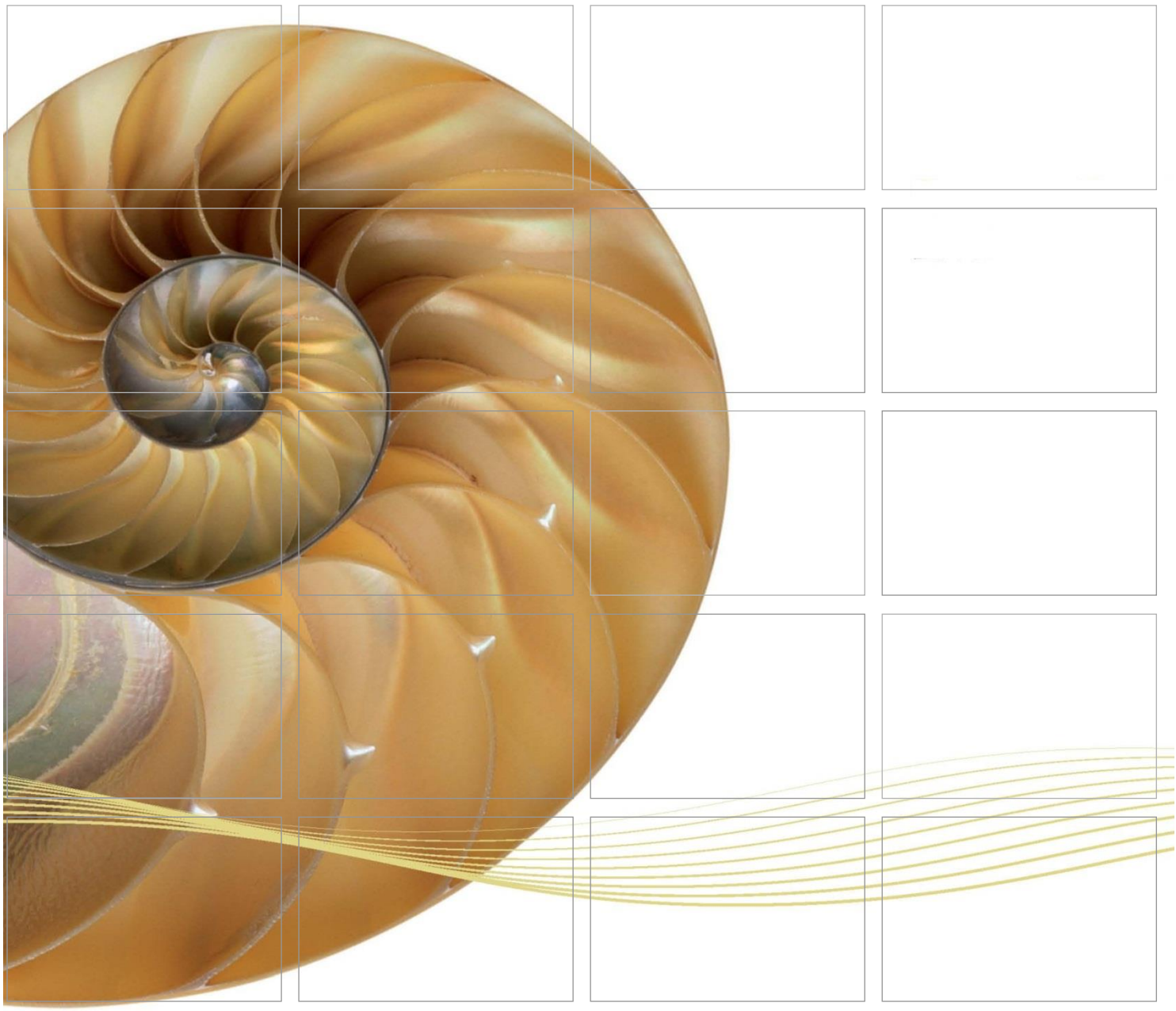
Report



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

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

09 June 2021

Environmental Resources Management
2509, 25/F
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Contract No. HY/2012/08
Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section

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

Document Code: 0212330_29th Quarterly EM&A_20210609.doc

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Client: DBJV	Project No: 0212330
Summary: This document presents the Twenty-ninth Quarterly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.	Date: 09 June 2021 Approved by: *Mr Craig Reid* *Partner* Certified by: *Dr Jasmine Ng* *ET Leader*

	29th Quarterly EM&A Report	VAR	JN	CAR	09/06/21
Revision	Description	By	Checked	Approved	Date

Distribution

☐ Internal

☒ Public

☐ Confidential

Ref.: HYDHZMBEEM00_0_8493L.21

22 June 2021

By Fax (2293 6300) and By Post

AECOM Asia Co. Ltd.
Supervising Officer Representative's Office
No.8 Mong Fat Street, Tuen Mun, New Territories, Hong Kong

Attention: Mr. Roger Man

Dear Mr. Man,

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/2012/08
TM-CLKL – Northern Connection Sub-sea Tunnel Section
29th Quarterly EM&A Summary Report for December 2020 to February 2021

Reference is made to the ET's submission of 29th Quarterly EM&A Summary Report for December 2020 to February 2021 (ET's ref.: "*0212330_29th Quarterly EM&A_20210609.doc*" dated 9 June 2021) certified by the ET Leader.

Please be informed that we have no adverse comments on the captioned Report.

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

Yours sincerely,

Brian Tam
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c.

HyD	Mr. Patrick Ng	(By Fax: 3188 6614)
HyD	Mr. Francis Chan	(By Fax: 3188 6614)
AECOM	Mr. Conrad Ng	(By Fax: 3922 9797)
ERM	Dr. Jasmine Ng	(By Fax: 2723 5660)
DBJV	Mr. Bryan Lee	(By Fax: 2293 7499)

Internal: DY, YH, ENPO Site

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

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in 2021. The impact monitoring of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

This is the Twenty-ninth Quarterly EM&A report presenting the EM&A works carried out during the period from 1 December 2020 to 28 February 2021 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the "Contract") in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, the major activities in the reporting quarter included:

Land-based Works

- Installation of green roof system & chain fence - South Ventilation Building;
- Defect works for reinstatement at Box culvert – Northern Landfall; and
- Demolition works and backfilling works of CLP substation.

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

24-hour TSP Monitoring	16 sessions
1-hour TSP Monitoring	16 sessions
Operational Phase Water Quality Monitoring	3 sessions
Operational Phase Dolphin Monitoring	6 sessions
Joint Environmental Site Inspection	12 sessions

Implementation of Marine Mammal Exclusion Zone

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

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

Three (3) Action Level exceedances of 1-hour TSP were recorded in this reporting period. No Action and Limit Level exceedance of 24-hour TSP monitoring was recorded. Investigation reports are provided in *Appendix J*.

Dolphin Monitoring

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2020 and February 2021.

Environmental Complaints, Non-compliance & Summons

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

Reporting Change

There was no reporting change in the reporting period.

Upcoming Works for the Next Reporting Period

As informed by the Contractor, there was no major activities undertaken in the coming quarterly period.

Future Key Issues

Potential environmental impacts in the coming quarterly period are expected to be mainly associated with waste management issues.

1 INTRODUCTION

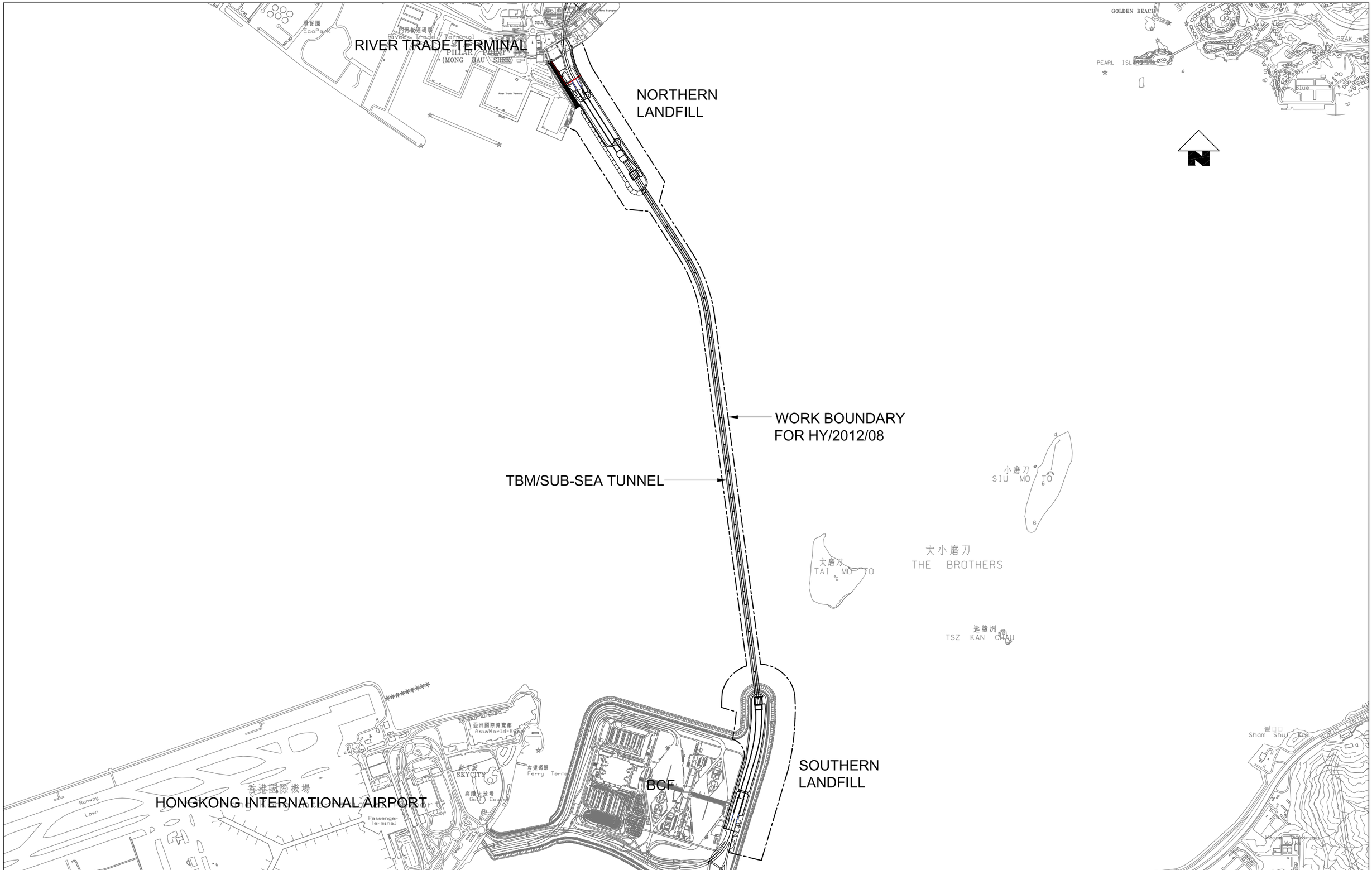
1.1 BACKGROUND

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

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

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

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



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				Drawn By	DAI
				Approved By	SPo PP
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Rev.	Description	Date	Checked		

Main Contractor

香寶嘉 Dragages HongKong

A member of the Bouygues Construction group

BOUYGUES TRAVAUX PUBLICS

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

路政署 HIGHWAYS DEPARTMENT

Contractor's Designer

ARUP Ove Arup & Partners Hong Kong Limited

Project

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

Drawing Title

Figure 1.1

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

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed in 2021. The impact monitoring phase of the EM&A programme, including air quality, water quality, marine ecological monitoring and environmental site inspections, were commenced on 1 November 2013.

1.2 SCOPE OF REPORT

This is the Twenty-ninth Quarterly EM&A Report under the *Contract No. HY/2012/08 Tuen Mun – Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section*. This report presents a summary of the environmental monitoring and audit works from 1 December 2020 to 28 February 2021.

1.3 ORGANIZATION STRUCTURE

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

Table 1.1 Contact Information of Key Personnel

Party	Position	Name	Telephone	Fax
Highways Department	Engr 24/SD	Ken T.M. Cheng	2762 4062	3188 6614
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Roger Man	2293 6388	2293 6300
ENPO / IEC (Ramboll Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Manson Yeung	9700 6767	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Deputy Environmental Manager	Bryan Lee	2293 7323	2293 7499
	24-hour hotline		2293 7330	
ET (ERM-HK)	ET Leader	Jasmine Ng	2271 3311	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

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

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

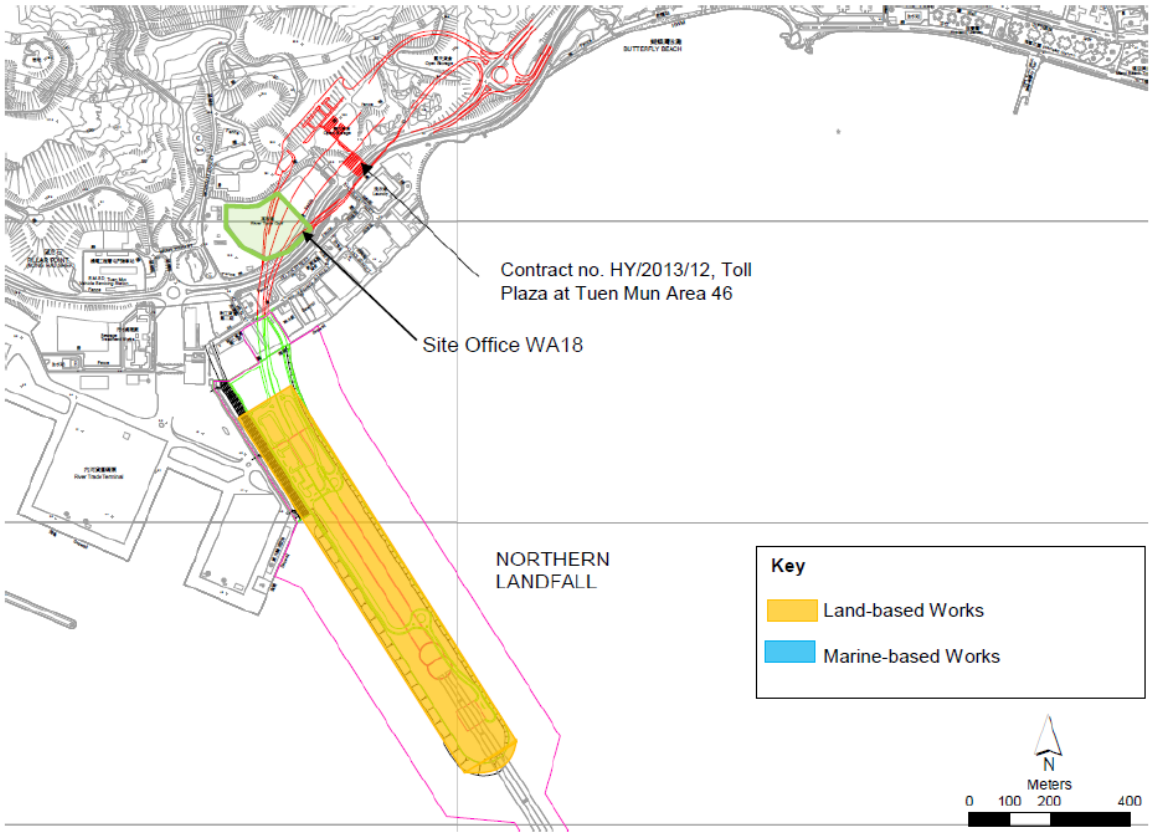
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Contract are shown in *Figure 1.3*.

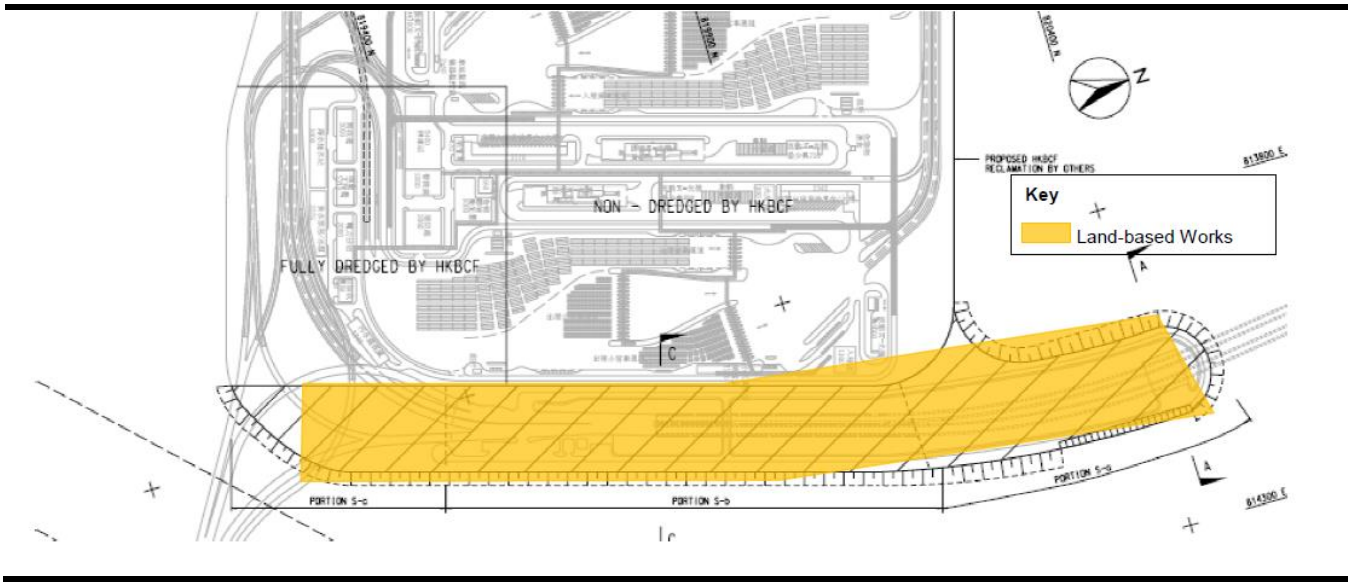
The implementation schedule of environmental mitigation measures is presented in *Appendix C*.

Table 1.2 Summary of Construction Activities Undertaken during the Reporting Period

Construction Activities Undertaken
Land-based Works
• Installation of green roof system & chain fence - South Ventilation Building; • Defect works for reinstatement at Box culvert – Northern Landfall; and • Demolition works and backfilling works of CLP substation.

Figure 1.2 Locations of Construction Activities – December 2020 to February 2021




NON - DREDGED BY HKBCF
FULLY DREDGED BY HKBCF
PROPOSED HKBCF RECLAMATION BY OTHERS
Key
Land-based Works
PORTION S-c
PORTION S-b
PORTION S-a

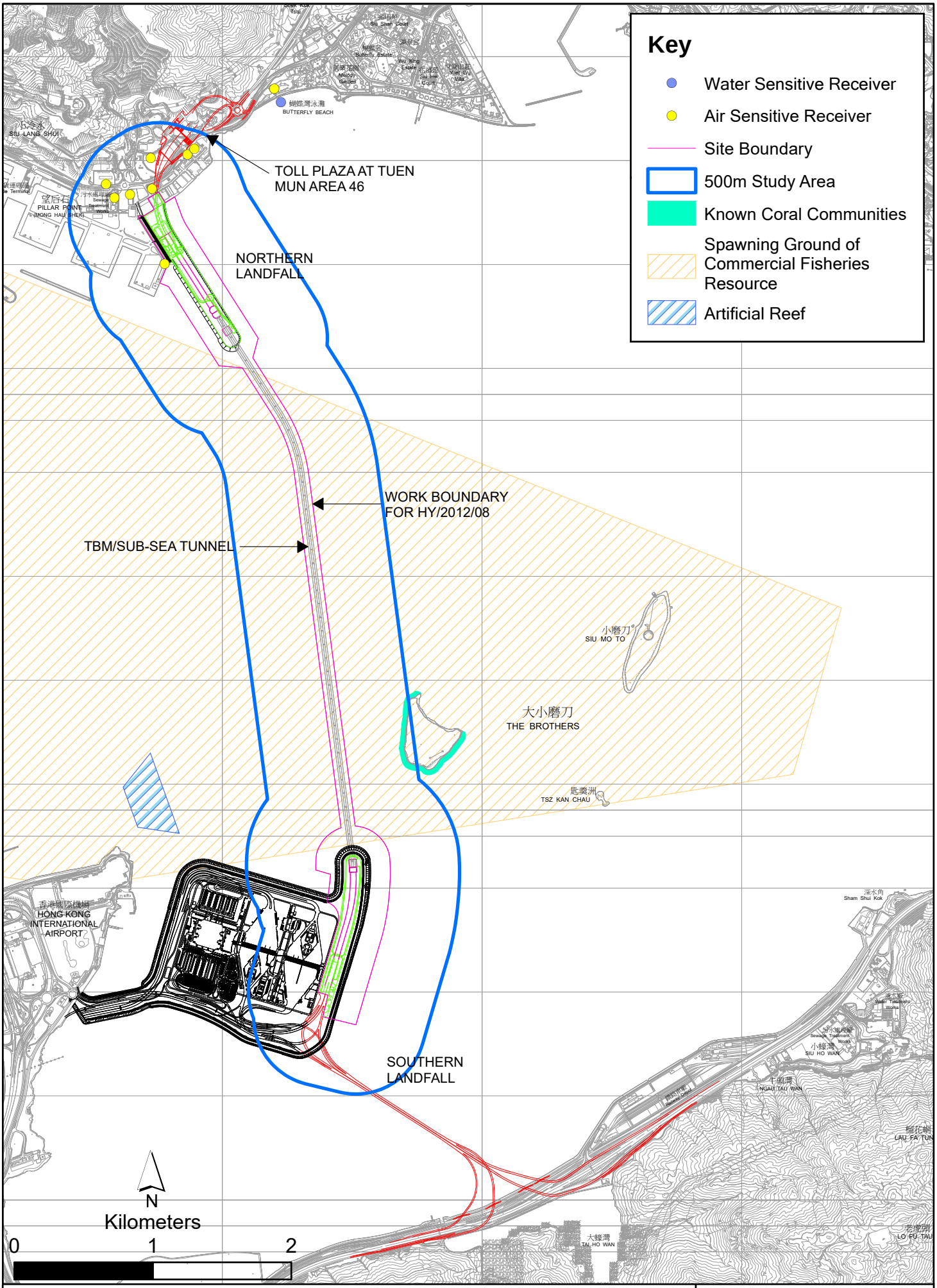


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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Date: 15/4/2014

Environmental Resources Management

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

2.1 AIR QUALITY

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

2.1.1 Monitoring Requirements and Equipment

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

Excavation works for launching shaft were completed and notification of change on air quality monitoring frequency was submitted to EPD on 14 September 2020. 1-hr and 24-hr TSP monitoring frequency was changed to three times per day every six days and daily every six days, respectively, since 14 September 2020.

