

**Contract No. HY/2012/08
Tuen Mun - Chek Lap Kok Link -
Northern Connection Sub-sea Tunnel
Section**

*Twenty-fifth Quarterly Environmental
Monitoring & Audit (EM&A) Report*

29 April 2020

Environmental Resources Management
2507, 25/F
One Harbourfront
18 Tak Fung Street
Hung Hom, Kowloon
Hong Kong
Telephone 2271 3000
Facsimile 2723 5660
www.erm.com



Contract No. HY/2012/08

Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

Environmental Resources Management

2507, 25/F
 One Harbourfront
 18 Tak Fung Street
 Hunghom, Kowloon
 Hong Kong
 Telephone: (852) 2271 3000
 Facsimile: (852) 2723 5660
 E-mail: post.hk@erm.com
 http://www.erm.com

Twenty-fifth Quarterly Environmental Monitoring & Audit (EM&A) Report

Document Code: 0212330_25th Quarterly EM&A_20200429.doc

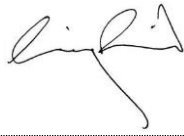
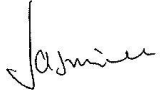


Client: DBJV		Project No: 0212330			
Summary: This document presents the Twenty-fifth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 29 April 2020			
		Approved by: 			
		<i>Mr Craig Reid</i> Partner			
		Certified by: 			
		<i>Dr Jasmine Ng</i> ET Leader			
	25 th Quarterly EM&A Report	VAR	JN	CAR	29/04/20
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		Distribution <input type="checkbox"/> Internal <input checked="" type="checkbox"/> Public <input type="checkbox"/> Confidential		 	

TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>I</i>
<i>1</i>	<i>INTRODUCTION</i>	<i>1</i>
<i>1.1</i>	<i>BACKGROUND</i>	<i>1</i>
<i>1.2</i>	<i>SCOPE OF REPORT</i>	<i>2</i>
<i>1.3</i>	<i>ORGANIZATION STRUCTURE</i>	<i>2</i>
<i>1.4</i>	<i>SUMMARY OF CONSTRUCTION WORKS</i>	<i>3</i>
<i>2</i>	<i>EM&A RESULTS</i>	<i>5</i>
<i>2.1</i>	<i>AIR QUALITY</i>	<i>5</i>
<i>2.2</i>	<i>WATER QUALITY MONITORING</i>	<i>7</i>
<i>2.3</i>	<i>DOLPHIN MONITORING</i>	<i>9</i>
<i>2.4</i>	<i>EM&A SITE INSPECTION</i>	<i>13</i>
<i>2.5</i>	<i>WASTE MANAGEMENT STATUS</i>	<i>15</i>
<i>2.6</i>	<i>ENVIRONMENTAL LICENSES AND PERMITS</i>	<i>16</i>
<i>2.7</i>	<i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>	<i>18</i>
<i>2.8</i>	<i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i>	<i>18</i>
<i>2.9</i>	<i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>	<i>20</i>
<i>3</i>	<i>FUTURE KEY ISSUES</i>	<i>21</i>
<i>3.1</i>	<i>CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER</i>	<i>21</i>
<i>3.2</i>	<i>KEY ISSUES FOR THE COMING QUARTER</i>	<i>21</i>
<i>3.3</i>	<i>MONITORING SCHEDULE FOR THE COMING QUARTER</i>	<i>21</i>
<i>4</i>	<i>CONCLUSIONS</i>	<i>22</i>

<i>APPENDIX A</i>	<i>PROJECT ORGANIZATION</i>
<i>APPENDIX B</i>	<i>CONSTRUCTION PROGRAMME</i>
<i>APPENDIX C</i>	<i>ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULES (EMIS)</i>
<i>APPENDIX D</i>	<i>ACTION AND LIMIT LEVELS</i>
<i>APPENDIX E</i>	<i>MONITORING SCHEDULE</i>
<i>APPENDIX F</i>	<i>AIR QUALITY MONITORING RESULTS</i>
<i>APPENDIX G</i>	<i>WATER QUALITY MONITORING RESULTS</i>
<i>APPENDIX H</i>	<i>IMPACT DOLPHIN MONITORING</i>
<i>APPENDIX I</i>	<i>EVENT AND ACTION PLAN</i>
<i>APPENDIX J</i>	<i>CUMULATIVE STATISTICS ON EXCEEDANCE AND COMPLAINT</i>
<i>APPENDIX K</i>	<i>WASTE FLOW TABLE</i>

EXECUTIVE SUMMARY

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of the Tuen Mun – Chek Lap Kok Link Project (TM-CLK Link Project) while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with *Environmental Permit No. EP-354/2009/A*. Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO). Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in early 2020. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Twenty-fifth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 December 2019 to 29 February 2020 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the “Contract”) in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, the major activities in the reporting quarter included:

Land-based Works

- Construction of Thermal barrier – TBM tunnel;
- Construction of Walkway Corbel & Cover – TBM Tunnel;
- Road & Drainage works – Portion N-A;
- C&C Tunnel RC structure – Portion S-A;
- Roofing System Installation – Portion S-A;
- Road & Drainage works – Portion S-B & S-C

Marine-based Works

- Seawall Modification Works – Portion S-B

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

24-hour TSP Monitoring	30 sessions
1-hour TSP Monitoring	30 sessions

Water Quality Monitoring ⁽¹⁾	12 sessions
Impact Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection ⁽²⁾	9 sessions

Implementation of Marine Mammal Exclusion Zone

Daily marine mammal exclusion zone was conducted in December 2019 during the period of silt curtain installation in open waters under this Contract. No sighting of the Indo-Pacific humpback dolphin (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring.

No marine works were undertaken since 30 December 2019, therefore, daily 250 m marine mammal exclusion zone monitoring was not undertaken since 30 December 2019.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

Four (4) Action Level and One (1) Limit Level exceedances of 1-hour TSP were recorded in this reporting period. Investigation reports are provided in Appendix J.

Breaches of Action and Limit Levels for Water Quality

No Action Level and Limit Level exceedance was recorded in the water quality monitoring.

Dolphin Monitoring

Whilst one (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2019 and February 2020, no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations during the dolphin monitoring in this reporting quarter.

Environmental Complaints, Non-compliance & Summons

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the construction of this Contract was recorded in this reporting period.

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

- (1) Seawall Modification Works has been completed on 30 December 2019. No marine works were carried out since 30 December 2019. Water Quality Monitoring was suspended since 30 December 2019.
- (2) Site inspection on 29 January, 5, 12 and 19 February 2020 were cancelled due to site closure during outbreak of novel coronavirus (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Reporting Change

Seawall Modification Works has been completed on 30 December 2019. Water Quality Monitoring was suspended since 30 December 2019. No marine works were carried out in the reporting month.

Upcoming Works for the Next Reporting Period

Works to be undertaken in the coming quarterly period include the following:
Land-based Works

- Construction of Thermal barrier – TBM tunnel;
- Construction of Walkway Corbel & Cover – TBM Tunnel;
- Road & Drainage works – Portion N-A;
- C&C Tunnel RC structure – Portion S-A;
- Roofing System Installation – Portion S-A;
- D-wall cut – Portion S-A;
- Tower Crane Removal – Portion S-A;
- Removal of Access Tower – Portion S-B;
- Gantry Crane Removal – Portion S-B;
- Road & Drainage works – Portion S-B & S-C

Future Key Issues

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are expected to be mainly associated with dust, marine ecology and waste management issues.

1.1

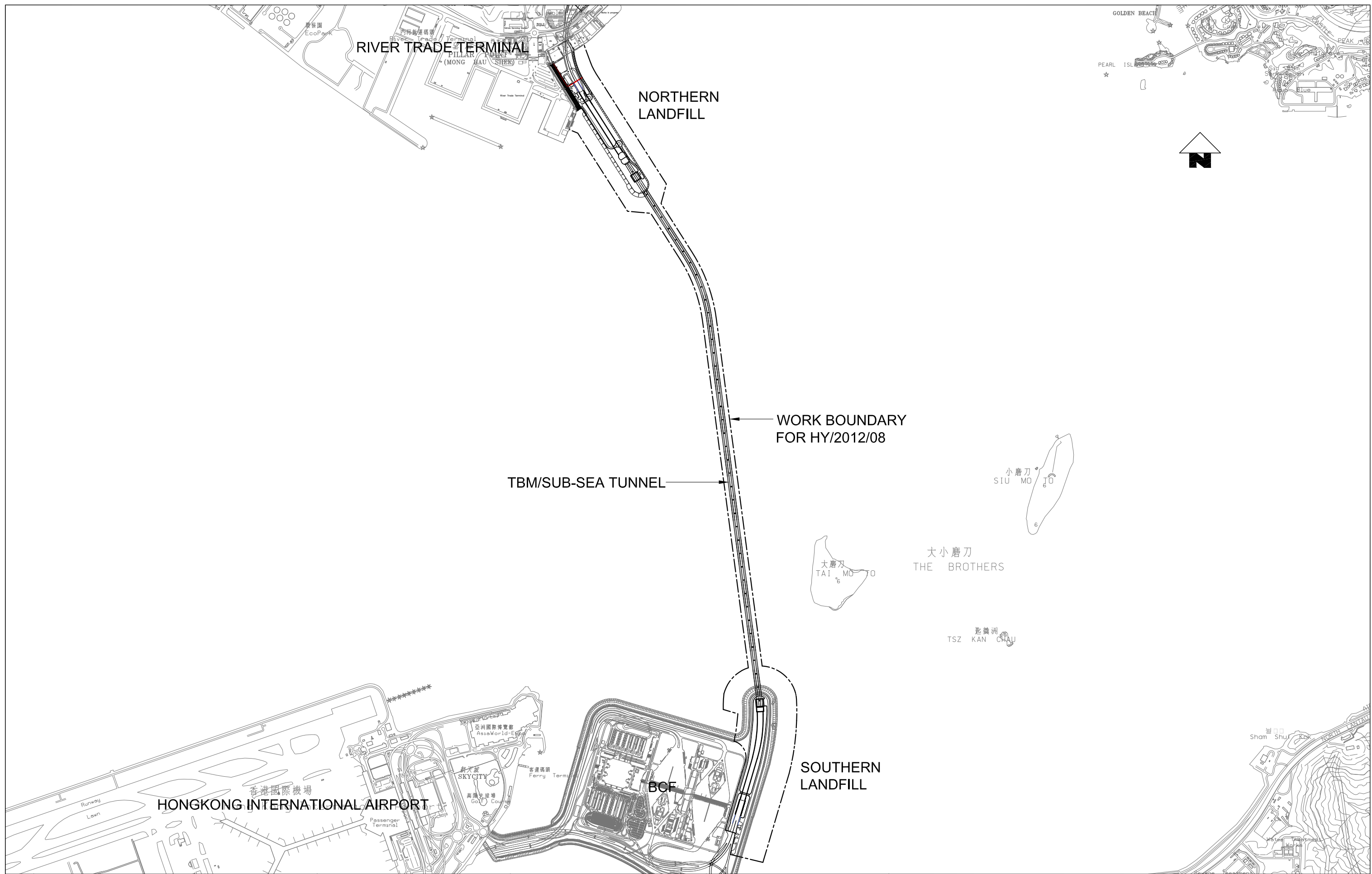
BACKGROUND

According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated increase in cross boundary traffic, developments in the Northwest New Territories (NWNT), and possible developments in North Lantau, including the Airport developments, the Lantau Logistics Park (LLP) and the Hong Kong – Zhuhai – Macao Bridge (HZMB). In order to cope with the anticipated traffic demand, two new road sections between NWNT and North Lantau – Tuen Mun – Chek Lap Kok Link (TM-CLKL) and Tuen Mun Western Bypass (TMWB) are proposed.

An Environmental Impact Assessment (EIA) of TM-CLKL (the Project) was prepared in accordance with the EIA Study Brief (No. ESB-175/2007) and the *Technical Memorandum of the Environmental Impact Assessment Process (EIAO-TM)*. The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number AEIAR-146/2009), an Environmental Permit (EP-354/2009) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (VEP) (EP-354/2009/A) was issued on 8 December 2010. Subsequent applications for variation of environmental permits (VEP), *EP-354/2009/B*, *EP-354/2009/C* and *EP-354/2009/D*, were granted on 28 January 2014, 10 December 2014 and 13 March 2015, respectively.

Under *Contract No. HY/2012/08*, Dragages – Bouygues Joint Venture (DBJV) is commissioned by the Highways Department (HyD) to undertake the design and construction of the Northern Connection Sub-sea Tunnel Section of TM-CLKL while AECOM Asia Company Limited was appointed by HyD as the Supervising Officer. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, ERM-Hong Kong, Limited (ERM) has been appointed as the Environmental Team (ET) in accordance with Environmental Permit No. EP-354/2009/A. Ramboll Hong Kong Ltd. was employed by HyD as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO).

Layout of the Contract components is presented in *Figure 1.1*.



Designed By	PKV	Date	11SEP2013
Drawn By	DAI	Checked	PKV
Approved By	SPo	Date	11SEP2013
Rev.	Description	Date	Checked
A	FIRST ISSUE	11SEP13	PKV

Main Contractor

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

路政署
HIGHWAYS DEPARTMENT

Contractor's Designer

Arup Ove Arup & Partners
Hong Kong Limited

Project

Contract No. HY/2012/08
Tuen Mun - Chek Lap Kok Link -
Northern Connection Sub-Sea Tunnel Section

Drawing Title

Figure 1.1

Drawing no.	TMCLKL8-DBJ-GEN-DWG-00174
Scale	1:25000 @ A3
CADD Ref.	TMCLKL8-DBJ-GEN-DWG-00174-DFT-A
Issue Status	DFT (DRAFT)
Revision	A

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in early 2020. The impact monitoring phase of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

1.2 SCOPE OF REPORT

This is the Twenty-fifth Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 December 2019 to 29 February 2020.

1.3 ORGANIZATION STRUCTURE

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

Table 1.1 *Contact Information of Key Personnel*

Party	Position	Name	Telephone	Fax
Highways Department	Engr 24/SD	Ken T.M. Cheng	2762 4062	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Roger Man	2293 6388	2293 6300
ENPO / IEC (Ramboll Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Deputy Environmental Manager	Bryan Lee	2293 7323	2293 7499
	24-hour hotline		2293 7330	
ET (ERM-HK)	ET Leader	Jasmine Ng	2271 3311	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

The construction phase of this Contract was commenced on 1 November 2013. The construction programme is shown in *Appendix B*.

As per DBJV's information, details of major construction works carried out in this reporting period are summarized in *Table 1.2*.

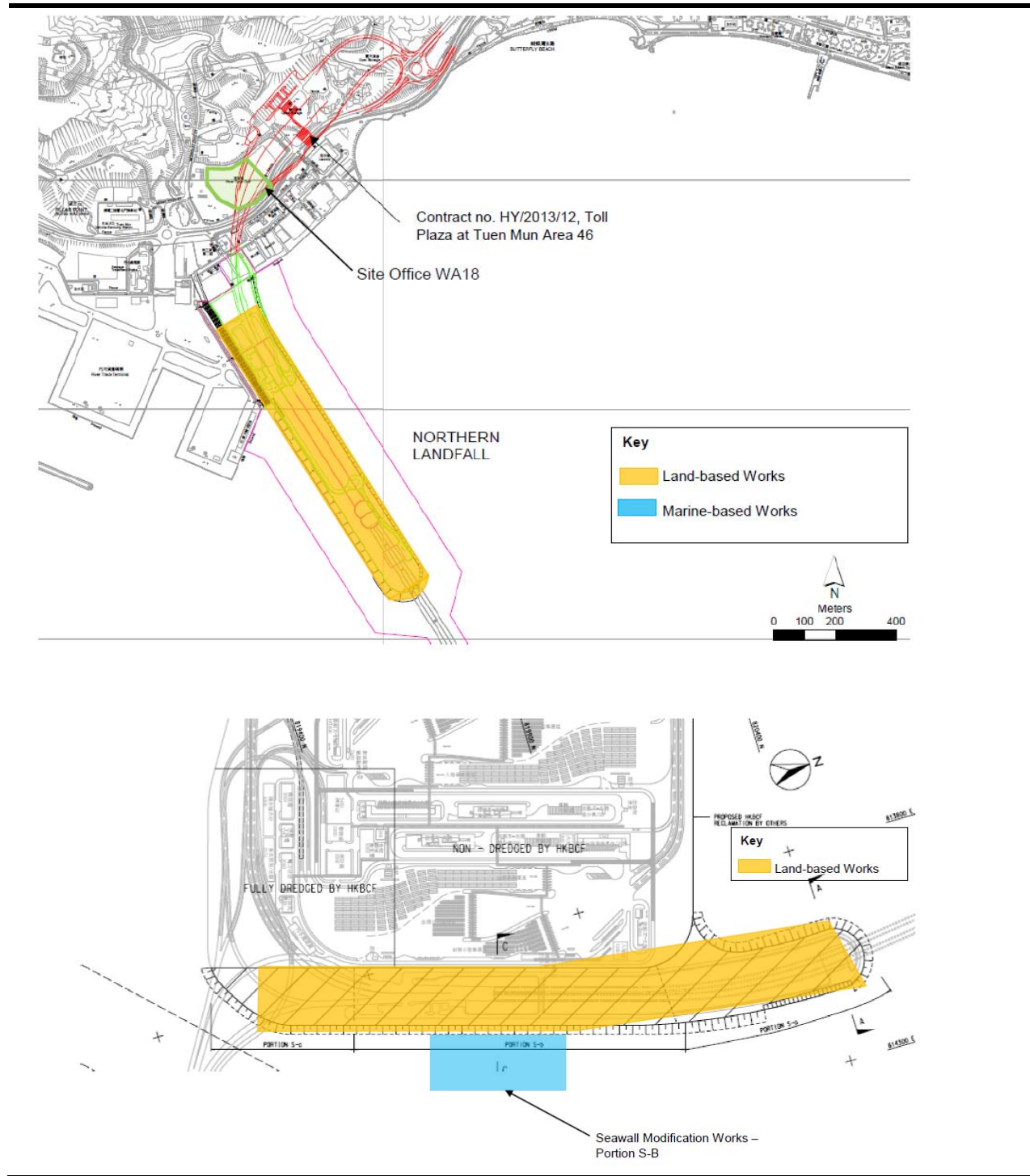
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Contract are shown in *Figure 1.3*.

The implementation schedule of environmental mitigation measures is presented in *Appendix C*.

Table 1.2 *Summary of Construction Activities Undertaken during the Reporting Period*

Construction Activities Undertaken
<i>Land-based Works</i>
<ul style="list-style-type: none">• Construction of Thermal barrier – TBM tunnel;• Construction of Walkway Corbel & Cover – TBM Tunnel;• Road & Drainage works – Portion N-A;• C&C Tunnel RC structure – Portion S-A;• Roofing System Installation – Portion S-A;• Road & Drainage works – Portion S-B & S-C
<i>Marine-based Works</i>
<ul style="list-style-type: none">• Seawall Modification Works – Portion S-B

Figure 1.2 Locations of Construction Activities - December 2019 to February 2020



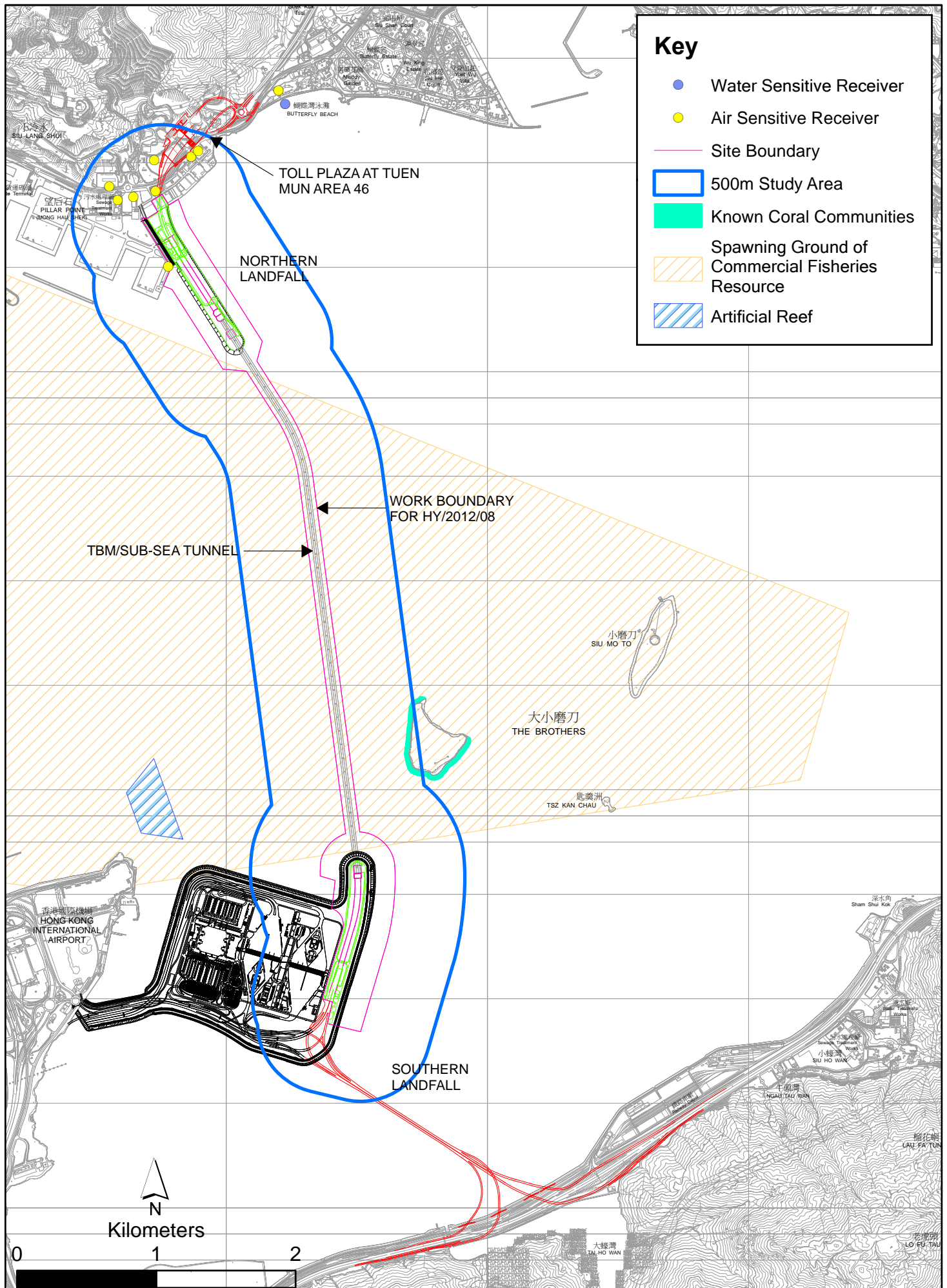


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

File: T:\GIS\CONTRACT\0212330\I\mxd\0212330_EMnA_Env_Sensitive_Receiver.mxd
Date: 15/4/2014

The EM&A programme required environmental monitoring for air quality, water quality and marine ecology as well as environmental site inspections for air quality, noise, water quality, waste management, marine ecology and landscape and visual impacts. The EM&A requirements and related findings for each component are summarized in the following sections

2.1 AIR QUALITY

As per the requirements under *Condition 2.4* of *EP-354/2009/D*, the Enhanced TSP Monitoring Plan has been prepared under *Contract No. HY/2012/08*. Details of the monitoring plan are presented in the *Enhanced TSP Monitoring Plan* ⁽¹⁾.

2.1.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual and the *Enhanced TSP Monitoring Plan*, impact 1-hour TSP monitoring was conducted three (3) times in every six (6) days and impact 24-hour TSP monitoring was carried out once in every six (6) days when the highest dust impact was expected. 1-hr and 24-hr TSP monitoring frequency was increased to three times per day every three days and daily every three days respectively as excavation works for launching shaft commenced on 24 October 2014.

High volume samplers (HVSs) were used to carry out the 1-hour and 24-hour TSP monitoring in the reporting quarter at the five (5) air quality monitoring stations in accordance with the requirements stipulated in the Updated EM&A Manual (*Figure 2.1; Table 2.1*). Wind anemometer was installed at the rooftop of ASR5 for logging wind speed and wind direction. Details of the equipment deployed are provided in *Table 2.2*.

Table 2.1 *Locations of Impact Air Quality Monitoring Stations and Monitoring Dates in this Reporting Period*

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	1, 4, 7, 10, 13, 16, 19, 22, 25, 28 and 31 December 2019	Tuen Mun Fireboat Station	Office	TSP monitoring
ASR5	3, 6, 9, 12, 15, 18, 21, 24 and 30 January 2020	Pillar Point Fire Station	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 6 days 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 6 days
AQMS1	2, 5, 8, 11, 14, 17, 20, 23, 26 and 29 February 2020	Previous River Trade Golf	Bare ground	Enhanced TSP monitoring (commenced on 24 October 2014)
ASR6		Butterfly Beach Laundry	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP,

(1) ERM (2013) Enhanced TSP Monitoring Plan. Submitted on 28 October 2013 and subsequently approved by EPD on 1 November 2013.

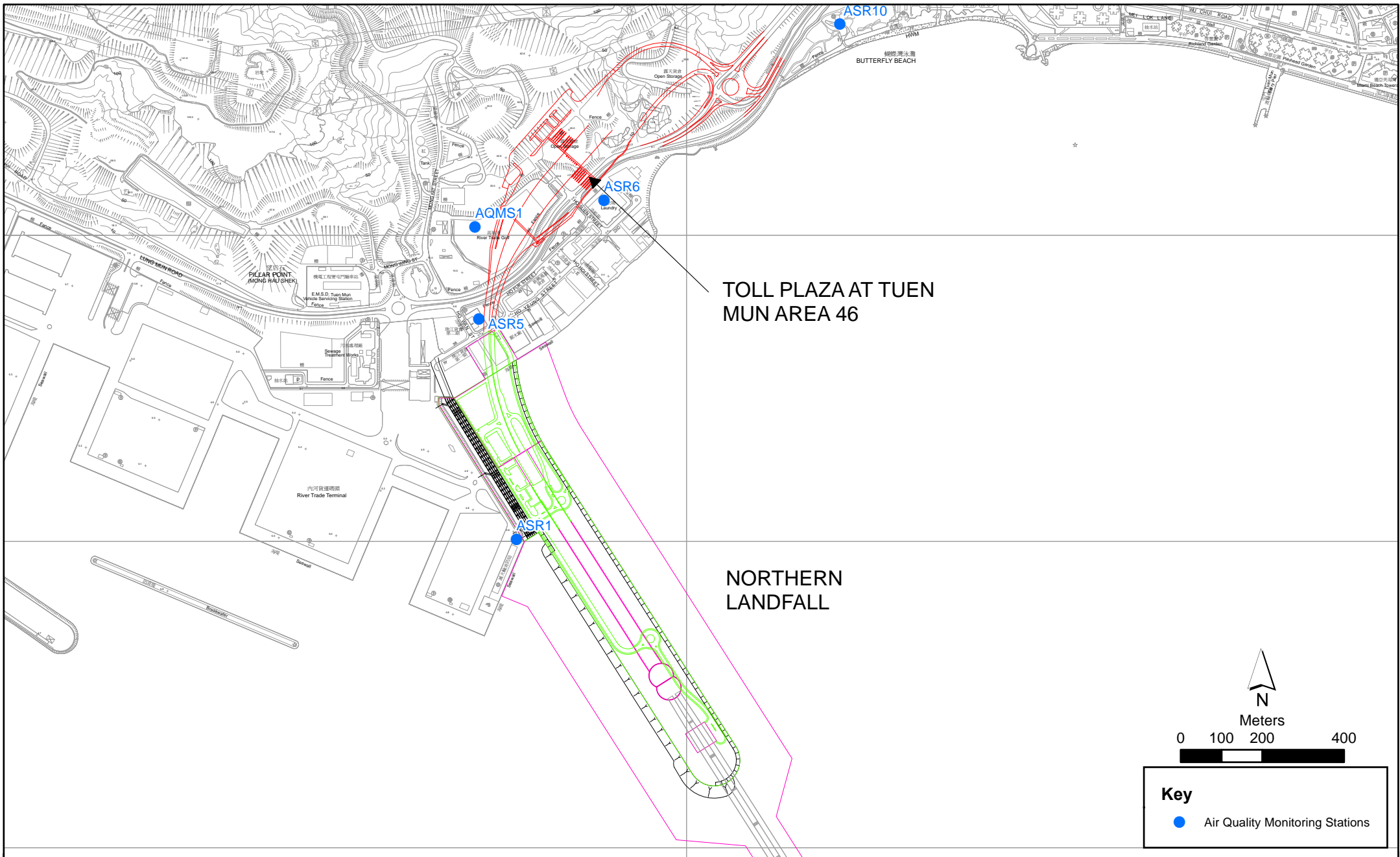


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR10		Butterfly Beach Park	Recreational uses	$\mu\text{g}/\text{m}^3$), 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 3 days

Table 2.2 Air Quality Monitoring Equipment

Equipment	Brand and Model
High Volume Sampler (1-hour TSP and 24-hour TSP)	Tisch Environmental Mass Flow Controlled Total Suspended Particulate (TSP) High Volume Sampler (Model No. TE-5170)
Wind Meter	Davis (Model: Vantage Pro 2 (S/N: AS160104014)
Wind Anemometer for calibration	Lutron (Model No. AM-4201)

2.1.2 Action & Limit Levels

The Action and Limit Levels of the air quality monitoring is provided in *Appendix D*. The Event and Action plan is presented in *Appendix H*.

2.1.3 Monitoring Schedule for the Reporting Quarter

The schedules for air quality monitoring in the reporting quarter are provided in *Appendix E*.

2.1.4 Results and Observations

Impact air quality monitoring was conducted at all designated monitoring stations in the reporting period under favourable weather conditions. The major dust sources in the reporting period include construction activities under the Contract as well as nearby traffic emissions.

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4*, respectively. Monitoring results are presented graphically in *Appendix G* and detailed impact air quality monitoring data were reported in the *Seventy-fourth* to *Seventy-sixth Monthly EM&A Reports*.

Table 2.3 Summary of 1-hour TSP Monitoring Results in this Reporting Period

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December 2019 to February 2020	ASR 1	153	37 - 747	331	500
	ASR 5	175	69 - 380	340	500
	AQMS1	121	26 - 303	335	500
	ASR6	116	34 - 276	338	500
	ASR10	88	28 - 407	337	500

Table 2.4 Summary of 24-hour TSP Monitoring Results in this Reporting Period

Month/Year	Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
December 2019 to	ASR 1	104	22 - 168	213	260
	ASR 5	110	49 - 190	238	260
February 2020	AQMS1	75	30 - 131	213	260
	ASR6	83	36 - 149	238	260
	ASR10	59	30 - 103	214	260

Four (4) Action Level and One (1) Limit Level exceedances of 1-hour TSP Monitoring were recorded in this reporting period. Investigation reports are provided in Appendix J. Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.15*.

2.2 WATER QUALITY MONITORING

The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

2.2.1 Monitoring Requirements & Equipment

In accordance with the approved Environmental Review Report dated 21 March 2018 for the Change in Design of Vertical Seawall to Sloping Seawall on Southern Landfall, Updated Impact water quality monitoring programme and water quality monitoring stations IS17, SR7 and IS(Mf)11 specified under the EM&A Manual for HZMB HKBCF project will be adopted (*Figure 2.2; Table 2.5*).

Results of water quality monitoring were adopted from the published EM&A data of Contract No. HY/2012/07 Tuen Mun-Chek Lap Kok Link - Southern Connection Viaduct Section.

The Action and Limit Levels of the water quality monitoring were adopted from the EM&A Manual for HZMB HKBCF project. The Action and Limit Levels are provided in Appendix D.

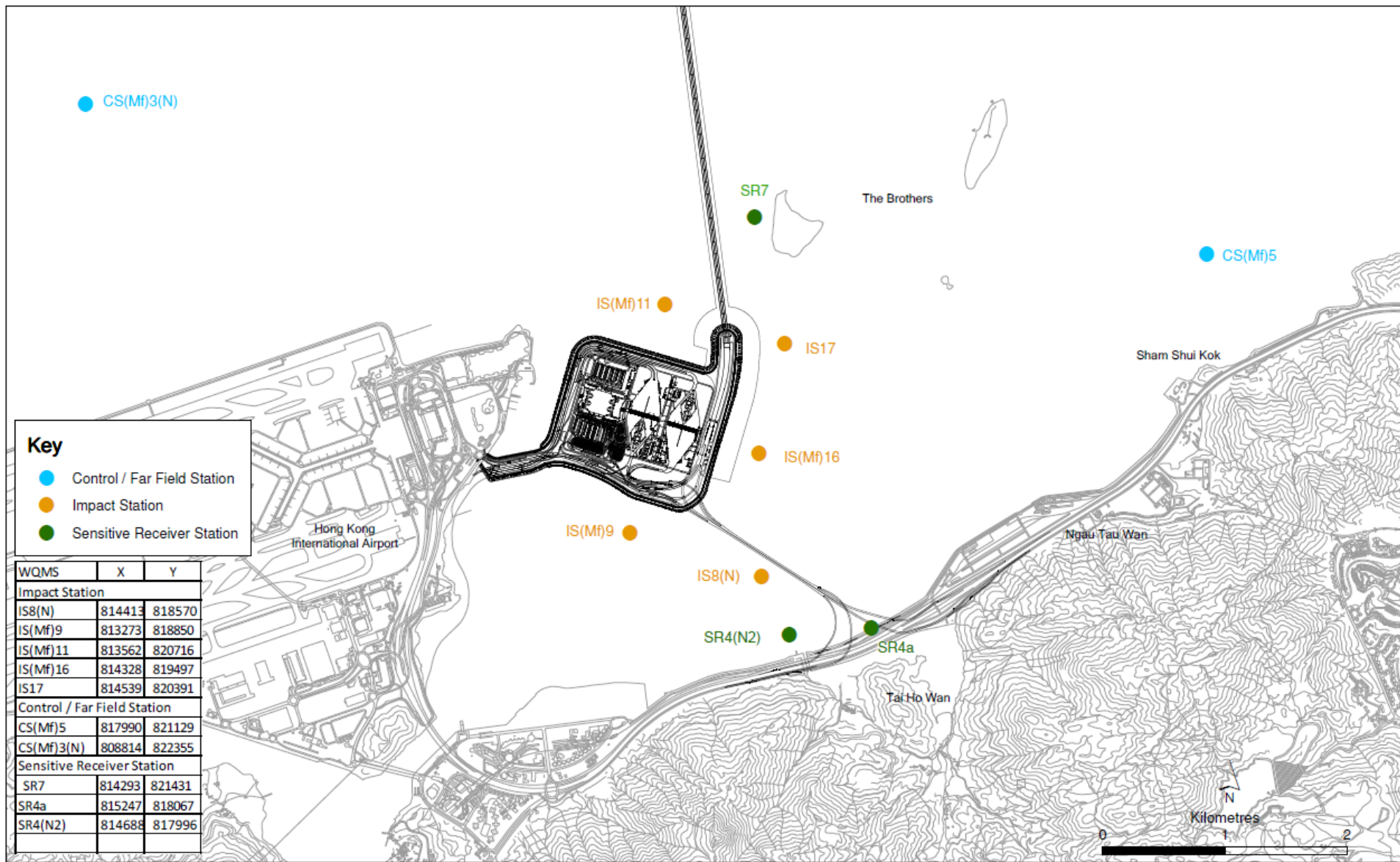


Figure 2.2

Water Quality Monitoring Stations

Table 2.5 *Locations of Water Quality Monitoring Stations and the Corresponding Monitoring Requirements*

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716	<ul style="list-style-type: none"> • Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt) • DO (mg/L and % of saturation) • SS (mg/L) 	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed.	Impact monitoring: 3 days per week, at mid-flood and mid-ebb tides during the construction period of the Contract.
IS17	Impact Station (Close to HKBCF construction site)	814539	820391		If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	
SR7	Sensitive receivers (Tai Mo Do)	814293	821431			
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850			
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497			
IS8(N)	Impact Station (Close to HKBCF construction site)	814413	818570			
SR4(N2)	Sensitive receiver (Tai Ho Inlet)	814688	817996			
SR4a	Sensitive receiver	815247	818067			
CS(Mf)3(N)	Control Station	808814	822355			
CS(Mf)5	Control Station	817990	821129			

***Notes:**

In addition to the parameters presented monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or works underway nearby were also recorded. Water Quality Monitoring Station CS(Mf)3 was relocated to CS(Mf)3(N) since 2 May 2017.

Water Quality Monitoring Station SR4 was relocated to SR4(N) since 2 March 2018.

Water Quality Monitoring Station SR4(N) was relocated to SR4(N2) since 12 June 2019

Water Quality Monitoring Station IS8 was relocated to IS8(N) since 12 June 2019.

Table 2.6 summarizes the equipment used in the impact water quality monitoring programme.

Table 2.6 Water Quality Monitoring Equipment

Equipment	Model
Multi-Parameters	YSI ProDss 00019CB2
Multi-Parameters	YSI ProDss 0001C6A7
Multi-Parameters	YSI ProDss 16H104233
Multi-Parameters	YSI ProDss 17H105557
Multi-Parameters	YSI ProDss 16H104234
Positioning Equipment	Furuno GP-170

2.2.2 Action & Limit Levels

The Action and Limit levels of water quality impact monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.2.3 Monitoring Schedule for the Reporting Period

The schedule for water quality monitoring in the reporting quarter is provided in *Appendix E*.

2.2.4 Results and Observations

Impact water quality monitoring was conducted at all designated monitoring stations in the reporting quarter. No Action Level and Limit Level exceedance was recorded in the water quality monitoring. Results and graphical presentations of impact water quality monitoring are presented in *Appendix G*. Detailed water quality monitoring data were reported in the *Seventy-fourth Monthly EM&A Report*.

2.3 DOLPHIN MONITORING

2.3.1 Monitoring Requirements

Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, Contract No. HY/2012/08 has taken over the responsibility for implementation of dolphin monitoring from HZMB HKLR Contract No. HY/2011/03 since October 2019.

2.3.2 Monitoring Equipment

Table 2.7 summarizes the equipment used for the impact dolphin monitoring.

Table 2.7 Dolphin Monitoring Equipment

Equipment	Model
Global Positioning System (GPS)	Garmin 18X-PC
Camera	Geo One Phottix Nikon D90 300m 2.8D fixed focus Nikon D90 20-300m zoom lens
Laser Binoculars	Infinitor LRF 1000
Marine Binocular	Bushell 7 x 50 marine binocular with compass and reticules
Vessel for Monitoring	65 foot single engine motor vessel with viewing platform 4.5m above water level

2.3.3 Monitoring Parameter, Frequencies & Duration

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

2.3.4 Monitoring Location

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.3*. The co-ordinates of all transect lines are shown in *Table 2.8* below.

Table 2.8 Impact Dolphin Monitoring Line Transect Co-ordinates

Line No.	Easting	Northing	Line No.	Easting	Northing		
1	Start Point	804671	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805476	820800*	14	Start Point	817537	820220
2	End Point	805476	826654	14	End Point	817537	824613
3	Start Point	806464	821150*	15	Start Point	818568	820735
3	End Point	806464	822911	15	End Point	818568	824433
4	Start Point	807518	821500*	16	Start Point	819532	821420
4	End Point	807518	829230	16	End Point	819532	824209
5	Start Point	808504	821850*	17	Start Point	820451	822125
5	End Point	808504	828602	17	End Point	820451	823671
6	Start Point	809490	822150*	18	Start Point	821504	822371
6	End Point	809490	825352	18	End Point	821504	823761
7	Start Point	810499	822000*	19	Start Point	822513	823268
7	End Point	810499	824613	19	End Point	822513	824321

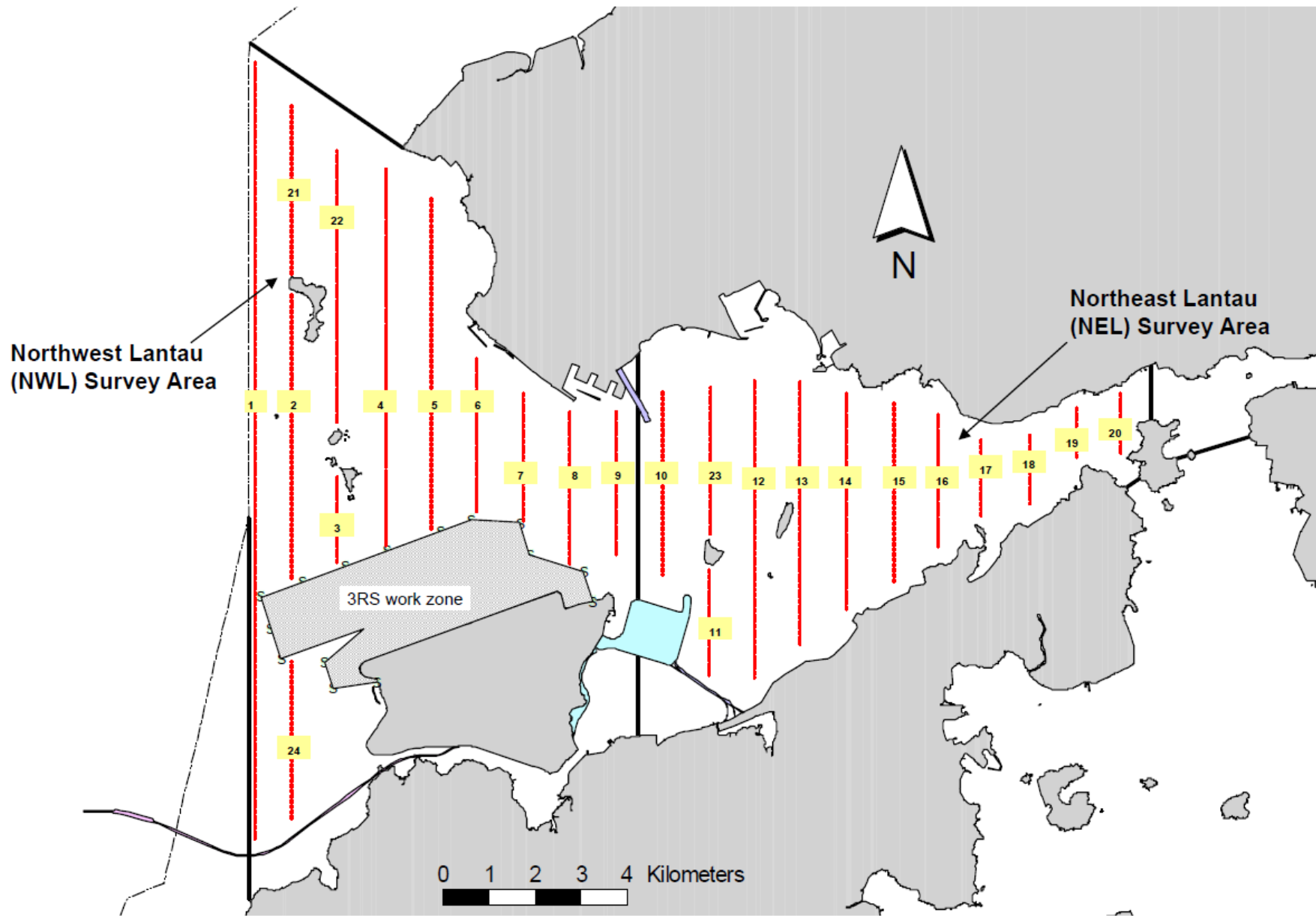


Figure 2.3

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

Line No.		Easting	Northing	Line No.		Easting	Northing
8	Start Point	811508	821123	20	Start Point	823477	823402
8	End Point	811508	824254	20	End Point	823477	824613
9	Start Point	812516	821303	21	Start Point	805476	827081
9	End Point	812516	824254	21	End Point	805476	830562
10	Start Point	813525	821176	22	Start Point	806464	824033
10	End Point	813525	824657	22	End Point	806464	829598
11	Start Point	814556	818853	23	Start Point	814559	821739
11	End Point	814556	820992	23	End Point	814559	824768
12	Start Point	815542	818807	24*	Start Point	805476*	815900*
12	End Point	815542	824882	24*	End Point	805476*	819100*

Remarks: The coordinates of several starting and ending points have been revised since August 2017 due to the presence of a work zone to the north of the airport platform with intense construction activities in association with the construction of the third runway expansion for the Hong Kong International Airport. Co-ordinates in red and marked with asterisk are revised co-ordinates of transect line.

2.3.5 Action & Limit Levels

The Action and Limit levels of dolphin impact monitoring are shown in *Appendix D*. The Event and Action plan is presented in *Appendix I*.

2.3.6 Monitoring Schedule for the Reporting Period

The dolphin monitoring schedules for the reporting period are shown in *Appendix E*.

2.3.7 Results & Observations

A total of 781.78 km of survey effort was conducted, with 100% of the total survey effort being conducted under favourable weather conditions (ie Beaufort Sea State 3 or below with good visibility) in this reporting quarter. Amongst the two areas, 287.40 km and 494.38 km of survey effort were conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 570.93 km and 210.85 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 7 groups of 29 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All seven dolphin sightings were made during on-effort search and were made on primary lines. During this reporting quarter, all dolphin groups were sighted in NWL, while no dolphin was sighted in NEL.

Encounter rates of Chinese White Dolphins are deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below with good visibility) in the reporting quarter with the results and comparison with baseline results present in *Tables 2.9* and *2.10*.

Table 2.9 Individual Survey Event Encounter Rates

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1 (3 & 10 Dec 2019)	0.00	0.00
	Set 2 (12 & 16 Dec 2019)	0.00	0.00
	Set 3 (2 & 6 Jan 2020)	0.00	0.00
	Set 4 (9 & 16 Jan 2020)	0.00	0.00
	Set 5 (10 & 18 Feb 2020)	0.00	0.00
	Set 6 (20 & 24 Feb 2020)	0.00	0.00
NWL	Set 1 (3 & 10 Dec 2019)	0.00	0.00
	Set 2 (12 & 16 Dec 2019)	5.03	21.81
	Set 3 (2 & 6 Jan 2020)	0.00	0.00
	Set 4 (9 & 16 Jan 2020)	0.00	0.00
	Set 5 (10 & 18 Feb 2020)	3.35	5.03
	Set 6 (20 & 24 Feb 2020)	3.39	22.05

Note: Dolphin Encounter Rates are deduced from the Two Sets of Surveys (Two Surveys in Each Set) in the reporting quarter in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.10 Quarterly Average Encounter Rates

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2019 - February 2020	September - November 2011	December 2019 - February 2020	September - November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	1.96 ± 2.23	9.85 ± 5.85	8.15 ± 10.85	44.66 ± 29.85

Note: Encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions.

Group size of Chinese White Dolphins ranged from 1 - 11 individuals per group in North Lantau region during December 2019 to February 2020. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in *Table 2.11*.

Table 2.11 *Average Dolphin Group Size*

	Average Dolphin Group Size	
	December 2019 - February 2020	September - November 2011
Overall	4.14 ± 4.41 (n = 7)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	4.14 ± 4.41 (n = 7)	3.92 ± 3.40 (n = 49)

Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between December 2019 and February 2020, no unacceptable impact from the construction activities of this Contract was recorded from the general observations.

Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL.

It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

2.3.8 *Implementation of Marine Mammal Exclusion Zone*

Daily marine mammal exclusion zone was conducted in December 2019 during the period of silt curtain installation in open waters under this Contract. No sighting of the Indo-Pacific humpback dolphin (i.e. Chinese White Dolphin) was recorded during the exclusion zone monitoring.

No marine works were undertaken since 30 December 2019, therefore, daily 250 m marine mammal exclusion zone monitoring was not undertaken since 30 December 2019.

2.4 *EM&A SITE INSPECTION*

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Nine (9) site inspections were carried out in the reporting quarter on 4, 11, 18 and 27 December 2019; 2, 8, 15 and 22 January 2020 and 26 February 2020.

Site inspection on 29 January, 5, 12 and 19 February 2020 were cancelled due to site closure during outbreak of novel coronavirus (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2).

Key observations during the site inspections in this reporting period are summarized in *Table 2.12*.

Table 2.12 *Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Period*

Inspection Date	Environmental Observations	Recommendations/ Remarks
4 December 2019	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Food waste should be removed. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> Drip tray should be provided during car repairing. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical container. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be cleared. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the food waste. <p>Works Area - Portion N-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray during car repairing. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical container. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to clear the stagnant water.
11 December 2019	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Chemical drums and cement bags should be removed. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> NRMM label should be displayed on the excavator. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the chemical drums and cement bags. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to display NRMM label on the excavator.
18 December 2019	<p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Cover should be provided between sand barges during sand crab action. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided. Domestic waste should be removed and water barrier should be repaired. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> Cement bags should be covered by tarpaulin sheets. Drip tray should be provided for the generator. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Stagnant water should be cleared. 	<p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide cover between sand barges during sand crab action. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. The Contractor was reminded to remove the domestic waste and repair the water barrier. <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to cover the cement bags by tarpaulin sheets. The Contractor was reminded to provide drip tray for the generator. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to clear the stagnant water.
27 December 2019	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Water spraying should be applied on the haul road. Drip tray for the chemicals should be provided. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying on the haul road. The Contractor was reminded to provide drip tray for the chemicals. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals.

Inspection Date	Environmental Observations	Recommendations/ Remarks
2 January 2020	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Waste on site should be removed. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Broken water barrier should be removed. Lid should be provided for the water barrier. 	<p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove waste on site. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the broken water barrier. The Contractor was reminded to provide the lid for the water barrier..
8 January 2020	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Food waste should be removed. Faded NRMM label should be replaced. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be removed. 	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the food waste. The Contractor was reminded to replace the faded NRMM label.. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be removed.
15 January 2020	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> Water spraying should applied at main haul road. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided. Food waste should be cleared. 	<p>Works Area - Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to apply water spraying at main haul road. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. The Contractor was reminded to clear the food waste.
22 January 2020	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemicals. Drip tray should be provided for the chemicals. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> Drip tray for the chemicals should be provided. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <p>Stagnant water should be removed.</p>	<p>Works Area - TBM tunnel</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. The Contractor was reminded to provide drip tray for the chemicals. <p>Works Area - Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemicals. <p>Reminder from the SOR</p> <p>Works Area - Portion S-A</p> <p>Stagnant water should be removed.</p>
26 February 2020	<p>Works Area - near South Ventilation Building</p> <ul style="list-style-type: none"> Food waste should be removed. 	<p>Works Area - near South Ventilation Building</p> <ul style="list-style-type: none"> The Contractor was reminded to remove food waste at work area.

The Contractor has rectified all of the observations as identified during environmental site inspections in the reporting quarter.

2.5 WASTE MANAGEMENT STATUS

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

Wastes generated during this reporting period include mainly construction wastes (inert and non-inert). Reference has been made to the waste flow table prepared by the Contractor (*Appendix K*). The quantities of different types of wastes are summarized in *Table 2.13*.

Table 2.13 *Quantities of Different Waste Generated in the Reporting Period*

Month/Year	Inert Construction Waste ^(a) (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste ^(b) (tonnes)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)		
						Category L	Category M (M _p & M _f)	Mixed (L+M)
December 2019	4,216	0	441	0	0	0	0	0
January 2020	174,690	0	2,540	0	0	0	0	0
February 2020	1,455	0	349 ^(d)	0	0	0	0	0

Notes:

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.
- (d) Updated figure and waste flow table is presented in this quarterly report.

The Contractor was advised to properly maintain on site C&D materials and waste collection, sorting and recording system, dispose of C&D materials and wastes at designated ground and maximize reuse/ recycle of C&D materials and wastes. The Contractor was also reminded to properly maintain the site tidiness and dispose of the wastes accumulated on site regularly and properly.

For chemical waste containers, the Contractor was reminded to treat properly and store temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes.

2.6 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.14* below.

Table 2.14 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	363510	19 August 2013	Throughout the Contract	DBJV	Northern Landfall
Construction Dust Notification	403620	10 June 2016	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Construction Waste Disposal Account	7021715	4 October 2019	14 January 2020	DBJV	Vessel Disposal
Waste Water Discharge License	WT00031435-2018	2 August 2018	31 August 2023	DBJV	Southern Landfall
Waste Water Discharge License	WT00034060-2019	25 July 2019	30 June 2024	DBJV	Northern Landfall (4 Discharge Point)
Construction Noise Permit	GW-RW0406-18	17 October 2019	15 April 2020	DBJV	Urmston Road in front of Pillar Point
Construction Noise Permit	GW-RW0497-19	17 October 2019	15 April 2020	DBJV	Northern Landfall
Construction Noise Permit	GW-RW0374-19	20 August 2019	19 February 2020	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	GW-RS0766-19	2 September 2019	25 February 2020	DBJV	Southern Landfall
Construction Noise Permit	GW-RS1137-19	26 December 2019	5 June 2020	DBJV	Southern Landfall

Notes:

HyD = Highways Department

DBJV = Dragages - Bouygues Joint Venture

VEP = Variation of Environmental Permit

2.7 **IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES**

In response to the site audit findings, the Contractors carried out all corrective actions.

A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in *Appendix C*. The necessary mitigation measures relevant to this Contract were implemented properly.

2.8 **SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT**

For air quality impact monitoring, a total of thirty monitoring events for both 1-hour TSP and 24-hour TSP were undertaken in which Four (4) Action Level and One (1) Limit Level exceedances of 1-hour TSP were recorded (*Table 2.15*).

Table 2.15 Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level	Date of Exceedances		Number of Exceedances	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AQMS1	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR1	Action Level	2019-12-04	-	1	-
	Limit Level	2019-12-01	-	1	-
ASR5	Action Level	2019-12-01 2019-12-04	-	2	-
	Limit Level	-	-	-	-
ASR6	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR10	Action Level	2019-12-01	-	1	-
	Limit Level	-	-	-	-
Total number of Action level Exceedances:				4	0
Total number of Limit level Exceedances:				1	0

For marine water quality impact monitoring, no Action and Limit level exceedance was recorded.

Table 2.16 Summary of Exceedances for Marine Water Quality Impact Monitoring in this Reporting Quarter

Station	Exceedance Level ^(a)	DO (Surface and Middle)		DO (Bottom)		Turbidity (depth-averaged)		SS (depth-averaged)	
		Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood	Mid-ebb	Mid-flood
IS17	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)11	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR7	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
CS(Mf)5	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
CS(Mf)3(N)	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)16	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR4a	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
SR4(N2)	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS8(N)	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
IS(Mf)9	AL	-	-	-	-	-	-	-	-
	LL	-	-	-	-	-	-	-	-
Total AL Exceedances:		0	0	0	0	0	0	0	0
Total LL Exceedances:		0	0	0	0	0	0	0	0

Notes:

(a) AL = Action Level; LL = Limit Level

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2019 and February 2020, whilst no unacceptable impact from the construction activities of the TM-CLKL Northern Connection Sub-sea Tunnel Section on Chinese White Dolphins was noticeable from general observations.

Cumulative statistics are provided in *Appendix J*.

2.9

SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.4*.

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

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

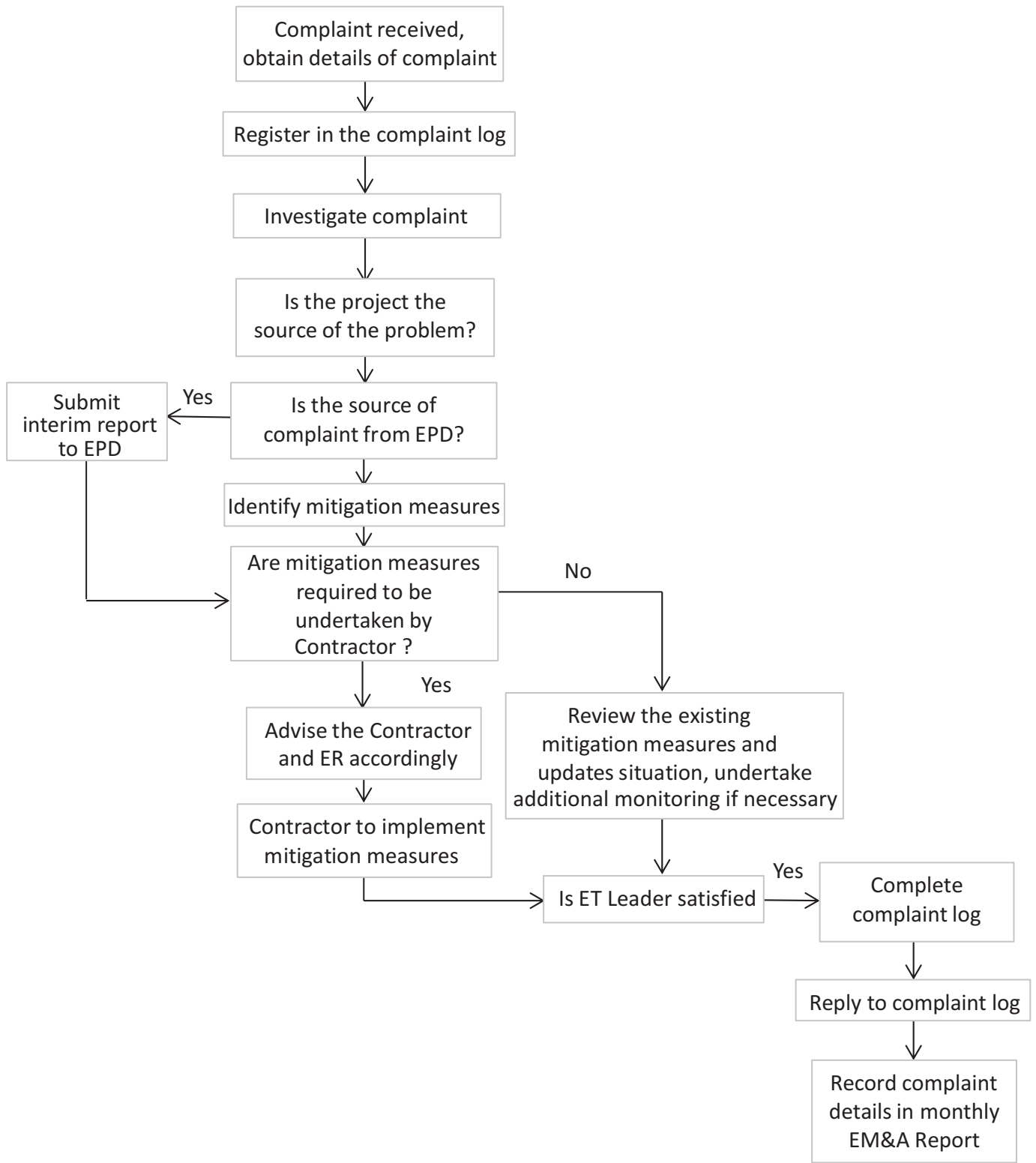


Figure 2.4

Environmental Complaint Handling Procedure

3 *FUTURE KEY ISSUES*

3.1 *CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER*

As informed by the Contractor, the major works for the Contract in the coming quarter are summarized in *Table 3.1*.

Table 3.1 Construction Works to Be Undertaken in the Coming Quarter

Works to be undertaken
<i>Land-based Works</i>
<ul style="list-style-type: none">• Construction of Thermal barrier - TBM tunnel;• Construction of Walkway Corbel & Cover - TBM Tunnel;• Road & Drainage works - Portion N-A;• C&C Tunnel RC structure - Portion S-A;• Roofing System Installation - Portion S-A;• D-wall cut - Portion S-A;• Tower Crane Removal - Portion S-A;• Removal of Access Tower - Portion S-B;• Gantry Crane Removal - Portion S-B;• Road & Drainage works - Portion S-B & S-C

3.2 *KEY ISSUES FOR THE COMING QUARTER*

Potential environmental impacts arising from the above upcoming construction activities in the coming quarterly period are expected to be mainly associated with dust, marine ecology and waste management issues.

3.3 *MONITORING SCHEDULE FOR THE COMING QUARTER*

Impact monitoring for air quality and marine ecology (include dolphin monitoring) are scheduled to continue for the next reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not considered to be necessary at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period.

