FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Date 27 April 2020
Our Ref. MCL/ED/0224/2020/C

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

BY EMAIL

Attn.: Mr. Ray Yan, Independent Environmental Checker

Dear Sir,

EP Condition 5.4 – Monthly 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 Condition 5.4 of the Environmental Permit (EP-353/2009K) for the captioned project, we hereby submit the certified Monthly EM&A Report for March 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. Winston Wong, Mr. Gordon Kok
Ramboll Attn: Mr. Y.H. Hui, Mr. Manson Yeung
CHEC Attn: Mr. Marko Chan, Mr. Matthew Wu

RAMBOLL

Ref.: HYDHZMBEEM00_0_7999L.20

27 April 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
Monthly EM&A Report for March 2020

Reference is made to the Environmental Team's submission of Monthly EM&A Report for February 2020 certified by the ET Leader (ET's ref.: "MCL/ED/0224/2020/C" dated 27 April 2020) and provided to us via e-mail on 27 April 2020.

We are pleased to inform you that we have no further comments on the captioned submission. We write to verify the captioned submission in accordance with Condition 5.4 of the Environmental Permit No. EP-353/2009/K (the EP).

The ET Leader is reminded that it is the ET's responsibility to ensure the report be timely submitted to the Director of Environmental Protection and the reported information be true, valid and correct as per Conditions 5.4 and 5.5 of the EP respectively.

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

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

Ray Yan
Independent Environmental Checker
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, MY, ENPO Site

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FUGRO

Monthly EM&A Report (March 2020)

0002/20/ED/0033 04 | 31 March 2020

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

Document Control

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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
04	25 Apr 2020	No adverse comment from IEC	KH	CY	MP
03	21 Apr 2020	IEC comments released	KH	CY	MP
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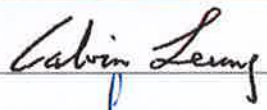
Environmental Team

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	

EXECUTIVE SUMMARY

This Monthly 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 2nd Monthly EM&A Report for the Contract which summaries findings of the EM&A programme during the reporting period from 1 March 2020 to 31 March 2020.

Environmental Monitoring and Audit Progress
The monthly 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 month. Also, no Action and Limit Level exceedance was recorded for construction noise monitoring in the reporting month.

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.

Future Key Issues

The main works will be anticipated in the next reporting period are as follow:

- Site Fence at South Public Transport Interchanges (SPTI) (land-based);
- Recessed Cover near building 035 (land-based);
- UPS room 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);

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1.6 Status of Environmental Licences, Notification and Permits

1.6.1 A summary of the relevant permits, licenses and/or notifications on environmental protection for this Contract is presented in **Table 1.2**.

Table 1.2 Environmental Licenses, Notification and Permits Summary

Permit/ Notification/ License	Reference No	Valid From	Valid Till
Environmental Permit	EP-353/2009/K	11-Apr-16	Not Applicable
Notification pursuant to Air Pollution (Construction Dust) Regulation	451380	28-Nov-19	Not Applicable
Billing Account for Disposal of C&D waste	A/C No. 7036097	18-Dec-19	Not Applicable
Chemical Waste Producer Registration	5296-951-C1186-32	6-Feb-20	Not Applicable
Water Discharge License	451376	TBA	Under Application
Construction Noise Permit	GW-RS0204-20	1-April-20	31-July-20

2. AIR QUALITY

2.1 Monitoring Requirement

2.1.1 In accordance with the Contract Specific EM&A Manual, 1-hour and 24-hour Total Suspended Particulates (TSP) levels should be measured at the designated air quality monitoring stations to indicate the impacts of construction dust on air quality. Impact 1-hour TSP monitoring was conducted for at least three times every 6 days, while impact 24-hour TSP monitoring was carried out for at least once every 6 days.

2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) deployed at the designated monitoring stations. The HVS shall meet all the requirements of the EM&A Manual.

2.2.2 A portable direct reading dust meter was used to carry out the 1-hour TSP monitoring.

2.2.3 The model of the air quality monitoring equipment used is summarized in **Table 2.1**.

Table 2.1 Air Quality Monitoring Equipment

Item	Location	Brand	Model	Equipment	Serial No.
1	AMS2	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-01
			TE-300-310X	-Mass Flow Controller	3002
			TE-5005X	-Blower Motor Assembly	4607
			TE-5007X	-Mechanical Timer	5596
			TE-5009X	-Continuous Flow Recorder	5752
2	AMS3C	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-02
			TE-300-310X	-Mass Flow Controller	3000
			TE-5005X	-Blower Motor Assembly	4610
			TE-5007X	-Mechanical Timer	5597
			TE-5009X	-Continuous Flow Recorder	5756
3	AMS7B	Tisch	TE-5170 (TSP)	High Volume Sampler	HVS-03
			TE-300-310X	-Mass Flow Controller	2792
			TE-5005X	-Blower Motor Assembly	3802
			TE-5007X	-Mechanical Timer	5781
			TE-5009X	-Continuous Flow Recorder	5483
4		Tisch	TE-5025A	HVS Sampler Calibrator	438320/2456
5		Sibata	Model LD-5R	Sibata Portable TSP Monitors	761104
6					761105
7					882147

2.6 Maintenance and Calibration for Direct Reading Dust Meter

2.6.1 ET shall submit sufficient information to the IEC to prove that the instrument is capable of achieving comparable results to the HVS. The instrument should also be calibrated regularly, and the 1-hour sampling shall be determined periodically by the HVS to check the validity and accuracy of the results measured by direct reading method. The calibration certificate for the direct reading dust meter is provided in **Appendix D**.

2.7 Monitoring Locations

2.7.1 In accordance with the Contract Specific EM&A Manual, four air quality monitoring locations, namely AMS2, AMS3C, AMS6 and AMS7B were set up at the proposed locations. AMS2, AMS3C and AMS7B are covered by Contract No. HY/2019/01 "Hong Kong-Zhuhai- Macao Bridge Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works"

2.7.2 AMS6 is covered by Contract No. HY/2011/03 "Hong Kong-Zhuhai-Macao Bridge Hong Kong Link Road (HZMB HKLR) – Section between Scenic Hill and HKBCF". 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 this air quality monitoring station is no longer covered by Contract No. HY/2011/03.

2.7.3 The most updated locations are summarized in **Table 2.2** and the locations of the air monitoring stations shown in **Figure 2**.

Table 2.2 Air Quality Monitoring Location

Monitoring Station	Location
AMS2	Tung Chung Development Pier
AMS3C	Ying Tung Estate Market Rooftop
AMS6	Dragonair / CNAC (Group) Building (HKIA)
AMS7B	Third Runway Site Office

Remarks: 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.

2.8 Monitoring Results

2.8.1 The schedule of air quality monitoring in reporting month is provided in **Appendix E**.

2.8.2 No Action / Limit Level exceedance was recorded for 1-hr and 24-hr TSP at AMS2, AMS3C and AMS7B.

2.8.3 The monitoring results for AMS6 are reported in the monthly EM&A Reports prepared for Contract No. HY/2011/03.

2.8.4 The weather conditions during the monitoring are provided in **Appendix K**.

2.8.5 The monitoring data of 1-hr TSP and 24-hr TSP are summarized in **Table 2.3**. Detailed monitoring data are presented in **Appendix F**.

Table 2.3 Summary of Air Quality Monitoring Results

Monitoring Station	Average ($\mu g/m^3$)	Range ($\mu g/ m^3$)	Action Level ($\mu g/ m^3$)	Limit Level ($\mu g/ m^3$)
1-hour TSP				
AMS2	67	50-115	374	500
AMS3C	67	46-106	368	
AMS7B	68	44-106	370	
24-hour TSP				
AMS2	55	27-87	176	260
AMS3C	61	31-95	167	
AMS7B	52	27-88	183	

2.8.6 The Event and Action Plan for air quality is given in **Appendix H**.

2.8.7 The wind data obtained from the on-site wind station during the reporting period is provided in **Appendix G**.

3. NOISE

3.1 Monitoring Requirement

3.1.1 In accordance with the Contract Specific EM&A Manuals, L_{eq} (30min) monitoring is conducted for at least once a week during the construction phase between 0700 and 1900 on normal weekdays at the designated monitoring locations.

3.2 Monitoring Equipment

3.2.1 The sound level meter used in noise monitoring shall comply with the International Electrotechnical Commission Publication (IEC) 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum issued under the Noise Control Ordinance (NCO).

3.2.2 Sound level calibrator shall be used for the on-site calibration of the meter. This calibrator complies with the IEC Publication 942 (1988) Class 1 and ANSI S1.40 - 1984. Noise measurements were only accepted to be valid if the calibration levels from before and after the measurement agree to within 1.0 dB(A).

3.2.3 Measurements shall be recorded to the nearest 0.1dB(A). Sound level meters are programmed to measure A-weighted equivalent continuous sound pressure level at 30-minute intervals between 0700 and 1900 on normal weekdays at least once a week when construction activities are underway.

3.2.4 The model of the noise monitoring equipment used is summarized in **Table 3.1**.

Table 3.1 Construction Noise Monitoring Equipment

Item	Brand	Model	Equipment	Serial No.
1	Casella	CEL-63X Series	Integrating Sound Level Meter	1488272
2	Casella	CEL-63X Series	Integrating Sound Level Meter	1488289
3	Casella	CEL-120/1	Calibrator	2383707
4	Casella	CEL-120/1	Calibrator	2383886
5	Benetech	GM816	Wind Speed Anemometer	N/A

3.3 Monitoring Parameters and Frequency

3.3.1 The parameters and frequencies of impact noise monitoring is summarized in **Table 3.2**.

Table 3.2 Monitoring Parameters and Frequencies of Noise Monitoring

Parameter	Frequency
L_{eq} (30min) L_{10} and L_{90} will be recorded for reference	At each station at 0700-1900 hours on normal weekdays at a frequency of once a week

3.4 Monitoring Methodology

3.4.1 Noise measurement should be conducted as the following procedures:

- Free field measurements was made at monitoring location M-N3. A correction of +3 dB(A) shall be made to the free field measurements.
- The battery condition should be checked to ensure good functioning of the meter.
- Parameters such as frequency weighting, the time weighting and the measurement time should set as follow:

  (i) Frequency weighting: A
  (ii) Time weighting: Fast
  (iii) Measurement time: continuous 5 minutes interval

- Prior to and after noise measurement, the meter shall be calibrated using the calibrator for 94.0 dB(A) at 1000 Hz. If the difference in the calibration level before and after measurement is more than 1.0 dB(A), the measurement will be considered invalid and repeat of noise measurement is required after re-calibration or repair of the equipment.
- The wind speed at the monitoring station shall be checked with the portable wind meter. Noise monitoring should be cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.
- Noise measurement should be paused during periods of high intrusive noise if possible and observation shall be recorded when intrusive noise is not avoided.
- At the end of the monitoring period, the L_{eq}, L_{10} and L_{90} should be recorded. In addition, site conditions and noise sources should also be recorded on a standard record sheet.

3.5 Maintenance and Calibration

3.5.1 Maintenance and calibration procedures should also be carried out, including:

- The microphone head of the sound level meter and calibrator should be cleaned with a soft cloth at quarterly intervals.
- The sound level meter and calibrator should be calibrated annually by a HOKLAS laboratory or the manufacturer.
- The calibration certificates for noise monitoring equipment are provided in **Appendix D.**

4. ECOLOGY MONITORING

4.1 Monitoring Requirements

4.1.1 All marine-based construction activities for the HKBCF project were completed in January 2019. No marine-based construction activities will be undertaken under this Contract. However, the ET of this Contract or another ET of the HZMB is required to conduct post-construction dolphin monitoring in accordance with Section 10.7 of the updated EM&A Manual.

4.1.2 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 relevant sections of dolphin monitoring report of Contract No. HY/2012/08 for this reporting month is extracted and given in **Appendix O**.

4.1.3 The CV of the proposed dolphin specialist for this Contract has been submitted to IEC for review prior to submission to AFCD for approval.

4.2 Monitoring Locations and Methodology

4.2.1 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.

4.2.2 The coordinates of the transect lines are shown in **Table 1** of **Appendix O.** The map of the transect lines provided by AFCD is presented in **Figure 4**.

4.2.3 The details of the line-transect method (Buckland et al. 2001) adopted in the survey and the photo-identification work when Chinese White Dolphins (CWD) are sighted are presented in **Section 2** of **Appendix O**.

4.3 Action and Limit Levels for Dolphin Monitoring

4.3.1 The Action and Limit Levels for CWD Monitoring are provided in **Table 4.3** & **Table 4.4**.

Table 4.3 Action and Limit Levels for Chinese White Dolphin Monitoring – Approach to Define Action Level (AL) and Limit Level (LL)

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

Remark: For North Lantau Social Cluster, action level will be trigger if either NEL or NWL fall below the criteria; limit level will be triggered if both NEL and NWL fall below the criteria.

Table 4.4 Derived Value of Action Level (AL) and Limit Level (LL) for Chinese White Dolphin Monitoring

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

4.3.2 If exceedance(s) at these transects is/are recorded by the ET of the Contract or referred by the other ET under the HZMB project to the Contract, the ET of the Contract will carry out an investigation and findings will be reported in the monthly EM&A Report.

4.3.3 The event and action plan is provided in **Appendix H**.

4.4 Monitoring Results

4.4.1 Vessel-based Line-Transect Survey

4.4.1.1 Two sets of vessel-based line transect surveys were conducted in NWL and NEL survey areas on 3, 9, 18 and 25 March 2020. The survey routes are presented in **Figures 2 to 5** of **Appendix O**.

4.4.1.2 During the 9 and 25 March 2020 surveys, several boats and barges involved in construction works near the southern end of Transect Line No. 8 were observed. Due to safety consideration, the survey vessel did not traverse these area. Therefore, only partial survey of Transect Line No. 8 was conducted as shown in **Figures 3** & **5 of Appendix O**.

4.4.1.3 A total of 259.52 km of survey effort was collected, with 100% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) (**Annex I** of **Appendix O**).

4.4.1.4 A total of 98.10 km and 161.42 km of survey effort were collected from NEL and NWL survey areas, respectively while the total survey effort conducted on primary and secondary lines were 189.64 km and 69.88 km, respectively (**Annex I** of **Appendix O**).

4.4.1.5 During the reporting period, a single CWD was sighted in NWL and no CWD sighted in NEL. The dolphin sighting was made on primary line during on-effort search, and it was not associated with any operating fishing vessel (**Annex I** of **Appendix O**).

4.4.1.6 Distribution of the single dolphin sighting made in March 2020 is shown in **Figure 6** of **Appendix O**. The dolphin was sighted to the west of the airport platform, relatively far from the HKBCF work site.

4.4.1.7 Encounter rates of Chinese White Dolphin deduced from the survey effort and on-effort dolphin sighting data made under favourable conditions (Beaufort 3 or below) in March 2020 are presented in **Table 4.1** & **Table 4.2**.

Table 4.1 Dolphin encounter rates deduced from the two sets of TMCLKL surveys (two surveys in each set) during the reporting month in Northeast (NEL) and Northwest Lantau (NWL)

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphin from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
NEL	Set 1: March 3rd / 9th	0.0	0.0
	Set 2: March 18th / 25th	0.0	0.0
NWL	Set 1: March 3rd / 9th	1.7	1.7
	Set 2: March 18th / 25th	0.0	0.0

Table 4.2 Overall dolphin encounter rates (sightings per 100 km of survey effort) from all four TMCLKL surveys conducted in the reporting month on primary lines only as well as both primary lines and secondary lines in NEL and NWL

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphin from all on-effort sightings per 100 km of survey effort)	
	Primary Lines Only	Both Primary and Secondary Line	Primary Lines Only	Both Primary and Secondary Line
NEL	0.0	0.0	0.0	0.0
NWL	0.8	0.6	0.8	0.6

4.4.2 Photo-identification Work

4.4.2.1 The single CWD sighted was identified as WL232 (**Annexes III** and **IV** of **Appendix O**) and was not sighted with any young calf.

5. SITE INSPECTION AND AUDIT

5.1 Site Inspection

5.1.1 Site audits were carried out by ET on weekly basis to monitor the implementation of proper environmental management practices and mitigation measures in the Project site.

5.1.2 In the reporting month, four site inspections were carried out on 6, 11, 18 and 25 March 2020.

5.1.3 No monitoring and audit of landscape and visual mitigation measures were implemented as no landscape works were conducted during the reporting month.

5.1.4 No outstanding issues were reported during the reporting month. Details of observations recorded during the site inspections are summarized in **Appendix M**.

5.2 Advice on the Solid and Liquid Waste Management Status

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

5.2.2 The monthly summary of waste flow table is detailed in **Appendix I**.

5.2.3 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.

5.2.4 The Contractor was reminded that chemical waste containers should be properly treated and stored temporarily in designated chemical waste storage area on site in accordance with the Code of Practice on the Packing, Labelling and Storage of Chemical Waste.

6. ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

6.1 Environmental Exceedance

6.1.1 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.

6.1.2 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.

6.2 Complaints, Notification of Summons and Prosecution

6.2.1 No environmental complaint, notification of summons and successful prosecution were received in the reporting month.

6.2.2 Cumulative complaint log, summaries of complaints, notification of summons and successful prosecutions are presented in **Appendix L**.

7. IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURE

7.1 Implementation Status

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 J.**

8. FUTURE KEY ISSUES

8.1 Construction Programme for the Next Month

- Site Fence at SPTI (land-based);
- Recessed Cover near building 035 (land-based);
- UPS room near building 062 (land-based);
- Minor Works at PCB (land-based);
- Site hoarding VCP (land-based);
- Excavation at VCP (land-based);
- Road & Drain works at SPTI and NPTI (land-based);
- Vertical access at PCB (land-based);
- Site office renovation at WA3 (land-based);
- Covered Walkway at SPTI and NPTI (land-based).

8.2 Key Issues for the Coming Month

8.2.1 Potential environmental impacts arising from the above construction activities are mainly associated with construction dust, construction noise, waste management and landscape and visual impact issues.

8.3 Monitoring Schedules for the Next Month

8.3.1 The tentative schedule for environmental monitoring in the coming month is provided in **Appendix E**.

9. CONCLUSION AND RECOMMENDATION

9.1 Conclusions

9.1.1 1-hour TSP and 24-hour TSP impact monitoring at AMS2, AMS3C and AMS7B were carried out in the reporting month, no Action / Limit Level exceedance was recorded during the period.

9.1.2 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.

9.1.3 Construction noise monitoring were carried out in the reporting month, no Action / Limit Level exceedance was recorded during the period.

9.1.4 Based on previous dolphin surveys conducted for the HZMB project, monthly variation in dolphin occurrence within the survey areas was observed. Hence, it is more suitable to assess whether post-construction activities of the HKBCF have adverse impacts on dolphin occurrence every quarter where monthly comparison of distribution, group size, and encounter rates will be conducted.

9.1.5 Four environmental site inspections were carried out in the reporting month. Recommendations on mitigation measures for air quality impact and chemical and waste management were given to the Contractor for remediating the deficiencies identified during the site inspections.

9.1.6 Referring to the Contractor's information, no environmental complaint, notification of summons and successful prosecution was received in the reporting month.

9.2 Comment and Recommendations

9.2.1 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.

9.2.2 According to the environmental site inspections performed in the reporting month, the following recommendations were provided:

Air Quality Impact

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

Construction Noise Impact

- No specific observation was identified in the reporting month.

Water Quality Impact

- No specific observation was identified in the reporting month.

Chemical and Waste Management

- All waste generated at the site should be cleaned and collected.

Landscape and Visual Impact

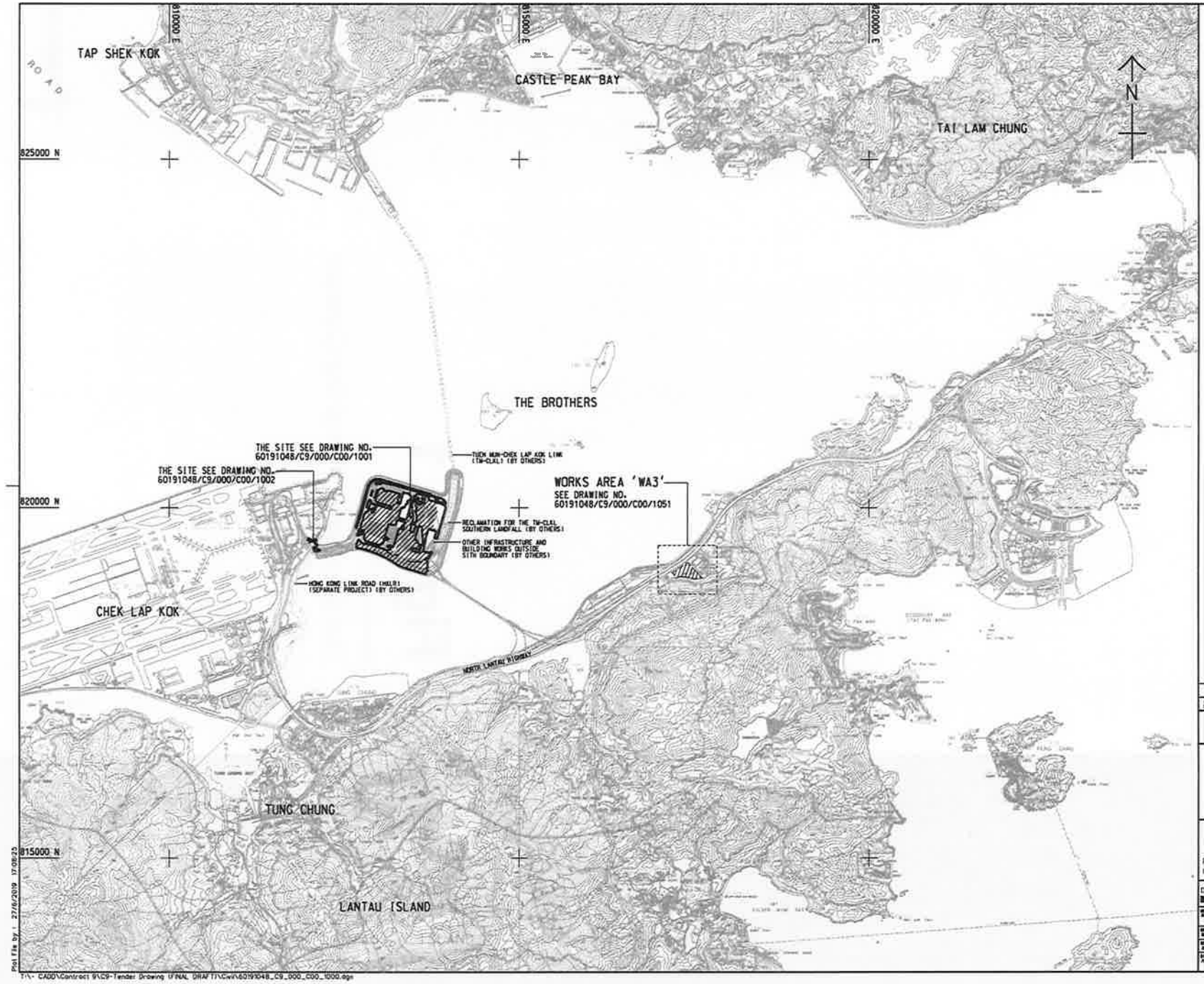
- No specific observation was identified in the reporting month.

Permit/ Licenses

- No specific observation was identified in the reporting month.

