

30 May 2019

By Fax (3468 2076) and By Post

AECOM Asia Co. Ltd.
The PRE's Office
550 Cheung Tung Road, Lantau
Hong Kong

Attention: Mr. Simon Cheung

Dear Sir,

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

**Contract No. HY/2013/01
HZMB HKBCF – Passenger Clearance Building
Quarterly EM&A Report No. 15 for March 2018 to May 2018**

Reference is made to the Environmental Team's submission of Quarterly EM&A Report No. 15 for March 2018 to May 2018 (Revision 4) certified by the ET Leader (ET's ref.: "5126871/19.10/OC153/KC/RL" dated 30 May 2019) and provided to us via e-mail on 30 May 2019.

We are pleased to inform you that we have no adverse comments on the captioned Quarterly EM&A Report for March 2018 to May 2018.

Thank you very much for your attention and please feel free to contact the undersigned should you require further information.

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


Ray Yan
Independent Environmental Checker

c.c.	HyD	Mr. Cheng Pan	(By Fax: 3188 6614)
	HyD	Ms. Iris Ng	(By Fax: 3188 6614)
	Atkins	Mr. Keith Chau	(By Fax: 2890 6343)
	LCWJV	Mr. Owen Leung	(By Fax: 3621 0180)

Internal: DY, YH, DF, HW, ENPO Site

Your ref.
Our ref. 5126871/19.10/OC153/KC/RL
Date: 30 May 2019

By Post and e-mail (Stephen.Tsang@lcwjb.com)

Leighton – Chun Wo Joint Venture
39/F Sun Hung Kai Centre
30 Harbour Road
Hong Kong

Attn: Mr. Stephen Tsang

Dear Mr. Tsang,

**Contract No. HY/2013/01
Hong Kong – Zhuhai – Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance Building
Certification of Quarterly EM&A Report No. 15**

Atkins China Limited certifies, in the capacity of Environmental Team Leader, that Quarterly EM&A Report No. 15 (Revision 4) conforms the requirements provided in Condition 16.4 of the Environmental Monitoring and Audit Manual for HKBCF (Version 1.0).

**Yours faithfully,
for and on behalf of
Atkins China Limited**



**Keith Chau
Environmental Team Leader**

cc.

1. AECOM – Mr. Malcolm Sage (By Fax.: 3468 2076)
2. IEC / ENPO – Mr. Ray Yan & Mr. Y.H. Hui (By Fax.: 3465 2899)

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Contract No. HY/2013/01

**Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance
Building**

**Quarterly EM&A Report No. 15
(Covering the Period from 1 March 2018 to 31 May 2018)**

20 May 2019

Revision 4

Main Contractor



Leighton - Chun Wo
Joint Venture

Environmental Team





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Executive Summary

This Quarterly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract HY/2013/01 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) – Passenger Clearance Building (hereafter referred to as “the Contract”) (includes the construction works of Contract No. HY/2013/06 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Automatic Vehicle Clearance Support System within Contract No. HY/2013/01 works area) for the Highways Department of Hong Kong Special Administrative Region (HKSAR). The Contract was awarded to Leighton – Chun Wo Joint Venture (construction works of Contract No. HY/2013/06 was awarded to ATAL Technologies Limited within Contract No. HY/2013/01 works area) (hereafter referred to as “the Contractor”) and Atkins China Limited was appointed as the Environmental Team (ET) by the Contractor

The Contract is part of Hong Kong – Zhuhai – Macao Bridge HKBCF which is a “Designated Project”, under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499) and Environmental Impact Assessment (EIA) Report (Register No. AEIAR-145/2009) was prepared for the Project. The current Environmental Permit (EP) No. EP-353/2009/K for HKBCF was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Site preparation works of the Contract started on 26 September 2014 and the construction works of the Contract commenced on 6 October 2014. The construction works of the Contract No. HY/2013/06 within Contract No. HY/2013/01 works area commenced on 20 February 2018.

Atkins China Limited has been appointed by the Contractor to implement the Environmental Monitoring & Audit (EM&A) programme for the Contract in accordance with the Updated EM&A Manual for HKBCF (Version 1.0) and will be providing environmental team services to the Contract.

This is the fifteenth Quarterly EM&A Report for the Contract which summaries findings of the EM&A works during the reporting period from 1 March 2018 to 31 May 2018. (includes the construction works of Contract No. HY/2013/06 within Contract No. HY/2013/01 works area)

Environmental Monitoring and Audit Progress

The EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). The air quality, noise, water quality and dolphin monitoring works under Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge HKBCF – Reclamation Works were suspended from 1 September 2017. The ET of Contract No. HY/2013/01 is required and continues the same implementation of environmental monitoring commencing on 1 September 2017. It should be noted that the air quality monitoring station (AMS6) is covered by Contract No. HY/2011/03 Hong Kong-Zhuhai Macao Bridge Hong Kong Link Road – Section between Scenic Hill and HKBCF.

A summary of the monitoring activities during the reporting period are listed below:

Monitoring Items	Date		
	March 2018	April 2018	May 2018
1-hour TSP Monitoring	1, 5, 7, 9, 12, 13, 16, 19, 22, 23, 28 and 29	3, 4, 6, 9, 12, 13, 18, 19, 23, 24, 27 and 30	3, 4, 7, 10, 11, 16, 17, 21, 23, 25, 28, and 31
24-hour TSP Monitoring	2, 5, 8, 9, 12, 14, 16, 20, 22, 26, 28 and 29	3, 4, 9, 10, 12, 13, 18, 23, 25, 27 and 30	3, 4, 9, 11, 15, 16, 19, 21, 24, 25, 30 and 31
Noise Monitoring	5, 9, 12, 14, 20, 22, 26 and 28	3, 4, 9, 12, 17, 19, 26, and 30	2, 11, 14, 16, 21, 24, 29 and 31
Water Quality Monitoring	2, 5, 7, 9, 12, 14, 16, 19, 21, 23, 25, 28 and 30	2, 4, 6, 9, 11, 13, 16, 18, 20, 23, 25, 27 and 30	2, 4, 7, 9, 11, 13, 16, 18, 21, 23, 25, 28 and 30
Chinese White Dolphin Monitoring	6, 9, 14 and 26	11, 18, 24 and 26	3, 15, 24 and 29

Environmental Site Inspection	7, 14, 23, and 28	4, 11, 18, and 25	2, 9, 16, 23 and 30
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Breaches of Action and Limit Levels :

A summary of environmental exceedances for the reporting period are listed below:

Environmental Monitoring	Parameters	Action Level (AL)			Limit Level (LL)		
		Mar 2018	Apr 2018	May 2018	Mar 2018	Apr 2018	May 2018
Air Quality	1-hr TSP	-	-	-	-	-	-
	24-hr TSP	-	-	-	-	-	-
Noise	L _{eq} (30 min)	-	-	-	-	-	-
Water Quality	Suspended solids level (SS)	4	5	-	-	-	-
	Turbidity level	-	-	2	-	-	-
	Dissolved oxygen level (DO)	-	-	2	-	-	-
Dolphin Monitoring	Quarterly Analysis	-			1		

Based on the investigation results, all exceedances are found that not related to Contract No. HY/2013/01.

Implementation of Environmental Measures

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. Potential environmental impacts due to the construction activities were monitored and reviewed.

Complaint Log

There was no complaint received in relation to the environmental impact during the reporting period.

Notifications of Summons and Successful Prosecutions

There was no notification of summon or prosecution received during this reporting period.

Reporting Change

There was no reporting change during the reporting period.

1 Introduction

1.1 Basic Project Information

- 1.1.1 This Quarterly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract HY/2013/01 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Passenger Clearance Building (hereafter referred to as “the Contract”) (includes the construction works of Contract No. HY/2013/06 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Automatic Vehicle Clearance Support System within Contract No. HY/2013/01 works area) for the Highways Department of Hong Kong Special Administrative Region. The Contract was awarded to Leighton – Chun Wo Joint Venture (construction works of Contract No. HY/2013/06 was awarded to ATAL Technologies Limited within Contract No. HY/2013/01 works area) (hereafter referred to as “the Contractor”) and Atkins China Limited was appointed as the Environmental Team (ET) by the Contractor.
- 1.1.2 The Contract is part of Hong Kong – Zhuhai – Macao Bridge Hong Kong Boundary Crossing Facilities (HKBCF) which is a “Designated Project”, under Schedule 2 of the Environmental Impact Assessment Ordinance (EIAO) (Cap 499). An Environmental Impact Assessment (EIA) Report (Register No. AEIAR-145/2009) was prepared for the Project. The current Environmental Permit (EP) No. EP-353/2009/K for HKBCF was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Site preparation work of the Contract started on 26 September 2014 and the construction works of the Contract commenced on 6 October 2014. The construction works of the Contract No. HY/2013/06 within Contract No. HY/2013/01 works area commenced on 20 February 2018. The works areas of the Contract are shown in **Appendix A**.
- 1.1.3 This is the fifteenth Quarterly EM&A Report for the Contract which summarizes the audit findings of the EM&A programme during the reporting period from 1 March 2018 to 31 May 2018.

1.2 Project Organisation

- 1.2.1 The project organization structure and lines of communication with respect to the on-site environmental management structure is shown in **Appendix B**. The key personnel contact names and numbers are summarized in **Table 1.1**.

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
<u>For Contract No. HY/2013/01</u>				
Engineer or Engineer's Representative (AECOM Asia Co. Ltd.)	Chief Resident Engineer	Malcolm Sage	3958 7330	3468 2076
Environmental Project Office / Independent Environmental Checker (Ramboll Hong Kong Limited)	Environmental Project Office Leader	Y. H. Hui	3465 2888	3465 2899
	Independent Environmental Checker	Raymond Dai	3465 2888	3465 2899
Contractor (Leighton – Chun Wo Joint Venture)	Project Manager	Owen Leung	9232 5750	3621 0180
	Environmental Officer	Stephen Tsang	9686 0787	3621 0180

Environmental Team (Atkins China Limited)	Environmental Team Leader	Keith Chau	2972 1721	2890 6343
24 hours complaint hotline	---	---	3958 7300	---
<u>For Contract No. HY/2013/06 within Contract No. HY/2013/01 works area</u>				
Engineer or Engineer's Representative (AECOM Asia Co. Ltd.)	Chief Registered Architect	Malcolm Sage	3958 7330	3468 2076
Environmental Project Office / Independent Environmental Checker (Ramboll Hong Kong Limited)	Environmental Project Office Leader	Y. H. Hui	3465 2888	3465 2899
	Independent Environmental Checker	Raymond Dai	3465 2888	3465 2899
Contractor (ATAL Technologies Limited)	Site Agent	Mr. Eric Yim	2565 3355	3162 5217
	Environmental Officer	Mr. W. Li	2565 3137	3162 5217
Environmental Team (Atkins China Limited)	Environmental Team Leader	Keith Chau	2972 1721	2890 6343
24 hours complaint hotline	---	---	6509 0375	---

1.3 Construction Programme

1.3.1 A copy of the Contractor's construction programme is provided in **Appendix C**.

1.4 Construction Works Undertaken During the Reporting Period

1.4.1 A summary of the construction activities undertaken during this reporting period is shown below:

For Contract No. HY/2013/01

Land-Based Work

- Pipework and ductwork installation
- Falsework stripping
- Wet trade works
- Dry trade works
- Mechanical, Electrical and Plumbing (MEP) High Level Containment
- Removal of temporary works
- Hanging scaffolding removal
- Southern toilet
- MISC steelwork
- Escalator installation
- Glazed lift installation
- Road and Kerbing
- Testing and commissioning works
- Water features and planters



-
- Kiosk/Booth installation
 - Paving
 - Planting Tree
 - Glazing Works
 - TPIDC Inspections
 - Lift/Escalator EMSD Inspection
 - Fit-out lift cars
 - Cleaning

Marine-based work

- No marine based construction work to be undertaken during reporting period.

For Contract No. HY/2013/06 within Contractor No. HY/2013/01 works area

- Conduit installation and Cabling at ELV & Server Room and Zone E PCB
- Equipment setup and system SAT at ELV & Server Room, Zone E PCB

2 EM&A Requirement

2.1 Summary of EM&A Requirements

- 2.1.1 The EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1). The air quality, noise, water quality and dolphin monitoring works under Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge HKBCF – Reclamation Works were suspended from 1 September 2017. The ET of Contract No. HY/2013/01 is required and continues the same implementation of environmental monitoring commencing on 1 September 2017. It should be noted that the air quality monitoring station (AMS 6) is covered by Contract No. HY/2011/03 Hong Kong-Zhuhai Macao Bridge Hong Kong Link Road – Section between Scenic Hill and HKBCF.
- 2.1.2 The permission to carry out impact air quality monitoring work at AMS7 (Hong Kong SkyCity Marriott Hotel) was not granted after 31 January 2015. The impact air quality monitoring location (AMS7) was relocated to a nearby air sensitive receiver, Chu Kong Air-Sea Union Transportation Co. Ltd. (AMS7A), from 5 February 2015 to 30 December 2015. The alternative location at Chu Kong Air-Sea Union Transportation Co. Ltd. was approved by EPD on 5 February 2015. However, AMS7A was relocated back to its original location (AMS7-Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The relocation of air quality monitoring location, AMS7A, back to AMS7 was approved by EPD on 21 December 2015. The baseline and action/limit level for air quality as derived from the baseline monitoring data recorded at Hong Kong SkyCity Marriott Hotel (AMS7) was adopted for the air quality monitoring location. As the permission to carry out air quality monitoring at Hong Kong SkyCity Marriott Hotel was not granted after the end of January 2018, as such, a proposal for the monitoring location relocated to 3RS Site Office(AMS7B) was justified by the ET Leader for Contract No. HY/2013/01 on 22 January 2018; verified by the IEC on 24 January 2018; and submitted to EPD on 30 January 2018, and the AQM has been carrying out at AMS7B with EPD's consent since 6 February 2018.
- 2.1.3 A summary of air and noise monitoring locations are presented in **Table 2.1**. The location of air quality and noise monitoring stations are shown as in **Figure 2.1** and **Figure 2.2**, respectively.

Table 2.1 Summary of Impact EM&A Requirements

Environmental Monitoring	ID	Location Description
Air Quality	AMS2 ⁽¹⁾	Tung Chung Development Pier
	AMS3B ⁽¹⁾	Site Boundary of Site Office Area at Work Area WA2
	AMS6 ⁽¹⁾	Dragonair/CNAC (Group) Building
	AMS7B ⁽¹⁾⁽²⁾	3RS Site Office
Noise	NMS2 ⁽³⁾	Seaview Crescent
	NMS3B ⁽³⁾⁽⁴⁾	Site Boundary of Site Office Area at Works Area WA2

Remarks:

- (1) The ET of this Contract should conduct impact air quality monitoring at the Air Monitoring Station listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project.
- (2) The original monitoring location was at Hong Kong SkyCity Marriott Hotel (AMS7). As the permission to carry out air quality monitoring at Hong Kong SkyCity Marriott Hotel was not granted after 31 January 2015, the monitoring location was relocated to Chu Kong Air-Sea Union Transportation Co. Ltd. (AMS7A) from 5 February 2015 to 30 December 2015. The alternative monitoring location at Chu Kong Air-Sea Union Transportation Co. Ltd. was approved by EPD on 5 February 2015. However, AMS7A was relocated back to its original location (AMS7-Hong Kong SkyCity Marriott Hotel) on 30 December 2015. The relocation of air quality monitoring location, AMS7A, back to AMS7 was approved by EPD on 21 December 2015. As the permission to carry out air quality monitoring at Hong Kong SkyCity Marriott Hotel was not granted after the end of January 2018, as such, a proposal for the monitoring location relocated to 3RS Site Office(AMS7B) was justified by the ET Leader for Contract No. HY/2013/01 on 22 January 2018; verified by the IEC on 24 January 2018; and

submitted to EPD on 30 January 2018, and the AQM has been carrying out at AMS7B with EPD's consent since 6 February 2018.

- (3) The ET of this Contract should conduct impact noise monitoring at the NMS listed in the table as part of EM&A programme according to the latest notification from ENPO when the monitoring station(s) is/are no longer covered by another ET of the HZMB project.
- (4) The Action and Limit Levels for schools will be applied for this alternative monitoring location.

2.1.4 The water quality works under Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge HKBCF – Reclamation Works were suspended from 1 September 2017. The ET of Contract No. HY/2013/01 is required and continues the same implementation of environmental monitoring commencing on 1 September 2017. A total of twenty-one stations (nine Impact Stations (IS), seven Sensitive Receiver Stations (SR) and five Control/Far Field Stations (CS)) are covered by the current EM&A programme.

2.1.5 The water quality monitoring stations at CS(Mf)3 (Coordinate: 809989E, 821117N), IS10 (Coordinate: 812577E, 820670N) and SR5 (811489E, 820455N) have been occupied by the marine work of a designated project - Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project). The alternative water quality monitoring station at CS(Mf)3(N) (Coordinate: 808814E, 822355N), IS10(N) (Coordinate: 812942E, 820881N) and SR5(N) (812569E, 8201475N) were justified and verified by the ET Leader for Contract No. HY/2010/02 and the IEC respectively on 24 March 2017 and it was approved by EPD on 12 May 2017.

2.1.6 **Table 2.2** and **Figure 2.3** show the locations of water quality monitoring stations.

Table 2.2 Impact Water Quality Monitoring Stations

Station	Description	East	North
IS5	Impact Station (Close to HKBCF construction site)	811579	817106
IS(Mf)6	Impact Station (Close to HKBCF construction site)	812101	817873
IS7	Impact Station (Close to HKBCF construction site)	812244	818777
IS8	Impact Station (Close to HKBCF construction site)	814251	818412
IS(Mf)9	Impact Station (Close to HKBCF construction site)	813273	818850
IS10	Impact Station (Close to HKBCF construction site)	812577	820670
IS10(N)*	Impact Station (Close to HKBCF construction site)	812942	820881
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716
IS(Mf)16	Impact Station (Close to HKBCF construction site)	814328	819497
IS17	Impact Station (Close to HKBCF construction site)	814539	820391
SR3(N) ^	Sensitive receivers (San Tau SSSI)	810689	816591
SR4(N)	Sensitive receivers (Tai Ho)	814705	817859
SR5	Sensitive receivers (Artificial Reef in NE Airport)	811489	820455
SR5(N)*	Sensitive receiver (Artificial Reef in NE Airport)	812569	821475
SR6	Sensitive receivers (Sha Chau and Lung Kwu Chau Marine Park)	805837	821818
SR7	Sensitive receivers (Tai Mo Do)	814293	821431
SR10A(N) ^	Sensitive receivers (Ma Wan FCZ) 1	823644	823484
SR10B(N2) ^	Sensitive receivers (Ma Wan FCZ) 2	823689	823159

CS(Mf)3	Control Station	809989	821117
CS(Mf)3(N)*	Control Station	808814	822355
CS(Mf)5#	Control Station	817990	821129
CS4	Control Station	810025	824004
CS6	Control Station	817028	823992
CSA	Control Station	818103	823064

Remarks:

* Alternative water quality monitoring stations at CS(Mf)3(N), SR5(N) and IS10(N) were justified and verified by the ET Leader for Contract No. HY/2010/02 and the IEC respectively on 24 March 2017 and it was approved by EPD on 12 May 2017.

^ Alternative water quality monitoring stations at SR3, SR10A and SR10B(N) were justified by the ET Leader on 8 November 2017 and verified by IEC on 13 November 2017; and submitted to EPD on 29 November 2017 and it was approved by EPD on 22 December 2017.

Due to safety reason, the water quality monitoring at station CS(Mf)5 for flood tide on 30 May 2018 was temporarily conducted at coordinate: 817926E, 821199N.

- 2.1.7 The dolphin monitoring works under Contract No. HY/2010/02 Hong Kong-Zhuhai-Macao Bridge HKBCF – Reclamation Works were suspended from 1 September 2017. The ET of Contract No. HY/2013/01 is required and continues the same implementation of environmental monitoring commencing on 1 September 2017.
- 2.1.8 The dolphin monitoring should adopt line-transect vessel survey method. The survey follows pre-set and fixed transect lines in the two areas defined by AFCD as: Northeast Lantau survey area; and Northwest Lantau survey area. The change of transect lines 2, 3, 4, 5, 6 and 7 and new vessel-based transect line 24 for dolphin monitoring have been proposed due to the marine work of a designated project - Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project). It was justified and verified by the ET Leader for Contract No. HY/2010/02 and the IEC respectively on 24 March 2017 and it was approved by EPD on 12 May 2017.
- 2.1.9 The co-ordinates for the transect lines showing the transect lines are shown in **Table 2.3** and **Figure 2.4** shows the layout map.

Table 2.3 Impact Dolphin Monitoring Line Transect Co-ordinates

Transect ID	HK Grid System	
	East	North
1*	804671	815456
	804671	831404
2	805476	820800
	805476	826654
3	806464	821150
	806464	822911
4	807518	821500
	807518	829230
5	808504	821850
	808504	828602
6	809490	822150
	809490	825352
7	810499	822000
	810499	824613
8*	811508	821123
	811508	824254
9*	812516	821303
	812516	824254
10*	813525	820827
	813525	824657

11#	814556	818853
	814556	820992
12	815542	818807
	815542	824882
13	816506	819480
	816506	824859
14	817537	820220
	817537	824613
15	818568	820735
	818568	824433
16	819532	821420
	819532	824209
17	820451	822125
	820451	823671
18	821504	822371
	821504	823761
19	822513	823268
	822513	824321
20	823477	823402
	823477	824613
21	805476	827081
	805476	830562
22	806464	824033
	806464	829598
23	814559	821739
	814559	824768
24	805476	815900
	805476	819100

Remarks:

- (a) * Due to the presence of deployed silt curtain systems at the site boundaries of the Contract, some of the transect lines shown in Figure 5.1 could not be fully surveyed during the regular survey. Transect 10 is reduced from 6.4km to approximately 3.6km in length due to the HKBCF construction site. Therefore the total transect length for both NEL and NWL combined is reduced to approximately 108km
- (b) # Coordinates for transect lines 1, 8, 9 and 11 have been updated in respect to the Proposal for Alteration of Transect Line for Dolphin Monitoring approved by EPD on 19 August 2015.
- (c) The change of transect lines 2, 3, 4, 5, 6 and 7 and new vessel-based transect line 24 for dolphin monitoring have been proposed due to the marine work of a designated project-Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project). It was justified and verified by the ET Leader for Contract No. HY/2010/02 and the IEC respectively on 24 March 2017 and it was approved by EPD on 12 May 2017.
- (d) Due to marine work of the Expansion of Hong Kong International Airport into a Three-Runway System (3RS Project), original transect lines of dolphin monitoring 2, 3, 4, 5, 6 and 7 are enclosed by works boundary of 3RS Project. Alternative dolphin monitoring transects lines 2, 3, 4, 5, 6, 7 and 24 are adopted starting from 17 May 2017 to replace the original transect lines.

2.2 Monitoring Requirements

- 2.2.1 The monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology, monitoring schedule, meteorological information is detailed in the monthly EM&A report for Contract No. HY/2013/01.

2.3 Action and Limit Levels

- 2.3.1 The Action and Limit Level for 1-hr TSP and 24-hr TSP are provided in **Table 2.4** and **Table 2.5**, respectively.

Table 2.4 Action and Limit Levels for 1-hour TSP

Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS2 – Tung Chung Development Pier	374	500
AMS3B - Site Boundary of Site Office at Work Area WA2	368	
AMS6 – Dragonair/CNAC (Group) Building (HKIA)	360	
AMS7B – 3RS Site Office	370	

Table 2.5 Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
AMS2 – Tung Chung Development Pier	176	260
AMS3B - Site Boundary of Site Office at Work Area WA2	167	
AMS6 – Dragonair/CNAC (Group) Building (HKIA)	173	
AMS7B – 3RS Site Office	183	

- 2.3.2 The Action and Limit Levels for construction noise are defined in **Table 2.6**.

Table 2.6 Action and Limit Level for Construction Noise

Parameter	Action Level	Limit Level
07:00 – 19:00 hours on normal weekdays	When one documented complaint is received	75/70/65 dB(A)*

Notes :

If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.

* Reduce to 70 dB(A) for schools and 65 dB(A) during school examination period. The Action and limit Levels for schools will be applied for NMS3B. Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65 dB(A) applies during the school examination period.

- 2.3.3 The Action and Limit Levels for water quality are provided in **Table 2.7**.

Table 2.7 Action and Limit Levels for Water Quality

Parameters	Action	Limit
DO in mg L ⁻¹ (Surface, Middle & Bottom)	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6
SS in mg L ⁻¹ (depth-averaged) at all monitoring stations and control stations	23.5 and 120% of upstream control station's SS at the same tide of the same day*	34.4 and 130% of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes*
Turbidity in NTU (depth-averaged)	27.5 and 120% of upstream control station's turbidity at the same tide of the same day*	47.0 and 130% of upstream control station's turbidity at the same tide of the same day*

* Remarks: Reference is made to EPD approval of adjustment of water quality assessment criteria issued and became effective on 18 February 2013.

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

2.3.4 The Action and Limit Levels for Chinese White Dolphin Monitoring are provided in **Table 2.8** and **Table 2.9**, respectively.

Table 2.8 Action and Limit Levels for Chinese White Dolphin Monitoring - Approach to Define Action Level (AL) and Limit Level (LL)

	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)]	

Table 2.9 Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

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

2.4 Event Action Plans

- 2.4.1 The Event Actions Plans for air quality, noise, water quality and dolphin monitoring are provided in **Appendix D**.

2.5 Mitigation Measures

- 2.5.1 Environmental mitigation measures for the Contract were recommended in the approved EIA Report. **Appendix E** lists the recommended mitigation measures and the implementation status.

3 Environmental Monitoring and Audit

3.1 Air Quality Monitoring Results

- 3.1.1 In accordance with the Contract Specific EM&A Manual, impact 1-hour Total Suspended Particulates (TSP) monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days at the 4 monitoring stations (AMS2, AMS3B, AMS6 and AMS7B).
- 3.1.2 The weather was warm and foggy with sunny periods were recorded in March 2018, the weather became cloudy with light rain patches in mid of March 2018, with slightly cooler weather until end of March 2018. The weather was generally fine and warm on the first few days of March 2018 then the weather turned cloudy with a few showers. From mid of March 2018, the weather gradually became mainly fine and hot towards the end of the month apart from isolated showers. Hot and dry in May 2018 with a 20-day fine spell that lasted till the end of May 2018. Construction works during the quarterly period are shown in Section 1.4.1. The major dust source in the reporting period included construction activities from the Project, as well as traffic emission.
- 3.1.3 The graphical plots of the monitoring results are presented in **Appendix F**. No specific trend of the monitoring results or existence of persistent pollution source was noted.
- 3.1.4 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A Reports (for March 2018 to May 2018) prepared by Contract No. HY/2011/03.
- 3.1.5 The number of exceedances recorded during the reporting period are presented in the **Table 3.1**. The monitoring results for 1-hour and 24-hour are summarized in **Table 3.2** and **Table 3.3** respectively.

Table 3.1 Summary of number of exceedances for 1-hr and 24-hr TSP Monitoring

Monitoring Station	March 2018		April 2018		May 2018	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
AMS2	-	-	-	-	-	-
AMS3B	-	-	-	-	-	-
AMS7B	-	-	-	-	-	-

Table 3.2 Summary of 1-hour TSP Monitoring Results During the Reporting Period

Reporting month	Monitoring 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 ($\mu\text{g}/\text{m}^3$)
March 2018	AMS2	46	13-139	374	500
	AMS3B	40	16-137	368	
	AMS7B	36	21-54	370	
April 2018	AMS2	71	28-116	374	500
	AMS3B	26	6-42	368	
	AMS7B	63	10-226	370	
May 2018	AMS2	51	24-141	374	500
	AMS3B	18	4-54	368	
	AMS7B	34	8-88	370	

Table 3.3 Summary of 24-hour TSP Monitoring Results During the Reporting Period

Reporting month	Monitoring 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 ($\mu\text{g}/\text{m}^3$)
March 2018	AMS2	67	47-103	176	260
	AMS3B	66	41-107	167	
	AMS7B	111	92-129	183	
April 2018	AMS2	55	23-107	176	260
	AMS3B	50	26-89	167	
	AMS7B	86	44-114	183	
May 2018	AMS2	39	17-84	176	260
	AMS3B	37	22-64	167	
	AMS7B	70	40-97	183	

- 3.1.6 No Action and Limit Level exceedances of 1-hour TSP were recorded at AMS2, AMS3B and AMS7B during the reporting period.
- 3.1.7 No Action and Limit Level exceedances of 24-hour TSP were recorded at AMS2, AMS3B and AMS7B during the reporting period.
- 3.1.8 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03. For detail of investigation, please refer to **Appendix K**.

3.2 Noise Monitoring Results

- 3.2.1 In accordance with the Contract Specific EM&A Manual, impact noise monitoring was conducted for at least once per week during the construction phase of the Contract.
- 3.2.2 The graphical plots of the monitoring results are presented in **Appendix F**. No specific trend of the monitoring results or existence of persistent pollution source was noted.
- 3.2.3 The number of exceedances recorded during the reporting period are presented in the **Table 3.4**. The monitoring results for construction noise are summarized in **Table 3.5**.

Table 3.4 Summary of number of exceedances for Impact Noise Monitoring

Monitoring Station	March 2018		April 2018		May 2018	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
NMS2	-	-	-	-	-	-
NMS3B ^(*)	-	-	-	-	-	-

Remark: (*) The Limit Level for schools will be applied for NMS3B. Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65 dB(A) applies during the school examination period.

Table 3.5 Summary of Construction Noise Monitoring Results During the Reporting Period

Reporting month	Monitoring Station	Average, dB(A) L _{eq} (30 mins)	Range, dB(A) L _{eq} (30 mins)	Limit Level, dB(A) L _{eq} (30 mins)
March 2018	NMS2	65	65 – 66	75
	NMS3B ^(*)	66	61 – 68	70/65
April 2018	NMS2	65	64 – 65	75
	NMS3B ^(*)	63	59 -67	70/65
May 2018	NMS2	65	63 – 66	75
	NMS3B ^(*)	63	62 - 66	70/65

Remark: (*) The Limit Level for schools will be applied for NMS3B. Daytime noise Limit Level of 70 dB(A) applies to education institutions, while 65 dB(A) applies during the school examination period.

On 9 April 2018, the Hong Kong Diploma of Secondary Education (HKDSE) Examination was conducted at Ho Yu College. The Limit Level of 65dB(A) was applied.

- 3.2.4 No Action and Limit Level exceedances of noise monitoring were recorded at NMS2 and NMS3B during the reporting period.
- 3.2.5 School calendar of Ho Yu College and calendar of Hong Kong Diploma of Secondary Education (HKDSE) were checked. On 9 April 2018, the examination of HKDSE was conducted at Ho Yu College. The measured noise level at NMS3B on 9 April 2018 was 62 dB(A), which was not exceeded the noise level of 65dB(A) during examination. As such the Event and Action Plan was not triggered.
- 3.2.6 The event and action plan is provided in **Appendix D**.

3.3 Water Quality Monitoring Results

- 3.3.1 Impact water quality monitoring was carried out to ensure that any deterioration of water quality was detected, and that timely action was taken to rectify the situation. For impact water quality monitoring, measurement were taken in accordance with the Contract Specific EM&A Manual.
- 3.3.2 The graphical plots of the monitoring results are presented in **Appendix F**.
- 3.3.3 For impact water quality monitoring, number of exceedances recorded for reporting period at each impact station are summarised in **Table 3.6**.

Table 3.6 Summary of Water Quality Exceedances

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
IS5	Action Level			2018-05-28				2018-04-02	
	Limit Level								
IS(Mf)6	Action Level								
	Limit Level								
IS7	Action Level								2018-03-21
	Limit Level								
IS8	Action Level			2018-05-25					
	Limit Level								
IS(Mf)9	Action Level								
	Limit Level								
IS10(N)	Action Level								2018-04-20
	Limit Level								
IS(Mf)11	Action Level						2018-05-13		
	Limit Level								
IS(Mf)16	Action Level								
	Limit Level								
IS17	Action Level								
	Limit Level								
SR3(N)	Action Level								
	Limit Level								
SR4(N)	Action Level								
	Limit Level								

Station	Exceedance Level	DO (S&M)		DO (Bottom)		Turbidity		SS	
		Ebb	Flood	Ebb	Flood	Ebb	Flood	Ebb	Flood
SR5(N)	Action Level						2018-05-13		2018-03-16; 2018-03-30
	Limit Level								
SR6	Action Level								2018-03-02; 2018-04-18
	Limit Level								
SR7	Action Level								2018-04-18; 2018-04-25
	Limit Level								
SR10A(N)	Action Level								
	Limit Level								
SR10B(N2)	Action Level								
	Limit Level								
Total	Action Level	0	0	2	0	0	2	1	8
		13							
	Limit Level	0	0	0	0	0	0	0	0
0									

- 3.3.4 2 Action Level exceedances of dissolved oxygen were recorded at mid-ebb tide on 25 and 28 May 2018 while no Action Level exceedances of dissolved oxygen at mid-flood tide. No Limit Level exceedances of dissolved oxygen during the reporting period.
- 3.3.5 2 Action Level exceedances of turbidity were recorded at mid-flood tide on 13 May 2018 while no Action Level exceedances of turbidity at mid-ebb tide. No Limit Level exceedances of turbidity during the reporting period.
- 3.3.6 8 Action Level exceedances of suspended solid were recorded at mid-flood tide on 2, 16, 21 and 30 March 2018, 18, 20 and 25 April 2018 while 1 Action Level exceedance of suspended solid was recorded at mid-ebb tide on 2 April 2018. No Limit Level exceedances of suspended solid during the reporting period.
- 3.3.7 As confirmed by the Contractor, no marine transportation and marine-based work was conducted when water quality monitoring was conducted in March, April and May 2018. Therefore, it is concluded that the exceedances were not related the Contract. The detailed investigation results of these exceedances recorded are shown in **Appendix K**.

3.4 Dolphins Monitoring Results

Data Analysis

- 3.4.1 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.

- 3.4.2 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. 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.
- 3.4.3 Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone, and only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in 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).
- 3.4.4 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.
- 3.4.5 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).
- 3.4.6 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

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

- 3.4.8 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.

Summary of Survey Effort and Dolphin Sightings

- 3.4.9 During the period of March 2018 to May 2018, six sets of systematic line-transect vessel surveys were conducted for the HKBCF project to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.4.10 From these surveys, a total of 803.0 km of survey effort was collected, with 88.5% 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, 302.3 km and 500.7 km of survey effort were conducted in NEL and NWL survey areas respectively.
- 3.4.11 The total survey effort conducted on primary lines was 577.0 km, while the effort on secondary lines was 226.0 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. A summary table of the survey effort is shown in **Annex I of Appendix L**.
- 3.4.12 During the six sets of monitoring surveys in March to May 2018, eight groups of 20 Chinese White Dolphins were sighted, with the summary table of the dolphin sightings shown in **Annex II of Appendix L**. All dolphin sightings were made during on-effort search, while seven of the eight on-effort dolphin sightings were made on primary lines. In addition, all dolphin groups were sighted in NWL, while none was sighted in NEL.

Distribution

- 3.4.13 Distribution of dolphin sightings made during monitoring surveys in March to May 2018 is shown in **Figure 1 of Appendix L**. All sightings were made at the northwestern end of the North Lantau Region, mainly within and around the Sha Chau and Lung Kwu Chau Marine Park (**Figure 1 of Appendix L**). One dolphin group was also sighted at the mouth of Deep Bay. On the contrary, they were completely absent from the central and eastern portions of North Lantau waters, similar to the consistent findings of HKLR03 surveys in recent years (**Figure 1 of Appendix L**).
- 3.4.14 Notably, all dolphin sighting were made far away from the HKBCF and HKLR03 reclamation sites, as well as the alignments of HKLR09 and Tuen Mun-Chek Lap Kok Link (TMCLKL) (**Figure 1 of Appendix L**).
- 3.4.15 Sighting distribution of dolphins during the present impact phase monitoring period (March to May 2018) was very different from the one during the baseline monitoring period (**Figure 1 of Appendix L**). 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 of Appendix L**).
- 3.4.16 On the other hand, dolphin occurrence in NWL waters was also noticeably different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were infrequently sighted there, and mainly at the northwestern end of the survey area, which was also in stark contrast with their frequent occurrences throughout the entire survey area during the baseline period (**Figure 1 of Appendix L**). Seasonal distributions of dolphins during baseline and impact periods can be referred to those presented in the corresponding quarterly EM&A summary report prepared under Contract No. HY/2011/03.

Encounter Rate

- 3.4.17 During the present three-month study 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 surveys in NEL and NWL are shown in **Table 3.7**. 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 3.8**).

3.4.18 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 1.7 sightings and 4.4 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.

Table 3.7 Dolphin Encounter Rates (Sightings Per 100 km of Survey Effort) During Reporting Period (March to May 2018)

Survey Area	Dolphin Monitoring	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (6 & 9 Mar 2018)	0.0	0.0
	Set 2 (14 & 26 Mar 2018)	0.0	0.0
	Set 3 (11 & 18 Apr 2018)	0.0	0.0
	Set 4 (24 & 26 Apr 2018)	0.0	0.0
	Set 5 (3 & 15 May 2018)	0.0	0.0
	Set 6 (24 & 29 May 2018)	0.0	0.0
Northwest Lantau	Set 1 (6 & 9 Mar 2018)	0.0	0.0
	Set 2 (14 & 26 Mar 2018)	1.7	6.7
	Set 3 (11 & 18 Apr 2018)	1.7	5.2
	Set 4 (24 & 26 Apr 2018)	3.4	8.6
	Set 5 (3 & 15 May 2018)	1.8	3.5
	Set 6 (24 & 29 May 2018)	3.3	4.9

Table 3.8 Comparison of Average Dolphin Encounter Rates From Impact Monitoring Period (March to May 2018) and Baseline Monitoring Period (September to November 2011)

Survey Area	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)	
	Reporting Period	Baseline Monitoring Period	Reporting Period	Baseline Monitoring Period
Northeast Lantau	0.0	6.0 ± 5.1	0.0	22.2 ± 26.8
Northwest Lantau	2.0 ± 1.3	9.9 ± 5.9	4.8 ± 2.9	44.7 ± 29.9

Notes:

- 1) The encounter rates deduced from the baseline monitoring period have been recalculated based only on the survey effort and on-effort sighting data made along the primary transect lines under favourable conditions.
- 2) \pm denotes the standard deviation of the average encounter rates.

- 3.4.19 In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have also been consistently recorded in recent years of HZMB monitoring (**Table 3.9**)

Table 3.9 Comparison of Average Dolphin Encounter Rates in Northeast Lantau Survey Area from All Quarters of Impact Monitoring Period and Baseline Monitoring Period (September to November 2011)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	6.0 \pm 5.1	22.2 \pm 26.8
March-May 2013 (HKLR03 Impact ^(*))	0.4 \pm 1.0	0.4 \pm 1.0
March-May 2014 (HKLR03 Impact ^(*))	0.0	0.0
March-May 2015 (HKLR03 Impact ^(*))	0.0	0.0
March-May 2016 (HKLR03 Impact ^(*))	0.0	0.0
March-May 2017 (HKLR03 Impact ^(*))	0.0	0.0
March-May 2018 (HKBCF Impact)	0.0	0.0

Notes:

- 1) The 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.
 - 2) \pm denotes the standard deviation of the average encounter rates.
- (*) As explained in Section 1.5 of Appendix L, the previous monitoring data from Contract No. HY/2011/03 (i.e. HKLR03) were adopted for comparison with the baseline and present HKBCF impact monitoring period.

- 3.4.20 On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period (reductions of 80.0% and 89.2% respectively) were tiny fractions of the ones recorded during the three-month baseline period, indicating a noticeable decline in dolphin usage of this survey area during the present impact phase period (**Table 3.10**).

- 3.4.21 During the same spring quarters (with comparison to past HKLR03 monitoring data), dolphin encounter rates in NWL during spring 2018 was similar to the previous spring periods in 2016 and 2017, slightly higher than the one in 2015, but much lower than the ones in 2013 and 2014 (**Table 3.10**). Such temporal trend should be closely monitored in the upcoming monitoring quarters whether the dolphin occurrence would slowly recover as almost all marine construction activities of HKBCF works have been completed in coming months.

Table 3.10 Comparison of Average Dolphin Encounter Rates in Northwest Lantau Survey Area from all winter quarters of Impact Monitoring Period and Baseline Monitoring Period (September to November 2011)

Monitoring Period	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)	9.9 ± 5.9	44.7 ± 29.9
March-May 2013 (HKLR03 Impact ^(*))	7.8 ± 4.0	24.2 ± 18.1
March-May 2014 (HKLR03 Impact ^(*))	6.5 ± 3.3	19.1 ± 7.2
March-May 2015 (HKLR03 Impact ^(*))	0.5 ± 0.7	2.4 ± 4.1
March-May 2016 (HKLR03 Impact ^(*))	1.0 ± 1.1	4.8 ± 6.9
March-May 2017 (HKLR03 Impact ^(*))	0.9 ± 1.0	5.3 ± 9.5
March-May 2018 (HKBCF Impact)	2.0 ± 1.3	4.8 ± 2.9

Notes:

- 1) The 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.
- 2) ± denotes the standard deviation of the average encounter rates.
- (*) As explained in Section 1.5 of Appendix L, the previous monitoring data from Contract No. HY/2011/03 (i.e. HKLR03) were adopted for comparison with the baseline and present HKBCF impact monitoring period.

- 3.4.22 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 impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.4.23 For the comparison between the baseline period and the present quarter, the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0031 and 0.0168 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarter in both the average dolphin encounter rates of STG and ANI.
- 3.4.24 As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in past HZMB dolphin monitoring studies.
- 3.4.25 The decline in dolphin usage of North Lantau region raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2017). Apparently, there was very little sign of recovery of dolphin usage even though most of the marine works associated with the HZMB construction have been completed, and therefore continuous dolphin monitoring would remain critical in coming months.

Group Size

- 3.4.26 Group size of Chinese White Dolphins ranged from one to four individuals per group in North Lantau region during March to May 2018. 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 3.11**.

Table 3.11 Comparison of average dolphin group sizes from impact monitoring period (March-May 2018) and baseline monitoring period (September-November 2011)

Survey Area	Average Dolphin Group Size	
	Reporting Period	Baseline Monitoring Period
Overall	2.5 ± 0.9 (n = 8)	3.7 ± 3.1 (n = 66)
Northeast Lantau	---	3.2 ± 2.2 (n = 17)
Northwest Lantau	2.5 ± 0.9 (n = 8)	3.9 ± 3.4 (n = 49)

Note:

- 1) \pm denotes the standard deviation of the average group size.

- 3.4.27 The average dolphin group size in NWL waters during March to May 2018 was lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of eight dolphin groups in the present quarter was much smaller when compared to the 66 groups sighted during the baseline period (**Table 3.11**).
- 3.4.28 Notably, all eight dolphin groups were composed of 1-4 individuals only, while none of the groups were larger than five animals (**Annex II of Appendix L**). This is in contrary to the baseline period, when the larger dolphin groups (5 animals or more per group) were frequently sighted and evenly distributed in NWL waters, with a few also sighted in NEL waters.

Habitat Use

- 3.4.29 From March to May 2018, the grids that recorded higher dolphin densities were located to the west of Sha Chau, while the grids around Lung Kwu Chau recorded relatively low dolphin densities (**Figures 2a and 2b of Appendix L**).
- 3.4.30 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 will be collected throughout the impact phase monitoring programme.
- 3.4.31 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 3 of Appendix L**). 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 3 of Appendix L**).
- 3.4.32 The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with high dolphin usage throughout the area during the baseline period. In contrast, only a few grids with moderate to high dolphin densities were located near Sha Chau and Lung Kwu Chau during the present impact phase period (**Figure 3 of Appendix L**).

Mother-calf Pairs

- 3.4.33 During the present quarterly period, no mother-calf was spotted among the eight groups of dolphins.

Activities and Associations with Fishing Boats

- 3.4.34 During the present quarterly period, none of the eight dolphin groups were engaged in feeding, socializing, traveling or milling/resting activity.

Summary Photo-identification works

- 3.4.35 From March to May 2018, over 1,000 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.
- 3.4.36 In total, 12 individuals sighted 16 times altogether were identified (see summary table in **Annex III of Appendix L** and photographs of identified individuals in **Annex IV of Appendix L**). All re-sightings of individual dolphins were made in NWL, while none was re-sighted in NEL during the quarterly period.
- 3.4.37 Among the 12 individuals, eight of them were re-sighted only once, while the other four individuals were re-sighted twice during the three-month period (**Annex III of Appendix L**).
- 3.4.38 Notably, five of these 12 individuals (i.e. CH34, NL136, NL182, NL261 and NL286) were also sighted in NWL survey area during the HKLR03 monitoring surveys conducted concurrently in

the same three-month period. Moreover, one individual (NL46) was also sighted in West Lantau waters during the HKLR09 monitoring surveys from the same quarterly period.

Individual range use

- 3.4.39 Ranging patterns of the 12 individuals identified during the three-month study period were determined by fixed kernel method, and are shown in **Annex V of Appendix L**.
- 3.4.40 All identified dolphins sighted in the present quarter were utilizing NWL waters only, while none of them occurred in NEL waters (**Annex V of Appendix L**). This is in contrary to the extensive movements of many individual dolphins between NEL and NWL survey areas as observed in the earlier impact monitoring quarters as well as the baseline period. On the other hand, only one individual (NL46) has extended its range use to WL waters during the present quarter.
- 3.4.41 In the upcoming quarters, individual range use and movements should be continuously monitored to examine whether there has been any consistent shifts of individual home ranges from North Lantau to West or Southwest Lantau.

Action Level / Limit Level Exceedance

- 3.4.42 There was 1 Limit Level exceedance of dolphin monitoring for the quarterly monitoring data (between March 2018 – May 2018). For detail of investigation, please refer to **Appendix K**.
- 3.4.43 During the present quarter of dolphin monitoring, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations.
- 3.4.44 Although dolphins seldom occurred in the area of HKBCF construction in the past and during the baseline monitoring period, it is apparent that dolphin usage has been dramatically reduced in North Lantau waters in recent years, and many individuals have shifted away from this once-important habitat for the dolphins.
- 3.4.45 It is critical to continuously 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 there is any sign of recovery when the construction works have been completed.

3.5 Implementation of Environmental Measures

- 3.5.1 In response to the site audit findings, the Contractor carried out corrective actions. Details of site audit findings and the corrective actions during the reporting period are presented in **Appendix G**.
- 3.5.2 The Contractor waters 8 times per day on all exposed soil within the Contract site and associated works areas when construction activities are being undertaken.
- 3.5.3 The marine traffic records and geographical plots of all the vessels tracks for the reporting month will be submitted by the Contractor to Engineer's Representative (ER), Environmental Team Leader (ETL) and Independent Environmental Checker / Environmental Project Office (IEC/ENPO) within 3 weeks after the reporting month. As informed by Contractor, there was no marine traffic since 30 January 2018.
- 3.5.4 Regarding the implementation of dolphin monitoring and protection measures (i.e. implementation of Dolphin Watching Plan, Dolphin Exclusion Zone and Silt Curtain integrity check), regular checking were conducted by the dolphin watcher(s) / dolphin observer(s) within the works area to ensure no dolphin was trapped by the enclosed silt curtain systems. No dolphin spotted within the enclosed silt curtain systems was reported and recorded during the reporting period. Silt curtain systems were also inspected timely in accordance to the submitted plan. All inspection records were kept properly.

- 3.5.5 Training was provided for barge operators in accordance with the Regular Marine Travel Routes Plan and relevant records were kept properly.
- 3.5.6 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix E**. Most of the necessary mitigation measures were implemented properly.

3.6 Advice on the Solid and Liquid Waste Management Status

- 3.6.1 The Contractor registered as a chemical waste producer for the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.
- 3.6.2 No marine sediment was generated/treated and no treated marine sediment was reused in the reporting period. As informed by the Contractor in May 2016, the transfer of treated marine sediment to Contract no. HY/2010/02 has been discontinued since July 2015.
- 3.6.3 The summary of waste flow table is detailed in **Appendix H**.
- 3.6.4 The Contractor was reminded that chemical waste containers should be properly treated and stored 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*.

3.7 Environmental Licenses and Permits

- 3.7.1 The valid environmental licenses and permits during the reporting period are summarized in **Appendix I**.

4 Summary of Exceedance, Complaint, Notification of Summons and Successful Prosecution

4.1 Summary of Exceedance of the Environmental Quality Performance Limit

- 4.1.1 For air quality monitoring, No Action and Limit Level exceedances of 1-hour TSP were recorded at AMS2, AMS3B and AMS7B during the reporting period. No Action and Limit Level exceedances of 24-hour TSP were recorded at AMS2, AMS3B and AMS7B during the reporting period.
- 4.1.2 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A Reports (for March to May 2018) prepared by Contract No. HY/2011/03.
- 4.1.3 There were no Action and Limit Level exceedance for noise recorded at NMS2 and NMS3B during the reporting period.
- 4.1.4 For water quality monitoring during the reporting period, 2 Action Level exceedances of dissolved oxygen were recorded at mid-ebb tide on 25 and 28 May 2018 while no Action Level exceedances of dissolved oxygen at mid-flood tide. No Limit Level exceedances of dissolved oxygen during the reporting period.
- 4.1.5 2 Action Level exceedances of turbidity were recorded at mid-flood tide on 13 May 2018 while no Action Level exceedances of turbidity at mid-ebb tide. No Limit Level exceedances of turbidity during the reporting period.
- 4.1.6 8 Action Level exceedances of suspended solid were recorded at mid-flood tide on 2, 16, 21, 30 March 2018, 18, 20, 25 April 2018. 1 Action Level exceedances of suspended solid was recorded at mid-ebb tide on 2 April 2018. No Limit Level exceedances of suspended solid were recorded at mid-ebb tide and mid-flood tide during the reporting period.
- 4.1.7 After investigation, the exceedance was considered not likely to be caused by this Contract's activities. No follow-up action is required.
- 4.1.8 Impact dolphin monitoring results at all transects are reported in the EM&A Reports prepared for Contract No. HY/2013/01. One Limit Level exceedance of dolphin monitoring was recorded in the reporting quarter.

4.2 Summary of Complaints, Notification of Summons and Successful Prosecution

- 4.2.1 There was no complaint received in relation to the environmental impact during the reporting period. The details of cumulative statistics of Environmental Complaints are provided in **Appendix J**.
- 4.2.2 Statistics on notifications of summons and successful prosecutions are summarized in **Appendix J**.

5 Comments, Recommendations and Conclusion

5.1 Comments

- 5.1.1 According to the environmental site inspections undertaken during the reporting period, the following recommendations were provided:
- The Contractor was reminded to provide drip trays for chemical containers.
 - The Contractor was reminded to clear the general refuse.
 - The Contractor was reminded to cover the bags of cement properly.

- The Contractor was reminded to display NRMM label for the air compressor.
- The Contractor was reminded to clean the oil stain.
- The Contractor was reminded to keep site tidiness and clear the rubbish.

5.1.2 A summary of the Implementation Schedule of Environmental Mitigation Measures (EMIS) is presented in **Appendix E**. Most of the necessary mitigation measures were implemented properly.

5.2 Recommendations

- 5.2.1 With implementation of the recommended environmental mitigation measures, the contract's environmental impacts were considered environmentally acceptable. The weekly environmental site inspections ensured that all the environmental mitigation measures recommended were effectively implemented.
- 5.2.2 The recommended environmental mitigation measures, as included in the EM&A programme, effectively minimize the potential environmental impacts from the contract. Also, the EM&A programme effectively monitored the environmental impacts from the construction activities and ensure the proper implementation of mitigation measures. No particular recommendation was advised for the improvement of the programme.

5.3 Conclusions

- 5.3.1 The site preparation work of the Contract started on 26 September 2014 and the construction works of the Contract commenced on 6 October 2014. The construction works of the Contract No. HY/2013/06 within Contractor No. HY/2013/01 works area commenced on 20 February 2018. This is the fifteen Quarterly EM&A Report summaries findings of the EM&A works during the reporting period from 1 March to 31 May 2018 (included the construction works of Contract No. HY/2013/06 within Contractor No. HY/2013/01 works area).
- 5.3.2 For air quality monitoring, no Action and Limit Level exceedances of 1-hour and 24-hour TSP level were recorded at AMS2, AMS3B and AMS7B during the reporting period.
- 5.3.3 Summary of Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level at AMS6 shall be referred to the monthly EM&A Reports (for March to May 2018) prepared by Contract No. HY/2011/03.
- 5.3.4 There were no Action and Limit Level exceedance for noise recorded at NMS2 and NMS3B during the reporting period.
- 5.3.5 For water quality monitoring during the reporting period, 2 Action Level exceedances of dissolved oxygen were recorded at mid-ebb tide on 25 and 28 May 2018 while no Action Level exceedances of dissolved oxygen at mid-flood tide. No Limit Level exceedances of dissolved oxygen during the reporting period.
- 5.3.6 2 Action Level exceedances of turbidity were recorded at mid-flood tide on 13 May 2018 while no Action Level exceedances of turbidity at mid-ebb tide. No Limit Level exceedances of turbidity during the reporting period.
- 5.3.7 8 Action Level exceedances of suspended solid were recorded at mid-flood tide on 2, 16, 21, 30 March 2018, 18, 20, 25 April 2018. 1 Action Level exceedances of suspended solid was recorded at mid-ebb tide on 2 April 2018. No Limit Level exceedances of suspended solid were recorded at mid-ebb tide and mid-flood tide during the reporting period.
- 5.3.8 After investigation, the exceedance was considered not likely to be caused by this Contract's activities. No follow-up action is required.
- 5.3.9 Impact dolphin monitoring results at all transects are reported in the EM&A Reports prepared for Contract No. HY/2013/01. One Limit Level exceedance of dolphin monitoring was recorded during the monitoring period (between March – May 2018).
- 5.3.10 Environmental site inspections were carried out on 7, 14, 23 and 28 March, 4, 11, 18, and 25 April and 2, 9, 16, 23 and 30 May 2018, for the Contract No. HY/2013/01 (includes the construction works of Contract No. HY/2013/06 within Contractor No. HY/2013/01 works area). Recommendations on remedial actions were given to the Contractor for the deficiencies identified during the site inspections.
- 5.3.11 There was no complaint received in relation to the environmental impact during the reporting period.
- 5.3.12 No notification of summons and successful prosecution was received during the reporting period.



FIGURES

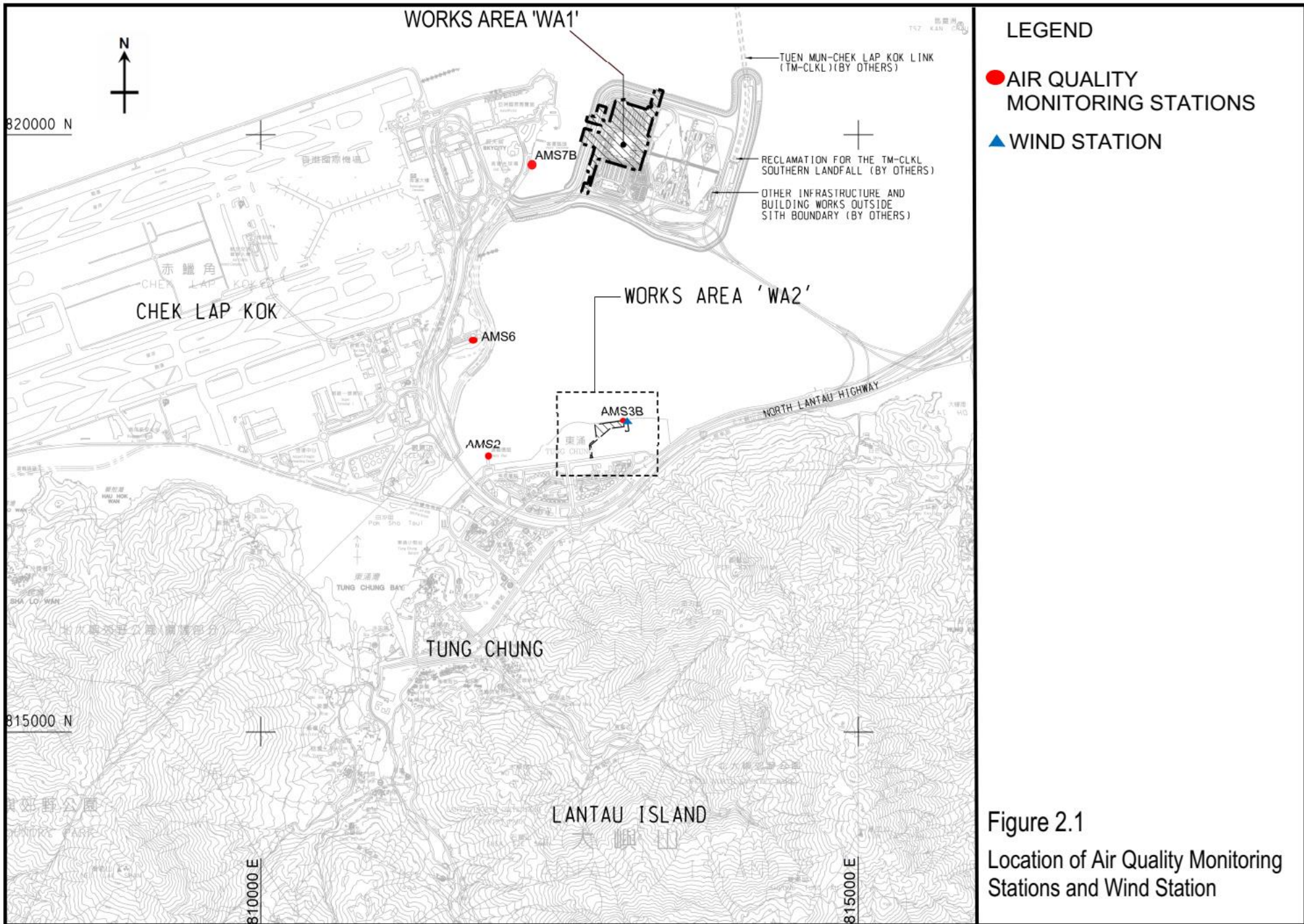


Figure 2.1
Location of Air Quality Monitoring Stations and Wind Station

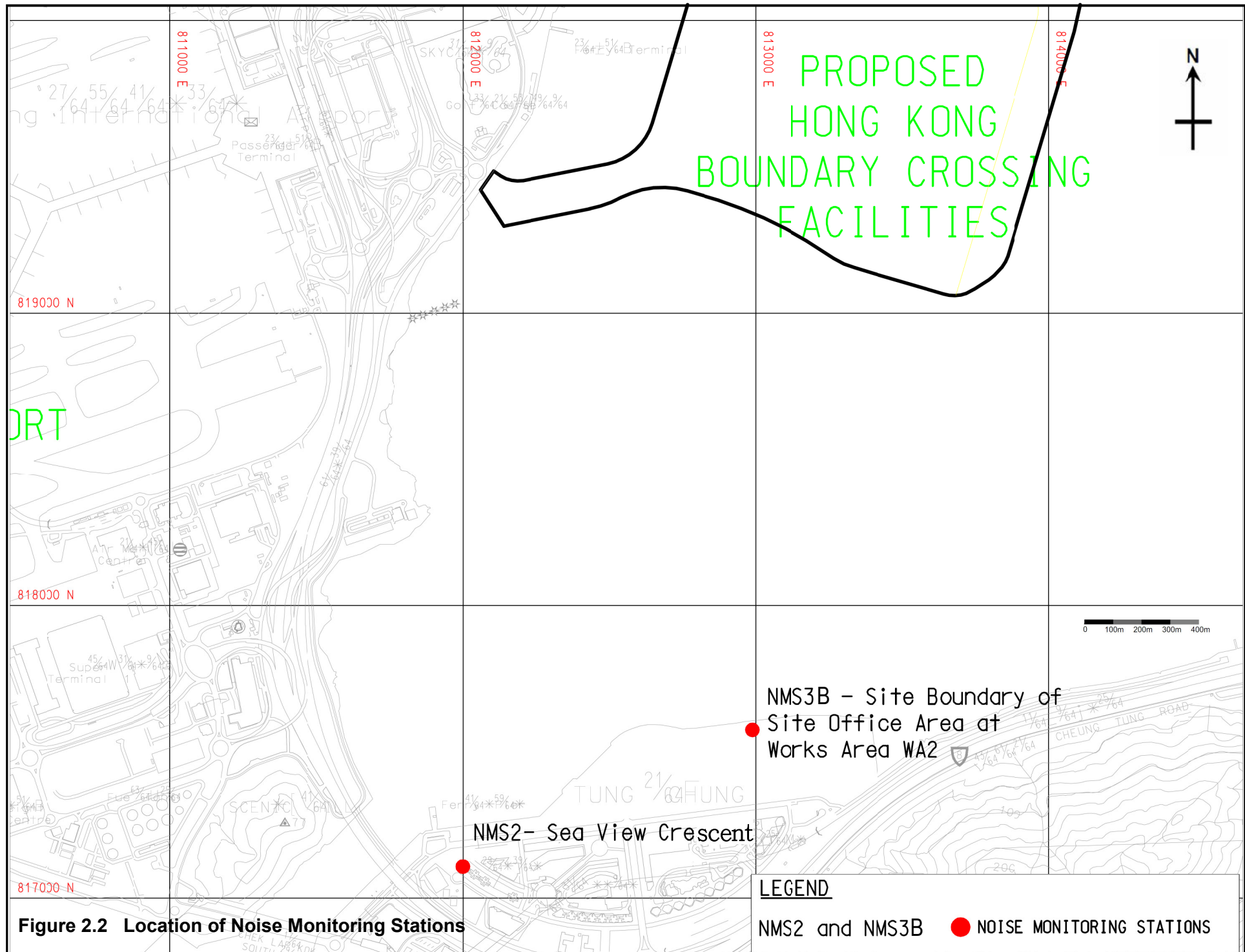
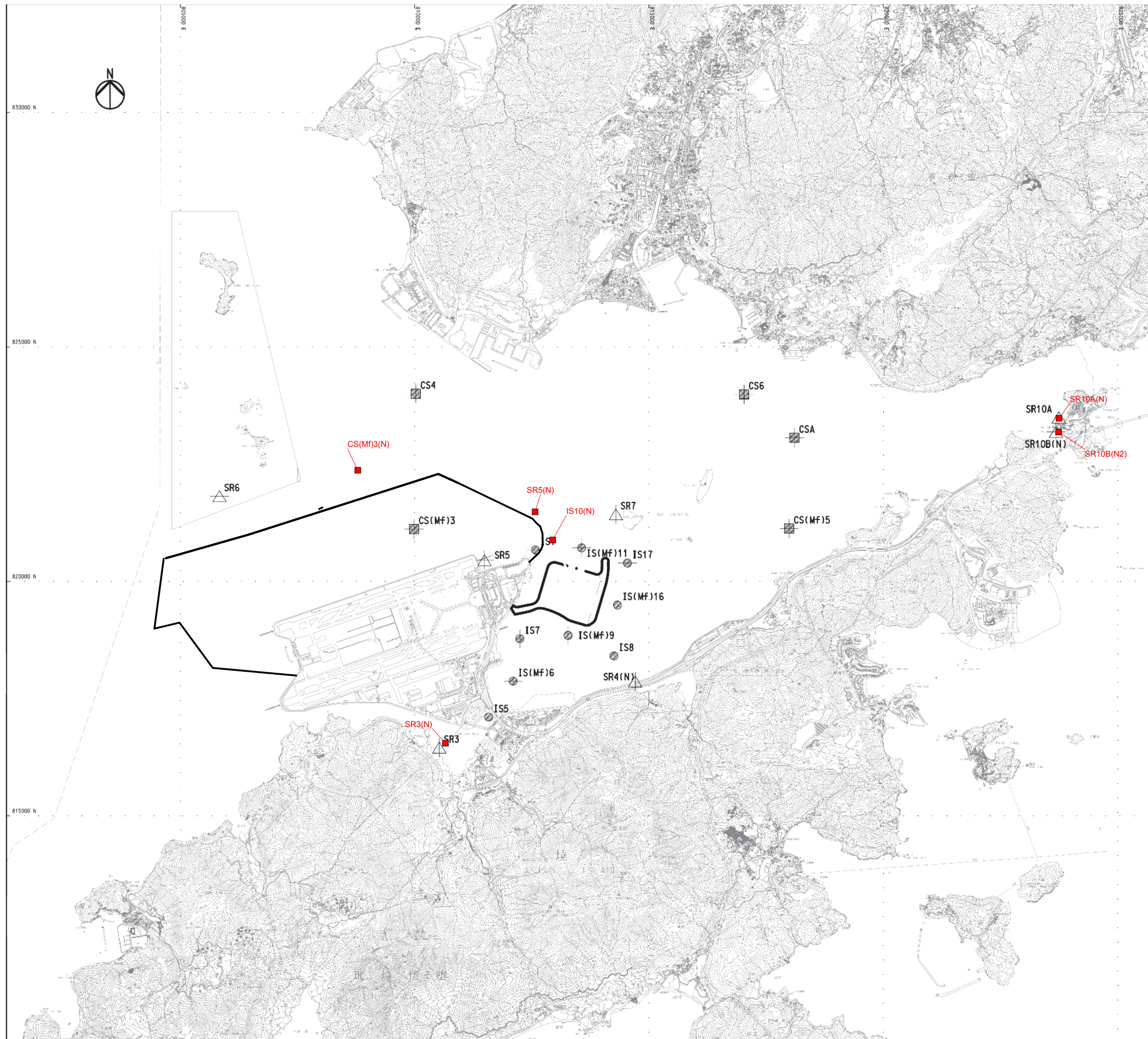


Figure 2.2 Location of Noise Monitoring Stations

LEGEND

NMS2 and NMS3B ● NOISE MONITORING STATIONS



Station	East	North
IS5	811579	817106
IS(Mf)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS(Mf)9	813273	818850
IS10(N)	812942	820881
IS(Mf)11	813562	820716
IS(Mf)16	814328	819497
IS17	814539	820391
SR3(N)	810689	816591
SR4(N)	814705	817859
SR5(N)	812569	821475
SR6	805837	821818
SR7	814293	821431
SR10A(N)	823644	823484
SR10B(N2)	823689	823159
CS(Mf)3(N)	808814	822355
CS(Mf)5	817990	821129
CS4	810025	824004
CS6	817028	823992
CSA	818103	823064

FIGURE 2.3 – LOCATION OF WATER QUALITY MONITORING STATIONS

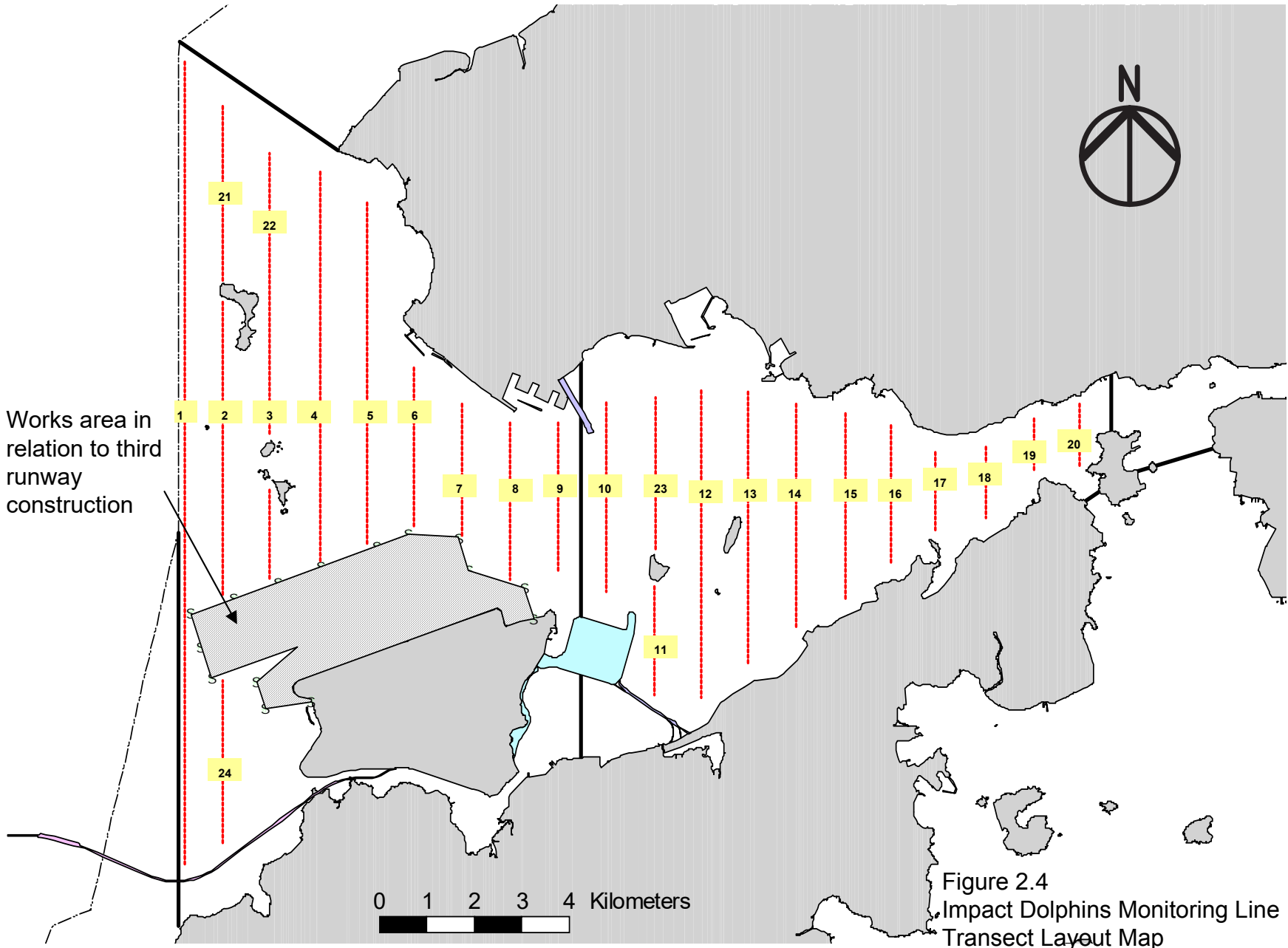
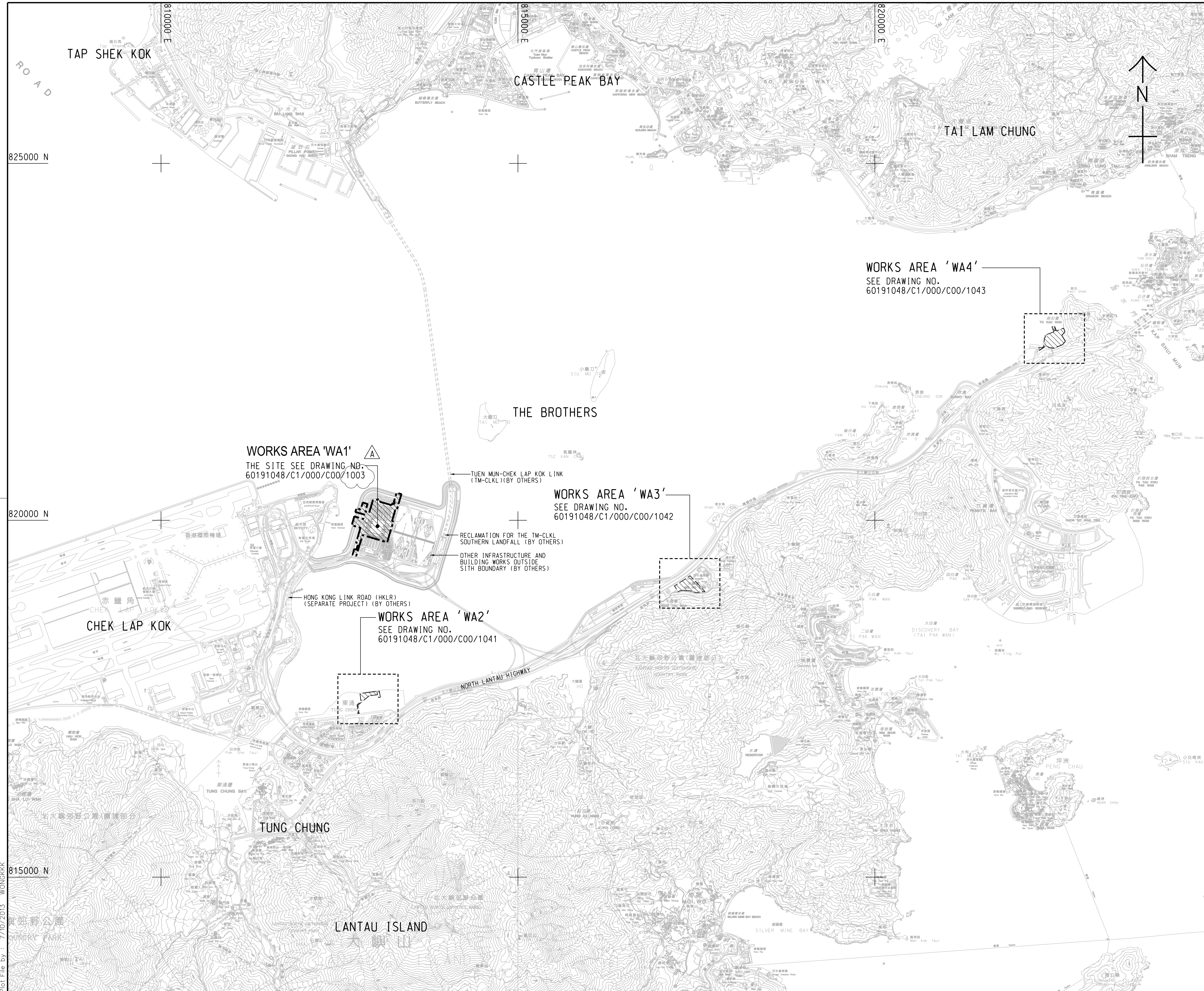


Figure 2.4
Impact Dolphins Monitoring Line
Transect Layout Map

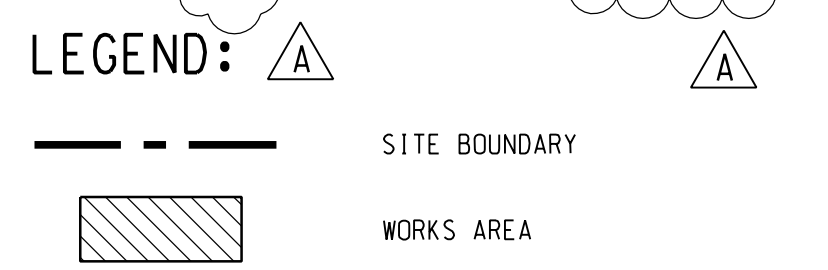


APPENDIX A

Location of Works Areas



- NOTES:**
- COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
 - DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.
 - THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C1/000/C00/1041 TO 1043.