This Twenty-fifth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 December 2019 to 29 February 2020, in accordance with the Updated EM&A Manual and the requirements of EP-354/2009/D.

Air quality (including 1-hour TSP and 24-hour TSP), water quality and dolphin monitoring were carried out in the reporting period. Four (4) Action level and one (1) Limit Level exceedances of 1-hour TSP were recorded in this reporting period.

For marine water quality impact monitoring, no Action and Limit level exceedance was recorded.

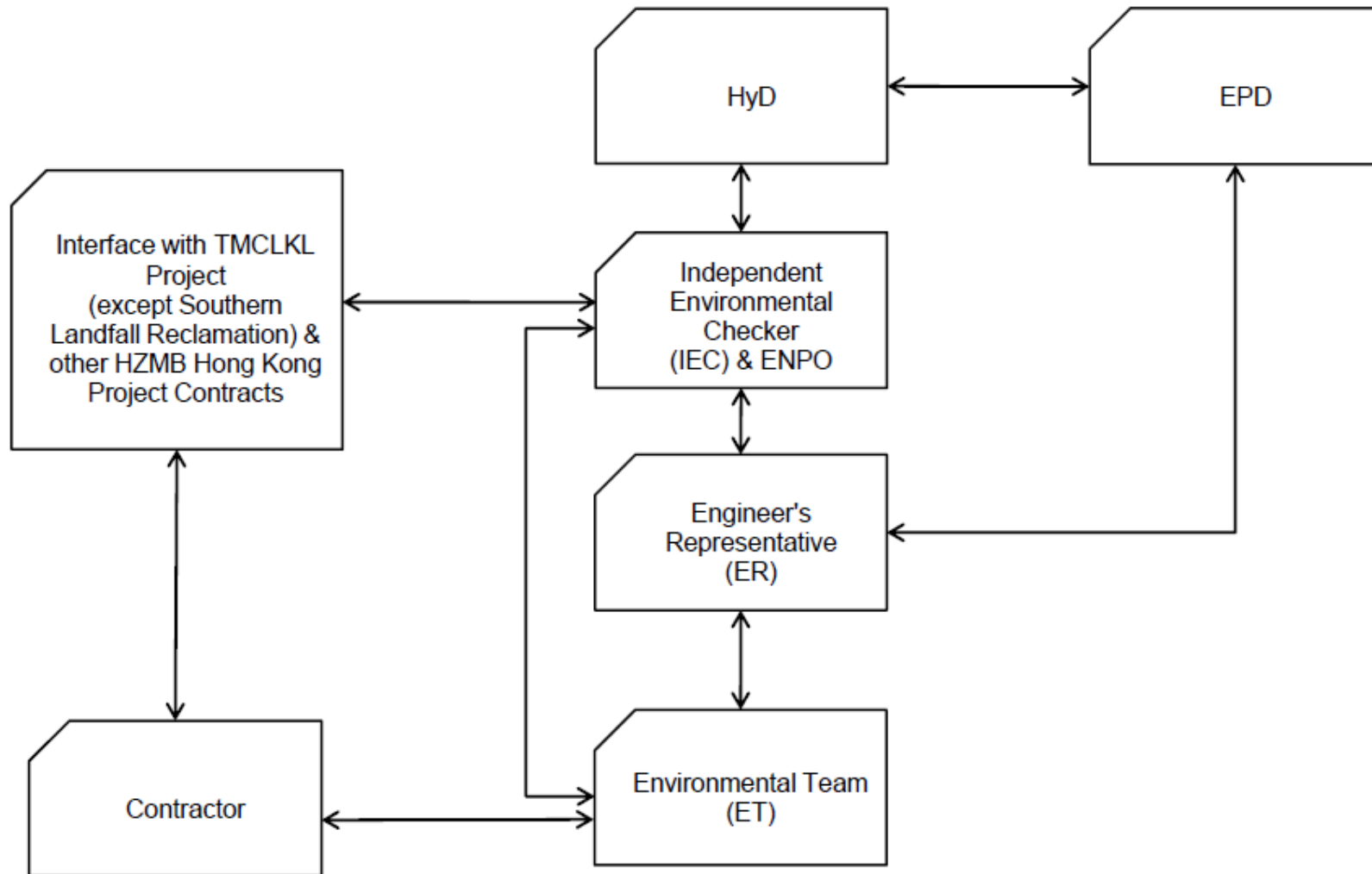
A total of 7 groups of 29 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All seven dolphin sightings were made during on-effort search and were made on primary lines. Whilst one limit level exceedance was observed for the quarterly dolphin monitoring data between December 2019 to February 2020, no unacceptable impact from the construction activities of this Contract was recorded from the general observations. Although the dolphins infrequently occurred along the alignment of TM-CLKL Northern Connection Sub-Sea Tunnel Section in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the construction works of the Contract, and whether suitable mitigation measure can be applied to improve the situation.

Nine weekly environmental site inspections were carried out in the reporting period. Recommendations on remedial actions provided for the deficiencies identified during the site audits were properly implemented by the Contractor. No non-compliance event was recorded during the reporting period.

The monitoring programme has been reviewed and was considered as adequate to cater for the nature of works in progress. Change to the monitoring programme was thus not recommended at this stage. The monitoring programme will be evaluated as appropriate in the next reporting period. The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

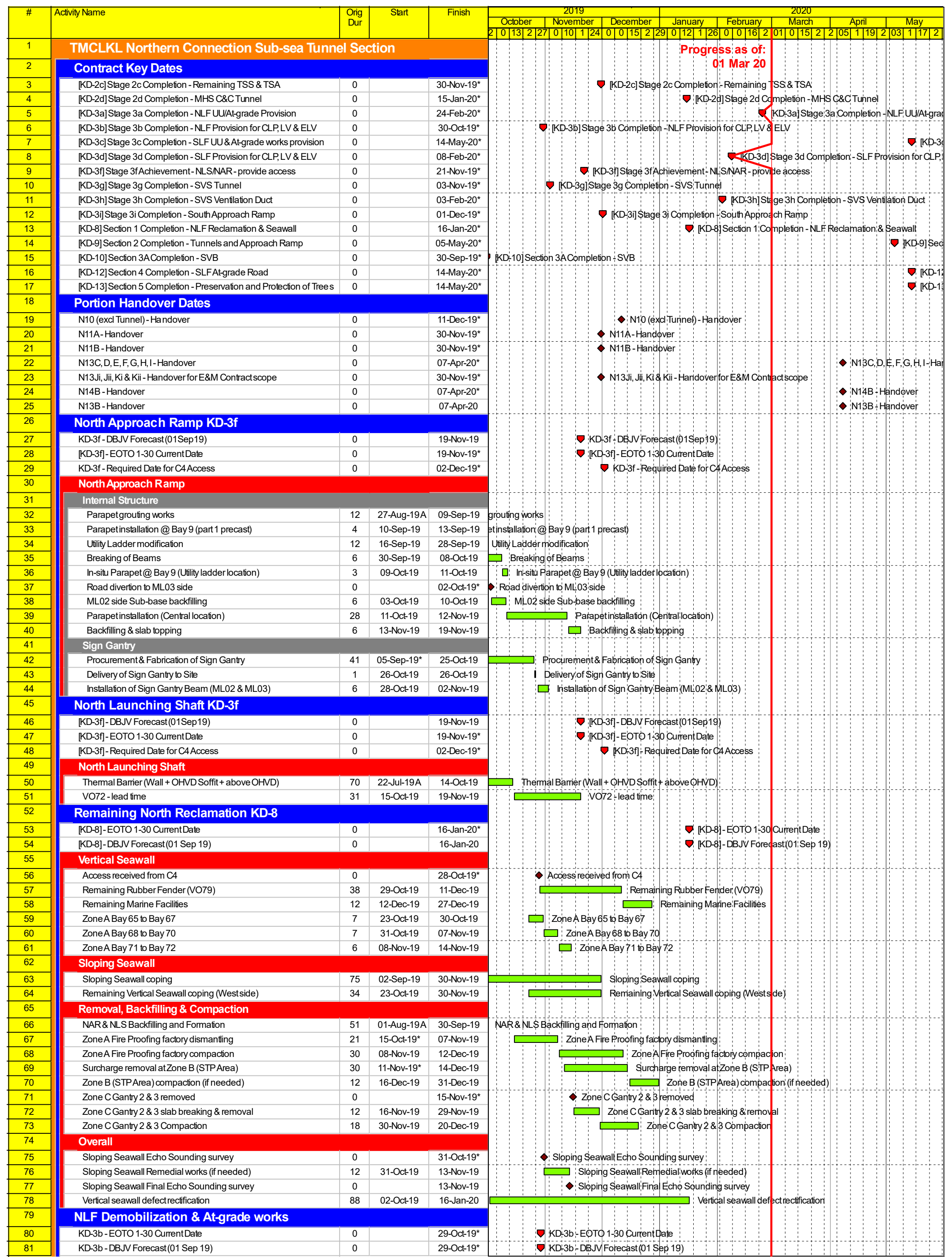
Project Organization for Environmental Works

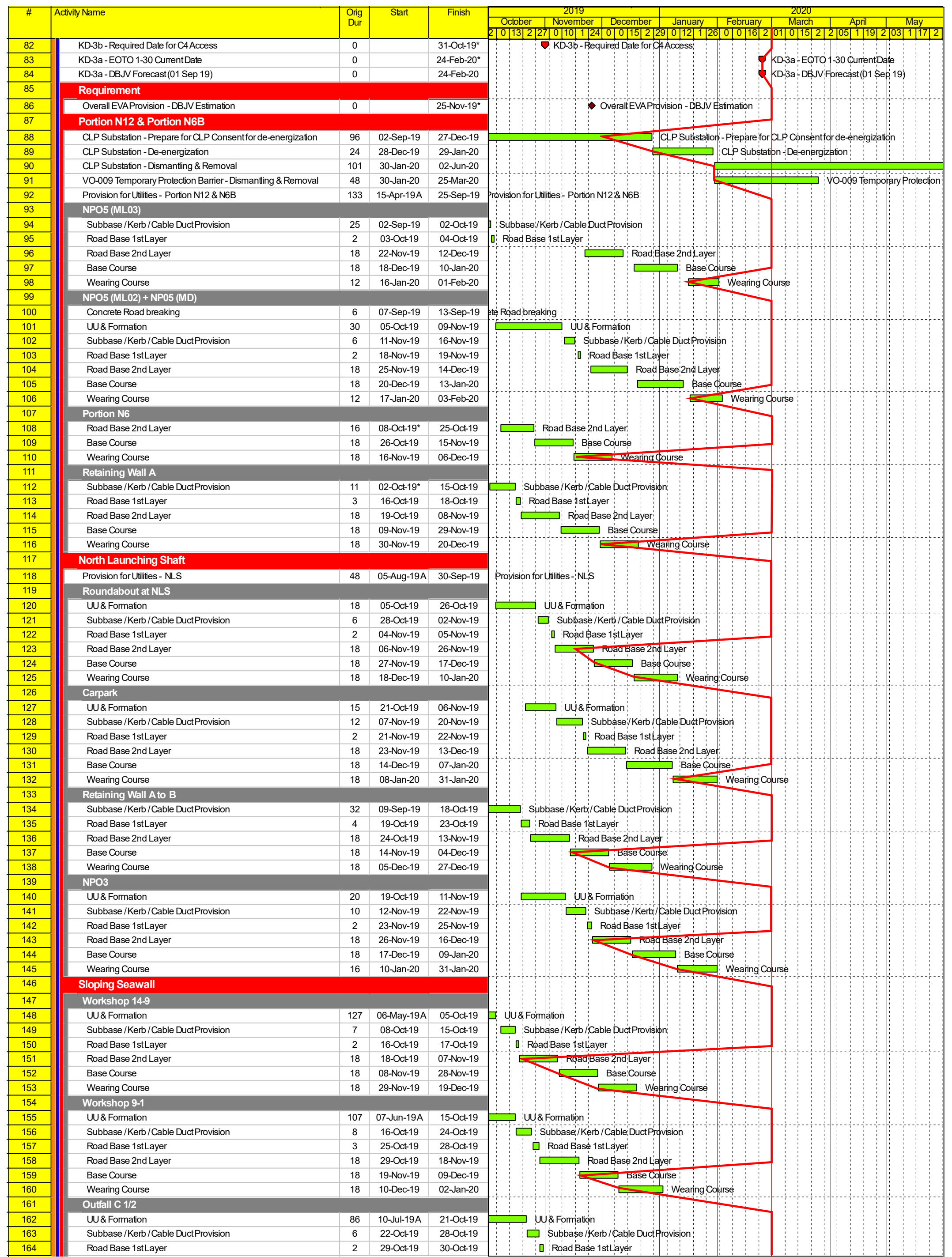


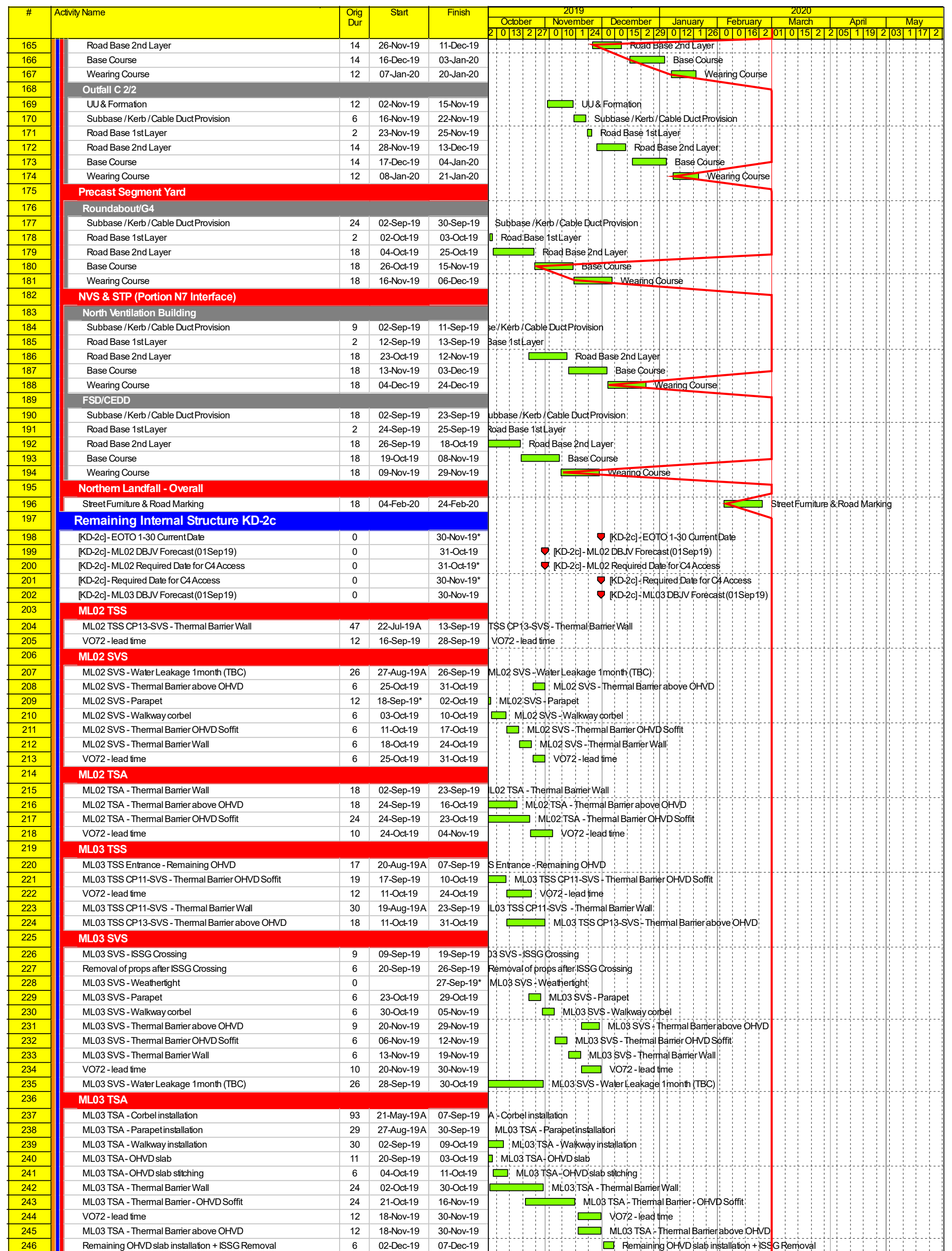
↔ Line of Communication

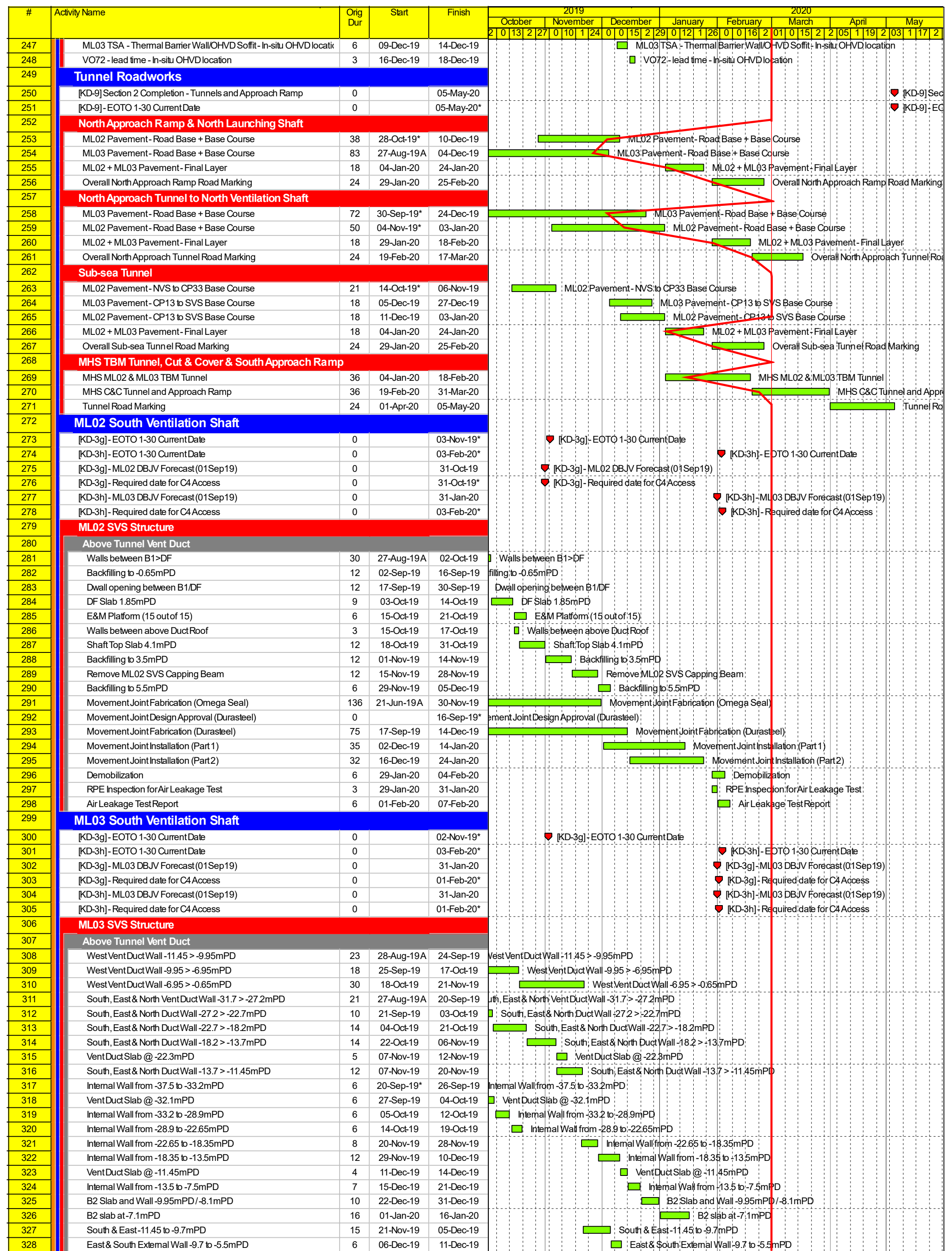
Appendix B

Construction Programme





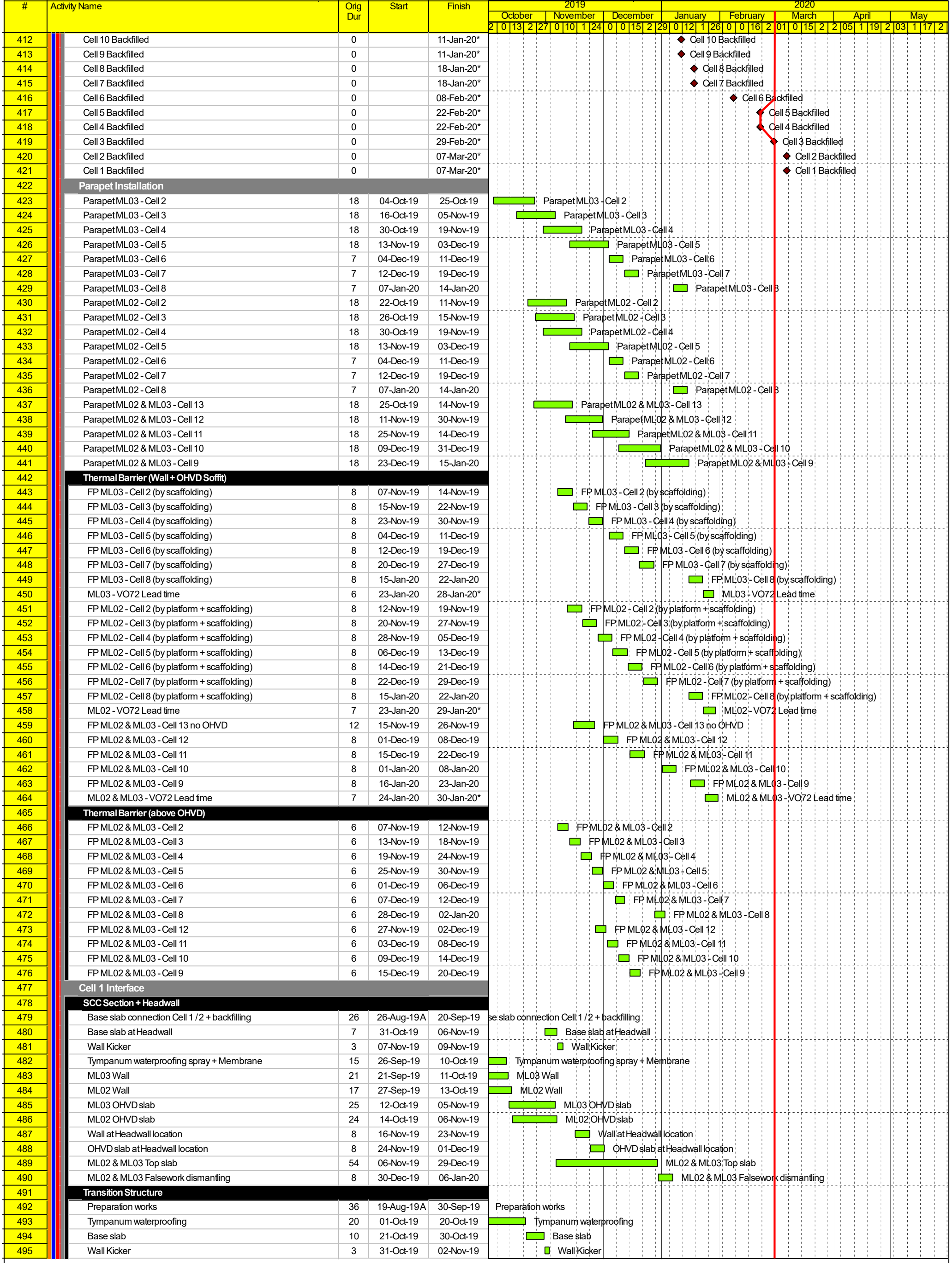




- Planned Bar
- ◆ Planned Milestone
- ◆ Key Date
- ◆ Progress Milestone
- Progress Bar

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

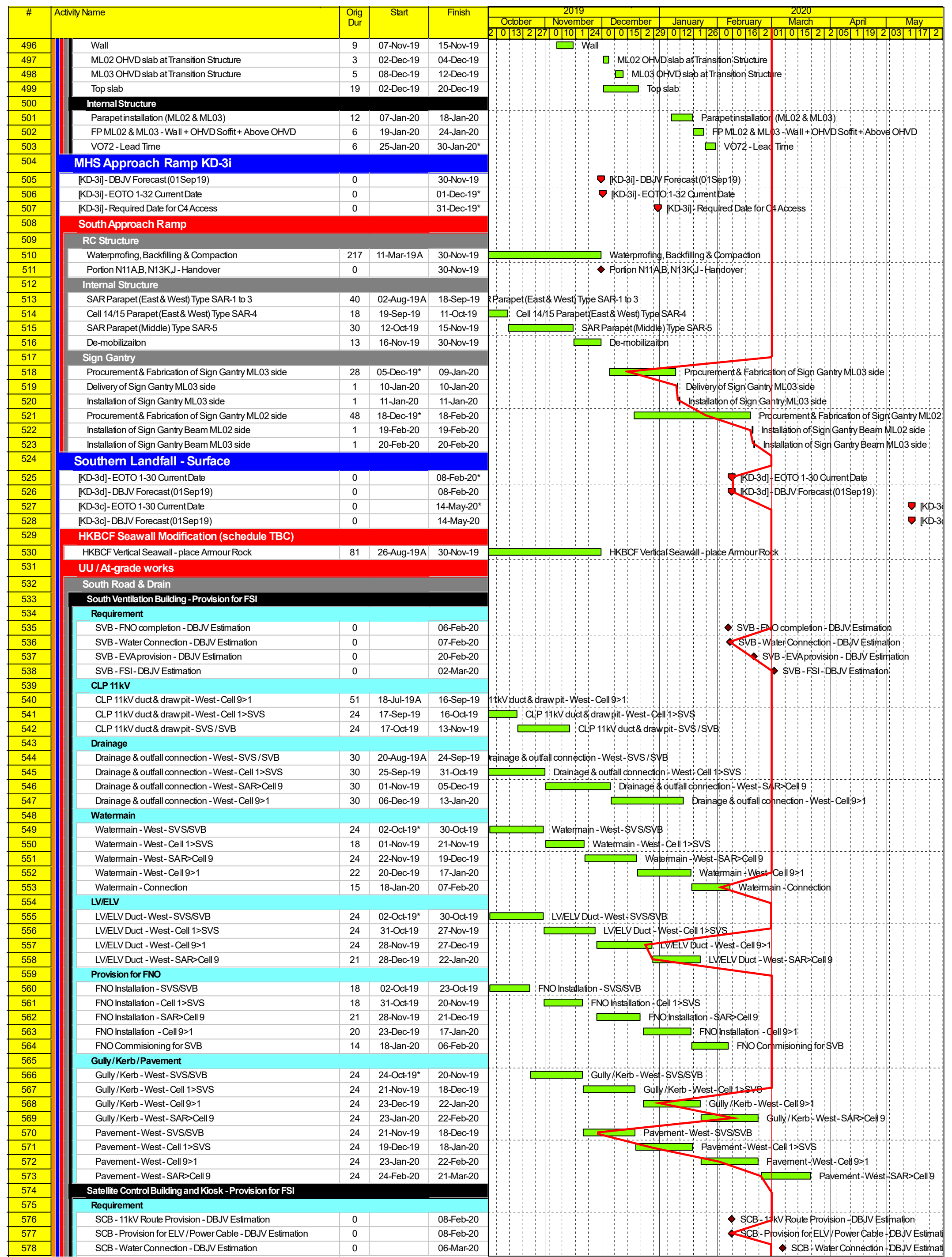
Date	Revision	Checked	Approved
22-Dec-17	Rev.H	WYu	
05-Feb-18	Rev.IAC	WYu	
07-Mar-18	Rev.I	WYu	
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu



- Planned Bar
- Planned Milestone
- Key Date
- Progress Milestone
- Progress Bar



Date	Revision	Checked	Approved
22-Dec-17	Rev.H	WYu	
05-Feb-18	Rev.IAC	WYu	
07-Mar-18	Rev.I	WYu	
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu



- Planned Bar
- ◆ Planned Milestone
- ♥ Key Date
- ◆ Progress Milestone
- Progress Bar

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Date	Revision	Checked	Approved
22-Dec-17	Rev.H	WYu	
05-Feb-18	Rev.IAC	WYu	
07-Mar-18	Rev.I	WYu	
04-Jun-18	Rev.J	WYu	
11-Nov-19	Rev.K	SPa	WYu
22-Jan-20	Rev.K1	SPa	WYu

Appendix C

Environmental Mitigation
and Enhancement Measure
Implementation Schedules

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	An effective watering programme of twice daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit.	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
<i>Marine Works (Sequence A)</i>									
6.1	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall	TM-CLKL southern landfall reclamation filling	Contractor	TM-EIAO		Y		N/A
6.1	-	a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall	TM-CLKL northern landfall reclamation filling	Contractor	TM-EIAO		Y		✓
6.1	-	Use of cage type silt curtains round allgrab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.	All areas dredging works	Contractor	TM-EIAO		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
	Figure 1.1 of Annex C	A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	Trailer suction hopper dredgers shall not allow mud to overflow.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	The use of Lean Material Overboard (LMOB) systems shall be prohibited.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	Annex A	For other parts of the reclamation works construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. It should be noted that the protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2b and detailed in Appendices D6b. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation; - Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and - Reclamation dredging and filling for Portion 1 of HKLR;	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓
6.1	-	The filling material for the other parts of the works are the same as Sequence A;	All other areas/backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	5.7	Cage type silt curtain (with steel enclosure) shall be used for grab dredgers working in the site of HKBCF and TM- CLKL southern reclamation. Cage type silt curtains will be applied round all grab dredgers at other works area.	HKBCF, HKLR and TM-CLKL grab dredging	Contractor	TM-EIAO		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	Annex A	A layer of floating type silt curtain will be applied around all works as defined in Appendix D6b.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	TM-CLKL northern landfall: - Reclamation filling shall not proceed until at least 200m section of leading seawall at both the east and west sides of the reclamation are formed above +2.5 mPD, except for 100m gaps for marine access;	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
<i>General Marine Works</i>									
6.1	-	Use of TMB for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N.A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					conditions.				
6.1	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
<i>Land Works</i>									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	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.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		N/A
6.1	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		<>
6.1	-	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	All areas/ throughout construction period	Contractor	TM-EIAO Waste Disposal Ordinance		Y		✓
6.1	-	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.	Roadside/design and operation	Design Consultant/ Contractor	TM-EIAO	Y		Y	✓
6.1	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
<i>Water Quality Monitoring</i>									
6.1	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations.	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	Water Quality Monitoring was conducted on 15 April 2019 and temporarily suspended since 30 December 2019.
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/ during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/ during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/ during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		N/A.
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
12.6		The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established.	Contract mobilisation	Contractor	TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		Y		✓
12.6		The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent discharges.	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The surplus surcharge should be transferred to a fill bank	Reclamation areas / after surcharge works	Contractor	TMEIA		Y		N/A
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			✓
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Reclamation areas / throughout dredging works	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: <i>f</i> suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; <i>f</i> Having a capacity of <450L unless the specifications have been approved by the EPD; and <i>f</i> Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. <i>f</i> Clearly labelled and used solely for the storage of chemical wastes; <i>f</i> Enclosed with at least 3 sides; <i>f</i> Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; <i>f</i> Adequate ventilation; <i>f</i> Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and <i>f</i> Incompatible materials are adequately	All areas / throughout construction period	Contractor	TMEIA		Y		<>

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		separated.							
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		N/A
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

* Remarks:

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

*Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule*

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	

- ✓ Compliance of Mitigation Measures
- <> Compliance of Mitigation but need improvement
- x Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by Contractor
- Δ Deficiency of Mitigation Measures but rectified by Contractor
- N/A Not Applicable in Reporting Period

Legend: D=Design, C=Construction, O=Operation

Note: Funding Agent for all mitigation measures will be the Highways Department of the Hong Kong SAR Government

Appendix D

Summary of Action and Limit Levels

Table D1 *Action and Limit Levels for 1-hour and 24-hour TSP*

Parameters	Action	Limit
24 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214	260
1 Hour TSP Level in $\mu\text{g}/\text{m}^3$	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337	500

Table D2 *Action and Limit Levels for Water Quality*

Parameter	Action Level#	Limit Level#
DO in mg/L ^(a)	<u>Surface and Middle</u> 5.0 mg/L	<u>Surface and Middle</u> 4.2 mg/L
	<u>Bottom</u> 4.7 mg/L	<u>Bottom</u> 3.6 mg/L
Turbidity in NTU (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 27.5 NTU	130% of upstream control station at the same tide of the same day and 99%-ile of baseline data, i.e., 47.0 NTU
SS in mg/L (Depth-averaged ^{(b), (c)})	120% of upstream control station at the same tide of the same day and 95%-ile of baseline data, i.e., 23.5 mg/L	130% of upstream control station at the same tide of the same day and 10mg/L for WSD Seawater Intakes at Tuen Mun and 99%-ile of baseline data, i.e., 34.4 mg/L

Notes:

Baseline data: data from HKZMB Baseline Water Quality Monitoring between 6 and 31 October 2011.

- (a) For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits.
- (b) "Depth-averaged" is calculated by taking the arithmetic means of reading of all three depths
- (c) For turbidity and SS, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.
- (d) All figures given in the table are used for reference only, and EPD may amend the figures whenever it is considered as necessary
- (e) The 1%-ile of baseline data for surface and middle DO is 4.2 mg/L, whilst for bottom DO is 3.6 mg/L.
- (f) The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

Table D3 *Action and Limit Levels for Impact Dolphin Monitoring*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 70% of baseline & ANI < 70% of baseline	STG < 70% of baseline & ANI < 70% of baseline
Limit Level	[STG < 40% of baseline & ANI < 40% of baseline] and STG < 40% of baseline & ANI < 40% of baseline	

Notes:

1. STG means quarterly encounter rate of number of dolphin sightings, which is **6.00 in NEL** and **9.85 in NWL** during the baseline monitoring period
2. ANI means quarterly encounter rate of total number of dolphins, which is **22.19 in NEL** and **44.66 in NWL** during the baseline monitoring period
3. For North Lantau Social Cluster, AL will be trigger if NEL or NWL fall below the criteria; LL will be triggered if both NEL and NWL fall below the criteria.

Table D4 *Derived Value of Action Level (AL) and Limit Level (LL)*

	North Lantau Social Cluster	
	NEL	NWL
Action Level	STG < 4.2 & ANI < 15.5	STG < 6.9 & ANI < 31.3
Limit Level	NEL = [STG < 2.4 & ANI < 8.9] and NWL = [STG < 3.9 & ANI < 17.9]	

Appendix E

EM&A Monitoring Schedules

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - December 2019**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	21-Dec
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	Public Holiday		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
29-Dec	30-Dec	31-Dec				
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM				

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Air Quality Impact Monitoring Schedule - January 2020**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday		
			Public Holiday	01-Jan	02-Jan	03-Jan	04-Jan	
						1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
05-Jan	06-Jan	07-Jan	08-Jan	09-Jan	10-Jan	11-Jan		
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM				
12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan		
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
19-Jan	20-Jan	21-Jan	Public Holiday	22-Jan	Public Holiday	24-Jan	Public Holiday	25-Jan
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM				1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
26-Jan	Public Holiday	27-Jan	Public Holiday	28-Jan	29-Jan	30-Jan	31-Jan	
					1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Air Quality Impact Monitoring Schedule - February 2020**

Air quality monitoring stations: ASR1, ASR5, ASR6, ASR10, AQMS1

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Feb
02-Feb	03-Feb	04-Feb	05-Feb	06-Feb	07-Feb	08-Feb
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
09-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	22-Feb
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb	29-Feb
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - December 2019**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
01-Dec	02-Dec	03-Dec	04-Dec	05-Dec	06-Dec	07-Dec
		Impact Dolphin Monitoring				
08-Dec	09-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		
15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	21-Dec
	Impact Dolphin Monitoring					
22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec
			Public holiday	Public holiday		
29-Dec	30-Dec	31-Dec				

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Impact Dolphin Monitoring Survey Monitoring Schedule - January 2020**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
			Public holiday 01-Jan	02-Jan	03-Jan	04-Jan
				Impact Dolphin Monitoring		
05-Jan	06-Jan	07-Jan	08-Jan	09-Jan	10-Jan	11-Jan
	Impact Dolphin Monitoring			Impact Dolphin Monitoring		
12-Jan	13-Jan	14-Jan	15-Jan	16-Jan	17-Jan	18-Jan
				Impact Dolphin Monitoring		
19-Jan	20-Jan	21-Jan	22-Jan	23-Jan	24-Jan	Public holiday 25-Jan
26-Jan	Public holiday 27-Jan	Public holiday 28-Jan	29-Jan	30-Jan	31-Jan	

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Impact Dolphin Monitoring Survey Monitoring Schedule - February 2020

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
						01-Feb
02-Feb	03-Feb	04-Feb	05-Feb	06-Feb	07-Feb	08-Feb
09-Feb	10-Feb	11-Feb	12-Feb	13-Feb	14-Feb	15-Feb
	Impact Dolphin Monitoring					
16-Feb	17-Feb	18-Feb	19-Feb	20-Feb	21-Feb	22-Feb
		Impact Dolphin Monitoring		Impact Dolphin Monitoring		
23-Feb	24-Feb	25-Feb	26-Feb	27-Feb	28-Feb	29-Feb
	Impact Dolphin Monitoring					

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall
Impact Marine Water Quality Monitoring (WQM) Schedule (December 2019)**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Dec	2-Dec	3-Dec	4-Dec	5-Dec	6-Dec	7-Dec
	ebb tide 2:35 - 6:05 flood tide 14:54 - 17:23		ebb tide 5:23 - 7:36 flood tide 12:59 - 16:29		ebb tide 6:16 - 9:46 flood tide 13:57 - 17:27	
8-Dec	9-Dec	10-Dec	11-Dec	12-Dec	13-Dec	14-Dec
	ebb tide 9:09 - 12:39 flood tide 15:09 - 18:39		ebb tide 10:33 - 14:03 flood tide 16:01 - 19:15		ebb tide 11:57 - 15:27 flood tide 7:15 - 10:11	
15-Dec	16-Dec	17-Dec	18-Dec	19-Dec	20-Dec	21-Dec
	ebb tide 14:15 - 17:45 flood tide 9:07 - 12:37		ebb tide 16:20 - 18:35 flood tide 10:59 - 14:29		ebb tide 6:35 - 8:51 flood tide 12:50 - 16:20	
22-Dec	23-Dec	24-Dec	25-Dec	26-Dec	27-Dec	28-Dec
	ebb tide 9:08 - 12:38 flood tide 14:48 - 18:18		Public Holiday	Public Holiday	ebb tide 12:13 - 15:43 flood tide 7:29 - 10:30	
29-Dec	30-Dec	31-Dec				
	ebb tide 14:09 - 17:39 flood tide 9:01 - 12:31					

