Your ref -
Our ref 214487/(HY/2011/09)/M45/630/B 26739

ARUP

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

www.arup.com

BY HAND

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

B26739

For the attention of Mr LO Kam Wah, Alfred

15 January 2018

Dear Sir

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

Submission under Environmental Permit (EP-352/2009/D – Condition 4.4)
Monthly EM&A Report – December 2017

On behalf of HyD/HZMB Project Management Office (the Permit Holder) of the captioned Environmental Permit (EP), I submit herewith three hard copies and one electronic copy (two hard copies and one electronic copy to EPD Wanchai, one hard copy to EPD Quarry Bay) of the Monthly EM&A Report for December 2017 as per Condition 4.4 of EP-352/2009/D.

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

Yours faithfully

Michael Chan
CRE / Supervising Officer's Representative

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

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

DS/JC/mw
DS

Ref.: HYDHZMBEEM00_0_6158L.18

15 January 2018

By Fax (3767 5922) and By Post

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

Attention: Mr. Colin Meadows / Mr. Michael Chan

Dear Sirs,

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

Contract No. HY/2011/09 HZMB Hong Kong Link Road –
Section between HKSAR Boundary and Scenic Hill
Revised Monthly EM&A Report for December 2017 (EP-352/2009/D)

Reference is made to the captioned Report (Version 2.0) certified by the Environmental Team Leader (ETL) received on 12 January 2018.

We have no adverse comments on the captioned Report and verify it in accordance with Condition 4.4 of EP-352/2009/D. The ETL shall be aware that the verification to the captioned report does not release ETL's obligations to comply with the EM&A Manual and the approved monitoring methodologies. The ETL is also reminded that it is the ET's responsibility to timely submit the report to the Authority and ensure the reported information to be true, valid and correct as per the EPs.

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

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

Antony Wong
Independent Environmental Checker
Hong Kong Link Road

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

Internal: DY, YH, ENPO Site

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\HYDHZMBEMM00_0_6158L.18.doc

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

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

Monthly EM&A Report

December 2017
(Version 2.0)

Certified By

Dr. Priscilla Choy
Environmental Team Leader
(Date: 12 January 2018)

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

TABLE OF CONTENTS

Page

EXECUTIVE SUMMARY 1

Introduction 1
Environmental Monitoring and Audit Progress 1
Breaches of Action and Limit Levels 2
Future Key Issues 3

1 INTRODUCTION 5

Purpose of the report 5
Structure of the report 5

2 CONTRACT INFORMATION 6

Background 6
Contract Organisation 7
Construction Programme 8
Summary of Construction Works Undertaken During Reporting Month 8
Status of Environmental Licences, Notification and Permits 10

3 AIR QUALITY MONITORING 12

Monitoring Requirements 12
Monitoring Location 12
Monitoring Equipment 12
Monitoring Parameters, Frequency and Duration 12
Monitoring Methodology and QA/QC Procedure 13
1-hour and 24-hour TSP Air Quality Monitoring 13
Instrumentation 13
HVS Installation 13
Filters Preparation 13
Operating/Analytical Procedures 13
Results and Observations 14
Event and Action Plan 15

4 NOISE MONITORING 16

Monitoring Requirements 16
Monitoring Location 16
Monitoring Equipment 16
Monitoring Parameters, Frequency and Duration 16
Monitoring Methodology and QA/QC Procedures 17
Maintenance and Calibration 17
Results and Observations 17
Event and Action Plan 18

5 WATER QUALITY MONITORING 19

Monitoring Requirements 19
Monitoring Locations 19
Monitoring Equipment 20
Monitoring Parameters, Frequency 22
Monitoring Methodology 22
Instrumentation 22
Operating/Analytical Procedures 23
Laboratory Analytical Methods 23

QA/QC Requirements 23
Maintenance and Calibration 24
Results and Observations 24
Event and Action Plan 25

6 DOLPHIN-RELATED MONITORING 26

Monitoring Requirements 26

DOLPHIN MONITORING (LINE-TRANSECT VESSEL SURVEY) 26

Monitoring Requirements 26
Monitoring Location 26
Monitoring Frequency 27
Monitoring Day 27
Monitoring Results 27

ADDITIONAL LAND-BASED DOLPHIN BEHAVIOUR AND MOVEMENT MONITORING 28

7 ENVIRONMENTAL SITE INSPECTION 29

Site Audits 29
Implementation Status of Environmental Mitigation Measures 29
Advice on the Solid and Liquid Waste Management Status 31

8 ENVIRONMENTAL NON-CONFORMANCE (EXCEEDANCES) 32

Summary of Exceedances 32
Summary of Notification of Summons and Successful Prosecution 32

9 FUTURE KEY ISSUES 33

Key Issues in the Coming Month 33
Monitoring Schedule for the Next Month 34
Construction Programme for the Next Month 34

10 CONCLUSIONS AND RECOMMENDATIONS 35

Conclusions 35
Recommendations 36

LIST OF TABLES

Table I	Summary Table for Monitoring Activities in the Reporting Month
Table II	Summary Table for Events Recorded in the Reporting Month
Table 2.1	Key Contacts of the Contract
Table 2.2	Status of Environmental Licences, Notification and Permits
Table 3.1	Location for Air Quality Monitoring Locations
Table 3.2	Air Quality Monitoring Equipment
Table 3.3	Impact Dust Monitoring Parameters, Frequency and Duration
Table 3.4	Summary Table of 1-hour TSP Monitoring Results during the Reporting Month
Table 3.5	Summary Table of 24-hour TSP Monitoring Results during the Reporting Month
Table 3.6	Observation at Dust Monitoring Stations
Table 4.1	Location for Noise Monitoring Locations
Table 4.2	Noise Monitoring Equipment
Table 4.3	Noise Monitoring Parameters, Frequency and Duration
Table 4.4	Summary Table of Noise Monitoring Results during the Reporting Month
Table 4.5	Observation at Noise Monitoring Stations
Table 5.1	Location for Marine Water Quality Monitoring Locations
Table 5.2	Water Quality Monitoring Equipment
Table 5.3	Water Quality Monitoring Parameters and Frequency
Table 5.4	Methods for Laboratory Analysis for Water Samples
Table 5.5	Summary of Water Quality Exceedances
Table 6.1	Co-ordinates of transect lines in WL survey area
Table 6.2	Dolphin encounter rates (sightings per 100 km of survey effort) in December's surveys
Table 7.1	Observations and Recommendations of Site Audit

LIST OF FIGURE

Figure 1a-d	Site Layout Plan
Figure 2	Project Organisation for Environmental Works
Figure 3	Locations of Air Quality, Noise and Wind Monitoring Stations
Figure 4	Locations of Water Quality Monitoring Stations

LIST OF APPENDICES

Appendix A Construction Programme
Appendix B Action and Limit Levels
Appendix C Copies of Calibration Certificates
Appendix D Environmental Monitoring Schedules
Appendix E 1-hour TSP Monitoring Results
Appendix F 24-hour TSP Monitoring Results
Appendix G Noise Monitoring Results
Appendix H Water Quality Monitoring Results
Appendix I Dolphin Monitoring Report (Line Transect)
Appendix J Wind Data
Appendix K Event Action Plans
Appendix L Summary of Exceedance
Appendix M Site Audit Summary
Appendix N Updated Environmental Mitigation Implementation Schedule
Appendix O Waste Generation in the Reporting Month
Appendix P Complaint Log
Appendix Q Summary of Successful Prosecutions

EXECUTIVE SUMMARY

Introduction

1. This is the 59th monthly 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 conducted in December 2017.

Environmental Monitoring and Audit Progress

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

Table I Summary Table for Monitoring Activities in the Reporting Month

Parameter(s)	**Date(s)**
1-hr TSP Monitoring	4th, 8th, 14th, 20th, 26th and 30th December 2017
24-hr TSP Monitoring	4th, 8th, 14th, 20th, 26th and 30th December 2017
Noise Monitoring	5th, 15th, 21st and 27th December 2017
Water Quality Monitoring	2nd, 4th, 6th, 8th, 12th, 14th, 16th, 18th, 20th, 22nd, 26th, 28th and 30th December 2017
Dolphin Monitoring (Line-transect Vessel Surveys)	4th and 21st December 2017
Environmental Site Inspection	5th, 12th, 19th and 27th December 2017
Archaeological Site Inspection	12th December 2017

Breaches of Action and Limit Levels

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

Table II Summary Table for Events Recorded in the Reporting Month

Environmental Monitoring	Parameter	No. of Exceedance		Total No. of Exceedance	No. of Exceedance related to the Construction Activities of this Contract		Total 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	0	0
	24-hr TSP	0	0	0	0	0	0
Noise	$L_{eq(30min)}$	0	0	0	0	0	0
Water Quality	Dissolved Oxygen (DO) (Surface & Middle)	0	0	0	0	0	0
	Dissolved Oxygen (DO) (Bottom)	0	0	0	0	0	0
	Turbidity	0	0	0	0	0	0
	Suspended Solids (SS)	3	1	4	0	0	0

1-hour TSP Monitoring

4. All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedances were recorded.

24-hour TSP Monitoring

5. All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedances were recorded.

Construction Noise

6. All construction noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

Water Quality

7. All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded.

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

   1) No pollution discharge from construction activity was observed;
   2) Control Station value already exceeded either the Baseline Action or Limit Levels;
   3) Adverse water quality outside the site boundary was observed while no pollution source from this Contract was observed and no construction vessel for this Contract was travelling nearby. Dispersion of sediment plume to the monitoring stations from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was also observed.

Complaint Log

9. No environmental complaint was received in the reporting month.

Notification of Summons and Successful Prosecutions

10. No notification of summons and successful prosecution was received in the reporting month.

Reporting Changes

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

Future Key Issues

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

WA4

- Operation of Asphalt Plant

Ancillary and Associated Facilities

- Breaking off the concrete footings for reinstatement of slope underneath the deck
- Reinstatement of sloping seawall
- Installation of precast parapet facial panel
- Construction of median and side barriers
- Construction of longitudinal stitching
- Sealing of deck openings and preparation deck surface for waterproofing
- Installation of fire hydrants and fire main
- Installation of utility trough covers

- Erection of sign gantry
- Installation of the additional pier number and information signs
- Installation of the headroom sign and vessel length restriction sign
- Installation of the height restriction sign
- Site clearance / formation work to reinstatement of SPR
- Construction of concrete carriageway for Chek Lap Kok South Road realignment*
- Installation of carrier drains
- Installation of watermain
- Laying of asphalt pavement
- Fill slope and road works for Chek Lap Kok South Road realignment*

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

E&M Works

- E&M ducting installation
- E&M works inside SHT building
- Street light cables and poles installation
- Cable hanger installation
- LV and HV cable laying works
- Cable tray installation of SMS system
- Cable laying works for HKPF
- GPS pole installation
- Installation of electrical sliding barrier
- Installation of pile cap lighting
- Installation of radar at radar platform

Removal of Temporary works at P68 - P70

Deck Erection

- Movement joints installation

Turnaround Facilities

- Casting of wingslab
- Casting of roof finishing and ground level finish of mobile telecom equipment room
- Apply waterproof membrane for mobile telecom equipment room
- Dismantling of sling platform, box girder support tower and extended platform
- Installation of Type K1 Kerb for traffic island
- Parapet installation

10m at P0

- Construction of central barrier and side barriers
- Construction of the utility trough

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 59th EM&A report which summarises the impact monitoring results and audit findings for the EM&A programme in December 2017.

Structure of the report

1.3 The structure of the report is as follows:

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

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

Section 3: **Air Quality Monitoring -** summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 4: **Noise Monitoring -** summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 5: **Water Quality Monitoring -** summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations, Action and Limit Levels, monitoring results and Event / Action Plans.

Section 6: **Dolphin-Related Monitoring -** summarises the monitoring parameters, monitoring programmes, monitoring methodologies, monitoring frequency, monitoring locations and monitoring results.

Section 7: **Environmental Site Inspection -** summarises the audit findings of the weekly site inspections undertaken within the reporting month.

Section 8: **Environmental Non-conformance -** summarises any monitoring exceedance, environmental complaints, environmental summons and successful prosecutions within the reporting month.

Section 9: **Future Key Issues -** summarises the impact forecast and monitoring schedule for the next three months.
Section 10: **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	Position	Phone No.	Fax No.
SOR (ARUP)	CRE	Mr. Michael Chan	3767 5803	3767 5922
		Mr. Colin Meadows	3767 5801	
ENPO/IEC (Ramboll Environ)	Environmental Project Office Leader	Mr. Y. H Hui	3465 2888	3465 2899
	Independent Environmental Checker	Mr. Antony Wong	3465 2888	3465 2899
Contractor (DCVJV)	Project Director	Mr. W.K Poon	3121 6638	3121 6688
	Environmental Officer	Mr. CHU Chung Sing	3121 6672	
	24-hour Hotline	--	6898 6161	--
ET (Cinotech)	Environmental Team Leader	Dr. Priscilla Choy	2151 2089	3107 1388

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

Construction Programme

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

Summary of Construction Works Undertaken During Reporting Month

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

Ancillary and Associated Facilities

(a) P115 & P114 interface area - Breaking off the concrete footings for reinstatement of slope underneath the deck is in progress;
(b) Reinstatement of sloping seawall at P94 to P90 and P85 to P87 are in progress;
(c) All precast parapet facial panels were completed and progress of this reporting period is summarized as follows:

Item	Number in this month	Cumulative No. of Precast Parapet Completed (up to 28th of month)
Precast Parapet Facial Panel Casting	73	6906
Precast Parapet Facial Panel Installation	187	6715
In-situ concreting works	561	20145

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

Type	Item	Monthly Workdone	Cumulative Workdone (up to 28th of month)
Central barrier (precast method)	Precast	223	6080
	Installation	366	6070
Central barrier (precast + in-situ method)	In-fill concreting #	883	9105

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

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

Type	Item	Monthly Workdone	Cumulative Workdone (up to 28th of month)
Side barrier (precast method)	Precast	364	6660
	Installation	582	6578
Side barrier (precast + in-situ method)	In-fill concreting #	2062	19732

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

(f) Construction of the longitudinal stitching to all bridges were completed except stitching between ML8 and Ramps;
(g) Sealing of deck openings and preparation of deck surface for waterproofing at ML8 & ML9 and ML10R to ML18L are in progress;
(h) Fire hydrants at P0, P4, P8, P12, P16, P18-P19, P21, P25-P26, P30, P34, P38-P39, P42-P43, P51-P52, P60-P61, P65, P68, P71, P73, P75-P76, P77-P78, P80, P82-P83,

P86, P91, P97, P102-P103, P108-P109 and P112 were installed. Fire main at ML7 and ML8 are in progress;
(i) Installation of utility trough covers are in progress;
(j) Erection of the sign gantries were completed;
(k) Installation of the additional pier number and information signs at ML3 was completed at ML3;
(l) Installation of the additional pier number and information signs at ML4 to ML9 commenced;
(m) Installation of the headroom sign and vessel length restriction sign at ML3 commenced;
(n) Installation of the height restriction sign commenced at ML12;
(o) Construction of concrete carriageway for Chek Lap Kok South Road realignment* were completed;
(p) Site clearance/formation work to the reinstatement of South Perimeter Road between P84 to P81 in progress.

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

E&M Works
(a) E&M ducting installation from ML7;
(b) E&M ducting installation from ML7 to ML10 and ML12 continues;
(c) E&M works inside SHT building is in progress;
(d) Cable hanger installation at M9 and ML10 completed;
(e) Cable hanger installation at ML8 commenced;
(f) Cable hanger installation at ML11, ML12 and ML13 completed;
(g) Street light cables and poles installation at ML1 continues;
(h) LV and HV cable laying works at ML1 to ML6 and ML16 to ML19 completed;
(i) LV and HV cable laying works at ML13 to ML15 continues;
(j) Cable tray installation of SMS system at ML12 and ML13 commenced;
(k) GPS pole installation from ML1 to ML14 continues;
(l) Cable laying works for HKPF at ML1 to ML6 continues;
(m) Installation of electrical sliding barrier between P0 and P1 commenced.

Removal of Temporary Works at P68 - P70
(a) P69 & 70 Jetty Dismantling Works - Removal the temporary jetty in progress (around 25% completed);
(b) P68 Platform Removal Works - Removal of temporary platform has been commenced.

Movement Joint

(a) Overall 40 nos. installed with both nosing casted;
(b) The last movement joint at P115R, is pending for the access road diversion open on the T001 tunnel by the Contract HY/2011/03.

Turnaround Facilities

(a) Roof finishing and ground level finish of mobile telecom equipment room were cast;
(b) Waterproof membrane for mobile telecom equipment room were applied;
(c) Dismantling of sling platform completed;
(d) Dismantling of box girder support tower completed;
(e) Dismantling of extended platform completed;
(f) Type K1 kerb for traffic island installed;
(g) Installation of type III parapet completed.

10m at P0

(a) Extended wing at P0 completed;
(b) Construction of central barrier completed;
(c) Construction of side barriers are in progress.

Road Pavement

Road Pavement	Total (m^2)	Monthly Workdone (m^2)	Cumulative Workdone (m^2)
Base Course	284440	44683	264520
Wearing Course	284440	57981	261264
Friction Course	274688	114035	129530

Status of Environmental Licences, Notification and Permits

2.11 A summary of the relevant permits, licences, and/or notifications on environmental protection for this Contract is presented in **Table 2.2**.

Table 2.2 Status of Environmental Licences, Notification and Permits

Permit / License No.	Valid Period		Status
	From	To	
Environmental Permit (EP)			
EP-352/2009/D	22/12/2014	N/A	Valid
Consruction Noise Permit (CNP)			
P84-P115: GW-RW0847-17	06/10/2017 (19:00)	05/04/2018 (23:00)	Valid
P0-P83: GW-RS0684-17	09/08/2017 (19:00)	08/02/2018 (24:00)	Valid
P94-P100: GW-RS0758-17	07/09/2017 (01:00)	31/12/2017 (05:30)	Valid
PWA4: GW-RW0471-17	08/09/2017 (00:00)	07/03/2018 (24:00)	Valid
Notification pursuant to Air Pollution Control (Construction Dust) Regulation			
345773	04/06/2012	N/A	Receipt acknowledged by EPD
Billing Account for Construction Waste Disposal			
A/C# 7015341 (Construction Site)	11/06/2012	N/A	Valid
Registration of Chemical Waste Producer			
WPN 5213-951-D2499-01	18/07/2012	N/A	Valid
Effluent Discharge License under Water Pollution Control Ordinance			

Permit / License No.	Valid Period		Status
	From	To	
WA6A (DCVJV site office): WT00028521-2017	18/07/2017	30/09/2022	Valid
WA6B (SOR site office): WT00028841-2017	03/08/2017	31/10/2022	Valid
WA3: WT00015118-2013	30/01/2013	31/01/2018	Valid
Portion C: WT00023624-2016	17/02/2016	28/02/2018	Valid
Portion A: WT00016076-2013	21/05/2013	31/05/2018	Valid
WA4B: WT00014750-2012	12/08/2013	31/08/2018	Valid
P114: WT00018631-2014	31/03/2014	31/03/2019	Valid
P81-P83: WT00023608-2016	01/04/2016	31/07/2020	Valid
Specific Process License (SP license) for conduct Tar and Bitumen Works			
WA4: Licence No. L-15-038(1)	31/05/2017	30/05/2020	Valid*

*The license holder is the supplier, ASL.

3 AIR QUALITY MONITORING

Monitoring Requirements

3.1 In accordance with the EM&A Manual, impact 1-hour TSP and 24-hour TSP monitoring were conducted to monitor the air quality for the Contract. **Appendix B** shows the established Action/Limit Levels for the air quality monitoring works.

3.2 Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was conducted for at least once every 6 days at 2 air quality monitoring stations.

Monitoring Location

3.3 Impact air quality monitoring was conducted at the 2 monitoring stations under the Contract, as shown in **Figure 3**. **Table 3.1** describes the locations of the air quality monitoring stations.

Table 3.1 Location for Air Quality Monitoring Locations

Monitoring Stations	Location
AMS1	Sha Lo Wan
AMS4	San Tau

Monitoring Equipment

3.4 **Table 3.2** summarizes the equipment used in the impact air monitoring programme. Copies of calibration certificates are attached in **Appendix C**.

Table 3.2 Air Quality Monitoring Equipment

Equipment	Model and Make	Quantity
HVS Sampler	TISCH Model: TE-5170	2
Calibrator	TISCH Model: TE-5025A	1
Wind Anemometer	DAVIS Model: Vantage Vantage PRO2 6152CUK	1

Monitoring Parameters, Frequency and Duration

3.5 **Table 3.3** summarizes the monitoring parameters and frequencies of impact dust monitoring during the course of the Contract activities. The air quality monitoring schedule for the reporting month is shown in **Appendix D**.

Table 3.3 Impact Dust Monitoring Parameters, Frequency and Duration

Parameters	Frequency
1-hr TSP	Three times / 6 days
24-hr TSP	Once / 6 days

Monitoring Methodology and QA/QC Procedure

1-hour and 24-hour TSP Air Quality Monitoring

Instrumentation

3.6 High Volume Samplers (HVS) completed with appropriate sampling inlets were employed for air quality monitoring. Each sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

HVS Installation

3.7 The following guidelines were adopted during the installation of HVS:

- Sufficient support was provided to secure the sampler against gusty wind.
- No two samplers were placed less than 2 meters apart.
- The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2 meters of separation from walls, parapets and penthouses was required for rooftop samples.
- A minimum of 2 meters separation from any supporting structure, measured horizontally was required.
- No furnaces or incineration flues were nearby.
- Airflow around the sampler was unrestricted.
- The samplers were more than 20 meters from the drip line.
- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
- Permission must be obtained to set up the samples and to obtain access to the monitoring stations; and
- A secured supply of electricity is needed to operate the samplers.

Filters Preparation

3.8 Filter paper of size 8" X 10" was used. A HOKLAS accredited laboratory, ETS – Testconsult Limited (ETS), was responsible for the preparation of 24-hr conditioned and pre-weighed filter papers for Cinotech's monitoring team.

3.9 All filters, which were prepared by ETS, were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ±3 °C; the relative humidity (RH) was < 50% and not variable by more than ±5%. A convenient working RH was 40%.

3.10 ETS has comprehensive quality assurance and quality control programmes.

Operating/Analytical Procedures

3.11 Operating/analytical procedures for the air quality monitoring were highlighted as follows:

- Prior to the commencement of the dust sampling, the flow rate of the HVS was properly set (between 1.1 m^3/min. and 1.4 m^3/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.
- The power supply was checked to ensure the sampler worked properly.
- On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air quality monitoring station.
- The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.
- The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- The shelter lid was closed and secured with the aluminum strip.
- The timer was then programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).
- After sampling, the filter was removed and sent to the ETS for weighing. The elapsed time was also recorded.
- Before weighing, all filters were equilibrated in a conditioning environment for 24 hours. The conditioning environment temperature should be between 25°C and 30°C and not vary by more than ±3°C; the relative humidity (RH) should be < 50% and not vary by more than ±5%. A convenient working RH is 40%. Weighing results were returned to Cinotech for further analysis of TSP concentrations collected by each filter.

Maintenance/Calibration

3.12 The following maintenance/calibration was required for the HVS:

- The high volume motors and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
- All HVS were calibrated (five point calibration) using Calibration Kit prior to the commencement of the baseline monitoring and thereafter at bi-monthly intervals.

Results and Observations

3.13 The monitoring results for 1-hour TSP and 24-hour TSP are summarized in **Table 3.4 and 3.5** respectively. Detailed monitoring results and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices E and F** respectively.

Table 3.4 Summary Table of 1-hour TSP Monitoring Results during the Reporting Month

Monitoring Station	Concentration (µg/m3)		Action Level, µg/m^3	Limit Level, µg/m^3
	Average	Range		
AMS1	112	21 – 234	381	500
AMS4	98	36 - 165	352	

Table 3.5 Summary Table of 24-hour TSP Monitoring Results during the Reporting Month

Monitoring Station	Concentration (µg/m3)		Action Level, µg/m^3	Limit Level, µg/m^3
	Average	Range		
AMS1	79	62 – 93	170	260
AMS4	74	53 - 120	171	

3.14 All 1-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedances were recorded.

3.15 All 24-hour TSP monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedances were recorded.

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

Table 3.6 Observation at Dust Monitoring Stations

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

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

3.18 The wind data for the reporting month is summarized in **Appendix J**.

Event and Action Plan

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

4 NOISE MONITORING

Monitoring Requirements

4.1 In accordance with EM&A Manual, two noise monitoring stations, namely NMS1 and NMS4 were selected for impact monitoring for the Contract. Impact noise monitoring was conducted for at least once per week during the construction phase of the Contract. **Appendix B** shows the established Action and Limit Levels for the noise monitoring works.

Monitoring Location

4.2 Impact noise monitoring was conducted at the 2 monitoring stations under the Contract, as shown in **Figure 3**. **Table 4.1** describes the locations of the noise monitoring stations.

Table 4.1 Location for Noise Monitoring Stations

Monitoring Stations	Location
NMS1	Sha Lo Wan
NMS4	San Tau

Monitoring Equipment

4.3 **Table 4.2** summarizes the noise monitoring equipment. Copies of calibration certificates are provided in **Appendix C**.

Table 4.2 Noise Monitoring Equipment

Equipment	Model and Make	Qty.
Integrating Sound Level Meter	SVAN977	1
Calibrator	SV 30A	1

Monitoring Parameters, Frequency and Duration

4.4 **Table 4.3** summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in **Appendix D**.

Table 4.3 Noise Monitoring Parameters, Frequency and Duration

Monitoring Stations	Parameter	Period	Frequency
NMS1 NMS4	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)	0700-1900 hrs on normal weekdays	Once per week

Monitoring Methodology and QA/QC Procedures

- The microphone head of the sound level meter was positioned 1m exterior of the noise sensitive facade and lowered sufficiently so that the building's external wall acts as a reflecting surface.
- The battery condition was checked to ensure the correct functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:
  - frequency weighting : A
  - time weighting : Fast
  - time measurement : L_{eq}(30 min.) dB(A) (as six consecutive $L_{eq, 5min}$ readings) during non-restricted hours (i.e. 0700-1900 hrs on normal weekdays)

- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- During the monitoring period, the L_{eq}, L_{90} and L_{10} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Noise measurement was paused temporarily during periods of high intrusive noise (e.g. dog barking, helicopter noise) if possible and observation was recorded when intrusive noise was not avoided.
- Noise monitoring was cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s. The wind speed shall be checked with a portable wind speed meter capable of measuring the wind speed in m/s.

Maintenance and Calibration

4.5 The microphone head of the sound level meter and calibrator were cleaned with a soft cloth at quarterly intervals.

4.6 The sound level meter and calibrator were checked and calibrated at yearly intervals.

4.7 Immediately prior to and following each noise measurement the accuracy of the sound level meter shall be checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements may be accepted as valid only if the calibration levels from before and after the noise measurement agree to within 1.0 dB.

Results and Observations

4.8 The noise monitoring results are summarized in **Table 4.4**. Detailed monitoring results and graphical presentations of noise monitoring are shown in **Appendices G**.

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

Monitoring Station	Noise Level, $L_{eq\ (30min)}$ dB(A)		Limit Level
	Average	Range	
NMS1	69	64 – 72	75 dB(A)
NMS4	57	54 – 60	

Remark: +3dB(A) Façade correction included

4.9 All noise monitoring was conducted as scheduled in the reporting month. No Action/Limit Level exceedance was recorded.

4.10 According to our field observations, the major noise source identified at the designated noise monitoring stations in the reporting month 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

Event and Action Plan

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

5 WATER QUALITY MONITORING

Monitoring Requirements

5.1 According to EM&A Manual, impact water quality monitoring shall be carried out three days per week during the construction period. The interval between two sets of monitoring will not be less than 36 hours.

5.2 Replicate in-situ measurements and samples collected from each independent sampling event shall be collected to ensure a robust statistically interpretable database.

5.3 Impact water quality monitoring was conducted two times per monitoring day during mid ebb (within ± 1.75 hours of the predicted time) and mid flood tides (within ± 1.75 hours of the predicted time) at three depths (i.e. 1m below surface, mid-depth and 1m above seabed, except where the water depth less than 6m, mid-depth station may be omitted. Should the water depth be less than 3m, only the mid-depth station was monitored) Dissolved oxygen, Suspended solids (SS), turbidity, pH, salinity and temperature were monitored in accordance with the requirements set out in the EM&A Manual.

5.4 The proposal for changing Action and Limit Levels for water quality monitoring was submitted to EPD on 15 March 2013. No objection was received from EPD according to the letter (ref. (10) in Ax(3) to EP2/G/A/129pt.4) dated 25 March 2013. Therefore, the updated Action and Limit Levels for water quality monitoring was used for comparison starting from 25 March 2013.

5.5 **Appendix B** shows the established Action/Limit Levels for the water quality monitoring works.

Monitoring Locations

5.6 Impact water quality monitoring was conducted at 14 monitoring stations under the Contract which are summarized in **Table 5.1**. The monitoring station is also shown in **Figure 4**.

5.7 The Proposal for Change of Marine Water Quality Monitoring Station was submitted to EPD on 12 July 2017. No objection was received from EPD according to the letter (ref. (22) in Ax(4) to EP2/G/A/129pt.4) dated 28 July 2017. Therefore, the updated Water Quality Monitoring Station was used for water quality monitoring starting from 31 July 2017.

Table 5.1 Location for Marine Water Quality Monitoring Locations

Monitoring Stations	Coordinates	
	Easting	Northing
IS1	803474	815060
IS2	804851	815715
IS3	806502	815743
IS4	807008	816986
CS1	801784	812711

Monitoring Stations	Coordinates	
	Easting	Northing
CS2	805849	818780
CS2(A)#	805232	818606
SR1	803126	812379
SR2	807856	816953
SR3	810525	816456
SR6	805837	821818
ST1	802677	816006
ST2	804055	818840
ST3	800667	810126
SRA	809872	817152

#Alternative station for CS2 starting from 31st July 2017, after the approval of the Proposal for Change of Marine Water Quality Monitoring Station by EPD on 28th July 2017.

Monitoring Equipment

Instrumentation

5.8 A multi-parameter meters (Model YSI 6820-C-M) were used to measure DO, turbidity, salinity, pH and temperature.

Dissolved Oxygen (DO) and Temperature Measuring Equipment

5.9 The instrument for measuring dissolved oxygen and temperature was portable and weatherproof complete with cable, sensor, comprehensive operation manuals and use DC power source. It was capable of measuring:

- a dissolved oxygen level in the range of 0-20 mg/L and 0-200% saturation; and
- a temperature of 0-45 degree Celsius.

5.10 It has a membrane electrode with automatic temperature compensation complete with a cable.

5.11 Sufficient stocks of spare electrodes and cables were available for replacement where necessary.

5.12 Salinity compensation was built-in in the DO equipment.

Turbidity

5.13 Turbidity was measured in situ by the nephelometric method. The instrument was portable and weatherproof using a DC power source complete with cable, sensor and comprehensive operation manuals. The equipment was capable of measuring turbidity between 0-1000 NTU. The probe cable was not less than 25m in length. The meter was calibrated in order to establish the relationship between NTU units and the levels of suspended solids. The turbidity measurement was carried out on split water sample collected from the same depths of suspended solids samples.

Sampler

5.14 A water sampler, consisting of a transparent PVC or glass cylinder of a capacity of not less than two litres which can be effectively sealed with cups at both ends was used. The water sampler has a positive latching system to keep it open and prevent premature closure until released by a messenger when the sampler was at the selected water depth.

Water Depth Detector

5.15 A portable, battery-operated echo sounder was used for the determination of water depth at each designated monitoring station.

pH

5.16 The instrument was consisting of a potentiometer, a glass electrode, a reference electrode and a temperature-compensating device. It was readable to 0.1pH in a range of 0 to 14. Standard buffer solutions of at least pH 7 and pH 10 were used for calibration of the instrument before and after use.

Salinity

5.17 A portable salinometer capable of recording salinity within the range of 0-40 ppt was used for salinity measurements.

Monitoring Position Equipment

5.18 A hand held Differential Global Positioning System (DGPS) was used during water quality monitoring to ensure the monitoring vessel is at the correct location before taking measurements.

Sample Container and Storage

5.19 Following collection, water samples for laboratory analysis were stored in high density polythene bottles (250ml/1L) with no preservatives added, packed in ice (cooled to 4°C without being frozen) and kept in dark during both on-site temporary storage and shipment to the testing laboratory. The samples were delivered to the laboratory as soon as possible and the laboratory determination works were started within 24 hours after collection of the water samples. Sufficient volume of samples was collected to achieve the detection limit.

Calibration of In Situ Instruments

5.20 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring programme. Responses of sensors and electrodes were checked with certified standard solutions before each use. Wet bulb calibration for a DO meter was carried out before measurement at each monitoring event.

5.21 For the on site calibration of field equipment (Multi-parameter Water Quality System), the BS 1427:2009, "Guide to on-site test methods for the analysis of waters" was observed.

5.22 Sufficient stocks of spare parts were maintained for replacements when necessary. Backup monitoring equipment was also being made available so that monitoring can proceed uninterrupted even when some equipment was under maintenance, calibration, etc.

5.23 The equipment used for impact water quality monitoring is shown in **Table 5.2** and copies of the calibration certificates are shown in **Appendix C**. All the monitoring equipment complied with the requirements set out in the EM&A Manual.

Table 5.2 Water Quality Monitoring Equipment

Equipment	Model and Make	Qty
Sonar Water Depth Detector	Garmin Fishfinder 140	2
Monitoring Position Equipment	KODEN DGPS (KGP913MKIID, GA-08 & BA-03)	2
Multi-parameter Water Quality System	YSI EXO	2
Water Sampler	Kahlsico Water-Bottle Model 135DW 150	2

Monitoring Parameters, Frequency

5.24 **Table 5.3** summarizes the monitoring parameters, monitoring period and frequencies of the water quality monitoring. The water quality monitoring schedule for the reporting month is shown in **Appendix D**.

Table 5.3 Water Quality Monitoring Parameters and Frequency

Monitoring Stations	Parameters, unit	Depth	Frequency
IS1, IS2, IS3 IS4, CS1, CS2(A), SR1, SR2, SR3, SR6, ST1, ST2, ST3, SRA	• 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)	• 3 water depths: 1m below sea surface, mid-depth and 1m above sea bed. • If the water depth is less than 3m, mid-depth sampling only. • If water depth less than 6m, mid-depth may be omitted.	• Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract

5.25 Monitoring location/position, time, water depth, sampling depth, pH, salinity, DO saturation, water temperature, tidal stages, weather conditions and any special phenomena or work underway nearby were recorded.

Monitoring Methodology

Instrumentation

5.26 A multi-parameter meters (Model YSI 6820-C-M) were used to measure DO, turbidity, salinity, pH and temperature.

Operating/Analytical Procedures

5.27 The monitoring stations were accessed by the guide of a hand-held Differential Global Positioning System (DGPS) during water quality monitoring in accordance with the EM&A Manual. The depth of the monitoring location was measured using depth meter in order to determine the sampling depths. Afterwards, the probes of the in-situ measurement equipment were lowered to the predetermined depths (1 m below water surface, mid-depth and 1 m above seabed) and the measurements were carried out accordingly.

5.28 At each measurement, two consecutive measurements of DO concentration, DO saturation, salinity, turbidity, pH and temperature were taken. The probes were retrieved out of the water after the first measurement and then re-deployed for the second measurement. Where the difference in the value between the first and second readings of each set was more than 25% of the value of the first reading, the reading was discarded and further readings were taken.

5.29 Water sampler was lowered into the water to the required depths of sampling. Upon reaching the pre-determined depth, a messenger to activate the sampler was then released to travel down the wire. The water sample was sealed within the sampler before retrieving. At each station, water samples at three depths (1 m below water surface, mid-depth and 1 m above seabed) were collected accordingly. Water samples were stored in a cool box and kept at less than 4°C but without frozen and sent to the laboratory as soon as possible. In addition, field information as described in Section 5.23 was also recorded.

Laboratory Analytical Methods

5.30 The testing of all parameters was conducted by CMA Testing and Certification Laboratories (HOKLAS Registration No.004) and comprehensive quality assurance and control procedures in place in order to ensure quality and consistency in results. The testing method, reporting limit and detection limit are provided in **Table 5.4**.

Table 5.4 Methods for Laboratory Analysis for Water Samples

Determinant	Instrumentation	Analytical Method	Detection Limit
Suspended Solid (SS)	Weighing	APHA 21e 2540D	0.5 mg/L

QA/QC Requirements

Decontamination Procedures

5.31 Water sampling equipment used during the course of the monitoring programme was decontaminated by manual washing and rinsed clean seawater/distilled water after each sampling event. All disposal equipment was discarded after sampling.

Sampling Management and Supervision

5.32 All sampling bottles were labelled with the sample I.D (including the indication of sampling station and tidal stage e.g. IS1_me_a), laboratory number and sampling date. Water samples were dispatched to the testing laboratory for analysis as soon as possible after the sampling. All samples were stored in a cool box and kept at less than 4°C but without frozen. All water samples were handled under chain of custody protocols and relinquished to the laboratory representatives at locations specified by the laboratory.

5.33 The laboratory determination works were started within 24 hours after collection of the water samples.

Quality Control Measures for Sample Testing

5.34 The samples testing were performed by CMA Testing and Certification Laboratories.

5.35 The following quality control programme was performed by the CMA Testing and Certification Laboratories for every batch of 20 samples:

- ✧ One set of quality control (QC) samples.

Maintenance and Calibration

5.36 All in situ monitoring instruments were checked, calibrated and certified by a laboratory accredited under HOKLAS or other international accreditation scheme before use, and subsequently re-calibrated at 3 monthly intervals throughout all stages of the water quality monitoring programme.

Results and Observations

5.37 The monitoring results and graphical presentation of water quality at the monitoring stations is shown in **Appendix H.**

5.38 The summary of exceedance record in reporting month is shown in **Appendix L** and summarized in the **Table 5.5**.

Table 5.5 Summary of Water Quality Exceedances

Station	Exceedance Level	DO (Surface & Middle)		DO(Bottom)		Turbidity		SS		Total Number of Exceedances	
		Mid-Ebb	Mid-Flood	Mid-Ebb	Mid-Flood	Mid-Ebb	Mid-Flood	Mid-Ebb	Mid-Flood	Mid-Ebb	Mid-Flood
IS1	Action Level							6/12/2017		1	
	Limit Level										
IS2	Action Level								6/12/2017		1
	Limit Level										
IS3	Action Level										
	Limit Level										
IS4	Action Level										
	Limit Level										
SR1	Action Level										
	Limit Level										
SR2	Action Level										
	Limit Level										

SR3	Action Level										
	Limit Level										
SR6	Action Level								6/12/2017		1
	Limit Level										
ST1	Action Level										
	Limit Level								6/12/2017		1
ST2	Action Level										
	Limit Level										
ST3	Action Level										
	Limit Level										
SRA	Action Level										
	Limit Level										
Total	Action Level							1	2	3	
	Limit Level							0	1	1	

5.39 All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded.

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

1) No pollution discharge from construction activity was observed;
2) Control Station value already exceeded either the Baseline Action or Limit Levels;
3) Adverse water quality outside the site boundary was observed while no pollution source from this Contract was observed and no construction vessel for this Contract was travelling nearby. Dispersion of sediment plume to the monitoring stations from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was also observed.

Event and Action Plan

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

6 DOLPHIN-RELATED MONITORING

Monitoring Requirements

6.1 According to Section 10 of the EM&A Manual, four kinds of ecological monitoring works are required during the construction phase, namely dolphin monitoring, construction-phase underwater noise monitoring, dolphin behavior monitoring and land-based dolphin behavior and movement monitoring. The 30 days of construction-phase underwater noise monitoring, dolphin behavior monitoring and land-based dolphin behavior and movement monitoring were completed in July 2013.

6.2 The monitoring work shall be undertaken by suitably qualified specialist(s), (i.e. dolphin specialist and bio-acoustician), who shall have sufficient (at least 5-10 years) relevant post-graduate experience and publication in the respective aspects. They should be approved by Agriculture, Fisheries and Conservation Department (AFCD) and Environmental Protection Department (EPD).

Dolphin Monitoring (Line-transect Vessel Survey)

Monitoring Requirements

6.3 According to EM&A Manual Section 10.3.2, a dolphin monitoring programme should be set up to verify the predictions of impacts and to ensure that there are no unforeseen impacts on the dolphin population during construction phase.

6.4 Following the requirement in the EM&A Manual Section 10.4.1, the dolphin monitoring should adopt line-transect vessel survey method, and cover the following line-transect survey areas as in AFCD annual marine mammal monitoring programme.

Monitoring Location

6.5 For this contract, dolphin monitoring will be carried out in the West Lantau (WL) along the line transect as depicted in **Figure 1** of **Appendix I**. The co-ordinates of all transect lines are shown in **Table 6.1**.

Table 6.1 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

Line No.		Easting	Northing	Line No.		Easting	Northing
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

Monitoring Frequency

6.6 Dolphin transect survey was carried out at least twice a month (i.e. complete all the transect lines of West Lantau survey area twice per month) throughout the construction period.

Monitoring Day

6.7 Dolphin monitoring was carried out on 4th and 21st December 2017. The dolphin monitoring schedule for the reporting period is shown in **Appendix D**.

Monitoring Results

6.8 From these surveys, a total of 64.86 km of survey effort was collected, with 87.7% of the total survey effort being conducted under favorable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) Out of the 64.86 km of survey effort, the total survey effort conducted on primary lines (the horizontal lines perpendicular to the coastlines) was 42.97 km.

6.9 3 groups of 9 Chinese White Dolphins were sighted from primary lines. Notably, none of the dolphin groups were associated with any operating fishing vessel. The three groups were scattered to the west and south of Tai O Peninsula, as well as between Peaked Hill and Fan Lau, with no particular concentration (Figure 4 of Appendix D).

6.10 Dolphin encounter rates deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) are shown in **Table 6.2**.

Table 6.2 Dolphin encounter rates (sightings per 100 km of survey effort) in December's surveys

		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**
WL	Set 1: December 4th	0.0	0.0
	Set 2: December 21st	5.6	39.2

6.11 The average group size of Chinese White Dolphins was 3.0 individuals per group during December's surveys, which was lower than the averages in previous months of monitoring surveys.

6.12 Two of the three dolphin groups were single animals, while there was a medium-sized dolphin group with seven animals.

6.13 During this month of dolphin monitoring, no major marine construction activities was conducted and no adverse impact on Chinese white dolphins was noticeable from general observations.

6.14 Evaluation of impacts on dolphins due to construction work will be conducted in the quarterly EM&A report.

6.15 Detailed monitoring methodology and results can be found in **Appendix I**.

Additional Land-based Dolphin Behaviour and Movement Monitoring

6.16 A total of 64 days of additional monitoring according to the Proposal for Land-based Dolphin Behaviour and Movement Monitoring had been completed in August 2016.

6.17 The Final Report of Land-based Monitoring on North-South Movement of Chinese White Dolphins in West Lantau Waters had been submitted to EPD on 28 July 2017.

6.18 Detailed monitoring methodology and results will be provided in a separate report.

7 ENVIRONMENTAL SITE INSPECTION

Site Audits

7.1 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 summaries of site audits are attached in **Appendix M**.

7.2 Site audits were conducted on 5th, 12th, 19th and 27th December 2017 by ET after the commencement of construction works for the Contract. A joint site audit with the representative with IEC, SOR, the Contractor and the ET was carried out on 19th December 2017. The details of observations during site audit can refer to **Table 7.1**.

7.3 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. The 17th inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 12th December 2017 and next inspection will be conducted in March 2018.

Implementation Status of Environmental Mitigation Measures

7.4 According to the EIA Study Report, Environmental Permit and the EM&A Manual, the mitigation measures detailed in the documents are recommended to be implemented during the construction phase. An updated summary of the EMIS is provided in **Appendix N**.

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

7.6 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.

7.7 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.

7.8 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.

7.9 During site inspections in the reporting month, no non-conformance was identified. The observations and recommendations made during the audit sessions are summarized in **Table 7.1**.

Table 7.1 Observations and Recommendations of Site Audit

Parameters	Date	Observations and Recommendations	Follow-up
Water Quality	N/A(1)	N/A(1)	N/A(1)
Ecology	N/A(1)	N/A(1)	N/A(1)
Air Quality	171205-R02	Water spraying should be provided to the scrabbling works at P57 for dust suppression.	Rectification/improvement was observed during the follow-up audit session on 12 December 2017.
	171212-R03	Cement bags at P113 Portion C should be covered by impervious sheet.	Rectification/improvement was observed during the follow-up audit session on 27 December 2017.
	171219-R02	Dusty material at P55 should be covered by impervious sheet or removed.	This item was remarked as 171227-R02.
	171219-R03	NRMM label should be provided to the generator at P56 and replaced on the equipment at P57.	This item was remarked as 171227-R03.
	171227-R02	Dusty material at P55 should be covered by impervious sheet or removed.	Rectification/improvement will be reported in next reporting month.
	171227-R03	NRMM label should be replaced on the generator at P57 and WA4.	Rectification/improvement will be reported in next reporting month.
Noise	N/A(1)	N/A(1)	N/A(1)
Waste / Chemical Management	171205-R01	Housekeeping should be enhanced at P56.	Rectification/improvement was observed during the follow-up audit session on 12 December 2017.
	171205-R03	Chemical containers at P55 should be provided with proper chemical label and drip tray.	Rectification/improvement was observed during the follow-up audit session on 12 December 2017.
	171212-R01	Oil stain at P106 Portion C should be cleared as chemical waste.	Rectification/improvement was observed during the follow-up audit session on 27 December 2017.
	171212-R02	Housekeeping at P111-112 Portion C should be enhanced.	Rectification/improvement was observed during the follow-up audit session on 27 December 2017.
	171219-R01	Housekeeping at P55 should be enhanced.	This item was remarked as 171227-R01.
	171227-R01	Housekeeping at P56 should be enhanced.	Rectification/improvement will be reported in next reporting month.
Landscape & Visual Impact	N/A(1)	N/A(1)	N/A(1)
Permits/Licences	N/A(1)	N/A(1)	N/A(1)
Other	N/A(1)	N/A(1)	N/A(1)
Cultural Heritage	12/12/2017	N/A(1)	N/A(1)

Parameters	Date	Observations and Recommendations	Follow-up
(Sha Lo Wan (West) Archaeological Site)			

Remark: N/A(1) - No major environmental deficiency was identified during the site inspection in the reporting month.

Advice on the Solid and Liquid Waste Management Status

7.10 According to the Contractor, 2659m^3 inert C&D materials were generated during the reporting month.

7.11 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.

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

8 ENVIRONMENTAL NON-CONFORMANCE (EXCEEDANCES)

Summary of Exceedances

8.1 Summary of exceedance is provided in **Appendix L**.

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

8.3 All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded.

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

1) No pollution discharge from construction activity was observed;
2) Control Station value already exceeded either the Baseline Action or Limit Levels.;
3) Adverse water quality outside the site boundary was observed while no pollution source from this Contract was observed and no construction vessel for this Contract was travelling nearby. Dispersion of sediment plume to the monitoring stations from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was also observed.

Summary of Environmental Complaint

8.5 No environmental related complaints were received in the reporting month. The Complaint Log is attached in **Appendix P**.

Summary of Notification of Summons and Successful Prosecution

8.6 There was one prosecution or notification of summons received since the Contract commencement. Summary of successful prosecution as attached in **Appendix Q**.

9 FUTURE KEY ISSUES

Key Issues in the Coming Month

9.1 Major site activities for the coming reporting month will include:

WA4

- Operation of Asphalt Plant

Ancillary and Associated Facilities

- Breaking off the concrete footings for reinstatement of slope underneath the deck
- Reinstatement of sloping seawall
- Installation of precast parapet facial panel
- Construction of median and side barriers
- Construction of longitudinal stitching
- Sealing of deck openings and preparation deck surface for waterproofing
- Installation of fire hydrants and fire main
- Installation of utility trough covers
- Erection of sign gantry
- Installation of the additional pier number and information signs
- Installation of the headroom sign and vessel length restriction sign
- Installation of the height restriction sign
- Site clearance / formation work to reinstatement of SPR
- Construction of concrete carriageway for Chek Lap Kok South Road realignment*
- Installation of carrier drains
- Installation of watermain
- Laying of asphalt pavement
- Fill slope and road works for Chek Lap Kok South Road realignment*

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

E&M Works

- E&M ducting installation
- E&M works inside SHT building
- Street light cables and poles installation
- Cable hanger installation
- LV and HV cable laying works
- Cable tray installation of SMS system
- Cable laying works for HKPF
- GPS pole installation
- Installation of electrical sliding barrier

- Installation of pile cap lighting
- Installation of radar at radar platform

Removal of Temporary works at P68 - P70

Deck Erection

- Movement joints installation

Turnaround Facilities

- Casting of wingslab
- Casting of roof finishing and ground level finish of mobile telecom equipment room
- Apply waterproof membrane for mobile telecom equipment room
- Dismantling of sling platform, box girder support tower and extended platform
- Installation of Type K1 Kerb for traffic island
- Parapet installation

10m at P0

- Construction of central barrier and side barriers
- Construction of the utility trough
-

Monitoring Schedule for the Next Month

9.2 The tentative environmental monitoring schedule for the next month is shown in **Appendix D**.

Construction Programme for the Next Month

9.3 A tentative construction programme is provided in **Appendix A**.

10 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

10.1 The Environmental Monitoring and Audit (EM&A) Report presents the EM&A works undertaken in December 2017 in accordance with EM&A Manual.

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

10.3 All water quality monitoring was conducted as scheduled in the reporting month. There are three Action Level and one Limit Level exceedances were recorded for suspended solids. No Action/Limit Level exceedance for dissolved oxygen and turbidity were recorded.

10.4 Dolphin transect survey was carried out on 4th and 21st December 2017. No adverse impact on Chinese White Dolphins was noticeable from general observations.

10.5 Environmental site inspection was conducted on 5th, 12th, 19th and 27th December 2017 by ET in the reporting month. All deficiencies identified during the site inspection have already rectified / improved during the follow-up audit session.

10.6 The inspection to the Sha Lo Wan (West) Archaeological Site was conducted on 12th December 2017. No access to Sha Lo Wan (West) Archaeological site for works areas and storage of construction equipment was observed.

10.7 There was no environmental complaints, no notification of summons and successful prosecution received in the reporting month.

10.8 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

10.9 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

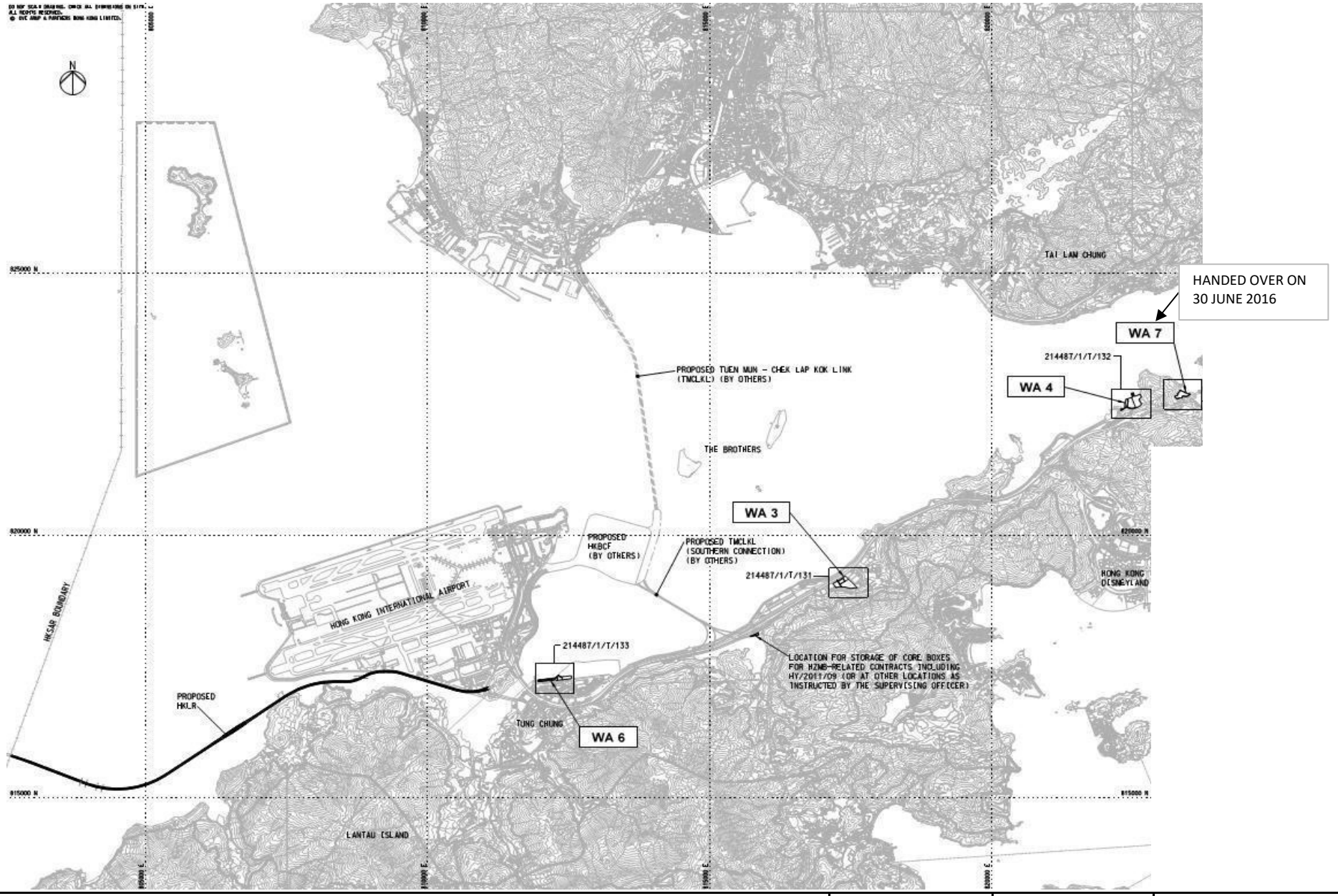
- To implement Spill Response Plan in the event of accidental spillage of or other hazardous chemicals.
- To implement Dolphin Exclusion Zone during the installation of bored pile casing located in the waters to the west of Airport.
- To implement Dolphin Watching Plan after the bored piling casing is 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

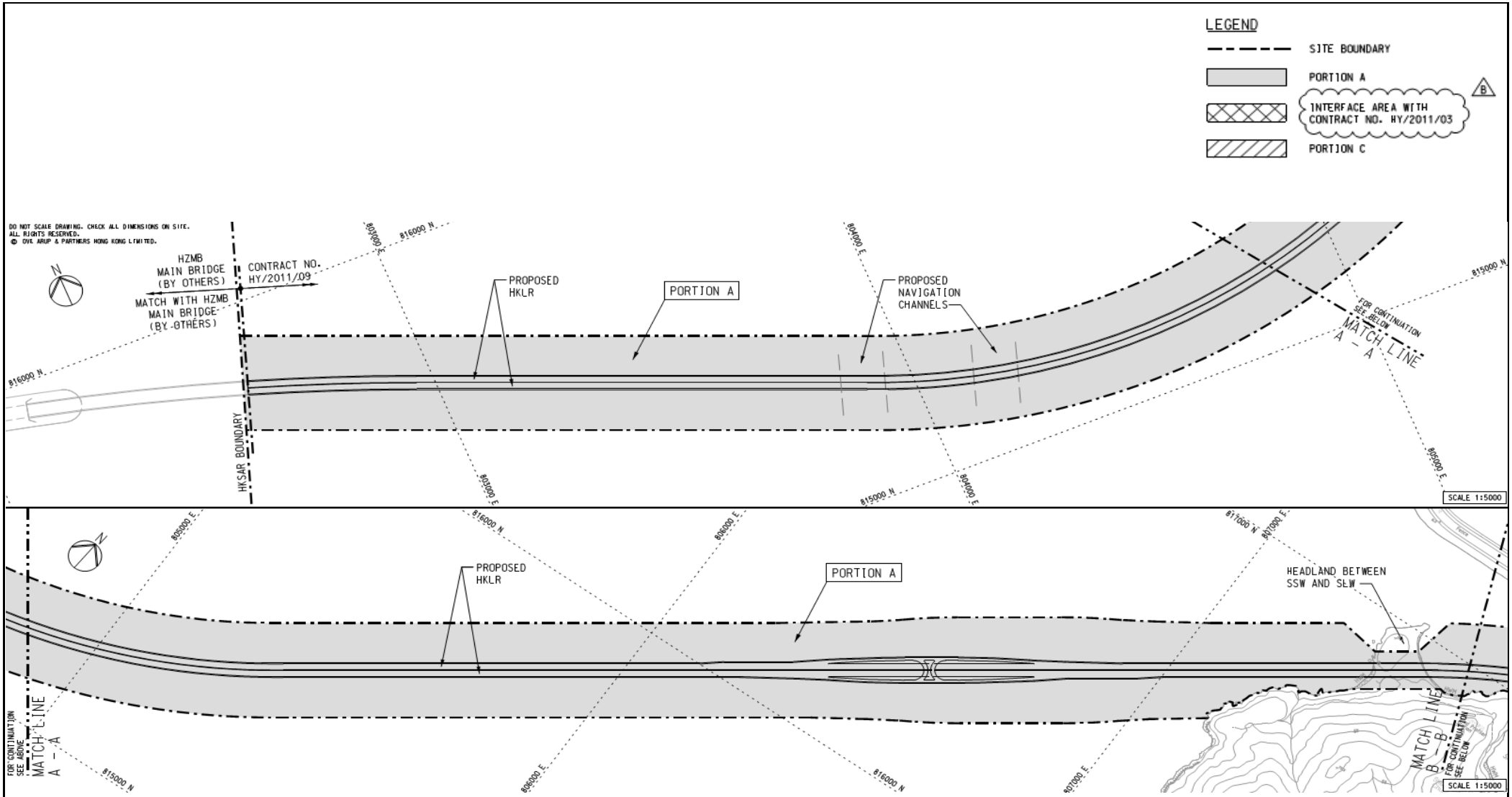
- To check for any accumulation of waste materials or rubbish on site.
- To ensure the performance of sorting of C&D materials at source (during generation);
- To carry out inspection of dump truck at site exit to ensure inert and non-inert C&D materials are properly segregated before removing off site.
- 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)



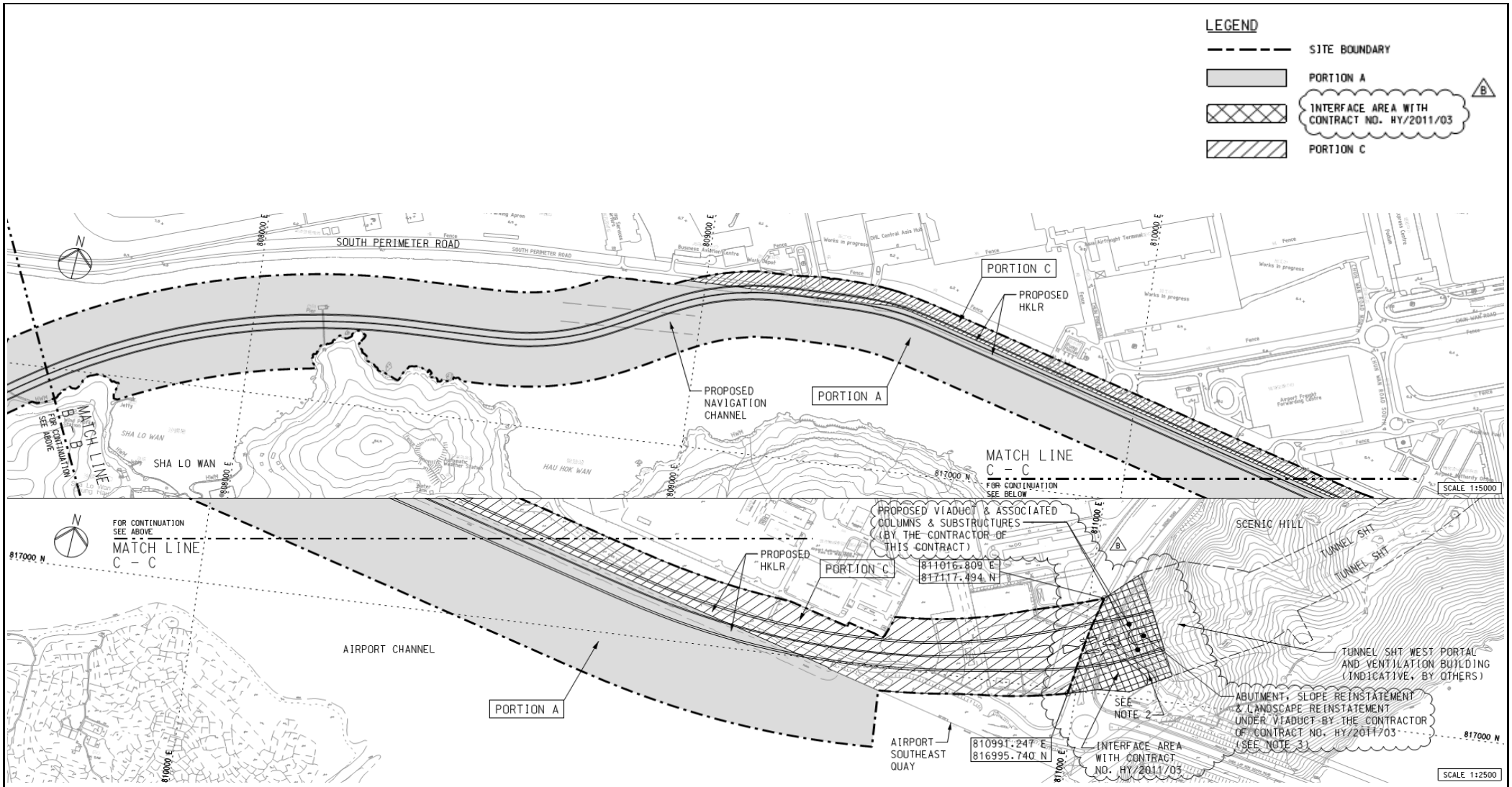
Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (WA3, WA4, WA6 and WA7)	Scale: N.T.S Date: Jul-16	Proposal No.: MA12014 Figure: 1a

CINOTECH



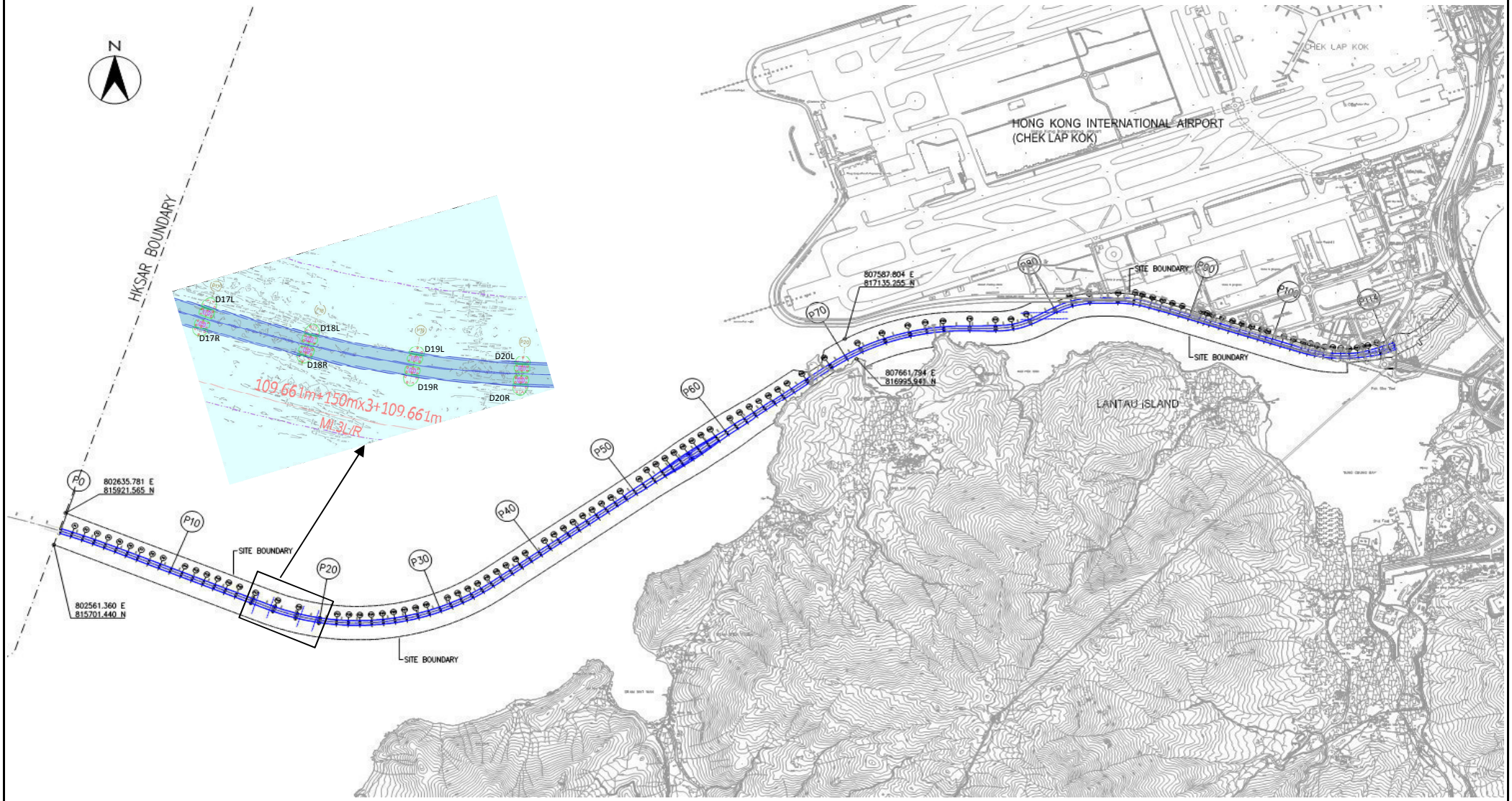
Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Portion A)	Scale: N.T.S Date: Oct-15	Proposa No.: MA12014 Figure: 1b

CINOTECH



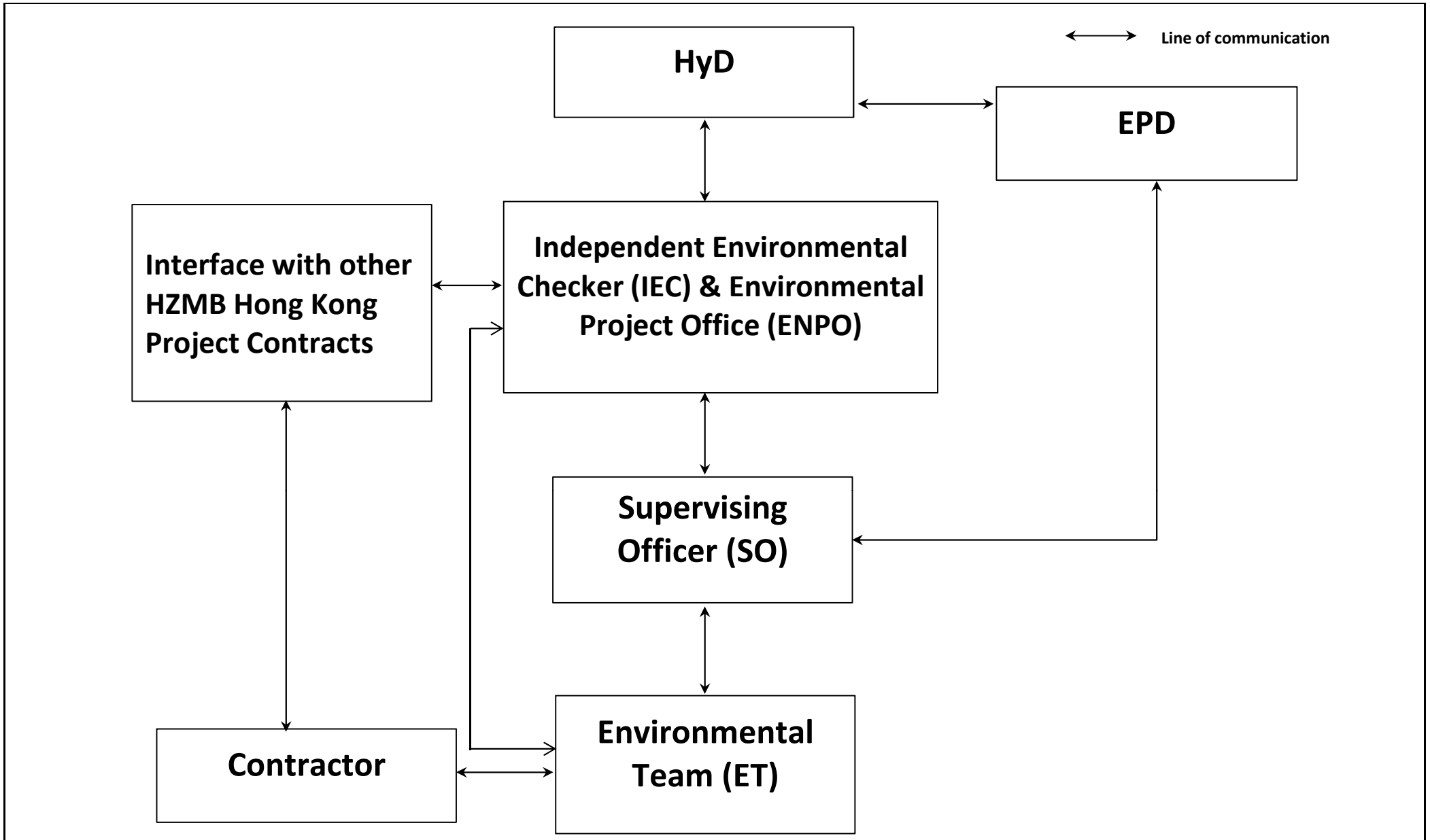
Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Site Layout Plan (Portion A and C)	Scale N.T.S	Proposa No. MA12014
		Date 五月-13	Figure 1c

CINOTECH



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

CINOTECH

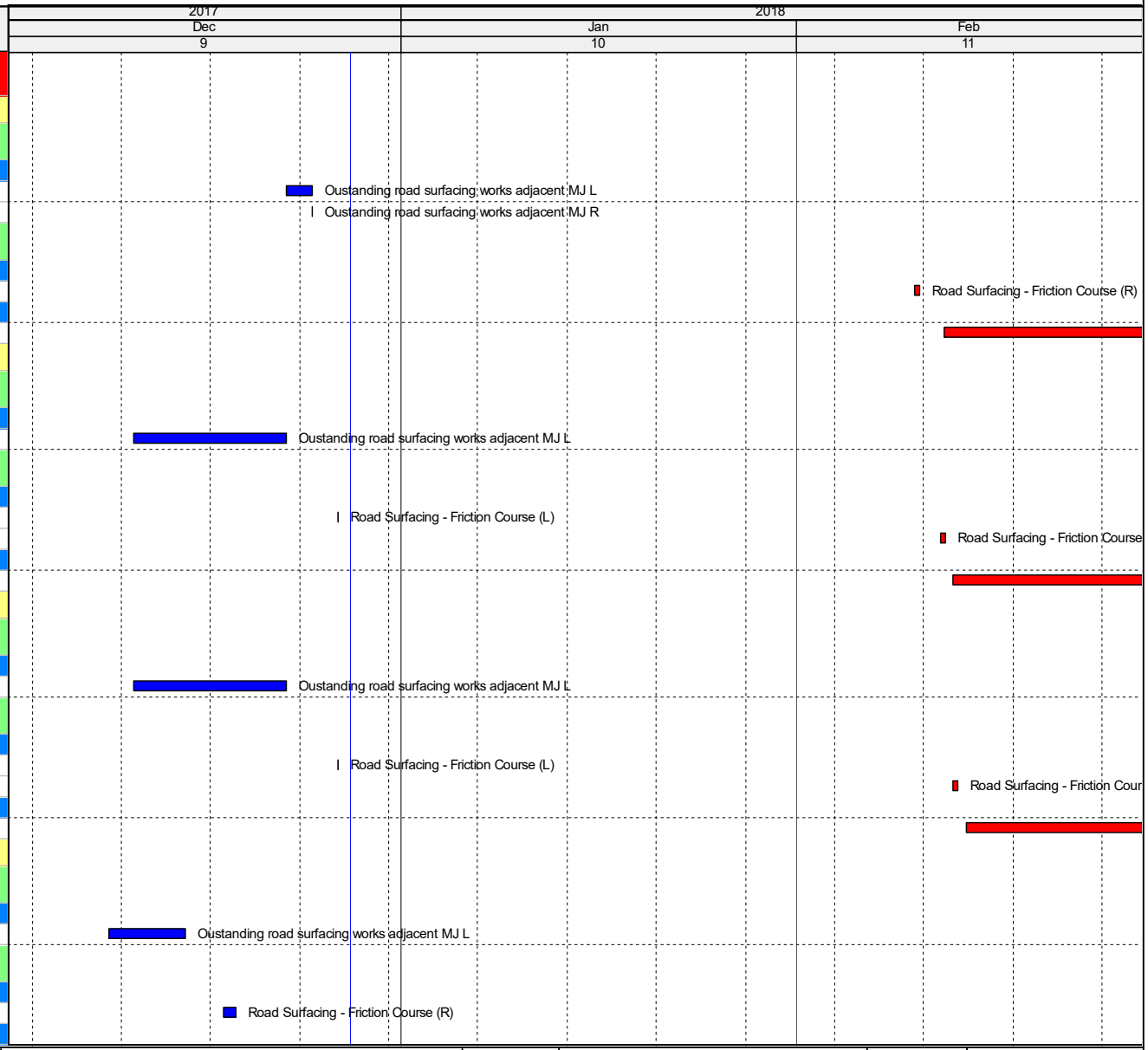


Title	Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Project Organisation for Environmental Works	Scale N.T.S Date Feb-13	Proposa No. MA12014 Figure 2	CINOTECH