Figure 1

The Site Layout Plan of the Contract



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:

SITE BOUNDARY

WORKS AREA

-	TENDER DRAWING	TTHE	JUL 19

HIGHWAYS DEPARTMENT

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

SITE LOCATION PLAN

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 60191048/C9/000/C00/1000

DESIGNED BY	TTHE	CONTRACT No.	H1/2015/01
DRAWN BY	JC	CHECKED	SCI
SCALE	A1 1 : 25000		
DIMENSIONS ARE IN	METRES		

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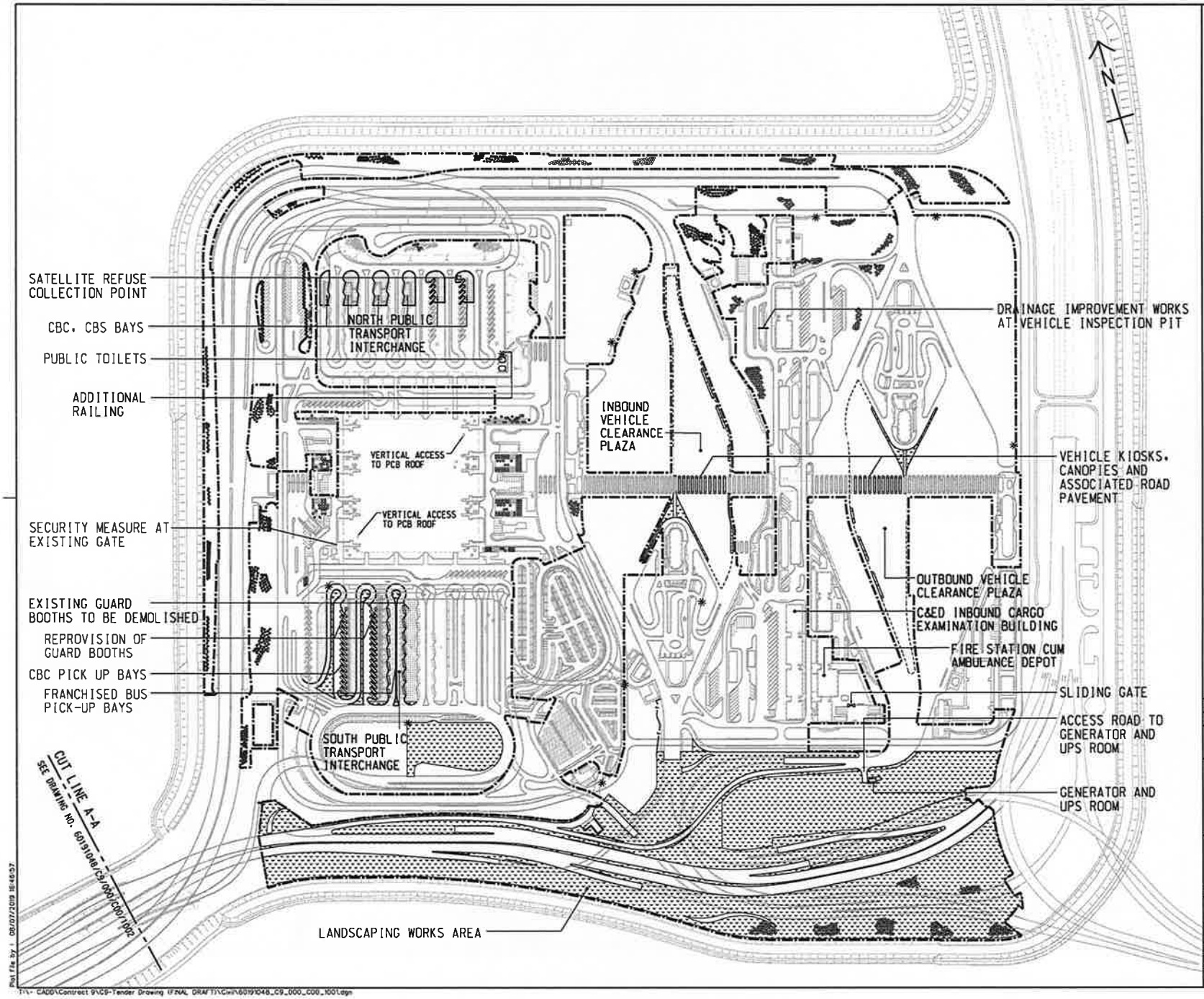


REMARKS:

1. IN SPTI:
   - 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 DRAINPIT COVERS
2. IN NPTI:
   - 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 DRAINPIT 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 AVCSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVCSS
5. VEHICLE KIOSKS AT INBOUND & OUTBOUND VCP
   - PROVISION OF AVCSS AT NEW KIOSKS TO SERVE 24 NOS. VEHICULAR LANES
   - REPLACEMENT OF BARRIER GATE WITH SKIRTING AT 12 NOS. EXISTING KIOSK
6. C&ED INBOUND CARGO EXAMINATION BUILDING
   - PROVISION OF NEW CENTRAL AVCSS EQUIPMENT WITH SUFFICIENT CAPACITY, PROCESSING POWER AND STORAGE TO ACCOMMODATE BOTH THE EXISTING AND NEW AVCSS

ABBREVIATION:

SPTI – SOUTH PUBLIC TRANSPORT INTERCHANGE
NPTI – 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
AVCSS – AUTOMATIC VEHICLE CLEARANCE SUPPORT SYSTEM

NOTE:

1. THIS DRAWING 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

-	TENDER DRAWING	TTHK	JUL 19

HIGHWAYS DEPARTMENT
Major Works Project Management Office (Special Projects)

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

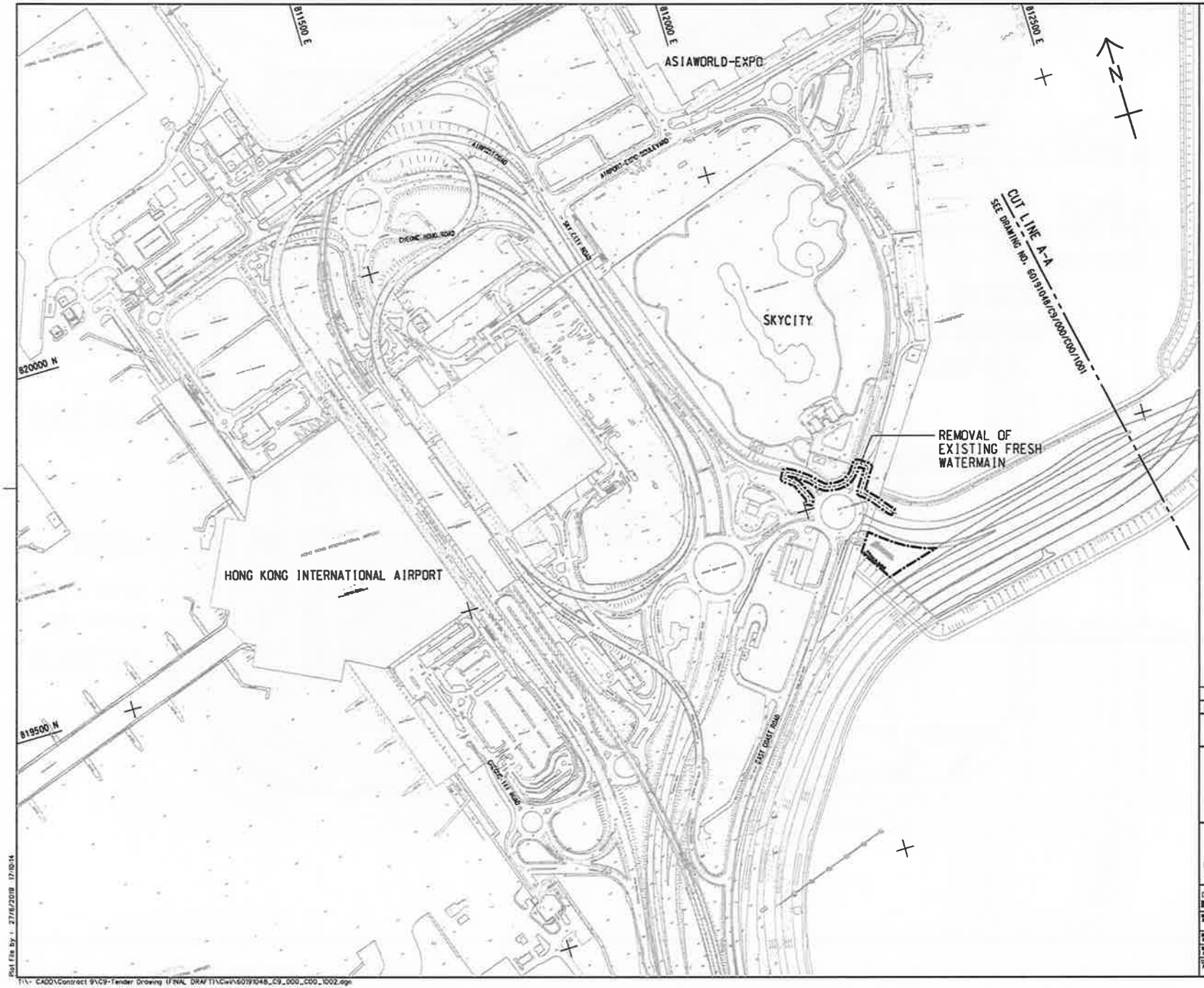
GENERAL ARRANGEMENT

SHEET 1 OF 2

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 60191048/C9/000/C00/1001

DESIGNED BY	TTHK	CONTRACT NO.	HY/2019/01
DRAWN BY	JC	CHK'D BY	SCI
SCALE	AT 1 : 2500		
DIMENSIONS ARE IN	METRES		



NOTE:

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

-	TENDER DRAWING	ITHK	JUL 19

HIGHWAYS DEPARTMENT

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

GENERAL ARRANGEMENT

SHEET 2 OF 2

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 60191048/C9/000/C00/1002

DESIGNED BY ITHK	CONTRACT NO. HY/2015/01	SHEET SIZE A1
DRAWN BY JC	STATUS -	
SCALE A1 1 : 2500		
DIMENSIONS IN METRES	© COPYRIGHT RESERVED	

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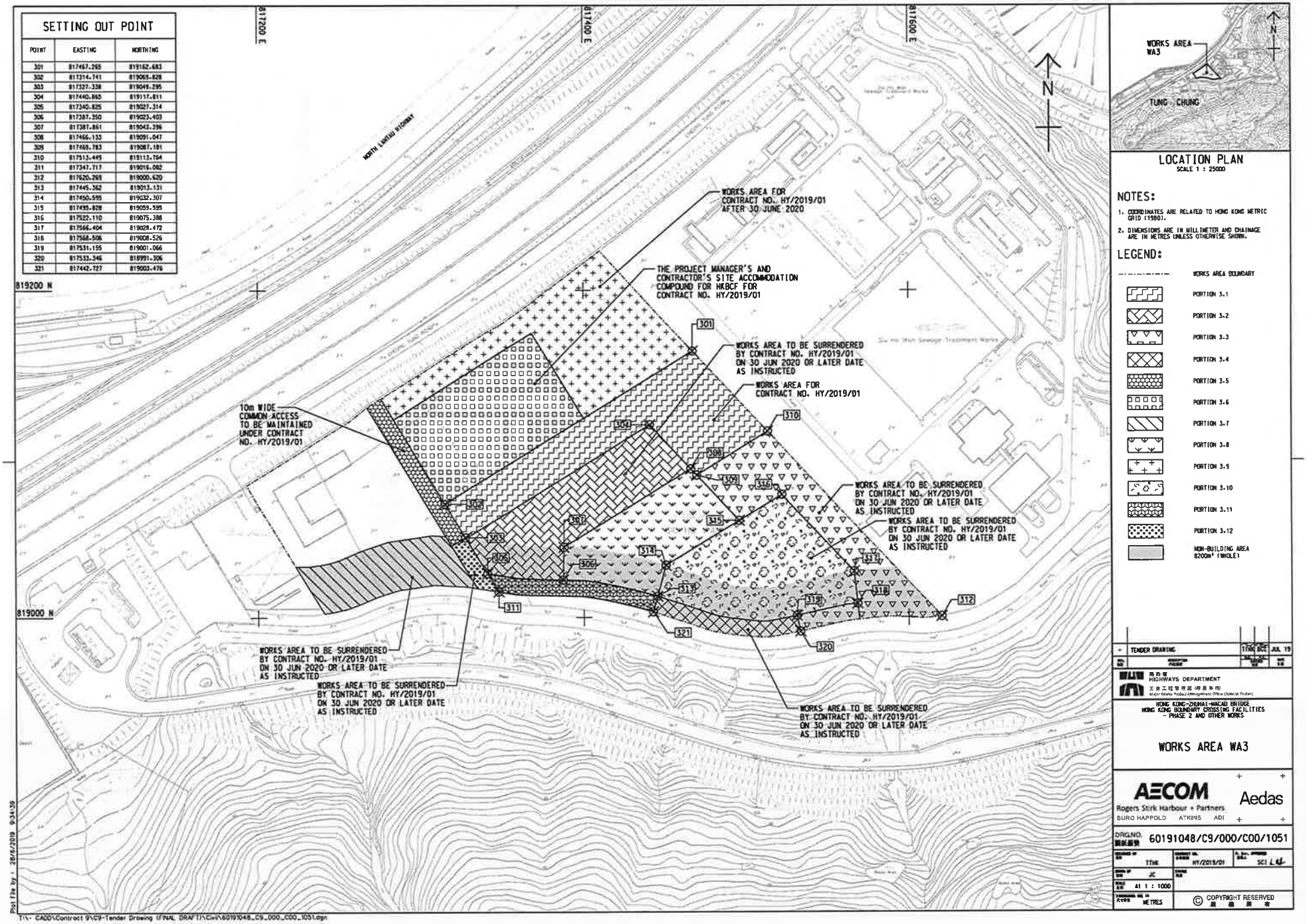

SETTING OUT POINT		
POINT	EASTING	NORTHING
301	817467.265	819162.683
302	817314.741	819065.828
303	817327.338	819049.295
304	817440.865	819137.811
305	817340.825	819027.314
306	817387.350	819023.403
307	817387.861	819043.396
308	817466.133	819091.047
309	817488.783	819087.181
310	817513.445	819113.764
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	818951.306
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 8200m² (WHOLE)

-	TENDER DRAWING	TTHK	JUL 19

HIGHWAYS DEPARTMENT
Major Works Project Management Office (Central Portion)

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

WORKS AREA WA3

AECOM
Rogers Stirk Harbour + Partners
BURO HAPPOLD ATKINS ADI
Aedas

DRG.NO. 60191048/C9/000/C00/1051

DESIGNED BY	TTHK	CONTRACT NO.	HY/2019/01
DRAWN BY	JC	SCALE	A1 1 : 1000
UNIT	METRES		

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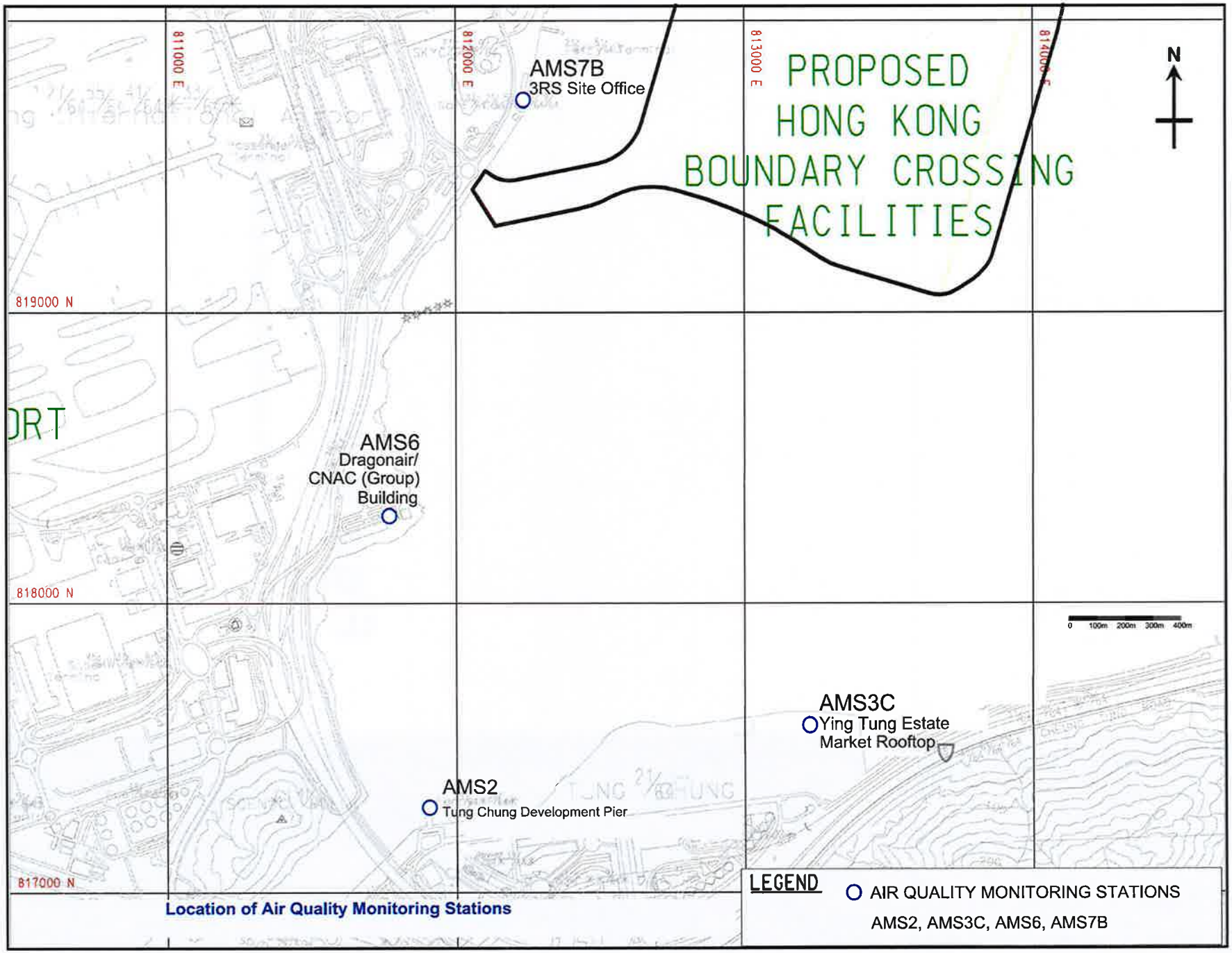
Figure 2

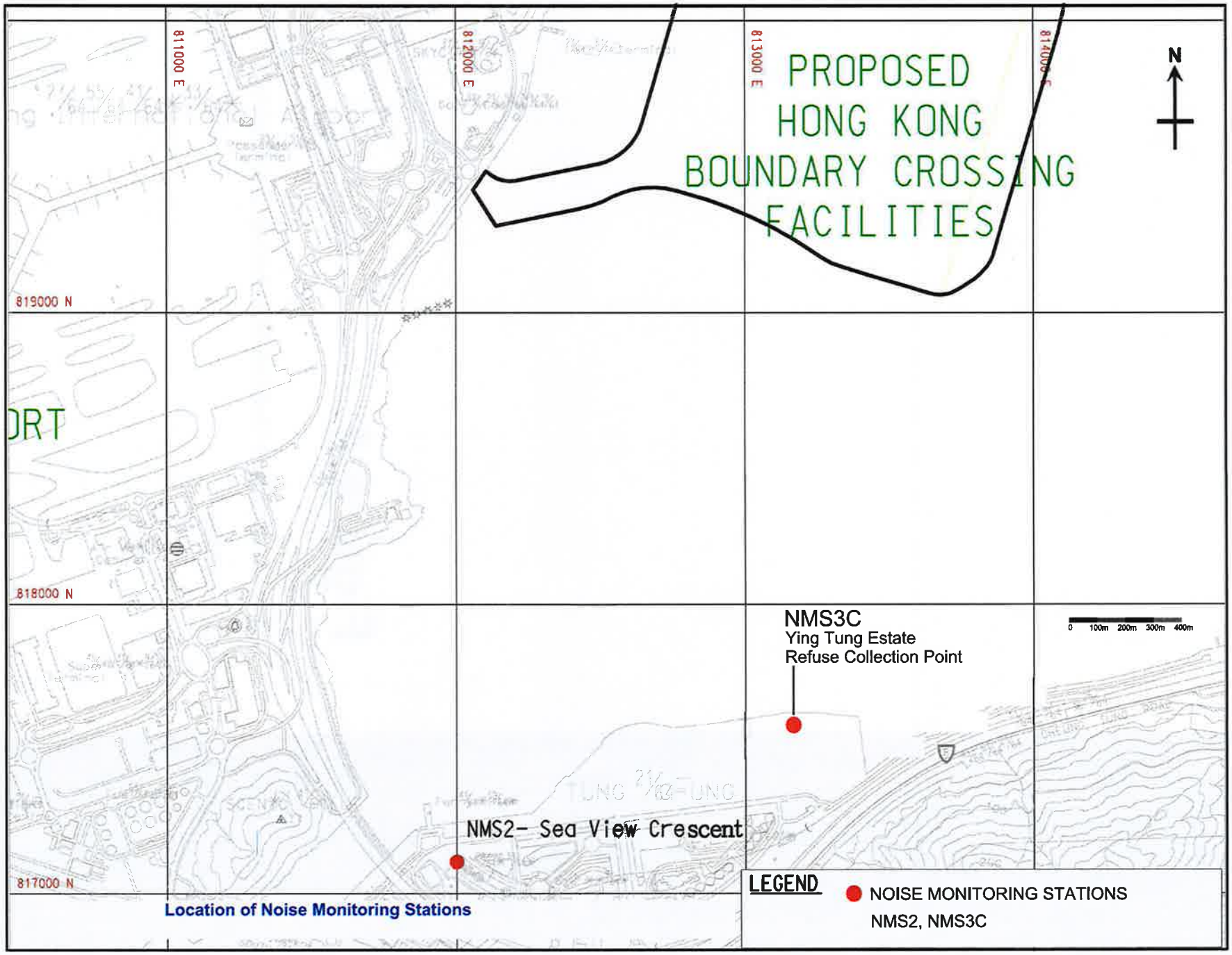
The Location of the Air Quality Monitoring Station



Location of Air Quality Monitoring Stations

Figure 3

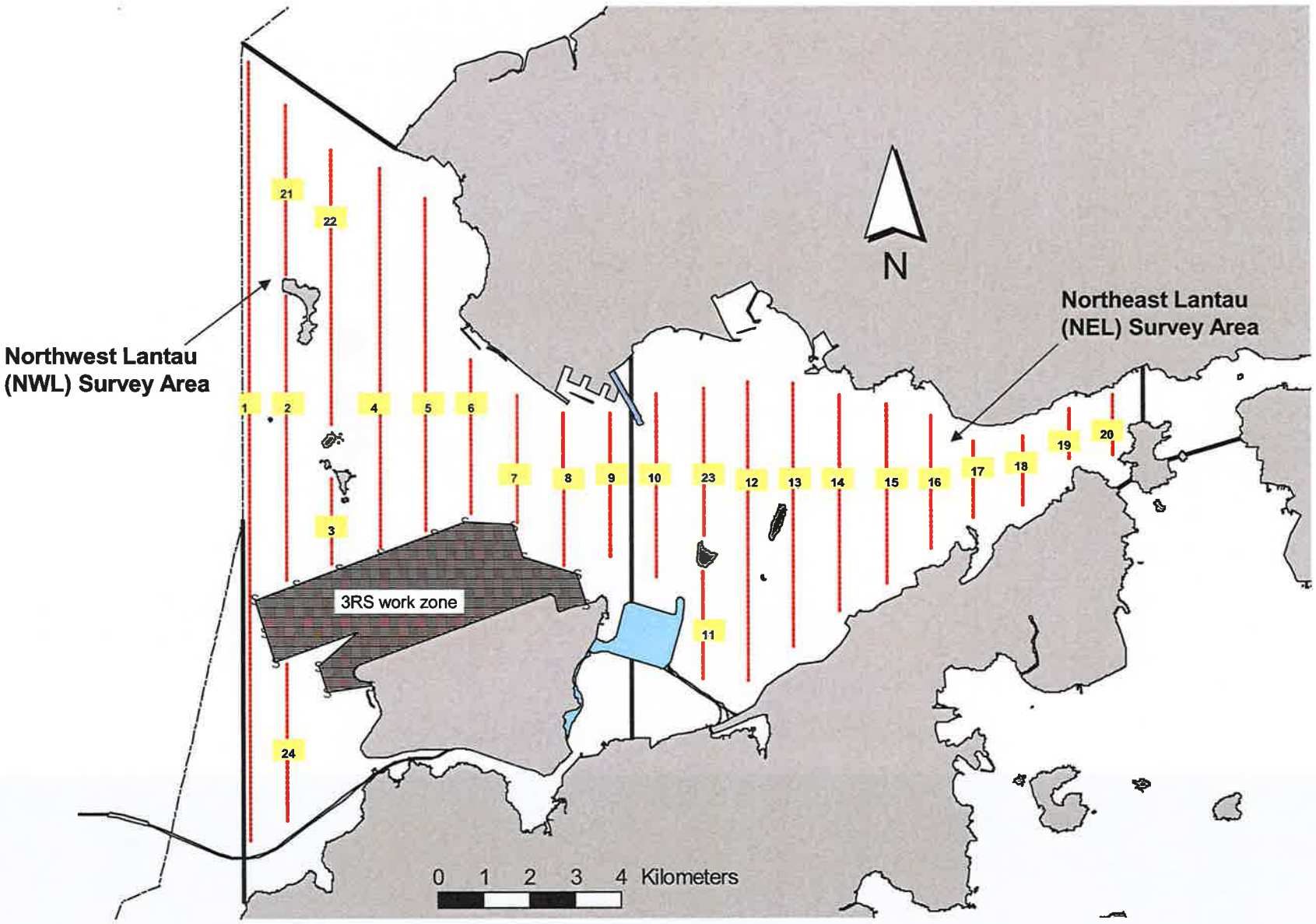
The Location of the Noise Monitoring Station



