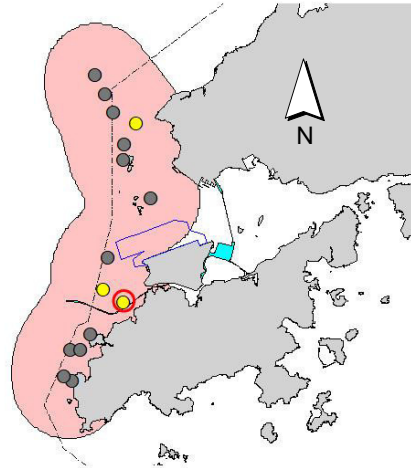


Appendix V. (cont'd)

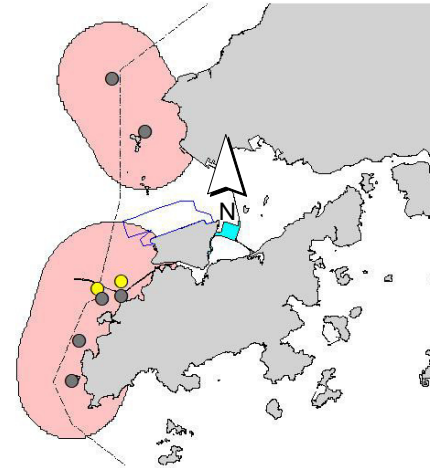
NL313



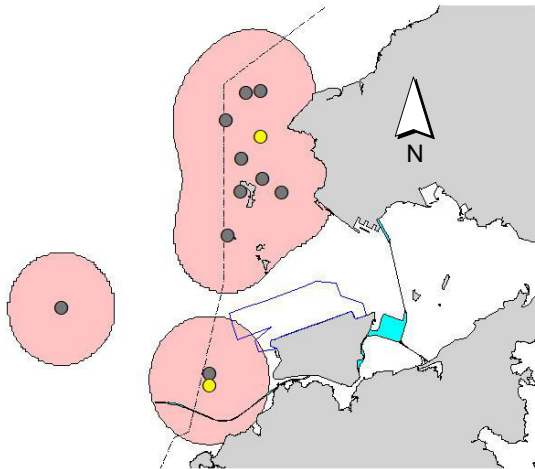
NL317



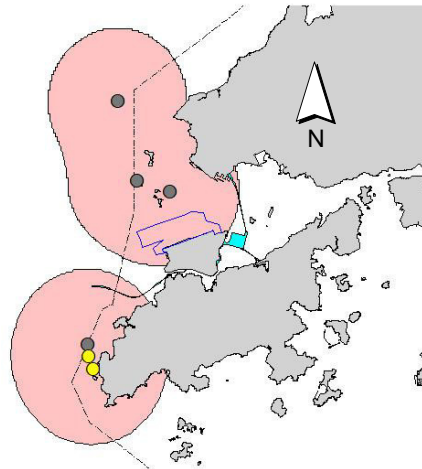
NL327



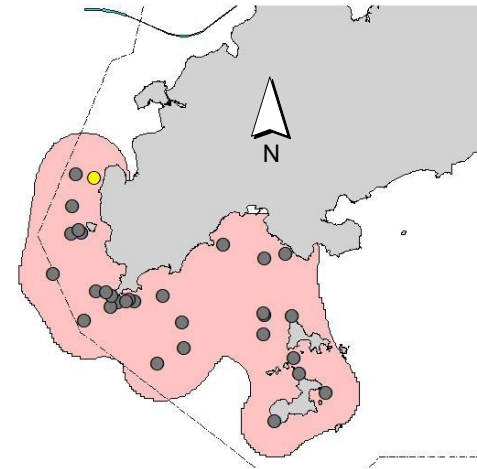
NL329



NL330

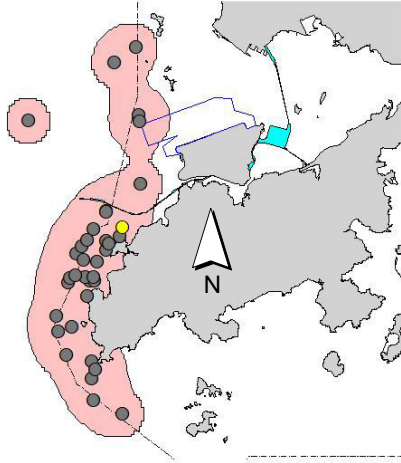


SL60

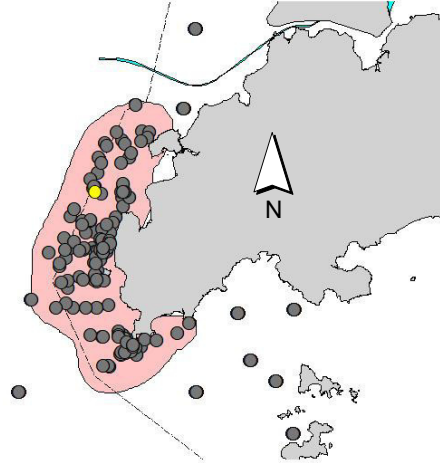


Appendix V. (cont'd)