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

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

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	4, 10, 16, 22 and 28 December 2020	Tuen Mun Fireboat Station	Office	TSP monitoring • 1-hour Total Suspended Particulates (1-hour TSP,

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

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR5	2, 8, 14, 20 and 26 January 2021	Pillar Point Fire Station	Office	µg/m³), 3 times in every 6 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 6 days Enhanced TSP monitoring (commenced on 24 October 2014) • 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 3 days
AQMS1	1, 5, 10, 16, 22 and 27 February 2021	Previous River Trade Golf	Bare ground	
ASR6		Butterfly Beach Laundry	Office	
ASR10		Butterfly Beach Park	Recreational uses	

Table 2.2 Air Quality Monitoring Equipment

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

2.1.2 Action & Limit Levels

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

2.1.3 Monitoring Schedule for the Reporting Quarter

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

2.1.4 Results and Observations

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

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

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

Month/Year	Station	Average (µg/m³)	Range (µg/m³)	Action Level (µg/m³)	Limit Level (µg/m³)
December	ASR 1	130	78 - 237	331	500
2020 to	ASR 5	165	85 - 472	340	500
February 2021	AQMS1	119	48 - 240	335	500

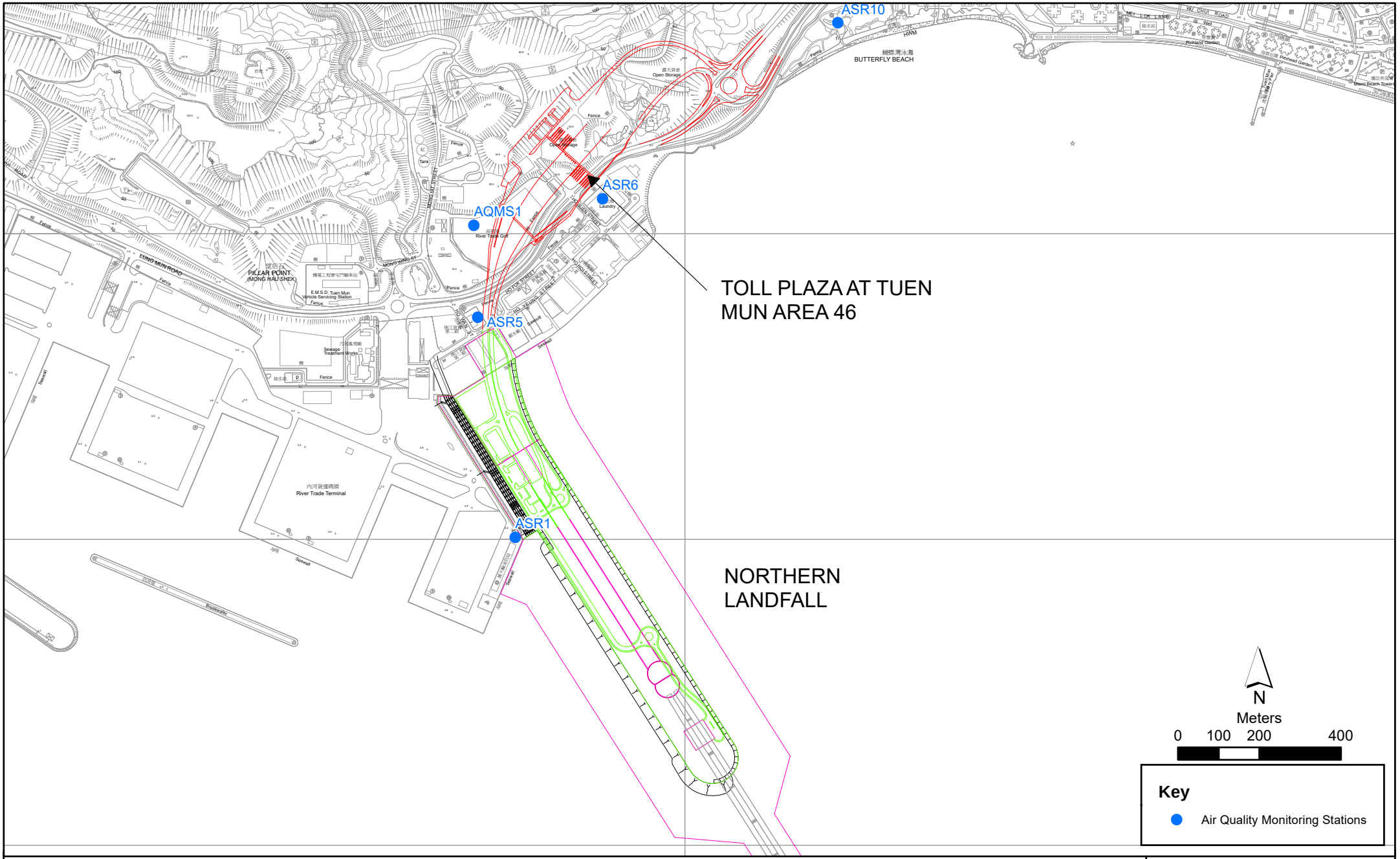

Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

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Date: 21/2/2014

Environmental Resources Management

ERM

Month/Year	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
	ASR6	154	61 - 261	338	500
	ASR10	97	39 - 246	337	500

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

Month/Year	Station	Average (μg/m³)	Range (μg/m³)	Action Level (μg/m³)	Limit Level (μg/m³)
December	ASR 1	103	47 - 147	213	260
2020 to	ASR 5	99	47 - 166	238	260
February 2021	AQMS1	79	37 - 130	213	260
	ASR6	108	62 - 167	238	260
	ASR10	72	46 - 121	214	260

Three (3) Action Level exceedances of 1-hour TSP were recorded in this reporting period. No Action and Limit Level exceedance of 24-hour TSP monitoring was recorded. Investigation reports are provided in Appendix J. Summary of Exceedances for Air Quality Impact Monitoring in this Reporting Quarter is detailed in *Table 2.15*.

2.2 WATER QUALITY MONITORING

2.2.1 Monitoring Requirements & Equipment

According to the Updated EM&A Manual, an operational phase water quality monitoring shall be performed monthly during the first year of Project operation at all designated monitoring stations including control stations. The operation phase water quality monitoring shall be ceased after the first year of operation of the Project subject to the first year review. Operational phase water quality monitoring commenced in June 2020. Locations of water quality monitoring stations presented in *Figure 2.2* and in *Table 2.5*.

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

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
		Easting	Northing			
IS(Mf)11	Impact Station (Close to HKBCF construction site)	813562	820716	• Temperature(°C) • pH(pH unit) • Turbidity (NTU) • Water depth (m) • Salinity (ppt)	3 water depths: 1m below sea surface, mid-depth and 1m above sea bed.	Monthly at each station, at mid-flood and mid-ebb tides during the construction period of the Contract.
SR4(N2)	Sensitive receiver (Tai Ho Inlet)	814688	817996	• DO (mg/L and % of saturation)		
CS2(A)	Control Station	805232	818606	• SS (mg/L)		

Station ID	Type	Coordinates		*Parameters, unit	Depth	Frequency
CS(Mf)5	Control Station	817990	821129		If the water depth is less than 3m, mid-depth sampling only. If water depth less than 6m, mid-depth may be omitted.	

*Notes:
In addition to the parameters presented monitoring location/position, time, water depth, sampling depth, tidal stages, weather conditions and any special phenomena or works underway nearby were also recorded.

With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR3 was relocated to SR3(N) since 1 September 2017.
With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR4 was relocated to SR4(N) since 1 January 2018.
With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station SR4(N) was relocated to SR4(N2) since 21 August 2019.
With reference to the EM&A Report under Contract No. HY/2011/03, water quality monitoring station CS2 was relocated to CS2(A) since 23 August 2017.

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

Table 2.6 Water Quality Monitoring Equipment

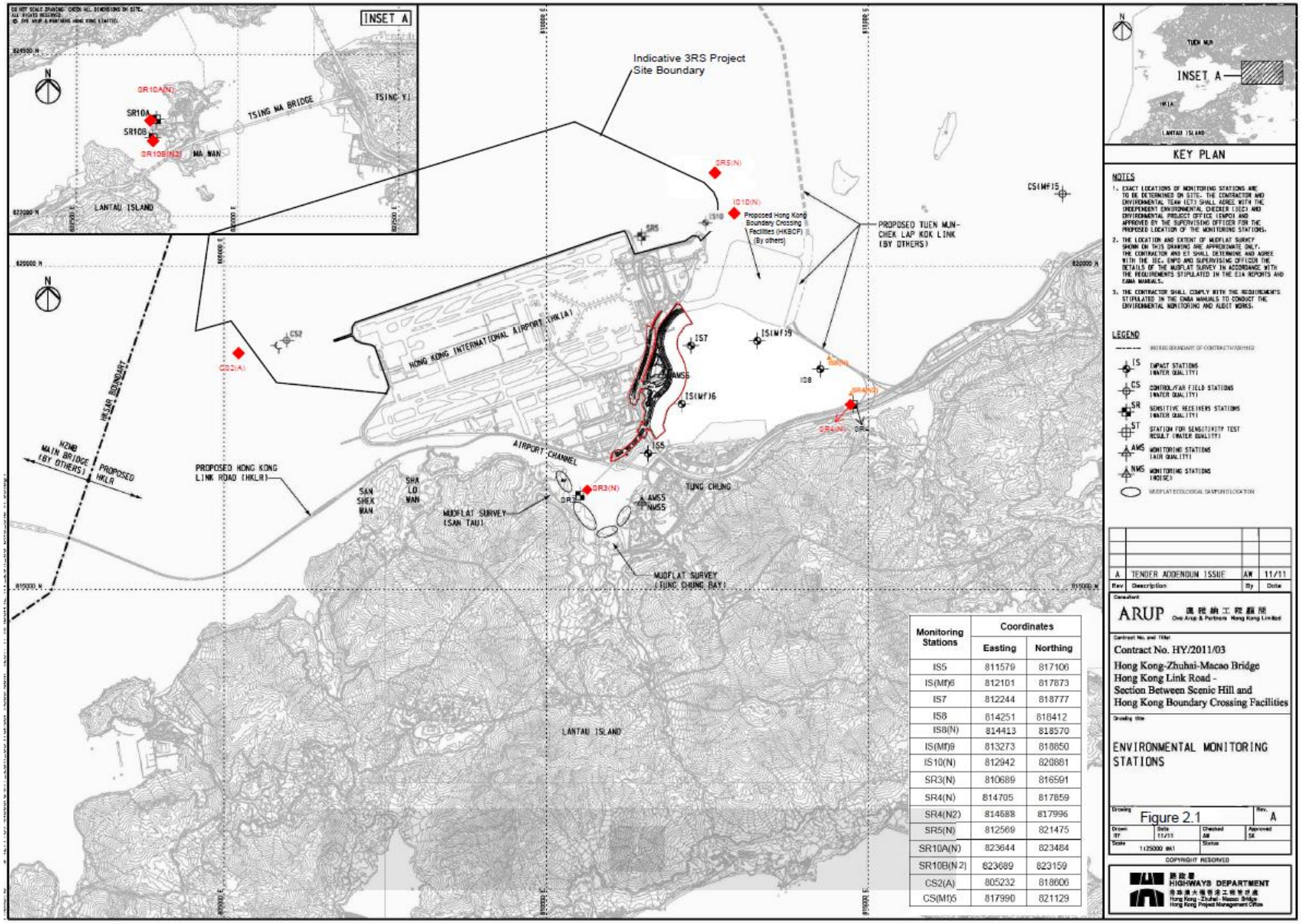
Equipment	Model
Multi-Parameters	YSI ProDss 17H105557; YSI 6920V2 0001C6A7; YSI ProDss 15M100005; YSI ProDss 16H104234 YSI ProDss 18A104824
Positioning Equipment	Furuno GP-170
Water Depth Detector	Lowrance Mark 5x / Garmin Striker 4

2.2.2 Monitoring Schedule for the Reporting Period

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

2.2.3 Results and Observations

In total of 3 monitoring events for operational phase water quality monitoring were conducted at all designated monitoring stations in the reporting period. Results and graphical presentations of impact water quality monitoring are presented in *Appendix G.* Detailed operational phase water quality monitoring results were reported in the *Eighty-sixth* to *Eighty-eighth Monthly EM&A Reports*.



Monitoring Stations	Coordinates	
	Easting	Northing
IS5	811579	817106
IS(Mf)6	812101	817873
IS7	812244	818777
IS8	814251	818412
IS8(N)	814413	818570
IS(Mf)9	813273	818850
IS10(N)	812942	820881
SR3(N)	810689	816591
SR4(N)	814705	817859
SR4(N2)	814588	817996
SR5(N)	812569	821475
SR10A(N)	823644	823484
SR10B(N2)	823689	823159
CS2(A)	805232	818606
CS(Mf)5	817990	821129

Figure 2.2

Operational Phase Water Quality Monitoring Stations SR3(N), CS2(A), SR4(N2) & CS(Mf)5

(Source from Contract No. HY/2011/03 EM&A Report)

2.3 DOLPHIN MONITORING

2.3.1 Monitoring Requirements

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

2.3.2 Monitoring Equipment

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

Table 2.7 Dolphin Monitoring Equipment

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

2.3.3 Monitoring Parameter, Frequencies & Duration

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

2.3.4 Monitoring Location

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

Table 2.8 Operational Phase Dolphin Monitoring Line Transect Co-ordinates

Line No.		Easting	Northing	Line No.		Easting	Northing
1	Start Point	804671	815456	13	Start Point	816506	819480
1	End Point	804671	831404	13	End Point	816506	824859
2	Start Point	805476	820800*	14	Start Point	817537	820220

Line No.		Easting	Northing	Line No.		Easting	Northing
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*

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

2.3.5 *Action & Limit Levels*

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

2.3.6 *Monitoring Schedule for the Reporting Period*

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

2.3.7 *Results & Observations*

A total of 777.67 km of survey effort was conducted, with 98.3% of the total survey effort being conducted under favourable weather conditions (ie Beaufort Sea State 3 or below with good visibility) in this reporting quarter. Amongst the two areas, 290.80 km and 486.87 km of survey effort were

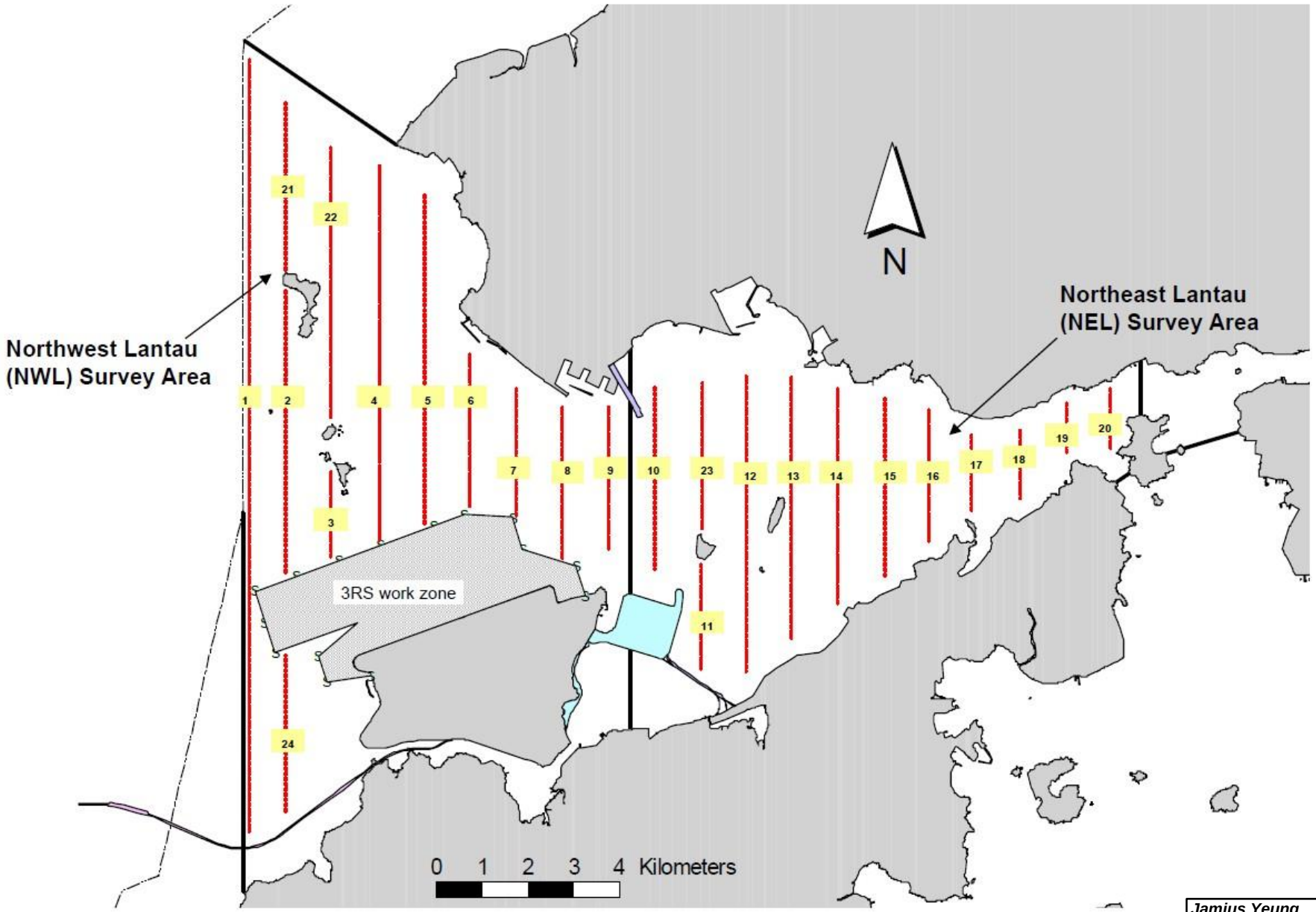


Figure 2.3

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

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Figure 2.3

Environmental Resources Management

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conducted from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 579.21 km and 198.46 km, respectively. The survey efforts are summarized in *Appendix H*.

A total of 14 groups of 40 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All dolphin sightings were made during on-effort search and 11 of the dolphin groups were made on primary lines. During this reporting quarter, all dolphin groups were sighted in NWL, while no dolphin was sighted in NEL.

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

Table 2.9 Individual Survey Event Encounter Rates

		Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	**Primary Lines Only**
NEL	Set 1 (1 & 3 Dec 2020)	0.00	0.00
	Set 2 (8 & 10 Dec 2020)	0.00	0.00
	Set 3 (25 & 26 Jan 2021)	0.00	0.00
	Set 4 (27 & 28 Jan 2021)	0.00	0.00
	Set 5 (2 & 8 Feb 2021)	0.00	0.00
	Set 6 (18 & 23 Feb 2021)	0.00	0.00
NWL	Set 1 (1 & 3 Dec 2020)	0.00	0.00
	Set 2 (8 & 10 Dec 2020)	0.00	0.00
	Set 3 (25 & 26 Jan 2021)	6.50	19.51
	Set 4 (27 & 28 Jan 2021)	5.08	11.86
	Set 5 (2 & 8 Feb 2021)	4.87	17.84
	Set 6 (18 & 23 Feb 2021)	1.62	1.62

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

Table 2.10 Quarterly Average Encounter Rates

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		**Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)**	
	December 2020 – February 2021	**September – November 2011**	**December 2020 – February 2021**	**September – November 2011**

Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	3.01 ± 2.83	9.85 ± 5.85	8.47 ± 9.07	44.66 ± 29.85

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

Group size of Chinese White Dolphins were singletons in North Lantau region during December 2020 to February 2021. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in *Table 2.11*.

Table 2.11 Average Dolphin Group Size

	Average Dolphin Group Size	
	December 2020 – February 2021	**September – November 2011**
Overall	2.86 ± 2.45 (n = 14)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.86 ± 2.45 (n = 14)	3.92 ± 3.40 (n = 49)

One limit level exceedance was observed for the quarterly dolphin monitoring data between December 2020 to February 2021.

2.3.8 Implementation of Marine Mammal Exclusion Zone

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

2.4 EM&A SITE INSPECTION

Site inspections were carried out on a weekly basis to monitor the implementation of proper environmental pollution control and mitigation measures under the Contract. Twelve (12) site inspections were carried out in the reporting quarter on 9, 16, 23 and 28 December 2020; 6, 14, 20 and 27 January 2021 and 3, 10, 17 and 24 February 2021.

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

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

Inspection Date	**Environmental Observations**	**Recommendations/ Remarks**
9 December 2020	Northern Landfall (CLP Substation) • Nil.	Northern Landfall (CLP Substation) • Nil.

Inspection Date	Environmental Observations	Recommendations/ Remarks
16 December 2020	South Ventilation Building carpark (southern landfall) • NRMM label on the generator was faded. • Chemical containers were observed not placed in drip tray. • Over 20 bags of cement bag were observed without proper cover.	South Ventilation Building carpark (southern landfall) • The Contractor was reminded to replace the NRMM label on the generator. • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to cover the cement bag with tarpaulin sheet to avoid windblown dust.
23 December 2020	Storage area (Northern landfall) • Chemical containers were observed not placed in drip tray.	Storage area (Northern landfall) • The Contractor was reminded to place chemical containers in drip tray.
28 December 2020	CLP Substation • Chemical container was observed not placed in the drip tray. Northern Landfall (Zone C) • Chemical containers were observed not placed in drip tray.	CLP Substation • The Contractor was reminded to place chemical container in drip tray. Northern Landfall (Zone C) • The Contractor was reminded to place chemical container in drip tray.
6 January 2021	Northern Landfall (Storage Area) • Chemical containers were observed not placed in drip tray.	Northern Landfall (Storage Area) • The Contractor was reminded to place chemical containers in drip tray.
14 January 2021	Northern Landfall (Storage Area) • Chemical containers were observed not placed in drip tray. CLP Substation • Chemical containers were observed not placed in drip tray.	Northern Landfall (Storage Area) • The Contractor was reminded to place chemical containers in drip tray. CLP Substation • The Contractor was reminded to place chemical containers in drip tray.
20 January 2021	Storage area (Northern landfall) • Chemical containers were observed not placed in drip tray. • Dust was observed on public road.	Storage area (Northern landfall) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to water the wheels of the vehicles before leaving the construction site.
27 January 2021	Northern Landfall (Storage Area) • Chemical containers were observed not placed in drip tray. • A faded NRMM label was observed on site.	Northern Landfall (Storage Area) • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to replace the NRMM label.
3 February 2021	CLP Substation • Empty chemical containers were not disposed properly.	CLP Substation • The Contractor was reminded to dispose chemical containers properly.
10 February 2021	CLP Substation • Chemicals were not placed in drip tray. Northern Landfall (N6) • Oil leakage was observed on site. Northern Landfall (Storage Area) • Chemicals were not placed in drip tray. • Bags of cement were not covered properly.	CLP Substation • The Contractor was reminded to place the chemicals in drip tray. Northern Landfall (N6) • The Contractor was reminded to clean the oil and prevent oil leakage. Northern Landfall (Storage Area) • The Contractor was reminded to place the chemicals in drip tray. • The Contractor was reminded to cover the cements properly.
17 February 2021	Northern Landfall (N6 and Zone C) • Chemical containers were observed not placed in drip tray.	Northern Landfall (N6 and Zone C) • The Contractor was reminded to place chemical containers in drip tray.

Inspection Date	Environmental Observations	Recommendations/ Remarks
24 February 2021	CLP Substation • Chemicals were not placed in drip tray. Northern Landfall (Storage Area) • Chemicals were not placed in drip tray.	CLP Substation • The Contractor was reminded to place the chemicals in drip tray. Northern Landfall (Storage Area) • The Contractor was reminded to place the chemicals in drip tray.

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

2.5 *WASTE MANAGEMENT STATUS*

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

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

Table 2.13 Quantities of Different Waste Generated in the Reporting Period

Month/Year	Inert Construction Waste [(a)] (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste [(b)] (tonnes)	Recyclable Materials [(c)] (kg)	Chemical Wastes (kg)	Marine Sediment (m^3)		
						Category L	Category M (M_p & M_f)	Mixed (L+M)
December 2020	554	0	173	0	0	0	0	0
January 2020	1,031	0	71	0	0	0	0	0
February 2020	210	0	11	0	0	0	0	0

Notes:

(a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.

(b) Non-inert construction wastes include general refuse disposed at landfill.

(c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

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

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

2.6 *ENVIRONMENTAL LICENSES AND PERMITS*

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

Table 2.14 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	435068	27 June 2018	Throughout the Contract	DBJV	Northern Landfall
Construction Dust Notification	435505	12 July 2018	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Waste Water Discharge License	WT00031435-2018	2 August 2018	31 August 2023	DBJV	Southern Landfall
Waste Water Discharge License	WT00034060-2019	25 July 2019	30 June 2024	DBJV	Northern Landfall (4 Discharge Point)

Notes:
HyD = Highways Department
DBJV = Dragages – Bouygues Joint Venture
VEP = Variation of Environmental Permit

IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

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

2.7 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

For air quality impact monitoring, a total of sixteen monitoring events for both 1-hour TSP and 24-hour TSP were undertaken in which three (3) Action Level exceedances of 1-hour TSP monitoring were recorded (*Table 2.15*).

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

Station	Exceedance Level	Date of Exceedances		Number of Exceedances	
		1-hr TSP	24-hr TSP	1-hr TSP	24-hr TSP
AQMS1	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR1	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR5	Action Level	2020-12-10 2021-02-16 2021-02-22	-	3	-
	Limit Level	-	-	-	-
ASR6	Action Level	-	-	-	-
	Limit Level	-	-	-	-
ASR10	Action Level	-	-	-	-
	Limit Level	-	-	-	-
Total number of Action level Exceedances:				**3**	**0**
Total number of Limit level Exceedances:				**0**	**0**

One (1) Limit Level exceedance was observed for the quarterly dolphin monitoring data between December 2020 and February 2021.

Cumulative statistics are provided in *Appendix J*.

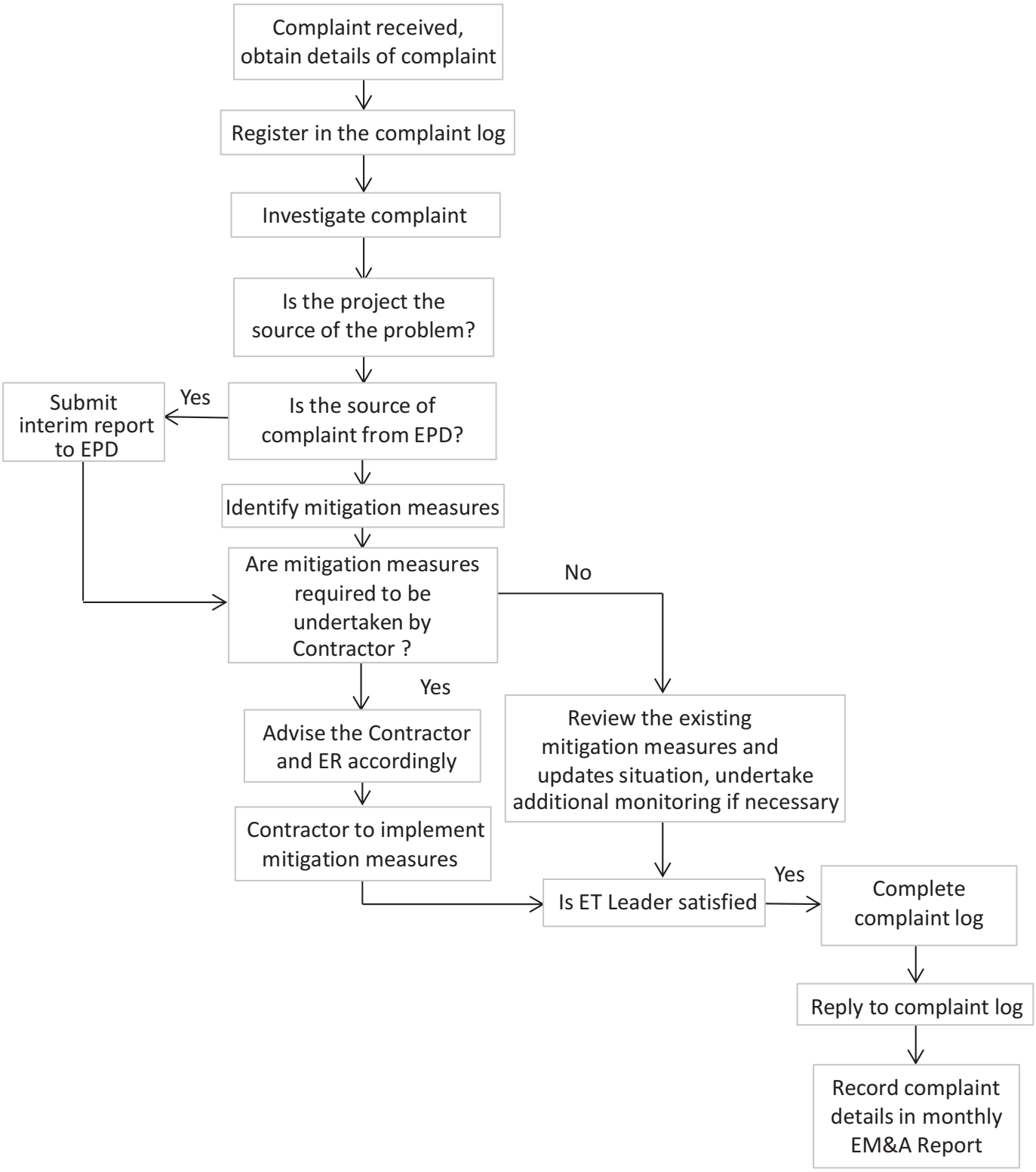
2.8 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

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



Environmental Complaint Handling Procedure

Figure 2.4

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3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING QUARTER

As informed by the Contractor, there was no major activities undertaken in the coming quarterly period.