Location of Noise Monitoring Stations

Figure 4

Post-Construction Dolphin Monitoring Line Transect Layout Map



Transect Line Layout in Northwest and Northeast Lantau Survey Areas

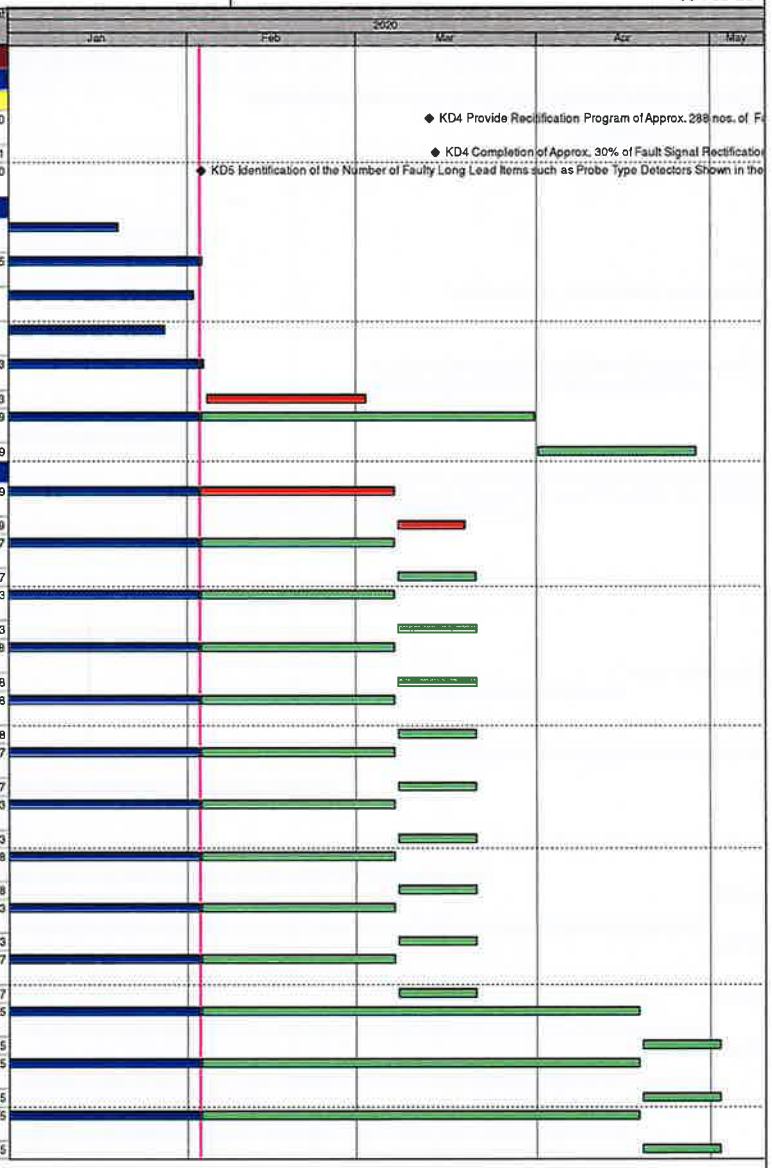
Appendix A

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
Revised Works Programme for HKZMB Phase 2 and Other Works (HY/2019/01)							
CONTRACT DATES							
Key Date							
AC150	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
AC160	KD4 Completion of Approx. 30% of Fault Signal Rectification Works (100 days)	0			14-Mar-20*	13-Mar-20	-1
AC170	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
SUBMISSIONS							
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
CONTRACTOR'S DESIGN							
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	Acceptanc 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

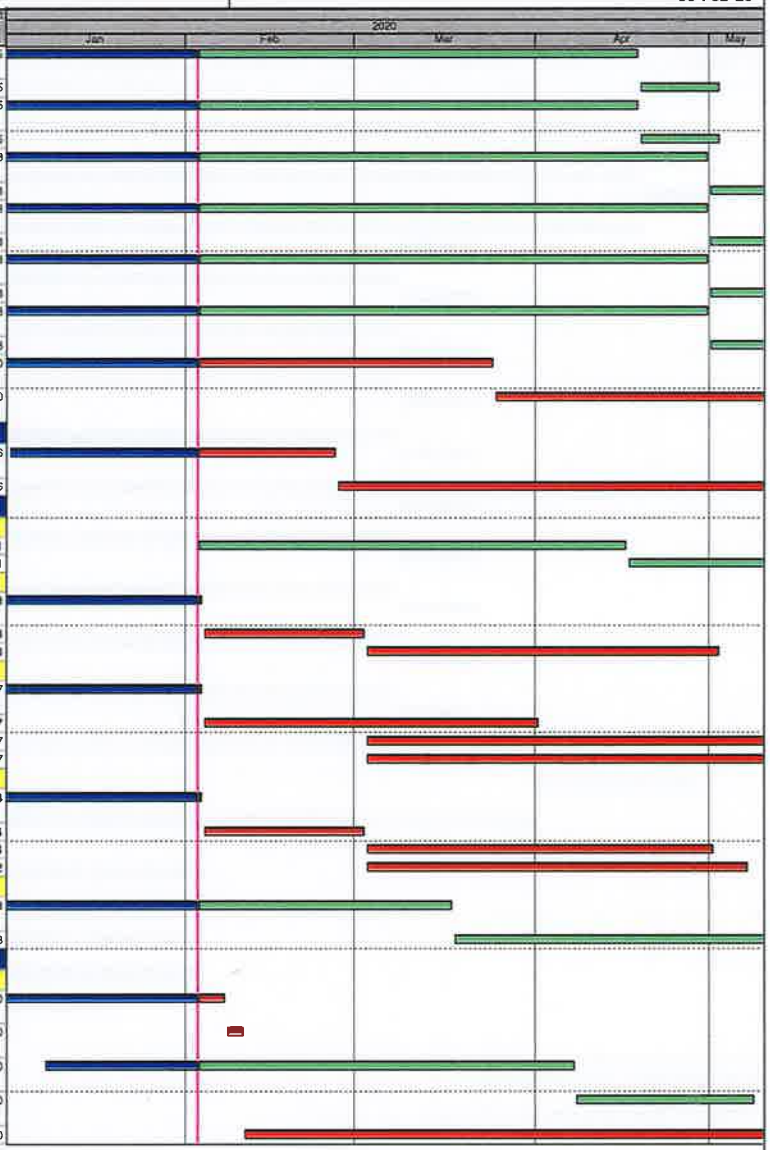
THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS
HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES

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
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
BUILDING INFORMATION MODELING							
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
REFINEMENT WORKS AT HKP (4A)							
Installation of Vehicle Barrier Gate at Existing Vehicle Kiosks (4A.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
Provision of Security Measures at Existing Gate at South-west of PCB (4A.C) (KD2)							
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
Replacement of Recess Type Cover for Manhole/Drawpit/Catchpit (4A.E) (KD1)							
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	Installationof Recess Cover in SPTI	90	03-Mar-20	24-Feb-20	22-Jun-20	13-Jun-20	-7
A6090	Installationof Recess Cover in NPTI	90	03-Mar-20	24-Feb-20	22-Jun-20	13-Jun-20	-7
Installation of New Security Fence (4A.D)(KD3)							
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
Installation of Sliding Gate at Building No. 041 (4A.J)							
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
SECTION 1: WORKS OF VERTICAL ACCESS TO THE ROOF OF PCB WITHIN PORTION A (4)							
Vertical Access to the Roof of PCB at Zone C (4.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

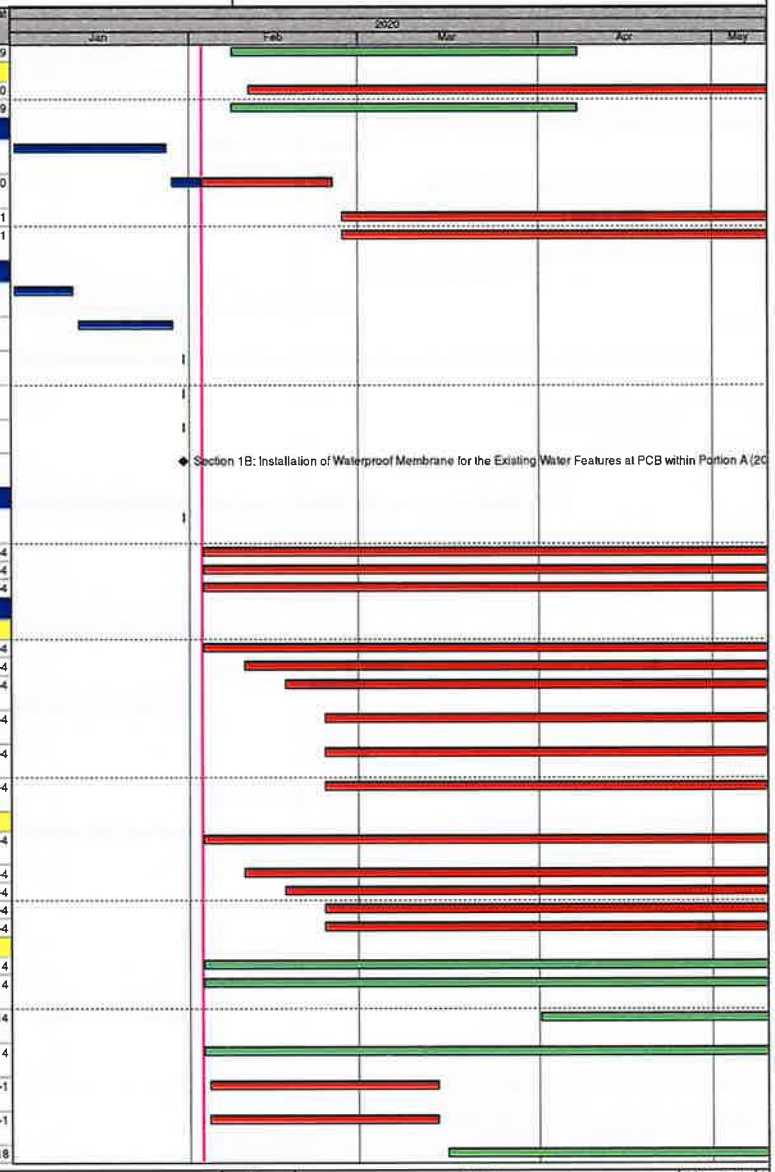
THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS
HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES

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
A3760	Plinth Construction	50	08-Feb-20	25-Mar-20	07-Apr-20	28-May-20	39
Vertical Access to the Roof of PCB at Zone G (4.C)							
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
SECTION 1A : IMPROVEMENT WORKS FOR THE EXISTING WATER FEATURES AT PCB WITHIN PORTION A (4.D-W)							
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 Feasures WF1 - 20	20	29-Jan-20 A	03-Feb-20	25-Feb-20	25-Feb-20	0
A6310	Installation for the Existing Water Feasures 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
SECTION 1B: INSTALLATION OF WATERPROOF MEMBRANE FOR THE EXISTING WATER FEATURES (Omission PMI 10)							
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	
A7260	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	
SECTION 1C: INSTALLATION OF WATER SKIMMERS, SOLAR REFLEVTIVE FILMS AND GLAZED DOORS							
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
SECTION 1D: INSTALLATION OF MINOR REMAINING WORKS AT PCB WITHIN PORTION A (4B)							
Civil Items							
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
ABWF Items (4B.G)							
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
Mechanical, Electrical and Plumbing (MEP) Works (4B.S-W)							
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 Rectificaton 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

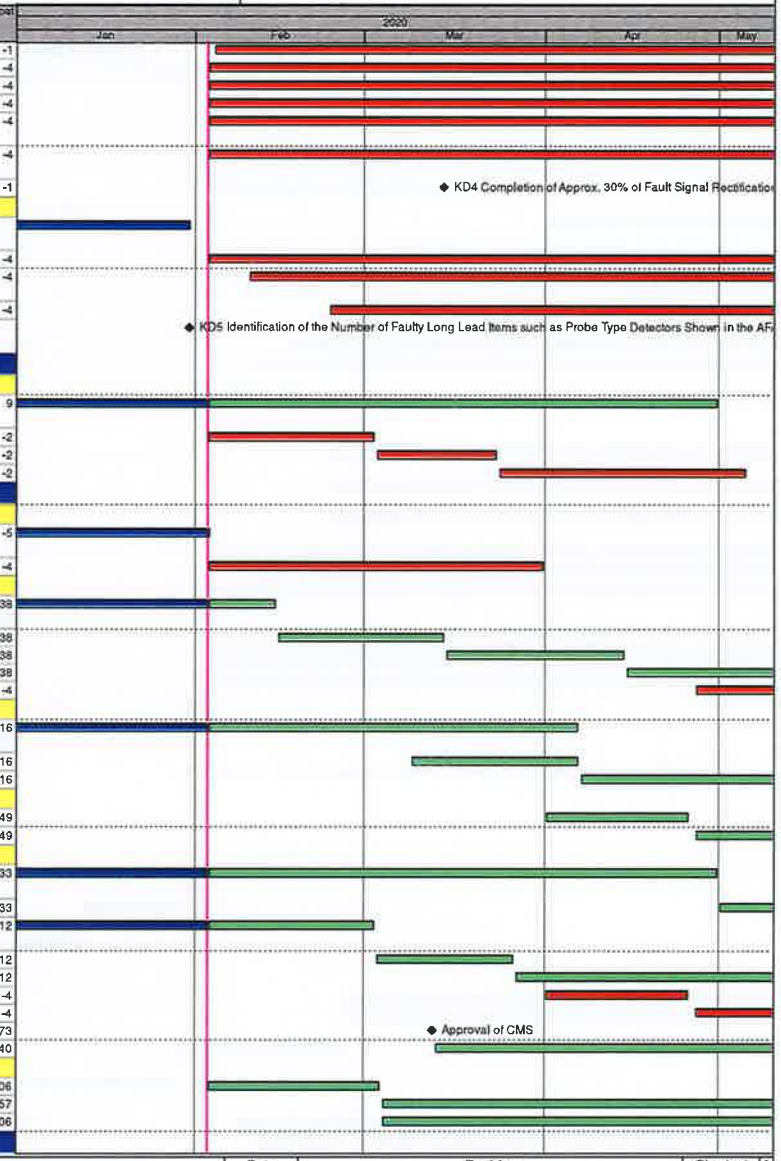
THREE MONTH ROLLING PROGRAMME FOR PHASE 2 AND OTHER WORKS
HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES

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
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
OTHER IMPROVEMENT WORKS AT PCB							
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	
SECTION 2A: BUILDING NO. 062 - GENERATOR AND UPS ROOM WITHIN PORTION C (4A.L)							
Generator and UPS Room 062							
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
SECTION 3: NPTI - REFUSE COLLECTION POINT, PUBLIC TOILET, COVERED WALKWAY & PAVEMENT (6)							
Erection of Hoarding							
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
Modification of Existing Covered Walkway (6.E)							
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	Submision of Shop Drawings	31	15-Mar-20	22-Apr-20	14-Apr-20	22-May-20	38
A1700	Acceptance of Submision 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
Additional Covered Walkway adjacent to Building 003 (6.C)							
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
Satellite Refuse Collection Point, Building 007 (6.A)							
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
Public Toilet Type 1, Building 003 (6.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
A2270	Delivery of Furniture	48	13-Mar-20	02-Sep-20	13-May-20	30-Oct-20	140
Drainage, Pavement, Kerbing, Lighting, Marking and Signs (6.F)							
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
SECTION 4: REMOVAL OF WATERMAIN AT THE SKYCITY INTERCHANGE WITHIN PORTION C AND D							



Actual Work ◆ ◆ Milestone
Remaining Work
Critical

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HKZMB - HONG KONG BOUNDARY CROSSING FACILITIES

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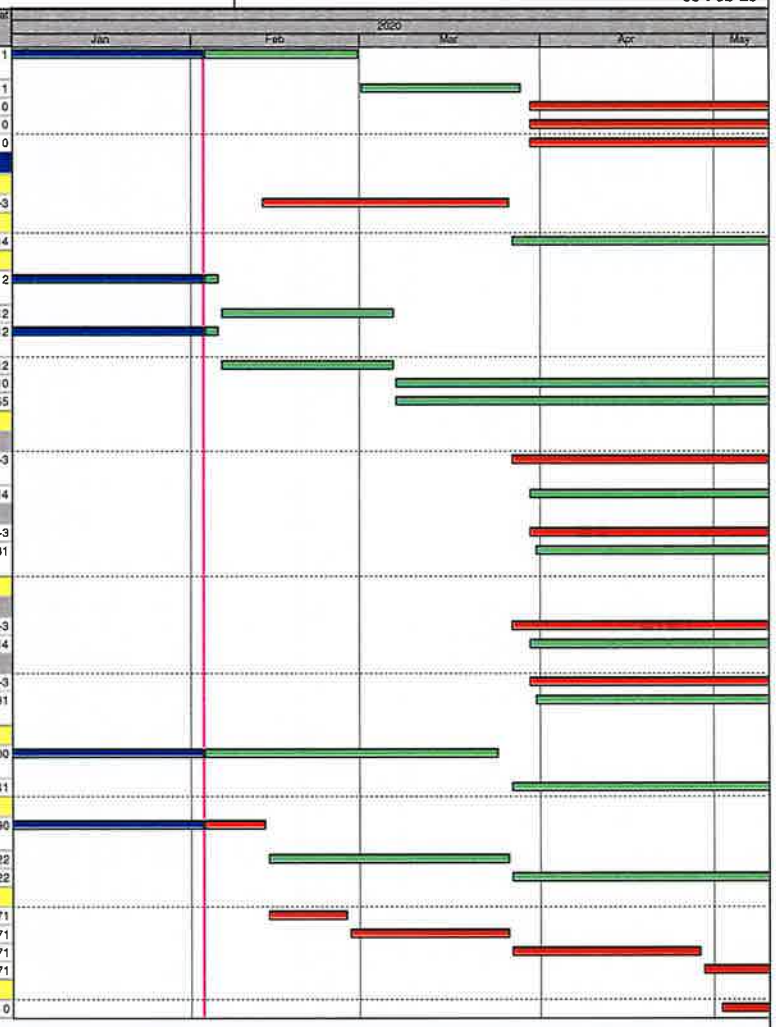
HKZMB HK Boundary Crossing Facilities - Phase 2 and Other Works

03-Feb-20

Activity ID	Activity Name	Remaining Duration	Start	Latest Start	Finish	Latest Finish	Total Float
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
	SECTION 5: REMAINING WORKS						
	Erection of Hoarding						
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
	External Works at Plaza						
A1510	Site Formation	75	27-Mar-20	17-Apr-20	30-Jun-20	17-Jul-20	14
	Design, Design Acceptance & Procurement for Kiosks						
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
	Inbound: 11 No. of Private Car Kiosks between 027/028						
	Builder Works (S.A)						
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
	E&M Works						
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
	Outbound: 11 No. of Private Car Kiosks between 029/030						
	Builder's Works (S.A)						
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
	E&M Works						
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
	Observation Guard Booths, Building 002-1						
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
	SPTI Stage 1						
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
	SPTI Stage 1A (3rd Lane)						
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
	Landscape Works (2)						
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

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

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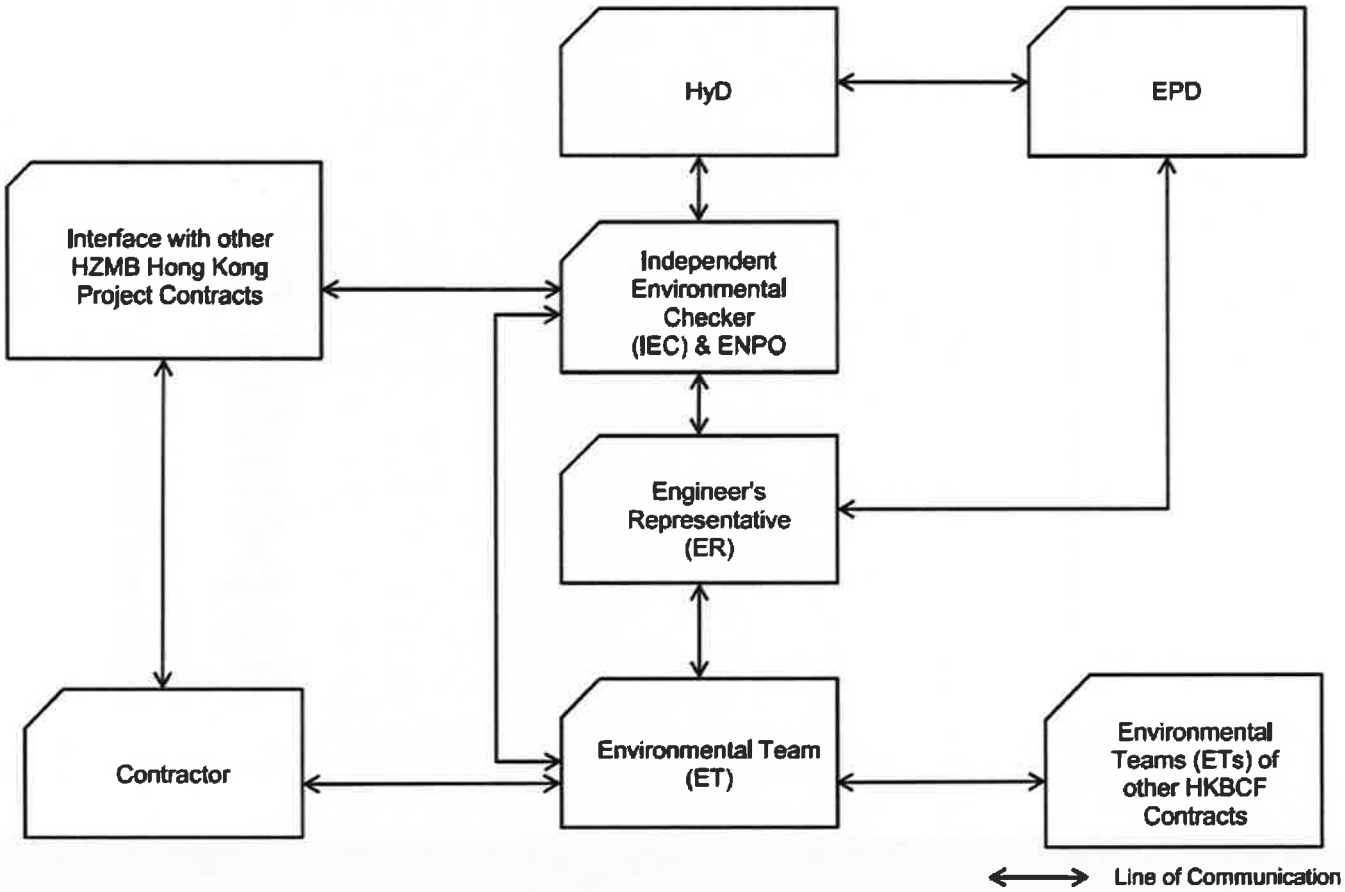
Appendix B

Project Organization Chart


HyD
EPD
Interface with other HZMB Hong Kong Project Contracts
Independent Environmental Checker (IEC) & ENPO
Engineer's Representative (ER)
Contractor
Environmental Team (ET)
Environmental Teams (ETs) of other HKBCF Contracts
Line of Communication

Appendix C

Action and Limit Levels

Action / Limit Levels for Air Quality

Parameters	Action Level	Limit Level
24-hour TSP Level in $\mu g/m^3$	[1]For baseline level ≤ 200 $\mu g/m^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 200 $\mu g/m^3$ Action level = Limit level	260 $\mu g/m^3$
1-hour TSP Level in $\mu g/m^3$	[2]For baseline level ≤ 384 $\mu g/m^3$, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 384 $\mu g/m^3$, Action level = Limit level	500 $\mu g/m^3$

Notes:

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

a) AMS 2 = (71.1*1.3 + 260) / 2 = 176 $\mu g/m^3$; b) AMS 3C = (56.9*1.3 + 260) / 2 = 167 $\mu g/m^3$;

c) AMS 6 = (66.4*1.3 + 260) / 2 = 173 $\mu g/m^3$; d) AMS 7B = (82.3*1.3 + 260) / 2 = 183 $\mu g/m^3$;

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

a) AMS 2 = (191.5*1.3 + 500) / 2 = 374 $\mu g/m^3$; b) AMS 3C = (18.2.2*1.3 + 500) / 2 = 368 $\mu g/m^3$;

c) AMS 6 = (169.2*1.3 + 500) / 2 = 360 $\mu g/m^3$; d) AMS 7B = (184.2*1.3 + 500) / 2 = 370 $\mu g/m^3$;

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.