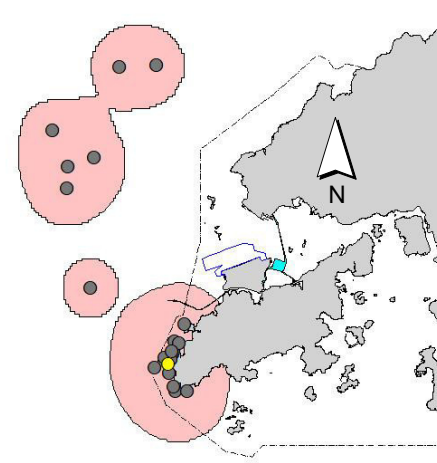
WL28



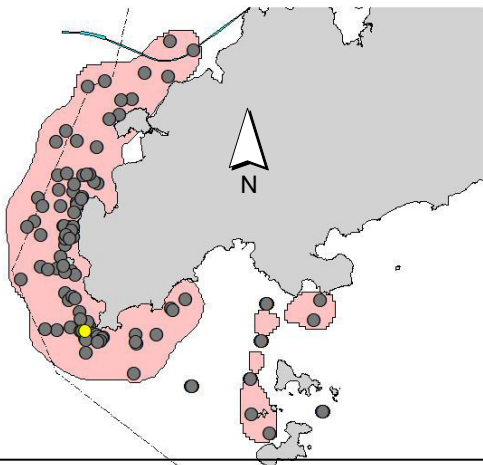
WL42



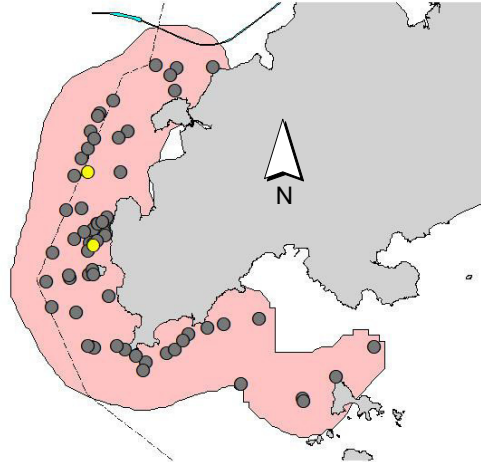
WL58



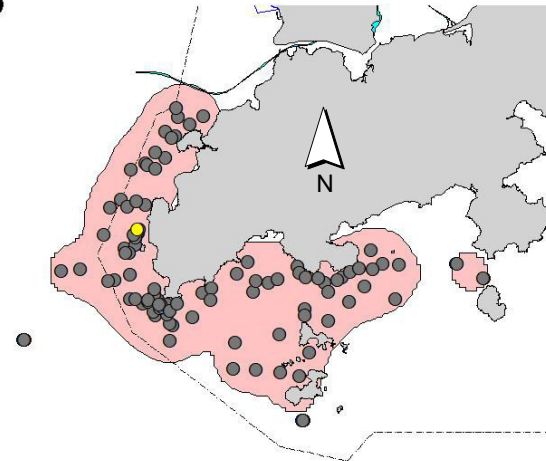
WL61



WL68

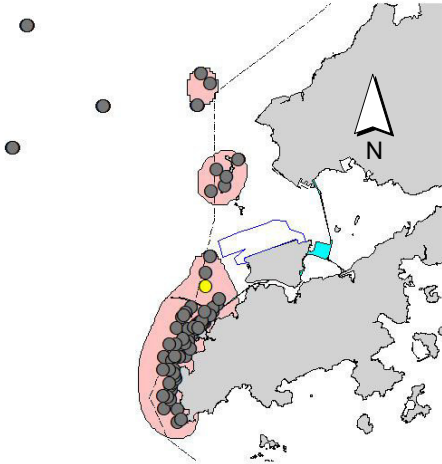


WL69

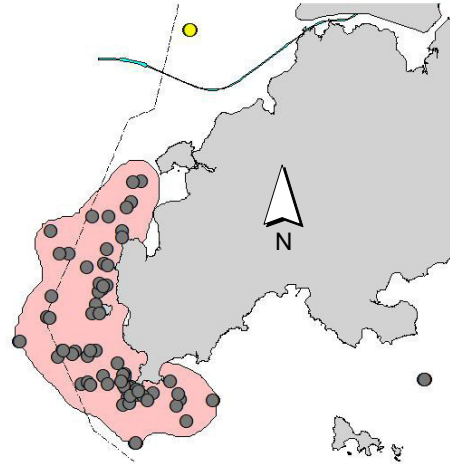


Appendix V. (cont'd)