3.2 KEY ISSUES FOR THE COMING QUARTER

Potential environmental impacts in the coming quarterly period are expected to be mainly associated with waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING QUARTER

Impact monitoring for air quality, operational phase water quality monitoring and post construction (operational) phase dolphin monitoring are scheduled to continue for the next reporting period.

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

4 CONCLUSIONS

This Twenty-ninth Quarterly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 December 2020 to 28 February 2021, in accordance with the Updated EM&A Manual and the requirements of *EP-354/2009/D*.

Air quality (including 1-hour TSP and 24-hour TSP), operational phase water quality monitoring and post construction (operational) phase dolphin monitoring were carried out in the reporting period. Three (3) Action Level exceedances of 1-hour TSP monitoring were recorded in this reporting period. No Action and Limit Level exceedance of 24-hour TSP monitoring was recorded.

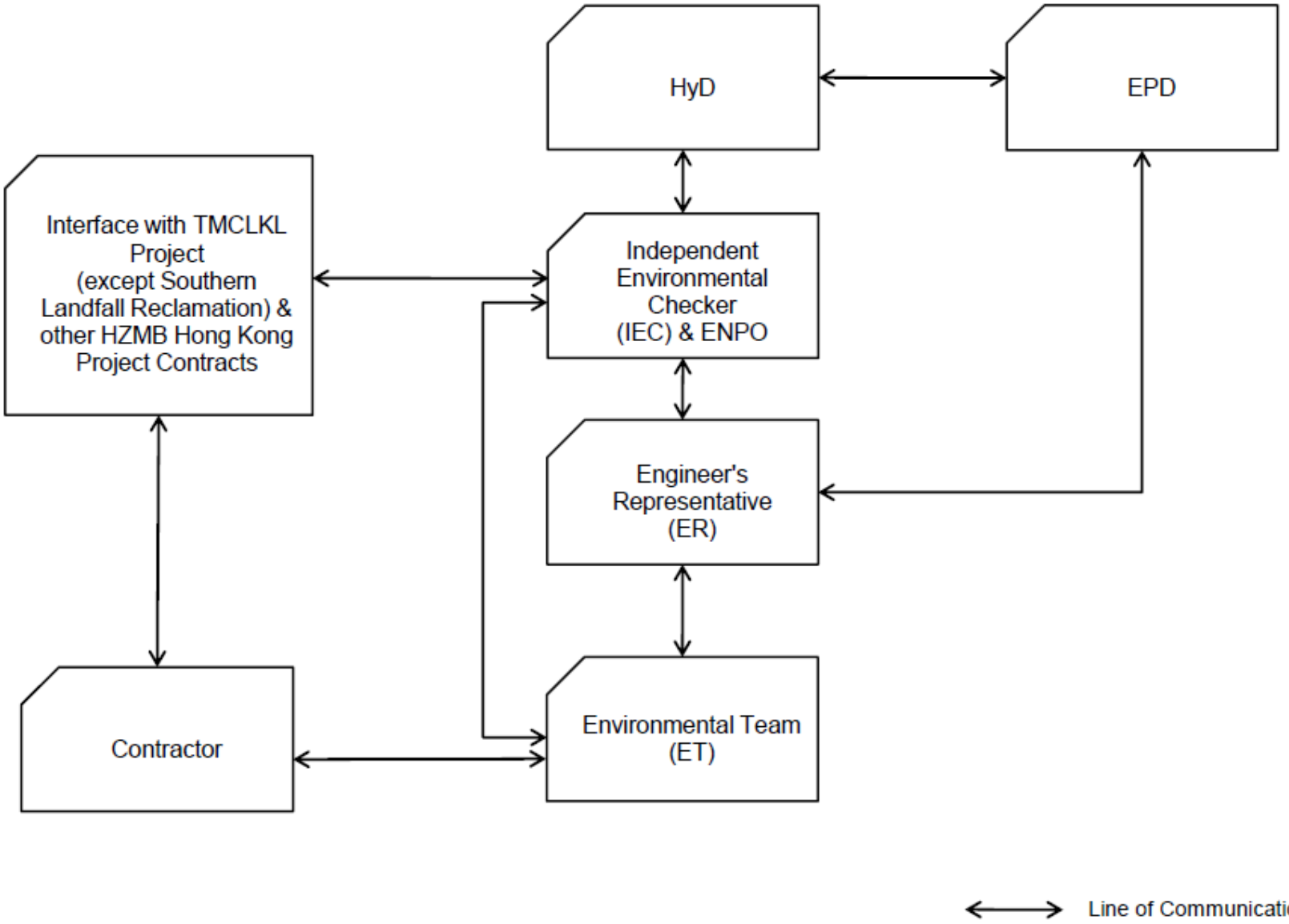
A total of 14 groups of 40 Chinese White Dolphins sightings were recorded during the six sets of surveys in this reporting quarter. All dolphin sightings were made during on-effort search and 11 of the dolphin groups were made on primary lines. One limit level exceedance was observed for the quarterly dolphin monitoring data between December 2020 and February 2021.

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

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

Appendix A

Project Organization for Environmental Works



Appendix A1

Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section
Project Organization

DATE: 06/03/2013

Environmental Resources Management

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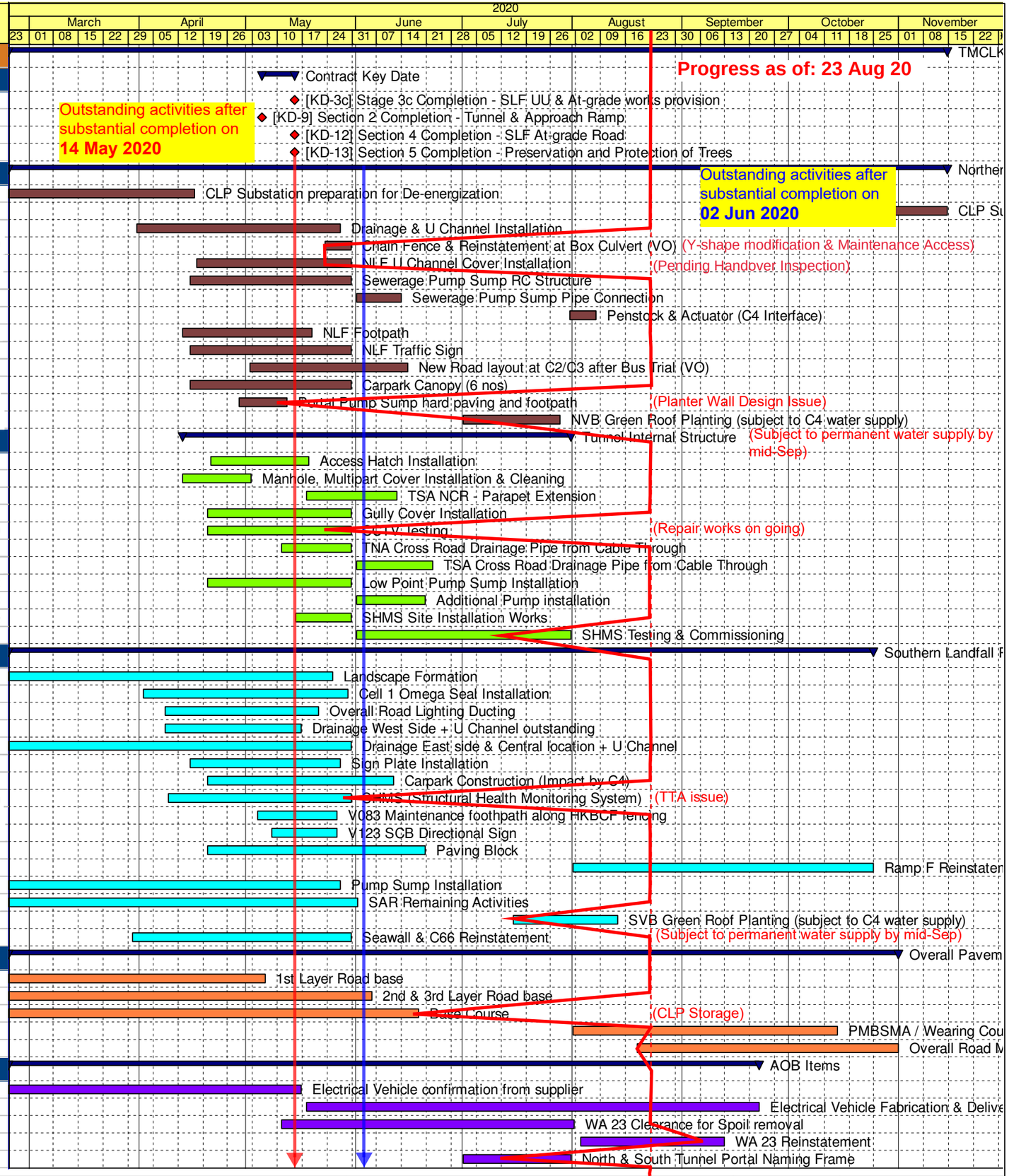
Appendix B

Construction Programme

#	Activity Name	Orig Dur	Start	Finish	Target Finish Date
1	**TMCLKL Northen Connection Sub-sea Tunnel Section**	217	24-Feb-20	14-Nov-20	
2	**Contract Key Date**	8	05-May-20	14-May-20	
3	[KD-3c] Stage 3c Completion - SLF UU & At-grade works provision	0		14-May-20	
4	[KD-9] Section 2 Completion - Tunnel & Approach Ramp	0		05-May-20	
5	[KD-12] Section 4 Completion - SLF At-grade Road	0		14-May-20	
6	[KD-13] Section 5 Completion - Preservation and Protection of Trees	0		14-May-20	
7	**Northern Landfall Remaining Works**	228	24-Feb-20	14-Nov-20	
8	CLP Substation preparation for De-energization	46	24-Feb-20	16-Apr-20	
9	CLP Substation - Dismantling, Removal & Reinstatement	39	01-Oct-20	14-Nov-20	
10	Drainage & U Channel Installation	50	31-Mar-20	27-May-20	
11	Chain Fence & Reinstatement at Box Culvert (VO)	7	23-May-20	30-May-20	30-Sep-20
12	NLF U Channel Cover Installation	38	17-Apr-20	30-May-20	15-Sep-20
13	Sewerage Pump Sump RC Structure	40	15-Apr-20	30-May-20	
14	Sewerage Pump Sump Pipe Connection	12	01-Jun-20	13-Jun-20	
15	Penstock & Actuator (C4 Interface)	7	31-Jul-20	07-Aug-20	
16	NLF Footpath	32	13-Apr-20	19-May-20	
17	NLF Traffic Sign	40	15-Apr-20	30-May-20	15-Aug-20
18	New Road layout at C2/C3 after Bus Trial (VO)	38	02-May-20	15-Jun-20	
19	Carpark Canopy (6 nos)	40	15-Apr-20	30-May-20	
20	Portal Pump Sump hard paving and footpath	12	29-Apr-20	12-May-20	05-Sep-20
21	NVB Green Roof Planting (subject to C4 water supply)	24	01-Jul-20	28-Jul-20	30-Sep-20
22	**Tunnel Internal Structure**	95	13-Apr-20	31-Jul-20	
23	Access Hatch Installation	24	21-Apr-20	18-May-20	
24	Manhole, Multipart Cover Installation & Cleaning	18	13-Apr-20	02-May-20	
25	TSA NCR - Parapet Extension	23	18-May-20	12-Jun-20	7-Aug-20
26	Gully Cover Installation	36	20-Apr-20	30-May-20	
27	CCTV Testing	36	20-Apr-20	30-May-20	15-Aug-20
28	TNA Cross Road Drainage Pipe from Cable Through	18	11-May-20	30-May-20	8-Jul-20
29	TSA Cross Road Drainage Pipe from Cable Through	19	01-Jun-20	22-Jun-20	4-Jul-20
30	Low Point Pump Sump Installation	36	20-Apr-20	30-May-20	15-Aug-20
31	Additional Pump installation	18	01-Jun-20	20-Jun-20	15-Aug-20
32	SHMS Site Installation Works	14	15-May-20	30-May-20	15-Aug-20
33	SHMS Testing & Commissioning	53	01-Jun-20	31-Jul-20	15-Oct-20
34	**Southern Landfall Remaining Works**	210	24-Feb-20	24-Oct-20	
35	Landscape Formation	79	24-Feb-20	25-May-20	
36	Cell 1 Omega Seal Installation	50	02-Apr-20	29-May-20	
37	Overall Road Lighting Ducting	38	08-Apr-20	21-May-20	
38	Drainage West Side + U Channel outstanding	34	08-Apr-20	16-May-20	
39	Drainage East side & Central location + U Channel	84	24-Feb-20	30-May-20	
40	Sign Plate Installation	37	15-Apr-20	27-May-20	
41	Carpark Construction (Impact by C4)	46	20-Apr-20	11-Jun-20	
42	SHMS (Structural Health Monitoring System)	45	09-Apr-20	30-May-20	26-Aug-20
43	V083 Maintenance foothpath along HKBCF fencing	20	04-May-20	26-May-20	
44	V123 SCB Directional Sign	16	08-May-20	26-May-20	
45	Paving Block	54	20-Apr-20	20-Jun-20	
46	Ramp F Reinstatement	73	01-Aug-20	24-Oct-20	
47	Pump Sump Installation	81	24-Feb-20	27-May-20	
48	SAR Remaining Activities	85	24-Feb-20	01-Jun-20	
49	SVB Green Roof Planting (subject to C4 water supply)	26	15-Jul-20	13-Aug-20	15-Sep-20
50	Seawall & C66 Reinstatement	54	30-Mar-20	30-May-20	
51	**Overall Pavement Works**	216	24-Feb-20	31-Oct-20	
52	1st Layer Road base	63	24-Feb-20	06-May-20	
53	2nd & 3rd Layer Road base	89	24-Feb-20	05-Jun-20	
54	Base Course	100	24-Feb-20	18-Jun-20	
55	PMBSMA / Wearing Course	64	01-Aug-20	14-Oct-20	
56	Overall Road Marking	64	19-Aug-20	31-Oct-20	
57	**AOB Items**	182	24-Feb-20	22-Sep-20	
58	Electrical Vehicle confirmation from supplier	72	24-Feb-20	16-May-20	
59	Electrical Vehicle Fabrication & Delivery	110	18-May-20	22-Sep-20	
60	WA 23 Clearance for Spoil removal	72	11-May-20	01-Aug-20	
61	WA 23 Reinstatement	36	03-Aug-20	12-Sep-20	
62	North & South Tunnel Portal Naming Frame	27	01-Jul-20	31-Jul-20	5 Sep-20



Page 1 of 1

Data Date: 24-Feb-20

Milestone | Pavement | Northern Landfall | AOB | Internal Structure | Summary | Southern Landfall

TMCLK Northern Connection Sub-sea Tunnel Section

Programme of Remaining Works

Forecast as of: 24 February 2020

Dragages HongKong 香港寶嘉 — A member of the Bouygues Construction group

Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

BOUYGUES TRAVAUX PUBLICS

Date	Revision	Checked	Approved
09-May-20	For Monitoring	SPa	DLo

Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	An effective watering programme of twice daily watering with complete coverage, is estimated to reduce by 50%. This is recommended for all areas in order to reduce dust levels to a minimum;	All areas / throughout construction period	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		<>
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	All site exits / throughout construction period	Contractor	TMEIA Avoid dust		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimised to areas in which works have been completed shall be restored as soon as is practicable.	All exposed surfaces / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	All stockpiles of aggregate or spoil shall be enclosed or covered and water applied in dry or windy condition.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>
4.11	Section 3	EM&A in the form of 1 hour and 24 hour dust monitoring and site audit.	All representative existing ASRs / throughout construction period	Contractor	EM&A Manual		Y		✓
WATER QUALITY									
Marine Works (Sequence A)									

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						D	C	O	
6.1 Figure 6.2a Appendix D6a	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 30% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL southern landfall	TM-CLKL southern landfall reclamation filling	Contractor	TM-EIAO		Y		N/A
6.1	-	a maximum of 100% public fill to be used for reclamation filling below +2.5mPD for TM-CLKL northern landfall	TM-CLKL northern landfall reclamation filling	Contractor	TM-EIAO		Y		✓
6.1	-	Use of cage type silt curtains round allgrab dredgers during the HKBCF, HKLR and TM-CLKL southern reclamation works.	All areas dredging works	Contractor	TM-EIAO		Y		✓
	Figure 1.1 of Annex C	A layer of floating type silt curtain will be applied when dredging and reclamation works are being undertaken at Portion N-a as shown in Figure 1.1 of Annex C of the EM&A Manual.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	Trailer suction hopper dredgers shall not allow mud to overflow.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	The use of Lean Material Overboard (LMOB) systems shall be prohibited.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1 Figure 6.2b Appendix D6b	Annex A	For other parts of the reclamation works construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. It should be noted that the protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2b and detailed in Appendices D6b. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation; - Reclamation filling for Portion D of HKBCF; Reclamation filling for FSD berth of HKBCF; and - Reclamation dredging and filling for Portion 1 of HKLR;	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓

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						D	C	O	
6.1	-	The filling material for the other parts of the works are the same as Sequence A;	All other areas/backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	5.7	Cage type silt curtain (with steel enclosure) shall be used for grab dredgers working in the site of HKBCF and TM- CLKL southern reclamation. Cage type silt curtains will be applied round all grab dredgers at other works area.	HKBCF, HKLR and TM-CLKL grab dredging	Contractor	TM-EIAO		Y		✓
6.1	Annex A	A layer of floating type silt curtain will be applied around all works as defined in Appendix D6b.	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
6.1	-	TM-CLKL northern landfall: - Reclamation filling shall not proceed until at least 200m section of leading seawall at both the east and west sides of the reclamation are formed above +2.5 mPD, except for 100m gaps for marine access;	All areas/ through out marine works	Contractor	TM-EIAO		Y		✓
General Marine Works									
6.1	-	Use of TMB for the construction of the submarine tunnel.	Tunnel works / Construction phase	Contractor	TM-EIAO		Y		N/A
6.1	-	Export dredged spoils from NWWCZ.	All areas as much as possible / dredging activities	Contractor	DASO Permit conditions		Y		✓
6.1	-	Where public fill is proposed for filling below +2.5mPD, the fine content in the public fill will be controlled to 25%	All areas/ backfilling works	Contractor	TM-EIAO		Y		N/A
6.1	-	Where sand fill is proposed for filling below +2.5mPD, the fine content in the sand fill will be controlled to 5%.	All areas/ backfilling works	Contractor	TM-EIAO		Y		N.A
6.1	-	Mechanical grabs shall be designed and maintained to avoid spillage and should seal tightly while being lifted.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Barges and hopper dredgers shall have tight fitting seals to their bottom openings to prevent leakage of material.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Any pipe leakages shall be repaired quickly. Plant should not be operated with leaking pipes.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Loading of barges and hoppers shall be controlled to prevent splashing of dredged material to the surrounding water. Barges or hoppers shall not be filled to a level which will cause overflow of materials or pollution of water during loading or transportation.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	-	Excess material shall be cleaned from the decks and exposed fittings of barges and hopper dredgers before the vessel is moved.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓

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						D	C	O	
6.1	-	Adequate freeboard shall be maintained on barges to reduce the likelihood of decks being washed by wave action;	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	All vessels shall be sized such that adequate clearance is maintained between vessels and the sea bed at all states of the tide to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		N/A
6.1	-	The works shall not cause foam, oil, grease, litter or other objectionable matter to be present in the water within and adjacent to the works site.	All areas/ throughout construction period	Contractor	Marine Fill Committee Guidelines. DASO permit conditions.		Y		✓
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
Land Works									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Storm drainage shall be directed to storm drains via adequately designed sand/silt removal facilities such as sand traps, silt traps and sediment basins. Channels, earth bunds or sand bag barriers should be provided on site to properly direct stormwater to such silt removal facilities. Catchpits and perimeter channels should be constructed in advance of site formation works and earthworks.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Silt removal facilities, channels and manholes shall be maintained and any deposited silt and grit shall be removed regularly, including specifically at the onset of and after each rainstorm.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Measures should be taken to prevent the washout of construction materials, soil, silt or debris into any drainage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Open stockpiles of construction materials (e.g. aggregates and sand) on site should be covered with tarpaulin or similar fabric during rainstorms.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	5.8	Manholes (including any newly constructed ones) should always be adequately covered and temporarily sealed so as to prevent silt, construction materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Discharges of surface run-off into foul sewers must always be prevented in order not to unduly overload the foul sewerage system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	All vehicles and plant should be cleaned before they leave the construction site to ensure that no earth, mud or debris is deposited by them on roads. A wheel washing bay should be provided at every site exit.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wheel wash overflow shall be directed to silt removal facilities before being discharged to the storm drain.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓

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						D	C	O	
6.1	-	Section of construction road between the wheel washing bay and the public road should be surfaced with crushed stone or coarse gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Wastewater generated from concreting, plastering, internal decoration, cleaning work and other similar activities, shall be screened to remove large objects.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Vehicle and plant servicing areas, vehicle wash bays and lubrication facilities shall be located under roofed areas. The drainage in these covered areas shall be connected to foul sewers via a petrol interceptor in accordance with the requirements of the WPCO or collected for off site disposal.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		N/A
6.1	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Waste oil should be collected and stored for recycling or disposal, in accordance with the Waste Disposal Ordinance.	All areas/ throughout construction period	Contractor	TM-EIAO Waste Disposal Ordinance		Y		✓
6.1	-	All fuel tanks and chemical storage areas should be provided with locks and be sited on sealed areas. The storage areas should be surrounded by bunds with a capacity equal to 110% of the storage capacity of the largest tank.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Surface run-off from bunded areas should pass through oil/grease traps prior to discharge to the stormwater system.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Roadside gullies to trap silt and grit shall be provided prior to discharging the stormwater into the marine environment. The sumps will be maintained and cleaned at regular intervals.	Roadside/design and operation	Design Consultant/ Contractor	TM-EIAO	Y		Y	✓
6.1	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓

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						D	C	O	
Water Quality Monitoring									
6.1	Section 5	Water quality monitoring shall be undertaken for suspended solids, turbidity, and dissolved oxygen. Nutrients and metal parameters shall also be measured for Mf sediment operations (only HKBCF and HKLR required handling of Mf sediment) during baseline, backfilling and post construction period. One year operation phase water quality monitoring at designated stations.	Designated monitoring stations as defined in EM&A Manual, Section 5/ Before, through-out marine construction period, post construction and monthly operational phase water quality monitoring for a year.	Contractor	EM&A Manual		Y	Y	**Operational phase water quality monitoring commenced in June 2020**
ECOLOGY									
8.14	6.3	Specification for and implement pre, during and post construction dolphin abundance monitoring.	All Areas/Detailed Design/ during construction works/post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
8.14	6.3,6.5	Specification and implementation of 250m dolphin exclusion zone.	All dredging and reclamation areas/Detailed Design/during all reclamation and dredging works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.3, 6.5	Specification and deployment of an artificial reef of an area of 3,600m2 in an area where fishing activities are prohibited.	Area of prohibited fishing activities/Detailed Design/towards end of construction period	TM-CLKL/ HKBCF Design Consultant/TM-CLKL/ HKBCF Contractor	TMEIA	Y		Y	N/A. To be implemented by AFCD.
8.14	6.3, 6.5	Specification and implementation of marine vessel control specifications	All areas/Detailed Design/during construction works	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.14	6.3, 6.5	Design and implementation of acoustic decoupling methods for dredging and reclamation works	All areas/ Detailed Design/during dredging and reclamation works	Design Consultant/ Contractor	TMEIA	Y	Y		✓