Appendix F

Impact Air Quality Monitoring Results

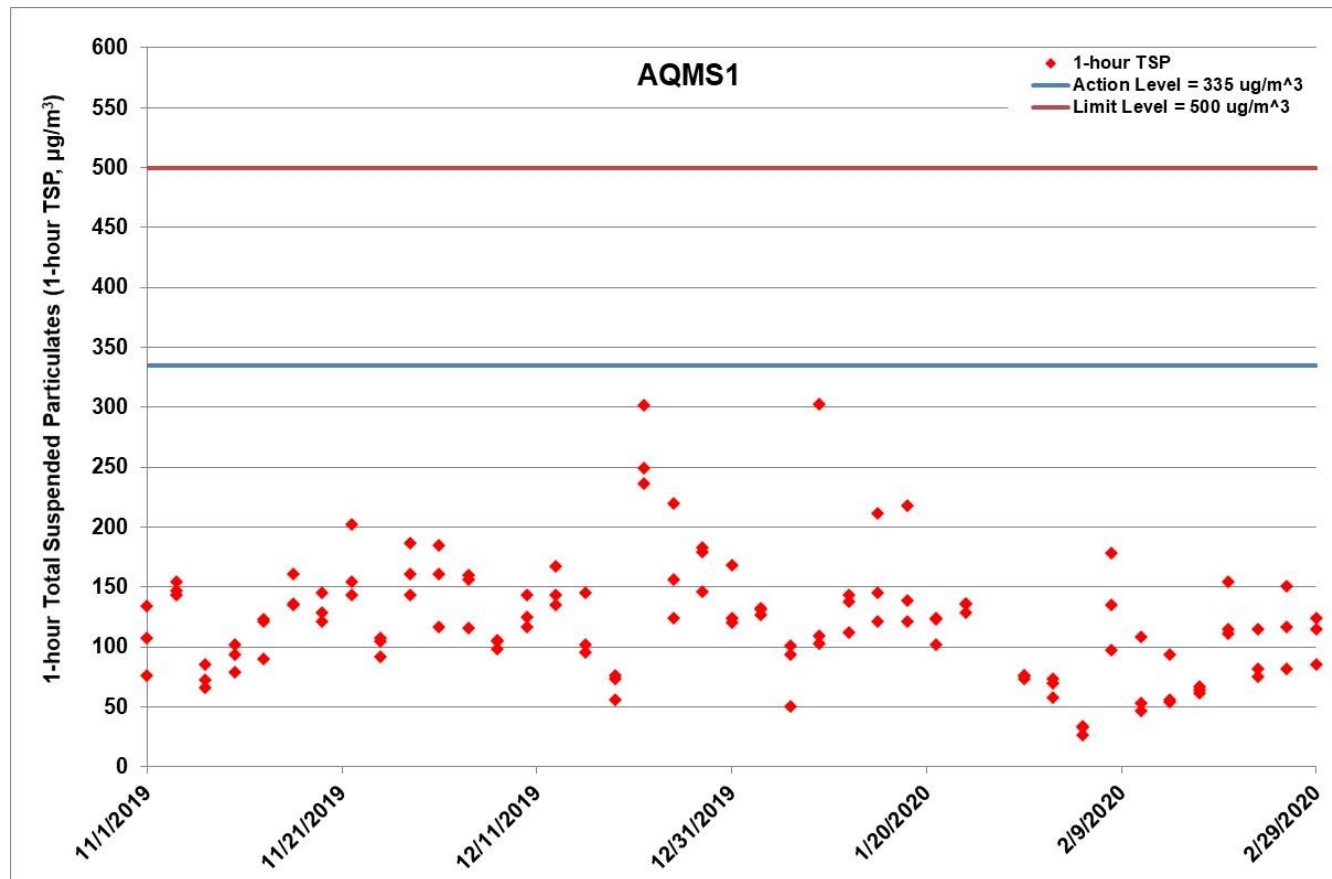


Figure F.1 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



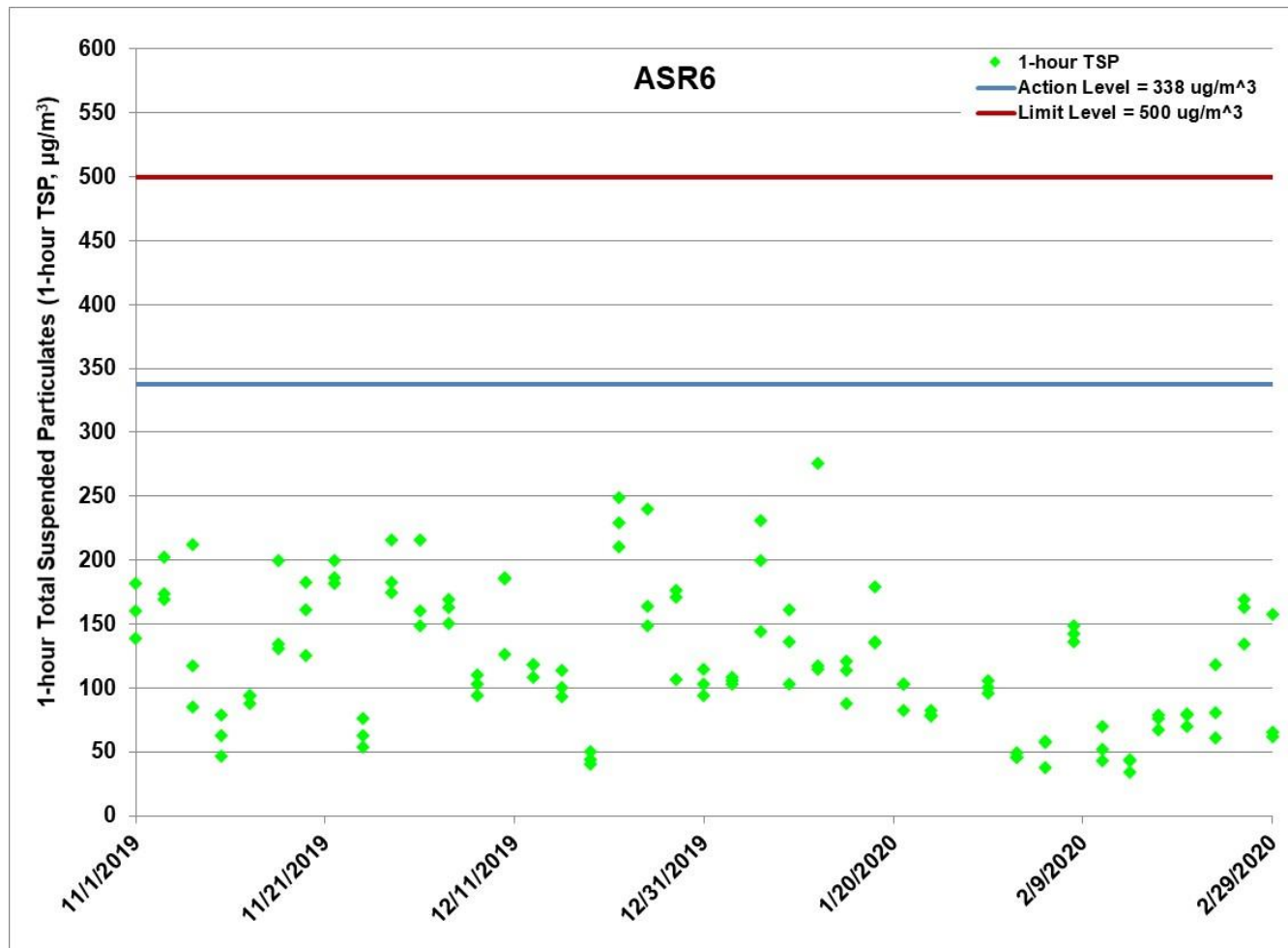


Figure F.2 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



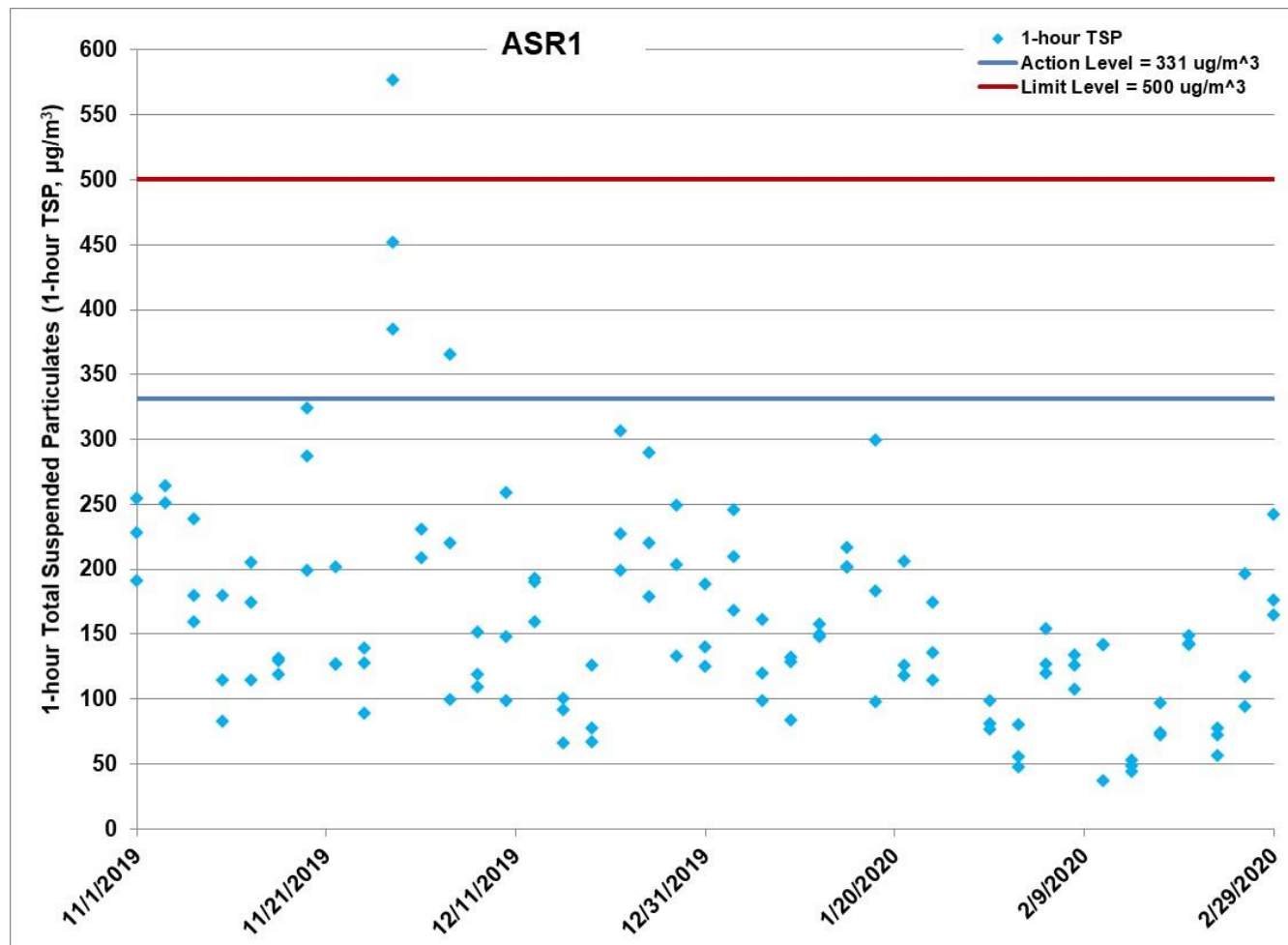


Figure F.3 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



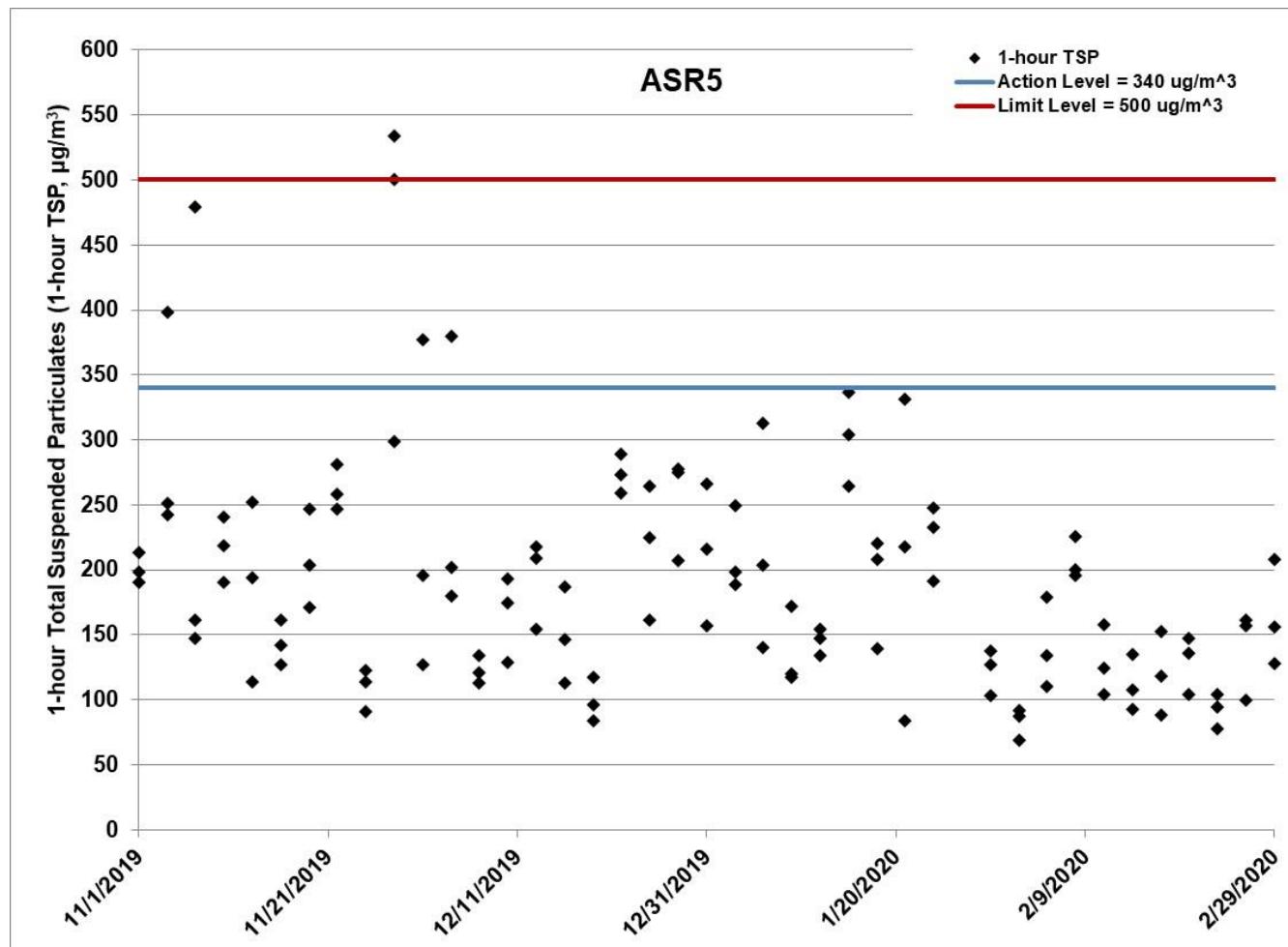


Figure F.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



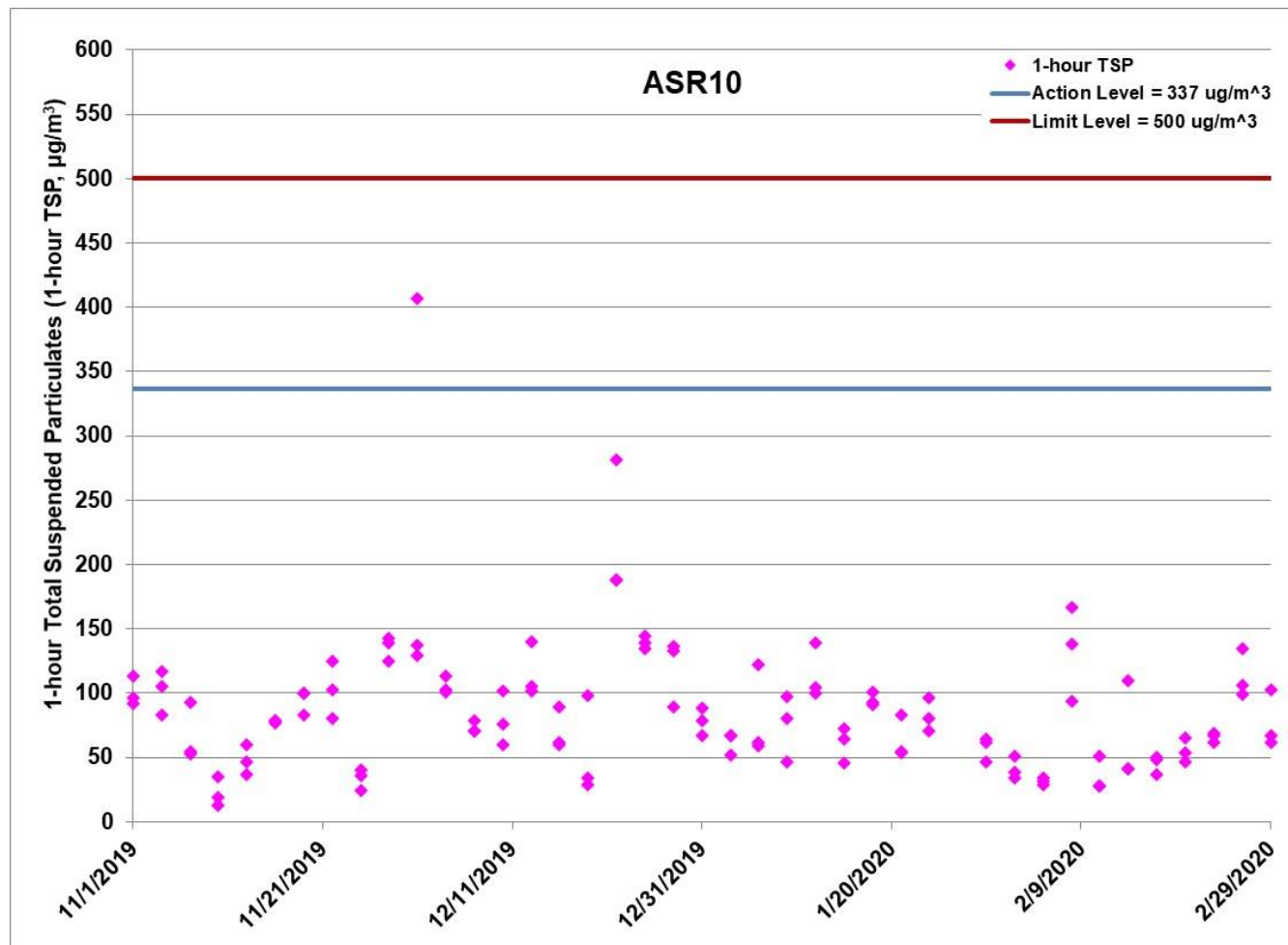


Figure F.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



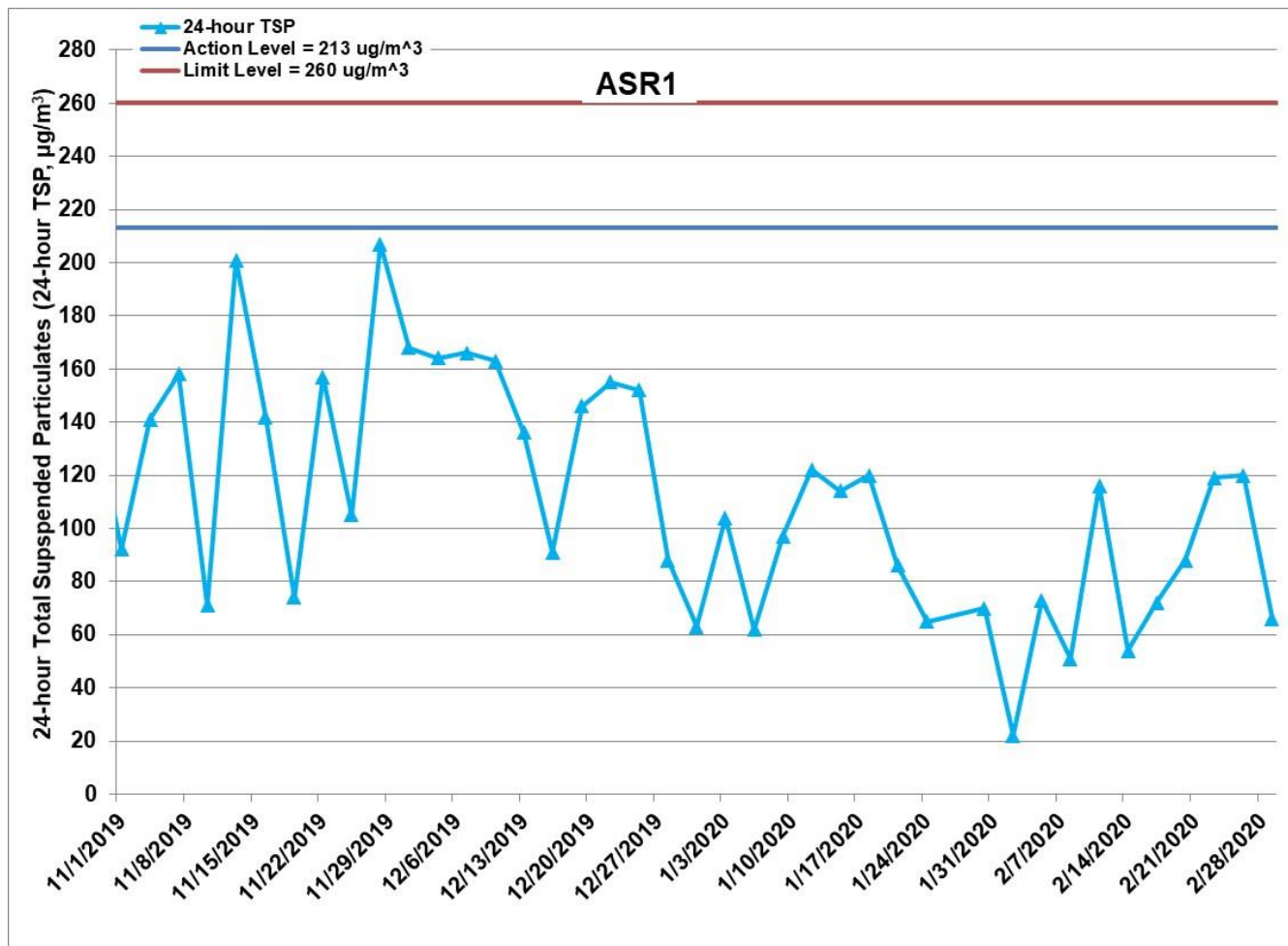


Figure F.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



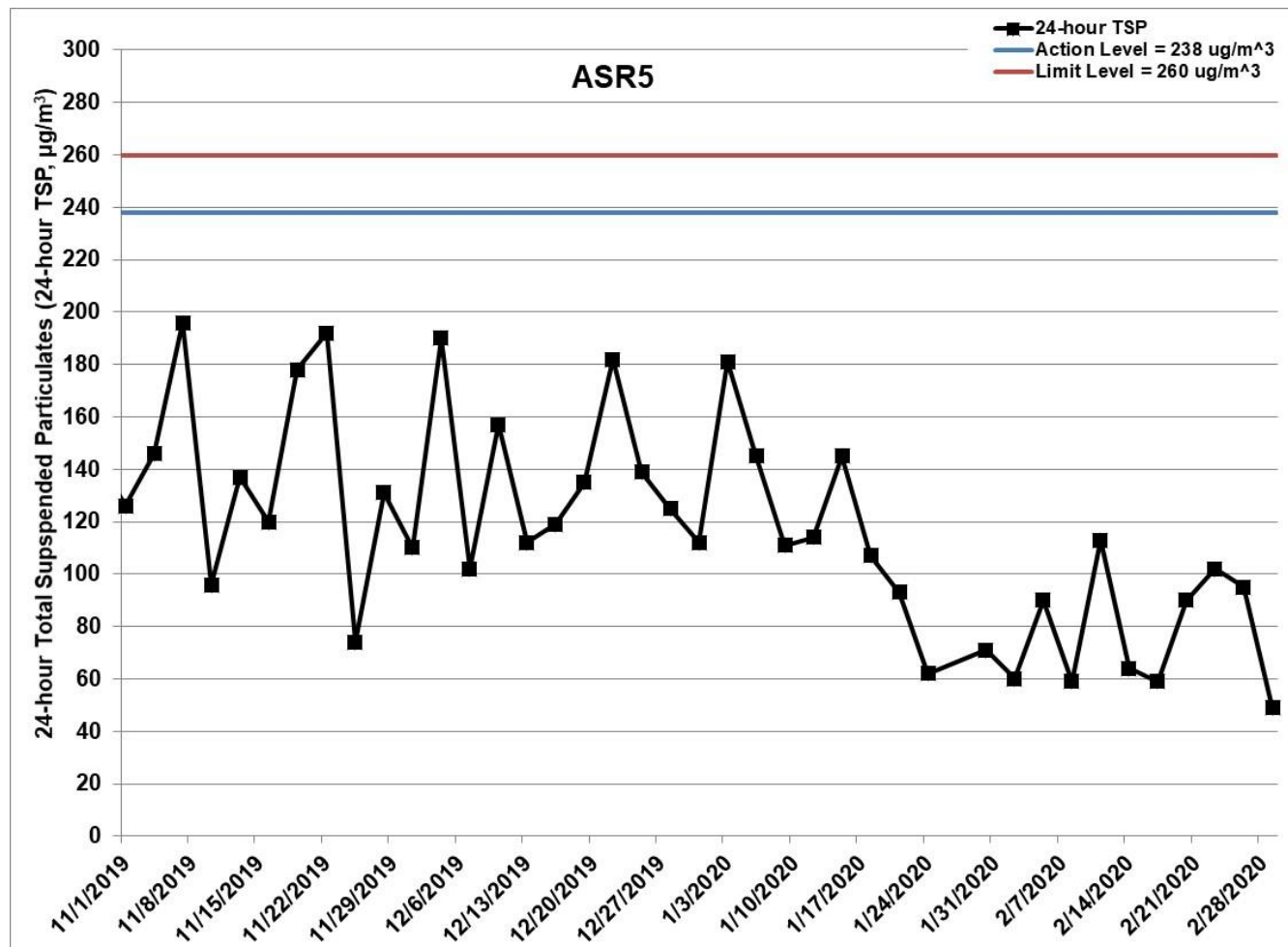


Figure F.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



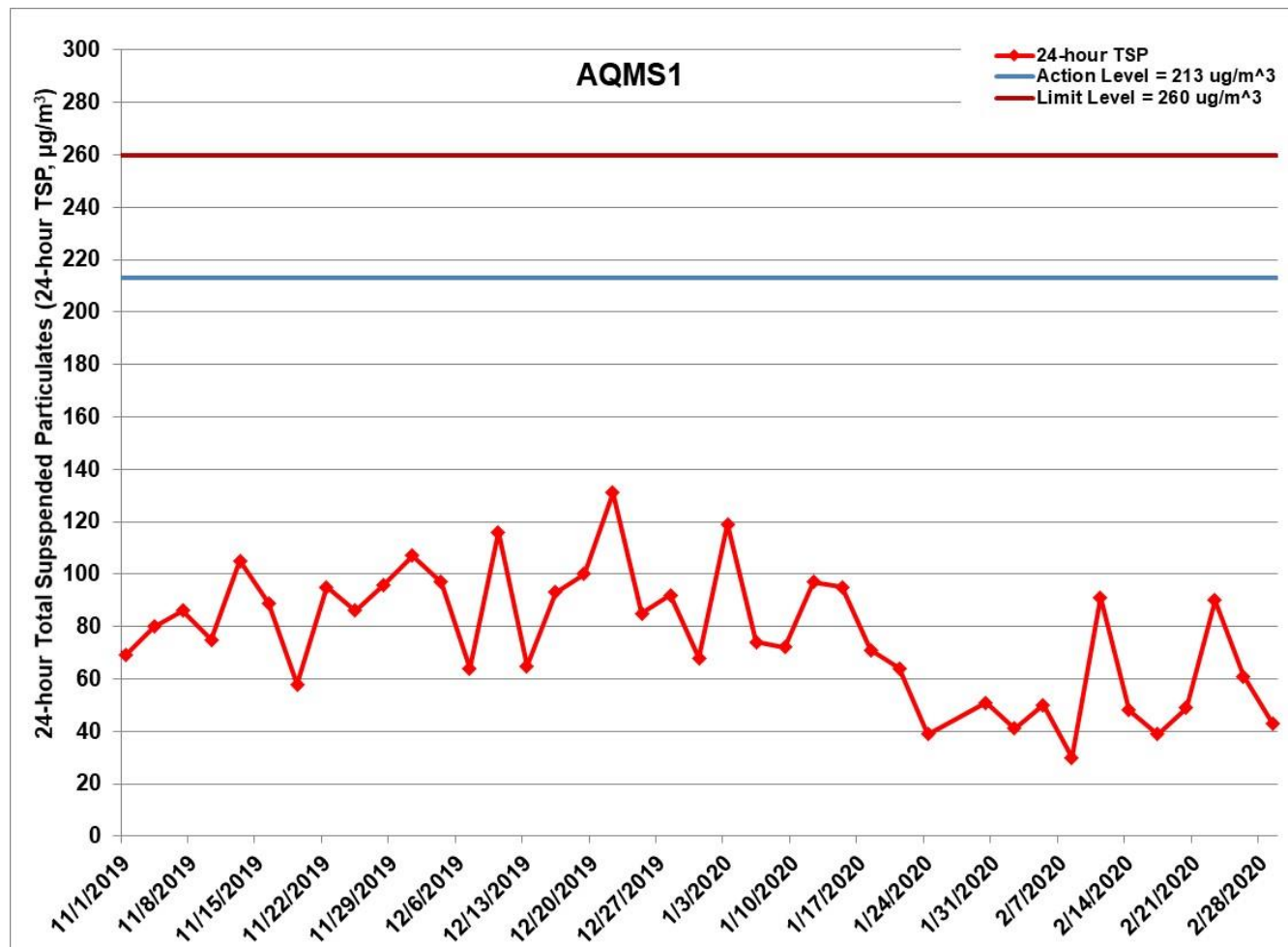


Figure F.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



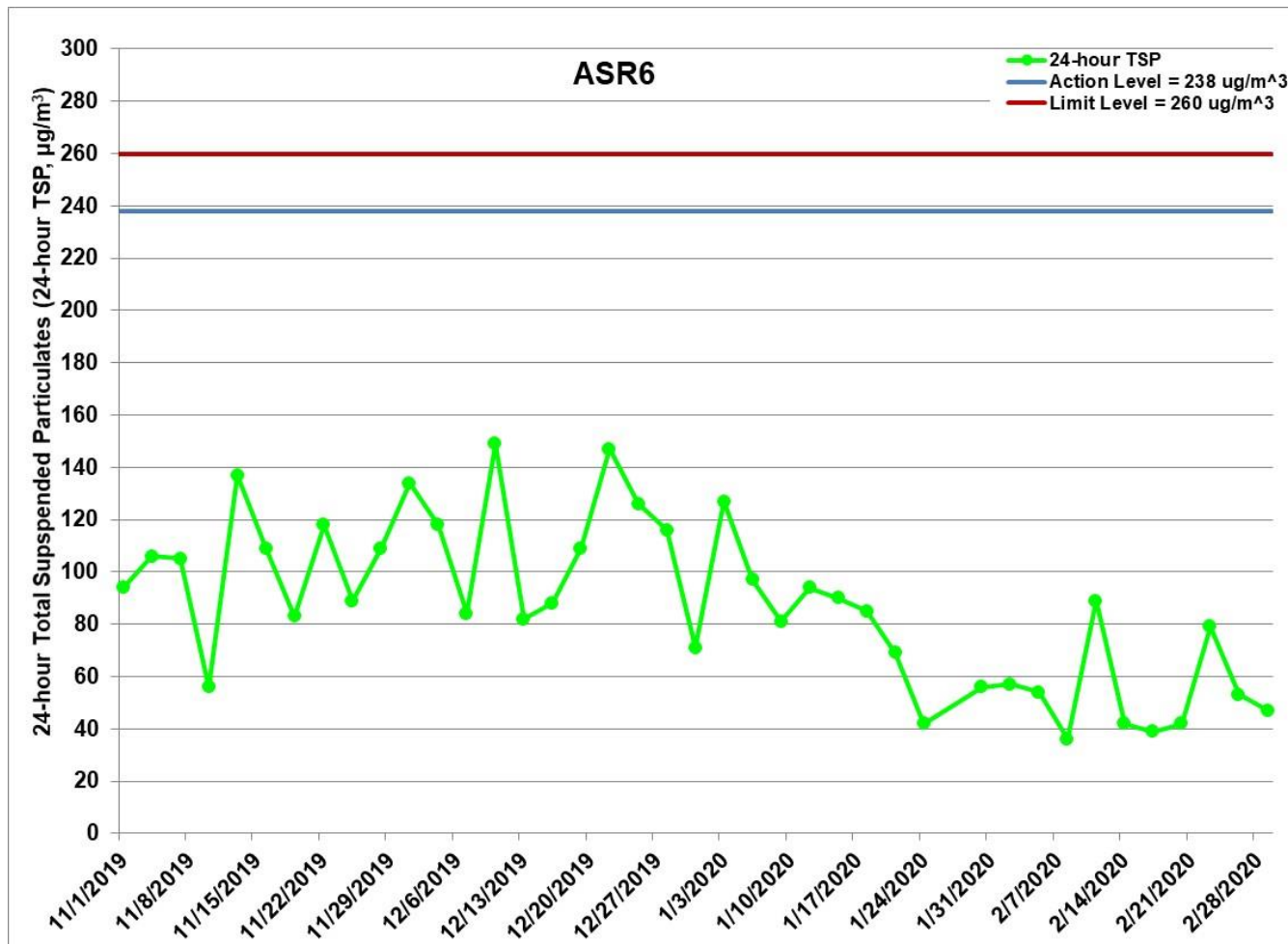


Figure F.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 - 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



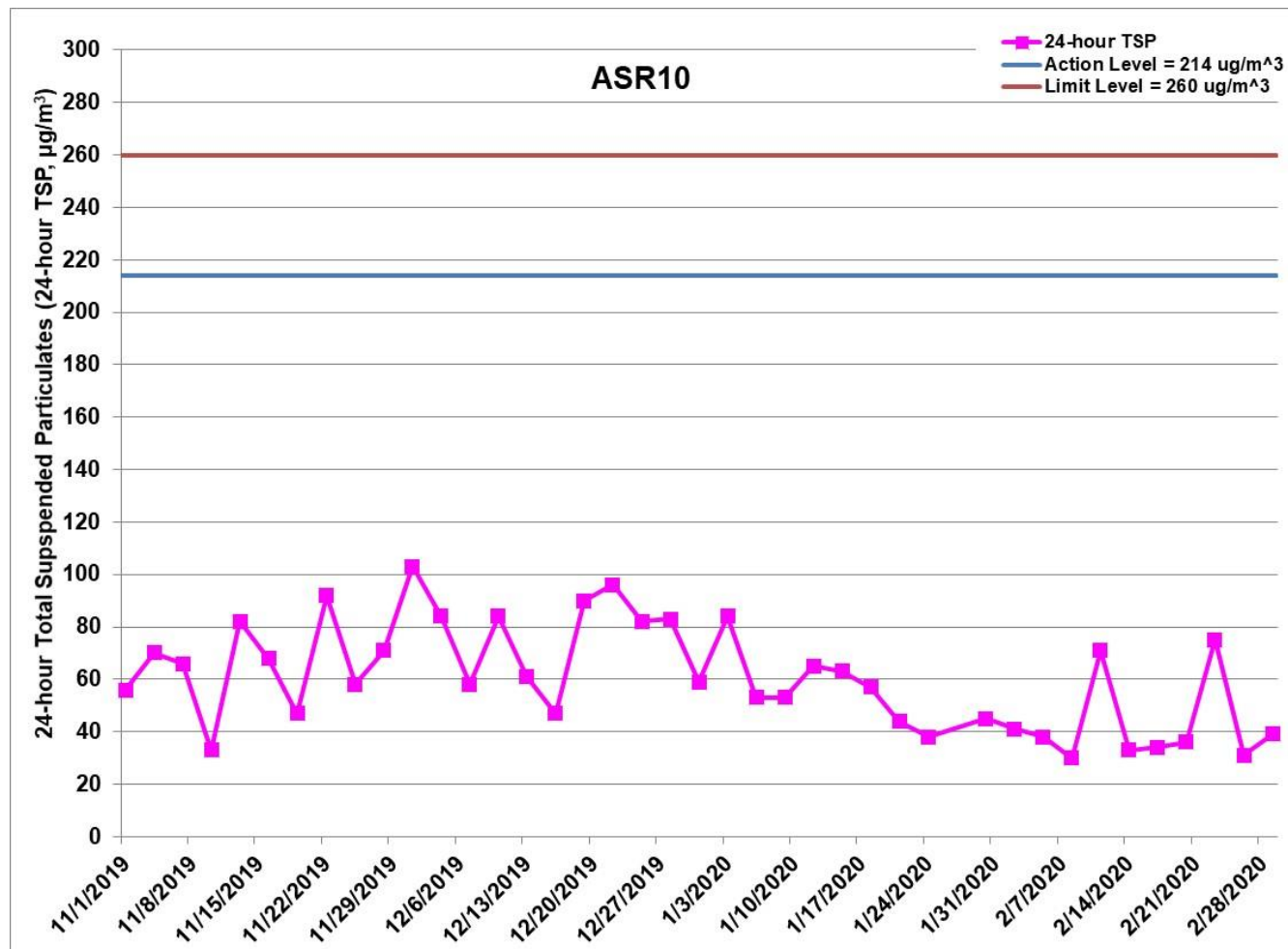


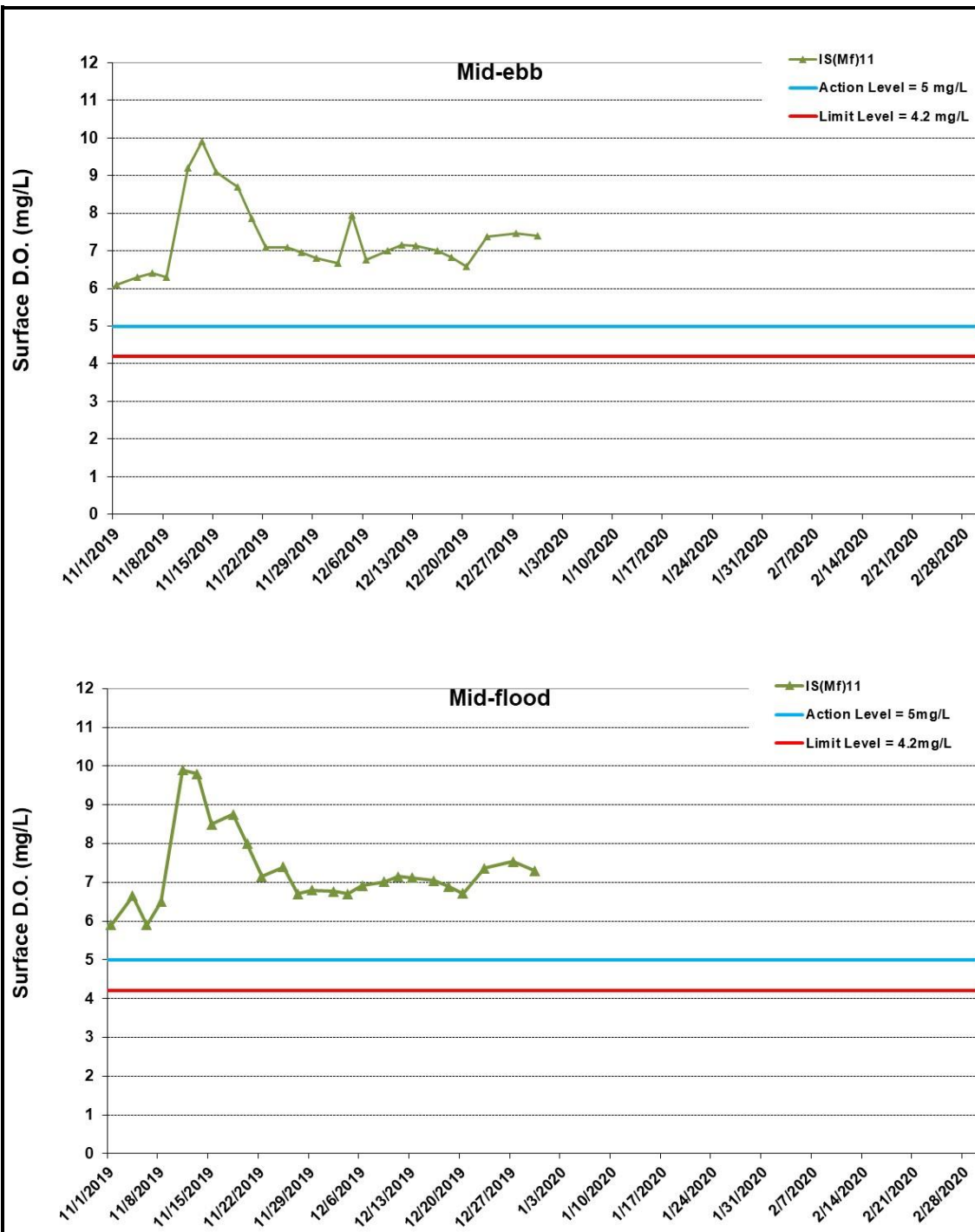
Figure F.10 Impact Monitoring – 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 November 2019 and 29 February 2020 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Construction of Thermal Barrier, Construction of Walkway Corbel & Cover, Road & Drainage Works, C&C Tunnel RC Structure and Roofing System Installation(1/11/2019 – 29/2/2020)

Ref: 0212330_Impact AQM graphs_February 2020.xlsx



Appendix G

Impact Water Quality Monitoring Results



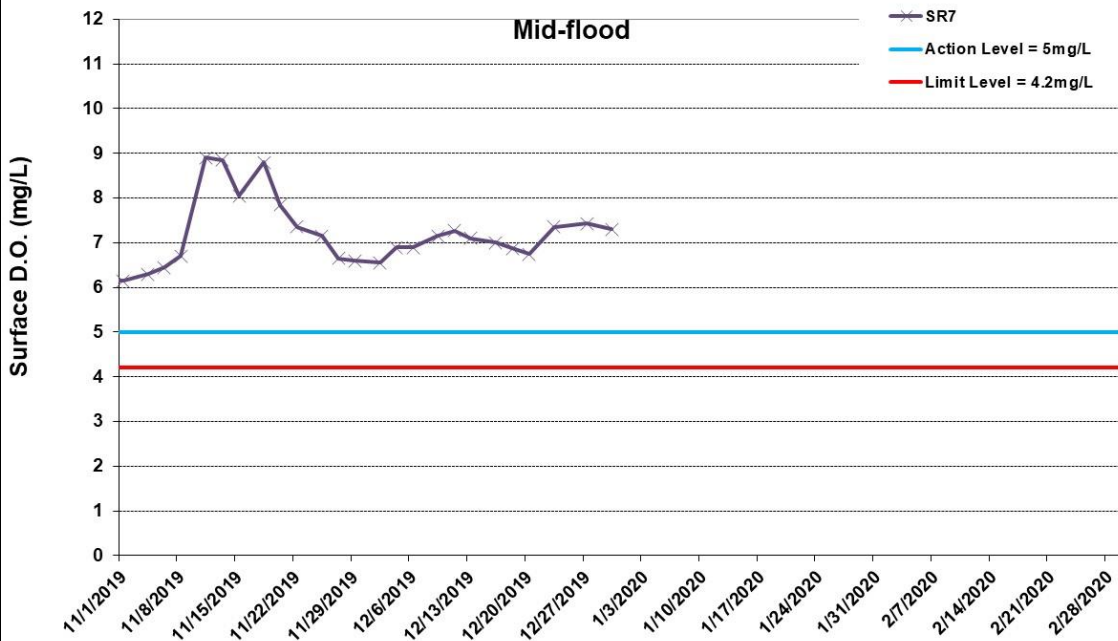
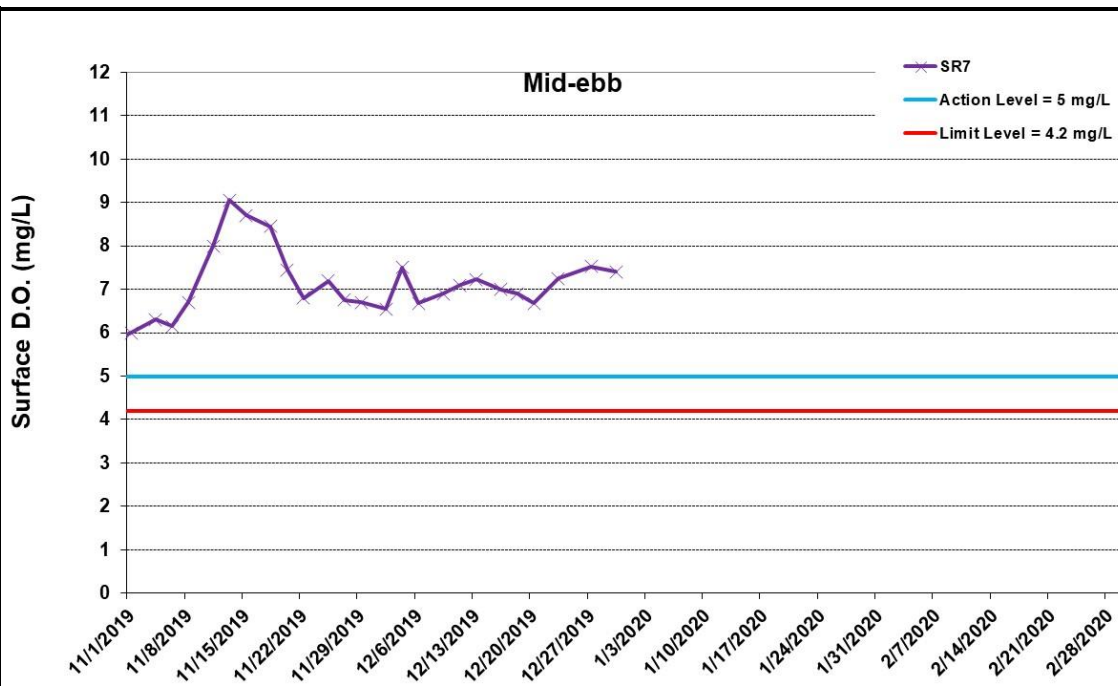
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G1 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





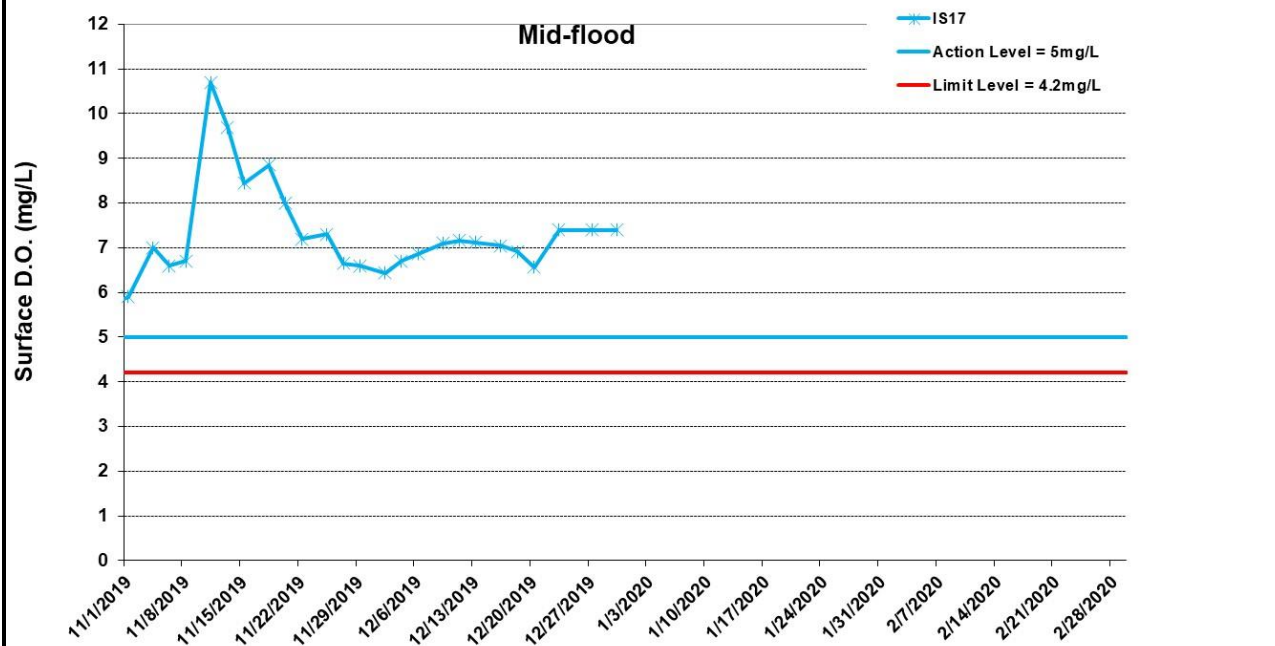
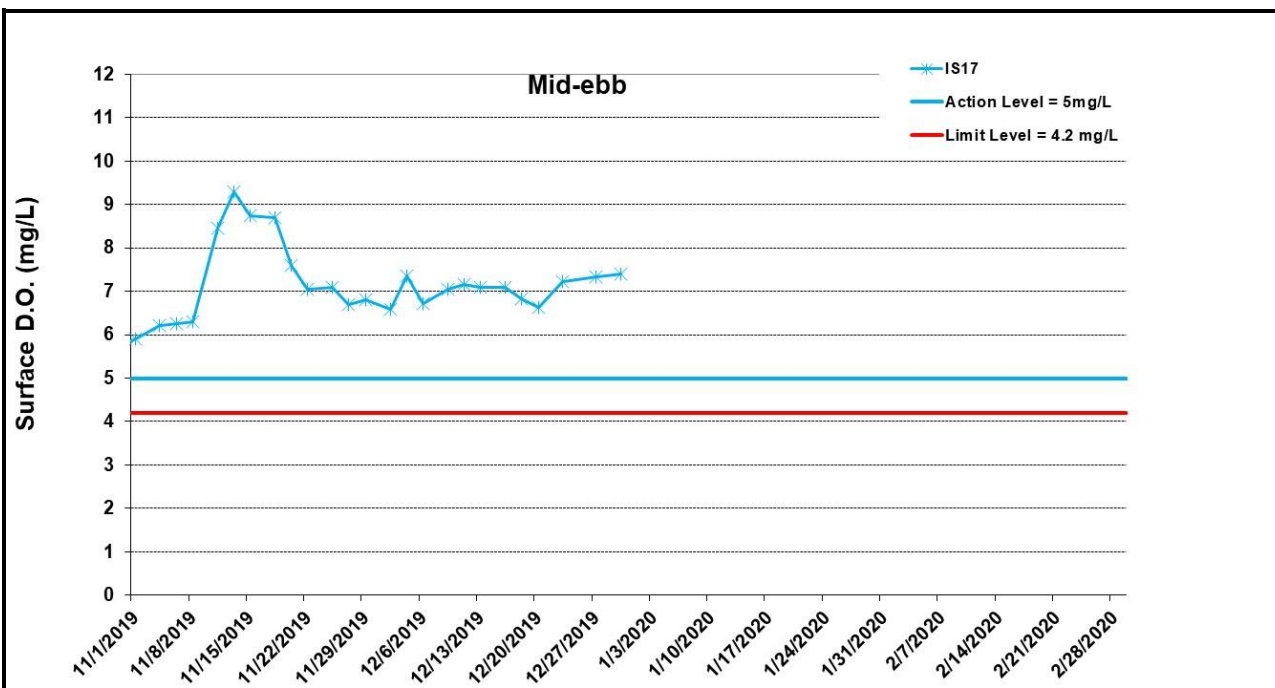
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G2 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





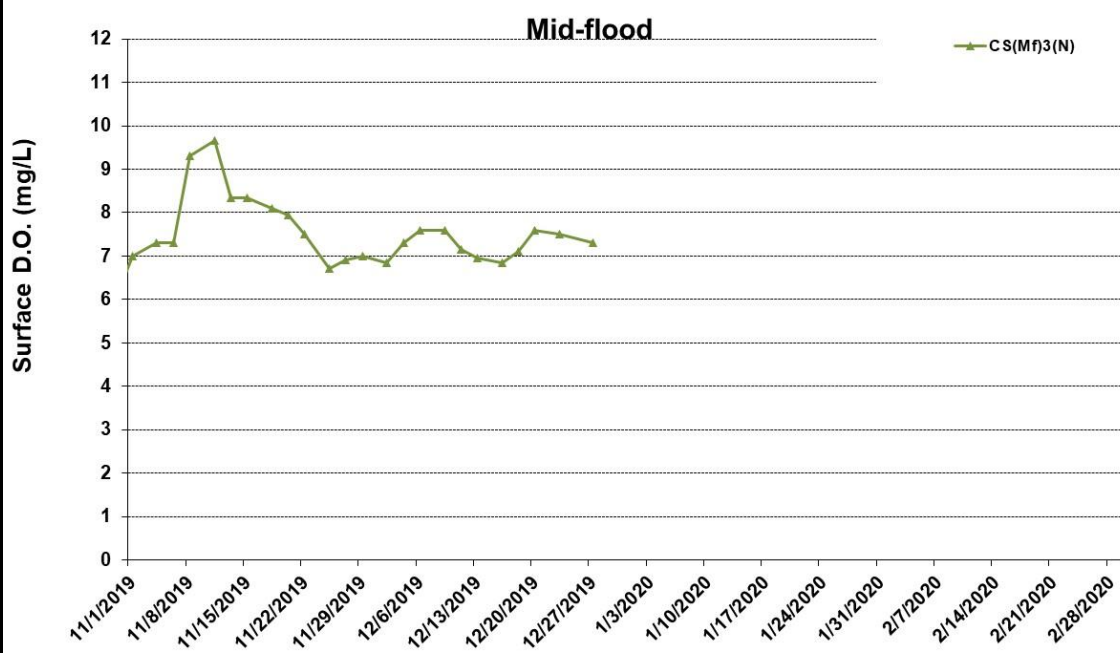
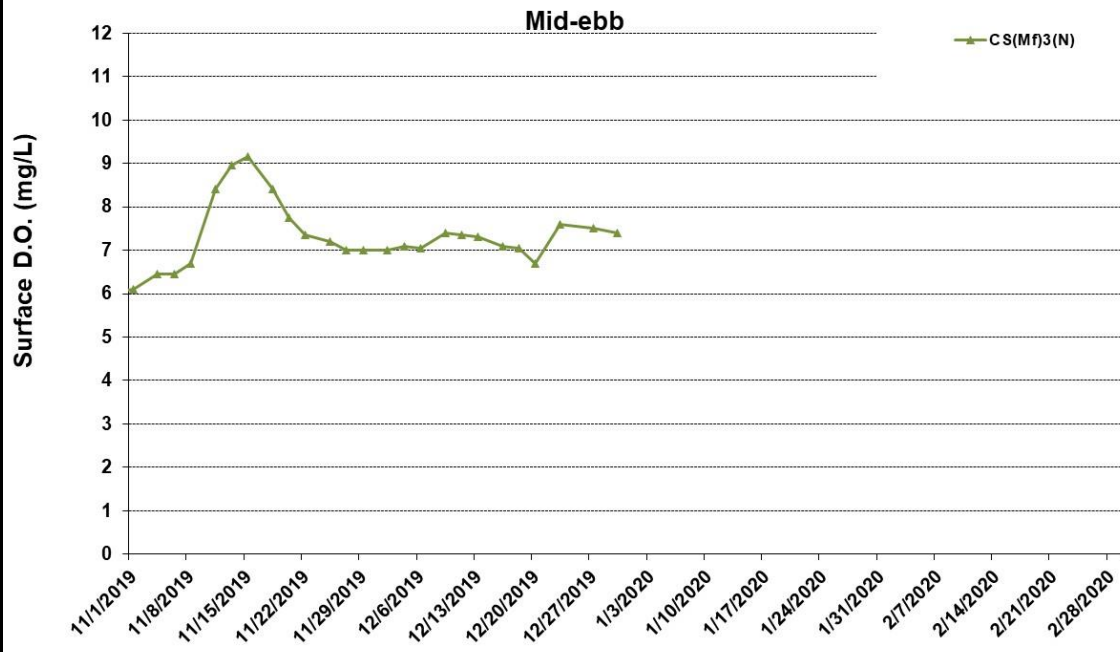
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

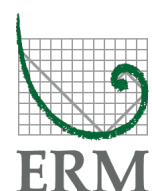
Figure G3 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).

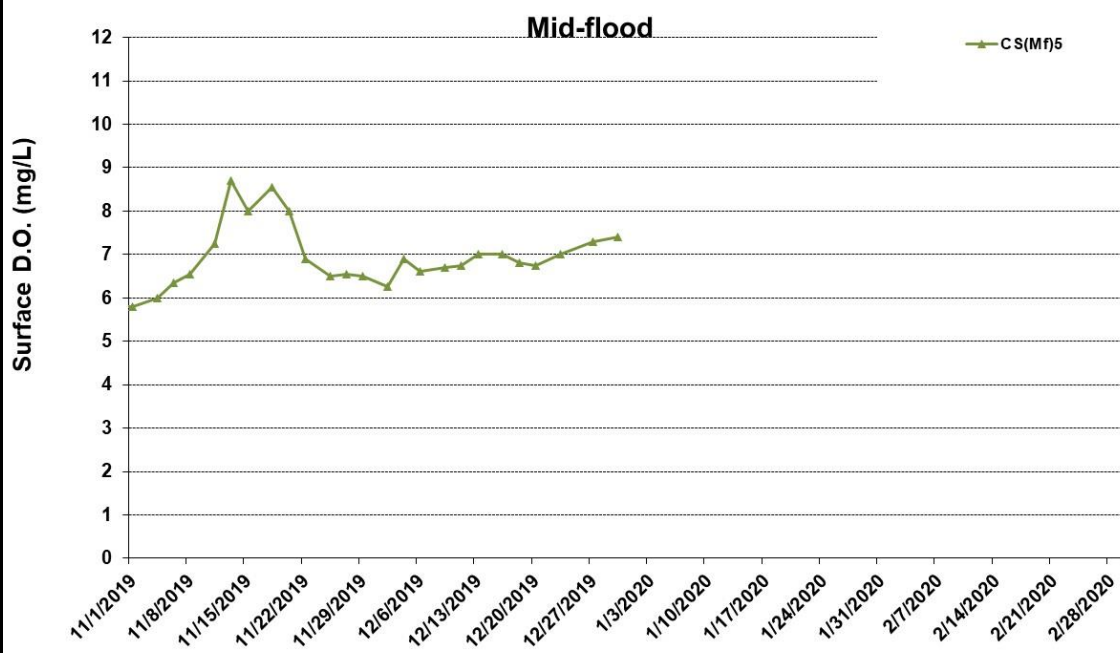
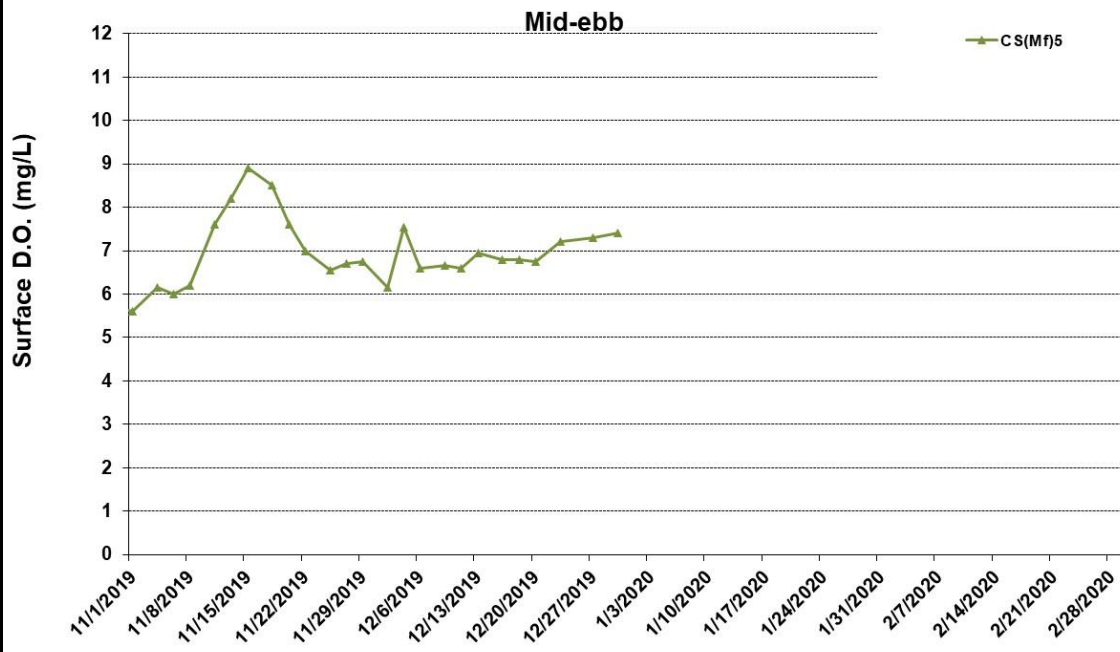




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G4 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

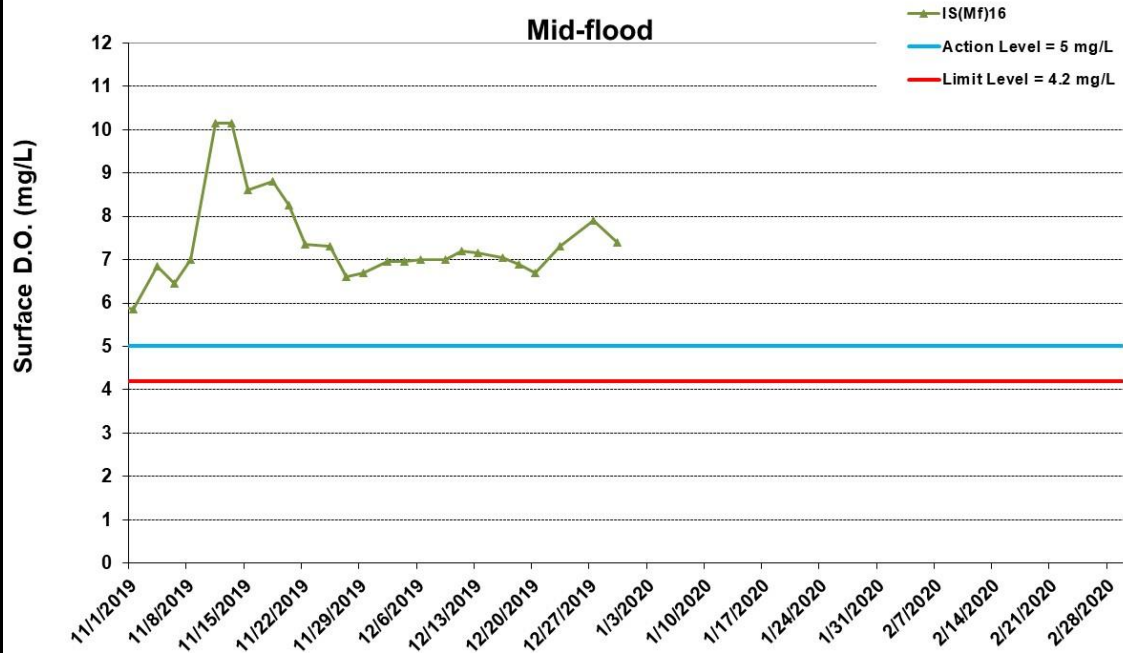
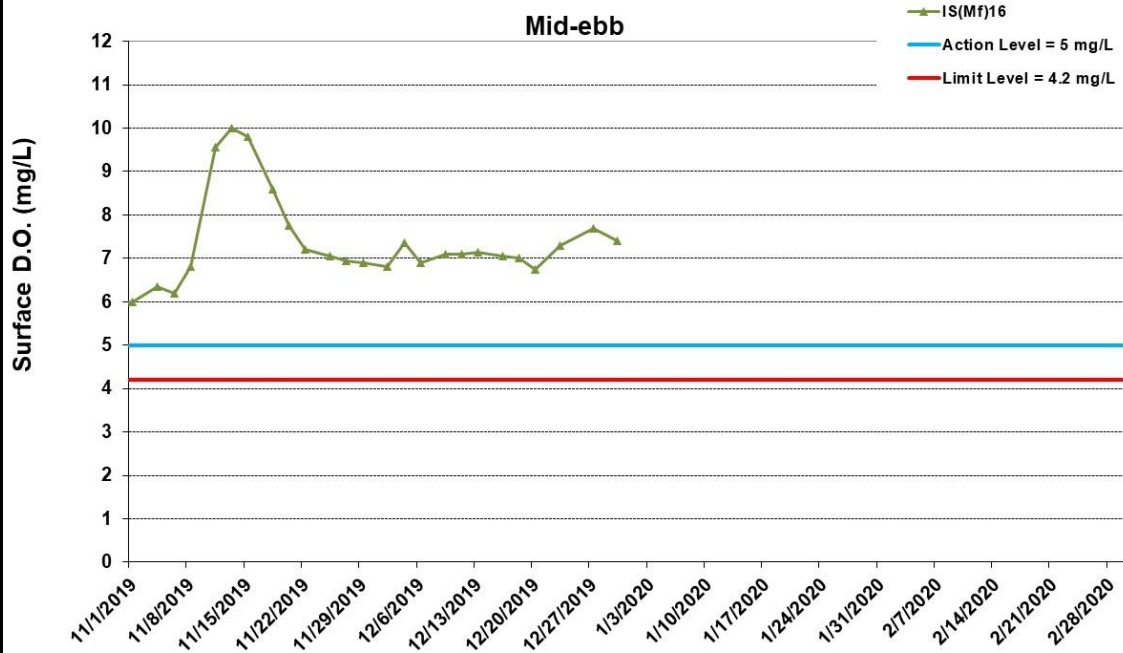




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G5 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

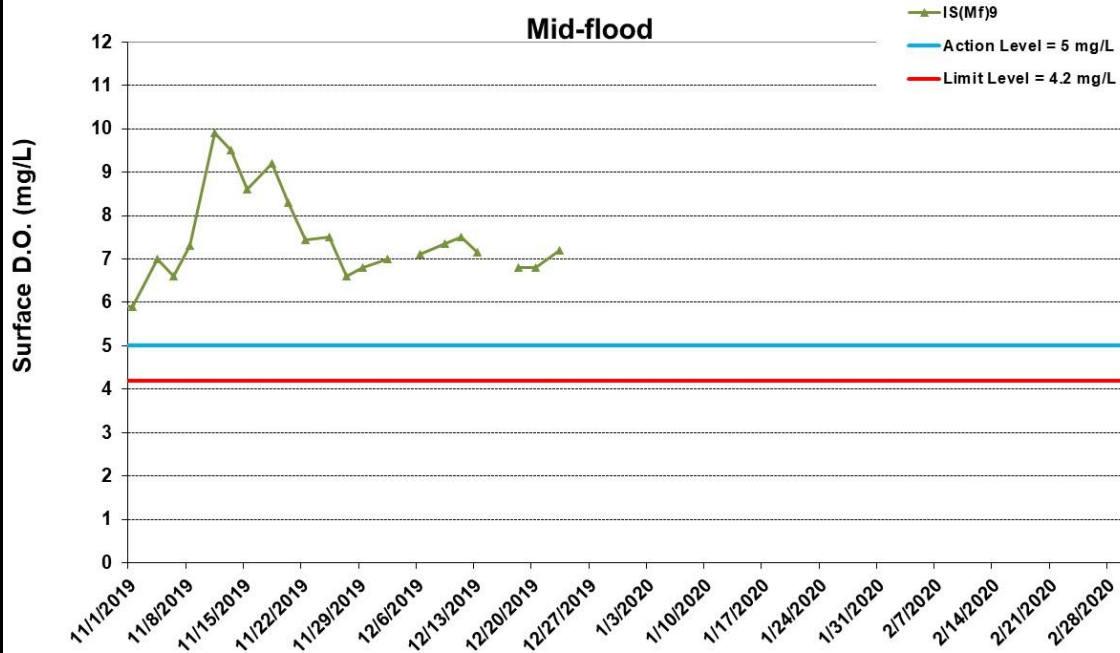
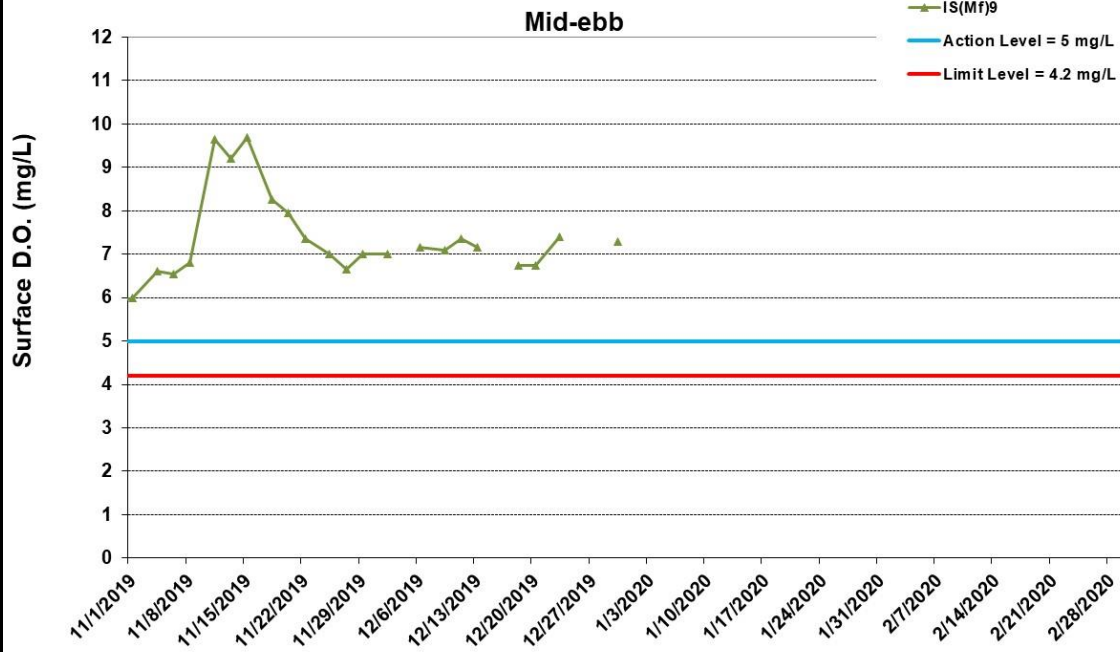




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G6 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



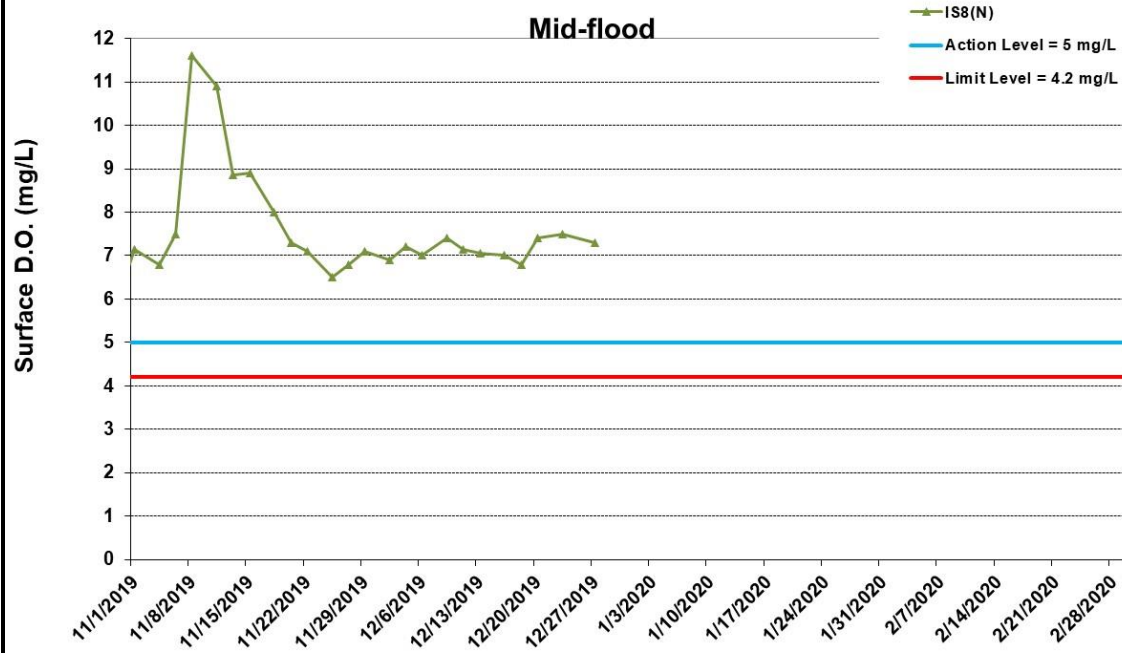
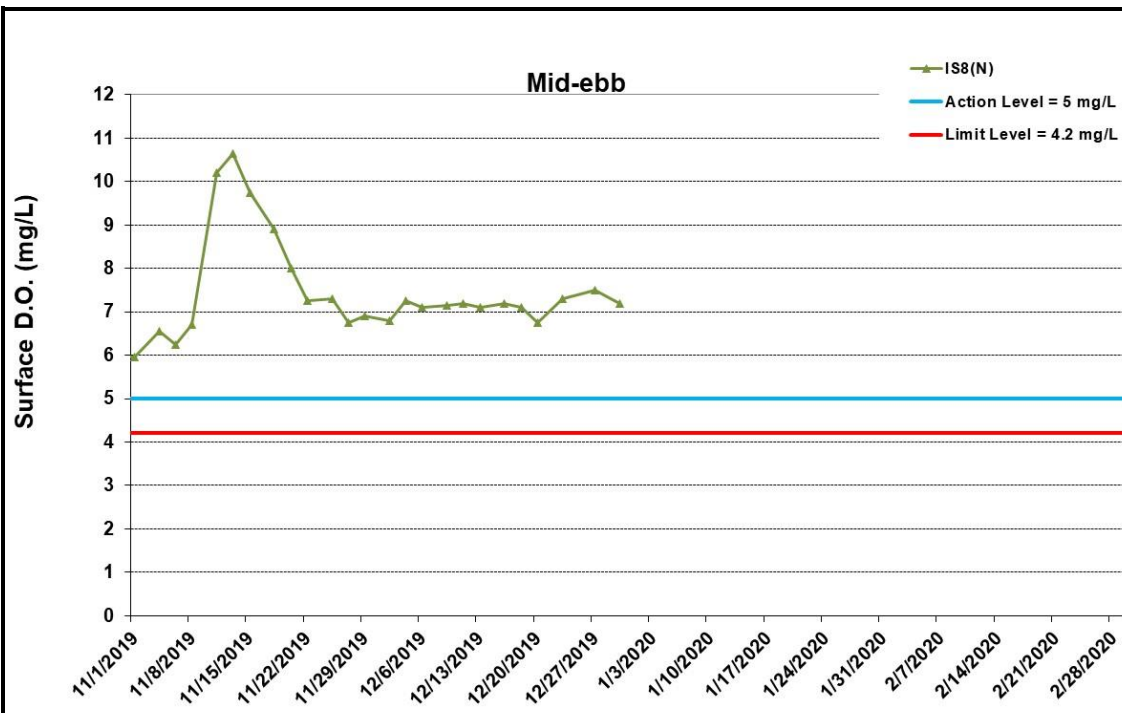


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G7 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

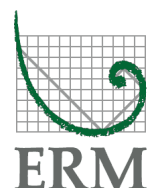


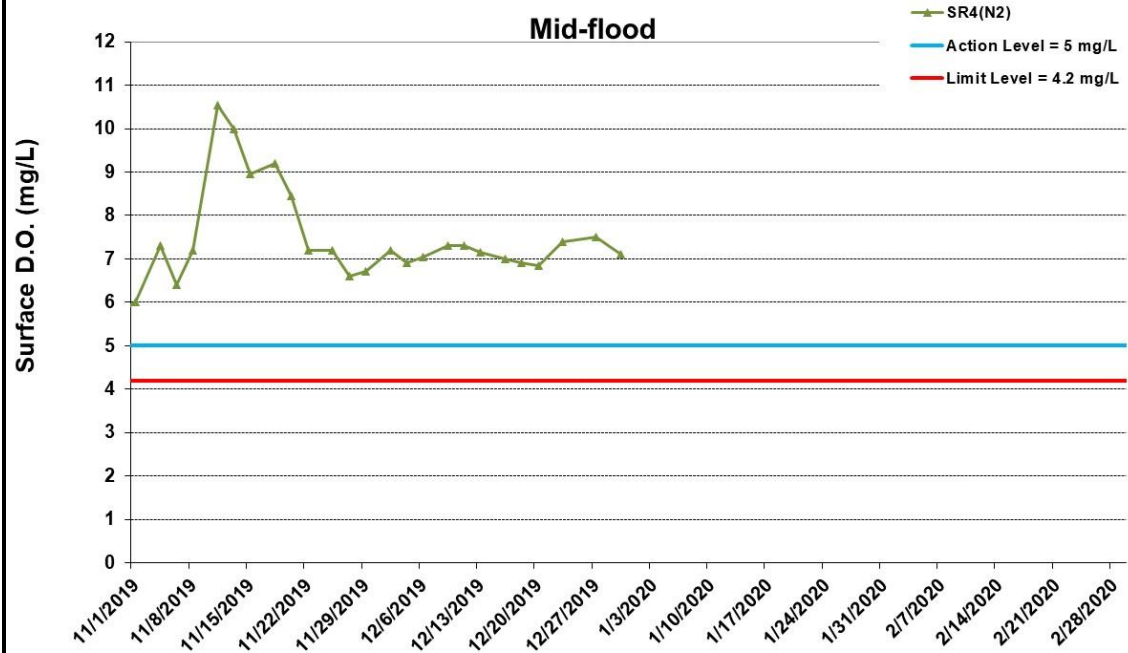
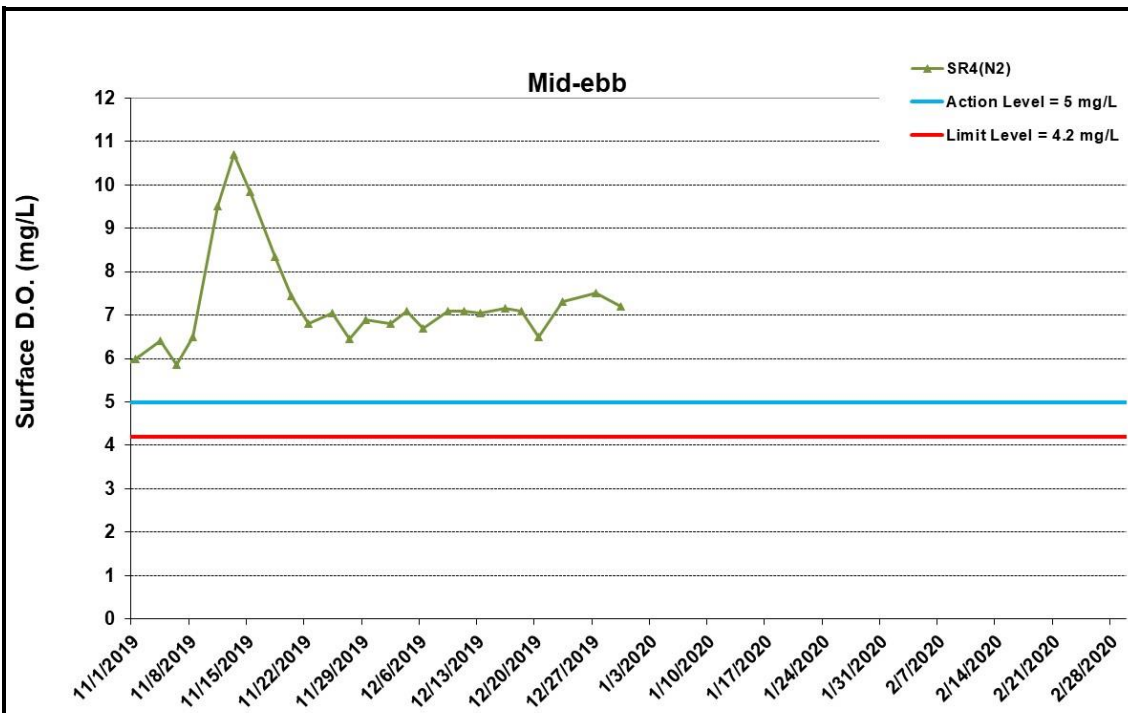
Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls



*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G8 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



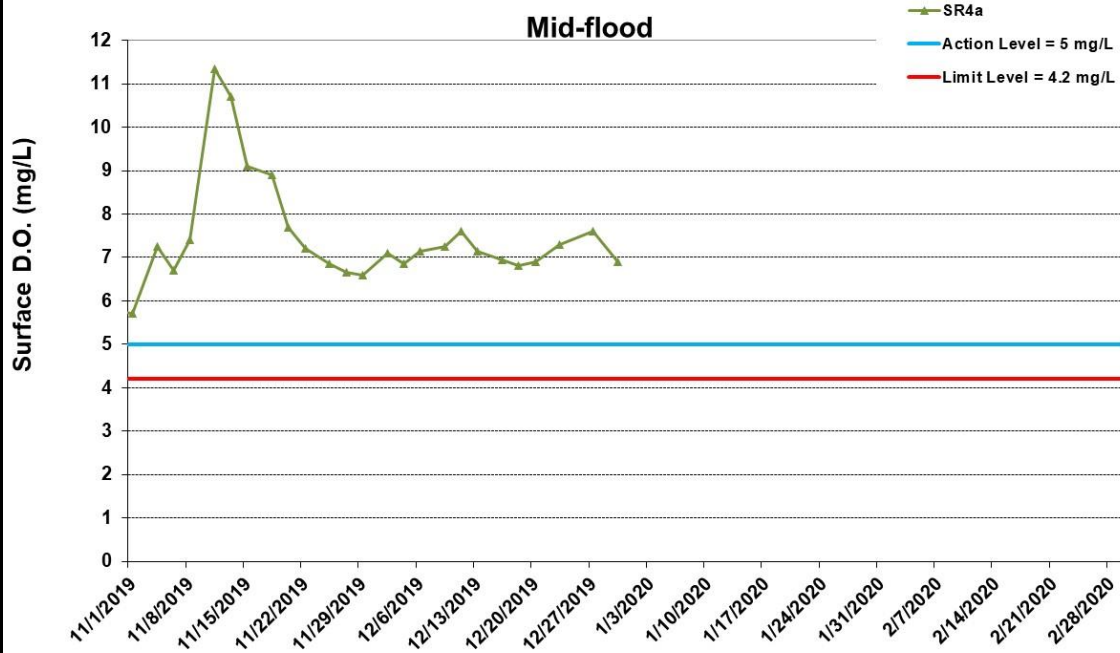
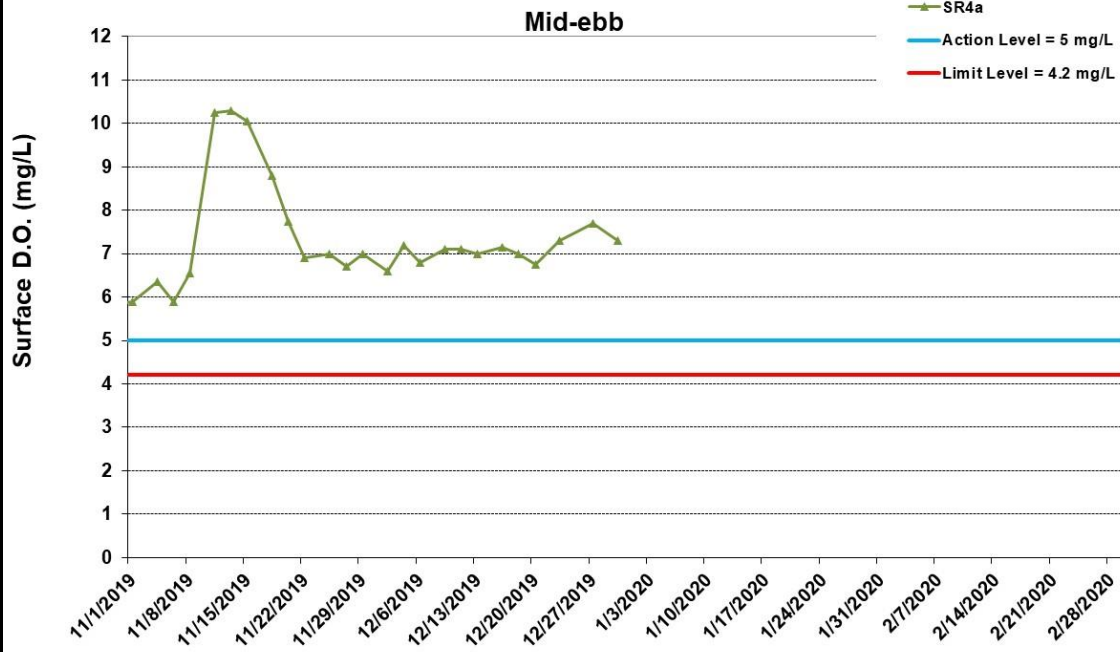


*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G9 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



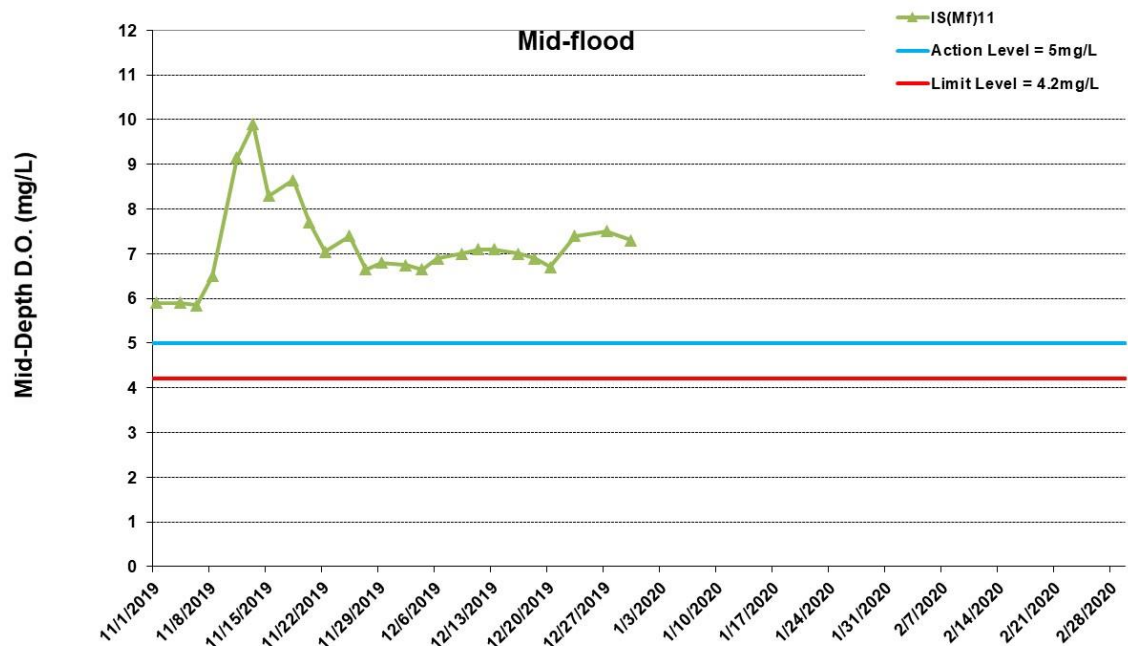
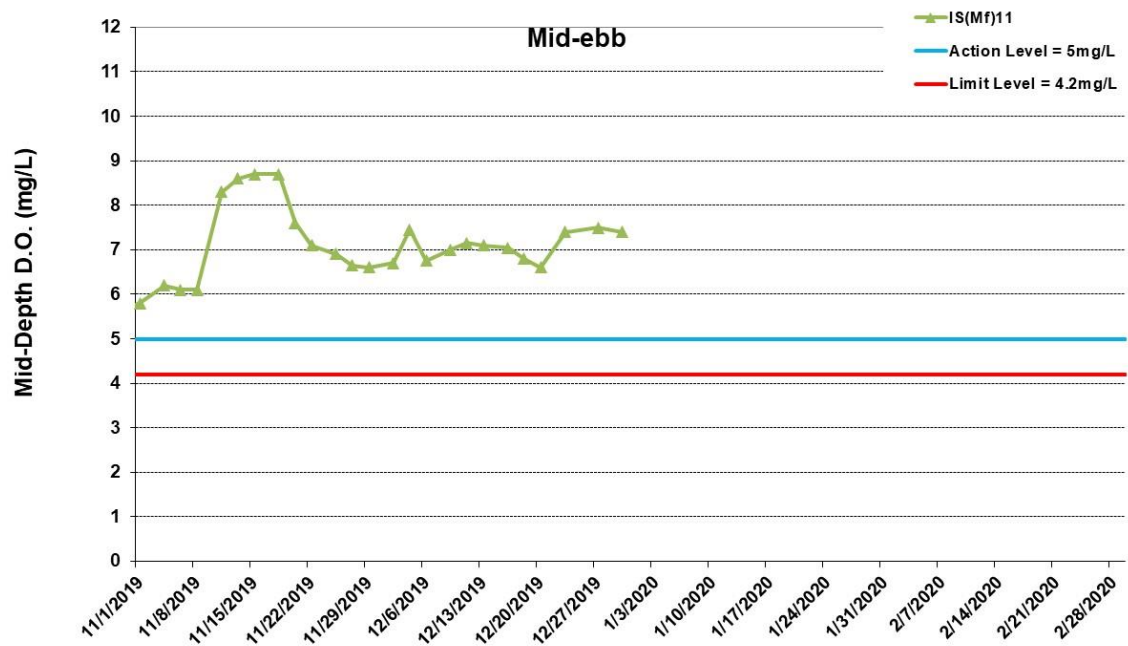
Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls



*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G10 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 November 2019 and 29 February 2020 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

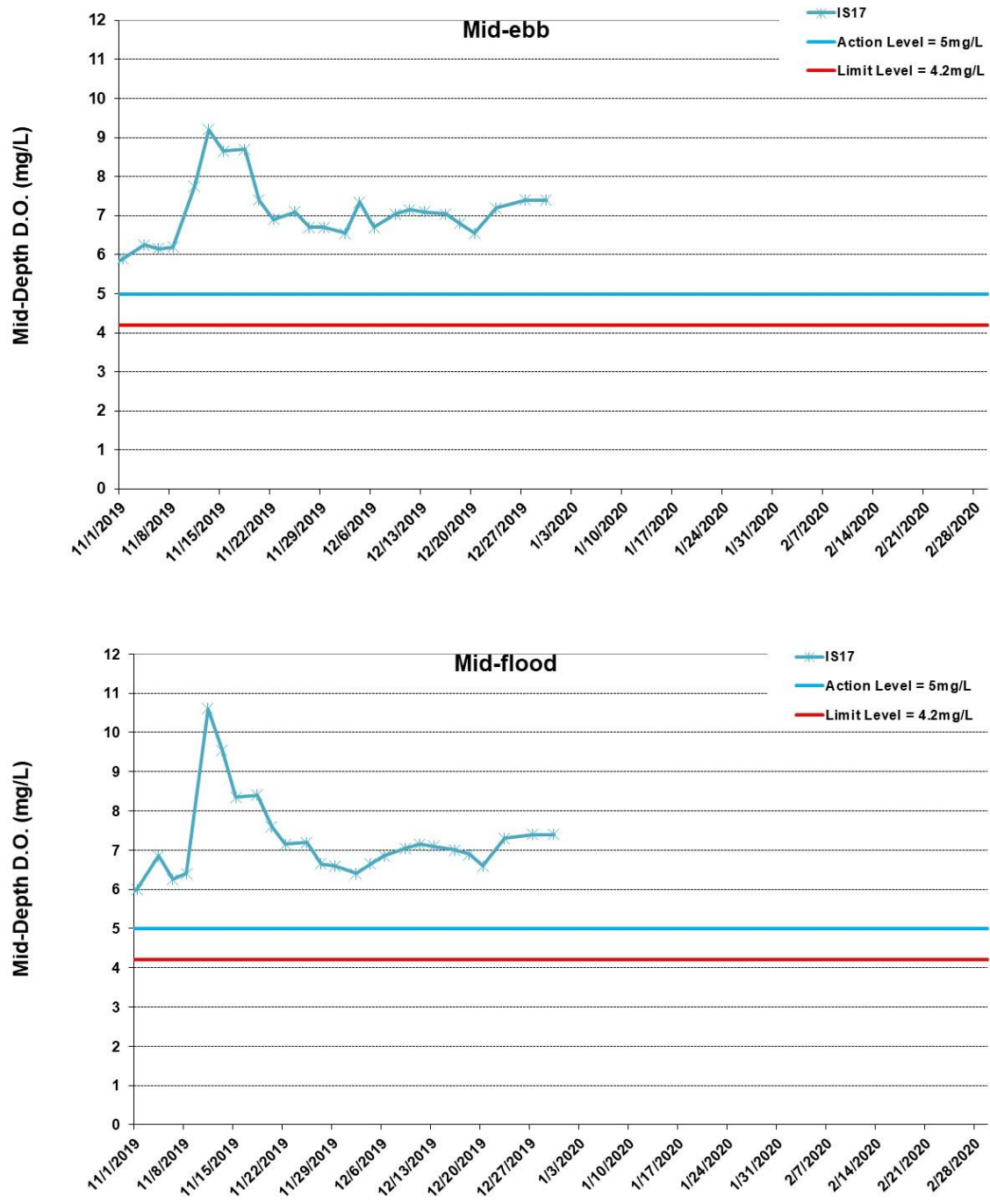
*No data for Stations SR7 due to shallow water depth (< 6m).

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G11 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

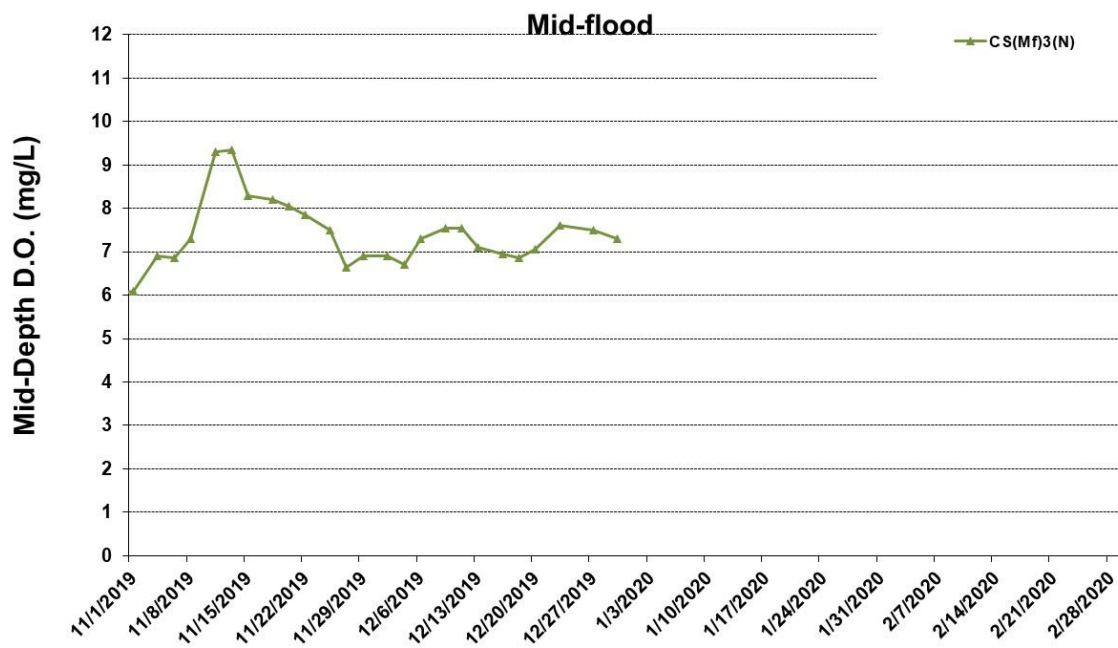
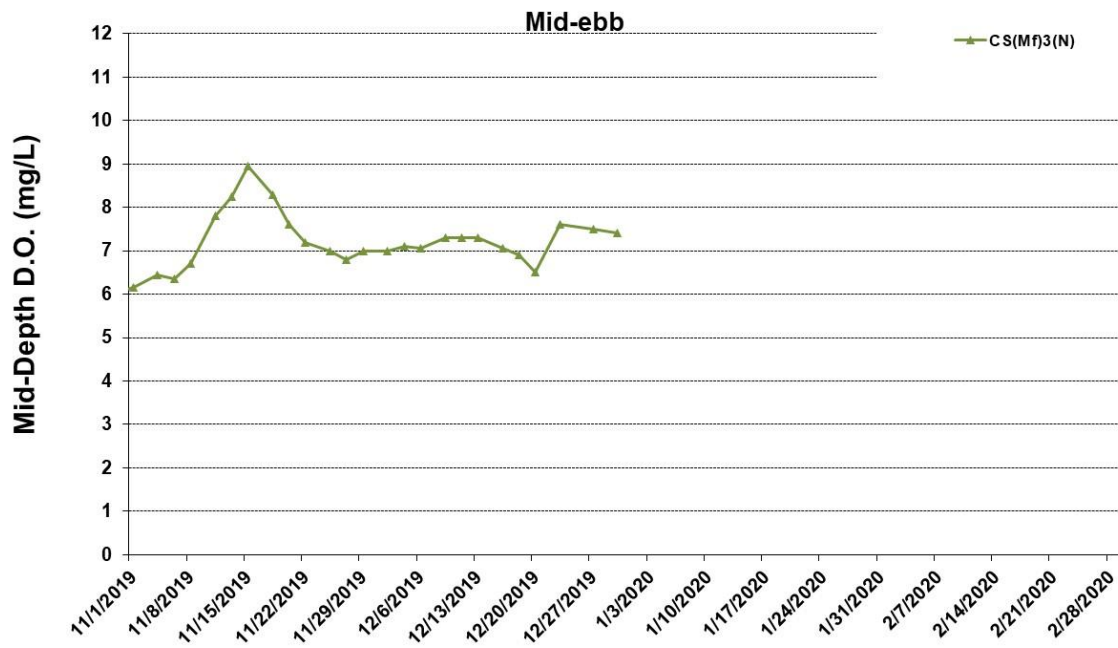
*No data for Stations SR7 due to shallow water depth (< 6m).

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G12 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2019 and 29 February 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

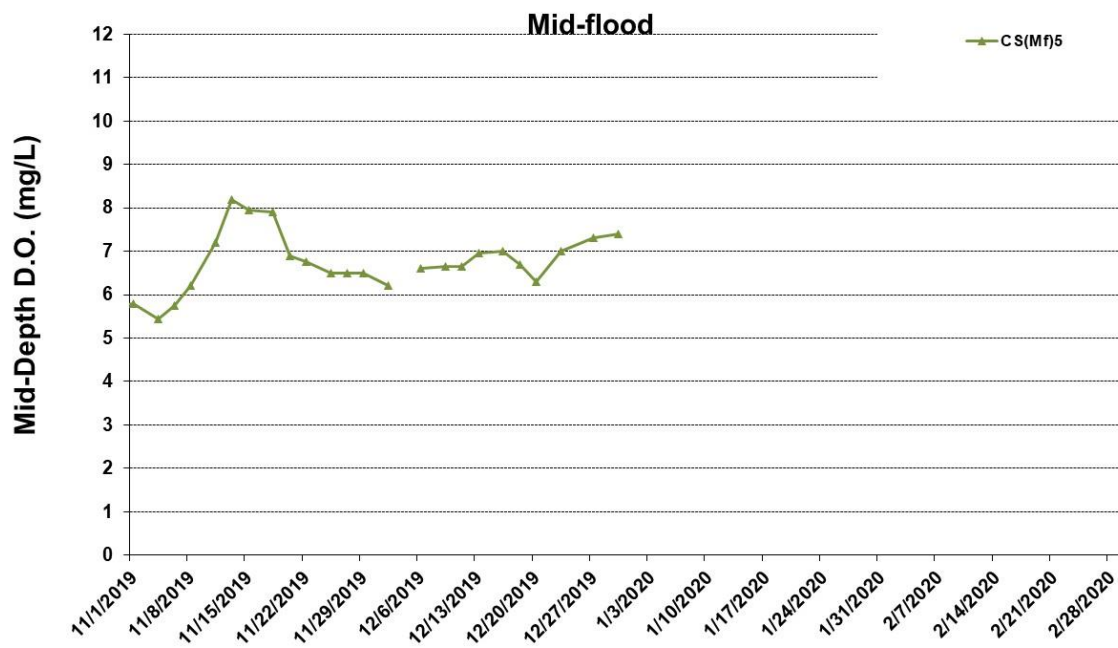
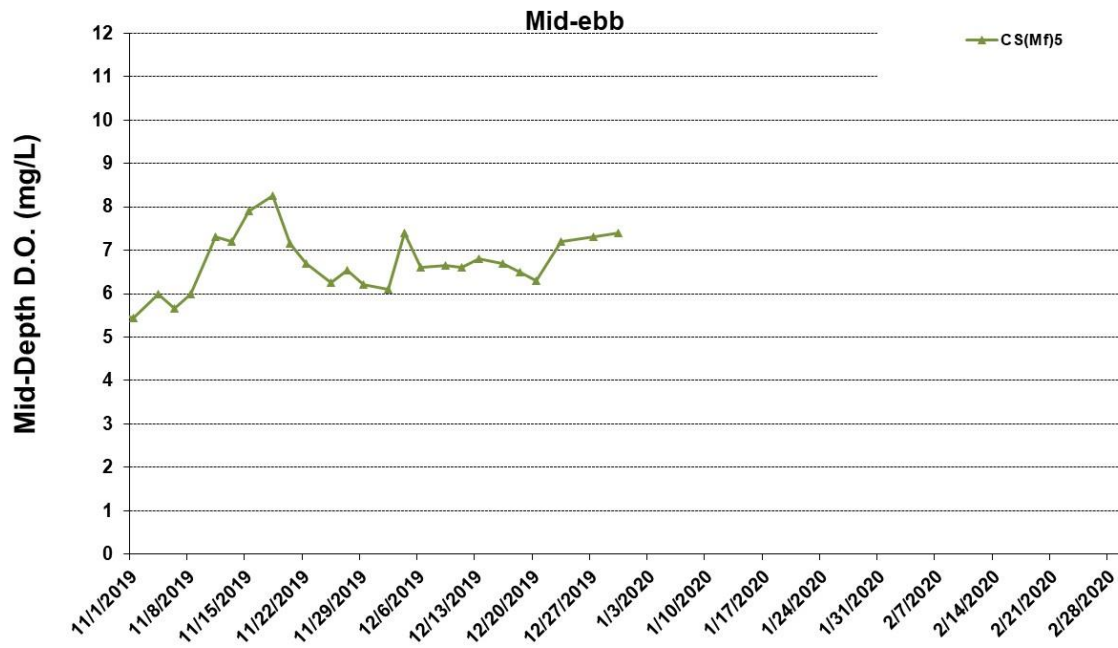




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G13 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2019 and 29 February 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

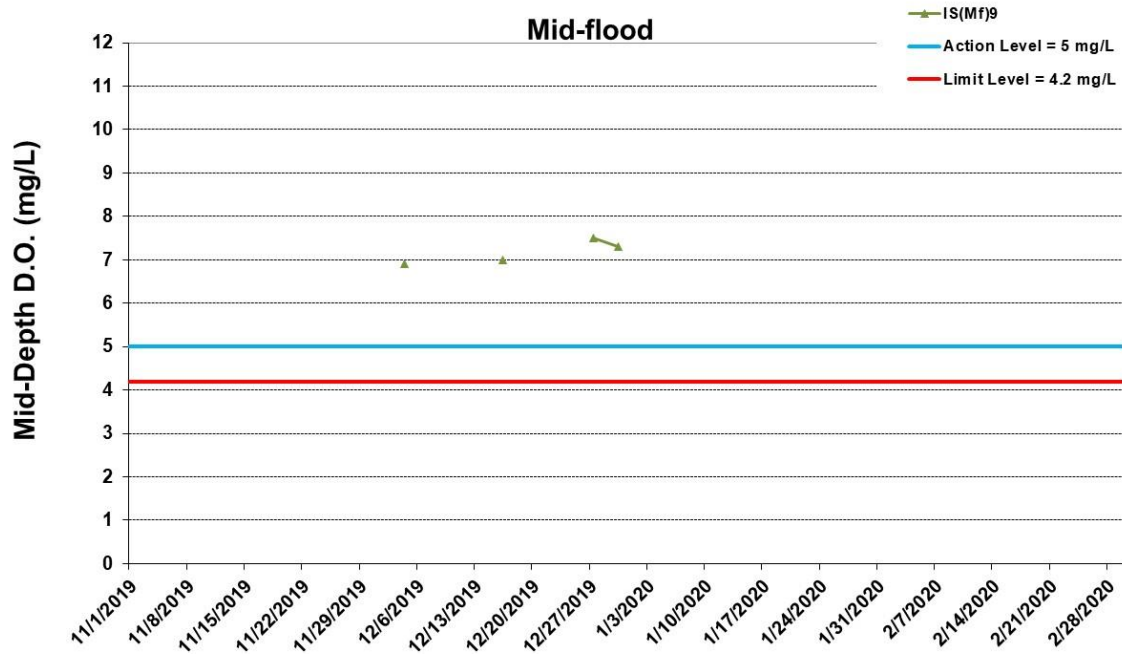
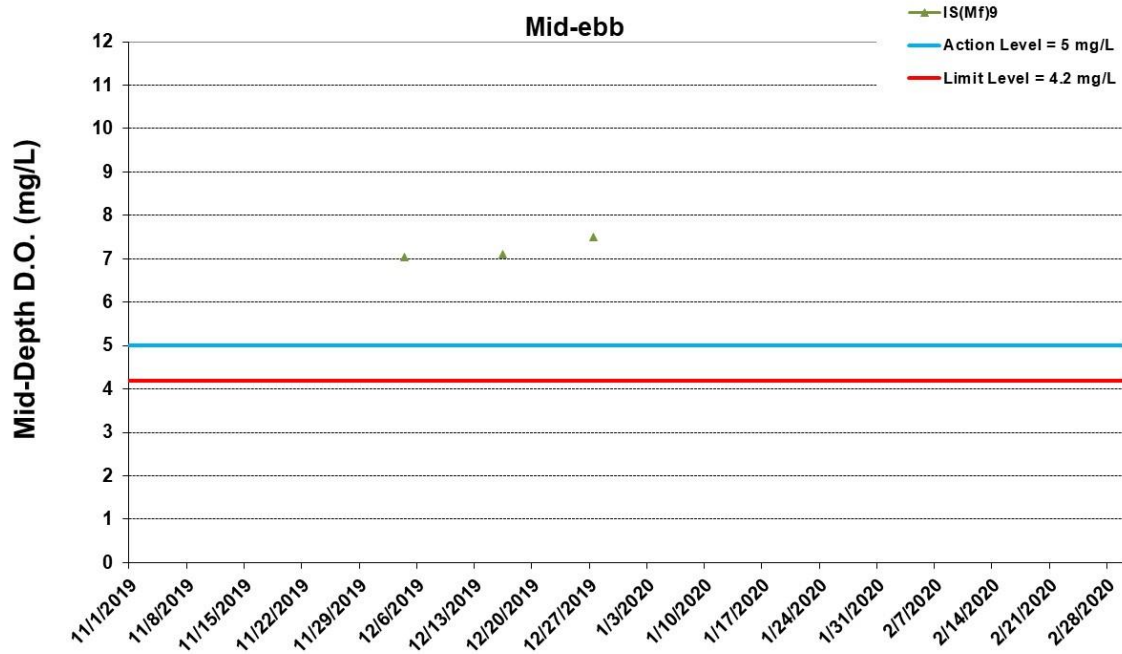




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G14 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2019 and 29 February 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

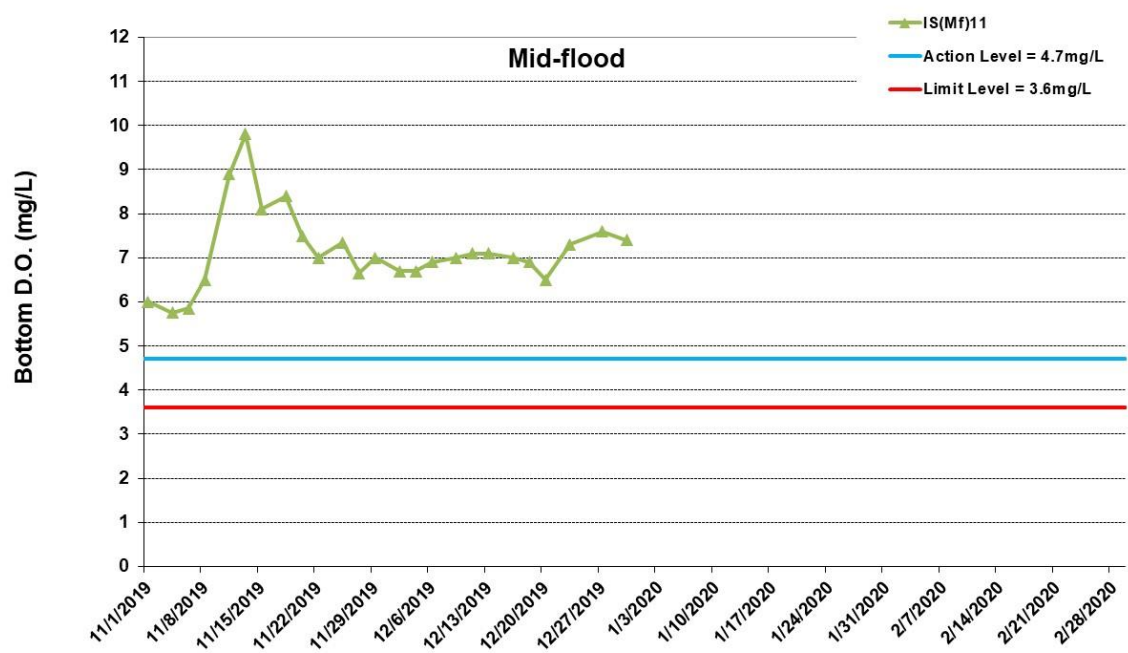
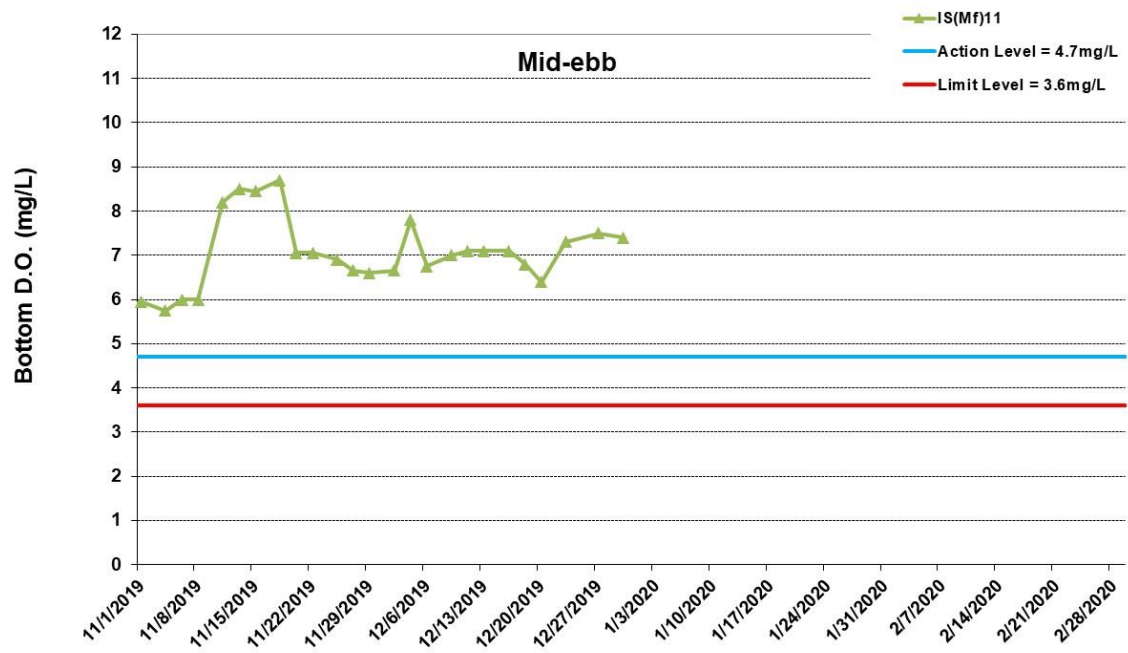




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G15 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 November 2019 and 29 February 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





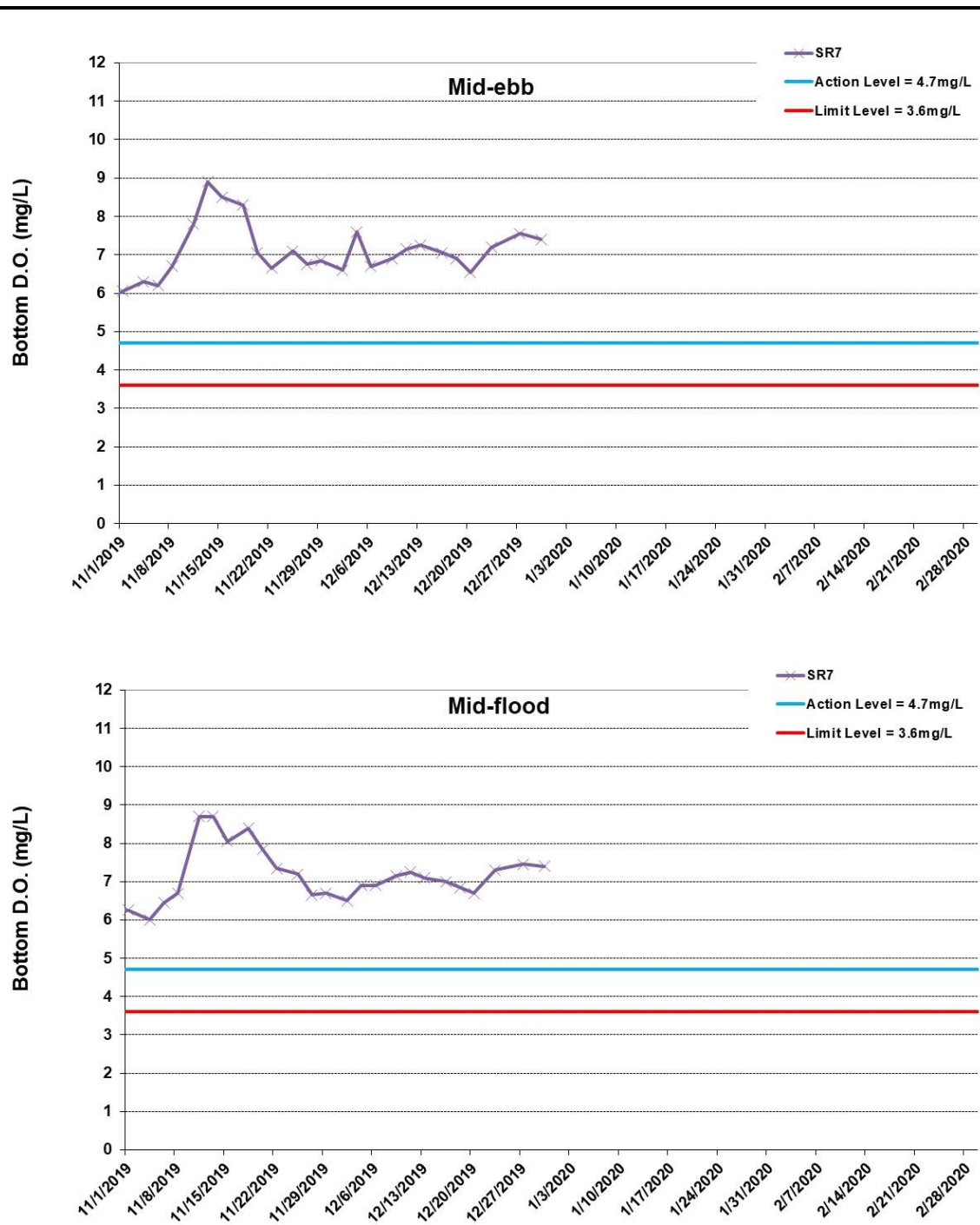
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G16 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





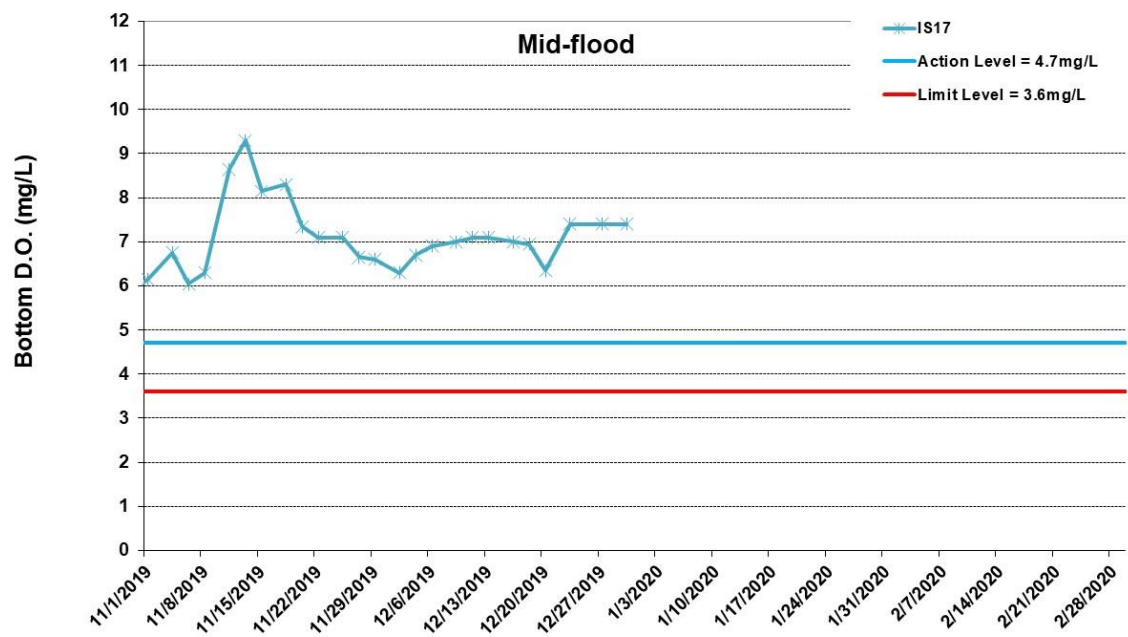
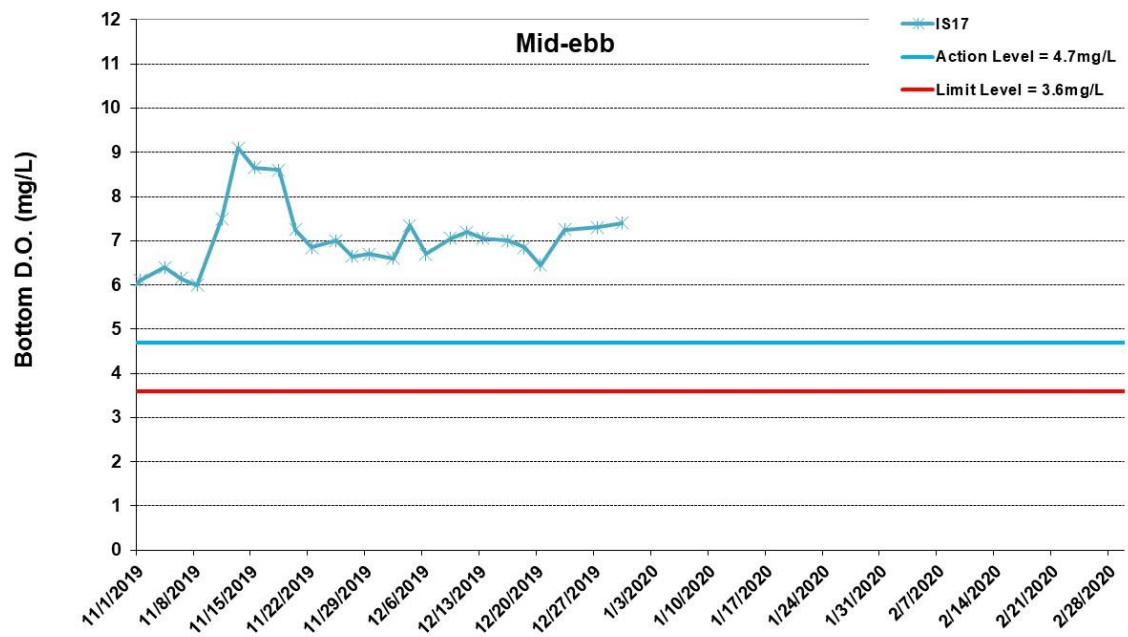
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G17 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



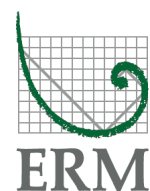


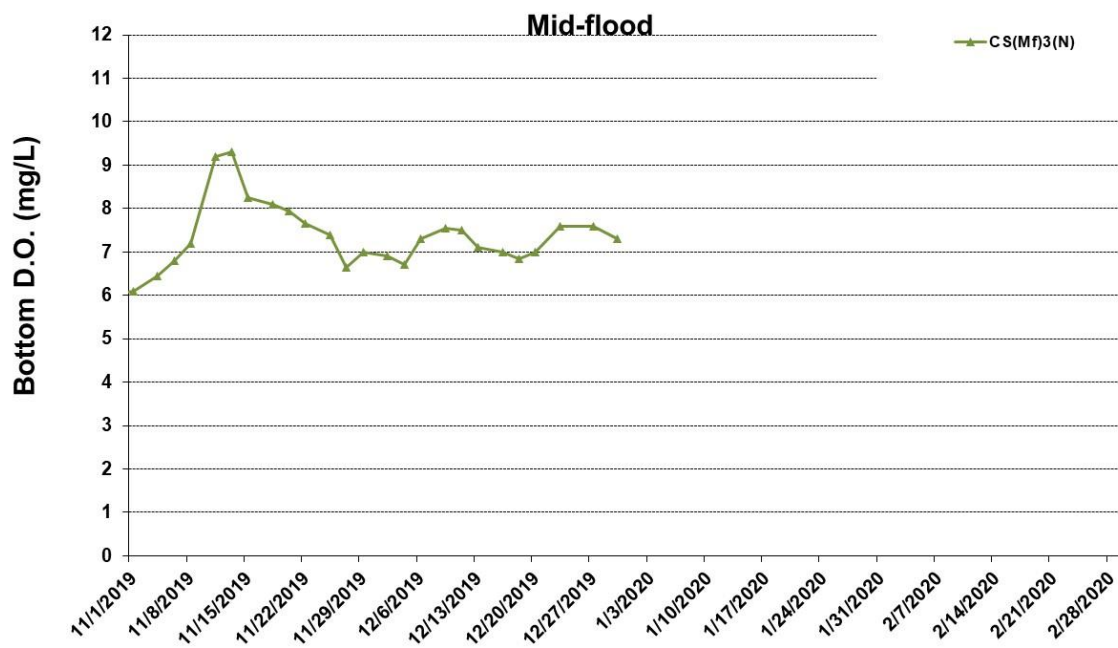
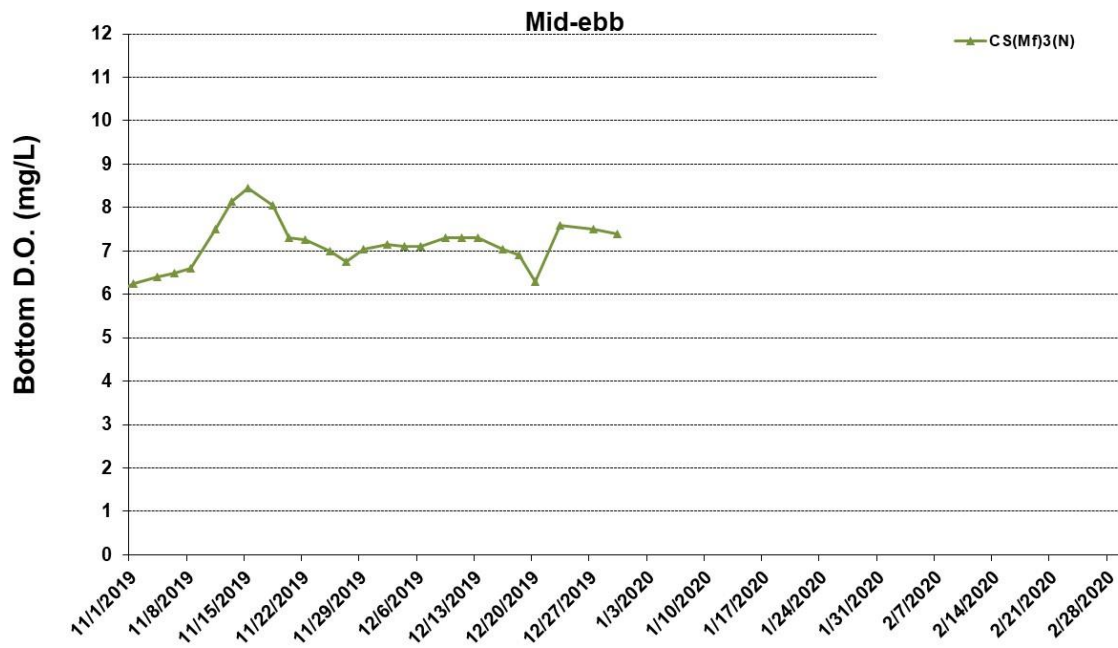
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G18 Impact Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).

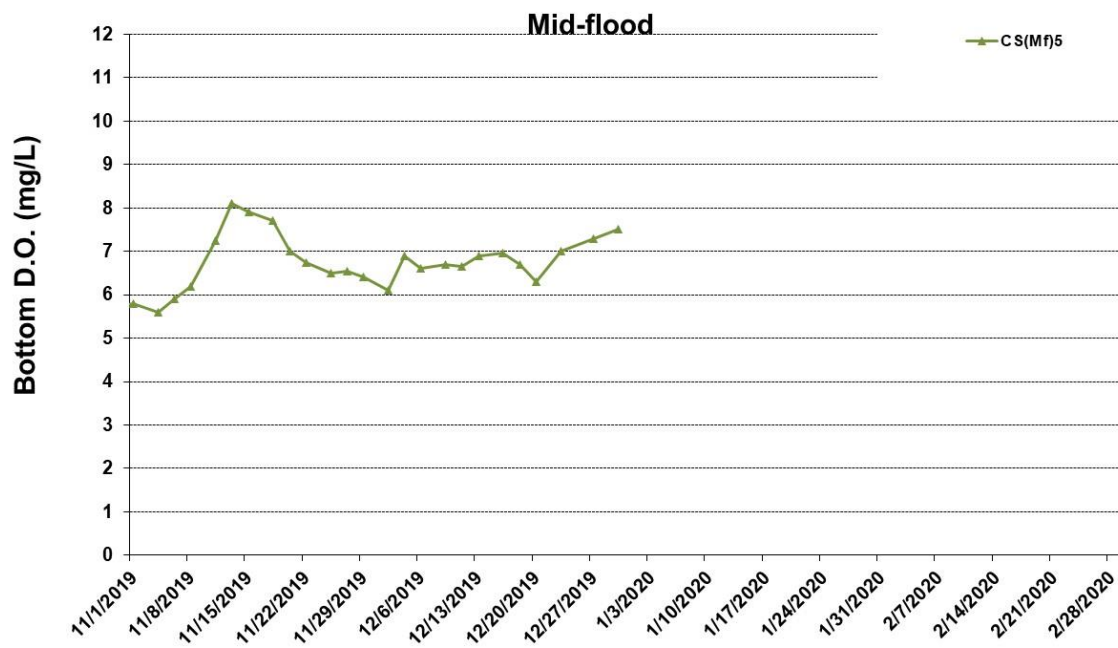
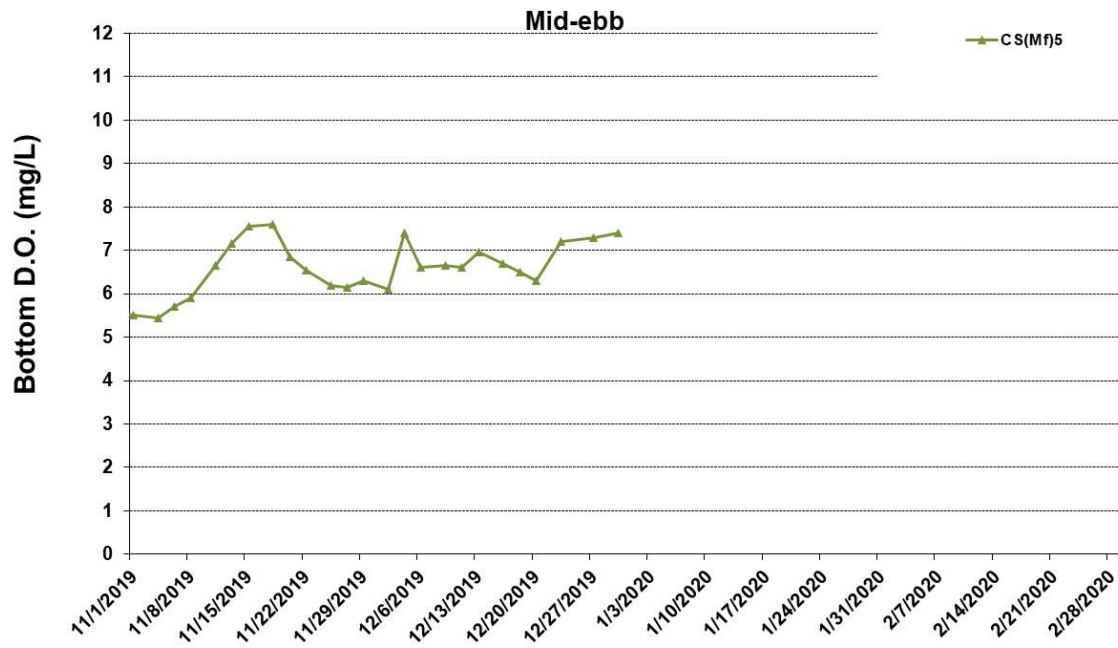




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G19 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

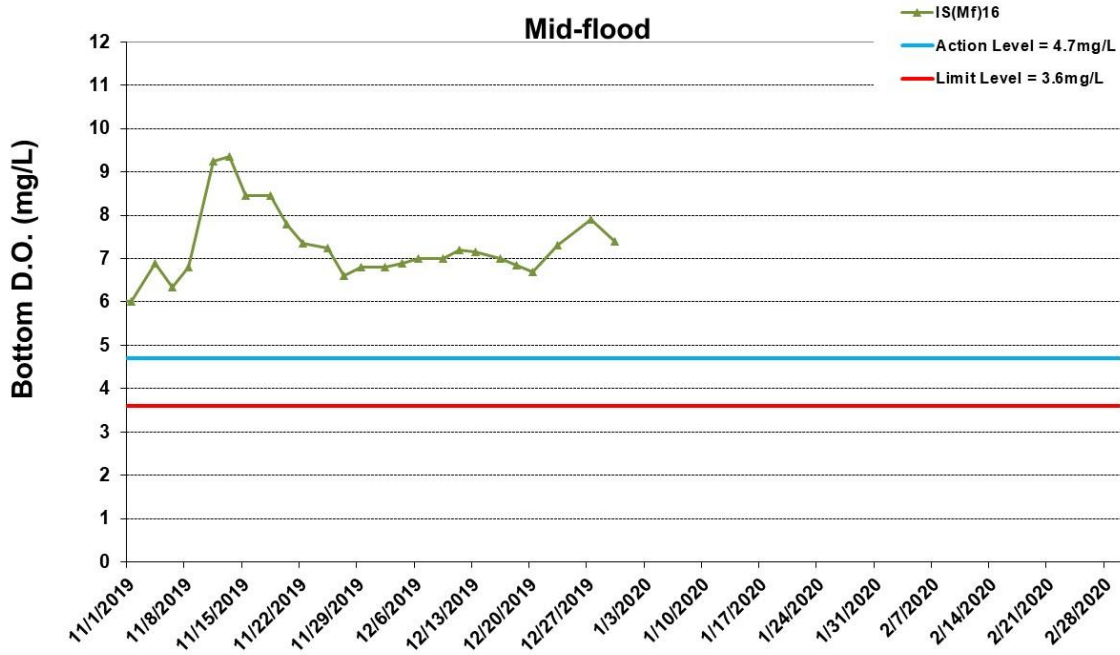
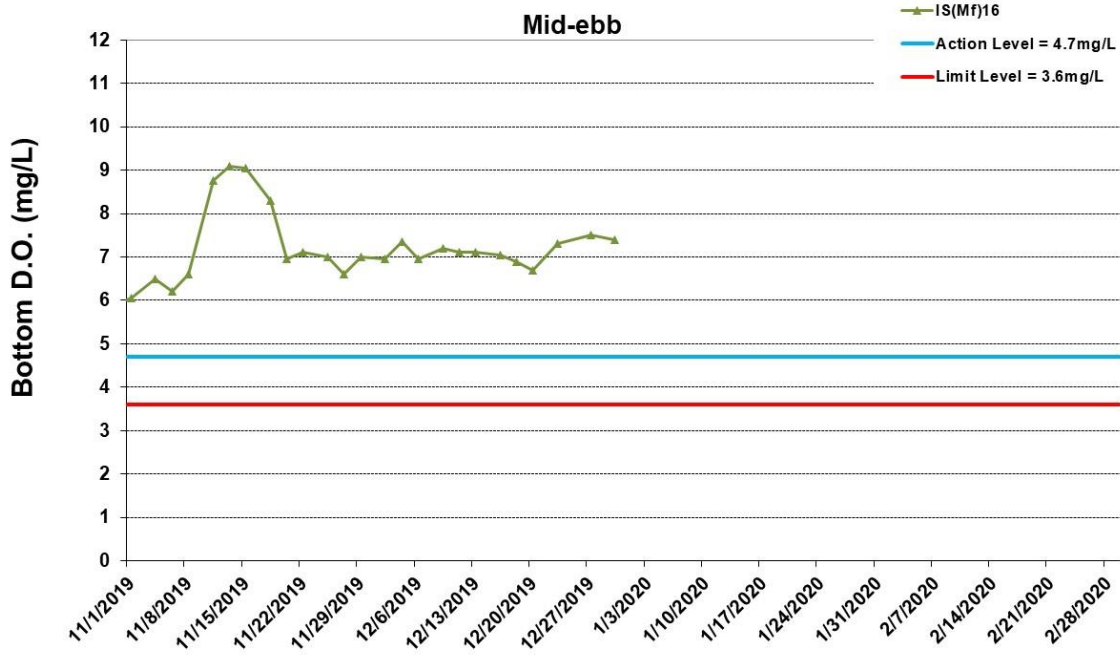




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G20 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

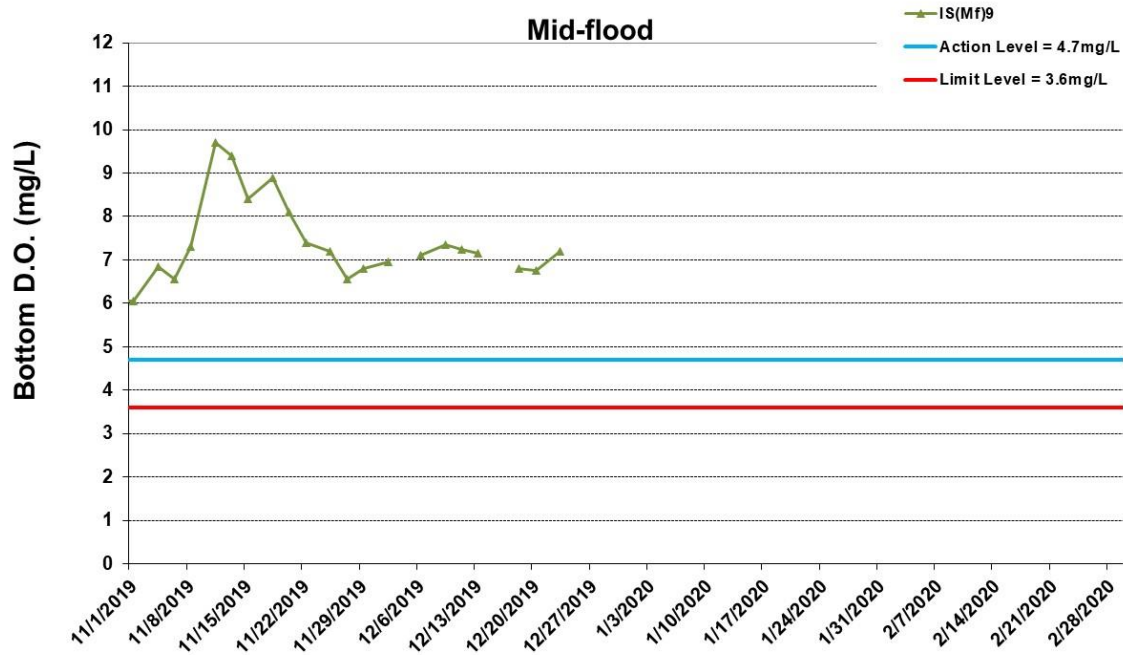
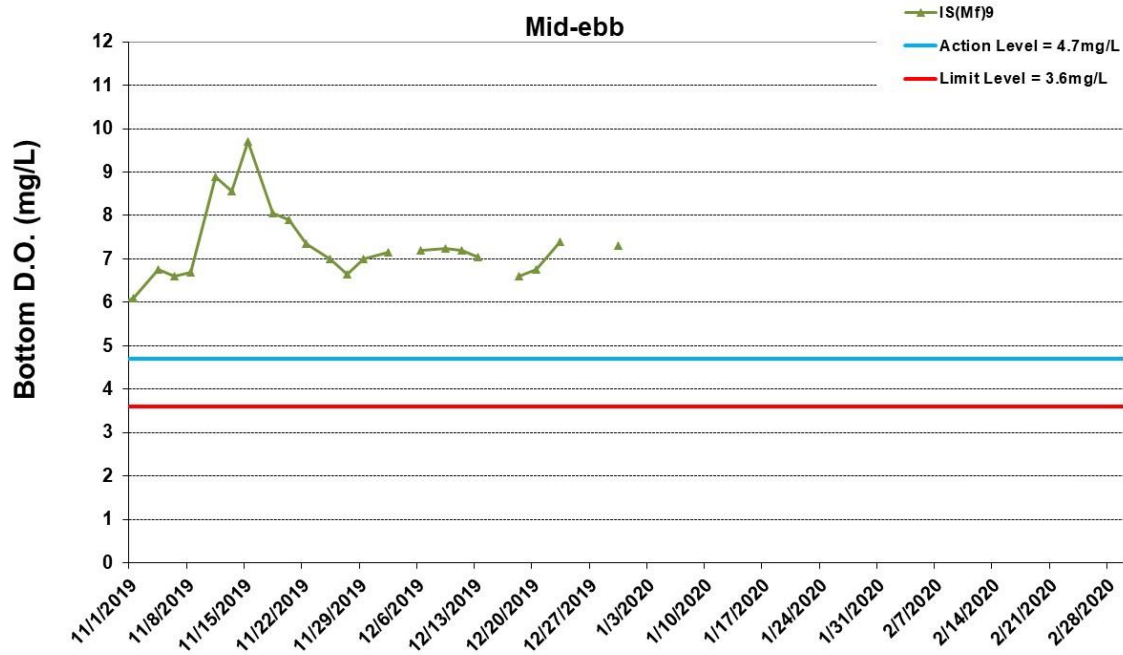