APPENDIX A
CONSTRUCTION PROGRAMME

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

Activity ID	Activity Name
HKZB Hong Kong Link Road - 3 Months R	
Bridge ML01	
Road Furnture	
Road Furnture	
ML01_1100	Oustanding road surfacing works adjacent MJ L
ML01_1120	Oustanding road surfacing works adjacent MJ R
Road Surfacing	
Road Surfacing	
ML01_1210	Road Surfacing - Friction Course (R)
Road Marking	
ML01_1220	Road Marking & remaining works
Bridge ML02	
Road Furnture	
Road Furnture	
ML02_1095	Oustanding road surfacing works adjacent MJ L
Road Surfacing	
Road Surfacing	
ML02_1190	Road Surfacing - Friction Course (L)
ML02_1210	Road Surfacing - Friction Course (R)
Road Marking	
ML02_1240	Road Marking & remaining works
Bridge ML03	
Road Furnture	
Road Furnture	
ML03_1090	Oustanding road surfacing works adjacent MJ L
Road Surfacing	
Road Surfacing	
ML03_1180	Road Surfacing - Friction Course (L)
ML03_1200	Road Surfacing - Friction Course (R)
Road Marking	
ML03_1210	Road Marking & remaining works
Bridge ML04	
Road Furnture	
Road Furnture	
ML04_1100	Oustanding road surfacing works adjacent MJ L
Road Surfacing	
Road Surfacing	
ML04_1210	Road Surfacing - Friction Course (R)
Road Marking	

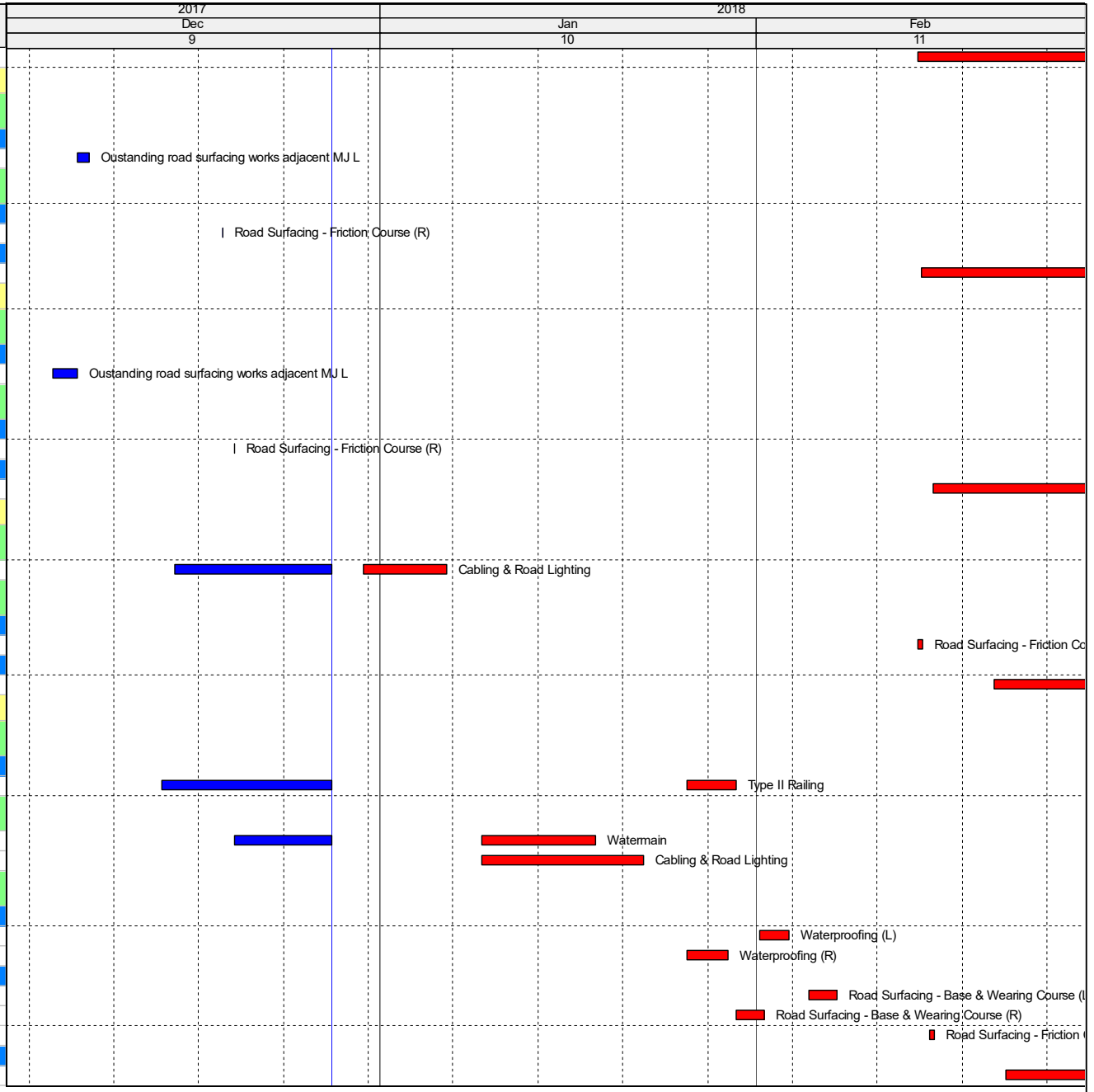


Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Dec 17 to Feb 18)
Page 1 of 4

Date	Revision	Checked	Approved
15/1/18	EM&A Report Dec 17 to Feb 18	Tim	

Activity ID	Activity Name
ML04_1220	Road Marking & remaining works
Bridge ML05	
Road Furnture	
Road Furnture	
ML05_1100	Oustanding road surfacing works adjacent MJ L
Road Surfacing	
Road Surfacing	
ML05_1210	Road Surfacing - Friction Course (R)
Road Marking	
ML05_1220	Road Marking & remaining works
Bridge ML06	
Road Furnture	
Road Furnture	
ML06_1090	Oustanding road surfacing works adjacent MJ L
Road Surfacing	
Road Surfacing	
ML06_1200	Road Surfacing - Friction Course (R)
Road Marking	
ML06_1210	Road Marking & remaining works
Bridge ML07	
Piping & Cabling	
ML07_1130	Cabling & Road Lighting
Road Surfacing	
Road Surfacing	
ML07_1200	Road Surfacing - Friction Course (R)
Road Marking	
ML07_1210	Road Marking & remaining works
Bridge ML08	
Road Furnture	
Road Furnture	
ML08_1060	Type II Railing
Piping & Cabling	
ML08_1100	Watermain
ML08_1110	Cabling & Road Lighting
Road Surfacing	
Waterproofing	
ML08_1120	Waterproofing (L)
ML08_1130	Waterproofing (R)
Road Surfacing	
ML08_1140	Road Surfacing - Base & Wearing Course (L)
ML08_1160	Road Surfacing - Base & Wearing Course (R)
ML08_1170	Road Surfacing - Friction Course (R)
Road Marking	
ML08_1180	Road Marking & remaining works

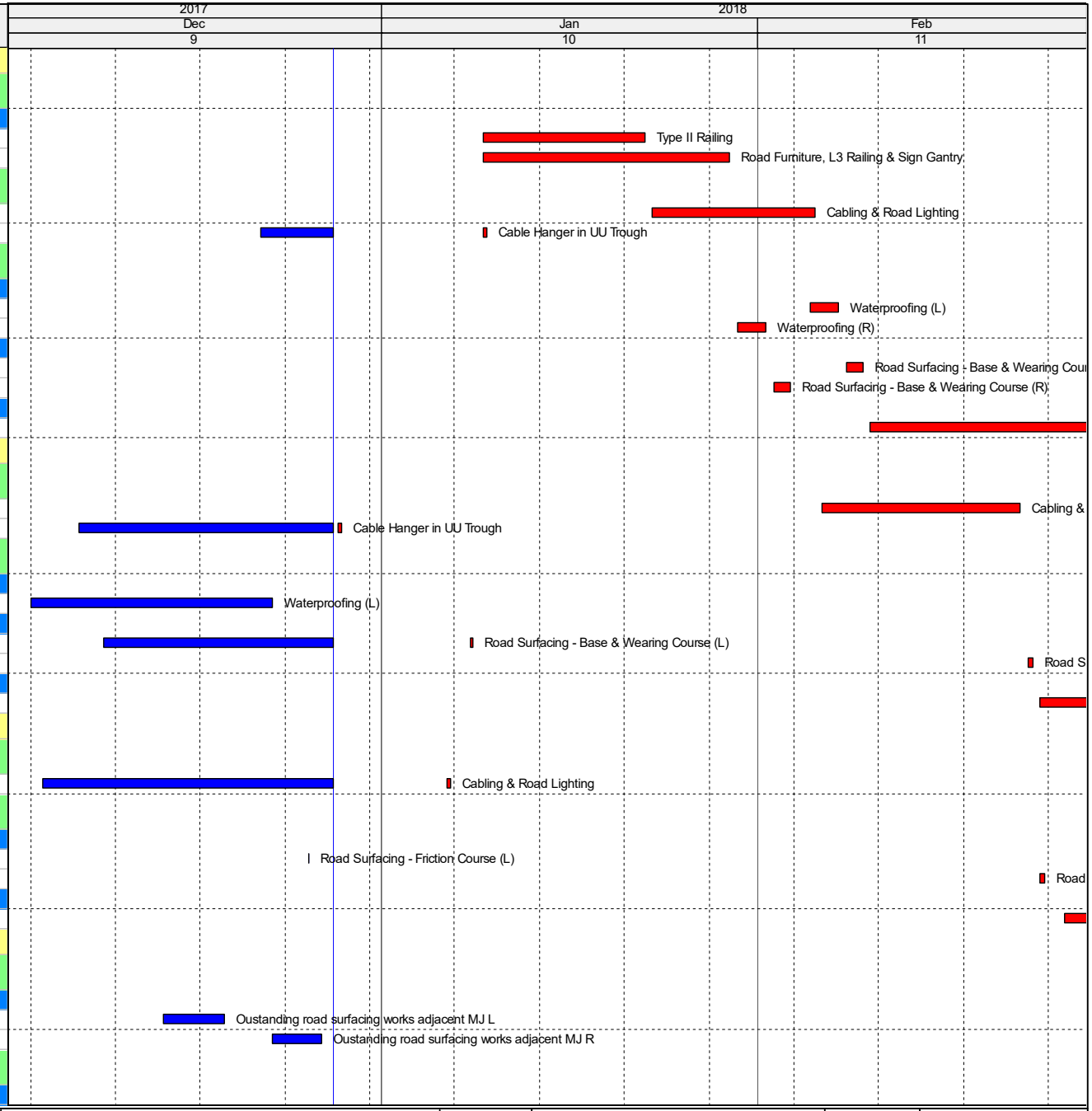


Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Dec 17 to Feb 18)
Page 2 of 4

Date	Revision	Checked	Approved
15/1/18	EM&A Report Dec 17 to Feb 18	Tim	

Activity ID	Activity Name
Turnaround	
Road Furnture	
Road Furnture	
MLTA_1050	Type II Railing
MLTA_1060	Road Furniture, L3 Railing & Sign Gantry
Piping & Cabling	
MLTA_1070	Cabling & Road Lighting
MLTA_1080	Cable Hanger in UU Trough
Road Surfacing	
Waterproofing	
MLTA_1090	Waterproofing (L)
MLTA_1100	Waterproofing (R)
Road Surfacing	
MLTA_1110	Road Surfacing - Base & Wearing Course (L)
MLTA_1120	Road Surfacing - Base & Wearing Course (R)
Road Marking	
MLTA_1130	Road Marking & remaining works
Bridge ML09	
Piping & Cabling	
ML09_1130	Cabling & Road Lighting
ML09_1140	Cable Hanger in UU Trough
Road Surfacing	
Waterproofing	
ML09_1150	Waterproofing (L)
Road Surfacing	
ML09_1170	Road Surfacing - Base & Wearing Course (L)
ML09_1200	Road Surfacing - Friction Course (R)
Road Marking	
ML09_1210	Road Marking & remaining works
Bridge ML10	
Piping & Cabling	
ML10_1120	Cabling & Road Lighting
Road Surfacing	
Road Surfacing	
ML10_1170	Road Surfacing - Friction Course (L)
ML10_1190	Road Surfacing - Friction Course (R)
Road Marking	
ML10_1200	Road Marking & remaining works
Bridge ML11	
Road Furnture	
Road Furnture	
ML11_1100	Oustanding road surfacing works adjacent MJ L
ML11_1230	Oustanding road surfacing works adjacent MJ R
Road Surfacing	
Road Surfacing	



Actual Work
Remaining Work
Critical Remaining Work
Milestone

HKLR EMA report (Dec 17 to Feb 18)
Page 3 of 4

Date	Revision	Checked	Approved
15/1/18	EM&A Report Dec 17 to Feb 18	Tim	

Activity ID	Activity Name
ML11_1190	Road Surfacing - Friction Course (L)
ML11_1210	Road Surfacing - Friction Course (R)
Road Marking	
ML11_1220	Road Marking & remaining works
Bridge ML12	
Road Furnture	
Road Furnture	
ML12_1080	Road Furniture, L3 Railing & Sign Gantry
ML12_1092	Oustanding road surfacing works adjacent MJ L
Piping & Cabling	
ML12_1120	Cabling & Road Lighting
Road Surfacing	
Road Surfacing	
ML12_1160	Road Surfacing - Base & Wearing Course (L)
ML12_1170	Road Surfacing - Friction Course (L)
ML12_1190	Road Surfacing - Friction Course (R)
Bridge ML13	
Road Furnture	
Road Furnture	
ML13_1220	Oustanding road surfacing works adjacent MJ R
Road Surfacing	
Waterproofing	
ML13_1150	Waterproofing (L)
ML13_1160	Waterproofing (R)
Road Surfacing	
ML13_1170	Road Surfacing - Base & Wearing Course (L)
ML13_1180	Road Surfacing - Friction Course (L)
ML13_1190	Road Surfacing - Base & Wearing Course (R)
Bridge ML14	
Road Furnture	
Road Furnture	
ML14_1210	Oustanding road surfacing works adjacent MJ R
Road Surfacing	
Road Surfacing	
ML14_1170	Road Surfacing - Friction Course (L)
Bridge ML15	
Road Surfacing	
Road Surfacing	
ML15_1190	Road Surfacing - Friction Course (L)
Bridge ML19	
Road Furnture	
Road Furnture	
ML19_1140	Install Movement Joint (East Abutment MJ20) R
ML19_1150	Oustanding road surfacing works adjacent MJ R

Actual Work
Critical Remaining Work
Remaining Work
Milestone

HKLR EMA report (Dec 17 to Feb 18)
Page 4 of 4

Date	Revision	Checked	Approved
15/1/18	EM&A Report Dec 17 to Feb 18	Tim	

APPENDIX B
ACTION AND LIMIT LEVELS

Appendix B - Action and Limit Levels

Table B-1 Action and Limit Levels for 1-Hour TSP

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

Table B-2 Action and Limit Levels for 24-Hour TSP

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

Table B-3 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 B-4 Action and Limit Levels for Water Quality

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

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

APPENDIX C
COPIES OF CALIBRATION CERTIFCATES

High-Volume TSP Sampler
5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA12014/67/0031

Project No. AMS 1 - Sha Lo Wan Operator: WK

Date: 23-Oct-17 Next Due Date: 22-Dec-17

Equipment No.: A-01-67 Serial No. 3218

Ambient Condition			
Temperature, Ta (K)	295.1	Pressure, Pa (mmHg)	765.4

Orifice Transfer Standard Information					
Serial No.	0993	Slope, mc	0.0578	Intercept, bc	-0.04890
Last Calibration Date:	28-Feb-17	**mc x Qstd + bc = $[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$**			
Next Calibration Date:	27-Feb-18	**Qstd = $\{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$ -bc} / mc**			

Calibration of TSP Sampler

Calibration Point	Orfice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) **X - axis**	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ **Y-axis**
1	14.8	3.88	67.97	10.6	3.28
2	12.0	3.49	61.29	8.4	2.92
3	8.7	2.97	52.31	6.2	2.51
4	5.4	2.34	41.39	3.5	1.89
5	3.4	1.86	33.02	2.3	1.53

By Linear Regression of Y on X

Slope , mw = 0.0506 **Intercept, bw =** -0.1663

Correlation coefficient* = 0.9992

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 43 CFM

From the Regression Equation, the "Y" value according to

$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$

Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ **3.98**

Remarks:

Conducted by: W.K. Tang Signature: Kwai Date: 23/10/17

Checked by: [illegible] Signature: [illegible] Date: 23 October 2017

High-Volume TSP Sampler
5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA12014/67/0032

Project No. AMS 1 - Sha Lo Wan Operator: MH

Date: 22-Dec-17 Next Due Date: 21-Feb-18

Equipment No.: A-01-67 Serial No. 3218

Ambient Condition			
Temperature, Ta (K)	292.9	Pressure, Pa (mmHg)	768.3

Orifice Transfer Standard Information					
Serial No.	0993	Slope, mc	0.0578	Intercept, bc	-0.04890
Last Calibration Date:	28-Feb-17	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	27-Feb-18	$Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler

Calibration Point	Orfice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) **X - axis**	ΔW (HVS), in. of water	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ **Y-axis**
1	14.6	3.88	67.89	10.4	3.27
2	12.2	3.54	62.13	8.6	2.97
3	8.8	3.01	52.90	6.3	2.55
4	5.3	2.33	41.24	3.9	2.00
5	3.4	1.87	33.20	2.4	1.57

By Linear Regression of Y on X

Slope , mw = 0.0484 **Intercept, bw =** -0.0158

Correlation coefficient* = 0.9997

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 43 CFM

From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ **4.14**

Remarks:

Conducted by: MH Signature: Date: 22-12-2017

Checked by: WK Tang Signature: Date: 22-12-2017

High-Volume TSP Sampler
5-POINT CALIBRATION DATA SHEET

CINOTECH

File No. MA12014/74/0031

Project No. AMS 4 - San Tau Operator: MH

Date: 17-Nov-17 Next Due Date: 16-Jan-18

Equipment No.: A-01-74 Serial No. 2202

Ambient Condition			
Temperature, Ta (K)	298.2	Pressure, Pa (mmHg)	763.8

Orifice Transfer Standard Information					
Serial No.	0993	Slope, mc	0.0578	Intercept, bc	-0.0489
Last Calibration Date:	28-Feb-17	$mc \times Qstd + bc = [\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	27-Feb-18	$Qstd = \{[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

Calibration of TSP Sampler

Calibration Point	Orfice			HVS	
	ΔH (orifice), in. of water	$[\Delta H \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (CFM) **X - axis**	ΔW (HVS), in. of oil	$[\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$ **Y-axis**
1	14.2	3.78	66.21	9.1	3.02
2	11.6	3.41	59.93	7.2	2.69
3	8.7	2.96	52.01	5.5	2.35
4	5.1	2.26	40.02	3.3	1.82
5	2.9	1.71	30.39	2.1	1.45

By Linear Regression of Y on X

Slope , mw = **0.0436** **Intercept, bw =** **0.0983**

Correlation coefficient* = **0.9989**

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 43 CFM

From the Regression Equation, the "Y" value according to

$$mw \times Qstd + bw = [\Delta W \times (Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; $W = (mw \times Qstd + bw)^2 \times (760 / Pa) \times (Ta / 298) =$ **3.88**

Remarks:

Conducted by: HH MW HEL Signature: Date: 17/11/17

Checked by: WK Tang Signature: Date: 17/11/2017

TISCH Environmental

TISCH ENVIRONMENTAL, INC.
145 SOUTH MIAMI AVE
VILLAGE OF CLEVES, OH
45002
513.467.9000
877.263.7610 TOLL FREE
513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Feb 28, 2017 Rootsmeter S/N 0438320 Ta (K) - 294
Operator Tisch Orifice I.D. - 0993 Pa (mm) - 750.57

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3860	3.2	2.00
2	NA	NA	1.00	0.9910	6.4	4.00
3	NA	NA	1.00	0.8840	7.9	5.00
4	NA	NA	1.00	0.8430	8.7	5.50
5	NA	NA	1.00	0.6970	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)		Va	(x axis) Qa	(y axis)
0.9967	0.7191	1.4149		0.9957	0.7184	0.8851
0.9925	1.0015	2.0010		0.9915	1.0005	1.2517
0.9904	1.1204	2.2372		0.9894	1.1192	1.3995
0.9894	1.1737	2.3464		0.9884	1.1725	1.4678
0.9842	1.4120	2.8299		0.9832	1.4106	1.7702
Qstd slope (m) =		2.04055		Qa slope (m) =		1.27776
intercept (b) =		-0.04890		intercept (b) =		-0.03059
coefficient (r) =		0.99995		coefficient (r) =		0.99995
y axis = SQRT[H2O(Pa/760)(298/Ta)]				y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

Vstd = Diff. Vol[(Pa-Diff. Hg)/760](298/Ta)
Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{[SQRT(H2O(Pa/760)(298/Ta))]- b}
Qa = 1/m{[SQRT H2O(Ta/Pa)]- b}

Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. **707368** Page 1 of 2 Pages

Customer : Dragages - China Habour - VSL Joint Venture

Address : 3/F., Island Place Tower, 510 King's Road, North Point, H. K.

Order No. : Q72989 **Date of receipt :** 27-Jul-17

Item Tested

Description : Weather Stations,Vantage Pro2

Manufacturer : Davis **I.D.** : --

Model : 6152CUK **Serial No.** : AK130520007

Test Conditions

Date of Test : 27-Jul-17 **Supply Voltage** : --

Ambient Temperature : (23 ± 3)°C **Relative Humidity :** (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : Z04.

Test Results

The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S219	Std. Anemometer	611931	NIM-PRC

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to International System of Units (SI), or by reference to a natural constant.
The test results apply to the above Unit-Under-Test only

Calibrated by : C H Chan

Approved by : Steve Kwan

Date: 27-Jul-17

This Certificate is issued by:
Hong Kong Calibration Ltd.
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street,Kwai Chung, NT,Hong Kong.
Tel: 2425 8801 Fax: 2425 8646

Calibration Certificate

Certificate No. 707368

Results :

1. Wind Speed

Applied Value (m/s)	UUT Reading (m/s)
0.0	0.0
2.5	2.2
5.0	4.9
7.5	7.2
10.0	9.8
15.0	14.8
19.0	19.2

Uncertainty : ± (0.9 % + 0.16 m/s)

2. Wind Direction

Reference Value	UUT Indication
N (0°)	N (0°)
NE (45°)	NE (45°)
E (90°)	E (90°)
SE (135°)	SE (135°)
S (180°)	S (180°)
SW (225°)	SW (225°)
W (270°)	W (270°)
NW (315°)	NW (315°)

Remark : 1. UUT: Unit-Under-Test
2. Atmospheric Pressure : 1 024 hPa
3. Before the calibration of the Wind Direction function, the Arrow Head was adjusted to the magnetic NORTH direction while the monitor indicated N. The customer is reminded to do the alignment again after installation.
4. The UUT was equipped with ISS Transmitter -- Mfg code: AK130520007.

---------- END ----------

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C167187
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-2886) Date of Receipt / 收件日期 : 16 December 2016

Description / 儀器名稱	:	Acoustic Calibrator
Manufacturer / 製造商	:	Svantek
Model No. / 型號	:	SV30A
Serial No. / 編號	:	24780
Supplied By / 委託者	:	Dragages - China Harbour - VSL Joint Venture 3/F, Island Place Tower, 510 King's Road, North Point, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 29 December 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By 測試 : H T Wong
Technical Officer

Certified By 核證 : K C Lee
Project Engineer

Date of Issue 簽發日期 : 30 December 2016

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址:: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C167187
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.

2. The results presented are the mean of 3 measurements at each calibration point.

3. Test equipment :

Equipment ID	Description	Certificate No.
CL130	Universal Counter	C163709
CL281	Multifunction Acoustic Calibrator	PA160023
TST150A	Measuring Amplifier	C161175

4. Test procedure : MA100N.

5. Results :

5.1 Sound Level Accuracy

UUT Nominal Value	Measured Value (dB)	Mfr's Spec. (dB)	Uncertainty of Measured Value (dB)
94 dB, 1 kHz	94.2	± 0.3	± 0.2
114 dB, 1 kHz	114.2		

5.2 Frequency Accuracy

UUT Nominal Value (kHz)	Measured Value (kHz)	Mfr's Spec.	Uncertainty of Measured Value (Hz)
1	0.999 99	1 kHz ± 0.02 %	± 0.01

Remark : - The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

輝創工程有限公司
Sun Creation Engineering Limited
Calibration and Testing Laboratory

Certificate of Calibration
校正證書

Certificate No. : C167188
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC16-2886) Date of Receipt / 收件日期 : 16 December 2016

Description / 儀器名稱	:	Sound & Vibration Analyser
Manufacturer / 製造商	:	Svantek
Model No. / 型號	:	SVAN977
Serial No. / 編號	:	45482
Supplied By / 委託者	:	Dragages - China Harbour - VSL Joint Venture 3/F, Island Place Tower, 510 King's Road, North Point, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 29 December 2016

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results do not exceed manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Agilent Technologies / Keysight Technologies
- Fluke Everett Service Center, USA
- Rohde & Schwarz Laboratory, Germany

Tested By 測試 : H T Wong, Technical Officer

Certified By 核證 : K C Lee, Project Engineer

Date of Issue 簽發日期 : 30 December 2016

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

Certificate of Calibration
校正證書

Certificate No. : C167188
證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.

2. Self-calibration using the Svantek acoustic calibrator SV30A, S/N : 24780 was performed before the test.

3. The results presented are the mean of 3 measurements at each calibration point.

4. Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C160077
CL281	Multifunction Acoustic Calibrator	PA160023

5. Test procedure : MA101N.

6. Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	113.8	± 1.1

6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
HIGH	SPL	A	Fast	114.00	1	113.8 (Ref.)
				104.00		103.8
				94.00		93.8

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

6.2 Time Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
HIGH	SPL	A	Fast	114.00	1	113.8	Ref.
			Slow			113.8	± 0.3

Certificate of Calibration
校正證書

Certificate No. : C167188
證書編號

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	A	Fast	114.00	63 Hz	87.6	-26.2 ± 1.5
					125 Hz	97.6	-16.1 ± 1.5
					250 Hz	105.1	-8.6 ± 1.4
					500 Hz	110.5	-3.2 ± 1.4
					1 kHz	113.8	Ref.
					2 kHz	115.0	+1.2 ± 1.6
					4 kHz	114.8	+1.0 ± 1.6
					8 kHz	112.8	-1.1 (+2.1 ; -3.1)
					12.5 kHz	109.5	-4.3 (+3.0 ; -6.0)

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 61672 Class 1 Spec. (dB)
Range	Mode	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
HIGH	SPL	C	Fast	114.00	63 Hz	113.0	-0.8 ± 1.5
					125 Hz	113.6	-0.2 ± 1.5
					250 Hz	113.8	0.0 ± 1.4
					500 Hz	113.8	0.0 ± 1.4
					1 kHz	113.8	Ref.
					2 kHz	113.6	-0.2 ± 1.6
					4 kHz	113.0	-0.8 ± 1.6
					8 kHz	110.9	-3.0 (+2.1 ; -3.1)
					12.5 kHz	107.6	-6.2 (+3.0 ; -6.0)

Certificate of Calibration
校正證書

Certificate No. : C167188
證書編號

Remarks : - UUT Microphone Model No. : ACO 7052E & S/N : 63626

- Mfr's Spec. : IEC 61672 Class 1

- Uncertainties of Applied Value :

114 dB	63 Hz - 125 Hz	: ± 0.45 dB
	250 Hz - 500 Hz	: ± 0.40 dB
	1 kHz	: ± 0.30 dB
	2 kHz - 4 kHz	: ± 0.45 dB
	8 kHz	: ± 0.55 dB
	12.5 kHz	: ± 0.80 dB
	1 kHz	: ±0.10 dB (Ref. 94 dB)
104 dB	1 kHz	: ± 0.10 dB (Ref. 94 dB)
94 dB	1 kHz	: ± 0.20 dB

- The uncertainties are for a confidence probability of not less than 95 %.

Note :
Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

Sun Creation Engineering Limited – Calibration & Testing Laboratory
c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong
輝創工程有限公司 – 校正及檢測實驗所
c/o 香港新界屯門興安里一號青山灣機樓四樓
Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com

CASTCO
佳力高試驗中心有限公司
CASTCO TESTING CENTRE LIMITED

TEST REPORT
Chemical Analysis of Water
Accuracy check of YSI Sondes Environmental Monitoring System

Date of issue: 04-11-2017
Page 1 of 1 page(s) Castco LRN: 171026-0110

Sample details as supplied by customer:-

Customer : Dragages-China Harbour-VSL Joint Venture Customer Ref. No. : --
Address: Tung Chung Waterfront Road, adjacent to Tung Chung New Development Pier
Job Title : Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road - Section between HKSAR Boundary and Scenic Hill
Contract No.: HY/2011/09

Laboratory Test Results:-

Instrument Name: Sonde Environmental Monitoring System
Manufacturer : YSI Instrument No. : SW-08-09
Model No. : EXO Date of Calibration : 26-10-2017
Serial No. : 16J100889 Date of Next Calibration : 26-01-2018

pH Value Check (pH Probe : 16J100419)

Expected Reading (pH Unit)	Sonde Reading (pH Unit)	Tolerance (pH Unit)	Tolerance Limit (pH Unit)	Method Reference
4.00	3.97	-0.03	± 0.2	APHA 21e, 4500-H^+B
7.02	6.98	-0.04		
10.06	9.97	-0.09		

Turbidity Check (Turbidity Sensor : 16H102467)

Expected Reading (NTU)	Sonde Reading (NTU)	Tolerance (%)	Tolerance Limit (%)	Method Reference
4.00	4.28	+7.0	± 10	APHA 21e, 2130B
10.00	10.63	+6.3		
20.00	21.16	+5.8		
50.00	51.51	+3.0		
100.00	102.33	+2.3		

Conductivity Performance Check (Conductivity Sensor : 16G102310)

Expected Reading (µS/cm)	Sonde Reading (µS/cm)	Tolerance (%)	Tolerance Limit (%)	Method Reference
1412 at 25 °C	1324 at 25 °C	-6.2	± 10	APHA 21e, 2510B

Salinity Performance Check (Salinity Sensor : 16G102310)

Expected Reading (µS/cm)	Sonde Reading (µS/cm)	Tolerance (%)	Tolerance Limit (%)	Method Reference
33	33.46	+1.4	± 10	APHA 19e, 2520B

Dissolved Oxygen Check (Dissolved Oxygen Sensor: 16H102988)

DO from Winkler Titration (mg/L)	Sonde Reading (mg/L)	Tolerance (mg/L)	Tolerance Limit (mg/L)	Method Reference
8.78	8.98	+0.20	± 0.20	APHA 21e, 4500-O C&G
4.97	5.15	+0.18		

Water Level Meter Check

Expected Reading (m)	Sonde Reading (m)	Tolerance (m)	Tolerance Limit (m)	Method Reference
1.06	1.061	+0.001	± 0.05	YSI Sondes Procedure Manual

Temperature Check

Expected Reading (℃)	Sonde Reading (℃)	Tolerance (℃)	Tolerance Limit (℃)	Method Reference
25.2	25.051	-0.149	± 2.0	Telarc Technical Guide No.3 1986

Checked by : _____
Au Kwok Kin
Senior Chemist

Certified by : _____
Cheng Chi Fai
Senior Manager

End of Report

Form No. ENV SONDE_T1 dd 02/16/2013

香港粉嶺安居街33號 33, On Kui Street, Fanling, Hong Kong. Tel : 2597 8333
香港粉嶺安全街29A號 29A, On Chuen Street, Fanling, Hong Kong. Fax: 2597 8399
E-mail: info@castco.com.hk Website: www.castco.com.hk

CASTCO
佳力高試驗中心有限公司
CASTCO TESTING CENTRE LIMITED

TEST REPORT
Chemical Analysis of Water
Accuracy check of YSI Sondes Environmental Monitoring System

Date of issue: 04-11-2017

Castco LRN: 171026-0112

Sample details as supplied by customer:-

Customer : Dragages-China Harbour-VSL Joint Venture Customer Ref. No. : --
Address: Tung Chung Waterfront Road, adjacent to Tung Chung New Development Pier
Job Title : Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road - Section between HKSAR Boundary and Scenic Hill
Contract No.: HY/2011/09

Laboratory Test Results:-

Instrument Name: Sonde Environmental Monitoring System
Manufacturer : YSI Instrument No. : SW-08-85
Model No. : EXO Date of Calibration : 26-10-2017
Serial No. : 17B100180 Date of Next Calibration : 26-01-2018

pH Value Check (pH Probe : 17A105263)

Expected Reading (pH Unit)	Sonde Reading (pH Unit)	Tolerance (pH Unit)	Tolerance Limit (pH Unit)	Method Reference
4.00	3.97	-0.03	± 0.2	APHA 21e, 4500-H^+B
7.02	6.97	-0.05		
10.06	9.97	-0.09		

Turbidity Check (Turbidity Sensor : 17A104092)

Expected Reading (NTU)	Sonde Reading (NTU)	Tolerance (%)	Tolerance Limit (%)	Method Reference
4.00	3.96	-1.0	± 10	APHA 21e, 2130B
10.00	10.01	+0.1		
20.00	20.11	+0.6		
50.00	50.84	+1.7		
100.00	101.97	+2.0		

Conductivity Performance Check (Conductivity Sensor : 17A105103)

Expected Reading (µS/cm)	Sonde Reading (µS/cm)	Tolerance (%)	Tolerance Limit (%)	Method Reference
1412 at 25 °C	1312 at 25 °C	-7.1	± 10	APHA 21e, 2510B

Salinity Performance Check (Salinity Sensor : 17A105103)

Expected Reading (µS/cm)	Sonde Reading (µS/cm)	Tolerance (%)	Tolerance Limit (%)	Method Reference
33	34.57	+4.8	± 10	APHA 19e, 2520B

Dissolved Oxygen Check (Dissolved Oxygen Sensor: 17A105009)

DO from Winkler Titration (mg/L)	Sonde Reading (mg/L)	Tolerance (mg/L)	Tolerance Limit (mg/L)	Method Reference
8.75	8.94	+0.19	± 0.20	APHA 21e, 4500-O C&G
4.68	4.88	+0.20		

Water Level Meter Check

Expected Reading (m)	Sonde Reading (m)	Tolerance (m)	Tolerance Limit (m)	Method Reference
1.06	1.035	-0.025	-0.025	YSI Sondes Procedure Manual

Temperature Check

Expected Reading (℃)	Sonde Reading (℃)	Tolerance (℃)	Tolerance Limit (℃)	Method Reference
25.0	24.870	-0.130	± 2.0	Telarc Technical Guide No.3 1986

Checked by : _____
Au Kwok Kin
Senior Chemist

Certified by : _____
Cheng Chi Fai
Senior Manager

End of Report

香港粉嶺安居街33號 33, On Kui Street, Fanling, Hong Kong. Tel : 2597 8333
香港粉嶺安全街29A號 29A, On Chuen Street, Fanling, Hong Kong. Fax: 2597 8399
E-mail: info@castco.com.hk Website: www.castco.com.hk

APPENDIX D
ENVIRONMENTAL MONITORING SCHEDULES

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Impact Air Quality and Noise Monitoring Schedule in December 2017

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Dec	2-Dec
3-Dec	4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec
	24 hr TSP 1 hr TSP X 3	Noise			24 hr TSP 1 hr TSP X 3	
10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec
				24 hr TSP 1 hr TSP X 3	Noise	
17-Dec	18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec
			24 hr TSP 1 hr TSP X 3	Noise		
24-Dec	**25-Dec**	**26-Dec**	27-Dec	28-Dec	29-Dec	30-Dec
		24 hr TSP 1 hr TSP X 3	Noise			24 hr TSP 1 hr TSP X 3
31-Dec						

Air Quality Monitoring Stations
AMS1 - Sha Lo Wan
AMS4 - San Tau

Noise Monitoring Stations
NMS1 - Sha Lo Wan
NMS4 - San Tau

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Tentative Impact Air Quality and Noise Monitoring Schedule in January 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan
					24 hr TSP 1 hr TSP X 3	Noise
7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan
				24 hr TSP 1 hr TSP X 3	Noise	
14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
			24 hr TSP 1 hr TSP X 3	Noise		
21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan
		24 hr TSP 1 hr TSP X 3	Noise			
28-Jan	29-Jan	30-Jan	31-Jan			
	24 hr TSP 1 hr TSP X 3	Noise				

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Air Quality Monitoring Stations
AMS1 - Sha Lo Wan
AMS4 - San Tau

Noise Monitoring Stations
NMS1 - Sha Lo Wan
NMS4 - San Tau

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Impact Water Quality Monitoring Schedule in December 2017

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Dec	2-Dec
						Water Quality Monitoring Mid-Ebb 11:35 Mid-Flood 17:27
3-Dec	4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec
	Water Quality Monitoring Mid-Ebb 13:14 Mid-Flood 18:41		Water Quality Monitoring Mid-Flood 9:19 Mid-Ebb 14:55		Water Quality Monitoring Mid-Flood 11:15 Mid-Ebb 16:51	
10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec
		Water Quality Monitoring Mid-Ebb 8:04 Mid-Flood 15:06		Water Quality Monitoring Mid-Ebb 10:21 Mid-Flood 16:17		Water Quality Monitoring Mid-Ebb 11:53 Mid-Flood 17:21
17-Dec	18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec
	Water Quality Monitoring Mid-Ebb 13:05 Mid-Flood 18:21		Water Quality Monitoring Mid-Flood 8:44 Mid-Ebb 14:09		Water Quality Monitoring Mid-Flood 9:54 Mid-Ebb 15:18	
24-Dec	**25-Dec**	**26-Dec**	27-Dec	28-Dec	29-Dec	30-Dec
		Water Quality Monitoring Mid-Flood 13:07 Mid-Ebb 19:23		Water Quality Monitoring Mid-Ebb 7:38 Mid-Flood 14:40		Water Quality Monitoring Mid-Ebb 10:12 Mid-Flood 16:07
31-Dec						

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Tentative Impact Water Quality Monitoring Schedule in January 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan
		Water Quality Monitoring Mid-Ebb 13:03 Mid-Flood 18:24		Water Quality Monitoring Mid-Flood 9:07 Mid-Ebb 14:44		Water Quality Monitoring Mid-Flood 10:41 Mid-Ebb 16:24
7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan
	Water Quality Monitoring Mid-Flood 12:20 Mid-Ebb 18:21		Water Quality Monitoring Mid-Ebb 7:03 Mid-Flood 14:01		Water Quality Monitoring Mid-Ebb 9:51 Mid-Flood 15:28	
14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
	Water Quality Monitoring Mid-Ebb 12:16 Mid-Flood 17:26		Water Quality Monitoring Mid-Flood 7:57 Mid-Ebb 13:22		Water Quality Monitoring Mid-Flood 8:52 Mid-Ebb 14:25	
21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan
	Water Quality Monitoring Mid-Flood 10:28 Mid-Ebb 16:18		Water Quality Monitoring Mid-Flood 11:49 Mid-Ebb 18:11		Water Quality Monitoring Mid-Ebb 6:58 Mid-Flood 13:37	
28-Jan	29-Jan	30-Jan	31-Jan			
	Water Quality Monitoring Mid-Ebb 11:04 Mid-Flood 16:29		Water Quality Monitoring Mid-Flood 7:19 Mid-Ebb 12:56			

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Construction-Phase Dolphin Monitoring in West Lantau (Line Transect Vessel Survey) in December 2017

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Dec	2-Dec
3-Dec	4-Dec	5-Dec	6-Dec	7-Dec	8-Dec	9-Dec
	Line Transect Vessel Survey					
10-Dec	11-Dec	12-Dec	13-Dec	14-Dec	15-Dec	16-Dec
17-Dec	18-Dec	19-Dec	20-Dec	21-Dec	22-Dec	23-Dec
				Line Transect Vessel Survey		
24-Dec	**25-Dec**	**26-Dec**	27-Dec	28-Dec	29-Dec	30-Dec
31-Dec						

Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill
Tentative Construction-Phase Dolphin Monitoring in West Lantau (Line Transect Vessel Survey) in January 2018

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Jan	2-Jan	3-Jan	4-Jan	5-Jan	6-Jan
			Line Transect Vessel Survey			
7-Jan	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	13-Jan
14-Jan	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	20-Jan
21-Jan	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	27-Jan
		Line Transect Vessel Survey				
28-Jan	29-Jan	30-Jan	31-Jan			

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)

APPENDIX E
1-HOUR TSP MONITORING RESULTS AND GRAPHICAL PRESENTATION

Appendix E - 1-hour TSP Monitoring Results

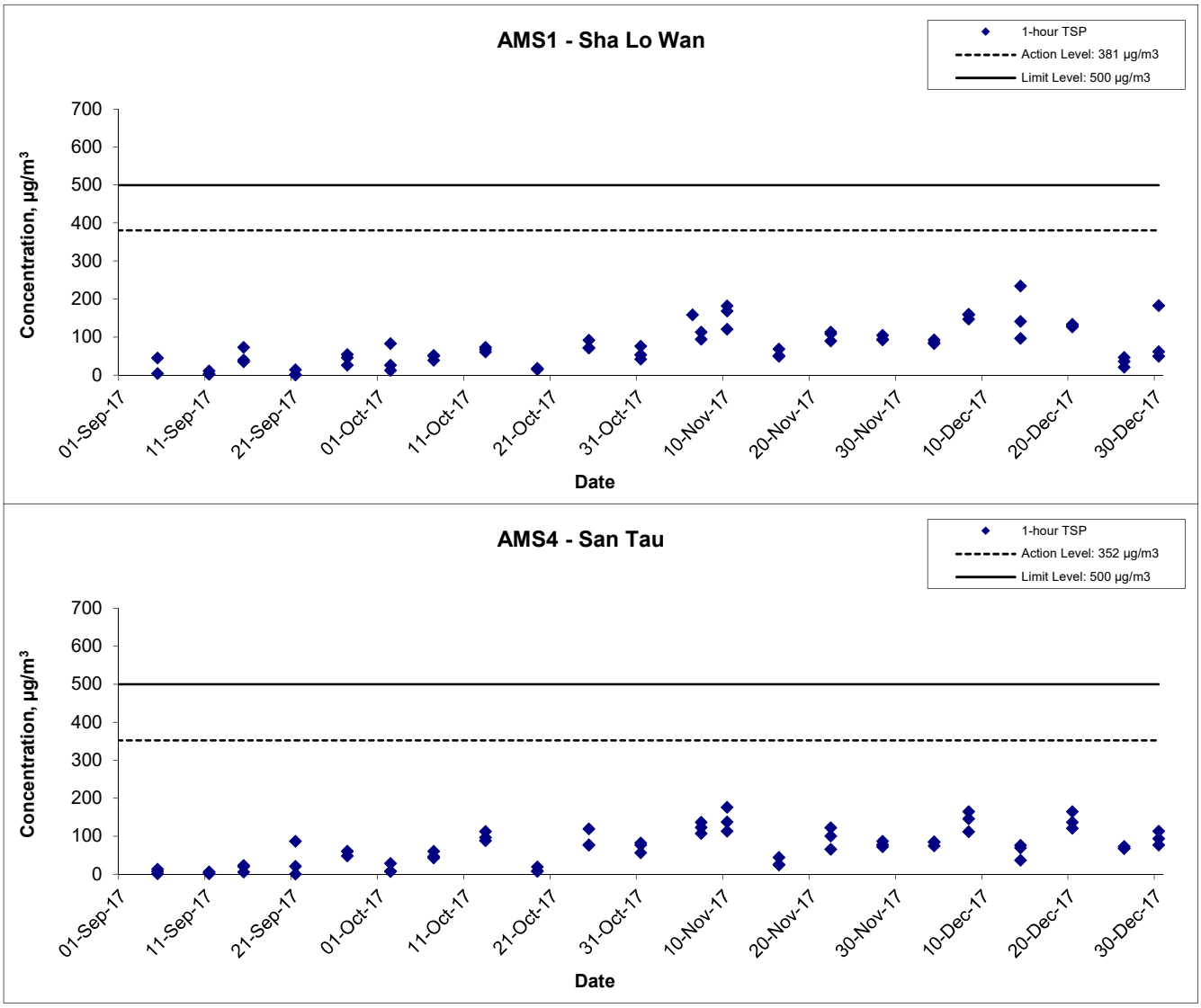
Location AMS1 - Sha Lo Wan

Sampling Date	Start Time	Weather Condition	Air Temp. (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Elapse Time		Sampling Time(hrs.)	Flow Rate (m^3/min.)		Av. flow (m^3/min)	Total vol. (m^3)	Conc. ($\mu g/m^3$)
					Initial	Final		Initial	Final		Initial	Final			
4-Dec-17	9:00	Sunny	292.5	767.3	2.5857	2.5920	0.0063	2722.9	2723.9	1.0	1.23	1.23	1.23	73.6	86
4-Dec-17	10:00	Sunny	292.7	767.1	2.5954	2.6015	0.0061	2723.9	2724.9	1.0	1.23	1.23	1.23	73.6	83
4-Dec-17	11:00	Sunny	292.9	766.9	2.5911	2.5979	0.0068	2724.9	2725.9	1.0	1.23	1.23	1.23	73.6	92
8-Dec-17	11:00	Sunny	289.8	769.5	2.5973	2.6082	0.0109	2749.9	2750.9	1.0	1.23	1.23	1.23	74.1	147
8-Dec-17	13:00	Sunny	291.7	767.6	2.5812	2.5930	0.0118	2750.9	2751.9	1.0	1.23	1.23	1.23	73.8	160
8-Dec-17	14:00	Sunny	291.9	767.4	2.5841	2.5958	0.0117	2751.9	2752.9	1.0	1.23	1.23	1.23	73.7	159
14-Dec-17	10:30	Cloudy	291.9	765.9	2.5776	2.5847	0.0071	2777.1	2778.1	1.0	1.23	1.23	1.23	73.7	96
14-Dec-17	13:00	Cloudy	293.0	765.3	2.5793	2.5897	0.0104	2778.1	2779.1	1.0	1.23	1.22	1.23	73.5	141
14-Dec-17	14:00	Cloudy	293.2	765.1	2.5960	2.6132	0.0172	2779.1	2780.1	1.0	1.22	1.22	1.22	73.5	234
20-Dec-17	9:00	Sunny	285.4	774.2	2.5942	2.6039	0.0097	2804.2	2805.2	1.0	1.25	1.25	1.25	74.8	130
20-Dec-17	10:00	Sunny	285.6	774.0	2.6002	2.6097	0.0095	2805.2	2806.2	1.0	1.25	1.25	1.25	74.8	127
20-Dec-17	11:00	Sunny	285.8	773.8	2.5824	2.5924	0.0100	2806.2	2807.2	1.0	1.25	1.25	1.25	74.7	134
26-Dec-17	9:00	Sunny	289.9	767.1	2.6184	2.6218	0.0034	2831.2	2832.2	1.0	1.22	1.21	1.22	72.9	47
26-Dec-17	10:00	Sunny	290.1	766.9	2.6013	2.6028	0.0015	2832.2	2833.2	1.0	1.21	1.21	1.21	72.9	21
26-Dec-17	11:00	Sunny	290.3	766.7	2.6039	2.6065	0.0026	2833.2	2834.2	1.0	1.21	1.21	1.21	72.8	36
30-Dec-17	10:00	Sunny	291.4	769.3	2.6011	2.6056	0.0045	2858.2	2859.2	1.0	1.21	1.21	1.21	72.8	62
30-Dec-17	11:00	Sunny	291.7	769.1	2.6078	2.6114	0.0036	2859.2	2860.2	1.0	1.21	1.21	1.21	72.8	49
30-Dec-17	14:00	Sunny	292.5	767.8	2.5865	2.5998	0.0133	2860.2	2861.2	1.0	1.21	1.21	1.21	72.6	183
														Min	21
														Max	234
														Average	112

Location AMS4 - San Tau

Sampling Date	Start Time	Weather Condition	Air Temp. (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Elapse Time		Sampling Time(hrs.)	Flow Rate (m^3/min.)		Av. flow (m^3/min)	Total vol. (m^3)	Conc. ($\mu g/m^3$)
					Initial	Final		Initial	Final		Initial	Final			
4-Dec-17	13:45	Cloudy	294.4	764.4	2.5918	2.5981	0.0063	9769.4	9770.4	1.0	1.23	1.23	1.23	73.8	85
4-Dec-17	14:52	Cloudy	294.6	764.2	2.6054	2.6109	0.0055	9770.4	9771.4	1.0	1.23	1.23	1.23	73.7	75
4-Dec-17	15:56	Cloudy	294.8	764.0	2.5867	2.5929	0.0062	9771.4	9772.4	1.0	1.23	1.23	1.23	73.7	84
8-Dec-17	13:05	Sunny	292.5	766.6	2.6025	2.6133	0.0108	9796.4	9797.4	1.0	1.24	1.24	1.24	74.1	146
8-Dec-17	14:05	Sunny	292.7	766.4	2.5888	2.5971	0.0083	9797.4	9798.4	1.0	1.24	1.23	1.24	74.1	112
8-Dec-17	15:05	Sunny	292.9	766.2	2.5860	2.5982	0.0122	9798.4	9799.4	1.0	1.23	1.23	1.23	74.1	165
14-Dec-17	10:00	Cloudy	292.3	765.3	2.5931	2.5958	0.0027	9823.4	9824.4	1.0	1.24	1.23	1.23	74.1	36
14-Dec-17	11:00	Cloudy	292.5	765.1	2.6009	2.6060	0.0051	9824.4	9825.4	1.0	1.23	1.23	1.23	74.1	69
14-Dec-17	13:00	Cloudy	293.2	764.6	2.6000	2.6056	0.0056	9825.4	9826.4	1.0	1.23	1.23	1.23	73.9	76
20-Dec-17	13:20	Sunny	291.5	771.6	2.6007	2.6130	0.0123	9850.4	9851.4	1.0	1.24	1.24	1.24	74.5	165
20-Dec-17	14:25	Sunny	291.7	771.4	2.5970	2.6072	0.0102	9851.4	9852.4	1.0	1.24	1.24	1.24	74.5	137
20-Dec-17	15:30	Sunny	291.9	771.2	2.5977	2.6067	0.0090	9852.4	9853.4	1.0	1.24	1.24	1.24	74.5	121
26-Dec-17	14:00	Sunny	293.1	766.5	2.5900	2.5954	0.0054	9877.4	9878.4	1.0	1.23	1.23	1.23	74.1	73
26-Dec-17	15:00	Sunny	293.3	766.3	2.6053	2.6103	0.0050	9878.4	9879.4	1.0	1.23	1.23	1.23	74.0	68
26-Dec-17	16:00	Sunny	293.5	766.1	2.5973	2.6023	0.0050	9879.4	9880.4	1.0	1.23	1.23	1.23	74.0	68
30-Dec-17	11:00	Cloudy	292.4	768.6	2.5936	2.5993	0.0057	9904.4	9905.4	1.0	1.24	1.24	1.24	74.3	77
30-Dec-17	13:00	Cloudy	293.2	767.3	2.6062	2.6131	0.0069	9905.4	9906.4	1.0	1.23	1.23	1.23	74.1	93
30-Dec-17	14:00	Cloudy	293.4	767.1	2.6026	2.6110	0.0084	9906.4	9907.4	1.0	1.23	1.23	1.23	74.0	113
														Min	36
														Max	165
														Average	98

1-hour TSP Concentration Levels



Title: Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 1-hour TSP Monitoring Results	Scale: N.T.S Date: Dec 17	Project No.: MA12014 Appendix: E	CINOTECH

APPENDIX F
24-HOUR TSP MONITORING RESULTS AND GRAPHICAL PRESENTATION

Appendix F - 24-hour TSP Monitoring Results

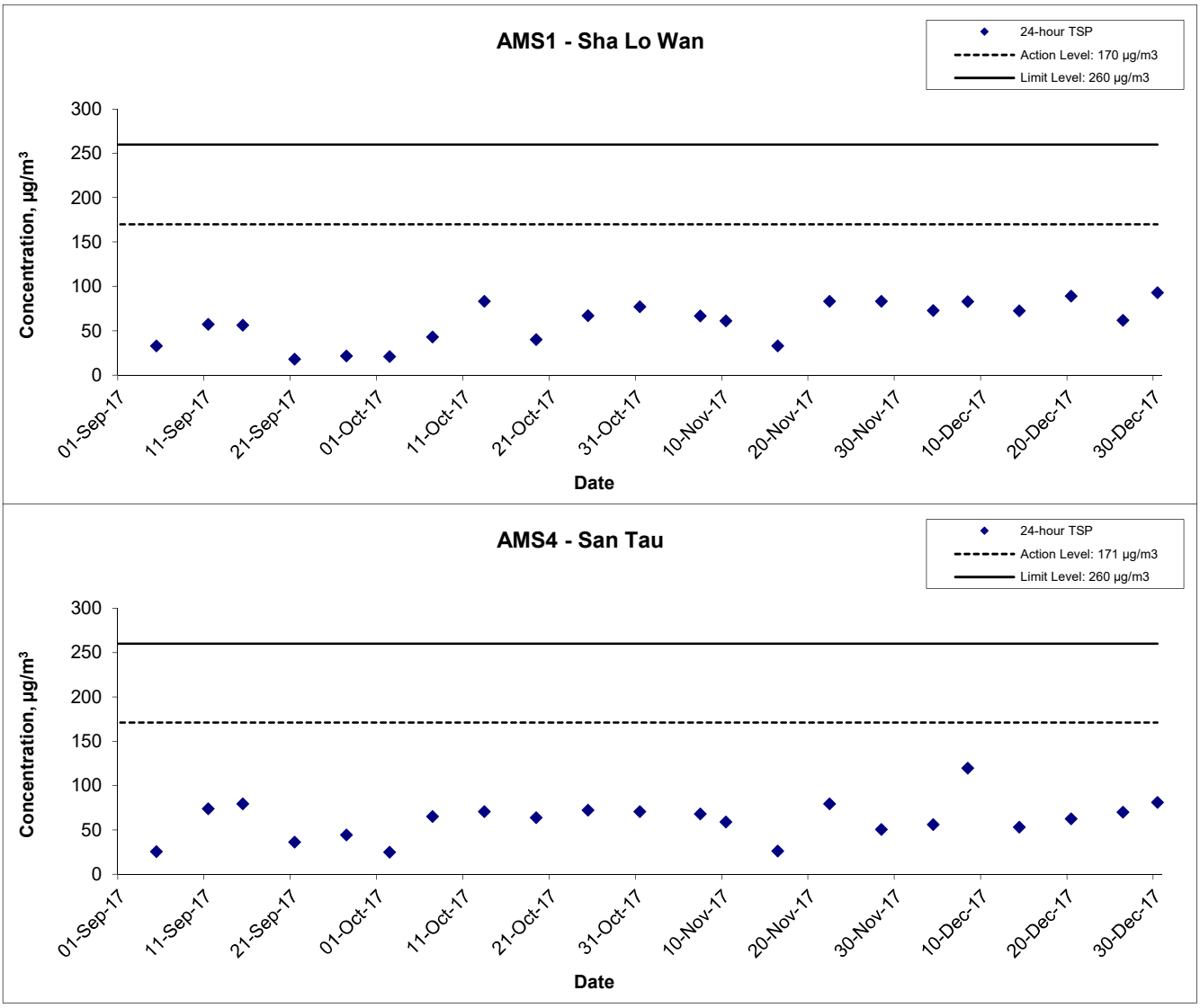
Location AMS1 - Sha Lo Wan

Sampling Date	Start Time	Weather Condition	Air Temp. (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Elapse Time		Sampling Time(hrs.)	Flow Rate (m^3/min.)		Av. flow (m^3/min)	Total vol. (m^3)	Conc. (μg/m^3)
					Initial	Final		Initial	Final		Initial	Final			
4-Dec-17	12:05	Cloudy	293.1	766.7	2.5762	2.7047	0.1285	2725.9	2749.9	24.0	1.23	1.23	1.23	1765.2	73
8-Dec-17	15:00	Sunny	292.1	767.2	2.5915	2.7384	0.1469	2752.9	2776.9	24.0	1.23	1.23	1.23	1768.6	83
14-Dec-17	16:00	Cloudy	293.8	764.7	2.5927	2.7206	0.1279	2780.2	2804.2	24.0	1.22	1.22	1.22	1761.2	73
20-Dec-17	12:35	Sunny	296.2	773.4	2.5880	2.7449	0.1569	2807.2	2831.2	24.0	1.23	1.22	1.22	1763.8	89
26-Dec-17	13:00	Sunny	290.7	766.2	2.5821	2.6901	0.1080	2834.2	2858.2	24.0	1.21	1.21	1.21	1746.5	62
30-Dec-17	16:10	Cloudy	293.0	767.1	2.6055	2.7673	0.1618	2861.2	2885.2	24.0	1.21	1.21	1.21	1740.7	93
														Min	62
														Max	93
														Average	79

Location AMS4 - San Tau

Sampling Date	Start Time	Weather Condition	Air Temp. (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Elapse Time		Sampling Time(hrs.)	Flow Rate (m^3/min.)		Av. flow (m^3/min)	Total vol. (m^3)	Conc. (μg/m^3)
					Initial	Final		Initial	Final		Initial	Final			
4-Dec-17	17:00	Cloudy	295.0	763.8	2.5881	2.6869	0.0988	9772.4	9796.4	24.0	1.23	1.23	1.23	1768.0	56
8-Dec-17	16:10	Cloudy	293.1	766.0	2.5931	2.8055	0.2124	9799.4	9823.4	24.0	1.23	1.23	1.23	1776.7	120
14-Dec-17	14:00	Cloudy	293.4	764.4	2.5869	2.6811	0.0942	9826.4	9850.4	24.0	1.23	1.23	1.23	1773.8	53
20-Dec-17	16:35	Sunny	292.1	771.0	2.5940	2.7056	0.1116	9853.4	9877.4	24.0	1.24	1.24	1.24	1786.0	62
26-Dec-17	17:00	Sunny	293.7	765.9	2.6017	2.7256	0.1239	9880.4	9904.4	24.0	1.23	1.23	1.23	1774.6	70
30-Dec-17	15:10	Cloudy	293.6	766.9	2.5870	2.7309	0.1439	9907.4	9931.4	24.0	1.23	1.23	1.23	1776.2	81
														Min	53
														Max	120
														Average	74

24-hour TSP Concentration Levels



Title: Contract No. HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road – Section between HKSAR Boundary and Scenic Hill Graphical Presentation of 24-hour TSP Monitoring Results	Scale: N.T.S Date: Dec 17	Project No.: MA12014 Appendix: F	CINOTECH

APPENDIX G
NOISE MONITORING RESULTS AND GRAPHICAL PRESENTATION

Appendix G - Noise Monitoring Results

Location NMS 1 - Sha Lo Wan

Date	Weather	Time	Unit: dB (A) (5-min)			Average	Baseline Level	Construction Noise Level
			L_{eq}	L_{10}	L_{90}	L_{eq}	L_{eq}	L_{eq}
5-Dec-17	Cloudy	9:56	71.7	76.9	61.4	72	66.9	72.0 Measured ≦ Limit Level
		10:01	73.1	76.9	61.8			
		10:06	70.9	73.7	67.1			
		10:11	71.2	74.3	66.7			
		10:16	73.4	79.0	63.4			
		10:21	71.8	76.6	63.2			
15-Dec-17	Cloudy	15:00	67.0	69.7	57.0	68		68.0 Measured ≦ Limit Level
		15:05	66.5	71.2	57.0			
		15:10	69.0	74.7	54.4			
		15:15	67.1	72.7	54.9			
		15:20	66.4	70.3	57.6			
		15:25	68.9	74.2	56.4			
21-Dec-17	Sunny	15:38	70.2	73.9	62.1	69		69.0 Measured ≦ Limit Level
		15:43	71.3	75.1	62.0			
		15:48	67.7	71.7	58.4			
		15:53	64.5	70.9	55.2			
		15:58	69.2	73.8	55.0			
		16:03	66.6	70.5	60.2			
27/17/2017	Sunny	11:00	63.5	68.2	56.9	64		64.0 Measured ≦ Limit Level
		11:05	63.6	68.1	55.4			
		11:10	64.1	67.2	56.4			
		11:15	63.8	68.0	56.5			
		11:20	63.7	67.8	56.1			
		11:25	63.0	67.5	56.3			

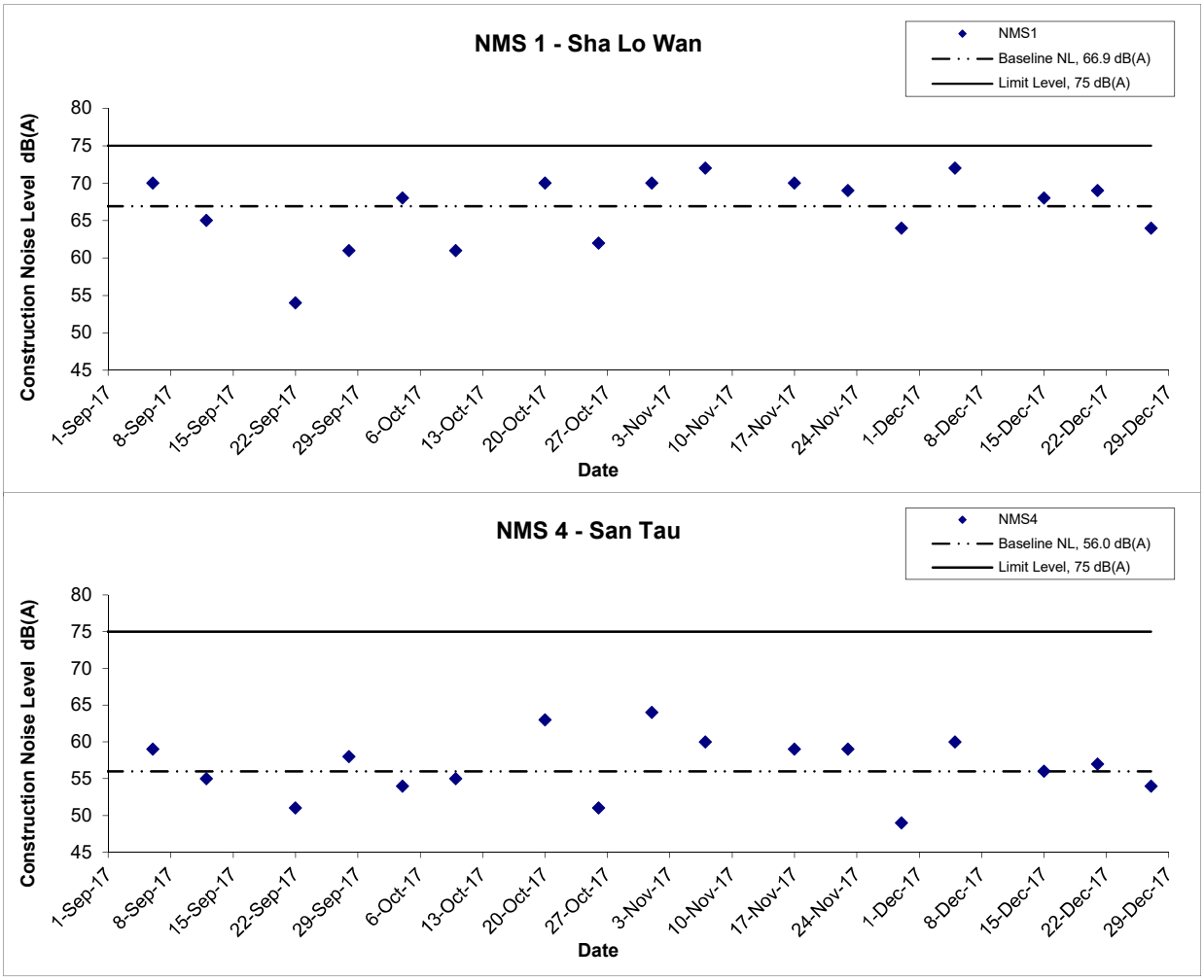
Remark: * +3dB(A) Façade correction included

Location NMS 4 - San Tau

Date	Weather	Time	Unit: dB (A) (5-min)			Average	Baseline Level	Construction Noise Level
			L_{eq}	L_{10}	L_{90}	L_{eq}	L_{eq}	L_{eq}
5-Dec-17	Cloudy	14:56	59.7	61.6	57.5	60	56.0	60.0 Measured ≦ Limit Level
		15:01	59.4	61.6	57.5			
		15:06	60.6	62.6	58.0			
		15:11	60.1	61.8	57.7			
		15:16	60.2	61.8	57.8			
		15:21	61.9	63.4	58.3			
15-Dec-17	Cloudy	14:00	54.8	56.3	52.5	56		56.0 Measured ≦ Limit Level
		14:05	57.6	60.5	53.4			
		14:10	56.3	58.9	48.4			
		14:15	57.2	61.0	45.3			
		14:20	53.6	56.5	46.4			
		14:25	51.5	55.2	44.8			
21-Dec-17	Sunny	16:49	55.5	58.5	51.1	57		57.0 Measured ≦ Limit Level
		16:54	57.5	61.1	50.6			
		16:59	56.1	59.2	50.1			
		17:04	57.4	61.1	51.4			
		17:09	55.8	59.2	51.0			
		17:14	58.5	61.9	51.7			
27/17/2017	Sunny	15:00	54.4	55.9	50.2	54		54.0 Measured ≦ Limit Level
		15:05	53.9	55.7	50.0			
		15:10	54.4	56.0	50.4			
		15:15	54.2	55.9	50.3			
		15:20	54.3	56.2	49.9			
		15:25	54.0	55.7	49.8			