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						D	C	O	
8.15	6.3, 6.4	Pre-construction phase survey and coral translocation	Detailed Design/Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
8.15	6.5	Audit coral translocation success	Post translocation	Contractor	TMEIA		Y		✓
7.13	6.5	The loss of habitat shall be supplemented by enhancement planting in accordance with the landscape mitigation schedule.	All areas / As soon as accessible	Contractor	TMEIA		Y		N/A.
7.13	6.5	Spoil heaps shall be covered at all times.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Avoid damage and disturbance to the remaining and surrounding natural habitat	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Placement of equipment in designated areas within the existing disturbed land	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Disturbed areas to be reinstated immediately after completion of the works.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
7.13	6.5	Construction activities should be restricted to the proposed works boundary.	All areas / Throughout construction period	Contractor	TMEIA		Y		✓
LANDSCAPE AND VISUAL									
10.9	7.6	The colour and shape of the toll control buildings, ventilation building and administration building shall adopt a design which could blend it into the vicinity elements, and the details will be developed in detailed design stage (DM2)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Aesthetic design of the viaduct, retaining wall and other structures will be developed under ACABAS submission (DM5)	All areas/detailed design	Design Consultant	TMEIA	Y			N/A
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes shall be incorporated to all buildings, engineering structures and associated infrastructure facilities (OM5)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (OM6)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		Y		✓
12.6		The Contractor shall prepare and implement a Waste Management Plan which specifies procedures such as a ticketing system, to facilitate tracking of loads and to ensure that illegal disposal of wastes does not occur, and protocols for the maintenance of records of the quantities of wastes generated, recycled and disposed. A recording system for the amount of waste generated, recycled and disposed (locations) should be established.	Contract mobilisation	Contractor	TMEIA, Works Branch Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material		Y		✓
12.6		The Contractor shall apply for and obtain the appropriate licenses for the disposal of public fill, chemical waste and effluent	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous		Y		✓

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						D	C	O	
		discharges.			Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.				
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedures including waste reduction, reuse and recycling.	Contract Mobilisation	Contractor	TMEIA		Y		✓
12.6	8.1	The extent of cutting operation should be optimised where possible. Earth retaining structures and bored pile walls should be proposed to minimise the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The surplus surcharge should be transferred to a fill bank	Reclamation areas / after surcharge works	Contractor	TMEIA		Y		N/A
12.6	8.1	Rock armour from the existing seawall should be reused on the new sloping seawall as far as possible	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	The site and surroundings shall be kept tidy and litter free.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	No waste shall be burnt on site.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Provisions to be made in contract documents to allow and promote the use of recycled aggregates where appropriate.	Detailed Design	Design Consultant	TMEIA	Y			✓
12.6	8.1	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Dredged marine mud shall be disposed of in a gazetted marine disposal ground under the requirements of the Dumping at Seas Ordinance.	Reclamation areas / throughout dredging works	Contractor	TMEIA		Y		✓
12.6	8.1	Standard formwork or pre-fabrication should be used as far as practicable so as to minimise the C&D materials arising. The use of more durable formwork/plastic facing for construction works should be considered. The use of wooden hoardings should be avoided and metal hoarding should be used to facilitate recycling. Purchasing of construction materials should avoid over-ordering and wastage.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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						D	C	O	
12.6	8.1	The Contractor should recycle as many C&D materials (this is a waste section) as possible on-site. The public fill and C&D waste should be segregated and stored in separate containers or skips to facilitate the reuse or recycling of materials and proper disposal. Where practicable, the concrete and masonry should be crushed and used as fill materials. Steel reinforcement bar should be collected for use by scrap steel mills. Different areas of the sites should be considered for segregation and storage activities.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All falsework will be steel instead of wood.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: *f* suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; *f* Having a capacity of <450L unless the specifications have been approved by the EPD; and *f* Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. *f* Clearly labelled and used solely for the storage of chemical wastes; *f* Enclosed with at least 3 sides; *f* Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; *f* Adequate ventilation; *f* Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and *f* Incompatible materials are adequately separated.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		N/A

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						D	C	O	
12.6	8.1	General refuse arising on-site should be stored in enclosed bins or compaction units separately from C&D and chemical wastes. Sufficient dustbins shall be provided for storage of waste as required under the Public Cleansing and Prevention of Nuisances By-laws. In addition, general refuse shall be cleared daily and shall be disposed of to the nearest licensed landfill or refuse transfer station. Burning of refuse on construction sites is prohibited.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	All waste containers shall be in a secure area on hardstanding;	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Training shall be provided to workers about the concepts of site cleanliness and appropriate waste management procedure, including waste reduction, reuse and recycling.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Office wastes can be reduced by recycling of paper if such volume is sufficiently large to warrant collection. Participation in a local collection scheme by the Contractor should be advocated. Waste separation facilities for paper, aluminium cans, plastic bottles, etc should be provided on-site.	Site Offices/ throughout construction period	Contractor	TMEIA		Y		✓
12.6	Section 8	EM&A of waste handling, storage, transportation, disposal procedures and documentation through the site audit programme shall be undertaken.	All areas / throughout construction period	Contractor	EM&A Manual		Y		✓
CULTURAL HERITAGE									
11.8	Section 9	EM&A in the form of audit of the mitigation measures	All areas / throughout construction period	Highways Department	EIAO-TM		Y		N/A

*** Remarks:**

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

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

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

Appendix D

Summary of Action and Limit Levels

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

Parameters	Action	Limit
24 Hour TSP Level in μg/m³	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214	260
1 Hour TSP Level in μg /m³	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337	500

Table D2 Action and Limit Levels for Post-Construction Dolphin Monitoring

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

Notes:

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

Table D3 Derived Value of Action Level (AL) and Limit Level (LL)

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

Appendix E

EM&A Monitoring Schedules

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

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

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - January 2021

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

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - February 2021

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

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall

Operational Phase Marine Water Quality Monitoring (WQM) Schedule (December 2020)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Dec	2-Dec	3-Dec	4-Dec	5-Dec
6-Dec	7-Dec	8-Dec	9-Dec	10-Dec	11-Dec	12-Dec
13-Dec	14-Dec	15-Dec	16-Dec	17-Dec	18-Dec	19-Dec
			ebb tide 12:36 - 16:06 flood tide 7:20 - 10:50			
20-Dec	21-Dec	22-Dec	23-Dec	24-Dec	25-Dec	26-Dec
27-Dec	28-Dec	29-Dec	30-Dec	31-Dec		

HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall
Operational Phase Marine Water Quality Monitoring (WQM) Schedule (January 2021)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jan	2-Jan
3-Jan	4-Jan	5-Jan	6-Jan	7-Jan	8-Jan	9-Jan
10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan
17-Jan	18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan
24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan
	ebb tide 9:30 - 12:06 flood tide 13:59 - 17:29					
31-Jan						

HY/2012/08 - Tuen Mun - Chek Lap Kok Link - Northern Landfall

Operational Phase Marine Water Quality Monitoring (WQM) Schedule (February 2021)

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
	1-Feb	2-Feb	3-Feb	4-Feb	5-Feb	6-Feb
7-Feb	8-Feb	9-Feb	10-Feb	11-Feb	12-Feb	13-Feb
14-Feb	15-Feb	16-Feb	17-Feb	18-Feb	19-Feb	20-Feb
21-Feb	22-Feb	23-Feb	24-Feb	25-Feb	26-Feb	27-Feb
			ebb tide 10:46 - 13:00 flood tide 14:33 - 18:03			
28-Feb						

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Operational Phase Dolphin Monitoring Survey Monitoring Schedule - December 2020

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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Operational Phase Dolphin Monitoring Survey Monitoring Schedule - January 2021

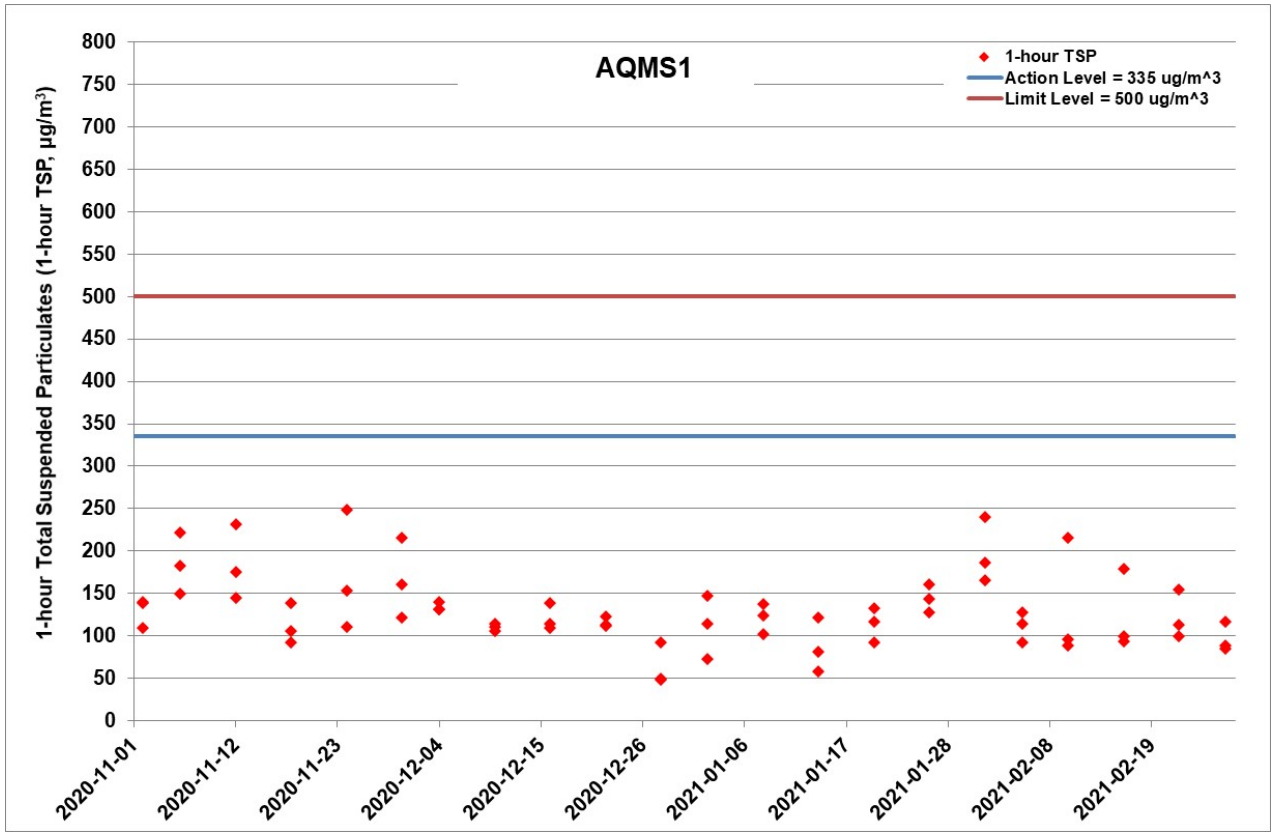
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					01-Jan	02-Jan
03-Jan	04-Jan	05-Jan	06-Jan	07-Jan	08-Jan	09-Jan
10-Jan	11-Jan	12-Jan	13-Jan	14-Jan	15-Jan	16-Jan
17-Jan	18-Jan	19-Jan	20-Jan	21-Jan	22-Jan	23-Jan
24-Jan	25-Jan	26-Jan	27-Jan	28-Jan	29-Jan	30-Jan
	Operational Phase Dolphin Monitoring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

HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Operational Phase Dolphin Monitoring Survey Monitoring Schedule - February 2021

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

Appendix F

Impact Air Quality Monitoring Results



- **Figure F.1 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at AQMS1 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)**

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

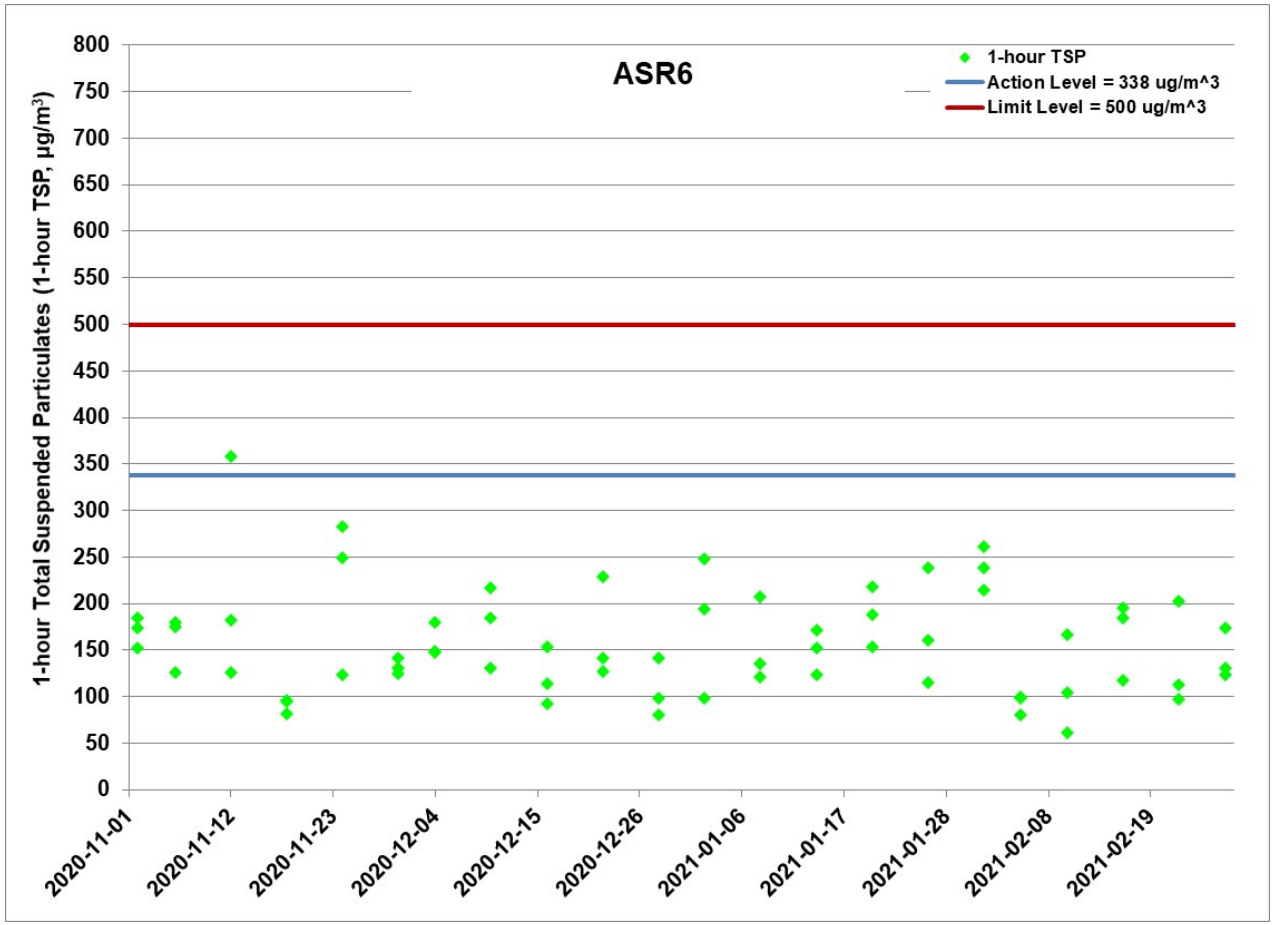


Figure F.2 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR6 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

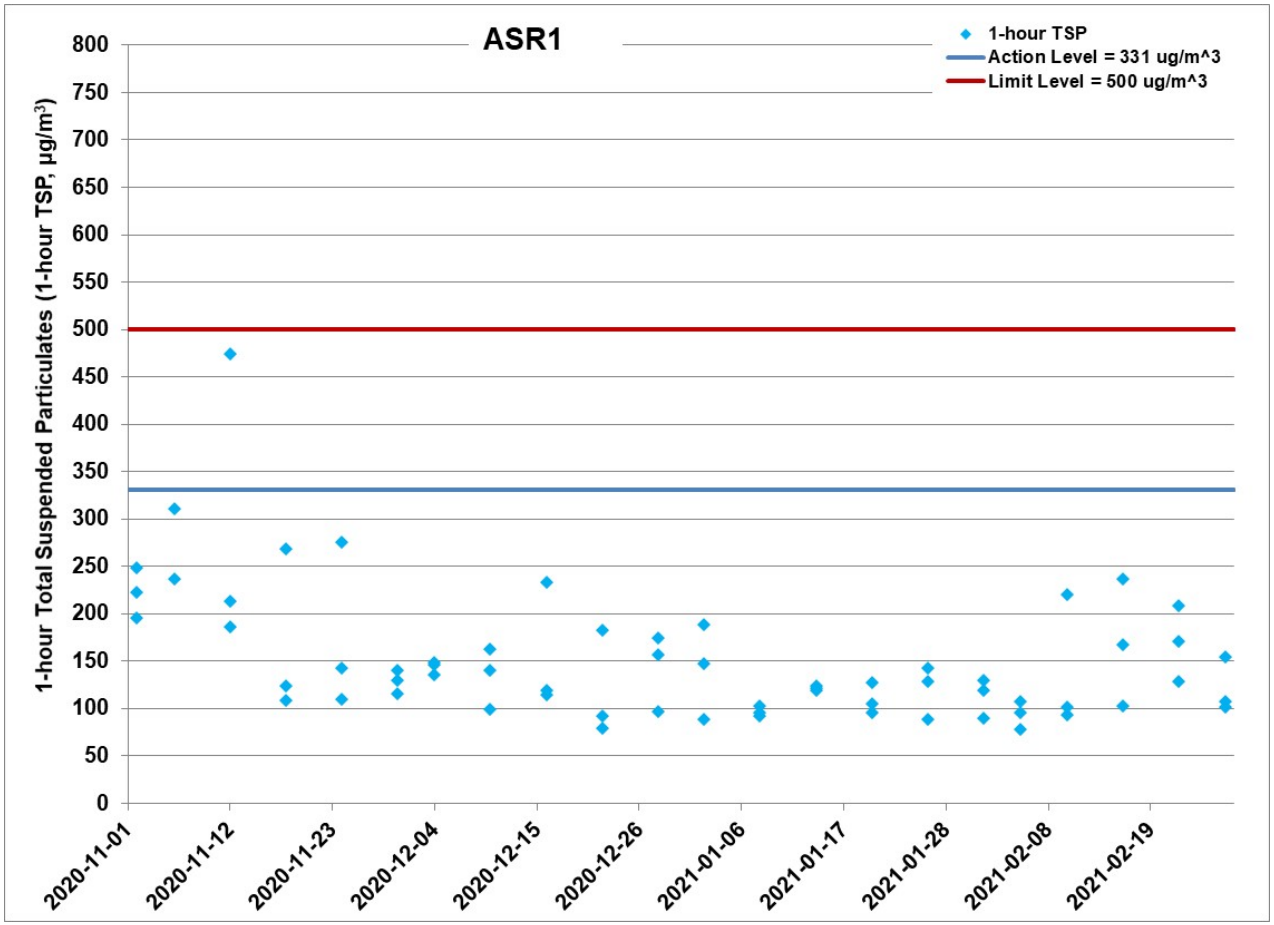


Figure F.3 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR1 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

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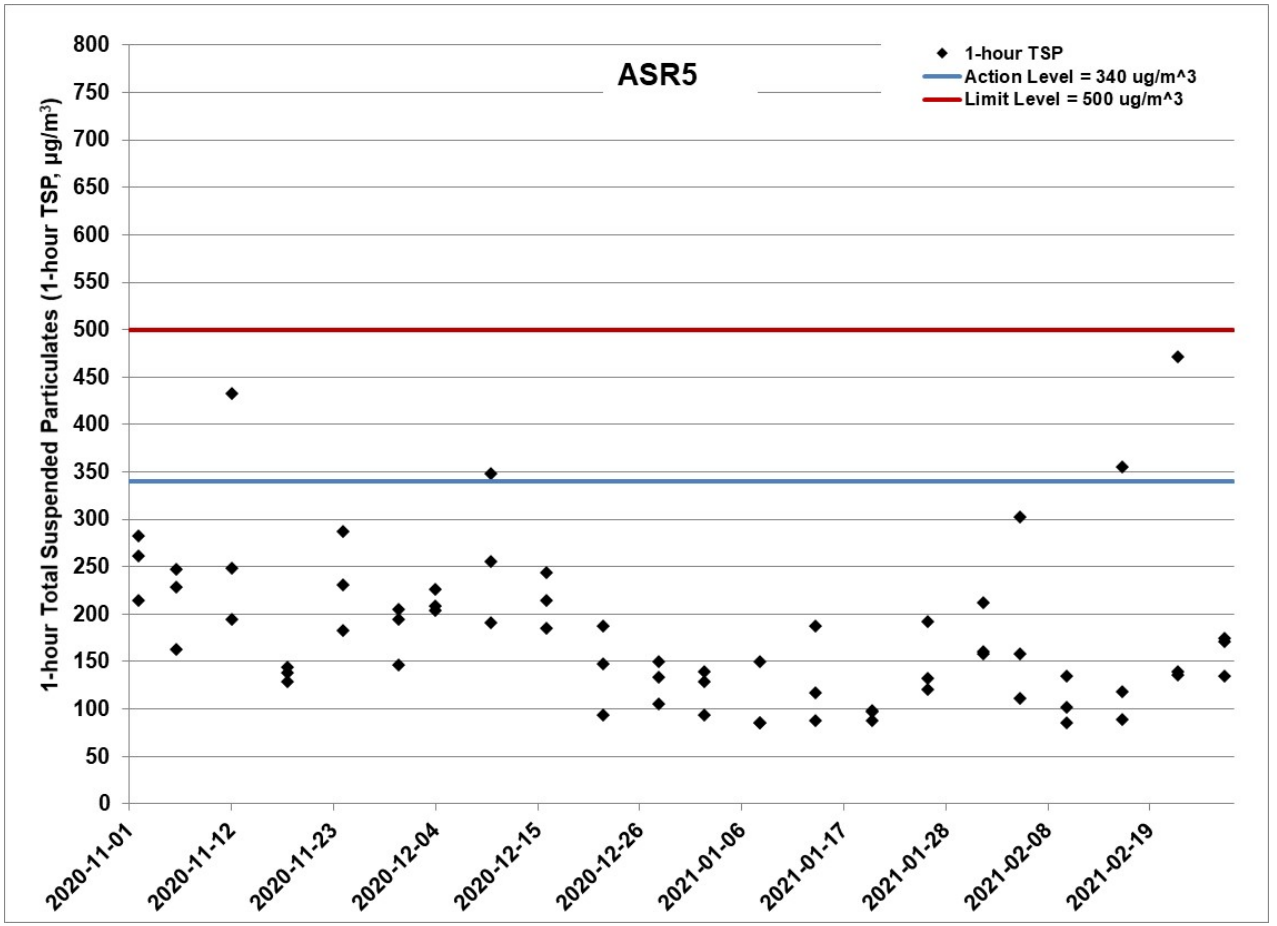


Figure F.4 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR5 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

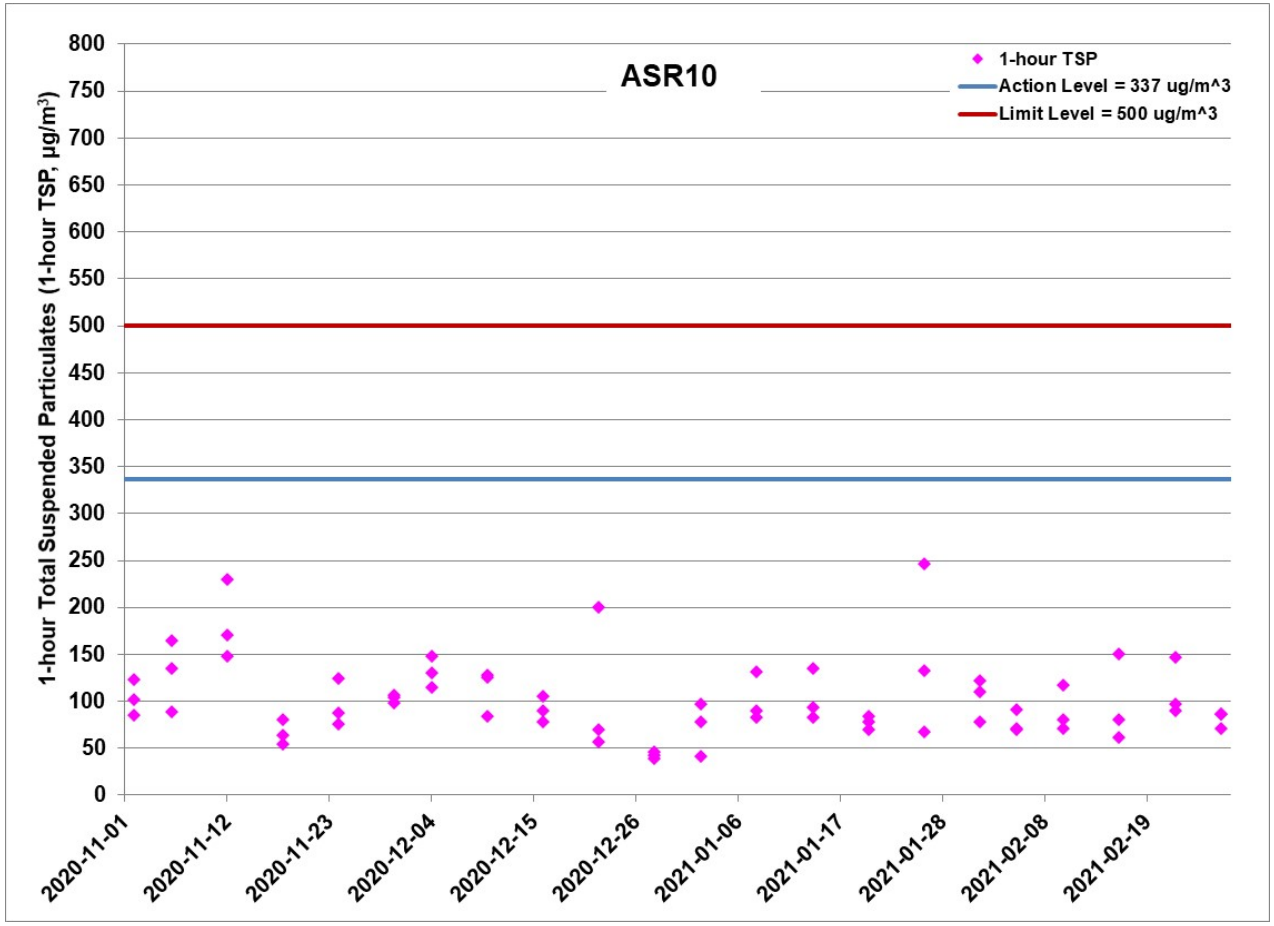


Figure F.5 Impact Monitoring – 1-hour Total Suspended Particulates (µg/m³) at ASR10 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

