

Ref.: HYDHZMBEEM00\_0\_8165L.20

18 August 2020

By Fax (3748 8900) and By Post

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

Attention: Mr. Jason Yu

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/2019/01  
HZMB HKBCF – Phase 2 and Other Works  
Quarterly EM&A Report for February 2020 - May 2020**

Reference is made to the Environmental Team's submission of Quarterly EM&A Report for February 2020 - May 2020 certified by the ET Leader (ET's ref.: "MCL/ED/0430/2020/C" dated 18 August 2020) and provided to us via e-mail on 18 August 2020.

We are pleased to inform you that we have no further comments on the captioned submission.

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



Manson Yeung  
Independent Environmental Checker  
HZMB HKBCF

c.c.	HyD	Attn.: Mr. Andy Ho	(By Fax: 3188 6614)
	HyD	Attn.: Mr. Harry Louie	(By Fax: 3188 6614)
	Fugro	Attn.: Mr. Calvin Leung	(By Fax: 2450 6138)
	CHEC	Attn.: Mr. Johnason Ko	(By Fax: 2887 3104)

Internal: DY, YH, ENPO Site



FUGRO TECHNICAL SERVICES LIMITED

Fugro Development Centre

5 Lok Yi Street, Tai Lam

Tuen Mun, NT

Hong Kong

Date 18 August 2020

Our Ref. MCL/ED/0430/2020/C

Ramboll Hong Kong Limited  
21/F, BEA Harbour View Centre,  
56 Gloucester Road,  
Wan Chai, Hong Kong

BY EMAIL

Attn.: Mr. Manson Yeung, Independent Environmental Checker

Dear Sir,

**Quarterly EM&A Report for  
Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and  
Other Works (Contract No. HY/2019/01)**

Pursuant to Section 16.4 of the updated EM&A Manual for Hong Kong Boundary Crossing Facilities covering the captioned project, we hereby submit the certified Quarterly EM&A Report for February 2020 to May 2020 for your verification.

Thank you for your attention, should there be any comments or queries, please contact our Mr. Cyrus Lai at 3565-4442 or the undersigned at 3565-4441.

Yours faithfully,  
for and on behalf of  
FUGRO TECHNICAL SERVICES LIMITED

Calvin Leung  
Environmental Team Leader

c.c. AECOM Attn: Mr. Jason Yu, Mr. Gordon Kok  
Ramboll Attn: Mr. Y. H. Hui, Mr. K. C. Chan  
CHEC Attn: Mr. Marko Chan, Mr. Matthew Wu



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## Quarterly EM&A Report (February 2020 - May 2020)

0002/20/ED/0093 03 |

**Contact No. HY/2019/01 Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works**

# Document Control

## Document Information

Project Title	Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works (Contract No. HY/2019/01)
Document Title	Quarterly EM&A Report (February 2020 - May 2020)
Fugro Project No.	0002/20
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## Client Information

Client	China Harbour Engineering Co., Ltd. - Contract No. HY/2019/01
Client Address	China Harbour Building, 370-4 King's Road, North Point Hong Kong
Client Contact	Matthew Wu

## Revision History

Issue	Date	Comments on Content	Prepared and checked By	Review By	Certified By
03	17 August 2020	No adverse comment from IEC	KH	CY	MP
02	13 August 2020	IEC comments released	KH	CY	MP
01	22 June 2020	IEC comments released	KH	CY	MP

## Environmental Team

Initials	Name	Role	Signature
MP	Calvin M.P. Leung	Environmental Team Leader	
CY	Cyrus C.Y. Lai	Senior Environmental Consultant	
KH	Toby K.H. Wan	Assistant Environmental Consultant	



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## EXECUTIVE SUMMARY

This Quarterly Environmental Monitoring and Audit (EM&A) Report is prepared for Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works" (hereafter referred to as "the Contract") for the Highways Department of Hong Kong Special Administrative Region (HKSAR). Contract No. HY/2019/01 was awarded to China Harbour Engineering Co. Limited and Fugro Technical Services Limited (FTS) was appointed as the Environmental Team (ET) by the Contractor.

Contract No. HY/2019/01 is part of the "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities" (HZMB HKBCF) Project which is a "Designated Project" under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The current Environmental Permit (EP) for HKBCF, namely No. EP-353/2009/K, was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. Commencement of the Contract took place on 4 December 2019 and the construction site preparation works commenced in early February 2020.

Fugro Technical Services Limited (FTS) 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 is providing environmental team services for the Contract.

This is the 1st Quarterly EM&A Report for the Contract which summaries findings of the EM&A programme during the reporting period from 1 February 2020 to 31 May 2020.

### **Environmental Monitoring and Audit Progress**

The Quarterly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality, noise and the post-construction dolphin monitoring works for the Contract are covered by Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works". The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 as part of EM&A programme if the impact air quality monitoring work is no longer covered by Contract No. HY/2011/03 respectively. However, this is subject to ENPO's final decision on which ET should carry out the monitoring work at these stations.

### **Breaches of Action and Limit Levels**

No Action and Limit Level exceedance was recorded for air quality monitoring in the reporting period. Also, no Action and Limit Level exceedance was recorded for construction noise monitoring in the reporting period.

### **Complaint Log**

No complaints were received in the reporting period.

### **Notifications of any Summons and Successful Prosecutions**

No notifications of summons and prosecutions were received in the reporting period.

### **Reporting Change**

The remaining post-construction dolphin monitoring works under Contract No. HY/2013/04 "HZMB HKBCF – Infrastructure Works Stage II (Southern Portion)" were suspended from 1 March 2020. The ET of Contract No. HY/2019/01 is required and continues the full implementation of environmental monitoring commencing on 1 March 2020.

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# 1. INTRODUCTION

## 1.1 Background

- 1.1.1 Fugro Technical Services Limited was commissioned by China Harbour Engineering Co. Limited (also referred to as “the Contractor”) to undertake the Environmental Team (ET) services (including environmental monitoring and audit (EM&A)) for Contract No. HY/2019/01 “Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works”.
- 1.1.2 Contract No. HY/2019/01 is part of the “Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities” (HZMB HKBCF) Project which is a “Designated Project” under Schedule 2 of the Environmental Impact Assessment (EIA) Ordinance (Cap. 499) and for which an EIA Report (Register No. AEIAR-145/2009) was prepared and approved. The current Environmental Permit (EP) for HKBCF, namely No. EP-353/2009/K, was issued on 11 April 2016. These documents are available through the EIA Ordinance Register. The general layout of the Project area is shown in **Figure 1**. Commencement of the Contract took place on 4 December 2019 and the construction site preparation works commenced in early February 2020.
- 1.1.3 This is the 1st Quarterly EM&A report to document the findings of site inspection activities and EM&A programme carried out by the Contractor of Contract No. HY/2019/01 from 1 February 2020 to 31 May 2020 (reporting period) and is submitted to fulfil Condition 5.4 of the EP.

## 1.2 Project Description

- 1.2.1 The works to be executed under Contract No. HY/2019/01 include the following major items:
- Landscaping and establishment works;
  - Irrigation system and associated drainage pumping system and facilities;
  - Erection and installation in the Passenger Clearance Building;
  - Public transport interchange (PTI) public toilet, satellite refuse collection point (RCP) and observation guard booths;
  - PTI cross boundary shuttle (CBS) / cross boundary coach (CBC) lanes and covered walkway;
  - Vehicle clearance plazas (VCP) vehicle kiosks and associate automatic vehicle clearance supporting system (AVCSS).

## 1.3 Project Organization

1.3.1 The Project Organization 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
Engineer or Engineer's Representative (AECOM Asia Co. Ltd.)	Senior Resident Engineer	Mr. Jason Yu	3748 8903
	Resident Engineer	Mr. Winston Wong	3748 8918
	Resident Engineer	Mr. Gordon Kok	3748 8967
Environmental Project Office / Independent Environmental Checker (Ramboll Hong Kong Limited)	Environmental Project Office Leader	Mr. Y. H. Hui	3465 2888
	Independent Environmental Checker (IEC) (until 17 May 2020)	Mr. Ray Yan	34652836
	Independent Environmental Checker (IEC) (from 18 May 2020)	Mr. Manson Yeung	9700 6767
	Environmental Site Supervisor (until 17 May 2020)	Mr. Manson Yeung	9700 6767
	Environmental Site Supervisor (from 18 May 2020)	Mr. K. C. Chan	3465 2882
Contractor (China Harbour Engineering Co. Ltd)	Environmental Manager	Mr. Marko Chan	9427 2879
	Environmental Officer	Mr. Matthew Wu	6076 2675
Environmental Team (Fugro Technical Services Limited)	Environmental Team Leader (ETL)	Mr. Calvin Leung	3565 4441

## 1.4 Construction Programme and Activities

1.4.1 The site layout plan of the Contract is shown in **Figure 1**.

1.4.2 The construction programme of this Contract is shown in **Appendix A**.

## 1.5 Works undertaken during the report period

1.5.1 The main construction works carried out in the reporting period were as follow:

- Site Fence at South Public Transport Interchanges (SPTI) (land-based);
- Security measure at existing gate at South Public Transport Interchanges (SPTI) (land-based);
- Recessed Cover at South Public Transport Interchanges (SPTI) and North Public Transport Interchanges (NPTI) (land-based);
- Recessed Cover near building 035 (land-based);
- UPS room at South Public Transport Interchanges (SPTI) and North Public Transport Interchanges (NPTI) (land-based);
- UPS room near building 062 (land-based);

- Minor Works near building 062 (land-based);
- Minor Works at Passenger Clearance Building (PCB) (land-based);
- Site hoarding at Vehicle Clearance Plaza (VCP) (land-based);
- Excavation at Vehicle Clearance Plaza (VCP) (land-based);
- Road & Drain works at South Public Transport Interchanges (SPTI) and North Public Transport Interchanges (NPTI) (land-based);
- Vertical access at Passenger Clearance Building (PCB) (land-based);
- Site office renovation at WA3 (land-based).
- Covered Walkway at South Public Transport Interchanges (SPTI) and North Public Transport Interchanges (NPTI) (land-based);
- Refuse collection point at North Public Transport Interchanges (NPTI) (land-based);
- Public Toilet at North Public Transport Interchanges (NPTI) (land-based).
- Kiosks Construction at Vehicle Clearance Plaza (VCP) (land-based).

## 2. EM&A REQUIREMENTS

### 2.1 Summary of EM&A Requirement

- 2.1.1 The Quarterly EM&A programme was undertaken in accordance with the Updated EM&A Manual for HKBCF (Version 1.0). It should be noted that the air quality, noise and the post-construction dolphin monitoring works for the Contract are covered by Contract No. HY/2019/01 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works".
- 2.1.2 According to the Contract Specific EM&A Manual, air quality monitoring at station AMS2, AMS3C and AMS7B, and noise monitoring at station NMS2 and NMS3C are covered by Contract No. HY/2019/01. It should be noted that the air quality monitoring at station AMS6 is covered by Contract No. HY/2011/03. The ET of the Contract or another ET of the HZMB project is required to conduct impact air quality monitoring at AMS6 as part of EM&A programme if the impact air quality monitoring work is no longer covered by Contract No. HY/2011/03 respectively. However, this is subject to ENPO's final decision on which ET should carry out the monitoring work at these stations.
- 2.1.3 The most updated air and noise locations are summarized in **Table 2.1**. The locations of the air quality and noise monitoring stations shown in **Figure 2** and **Figure 3**, respectively.

Table 2.1 Air Quality and Noise Monitoring Location

Environmental Monitoring	Monitoring Station	Location
Air Quality	AMS2	Tung Chung Development Pier
	AMS3C	Ying Tung Estate Market Rooftop
	AMS6	Dragonair / CNAC (Group) Building (HKIA)
	AMS7B	Third Runway Site Office
Noise	NMS2	Seaview Crescent
	NMS3	Ying Tung Estate Refuse Collection Point

Remarks:

1. The ET of this Contract should conduct impact air quality monitoring at station AMS6 listed in the table as part of EM&A programme according to latest notification from ENPO when the monitoring station is no longer covered by another ET of the HZMB project.
2. The Limit Levels for schools will be applied for NMS3C.



- 2.1.4 The remaining post-construction dolphin monitoring works under Contract No. HY/2013/04 "HZMB HKBCF – Infrastructure Works Stage II (Southern Portion)" were suspended from 1 March 2020. The ET of Contract No. HY/2019/01 is required and continues the full implementation of environmental monitoring commencing on 1 March 2020.
- 2.1.5 Currently, the role of dolphin monitoring and data collection are still under Contract No. HY/2012/08 "Tuen Mun-Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section". To avoid redundancy in the monitoring effort, the findings of Contract No. HY/2012/08 were used for this reporting month. The dolphin monitoring programme have adopted the standard line-transect method (Buckland et al. 2001) to survey the pre-set and fixed transect lines defined by AFCD in the Northeast Lantau (NEL) and Northwest Lantau (NWL) survey areas.

## 2.2 Monitoring Requirement

- 2.2.1 The monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology, monitoring schedule, meteorological information are detailed in the monthly EM&A report prepared for this Contract.
- 2.2.2 The air quality monitoring requirements, monitoring equipment, monitoring parameters, frequency and duration, monitoring methodology, monitoring schedule, meteorological information for AMS6 are detailed in the monthly EM&A report prepared for Contract No. HY/2011/03.

## 2.3 Action and Limit Levels

- 2.3.1 The Action and Limit Levels for noise impact monitoring have been set and are presented in **Appendix C**.

## 2.4 Event and Action Plans

- 2.4.1 The event and action plans for air quality and noise monitoring are presented in **Appendix D**.

## 2.5 Mitigation Measures

- 2.5.1 The Contractor had implemented environmental mitigation measures and requirements as stated in the EIA Reports, the EP and EM&A Manuals. The implementation status of the environmental mitigation measures during the reporting period is summarized in **Appendix E**.

### 3. ENVIRONMENTAL MONITORING AND AUDIT

#### 3.1 Air Quality Monitoring Results

- 3.1.1 1-hour TSP and 24-hour TSP impact monitoring at AMS2, AMS3C and AMS7B were carried out in the reporting period, the monitoring results are reported in the monthly EM&A Report prepared for this Contract.
- 3.1.2 There was no Action / Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS2, AMS3C and AMS7B was recorded during the reporting period.
- 3.1.3 The monitoring results for AMS6 are reported in the monthly EM&A Reports prepared for Contract No. HY/2011/03.
- 3.1.4 Summary of Action and Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.

#### 3.2 Noise Monitoring Results

- 3.2.1 Construction noise monitoring were carried out in the reporting period, the monitoring results for NMS2 and NMS3C are reported in the monthly EM&A Reports prepared for this Contract.
- 3.2.2 There was no Action / Limit Level exceedance for construction noise at NMS2 was recorded during the reporting period.
- 3.2.3 School calendar of Ho Yu College was checked against noise monitoring days at NMS3C. However, all schools were suspended under the government's special arrangement in reducing the risk of the coronavirus disease (COVID-19) in the reporting period. Ho Yu College was served as the examination centre for Hong Kong Diploma of Secondary Education Examination (HKDSE) on 27, 28 April 2020, and 8, 14 May 2020. The Limit Level of 65 dB (A) was applied on these days.
- 3.2.4 The measured noise levels recorded at NMS3C on 8 and 14 May 2020 were 67.1 dB (A) and 65.5 dB (A), which exceeded the noise level of 65 dB (A) during examination at Ho Yu College. The noise level recorded on 8 May 2020 was higher than the baseline level of 66.3 dB (A). Therefore, baseline correction was carried out and the corrected noise level which solely represent the noise level of construction works was 59.4 dB (A), there was no exceedance after correction. The noise level recorded on 14 May 2020 was below the baseline level, it is not considered as an exceedance. As such the Event and Action Plan was not triggered.

#### 3.3 Dolphin Monitoring Results

- 3.3.1 In accordance with the requirements of the updated EM&A manual, the dolphin monitoring programme have adopted the standard line-transect method (Buckland et al. 2001) to survey the pre-set and fixed transect lines defined by AFCD in the Northeast Lantau (NEL) and Northwest Lantau (NWL) survey areas.

3.3.2 The post-construction dolphin monitoring conducted is vessel-based and combines line-transect and photo-ID methodology, which have adopted. To avoid redundancy in the monitoring effort, the findings of Contract No. HY/2012/08 were used for this reporting month. The details are presented in **Appendix I**.

### **3.4 Site Inspection**

3.4.1 Site inspections were carried out weekly to monitor the implementation of proper environmental pollution control and mitigation measures for the Project. A summary of the mitigation measures implementation schedule is provided in **Appendix E**.

3.4.2 17 weekly environmental site inspections were carried out in the reporting period. Details of observations recorded during the site inspections are presented in **Appendix F**.

### **3.5 Advice on the Solid and Liquid Waste Management Status**

3.5.1 The Contractor registered as a chemical waste producer for the Contract. Sufficient numbers of receptacles were available for general refuse collection and sorting.

3.5.2 The summary of waste flow table is detailed in **Appendix G**.

3.5.3 If off-site disposal is required, the excavated marine mud from the land-based works shall be disposed of at the designated disposal sites within Hong Kong as allocated by the Marine Fill Committee or other locations as agreed by the Director. The Contractor shall ensure no spilling and overflowing of materials during loading / unloading / transportation is allowed.

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 Packing, Labelling and Storage of Chemical Waste.

## 4. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

### 4.1 Environmental Exceedance

- 4.1.1 No Action and Limit Level exceedance of 1-hr TSP level and 24-hr TSP level recorded at station AMS2, AMS3C and AMS7B in the reporting period.
- 4.1.2 Summary of Action and Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.
- 4.1.3 No Action / Limit Level exceedance for construction noise at NMS2 and NMS3C was recorded during the reporting period.

### 4.2 Complaints, Notification of Summons and Prosecution

- 4.2.1 No environmental complaint, notification of summons and successful prosecution were received in the reporting period.
- 4.2.2 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Appendix H**.

## 5. CONCLUSION AND RECOMMENDATION

### 5.1 Conclusions

- 5.1.1 1-hour TSP and 24-hour TSP impact monitoring at AMS2, AMS3C and AMS7B were carried out in the reporting period, no Action / Limit Level exceedance was recorded during the period.
- 5.1.2 Summary of Action and Limit Level exceedance of 1-hour TSP level and 24-hour TSP level at AMS6 shall be referred to the monthly EM&A report prepared by Contract No. HY/2011/03.
- 5.1.3 Construction noise monitoring were carried out in the reporting period, no Action / Limit Level exceedance was recorded during the period.
- 5.1.4 In accordance with the Dolphin Monitoring Survey Findings and Analysis in Section 3.3.9 and 3.3.10 of **Appendix I**, low dolphin occurrence of dolphins within the survey areas in both NEL and NWL were observed during the construction period. Moreover, such significantly and dramatically decrease of dolphin usage in those area has also been observed in this reporting quarter. In addition, the dolphin usage in North Lantau water has not only shown no sign of recovery, but also has continued to decline to the lowest ever level. However, it is critical to continuously monitor the dolphin usage in North Lantau region, in order to determine whether there is any sign of recovery under the post-construction activities of the HKBCF next quarter.
- 5.1.5 17 weekly environmental site inspections were carried out in the reporting period. Recommendations on mitigation measures for air quality impact, water quality impact and chemical and waste management were given to the Contractor for remediating the deficiencies identified during the site inspections.
- 5.1.6 Referring to the Contractor's information, no environmental complaint, notification of summons and successful prosecution was received in the reporting period.

### 5.2 Comment and Recommendations

- 5.2.1 The recommended environmental mitigation measures, as proposed in the EIA reports and EM&A Manuals shall be effectively implemented to minimize the potential environmental impacts from the Project. The EM&A programme would effectively monitor the environmental impacts generated from the construction activities and ensure the proper implementation of mitigation measures.
- 5.2.2 According to the environmental site inspections performed in the reporting period, the following recommendations were provided:

#### Air Quality Impact

- Dust suppression measure should be provided.
- Water spray should be provided at all main exit to prevent sludge from being taken outside the site area.

- The contractor was reminded to maintain housekeeping to prevent dust leaving from the site.

#### Construction Noise Impact

- No specific observation was identified in the reporting period.

#### Water Quality Impact

- Stagnant water should be avoided and removed.
- Silt inside the U-channel should be cleared.
- The contractor was reminded surface water should be controlled properly to prevent flowing outside.

#### Chemical and Waste Management

- All waste generated at the site should be cleaned and collected.
- The opening of drip tray should be plugged to prevent chemical leakage.
- Drip tray should be provided for chemical container.
- The contractor was reminded to maintain housekeeping.

#### Landscape and Visual Impact

- No specific observation was identified in the reporting period.

#### Permit/ Licenses

- NRMM label should be provided to replace the substandard label.