B	WORKING DRAWING	BWCW SCI JUN.14
A	TENDER ADDENDUM NO. 1	BWCW SCI OCT.13
-	TENDER DRAWING	BWCW SCI SEP.13
REV.	DESCRIPTION	CHECKED DATE
修訂	內容摘要	審核 日期

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港珠澳大橋香港工程管理處
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HONG KONG-ZHUHAI-MACAO BRIDGE
 HONG KONG BOUNDARY CROSSING FACILITIES
 - PASSENGER CLEARANCE BUILDING

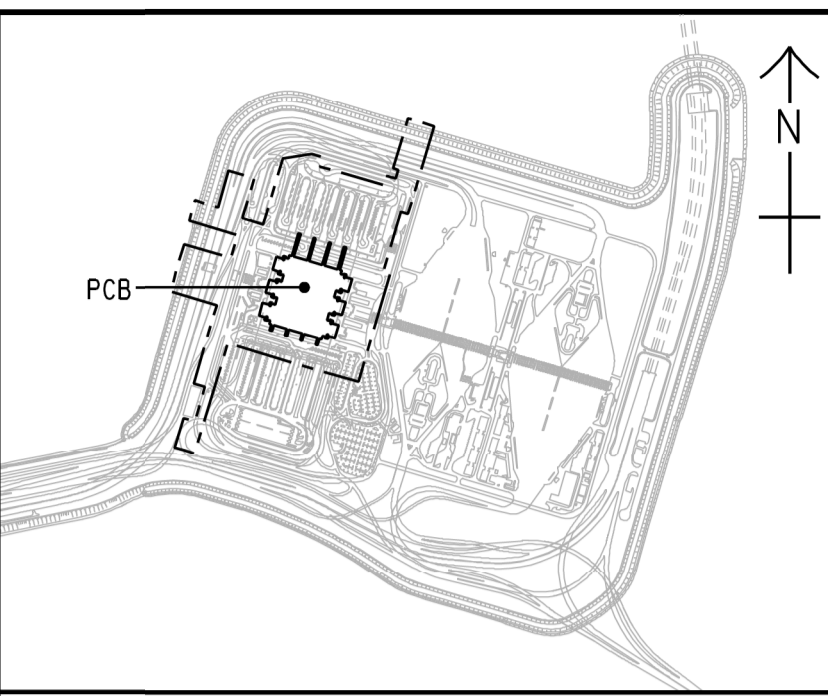
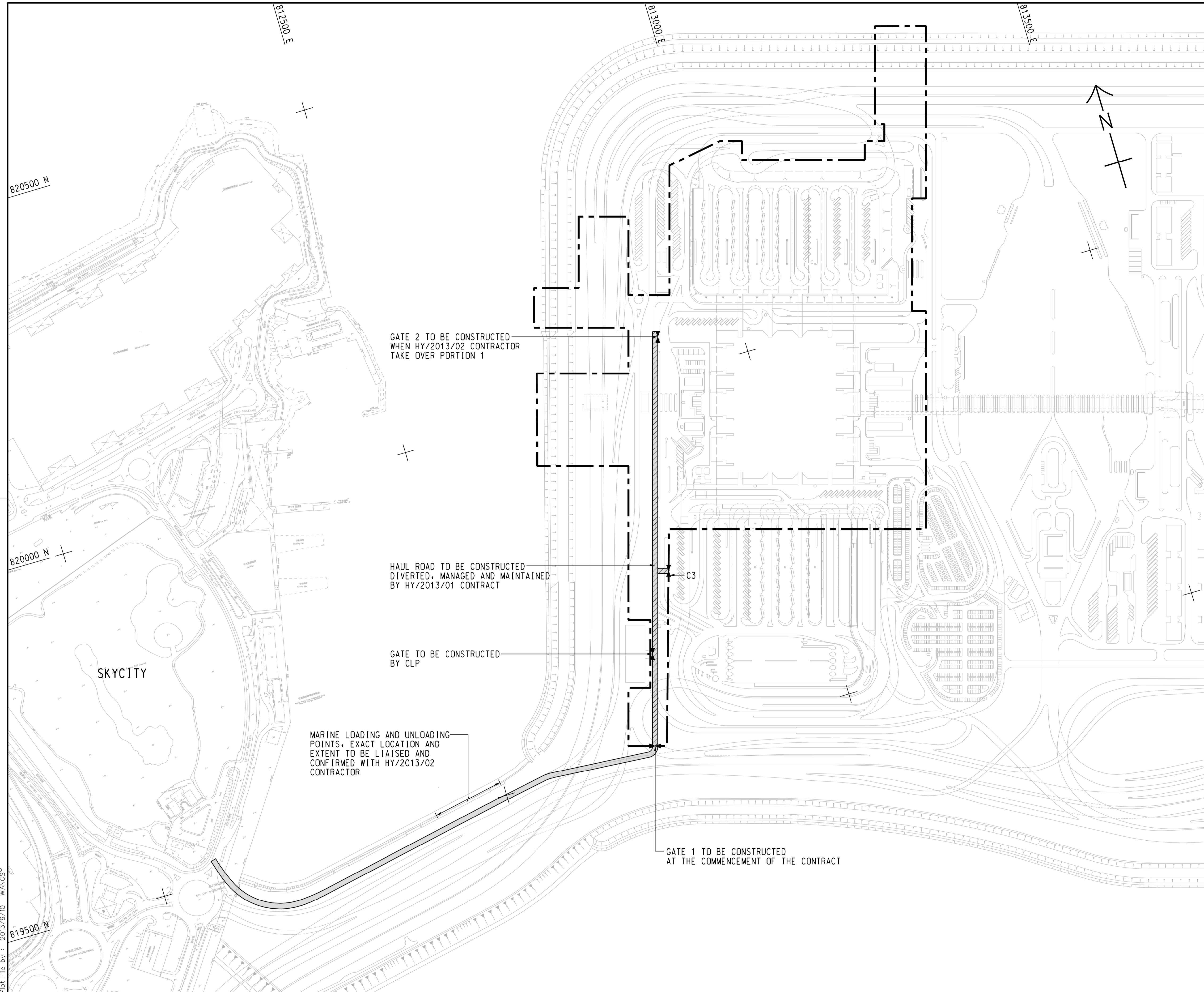
SITE LOCATION PLAN

AECOM + +
Rogers Stirk Harbour + Partners **Aedas**
 BURO HAPPOLD ATKINS ADI + +

DRG.NO. 60191048/C1/000/C00/1000B
 圖紙編號

DESIGNED BY 設計	BWCW	CONTRACT NO. 合約編號	HY/2013/01	P. DIR. APPROVED 批准人	TKH
DRAWN BY 繪圖	WSY	STATUS 階段	WORKING DRAWING		
SCALE 比例	A1 1 : 25000	DIMENSIONS ARE IN 尺寸單位			
		METRES			
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Plot File by : 7/10/2013 WONGKKK



LOCATION PLAN
SCALE 1 : 20000

NOTES:

- COORDINATES ARE BASED ON HONG KONG METRIC GRID (1980) UNLESS OTHERWISE NOTED.
- LEVELS ARE IN METRES RELATIVE TO HONG KONG PRINCIPAL DATUM (mPD) UNLESS OTHERWISE NOTED.
- DIMENSIONS ARE IN METRES UNLESS OTHERWISE STATED.
- SETTING OUT, DIMENSIONS, LEVELS, COORDINATES ARE TO BE CALCULATED BY THE CONTRACTOR. NO INFORMATION SHOULD BE SCALED PHYSICALLY OR ELECTRONICALLY FROM THE DRAWINGS OR FILES.
- SITE ACCESS SHALL BE HARD PAVED WITH PROPER DRAINAGE PROVIDED. IT SHALL BE KEPT UNOBSTRUCTED AND UNDISRUPTED AT ALL TIMES.

LEGEND:

- SITE BOUNDARY
- 7.3m CLEAR WIDTH CONSTRUCTION HAUL ROAD
- INDICATIVE 20m WIDE VEHICULAR ACCESS BY RECLAMATION CONTRACT HY/2010/02

GATE 2 TO BE CONSTRUCTED WHEN HY/2013/02 CONTRACTOR TAKE OVER PORTION 1

HAUL ROAD TO BE CONSTRUCTED DIVERTED, MANAGED AND MAINTAINED BY HY/2013/01 CONTRACT

GATE TO BE CONSTRUCTED BY CLP

MARINE LOADING AND UNLOADING POINTS, EXACT LOCATION AND EXTENT TO BE LIAISED AND CONFIRMED WITH HY/2013/02 CONTRACTOR

GATE 1 TO BE CONSTRUCTED AT THE COMMENCEMENT OF THE CONTRACT

- TENDER DRAWING		BWCW SCI	SEP.13
REV. 修改	DESCRIPTION 工程描述	CHECKED 審核	DATE 日期

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WORKS AREA WA1

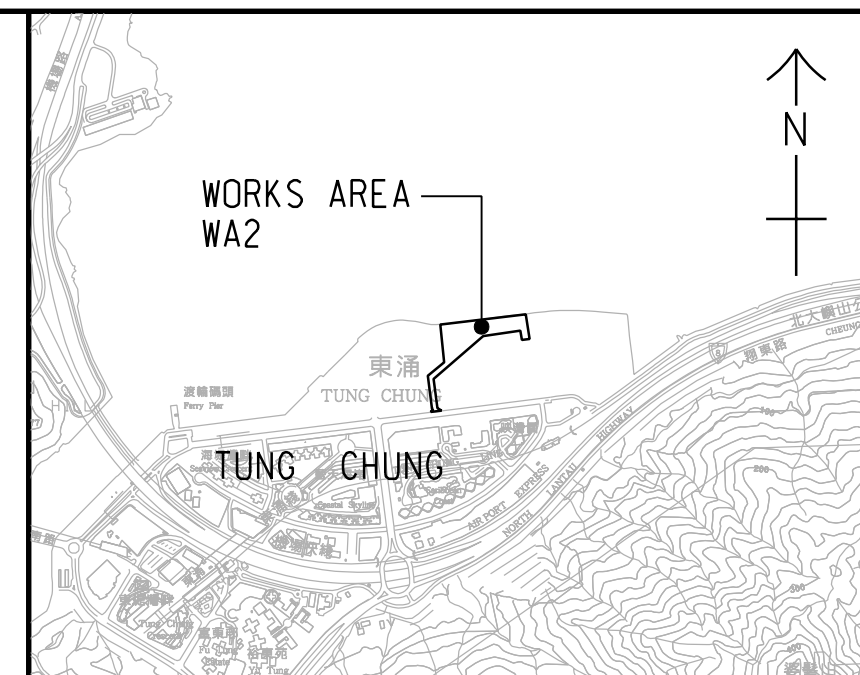
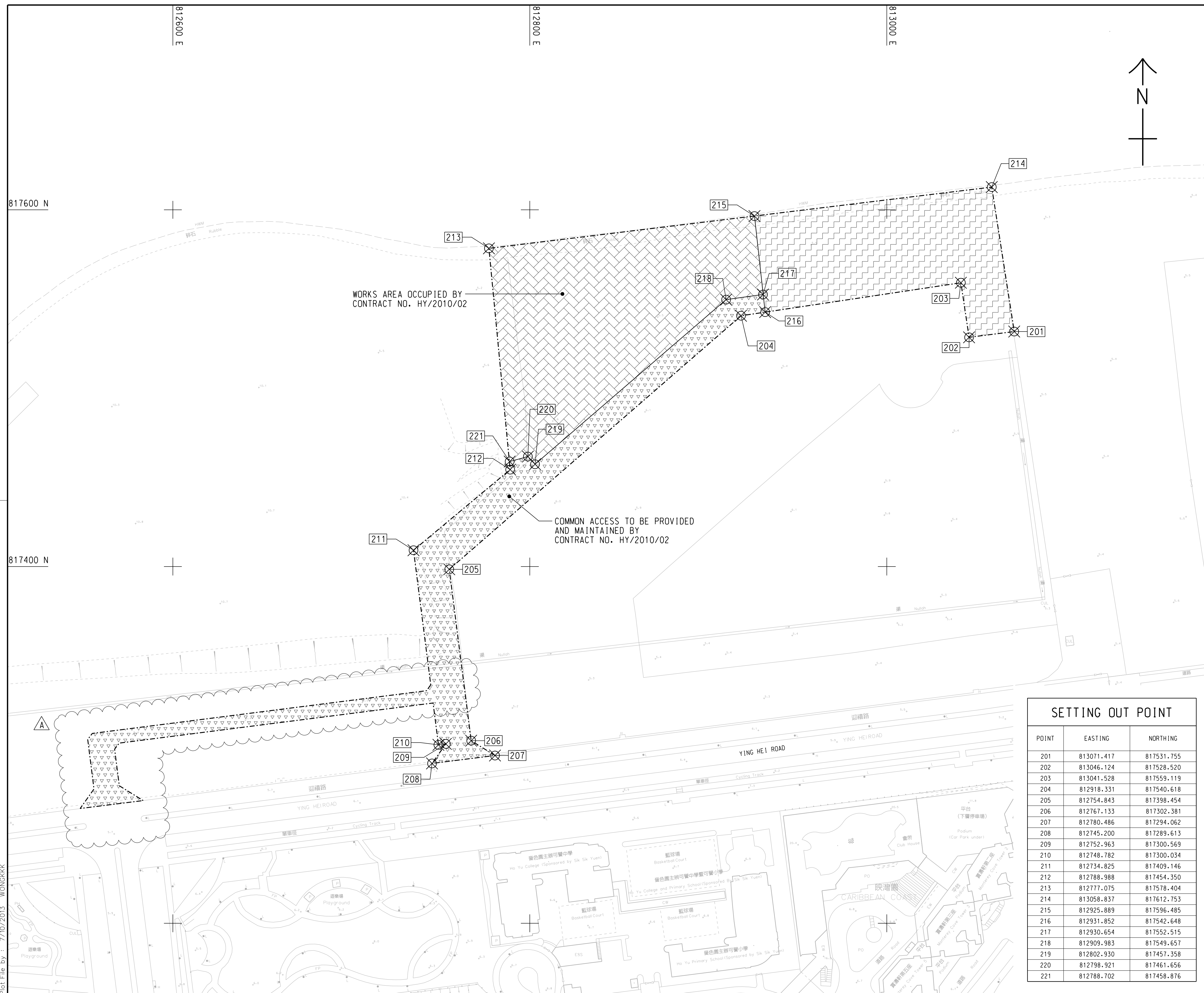
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SCALE 比例
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METRES
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LOCATION PLAN
SCALE 1 : 25000

- NOTES:**
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- LEGEND:**
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 - [Cross-hatched Pattern] PORTION 2.2
 - [Triangle Pattern] PORTION 2.3

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-	TENDER DRAWING	BWCW SCI	SEP. 13
REV.	DESCRIPTION	CHECKED	DATE
01	內務圖則	曾啟	

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WORKS AREA WA2

AECOM +
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 BURO HAPPOLD ATKINS ADI +

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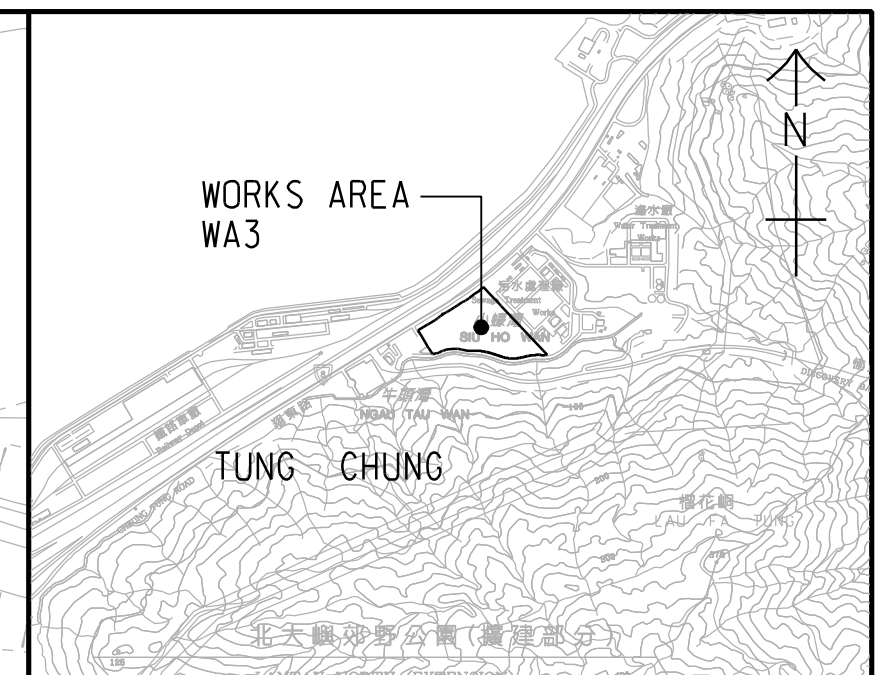
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204	812918.331	817540.618
205	812754.843	817398.454
206	812767.133	817302.381
207	812780.486	817294.062
208	812745.200	817289.613
209	812752.963	817300.569
210	812748.782	817300.034
211	812734.825	817409.146
212	812788.988	817454.350
213	812777.075	817578.404
214	813058.837	817612.753
215	812925.889	817596.485
216	812931.852	817542.648
217	812930.654	817552.515
218	812909.983	817549.657
219	812802.930	817457.358
220	812798.921	817461.656
221	812788.702	817458.876

Plot File by : 7/10/2013 WONGKKK

SETTING OUT POINT

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305	817340.825	819027.314
306	817387.350	819023.403
307	817387.861	819043.396
308	817466.133	819091.047
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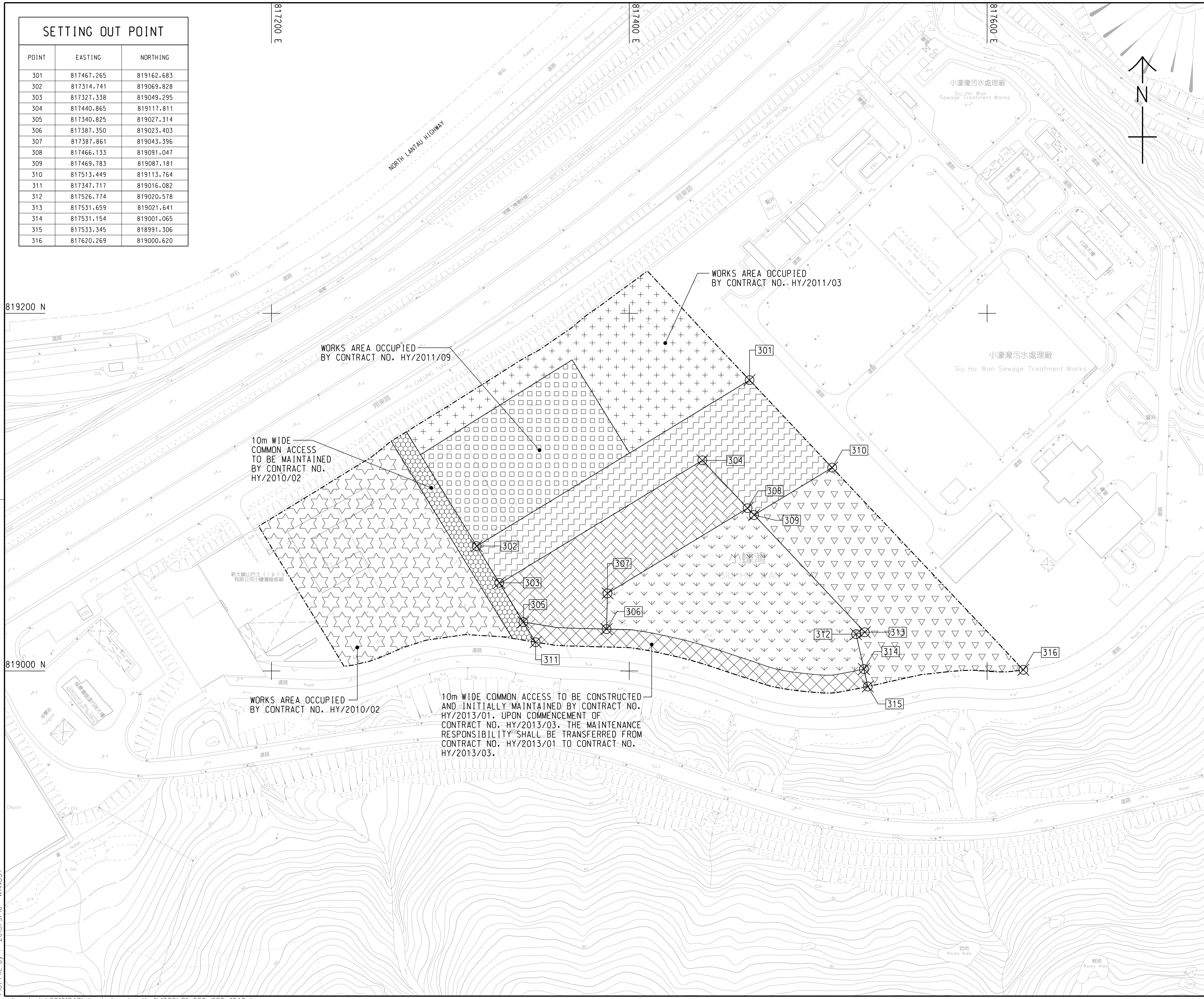
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NOTES:

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- DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.

LEGEND:

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	PORTION 3.1
	PORTION 3.2
	PORTION 3.3
	PORTION 3.4
	PORTION 3.5
	PORTION 3.6
	PORTION 3.7
	PORTION 3.8
	PORTION 3.9



WORKS AREA OCCUPIED BY CONTRACT NO. HY/2011/09

WORKS AREA OCCUPIED BY CONTRACT NO. HY/2011/03

10m WIDE COMMON ACCESS TO BE MAINTAINED BY CONTRACT NO. HY/2010/02

WORKS AREA OCCUPIED BY CONTRACT NO. HY/2010/02

10m WIDE COMMON ACCESS TO BE CONSTRUCTED AND INITIALLY MAINTAINED BY CONTRACT NO. HY/2013/01. UPON COMMENCEMENT OF CONTRACT NO. HY/2013/03, THE MAINTENANCE RESPONSIBILITY SHALL BE TRANSFERRED FROM CONTRACT NO. HY/2013/01 TO CONTRACT NO. HY/2013/03.

A	WORKING DRAWING	BWCW SCI JUN. 14
-	TENDER DRAWING	BWCW SCI SEP. 13
REV. 修改	DESCRIPTION 內容摘要	CHECKED 查核 DATE 日期

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WORKS AREA WA3

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圖紙編號

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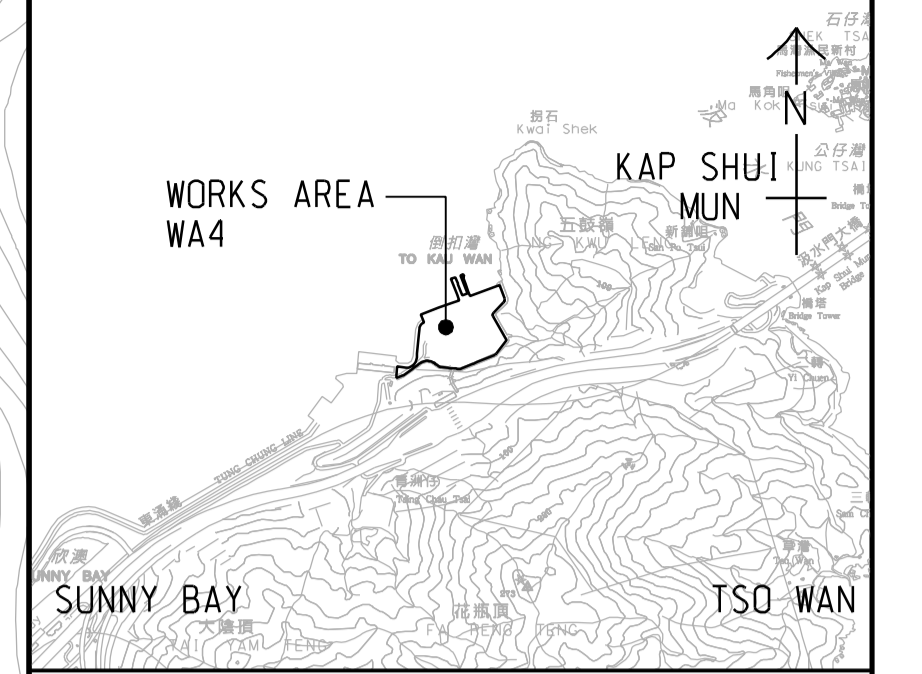
SETTING OUT POINT

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404	822610.940	822599.642
405	822629.428	822607.359
406	822526.988	822529.813
407	822618.348	822567.950
408	822542.232	822489.581
409	822584.983	822507.426
410	822606.866	822516.561
411	822560.278	822441.956
412	822602.949	822460.010
413	822621.914	822467.959
414	822624.130	822470.998
415	822651.725	822508.856

822400 E

822600 E

TO KAU WAN



LOCATION PLAN
SCALE 1 : 25000

NOTES:

- COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
- DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.

LEGEND:

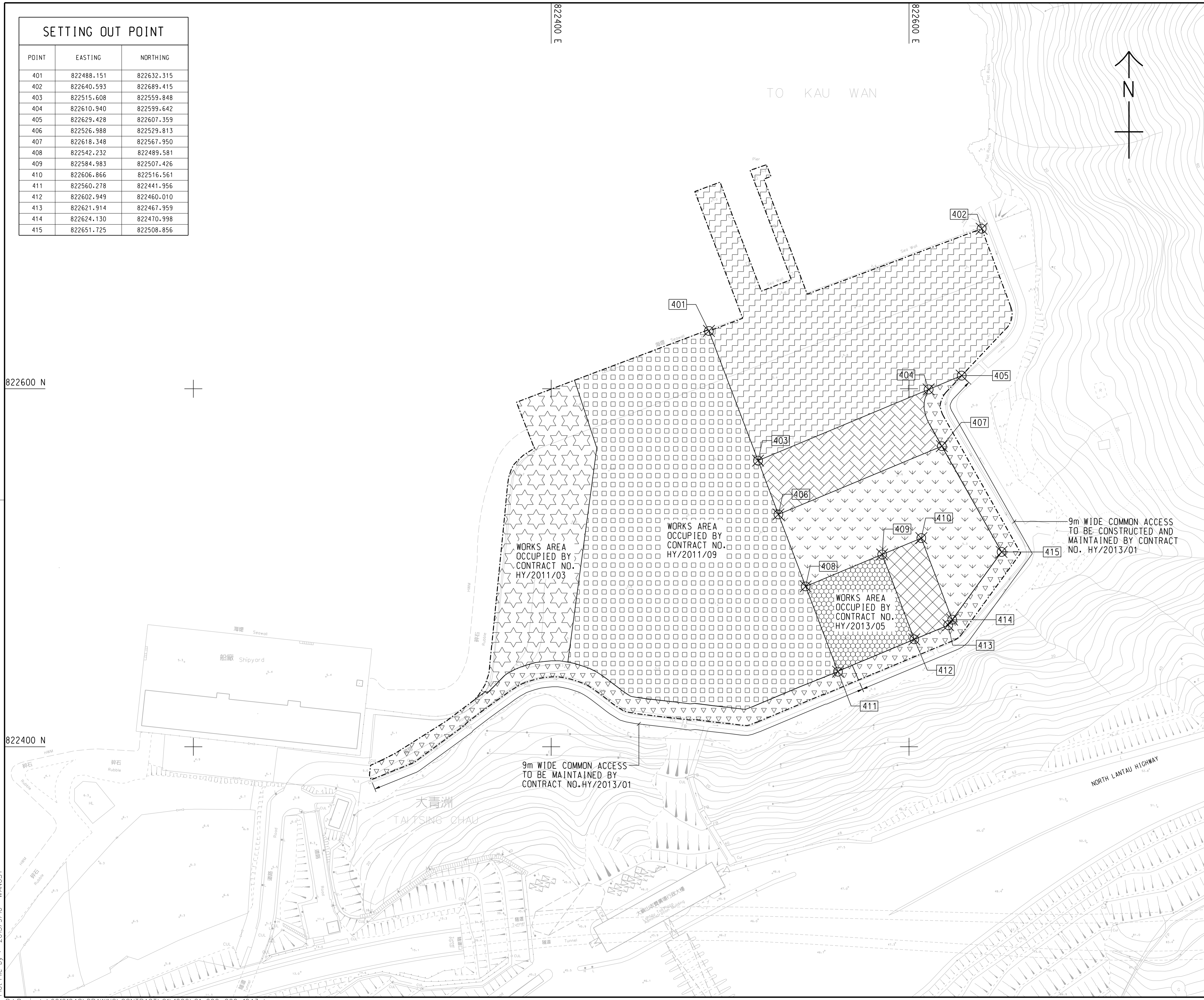
- WORKS AREA BOUNDARY
- [Pattern 1] PORTION 4.1
- [Pattern 2] PORTION 4.2
- [Pattern 3] PORTION 4.3
- [Pattern 4] PORTION 4.4
- [Pattern 5] PORTION 4.5
- [Pattern 6] PORTION 4.6
- [Pattern 7] PORTION 4.7
- [Pattern 8] PORTION 4.8

822600 N

822400 N

Plot File by : 2013/9/10 WANGSY

P:\Projects\60191048\DRAWING\CONTRACT\C1\1000\C1_000_C00_1043.dgn



WORKS AREA OCCUPIED BY CONTRACT NO. HY/2011/03

WORKS AREA OCCUPIED BY CONTRACT NO. HY/2011/09

WORKS AREA OCCUPIED BY CONTRACT NO. HY/2013/05

9m WIDE COMMON ACCESS TO BE CONSTRUCTED AND MAINTAINED BY CONTRACT NO. HY/2013/01

9m WIDE COMMON ACCESS TO BE MAINTAINED BY CONTRACT NO. HY/2013/01

REV.	DESCRIPTION	DATE
1	TENDER DRAWING	SEP.13

路政署 HIGHWAYS DEPARTMENT
香港大橋香港工程管理有限公司
Hong Kong - Zhuhai - Macao Bridge Hong Kong Project Management Office

HONG KONG-ZHUHAI-MACAO BRIDGE
HONG KONG BOUNDARY CROSSING FACILITIES
- PASSENGER CLEARANCE BUILDING

WORKS AREA WA4

AECOM Aedas
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI

DRG.NO. 60191048/C1/000/C00/1043
圖紙編號

DESIGNED BY BWCW CONTRACT NO. HY/2013/01 P. Dir. APPROVED EMSC

DRAWN BY WSY STATUS 補放

SCALE 1:1000 DIMENSIONS ARE IN METRES

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路政署
HIGHWAYS DEPARTMENT

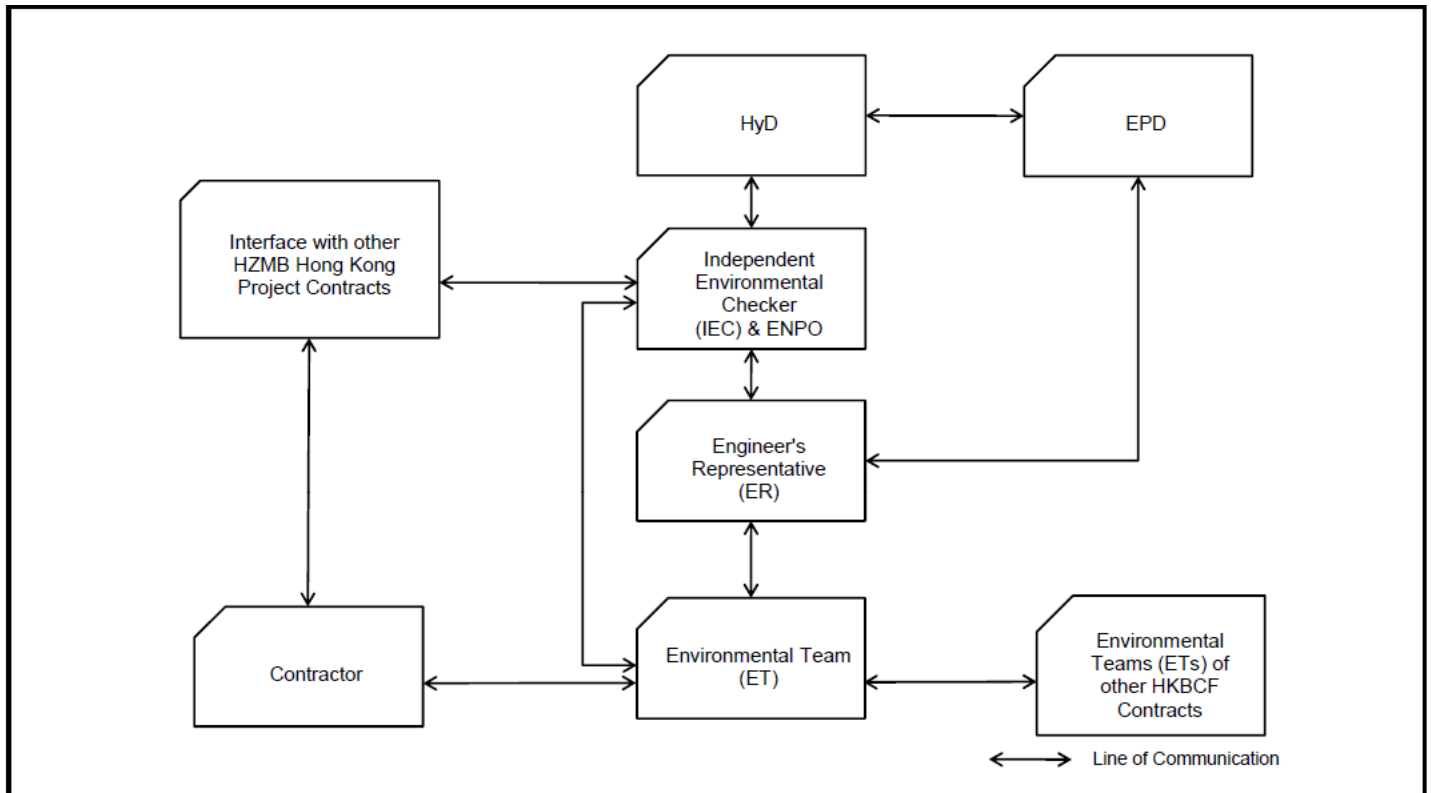
港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Contract No. HY/2013/01
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance Building
15th Quarterly EM&A Report

APPENDIX B

Project Organization for Environmental Works

Project Organisation for Environmental Works



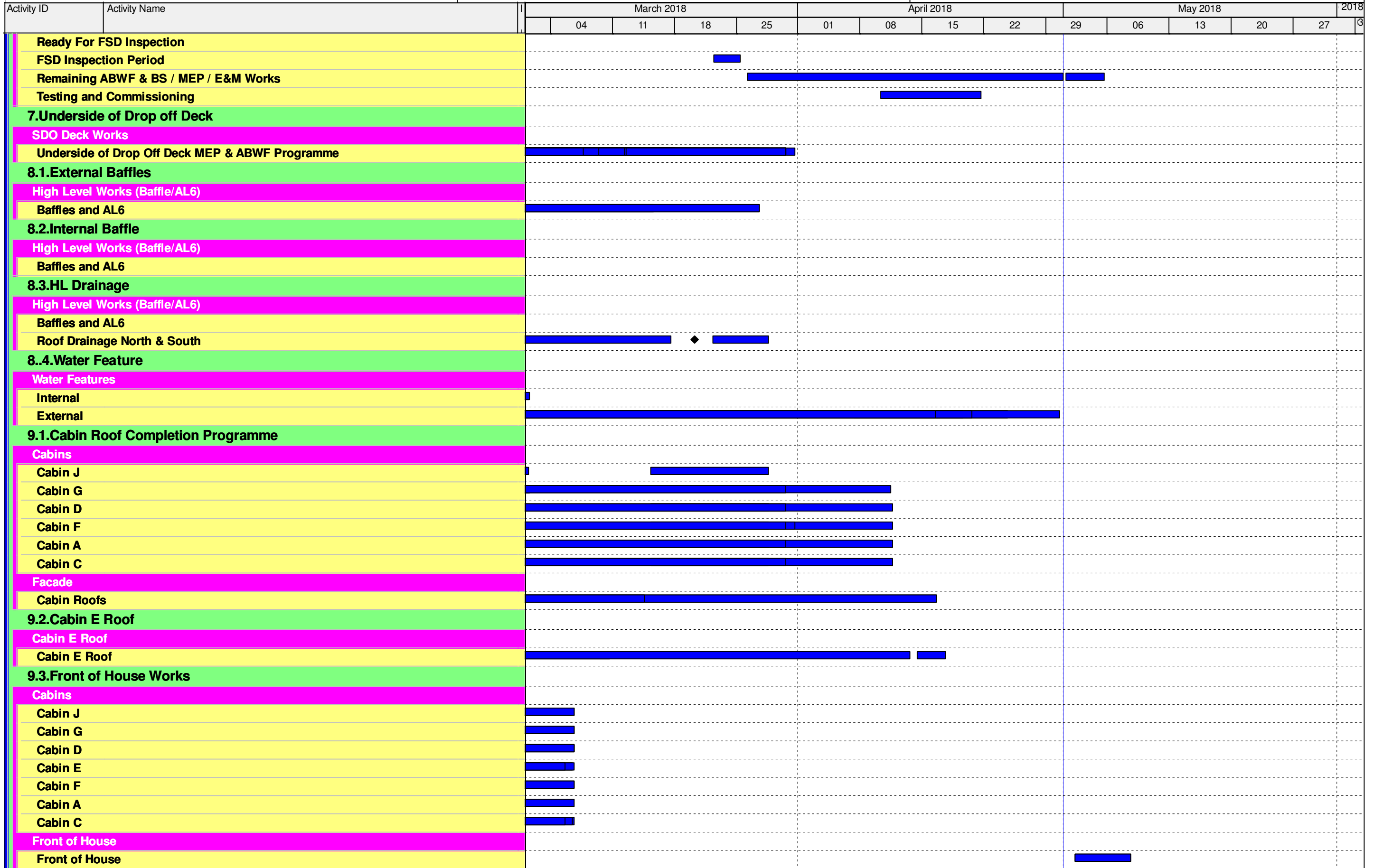


APPENDIX C

Construction Programme

Activity ID	Activity Name	March 2018				April 2018				May 2018				2018	
		04	11	18	25	01	08	15	22	29	06	13	20	27	31
Target Programme to Completion Update DD 1st May															
0.Fire Service Inspections															
Fire Service Inspections															
Fire Service Inspections															
FSD1000	Complete FS defects from 1st Inspection														
FSD1010	FS taskforce inspections														
FSD1020	Additional works - AVAS systems														
FSD1030	Additional works - BSMT AHU Room Detectors														
FSD1035	Additional works - Probe detetors (AHU Plantroom)														
FSD1040	Final FS rehearsal tests/make ready for FS re inspection	████████████████████													
FSD1050	Request FS re-inspecton (excluding EVA + SFH)														
FSD1055	FS Review Period														
FSD1060	FS reinspection(s) (excluding EVA+SFH)	██													
FSD1071	FS reinspection for EVA+SFH	████████													
FSD1072	EVA & SFH completion including FS Inspection	◆													
FSD1072a	FS Review					████████████████				████████					
FSD1080	FS Issue fire certification	◆													
FSD1090	TPIDC/AP/RSE Inspection	████████████████████													
FSD1100	OP Obtained	◆													
FSD1110	Complete o/s items during Maintenance Period														
1.External Works															
External Staircases		██													
External Works															
PCB - East		██													
PCB - West		██													
PCB - North (Under Row 5)		██													
PCB - Site entrance area and northern end (North West)		██													
Guard Booths		██													
2.External Toilets															
Public Toilets															
RC Structures		█													
ABWF Works		██													
MEP		██													
Roof		██													
3.Covered Walkway															
Covered Walkway															
South		██													
North		██													
4.Vertical Circulation															
Vertical Circulation															
Eastern Vertical Circulation		██													
Western Vertical Circulation		██													
5.Smoke Vent and Delivery Hatch															
Smoke Vent and Delivery Hatch															
6.Refuse Collection Point															
Refuse Collection Building															

█ Remaining Level of Effort
 █ Remaining Work
 ◆ Milestone
 █ Actual Work
 █ Critical Remaining Work



■ Remaining Level of Effort
 ■ Remaining Work
 ◆ Milestone
 ■ Actual Work
 ■ Critical Remaining Work

Activity ID	Activity Name	March 2018				April 2018				May 2018				2018	
		04	11	18	25	01	08	15	22	29	06	13	20	27	31
Kiosks & Booths		[Gantt bars for Kiosks & Booths]													
Red & Green Channels		[Gantt bars for Red & Green Channels]													
A26132	Red & Green Channel - Building Steel / Glazing	[Gantt bar]													
A26133	Red & Green Channel - Critical Room - ABWF	[Gantt bar]													
A26134	Red & Green Channel - Other Room - MEP	[Gantt bar]													
A26135	Red & Green Channel - Other Room - ABWF	[Gantt bar]													
A26136	Red & Green Channel - Critical Room - MEP	[Gantt bar]													
A26137	Red & Green Channel - Building Steel / Glazing	[Gantt bar]													
A26137a	Red & Green Channel - Hanging TV frames	[Gantt bar]													
A26138	Red & Green Channel - Critical Room - ABWF	[Gantt bar]													
A26139	Red & Green Channel - Critical Room - MEP	[Gantt bar]													
A26140	Red & Green Channel - Other Room - MEP	[Gantt bar]													
A26141	Red & Green Channel - Other Room - ABWF	[Gantt bar]													
10. Balustrade		[Gantt bars for Balustrade]													
Balustrade		[Gantt bars for Balustrade]													
Internal		[Gantt bars for Internal]													
Footbridges		[Gantt bars for Footbridges]													
11. Roof Works		[Gantt bars for Roof Works]													
High Level Works (Baffle/AL6)		[Gantt bars for High Level Works]													
Roof Cladding & Glazing		[Gantt bars for Roof Cladding & Glazing]													
Southern Drop Off Deck		[Gantt bars for Southern Drop Off Deck]													
SDO Deck Works		[Gantt bars for SDO Deck Works]													
EVA and Stage 1		[Gantt bar]													
Stage 2 (DOD North West)		[Gantt bar]													
Stage 3 (DOD South West)		[Gantt bar]													
Stage 4 (DOD East)		[Gantt bar]													
Movement Joint		[Gantt bar]													
Facade Programme		[Gantt bars for Facade Programme]													
Facade		[Gantt bars for Facade]													
Genset Building		[Gantt bar]													
Sea Water Pump House		[Gantt bar]													
Testing and Commissioning		[Gantt bars for Testing and Commissioning]													
Electrical Systems		[Gantt bars for Electrical Systems]													
CLP Tx Power & LV Sub-mains Power-On		[Gantt bars for CLP Tx Power & LV Sub-mains Power-On]													
EL1000	C3 handover for Remaining External Cable Duct Routes	[Gantt bar]													
EL1010	Complete Balance of Submains Cabling to External Areas incl C2 & C3 areas	[Gantt bar]													
EL1020	Progressively Energise Outgoing Circuits from LV switchboards - External Areas incl C2&C3	[Gantt bar]													
EL1030	LV Switchboards - Final Interfacing T&C with SCADA system	[Gantt bar]													
Electrical Sub-mains Installation & Final Distribution		[Gantt bars for Electrical Sub-mains Installation & Final Distribution]													
EL1040	Complete Installation CBS Lighting Control for Emergency FS Lighting (26 no. sets):	[Gantt bar]													
EL1050	Final T&C: CBS Lighting Control fo FS Related Lighting Installations	[Gantt bar]													
EL1060	SCADA Interfacing with CBS and Final T&C	[Gantt bar]													
Lighting and Small Power		[Gantt bars for Lighting and Small Power]													
EL1070	Non-FS: Lighting & Small Power Final Circuit Testing / Progressive Switch Lights On	[Gantt bar]													
EL1080	Non-FS : Lighting & Small Power - Final Lighting Control T&C and Lux Level Checks	[Gantt bar]													
EL1090	Non-FS: Lighting & Small Power Final Circuit Testing / Progressive Switch Lights On	[Gantt bar]													
EL1100	Non-FS : Lighting & Small Power - Final Lighting Control T&C and Lux Level Checks	[Gantt bar]													

█ Remaining Level of Effort
 █ Remaining Work
 ◆ Milestone
 █ Actual Work
 █ Critical Remaining Work

Activity ID	Activity Name	March 2018				April 2018				May 2018				2018
		04	11	18	25	01	08	15	22	29	06	13	20	
EL1110	Non-FS: Lighting & Small Power Final Circuit Testing / Progressive Switch Lights On	[Actual Work]												
EL1120	Non-FS : Lighting & Small Power - Final Lighting Control T&C and Lux Level Checks													
EL1130	Non-FS: Lighting & Small Power Final Circuit Testing / Progressive Switch Lights On	[Actual Work]												
EL1140	Non-FS : Lighting & Small Power - Final Lighting Control T&C and Lux Level Checks													
UPS Systems - Final T&C:														
EL1150	Full Load Test and Functional T&C													
EL1160	Interfacing with SCADA													
Emergency Generator & Associated Diesel Fuel Supply systems														
EL1170	Fire Service Generators (Zone C & G) Final T&C and Interfacing with SCADA													
EL1180	Fire Service Generators (Zone A, D & J) Final T&C and Interfacing with SCADA													
EL1190	Emergency Generators (3no at EGB) Final T&C and Interfacing with SCADA													
Other "Misc" Electrical Systems														
EL1200	Earthing System - Final T&C													
EL1210	Lightning Protection System - Final T&C													
EL1220	SCADA System Interfacing with LV Sw Board and PQM Energy Mgt system													
MVAC Systems														
Chiller Plant & Associated Chilled & Heating Water Distribution														
MV1000	Stage 1 T&C for Chilled Water Circuit to enable Conditioned Wild Air													
MV1010	Progressive Energise Chiller Plant MCC's													
MV1020	Chilled Water - Primary & Secondary Water Circuit Flushing & Chemical Cleaning													
MV1020a	Chilled Water - Primary & Secondary Water Circuit Flushing & Chemical Cleaning - remaining													
MV1030	Chiller Primary Water Circuit By-pass Loops Re-instatement following flushing													
MV1040	Chiller Secondary Water Circuit By-pass Loops at AHU's and Hx Re-instatement													
MV1050	Chilled Water Pumps - Functional and Performance Tests													
MV1050a	Chilled Water Pumps - Functional and Performance Tests - Remaining													
MV1060	Chilled Water System - Ancilliary Equipment T&C													
MV1060a	Chilled Water System - Ancilliary Equipment T&C - Remaining													
MV1070	Chiller 1 & 2 Initial start-up checks (with Chiller supplier)													
MV1080	Chiller 3 to 8 Initial start-up checks (with Chiller supplier)													
MV1090	Light Chiller 1 to 3 Initial start-up checks (with Chiller supplier)													
MV1100	Condensor Seawater Supply Available													
MV1110	Target Chillers 1 & 2 Chillers Available and Chilled Water ON (In Manual Mode)													
MV1120	Target ALL Chillers Available (In Manual Mode)													
MV1130	Chilled Water - Secondary Water Circuit Flushing & Chemical Cleaning - CUE													
MV1140	Chiller Secondary Water Circuit Remove By-pass Loops - CUE													
MV1620	Chilled Water Riser Branches local flushing													
MV1630	CHW Riser chemical treatment and cleaning													
MV1640	Complete balance CW,HW pwk - Flushing , Chem Clean and Final Balance													
Chilled Water and Sea Water System SCADA T&C														
MV1150	Progressive Power On to SCADA PLC Panels													
MV1160	SWPH & Chiller Plant - End to End SCADA Wiring - Point Testing from PLC to Field Equipm													
MV1170	SWPH & Ciller Plant - SCADA Functional Testing													
MV1180	Chiller Plant & SWP - SCADA Chiller Start-up/Shut Down Programme Checking													
MV1190	Chiller & SWP Plant - SCADA Integrated Equipment Tests													
MV1200	Chiller & SWP Plant - SCADA Operation of System in Full Auto Mode													
MV1210	Chiller & SWP Plant - SCADA "Fine Tune" System Settings / Operation													
Heating Water Distribution - T&C														
MV1220	Heating Water Pumps - T&C / Pump Alignment													
MV1230	Primary & Secondary Heating Water Pipe Flushing and Chemical Cleaning													
MV1240	Stage 1 Water Balancing - Main Pipework Basement level and up to G/F Riser													

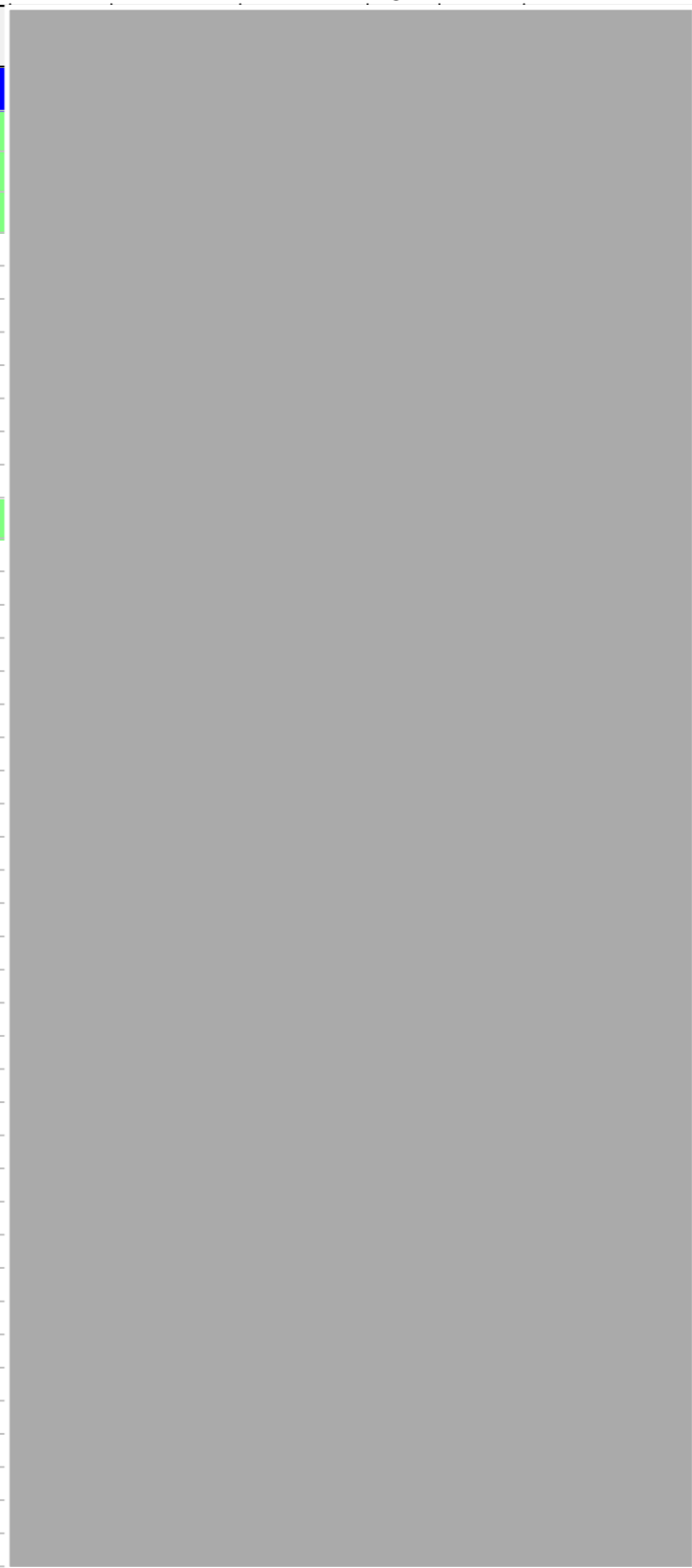
█ Remaining Level of Effort
 █ Remaining Work
 ◆ Milestone
█ Actual Work
█ Critical Remaining Work

Three Month Rolling Programme HKMZB HKBCF - Passenger Clearance Building		1.03 Aecom Output										09-May-18 09:07					
Activity ID	Activity Name	March 2018				April 2018				May 2018				2018			
		04	11	18	25	01	08	15	22	29	06	13	20	27	31		
MV1250	Complete balance HTG Pwk - Flushing, Chem. Clean and Final Balance	[Actual Work]										[Remaining Work]					
Heat Pumps - Initial start-up SAT checks & SCADA T&C																	
MV1260	Heat Pump 1 to 4 Initial start-up checks (with Chiller supplier)	[Actual Work]															
MV1270	Progressive Power On to SCADA PLC Panels	[Actual Work]															
MV1280	Heat Pump - End to End SCADA Wiring - Point Testing from PLC to Field Eq.	[Actual Work]										[Remaining Work]					
MV1290	Heat Pump System - SCADA Functional Testing	[Actual Work]															
MV1300	Heat Pump - SCADA Heat PumpStart-up/Shut Down Programme Checking	[Actual Work]															
MV1310	Heat Pump system- SCADA Integrated Equipment Tests											◆					
MV1320	Heat Pump - SCADA Operation of System in Full Auto Mode	[Actual Work]				[Actual Work]				[Remaining Work]							
AHU, Fans & Associated Distribution (including VAV, FCU, etc) B/F																	
MV1340	FCU Installations at LV Switch Rooms and Elect/ELV Rooms	[Actual Work]															
MV1350	Misc Ventilation Systems (various areas)																
All Cabins (G/F to Roof) - incls AHU+Duct Riser+ VAV(if applicable)+ Final Air Grille																	
MV1360	BOH Cabin AHU - Chilled water Available - Initial AHU Start-up T&C																
MV1370	BOH Cabin AHU & Main Distribution Ducts - Initial System Air Balance for conditioned "Wild A	[Actual Work]															
MV1380	Target ALL Cabin AHU's Operational - providing conditioned "Wild Air" to Cabins																
MV1390	Cabins VAV Box -Progressive Power On for VAV Box & SCADA network	[Actual Work]															
MV1400	BOH Cabin AHU - Complete Final Airside Balancing for Main Duct Runs and at VAV boxes	[Actual Work]										[Remaining Work]					
MV1410	BOH Cabins AHU & VAV -Final SCADA Interfacing & Control for Air-side Equipment	[Actual Work]										[Remaining Work]					
MV1420	BOH Cabin AHU & VAV - Put SCADA in Auto / "Fine Tune" System Settings / Operation	[Actual Work]										[Remaining Work]					
MV1430	BOH cabins : FCU Installations at BOH Elect/ELV Rooms	[Actual Work]															
MV1440	CRAC System for Critical Rooms (Split Refrig. & Waterside Units) incl SCADA Interfacing																
MV1450	BOH Cabins : Misc Ventilation Systems (various areas)																
G/F FOH Concourse - incls AHU+Duct Riser+ Drum Louvre /Final Air Grille																	
MV1460	FOH AHU - Chilled Water Available - Initial AHU Start-up T&C																
MV1470	FOH AHU & Main Distribution Ducts - Initial System Air Balance for "Wild Air"																
MV1480	Target 50% of FOH AHU's Operational - providing conditioned "Wild Air" to FOH																
MV1490	Target 100% of FOH AHU's Operational - providing conditioned "Wild Air" to FOH																
MV1500	FOH AHU, Distribution Duct & Drum Louvre - Final Airside Balancing for Main Duct Runs	[Actual Work]										[Remaining Work]					
MV1510	FOH Areas: AHU - Final SCADA Interfacing & Control for Air-side Equipment	[Actual Work]										[Remaining Work]					
MV1520	FOH Areas - Put AHU SCADA in Auto / "Fine Tune" System Settings / Operation	[Actual Work]										[Remaining Work]					
MV1530	R&G Channel, Kiosks and Retail: MVAC Installations T&C	[Actual Work]										[Remaining Work]					
1/F FOH Concourse - incls AHU+Duct Riser+ VAV(if applicable)+ Final Air Grille																	
MV1540	FOH AHU - Chilled Water Available - Initial AHU Start-up T&C	[Actual Work]										[Remaining Work]					
MV1550	FOH AHU & Main Distribution Ducts - Initial System Air Balance for "Wild Air"																
MV1560	Target 50% of FOH AHU's Operational - providing conditioned "Wild Air" to FOH																
MV1570	Target 100% of FOH AHU's Operational - providing conditioned "Wild Air" to FOH																
MV1580	FOH AHU, Distribution Duct & Drum Louvre - Final Airside Balancing for Main Duct Runs	[Actual Work]										[Remaining Work]					
MV1590	FOH Areas: AHU - Final SCADA Interfacing & Control for Air-side Equipment	[Actual Work]										[Remaining Work]					
MV1600	FOH Areas - Put AHU SCADA in Auto / "Fine Tune" System Settings / Operation	[Actual Work]										[Remaining Work]					
MV1610	R&G Channel, Kiosks and Retail: MVAC Installations T&C	[Actual Work]										[Remaining Work]					

Remark: The landscape work for Contract No. HY/2013/01 was commenced on 1 March 2018. The tentative completion date of related landscape work is end of June 2018.

█ Remaining Level of Effort
█ Remaining Work
█ Actual Work
█ Critical Remaining Work
◆ Milestone

Activity ID	Activity Name
Hong Kong-Zhuhai_Macao Bridge Hong Kong Boundary Crossing F	
Key Dates	
Interface Activities	
Site and Facility Inspection	
JS1200	Pre Site and Facility Inspection by Contractor at Location 4 - Deg2
JS1210	Joint Site and Facility Inspection with Interface Contractor at Location 4 - Deg2
JS1620	Pre Site and Facility Inspection by Contractor at Location 14 - Deg2
JS1630	Joint Site and Facility Inspection with Interface Contractor at Location 14 - Deg2
JS1760	Pre Site and Facility Inspection by Contractor at Location 18 - Deg1
JS1770	Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg1
JS1780	Pre Site and Facility Inspection by Contractor at Location 18 - Deg2
JS1790	Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg2
Access Dates	
AD1000	Location 1(PCB (001) Basement)-Deg1 (270d)
AD1010	Location 1(PCB (001) Basement)-Deg2 (380d)
AD1020	Location 1(PCB (001) ELV Room (Grid Line E3))-Deg1 (270d)
AD1030	Location 1(PCB (001) ELV Room (Grid Line E3))-Deg2 (380d)
AD1040	Location 2(PCB (001) First Floor Main Server Room)-Deg1 (330d)
AD1050	Location 2(PCB (001) First Floor Main Server Room)-Deg2 (380d)
AD1060	Location 2(PCB (001) First Floor Main Server Room) - For Server Installation - Deg2 (380d)
AD1070	Location 2(PCB (001) Ground Floor ELV Room (Grid Line E3)) - Deg1 (330d)
AD1080	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) - Deg1 (330d)
AD1090	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) - Deg2 (380d)
AD1130	Location 3(Inbd Cargo Exam Bldg (037) Platform Control Room)-Deg2 (500d)
AD1150	Location 3(Inbd Cargo Exam Bldg (037) Inspector Offices 128,129,130,131,128,129,14)
AD1170	Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Room)-Deg2 (480d)
AD1190	Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room)-Deg2 (480d)
AD1200	Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room) - For Server installation - Deg2 (480d)
AD1220	Location 4(Outbd Cargo Exam Bldg (023))-Deg2 (680d)
AD1240	Location 4a(Outbd Cargo Exam Bldg (023))-Deg2 (630d)
AD1270	Location 6(Common Utility Enclosure & Staff Subway)-Deg1 (400d)
AD1290	Location 7(Common Utility Enclosure & Staff Subway)-Deg1 (270d)
AD1300	Location 8(Inbd Private Car Annex (025))-Deg1 (430d)
AD1310	Location 8(Inbd Private Car Annex (025))-Deg2 (580d)
AD1320	Location 8(Inbd Private Car Annex (025) Canopy)-Deg1 (430d)
AD1330	Location 8(Inbd Private Car Annex (025) Canopy)-Deg2 (580d)
AD1340	Location 9(Outbd Private Car Annex (032))-Deg1 (520d)
AD1350	Location 9(Outbd Private Car Annex (032))-Deg2 (660d)
AD1360	Location 9(Outbd Private Car Annex (032) Canopy)-Deg1 (520d)
AD1370	Location 9(Outbd Private Car Annex (032) Canopy)-Deg2 (660d)
AD1501	Location 12(Inbd Private Car Kiosks(027))-Deg1 (400d) Phase 2
AD1510	Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 1
AD1511	Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 2
AD1521	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg1 (400d) Phase 2



2015			2016				2017				2018				2019		
Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
22-Oct-17, Hong Kong-Zhuhai_Macao Bridge 23-Jun-17, Site and Facility Inspection: Pre Site and Facility Inspection by Contractor at Location 4 - Deg2 Joint Site and Facility Inspection with Interface Contractor at Location 4 - Deg2 Pre Site and Facility Inspection by Contractor at Location 14 - Deg2 Joint Site and Facility Inspection with Interface Contractor at Location 14 - Deg2 Pre Site and Facility Inspection by Contractor at Location 18 - Deg1 Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg1 Pre Site and Facility Inspection by Contractor at Location 18 - Deg2 Joint Site and Facility Inspection with Interface Contractor at Location 18 - Deg2 24-Aug-17, Access Dates: Location 1(PCB (001) Basement)-Deg1 (270d), 31-May-17 Location 1(PCB (001) Basement)-Deg2 (380d), 15-Jun-17 Location 1(PCB (001) ELV Room (Grid Line E3))-Deg1 (270d), 31-May-17 Location 1(PCB (001) ELV Room (Grid Line E3))-Deg2 (380d), 15-Jun-17 Location 2(PCB (001) First Floor Main Server Room)-Deg1 (330d), 31-May-17 Location 2(PCB (001) First Floor Main Server Room)-Deg2 (380d), 15-Jun-17 Location 2(PCB (001) First Floor Main Server Room) - For Server Installation - Deg2 (380d), 15-Jun-17 Location 2(PCB (001) Ground Floor ELV Room (Grid Line E3)) - Deg1 (330d), 31-May-17 Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) - Deg1 (330d), 31-May-17 Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5)) - Deg2 (380d), 15-Jun-17 Location 3(Inbd Cargo Exam Bldg (037) Platform Control Room)-Deg2 (500d), 15-Jun-17 Location 3(Inbd Cargo Exam Bldg (037) Inspector Offices 128,129,130,131,128,129,14), 15-Jun-17 Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Room)-Deg2 (480d), 15-Jun-17 Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room)-Deg2 (480d), 15-Jun-17 Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room) - For Server installation - Deg2 (480d), 15-Jun-17 Location 4(Outbd Cargo Exam Bldg (023))-Deg2 (680d), 15-Jun-17 Location 4a(Outbd Cargo Exam Bldg (023))-Deg2 (630d), 15-Jun-17 Location 6(Common Utility Enclosure & Staff Subway)-Deg1 (400d), 15-Jun-17 Location 7(Common Utility Enclosure & Staff Subway)-Deg1 (270d), 15-Jun-17 Location 8(Inbd Private Car Annex (025))-Deg1 (430d), 15-Jun-17 Location 8(Inbd Private Car Annex (025))-Deg2 (580d), 15-Jun-17 Location 8(Inbd Private Car Annex (025) Canopy)-Deg1 (430d), 15-Jun-17 Location 8(Inbd Private Car Annex (025) Canopy)-Deg2 (580d), 15-Jun-17 Location 9(Outbd Private Car Annex (032))-Deg1 (520d), 15-Jun-17 Location 9(Outbd Private Car Annex (032))-Deg2 (660d), 15-Jun-17 Location 9(Outbd Private Car Annex (032) Canopy)-Deg1 (520d), 15-Jun-17 Location 9(Outbd Private Car Annex (032) Canopy)-Deg2 (660d), 15-Jun-17 Location 12(Inbd Private Car Kiosks(027))-Deg1 (400d) Phase 2, 15-Jun-17 Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 1, 15-Jun-17 Location 12(Inbd Private Car Kiosks(027))-Deg2 (480d) Phase 2, 15-Jun-17 Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg1 (400d) Phase 2, 15-Jun-17																	

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- Actual Level of Effort
- Primary Baseline
- Actual Work
- Remaining Work
- Critical Remaining Work
- Baseline Milestone
- Milestone

summary

Hong Kong-Zhuhai-Macao Bridge
 Hong Kong Boundary Crossing
 Facilities - Automatic Vehicle
 Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name	2015												2016				2017				2018				2019		
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3									
AD1530	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg2 (480d) Phase 1																		◆ Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg2									
AD1531	Location 12(Inbd Private Car Kiosks(027) Canopy)-Deg2 (480d) Phase 2																		◆ Location 12(Inbd Private Car Kiosks(027) Canopy)-D									
AD1540	Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase 1																		◆ Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase 1									
AD1541	Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase 2																		◆ Location 12(Inbd GV Kiosks (028))-Deg1 (400d) Phase									
AD1550	Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Phase 1																		◆ Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Phase									
AD1551	Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Phase 2																		◆ Location 12(Inbd GV Kiosks (028))-Deg2 (480d) Pha									
AD1560	Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400d) Phase 1																		◆ Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400d)									
AD1561	Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400d) Phase 2																		◆ Location 12(Inbd GV Kiosks (028) Canopy)-Deg1 (400									
AD1570	Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (480d) Phase 1																		◆ Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (480d									
AD1571	Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (480d) Phase 2																		◆ Location 12(Inbd GV Kiosks (028) Canopy)-Deg2 (48									
AD1580	Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Phase 1																		◆ Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Phase									
AD1581	Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Phase 2																		◆ Location 12(Outbd GV Kiosks (029))-Deg1 (400d) Pha									
AD1590	Location 12(Outbd GV Kiosks (029))-Deg2 (480d) Phase 1																		◆ Location 12(Outbd GV Kiosks (029))-Deg2 (480d) Phase									
AD1591	Location 12(Outbd GV Kiosks (029))-Deg2 (480d) Phase 2																		◆ Location 12(Outbd GV Kiosks (029))-Deg2 (480d) P									
AD1600	Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (400d) Phase 1																		◆ Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (400									
AD1601	Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (400d) Phase 2																		◆ Location 12(Outbd GV Kiosks (029) Canopy)-Deg1 (40									
AD1610	Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (480d) Phase 1																		◆ Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (48									
AD1611	Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (480d) Phase 2																		◆ Location 12(Outbd GV Kiosks (029) Canopy)-Deg2 (
AD1620	Location 13(Outbd Private Car Kiosks (030))-Deg1 (480d) Phase 1																		◆ Location 13(Outbd Private Car Kiosks (030))-Deg1 (48									
AD1630	Location 13(Outbd Private Car Kiosks (030))-Deg2 (550d) Phase 1																		◆ Location 13(Outbd Private Car Kiosks (030))-Deg2 (55									
AD1640	Location 13(Outbd Private Car Kiosks (030) Canopy)-Deg1 (480d) Phase 1																		◆ Location 13(Outbd Private Car Kiosks (030) Canopy)-D									
AD1650	Location 13(Outbd Private Car Kiosks (030) Canopy)-Deg2 (550d) Phase 1																		◆ Location 13(Outbd Private Car Kiosks (030) Canopy)-I									
AD1660	Location 14(Future-Outbd/Inbd Private Car Kiosks)-Deg1 (610d)																		◆ Location 14(Future-Outbd/Inbd Private Car Kiosks)-Deg									
AD1670	Location 14(Future-Outbd/Inbd Private Car Kiosks)-Deg2 (680d)																		◆ Location 14(Future-Outbd/Inbd Private Car Kiosks)-D									
AD1700	Location 16(Outbd Traffic Control Kiosk (101))-Deg1 (400d)																		◆ Location 16(Outbd Traffic Control Kiosk (101))-Deg1 (40									
AD1710	Location 16(Outbd Traffic Control Kiosk (101))-Deg2 (480d)																		◆ Location 16(Outbd Traffic Control Kiosk (101))-Deg									
AD1740	Location 18(Outbd Private Car Exam Bldg(024))-Deg1 (-)																		◆ Location 18(Outbd Private Car Exam Bldg(024))-Deg1									
AD1750	Location 18(Outbd Private Car Exam Bldg(024))-Deg2 (670d)																		◆ Location 18(Outbd Private Car Exam Bldg(024))-Deg2									
AD1780	(by C03) Underground Ducting (UUD1.1) between CUE and Inbd Cargo Exam Bldg (0																		◆ (by C03) Underground Ducting (UUD1.1)between CUE									
AD1790	(by C03) (UUD1.2) between Inbd Cargo Exam Bldg South (037[S]) and DOH Cargo C																		◆ (by C03) (UUD1.2) between Inbd Cargo Exam Bldg Sou									
AD1800	(by C03) (UUD2) between Inbd Cargo Exam Bldg North (037[N]) and Inbd Vehicle Cle																		◆ (by C03) (UUD2) between Inbd Cargo Exam Bldg North									
AD1810	(by C03) (UUD9.1) btw Inbd Cargo Exam Bldg S.(037[S]) & Inbd PC Exam Bldg(033) &																		◆ (by C03) (UUD9.1) btw Inbd Cargo Exam Bldg S.(037[S									
AD1820	(by C03) (UUD9.3) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clear																		◆ (by C03) (UUD9.3) between Inbd Private Car Exam Bldg									
AD1830	(by C03) (UUD9.2) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clear																		◆ (by C03) (UUD9.2) between Inbd Private Car Exam Bldg									
AD1840	(by C03) Underground Ducting (UUD3.1) between CUE to Outbd Cargo Exam Bldg (0																		◆ (by C03) Underground Ducting (UUD3.1)between CUE									
AD1850	(by C03) (UUD3.2) btw Outbd Car Exam Bldg (023) and Outbd PC Exam Bldg (024) ai																		◆ (by C03) (UUD3.2) btw Outbd Car Exam Bldg (023) and									
AD1860	(byC03) (UUD4.1) between Outbd Private Car Exam Bldg (024) and Outbd Vehicle Cle																		◆ (byC03) (UUD4.1) between Outbd Private Car Exam Bld									
AD1870	(byC03) (UUD5) between Outbd Car Exam Bldg South (023[S]) and Outbd Vehicle Cle																		◆ (byC03) (UUD5) between Outbd Car Exam Bldg South (
AD1880	(by C03) Underground Ducting (UUD8) between CUE and Outbd PCA (032)																		◆ (by C03) Underground Ducting (UUD8) between CUE a									
AD1910	(by C03) Inbound Vehicle Clearance Plaza																		◆ (by C03) Inbound Vehicle Clearance Plaza, 01-Jun-17*									
AD1920	(by C03) Outbound Vehicle Clearance Plaza																		◆ (by C03) Outbound Vehicle Clearance Plaza, 01-Jun-17*									
<ul style="list-style-type: none"> ■ Interfaces Provisions ■ Mobilization Provisions ■ WA4 Site Erection & Servicing 																						◆ 12-Aug-17, Interfaces Provisions ◆ 22-Oct-17, Mobilization Provisions						

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Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
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Activity ID	Activity Name	2015												2016				2017				2018				2019		
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q1	Q2	Q3						
	Detailed Design Specification																											
	Construction Design and Management																											
	Supply/Manufacture Mock-up items																											
	Supply/Manufacture prototypes																											
	Software Design, Coding and Testing																											
	Coding																											
	Software System Integration																											
	Prototype & Software Simulation Tests																											
	Procurement - Phase 1 / Section I																											
	Supply/Manufacture products for FAT																											
	Factory Acceptance Test (FAT)																											
	Supply/Manufacture Equipment																											
	Delivery and Bench Acceptance Test for Phase 1/ Section I																											
	Installation - Phase 1 / Section I																											
	Location 1(PCB (001) Basement)																											
EM1920	L1(001)B/F - Cable Laying and termination at Location 1 and Location 2																											
	Location 1(PCB (001) ELV Room (Grid Line E3))																											
EM1940	L1(001)ELV Rm - Cable Laying and termination at Location 1 and Location 2																											
	Location 2(PCB (001) Ground Floor ELV Room (Grid Line E3))																											
EM1960	L2(001)ELV Rm - Cable Laying and termination at Location 1 and Location 2																											
	Location 2(PCB (001) Ground Floor DOH Port Health Control Room (Grid Line BD5))																											
EM1080	L2(001)Heath Ctrl Rm - Cable Laying and termination at Location 1 and Location 2																											
EM1100	L2(001)Heath Ctrl Rm - Cable Splicing and Testing and Labeling																											
EM1120	L2(001)Health Ctrl Rm - Intercom and PA system Installation																											
EM1140	L2(001)Heath Ctrl Rm - Intercom and PA system tuning																											
	Location 2(PCB (001) First Floor Main Server Room)																											
EM1000	L2(001)Main Server Rm - Cable Laying and termination at Location 1 and Location 2																											
EM1020	L2(001)Main Server Rm - Cable Splicing and Testing and Labeling																											
EM1040	L2(001)Main Server Rm - AVCSS Network and Server Installation																											
EM1060	L2(001)Main Server Rm - AVCSS Network and Server Tuning																											
	Location 3(Inbd Cargo Exam Bldg (037) MDF Room)																											
	Location 3(Inbd Cargo Exam Bldg (037) ELV Room)																											
	Location 3(Inbd Cargo Exam Bldg (037) Inspector Offices 128,129,130,131,128,129,141)																											
EM2020	L3(037)Inspec Offices - Cable Laying and termination in Location 3 and Location 3a																											
EM2040	L3(037)Inspec Offices - Cable Splicing and Testing and Labeling																											
EM2060	L3(037)Inspec Offices - AVCSS SURCON WS and 55" LCD Installation																											
EM2080	L3(037)Inspec Offices - VTS WS Installation																											
EM2100	L3(037)Inspec Offices - SURCON and WS Tuning																											
	Location 3(Inbd Cargo Exam Bldg (037) Platform Control Room)																											
EM1160	L3(037)PLF Ctrl Rm - Cable Laying and termination in Location 3 and Location 3a																											
EM1180	L3(037)PLF Ctrl Rm - Cable Splicing and Testing and Labeling																											
EM1200	L3(037)PLF Ctrl Rm - AVCSS SYSCON WS and 55" TV Wall Installation																											
EM1220	L3(037)PLF Ctrl Rm - AVCSS SYSCON WS Tuning																											

01-Sep-17, Installation - Phase 1 / Section I
 22-Jun-17, Location:1(PCB (001),Basement)
 L1(001)B/F - Cable Laying and termination at Location
 22-Jun-17, Location:1(PCB (001),ELV Room (Grid Line
 L1(001)ELV Rm - Cable Laying and termination at Loca
 22-Jun-17, Location:2(PCB (001),Ground Floor ELV R
 L2(001)ELV Rm - Cable Laying and termination at Loca
 18-Aug-17, Location:2(PCB (001),Ground Floor DO
 L2(001)Heath Ctrl Rm - Cable Laying and termination
 L2(001)Heath Ctrl Rm - Cable Splicing and Testing and
 L2(001)Health Ctrl Rm - Intercom and PA system In
 L2(001)Health Ctrl Rm - Intercom and PA system tu
 21-Aug-17, Location:2(PCB (001) First Floor Main
 L2(001)Main Server Rm - Cable Laying and terminatio
 L2(001)Main Server Rm - Cable Splicing and Testing
 L2(001)Main Server Rm - AVCSS Network and Ser
 L2(001)Main Server Rm - AVCSS Network and Se
 07-Aug-17, Location 3(Inbd Cargo Exam Bldg (037
 L3(037)Inspec Offices - Cable Laying and termination i
 L3(037)Inspec Offices - Cable Splicing and Testing and
 L3(037)Inspec Offices - AVCSS SURCON WS and 5
 L3(037)Inspec Offices - VTS WS Installation
 L3(037)Inspec Offices - SURCON and WS Tuning
 07-Aug-17, Location 3(Inbd Cargo Exam Bldg (037
 L3(037)PLF Ctrl Rm - Cable Laying and termination in
 L3(037)PLF Ctrl Rm - Cable Splicing and Testing and
 L3(037)PLF Ctrl Rm - AVCSS SYSCON WS and 55
 L3(037)PLF Ctrl Rm - AVCSS SYSCON WS Tuning

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Activity ID	Activity Name	2015																		2016				2017				2018				2019		
		Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3					
Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Room)		07-Aug-17, Location 3a(Inbd Cargo Exam Bldg (037) ROCARS Rm - Cable Laying and termination in Location 3 and Location 3a																																
EM1240	L3a(037) ROCARS Rm - Cable Laying and termination in Location 3 and Location 3a	L3a(037) ROCARS Rm - Cable Laying and termination in Location 3 and Location 3a																																
EM1260	L3a(037) ROCARS Rm - Cable Splicing and Testing and Labeling	L3a(037) ROCARS Rm - Cable Splicing and Testing and Labeling																																
EM1280	L3a(037) ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation	L3a(037) ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation																																
EM1300	L3a(037) ROCARS Rm - VTS WS Installation	L3a(037) ROCARS Rm - VTS WS Installation																																
EM1320	L3a(037) ROCARS Rm - VID WS Installation	L3a(037) ROCARS Rm - VID WS Installation																																
EM1340	L3a(037) ROCARS Rm - SURCON and SYSCON and WS Tuning	L3a(037) ROCARS Rm - SURCON and SYSCON and WS Tuning																																
Location 3a(Inbd Cargo Exam Bldg (037) Main Server Room)		07-Aug-17, Location 3a(Inbd Cargo Exam Bldg (037) Main Server Rm - Cable Laying and termination in Location 3 and Location 3a																																
EM2120	L3a(037) Main Server Rm - Cable Laying and termination in Location 3 and Location 3a	L3a(037) Main Server Rm - Cable Laying and termination in Location 3 and Location 3a																																
EM2140	L3a(037) Main Server Rm - Cable Splicing and Testing and Labeling	L3a(037) Main Server Rm - Cable Splicing and Testing and Labeling																																
EM2160	L3a(037) Main Server Rm - AVCSS Server Installation	L3a(037) Main Server Rm - AVCSS Server Installation																																
EM2180	L3a(037) Main Server Rm - VTS Server Installation	L3a(037) Main Server Rm - VTS Server Installation																																
EM2200	L3a(037) Main Server Rm - Servers Tuning	L3a(037) Main Server Rm - Servers Tuning																																
Location 4(Outbd Cargo Exam Bldg (023) MDF Room)		04-Aug-17, Location 4a(Outbd Cargo Exam Bldg (023) ROCARS Rm - Cable Splicing and Testing and Labeling																																
EM2240	L4a(023) ROCARS Rm - Cable Splicing and Testing and Labeling	L4a(023) ROCARS Rm - Cable Splicing and Testing and Labeling																																
EM2260	L4a(023) ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation	L4a(023) ROCARS Rm - AVCSS SYSCON and SURCON and Intercom Installation																																
EM2280	L4a(023) ROCARS Rm - VTS WS Installation	L4a(023) ROCARS Rm - VTS WS Installation																																
EM2300	L4a(023) ROCARS Rm - SYSCON and SURCON and WS Tuning	L4a(023) ROCARS Rm - SYSCON and SURCON and WS Tuning																																
Location 5(Common Utility Enclosure & Staff Subway)		01-Sep-17, Location 5(Common Utility Enclosure & Staff Subway) - Cable Laying between Location 5 and Location 6																																
EM2341	L5(CUE) - Cable Laying between Location 5 and Location 6	L5(CUE) - Cable Laying between Location 5 and Location 6																																
EM2361	L5(CUE) - Cable Laying between Location 5 and Location 7	L5(CUE) - Cable Laying between Location 5 and Location 7																																
EM2380	L5(CUE) - Cable Splicing and Testing and Labeling	L5(CUE) - Cable Splicing and Testing and Labeling																																
Location 6(Common Utility Enclosure & Staff Subway)		26-Aug-17, Location 6(Common Utility Enclosure & Staff Subway) - Cable Laying between Location 5 and Location 6																																
EM2400	L6(CUE) - Cable Laying between Location 5 and Location 6	L6(CUE) - Cable Laying between Location 5 and Location 6																																
EM2420	L6(CUE) - Cable Splicing and Testing and Labeling	L6(CUE) - Cable Splicing and Testing and Labeling																																
Location 7(Common Utility Enclosure & Staff Subway)		01-Sep-17, Location 7(Common Utility Enclosure & Staff Subway) - Cable Laying between Location 5 and Location 7																																
EM2440	L7(CUE) - Cable Laying between Location 5 and Location 7	L7(CUE) - Cable Laying between Location 5 and Location 7																																
EM2460	L7(CUE) - Cable Splicing and Testing and Labeling	L7(CUE) - Cable Splicing and Testing and Labeling																																
Location 12(Inbd Private Car Kiosks,GV Kiosks (027,028,029))		30-Aug-17, Location 12(Inbd Private Car Kiosks,GV Kiosks (027,028,029)) - Cable Splicing and Testing and Labeling																																
Inbd Private Car Kiosks(027) - 9 nos (Phase 1)		24-Aug-17, Inbd Private Car Kiosks(027) - 9 nos (Phase 1) - Cable Splicing and Testing and Labeling																																
EM1500	L12(027)(9nos P1) - Cable Splicing and Testing and Labeling	L12(027)(9nos P1) - Cable Splicing and Testing and Labeling																																
EM1520	L12(027)(9nos P1) - AVCSS/MOM Kiosk Equipment Installation (9 nos)	L12(027)(9nos P1) - AVCSS/MOM Kiosk Equipment Installation (9 nos)																																
EM1541	L12(027)(9nos P1) - XDB installation (18 nos)	L12(027)(9nos P1) - XDB installation (18 nos)																																
EM1542	L12(027)(9nos P1) - ODB installation (5 nos)	L12(027)(9nos P1) - ODB installation (5 nos)																																
EM1543	L12(027)(9nos P1) - ODB installation (2 nos)	L12(027)(9nos P1) - ODB installation (2 nos)																																
EM1544	L12(027)(9nos P1) - ODB installation (2 nos)	L12(027)(9nos P1) - ODB installation (2 nos)																																
EM1560	L12(027)(9nos P1) - Loop installation (45 nos)	L12(027)(9nos P1) - Loop installation (45 nos)																																
Inbd Goods Vehicle Kiosks(028) - 5 nos (Phase 1)		30-Aug-17, Inbd Goods Vehicle Kiosks(028) - 5 nos (Phase 1) - Cable Laying and termination																																
EM1620	L12(028)(5nos P1) - Cable Laying and termination	L12(028)(5nos P1) - Cable Laying and termination																																
EM1640	L12(028)(5nos P1) - Cable Splicing and Testing and Labeling	L12(028)(5nos P1) - Cable Splicing and Testing and Labeling																																
EM1660	L12(028)(5nos P1) - AVCSS/MOM Kiosk Equipment Installation (5 nos)	L12(028)(5nos P1) - AVCSS/MOM Kiosk Equipment Installation (5 nos)																																
EM1681	L12(028)(5nos P1) - XDB installation (10 nos)	L12(028)(5nos P1) - XDB installation (10 nos)																																
EM1682	L12(028)(5nos P1) - ODB installation (3 nos)	L12(028)(5nos P1) - ODB installation (3 nos)																																
EM1683	L12(028)(5nos P1) - ODB installation (2 nos)	L12(028)(5nos P1) - ODB installation (2 nos)																																