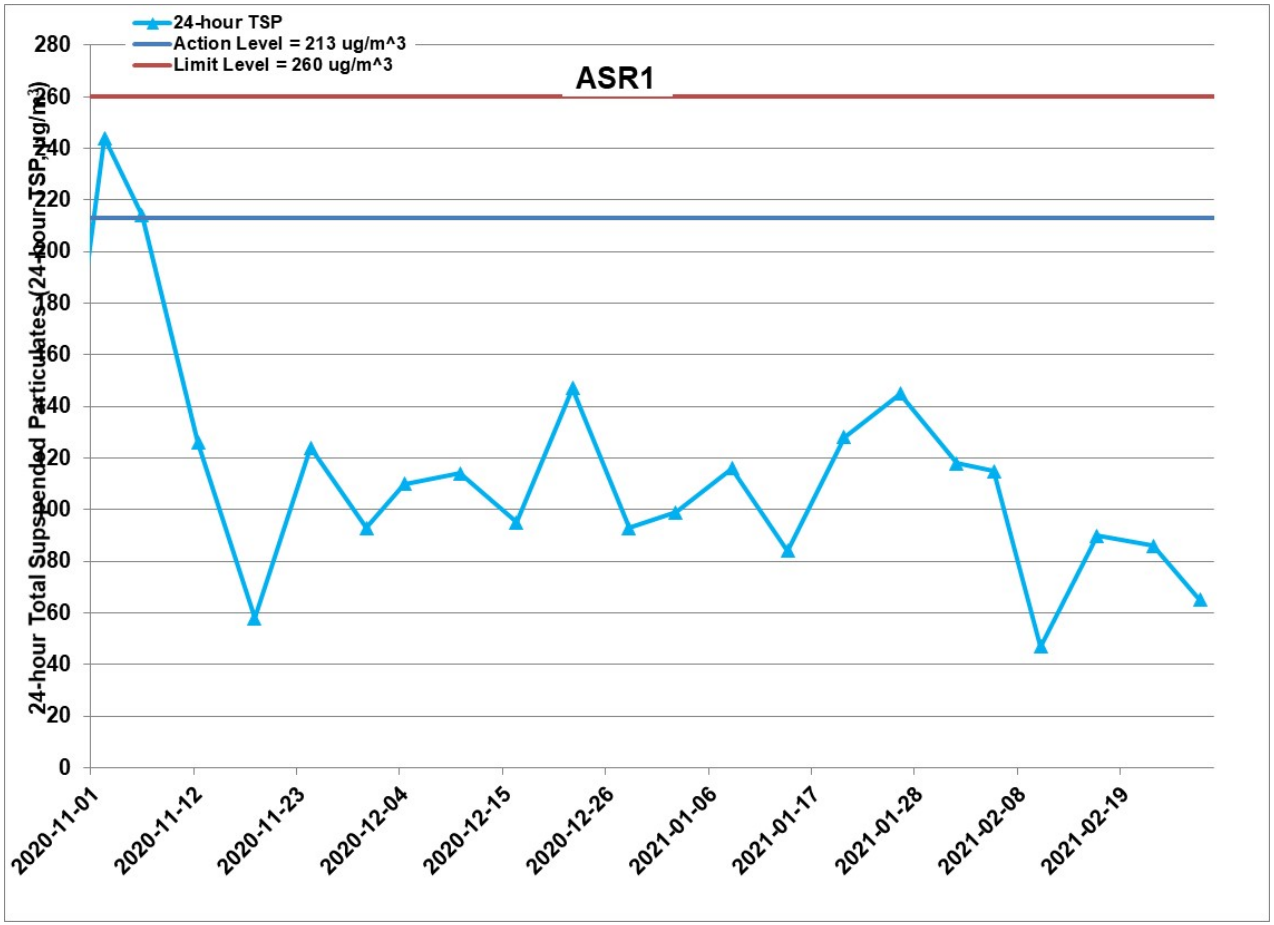


Figure F.6 Impact Monitoring – 24-hour Total Suspended Particulates (μg/m³) at ASR1 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

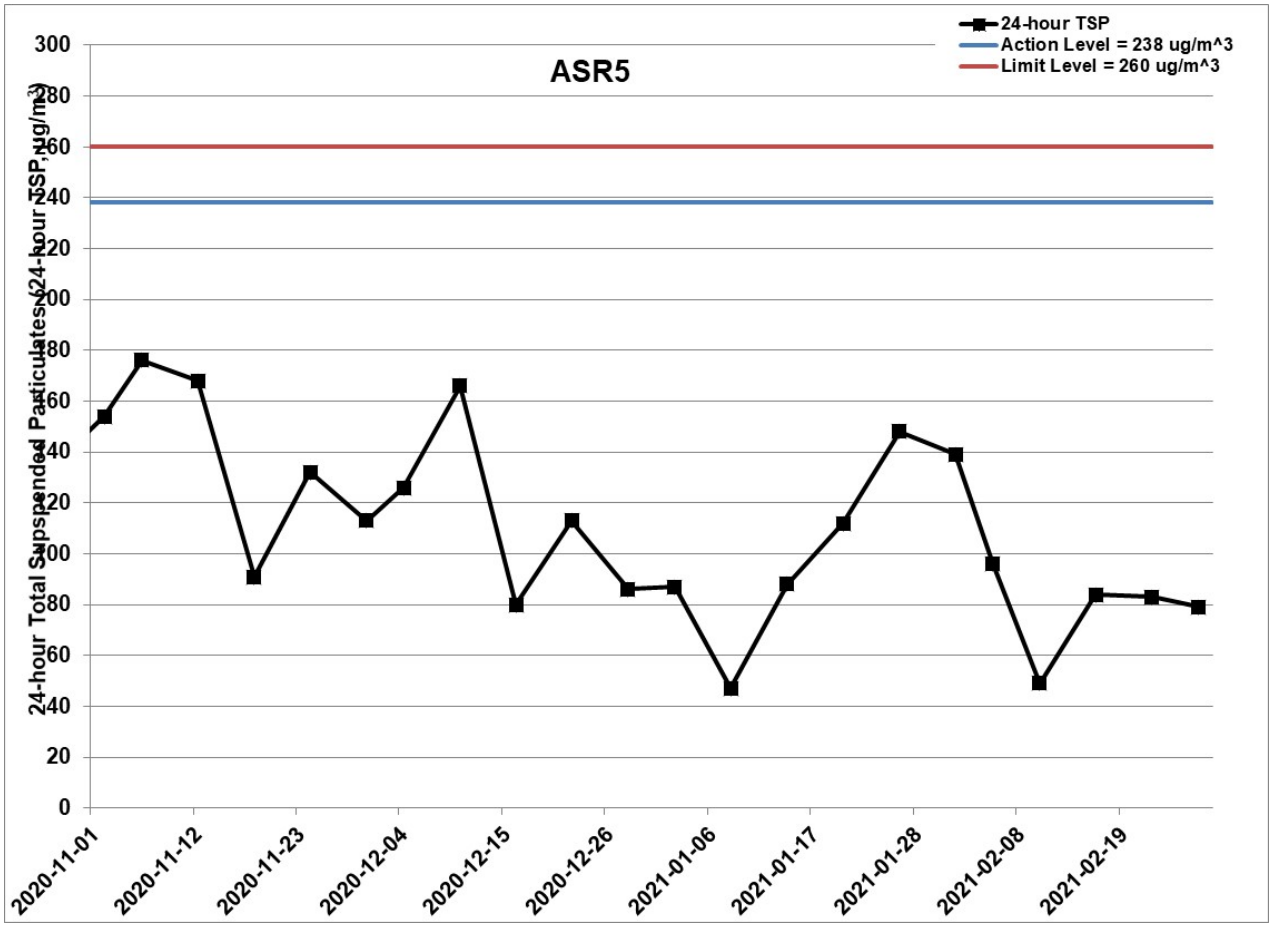


Figure F.7 Impact Monitoring – 24-hour Total Suspended Particulates (μg/m³) at ASR5 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

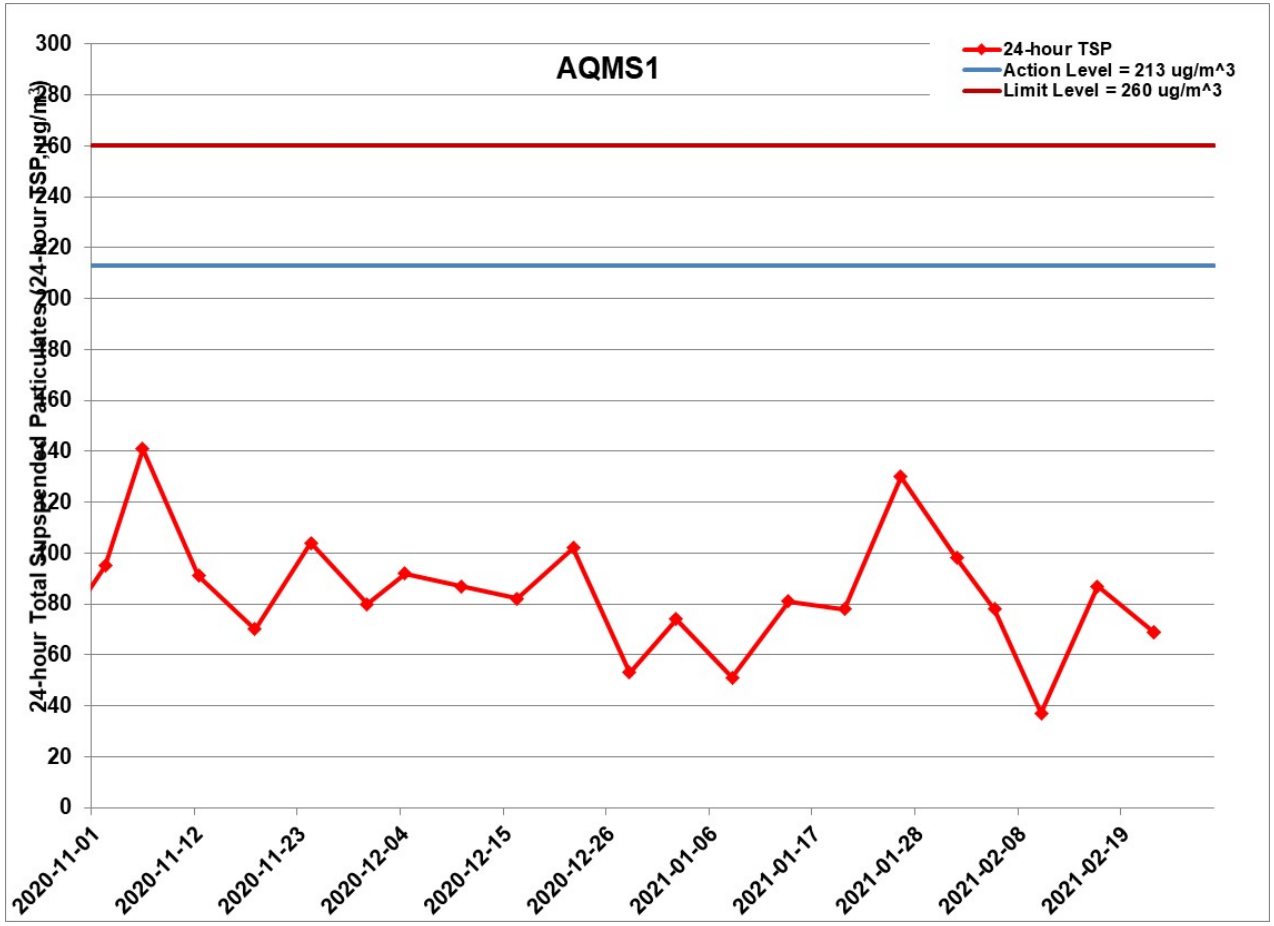


Figure F.8 Impact Monitoring – 24-hour Total Suspended Particulates (μg/m³) at AQMS1 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

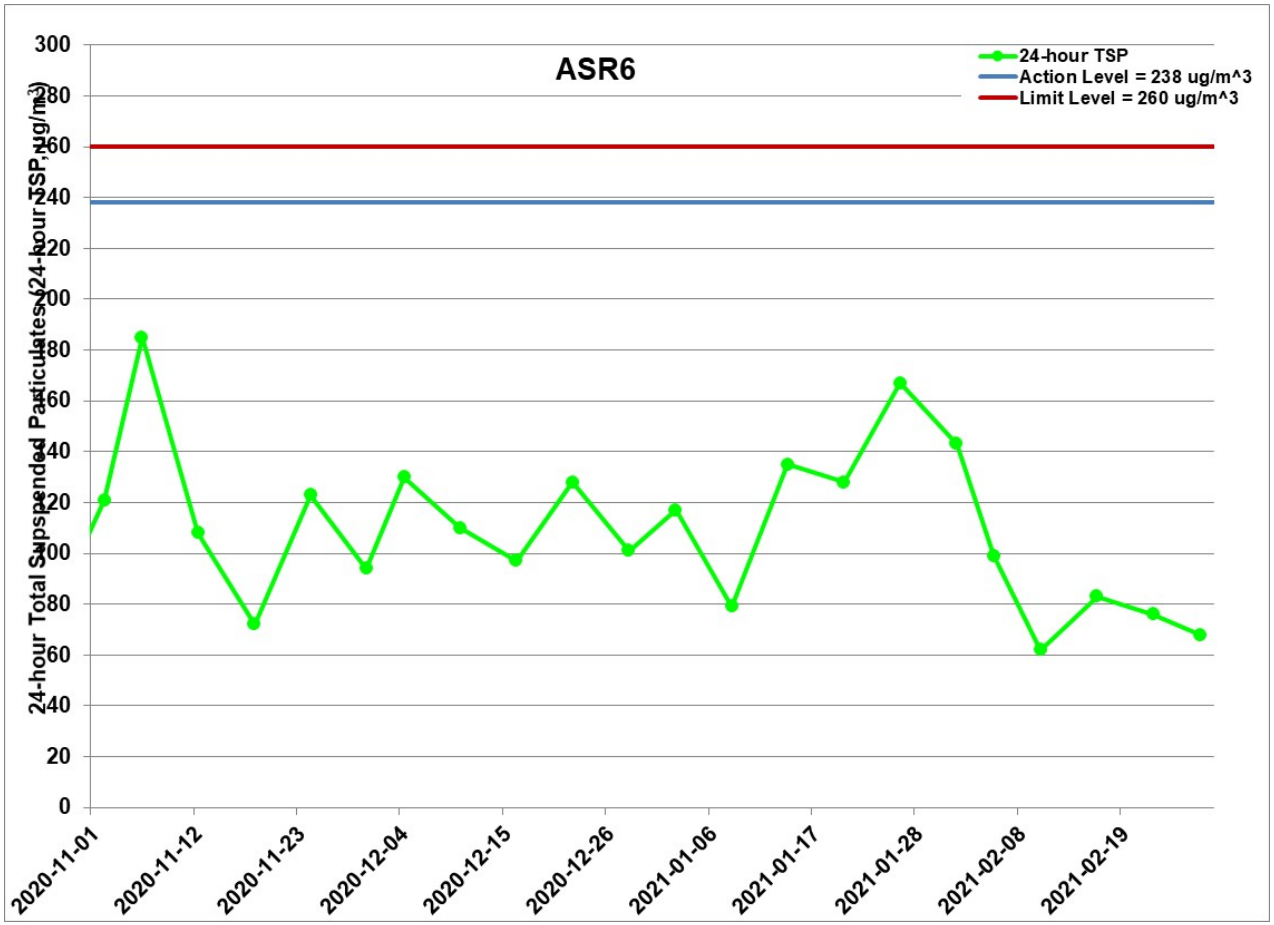


Figure F.9 Impact Monitoring – 24-hour Total Suspended Particulates (μg/m³) at ASR6 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

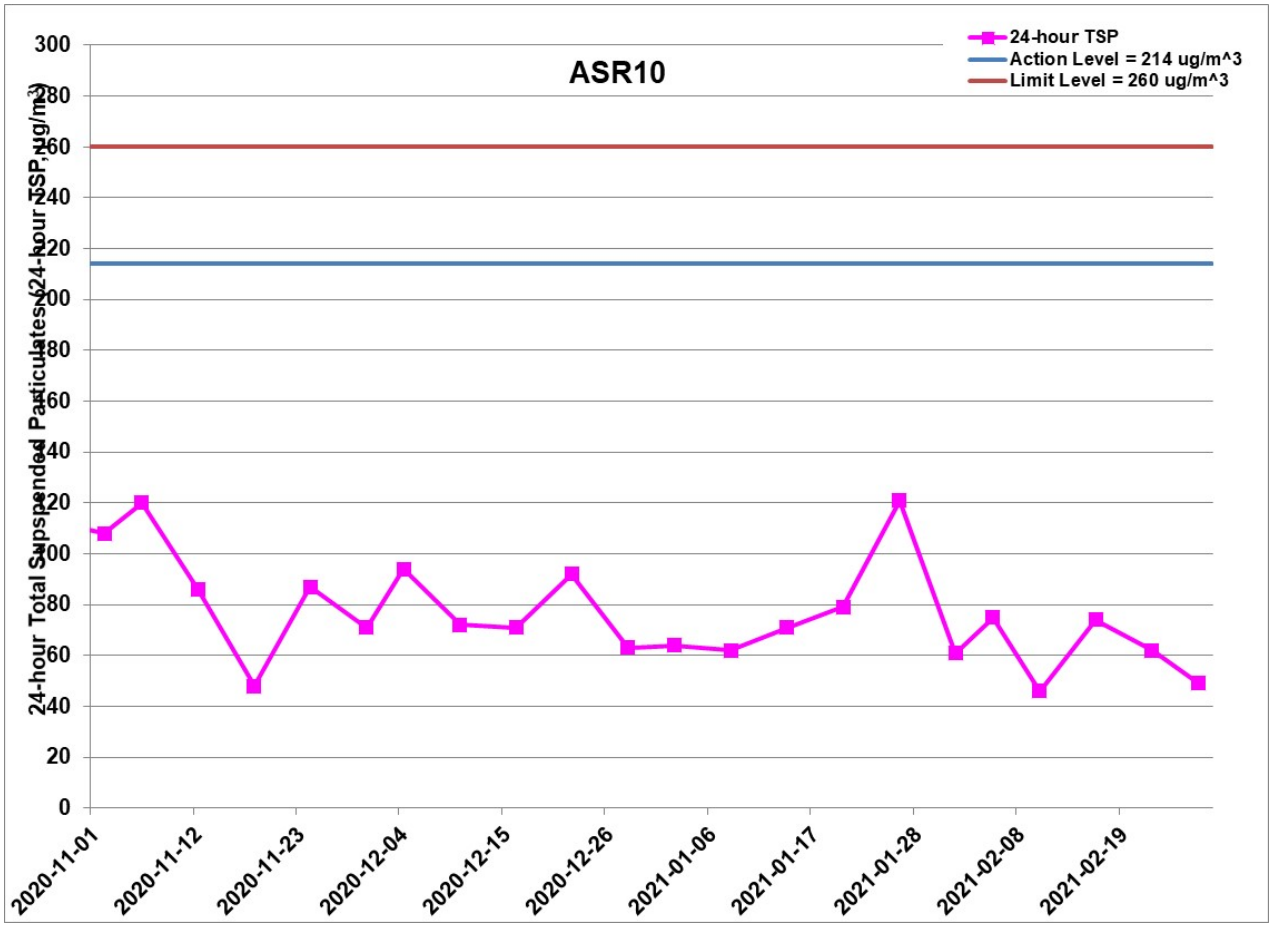


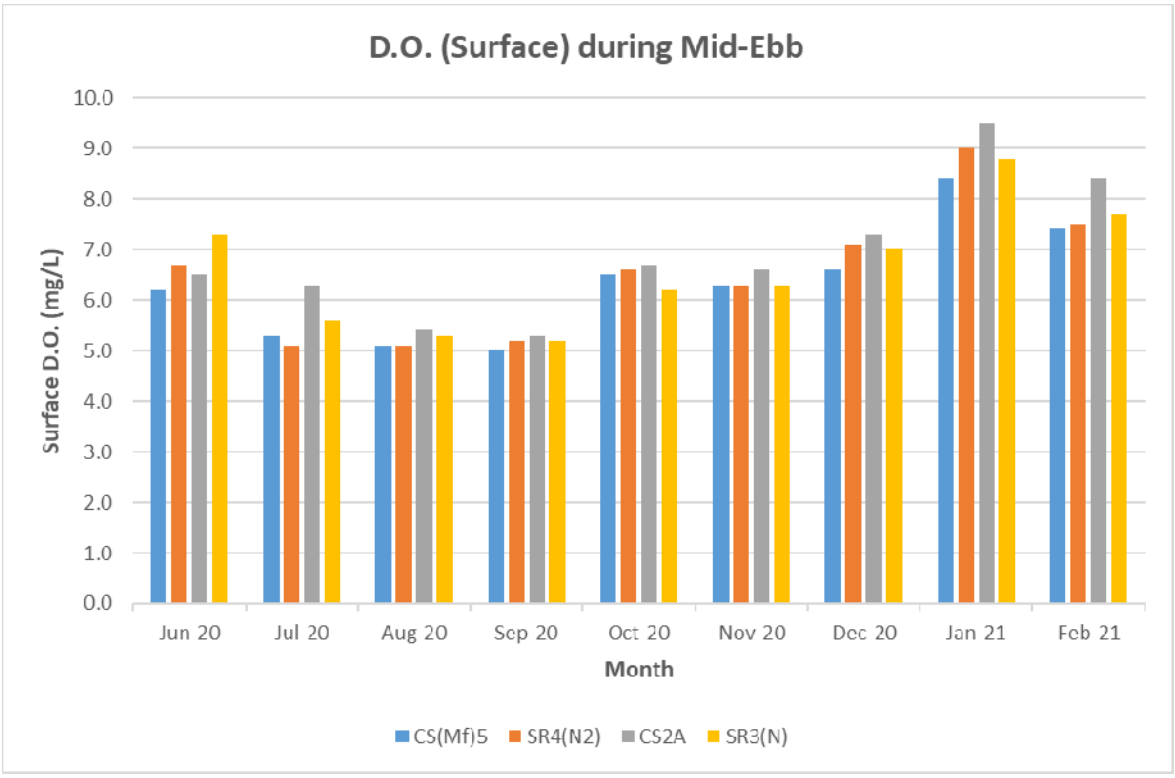
Figure F.10 Impact Monitoring – 24-hour Total Suspended Particulates (μg/m³) at ASR10 between 1 November 2020 and 28 February 2021 during impact monitoring period. The weather conditions during the monitoring period were sunny and hazy. Major land-based construction activities included Installation of green roof system& chain fence - South Ventilation Building; Defect works for reinstatement at Box culvert – Northern Landfall; Demolition works and backfilling works of CLP substation (1/11/2020 – 28/2/2021)