Remark: * +3dB(A) Façade correction included

Noise Levels



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

APPENDIX H
WATER QUALITY MONITORING RESULTS AND GRAPHICAL PRESENTATION

Water Quality Monitoring Results at CS1 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:06	Surface	1	22.3 22.3	22.3	8.2 8.2	8.2	33.5 33.6	33.6	100.5 99.0	99.8	7.2 7.1	7.2	7.2	8.5 7.8	8.2	14.6	10.9 8.4	9.7	8.3
				Middle	5.5	22.3 22.3	22.3	8.2 8.2	8.2	33.6 33.6	33.6	99.7 99.0	99.4	7.1 7.1	7.1		8.0 8.8	8.4		7.4 7.4	7.4	
				Bottom	10	22.2 22.2	22.2	8.2 8.3	8.3	33.6 33.6	33.6	98.4 97.7	98.1	7.0 7.0	7.0	7.0	25.8 28.4	27.1		7.3 8.4	7.9	
4-Dec-17	Cloudy	Moderate	12:37	Surface	1	22.2 22.2	22.2	8.0 8.0	8.0	31.8 31.8	31.8	100.1 98.4	99.3	7.3 7.1	7.2	7.2	8.0 8.0	8.0	12.6	15.2 11.5	13.4	12.2
				Middle	6	22.0 22.0	22.0	8.0 8.0	8.0	32.2 32.1	32.2	97.4 97.5	97.5	7.1 7.1	7.1		9.9 9.9	9.9		12.5 10.4	11.5	
				Bottom	11	22.0 22.0	22.0	8.0 8.0	8.0	33.0 32.8	32.9	96.6 96.6	96.6	7.0 7.0	7.0	7.0	20.0 19.6	19.8		11.1 12.3	11.7	
6-Dec-17	Fine	Moderate	14:01	Surface	1	21.9 21.9	21.9	8.0 8.0	8.0	31.9 31.9	31.9	96.5 95.8	96.2	7.0 7.0	7.0	7.0	9.4 9.4	9.4	17.3	15.8 11.6	13.7	16.6
				Middle	5.5	21.8 21.8	21.8	8.0 8.0	8.0	32.7 32.7	32.7	95.0 95.0	95.0	6.9 6.9	6.9		16.1 16.4	16.3		18.9 17.1	18.0	
				Bottom	10	21.8 21.8	21.8	8.0 8.0	8.0	33.0 32.9	33.0	94.5 94.3	94.4	6.8 6.9	6.9	6.9	26.1 26.4	26.3		20.4 15.5	18.0	
8-Dec-17	Cloudy	Rough	15:27	Surface	1	21.5 21.5	21.5	7.9 7.9	7.9	32.4 32.4	32.4	99.1 98.6	98.9	7.2 7.2	7.2	7.2	13.1 13.0	13.1	14.7	10.4 9.2	9.8	10.6
				Middle	6	21.6 21.6	21.6	7.9 8.0	8.0	32.9 32.9	32.9	97.2 96.9	97.1	7.1 7.0	7.1		15.1 15.1	15.1		14.4 11.1	12.8	
				Bottom	11	21.6 21.6	21.6	8.0 8.0	8.0	33.1 33.1	33.1	97.0 96.9	97.0	7.0 7.0	7.0	7.0	15.9 15.6	15.8		10.1 8.3	9.2	
12-Dec-17	Fine	Calm	08:37	Surface	1	20.8 20.8	20.8	8.1 8.1	8.1	33.2 33.2	33.2	97.7 97.4	97.6	7.2 7.2	7.2	7.2	4.1 4.4	4.3	4.9	5.9 5.2	5.6	6.1
				Middle	5.5	20.8 20.8	20.8	8.1 8.1	8.1	33.2 33.2	33.2	97.3 97.2	97.3	7.2 7.2	7.2		4.7 4.7	4.7		7.7 5.0	6.4	
				Bottom	10	20.8 20.8	20.8	8.1 8.1	8.1	33.2 33.2	33.2	97.1 97.2	97.2	7.2 7.2	7.2	7.2	5.5 5.9	5.7		6.6 6.1	6.4	
14-Dec-17	Cloudy	Moderate	11:02	Surface	1	20.5 20.6	20.6	8.1 8.1	8.1	33.7 33.7	33.7	97.1 96.7	96.9	7.2 7.1	7.2	7.2	7.8 8.0	7.9	9.9	9.8 11.6	10.7	9.6
				Middle	5.5	20.5 20.6	20.6	8.1 8.1	8.1	33.7 33.7	33.7	96.1 96.3	96.2	7.1 7.1	7.1		9.6 9.8	9.7		9.2 9.3	9.3	
				Bottom	10	20.5 20.5	20.5	8.1 8.1	8.1	33.7 33.7	33.7	95.8 95.6	95.7	7.1 7.0	7.1	7.1	12.0 11.9	12.0		9.5 7.9	8.7	
16-Dec-17	Cloudy	Rough	12:05	Surface	1	19.9 19.9	19.9	8.0 8.0	8.0	32.3 32.3	32.3	99.5 98.8	99.2	7.5 7.4	7.5	7.4	9.4 9.6	9.5	10.1	13.6 13.8	13.7	16.0
				Middle	5.5	20.1 20.1	20.1	8.1 8.1	8.1	32.8 32.8	32.8	97.9 97.6	97.8	7.3 7.3	7.3		9.1 9.1	9.1		19.6 21.7	20.7	
				Bottom	10	20.1 20.1	20.1	8.1 8.1	8.1	33.3 33.6	33.5	96.4 96.1	96.3	7.2 7.2	7.2	7.2	11.7 11.8	11.8		11.9 15.0	13.5	
18-Dec-17	Cloudy	Moderate	12:54	Surface	1	18.7 18.8	18.8	8.0 8.0	8.0	33.1 33.2	33.2	104.8 98.9	101.9	8.0 7.6	7.8	7.8	10.6 10.1	10.4	11.4	17.1 17.4	17.3	15.1
				Middle	5.5	18.7 18.8	18.8	8.0 8.0	8.0	33.2 33.2	33.2	101.1 98.7	99.9	7.7 7.6	7.7		11.2 10.7	11.0		19.3 19.6	19.5	
				Bottom	10	18.6 18.6	18.6	8.0 8.0	8.0	33.2 33.2	33.2	99.3 98.2	98.8	7.6 7.5	7.6	7.6	13.2 12.5	12.9		8.8 8.4	8.6	
20-Dec-17	Cloudy	Rough	14:24	Surface	1	17.9 18.0	18.0	8.1 8.1	8.1	33.0 33.0	33.0	100.5 99.3	99.9	7.8 7.7	7.8	7.8	11.0 9.9	10.5	11.3	9.5 12.2	10.9	11.4
				Middle	5.5	18.0 18.0	18.0	8.1 8.1	8.1	33.0 33.0	33.0	99.7 99.1	99.4	7.8 7.7	7.8		11.1 10.6	10.9		12.1 12.7	12.4	
				Bottom	10	17.8 17.8	17.8	8.1 8.1	8.1	33.0 33.0	33.0	99.1 98.7	98.9	7.7 7.7	7.7	7.7	11.9 12.8	12.4		11.0 10.7	10.9	
22-Dec-17	Sunny	Moderate	14:07	Surface	1	17.9 17.9	17.9	8.1 8.1	8.1	32.9 32.9	32.9	100.0 99.8	99.9	7.8 7.8	7.8	7.8	11.2 11.0	11.1	16.3	7.6 7.7	7.7	8.0
				Middle	5.5	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	99.1 99.3	99.2	7.7 7.8	7.8		18.8 19.7	19.3		7.8 8.5	8.2	
				Bottom	10	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	99.0 99.1	99.1	7.7 7.8	7.8	7.8	18.6 18.5	18.6		8.4 8.0	8.2	
26-Dec-17	Fine	Moderate	18:39	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.3 32.2	32.3	103.2 101.9	102.6	8.0 7.9	8.0	8.0	2.7 2.7	2.7	3.8	10.1 13.4	11.8	10.4
				Middle	5.5	18.1 18.1	18.1	8.1 8.1	8.1	32.6 32.6	32.6	101.8 101.6	101.7	7.9 7.9	7.9		4.0 4.0	4.0		9.3 10.0	9.7	
				Bottom	10	18.1 18.1	18.1	8.1 8.1	8.1	32.7 32.7	32.7	101.2 101.4	101.3	7.9 7.9	7.9	7.9	4.7 4.7	4.7		9.4 9.9	9.7	
28-Dec-17	Cloudy	Moderate	08:21	Surface	1	17.9 18.0	18.0	8.1 8.1	8.1	31.4 31.3	31.4	101.0 100.2	100.6	7.9 7.9	7.9	7.8	3.3 2.8	3.1	4.2	9.4 9.1	9.3	8.3
				Middle	5.5	18.1 18.1	18.1	8.1 8.1	8.1	32.3 32.3	32.3	99.3 99.4	99.4	7.7 7.7	7.7		4.4 4.2	4.3		7.2 7.3	7.3	
				Bottom	10	18.1 18.1	18.1	8.1 8.1	8.1	32.3 32.3	32.3	98.9 99.0	99.0	7.7 7.7	7.7	7.7	5.1 5.2	5.2		8.2 8.5	8.4	
30-Dec-17	Cloudy	Moderate	10:42	Surface	1	18.3 18.2	18.3	8.1 8.1	8.1	31.9 31.9	31.9	101.0 100.4	100.7	7.9 7.8	7.9	7.9	4.9 4.8	4.9	8.4	8.4 9.3	8.9	8.7
				Middle	5.5	18.1 18.2	18.2	8.1 8.1	8.1	32.0 32.0	32.0	99.4 99.6	99.5	7.8 7.8	7.8		6.0 5.6	5.8		8.6 7.9	8.3	
				Bottom	10	18.2 18.2	18.2	8.1 8.1	8.1	32.2 32.2	32.2	98.7 98.8	98.8	7.7 7.7	7.7	7.7	13.6 15.3	14.5		9.6 8.4	9.0	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at CS1 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:20	Surface	1	22.4 22.4	22.4	7.9 8.0	8.0	33.6 33.6	33.6	99.4 98.9	99.2	7.1 7.1	7.1	7.1	7.3 7.5	7.4	8.0	13.8 13.6	13.7	14.8
				Middle	5.5	22.4 22.4	22.4	7.9 8.0	8.0	33.6 33.6	33.6	99.0 98.9	99.0	7.1 7.1	7.1		7.9 7.5	7.7		14.1 15.4	14.8	
				Bottom	10	22.4 22.4	22.4	7.9 8.1	8.0	33.6 33.6	33.6	98.0 98.4	98.2	7.0 7.0	7.0	7.0	8.8 8.9	8.9		17.8 13.7	15.8	
4-Dec-17	Cloudy	Rough	17:52	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	32.4 32.4	32.4	97.7 96.9	97.3	7.1 7.0	7.1	7.1	11.1 11.5	11.3	12.7	18.2 18.6	18.4	17.3
				Middle	6	22.1 22.1	22.1	8.0 8.0	8.0	32.4 32.4	32.4	96.8 96.9	96.9	7.0 7.0	7.0		11.9 11.9	11.9		16.3 19.5	17.9	
				Bottom	11	22.1 22.1	22.1	8.0 8.0	8.0	32.5 32.5	32.5	96.6 96.8	96.7	7.0 7.0	7.0	7.0	15.7 13.8	14.8		16.3 14.7	15.5	
6-Dec-17	Fine	Moderate	09:58	Surface	1	21.3 21.3	21.3	8.0 8.0	8.0	31.7 31.7	31.7	95.3 94.7	95.0	7.0 7.0	7.0	7.0	19.1 19.0	19.1	21.5	24.5 22.8	23.7	23.6
				Middle	5	21.6 21.5	21.6	8.0 8.0	8.0	32.5 32.3	32.4	94.8 94.7	94.8	6.9 6.9	6.9		22.3 21.3	21.8		20.4 23.6	22.0	
				Bottom	9	21.7 21.7	21.7	8.0 8.0	8.0	32.7 32.7	32.7	94.4 94.9	94.7	6.9 6.9	6.9	6.9	23.6 23.6	23.6		26.1 24.2	25.2	
8-Dec-17	Cloudy	Rough	12:18	Surface	1	21.7 21.7	21.7	8.1 8.1	8.1	33.1 33.1	33.1	97.6 96.9	97.3	7.1 7.0	7.1	7.1	11.6 10.5	11.1	25.4	10.1 10.7	10.4	9.0
				Middle	5.5	21.7 21.7	21.7	8.1 8.1	8.1	33.1 33.1	33.1	96.1 95.9	96.0	7.0 7.0	7.0		26.6 27.6	27.1		9.7 8.5	9.1	
				Bottom	10	21.7 21.7	21.7	8.0 8.0	8.0	33.1 33.1	33.1	95.4 95.4	95.4	6.9 6.9	6.9	6.9	38.7 37.3	38.0		7.6 7.2	7.4	
12-Dec-17	Fine	Calm	13:52	Surface	1	21.0 20.9	21.0	7.9 8.1	8.0	33.2 33.2	33.2	98.7 98.8	98.8	7.3 7.3	7.3	7.3	4.5 4.2	4.4	5.4	9.7 10.9	10.3	9.3
				Middle	5.5	20.9 20.9	20.9	8.0 8.1	8.1	33.2 33.2	33.2	98.5 98.3	98.4	7.2 7.2	7.2		5.0 5.4	5.2		8.2 7.0	7.6	
				Bottom	10	20.8 20.8	20.8	8.0 8.1	8.1	33.2 33.2	33.2	97.7 97.9	97.8	7.2 7.2	7.2	7.2	6.1 6.9	6.5		11.5 8.6	10.1	
14-Dec-17	Cloudy	Moderate	15:14	Surface	1	20.8 20.8	20.8	8.1 8.0	8.1	33.7 33.7	33.7	97.5 97.3	97.4	7.1 7.1	7.1	7.1	4.5 4.2	4.4	6.1	7.0 10.3	8.7	7.9
				Middle	5.5	20.7 20.7	20.7	8.1 8.1	8.1	33.7 33.7	33.7	96.5 96.6	96.6	7.1 7.1	7.1		6.5 6.1	6.3		6.5 7.2	6.9	
				Bottom	10	20.7 20.7	20.7	8.1 8.1	8.1	33.7 33.7	33.7	96.1 96.0	96.1	7.1 7.0	7.1	7.1	7.6 7.7	7.7		8.0 8.1	8.1	
16-Dec-17	Cloudy	Rough	16:01	Surface	1	19.9 20.0	20.0	8.1 8.1	8.1	32.8 32.8	32.8	98.4 97.8	98.1	7.4 7.3	7.4	7.4	8.0 7.9	8.0	8.4	15.7 15.2	15.5	12.0
				Middle	5.5	20.0 20.0	20.0	8.1 8.1	8.1	32.9 32.9	32.9	97.5 97.2	97.4	7.3 7.3	7.3		8.2 8.2	8.2		9.6 10.0	9.8	
				Bottom	10	20.2 20.2	20.2	8.1 8.1	8.1	33.7 33.5	33.6	95.5 96.1	95.8	7.1 7.2	7.2	7.2	9.3 8.9	9.1		9.9 11.2	10.6	
18-Dec-17	Cloudy	Rough	16:59	Surface	1	18.8 18.8	18.8	8.0 8.0	8.0	33.1 33.1	33.1	102.5 99.2	100.9	7.9 7.6	7.8	7.7	9.3 9.5	9.4	9.6	17.5 17.2	17.4	14.1
				Middle	5.5	18.8 18.8	18.8	8.0 8.0	8.0	33.1 33.1	33.1	99.4 99.2	99.3	7.6 7.6	7.6		9.9 9.7	9.8		11.6 11.4	11.5	
				Bottom	10	18.8 18.8	18.8	8.0 8.0	8.0	33.1 33.1	33.1	99.1 99.3	99.2	7.6 7.6	7.6	7.6	9.6 9.7	9.7		13.3 13.3	13.3	
20-Dec-17	Cloudy	Rough	09:31	Surface	1	17.7 17.7	17.7	8.1 8.1	8.1	33.1 33.0	33.1	105.1 99.2	102.2	8.2 7.7	8.0	7.9	16.5 14.3	15.4	23.0	9.2 8.6	8.9	9.0
				Middle	5.5	17.7 17.7	17.7	8.1 8.1	8.1	33.1 33.1	33.1	101.4 99.0	100.2	7.9 7.7	7.8		20.5 19.2	19.9		8.4 9.1	8.8	
				Bottom	10	17.7 17.7	17.7	8.1 8.1	8.1	33.1 33.1	33.1	99.9 98.7	99.3	7.8 7.7	7.8	7.8	32.9 34.7	33.8		9.7 9.1	9.4	
22-Dec-17	Sunny	Moderate	10:48	Surface	1	17.6 17.7	17.7	8.1 8.1	8.1	33.0 33.0	33.0	100.9 100.0	100.5	7.9 7.8	7.9	7.9	12.8 12.8	12.8	23.7	7.4 7.2	7.3	7.4
				Middle	5.5	17.6 17.6	17.6	8.1 8.1	8.1	33.0 33.0	33.0	99.9 99.5	99.7	7.8 7.8	7.8		24.7 24.7	24.7		6.8 7.7	7.3	
				Bottom	10	17.6 17.6	17.6	8.1 8.1	8.1	32.9 33.0	33.0	99.4 99.3	99.4	7.8 7.8	7.8	7.8	33.8 33.4	33.6		7.6 7.8	7.7	
26-Dec-17	Fine	Moderate	13:05	Surface	1	18.0 18.1	18.1	8.2 8.1	8.2	32.5 32.6	32.6	102.2 101.1	101.7	8.0 7.9	8.0	8.0	7.2 7.1	7.2	9.7	16.8 19.6	18.2	18.7
				Middle	5.5	18.0 18.0	18.0	8.1 8.1	8.1	32.6 32.6	32.6	101.0 100.4	100.7	7.9 7.8	7.9		9.3 9.1	9.2		23.3 21.2	22.3	
				Bottom	10	18.0 18.0	18.0	8.1 8.1	8.1	32.6 32.6	32.6	100.2 100.0	100.1	7.8 7.8	7.8	7.8	13.1 12.5	12.8		15.3 15.8	15.6	
28-Dec-17	Fine	Moderate	13:38	Surface	1	18.3 18.2	18.3	8.1 8.1	8.1	32.2 32.1	32.2	99.9 100.5	100.2	7.8 7.8	7.8	7.8	3.3 3.8	3.6	5.0	7.0 7.8	7.4	7.8
				Middle	5.5	18.2 18.1	18.2	8.1 8.1	8.1	32.2 32.2	32.2	100.6 100.4	100.5	7.8 7.8	7.8		3.8 4.5	4.2		8.0 8.2	8.1	
				Bottom	10	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.2	32.2	99.8 99.6	99.7	7.8 7.8	7.8	7.8	7.6 6.6	7.1		7.5 8.0	7.8	
30-Dec-17	Cloudy	Calm	15:04	Surface	1	18.8 18.8	18.8	8.1 8.1	8.1	32.0 32.0	32.0	103.5 103.2	103.4	8.0 7.9	8.0	8.0	4.2 4.3	4.3	7.5	6.7 6.5	6.6	7.4
				Middle	5.5	18.4 18.6	18.5	8.1 8.1	8.1	32.1 32.1	32.1	101.7 102.4	102.1	7.9 7.9	7.9		4.3 4.4	4.4		7.4 7.4	7.4	
				Bottom	10	18.2 18.2	18.2	8.1 8.1	8.1	32.2 32.2	32.2	99.2 99.2	99.2	7.7 7.7	7.7	7.7	13.2 14.1	13.7		8.5 7.9	8.2	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at CS2(A) - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:43	Surface	1	22.3 22.3	22.3	8.0 8.1	8.1	33.2 33.1	33.2	99.1 99.0	99.1	7.1 7.1	7.1	7.1	11.5 11.5	11.5	14.3	8.0 8.0	8.0	8.6
				Middle	4	22.2 22.2	22.2	8.0 8.1	8.1	33.2 33.2	33.2	97.9 98.3	98.1	7.0 7.1	7.1		14.4 13.8	14.1		9.5 9.2	9.4	
				Bottom	7	22.2 22.2	22.2	8.0 8.0	8.0	33.2 33.2	33.2	97.8 97.8	97.8	7.0 7.0	7.0	7.0	17.6 17.2	17.4		8.3 8.6	8.5	
4-Dec-17	Cloudy	Moderate	12:18	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	33.1 33.1	33.1	97.5 95.9	96.7	7.0 6.9	7.0	7.0	15.4 15.8	15.6	23.2	24.0 22.3	23.2	18.5
				Middle	3.5	22.0 22.0	22.0	8.0 8.0	8.0	33.3 33.3	33.3	95.4 95.0	95.2	6.9 6.9	6.9		24.0 22.8	23.4		15.4 16.2	15.8	
				Bottom	6	22.0 22.0	22.0	8.0 8.0	8.0	33.4 33.5	33.5	95.0 94.8	94.9	6.8 6.8	6.8	6.8	29.7 31.3	30.5		17.3 15.5	16.4	
6-Dec-17	Fine	Moderate	14:58	Surface	1	22.0 22.1	22.1	7.3 7.4	7.4	33.3 33.3	33.3	97.9 97.4	97.7	7.1 7.0	7.1	7.0	9.3 9.0	9.2	14.1	16.6 14.6	15.6	15.9
				Middle	3.5	21.7 21.7	21.7	7.3 7.4	7.4	33.5 33.5	33.5	94.7 94.3	94.5	6.9 6.8	6.9		14.3 13.0	13.7		16.8 13.5	15.2	
				Bottom	6	21.7 21.7	21.7	7.4 7.4	7.4	33.6 33.6	33.6	94.3 94.1	94.2	6.8 6.8	6.8	6.8	19.2 19.8	19.5		14.1 19.6	16.9	
8-Dec-17	Cloudy	Rough	15:56	Surface	1	21.6 21.5	21.6	8.1 8.0	8.1	33.6 33.6	33.6	95.0 94.8	94.9	6.9 6.9	6.9	6.9	22.0 24.6	23.3	25.3	13.6 12.5	13.1	12.9
				Middle	3.5	21.6 21.6	21.6	8.0 8.0	8.0	33.6 33.6	33.6	94.6 94.8	94.7	6.9 6.9	6.9		23.1 25.5	24.3		13.3 12.5	12.9	
				Bottom	6	21.6 21.6	21.6	8.0 8.0	8.0	33.6 33.6	33.6	94.6 94.6	94.6	6.9 6.9	6.9	6.9	27.7 28.8	28.3		12.3 13.3	12.8	
12-Dec-17	Fine	Calm	08:01	Surface	1	20.4 20.4	20.4	8.0 8.0	8.0	33.1 33.1	33.1	96.7 95.9	96.3	7.2 7.1	7.2	7.2	4.8 4.8	4.8	5.3	7.2 7.3	7.3	7.7
				Middle	4	20.4 20.4	20.4	8.1 8.1	8.1	33.1 33.1	33.1	96.0 95.7	95.9	7.1 7.1	7.1		4.8 5.2	5.0		8.1 8.3	8.2	
				Bottom	7	20.5 20.4	20.5	8.1 8.1	8.1	33.1 33.1	33.1	95.3 95.3	95.3	7.1 7.1	7.1	7.1	6.5 5.7	6.1		6.8 8.5	7.7	
14-Dec-17	Cloudy	Moderate	10:16	Surface	1	20.5 20.5	20.5	8.1 8.1	8.1	33.3 33.3	33.3	98.1 98.0	98.1	7.3 7.3	7.3	7.3	5.8 5.7	5.8	6.5	6.5 7.4	7.0	8.2
				Middle	3.5	20.5 20.5	20.5	8.1 8.1	8.1	33.3 33.3	33.3	97.3 97.5	97.4	7.2 7.2	7.2		6.5 6.4	6.5		8.3 7.2	7.8	
				Bottom	6	20.4 20.5	20.5	8.1 8.1	8.1	33.3 33.3	33.3	97.2 97.3	97.3	7.2 7.2	7.2	7.2	7.2 7.1	7.2		10.3 9.3	9.8	
16-Dec-17	Cloudy	Rough	11:24	Surface	1	19.9 19.9	19.9	8.1 8.1	8.1	32.2 32.2	32.2	99.2 98.9	99.1	7.5 7.5	7.5	7.5	10.7 11.4	11.1	12.9	13.3 12.3	12.8	12.9
				Middle	3.5	20.0 20.0	20.0	8.1 8.1	8.1	32.5 32.5	32.5	98.6 98.5	98.6	7.4 7.4	7.4		12.1 12.4	12.3		13.4 12.7	13.1	
				Bottom	6	20.1 20.1	20.1	8.1 8.1	8.1	32.8 32.8	32.8	97.8 98.0	97.9	7.3 7.3	7.3	7.3	15.7 14.8	15.3		13.7 11.9	12.8	
18-Dec-17	Cloudy	Moderate	12:00	Surface	1	18.7 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	98.9 97.6	98.3	7.6 7.5	7.6	7.6	14.7 15.0	14.9	21.5	11.9 11.7	11.8	14.7
				Middle	3.5	18.7 18.7	18.7	8.0 8.1	8.1	33.2 33.2	33.2	97.6 96.9	97.3	7.5 7.4	7.5		19.1 20.0	19.6		13.0 13.0	13.0	
				Bottom	6	18.7 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	96.7 96.4	96.6	7.4 7.4	7.4	7.4	29.5 30.3	29.9		19.1 19.3	19.2	
20-Dec-17	Cloudy	Rough	14:06	Surface	1	17.8 17.8	17.8	8.0 8.0	8.0	34.0 34.0	34.0	99.0 98.2	98.6	7.7 7.6	7.7	7.7	17.4 18.2	17.8	18.2	12.7 14.5	13.6	16.3
				Middle	4	17.8 17.8	17.8	8.0 8.0	8.0	34.0 34.0	34.0	98.5 98.1	98.3	7.6 7.6	7.6		17.5 18.0	17.8		19.6 18.8	19.2	
				Bottom	7	17.8 17.8	17.8	8.0 8.0	8.0	34.0 34.0	34.0	98.0 97.8	97.9	7.6 7.6	7.6	7.6	19.4 18.6	19.0		13.6 18.8	16.2	
22-Dec-17	Sunny	Moderate	13:57	Surface	1	17.8 17.9	17.9	8.1 8.1	8.1	33.8 33.8	33.8	101.3 100.3	100.8	7.9 7.8	7.9	7.8	7.8 8.0	7.9	12.8	7.3 7.7	7.5	8.1
				Middle	3.5	17.6 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	98.8 98.7	98.8	7.7 7.7	7.7		13.1 13.2	13.2		8.5 8.1	8.3	
				Bottom	6	17.6 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	98.4 98.2	98.3	7.7 7.7	7.7	7.7	16.5 18.3	17.4		8.6 8.3	8.5	
26-Dec-17	Fine	Moderate	18:18	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.3 33.3	33.3	100.7 100.3	100.5	7.8 7.8	7.8	7.8	5.1 4.8	5.0	6.2	9.6 10.9	10.3	11.0
				Middle	3.5	18.0 18.0	18.0	8.1 8.1	8.1	33.4 33.4	33.4	100.1 99.8	100.0	7.8 7.7	7.8		6.7 6.4	6.6		10.1 9.8	10.0	
				Bottom	6	18.0 18.0	18.0	8.1 8.1	8.1	33.4 33.4	33.4	99.4 99.4	99.4	7.7 7.7	7.7	7.7	6.8 6.9	6.9		13.9 11.5	12.7	
28-Dec-17	Cloudy	Moderate	07:45	Surface	1	18.0 18.0	18.0	8.0 8.0	8.0	33.3 33.3	33.3	99.4 99.1	99.3	7.7 7.7	7.7	7.7	4.1 3.9	4.0	4.8	7.1 6.7	6.9	7.6
				Middle	3.5	18.0 18.0	18.0	8.0 8.0	8.0	33.3 33.3	33.3	99.0 98.9	99.0	7.7 7.7	7.7		4.2 4.0	4.1		7.6 7.4	7.5	
				Bottom	6	18.0 18.0	18.0	8.0 8.0	8.0	33.3 33.3	33.3	98.7 98.6	98.7	7.7 7.7	7.7	7.7	6.4 6.4	6.4		8.2 8.5	8.4	
30-Dec-17	Cloudy	Moderate	10:01	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	32.8 32.8	32.8	99.8 99.3	99.6	7.7 7.7	7.7	7.7	5.0 5.0	5.0	5.4	9.0 8.6	8.8	8.4
				Middle	3.5	18.3 18.3	18.3	8.1 8.1	8.1	32.8 32.8	32.8	99.0 98.7	98.9	7.7 7.6	7.7		5.2 5.1	5.2		8.7 8.7	8.7	
				Bottom	6	18.3 18.3	18.3	8.1 8.1	8.1	32.9 32.9	32.9	98.1 98.0	98.1	7.6 7.6	7.6	7.6	6.1 6.1	6.1		7.1 8.0	7.6	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at CS2(A) - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:04	Surface	1	22.4 22.4	22.4	8.2 8.1	8.2	32.3 32.3	32.3	98.4 98.3	98.4	7.1 7.1	7.1	7.1	8.2 7.9	8.1	8.9	14.9 15.0	15.0	14.3
				Middle	4	22.3 22.3	22.3	8.1 8.1	8.1	32.6 32.7	32.7	98.7 98.3	98.5	7.1 7.1	7.1		7.9 8.0	8.0		14.5 14.0	14.3	
				Bottom	7	22.3 22.3	22.3	8.1 8.1	8.1	32.8 32.8	32.8	98.8 98.7	98.8	7.1 7.1	7.1	7.1	10.6 10.7	10.7		13.1 13.9	13.5	
4-Dec-17	Cloudy	Rough	17:40	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	33.0 33.0	33.0	97.6 97.3	97.5	7.0 7.0	7.0	7.0	11.1 10.6	10.9	11.0	11.2 11.0	11.1	13.1
				Middle	3.5	22.1 22.1	22.1	8.1 8.1	8.1	33.0 33.0	33.0	97.5 97.2	97.4	7.0 7.0	7.0		10.7 10.5	10.6		16.3 10.9	13.6	
				Bottom	6	22.1 22.1	22.1	8.1 8.1	8.1	33.0 33.0	33.0	97.1 96.9	97.0	7.0 7.0	7.0	7.0	11.6 11.6	11.6		16.9 12.5	14.7	
6-Dec-17	Fine	Moderate	09:01	Surface	1	21.7 21.7	21.7	8.1 8.3	8.2	33.3 33.3	33.3	94.2 93.2	93.7	6.8 6.8	6.8	6.8	13.5 13.7	13.6	17.5	10.4 9.9	10.2	13.0
				Middle	3.5	21.7 21.7	21.7	8.1 8.4	8.3	33.3 33.3	33.3	93.2 92.7	93.0	6.8 6.7	6.8		14.7 16.6	15.7		12.5 11.2	11.9	
				Bottom	6	21.7 21.7	21.7	8.2 8.5	8.4	33.3 33.3	33.3	92.6 92.4	92.5	6.7 6.7	6.7	6.7	22.7 23.4	23.1		16.6 16.9	16.8	
8-Dec-17	Cloudy	Rough	11:04	Surface	1	21.3 21.2	21.3	7.6 8.2	7.9	32.6 32.6	32.6	93.3 92.9	93.1	6.8 6.8	6.8	6.8	15.2 16.3	15.8	23.5	17.0 17.3	17.2	16.3
				Middle	3.5	21.3 21.2	21.3	7.9 8.4	8.2	32.6 32.6	32.6	92.7 92.7	92.7	6.8 6.8	6.8		18.9 19.0	19.0		15.9 16.0	16.0	
				Bottom	6	21.3 21.3	21.3	8.1 8.5	8.3	32.7 32.7	32.7	92.1 92.2	92.2	6.8 6.8	6.8	6.8	35.6 35.5	35.6		15.6 15.6	15.6	
12-Dec-17	Fine	Calm	13:51	Surface	1	20.3 20.3	20.3	8.0 8.0	8.0	32.5 32.5	32.5	98.3 97.9	98.1	7.3 7.3	7.3	7.3	5.0 4.9	5.0	6.3	11.5 8.7	10.1	8.9
				Middle	3.5	20.2 20.2	20.2	8.0 8.0	8.0	32.7 32.8	32.8	97.2 97.1	97.2	7.3 7.3	7.3		5.1 5.0	5.1		7.9 9.2	8.6	
				Bottom	6	20.3 20.3	20.3	8.0 8.0	8.0	32.9 32.9	32.9	96.1 96.1	96.1	7.2 7.2	7.2	7.2	8.7 8.8	8.8		7.9 8.2	8.1	
14-Dec-17	Cloudy	Moderate	15:19	Surface	1	20.4 20.4	20.4	8.1 8.1	8.1	32.7 32.8	32.8	101.3 100.6	101.0	7.5 7.5	7.5	7.4	4.8 5.0	4.9	6.4	6.7 8.1	7.4	7.0
				Middle	3.5	20.3 20.3	20.3	8.1 8.1	8.1	33.1 33.1	33.1	98.0 98.6	98.3	7.3 7.3	7.3		5.1 5.2	5.2		7.2 8.6	7.9	
				Bottom	6	20.3 20.3	20.3	8.1 8.1	8.1	33.1 33.1	33.1	97.7 97.9	97.8	7.3 7.3	7.3	7.3	9.2 8.7	9.0		5.1 6.4	5.8	
16-Dec-17	Cloudy	Rough	16:16	Surface	1	20.0 20.0	20.0	8.1 8.1	8.1	32.7 32.7	32.7	99.6 99.7	99.7	7.5 7.5	7.5	7.5	11.5 10.6	11.1	11.2	10.9 14.6	12.8	14.2
				Middle	3.5	20.0 20.0	20.0	8.1 8.1	8.1	32.7 32.7	32.7	99.2 99.7	99.5	7.4 7.5	7.5		11.0 10.8	10.9		13.3 12.8	13.1	
				Bottom	6	20.0 20.0	20.0	8.1 8.1	8.1	32.7 32.7	32.7	99.5 99.7	99.6	7.5 7.5	7.5	7.5	10.9 12.0	11.5		18.5 14.6	16.6	
18-Dec-17	Cloudy	Rough	17:12	Surface	1	18.6 18.6	18.6	8.0 8.1	8.1	33.1 33.1	33.1	98.9 98.1	98.5	7.6 7.5	7.6	7.6	11.3 11.5	11.4	11.7	11.7 11.6	11.7	12.0
				Middle	3.5	18.6 18.6	18.6	8.1 8.1	8.1	33.1 33.1	33.1	98.4 97.6	98.0	7.6 7.5	7.6		12.0 12.2	12.1		11.9 11.9	11.9	
				Bottom	6	18.6 18.6	18.6	8.1 8.1	8.1	33.1 33.2	33.2	97.8 97.3	97.6	7.5 7.5	7.5	7.5	11.2 11.9	11.6		12.4 12.6	12.5	
20-Dec-17	Cloudy	Rough	09:13	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	33.8 33.9	33.9	96.5 95.5	96.0	7.4 7.3	7.4	7.4	12.5 12.2	12.4	21.5	8.6 9.3	9.0	8.4
				Middle	3.5	18.3 18.3	18.3	8.1 8.1	8.1	33.9 33.9	33.9	95.7 95.1	95.4	7.4 7.3	7.4		12.1 12.3	12.2		8.5 7.7	8.1	
				Bottom	6	18.2 18.1	18.2	8.1 8.1	8.1	33.9 33.9	33.9	94.9 95.0	95.0	7.3 7.3	7.3	7.3	40.9 39.0	40.0		8.5 7.9	8.2	
22-Dec-17	Sunny	Moderate	10:00	Surface	1	17.8 17.8	17.8	8.1 8.0	8.1	33.9 33.9	33.9	98.2 97.5	97.9	7.6 7.6	7.6	7.6	8.4 8.5	8.5	11.2	8.3 8.0	8.2	7.7
				Middle	3.5	17.8 17.8	17.8	8.1 8.1	8.1	33.9 33.9	33.9	97.0 96.5	96.8	7.5 7.5	7.5		10.8 10.9	10.9		7.0 6.9	7.0	
				Bottom	6	17.7 17.7	17.7	8.1 8.1	8.1	33.9 33.9	33.9	96.4 96.3	96.4	7.5 7.5	7.5	7.5	14.1 14.5	14.3		7.7 8.1	7.9	
26-Dec-17	Fine	Moderate	12:25	Surface	1	17.8 17.8	17.8	8.0 8.0	8.0	32.6 32.6	32.6	99.8 99.7	99.8	7.8 7.8	7.8	7.8	4.7 4.8	4.8	6.1	10.9 12.0	11.5	13.6
				Middle	3.5	17.6 17.6	17.6	8.1 8.1	8.1	32.5 32.5	32.5	98.7 98.3	98.5	7.8 7.7	7.8		6.0 6.3	6.2		19.7 13.0	16.4	
				Bottom	6	17.6 17.6	17.6	8.1 8.1	8.1	32.5 32.5	32.5	97.9 97.8	97.9	7.7 7.7	7.7	7.7	7.3 7.4	7.4		13.1 12.7	12.9	
28-Dec-17	Fine	Moderate	13:30	Surface	1	18.3 18.4	18.4	8.1 8.1	8.1	32.3 32.2	32.3	102.2 101.9	102.1	7.9 7.9	7.9	7.9	2.3 2.2	2.3	3.7	8.2 8.0	8.1	7.9
				Middle	3.5	18.1 18.1	18.1	8.1 8.1	8.1	32.9 33.0	33.0	100.1 100.0	100.1	7.8 7.8	7.8		2.7 2.7	2.7		8.3 8.1	8.2	
				Bottom	6	18.0 18.0	18.0	8.1 8.1	8.1	33.3 33.3	33.3	98.6 98.7	98.7	7.7 7.7	7.7	7.7	6.1 6.0	6.1		7.1 7.4	7.3	
30-Dec-17	Cloudy	Calm	15:20	Surface	1	19.0 19.1	19.1	8.2 8.0	8.1	31.7 31.7	31.7	106.0 106.2	106.1	8.1 8.2	8.2	8.1	2.2 2.3	2.3	4.1	8.9 4.5	6.7	6.3
				Middle	3.5	18.5 18.5	18.5	8.2 8.1	8.2	32.5 32.4	32.5	103.2 103.5	103.4	8.0 8.0	8.0		2.9 3.0	3.0		5.4 6.8	6.1	
				Bottom	6	18.3 18.3	18.3	8.2 8.1	8.2	32.8 32.8	32.8	99.7 99.9	99.8	7.7 7.7	7.7	7.7	7.2 6.9	7.1		5.3 6.6	6.0	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS1 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:28	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	99.2 99.0	99.1	7.1 7.1	7.1	7.1	8.5 8.9	8.7	10.8	9.7 9.5	9.6	10.0
				Middle	5	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.7	98.6	7.1 7.1	7.1		12.2 13.0	12.6		8.4 11.5	10.0	
				Bottom	9	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.3 98.9	98.6	7.1 7.1	7.1	7.1	11.1 11.2	11.2		9.5 11.4	10.5	
4-Dec-17	Cloudy	Moderate	13:01	Surface	1	22.2 22.3	22.3	8.0 8.0	8.0	32.6 32.6	32.6	98.8 98.1	98.5	7.1 7.1	7.1	7.1	8.2 8.4	8.3	11.5	13.1 16.7	14.9	15.2
				Middle	5	22.1 22.1	22.1	8.1 8.1	8.1	32.9 33.0	33.0	97.0 96.2	96.6	7.0 6.9	7.0		9.9 10.4	10.2		18.5 14.5	16.5	
				Bottom	9	22.0 22.0	22.0	8.1 8.1	8.1	33.6 33.6	33.6	94.7 94.7	94.7	6.8 6.8	6.8	6.8	16.0 16.1	16.1		13.4 14.7	14.1	
6-Dec-17	Fine	Moderate	15:38	Surface	1	21.8 21.7	21.8	7.5 7.5	7.5	33.2 33.2	33.2	95.0 94.3	94.7	6.9 6.8	6.9	6.9	13.0 14.7	13.9	21.5	20.6 19.8	20.2	32.3
				Middle	5	21.7 21.7	21.7	7.5 7.5	7.5	33.3 33.3	33.3	93.9 93.8	93.9	6.8 6.8	6.8		22.2 20.3	21.3		34.8 37.0	35.9	
				Bottom	9	21.7 21.7	21.7	7.5 7.5	7.5	33.3 33.3	33.3	93.5 93.5	93.5	6.8 6.8	6.8	6.8	29.2 29.5	29.4		39.9 41.6	40.8	
8-Dec-17	Cloudy	Rough	16:52	Surface	1	21.5 21.5	21.5	8.0 8.0	8.0	33.5 33.5	33.5	97.1 96.3	96.7	7.1 7.0	7.1	7.1	10.0 10.1	10.1	11.2	11.5 10.9	11.2	12.2
				Middle	5	21.6 21.6	21.6	8.0 8.0	8.0	33.7 33.7	33.7	96.1 95.9	96.0	7.0 7.0	7.0		11.0 10.9	11.0		12.0 12.4	12.2	
				Bottom	9	21.6 21.6	21.6	8.0 8.1	8.1	34.0 33.9	34.0	95.4 95.4	95.4	6.9 6.9	6.9	6.9	12.5 12.2	12.4		12.5 14.1	13.3	
12-Dec-17	Fine	Calm	08:39	Surface	1	20.8 20.8	20.8	8.0 8.0	8.0	33.3 33.3	33.3	96.6 96.1	96.4	7.1 7.1	7.1	7.1	3.9 4.0	4.0	4.8	6.4 7.0	6.7	7.5
				Middle	5.5	20.8 20.8	20.8	8.0 8.0	8.0	33.3 33.3	33.3	95.9 95.8	95.9	7.1 7.1	7.1		4.1 3.9	4.0		9.8 6.3	8.1	
				Bottom	10	20.8 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	95.4 95.4	95.4	7.0 7.0	7.0	7.0	6.7 6.2	6.5		8.1 7.5	7.8	
14-Dec-17	Cloudy	Moderate	10:56	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.7 97.7	97.7	7.2 7.2	7.2	7.2	5.6 5.6	5.6	5.8	6.4 6.4	6.4	7.3
				Middle	5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.3 97.3	97.3	7.2 7.2	7.2		5.8 5.6	5.7		6.7 7.4	7.1	
				Bottom	9	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.3 97.3	97.3	7.2 7.2	7.2	7.2	5.9 6.4	6.2		8.4 8.2	8.3	
16-Dec-17	Cloudy	Rough	12:17	Surface	1	19.9 20.0	20.0	8.0 8.0	8.0	31.6 31.6	31.6	99.0 98.1	98.6	7.5 7.4	7.5	7.5	9.9 10.1	10.0	12.8	12.7 11.8	12.3	13.2
				Middle	5	20.0 20.0	20.0	8.0 8.0	8.0	31.9 31.8	31.9	97.7 97.7	97.7	7.4 7.4	7.4		11.3 11.0	11.2		13.8 13.4	13.6	
				Bottom	9	20.0 20.0	20.0	8.0 8.0	8.0	32.3 32.3	32.3	96.7 97.0	96.9	7.3 7.3	7.3	7.3	17.3 17.3	17.3		13.1 14.3	13.7	
18-Dec-17	Cloudy	Moderate	12:47	Surface	1	18.9 18.9	18.9	8.0 8.1	8.1	33.2 33.2	33.2	98.0 97.6	97.8	7.5 7.5	7.5	7.5	12.5 12.2	12.4	14.3	11.7 11.5	11.6	12.0
				Middle	5	18.8 18.8	18.8	8.1 8.1	8.1	33.2 33.2	33.2	97.2 96.8	97.0	7.4 7.4	7.4		13.4 13.0	13.2		10.9 10.9	10.9	
				Bottom	9	18.6 18.6	18.6	8.1 8.1	8.1	33.3 33.3	33.3	96.4 96.3	96.4	7.4 7.4	7.4	7.4	17.2 17.3	17.3		13.5 13.7	13.6	
20-Dec-17	Cloudy	Rough	15:02	Surface	1	17.8 17.9	17.9	8.1 8.1	8.1	33.9 33.9	33.9	99.0 98.2	98.6	7.7 7.6	7.7	7.7	11.5 10.8	11.2	11.7	10.6 10.7	10.7	11.0
				Middle	5.5	17.8 17.8	17.8	8.0 8.1	8.1	33.9 33.9	33.9	98.4 97.8	98.1	7.6 7.6	7.6		12.2 11.5	11.9		11.0 10.6	10.8	
				Bottom	10	17.8 17.8	17.8	8.1 8.1	8.1	33.9 33.9	33.9	97.5 97.4	97.5	7.6 7.6	7.6	7.6	12.2 11.6	11.9		11.0 11.7	11.4	
22-Dec-17	Sunny	Moderate	14:43	Surface	1	17.9 18.0	18.0	8.1 8.1	8.1	33.8 33.8	33.8	99.7 99.7	99.7	7.7 7.7	7.7	7.7	7.6 7.3	7.5	13.7	7.9 8.0	8.0	8.2
				Middle	5	17.7 17.7	17.7	8.1 8.1	8.1	33.9 33.9	33.9	98.0 97.8	97.9	7.6 7.6	7.6		14.5 15.7	15.1		8.3 8.4	8.4	
				Bottom	9	17.7 17.7	17.7	8.1 8.1	8.1	33.9 33.9	33.9	97.6 97.6	97.6	7.6 7.6	7.6	7.6	18.6 18.4	18.5		8.9 7.7	8.3	
26-Dec-17	Fine	Moderate	19:06	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	33.5 33.5	33.5	100.3 99.9	100.1	7.8 7.7	7.8	7.8	4.4 4.7	4.6	5.7	8.9 9.2	9.1	10.1
				Middle	5	18.1 18.1	18.1	8.1 8.0	8.1	33.5 33.5	33.5	99.8 99.7	99.8	7.7 7.7	7.7		4.7 4.6	4.7		9.3 9.1	9.2	
				Bottom	9	18.1 18.1	18.1	8.1 8.1	8.1	33.5 33.5	33.5	99.7 99.5	99.6	7.7 7.7	7.7	7.7	7.7 7.6	7.7		10.2 14.0	12.1	
28-Dec-17	Cloudy	Moderate	08:32	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	32.6 32.6	32.6	100.2 100.0	100.1	7.8 7.8	7.8	7.8	2.4 2.3	2.4	2.9	7.5 7.2	7.4	7.9
				Middle	5	18.1 18.1	18.1	8.1 8.1	8.1	33.0 33.0	33.0	99.3 99.3	99.3	7.7 7.7	7.7		2.7 2.6	2.7		8.0 7.7	7.9	
				Bottom	9	18.1 18.1	18.1	8.1 8.1	8.1	33.1 33.1	33.1	98.5 98.5	98.5	7.6 7.6	7.6	7.6	3.5 3.9	3.7		8.5 8.3	8.4	
30-Dec-17	Cloudy	Moderate	10:41	Surface	1	18.3 18.3	18.3	8.2 8.2	8.2	33.0 33.0	33.0	99.7 99.5	99.6	7.7 7.7	7.7	7.7	4.7 5.0	4.9	6.4	11.4 8.0	9.7	10.6
				Middle	5	18.2 18.2	18.2	8.2 8.2	8.2	33.1 33.1	33.1	98.6 98.7	98.7	7.6 7.6	7.6		5.6 5.4	5.5		11.5 8.7	10.1	
				Bottom	9	18.2 18.2	18.2	8.1 8.1	8.1	33.2 33.2	33.2	97.8 97.8	97.8	7.6 7.6	7.6	7.6	8.7 9.0	8.9		8.3 15.6	12.0	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS1 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:52	Surface	1	22.3 22.4	22.4	8.1 8.1	8.1	33.1 33.1	33.1	99.8 99.4	99.6	7.2 7.1	7.2	7.2	9.4 9.7	9.6	17.2	8.2 8.6	8.4	9.4
				Middle	5	22.4 22.4	22.4	8.1 8.1	8.1	33.1 33.1	33.1	99.1 99.2	99.2	7.1 7.1	7.1		13.2 13.4	13.3		11.2 9.5	10.4	
				Bottom	9	22.4 22.4	22.4	8.0 8.0	8.0	33.2 33.2	33.2	98.8 98.8	98.8	7.1 7.1	7.1	7.1	28.6 28.7	28.7		9.3 9.2	9.3	
4-Dec-17	Cloudy	Rough	18:32	Surface	1	22.2 22.2	22.2	8.0 8.0	8.0	32.8 32.8	32.8	98.2 97.7	98.0	7.1 7.0	7.1	7.1	13.4 13.5	13.5	17.1	12.3 11.6	12.0	12.2
				Middle	5	22.2 22.2	22.2	8.0 8.0	8.0	32.9 32.9	32.9	97.5 97.2	97.4	7.0 7.0	7.0		13.5 13.7	13.6		11.7 13.9	12.8	
				Bottom	9	22.1 22.1	22.1	8.1 8.1	8.1	33.0 33.0	33.0	96.3 96.3	96.3	6.9 6.9	6.9	6.9	24.4 23.9	24.2		13.3 10.4	11.9	
6-Dec-17	Fine	Moderate	09:44	Surface	1	21.6 21.6	21.6	8.2 8.4	8.3	33.5 33.5	33.5	95.3 94.8	95.1	6.9 6.9	6.9	6.9	13.4 13.4	13.4	22.6	9.5 10.3	9.9	22.8
				Middle	5	21.6 21.6	21.6	8.2 8.4	8.3	33.7 33.7	33.7	94.3 94.2	94.3	6.8 6.8	6.8		25.1 25.1	25.1		18.0 18.1	18.1	
				Bottom	9	21.6 21.6	21.6	8.3 8.4	8.4	33.7 33.7	33.7	93.8 93.6	93.7	6.8 6.8	6.8	6.8	28.8 29.5	29.2		40.8 39.7	40.3	
8-Dec-17	Cloudy	Rough	12:16	Surface	1	21.0 21.1	21.1	8.4 8.6	8.5	32.2 32.3	32.3	94.5 93.5	94.0	7.0 6.9	7.0	7.0	9.5 9.0	9.3	24.1	13.8 15.9	14.9	15.1
				Middle	5	21.5 21.5	21.5	8.3 8.6	8.5	33.6 33.6	33.6	94.5 94.2	94.4	6.9 6.8	6.9		16.7 14.4	15.6		14.8 13.8	14.3	
				Bottom	9	21.5 21.5	21.5	8.5 8.6	8.6	33.6 33.6	33.6	93.7 93.8	93.8	6.8 6.8	6.8	6.8	47.3 47.3	47.3		15.6 16.4	16.0	
12-Dec-17	Fine	Calm	14:36	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.1 33.1	33.1	97.7 97.4	97.6	7.2 7.2	7.2	7.2	5.2 5.2	5.2	7.3	7.9 6.6	7.3	8.6
				Middle	5.5	20.6 20.6	20.6	8.1 8.1	8.1	33.2 33.2	33.2	97.1 97.1	97.1	7.2 7.2	7.2		6.3 6.4	6.4		6.9 7.8	7.4	
				Bottom	10	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	96.3 96.3	96.3	7.1 7.1	7.1	7.1	10.0 10.3	10.2		12.0 10.4	11.2	
14-Dec-17	Cloudy	Moderate	16:05	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	98.4 98.5	98.5	7.3 7.3	7.3	7.3	6.5 7.2	6.9	9.2	9.4 9.0	9.2	7.8
				Middle	5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	98.2 98.4	98.3	7.3 7.3	7.3		9.8 8.4	9.1		6.6 8.6	7.6	
				Bottom	9	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	98.3 98.3	98.3	7.3 7.3	7.3	7.3	11.7 11.6	11.7		6.4 6.5	6.5	
16-Dec-17	Cloudy	Rough	17:32	Surface	1	19.9 20.0	20.0	8.1 8.1	8.1	32.2 32.2	32.2	98.7 97.5	98.1	7.4 7.3	7.4	7.4	7.9 8.2	8.1	23.0	9.7 11.1	10.4	12.1
				Middle	5	20.0 20.0	20.0	8.1 8.1	8.1	32.2 32.2	32.2	97.7 97.5	97.6	7.4 7.3	7.4		10.0 9.3	9.7		12.9 12.5	12.7	
				Bottom	9	20.1 20.1	20.1	8.1 8.0	8.1	32.5 32.5	32.5	97.0 96.7	96.9	7.3 7.3	7.3	7.3	50.6 51.5	51.1		12.4 13.8	13.1	
18-Dec-17	Cloudy	Rough	17:55	Surface	1	18.8 18.8	18.8	8.0 8.0	8.0	33.2 33.2	33.2	98.3 97.4	97.9	7.5 7.5	7.5	7.5	8.3 8.2	8.3	11.2	8.4 8.4	8.4	9.2
				Middle	5	18.8 18.8	18.8	8.0 8.0	8.0	33.2 33.2	33.2	97.4 97.0	97.2	7.5 7.4	7.5		9.5 10.1	9.8		10.6 10.5	10.6	
				Bottom	9	18.8 18.8	18.8	8.1 8.1	8.1	33.2 33.2	33.2	97.0 96.9	97.0	7.4 7.4	7.4	7.4	15.9 15.3	15.6		8.7 8.7	8.7	
20-Dec-17	Cloudy	Rough	10:05	Surface	1	17.6 17.6	17.6	8.1 8.1	8.1	34.0 34.0	34.0	99.1 97.8	98.5	7.7 7.6	7.7	7.7	13.1 11.5	12.3	25.7	10.0 10.2	10.1	9.3
				Middle	5	17.6 17.6	17.6	8.1 8.1	8.1	34.0 34.0	34.0	98.0 97.5	97.8	7.6 7.6	7.6		30.1 29.3	29.7		9.7 9.4	9.6	
				Bottom	9	17.6 17.6	17.6	8.1 8.0	8.1	34.0 34.0	34.0	97.3 97.0	97.2	7.6 7.6	7.6	7.6	35.2 35.1	35.2		8.4 8.1	8.3	
22-Dec-17	Sunny	Moderate	10:44	Surface	1	17.6 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	98.7 98.1	98.4	7.7 7.6	7.7	7.7	9.6 11.5	10.6	25.8	7.8 7.7	7.8	7.7
				Middle	5	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	97.7 97.4	97.6	7.6 7.6	7.6		28.8 27.7	28.3		6.7 7.2	7.0	
				Bottom	9	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	97.3 97.1	97.2	7.6 7.6	7.6	7.6	37.1 39.8	38.5		8.5 8.1	8.3	
26-Dec-17	Fine	Moderate	13:09	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	99.8 99.7	99.8	7.7 7.7	7.7	7.7	4.4 4.4	4.4	10.6	16.2 7.4	11.8	14.1
				Middle	5	17.9 17.9	17.9	8.1 8.1	8.1	33.3 33.3	33.3	98.0 98.2	98.1	7.6 7.6	7.6		12.4 12.2	12.3		10.4 10.2	10.3	
				Bottom	9	17.9 17.9	17.9	8.1 8.1	8.1	33.3 33.3	33.3	97.8 97.8	97.8	7.6 7.6	7.6	7.6	15.0 15.1	15.1		21.2 19.1	20.2	
28-Dec-17	Fine	Moderate	14:13	Surface	1	18.2 18.2	18.2	8.0 8.0	8.0	32.9 32.9	32.9	100.6 100.5	100.6	7.8 7.8	7.8	7.8	3.1 3.2	3.2	4.1	8.7 10.0	9.4	8.9
				Middle	5	18.2 18.2	18.2	8.0 8.0	8.0	33.0 33.0	33.0	100.3 100.1	100.2	7.8 7.8	7.8		3.1 3.2	3.2		10.1 9.5	9.8	
				Bottom	9	18.1 18.1	18.1	8.0 8.1	8.1	33.2 33.3	33.3	98.9 98.8	98.9	7.7 7.7	7.7	7.7	6.0 6.0	6.0		7.8 7.4	7.6	
30-Dec-17	Cloudy	Calm	16:07	Surface	1	18.6 18.6	18.6	8.0 8.1	8.1	33.0 33.0	33.0	101.2 101.1	101.2	7.8 7.8	7.8	7.7	3.8 3.7	3.8	14.7	12.5 8.9	10.7	8.6
				Middle	5	18.2 18.3	18.3	8.1 8.1	8.1	33.1 33.1	33.1	98.1 98.8	98.5	7.6 7.6	7.6		14.7 14.4	14.6		5.0 8.6	6.8	
				Bottom	9	18.2 18.2	18.2	8.0 8.1	8.1	33.1 33.1	33.1	97.6 97.9	97.8	7.6 7.6	7.6	7.6	25.6 25.7	25.7		8.8 7.9	8.4	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS2 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:40	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	99.6 98.6	99.1	7.1 7.1	7.1	7.1	12.0 12.8	12.4	17.4	9.2 7.9	8.6	9.4
				Middle	3	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.4 98.3	98.4	7.1 7.1	7.1		16.8 17.7	17.3		12.1 11.1	11.6	
				Bottom	5	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.2 98.3	98.3	7.1 7.1	7.1	7.1	22.1 22.8	22.5		7.4 8.7	8.1	
4-Dec-17	Cloudy	Moderate	13:11	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	32.6 32.7	32.7	98.5 97.6	98.1	7.1 7.0	7.1	7.1	10.1 10.8	10.5	13.3	11.4 11.9	11.7	13.8
				Middle	3	22.1 22.1	22.1	8.1 8.1	8.1	33.0 32.9	33.0	96.4 96.3	96.4	7.0 6.9	7.0		11.1 10.9	11.0		14.9 16.6	15.8	
				Bottom	5	22.1 22.1	22.1	8.1 8.1	8.1	33.4 33.4	33.4	95.0 95.1	95.1	6.8 6.8	6.8	6.8	18.0 18.7	18.4		12.3 15.4	13.9	
6-Dec-17	Fine	Moderate	15:46	Surface	1	21.9 21.9	21.9	7.4 7.5	7.5	33.2 33.2	33.2	96.9 95.6	96.3	7.0 6.9	7.0	7.0	10.6 10.1	10.4	12.4	16.3 15.9	16.1	16.2
				Middle	3	21.7 21.7	21.7	7.4 7.5	7.5	33.2 33.2	33.2	95.1 94.8	95.0	6.9 6.9	6.9		12.1 11.6	11.9		16.1 17.1	16.6	
				Bottom	5	21.7 21.7	21.7	7.4 7.5	7.5	33.4 33.4	33.4	94.6 94.3	94.5	6.9 6.8	6.9	6.9	13.9 15.7	14.8		17.1 14.6	15.9	
8-Dec-17	Cloudy	Rough	17:03	Surface	1	21.6 21.6	21.6	8.0 8.1	8.1	33.9 33.9	33.9	96.7 96.2	96.5	7.0 7.0	7.0	7.0	18.8 16.1	17.5	19.4	13.3 12.1	12.7	12.6
				Middle	3	21.6 21.6	21.6	8.0 8.1	8.1	33.9 33.9	33.9	96.2 96.0	96.1	7.0 6.9	7.0		18.0 21.8	19.9		12.6 13.0	12.8	
				Bottom	5	21.6 21.7	21.7	8.0 8.1	8.1	33.9 34.0	34.0	95.9 95.7	95.8	6.9 6.9	6.9	6.9	20.5 20.8	20.7		11.3 13.2	12.3	
12-Dec-17	Fine	Calm	08:48	Surface	1	20.6 20.6	20.6	8.0 8.0	8.0	33.3 33.3	33.3	96.9 96.0	96.5	7.2 7.1	7.2	7.2	5.9 6.5	6.2	6.2	11.9 9.6	10.8	12.1
				Middle	3.5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	96.4 96.1	96.3	7.1 7.1	7.1		6.1 5.7	5.9		9.6 14.1	11.9	
				Bottom	6	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	96.0 95.8	95.9	7.1 7.1	7.1	7.1	6.8 6.1	6.5		12.8 14.1	13.5	
14-Dec-17	Cloudy	Moderate	11:05	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	98.6 98.4	98.5	7.3 7.3	7.3	7.3	4.4 5.2	4.8	5.5	7.2 6.8	7.0	7.2
				Middle	3	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	98.2 98.0	98.1	7.3 7.2	7.3		5.2 5.4	5.3		7.4 8.1	7.8	
				Bottom	5	20.5 20.5	20.5	8.1 8.1	8.1	33.3 33.3	33.3	97.4 97.3	97.4	7.2 7.2	7.2	7.2	6.0 6.6	6.3		6.9 6.7	6.8	
16-Dec-17	Cloudy	Rough	12:27	Surface	1	20.0 20.0	20.0	8.1 8.1	8.1	32.1 32.1	32.1	100.0 98.8	99.4	7.5 7.4	7.5	7.5	8.3 8.8	8.6	9.2	17.5 20.7	19.1	16.6
				Middle	3	20.0 20.0	20.0	8.1 8.1	8.1	32.1 32.1	32.1	98.9 98.6	98.8	7.4 7.4	7.4		9.1 9.2	9.2		19.3 18.9	19.1	
				Bottom	5	20.0 20.0	20.0	8.1 8.0	8.1	32.5 32.4	32.5	98.1 98.1	98.1	7.4 7.4	7.4	7.4	9.6 9.8	9.7		12.3 10.9	11.6	
18-Dec-17	Cloudy	Moderate	12:58	Surface	1	18.8 18.8	18.8	8.0 8.0	8.0	33.2 33.2	33.2	98.9 97.5	98.2	7.6 7.5	7.6	7.6	14.0 14.0	14.0	16.0	11.1 11.3	11.2	13.0
				Middle	3	18.8 18.8	18.8	8.1 8.1	8.1	33.2 33.2	33.2	98.2 97.4	97.8	7.5 7.5	7.5		14.7 14.7	14.7		15.0 14.6	14.8	
				Bottom	5	18.7 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	97.3 97.1	97.2	7.5 7.4	7.5	7.5	19.7 18.9	19.3		12.9 13.1	13.0	
20-Dec-17	Cloudy	Rough	15:13	Surface	1	17.8 17.8	17.8	8.0 8.1	8.1	34.0 34.0	34.0	99.3 98.1	98.7	7.7 7.6	7.7	7.7	20.0 19.3	19.7	19.8	15.8 13.2	14.5	15.0
				Middle	3.5	17.8 17.8	17.8	8.0 8.1	8.1	34.0 34.0	34.0	98.4 98.0	98.2	7.6 7.6	7.6		18.6 18.9	18.8		12.5 13.0	12.8	
				Bottom	6	17.8 17.8	17.8	8.1 8.1	8.1	34.0 34.0	34.0	98.2 98.0	98.1	7.6 7.6	7.6	7.6	20.9 20.7	20.8		17.2 17.9	17.6	
22-Dec-17	Sunny	Moderate	14:54	Surface	1	17.9 18.0	18.0	8.1 8.1	8.1	33.9 33.9	33.9	99.3 99.6	99.5	7.7 7.7	7.7	7.7	9.8 10.0	9.9	11.3	7.8 9.1	8.5	8.0
				Middle	3	17.8 17.8	17.8	8.1 8.1	8.1	33.9 33.9	33.9	98.6 98.5	98.6	7.7 7.6	7.7		11.3 11.7	11.5		7.6 7.5	7.6	
				Bottom	5	17.7 17.7	17.7	8.1 8.1	8.1	33.9 33.9	33.9	98.2 98.1	98.2	7.6 7.6	7.6	7.6	12.5 12.5	12.5		7.6 8.0	7.8	
26-Dec-17	Fine	Moderate	19:16	Surface	1	18.0 18.1	18.1	8.1 8.0	8.1	33.5 33.5	33.5	100.0 99.7	99.9	7.8 7.7	7.8	7.8	5.5 5.6	5.6	5.6	12.9 11.8	12.4	12.2
				Middle	3	18.0 18.1	18.1	8.1 8.1	8.1	33.5 33.5	33.5	99.7 99.6	99.7	7.7 7.7	7.7		5.5 5.8	5.7		10.9 12.4	11.7	
				Bottom	5	18.1 18.1	18.1	8.1 8.1	8.1	33.5 33.5	33.5	99.7 99.6	99.7	7.7 7.7	7.7	7.7	5.4 5.3	5.4		10.2 14.5	12.4	
28-Dec-17	Cloudy	Moderate	08:42	Surface	1	18.0 18.0	18.0	8.1 8.0	8.1	33.0 33.0	33.0	99.9 99.6	99.8	7.8 7.7	7.8	7.8	2.6 2.7	2.7	3.0	7.1 6.9	7.0	7.3
				Middle	3	18.0 18.0	18.0	8.0 8.1	8.1	33.0 33.0	33.0	99.5 99.4	99.5	7.7 7.7	7.7		2.7 2.8	2.8		8.5 8.3	8.4	
				Bottom	5	18.1 18.1	18.1	8.0 8.1	8.1	33.1 33.1	33.1	99.0 99.0	99.0	7.7 7.7	7.7	7.7	3.4 3.3	3.4		7.0 6.2	6.6	
30-Dec-17	Cloudy	Moderate	10:50	Surface	1	18.4 18.4	18.4	8.1 8.1	8.1	32.9 33.0	33.0	99.9 99.9	99.9	7.7 7.7	7.7	7.7	5.9 5.9	5.9	6.5	13.0 9.9	11.5	11.3
				Middle	3	18.3 18.3	18.3	8.1 8.1	8.1	33.0 33.0	33.0	99.4 99.4	99.4	7.7 7.7	7.7		6.8 6.8	6.8		9.9 13.5	11.7	
				Bottom	5	18.3 18.2	18.3	8.1 8.1	8.1	33.1 33.1	33.1	98.7 98.6	98.7	7.6 7.6	7.6	7.6	6.8 6.9	6.9		11.0 10.3	10.7	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS2 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	17:01	Surface	1	22.4 22.4	22.4	8.1 8.1	8.1	33.1 33.1	33.1	99.2 98.9	99.1	7.1 7.1	7.1	7.1	12.0 12.6	12.3	15.4	13.4 14.6	14.0	15.2
				Middle	3	22.4 22.4	22.4	8.1 8.1	8.1	33.1 33.1	33.1	98.8 98.8	98.8	7.1 7.1	7.1		13.0 13.7	13.4		18.7 18.1	18.4	
				Bottom	5	22.4 22.4	22.4	8.1 8.1	8.1	33.1 33.1	33.1	98.6 98.7	98.7	7.1 7.1	7.1	7.1	20.6 20.2	20.4		13.5 12.6	13.1	
4-Dec-17	Cloudy	Rough	18:41	Surface	1	22.1 22.1	22.1	8.1 8.1	8.1	32.9 32.9	32.9	97.6 96.5	97.1	7.0 7.0	7.0	7.0	9.7 9.7	9.7	14.5	14.1 13.6	13.9	15.8
				Middle	3	22.1 22.1	22.1	8.1 8.1	8.1	32.9 32.9	32.9	96.8 96.2	96.5	7.0 6.9	7.0		12.6 12.4	12.5		18.1 17.8	18.0	
				Bottom	5	22.1 22.1	22.1	8.1 8.1	8.1	32.9 32.9	32.9	96.5 96.3	96.4	7.0 6.9	7.0	7.0	20.9 21.9	21.4		13.4 17.6	15.5	
6-Dec-17	Fine	Moderate	09:51	Surface	1	21.6 21.6	21.6	8.0 8.1	8.1	33.6 33.6	33.6	95.4 94.9	95.2	6.9 6.9	6.9	6.9	23.3 23.4	23.4	26.9	28.6 30.3	29.5	30.2
				Middle	3	21.6 21.6	21.6	8.0 8.2	8.1	33.7 33.7	33.7	94.9 94.6	94.8	6.9 6.9	6.9		26.0 26.2	26.1		33.4 33.3	33.4	
				Bottom	5	21.6 21.6	21.6	8.1 8.2	8.2	33.7 33.7	33.7	94.5 94.3	94.4	6.9 6.8	6.9	6.9	30.9 31.3	31.1		27.7 27.5	27.6	
8-Dec-17	Cloudy	Rough	12:27	Surface	1	21.1 21.1	21.1	8.2 8.3	8.3	32.8 32.7	32.8	95.6 94.7	95.2	7.0 7.0	7.0	7.0	10.6 8.9	9.8	17.8	17.8 15.7	16.8	15.6
				Middle	3.5	21.1 21.1	21.1	8.1 8.3	8.2	32.8 32.8	32.8	94.8 94.5	94.7	7.0 6.9	7.0		14.2 15.7	15.0		16.3 14.8	15.6	
				Bottom	6	21.2 21.2	21.2	8.2 8.3	8.3	32.9 33.0	33.0	94.5 94.4	94.5	6.9 6.9	6.9	6.9	28.2 29.0	28.6		14.8 13.9	14.4	
12-Dec-17	Fine	Calm	14:42	Surface	1	20.6 20.6	20.6	8.0 8.0	8.0	33.3 33.2	33.3	97.1 96.6	96.9	7.2 7.1	7.2	7.2	6.3 6.3	6.3	7.7	14.6 11.6	13.1	11.9
				Middle	3	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.2	33.3	96.5 96.7	96.6	7.1 7.2	7.2		6.7 6.5	6.6		12.8 12.8	12.8	
				Bottom	5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	96.1 96.1	96.1	7.1 7.1	7.1	7.1	10.3 10.1	10.2		10.0 9.7	9.9	
14-Dec-17	Cloudy	Moderate	16:13	Surface	1	20.8 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	98.6 98.7	98.7	7.3 7.3	7.3	7.3	6.0 5.3	5.7	8.2	9.8 8.3	9.1	7.9
				Middle	3	20.8 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	98.5 98.5	98.5	7.3 7.3	7.3		7.9 9.7	8.8		7.2 9.7	8.5	
				Bottom	5	20.8 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	98.2 98.4	98.3	7.2 7.2	7.2	7.2	9.5 10.6	10.1		6.7 5.7	6.2	
16-Dec-17	Cloudy	Rough	17:44	Surface	1	19.9 19.9	19.9	8.1 8.1	8.1	32.3 32.3	32.3	98.8 98.3	98.6	7.4 7.4	7.4	7.4	21.8 19.6	20.7	21.6	11.4 11.1	11.3	11.0
				Middle	3	19.9 19.9	19.9	8.1 8.1	8.1	32.3 32.3	32.3	97.9 98.4	98.2	7.4 7.4	7.4		21.2 20.9	21.1		11.7 10.6	11.2	
				Bottom	5	19.9 19.9	19.9	8.1 8.1	8.1	32.3 32.3	32.3	97.9 98.5	98.2	7.4 7.4	7.4	7.4	22.9 23.0	23.0		10.3 10.9	10.6	
18-Dec-17	Cloudy	Rough	18:04	Surface	1	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	98.9 98.1	98.5	7.6 7.5	7.6	7.6	11.5 11.6	11.6	12.6	11.2 11.4	11.3	13.6
				Middle	3.5	18.7 18.7	18.7	8.0 8.1	8.1	33.2 33.2	33.2	98.1 97.6	97.9	7.5 7.5	7.5		12.5 12.5	12.5		18.4 18.4	18.4	
				Bottom	6	18.7 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	97.7 97.3	97.5	7.5 7.5	7.5	7.5	13.6 13.5	13.6		11.2 11.0	11.1	
20-Dec-17	Cloudy	Rough	10:12	Surface	1	17.5 17.5	17.5	8.0 8.1	8.1	34.1 34.1	34.1	99.7 97.8	98.8	7.8 7.6	7.7	7.7	14.9 15.0	15.0	21.7	7.7 7.2	7.5	8.0
				Middle	3.5	17.5 17.5	17.5	8.0 8.0	8.0	34.1 34.1	34.1	98.3 97.6	98.0	7.7 7.6	7.7		19.3 17.8	18.6		7.4 7.9	7.7	
				Bottom	6	17.5 17.5	17.5	8.0 8.0	8.0	34.1 34.1	34.1	97.7 97.4	97.6	7.6 7.6	7.6	7.6	32.8 30.1	31.5		8.5 8.9	8.7	
22-Dec-17	Sunny	Moderate	10:54	Surface	1	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	98.4 97.8	98.1	7.7 7.6	7.7	7.7	13.3 14.6	14.0	22.0	7.8 7.5	7.7	7.8
				Middle	3	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	98.2 97.7	98.0	7.7 7.6	7.7		24.2 26.4	25.3		8.4 7.6	8.0	
				Bottom	5	17.5 17.5	17.5	8.1 8.0	8.1	33.9 33.9	33.9	97.8 97.8	97.8	7.6 7.6	7.6	7.6	26.9 26.4	26.7		7.8 7.7	7.8	
26-Dec-17	Fine	Moderate	13:17	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.3 33.3	33.3	99.7 99.1	99.4	7.7 7.7	7.7	7.7	8.4 8.4	8.4	10.6	13.0 15.7	14.4	15.7
				Middle	3	17.9 18.0	18.0	8.1 8.1	8.1	33.3 33.3	33.3	99.1 98.9	99.0	7.7 7.7	7.7		10.6 10.3	10.5		15.4 16.7	16.1	
				Bottom	5	17.9 17.9	17.9	8.1 8.1	8.1	33.3 33.3	33.3	98.8 98.7	98.8	7.7 7.7	7.7	7.7	12.8 12.8	12.8		15.2 17.9	16.6	
28-Dec-17	Fine	Moderate	14:22	Surface	1	18.2 18.1	18.2	8.1 8.0	8.1	33.2 33.2	33.2	100.5 99.9	100.2	7.8 7.7	7.8	7.8	4.0 4.4	4.2	4.4	7.5 7.4	7.5	7.8
				Middle	3	18.1 18.1	18.1	8.1 8.1	8.1	33.2 33.2	33.2	99.8 99.8	99.8	7.7 7.7	7.7		4.2 4.5	4.4		8.3 8.0	8.2	
				Bottom	5	18.1 18.1	18.1	8.0 8.1	8.1	33.2 33.2	33.2	99.6 99.6	99.6	7.7 7.7	7.7	7.7	4.5 4.6	4.6		7.6 8.0	7.8	
30-Dec-17	Cloudy	Calm	16:16	Surface	1	18.7 18.6	18.7	8.1 8.1	8.1	32.9 32.9	32.9	102.1 101.6	101.9	7.8 7.8	7.8	7.8	4.2 4.6	4.4	7.8	9.7 8.5	9.1	9.5
				Middle	3	18.5 18.5	18.5	8.1 8.2	8.2	32.9 32.9	32.9	100.7 100.7	100.7	7.8 7.8	7.8		6.9 7.2	7.1		9.2 10.2	9.7	
				Bottom	5	18.5 18.5	18.5	8.2 8.3	8.3	33.0 33.0	33.0	100.0 100.1	100.1	7.7 7.7	7.7	7.7	11.7 12.0	11.9		10.0 9.5	9.8	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS3 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:50	Surface	1	22.4 22.4	22.4	8.1 8.1	8.1	33.6 33.6	33.6	100.0 99.7	99.9	7.1 7.1	7.1	7.1	8.6 8.4	8.5	11.9	7.0 6.6	6.8	7.4
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	22.1 22.1	22.1	8.1 8.2	8.2	33.5 33.5	33.5	97.9 97.5	97.7	7.0 7.0	7.0	7.0	14.6 15.7	15.2		8.6 7.4	8.0	
4-Dec-17	Cloudy	Moderate	12:24	Surface	1	22.2 22.3	22.3	8.0 8.0	8.0	32.8 32.8	32.8	99.9 99.4	99.7	7.2 7.2	7.2	7.2	9.2 9.2	9.2	11.7	11.2 11.1	11.2	11.3
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	22.2 22.2	22.2	8.0 8.0	8.0	32.8 32.8	32.8	99.6 99.1	99.4	7.2 7.1	7.2	7.2	14.0 14.2	14.1		9.7 12.8	11.3	
6-Dec-17	Fine	Moderate	14:24	Surface	1	21.9 21.9	21.9	8.0 8.0	8.0	32.2 32.2	32.2	98.4 97.7	98.1	7.2 7.1	7.2	7.2	10.3 10.3	10.3	11.7	14.5 11.5	13.0	13.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.85	21.8 21.8	21.8	8.0 8.0	8.0	32.5 32.5	32.5	96.8 96.6	96.7	7.0 7.0	7.0	7.0	12.8 13.2	13.0		13.2 15.5	14.4	
8-Dec-17	Cloudy	Rough	15:58	Surface	1	21.2 21.2	21.2	8.0 8.0	8.0	31.8 31.8	31.8	97.5 97.2	97.4	7.2 7.2	7.2	7.2	19.2 19.0	19.1	20.2	10.9 9.8	10.4	10.5
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.05	21.2 21.2	21.2	8.0 8.0	8.0	31.8 31.8	31.8	96.9 96.5	96.7	7.2 7.1	7.2	7.2	21.1 21.3	21.2		12.8 8.1	10.5	
12-Dec-17	Fine	Calm	08:20	Surface	1	20.5 20.5	20.5	8.1 8.1	8.1	33.2 33.2	33.2	97.0 97.0	97.0	7.2 7.2	7.2	7.2	5.6 5.6	5.6	5.7	6.5 6.4	6.5	6.2
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.05	20.5 20.5	20.5	8.1 8.1	8.1	33.2 33.2	33.2	97.9 96.9	97.4	7.3 7.2	7.3	7.3	5.6 5.7	5.7		5.8 6.0	5.9	
14-Dec-17	Cloudy	Moderate	10:47	Surface	1	20.6 20.5	20.6	8.0 8.0	8.0	33.7 33.7	33.7	97.9 97.3	97.6	7.2 7.2	7.2	7.2	4.9 5.2	5.1	5.4	7.6 9.4	8.5	8.0
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.6	20.4 20.3	20.4	8.0 8.0	8.0	33.7 33.7	33.7	96.4 96.3	96.4	7.1 7.1	7.1	7.1	5.6 5.7	5.7		7.9 6.8	7.4	
16-Dec-17	Cloudy	Rough	11:51	Surface	1	19.8 19.8	19.8	8.1 8.0	8.1	33.6 33.6	33.6	98.5 97.7	98.1	7.4 7.3	7.4	7.4	21.6 22.3	22.0	25.8	16.1 18.6	17.4	17.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.6	19.8 20.0	19.9	8.1 8.1	8.1	33.6 33.7	33.7	97.3 97.0	97.2	7.3 7.2	7.3	7.3	29.8 29.2	29.5		17.6 18.4	18.0	
18-Dec-17	Cloudy	Moderate	12:34	Surface	1	18.0 18.1	18.1	8.0 8.0	8.0	32.9 32.9	32.9	102.1 99.1	100.6	7.9 7.7	7.8	7.8	14.6 13.4	14.0	21.0	15.4 15.6	15.5	14.9
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.0 18.0	18.0	8.0 8.0	8.0	32.9 32.9	32.9	99.4 98.9	99.2	7.7 7.7	7.7	7.7	27.2 28.5	27.9		14.4 14.0	14.2	
20-Dec-17	Cloudy	Rough	14:52	Surface	1	17.7 17.8	17.8	8.1 8.1	8.1	33.1 33.1	33.1	102.1 100.6	101.4	8.0 7.9	8.0	8.0	10.5 10.3	10.4	16.4	14.5 15.9	15.2	11.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	17.6 17.6	17.6	8.1 8.1	8.1	33.1 33.2	33.2	100.2 100.1	100.2	7.8 7.8	7.8	7.8	22.3 22.5	22.4		8.3 8.0	8.2	
22-Dec-17	Sunny	Moderate	14:49	Surface	1	17.9 17.9	17.9	8.1 8.1	8.1	33.0 33.0	33.0	102.3 101.6	102.0	8.0 7.9	8.0	8.0	6.9 7.3	7.1	8.3	8.2 7.5	7.9	8.3
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	17.7 17.7	17.7	8.1 8.1	8.1	33.0 33.0	33.0	101.1 100.6	100.9	7.9 7.9	7.9	7.9	9.4 9.6	9.5		8.5 8.7	8.6	
26-Dec-17	Fine	Moderate	18:57	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.5 32.5	32.5	102.8 101.6	102.2	8.0 7.9	8.0	8.0	5.6 5.6	5.6	6.1	10.6 10.3	10.5	10.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.1 18.1	18.1	8.1 8.1	8.1	32.6 32.6	32.6	101.1 101.0	101.1	7.9 7.9	7.9	7.9	6.5 6.7	6.6		11.1 10.0	10.6	
28-Dec-17	Cloudy	Moderate	08:03	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	32.1 32.1	32.1	101.6 100.3	101.0	7.9 7.8	7.9	7.9	3.6 3.7	3.7	3.8	7.8 7.1	7.5	7.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.0 18.0	18.0	8.1 8.1	8.1	32.1 32.1	32.1	100.4 100.2	100.3	7.8 7.8	7.8	7.8	3.7 3.9	3.8		7.8 8.2	8.0	
30-Dec-17	Cloudy	Moderate	10:25	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	31.9 31.9	31.9	99.5 97.7	98.6	7.7 7.6	7.7	7.7	4.4 4.4	4.4	6.0	12.2 10.6	11.4	12.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.2 18.2	18.2	8.1 8.1	8.1	32.0 32.0	32.0	98.3 98.2	98.3	7.7 7.6	7.7	7.7	7.6 7.6	7.6		14.7 13.0	13.9	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS3 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:34	Surface	1	22.4 22.4	22.4	8.3 8.2	8.3	33.4 33.4	33.4	100.3 99.8	100.1	7.2 7.1	7.2	7.2	8.5 8.6	8.6	9.7	12.6 11.7	12.2	13.1
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.05	22.3 22.3	22.3	8.2 8.3	8.3	33.4 33.4	33.4	99.6 98.3	99.0	7.1 7.0	7.1	7.1	10.7 10.7	10.7		13.2 14.7	14.0	
4-Dec-17	Cloudy	Rough	18:12	Surface	1	22.4 22.4	22.4	8.0 8.0	8.0	32.5 32.6	32.6	99.4 99.7	99.6	7.2 7.2	7.2	7.2	13.6 14.2	13.9	16.7	12.4 17.1	14.8	16.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3	22.4 22.4	22.4	8.0 8.0	8.0	32.6 32.6	32.6	99.8 99.8	99.8	7.2 7.2	7.2	7.2	19.4 19.5	19.5		17.1 19.4	18.3	
6-Dec-17	Fine	Moderate	09:37	Surface	1	21.5 21.5	21.5	8.1 8.1	8.1	32.7 32.7	32.7	96.2 95.4	95.8	7.0 7.0	7.0	7.0	12.9 12.1	12.5	14.6	15.8 15.6	15.7	19.4
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.4	21.5 21.5	21.5	8.1 8.1	8.1	32.8 32.8	32.8	95.2 95.2	95.2	7.0 7.0	7.0	7.0	16.4 16.8	16.6		22.6 23.3	23.0	
8-Dec-17	Cloudy	Rough	12:05	Surface	1	21.0 21.0	21.0	8.1 8.0	8.1	31.9 31.9	31.9	97.6 97.2	97.4	7.2 7.2	7.2	7.2	8.3 8.0	8.2	12.3	10.2 10.1	10.2	10.0
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.6	21.0 21.0	21.0	8.0 8.0	8.0	31.9 31.9	31.9	96.4 96.3	96.4	7.1 7.1	7.1	7.1	16.3 16.2	16.3		10.4 8.9	9.7	
12-Dec-17	Fine	Calm	14:37	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.0 33.0	33.0	100.5 100.1	100.3	7.4 7.4	7.4	7.4	6.1 6.0	6.1	6.3	7.7 7.4	7.6	7.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3	20.6 20.6	20.6	8.1 8.1	8.1	33.0 33.0	33.0	100.0 99.9	100.0	7.4 7.4	7.4	7.4	6.4 6.4	6.4		8.4 6.8	7.6	
14-Dec-17	Cloudy	Moderate	15:32	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.6 33.6	33.6	100.4 100.0	100.2	7.4 7.4	7.4	7.4	3.9 3.8	3.9	5.9	7.3 8.7	8.0	7.0
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.8	20.5 20.5	20.5	8.1 8.1	8.1	33.7 33.7	33.7	97.5 97.5	97.5	7.2 7.2	7.2	7.2	7.8 7.7	7.8		6.6 5.3	6.0	
16-Dec-17	Cloudy	Rough	16:46	Surface	1	20.0 20.0	20.0	8.0 8.1	8.1	33.8 33.8	33.8	99.3 98.9	99.1	7.4 7.4	7.4	7.4	19.9 19.8	19.9	21.4	11.0 9.7	10.4	13.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.7	20.0 20.0	20.0	8.0 8.1	8.1	33.8 33.8	33.8	98.9 98.6	98.8	7.4 7.3	7.4	7.4	22.6 23.0	22.8		16.7 17.3	17.0	
18-Dec-17	Cloudy	Rough	17:30	Surface	1	18.4 18.4	18.4	8.1 8.0	8.1	33.0 33.0	33.0	106.4 100.4	103.4	8.2 7.7	8.0	8.0	15.2 16.3	15.8	19.8	16.1 18.4	17.3	14.9
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.4 18.4	18.4	8.0 8.0	8.0	33.0 33.0	33.0	101.6 100.3	101.0	7.8 7.7	7.8	7.8	23.4 23.9	23.7		12.3 12.6	12.5	
20-Dec-17	Cloudy	Rough	09:16	Surface	1	17.1 17.2	17.2	8.1 8.1	8.1	33.1 33.1	33.1	105.0 100.0	102.5	8.3 7.9	8.1	8.1	18.6 21.0	19.8	21.3	9.0 10.1	9.6	9.5
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	17.2 17.2	17.2	8.1 8.1	8.1	33.1 33.1	33.1	102.2 99.5	100.9	8.1 7.9	8.0	8.0	22.7 22.7	22.7		9.4 9.2	9.3	
22-Dec-17	Sunny	Moderate	10:28	Surface	1	17.4 17.3	17.4	8.1 8.1	8.1	33.0 33.0	33.0	104.2 99.8	102.0	8.2 7.9	8.1	8.1	11.9 11.9	11.9	13.1	7.9 7.3	7.6	7.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	17.3 17.3	17.3	8.1 8.1	8.1	33.0 33.0	33.0	99.9 99.5	99.7	7.9 7.8	7.9	7.9	13.8 14.6	14.2		7.8 8.0	7.9	
26-Dec-17	Fine	Moderate	12:47	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	32.3 32.3	32.3	101.7 101.1	101.4	7.9 7.9	7.9	7.9	5.3 5.4	5.4	6.0	8.4 8.5	8.5	9.5
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.0 18.0	18.0	8.1 8.1	8.1	32.3 32.3	32.3	101.0 101.0	101.0	7.9 7.9	7.9	7.9	6.6 6.4	6.5		10.8 10.2	10.5	
28-Dec-17	Fine	Moderate	14:20	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	32.2 32.2	32.2	102.6 102.0	102.3	8.0 7.9	8.0	8.0	4.6 5.2	4.9	5.4	8.2 8.2	8.2	7.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.8	18.3 18.3	18.3	8.1 8.1	8.1	32.2 32.2	32.2	101.5 101.8	101.7	7.9 7.9	7.9	7.9	5.9 5.9	5.9		7.1 7.5	7.3	
30-Dec-17	Cloudy	Calm	15:16	Surface	1	18.7 18.8	18.8	8.1 8.1	8.1	31.9 31.9	31.9	104.0 104.2	104.1	8.0 8.0	8.0	8.0	3.7 4.1	3.9	6.3	7.0 7.8	7.4	7.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.4 18.4	18.4	8.1 8.1	8.1	31.9 31.9	31.9	101.0 101.6	101.3	7.8 7.9	7.9	7.9	8.9 8.2	8.6		7.8 7.9	7.9	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS4 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:52	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.0 33.0	33.0	99.6 98.9	99.3	7.2 7.1	7.2	7.2	9.8 9.6	9.7	11.2	17.0 16.9	17.0	15.5
				Middle	3	22.2 22.2	22.2	8.1 8.1	8.1	33.0 33.0	33.0	98.7 98.8	98.8	7.1 7.1	7.1		11.8 11.2	11.5		13.3 15.4	14.4	
				Bottom	5	22.2 22.2	22.2	8.1 8.1	8.1	33.0 33.0	33.0	98.6 98.5	98.6	7.1 7.1	7.1	7.1	12.5 12.3	12.4		13.9 16.2	15.1	
4-Dec-17	Cloudy	Moderate	12:07	Surface	1	22.2 22.2	22.2	8.0 8.0	8.0	33.3 33.3	33.3	98.9 97.1	98.0	7.1 7.0	7.1	7.1	11.7 11.9	11.8	18.4	17.7 17.5	17.6	15.9
				Middle	3.5	22.0 22.0	22.0	8.0 8.0	8.0	33.3 33.3	33.3	96.6 96.3	96.5	7.0 6.9	7.0		19.9 19.7	19.8		14.6 11.7	13.2	
				Bottom	6	22.0 22.0	22.0	8.0 8.0	8.0	33.3 33.3	33.3	95.5 95.5	95.5	6.9 6.9	6.9	6.9	23.9 23.0	23.5		15.2 18.4	16.8	
6-Dec-17	Fine	Moderate	14:47	Surface	1	22.1 22.1	22.1	8.3 8.2	8.3	33.4 33.3	33.4	98.3 98.0	98.2	7.1 7.1	7.1	7.0	9.0 9.2	9.1	12.8	13.4 14.1	13.8	15.9
				Middle	3	21.9 21.9	21.9	8.3 8.2	8.3	33.6 33.6	33.6	96.1 96.1	96.1	6.9 6.9	6.9		10.5 11.1	10.8		14.3 15.4	14.9	
				Bottom	5	21.8 21.8	21.8	8.3 8.2	8.3	33.6 33.6	33.6	95.6 95.6	95.6	6.9 6.9	6.9	6.9	18.3 18.9	18.6		19.6 18.6	19.1	
8-Dec-17	Cloudy	Rough	17:15	Surface	1	21.1 21.1	21.1	8.0 8.0	8.0	32.9 32.9	32.9	96.9 96.0	96.5	7.1 7.1	7.1	7.1	15.2 13.3	14.3	16.0	13.4 12.5	13.0	13.1
				Middle	3.5	21.1 21.1	21.1	8.0 8.0	8.0	32.9 32.8	32.9	96.3 95.8	96.1	7.1 7.0	7.1		16.0 13.7	14.9		14.0 13.5	13.8	
				Bottom	6	21.1 21.1	21.1	8.0 8.0	8.0	32.9 32.8	32.9	95.8 95.4	95.6	7.0 7.0	7.0	7.0	20.0 17.3	18.7		13.8 11.2	12.5	
12-Dec-17	Fine	Calm	07:51	Surface	1	20.4 20.4	20.4	8.0 8.0	8.0	33.2 33.2	33.2	96.0 95.7	95.9	7.1 7.1	7.1	7.1	5.2 5.3	5.3	5.3	8.2 8.3	8.3	8.9
				Middle	3.5	20.4 20.4	20.4	8.1 8.1	8.1	33.2 33.2	33.2	95.5 95.6	95.6	7.1 7.1	7.1		5.3 5.1	5.2		8.9 11.9	10.4	
				Bottom	6	20.4 20.4	20.4	8.1 8.1	8.1	33.2 33.2	33.2	95.5 95.3	95.4	7.1 7.1	7.1	7.1	5.2 5.5	5.4		7.6 8.3	8.0	
14-Dec-17	Cloudy	Moderate	10:07	Surface	1	20.4 20.4	20.4	7.9 8.0	8.0	33.3 33.3	33.3	97.8 97.5	97.7	7.3 7.2	7.3	7.3	7.2 6.9	7.1	7.3	10.2 6.9	8.6	7.7
				Middle	3.5	20.4 20.4	20.4	8.0 8.0	8.0	33.3 33.3	33.3	97.5 97.5	97.5	7.2 7.2	7.2		7.4 7.1	7.3		7.3 7.3	7.3	
				Bottom	6	20.4 20.4	20.4	8.0 8.0	8.0	33.3 33.3	33.3	97.4 97.2	97.3	7.2 7.2	7.2	7.2	7.2 7.5	7.4		7.0 7.4	7.2	
16-Dec-17	Cloudy	Rough	11:09	Surface	1	20.0 20.0	20.0	8.0 8.0	8.0	32.9 32.9	32.9	99.1 98.1	98.6	7.4 7.4	7.4	7.4	19.3 16.6	18.0	25.3	18.7 12.4	15.6	12.8
				Middle	3.5	20.0 20.0	20.0	8.0 8.0	8.0	32.9 32.9	32.9	98.3 98.0	98.2	7.4 7.3	7.4		19.2 17.8	18.5		10.2 10.1	10.2	
				Bottom	6	20.1 20.1	20.1	8.0 8.0	8.0	32.9 32.9	32.9	97.4 97.4	97.4	7.3 7.3	7.3	7.3	38.9 39.8	39.4		10.3 14.9	12.6	
18-Dec-17	Cloudy	Moderate	11:48	Surface	1	18.2 18.1	18.2	8.0 8.0	8.0	33.0 33.1	33.1	98.2 97.3	97.8	7.6 7.5	7.6	7.6	15.5 15.1	15.3	16.6	12.1 12.3	12.2	15.4
				Middle	3.5	18.1 18.1	18.1	8.0 8.0	8.0	33.0 33.0	33.0	97.4 96.9	97.2	7.6 7.5	7.6		15.7 16.1	15.9		18.9 18.9	18.9	
				Bottom	6	18.1 18.1	18.1	8.0 8.0	8.0	33.0 33.0	33.0	96.9 96.5	96.7	7.5 7.5	7.5	7.5	18.4 18.8	18.6		14.9 15.0	15.0	
20-Dec-17	Cloudy	Rough	13:47	Surface	1	17.6 17.6	17.6	8.1 8.1	8.1	34.1 34.1	34.1	99.9 98.7	99.3	7.8 7.7	7.8	7.8	15.4 15.2	15.3	16.9	19.1 21.1	20.1	15.8
				Middle	3.5	17.6 17.6	17.6	8.1 8.1	8.1	34.1 34.1	34.1	99.5 98.4	99.0	7.7 7.7	7.7		15.0 15.6	15.3		12.5 16.1	14.3	
				Bottom	6	17.5 17.4	17.5	8.0 8.0	8.0	34.1 34.1	34.1	98.4 98.0	98.2	7.7 7.7	7.7	7.7	20.6 19.7	20.2		14.0 12.2	13.1	
22-Dec-17	Sunny	Moderate	13:48	Surface	1	17.8 17.9	17.9	8.2 8.1	8.2	33.9 33.9	33.9	100.7 100.4	100.6	7.8 7.8	7.8	7.8	12.5 12.6	12.6	12.8	7.4 7.4	7.4	7.5
				Middle	3	17.6 17.7	17.7	8.1 8.1	8.1	33.9 33.9	33.9	99.2 99.4	99.3	7.7 7.7	7.7		12.2 12.7	12.5		7.0 6.9	7.0	
				Bottom	5	17.6 17.6	17.6	8.2 8.2	8.2	33.9 33.9	33.9	98.7 98.5	98.6	7.7 7.7	7.7	7.7	13.4 13.0	13.2		8.1 8.2	8.2	
26-Dec-17	Fine	Moderate	18:04	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	99.9 99.3	99.6	7.8 7.7	7.8	7.8	5.4 5.0	5.2	5.6	13.1 10.4	11.8	11.0
				Middle	3.5	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	99.3 99.3	99.3	7.7 7.7	7.7		5.5 5.3	5.4		8.9 13.8	11.4	
				Bottom	6	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	99.1 99.1	99.1	7.7 7.7	7.7	7.7	6.0 6.4	6.2		10.1 9.4	9.8	
28-Dec-17	Cloudy	Moderate	07:34	Surface	1	18.0 18.1	18.1	8.0 8.0	8.0	33.1 33.1	33.1	99.1 99.2	99.2	7.7 7.7	7.7	7.7	3.1 3.3	3.2	3.9	8.3 7.4	7.9	7.6
				Middle	3	18.1 18.1	18.1	8.1 8.1	8.1	33.1 33.1	33.1	98.9 99.0	99.0	7.7 7.7	7.7		3.4 3.3	3.4		7.9 7.1	7.5	
				Bottom	5	18.1 18.1	18.1	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.6	98.6	7.6 7.6	7.6	7.6	4.8 5.1	5.0		7.7 7.1	7.4	
30-Dec-17	Cloudy	Moderate	09:51	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	32.8 32.8	32.8	99.5 99.3	99.4	7.7 7.7	7.7	7.7	4.1 4.2	4.2	4.5	11.7 8.9	10.3	9.0
				Middle	3	18.2 18.3	18.3	8.2 8.2	8.2	32.8 32.8	32.8	99.0 99.1	99.1	7.7 7.7	7.7		4.5 4.4	4.5		8.1 8.7	8.4	
				Bottom	5	18.2 18.2	18.2	8.2 8.2	8.2	32.8 32.8	32.8	98.2 98.5	98.4	7.6 7.6	7.6	7.6	5.0 4.7	4.9		8.7 8.0	8.4	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at IS4 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	17:11	Surface	1	22.4 22.4	22.4	8.1 8.1	8.1	33.0 33.0	33.0	100.6 100.4	100.5	7.2 7.2	7.2	7.2	9.5 9.5	9.5	10.0	14.8 12.8	13.8	15.2
				Middle	3	22.4 22.4	22.4	8.1 8.1	8.1	33.0 33.0	33.0	100.3 100.2	100.3	7.2 7.2	7.2		9.4 9.5	9.5		14.8 14.9	14.9	
				Bottom	5	22.4 22.4	22.4	8.1 8.1	8.1	33.0 33.0	33.0	99.9 100.0	100.0	7.2 7.2	7.2	7.2	11.1 10.9	11.0		18.4 15.6	17.0	
4-Dec-17	Cloudy	Rough	17:21	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	99.3 98.5	98.9	7.1 7.1	7.1	7.1	16.2 16.5	16.4	25.0	18.7 21.3	20.0	17.4
				Middle	3	22.3 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	98.7 98.4	98.6	7.1 7.1	7.1		28.6 28.0	28.3		14.7 18.7	16.7	
				Bottom	5	22.3 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	98.4 98.2	98.3	7.1 7.1	7.1	7.1	29.9 30.9	30.4		17.2 13.7	15.5	
6-Dec-17	Fine	Moderate	08:52	Surface	1	21.5 21.5	21.5	7.6 8.1	7.9	33.6 33.7	33.7	94.7 94.3	94.5	6.9 6.8	6.9	6.9	17.7 19.5	18.6	22.7	16.9 14.1	15.5	17.0
				Middle	3	21.5 21.5	21.5	7.8 8.2	8.0	33.6 33.7	33.7	93.9 94.1	94.0	6.8 6.8	6.8		18.9 22.9	20.9		19.3 16.1	17.7	
				Bottom	5	21.5 21.5	21.5	7.9 8.3	8.1	33.6 33.7	33.7	93.7 93.8	93.8	6.8 6.8	6.8	6.8	31.7 25.7	28.7		20.8 14.7	17.8	
8-Dec-17	Cloudy	Rough	12:40	Surface	1	21.1 21.1	21.1	8.0 8.2	8.1	32.8 32.8	32.8	96.4 95.1	95.8	7.1 7.0	7.1	7.1	23.7 23.0	23.4	26.8	10.9 8.6	9.8	11.0
				Middle	3	21.1 21.1	21.1	8.0 8.2	8.1	32.8 32.8	32.8	95.3 94.9	95.1	7.0 7.0	7.0		27.3 26.4	26.9		8.6 8.6	8.6	
				Bottom	5	21.1 21.1	21.1	8.1 8.3	8.2	32.8 32.8	32.8	95.0 94.7	94.9	7.0 7.0	7.0	7.0	30.3 30.1	30.2		14.9 14.5	14.7	
12-Dec-17	Fine	Calm	13:41	Surface	1	20.5 20.5	20.5	8.0 8.0	8.0	33.1 33.1	33.1	97.6 97.6	97.6	7.2 7.2	7.2	7.2	5.5 5.4	5.5	5.8	9.1 10.0	9.6	9.9
				Middle	3	20.4 20.4	20.4	8.0 8.0	8.0	33.1 33.1	33.1	97.6 97.3	97.5	7.2 7.2	7.2		5.5 5.6	5.6		11.1 11.3	11.2	
				Bottom	5	20.4 20.4	20.4	8.1 8.1	8.1	33.1 33.1	33.1	97.1 97.0	97.1	7.2 7.2	7.2	7.2	6.4 6.3	6.4		8.8 9.1	9.0	
14-Dec-17	Cloudy	Moderate	15:09	Surface	1	20.4 20.3	20.4	8.1 8.1	8.1	33.2 33.2	33.2	98.2 98.0	98.1	7.3 7.3	7.3	7.3	5.7 5.2	5.5	7.9	6.6 6.4	6.5	6.2
				Middle	3	20.3 20.3	20.3	8.1 8.1	8.1	33.2 33.2	33.2	98.0 97.9	98.0	7.3 7.3	7.3		7.5 7.3	7.4		5.0 5.5	5.3	
				Bottom	5	20.3 20.3	20.3	8.1 8.1	8.1	33.2 33.2	33.2	97.7 97.8	97.8	7.3 7.3	7.3	7.3	10.8 10.7	10.8		7.4 6.2	6.8	
16-Dec-17	Cloudy	Rough	15:56	Surface	1	19.9 20.0	20.0	8.0 8.0	8.0	32.9 32.9	32.9	98.2 98.1	98.2	7.4 7.4	7.4	7.4	15.6 15.9	15.8	15.5	17.9 19.6	18.8	13.8
				Middle	3	20.0 20.0	20.0	8.0 8.0	8.0	32.9 33.0	33.0	98.0 98.2	98.1	7.3 7.4	7.4		15.6 14.3	15.0		11.8 12.1	12.0	
				Bottom	5	20.0 20.0	20.0	8.0 8.0	8.0	32.9 33.0	33.0	97.9 98.3	98.1	7.3 7.4	7.4	7.4	15.5 15.6	15.6		9.5 11.7	10.6	
18-Dec-17	Cloudy	Rough	16:58	Surface	1	18.4 18.4	18.4	8.0 8.1	8.1	33.0 33.0	33.0	101.2 98.7	100.0	7.8 7.6	7.7	7.7	11.2 11.1	11.2	11.4	10.0 10.0	10.0	10.7
				Middle	3	18.4 18.4	18.4	8.1 8.1	8.1	33.0 33.0	33.0	100.0 98.6	99.3	7.7 7.6	7.7		11.5 11.5	11.5		10.5 10.3	10.4	
				Bottom	5	18.4 18.4	18.4	8.1 8.1	8.1	33.0 33.0	33.0	99.1 98.2	98.7	7.6 7.6	7.6	7.6	11.4 11.7	11.6		11.7 11.7	11.7	
20-Dec-17	Cloudy	Rough	08:56	Surface	1	17.0 17.1	17.1	8.1 8.1	8.1	34.0 34.0	34.0	96.8 96.4	96.6	7.6 7.6	7.6	7.6	11.8 11.8	11.8	13.9	9.2 9.5	9.4	9.9
				Middle	3	17.0 17.1	17.1	8.1 8.1	8.1	34.0 34.0	34.0	96.4 96.0	96.2	7.6 7.5	7.6		14.2 14.3	14.3		9.4 10.3	9.9	
				Bottom	5	17.1 17.1	17.1	8.1 8.1	8.1	34.0 34.0	34.0	96.1 95.9	96.0	7.6 7.5	7.6	7.6	15.5 15.8	15.7		10.8 9.9	10.4	
22-Dec-17	Sunny	Moderate	09:48	Surface	1	17.3 17.3	17.3	8.1 8.1	8.1	33.9 33.9	33.9	97.7 97.6	97.7	7.7 7.6	7.7	7.7	6.2 6.1	6.2	6.7	8.0 7.5	7.8	8.2
				Middle	3	17.3 17.3	17.3	8.1 8.1	8.1	33.9 33.9	33.9	97.5 97.3	97.4	7.6 7.6	7.6		6.7 6.9	6.8		8.4 7.2	7.8	
				Bottom	5	17.3 17.3	17.3	8.1 8.1	8.1	33.9 33.9	33.9	97.3 97.2	97.3	7.6 7.6	7.6	7.6	7.2 7.2	7.2		9.3 8.9	9.1	
26-Dec-17	Fine	Moderate	12:14	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.1 33.1	33.1	99.3 99.1	99.2	7.7 7.7	7.7	7.7	5.4 5.2	5.3	5.5	10.8 15.5	13.2	10.7
				Middle	3	17.9 17.9	17.9	8.1 8.1	8.1	33.1 33.2	33.2	98.7 98.8	98.8	7.7 7.7	7.7		5.6 5.3	5.5		8.4 10.0	9.2	
				Bottom	5	17.9 17.9	17.9	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.4	98.5	7.7 7.7	7.7	7.7	5.5 5.9	5.7		10.2 9.0	9.6	