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5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name	2015			2016				2017				2018				2019				
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3		
EM1700	L12(028)(5nos P1) - AIOP Installation (5 nos)																				
EM1720	L12(028)(5nos P1) - Loop installation (25 nos)																				
Outbd Goods Vehicle Kiosks(029) - 5 nos (Phase 1)																					
EM1740	L12(029)(5nos P1) - Cable Containment in Kiosks																				
EM1760	L12(029)(5nos P1) - Cable Laying and termination																				
EM1780	L12(029)(5nos P1) - Cable Splicing and Testing and Labeling																				
EM1800	L12(029)(5nos P1) - AVCSS/MOM Kiosk Equipment Installation (5 nos)																				
EM1821	L12(029)(5nos P1) - XDB installation (5 nos)																				
EM1822	L12(029)(5nos P1) - ODB installation (4 nos)																				
EM1823	L12(029)(5nos P1) - ODB installation (1 nos)																				
EM1840	L12(029)(5nos P1) - AIOP Installation (5 nos)																				
Location 13(Outbd Private Car Kiosks (030)) - 9 nos (Phase 1)																					
EM2520	L13(030)(9nos P1) - Cable Containment in Kiosks																				
EM2540	L13(030)(9nos P1) - Cable Laying and termination																				
EM2560	L13(030)(9nos P1) - Cable Splicing and Testing and Labeling																				
EM2580	L13(030)(9nos P1) - AVCSS/MOM Kiosk Equipment Installation (9 nos)																				
EM2601	L13(030)(9nos P1) - XDB installation (9 nos)																				
EM2602	L13(030)(9nos P1) - ODB installation (7 nos)																				
Location 14(Future-Outbd/Inbd Private Car Kiosks) - 6+6 nos																					
EM1440	L14 - Cable Laying and termination at ELV Room in CUE																				
Location 15(Inbd Traffic Control Kiosk (100))																					
Location 16(Outbd Traffic Control Kiosk (101))																					
EM2760	L16(101) - Cable Laying and termination																				
EM2780	L16(101) - Cable Splicing and Testing and Labeling																				
EM2800	L16(101) - AVCSS SYSCON and SURCON Installation																				
EM2820	L16(101) - VTS WS and 55" LCD Installation																				
Location 17(Inbd Private Car Exam Bldg(033) Operational Office)																					
Location 18 (Outbd Private Car Exam Bldg(024) Operational Office)																					
EM2940	L18(024) - Cable Laying and termination																				
EM2960	L18(024) - Cable Splicing and Testing and Labeling																				
EM2980	L18(024) - AVCSS SURCON and 55" LCD Installation																				
EM3000	L18(024) - SURCON Tuning																				
Location 19 (DOH Cargo Clearance Bldg(043))																					
EM1360	L19(043) - Cable Laying and termination																				
EM1380	L19(043) - Cable Splicing and Testing and Labeling																				
EM1400	L19(043) - PA and Intercom Installation																				
EM1420	L19(043) - PA and Intercom Tuning																				
Inbd Vehicle Clearance Plaza - 8 nos VID, 7 nos VTS, 4 nos TLS																					
EM3020	Inbound VID cabling from pillar box to VID field equipment																				
EM3040	Inbound VTS cabling from pillar box to VTS field equipment																				
EM3060	Inbound TLS cabling from pillar box to TLS field equipment																				
EM3080	Inbound VID field equipment installation (8 VID)																				
EM3100	Inbound VTS field equipment installation (4 RFID + 3 Cameras)																				
EM3120	Inbound TLS field equipment installation (4 TLS)																				
EM3140	Inbound VID and VTS and TLS field equipment tuning																				

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█ Actual Level of Effort ▼ summary
█ Primary Baseline
█ Actual Work
█ Remaining Work
█ Critical Remaining Work
◆ Baseline Milestone
◆ Milestone

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

Date	Revision	Checked	Approved
14-Nov-16	Rev.: 0	WC	LC
10-Mar-17	Rev.: 1.0a	WC	LC
5-May-17	Rev.: 1.0b	WC	LC

Activity ID	Activity Name	2015																		2016																		2017																		2018																		2019																	
		Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4			Q1			Q2			Q3			Q4																																															
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4																																																											
Outbd Vehicle Clearance Plaza - 8 nos VID, 6 nos VTS, 4 nos TLS		<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbd Vehicle Clearance Plaza - 8 nos V 02-Aug-17, Outbd Vehicle Clearance Plaza - 8 nos V </div>																																																																																									
EM3160	Outbound VID cabling from pillar box to VID field equipment	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound VID cabling from pillar box to VID field equi 02-Aug-17, Outbound VID cabling from pillar box to VID field equi </div>																																																																																									
EM3180	Outbound VTS cabling from pillar box to VTS field equipment	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound VTS cabling from pillar box to VTS field equi 02-Aug-17, Outbound VTS cabling from pillar box to VTS field equi </div>																																																																																									
EM3200	Outbound TLS cabling from pillar box to TLS field equipment	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound TLS cabling from pillar box to TLS field equ 02-Aug-17, Outbound TLS cabling from pillar box to TLS field equ </div>																																																																																									
EM3220	Outbound VID field equipment installation (8 VID)	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound VID field equipment installation (8 VID) 02-Aug-17, Outbound VID field equipment installation (8 VID) </div>																																																																																									
EM3240	Outbound VTS field equipment installation (3 RFID + 3 Cameras)	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound VTS field equipment installation (3 RFID + 02-Aug-17, Outbound VTS field equipment installation (3 RFID + </div>																																																																																									
EM3260	Outbound TLS field equipment installation (4 TLS)	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound TLS field equipment installation (4 TLS) 02-Aug-17, Outbound TLS field equipment installation (4 TLS) </div>																																																																																									
EM3280	Outbound VID and VTS and TLS field equipment tuning	<div style="display: flex; justify-content: space-between;"> 02-Aug-17, Outbound VID and VTS and TLS field equipment tun 02-Aug-17, Outbound VID and VTS and TLS field equipment tun </div>																																																																																									
Underground Ducting (UUD1.1) between CUE and Inbd Cargo Exam Bldg (037)		<div style="display: flex; justify-content: space-between;"> 13-Jun-17, Underground Ducting (UUD1.1) between C 13-Jun-17, Underground Ducting (UUD1.1) between C </div>																																																																																									
UD1000	(UUD1.1 [CUE-037]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD1.1 [CUE-037]) - Cable laying and termination; (UUD1.1 [CUE-037]) - Cable laying and termination; </div>																																																																																									
(UUD1.2) between Inbd Cargo Exam Bldg South (037[S]) and DOH Cargo Clearance Bldg (037[S])		<div style="display: flex; justify-content: space-between;"> 27-Jun-17, (UUD1.2) between Inbd Cargo Exam Bldg 27-Jun-17, (UUD1.2) between Inbd Cargo Exam Bldg </div>																																																																																									
UD1060	(UUD1.2 [037[S]-043]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD1.2 [037[S]-043]) - Cable laying and termination (UUD1.2 [037[S]-043]) - Cable laying and termination </div>																																																																																									
Underground Ducting (UUD6) between CUE and Shuttle Bus Kiosk (006) and Inbd Private Car Exam Bldg (033)		<div style="display: flex; justify-content: space-between;"> 12-Jul-17, (UUD9.1) btw IB Cargo Exam Bldg South(12-Jul-17, (UUD9.1) btw IB Cargo Exam Bldg South(</div>																																																																																									
(UUD9.1) btw IB Cargo Exam Bldg South(037[S]) & IB PC Exam Bldg(033) & IB Traffic Control Bldg (033)		<div style="display: flex; justify-content: space-between;"> (UUD9.1 [037[S]-033-100]) - Cable laying and termina (UUD9.1 [037[S]-033-100]) - Cable laying and termina </div>																																																																																									
UD1040	(UUD9.1 [037[S]-033-100]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD9.1 [037[S]-033-100]) - Cable laying and termina (UUD9.1 [037[S]-033-100]) - Cable laying and termina </div>																																																																																									
(UUD2) between Inbd Cargo Exam Bldg North (037[N]) to Inbd VCP		<div style="display: flex; justify-content: space-between;"> 26-Jul-17, (UUD2) between Inbd Cargo Exam Bldg I 26-Jul-17, (UUD2) between Inbd Cargo Exam Bldg I </div>																																																																																									
UD1010	(UUD2 [037[N]-IB VCP]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD2 [037[N]-IB VCP]) - Cable laying and terminat (UUD2 [037[N]-IB VCP]) - Cable laying and terminat </div>																																																																																									
(UUD9.3) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clearance Plaza		<div style="display: flex; justify-content: space-between;"> 09-Aug-17, (UUD9.3) between Inbd Private Car Ex 09-Aug-17, (UUD9.3) between Inbd Private Car Ex </div>																																																																																									
UD1070	(UUD9.3 [033-IB VCP[W]]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD9.3 [033-IB VCP[W]]) - Cable laying and termi (UUD9.3 [033-IB VCP[W]]) - Cable laying and termi </div>																																																																																									
(UUD9.2) between Inbd Private Car Exam Bldg (033) and Inbd Vehicle Clearance Plaza		<div style="display: flex; justify-content: space-between;"> 23-Aug-17, (UUD9.2) between Inbd Private Car E 23-Aug-17, (UUD9.2) between Inbd Private Car E </div>																																																																																									
UD1020	(UUD9.2 [033-IB VCP[E]]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD9.2 [033-IB VCP[E]]) - Cable laying and termi (UUD9.2 [033-IB VCP[E]]) - Cable laying and termi </div>																																																																																									
Underground Ducting (UUD7) between PCB(001) and Inbd Coach Kiosks(010)		<div style="display: flex; justify-content: space-between;"> 14-Jun-17, Underground Ducting (UUD3.1) between C 14-Jun-17, Underground Ducting (UUD3.1) between C </div>																																																																																									
Underground Ducting (UUD3.1) between CUE and Outbd Cargo Exam Bldg (023)		<div style="display: flex; justify-content: space-between;"> (UUD3.1 [CUE-023]) - Cable laying and termination; (UUD3.1 [CUE-023]) - Cable laying and termination; </div>																																																																																									
UD1030	(UUD3.1 [CUE-023]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD3.1 [CUE-023]) - Cable laying and termination; (UUD3.1 [CUE-023]) - Cable laying and termination; </div>																																																																																									
(UUD3.2) btw OB Car Exam Bldg(023) & OB PC Exam Bldg(024) & OB Traffic Control Bldg (023)		<div style="display: flex; justify-content: space-between;"> 28-Jun-17, (UUD3.2) btw OB Car Exam Bldg(023) & C 28-Jun-17, (UUD3.2) btw OB Car Exam Bldg(023) & C </div>																																																																																									
UD1050	(UUD3.2 [023-024-101]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD3.2 [023-024-101]) - Cable laying and termination (UUD3.2 [023-024-101]) - Cable laying and termination </div>																																																																																									
Underground Ducting (UUD8) between CUE and Outbd PCA (032)		<div style="display: flex; justify-content: space-between;"> 13-Jun-17, Underground Ducting (UUD8) between CU 13-Jun-17, Underground Ducting (UUD8) between CU </div>																																																																																									
UD1100	(UUD8 [CUE-032]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD8 [CUE-032]) - Cable laying and termination (UUD8 [CUE-032]) - Cable laying and termination </div>																																																																																									
(UUD4.1) between Outbd PC Exam Bldg (024) and Outbd Vehicle Clearance Plaza		<div style="display: flex; justify-content: space-between;"> 13-Jul-17, (UUD4.1) between Outbd PC Exam Bldg(13-Jul-17, (UUD4.1) between Outbd PC Exam Bldg(</div>																																																																																									
UD1080	(UUD4.1 [024-OB VCP]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD4.1 [024-OB VCP]) - Cable laying and terminat (UUD4.1 [024-OB VCP]) - Cable laying and terminat </div>																																																																																									
(UUD5) between Outbd Car Exam Bldg (023[S]) and Outbd Vehicle Clearance Plaza		<div style="display: flex; justify-content: space-between;"> 27-Jun-17, (UUD5) between Outbd Car Exam Bldg (02 27-Jun-17, (UUD5) between Outbd Car Exam Bldg (02 </div>																																																																																									
UD1090	(UUD5 [023[S]-OB VCP]) - Cable laying and termination	<div style="display: flex; justify-content: space-between;"> (UUD5 [023[S]-OB VCP]) - Cable laying and terminat (UUD5 [023[S]-OB VCP]) - Cable laying and terminat </div>																																																																																									
Initial On-Site Test and Commissioning / Pre-SAT (Phase 1 / Section I)		<div style="display: flex; justify-content: space-between;"> 30-Aug-17, Installation -Phase 2/ Section II 30-Aug-17, Installation -Phase 2/ Section II </div>																																																																																									
Site Acceptance Test (Phase 1 / Section I)																																																																																											
Security Risk Assessment and Audit																																																																																											
Operability Period Test (Phase 1 / Section I)																																																																																											
Completion (Phase 1 /Section I)																																																																																											
Training and Document (Phase 1 /Section I)																																																																																											
Operation (Phase 1 /Section I)																																																																																											
Engineering Support for Phase 1 / Section I																																																																																											
Procurement - Phase 2 / Section II																																																																																											
Delivery and Bench Acceptance Test for Phase 2/Section II																																																																																											
Installation - Phase 2 / Section II																																																																																											

Programme No.: HZMB-DWP Data Date: 14-Aug-15		Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities - Automatic Vehicle Clearance Support System (AVCSS)	Date	Revision	Checked	Approved
			14-Nov-16	Rev.: 0	WC	LC
			10-Mar-17	Rev.: 1.0a	WC	LC
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Activity ID	Activity Name	2015			2016				2017				2018				2019		
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3
Location 8(Inbd Private Car Annex (025)) (Phase 2)		▼ 30-Aug-17; Location 8(Inbd Private Car Annex (025))																	
EM3370	L8(025) - Cable Containment in Kiosks	L8(025) - Cable Containment in Kiosks																	
EM3380	L8(025) - Cable Laying and termination	L8(025) - Cable Laying and termination																	
EM3400	L8(025) - Cable Splicing and Testing and Labeling	L8(025) - Cable Splicing and Testing and Labeling																	
Location 9(Outbd Private Car Annex (032)) (Phase 2)		▼ 30-Aug-17; Location 9(Outbd Private Car Annex (032))																	
EM3500	L9(032) - Cable Containment in Kiosks	L9(032) - Cable Containment in Kiosks																	
EM3520	L9(032) - Cable Laying and termination	L9(032) - Cable Laying and termination																	
Initial On-Site Test and Commissioning / Pre-SAT (Phase 2 / Section II)																			
Site Acceptance Test (Phase 2 / Section II)																			
Operability Period Test (Phase 2 / Section II)																			
Completion (Phase 2 / Section II)																			
Engineering Support for Phase 2 / Section II																			
Procurement for Phase2 / Section III																			
Delivery and Bench Acceptance Test for Phase2 / Section III																			
Installation - Phase 2 / Section III		▼ 09-Oct-17; Installation - Phase 2/ Section III																	
Location 10,11,12,13 (Vehicle Clearance Kiosks)		▼ 09-Oct-17; Location 10,11,12,13 (Vehicle Clearance Kiosks)																	
Location 12 Inbd Private Car Kiosks (027) - 12 nos (Phase 2)		▼ 09-Oct-17; Location 12 Inbd Private Car Kiosks																	
EM4440	L12(027)(12nos P2) - Cable Laying and termination	L12(027)(12nos P2) - Cable Laying and termination																	
EM4460	L12(027)(12nos P2) - Cable Splicing and Testing and Labeling	L12(027)(12nos P2) - Cable Splicing and Testing and Labeling																	
EM4480	L12(027)(12nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (12 nos)	L12(027)(12nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (12 nos)																	
Location 13 Outbd Private Car Kiosks (030) - 12 nos (Phase 2)		▼ 01-Sep-17; Location 13 Outbd Private Car Kiosks																	
EM4560	L13(030)(12nos P2) - Cable Containment in Kiosks	L13(030)(12nos P2) - Cable Containment in Kiosks																	
Location 12 Outbd Goods Vehicle Kiosks (029) - 3 nos (Phase 2)		▼ 31-Aug-17; Location 12 Outbd Goods Vehicle Kiosks																	
EM4880	L12(029)(3nos P2) - Cable Laying and termination	L12(029)(3nos P2) - Cable Laying and termination																	
EM4900	L12(029)(3nos P2) - Cable Splicing and Testing and Labeling	L12(029)(3nos P2) - Cable Splicing and Testing and Labeling																	
EM4920	L12(029)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)	L12(029)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)																	
EM4940	L12(029)(3nos P2) - ODB & XDB Installation (3 nos)	L12(029)(3nos P2) - ODB & XDB Installation (3 nos)																	
EM4960	L12(029)(3nos P2) - AIOP Installation (3 nos)	L12(029)(3nos P2) - AIOP Installation (3 nos)																	
EM4980	L12(029)(3nos P2) - Loop Installation (15 nos)	L12(029)(3nos P2) - Loop Installation (15 nos)																	
Location 11 Outbd Coach Kiosks (009) - 4 nos (Phase 2)																			
Location 12 Inbd Goods Vehicle Kiosks (028) - 3 nos (Phase 2)		▼ 24-Aug-17; Location 12 Inbd Goods Vehicle Kiosks																	
EM4720	L12(028)(3nos P2) - Cable Laying and termination	L12(028)(3nos P2) - Cable Laying and termination																	
EM4740	L12(028)(3nos P2) - Cable Splicing and Testing and Labeling	L12(028)(3nos P2) - Cable Splicing and Testing and Labeling																	
EM4760	L12(028)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)	L12(028)(3nos P2) - AVCSS/DOH/MOM Kiosk Equipment Installation (3 nos)																	
EM4780	L12(028)(3nos P2) - ODB & XDB Installation (3 nos)	L12(028)(3nos P2) - ODB & XDB Installation (3 nos)																	
EM4800	L12(028)(3nos P2) - AIOP Installation (3 nos)	L12(028)(3nos P2) - AIOP Installation (3 nos)																	
EM4820	L12(028)(3nos P2) - Loop Installation (15 nos)	L12(028)(3nos P2) - Loop Installation (15 nos)																	
EM4840	L12(028)(3nos P2) - Kiosk Equipment Configuration (3 nos)	L12(028)(3nos P2) - Kiosk Equipment Configuration (3 nos)																	
EM5120	L12(028)(3nos P2) - Inbd Goods Vehicle Kiosks Installation Complete	L12(028)(3nos P2) - Inbd Goods Vehicle Kiosks Installation Complete																	
Location 10 Shuttle Bus Kiosks (006) - 4 nos (Phase 2)		▼ 30-Aug-17; Location 10 Shuttle Bus Kiosks (006)																	
EM4000	L10(006)(4nos P2) - Cable Containment in Kiosks	L10(006)(4nos P2) - Cable Containment in Kiosks																	
Location 11 Inbd Coach Kiosks (010) - 2 nos (Phase 2)-1																			
Location 11 Inbd Coach Kiosks (010) - 2 nos (Phase 2)-2																			
Initial On-Site Test and Commissioning / Pre-SAT (Phase 2 / Section III)																			

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- Actual Level of Effort
- Primary Baseline
- Actual Work
- Remaining Work
- Critical Remaining Work
- Baseline Milestone
- Milestone
- summary

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
Facilities - Automatic Vehicle
Clearance Support System (AVCSS)

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Activity ID	Activity Name	2015			2016				2017				2018				2019			
		Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	
	<ul style="list-style-type: none">  Site Acceptance Test (Phase 2 / Section III)  Operability Period Test (Phase 2 / Section III)  Completion (Phase 2 / Section III)  Operation (Phase 2 / Section III)  Defect Liability Period (DLP)  Document Submission (Phase 2 / Section III) 																			

Programme No.: HZMB-DWP
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-  Actual Level of Effort
-  Primary Baseline
-  Actual Work
-  Remaining Work
-  Critical Remaining Work
-  Baseline Milestone
-  Milestone

Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing
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APPENDIX D

Event and Action Plan

Event/Action Plan for Air Quality Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
LIMIT LEVEL				
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Construction Noise Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Water Quality Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat in situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Repeat measurement on next day of exceedance to confirm findings. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET and Contractor's working methods; 2. Discuss with ET and Contractor on possible remedial actions; 3. Review the proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER; 5. Implement the agreed mitigation measures. 6. Amend working methods if appropriate.
Action level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat in situ measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor and ER; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Action level; 8. Repeat measurement on next day of exceedance to confirm findings. 	<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 proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of non-compliance in writing; 2. Discuss with IEC on the proposed mitigation measures; 3. Make agreement on mitigation measures to be implemented; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the Engineer and confirm notification of the non-compliance in writing; 2. Rectify unacceptable practice; 3. Check all plant and equipment and consider changes of working methods; 4. Discuss with ET and IEC on possible remedial actions and propose mitigation measures to IEC and ER within 3 working days of notification; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, Contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER and Contractor; 6. Ensure mitigation measures are implemented; 7. Increase the monitoring frequency to daily until no exceedance of Limit level. 	<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 proposed mitigation measures submitted by Contractor and advise the ER accordingly; 4. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Ensure mitigation measures are properly implemented; 5. Assess the effectiveness of the implemented mitigation measures. 	<ol style="list-style-type: none"> 1. Inform the ER and confirm notification of the 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 ER within 3 working days of notification and discuss with ET, IEC and ER; 5. Implement the agreed mitigation measures; 6. Amend working methods if appropriate.
Limit level being exceeded by two or more consecutive sampling days	<ol style="list-style-type: none"> 1. Repeat <i>in-situ</i> measurement to confirm findings; 2. Identify source(s) of impact; 3. Inform IEC, contractor, ER and EPD; 4. Check monitoring data, all plant, equipment and Contractor's working methods; 5. Discuss mitigation measures with IEC, ER 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 ER accordingly. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Discuss with IEC, ET and Contractor on the proposed mitigation measures; 3. Request Contractor to critically review the working methods; 4. Make agreement on the mitigation measures to be implemented; 5. Ensure mitigation measures are properly implemented; 6. Assess the effectiveness of the implemented mitigation measures; 7. 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. Inform the ER and confirm notification of the non-compliance in writing; 2. Take immediate action to avoid further exceedance; 3. Rectify unacceptable practice; 4. Check all plant and equipment and consider changes of working methods; 5. Submit proposal of mitigation measures to ER within 3 working days of notification and discuss with ET, IEC and ER; 6. Implement the agreed mitigation measures; 7. Resubmit proposals of mitigation measures if problem still not under control; 8. As directed by the Engineer, to slow down or to stop all or part of the construction activities until no exceedance of Limit level.

Event / Action Plan for Dolphin Monitoring

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

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

APPENDIX E

Implementation Schedule for Environmental Mitigation Measures (EMIS)

Contract No. HY/2013/01 – Hong Kong Zhuhai and Macao Bridge Hong Kong Boundary Crossing Facilities – Passenger Clearance Building

Implementation Schedule for Environmental Mitigation Measures

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
Air Quality								
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 $\mu\text{g}\text{m}^{-3}$ and 260 $\mu\text{g}\text{m}^{-3}$, respectively)	√
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: <ul style="list-style-type: none"> • Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; • Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; • A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. • The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; • Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores; • The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials; • Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; • Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; 	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 $\mu\text{g}\text{m}^{-3}$ and 260 $\mu\text{g}\text{m}^{-3}$, respectively)	√ √ √ √ √ √ √

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S5.5.6.2	A2	<ul style="list-style-type: none"> Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; Any skip hoist for material transport should be totally enclosed by impervious sheeting; Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides; Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site or part of the construction site where the exposed earth lies. 	Good construction site practices to control the dust impact at the nearby sensitive receivers to within the relevant criteria.	Contractor	All construction sites	Construction stage	To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 $\mu\text{g}\text{m}^{-3}$ and 260 $\mu\text{g}\text{m}^{-3}$, respectively)	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>
S5.5.6.4	A3	The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	Control construction dust	Contractor	All construction sites	Construction stage	To control the dust impact	√
S5.5.6.5	A4	Engineer to incorporate the controlled measures into the Particular Specification (PS) for the civil work. The PS should also draw the contractor's attention to the relevant latest Practice Notes issued by EPD.	Control construction dust	Engineer	All construction sites	Design Stage	Air Pollution Control (Construction Dust) Regulation	√

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S5.5.6.5	A5	Implement regular dust monitoring under EM&A programme during the construction stage.	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	<ul style="list-style-type: none"> Air Pollution Control (Construction Dust) Regulation To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 $\mu\text{g}\text{m}^{-3}$ and 260 $\mu\text{g}\text{m}^{-3}$, respectively) 	<p style="text-align: center;">√</p> (The dust monitoring works (Station AMS6) under EM&A programme for the Contract is covered by Contract No. HY/2011/03. Monitoring stations AMS2, AMS3B and AMS7B for the Contract are covered by Contract No. HY/2013/01)
S5.5.7.1	A6	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant: <ul style="list-style-type: none"> Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; The materials which may generate airborne dusty emissions should be wetted by water spray system; All receiving hoppers should be enclosed on three sides up to 3m above unloading point; All conveyor transfer points should be totally enclosed; All access and route roads within the premises should be paved and wetted; and Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body. 	Monitor the 24 hr and 1hr TSP levels at the representative dust monitoring stations to ensure compliance with relevant criteria throughout the construction period.	Contractor	Selected representative dust monitoring station	Construction stage	<ul style="list-style-type: none"> Air Pollution Control (Construction Dust) Regulation To control the dust impact to within the HKAQO and TM-EIA criteria (Ref. 1- hr and 24hr TSP levels are 500 $\mu\text{g}\text{m}^{-3}$ and 260 $\mu\text{g}\text{m}^{-3}$, respectively) 	N/A
S5.5.2.7	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: <ul style="list-style-type: none"> All road surface within the barging facilities will be paved; Dust enclosures will be provided for the loading ramp; Vehicles will be required to pass through designated wheels wash facilities; and Continuous water spray at the loading points. 	Control construction dust	Contractor	All construction sites	Construction stage	Air Pollution Control (Construction Dust) Regulation	N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
Construction Noise (Air borne)								
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the following: <ul style="list-style-type: none"> only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs; silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; mobile plant should be sited as far away from NSRs as possible and practicable; material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities. 	Control construction airborne noise by means of good site practices	Contractor	All construction sites	Construction stage	Noise Control Ordinance	 √ √ √ √ √ √
S6.4.11	N2	2) Install temporary hoarding located on the site boundaries between noisy construction activities and NSRs. The conditions of the hoardings shall be properly maintained throughout the construction period.	Reduce the construction noise levels at low-level zone of NSRs through partial screening.	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Noise Control Ordinance Annex 5, TM-EIA 	N/A
S6.4.12	N3	3) Install movable noise barriers (typically density @14kg/m ²), acoustic mat or full enclosure close to noisy plants including air compressor, generators, saw.	Screen the noisy plant items to be used at all construction sites	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	<ul style="list-style-type: none"> Noise Control Ordinance Annex 5, TM-EIA 75dB(A) for residential premises The movable barrier should achieve at least 5dB(A) and the full enclosure should be designed to achieve 10dB(A) 	N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	Reduce the noise levels of plant items	Contractor	For plant items listed in Appendix 6D of the EIA report at all construction sites	Construction stage	<ul style="list-style-type: none"> Noise Control Ordinance & its TM Annex 5, TM-EIA 	√
S6.4.14	N5	5) Sequencing operation of construction plants where practicable.	Operate sequentially within the same work site to reduce the construction airborne noise	Contractor	All construction sites where practicable	Construction stage	<ul style="list-style-type: none"> Noise Control Ordinance Annex 5, TM-EIA 	√
S6.4.14	N6	6) Implement a noise monitoring under EM&A programme.	Monitor the construction noise levels at the selected representative locations	Contractor	Selected representative noise monitoring station	Construction stage	<ul style="list-style-type: none"> Noise Control Ordinance Annex 5, TM-EIA 75dB(A) for residential premises 	(ET of Contract No. HY/2013/01 is responsible conducting monitoring for entire HKBCF) √
Sediment								
S7.3	S1	1) The requirements as recommended in ETWB TC 34/2002 Management of Dredged/Excavated Sediment shall be included in the Particular Specification as appropriate.	Develop sediment disposal arrangement	Engineer	All construction sites	Design stage	<ul style="list-style-type: none"> Waste Disposal Ordinance ETW B TC 34/2002 	N/A
Waste Management (Construction Waste)								
S8.3.8	WM1	<u>Construction and Demolition Material</u> The following mitigation measures should be implemented in handling the waste: <ul style="list-style-type: none"> Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; Carry out on-site sorting; Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; Adopt 'Selective Demolition' technique to demolish the existing structures and facilities with a view to recovering broken concrete effectively for recycling purpose, where possible; Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and 	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETW BTC 19/2005 	√ √ √ √

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S8.3.8	WM1	<ul style="list-style-type: none"> Implement an enhanced Waste Management Plan similar to ETW BTC (Works) No. 19/2005 – “Environmental Management on Construction Sites” to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation. 	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> 	<p>√</p> <p>√</p>
S8.3.9- S8.3.11	WM2	<p><u>C&D Waste</u></p> <ul style="list-style-type: none"> Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable, concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage. 	Good site practice to minimize the waste generation and recycle the C&D materials as far as practicable so as to reduce the amount for final disposal	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Land (Miscellaneous Provisions) Ordinance Waste Disposal Ordinance ETWB TC 19/2005 	<p>√</p> <p>√</p>
S8.2.12- S8.3.15	WM3	<p><u>Chemical Waste</u></p> <ul style="list-style-type: none"> Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. 	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Waste Disposal (Chemical Waste) (General) Regulation Code of Practice on the Packaging, Labelling and Storage of Chemical Waste 	<p>√</p> <p>√</p> <p>√</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S8.2.12- S8.3.15	WM3	<ul style="list-style-type: none"> Disposal of chemical waste should be via a licensed waste collector; be to a facility licensed to receive chemical waste, such as the Chemical Waste Treatment Centre which also offers a chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD. 	Control the chemical waste and ensure proper storage, handling and disposal.	Contractor	All construction sites	Construction stage		√
S8.3.16	WM4	<p><u>Sewage</u></p> <ul style="list-style-type: none"> Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state, which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly. 	Proper handling of sewage from worker to avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Waste Disposal Ordinance 	√
S8.3.17	WM5	<p><u>General Refuse</u></p> <ul style="list-style-type: none"> General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. In addition, waste separation facilities for paper, aluminum cans, plastic bottles etc., should be provided. Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes. 	Minimize production of the general refuse and avoid odour, pest and litter impacts	Contractor	All construction sites	Construction stage	<ul style="list-style-type: none"> Waste Disposal Ordinance 	√ √ √ √ √

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S.9.11.1.7	W1	<ul style="list-style-type: none"> The conveyor belts shall be fitted with windboards and conveyor release points shall be covered with curtain to prevent any spillage of filling materials onto the surrounding waters; and An additional layer of silt curtain shall be installed near the active stone column installation points. A layer of geotextile with stone blanket on top shall be placed on the seabed prior to stone column installation works. 	To control construction water quality	Contractor	During filling	Construction stage	TM-EIAO	<p>√</p> <p>√</p>
S.9.11.1.7	W2	<p><u>Land Works</u></p> <p>General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include:</p> <ul style="list-style-type: none"> wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; 	To control construction water quality	Contractor	Land-based works areas	Construction stage	TM-EIAO	<p>√</p>
S.9.11.1.7	W2	<ul style="list-style-type: none"> sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; temporary access roads should be surfaced with crushed stone or gravel; rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system; 	To control construction water quality	Contractor	Land-based works areas	Construction stage	TM-EIAO	<p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p> <p>√</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S9.11.1.7	W2	<ul style="list-style-type: none"> 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; wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system. 	To control construction water quality	Contractor	Land-based works areas	Construction stage	TM-EIAO	<ul style="list-style-type: none"> √ √ √ √ √ √ √ √
S.9.14	W3	<ul style="list-style-type: none"> Implement a water quality monitoring programme. 	To control water quality	Contractor	Selected representative water quality monitoring station	Construction stage	<ul style="list-style-type: none"> TM-EIAO Water Pollution Control Ordinance 	<ul style="list-style-type: none"> √ <p>(ET of ContractNo. HY/2013/01 is responsible conducting monitoring for entire HKBCF)</p>

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
Ecology (Construction Phase)								
S10.7	E1	<ul style="list-style-type: none"> Install silt curtain during the construction Limit works fronts Construct seawall prior to reclamation filling where practicable Good site practices Strict enforcement of no marine dumping Site runoff control Spill response plan 	Prevent Sedimentation from Land-based works areas	Contractor	Seawall, reclamation area	During construction	TM-Water	<ul style="list-style-type: none"> √ √ √ √ √ √
S10.7	E2	<ul style="list-style-type: none"> Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater. 	Prevent Sedimentation from Land-based works areas	Contractor	Land-based works areas	During construction	TM-Water	<ul style="list-style-type: none"> √
S10.7	E3	<ul style="list-style-type: none"> Good site practices, including strictly following the permitted works hours, using quieter machines where practicable, and avoiding excessive lightings during night time 	Prevent disturbance to terrestrial fauna and habitats	Contractor	Land-based works areas	During construction	TM-Water	<ul style="list-style-type: none"> √
S10.7	E4	<ul style="list-style-type: none"> Dolphin Exclusion Zone Dolphin Watching plan 	Minimise marine traffic disturbance on dolphins	Contractor	Marine Works	During construction	TM-Water	<ul style="list-style-type: none"> √ √
S10.7	E5	<ul style="list-style-type: none"> Decouple compressors and other equipment on working vessels Proposal on design and implementation of acoustic decoupling measures applied during reclamation works Avoidance of percussive piling 	Minimise marine traffic disturbance on dolphins	Contractor	Marine Works	During construction	TM-Water	<ul style="list-style-type: none"> √ √ √
S10.7	E6	<ul style="list-style-type: none"> Control vessel speed Skipper training Predefined and regular routes for working vessels; avoid Brother Islands. 	Minimise marine traffic disturbance on dolphins	Contractor	Marine Traffic	During construction	TM-Water	<ul style="list-style-type: none"> √ √ √
S10.7	E7	<ul style="list-style-type: none"> Vessel based dolphin monitoring 	Minimise marine traffic disturbance on dolphins	Contractor	Northeast and Northwest Lantau	During construction	TM-Water	<ul style="list-style-type: none"> √ (ET of Contract No. HY/2013/01 is responsible conducting monitoring for entire HKBCF.)
Fisheries								
S11.7	F1	<ul style="list-style-type: none"> Reduce re-suspension of sediments Limit works fronts Good site practices Strict enforcement of no marine dumping Spill response plan 	Minimise impacts on marine water quality impacts	Marine Department	Seawall, reclamation area	During operation		<ul style="list-style-type: none"> √ √ √ √ √
S11.7	F2	<ul style="list-style-type: none"> Install silt-grease trap in the drainage system collecting surface runoff 	Minimise impacts on marine water quality impacts	Marine Department	Reclamation area	During operation		<ul style="list-style-type: none"> √

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S11.7	F4	<ul style="list-style-type: none"> Maritime Oil Spill Response Plan (MOSRP); Contingency plan. 	Minimise impacts on marine water quality impacts	Marine Department	HKBCF	During operation		N/A
Landscape & Visual (Detailed Design Phase)								
S14.3.3.1	LV1	<p>General design measures include:</p> <ul style="list-style-type: none"> Roadside planting and planting along the edge of the HKBCF Island is proposed; Transplanting of mature trees in good health and amenity value where appropriate and reinstatement of areas disturbed during construction by compensatory hydro-seeding and planting; Protection measures for the trees to be retained during construction activities; Optimizing the sizes and spacing of the bridge columns; Fine-tuning the location of the bridge columns to avoid visually-sensitive locations; Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed; Providing planting area around peripheral of HKBCF for tree planting screening effect; Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline; 	Minimise visual & landscape impact	Detailed designer	HKBCF	Design Stage		N/A
S14.3.3.1	LV1	<ul style="list-style-type: none"> For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF; and Fine-tuning the sizes of the structural members to minimize the bulkiness of buildings and adjustment of building arrangement to minimise disturbance to surrounding vegetation in the HKBCF. 	Minimise visual & landscape impact	Detailed designer	HKBCF	Design Stage		N/A

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
Landscape & Visual (Construction Phase)								
S14.3.3.3	LV2	<p>Mitigate both Landscape and Visual Impacts</p> <ul style="list-style-type: none"> Grass-hydroseed bare soil surface and stock pile areas. Add planting strip and automatic irrigation system if appropriate at some portions of bridge footbridge to screen bridge and traffic. Not applicable as this is for HKLR. For HKBCF, providing aesthetic architectural design on the related buildings (e.g. similar materials for PCB building facade to Airport buildings, roof planting and subtle materials for other facilities buildings and so on), and the related infrastructure (e.g. parapet planting and transparent cover for elevated footbridges) to provide harmonious atmosphere of the HKBCF. Vegetation reinstatement and upgrading to disturbed areas Maximizing new tree shrub and other vegetation planting to compensate tree felled and vegetation removed Providing planting area around peripheral of HKBCF for tree planting screening effect; Plant salt-tolerant native and shrubs etc along the planter strip at affected seawall. Reserve of loose natural granite rocks for re-use. Provide new coastline to adopt "natural-look" by means of using armour rocks in the form of natural rock materials and planting strip area accommodating screen buffer to enhance "natural-look" of the new coastline. 	Minimise visual & landscape impact	Contractor	HKBCF	Construction stage		<p>N/A</p> <p>N/A</p> <p>√</p> <p>N/A</p> <p>√</p> <p>N/A</p> <p>N/A</p> <p>N/A</p>
S14.3.3.3	LV3	<p><u>Mitigate Visual Impacts</u></p> <ul style="list-style-type: none"> V1.Minimize time for construction activities during construction period. V2.Provide screen hoarding at the portion of the project site / works areas / storage areas near VSRs who have close low-level views to the Project during HKBCF construction. 						<p>√</p> <p>√</p>
EM&A								
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	Control EM&A Performance	Project Proponent	All construction sites		<ul style="list-style-type: none"> EIAO Guidance Note No.4/2002 TM-EIAO 	√

EIA Ref.	EM&A Log Ref	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Who to implement the measures?	Location of the measures	When to implement the measures?	What requirements or standards for the measures to achieve?	Implementation Status
S15.5 - S15.6	EM2	<ul style="list-style-type: none"> An Environmental Team needs to be employed as per the EM&A Manual. Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with. 	Perform environmental monitoring & auditing	Contractor	All construction sites		<ul style="list-style-type: none"> EIAO Guidance Note No.4/2002 TM-EIAO 	<p>√</p> <p>√</p> <p>√</p>

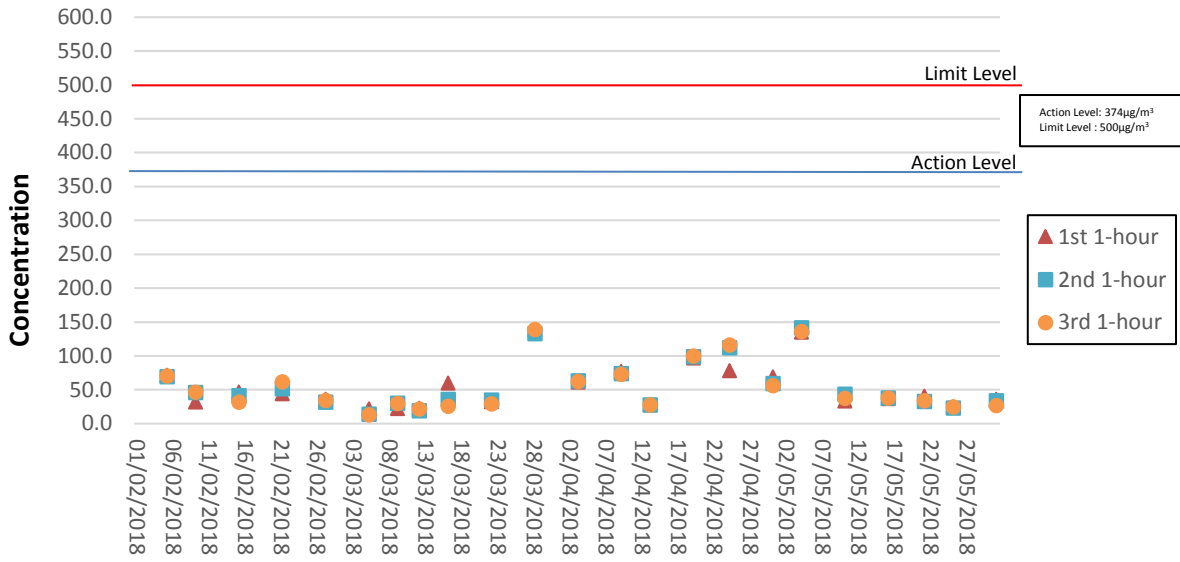
Legends: √ = Implemented; X = Not implemented; N/A = Not applicable



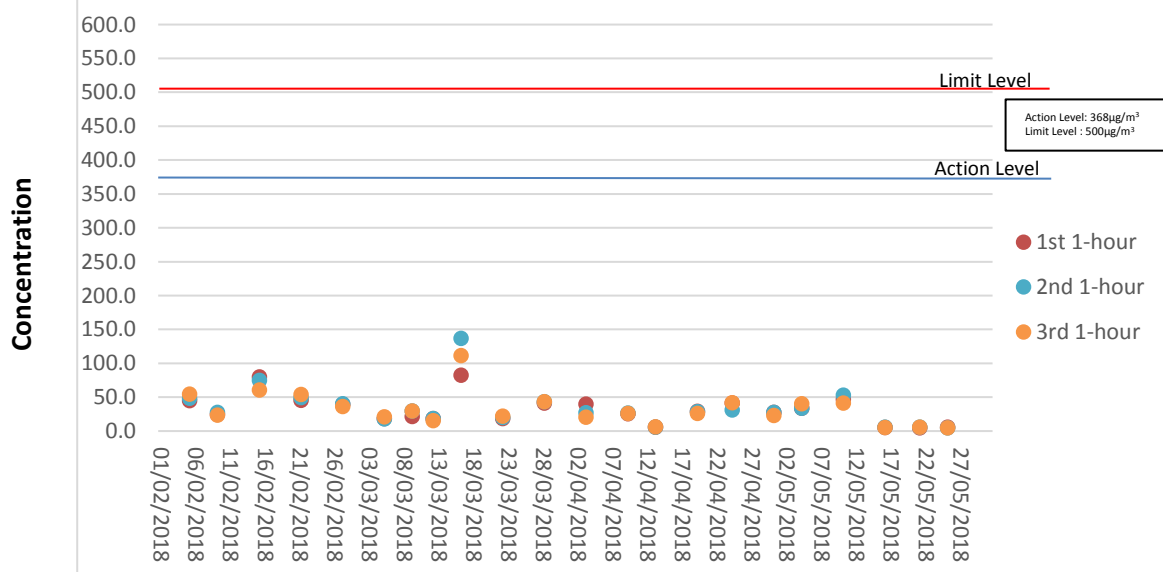
APPENDIX F

Graphical Plot (Air Quality, Noise and Water Quality)

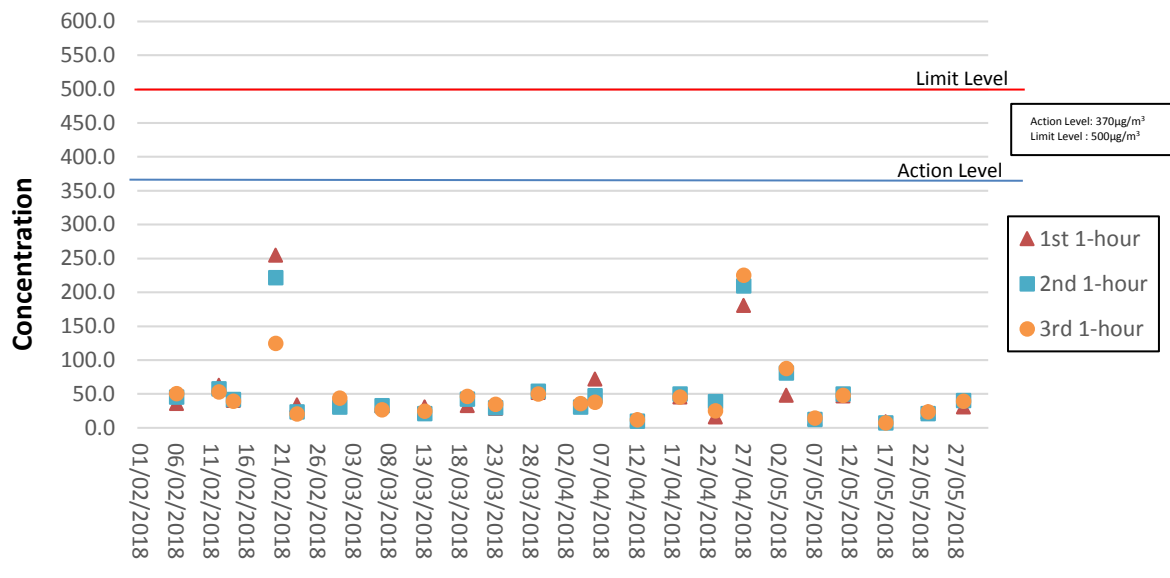
Air Quality Monitoring Data (1-hour) at AMS2

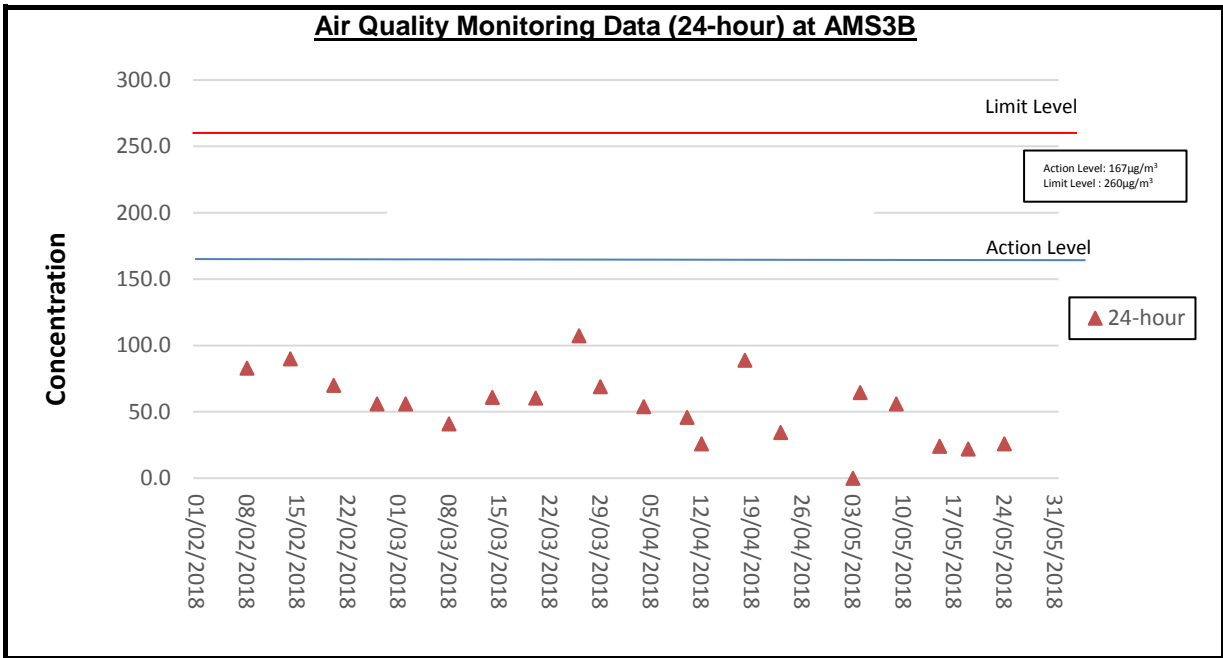
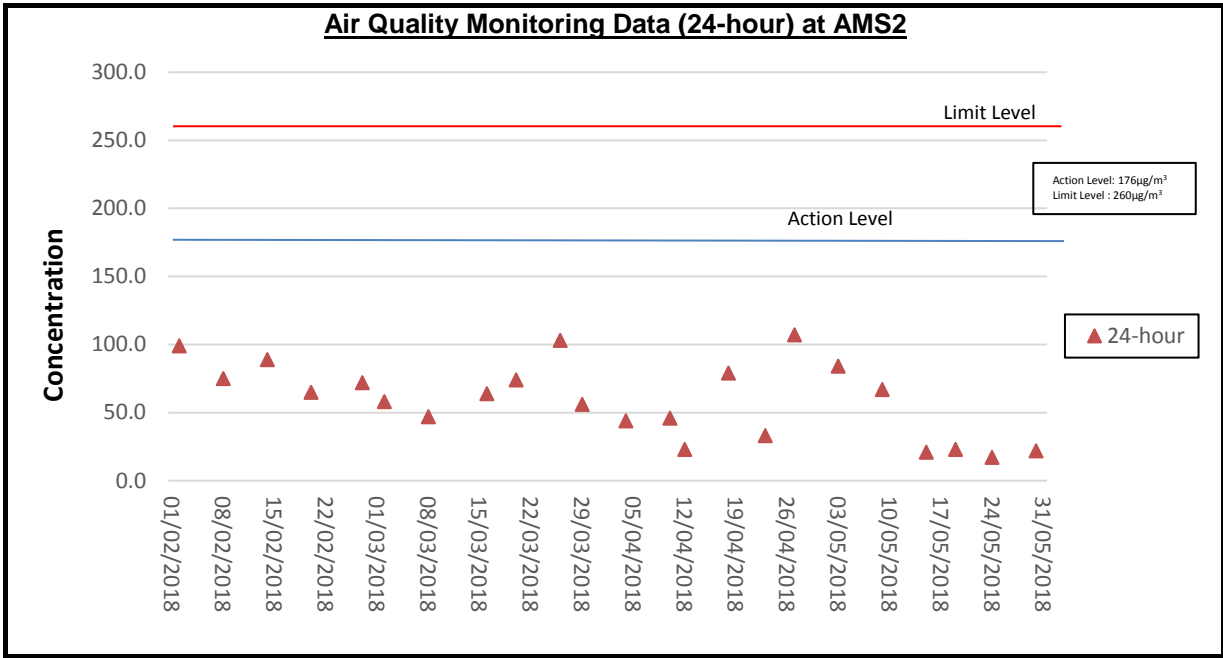


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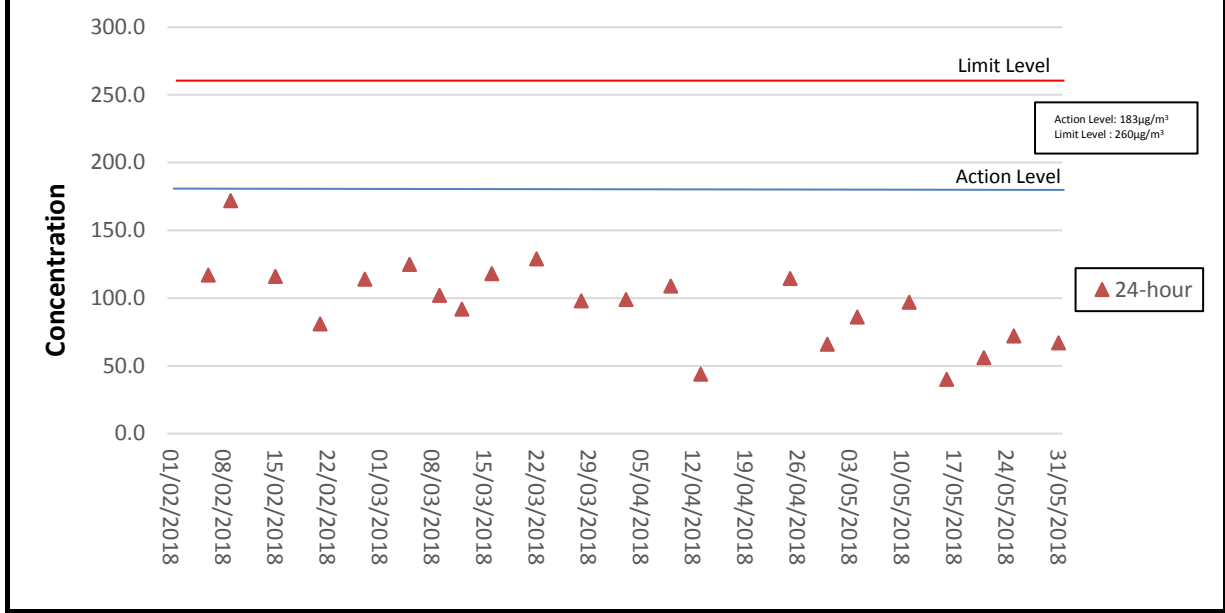


Air Quality Monitoring Data (1-hour) at AMS7B

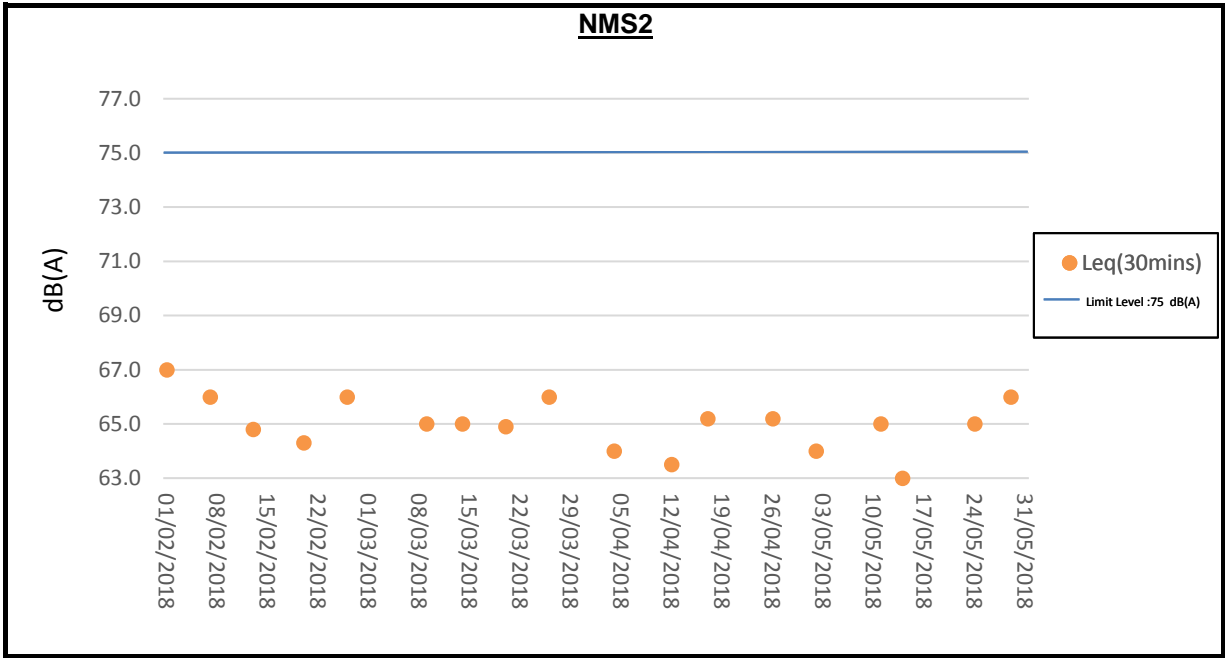




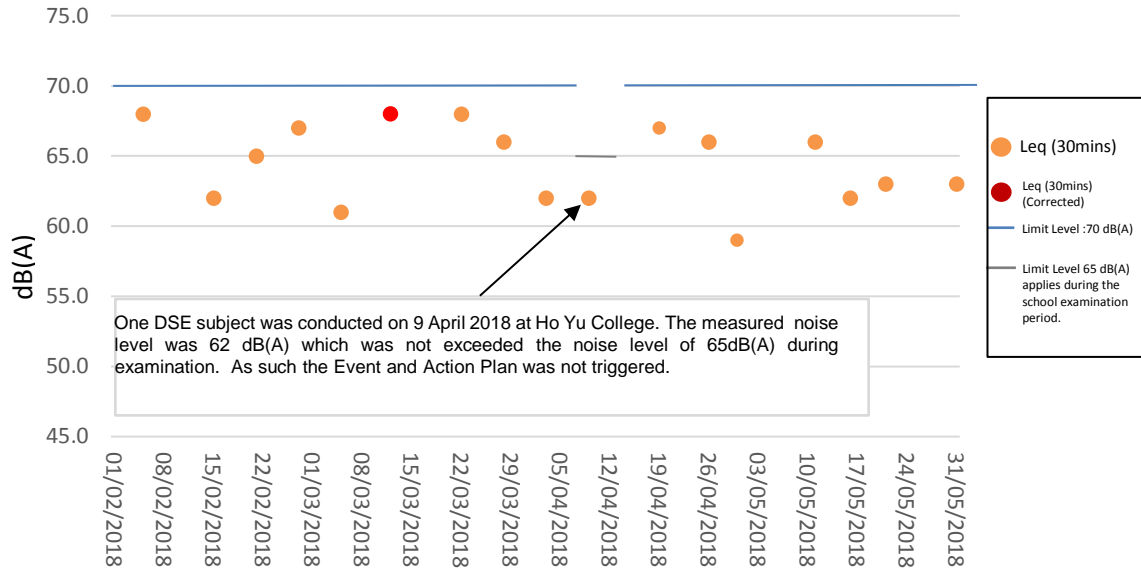
Air Quality Monitoring Data (24-hour) at AMS7B



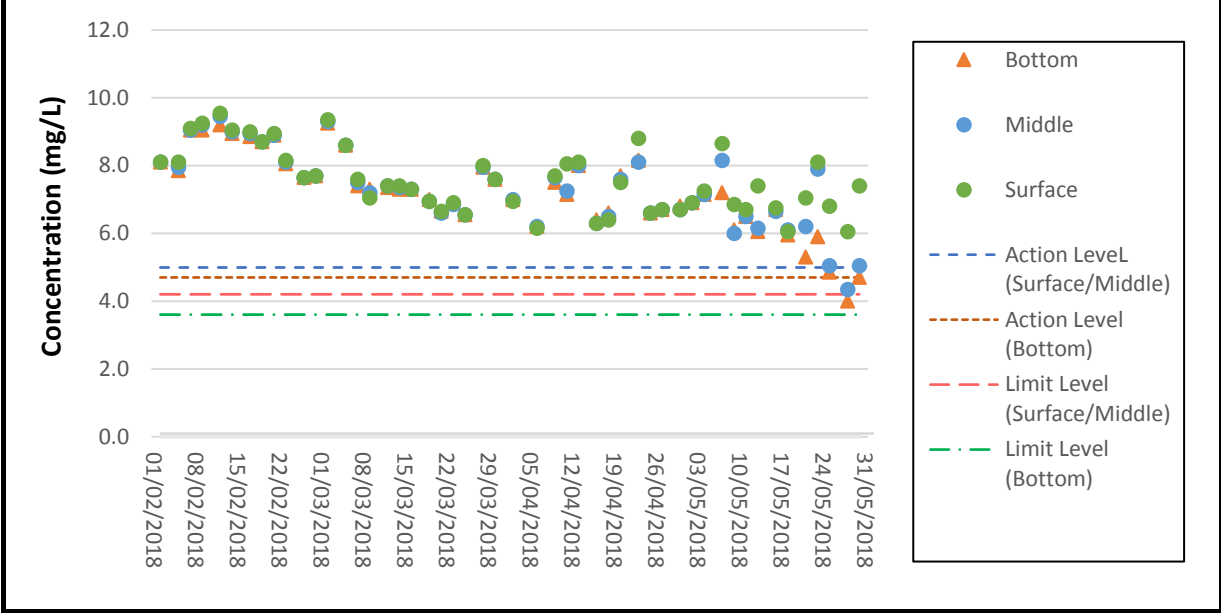
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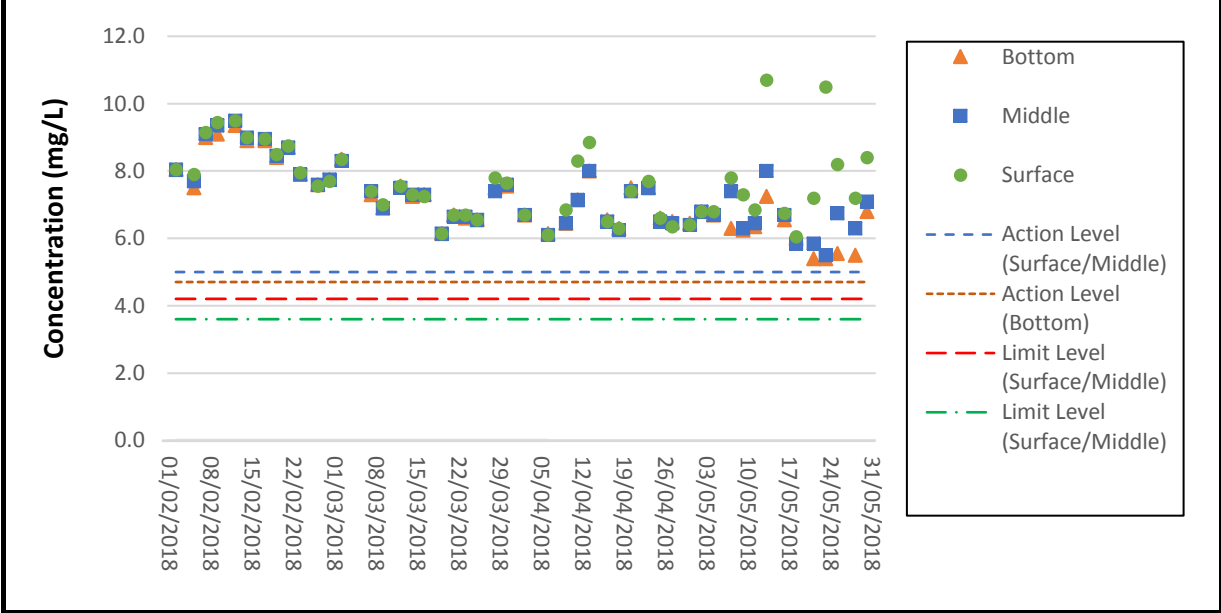
NMS3B

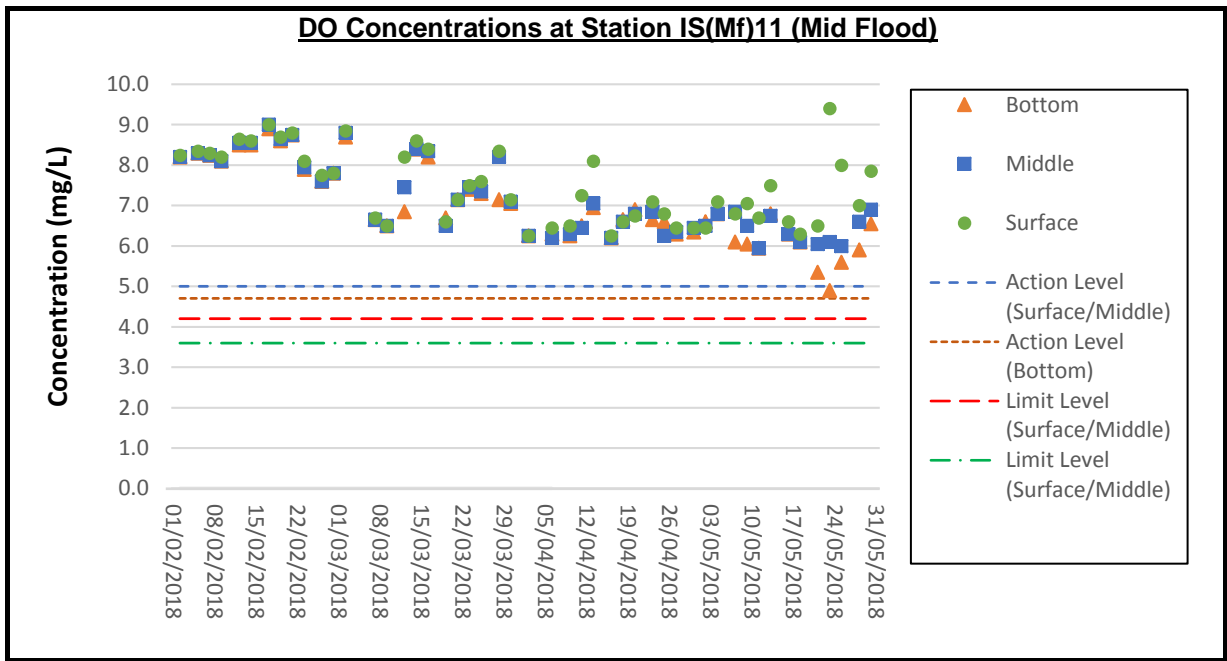
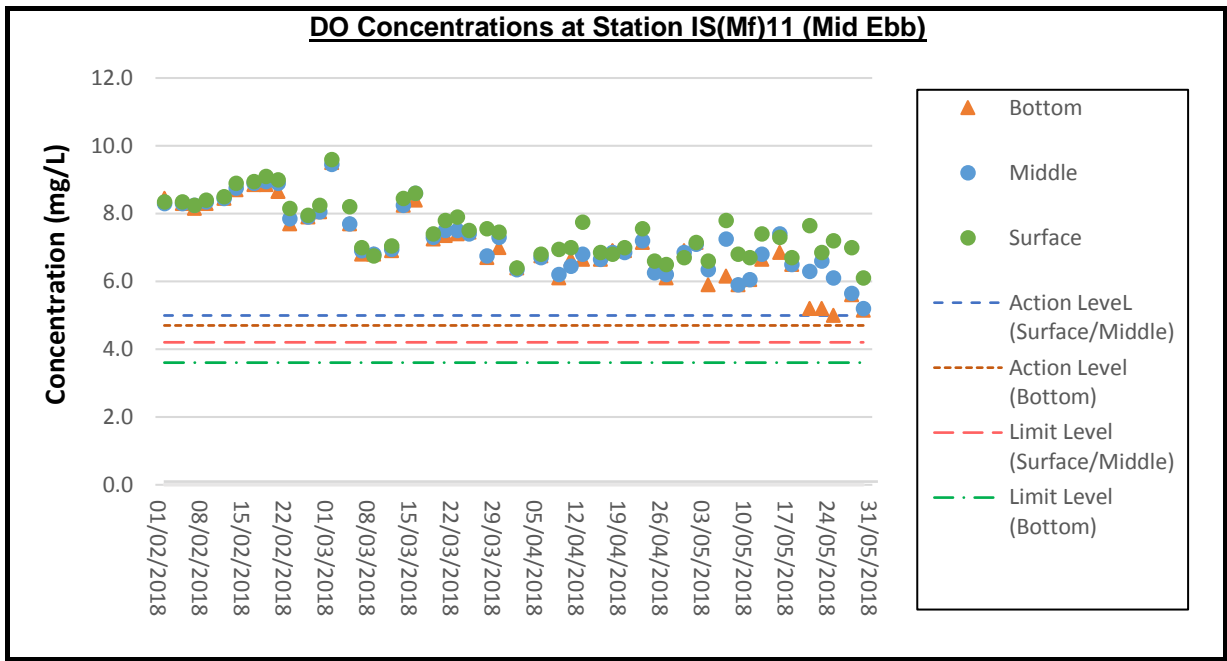


DO Concentrations at Station IS5 (Mid Ebb)

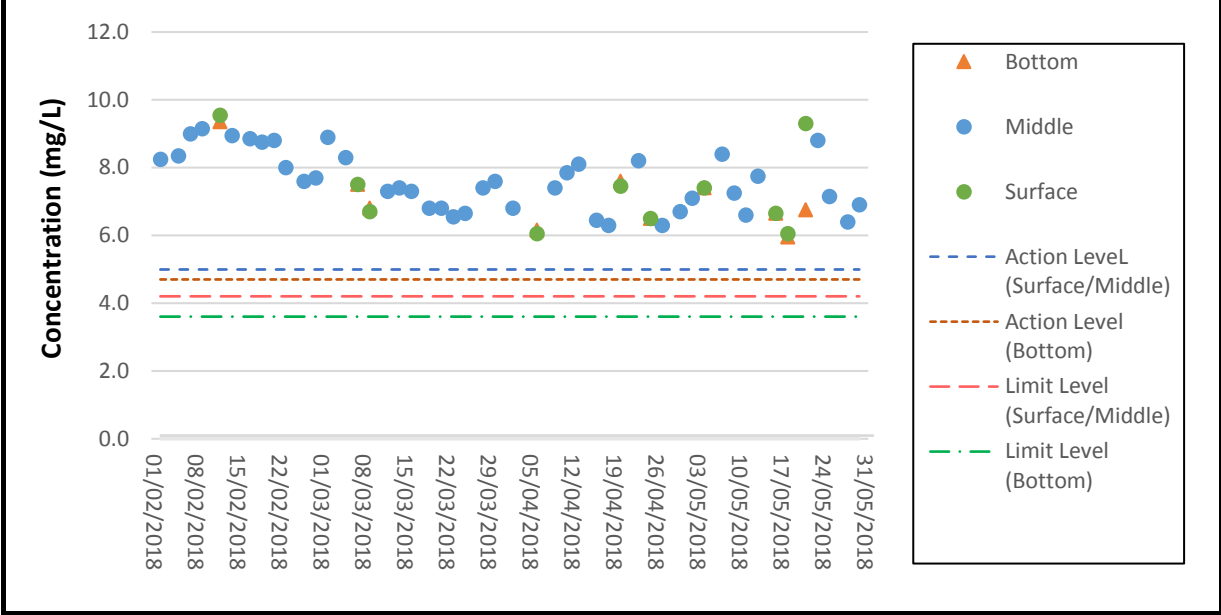


DO Concentrations at Station IS5 (Mid Flood)

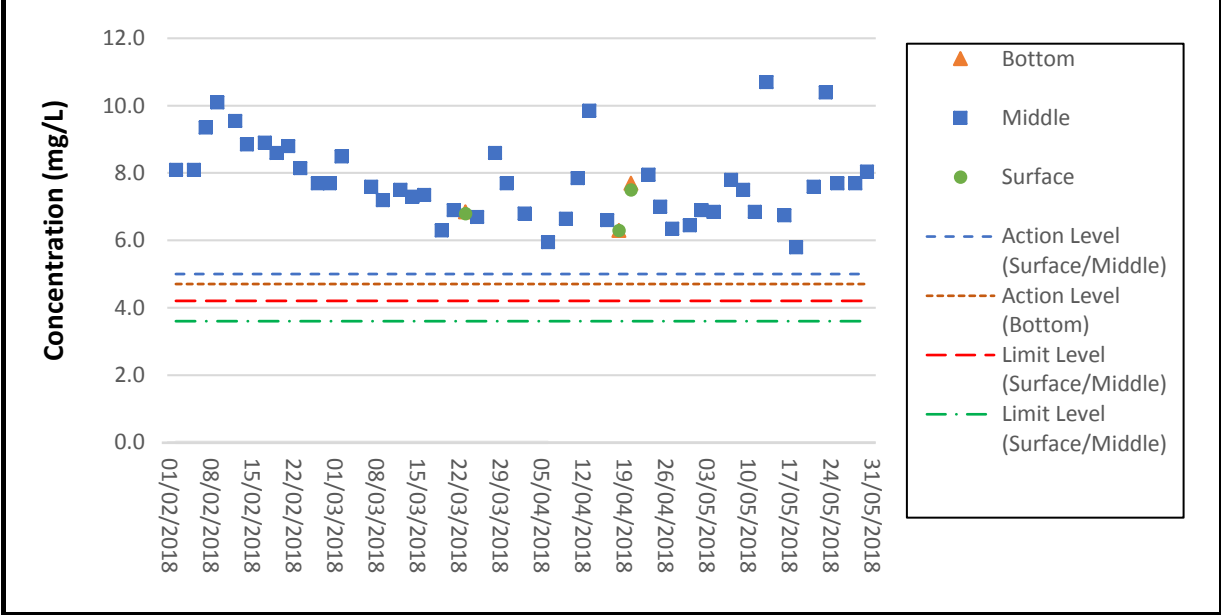




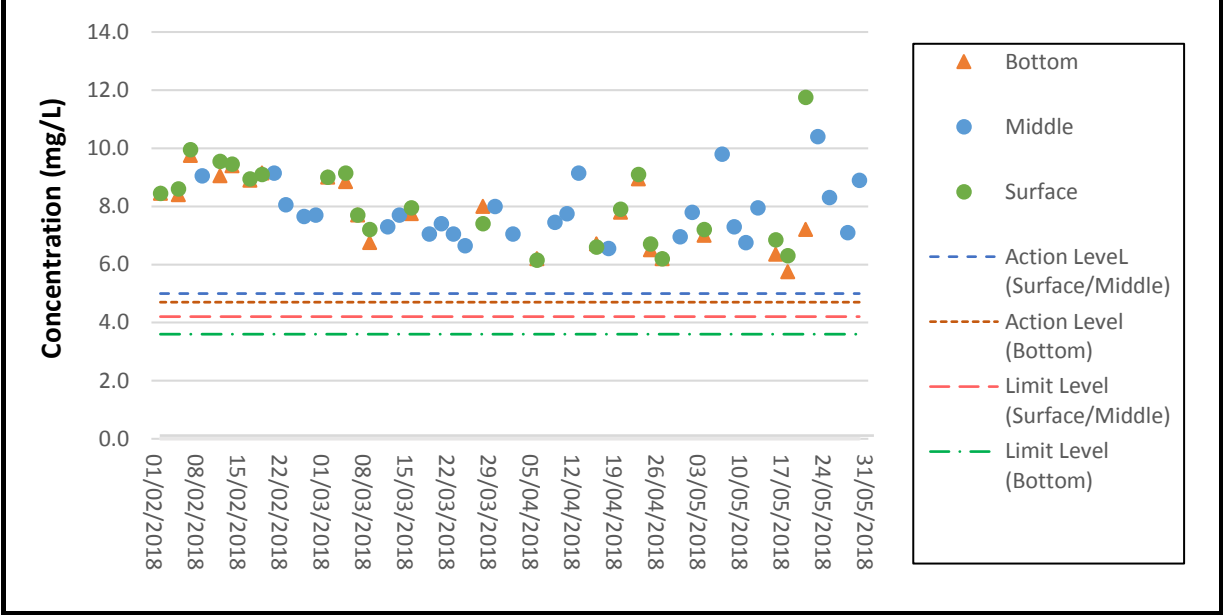
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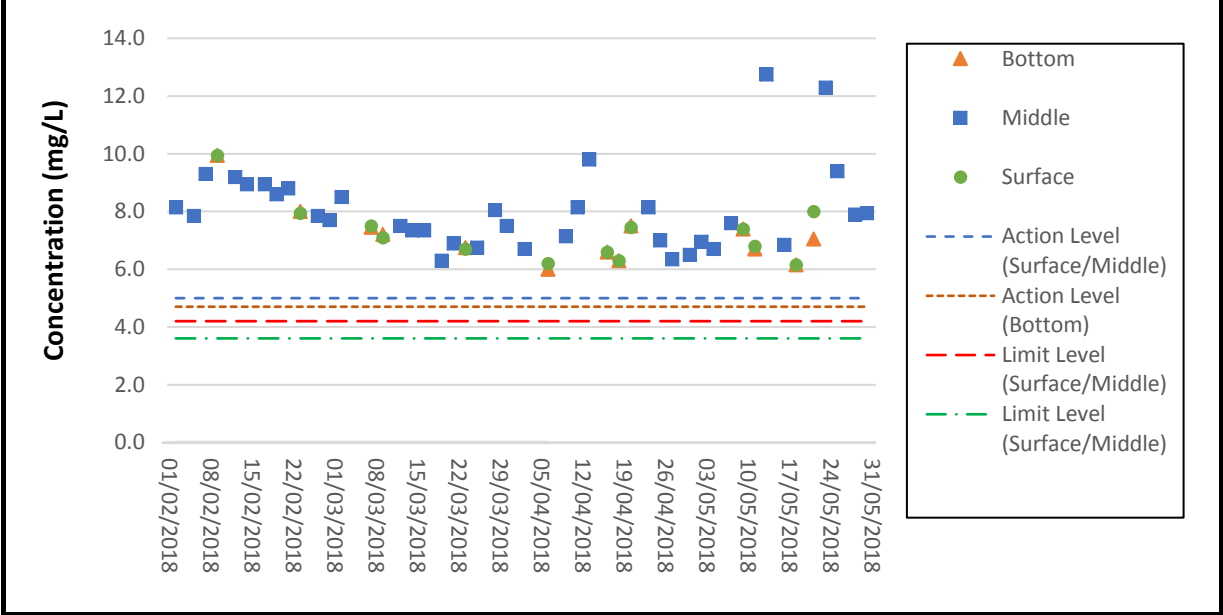
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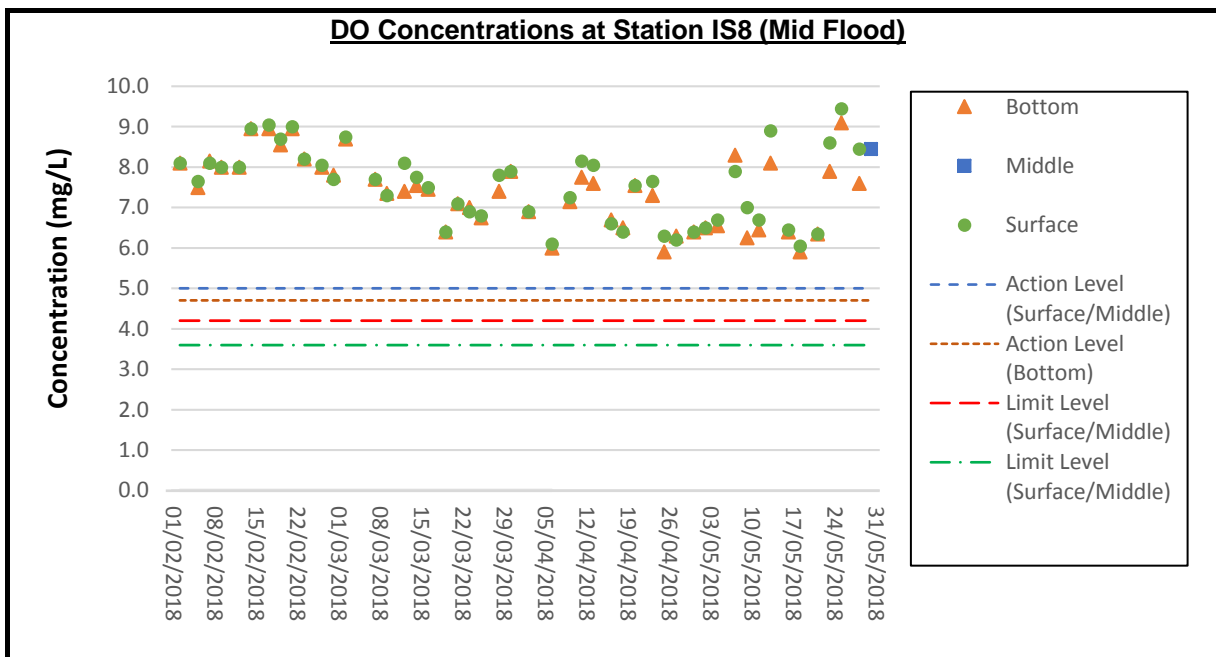
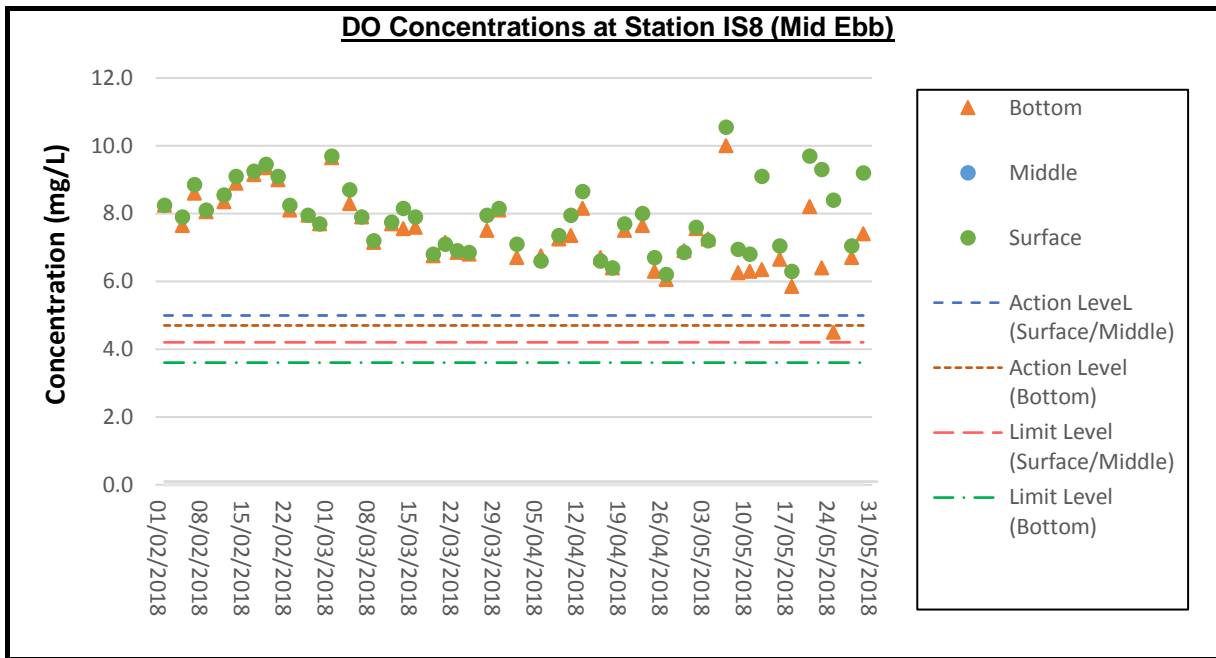