Ref: 0212330_Impact AQM graphs_February 2021.xlsx

ERM

Appendix G

Operational Phase Water Quality Monitoring Results



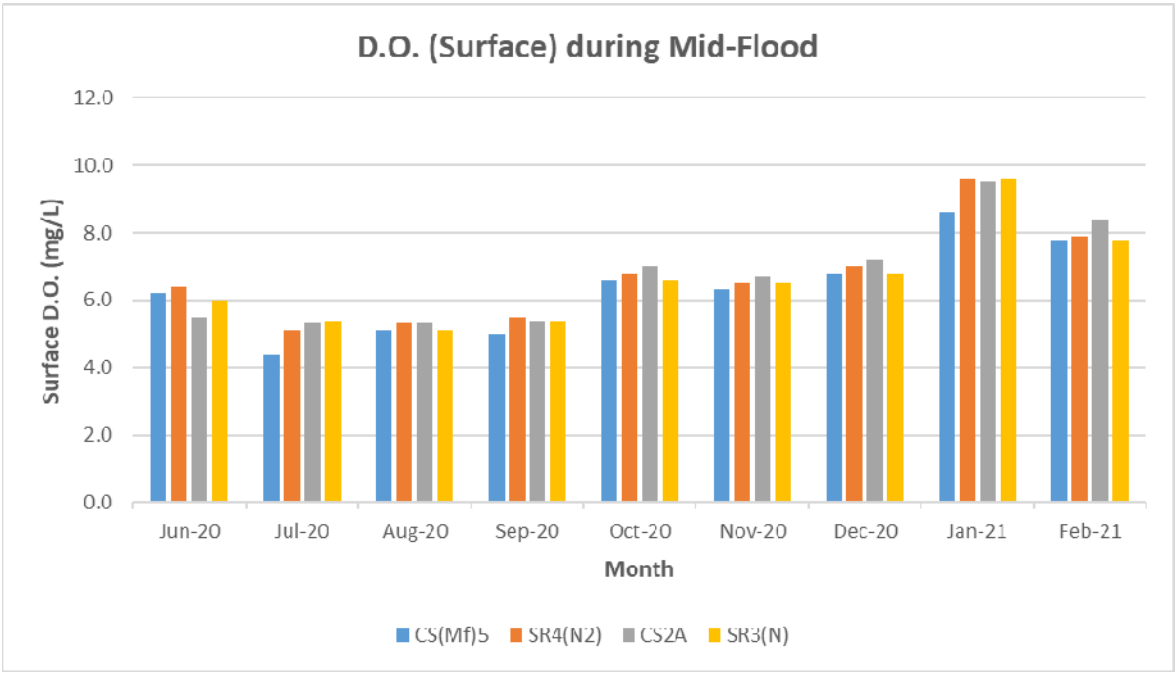
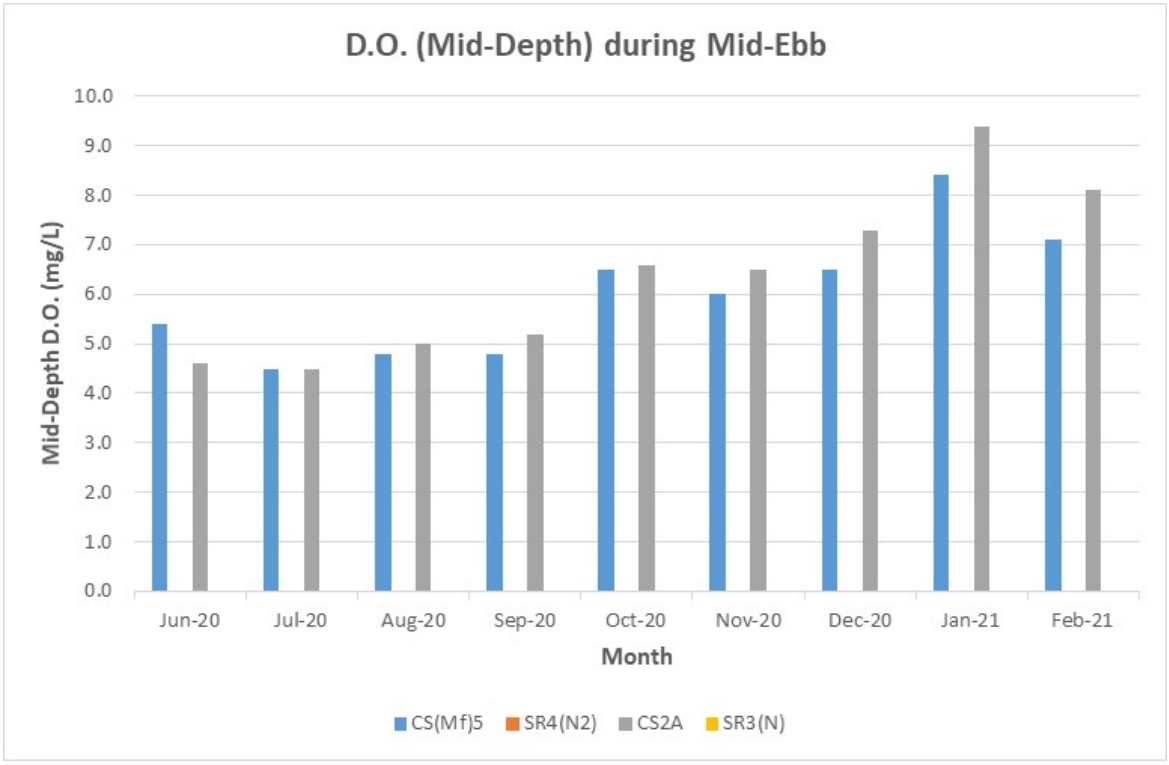


Figure G1 Operational Phase Monitoring – Mean Level of Dissolved Oxygen (mg/L) in surface waters between 1 June 2020 and 28 February 2021. The weather conditions during the monitoring period varied mostly from sunny to cloudy.

Ref: 0212330_Impact-WQM_February 2021 _graphs_Rev a.xls

ERM



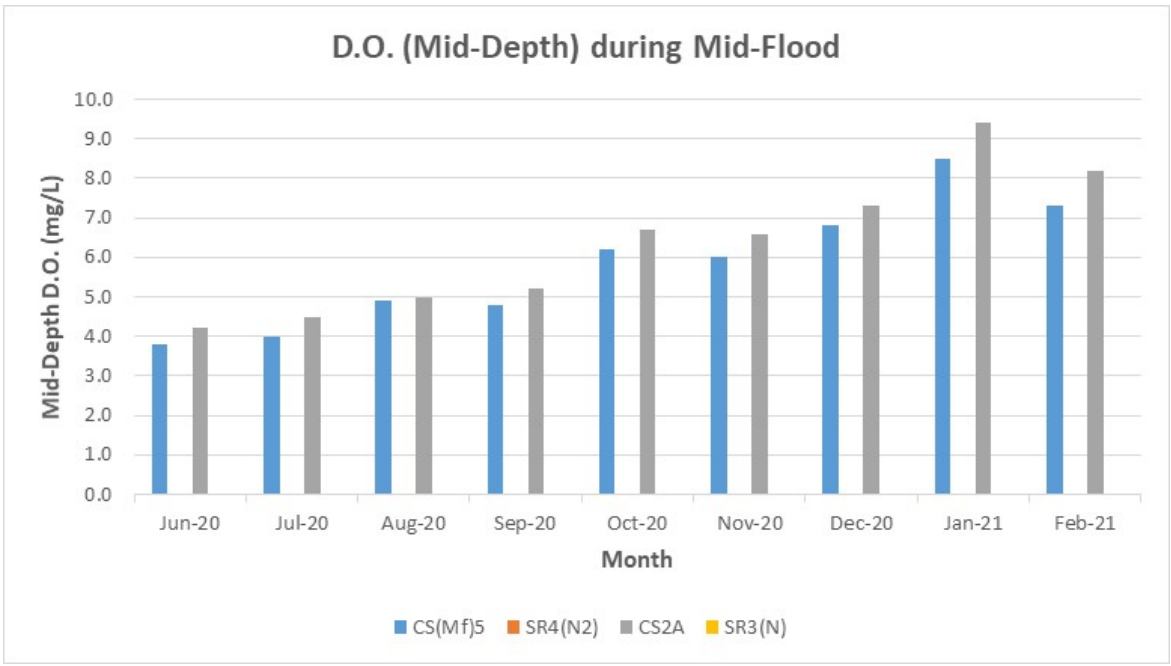


Figure G2 Operational Phase Monitoring – Mean Level of Dissolved Oxygen (mg/L) in mid-depth waters between 1 June 2020 and 28 February 2021. The weather conditions during the monitoring period varied mostly from sunny to cloudy.

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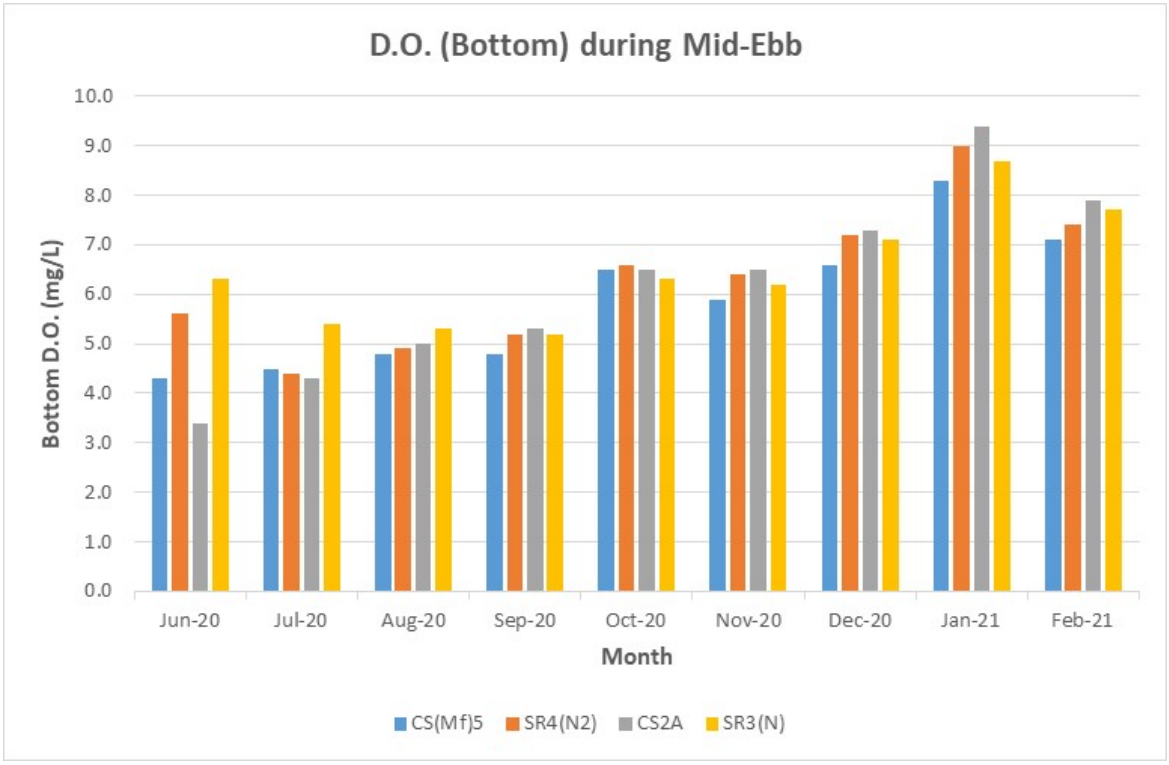


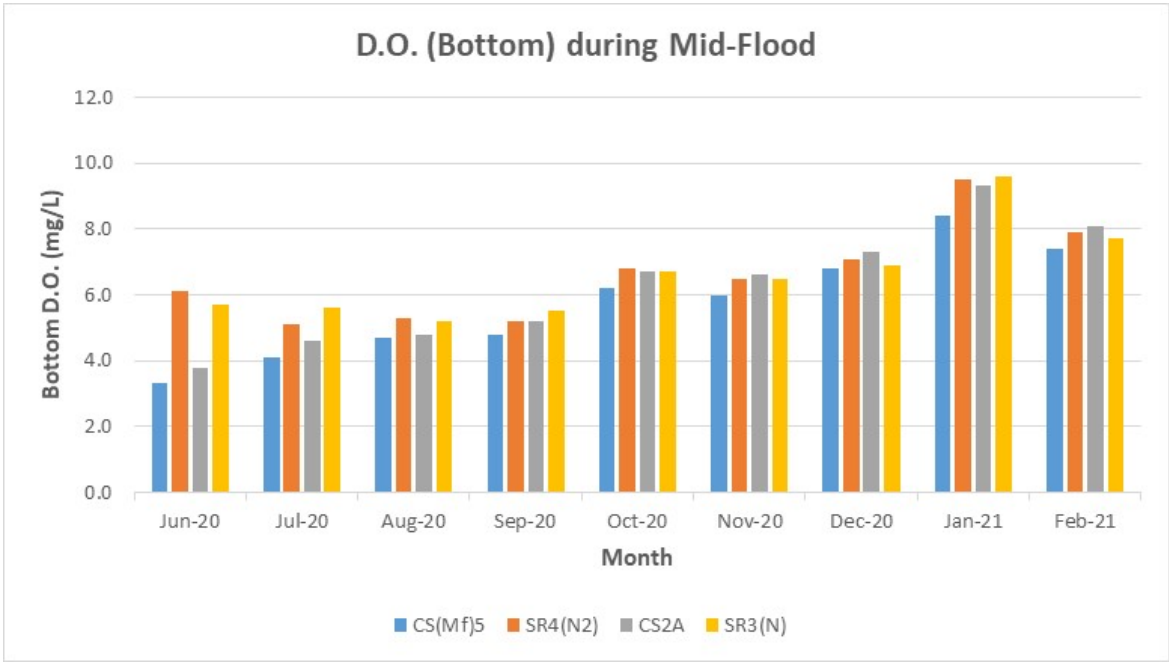
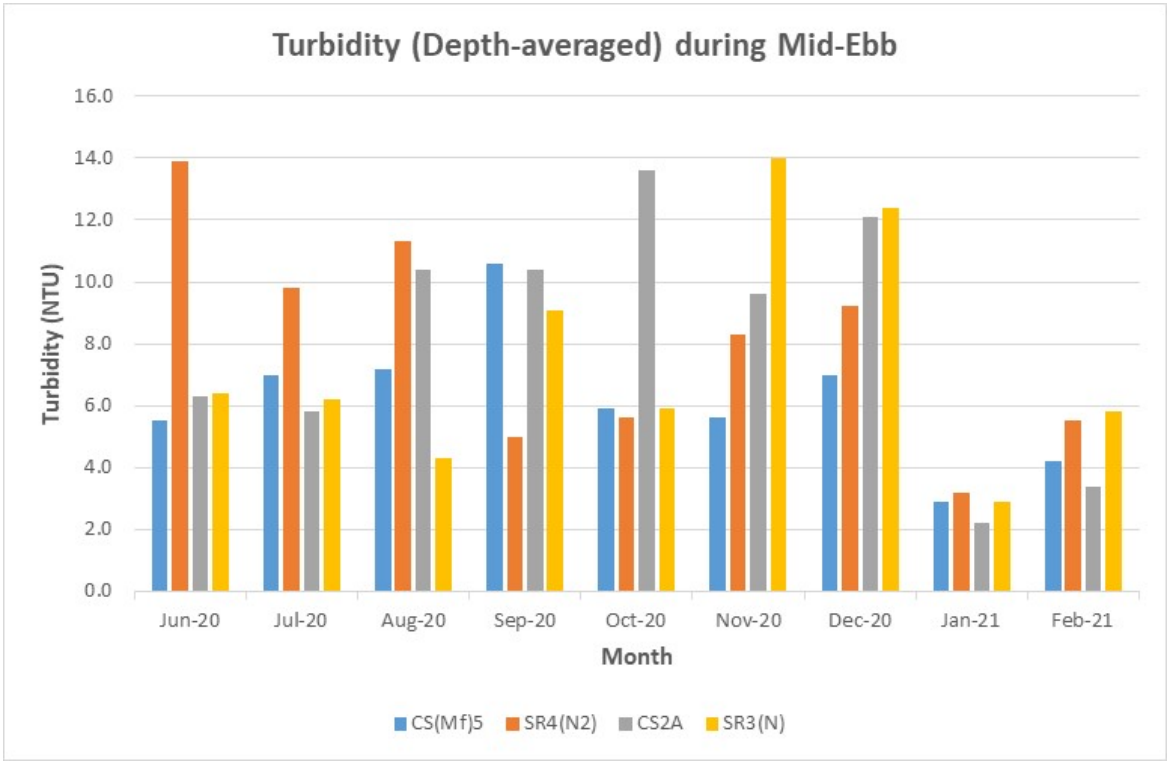


Figure G3 Operational Phase Monitoring – Mean Level of Dissolved Oxygen (mg/L) in bottom waters between 1 June 2020 and 28 February 2021. The weather conditions during the monitoring period varied mostly from sunny to cloudy.

Ref: 0212330_Impact-WQM_February 2021 _graphs_Rev a.xls

ERM



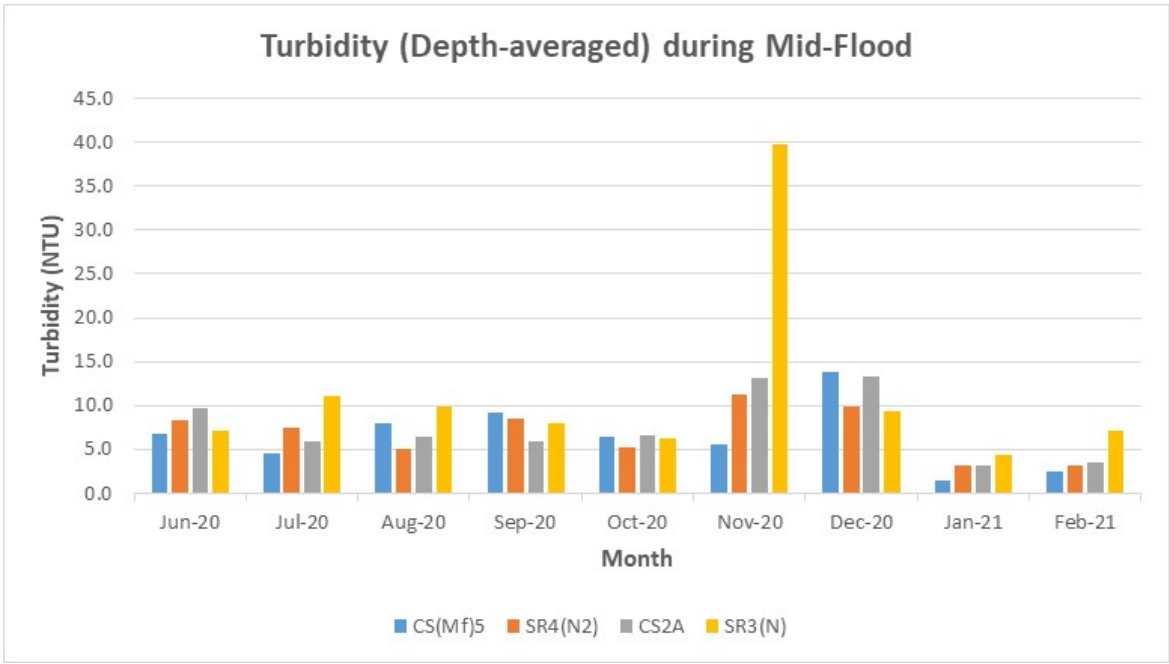
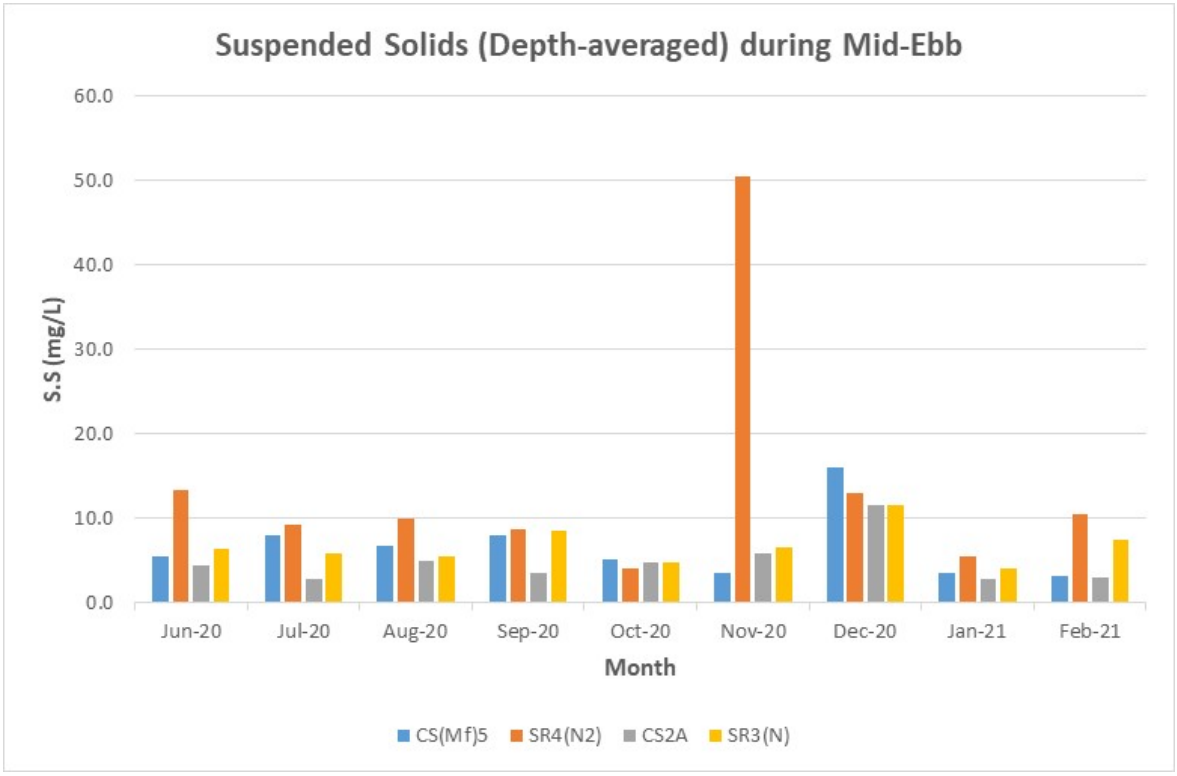


Figure G4 Operational Phase Monitoring – Mean Depth-averaged Level of Turbidity (NTU) between 1 June 2020 and 28 February 2021. The weather conditions during the monitoring period varied mostly from sunny to cloudy.

Ref: 0212330_Impact-WQM_February 2021 _graphs_Rev a.xls

ERM



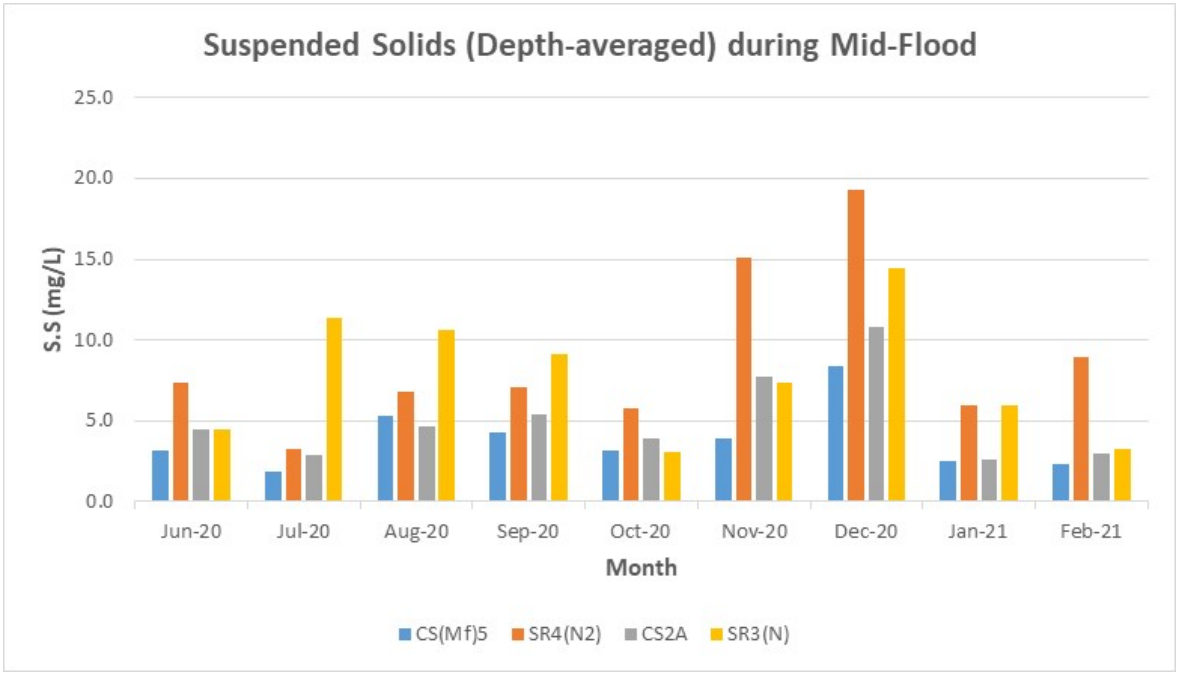


Figure G5 Operational Phase Monitoring – Mean Depth-averaged Level of Suspended Solids (mg/L) between 1 June 2020 and 28 February 2021. The weather conditions during the monitoring period varied mostly from sunny to cloudy.

Ref: 0212330_Impact-WQM_February 2021 _graphs_Rev a.xls

Appendix H

Post Construction (Operational) Dolphin Monitoring Survey

CONTRACT NO. HY/2012/08
Hong Kong-Zhuhai-Macao Bridge Tuen Mun – Chek Lap Kok Link (Northern Connection Sub-sea Tunnel Section) Post-Construction Dolphin Monitoring

3rd Quarterly Progress Report (December 2020-February 2021)
submitted to Dragages – Bouygues Joint Venture & ERM Hong Kong Ltd.

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

5 March 2021

1. Introduction

1.1. As part of the Hong Kong-Zhuhai-Macao Bridge, the Tuen Mun-Chek Lap Kok Link (TM-CLKL) Northern Connection Sub-sea Tunnel Section (Contract no. HY/2012/08) comprises the sub-sea TBM tunnels (two tubes with cross passages) across the Urmston Road to connect Tuen Area 40 and Hong Kong Boundary Crossing Facilities (HKBCF) of approximately 4 km in length with dual 2-lane carriageway, the tunnels at both the southern landfall and the northern landfall for construction of approach roads to the sub-sea TBM tunnels of approximately 1.5 km in length, as well as the northern landfall reclamation of approximately 16.5 hectares and about 20.km long seawalls. Dragages – Bouygues Joint Venture (hereinafter called the "Contractor") was awarded as the main contractor for the Northern Connection Sub-sea Tunnel Section, and ERM Hong Kong Limited would serve as the Environmental Team to implement the Environmental Monitoring and Audit (EM&A) programme.