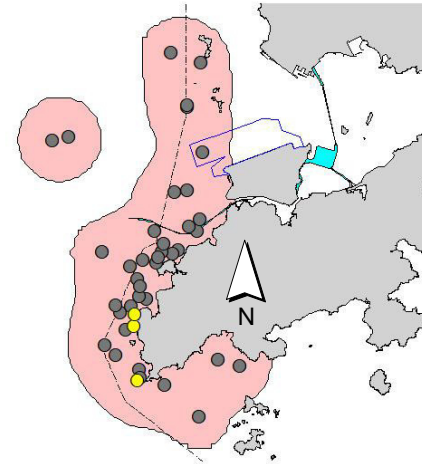
WL79



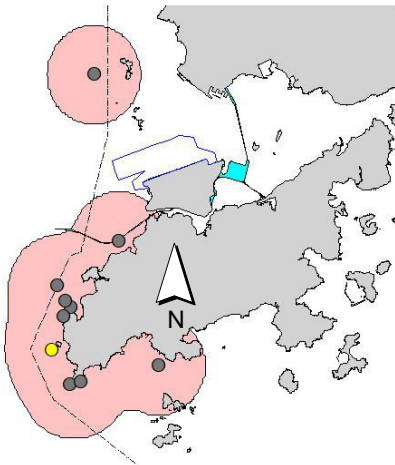
WL94



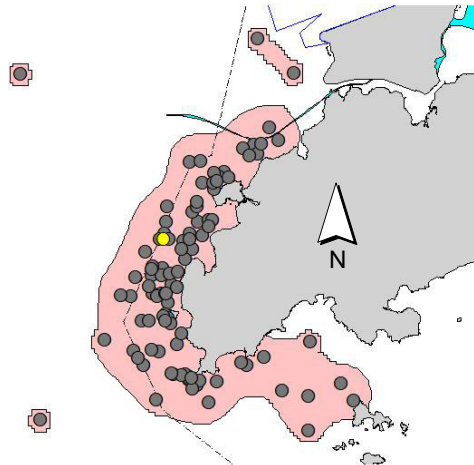
WL98



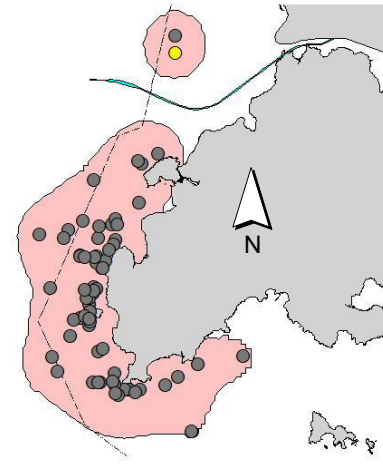
WL100



WL109

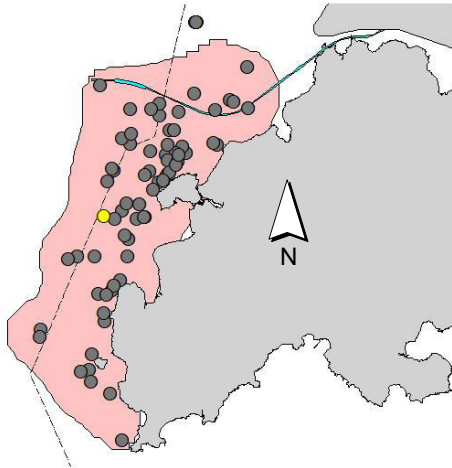


WL118

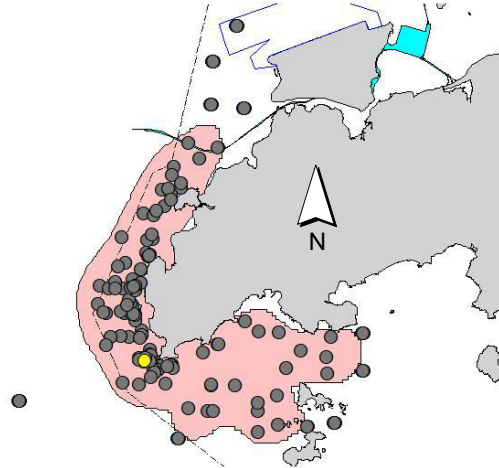


Appendix V. (cont'd)

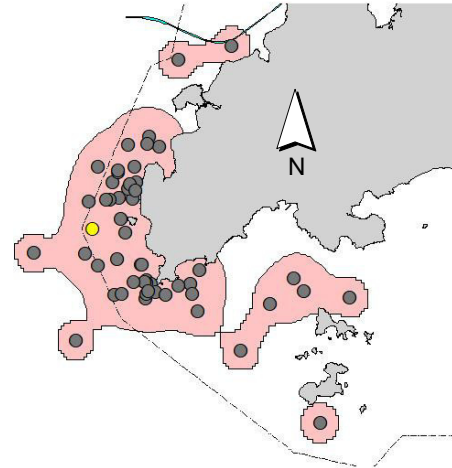
WL120



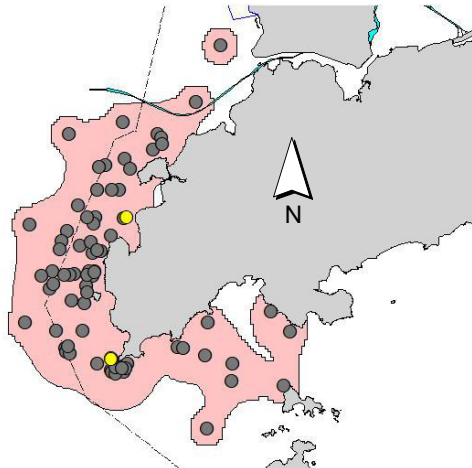
WL123



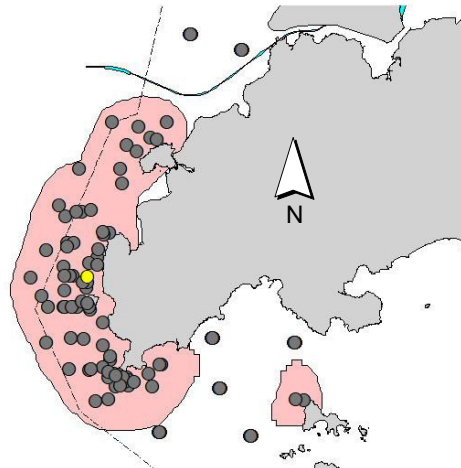
WL128



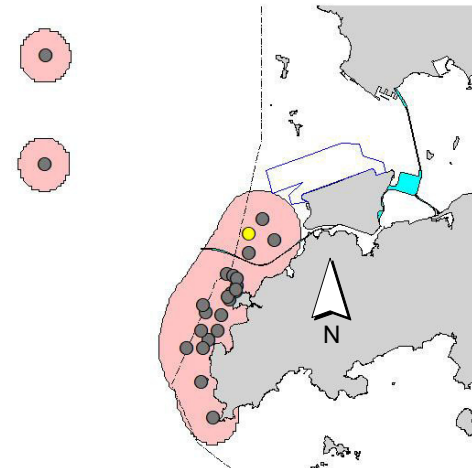
WL137



WL152

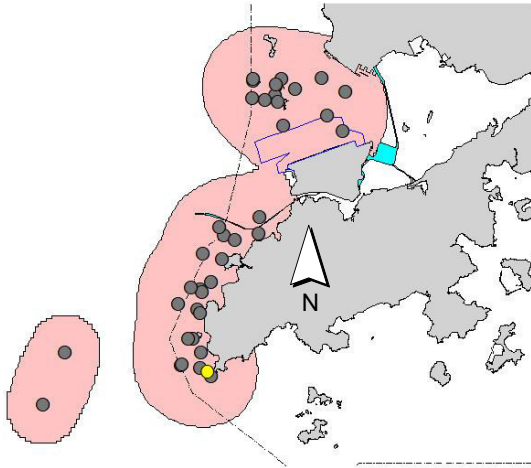


WL159

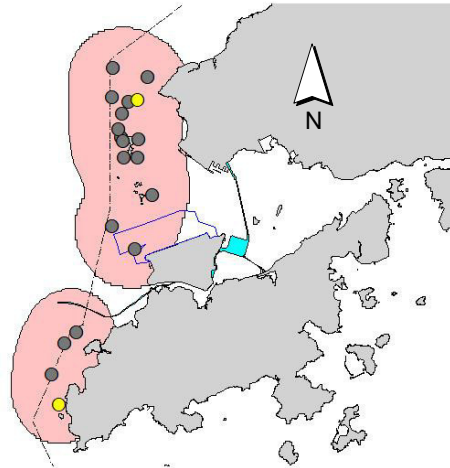


Appendix V. (cont'd)