28-Dec-17	Fine	Moderate	13:19	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	33.3 33.3	33.3	100.6 100.6	100.6	7.8 7.8	7.8	7.8	2.5 2.5	2.5	3.3	7.8 8.4	8.1	8.2
				Middle	3	18.2 18.2	18.2	8.1 8.1	8.1	33.3 33.3	33.3	99.8 100.0	99.9	7.7 7.7	7.7		3.4 3.5	3.5		8.0 7.9	8.0	
				Bottom	5	18.2 18.2	18.2	8.1 8.1	8.1	33.3 33.3	33.3	99.6 99.7	99.7	7.7 7.7	7.7	7.7	4.0 3.5	3.8		8.3 8.5	8.4	
30-Dec-17	Cloudy	Calm	15:09	Surface	1	19.0 18.9	19.0	8.1 8.1	8.1	32.6 32.7	32.7	103.7 103.0	103.4	7.9 7.9	7.9	7.9	2.7 2.8	2.8	3.3	5.1 4.8	5.0	6.3
				Middle	3	18.8 18.8	18.8	8.1 8.1	8.1	32.7 32.7	32.7	102.9 102.6	102.8	7.9 7.9	7.9		3.0 2.9	3.0		7.7 6.5	7.1	
				Bottom	5	18.6 18.7	18.7	8.3 8.4	8.4	32.8 32.8	32.8	101.4 101.7	101.6	7.8 7.8	7.8	7.8	4.3 4.0	4.2		7.1 6.4	6.8	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR1 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:25	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	9.8	-	-	12.4
				Middle	1.1	22.3 22.3	22.3	8.2 8.2	8.2	33.6 33.6	33.6	100.7 100.2	100.5	7.2 7.2	7.2		9.6 9.9	9.8		9.4 15.3	12.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Moderate	12:59	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	11.7	-	-	10.8
				Middle	1.1	22.2 22.2	22.2	8.0 8.0	8.0	32.3 32.4	32.4	100.3 99.5	99.9	7.3 7.2	7.3		11.9 11.4	11.7		10.1 11.5	10.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	13:32	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	13.3	-	-	19.7
				Middle	0.9	21.8 21.8	21.8	8.1 8.1	8.1	32.0 32.0	32.0	97.8 97.4	97.6	7.1 7.1	7.1		13.2 13.4	13.3		18.8 20.6	19.7	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	15:47	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	21.7	-	-	9.4
				Middle	1.1	21.6 21.6	21.6	8.0 8.0	8.0	33.0 33.0	33.0	97.3 97.1	97.2	7.1 7.1	7.1		21.3 22.0	21.7		9.1 9.7	9.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	09:04	Surface	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	6.1	-	-	7.1
				Middle	1	20.5 20.5	20.5	8.1 8.1	8.1	33.2 33.2	33.2	99.9 99.0	99.5	7.4 7.3	7.4		6.0 6.2	6.1		7.7 6.5	7.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	11:35	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	6.0	-	-	8.3
				Middle	0.9	20.6 20.6	20.6	8.0 8.1	8.1	33.7 33.7	33.7	97.3 97.2	97.3	7.2 7.2	7.2		6.0 5.9	6.0		8.1 8.5	8.3	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	12:34	Surface	-	-	-	-	-	-	-	-	-	-	-	7.5	-	-	13.1	-	-	17.7
				Middle	0.9	19.9 19.9	19.9	8.0 8.1	8.1	33.0 33.0	33.0	99.7 99.5	99.6	7.5 7.5	7.5		13.3 12.9	13.1		20.6 14.8	17.7	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Moderate	13:11	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	14.0	-	-	9.9
				Middle	1.2	18.3 18.3	18.3	8.0 8.0	8.0	33.1 33.1	33.1	103.4 102.2	102.8	8.0 7.9	8.0		14.0 14.0	14.0		10.0 9.8	9.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	13:56	Surface	-	-	-	-	-	-	-	-	-	-	-	7.9	-	-	10.6	-	-	10.8
				Middle	1	17.7 17.7	17.7	8.1 8.1	8.1	33.1 33.1	33.1	100.9 101.0	101.0	7.9 7.9	7.9		10.5 10.7	10.6		12.4 9.2	10.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	14:31	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	10.5	-	-	7.4
				Middle	1	17.9 17.9	17.9	8.0 8.0	8.0	33.0 33.0	33.0	102.3 101.9	102.1	8.0 7.9	8.0		10.5 10.5	10.5		7.4 7.3	7.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	18:16	Surface	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	5.5	-	-	10.2
				Middle	1	18.2 18.2	18.2	8.1 8.1	8.1	32.5 32.5	32.5	106.1 105.0	105.6	8.2 8.2	8.2		5.4 5.5	5.5		10.2 10.1	10.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Cloudy	Moderate	08:48	Surface	-	-	-	-	-	-	-	-	-	-	-	7.9	-	-	3.4	-	-	7.4
				Middle	1.1	18.2 18.2	18.2	8.1 8.1	8.1	31.7 31.7	31.7	100.6 100.3	100.5	7.9 7.8	7.9		3.4 3.4	3.4		7.5 7.2	7.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Moderate	11:06	Surface	-	-	-	-	-	-	-	-	-	-	-	7.8	-	-	6.7	-	-	16.8
				Middle	1.1	18.3 18.3	18.3	8.1 8.1	8.1	32.1 32.1	32.1	100.2 100.0	100.1	7.8 7.8	7.8		6.6 6.7	6.7		19.2 14.3	16.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR1 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:02	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	17.5	-	-	16.1
				Middle	0.7	22.4 22.4	22.4	7.9 8.0	8.0	33.6 33.6	33.6	99.5 99.4	99.5	7.1 7.1	7.1		16.3 18.6	17.5		14.9 17.2	16.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Rough	17:30	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	18.7	-	-	14.8
				Middle	1	22.3 22.3	22.3	8.1 8.1	8.1	32.2 32.2	32.2	99.5 99.5	99.5	7.2 7.2	7.2		16.7 20.6	18.7		15.5 14.1	14.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	10:29	Surface	-	-	-	-	-	-	-	-	-	-	-	7.0	-	-	22.1	-	-	21.2
				Middle	0.9	21.5 21.5	21.5	8.0 8.0	8.0	32.9 32.9	32.9	96.1 95.7	95.9	7.0 7.0	7.0		22.5 21.6	22.1		20.6 21.7	21.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	12:40	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	16.6	-	-	10.0
				Middle	1.1	21.2 21.2	21.2	8.0 8.0	8.0	32.4 32.4	32.4	97.3 96.8	97.1	7.2 7.1	7.2		16.4 16.8	16.6		9.7 10.2	10.0	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	14:20	Surface	-	-	-	-	-	-	-	-	-	-	-	7.6	-	-	8.6	-	-	8.9
				Middle	1	20.7 20.7	20.7	8.1 8.1	8.1	33.2 33.2	33.2	102.9 102.0	102.5	7.6 7.5	7.6		8.3 8.9	8.6		9.5 8.2	8.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	14:50	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	7.0	-	-	11.7
				Middle	0.9	20.7 20.7	20.7	8.0 8.0	8.0	33.7 33.7	33.7	99.0 98.9	99.0	7.3 7.3	7.3		7.2 6.8	7.0		13.0 10.4	11.7	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	16:30	Surface	-	-	-	-	-	-	-	-	-	-	-	7.5	-	-	25.3	-	-	19.2
				Middle	1.1	19.7 19.7	19.7	8.1 8.1	8.1	33.5 33.4	33.5	100.0 99.7	99.9	7.5 7.5	7.5		25.3 25.3	25.3		18.0 20.4	19.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Rough	17:17	Surface	-	-	-	-	-	-	-	-	-	-	-	7.9	-	-	14.5	-	-	13.0
				Middle	1.1	18.4 18.4	18.4	8.1 8.1	8.1	33.1 33.1	33.1	103.0 102.4	102.7	7.9 7.9	7.9		14.2 14.8	14.5		13.1 12.8	13.0	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	10:03	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	20.7	-	-	10.1
				Middle	1.1	16.6 16.6	16.6	8.1 8.1	8.1	33.1 33.1	33.1	101.6 101.3	101.5	8.1 8.1	8.1		20.1 21.3	20.7		10.8 9.3	10.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	11:15	Surface	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	10.3	-	-	8.3
				Middle	1	17.3 17.3	17.3	8.1 8.1	8.1	32.9 33.0	33.0	103.5 102.5	103.0	8.2 8.1	8.2		10.1 10.5	10.3		8.4 8.1	8.3	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	13:38	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	6.8	-	-	10.4
				Middle	1	18.3 18.2	18.3	8.1 8.1	8.1	32.6 32.6	32.6	102.1 103.2	102.7	7.9 8.0	8.0		6.7 6.8	6.8		10.2 10.6	10.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Fine	Moderate	14:04	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	7.8	-	-	6.7
				Middle	1.1	18.3 18.3	18.3	8.0 8.0	8.0	31.8 31.8	31.8	102.3 102.2	102.3	8.0 8.0	8.0		7.6 8.0	7.8		6.8 6.5	6.7	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Calm	14:41	Surface	-	-	-	-	-	-	-	-	-	-	-	7.8	-	-	9.7	-	-	7.9
				Middle	1	18.9 18.8	18.9	8.1 8.1	8.1	32.1 32.1	32.1	101.8 101.8	101.8	7.8 7.8	7.8		9.5 9.8	9.7		8.0 7.7	7.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR2 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:44	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	7.9	-	-	9.8
				Middle	0.9	22.3	22.3	8.1	8.1	33.1	33.2	101.6	100.8	7.3	7.3		7.2	7.9		10.0	9.8	
						22.3		8.1		33.3		99.9		7.2			8.6			9.6		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Moderate	12:18	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	10.9	-	-	11.9
				Middle	1.1	22.2	22.2	8.0	8.0	32.8	32.8	100.7	100.5	7.3	7.3		10.2	10.9		12.1	11.9	
						22.2		8.0		32.8		100.2		7.2			11.6			11.6		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	14:34	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	11.3	-	-	12.7
				Middle	0.9	21.8	21.8	8.0	8.0	32.7	32.7	97.2	97.1	7.1	7.1		11.1	11.3		12.4	12.7	
						21.8		8.0		32.7		96.9		7.0			11.5			12.9		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	16:05	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	16.9	-	-	9.8
				Middle	0.6	21.2	21.2	8.0	8.0	32.0	32.1	98.6	98.2	7.3	7.3		16.9	16.9		10.9	9.8	
						21.2		8.0		32.1		97.7		7.2			16.9			8.7		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	08:12	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	6.2	-	-	6.5
				Middle	0.7	20.0	20.1	8.0	8.0	32.9	32.9	95.5	95.1	7.2	7.2		6.2	6.2		7.5	6.5	
						20.1		8.0		32.9		94.7		7.1			6.2			5.4		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	10:09	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	10.1	-	-	15.7
				Middle	0.6	20.0	20.0	8.1	8.1	33.3	33.3	94.6	94.6	7.1	7.1		10.1	10.1		16.9	15.7	
						20.0		8.1		33.2		94.5		7.0			10.0			14.5		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	11:41	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	10.7	-	-	16.2
				Middle	0.5	19.7	19.7	8.1	8.1	33.7	33.7	97.3	97.1	7.3	7.3		10.8	10.7		14.9	16.2	
						19.7		8.1		33.7		96.9		7.3			10.5			17.5		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Moderate	12:29	Surface	-	-	-	-	-	-	-	-	-	-	-	7.9	-	-	11.7	-	-	15.8
				Middle	1.1	18.0	18.1	8.0	8.0	32.7	32.7	100.9	100.6	7.9	7.9		11.6	11.7		16.0	15.8	
						18.1		8.0		32.7		100.3		7.8			11.8			15.6		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	15:02	Surface	-	-	-	-	-	-	-	-	-	-	-	8.4	-	-	12.6	-	-	11.3
				Middle	1	17.6	17.6	8.1	8.1	32.9	32.9	107.3	106.6	8.4	8.4		12.7	12.6		11.4	11.3	
						17.6		8.1		32.9		105.8		8.3			12.4			11.1		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	14:58	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	10.1	-	-	9.1
				Middle	1	17.7	17.7	8.1	8.1	33.0	33.0	102.4	102.3	8.0	8.0		9.8	10.1		9.0	9.1	
						17.6		8.1		33.0		102.1		8.0			10.3			9.1		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	19:07	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	7.0	-	-	11.0
				Middle	1	18.1	18.1	8.1	8.1	32.2	32.2	102.5	102.3	8.0	8.0		6.9	7.0		11.2	11.0	
						18.1		8.1		32.2		102.1		8.0			7.1			10.8		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Cloudy	Moderate	07:56	Surface	-	-	-	-	-	-	-	-	-	-	-	7.7	-	-	5.1	-	-	8.6
				Middle	0.8	17.9	17.9	8.1	8.1	32.3	32.4	99.6	98.5	7.8	7.7		5.4	5.1		8.2	8.6	
						17.9		8.1		32.4		97.3		7.6			4.7			8.9		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Moderate	10:03	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	6.8	-	-	15.2
				Middle	1	18.5	18.5	8.1	8.1	32.0	32.0	101.5	102.3	7.9	8.0		6.9	6.8		15.6	15.2	
						18.5		8.1		32.0		103.0		8.0			6.7			14.8		
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR2 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:41	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	16.9	-	-	13.6
				Middle	1	22.5 22.5	22.5	8.1 8.1	8.1	33.3 33.3	33.3	100.0 99.9	100.0	7.1 7.1	7.1		18.1 15.7	16.9		15.2 11.9	13.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Rough	18:20	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	13.7	-	-	16.6
				Middle	1.1	22.3 22.3	22.3	8.0 8.0	8.0	32.5 32.5	32.5	99.4 99.3	99.4	7.2 7.1	7.2		13.8 13.6	13.7		16.1 17.1	16.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	09:28	Surface	-	-	-	-	-	-	-	-	-	-	-	6.9	-	-	13.5	-	-	20.2
				Middle	0.7	21.3 21.3	21.3	8.0 8.0	8.0	32.6 32.6	32.6	93.7 93.3	93.5	6.9 6.8	6.9		13.2 13.8	13.5		22.3 18.0	20.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	11:59	Surface	-	-	-	-	-	-	-	-	-	-	-	6.9	-	-	26.8	-	-	14.1
				Middle	0.5	21.1 21.1	21.1	8.0 8.0	8.0	32.3 32.3	32.3	94.0 93.8	93.9	6.9 6.9	6.9		26.6 27.0	26.8		13.4 14.7	14.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	14:48	Surface	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	11.0	-	-	7.8
				Middle	0.8	20.6 20.6	20.6	8.1 8.1	8.1	32.7 32.7	32.7	99.4 99.3	99.4	7.4 7.4	7.4		11.1 10.8	11.0		7.7 7.8	7.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	15:41	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	9.3	-	-	6.8
				Middle	0.8	20.4 20.4	20.4	8.1 8.1	8.1	33.4 33.4	33.4	98.2 97.8	98.0	7.3 7.2	7.3		9.0 9.5	9.3		7.0 6.5	6.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	16:54	Surface	-	-	-	-	-	-	-	-	-	-	-	7.5	-	-	14.8	-	-	17.9
				Middle	0.4	19.9 19.9	19.9	8.1 8.1	8.1	33.6 33.6	33.6	99.8 99.6	99.7	7.5 7.4	7.5		15.0 14.6	14.8		17.7 18.0	17.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Rough	17:41	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	17.3	-	-	12.4
				Middle	1.2	18.1 18.1	18.1	8.0 8.0	8.0	32.8 32.8	32.8	104.5 103.2	103.9	8.1 8.0	8.1		17.2 17.4	17.3		12.4 12.4	12.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	09:05	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	9.2	-	-	8.9
				Middle	1	17.0 17.0	17.0	8.0 8.0	8.0	32.8 32.8	32.8	102.4 100.5	101.5	8.1 8.0	8.1		9.2 9.1	9.2		8.8 9.0	8.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	10:18	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	9.3	-	-	7.6
				Middle	1	17.2 17.3	17.3	8.1 8.1	8.1	33.0 33.0	33.0	101.6 100.6	101.1	8.0 7.9	8.0		9.2 9.3	9.3		7.1 8.1	7.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	12:37	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	14.8	-	-	12.1
				Middle	1	18.1 18.2	18.2	8.1 8.1	8.1	32.1 32.1	32.1	103.3 103.1	103.2	8.1 8.0	8.1		14.8 14.7	14.8		12.2 12.0	12.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Fine	Moderate	14:32	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	5.7	-	-	8.9
				Middle	0.8	18.5 18.5	18.5	8.1 8.1	8.1	32.2 32.2	32.2	102.8 102.7	102.8	8.0 8.0	8.0		5.7 5.7	5.7		9.4 8.4	8.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Calm	15:45	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	7.4	-	-	7.5
				Middle	1	18.9 18.8	18.9	8.1 8.1	8.1	31.9 31.9	31.9	104.4 103.5	104.0	8.0 8.0	8.0		7.6 7.1	7.4		7.7 7.3	7.5	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR3 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:25	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	7.3	-	-	7.4
				Middle	0.9	22.6 22.6	22.6	8.1 8.1	8.1	33.0 33.0	33.0	100.6 100.6	100.6	7.2 7.2	7.2		7.1 7.5	7.3		7.5 7.3	7.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Moderate	12:00	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	12.9	-	-	13.2
				Middle	1.1	22.8 22.8	22.8	7.9 7.9	7.9	32.8 32.8	32.8	102.3 103.0	102.7	7.3 7.3	7.3		12.1 13.6	12.9		13.5 12.8	13.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	14:59	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	9.0	-	-	14.4
				Middle	0.5	22.2 22.3	22.3	8.0 8.0	8.0	32.6 32.6	32.6	100.8 100.5	100.7	7.3 7.2	7.3		9.1 8.8	9.0		15.7 13.0	14.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	16:34	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	11.6	-	-	23.4
				Middle	0.8	21.3 21.3	21.3	8.0 8.0	8.0	32.4 32.4	32.4	98.3 98.0	98.2	7.2 7.2	7.2		11.5 11.7	11.6		25.9 20.8	23.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	07:58	Surface	-	-	-	-	-	-	-	-	-	-	-	6.9	-	-	4.4	-	-	6.6
				Middle	0.9	20.2 20.2	20.2	8.0 8.0	8.0	32.5 32.5	32.5	92.3 92.3	92.3	6.9 6.9	6.9		4.4 4.4	4.4		6.0 7.2	6.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	09:50	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	5.3	-	-	7.1
				Middle	0.7	19.9 19.9	19.9	8.1 8.1	8.1	32.8 32.8	32.8	94.8 95.0	94.9	7.1 7.1	7.1		5.4 5.1	5.3		7.3 6.9	7.1	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	11:23	Surface	-	-	-	-	-	-	-	-	-	-	-	7.3	-	-	7.2	-	-	14.2
				Middle	0.6	20.2 20.2	20.2	8.0 8.0	8.0	33.6 33.6	33.6	97.9 97.7	97.8	7.3 7.3	7.3		7.2 7.2	7.2		14.0 14.3	14.2	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Moderate	12:13	Surface	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	6.2	-	-	13.8
				Middle	0.7	18.3 18.3	18.3	8.0 8.0	8.0	32.7 32.7	32.7	108.3 103.9	106.1	8.4 8.0	8.2		6.1 6.3	6.2		13.7 13.9	13.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	15:21	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	8.9	-	-	10.4
				Middle	0.5	17.9 17.9	17.9	8.1 8.1	8.1	32.9 32.9	32.9	102.0 101.9	102.0	8.0 7.9	8.0		8.9 8.9	8.9		11.1 9.7	10.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	15:11	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	8.4	-	-	8.0
				Middle	0.5	18.0 18.0	18.0	8.1 8.1	8.1	33.0 33.0	33.0	104.7 104.7	104.7	8.1 8.1	8.1		8.5 8.3	8.4		7.8 8.2	8.0	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	19:24	Surface	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	7.2	-	-	10.6
				Middle	0.5	18.2 18.3	18.3	8.1 8.1	8.1	32.2 32.2	32.2	104.8 104.6	104.7	8.2 8.1	8.2		7.2 7.2	7.2		10.4 10.7	10.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Cloudy	Moderate	07:39	Surface	-	-	-	-	-	-	-	-	-	-	-	7.7	-	-	5.1	-	-	7.3
				Middle	0.6	18.1 18.1	18.1	8.0 8.0	8.0	32.3 32.3	32.3	99.2 99.2	99.2	7.7 7.7	7.7		4.9 5.2	5.1		7.4 7.2	7.3	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Moderate	09:48	Surface	-	-	-	-	-	-	-	-	-	-	-	7.9	-	-	5.9	-	-	13.8
				Middle	0.5	18.7 18.7	18.7	8.0 8.1	8.1	32.1 32.1	32.1	102.6 102.3	102.5	7.9 7.9	7.9		5.9 5.9	5.9		13.9 13.6	13.8	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR3 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	17:01	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	7.1	-	-	12.5
				Middle	0.9	22.6 22.6	22.6	8.1 8.1	8.1	32.9 33.0	33.0	99.9 99.3	99.6	7.1 7.1	7.1		7.0 7.2	7.1		12.0 12.9	12.5	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
4-Dec-17	Cloudy	Rough	18:39	Surface	-	-	-	-	-	-	-	-	-	-	-	7.1	-	-	9.3	-	-	15.6
				Middle	1	22.2 22.2	22.2	8.0 8.0	8.0	32.8 32.8	32.8	98.2 97.9	98.1	7.1 7.1	7.1		9.3 9.3	9.3		19.0 12.1	15.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
6-Dec-17	Fine	Moderate	09:11	Surface	-	-	-	-	-	-	-	-	-	-	-	7.0	-	-	12.7	-	-	19.5
				Middle	0.5	21.6 21.6	21.6	8.0 8.0	8.0	32.6 32.6	32.6	96.4 96.3	96.4	7.0 7.0	7.0		12.2 13.1	12.7		20.2 18.8	19.5	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
8-Dec-17	Cloudy	Rough	11:39	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	16.3	-	-	13.9
				Middle	0.5	21.5 21.5	21.5	7.9 7.9	7.9	32.3 32.3	32.3	98.6 98.5	98.6	7.2 7.2	7.2		16.4 16.1	16.3		14.3 13.4	13.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
12-Dec-17	Fine	Calm	15:06	Surface	-	-	-	-	-	-	-	-	-	-	-	7.5	-	-	10.0	-	-	8.6
				Middle	0.9	20.7 20.7	20.7	8.1 8.1	8.1	32.6 32.6	32.6	101.4 101.2	101.3	7.5 7.5	7.5		9.8 10.1	10.0		9.7 7.5	8.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
14-Dec-17	Cloudy	Moderate	16:19	Surface	-	-	-	-	-	-	-	-	-	-	-	7.2	-	-	6.1	-	-	6.7
				Middle	0.6	20.2 20.2	20.2	8.1 8.1	8.1	32.9 32.9	32.9	97.3 97.1	97.2	7.2 7.2	7.2		6.1 6.0	6.1		6.6 6.7	6.7	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
16-Dec-17	Cloudy	Rough	17:09	Surface	-	-	-	-	-	-	-	-	-	-	-	7.4	-	-	14.6	-	-	13.4
				Middle	0.5	19.5 19.5	19.5	8.1 8.1	8.1	33.6 33.6	33.6	98.7 98.5	98.6	7.4 7.4	7.4		14.4 14.7	14.6		13.8 13.0	13.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
18-Dec-17	Cloudy	Rough	17:52	Surface	-	-	-	-	-	-	-	-	-	-	-	8.1	-	-	13.2	-	-	12.5
				Middle	0.5	18.0 18.1	18.1	8.0 8.0	8.0	32.6 32.6	32.6	105.1 103.2	104.2	8.2 8.0	8.1		13.2 13.2	13.2		12.4 12.5	12.5	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
20-Dec-17	Cloudy	Rough	08:49	Surface	-	-	-	-	-	-	-	-	-	-	-	7.8	-	-	7.9	-	-	9.6
				Middle	0.5	17.3 17.3	17.3	8.1 8.1	8.1	32.8 32.8	32.8	98.5 98.1	98.3	7.8 7.7	7.8		7.8 7.9	7.9		9.6 9.5	9.6	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
22-Dec-17	Sunny	Moderate	09:58	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	9.1	-	-	8.4
				Middle	0.4	17.4 17.4	17.4	7.9 8.0	8.0	33.0 33.0	33.0	101.3 101.3	101.3	8.0 8.0	8.0		9.2 8.9	9.1		8.5 8.2	8.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
26-Dec-17	Fine	Moderate	12:15	Surface	-	-	-	-	-	-	-	-	-	-	-	8.0	-	-	7.0	-	-	11.4
				Middle	0.5	18.5 18.5	18.5	8.1 8.1	8.1	32.1 32.2	32.2	103.4 103.6	103.5	8.0 8.0	8.0		7.0 6.9	7.0		11.4 11.3	11.4	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
28-Dec-17	Fine	Moderate	14:46	Surface	-	-	-	-	-	-	-	-	-	-	-	8.2	-	-	5.6	-	-	8.3
				Middle	0.4	18.6 18.6	18.6	8.1 8.1	8.1	32.3 32.3	32.3	105.9 106.3	106.1	8.2 8.2	8.2		5.6 5.6	5.6		8.1 8.5	8.3	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	
30-Dec-17	Cloudy	Calm	16:06	Surface	-	-	-	-	-	-	-	-	-	-	-	8.3	-	-	7.1	-	-	6.9
				Middle	0.5	19.4 19.3	19.4	8.1 8.1	8.1	32.1 32.1	32.1	108.6 107.8	108.2	8.3 8.2	8.3		7.3 6.9	7.1		6.5 7.3	6.9	
				Bottom	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-	-	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR6 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:58	Surface	1	22.1 22.1	22.1	8.1 8.1	8.1	32.8 32.8	32.8	99.5 98.8	99.2	7.2 7.1	7.2	7.2	11.8 11.4	11.6	13.2	15.4 13.7	14.6	15.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.95	22.1 22.1	22.1	8.1 8.1	8.1	32.9 32.9	32.9	98.6 98.5	98.6	7.1 7.1	7.1	7.1	15.1 14.5	14.8		14.3 18.9	16.6	
4-Dec-17	Cloudy	Moderate	12:31	Surface	1	22.2 22.2	22.2	8.1 8.1	8.1	32.5 32.5	32.5	98.5 98.1	98.3	7.1 7.1	7.1	7.1	9.3 9.5	9.4	14.4	10.7 8.3	9.5	10.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	22.0 22.0	22.0	8.1 8.1	8.1	33.1 33.1	33.1	95.3 95.3	95.3	6.9 6.9	6.9	6.9	19.8 18.9	19.4		11.6 12.1	11.9	
6-Dec-17	Fine	Moderate	15:09	Surface	1	21.7 21.7	21.7	7.6 7.7	7.7	33.0 33.1	33.1	97.0 96.6	96.8	7.0 7.0	7.0	7.0	9.7 9.7	9.7	18.1	18.0 15.9	17.0	16.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.05	21.5 21.6	21.6	7.7 7.7	7.7	33.2 33.2	33.2	94.3 94.1	94.2	6.9 6.8	6.9	6.9	27.9 25.1	26.5		16.9 15.4	16.2	
8-Dec-17	Cloudy	Rough	16:13	Surface	1	21.0 21.0	21.0	7.9 8.0	8.0	32.5 32.5	32.5	96.2 95.0	95.6	7.1 7.0	7.1	7.1	20.1 16.5	18.3	23.7	12.9 12.9	12.9	12.5
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.05	21.0 21.0	21.0	8.0 8.0	8.0	32.5 32.5	32.5	94.8 94.4	94.6	7.0 7.0	7.0	7.0	28.9 29.1	29.0		12.3 11.9	12.1	
12-Dec-17	Fine	Calm	08:12	Surface	1	20.0 20.0	20.0	8.1 8.1	8.1	32.6 32.6	32.6	96.9 96.2	96.6	7.3 7.2	7.3	7.3	6.3 6.4	6.4	6.6	17.0 14.2	15.6	12.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.55	20.2 20.2	20.2	8.1 8.1	8.1	33.0 33.0	33.0	96.0 95.7	95.9	7.2 7.1	7.2	7.2	6.8 6.6	6.7		9.0 10.8	9.9	
14-Dec-17	Cloudy	Moderate	10:27	Surface	1	20.2 20.2	20.2	8.1 8.1	8.1	32.7 32.7	32.7	98.4 98.4	98.4	7.4 7.4	7.4	7.4	5.2 4.9	5.1	5.7	7.5 6.9	7.2	7.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.05	20.2 20.2	20.2	8.1 8.1	8.1	32.9 32.9	32.9	97.7 97.8	97.8	7.3 7.3	7.3	7.3	6.3 6.2	6.3		8.4 8.4	8.4	
16-Dec-17	Cloudy	Rough	11:41	Surface	1	20.1 20.1	20.1	8.1 8.1	8.1	32.7 32.7	32.7	98.6 98.3	98.5	7.4 7.4	7.4	7.4	9.5 10.6	10.1	11.7	16.8 16.2	16.5	16.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	20.1 20.1	20.1	8.1 8.1	8.1	32.7 32.7	32.7	98.1 98.0	98.1	7.3 7.3	7.3	7.3	13.4 13.1	13.3		15.4 18.8	17.1	
18-Dec-17	Cloudy	Moderate	12:17	Surface	1	18.4 18.4	18.4	8.1 8.1	8.1	32.8 32.9	32.9	98.9 97.9	98.4	7.6 7.6	7.6	7.6	12.1 11.8	12.0	14.0	10.9 11.0	11.0	11.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.3 18.3	18.3	8.1 8.1	8.1	32.9 32.9	32.9	97.6 97.1	97.4	7.5 7.5	7.5	7.5	15.9 16.1	16.0		11.6 12.9	12.3	
20-Dec-17	Cloudy	Rough	14:27	Surface	1	17.7 17.8	17.8	8.1 8.1	8.1	34.0 34.0	34.0	99.6 98.6	99.1	7.7 7.7	7.7	7.7	21.3 21.9	21.6	27.0	15.0 16.5	15.8	16.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	17.7 17.7	17.7	8.1 8.0	8.1	34.0 34.0	34.0	98.6 98.2	98.4	7.7 7.6	7.7	7.7	33.0 31.7	32.4		18.0 16.6	17.3	
22-Dec-17	Sunny	Moderate	14:10	Surface	1	17.8 17.8	17.8	8.1 8.1	8.1	33.9 33.9	33.9	100.3 99.8	100.1	7.8 7.8	7.8	7.8	11.9 11.9	11.9	13.4	6.1 6.5	6.3	6.9
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.9	17.6 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	98.7 98.5	98.6	7.7 7.7	7.7	7.7	14.9 14.9	14.9		7.3 7.4	7.4	
26-Dec-17	Fine	Moderate	18:30	Surface	1	18.0 18.0	18.0	8.0 8.0	8.0	33.2 33.2	33.2	100.2 99.9	100.1	7.8 7.8	7.8	7.8	4.8 4.9	4.9	5.8	9.9 9.7	9.8	10.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.3	18.0 18.0	18.0	8.1 8.1	8.1	33.3 33.3	33.3	99.4 99.4	99.4	7.7 7.7	7.7	7.7	6.8 6.6	6.7		12.7 9.9	11.3	
28-Dec-17	Cloudy	Moderate	07:58	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.4 32.4	32.4	98.9 98.7	98.8	7.7 7.7	7.7	7.7	2.5 2.8	2.7	3.7	7.2 7.3	7.3	7.3
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.0 18.0	18.0	8.1 8.1	8.1	33.0 33.0	33.0	98.6 98.6	98.6	7.7 7.7	7.7	7.7	4.6 4.5	4.6		7.4 7.0	7.2	
30-Dec-17	Cloudy	Moderate	10:13	Surface	1	18.5 18.5	18.5	8.1 8.1	8.1	31.5 31.5	31.5	101.3 101.2	101.3	7.9 7.9	7.9	7.9	2.9 2.8	2.9	3.4	6.0 6.2	6.1	6.7
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.3 18.3	18.3	8.1 8.1	8.1	32.3 32.3	32.3	100.1 99.9	100.0	7.8 7.7	7.8	7.8	3.7 3.8	3.8		8.3 6.2	7.3	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SR6 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:21	Surface	1	22.4 22.4	22.4	8.0 8.0	8.0	32.2 32.2	32.2	97.9 97.5	97.7	7.1 7.0	7.1	7.1	9.1 8.5	8.8	10.9	15.0 15.8	15.4	16.9
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	22.4 22.4	22.4	8.0 8.0	8.0	32.2 32.2	32.2	96.8 96.8	96.8	7.0 7.0	7.0	7.0	13.0 13.0	13.0		18.0 18.6	18.3	
4-Dec-17	Cloudy	Rough	17:58	Surface	1	22.2 22.3	22.3	8.1 8.1	8.1	32.7 32.7	32.7	97.6 96.8	97.2	7.0 7.0	7.0	7.0	9.5 9.7	9.6	13.0	11.1 10.8	11.0	11.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.9	22.3 22.3	22.3	8.1 8.1	8.1	32.8 32.8	32.8	97.0 96.6	96.8	7.0 7.0	7.0	7.0	16.1 16.7	16.4		11.9 12.5	12.2	
6-Dec-17	Fine	Moderate	09:14	Surface	1	21.9 21.9	21.9	7.9 8.2	8.1	32.9 32.9	32.9	91.6 91.2	91.4	6.6 6.6	6.6	6.6	17.6 17.5	17.6	22.3	19.7 20.9	20.3	28.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.85	21.9 21.9	21.9	8.0 8.3	8.2	32.9 32.9	32.9	91.0 90.7	90.9	6.6 6.6	6.6	6.6	27.0 26.8	26.9		37.1 36.6	36.9	
8-Dec-17	Cloudy	Rough	11:24	Surface	1	21.4 21.4	21.4	8.4 8.7	8.6	32.3 32.4	32.4	93.4 92.9	93.2	6.9 6.8	6.9	6.9	25.3 25.5	25.4	27.3	15.1 15.3	15.2	15.1
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.85	21.4 21.4	21.4	8.6 8.8	8.7	32.3 32.4	32.4	92.5 92.2	92.4	6.8 6.8	6.8	6.8	29.1 29.2	29.2		15.6 14.4	15.0	
12-Dec-17	Fine	Calm	14:03	Surface	1	20.6 20.6	20.6	8.0 8.0	8.0	32.3 32.3	32.3	96.5 96.1	96.3	7.2 7.2	7.2	7.2	6.2 5.7	6.0	6.7	9.4 9.1	9.3	10.1
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.9	20.5 20.6	20.6	8.0 8.1	8.1	32.3 32.3	32.3	95.8 95.4	95.6	7.1 7.1	7.1	7.1	7.3 7.3	7.3		11.1 10.6	10.9	
14-Dec-17	Cloudy	Moderate	15:31	Surface	1	20.5 20.5	20.5	8.0 8.0	8.0	32.2 32.2	32.2	96.8 96.2	96.5	7.2 7.2	7.2	7.2	5.7 5.8	5.8	8.0	7.3 8.5	7.9	7.4
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.85	20.4 20.4	20.4	8.0 8.0	8.0	32.3 32.3	32.3	96.1 96.1	96.1	7.2 7.2	7.2	7.2	10.9 9.5	10.2		5.9 7.8	6.9	
16-Dec-17	Cloudy	Rough	16:44	Surface	1	20.1 20.0	20.1	8.1 8.1	8.1	31.8 31.8	31.8	98.9 98.2	98.6	7.4 7.4	7.4	7.4	9.1 9.2	9.2	11.4	13.3 17.6	15.5	15.3
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.9	20.1 20.1	20.1	8.1 8.1	8.1	31.8 31.8	31.8	98.2 98.1	98.2	7.4 7.4	7.4	7.4	13.3 13.8	13.6		13.4 16.5	15.0	
18-Dec-17	Cloudy	Rough	17:25	Surface	1	18.5 18.5	18.5	8.0 8.0	8.0	32.7 32.7	32.7	98.4 97.6	98.0	7.6 7.5	7.6	7.6	8.1 8.9	8.5	9.2	9.7 9.8	9.8	11.0
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4	18.5 18.5	18.5	8.1 8.1	8.1	32.7 32.7	32.7	97.4 97.1	97.3	7.5 7.5	7.5	7.5	9.8 9.9	9.9		12.2 12.2	12.2	
20-Dec-17	Cloudy	Rough	09:29	Surface	1	18.5 18.4	18.5	8.1 8.1	8.1	33.8 33.8	33.8	96.4 95.1	95.8	7.4 7.3	7.4	7.4	13.2 13.7	13.5	15.0	8.9 9.3	9.1	8.4
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.5 18.5	18.5	8.1 8.1	8.1	33.8 33.8	33.8	95.3 94.7	95.0	7.3 7.3	7.3	7.3	16.0 16.8	16.4		6.9 8.2	7.6	
22-Dec-17	Sunny	Moderate	10:11	Surface	1	18.1 18.1	18.1	8.0 8.0	8.0	33.8 33.8	33.8	97.7 96.7	97.2	7.5 7.5	7.5	7.5	10.2 10.9	10.6	14.2	8.7 9.2	9.0	8.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	3.8	18.1 18.1	18.1	8.0 8.0	8.0	33.8 33.8	33.8	96.3 96.0	96.2	7.4 7.4	7.4	7.4	17.8 17.7	17.8		8.5 7.8	8.2	
26-Dec-17	Fine	Moderate	12:38	Surface	1	18.1 18.1	18.1	8.0 8.1	8.1	32.2 32.2	32.2	98.4 98.2	98.3	7.7 7.7	7.7	7.7	4.5 4.1	4.3	4.7	18.7 16.0	17.4	16.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.0 18.0	18.0	8.1 8.1	8.1	32.3 32.3	32.3	97.6 97.4	97.5	7.6 7.6	7.6	7.6	5.1 5.0	5.1		16.3 15.9	16.1	
28-Dec-17	Fine	Moderate	13:42	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	31.5 31.5	31.5	99.6 99.3	99.5	7.8 7.8	7.8	7.8	2.4 2.2	2.3	3.0	8.0 8.2	8.1	7.8
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.3 18.3	18.3	8.1 8.1	8.1	31.7 31.8	31.8	98.9 98.7	98.8	7.7 7.7	7.7	7.7	3.6 3.7	3.7		7.6 7.4	7.5	
30-Dec-17	Cloudy	Calm	15:31	Surface	1	18.7 18.7	18.7	8.2 8.1	8.2	31.0 30.9	31.0	103.1 102.9	103.0	8.0 8.0	8.0	8.0	2.4 2.4	2.4	3.6	6.4 5.8	6.1	6.6
				Middle	-	- -	-	- -	-	- -	-	- -	-	- -	-		- -	-		- -	-	
				Bottom	4.1	18.6 18.6	18.6	8.2 8.1	8.2	31.5 31.5	31.5	101.6 101.6	101.6	7.9 7.9	7.9	7.9	4.5 5.0	4.8		6.6 7.6	7.1	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SRA - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	11:37	Surface	1	22.5 22.5	22.5	8.4 8.4	8.4	33.1 33.2	33.2	100.2 97.5	98.9	7.1 7.0	7.1	7.1	5.2 6.0	5.6	7.0	8.2 7.8	8.0	8.5
				Middle	4	22.4 22.4	22.4	8.4 8.4	8.4	33.2 33.2	33.2	98.4 97.2	97.8	7.0 6.9	7.0		6.1 6.3	6.2		9.1 10.6	9.9	
				Bottom	7	22.3 22.4	22.4	8.4 8.4	8.4	33.2 33.2	33.2	96.7 96.4	96.6	6.9 6.9	6.9	6.9	9.4 8.8	9.1		7.3 7.9	7.6	
4-Dec-17	Cloudy	Moderate	12:11	Surface	1	22.7 22.3	22.5	7.9 8.0	8.0	32.8 32.8	32.8	103.7 96.9	100.3	7.4 7.0	7.2	7.1	7.6 7.7	7.7	9.8	10.4 10.5	10.5	11.6
				Middle	4	22.1 22.2	22.2	8.0 8.0	8.0	32.8 32.8	32.8	97.1 96.8	97.0	7.0 7.0	7.0		9.3 9.4	9.4		10.6 11.1	10.9	
				Bottom	7	22.1 22.1	22.1	8.0 8.0	8.0	32.9 32.9	32.9	96.8 96.6	96.7	7.0 7.0	7.0	7.0	12.3 12.2	12.3		14.3 12.6	13.5	
6-Dec-17	Fine	Moderate	14:50	Surface	1	21.7 21.8	21.8	8.0 8.0	8.0	32.6 32.7	32.7	97.3 96.3	96.8	7.1 7.0	7.1	7.1	14.3 14.2	14.3	15.5	10.6 11.4	11.0	14.6
				Middle	4.5	21.7 21.7	21.7	8.0 8.0	8.0	32.7 32.7	32.7	96.2 96.0	96.1	7.0 7.0	7.0		14.6 15.3	15.0		16.3 18.7	17.5	
				Bottom	8	21.7 21.7	21.7	8.0 8.0	8.0	32.7 32.7	32.7	95.8 95.9	95.9	7.0 7.0	7.0	7.0	17.3 17.1	17.2		17.1 13.5	15.3	
8-Dec-17	Cloudy	Rough	16:10	Surface	1	21.2 21.2	21.2	8.0 8.0	8.0	32.3 32.4	32.4	95.6 94.5	95.1	7.0 7.0	7.0	7.0	8.2 8.6	8.4	8.9	21.3 18.4	19.9	16.6
				Middle	4	21.2 21.2	21.2	8.0 8.0	8.0	32.4 32.4	32.4	94.7 94.5	94.6	7.0 7.0	7.0		8.7 8.8	8.8		21.2 19.2	20.2	
				Bottom	7	21.2 21.2	21.2	8.0 8.0	8.0	32.4 32.4	32.4	94.5 94.5	94.5	6.9 6.9	6.9	6.9	9.8 9.3	9.6		10.3 9.2	9.8	
12-Dec-17	Fine	Calm	08:02	Surface	1	20.3 20.3	20.3	8.0 8.0	8.0	32.7 32.7	32.7	96.4 95.4	95.9	7.2 7.1	7.2	7.2	5.0 4.9	5.0	5.6	9.1 6.4	7.8	7.3
				Middle	4	20.3 20.3	20.3	8.0 8.0	8.0	32.7 32.7	32.7	95.7 95.4	95.6	7.1 7.1	7.1		5.6 5.1	5.4		7.0 7.3	7.2	
				Bottom	7	20.4 20.4	20.4	8.0 8.0	8.0	32.8 32.8	32.8	95.5 95.4	95.5	7.1 7.1	7.1	7.1	6.3 6.4	6.4		5.9 7.7	6.8	
14-Dec-17	Cloudy	Moderate	09:56	Surface	1	19.9 19.9	19.9	8.1 8.1	8.1	32.9 32.9	32.9	95.5 95.4	95.5	7.1 7.1	7.1	7.1	4.9 4.8	4.9	5.1	7.7 8.0	7.9	8.9
				Middle	4	19.9 19.9	19.9	8.1 8.1	8.1	32.9 32.9	32.9	94.6 94.4	94.5	7.1 7.1	7.1		5.1 5.0	5.1		9.1 11.1	10.1	
				Bottom	7	19.9 19.9	19.9	8.1 8.1	8.1	32.9 32.9	32.9	94.1 94.1	94.1	7.0 7.0	7.0	7.0	5.1 5.2	5.2		8.9 8.2	8.6	
16-Dec-17	Cloudy	Rough	11:30	Surface	1	20.2 20.2	20.2	8.1 8.1	8.1	33.6 33.6	33.6	96.4 95.2	95.8	7.2 7.1	7.2	7.2	5.1 5.4	5.3	5.8	19.2 12.0	15.6	13.8
				Middle	4	20.1 20.1	20.1	8.1 8.1	8.1	33.6 33.6	33.6	95.1 94.6	94.9	7.1 7.0	7.1		5.8 6.0	5.9		13.6 14.7	14.2	
				Bottom	7	20.1 20.1	20.1	8.1 8.1	8.1	33.6 33.6	33.6	94.5 94.3	94.4	7.0 7.0	7.0	7.0	6.1 6.2	6.2		11.8 11.6	11.7	
18-Dec-17	Cloudy	Moderate	12:20	Surface	1	18.0 18.1	18.1	8.0 8.0	8.0	32.7 32.7	32.7	99.2 96.3	97.8	7.7 7.5	7.6	7.6	5.1 5.0	5.1	5.5	13.3 13.1	13.2	14.7
				Middle	4	18.0 18.0	18.0	8.0 8.0	8.0	32.7 32.7	32.7	97.5 95.9	96.7	7.6 7.5	7.6		5.3 5.7	5.5		13.8 13.8	13.8	
				Bottom	7	18.0 18.0	18.0	8.0 8.0	8.0	32.7 32.7	32.7	96.5 95.6	96.1	7.5 7.4	7.5	7.5	5.6 5.9	5.8		17.0 17.4	17.2	
20-Dec-17	Cloudy	Rough	15:14	Surface	1	17.5 17.5	17.5	8.1 8.0	8.1	32.9 32.9	32.9	103.7 98.8	101.3	8.1 7.8	8.0	7.9	6.9 6.9	6.9	7.7	9.4 9.1	9.3	9.9
				Middle	4	17.4 17.4	17.4	8.0 8.0	8.0	32.9 32.9	32.9	100.3 98.2	99.3	7.9 7.7	7.8		7.4 7.4	7.4		10.4 10.0	10.2	
				Bottom	7	17.3 17.4	17.4	8.0 8.0	8.0	33.0 32.9	33.0	98.4 97.8	98.1	7.8 7.7	7.8	7.8	9.1 8.4	8.8		10.1 10.3	10.2	
22-Dec-17	Sunny	Moderate	15:05	Surface	1	17.6 17.6	17.6	8.1 8.1	8.1	33.0 33.0	33.0	102.3 100.6	101.5	8.0 7.9	8.0	8.0	7.7 6.5	7.1	6.8	8.9 8.7	8.8	8.1
				Middle	4	17.5 17.5	17.5	8.1 8.1	8.1	33.0 33.0	33.0	100.6 100.3	100.5	7.9 7.9	7.9		6.4 6.7	6.6		7.7 7.3	7.5	
				Bottom	7	17.5 17.5	17.5	8.1 8.1	8.1	33.0 33.0	33.0	100.2 100.3	100.3	7.9 7.9	7.9	7.9	6.7 6.8	6.8		7.8 8.2	8.0	
26-Dec-17	Fine	Moderate	19:17	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.2	32.2	102.8 101.4	102.1	8.0 7.9	8.0	8.0	6.5 6.3	6.4	6.3	11.6 10.1	10.9	10.6
				Middle	4	18.2 18.2	18.2	8.1 8.1	8.1	32.3 32.3	32.3	101.8 101.5	101.7	7.9 7.9	7.9		6.2 5.9	6.1		9.2 9.9	9.6	
				Bottom	7	18.2 18.2	18.2	8.1 8.1	8.1	32.3 32.3	32.3	101.3 101.3	101.3	7.9 7.9	7.9	7.9	6.4 6.1	6.3		12.7 9.6	11.2	
28-Dec-17	Cloudy	Moderate	07:45	Surface	1	18.2 18.2	18.2	8.1 8.1	8.1	32.3 32.4	32.4	99.9 100.0	100.0	7.8 7.8	7.8	7.8	3.1 3.0	3.1	3.4	8.2 8.7	8.5	8.1
				Middle	4	18.2 18.2	18.2	8.1 8.1	8.1	32.4 32.4	32.4	99.8 99.8	99.8	7.8 7.8	7.8		3.2 3.3	3.3		7.8 7.6	7.7	
				Bottom	7	18.2 18.2	18.2	8.1 8.1	8.1	32.4 32.4	32.4	99.6 99.7	99.7	7.7 7.8	7.8	7.8	3.8 3.5	3.7		8.0 8.4	8.2	
30-Dec-17	Cloudy	Moderate	09:55	Surface	1	18.6 18.6	18.6	8.1 8.1	8.1	32.1 32.1	32.1	100.8 100.5	100.7	7.8 7.8	7.8	7.8	4.6 4.8	4.7	5.0	13.4 16.9	15.2	15.3
				Middle	4	18.6 18.6	18.6	8.1 8.1	8.1	32.1 32.1	32.1	100.4 100.5	100.5	7.8 7.8	7.8		5.1 4.9	5.0		17.2 12.3	14.8	
				Bottom	7	18.6 18.6	18.6	8.1 8.1	8.1	32.1 32.1	32.1	100.2 100.3	100.3	7.7 7.8	7.8	7.8	5.3 5.4	5.4		17.8 13.8	15.8	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at SRA - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:56	Surface	1	22.7 22.7	22.7	8.0 8.0	8.0	33.0 33.0	33.0	99.8 99.2	99.5	7.1 7.1	7.1	7.1	7.4 6.3	6.9	7.0	13.6 15.3	14.5	14.6
				Middle	4	22.7 22.7	22.7	8.0 8.0	8.0	33.0 33.0	33.0	99.4 99.0	99.2	7.1 7.0	7.1		6.9 6.6	6.8		17.8 16.5	17.2	
				Bottom	7	22.7 22.7	22.7	8.0 8.1	8.1	33.0 33.0	33.0	98.9 98.6	98.8	7.0 7.0	7.0	7.0	7.4 6.9	7.2		11.8 12.5	12.2	
4-Dec-17	Cloudy	Rough	18:34	Surface	1	22.3 22.3	22.3	8.0 8.0	8.0	32.7 32.8	32.8	99.4 98.1	98.8	7.2 7.1	7.2	7.2	7.7 7.9	7.8	8.4	16.1 10.6	13.4	14.2
				Middle	4	22.3 22.3	22.3	8.0 8.0	8.0	32.8 32.8	32.8	98.7 98.0	98.4	7.1 7.1	7.1		8.3 8.3	8.3		10.2 17.7	14.0	
				Bottom	7	22.3 22.3	22.3	8.0 8.0	8.0	32.8 32.8	32.8	98.3 98.0	98.2	7.1 7.0	7.1	7.1	9.1 8.9	9.0		13.0 17.6	15.3	
6-Dec-17	Fine	Moderate	09:17	Surface	1	21.5 21.5	21.5	8.0 8.0	8.0	32.6 32.6	32.6	94.4 93.7	94.1	6.9 6.8	6.9	6.9	9.8 10.1	10.0	10.6	15.1 13.4	14.3	15.3
				Middle	4	21.5 21.5	21.5	8.0 8.0	8.0	32.6 32.6	32.6	93.5 93.4	93.5	6.8 6.8	6.8		10.8 10.8	10.8		16.7 17.3	17.0	
				Bottom	7	21.5 21.5	21.5	8.0 8.0	8.0	32.6 32.6	32.6	93.2 93.3	93.3	6.8 6.8	6.8	6.8	11.0 10.7	10.9		16.6 12.5	14.6	
8-Dec-17	Cloudy	Rough	11:46	Surface	1	21.1 21.1	21.1	8.0 8.0	8.0	32.4 32.4	32.4	96.1 95.5	95.8	7.1 7.0	7.1	7.0	12.9 12.7	12.8	12.4	8.7 8.7	8.7	8.9
				Middle	3.5	21.1 21.2	21.2	8.0 8.0	8.0	32.4 32.4	32.4	94.2 94.1	94.2	6.9 6.9	6.9		12.8 11.9	12.4		10.8 9.4	10.1	
				Bottom	6	21.1 21.1	21.1	8.0 8.0	8.0	32.4 32.4	32.4	93.5 93.5	93.5	6.9 6.9	6.9	6.9	12.1 12.0	12.1		8.0 7.7	7.9	
12-Dec-17	Fine	Calm	14:59	Surface	1	20.6 20.6	20.6	8.1 8.0	8.1	32.6 32.6	32.6	99.5 97.1	98.3	7.4 7.2	7.3	7.3	6.5 6.7	6.6	7.1	11.3 9.8	10.6	12.1
				Middle	4	20.6 20.6	20.6	8.0 8.0	8.0	32.6 32.6	32.6	97.3 96.6	97.0	7.2 7.2	7.2		7.0 7.1	7.1		10.6 10.4	10.5	
				Bottom	7	20.5 20.5	20.5	8.0 8.0	8.0	32.6 32.6	32.6	96.5 96.2	96.4	7.2 7.2	7.2	7.2	7.6 7.7	7.7		15.5 15.0	15.3	
14-Dec-17	Cloudy	Moderate	16:09	Surface	1	20.2 20.2	20.2	8.1 8.1	8.1	32.9 32.9	32.9	97.6 97.0	97.3	7.3 7.2	7.3	7.3	4.6 4.8	4.7	4.8	12.0 8.6	10.3	9.2
				Middle	4	20.1 20.1	20.1	8.1 8.1	8.1	32.9 32.9	32.9	96.3 96.1	96.2	7.2 7.2	7.2		4.9 4.3	4.6		9.8 9.8	9.8	
				Bottom	7	20.1 20.1	20.1	8.1 8.1	8.1	32.9 32.9	32.9	95.5 95.3	95.4	7.1 7.1	7.1	7.1	5.2 5.2	5.2		7.5 7.2	7.4	
16-Dec-17	Cloudy	Rough	17:00	Surface	1	20.1 20.1	20.1	8.0 8.0	8.0	33.6 33.6	33.6	96.5 95.2	95.9	7.2 7.1	7.2	7.2	7.0 6.9	7.0	7.5	7.7 8.0	7.9	9.3
				Middle	4.5	20.1 20.1	20.1	8.0 8.0	8.0	33.6 33.6	33.6	95.6 95.0	95.3	7.1 7.1	7.1		8.2 7.9	8.1		7.9 9.6	8.8	
				Bottom	8	20.1 20.1	20.1	8.0 8.0	8.0	33.6 33.6	33.6	95.1 94.8	95.0	7.1 7.1	7.1	7.1	7.4 7.6	7.5		12.1 10.4	11.3	
18-Dec-17	Cloudy	Rough	17:46	Surface	1	18.2 18.2	18.2	8.0 8.0	8.0	32.8 32.8	32.8	96.8 96.7	96.8	7.5 7.5	7.5	7.6	10.0 10.0	10.0	10.7	11.3 11.0	11.2	14.7
				Middle	4.5	18.2 18.2	18.2	8.0 8.0	8.0	32.8 32.8	32.8	100.3 96.5	98.4	7.8 7.5	7.7		11.3 10.5	10.9		13.2 13.2	13.2	
				Bottom	8	18.2 18.2	18.2	8.0 8.0	8.0	32.8 32.8	32.8	98.0 96.4	97.2	7.6 7.5	7.6	7.6	11.7 10.6	11.2		19.6 19.7	19.7	
20-Dec-17	Cloudy	Rough	08:56	Surface	1	17.3 17.4	17.4	8.0 8.0	8.0	32.7 32.9	32.8	104.0 96.1	100.1	8.2 7.6	7.9	7.8	8.2 7.8	8.0	8.0	7.6 8.1	7.9	9.8
				Middle	4	17.5 17.4	17.5	8.0 8.0	8.0	32.9 32.9	32.9	97.7 96.2	97.0	7.7 7.6	7.7		8.3 7.9	8.1		10.2 10.1	10.2	
				Bottom	7	17.5 17.5	17.5	8.0 8.0	8.0	32.9 32.9	32.9	96.3 96.1	96.2	7.6 7.6	7.6	7.6	8.0 7.7	7.9		11.2 11.2	11.2	
22-Dec-17	Sunny	Moderate	10:05	Surface	1	17.4 17.4	17.4	8.1 8.1	8.1	33.0 33.0	33.0	101.5 99.0	100.3	8.0 7.8	7.9	7.9	7.4 8.0	7.7	8.0	7.4 8.2	7.8	7.5
				Middle	4	17.3 17.4	17.4	8.1 8.1	8.1	33.0 33.0	33.0	99.1 98.9	99.0	7.8 7.8	7.8		8.1 8.1	8.1		7.5 7.9	7.7	
				Bottom	7	17.3 17.4	17.4	8.1 8.1	8.1	33.0 33.0	33.0	98.8 98.8	98.8	7.8 7.8	7.8	7.8	8.4 8.1	8.3		6.7 7.2	7.0	
26-Dec-17	Fine	Moderate	12:24	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.2	32.2	103.3 101.5	102.4	8.1 7.9	8.0	8.0	5.7 6.1	5.9	5.9	10.3 10.2	10.3	10.8
				Middle	4	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.2	32.2	102.4 101.2	101.8	8.0 7.9	8.0		6.0 5.8	5.9		10.9 11.6	11.3	
				Bottom	7	18.0 18.0	18.0	8.1 8.1	8.1	32.2 32.2	32.2	100.6 100.4	100.5	7.9 7.8	7.9	7.9	5.6 6.0	5.8		11.0 10.7	10.9	
28-Dec-17	Fine	Moderate	14:39	Surface	1	18.5 18.6	18.6	8.1 8.1	8.1	32.3 32.3	32.3	103.4 103.3	103.4	8.0 8.0	8.0	8.0	4.9 4.9	4.9	4.8	8.0 8.2	8.1	8.7
				Middle	4	18.5 18.5	18.5	8.1 8.1	8.1	32.3 32.3	32.3	102.4 102.2	102.3	7.9 7.9	7.9		4.7 5.1	4.9		8.1 8.4	8.3	
				Bottom	7	18.4 18.4	18.4	8.1 8.1	8.1	32.3 32.3	32.3	101.4 101.3	101.4	7.9 7.9	7.9	7.9	4.5 4.7	4.6		10.0 9.1	9.6	
30-Dec-17	Cloudy	Calm	15:59	Surface	1	19.1 19.2	19.2	8.1 8.1	8.1	32.1 32.1	32.1	106.3 106.4	106.4	8.1 8.1	8.1	8.1	4.6 5.0	4.8	4.6	8.2 7.3	7.8	7.4
				Middle	4	19.0 19.0	19.0	8.1 8.1	8.1	32.1 32.1	32.1	104.6 104.9	104.8	8.0 8.1	8.1		4.4 4.4	4.4		7.2 7.8	7.5	
				Bottom	7	18.9 18.9	18.9	8.1 8.1	8.1	32.1 32.1	32.1	104.2 104.1	104.2	8.0 8.0	8.0	8.0	4.5 4.6	4.6		6.3 7.2	6.8	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST1 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:20	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	99.3 98.9	99.1	7.1 7.1	7.1	7.1	9.0 9.2	9.1	14.9	9.6 9.2	9.4	11.6
				Middle	5.5	22.3 22.3	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.3	98.4	7.1 7.1	7.1		14.4 14.7	14.6		16.4 12.2	14.3	
				Bottom	10	22.3 22.2	22.3	8.1 8.1	8.1	33.2 33.2	33.2	98.2 98.1	98.2	7.1 7.0	7.1	7.1	20.3 21.6	21.0		12.7 9.7	11.2	
4-Dec-17	Cloudy	Moderate	12:52	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	32.7 32.7	32.7	96.5 95.8	96.2	7.0 6.9	7.0	7.0	14.6 14.8	14.7	19.3	12.0 12.9	12.5	15.1
				Middle	5.5	22.0 22.0	22.0	8.0 8.0	8.0	33.0 33.1	33.1	95.3 95.1	95.2	6.9 6.9	6.9		19.9 20.4	20.2		15.1 14.2	14.7	
				Bottom	10	22.1 22.0	22.1	8.1 8.1	8.1	33.5 33.4	33.5	95.0 94.9	95.0	6.8 6.8	6.8	6.8	22.4 23.3	22.9		19.8 16.2	18.0	
6-Dec-17	Fine	Moderate	15:28	Surface	1	21.6 21.6	21.6	7.5 7.5	7.5	33.1 33.1	33.1	95.1 94.5	94.8	6.9 6.9	6.9	6.9	10.6 10.3	10.5	18.6	13.2 14.0	13.6	22.5
				Middle	5.5	21.7 21.8	21.8	7.5 7.5	7.5	33.3 33.3	33.3	93.9 93.8	93.9	6.8 6.8	6.8		17.9 18.2	18.1		21.6 18.6	20.1	
				Bottom	10	21.7 21.7	21.7	7.5 7.6	7.6	33.4 33.4	33.4	93.1 93.0	93.1	6.7 6.7	6.7	6.7	27.0 27.3	27.2		31.3 36.1	33.7	
8-Dec-17	Cloudy	Rough	16:42	Surface	1	21.2 21.2	21.2	8.0 8.0	8.0	32.8 32.9	32.9	94.8 94.4	94.6	7.0 6.9	7.0	7.0	22.9 23.1	23.0	25.0	12.2 10.9	11.6	12.4
				Middle	5.5	21.4 21.3	21.4	8.0 8.0	8.0	33.1 33.0	33.1	94.5 94.2	94.4	6.9 6.9	6.9		30.6 28.7	29.7		12.7 13.2	13.0	
				Bottom	10	21.5 21.6	21.6	8.0 8.0	8.0	33.4 33.6	33.5	95.3 95.2	95.3	6.9 6.9	6.9	6.9	22.4 22.4	22.4		12.5 12.4	12.5	
12-Dec-17	Fine	Calm	08:33	Surface	1	20.7 20.7	20.7	8.1 8.0	8.1	33.3 33.3	33.3	96.7 96.0	96.4	7.1 7.1	7.1	7.1	3.8 3.8	3.8	4.2	6.5 6.8	6.7	7.0
				Middle	5.5	20.7 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	95.9 95.5	95.7	7.1 7.0	7.1		4.2 4.0	4.1		7.0 7.1	7.1	
				Bottom	10	20.8 20.8	20.8	8.1 8.1	8.1	33.3 33.3	33.3	95.5 95.1	95.3	7.0 7.0	7.0	7.0	4.5 5.0	4.8		7.9 6.4	7.2	
14-Dec-17	Cloudy	Moderate	10:50	Surface	1	20.7 20.6	20.7	8.1 8.1	8.1	33.3 33.3	33.3	98.8 98.1	98.5	7.3 7.2	7.3	7.3	4.3 4.6	4.5	5.2	5.9 5.9	5.9	7.2
				Middle	5.5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.4 97.5	97.5	7.2 7.2	7.2		5.2 4.9	5.1		7.6 7.6	7.6	
				Bottom	10	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.3 97.4	97.4	7.2 7.2	7.2	7.2	5.7 6.5	6.1		7.8 8.4	8.1	
16-Dec-17	Cloudy	Rough	12:09	Surface	1	20.1 20.1	20.1	8.1 8.1	8.1	32.3 32.3	32.3	98.4 97.9	98.2	7.4 7.4	7.4	7.4	9.5 9.7	9.6	11.1	11.6 12.1	11.9	13.9
				Middle	5.5	20.2 20.2	20.2	8.1 8.1	8.1	32.6 32.6	32.6	97.5 97.5	97.5	7.3 7.3	7.3		10.5 10.5	10.5		14.8 14.2	14.5	
				Bottom	10	20.3 20.3	20.3	8.1 8.1	8.1	32.8 32.8	32.8	96.4 96.9	96.7	7.2 7.2	7.2	7.2	13.0 13.1	13.1		12.7 17.6	15.2	
18-Dec-17	Cloudy	Moderate	12:38	Surface	1	18.8 18.8	18.8	8.1 8.1	8.1	33.2 33.2	33.2	97.7 97.1	97.4	7.5 7.4	7.5	7.5	15.5 15.5	15.5	16.4	17.3 17.6	17.5	18.0
				Middle	5.5	18.6 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	96.9 96.4	96.7	7.4 7.4	7.4		16.4 16.5	16.5		18.8 18.7	18.8	
				Bottom	10	18.6 18.6	18.6	8.1 8.1	8.1	33.2 33.2	33.2	96.2 96.5	96.4	7.4 7.4	7.4	7.4	16.9 17.3	17.1		17.9 17.7	17.8	
20-Dec-17	Cloudy	Rough	14:52	Surface	1	18.0 18.0	18.0	8.1 8.1	8.1	33.9 33.9	33.9	99.1 98.1	98.6	7.7 7.6	7.7	7.7	14.0 14.3	14.2	15.7	11.4 12.2	11.8	13.3
				Middle	5.5	18.0 18.0	18.0	8.1 8.1	8.1	33.9 33.9	33.9	98.2 97.9	98.1	7.6 7.6	7.6		15.9 15.8	15.9		13.1 12.2	12.7	
				Bottom	10	17.9 17.9	17.9	8.1 8.1	8.1	34.0 34.0	34.0	97.6 97.4	97.5	7.6 7.5	7.6	7.6	17.2 16.8	17.0		13.6 17.3	15.5	
22-Dec-17	Sunny	Moderate	14:33	Surface	1	17.9 17.9	17.9	8.0 8.0	8.0	33.8 33.8	33.8	100.1 99.3	99.7	7.8 7.7	7.8	7.8	9.8 9.8	9.8	12.1	7.8 9.4	8.6	8.0
				Middle	5.5	17.7 17.7	17.7	8.0 8.0	8.0	33.8 33.8	33.8	98.7 98.5	98.6	7.7 7.7	7.7		12.3 11.6	12.0		7.4 6.7	7.1	
				Bottom	10	17.6 17.6	17.6	8.0 8.0	8.0	33.8 33.8	33.8	97.9 97.8	97.9	7.6 7.6	7.6	7.6	15.4 13.6	14.5		8.3 8.2	8.3	
26-Dec-17	Fine	Moderate	18:56	Surface	1	18.0 18.0	18.0	8.0 8.0	8.0	33.3 33.3	33.3	99.7 99.3	99.5	7.7 7.7	7.7	7.7	6.9 6.3	6.6	7.4	11.3 10.9	11.1	11.5
				Middle	5.5	18.0 18.0	18.0	8.0 8.1	8.1	33.4 33.4	33.4	99.4 99.2	99.3	7.7 7.7	7.7		7.9 8.1	8.0		13.2 12.7	13.0	
				Bottom	10	18.0 18.1	18.1	8.1 8.1	8.1	33.4 33.4	33.4	99.2 99.1	99.2	7.7 7.7	7.7	7.7	7.7 7.6	7.7		10.5 10.4	10.5	
28-Dec-17	Cloudy	Moderate	08:21	Surface	1	17.9 17.9	17.9	8.0 8.0	8.0	32.9 32.9	32.9	99.7 99.7	99.7	7.8 7.8	7.8	7.8	2.5 2.5	2.5	3.1	7.9 8.5	8.2	7.7
				Middle	5.5	18.0 18.0	18.0	8.1 8.1	8.1	33.0 33.0	33.0	99.0 99.1	99.1	7.7 7.7	7.7		2.9 2.7	2.8		7.2 7.0	7.1	
				Bottom	10	18.0 18.0	18.0	8.1 8.1	8.1	33.1 33.1	33.1	98.3 98.5	98.4	7.6 7.7	7.7	7.7	4.1 4.0	4.1		7.4 8.0	7.7	
30-Dec-17	Cloudy	Moderate	10:32	Surface	1	18.3 18.3	18.3	8.2 8.2	8.2	32.8 32.8	32.8	99.5 99.2	99.4	7.7 7.7	7.7	7.7	4.6 4.7	4.7	6.2	8.6 7.8	8.2	9.5
				Middle	5.5	18.2 18.2	18.2	8.2 8.2	8.2	32.9 32.9	32.9	98.5 98.4	98.5	7.6 7.6	7.6		4.9 5.0	5.0		13.4 9.3	11.4	
				Bottom	10	18.2 18.2	18.2	8.2 8.2	8.2	33.2 33.2	33.2	97.5 97.4	97.5	7.6 7.5	7.6	7.6	8.8 9.0	8.9		7.8 10.1	9.0	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST1 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:44	Surface	1	22.3 22.3	22.3	8.0 8.1	8.1	33.1 33.1	33.1	98.4 98.3	98.4	7.1 7.1	7.1	7.1	17.0 19.2	18.1	24.0	19.6 15.0	17.3	14.6
				Middle	5.5	22.3 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	98.2 98.2	98.2	7.1 7.0	7.1		20.1 16.3	18.2		12.5 15.2	13.9	
				Bottom	10	22.3 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	98.2 98.3	98.3	7.1 7.1	7.1	7.1	35.6 36.0	35.8		12.2 12.9	12.6	
4-Dec-17	Cloudy	Rough	18:23	Surface	1	22.0 22.0	22.0	8.0 8.0	8.0	32.8 32.8	32.8	96.5 95.8	96.2	7.0 6.9	7.0	7.0	14.6 14.6	14.6	19.0	10.5 11.1	10.8	11.6
				Middle	5.5	22.0 22.0	22.0	8.0 8.1	8.1	32.8 32.9	32.9	95.9 95.6	95.8	6.9 6.9	6.9		15.5 15.7	15.6		10.1 10.6	10.4	
				Bottom	10	22.0 22.0	22.0	8.0 8.1	8.1	32.9 32.9	32.9	95.3 95.5	95.4	6.9 6.9	6.9	6.9	27.4 26.3	26.9		12.9 14.1	13.5	
6-Dec-17	Fine	Moderate	09:35	Surface	1	21.4 21.4	21.4	8.2 8.4	8.3	33.2 33.3	33.3	94.6 94.0	94.3	6.9 6.8	6.9	6.9	14.9 15.6	15.3	23.0	37.0 35.4	36.2	35.3
				Middle	5.5	21.4 21.5	21.5	8.4 8.5	8.5	33.3 33.3	33.3	93.9 93.7	93.8	6.8 6.8	6.8		24.9 25.1	25.0		59.5 56.3	57.9	
				Bottom	10	21.5 21.5	21.5	8.2 8.5	8.4	33.4 33.4	33.4	93.5 93.4	93.5	6.8 6.8	6.8	6.8	28.6 28.8	28.7		11.0 12.3	11.7	
8-Dec-17	Cloudy	Rough	12:07	Surface	1	21.0 21.0	21.0	8.2 8.8	8.5	32.2 32.2	32.2	93.5 92.9	93.2	6.9 6.9	6.9	6.9	11.6 10.8	11.2	22.5	15.8 16.8	16.3	16.1
				Middle	5.5	21.0 21.0	21.0	8.5 8.8	8.7	32.4 32.3	32.4	92.6 92.4	92.5	6.8 6.8	6.8		24.2 24.3	24.3		15.9 16.0	16.0	
				Bottom	10	21.0 21.0	21.0	8.7 8.9	8.8	32.4 32.4	32.4	92.2 91.9	92.1	6.8 6.8	6.8	6.8	31.5 32.7	32.1		15.6 16.5	16.1	
12-Dec-17	Fine	Calm	14:28	Surface	1	20.6 20.6	20.6	8.1 8.0	8.1	33.2 33.2	33.2	97.2 97.2	97.2	7.2 7.2	7.2	7.2	5.0 5.2	5.1	5.9	12.2 8.0	10.1	8.8
				Middle	5.5	20.6 20.7	20.7	8.0 8.1	8.1	33.2 33.2	33.2	97.7 96.7	97.2	7.2 7.1	7.2		5.2 5.4	5.3		8.3 8.9	8.6	
				Bottom	10	20.7 20.7	20.7	8.1 8.1	8.1	33.2 33.2	33.2	96.5 95.9	96.2	7.1 7.1	7.1	7.1	7.5 7.2	7.4		7.9 7.3	7.6	
14-Dec-17	Cloudy	Moderate	15:57	Surface	1	20.7 20.7	20.7	8.1 8.1	8.1	33.3 33.3	33.3	98.6 98.6	98.6	7.3 7.3	7.3	7.3	7.2 7.2	7.2	7.2	8.9 8.1	8.5	7.4
				Middle	5.5	20.7 20.7	20.7	8.1 8.1	8.1	33.3 33.3	33.3	98.5 98.6	98.6	7.3 7.3	7.3		6.9 5.7	6.3		6.5 8.9	7.7	
				Bottom	10	20.7 20.7	20.7	8.1 8.1	8.1	33.3 33.3	33.3	98.6 98.7	98.7	7.3 7.3	7.3	7.3	7.3 9.0	8.2		6.2 6.0	6.1	
16-Dec-17	Cloudy	Rough	17:21	Surface	1	19.9 19.9	19.9	8.1 8.1	8.1	32.2 32.2	32.2	99.3 98.7	99.0	7.5 7.4	7.5	7.5	9.9 9.6	9.8	10.4	12.7 14.6	13.7	15.6
				Middle	5.5	19.9 19.9	19.9	8.1 8.1	8.1	32.2 32.2	32.2	98.7 98.8	98.8	7.4 7.5	7.5		10.2 9.6	9.9		13.3 14.5	13.9	
				Bottom	10	19.9 19.9	19.9	8.1 8.1	8.1	32.2 32.2	32.2	98.7 98.9	98.8	7.4 7.5	7.5	7.5	11.0 11.9	11.5		19.5 18.7	19.1	
18-Dec-17	Cloudy	Rough	17:47	Surface	1	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	98.7 97.6	98.2	7.6 7.5	7.6	7.6	12.7 12.8	12.8	16.6	10.0 9.7	9.9	14.5
				Middle	5.5	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	97.7 97.3	97.5	7.5 7.5	7.5		16.2 16.7	16.5		17.9 17.7	17.8	
				Bottom	10	18.8 18.7	18.8	8.0 8.0	8.0	33.2 33.2	33.2	97.2 96.9	97.1	7.4 7.4	7.4	7.4	20.1 20.9	20.5		15.7 15.7	15.7	
20-Dec-17	Cloudy	Rough	09:56	Surface	1	17.8 17.8	17.8	8.1 8.1	8.1	34.1 34.1	34.1	98.4 97.8	98.1	7.6 7.6	7.6	7.6	13.4 13.5	13.5	20.4	8.5 9.4	9.0	8.3
				Middle	5.5	17.8 17.8	17.8	8.1 8.1	8.1	34.1 34.1	34.1	97.7 97.3	97.5	7.6 7.5	7.6		22.8 24.9	23.9		7.9 8.8	8.4	
				Bottom	10	17.8 17.8	17.8	8.1 8.1	8.1	34.1 34.1	34.1	97.4 97.1	97.3	7.6 7.5	7.6	7.6	23.2 24.1	23.7		7.8 7.2	7.5	
22-Dec-17	Sunny	Moderate	10:35	Surface	1	17.5 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	98.2 97.8	98.0	7.7 7.6	7.7	7.7	22.5 22.6	22.6	26.1	7.4 7.1	7.3	7.6
				Middle	5.5	17.6 17.6	17.6	8.1 8.1	8.1	33.9 33.9	33.9	97.6 97.3	97.5	7.6 7.6	7.6		25.1 26.2	25.7		7.4 8.3	7.9	
				Bottom	10	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	97.1 97.1	97.1	7.6 7.6	7.6	7.6	29.5 30.5	30.0		7.7 7.3	7.5	
26-Dec-17	Fine	Moderate	13:00	Surface	1	17.8 17.8	17.8	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.0	98.3	7.7 7.6	7.7	7.7	12.6 12.3	12.5	17.5	20.8 21.2	21.0	21.1
				Middle	5.5	17.8 17.8	17.8	8.1 8.1	8.1	33.2 33.2	33.2	97.6 97.6	97.6	7.6 7.6	7.6		17.8 17.7	17.8		21.8 19.2	20.5	
				Bottom	10	17.8 17.8	17.8	8.1 8.1	8.1	33.2 33.2	33.2	97.4 97.3	97.4	7.6 7.6	7.6	7.6	21.6 22.5	22.1		22.5 21.1	21.8	
28-Dec-17	Fine	Moderate	14:03	Surface	1	18.1 18.1	18.1	8.1 8.0	8.1	33.2 33.2	33.2	100.3 100.1	100.2	7.8 7.8	7.8	7.8	3.0 3.2	3.1	3.7	7.4 7.2	7.3	7.9
				Middle	5.5	18.1 18.1	18.1	8.0 8.0	8.0	33.2 33.2	33.2	100.0 99.7	99.9	7.7 7.7	7.7		3.2 3.7	3.5		8.0 8.2	8.1	
				Bottom	10	18.1 18.1	18.1	8.0 8.0	8.0	33.2 33.3	33.3	99.2 99.1	99.2	7.7 7.7	7.7	7.7	4.3 4.4	4.4		8.3 8.1	8.2	
30-Dec-17	Cloudy	Calm	15:53	Surface	1	18.4 18.4	18.4	8.3 8.3	8.3	32.9 32.9	32.9	100.1 100.3	100.2	7.7 7.7	7.7	7.7	4.8 4.7	4.8	10.0	17.3 15.5	16.4	14.3
				Middle	5.5	18.3 18.3	18.3	8.3 8.3	8.3	33.0 33.0	33.0	98.9 98.7	98.8	7.6 7.6	7.6		11.3 11.8	11.6		13.2 15.5	14.4	
				Bottom	10	18.2 18.2	18.2	8.3 8.3	8.3	33.1 33.0	33.1	98.0 98.2	98.1	7.6 7.6	7.6	7.6	13.7 13.2	13.5		11.2 12.9	12.1	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST2 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:09	Surface	1	22.3 22.3	22.3	8.1 8.1	8.1	33.0 33.0	33.0	99.3 99.1	99.2	7.1 7.1	7.1	7.1	12.3 12.4	12.4	18.2	8.6 8.8	8.7	8.8
				Middle	4	22.2 22.3	22.3	8.1 8.1	8.1	33.1 33.1	33.1	98.7 98.9	98.8	7.1 7.1	7.1		14.5 15.5	15.0		8.2 8.9	8.6	
				Bottom	7	22.2 22.2	22.2	8.1 8.1	8.1	33.1 33.1	33.1	98.5 98.6	98.6	7.1 7.1	7.1	7.1	26.4 27.8	27.1		9.3 8.8	9.1	
4-Dec-17	Cloudy	Moderate	12:41	Surface	1	22.2 22.3	22.3	8.0 8.0	8.0	32.5 32.5	32.5	98.2 97.5	97.9	7.1 7.0	7.1	7.0	11.6 11.5	11.6	17.0	18.4 13.4	15.9	18.4
				Middle	3.5	22.0 22.0	22.0	8.0 8.0	8.0	33.1 33.1	33.1	95.6 95.6	95.6	6.9 6.9	6.9		16.1 17.0	16.6		16.6 16.3	16.5	
				Bottom	6	22.0 22.0	22.0	8.0 8.0	8.0	33.3 33.2	33.3	94.7 94.5	94.6	6.8 6.8	6.8	6.8	22.8 22.7	22.8		24.6 21.1	22.9	
6-Dec-17	Fine	Moderate	15:18	Surface	1	21.6 21.7	21.7	7.5 7.6	7.6	33.2 33.2	33.2	96.0 95.6	95.8	7.0 6.9	7.0	7.0	11.1 11.2	11.2	16.6	21.0 18.3	19.7	22.2
				Middle	3.5	21.6 21.6	21.6	7.6 7.6	7.6	33.4 33.4	33.4	95.2 94.6	94.9	6.9 6.9	6.9		14.0 13.3	13.7		21.6 22.6	22.1	
				Bottom	6	21.6 21.6	21.6	7.6 7.6	7.6	33.5 33.5	33.5	93.9 93.7	93.8	6.8 6.8	6.8	6.8	25.8 23.8	24.8		26.0 23.8	24.9	
8-Dec-17	Cloudy	Rough	16:23	Surface	1	21.3 21.3	21.3	8.0 8.0	8.0	32.9 32.9	32.9	96.2 95.3	95.8	7.0 7.0	7.0	7.0	18.9 19.6	19.3	25.6	12.6 11.8	12.2	12.4
				Middle	3.5	21.4 21.4	21.4	8.0 8.0	8.0	33.1 33.0	33.1	95.3 94.7	95.0	7.0 6.9	7.0		25.7 27.2	26.5		11.5 12.1	11.8	
				Bottom	6	21.6 21.6	21.6	8.0 8.0	8.0	33.6 33.6	33.6	94.9 94.5	94.7	6.9 6.9	6.9	6.9	30.9 31.1	31.0		13.4 13.0	13.2	
12-Dec-17	Fine	Calm	08:23	Surface	1	20.5 20.5	20.5	8.0 8.0	8.0	33.1 33.1	33.1	96.5 95.9	96.2	7.2 7.1	7.2	7.2	4.5 4.7	4.6	5.0	7.2 5.8	6.5	7.2
				Middle	4	20.5 20.5	20.5	8.0 8.0	8.0	33.1 33.1	33.1	95.9 95.5	95.7	7.1 7.1	7.1		5.1 4.7	4.9		7.7 7.5	7.6	
				Bottom	7	20.5 20.5	20.5	8.1 8.1	8.1	33.1 33.1	33.1	95.5 95.4	95.5	7.1 7.1	7.1	7.1	5.1 6.1	5.6		7.2 7.9	7.6	
14-Dec-17	Cloudy	Moderate	10:37	Surface	1	20.6 20.7	20.7	8.1 8.1	8.1	33.3 33.3	33.3	98.2 98.4	98.3	7.3 7.3	7.3	7.3	5.2 5.1	5.2	5.8	7.9 6.6	7.3	7.2
				Middle	3.5	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.5 97.7	97.6	7.2 7.2	7.2		5.9 5.8	5.9		6.3 6.9	6.6	
				Bottom	6	20.6 20.6	20.6	8.1 8.1	8.1	33.3 33.3	33.3	97.2 97.3	97.3	7.2 7.2	7.2	7.2	6.5 6.3	6.4		7.0 8.6	7.8	
16-Dec-17	Cloudy	Rough	11:53	Surface	1	19.9 19.9	19.9	8.1 8.1	8.1	32.1 32.1	32.1	98.5 98.8	98.7	7.4 7.4	7.4	7.4	16.2 14.7	15.5	18.9	13.6 14.4	14.0	14.2
				Middle	3.5	20.0 20.0	20.0	8.1 8.1	8.1	32.3 32.3	32.3	98.2 98.4	98.3	7.4 7.4	7.4		21.2 20.3	20.8		13.8 13.3	13.6	
				Bottom	6	20.1 20.1	20.1	8.1 8.1	8.1	32.5 32.5	32.5	97.7 97.6	97.7	7.3 7.3	7.3	7.3	19.8 21.1	20.5		14.7 15.2	15.0	
18-Dec-17	Cloudy	Moderate	12:29	Surface	1	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	98.6 97.6	98.1	7.6 7.5	7.6	7.6	14.9 14.4	14.7	15.6	12.4 12.1	12.3	12.7
				Middle	4	18.7 18.7	18.7	8.1 8.1	8.1	33.2 33.2	33.2	97.7 97.2	97.5	7.5 7.5	7.5		15.3 15.2	15.3		11.7 11.7	11.7	
				Bottom	7	18.6 18.6	18.6	8.1 8.1	8.1	33.2 33.2	33.2	96.9 96.7	96.8	7.4 7.4	7.4	7.4	17.3 16.2	16.8		14.1 13.9	14.0	
20-Dec-17	Cloudy	Rough	14:39	Surface	1	17.9 17.9	17.9	8.1 8.1	8.1	34.0 34.0	34.0	98.8 97.9	98.4	7.7 7.6	7.7	7.7	16.6 16.2	16.4	18.6	12.8 12.1	12.5	13.2
				Middle	3.5	17.9 17.9	17.9	8.1 8.1	8.1	34.0 34.0	34.0	98.2 97.8	98.0	7.6 7.6	7.6		16.3 17.0	16.7		14.7 12.2	13.5	
				Bottom	6	17.9 17.9	17.9	8.1 8.1	8.1	34.0 34.0	34.0	97.5 97.5	97.5	7.6 7.6	7.6	7.6	22.6 22.5	22.6		14.9 12.5	13.7	
22-Dec-17	Sunny	Moderate	14:21	Surface	1	17.6 17.5	17.6	8.1 8.0	8.1	33.7 33.7	33.7	100.1 99.3	99.7	7.8 7.8	7.8	7.8	9.0 9.1	9.1	11.4	7.2 7.5	7.4	7.6
				Middle	4	17.5 17.6	17.6	8.0 8.0	8.0	33.8 33.8	33.8	99.1 98.9	99.0	7.7 7.7	7.7		10.5 10.5	10.5		7.4 8.4	7.9	
				Bottom	7	17.6 17.5	17.6	8.0 8.1	8.1	33.8 33.8	33.8	97.8 97.6	97.7	7.6 7.6	7.6	7.6	14.9 14.2	14.6		7.6 7.1	7.4	
26-Dec-17	Fine	Moderate	18:41	Surface	1	18.0 18.0	18.0	8.0 8.1	8.1	33.4 33.4	33.4	99.7 99.1	99.4	7.7 7.7	7.7	7.7	6.5 7.0	6.8	7.0	12.3 12.3	12.3	11.8
				Middle	3.5	18.0 18.0	18.0	8.1 8.1	8.1	33.4 33.4	33.4	99.3 98.9	99.1	7.7 7.7	7.7		6.9 7.2	7.1		12.3 11.7	12.0	
				Bottom	6	18.0 18.0	18.0	8.1 8.1	8.1	33.4 33.4	33.4	98.9 98.7	98.8	7.7 7.7	7.7	7.7	7.0 7.1	7.1		11.3 10.7	11.0	
28-Dec-17	Cloudy	Moderate	08:09	Surface	1	18.0 18.0	18.0	8.0 8.0	8.0	33.1 33.1	33.1	99.7 99.4	99.6	7.8 7.7	7.8	7.8	2.7 2.8	2.8	4.2	7.5 7.9	7.7	7.8
				Middle	4	18.0 18.0	18.0	8.0 8.0	8.0	33.2 33.3	33.3	99.2 99.0	99.1	7.7 7.7	7.7		3.2 3.2	3.2		7.2 7.4	7.3	
				Bottom	7	18.0 18.0	18.0	8.0 8.0	8.0	33.3 33.3	33.3	98.6 98.5	98.6	7.6 7.6	7.6	7.6	6.8 6.4	6.6		8.2 8.3	8.3	
30-Dec-17	Cloudy	Moderate	10:22	Surface	1	18.3 18.3	18.3	8.1 8.1	8.1	32.9 32.9	32.9	99.9 99.6	99.8	7.7 7.7	7.7	7.7	4.8 4.8	4.8	5.1	8.2 8.4	8.3	10.6
				Middle	3.5	18.2 18.2	18.2	8.1 8.2	8.2	32.9 32.9	32.9	98.8 98.9	98.9	7.7 7.7	7.7		5.1 5.0	5.1		16.0 7.8	11.9	
				Bottom	6	18.2 18.2	18.2	8.1 8.1	8.1	32.9 32.9	32.9	98.2 98.4	98.3	7.6 7.6	7.6	7.6	5.4 5.5	5.5		8.8 14.4	11.6	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST2 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:31	Surface	1	22.2 22.2	22.2	8.0 8.0	8.0	32.7 32.7	32.7	99.8 99.5	99.7	7.2 7.2	7.2	7.2	10.3 10.0	10.2	13.8	10.2 9.3	9.8	12.7
				Middle	4	22.2 22.2	22.2	8.0 8.0	8.0	32.7 32.7	32.7	98.6 98.8	98.7	7.1 7.1	7.1		11.2 10.9	11.1		10.5 10.2	10.4	
				Bottom	7	22.2 22.3	22.3	8.1 8.1	8.1	32.8 32.8	32.8	98.5 98.5	98.5	7.1 7.1	7.1	7.1	20.4 19.5	20.0		18.0 18.0	18.0	
4-Dec-17	Cloudy	Rough	18:11	Surface	1	22.1 22.1	22.1	8.1 8.1	8.1	32.8 32.8	32.8	97.3 96.7	97.0	7.0 7.0	7.0	7.0	12.3 12.4	12.4	15.6	9.9 9.6	9.8	11.8
				Middle	4	22.1 22.1	22.1	8.1 8.1	8.1	32.8 32.8	32.8	96.8 96.5	96.7	7.0 7.0	7.0		12.9 12.3	12.6		8.9 9.5	9.2	
				Bottom	7	22.1 22.1	22.1	8.1 8.1	8.1	32.8 32.8	32.8	96.5 96.0	96.3	7.0 6.9	7.0	7.0	22.1 21.5	21.8		18.0 14.5	16.3	
6-Dec-17	Fine	Moderate	09:25	Surface	1	21.6 21.6	21.6	8.1 8.3	8.2	33.2 33.2	33.2	94.0 93.3	93.7	6.8 6.8	6.8	6.8	15.5 15.5	15.5	22.0	11.3 11.1	11.2	14.5
				Middle	3.5	21.6 21.6	21.6	8.1 8.4	8.3	33.3 33.2	33.3	93.0 92.7	92.9	6.8 6.7	6.8		20.6 21.3	21.0		14.1 15.3	14.7	
				Bottom	6	21.6 21.6	21.6	8.2 8.5	8.4	33.3 33.3	33.3	92.5 92.2	92.4	6.7 6.7	6.7	6.7	29.5 29.6	29.6		18.0 17.2	17.6	
8-Dec-17	Cloudy	Rough	11:35	Surface	1	20.9 20.9	20.9	8.5 8.7	8.6	32.0 32.0	32.0	94.4 93.3	93.9	7.0 6.9	7.0	6.9	18.1 18.2	18.2	23.5	10.0 15.1	12.6	15.0
				Middle	3.5	21.2 21.2	21.2	8.6 8.6	8.6	32.6 32.6	32.6	93.0 92.5	92.8	6.8 6.8	6.8		15.6 15.8	15.7		14.7 15.6	15.2	
				Bottom	6	21.3 21.3	21.3	8.6 8.6	8.6	32.7 32.7	32.7	92.0 91.9	92.0	6.7 6.7	6.7	6.7	35.8 37.5	36.7		16.9 17.4	17.2	
12-Dec-17	Fine	Calm	14:13	Surface	1	20.2 20.2	20.2	8.0 8.0	8.0	32.7 32.7	32.7	99.1 98.3	98.7	7.4 7.3	7.4	7.3	6.1 6.0	6.1	9.1	10.3 9.0	9.7	11.1
				Middle	3.5	20.2 20.2	20.2	8.0 8.0	8.0	32.8 32.8	32.8	97.0 96.6	96.8	7.2 7.2	7.2		8.8 8.5	8.7		12.0 12.0	12.0	
				Bottom	6	20.3 20.3	20.3	8.1 8.1	8.1	33.0 33.0	33.0	96.4 96.1	96.3	7.2 7.2	7.2	7.2	12.6 12.3	12.5		10.9 12.0	11.5	
14-Dec-17	Cloudy	Moderate	15:41	Surface	1	20.3 20.3	20.3	8.1 8.1	8.1	32.8 32.8	32.8	100.3 100.3	100.3	7.5 7.5	7.5	7.5	4.0 3.9	4.0	7.0	8.4 6.5	7.5	7.1
				Middle	3.5	20.3 20.3	20.3	8.1 8.1	8.1	33.1 33.1	33.1	98.9 98.9	98.9	7.4 7.4	7.4		6.4 5.5	6.0		6.2 7.9	7.1	
				Bottom	6	20.4 20.4	20.4	8.1 8.1	8.1	33.2 33.2	33.2	98.4 98.5	98.5	7.3 7.3	7.3	7.3	12.2 9.8	11.0		6.7 6.7	6.7	
16-Dec-17	Cloudy	Rough	16:58	Surface	1	20.0 20.0	20.0	8.1 8.1	8.1	32.6 32.6	32.6	98.4 98.7	98.6	7.4 7.4	7.4	7.4	12.3 12.4	12.4	12.6	12.0 17.0	14.5	12.8
				Middle	3.5	20.0 19.9	20.0	8.1 8.1	8.1	32.6 32.6	32.6	98.3 98.8	98.6	7.4 7.4	7.4		11.7 11.0	11.4		12.4 11.4	11.9	
				Bottom	6	20.0 20.0	20.0	8.1 8.1	8.1	32.6 32.6	32.6	98.4 98.8	98.6	7.4 7.4	7.4	7.4	13.8 14.3	14.1		11.1 12.7	11.9	
18-Dec-17	Cloudy	Rough	17:37	Surface	1	18.6 18.6	18.6	8.1 8.1	8.1	33.1 33.1	33.1	98.8 97.6	98.2	7.6 7.5	7.6	7.6	11.2 11.6	11.4	12.0	10.4 10.4	10.4	11.0
				Middle	4	18.6 18.6	18.6	8.0 8.0	8.0	33.1 33.1	33.1	98.0 97.5	97.8	7.5 7.5	7.5		11.1 11.4	11.3		11.4 11.6	11.5	
				Bottom	7	18.6 18.6	18.6	8.1 8.1	8.1	33.1 33.1	33.1	97.5 97.1	97.3	7.5 7.5	7.5	7.5	13.2 13.4	13.3		11.3 11.0	11.2	
20-Dec-17	Cloudy	Rough	09:44	Surface	1	17.6 17.6	17.6	8.1 8.1	8.1	34.0 34.0	34.0	99.6 97.8	98.7	7.8 7.6	7.7	7.7	18.3 18.6	18.5	25.9	8.2 8.1	8.2	7.6
				Middle	3.5	17.6 17.6	17.6	8.1 8.1	8.1	34.0 34.0	34.0	98.0 97.4	97.7	7.6 7.6	7.6		26.6 25.7	26.2		7.9 7.1	7.5	
				Bottom	6	17.5 17.6	17.6	8.1 8.1	8.1	34.0 34.0	34.0	97.5 97.1	97.3	7.6 7.6	7.6	7.6	33.0 33.1	33.1		7.3 6.8	7.1	
22-Dec-17	Sunny	Moderate	10:24	Surface	1	17.5 17.5	17.5	8.1 8.1	8.1	33.9 33.9	33.9	98.6 97.9	98.3	7.7 7.6	7.7	7.7	13.7 13.6	13.7	21.1	7.2 7.5	7.4	7.7
				Middle	3.5	17.4 17.4	17.4	8.0 8.1	8.1	33.9 33.9	33.9	97.7 97.4	97.6	7.6 7.6	7.6		22.7 22.4	22.6		8.2 7.8	8.0	
				Bottom	6	17.4 17.4	17.4	8.1 8.1	8.1	33.9 33.9	33.9	97.2 97.1	97.2	7.6 7.6	7.6	7.6	27.5 26.2	26.9		7.1 8.4	7.8	
26-Dec-17	Fine	Moderate	12:49	Surface	1	17.8 17.8	17.8	8.1 8.1	8.1	32.7 32.8	32.8	100.2 100.0	100.1	7.8 7.8	7.8	7.8	4.4 5.0	4.7	13.1	11.4 9.6	10.5	12.3
				Middle	4	17.6 17.6	17.6	8.1 8.1	8.1	32.9 32.9	32.9	97.7 97.7	97.7	7.7 7.7	7.7		14.1 14.7	14.4		10.4 14.3	12.4	
				Bottom	7	17.6 17.6	17.6	8.1 8.1	8.1	32.9 32.9	32.9	97.3 97.2	97.3	7.6 7.6	7.6	7.6	20.3 20.0	20.2		15.3 12.7	14.0	
28-Dec-17	Fine	Moderate	13:52	Surface	1	18.1 18.2	18.2	8.1 8.1	8.1	32.9 32.8	32.9	101.2 101.2	101.2	7.9 7.9	7.9	7.8	3.0 3.0	3.0	5.7	8.1 7.8	8.0	7.7
				Middle	4	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	99.3 99.1	99.2	7.7 7.7	7.7		5.3 5.8	5.6		7.6 7.9	7.8	
				Bottom	7	18.0 18.0	18.0	8.1 8.1	8.1	33.2 33.2	33.2	98.7 98.7	98.7	7.7 7.7	7.7	7.7	8.7 8.2	8.5		7.4 7.4	7.4	
30-Dec-17	Cloudy	Calm	15:41	Surface	1	18.6 18.6	18.6	8.3 8.3	8.3	32.2 32.2	32.2	106.4 106.4	106.4	8.2 8.2	8.2	8.1	2.2 2.3	2.3	7.7	7.3 5.6	6.5	6.6
				Middle	3.5	18.4 18.4	18.4	8.3 8.3	8.3	32.7 32.7	32.7	101.6 101.6	101.6	7.9 7.9	7.9		6.9 7.1	7.0		5.4 9.1	7.3	
				Bottom	6	18.3 18.3	18.3	8.3 8.3	8.3	32.8 32.8	32.8	99.7 99.7	99.7	7.7 7.7	7.7	7.7	13.8 14.0	13.9		6.2 6.0	6.1	

Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST3 - Mid-Ebb Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	12:13	Surface	1	22.2 22.2	22.2	8.2 8.1	8.2	33.5 33.5	33.5	99.6 99.0	99.3	7.1 7.1	7.1	7.1	12.3 12.3	12.3	20.3	9.0 9.0	9.0	8.6
				Middle	5	22.2 22.2	22.2	8.1 8.2	8.2	33.5 33.6	33.6	98.2 98.3	98.3	7.0 7.0	7.0		23.9 23.0	23.5		10.4 8.6	9.5	
				Bottom	9	22.2 22.2	22.2	8.1 8.2	8.2	33.5 33.6	33.6	98.0 97.9	98.0	7.0 7.0	7.0	7.0	25.3 25.0	25.2		6.8 7.9	7.4	
4-Dec-17	Cloudy	Moderate	12:46	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	32.3 32.2	32.3	99.6 98.1	98.9	7.2 7.1	7.2	7.1	8.8 8.8	8.8	15.4	13.2 13.3	13.3	12.9
				Middle	6	22.0 22.0	22.0	8.0 8.0	8.0	32.5 32.5	32.5	97.1 97.0	97.1	7.0 7.0	7.0		13.6 13.7	13.7		17.1 11.3	14.2	
				Bottom	11	22.0 22.0	22.0	8.0 8.0	8.0	32.5 32.5	32.5	97.0 97.0	97.0	7.0 7.0	7.0	7.0	23.6 24.0	23.8		11.9 10.4	11.2	
6-Dec-17	Fine	Moderate	13:44	Surface	1	21.9 22.0	22.0	8.0 8.0	8.0	32.4 32.5	32.5	97.5 96.6	97.1	7.1 7.0	7.1	7.1	9.2 9.5	9.4	14.9	14.4 13.2	13.8	13.3
				Middle	6	22.0 22.0	22.0	8.0 8.0	8.0	33.0 33.0	33.0	96.3 96.3	96.3	7.0 7.0	7.0		14.0 13.3	13.7		12.5 10.2	11.4	
				Bottom	11	22.1 22.1	22.1	8.0 8.0	8.0	33.3 33.3	33.3	96.6 96.6	96.6	7.0 7.0	7.0	7.0	22.0 21.3	21.7		16.3 12.8	14.6	
8-Dec-17	Cloudy	Rough	15:36	Surface	1	21.7 21.7	21.7	8.0 8.0	8.0	33.3 33.2	33.3	99.2 97.7	98.5	7.2 7.1	7.2	7.2	12.6 12.5	12.6	13.6	9.3 10.0	9.7	9.7
				Middle	6.5	21.7 21.7	21.7	8.0 8.0	8.0	33.3 33.3	33.3	98.2 97.6	97.9	7.1 7.1	7.1		13.4 13.4	13.4		10.5 10.3	10.4	
				Bottom	12	21.8 21.8	21.8	8.0 8.0	8.0	33.3 33.3	33.3	97.6 97.3	97.5	7.1 7.1	7.1	7.1	14.9 14.8	14.9		9.0 8.7	8.9	
12-Dec-17	Fine	Calm	08:48	Surface	1	20.6 20.6	20.6	8.1 8.1	8.1	33.2 33.2	33.2	99.2 97.9	98.6	7.3 7.2	7.3	7.3	5.7 5.7	5.7	6.5	8.1 7.3	7.7	6.8
				Middle	5.5	20.6 20.6	20.6	8.1 8.1	8.1	33.2 33.2	33.2	98.1 97.9	98.0	7.3 7.2	7.3		5.8 6.9	6.4		7.3 7.5	7.4	
				Bottom	10	20.6 20.6	20.6	8.1 8.1	8.1	33.2 33.2	33.2	97.9 97.9	97.9	7.2 7.2	7.2	7.2	6.9 7.7	7.3		5.3 5.5	5.4	
14-Dec-17	Cloudy	Moderate	11:16	Surface	1	20.5 20.5	20.5	8.0 8.0	8.0	33.7 33.7	33.7	97.2 96.7	97.0	7.2 7.1	7.2	7.2	7.4 8.2	7.8	10.3	15.9 10.5	13.2	13.7
				Middle	6	20.5 20.5	20.5	8.0 8.1	8.1	33.7 33.7	33.7	96.3 96.2	96.3	7.1 7.1	7.1		9.1 9.4	9.3		13.3 17.1	15.2	
				Bottom	11	20.5 20.5	20.5	8.1 8.1	8.1	33.7 33.7	33.7	95.9 95.7	95.8	7.1 7.1	7.1	7.1	13.6 14.0	13.8		12.7 12.9	12.8	
16-Dec-17	Cloudy	Rough	12:18	Surface	1	20.1 20.1	20.1	8.1 8.1	8.1	32.9 32.9	32.9	99.0 98.3	98.7	7.4 7.4	7.4	7.4	9.2 9.2	9.2	10.0	14.2 17.5	15.9	15.8
				Middle	6	20.1 20.1	20.1	8.1 8.1	8.1	33.1 33.0	33.1	98.3 97.8	98.1	7.3 7.3	7.3		9.2 9.1	9.2		11.5 15.0	13.3	
				Bottom	11	20.1 20.1	20.1	8.1 8.1	8.1	33.4 33.4	33.4	97.0 96.7	96.9	7.2 7.2	7.2	7.2	11.5 11.6	11.6		18.6 17.6	18.1	
18-Dec-17	Cloudy	Moderate	13:01	Surface	1	18.5 18.5	18.5	8.0 8.0	8.0	33.1 33.2	33.2	105.4 98.8	102.1	8.1 7.6	7.9	7.8	11.4 11.6	11.5	12.8	8.4 8.4	8.4	10.1
				Middle	5.5	18.5 18.5	18.5	8.0 8.0	8.0	33.2 33.2	33.2	102.0 98.4	100.2	7.8 7.6	7.7		12.5 13.4	13.0		11.9 11.7	11.8	
				Bottom	10	18.5 18.5	18.5	8.0 8.0	8.0	33.2 33.2	33.2	99.7 98.2	99.0	7.7 7.6	7.7	7.7	13.4 14.6	14.0		9.8 10.1	10.0	
20-Dec-17	Cloudy	Rough	14:04	Surface	1	17.8 17.9	17.9	8.0 8.1	8.1	33.0 33.0	33.0	104.5 99.6	102.1	8.2 7.8	8.0	8.0	12.4 12.5	12.5	11.7	9.2 9.7	9.5	12.3
				Middle	5.5	17.8 17.9	17.9	8.0 8.1	8.1	33.0 33.0	33.0	102.1 99.4	100.8	8.0 7.7	7.9		10.8 10.7	10.8		19.0 15.8	17.4	
				Bottom	10	17.8 17.8	17.8	8.1 8.1	8.1	33.0 33.0	33.0	100.1 99.2	99.7	7.8 7.7	7.8	7.8	12.4 10.9	11.7		10.4 9.8	10.1	
22-Dec-17	Sunny	Moderate	14:18	Surface	1	17.8 17.8	17.8	8.0 8.0	8.0	32.9 32.9	32.9	103.0 100.5	101.8	8.0 7.8	7.9	7.9	10.2 10.2	10.2	12.3	7.6 8.3	8.0	7.9
				Middle	5.5	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	101.2 99.9	100.6	7.9 7.8	7.9		12.3 11.0	11.7		7.8 8.1	8.0	
				Bottom	10	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	100.1 99.4	99.8	7.8 7.8	7.8	7.8	15.5 14.6	15.1		7.9 7.3	7.6	
26-Dec-17	Fine	Moderate	18:25	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.1	32.2	103.3 102.1	102.7	8.1 8.0	8.1	8.0	3.6 3.7	3.7	4.7	10.6 10.2	10.4	10.5
				Middle	5.5	18.1 18.1	18.1	8.1 8.1	8.1	32.4 32.4	32.4	102.0 101.6	101.8	7.9 7.9	7.9		4.2 4.3	4.3		11.1 11.1	11.1	
				Bottom	10	18.2 18.2	18.2	8.1 8.1	8.1	32.5 32.5	32.5	101.6 101.6	101.6	7.9 7.9	7.9	7.9	6.0 6.2	6.1		11.3 8.4	9.9	
28-Dec-17	Cloudy	Moderate	08:33	Surface	1	17.8 17.9	17.9	8.1 8.1	8.1	30.6 30.7	30.7	101.6 99.5	100.6	8.0 7.9	8.0	8.0	3.8 3.8	3.8	5.4	9.1 8.1	8.6	8.4
				Middle	5.5	18.0 18.1	18.1	8.1 8.1	8.1	31.2 31.6	31.4	101.0 100.6	100.8	7.9 7.9	7.9		4.0 4.1	4.1		8.0 8.4	8.2	
				Bottom	10	18.1 18.2	18.2	8.1 8.1	8.1	32.2 32.3	32.3	99.7 97.5	98.6	7.8 7.6	7.7	7.7	8.1 8.2	8.2		8.8 8.2	8.5	
30-Dec-17	Cloudy	Moderate	10:51	Surface	1	18.2 18.3	18.3	8.1 8.1	8.1	31.8 31.8	31.8	100.7 100.9	100.8	7.9 7.9	7.9	7.9	4.7 5.2	5.0	7.6	19.5 15.0	17.3	15.3
				Middle	5.5	18.1 18.1	18.1	8.1 8.1	8.1	32.3 32.3	32.3	99.6 99.2	99.4	7.8 7.7	7.8		7.4 7.6	7.5		10.4 15.7	13.1	
				Bottom	10	18.1 18.1	18.1	8.1 8.1	8.1	32.4 32.4	32.4	98.7 98.8	98.8	7.7 7.7	7.7	7.7	10.5 10.2	10.4		17.9 13.3	15.6	

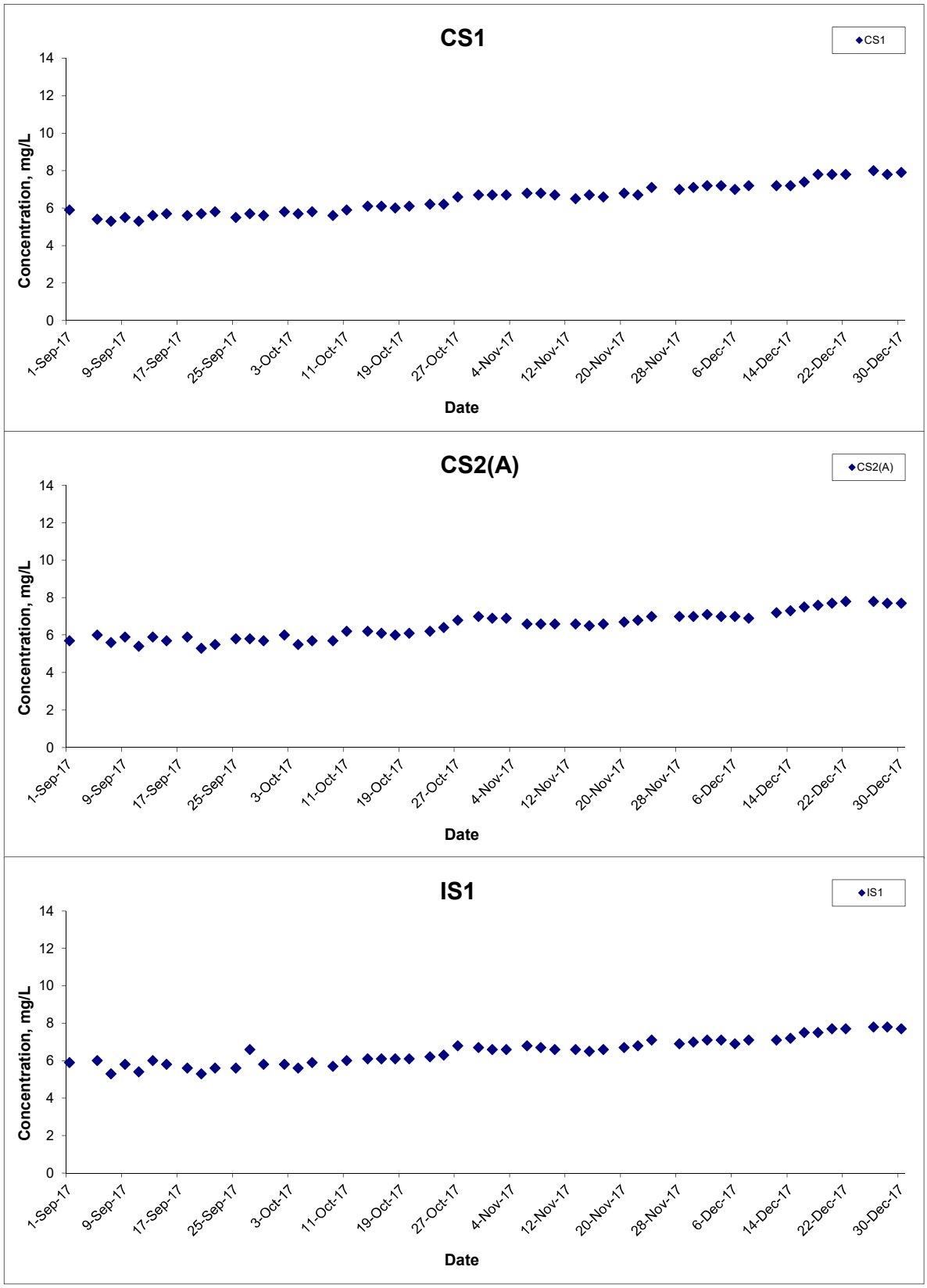
Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

Water Quality Monitoring Results at ST3 - Mid-Flood Tide

Date	Weather Condition	Sea Condition**	Sampling Time	Depth (m)		Temperature (°C)		pH		Salinity ppt		DO Saturation (%)		Dissolved Oxygen (mg/L)			Turbidity(NTU)			Suspended Solids (mg/L)		
						Value	Average	Value	Average	Value	Average	Value	Average	Value	Average	DA*	Value	Average	DA*	Value	Average	DA*
2-Dec-17	Cloudy	Rough	16:11	Surface	1	22.3 22.3	22.3	8.3 8.3	8.3	33.5 33.5	33.5	99.0 98.2	98.6	7.1 7.0	7.1	7.1	9.3 10.3	9.8	10.6	15.6 12.3	14.0	14.3
				Middle	5	22.3 22.3	22.3	8.2 8.3	8.3	33.5 33.5	33.5	98.2 98.0	98.1	7.0 7.0	7.0		11.6 10.4	11.0		14.2 13.3	13.8	
				Bottom	9	22.3 22.3	22.3	8.3 8.3	8.3	33.5 33.5	33.5	97.8 97.7	97.8	7.0 7.0	7.0	7.0	11.2 10.7	11.0		19.3 10.7	15.0	
4-Dec-17	Cloudy	Rough	17:40	Surface	1	22.1 22.1	22.1	8.0 8.0	8.0	32.2 32.2	32.2	98.2 97.9	98.1	7.1 7.1	7.1	7.1	7.4 7.4	7.4	7.9	17.0 17.7	17.4	16.2
				Middle	6	22.1 22.1	22.1	8.0 8.0	8.0	32.2 32.2	32.2	97.8 97.7	97.8	7.1 7.1	7.1		7.5 7.9	7.7		15.3 16.0	15.7	
				Bottom	11	22.1 22.1	22.1	8.0 8.0	8.0	32.2 32.3	32.3	97.6 97.6	97.6	7.1 7.1	7.1	7.1	8.1 9.3	8.7		15.5 15.4	15.5	
6-Dec-17	Fine	Moderate	10:13	Surface	1	21.4 21.4	21.4	8.0 8.0	8.0	31.5 31.5	31.5	94.4 93.7	94.1	7.0 6.9	7.0	7.0	21.8 21.5	21.7	24.0	26.4 25.0	25.7	20.8
				Middle	5.5	21.7 21.7	21.7	8.0 8.0	8.0	32.6 32.6	32.6	94.7 94.7	94.7	6.9 6.9	6.9		23.6 23.3	23.5		25.0 20.7	22.9	
				Bottom	10	21.9 21.9	21.9	8.0 8.0	8.0	33.1 33.1	33.1	95.2 95.2	95.2	6.9 6.9	6.9	6.9	26.9 26.8	26.9		13.6 13.7	13.7	
8-Dec-17	Cloudy	Rough	12:26	Surface	1	21.7 21.7	21.7	8.1 8.1	8.1	33.3 33.3	33.3	97.8 96.6	97.2	7.1 7.0	7.1	7.1	12.3 12.9	12.6	21.8	10.4 10.8	10.6	11.1
				Middle	6	21.7 21.7	21.7	8.1 8.1	8.1	33.3 33.3	33.3	96.8 96.4	96.6	7.0 7.0	7.0		25.6 25.6	25.6		9.9 8.7	9.3	
				Bottom	11	21.7 21.7	21.7	8.1 8.1	8.1	33.3 33.3	33.3	96.3 96.3	96.3	7.0 7.0	7.0	7.0	27.3 27.1	27.2		10.7 16.3	13.5	
12-Dec-17	Fine	Calm	14:06	Surface	1	20.7 20.7	20.7	8.1 8.1	8.1	33.2 33.2	33.2	98.5 98.5	98.5	7.3 7.3	7.3	7.3	9.5 8.8	9.2	11.2	7.6 9.0	8.3	8.9
				Middle	5.5	20.7 20.7	20.7	8.1 8.1	8.1	33.2 33.2	33.2	98.1 98.3	98.2	7.2 7.3	7.3		11.0 12.8	11.9		8.6 8.5	8.6	
				Bottom	10	20.7 20.7	20.7	8.1 8.1	8.1	33.2 33.2	33.2	98.1 98.3	98.2	7.2 7.3	7.3	7.3	12.9 12.1	12.5		11.2 8.3	9.8	
14-Dec-17	Cloudy	Moderate	15:00	Surface	1	20.8 20.8	20.8	8.0 8.0	8.0	33.7 33.7	33.7	98.2 98.0	98.1	7.2 7.2	7.2	7.2	4.2 4.4	4.3	5.7	10.3 14.5	12.4	10.3
				Middle	6	20.7 20.7	20.7	8.1 8.1	8.1	33.7 33.7	33.7	97.0 96.7	96.9	7.1 7.1	7.1		4.9 5.0	5.0		7.7 7.9	7.8	
				Bottom	11	20.6 20.6	20.6	8.1 8.1	8.1	33.7 33.7	33.7	96.2 96.1	96.2	7.1 7.1	7.1	7.1	7.9 7.8	7.9		11.9 9.2	10.6	
16-Dec-17	Cloudy	Rough	16:15	Surface	1	20.0 20.0	20.0	8.0 8.0	8.0	32.9 32.9	32.9	99.2 98.1	98.7	7.4 7.4	7.4	7.4	6.7 6.7	6.7	7.6	9.0 10.1	9.6	9.0
				Middle	6	20.0 20.1	20.1	8.1 8.0	8.1	33.0 33.0	33.0	98.2 97.7	98.0	7.4 7.3	7.4		6.7 6.9	6.8		8.0 8.4	8.2	
				Bottom	11	20.2 20.2	20.2	8.1 8.1	8.1	33.6 33.5	33.6	96.6 96.4	96.5	7.2 7.2	7.2	7.2	9.1 9.6	9.4		8.9 9.3	9.1	
18-Dec-17	Cloudy	Rough	17:08	Surface	1	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	101.2 98.7	100.0	7.8 7.6	7.7	7.7	8.2 7.8	8.0	8.5	17.5 17.5	17.5	14.2
				Middle	5.5	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	99.7 98.7	99.2	7.6 7.6	7.6		8.6 8.3	8.5		13.1 12.8	13.0	
				Bottom	10	18.7 18.7	18.7	8.0 8.0	8.0	33.2 33.2	33.2	99.1 98.7	98.9	7.6 7.6	7.6	7.6	9.2 8.7	9.0		12.1 12.1	12.1	
20-Dec-17	Cloudy	Rough	09:43	Surface	1	17.6 17.7	17.7	8.1 8.1	8.1	33.0 33.0	33.0	103.1 98.9	101.0	8.1 7.7	7.9	7.9	17.0 16.5	16.8	23.0	10.1 11.1	10.6	11.3
				Middle	5.5	17.7 17.7	17.7	8.1 8.1	8.1	33.0 33.0	33.0	100.0 98.9	99.5	7.8 7.7	7.8		17.5 17.0	17.3		11.9 11.2	11.6	
				Bottom	10	17.7 17.7	17.7	8.1 8.1	8.1	33.0 33.0	33.0	99.4 98.8	99.1	7.8 7.7	7.8	7.8	34.8 34.8	34.8		12.0 11.5	11.8	
22-Dec-17	Sunny	Moderate	11:02	Surface	1	17.8 17.8	17.8	8.1 8.1	8.1	32.9 32.9	32.9	101.9 99.9	100.9	8.0 7.8	7.9	7.9	13.3 13.6	13.5	19.4	7.5 8.1	7.8	7.8
				Middle	5.5	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	100.3 99.6	100.0	7.8 7.8	7.8		19.5 19.3	19.4		7.3 7.9	7.6	
				Bottom	10	17.7 17.7	17.7	8.1 8.1	8.1	32.9 32.9	32.9	99.7 99.5	99.6	7.8 7.8	7.8	7.8	25.4 25.3	25.4		7.8 8.2	8.0	
26-Dec-17	Fine	Moderate	13:23	Surface	1	18.1 18.1	18.1	8.1 8.1	8.1	32.7 32.7	32.7	101.5 101.6	101.6	7.9 7.9	7.9	7.9	7.4 7.3	7.4	10.9	16.8 22.4	19.6	18.4
				Middle	5.5	18.0 18.0	18.0	8.1 8.1	8.1	32.7 32.7	32.7	101.3 101.0	101.2	7.9 7.9	7.9		10.3 10.4	10.4		16.1 16.2	16.2	
				Bottom	10	18.0 18.0	18.0	8.1 8.1	8.1	32.7 32.7	32.7	101.0 100.8	100.9	7.9 7.8	7.9	7.9	14.3 15.2	14.8		21.8 17.0	19.4	
28-Dec-17	Fine	Moderate	13:50	Surface	1	18.2 18.2	18.2	8.1 8.1	8.1	31.6 31.6	31.6	102.5 102.2	102.4	8.0 8.0	8.0	7.9	3.9 3.8	3.9	7.9	7.6 8.1	7.9	7.8
				Middle	5.5	18.2 18.2	18.2	8.1 8.1	8.1	32.0 32.0	32.0	99.7 99.6	99.7	7.8 7.8	7.8		6.6 6.6	6.6		7.6 7.4	7.5	
				Bottom	10	18.1 18.1	18.1	8.1 8.1	8.1	32.2 32.2	32.2	98.1 97.8	98.0	7.6 7.6	7.6	7.6	13.7 12.6	13.2		8.0 7.7	7.9	
30-Dec-17	Cloudy	Calm	14:53	Surface	1	18.6 18.6	18.6	8.1 8.1	8.1	31.9 31.9	31.9	102.5 102.3	102.4	7.9 7.9	7.9	7.8	4.0 4.6	4.3	10.9	7.8 9.8	8.8	8.7
				Middle	5.5	18.2 18.2	18.2	8.1 8.1	8.1	32.3 32.3	32.3	98.9 98.6	98.8	7.7 7.7	7.7		12.3 14.3	13.3		8.3 7.0	7.7	
				Bottom	10	18.2 18.2	18.2	8.1 8.1	8.1	32.3 32.3	32.3	98.4 98.3	98.4	7.7 7.7	7.7	7.7	14.5 15.4	15.0		10.2 8.8	9.5	

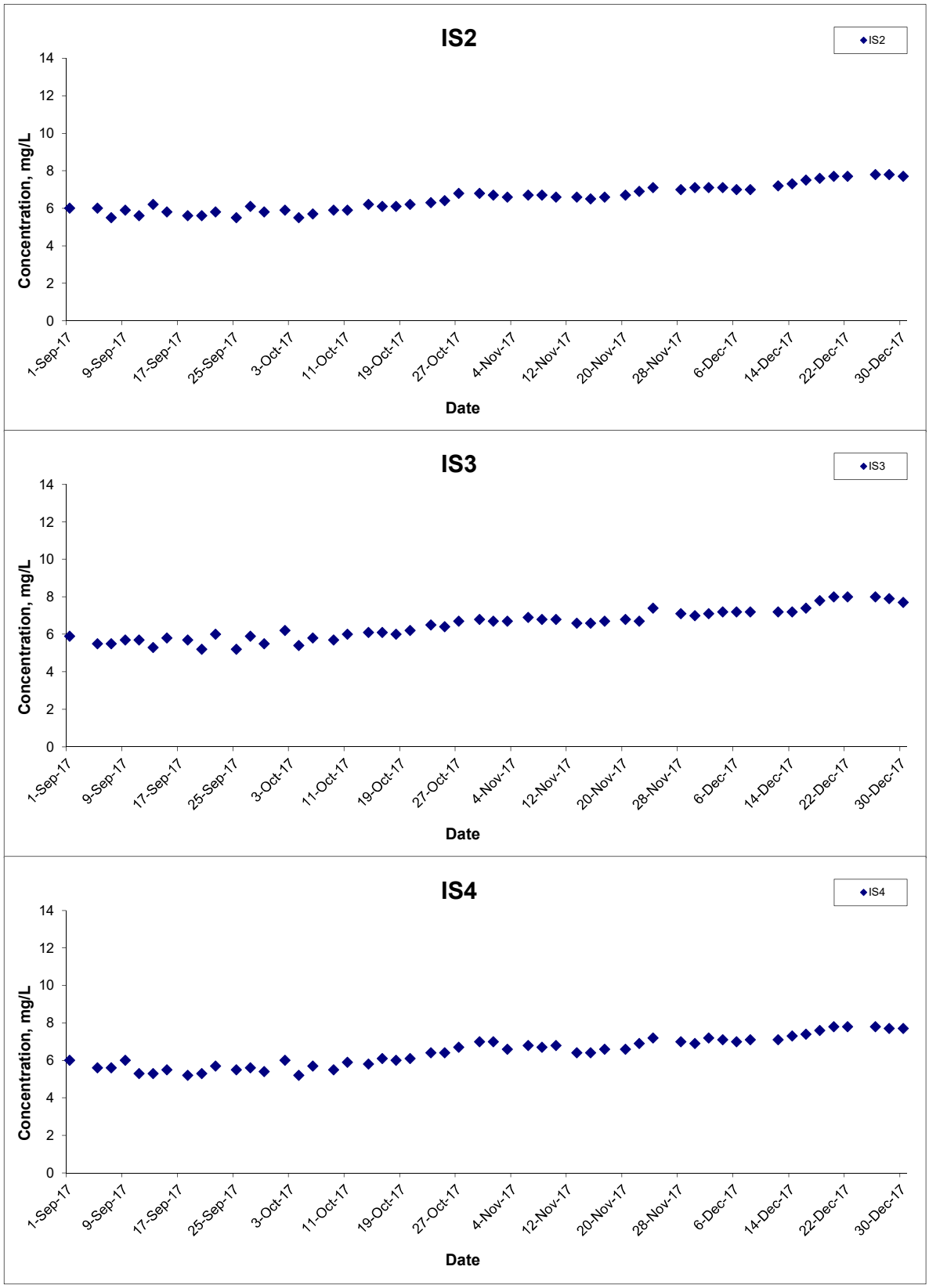
Remarks: *DA: Depth-Averaged
**Calm: Small or no wave; Moderate: Between calm and rough; Rough : White capped or rougher.