1.2. According to the updated EM&A Manual (for TM-CLKL), monthly line-transect vessel surveys for Chinese White Dolphin should be conducted to cover the Northwest (NWL) and Northeast Lantau (NEL) survey areas as in AFCD annual marine mammal monitoring programme. Between 2013 and 2019, as such surveys have already been undertaken by the HKLR03 and HKBCF projects in the survey same areas of NEL and NWL, a combined monitoring approach was recommended by the Highways Department, that the TM-CLKL EM&A project can utilize the monitoring data collected by HKLR03 or HKBCF project to avoid any redundancy in monitoring effort. Such exemption for the dolphin monitoring has ended in September 2019 as the dolphin monitoring works carried out by HKLR03 and HKBCF contract have been completed. Starting in October 2019, TMCLKL08 contract takes over the dolphin monitoring works by conducting the regular vessel-based line-transect surveys during the construction phase. And as the construction works for the TMCLKL08 contract has also been completed in May 2020, the post-construction dolphin monitoring works have subsequently commenced in June 2020.

1.3. Since 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 TMCLKL 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) as well as the post-construction phase of the TMCLKL project in Northwest Lantau (NWL) and Northeast Lantau (NEL) survey areas. During both phases, the dolphin specialist is responsible to utilize the collected monitoring data in order to examine any potential impacts on the dolphins during and after the TMCLKL construction works.

1.4. This report is the third quarterly progress report under the TM-CLKL post-construction phase dolphin monitoring programme submitted to the Contractor, which summarizes the results of the survey findings during the period of December 2020 to February 2021.

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 and post-construction monitoring period. The co-ordinates of all transect lines are shown in Table 1.

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

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

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

2.1.2. The TMCLKL08 survey team used standard line-transect methods (Buckland et al. 2001) to conduct the systematic vessel surveys, and followed the same technique of data collection that has been adopted over the last 22 years of marine mammal monitoring surveys in Hong Kong developed by HKCRP (see Hung 2020). For each monitoring vessel survey, a 15-m inboard vessel with an open upper deck (about 4.5 m above water surface) was used to make observations from the flying bridge area.

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

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

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

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

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

2.2. Photo-identification Work

2.2.1. When a group of Chinese White Dolphins were sighted during the line-transect survey, the TMCLKL08 survey team would end effort and approach the group slowly from the side and behind to take photographs of them. Every attempt was made to photograph every dolphin in the group, and even photograph both sides of the dolphins, since the colouration and markings on both sides may not be symmetrical.

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

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

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

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

2.3. Data Analysis

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

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

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

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

2.3.3. Quantitative grid analysis on habitat use – To conduct quantitative grid analysis of habitat use, positions of on-effort sightings of Chinese White Dolphins collected during the quarterly monitoring period were plotted onto 1-km^2 grids among NWL and NEL survey areas on GIS. Sighting densities (number of on-effort sightings per km^2) and dolphin densities (total number of dolphins from on-effort sightings per km^2) were then calculated for each 1 km by 1 km grid with the aid of GIS.

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

The newly-derived unit for sighting density was termed SPSE, representing the number of on-effort **s**ightings **p**er 100 units of **s**urvey **e**ffort. In addition, the derived unit for actual dolphin density was termed DPSE, representing the number of **d**olphins **p**er 100 units of **s**urvey **e**ffort. Among the 1-km^2 grids that were partially covered by land, the percentage of sea area was calculated using GIS tools, and their SPSE and DPSE values were adjusted accordingly. The following formulae were used to estimate SPSE and DPSE in each 1-km^2 grid within the study area:

SPSE = ((S / E) x 100) / SA%
DPSE = ((D / E) x 100) / SA%

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

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

2.3.5. Ranging pattern analysis – Location data of individual dolphins that occurred during the 3-month impact phase monitoring period were obtained from the dolphin sighting database and photo-identification catalogue. To deduce home ranges for individual dolphins using the fixed kernel methods, the program Animal Movement Analyst Extension, was loaded as an extension with ArcView© 3.1 along with another extension Spatial Analyst 2.0. Using the fixed kernel method, the program calculated kernel density estimates based on all sighting positions, and provided an active interface to display kernel density plots. The kernel estimator then calculated and displayed the overall ranging area at 95% UD level.

3. Monitoring Results

3.1. Summary of survey effort and dolphin sightings

3.1.1. During the period of December 2020 to February 2021, six sets of systematic line-transect vessel surveys were conducted under the TMCLKL08 post-construction dolphin monitoring works to cover all transect lines in NWL and NEL survey areas twice per month.

3.1.2. From these TMCLKL08 surveys, a total of 777.67 km of survey effort was collected, with 98.3% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility). Among the two areas, 290.80 km and 486.87 km of survey effort were conducted in NEL and NWL survey areas respectively.

3.1.3. The total survey effort conducted on primary lines was 579.21 km, while the effort on secondary lines was 198.46 km. Survey effort conducted on both primary and secondary lines were considered to be on-effort survey data. A summary table of the survey effort is shown in Appendix I.

3.1.4. During the six sets of TMCLKL08 monitoring surveys conducted between December

2020 and February 2021, a total of 14 groups of 40 Chinese White Dolphins were sighted. All dolphin sightings were made during on-effort search in this quarter, with 11 of the dolphin groups sighted on primary lines. A summary table of dolphin sightings is shown in Appendix II.

3.1.5. In this quarterly period, all 14 dolphin groups were sighted in NWL, and no dolphin was sighted at all in NEL. In fact, since August 2014, only two sightings of two lone dolphins were made respectively in NEL during the HKLR03/TMCLKL08 monitoring surveys.

3.2. Distribution

3.2.1. Distribution of dolphin sightings made during the TMCLKL08 monitoring surveys from December 2020 to February 2021 is shown in Figure 1. The 14 dolphin sightings were all made at the western end of the North Lantau region, with half of them made around Lung Kwu Chau (Figure 1). Other dolphin groups were sighted near Sha Chau, as well as the northwestern and southwestern corners of NWL survey area. As consistently recorded in previous monitoring quarters in recent years, the dolphins were completely absent from the central and eastern portions of North Lantau waters (Figure 1).

3.2.2. Notably, all dolphin sightings made during this quarterly period were located far away from the TMCLKL alignment as well as the HKBCF and HKLR03 reclamation sites (Figure 1). However, three sightings were made just 1-2 km to the north of the HKLR09 alignment.

3.2.3. Sighting distribution of dolphins during the present post-construction monitoring period was drastically different from the one during the baseline monitoring period (Figure 1). In the present quarter, dolphins have disappeared from the NEL region, which was in stark contrast to their frequent occurrence around the Brothers Islands, near Shum Shui Kok and in the vicinity of HKBCF reclamation site during the baseline period (Figure 1). The nearly complete abandonment of NEL region by the dolphins has been consistently recorded in the past seven years of HKLR03/TMCLKL08 dolphin monitoring, which has resulted in zero to extremely low encounter rates in this area.

3.2.4. In NWL survey area, dolphin occurrences were also drastically different between the baseline and the present post-construction monitoring periods. During the present quarter, the dolphin sightings were confined to the western end of the North Lantau region, which was in contrary to their frequent occurrences throughout the area during the baseline period (Figure 1).

3.2.5. Another comparison in dolphin distribution was made between six quarterly periods of winter months in 2015-21 (Figure 2). Across the six winter periods, the majority of dolphin sightings were made consistently at the western end of the North Lantau region (Figure 2). However, some sightings were also made in the central portion of this region in 2015-16 but the dolphin distribution has become more restricted to become mostly close to the western territorial border in recent years. Notably, they were consistently absent from the NEL survey area throughout the six winter periods.

3.3. Encounter rate

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

Table 2. Dolphin encounter rates (sightings per 100 km of survey effort) during December 2020-February 2021

SURVEY AREA	DOLPHIN MONITORING DATES	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)
		Primary Lines Only	Primary Lines Only
Northeast Lantau	Set 1 (1 & 3 Dec 2020)	0.00	0.00
	Set 2 (8 & 10 Dec 2020)	0.00	0.00
	Set 3 (25 & 26 Jan 2021)	0.00	0.00
	Set 4 (27 & 28 Jan 2021)	0.00	0.00
	Set 5 (2 & 8 Feb 2021)	0.00	0.00
	Set 6 (18 & 23 Feb 2021)	0.00	0.00
Northwest Lantau	Set 1 (1 & 3 Dec 2020)	0.00	0.00
	Set 2 (8 & 10 Dec 2020)	0.00	0.00
	Set 3 (25 & 26 Jan 2021)	6.50	19.51
	Set 4 (27 & 28 Jan 2021)	5.08	11.86
	Set 5 (2 & 8 Feb 2021)	4.87	17.84
	Set 6 (18 & 23 Feb 2021)	1.62	1.62

Table 3. Comparison of average dolphin encounter rates from the present post-construction monitoring period (December 2020-February 2021) and baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; ± denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)		Encounter rate (ANI) (no. of dolphins from all on-effort sightings per 100 km of survey effort)	
	December 2020 – February 2021	September – November 2011	December 2020 – February 2021	September – November 2011
Northeast Lantau	0.0	6.00 ± 5.05	0.0	22.19 ± 26.81
Northwest Lantau	3.01 ± 2.83	9.85 ± 5.85	8.47 ± 9.07	44.66 ± 29.85

3.3.2. To facilitate the comparison with the AFCD long-term monitoring results, the encounter rates were also calculated for the present quarter using both primary and secondary survey effort. The encounter rates of sightings (STG) and dolphins (ANI) in NWL were 2.75 sightings and 8.24 dolphins per 100 km of survey effort respectively, while the encounter rates of sightings (STG) and dolphins (ANI) in NEL were both nil for this quarter.

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

Table 4. Comparison of average dolphin encounter rates in Northeast Lantau survey area from the same winter quarters of HKLR03/TMCLKL08 impact and post-construction monitoring periods since 2012-13 and the baseline monitoring period (September-November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; ± denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	6.00 ± 5.05	22.19 ± 26.81
December 2012-February 2013 (Impact)	3.14 ± 3.21	6.33 ± 8.64
December 2013-February 2014 (Impact)	0.45 ± 1.10	1.34 ± 3.29
December 2014-February 2015 (Impact)	0.00	0.00
December 2015-February 2016 (Impact)	0.00	0.00
December 2016-February 2017 (Impact)	0.00	0.00
December 2017-February 2018 (Impact)	0.00	0.00
December 2018-February 2019 (Impact)	0.00	0.00
December 2019-February 2020 (Impact)	0.00	0.00
December 2020-February 2021 (Post-Construction)	0.00	0.00

3.3.4. On the other hand, the average dolphin encounter rates (STG and ANI) in NWL during the present quarterly period were only small fractions of the ones recorded during the three-month baseline period (with reductions of 69.4% and 81.0% respectively), indicating a dramatic decline in dolphin usage of this survey area during the present quarterly period as compared to the baseline period in 2011 (Table 5).

3.3.5. When comparing to the past eight winter quarters in 2012-20, although the quarterly encounter rate in STG in 2020-21 has rebounded slightly from the lowest level recorded in 2019-20, the encounter rate in ANI has remained at the lowest level as in the previous two winter quarters (Table 5). The dramatic drop in dolphin occurrence in NWL after the winter period in 2013-14 raises serious concerns, and the temporal trend would need

to be closely monitoring in upcoming quarters when all construction activities of HZMB works have been completed.

Table 5. Comparison of average dolphin encounter rates in Northwest Lantau survey area from the same winter quarters of HKLR03/TMCLKL08 impact and post-construction monitoring periods since 2012-13 and the baseline monitoring period (September- November 2011) (Note: encounter rates deduced from the baseline monitoring period have been recalculated based only on survey effort and on-effort sighting data made along the primary transect lines under favourable conditions; ± denotes the standard deviation of the average encounter rates)

	Encounter rate (STG) (no. of on-effort dolphin sightings per 100 km of survey effort)	**Encounter rate (ANI)** (no. of dolphins from all on-effort sightings per 100 km of survey effort)
September-November 2011 (Baseline)	9.85 ± 5.85	44.66 ± 29.85
December 2012-February 2013 (Impact)	8.36 ± 5.03	35.90 ± 23.10
December 2013-February 2014 (Impact)	8.21 ± 2.21	32.58 ± 11.21
December 2014-February 2015 (Impact)	2.91 ± 2.69	11.27 ± 15.19
December 2015-February 2016 (Impact)	2.64 ± 1.52	10.98 ± 3.81
December 2016-February 2017 (Impact)	3.80 ± 3.79	14.52 ± 17.21
December 2017-February 2018 (Impact)	4.75 ± 2.26	15.73 ± 15.94
December 2018-February 2019 (Impact)	2.40 ± 1.88	7.95 ± 6.60
December 2019-February 2020 (Impact)	1.96 ± 2.23	8.15 ± 10.85
December 2020-February 2021 (Post-Construction)	3.01 ± 2.83	8.47 ± 9.07

3.3.6. A two-way ANOVA with repeated measures and unequal sample size was conducted to examine whether there were any significant differences in the average encounter rates between the baseline and HKLR03/TMCLKL08 monitoring periods. The two variables that were examined included the two periods (baseline and impact/post-construction phases) and two locations (NEL and NWL).

3.3.7. For the comparison between the baseline period and the present quarter (the third quarter of the TMCLKL08 post-construction monitoring period being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were 0.0063 and 0.0268 respectively. If the alpha value is set at 0.05, significant differences were detected between the baseline period and present quarter in both the average dolphin encounter rates of STG and ANI.

3.3.8. For the comparison between the baseline period and the cumulative quarters of the HKLR03/TMCLKL08 monitoring period (i.e. the first 33 quarters of the impact and post-construction phases being assessed), the p-values for the differences in average dolphin encounter rates of STG and ANI were both 0.000000. Even if the alpha value is set at 0.00001, significant differences were still detected in both the average dolphin encounter rates of STG and ANI (i.e. between the cumulative periods and the locations).

3.3.9. As indicated in both dolphin distribution patterns and encounter rates, dolphin usage has been significantly and dramatically reduced in both NEL and NWL survey areas during the present quarterly period, and such low occurrence of dolphins has also been consistently documented throughout the HKLR03/TMCLKL08 monitoring period.

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

3.4. Group size

3.4.1. Group size of the 14 Chinese White Dolphin sightings ranged from singletons to eight animals per group in the North Lantau region during December 2020-February 2021. The average dolphin group sizes from these three months were compared with the ones deduced from the baseline period in September to November 2011, as shown in Table 6.

Table 6. Comparison of average dolphin group sizes from the present post-construction monitoring period (December 2020 – February 2021) and baseline monitoring period (September – November 2011) (Note: ± denotes the standard deviation of the average group size)

	Average Dolphin Group Size	
	December 2020 – February 2021	**September – November 2011**
Overall	2.86 ± 2.45 (n = 14)	3.72 ± 3.13 (n = 66)
Northeast Lantau	---	3.18 ± 2.16 (n = 17)
Northwest Lantau	2.86 ± 2.45 (n = 14)	3.92 ± 3.40 (n = 49)

3.4.2. The average dolphin group size in NWL waters during the present quarter was lower than the one recorded during the three-month baseline period, but it should also be noted that the sample size of 14 dolphin groups in the present quarter was only a small fraction of the 66 dolphin groups sighted during the baseline period (Table 6).

3.4.3. Notably, nine of the 14 dolphin groups were very small with 1-2 individuals per group only, but there were also three medium-sized groups of dolphins with 6-8 individuals per group (Appendix II). These larger groups were sighted near the northwestern corner of the NWL survey area, to the north of Lung Kwu Chau and to the west of the airport platform, respectively (Figure 3). This is in stark contrast to the baseline period when the larger groups were frequently sighted and evenly distributed throughout NWL waters, with a few also sighted in NEL waters (Figure 3).

3.5. Habitat use

3.5.1. From December 2020 to February 2021, a total of 13 grids in North Lantau waters have recorded dolphin occurrences, and all of them were located at the western end of the NWL survey area (Figures 4a and 4b). A few grids near Lung Kwu Chau, at the northwestern corner of NWL survey area, and to the southwest of the airport platform

recorded higher dolphin densities. Notably, all grids near TMCLKL alignment did not record any presence of dolphins at all during on-effort search in the present quarterly period (Figures 4a and 4b).

3.5.2. It should be emphasized that the amount of survey effort collected in each grid during the three-month period was fairly low (6-12 units of survey effort for most grids), and therefore the habitat use pattern derived from the three-month dataset should be treated with caution.

3.5.3. When compared with the habitat use patterns during the baseline period, dolphin usage in NEL and NWL has drastically diminished in both areas during the present post-construction monitoring period (Figure 5). During the baseline period, many grids between Siu Mo To and Shum Shui Kok in NEL recorded moderately high to high dolphin densities, which was in stark contrast to the complete absence of dolphins there during the present quarter (Figure 5).

3.5.4. The density patterns were also very different in NWL between the baseline and present post-construction monitoring periods, with high dolphin usage throughout the area, especially around Sha Chau, near Black Point, to the west of the airport, as well as between Pillar Point and airport platform during the baseline period. On the contrary, the grids with dolphin occurrences were all distributed at the western end of the NWL survey area with only a handful of grids recording higher dolphin densities during the present quarter (Figure 5).

3.6. Mother-calf pairs

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

3.7. Activities and associations with fishing boats

3.7.1. From December 2020 to February 2021, four dolphin groups were engaged in feeding activities but none was engaged in socializing or other activities. These four groups were located near Lung Kwu Chau and to the west of the airport platform, and such distribution is in stark contrast with the regular occurrence and even distribution of dolphin groups engaged in different activities during the baseline period (Figure 6).

3.7.2. Notably, none of the 14 dolphin groups was found to be associated with any operating fishing vessel during this post-construction monitoring period.

3.8. Summary of photo-identification works

3.8.1. About 1,000 digital photographs of Chinese White Dolphins were taken during the present post-construction monitoring period for the photo-identification work. In total, 21 individuals sighted 25 times were identified (see summary table in Appendix III and photographs of identified individuals in Appendix IV).

3.8.2. All of these re-sightings were made in NWL. Seventeen individuals were re-sighted only once, while another four individuals (NL49, NL202, NL331 and WL179) were re-sighted twice during the quarterly monitoring period (Appendix III).

3.9. Individual range use

3.9.1. Ranging patterns of the 21 individuals identified during the present quarterly period were determined by fixed kernel method, and are shown in Appendix V.

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

3.9.3. Notably, most of the individuals have primarily centered their range use in North Lantau waters in the past, and were still re-sighted within their normal ranges during this quarterly period. But there were also a number of individuals (e.g. CH105, WL179, WL227) which have their primary ranges in West Lantau waters but have extended to NWL waters during the present quarterly period (Appendix V).

4. References

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

- Hung, S. K. 2020. Monitoring of marine mammals in Hong Kong waters – data collection: final report (2019-20). An unpublished report submitted to the Agriculture, Fisheries and Conservation Department of Hong Kong SAR Government, 138 pp.

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

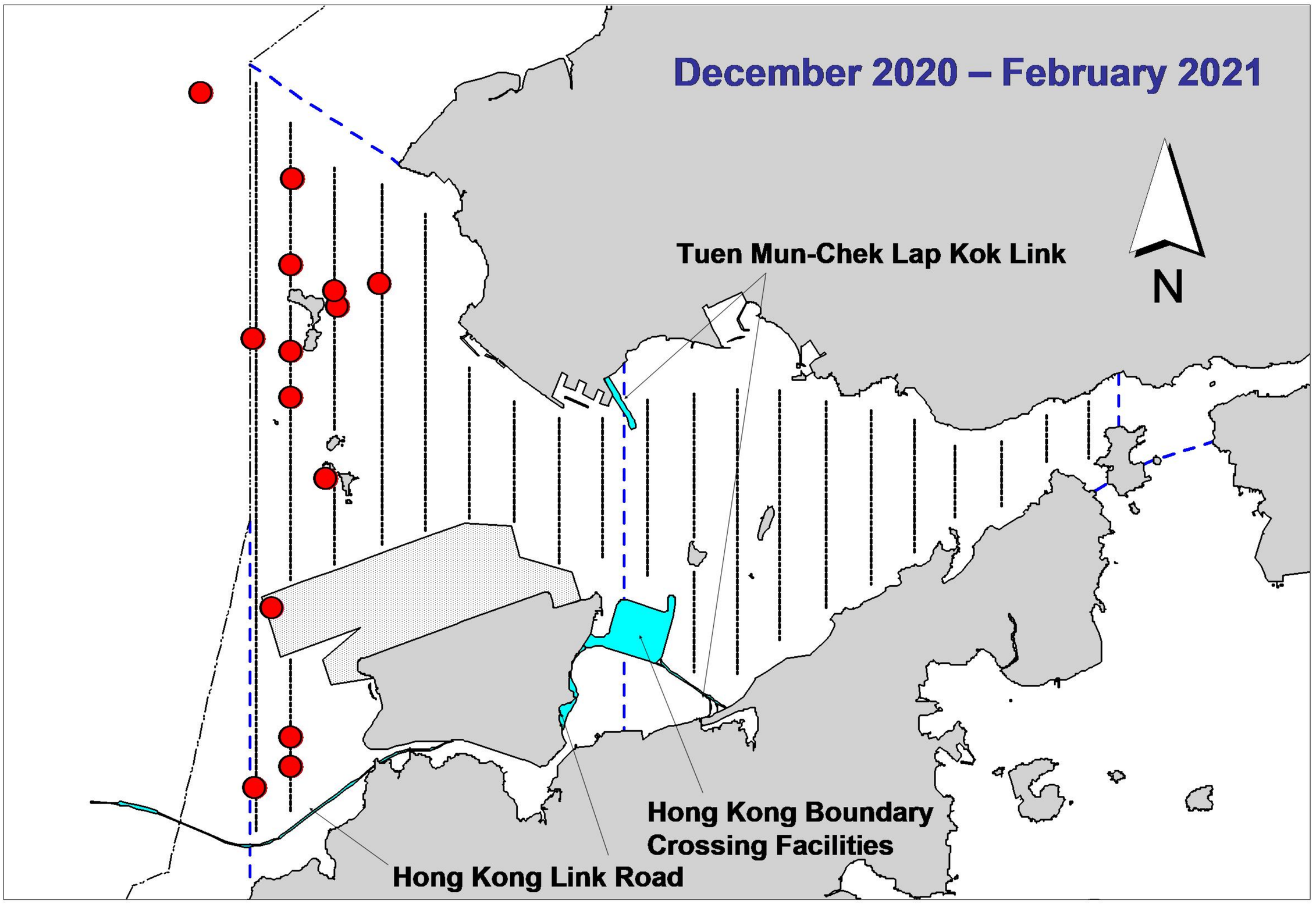


Figure 1. Distribution of Chinese white dolphin sighting in Northwest and Northeast Lantau during the present TMCLKL08 monitoring period (top) and baseline period in 2011 (bottom)

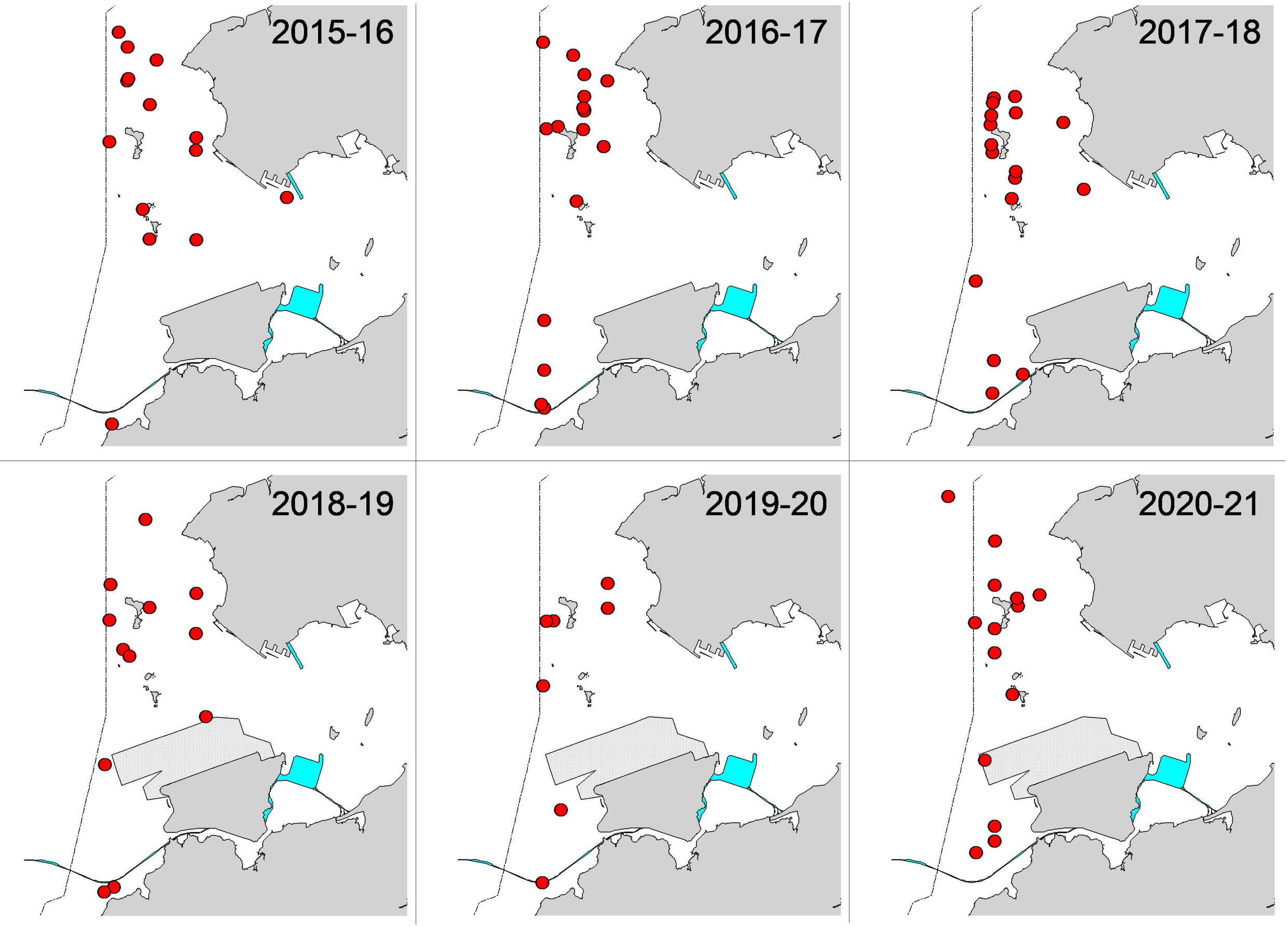


Figure 2. Distribution of Chinese white dolphin sightings in Northwest and Northeast Lantau during the past six winter quarters (December-February) of HKLR03/TMCLKL08 monitoring in 2015-21