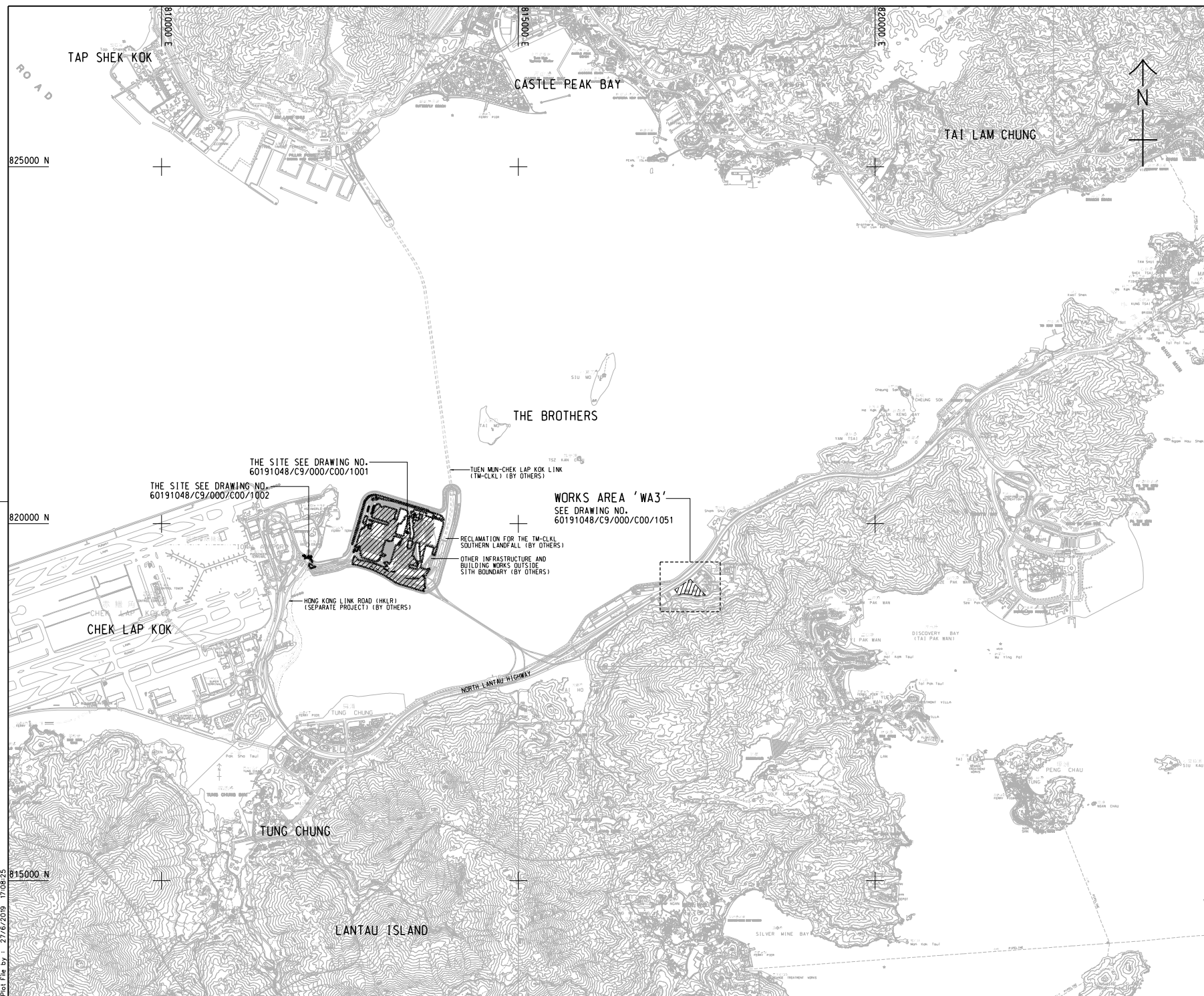
#### Others

- The caps for the water-safety barriers should be provided.

# Figure 1

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The Site Layout Plan of the Contract



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

**LEGEND:**

- [Hatched Box] SITE BOUNDARY
- [Hatched Box] WORKS AREA

THE SITE SEE DRAWING NO. 60191048/C9/000/C00/1001

THE SITE SEE DRAWING NO. 60191048/C9/000/C00/1002

WORKS AREA 'WA3'  
SEE DRAWING NO. 60191048/C9/000/C00/1051

TUEN MUN-CHEK LAP KOK LINK (TM-CKLK) (BY OTHERS)

RECLAMATION FOR THE TM-CKLK SOUTHERN LANDFALL (BY OTHERS)

OTHER INFRASTRUCTURE AND BUILDING WORKS OUTSIDE SITE BOUNDARY (BY OTHERS)

HONG KONG LINK ROAD (HKLR) (SEPARATE PROJECT) (BY OTHERS)

REV. NO.	DESCRIPTION	BY	DATE
-	TENDER DRAWING	TTHK	JUL 19

**香港高速公路局**  
**HIGHWAYS DEPARTMENT**  
 主要工程管理處 (傳真與函)  
 Major Works Project Management Office (Special Duties)

**HONG KONG-ZHUHAI-MACAO BRIDGE**  
**HONG KONG BOUNDARY CROSSING FACILITIES**  
 - PHASE 2 AND OTHER WORKS

**SITE LOCATION PLAN**

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

DRG. NO. 60191048/C9/000/C00/1000  
 圖紙編號

DESIGNED BY TTHK	CONTRACT NO. HY/2019/01	APPROVED BY SC1
DRAWN BY JC	STATUS REV	

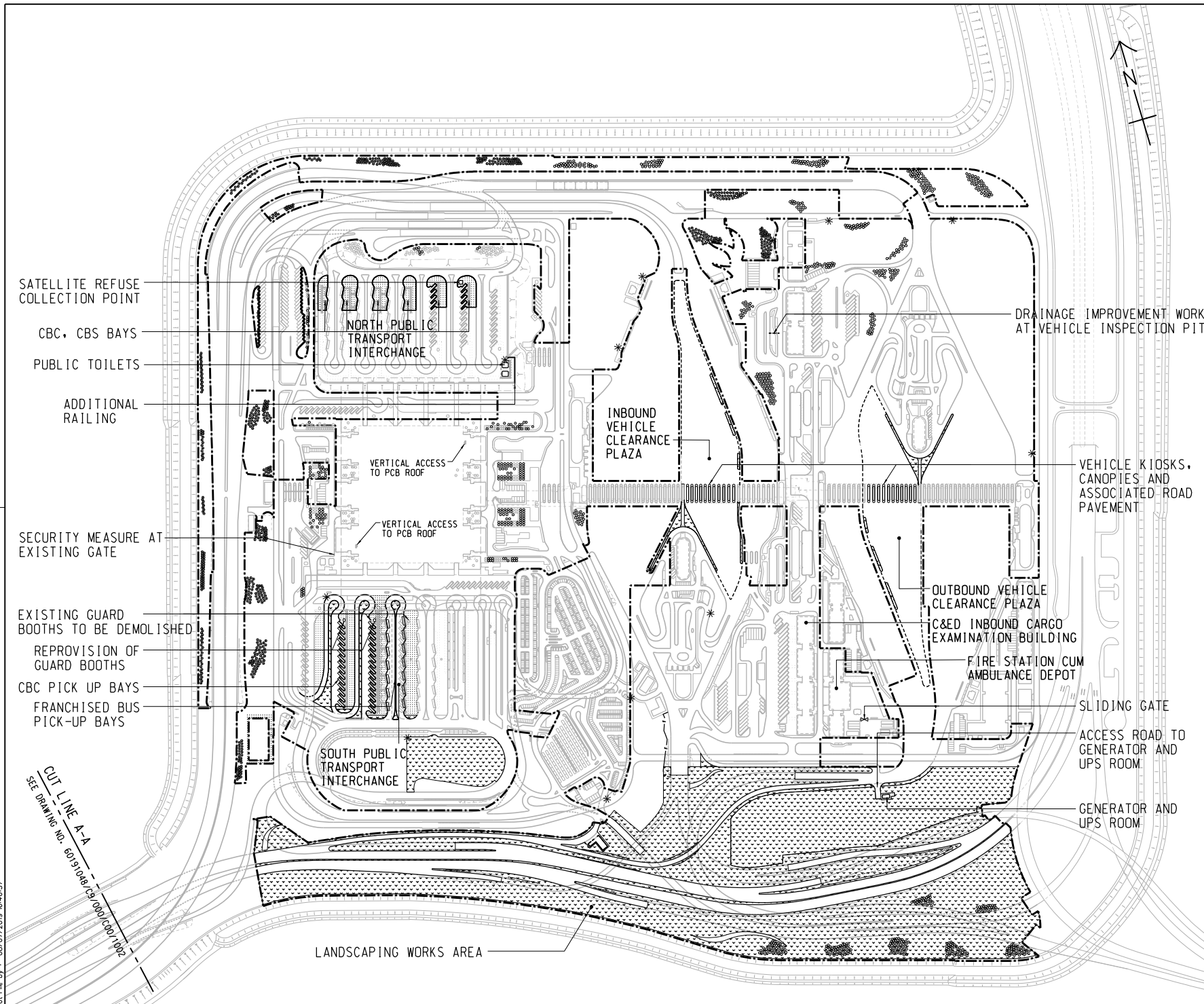
SCALE 1:25000  
 縮尺 1:25000

VERTICAL AXIS IN METRES  
 垂直軸以公尺

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Plot File by : 27/6/2019 17:08:25





**REMARKS:**

1. IN SPT1:
  - DEMOLISH 2 NOS. EXISTING GUARD BOOTHS AND RE-PROVISION TO REVISED LOCATIONS AS SHOWN
  - CONSTRUCT COVERED WALKWAYS FOR THE NEW FB AND CBC PICK UP BAYS
  - MODIFY EXISTING DUCTING AND POLES FOR ELV SYSTEM, ROAD LIGHTING AND PILLAR BOXES, AND THE ASSOCIATED CABLING WORKS.
  - RELOCATE AND REINSTATE 3 NOS. OF EXISTING BUS OPERATOR OFFICES AND FOOD TRUCK
  - REPLACEMENT OF DRAWPIT COVERS
2. IN NPT1:
  - CONSTRUCT COVERED WALKWAYS FOR THE NEW CBC, CBS PICK UP BAYS AND PUBLIC TOILETS
  - PROVIDE AUTOMATIC IRRIGATION SYSTEM AT SLOPES
  - MODIFY EXISTING COVERED WALKWAY AND PROVISION OF LIGHTING
  - REPLACEMENT OF DRAWPIT COVERS
3. LANDSCAPING WORKS AREA:
  - CONSTRUCT IRRIGATION SYSTEM WITH 13 NOS. OF NEW WATER POINT AND THE AUTOMATIC IRRIGATION SYSTEM AND PROVIDE MAINTENANCE WORKS
  - LANDSCAPE SOFTWORK, ESTABLISHMENT AND MAINTENANCE WORKS
  - CONSTRUCT RIVER WASHED STONE SWATHE AND MAINTENANCE WORKS
  - PROTECT EXISTING PLANTING AND HARD STRUCTURES
4. PASSENGER CLEARANCE BUILDING
  - VERTICAL ACCESS
  - IMPROVEMENT WORKS FOR WATER FEATURE
  - MINOR REMAINING WORKS
  - PROVISION OF NEW CENTRAL AVSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVSS
5. VEHICLE KIOSKS AT INBOUND & OUTBOUND VCP
  - PROVISION OF AVSS AT NEW KIOSKS TO SERVE 24 NOS. VEHICULAR LANES
  - REPLACEMENT OF BARRIER GATE WITH SKIRTING AT 72 NOS. EXISTING KIOSK
6. C&E INBOUND CARGO EXAMINATION BUILDING
  - PROVISION OF NEW CENTRAL AVSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVSS

**ABBREVIATION:**

- SPT1 - SOUTH PUBLIC TRANSPORT INTERCHANGE
- NPT1 - NORTH PUBLIC TRANSPORT INTERCHANGE
- VCP - VEHICLE CLEARANCE PLAZA
- PCB - PASSENGER CLEARANCE BUILDING
- FB - FRANCHISED BUS
- CBC - CROSS BOUNDARY COACH
- CBS - CROSS BOUNDARY SHUTTLE
- ELV - EXTRA LOW VOLTAGE
- AVSS - AUTOMATIC VEHICLE CLEARANCE SUPPORT SYSTEM

**NOTE:**

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C9/000/C00/1002

**LEGEND:**

- SITE BOUNDARY
- ▨ AMENITY AREA
- ▤ FOOTPATH
- ▩ COVERED WALKWAY
- - - SECURITY FENCE
- TREE PLANTING
- \* IRRIGATION POINT

NO.	DESCRIPTION	DATE
1	TENDER DRAWING	JUL 19

香港公路局 (Highways Department)
   
 主要工程管理處 (Special Duties) (Major Works Project Management Office)
   
 HONG KONG-ZHUIHAI-MACAO BRIDGE
   
 HONG KONG BOUNDARY CROSSING FACILITIES
   
 PHASE 2 AND OTHER WORKS

**GENERAL ARRANGEMENT**

SHEET 1 OF 2

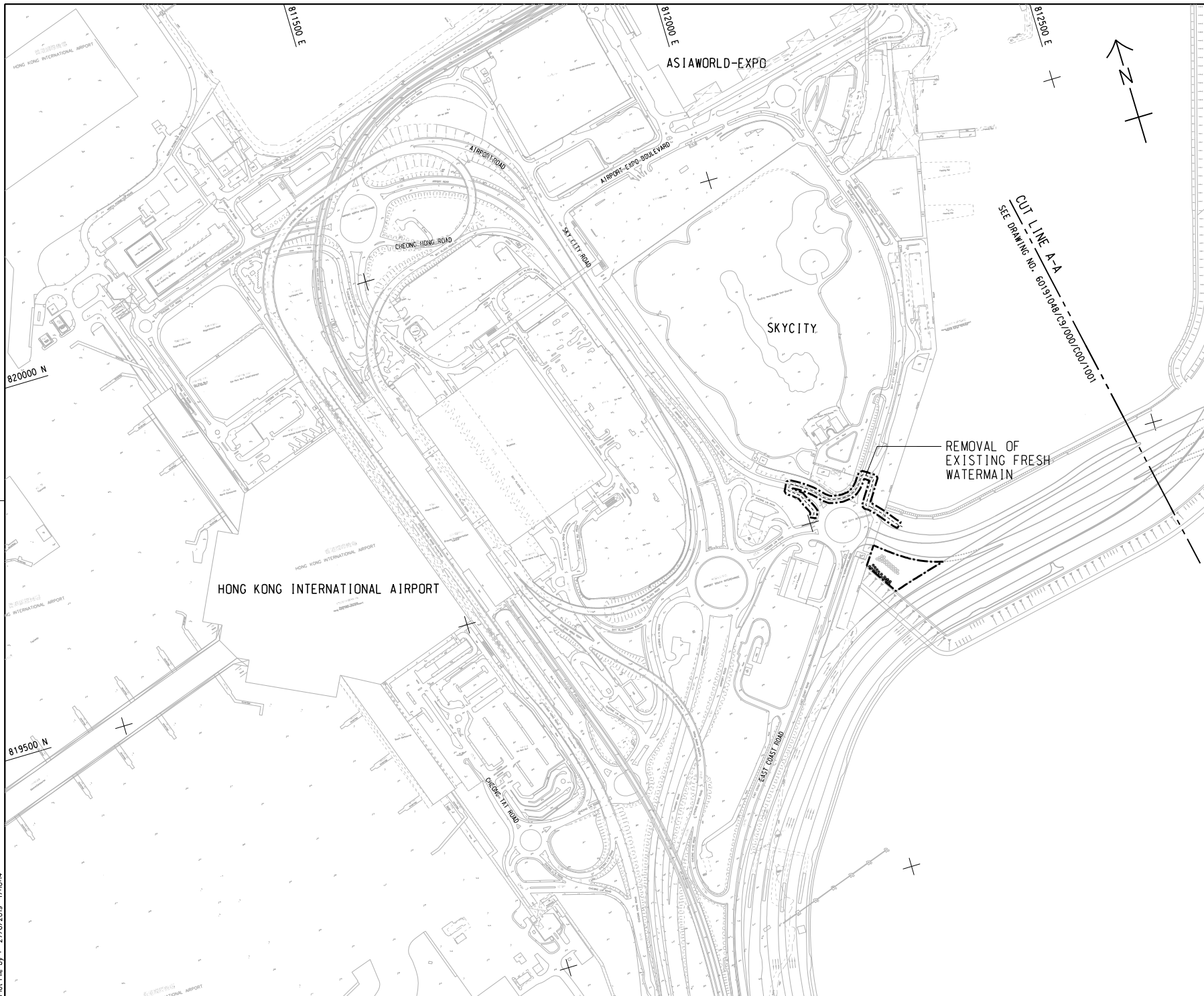
Rogers Stirk Harbour + Partners
   
 BURO HAPPOLD ATKINS ADI

DRGNO 60191048/C9/000/C00/1001
   
 圖紙編號

DESIGNED BY TTHK	CONTRACT NO. HY/2019/01	APPROVED BY SCI
DRAWN BY JC	STATUS REV	
SCALE 1:2500	DRAWING UNIT METRES	

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**NOTE:**  
 1. THIS DRAWING TO BE READ IN CONJUNCTION WITH DRAWING NOS. 60191048/C9/000/C00/1001.

REV. NO.	DESCRIPTION	DATE
1	TENDER DRAWING	JUL 19

香港公路局  
 HIGHWAYS DEPARTMENT  
 主要工程管理處 (傳真專組)  
 Major Works Project Management Office (Special Duties)

HONG KONG-ZHUHAI-MACAO BRIDGE  
 HONG KONG BOUNDARY CROSSING FACILITIES  
 - PHASE 2 AND OTHER WORKS

**GENERAL ARRANGEMENT**  
 SHEET 2 OF 2

AECOM  
 Rogers Strik Harbour + Partners  
 BURO HAPPOLD ATKINS ADI

DRG. NO. 60191048/C9/000/C00/1002  
 圖紙編號

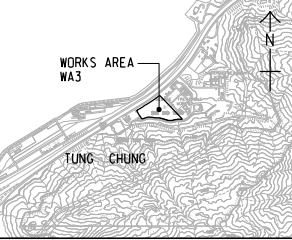
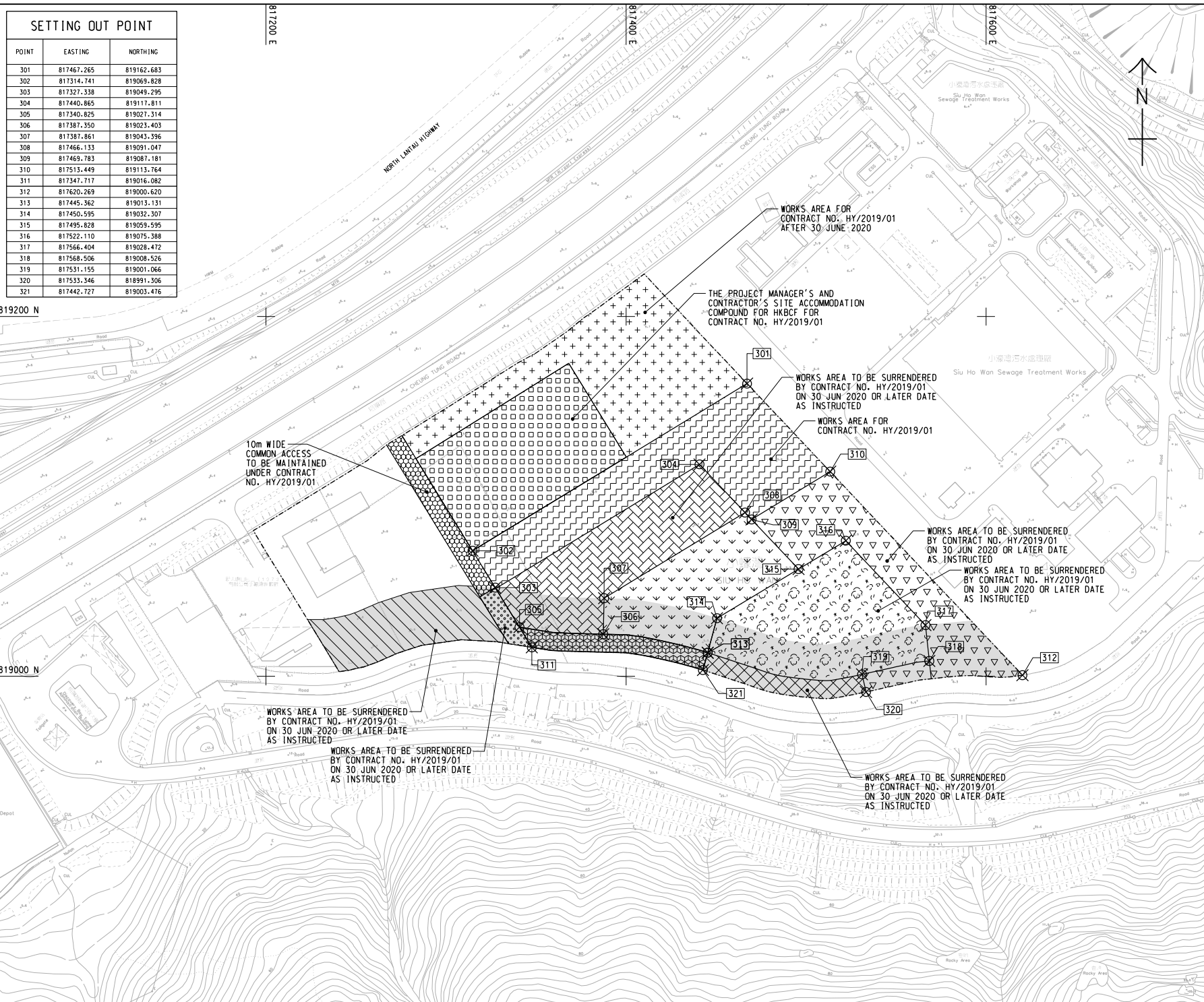
DESIGNED BY 設計	CONTRACT NO. 合約編號	P. Dir. APPROVED 審核
TTHK	HY/2019/01	SC1