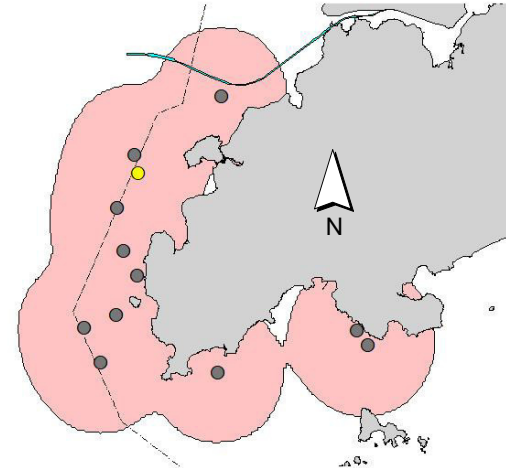
WL179



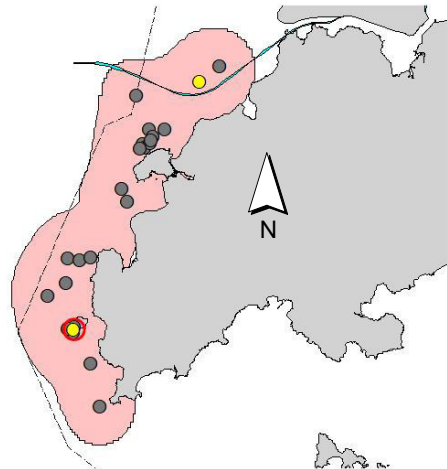
WL188



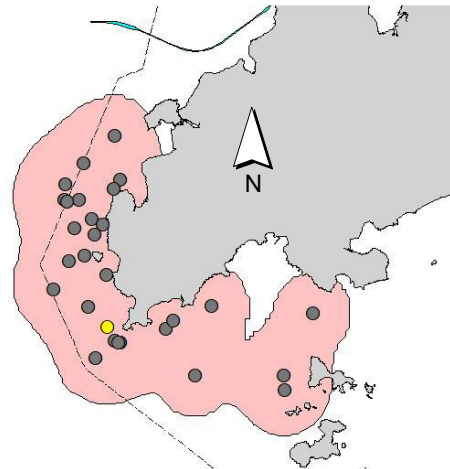
WL190



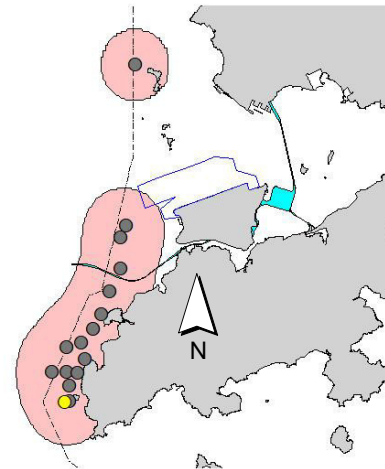
WL207



WL211

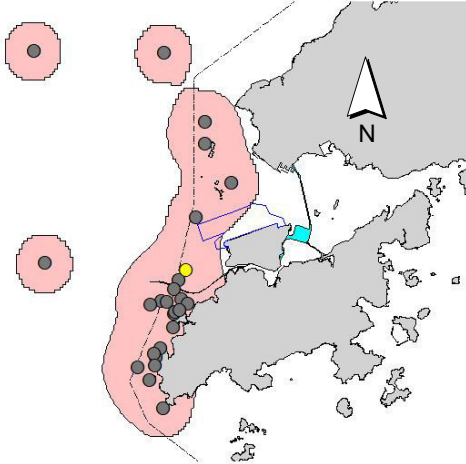


WL213

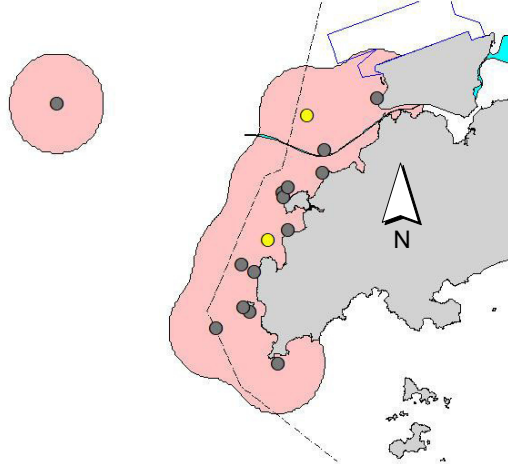


Appendix V. (cont'd)