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

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

Remark: For North Lantau Social Cluster, action level will be trigger if either NEL or NWL fall below the criteria; limit level will be triggered if both NEL and NWL fall below the criteria.

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

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

Appendix D

Calibration Certificate of Monitoring Equipment

TISCH Environmental

RECALIBRATION DUE DATE:
October 21, 2020

Certificate of Calibration

Calibration Certification Information				
Cal. Date:	October 21, 2019	**Rootsmeter S/N:** 438320	**Ta:** 295	°K
Operator:	Jim Tisch		**Pa:** 744.2	mm Hg
Calibration Model #:	TE-5025A	**Calibrator S/N:** **2456**		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4200	3.2	2.00
2	3	4	1	1.0180	6.3	4.00
3	5	6	1	0.9030	7.9	5.00
4	7	8	1	0.8620	8.8	5.50
5	9	10	1	0.7120	12.6	8.00

Data Tabulation

Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H\left(Ta/Pa\right)}$ (y-axis)
0.9849	0.6936	1.4066	0.9957	0.7012	0.8904
0.9808	0.9635	1.9892	0.9915	0.9740	1.2592
0.9787	1.0838	2.2240	0.9894	1.0957	1.4078
0.9775	1.1340	2.3325	0.9882	1.1464	1.4765
0.9724	1.3658	2.8131	0.9831	1.3807	1.7808
QSTD	**m=**	**2.08799**	**QA**	**m=**	**1.30746**
	b=	**-0.03545**		**b=**	**-0.02244**
	r=	**0.99989**		**r=**	**0.99989**

Calculations

Vstd=	ΔVol((Pa-ΔP)/Pstd)(Tstd/Ta)	**Va=**	ΔVol((Pa-ΔP)/Pa)
Qstd=	Vstd/ΔTime	**Qa=**	Va/ΔTime

For subsequent flow rate calculations:

Qstd= $1/m\left(\left(\sqrt{\Delta H\left(\frac{Pa}{Pstd}\right)\left(\frac{Tstd}{Ta}\right)}\right)-b\right)$

Qa= $1/m\left(\left(\sqrt{\Delta H\left(Ta/Pa\right)}\right)-b\right)$

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg

Key
ΔH: calibrator manometer reading (in H2O)
ΔP: rootsmeter manometer reading (mm Hg)
Ta: actual absolute temperature (°K)
Pa: actual barometric pressure (mm Hg)
b: intercept
m: slope

RECALIBRATION

US EPA recommends annual recalibration per 1998 40 Code of Federal Regulations Part 50 to 51, Appendix B to Part 50, Reference Method for the Determination of Suspended Particulate Matter in the Atmosphere, 9.2.17, page 30

Tisch Environmental, Inc.
145 South Miami Avenue
Village of Cleves, OH 45002

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Room 723 & 725, 7/F, Block B,
Profit Industrial Building,
1-15 Kwai Fung Crescent, Kwai Fong,
Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge
Date of Calibration: 5-Feb-20
Location : AMS2
Next Calibration Date: 4-May-20
Brand: Tisch
Technician: Sam Fong
Model: TE-5170 S/N: HVS-01

CONDITIONS

Sea Level Pressure (hPa):	1020.6	Corrected Pressure (mm Hg):	766
Temperature (°C):	17.5	Temperature (K):	291

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.08799
Model:	TE-5025A	Qstd Intercept:	-0.03545
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20
S/N:	2456		

CALIBRATION

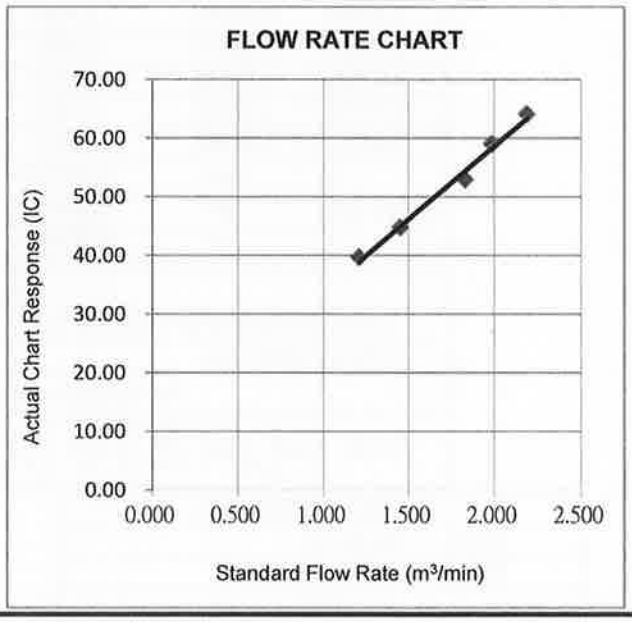
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	11.00	-8.90	19.900	2.189	63.00	64.04	Slope =	24.9577
13	8.70	-7.70	16.400	1.988	58.00	58.96	Intercept =	8.7600
10	7.60	-6.30	13.900	1.832	52.00	52.86	Corr. coeff.=	0.9950
7	4.40	-4.30	8.700	1.453	44.00	44.73		
5	2.70	-3.30	6.000	1.209	39.00	39.64		

Calculations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)
m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



Wan Ka Ho
Project Consultant

Report Date: 14/2/2020

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Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge
Date of Calibration: 5-Feb-20
Location : AMS3C
Next Calibration Date: 4-May-20
Brand: Tisch
Technician: Sam Fong
Model: TE-5170 S/N: HVS-02

CONDITIONS

Sea Level Pressure (hPa):	1020.6	Corrected Pressure (mm Hg):	766
Temperature (°C):	17.5	Temperature (K):	291

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.08799
Model:	TE-5025A	Qstd Intercept:	-0.03545
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20
S/N:	2456		

CALIBRATION

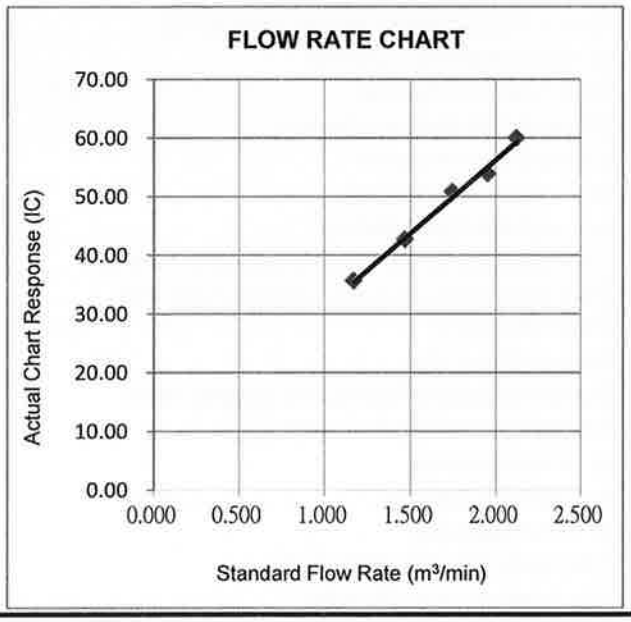
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	11.40	-7.30	18.700	2.122	59.00	59.97	Slope =	25.0744
13	9.10	-6.70	15.800	1.952	53.00	53.87	Intercept =	6.1741
10	7.30	-5.30	12.600	1.745	50.00	50.82	Corr. coeff.=	0.9962
7	4.70	-4.20	8.900	1.469	42.00	42.69		
5	2.60	-3.00	5.600	1.169	35.00	35.58		

Calculations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)
m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



Report Date: 14/2/2020

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Project Consultant

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Hong Kong.

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Project : Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge
Date of Calibration: 5-Feb-20
Location : AMS7B
Next Calibration Date: 4-May-20
Brand: Tisch
Technician: Sam Fong
Model: TE-5170 S/N: HVS-03

CONDITIONS

Sea Level Pressure (hPa):	1020.6	Corrected Pressure (mm Hg):	766
Temperature (°C):	17.5	Temperature (K):	291

CALIBRATION ORIFICE

Make:	Tisch	Qstd Slope:	2.08799
Model:	TE-5025A	Qstd Intercept:	-0.03545
Calibration Date:	21-Oct-19	Expiry Date:	21-Oct-20
S/N:	2456		

CALIBRATION

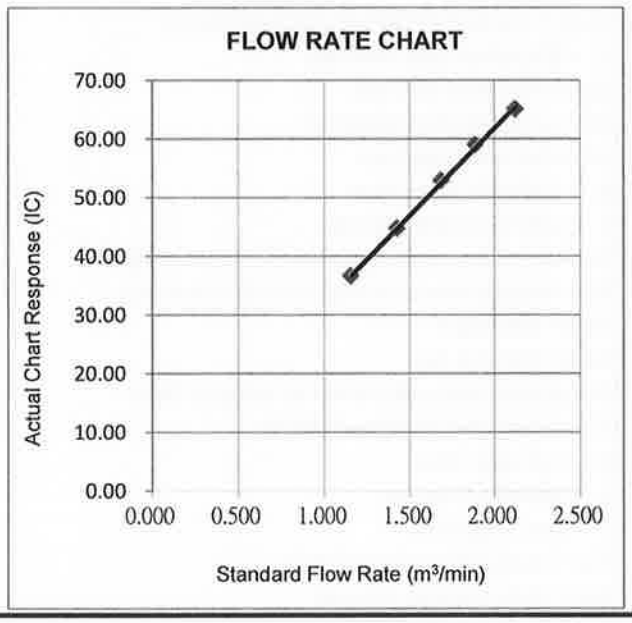
Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m^3/min)	I (chart)	IC (corrected)	LINEAR REGRESSION	
18	10.90	-7.80	18.700	2.122	64.00	65.06	Slope =	29.8113
13	8.30	-6.50	14.800	1.890	58.00	58.96	Intercept =	2.2229
10	6.40	-5.40	11.800	1.689	52.00	52.86	Corr. coeff.=	0.9996
7	4.40	-4.00	8.400	1.428	44.00	44.73		
5	2.70	-2.80	5.500	1.159	36.00	36.59		

Calculations:

Qstd = 1/m[Sqrt(H2O(Pa/Pstd)(Tstd/Ta))-b]
IC = I[Sqrt(Pa/Pstd)(Tstd/Ta)]
Qstd = standard flow rate
IC = corrected chart response
I = actual chart response
m = calibrator Qstd slope
b = calibrator Qstd intercept
Ta = actual temperature during calibration (deg K)
Pa = actual pressure during calibration (mm Hg)
Tstd = 298 deg K
Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

1/m((I)[Sqrt(298/Tav)(Pav/760)]-b)
m = sampler slope
b = sampler intercept
I = chart response
Tav = daily average temperature
Pav = daily average pressure



Toby

Wan Ka Ho
Project Consultant

Report Date: 14/2/2020

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Hong Kong.

CALIBRATION REPORT OF WIND METER

Project: Contract No. HY/2019/01 - Hong Kong-Zhuhai-Macao Bridge		**Date of Calibration:**	5-Feb-2020
Location: AMS3C		**Next Calibration Date:**	4-Jul-2020
		Technician:	Sam Fong
Brand: Global Water			
Model: GL500-7-2	**S/N:** 1847003409		

Anemometer

Brand:	Benetech		
Model:	GM816	**Equipment ID:**	08

Procedures:

1. **Wind Still Test:** The wind speed sensor was held by hand until stabilized.
2. **Wind Speed Test:** The wind meter was calibrated in-situ and compared with the Anemometer.
3. **Wind Direction Test:** The wind meter was calibrated in-situ and compared with a marine compass from four directions.

Wind Still Test:

Wind Speed (m/s)
0.00

Wind Speed Test:

Global Water (m/s)	Anemometer (m/s)
2.3	2.6
3.0	2.8
3.4	3.0

Wind Direction Test:

	Marine Compass (o)
252	250
72	70
0	357
340	341

Report Date: 14/2/2020

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Website : www.fugro.com

MateriaLab

Report No. : 183057CA195782(1)

CALIBRATION CERTIFICATE OF ANEMOMETER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Anemometer

Manufacturer : Benetech

Model No. : GM816

Serial No. : N/A

Equipment ID. : WS-08

Next Calibration Date : 17-Jun-2020

Laboratory Information

Details of Reference Equipment –

Description : Reference Anemometer

Equipment ID. : R-101-4

Date of Calibration : 18-Jun-2019 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : R-C-279

Calibration Results :

Reference Reading (m/s)	UUT Reading (m/s)	Error (m/s)
2.05	1.0	-1.1
4.08	3.1	-1.0
6.07	4.8	-1.3
8.03	6.7	-1.3
10.14	8.8	-1.3

Remark :

1. The equipment being used in this calibration is traceable to recognized National Standards.

Checked by : William Date : 20-6-2019 Certified by : K T Leung Date : 24-6-2019

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA200109(5)

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser dust monitor
Manufacturer	: SIBATA
Model No.	: LD-5R
Serial No.	: 761104
Specification Limit	: NA
Next Calibration Date	: 21-Oct-2020

Laboratory Information

Description	: TSP high volume air sampler
Serial No.	: 4350
Date of Calibration	: 22-Oct-2019 Ambient Temperature : 25 °C
Calibration Location	: Ma Wan A1 Site Boundary
Method Used	: By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.1287	3564	59.40
0.0888	2877	47.95
0.1141	3267	54.45

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x [UUT reading (CPM)], where K = 0.002049
3. Correlation coefficient (r) : 0.9971

Checked by : _____ Date : 10-2-2020 Certified by : _____ Date : 10-2-2020

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA200109(14)

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited
Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser dust monitor
Manufacturer	: SIBATA
Model No.	: LD-5R
Serial No.	: 761105
Specification Limit	: NA
Next Calibration Date	: 05-Dec-2020

Laboratory Information

Description	: TSP high volume air sampler
Serial No.	: 4350
Date of Calibration	: 06-Dec-2019 Ambient Temperature : 26 °C
Calibration Location	: Ma Wan A1 Site Boundary
Method Used	: By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.0393	1260	21.00
0.0681	1519	25.32
0.0504	1327	22.12

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x [UUT reading (CPM)], where K = 0.002306
3. Correlation coefficient (r) : 0.9906

Checked by : _____ Date : 10-2-2020 Certified by : _____ Date : 10-2-2020

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no. : 940891CA200109

CALIBRATION CERTIFICATE OF DUST METER

Client : Fugro Technical Services Limited

Project : Calibration Services

Client Supplied Information

Details of Unit Under Test, UUT

Description	: Laser dust monitor
Manufacturer	: SIBATA
Model No.	: LD-5R
Serial No.	: 882147
Specification Limit	: NA
Next Calibration Date	: 09-Oct-2020

Laboratory Information

Description	: TSP high volume air sampler
Serial No.	: 4350
Date of Calibration	: 10-Oct-2019 Ambient Temperature : 28 °C
Calibration Location	: Ma Wan A1 Site Boundary
Method Used	: By direct comparison the weight of dust particle trapped in a filter paper using high volume sampler (TSP method) for a certain period, with the reading of the UUT. They should be placed at the same location and powered on and off at the same time.

Calibration Results :

Reference concentration (mg/m^3)	Total count for 1 hour	CPM (Count per minute)
0.1047	2477	41.28
0.0623	2121	35.35
0.0587	2073	34.55

Remarks:

1. The equipment being used in this calibration is traceable to recognized National Standards.
2. The interpolation equation : Concentration (mg/m^3) = K x [UUT reading (CPM)], where K = 0.002030
3. Correlation coefficient (r) : 0.9993

Checked by : Date : 10-2-2020 Certified by : Date : 10-2-2020

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

** End of Report **

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Website : www.fugro.com

MateriaLab

Report no.: 183057CA196181

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Sound Level Meter

Manufacturer : Casella

	Meter	Microphone	Preamplifier
Model No.	CEL-63X	CE-251	CEL-495
Serial No.	1488272	02552	003942

Next Calibration Date : 01-Oct-2020

Specification Limit : EN 61672: 2003 Type 1

Laboratory Information

Details of Reference Equipment -

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 02-Oct-2019 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	2.0	2.6 to -0.6
	2000Hz	1.4	2.8 to -0.4
	1000Hz	0.0	1.1 to -1.1
	500Hz	-3.4	-1.8 to -4.6
	250Hz	-8.8	-7.2 to -10.0
	125Hz	-16.3	-14.6 to -17.6
	63Hz	-26.3	-24.7 to -27.7
	31.5Hz	-39.3	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 0.6

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast
4. The equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.
5. The values given in this Calibration Certificate only relate to the unit-under-test and the values measured at the time of the test. Uncertainties will not include allowances for the environmental changes, variation and shock during transportation, or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 4-10-2019 Certified by : K T Leung Date : 4-10-2019

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

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Website : www.fugro.com

MateriaLab

Report no.: 183057CA196350

CALIBRATION CERTIFICATE OF SOUND LEVEL METER

Client Supplied Information

Client : Fugro Technical Services Ltd.

Address : Room 723 & 725, 7/F., Block B Profit Industrial Building, 1-15 Kwai Fung Crescent, Kwai Chung, N.T.

Project : Calibration Services

Details of Unit Under Test, UUT

Description : Sound Level Meter

Manufacturer : Casella

	Meter	Microphone	Preamplifier
Model No.	CEL-63X	CE-251	CEL-495
Serial No.	1488289	02789	004065

Next Calibration Date : 23-Oct-2020

Specification Limit : EN 61672: 2003 Type 1

Laboratory Information

Details of Reference Equipment -

Description : B & K Acoustic Multifunction Calibrator 4226 (Traditional free field setting)

Equipment ID. : R-108-1

Date of Calibration : 24-Oct-2019 Ambient Temperature : 22 °C

Calibration Location : Calibration Laboratory of FTS

Method Used : By direct comparison

Calibration Results :

Parameters		Mean Value (dB)	Specification Limit(dB)
A-weighting frequency response	4000Hz	2.1	2.6 to -0.6
	2000Hz	1.6	2.8 to -0.4
	1000Hz	0.1	1.1 to -1.1
	500Hz	-3.3	-1.8 to -4.6
	250Hz	-8.7	-7.2 to -10.0
	125Hz	-16.2	-14.6 to -17.6
	63Hz	-26.2	-24.7 to -27.7
	31.5Hz	-38.9	-37.4 to -41.4
Differential level linearity	94dB-104dB	0.0	± 0.6
	104dB-114dB	0.0	± 0.6

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. For calibration: Reference SPL are 94, 104 & 114dB, range setting is 20-140dB & time weighting is fast
4. The equipment does comply with EN 61672: 2003 Type 1 sound level meter for the above measurement.
5. The values given in this Calibration Certificate only relate to the values at the time of the test and any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 1-11-2019 Certified by : K.T. Young Date : 1-11-2019

Leung Kwok Tai (Assistant Manager)

CA-R-297 (22/07/2009)

** End of Report **

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MateriaLab

Report no.: 183057CA196350(4)

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Casella (Model CEL-120/1)
Serial No.	:	2383707
Equipment ID	:	N/A
Next Calibration Date	:	23-Oct-2020
Specification Limit	:	EN 60942: 2003 Type 1

Laboratory Information

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-1
Date of Calibration :	24-Oct-2019	Ambient Temperature : 22 °C
Calibration Location :	Calibration Laboratory of FTS	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.2 dB	±0.4dB
114dB	-0.1 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment does comply with the specification limit.
4. The values given in this Calibration Certificate only relate to the values at the time of the test and any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 1-11-2019 Certified by : R.T.Leung Date : 1-11-2019

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

** End of Report **

FUGRO TECHNICAL SERVICES LIMITED
Fugro Development Centre
5 Lok Yi Street, Tai Lam
Tuen Mun, NT
Hong Kong

Report no.: 183057CA200018(1)

CALIBRATION CERTIFICATE OF SOUND CALIBRATOR

Client Supplied Information

Client : Fugro Technical Services Ltd.

Project : Calibration Services

Details of Unit Under Test, UUT

Description	:	Sound Calibrator
Manufacturer	:	Casella (Model CEL-120/1)
Serial No.	:	2383886
Equipment ID	:	N/A
Next Calibration Date	:	12-Jan-2021
Specification Limit	:	EN 60942: 2003 Type 1

Laboratory Information

Description	:	Reference Sound level meter
Equipment ID.	:	R-119-1
Date of Calibration :	13-Jan-2020	Ambient Temperature : 22 °C
Calibration Location :	Calibration Laboratory of FTS	
Method Used	:	By direct comparison

Calibration Results :

Parameters (Setting of UUT)	Mean Value (error of measurement)	Specification Limit(dB)
94dB	-0.2 dB	±0.4dB
114dB	-0.1 dB	

Remarks :

1. The equipment used in this calibration is traceable to recognized National Standards.
2. The mean value is the average of four measurements.
3. The equipment does comply with the specification limit.
4. The values given in this Calibration Certificate only relate to the values at the time of the test and any uncertainties will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during tranportation, overloading, mis-handling or the capability of any other laboratory to repeat the measurement.

Checked by : William Date : 20-1-2020 Certified by : K T Leung Date : 21-1-2020

CA-R-297 (22/07/2009)

Leung Kwok Tai (Assistant Manager)

** End of Report **

Appendix E

Environmental Monitoring Schedule

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

Impact Monitoring Schedule (March 2020)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
1 March	2	3 Dolphin Monitoring	4	5 Dust Monitoring Noise Monitoring	6	7
8	9 Dolphin Monitoring	10	11 Dust Monitoring Noise Monitoring	12	13	14
15	16	17 Dust Monitoring Noise Monitoring	18 Dolphin Monitoring	19	20	21
22	23 Dust Monitoring Noise Monitoring	24	25 Dolphin Monitoring	26	27	28 Dust Monitoring
29	30	31				

Remarks

1. Actual monitoring may be subjected to change due to any safety concern or adverse weather condition
2. Dust Monitoring: 24-hours TSP Monitoring per 6 days, and 3 x 1-hour TSP Monitoring per 6 days
3. Noise Monitoring: Leq (30 min) between 0700 and 1900 hours
4. Dolphin Monitoring: Chinese White Dolphin (post-construction phase, monthly); monitoring conducted and data collected by TM-CLKL Contract No. HY/2012/08
5. Dust Monitoring Location: AMS2 (Tung Chung New Development Pier), AMS3C (Ying Tung Estate Market Rooftop) and AMS7B (3RS Site Offices)
6. Noise Monitoring Location: NMS2 (Seaview Crescent), NMS3C (Ying Tung Estate Refuse Collection Point)

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

Impact Monitoring Schedule (April 2020)

Sun	Mon	Tue	Wed	Thur	Fri	Sat
1			1 April	2	3 Dust Monitoring Noise Monitoring	4
5	6	7	8 Dolphin Monitoring	9 Dust Monitoring Noise Monitoring	10	11
12	13	14	15 Dust Monitoring Noise Monitoring Dolphin Monitoring	16	17	18
19	20	21 Dust Monitoring Noise Monitoring	22 Dolphin Monitoring	23	24	25
26	27 Dust Monitoring Noise Monitoring	28	29 Dolphin Monitoring	30		

Remarks

1. Actual monitoring may be subjected to change due to any safety concern or adverse weather condition
2. Dust Monitoring: 24-hours TSP Monitoring per 6 days, and 3 x 1-hour TSP Monitoring per 6 days
3. Noise Monitoring: Leq (30 min) between 0700 and 1900 hours
4. Dolphin Monitoring: Chinese White Dolphin (post-construction phase, monthly); monitoring conducted and data collected by TM-CLKL Contract No. HY/2012/08
5. Dust Monitoring Location: AMS2 (Tung Chung New Development Pier), AMS3C (Ying Tung Estate Market Rooftop) and AMS7B (3RS Site Offices)
6. Noise Monitoring Location: NMS2 (Seaview Crescent), NMS3C (Ying Tung Estate Refuse Collection Point)

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Appendix F

Air Quality Monitoring Results

and Construction Noise Monitoring Results

24-hour TSP Monitoring Result for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

AMS2 - Tung Chung Development Pier

Start Date	Weather Condition	Air Temperature (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Sampling Time(hrs)	Flow Rate (m^3/min.)		Average flow (m^3/min.)	Total volume (m^3)	Conc. (ug/m^3)	Action Level	Limit Level
				Initial	Final			Initial	Final				(ug/m^3)	(ug/m^3)
5-Mar-20	Cloudy	291.2	764.6	2.6638	2.7126	0.0488	24	1.60	1.57	1.59	2284.4	27	176	260
11-Mar-20	Cloudy	292.2	763.3	2.7249	2.8245	0.0996	24	1.72	1.65	1.68	2426.1	44		
17-Mar-20	Cloudy	293.3	764.1	2.6984	2.8886	0.1902	24	1.67	1.65	1.66	2394.9	79		
23-Mar-20	Fine	297.6	760.7	2.6708	2.7637	0.0929	24	1.65	1.65	1.65	2381.1	39		
28-Mar-20	Fine	295.8	760.0	2.5380	2.7247	0.1867	24	1.42	1.57	1.50	2153.4	87		
											Min	27		
											Max	87		
											Average	55		