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G21 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

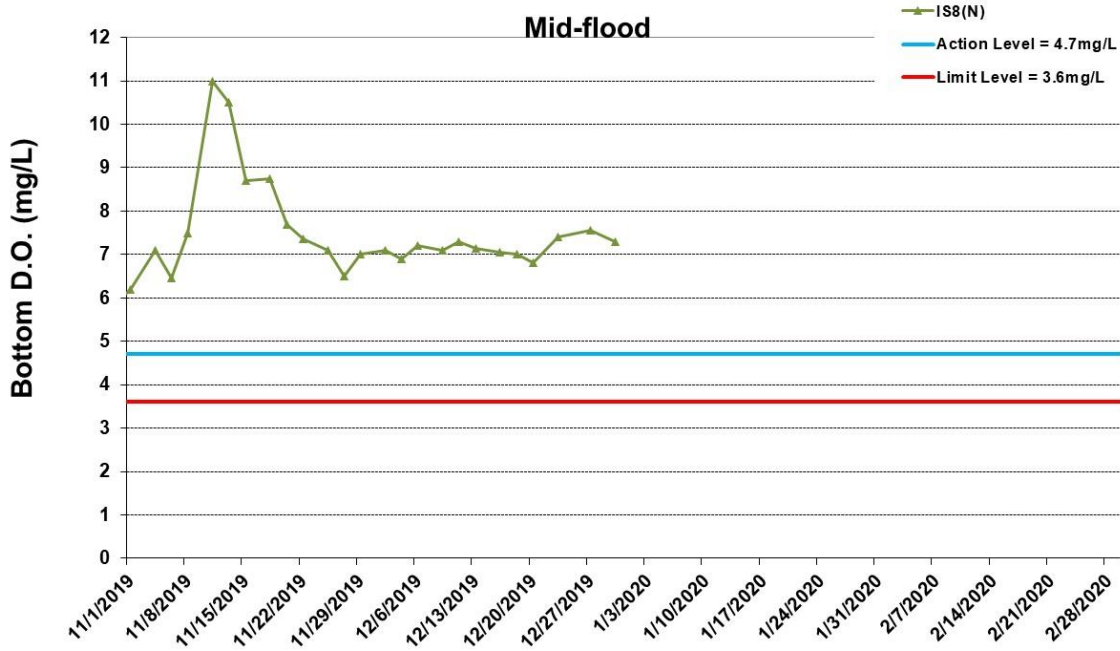
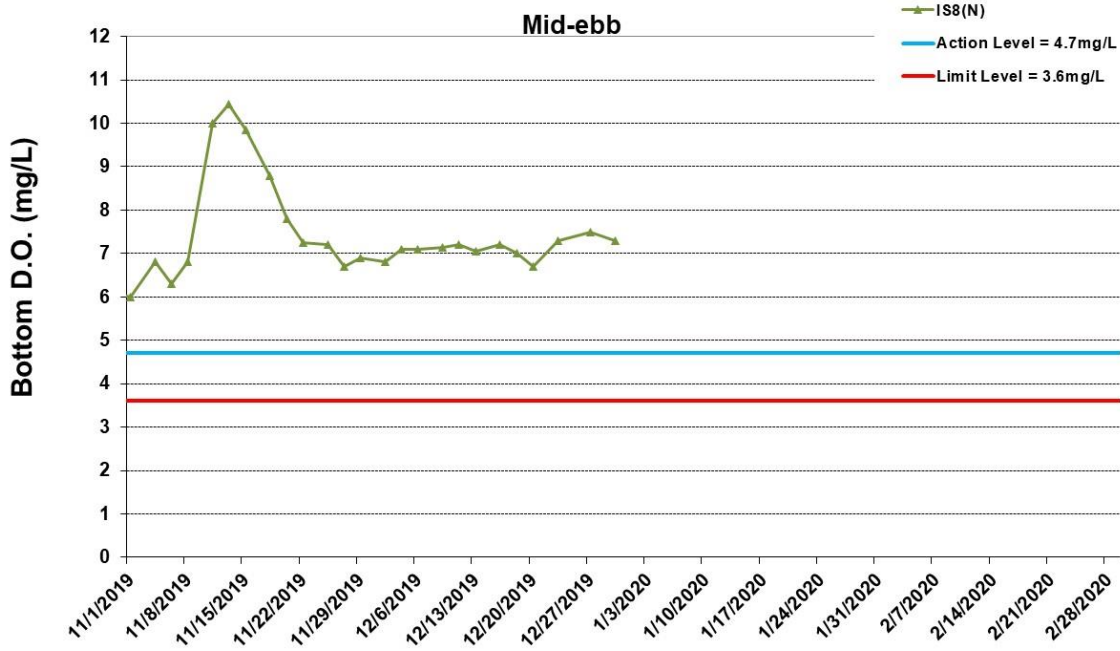




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G22 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

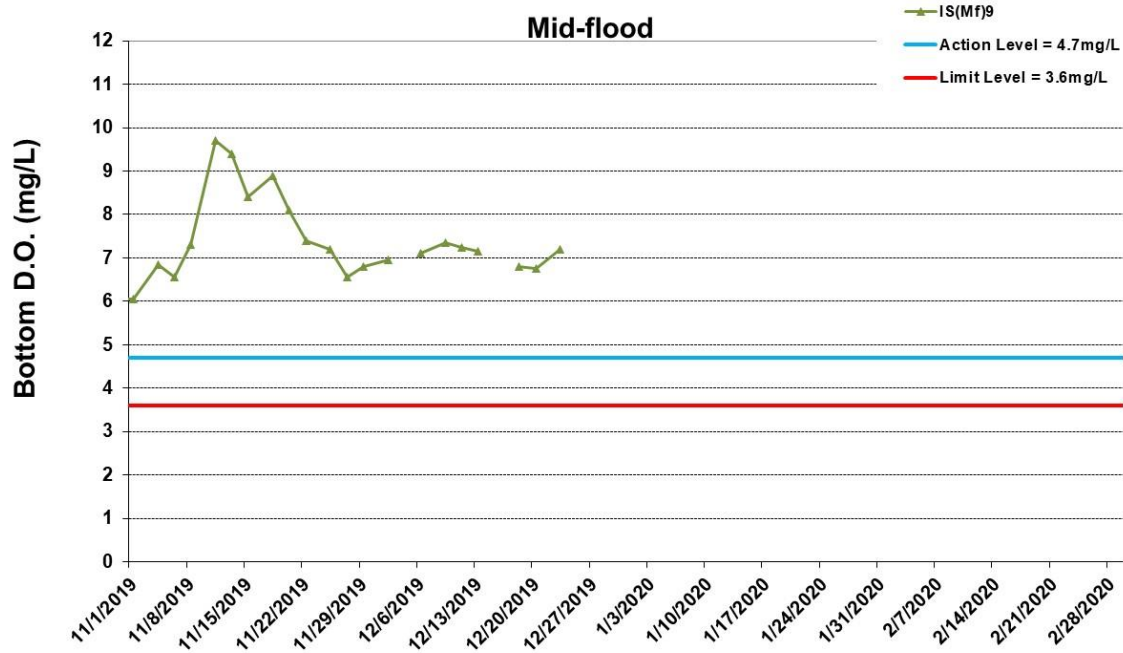
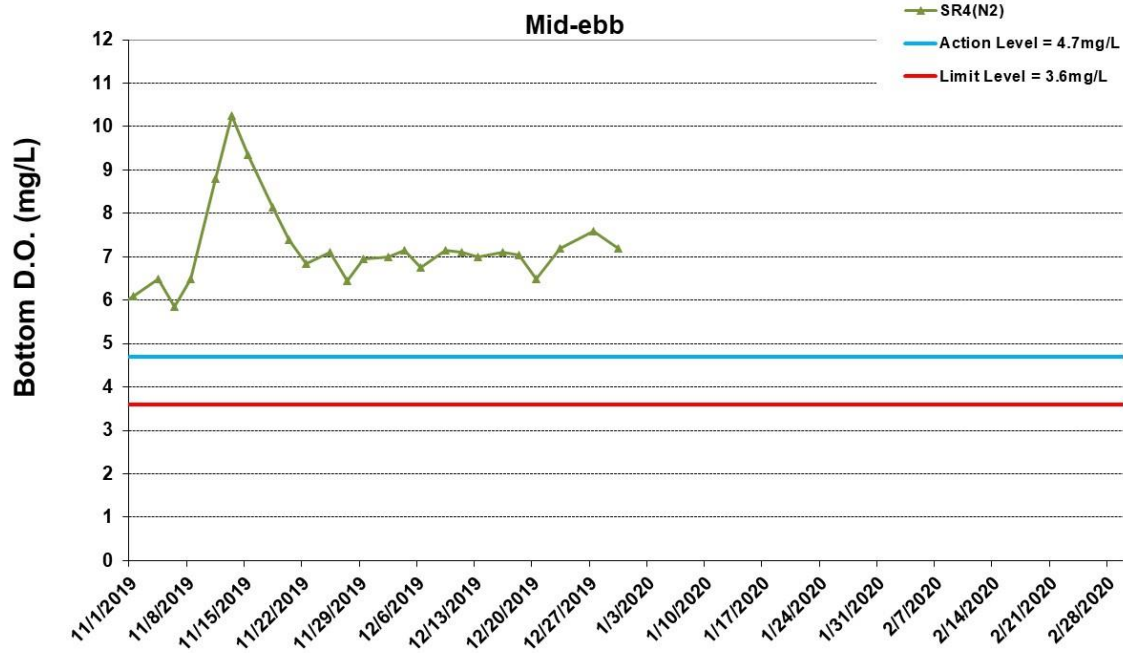




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G23 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

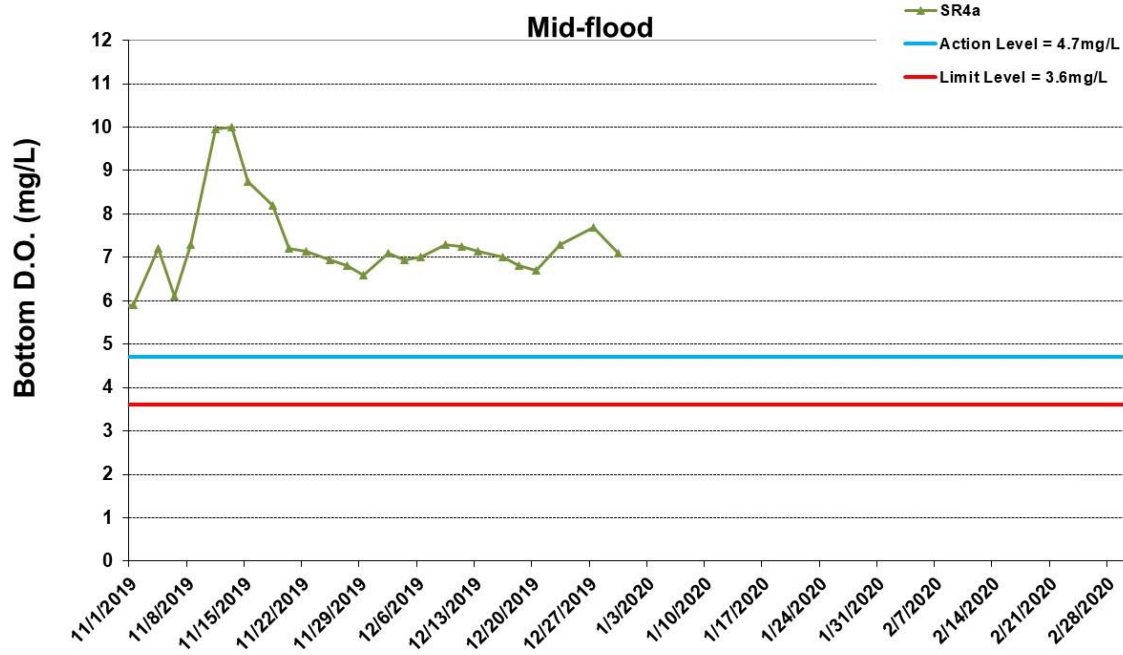
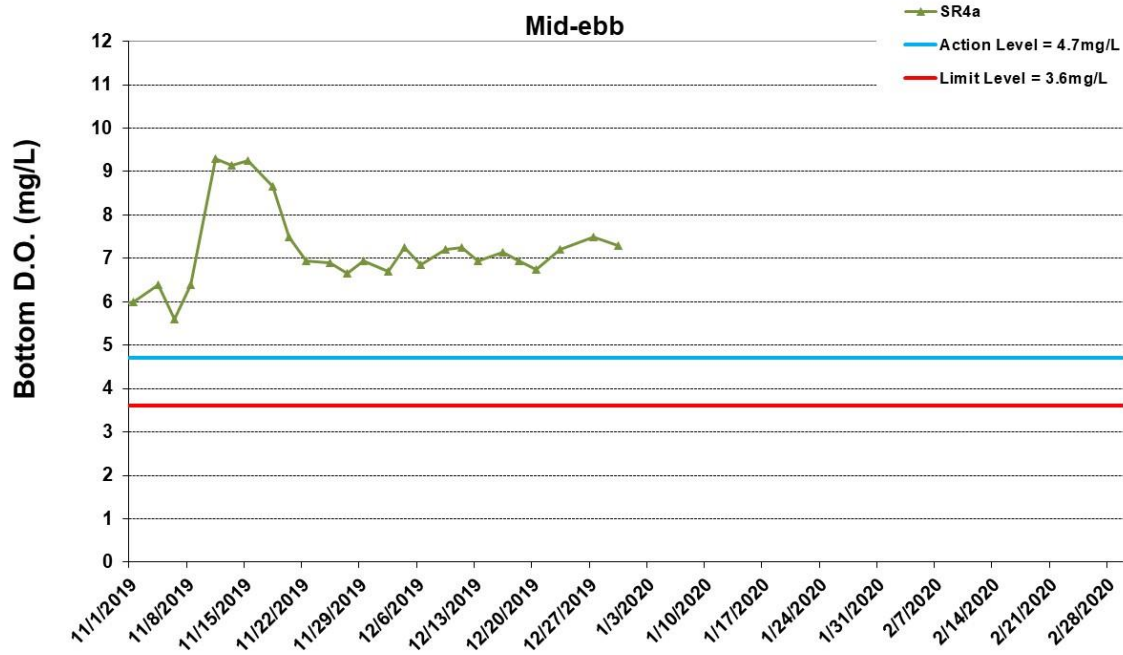




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G24 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

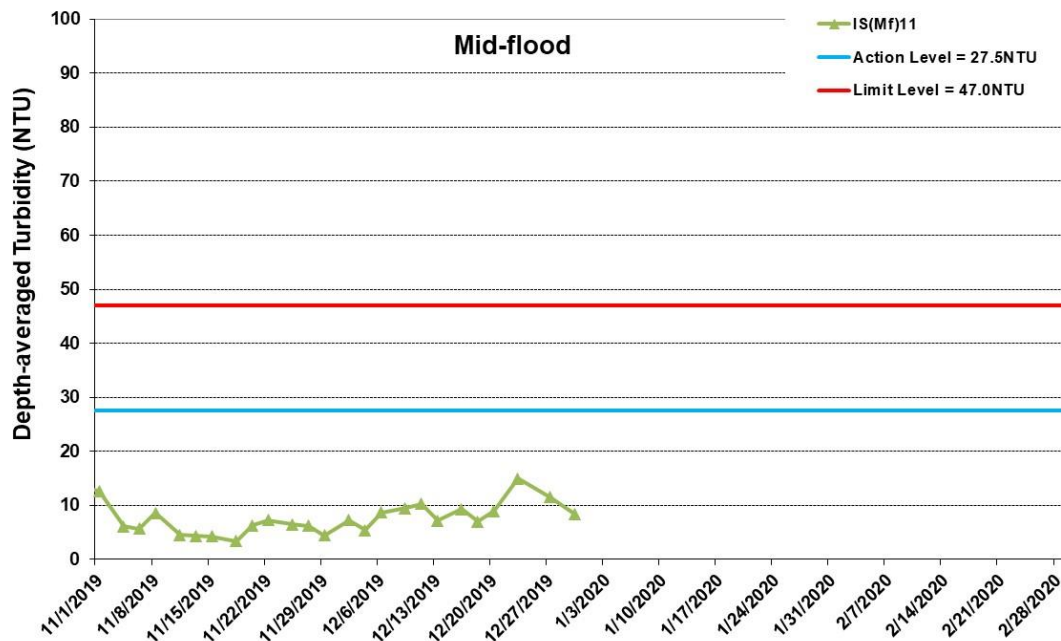
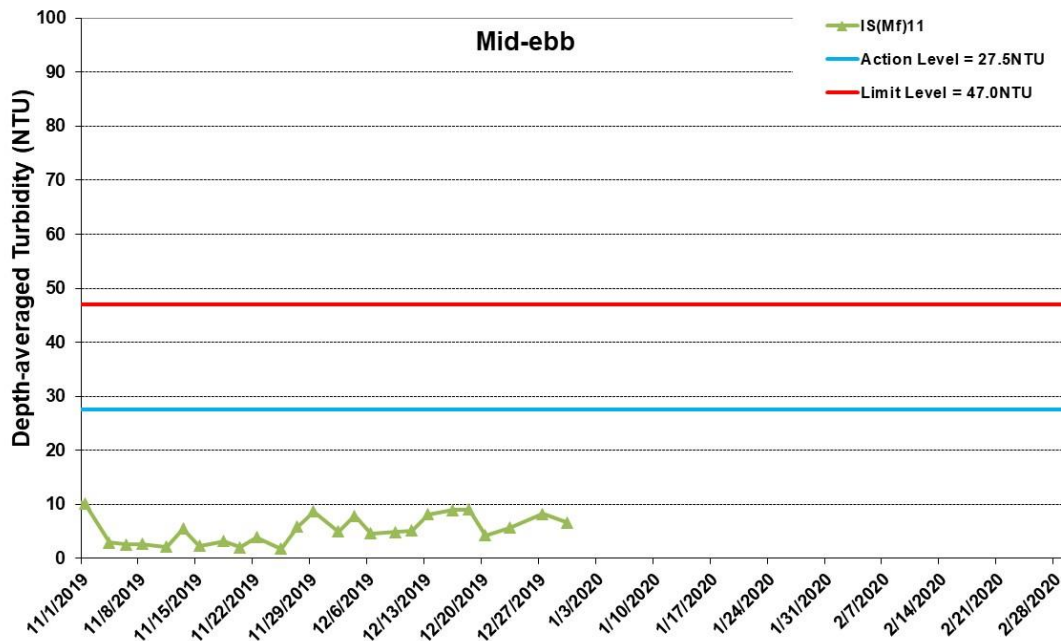




*Exceedances of Dissolved oxygen level are calculated based on average value of data from both Surface and Middle level, and bottom level separately.

Figure G25 Impact Monitoring - Mean Level of Dissolved Oxygen (mg/L) in bottom water between 1 November 2019 and 29 February 2020 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



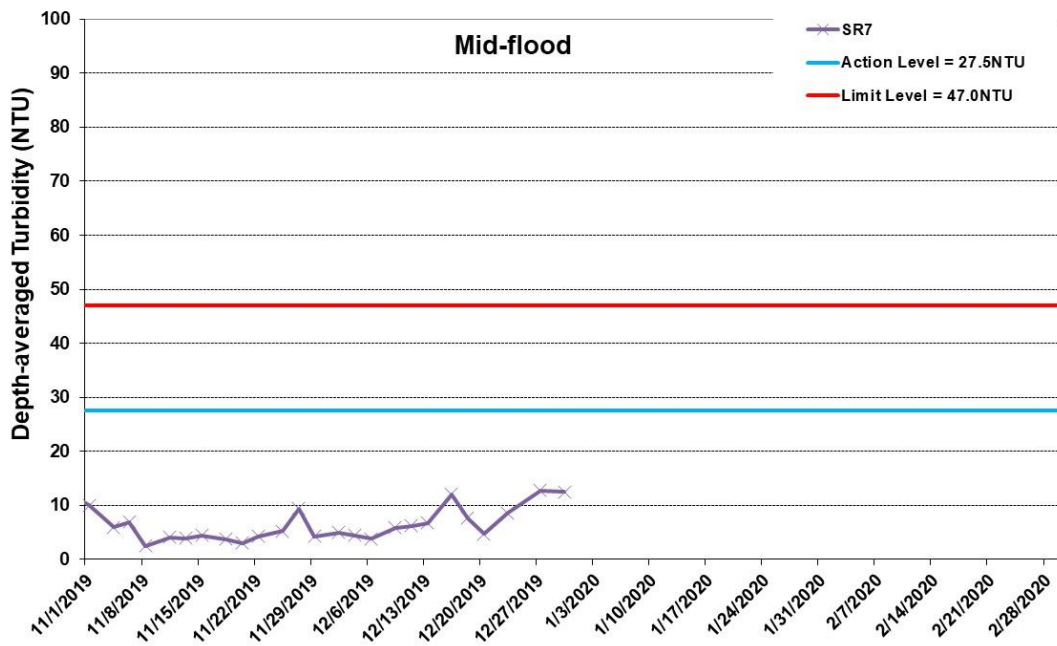
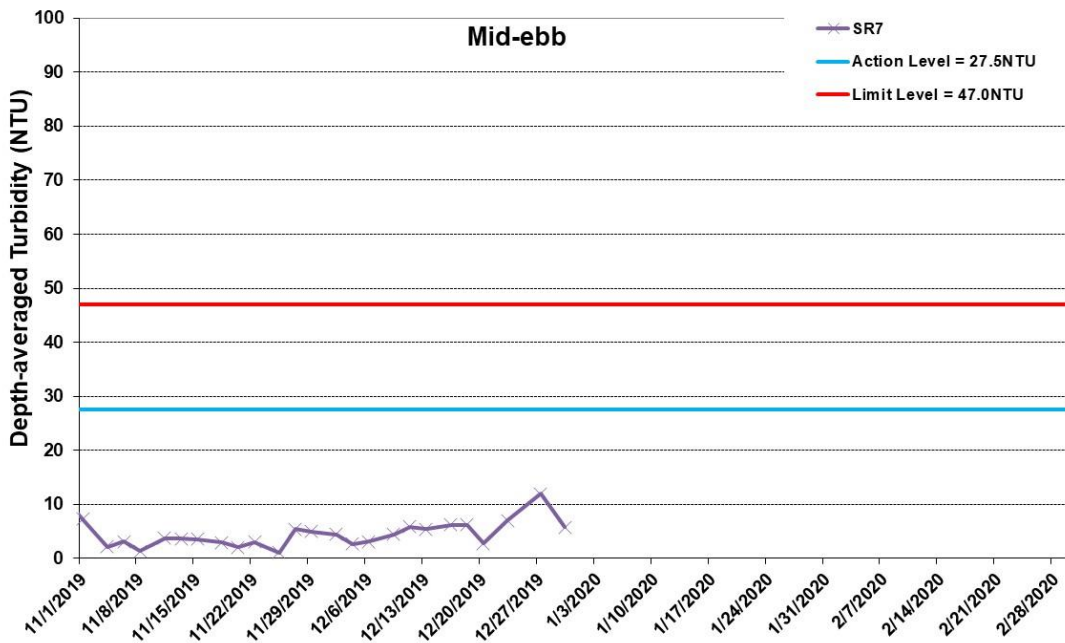


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G26 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





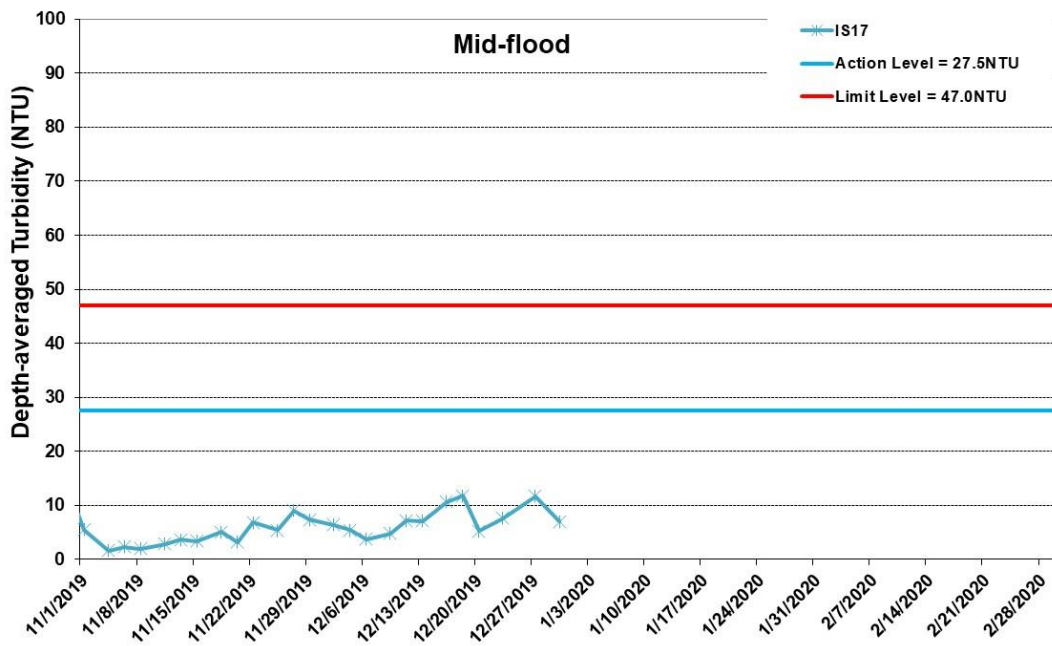
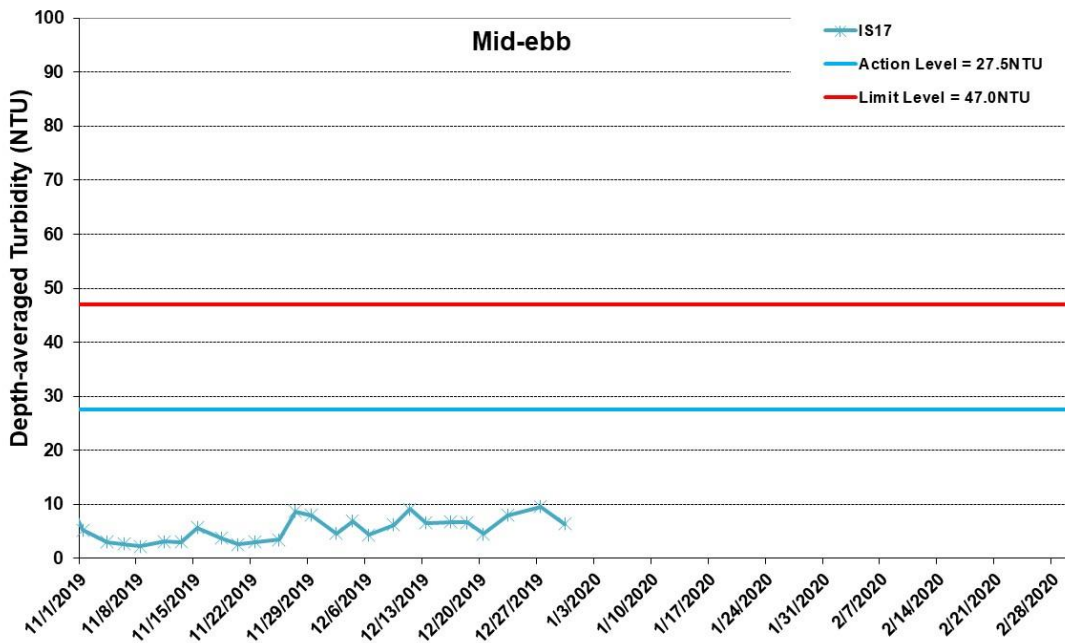
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G27 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls



* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G28 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

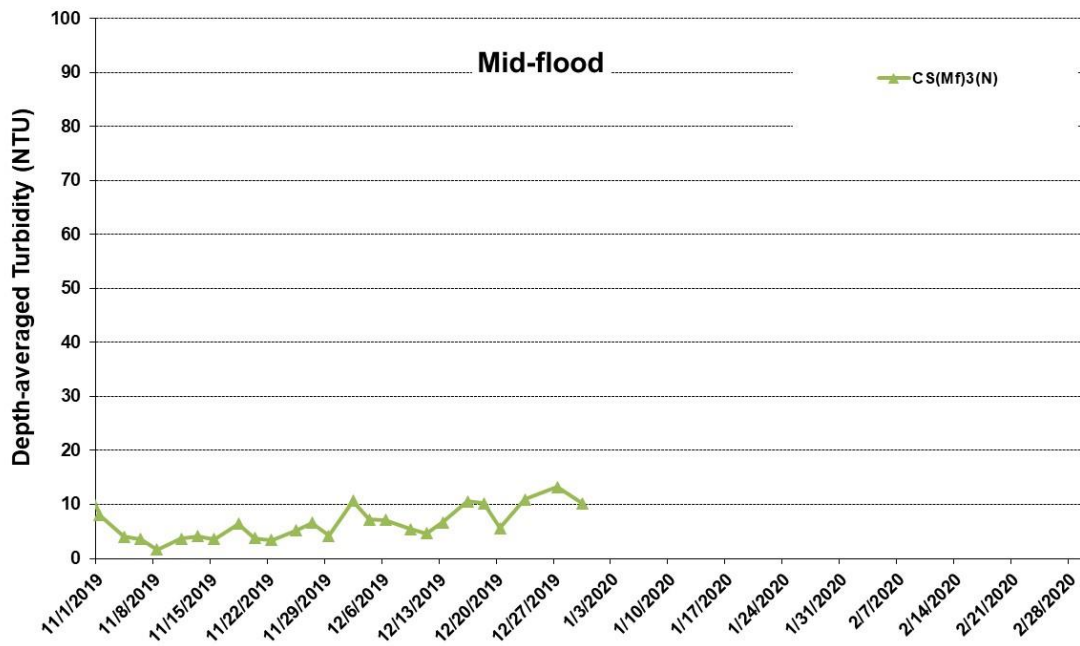
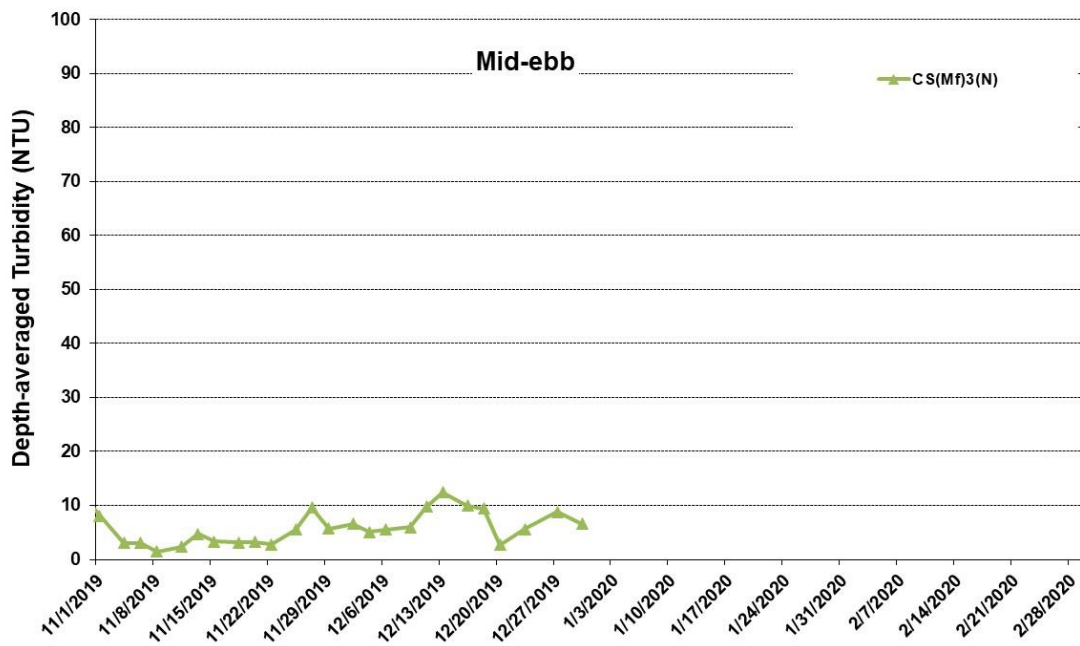


Figure G29 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



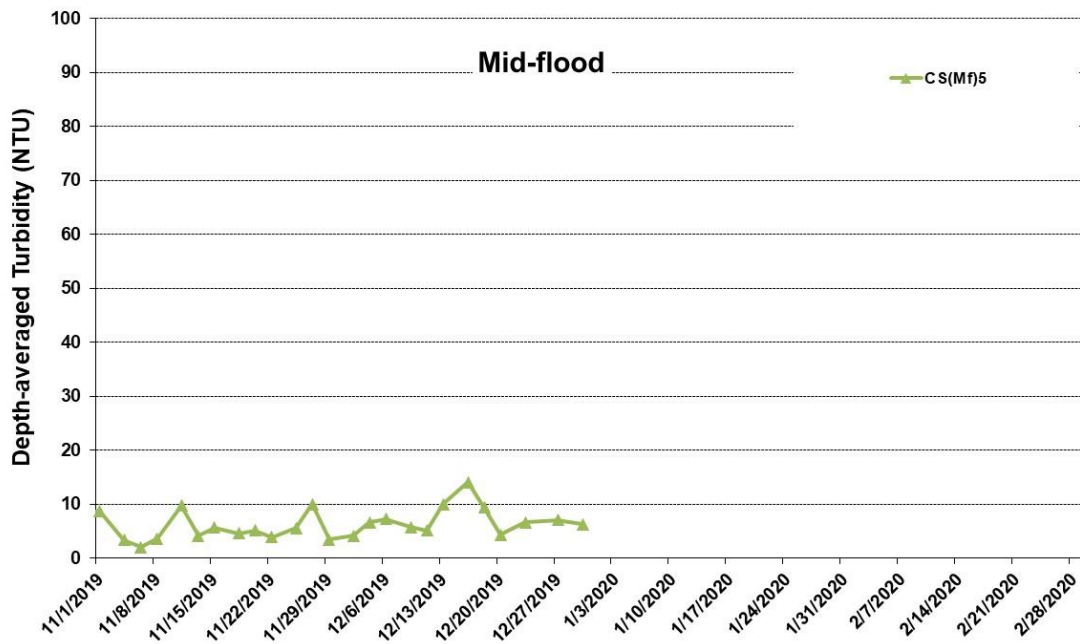
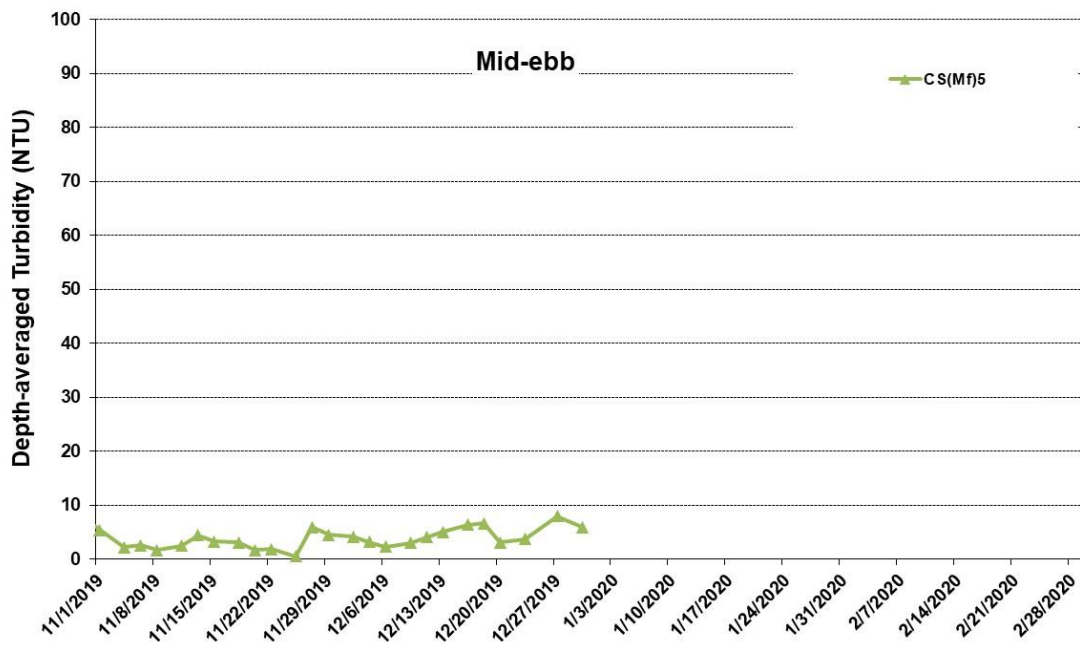


Figure G30 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



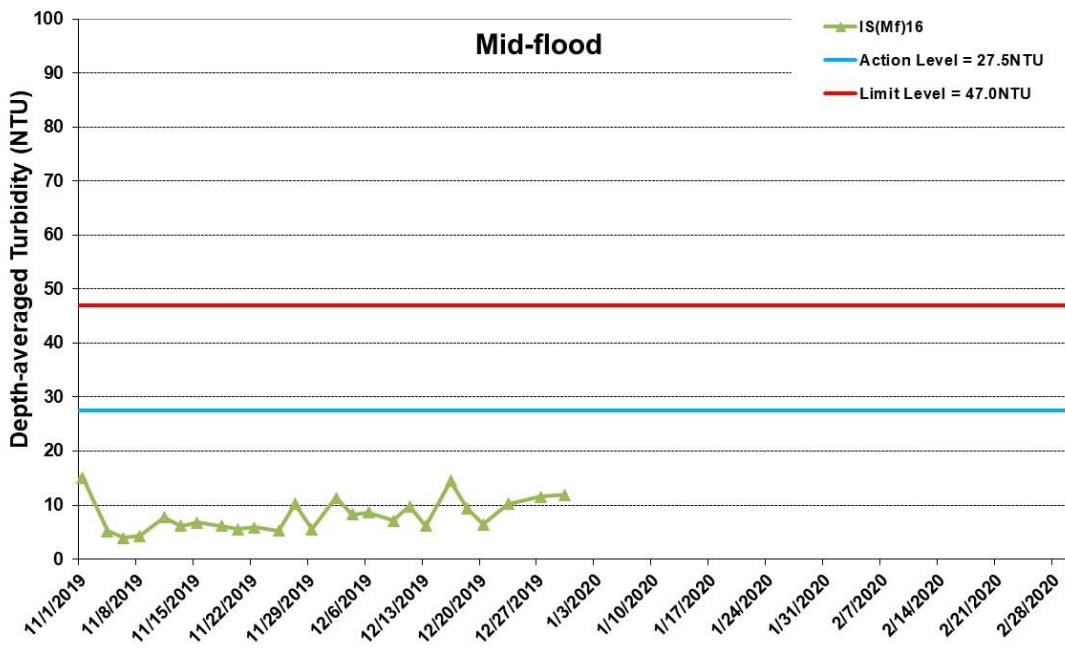
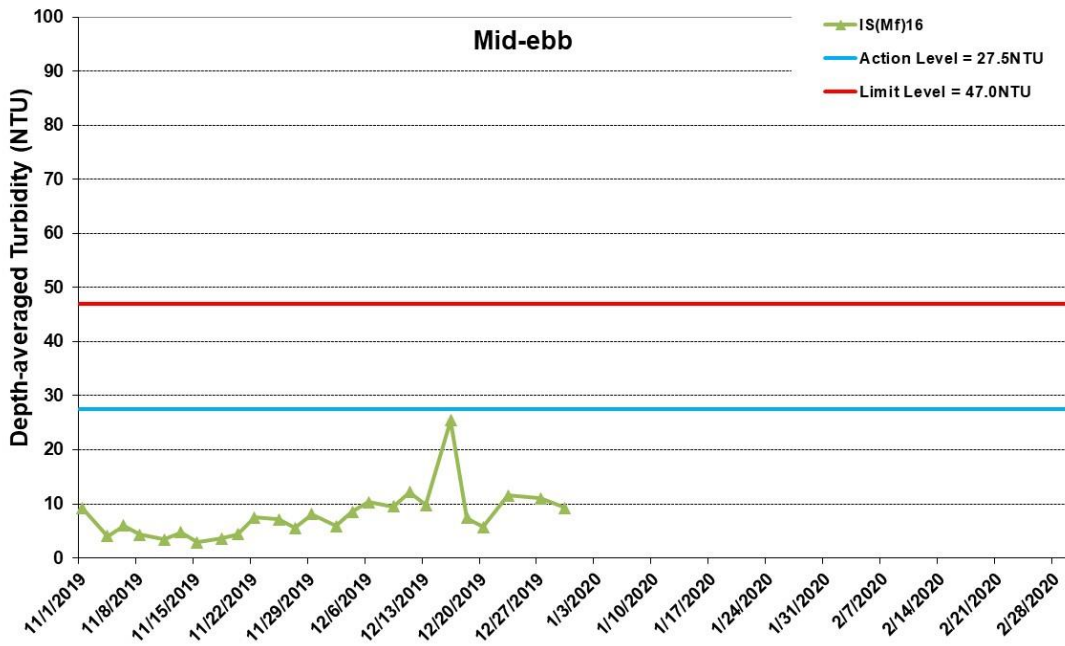


Figure G31 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



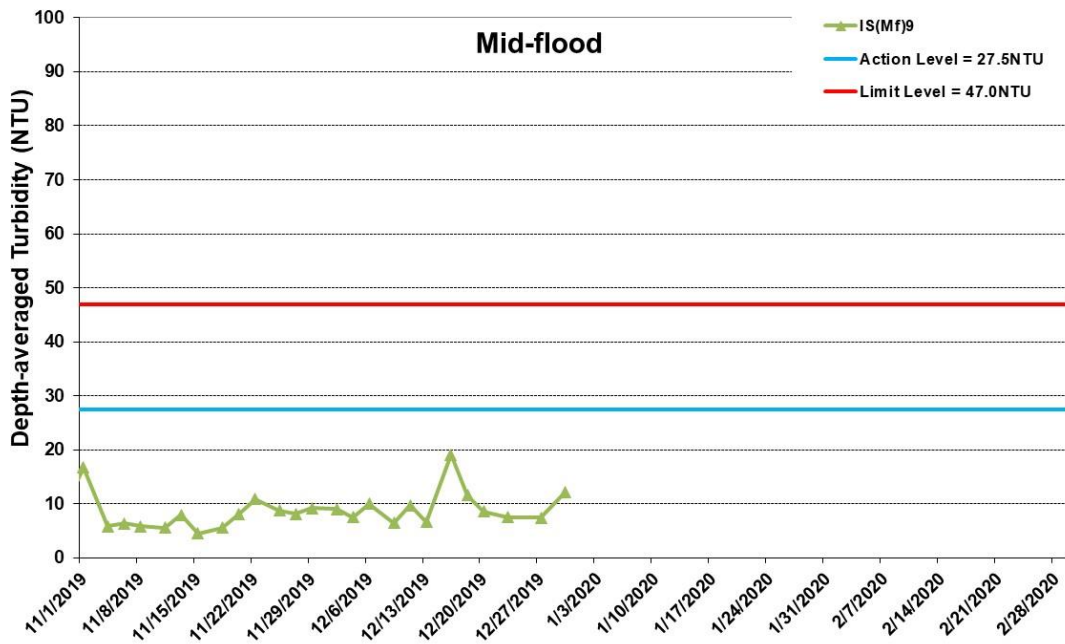
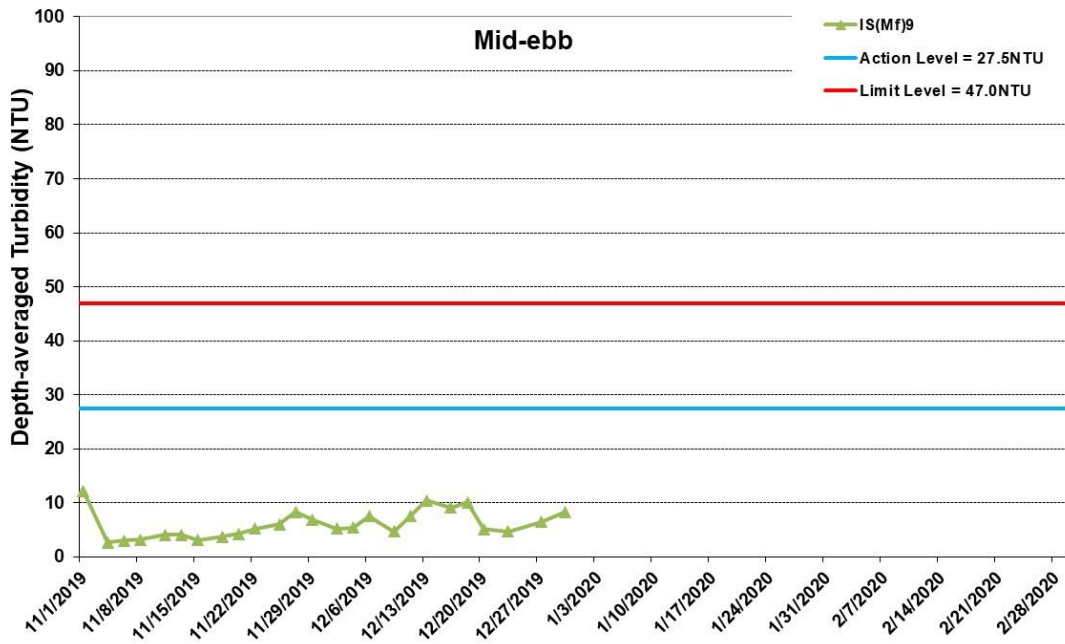


Figure G32 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



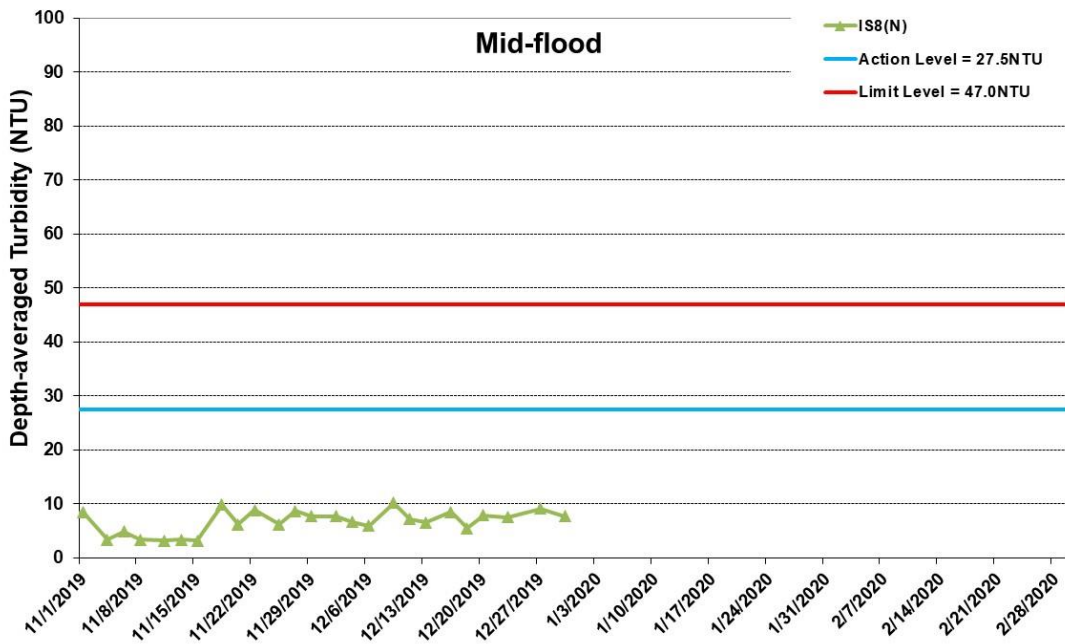
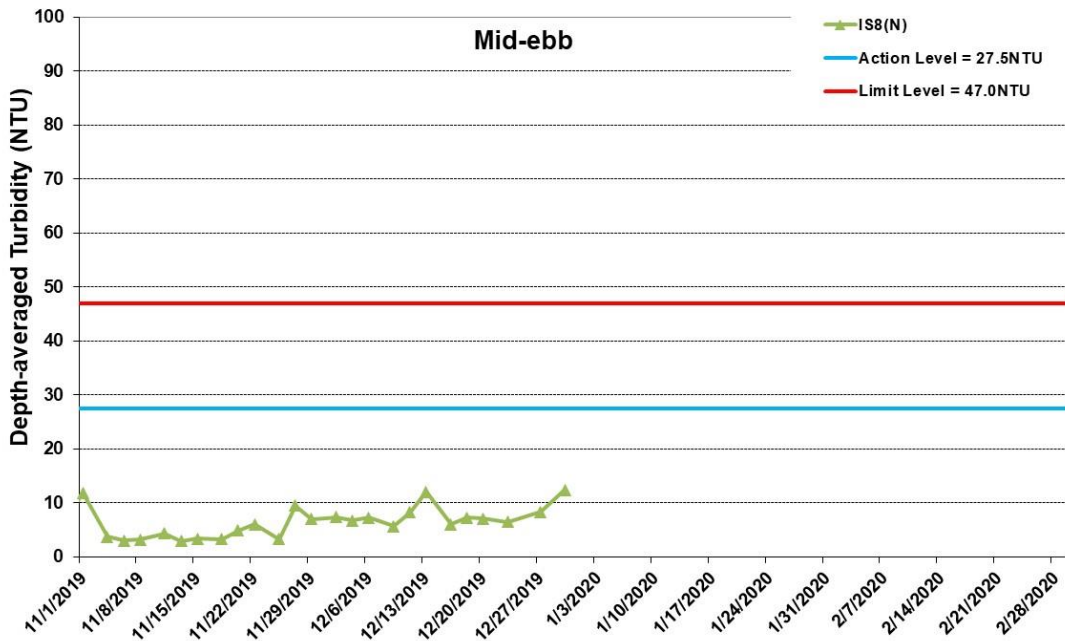


Figure G33 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



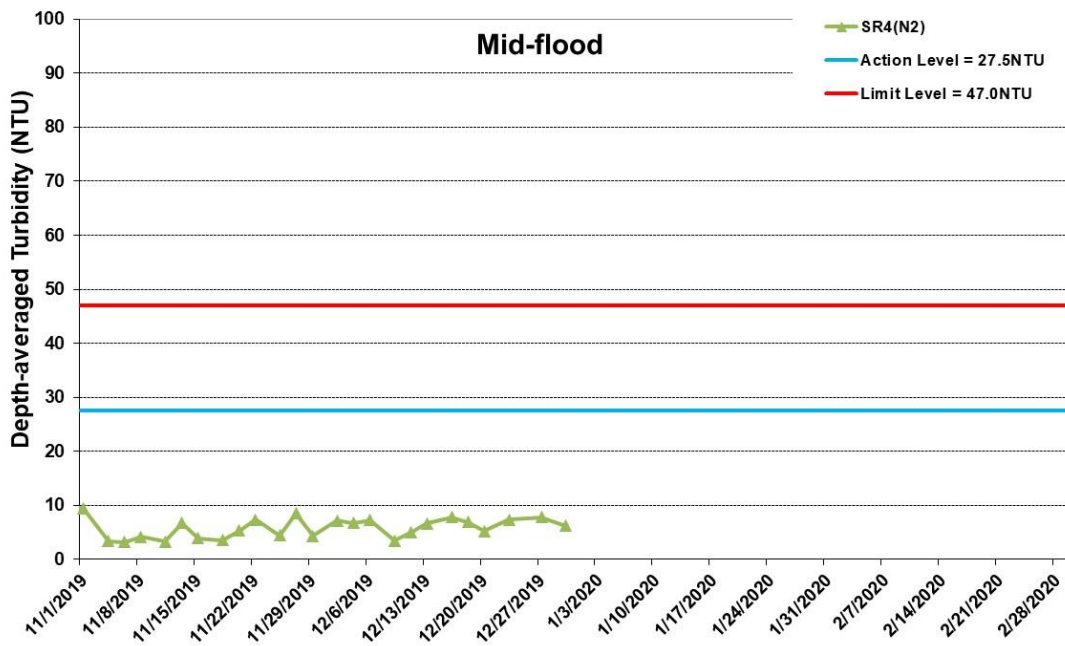
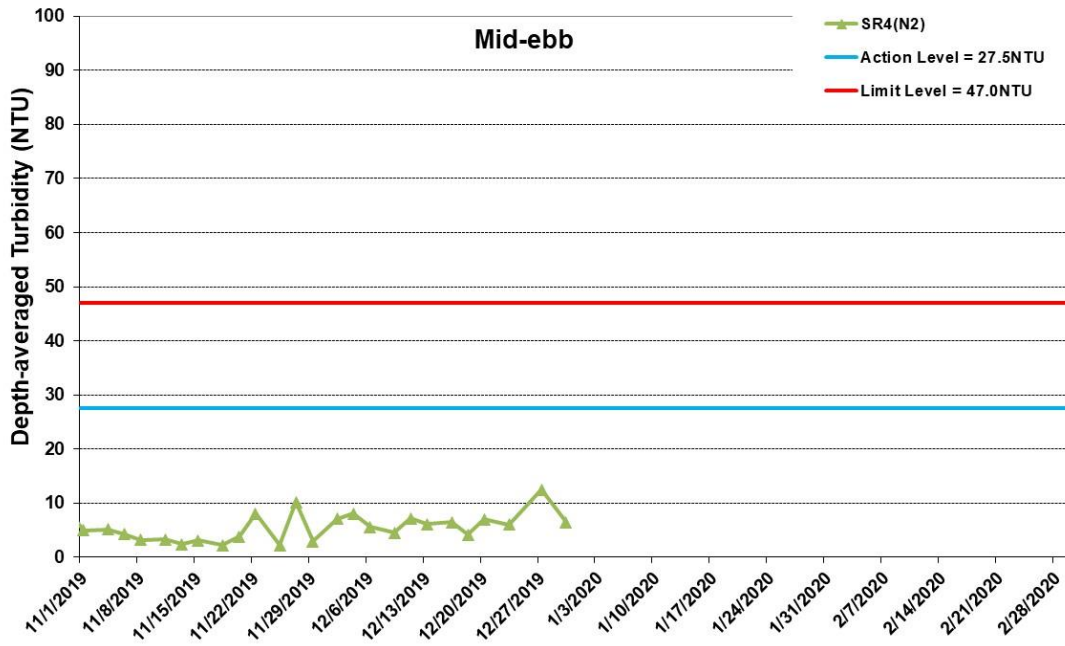


Figure G34 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



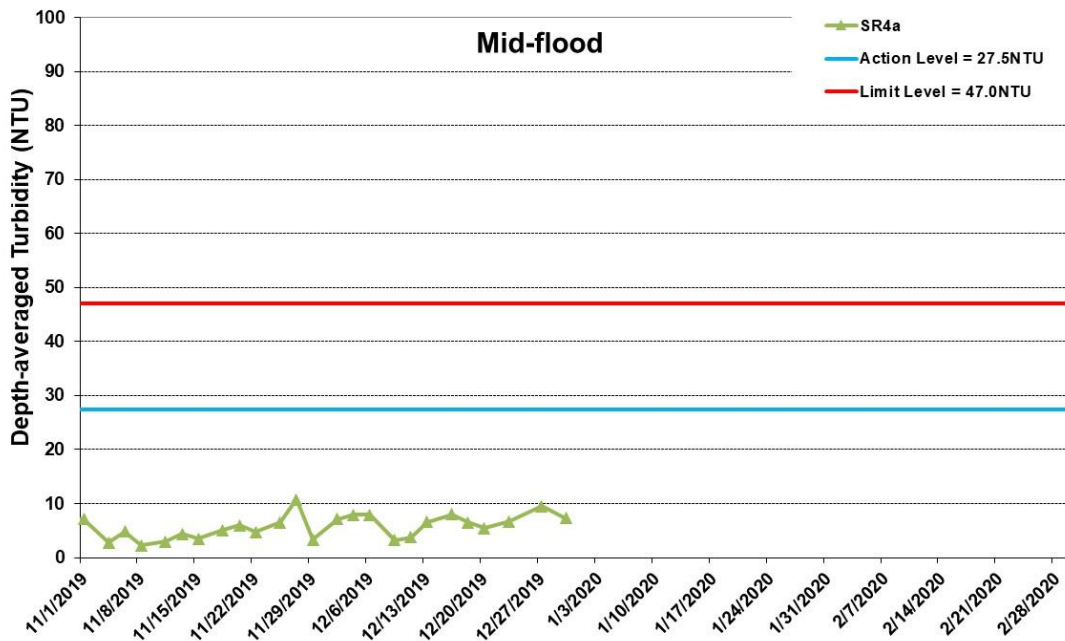
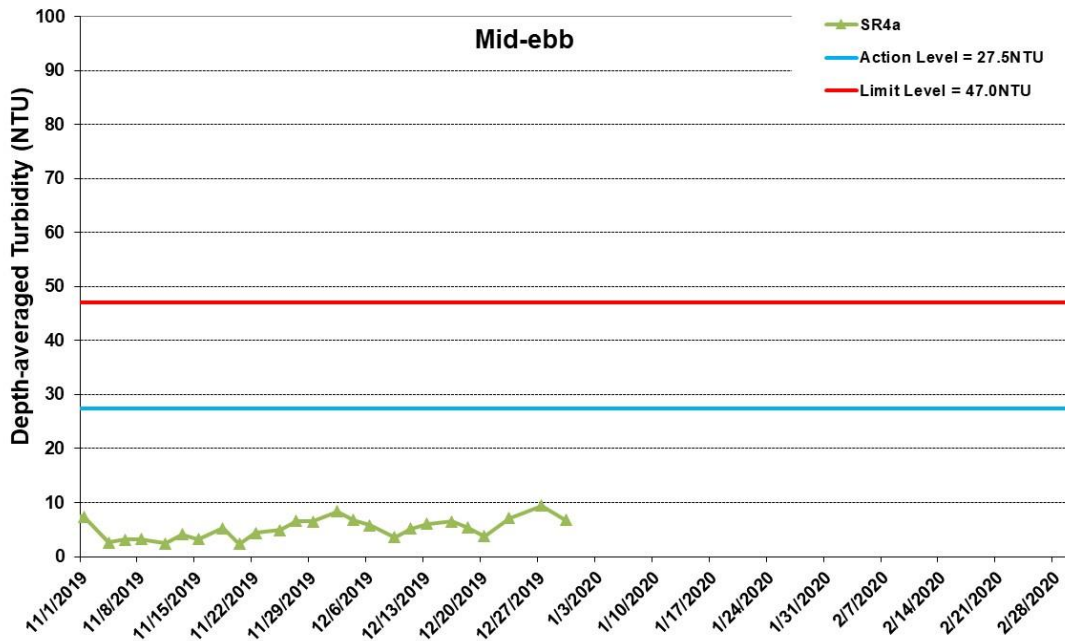
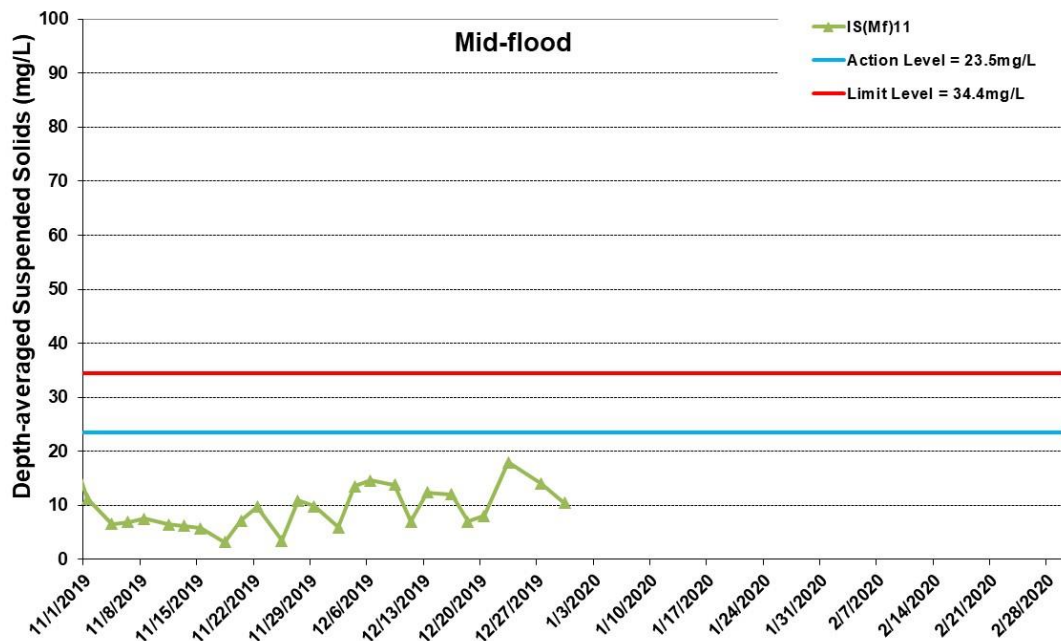
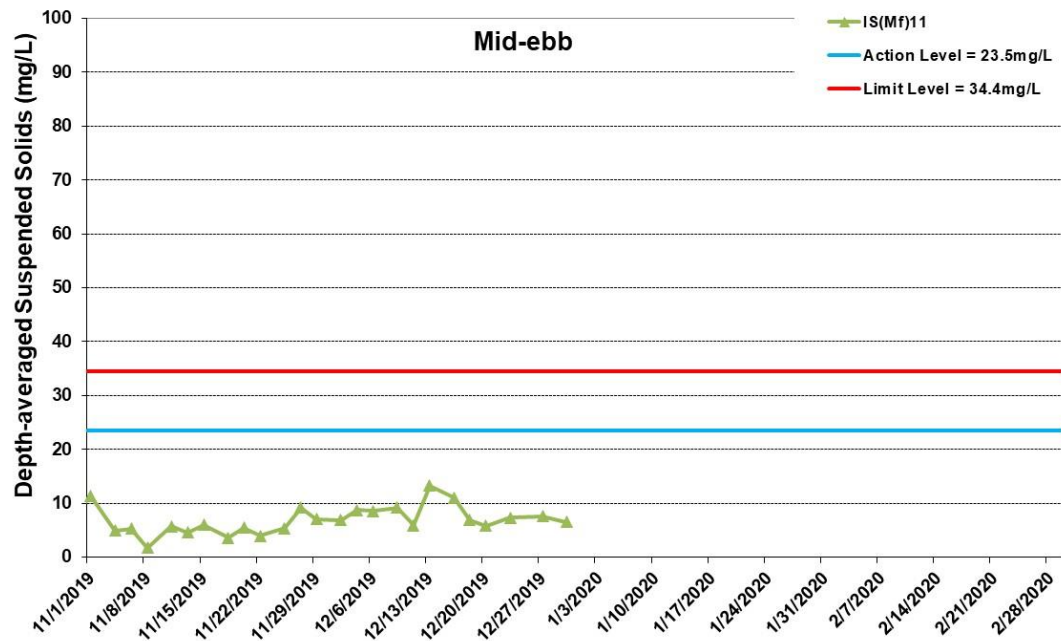


Figure G35 Impact Monitoring - Mean Depth-averaged Level of Turbidity (NTU) between 1 November 2019 and 29 February 2020 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).

Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls





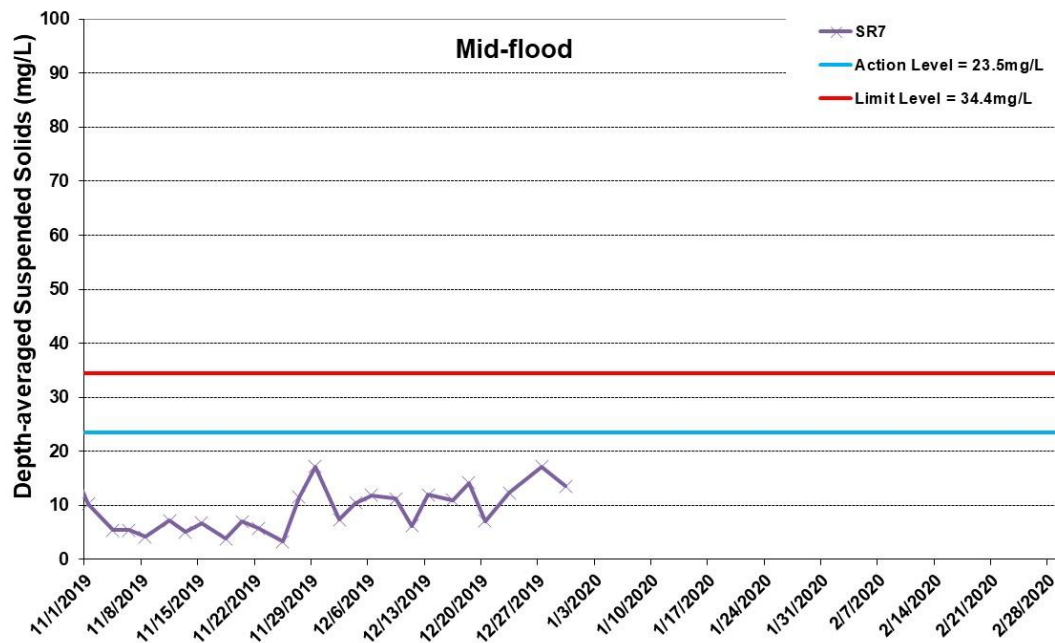
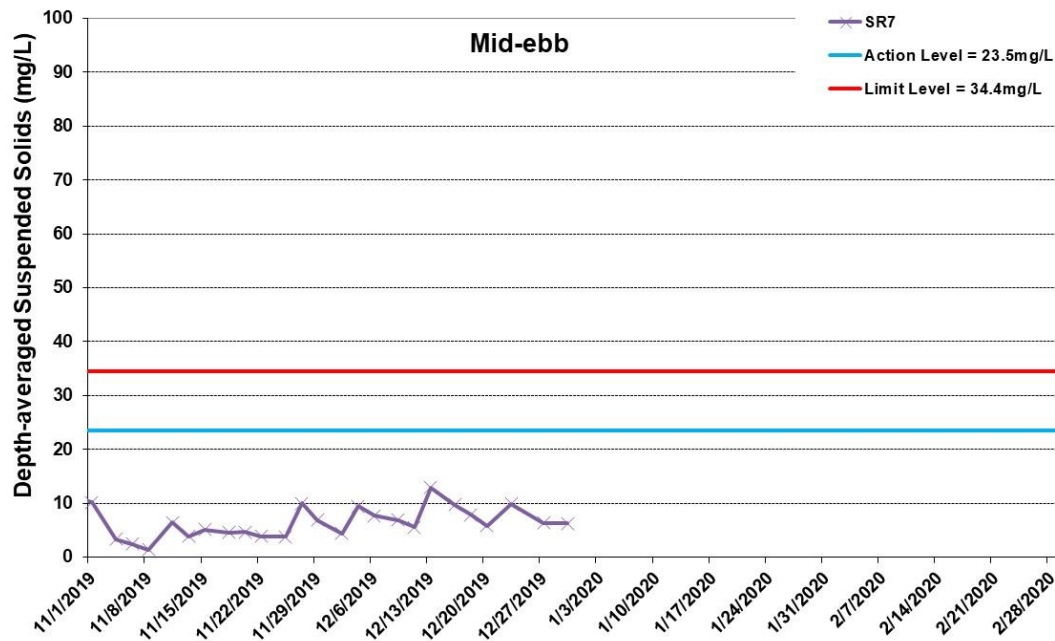
* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G36 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at IS(Mf)11. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

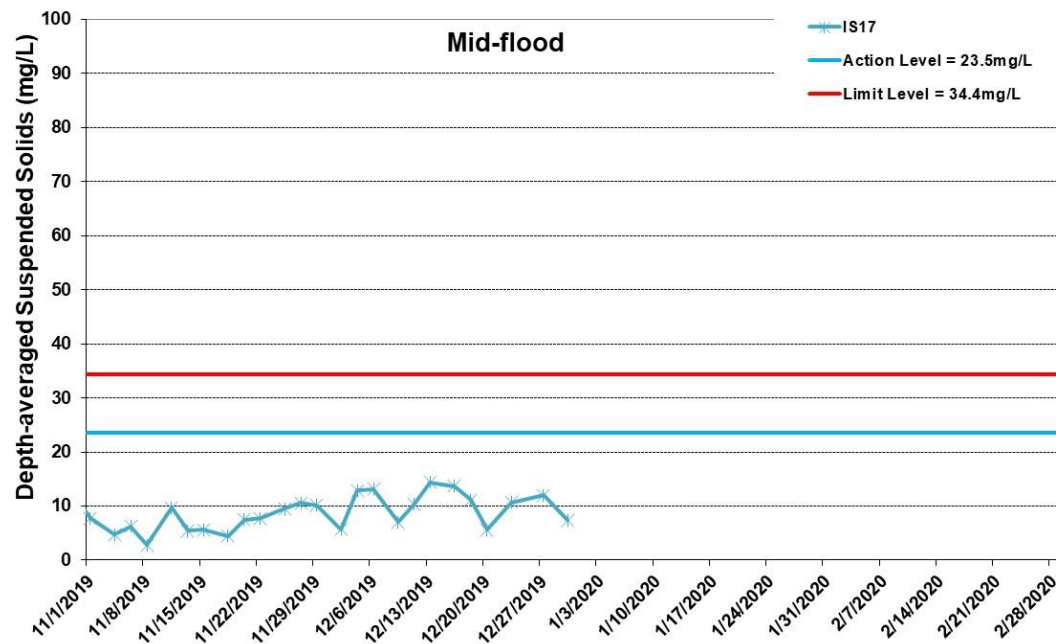


* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G37 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at SR7. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).





* The AL/LL for WQM stations, IS(Mf)11, IS17 and SR7, are adopted from HZMB HKBCF project.

* The Seawall Modification Works has commenced since 12 August 2019 and completed on 30 December 2019. Water quality monitoring was carried out in December 2019 and suspended since 30 December 2019.

Figure G38 Impact Monitoring - Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at IS17. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 - 29/2/2020).



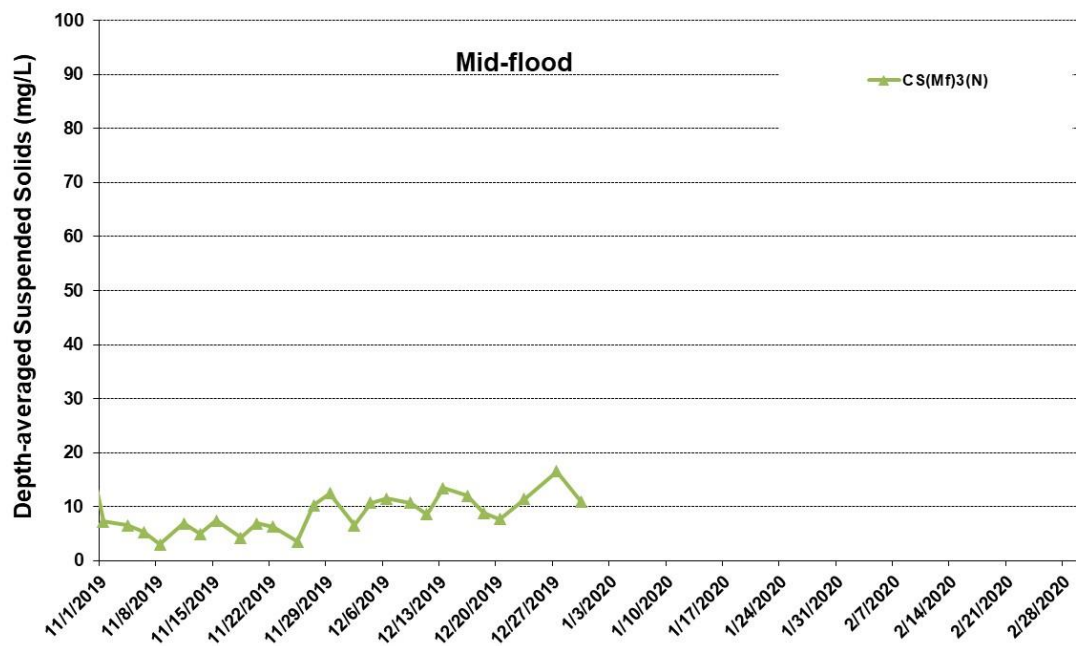
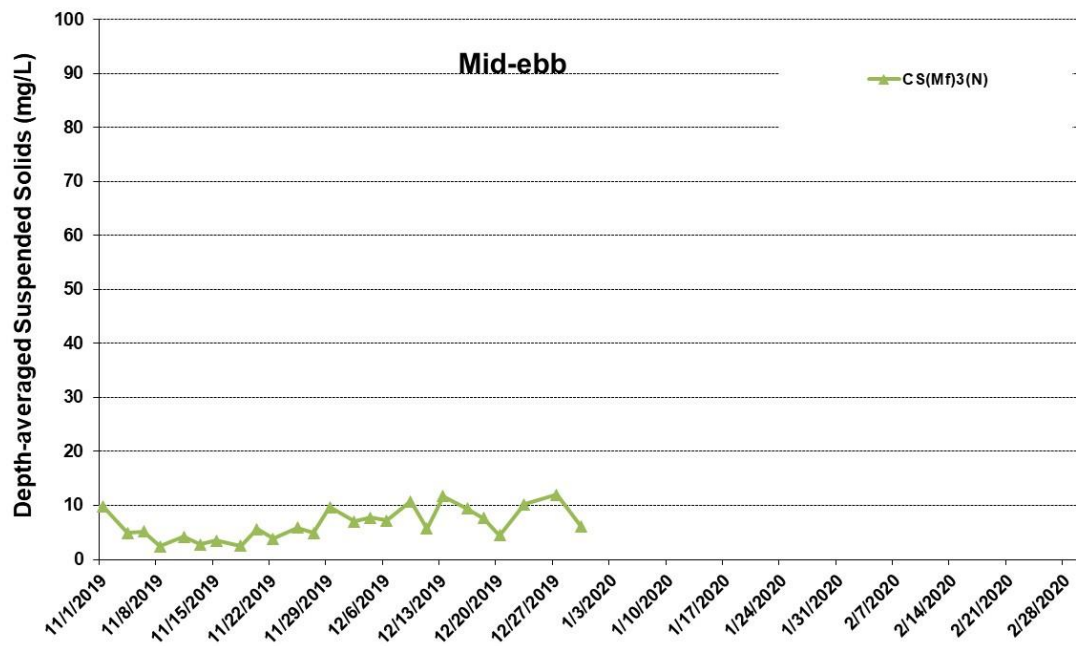


Figure G39 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at CS(Mf)3(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

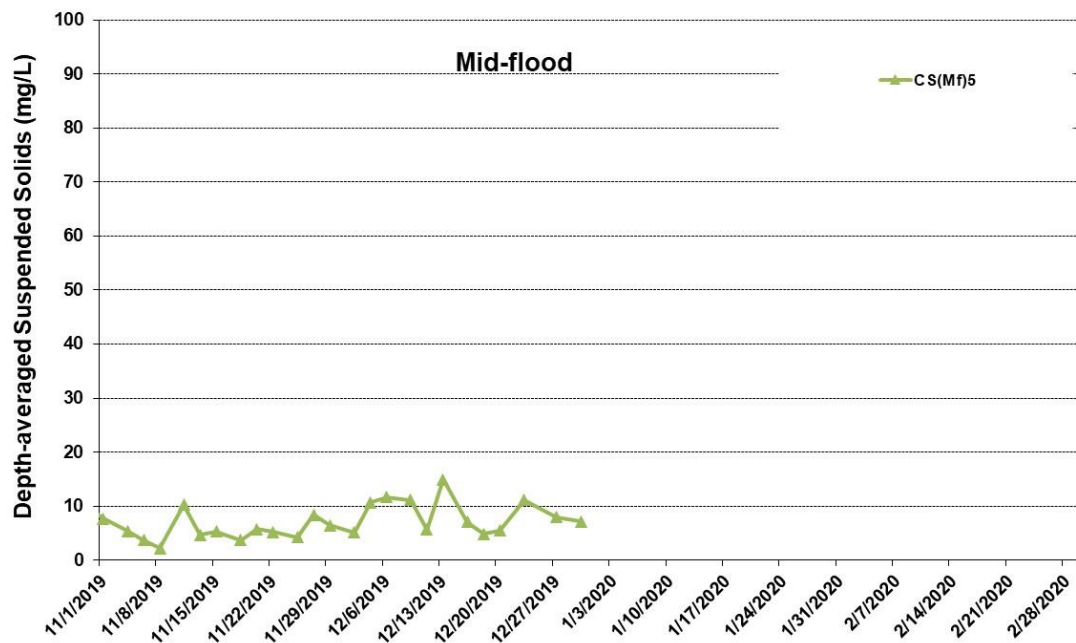
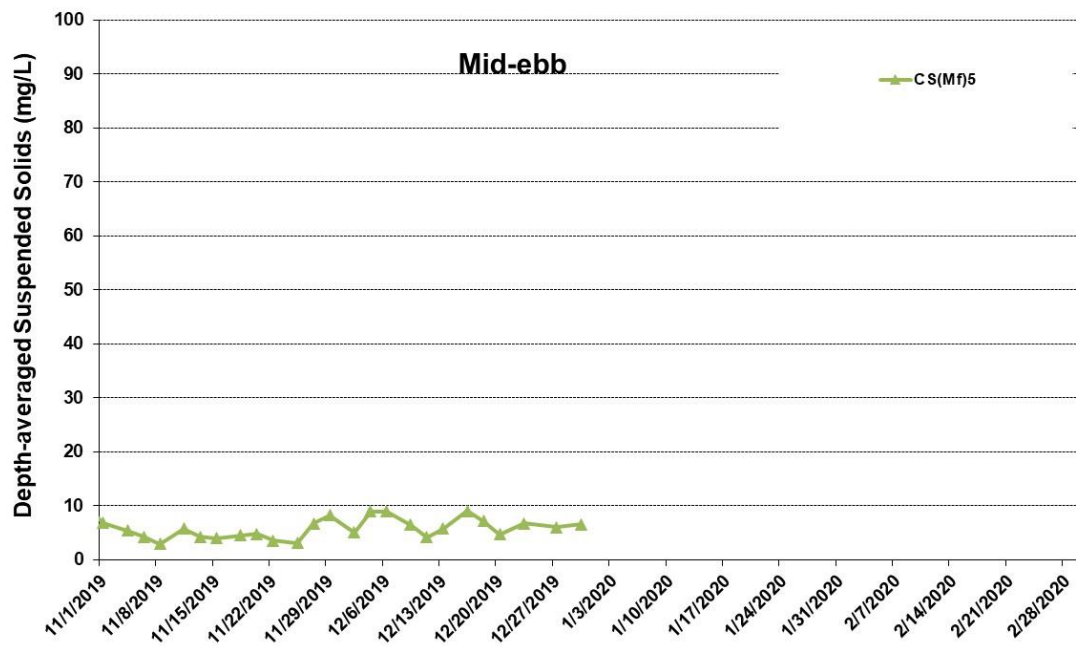


Figure G40 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at CS(Mf)5. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

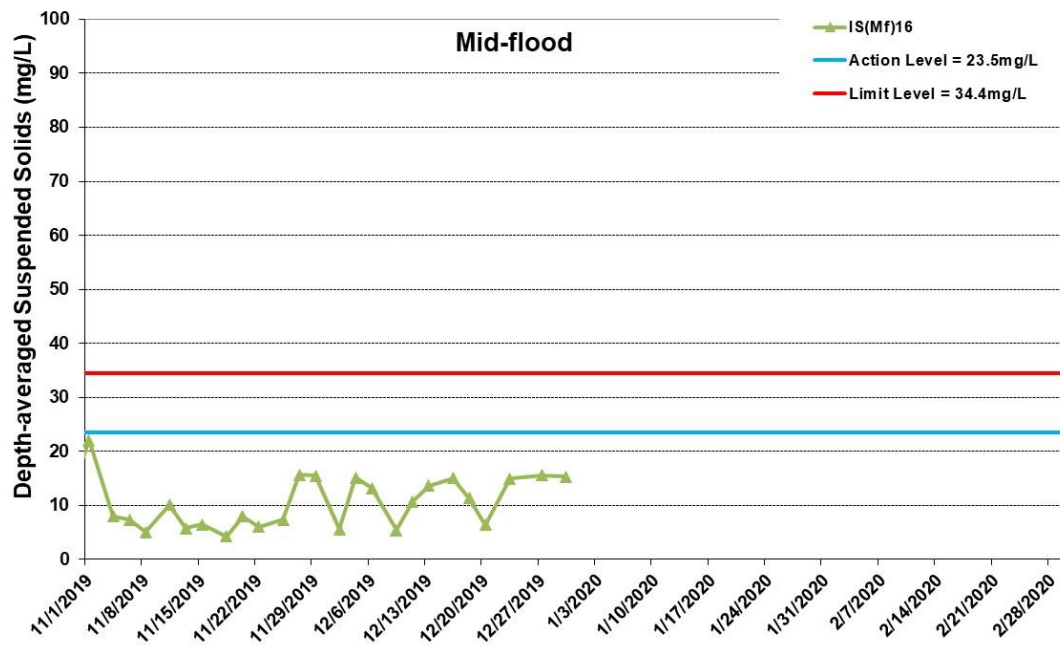
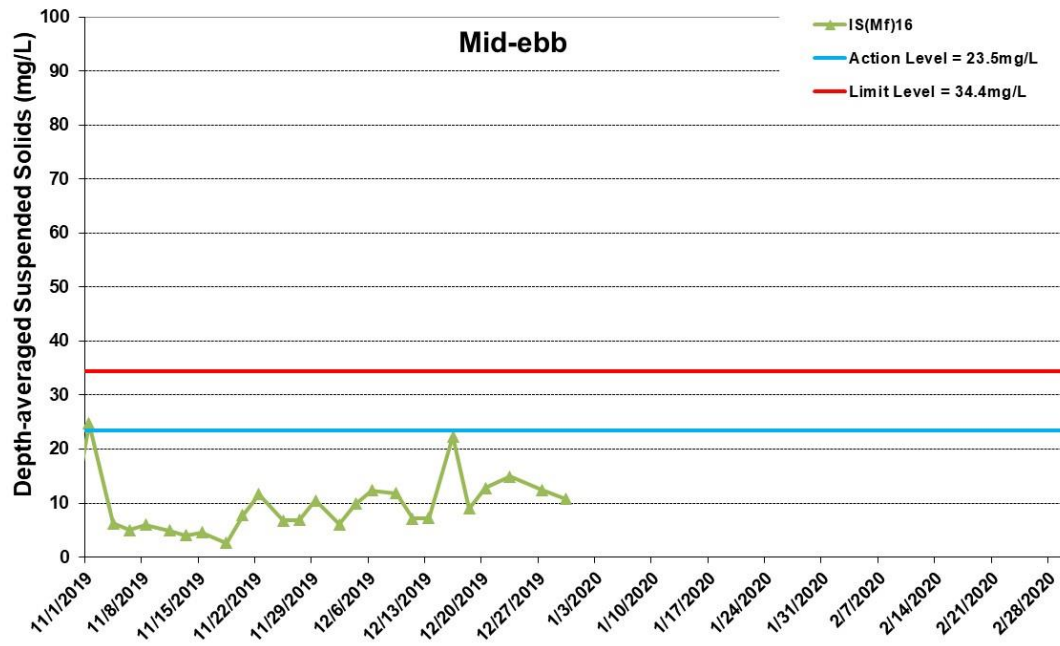


Figure G41 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at IS(Mf)16. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

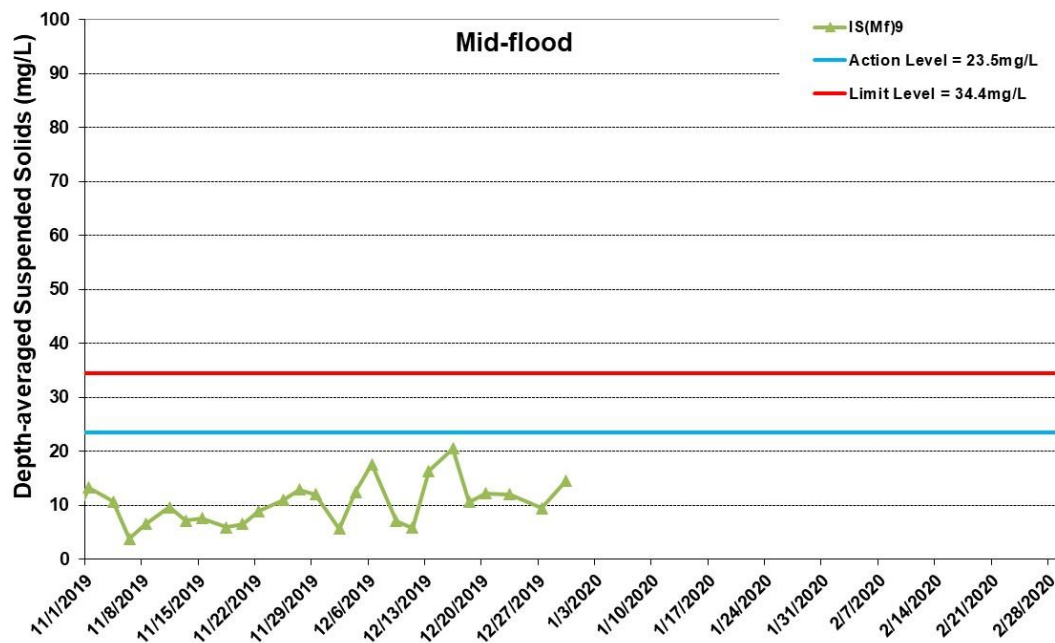
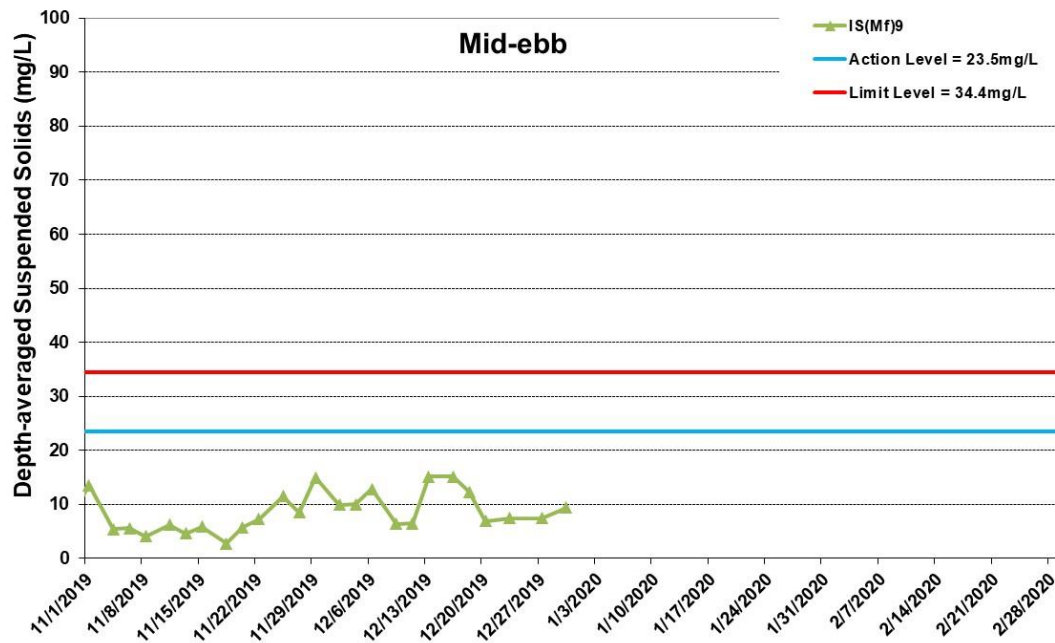


Figure G42 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at IS(Mf)9. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

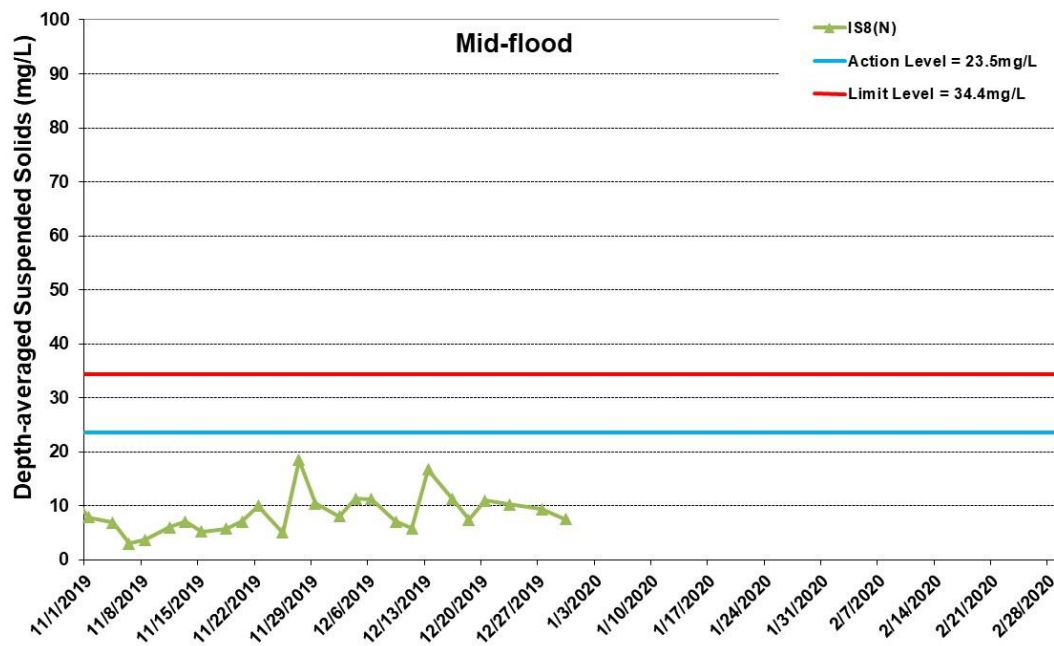
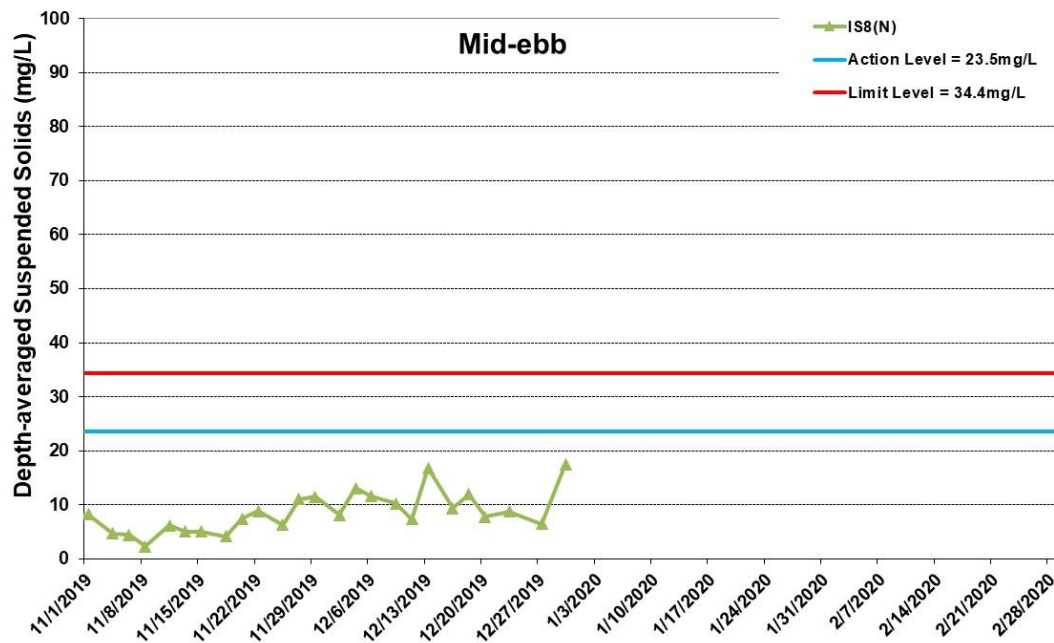


Figure G43 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at IS8(N). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

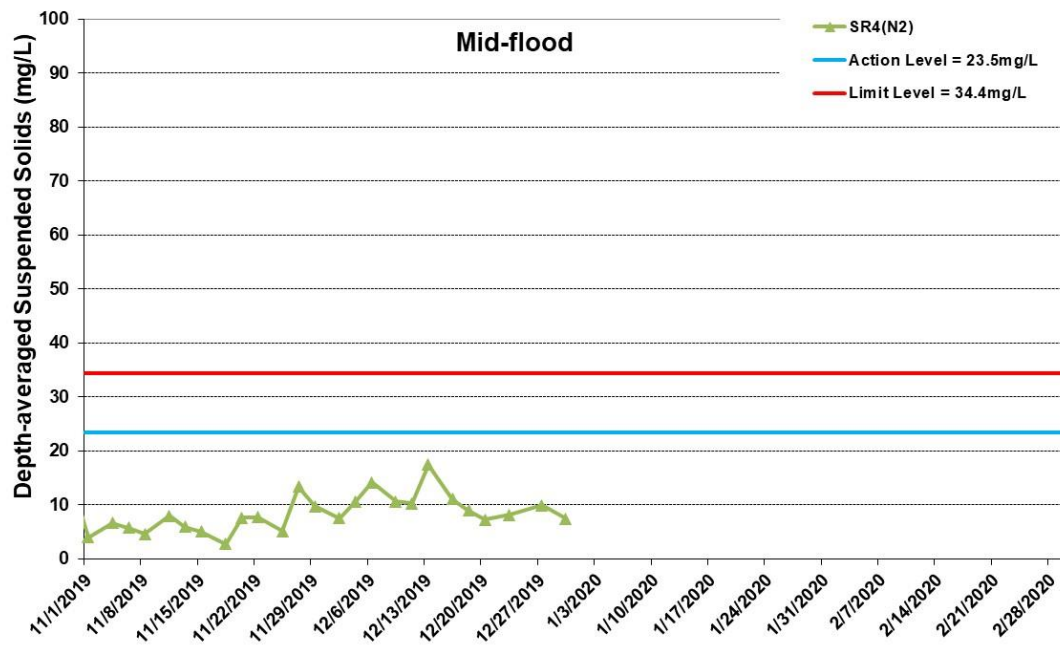
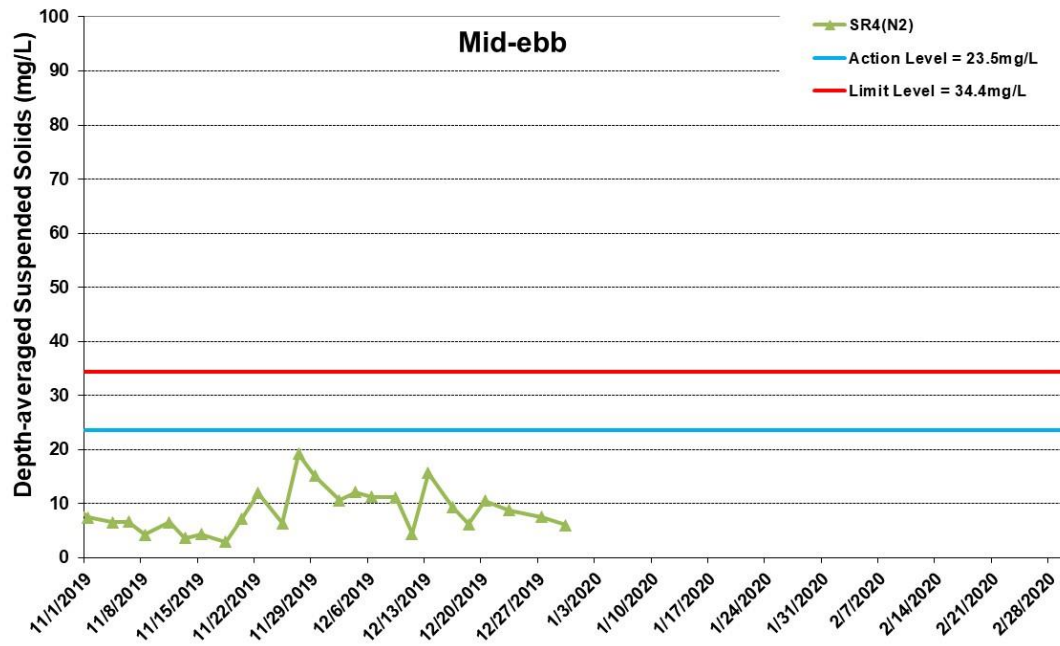


Figure G44 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at SR4(N2). The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

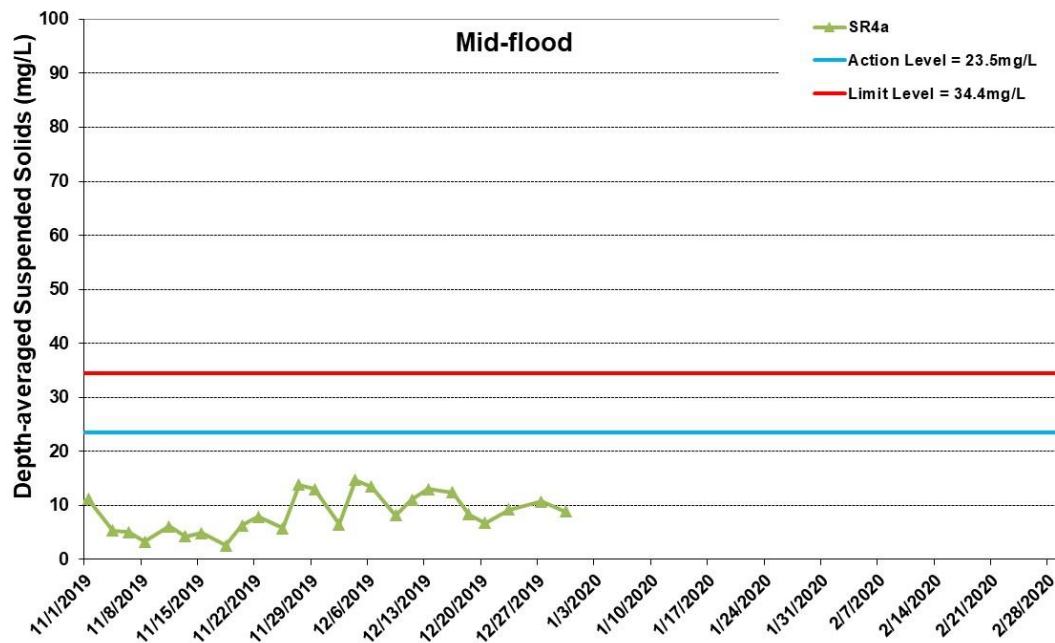
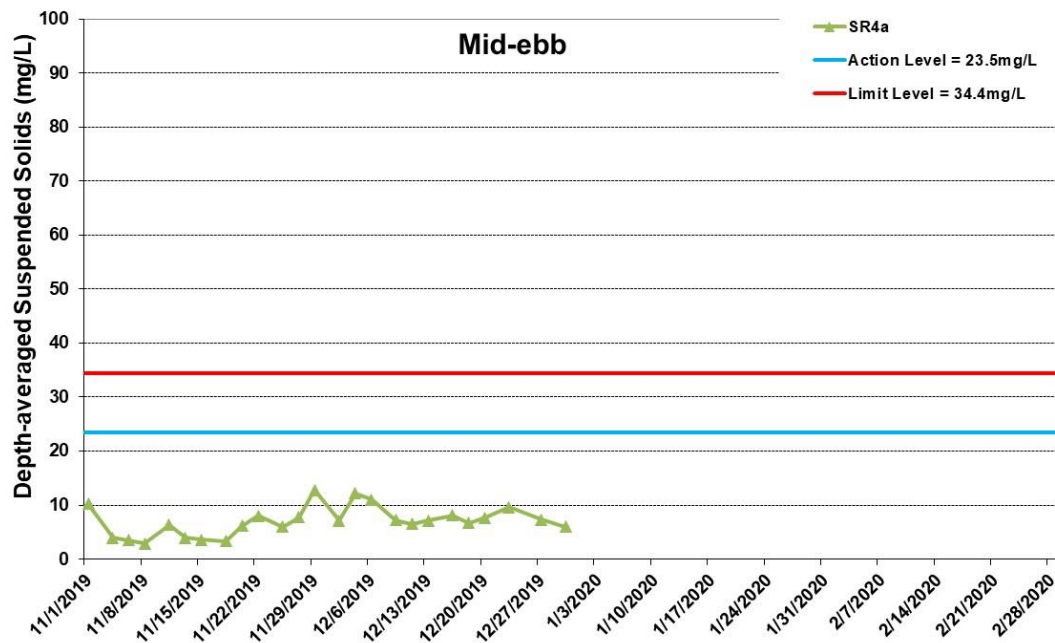
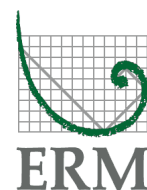


Figure G45 Impact Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 November 2019 and 29 February 2020 at SR4a. The weather conditions during the monitoring period varied mostly from sunny to cloudy. Major marine works included: Seawall Modification Works at Portion S-B (1/11/2019 – 29/2/2020).



Ref: 0212330_Impact-WQM_February2020_graphs_Rev a.xls

Appendix H

Impact Dolphin Monitoring Survey

CONTRACT NO. HY/2012/08

**Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link
(Northern Connection Sub-sea Tunnel Section)
Dolphin Quarterly Monitoring**

*25th Quarterly Progress Report (December 2019-February 2020)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

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

22 April 2020

1. Introduction

- 1.1. As part of the Hong Kong-Zhuhai-Macao Bridge, the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Northern Connection Sub-sea Tunnel Section (Contract no. HY/2012/08) comprises the sub-sea TBM tunnels (two tubes with cross passages) across the Urmston Road to connect Tuen Area 40 and Hong Kong Boundary Crossing Facilities (HKBCF) of approximately 4 km in length with dual 2-lane carriageway, the tunnels at both the southern landfall and the northern landfall for construction of approach roads to the sub-sea TBM tunnels of approximately 1.5 km in length, as well as the northern landfall reclamation of approximately 16.5 hectares and about 20.km long seawalls. Dragages – Bouygues Joint Venture (hereinafter called the “Contractor”) was awarded as the main contractor for the Northern Connection Sub-sea Tunnel Section, and ERM Hong Kong Limited would serve as the Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme.
- 1.2. According to the updated EM&A Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. However, as such surveys have been undertaken by the HKLR03 and HKBCF projects in the same areas (i.e. NWL and NEL), a combined monitoring approach is recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring has ended in September 2019, upon the completion of the dolphin monitoring carried out by HKLR03 contract. Starting in October 2019, the TMCLKL08 contract (i.e. the TM-CLKL Northern Connection Sub-sea Tunnel Section contract) takes over the dolphin monitoring works by conducting the regular vessel-based line-transect surveys.
- 1.3. In November 2013, the Director of Hong Kong Cetacean Research Project (HKCRP), Dr. Samuel Hung, has been appointed by ERM Hong Kong Limited as the dolphin specialist for the TMCLKL08 EM&A project. He is responsible for the dolphin monitoring study,

including the data collection on Chinese White Dolphins during the construction phase (i.e. impact period) of the TMCLKL08 project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas.

- 1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to examine any potential impacts of TMCLKL08 construction works on the dolphins up until September 2019. Thereafter, the dolphin specialist would utilize the monitoring data collected by TMCLKL08 dolphin monitoring programme to produce regular progress reports. 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 25th quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the survey findings during the period of December 2019 to February 2020 by utilizing the survey data collected by TMCLKL08 impact phase monitoring project.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

Table 1 Co-ordinates of transect lines conducted by TMCLKL08 project

Line No.		Easting	Northing		Line No.	Easting	Northing	
1	Start Point	804671	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859
2	Start Point	805476	820800		14	Start Point	817537	820220
2	End Point	805476	826654		14	End Point	817537	824613
3	Start Point	806464	821150		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	821500		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	821850		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	822150		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761

7	Start Point	810499	822000		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	821123		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	821303		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	821176		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818853		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807		24	Start Point	805476	815900
12	End Point	815542	824882		24	End Point	805476	819100

- 2.1.2. The TMCLKL08 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 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2018). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size

estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

- 2.1.7. Survey effort being conducted along the parallel transect lines that were perpendicular to the coastlines (as indicated in Figure 1) was labeled as “primary” survey effort, while the survey effort conducted along the connecting lines between parallel lines was labeled as “secondary” survey effort. According to HKCRP long-term dolphin monitoring data, encounter rates of Chinese white dolphins deduced from effort and sighting data collected along primary and secondary lines were similar in NEL and NWL survey areas. Therefore, both primary and secondary survey effort were presented as on-effort survey effort in this report.

2.2. Photo-identification Work

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the TMCLKL08 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* model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. Data Analysis

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

different subsets to examine distribution patterns of dolphin groups with different categories of group sizes, young calves and activities.

- 2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Only data collect under Beaufort 3 or below condition would be used for the encounter rate analyses. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in North Lantau), which was also compared with the one deduced from the six events during the baseline period (i.e. six sets of line-transect surveys in North Lantau).

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

- 2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km² grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km²) and dolphin densities (total number of dolphins from on-effort sightings per km²) were then calculated for each 1 km by 1 km grid with the aid of GIS.

Sighting density grids and dolphin density grids were then further normalized with the amount of survey effort conducted within each grid. The total amount of survey effort spent on each grid was calculated by examining the survey coverage on each line-transect survey to determine how many times the grid was surveyed during the study period. For example, when the survey boat traversed through a specific grid 50 times, 50 units of survey effort were counted for that grid. With the amount of survey effort calculated for each grid, the sighting density and dolphin density of each grid were then normalized (i.e. divided by the unit of survey effort).

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort sightings per 100 units of survey effort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of dolphins per 100 units of survey effort. Among the 1-km² grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and

DPSE in each 1-km² grid within the study area:

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

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

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

- 2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, socializing, traveling, and milling/resting) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView[®] 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

- 3.1. *Summary of survey effort and dolphin sightings*
- 3.1.1. During the period of December 2019 to February 2020, six sets of systematic line-transect vessel surveys were conducted under the TMCLKL08 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these TMCLKL08 surveys, a total of 781.78 km of survey effort was collected, with 100% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas, 287.40 km and 494.38 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.1.3. The total survey effort conducted on primary lines was 570.93 km, while the effort on secondary lines was 210.85 km. Survey effort conducted on both primary and secondary lines were considered to be on-effort survey data. A summary table of the survey effort is shown in Appendix I.

- 3.1.4. During the six sets of TMCLKL08 monitoring surveys from December 2019 to February 2020, seven groups of 29 Chinese White Dolphins were sighted. All seven dolphin sightings were made on primary lines during on-effort search in this quarter. A summary table of dolphin sightings is shown in Appendix II.
- 3.1.5. In this quarterly period, all dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during the HKLR03/TMCLKL08 monitoring surveys.
- 3.2. *Distribution*
- 3.2.1. Distribution of dolphin sightings made during the TMCLKL08 monitoring surveys from December 2019 to February 2020 is shown in Figure 1. Among the seven groups, two were sighted to the west of Lung Kwu Chau, and another two were located in the Urmston Road section between Lung Kwu Tan and Lung Kwu Chau (Figure 1). The rest of them were scattered to the west of Sha Chau and the airport platform respectively, as well as near the HKLR09 alignment at the southwestern corner of the NWL survey area (Figure 1). And as consistently recorded in the previous monitoring quarters in recent years, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).
- 3.2.2. Notably, all dolphin sightings were located far away from the TMCLKL alignment as well as the HKBCF and HKLR03 reclamation sites during the quarterly period (Figure 1).
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past six years of HKLR03/TMCLKL08 impact phase monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.
- 3.2.4. In NWL survey area, dolphin occurrences were also drastically different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were sighted infrequently here, and mostly at the western end of the North Lantau region. This was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the six quarterly periods of winter months in 2014-20 (Figure 2). Dolphins were sighted regularly in NWL waters in the first four quarterly periods, but their occurrences have progressively diminished in the winter quarters of 2018-19 and 2019-20 (Figure 2). On the other hand, dolphins were consistently absent from the NEL survey area throughout the six quarterly periods.

3.3. Encounter rate

3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines under favourable conditions (Beaufort 3 or below) for each set of the TMCLKL08 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of surveys were also compared with the ones deduced from the baseline monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during December 2019-February 2020

SURVEY AREA	DOLPHIN MONITORING DATES	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
Northeast Lantau	Set 1 (3 & 10 Dec 2019)	0.00	0.00
	Set 2 (12 & 16 Dec 2019)	0.00	0.00
	Set 3 (2 & 6 Jan 2020)	0.00	0.00
	Set 4 (9 & 16 Jan 2020)	0.00	0.00
	Set 5 (10 & 18 Feb 2020)	0.00	0.00
	Set 6 (20 & 24 Feb 2020)	0.00	0.00
Northwest Lantau	Set 1 (3 & 10 Dec 2019)	0.00	0.00
	Set 2 (12 & 16 Dec 2019)	5.03	21.81
	Set 3 (2 & 6 Jan 2020)	0.00	0.00
	Set 4 (9 & 16 Jan 2020)	0.00	0.00
	Set 5 (10 & 18 Feb 2020)	3.35	5.03
	Set 6 (20 & 24 Feb 2020)	3.39	22.05

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (December 2019-February 2020) and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2019 – February 2020	September – November 2011	December 2019 – February 2020	September – November 2011
Northeast Lantau	0.0	6.00 \pm 5.05	0.0	22.19 \pm 26.81
Northwest Lantau	1.96 \pm 2.23	9.85 \pm 5.85	8.15 \pm 10.85	44.66 \pm 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter

rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 1.42 sightings and 5.87 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

- 3.3.3 In NEL, the average dolphin encounter rates (both STG and ANI) in the present quarterly impact monitoring period were both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have been consistently recorded during the same winter quarters throughout the HKLR03/TMCLKL08 monitoring in the past seven consecutive years (Table 4).

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same winter quarters of HKLR03/TMCLKL08 impact monitoring period since 2012 and the baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	6.00 \pm 5.05	22.19 \pm 26.81
December 2012-February 2013 (Impact)	3.14 \pm 3.21	6.33 \pm 8.64
December 2013-February 2014 (Impact)	0.45 \pm 1.10	1.34 \pm 3.29
December 2014-February 2015 (Impact)	0.00	0.00
December 2015-February 2016 (Impact)	0.00	0.00
December 2016-February 2017 (Impact)	0.00	0.00
December 2017-February 2018 (Impact)	0.00	0.00
December 2018-February 2019 (Impact)	0.00	0.00
December 2019-February 2020 (Impact)	0.00	0.00

- 3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present quarterly period were only very small fractions of the ones recorded during the three-month baseline period (with reductions of 80.1% and 81.8% respectively), indicating a dramatic decline in dolphin usage of this survey area during the present quarterly period as compared to the baseline period (Table 5).
- 3.3.5. When comparing among the seven winter quarters since 2012-13, the quarterly encounter rates in 2019-20 continued to plummet to the lowest level among all winter quarters during the HKLR03/TMCLKL08 impact monitoring period (Table 5). Such dramatic drop in dolphin occurrence in NWL raises serious concerns, and the temporal trend should be closely monitored in the upcoming monitoring quarters as the construction activities of HZMB works will soon be completed in coming months.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from the same winter quarters of HKLR03/TMCLKL08 impact monitoring period since 2012 and the baseline monitoring period (September- November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; \pm denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 \pm 5.85	44.66 \pm 29.85
December 2012-February 2013 (Impact)	8.36 \pm 5.03	35.90 \pm 23.10
December 2013-February 2014 (Impact)	8.21 \pm 2.21	32.58 \pm 11.21
December 2014-February 2015 (Impact)	2.91 \pm 2.69	11.27 \pm 15.19
December 2015-February 2016 (Impact)	2.64 \pm 1.52	10.98 \pm 3.81
December 2016-February 2017 (Impact)	3.80 \pm 3.79	14.52 \pm 17.21
December 2017-February 2018 (Impact)	4.75 \pm 2.26	15.73 \pm 15.94
December 2018-February 2019 (Impact)	2.40 \pm 1.88	7.95 \pm 6.60
December 2019-February 2020 (Impact)	1.96 \pm 2.23	8.15 \pm 10.85

- 3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and HKLR03/TMCLKL08 impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.7. For the comparison between the baseline period and the present quarter (29th quarter of the HKLR03/TMCLKL08 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0035 and 0.0239 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline period and present quarter in both the average dolphin encounter rates of STG and ANI.
- 3.3.8. For the comparison between the baseline period and the cumulative quarters of the HKLR03/TMCLKL08 impact phase (i.e. the first 29 quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were both 0.000000. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).
- 3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly and dramatically reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented throughout the HKLR03/TMCLKL08 construction period.
- 3.3.10. Even though all marine works associated with the HZMB construction have already been

completed, and the Brothers Marine Park has been established as a compensation measure for the permanent habitat loss in association with the HZMB reclamation works since late 2016, apparently there has not been any sign of recovery of dolphin usage in North Lantau waters at all.

3.4. *Group size*

- 3.4.1. Group size of Chinese White Dolphins ranged from singletons to eleven individuals per group in North Lantau region during December 2019 to February 2020. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from impact monitoring period (December 2019 – February 2020) and baseline monitoring period (September – November 2011) (Note: \pm denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	December 2019 – February 2020	September – November 2011
Overall	4.14 \pm 4.41 (n = 7)	3.72 \pm 3.13 (n = 66)
Northeast Lantau	---	3.18 \pm 2.16 (n = 17)
Northwest Lantau	4.14 \pm 4.41 (n = 7)	3.92 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during December 2019 to February 2020 was slightly higher than the one recorded during the three-month baseline period, but it should also be noted that the sample size of only seven dolphin groups in the present quarter was only a small fraction of the 66 dolphin groups sighted during the baseline period (Table 6).
- 3.4.3. Notably, five of the seven dolphin groups were small with 1-3 individuals per group only, but there were also two large groups of dolphins, with 10 and 11 individuals each (Appendix II).
- 3.4.4. The two large groups were sighted to the west of Lung Kwu Chau and near HKLR09 alignment (or at the southwestern corner of the NWL survey area) respectively (Figure 3). This is in stark contrast to the baseline period when the larger groups were frequently sighted and evenly distributed throughout NWL waters, with a few also sighted in NEL waters (Figure 3).
- 3.5. *Habitat use*
- 3.5.1. From December 2019 to February 2020, only seven grids in North Lantau waters recorded dolphin occurrences, with five of them recorded low to moderate dolphin densities and another two with very high densities (Figures 4a and 4b). Notably, all grids near TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).
- 3.5.2. However, it should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids),

and therefore the habitat use pattern derived from the three-month dataset should be treated with caution. A more complete picture of dolphin habitat use pattern should be examined when more survey effort for each grid is collected throughout the impact phase monitoring programme.

- 3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present impact monitoring period (Figure 5). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present impact phase period (Figure 5).
- 3.5.4. The density patterns were also very different in NWL between the baseline and present impact phase monitoring periods, with high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. In contrast, all grids with dolphin densities were distributed at the western end of the NWL survey area with most of them recorded low to moderate densities during the present impact phase period (Figure 5).
- 3.6. *Mother-calf pairs*
- 3.6.1. During the present quarterly period, a total of three unspotted juveniles were sighted with their mothers to the west of Lung Kwu Chau and near the HKLR09 alignment in the NWL survey area (Figure 6). In fact, in the past three years of HKLR03/TMCLKL08 impact phase monitoring, only one other young calf was sighted in January 2019.
- 3.6.2. It should be noted that the rare occurrence of young calves in the present quarter as well as in recent years of HKLR03/TMCLKL08 monitoring was very different from their regular occurrence in North Lantau waters during the baseline period (Figure 6).
- 3.7. *Activities and associations with fishing boats*
- 3.7.1. Among the seven dolphin groups, two of them were engaged in feeding activities, and another two were engaged in socializing activities during the quarterly period. The two dolphin groups engaged in feeding activities were located to the west of Lung Kwu Chau and the airport platform, while the other two groups engaged in socializing activities were sighted to the west of Lung Kwu Chau and near the HKLR09 alignment (Figure 7). Such distribution of sightings with feeding and socializing activities is in stark contrast with the regular occurrence and even distribution of dolphin groups engaged in different activities during the baseline period (Figure 7).
- 3.7.2. Notably, none of the seven dolphin groups was found to be associated with any operating fishing vessel during the present impact phase period.
- 3.8. *Summary of photo-identification works*
- 3.8.1. From December 2019 to February 2020, about 1,500 digital photographs of Chinese White Dolphins were taken during the present impact phase monitoring surveys for the photo-identification work.

- 3.8.2. In total, 17 individuals sighted 22 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All of these re-sightings were made in NWL. Twelve identified individuals were re-sighted only once, while another five individuals (NL120, NL182, NL202, NL261 and WL214) were re-sighted twice during the quarterly monitoring period (Appendix III).
- 3.8.3. Notably, only one of these individuals (SL59) was also sighted in WL waters during the HKLR09 monitoring surveys under the same three-month period of December 2019 to February 2020.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 17 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.
- 3.9.2. All identified dolphins sighted in the present quarter were utilizing NWL waters only, but have completely avoided NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as the baseline period.
- 3.9.3. Moreover, only one individual (SL59) has extended its range use to WL waters during the quarterly period (Appendix V), even though such movements between North and West Lantau have been quite frequent among many individuals in the past several years of HKLR03 impact phase monitoring.
- 3.9.4. Notably, while the majority of the 17 individuals that primarily centered their range use in North Lantau were still sighted within their normal ranges, there were a number of individuals (e.g. SL59, WL214, WL243) which have their primary ranges in West Lantau but have extended to NWL waters during the present quarterly period (Appendix V).

4. Conclusion

- 4.1. During this quarter of dolphin monitoring, no adverse impact from the activities of the TMCLKL construction project on Chinese White Dolphins was noticeable from general observations.
- 4.2. Although the dolphins infrequently occurred along the alignment of TMCLKL southern connection viaduct in the past and during the baseline monitoring period, it is apparent that dolphin usage has been significantly reduced in NEL, and many individuals have shifted away from the important habitat around the Brothers Islands.
- 4.3. It is critical to monitor the dolphin usage in North Lantau region in the upcoming quarters, to determine whether the dolphins are continuously affected by the various construction activities in relation to the HZMB-related works, and whether suitable mitigation measure can be applied to revert the situation.

5. References

- 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. 2018. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2017-18). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 174 pp.
- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.