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



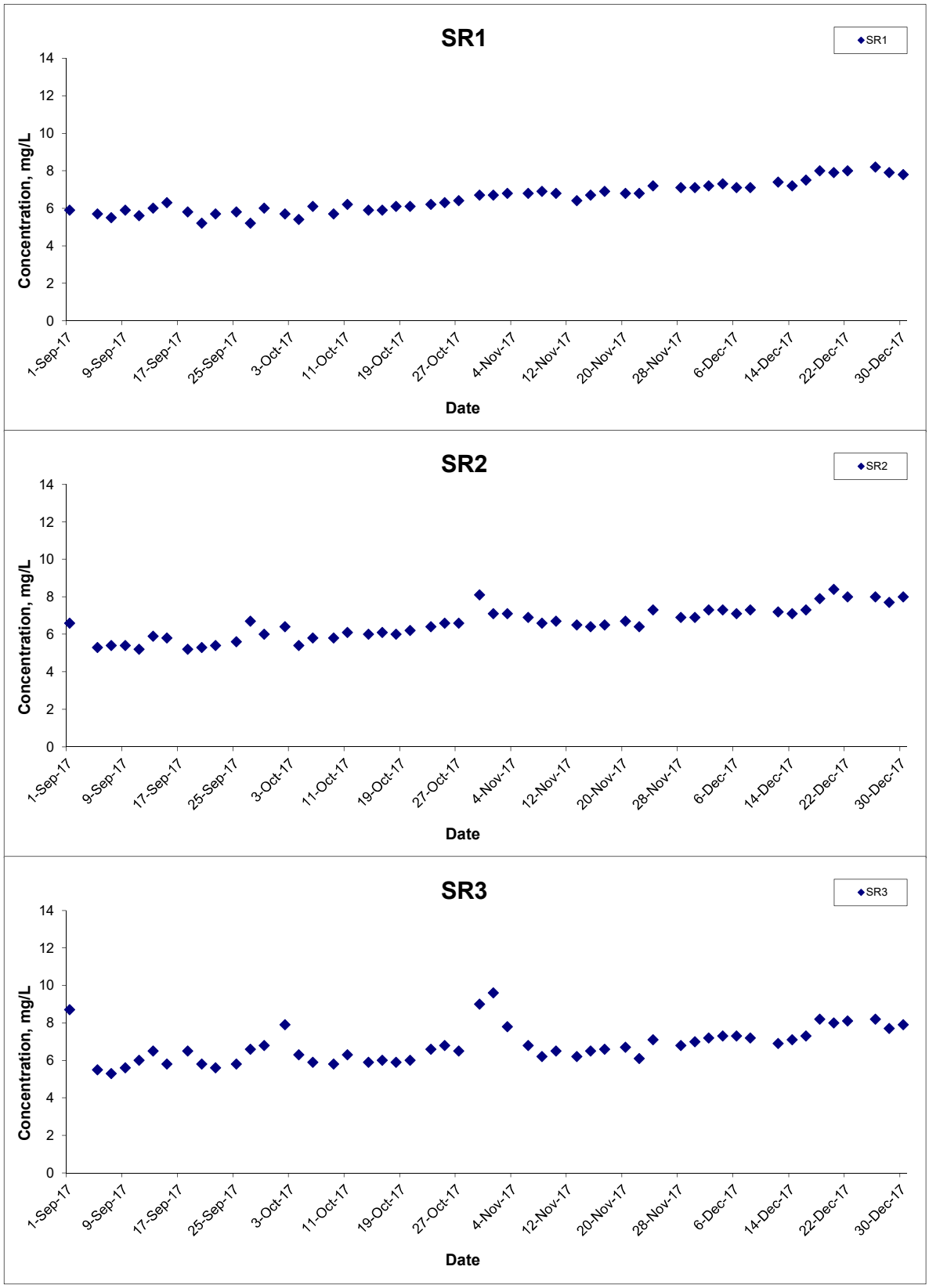
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



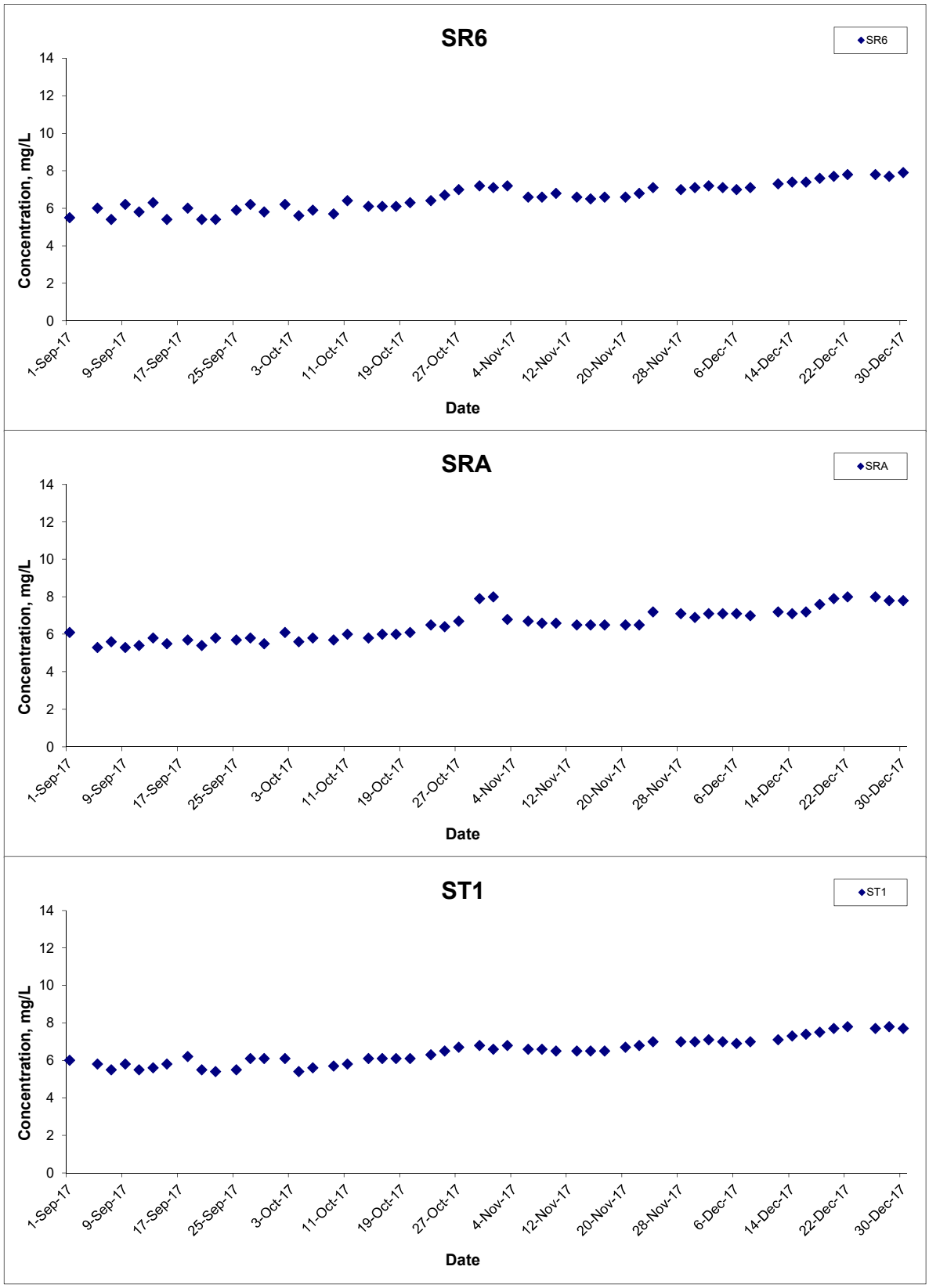
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



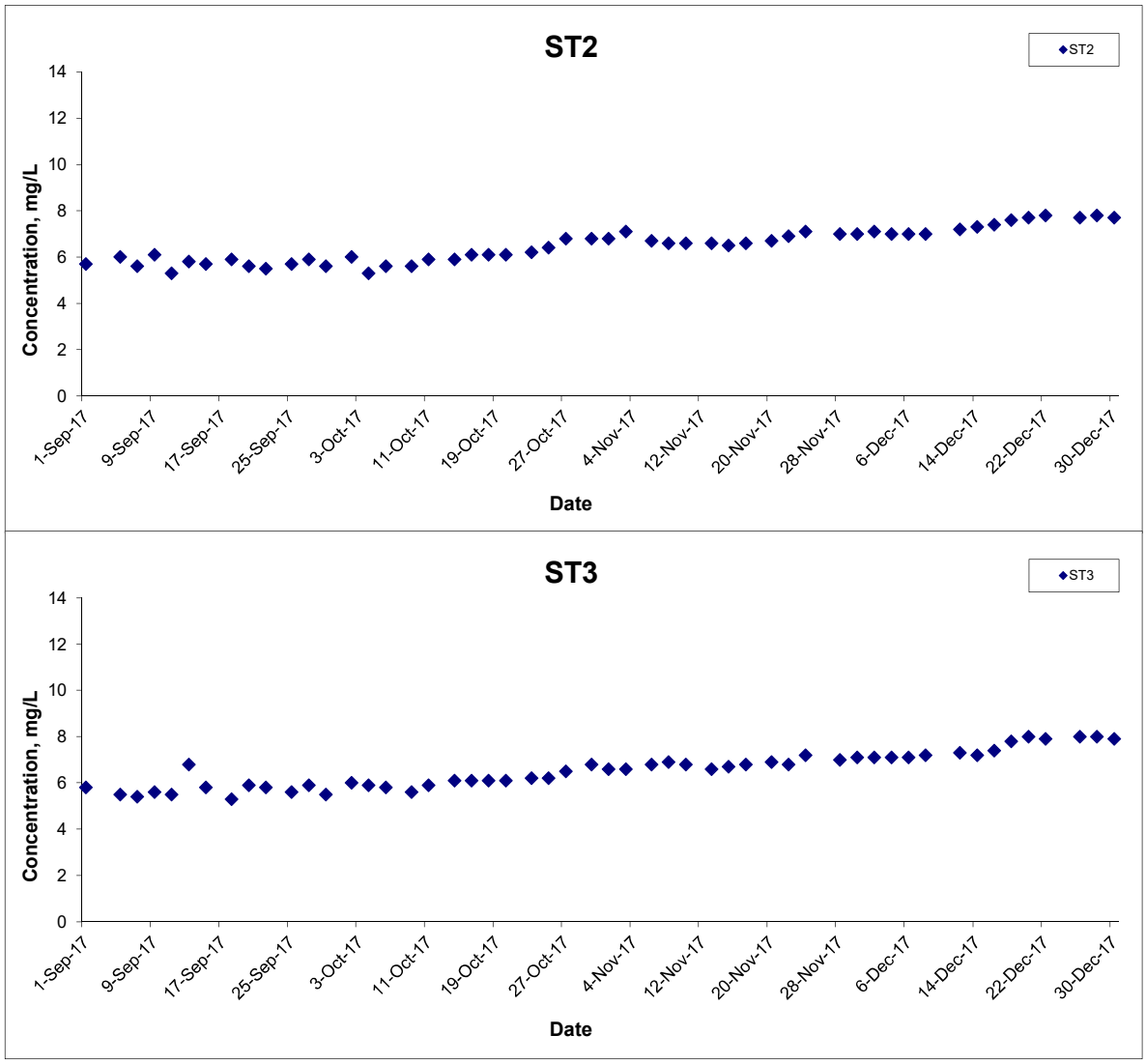
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



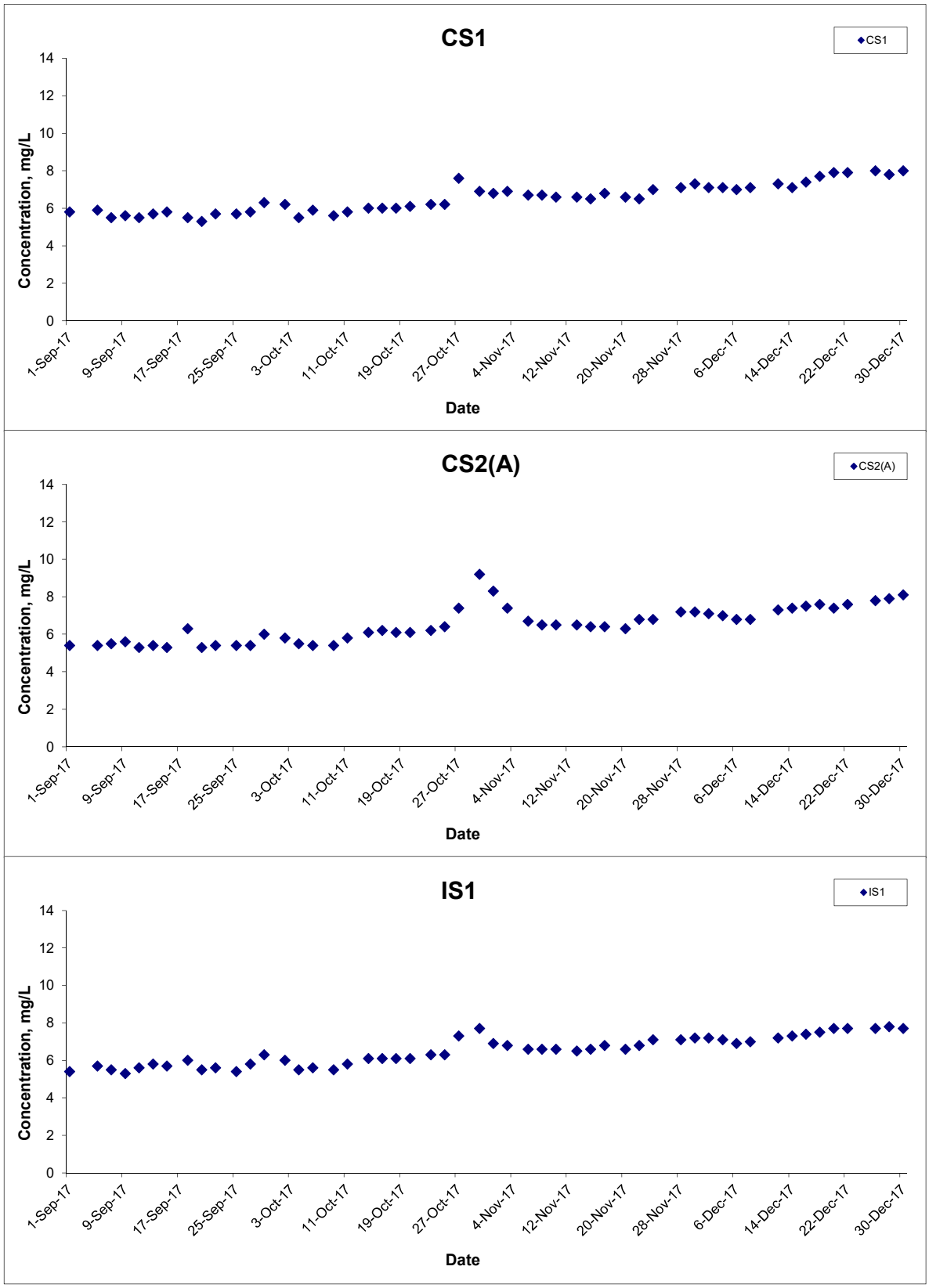
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



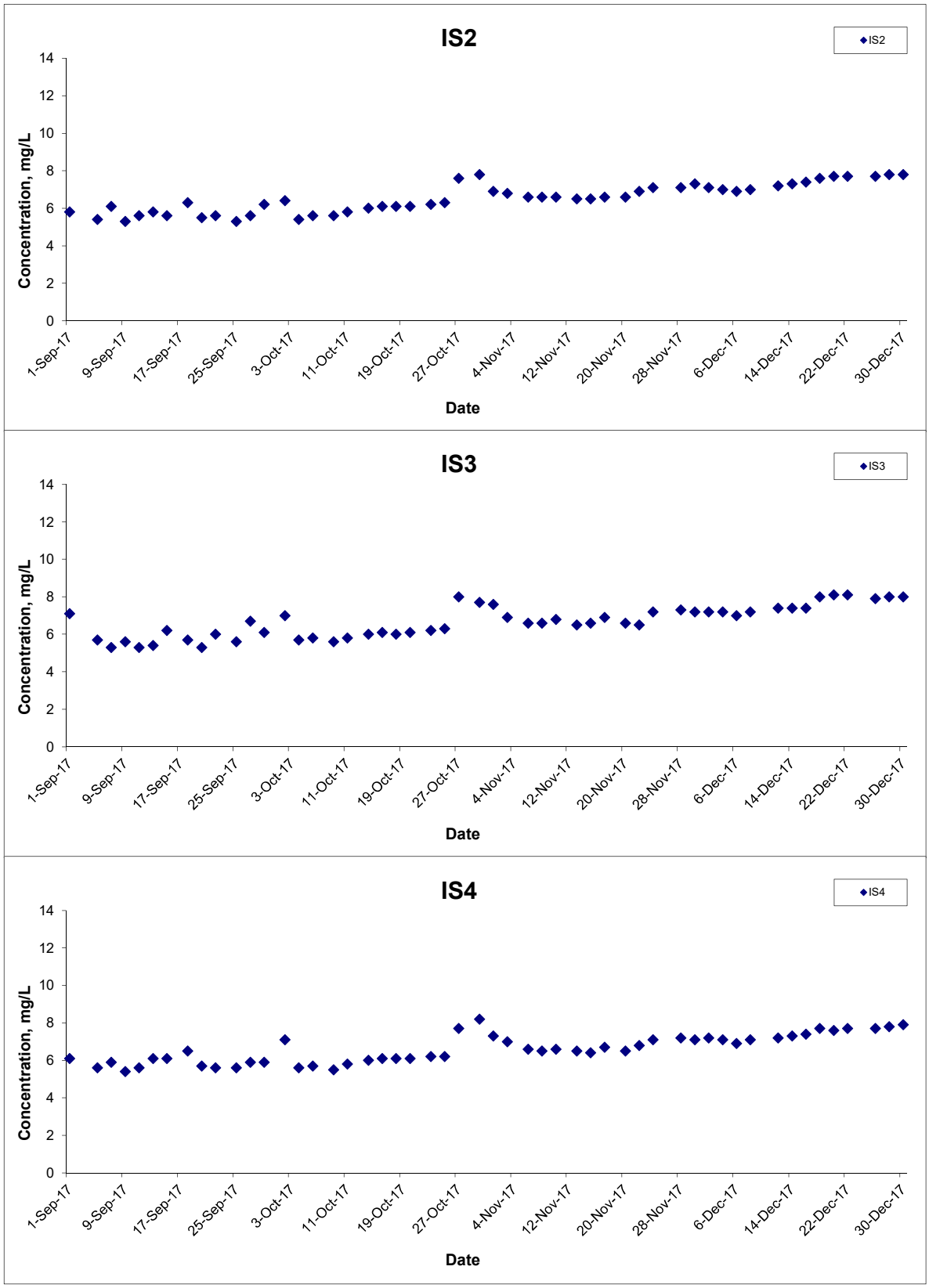
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



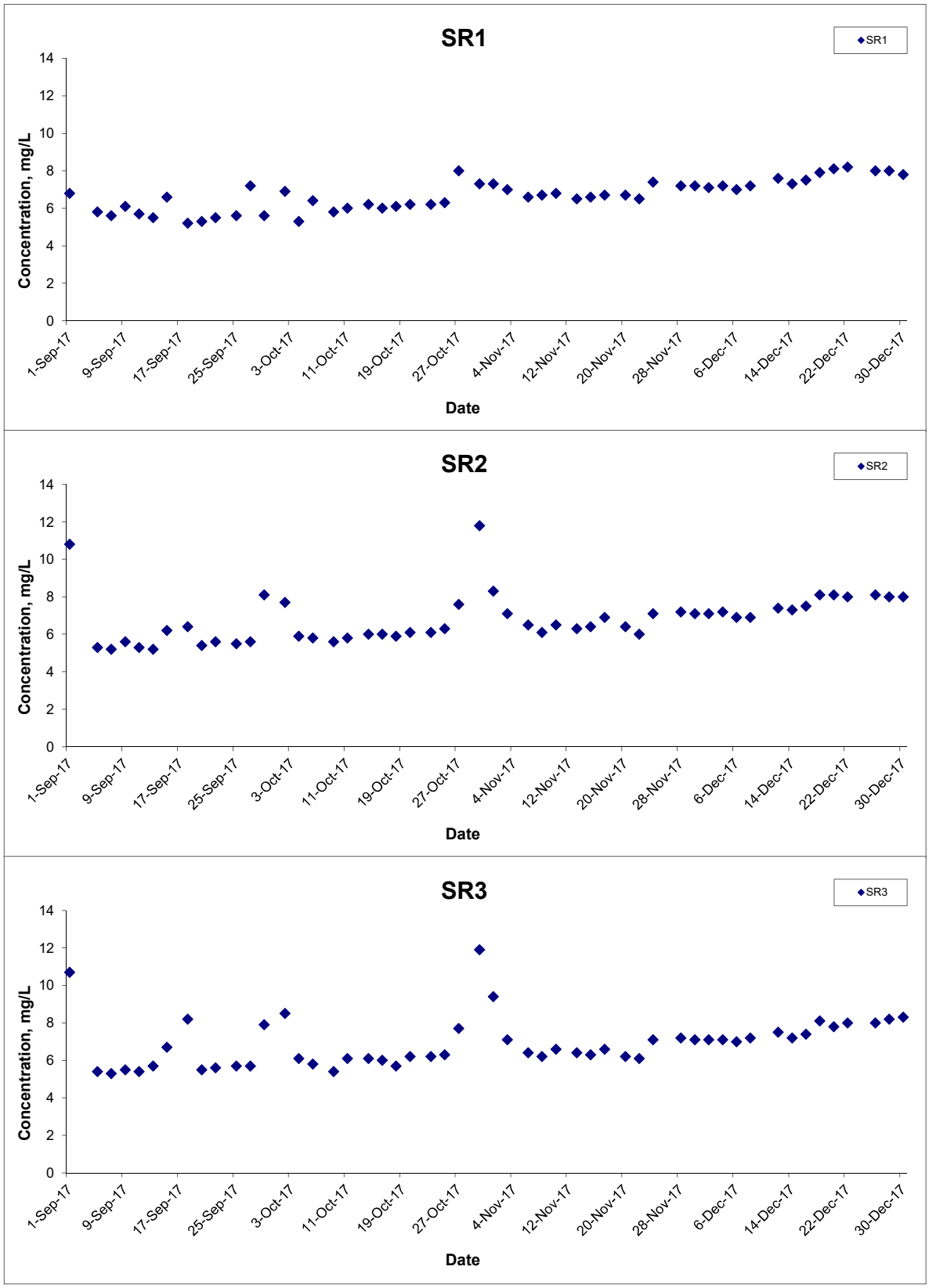
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



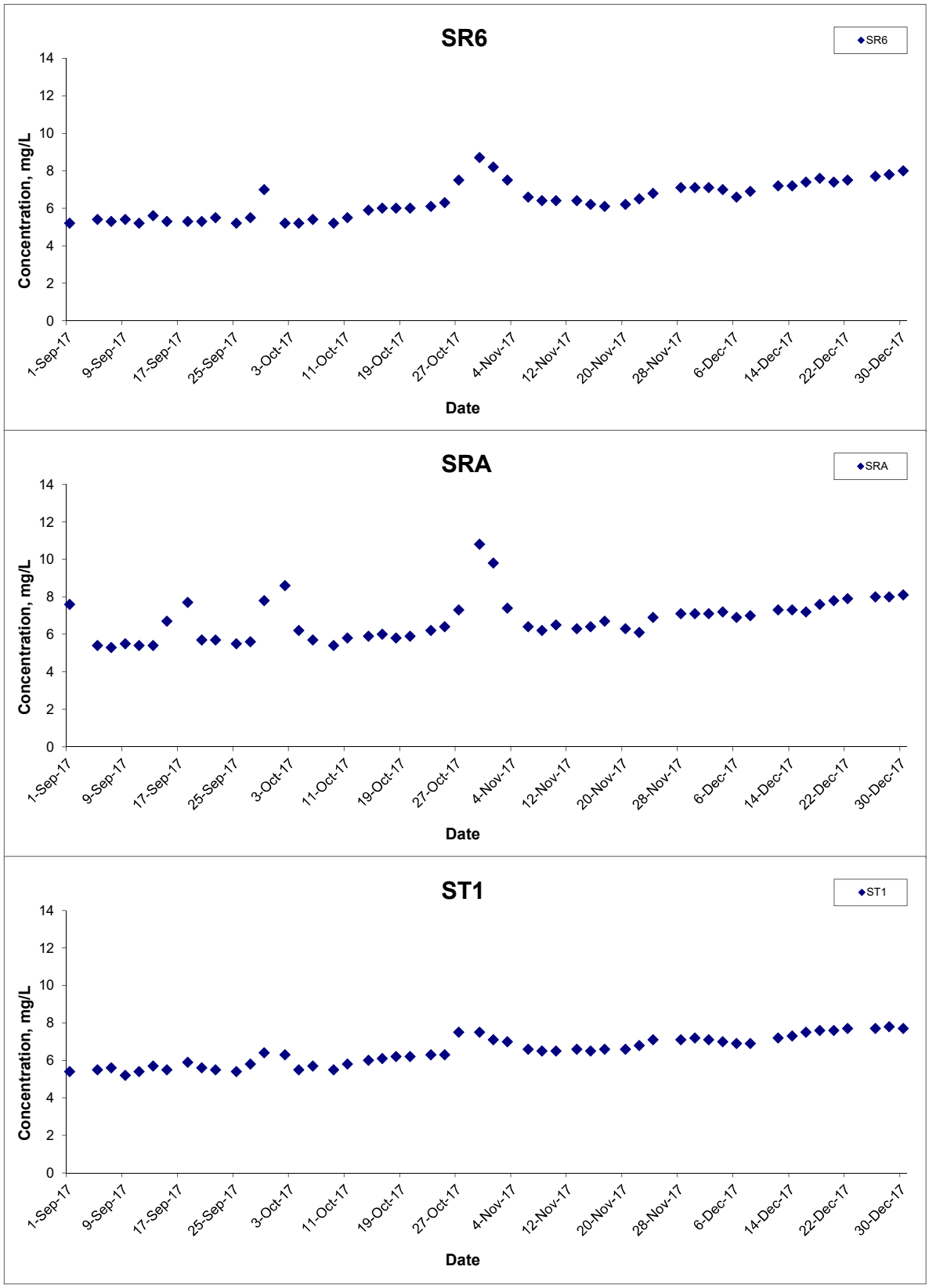
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



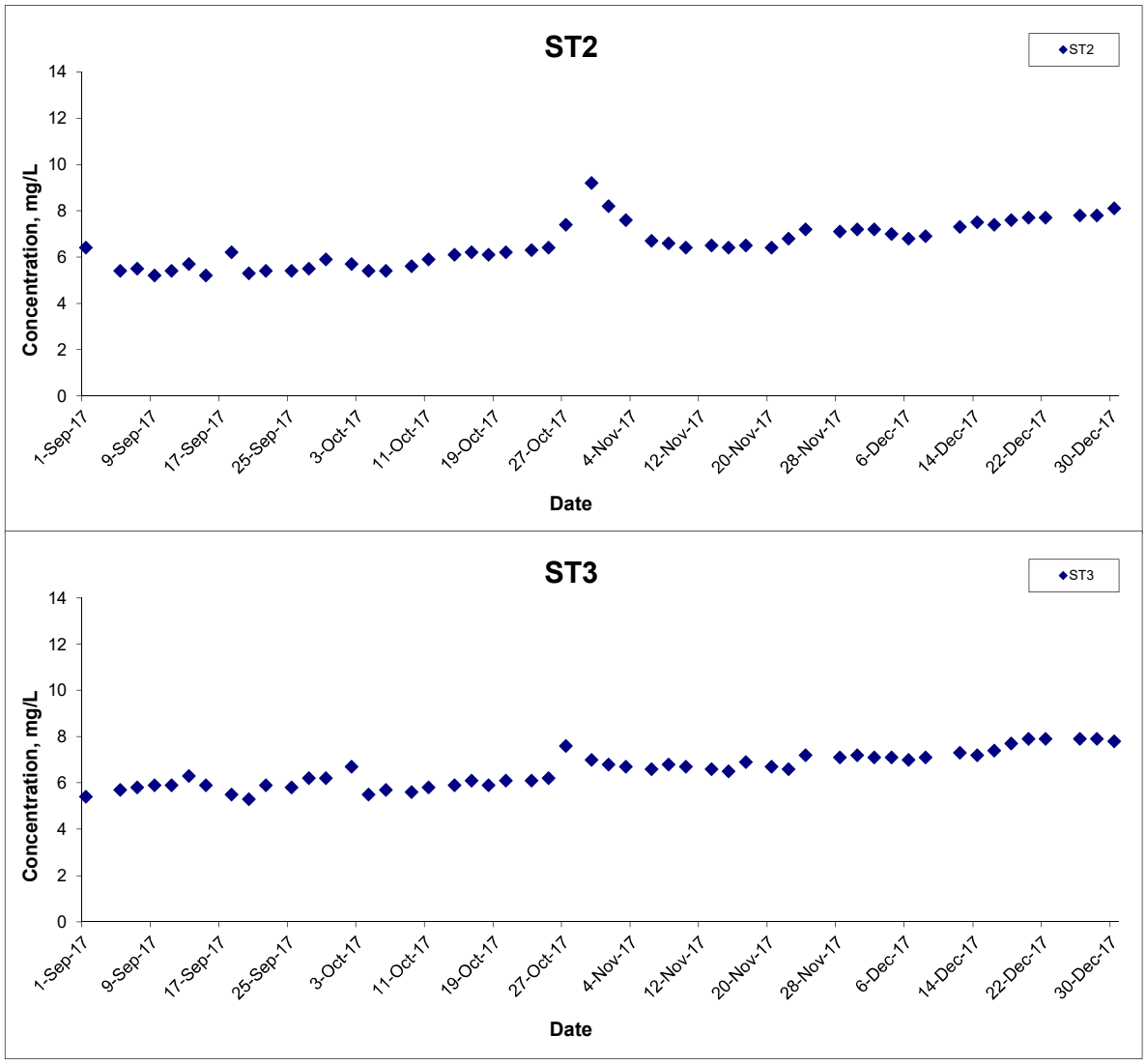
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



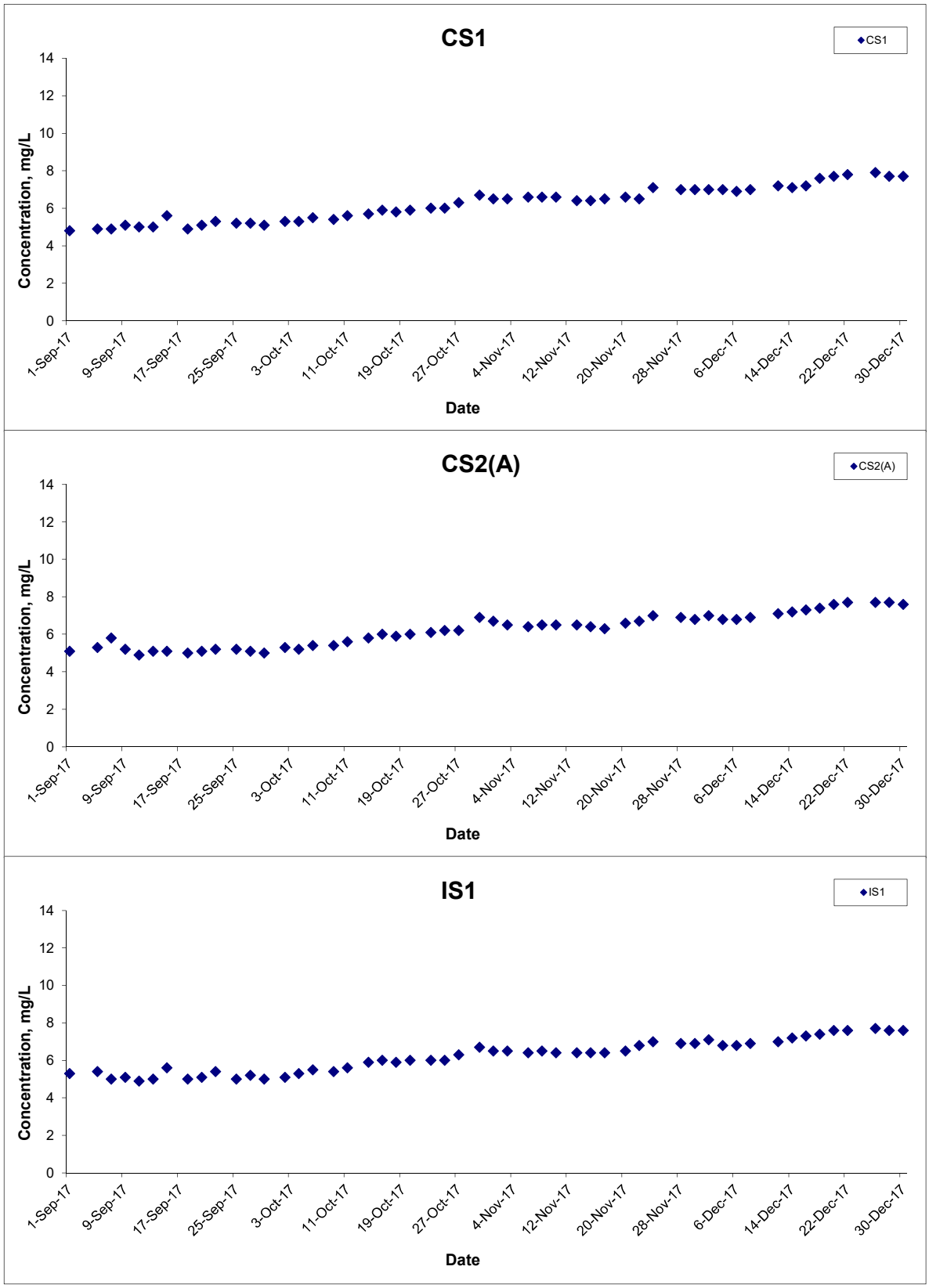
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



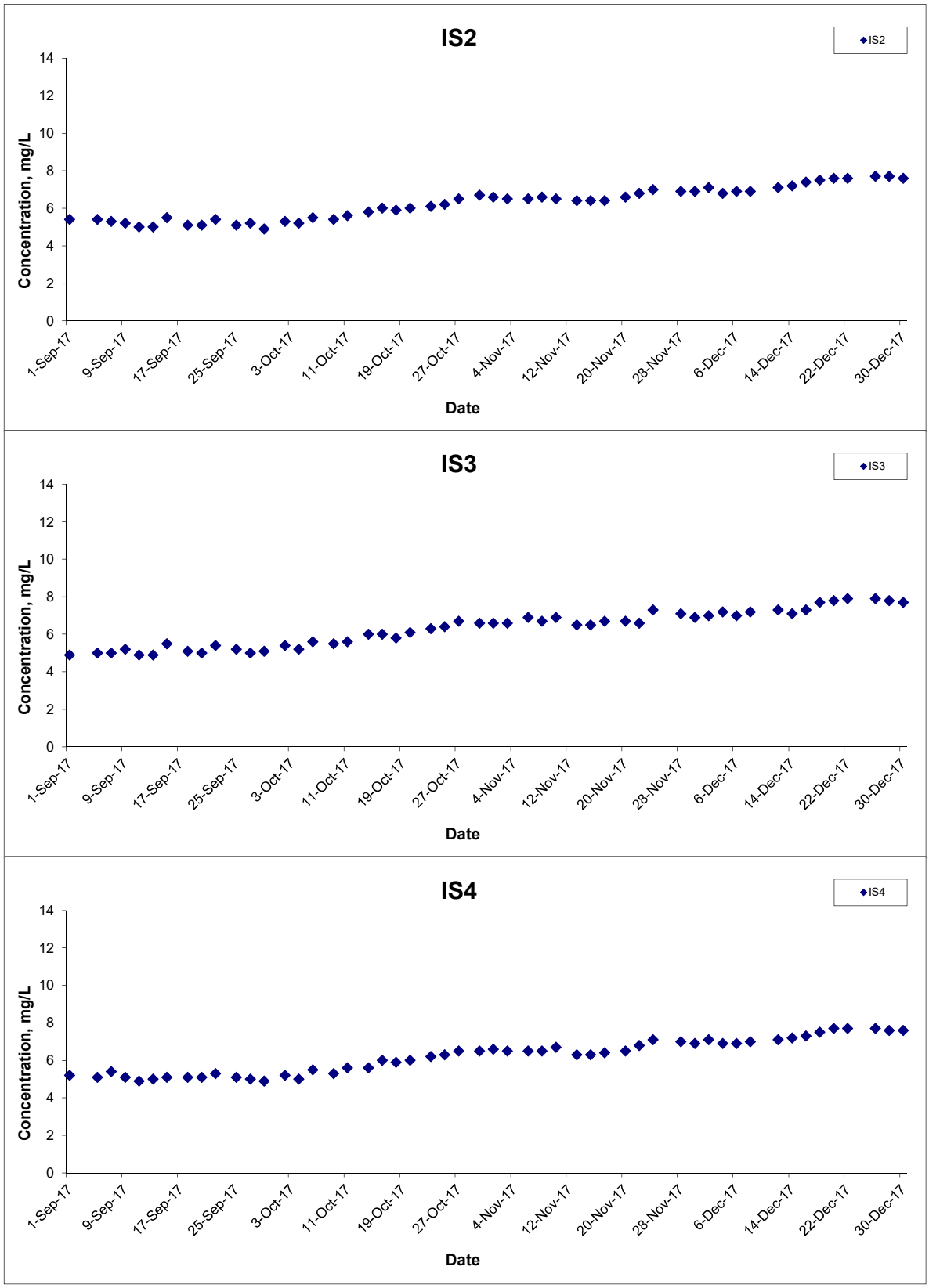
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



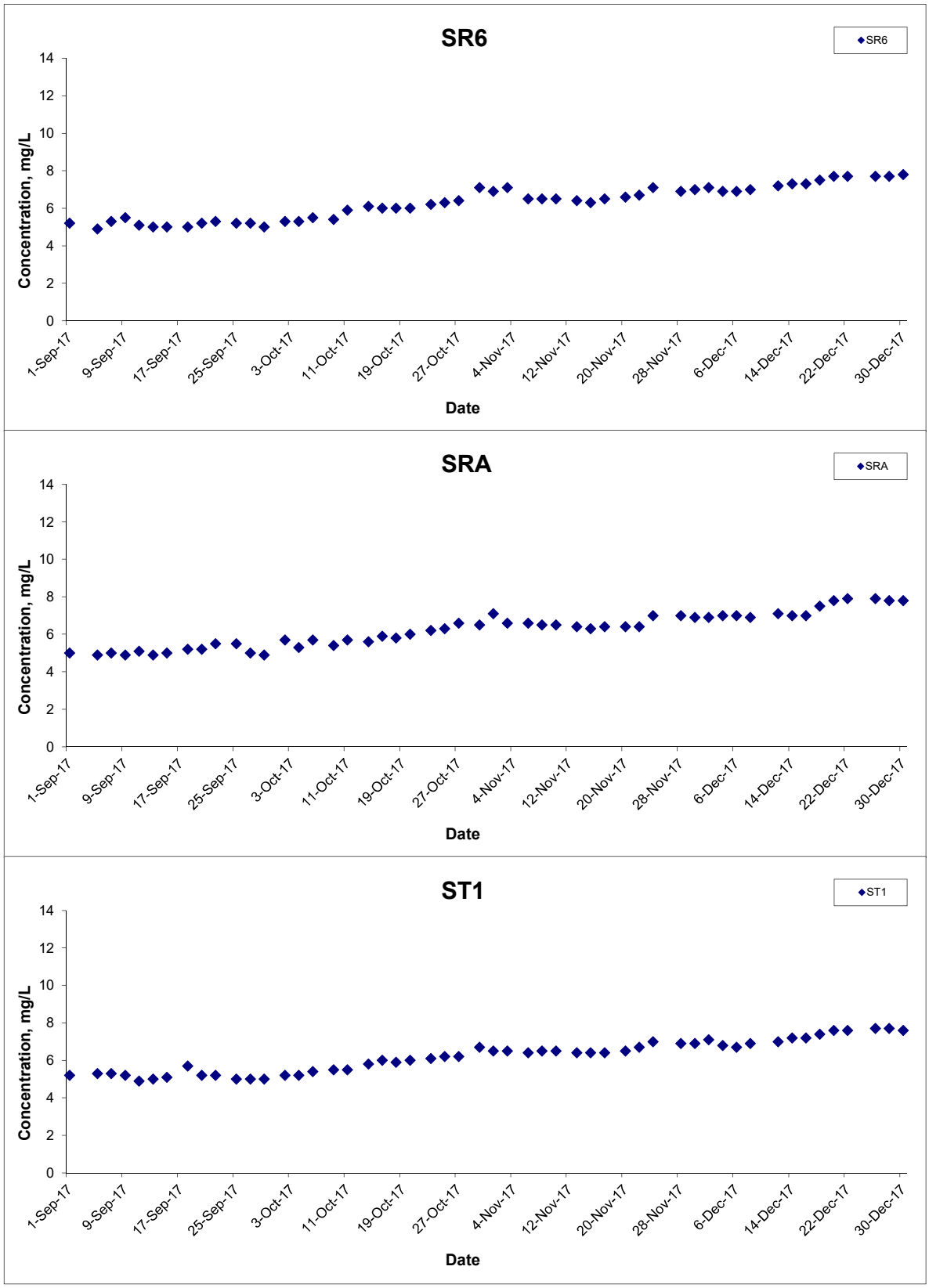
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



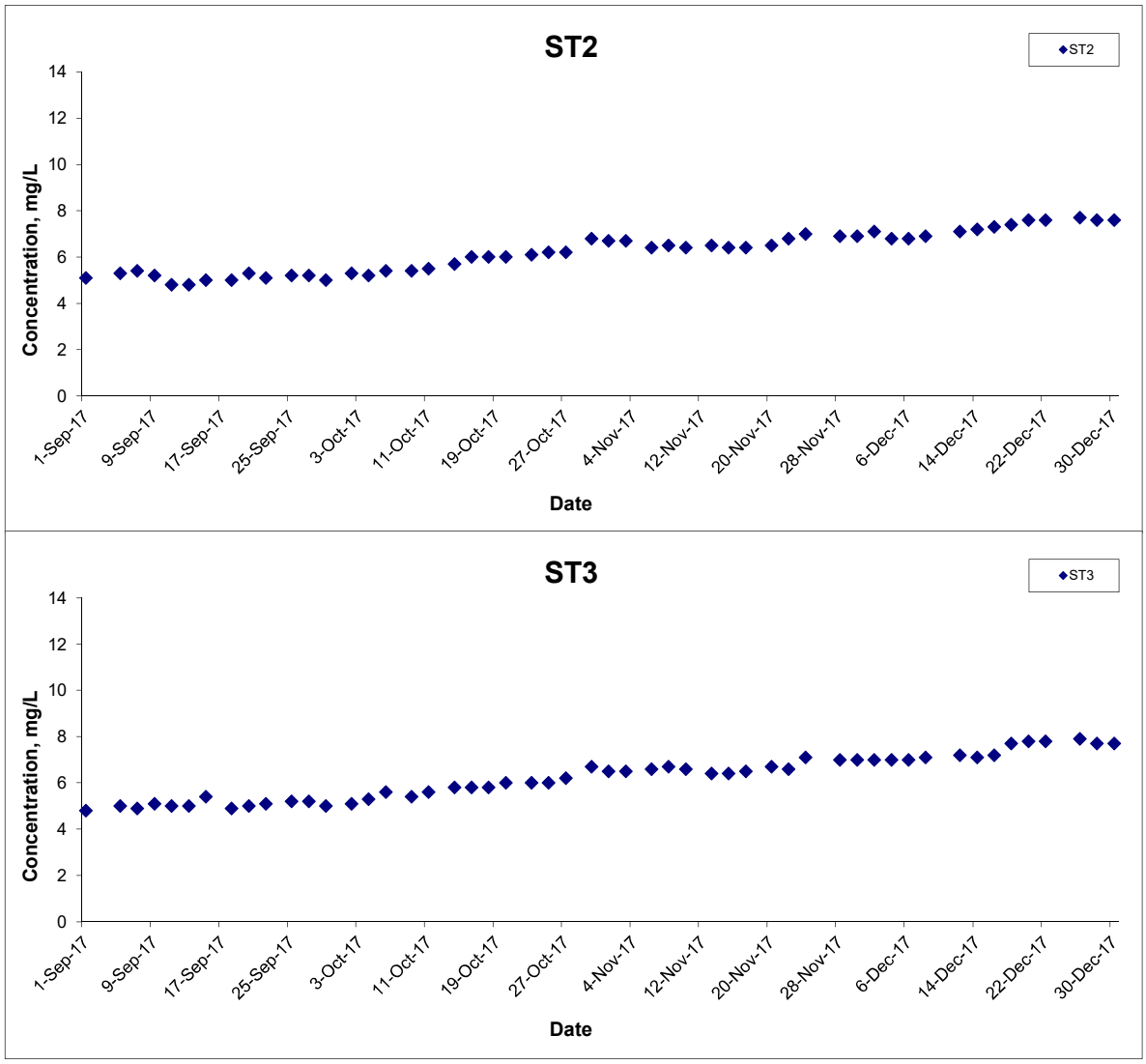
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



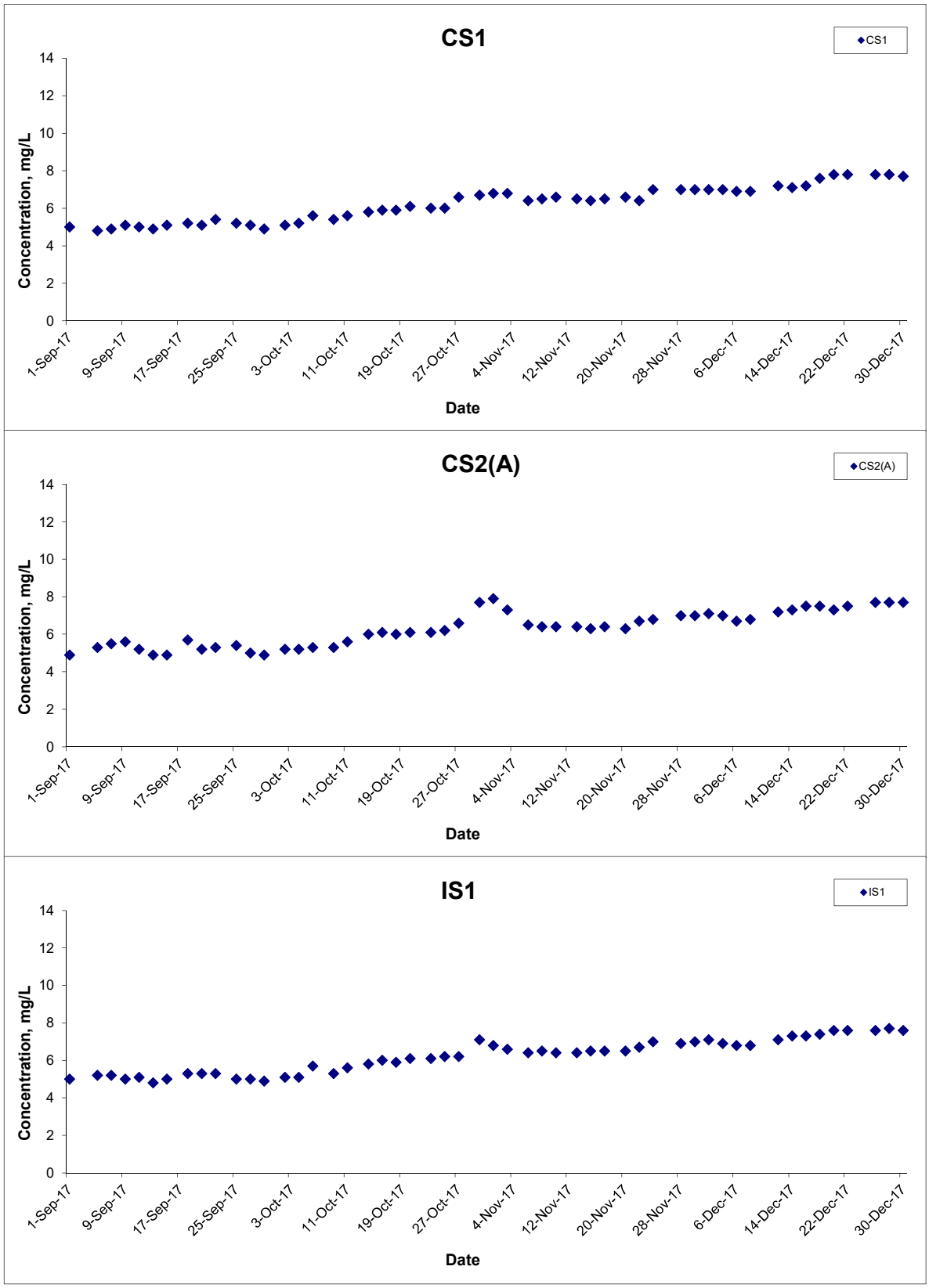
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Ebb Tide



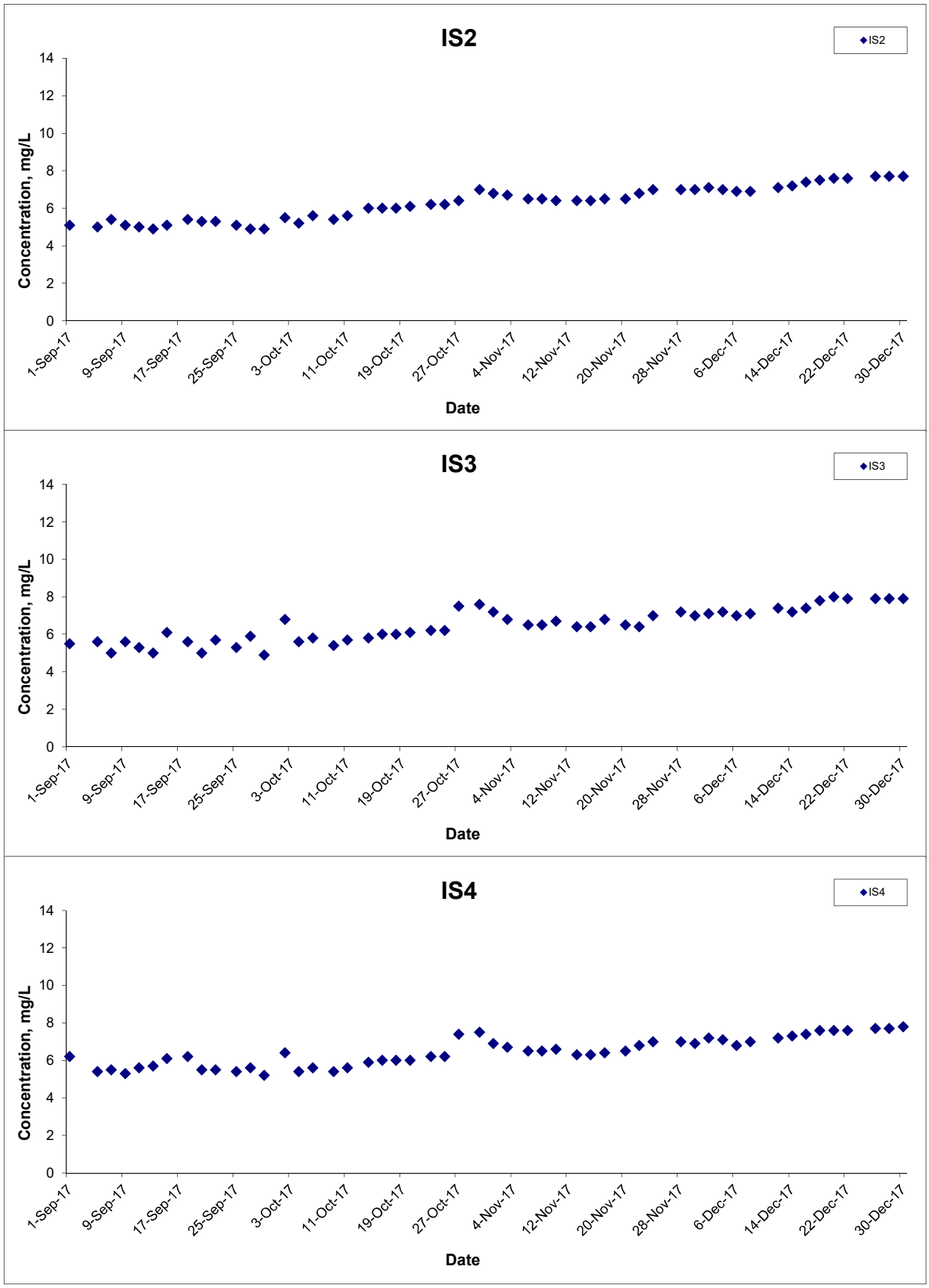
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



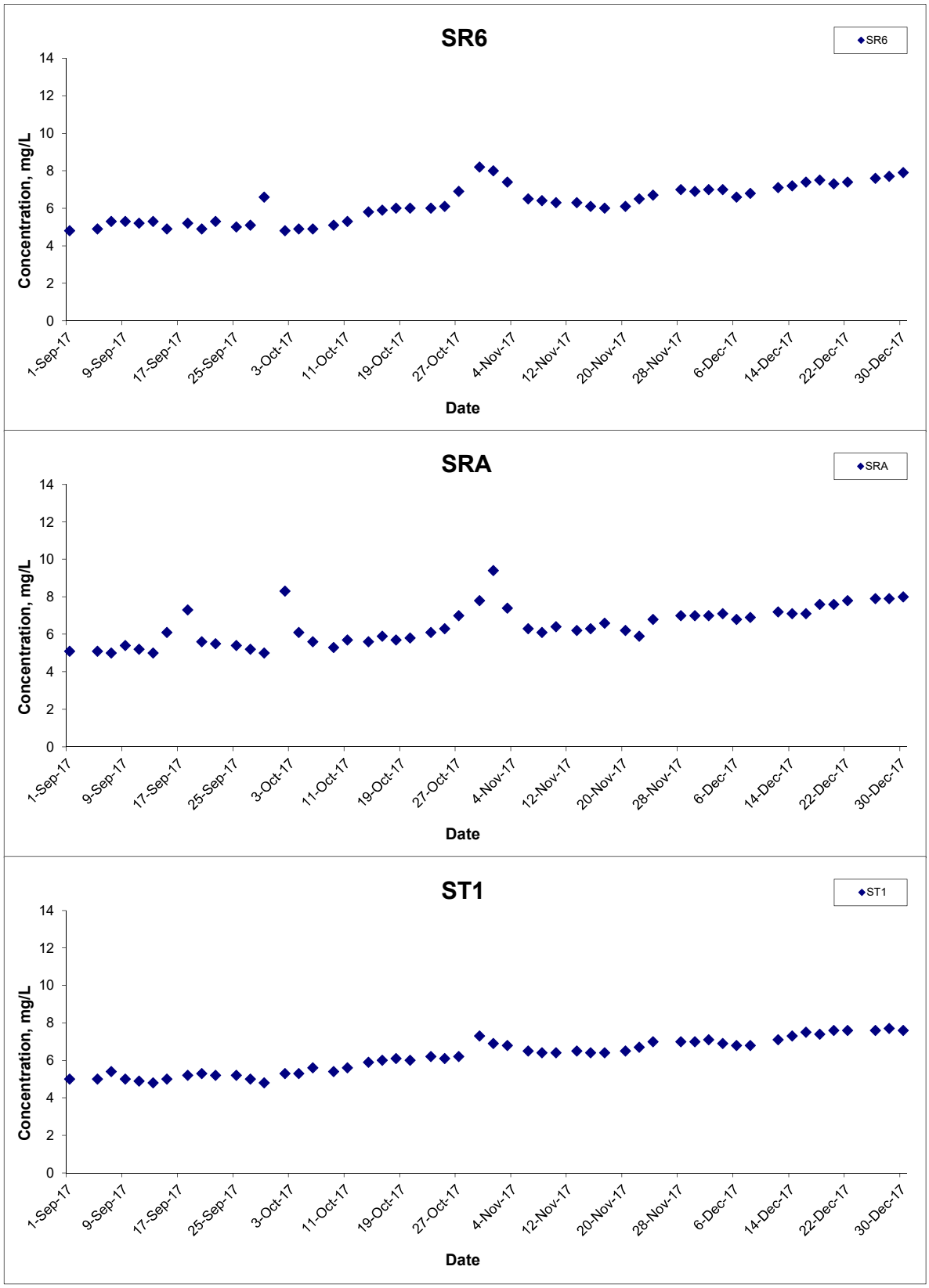
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



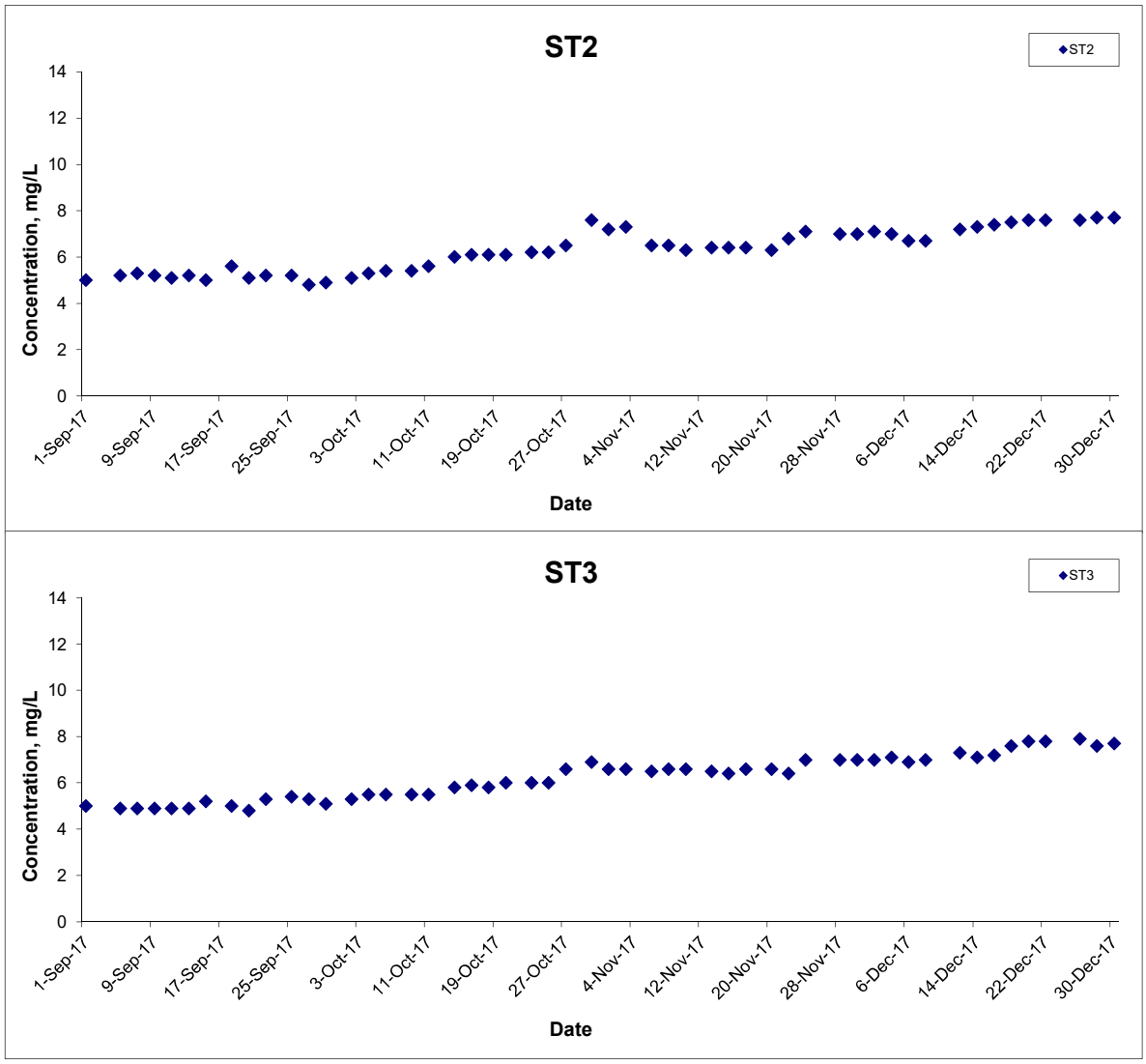
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



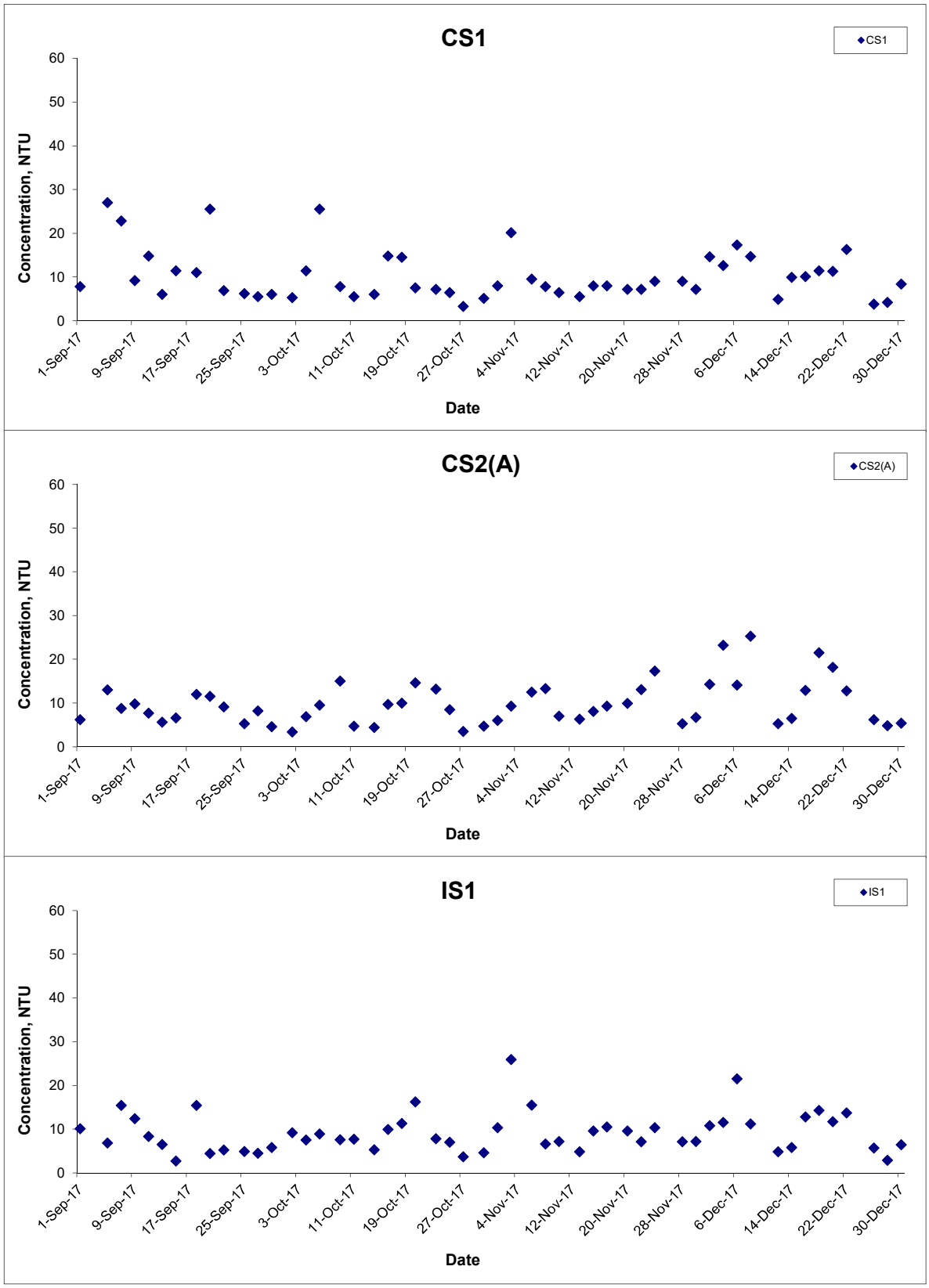
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Dissolved Oxygen (Bottom) at Mid-Flood Tide



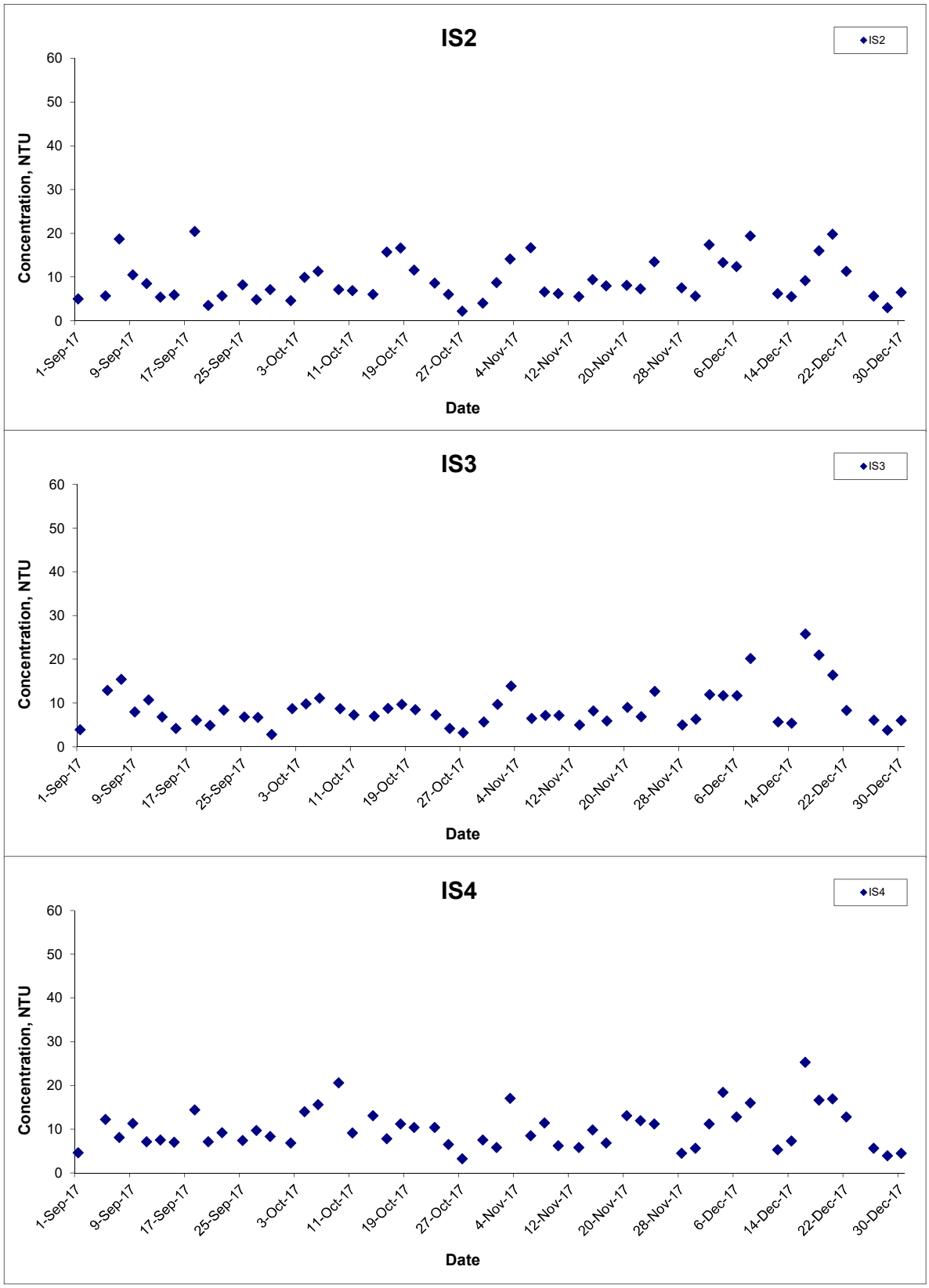
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



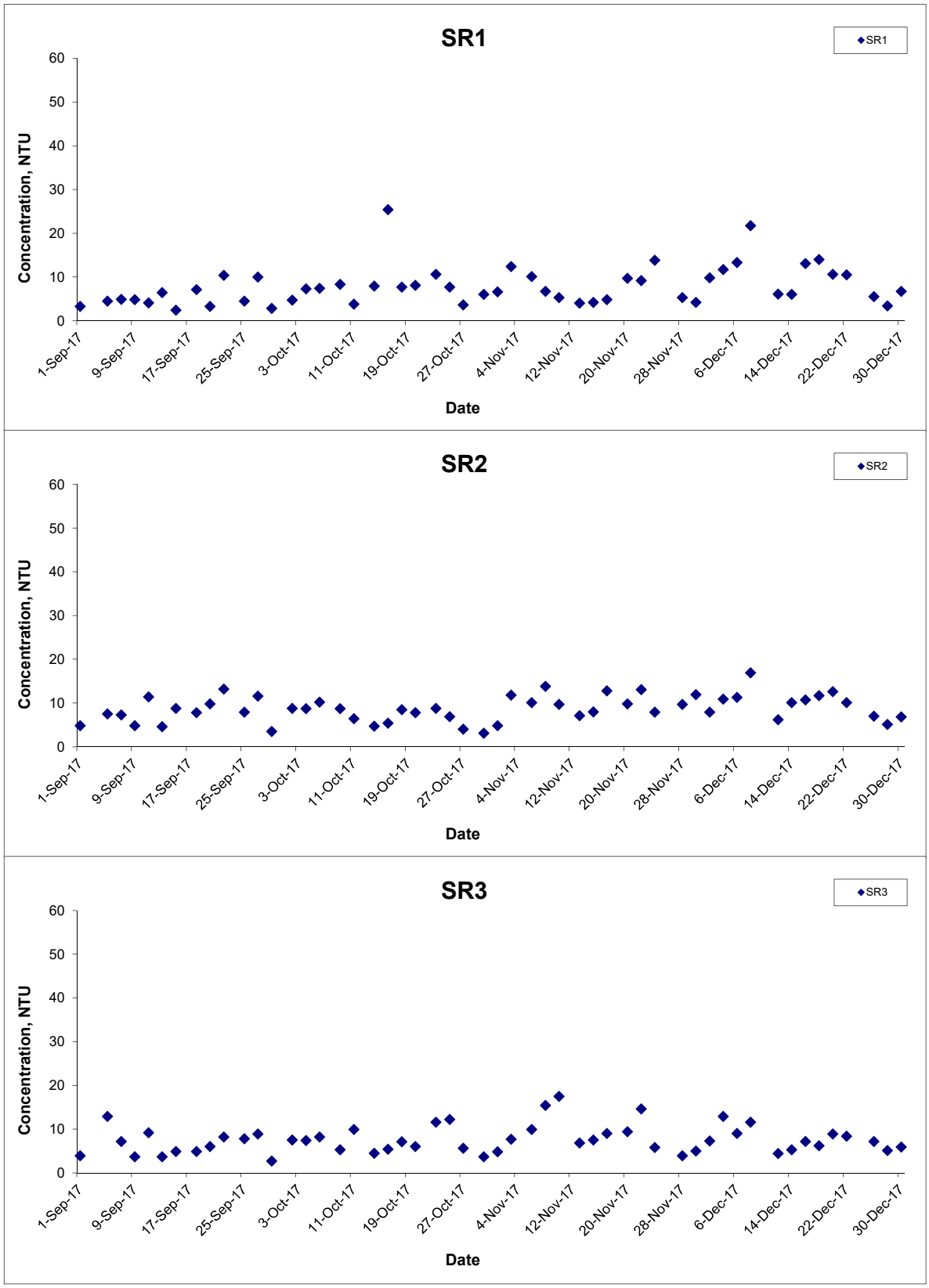
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



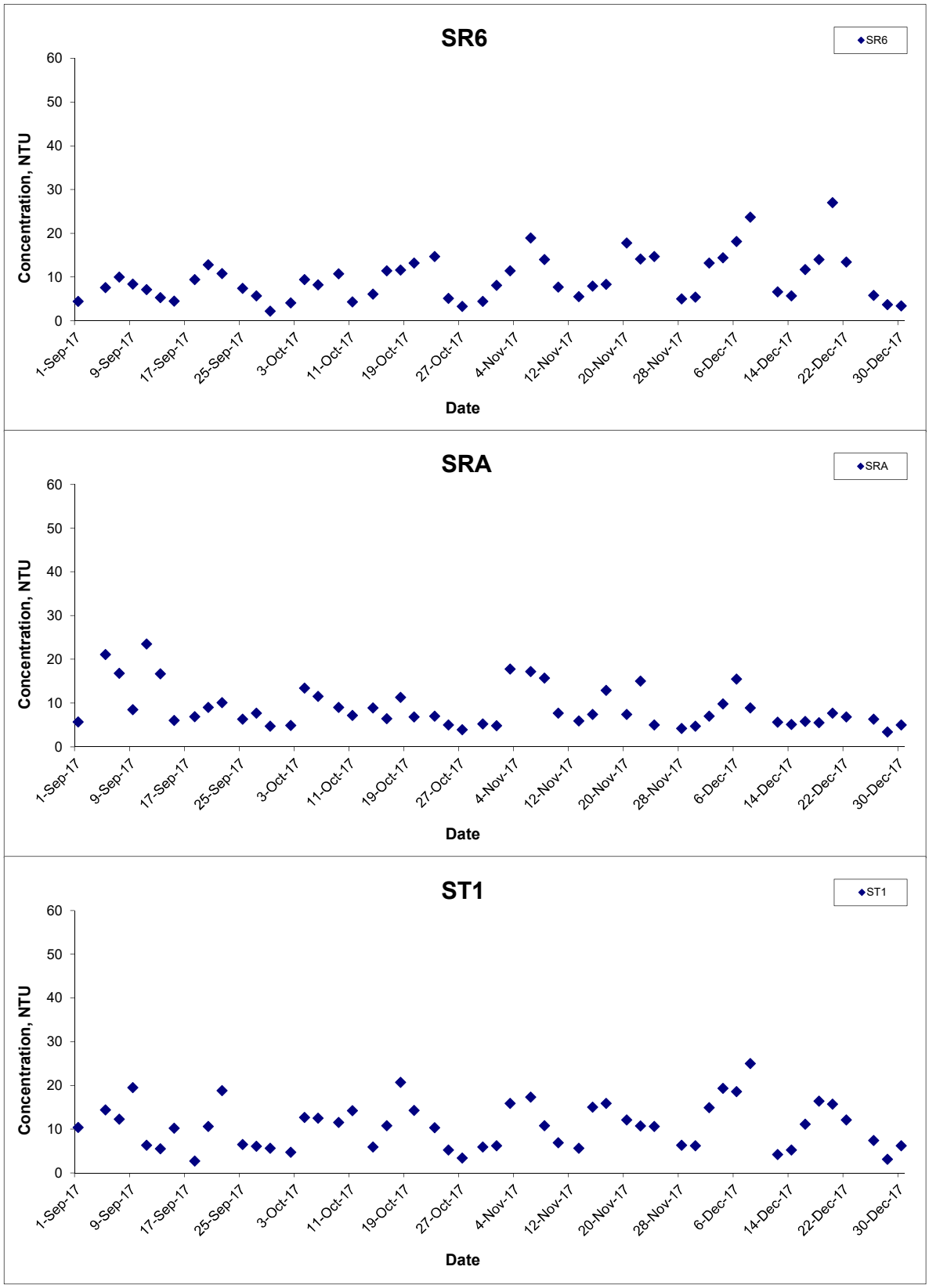
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