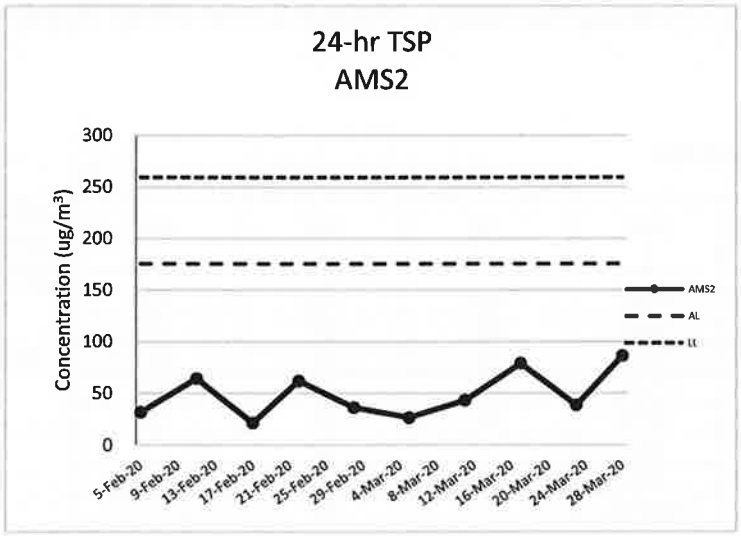
AMS3C - Ying Tung Estate Market Rooftop

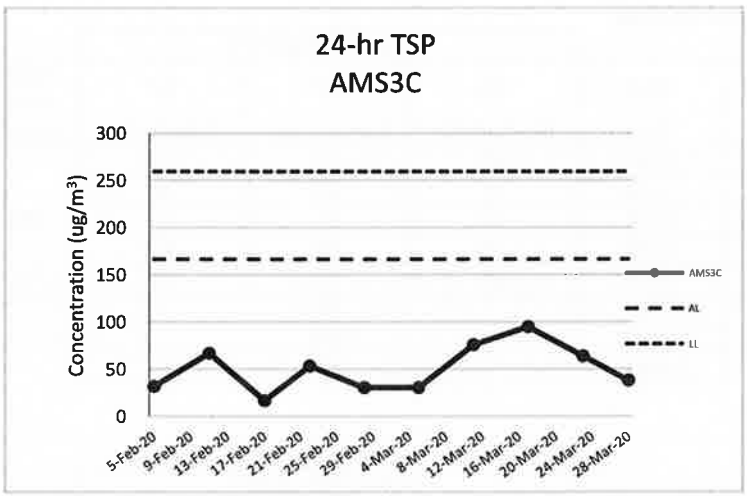
Start Date	Weather Condition	Air Temperature (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Sampling Time(hrs)	Flow Rate (m^3/min.)		Average flow (m^3/min.)	Total volume (m^3)	Conc. (ug/m^3)	Action Level	Limit Level
				Initial	Final			Initial	Final				(ug/m^3)	(ug/m^3)
5-Mar-20	Cloudy	291.2	764.6	2.6671	2.7418	0.0747	24	1.70	1.67	1.68	2422.2	31	167	260
11-Mar-20	Cloudy	292.2	763.3	2.7199	2.8907	0.1708	24	1.57	1.55	1.56	2245.4	76		
17-Mar-20	Cloudy	293.3	764.1	2.7068	2.9371	0.2303	24	1.69	1.67	1.68	2416.8	95		
23-Mar-20	Fine	297.6	760.7	2.6611	2.8234	0.1623	24	1.75	1.75	1.75	2518.5	64		
28-Mar-20	Fine	295.8	760.0	2.6593	2.7345	0.0752	24	1.35	1.35	1.35	1946.9	39		
											Min	31		
											Max	95		
											Average	61		

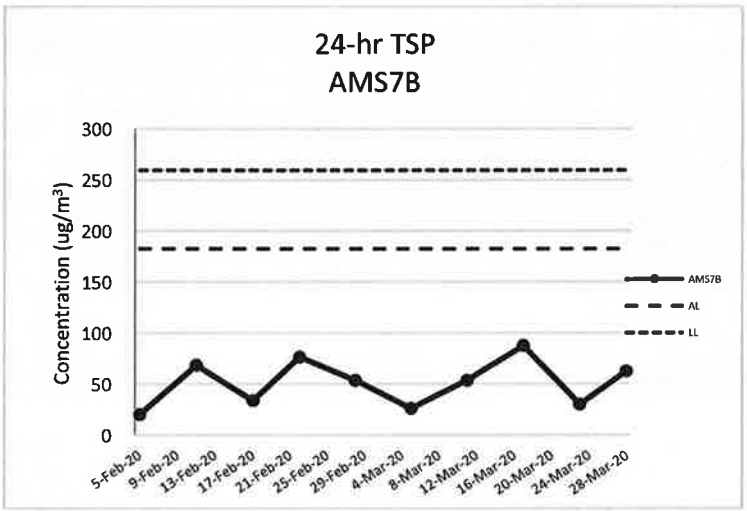
AMS7B - 3RS Site Offices

Start Date	Weather Condition	Air Temperature (K)	Atmospheric Pressure, Pa (mmHg)	Filter Weight (g)		Particulate weight (g)	Sampling Time(hrs)	Flow Rate (m^3/min.)		Average flow (m^3/min.)	Total volume (m^3)	Conc. (ug/m^3)	Action Level	Limit Level
				Initial	Final			Initial	Final				(ug/m^3)	(ug/m^3)
5-Mar-20	Cloudy	291.2	764.6	2.6638	2.7126	0.0488	24	1.29	1.27	1.28	1839.0	27	183	260
11-Mar-20	Cloudy	292.2	763.3	2.7249	2.8245	0.0996	24	1.28	1.27	1.28	1836.5	54		
17-Mar-20	Cloudy	293.3	764.1	2.6897	2.8598	0.1701	24	1.35	1.33	1.34	1932.2	88		
23-Mar-20	Fine	297.6	760.7	2.6481	2.7039	0.0558	24	1.27	1.27	1.27	1825.9	31		
28-Mar-20	Fine	295.8	760.0	2.6782	2.7936	0.1154	24	1.27	1.27	1.27	1828.4	63		
											Min	27		
											Max	88		
											Average	52		

Note:
Underline: Exceedance of Action Level
Underline and Bold: Exceedance of Limit Level


24-hr TSP
AMS2
Concentration (ug/m³)
300
250
200
150
100
50
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
AMS2
AL
LL


24-hr TSP
AMS3C
Concentration (ug/m³)
300
250
200
150
100
50
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
AMS3C
AL
LL


24-hr TSP
AMS7B
Concentration (ug/m³)
300
250
200
150
100
50
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
AMS7B
AL
LL

1-hour TSP Monitoring Result for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

AMS2 - Tung Chung Development Pier

Date	Weather Condition	Start Time	1-hour TSP (μg/m³) 1st Measurement	2nd Measurement	3rd Measurement	Action Level (ug/m³)	Limit Level (ug/m³)
5-Mar-20	Cloudy	10:42	106	106	115	374	500
11-Mar-20	Cloudy	09:47	55	58	58		
17-Mar-20	Cloudy	13:42	58	54	60		
23-Mar-20	Fine	13:22	52	50	52		
28-Mar-20	Fine	09:00	68	60	58		
		Min	50				
		Max	115				
		Average	67				

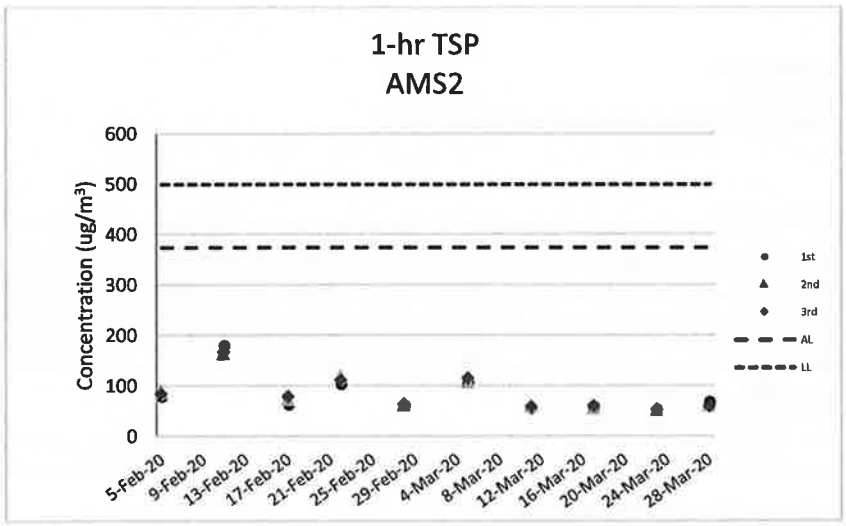
AMS3C - Ying Tung Estate Market Rooftop

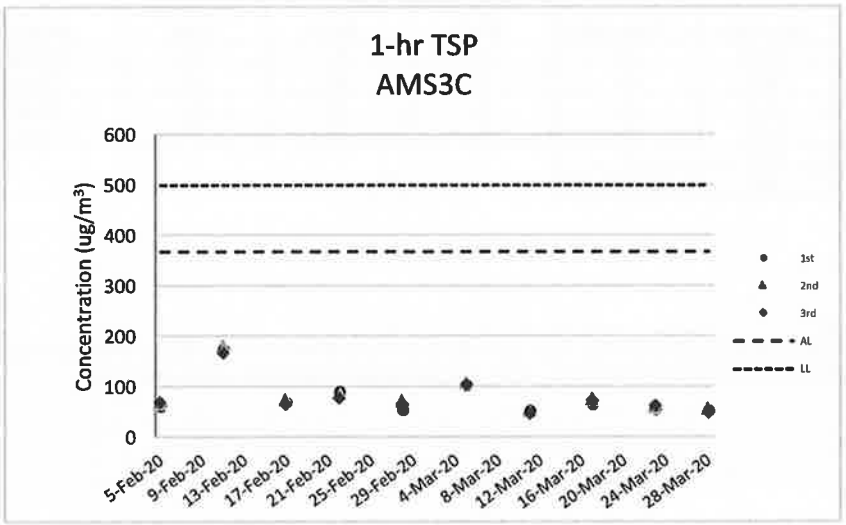
Date	Weather Condition	Start Time	1-hour TSP (μg/m³) 1st Measurement	2nd Measurement	3rd Measurement	Action Level (ug/m³)	Limit Level (ug/m³)
5-Mar-20	Cloudy	10:55	102	106	104	368	500
11-Mar-20	Cloudy	10:04	52	50	46		
17-Mar-20	Cloudy	13:30	64	74	71		
23-Mar-20	Fine	14:20	55	58	62		
28-Mar-20	Fine	09:35	52	54	48		
		Min	46				
		Max	106				
		Average	67				

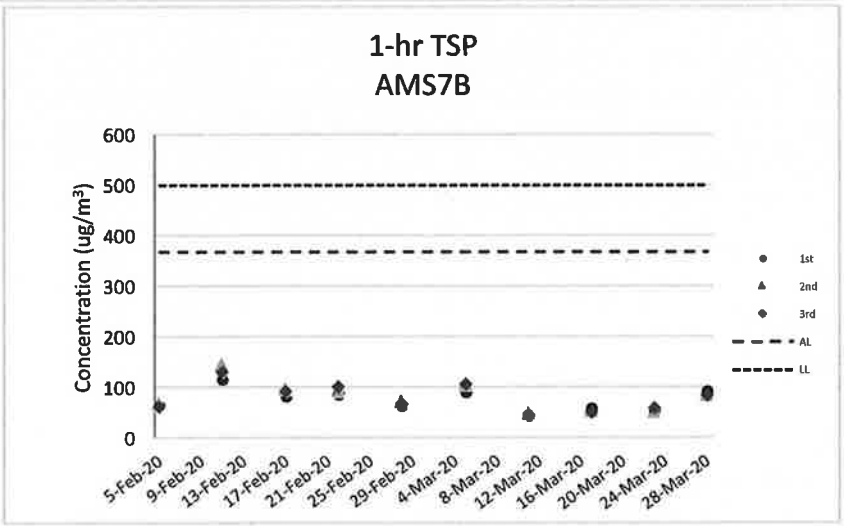
AMS7B - 3RS Site Offices

Date	Weather Condition	Start Time	1-hour TSP (μg/m³) 1st Measurement	2nd Measurement	3rd Measurement	Action Level (ug/m³)	Limit Level (ug/m³)
5-Mar-20	Cloudy	10:30	90	104	106	370	500
11-Mar-20	Cloudy	09:32	44	48	46		
17-Mar-20	Cloudy	13:05	58	52	50		
23-Mar-20	Fine	13:47	56	50	58		
28-Mar-20	Fine	10:00	92	83	83		
		Min	44				
		Max	106				
		Average	68				

Note:
Underline: Exceedance of Action Level
Underline and Bold: Exceedance of Limit Level


1-hr TSP
AMS2
Concentration (ug/m³)
600
500
400
300
200
100
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
1st
2nd
3rd
AL
LL


1-hr TSP
AMS3C
Concentration (ug/m³)
600
500
400
300
200
100
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
1st
2nd
3rd
AL
LL


1-hr TSP
AMS7B
Concentration (ug/m³)
600
500
400
300
200
100
0
5-Feb-20
9-Feb-20
13-Feb-20
17-Feb-20
21-Feb-20
25-Feb-20
29-Feb-20
4-Mar-20
8-Mar-20
12-Mar-20
16-Mar-20
20-Mar-20
24-Mar-20
28-Mar-20
1st
2nd
3rd
AL
LL

Noise Impact Monitoring Result for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

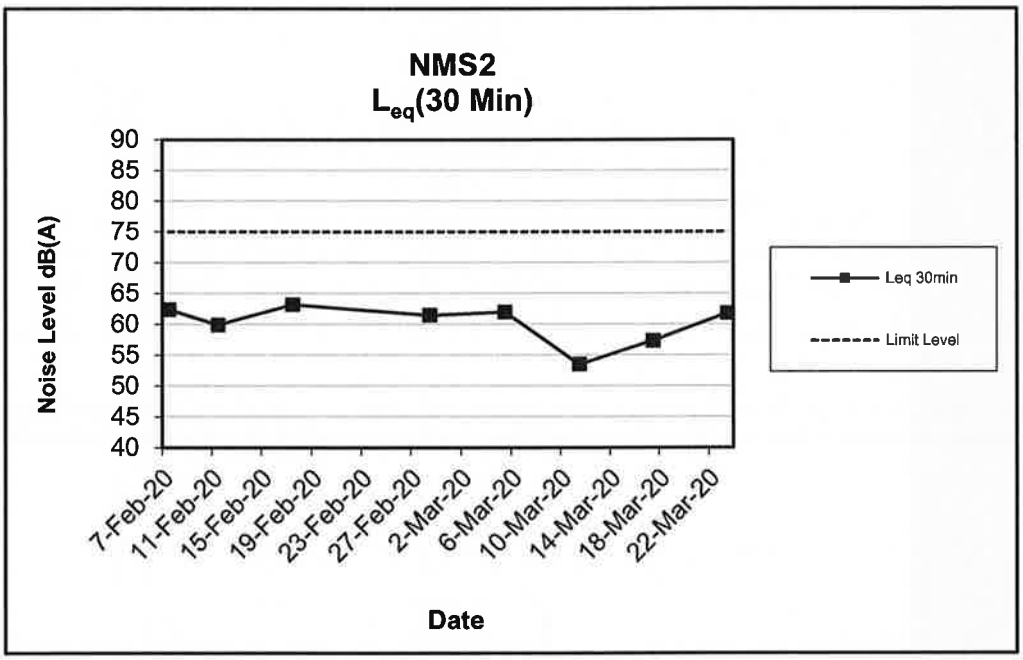
NMS2 - Seaview Crescent

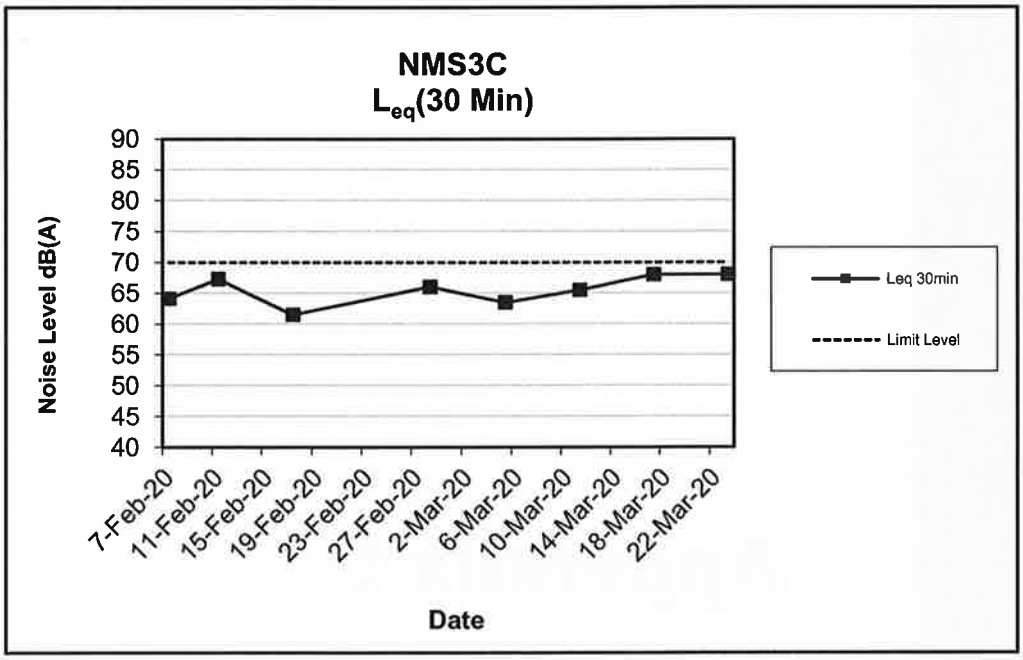
Date	Start Time	L_{eq} 30min dB(A)	L_{10} dB(A)	L_{90} dB(A)	Wind Speed (m/s)	Weather	Limit Level dB(A)
5-Mar-20	11:48	62	65	58	3.0	Cloudy	75
11-Mar-20	11:47	54	56	53	2.4	Cloudy	75
17-Mar-20	14:17	57	58	48	2.7	Cloudy	75
23-Mar-20	15:07	62	65	57	4.0	Fine	75
	Max	62					
	Min	54					

NMS3C - Ying Tung Estate Refuse Collection Point

Date	Start Time	L_{eq} 30min dB(A)	L_{10} dB(A)	L_{90} dB(A)	Wind Speed (m/s)	Weather	Limit Level dB(A)
5-Mar-20	10:59	64	66	61	2.8	Cloudy	70
11-Mar-20	10:04	66	67	63	2.3	Cloudy	70
17-Mar-20	13:30	68	71	56	1.7	Cloudy	70
23-Mar-20	14:20	68	70	60	2.2	Fine	70
	Max	68					
	Min	64					

Note:
NMS2: Façade Measurement
NMS3C: Free-field measurement (+3dB(A) correction has been applied), reduction to 65dB(A) during school examination periods will be applied.
No raining or wind with speed over 5 m/s was observed during noise monitoring according to the onsite observation.


NMS2
L_{eq}(30 Min)
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
7-Feb-20
11-Feb-20
15-Feb-20
19-Feb-20
23-Feb-20
27-Feb-20
2-Mar-20
6-Mar-20
10-Mar-20
14-Mar-20
18-Mar-20
22-Mar-20
Date
Leq 30min
Limit Level


NMS3C
L_{eq}(30 Min)
Noise Level dB(A)
90
85
80
75
70
65
60
55
50
45
40
7-Feb-20
11-Feb-20
15-Feb-20
19-Feb-20
23-Feb-20
27-Feb-20
2-Mar-20
6-Mar-20
10-Mar-20
14-Mar-20
18-Mar-20
22-Mar-20
Date
Leq 30min
Limit Level

Appendix G

Wind Data

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
1/3/2020 00:00	2.3	N
1/3/2020 01:00	2.3	N
1/3/2020 02:00	2.3	N
1/3/2020 03:00	2.3	S
1/3/2020 04:00	2.3	S
1/3/2020 05:00	2.3	NE
1/3/2020 06:00	2.3	NE
1/3/2020 07:00	2.3	N
1/3/2020 08:00	2.3	N
1/3/2020 09:00	2.3	SE
1/3/2020 10:00	2.5	S
1/3/2020 11:00	2.4	SE
1/3/2020 12:00	2.3	SE
1/3/2020 13:00	2.4	SE
1/3/2020 14:00	2.3	SE
1/3/2020 15:00	2.3	NE
1/3/2020 16:00	2.4	NE
1/3/2020 17:00	2.4	SE
1/3/2020 18:00	2.3	S
1/3/2020 19:00	2.3	S
1/3/2020 20:00	2.3	NE
1/3/2020 21:00	2.3	N
1/3/2020 22:00	2.3	W
1/3/2020 23:00	2.3	N
2/3/2020 00:00	2.3	E
2/3/2020 01:00	2.3	NE
2/3/2020 02:00	2.3	N
2/3/2020 03:00	2.3	N
2/3/2020 04:00	2.4	SW
2/3/2020 05:00	2.3	SW
2/3/2020 06:00	2.4	NW
2/3/2020 07:00	2.7	NW
2/3/2020 08:00	2.7	NW
2/3/2020 09:00	6.4	NW
2/3/2020 10:00	3.4	E
2/3/2020 11:00	2.3	SW
2/3/2020 12:00	3.8	SE
2/3/2020 13:00	2.5	SE
2/3/2020 14:00	3.5	SE
2/3/2020 15:00	2.4	SE

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
2/3/2020 16:00	2.3	NE
2/3/2020 17:00	2.3	W
2/3/2020 18:00	3.9	SE
2/3/2020 19:00	2.3	NE
2/3/2020 20:00	2.7	S
2/3/2020 21:00	2.3	SW
2/3/2020 22:00	6.3	SE
2/3/2020 23:00	5.6	SE
3/3/2020 00:00	2.4	NE
3/3/2020 01:00	2.7	SE
3/3/2020 02:00	3.7	E
3/3/2020 03:00	2.8	N
3/3/2020 04:00	2.6	S
3/3/2020 05:00	7.8	SW
3/3/2020 06:00	3.6	W
3/3/2020 07:00	3.6	W
3/3/2020 08:00	2.6	NW
3/3/2020 09:00	5.2	W
3/3/2020 10:00	3.7	SW
3/3/2020 11:00	3.4	S
3/3/2020 12:00	2.8	NW
3/3/2020 13:00	4.1	SW
3/3/2020 14:00	2.7	SW
3/3/2020 15:00	2.8	S
3/3/2020 16:00	3.4	SE
3/3/2020 17:00	2.3	S
3/3/2020 18:00	2.4	NW
3/3/2020 19:00	2.3	SW
3/3/2020 20:00	2.3	NW
3/3/2020 21:00	3.0	W
3/3/2020 22:00	2.3	SW
3/3/2020 23:00	2.3	S
4/3/2020 00:00	2.3	SW
4/3/2020 01:00	2.3	SE
4/3/2020 02:00	2.3	SW
4/3/2020 03:00	2.3	SW
4/3/2020 04:00	2.3	W
4/3/2020 05:00	2.3	W
4/3/2020 06:00	2.5	SW
4/3/2020 07:00	2.3	SW
4/3/2020 08:00	2.3	NE

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
4/3/2020 09:00	2.3	W
4/3/2020 10:00	2.3	SE
4/3/2020 11:00	2.3	S
4/3/2020 12:00	2.3	SE
4/3/2020 13:00	2.8	SW
4/3/2020 14:00	2.3	SE
4/3/2020 15:00	3.5	N
4/3/2020 16:00	2.3	S
4/3/2020 17:00	2.4	SW
4/3/2020 18:00	2.3	S
4/3/2020 19:00	2.3	SE
4/3/2020 20:00	2.3	SE
4/3/2020 21:00	2.3	SW
4/3/2020 22:00	2.3	SW
4/3/2020 23:00	2.3	SE
5/3/2020 00:00	2.5	S
5/3/2020 01:00	2.3	SE
5/3/2020 02:00	2.3	N
5/3/2020 03:00	2.3	S
5/3/2020 04:00	2.3	SW
5/3/2020 05:00	4.0	NW
5/3/2020 06:00	2.5	W
5/3/2020 07:00	2.3	SW
5/3/2020 08:00	4.3	SW
5/3/2020 09:00	3.3	W
5/3/2020 10:00	3.2	S
5/3/2020 11:00	2.4	S
5/3/2020 12:00	2.8	SE
5/3/2020 13:00	2.3	SE
5/3/2020 14:00	2.3	SW
5/3/2020 15:00	2.4	S
5/3/2020 16:00	2.4	S
5/3/2020 17:00	2.4	SE
5/3/2020 18:00	2.9	SE
5/3/2020 19:00	2.6	SE
5/3/2020 20:00	2.3	N
5/3/2020 21:00	2.3	W
5/3/2020 22:00	2.4	SE
5/3/2020 23:00	2.7	S
6/3/2020 00:00	2.3	NW
6/3/2020 01:00	2.8	S