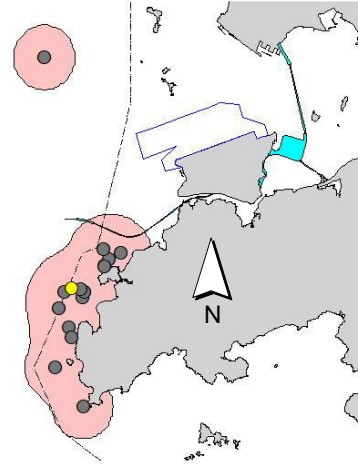
WL214



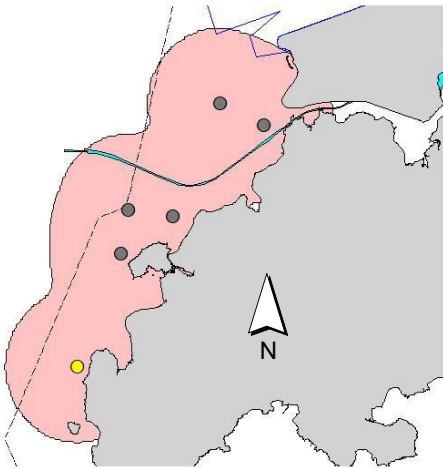
WL218



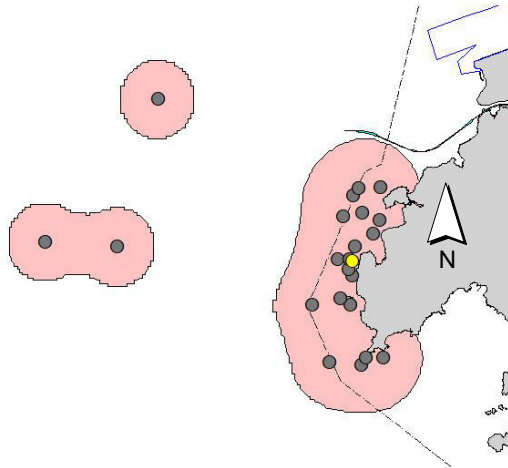
WL226



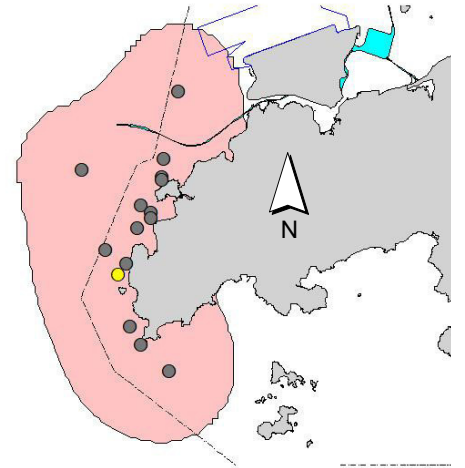
WL227



WL229

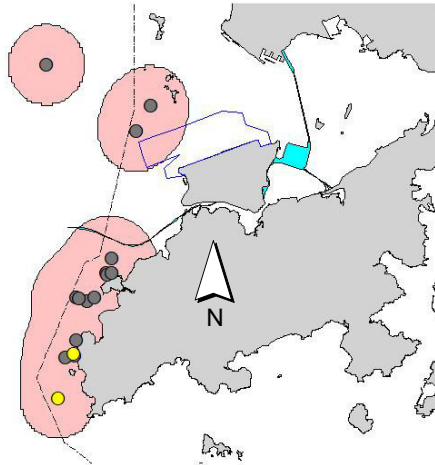


WL233

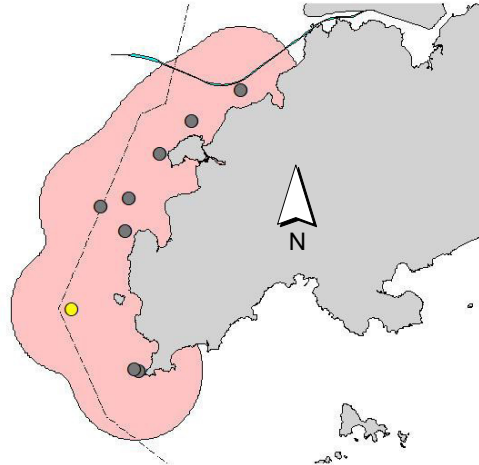


Appendix V. (cont'd)

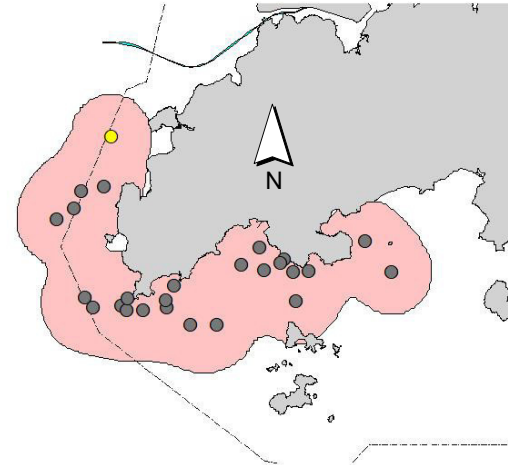
WL245



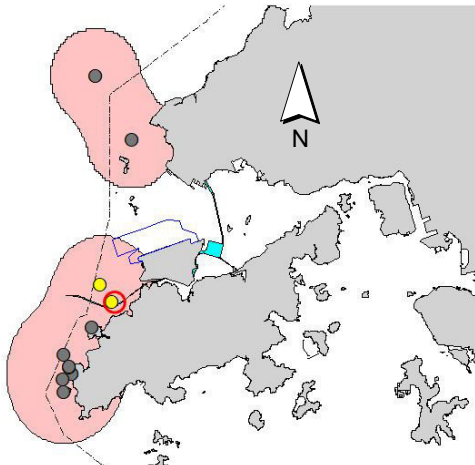
WL246



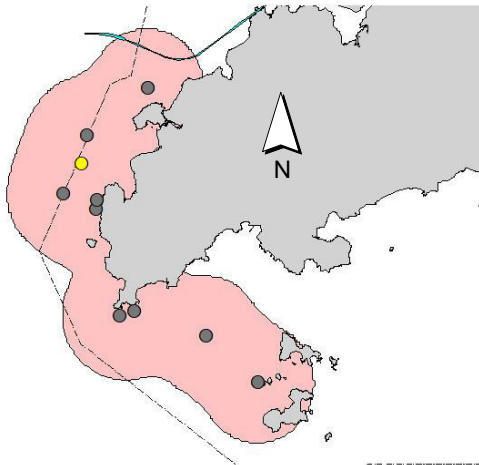
WL250



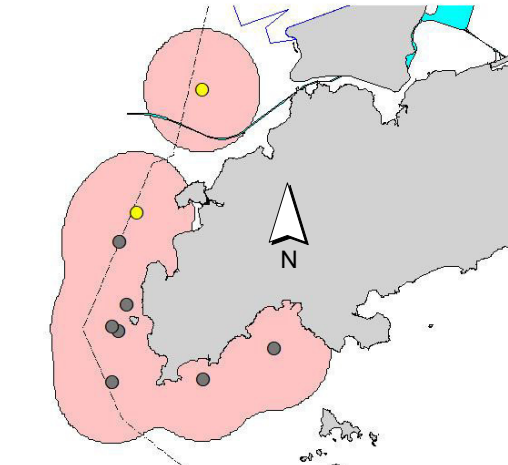
WL251



WL257

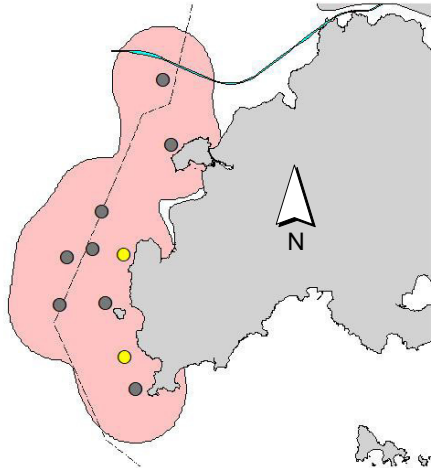


WL267

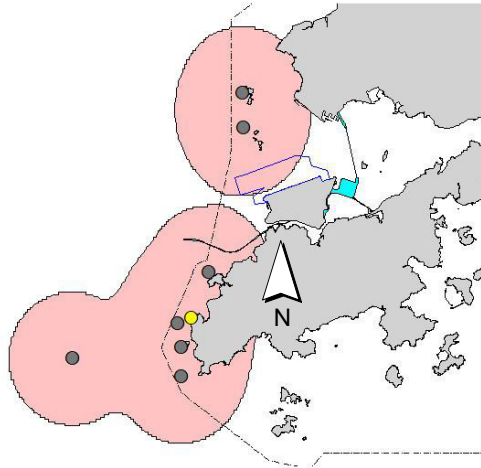


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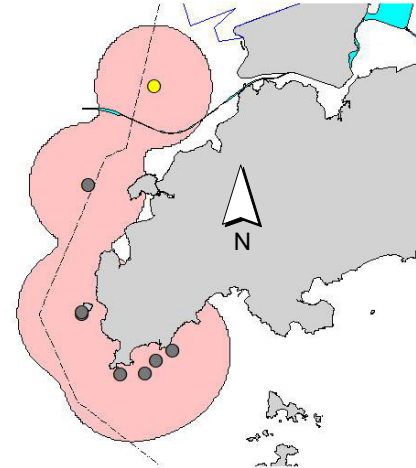
WL272