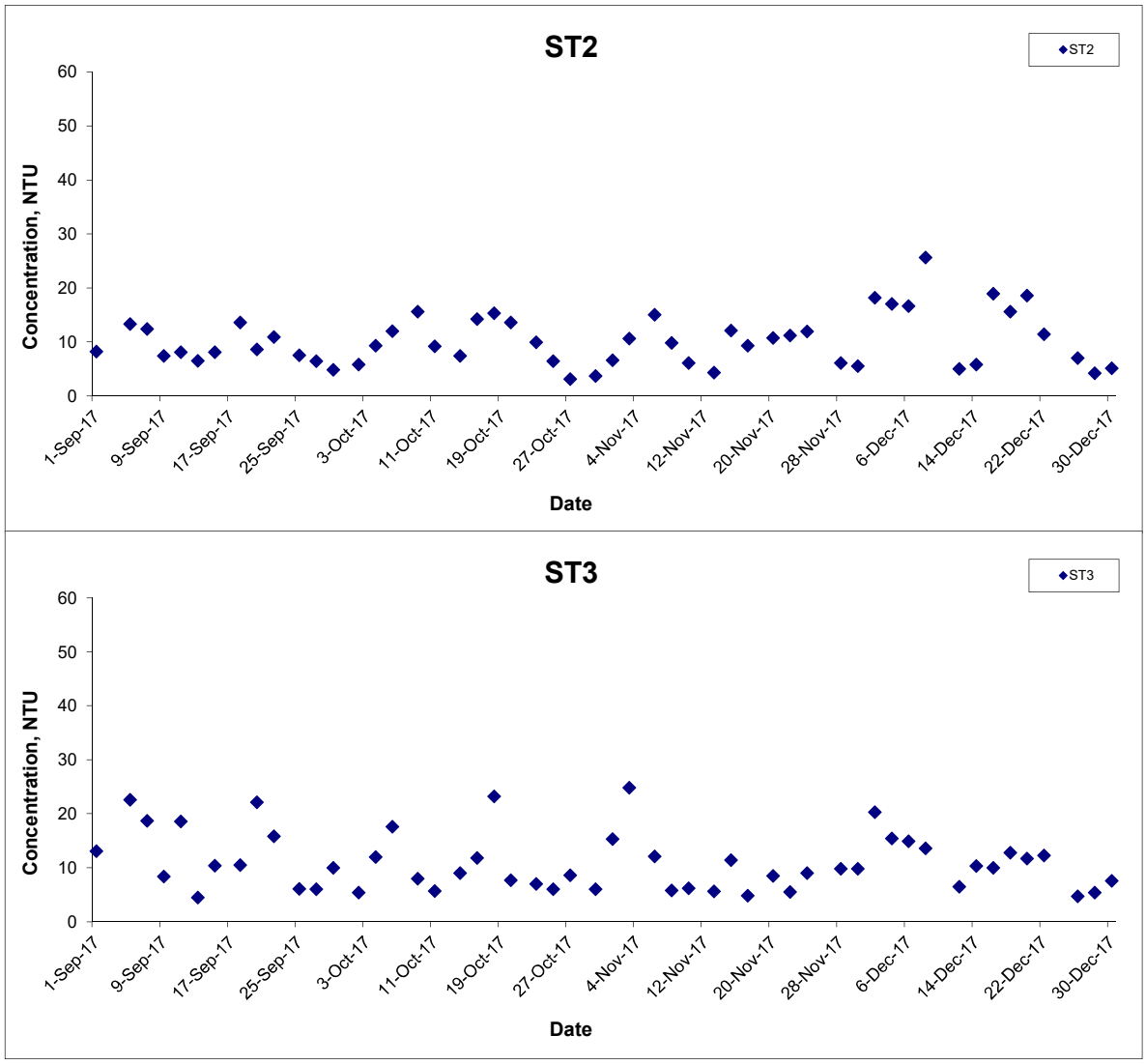
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



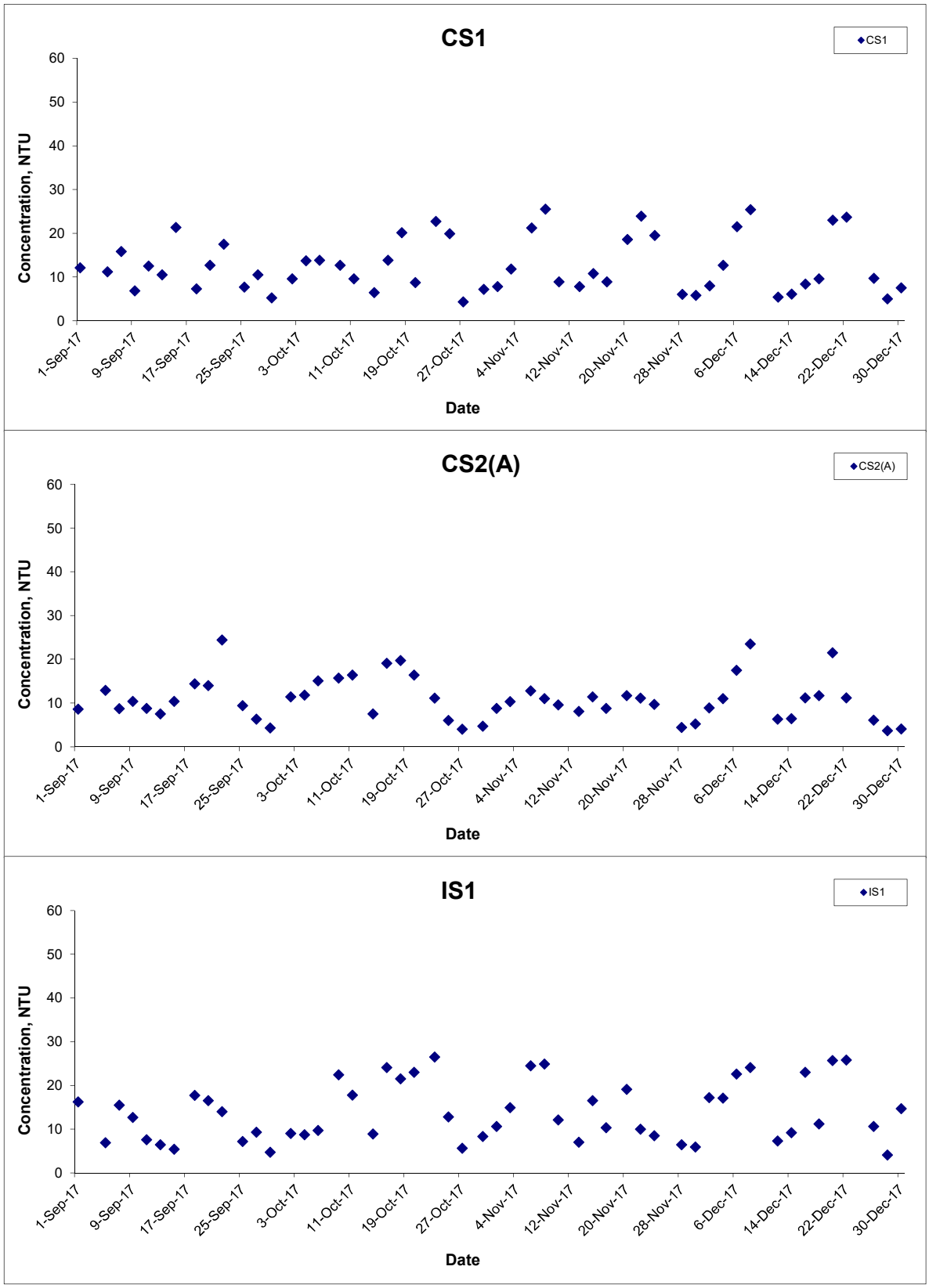
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Ebb Tide



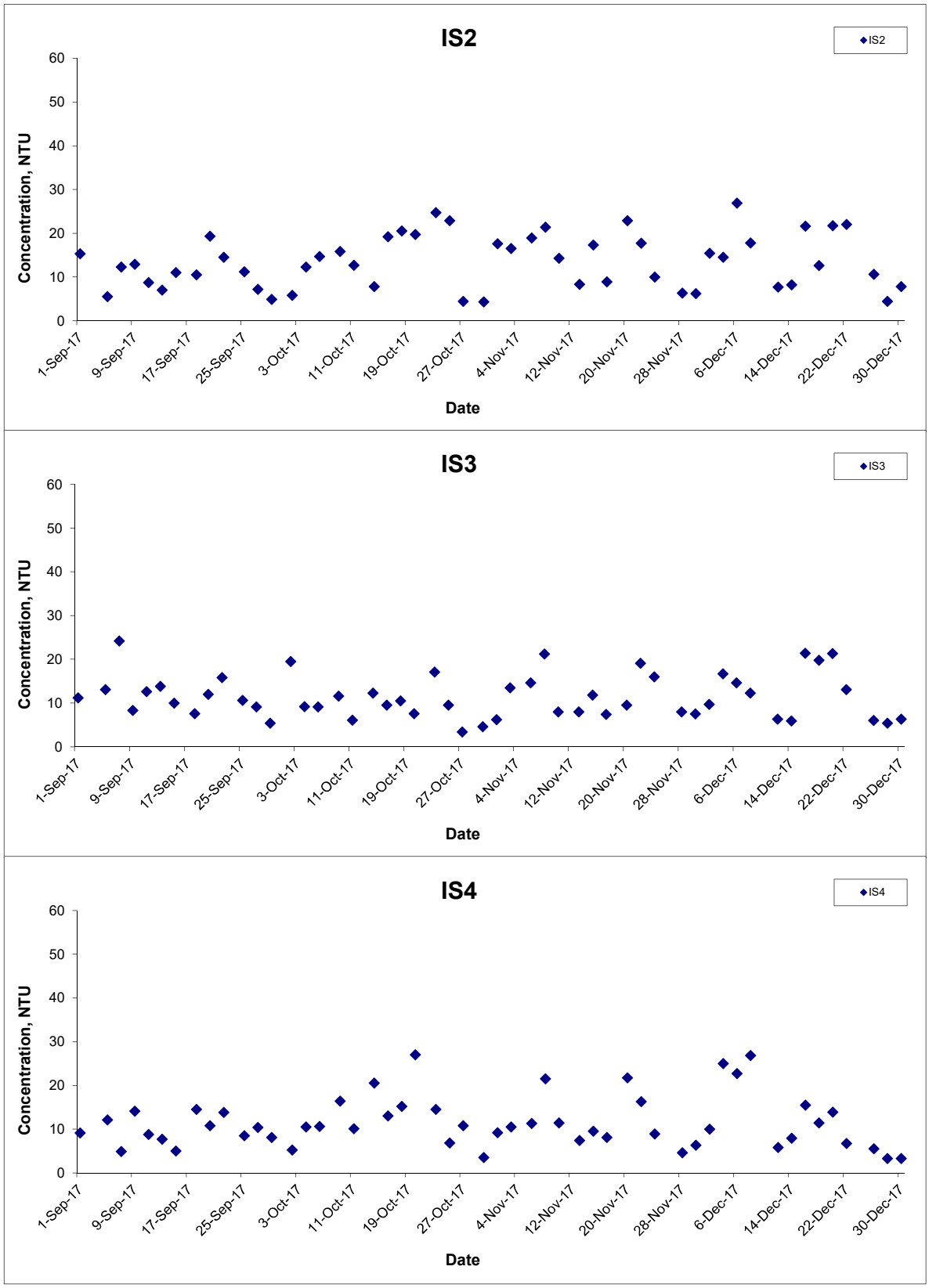
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



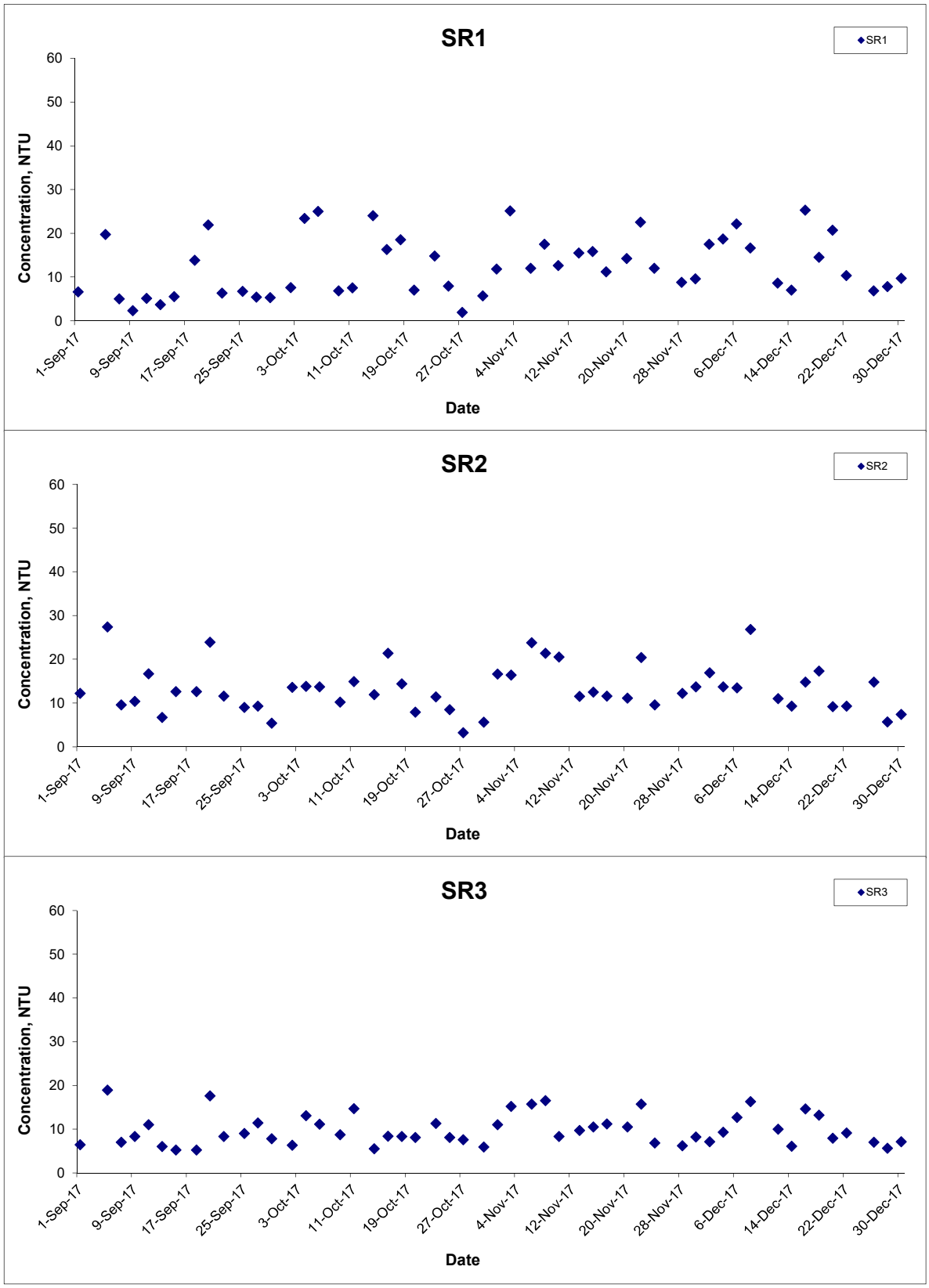
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



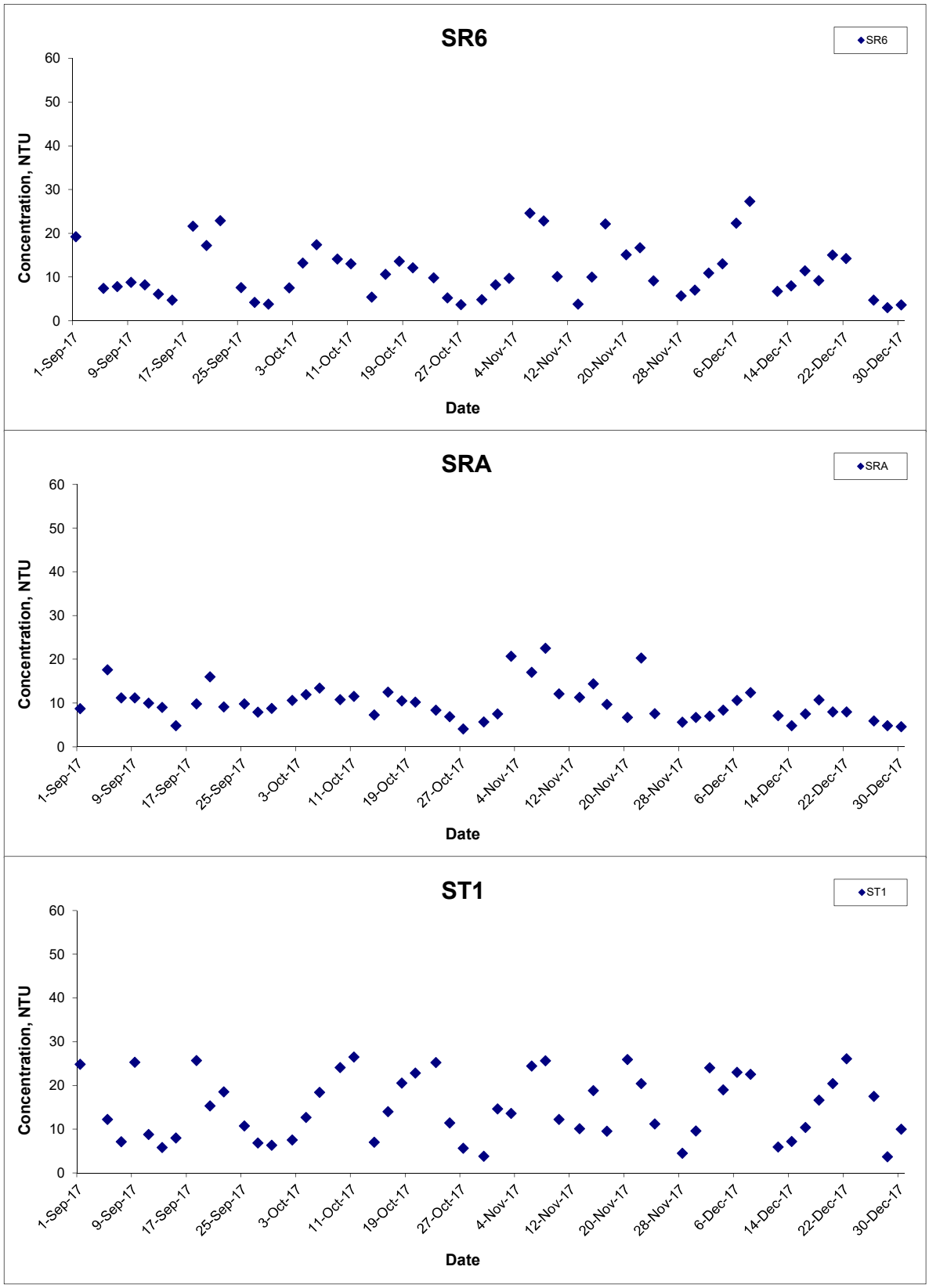
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



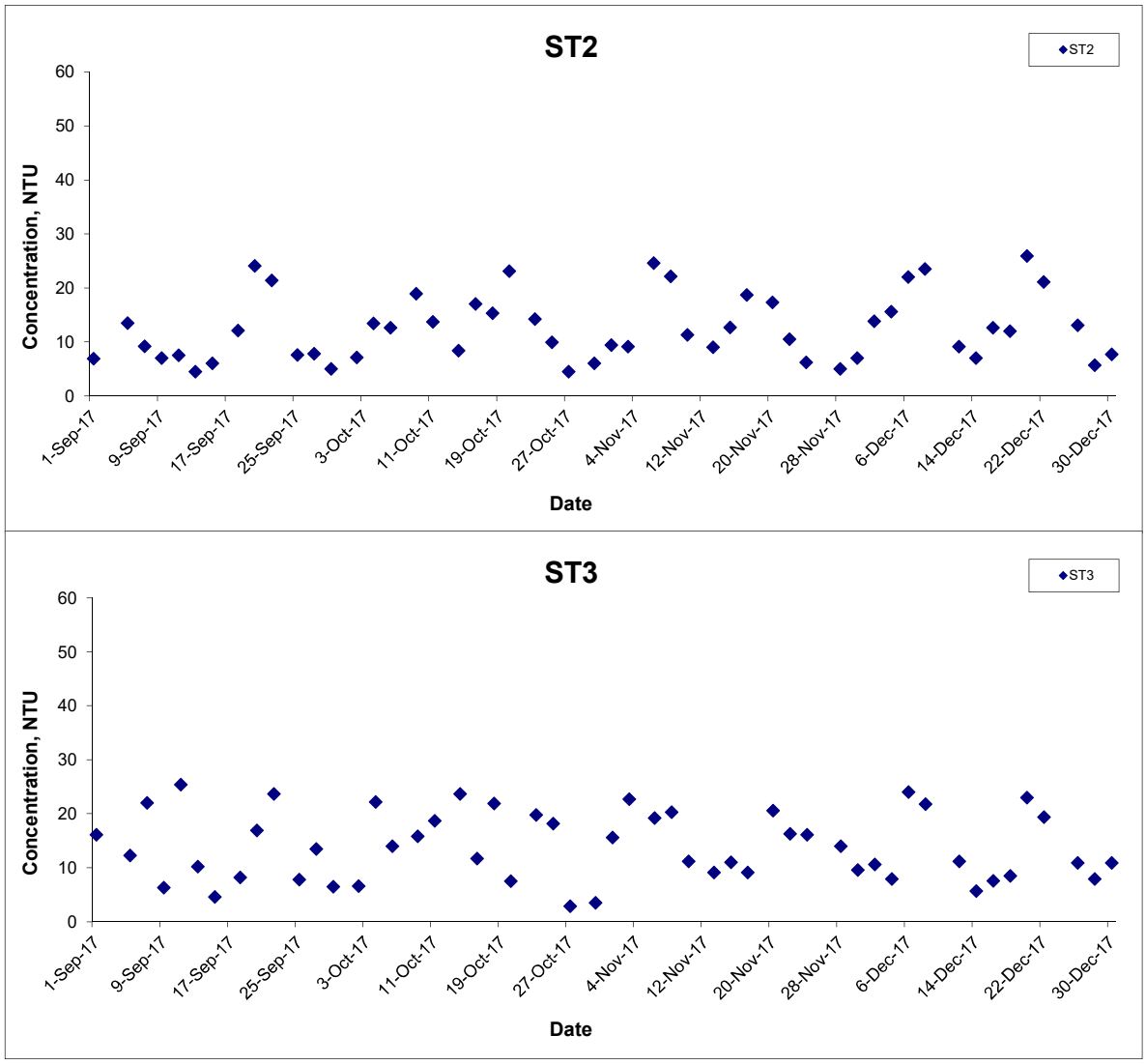
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



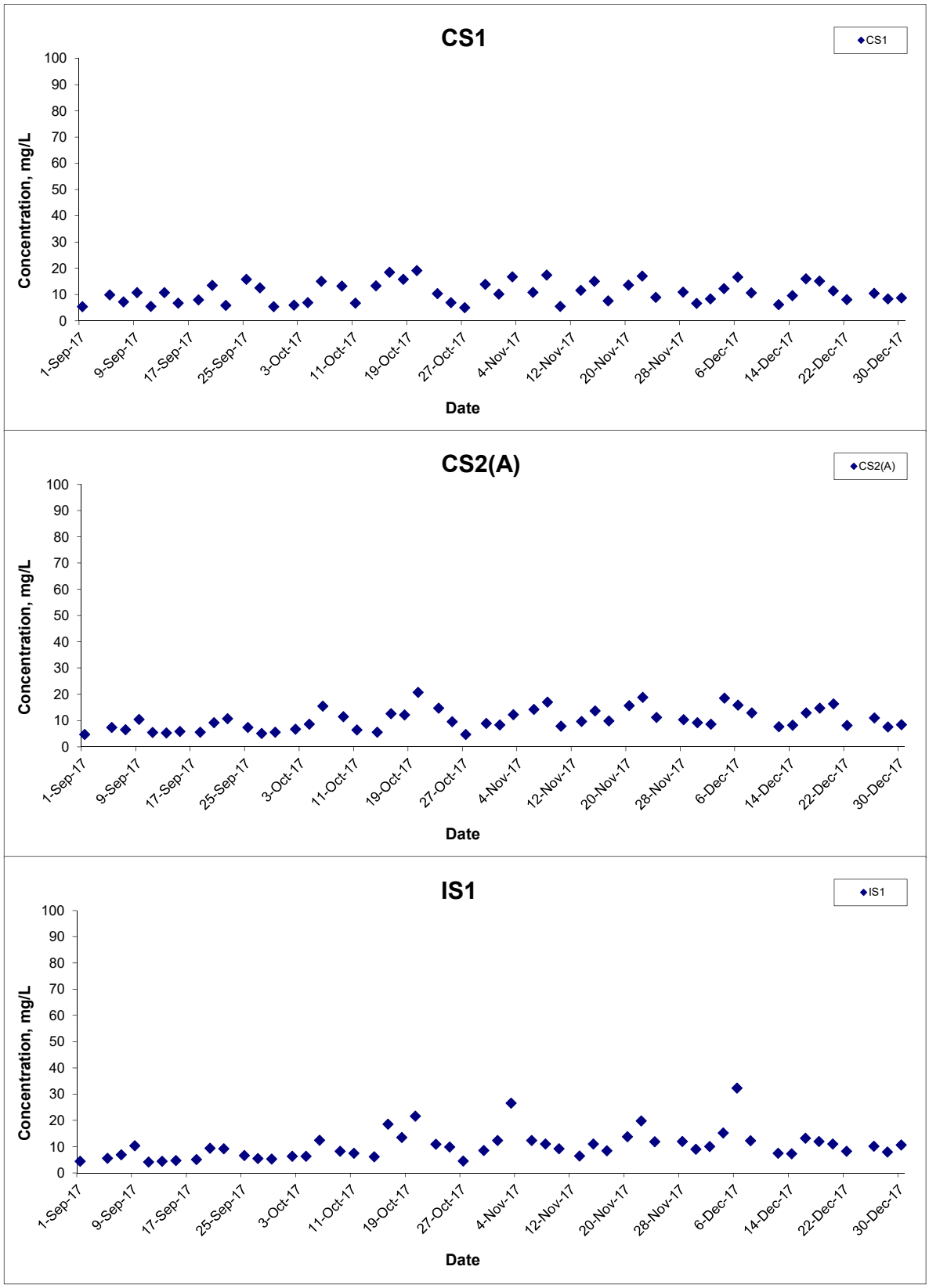
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

Turbidity (Depth-averaged) at Mid-Flood Tide



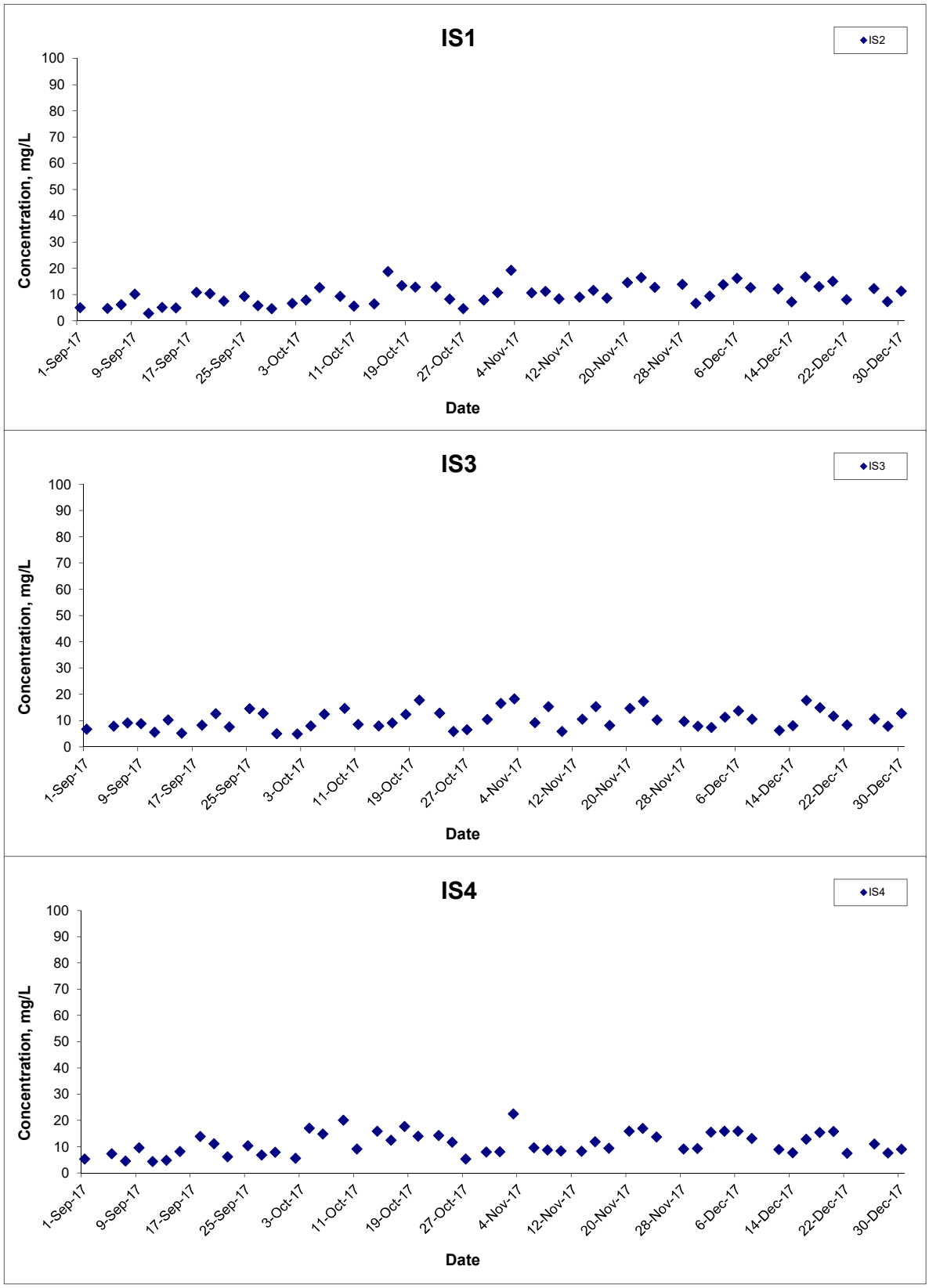
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



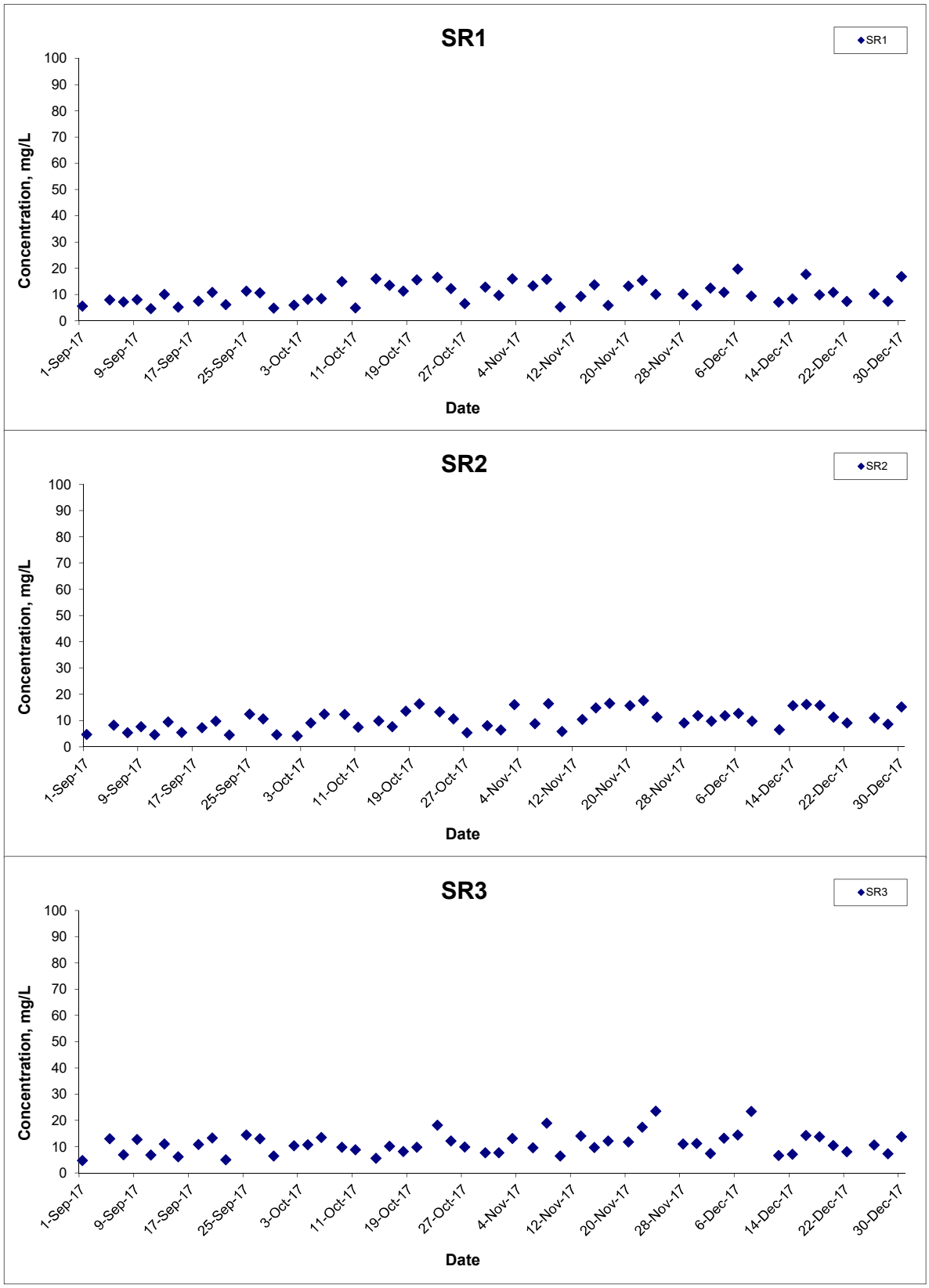
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
		Date Dec 17	Appendix H	

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



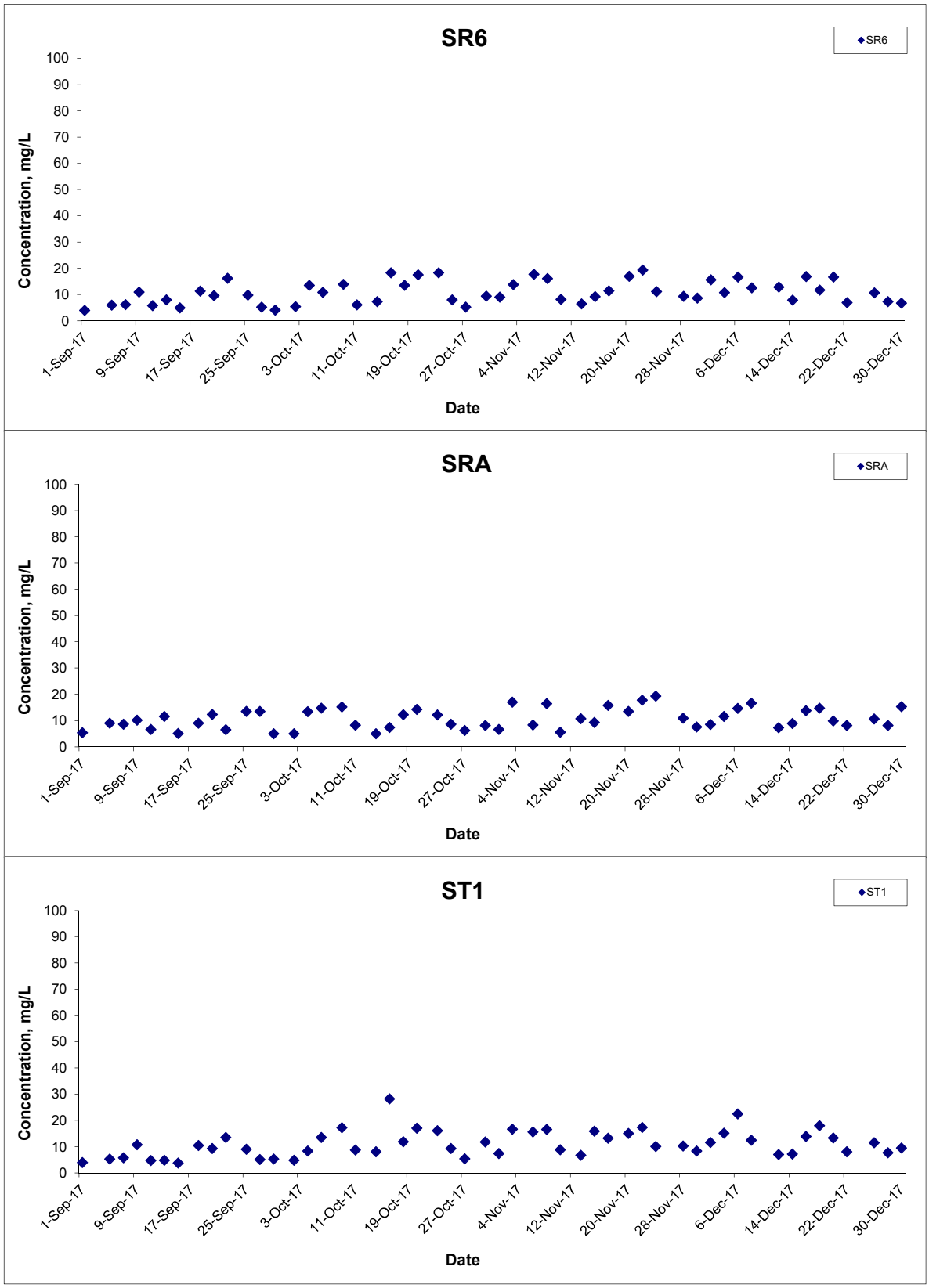
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
		Date Dec 17	Appendix H	

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



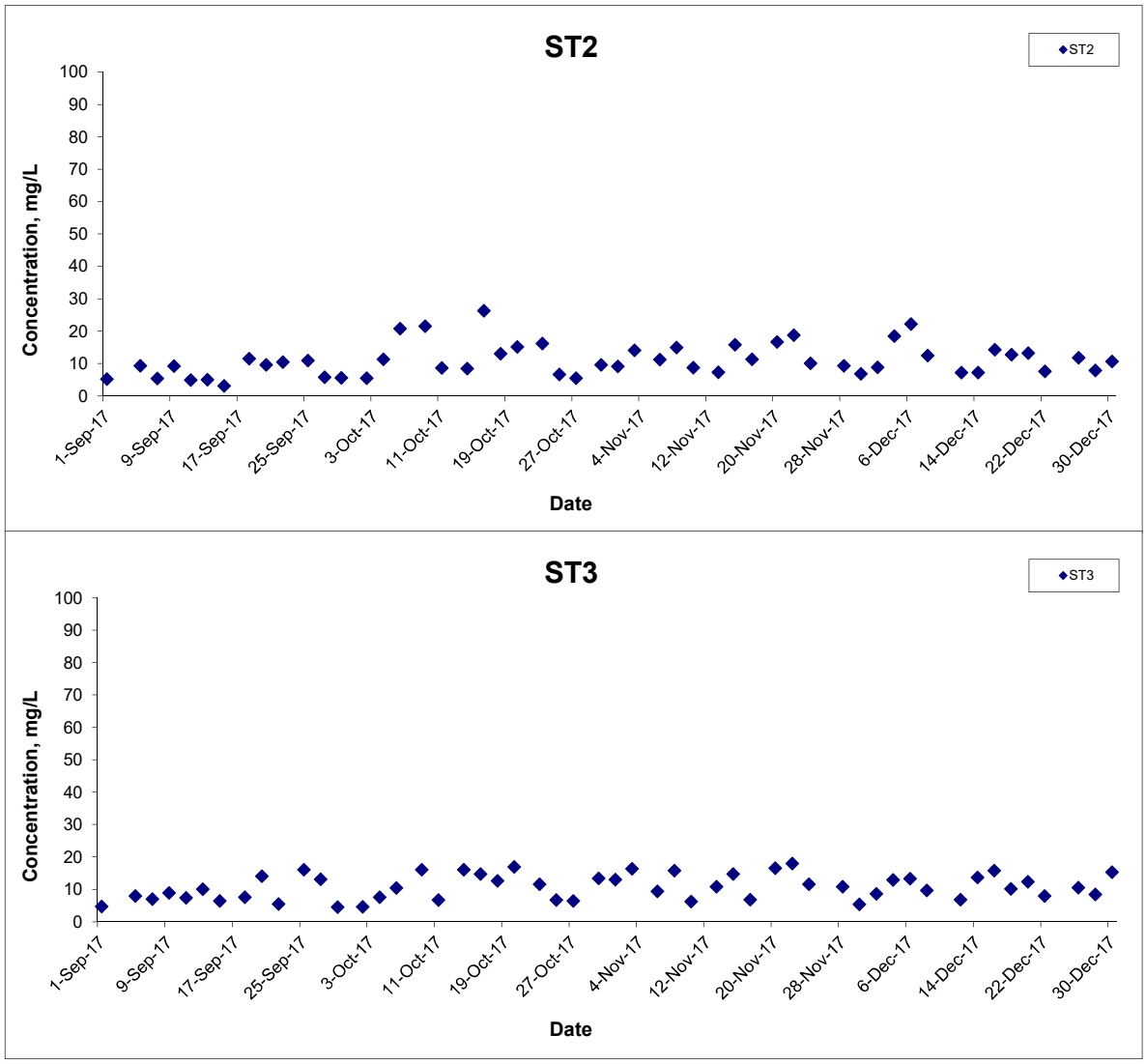
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



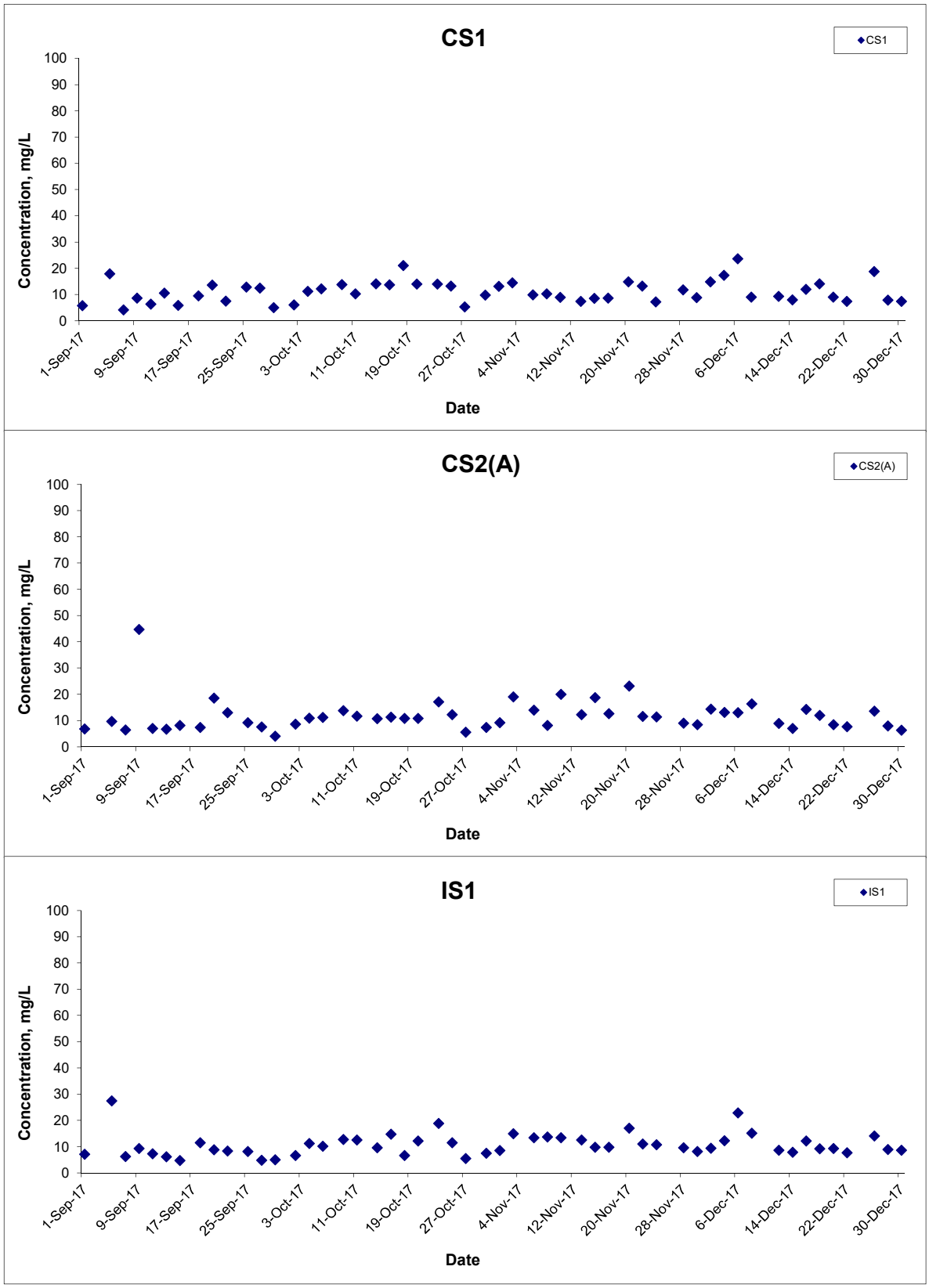
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
		Date Dec 17	Appendix H	

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



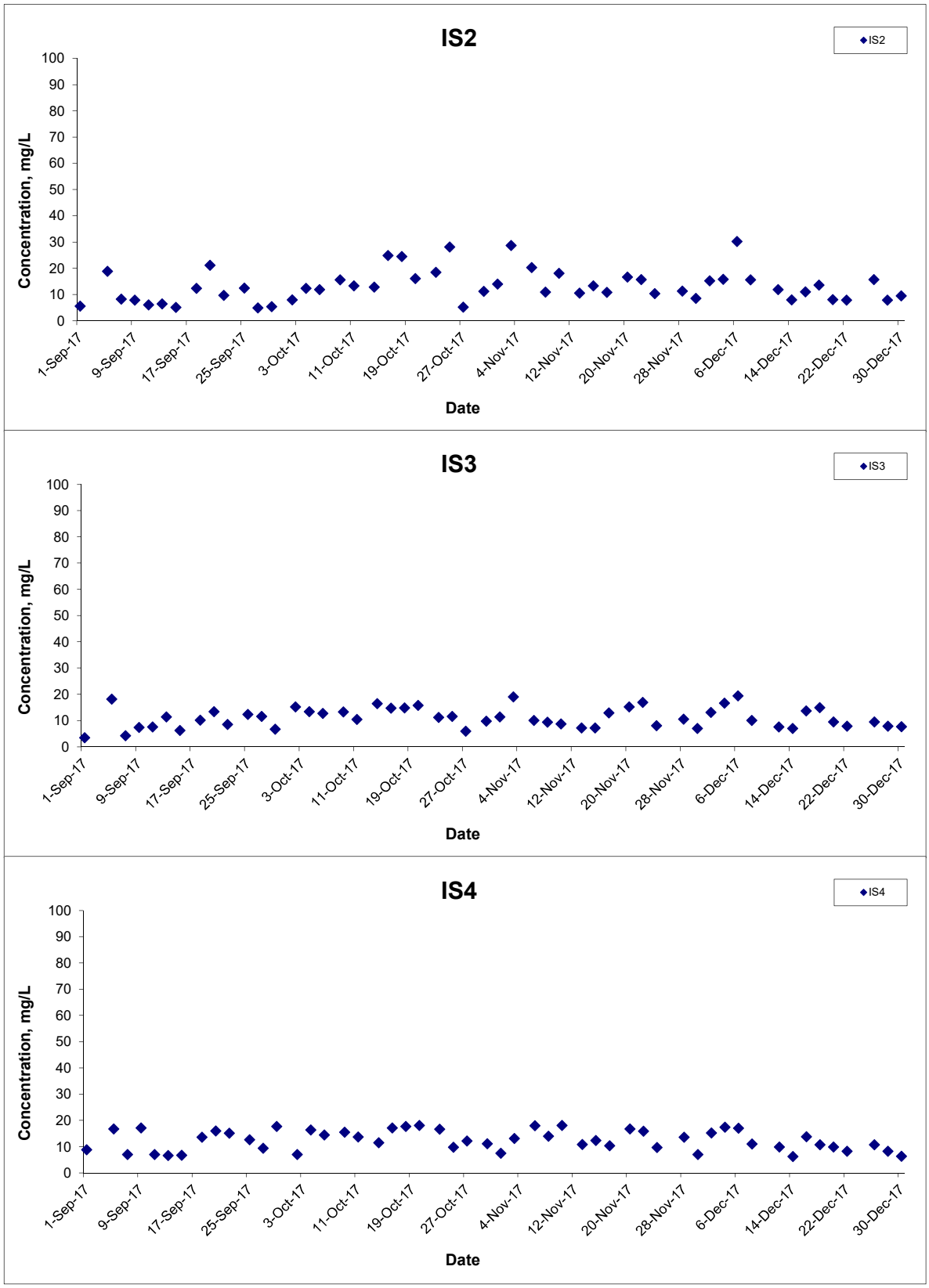
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



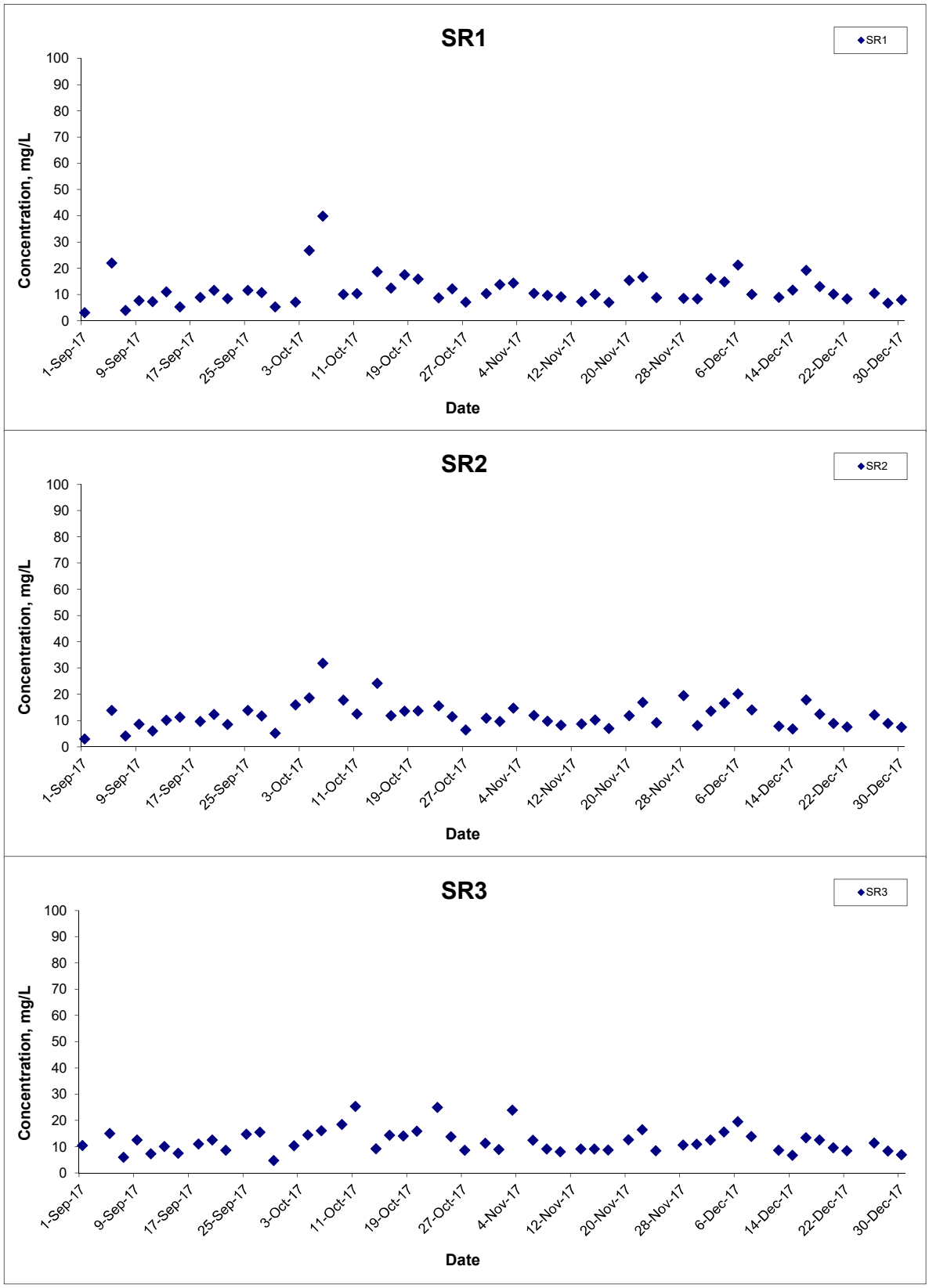
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale N.T.S	Project No. MA12014	CINOTECH
		Date Dec 17	Appendix H	

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



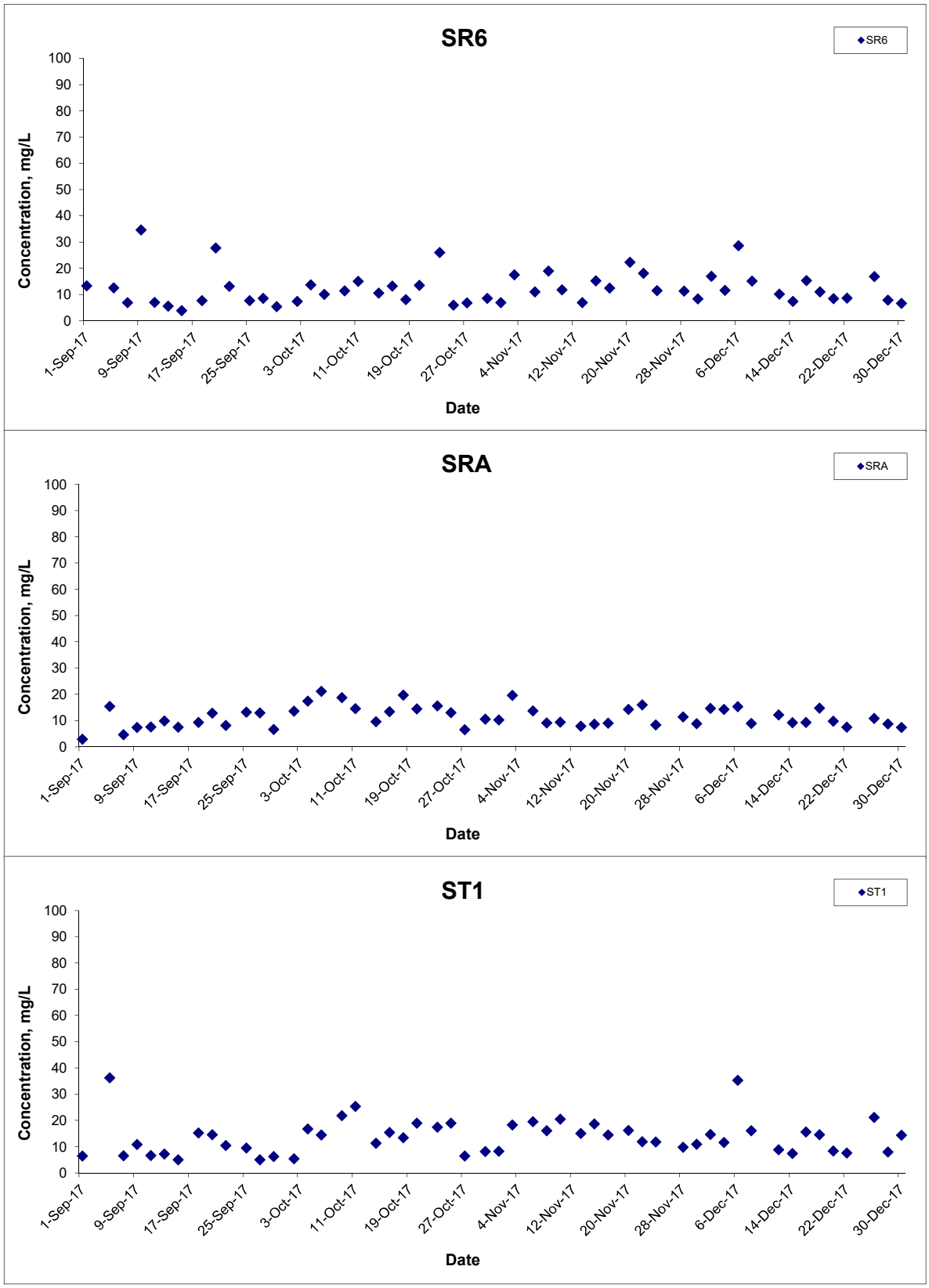
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



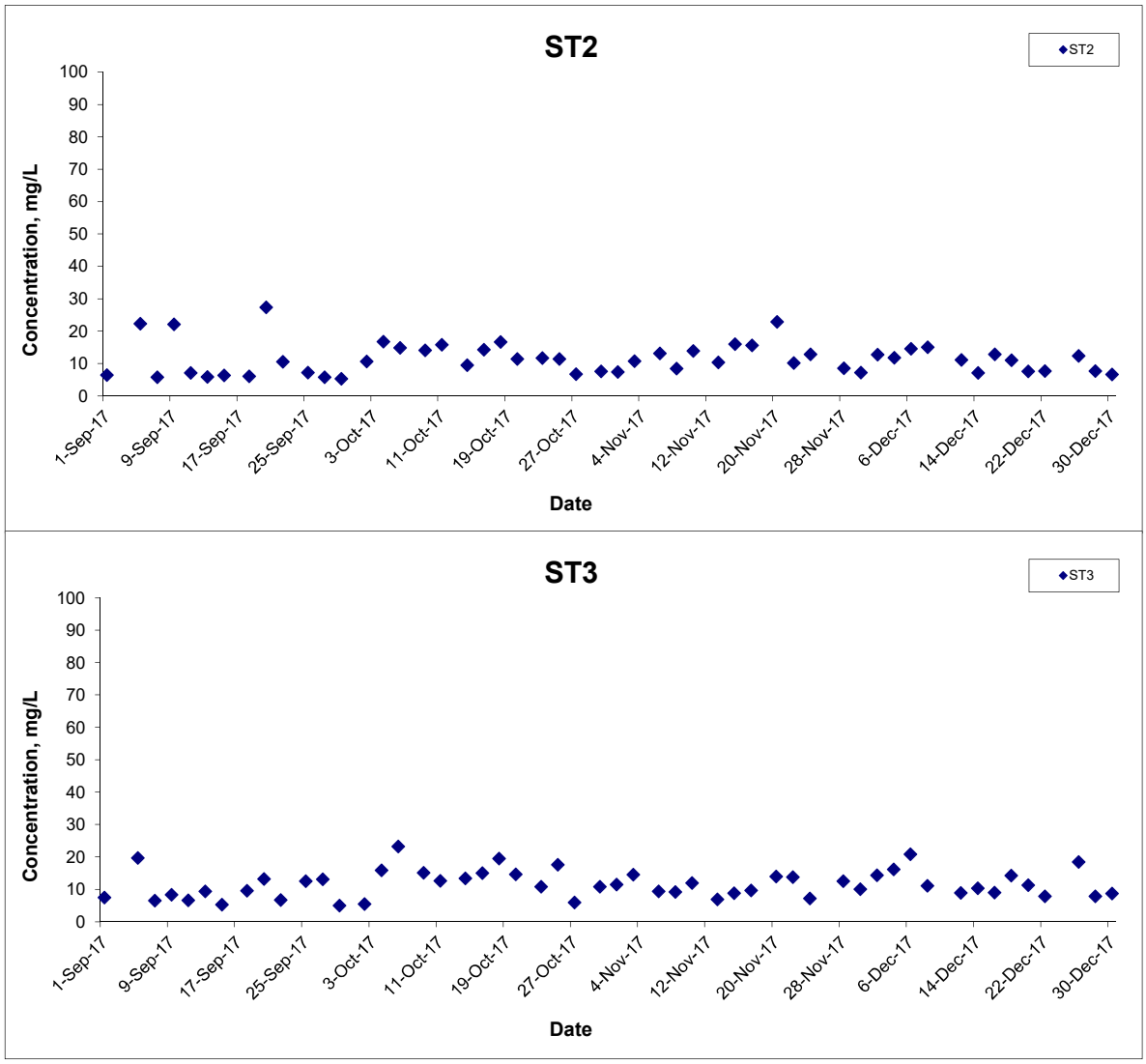
Title	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Graphical Presentation of Water Quality Monitoring Results	Scale: N.T.S	Project No.: MA12014	CINOTECH
		Date: Dec 17	Appendix: H	

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



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

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



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

APPENDIX I
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

59th Monthly Progress Report (December 2017)

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

31 December 2017

1. Introduction

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

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

1.3. Since November 2012, Hong Kong Cetacean Research Project (HKCRP) has been commissioned by Dragages – China Harbour – VSL JV 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 59th monthly progress report under the HKLR09 construction phase dolphin monitoring programme, summarizing the results of the survey findings during the month of December 2017.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

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

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

2.1.2. The survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 20 years of marine

mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2017). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270^{o} and 90^{o} (in relation to the bow, which is defined as 0^{o}). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

2.1.4. During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS.

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.

2.1.8. Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort) were calculated in WL survey area in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using primary survey effort alone, as well as the combined survey effort from both primary and secondary lines.

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. A professional digital camera (*Canon* EOS 7D Mark II model) equipped with long telephoto lenses (100-400 mm zoom) were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

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

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

(Jefferson 2000).

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

3. Monitoring Results

3.1. Vessel-based Line-transect Survey

3.1.1. During the monitoring month of December 2017, two complete sets of systematic line-transect vessel surveys were conducted on the 4th and 21st, to cover all transect lines in WL survey area twice. The survey routes of each survey day are presented in Figures 2-3.

3.1.2. From these surveys, a total of 64.86 km of survey effort was collected, with 87.7% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (Appendix I). The total survey effort conducted on primary lines (the horizontal lines perpendicular to the coastlines) was 42.97 km, while the effort on secondary lines (the lines connecting the primary lines) was 21.89 km.

3.1.3. During the monitoring surveys conducted in December 2017, three groups of nine Chinese White Dolphins were sighted. All three dolphin groups were sighted during on-effort search, and only one of the three on-effort sightings were made on primary lines (Appendix II). Notably, none of the dolphin groups were associated with any operating fishing vessel.

3.1.4. Distribution of the dolphin sightings made during December's surveys is shown in Figure 4. The three groups were scattered to the west and south of Tai O Peninsula, as well as between Peaked Hill and Fan Lau, with no particular concentration (Figure 4).

3.1.5. As consistently found in previous monitoring months, none of the dolphin groups was sighted near the HKLR09 alignment (Figure 4).

3.1.6. During the December's surveys, encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) are shown in Tables 2 & 3.

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) per set during December's surveys in West Lantau (WL)

		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: December 4th	0.0	0.0
	Set 2: December 21st	5.6	39.2

Table 3. Overall dolphin encounter rates (sightings per 100 km of survey effort) in December's surveys on primary lines only as well as both primary lines and secondary lines in West Lantau (WL)

	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	**Both Primary and Secondary Lines**	**Primary Lines Only**	**Both Primary and Secondary Lines**
West Lantau	2.5	5.3	17.8	15.8

3.1.7. The average group size of Chinese White Dolphins was 3.0 individuals per group during December's surveys, which was lower than the averages in previous months of monitoring surveys.

3.1.8. Two of the three dolphin groups were single animals, while there was a medium-sized dolphin group with seven animals (Appendix II).

3.2. Photo-identification Work

3.2.1. Four different individual Chinese White Dolphins were identified four times during December's surveys (Appendices III and IV). All four individuals were re-sighted only once during the monitoring month.

3.2.2. One of these four individuals (i.e. WL118) was accompanied by her young calf during their re-sightings in this month's monitoring surveys.

3.3. Conclusion

3.3.1. In this month of dolphin monitoring, marine construction activities have continued under this contract. However, no adverse impact on Chinese white dolphins was noticeable from general observations.

3.3.2. Due to the monthly variation in dolphin occurrence within the study area, it would be more appropriate to draw conclusion on whether any impacts on dolphins have been detected related to the construction activities of this project in the quarterly EM&A report, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period (i.e. December 2017 – February 2018) and baseline monitoring period will be made.

4. References

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

- Hung, S. K. 2017. Monitoring of marine mammals in Hong Kong waters: final report (2016-17). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 162 pp.