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
6/3/2020 02:00	2.3	SE
6/3/2020 03:00	4.9	E
6/3/2020 04:00	2.6	NE
6/3/2020 05:00	3.5	SW
6/3/2020 06:00	2.6	SW
6/3/2020 07:00	2.4	N
6/3/2020 08:00	2.7	W
6/3/2020 09:00	2.4	NW
6/3/2020 10:00	2.5	SE
6/3/2020 11:00	2.8	SW
6/3/2020 12:00	2.6	SW
6/3/2020 13:00	2.4	W
6/3/2020 14:00	2.4	W
6/3/2020 15:00	3.1	SE
6/3/2020 16:00	5.0	S
6/3/2020 17:00	2.8	SE
6/3/2020 18:00	3.3	NW
6/3/2020 19:00	2.6	W
6/3/2020 20:00	2.6	SE
6/3/2020 21:00	2.3	S
6/3/2020 22:00	3.4	W
6/3/2020 23:00	4.5	E
7/3/2020 00:00	2.3	N
7/3/2020 01:00	2.4	SW
7/3/2020 02:00	2.4	NW
7/3/2020 03:00	3.3	SE
7/3/2020 04:00	2.6	SE
7/3/2020 05:00	2.4	SW
7/3/2020 06:00	2.3	S
7/3/2020 07:00	2.6	SE
7/3/2020 08:00	2.9	N
7/3/2020 09:00	2.3	W
7/3/2020 10:00	2.5	NW
7/3/2020 11:00	2.5	W
7/3/2020 12:00	2.7	SE
7/3/2020 13:00	2.3	SE
7/3/2020 14:00	2.3	SE
7/3/2020 15:00	3.0	S
7/3/2020 16:00	2.4	SE
7/3/2020 17:00	2.5	S
7/3/2020 18:00	2.3	SW

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
7/3/2020 19:00	2.3	S
7/3/2020 20:00	2.4	SW
7/3/2020 21:00	2.3	SW
7/3/2020 22:00	2.3	N
7/3/2020 23:00	3.5	SE
8/3/2020 00:00	2.4	NW
8/3/2020 01:00	2.3	N
8/3/2020 02:00	2.3	SW
8/3/2020 03:00	2.3	N
8/3/2020 04:00	2.3	N
8/3/2020 05:00	2.5	S
8/3/2020 06:00	2.5	S
8/3/2020 07:00	2.5	S
8/3/2020 08:00	2.3	W
8/3/2020 09:00	2.3	NW
8/3/2020 10:00	2.3	NW
8/3/2020 11:00	2.3	SE
8/3/2020 12:00	2.3	E
8/3/2020 13:00	2.3	SE
8/3/2020 14:00	3.4	SE
8/3/2020 15:00	3.4	SE
8/3/2020 16:00	2.6	SE
8/3/2020 17:00	4.6	S
8/3/2020 18:00	4.5	S
8/3/2020 19:00	2.6	S
8/3/2020 20:00	3.0	SE
8/3/2020 21:00	2.9	S
8/3/2020 22:00	2.8	SE
8/3/2020 23:00	4.6	S
9/3/2020 00:00	2.4	W
9/3/2020 01:00	3.1	NW
9/3/2020 02:00	2.4	W
9/3/2020 03:00	2.4	SE
9/3/2020 04:00	2.7	S
9/3/2020 05:00	2.4	SE
9/3/2020 06:00	2.3	SE
9/3/2020 07:00	3.5	S
9/3/2020 08:00	3.3	SE
9/3/2020 09:00	2.4	S
9/3/2020 10:00	2.6	SE
9/3/2020 11:00	2.3	S

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
9/3/2020 12:00	2.3	W
9/3/2020 13:00	2.3	NW
9/3/2020 14:00	2.6	S
9/3/2020 15:00	2.4	W
9/3/2020 16:00	2.3	NE
9/3/2020 17:00	2.7	N
9/3/2020 18:00	2.6	E
9/3/2020 19:00	2.5	NW
9/3/2020 20:00	2.4	W
9/3/2020 21:00	2.3	S
9/3/2020 22:00	2.3	W
9/3/2020 23:00	2.3	W
10/3/2020 00:00	2.3	SW
10/3/2020 01:00	2.3	W
10/3/2020 02:00	2.3	NW
10/3/2020 03:00	2.5	N
10/3/2020 04:00	2.3	NW
10/3/2020 05:00	2.6	NW
10/3/2020 06:00	3.4	SW
10/3/2020 07:00	2.5	W
10/3/2020 08:00	2.4	SW
10/3/2020 09:00	3.4	SW
10/3/2020 10:00	3.4	S
10/3/2020 11:00	2.5	S
10/3/2020 12:00	3.0	N
10/3/2020 13:00	3.0	NW
10/3/2020 14:00	2.5	W
10/3/2020 15:00	2.6	N
10/3/2020 16:00	2.4	N
10/3/2020 17:00	2.3	W
10/3/2020 18:00	3.0	S
10/3/2020 19:00	2.4	NE
10/3/2020 20:00	2.6	W
10/3/2020 21:00	3.2	W
10/3/2020 22:00	2.6	W
10/3/2020 23:00	2.4	SW
11/3/2020 00:00	2.6	W
11/3/2020 01:00	2.4	SW
11/3/2020 02:00	2.3	W
11/3/2020 03:00	2.4	SW
11/3/2020 04:00	2.3	N

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
11/3/2020 05:00	2.3	W
11/3/2020 06:00	2.3	SW
11/3/2020 07:00	2.5	NW
11/3/2020 08:00	3.2	SE
11/3/2020 09:00	2.3	S
11/3/2020 10:00	2.3	NW
11/3/2020 11:00	2.3	N
11/3/2020 12:00	2.3	SE
11/3/2020 13:00	2.6	W
11/3/2020 14:00	3.0	E
11/3/2020 15:00	2.3	E
11/3/2020 16:00	2.7	S
11/3/2020 17:00	5.1	SE
11/3/2020 18:00	2.8	NW
11/3/2020 19:00	2.5	NE
11/3/2020 20:00	3.0	SE
11/3/2020 21:00	2.4	S
11/3/2020 22:00	3.8	SW
11/3/2020 23:00	2.6	E
12/3/2020 00:00	2.4	W
12/3/2020 01:00	3.9	NW
12/3/2020 02:00	3.3	SW
12/3/2020 03:00	3.2	S
12/3/2020 04:00	2.3	S
12/3/2020 05:00	2.6	SE
12/3/2020 06:00	3.3	S
12/3/2020 07:00	3.5	S
12/3/2020 08:00	3.6	SE
12/3/2020 09:00	4.5	SE
12/3/2020 10:00	3.3	SE
12/3/2020 11:00	2.5	S
12/3/2020 12:00	4.0	SW
12/3/2020 13:00	3.5	W
12/3/2020 14:00	2.4	NE
12/3/2020 15:00	3.3	N
12/3/2020 16:00	2.4	NW
12/3/2020 17:00	2.8	W
12/3/2020 18:00	2.7	NW
12/3/2020 19:00	2.3	S
12/3/2020 20:00	2.3	W
12/3/2020 21:00	2.3	N

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
12/3/2020 22:00	2.3	W
12/3/2020 23:00	2.4	NW
13/3/2020 00:00	2.3	SE
13/3/2020 01:00	2.4	SE
13/3/2020 02:00	2.3	W
13/3/2020 03:00	2.3	W
13/3/2020 04:00	2.3	S
13/3/2020 05:00	2.3	W
13/3/2020 06:00	2.4	NW
13/3/2020 07:00	2.3	SW
13/3/2020 08:00	2.3	NW
13/3/2020 09:00	2.3	SW
13/3/2020 10:00	2.3	W
13/3/2020 11:00	2.4	SW
13/3/2020 12:00	2.3	NW
13/3/2020 13:00	2.3	S
13/3/2020 14:00	2.5	SW
13/3/2020 15:00	2.3	W
13/3/2020 16:00	2.3	NE
13/3/2020 17:00	2.3	W
13/3/2020 18:00	2.3	S
13/3/2020 19:00	2.3	SE
13/3/2020 20:00	2.3	S
13/3/2020 21:00	2.3	SW
13/3/2020 22:00	2.3	SE
13/3/2020 23:00	2.3	N
14/3/2020 00:00	2.3	N
14/3/2020 01:00	2.3	E
14/3/2020 02:00	2.4	N
14/3/2020 03:00	2.4	SW
14/3/2020 04:00	2.9	S
14/3/2020 05:00	2.4	S
14/3/2020 06:00	2.3	N
14/3/2020 07:00	2.4	SE
14/3/2020 08:00	2.3	NW
14/3/2020 09:00	2.3	SE
14/3/2020 10:00	2.3	S
14/3/2020 11:00	2.3	SE
14/3/2020 12:00	2.3	S
14/3/2020 13:00	2.4	N
14/3/2020 14:00	2.5	SE

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
14/3/2020 15:00	2.4	NW
14/3/2020 16:00	2.3	SE
14/3/2020 17:00	2.4	SW
14/3/2020 18:00	3.0	S
14/3/2020 19:00	2.3	SW
14/3/2020 20:00	4.9	SE
14/3/2020 21:00	3.0	SE
14/3/2020 22:00	2.3	N
14/3/2020 23:00	2.3	W
15/3/2020 00:00	2.5	SW
15/3/2020 01:00	2.5	W
15/3/2020 02:00	2.5	W
15/3/2020 03:00	2.3	SW
15/3/2020 04:00	2.3	NW
15/3/2020 05:00	2.3	W
15/3/2020 06:00	2.4	SW
15/3/2020 07:00	2.3	SW
15/3/2020 08:00	2.4	SW
15/3/2020 09:00	2.3	W
15/3/2020 10:00	2.4	W
15/3/2020 11:00	2.9	SW
15/3/2020 12:00	2.9	SW
15/3/2020 13:00	3.1	N
15/3/2020 14:00	3.1	SE
15/3/2020 15:00	2.5	W
15/3/2020 16:00	2.3	NW
15/3/2020 17:00	2.3	SE
15/3/2020 18:00	3.0	NW
15/3/2020 19:00	2.4	SE
15/3/2020 20:00	2.3	NW
15/3/2020 21:00	2.8	S
15/3/2020 22:00	2.6	SE
15/3/2020 23:00	2.3	SW
16/3/2020 00:00	2.4	SW
16/3/2020 01:00	2.3	NW
16/3/2020 02:00	2.3	SW
16/3/2020 03:00	2.3	NW
16/3/2020 04:00	2.3	NW
16/3/2020 05:00	2.3	NW
16/3/2020 06:00	2.7	SE
16/3/2020 07:00	2.3	SW

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
16/3/2020 08:00	3.5	SE
16/3/2020 09:00	2.4	NW
16/3/2020 10:00	2.5	NW
16/3/2020 11:00	2.4	W
16/3/2020 12:00	2.5	NW
16/3/2020 13:00	2.4	SW
16/3/2020 14:00	2.3	S
16/3/2020 15:00	3.0	W
16/3/2020 16:00	2.4	SW
16/3/2020 17:00	2.5	SW
16/3/2020 18:00	2.3	NW
16/3/2020 19:00	2.7	NW
16/3/2020 20:00	2.4	S
16/3/2020 21:00	2.5	SE
16/3/2020 22:00	2.9	SE
16/3/2020 23:00	2.4	NW
17/3/2020 00:00	2.3	N
17/3/2020 01:00	2.4	SW
17/3/2020 02:00	2.3	NE
17/3/2020 03:00	2.4	S
17/3/2020 04:00	2.3	W
17/3/2020 05:00	2.3	N
17/3/2020 06:00	3.1	W
17/3/2020 07:00	2.6	SE
17/3/2020 08:00	3.0	SE
17/3/2020 09:00	2.4	W
17/3/2020 10:00	2.4	E
17/3/2020 11:00	2.4	N
17/3/2020 12:00	2.3	SW
17/3/2020 13:00	3.3	W
17/3/2020 14:00	2.3	W
17/3/2020 15:00	2.6	S
17/3/2020 16:00	2.6	SW
17/3/2020 17:00	2.5	NW
17/3/2020 18:00	2.3	W
17/3/2020 19:00	2.3	S
17/3/2020 20:00	2.4	W
17/3/2020 21:00	2.3	W
17/3/2020 22:00	3.0	S
17/3/2020 23:00	2.4	SE
18/3/2020 00:00	3.6	W

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
18/3/2020 01:00	2.7	SW
18/3/2020 02:00	2.3	W
18/3/2020 03:00	2.3	SW
18/3/2020 04:00	2.4	SE
18/3/2020 05:00	2.3	S
18/3/2020 06:00	2.6	S
18/3/2020 07:00	2.3	N
18/3/2020 08:00	2.3	W
18/3/2020 09:00	2.4	SW
18/3/2020 10:00	3.1	S
18/3/2020 11:00	3.6	SE
18/3/2020 12:00	2.3	SW
18/3/2020 13:00	2.3	N
18/3/2020 14:00	2.4	SW
18/3/2020 15:00	5.4	SE
18/3/2020 16:00	2.3	SE
18/3/2020 17:00	2.4	NW
18/3/2020 18:00	2.3	SW
18/3/2020 19:00	2.3	W
18/3/2020 20:00	2.3	E
18/3/2020 21:00	2.3	W
18/3/2020 22:00	2.3	W
18/3/2020 23:00	2.3	N
19/3/2020 00:00	2.3	N
19/3/2020 01:00	2.3	N
19/3/2020 02:00	2.3	NW
19/3/2020 03:00	2.3	SE
19/3/2020 04:00	2.5	SE
19/3/2020 05:00	2.5	SE
19/3/2020 06:00	2.3	NE
19/3/2020 07:00	2.4	SE
19/3/2020 08:00	2.3	SW
19/3/2020 09:00	2.4	SE
19/3/2020 10:00	2.3	SE
19/3/2020 11:00	2.3	NW
19/3/2020 12:00	2.3	N
19/3/2020 13:00	2.7	SE
19/3/2020 14:00	2.3	NE
19/3/2020 15:00	2.3	SW
19/3/2020 16:00	2.3	SW
19/3/2020 17:00	2.4	S

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
19/3/2020 18:00	2.4	SE
19/3/2020 19:00	2.3	NW
19/3/2020 20:00	2.3	NW
19/3/2020 21:00	2.3	NW
19/3/2020 22:00	2.3	E
19/3/2020 23:00	2.3	SW
20/3/2020 00:00	2.3	SW
20/3/2020 01:00	2.3	SE
20/3/2020 02:00	2.3	N
20/3/2020 03:00	2.3	SW
20/3/2020 04:00	2.3	S
20/3/2020 05:00	2.3	N
20/3/2020 06:00	2.3	N
20/3/2020 07:00	2.3	SW
20/3/2020 08:00	2.4	NW
20/3/2020 09:00	3.3	SE
20/3/2020 10:00	2.3	SE
20/3/2020 11:00	2.4	SW
20/3/2020 12:00	2.3	NW
20/3/2020 13:00	2.6	NW
20/3/2020 14:00	2.3	SE
20/3/2020 15:00	2.7	SW
20/3/2020 16:00	5.0	SE
20/3/2020 17:00	2.3	NW
20/3/2020 18:00	2.4	W
20/3/2020 19:00	2.5	W
20/3/2020 20:00	2.3	S
20/3/2020 21:00	5.4	W
20/3/2020 22:00	2.3	NW
20/3/2020 23:00	3.3	SW
21/3/2020 00:00	2.3	NW
21/3/2020 01:00	2.7	S
21/3/2020 02:00	2.3	SE
21/3/2020 03:00	2.4	N
21/3/2020 04:00	2.7	SE
21/3/2020 05:00	3.0	SE
21/3/2020 06:00	2.3	S
21/3/2020 07:00	3.7	SE
21/3/2020 08:00	2.3	NW
21/3/2020 09:00	2.3	SE
21/3/2020 10:00	2.3	SE

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
21/3/2020 11:00	2.3	SE
21/3/2020 12:00	2.3	S
21/3/2020 13:00	2.3	SE
21/3/2020 14:00	2.3	N
21/3/2020 15:00	2.3	NW
21/3/2020 16:00	2.3	SW
21/3/2020 17:00	2.3	S
21/3/2020 18:00	2.3	E
21/3/2020 19:00	2.3	NW
21/3/2020 20:00	2.3	S
21/3/2020 21:00	2.4	SE
21/3/2020 22:00	2.3	S
21/3/2020 23:00	2.3	SE
22/3/2020 00:00	2.3	NE
22/3/2020 01:00	2.3	W
22/3/2020 02:00	2.3	SW
22/3/2020 03:00	2.3	W
22/3/2020 04:00	2.3	W
22/3/2020 05:00	2.3	NE
22/3/2020 06:00	2.3	W
22/3/2020 07:00	2.3	N
22/3/2020 08:00	2.3	SW
22/3/2020 09:00	2.3	SE
22/3/2020 10:00	2.7	S
22/3/2020 11:00	2.3	SE
22/3/2020 12:00	2.7	SW
22/3/2020 13:00	2.6	SW
22/3/2020 14:00	2.7	S
22/3/2020 15:00	3.3	S
22/3/2020 16:00	2.3	S
22/3/2020 17:00	2.3	SW
22/3/2020 18:00	2.3	NW
22/3/2020 19:00	2.3	NW
22/3/2020 20:00	2.3	W
22/3/2020 21:00	2.3	S
22/3/2020 22:00	2.3	N
22/3/2020 23:00	2.3	S
23/3/2020 00:00	2.3	N
23/3/2020 01:00	2.3	N
23/3/2020 02:00	2.3	N
23/3/2020 03:00	2.3	S

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
23/3/2020 04:00	2.3	NW
23/3/2020 05:00	2.3	NW
23/3/2020 06:00	2.3	SW
23/3/2020 07:00	2.3	S
23/3/2020 08:00	2.3	S
23/3/2020 09:00	2.3	SW
23/3/2020 10:00	2.3	SE
23/3/2020 11:00	2.4	N
23/3/2020 12:00	2.8	SE
23/3/2020 13:00	3.3	SE
23/3/2020 14:00	2.5	SW
23/3/2020 15:00	2.4	S
23/3/2020 16:00	2.8	SW
23/3/2020 17:00	2.3	SW
23/3/2020 18:00	2.3	N
23/3/2020 19:00	2.3	SE
23/3/2020 20:00	2.3	NW
23/3/2020 21:00	2.3	SE
23/3/2020 22:00	2.5	SE
23/3/2020 23:00	2.8	SE
24/3/2020 00:00	2.3	N
24/3/2020 01:00	2.4	N
24/3/2020 02:00	2.3	SE
24/3/2020 03:00	2.4	NW
24/3/2020 04:00	2.5	S
24/3/2020 05:00	2.3	S
24/3/2020 06:00	2.3	SE
24/3/2020 07:00	4.5	SE
24/3/2020 08:00	4.4	S
24/3/2020 09:00	3.8	SE
24/3/2020 10:00	2.6	SE
24/3/2020 11:00	3.7	NW
24/3/2020 12:00	4.4	SE
24/3/2020 13:00	2.4	N
24/3/2020 14:00	2.3	E
24/3/2020 15:00	2.6	S
24/3/2020 16:00	2.4	W
24/3/2020 17:00	2.3	N
24/3/2020 18:00	2.5	S
24/3/2020 19:00	2.3	SE
24/3/2020 20:00	2.3	N

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
24/3/2020 21:00	3.9	SE
24/3/2020 22:00	2.3	SW
24/3/2020 23:00	2.7	SE
25/3/2020 00:00	2.5	SE
25/3/2020 01:00	2.3	SE
25/3/2020 02:00	2.5	SE
25/3/2020 03:00	2.4	NW
25/3/2020 04:00	2.7	S
25/3/2020 05:00	2.4	S
25/3/2020 06:00	2.6	SE
25/3/2020 07:00	2.3	N
25/3/2020 08:00	2.4	N
25/3/2020 09:00	2.4	S
25/3/2020 10:00	2.4	NW
25/3/2020 11:00	3.6	W
25/3/2020 12:00	2.3	SW
25/3/2020 13:00	2.4	SE
25/3/2020 14:00	3.0	NW
25/3/2020 15:00	2.4	SE
25/3/2020 16:00	2.4	NW
25/3/2020 17:00	2.3	E
25/3/2020 18:00	2.3	SE
25/3/2020 19:00	2.4	SW
25/3/2020 20:00	2.3	SW
25/3/2020 21:00	2.3	SW
25/3/2020 22:00	2.3	NW
25/3/2020 23:00	2.3	NW
26/3/2020 00:00	2.3	SE
26/3/2020 01:00	2.3	SW
26/3/2020 02:00	2.8	SW
26/3/2020 03:00	3.4	W
26/3/2020 04:00	2.4	S
26/3/2020 05:00	2.3	SW
26/3/2020 06:00	2.3	N
26/3/2020 07:00	2.5	SW
26/3/2020 08:00	2.5	S
26/3/2020 09:00	3.9	SW
26/3/2020 10:00	2.8	S
26/3/2020 11:00	3.0	W
26/3/2020 12:00	2.3	W

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
26/3/2020 13:00	2.5	SE
26/3/2020 14:00	2.3	W
26/3/2020 15:00	2.3	SE
26/3/2020 16:00	2.3	NW
26/3/2020 17:00	2.3	S
26/3/2020 18:00	2.3	SW
26/3/2020 19:00	2.5	SE
26/3/2020 20:00	2.3	SW
26/3/2020 21:00	2.3	SW
26/3/2020 22:00	2.3	N
26/3/2020 23:00	2.3	SE
27/3/2020 00:00	2.3	NW
27/3/2020 01:00	2.3	NW
27/3/2020 02:00	2.3	SW
27/3/2020 03:00	2.3	E
27/3/2020 04:00	2.3	NE
27/3/2020 05:00	2.3	W
27/3/2020 06:00	2.3	NW
27/3/2020 07:00	2.3	SE
27/3/2020 08:00	2.3	S
27/3/2020 09:00	2.3	NE
27/3/2020 10:00	2.3	NE
27/3/2020 11:00	3.3	NE
27/3/2020 12:00	3.3	SE
27/3/2020 13:00	2.4	SW
27/3/2020 14:00	2.3	S
27/3/2020 15:00	4.1	SW
27/3/2020 16:00	2.3	NW
27/3/2020 17:00	2.7	NW
27/3/2020 18:00	2.4	NE
27/3/2020 19:00	2.3	SE
27/3/2020 20:00	2.3	S
27/3/2020 21:00	2.3	S
27/3/2020 22:00	2.8	SE
27/3/2020 23:00	2.3	W
28/3/2020 00:00	3.3	SW
28/3/2020 01:00	2.3	NW
28/3/2020 02:00	3.2	NW
28/3/2020 03:00	2.3	N
28/3/2020 04:00	2.3	SW
28/3/2020 05:00	2.3	NW

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
28/3/2020 06:00	2.3	NW
28/3/2020 07:00	2.3	S
28/3/2020 08:00	2.3	S
28/3/2020 09:00	2.3	W
28/3/2020 10:00	2.3	W
28/3/2020 11:00	2.3	SE
28/3/2020 12:00	2.3	SW
28/3/2020 13:00	2.3	NE
28/3/2020 14:00	2.3	N
28/3/2020 15:00	2.3	N
28/3/2020 16:00	2.3	N
28/3/2020 17:00	2.3	N
28/3/2020 18:00	2.3	NW
28/3/2020 19:00	2.3	E
28/3/2020 20:00	2.3	SW
28/3/2020 21:00	2.4	N
28/3/2020 22:00	2.6	SW
28/3/2020 23:00	2.5	W
29/3/2020 00:00	3.1	SW
29/3/2020 01:00	4.2	SE
29/3/2020 02:00	2.8	NW
29/3/2020 03:00	6.1	S
29/3/2020 04:00	2.6	W
29/3/2020 05:00	2.4	SW
29/3/2020 06:00	4.3	S
29/3/2020 07:00	7.2	SE
29/3/2020 08:00	2.8	SW
29/3/2020 09:00	3.1	S
29/3/2020 10:00	2.9	SE
29/3/2020 11:00	4.8	SW
29/3/2020 12:00	2.8	SW
29/3/2020 13:00	2.3	SE
29/3/2020 14:00	4.8	SE
29/3/2020 15:00	2.4	E
29/3/2020 16:00	2.3	E
29/3/2020 17:00	3.4	SE
29/3/2020 18:00	4.1	W
29/3/2020 19:00	3.8	SE
29/3/2020 20:00	5.6	SE
29/3/2020 21:00	3.1	S
29/3/2020 22:00	2.5	NW