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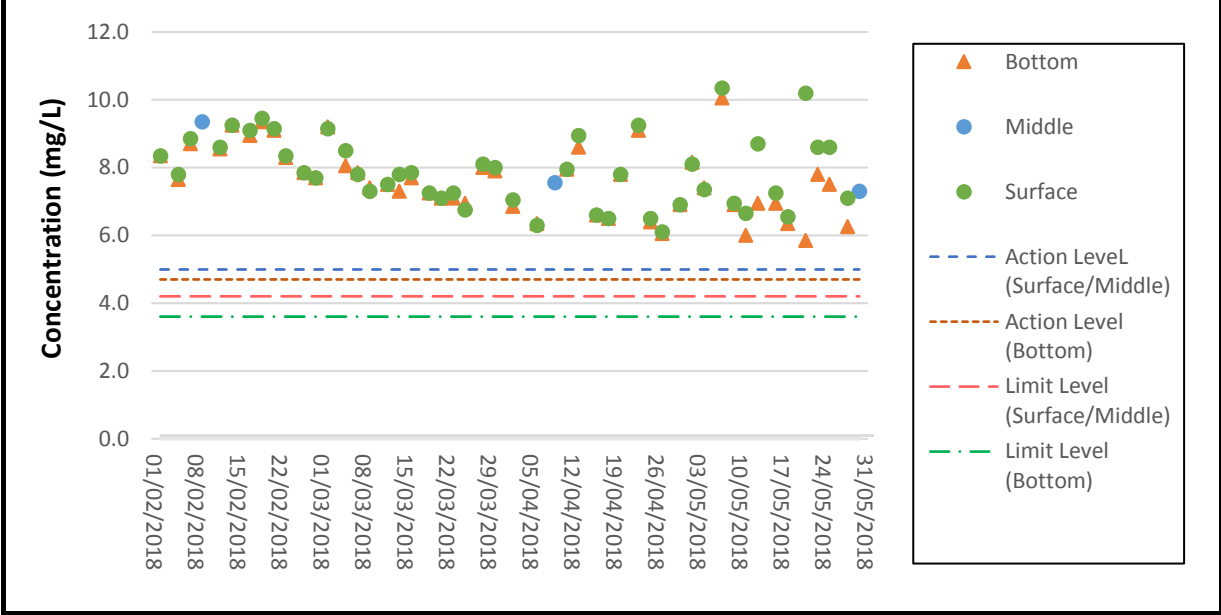


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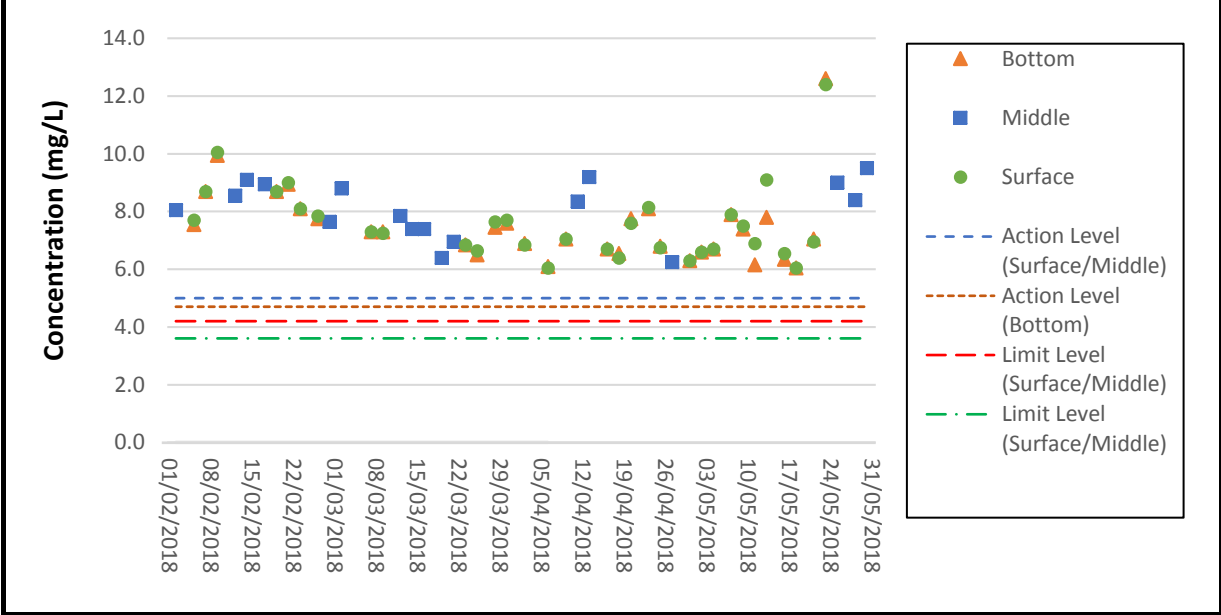




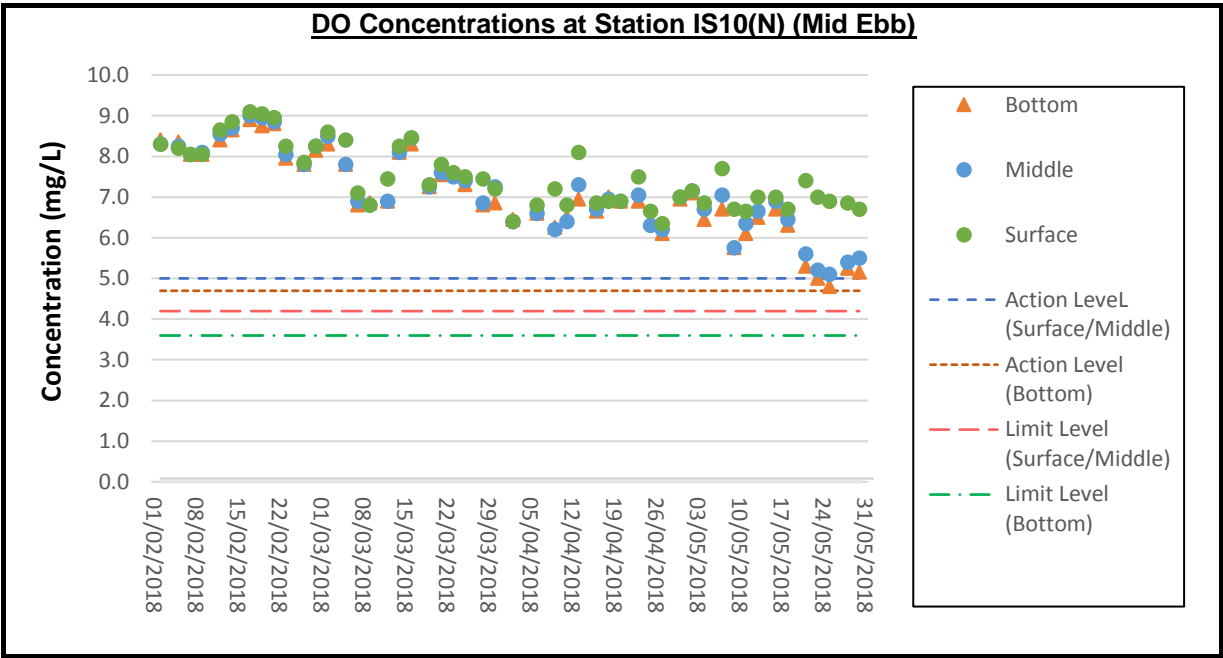
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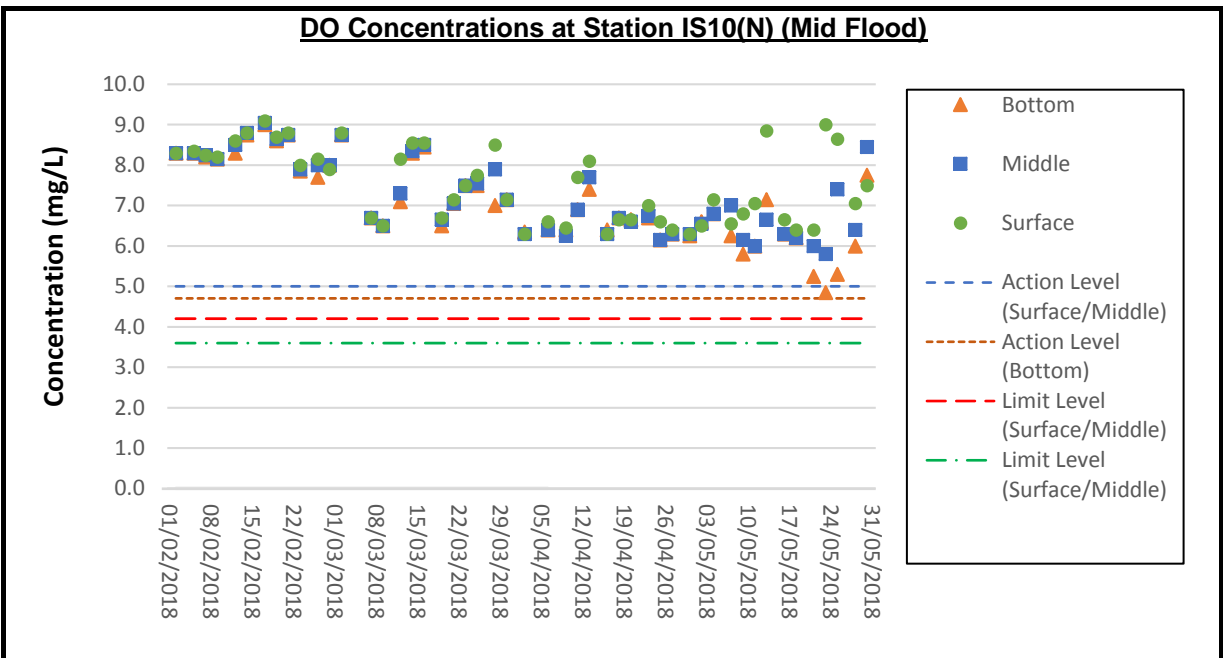
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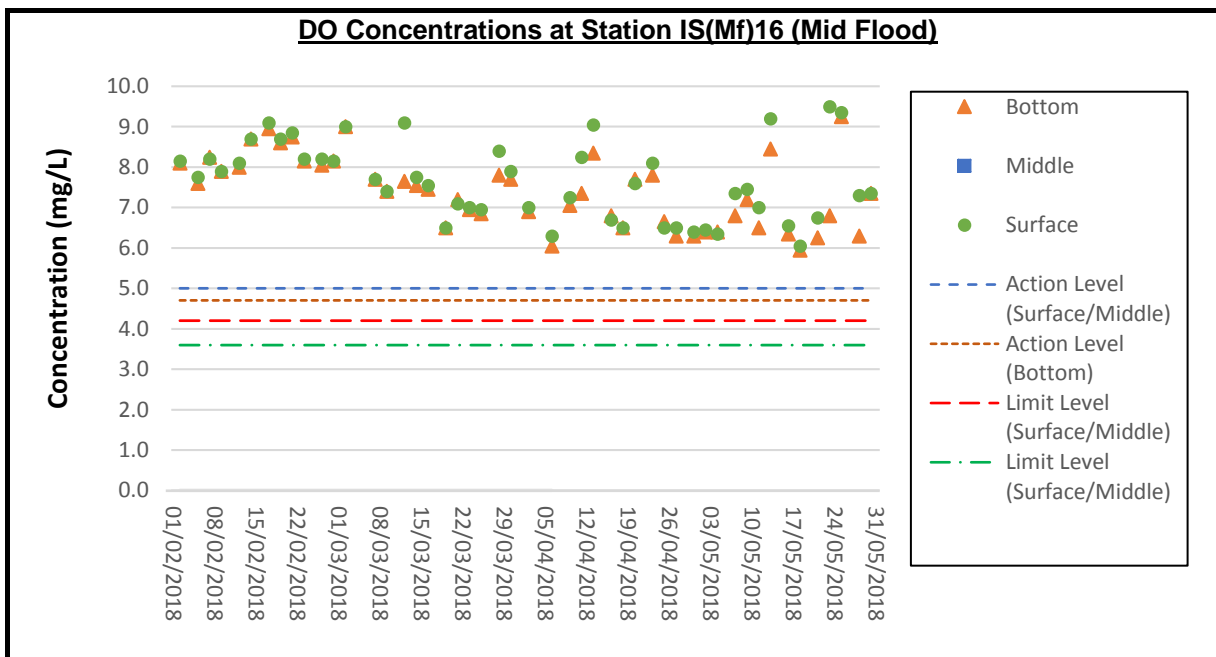
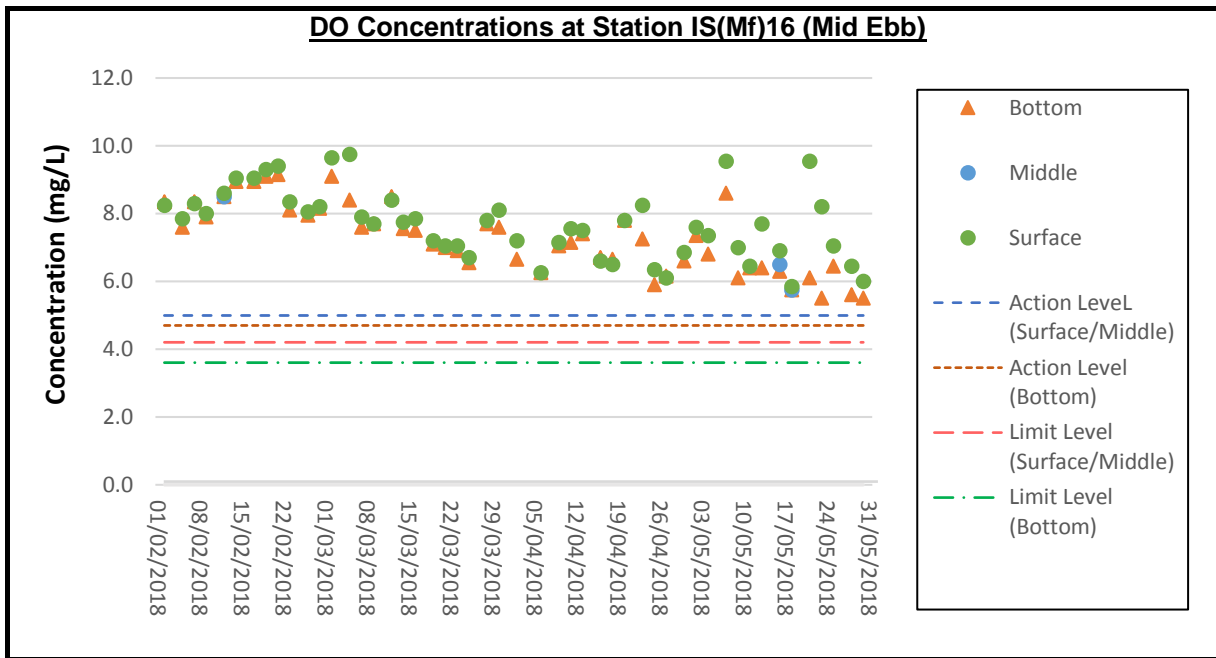


DO Concentrations at Station IS10(N) (Mid Ebb)

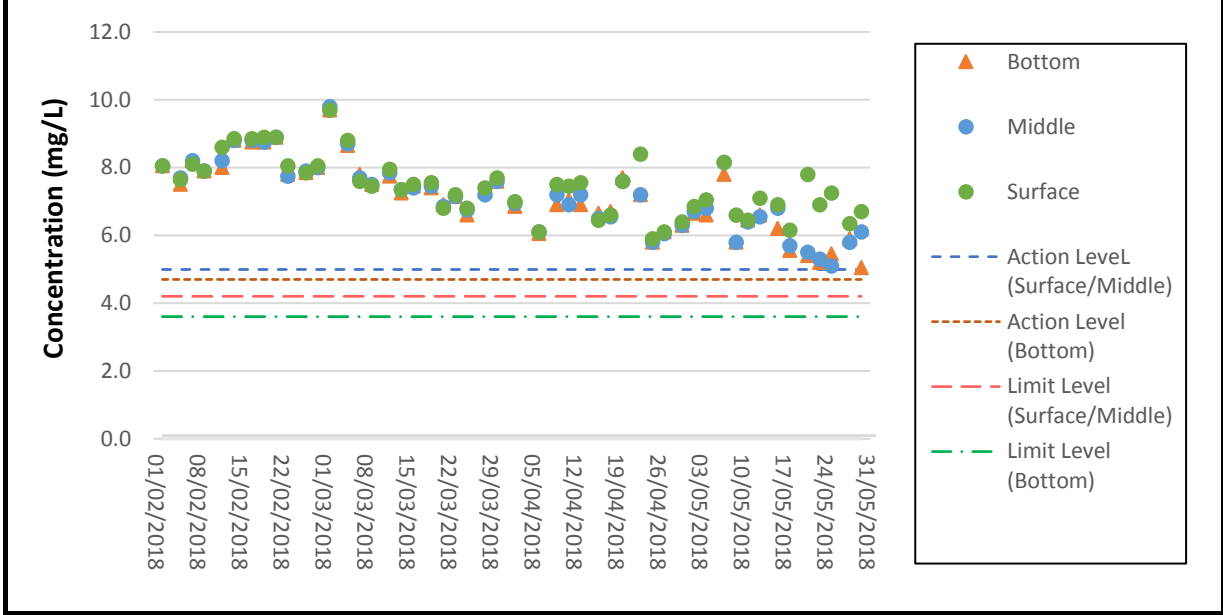


DO Concentrations at Station IS10(N) (Mid Flood)



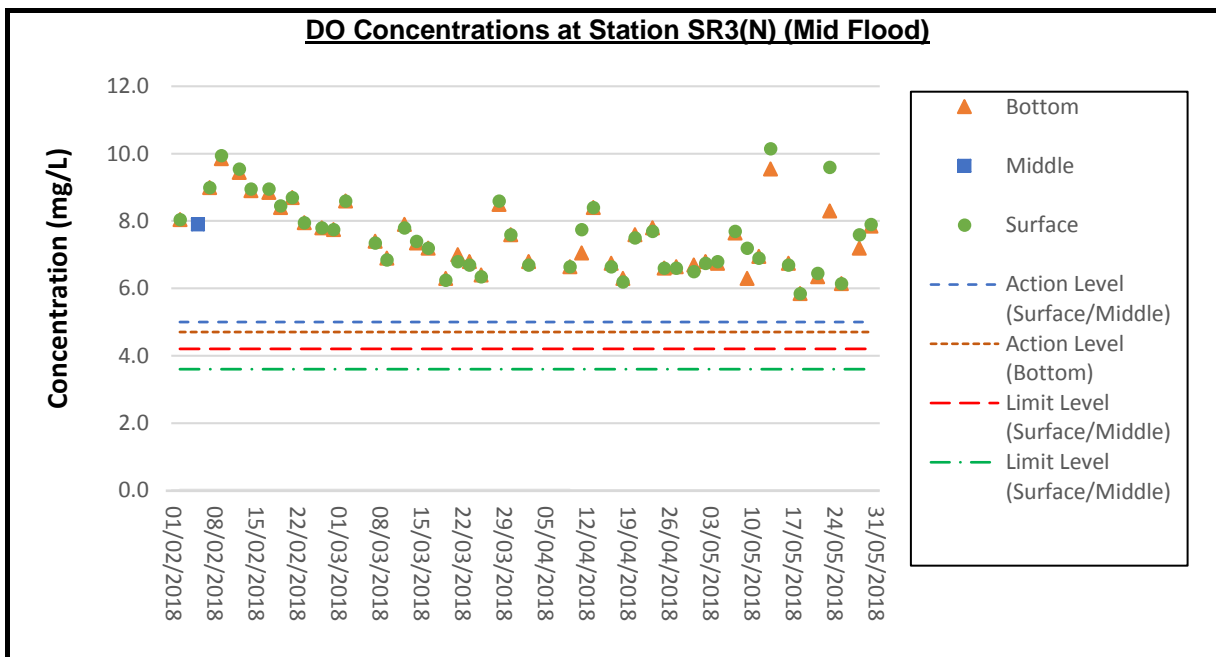
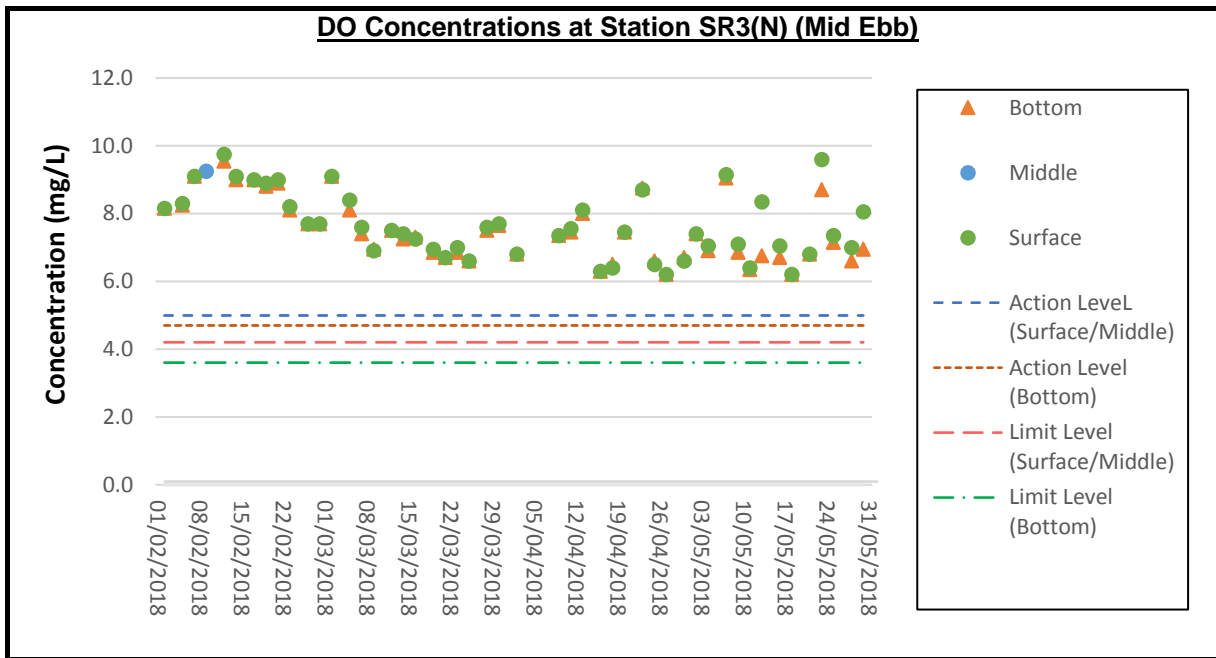


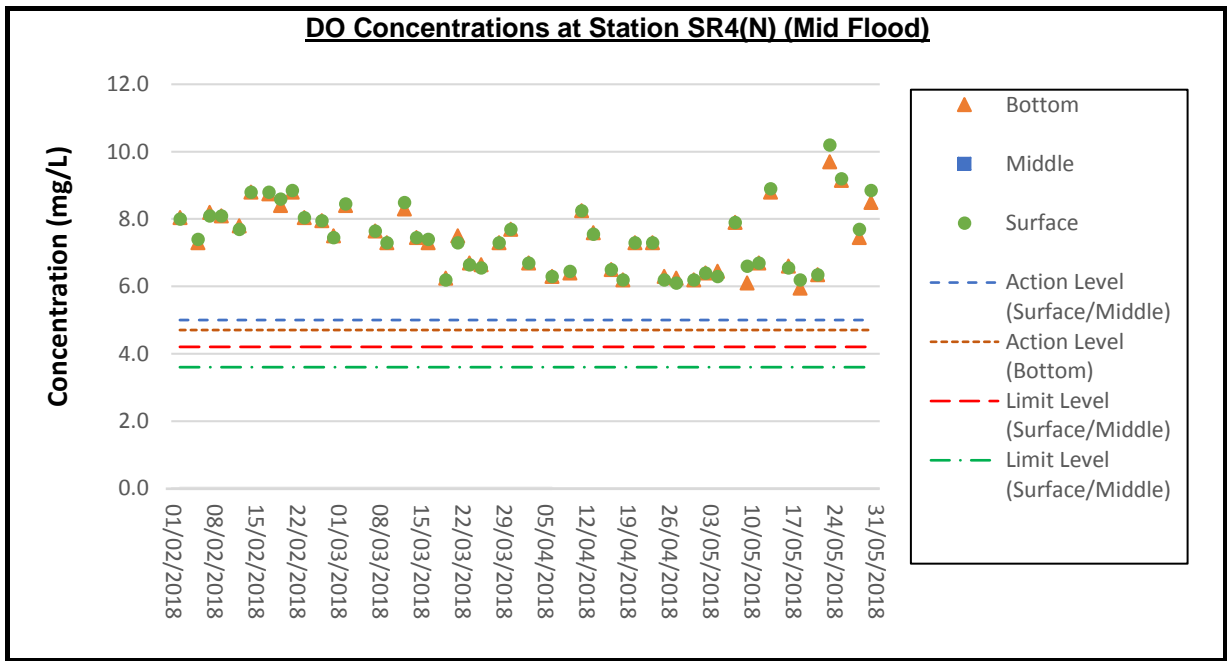
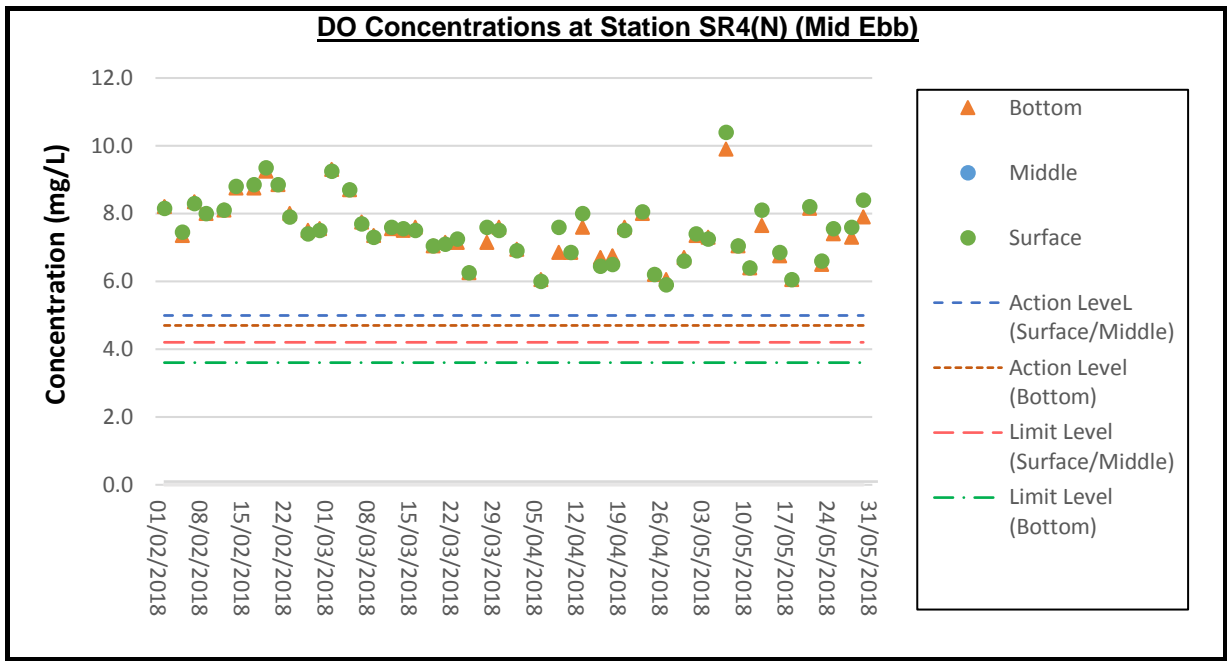
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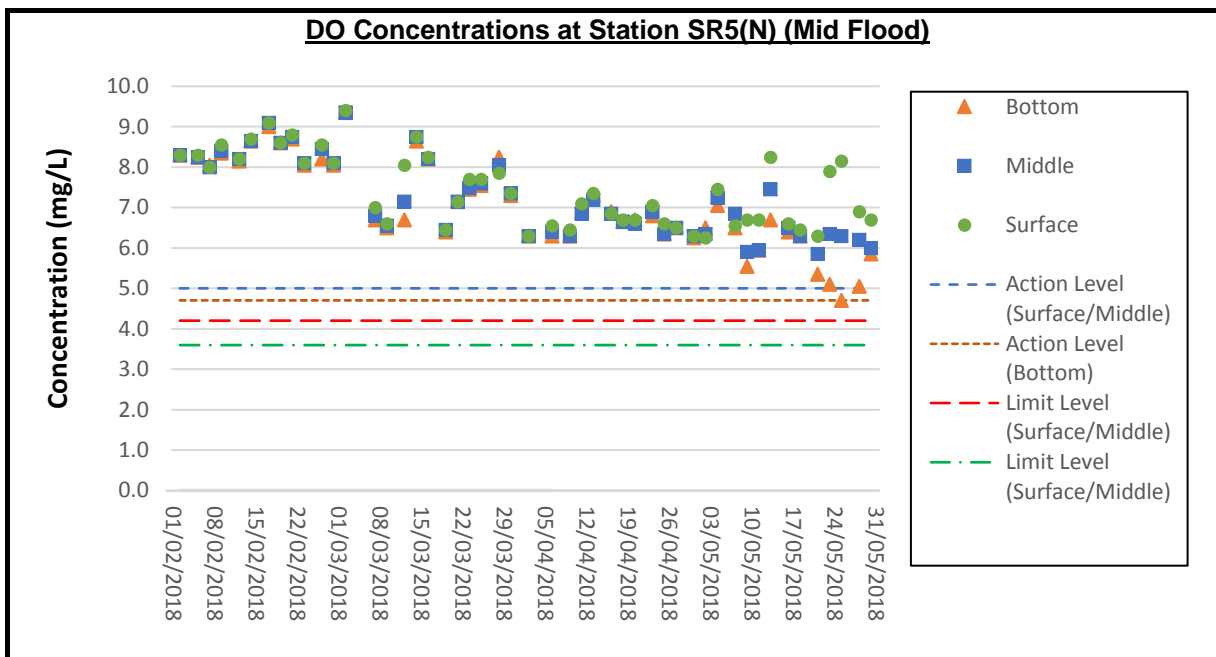
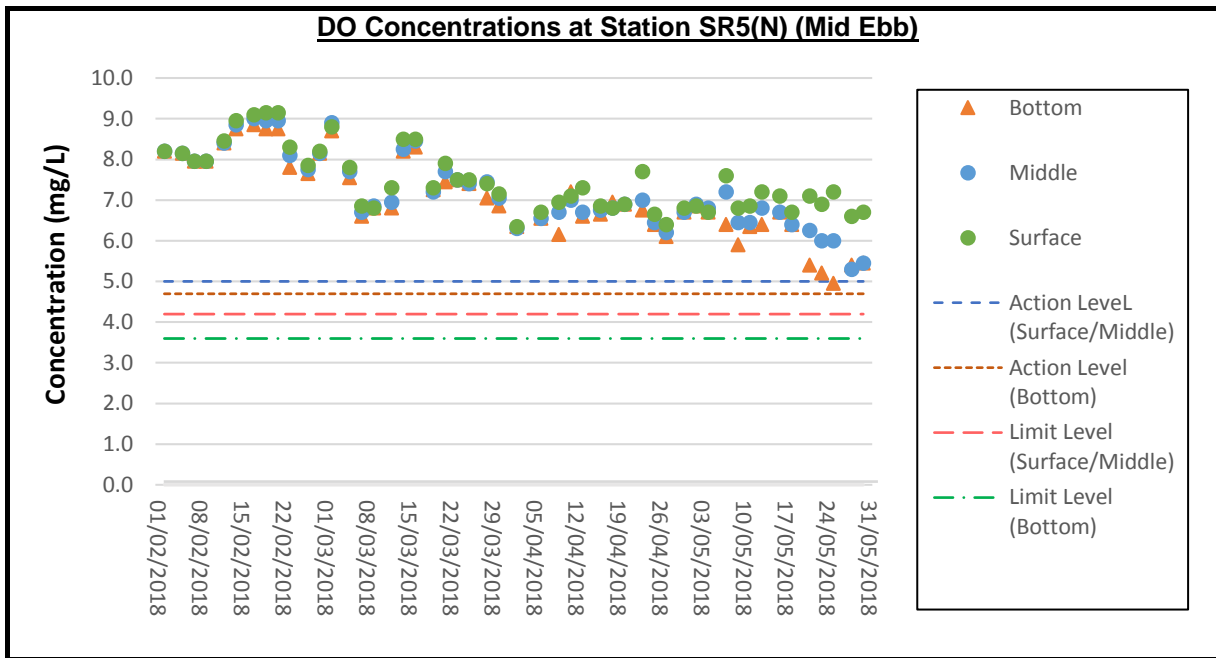


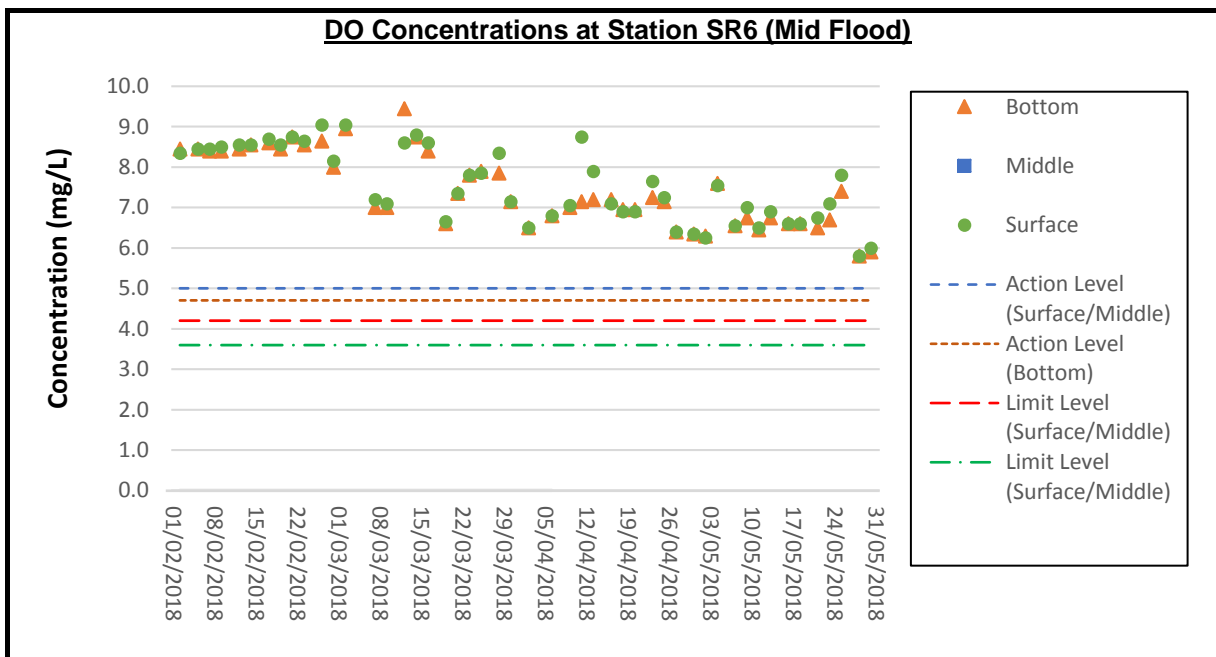
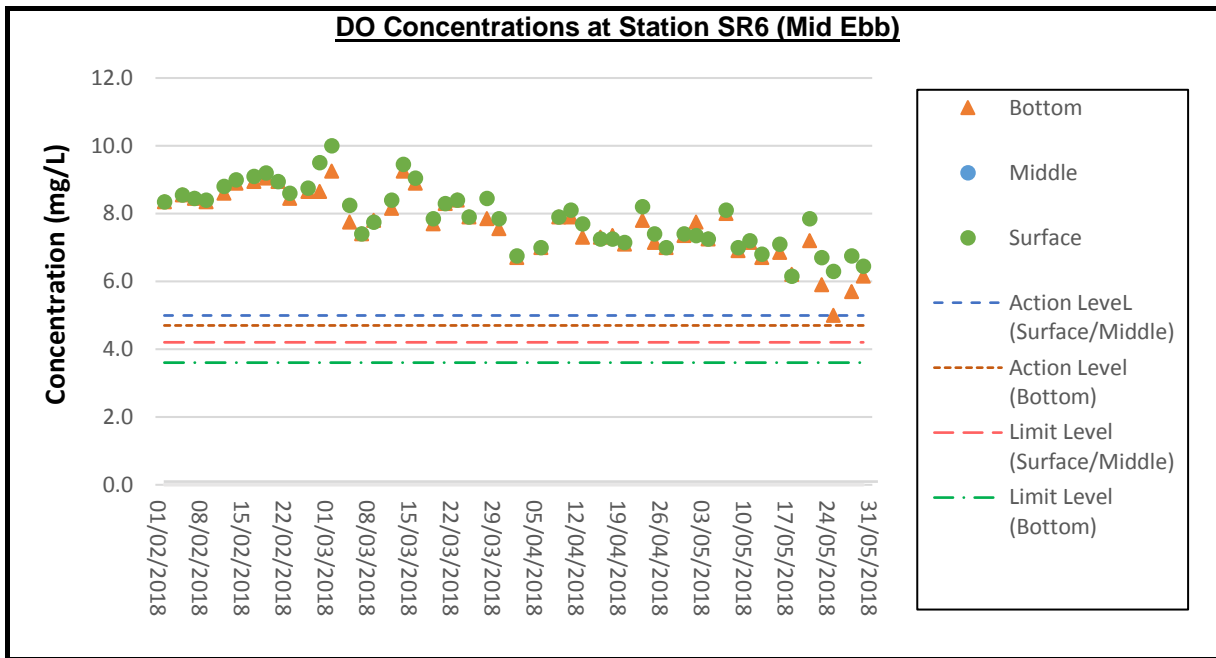
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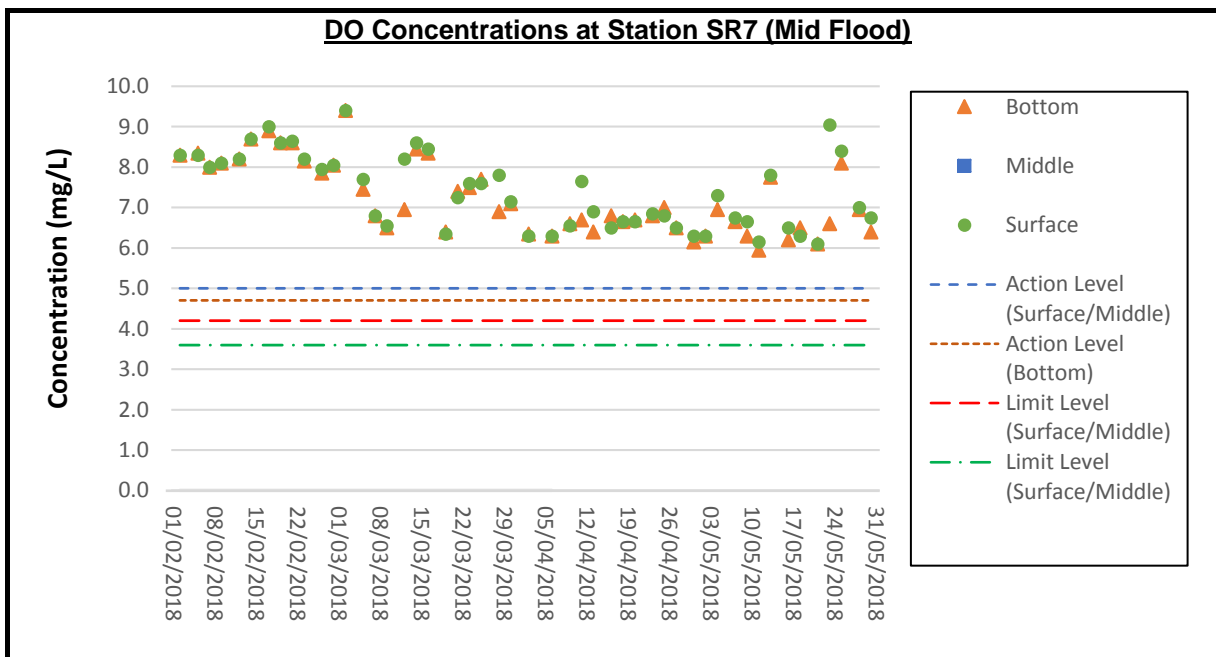
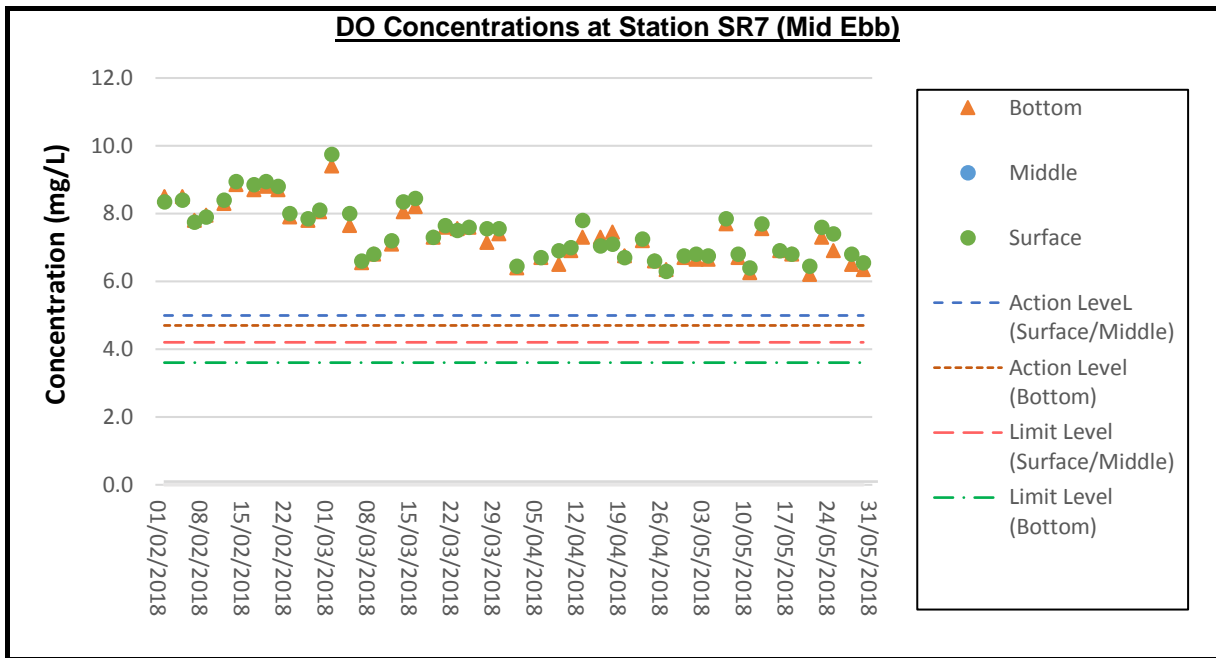


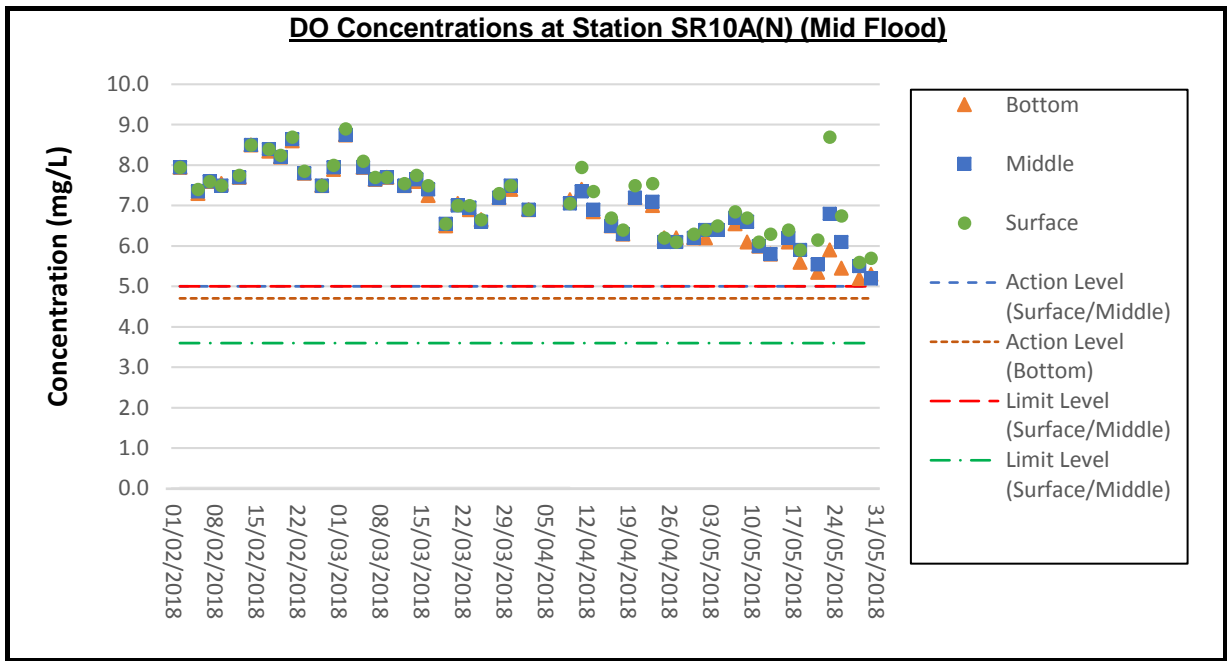
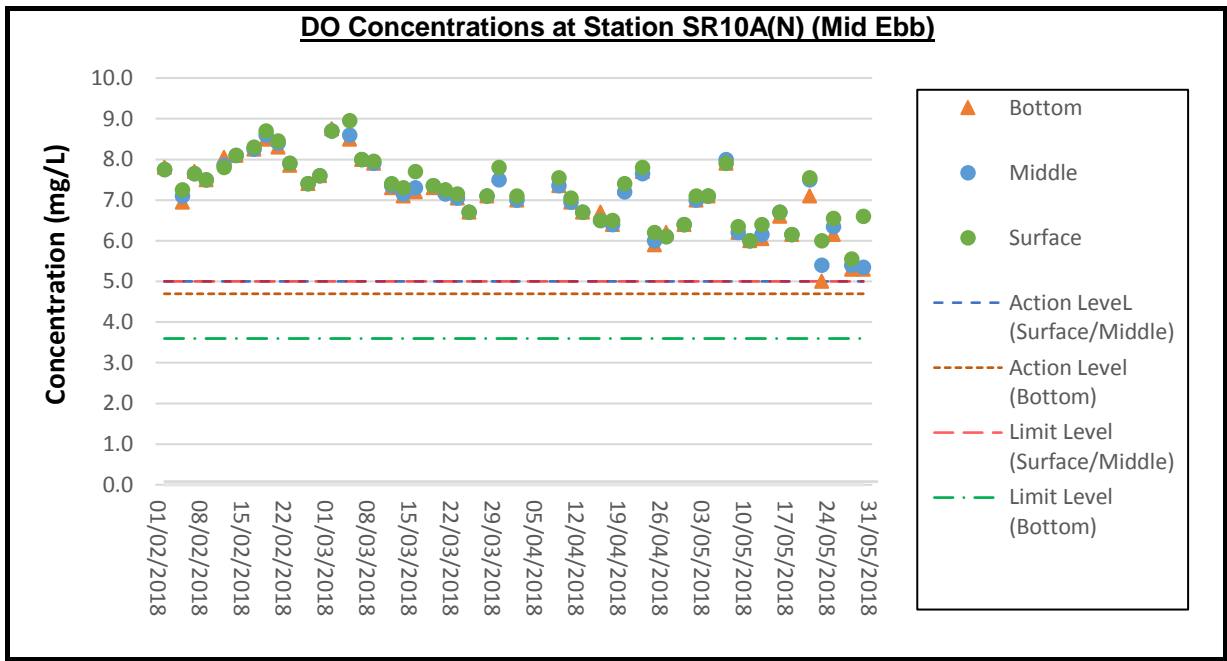




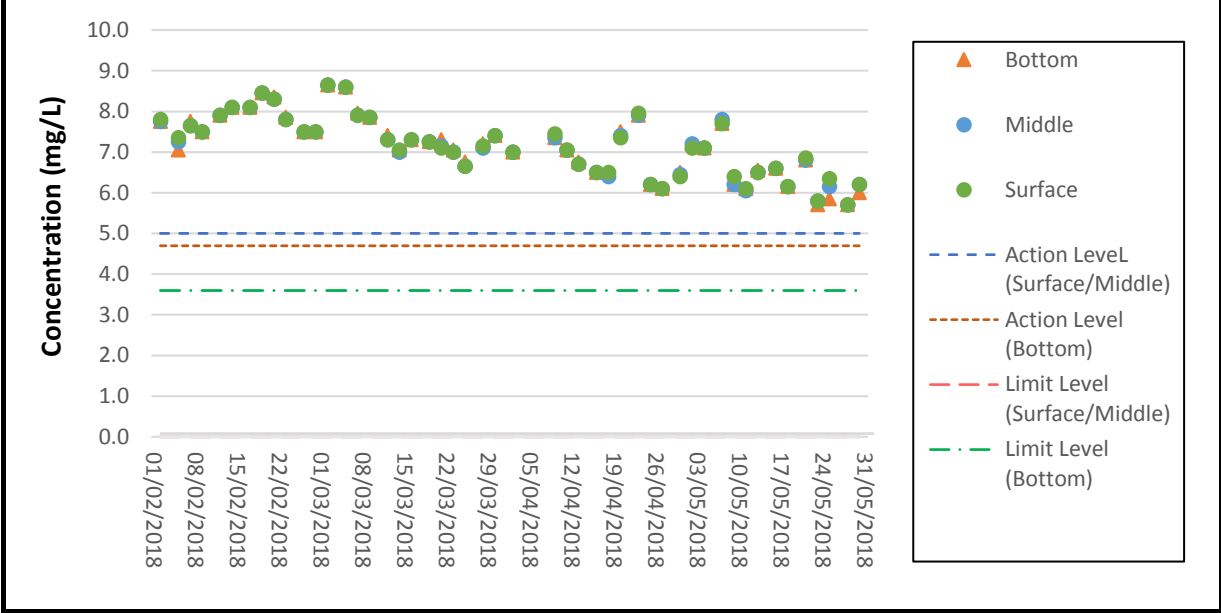




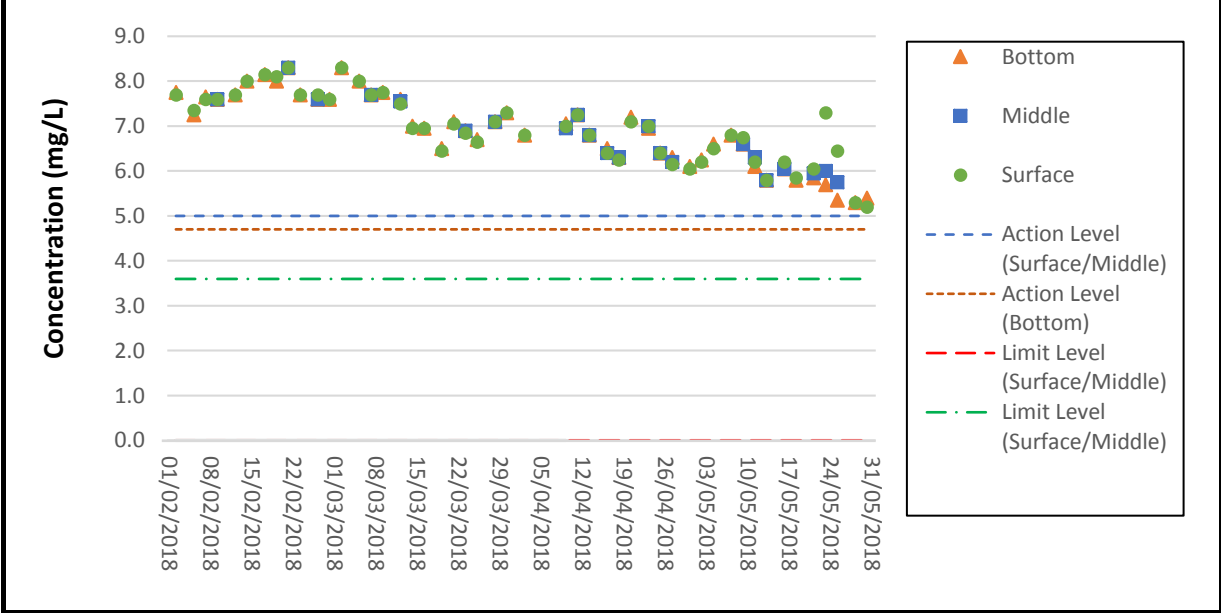


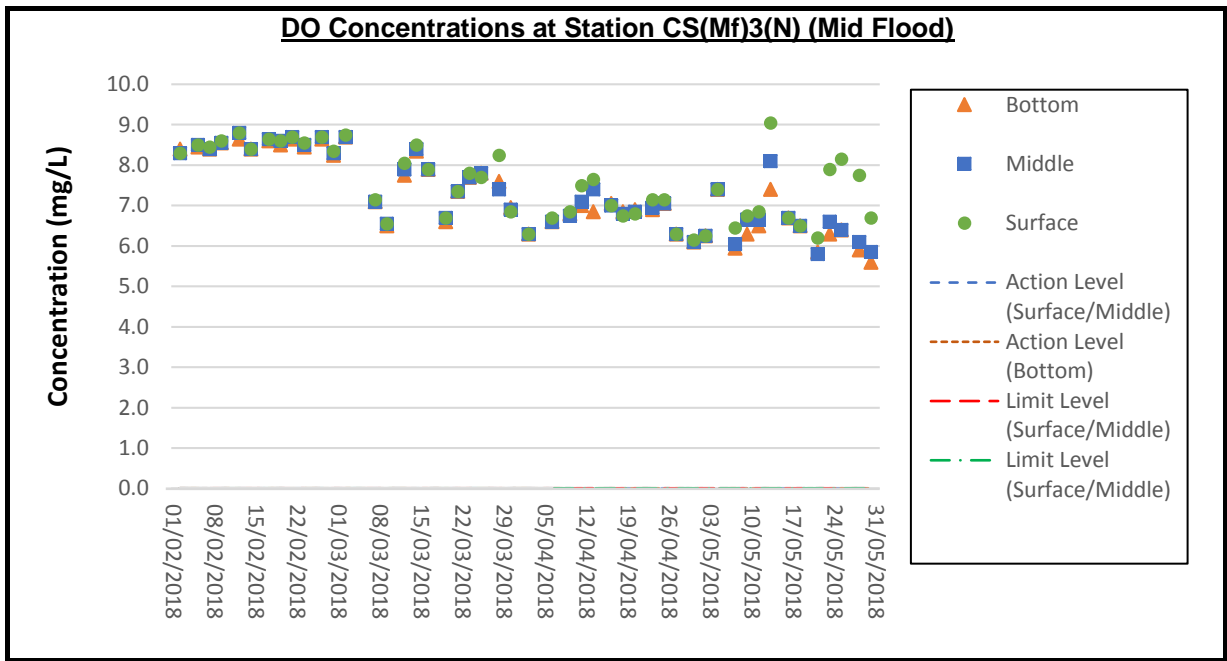
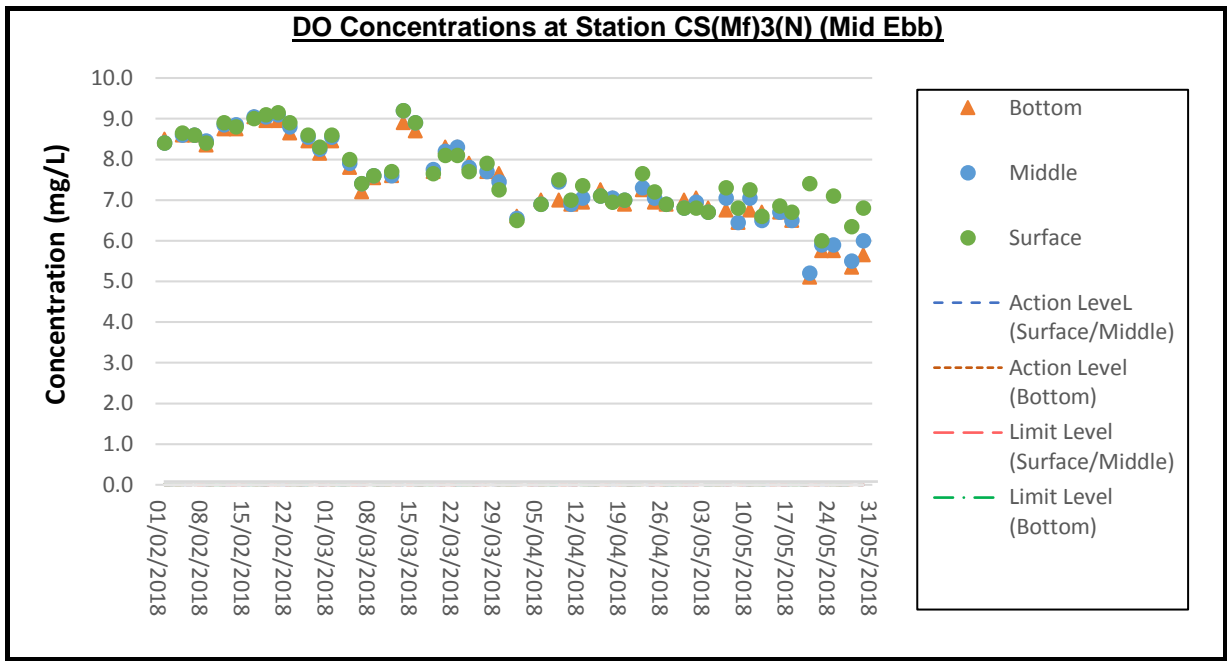


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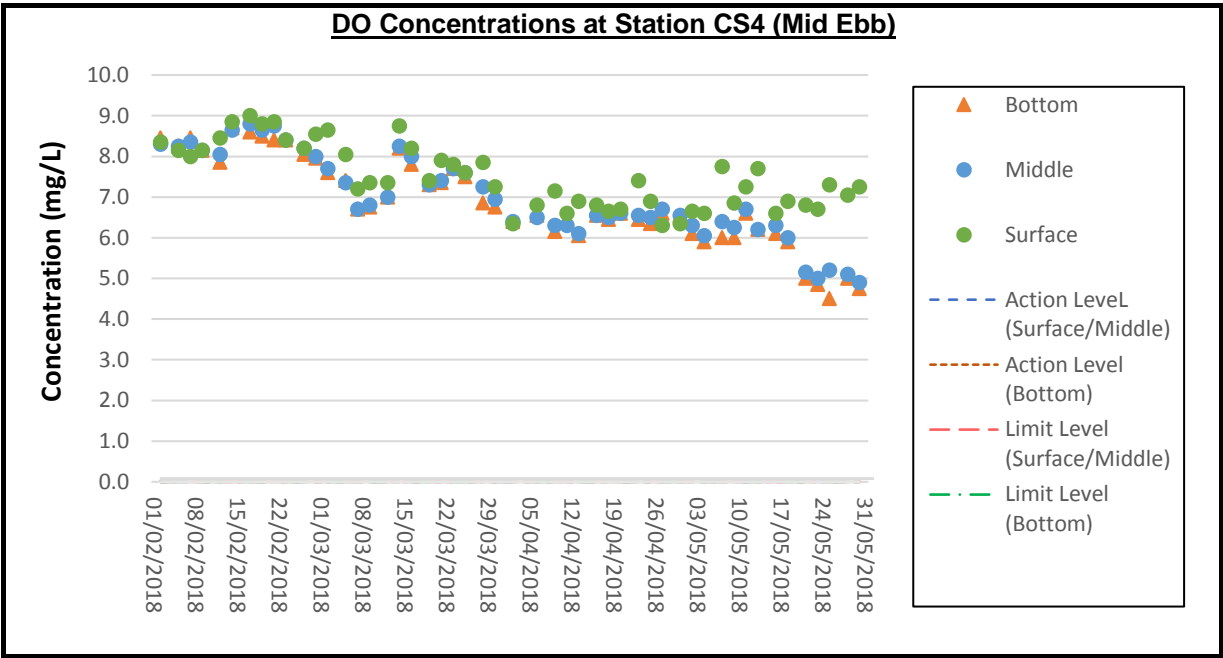


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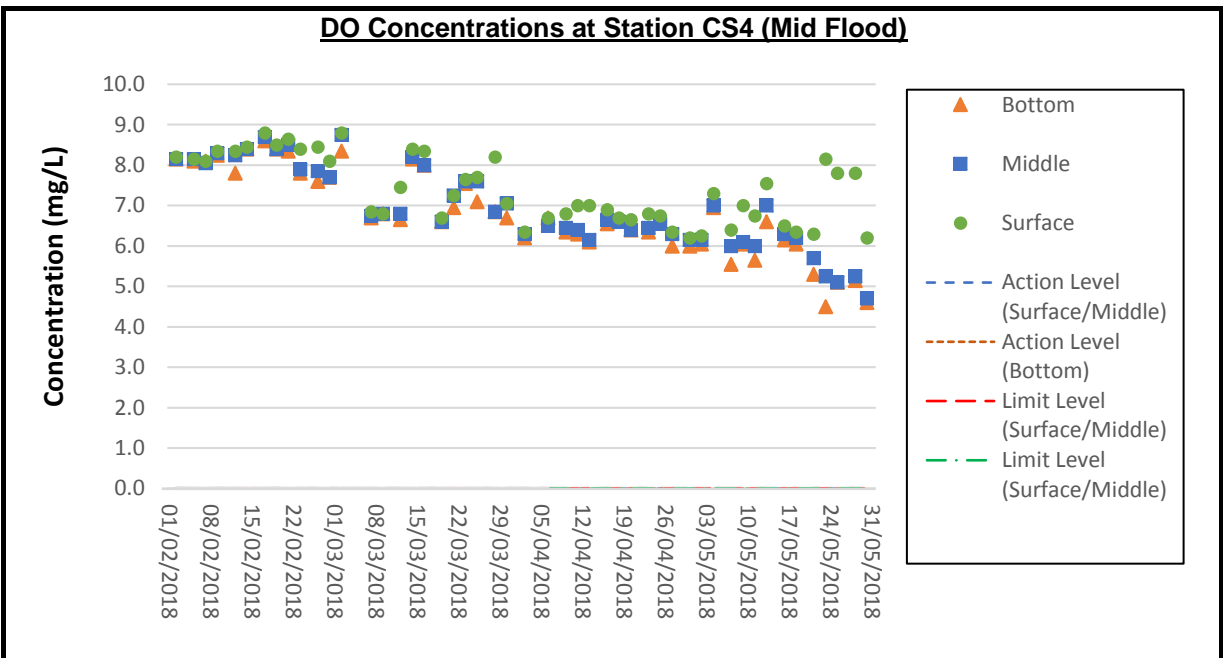


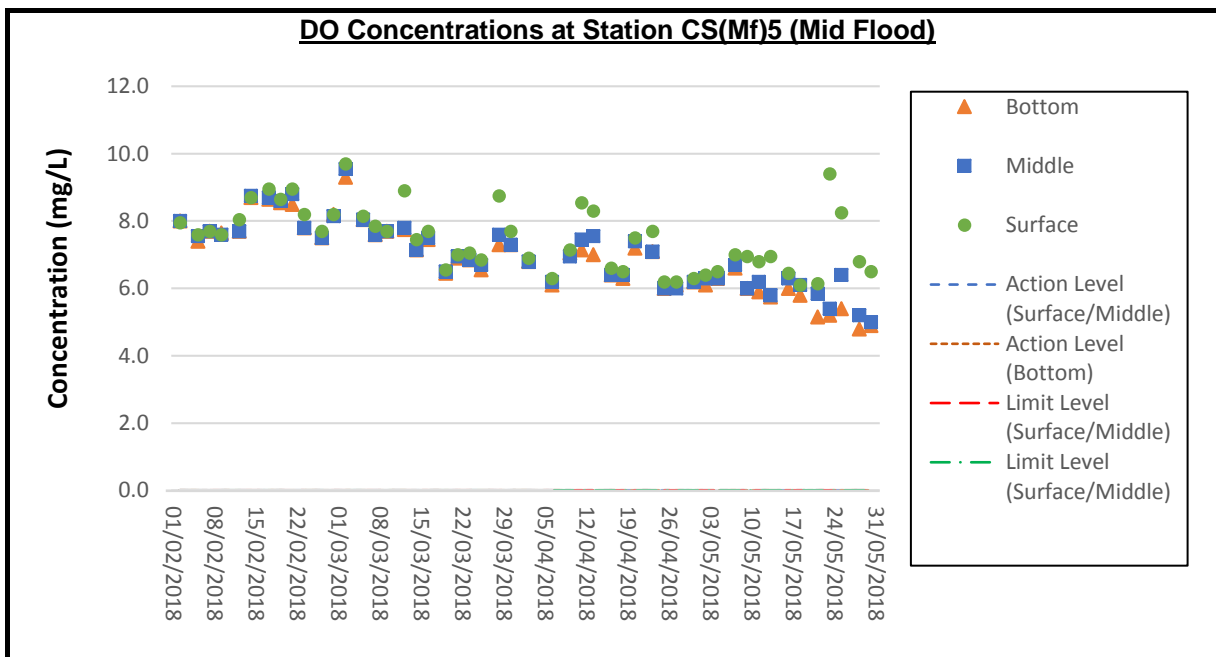
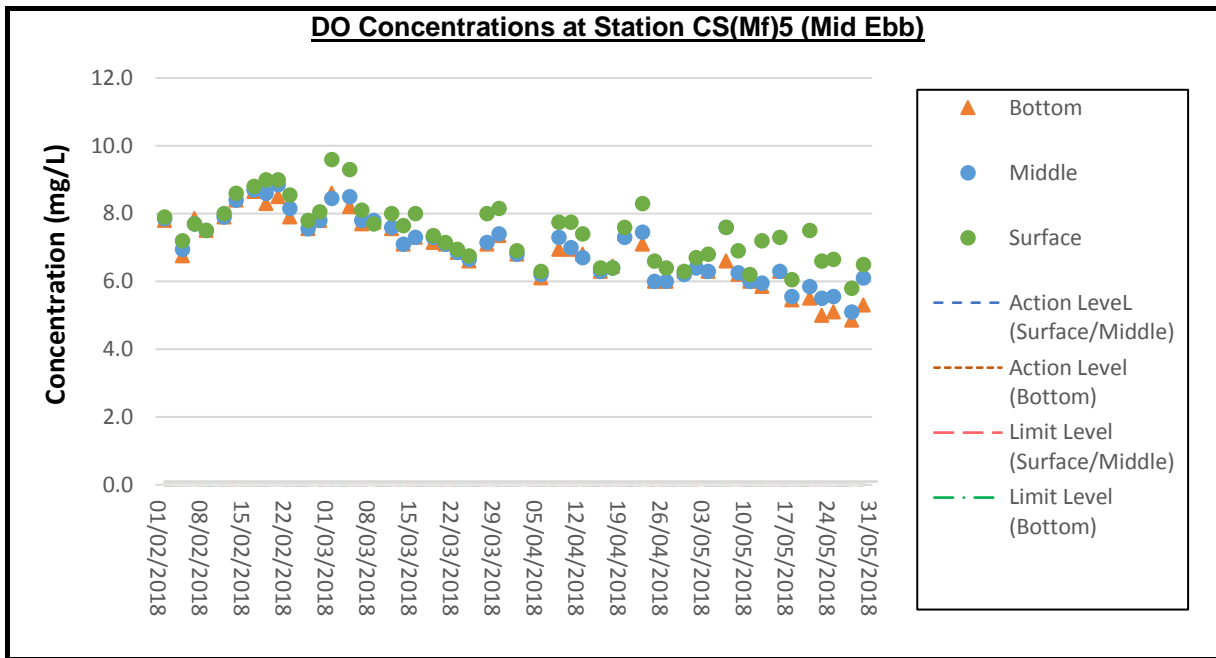


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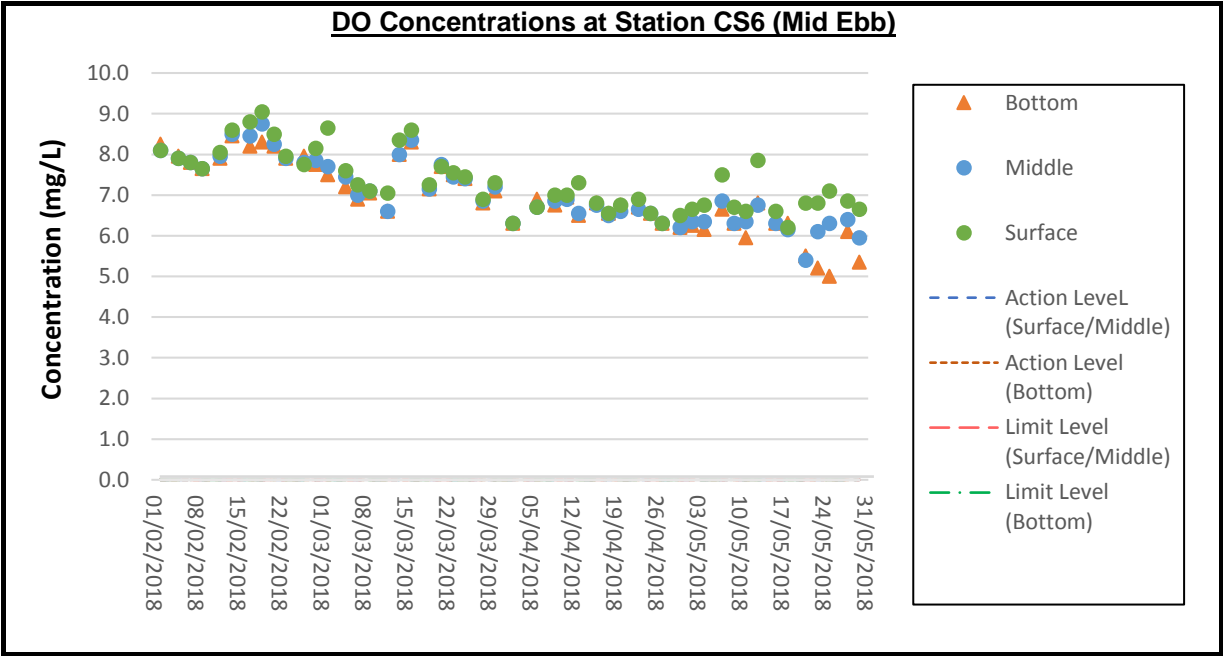


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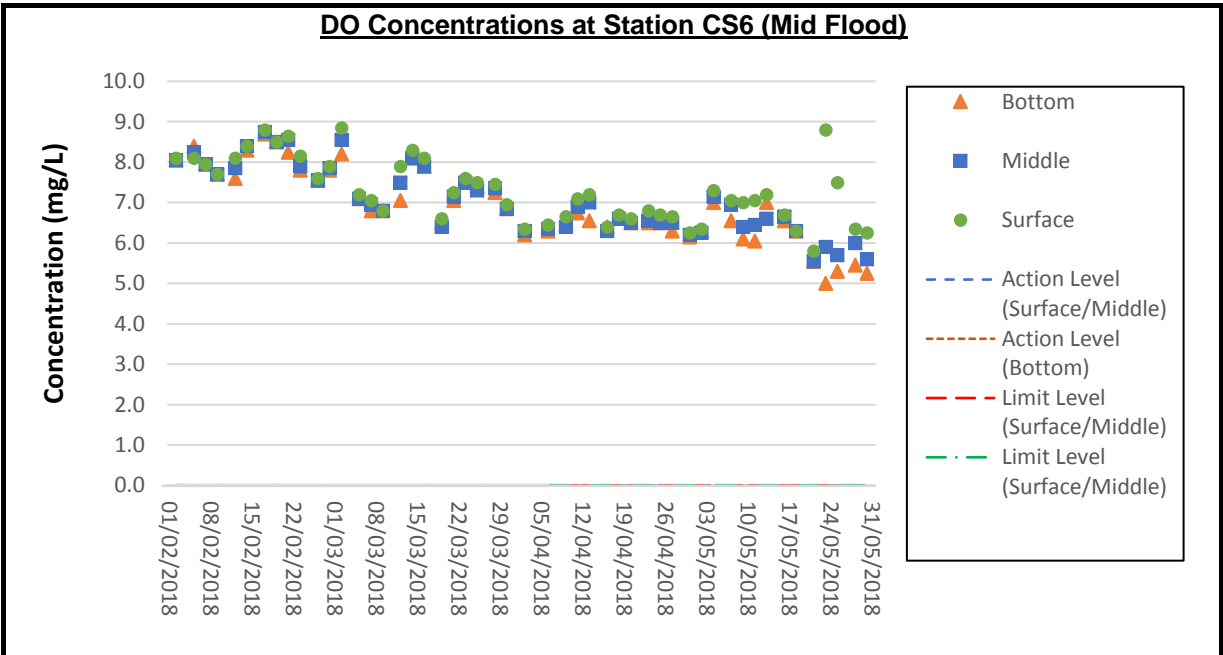