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

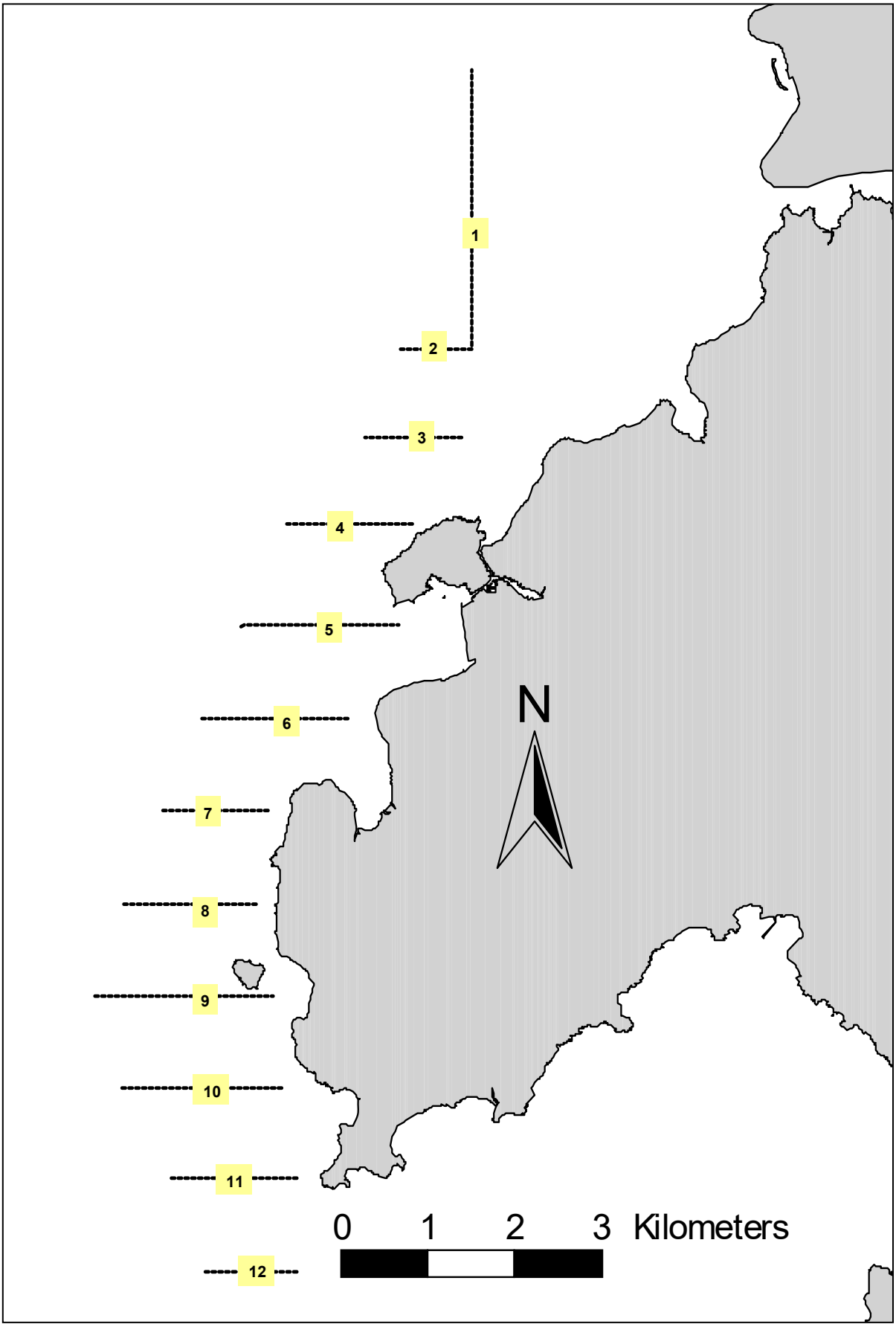


Figure 1. Transect Line Layout in West Lantau Survey Areas

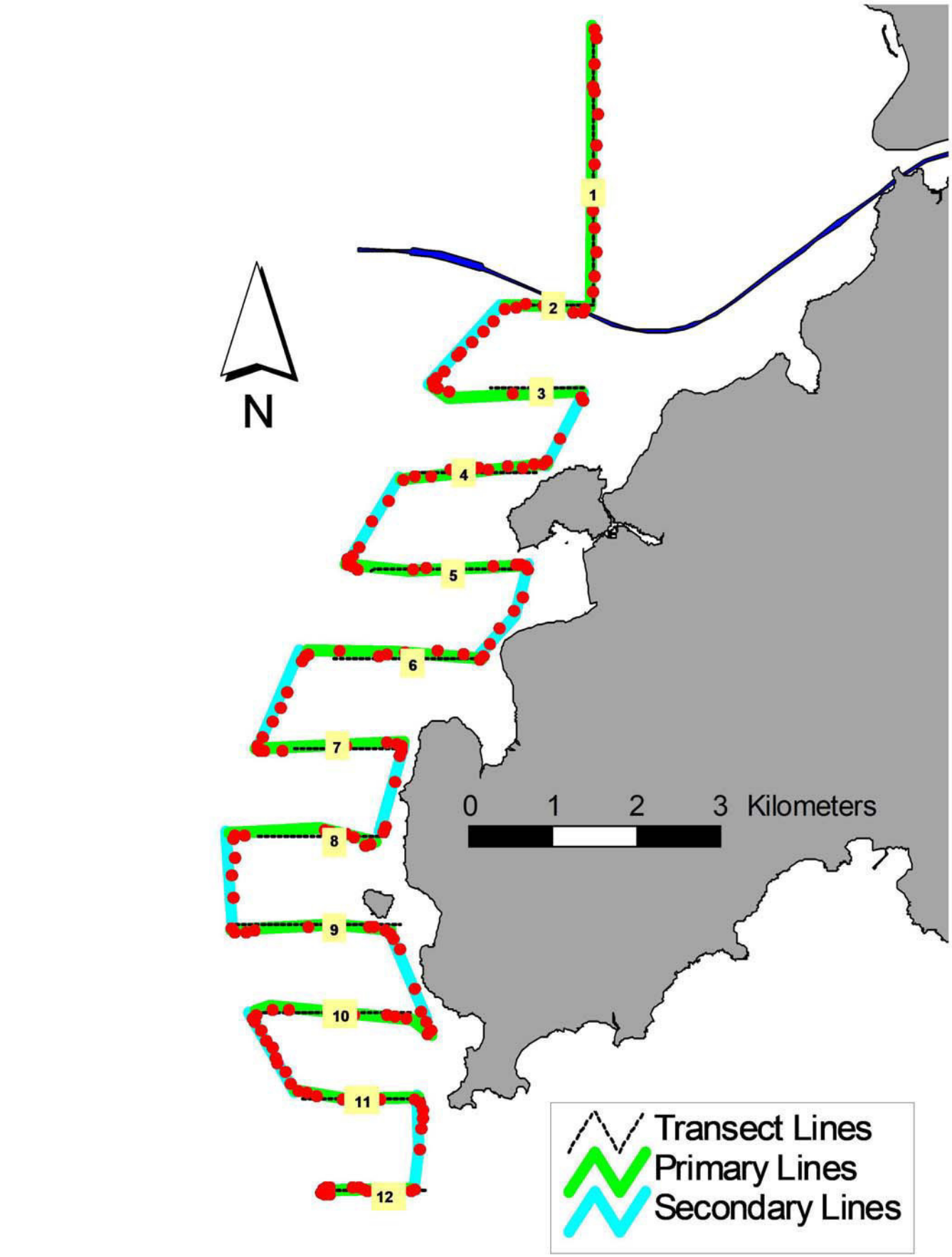


Figure 2. Survey Route on December 4th, 2017 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)

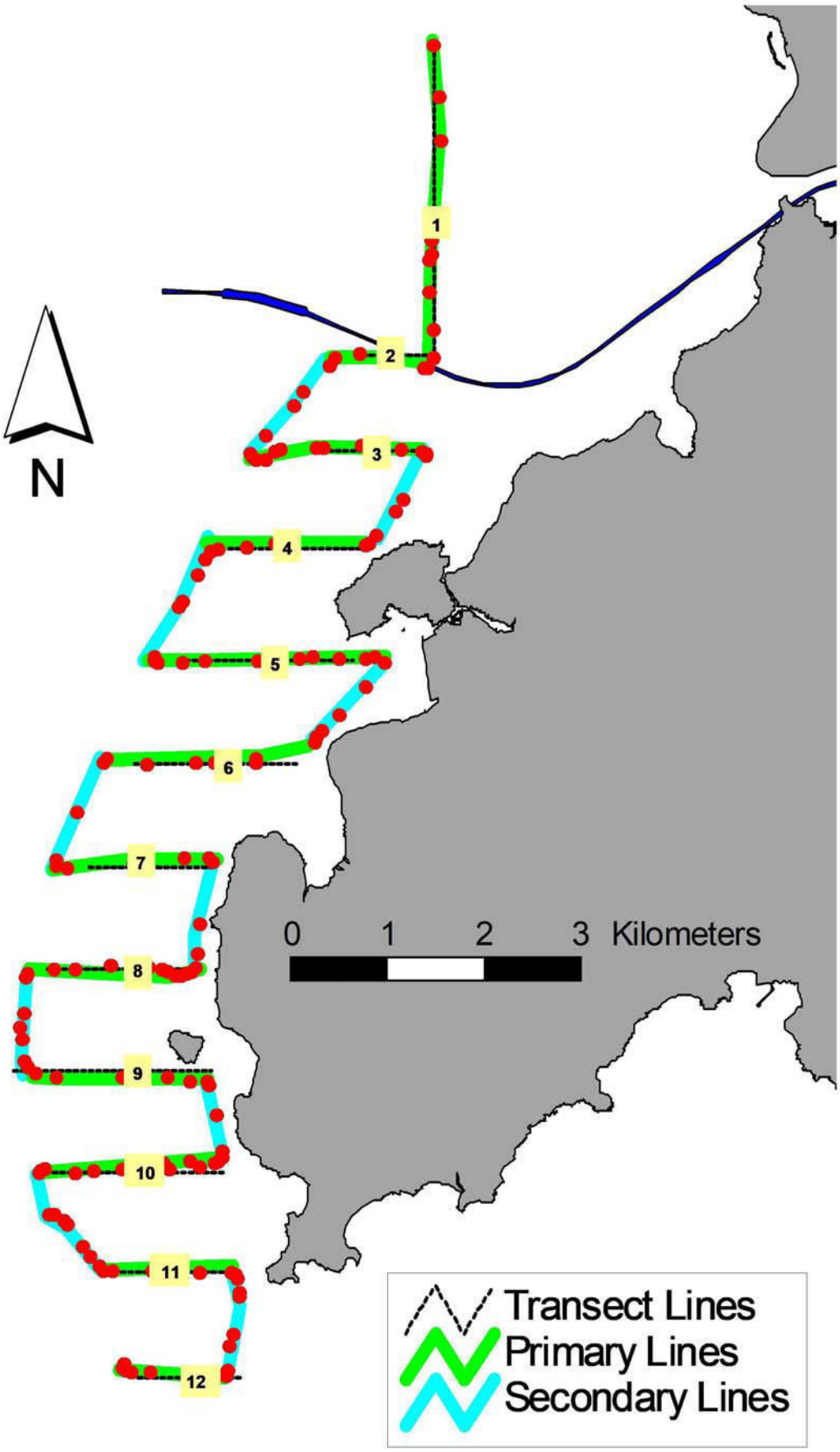


Figure 3. Survey Route on December 21st, 2017 (note: red dots represent the tracked positions of survey boat logged continuously by GPS throughout the course of the survey)

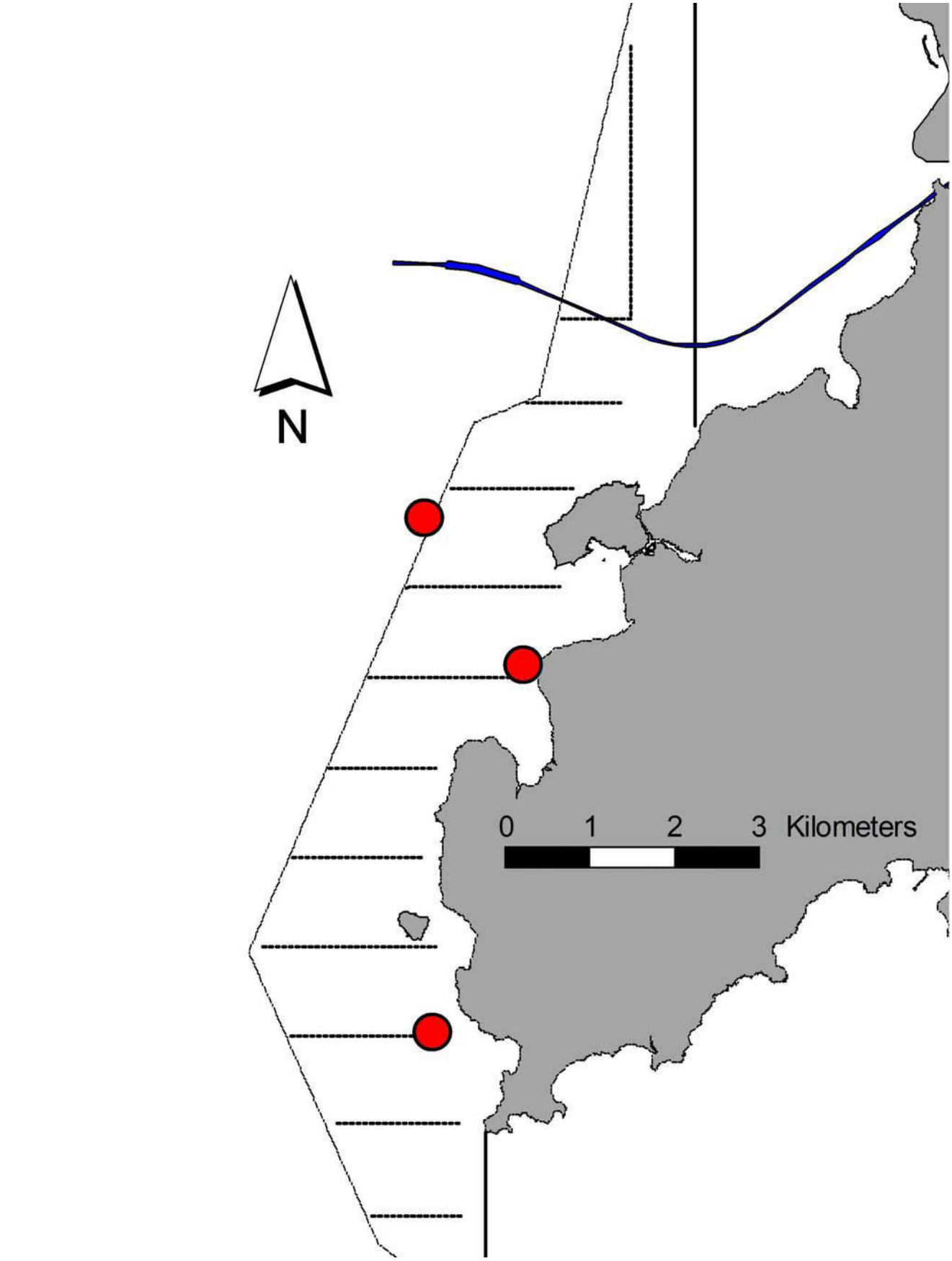


Figure 4. Distribution of Chinese White Dolphin Sighting during December 2017 HKLR09 Monitoring Surveys

Appendix I. HKLR09 Survey Effort Database (December 2017)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
4-Dec-17	W LANTAU	2	0.20	WINTER	STANDARD36826	HKLR	P
4-Dec-17	W LANTAU	3	21.35	WINTER	STANDARD36826	HKLR	P
4-Dec-17	W LANTAU	4	1.10	WINTER	STANDARD36826	HKLR	P
4-Dec-17	W LANTAU	2	1.20	WINTER	STANDARD36826	HKLR	S
4-Dec-17	W LANTAU	3	9.75	WINTER	STANDARD36826	HKLR	S
21-Dec-17	W LANTAU	2	1.21	WINTER	STANDARD36826	HKLR	P
21-Dec-17	W LANTAU	3	16.65	WINTER	STANDARD36826	HKLR	P
21-Dec-17	W LANTAU	4	2.46	WINTER	STANDARD36826	HKLR	P
21-Dec-17	W LANTAU	2	3.11	WINTER	STANDARD36826	HKLR	S
21-Dec-17	W LANTAU	3	3.39	WINTER	STANDARD36826	HKLR	S
21-Dec-17	W LANTAU	4	4.44	WINTER	STANDARD36826	HKLR	S

Appendix II. HKLR09 Chinese White Dolphin Sighting Database (December 2017)

(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; ND = Not Determined; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
4-Dec-17	1	1059	1	W LANTAU	3	31	ON	HKLR	813229	801307	WINTER	NONE	S
21-Dec-17	1	1129	1	W LANTAU	2	106	ON	HKLR	811587	802488	WINTER	NONE	S
21-Dec-17	2	1230	7	W LANTAU	2	408	ON	HKLR	807492	801397	WINTER	NONE	P

Appendix III. Individual dolphins identified during HKLR09 monitoring surveys in December 2017

ID#	DATE	STG#	AREA
CH38	21/12/17	2	W LANTAU
SL40	21/12/17	2	W LANTAU
WL97	21/12/17	1	W LANTAU
WL118	21/12/17	2	W LANTAU

Appendix IV. Photographs of Identified Individual Dolphins in December 2017 (HKLR09)

APPENDIX J
WIND DATA

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
1-Dec-2017	00:00	1.9	W
1-Dec-2017	01:00	1.9	WSW
1-Dec-2017	02:00	1.8	WNW
1-Dec-2017	03:00	1.8	W
1-Dec-2017	04:00	1.4	WSW
1-Dec-2017	05:00	1.6	WSW
1-Dec-2017	06:00	0.8	WSW
1-Dec-2017	07:00	1.2	WSW
1-Dec-2017	08:00	0.9	WNW
1-Dec-2017	09:00	1.3	SW
1-Dec-2017	10:00	2.1	W
1-Dec-2017	11:00	2.1	WNW
1-Dec-2017	12:00	2.6	WNW
1-Dec-2017	13:00	3	W
1-Dec-2017	14:00	2.7	W
1-Dec-2017	15:00	2.9	W
1-Dec-2017	16:00	2.6	W
1-Dec-2017	17:00	2.4	W
1-Dec-2017	18:00	1.8	W
1-Dec-2017	19:00	1.6	WSW
1-Dec-2017	20:00	1.5	W
1-Dec-2017	21:00	1.7	S
1-Dec-2017	22:00	1.9	S
1-Dec-2017	23:00	1.6	W
2-Dec-2017	00:00	1.7	W
2-Dec-2017	01:00	1.4	W
2-Dec-2017	02:00	1.5	W
2-Dec-2017	03:00	1	W
2-Dec-2017	04:00	0.9	W
2-Dec-2017	05:00	1.1	SSW
2-Dec-2017	06:00	1	SW
2-Dec-2017	07:00	1	S
2-Dec-2017	08:00	1.4	WSW
2-Dec-2017	09:00	1.7	SW
2-Dec-2017	10:00	2.2	WSW
2-Dec-2017	11:00	2.5	WSW
2-Dec-2017	12:00	2.7	SSW
2-Dec-2017	13:00	2.9	S
2-Dec-2017	14:00	3	S
2-Dec-2017	15:00	3.2	SSW
2-Dec-2017	16:00	2.4	SSW
2-Dec-2017	17:00	2.6	S
2-Dec-2017	18:00	2.8	SW
2-Dec-2017	19:00	2.4	NNW
2-Dec-2017	20:00	2.1	SW
2-Dec-2017	21:00	2.4	W
2-Dec-2017	22:00	2.1	SE
2-Dec-2017	23:00	1.7	W
3-Dec-2017	00:00	1.8	WNW
3-Dec-2017	01:00	2.3	N
3-Dec-2017	02:00	1.7	WNW
3-Dec-2017	03:00	1.4	NE
3-Dec-2017	04:00	1	ENE
3-Dec-2017	05:00	1.2	NE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
3-Dec-2017	06:00	0.9	ENE
3-Dec-2017	07:00	1.1	SSE
3-Dec-2017	08:00	1.6	N
3-Dec-2017	09:00	2.4	N
3-Dec-2017	10:00	2.2	NE
3-Dec-2017	11:00	1.8	NNE
3-Dec-2017	12:00	2.5	ENE
3-Dec-2017	13:00	2.1	NE
3-Dec-2017	14:00	1.8	ENE
3-Dec-2017	15:00	2.4	ENE
3-Dec-2017	16:00	2.4	SE
3-Dec-2017	17:00	2.2	SE
3-Dec-2017	18:00	1.7	WNW
3-Dec-2017	19:00	1.7	WNW
3-Dec-2017	20:00	1.3	WNW
3-Dec-2017	21:00	1.5	SW
3-Dec-2017	22:00	1.4	W
3-Dec-2017	23:00	1.8	W
4-Dec-2017	00:00	1.7	WNW
4-Dec-2017	01:00	1.5	SSE
4-Dec-2017	02:00	1.3	SW
4-Dec-2017	03:00	1.3	SSW
4-Dec-2017	04:00	1.3	SW
4-Dec-2017	05:00	1.2	W
4-Dec-2017	06:00	1	W
4-Dec-2017	07:00	1.4	W
4-Dec-2017	08:00	2.4	W
4-Dec-2017	09:00	2.5	W
4-Dec-2017	10:00	2.4	SW
4-Dec-2017	11:00	2.9	WNW
4-Dec-2017	12:00	3.3	WNW
4-Dec-2017	13:00	3.5	W
4-Dec-2017	14:00	3.1	W
4-Dec-2017	15:00	3.5	W
4-Dec-2017	16:00	3.1	WNW
4-Dec-2017	17:00	2.9	W
4-Dec-2017	18:00	2.3	WNW
4-Dec-2017	19:00	2.3	W
4-Dec-2017	20:00	2.6	WNW
4-Dec-2017	21:00	2.4	WNW
4-Dec-2017	22:00	2.7	WNW
4-Dec-2017	23:00	2.6	WNW
5-Dec-2017	00:00	2.2	WNW
5-Dec-2017	01:00	2.6	WNW
5-Dec-2017	02:00	2.7	WNW
5-Dec-2017	03:00	2.3	W
5-Dec-2017	04:00	2.6	W
5-Dec-2017	05:00	2.2	WNW
5-Dec-2017	06:00	2	SE
5-Dec-2017	07:00	2.1	ESE
5-Dec-2017	08:00	2.6	ESE
5-Dec-2017	09:00	2.7	NE
5-Dec-2017	10:00	2.4	NE
5-Dec-2017	11:00	2.5	NE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
5-Dec-2017	12:00	2.6	E
5-Dec-2017	13:00	3.1	NE
5-Dec-2017	14:00	3.4	ENE
5-Dec-2017	15:00	3.5	NNE
5-Dec-2017	16:00	3	NNE
5-Dec-2017	17:00	3.1	NE
5-Dec-2017	18:00	2.7	E
5-Dec-2017	19:00	2.3	E
5-Dec-2017	20:00	2.3	E
5-Dec-2017	21:00	2.4	NE
5-Dec-2017	22:00	2.5	ENE
5-Dec-2017	23:00	2.3	SSE
6-Dec-2017	00:00	2.3	SSE
6-Dec-2017	01:00	2.1	SSE
6-Dec-2017	02:00	1.9	ESE
6-Dec-2017	03:00	1.9	ESE
6-Dec-2017	04:00	2.4	ESE
6-Dec-2017	05:00	2.5	ENE
6-Dec-2017	06:00	2.5	ENE
6-Dec-2017	07:00	2.4	ENE
6-Dec-2017	08:00	2.4	ENE
6-Dec-2017	09:00	2.4	E
6-Dec-2017	10:00	2.6	ENE
6-Dec-2017	11:00	3.1	N
6-Dec-2017	12:00	2.9	W
6-Dec-2017	13:00	3.1	W
6-Dec-2017	14:00	2.6	W
6-Dec-2017	15:00	2.8	W
6-Dec-2017	16:00	2.8	NNE
6-Dec-2017	17:00	2.9	E
6-Dec-2017	18:00	2.6	W
6-Dec-2017	19:00	3	E
6-Dec-2017	20:00	2.7	SSE
6-Dec-2017	21:00	2.2	E
6-Dec-2017	22:00	2	S
6-Dec-2017	23:00	1.6	ENE
7-Dec-2017	00:00	1.3	ESE
7-Dec-2017	01:00	1.5	S
7-Dec-2017	02:00	1.6	S
7-Dec-2017	03:00	1.6	SSE
7-Dec-2017	04:00	1.4	S
7-Dec-2017	05:00	1.7	ESE
7-Dec-2017	06:00	1.8	ESE
7-Dec-2017	07:00	1.8	SSE
7-Dec-2017	08:00	1.5	E
7-Dec-2017	09:00	2.1	SE
7-Dec-2017	10:00	2.6	SSE
7-Dec-2017	11:00	2.7	SSE
7-Dec-2017	12:00	3.2	SSE
7-Dec-2017	13:00	2.8	SE
7-Dec-2017	14:00	2.7	SSE
7-Dec-2017	15:00	2.1	SSE
7-Dec-2017	16:00	2.1	E
7-Dec-2017	17:00	1.8	E

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
7-Dec-2017	18:00	1.4	E
7-Dec-2017	19:00	1	SSE
7-Dec-2017	20:00	0.7	SSE
7-Dec-2017	21:00	1	E
7-Dec-2017	22:00	0.8	E
7-Dec-2017	23:00	1.5	N
8-Dec-2017	00:00	1.3	W
8-Dec-2017	01:00	0.9	W
8-Dec-2017	02:00	0.9	W
8-Dec-2017	03:00	1	NE
8-Dec-2017	04:00	0.8	E
8-Dec-2017	05:00	0.8	E
8-Dec-2017	06:00	0.7	NE
8-Dec-2017	07:00	0.9	SSW
8-Dec-2017	08:00	1.5	SSW
8-Dec-2017	09:00	1.7	SW
8-Dec-2017	10:00	1.9	W
8-Dec-2017	11:00	2.6	WSW
8-Dec-2017	12:00	2.4	WSW
8-Dec-2017	13:00	2.7	NNW
8-Dec-2017	14:00	2.9	WNW
8-Dec-2017	15:00	2.9	N
8-Dec-2017	16:00	2.4	W
8-Dec-2017	17:00	2.3	S
8-Dec-2017	18:00	2.2	W
8-Dec-2017	19:00	1.9	W
8-Dec-2017	20:00	1.8	W
8-Dec-2017	21:00	1.5	WSW
8-Dec-2017	22:00	1.7	WSW
8-Dec-2017	23:00	1.7	W
9-Dec-2017	00:00	1	W
9-Dec-2017	01:00	0.7	W
9-Dec-2017	02:00	0.8	W
9-Dec-2017	03:00	1.3	W
9-Dec-2017	04:00	1.5	W
9-Dec-2017	05:00	1.2	SW
9-Dec-2017	06:00	1.2	ENE
9-Dec-2017	07:00	1.5	WSW
9-Dec-2017	08:00	1.5	WSW
9-Dec-2017	09:00	1.8	ESE
9-Dec-2017	10:00	1.6	W
9-Dec-2017	11:00	1.8	SSE
9-Dec-2017	12:00	1.9	SSW
9-Dec-2017	13:00	1.4	SE
9-Dec-2017	14:00	1.4	SSE
9-Dec-2017	15:00	1.8	SSE
9-Dec-2017	16:00	2.1	E
9-Dec-2017	17:00	1.8	SE
9-Dec-2017	18:00	1.4	SE
9-Dec-2017	19:00	1.6	ESE
9-Dec-2017	20:00	1.8	ESE
9-Dec-2017	21:00	1.7	NE
9-Dec-2017	22:00	1.8	E
9-Dec-2017	23:00	1.3	SSE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
10-Dec-2017	00:00	1.2	SSE
10-Dec-2017	01:00	1.3	SSE
10-Dec-2017	02:00	1.1	SSE
10-Dec-2017	03:00	1.3	ESE
10-Dec-2017	04:00	1.3	ESE
10-Dec-2017	05:00	1	SE
10-Dec-2017	06:00	0.8	SE
10-Dec-2017	07:00	1.3	ESE
10-Dec-2017	08:00	1.7	SSE
10-Dec-2017	09:00	2.3	ESE
10-Dec-2017	10:00	2.5	SSE
10-Dec-2017	11:00	2.5	SSE
10-Dec-2017	12:00	2.4	S
10-Dec-2017	13:00	2.8	SSE
10-Dec-2017	14:00	3.2	SSE
10-Dec-2017	15:00	2.7	ESE
10-Dec-2017	16:00	2.9	ESE
10-Dec-2017	17:00	3	SW
10-Dec-2017	18:00	2.4	SW
10-Dec-2017	19:00	2.2	SW
10-Dec-2017	20:00	2.1	WSW
10-Dec-2017	21:00	2.1	W
10-Dec-2017	22:00	1.9	SSW
10-Dec-2017	23:00	1.8	SW
11-Dec-2017	00:00	2.2	WNW
11-Dec-2017	01:00	2.1	W
11-Dec-2017	02:00	2.2	ENE
11-Dec-2017	03:00	1.8	SSW
11-Dec-2017	04:00	1.3	SW
11-Dec-2017	05:00	1.5	SW
11-Dec-2017	06:00	1.3	SW
11-Dec-2017	07:00	1.6	WNW
11-Dec-2017	08:00	1.6	WNW
11-Dec-2017	09:00	1.8	SW
11-Dec-2017	10:00	2.1	SW
11-Dec-2017	11:00	2.1	SW
11-Dec-2017	12:00	2.6	WSW
11-Dec-2017	13:00	2.5	WSW
11-Dec-2017	14:00	2	S
11-Dec-2017	15:00	1.9	S
11-Dec-2017	16:00	2	WSW
11-Dec-2017	17:00	2.1	W
11-Dec-2017	18:00	1.7	SSW
11-Dec-2017	19:00	1.6	SW
11-Dec-2017	20:00	1.9	SW
11-Dec-2017	21:00	2	SW
11-Dec-2017	22:00	2	SW
11-Dec-2017	23:00	2.1	SW
12-Dec-2017	00:00	2.3	SW
12-Dec-2017	01:00	2.3	SSW
12-Dec-2017	02:00	2.6	SE
12-Dec-2017	03:00	2.3	ESE
12-Dec-2017	04:00	2.6	E
12-Dec-2017	05:00	2.7	E

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
12-Dec-2017	06:00	2.7	E
12-Dec-2017	07:00	2.4	WNW
12-Dec-2017	08:00	2.6	WNW
12-Dec-2017	09:00	2.5	NW
12-Dec-2017	10:00	3	WNW
12-Dec-2017	11:00	3.6	SSW
12-Dec-2017	12:00	3.6	SSW
12-Dec-2017	13:00	3.7	SW
12-Dec-2017	14:00	3.3	W
12-Dec-2017	15:00	3.7	WNW
12-Dec-2017	16:00	3.1	WSW
12-Dec-2017	17:00	3	SW
12-Dec-2017	18:00	2.7	WNW
12-Dec-2017	19:00	2.7	WNW
12-Dec-2017	20:00	2.4	NNE
12-Dec-2017	21:00	2.6	SE
12-Dec-2017	22:00	2.6	SSW
12-Dec-2017	23:00	3.3	ESE
13-Dec-2017	00:00	2.5	ESE
13-Dec-2017	01:00	2.8	ESE
13-Dec-2017	02:00	2.6	SE
13-Dec-2017	03:00	2.2	SE
13-Dec-2017	04:00	1.7	S
13-Dec-2017	05:00	1.6	E
13-Dec-2017	06:00	1.5	E
13-Dec-2017	07:00	1.7	E
13-Dec-2017	08:00	2.6	SE
13-Dec-2017	09:00	3.2	SE
13-Dec-2017	10:00	3	SE
13-Dec-2017	11:00	3	NE
13-Dec-2017	12:00	3	E
13-Dec-2017	13:00	2.7	ESE
13-Dec-2017	14:00	2.7	ESE
13-Dec-2017	15:00	2.6	SE
13-Dec-2017	16:00	2.8	SE
13-Dec-2017	17:00	2.8	SSE
13-Dec-2017	18:00	2.5	E
13-Dec-2017	19:00	2.3	ESE
13-Dec-2017	20:00	1.7	SE
13-Dec-2017	21:00	1.5	ESE
13-Dec-2017	22:00	1.4	ESE
13-Dec-2017	23:00	1.5	ESE
14-Dec-2017	00:00	1.4	ESE
14-Dec-2017	01:00	1.6	ESE
14-Dec-2017	02:00	1.8	SSE
14-Dec-2017	03:00	2.1	SSE
14-Dec-2017	04:00	1.7	ESE
14-Dec-2017	05:00	1.8	SW
14-Dec-2017	06:00	1.4	SSW
14-Dec-2017	07:00	1.4	WNW
14-Dec-2017	08:00	1.6	WNW
14-Dec-2017	09:00	2.6	SSW
14-Dec-2017	10:00	2.4	WSW
14-Dec-2017	11:00	2.8	SW

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
14-Dec-2017	12:00	2.9	SW
14-Dec-2017	13:00	3.2	N
14-Dec-2017	14:00	2.8	SW
14-Dec-2017	15:00	2.3	WSW
14-Dec-2017	16:00	2.4	W
14-Dec-2017	17:00	2.3	WSW
14-Dec-2017	18:00	2.3	SW
14-Dec-2017	19:00	2.4	SW
14-Dec-2017	20:00	2.4	SSW
14-Dec-2017	21:00	2.2	SSE
14-Dec-2017	22:00	2.2	SSE
14-Dec-2017	23:00	1.3	SSE
15-Dec-2017	00:00	1.7	NE
15-Dec-2017	01:00	1.4	E
15-Dec-2017	02:00	1.5	W
15-Dec-2017	03:00	1.4	SE
15-Dec-2017	04:00	1.5	ENE
15-Dec-2017	05:00	1.7	E
15-Dec-2017	06:00	1.5	NE
15-Dec-2017	07:00	1.5	NNE
15-Dec-2017	08:00	1.5	SE
15-Dec-2017	09:00	1.4	SE
15-Dec-2017	10:00	1.6	SE
15-Dec-2017	11:00	2.1	SE
15-Dec-2017	12:00	1.9	S
15-Dec-2017	13:00	1.9	S
15-Dec-2017	14:00	1.9	SW
15-Dec-2017	15:00	2.1	SW
15-Dec-2017	16:00	2.1	SSE
15-Dec-2017	17:00	2.2	WSW
15-Dec-2017	18:00	1.8	NNE
15-Dec-2017	19:00	1.4	NE
15-Dec-2017	20:00	1.7	WNW
15-Dec-2017	21:00	1.6	WNW
15-Dec-2017	22:00	1.6	NE
15-Dec-2017	23:00	1.5	NNE
16-Dec-2017	00:00	1.6	W
16-Dec-2017	01:00	1.4	W
16-Dec-2017	02:00	2.1	W
16-Dec-2017	03:00	1.7	WNW
16-Dec-2017	04:00	2.1	W
16-Dec-2017	05:00	2.2	W
16-Dec-2017	06:00	1.8	WNW
16-Dec-2017	07:00	2	SSE
16-Dec-2017	08:00	2	SSE
16-Dec-2017	09:00	2.2	ESE
16-Dec-2017	10:00	2.3	SSE
16-Dec-2017	11:00	2.5	SSE
16-Dec-2017	12:00	3.1	ENE
16-Dec-2017	13:00	3.4	NNE
16-Dec-2017	14:00	3.4	N
16-Dec-2017	15:00	3.6	SSW
16-Dec-2017	16:00	3.4	NE
16-Dec-2017	17:00	3.1	NE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
16-Dec-2017	18:00	2.7	NE
16-Dec-2017	19:00	2.6	NE
16-Dec-2017	20:00	2.4	SSW
16-Dec-2017	21:00	2.2	SW
16-Dec-2017	22:00	2.4	SSW
16-Dec-2017	23:00	2	SW
17-Dec-2017	00:00	2.4	NNW
17-Dec-2017	01:00	2.4	W
17-Dec-2017	02:00	2.8	W
17-Dec-2017	03:00	2.6	WNW
17-Dec-2017	04:00	2.1	N
17-Dec-2017	05:00	2.3	WSW
17-Dec-2017	06:00	2.4	NW
17-Dec-2017	07:00	2.3	WNW
17-Dec-2017	08:00	2.9	WNW
17-Dec-2017	09:00	3.2	WNW
17-Dec-2017	10:00	3.4	WNW
17-Dec-2017	11:00	3.8	WNW
17-Dec-2017	12:00	3.7	WNW
17-Dec-2017	13:00	3.6	WNW
17-Dec-2017	14:00	3.7	WNW
17-Dec-2017	15:00	3.7	W
17-Dec-2017	16:00	4	NW
17-Dec-2017	17:00	3.2	W
17-Dec-2017	18:00	3.1	WSW
17-Dec-2017	19:00	2.4	WSW
17-Dec-2017	20:00	2.4	W
17-Dec-2017	21:00	3	WNW
17-Dec-2017	22:00	3.2	SW
17-Dec-2017	23:00	3	WNW
18-Dec-2017	00:00	2.1	W
18-Dec-2017	01:00	2.7	WSW
18-Dec-2017	02:00	2.4	NNW
18-Dec-2017	03:00	2.9	W
18-Dec-2017	04:00	3.3	SW
18-Dec-2017	05:00	3.6	SSW
18-Dec-2017	06:00	3.5	WNW
18-Dec-2017	07:00	3.1	WSW
18-Dec-2017	08:00	4.3	SW
18-Dec-2017	09:00	4.6	NW
18-Dec-2017	10:00	3.8	SSE
18-Dec-2017	11:00	4	SSE
18-Dec-2017	12:00	4.6	W
18-Dec-2017	13:00	4.4	SSE
18-Dec-2017	14:00	4.6	SSE
18-Dec-2017	15:00	4.5	SSE
18-Dec-2017	16:00	4.7	SE
18-Dec-2017	17:00	4	SE
18-Dec-2017	18:00	4.1	SE
18-Dec-2017	19:00	3.6	SSE
18-Dec-2017	20:00	3.6	ESE
18-Dec-2017	21:00	3.8	ESE
18-Dec-2017	22:00	4.4	E
18-Dec-2017	23:00	3.9	SE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
19-Dec-2017	00:00	4	SE
19-Dec-2017	01:00	4.2	ESE
19-Dec-2017	02:00	4.2	ESE
19-Dec-2017	03:00	3.9	SE
19-Dec-2017	04:00	3.8	E
19-Dec-2017	05:00	4.1	ESE
19-Dec-2017	06:00	3.5	E
19-Dec-2017	07:00	3.5	E
19-Dec-2017	08:00	3.8	ESE
19-Dec-2017	09:00	4.4	E
19-Dec-2017	10:00	4.3	ESE
19-Dec-2017	11:00	3.7	E
19-Dec-2017	12:00	3.2	ESE
19-Dec-2017	13:00	2.8	ESE
19-Dec-2017	14:00	2.5	ESE
19-Dec-2017	15:00	2.9	ESE
19-Dec-2017	16:00	2.8	ESE
19-Dec-2017	17:00	2.1	SE
19-Dec-2017	18:00	2.5	E
19-Dec-2017	19:00	1.9	ENE
19-Dec-2017	20:00	2.1	ENE
19-Dec-2017	21:00	2.6	E
19-Dec-2017	22:00	2.8	ENE
19-Dec-2017	23:00	2.7	ENE
20-Dec-2017	00:00	2.3	ENE
20-Dec-2017	01:00	2.5	ENE
20-Dec-2017	02:00	2.8	ENE
20-Dec-2017	03:00	2.5	ESE
20-Dec-2017	04:00	2.3	E
20-Dec-2017	05:00	2.4	SE
20-Dec-2017	06:00	2.5	E
20-Dec-2017	07:00	2.6	E
20-Dec-2017	08:00	2	E
20-Dec-2017	09:00	2.4	SSE
20-Dec-2017	10:00	2.2	ESE
20-Dec-2017	11:00	2.2	SSE
20-Dec-2017	12:00	2.8	SSE
20-Dec-2017	13:00	3.4	ESE
20-Dec-2017	14:00	3.2	SSE
20-Dec-2017	15:00	3.1	SSE
20-Dec-2017	16:00	3.4	SE
20-Dec-2017	17:00	2.4	E
20-Dec-2017	18:00	2.3	ESE
20-Dec-2017	19:00	2.2	E
20-Dec-2017	20:00	1.9	E
20-Dec-2017	21:00	2.1	ENE
20-Dec-2017	22:00	1.9	ENE
20-Dec-2017	23:00	2.1	ENE
21-Dec-2017	00:00	1.3	SE
21-Dec-2017	01:00	1.2	E
21-Dec-2017	02:00	1.1	E
21-Dec-2017	03:00	1.6	E
21-Dec-2017	04:00	2.1	ENE
21-Dec-2017	05:00	2.1	SE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
21-Dec-2017	06:00	1.5	NE
21-Dec-2017	07:00	0.8	ESE
21-Dec-2017	08:00	0.9	E
21-Dec-2017	09:00	1.3	N
21-Dec-2017	10:00	1.3	SE
21-Dec-2017	11:00	1.7	ESE
21-Dec-2017	12:00	2.7	E
21-Dec-2017	13:00	2.6	SSE
21-Dec-2017	14:00	2.4	SE
21-Dec-2017	15:00	2.1	SE
21-Dec-2017	16:00	2	SE
21-Dec-2017	17:00	2.1	ESE
21-Dec-2017	18:00	1.7	SSE
21-Dec-2017	19:00	1.7	SSE
21-Dec-2017	20:00	1.3	S
21-Dec-2017	21:00	2.6	SSW
21-Dec-2017	22:00	1.3	SSW
21-Dec-2017	23:00	1.6	SE
22-Dec-2017	00:00	1.7	SSE
22-Dec-2017	01:00	1.9	SE
22-Dec-2017	02:00	2.1	SE
22-Dec-2017	03:00	2.1	NE
22-Dec-2017	04:00	2.2	WSW
22-Dec-2017	05:00	2.3	W
22-Dec-2017	06:00	2.6	WSW
22-Dec-2017	07:00	3.1	NE
22-Dec-2017	08:00	3.4	W
22-Dec-2017	09:00	3.5	WSW
22-Dec-2017	10:00	3.4	W
22-Dec-2017	11:00	2.7	ESE
22-Dec-2017	12:00	3.2	ESE
22-Dec-2017	13:00	2.9	ESE
22-Dec-2017	14:00	3.3	E
22-Dec-2017	15:00	3.1	E
22-Dec-2017	16:00	2.9	N
22-Dec-2017	17:00	2.7	NE
22-Dec-2017	18:00	2.4	SE
22-Dec-2017	19:00	2.4	SE
22-Dec-2017	20:00	1.7	ESE
22-Dec-2017	21:00	2.1	SSE
22-Dec-2017	22:00	2.1	SE
22-Dec-2017	23:00	2.1	SE
23-Dec-2017	00:00	1.9	S
23-Dec-2017	01:00	1.6	SSW
23-Dec-2017	02:00	1.6	SE
23-Dec-2017	03:00	1.5	NE
23-Dec-2017	04:00	1.3	WSW
23-Dec-2017	05:00	1.7	SW
23-Dec-2017	06:00	1.5	SW
23-Dec-2017	07:00	1.6	SSE
23-Dec-2017	08:00	2.3	W
23-Dec-2017	09:00	2.1	WSW
23-Dec-2017	10:00	3.1	W
23-Dec-2017	11:00	3.3	WNW

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
23-Dec-2017	12:00	3.3	WSW
23-Dec-2017	13:00	2.9	W
23-Dec-2017	14:00	2.6	S
23-Dec-2017	15:00	3.2	WNW
23-Dec-2017	16:00	3	ENE
23-Dec-2017	17:00	2.4	ESE
23-Dec-2017	18:00	2.5	SE
23-Dec-2017	19:00	2.4	SSE
23-Dec-2017	20:00	3	SSE
23-Dec-2017	21:00	2.9	ESE
23-Dec-2017	22:00	2.8	S
23-Dec-2017	23:00	2.4	SSE
24-Dec-2017	00:00	2.7	SE
24-Dec-2017	01:00	2.7	NE
24-Dec-2017	02:00	2.2	NE
24-Dec-2017	03:00	2.5	ESE
24-Dec-2017	04:00	2.7	E
24-Dec-2017	05:00	1.9	ENE
24-Dec-2017	06:00	2	E
24-Dec-2017	07:00	2.3	ENE
24-Dec-2017	08:00	2.1	SE
24-Dec-2017	09:00	2.3	SE
24-Dec-2017	10:00	2.6	SE
24-Dec-2017	11:00	2.8	SE
24-Dec-2017	12:00	3.1	SE
24-Dec-2017	13:00	3.4	SE
24-Dec-2017	14:00	3.4	SE
24-Dec-2017	15:00	2.9	ESE
24-Dec-2017	16:00	2.7	ESE
24-Dec-2017	17:00	2.6	ESE
24-Dec-2017	18:00	2.4	SE
24-Dec-2017	19:00	2.2	SE
24-Dec-2017	20:00	2.2	SE
24-Dec-2017	21:00	2.8	SE
24-Dec-2017	22:00	2.8	SE
24-Dec-2017	23:00	2.7	SE
25-Dec-2017	00:00	3	SE
25-Dec-2017	01:00	2.8	ENE
25-Dec-2017	02:00	2.3	SE
25-Dec-2017	03:00	2.7	SE
25-Dec-2017	04:00	2.8	ESE
25-Dec-2017	05:00	2.5	SE
25-Dec-2017	06:00	2.5	SE
25-Dec-2017	07:00	2.4	SE
25-Dec-2017	08:00	2.7	ESE
25-Dec-2017	09:00	2.7	SE
25-Dec-2017	10:00	3.1	NE
25-Dec-2017	11:00	2.6	SE
25-Dec-2017	12:00	2.9	SE
25-Dec-2017	13:00	2.9	SE
25-Dec-2017	14:00	3	SE
25-Dec-2017	15:00	3.1	E
25-Dec-2017	16:00	2.8	NE
25-Dec-2017	17:00	2.5	SE

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
25-Dec-2017	18:00	1.9	ENE
25-Dec-2017	19:00	2	E
25-Dec-2017	20:00	1.7	SE
25-Dec-2017	21:00	1.9	SE
25-Dec-2017	22:00	2	SE
25-Dec-2017	23:00	1.5	ESE
26-Dec-2017	00:00	1.5	SE
26-Dec-2017	01:00	1.4	SE
26-Dec-2017	02:00	1.8	SE
26-Dec-2017	03:00	2.2	ESE
26-Dec-2017	04:00	1.5	SE
26-Dec-2017	05:00	1.5	NE
26-Dec-2017	06:00	1.5	NE
26-Dec-2017	07:00	1.6	ESE
26-Dec-2017	08:00	2.1	SE
26-Dec-2017	09:00	2.1	SE
26-Dec-2017	10:00	2.4	SE
26-Dec-2017	11:00	2.8	SE
26-Dec-2017	12:00	3.4	SE
26-Dec-2017	13:00	4	ENE
26-Dec-2017	14:00	3.4	S
26-Dec-2017	15:00	3	SE
26-Dec-2017	16:00	3.4	SE
26-Dec-2017	17:00	3.2	SE
26-Dec-2017	18:00	2.6	SE
26-Dec-2017	19:00	2.4	ESE
26-Dec-2017	20:00	2	ESE
26-Dec-2017	21:00	2	E
26-Dec-2017	22:00	1.8	SE
26-Dec-2017	23:00	1.6	SE
27-Dec-2017	00:00	1.6	ESE
27-Dec-2017	01:00	1.2	SE
27-Dec-2017	02:00	1.3	ESE
27-Dec-2017	03:00	0.9	ESE
27-Dec-2017	04:00	0.9	ESE
27-Dec-2017	05:00	0.7	SSE
27-Dec-2017	06:00	0.8	SE
27-Dec-2017	07:00	0.7	SSE
27-Dec-2017	08:00	1.2	SE
27-Dec-2017	09:00	2.2	ESE
27-Dec-2017	10:00	2.2	SSE
27-Dec-2017	11:00	2.1	SSE
27-Dec-2017	12:00	2.3	ENE
27-Dec-2017	13:00	2.8	NE
27-Dec-2017	14:00	2.5	N
27-Dec-2017	15:00	2.7	SSE
27-Dec-2017	16:00	2.7	ESE
27-Dec-2017	17:00	2.4	SSE
27-Dec-2017	18:00	2.7	SSE
27-Dec-2017	19:00	2.2	ESE
27-Dec-2017	20:00	2.4	ESE
27-Dec-2017	21:00	2.4	SSE
27-Dec-2017	22:00	2.4	SSE
27-Dec-2017	23:00	2.4	WSW

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
28-Dec-2017	00:00	2.6	W
28-Dec-2017	01:00	2.2	N
28-Dec-2017	02:00	1.5	N
28-Dec-2017	03:00	2.3	N
28-Dec-2017	04:00	1.9	N
28-Dec-2017	05:00	2.2	E
28-Dec-2017	06:00	1.8	ENE
28-Dec-2017	07:00	1.8	SE
28-Dec-2017	08:00	2.4	ESE
28-Dec-2017	09:00	2.4	ESE
28-Dec-2017	10:00	2.7	NE
28-Dec-2017	11:00	2.8	SSE
28-Dec-2017	12:00	2.8	WNW
28-Dec-2017	13:00	3	SW
28-Dec-2017	14:00	3.1	WNW
28-Dec-2017	15:00	2.7	E
28-Dec-2017	16:00	2.9	W
28-Dec-2017	17:00	3.3	W
28-Dec-2017	18:00	2.7	W
28-Dec-2017	19:00	2.2	W
28-Dec-2017	20:00	1.9	W
28-Dec-2017	21:00	2	SSW
28-Dec-2017	22:00	1.7	NE
28-Dec-2017	23:00	2	ENE
29-Dec-2017	00:00	1.8	ENE
29-Dec-2017	01:00	2.1	ENE
29-Dec-2017	02:00	2.3	SSE
29-Dec-2017	03:00	2	WNW
29-Dec-2017	04:00	2.1	WNW
29-Dec-2017	05:00	2	WNW
29-Dec-2017	06:00	1.9	NNW
29-Dec-2017	07:00	1.3	WNW
29-Dec-2017	08:00	1.7	SW
29-Dec-2017	09:00	1.8	W
29-Dec-2017	10:00	3.1	W
29-Dec-2017	11:00	2.8	WNW
29-Dec-2017	12:00	2.7	WNW
29-Dec-2017	13:00	2.4	W
29-Dec-2017	14:00	2.7	NE
29-Dec-2017	15:00	2.6	NE
29-Dec-2017	16:00	2.7	ENE
29-Dec-2017	17:00	2.2	N
29-Dec-2017	18:00	1.7	ESE
29-Dec-2017	19:00	1.9	ESE
29-Dec-2017	20:00	1.8	WNW
29-Dec-2017	21:00	2.4	W
29-Dec-2017	22:00	2.4	W
29-Dec-2017	23:00	2.3	NE
30-Dec-2017	00:00	2.5	ENE
30-Dec-2017	01:00	1.9	NE
30-Dec-2017	02:00	1.9	N
30-Dec-2017	03:00	1.6	N
30-Dec-2017	04:00	1.6	N
30-Dec-2017	05:00	1.4	WSW

Appendix J - Wind Data

Date	Time	Wind Speed m/s	Direction
30-Dec-2017	06:00	1.2	WSW
30-Dec-2017	07:00	1.8	WSW
30-Dec-2017	08:00	2	W
30-Dec-2017	09:00	3	W
30-Dec-2017	10:00	2.5	N
30-Dec-2017	11:00	3.4	N
30-Dec-2017	12:00	3.5	N
30-Dec-2017	13:00	3.1	ENE
30-Dec-2017	14:00	3.6	ENE
30-Dec-2017	15:00	3.2	NE
30-Dec-2017	16:00	2.9	ENE
30-Dec-2017	17:00	2.5	ENE
30-Dec-2017	18:00	2.7	ENE
30-Dec-2017	19:00	2.5	ENE
30-Dec-2017	20:00	2.3	ENE
30-Dec-2017	21:00	1.7	W
30-Dec-2017	22:00	1.7	WSW
30-Dec-2017	23:00	2.3	W
31-Dec-2017	00:00	2.9	NW
31-Dec-2017	01:00	3.2	NE
31-Dec-2017	02:00	3	ESE
31-Dec-2017	03:00	3.1	W
31-Dec-2017	04:00	2.9	WSW
31-Dec-2017	05:00	2.8	WNW
31-Dec-2017	06:00	3.1	WSW
31-Dec-2017	07:00	3.5	W
31-Dec-2017	08:00	3.1	WNW
31-Dec-2017	09:00	2.5	W
31-Dec-2017	10:00	3.1	N
31-Dec-2017	11:00	2.4	N
31-Dec-2017	12:00	2.2	WSW
31-Dec-2017	13:00	2.8	N
31-Dec-2017	14:00	2.6	WSW
31-Dec-2017	15:00	2.5	W
31-Dec-2017	16:00	2.3	W
31-Dec-2017	17:00	3.2	N
31-Dec-2017	18:00	3.1	NE
31-Dec-2017	19:00	2.9	N
31-Dec-2017	20:00	3.4	WNW
31-Dec-2017	21:00	3.4	W
31-Dec-2017	22:00	3.6	WSW
31-Dec-2017	23:00	3.2	SSW

APPENDIX K
EVENT ACTION PLANS

Event / Action Plan for Air Quality

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

LIMIT LEVEL				
1.Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform SO, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the SO on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2.Exceedance for two or more consecutive samples	1. Notify IEC, SO, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and SO to discuss the remedial actions to	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 remedial	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented;	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the SO until the exceedance is

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

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

Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	**IEC**	**SO**	**CONTRACTOR**
Action Level	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Notify IEC and Contractor; 3. Report the results of investigation to the IEC, SO and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the SO accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Identify source; 2. Inform IEC, SO, EPD and Contractor; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, SO and EPD	1. Discuss amongst SO, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the SO accordingly; 3. Supervise the implementation of	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise	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;

EVENT	ACTION			
	ET	IEC	SO	CONTRACTOR
	the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and SO informed of the results; 8. If exceedance stops, cease additional monitoring.	remedial measures.	problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	5. Stop the relevant portion of works as determined by the SO until the exceedance is abated.

Event and Action Plan for Water Quality

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

Event	ET Leader	IEC	SO	Contractor
Limit level being exceeded by two or more consecutive sampling days	Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor, SO and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SO and Contractor; Ensure mitigation measures are implemented;	Check monitoring data submitted by ET and Contractor's working method; Discuss with ET and Contractor on possible remedial actions; Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SO accordingly; Supervise the implementation of mitigation measures.	Discuss with IEC, ET and Contractor on the proposed mitigation measures; Request Contractor to critically review the working methods; Make agreement on the mitigation measures to be implemented; Ensure mitigation measures are properly implemented; Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the construction activities until no exceedance of Limit level.	Take immediate action to avoid further exceedance; Submit proposal of mitigation measures to SO within 3 working days of notification and discuss with ET, IEC and SO; Implement the agreed mitigation measures; Resubmit proposals of mitigation measures if problem still not under control; As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

APPENDIX L
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)	3	1	0	0

Contract No. HY/2011/09

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

Date of Water Quality Monitoring: 6 December 2017

Part A – Exceedance Summary Tables

Table I: Parameter(s) – ~~Dissolved Oxygen (DO) / Turbidity (TURB)~~ / Suspended Solids (SS)

Station(s)	Tide	Baseline Action Level (mg/L)	Baseline Limit Level (mg/L)	Control Station(s)	Depth-average Value at Control Stations (mg/L)	120% of Control Station Action Level (mg/L)	130% of Control Station Limit Level (mg/L)	Depth-average Measured Value (mg/L)	Justification*	Validity (Yes/No)
IS1	Mid-Ebb	23.5	34.4	CS2(A)	15.9	19.1	20.7	***32.3***	(2), (6)	No
IS2	Mid-Flood			CS1	23.6	28.3	30.7	***30.2***	(2), (3)	No
SR6								***28.6***	(2), (3)	No
ST1								***35.3***	(2), (3)	No

Note: ***Bold Italic*** means Action Level exceedance
Bold Italic with underline means Limit Level exceedance

*Remarks (1) – No major marine construction activity was conducted.
(2) – No pollution discharge from construction activity was observed.
(3) – Control Station value already exceeded either the Baseline Action or Limit Levels.
(4) – The exceeded results were similar or within the ranges baseline monitoring results.
(5) – Monitoring station is situated at the upstream of the construction sites.
(6) – Other(s): Please specify – Adverse water quality outside the site boundary was observed while no pollution source from this Contract was observed and no construction vessel for this Contract was travelling nearby. Dispersion of sediment plume to the monitoring stations from the area outside the site boundary (i.e. works area not under and related to HY/2011/09) was also observed.

Contract No. HY/2011/09

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

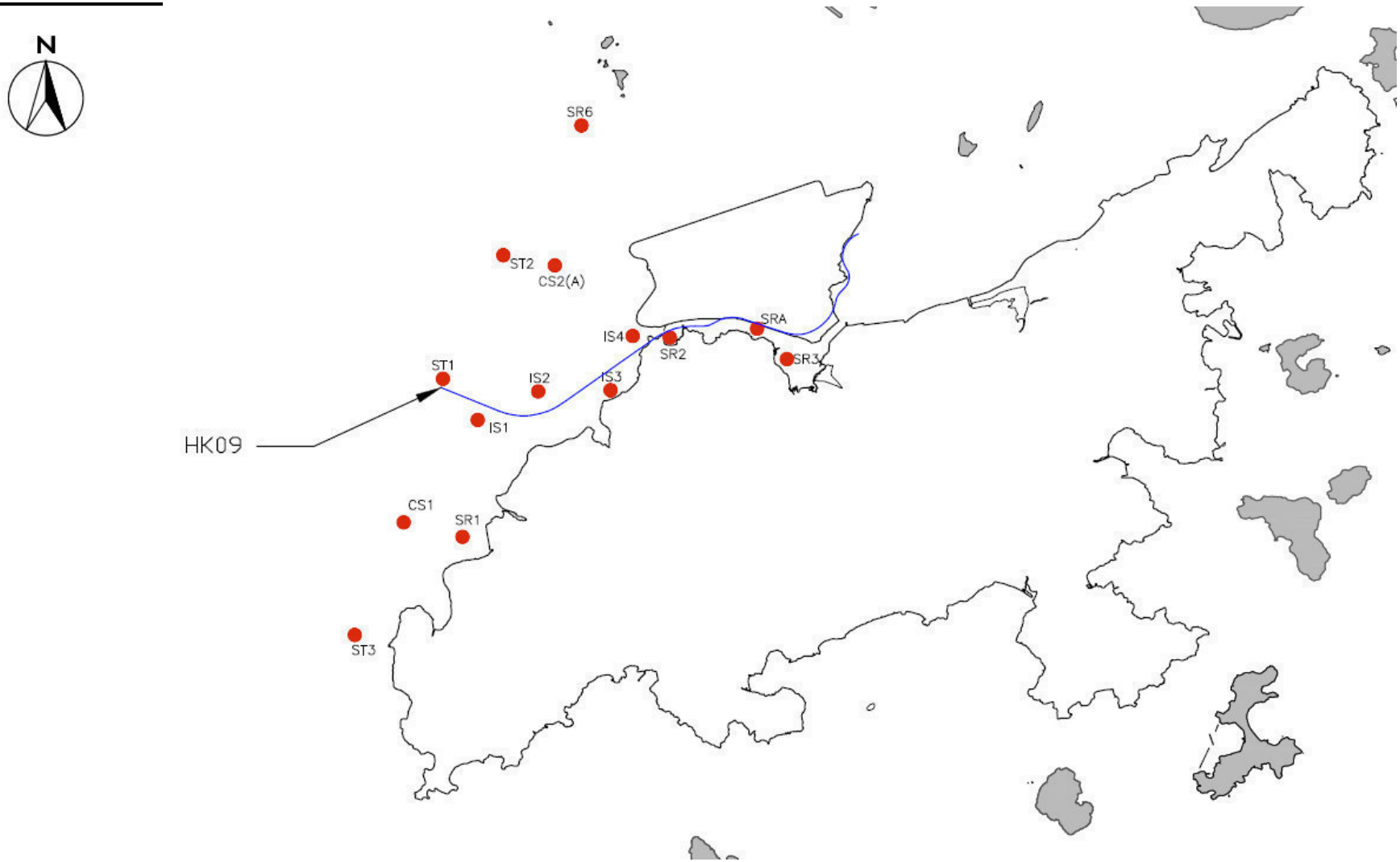
Part B – Conclusion: No direct evidence that the exceedances were due to the Contract, therefore the exceedances are considered due to the other external factors rather than the contract works.

Part C – Recommendation: As the exceedances were not related to the contract works, no further action to be required.

Contract No. HY/2011/09

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

Location Plan:



Reviewed by: Dr. Priscilla Choy

Title: Environmental Team Leader

Date: 3 January 2018

APPENDIX M
SITE AUDIT SUMMARY

Contract HY/2011/09

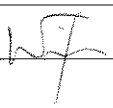
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	171205
Date	5 December 2017 (Tuesday)
Time	9:15-12:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
171205-R02	• Water spraying should be provided to the scrabbling works at P57 for dust suppression.	D15
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
171205-R01	• Housekeeping should be enhanced at P56.	F1i,1iii,4ii
171205-R03	• Chemical containers at P55 should be provided with proper chemical label and drip tray.	F2iii,8
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:171128), follow up action is required for the item 171128-R01.	

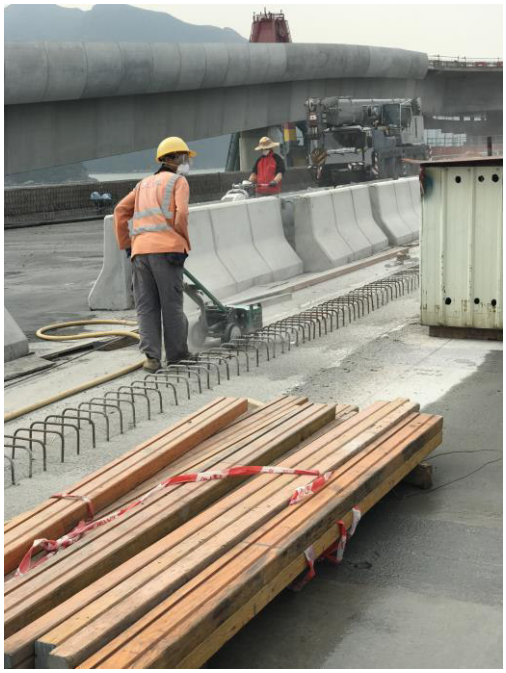
	Name	Signature	Date
Recorded by	Cecilia Yang		5 December 2017
Checked by	Dr. Priscilla Choy		5 December 2017

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Environmental Observations Identified during the Environmental Site Inspection (5 December 2017)

	**Ref No:** 171205-R01 **Impact:** Waste / Chemical Management (F1i,1iii,4ii) **Details:** Housekeeping should be enhanced at P56.
	**Ref No:** 171205-R02 **Impact:** Air Quality (D15) **Details:** Water spraying should be provided to the scrabbling works at P57 for dust suppression.

Ref No: 171205-R03

Impact:
Waste / Chemical Management (F2iii,8)

Details:

Chemical containers at P55 should be provided with proper chemical label and drip tray.

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	171212
Date	12 December 2017 (Tuesday)
Time	9:30-12:00; 13:30-16:30

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
171212-R03	• Cement bags at P113 Portion C should be covered by impervious sheet.	D20
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
171212-R01	• Oil stain at P106 Portion C should be cleared as chemical waste.	F8
171212-R02	• Housekeeping at P111-112 Portion C should be enhanced.	F1i,1iii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:171205), all identified environmental deficiency was observed improved/rectified by the Contractor.	

	Name	Signature	Date
Recorded by	Cecilia Yang		12 December 2017
Checked by	Dr. Priscilla Choy		12 December 2017

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Environmental Observations Identified during the Environmental Site Inspection (12 December 2017)

	**Ref No:** 171212-R01 **Impact:** Waste / Chemical Management (F8) **Details:** Oil stain at P106 Portion C should be cleared as chemical waste.

Ref No: 171212-R02

Impact:
Waste / Chemical Management (F1i,1iii)

Details:

Housekeeping at P111-112 Portion C should be enhanced.

Ref No: 171212-R03

Impact:
Air Quality (D20)

Details:

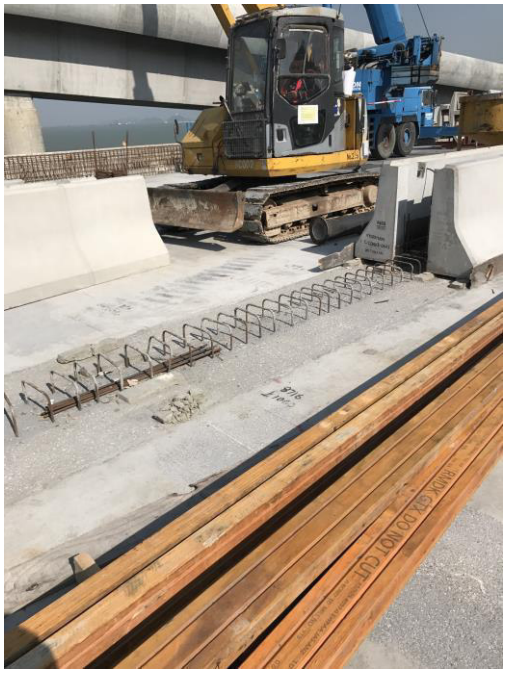
Cement bags at P113 Portion C should be covered by impervious sheet.

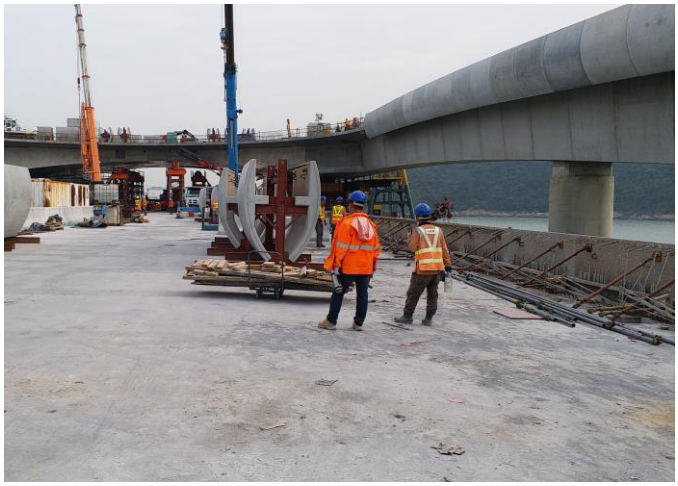
Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Rectification Actions taken by the Contractor for Environmental Deficiencies Identified during Previous Audit Session

	**Ref No:** 171205-R01 **Impact:** Waste / Chemical Management (F1i,1iii,4ii) **Details:** Housekeeping should be enhanced at P56. **Follow-up:** Housekeeping was enhanced at P56.
	**Ref No:** 171205-R02 **Impact:** Air Quality (D15) **Details:** Water spraying should be provided to the scrabbling works at P57 for dust suppression. **Follow-up:** Scrabbling works at P57 was completed.

	**Ref No:** 171205-R03 **Impact:** Waste / Chemical Management (F2iii,8) **Details:** Chemical containers at P55 should be provided with proper chemical label and drip tray. **Follow-up:** Chemical containers at P55 were removed.
	**Ref No:** 171128-R01 **Impact:** Air Quality (D15) **Details:** Breaking work at Portion C P112 should be provided with water spray for dust suppression. **Follow-up:** Breaking work at Portion C P112 was completed.

Contract HY/2011/09

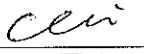
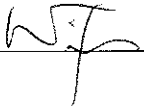
Hong Kong-Zhuhai-Macao Bridge

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

Weekly Site Inspection Record Summary

Checklist Reference Number	171219
Date	19 December 2017 (Tuesday)
Time	9:30-12:00

Ref. No.	Non-Compliance	Related Item No.
-	None identified	-
Ref. No.	**Remarks/Observations**	**Related Item No.**
	B. Water Quality	
	• No environmental deficiency was identified during site inspection.	
	C. Ecology	
	• No environmental deficiency was identified during site inspection.	
	D. Air Quality	
171219-R02	• Dusty material at P55 should be covered by impervious sheet or removed.	D7
171219-R03	• NRMM label should be provided to the generator at P56 and replaced on the equipment at P57.	D26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
171219-R01	• Housekeeping at P56 should be enhanced.	F4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:171212), follow up action is required for the item 171212-R01 to R03.	

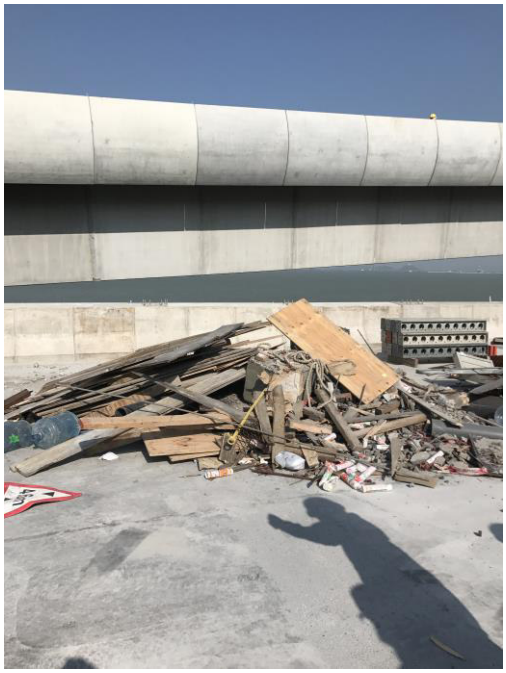
	Name	Signature	Date
Recorded by	Cecilia Yang		19 December 2017
Checked by	Dr. Priscilla Choy		19 December 2017

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Environmental Observations Identified during the Environmental Site Inspection (19 December 2017)

	**Ref No:** 171219-R01 **Impact:** Waste / Chemical Management (F4ii) **Details:** Housekeeping at P56 should be enhanced.
	**Ref No:** 171219-R02 **Impact:** Air Quality (D7) **Details:** Dusty material at P55 should be covered by impervious sheet or removed.

Ref No: 171219-R03

Impact:
Air Quality (D26)

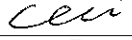
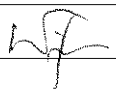
Details:

NRMM label should be provided to the generator at P56 and replaced on the equipment at P57.

Weekly Site Inspection Record Summary

Checklist Reference Number	171227
Date	27 December 2017 (Tuesday)
Time	9:30-12:00; 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	
171227-R02	• Dusty material at P55 should be covered by impervious sheet or removed.	D7
171227-R03	• NRMM label should be replaced on the generator at P57 and WA4.	D26
	E. Noise	
	• No environmental deficiency was identified during site inspection.	
	F. Waste / Chemical Management	
171227-R01	• Housekeeping at P56 should be enhanced.	F4ii
	G. Permits/Licences	
	• No environmental deficiency was identified during site inspection.	
	H. Others	
	• Follow-up on previous audit section (Ref. No.:171219), item 171219-R01, 171219-R02 and 171219-R03 were found outstanding and remarked as 171227-R01, 171227-R02 and 171227-R03.	

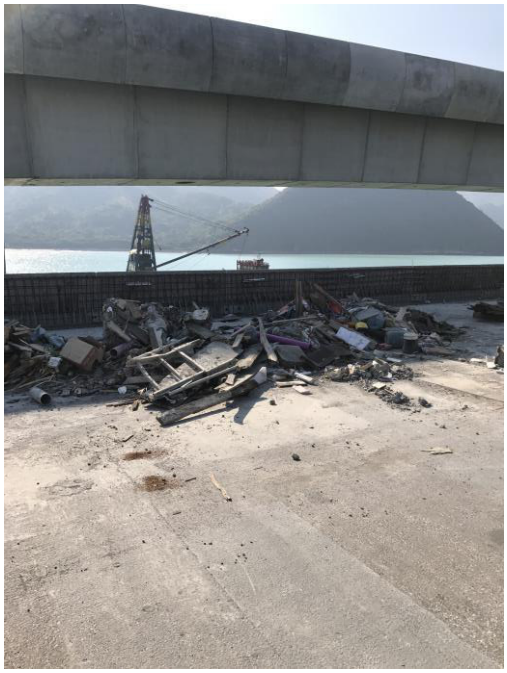
	Name	Signature	Date
Recorded by	Cecilia Yang		27 December 2017
Checked by	Dr. Priscilla Choy		27 December 2017

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Environmental Observations Identified during the Environmental Site Inspection (27 December 2017)

	**Ref No:** 171227-R01 **Impact:** Waste / Chemical Management (F4ii) **Details:** Housekeeping at P56 should be enhanced.
	**Ref No:** 171227-R02 **Impact:** Air Quality (D7) **Details:** Dusty material at P55 should be covered by impervious sheet or removed.

Ref No: 171227-R03

Impact:
Air Quality (D26)

Details:

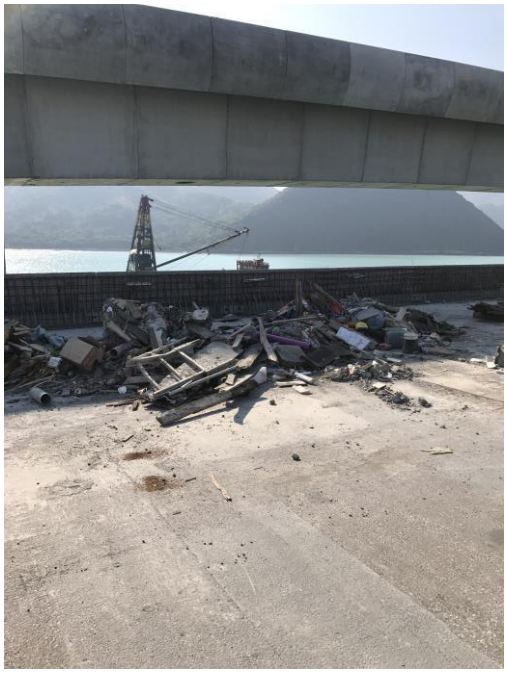
NRMM label should be replaced on the generator at P57 and WA4.

Contract HY/2011/09

Hong Kong-Zhuhai-Macao Bridge

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

Rectification Actions taken by the Contractor for Environmental Deficiencies Identified during Previous Audit Session

	**Ref No:** 171219-R01 **Impact:** Waste / Chemical Management (F4ii) **Details:** Housekeeping at P56 should be enhanced. **Follow-up:** Housekeeping at P56 was still found not enhanced during inspection. This item was remarked as 171227-R01.
	**Ref No:** 171219-R02 **Impact:** Air Quality (D7) **Details:** Dusty material at P55 should be covered by impervious sheet or removed. **Follow-up:** Dusty material at P55 was still observed during inspection. This item was remarked as 171227-R02.

Ref No: 171219-R03

Impact:
Air Quality (D26)

Details:

NRMM label should be provided to the generator at P56 and replaced on the equipment at P57.

Follow-up:

The generator at P56 was removed. The NRMM label on the equipment at P57 still found faded during inspection. This item was remarked as 171227-R03.

Ref No: 171212-R01

Impact:
Waste / Chemical Management (F8)

Details:

Oil stain at P106 Portion C should be cleared as chemical waste.

Follow-up:

Oil stain at P106 Portion C was cleared.

Ref No: 171212-R02

Impact:
Waste / Chemical Management (F1i,1iii)

Details:

Housekeeping at P111-112 Portion C should be enhanced.

Follow-up:

Housekeeping at P111-112 Portion C was enhanced.

Ref No: 171212-R03

Impact:
Air Quality (D20)

Details:

Cement bags at P113 Portion C should be covered by impervious sheet.

Follow-up:

Cement bags at P113 Portion C was covered by impervious sheet.

Photo 1

Photo 2

Photo 3

Photo 4

Photo 5

Photo 6

CINOTECH 漢蒝 consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S. Project No. MA12014	DATE Dec-17 Appendix M1

Photo 7

Photo 8

Photo 9

Photo 10

Photo 11

Photo 12

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S. Project No. MA12014	DATE Dec-17 Appendix M2

Photo 13

Photo 14

Photo 15

Photo 16

Photo 17

Photo 18

CINOTECH 漢騰 consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M3

Photo 19

Photo 20

Photo 21

Photo 22

Photo 23

Photo 24

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M4

Photo 25

Photo 26

Photo 27

Photo 28

Photo 29

Photo 30

CINOTECH 漢蘇 consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S. Project No. MA12014	DATE Dec-17 Appendix M5

Photo 31

Photo 32

Photo 33

Photo 34

Photo 35

Photo 36

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S. Project No. MA12014	DATE Dec-17 Appendix M6

Photo 37

Photo 38

Photo 39

Photo 40

Photo 41

Photo 42

CINOTECH 漢蘇 consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M7

Photo 43

Photo 44

Photo 45

Photo 46

Photo 47

Photo 48

CINOTECH 漢臻 consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M8

Photo 49

Photo 50

Photo 51

Photo 52

Photo 53

Photo 54

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M9

Photo 55

Photo 56

Photo 57

Photo 58

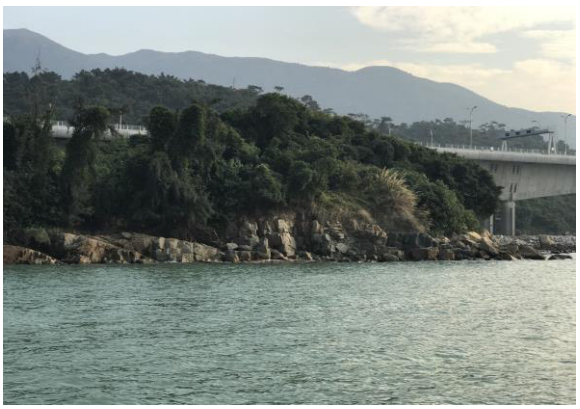


Photo 59

Photo 60

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M10

Photo 61

Photo 62

Photo 63

Photo 64

Photo 65

Photo 66

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S.	DATE Dec-17
		Project No. MA12014	Appendix M11

Photo 67

Photo 68

Photo 69

Photo 70

Photo 71

Photo 72

CINOTECH consultants limited	Contract HY/2011/09 Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road-Section between HKSAR Boundary and Scenic Hill Photographic Records for Sha Lo Wan (West) Archaeological Site	SCALE N.T.S. Project No. MA12014	DATE Dec-17 Appendix M12

APPENDIX N
UPDATED ENVIRONMENTAL MITIGATION IMPLEMENTATION SCHEDULE (EMIS)

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

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

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

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

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

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

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

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

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

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

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

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved; • adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; • all vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash; and • the works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.					^ ^ ^
S9.11.1.3	W2	<u>*Land Works*</u> General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: • wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; • sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; • storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt	To control construction water quality	Contractor	During seawall dredging and filling	Construction stage	^ N/A ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; • silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; • temporary access roads should be surfaced with crushed stone or gravel; • rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; • measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; • open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; • manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; • discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; • all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit;					^ ^ ^ ^ ^ ^ ^

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to Implement the measures?	Implementation Status
		• wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; • the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; • wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; • vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; • the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; • waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; • all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and • surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.					^ ^ ^ N/A ^ ^ ^ ^
S9.14	W3	Implement a water quality monitoring programme	Control water quality	Contractor	At identified	During	^

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

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

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

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

Remarks: ^ Compliance of mitigation measure

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

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

APPENDIX O
WASTE GENERATION IN THE REPORTING MONTH

Appendix: C6 Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No.: HY/2011/09

Monthly Summary Waste Flow Table for 2017 (Year)

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated[9]	Hard Rock and Large Broken Concrete[6]	Reused in the Contract[7]	Reused in other Projects[5,7,11]	Disposed as Public Fill[7]	Imported Fill[6,7]	Metals[10]	Paper/ cardboard packaging	Plastics[3]	Chemical Waste	Others, e.g. general refuse[7]
	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 m^3)	(in '000 kg)	(in '000 kg)	(in '000 kg)	(in '000 m^3)
Jan	0.355	0.000	0.000	0.000	0.355	0.000	0.069	0.746	0.000	0.000	0.286
Feb	7.781	0.000	0.000	0.000	7.781	0.000	0.026	1.153	0.000	0.000	0.306
Mar	7.807	0.000	0.000	2.565	5.242	0.000	0.456	0.704	0.000	0.000	0.325
Apr	8.177	0.000	0.000	5.778	2.400	0.000	0.017	0.838	0.000	0.000	0.325
May	7.075	0.000	0.000	6.094	0.982	0.000	0.036	0.847	0.000	1.982	0.358
Jun	0.561	0.000	0.000	0.000	0.561	0.000	0.064	0.674	0.000	0.000	0.332
Sub-Total	31.756	0.000	0.000	14.436	17.319	0.000	0.669	4.962	0.000	1.982	1.931
Jul	9.806	0.000	0.000	9.331	0.475	0.000	0.021	0.689	0.000	1.982	0.371
Aug	1.762	0.000	0.000	0.502	1.261	0.000	0.028	1.275	0.000	0.000	0.449
Sep	6.076	0.000	0.000	0.000	6.076	0.000	0.104	0.668	0.000	0.000	0.423
Oct	1.594	0.000	0.000	0.000	1.594	0.000	0.029	0.453	0.000	0.000	0.559
Nov	7.762	0.000	0.000	0.000	7.762	0.000	0.073	0.556	0.000	0.000	0.774
Dec	2.659	0.000	0.000	0.000	2.659	0.000	0.033	0.694	0.000	0.000	0.780
Total	61.415	0.000	0.000	24.269	37.146	0.000	0.956	9.297	0.000	3.964	5.285

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)
309.000	0.000	5.000	100.000	150.000	54.000	6.500	50.000	0.000	35.000	20.000

Notes:

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

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

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

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

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

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

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

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

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

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

(11) The C&D materials were delivered to XRL 8217, HY/2012/08, HK/2009/02 Projects and Tailor Recycled Aggregates Limited.

APPENDIX P
COMPLAINT LOG

Appendix P - Complaint Log

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Log Ref.	Location	Received Date	Details of Complaint	Investigation/ Mitigation Action	Status
				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 Q
SUMMARY OF SUCCESSFUL PROSECUTION

Appendix Q - 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.