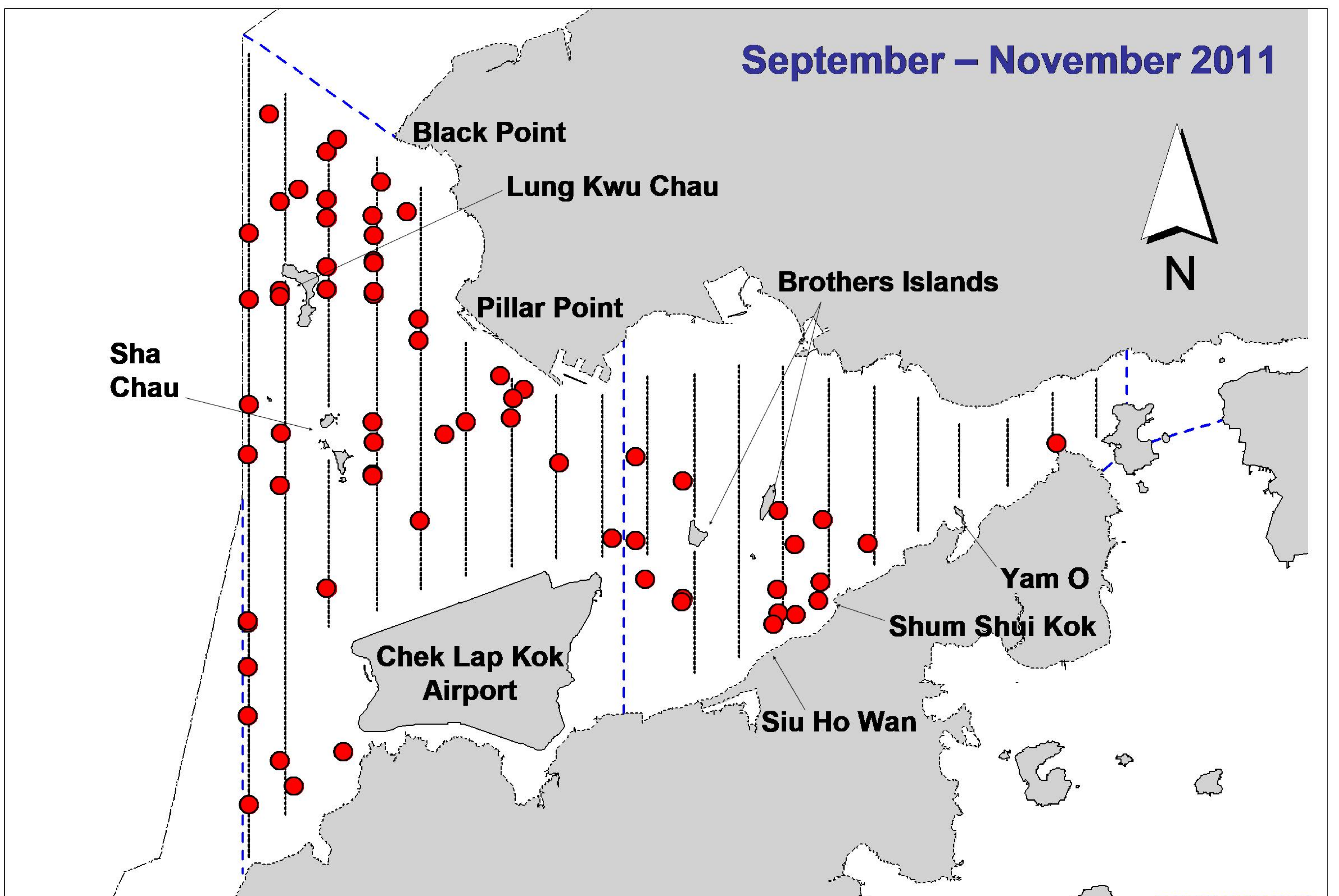
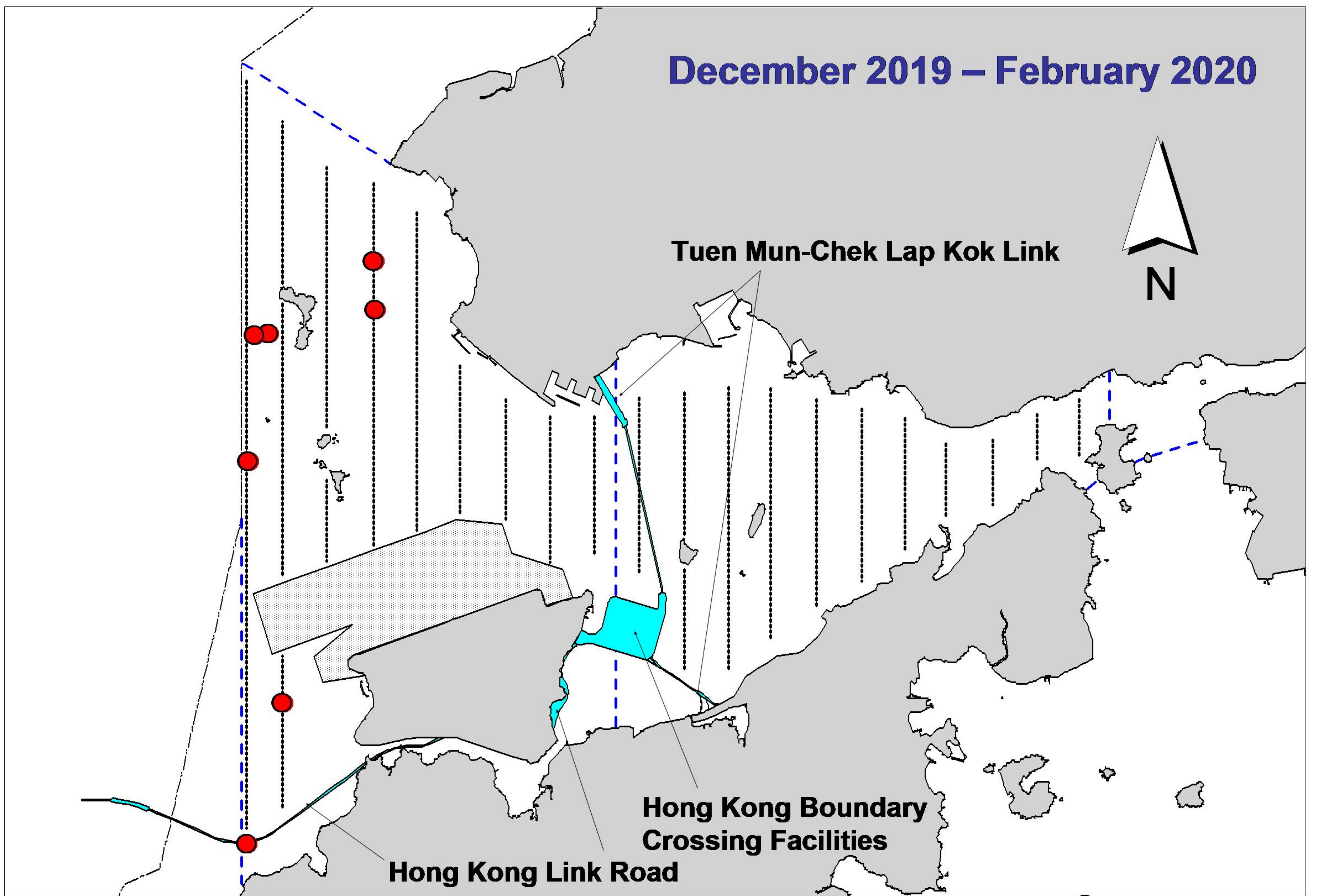


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom)

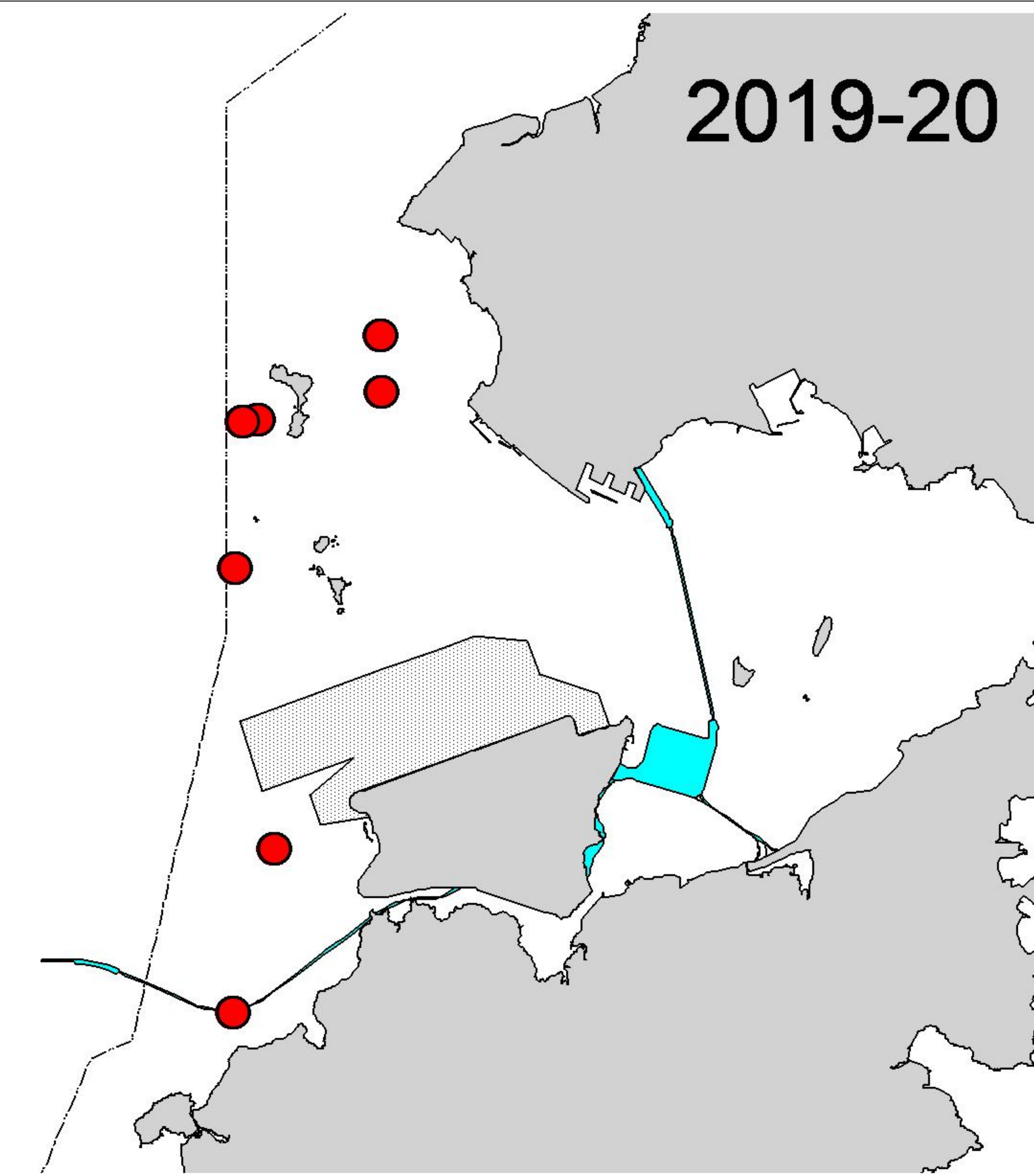
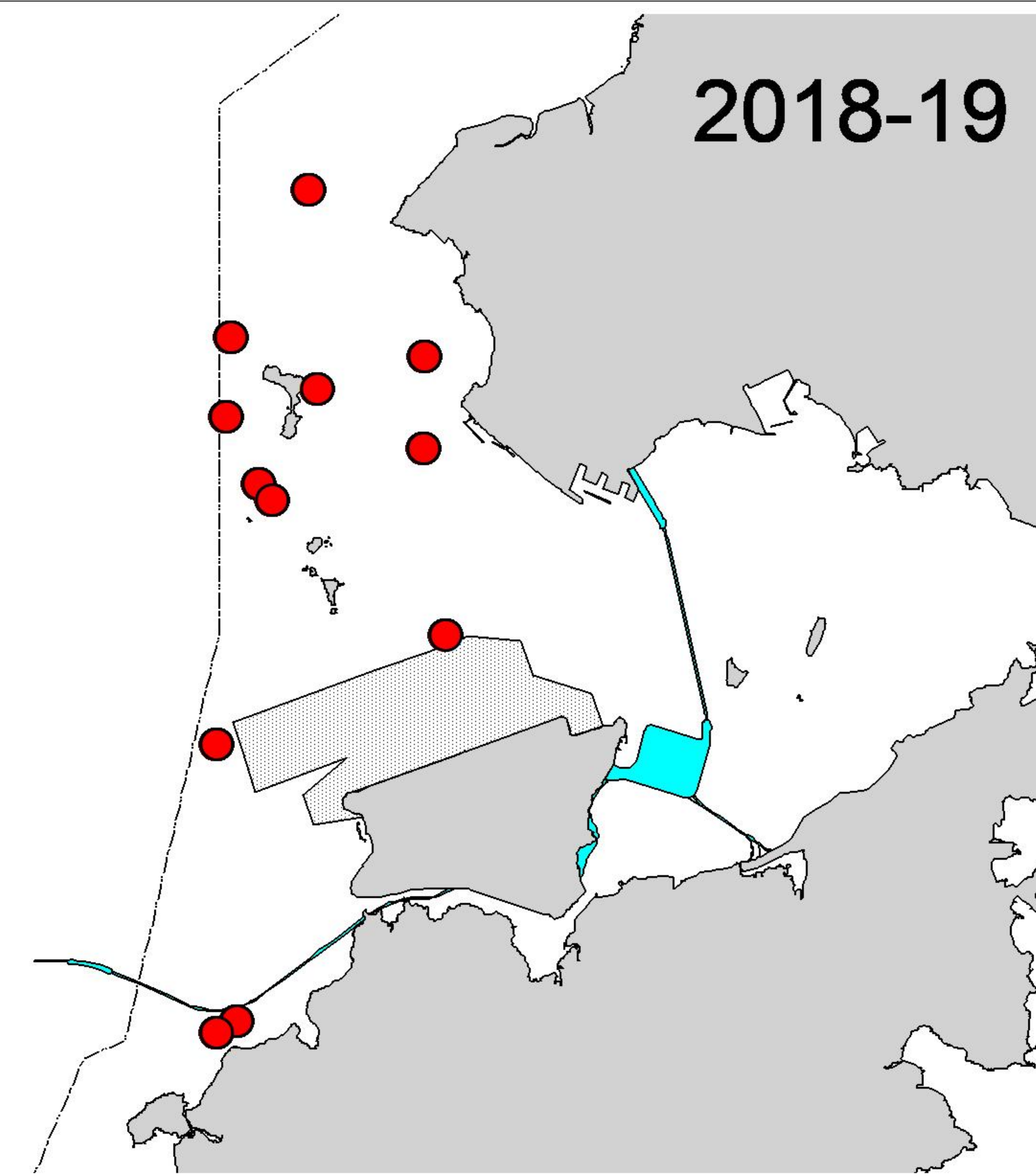
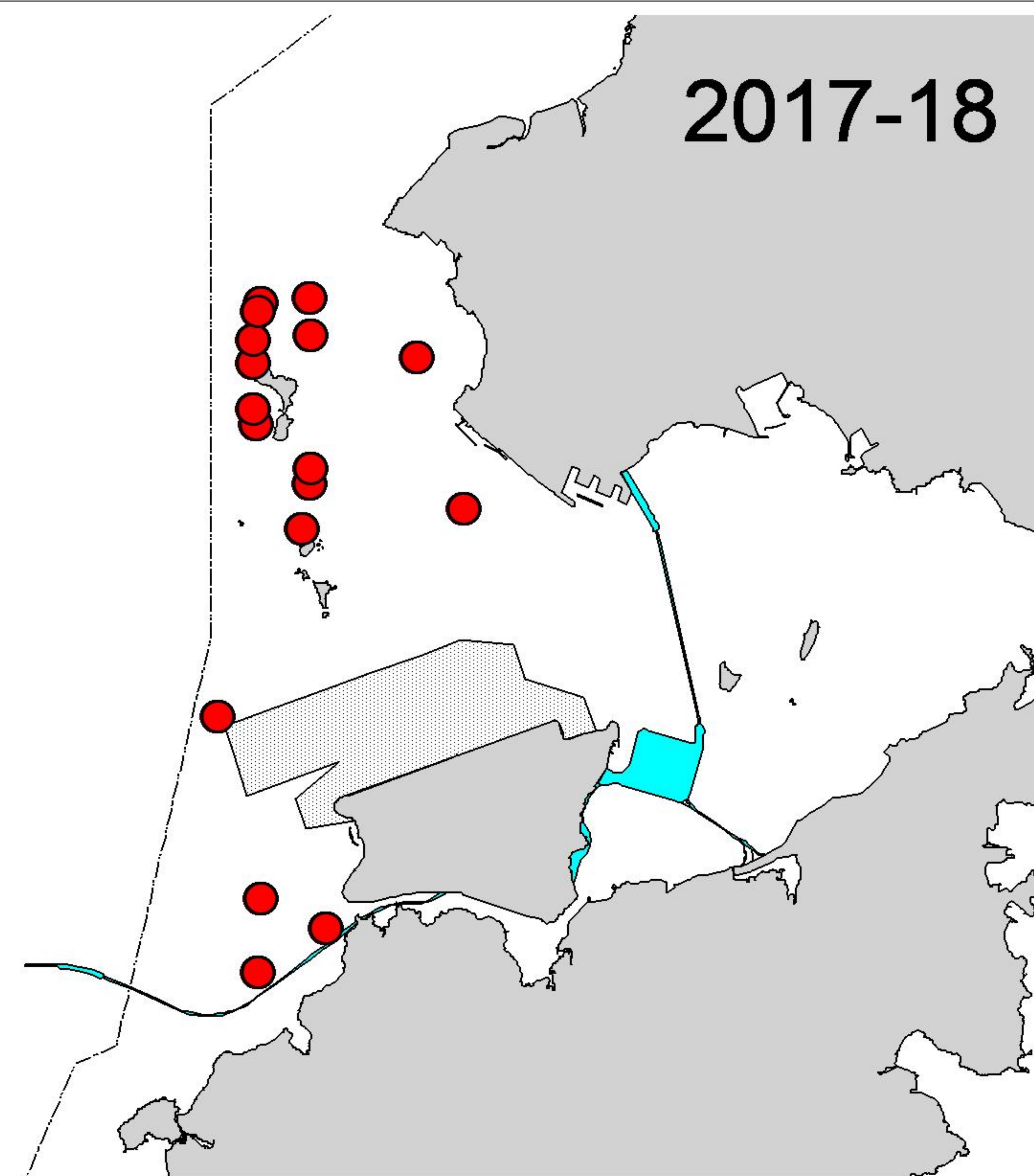
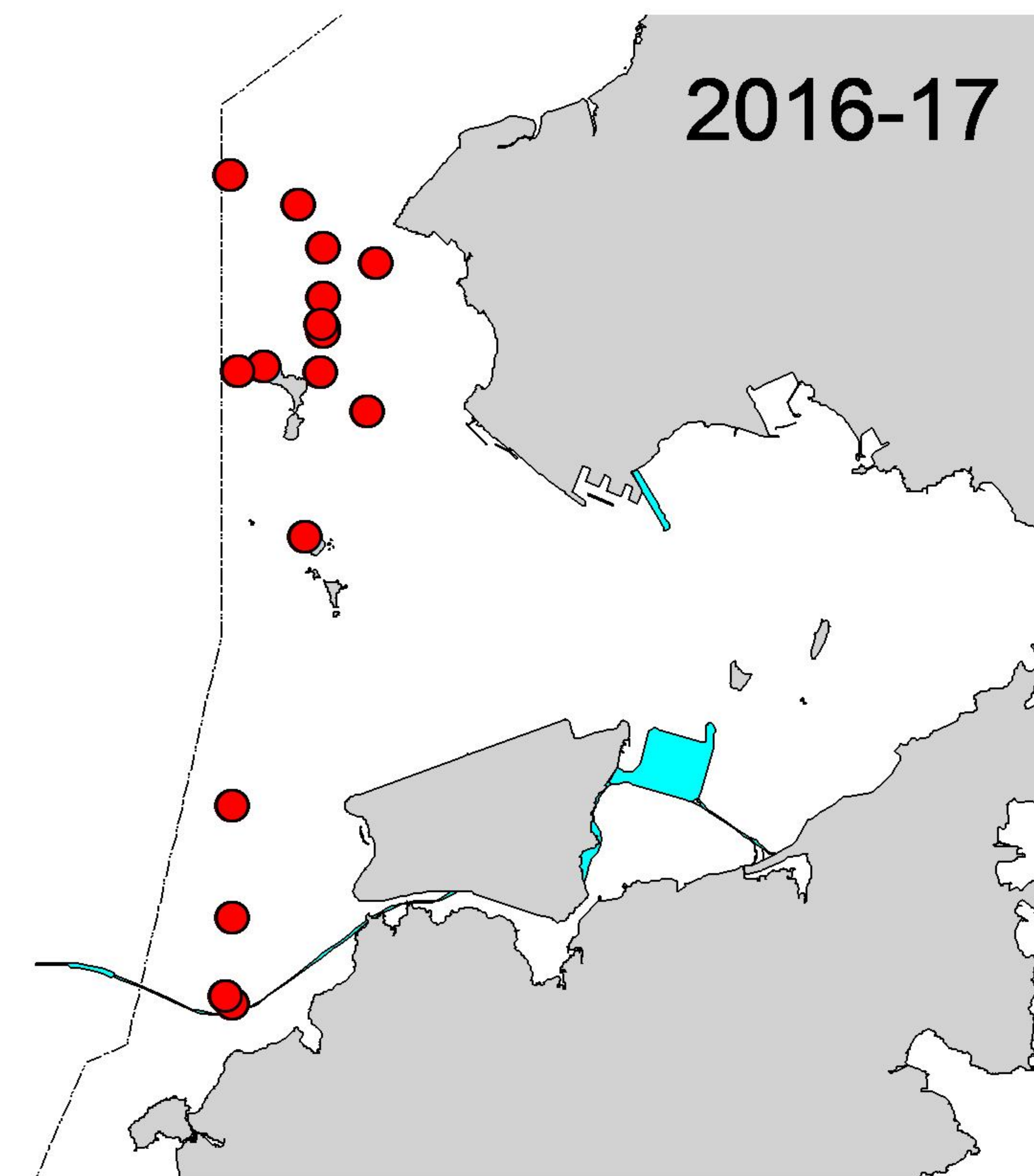
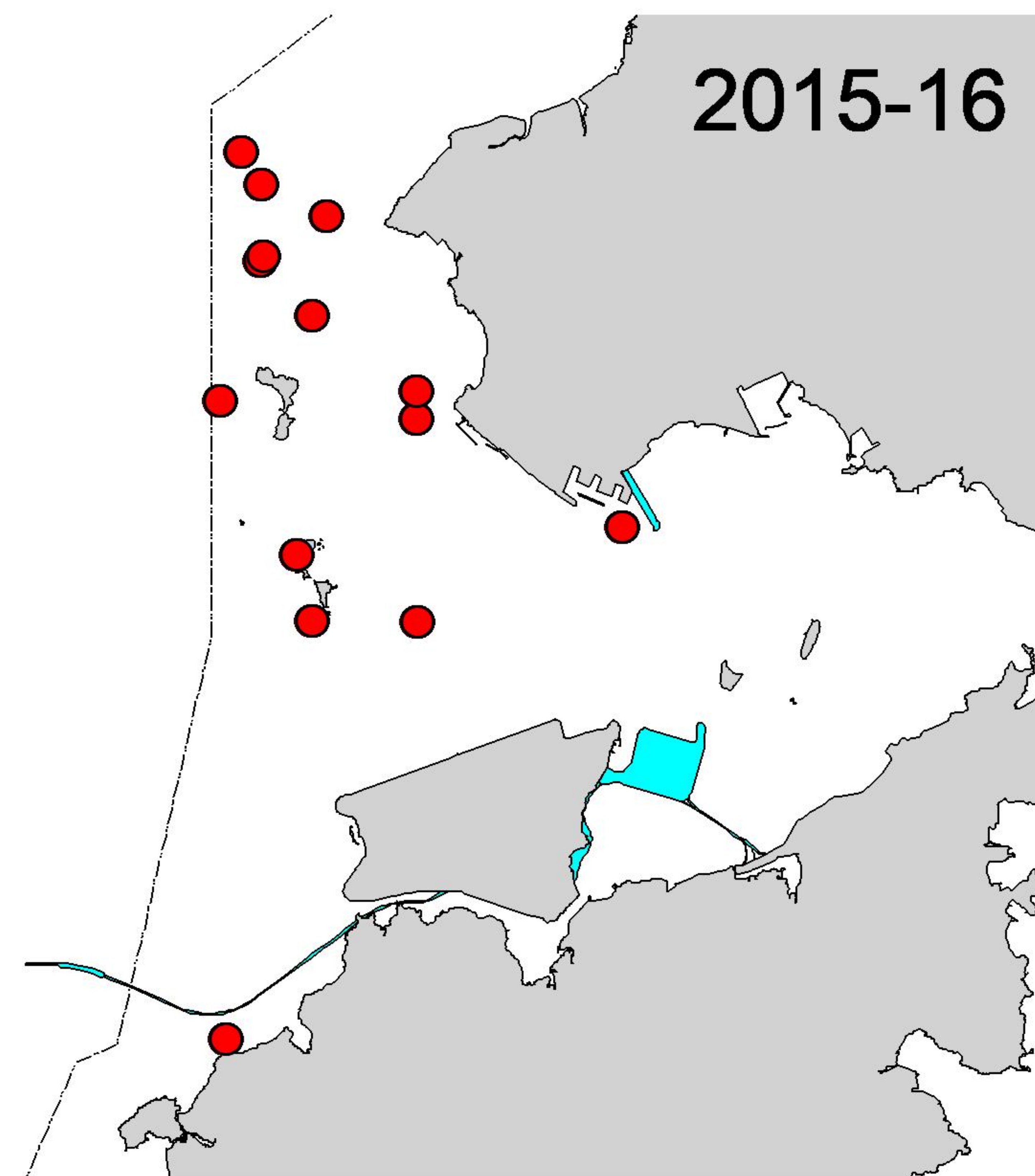
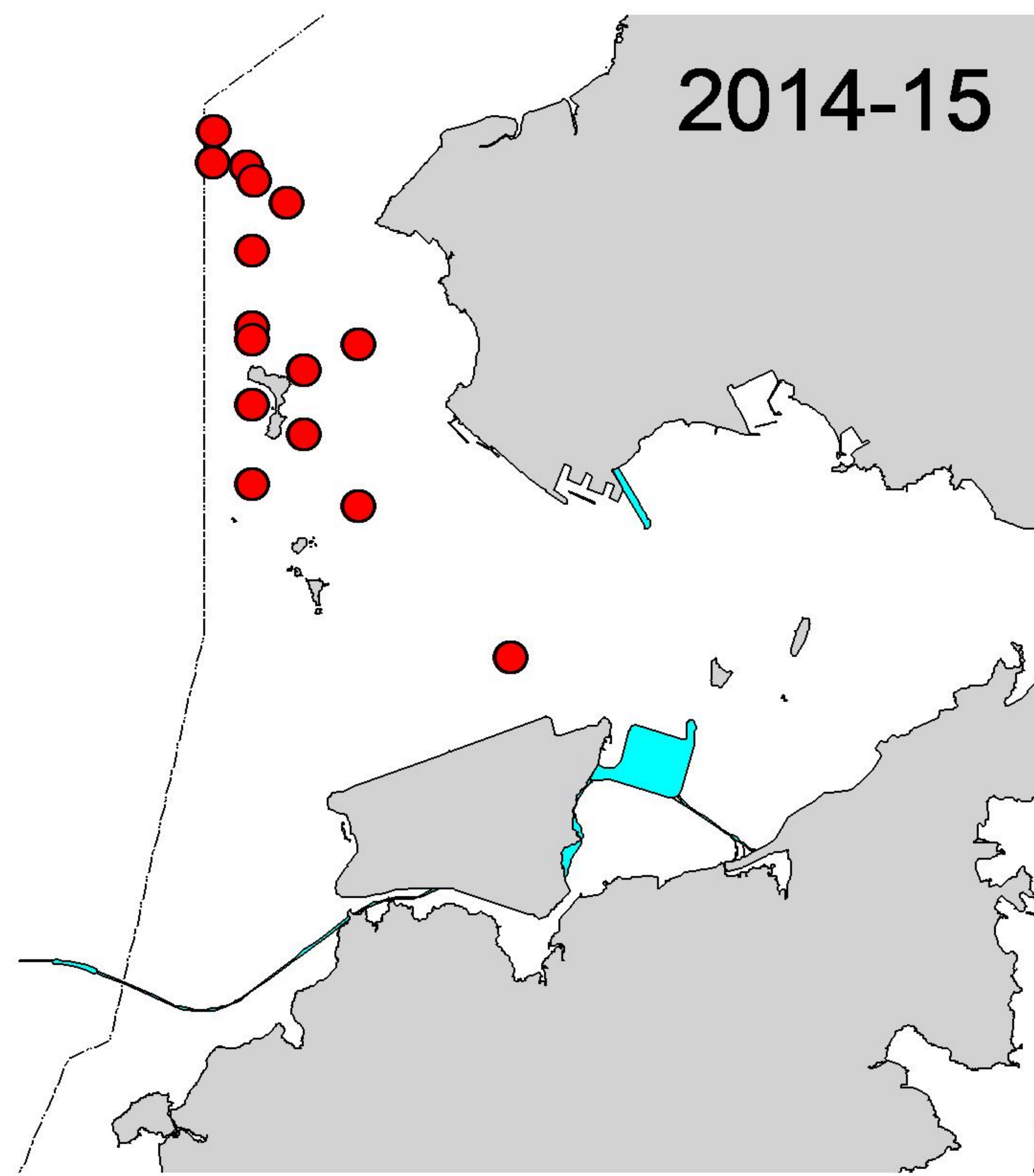


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six winter quarters (December-February) of HKLR03/TMCLKL08 impact phase in 2014-20

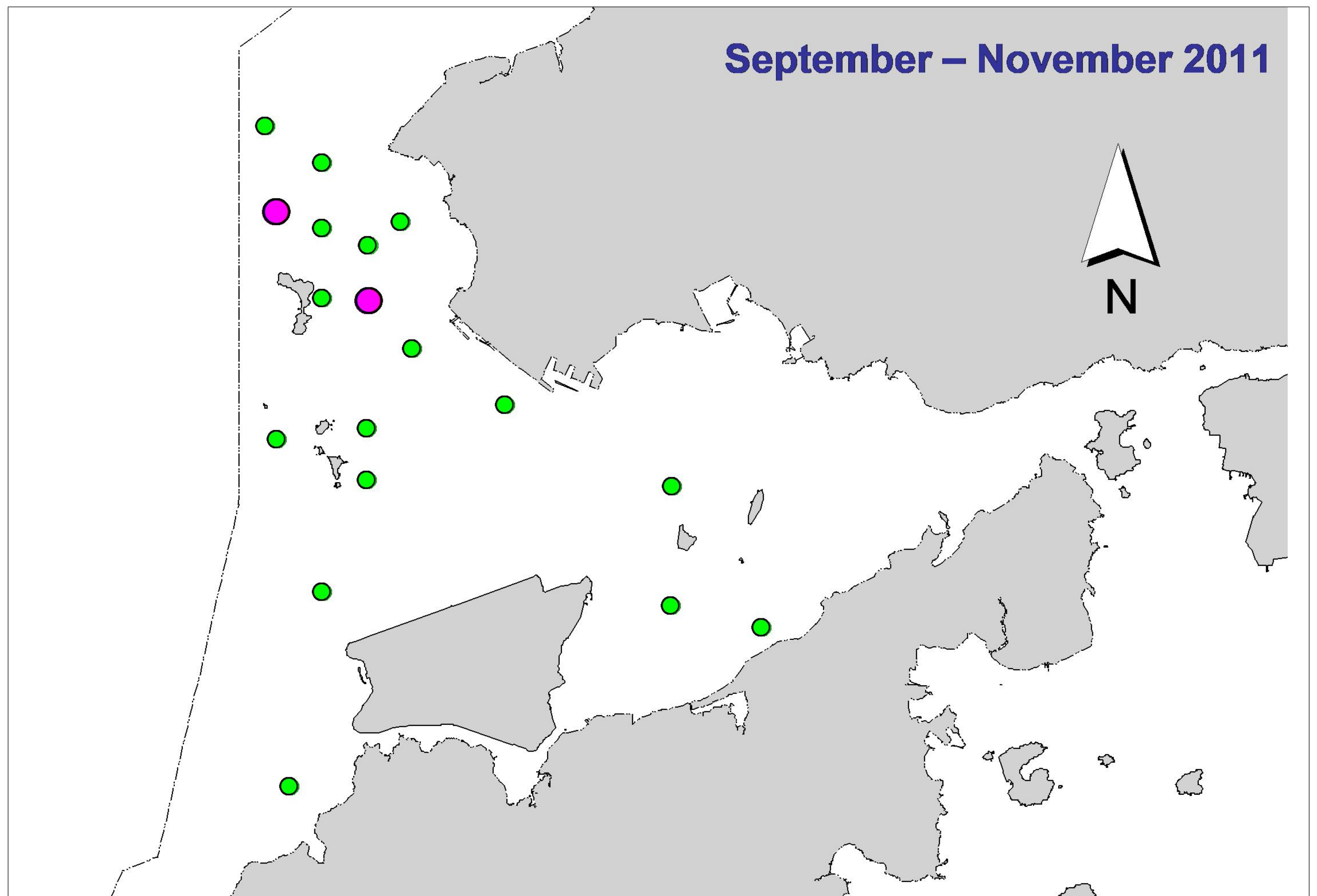
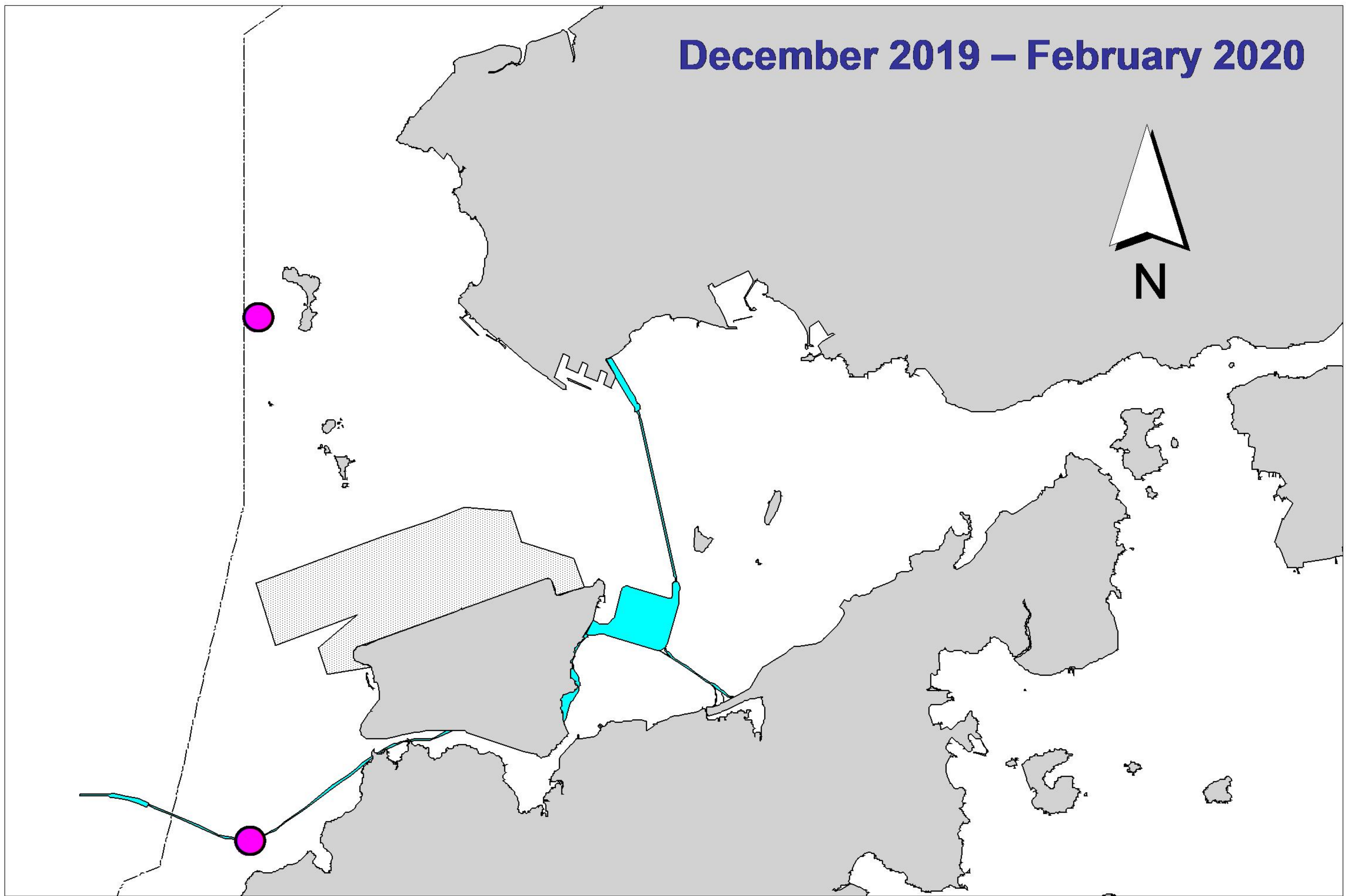


Figure 3. Distribution of Chinese white dolphins with larger group sizes during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

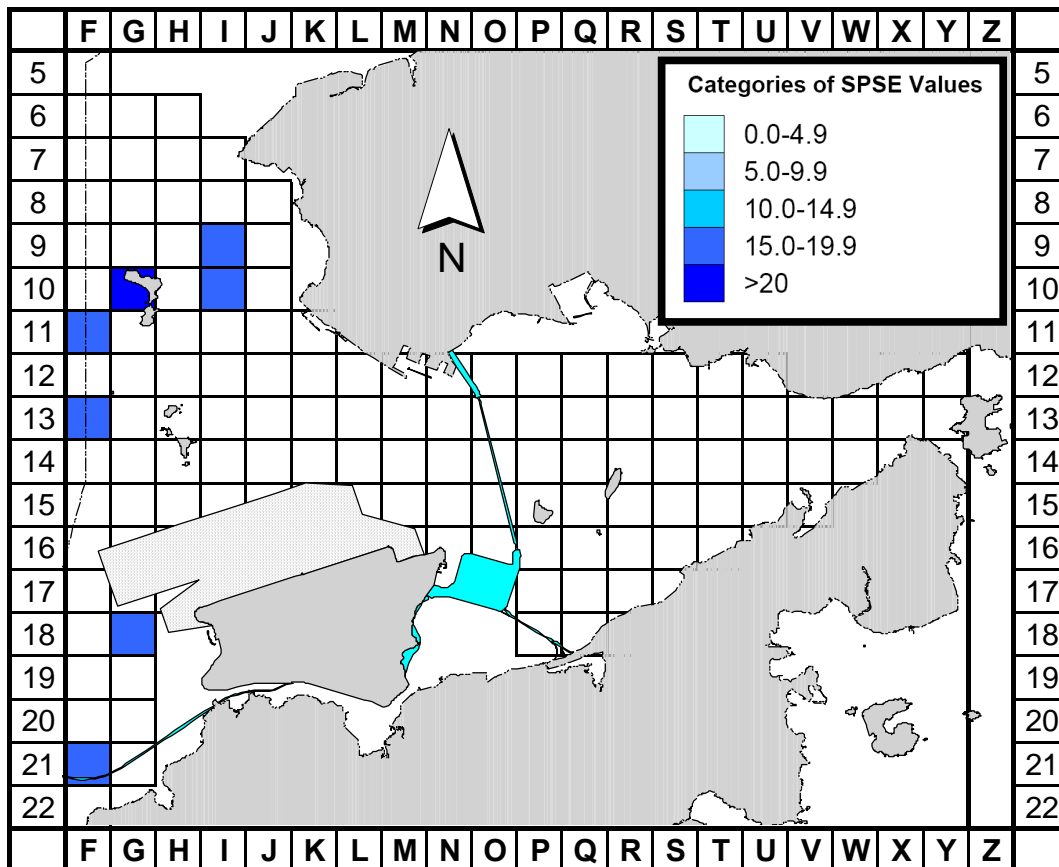


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (December 2019-February 2020) (SPSE = no. of on-effort sightings per 100 units of survey effort)

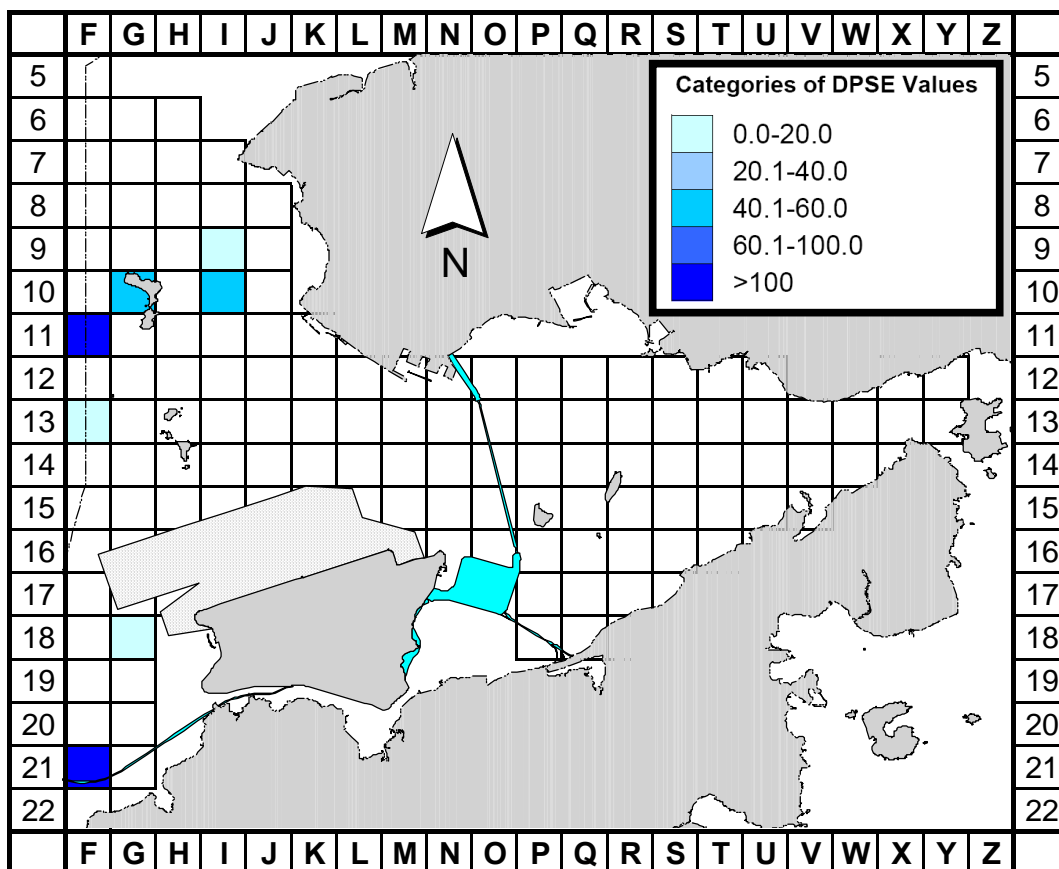


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (December 2019-February 2020) (DPSE = no. of dolphins per 100 units of survey effort)

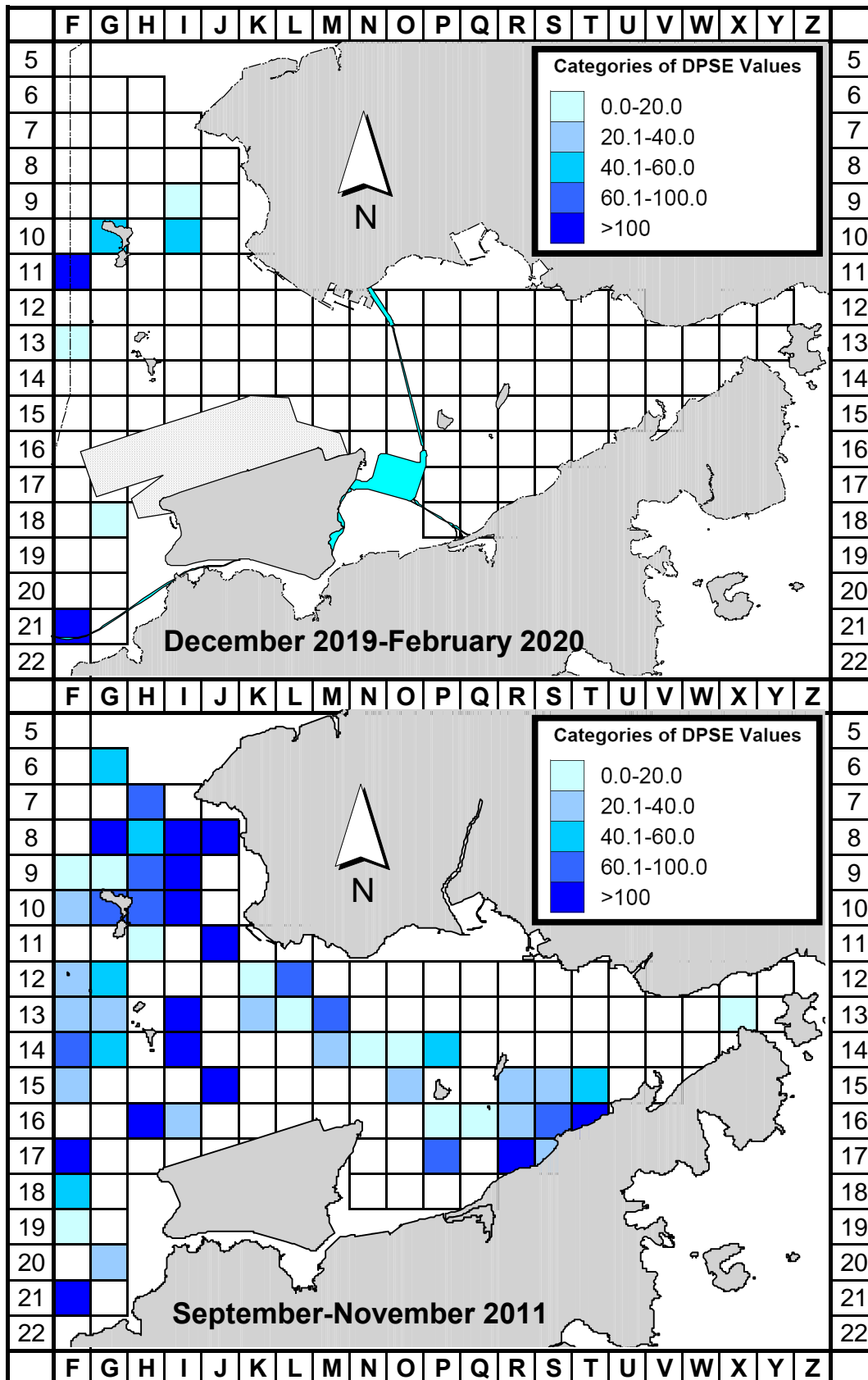


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the TMCLKL08 impact monitoring period (December 2019 - February 2020) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

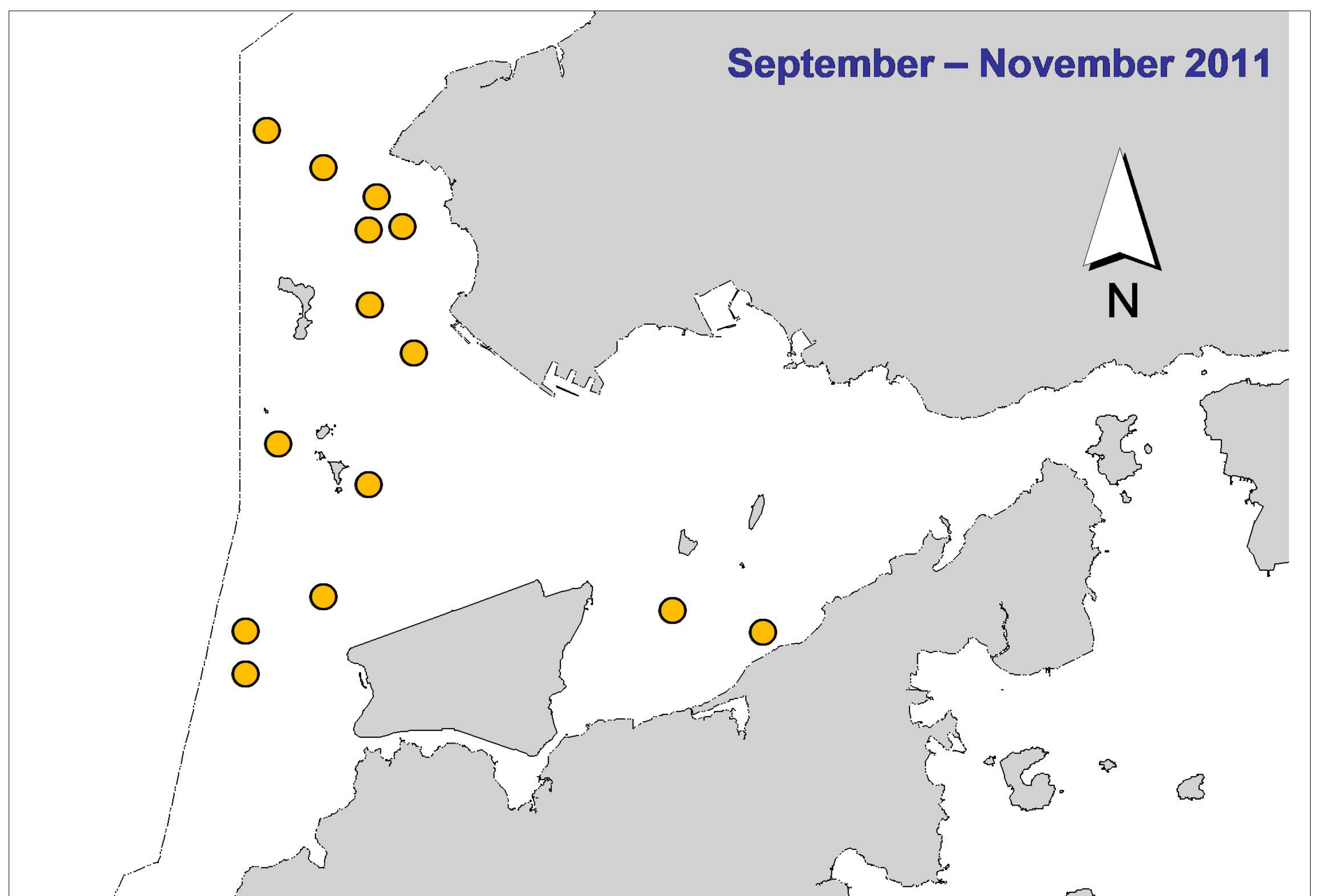
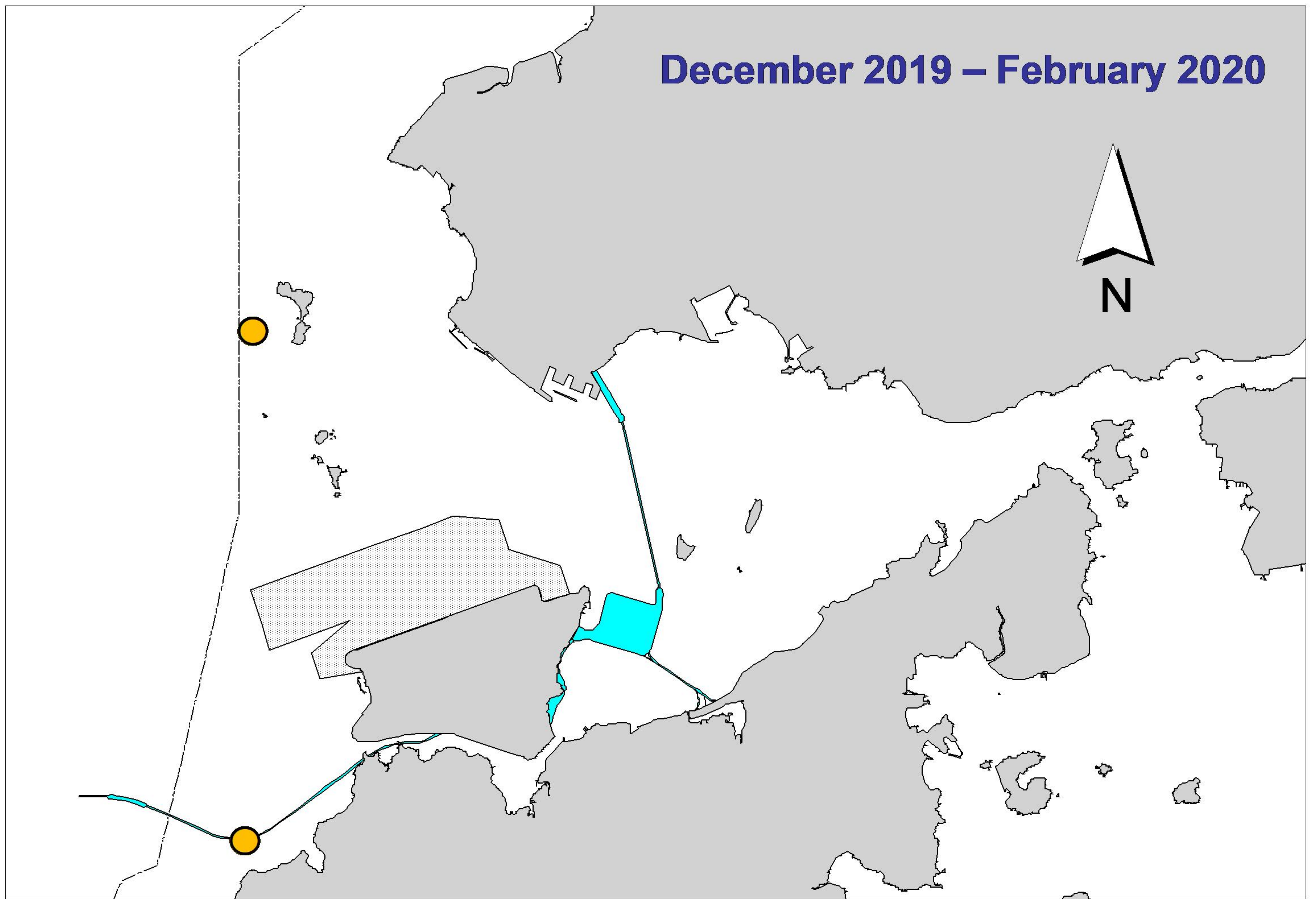


Figure 6. Distribution of young calves of Chinese white dolphins during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom)

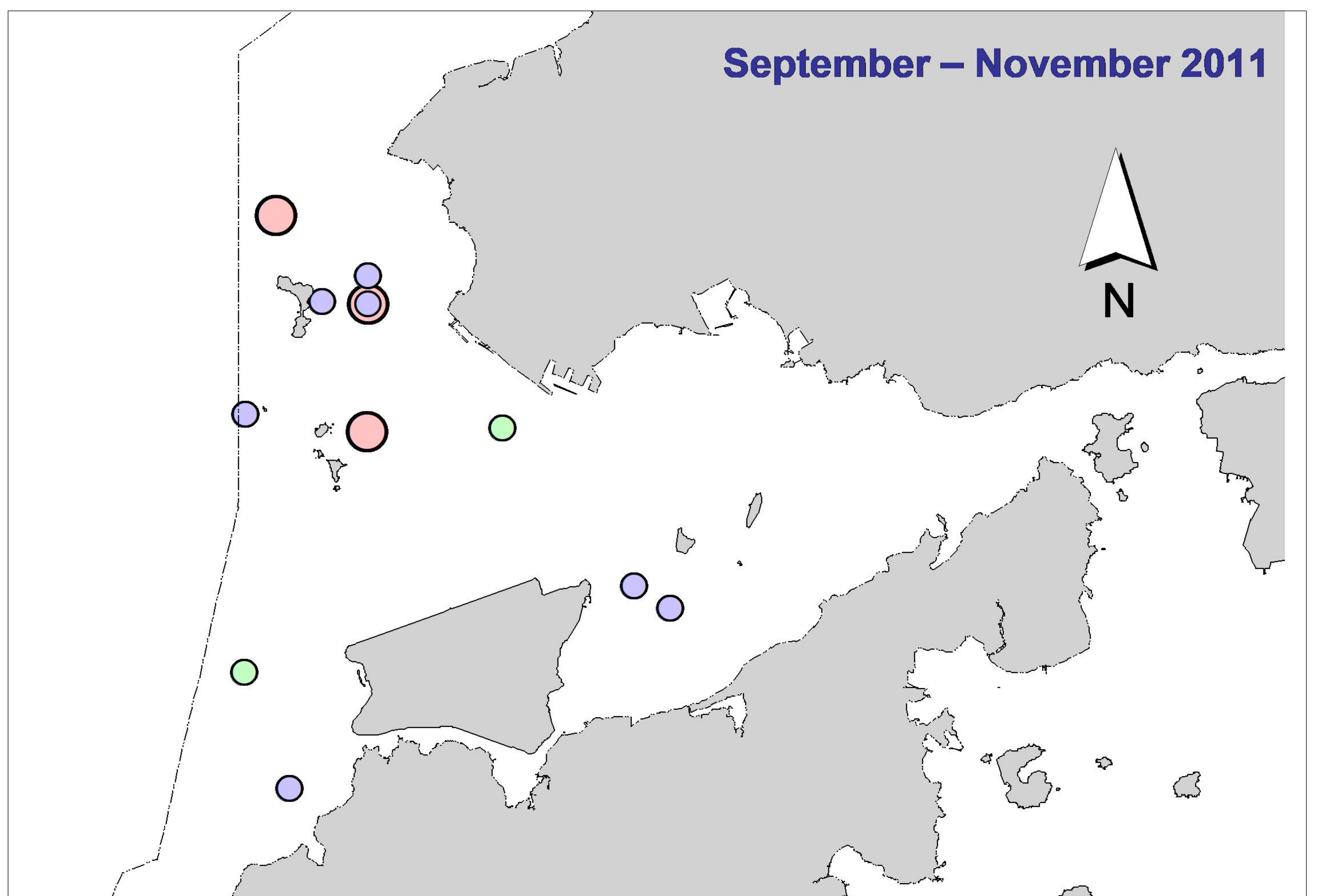
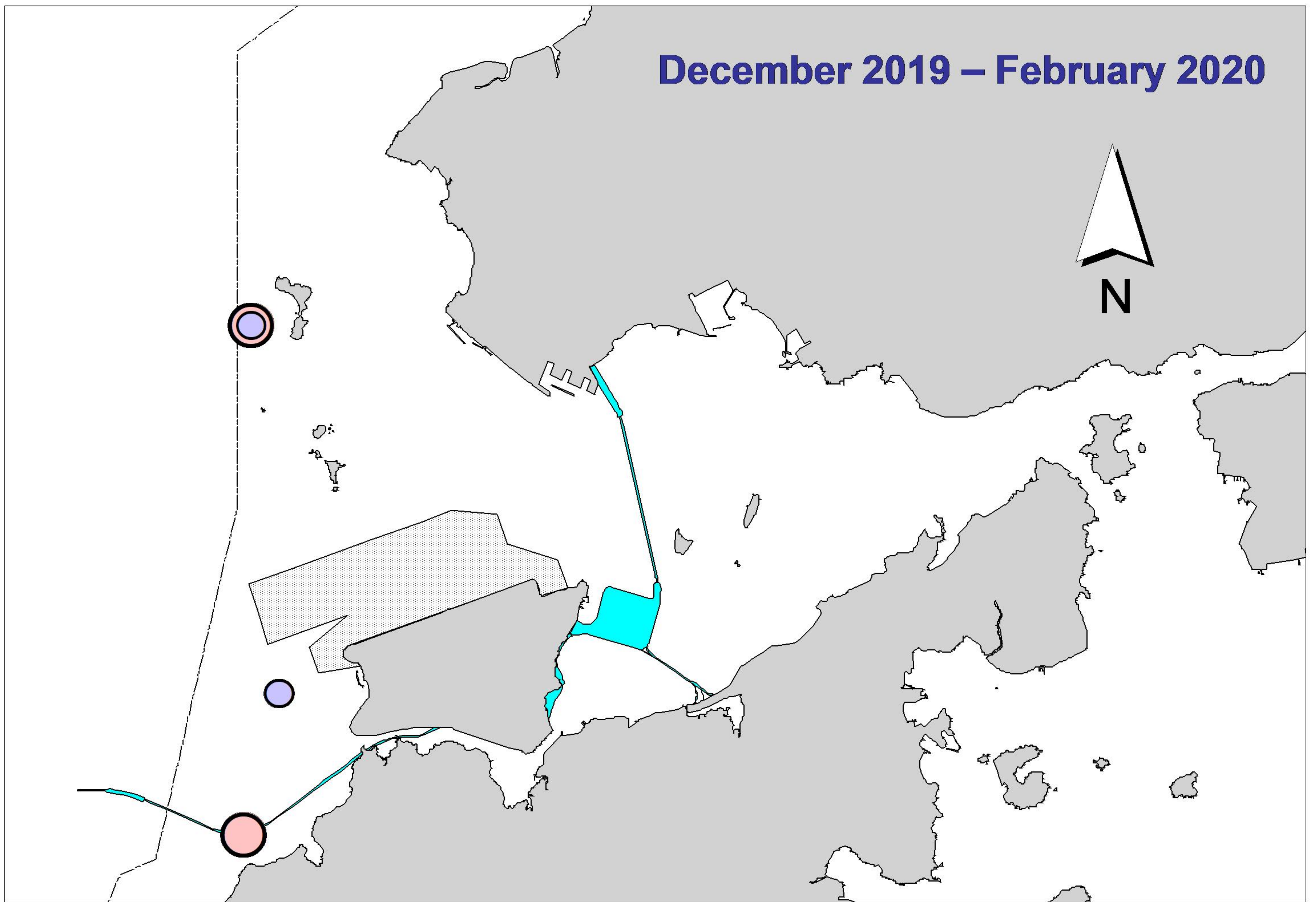