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
29/3/2020 23:00	4.1	SW
30/3/2020 00:00	2.4	SE
30/3/2020 01:00	2.4	S
30/3/2020 02:00	2.4	E
30/3/2020 03:00	5.0	W
30/3/2020 04:00	2.3	SE
30/3/2020 05:00	2.4	W
30/3/2020 06:00	2.5	W
30/3/2020 07:00	2.3	W
30/3/2020 08:00	2.3	S
30/3/2020 09:00	2.3	NE
30/3/2020 10:00	2.4	N
30/3/2020 11:00	2.3	E
30/3/2020 12:00	2.3	SE
30/3/2020 13:00	2.3	NE
30/3/2020 14:00	2.3	SW
30/3/2020 15:00	2.3	N
30/3/2020 16:00	2.3	N
30/3/2020 17:00	2.3	NE
30/3/2020 18:00	2.3	SE
30/3/2020 19:00	2.3	E
30/3/2020 20:00	2.3	N
30/3/2020 21:00	2.3	NE
30/3/2020 22:00	2.3	N
30/3/2020 23:00	2.3	NE
31/3/2020 00:00	2.3	NE
31/3/2020 01:00	2.3	SE
31/3/2020 02:00	2.3	NE
31/3/2020 03:00	2.3	N
31/3/2020 04:00	2.3	N
31/3/2020 05:00	2.3	N
31/3/2020 06:00	2.3	NE
31/3/2020 07:00	2.4	S
31/3/2020 08:00	2.3	S
31/3/2020 09:00	2.4	SE
31/3/2020 10:00	2.3	NW
31/3/2020 11:00	2.3	SW
31/3/2020 12:00	2.3	SE
31/3/2020 13:00	2.3	N
31/3/2020 14:00	2.3	E
31/3/2020 15:00	2.3	NE

Wind Data for
Hong Kong-Zhuhai-Macao Bridge
Hong Kong Boundary Crossing Facilities – Phase 2 and Other Works

Date	Wind Speed	Wind Direction
31/3/2020 16:00	2.3	N
31/3/2020 17:00	2.3	SE
31/3/2020 18:00	2.3	N
31/3/2020 19:00	2.3	E
31/3/2020 20:00	2.3	N
31/3/2020 21:00	2.3	NE
31/3/2020 22:00	2.4	N
31/3/2020 23:00	2.3	N
1/4/2020 00:00	2.3	NW

Appendix H

Event and Action Plan

Event / Action Plan for Air Quality

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

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
	LIMIT LEVEL			
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Notify IEC and Contractor; 2. Identify source, investigate the causes of exceedance and propose remedial measures; 3. Report the results of investigation to the IEC, ER and Contractor; 4. Discuss with the Contractor and formulate remedial measures; 5. Increase monitoring frequency to check mitigation effectiveness.	1. Review the analysed results submitted by the ET; 2. Review the proposed remedial measures by the Contractor and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose remedial measures for the analysed noise problem; 4. Ensure remedial measures are properly implemented	1. Submit noise mitigation proposals to IEC; 2. Implement noise mitigation proposals.
Limit Level	1. Inform IEC, ER, EPD and Contractor; 2. Identify source; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring.	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Require Contractor to propose 4. remedial 5. measures for the analysed noise problem; 6. Ensure remedial measures properly implemented; 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.	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Event / Action Plan for Dolphin Monitoring

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Action Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor; 5. Check monitoring data. 6. Review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and finding with the ET and the Contractor.	1. Discuss monitoring with the IEC and any other measures proposed by the ET; 2. If ER/SOR is satisfied with the proposal of any other measures, ER/SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the ER/SOR; 3. Implement the agreed measures.

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
Limit Level	1. Repeat statistical data analysis to confirm findings; 2. Review all available and relevant data, including raw data and statistical analysis results of other parameters covered in the EM&A, to ascertain if differences are as a result of natural variation or previously observed seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, ER/SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, ER/SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	1. Check monitoring data submitted by ET and Contractor; 2. Discuss monitoring results and findings with the ET and the Contractor; 3. Attend the meeting to discuss with ET, ER/SOR and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 4. Review proposals for additional monitoring and any other mitigation measures submitted by ET and Contractor and advise ER/SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise ER/SOR the results and findings accordingly.	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures. 2. If ER/SOR is satisfied with the proposals for additional dolphin monitoring and/or any other mitigation measures submitted by ET and Contractor and verified by IEC, ER/SOR to signify the agreement in writing on such proposals and any other mitigation measures 3. Supervise the implementation of additional monitoring and/or any other mitigation measures.	1. Inform the ER/SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and ER/SOR the necessity of additional dolphin monitoring and any other potential mitigation measures. 3. Jointly submit with ET to IEC a proposal of additional dolphin monitoring and/or any other mitigation measures when necessary. 4. Implement the agreed additional dolphin monitoring and/or any other mitigation measures.

Appendix I

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	93.1	Nil	93.1	Nil	Nil	Nil	0.335	Nil	Nil	2.23
2020 Mar	10306.75	Nil	9181.10	Nil	1125.65	Nil	Nil	Nil	Nil	8.05
2020 Apr										
2020 May										
2020 Jun										
2020 Jul										
2020 Aug										
2020 Sep										
2020 Oct										
2020 Nov										
2020 Dec										
Total	10399.85	0	9274.20	0	1125.65	0	0.335	0	0	10.280

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 J

Implementation Status of

Environment mitigation Measures (Construction Phase)

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
Air Quality				
S5.5.6.1	A1	1) The contractor shall follow the procedures and requirements given in the Air Pollution Control (Construction Dust) Regulation	All construction sites	Implemented
S5.5.6.2	A2	2) Proper watering of exposed spoil should be undertaken throughout the construction phase: •Any excavated or stockpile of dusty material should be covered entirely by impervious sheeting or sprayed with water to maintain the entire surface wet and then removed or backfilled or reinstated where practicable within 24 hours of the excavation or unloading; •Any dusty materials remaining after a stockpile is removed should be wetted with water and cleared from the surface of roads; •A stockpile of dusty material should not be extend beyond the pedestrian barriers, fencing or traffic cones. •The load of dusty materials on a vehicle leaving a construction site should be covered entirely by impervious sheeting to ensure that the dusty materials do not leak from the vehicle; •Where practicable, vehicle washing facilities with high pressure water jet should be provided at every discernible or designated vehicle exit point. The area where vehicle washing takes place and the road section between the washing facilities and the exit point should be paved with concrete, bituminous materials or hardcores;	All construction sites	Implemented
S5.5.6.2	A2	•When there are open excavation and reinstatement works, hoarding of not less than 2.4m high should be provided as far as practicable along the site boundary with provision for public crossing. Good site practice shall also be adopted by the Contractor to ensure the conditions of the hoardings are properly maintained throughout the construction period; •The portion of any road leading only to construction site that is within 30m of a vehicle entrance or exit should be kept clear of dusty materials, •Surfaces where any pneumatic or power-driven drilling, cutting, polishing or other mechanical breaking operation takes place should be sprayed with water or a dust suppression chemical continuously; •Any area that involves demolition activities should be sprayed with water or a dust suppression chemical immediately prior to, during and immediately after the activities so as to maintain the entire surface wet; •Where a scaffolding is erected around the perimeter of a building under construction, effective dust screens, sheeting or netting should be provided to enclose the scaffolding from the ground floor level of the building, or a canopy should be provided from the first floor level up to the highest level of the scaffolding; •Any skip hoist for material transport should be totally enclosed by impervious sheeting; •Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top	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
S5.5.6.2	A2	• Cement or dry PFA delivered in bulk should be stored in a closed silo fitted with an audible high level alarm which is interlocked with the material filling line and no overfilling is allowed; • Loading, unloading, transfer, handling or storage of bulk cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter or equivalent air pollution control system; and • Exposed earth should be properly treated by compaction, turfing, hydroseeding, vegetation planting or sealing with latex, vinyl, bitumen, shotcrete or other suitable surface stabiliser within six months after the last construction activity on the construction site r part of the construction site where the exposed earth lies	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	The following mitigation measures should be adopted to prevent fugitive dust emissions for concrete batching plant; •Loading, unloading, handling, transfer or storage of any dusty materials should be carried out in totally enclosed system; •All dust-laden air or waste gas generated by the process operations should be properly extracted and vented to fabric filtering system to meet the emission limits for TSP; •Vents for all silos and cement/pulverised fuel ash (PFA) weighing scale should be fitted with fabric filtering system; •The materials which may generate airborne dusty emissions should be wetted by water spray system; •All receiving hoppers should be enclosed on three sides up to 3m above unloading point; •All conveyor transfer points should be totally enclosed; •All access and route roads within the premises should be paved and wetted; and •Vehicle cleaning facilities should be provided and used by all concrete trucks before leaving the premises to wash off any dust on the wheels and/or body.	Selected representative dust monitoring station	Implemented
S5.5.2.7	A7	The following mitigation measures should be adopted to prevent fugitive dust emissions at barging point: • All road surface within the barging facilities will be paved; • Dust enclosures will be provided for the loading ramp; •Vehicles will be required to pass through designated wheels wash facilities; and • Continuous water spray at the loading points.	All construction sites	Implemented
Construction Noise (Air borne)				
S6.4.10	N1	1) Use of good site practices to limit noise emissions by considering the following: •only well-maintained plant should be operated on-site and plant should be serviced regularly during the construction programme; •machines and plant (such as trucks, cranes) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum; •plant known to emit noise strongly in one direction, where possible, be orientated so that the noise is directed away from nearby NSRs;	All construction sites	Implemented

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		•silencers or mufflers on construction equipment should be properly fitted and maintained during the construction works; •mobile plant should be sited as far away from NSRs as possible and practicable; •material stockpiles, mobile container site officer and other structures should be effectively utilised, where practicable, to screen noise from on-site construction activities.		
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
Waste Management (Construction Noise)				
S8.3.8	WM1	Construction and Demolition Material The following mitigation measures should be implemented in handling the waste: •Maintain temporary stockpiles and reuse excavated fill material for backfilling and reinstatement; •Carry out on-site sorting; •Make provisions in the Contract documents to allow and promote the use of recycled aggregates where appropriate; •Implement a trip-ticket system for each works contract to ensure that the disposal of C&D materials are properly documented and verified; and •Implement an enhanced Waste Management Plan similar to ETWBTC (Works) No. 19/2005 - "Environmental Management on Construction Sites" to encourage on-site sorting of C&D materials and to minimize their generation during the course of construction. •In addition, disposal of the C&D materials onto any sensitive locations such as agricultural lands, etc. should be avoided. The Contractor shall propose the final disposal sites to the Project Proponent and get its approval before implementation.	All construction sites	N/A
S8.3.9-S8.3.11	WM2	C&D Waste •Standard formwork or pre-fabrication should be used as far as practicable in order to minimise the arising of C&D materials. The use of more durable formwork or plastic facing for the construction works should be considered. Use of wooden hoardings should not be used, as in other projects. Metal hoarding should be used to enhance the possibility of recycling. The purchasing of construction materials will be carefully planned in order to avoid over ordering and wastage. •The Contractor should recycle as much of the C&D materials as possible on-site. Public fill and C&D waste should be segregated and stored in different containers or skips to enhance reuse or recycling of materials and their proper disposal. Where practicable,	All construction sites	Implemented

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	Chemical Waste •Chemical waste that is produced, as defined by Schedule 1 of the Waste Disposal (Chemical Waste) (General) Regulation, should be handled in accordance with the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. •Containers used for the storage of chemical wastes should be suitable for the substance they are holding, resistant to corrosion, maintained in a good condition, and securely closed; have a capacity of less than 450 liters unless the specification has been approved by the EPD; and display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the regulation. •The storage area for chemical wastes should be clearly labelled and used solely for the storage of chemical waste; enclosed on at least 3 sides; have an impermeable floor and bunding of sufficient capacity to accommodate 110% of the volume of the largest container or 20 % of the total volume of waste stored in that area, whichever is the greatest; have adequate ventilation; covered to prevent rainfall entering; and arranged so that incompatible materials are adequately separated. •Disposal of chemical waste should be via a licensed waste 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.	All construction sites	Implemented
S8.3.16	WM4	Sewage •Adequate numbers of portable toilets should be provided for the workers. The portable toilets should be maintained in a state which will not deter the workers from utilizing these portable toilets. Night soil should be collected by licensed collectors regularly.	All construction sites	Implemented

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
S8.3.17–S8.3.19	WM5	General Refuse •General refuse generated on-site should be stored in enclosed bins or compaction units separately from construction and chemical wastes. •A reputable waste collector should be employed by the Contractor to remove general refuse from the site, separately from construction and chemical wastes, on a daily basis to minimize odour, pest and litter impacts. Burning of refuse on construction sites is prohibited by law. •Aluminium cans are often recovered from the waste stream by individual collectors if they are segregated and made easily accessible. Separate labelled bins for their deposit should be provided if feasible. •Office wastes can be reduced through the recycling of paper if volumes are large enough to warrant collection. Participation in a local collection scheme should be considered by the Contractor. •Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including reduction, reuse and recycling of wastes.	All construction sites	Partially Implemented
Water Quality (Construction Phase)				
S9.11.1.7	W2	Land Works General construction activities on land should also be governed by standard good working practice. Specific measures to be written into the works contracts should include: •wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters; •sewage effluent and discharges from on-site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided; •storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks; •silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm; •temporary access roads should be surfaced with crushed stone or gravel; •rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities; •measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system; •open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms; •manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers; •discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system;	All land-based construction sites	Implemented

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		•all vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit; •wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain; •the section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel; •wastewater generated from concreting, plastering, Internal decoration, cleaning work and other similar activities, shall be screened to remove large objects; •vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal; •the contractors shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately; •waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance; •all fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank; and •surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.		
Ecology (Construction Phase)				
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 (Post-construction dolphin monitoring, covered by Contract No. HY/2012/08)
Landscape & Visual (Construction Phase)				
S14.3.3.3	LV2	Mitigate both Landscape and Visual Impacts G1. Grass-hydroseed bare soil surface and stock pile areas; G2. Add planting strip and automatic irrigation system if appropriate at some portions of bridge or footbridge to screen bridge and traffic. G3. 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. G4. Vegetation reinstatement and upgrading to disturbed areas;	All construction site areas	N/A

EIA Ref.	EM&A Log Ref.	Recommended Mitigation Measures	Location of the measures	Implementation Status
		G5. Maximizing new tree, shrub and other vegetation planting to compensate tree felled and vegetation removed; G6. Providing planting area around peripheral of HKBCF for tree planting screening effect; G7. Providing salt-tolerant native trees along the planter strip at affected seawall and newly reclaimed coastline; and 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.		
S14.3.3.3	LV3	Mitigate Visual Impacts V1. Minimize time for construction activities during construction period. V2. Provide screen hoarding at the portion of the project site/ works areas / storage areas near VSRs who have close low- level views to the Project during HKBCF construction.	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	1) An Environmental Team needs to be employed as per the EM&A Manual. 2) Prepare a systematic Environmental Management Plan to ensure effective implementation of the mitigation measures. 3) An environmental impact monitoring needs to be implementing by the Environmental Team to ensure all the requirements given in the EM&A Manual are fully complied with.	All construction sites	Implemented

Appendix K

Weather and Meteorological Conditions during Reporting Month

Station: Hong Kong Observatory

Date	Mean Pressure (hPa)	Air Temperature			Mean Relative Humidity (%)	Total Rainfall (mm)
		Maximum (deg. C)	Mean (deg. C)	Minimum (deg. C)		
March 2020						
1	1014.2	26.6	22.8	20.4	82	0
2	1017.6	21.8	20.1	18.8	84	Trace
3	1018.2	21.0	19.4	18.2	81	Trace
4	1018.0	21.5	19.9	18.2	84	3.1
5	1019.4	20.7	18.2	16.5	85	0.4
6	1017.5	19.8	18.3	17.2	80	Trace
7	1014.0	24.3	20.6	18.8	88	Trace
8	1010.7	23.6	22.1	20.9	92	Trace
9	1008.5	26.8	23.4	20.8	89	Trace
10	1013.3	26.7	23.4	20.7	67	Trace
11	1017.7	20.8	19.2	17.9	72	Trace
12	1015.7	20.2	19.2	18.0	89	Trace
13	1015.7	25.0	21.4	19.3	91	0
14	1017.6	25.9	21.6	19.8	78	0.4
15	1019.3	23.0	20.2	18.9	70	0
16	1019.7	22.8	20.3	18.5	75	0
17	1018.7	21.7	20.3	19.5	79	0
18	1015.8	21.6	20.5	19.7	86	10.7
19	1014.7	23.0	21.1	20.3	88	0.8
20	1015.4	23.0	21.2	20.5	87	0.4
21	1015.4	23.0	21.2	20.2	94	0.2
22	1014.0	28.5	24.2	21.6	84	0
23	1014.2	28.5	24.6	22.0	81	0
24	1015.3	26.6	22.8	21.0	82	Trace
25	1014.2	26.5	22.8	21.2	83	Trace
26	1013.5	26.3	23.3	22.0	90	1
27	1013.0	27.7	24.4	22.4	86	Trace
28	1013.3	25.9	22.8	19.8	91	9.8
29	1013.5	21.9	20.2	19.1	91	2.2
30	1012.2	21.4	20.4	19.7	95	6.5
31	1013.1	21.3	20.3	19.2	95	5.8

Remark: The corresponding weather station at Hong Kong International Airport were unavailable at the time of preparation of this report.
Source: Hong Kong Observatory

Appendix L

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
Total	0	0	0

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
Total	0	0	0

Appendix M

Summary of Site Audit in the Reporting Month

Summary of Site Audit in the Reporting Month

Parameters	Date	Observations and Recommendations	Follow-up
Air Quality	11 March 2020	Observation: Dust suppression measure should be provided at the main haul road. (SPTI)	14 March 2020
	25 March 2020	Reminder: Water spray should be provided at all main exit to prevent sludge from being taken outside the site area. (SPTI)	NA
Noise	NA		
Water Quality	NA		
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
Land Contamination	NA		
Landscape and Visual Impact	NA		
Permit / Licenses	NA		
Others	NA		

Appendix N

Outstanding Issues and Deficiencies

Summary of Outstanding Issues and Deficiencies in the Reporting Month

Parameters	Outstanding Issues	Deficiencies
Air Quality	NA	Any items of deficiencies can be referred to **Appendix M**.
Noise	NA	
Water Quality	NA	
Chemical and Waste Management	NA	
Land Contamination	NA	
Landscape and Visual Impact	NA	
Permit / Licenses	NA	
Others	NA	

Appendix O

Dolphin Monitoring Results

Remarks:

1. The relevant sections of dolphin monitoring report of Contract No. HY/2012/08 is extracted.
2. Introduction (Section 1) and Conclusion (Section 4) are not shown in this report.
3. The introduction part is introducing Contract No. HY/2012/08, it is not applicable for our contract.
4. Conclusions have been provided in this monthly report, so the conclusions from Contract No. HY/2012/08 was not applicable.

HKBCF project to avoid any redundancy in monitoring effort. However, such exemption for the dolphin monitoring has ended in September 2019 as the dolphin monitoring works carried out by HKLR03 and HKBCF contract have been completed. Therefore, starting in October 2019, TMCLKL08 contract will take 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 TM-CLKL Northern Connection Sub-sea Tunnel Section 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 TM-CLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas. During the construction period of TMCLKL, the dolphin specialist is responsible to utilize the collected monitoring data in order to examine any potential impacts of TM-CLKL construction works on the dolphins. From the monitoring results, any changes in dolphin occurrence within the study area will be examined for possible causes, and appropriate actions and additional mitigation measures will be recommended as necessary.

1.4. This report is the 77th monthly progress report under the TM-CLKL construction phase dolphin monitoring programme submitted to the Contractor, summarizing the results of the survey findings during the month of March 2020.

2. Monitoring Methodology

2.1. Vessel-based Line-transect Survey

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

Table 1 Co-ordinates of transect lines

Line No.		Easting	Northing		Line No.		Easting	Northing
1	Start Point	804671	815456		13	Start Point	816506	819480
1	End Point	804671	831404		13	End Point	816506	824859

2.1.3. 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 *Fuijnon* marine binoculars. Both observers searched the sea ahead of the vessel, between 270° and 90° (in relation to the bow, which is defined as 0°). One to two additional experienced observers were available on the boat to work in shift (i.e. rotate every 30 minutes) in order to minimize fatigue of the survey team members. All observers were experienced in small cetacean survey techniques and identifying local cetacean species.

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

2.1.5. Data including time, position and vessel speed were also automatically and continuously logged by handheld GPS throughout the entire survey for subsequent review.

2.1.6. When dolphins were sighted, the survey team would end the survey effort, and immediately record the initial sighting distance and angle of the dolphin group from the survey vessel, as well as the sighting time and position. Then the research vessel was diverted from its course to approach the animals for species identification, group size estimation, assessment of group composition, and behavioural observations. The perpendicular distance (PSD) of the dolphin group to the transect line was later calculated from the initial sighting distance and angle.

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

2.1.8. Encounter rates of Chinese white dolphins (number of on-effort sightings per 100 km of survey effort and number of dolphins from all on-effort sightings per 100 km of survey effort) were calculated in NEL and NWL survey areas in relation to the amount of survey

2	Start Point	805476	820800		14	Start Point	817537	820220
2	End Point	805476	826654		14	End Point	817537	824613
3	Start Point	806464	821150		15	Start Point	818568	820735
3	End Point	806464	822911		15	End Point	818568	824433
4	Start Point	807518	821500		16	Start Point	819532	821420
4	End Point	807518	829230		16	End Point	819532	824209
5	Start Point	808504	821850		17	Start Point	820451	822125
5	End Point	808504	828602		17	End Point	820451	823671
6	Start Point	809490	822150		18	Start Point	821504	822371
6	End Point	809490	825352		18	End Point	821504	823761
7	Start Point	810499	822000		19	Start Point	822513	823268
7	End Point	810499	824613		19	End Point	822513	824321
8	Start Point	811508	821123		20	Start Point	823477	823402
8	End Point	811508	824254		20	End Point	823477	824613
9	Start Point	812516	821303		21	Start Point	805476	827081
9	End Point	812516	824254		21	End Point	805476	830562
10	Start Point	813525	821176		22	Start Point	806464	824033
10	End Point	813525	824657		22	End Point	806464	829598
11	Start Point	814556	818853		23	Start Point	814559	821739
11	End Point	814556	820992		23	End Point	814559	824768
12	Start Point	815542	818807		24	Start Point	805476	815900
12	End Point	815542	824882		24	End Point	805476	819100

2.1.2. The survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2019). 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.

effort conducted during each month of monitoring survey. Only data collected under Beaufort 3 or below condition would be used for encounter rate analysis. Dolphin encounter rates were calculated using primary survey effort alone, as well as the combined survey effort from both primary and secondary lines.

2.2. Photo-identification Work

2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

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

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

2.2.4. Chinese White Dolphins can be identified by their natural markings, such as nicks, cuts, scars and deformities on their dorsal fin and body, and their unique spotting patterns were also used as secondary identifying features (Jefferson 2000).

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

3. Monitoring Results

3.1. Vessel-based Line-transect Survey

3.1.1. Two sets of systematic line-transect vessel surveys were conducted on the 3rd, 9th, 18th and 25th of March 2020, to cover all transect lines in NWL and NEL survey areas twice. The survey routes of each survey day are presented in Figures 2-5.

3.1.2. A total of 259.52 km of survey effort was collected, with 100% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) during the March's surveys (Appendix I).

3.1.3. Among the two areas, 98.10 km and 161.42 km of survey effort were collected from NEL and NWL survey areas respectively. The total survey effort conducted on primary and secondary lines were 189.64 km and 69.88 km respectively (Appendix I).

3.1.4. During the two sets of monitoring surveys conducted in March 2020, only a single Chinese White Dolphin was sighted in NWL, while no dolphin sighting was made in NEL (Appendix II). The lone dolphin sighting was made on primary line during on-effort search, and it was not associated with any operating fishing vessel (Appendix II).

3.1.5. Distribution of the single dolphin sighting made in March 2020 is shown in Figure 6. The dolphin was sighted to the west of the airport platform, which was located very far away from the TMCLKL alignment.