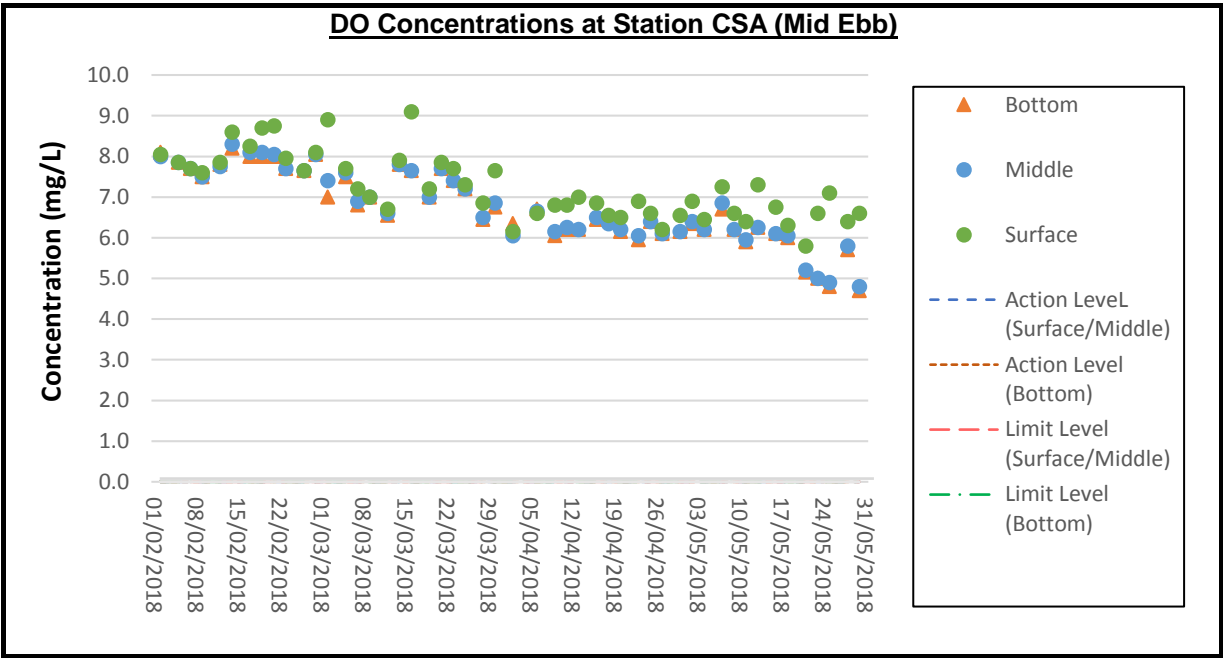
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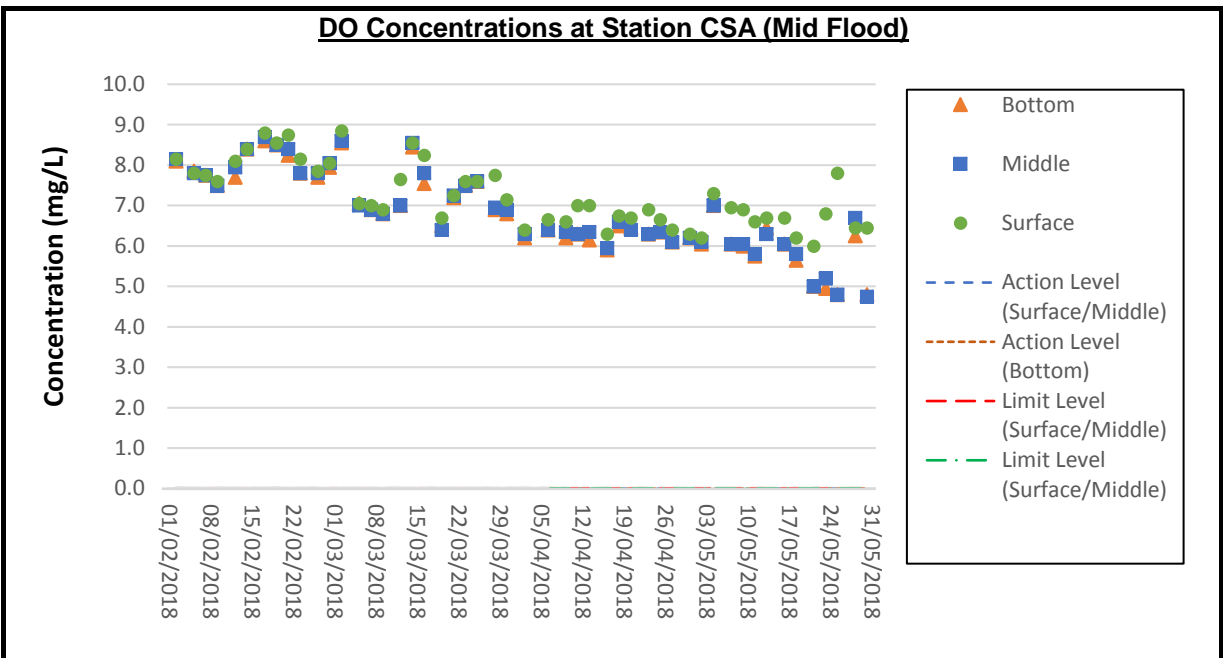
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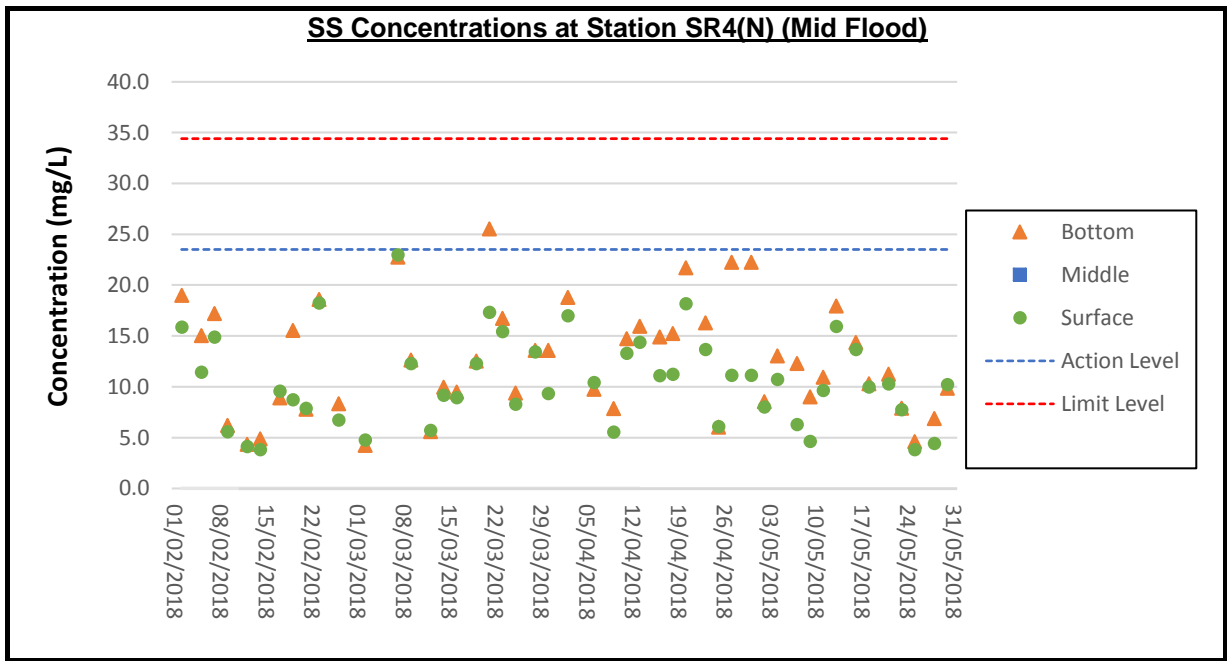
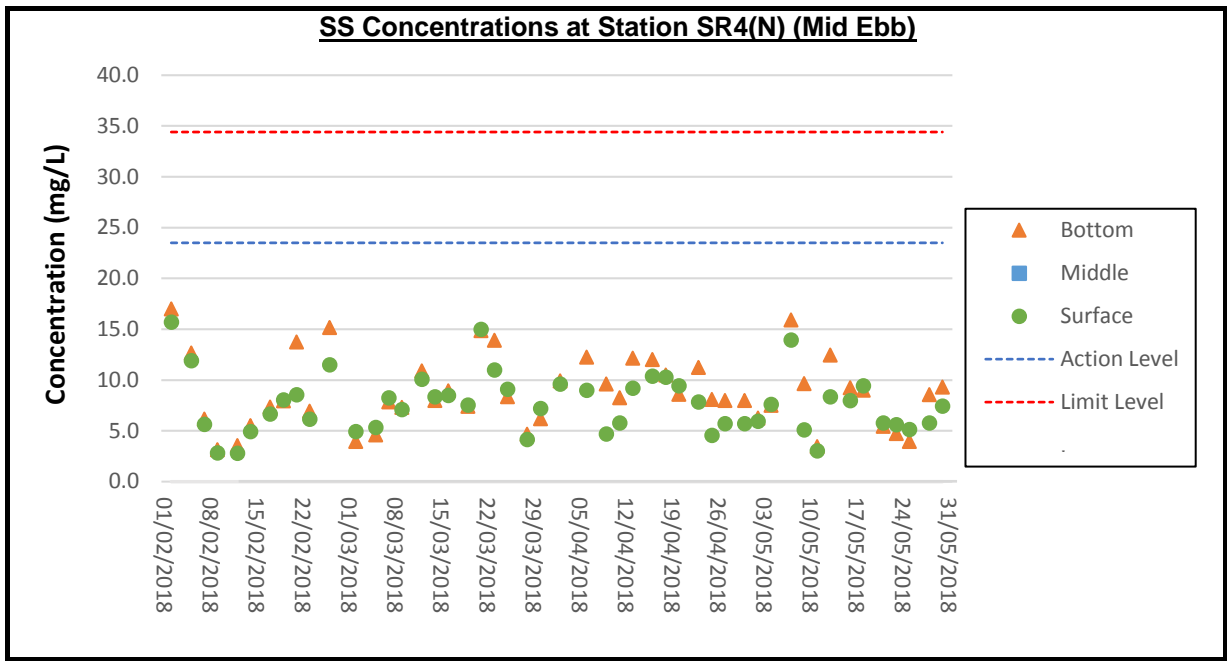


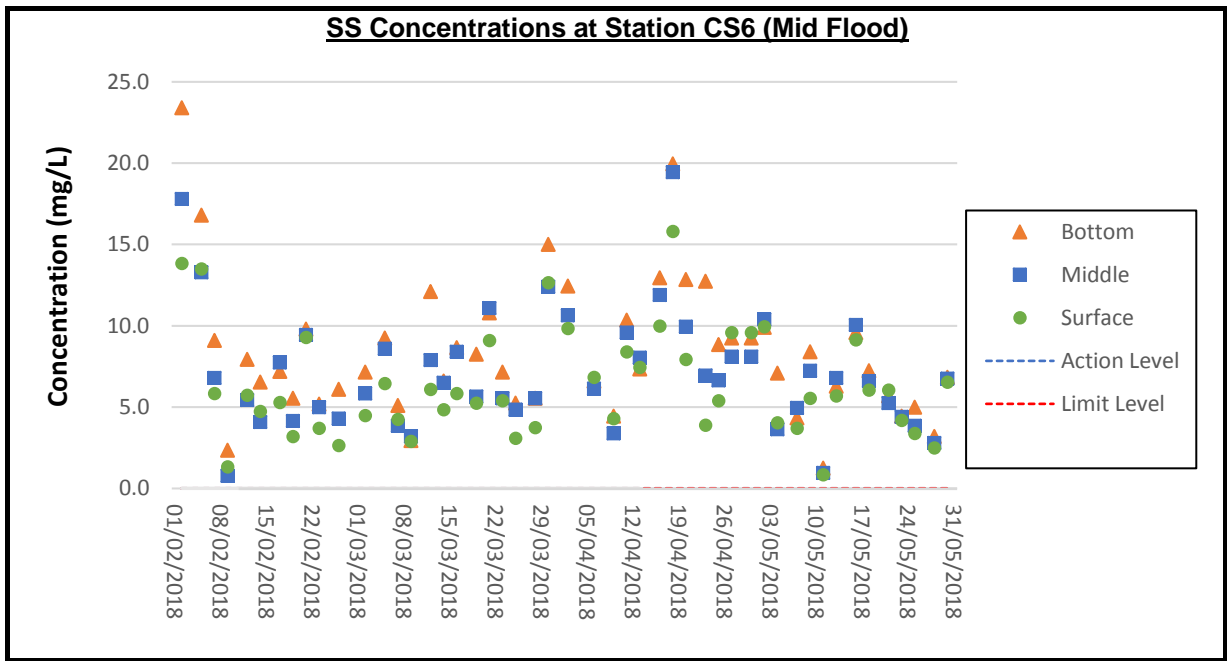
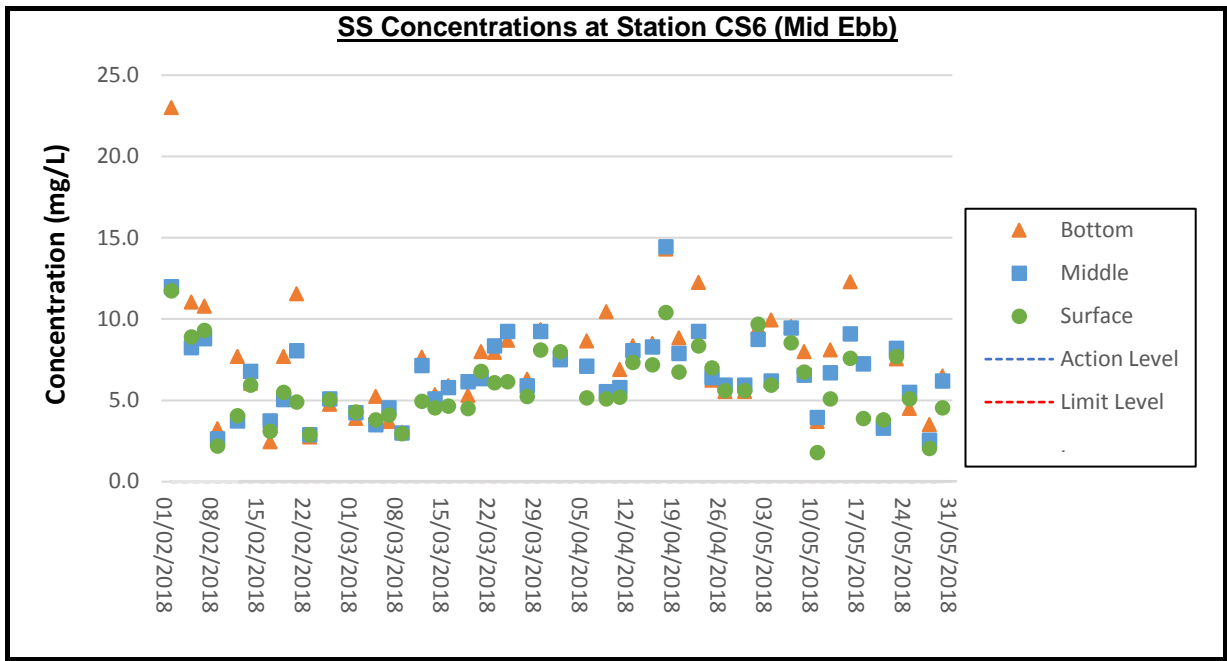
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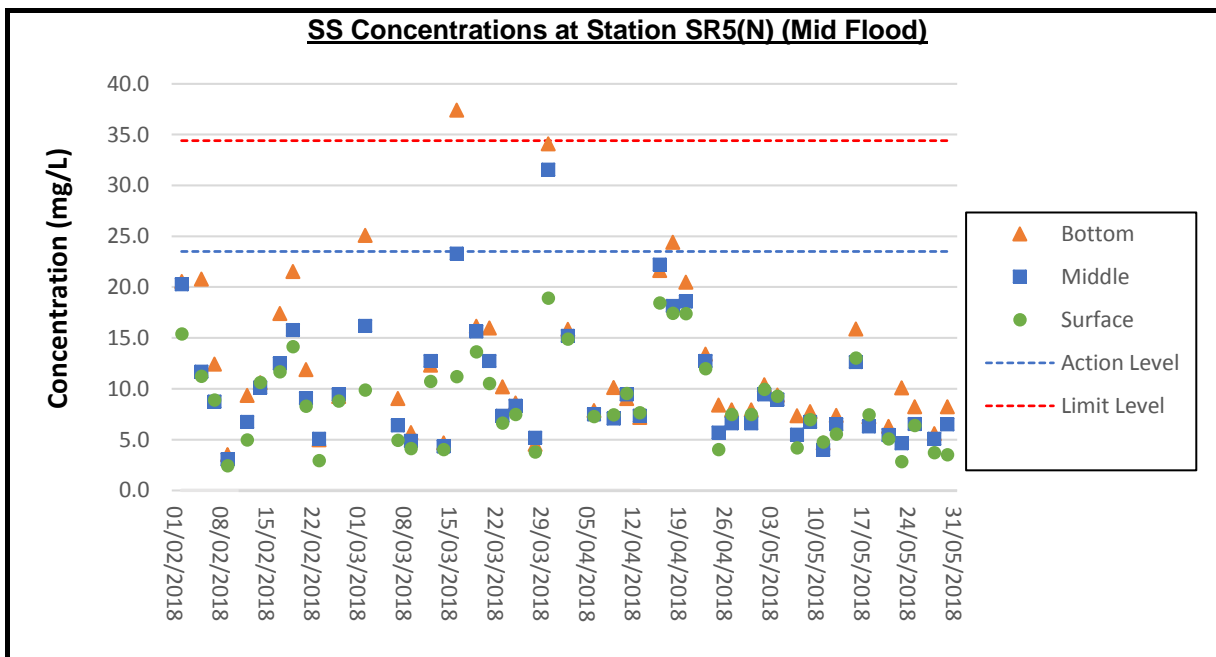
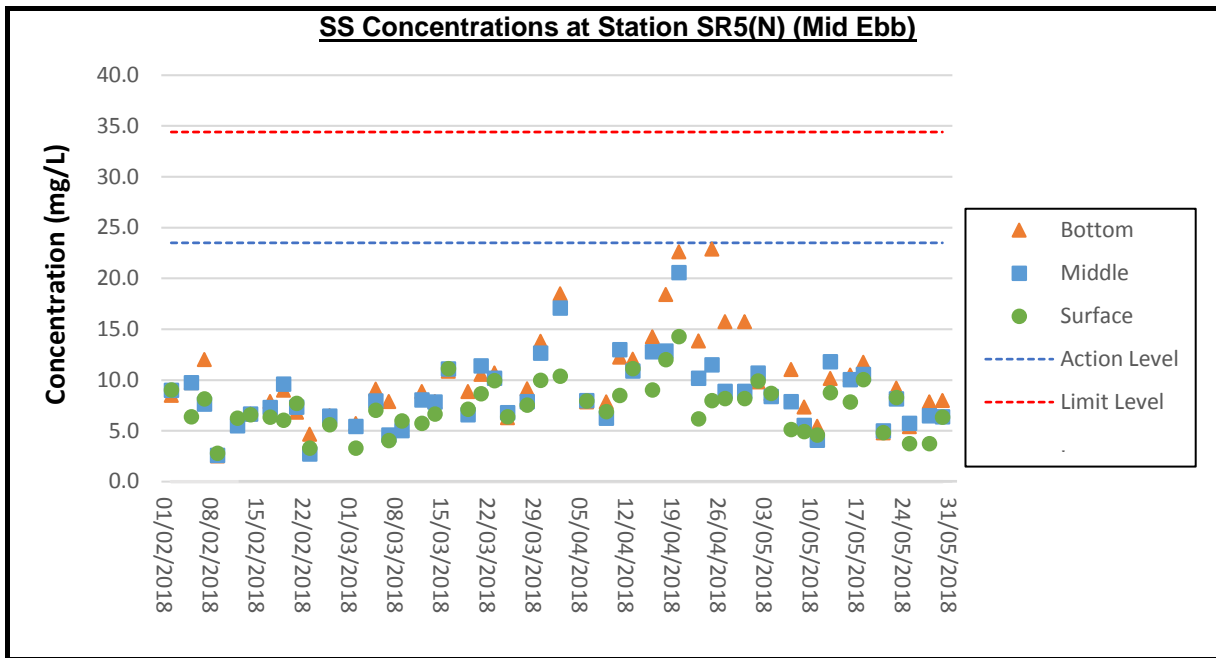


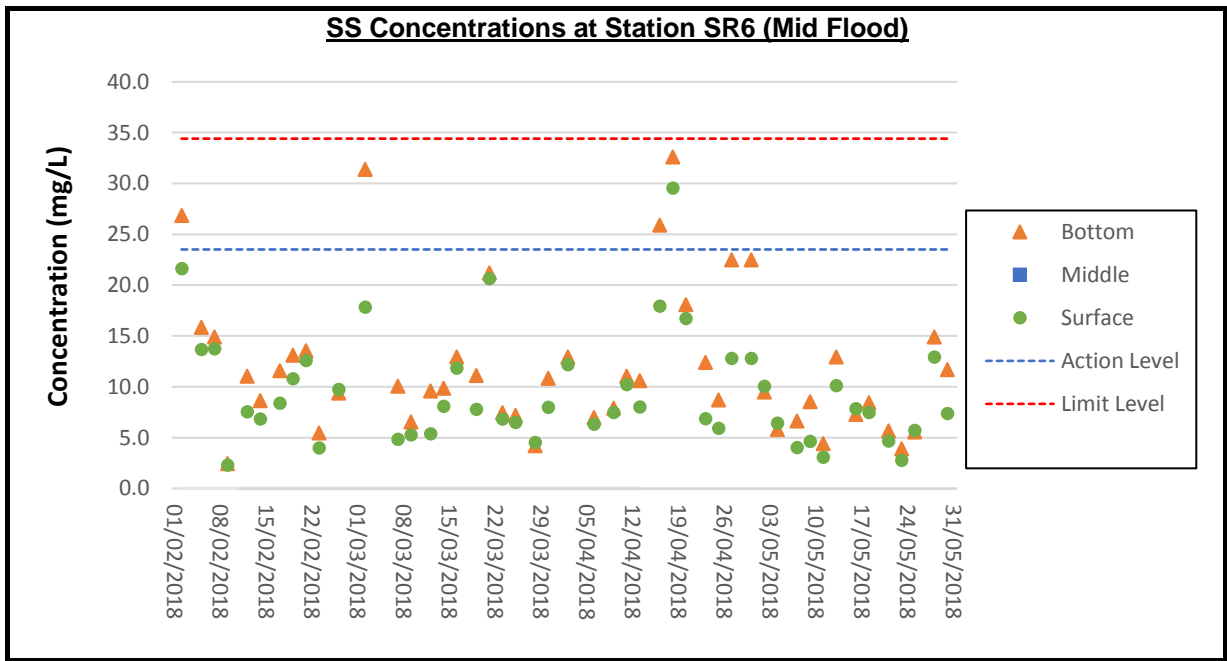
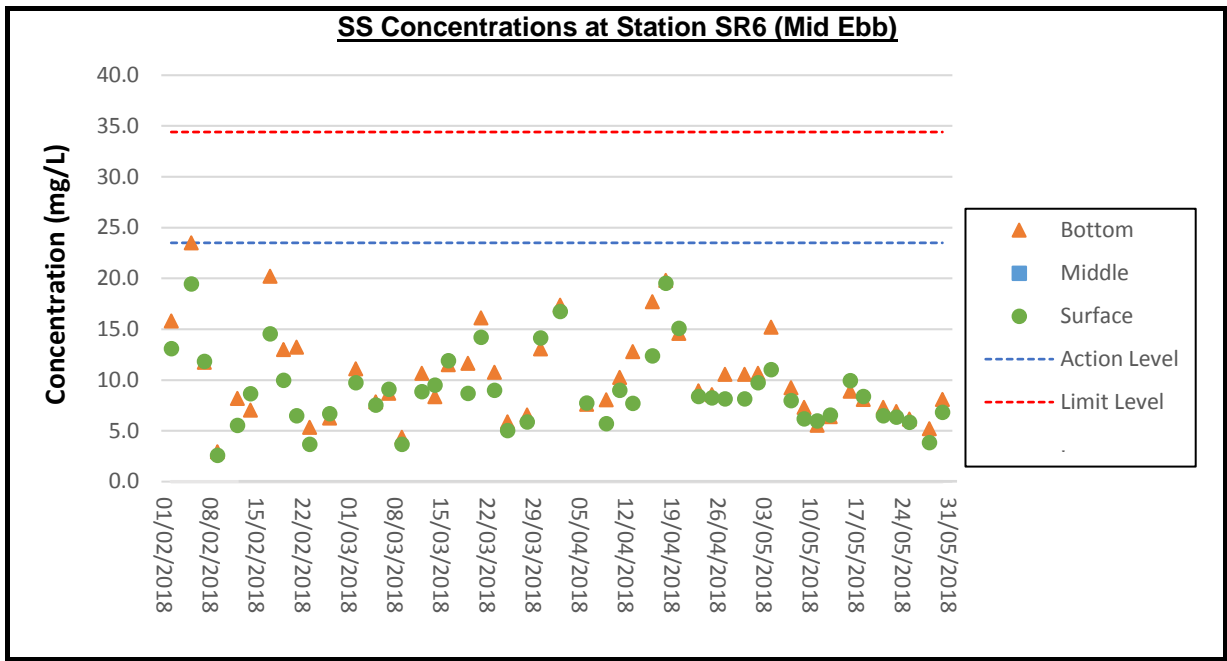
DO Concentrations at Station CSA (Mid Flood)

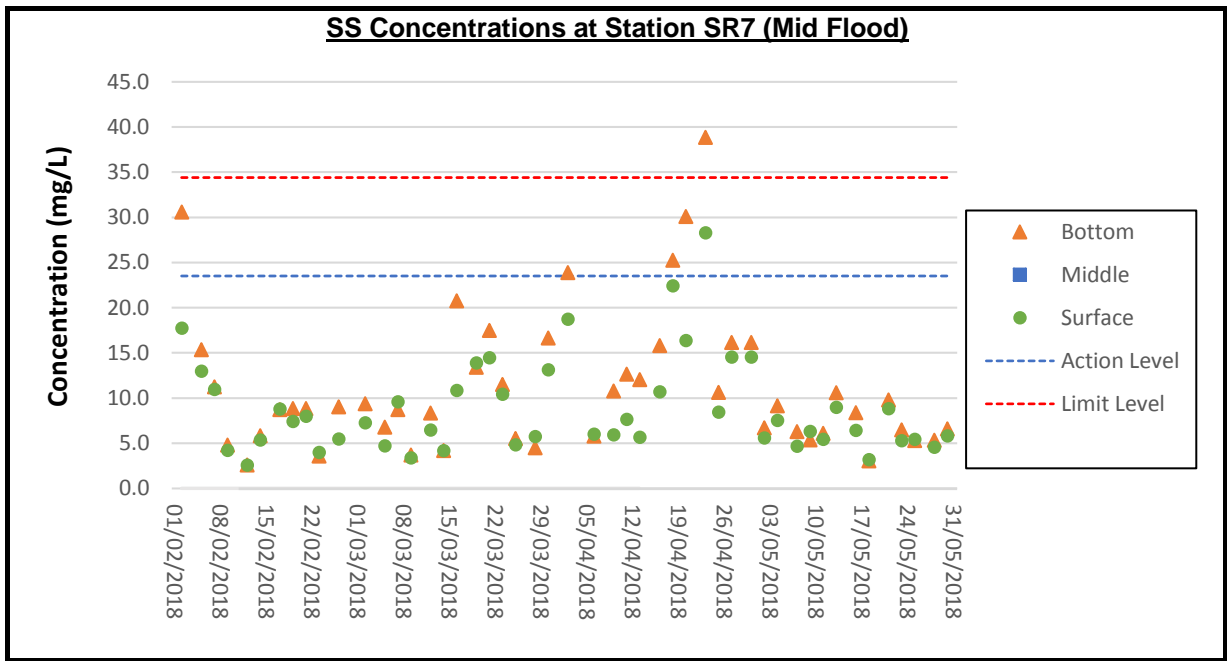
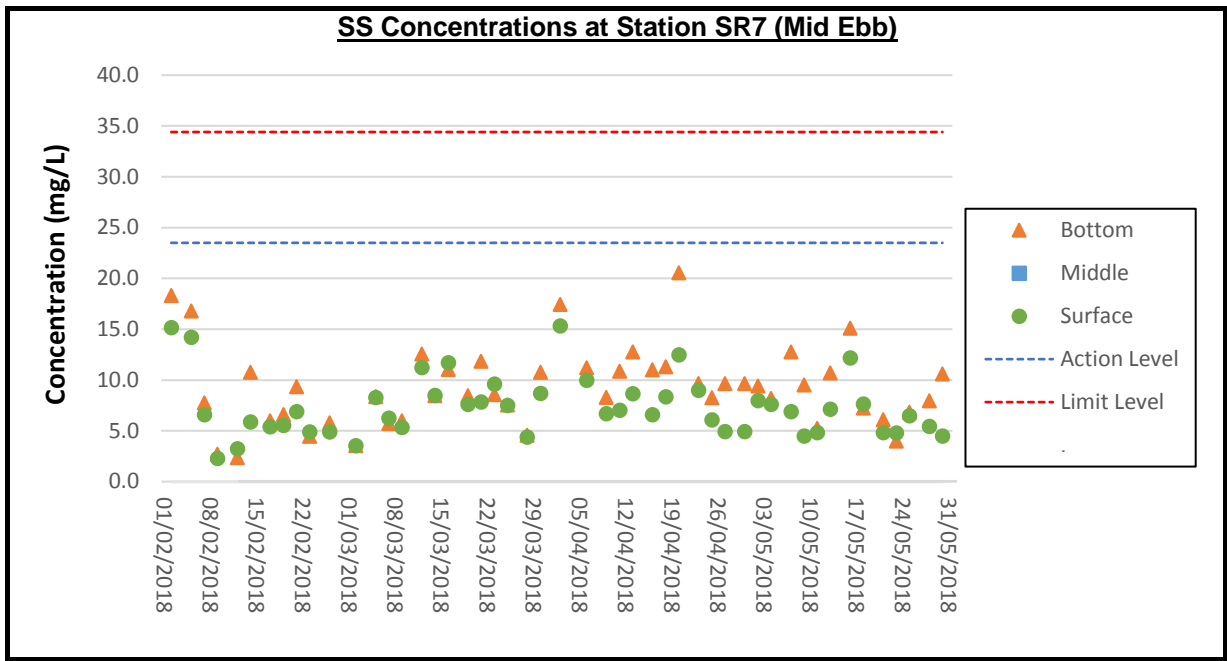


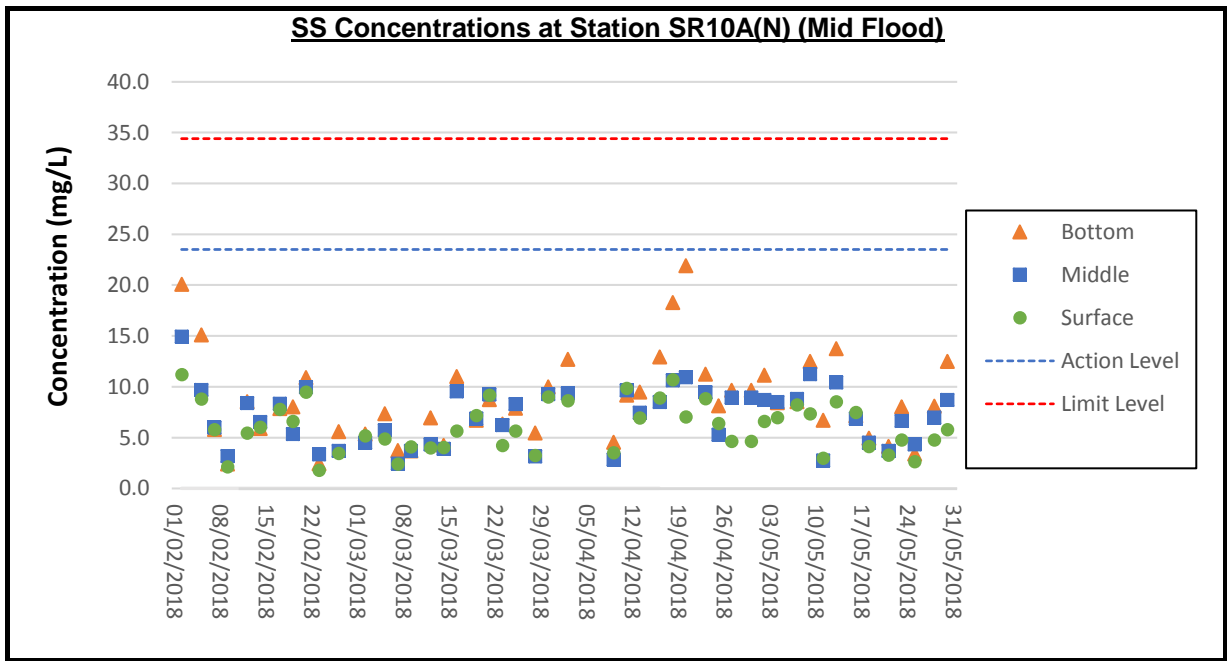
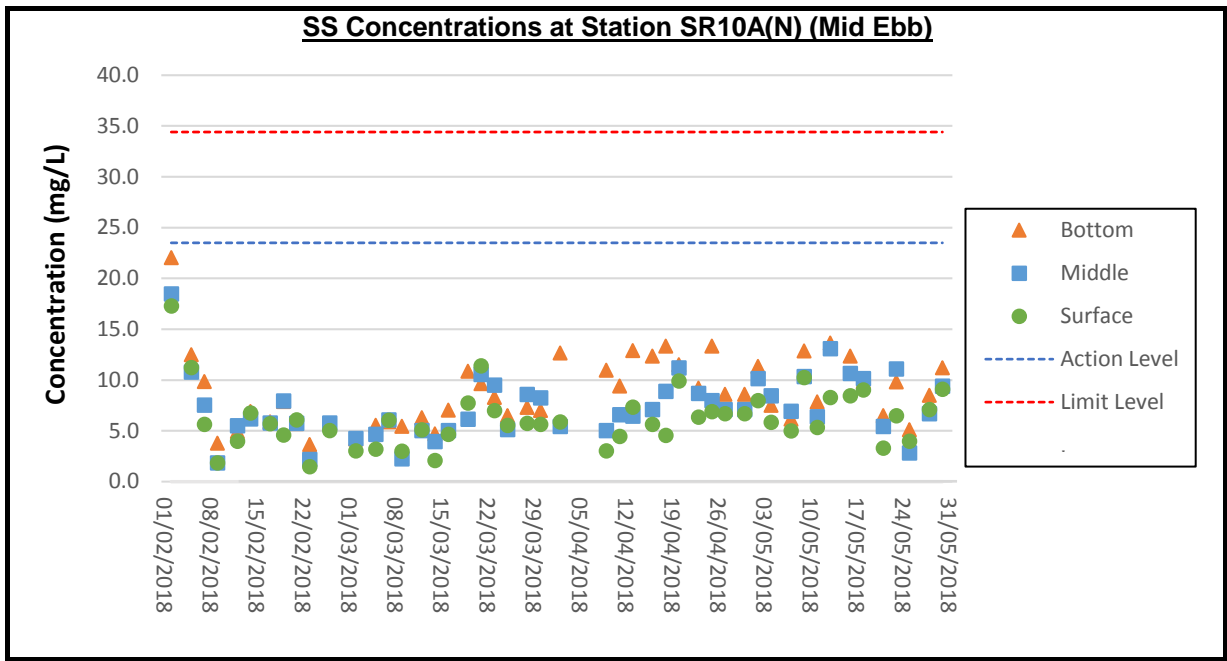


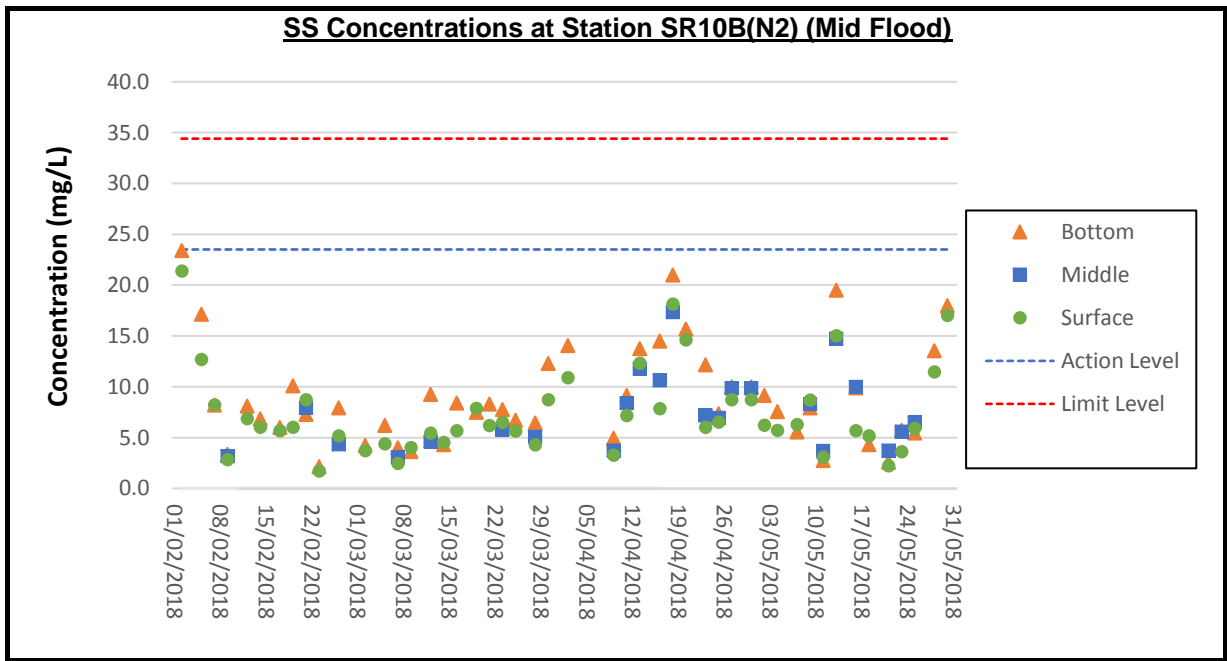
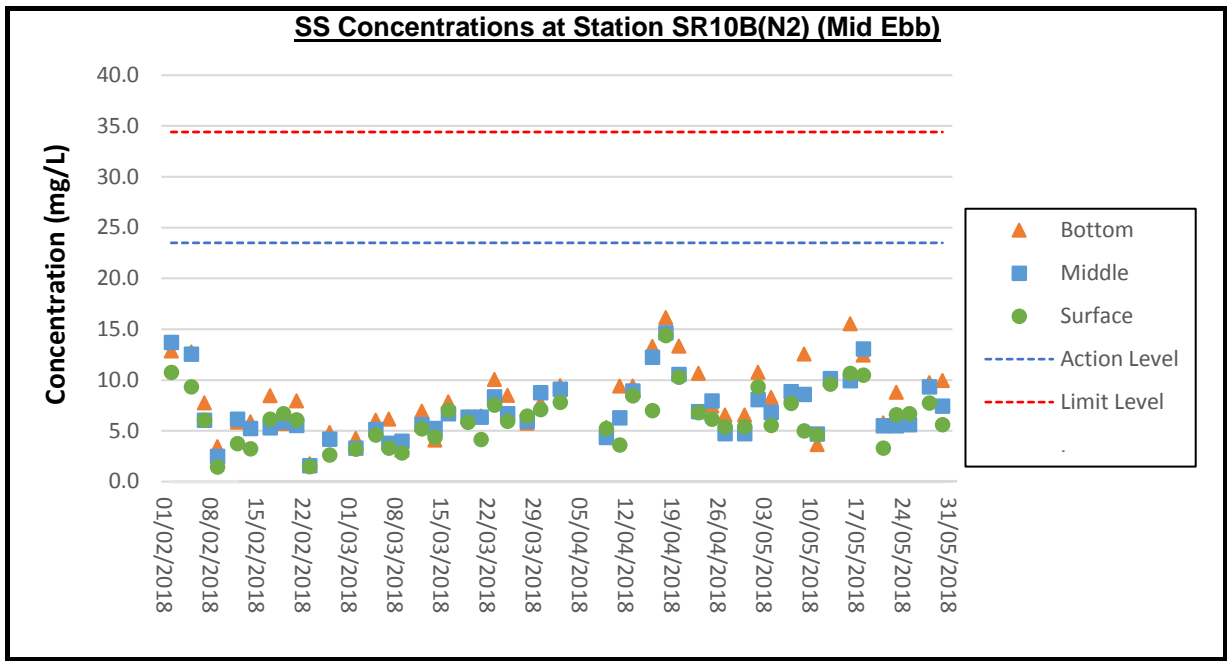


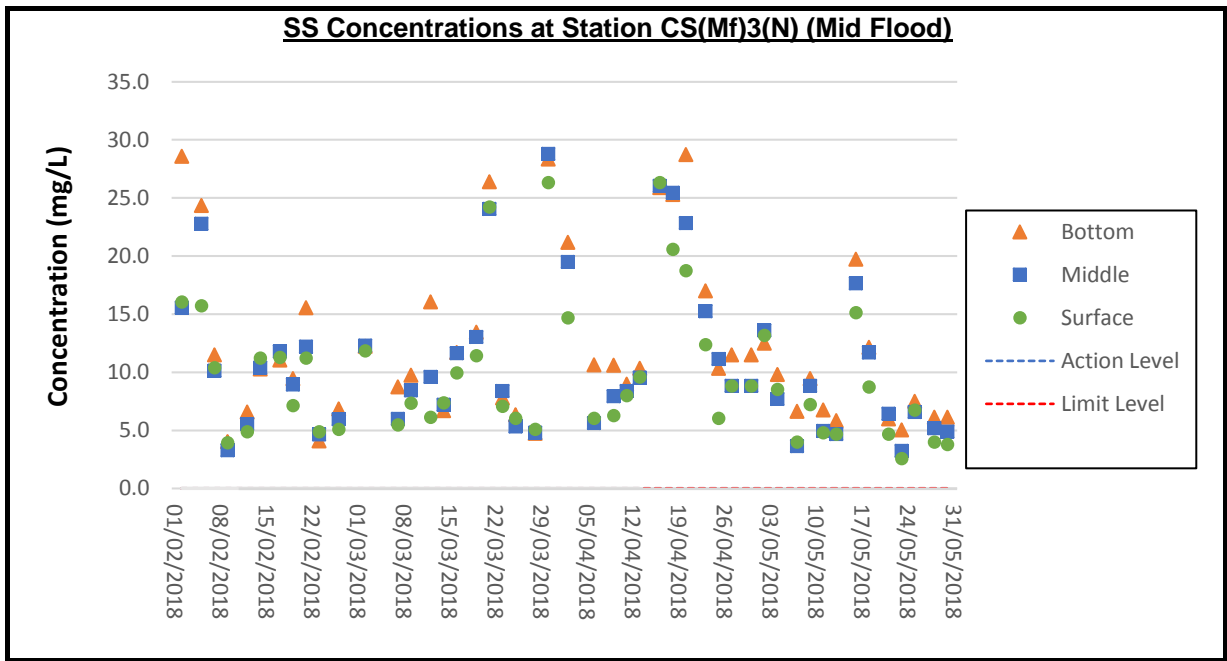
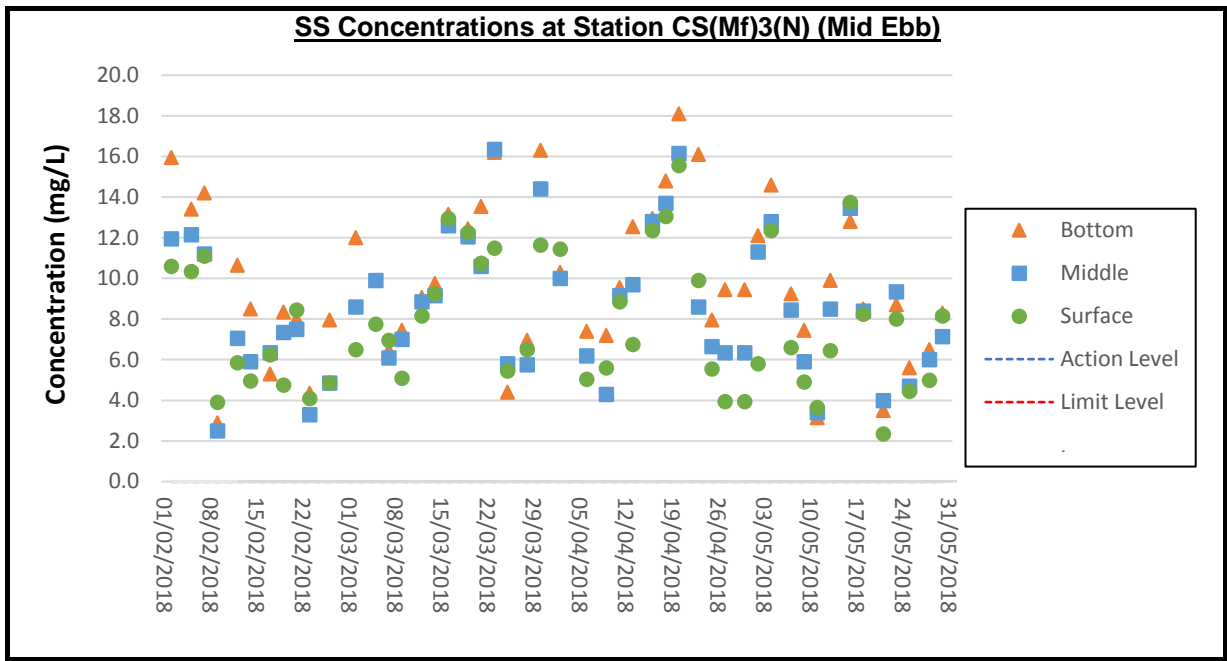


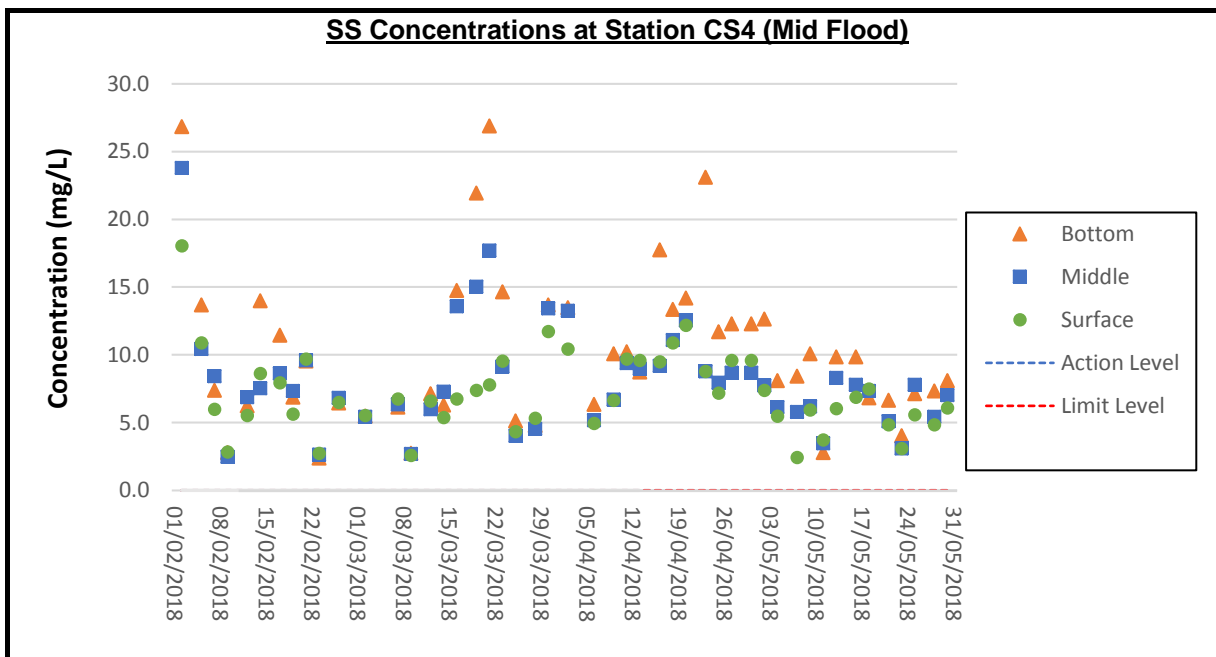
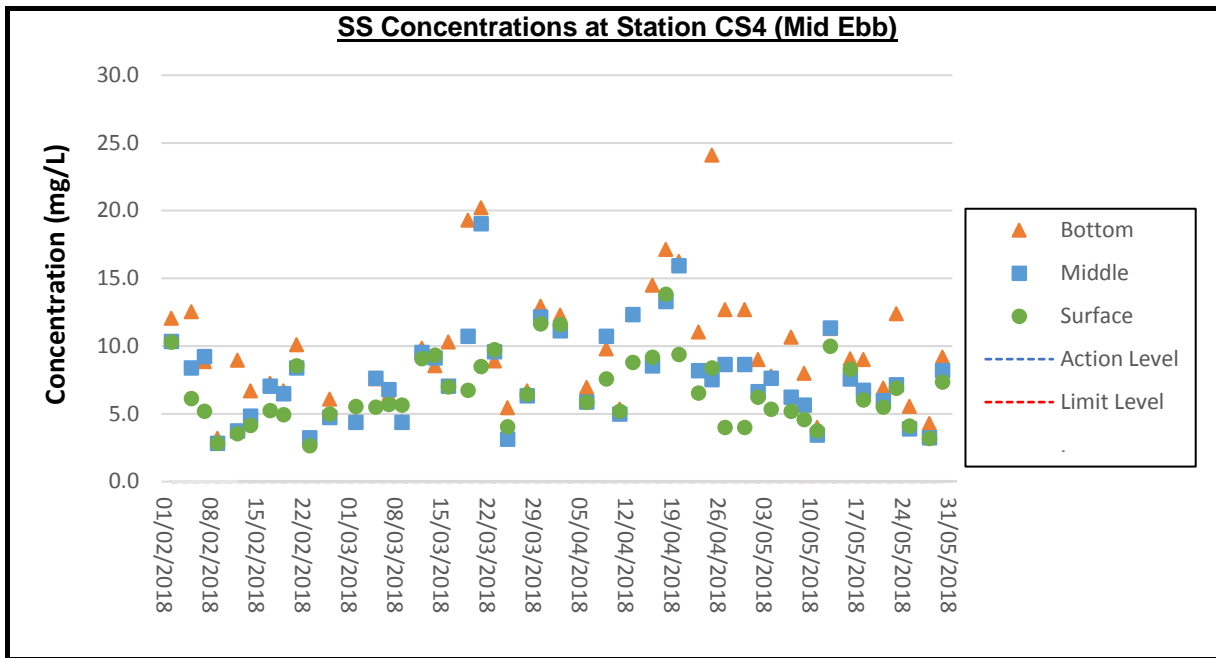


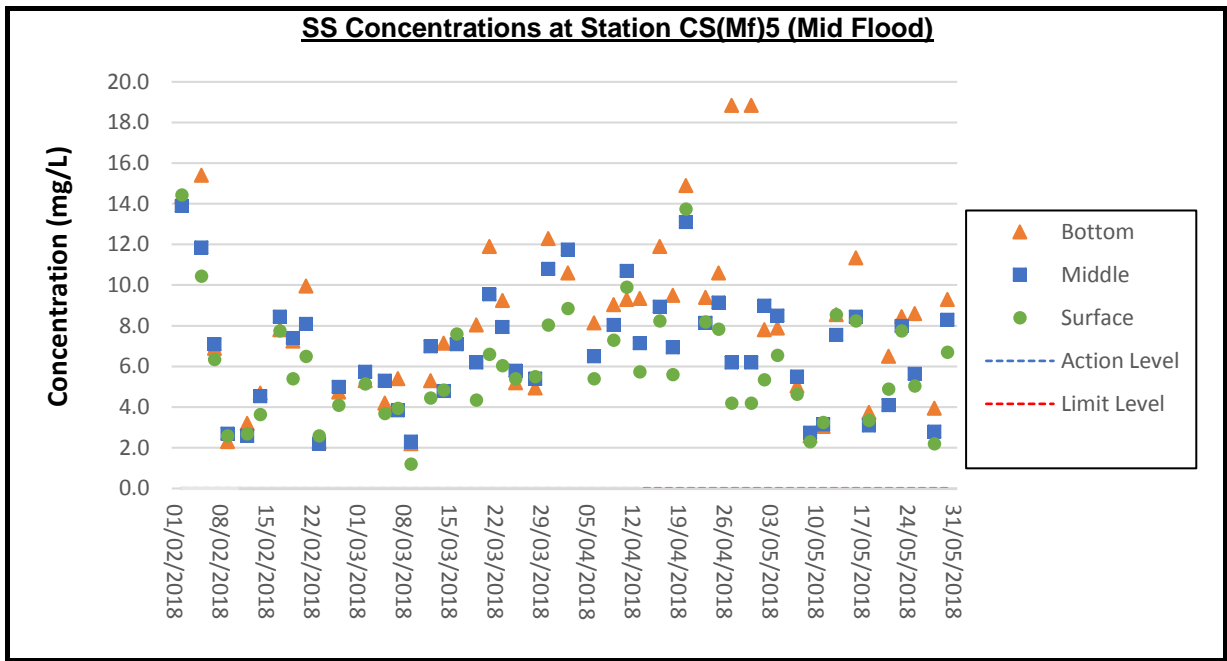
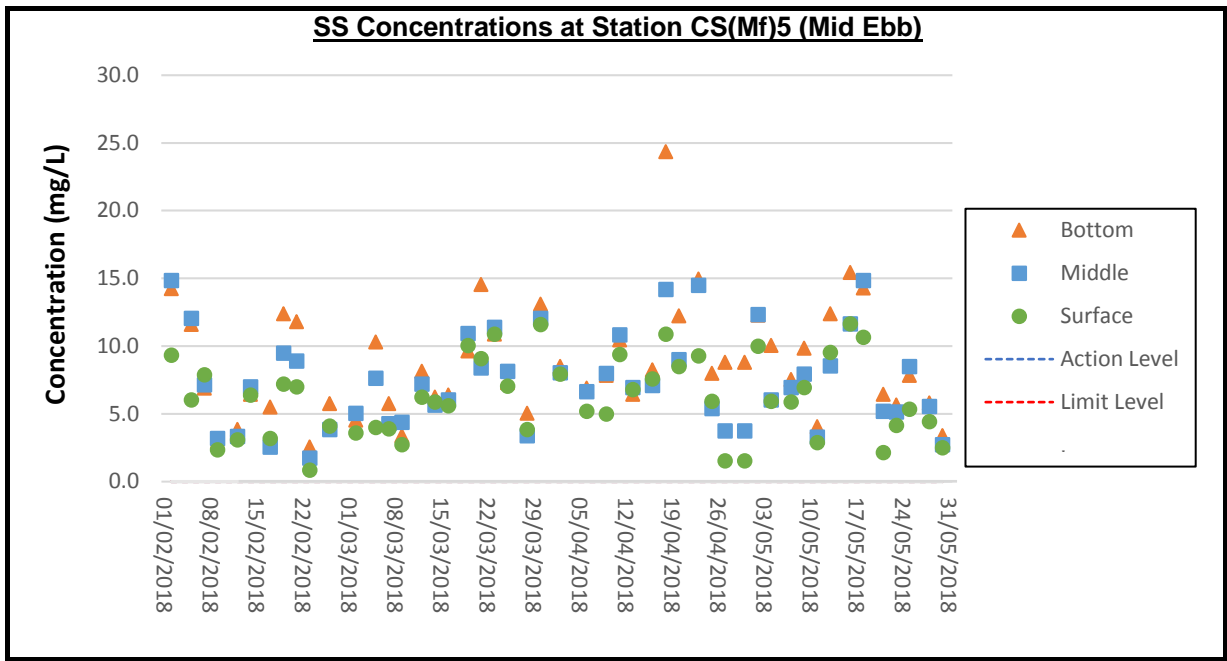


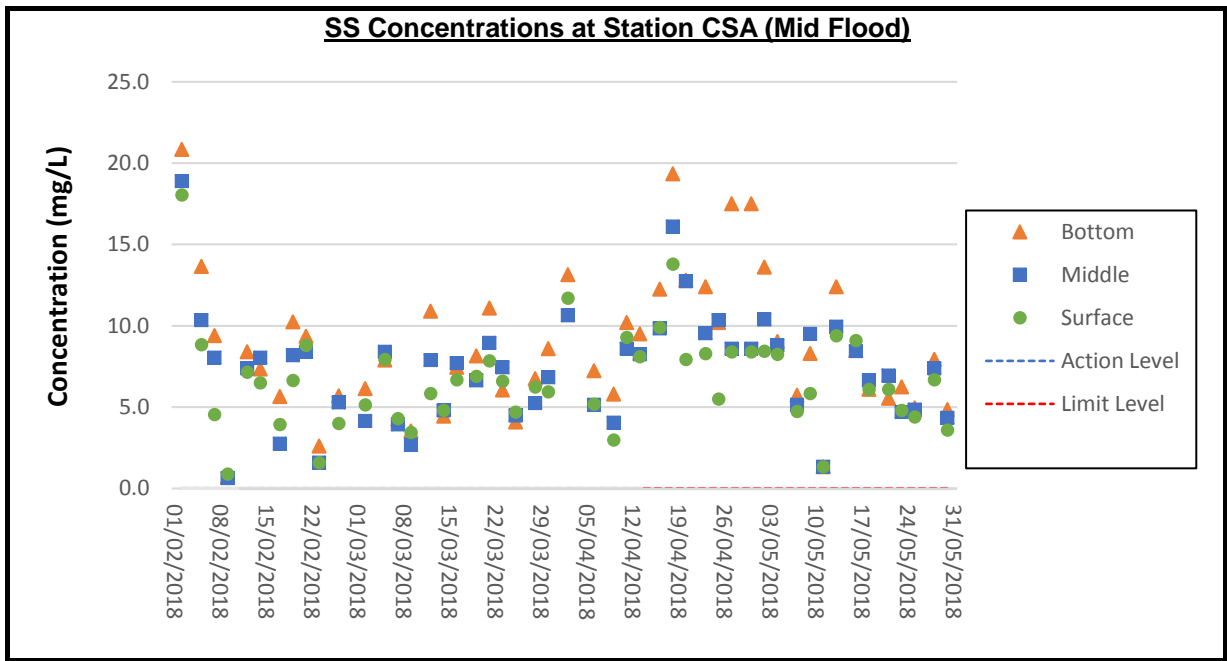
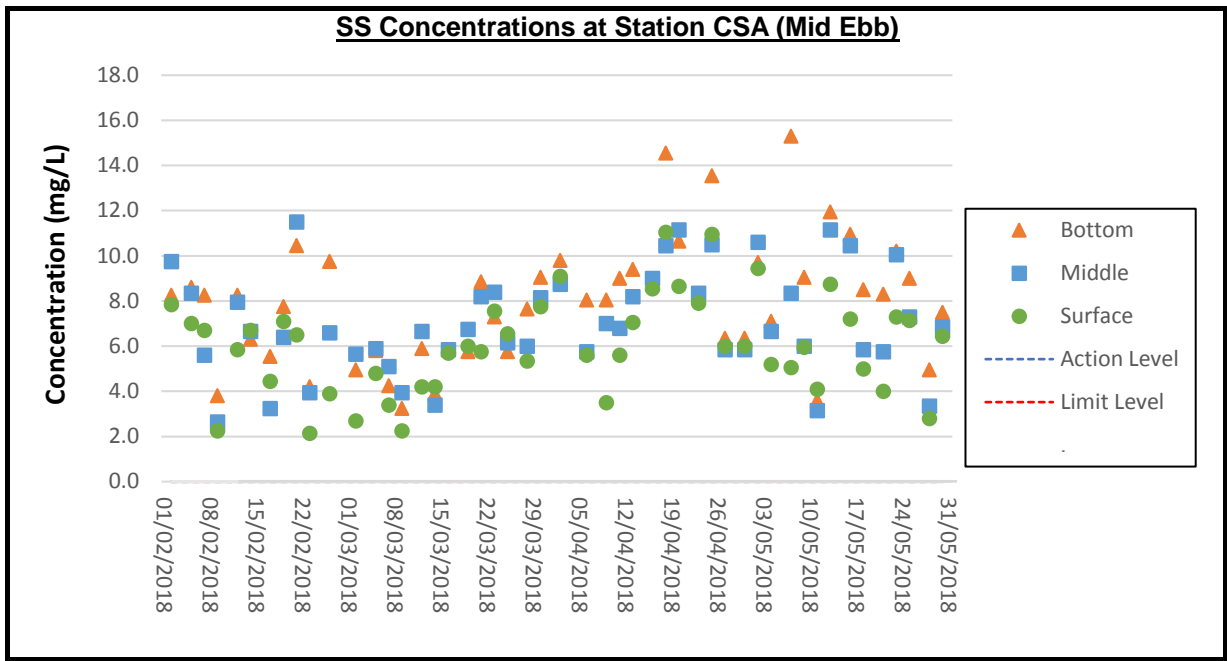


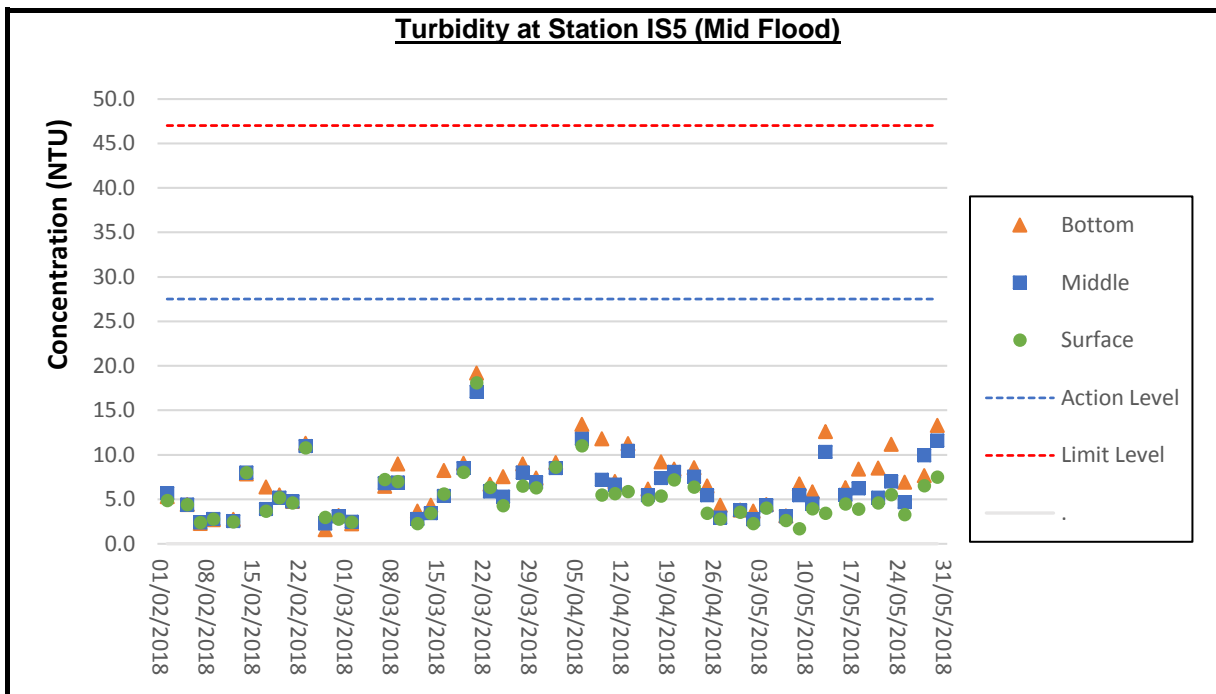
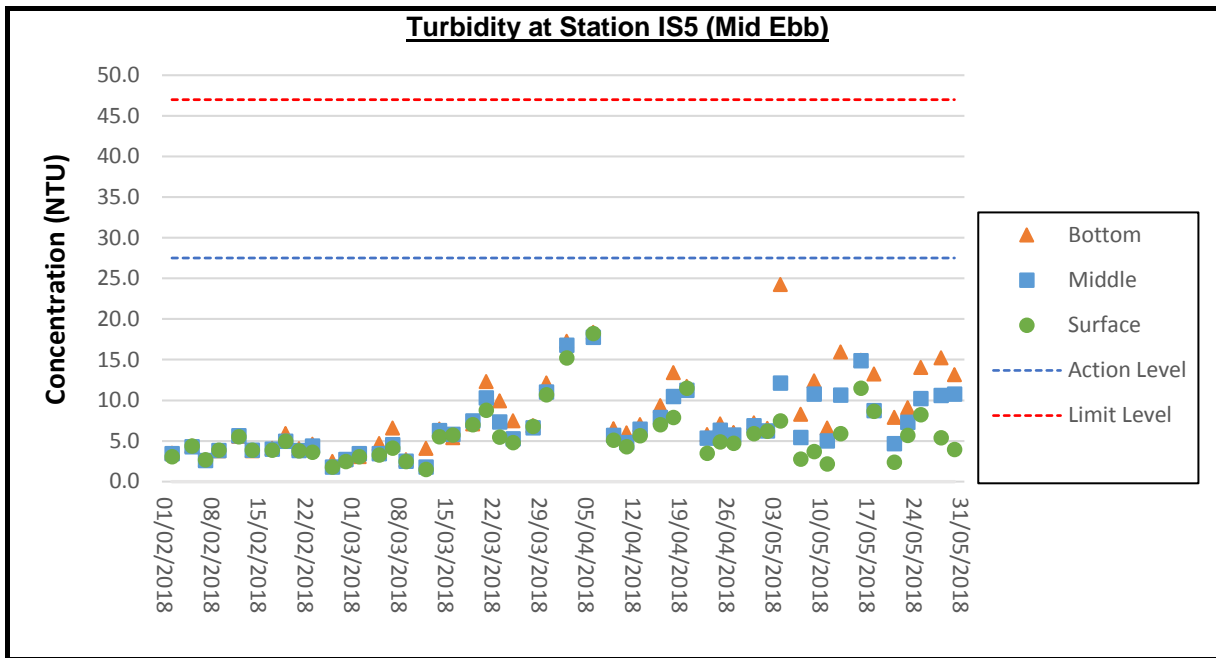


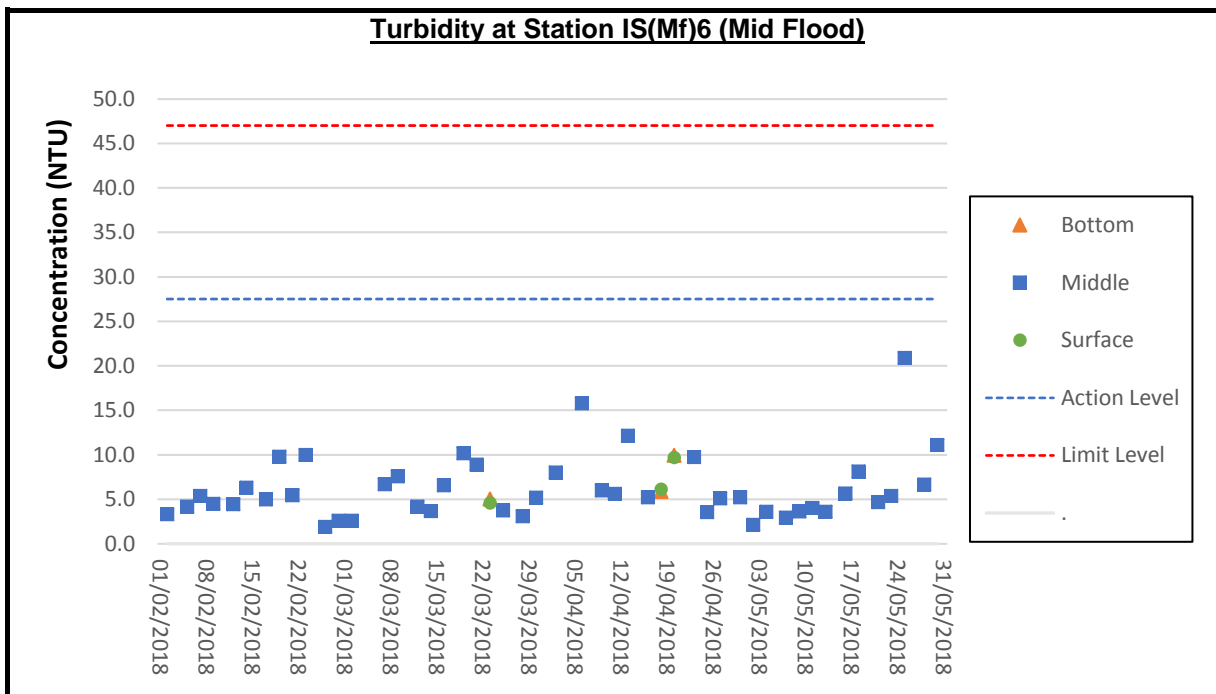
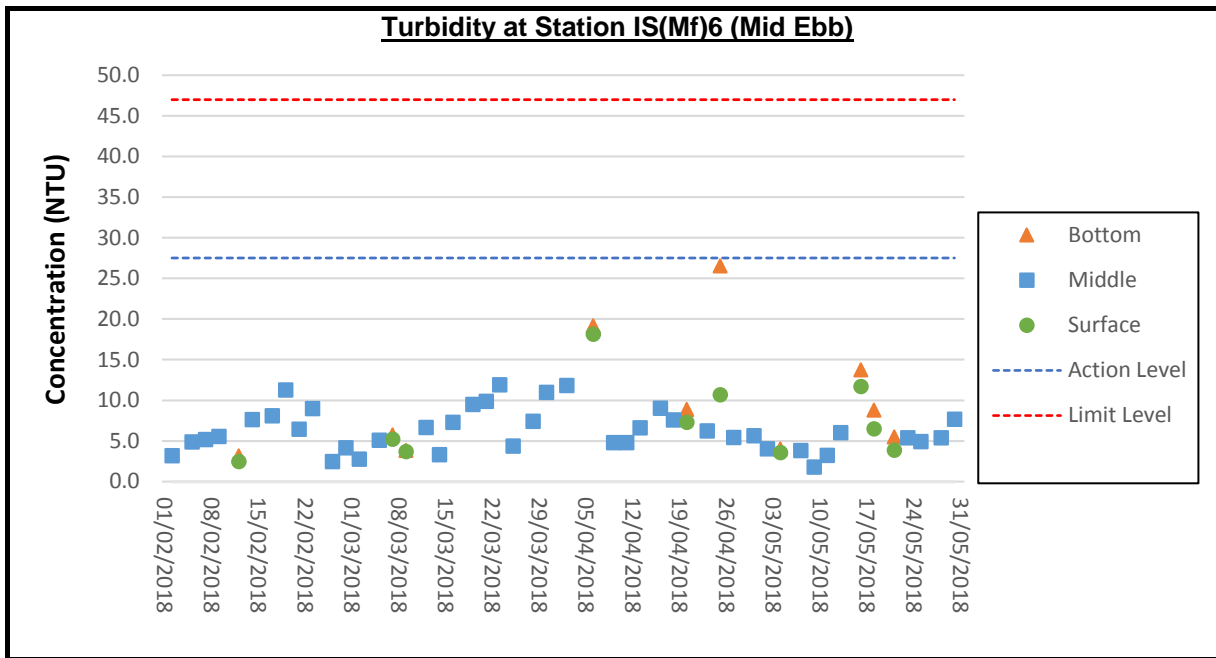


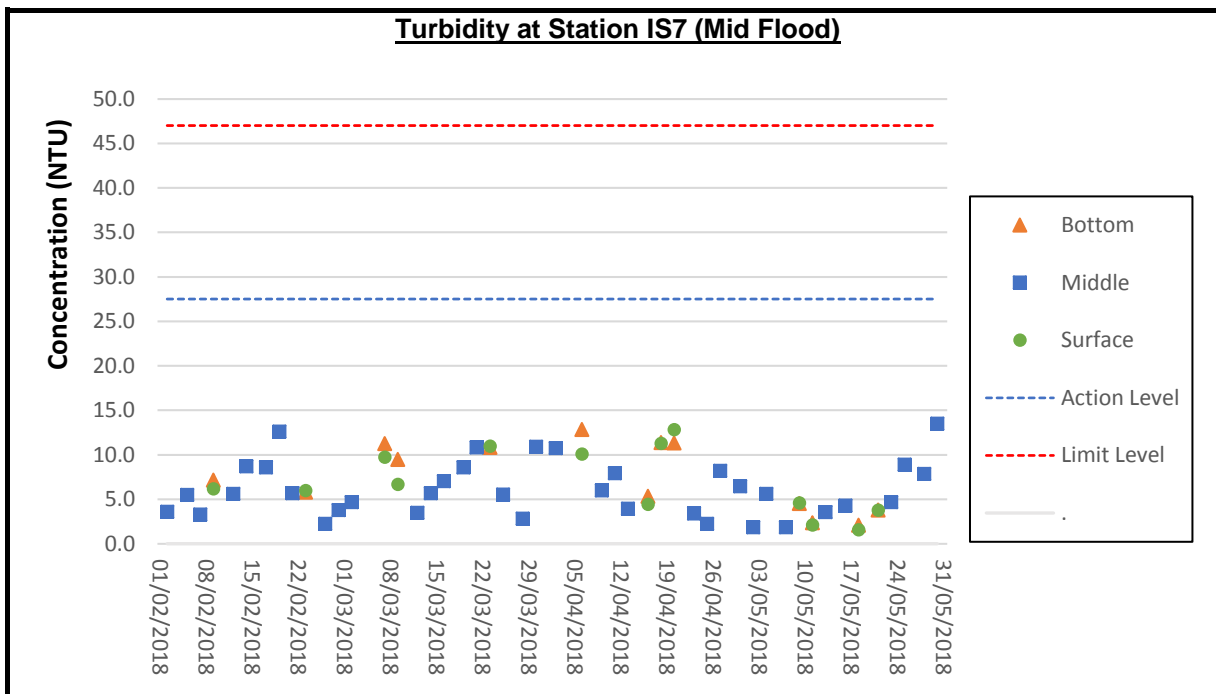
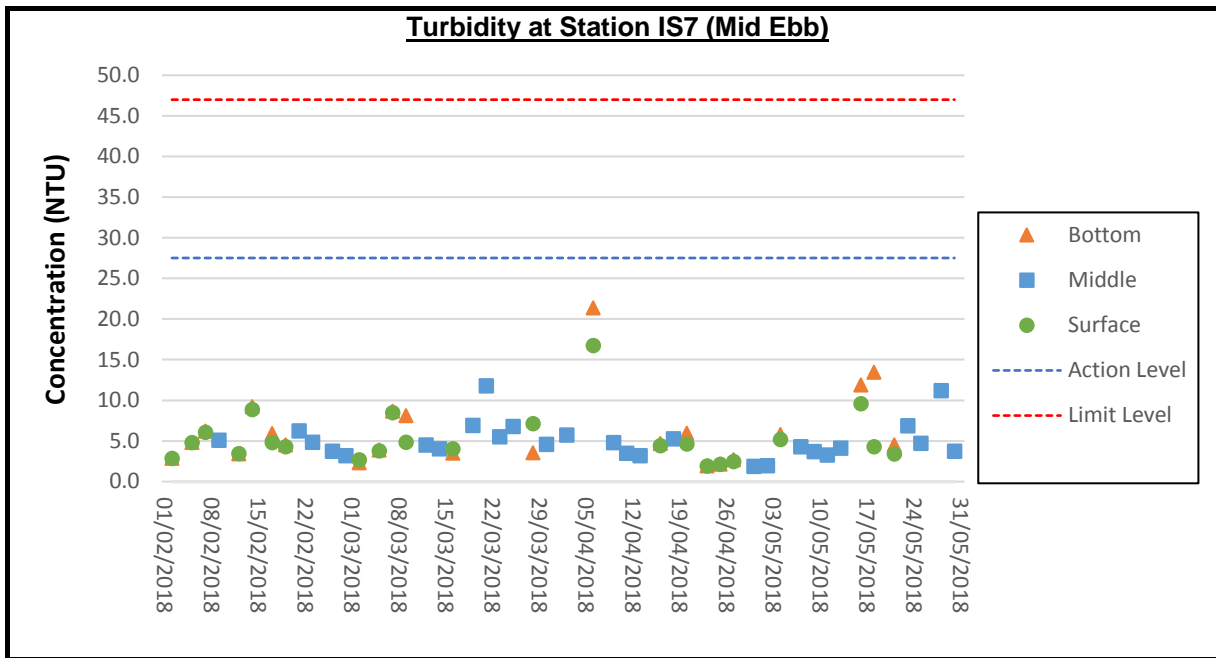


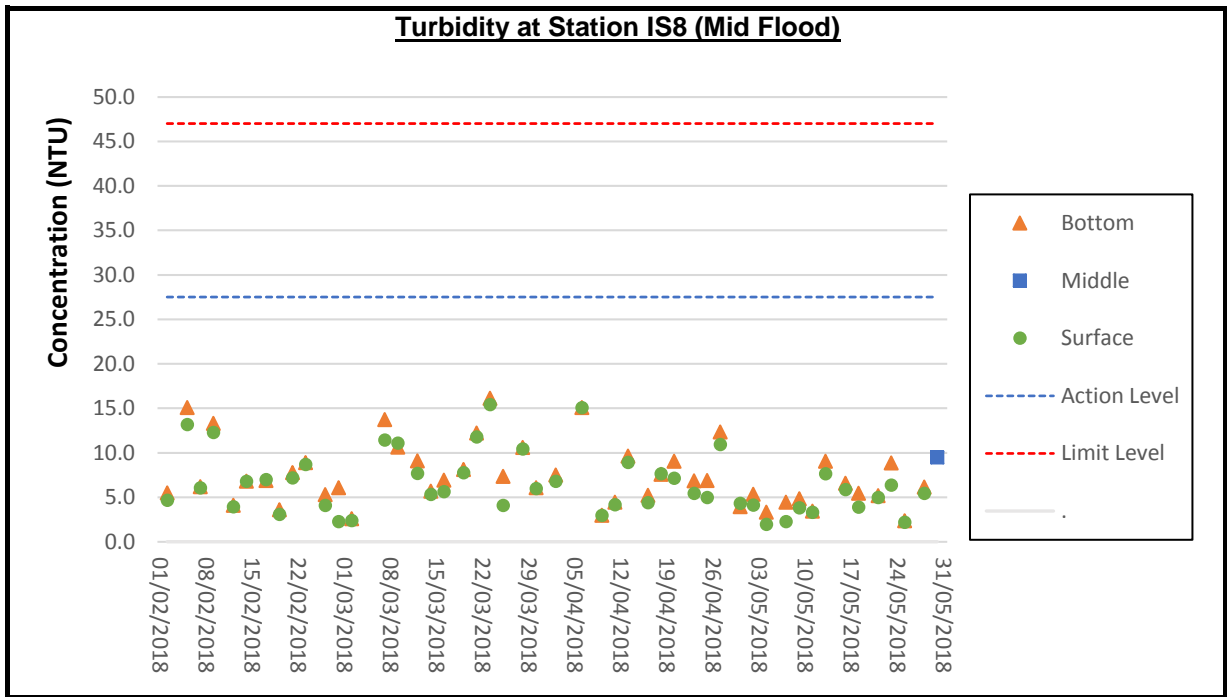
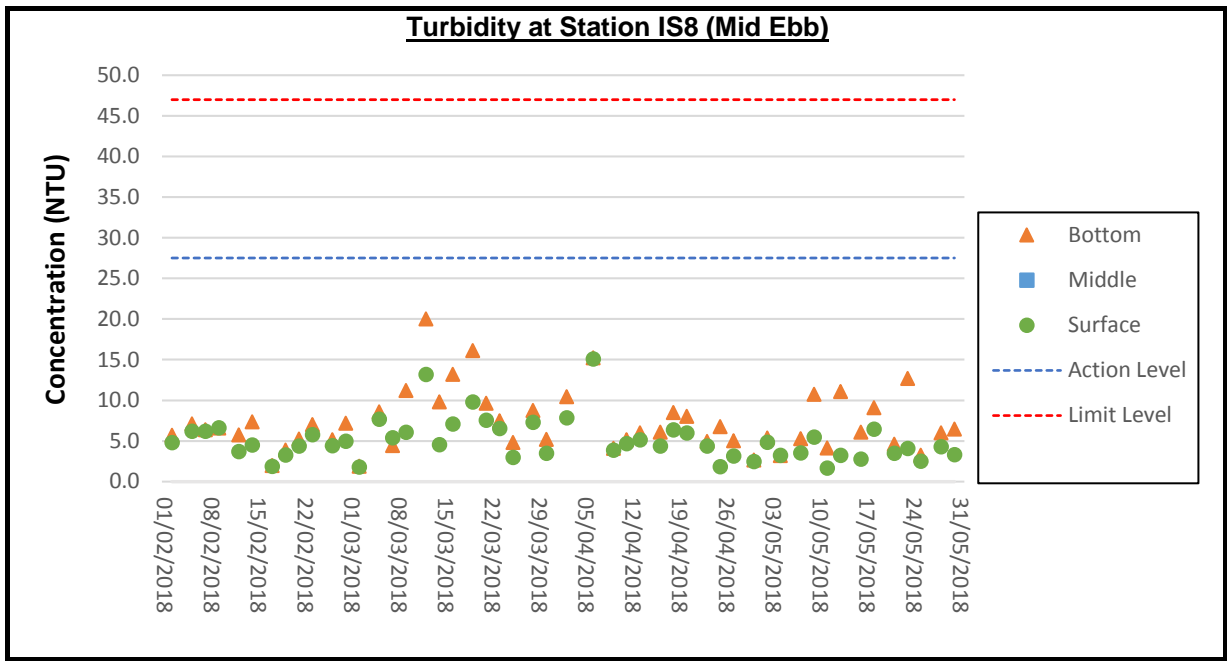