SCALE  
 比例尺  
 A1 1 : 2500  
 DIMENSIONING UNIT IN METRES  
 尺寸單位 公尺  

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Plot File by : 27/6/2019 17:03:4

SETTING OUT POINT		
POINT	EASTING	NORTHING
301	817467.265	819162.683
302	817314.741	819069.828
303	817327.338	819049.295
304	817440.865	819117.811
305	817340.825	819027.314
306	817387.350	819023.403
307	817387.861	819043.396
308	817466.133	819091.047
309	817469.783	819087.181
310	817513.449	819113.764
311	817347.717	819016.082
312	817620.269	819000.620
313	817445.362	819013.131
314	817450.595	819032.307
315	817495.828	819059.595
316	817522.110	819075.388
317	817566.404	819028.472
318	817568.506	819008.526
319	817531.155	819001.066
320	817533.346	818991.306
321	817442.727	819003.476



LOCATION PLAN  
SCALE 1 : 25000

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

LEGEND:

	WORKS AREA BOUNDARY
	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
	PORTION 3.10
	PORTION 3.11
	PORTION 3.12
	NON-BUILDING AREA 8200m <sup>2</sup> (WHOLE)

REV. NO.	DESCRIPTION	DATE
1	TENDER DRAWING	TTHK 06/2019

HIGHWAYS DEPARTMENT  
 Major Works Project Management Office (Special Duties)  
 HONG KONG-ZHUHAI-MACAO BRIDGE  
 HONG KONG BOUNDARY CROSSING FACILITIES  
 - PHASE 2 AND OTHER WORKS

WORKS AREA WA3

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

DRGNO. 60191048/C9/000/C00/1051  
 圖紙編號

DESIGNED BY TTHK	CONTRACT NO. HY/2019/01	P. Dir. APPROVED SCL
DRAWN BY JC	STATUS REV	
SCALE AS 1 : 1000	DRAWING UNIT IN METRES	

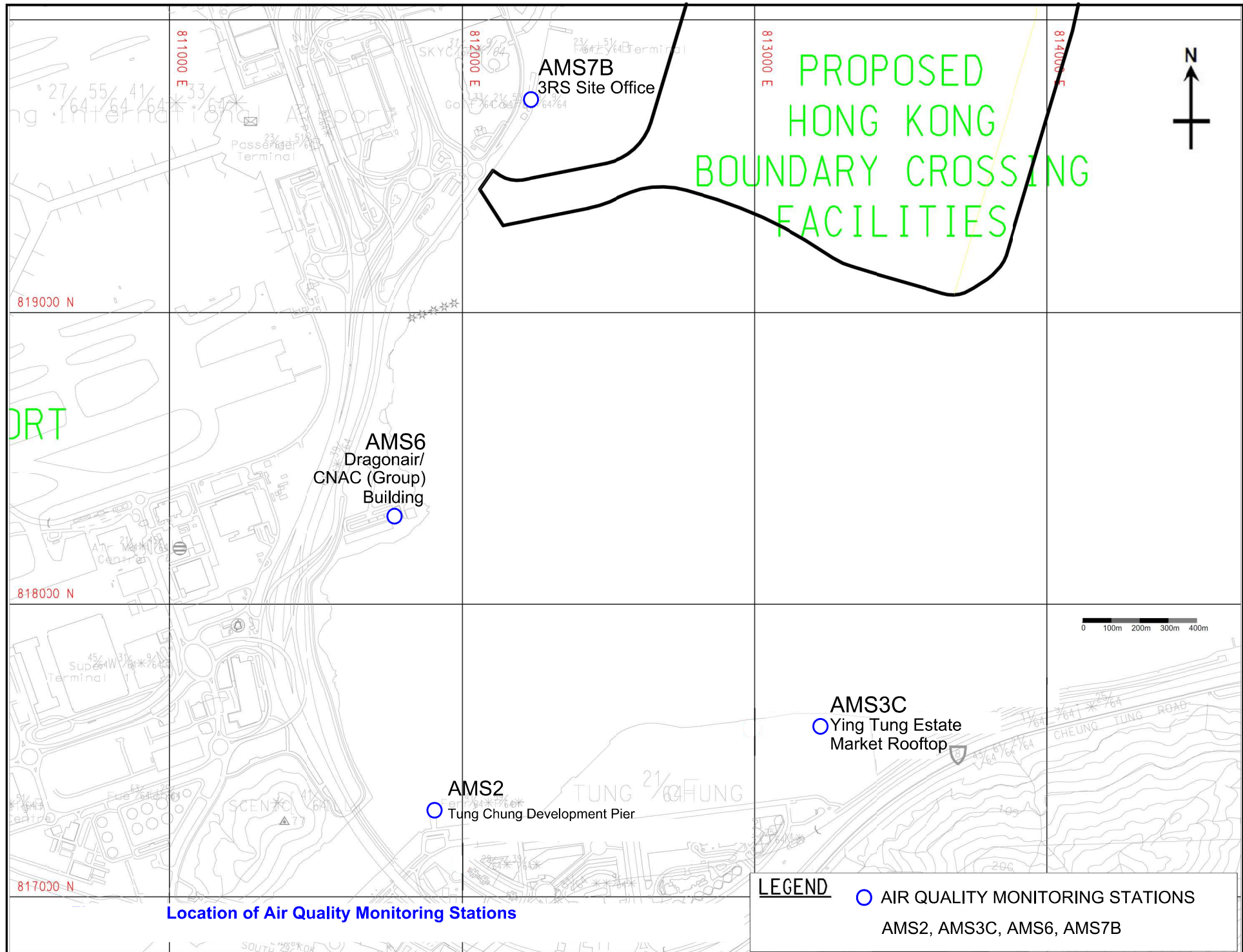
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Plot File by : 2019/06/20 9:34:39

## Figure 2

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The Location of the Air Quality Monitoring Station



**Location of Air Quality Monitoring Stations**

**LEGEND**

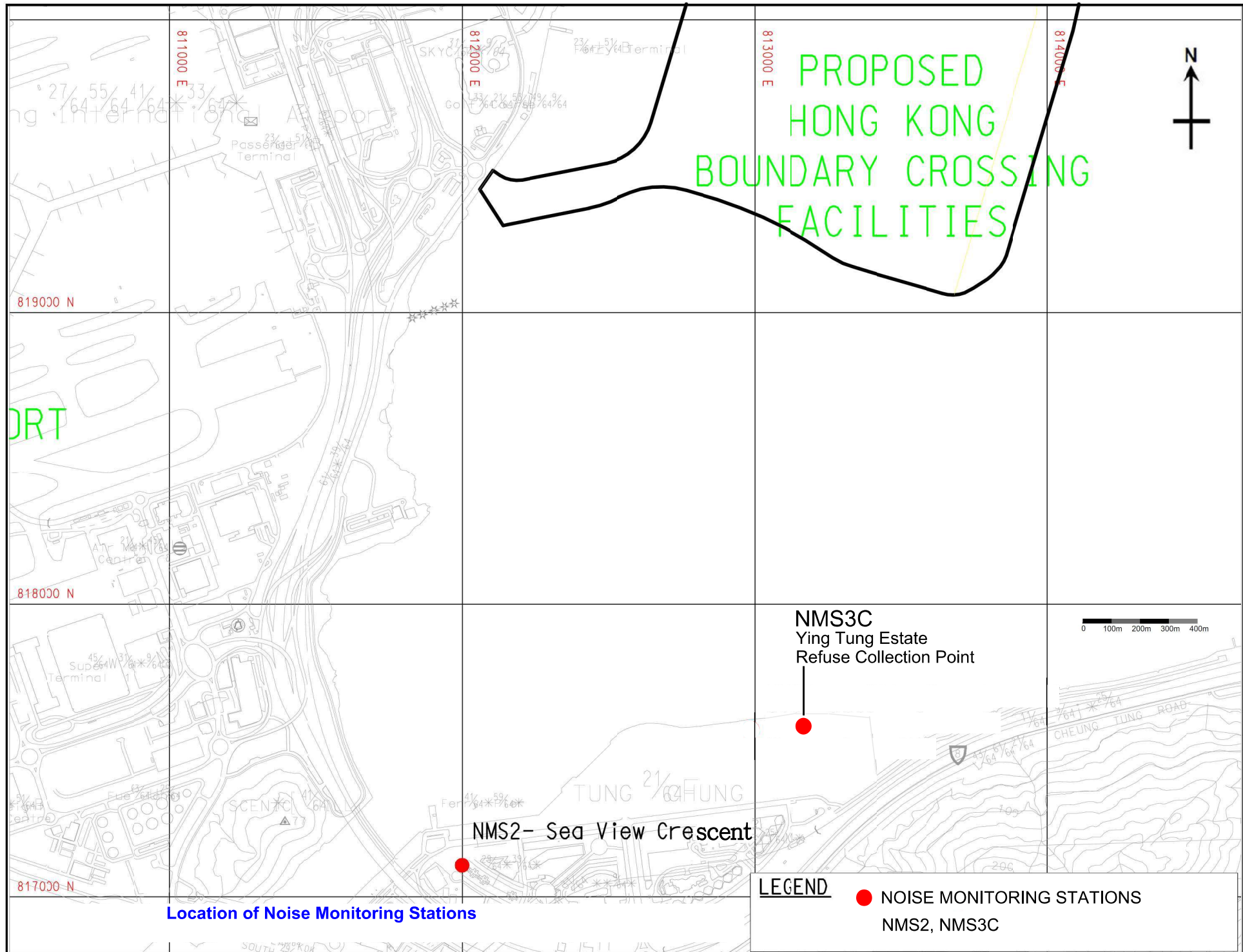
- AIR QUALITY MONITORING STATIONS
- AMS2, AMS3C, AMS6, AMS7B

## Figure 3

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The Location of the Noise Monitoring Station



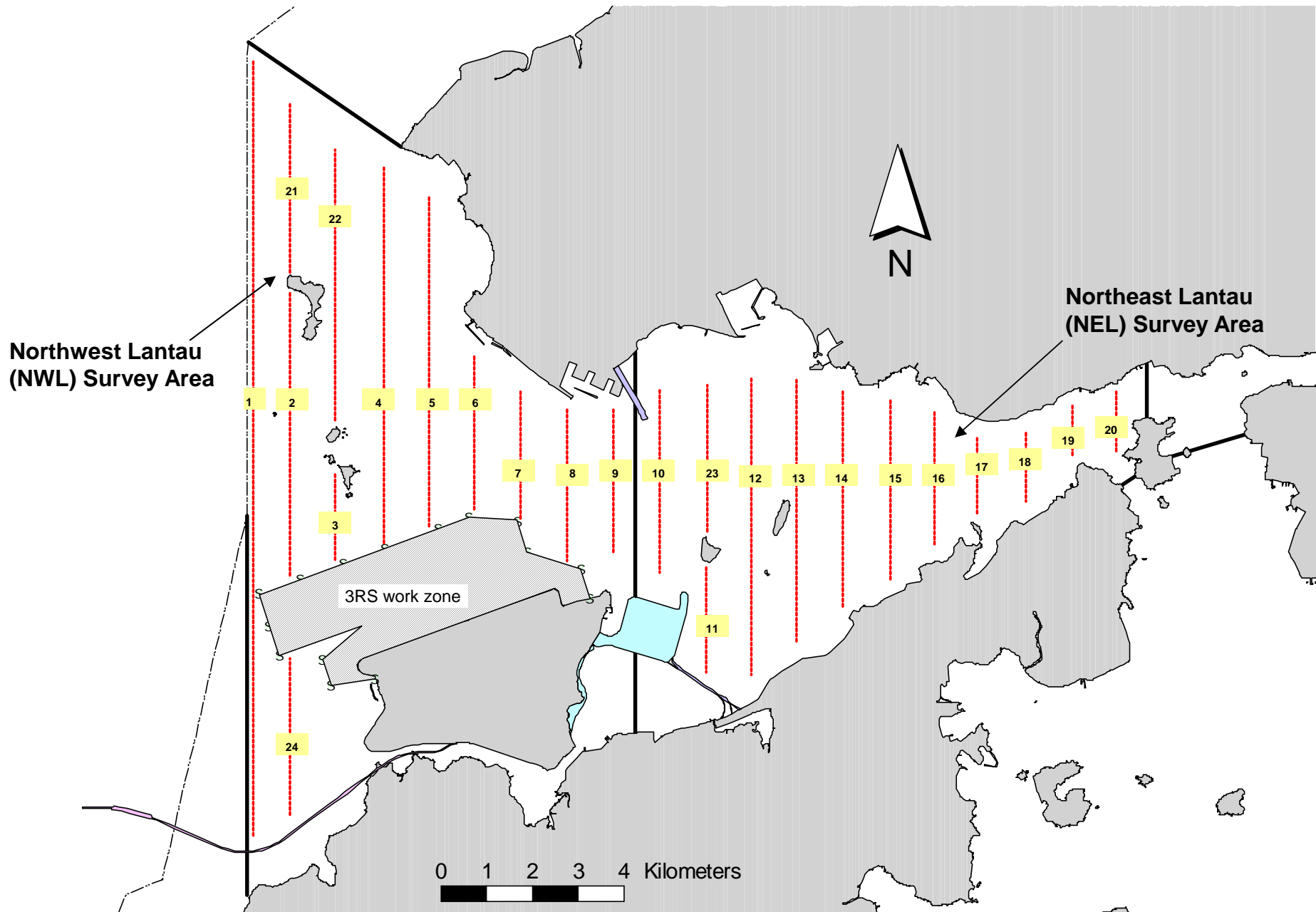


## Figure 4

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Post-Construction Dolphin Monitoring Line Transect  
Layout Map





Transect Line Layout in Northwest and Northeast Lantau Survey Areas

# Appendix A

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Construction Programme

HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float	2020						
								Jan	Feb	Mar	Apr	May		
<b>Revised Works Programme for HKZMB Phase 2 and Other Works (HY/2019/01)</b>														
<b>CONTRACT DATES</b>														
<b>Key Date</b>														
A0150	KD4 Provide Rectification Program of Approx. 288 nos. of Fault Signals as Shown in the AFA Panel (100 days)	0			13-Mar-20*	13-Mar-20	0							
A0160	KD4 Completion of Approx. 30% of Fault Signal Rectification Works (100 days)	0			14-Mar-20*	13-Mar-20	-1							
A0170	KD5 Identification of the Number of Faulty Long Lead Items such as Probe Type Detectors Shown in the AFA Panel (60 days)	0			03-Feb-20*	02-Feb-20	0							
<b>SUBMISSIONS</b>														
A0440	Submission of Subcontractors for Acceptance	0	20-Dec-19 A	29-Jan-20	20-Jan-20 A	29-Jan-20								
A0460	Acceptance of TTA	0	01-Jan-20 A	28-Jan-20	03-Feb-20	28-Jan-20	-5							
A0490	Submission of Identification of the Number of Faulty Long Lead Items	0	04-Dec-19 A	03-Feb-20	02-Feb-20 A	03-Feb-20								
A6120	Acceptance of Security Arrangement Proposal	0	01-Jan-20 A	29-Jan-20	28-Jan-20 A	29-Jan-20								
A6170	Submission of Concrete Mix	1	04-Dec-19 A	31-Jan-20	03-Feb-20	31-Jan-20	-3							
A6180	Acceptance of Concrete Mix	28	04-Feb-20	01-Feb-20	02-Mar-20	28-Feb-20	-3							
A6190	Submission of Bitumen	58	04-Dec-19 A	19-Oct-20	31-Mar-20	15-Dec-20	259							
A6200	Acceptance of Bitumen	28	01-Apr-20	16-Dec-20	28-Apr-20	12-Jan-21	259							
<b>CONTRACTOR'S DESIGN</b>														
A4840	Design for Signage	34	04-Dec-19 A	15-Jan-20	07-Mar-20*	17-Feb-20	-19							
A4845	Acceptance of Design for Signage	12	08-Mar-20	18-Feb-20	19-Mar-20*	29-Feb-20	-19							
A4870	Design for Structural Support for E&M System	34	04-Dec-19 A	15-Jan-23	07-Mar-20	17-Feb-23	1077							
A4875	Acceptance of Design for Structural Support for E&M System	14	08-Mar-20	18-Feb-23	21-Mar-20	03-Mar-23	1077							
A4890	Design for Aluminum Cladding	34	04-Dec-19 A	17-Mar-20	07-Mar-20	19-Apr-20	43							
A4900	Acceptance of Design for Aluminum Cladding	14	08-Mar-20	20-Apr-20	21-Mar-20	03-May-20	43							
A4910	Design for Raised Access Floor System	34	04-Dec-19 A	19-Aug-20	07-Mar-20	21-Sep-20	198							
A4920	Acceptance of Design for Raised Access Floor System	14	08-Mar-20	22-Sep-20	21-Mar-20	05-Oct-20	198							
A4930	Design for Mechanical Handling and Lifting Installation	34	04-Dec-19 A	19-Aug-20	07-Mar-20	21-Sep-20	198							
A4935	Acceptance of Design for Mechanical Handling and Lifting Installation	14	08-Mar-20	22-Sep-20	21-Mar-20	05-Oct-20	198							
A4940	Design for Skylight	34	04-Dec-19 A	15-Jan-23	07-Mar-20	17-Feb-23	1077							
A4945	Acceptance of Design for Skylight	14	08-Mar-20	18-Feb-23	21-Mar-20	03-Mar-23	1077							
A4950	Design for BS Items	34	04-Dec-19 A	17-Mar-20	07-Mar-20	19-Apr-20	43							
A4955	Acceptance of Design for BS Items	14	08-Mar-20	20-Apr-20	21-Mar-20	03-May-20	43							
A4960	Design for Blockwall	34	04-Dec-19 A	19-Aug-20	07-Mar-20	21-Sep-20	198							
A4965	Acceptance of Design for Blockwall	14	08-Mar-20	22-Sep-20	21-Mar-20	05-Oct-20	198							
A4970	Design for Structural Support for E&M System	34	04-Dec-19 A	17-Mar-20	07-Mar-20	19-Apr-20	43							
A4975	Acceptance of Design for Structural Support for E&M System	14	08-Mar-20	20-Apr-20	21-Mar-20	03-May-20	43							
A4990	Design for External False Ceiling System at Kiosks	34	04-Dec-19 A	15-Jan-23	07-Mar-20	17-Feb-23	1077							
A5000	Acceptance of Design for External False Ceiling System at Kiosks	14	08-Mar-20	18-Feb-23	21-Mar-20	03-Mar-23	1077							
A5020	Design for Public Address (PA) System	76	04-Dec-19 A	04-Dec-22	18-Apr-20	17-Feb-23	1035							
A5025	Acceptance of Design for Public Address (PA) System	14	19-Apr-20	18-Feb-23	02-May-20	03-Mar-23	1035							
A5030	Design for Access Control and Security Alarm (ACS)	76	04-Dec-19 A	04-Dec-22	18-Apr-20	17-Feb-23	1035							
A5035	Acceptance of Design for Access Control and Security Alarm (ACS)	14	19-Apr-20	18-Feb-23	02-May-20	03-Mar-23	1035							
A5040	Design for Closed Circuit Television (CCTV) System	76	04-Dec-19 A	04-Dec-22	18-Apr-20	17-Feb-23	1035							
A5045	Acceptance of Design for Closed Circuit Television (CCTV) System	14	19-Apr-20	18-Feb-23	02-May-20	03-Mar-23	1035							

■ Actual Work    ◆ Milestone  
■ Remaining Work  
■ Critical

**THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS**  
**HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES**  
 Page 1 of 5

Date	Revision	Checked	A
03-Feb-20	3mth Rolling Programme, updated as of 8 Jan. 2020	ZJ	

**HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works**

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float	2020							
								Jan	Feb	Mar	Apr	May			
A5050	Design for IT Network System	76	04-Dec-19 A	04-Dec-22	18-Apr-20	17-Feb-23	1035								
A5055	Acceptance of Design for IT Network System	14	19-Apr-20	18-Feb-23	02-May-20	03-Mar-23	1035								
A5060	Design for PABX System	76	04-Dec-19 A	04-Dec-22	18-Apr-20	17-Feb-23	1035								
A5065	Acceptance of Design for PABX System	14	19-Apr-20	18-Feb-23	02-May-20	03-Mar-23	1035								
A5070	Design for 2-Way Radio for MOM	88	04-Dec-19 A	22-Nov-22	30-Apr-20	17-Feb-23	1023								
A5075	Acceptance of Design for 2-Way Radio for MOM	14	01-May-20	18-Feb-23	14-May-20	03-Mar-23	1023								
A5080	Design for Coach Parking Information System (CPIS)	88	04-Dec-19 A	22-Nov-22	30-Apr-20	17-Feb-23	1023								
A5085	Acceptance of Design for Coach Parking Information System (CPIS)	14	01-May-20	18-Feb-23	14-May-20	03-Mar-23	1023								
A5090	Design for Island Wide SCADA	88	04-Dec-19 A	22-Nov-22	30-Apr-20	17-Feb-23	1023								
A5100	Acceptance of Design for Island Wide SCADA	14	01-May-20	18-Feb-23	14-May-20	03-Mar-23	1023								
A6010	Design for HAVC System	88	04-Dec-19 A	22-Nov-22	30-Apr-20	17-Feb-23	1023								
A7510	Acceptance of Designs for HAVC System	14	01-May-20	18-Feb-23	14-May-20	03-Mar-23	1023								
A7520	8.1.1.1-Design for Automatic Vehicle Clearance Support System (AVCSS) - Approval with comments	51	04-Dec-19 A	03-Feb-20	24-Mar-20	24-Mar-20	0								
A7530	8.1.1.2-Design for Automatic Vehicle Clearance Support System (AVCSS) - Approval	115	25-Mar-20	25-Mar-20	17-Jul-20	17-Jul-20	0								
<b>BUILDING INFORMATION MODELING</b>															
A7540	Acceptance of BIM Manager	24	02-Jan-20 A	08-Jan-20	26-Feb-20	31-Jan-20	-26								
A7550	Completion of BIM 3D Model	672	27-Feb-20	01-Feb-20	29-Dec-21	03-Dec-21	-26								
<b>REFINEMENT WORKS AT HKP (4A)</b>															
<b>Installation of Vehicle Barrier Gate at Existing Vehicle Kiosks (4A.B)</b>															
A4340	4A.2.1.1-Condition Survey & Design of Barrier Gate and Gate Control	60	03-Feb-20	18-Jun-20	16-Apr-20	28-Aug-20	111								
A4342	4A.2.1.1A-Approval of Design - Barrier Gate and Gate Control (by Engineer)	20	17-Apr-20	29-Aug-20	11-May-20	21-Sep-20	111								
<b>Provision of Security Measures at Existing Gate at South-west of PCB (4A.C) (KD2)</b>															
A3740	Design for Security Measure at Existing Gate (E&M works)	1	04-Dec-19 A	31-Jan-20	03-Feb-20	31-Jan-20	-3								
A6570	Acceptance of Design for Security Measure at Existing Gate	28	04-Feb-20	01-Feb-20	02-Mar-20	28-Feb-20	-3								
A6580	Procurement/Supply for Security Measure at Existing Gate	61	03-Mar-20	29-Feb-20	02-May-20	29-Apr-20	-3								
<b>Replacement of Recess Type Cover for Manhole/Drawpit/Catchpit (4A.E) (KD1)</b>															
A1650	Submission of Measures and Material	1	04-Dec-19 A	22-Jan-20	03-Feb-20	22-Jan-20	-7								
A4330	Acceptance and Procurement of Recess Cover	50	04-Feb-20	23-Jan-20	01-Apr-20	24-Mar-20	-7								
A6080	Installation of Recess Cover in SPTI	90	03-Mar-20	24-Feb-20	22-Jun-20	13-Jun-20	-7								
A6090	Installation of Recess Cover in NPPI	90	03-Mar-20	24-Feb-20	22-Jun-20	13-Jun-20	-7								
<b>Installation of New Security Fence (4A.D)(KD3)</b>															
A2500	Submissions of SF Steelwork Material	1	10-Dec-19 A	20-Jan-20	03-Feb-20	20-Jan-20	-14								
A2520	Acceptance of Submissions of SF Steelwork Material	28	04-Feb-20	21-Jan-20	02-Mar-20	17-Feb-20	-14								
A2530	Procurement of SF Steel Material	60	03-Mar-20	18-Feb-20	01-May-20	17-Apr-20	-14								
A6060	Construction of SF Footing and Maintenance Path	52	03-Mar-20	18-Feb-20	07-May-20	22-Apr-20	-12								
<b>Installation of Sliding Gate at Building No. 041 (4A.J)</b>															
A4980	Design for Sliding Gate	44	04-Dec-19 A	23-Sep-20	17-Mar-20	05-Nov-20	233								
A6650	Acceptance for Design of Sliding Gate	91	18-Mar-20	06-Nov-20	16-Jun-20	04-Feb-21	233								
<b>SECTION 1: WORKS OF VERTICAL ACCESS TO THE ROOF OF PCB WITHIN PORTION A (4)</b>															
<b>Vertical Access to the Roof of PCB at Zone C (4.B)</b>															
A3700	Design for Maintenance Access Equipment and Fittings and Walkway at Roof	5	04-Dec-19 A	03-Feb-20	07-Feb-20	07-Feb-20	0								
A3710	Acceptance of the Design for Maintenance Access Equipment and Fittings and Walkway at Roof	3	08-Feb-20	08-Feb-20	10-Feb-20*	10-Feb-20	0								
A3720	Design for Steel Grating at Vertical Access to PCB, the Associated Support and Fixings	65	08-Jan-20 A	23-Feb-20	07-Apr-20	27-Apr-20	20								
A3730	Acceptance of Design for Steel Grating at Vertical Access to PCB, the Associated Support and Fixings	31	08-Apr-20	28-Apr-20	08-May-20	28-May-20	20								
A3750	Steel Prefabrication for the Staircase (include shop drawing)	75	11-Feb-20	11-Feb-20	13-May-20	13-May-20	0								

█ Actual Work    ◆ Milestone  
█ Remaining Work  
█ Critical

**THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS  
HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES**

Date	Revision	Checked	A
03-Feb-20	3mth Rolling Programme, updated as of 8 Jan. 2020	ZJ	

**HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works**

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float	2020						
								Jan	Feb	Mar	Apr	May		
A3760	Plinth Construction	50	08-Feb-20	25-Mar-20	07-Apr-20	28-May-20	39							
<b>Vertical Access to the Roof of PCB at Zone G (4.C)</b>														
A3810	Steel Prefabrication for the Staircase	75	11-Feb-20	11-Feb-20	13-May-20	13-May-20	0							
A3820	Plinth Construction	50	08-Feb-20	25-Mar-20	07-Apr-20	28-May-20	39							
<b>SECTION 1A: IMPROVEMENT WORKS FOR THE EXISTING WATER FEATURES AT PCB WITHIN PORTION A (4.D-W)</b>														
A6220	Acceptance for the Design for Water Leakage Detection System	0	02-Jan-20 A	01-Feb-20	28-Jan-20 A	01-Feb-20								
A6230	Procurement for the Existing Water Features WF1 - 20	20	29-Jan-20 A	03-Feb-20	25-Feb-20	25-Feb-20	0							
A6310	Installation for the Existing Water Features WF1 - 20	80	27-Feb-20	26-Feb-20	05-Jun-20	04-Jun-20	-1							
A6410	Improvement Works for the Existing Water Feature inside Plant Room and MCC Room	80	27-Feb-20	26-Feb-20	05-Jun-20	04-Jun-20	-1							
<b>SECTION 1B: INSTALLATION OF WATERPROOF MEMBRANE FOR THE EXISTING WATER FEATURES (Omission PMI 10)</b>														
A6780	Acceptance for the Material	0	02-Jan-20 A	01-Feb-20	12-Jan-20 A	01-Feb-20								
A6790	Procurement of material	0	13-Jan-20 A	01-Feb-20	29-Jan-20 A	01-Feb-20								
A6810	Installation of Waterproof Membrane at Water features WF1 - 20	0	31-Jan-20 A	01-Feb-20	31-Jan-20 A	01-Feb-20								
A6820	Time Risk Allowance for Installation Works	0	31-Jan-20 A	21-Jun-20	31-Jan-20 A	21-Jun-20								
A6830	T&C	0	31-Jan-20 A	21-Jun-20	31-Jan-20 A	21-Jun-20								
A7280	Section 1B: Installation of Waterproof Membrane for the Existing Water Features at PCB within Portion A (200 days)	0			31-Jan-20 A	21-Jun-20								
<b>SECTION 1C: INSTALLATION OF WATER SKIMMERS, SOLAR REFLECTIVE FILMS AND GLAZED DOORS</b>														
A3910	Installation of Water Skimmers at Water Features WF6 - 15 (4.Y) Omission PMI 10)	0	31-Jan-20 A	21-Jun-20	31-Jan-20 A	21-Jun-20								
A3920	Installation of Solar Reflective Films	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4							
A3930	Installation of Glazed Doors and Door Stop (4A.G)	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4							
A3940	Supply and Install C&ED Dog Latrine (4A.F)	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4							
<b>SECTION 1D: INSTALLATION OF MINOR REMAINING WORKS AT PCB WITHIN PORTION A (4B)</b>														
<b>Civil Items</b>														
A0710	Drainage Works - Storm & Foul Water: CCTV (4B.A)	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4							
A0720	Road Works: TTA: Demolition and Re-pave (4B.B)	100	10-Feb-20	05-Feb-20	11-Jun-20	06-Jun-20	-4							
A0730	Paved Footpath: Rectify Paving Block and Cover of the Delivery Hatch and Smoke Vent (4B.C)	100	17-Feb-20	12-Feb-20	18-Jun-20	13-Jun-20	-4							
A0740	Drop Off Deck: Rectify Defects, Stop Leakage and Install a SS Channel and Connecting Drain Pipe (4B.D)	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4							
A0750	External Footbridges: Removal of Extra Sealant at Movement Joint and Paint (4B.E)	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4							
A0760	CUE: Rectification of Ground Water Seepage at the Movement Joint Trench (4B.F)	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4							
<b>ABWF Items (4B.G)</b>														
A0830	Paint Touch-up Remedial Works to the Emblem of C&ED and Alignment Rectification of Character Blocks	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4							
A0840	Repair Defective Self-Closing Device of External Facade Glass Doors	100	10-Feb-20	05-Feb-20	11-Jun-20	06-Jun-20	-4							
A0850	Installation of Missing Pins at Smoke vent's Fail-safe Catch	100	17-Feb-20	12-Feb-20	18-Jun-20	13-Jun-20	-4							
A0860	Modification Works to Existing Doors in the PCB	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4							
A0870	Investigation of Automatic Swing Facade Door and Submission of Report	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4							
<b>Mechanical, Electrical and Plumbing (MEP) Works (4B.S-W)</b>														
A0910	DCS: Installation of Straining Element for Each of the Two Sea Water ABS (4B.S)	100	03-Feb-20	19-Feb-20	04-Jun-20	20-Jun-20	14							
A0920	Supplement and Installation of 104 nos. MSFD with Air Ducting and Grilles for TAD	100	03-Feb-20	19-Feb-20	04-Jun-20	20-Jun-20	14							
A0930	Interface Testing between PCB SCADA and the MSFDs Microswitches for the 104 nos. of Newly Installed MSFDs of TADs	50	01-Apr-20	22-Apr-20	04-Jun-20	20-Jun-20	14							
A0940	Investigation and Rectification of the Interfacing of Monitoring of the Fire Services Systems	100	03-Feb-20	19-Feb-20	04-Jun-20	20-Jun-20	14							
A0950	Fire Services System: Provide Rectification Program of Faults Signals (288 nos.) in AFA (KD4 achievement)	35	04-Feb-20	03-Feb-20	14-Mar-20	13-Mar-20	-1							
A0960	Fire Services System: Completion of Approx. 30% Rectification of Faults in AFA (KD4 achievement)	35	04-Feb-20	03-Feb-20	14-Mar-20	13-Mar-20	-1							
A0970	Fire Services System: Completion of Remaining Rectification of Faults in AFA	60	16-Mar-20	07-Apr-20	30-May-20	20-Jun-20	18							

█ Actual Work    ◆ Milestone  
█ Remaining Work  
█ Critical

**THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS  
HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES**

Date	Revision	Checked	A
03-Feb-20	3mth Rolling Programme, updated as of 8 Jan. 2020	ZJ	

**HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works**

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float	2020							
								Jan	Feb	Mar	Apr	May			
A0980	Coordination with and Provision of Information to the PCB SCADA	114	04-Feb-20	03-Feb-20	22-Jun-20	20-Jun-20	-1								
A0990	Modification and Testing of the Existing UPS LVSBs and UPS system.	90	03-Feb-20	29-Jan-20	23-May-20	18-May-20	-4								
A4740	Electrical Services: Modification and Lighting Rectification Work	90	03-Feb-20	29-Jan-20	23-May-20	18-May-20	-4								
A4760	Providing Zoning and Proposal of Zoning and T&C of BOH LCS	90	03-Feb-20	29-Jan-20	23-May-20	18-May-20	-4								
A4780	Checking Investigating and Rectifying any Defect of Insulation of Outgoing Circuit of Essential LVSB	90	03-Feb-20	29-Jan-20	23-May-20	18-May-20	-4								
A4800	Checking and Site-investigating, Rectifying and Replacing Defective Existing Lighting FOH LED	90	03-Feb-20	29-Jan-20	23-May-20	18-May-20	-4								
A7310	KD4 Completion of Approx. 30% of Fault Signal Rectification Works (100 days)	0			14-Mar-20*	13-Mar-20	-1							◆ KD4 Completion of Approx. 30% of Fault Signal Rectification	
<b>OTHER IMPROVEMENT WORKS AT PCB</b>															
A0900	Identification of the Number of Faulty Long Lead Items such as Probe Type Detectors Shown in the AFA Panel (Omission)	0	04-Dec-19 A	02-Feb-20	31-Jan-20 A	02-Feb-20									
A6020	Fabrication and Supply of Holding Brackets for Baffle Ceiling Panel	100	03-Feb-20	29-Jan-20	04-Jun-20	30-May-20	-4								
A6030	Modification of Existing Sub-main Power Distribution System for TD's Room in PCB	100	10-Feb-20	05-Feb-20	11-Jun-20	06-Jun-20	-4								
A6040	Supply and Installation of Drip Tray at CUE	100	24-Feb-20	19-Feb-20	26-Jun-20	20-Jun-20	-4								
A7320	KD5 Identification of the Number of Faulty Long Lead Items such as Probe Type Detectors Shown in the AFA Panel (60 days)	0			31-Jan-20 A	02-Feb-20								◆ KD5 Identification of the Number of Faulty Long Lead Items such as Probe Type Detectors Shown in the AF	
<b>SECTION 2A: BUILDING NO. 062 - GENERATOR AND UPS ROOM WITHIN PORTION C (4A.L)</b>															
<b>Generator and UPS Room 062</b>															
A4210	Procurement of Generator	72	04-Dec-19 A	13-Feb-20	30-Apr-20	12-May-20	9								
A4220	Formation & Plate Load Test	25	03-Feb-20	31-Jan-20	02-Mar-20	28-Feb-20	-2								
A4230	Footing Construction	18	03-Mar-20	29-Feb-20	23-Mar-20	20-Mar-20	-2								
A4240	Construction of Wall, Beams, Slab	32	24-Mar-20	21-Mar-20	05-May-20	02-May-20	-2								
<b>SECTION 3: NPTI - REFUSE COLLECTION POINT, PUBLIC TOILET, COVERED WALKWAY &amp; PAVEMENT (6)</b>															
<b>Erection of Hoarding</b>															
A6960	Acceptance of Security Arrangement Proposal	0	01-Jan-20 A	28-Jan-20	03-Feb-20	28-Jan-20	-5								
A6970	Erection of Hoarding	50	03-Feb-20	29-Jan-20	31-Mar-20	26-Mar-20	-4								
<b>Modification of Existing Covered Walkway (6.E)</b>															
A1670	Submission of Design for Covered Walkway	12	04-Dec-19 A	12-Mar-20	14-Feb-20	23-Mar-20	38								
A1680	Acceptance of Submission of Design for Covered Walkway	29	15-Feb-20	24-Mar-20	14-Mar-20	21-Apr-20	38								
A1690	Submission of Shop Drawings	31	15-Mar-20	22-Apr-20	14-Apr-20	22-May-20	38								
A1700	Acceptance of Submission of Shop Drawings	30	15-Apr-20	23-May-20	14-May-20	21-Jun-20	38								
A2540	Footing for Covered Walkway	50	27-Apr-20	22-Apr-20	26-Jun-20	20-Jun-20	-4								
<b>Additional Covered Walkway adjacent to Building 003 (6.C)</b>															
A4400	Shop Drawing & Acceptance	54	04-Dec-19 A	21-Feb-20	06-Apr-20	28-Apr-20	16								
A4410	Demolition Works	24	09-Mar-20	27-Mar-20	06-Apr-20	28-Apr-20	16								
A4420	Footing for Covered Walkway	50	07-Apr-20	29-Apr-20	09-Jun-20	29-Jun-20	16								
<b>Satellite Refuse Collection Point, Building 007 (6.A)</b>															
A1720	Formation/Earthworks	18	01-Apr-20	04-Jun-20	25-Apr-20	24-Jun-20	49								
A1730	Raft Foundation	18	27-Apr-20	26-Jun-20	18-May-20	17-Jul-20	49								
<b>Public Toilet Type 1, Building 003 (6.B)</b>															
A1660	Design for Toilet Partitions	88	04-Dec-19 A	07-Mar-20	30-Apr-20	02-Jun-20	33								
A1710	Acceptance of Design for Toilet Partitions	24	01-May-20	03-Jun-20	24-May-20	26-Jun-20	33								
A1740	Submission of Material for Toilet	29	04-Dec-19 A	25-May-20	02-Mar-20	22-Jun-20	112								
A1770	Acceptance of Material for Toilet	24	03-Mar-20	23-Jun-20	26-Mar-20	16-Jul-20	112								
A1780	Procurement of Materials	75	27-Mar-20	17-Jul-20	09-Jun-20	29-Sep-20	112								
A1790	Formation/Earthworks/Plate Load Test	18	01-Apr-20	27-Mar-20	25-Apr-20	21-Apr-20	-4								
A1800	Raft Foundation	18	27-Apr-20	22-Apr-20	18-May-20	13-May-20	-4								
A2260	Approval of CMS	0			12-Mar-20	01-Sep-20	173							◆ Approval of CMS	
A2270	Delivery of Furniture	48	13-Mar-20	02-Sep-20	13-May-20	30-Oct-20	140								
<b>Drainage, Pavement, Kerbing, Lighting, Marking and Signs (6.F)</b>															
A1410	Demolition of Road Marking	26	03-Feb-20	12-Jun-20	03-Mar-20	14-Jul-20	106								
A1420	Sewerage Pipelaying	75	04-Mar-20	12-Sep-20	05-Jun-20	11-Dec-20	157								
A1620	Drainage & Sewerage, Fresh and Flush Water Main Laying	100	04-Mar-20	15-Jul-20	07-Jul-20	11-Nov-20	106								
<b>SECTION 4: REMOVAL OF WATERMAIN AT THE SKYCITY INTERCHANGE WITHIN PORTION C AND D</b>															

█ Actual Work    ◆ Milestone  
█ Remaining Work  
█ Critical

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Date	Revision	Checked	A
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**HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works**