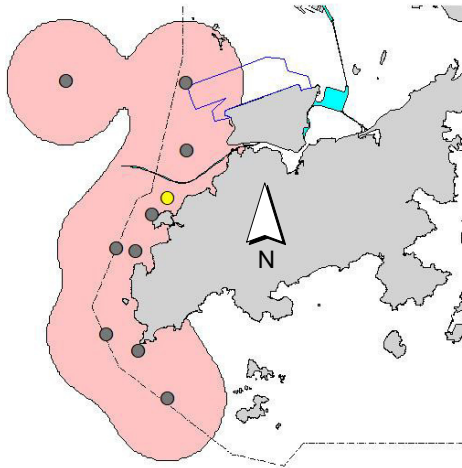
WL281



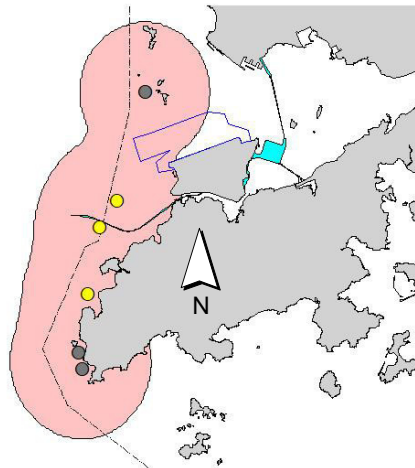
WL286



WL288



WL293



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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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; 	<ol style="list-style-type: none"> 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

	<p>the remedial actions to be taken;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring.</p>	<p>remedial measures.</p>	<p>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.</p>	<p>is abated.</p>
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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	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 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; 	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed 	<ol style="list-style-type: none"> 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
	<p>6. Inform IEC, SO and EPD the causes and actions taken for the exceedances;</p> <p>7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results;</p> <p>8. If exceedance stops, cease additional monitoring.</p>	remedial measures.	<p>noise problem;</p> <p>4. Ensure remedial measures properly implemented;</p> <p>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.</p>	<p>4. Resubmit proposals if problem still not under control;</p> <p>5. Stop the relevant portion of works as determined by the SO until the exceedance is abated.</p>

Event and Action Plan for Water Quality

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

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

Event Action Plan for Dolphin Monitoring

Event	ET Leader	IEC	ER / SOR	Contractor
Action Level	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor. 2. Discuss monitoring results and findings with the ET and the Contractor. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 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 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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. 	<ol style="list-style-type: none"> 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.			
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**APPENDIX H
UPDATED ENVIRONMENTAL
MITIGATION IMPLEMENTATION
SCHEDULE (EMIS)**

[illegible]

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	<ul style="list-style-type: none"> 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	<p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>^</p> <p>^</p>

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	<ul style="list-style-type: none"> 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	<p>N/A</p> <p>N/A</p> <p>N/A</p>
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: <ul style="list-style-type: none"> 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	N/A N/A N/A N/A N/A N/A
S5.5.2.7	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: <ul style="list-style-type: none"> 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	<p>1) Use of good site practices to limit noise emissions by considering the following:</p> <ul style="list-style-type: none"> 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 office 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	<p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p>
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites	Construction stage	^
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m ²), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all	Construction stage	^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
					construction sites		
S6.4.13	N4	4) Select “Quiet plants” which comply with the BS 5228 Part 1 or TM standards.	Reduce the noise levels of plant items	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	^
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	^
	N6	6) Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction stage	^
Waste Management (Construction Waste)							
S8.3.8	WM1	<u>Construction and Demolition Material</u> The following mitigation measures should be implemented in handling the waste: <ul style="list-style-type: none"> • 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
		<p>effectively for recycling purpose, where possible;</p> <ul style="list-style-type: none"> 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 					<p>^</p> <p>^</p> <p>^</p>
S8.3.9 - S8.3.11	WM2	<p><u>C&D Waste</u></p> <ul style="list-style-type: none"> 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 	<p>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</p>	Contractor	All construction sites	Construction stage	<p>^</p> <p>^</p>

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
		<p>practicable, concrete and masonry can be crushed and used as fill.</p> <p>Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.</p>					
S8.2.12- S8.3.15	WM3	<p><u>Chemical Waste</u></p> <ul style="list-style-type: none"> 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	<p>*</p> <p>^</p> <p>^</p> <p>^</p>

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	<u>Sewage</u> <ul style="list-style-type: none"> 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	<u>General Refuse</u> <ul style="list-style-type: none"> 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
		<p>local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided.</p> <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>^</p> <p>N/A</p>
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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
		<p>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.</p> <ul style="list-style-type: none"> silt curtain shall be fully maintained throughout the works. <p>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.</p> <ul style="list-style-type: none"> 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; 					<p>^</p> <p>N/A</p> <p>N/A</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p>

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
		<ul style="list-style-type: none"> 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. 					<p>^</p> <p>^</p> <p>^</p> <p>^</p>
S9.11.1.3	W2	<p><u>Land Works</u></p> <p>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:</p> <ul style="list-style-type: none"> 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	<p>^</p> <p>N/A</p> <p>*</p>

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
		<p>removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks;</p> <ul style="list-style-type: none"> • 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; 					<p>^</p> <p>^</p> <p>^</p> <p>*</p> <p>^</p> <p>^</p> <p>^</p> <p>*</p>