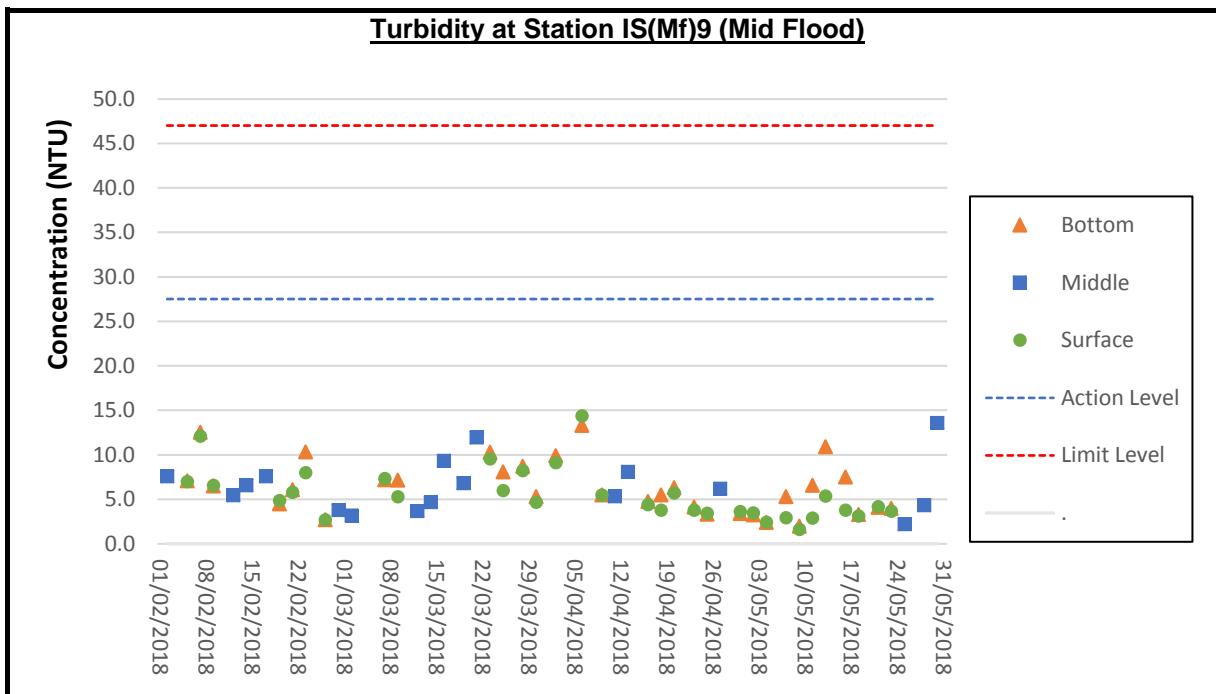
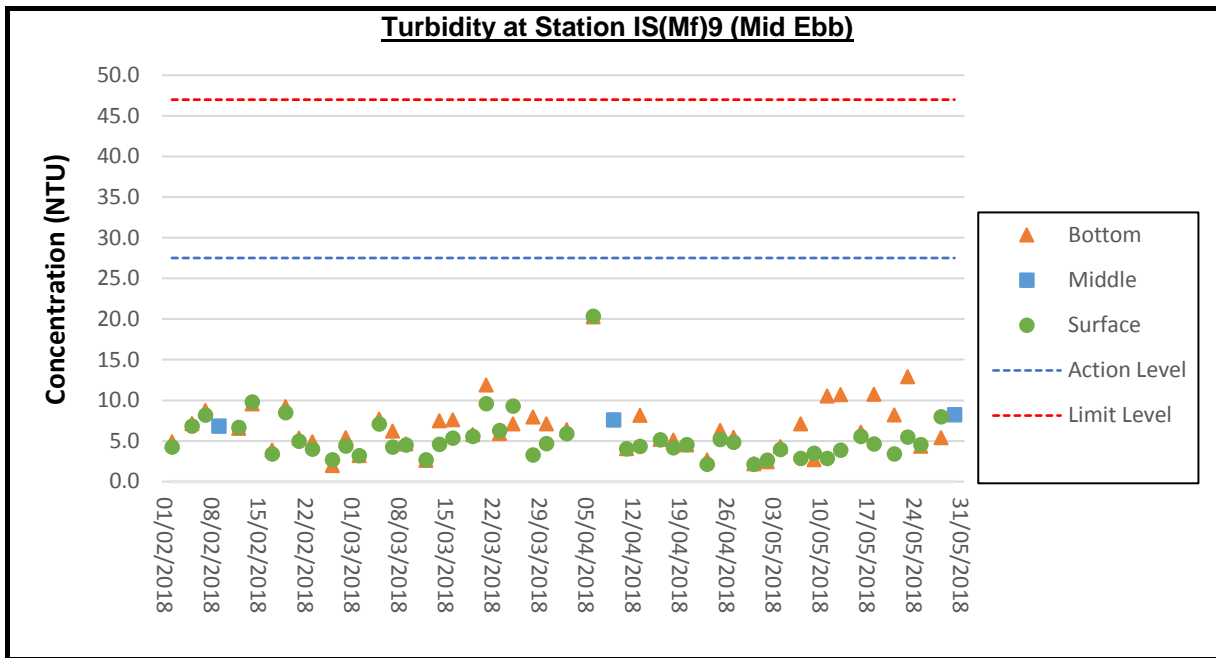


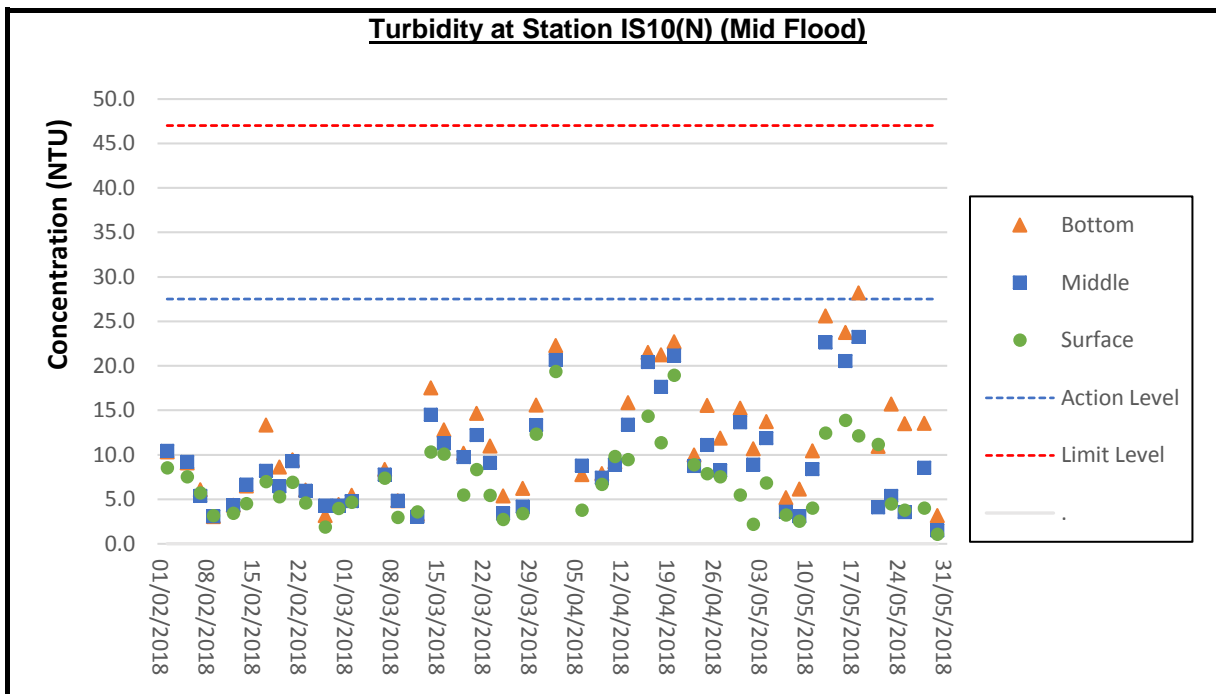
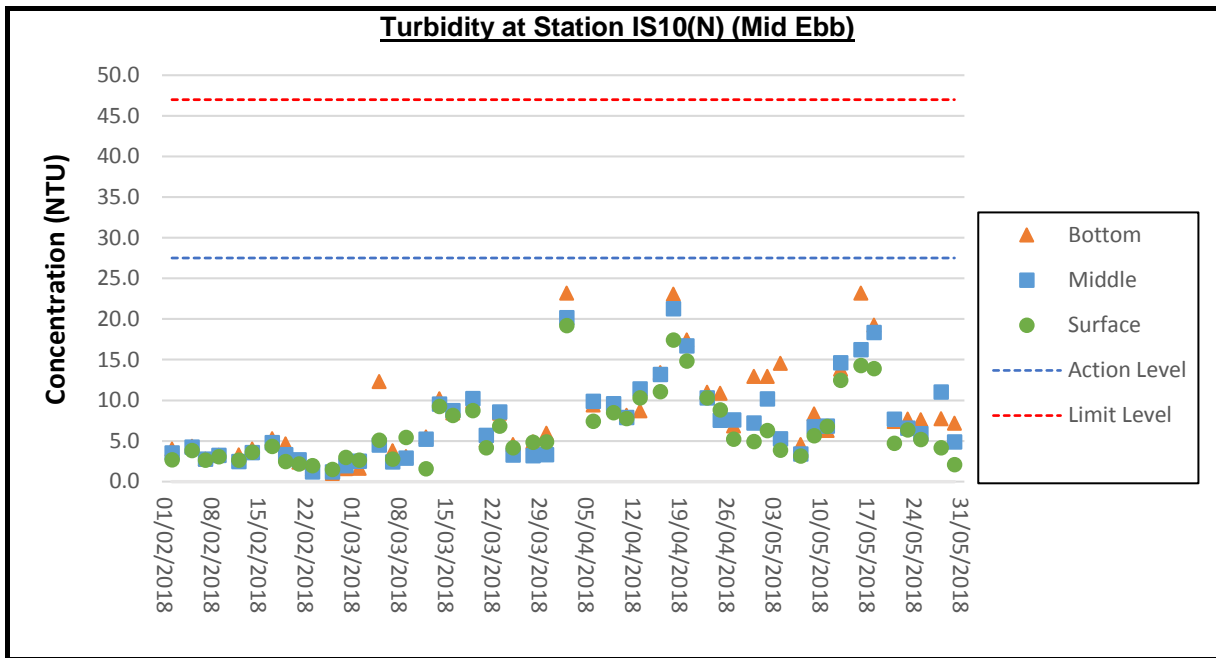


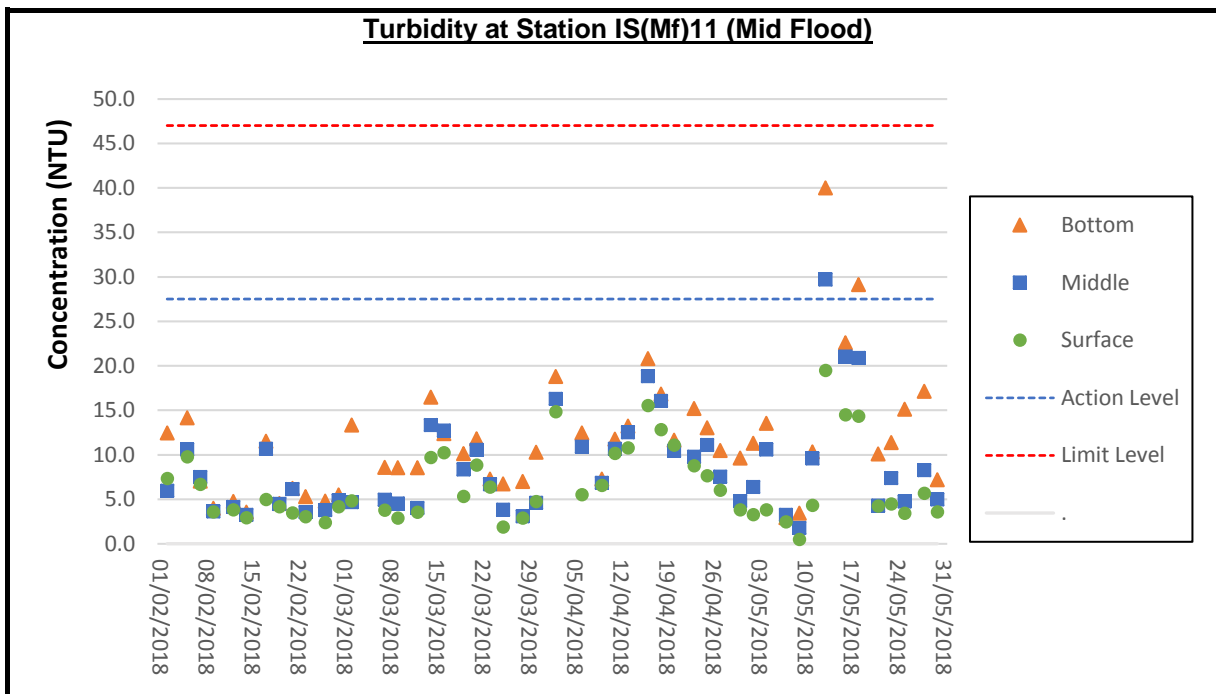
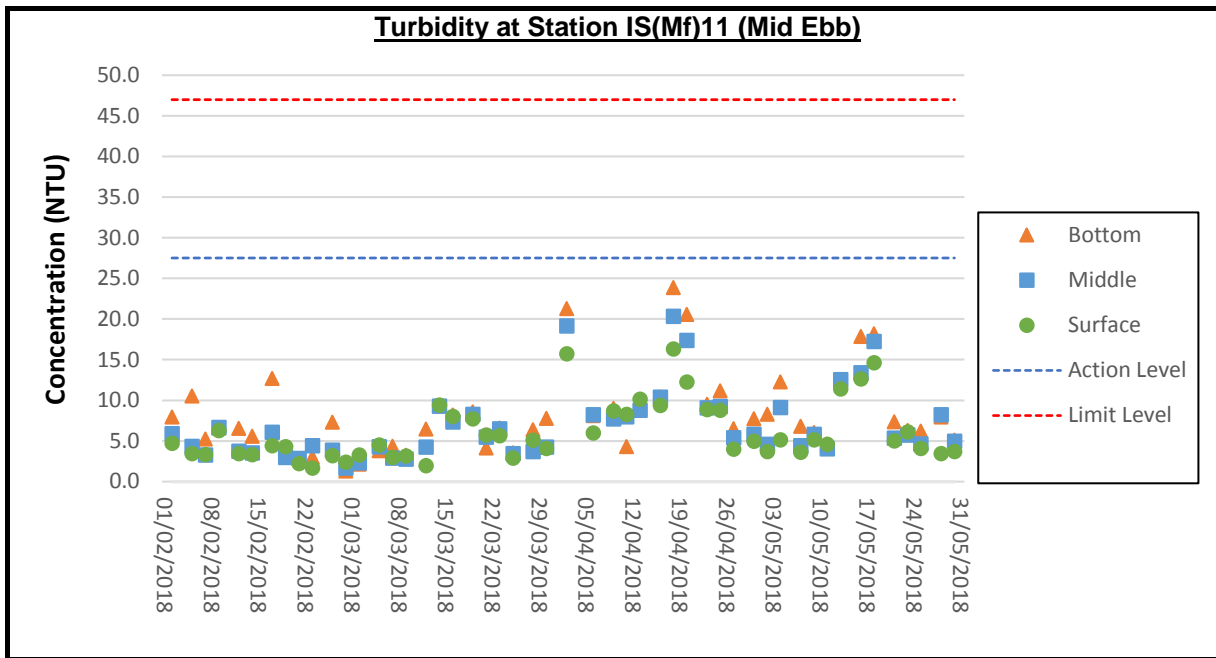


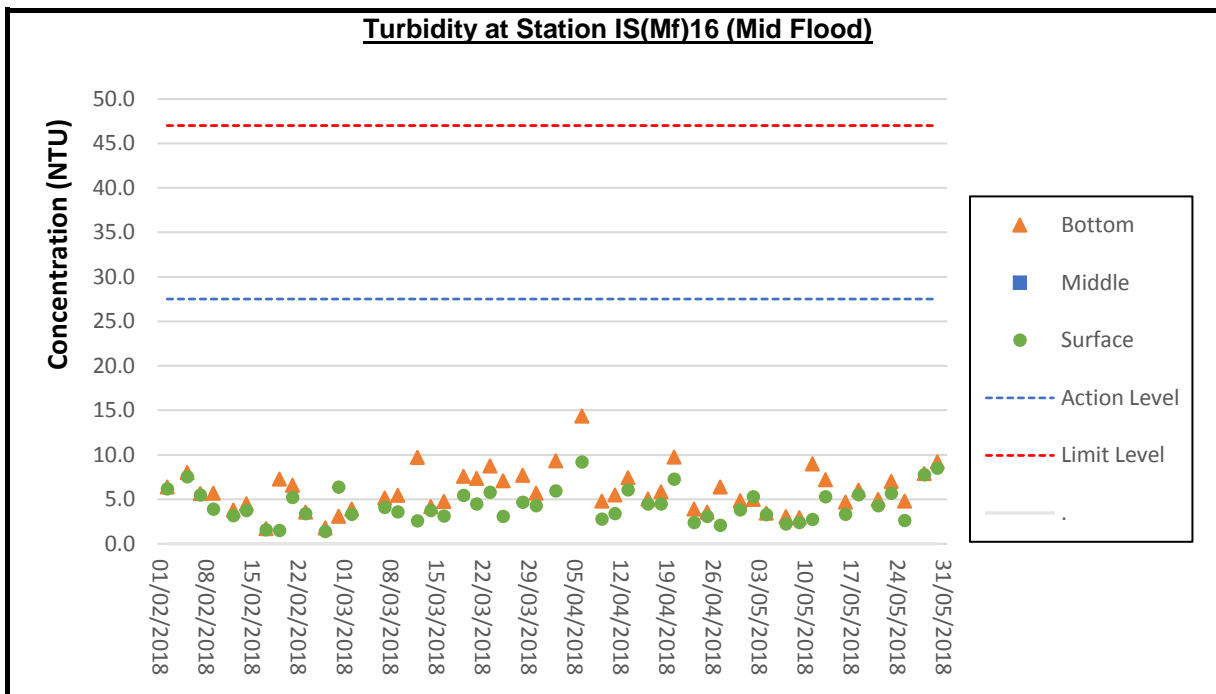
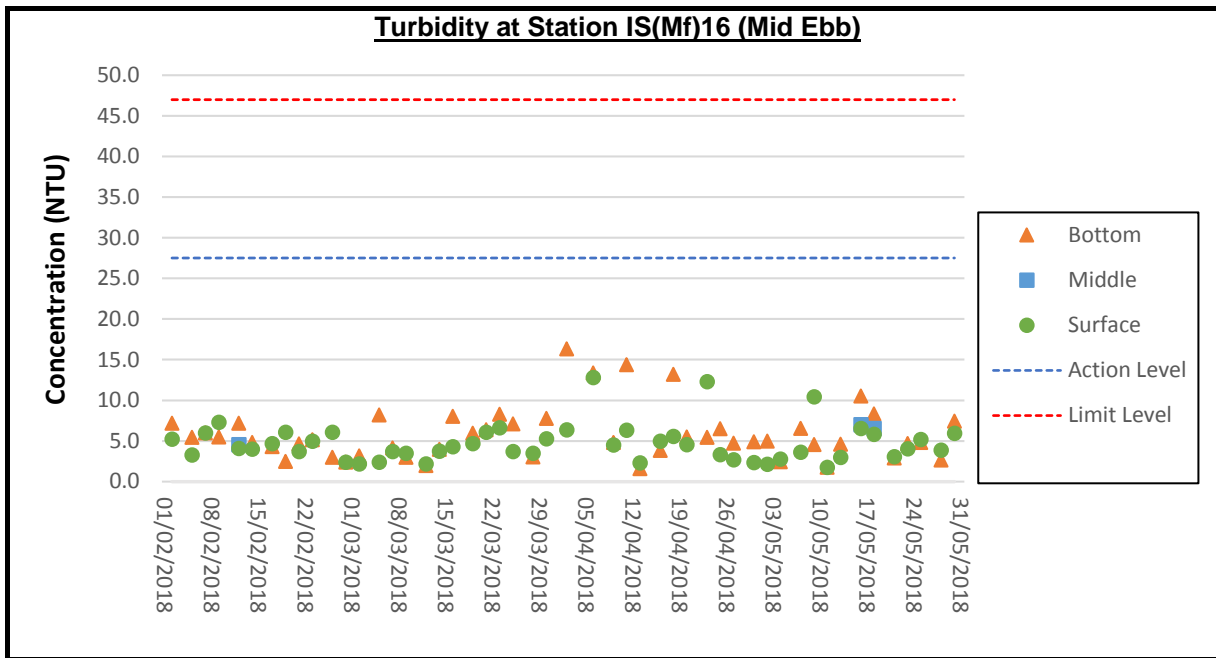


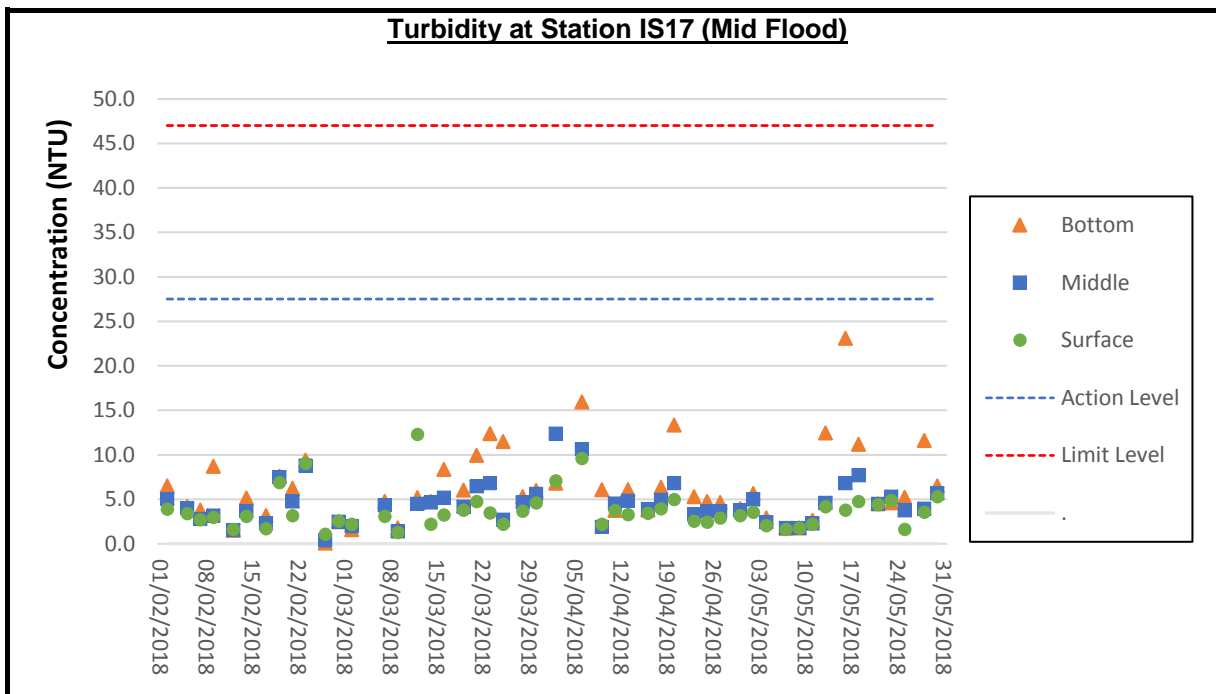
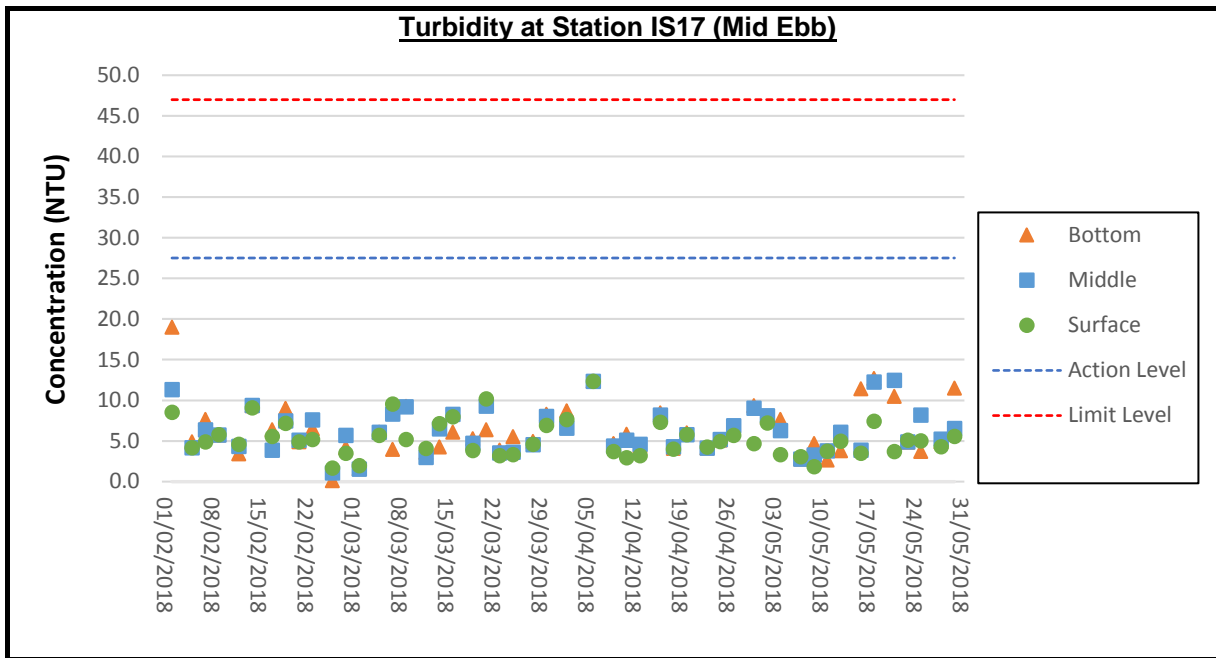


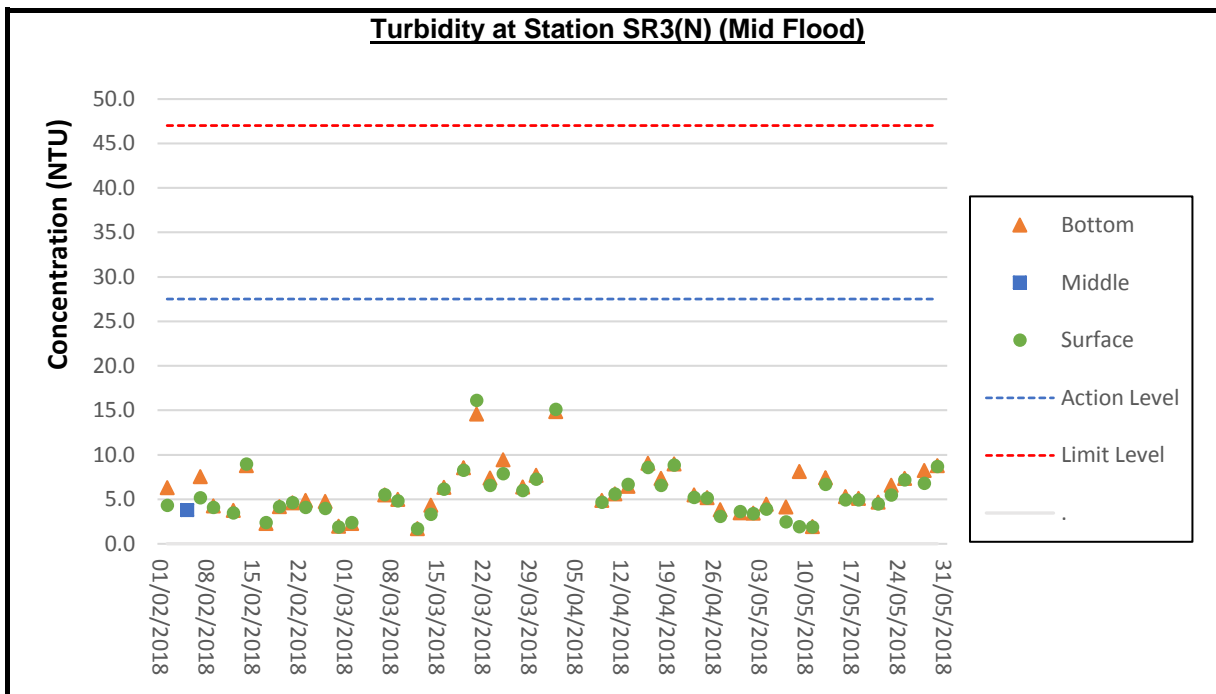
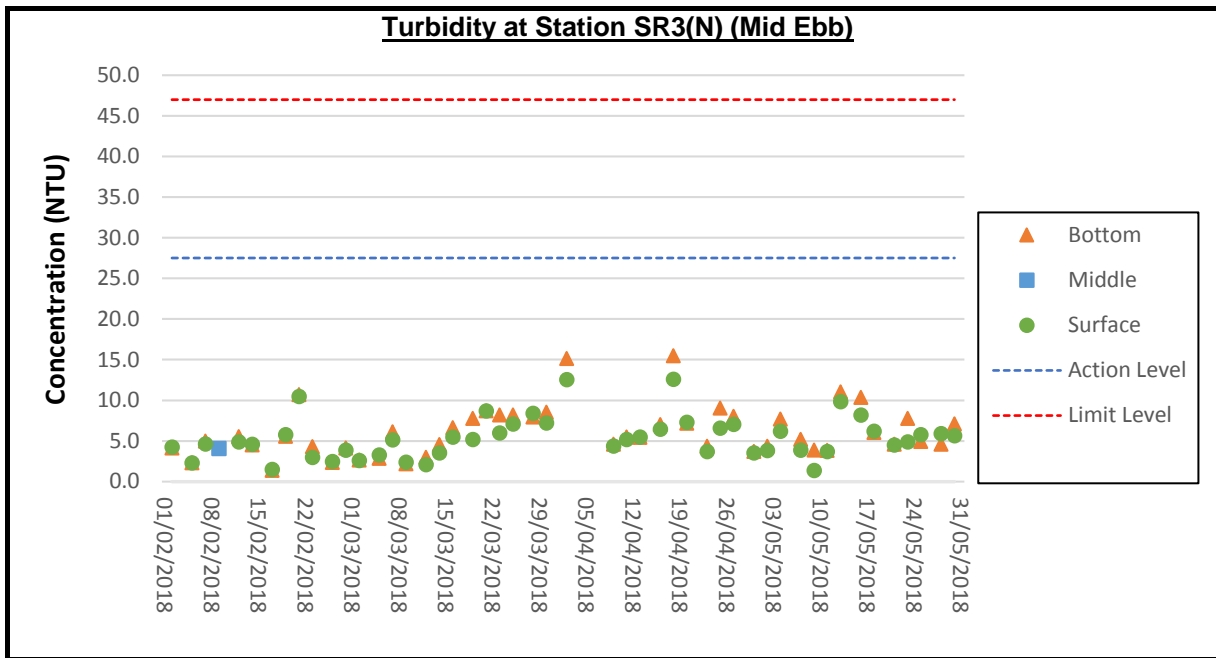


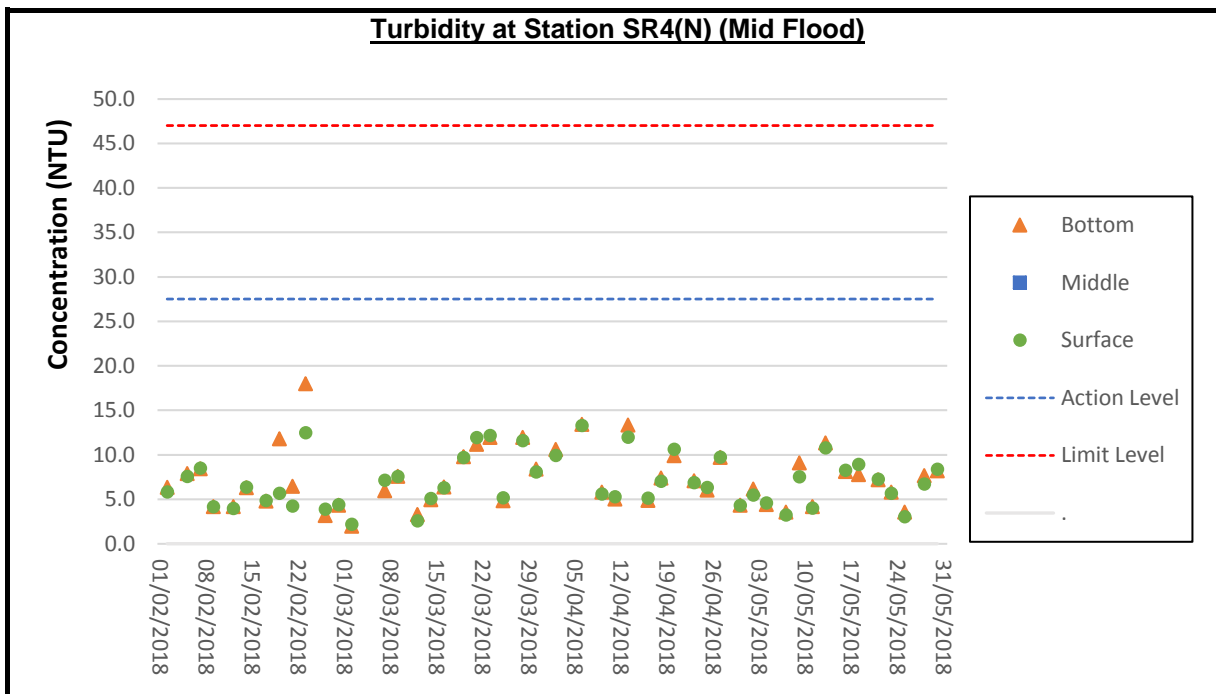
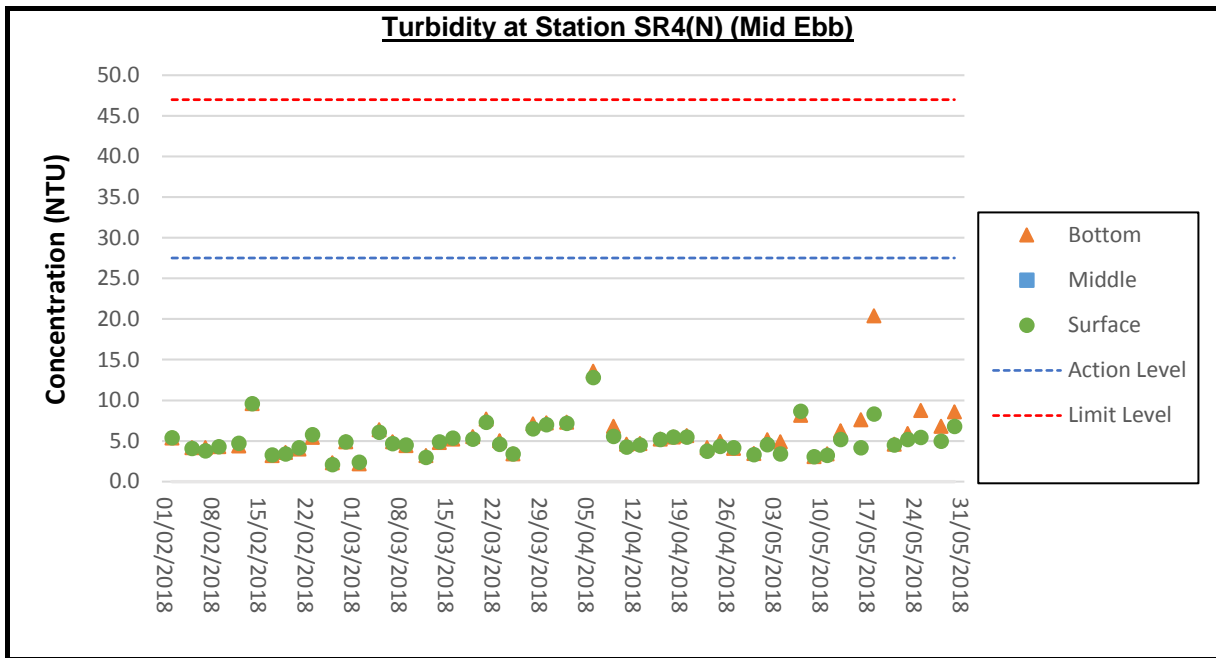


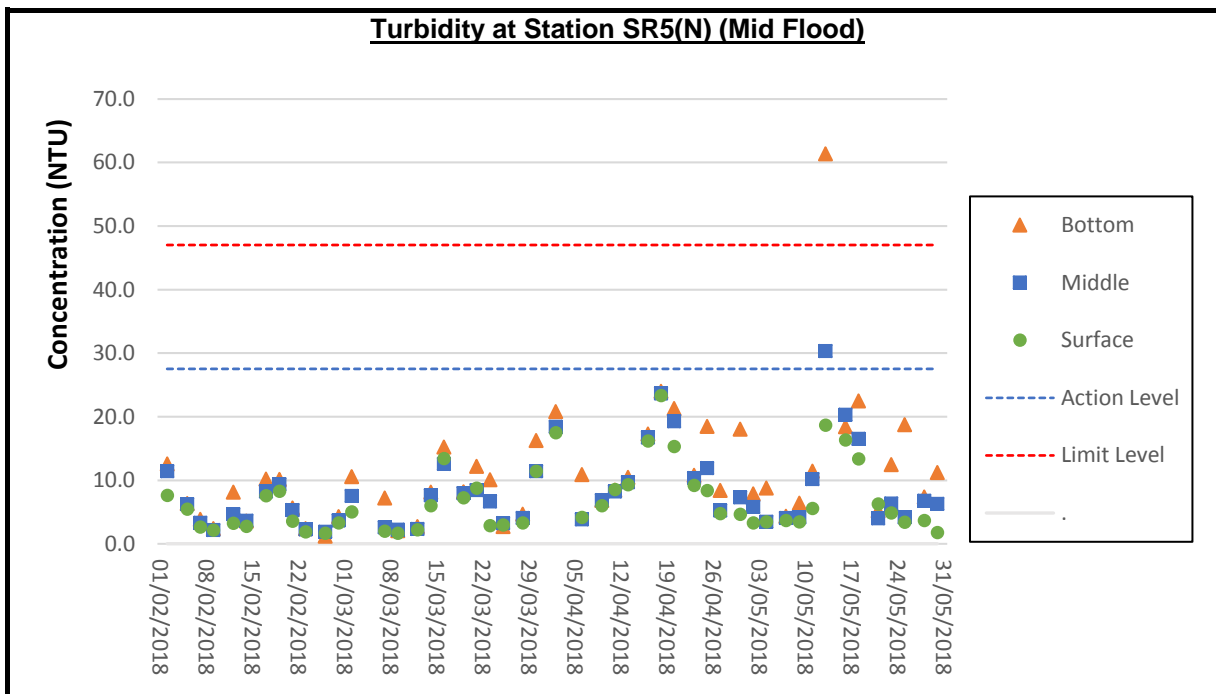
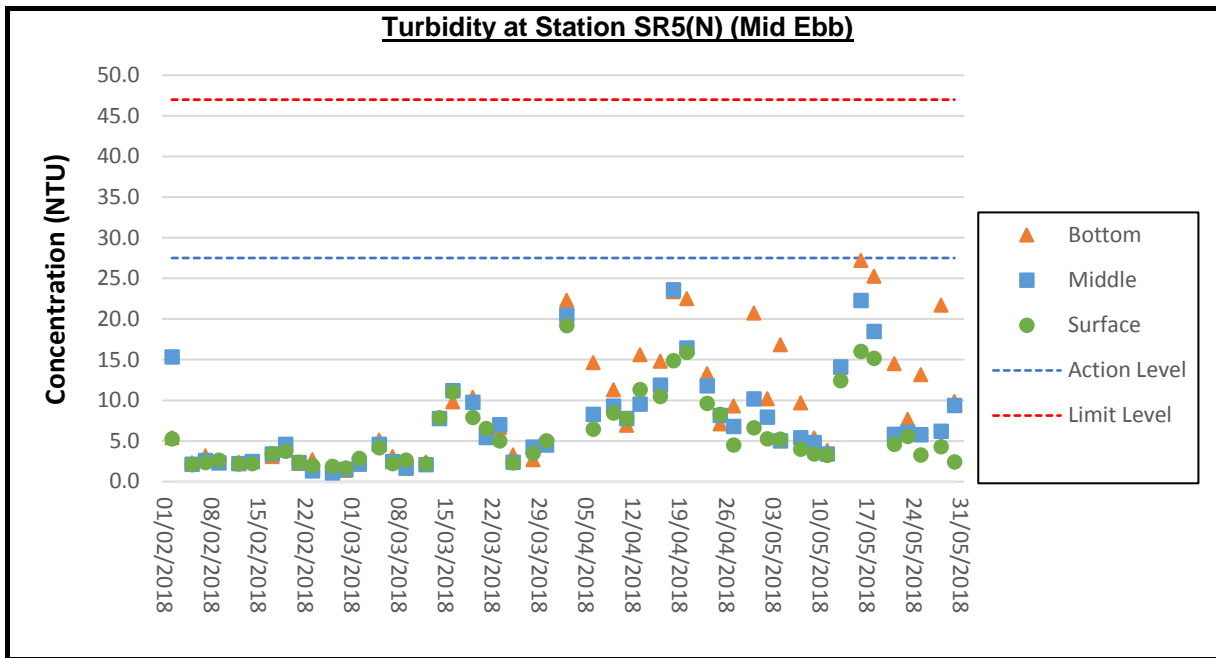


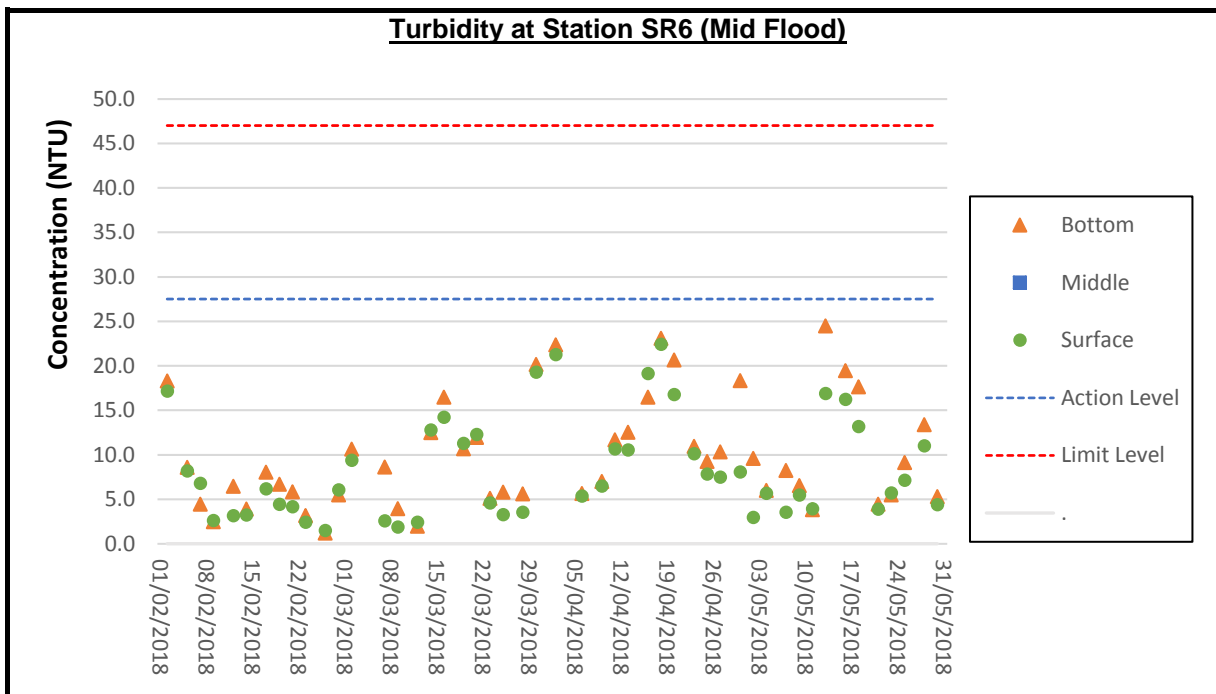
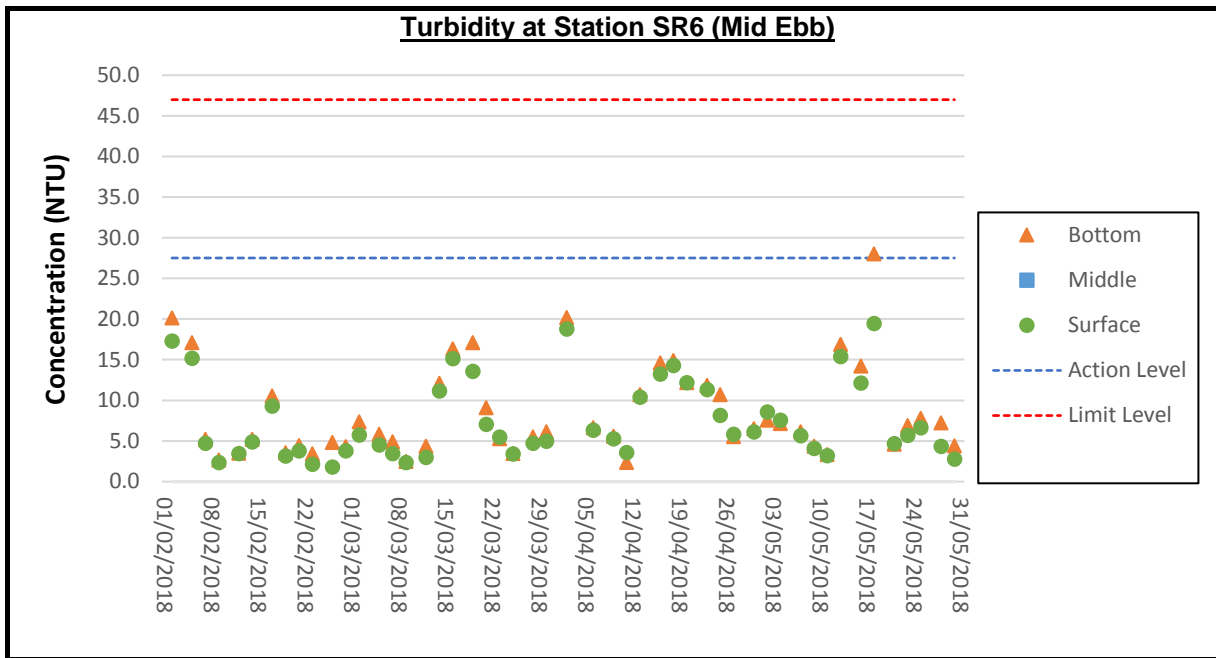


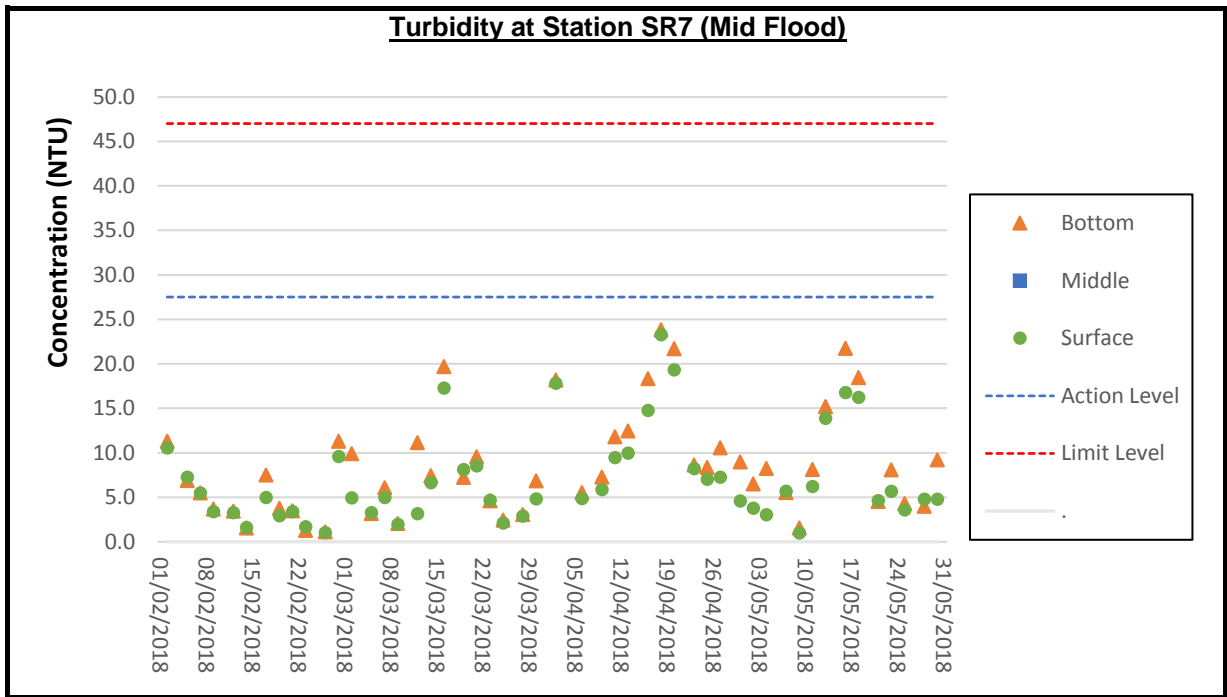
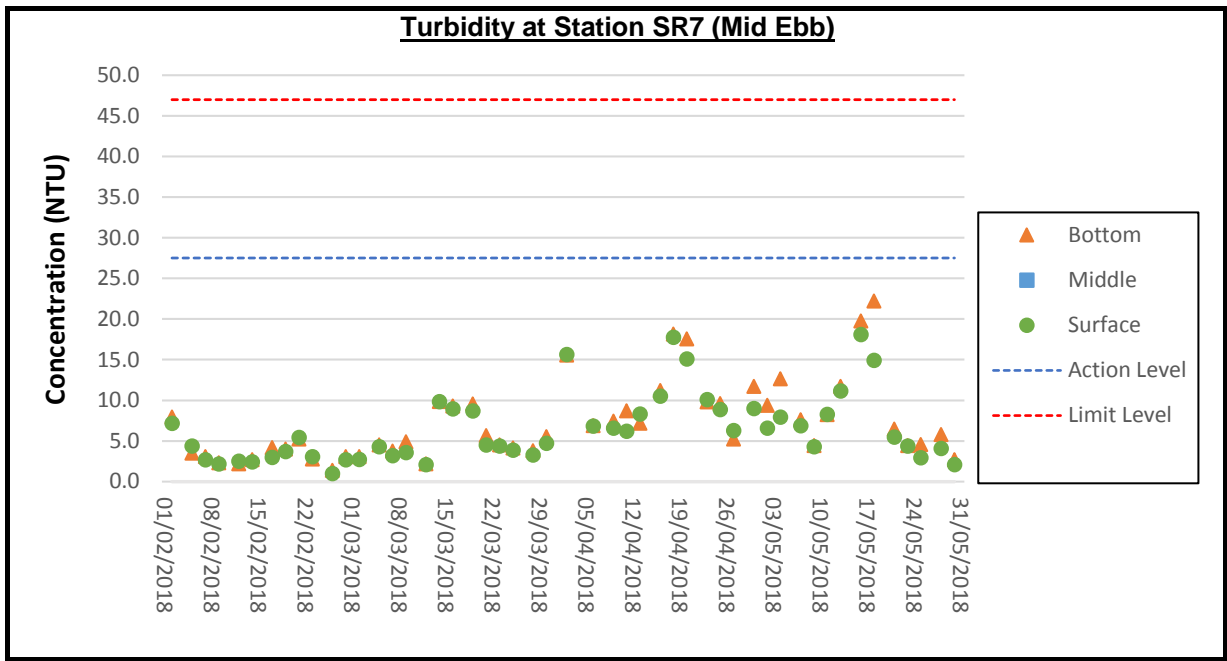


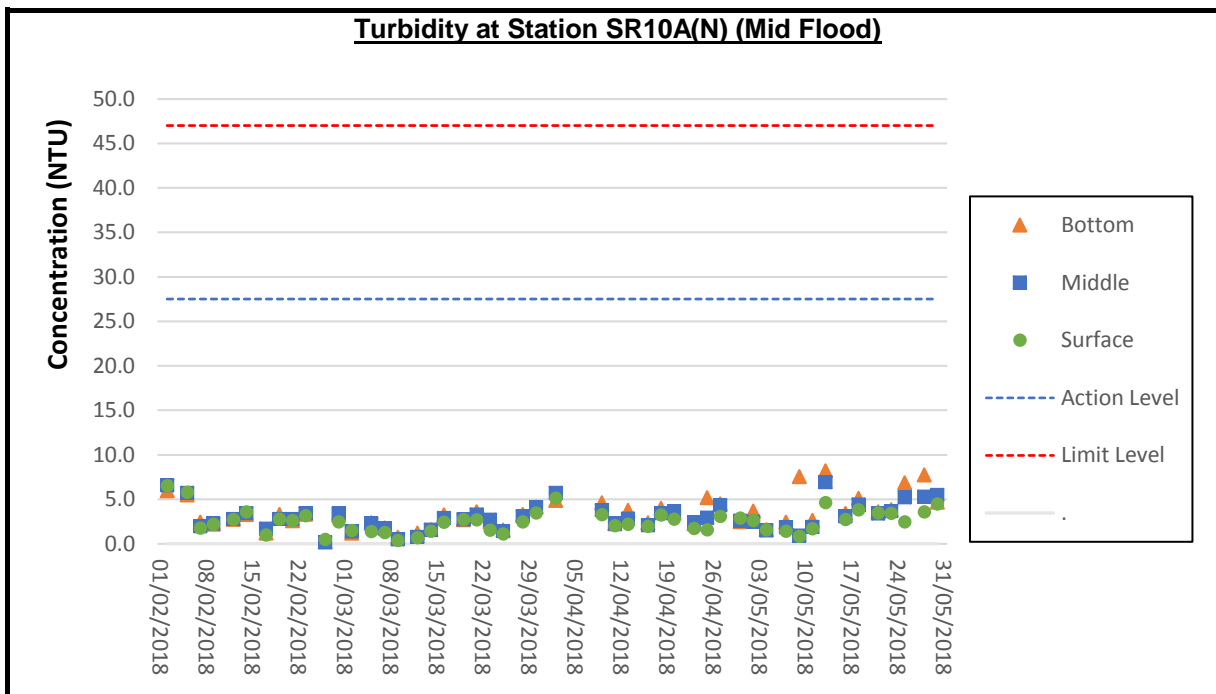
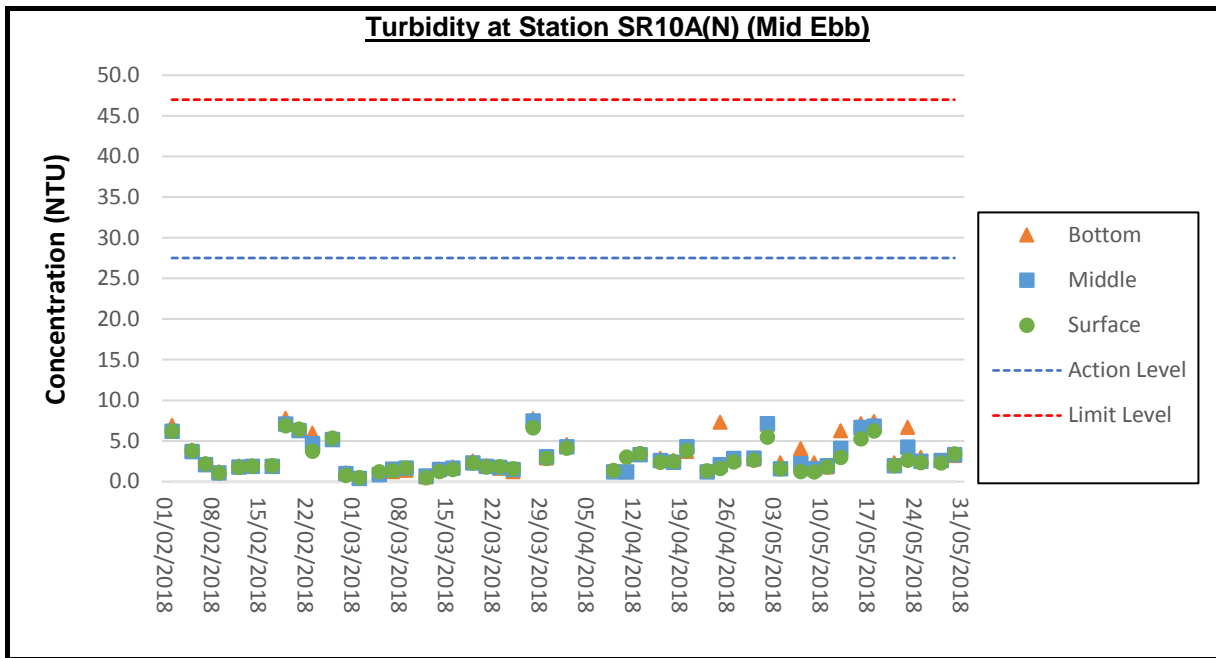


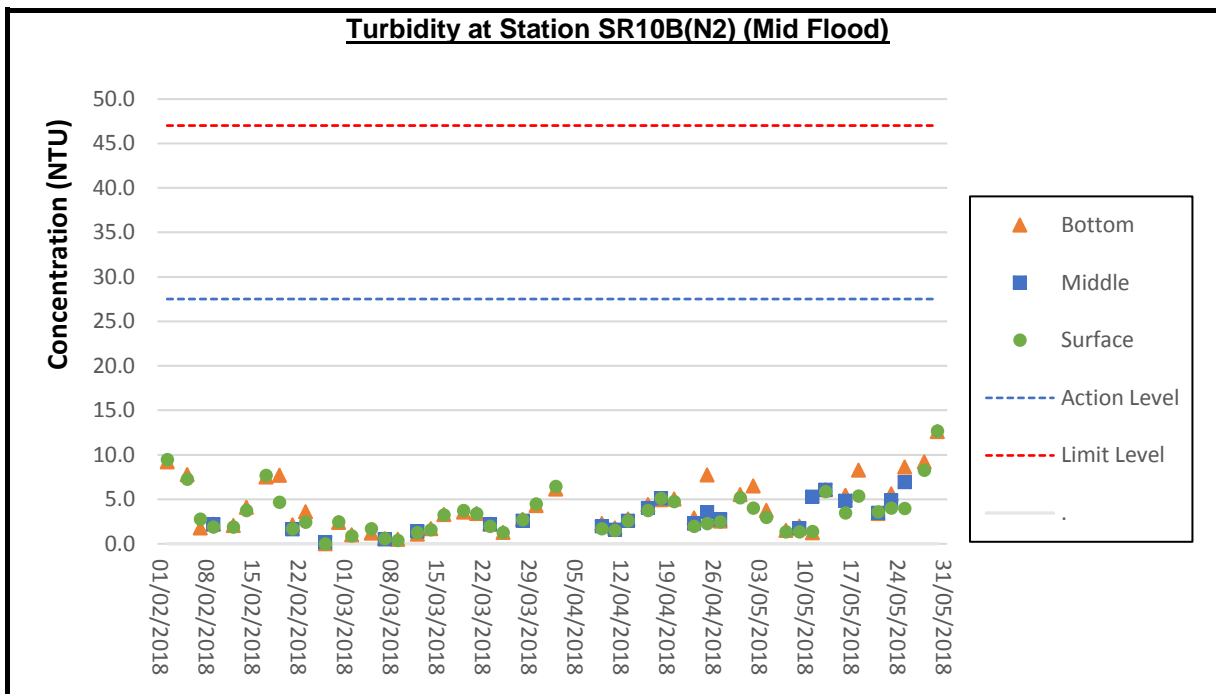
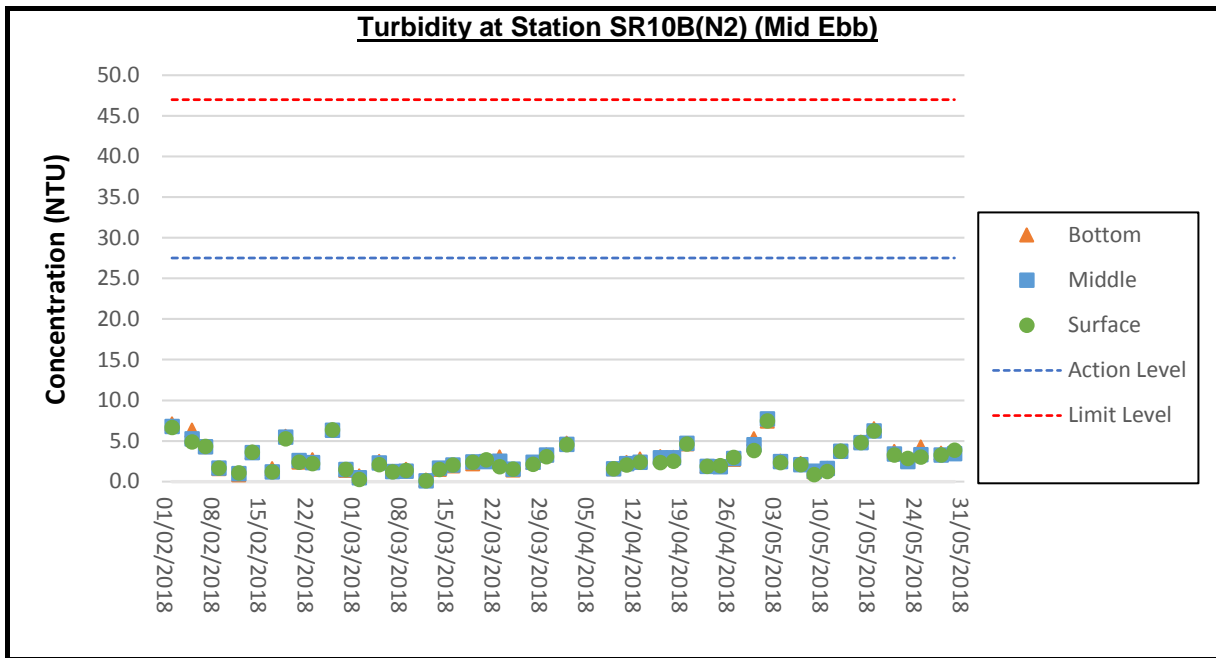


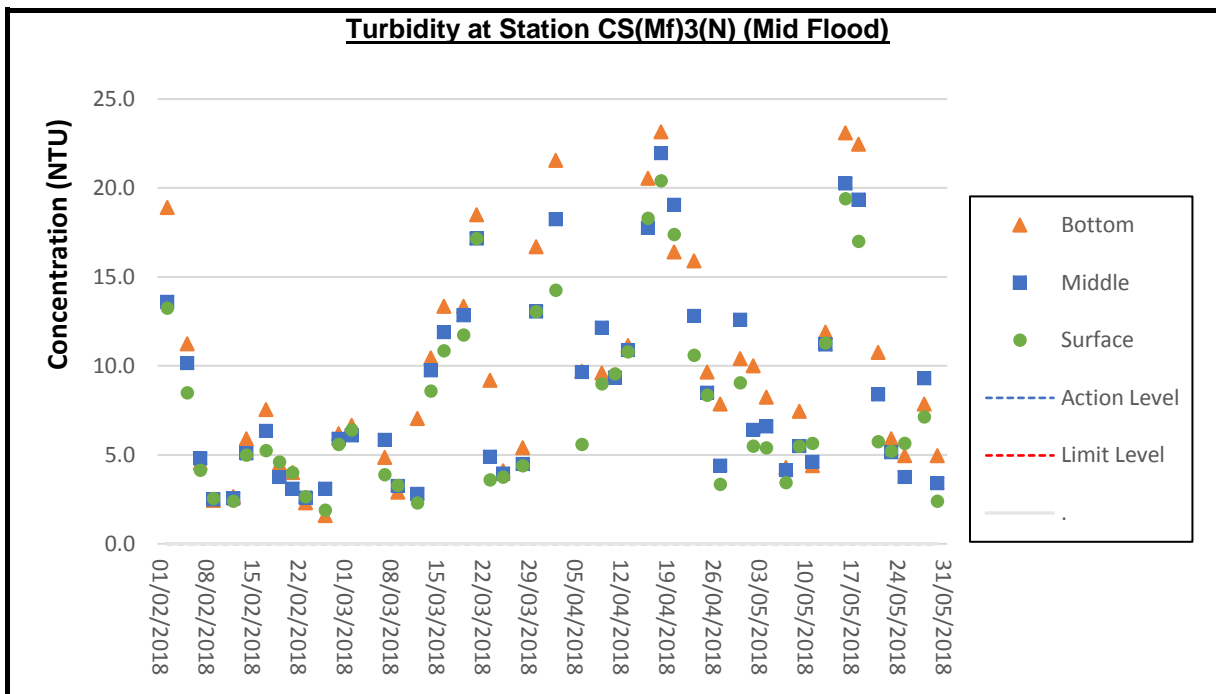
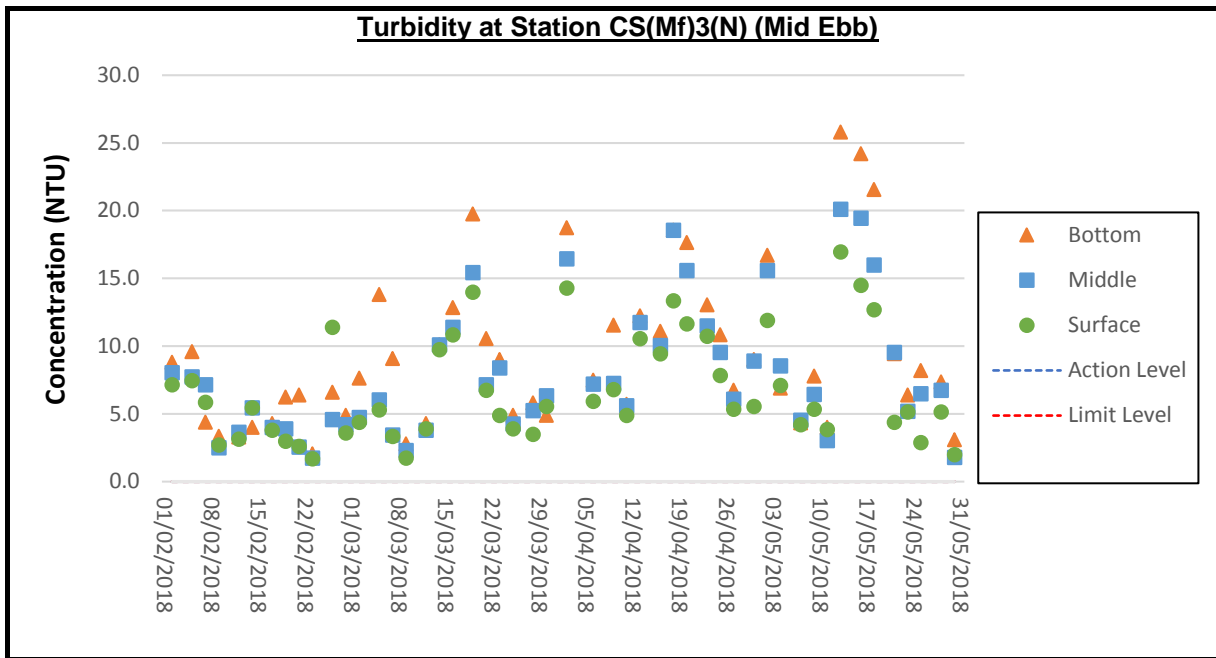


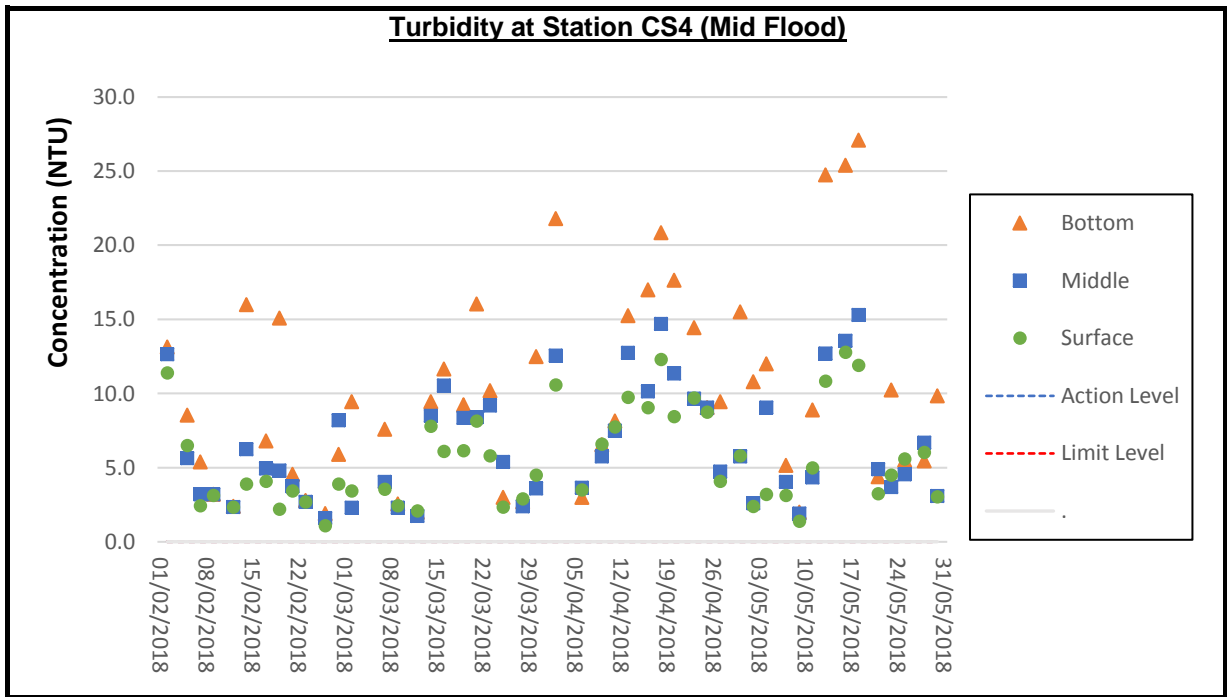
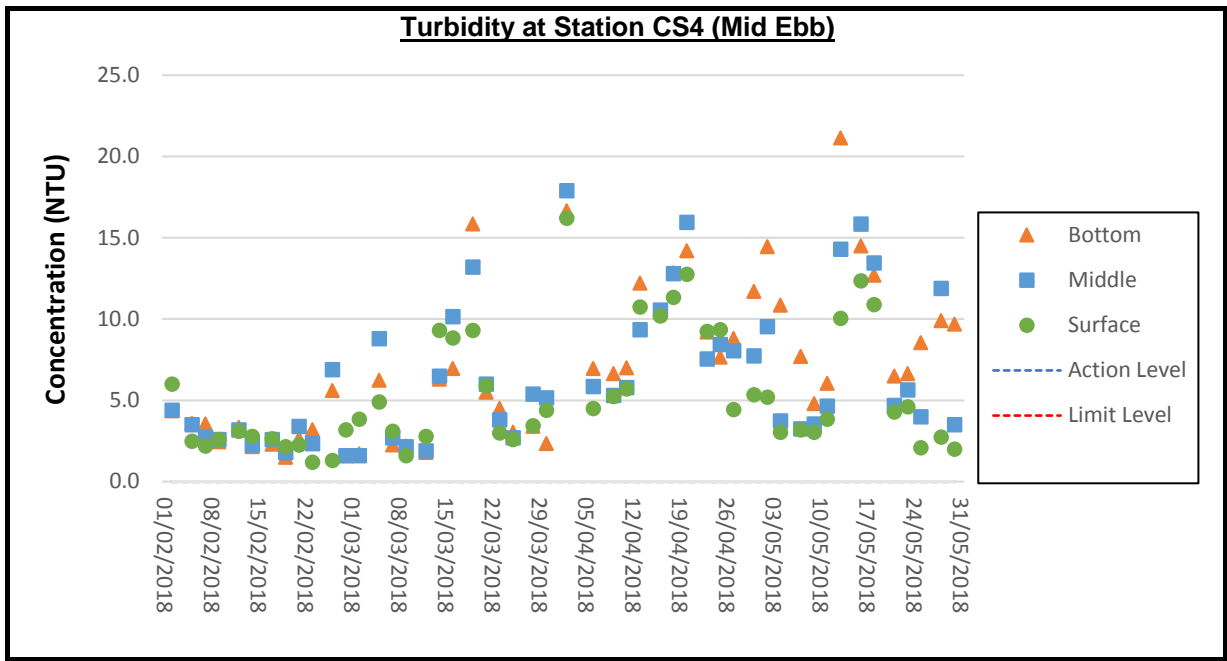


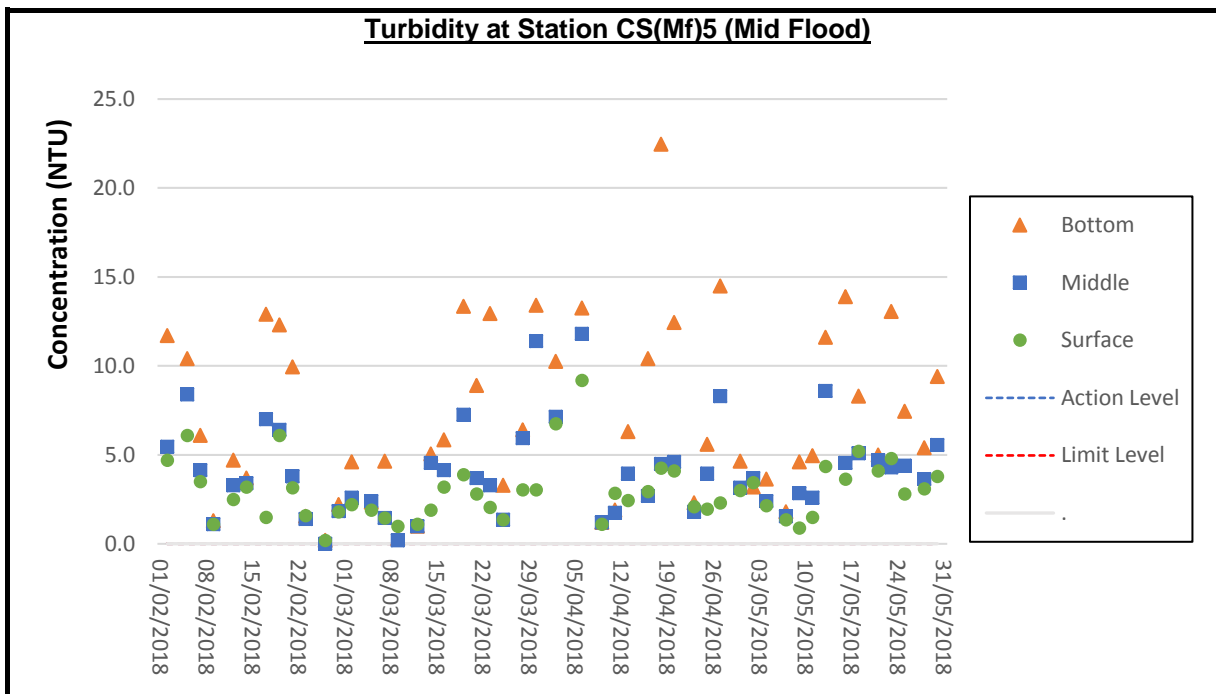
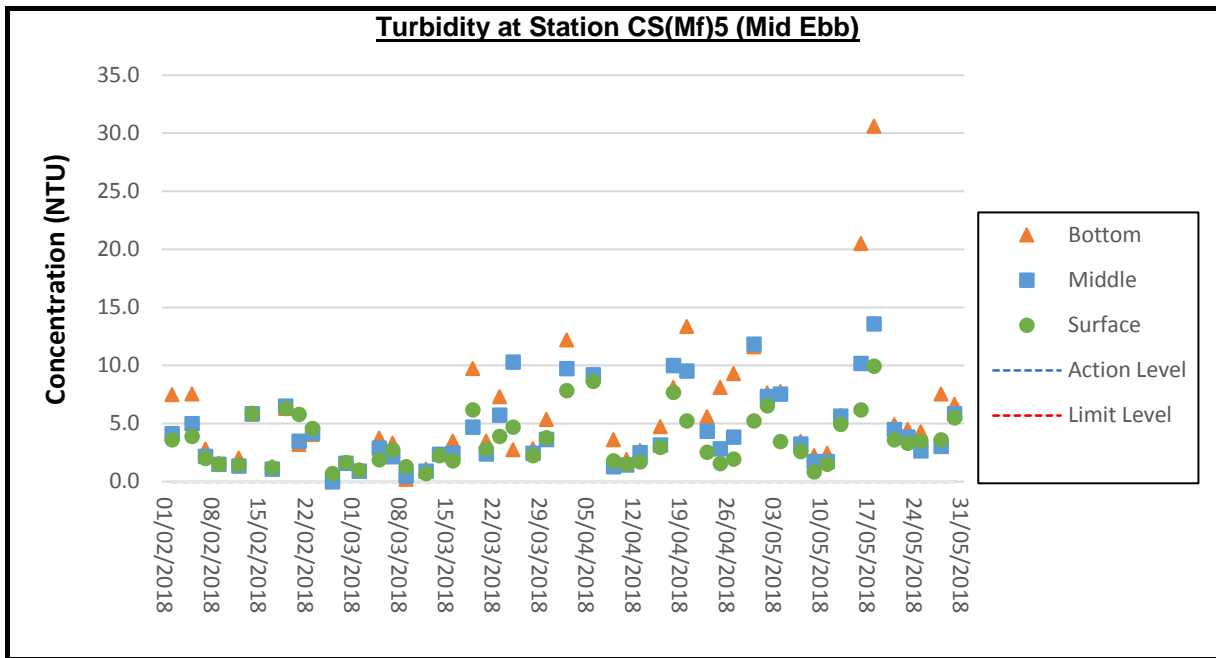