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float	2020						
								Jan	Feb	Mar	Apr	May		
A3610	Submission of TTA	27	04-Dec-19 A	04-Feb-20	29-Feb-20	01-Mar-20	1							
A3650	Acceptance of TTA	28	01-Mar-20	02-Mar-20	28-Mar-20	29-Mar-20	1							
A4040	Preparation Works for Implementation of TTA	100	30-Mar-20	30-Mar-20	01-Aug-20	01-Aug-20	0							
A4050	Liaise with AAHK for Site Access	100	30-Mar-20	30-Mar-20	01-Aug-20	01-Aug-20	0							
A4060	Liaise with HyD & WSD for the Road Permit, Removed Details	100	30-Mar-20	30-Mar-20	01-Aug-20	01-Aug-20	0							
<b>SECTION 5: REMAINING WORKS</b>														
<b>Erection of Hoarding</b>														
A2510	Erection of Hoarding (incl. removal of plant material and site clearance)	37	13-Feb-20	10-Feb-20	26-Mar-20	23-Mar-20	-3							
<b>External Works at Plaza</b>														
A1510	Site Formation	75	27-Mar-20	17-Apr-20	30-Jun-20	17-Jul-20	14							
<b>Design, Design Acceptance &amp; Procurement for Kiosks</b>														
A1120	Design for Window System	3	04-Dec-19 A	15-Feb-20	05-Feb-20	17-Feb-20	12							
A1130	Acceptance of Design for Window System	30	06-Feb-20	18-Feb-20	06-Mar-20	18-Mar-20	12							
A1310	Design for Metal Roofing System	3	04-Dec-19 A	15-Feb-20	05-Feb-20	17-Feb-20	12							
A1320	Acceptance of Design for Metal Roofing System	30	06-Feb-20	18-Feb-20	06-Mar-20	18-Mar-20	12							
A7110	Procurement of Steelwork/Glazing/ABWF/E&M Material	180	07-Mar-20	19-Mar-20	14-Oct-20	27-Oct-20	10							
A7120	Procurement of Y-Junction	200	07-Mar-20	29-May-20	07-Nov-20	26-Jan-21	65							
<b>Inbound: 11 No. of Private Car Kiosks between 027/028</b>														
<b>Builder Works (5.A)</b>														
A1010	Formation and Demolishment of Existing Slab and Associated Works (FS Hoarding)	75	27-Mar-20	24-Mar-20	30-Jun-20	26-Jun-20	-3							
A1050	Construction of Base Slab, RC Wall and Roof at Kiosks	144	30-Mar-20	20-Apr-20	22-Sep-20	10-Oct-20	14							
<b>E&amp;M Works</b>														
A1120-10	8.1.2.0-Install Concealed Conduits at Base Slabs for AVCSS (027/028)	75	30-Mar-20	26-Mar-20	03-Jul-20	29-Jun-20	-3							
A1120-11	8.1.2.0-Install Concealed Conduits/EDU Mount at RS Wall and Conduits at Roof of Kiosk for AVCSS (027/028)	144	31-Mar-20	12-May-20	23-Sep-20	02-Nov-20	31							
<b>Outbound: 11 No. of Private Car Kiosks between 029/030</b>														
<b>Builder's Works (5.A)</b>														
A1200	Formation and Demolishment of Existing Slab and Associated Works	75	27-Mar-20	24-Mar-20	30-Jun-20	26-Jun-20	-3							
A1240	Construction of Base Slab, RC Wall and Roof at Kiosks	144	30-Mar-20	20-Apr-20	22-Sep-20	10-Oct-20	14							
<b>E&amp;M Works</b>														
A1310-10	8.1.2.0-Install Concealed Conduits at Base Slabs for AVCSS (029/030)	75	30-Mar-20	26-Mar-20	03-Jul-20	29-Jun-20	-3							
A1310-11	8.1.2.0-Install Concealed Conduits/EDU Mount at RS Wall and Conduits at Roof of Kiosk for AVCSS (029/030)	144	31-Mar-20	12-May-20	23-Sep-20	02-Nov-20	31							
<b>Observation Guard Booths, Building 002-1</b>														
A1810	Liaison with Relevant Party	51	04-Dec-19 A	29-Nov-20	24-Mar-20	18-Jan-21	300							
A1820	Demolition of Existing Guard Booth	50	27-Mar-20	19-Jan-21	30-May-20	20-Mar-21	241							
<b>SPTI Stage 1</b>														
A2600	Liaison with Bus Operators for Site Possession and Relocation of Office	11	04-Dec-19 A	05-Nov-19	13-Feb-20	15-Nov-19	-90							
A2620	TTA/Hoarding for Stage 1	36	14-Feb-20	16-Mar-21	26-Mar-20	29-Apr-21	322							
A2630	Site Formation Works	48	27-Mar-20	30-Apr-21	28-May-20	28-Jun-21	322							
<b>SPTI Stage 1A (3rd Lane)</b>														
A7610	TTA/Hoarding for Stage 1	12	14-Feb-20	16-Nov-19	27-Feb-20	29-Nov-19	-71							
A7620	Remove E&M System	24	28-Feb-20	30-Nov-19	26-Mar-20	30-Dec-19	-71							
A7630	Demolish Existing Covered Walkway	24	27-Mar-20	31-Dec-19	28-Apr-20	31-Jan-20	-71							
A7640	Site Formation Works & Demolish Existing Drainage & Footing	12	29-Apr-20	01-Feb-20	13-May-20	14-Feb-20	-71							
<b>Landscape Works (2)</b>														
A4150	Import CDG for Soilmix & Stockpile	274	02-May-20	02-May-20	31-Mar-21	31-Mar-21	0							

█ Actual Work    ◆ Milestone  
█ Remaining Work  
█ Critical

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HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES**

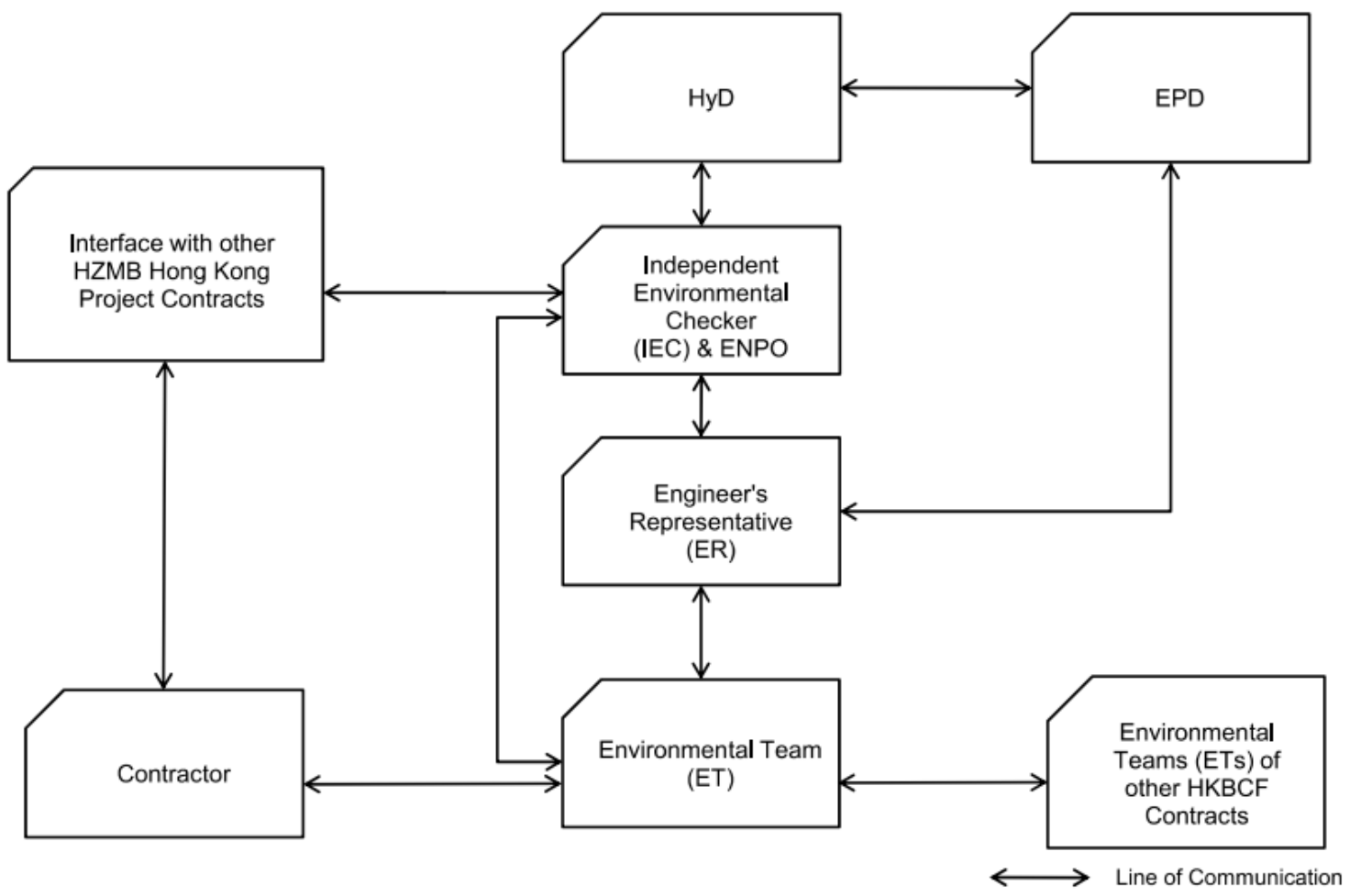
Date	Revision	Checked	A
03-Feb-20	3mth Rolling Programme, updated as of 8 Jan. 2020	ZJ	

# Appendix B

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Project Organization Chart





# Appendix C

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Action and Limit Levels

## Action / Limit Levels for Air Quality

Parameters	Action Level	Limit Level
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	<sup>1</sup> For baseline level $\leq 200 \mu\text{g}/\text{m}^3$ , Action level = $(\text{baseline level} * 1.3 + \text{Limit level})/2$ ; For baseline level $> 200 \mu\text{g}/\text{m}^3$ Action level = Limit level	260 $\mu\text{g}/\text{m}^3$
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	<sup>2</sup> For baseline level $\leq 384 \mu\text{g}/\text{m}^3$ , Action level = $(\text{baseline level} * 1.3 + \text{Limit level})/2$ ; For baseline level $> 384 \mu\text{g}/\text{m}^3$ , Action level = Limit level	500 $\mu\text{g}/\text{m}^3$

### Notes:

#### 1. The Action Level for 24-hour TSP Level:

a)  $\text{AMS } 2 = (71.1 * 1.3 + 260) / 2 = 176 \mu\text{g}/\text{m}^3$ ; b)  $\text{AMS } 3\text{C} = (56.9 * 1.3 + 260) / 2 = 167 \mu\text{g}/\text{m}^3$ ;  
 c)  $\text{AMS } 6 = (66.4 * 1.3 + 260) / 2 = 173 \mu\text{g}/\text{m}^3$ ; d)  $\text{AMS } 7\text{B} = (82.3 * 1.3 + 260) / 2 = 183 \mu\text{g}/\text{m}^3$ ;

#### 2. The Action Level for 1-hour TSP Level:

a)  $\text{AMS } 2 = (191.5 * 1.3 + 500) / 2 = 374 \mu\text{g}/\text{m}^3$ ; b)  $\text{AMS } 3\text{C} = (18.2 * 1.3 + 500) / 2 = 368 \mu\text{g}/\text{m}^3$ ;  
 c)  $\text{AMS } 6 = (169.2 * 1.3 + 500) / 2 = 360 \mu\text{g}/\text{m}^3$ ; d)  $\text{AMS } 7\text{B} = (184.2 * 1.3 + 500) / 2 = 370 \mu\text{g}/\text{m}^3$ ;

## Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level
0700 - 1900 hours on normal weekdays	When one documented complaint is received	75 dB(A) *

Note : 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 periods.

# Appendix D

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Event and Action Plan

## Event / Action Plan for Air Quality

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

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

## Event / Action Plan for Construction Noise

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

# Appendix E

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Implementation Status of

Environment mitigation Measures (Construction Phase)



## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
<b>Air Quality</b>				
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	All construction sites	Implemented
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: <ul style="list-style-type: none"> <li>•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;</li> <li>•Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads;</li> <li>•A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones.</li> <li>•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;</li> <li>•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;</li> </ul>	All construction sites	Implemented
S5.5.6.2	A2	<ul style="list-style-type: none"> <li>•When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period;</li> <li>•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,</li> <li>•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;</li> <li>•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;</li> <li>•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;</li> <li>•Any skip hoist for material transport should be totally enclosed by impervious sheeting;</li> <li>•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</li> </ul>	All construction sites	Partially Implemented

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S5.5.6.2	A2	<ul style="list-style-type: none"> <li>• 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;</li> <li>• 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</li> <li>• 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 r part of the construction site where the exposed earth lies</li> </ul>	All construction sites	N/A
S5.5.6.3	A3	3) The Contractor should undertake proper watering on all exposed spoil (with at least 8 times per day) throughout the construction phase.	All construction sites	Partially Implemented
S5.5.6.4	A4	4) Project Manager 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.	All construction sites	Implemented
S5.5.6.4	A5	5) Implement regular dust monitoring under EM&A programme during the construction stage.	Selected representative dust monitoring station	Implemented
S5.5.7.1	A6	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant;</p> <ul style="list-style-type: none"> <li>•Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system;</li> <li>•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;</li> <li>•Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system;</li> <li>•The materials which may generate airborne dusty emissions should be wetted by water spray system;</li> <li>•All receiving hoppers should be enclosed on three sides up to 3m above unloading point;</li> <li>•All conveyor transfer points should be totally enclosed;</li> <li>•All access and route roads within the premises should be paved and wetted; and</li> <li>•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.</li> </ul>	Selected representative dust monitoring station	Implemented
S5.5.2.7	A7	<p>The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point:</p> <ul style="list-style-type: none"> <li>• All road surface within the barging facilities will be paved;</li> <li>• Dust enclosures will be provided for the loading ramp;</li> <li>•Vehicles will be required to pass through designated wheels wash facilities; and</li> <li>• Continuous water spray at the loading points.</li> </ul>	All construction sites	Implemented
<b>Construction Noise (Air borne)</b>				
S6.4.10	N1	<p>1) Use of good site practices to limit noise emissions by considering the following:</p> <ul style="list-style-type: none"> <li>•only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme;</li> <li>•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;</li> <li>•plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;</li> </ul>	All construction sites	Implemented

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		<ul style="list-style-type: none"> <li>•silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works;</li> <li>•mobile plant should be sited as far away from NSRs as possible and practicable;</li> <li>•material stockpiles, mobile container site office and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.</li> </ul>		
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.	All construction sites	Implemented
S6.4.12	N3	3) Install movable noise barriers (typically density@14kg/m acoustic mat or full enclosure close to noisy plants including compressor, generators, saw.	For plant items listed in Appendix 6D of the EIA report at all construction sites	N/A
S6.4.13	N4	4) Select "Quiet plants" which comply with the BS 5228 Part 1 or TM standards.	For plant items listed in Appendix 6D of the EIA report at all construction sites	Implemented
S6.4.14	N5	5) Sequencing operation of construction plants where practicable	All construction sites where practicable	Implemented
S5.1	N6	6) Implement a noise monitoring under EM&A programme.	Selected representative noise monitoring station	Implemented
<b>Waste Management (Construction Noise)</b>				
S8.3.8	WM1	<p>Construction and Demolition Material</p> <p>The following mitigation measures should be implemented in handling the waste:</p> <ul style="list-style-type: none"> <li>•Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement;</li> <li>•Carry out on-site sorting;</li> <li>•Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate;</li> <li>•Implement a trip-ticket system for each works contract to ensure that the disposal of C&amp;D materials are properly documented and verified; and</li> <li>•Implement an enhanced Waste Management Plan similar to E7WBTC (Works) No. 19/2005 - "Environmental Management on Construction Sites" to encourage on-site sorting of C&amp;D materials and to minimize their generation during the course of construction.</li> <li>•In addition, disposal of the C&amp;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.</li> </ul>	All construction sites	N/A
S8.3.9- S8.3.11	WM2	<p>C&amp;D Waste</p> <ul style="list-style-type: none"> <li>•Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&amp;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.</li> <li>•The Contractor should recycle as much of the C&amp;D materials as possible on-site. Public fill and C&amp;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,</li> </ul>	All construction sites	Implemented

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		concrete and masonry can be crushed and used as fill. Steel reinforcement bar can be used by scrap steel mills. Different areas of the sites should be considered for such segregation and storage.		
S8.2.12- S8.3.15	WM3	<p>Chemical Waste</p> <ul style="list-style-type: none"> <li>•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.</li> <li>•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.</li> <li>•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.</li> <li>•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 chemical waste collection service and can supply the necessary storage containers; or be to a reuser of the waste, under approval from the EPD.</li> </ul>	All construction sites	Partially Implemented
S8.3.16	WM4	<p>Sewage</p> <ul style="list-style-type: none"> <li>•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.</li> </ul>	All construction sites	Implemented

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S8.3.17– S8.3.19	WM5	<p>General Refuse</p> <ul style="list-style-type: none"> <li>•General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes.</li> <li>•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.</li> <li>•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.</li> <li>•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.</li> <li>•Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.</li> </ul>	All construction sites	Partially Implemented
<b>Water Quality (Construction Phase)</b>				
S9.11.1.7	W2	<p>Land Works</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"> <li>•wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters;</li> <li>•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;</li> <li>•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;</li> <li>•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;</li> <li>•temporary access roads should be surfaced with crushed stone or gravel;</li> <li>•rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities;</li> <li>•measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system;</li> <li>•open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms;</li> <li>•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;</li> <li>•discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system;</li> </ul>	All land-based construction sites	Partially Implemented

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		<ul style="list-style-type: none"> <li>•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;</li> <li>•wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain;</li> <li>•the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel;</li> <li>•wastewater generated from concreting, plastering, Internal decoration, cleaning work and other similar activities, shall be screened to remove large objects;</li> <li>•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;</li> <li>•the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately;</li> <li>•waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance;</li> <li>•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</li> <li>•surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.</li> </ul>		
<b>Ecology (Construction Phase)</b>				
S10.7	E4	•Watering to reduce dust generation; prevention of siltation of freshwater habitats; Site runoff should be desilted, to reduce the potential for suspended sediments, organics and other contaminants to enter streams and standing freshwater	Seawall, reclamation area	N/A
	E9	•Dolphin vessel monitoring	North Lantau and West Lantau	Implemented (The results and the analysis adopted from published Quarterly EM&A report of Contract No. HY/2012/08)
<b>Landscape &amp; Visual (Construction Phase)</b>				
S14.3.3.3	LV2	<p>Mitigate both Landscape and Visual Impacts</p> <p>G1. Grass-hydroseed bare soil surface and stock pile areas;</p> <p>G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic.</p> <p>G3. Providing aesthetic architectural design on 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 harmonic atmosphere of the HKBCF.</p>	All construction site areas	N/A

## Implementation Status of Environment Mitigation Measures (Construction Phase) - Contract No. HY/2019/01

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		<p>G4. Vegetation reinstatement and upgrading to disturbed areas;</p> <p>G5. Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed;</p> <p>G6. Providing planting area around peripheral of HKBCF for tree planting screening effect;</p> <p>G7. Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline; and</p> <p>G8. 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.</p>		
S14.3.3.3	LV3	<p>Mitigate Visual Impacts</p> <p>V1. Minimize time for construction activities during construction period.</p> <p>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>	All construction site areas	N/A
S15.2.2	EM1	An Independent Environmental Checker needs to be employed as per the EM&A Manual.	All construction sites	Implemented
S15.5 – S15.6	EM2	<p>1) An Environmental Team needs to be employed as per the EM&amp;A Manual.</p> <p>2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures.</p> <p>3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&amp;A Manual are fully complied with.</p>	All construction sites	Implemented

# Appendix F

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Summary of Site Audit in the Reporting Period



## Summary of Site Audit in the Reporting Period

Parameters	Date	Observations and Recommendations	Follow-up
Air Quality	20 May 2020	Observation: The contractor was reminded to maintain housekeeping to prevent dust leaving from the site. (Near building 023)	22 May 2020
Noise	NA		
Water Quality	12 February 2020	Reminder: Stagnant water should be removed.	NA
	12 February 2020	Observation: The opening of drip tray should be plugged to prevent chemical leakage.	14 February 2020
	13 May 2020	Observation: Silt insider the U-channel should be cleared. (SPTI)	15 May 2020
	27 May 2020	Observation: The contractor was reminded surface water should be controlled properly to prevent flowing outside. (SPTI)	29 May 2020
Chemical and Waste Management	6 March 2020	Observation: All waste generated at the site should be cleaned and collected. (SPTI)	9 March 2020
	18 March 2020	Observation: All waste generated at the site should be cleaned and collected. (SPTI)	20 March 2020
	15 April 2020	Observation: Drip tray should be provided for chemical container. (NPTI)	17 April 2020
	29 April 2020	Reminder: The contractor was reminder to maintain housekeeping. (NPTI)	NA

	6 May 2020	Observation: The contractor was reminded to maintain housekeeping. (NPTI)	8 May 2020
Land Contamination	NA		
Landscape and Visual Impact	NA		
Permit / Licenses	15 April 2020	Observation: NRMM label should be provided to replace the substandard label. (SPTI)	22 April 2020
Others	26 February 2020	Reminder: The caps for the water safety barriers should be provided.	NA

# Appendix G

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Waste Flow Table

Waste Flow Table for Year 2020										
Monthly Ending	Actual Quantities of Inert C&D Materials Generated Monthly					Actual Quantities of Non-inert C&D Wastes Generated Monthly				
	Total Quantity Generated (Inert C&D)	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Metals	Paper/ cardboard packaging	Plastics (see Note 2)	Chemical Waste	Others, e.g. general refuse
	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)	(in '000 Kg)
2020 Jan	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil	Nil
2020 Feb	720.34	Nil	720.34	Nil	Nil	Nil	0.335	Nil	Nil	2.23
2020 Mar	11344.57	Nil	10218.92	Nil	1125.65	Nil	0.669	Nil	Nil	8.05
2020 Apr	19649.37	Nil	18670.3	Nil	979.07	Nil	Nil	Nil	Nil	21.64
2020 May	26767.55	Nil	26692.04	Nil	75.51	Nil	2.42	Nil	Nil	196.64
2020 Jun										
2020 Jul										
2020 Aug										
2020 Sep										
2020 Oct										
2020 Nov										
2020 Dec										
<b>Total</b>	<b>58481.830</b>	<b>0</b>	<b>56301.600</b>	<b>0</b>	<b>2180.230</b>	<b>0</b>	<b>3.424</b>	<b>0</b>	<b>0</b>	<b>228.560</b>

Note:

- 1) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.
- 2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging materials.
- 3) Total Quantity Generated (Inert) = Hard Rock and Large Broken Concrete + Reused in the Contract + Disposed as Public Fill – Imported Fill

# Appendix H

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

### Environmental Complaints Log

Reference No.	Date of Complaint Received	Received From	Received By	Nature of Complaint	Date of Investigation	Outcome	Date of Reply

### Cumulative Statistics on Complaints

Environmental Parameters	Cumulative No. Brought Forward	No. of Complaints This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>

### Cumulative Statistics on Notification of Summons and Successful Prosecutions

Environmental Parameters	Cumulative No. Brought Forward	No. of Notification of Summons and Prosecutions This Month	Cumulative Project-to-Date
Air	0	0	0
Noise	0	0	0
Water	0	0	0
Waste	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>

# Appendix I

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Dolphin Monitoring Survey Findings and Analysis From  
Contract No. HY/2012/08

Remarks:

1. The relevant sections of dolphin monitoring survey findings and analysis report of Contract No. HY/2012/08 is extracted.
2. The introduction part in Appendix I is introducing Contract No. HY/2012/08, it is not applicable for our contract.
3. Conclusions have been provided in this quarterly report (Section 5.1.4), so the conclusions from Contract No. HY/2012/08 was not applicable.