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
		<ul style="list-style-type: none"> wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system. 					<p>^</p> <p>^</p> <p>^</p> <p>N/A</p> <p>^</p> <p>^</p> <p>^</p> <p>^</p>
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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Dolphin watching plan 	habitat loss impact to dolphins			works	^
S10.7	E7	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Strict enforcement of no marine dumping Spill response plan 					^ ^
Landscape & Visual (Construction Phase)							
S14.3.3.3	LV2	Mitigate both Landscape and Visual Impacts <ul style="list-style-type: none"> 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 ^
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
		<ul style="list-style-type: none"> 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. 					<p>^</p> <p>^</p>
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	<p>^</p> <p>^</p> <p>^</p>

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	180605
Date	5 June 2018 (Tuesday)
Time	09:30-11:00

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	
180605-R01	• To clear the accumulated waste at P109 (Portion C).	F 1i, 1iii & 4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180529), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		5 June 2018
Checked by	Dr. Priscilla Choy		6 June 2018

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	180612
Date	12 June 2018 (Tuesday)
Time	09:30-11:00

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	
180612-R01	• Provide drip tray for the chemical container at WA4.	F 8 & 9
180612-R02	• Clear the damaged traffic barrier at WA4.	F 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180605), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		12 June 2018
Checked by	Dr. Priscilla Choy		14 June 2018

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	180619
Date	19 June 2018 (Tuesday)
Time	14:00-16:30

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	
180619-R01	• Provide drip tray for the chemical containers at Portion C.	F 8 & 9
180619-R02	• Clear the accumulated waste at P101.	F 1i & 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180612), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		19 June 2018
Checked by	Dr. Priscilla Choy		21 June 2018

Contract HY/2011/09


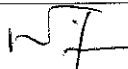
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	180626
Date	26 June 2018 (Tuesday)
Time	09:30-11:00

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	
180626-R01	• To provide NRMM Label for air compressor at P56.	D 26
180626-R03	• To provide sufficient water spray before breaking works at P56 to avoid dust generation.	D 15
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
180626-R02	• To clear the oil stain as chemical waste at P56.	F 8
180626-F04	• Provide drip tray for the chemical containers at Portion C.	F 8 & 9
180626-F05	• Clear the accumulated waste at P101.	F 1i & 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180612), follow up action is needed to be reviewed for item 180619-R01 and 180619-R02.	

	Name	Signature	Date
Recorded by	Kinson Poon		26 June 2018
Checked by	Dr. Priscilla Choy		28 June 2018

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	180703
Date	3 July 2018 (Tuesday)
Time	09:30-11:00

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	
180703-F03	• To provide NRMM Label for air compressor at P56.	D 26
180703-F05	• To provide sufficient water spray before breaking works at P56 to avoid dust generation.	D 15
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
180703-F04	• To clear the oil stain as chemical waste at P56.	F 8
180703-R01	• To provide drip tray for the chemical containers at near P82.	F 8
180703-R02	• To clear the damaged traffic barriers at near P82 and Portion C.	F1i & iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180626), follow up action is needed to be reviewed for item 180626-R01, 180626-R02 and 180626-R03.	

	Name	Signature	Date
Recorded by	Kinson Poon		3 July 2018
Checked by	Dr. Priscilla Choy		5 July 2018

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	180710
Date	10 July 2018 (Tuesday)
Time	09:30-11:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	B. Water Quality	
180710-R02	• Ponding water should be avoided at WA4.	B 8
	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	
180710-R01	• To clear the accumulated waste on the sheet pile at WA4.	F ii & iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180703), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		10 July 2018
Checked by	Dr. Priscilla Choy		12 July 2018

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	180717
Date	17 July 2018 (Tuesday)
Time	14:30-16:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
	• No environmental deficiency was identified during site inspection.	
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
180717-R01	• Housekeeping should be enhanced at Portion C.	F 7
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180710), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		17 July 2018
Checked by	Dr. Priscilla Choy		19 July 2018

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	180724
Date	24 July 2018 (Tuesday)
Time	09:30-11:00

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	
180724-R01	• NRMM labels should be provided for the generator and the air compressor at P56.	D 26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
180724-R02	• Oil stains at P56 should be properly cleared as chemical waste.	F 8
180724-R03	• To clear the construction waste and set up a proper tree protection zone at near P82.	F 4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180717), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		24 July 2018
Checked by	Dr. Priscilla Choy		25 July 2018

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	180731
Date	31 July 2018 (Tuesday)
Time	09:30-11:00

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	
180731-R01	• To provide a drip tray for the chemical containers at Portion C.	F 9
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180724), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		31 July 2018
Checked by	Dr. Priscilla Choy		2 August 2018

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	180807
Date	7 August 2018 (Tuesday)
Time	09:30-11:00

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	
180807-R02	• To provide NRMM Label for the forklift at WA4.	D 26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
180807-R01	• To clear the accumulated waste at WA4.	F 1i & 1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180731), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		7 August 2018
Checked by	Dr. Priscilla Choy		9 August 2018

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	180814
Date	14 August 2018 (Tuesday)
Time	09:30-11:00

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	
180814-R01	• Properly clear the rubbish at near the water barrier at P84.	F 1i & 1iii
180814-R02	• Regular clear the construction wastes at P109 to avoid accumulation.	F 4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180807), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Ivy Tam		14 August 2018
Checked by	Dr. Priscilla Choy		16 August 2018

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	180821
Date	21 August 2018 (Tuesday)
Time	14:30-16:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	Remarks/Observations	Related Item No.
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
180821-R01	• To provide NRMM Label for the forklift at WA4.	D 26
	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.:180814), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		21 August 2018
Checked by	Dr. Priscilla Choy		23 August 2018

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	180828
Date	28 August 2018 (Tuesday)
Time	09:30-11:00

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	
180828-R01	• To clear the unknown liquid on the ground as chemical waste at P56.	F 6
180828-R02	• To provide drip tray for the chemical container at P56.	F 8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:180821), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Kinson Poon		28 August 2018
Checked by	Dr. Priscilla Choy		30 August 2018