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

Table 2. Dolphin encounter rates deduced from the two sets of surveys (two surveys in each set) in March 2020 in Northeast (NEL) and Northwest Lantau (NWL)

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	**Primary Lines Only**
NEL	Set 1: March 3rd / 9th	0.0	0.0
	Set 2: March 18th / 25th	0.0	0.0
NWL	Set 1: March 3rd / 9th	1.7	1.7
	Set 2: March 18th / 25th	0.0	0.0

Table 3. Overall dolphin encounter rates (sightings per 100 km of survey effort) from all four surveys conducted in March 2020 on primary lines only as well as both primary lines and secondary lines in Northeast and Northwest Lantau

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	Primary Lines Only	**Both Primary and Secondary Lines**	**Primary Lines Only**	**Both Primary and Secondary Lines**
Northeast Lantau	0.0	0.0	0.0	0.0
Northwest Lantau	0.8	0.6	0.8	0.6

3.2. Photo-identification Work

3.2.1. The only individual sighted during the March's surveys was identified as WL232 (Appendices III and IV). The lone animal was not sighted with any young calf.

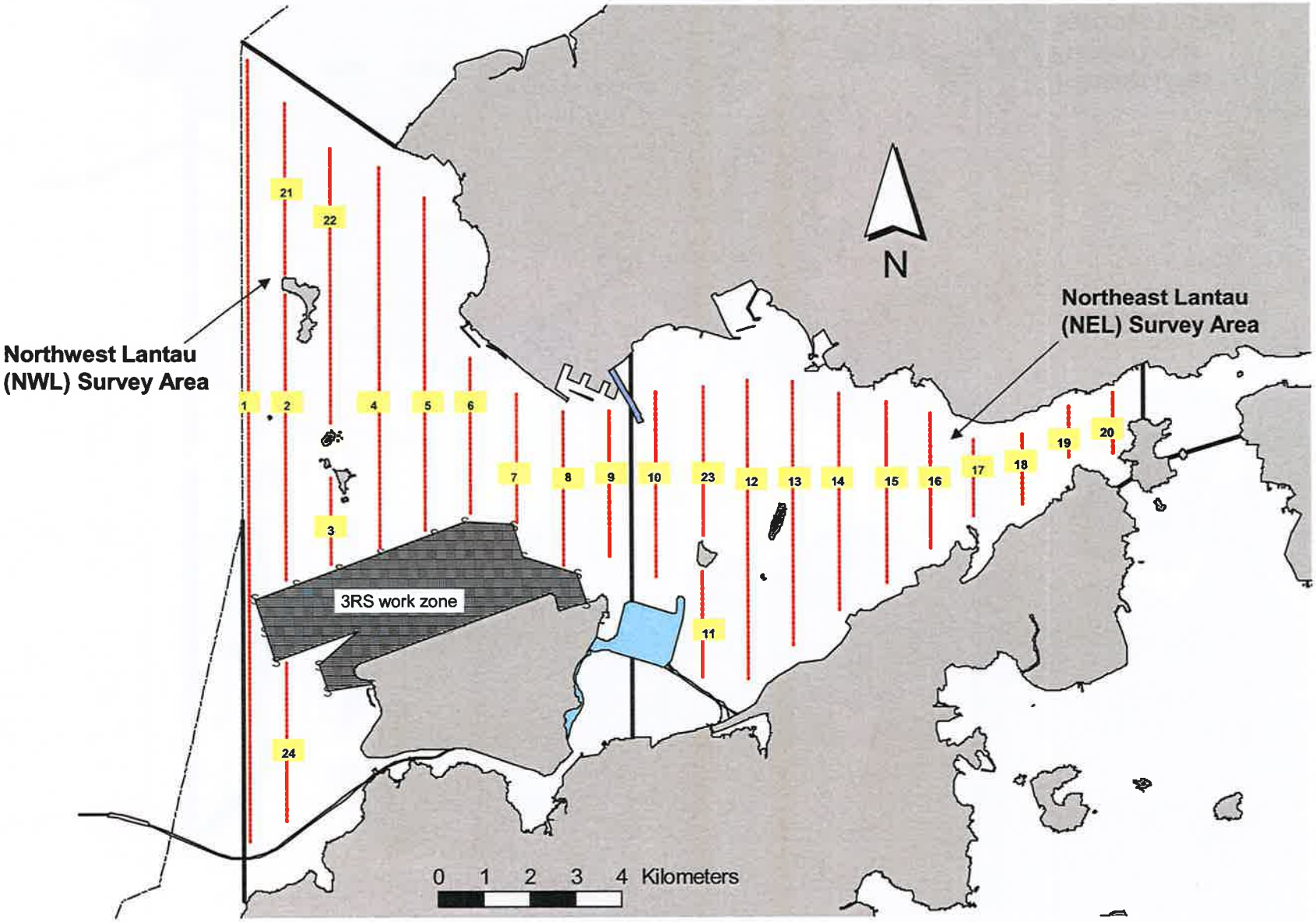


Figure 1. Transect Line Layout in Northwest and Northeast Lantau Survey Areas

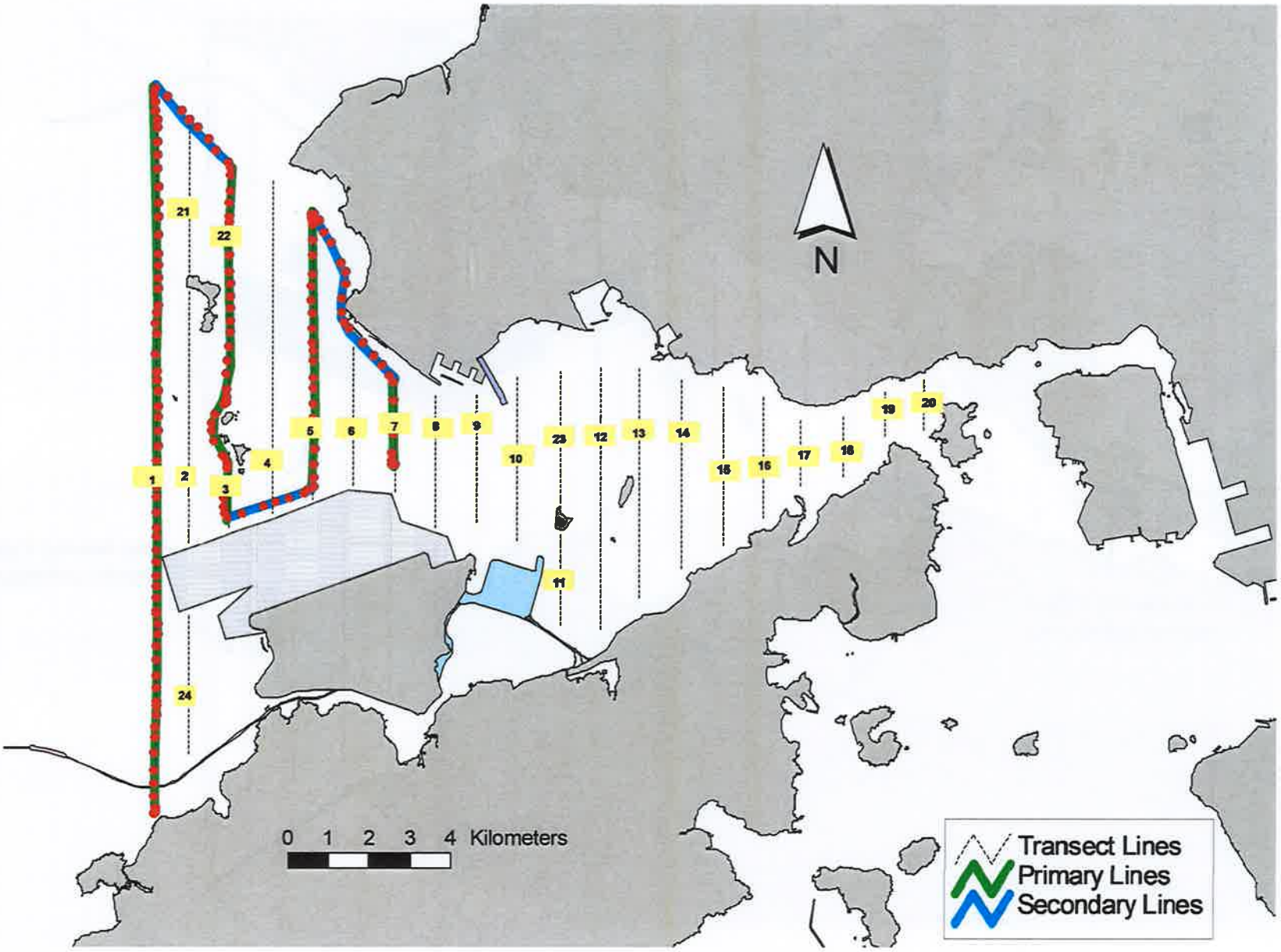


Figure 2. Survey Route on March 3rd, 2020

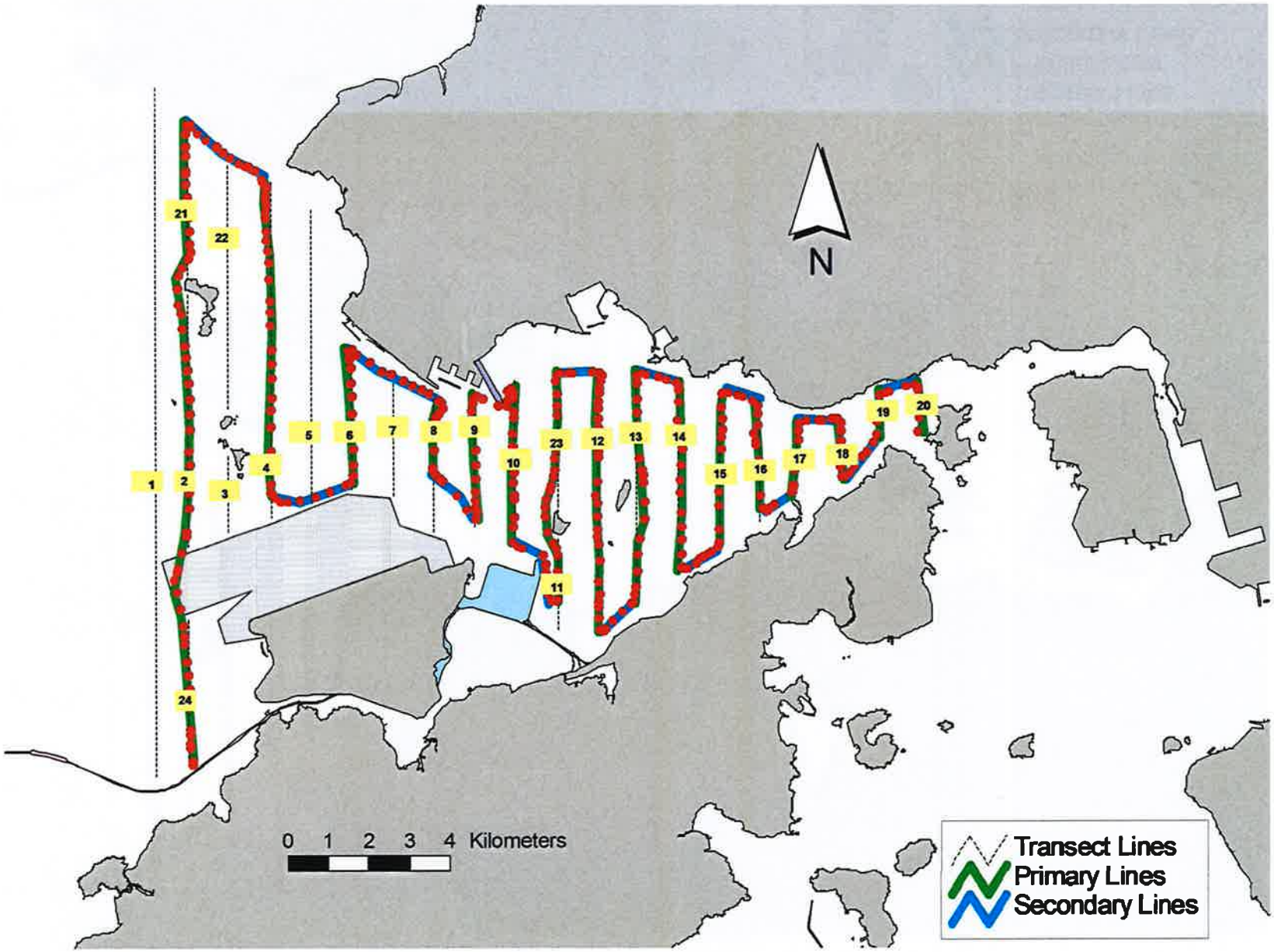


Figure 3. Survey Route on March 9th, 2020

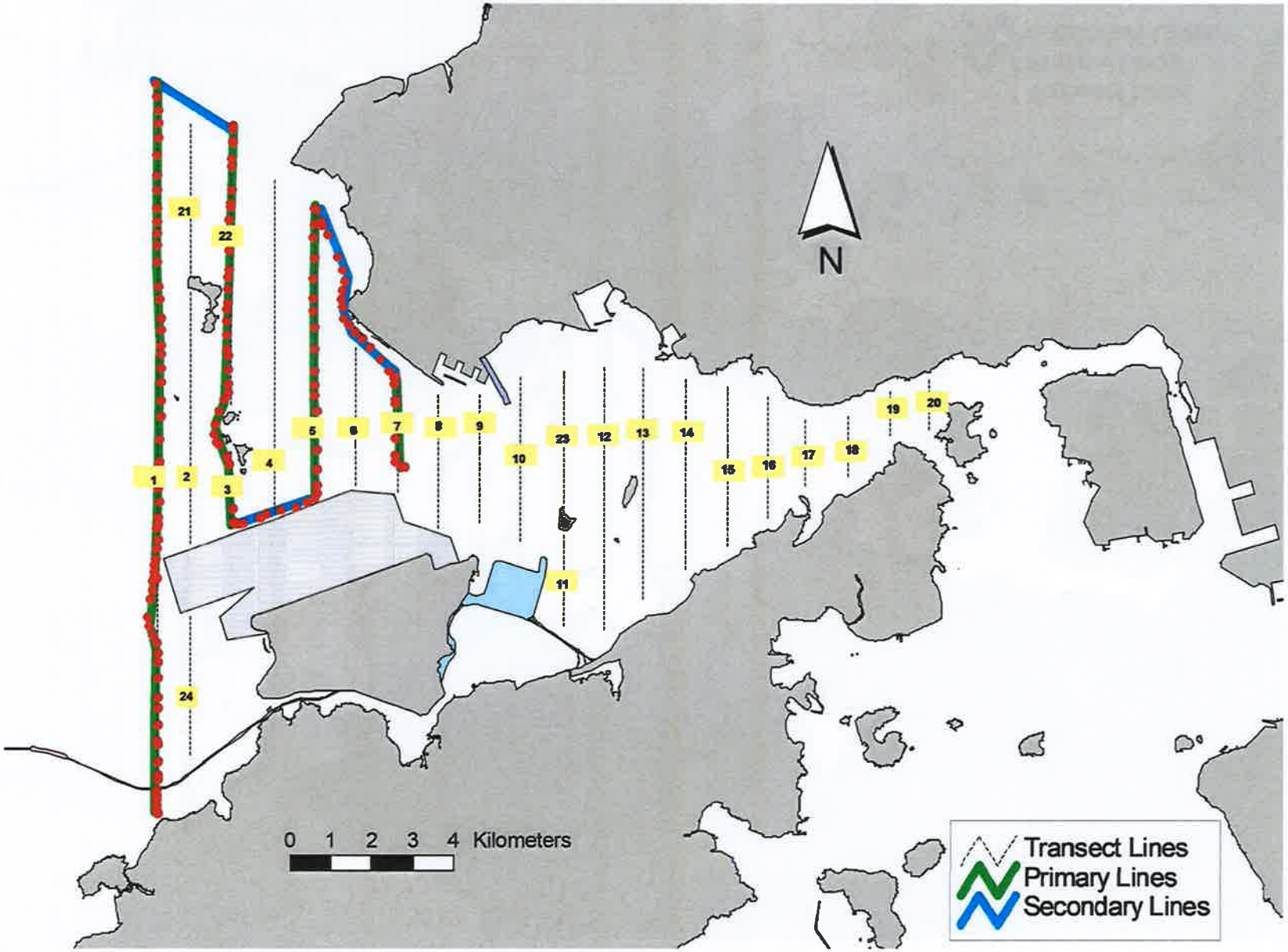


Figure 4. Survey Route on March 18th, 2020

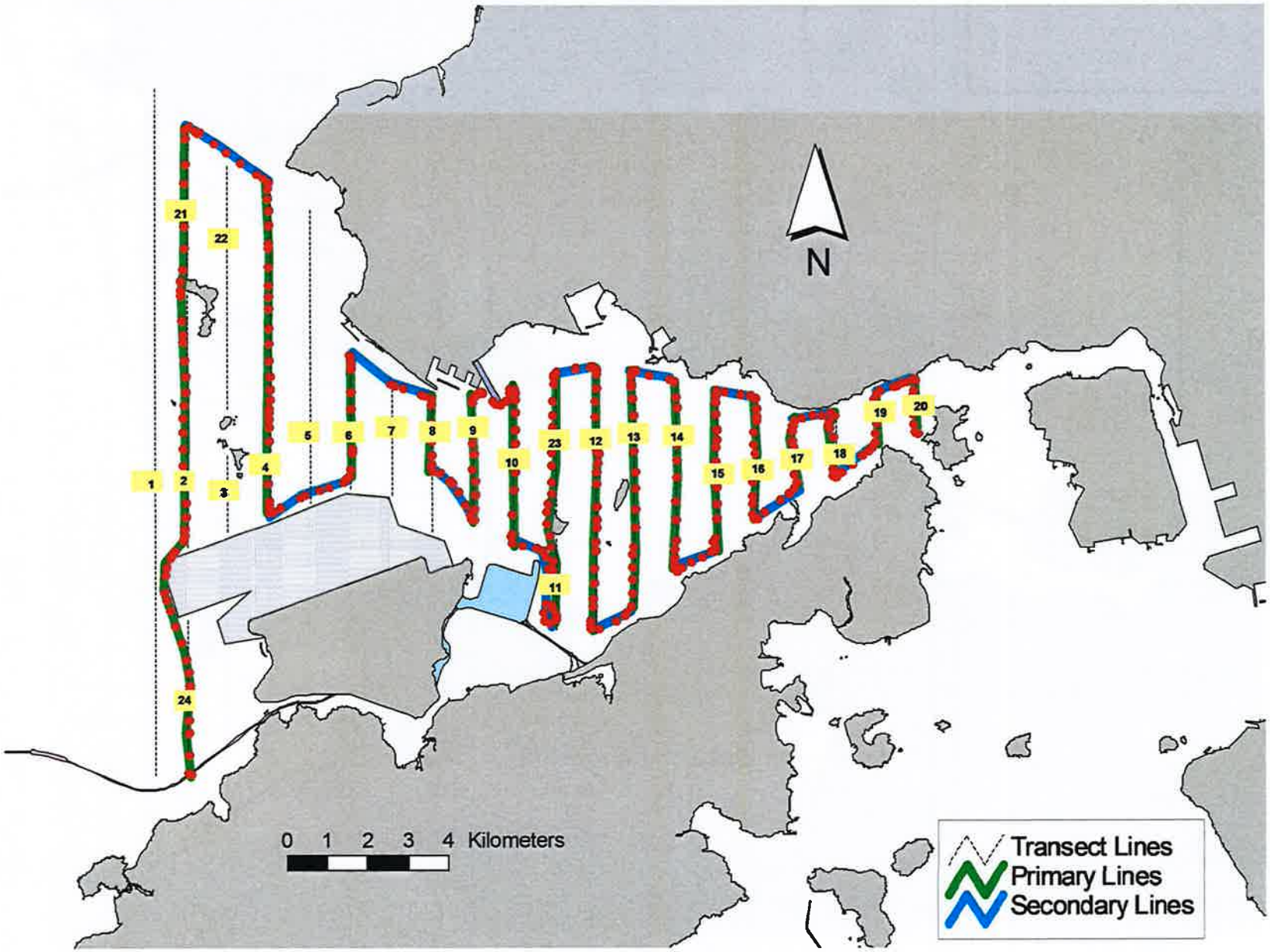


Figure 5. Survey Route on March 25th, 2020

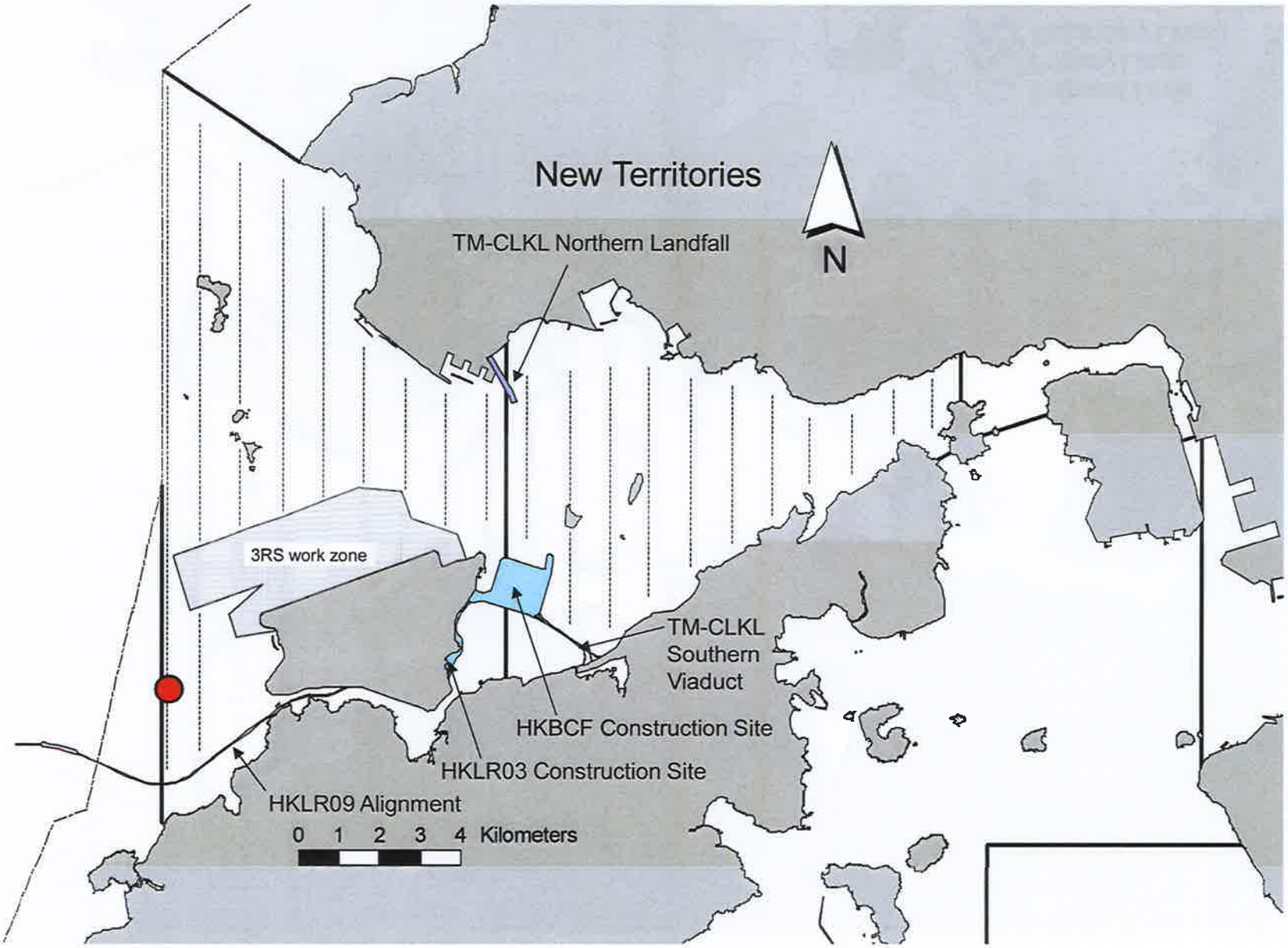


Figure 6. Distribution of Chinese White Dolphin Sightings during March 2020 Monitoring Surveys

Appendix I. TMCLKL Survey Effort Database (March 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

Appendix II. TMCLKL Chinese White Dolphin Sighting Database (March 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

Appendix III. Individual dolphins identified during TMCLKL monitoring surveys in (March 2020)

ID#	DATE	STG#	AREA
WL232	03/03/20	1	NW LANTAU

Appendix IV. Photographs of Identified Individual Dolphin in March 2020 (TMCLKL)