**CONTRACT NO. HY/2012/08**

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

*26<sup>th</sup> Quarterly Progress Report (March-May 2020)*

*submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.*

Submitted by

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

20 July 2020

**1. Introduction**

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

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

- 1.4. During the construction period of HKLR, the dolphin specialist would be in charge of reviewing and collating information collected by HKLR03 dolphin monitoring programme to examine any potential impacts of TMCLKL08 construction works on the dolphins up until September 2019. Thereafter, the dolphin specialist would utilize the monitoring data collected by TMCLKL08 dolphin monitoring programme to produce regular progress reports. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.
- 1.5. This report is the 26<sup>th</sup> quarterly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the survey findings during the period of March to May 2020 by utilizing the survey data collected by TMCLKL08 impact phase monitoring project.

## 2. Monitoring Methodology

### 2.1. Vessel-based Line-transect Survey

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

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

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

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

- 2.1.2. The TMCLKL08 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2018). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.
- 2.1.3. Two experienced observers (a data recorder and a primary observer) made up the on-effort survey team, and the survey vessel transited different transect lines at a constant speed of 13-15 km per hour. The data recorder searched with unaided eyes and filled out the datasheets, while the primary observer searched for dolphins and porpoises continuously through 7 x 50 *Fujinon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.
- 2.1.4. During on-effort survey periods, the survey team recorded effort data including time, positions (latitude and longitude), weather conditions (Beaufort sea state and visibility), and distance traveled in each series (a continuous period of search effort) with the assistance of a handheld GPS (*Garmin eTrex Legend*).
- 2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.
- 2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size

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

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

## 2.2. Photo-identification Work

- 2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the TMCLKL08 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.
- 2.2.2. A professional digital camera (*Canon EOS 7D* model), equipped with long telephoto lenses (100-400 mm zoom), were available on board for researchers to take sharp, close-up photographs of dolphins as they surfaced. The images were shot at the highest available resolution and stored on Compact Flash memory cards for downloading onto a computer.
- 2.2.3. All digital images taken in the field were first examined, and those containing potentially identifiable individuals were sorted out. These photographs would then be examined in greater detail, and were carefully compared to the existing Chinese White Dolphin photo-identification catalogue maintained by HKCRP since 1995.
- 2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).
- 2.2.5. All photographs of each individual were then compiled and arranged in chronological order, with data including the date and location first identified (initial sighting), re-sightings, associated dolphins, distinctive features, and age classes entered into a computer database.

## 2.3. Data Analysis

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

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

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

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

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

- 2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly impact phase monitoring period were plotted onto 1-km<sup>2</sup> grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km<sup>2</sup>) and dolphin densities (total number of dolphins from on-effort sightings per km<sup>2</sup>) 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-km<sup>2</sup> grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and



DPSE in each 1-km<sup>2</sup> grid within the study area:

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

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

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

- 2.3.4. Behavioural analysis – When dolphins were sighted during vessel surveys, their behaviour was observed. Different activities were categorized (i.e. feeding, socializing, traveling, and milling/resting) and recorded on sighting datasheets. This data was then input into a separate database with sighting information, which can be used to determine the distribution of behavioural data with a desktop GIS. Distribution of sightings of dolphins engaged in different activities and behaviours would then be plotted on GIS and carefully examined to identify important areas for different activities of the dolphins.
- 2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView<sup>®</sup> 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 2020, six sets of systematic line-transect vessel surveys were conducted under the TMCLKL08 monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.
- 3.1.2. From these TMCLKL08 surveys, a total of 772.01 km of survey effort was collected, with 98.4% 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, 290.10 km and 481.91 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 569.64 km, while the effort on secondary lines was 202.37 km. Survey effort conducted on both primary and secondary lines were considered to be on-effort survey data. A summary table of the survey effort is shown in Appendix I.

- 3.1.4. During the six sets of TMCLKL08 monitoring surveys from March to May 2020, only two groups of two Chinese White Dolphins were sighted (i.e. both were single individuals). Both dolphin sightings were made on primary lines during on-effort search in this quarter. A summary table of dolphin sightings is shown in Appendix II.
- 3.1.5. In this quarterly period, both dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during the HKLR03/TMCLKL08 monitoring surveys.
- 3.2. *Distribution*
- 3.2.1. Distribution of dolphin sightings made during the TMCLKL08 monitoring surveys from March to May 2020 is shown in Figure 1. Both sightings were made to the west of the airport platform at the southwestern portion of the NWL survey area, with one of them located adjacent to the HKLR alignment (Figure 1). As consistently recorded in the previous monitoring quarters in recent years, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).
- 3.2.2. Notably, both dolphin sightings were located far away from the TMCLKL alignment as well as the HKBCF and HKLR03 reclamation sites during the quarterly period (Figure 1).
- 3.2.3. Sighting distribution of dolphins during the present impact phase monitoring period was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past seven years of HKLR03/TMCLKL08 impact phase monitoring, which has resulted in zero to extremely low dolphin encounter rates in this area.
- 3.2.4. In NWL survey area, dolphin occurrences were also drastically different between the baseline and impact phase periods. During the present impact monitoring period, dolphins were rarely sighted here, and only at the southwestern end of the North Lantau region. This was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).
- 3.2.5. Another comparison in dolphin distribution was made between the six quarterly periods of spring months in 2015-20 (Figure 2). Dolphins were sighted infrequently and mostly around the Sha Chau and Lung Kwu Chau Marine Park in NWL waters during the first five spring quarters, but their occurrence was diminished even further and only restricted to the southwestern portion of North Lantau region in the spring quarter of 2020 (Figure 2). Notably, they were consistently absent from the NEL survey area throughout the six quarterly periods.
- 3.3. *Encounter rate*
- 3.3.1. During the present quarterly period, the encounter rates of Chinese White Dolphins deduced from the survey effort and on-effort sighting data from the primary transect lines
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under favourable conditions (Beaufort 3 or below) for each set of the TMCLKL08 surveys in NEL and NWL are shown in Table 2. The average encounter rates deduced from the six sets of surveys were also compared with the ones deduced from the baseline monitoring period (September-November 2011) (Table 3).

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during March-May 2020

SURVEY AREA	DOLPHIN MONITORING DATES	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (3 & 9 Mar 2020)	0.00	0.00
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	0.00	0.00
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	0.00	0.00
Northwest Lantau	Set 1 (3 & 9 Mar 2020)	1.66	1.66
	Set 2 (18 & 25 Mar 2020)	0.00	0.00
	Set 3 (8 & 14 Apr 2020)	1.68	1.68
	Set 4 (21 & 22 Apr 2020)	0.00	0.00
	Set 5 (5 & 12 May 2020)	0.00	0.00
	Set 6 (18 & 25 May 2020)	0.00	0.00

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

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	March – May 2020	September – November 2011	March – May 2020	September – November 2011
Northeast Lantau	0.0	6.00 $\pm$ 5.05	0.0	22.19 $\pm$ 26.81
Northwest Lantau	0.56 $\pm$ 0.86	9.85 $\pm$ 5.85	0.56 $\pm$ 0.86	44.66 $\pm$ 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 0.43 sightings and 0.43 dolphins per 100 km of survey effort respectively, while the encounter



rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

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

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

	<b>Encounter rate (STG)</b> (no. of on-effort dolphin sightings per 100 km of survey effort)	<b>Encounter rate (ANI)</b> (no. of dolphins from all on-effort sightings per 100 km of survey effort)
<b>September-November 2011 (Baseline)</b>	6.00 $\pm$ 5.05	22.19 $\pm$ 26.81
<b>March-May 2013 (Impact)</b>	0.42 $\pm$ 1.03	0.42 $\pm$ 1.03
<b>March-May 2014 (Impact)</b>	0.00	0.00
<b>March-May 2015 (Impact)</b>	0.00	0.00
<b>March-May 2016 (Impact)</b>	0.00	0.00
<b>March-May 2017 (Impact)</b>	0.00	0.00
<b>March-May 2018 (Impact)</b>	0.00	0.00
<b>March-May 2019 (Impact)</b>	0.00	0.00
<b>March-May 2020 (Impact)</b>	0.00	0.00

- 3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present quarterly period were only tiny fractions of the ones recorded during the three-month baseline period (with reductions of 94.3% and 98.7% respectively), indicating a dramatic decline in dolphin usage of this survey area during the present quarterly period as compared to the baseline period (Table 5).
- 3.3.5. When comparing to the past seven spring quarters in 2013-19, the quarterly encounter rates in 2020 continued to plummet to the lowest level among all spring quarters during the HKLR03/TMCLKL08 impact monitoring period (Table 5). Such dramatic drop in dolphin occurrence in NWL raises serious concerns, and the temporal trend should be closely monitored in the upcoming monitoring quarters while all construction activities of HZMB works has recently been completed.

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

	<b>Encounter rate (STG)</b> (no. of on-effort dolphin sightings per 100 km of survey effort)	<b>Encounter rate (ANI)</b> (no. of dolphins from all on-effort sightings per 100 km of survey effort)
<b>September-November 2011 (Baseline)</b>	9.85 $\pm$ 5.85	44.66 $\pm$ 29.85
<b>March-May 2013 (Impact)</b>	7.75 $\pm$ 3.96	24.23 $\pm$ 18.05
<b>March-May 2014 (Impact)</b>	6.51 $\pm$ 3.34	19.14 $\pm$ 7.19
<b>March-May 2015 (Impact)</b>	0.47 $\pm$ 0.73	2.36 $\pm$ 4.07
<b>March-May 2016 (Impact)</b>	0.98 $\pm$ 1.10	4.78 $\pm$ 6.85
<b>March-May 2017 (Impact)</b>	0.93 $\pm$ 1.03	5.25 $\pm$ 9.53
<b>March-May 2018 (Impact)</b>	2.88 $\pm$ 4.81	11.12 $\pm$ 22.46
<b>March-May 2019 (Impact)</b>	1.13 $\pm$ 1.39	2.54 $\pm$ 3.00
<b>March-May 2020 (Impact)</b>	0.56 $\pm$ 0.86	0.56 $\pm$ 0.86

- 3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and HKLR03/TMCLKL08 impact monitoring periods. The two variables that were examined included the two periods (baseline and impact phases) and two locations (NEL and NWL).
- 3.3.7. For the comparison between the baseline period and the present quarter (30<sup>th</sup> quarter of the HKLR03/TMCLKL08 impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0019 and 0.0021 respectively. Even if the alpha value is set at 0.01, significant differences were detected between the baseline period and present quarter in both the average dolphin encounter rates of STG and ANI.
- 3.3.8. For the comparison between the baseline period and the cumulative quarters of the HKLR03/TMCLKL08 impact phase (i.e. the first 30 quarters of the impact phase being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were both 0.000000. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the two periods and the locations).
- 3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly and dramatically reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented throughout the HKLR03/TMCLKL08 construction period.

3.3.10. Even though all marine works associated with the HZMB construction have already been completed, and the Brothers Marine Park has been established as a compensation measure for the permanent habitat loss in association with the HZMB reclamation works since late 2016, apparently there has been no sign of recovery of dolphin usage in North Lantau waters at all, while such usage has continued to diminish to the lowest ever level.

### 3.4. *Group size*

3.4.1. Group size of both Chinese White Dolphin sightings were singletons in North Lantau region during March to March 2020. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

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

	Average Dolphin Group Size	
	March – May 2020	September – November 2011
<b>Overall</b>	1.00 $\pm$ 0.00 (n = 2)	3.72 $\pm$ 3.13 (n = 66)
<b>Northeast Lantau</b>	---	3.18 $\pm$ 2.16 (n = 17)
<b>Northwest Lantau</b>	1.00 $\pm$ 0.00 (n = 2)	3.92 $\pm$ 3.40 (n = 49)

3.4.2. The average dolphin group size in NWL waters during the present quarter was much lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of only two dolphin groups in the present quarter was only a tiny fraction of the 66 dolphin groups sighted during the baseline period (Table 6).

### 3.5. *Habitat use*

3.5.1. From March to May 2020, only two grids in North Lantau waters recorded dolphin occurrences, and both of them recorded very low dolphin densities (Figures 3a and 3b). Notably, all grids near TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 3a and 3b).

3.5.2. 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.

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 4). 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 4).

3.5.4. The density patterns were also very different in NWL between the baseline and present

impact phase monitoring periods, with high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. In contrast, both grids with dolphin records were distributed at the southwestern end of the NWL survey area in very low densities during the present impact phase period (Figure 4).

3.6. *Mother-calf pairs*

3.6.1. During the present quarterly period, no mother-calf pair was sighted.

3.7. *Activities and associations with fishing boats*

3.7.1. From March to May 2020, neither of the two dolphin groups was engaged in any activities, and both groups were not associated with any operating fishing vessel during this impact phase period.

3.8. *Summary of photo-identification works*

3.8.1. From March to May 2020, about 150 digital photographs of Chinese White Dolphins were taken during the present impact phase monitoring surveys for the photo-identification work.

3.8.2. In total, two individuals sighted twice were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV). Both re-sightings were made in NWL.

3.8.3. Notably, one of the two individuals (WL232) was also sighted in WL waters during the HKLR09 monitoring surveys under the same three-month period of March-May 2020.

3.9. *Individual range use*

3.9.1. Ranging patterns of the two individuals identified during the three-month study period were determined by fixed kernel method, and are shown in Appendix V.

3.9.2. Both identified dolphins sighted in the present quarter were utilizing NWL waters only, but have completely avoided NEL waters where many of them have utilized as their core areas in the past (Appendix V). This is in contrary to the extensive movements between NEL and NWL survey areas observed in the earlier impact monitoring quarters as well as the baseline period.

3.9.3. Moreover, both individuals (WL232 and WL268) has extended its range use from WL waters to NWL waters during the quarterly period (Appendix V), and such movements between North and West Lantau have been quite frequent among many individuals in the past several years of HKLR03 impact phase monitoring. However, it should also be noted that their re-sightings were only made at the juncture of West and Northwest Lantau survey areas during this quarterly period, which is in close proximity to their primary ranges in WL waters (Appendix V).

#### 4. Conclusion

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

#### 5. References

- Buckland, S. T., Anderson, D. R., Burnham, K. P., Laake, J. L., Borchers, D. L., and Thomas, L. 2001. Introduction to distance sampling: estimating abundance of biological populations. Oxford University Press, London.
- Hung, S. K. 2018. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2017-18). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 174 pp.
- Jefferson, T. A. 2000. Population biology of the Indo-Pacific hump-backed dolphin in Hong Kong waters. Wildlife Monographs 144:1-65.



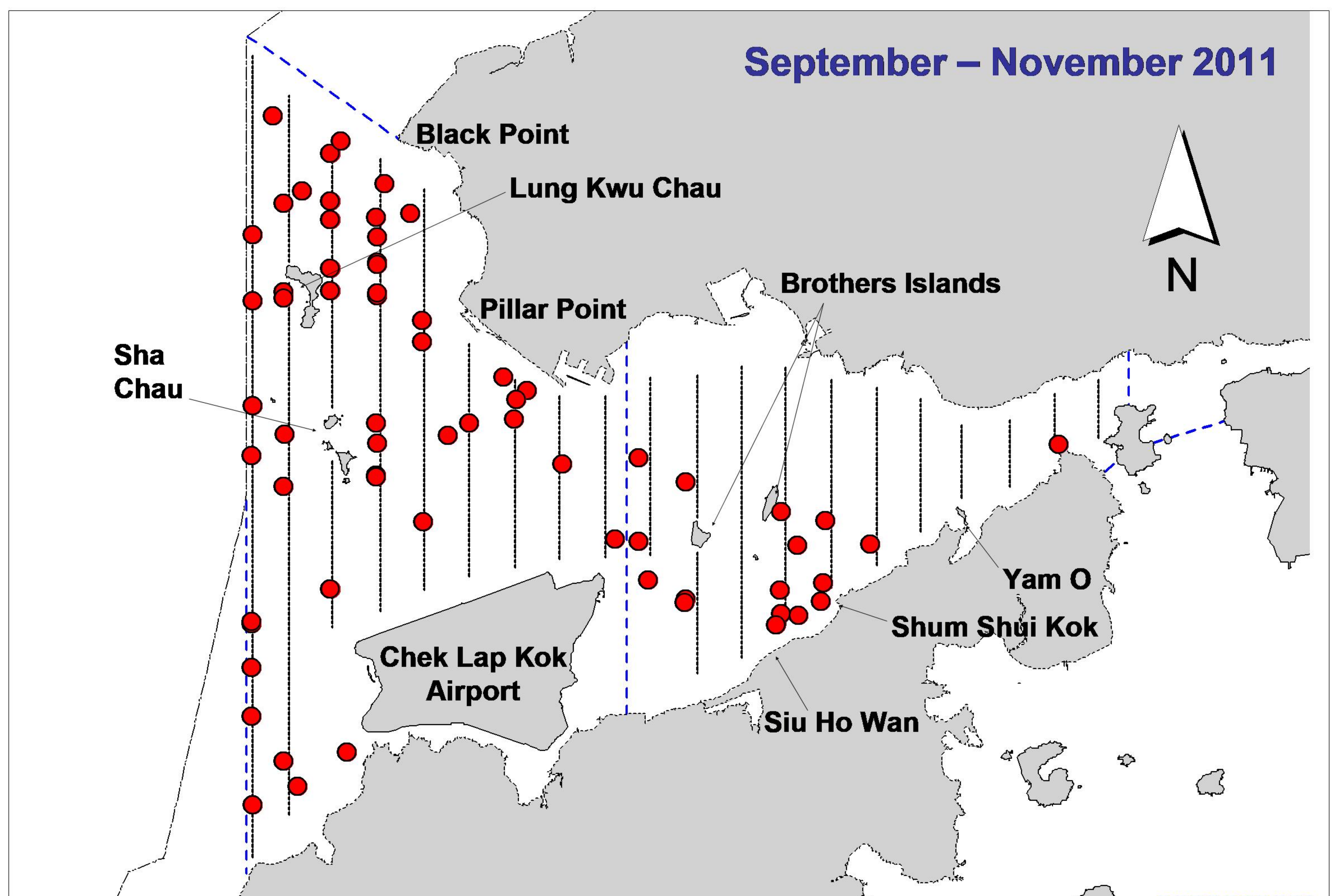
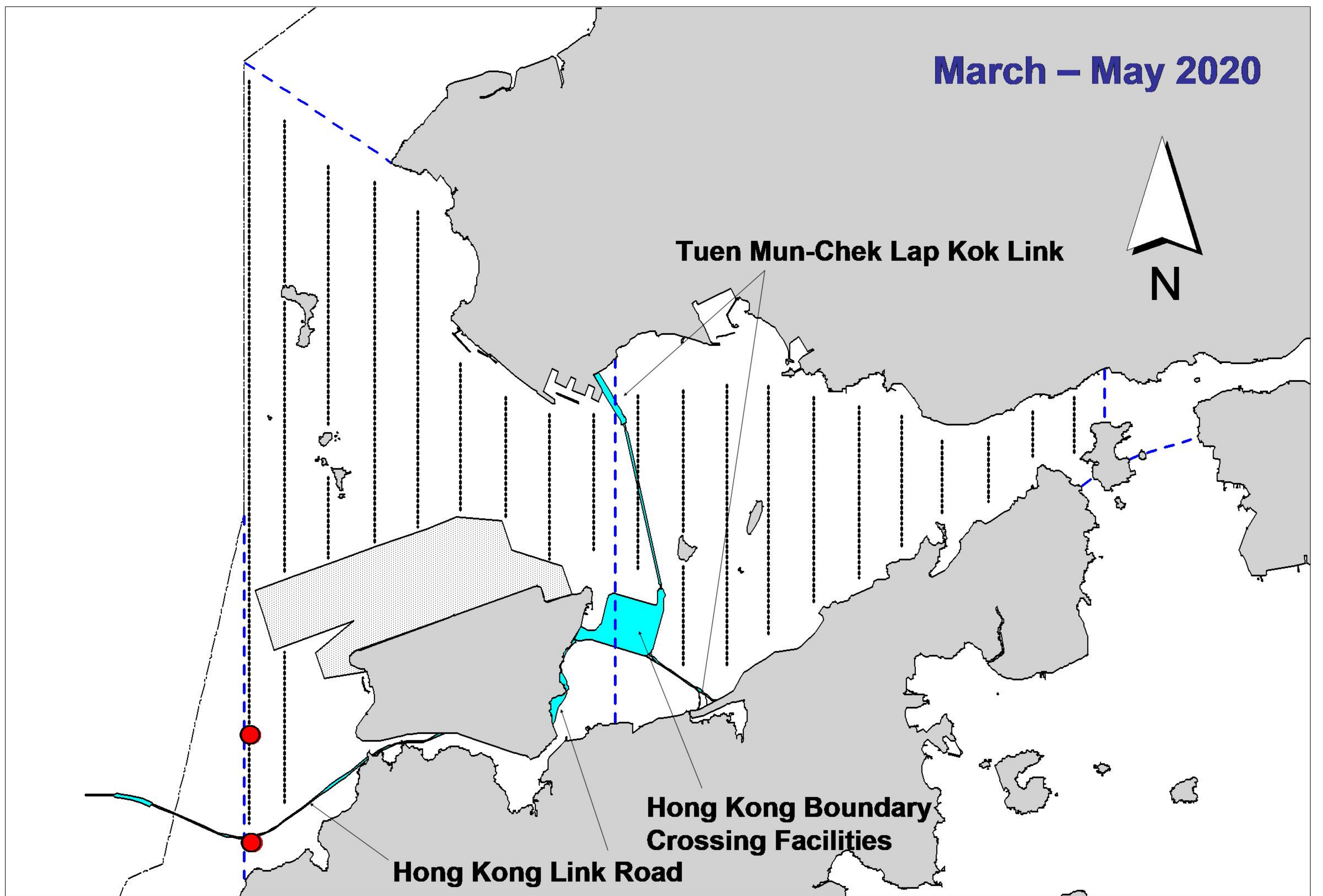