**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 2018 (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	11.452	0.000	0.000	0.917	10.498	0.037	0.178	0.994	0.000	0.000	0.683
Feb	7.071	0.000	0.000	0.000	7.006	0.064	0.018	0.898	0.000	0.000	0.325
Mar	3.555	0.000	0.000	0.000	1.592	1.964	0.003	1.115	0.000	0.000	0.156
Apr	1.465	0.000	0.000	0.000	1.219	0.246	0.012	0.571	0.000	0.000	0.163
May	2.635	0.000	0.000	0.000	2.635	0.000	0.032	0.620	0.000	0.000	0.072
Jun	0.966	0.000	0.000	0.000	0.966	0.000	0.002	0.727	0.000	0.530	0.072
Sub-Total	27.144	0.000	0.000	0.917	23.916	2.311	0.244	4.925	0.000	0.530	1.469
Jul	0.116	0.000	0.000	0.000	0.052	0.063	0.004	0.804	0.000	0.000	0.163
Aug	0.010	0.000	0.000	0.000	0.000	0.010	0.008	0.802	0.000	0.000	0.124
Sep											
Oct											
Nov											
Dec											
Total	27.270	0.000	0.000	0.917	23.968	2.385	0.257	6.531	0.000	0.530	1.755



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)
360.000	0.000	5.000	110.000	180.000	65.000	6.500	60.000	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 m³. (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/m³ and 1.8 tonnes/m³ respectively.
- (7) Assuming the loading quantities of a 30-tonne truck and a 24-tonne truck are 8.0m³ and 6.5m³ respectively.
- (8) The forecast 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/m³.
- (11) The C&D materials were delivered to XRL 8217, HY/2012/08, HK/2009/02 Projects and Tailor Recycled Aggregates Limited.
- (12) Figure highlighted in RED color is revised for previous month.

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)	19	0	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	0	0	0	0

**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 (around 8:45a.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
			<p>April 2013 (Com-2013-04-001).</p> <p>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.</p>	<p>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.</p> <p>The following mitigation measures have been implemented by DCVJV:</p> <ul style="list-style-type: none"> • 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 17 th 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.	<p>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.</p> <p>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.</p> <p>On 30 July 2013, no tug boat and concrete lorry mixers were observed during the inspection.</p> <p>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.</p> <p>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</p>	

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				<p>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.</p> <p>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.</p>	
Com-2013-11-001	Chek Lap Kok (CLK) South Road	16 November 2013	The complaint was received by project customer services on 16 th November 2013 regarding the dust problem at Chek Lap Kok (CLK) South Road.	<p>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:-</p> <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> 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 3 rd 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
				<p>conditions may lead to cancellation of the permit, subsequent prosecution action and the Authority's refusal to issue further permit.</p> <p>In addition, the following environmental mitigation measures were recommended:</p> <ul style="list-style-type: none"> • 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
				<p>mitigation measures.</p> <p>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):-</p> <ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> • 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 1 st 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
				<p>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:</p> <ul style="list-style-type: none"> · 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)	<p>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.</p> <p>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.</p> <p>However, there is no significant increase of cetacean stranding were found in Hong Kong since the commencement of Contact No. HY/2011/09.</p> <p>In regard to the complaint, the following recommendations were made:</p>	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				<ul style="list-style-type: none"> ➤ In case stranded cetaceans are found, the AFCD shall be contacted immediately and provide the following information to facilitate AFCD's investigation: <ol style="list-style-type: none"> 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.	<p>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.</p> <p>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.</p>	
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.	<p>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.</p> <p>EPD and AFCD provided their comments on 5 and 9 June 2014 respectively.</p> <p>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.</p>	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: <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • 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. <ul style="list-style-type: none"> To maintain the surface of ro-ro-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 ro-ro-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 ro-ro barge and marine littering were suspected. The following recommendations were made: <ul style="list-style-type: none"> ➤ 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 ro-ro 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 ro-ro 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 ro-ro-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 ro-ro-barge. ➤ Provide spare and sufficient sand bags at each ro-ro barges to confine the concerned area in the event of accidental spillage of concrete when discharge the concrete from the concrete lorry mixers to pump truck. ➤ Provide absorptive materials to absorb the wastewater in case of accidental spillage of wastewater	

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

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			east side had disturbed the seabed causing an increase of turbidity in marine waters at around noon of 15 November 2014.	<p>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.</p> <p>3) No illegally discharge of wastewater or domestic wastewater to the sea from FCBP.</p> <p>4) Relevant environmental mitigation measures as shown in EP-352/2009/C were properly implemented.</p> <p>5) No deterioration of marine water quality based on the marine water quality monitoring results on 15 November 2014.</p> <p>Nevertheless, DCVJV was also recommended the mitigation measures as below:</p> <ul style="list-style-type: none"> • 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

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				regularly regarding the water quality mitigation measures and waste management to increase their awareness of environmental protection.	
Com-2014-12-002	Site Office of HZMB-HKLR – Section between HKSAR Boundary and Scenic Hill	2 December 2014	Highways Department (HyD) received a public complaint from a resident of Le Bleu Duex on 2 December 2014. According to the email from ARUP dated 3 December 2014, the complainant advised that the noise nuisance due to the metal parts were dropped onto the ground by people repetitively and loading or unloading a boat at the pier. The complaint was quoted, “A resident living in Le Bleu Duex addressed a complaint to CE of HyD at about 20:04 hrs last night. He complained about the noise nuisance coming from site office since 19:30 hrs last night. Repetitively metal parts had been dropped on the ground by people who seem to	Based on the information collected, the noise generated is considered due to the metal parts were dropped onto the ground at the seashore area near Le Bleu Duex. The metal pipe was unloaded at non-designated area and no powered mechanical equipment was used for unloading works at WA6 during restricted hour. The Contractor was reminded to take sufficient noise mitigation measures to minimize the environmental impact on the nearby community as recommended in the approved EIA report and the specific mitigation measures for the complaint including but not limited to:- <ul style="list-style-type: none"> • To place wooden planks or rubber mats on ground for loading and unloading heavy or metal objects; and • To deploy professional personnel to 	Closed

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
			<i>be loading or unloading a boat at the pier. Noise was still going on right now at 20:04.”</i>	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.	<p>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.</p> <p>Nevertheless, DCVJV was also recommended the mitigation measures as below:</p> <ul style="list-style-type: none"> • 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	<p>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.</p> <p>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).</p> <p>The Contractor was reminded to obtain Construction Noise Permit (CNP) for PME use in restricted hours.</p> <p>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:-</p> <ul style="list-style-type: none"> • 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 <ul style="list-style-type: none"> 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
				<ul style="list-style-type: none"> •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.	<p>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.</p> <p>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</p>	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.