Figure 7. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom)

Appendix I. TMCLKL08 Survey Effort Database (December 2019-February 2020)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
3-Dec-19	NW LANTAU	2	12.20	WINTER	STANDARD36826	TMCLKL	P
3-Dec-19	NW LANTAU	3	14.35	WINTER	STANDARD36826	TMCLKL	P
3-Dec-19	NW LANTAU	2	2.10	WINTER	STANDARD36826	TMCLKL	S
3-Dec-19	NW LANTAU	3	10.85	WINTER	STANDARD36826	TMCLKL	S
3-Dec-19	NE LANTAU	2	35.34	WINTER	STANDARD36826	TMCLKL	P
3-Dec-19	NE LANTAU	2	13.06	WINTER	STANDARD36826	TMCLKL	S
3-Dec-19	NE LANTAU	3	1.20	WINTER	STANDARD36826	TMCLKL	S
10-Dec-19	NW LANTAU	1	2.21	WINTER	STANDARD36826	TMCLKL	P
10-Dec-19	NW LANTAU	2	30.56	WINTER	STANDARD36826	TMCLKL	P
10-Dec-19	NW LANTAU	1	1.72	WINTER	STANDARD36826	TMCLKL	S
10-Dec-19	NW LANTAU	2	9.41	WINTER	STANDARD36826	TMCLKL	S
12-Dec-19	NW LANTAU	1	1.88	WINTER	STANDARD36826	TMCLKL	P
12-Dec-19	NW LANTAU	2	20.64	WINTER	STANDARD36826	TMCLKL	P
12-Dec-19	NW LANTAU	3	9.32	WINTER	STANDARD36826	TMCLKL	P
12-Dec-19	NW LANTAU	2	9.59	WINTER	STANDARD36826	TMCLKL	S
12-Dec-19	NW LANTAU	3	1.29	WINTER	STANDARD36826	TMCLKL	S
12-Dec-19	NE LANTAU	2	35.13	WINTER	STANDARD36826	TMCLKL	P
12-Dec-19	NE LANTAU	2	11.07	WINTER	STANDARD36826	TMCLKL	S
16-Dec-19	NW LANTAU	0	1.25	WINTER	STANDARD36826	TMCLKL	P
16-Dec-19	NW LANTAU	1	7.14	WINTER	STANDARD36826	TMCLKL	P
16-Dec-19	NW LANTAU	2	19.38	WINTER	STANDARD36826	TMCLKL	P
16-Dec-19	NW LANTAU	1	1.60	WINTER	STANDARD36826	TMCLKL	S
16-Dec-19	NW LANTAU	2	10.73	WINTER	STANDARD36826	TMCLKL	S
2-Jan-20	NW LANTAU	2	32.30	WINTER	STANDARD36826	TMCLKL	P
2-Jan-20	NW LANTAU	2	11.20	WINTER	STANDARD36826	TMCLKL	S
2-Jan-20	NE LANTAU	2	36.31	WINTER	STANDARD36826	TMCLKL	P
2-Jan-20	NE LANTAU	2	12.59	WINTER	STANDARD36826	TMCLKL	S
6-Jan-20	NW LANTAU	2	13.30	WINTER	STANDARD36826	TMCLKL	P
6-Jan-20	NW LANTAU	3	14.25	WINTER	STANDARD36826	TMCLKL	P
6-Jan-20	NW LANTAU	2	7.90	WINTER	STANDARD36826	TMCLKL	S
6-Jan-20	NW LANTAU	3	4.85	WINTER	STANDARD36826	TMCLKL	S
9-Jan-20	NW LANTAU	2	10.10	WINTER	STANDARD36826	TMCLKL	P
9-Jan-20	NW LANTAU	3	17.66	WINTER	STANDARD36826	TMCLKL	P
9-Jan-20	NW LANTAU	2	1.20	WINTER	STANDARD36826	TMCLKL	S
9-Jan-20	NW LANTAU	3	9.84	WINTER	STANDARD36826	TMCLKL	S
9-Jan-20	NE LANTAU	2	19.91	WINTER	STANDARD36826	TMCLKL	P
9-Jan-20	NE LANTAU	3	14.81	WINTER	STANDARD36826	TMCLKL	P
9-Jan-20	NE LANTAU	2	7.70	WINTER	STANDARD36826	TMCLKL	S
9-Jan-20	NE LANTAU	3	5.78	WINTER	STANDARD36826	TMCLKL	S
16-Jan-20	NW LANTAU	2	16.55	WINTER	STANDARD36826	TMCLKL	P
16-Jan-20	NW LANTAU	3	16.60	WINTER	STANDARD36826	TMCLKL	P
16-Jan-20	NW LANTAU	2	8.05	WINTER	STANDARD36826	TMCLKL	S
10-Feb-20	NW LANTAU	2	32.50	WINTER	STANDARD36826	TMCLKL	P
10-Feb-20	NW LANTAU	2	10.60	WINTER	STANDARD36826	TMCLKL	S
18-Feb-20	NW LANTAU	2	19.10	WINTER	STANDARD36826	TMCLKL	P
18-Feb-20	NW LANTAU	3	8.06	WINTER	STANDARD36826	TMCLKL	P
18-Feb-20	NW LANTAU	2	10.43	WINTER	STANDARD36826	TMCLKL	S
18-Feb-20	NW LANTAU	3	1.67	WINTER	STANDARD36826	TMCLKL	S
18-Feb-20	NE LANTAU	2	25.24	WINTER	STANDARD36826	TMCLKL	P
18-Feb-20	NE LANTAU	3	10.09	WINTER	STANDARD36826	TMCLKL	P
18-Feb-20	NE LANTAU	2	9.40	WINTER	STANDARD36826	TMCLKL	S

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
18-Feb-20	NE LANTAU	3	3.07	WINTER	STANDARD36826	TMCLKL	S
20-Feb-20	NW LANTAU	1	14.10	WINTER	STANDARD36826	TMCLKL	P
20-Feb-20	NW LANTAU	2	17.97	WINTER	STANDARD36826	TMCLKL	P
20-Feb-20	NW LANTAU	1	6.00	WINTER	STANDARD36826	TMCLKL	S
20-Feb-20	NW LANTAU	2	4.63	WINTER	STANDARD36826	TMCLKL	S
20-Feb-20	NE LANTAU	2	17.89	WINTER	STANDARD36826	TMCLKL	P
20-Feb-20	NE LANTAU	3	17.90	WINTER	STANDARD36826	TMCLKL	P
20-Feb-20	NE LANTAU	2	7.11	WINTER	STANDARD36826	TMCLKL	S
20-Feb-20	NE LANTAU	3	3.80	WINTER	STANDARD36826	TMCLKL	S
24-Feb-20	NW LANTAU	2	15.23	WINTER	STANDARD36826	TMCLKL	P
24-Feb-20	NW LANTAU	3	11.66	WINTER	STANDARD36826	TMCLKL	P
24-Feb-20	NW LANTAU	2	7.51	WINTER	STANDARD36826	TMCLKL	S
24-Feb-20	NW LANTAU	3	4.90	WINTER	STANDARD36826	TMCLKL	S

Appendix II. TMCLKL08 Chinese White Dolphin Sighting Database (December 2019-February 2020)

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
12-Dec-19	1	1016	11	NW LANTAU	2	55	ON	TMCLKL	815115	804650	WINTER	NONE	P
12-Dec-19	2	1112	1	NW LANTAU	3	36	ON	TMCLKL	823299	804678	WINTER	NONE	P
16-Dec-19	1	1126	1	NW LANTAU	2	674	ON	TMCLKL	827556	807529	WINTER	NONE	P
18-Feb-20	1	1014	1	NW LANTAU	2	94	ON	TMCLKL	818137	805450	WINTER	NONE	P
18-Feb-20	2	1059	2	NW LANTAU	3	176	ON	TMCLKL	826011	805136	WINTER	NONE	P
20-Feb-20	1	1057	10	NW LANTAU	2	272	ON	TMCLKL	825978	804817	WINTER	NONE	P
24-Feb-20	1	1115	3	NW LANTAU	2	69	ON	TMCLKL	826515	807537	WINTER	NONE	P

Appendix III. Individual dolphins identified during TMCLKL08 monitoring surveys in December 2019 - February 2020

ID#	DATE	STG#	AREA
CH108	12/12/19	1	NW LANTAU
NL33	12/12/19	1	NW LANTAU
NL120	12/12/19	1	NW LANTAU
	24/02/20	1	NW LANTAU
NL123	16/12/19	1	NW LANTAU
NL182	18/02/20	2	NW LANTAU
	24/02/20	1	NW LANTAU
NL202	18/02/20	2	NW LANTAU
	20/02/20	1	NW LANTAU
NL261	20/02/20	1	NW LANTAU
	24/02/20	1	NW LANTAU
NL321	20/02/20	1	NW LANTAU
NL322	20/02/20	1	NW LANTAU
SL59	20/02/20	1	NW LANTAU
WL100	12/12/19	1	NW LANTAU
WL145	12/12/19	1	NW LANTAU
WL214	12/12/19	1	NW LANTAU
	20/02/20	1	NW LANTAU
WL243	18/02/20	1	NW LANTAU
WL268	12/12/19	2	NW LANTAU
WL279	20/02/20	1	NW LANTAU
WL284	12/12/19	1	NW LANTAU

Appendix IV. Seventeen individual dolphins that were identified between December 2019 and February 2020 under TMCLKL08 monitoring surveys



Appendix IV. (cont'd)

NL182



NL202



NL261



NL321



Appendix IV. (cont'd)



NL322



SL59



WL100



WL145

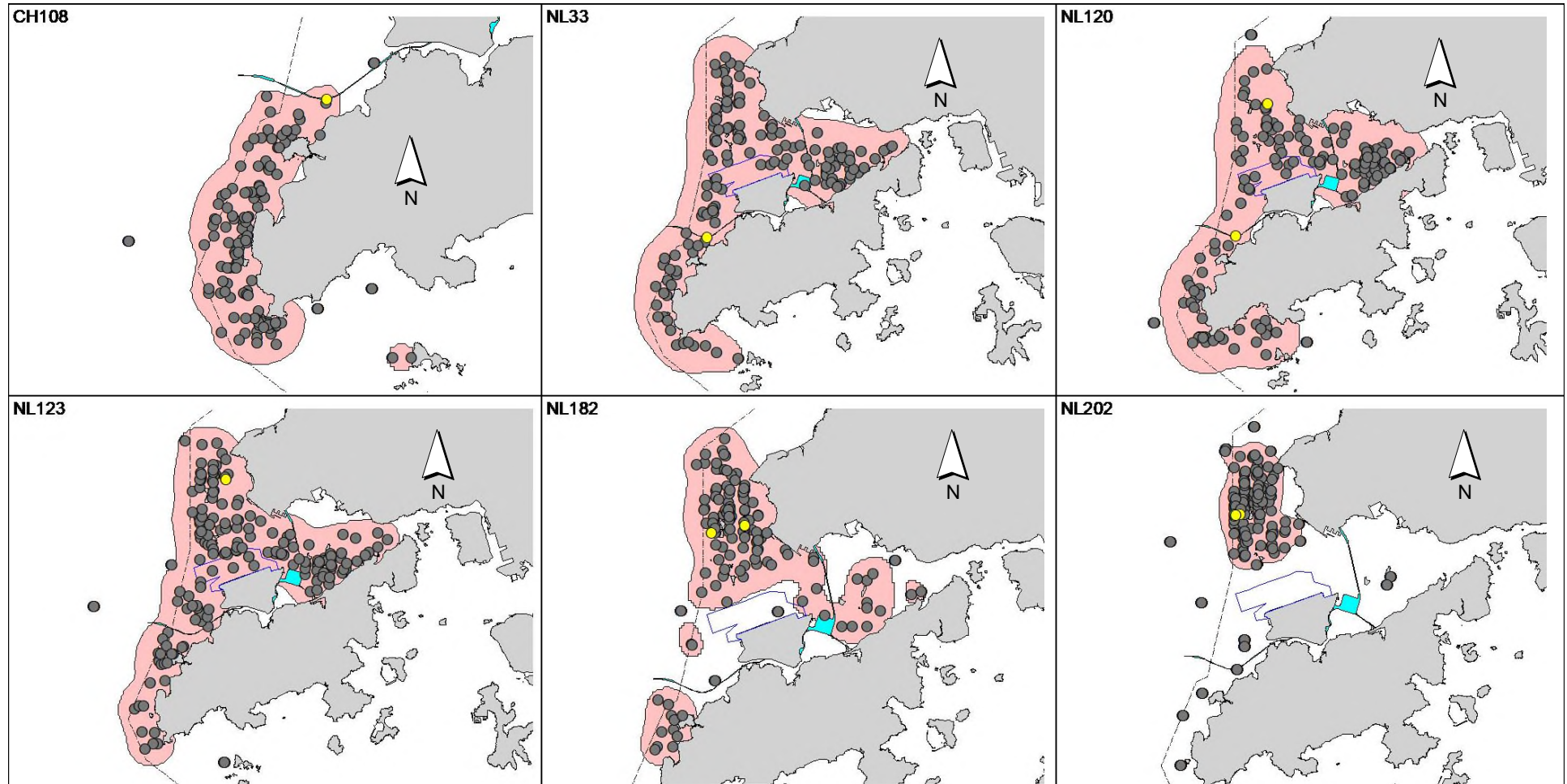
Appendix IV. (cont'd)



Appendix IV. (cont'd)

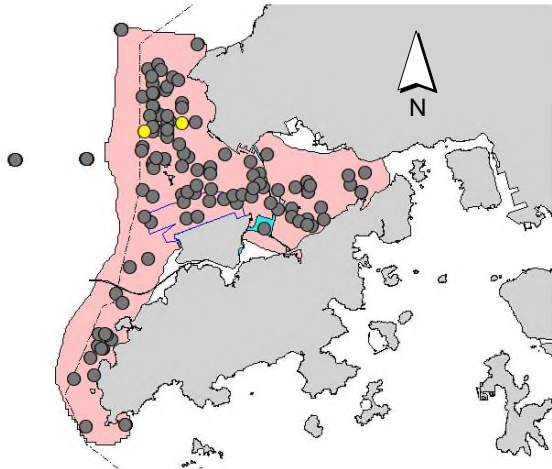


Appendix V. Ranging patterns (95% kernel ranges) of 17 individual dolphins that were sighted during TMCLKL08 impact phase monitoring period
(note: yellow dots indicate sightings made in December 2019 – February 2020 during TMCLKL08 monitoring surveys)

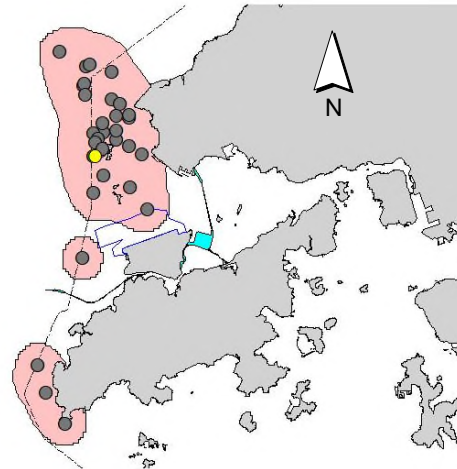


Appendix V. (cont'd)

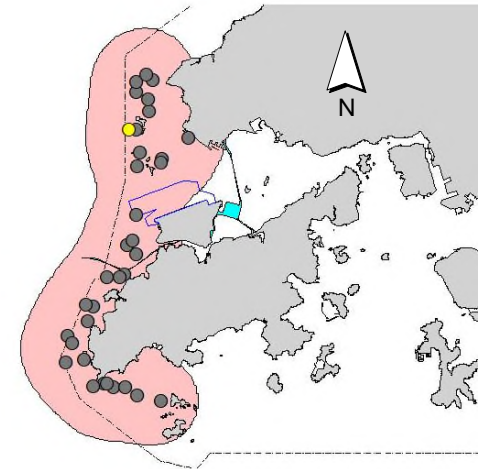
NL261



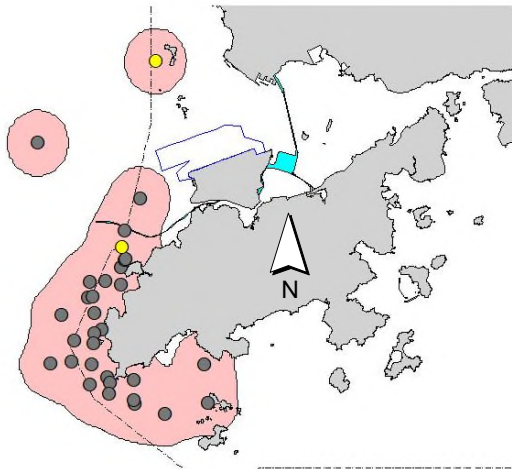
NL321



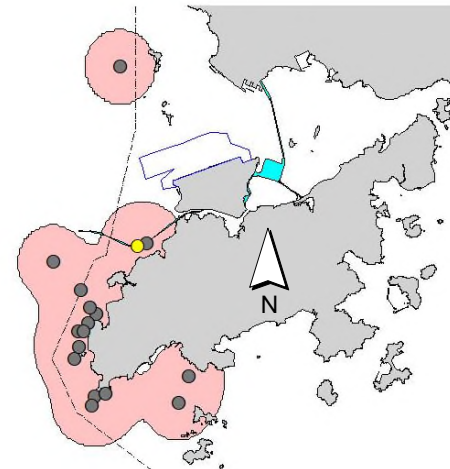
NL322



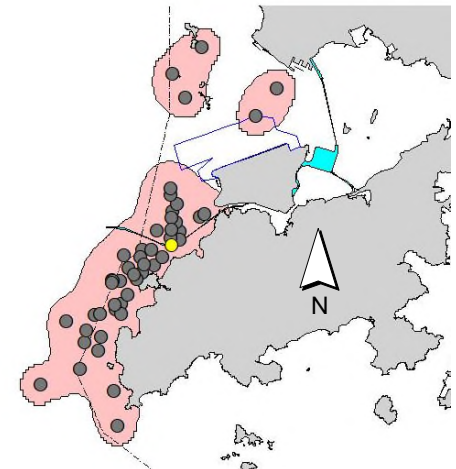
SL59



WL100

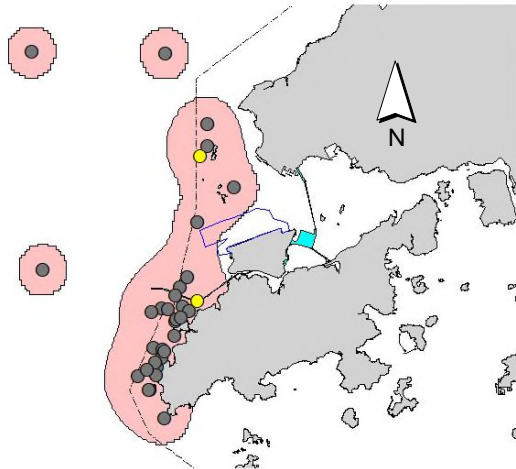


WL145

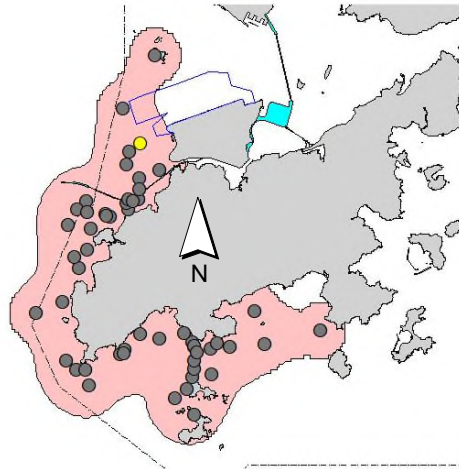


Appendix V. (cont'd)

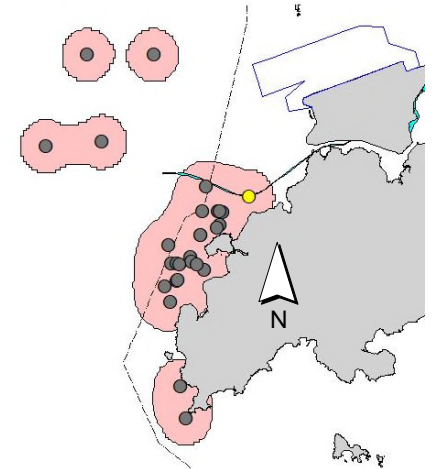
WL214



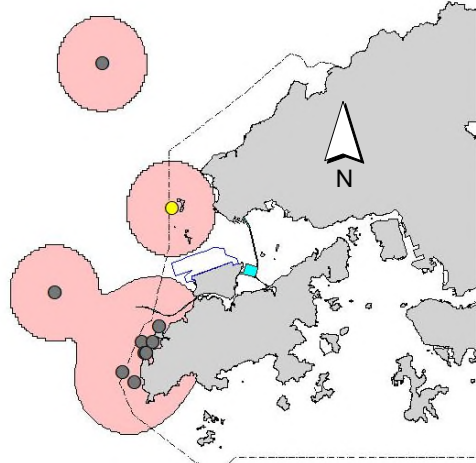
WL243



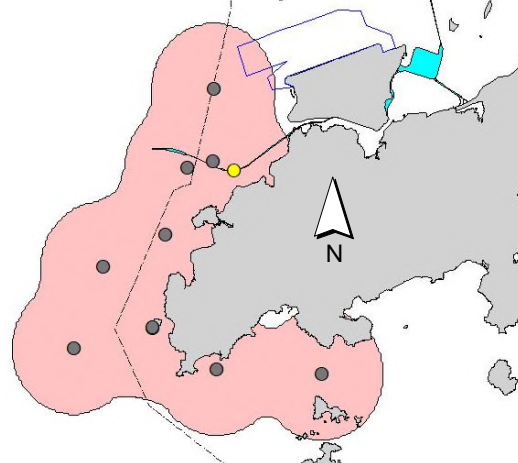
WL268



WL279



WL284



Appendix I

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

	Action			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
Action Level Exceedance				
1. Identify the source.	1. Check monitoring data submitted by the ET.	1. Confirm receipt of notification of failure in writing.	1. Rectify any unacceptable practice	
2. Repeat measurement to confirm finding. If two consecutive measurements exceed Action Level, the exceedance is then confirmed.	2. Check the Contractor's working method.	2. Notify the Contractor.	2. Amend working methods if appropriate	
3. Inform the IEC and the SOR.	3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures.	3. Ensure remedial measures properly implemented.	3. If the exceedance is confirmed to be Project related, submit proposals for remedial actions to IEC within 3 working days of notification	
4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented.	4. Advise the SOR on the effectiveness of the proposed remedial measures.		4. Implement the agreed proposals	
5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily.	5. Supervise implementation of remedial measures.		5. Amend proposal if appropriate	
6. Discuss with the IEC and the Contractor on remedial actions required.				
7. If exceedance continues, arrange meeting with the IEC and the SOR.				
8. If exceedance stops, cease additional monitoring.				

	Action			
	ET (a)	IEC (a)	SOR (a)	Contractor(s)
Limit Level Exceedance				
	<ol style="list-style-type: none"> 1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Limit Level, the exceedance is then confirmed. 3. Inform the IEC, the SOR, the DEP and the Contractor. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 7. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 8. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 9. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. If the exceedance is confirmed to be Project related after investigation, in consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance. 2. If the exceedance is confirmed to be Project related after investigation, submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

Note: (a) ET - Environmental Team; IEC - Independent Environmental Checker; SOR - Supervising Officer's Representative

Event & Action Plan for Impact Water Quality Monitoring

Event	ET Leader	IEC	SOR	Contractor
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat <i>in situ</i> measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, contractor and SOR; Check monitoring data, all plant, equipment and Contractor's working methods. 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and Contractor's working methods. 	<ol style="list-style-type: none"> Confirm receipt of notification of non-compliance in writing; Notify Contractor. 	<ol style="list-style-type: none"> Inform the SOR 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	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; Identify source(s) of impact; Inform IEC, Contractor, SOR and EPD; Check monitoring data, all plant, equipment and Contractor's working methods; Discuss mitigation measures with IEC, SOR and Contractor; Ensure mitigation measures are implemented; Increase the monitoring frequency to daily until no exceedance of Action level; 	<ol style="list-style-type: none"> 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 SOR accordingly; Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> Discuss with IEC on the proposed mitigation measures; Ensure mitigation measures are properly implemented; Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 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 SOR within 3 working days of notification and discuss with ET, IEC and SOR; Implement the agreed mitigation measures.
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> Repeat measurement on next day of exceedance to confirm findings; 	<ol style="list-style-type: none"> Check monitoring data submitted by ET and 	<ol style="list-style-type: none"> Confirm receipt of notification of failure in 	<ol style="list-style-type: none"> Inform the SOR and confirm notification of the

Event	ET Leader	IEC	SOR	Contractor
	<ol style="list-style-type: none"> 2. Identify source(s) of impact; 3. Inform IEC, Contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 	<ol style="list-style-type: none"> 1. Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the SOR accordingly. 	<ol style="list-style-type: none"> 1. writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to review the working methods. 	<ol style="list-style-type: none"> 1. non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR.
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat measurement on next day of exceedance to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, SOR and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, SOR and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level for two consecutive days; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working method; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the Contractor's mitigation measures whenever necessary to assure their effectiveness and advise the SOR accordingly; 4. Supervise the implementation of mitigation measures. 	<ol style="list-style-type: none"> 1. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 2. Request Contractor to critically review the working methods; 3. Make agreement on the mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. 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. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposal of mitigation measures to SOR within 3 working days of notification and discuss with ET, IEC and SOR; 3. Implement the agreed mitigation measures; 4. Resubmit proposals of mitigation measures if problem still not under control; 5. As directed by the Supervising Officer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Note: ET – Environmental Team, IEC – Independent Environmental Checker, SOR – Supervising Officer's Representative

Event / Action Plan for Impact Dolphin Monitoring

EVENT	ACTION			
	ET	IEC	SOR	Contractor
Action Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor. 	<ol style="list-style-type: none"> 1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented. 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.
Limit Level	<ol style="list-style-type: none"> 1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, SOR and 	<ol style="list-style-type: none"> 1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If SOR is satisfied with the 	<ol style="list-style-type: none"> 1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and SOR the necessity of additional dolphin monitoring and any other

EVENT	ACTION			
	ET	IEC	SOR	Contractor
	<ol style="list-style-type: none"> 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary. 	<p>Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.</p> <ol style="list-style-type: none"> 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly. 	<p>proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, SOR to signify the agreement in writing on such proposals and any other mitigation measures.</p> <ol style="list-style-type: none"> 3. Supervise the implementation of additional monitoring and/or any other mitigation measures. 	<p>potential mitigation measures.</p> <ol style="list-style-type: none"> 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

Note: ET – Environmental Team, IEC – Independent Environmental Checker, SOR – Supervising Officer’s Representative

Appendix J

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

Table J1 *Cumulative Statistics on Exceedances*

Monitoring Parameters	Action/Limit Level	Total No. recorded in this reporting quarter	Total No. recorded since Contract commencement
1-Hr TSP	Action	4	105
	Limit	1	12
24-Hr TSP	Action	0	10
	Limit	0	4
Water Quality	Action	0	167
	Limit	0	19
Impact Dolphin Monitoring	Action	0	11
	Limit	1	18

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

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (December 2019 to February 2020)	0	0	0
Total No. received since Contract commencement	17	1	0

Email
message

Environmental
Resources
Management

To Ramboll Hong Kong, Limited (ENPO)

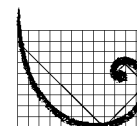
From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun–Chek Lap
Kok Link–Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Air Quality
Impact Monitoring

Date 21 December 2019

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660



ERM

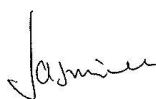
Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_1December2019_1hrTSP_Station ASR1
0212330_1December2019_1hrTSP_Station ASR10
0212330_1December2019_1hrTSP_Station ASR5

One Limit Level and Two Action Level Exceedances were recorded on 1
December 2019.

Regards,



Dr Jasmine Ng
Environmental Team Leader

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the addressee and is confidential. If you are not the addressee it may be unlawful for you to read, copy, distribute, disclose or otherwise use the information in this facsimile. If you are not the intended recipient, please telephone or fax us.



ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
 TUEN MUN – CHEK LAP KOK LINK –
 NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	<p style="text-align: center;"><u>Action Level Exceedance</u> 0212330_1December2019_1hrTSP_Station ASR10 0212330_1December2019_1hrTSP_Station ASR5 <u>Limit Level Exceedance</u> 0212330_1December2019_1hrTSP_Station ASR1 [Total No. of Exceedances = 3]</p>	
Date	<p style="text-align: center;">1 December 2019 (Measured) 16 December 2019 (Laboratory results received by ERM)</p>	
Monitoring Station	<p style="text-align: center;">ASR1, ASR5, ASR6, ASR10 and AQMS1</p>	
Parameter(s) with Exceedance(s)	<p style="text-align: center;">1-hr TSP</p>	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	<p style="text-align: center;">ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214</p>
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	<p style="text-align: center;">ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337</p>
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	<p style="text-align: center;">500</p>
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	<p style="text-align: center;">260</p>
Measured Levels	<p>Action Level Exceedance for 1-hr TSP is observed at ASR10 ($407 \mu\text{g}/\text{m}^3$) during 1515- 1615. Action Level Exceedance for 1-hr TSP is observed at ASR5 ($377 \mu\text{g}/\text{m}^3$) during 1540- 1640. Limit Level Exceedance for 1-hr TSP is observed at ASR1 ($747 \mu\text{g}/\text{m}^3$) during 1551- 1651.</p>	
Works Undertaken (at the time of monitoring event)	<p>On 1 December 2019, no construction works were carried out on site.</p>	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance is unlikely to be due to this Contract, in view of the following:</p> <ul style="list-style-type: none"> • According to the construction information provided by the Contractor, no construction works were carried out on site on 1 December 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas. • With reference to the recorded wind direction (ranged between 272° and 302°, blowing from a north-westerly direction) and wind speed (0.9 – 1.8 m/s) during the works period, Stations ASR5 and ASR1 are located upstream to the site. Stations ASR10 are located downstream to the site. However, since there were no construction works carried out on site, the exceedances are unlikely to be due to the site activities of this contract. <p>Based on the above, the exceedance is unlikely to be due to this Contract.</p>	

Actions Taken/ To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 1/12/2019

Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2019-12-01	AQMS1	Sunny	13:58	1-hour TSP	185	ug/m3
TMCLKL	HY/2012/08	2019-12-01	AQMS1	Sunny	15:00	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2019-12-01	AQMS1	Sunny	16:02	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR1	Sunny	13:47	1-hour TSP	231	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR1	Sunny	14:49	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR1	Sunny	15:51	1-hour TSP	747	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR10	Sunny	13:11	1-hour TSP	137	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR10	Sunny	14:13	1-hour TSP	129	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR10	Sunny	15:15	1-hour TSP	407	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR5	Sunny	13:36	1-hour TSP	196	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR5	Sunny	14:38	1-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR5	Sunny	15:40	1-hour TSP	377	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR6	Sunny	13:23	1-hour TSP	216	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR6	Sunny	14:25	1-hour TSP	149	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR6	Sunny	15:27	1-hour TSP	160	ug/m3
TMCLKL	HY/2012/08	2019-12-01	AQMS1	Sunny	17:04	24-hour TSP	107	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR1	Sunny	16:53	24-hour TSP	168	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR10	Sunny	16:17	24-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR5	Sunny	16:42	24-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2019-12-01	ASR6	Sunny	16:29	24-hour TSP	134	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction(degree)
19/12/01	1:00	1.3	304
19/12/01	2:00	1.3	319
19/12/01	3:00	0.9	303
19/12/01	4:00	0.4	290
19/12/01	5:00	0.4	339
19/12/01	6:00	0	-
19/12/01	7:00	0	-
19/12/01	8:00	1.3	28
19/12/01	9:00	1.3	28
19/12/01	10:00	1.8	207
19/12/01	11:00	1.3	210
19/12/01	12:00	1.8	309
19/12/01	13:00	2.7	273
19/12/01	14:00	2.2	288
19/12/01	15:00	1.8	272
19/12/01	16:00	0.9	302
19/12/01	17:00	0.9	319
19/12/01	18:00	0.9	288
19/12/01	19:00	1.3	289
19/12/01	20:00	1.3	315
19/12/01	21:00	2.2	309
19/12/01	22:00	1.8	311
19/12/01	23:00	1.3	318

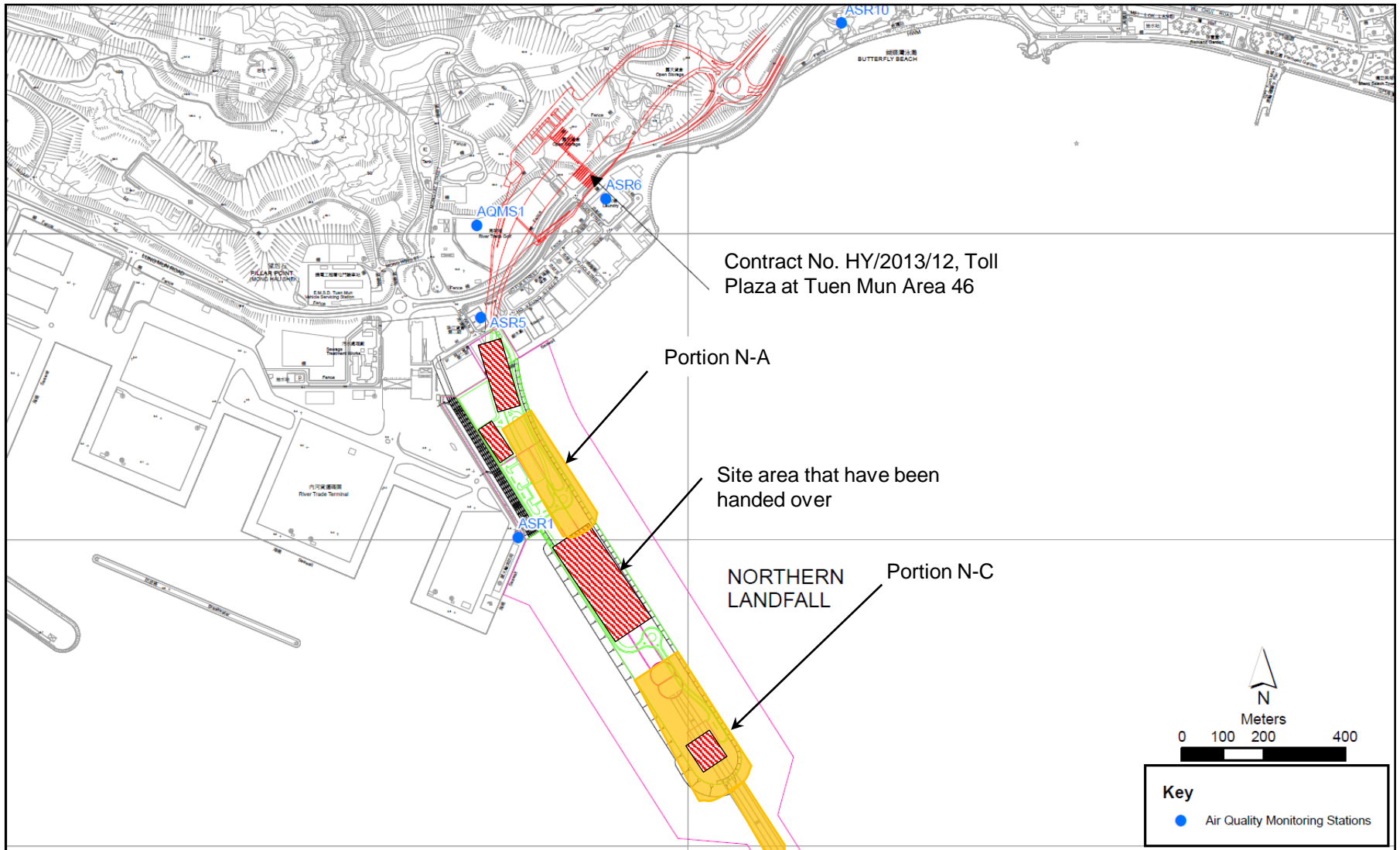


Figure 1

Indicative Construction Works Area on 1 December 2019

Site Location 地盤位置: Northern Landfall
Date 日期: 25 Nov 2019 to 至 01 Dec 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	✓	✓	✓	✓	✓	✓	✓
2	8:45 – 9:30	✓	✓	✓	✓	✓	✓	✓
3	9:30 – 10:15	✓	✓	✓	✓	✓	✓	✓
4	10:15 – 11:00	✓	✓	✓	✓	✓	✓	✓
5	11:00 – 11:45	✓	✓	✓	✓	✓	✓	✓
6	11:45 – 12:30	✓	✓	✓	✓	✓	✓	✓
7	12:30 – 13:15	✓	✓	✓	✓	✓	✓	✓
8	13:15 – 14:00	✓	✓	✓	✓	✓	✓	✓
9	14:00 – 14:45	✓	✓	✓	✓	✓	✓	✓
10	14:45 – 15:30	✓	✓	✓	✓	✓	✓	✓
11	15:30 – 16:45	✓	✓	✓	✓	✓	✓	✓
12	16:45 – 17:30	✓	✓	✓	✓	✓	✓	✓
	Verified by Site Foreman 地盤科文簽署確認	子	子	子	子	子	子	子

Night shift 夜間工作 (if necessary 如需要)

	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (✓) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(✓)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

- Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
- Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
- If it is raining, no water spraying is needed.
- The no of spraying will be increased due to site condition.

備註:

- 根據環境許可證 3.15 條例, 在整個施工階段內, 許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
- 灑水位置包括主要運輸道路, 空曠地帶, 斜坡, 存料堆, 以及任何其他產生塵埃物料。
- 當下雨時, 地盤將不需要灑水。
- 如果地盤情況更改或有需要時, 灑水次數會相應增加。

Email
message

Environmental
Resources
Management

To Ramboll Hong Kong, Limited (ENPO)

From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun–Chek Lap
Kok Link–Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Air Quality
Impact Monitoring

Date 21 December 2019

2507, 25/F One Harbourfront
18 Tak Fung Street
Hung Hom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660



ERM

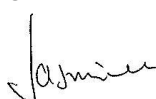
Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_4December2019_1hrTSP_Station ASR1
0212330_4December2019_1hrTSP_Station ASR5

Two Action Level Exceedances were recorded on 4 December 2019.

Regards,



Dr Jasmine Ng
Environmental Team Leader

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the addressee and is confidential. If you are not the addressee it may be unlawful for you to read, copy, distribute, disclose or otherwise use the information in this facsimile. If you are not the intended recipient, please telephone or fax us.



ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08
 TUEN MUN – CHEK LAP KOK LINK –
 NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

Air Quality Impact Monitoring
 Notification of Exceedance

Log No.	<u>Action Level Exceedance</u> 0212330_4December2019_1hrTSP_Station ASR1 0212330_4December2019_1hrTSP_Station ASR5 [Total No. of Exceedances = 2]	
Date	4 December 2019 (Measured) 16 December 2019 (Laboratory results received by ERM)	
Monitoring Station	ASR1, ASR5, ASR6, ASR10 and AQMS1	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP ($\mu\text{g}/\text{m}^3$)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP ($\mu\text{g}/\text{m}^3$)	500
	24-hr TSP ($\mu\text{g}/\text{m}^3$)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR1 ($366 \mu\text{g}/\text{m}^3$) during 0837 - 0937. Action Level Exceedance for 1-hr TSP is observed at ASR5 ($380 \mu\text{g}/\text{m}^3$) during 0825 - 0925.	
Works Undertaken (at the time of monitoring event)	On 4 December 2019, Road and Drainage Works were carried out on site.	
Possible Reason for Action or Limit Level Exceedance(s)	<p>The exceedance is unlikely to be due to this Contract, in view of the following:</p> <ul style="list-style-type: none"> • According to the construction information provided by the Contractor, only Road and Drainage Works were carried out on site on 4 December 2019. • The exceedance is unlikely to be due to this Contract as dust suppression measures were implemented properly on site. Water spraying was applied on site to prevent dust. Water spraying was also applied on exposed soil within the Contract site and associated works areas. • With reference to the recorded wind direction (ranged between 356° and 14°, blowing from a northern direction) and wind speed (2.7 – 3.1 m/s) during the works period, Stations ASR5 are located upstream to the construction works at Portion N-A. Stations ASR1 are located downstream to the construction works at Portion N-A. However, Road & Drainage Works carried out at Portion N-A with implementation of dust mitigation measures are unlikely to cause significant dust impact. <p>Based on the above, the exceedance is unlikely to be due to this Contract.</p>	

Actions Taken/ To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached.

Air quality monitoring results on 4/12/2019

Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2019-12-04	AQMS1	Sunny	8:44	1-hour TSP	156	ug/m3
TMCLKL	HY/2012/08	2019-12-04	AQMS1	Sunny	9:51	1-hour TSP	160	ug/m3
TMCLKL	HY/2012/08	2019-12-04	AQMS1	Sunny	10:53	1-hour TSP	116	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR1	Sunny	8:37	1-hour TSP	366	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR1	Sunny	9:39	1-hour TSP	220	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR1	Sunny	10:41	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR10	Sunny	8:02	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR10	Sunny	9:04	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR10	Sunny	10:06	1-hour TSP	101	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR5	Sunny	8:25	1-hour TSP	380	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR5	Sunny	9:27	1-hour TSP	180	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR5	Sunny	10:29	1-hour TSP	202	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR6	Sunny	8:13	1-hour TSP	150	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR6	Sunny	9:15	1-hour TSP	163	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR6	Sunny	10:17	1-hour TSP	169	ug/m3
TMCLKL	HY/2012/08	2019-12-04	AQMS1	Sunny	11:55	24-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR1	Sunny	11:43	24-hour TSP	164	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR10	Sunny	11:08	24-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR5	Sunny	11:31	24-hour TSP	190	ug/m3
TMCLKL	HY/2012/08	2019-12-04	ASR6	Sunny	11:19	24-hour TSP	118	ug/m3

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	Time (24hrs)	Average of Wind Speed (m/s)	Average of Wind Direction(degree)
19/12/04	0:00	1.8	328
19/12/04	1:00	2.7	30
19/12/04	2:00	2.2	25
19/12/04	3:00	1.8	13
19/12/04	4:00	1.8	19
19/12/04	5:00	2.7	355
19/12/04	6:00	1.8	339
19/12/04	7:00	1.8	339
19/12/04	8:00	3.1	356
19/12/04	9:00	2.7	14
19/12/04	10:00	2.2	28
19/12/04	11:00	2.2	16
19/12/04	12:00	1.8	31
19/12/04	13:00	1.8	31
19/12/04	14:00	1.3	306
19/12/04	15:00	2.2	325
19/12/04	16:00	1.8	345
19/12/04	17:00	1.8	341
19/12/04	18:00	0.9	306
19/12/04	19:00	0.4	292
19/12/04	20:00	0.4	311
19/12/04	21:00	1.3	14
19/12/04	22:00	1.3	56
19/12/04	23:00	1.8	28

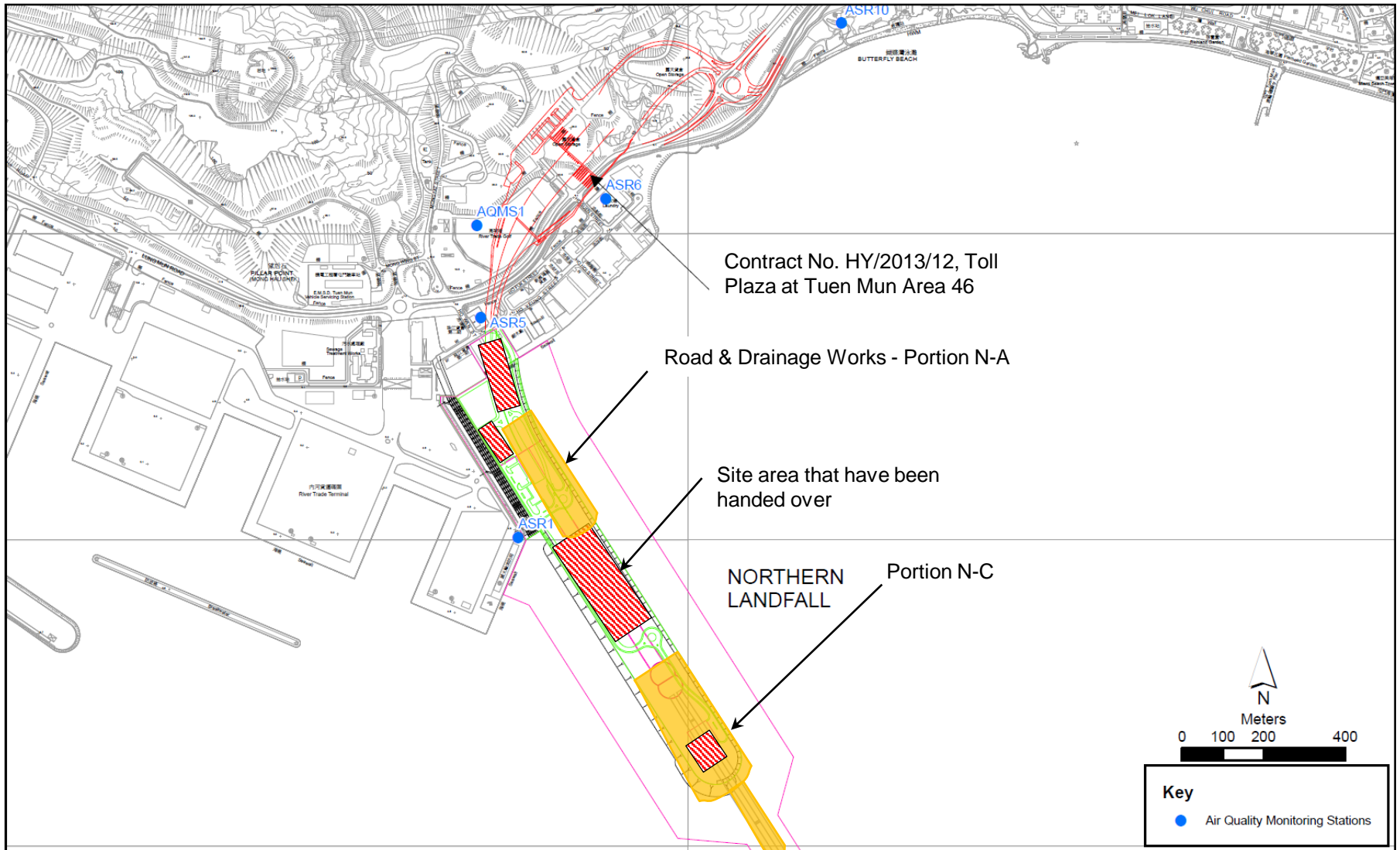


Figure 1

Indicative Construction Works Area on 4 December 2019

Site Location 地盤位置: Northern Landfall
Date 日期: 02 Dec 2019 to 至 08 Dec 2019

	Time 時間	Monday 星期一	Tuesday 星期二	Wednesday 星期三	Thursday 星期四	Friday 星期五	Saturday 星期六	Sunday 星期日
1	8:00 – 8:45	✓	✓	✓	✓	✓	✓	✓
2	8:45 – 9:30	✓	✓	✓	✓	✓	✓	✓
3	9:30 – 10:15	✓	✓	✓	✓	✓	✓	✓
4	10:15 – 11:00	✓	✓	✓	✓	✓	✓	✓
5	11:00 – 11:45	✓	✓	✓	✓	✓	✓	✓
6	11:45 – 12:30	✓	✓	✓	✓	✓	✓	✓
7	12:30 – 13:15	✓	✓	✓	✓	✓	✓	✓
8	13:15 – 14:00	✓	✓	✓	✓	✓	✓	✓
9	14:00 – 14:45	✓	✓	✓	✓	✓	✓	✓
10	14:45 – 15:30	✓	✓	✓	✓	✓	✓	✓
11	15:30 – 16:45	✓	✓	✓	✓	✓	✓	✓
12	16:45 – 17:30	✓	✓	✓	✓	✓	✓	✓
	Verified by Site Foreman 地盤科文簽署確認	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>	<i>[Signature]</i>

Night shift 夜間工作 (if necessary 如需要)								
	17:30 – 19:00							
	19:00 – 20:30							
	20:30 – 22:00							
	22:00 – 23:00							

*Please - tick (✓) in the box if complete the spraying of water.
circle (O) in the box if it is raining.

*如果 - 已經完成灑水, 請於方格內加上剔號(✓)。
是下雨天, 請於方格內加上圓圈(O)。

Remarks:

- Pursuant to EP Clause 3.15, the Permit Holder shall undertake watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction phase.
- Spraying position includes the main haul road, open area, slopes, stockpiles and any other dusty materials.
- If it is raining, no water spraying is needed.
- The no of spraying will be increased due to site condition.

備註:

- 根據環境許可證 3.15 條例, 在整個施工階段內, 許可證持有人須每天至少 12 次在屯門區項目工地和相關的工作區域內的所有暴露土壤灑水。
- 灑水位置包括主要運輸道路, 空曠地帶, 斜坡, 存料堆, 以及任何其他產生塵埃物料。
- 當下雨時, 地盤將不需要灑水。
- 如果地盤情況更改或有需要時, 灑水次數會相應增加。

**Email
message**

**Environmental
Resources
Management**

To Ramboll Hong Kong, Limited (ENPO)

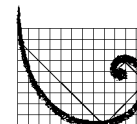
From ERM- Hong Kong, Limited

Ref/Project number Contract No. HY/2012/08 Tuen Mun–Chek Lap
Kok Link–Northern Connection Sub-sea Tunnel
Section

Subject Notification of Exceedance for Impact Dolphin
Monitoring

Date 23 April 2020

2507, 25/F One Harbourfront
18 Tak Fung Street
Hung Hom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660



ERM

Dear Sir or Madam,

Please find attached the Notification of Exceedance (NOE) of the following
Log no.:

0212330_Dec2019/Feb2020_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly impact
dolphin monitoring data between December 2019 and February 2020.

Regards,

A handwritten signature in black ink, appearing to read "Jasmine", written in a cursive style.

Dr Jasmine Ng
Environmental Team Leader

CONFIDENTIALITY NOTICE

This facsimile transmission is intended only for the use of the addressee and is confidential. If you are not the addressee it may be unlawful for you to read, copy, distribute, disclose or otherwise use the information in this facsimile. If you are not the intended recipient, please telephone or fax us.



ERM-Hong Kong, Limited

CONTRACT NO. HY/2012/08

TUEN MUN – CHEK LAP KOK LINK –

NORTHERN CONNECTION SUB-SEA TUNNEL SECTION

**Impact Dolphin Monitoring
Notification of Exceedance**

Log No.	0212330_ Dec2019/Feb2020_dolphin_STG&ANI_NEL&NWL [Total No. of Exceedances = 1 Limit Level Exceedance]	
Date	December 2019 – February 2020 (monitored) 22 April 2020 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0 & ANI = 0
	NWL	STG = 0.62 & ANI = 1.55
	One Limit Level Exceedance was recorded in the quarterly impact dolphin monitoring at NEL and NWL between December 2019 to February 2020. The exceedance was reported in the approved <i>Seventy-sixth Monthly EM&A Report</i> dated 13 March 2020.	
Statistical Analyses	<p>Further to the review of the available and relevant dolphin monitoring data in the EM&A programme by this Contract, statistical analyses were conducted as follows:</p> <ul style="list-style-type: none"> • A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs impact – present impact quarter, December 2019 to February 2020) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present impact monitoring quarter. By setting $\alpha = 0.05$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0035$) and ANI ($p = 0.0239$) were detected between Periods. • A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: baseline vs impact – cumulative quarters, December 2012 to February 2020) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative impact monitoring quarter. By setting $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.00001$) between Cumulative Period and Location were detected. <p>*Note: The commencement date under <i>Contract No. HY/2012/08</i> is 1 November 2013.</p>	
Works Undertaken (in the monitoring quarter)	Seawall Modification Works was undertaken in December 2019 under Contract No. HY/2012/08. No marine works was undertaken in January and February 2020.	

<p>Possible Reason for Action or Limit Level Exceedance(s)</p>	<p>The potential factors that may have contributed to the observed exceedance are reviewed below:</p> <ul style="list-style-type: none"> • Blocking of CWD travelling corridor: The <i>Monitoring of Marine Mammals in Hong Kong Waters (2018 – 19)</i> ⁽¹⁾ reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to this Contract), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • Marine works of the Contract: As per the findings from the EIA report (<i>Section 8.11.9</i>), the major influences on the Chinese White Dolphin (CWD) <i>Sousa chinensis</i> under this Contract are marine traffics, reclamation and dredging works. The Contractor implemented the marine traffic control in the reporting period as per the requirements in the <i>EP-354/2009/D</i> and the updated <i>EM&A Manual</i>. Most of the vessels of this Contract also worked within the site boundary, in which the area is seldom used by CWD. Disturbance from vessels of this Contract is considered minor. During this quarter of dolphin monitoring, no adverse impact on CWD due to the activities under this Contract was observed. • Impact on water quality: According to the findings in the water quality monitoring results at the impact monitoring stations in December 2019, no exceedance was recorded in the water quality monitoring in December 2019. No water quality monitoring was undertaken in January and February 2020 as there were no marine works. <p>In view of the above, marine ecological mitigation measures were considered properly implemented, and thus no unacceptable impact on CWD or its habitat was associated with this Contract in this quarter.</p>
<p>Actions Taken / To Be Taken</p>	<p>Seawall Modification Works was undertaken in December 2019 under Contract No. HY/2012/08. No marine works was undertaken in January and February 2020.</p> <p>The existing mitigation measures are recommended to be continuously implemented. Furthermore, it is also recommended to reduce the vessels for marine works as much as possible. The ET will monitor for future trends in exceedance(s).</p> <p>ET shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractors to ensure the relevant measures are fully implemented. The marine works of HZMB projects should be completed as soon as possible to reduce the overall duration of impacts and allow the dolphins population to recover as early as possible. The protection measures (e.g. speed limit control) for the BMP shall be implemented so as to provide a better habitat for dolphin recovery. It is noted that even though marine vessels may moor within the mooring site of BMP, commercial activities including loading / unloading / transshipment are not allowed except a permit is obtained. The HZMB works vessels should avoid the BMP. The marine works footprint and vessels for the marine works should also be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible.</p> <p>Dolphin specialists of the Projects confirmed that the CWD sighting nearby north of Sha Chau and Lung Kwu Chau Marine Park has significantly declined. The reason for the decline was likely related to the re-routing of high-speed ferry from Sky Pier. The CWDs in the area should be closely followed.</p>
<p>Remarks</p>	<p>The results of impact dolphin monitoring, the status of implemented marine ecological mitigation measures are documented in the approved <i>Seventy-Fourth to Seventy-Sixth Monthly EM&A Reports</i>.</p>

(1) Hung S K Y (2019). Prepared for AFCD. Available at: [https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi_chi/files/Final_Report_2018_19.pdf](https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2018_19.pdf)

Appendix K

Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No. / Works Order No.: HY/2012/08

Monthly Summary Waste Flow Table for December 2019 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	2224.407	0.000	76.754	585.369	1562.284
Jan-2019	299.831	0.000	53.419	215.427	30.985
Feb-2019	133.335	0.000	46.021	67.707	19.607
Mar-2019	120.224	0.000	50.455	20.964	48.805
Apr-2019	130.329	0.000	58.956	0.000	71.373
May-2019	67.355	0.000	51.297	0.000	16.058
Jun-2019	4.134	0.000	0.000	0.000	4.134
Half Year Sub-total	755.208	0.000	260.148	304.098	190.962
Jul-2019	3.821	0.000	0.000	0.000	3.821
Aug-2019	2.388	0.000	0.000	0.000	2.388
Sep-2019	4.191	0.000	0.000	0.000	4.191
Oct-2019	8.366	0.000	0.000	0.000	8.366
Nov-2019	6.215	0.000	0.000	0.000	6.215
Dec-2019	4.216	0.000	0.000	0.000	4.216
Project Total Quantities	3008.822	0.000	336.902	889.467	1782.443

Month	Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	6763.82	6763.82	7.74	7.74	8.70	8.70	60.35	60.35	13.989
Jan-2019	394.55	394.55	0.00	0.00	0.00	0.00	0.00	0.00	0.538
Feb-2019	103.72	103.72	0.62	0.62	0.00	0.00	1.672	1.672	0.578
Mar-2019	88.20	88.20	0.46	0.46	0.00	0.00	0.00	0.00	0.692
Apr-2019	260.89	260.89	0.00	0.00	3.90	3.90	1.045	1.045	0.707
May-2019	0.66	0.66	1.46	1.46	0.00	0.00	0.00	0.00	0.798
Jun-2019	136.75	136.75	0.66	0.66	0.00	0.00	4.14	4.14	0.751
Half Year Sub-total	984.77	984.77	3.20	3.20	3.90	3.90	6.857	6.857	4.064
Jul-2019	444.37	444.37	1.20	1.20	0.00	0.00	0.00	0.00	0.730
Aug-2019	505.93	505.93	0.00	0.00	1.58	1.58	3.80	3.80	0.703
Sep-2019	397.10	397.10	0.60	0.60	1.62	1.62	8.00	8.00	0.737
Oct-2019	523.05	523.05	0.00	0.00	1.04	1.04	5.80	5.80	0.754
Nov-2019	271.73	271.73	1.90	1.90	0.00	0.00	1.00	1.00	0.525
Dec-2019	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.441
Project Total Quantities	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	21.943

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
3200.000	0.000	350.000	1000.000	2000.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
10500.00	20.00	20.00	100.00	30.000

- Notes:
- (1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
 - (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 amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).

Monthly Summary Waste Flow Table

Name of Department: HyD

Contract No. / Works Order No.: HY/2012/08

Monthly Summary Waste Flow Table for February 2020 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	3008.822	0.000	336.902	889.467	1782.433
Jan-2020	174.69	0.000	0.000	0.000	174.69
Feb-2020	1.455	0.000	0.000	0.000	1.455
Mar-2020					
Apr-2020					
May-2020					
Jun-2020					
Half Year Sub-total					
Jul-2020					
Aug-2020					
Sep-2020					
Oct-2020					
Nov-2020					
Dec-2020					
Project Total Quantities	3184.967	0.000	336.902	889.467	1958.578

Month	Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	21.943
Jan-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.54
Feb-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.349
Mar-2020									
Apr-2020									
May-2020									
Jun-2020									
Half Year Sub-total									
Jul-2020									
Aug-2020									
Sep-2020									
Oct-2020									
Nov-2020									
Dec-2020									
Project Total Quantities	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	24.831

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed of as Public Fill
(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
3200.000	0.000	300.000	1000.000	2000.000

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
9500.00	15.00	15.00	80.00	30.000

- Notes:
- (1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
 - (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 amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).