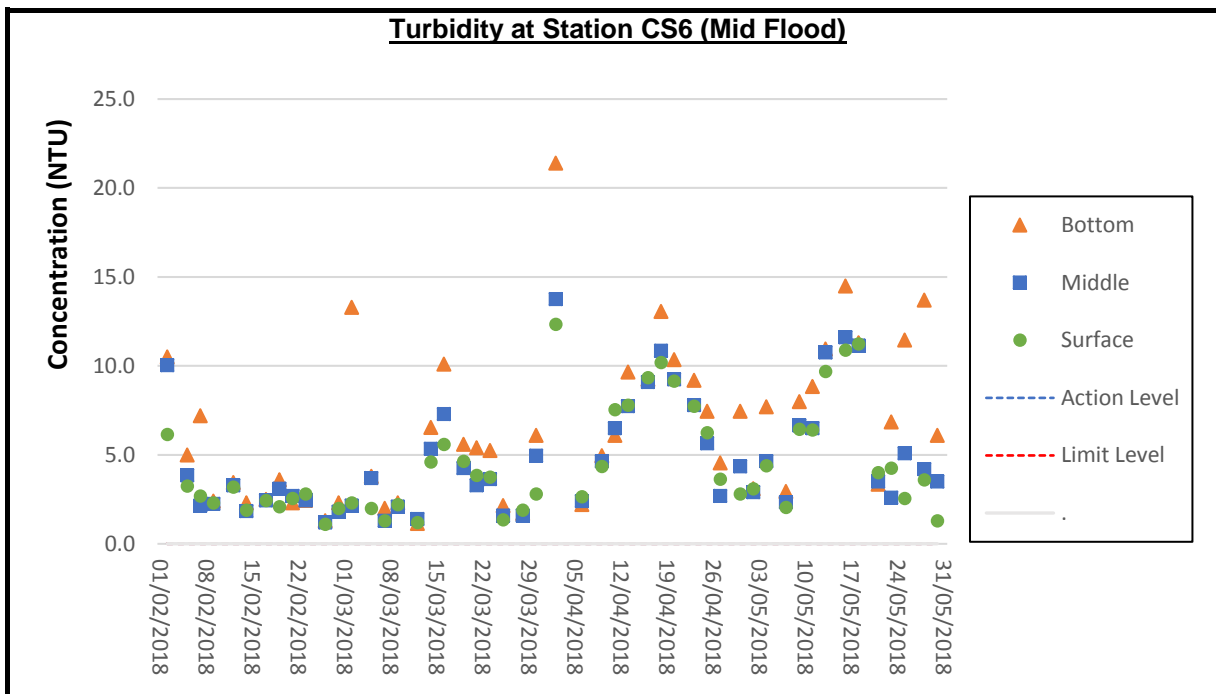
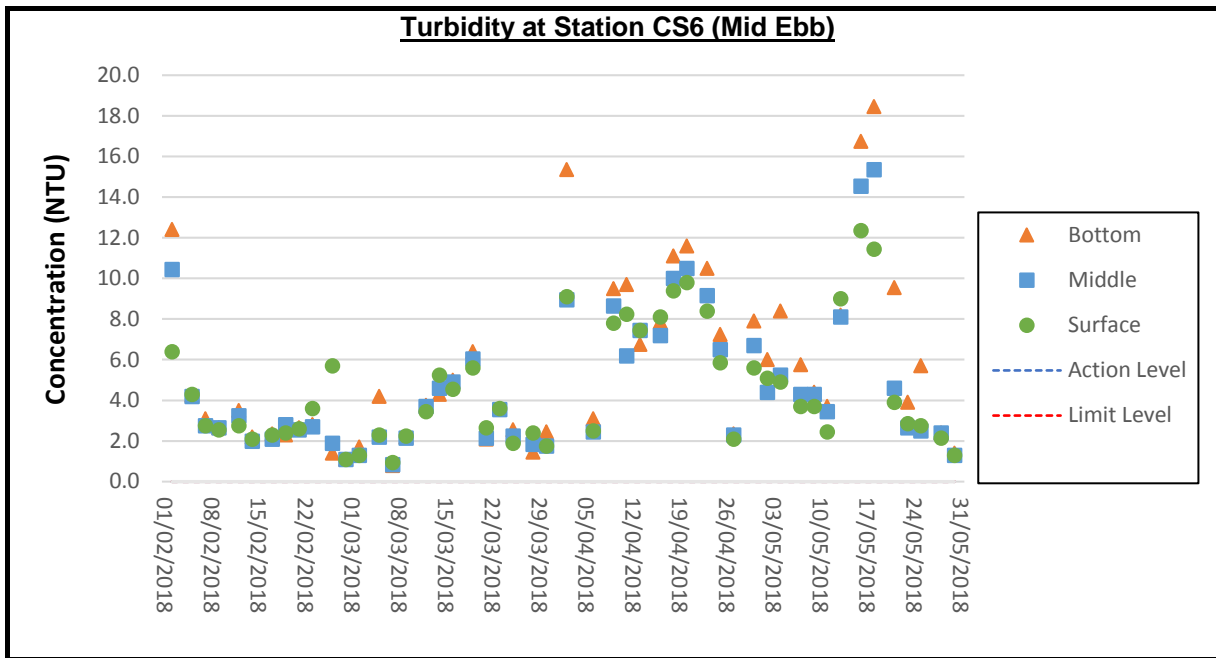


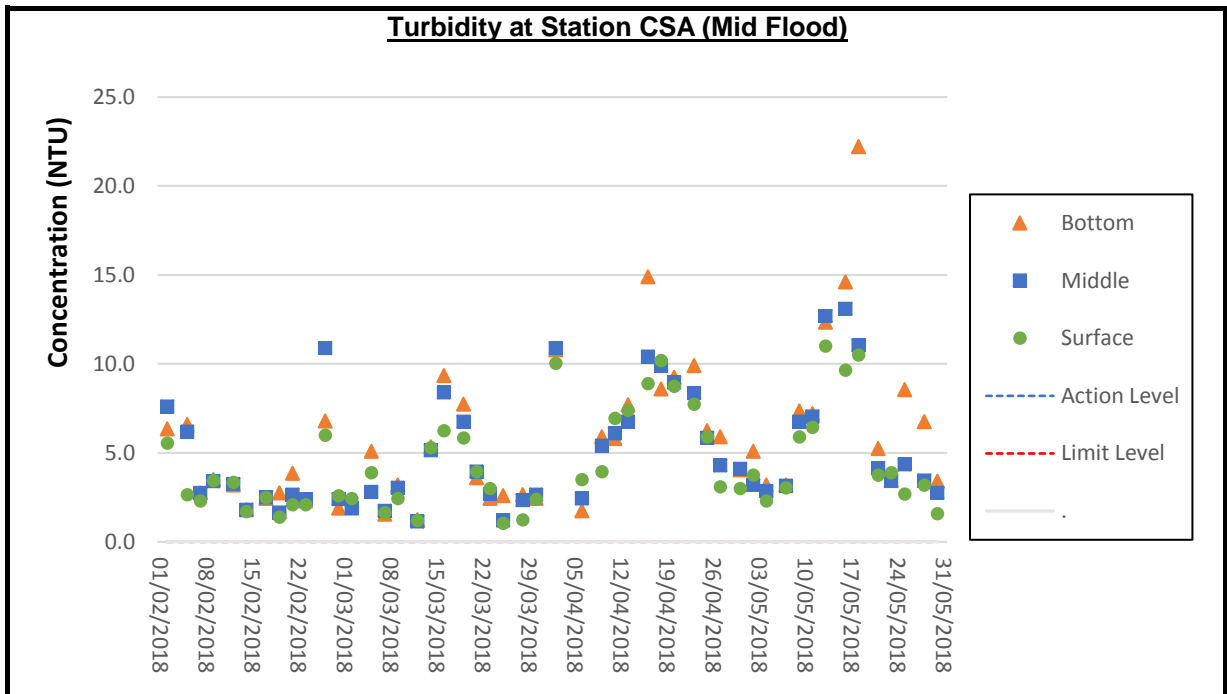
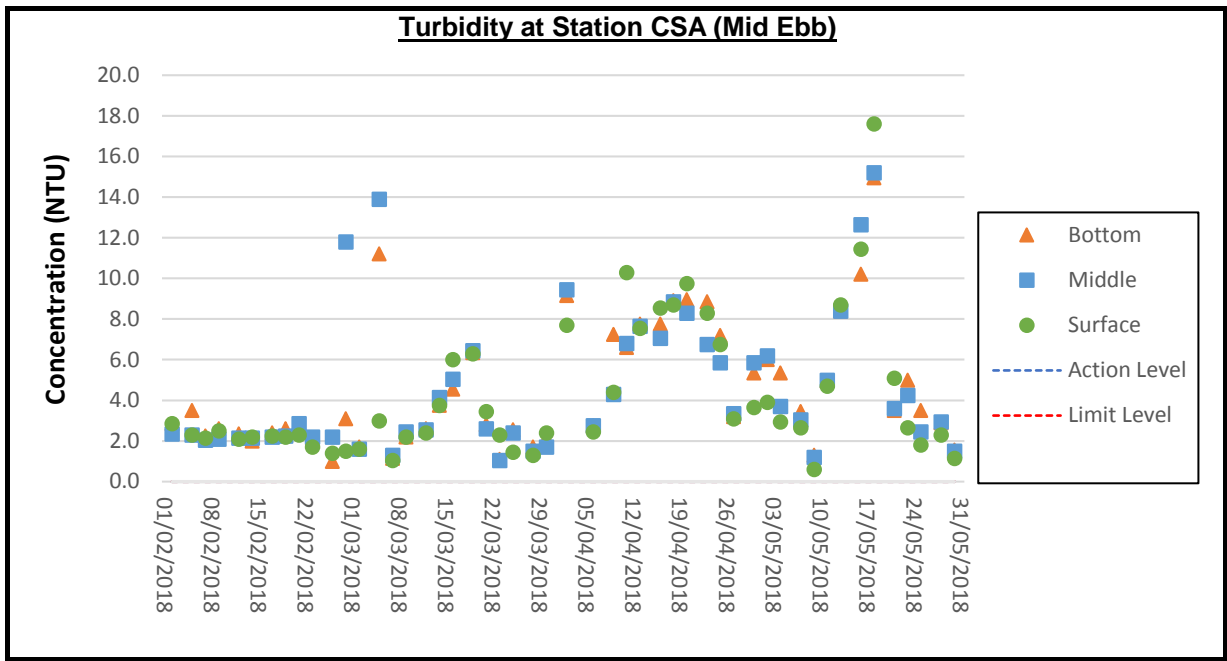














APPENDIX G

Site Audit Findings and Corrective Actions

Appendix G – Site Audit Findings and Corrective Actions

1.1.1 Site Inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures for the the Contract No. HY/2013/01 (includes the construction works of Contract No. HY/2013/06 within Contract No. HY/2013/01 works area). During the reporting period, thirteen site inspections were carried out 7, 14, 23 and 28 March, 4, 11, 18, and 25 April and 2, 9, 16, 23 and 30 May 2018

1.1.2 Particular for Contract No. HY/2013/01 and Contract No. HY/2013/06 within Contract No. HY/2013/01 works area during the site inspections and corrective actions undertaken by the Contractor are described in Table 1 and Table 2.

Table 1 Summary of Environmental Site Inspections for Contract No. HY/2013/01

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
28 February 2018	1. More than 20 cement bags were observed without impervious cover on the 1/F of Row 5.	1. The bags of cement were removed on the 1/F of Row 5.	7 March 2018
7 March 2018	Nil	Nil.	Nil.
14 March 2018	1. More than 20 bags of cement were not covered.	1. The bags of cement were removed.	23 March 2018
23 March 2018	1. NRMM label was not displayed on an air compressor at Row 1 of PCB building.	1. NRMM label was displayed on the air compressor at Row 1 of PCB building.	28 March 2018
28 March 2018	Nil	Nil.	Nil.
4 April 2018	Nil	Nil.	Nil.
11 April 2018	1. General refuses were found in the works area at Row 1. 2. Oil stains was observed at Row 1. 3. Chemical container was found without drip tray at Row 4.	1. The general refuses were removed from the works area at Row 1. 2. The oil stain was cleared at Row 1. 3. The chemical container was removed at Row 4.	18 April 2018
18 April 2018	Nil.	Nil.	Nil.
25 April 2018	1. Chemical containers were found without drip tray at Row 1.	1. The chemical containers were removed at Row 1.	2 May 2018
2 May 2018	Nil	Nil.	Nil.
9 May 2018	1. Oily water was observed in the water features area	1. The oily water was cleared in the water features area (under construction) near	16 May 2018

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
	(under construction) near Row 1.	Row 1.	
16 May 2018	1. Many flies were observed next to rubbish bin and rubbish was observed on the ground at Row 1.	1. The site was tidiness and the rubbish was cleared on the ground at Row 1.	23 May 2018
23 May 2018	Nil.	Nil.	N/A
30 May 218	Nil.	Nil.	N/A

Table 2 Summary of Environmental Site Inspections for Contract No. HY/2013/06 within Contract No. HY/2013/01 works area

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
7 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
14 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
23 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
28 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
4 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
11 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
18 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
25 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
2 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
9 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
16 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
23 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
30 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.

1.1.3 Particular observations (Landscape works) for Contract No. HY/2013/01 during the site inspections and corrective actions undertaken by the Contractor are described in Table 3. The landscape work for Contract No. HY/2013/01 was commenced on 1 March 2018. The implementation of mitigation measures for landscape and visual resources recommended in the EIA Report were monitored during the reporting period. Landscape and visual mitigation measures in accordance with the EP, EIA and EM&A Manual were implemented by the Contractor.

Table 3 Summary of Environmental Site Inspections (Landscape works) for Contract No. HY/2013/01 works area

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
14 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
28 March 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
11 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
25 April 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.



路政署
HIGHWAYS DEPARTMENT

港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Contract No. HY/2013/01
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance Building
15th Quarterly EM&A Report

Date of Audit	Observations	Actions Taken by Contractor / Recommendation	Date of Observations Closed
9 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.
23 May 2018	No particular environmental issue was recorded during the site inspection.	Nil.	Nil.



APPENDIX H

Waste Flow Table

Monthly Summary Waste Flow Table for 2018



Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of C&D Wastes Generated Monthly				
	a.Total Quantity Generated (see Note 8)	b. Hard Rock and Large Broken Concrete (see Note 9)	c. Reused in the Contract	d. Reused in Other Projects	e. Disposed as Public Fill (see Note 10)	f. Imported Fill	g. Metals (see Note 5)	h. Paper / Cardboard Packaging (see Note 5)	i. Plastics (see Note 3) (see Note 5)	j. Chemical Waste	k. Others, e.g. general refuse
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
January	1.836	1.836	0.000	0.000	1.836	0.000	437.360	1.922	0.000	0.000	0.912
February	0.648	0.648	0.000	0.000	0.648	0.000	0.000	0.000	0.000	0.000	1.124
March	2.590	2.590	0.000	0.000	2.590	0.000	0.000	1.785	0.000	0.000	1.661
April	0.355	0.355	0.000	0.000	0.355	0.000	0.000	1.630	0.000	0.000	1.067
May	0.066	0.000	0.000	0.000	0.066	0.000	0.000	1.493	0.000	0.000	0.510
June											
Sub-total	5.495	5.429	0.000	0.000	5.495	0.000	437.360	6.830	0.000	0.000	5.274
July											
August											
September											
October											
November											
December											
Total	5.495	5.429	0.000	0.000	5.495	0.000	437.360	6.830	0.000	0.000	5.274

Total C&D waste generated = a+b+f+g+h+i+j+k

Total C&D waste generated (excluded excavated material) = g+h+i+j+k

Total C&D waste recycled = c+d+g+h+i

% of recycled C&D waste = (Total C&D waste generated - Total C&D waste recycled) / Total C&D waste generated

Forecast of Total Quantities of C&D Materials to be Generated from the Contract*										
a.Total Quantity Generated (see Note 8)	b. Hard Rock and Large Broken Concrete (see Note 9)	c. Reused in the Contract	d. Reused in Other Projects	e. Disposed as Public Fill (see Note 10)	f. Imported Fill	g. Metals (see Note 5)	h. Paper / Cardboard Packaging (see Note 5)	i. Plastics (see Note 3) (see Note 5)	j. Chemical Waste	k. Others, e.g. general refuse
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)

- Notes: (1) The performance target are given in PS Clause 6(14)
- (2) The waste flow table shall also include C&D materials that are not specified in the Contract 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 amount of C&D materials expected to be generated from the Works, together with a break down of the nature where the total amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000m³.
- (5) All recyclable materials, including metals, paper / cardboard packaging, plastics, etc. will be collected by registered collector for recycling.
- (6) Conversion factors for reporting purpose:
 in-situ: rock = 2.5 tonnes/m³; soil = 2.0 tonnes/m³
 excavated: rock = 2.0 tonnes/m³; soil = 1.8 tonnes/m³; broken concrete and bitumen = 2.4 tonnes/m³
 C&D Waste = 0.9 tonnes/m³; bentonite slurry = 2.8 tonnes/m³
 Diesel density: 0.8kg/l
- (7) Numbers are rounded off to the nearest three decimal places
- (8) The "Total Quantity Generated" equals to the sum of "Reuse in the Contract", "Reuse in Other Projects" and "Disposed as Public Fill"
- (9) The "Hard Rock and Large Broken Concrete" were disposed as public fill
- (10) The amount in "Disposed as Public Fill" included the "Hard Rock and Large Broken Concrete" disposed as public fill

ATAL Technologies Ltd.
 Contract No. **HY/2013/06** HKBCF Automatic Vehicle Clearance Support System
 Location: Artificial Island of HKBCF (**C1 Area**)

Monthly Summary Waste Flow Table for 2018

Month	Inert C&D Waste disposal / 墮性廢物 (in tonnes) (see Note 1)						Non-inert C&D Waste disposal 非墮性廢物 (in tonnes)		Waste to be recycled and returned / 可再循環利用或回收的廢物								Total Quantity Generated 總生產量		
	Reused in the Work Package (e.g. backfilling) 再用於工程 (如回填)		Reused in other Projects 再用於其他工程		Inert Waste (e.g. soil, broken concrete, rubble, fill material etc.) 墮性廢物 (如泥, 石矢頭, 石, 填料等)		Others (e.g. general refuse, broken formwork etc) 其他 (如垃圾, 廢板枋等)		Metals 金屬		Plastic 塑膠		Paper/cardboard packaging 廢紙/包裝紙類		Chemical Waste 化學廢物				
	(b)		(c)		(d)		(e)		(in tonnes)		(in tonnes)		(in tonnes)		(in litre)		(a)=(b+c+d+e)		
	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	Est. Qty. 估計數量	Act. Qty. 實際數量	
January	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
February	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.002	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010
March	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.005	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010
April	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010
May	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.010	0.010
June																			
July																			
August																			
September																			
October																			
November																			
December																			
Total	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.040	0.007	0.007	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.040	0.040

 Notes: (1) The quantities of C&D Materials, in tonne, was calculated by multiply the estimated volume, in m3, with the density of the soil, which is 1.5 gcm⁻³.



APPENDIX I

Environmental Licenses and Permits

Environmental License/ Permits /Notification Register

LCAL H2620

Contract No. HY/2013/01 – Hong Kong Zhuhai and Macao Bridge Hong Kong Boundary Crossing Facilities - Passenger Clearance Building

Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
1.	All Areas	29 Jul 13	N/A	Environmental Permit to construct the Passenger Clearance Building and associated works of the Hong Kong Zhuhai and Macao Bridge Boundary Crossing Facilities	EP-353/2009/G	06 Aug 13	N/A	EPD	Superseded by EP-353/2009/H
2.	All Areas	16 Jan 15	N/A	Environmental Permit to construct the Passenger Clearance Building and associated works of the Hong Kong Zhuhai and Macao Bridge Boundary Crossing Facilities	EP-353/2009/H	19 Jan 15	N/A	EPD	Superseded by EP-353/2009/I
3.	All Areas	30 Jun 15	N/A	Environmental Permit to construct the Passenger Clearance Building and associated works of the Hong Kong Zhuhai and Macao Bridge Boundary Crossing Facilities	EP-353/2009/I	17 Jul 15	N/A	EPD	Superseded by EP-353/2009/J
4.	All Areas	18 Feb 2016	N/A	Environmental Permit to construct the Passenger Clearance Building and associated works of the Hong Kong Zhuhai and Macao Bridge Boundary Crossing Facilities	EP-353/2009/J	25 Feb 2016	N/A	EPD	Superseded by EP-353/2009/K

Environmental License/ Permits /Notification Register

LCAL H2620

Contract No. HY/2013/01 – Hong Kong Zhuhai and Macao Bridge Hong Kong Boundary Crossing Facilities - Passenger Clearance Building

Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
5.	All Areas	24 Mar 2016	N/A	Environmental Permit to construct the Passenger Clearance Building and associated works of the Hong Kong Zhuhai and Macao Bridge Boundary Crossing Facilities	EP-353/2009/K	11 Apr 2016	N/A	EPD	
6.	All Areas	29 Apr 14	H2620-LTR-EPD-AU-000006	Billing Account for disposal of construction waste	Billing Account No.: 7019944	16 May 14	N/A	EPD	
7.	PCB	30 Apr 14	H2620-LTR- EPD-000002	Notification that notifiable works are anticipated to commence (Form NA).	Acknowledge Receipt Ref. No. 373961	05 May 14	N/A	EPD	
8.	WA2	30 Apr 14	H2620-LTR- EPD-000003	Notification that notifiable works are anticipated to commence (Form NA).	Acknowledge Receipt Ref. No. 373956	05 May 14	N/A	EPD	
9.	WA3	30 Apr 14	H2620-LTR-EPD-AU-000001	Notification that notifiable works are anticipated to commence (Form NA).	Acknowledge Receipt Ref. No. 373962	05 May 14	N/A	EPD	

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
10.	PCB	30 May 14	H2620-LTR-EPD-AU-000020	Registration as Chemical Waste Producer for disposal of spent batteries, used lubrication oil and surplus paint at PCB area	WPN: 5213-951-L2846-01	08 Jul 14	N/A	EPD	
11.	PCB	23 Jun 14	In H2620-LTR-EPD-000017	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0683-14	03 Jul 14	29 Dec 14	EPD	Superseded by GW-RS0908-14
12.	WA2	02 Jul 14	H2620-LTR-LCJ-AU-000280	CNP for the use of powered mechanical equipment for the purpose of carry out ER Office construction works from 19:00 to 23:00. (Non-designated area)	GW-RS0715-14	17 Jul 14	15 Jan 15	EPD	Superseded by GW-RS1034-14
13.	WA3	02 Jul 14	H2620-LTR-LCJ-AU-000324	CNP for the use of powered mechanical equipment for the purpose of carry out construction of JV site office from 19:00 to 23:00. (Non-designated)	GW-RS0716-14	17 Jul 14	15 Jan 15	EPD	Expired

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
14.	PCB	23 Jun 14	H2620-LTR- EPD-000527	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0908-14	03 Sep 14	22 Dec 14	EPD	Superseded by GW-RS1044-14
15.	PCB	29 Sep 14	H2620-LTR-EPD-AU-000034	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1044-14	29 Sep 14	24 Dec 14	EPD	Superseded by GW-RS1300-14
16.	WA2	12 Sep 14	H2620-LTR-EPD-AU-000032	CNP for the use of powered mechanical equipment for the purpose of carry out ER Office construction works from 19:00 to 23:00. (Non-designated area)	GW-RS1034-14	29 Sep 14	28 Mar 15	EPD	Expired
17.	WA4	17 Oct 14	H2620-LTR-EPD-AU-000036	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0814-14	20 Oct 14	19 Apr 15	EPD	Expired and replaced by GW-RW0171-15

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Contract No. HY/2013/01 – Hong Kong Zhuhai and Macao Bridge Hong Kong Boundary Crossing Facilities - Passenger Clearance Building

Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
18.	PCB	03 Nov 14	H2620-LTR-EPD-AU-000040	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1300-14	17 Nov 14	16 Feb 15	EPD	Superseded by GW-RS0087-15
19.	PCB	12 Jan 15	H2620-LTR-EPD-AU-000046	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0087-15	26 Jan 15	25 Apr 15	EPD	Superseded by GW-RS0308-15
20.	PCB	12 Mar 15	H2620-LTR-EPD-AU-000051	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0308-15	26 Mar 15	25 Jun 15	EPD	Superseded by GW-RS0476-15
21.	PCB	31 Jul 14	H2620-LTR-EPD-AU-000038	Water Discharge License for construction works on PCB island	WT00020335-2014	13 Nov 14	30 Nov 19	EPD	

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
22.	WA4	27 Mar 15	H2620-LTR-EPD-AU-000054	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0171-15	20 Apr 15	19 Oct 15	EPD	Superseded by GW-RW0351-15
23.	PCB	15 Apr 15	H2620-LTR-EPD-AU-000057	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0476-15	01 May 15	31 Jul 15	EPD	Superseded by GW-RS0685-15
24.	PCB	09 Jun 15	H2620-LTR-EPD-AU-000063	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0685-15	01 Jul 15	30 Sep 15	EPD	Superseded by GW-RS0877-15
25.	WA4	29 Jun 15	H2620-LTR-EPD-AU-000066	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0351-15	17 Jul 15	12 Jan 16	EPD	Expired. Replaced by GW-RW0003-16

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
26.	PCB	27 Jul 15	H2620-LTR-EPD-AU-000069	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0877-15	10 Aug 15	09 Nov 15	EPD	Superseded by GW-RS1016-15
27.	PCB	02 Sep 15	H2620-LTR-EPD-AU-000072	CNP for the use of powered mechanical equipment for the purpose of carry out pre-drill and bore piling works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1016-15	18 Sep 15	17 Dec 15	EPD	Superseded by GW-RS1195-15
28.	PCB	22 Oct 15	H2620-LTR-EPD-AU-000075	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1195-15	9 Nov 15	8 Feb 16	EPD	Superseded by GW-RS1444-15
29.	PCB	17 Dec 15	H2620-LTR-EPD-AU-000076	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1444-15	31 Dec 15	30 Mar 16	EPD	Superseded by GW-RW0191-16

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
30.	WA4	24 Dec 15	H2620-LTR-EPD-AU-000080	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0003-16	13 Jan 16	06 Jul 16	EPD	Superseded by GW-RW0394-16
31.	PCB	17 Feb 16	H2620-LTR-EPD-AU-000083	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0191-16	3 Mar 16	2 Jun 16	EPD	Superseded by GW-RW0543-16
32.	PCB	18 May 16	H2620-LTR-EPD-AU-000086	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0543-16	2 Jun 16	1 Sep 16	EPD	Superseded by GW-RS0879-16
33.	WA4	20 Jun 16	H2620-LTR-EPD-AU-000089	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0394-16	07 Jul 16	06 Jan 17	EPD	Superseded by GW-RW0742-16

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
34.	PCB	09 Aug 16	H2620-LTR-EPD-AU-000092	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0879-16	23 Aug 16	22 Dec 16	EPD	Superseded by GW-RS1193-16
35.	PCB	16 Nov 16	H2620-LTR-EPD-AU-000094	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS1193-16	30 Nov 16	29 May 17	EPD	Superseded by GW-RS0005-17
36.	WA4	17 Dec 16	H2620-LTR-EPD-AU-000100	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0742-16	07 Jan 17	06 Jul 17	EPD	Superseded by GW-RW0341-17
37.	PCB	19 Dec 16	H2620-LTR-EPD-AU-000103	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0005-17	6 Jan 17	5 Jul 17	EPD	Superseded by GW-RS0461-17

Environmental License/ Permits /Notification Register

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Contract No. HY/2013/01 – Hong Kong Zhuhai and Macao Bridge Hong Kong Boundary Crossing Facilities - Passenger Clearance Building

Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
38.	WA3	30 Dec 16	H2620-LTR-EPD-AU-000102	CNP for the use of powered mechanical equipment for the purpose of carry out construction of JV site office from 19:00 to 23:00. (Non-designated)	GW-RS0015-17	12 Jan 17	11 Jul 17	EPD	Superseded by GW-RS0587-17
39.	PCB	12 May 17	H2620-LTR-EPD-AU-000106	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0461-17	25 May 17	24 Nov 17	EPD	Superseded by GW-RS0998-17
40.	WA3	22 Jun 17	H2620-LTR-EPD-AU-000113	CNP for the use of powered mechanical equipment for the purpose of carry out construction of JV site office from 19:00 to 23:00. (Non-designated)	GW-RS0587-17	12 Jul 17	11 Jan 18	EPD	Expired and replaced by GW-RS1201-17
41.	WA4	19 Jun 17	H2620-LTR-EPD-AU-000112	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0341-17	10 Jul 17	6 Jan 18	EPD	Expired and replaced by GW-RW0005-18

Environmental License/ Permits /Notification Register

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Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
42.	PCB	20 Oct 17	H2620-LTR-EPD-AU-000117	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0998-17	15 Nov 17	12 May 18	EPD	Expired and replaced by GW-RS0389-18
43.	WA3	20 Dec 17	H2620-LTR-EPD-AU-000119	CNP for the use of powered mechanical equipment for the purpose of carry out construction of JV site office from 19:00 to 23:00. (Non-designated)	GW-RS1201-17	12 Jan 18	11 Jul 18	EPD	-
44.	WA4	20 Dec 17	H2620-LTR-EPD-AU-000118	CNP for the use of powered mechanical equipment from 19:00 to 23:00. (Non-designated area)	GW-RW0005-18	07 Jan 18	06 Jul 18	EPD	-
45.	PCB	27 Apr 18	H2620-LTR-EPD-AU-000125	CNP for the use of powered mechanical equipment for the purpose of carry out works from 19:00 to 23:00 and 23:00 to 07:00. (Non-designated area)	GW-RS0389-18	13 May 18	12 Nov 18	EPD	-

Environmental License/ Permits /Notification Register

LCAL H2642

Contract No. HY/2013/06 – Hong Kong Zhuhai and Macao Bridge - HKBCF – Automatic Vehicle Clearance Support System

Date: 30 May 2018									
Item No.	Permit/License or Registration Application			Permit/License/ Notification/ Registration Description	Permit/License/ Registration Number	Issue/Start Date	Expiry Date	Issuing Office	Remark
	Work Area	Date	Reference						
1	HZMB-HK Boundary Crossing Facilities	31 July 2015	WFG14980	Disposal of Construction Waste Billing Account	7023015	20 August 2015	--	EPD	
2	HZMB-HK Boundary Crossing Facilities	14 Nov 2017	EP831/N09/R S1037-17	Construction Noise Permit	GW-RS1037-17	1 Dec 2017	30 May 2018	EPD	

APPENDIX J

Statistics on Environmental Complaints, Notification of Summons and Successful Prosecutions



Statistics on Environmental Complaints, Notifications of Summons and Successful Prosecutions

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of summons	Successful prosecutions
This reporting period	0	0	0
From commencement date of contract to end of reporting period	10	0	0



APPENDIX K

Investigation Report

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180302SS						
Date of Notification: 8 March 2018				Date of Investigation Report: 9 April 2018		
Works Inspected: Data collected from water sampling works on 2 March 2018 and the results were issued on 7 March 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS)/ Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	SR6	Depth Average	23.5 and 120% (i.e. 8.3 for mid-ebb/6.6 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 9.0 for mid-ebb/7.1 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	10.4	24.6
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. <u>Bold with underline</u> means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 2 March 2018, one AL exceedance of SS at SR6 was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 2 March 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was cat ladder installation inside box culvert which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station SR6, the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 2 March 2018.

The location of the WQM station where exceedances were recorded and all relevant WQM stations are shown in **Figure 1** and the location of marine-based construction works are shown in **Figure 2**.

The RSS of Contract No. HY/2013/03 concluded that the captioned exceedance was not related to the construction site activities of the contract.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 2 March 2018. Furthermore, no discharge originating from any HY/2013/04 site works on 2 March 2018 was identified.

While SS exceedance was recorded at SR6, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and the shoreline interfacing with open waters. Also, no SS exceedance at SR6 was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's regular weekly site inspection on 28 February 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:00 and 15:00. There were no observations referring to water quality mitigation measures associated with that shoreline. During ET's subsequent regular weekly site inspection on 7 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:00 and 15:00. A water quality observation regarding the wetsep near the wheel washing bay was made; the Contractor was reminded to operate the wetsep as soon as possible. However, there was no observation regarding any presence of silty water in the open waters associated with that shoreline.

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03

The captioned exceedance was not related to the Contract and therefore, no additional follow-up action is needed. However, RSS proposed recommendations to Contractor in particular to the following aspects when there are marine construction activities.

Water Quality:

- Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material;
- Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes;
- Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation;
- Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved;
- Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action; and
- 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.
- wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters;
- 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;
- 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;
- rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities;
- measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system;
- open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms;
- discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system;
- surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by: Keith Chau
_____ Title: Environmental Team Leader
(Contract No. HY/2013/01)

Signature: 
_____ Date: 9 April 2018

Copied to : Contractor, Engineer Representative and IEC/ENPO

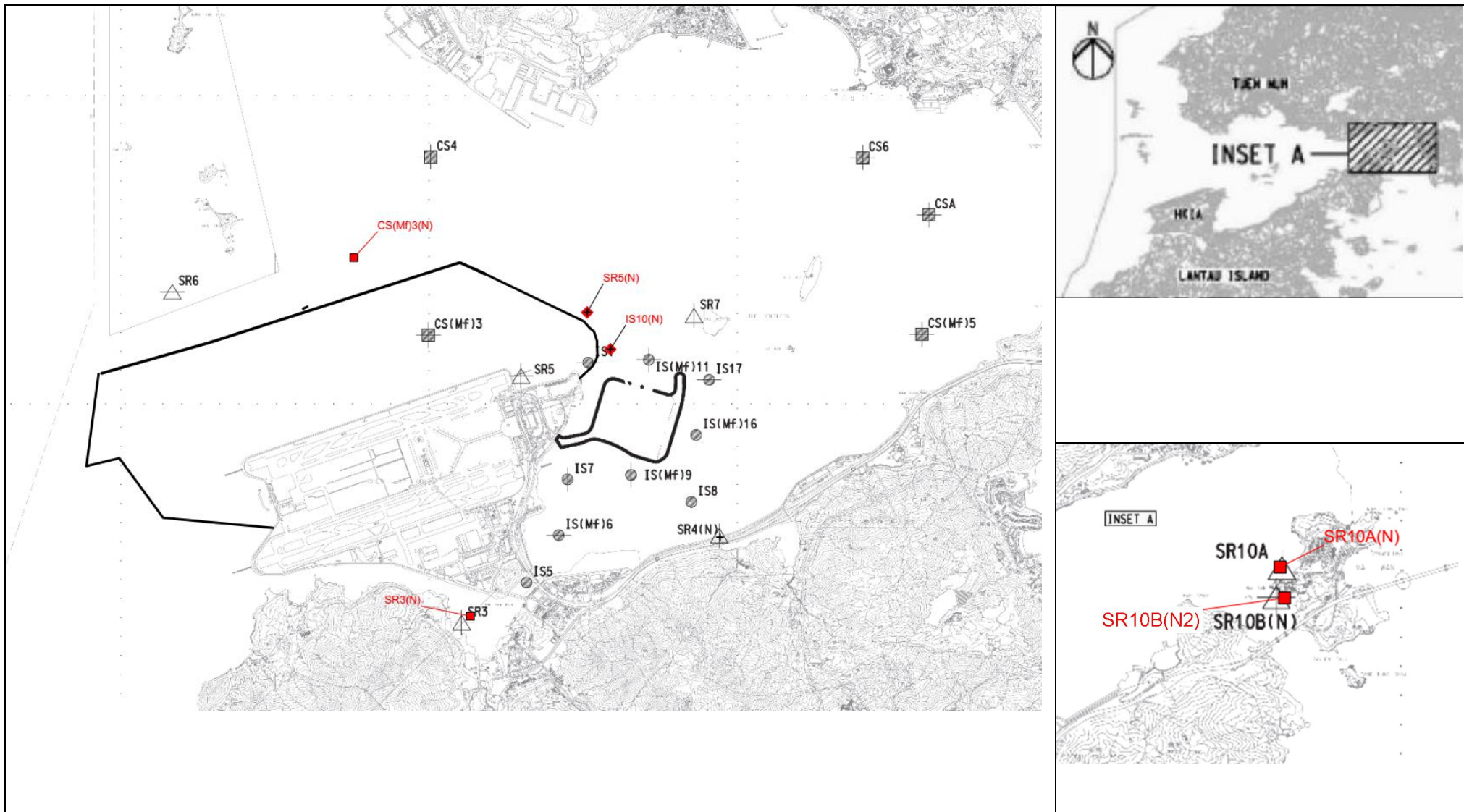
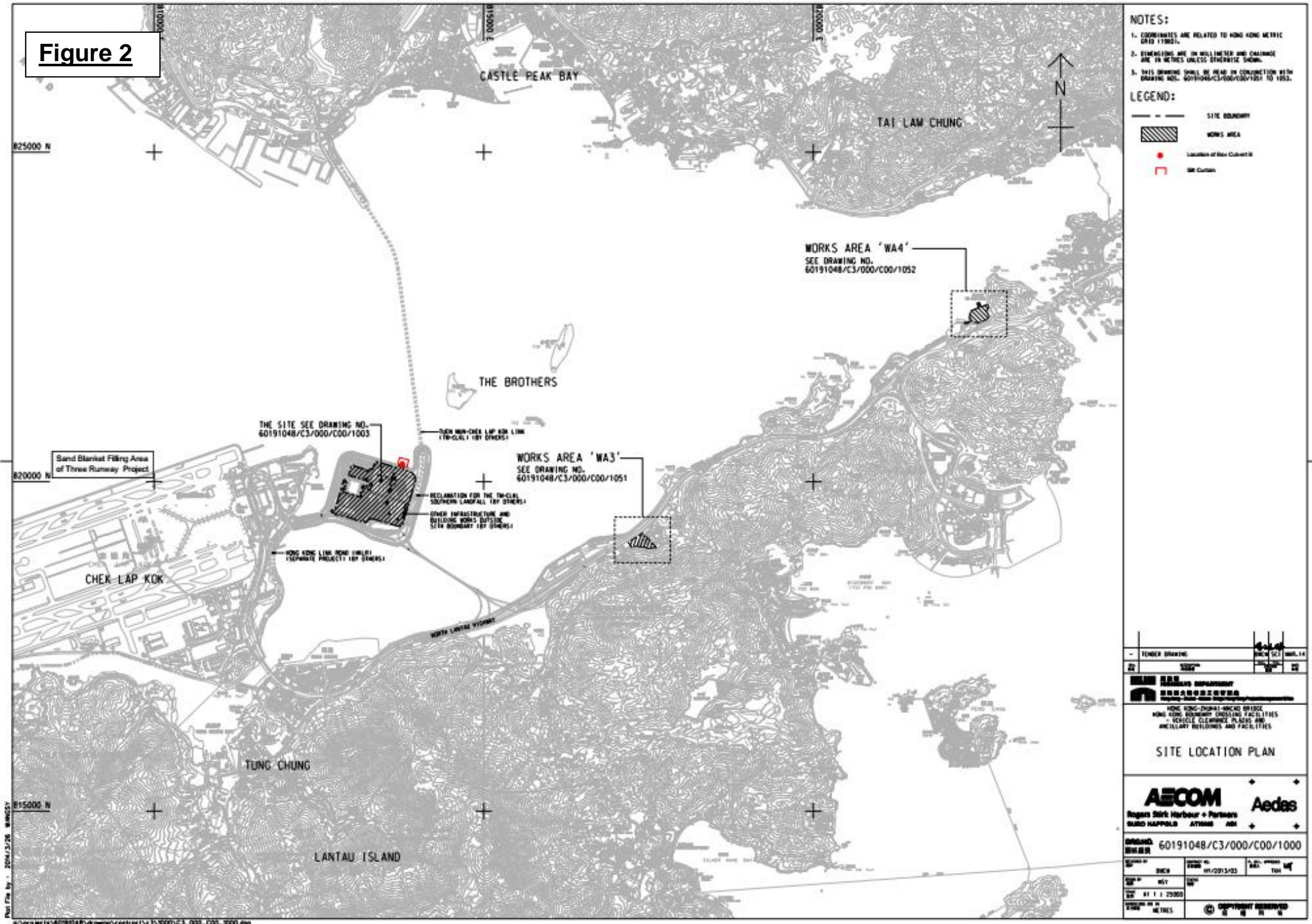


Figure 1: Location Plan

Figure 2



- NOTES:**
1. COORDINATES ARE RELATED TO HONG KONG METRIC GRID (1980).
 2. DIMENSIONS ARE IN MILLIMETER AND CHAINAGE ARE IN METRES UNLESS OTHERWISE SHOWN.
 3. THIS DRAWING SHALL BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C3/000/C00/1051 TO 1053.

LEGEND:

- SITE BOUNDARY
- ▨ WORKS AREA
- Location of New Culvert II
- Old Culvert

REVISION	DATE	BY	CHKD
1	2004/12/28	WANGCY	

THE HONG KONG GOVERNMENT
香港特別行政區政府
 HONG KONG CONSTRUCTION DEPARTMENT
 香港房屋委員會

SITE LOCATION PLAN

AECOM **Aedas**
 Rogers Shirk Harbour + Partners
 GARD HAPPOLO ATONG AOK

PROJECT NO.	60191048/C3/000/C00/1000
DATE	01/2015/03
SCALE	1:1
DATE	01/2015/03
SCALE	1:1
DATE	01/2015/03
SCALE	1:1
DATE	01/2015/03
SCALE	1:1

Plot File by : 2004/12/28 WANGCY
 s:\projects\60191048\drawing\contract\1\c3\000\C3_000_C00_1000.dwg

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180316SS						
Date of Notification: 23 March 2018				Date of Investigation Report: 9 April 2018		
Works Inspected: Data collected from water sampling works on 16 March 2018 and the results were issued on 22 March 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS)/ Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	SR5(N)	Depth Average	23.5 and 120% (i.e. 12.6 for mid-ebb/8.9 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 13.7 for mid-ebb/9.6 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	11.0	24.0
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 16 March 2018, one AL exceedance of SS at SR5(N) was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 16 March 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station SR5(N), the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 16 March 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 16 March 2018.

While SS exceedance was recorded at SR5(N), no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and the shoreline interfacing with open waters. Also, no SS exceedance at SR5(N) was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 14 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:10 and 14:50. There were no observations referring to water quality mitigation measures associated with that shoreline. Furthermore, no discharge originating from any HY/2013/04 site works on 14 March 2018 was identified.

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 19 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:10 and 14:20. There were no observations referring to water quality mitigation measures associated with that shoreline. Furthermore, no discharge originating from any HY/2013/04 site works on 19 March 2018 was identified. It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such,

Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 1, 8, 16 and 22 March 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures. ET (Contract No.: HY/2013/03) will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>9 April 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

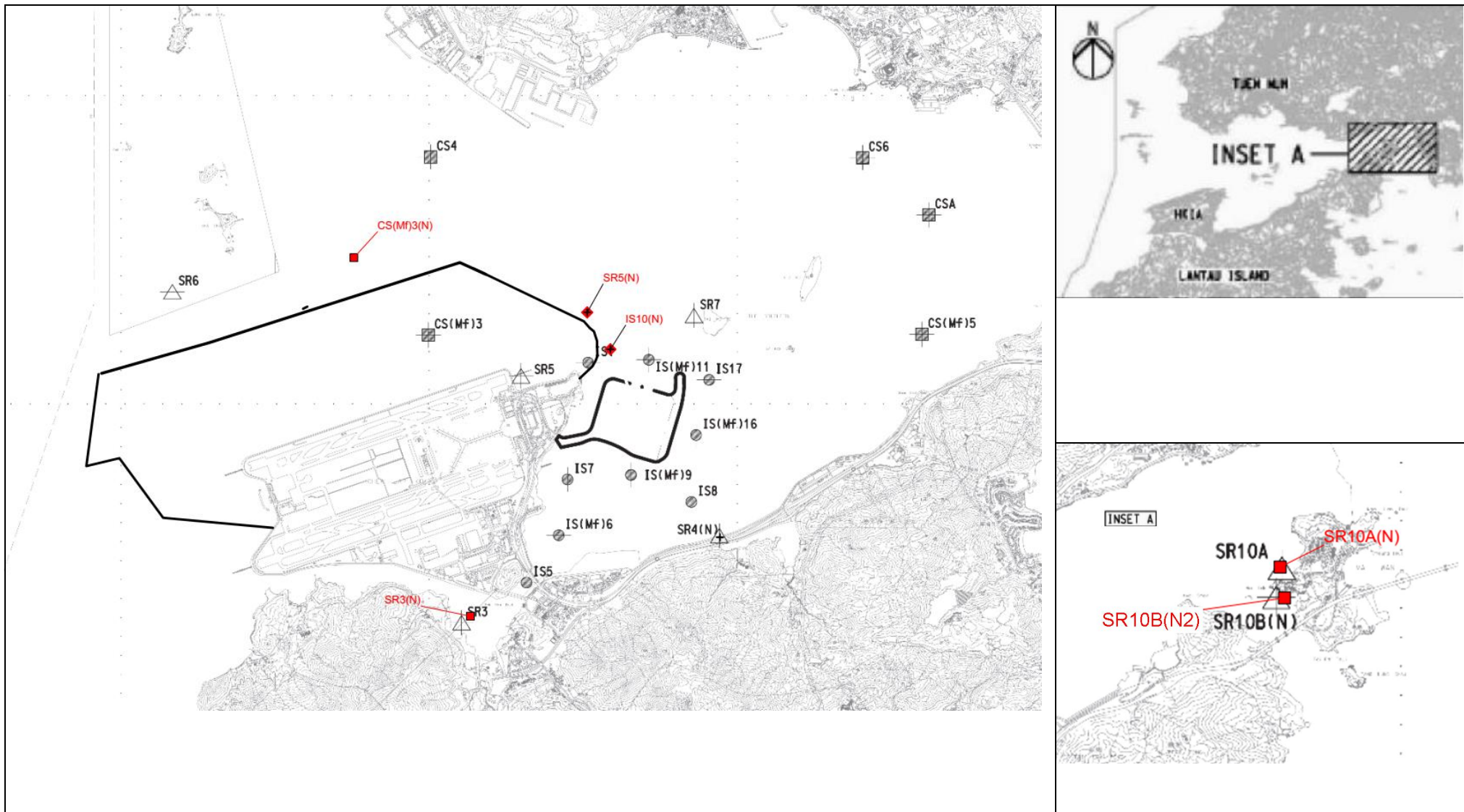


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180321SS						
Date of Notification: 4 April 2018				Date of Investigation Report: 10 April 2018		
Works Inspected: Data collected from water sampling works on 21 March 2018 and the results were issued on 29 March 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS)/ Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	IS7	Depth Average	23.5 and 120% (i.e. 16.5 for mid-ebb/11.6 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 17.9 for mid-ebb/12.6 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	13.1	25.8
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 21 March 2018, one AL exceedance of SS at IS7 was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 21 March 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station IS7, the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 21 March 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 21 March 2018.

While SS exceedance was recorded at IS7, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at IS7 was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 19 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:10 and 14:20. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 28 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:00 and 15:10. There were no observations referring to water quality mitigation measures associated with that shoreline.

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03

During weekly site audit on 1, 8, 16 and 22 March 2018, ET confirmed the Contractor had provided workable and effective water quality mitigation measures. ET will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by: Keith Chau Title: Environmental Team Leader
(Contract No. HY/2013/01)

Signature:  Date: 10 April 2018

Copied to : Contractor, Engineer Representative and IEC/ENPO

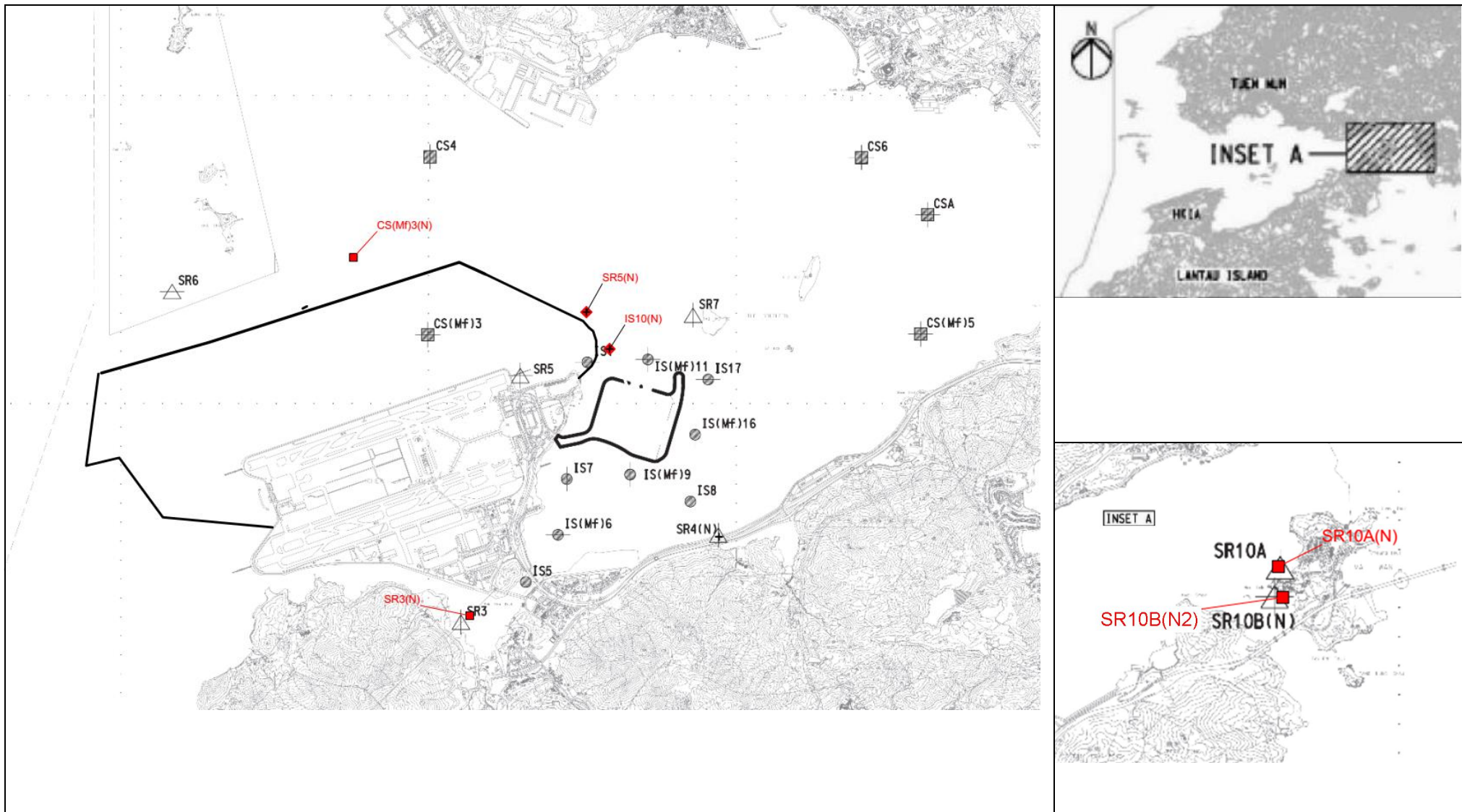


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180330SS						
Date of Notification: 12 April 2018				Date of Investigation Report: 13 April 2018		
Works Inspected: Data collected from water sampling works on 30 March 2018 and the results were issued on 12 April 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS)/ Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	SR5(N)	Depth Average	23.5 and 120% (i.e. 15.8 for mid-ebb/12.3 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 17.1 for mid-ebb/13.4 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	12.2	28.2
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 30 March 2018, one AL exceedance of SS at SR5(N) was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 30 March 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station SR5(N), the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 30 March 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 30 March 2018.

While SS exceedance was recorded at SR5(N), no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at SR5(N) was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 28 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:00 and 15:10. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's subsequent regular weekly site inspection on 4 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:20 and 14:35. There were no observations referring to water quality mitigation measures associated. It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 16, 22 29 March and 6 April 2018, ET confirmed the Contractor had provided workable and effective water quality mitigation measures. ET will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>13 April 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

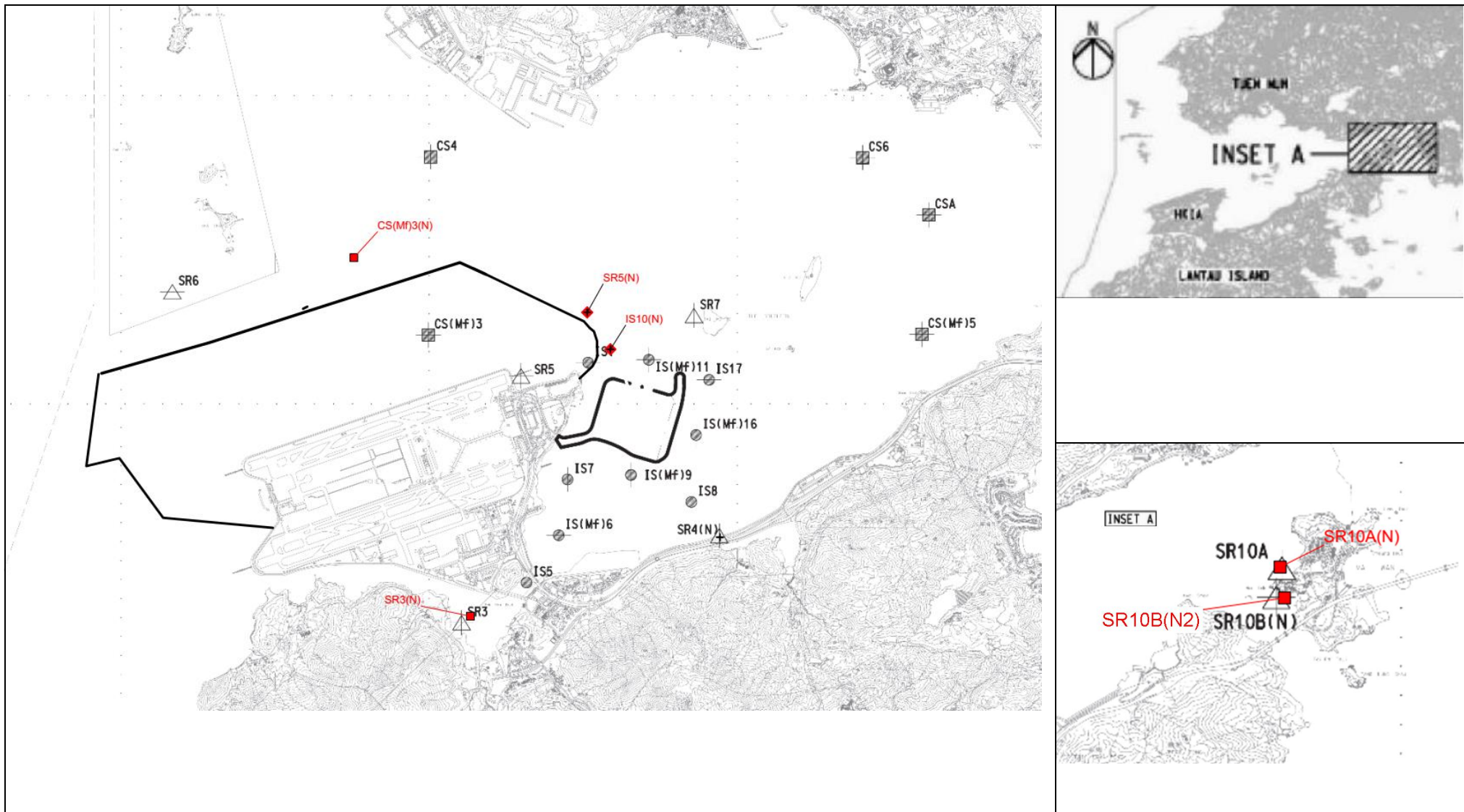


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180402SS						
Date of Notification: 18 April 2018				Date of Investigation Report: 25 April 2018		
Works Inspected: Data collected from water sampling works on 02 April 2018 and the results were issued on 18 April 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS) / Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	IS5	Depth Average	23.5 and 120% (i.e. 13.4 for mid-ebb/13.3 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 14.5 for mid-ebb/14.4 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	24.7	13.1
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 2 April 2018, one AL exceedance of SS at IS5 was recorded during mid-ebb tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 2 April 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station IS5, the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-ebb tide on 2 April 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 2 April 2018.

While SS exceedance was recorded at IS5, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at IS5 was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 28 March 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:00 and 15:10. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 4 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:20 and 14:35. There were no observations referring to water quality mitigation measures associated

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 22, 29 March, 6 and 12 April 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures. ET (Contract No.: HY/2013/03) will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>25 April 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

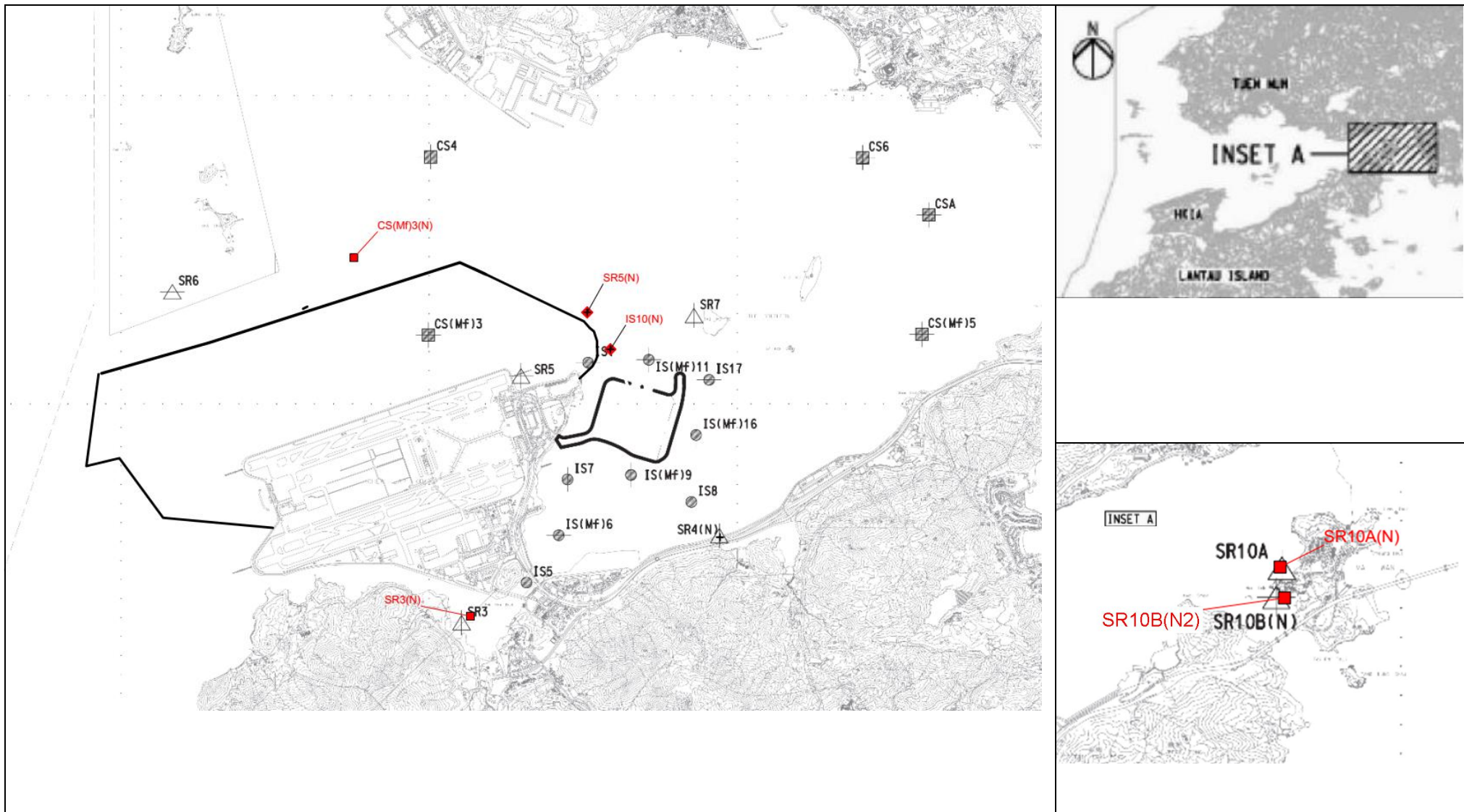


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180418SS_v1						
Date of Notification: 25 April 2018			Date of Investigation Report: 2 May 2018			
Works Inspected: Data collected from water sampling works on 18 April 2018 and the results were issued on 25 April 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS) / Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	SR6	Depth Average	23.5 and 120% (i.e. 17.2 for mid-ebb/16.9 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 18.6 for mid-ebb/18.3 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	19.7	31.1
SS	SR7	Depth Average	23.5 and 120% (i.e. 17.2 for mid-ebb/16.9 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 18.6 for mid-ebb/18.3 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	9.8	23.9
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. <u>Bold with underline</u> means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 18 April 2018, two AL exceedances of SS at SR6 and SR7 were recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 18 April 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station SR6 and SR7, the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 18 April 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 18 April 2018.

While SS exceedance was recorded at SR6 and SR7, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at SR6 and SR7 was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 11 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:15 and 15:30. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 18 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected at 15:10. There were no observations referring to water quality mitigation measures associated

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 6, 12, 20 and 26 April 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures. ET (Contract No.: HY/2013/03) will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>2 May 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

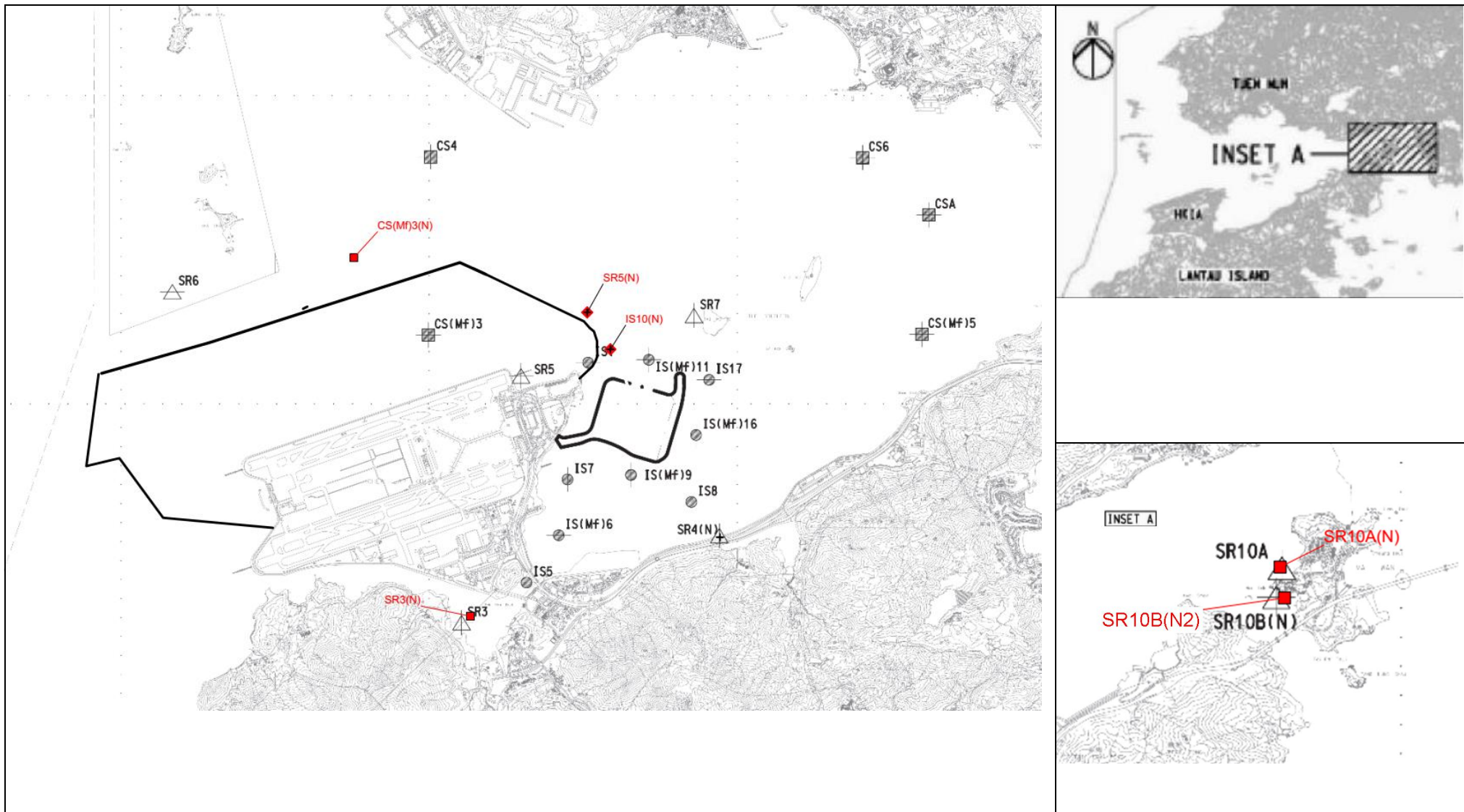


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180420SS						
Date of Notification: 27 April 2018				Date of Investigation Report: 3 May 2018		
Works Inspected: Data collected from water sampling works on 20 April 2018 and the results were issued on 27 April 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS) / Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	IS10(N)	Depth Average	23.5 and 120% (i.e. 18.3 for mid-ebb/14.1 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 19.8 for mid-ebb/15.3 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	21.0	25.5
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 20 April 2018, one AL exceedance of SS at IS10(N) was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 20 April 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station IS10(N), the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 20 April 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 20 April 2018.

While SS exceedance was recorded at IS10(N), no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at IS10(N) was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 18 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected at 15:10. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's subsequent regular weekly site inspection on 23 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:15 and 14:50 Regarding water quality mitigation measures associated with that shoreline, it was observed that the silt curtain at Box Culvert C was not securely positioned at one end. The Contractor was reminded to secure the silt curtain to prevent contained site runoff entering the open waters. However, given the large distance between HY/2013/04 site shoreline and IS10(N), it is unlikely that this observation could be related to the subject exceedance. It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 6, 12, 20 and 26 April 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures. ET (Contract No.: HY/2013/03) will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>30 April 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

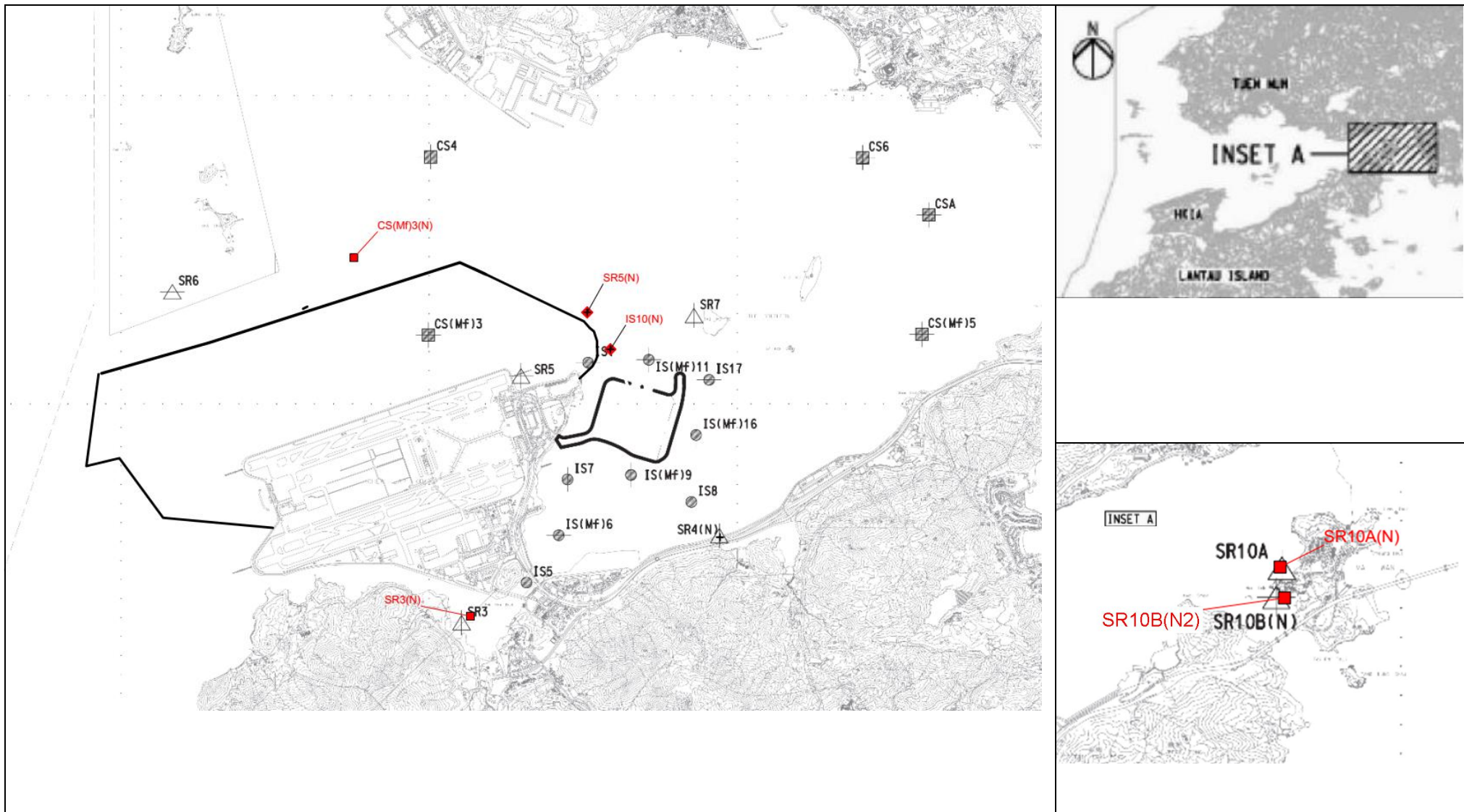


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge
Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts)
Notifications of Environmental Quality Limits Exceedances Notification No.: 20180423SS_v2

Date of Notification: 3 May 2018 **Date of Investigation Report:** 11 May 2018

Works Inspected: Data collected from water sampling works on 23 April 2018 and the results were issued on 3 May 2018

Monitoring Location: Water Quality Monitoring Station

Parameter: ~~Dissolved Oxygen (DO)~~ / Suspended Solid (SS) / ~~Turbidity (TURB)~~

Action & Limit Level (AL & LL) / Measured Level:

PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
SS	SR7	Depth Average	23.5 and 120% (i.e. 12.1 for mid-ebb/10.6 for mid-flood) of upstream control station's SS at the same tide of the same day	34.4 and 130% (i.e. 13.1 for mid-ebb/11.5 for mid-flood) of upstream control station's SS at the same tide of the same day and 10mg/L for WSD Seawater intakes	9.3	33.6

Notes:
AL means Action Level.
LL means Limit Level.
Bold means AL exceedances.
Bold with underline means LL exceedances.
Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4
Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA

Possible reason for Action / Limit Level Non-compliance:

On 23 April 2018, one AL exceedance of SS at SR7 was recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 23 April 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. Regarding marine-based works in Box Culvert B, the work undertaken at the date of exceedance was preparation work of precast installation which had a cofferdam to separate seawater and works area. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. All sea water flows into the work area of box culvert B will be treated by desilting facilities before discharge in accordance with the discharge license approved by EPD for Contract No. HY/2013/03. For SS exceedance recorded at the WQM station SR7, the concerned WQM stations where the exceedances were recorded were not close to the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused SS exceedance recorded at the concerned WQM station during mid-flood tide on 23 April 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 23 April 2018.

While SS exceedance was recorded at SR7, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no SS exceedance at SR7, was observed during monitoring at the next tide (i.e. mid-ebb tide on the same day).

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 23 April 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:15 and 14:50. Regarding water quality mitigation measures associated with that shoreline, it was observed that the silt curtain at Box Culvert C was not securely positioned at one end. The Contractor was reminded to secure the silt curtain to prevent contained site runoff entering the open waters. However, given the large distance between HY/2013/04 site shoreline and SR7, plus taking into account the subject exceedance being only observed at SR7, it is unlikely that this observation could be related to the subject exceedance. It is also noted that no exceedance was recorded at the monitoring locations closest to the silt curtain at Box Culvert C, namely IS7 and IS(Mf)9, on 23 April 2018.

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. Not applicable as SS was not measured in situ;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the suspended solids exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the suspended solids exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 12, 20, 26 April and 3 May 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures. ET (Contract No.: HY/2013/03) will take relevant photo records of the marine-based works for Contract No. HY/2013/03 via the on-going site inspections to support the necessary review of the effectiveness of site mitigation measures specific to the exceedance investigation.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>11 May 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

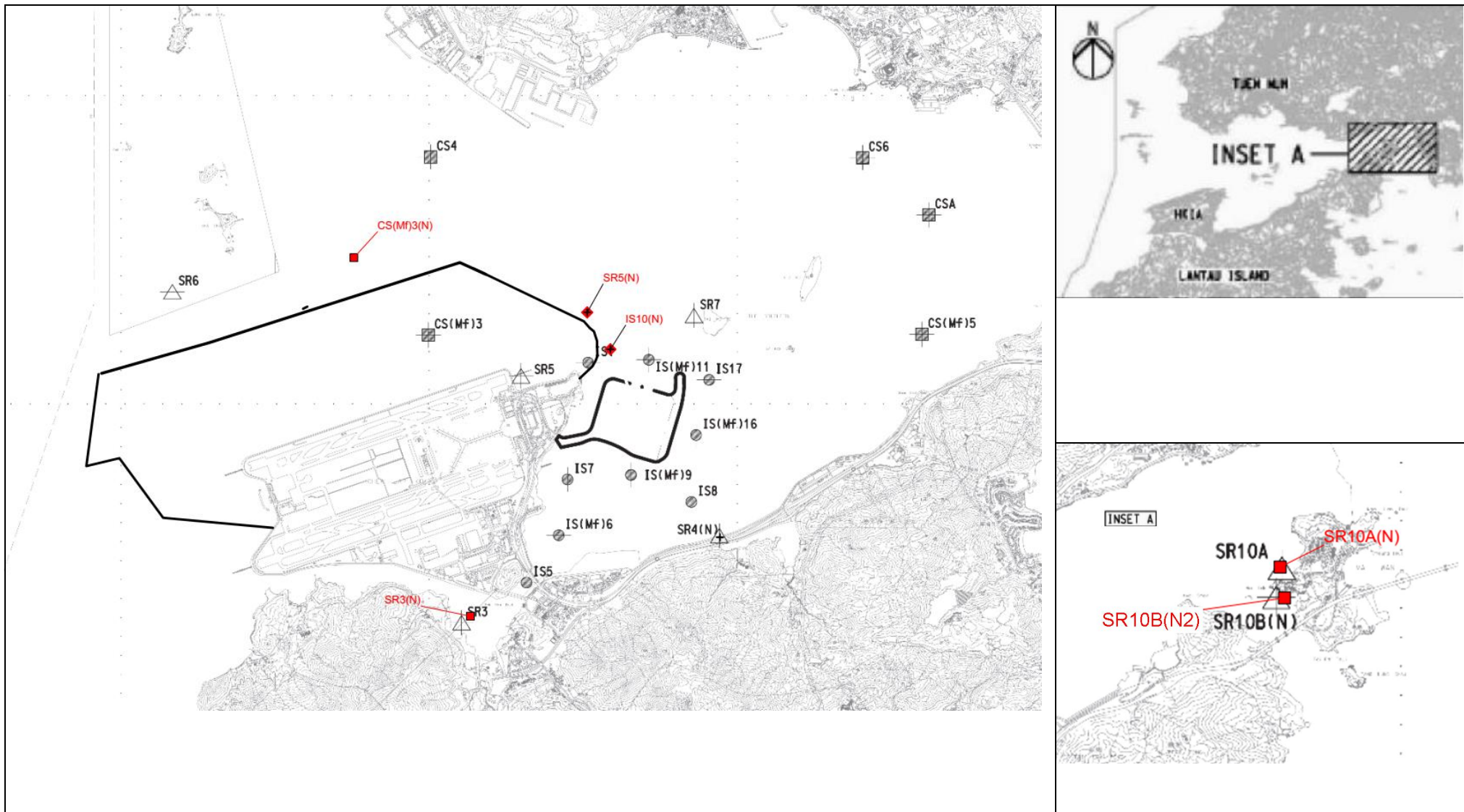


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180518TURB_v3						
Date of Notification: 18 May 2018			Date of Investigation Report: 15 June 2018			
Works Inspected: Data collected from water sampling works on 13 May 2018 and the results were issued on 18 May 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO) / Suspended Solid (SS) / Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (NTU)	LL (NTU)	MEASURED AT MID-EBB TIDE (NTU)	MEASURED AT MID-FLOOD TIDE (NTU)
TURB	IS(Mf)11	Depth Average	27.5 and 120% (i.e. 21.7 for mid-ebb/12.3 for mid-flood) of upstream control station's turbidity at the same tide of the same day	47.0 and 130% (i.e. 23.5 for mid-ebb/13.3 for mid-flood) of upstream control station's turbidity at the same tide of the same day	12.1	29.7
TURB	SR5(N)	Depth Average	27.5 and 120% (i.e. 21.7 for mid-ebb/12.3 for mid-flood) of upstream control station's turbidity at the same tide of the same day	47.0 and 130% (i.e. 23.5 for mid-ebb/13.3 for mid-flood) of upstream control station's turbidity at the same tide of the same day	13.6	36.8
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. <u>Bold with underline</u> means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 13 May 2018, two AL exceedances of TURB at IS(Mf)11 and SR5(N) were recorded during mid-flood tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 13 May 2018. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. The marine-based works in Box Culvert B had been completed. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. For turbidity exceedance recorded at the WQM station IS(Mf)11 and SR5(N) closer to the marine delivery route, there was no turbidity exceedance recorded at WQM station IS10(N) which also close to the marine delivery route. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused turbidity exceedance recorded at the concerned WQM station during mid-flood tide on 13 May 2018. The photos of site situation at box culvert are shown in Attachment 2.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 13 May 2018.