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during TMCLKL08 impact phase (top) and baseline monitoring surveys (bottom)



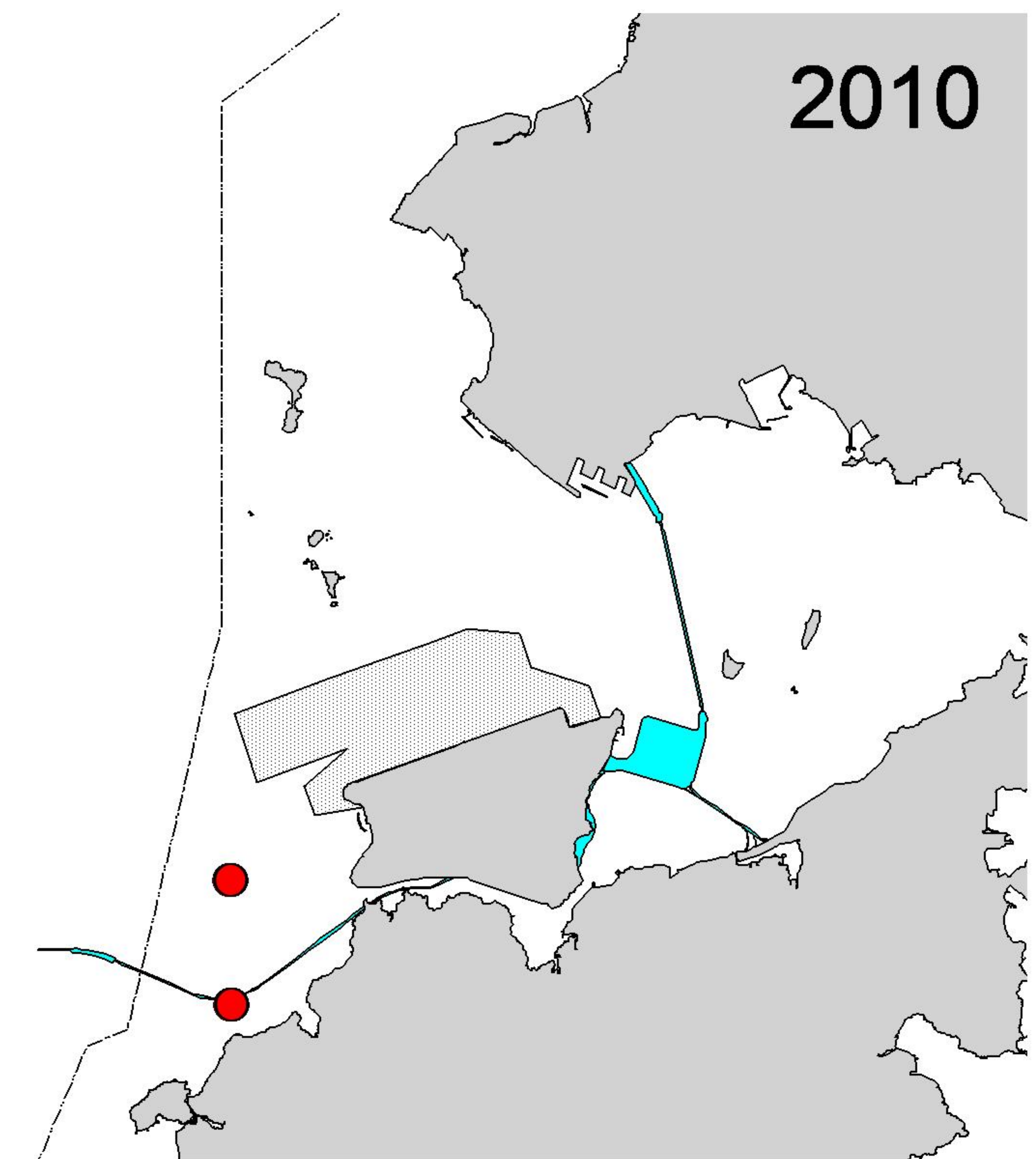
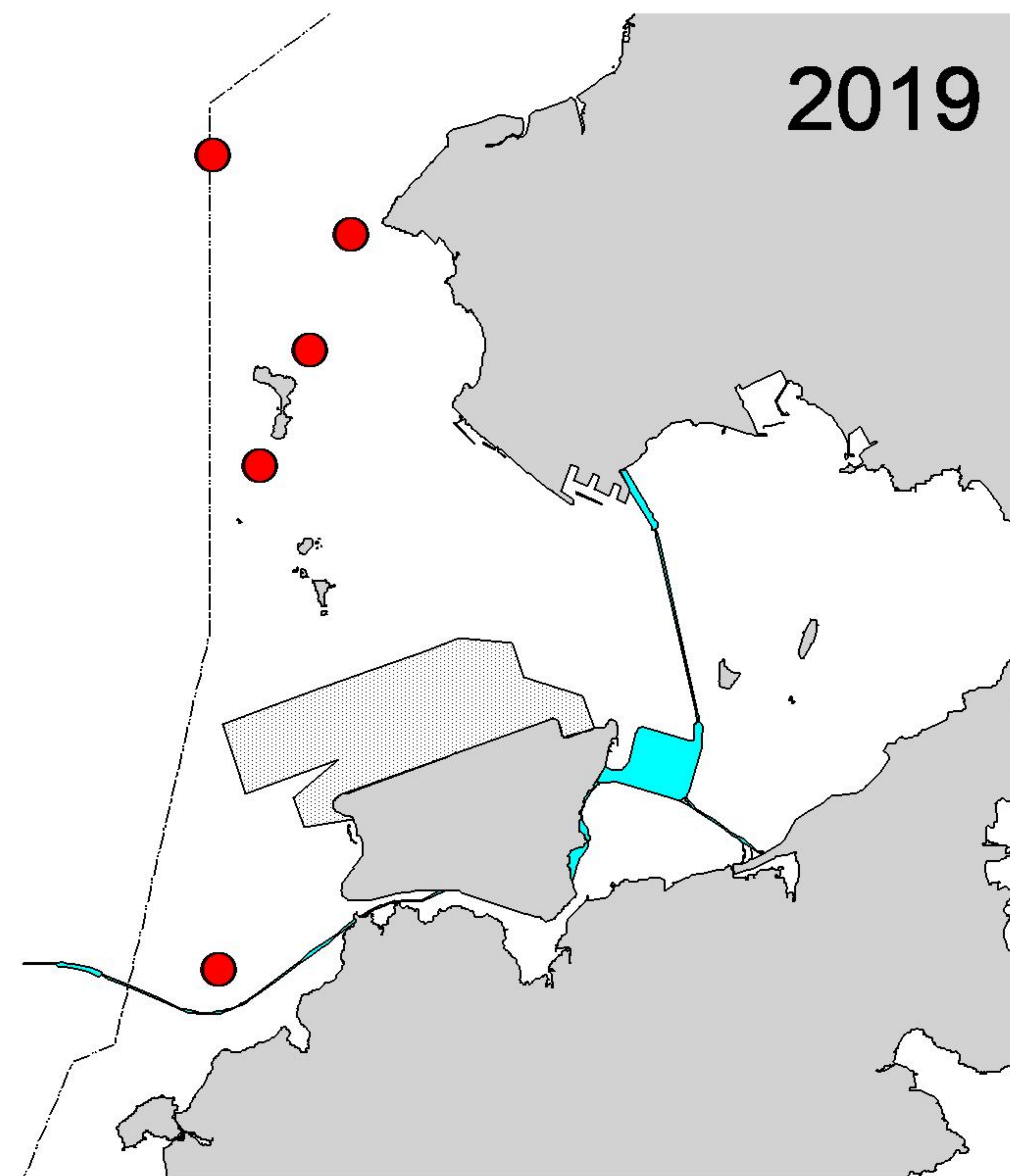
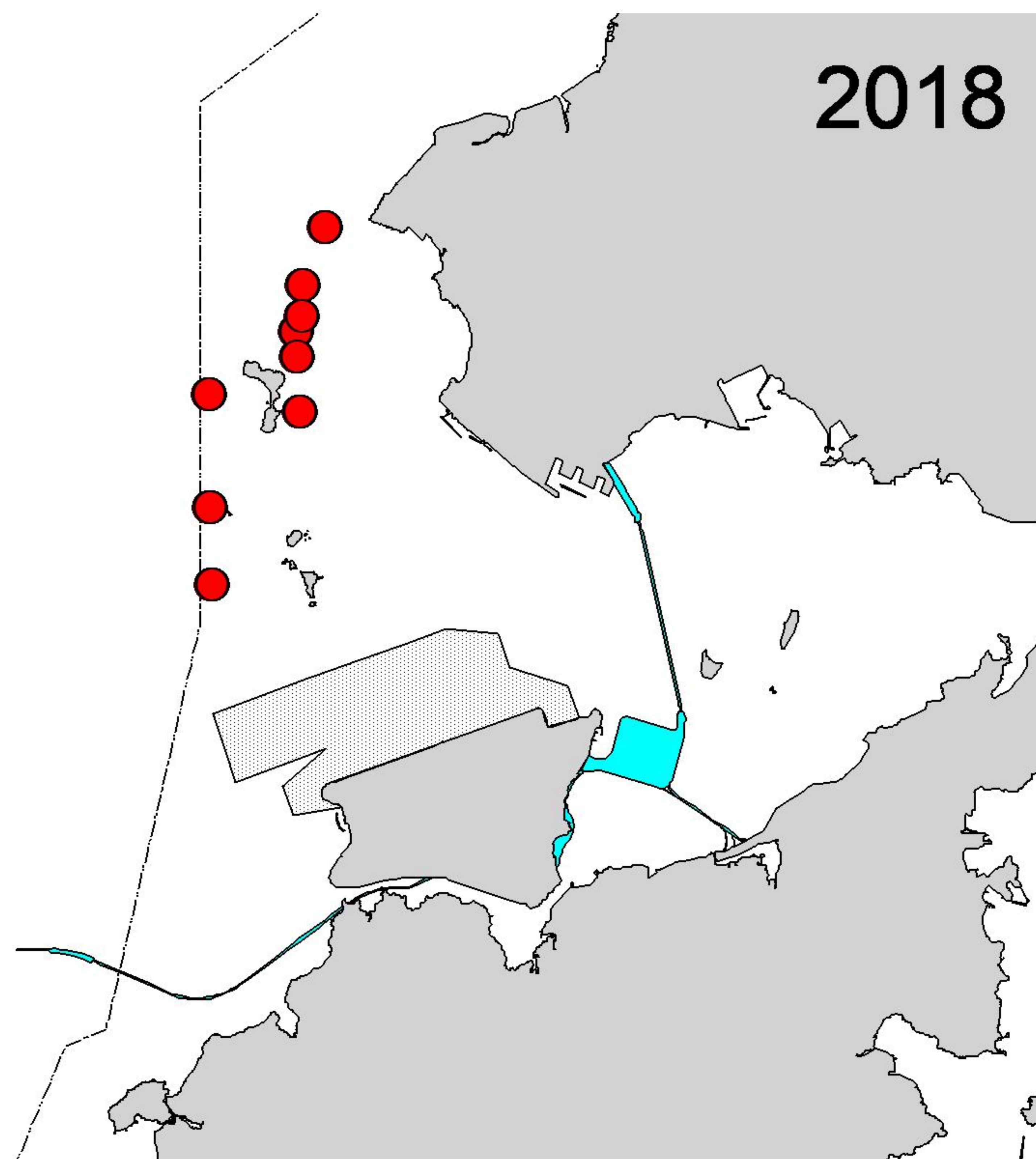
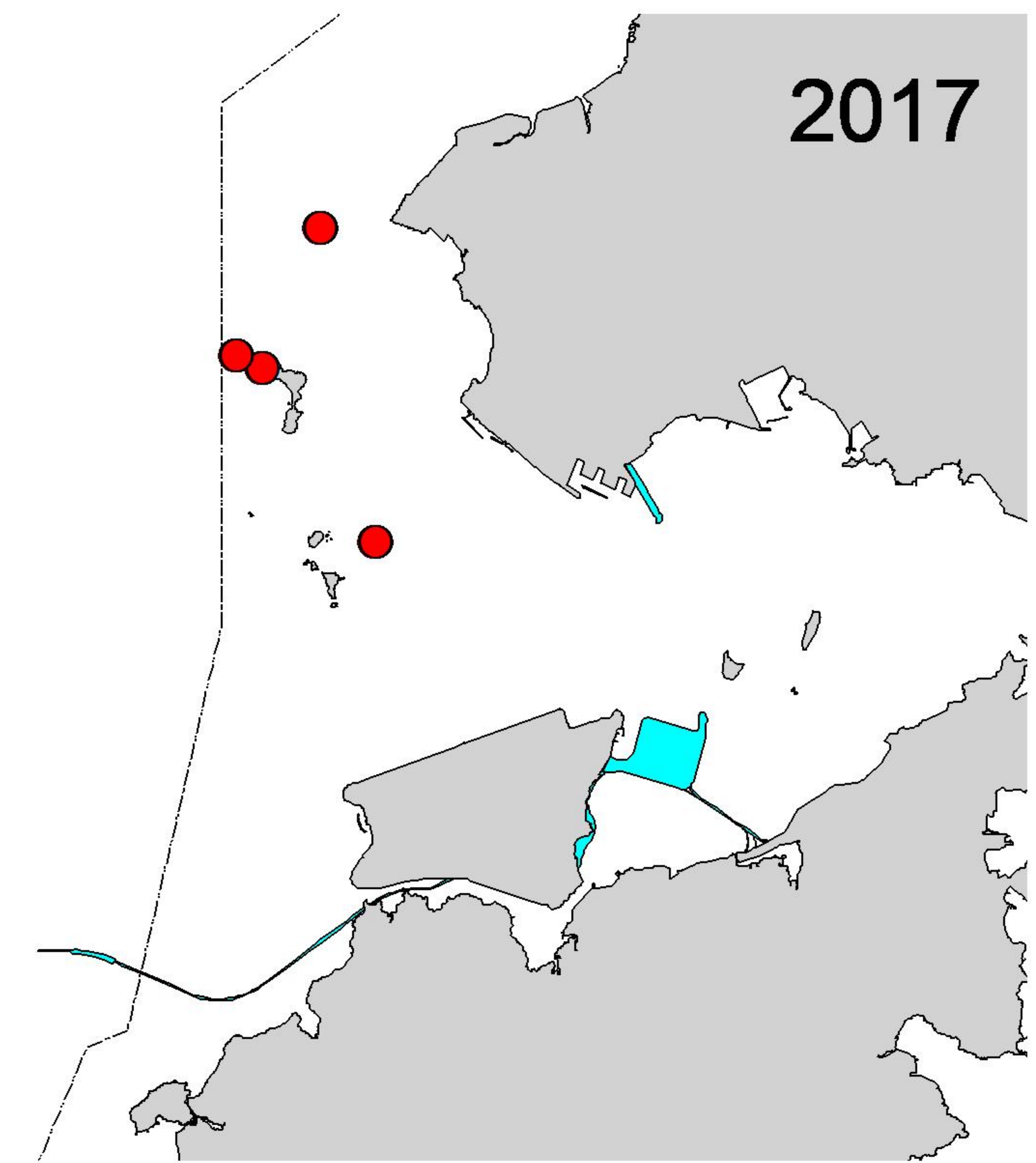
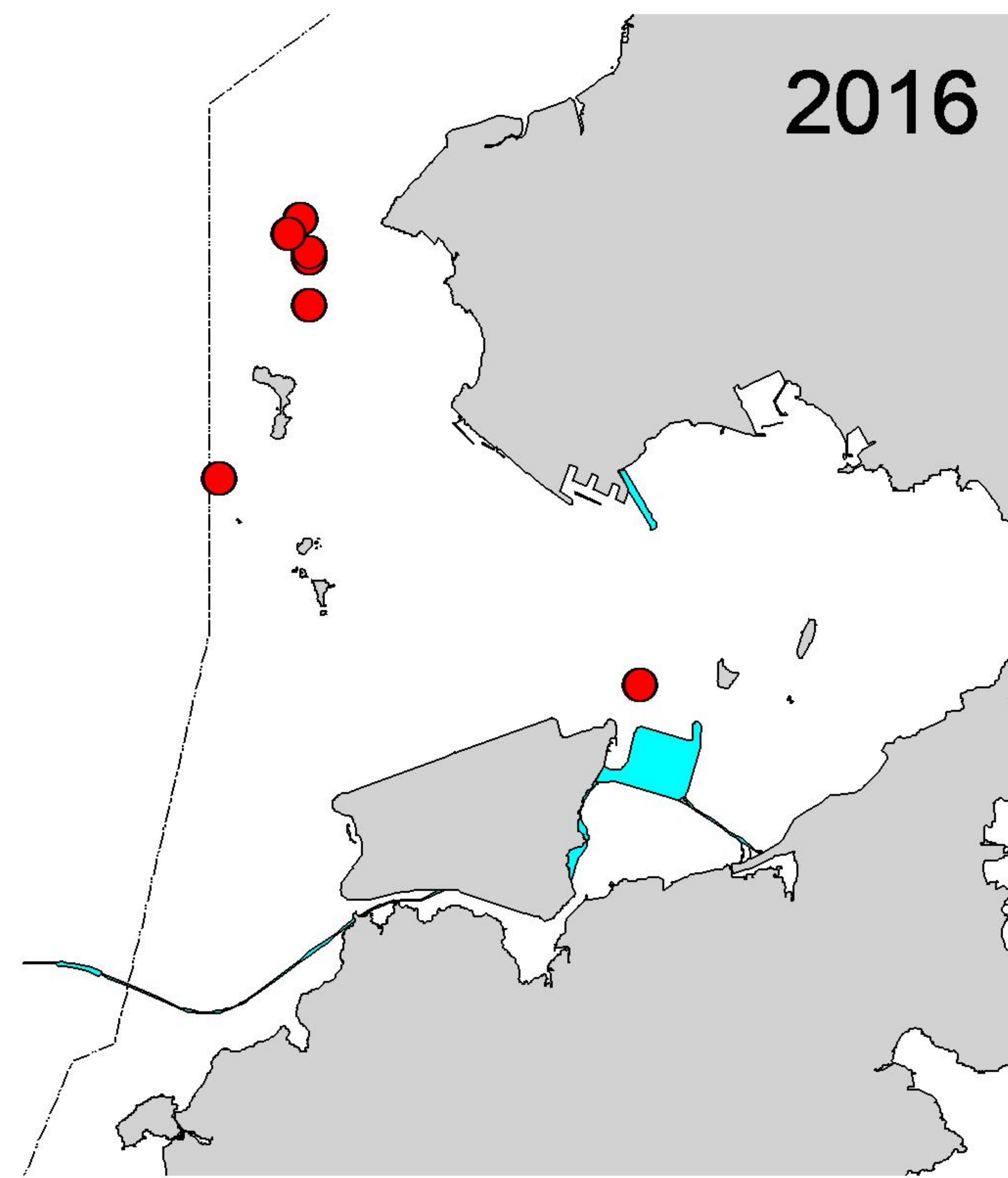
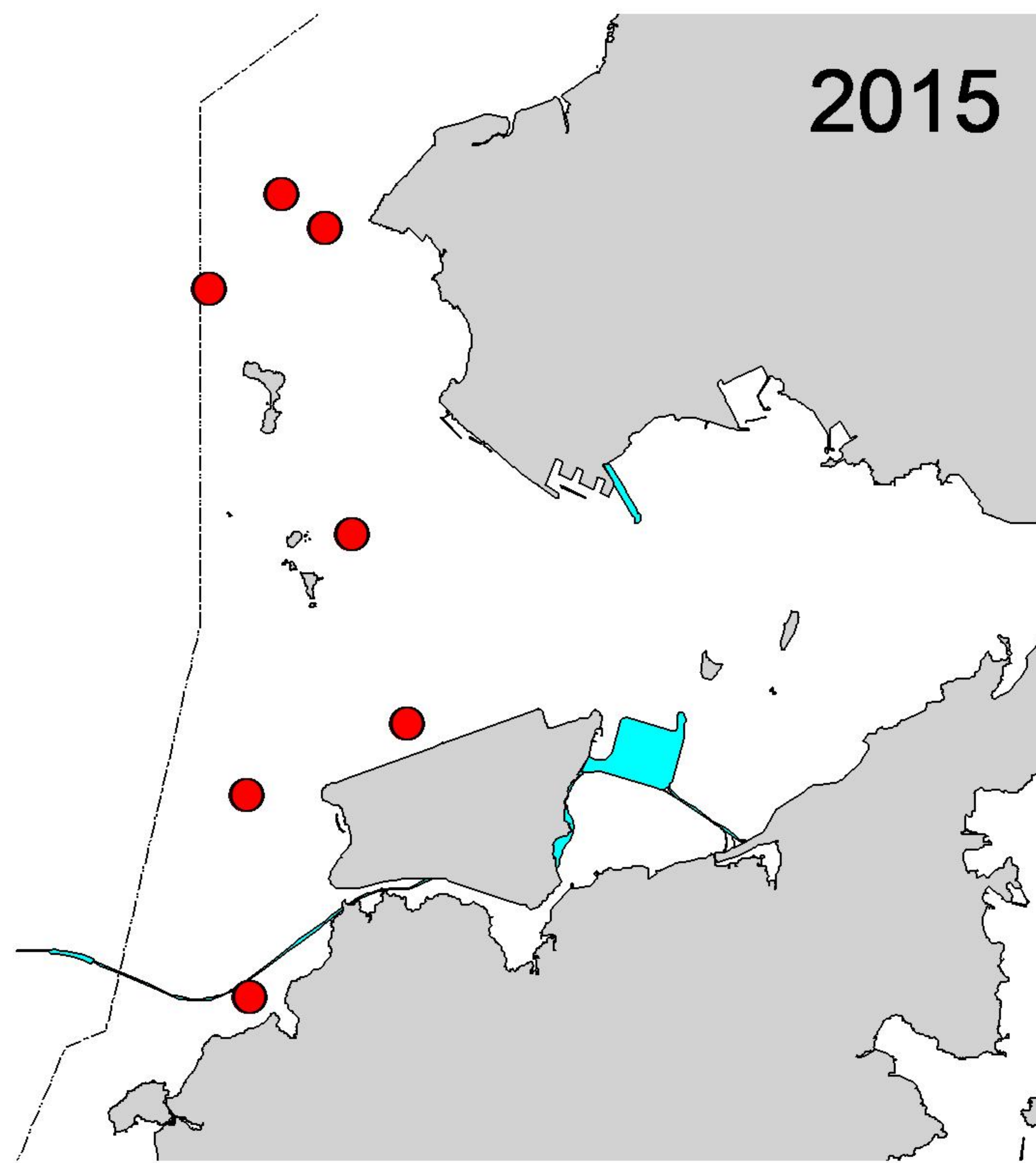