While turbidity exceedance was recorded at IS(Mf)11 and SR5(N), no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters.

During ET's (Contract No.: HY/2013/04) regular weekly site inspection on 10 May 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 09:55 and 10:00. There were no observations referring to water quality mitigation measures associated with that shoreline.

During ET's (Contract No.: HY/2013/04) subsequent regular weekly site inspection on 14 May 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:20 and 15:20. Regarding water quality mitigation measures associated with that shoreline, it was observed that silty water was observed outside silt curtain at Box Culvert D. The Contractor was reminded to check the integrity of silt curtain. However, the observed silty water was limited to the immediate vicinity of the silt curtain (see photo in Attachment 1). Also, no exceedance was recorded at the monitoring locations closest to the silt curtain at Box Culvert D, namely IS7 and IS(Mf)9, on 13 May 2018. Furthermore, given the large distance between HY/2013/04 site shoreline and the exceedance locations of IS(Mf)11 and SR5(N), it is unlikely that this observation could be related to the subject exceedances. It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. *In situ* measurement was repeated to confirm findings;
 2. After considering the above-mentioned investigation results, it appears that it was unlikely that the turbidity exceedances were attributed to active construction activities of this Contract;
 3. IEC, Contractor and ER were informed via email;
 4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
 5. Since it is considered that the turbidity exceedances are unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.
- However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 3, 10, 17 and 25 May 2018, ET (Contract No.: HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>15 June 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

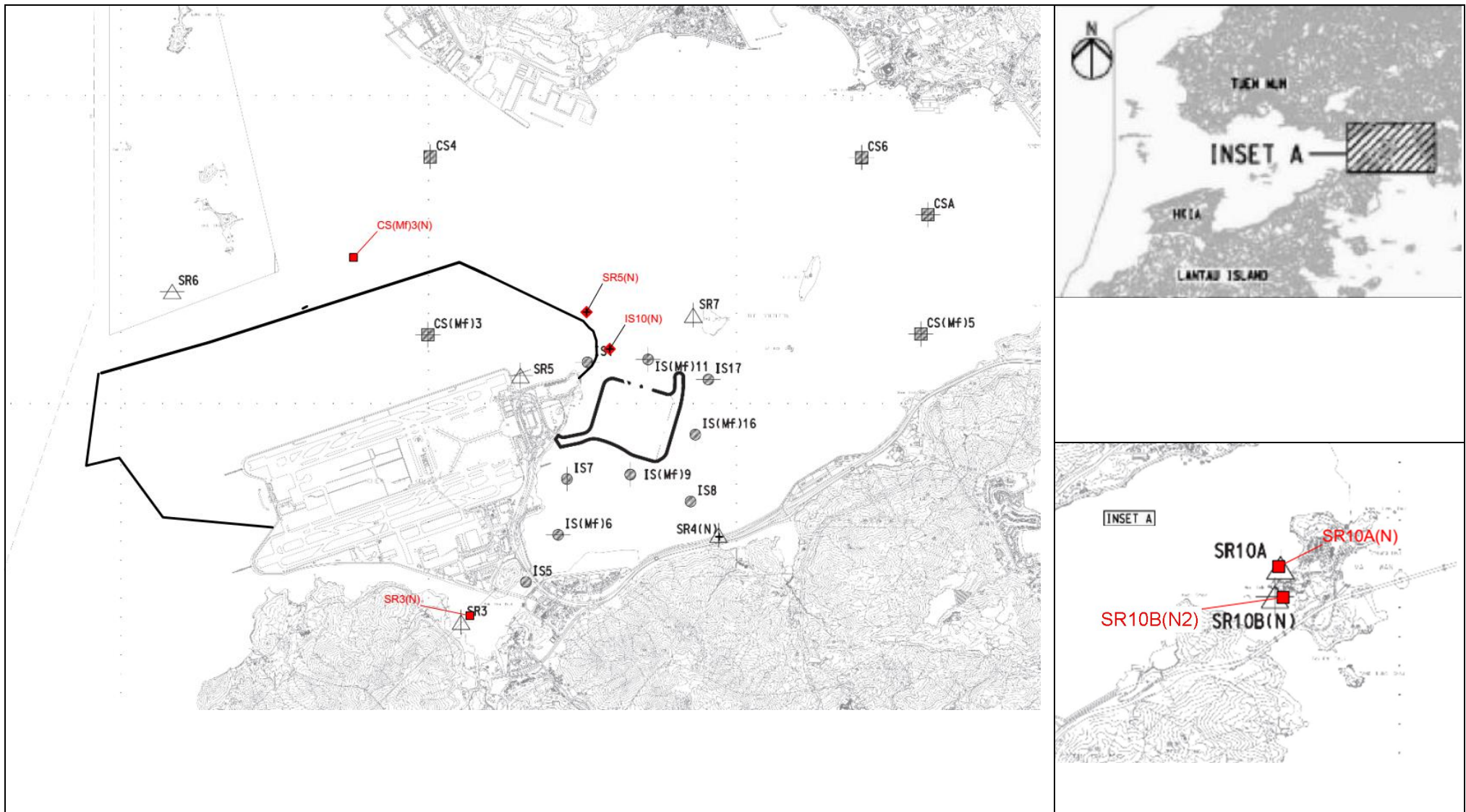


Figure 1: Location Plan

Attachment 1

Silty water was observed outside silt curtain at Box Culvert D. The Contractor was reminded to check the integrity of silt curtain.



Attachment 2

Photo 1



Photo 2



Photo 3 | Construction of seawall



Hong Kong- Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts) Notifications of Environmental Quality Limits Exceedances Notification No.: 20180525DO_v3						
Date of Notification: 30 May 2018				Date of Investigation Report: 15 June 2018		
Works Inspected: Data collected from water sampling works on 25 May 2018 and the results were issued on 30 May 2018						
Monitoring Location: Water Quality Monitoring Station						
Parameter: Dissolved Oxygen (DO)/ Suspended Solid (SS) / Turbidity (TURB)						
Action & Limit Level (AL & LL) / Measured Level:						
PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
DO	IS8	Depth Average	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6	4.5	9.1
Notes: AL means Action Level. LL means Limit Level. Bold means AL exceedances. Bold with underline means LL exceedances. Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4 Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA						

Possible reason for Action / Limit Level Non-compliance:

On 25 May 2018, one AL exceedance of DO at IS8 was recorded during mid-ebb tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 25 May 2018. No site runoff within the Contract site has been observed. All wastewater generated from construction site which potentially contain organic matter was collected by vacuum truck. No organic matter discharge/ accumulation at active works areas on 25 May 2018. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017. ET (Contract No. HY/2013/02) confirmed that no any organic matter discharge/accumulation at active works areas under Contract HY/2013/02 was observed on the date of exceedance with respect to the exceedance in DO.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. As confirmed with Mr. Marko Chan, Environmental Officer, and operation team of Contract No. HY/2013/03, no organic matter discharge or accumulation at active works areas on 25 May 2018 under Contract No. HY/2013/03. The marine-based works in Box Culvert B had been completed. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. In addition, the exceedances recorded at WQM station IS8 are far away from the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused DO exceedance recorded at the concerned WQM station during mid-ebb tide on 25 May 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 25 May 2018. Furthermore, there was no visible observation of any discharge or accumulation of organic matter at the active works areas within HY/2013/04 site area on 25 May 2018.

While DO exceedance was recorded at IS8, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no notification of DO exceedance at IS8 during monitoring at the next tide (i.e. mid-flood tide on the same day) was received.

During ET's (Contract No. HY/2013/04) regular weekly site inspection on 23 May 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:15 and 15:00. There were no observations referring to water quality mitigation measures associated with that shoreline.

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. All wastewater generated from construction site which potentially contain organic matter was collected by vacuum truck. No organic matter discharge/ accumulation at active works areas on 25 May 2018. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. in situ measurement was repeated to confirm findings;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the dissolved oxygen exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the dissolved oxygen exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 3, 10, 17, 25 and 31 May 2018, ET confirmed the Contractor had provided workable and effective water quality mitigation measures.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>15 June 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

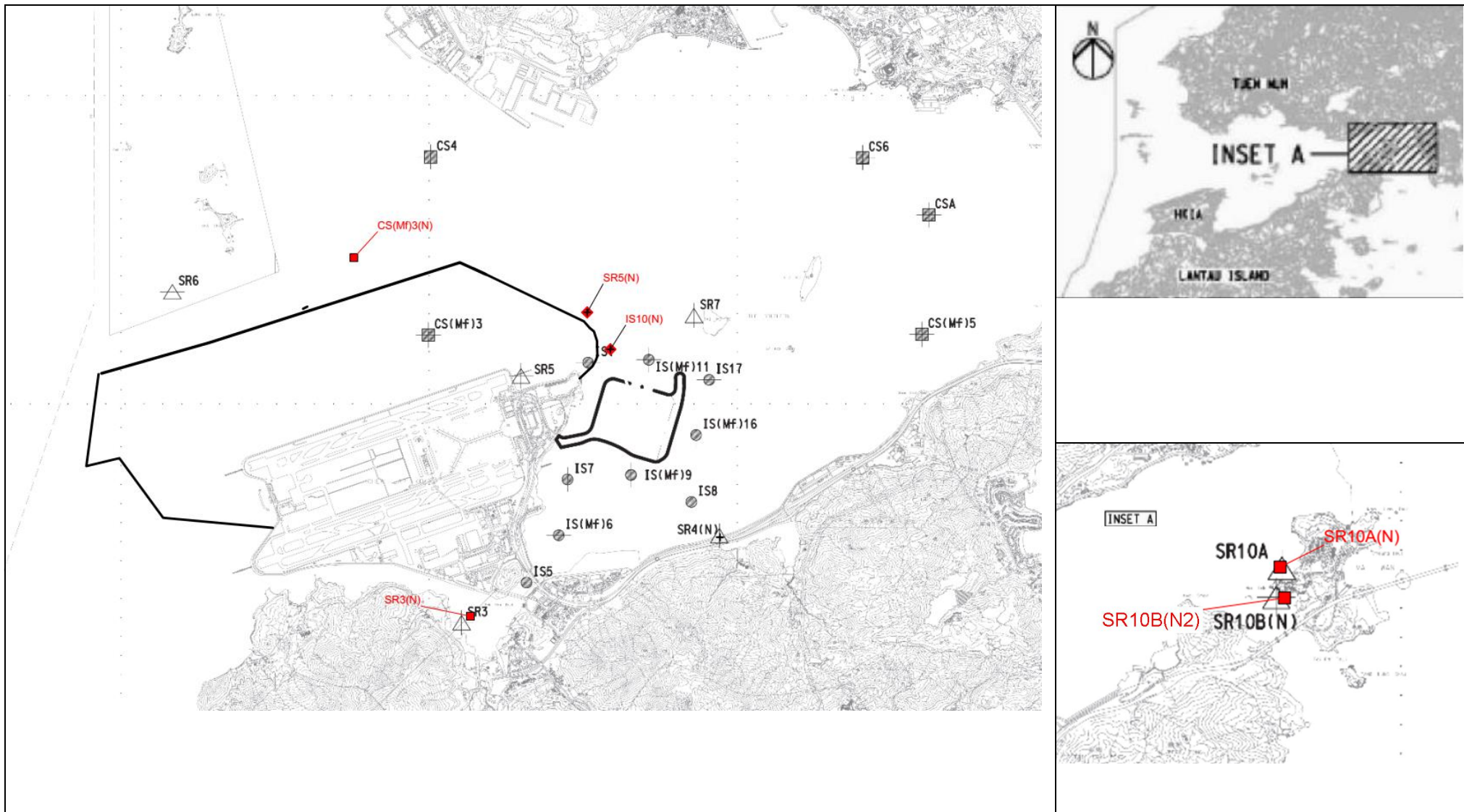


Figure 1: Location Plan

Hong Kong- Zhuhai- Macao Bridge**Hong Kong Boundary Crossing Facilities (Superstructure and Infrastructure Contracts)****Notifications of Environmental Quality Limits Exceedances**

Notification No.: 20180528DO_v3

Date of Notification: 1 June 2018**Date of Investigation Report:** 15 June 2018**Works Inspected:** Data collected from water sampling works on 28 May 2018 and the results were issued on 1 June 2018**Monitoring Location:** Water Quality Monitoring Station**Parameter:** Dissolved Oxygen (DO)/ ~~Suspended Solid (SS) / Turbidity (TURB)~~**Action & Limit Level (AL & LL) / Measured Level:**

PARAM	STATION	DEPTH	AL (mg/L)	LL (mg/L)	MEASURED AT MID-EBB TIDE (mg/L)	MEASURED AT MID-FLOOD TIDE (mg/L)
DO	IS5	Bottom	Surface and Middle 5.0 Bottom 4.7	Surface and Middle 4.2 (except 5 mg/L for FCZ) Bottom 3.6	4.0	5.5

Notes:

AL means Action Level.

LL means Limit Level.

Bold means AL exceedances.**Bold with underline** means LL exceedances.

Upstream control stations of mid-ebb tide: CS(Mf)3(N) and CS4

Upstream control stations of mid-flood tide: CS(Mf)5, CS6 and CSA

Possible reason for Action / Limit Level Non-compliance:

On 28 May 2018, one AL exceedance of DO at IS5 was recorded during mid-ebb tide.

Contract No.: HY/2013/01

As confirmed by the Contractor of Contract No.: HY/2013/01, there was no marine transportation and marine-based work on 28 May 2018. No site runoff within the Contract site has been observed. All wastewater generated from construction site which potentially contain organic matter was collected by vacuum truck. No organic matter discharge/ accumulation at active works areas on 25 May 2018. Therefore, it is concluded that the exceedances were not related to the Contract.

Contract No.: HY/2013/02

As confirmed with RSS, it is concluded that the exceedances were not related to the Contract due to completion of marine works on 10 September 2017. ET (Contract No. HY/2013/02) confirmed that no any organic matter discharge/accumulation at active works areas under Contract HY/2013/02 was observed on the date of exceedance with respect to the exceedance in DO.

Contract No.: HY/2013/03

As confirmed with RSS of Contract No. HY/2013/03, there was no marine transportation on the date of exceedance. As confirmed with Mr. Marko Chan, Environmental Officer, and operation team of Contract No. HY/2013/03, no organic matter discharge or accumulation at active works areas on 25 May 2018 under Contract No. HY/2013/03. The marine-based works in Box Culvert B had been completed. Silt curtain was also maintained to enclose the work area of the outlet of the box culvert fully. In addition, the exceedances recorded at WQM station IS5 are far away from the marine works area of Contract No. HY/2013/03, while there was no notification of exceedance received at the WQM stations closer to the works areas, such as IS(Mf)11. It was unlikely that the works undertaken by Contract No. HY/2013/03 caused DO exceedance recorded at the concerned WQM station during mid-ebb tide on 28 May 2018.

Contract No.: HY/2013/04

According to the Contractor of HY/2013/04, all marine-based segment deliveries were completed in January 2018 and no marine-based works were conducted under the contract on 28 May 2018. Furthermore, there was no visible observation of any discharge or accumulation of organic matter at the active works areas within HY/2013/04 site area on 25 May 2018.

While DO exceedance was recorded at IS5, no exceedance was recorded at IS(Mf)9 which is the nearest monitoring location to HY/2013/04 loading and unloading point and HY/2013/04 shoreline interfacing with open waters. Also, no notification of DO exceedance at IS5 during monitoring at the next tide (i.e. mid-flood tide on the same day) was received.

During ET's (Contract No. HY/2013/04) regular weekly site inspection on 23 May 2018, HY/2013/04 site shoreline interfacing with open waters was inspected between 14:15 and 15:00. There were no observations referring to water quality mitigation measures associated with that shoreline.

It was concluded that the exceedance was not due to HY/2013/04.

Contract No.: HY/2014/05

There was no marine transportation and marine-based work under this contract. No site runoff within the Contract site has been observed. Therefore, it is concluded that the exceedances were not related to the Contract.

Actions taken/ to be taken:

Contract No.: HY/2013/01

Actions were taken under action plan:

1. in situ measurement was repeated to confirm findings;
2. After considering the above-mentioned investigation results, it appears that it was unlikely that the dissolved oxygen exceedance was attributed to active construction activities of this Contract;
3. IEC, Contractor and ER were informed via email;
4. Monitoring data, all plant, equipment and Contractor's working methods were checked;
5. Since it is considered that the dissolved oxygen exceedance is unlikely to be contract related, as such, Actions 5-7 under the EAP are not considered applicable.

However, the Contractor was also reminded to implement environmental mitigation measures in accordance with Environmental Mitigation Implementation Schedule.

Contract No.: HY/2013/02

Although the exceedance was considered not due to HY/2013/02, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2013/03


During weekly site audit on 3, 10, 17, 25 and 31 May 2018, ET (Contract No. HY/2013/03) confirmed the Contractor had provided workable and effective water quality mitigation measures.

Contract No.: HY/2013/04

Although the exceedance was considered not due to HY/2013/04, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Contract No.: HY/2014/05

Although the exceedance was considered not due to HY/2014/05, the Contractor is reminded to implement all necessary water quality mitigation measures identified in the EM&A Manual.

Checked by:	<u>Keith Chau</u>	Title:	<u>Environmental Team Leader (Contract No. HY/2013/01)</u>
Signature:	<u></u>	Date:	<u>15 June 2018</u>
Copied to	: Contractor, Engineer Representative and IEC/ENPO		

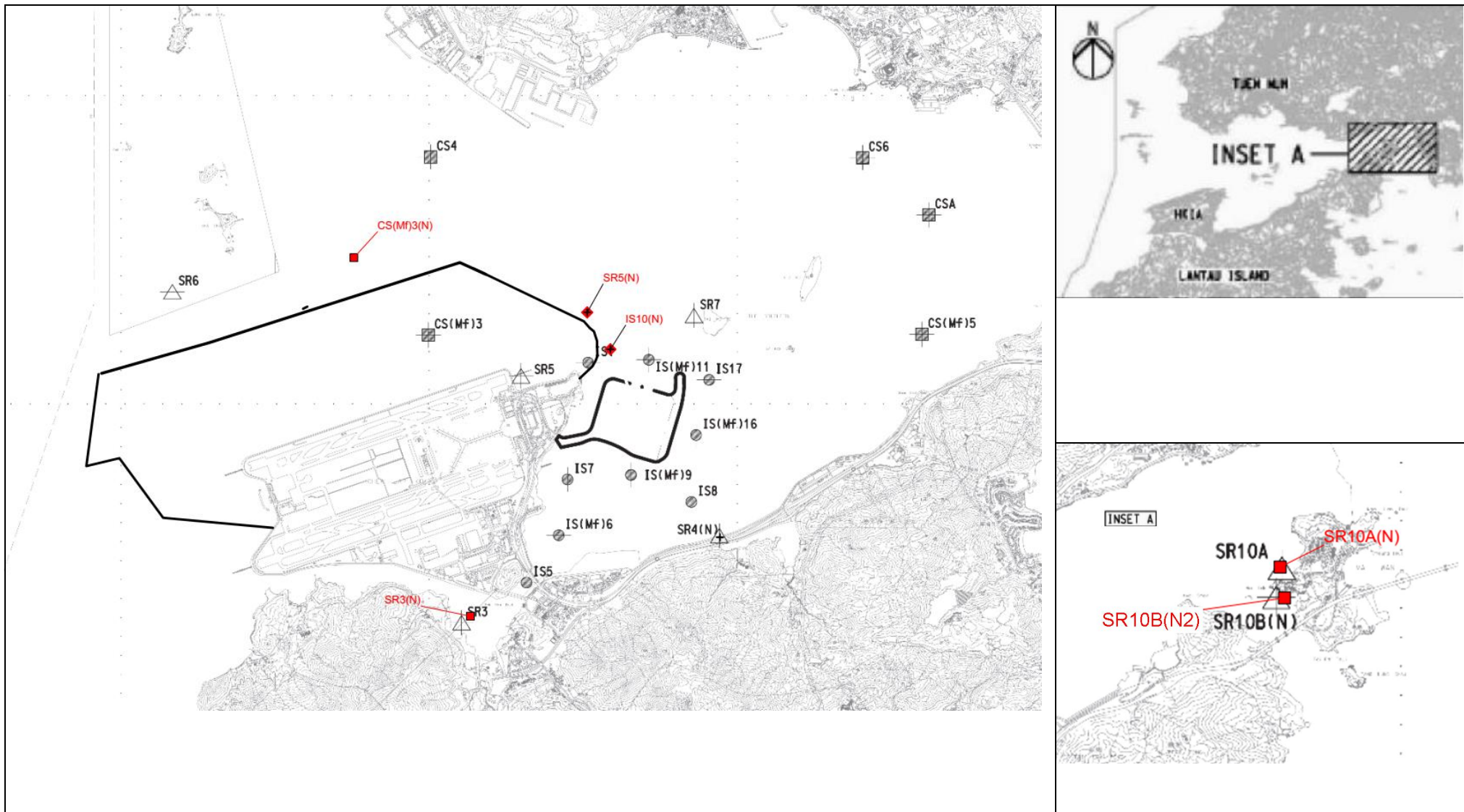


Figure 1: Location Plan

**Contract No. HY/2013/01 -
Hong Kong- Zhuhai- Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance Building
Notification of Environmental Quality Limit Exceedance**

Notification No.: 201803-05D

Date of Notification: 4 March 2019

Works Inspected: Not Applicable

Monitoring Location: NEL & NWL

Parameter: Ecology (Chinese White Dolphin Monitoring)

Action & Limit Levels

Monitoring Results

North Lantau Social Cluster		The quarter of March – May 2018
Action Level (AL)	Limit Level (LL)	
Northeast Lantau (NEL)	STG < 4.2 & ANI < 15.5	<u>STG = 0; ANI = 0</u>
Northwest Lantau (NWL)	STG < 6.9 & ANI < 31.3	
		<u>STG = 1.97; ANI = 4.81</u>

Notes:

1. STG means quarterly encounter rate of number of dolphin sightings.
2. ANI means quarterly encounter rate of total number of dolphins.
3. For North Lantau Social Cluster, AL will be triggered if either NEL or NWL falls below the criteria; LL will be triggered if both NEL and NWL fall below the criteria.
4. ***Bold Italic*** means AL exceedances.
5. ***Bold Italic with underline*** means LL exceedances.

Possible reason for Action / Limit Level Non-compliance:

One Limit Level exceedance of dolphin monitoring was recorded during quarterly monitoring (March – May 2018). The ETL informed IEC, ENPO, ER and Contractor via email on 8 June 2018.

According to information provided by ER, the marine based works undertaken during the quarterly were shown as below:

Contract No.: HY/2013/01

- No marine based work.

There is no evidence showing the current LL non-compliance directly related to the construction works of Contract No. HY/2013/01 (the Contract). According to information from the Contractor, no marine based construction works and marine transportation were undertaken during reporting period.

Contract No.: HY/2013/02

- No marine based works.

Contract No.: HY/2013/03

- Box Culvert B outfall construction with cofferdams.

Contract No.: HY/2013/04

- Outfall construction at Box C and D inside cofferdam.

Actions taken/ to be taken:

1. Statistical data analysis has been repeated to confirm findings;
2. All available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A have been reviewed;
3. Identification of source of impact was carried out;
4. The ETL informed IEC, ENPO, ER and Contractor have been informed of findings on 8 June 2018;
5. Monitoring data have been checked;
6. Repeated review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary;
7. After investigation, there was no evidence that indicated that the reduced number of dolphins in NWL and NEL was related solely to Project works. It was also concluded the contributed of impacted due to the HZMB works as a whole (or individual nor separate).

Recommendations/ mitigation measures/ actions if necessary:

All dolphin protective measures are fully and properly implemented in accordance with the EM&A Manual.

Contract No.: HY/2013/01

Not applicable.

Contract No.: HY/2013/02

Not applicable.

Contract No.: HY/2013/03

According to information from ER, silt curtain was installed.

Contract No.: HY/2013/04

According to information from ER, silt curtain was installed.

Based on section 10.2.19 of the Updated EM&A Manual (for Hong Kong Boundary Crossing Facilities) (version 1.0) that verification by IEC on 4 January 2012, the travelling speed of vessels must not exceed 10 knots within the boundaries of the Sha Chau/Lung Kwu Chau Marine Park appears to be effective in protecting the dolphins from vessel collisions. The Contractor will continue to provide training for Captains of construction vessels working in the West Lantau waters and near the Brothers Marine Parks should undergo training to learn about local dolphins and porpoises. They should be trained to be aware of the protocol for "dolphin friendly" vessel operation. All working vessels should be required to use regular travel routes, in order to minimize the chance of vessel collision. And the routes would not go through the dolphin hotspot near Brothers Marine Parks.

A meeting was held on 4 September 2018 with attendance of representative of ENPO, Resident Site Staff (RSS), Environmental Team (ET) and dolphin specialist for Contract Nos. HY/2013/01, HY/2011/03, HY/2012/07, HY/2012/08, to discuss dolphin encounter rates during the period March- May 2018.

In the meeting, it was conducted that the Hong Kong-Zhuhai-Macao (HZMB) works is one of the contribution factors affecting the dolphins. It was also concluded the contribution of impacts due to the HZMB work as a whole (or individual marine contracts) cannot be quantified nor separate from the other stress factors.

It was reminded that ETs shall keep reviewing the implementation status of the dolphin related mitigation measures and remind the contractor to ensure the relevant measures were fully implemented.

It was recommended that the marine works footprint (e.g., reduce the size of peripheral silt curtain) and vessels for the marine works should be reduced as much as possible, and vessels idling / mooring in other part of the North Lantau shall be avoided whenever possible.

The marine travel route will shift along the edge of Brothers Marine Park (BMP) as much as practical under the Regular Marine Travel Route Plan. It was 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 were recommended to avoid the BMP.

There was a discussion on exploring possible further mitigation measures, for example, controlling the underwater noise. It was noted that the EIA reports for the projects suggested several mitigation measures, all of which have been implemented.

Prepared by: Ruby Law

Title: ET Representative (up to 31 October 2018)



Date: 4 March 2019

Reviewed by: Keith Chau

Title: ET Leader (up to 31 October 2018)



Date : 4 March 2019

Copied to: IEC/ENPO, Contractor and Engineer Representative



路政署
HIGHWAYS DEPARTMENT

港珠澳大橋香港工程管理處
Hong Kong - Zhuhai - Macao Bridge
Hong Kong Project Management Office

Contract No. HY/2013/01
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Passenger Clearance Building
15th Quarterly EM&A Report

APPENDIX L

Dolphin Monitoring Results

CONTRACT NO. HY/2013/01

Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Dolphin Monthly Monitoring

*Third Quarterly Progress Report (March-May 2018)
submitted to Leighton – Chun Wo Joint Venture*

Submitted by

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

June 20, 2018

1. Introduction

- 1.1. For the Hong Kong-Zhuhai-Macao Bridge (HZMB) Hong Kong Boundary Crossing Facilities (HKBCF), the construction of the Passenger Clearance Building (PCB) requires the contractor (i.e. Leighton – Chun Wo Joint Venture) and the associated environmental team to conduct monthly line-transect vessel surveys for the Chinese White Dolphins to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas under the Environmental Monitoring and Audit (EM&A) programme.
- 1.2. In August 2017, Hong Kong Cetacean Research Project (HKCRP) has been commissioned by the contractor to conduct regular dolphin monitoring study in order to collect data on Chinese White Dolphins during the construction phase (i.e. impact period) of the HKBCF-PCB project, and to analyze the collected survey data to monitor distribution, encounter rate, activities and occurrence of dolphin calves. Photo-identification will also be collected from individual Chinese White Dolphins to examine their individual ranging patterns.
- 1.3. 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.
- 1.4. This report is the third quarterly progress report under the HKBCF construction phase dolphin monitoring programme submitted to Leighton – Chun Wo Joint Venture, summarizing the results of the surveys findings during the period of March to May 2018.

1.5. Notably, throughout the present quarterly progress report, the previous monitoring data obtained under Contract No. HY/2011/03 (i.e. HKLR03) are referenced and compared to the present quarterly monitoring data collected for the HKBCF-PCB project, as both HKBCF-PCB and HKLR03 project data was collected by the same HKCRP survey team, to ensure 100% consistency in monitoring methodology including vessel survey method as well as various analyses. On the contrary, the previous monitoring data collected under HZMB HKBCF-Reclamation Works contract (Contract No. HY/2010/02) was from a different survey team that have adopted different survey methodology (e.g. two observers and one data recorder under HKBCF-Reclamation Works contract, as compared to one primary observer and one data recorder under HKLR03 and HKBCF-PCB contract). Therefore, we cannot ensure that such HKBCF monitoring data under that contract can be directly comparable to the HKBCF-PCB monitoring data, and would rather use the previous HKLR03 monitoring data instead for comparison with the present quarterly findings.

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

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 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 20 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2017). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local

cetacean species.

- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, position (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex 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 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. One to two professional digital cameras (*Canon EOS 7D* model), each equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.

- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

2.3. *Data analysis*

- 2.3.1. Distribution Analysis – The line-transect survey data was integrated with the Geographic Information System (GIS) in order to visualize and interpret different spatial and temporal patterns of dolphin distribution using sighting positions. Location data of dolphin groups were plotted on map layers of Hong Kong using a desktop GIS (ArcView[®] 3.1) to examine their distribution patterns in details. The dataset was also stratified into different subsets to examine distribution patterns of dolphin groups with different categories of group sizes, young calves and activities.
- 2.3.2. Encounter rate analysis – Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort, and total number of dolphins sighted on-effort per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey effort conducted during each month of monitoring survey. Dolphin encounter rates were calculated in two ways for comparisons with the HZMB baseline monitoring results as well as to AFCD long-term marine mammal monitoring results.

Firstly, for the comparison with the HZMB baseline monitoring results, the encounter rates were calculated using primary survey effort alone, and only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. The average encounter rate of sightings (STG) and average encounter rate of dolphins (ANI) were deduced based on the encounter rates from six events during the present quarter (i.e. six sets of line-transect surveys in 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, milling/resting, traveling, socializing) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 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 March to May 2018, six sets of systematic line-transect vessel surveys were conducted for the HKBCF project to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these surveys, a total of 803.0 km of survey effort was collected, with 88.5% 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, 302.3 km and 500.7 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 577.0 km, while the effort on secondary lines was 226.0 km. Survey effort conducted on both primary and secondary lines were considered as on-effort survey data. A summary table of the survey effort is shown in Appendix I.
- 3.1.4. During the six sets of monitoring surveys in March to May 2018, eight groups of 20 Chinese White Dolphins were sighted, with the summary table of the dolphin sightings

shown in Appendix II. All dolphin sightings were made during on-effort search, while seven of the eight on-effort dolphin sightings were made on primary lines. In addition, all dolphin groups were sighted in NWL, while none was sighted in NEL.

3.2. *Distribution*

3.2.1. Distribution of dolphin sightings made during monitoring surveys in March to May 2018 is shown in Figure 1. All sightings were made at the northwestern end of the North Lantau Region, mainly within and around the Sha Chau and Lung Kwu Chau Marine Park (Figure 1). One dolphin group was also sighted at the mouth of Deep Bay. On the contrary, they were completely absent from the central and eastern portions of North Lantau waters, similar to the consistent findings of HKLR03 surveys in recent years (Figure 1).

3.2.2. Notably, all dolphin sightings were made far away from the HKBCF and HKLR03 reclamation sites, as well as the alignments of HKLR09 and Tuen Mun-Chek Lap Kok Link (TMCLKL) (Figure 1).

3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period (March to May 2018) was very 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).

3.2.4. On the other hand, dolphin occurrence in NWL waters was also noticeably different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were infrequently sighted there, and mainly at the northwestern end of the survey area, which was also in stark contrast with their frequent occurrences throughout the entire survey area during the baseline period (Figure 1).

3.3. *Encounter rate*

3.3.1. During the present three-month study 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 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).

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 1.7 sightings and 4.4 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.

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during March-May 2018

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 (6 & 9 Mar 2018)	0.0	0.0
	Set 2 (14 & 26 Mar 2018)	0.0	0.0
	Set 3 (11 & 18 Apr 2018)	0.0	0.0
	Set 4 (24 & 26 Apr 2018)	0.0	0.0
	Set 5 (3 & 15 May 2018)	0.0	0.0
	Set 6 (24 & 29 May 2018)	0.0	0.0
Northwest Lantau	Set 1 (6 & 9 Mar 2018)	0.0	0.0
	Set 2 (14 & 26 Mar 2018)	1.7	6.7
	Set 3 (11 & 18 Apr 2018)	1.7	5.2
	Set 4 (24 & 26 Apr 2018)	3.4	8.6
	Set 5 (3 & 15 May 2018)	1.8	3.5
	Set 6 (24 & 29 May 2018)	3.3	4.9

3.3.3. In NEL, the average dolphin encounter rates (both STG and ANI) in the present three-month impact monitoring period were both zero with no on-effort sighting being made, and such extremely low occurrence of dolphins in NEL have also been consistently recorded in recent years of HZMB monitoring (Table 4).

Table 3. Comparison of average dolphin encounter rates from impact monitoring period (March-May 2018) 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)	
	March – May 2018	September – November 2011	March – May 2018	September – November 2011
Northeast Lantau	0.00	6.0 \pm 5.05	0.0	22.2 \pm 26.81
Northwest Lantau	2.0 \pm 1.26	9.9 \pm 5.85	4.8 \pm 2.93	44.7 \pm 29.85

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same spring quarters of HKLR03 and HKBCF impact monitoring periods 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)
September-November 2011 (Baseline)	6.0 \pm 5.05	22.2 \pm 26.81
March-May 2013 (HKLR03 Impact*)	0.4 \pm 1.03	0.4 \pm 1.03
March-May 2014 (HKLR03 Impact*)	0.0	0.0
March-May 2015 (HKLR03 Impact*)	0.0	0.0
March-May 2016 (HKLR03 Impact*)	0.0	0.0
March-May 2017 (HKLR03 Impact*)	0.0	0.0
March-May 2018 (HKBCF Impact)	0.0	0.0

* As explained in Section 1.5, the previous monitoring data from Contract No. HY/2011/03 (i.e. HKLR03) were adopted for comparison with the baseline and present HKBCF impact monitoring period

3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present impact phase monitoring period (reductions of 80.0% and 89.2% respectively) were tiny fractions of the ones recorded during the three-month baseline period,

indicating a noticeable decline in dolphin usage of this survey area during the present impact phase period (Table 5).

- 3.3.5. During the same spring quarters (with comparison to past HKLR03 monitoring data), dolphin encounter rates in NWL during spring 2018 was similar to the previous spring periods in 2016 and 2017, slightly higher than the one in 2015, but much lower than the ones in 2013 and 2014 (Table 5). Such temporal trend should be closely monitored in the upcoming monitoring quarters whether the dolphin occurrence would slowly recover as almost all marine construction activities of HKBCF works have been completed in coming months.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from all winter quarters of HKLR03 and HKBCF impact monitoring periods 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)
September-November 2011 (Baseline)	9.9 \pm 5.85	44.7 \pm 29.85
March-May 2013 (HKLR03 Impact*)	7.8 \pm 3.96	24.2 \pm 18.05
March-May 2014 (HKLR03 Impact*)	6.5 \pm 3.34	19.1 \pm 7.19
March-May 2015 (HKLR03 Impact*)	0.5 \pm 0.73	2.4 \pm 4.07
March-May 2016 (HKLR03 Impact*)	1.0 \pm 1.10	4.8 \pm 6.85
March-May 2017 (HKLR03 Impact*)	0.9 \pm 1.03	5.3 \pm 9.53
March-May 2018 (HKBCF Impact)	2.0 \pm 1.26	4.8 \pm 2.93

* As explained in Section 1.5, the previous monitoring data from Contract No. HY/2011/03 (i.e. HKLR03) were adopted for comparison with the baseline and present HKBCF impact monitoring period

- 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 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, the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0031 and

0.0168 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline and present quarter in both the average dolphin encounter rates of STG and ANI.

- 3.3.8. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented in past HZMB dolphin monitoring studies.
- 3.3.9. The decline in dolphin usage of North Lantau region raises serious concern, as the timing of the decline in dolphin usage in North Lantau waters coincided well with the construction schedule of the HZMB-related projects (Hung 2017). Apparently there was very little sign of recovery of dolphin usage even though most of the marine works associated with the HZMB construction have been completed, and therefore continuous dolphin monitoring would remain critical in coming quarters.
- 3.4. *Group size*
- 3.4.1. Group size of Chinese White Dolphins ranged from one to four individuals per group in North Lantau region during March to May 2018. 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 (March-May 2018) and baseline monitoring period (September-November 2011) (Note: \pm denotes the standard deviation of average group size)

	Average Dolphin Group Size	
	March – May 2018	September – November 2011
Overall	2.5 \pm 0.93 (n = 8)	3.7 \pm 3.13 (n = 66)
Northeast Lantau	---	3.2 \pm 2.16 (n = 17)
Northwest Lantau	2.5 \pm 0.93 (n = 8)	3.9 \pm 3.40 (n = 49)

- 3.4.2. The average dolphin group size in NWL waters during March to May 2018 was lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of eight dolphin groups in the present quarter was much smaller when compared to the 66 groups sighted during the baseline period (Table 6).
- 3.4.3. Notably, all eight dolphin groups were composed of 1-4 individuals only, while none of the groups were larger than five animals (Appendix II). This is in contrary to the baseline period, when the larger dolphin groups (5 animals or more per group) were

frequently sighted and evenly distributed in NWL waters, with a few also sighted in NEL waters.

3.5. *Habitat use*

3.5.1. From March to May 2018, the grids that recorded higher dolphin densities were located to the west of Sha Chau, while the grids around Lung Kwu Chau recorded relatively low dolphin densities (Figures 2a and 2b).

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 will be 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 3). 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 3).

3.5.4. The density patterns were also very different in NWL between the baseline and impact phase monitoring periods, with high dolphin usage throughout the area during the baseline period. In contrast, only a few grids with moderate to high dolphin densities were located near Sha Chau and Lung Kwu Chau during the present impact phase period (Figure 3).

3.6. *Mother-calf pairs*

3.6.1. During the present quarterly period, no mother-calf was spotted among the eight groups of dolphins.

3.7. *Activities and associations with fishing boats*

3.7.1. During the present quarterly period, none of the eight dolphin groups were engaged in feeding, socializing, traveling or milling/resting activity.

3.8. *Summary of photo-identification works*

3.8.1. From March to May 2018, over 1,000 digital photographs of Chinese White Dolphins were taken during the impact phase monitoring surveys for the photo-identification work.

- 3.8.2. In total, 12 individuals sighted 16 times altogether were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). All re-sightings of individual dolphins were made in NWL, while none was re-sighted in NEL during the quarterly period.
- 3.8.3. Among the 12 individuals, eight of them were re-sighted only once, while the other four individuals were re-sighted twice during the three-month period (Appendix III).
- 3.8.4. Notably, five of these 12 individuals (i.e. CH34, NL136, NL182, NL261 and NL286) were also sighted in NWL survey area during the HKLR03 monitoring surveys conducted concurrently in the same three-month period. Moreover, one individual (NL46) was also sighted in West Lantau waters during the HKLR09 monitoring surveys from the same quarterly period.
- 3.9. *Individual range use*
- 3.9.1. Ranging patterns of the 12 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, while none of them occurred in NEL waters (Appendix V). This is in contrary to the extensive movements of many individual dolphins between NEL and NWL survey areas as observed in the earlier impact monitoring quarters as well as the baseline period. On the other hand, only one individual (NL46) has extended its range use to WL waters during the present quarter.
- 3.9.4. In the upcoming quarters, individual range use and movements should be continuously monitored to examine whether there has been any consistent shifts of individual home ranges from North Lantau to West or Southwest Lantau.

4. Conclusion

- 4.1. During the present quarter of dolphin monitoring, no adverse impact from the activities of this construction project on Chinese White Dolphins was noticeable from general observations.
- 4.2. Although dolphins seldom occurred in the area of HKBCF construction in the past and during the baseline monitoring period, it is apparent that dolphin usage has been dramatically reduced in North Lantau waters in recent years, and many individuals have

shifted away from this once-important habitat for the dolphins.

- 4.3. It is critical to continuously 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 there is any sign of recovery when the construction works have been completed.

5. References

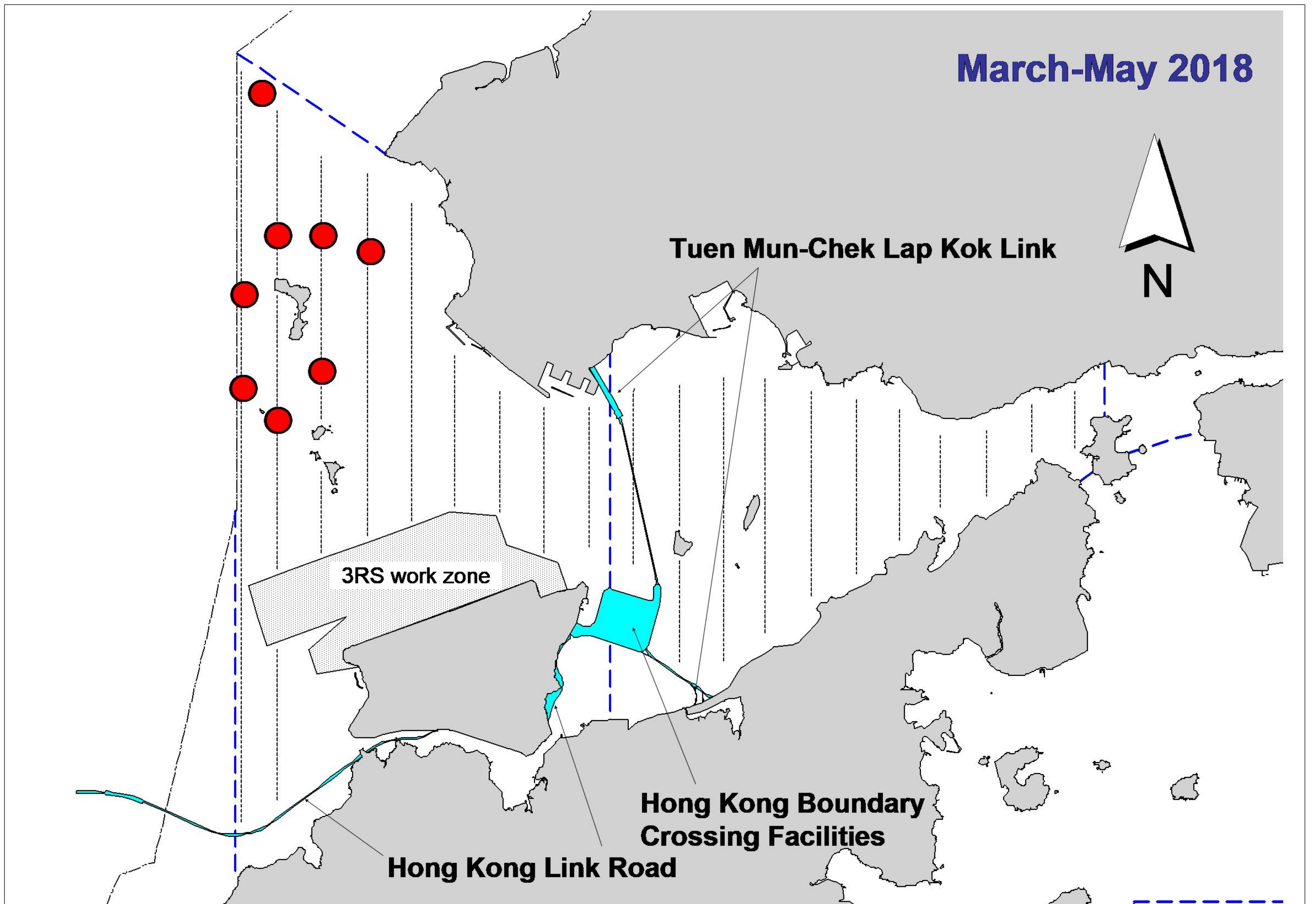
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March-May 2018



September – November 2011

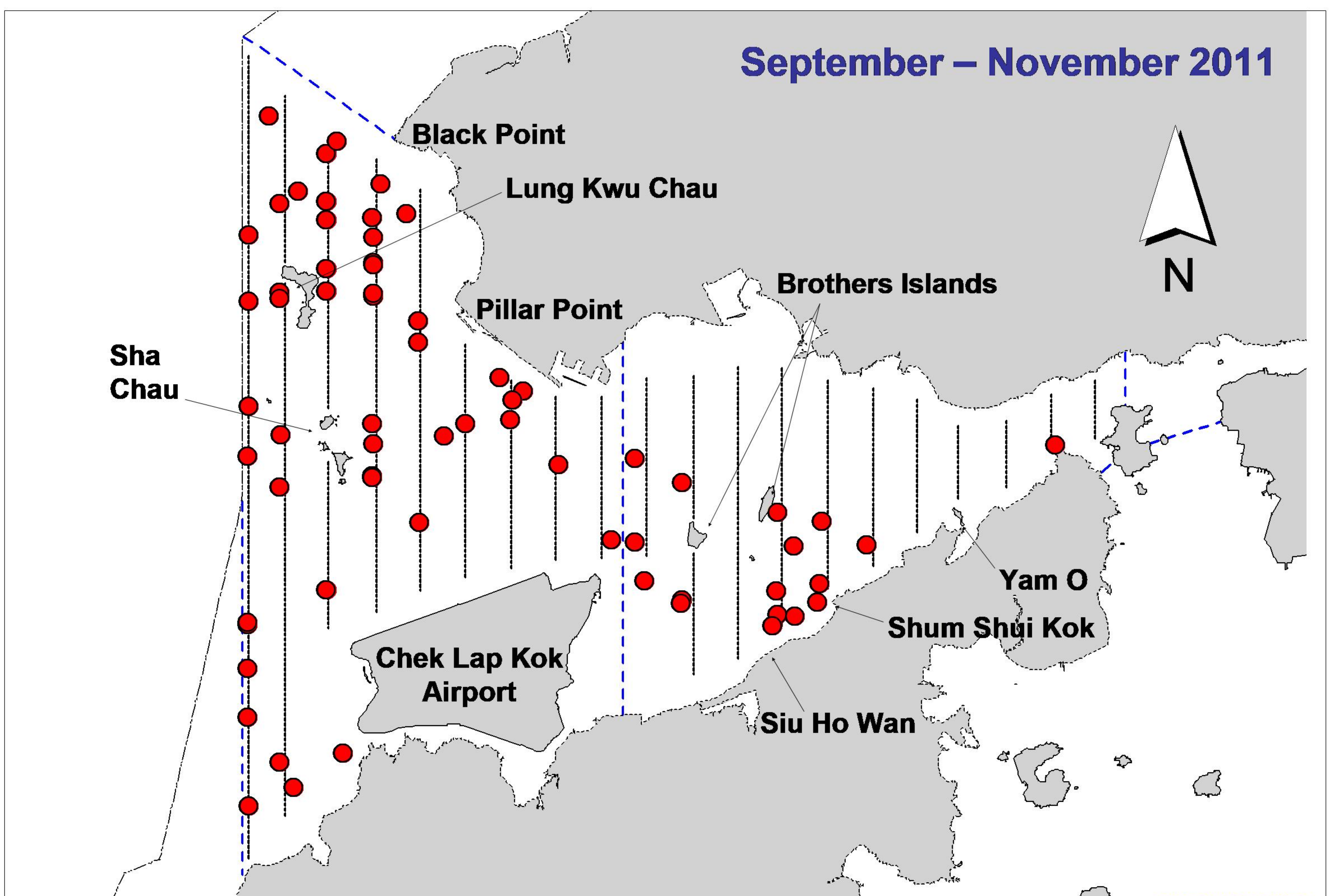


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during HKBCF impact phase (top) and baseline monitoring surveys (bottom)

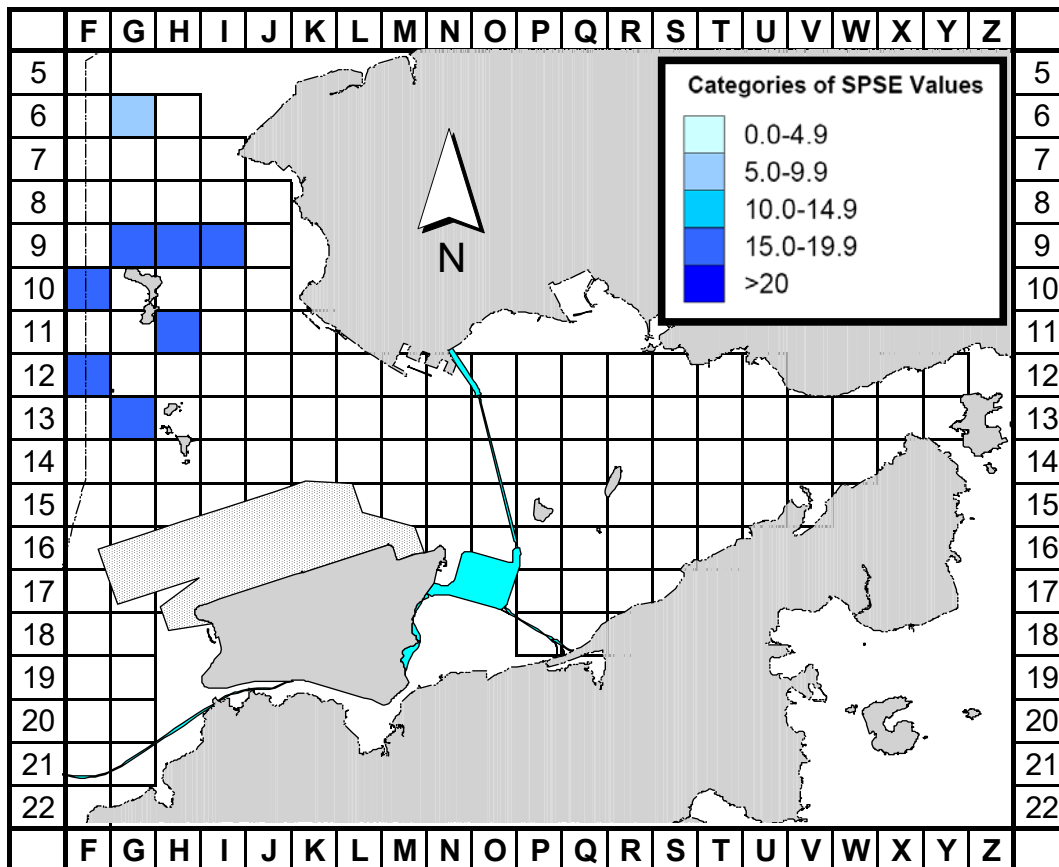


Figure 2a. Sighting density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKBCF impact monitoring period (March-May 18) (SPSE = no. of on-effort sightings per 100 units of survey effort)

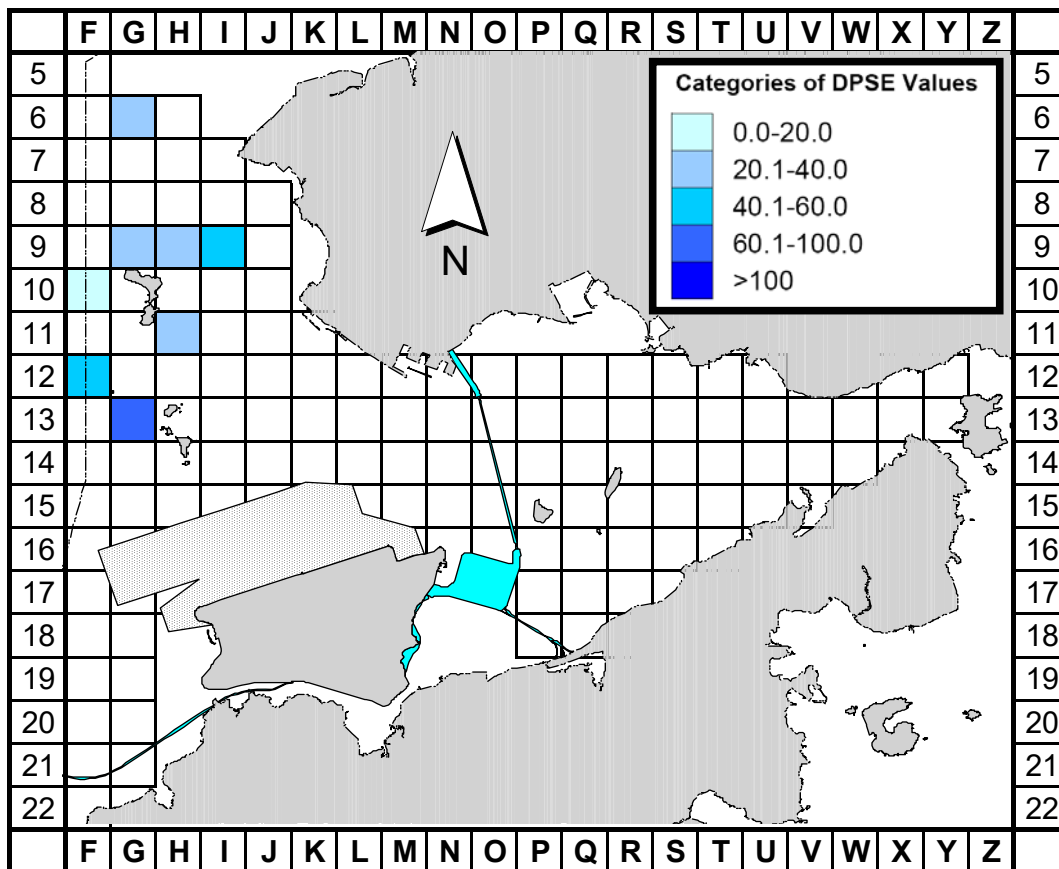


Figure 2b. Density of Chinese white dolphins with corrected survey effort per km² in Northeast and Northwest Lantau survey areas, using data collected during HKBCF impact monitoring period (March-May 18) (DPSE = no. of dolphins per 100 units of survey effort)

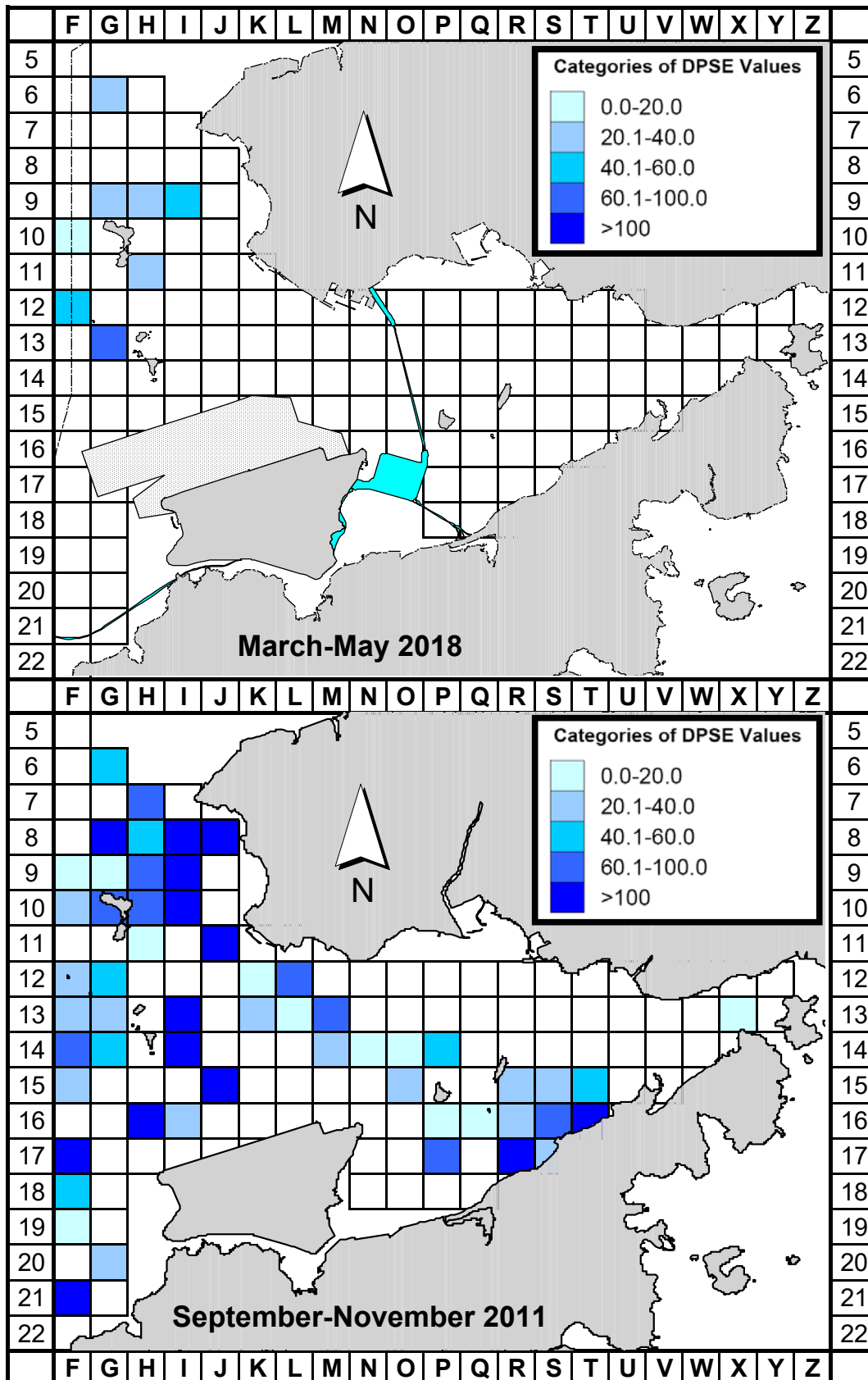


Figure 3. Comparison of density of Chinese white dolphins with corrected survey effort per km² in Northwest and Northeast Lantau survey area between the HKBCF impact monitoring period (March-May 2018) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

Appendix I. HKBCF Survey Effort Database (March-May 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
6-Mar-18	NW LANTAU	3	5.40	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NW LANTAU	4	12.30	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NW LANTAU	5	10.44	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NW LANTAU	3	3.50	SPRING	STANDARD36826	HKBCF	S
6-Mar-18	NW LANTAU	4	0.80	SPRING	STANDARD36826	HKBCF	S
6-Mar-18	NW LANTAU	5	6.86	SPRING	STANDARD36826	HKBCF	S
6-Mar-18	NE LANTAU	2	2.20	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NE LANTAU	3	12.59	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NE LANTAU	4	20.69	SPRING	STANDARD36826	HKBCF	P
6-Mar-18	NE LANTAU	2	1.10	SPRING	STANDARD36826	HKBCF	S
6-Mar-18	NE LANTAU	3	4.90	SPRING	STANDARD36826	HKBCF	S
6-Mar-18	NE LANTAU	4	7.92	SPRING	STANDARD36826	HKBCF	S
9-Mar-18	NW LANTAU	2	4.71	SPRING	STANDARD36826	HKBCF	P
9-Mar-18	NW LANTAU	3	21.55	SPRING	STANDARD36826	HKBCF	P
9-Mar-18	NW LANTAU	4	5.82	SPRING	STANDARD36826	HKBCF	P
9-Mar-18	NW LANTAU	2	1.86	SPRING	STANDARD36826	HKBCF	S
9-Mar-18	NW LANTAU	3	7.56	SPRING	STANDARD36826	HKBCF	S
9-Mar-18	NW LANTAU	4	1.30	SPRING	STANDARD36826	HKBCF	S
14-Mar-18	NE LANTAU	1	17.53	SPRING	STANDARD36826	HKBCF	P
14-Mar-18	NE LANTAU	2	18.29	SPRING	STANDARD36826	HKBCF	P
14-Mar-18	NE LANTAU	1	7.89	SPRING	STANDARD36826	HKBCF	S
14-Mar-18	NE LANTAU	2	5.09	SPRING	STANDARD36826	HKBCF	S
14-Mar-18	NW LANTAU	1	13.94	SPRING	STANDARD36826	HKBCF	P
14-Mar-18	NW LANTAU	2	13.64	SPRING	STANDARD36826	HKBCF	P
14-Mar-18	NW LANTAU	1	5.30	SPRING	STANDARD36826	HKBCF	S
14-Mar-18	NW LANTAU	2	6.25	SPRING	STANDARD36826	HKBCF	S
14-Mar-18	NW LANTAU	3	0.40	SPRING	STANDARD36826	HKBCF	S
26-Mar-18	NW LANTAU	1	2.17	SPRING	STANDARD36826	HKBCF	P
26-Mar-18	NW LANTAU	2	30.10	SPRING	STANDARD36826	HKBCF	P
26-Mar-18	NW LANTAU	1	0.67	SPRING	STANDARD36826	HKBCF	S
26-Mar-18	NW LANTAU	2	11.36	SPRING	STANDARD36826	HKBCF	S
11-Apr-18	NW LANTAU	1	6.10	SPRING	STANDARD36826	HKBCF	P
11-Apr-18	NW LANTAU	2	24.40	SPRING	STANDARD36826	HKBCF	P
11-Apr-18	NW LANTAU	1	1.43	SPRING	STANDARD36826	HKBCF	S
11-Apr-18	NW LANTAU	2	12.52	SPRING	STANDARD36826	HKBCF	S
18-Apr-18	NE LANTAU	2	27.24	SPRING	STANDARD36826	HKBCF	P
18-Apr-18	NE LANTAU	3	10.20	SPRING	STANDARD36826	HKBCF	P
18-Apr-18	NE LANTAU	2	12.56	SPRING	STANDARD36826	HKBCF	S
18-Apr-18	NE LANTAU	3	1.40	SPRING	STANDARD36826	HKBCF	S
18-Apr-18	NW LANTAU	2	17.48	SPRING	STANDARD36826	HKBCF	P
18-Apr-18	NW LANTAU	3	10.07	SPRING	STANDARD36826	HKBCF	P
18-Apr-18	NW LANTAU	2	8.00	SPRING	STANDARD36826	HKBCF	S
18-Apr-18	NW LANTAU	3	3.45	SPRING	STANDARD36826	HKBCF	S
24-Apr-18	NW LANTAU	1	10.54	SPRING	STANDARD36826	HKBCF	P
24-Apr-18	NW LANTAU	2	12.57	SPRING	STANDARD36826	HKBCF	P
24-Apr-18	NW LANTAU	1	5.84	SPRING	STANDARD36826	HKBCF	S
24-Apr-18	NW LANTAU	2	5.19	SPRING	STANDARD36826	HKBCF	S
26-Apr-18	NE LANTAU	1	1.24	SPRING	STANDARD36826	HKBCF	P
26-Apr-18	NE LANTAU	2	26.24	SPRING	STANDARD36826	HKBCF	P
26-Apr-18	NE LANTAU	3	9.43	SPRING	STANDARD36826	HKBCF	P

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
26-Apr-18	NE LANTAU	2	14.59	SPRING	STANDARD36826	HKBCF	S
26-Apr-18	NW LANTAU	2	32.47	SPRING	STANDARD36826	HKBCF	P
26-Apr-18	NW LANTAU	3	2.55	SPRING	STANDARD36826	HKBCF	P
26-Apr-18	NW LANTAU	2	11.26	SPRING	STANDARD36826	HKBCF	S
26-Apr-18	NW LANTAU	3	2.22	SPRING	STANDARD36826	HKBCF	S
3-May-18	NW LANTAU	1	1.30	SPRING	STANDARD36826	HKBCF	P
3-May-18	NW LANTAU	2	20.52	SPRING	STANDARD36826	HKBCF	P
3-May-18	NW LANTAU	3	13.26	SPRING	STANDARD36826	HKBCF	P
3-May-18	NW LANTAU	2	12.49	SPRING	STANDARD36826	HKBCF	S
3-May-18	NW LANTAU	3	1.63	SPRING	STANDARD36826	HKBCF	S
3-May-18	NE LANTAU	1	2.54	SPRING	STANDARD36826	HKBCF	P
3-May-18	NE LANTAU	2	2.82	SPRING	STANDARD36826	HKBCF	P
3-May-18	NE LANTAU	3	12.91	SPRING	STANDARD36826	HKBCF	P
3-May-18	NE LANTAU	4	19.10	SPRING	STANDARD36826	HKBCF	P
3-May-18	NE LANTAU	2	2.61	SPRING	STANDARD36826	HKBCF	S
3-May-18	NE LANTAU	3	6.82	SPRING	STANDARD36826	HKBCF	S
3-May-18	NE LANTAU	4	3.90	SPRING	STANDARD36826	HKBCF	S
15-May-18	NW LANTAU	2	6.33	SPRING	STANDARD36826	HKBCF	P
15-May-18	NW LANTAU	3	15.62	SPRING	STANDARD36826	HKBCF	P
15-May-18	NW LANTAU	4	3.20	SPRING	STANDARD36826	HKBCF	P
15-May-18	NW LANTAU	2	4.55	SPRING	STANDARD36826	HKBCF	S
15-May-18	NW LANTAU	3	6.80	SPRING	STANDARD36826	HKBCF	S
24-May-18	NW LANTAU	1	2.40	SPRING	STANDARD36826	HKBCF	P
24-May-18	NW LANTAU	2	21.73	SPRING	STANDARD36826	HKBCF	P
24-May-18	NW LANTAU	3	4.50	SPRING	STANDARD36826	HKBCF	P
24-May-18	NW LANTAU	1	2.10	SPRING	STANDARD36826	HKBCF	S
24-May-18	NW LANTAU	2	7.47	SPRING	STANDARD36826	HKBCF	S
24-May-18	NW LANTAU	3	1.40	SPRING	STANDARD36826	HKBCF	S
24-May-18	NE LANTAU	2	12.00	SPRING	STANDARD36826	HKBCF	P
24-May-18	NE LANTAU	3	24.08	SPRING	STANDARD36826	HKBCF	P
24-May-18	NE LANTAU	2	8.00	SPRING	STANDARD36826	HKBCF	S
24-May-18	NE LANTAU	3	6.42	SPRING	STANDARD36826	HKBCF	S
29-May-18	NW LANTAU	1	16.86	SPRING	STANDARD36826	HKBCF	P
29-May-18	NW LANTAU	2	15.94	SPRING	STANDARD36826	HKBCF	P
29-May-18	NW LANTAU	1	9.65	SPRING	STANDARD36826	HKBCF	S
29-May-18	NW LANTAU	2	0.95	SPRING	STANDARD36826	HKBCF	S

Appendix II. HKBCF Chinese White Dolphin Sighting Database (March-May 2018)

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
9-Mar-18	1	1157	3	NW LANTAU	2	377	ON	HKBCF	830950	805095	SPRING	NONE	S
14-Mar-18	1	1039	4	NW LANTAU	1	266	ON	HKBCF	823995	805472	SPRING	NONE	P
11-Apr-18	1	1056	3	NW LANTAU	2	199	ON	HKBCF	824672	804680	SPRING	NONE	P
24-Apr-18	1	1238	3	NW LANTAU	2	436	ON	HKBCF	827556	807549	SPRING	NONE	P
24-Apr-18	2	1329	2	NW LANTAU	2	21	ON	HKBCF	827915	805460	SPRING	NONE	P
3-May-18	1	1147	2	NW LANTAU	2	94	ON	HKBCF	825023	806473	SPRING	NONE	P
29-May-18	1	1113	1	NW LANTAU	1	67	ON	HKBCF	826654	804705	SPRING	NONE	P
29-May-18	2	1158	2	NW LANTAU	2	173	ON	HKBCF	827913	806479	SPRING	NONE	P

Appendix III. Individual dolphins identified during HKBCF monitoring surveys in March - May 2018

ID#	DATE	STG#	AREA
CH34	24/04/18	1	NW LANTAU
	29/05/18	2	NW LANTAU
NL37	14/03/18	1	NW LANTAU
NL46	29/05/18	1	NW LANTAU
NL123	24/04/18	1	NW LANTAU
	24/04/18	2	NW LANTAU
NL136	03/05/18	1	NW LANTAU
NL182	24/04/18	1	NW LANTAU
NL202	11/04/18	1	NW LANTAU
	03/05/18	1	NW LANTAU
NL261	11/04/18	1	NW LANTAU
NL286	11/04/18	1	NW LANTAU
	29/05/18	2	NW LANTAU
NL295	14/03/18	1	NW LANTAU
WL11	14/03/18	1	NW LANTAU
WL281	14/03/18	1	NW LANTAU

Appendix IV. Twelve individual dolphins that were identified during March to May 2018 under HKBCF impact phase monitoring surveys



Appendix IV. (cont'd)

NL136



NL182



NL202



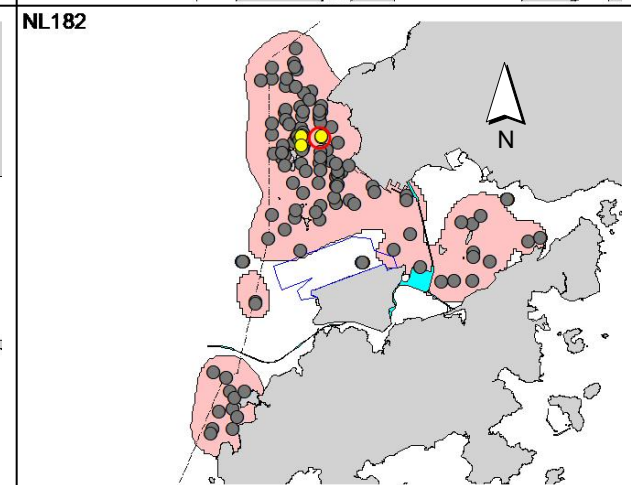
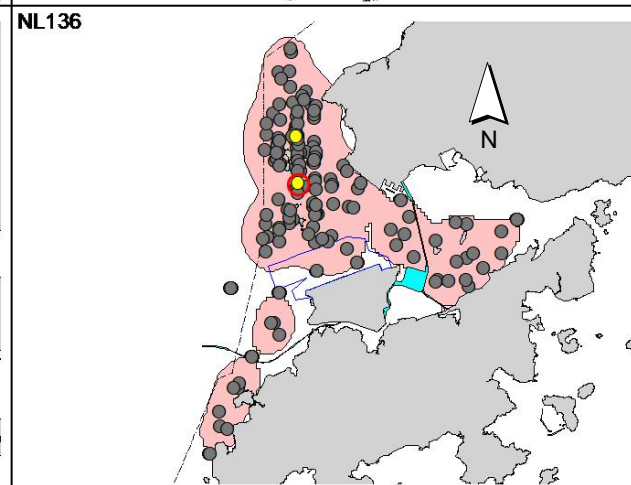
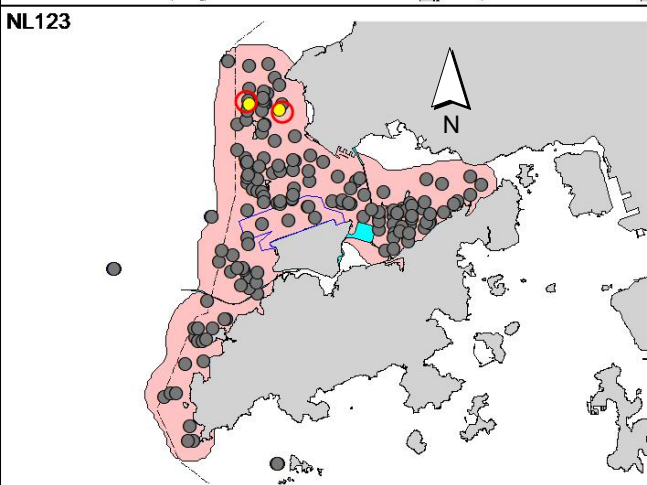
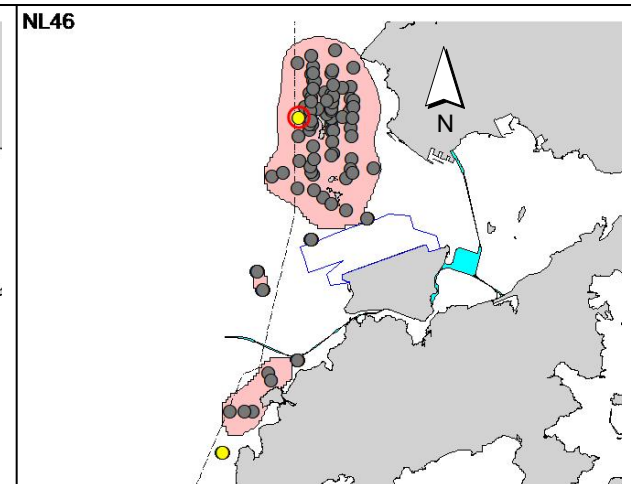
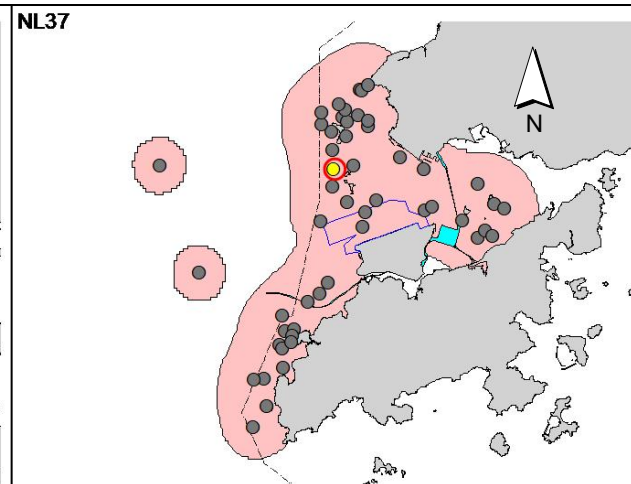
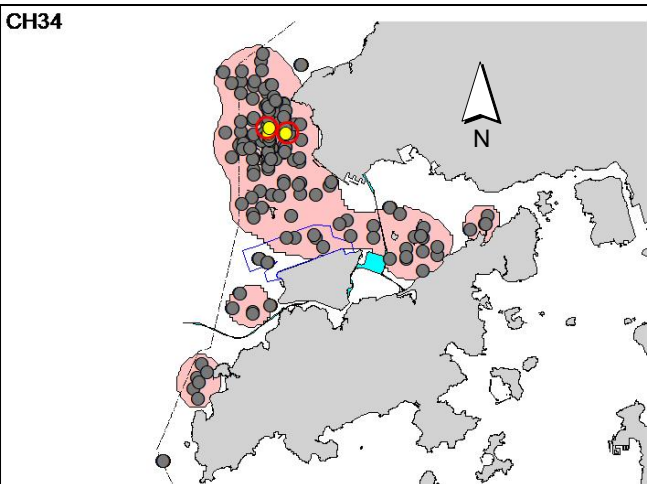
NL261



Appendix IV. (cont'd)

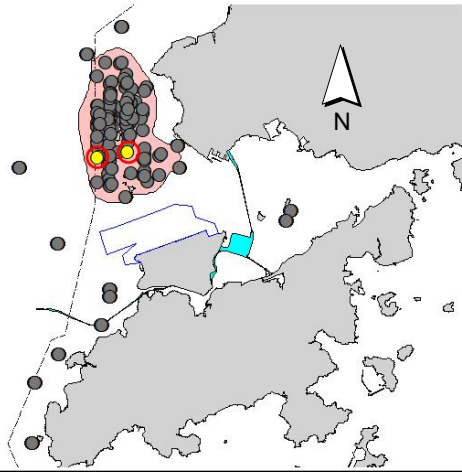


Appendix V. Ranging patterns (95% kernel ranges) of 12 individual dolphins that were sighted during HKBCF impact phase monitoring period (note: yellow dots with red circles indicate sightings made in March-May 2018 during HKBCF monitoring surveys; other yellow dots indicate the ones made during HKLR03 & HKLR09 monitoring surveys)

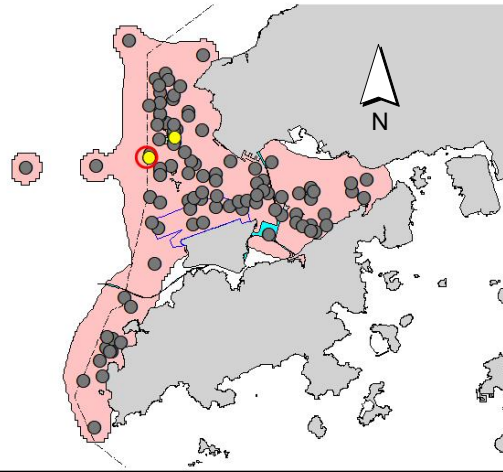


Appendix V. (cont'd)

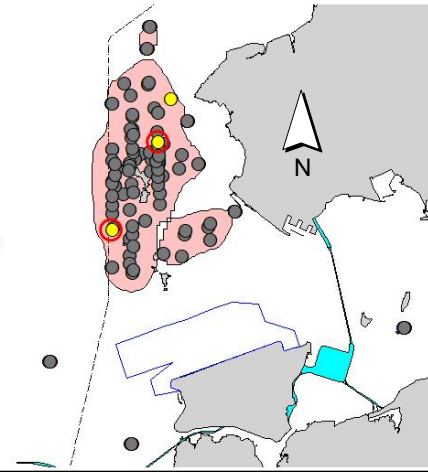
NL202



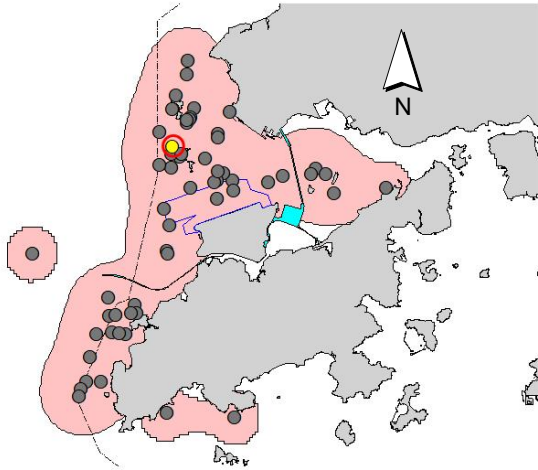
NL261



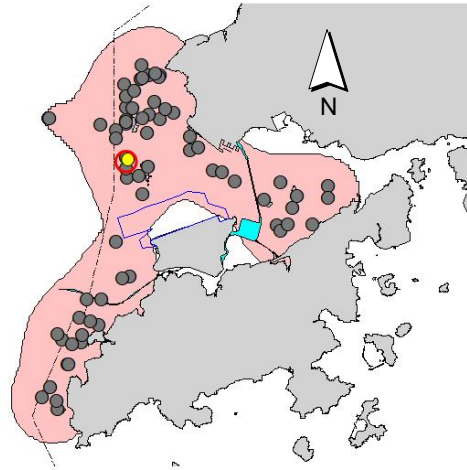
NL286



NL295



WL11



WL281