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six spring quarters (March-May) of HKLR03/TMCLKL08 impact phase in 2015-20



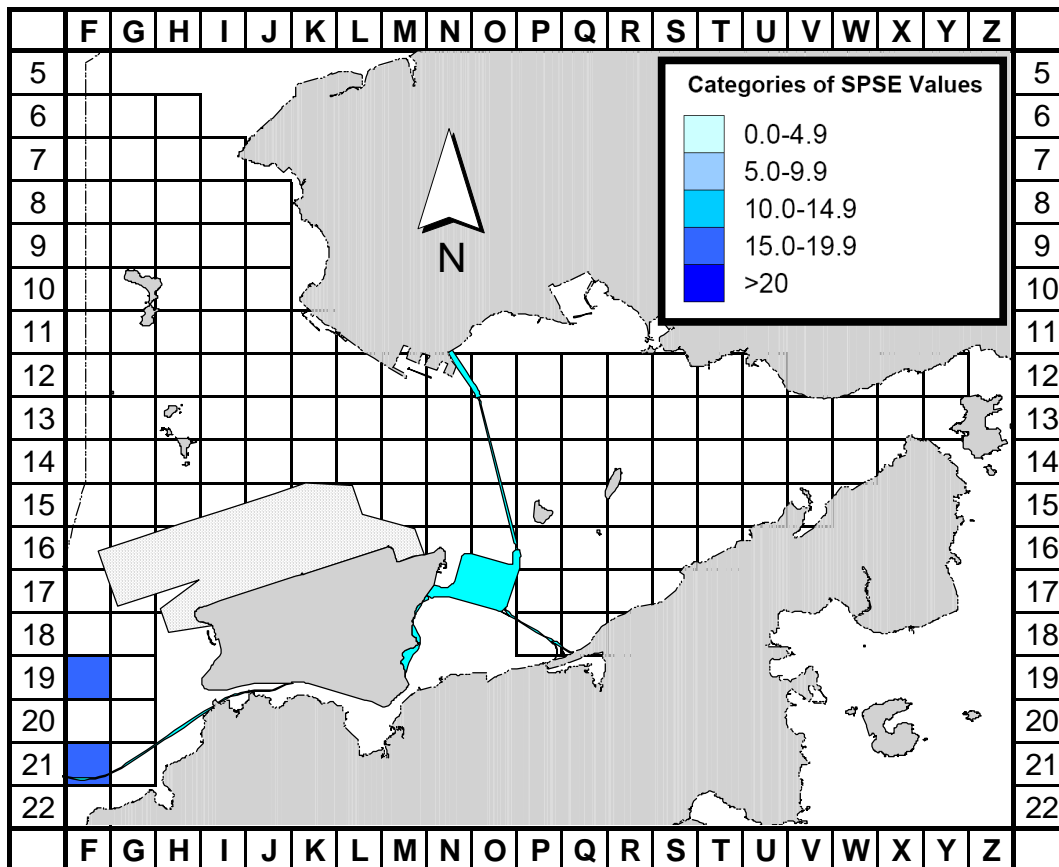


Figure 3a. Sighting density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (March-May 2020) (SPSE = no. of on-effort sightings per 100 units of survey effort)

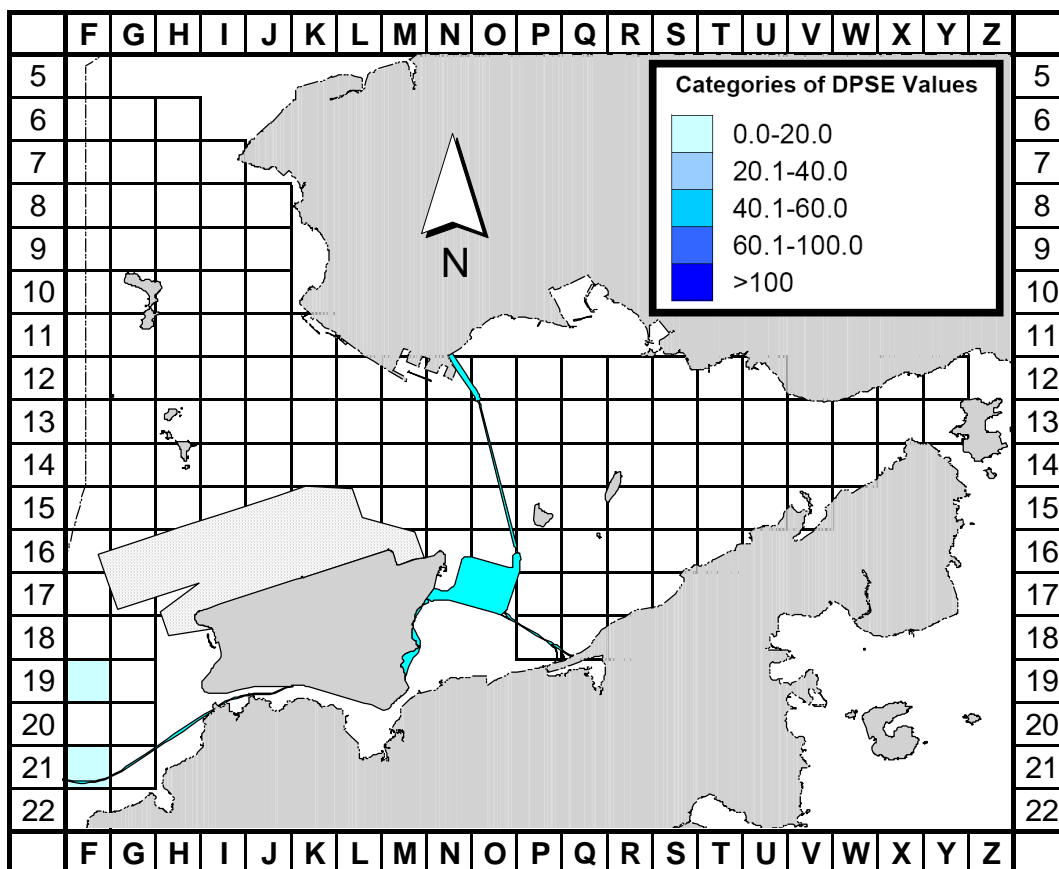


Figure 3b. Density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northeast and Northwest Lantau survey areas, using data collected during TMCLKL08 impact monitoring period (March-May 2020) (DPSE = no. of dolphins per 100 units of survey effort)



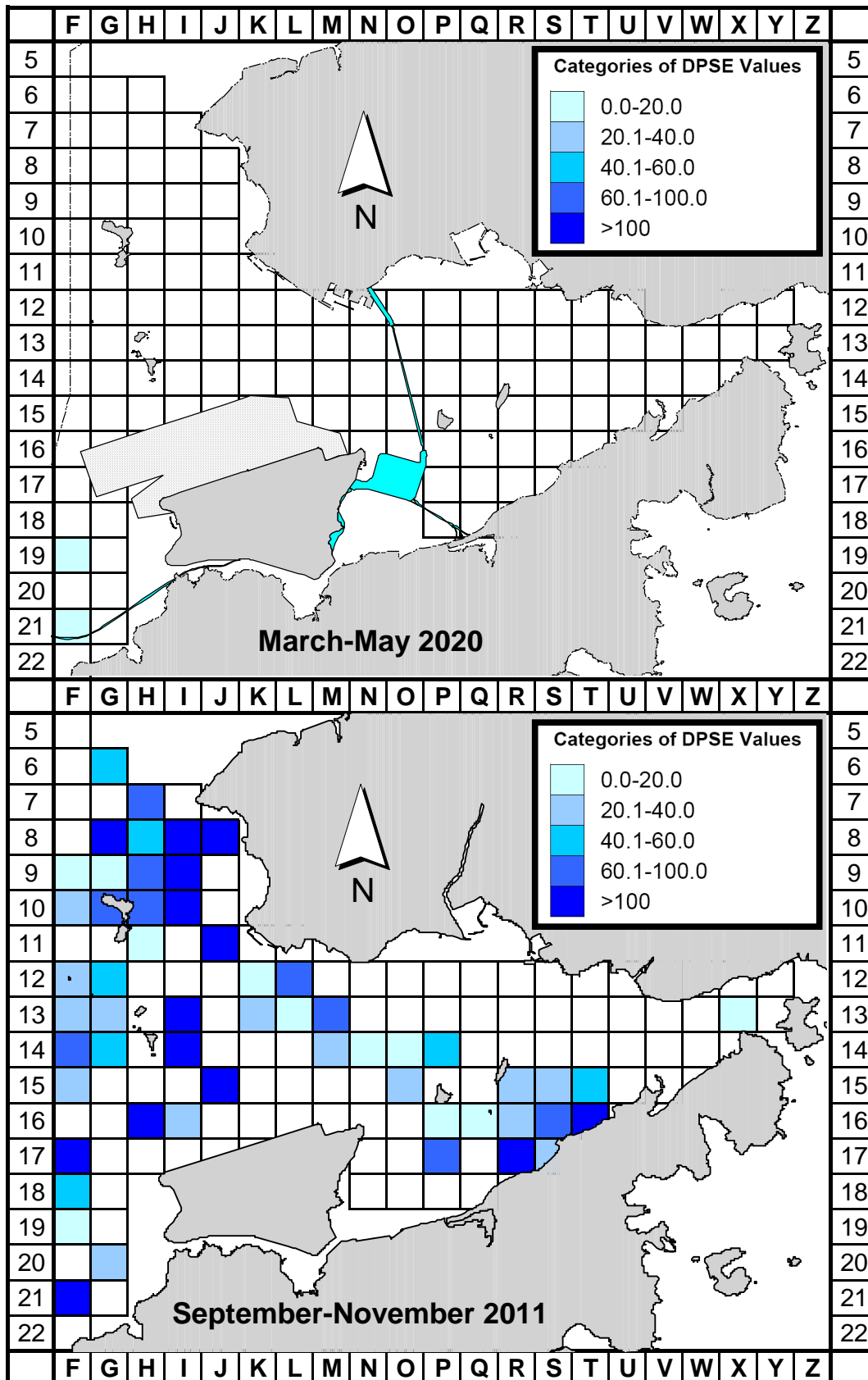


Figure 4. Comparison of density of Chinese white dolphins with corrected survey effort per km<sup>2</sup> in Northwest and Northeast Lantau survey area between the TMCLKL08 impact monitoring period (March-May 2020) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

## Appendix I. TMCLKL08 Survey Effort Database (March-May 2020)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
3-Mar-20	NW LANTAU	2	7.92	SPRING	STANDARD36826	TMCLKL	P
3-Mar-20	NW LANTAU	3	24.49	SPRING	STANDARD36826	TMCLKL	P
3-Mar-20	NW LANTAU	2	7.77	SPRING	STANDARD36826	TMCLKL	S
3-Mar-20	NW LANTAU	3	3.20	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NW LANTAU	2	13.90	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NW LANTAU	3	13.86	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NW LANTAU	2	6.20	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NW LANTAU	3	4.74	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NE LANTAU	2	29.58	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NE LANTAU	3	5.14	SPRING	STANDARD36826	TMCLKL	P
9-Mar-20	NE LANTAU	2	10.81	SPRING	STANDARD36826	TMCLKL	S
9-Mar-20	NE LANTAU	3	1.87	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	1	2.30	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	2	13.75	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	3	16.02	SPRING	STANDARD36826	TMCLKL	P
18-Mar-20	NW LANTAU	1	1.66	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	2	6.73	SPRING	STANDARD36826	TMCLKL	S
18-Mar-20	NW LANTAU	3	0.90	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NE LANTAU	2	25.17	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NE LANTAU	3	11.60	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NE LANTAU	2	11.93	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NE LANTAU	3	2.00	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NW LANTAU	2	20.01	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NW LANTAU	3	5.90	SPRING	STANDARD36826	TMCLKL	P
25-Mar-20	NW LANTAU	2	9.43	SPRING	STANDARD36826	TMCLKL	S
25-Mar-20	NW LANTAU	3	2.64	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NW LANTAU	1	10.88	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	2	11.06	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	3	4.40	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NW LANTAU	2	12.06	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NW LANTAU	3	1.50	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	1	1.70	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	2	18.30	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	3	15.66	SPRING	STANDARD36826	TMCLKL	P
8-Apr-20	NE LANTAU	1	1.10	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	2	7.05	SPRING	STANDARD36826	TMCLKL	S
8-Apr-20	NE LANTAU	3	5.19	SPRING	STANDARD36826	TMCLKL	S
14-Apr-20	NW LANTAU	1	1.46	SPRING	STANDARD36826	TMCLKL	P
14-Apr-20	NW LANTAU	2	31.85	SPRING	STANDARD36826	TMCLKL	P
14-Apr-20	NW LANTAU	2	3.95	SPRING	STANDARD36826	TMCLKL	S
21-Apr-20	NW LANTAU	1	1.20	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	2	19.06	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	3	11.81	SPRING	STANDARD36826	TMCLKL	P
21-Apr-20	NW LANTAU	1	1.80	SPRING	STANDARD36826	TMCLKL	S
21-Apr-20	NW LANTAU	2	9.33	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NW LANTAU	3	19.50	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NW LANTAU	4	8.95	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NW LANTAU	3	7.42	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NW LANTAU	4	3.33	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NE LANTAU	2	4.00	SPRING	STANDARD36826	TMCLKL	P
22-Apr-20	NE LANTAU	3	31.97	SPRING	STANDARD36826	TMCLKL	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
22-Apr-20	NE LANTAU	2	3.50	SPRING	STANDARD36826	TMCLKL	S
22-Apr-20	NE LANTAU	3	9.53	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NW LANTAU	2	7.25	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NW LANTAU	3	20.75	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NW LANTAU	3	11.20	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NE LANTAU	2	24.87	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NE LANTAU	3	9.60	SPRING	STANDARD36826	TMCLKL	P
5-May-20	NE LANTAU	2	9.29	SPRING	STANDARD36826	TMCLKL	S
5-May-20	NE LANTAU	3	3.34	SPRING	STANDARD36826	TMCLKL	S
12-May-20	NW LANTAU	2	32.61	SPRING	STANDARD36826	TMCLKL	P
12-May-20	NW LANTAU	2	6.74	SPRING	STANDARD36826	TMCLKL	S
12-May-20	NW LANTAU	3	1.85	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NW LANTAU	1	1.50	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	2	9.00	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	3	16.13	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NW LANTAU	2	5.20	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NW LANTAU	3	7.27	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NE LANTAU	1	6.72	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	2	23.97	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	3	4.22	SPRING	STANDARD36826	TMCLKL	P
18-May-20	NE LANTAU	1	3.53	SPRING	STANDARD36826	TMCLKL	S
18-May-20	NE LANTAU	2	8.46	SPRING	STANDARD36826	TMCLKL	S
25-May-20	NW LANTAU	1	1.31	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	2	26.44	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	3	3.83	SPRING	STANDARD36826	TMCLKL	P
25-May-20	NW LANTAU	2	9.85	SPRING	STANDARD36826	TMCLKL	S

**Appendix II. TMCLKL08 Chinese White Dolphin Sighting Database (March-May 2020)**

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

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
3-Mar-20	1	1310	1	NW LANTAU	3	3	ON	TMCLKL	817341	804686	SPRING	NONE	P
14-Apr-20	1	1002	1	NW LANTAU	2	210	ON	TMCLKL	815038	804702	SPRING	NONE	P

**Appendix III. Individual dolphins identified during TMCLKL08 monitoring surveys in March-May 2020**

<b>ID#</b>	<b>DATE</b>	<b>STG#</b>	<b>AREA</b>
WL232	03/03/20	1	NW LANTAU
WL268	14/04/20	1	NW LANTAU

Appendix IV. Two individual dolphins that were identified between March-May 2020 under TMCLKL08 monitoring surveys