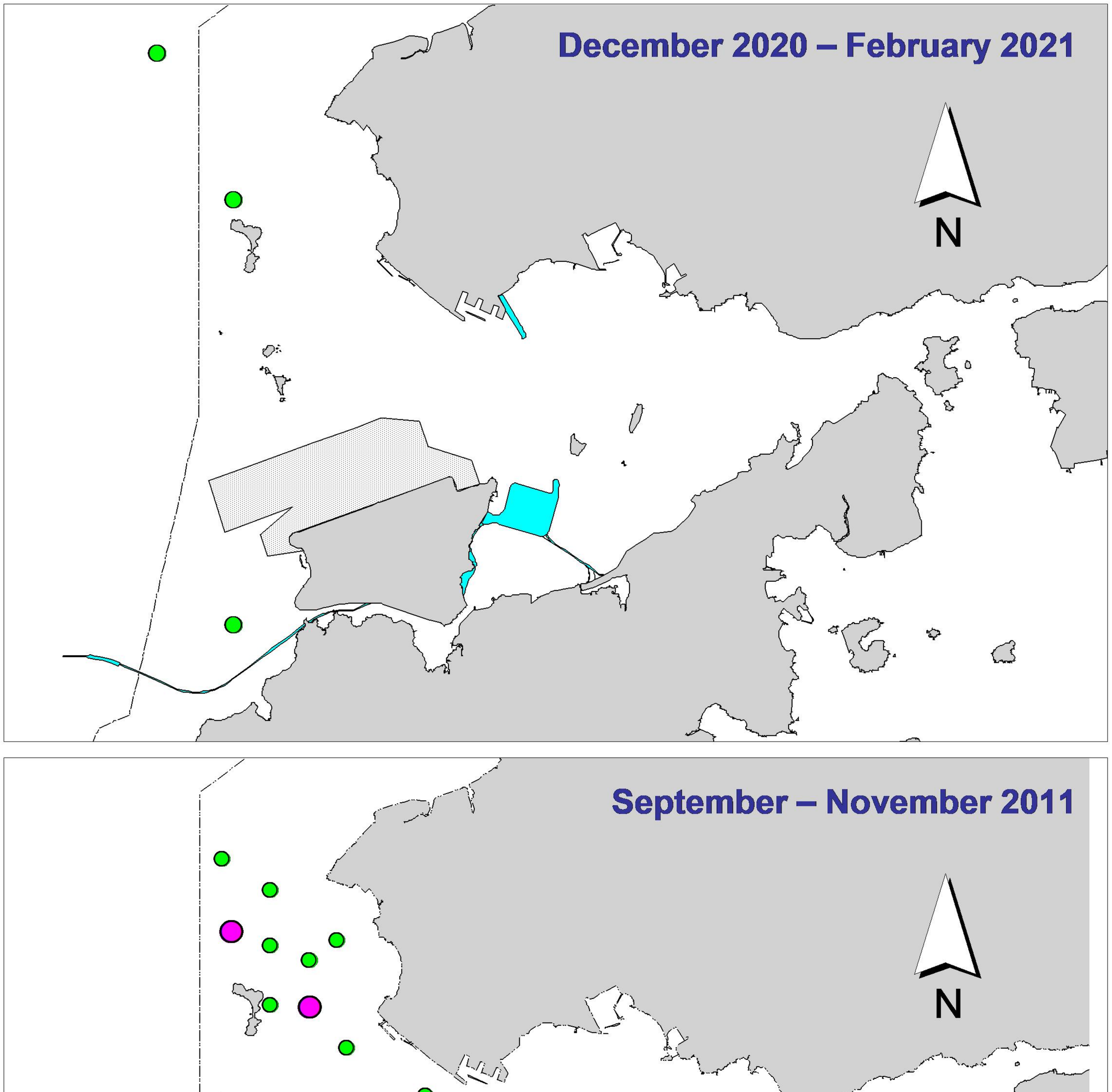


Figure 3. Distribution of Chinese white dolphins with larger group sizes during the present TMCLKL08 monitoring period (top) and baseline period in 2011 (bottom) (green dots: group sizes of 5 or more; purple dots: group sizes of 10 or more)

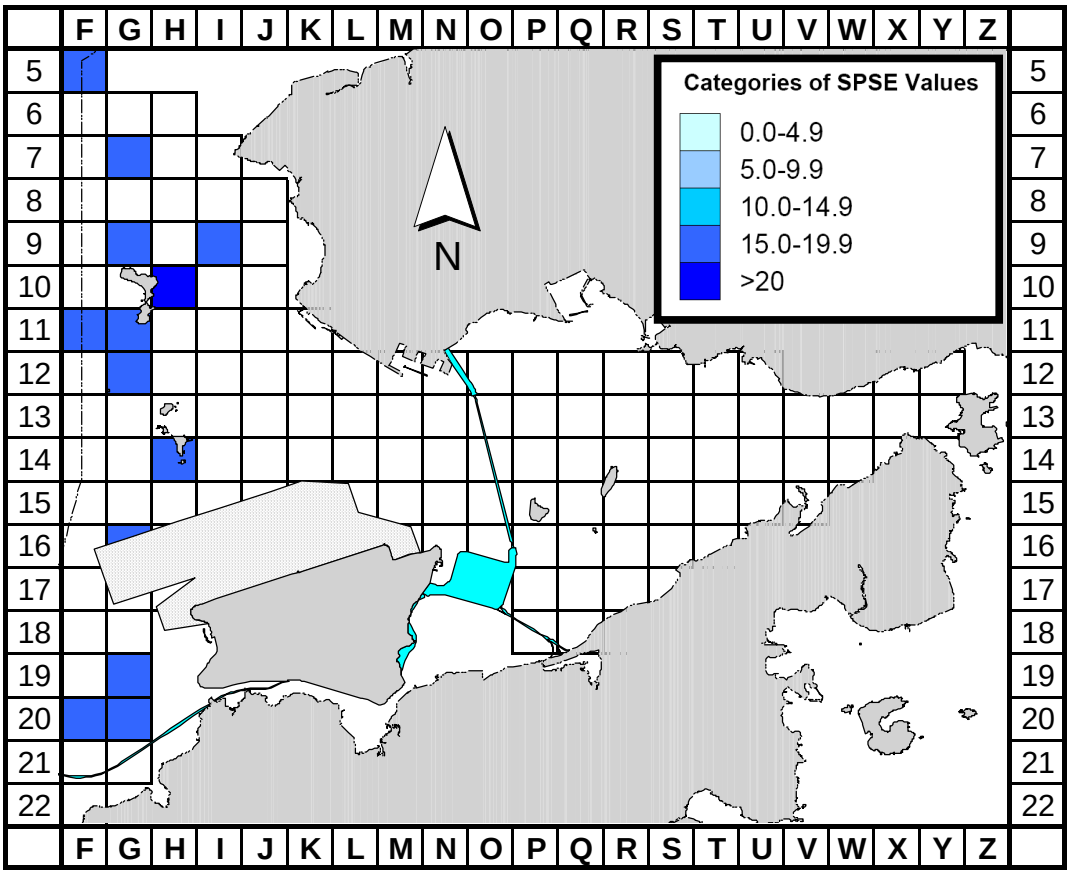


Figure 4a. Sighting density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during present TMCLKL08 monitoring period (December 2020-February 2021) (SPSE = no. of on-effort sightings per 100 units of survey effort)

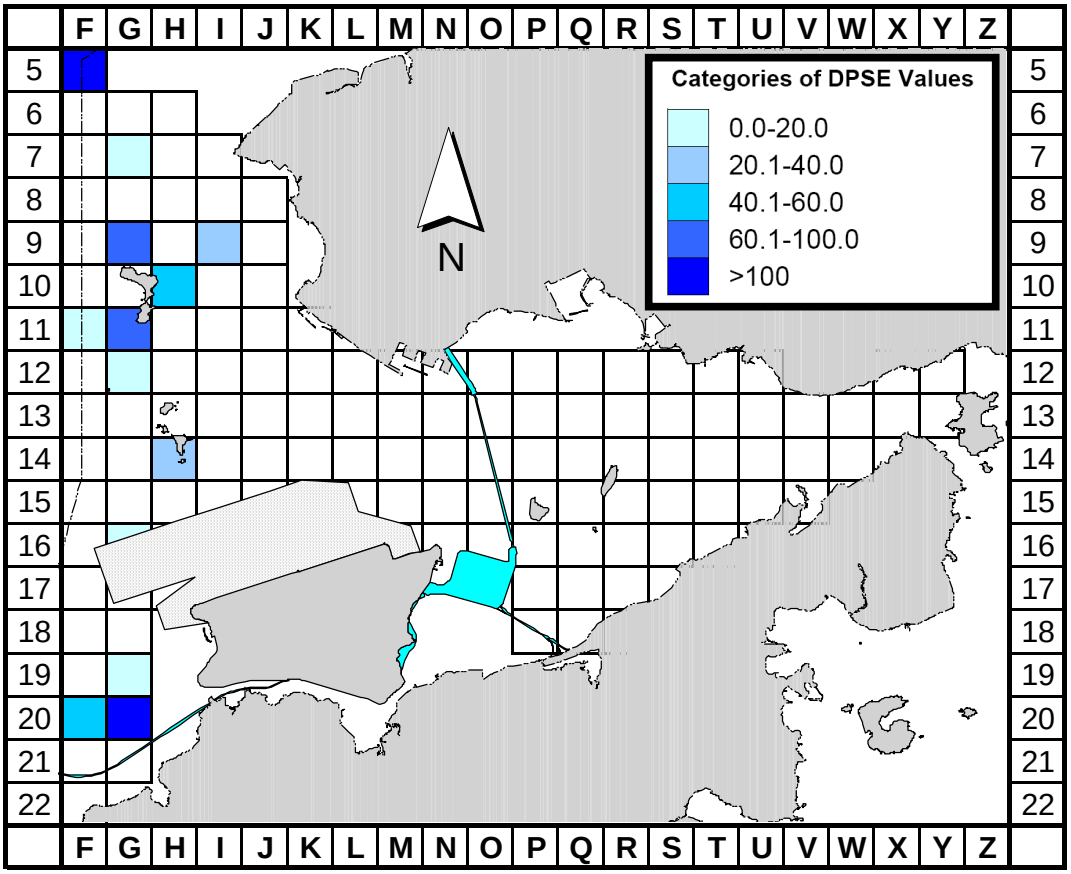


Figure 4b. Density of Chinese white dolphins with corrected survey effort per km^2 in Northeast and Northwest Lantau survey areas, using data collected during present TMCLKL08 monitoring period (December 2020-February 2021) (DPSE = no. of dolphins per 100 units of survey effort)

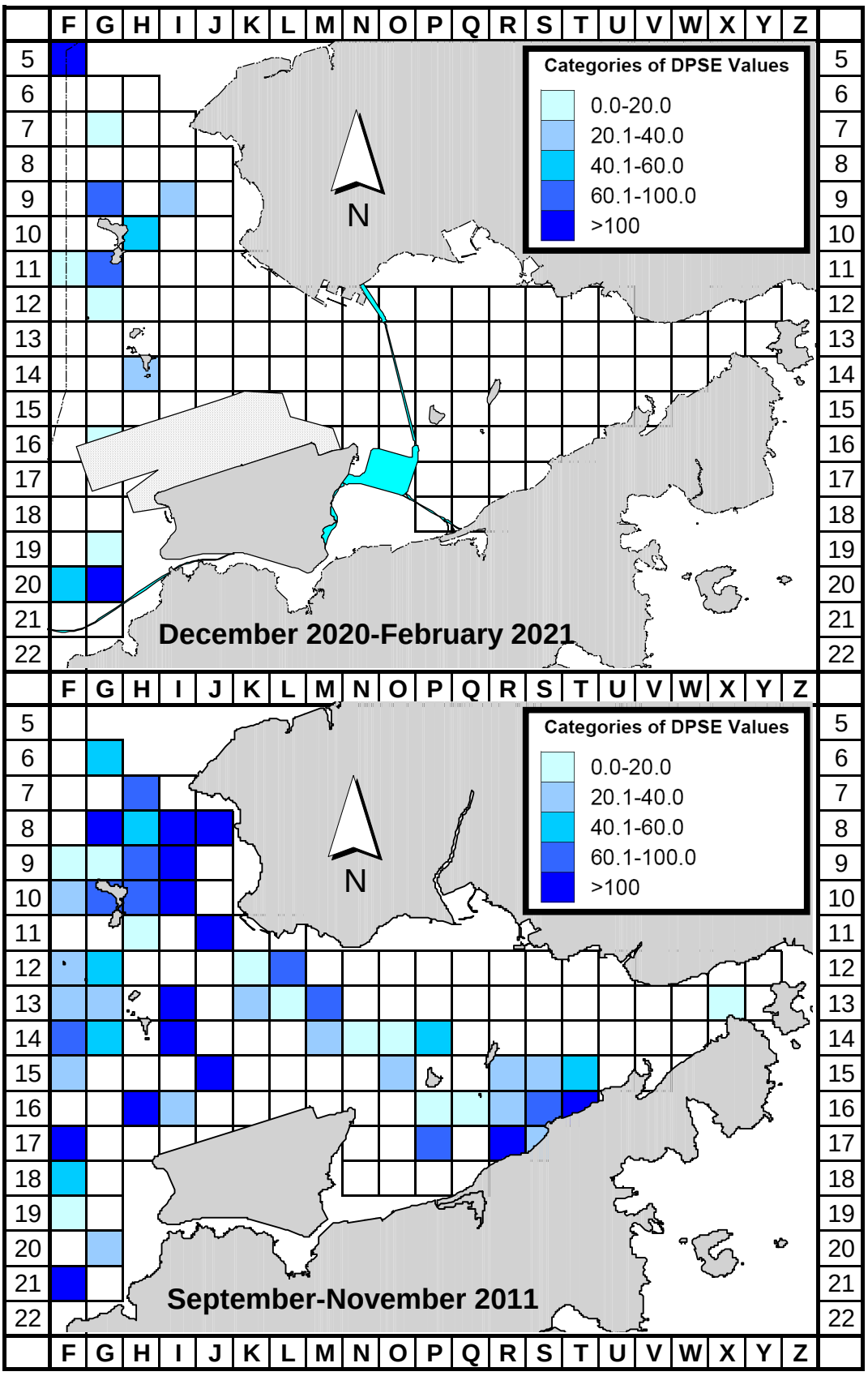


Figure 5. Comparison of density of Chinese white dolphins with corrected survey effort per km^2 in Northwest and Northeast Lantau survey area between present TMCLKL08 monitoring period (December 2020 - February 2021) and baseline monitoring period (September-November 2011) (DPSE = no. of dolphins per 100 units of survey effort)

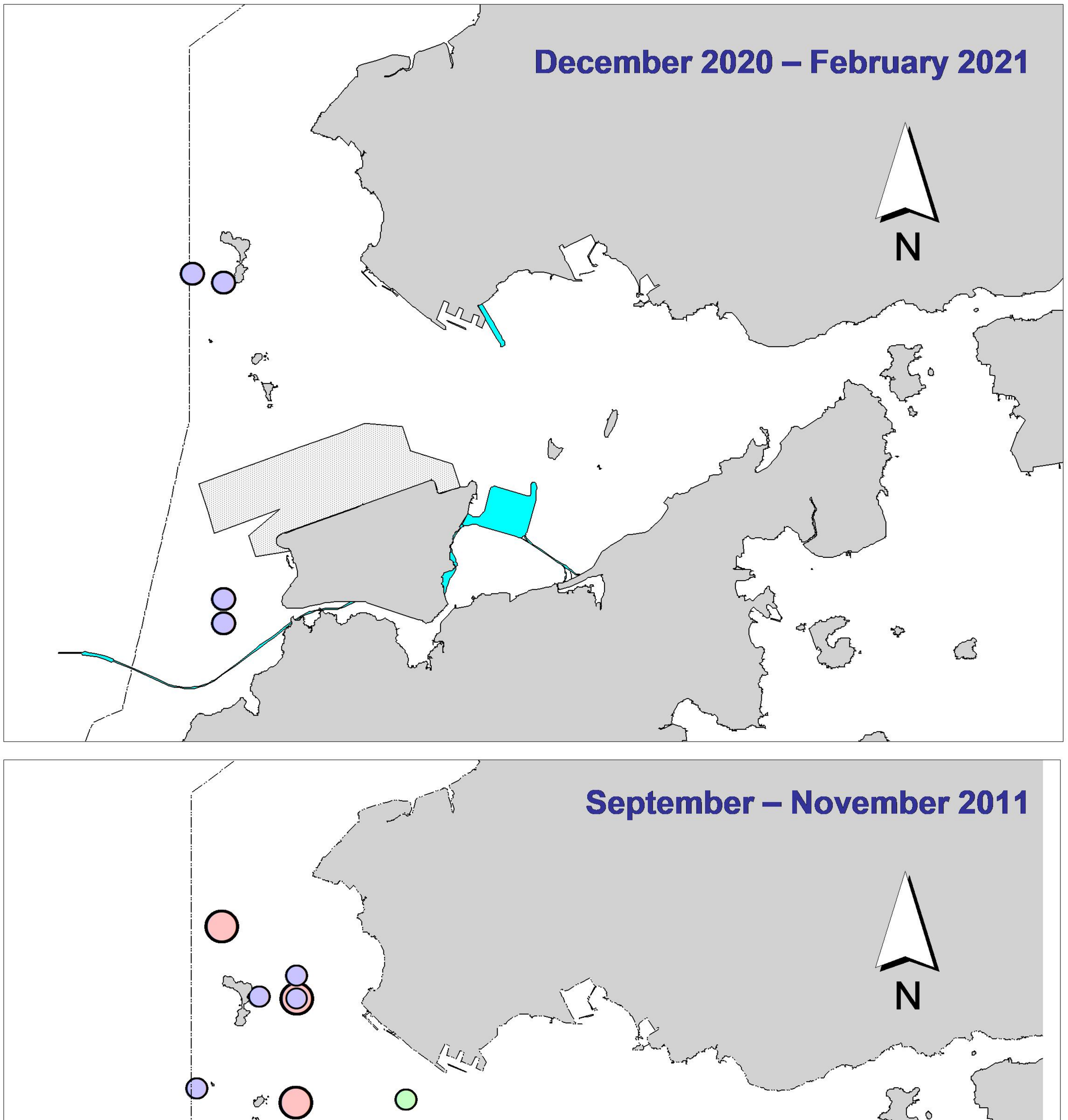


Figure 6. Distribution of Chinese white dolphins engaged in feeding (purple dots), socializing (pink dots) and traveling (green dots) activities during the present TMCLKL08 monitoring period (top) and baseline period in 2011 (bottom)

Appendix I. TMCLKL08 Survey Effort Database (Dec 2020 - Feb 2021)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
1-Dec-20	NW LANTAU	2	9.10	WINTER	STANDARD36826	TMCLKL	P
1-Dec-20	NW LANTAU	3	13.63	WINTER	STANDARD36826	TMCLKL	P
1-Dec-20	NW LANTAU	4	4.83	WINTER	STANDARD36826	TMCLKL	P
1-Dec-20	NW LANTAU	2	9.00	WINTER	STANDARD36826	TMCLKL	S
1-Dec-20	NW LANTAU	3	2.44	WINTER	STANDARD36826	TMCLKL	S
1-Dec-20	NE LANTAU	1	2.50	WINTER	STANDARD36826	TMCLKL	P
1-Dec-20	NE LANTAU	2	32.93	WINTER	STANDARD36826	TMCLKL	P
1-Dec-20	NE LANTAU	1	1.20	WINTER	STANDARD36826	TMCLKL	S
1-Dec-20	NE LANTAU	2	11.77	WINTER	STANDARD36826	TMCLKL	S
3-Dec-20	NW LANTAU	2	1.43	WINTER	STANDARD36826	TMCLKL	P
3-Dec-20	NW LANTAU	3	23.50	WINTER	STANDARD36826	TMCLKL	P
3-Dec-20	NW LANTAU	4	8.46	WINTER	STANDARD36826	TMCLKL	P
3-Dec-20	NW LANTAU	2	1.84	WINTER	STANDARD36826	TMCLKL	S
3-Dec-20	NW LANTAU	3	6.47	WINTER	STANDARD36826	TMCLKL	S
8-Dec-20	NW LANTAU	2	5.40	WINTER	STANDARD36826	TMCLKL	P
8-Dec-20	NW LANTAU	3	22.14	WINTER	STANDARD36826	TMCLKL	P
8-Dec-20	NW LANTAU	2	3.60	WINTER	STANDARD36826	TMCLKL	S
8-Dec-20	NW LANTAU	3	8.06	WINTER	STANDARD36826	TMCLKL	S
8-Dec-20	NE LANTAU	2	35.51	WINTER	STANDARD36826	TMCLKL	P
8-Dec-20	NE LANTAU	2	12.49	WINTER	STANDARD36826	TMCLKL	S
10-Dec-20	NW LANTAU	2	27.88	WINTER	STANDARD36826	TMCLKL	P
10-Dec-20	NW LANTAU	3	4.95	WINTER	STANDARD36826	TMCLKL	P
10-Dec-20	NW LANTAU	2	8.26	WINTER	STANDARD36826	TMCLKL	S
25-Jan-21	NW LANTAU	1	4.08	WINTER	STANDARD36826	TMCLKL	P
25-Jan-21	NW LANTAU	2	28.26	WINTER	STANDARD36826	TMCLKL	P
25-Jan-21	NW LANTAU	2	8.25	WINTER	STANDARD36826	TMCLKL	S
26-Jan-21	NW LANTAU	1	4.74	WINTER	STANDARD36826	TMCLKL	P
26-Jan-21	NW LANTAU	2	24.42	WINTER	STANDARD36826	TMCLKL	P
26-Jan-21	NW LANTAU	1	1.50	WINTER	STANDARD36826	TMCLKL	S
26-Jan-21	NW LANTAU	2	8.81	WINTER	STANDARD36826	TMCLKL	S
26-Jan-21	NE LANTAU	1	2.60	WINTER	STANDARD36826	TMCLKL	P
26-Jan-21	NE LANTAU	2	33.98	WINTER	STANDARD36826	TMCLKL	P
26-Jan-21	NE LANTAU	1	2.30	WINTER	STANDARD36826	TMCLKL	S
26-Jan-21	NE LANTAU	2	9.92	WINTER	STANDARD36826	TMCLKL	S
27-Jan-21	NW LANTAU	1	6.50	WINTER	STANDARD36826	TMCLKL	P
27-Jan-21	NW LANTAU	2	26.15	WINTER	STANDARD36826	TMCLKL	P
27-Jan-21	NW LANTAU	1	3.90	WINTER	STANDARD36826	TMCLKL	S
27-Jan-21	NW LANTAU	2	6.75	WINTER	STANDARD36826	TMCLKL	S
28-Jan-21	NW LANTAU	1	0.52	WINTER	STANDARD36826	TMCLKL	P
28-Jan-21	NW LANTAU	2	22.11	WINTER	STANDARD36826	TMCLKL	P
28-Jan-21	NW LANTAU	3	3.73	WINTER	STANDARD36826	TMCLKL	P
28-Jan-21	NW LANTAU	1	2.53	WINTER	STANDARD36826	TMCLKL	S
28-Jan-21	NW LANTAU	2	9.50	WINTER	STANDARD36826	TMCLKL	S
28-Jan-21	NE LANTAU	2	21.46	WINTER	STANDARD36826	TMCLKL	P
28-Jan-21	NE LANTAU	3	14.01	WINTER	STANDARD36826	TMCLKL	P
28-Jan-21	NE LANTAU	2	8.40	WINTER	STANDARD36826	TMCLKL	S
28-Jan-21	NE LANTAU	3	4.03	WINTER	STANDARD36826	TMCLKL	S
2-Feb-21	NW LANTAU	1	3.60	WINTER	STANDARD36826	TMCLKL	P
2-Feb-21	NW LANTAU	2	24.81	WINTER	STANDARD36826	TMCLKL	P
2-Feb-21	NW LANTAU	1	2.45	WINTER	STANDARD36826	TMCLKL	S
2-Feb-21	NW LANTAU	2	7.70	WINTER	STANDARD36826	TMCLKL	S

Appendix I. (cont'd)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
2-Feb-21	NE LANTAU	0	1.60	WINTER	STANDARD36826	TMCLKL	P
2-Feb-21	NE LANTAU	1	15.60	WINTER	STANDARD36826	TMCLKL	P
2-Feb-21	NE LANTAU	2	18.77	WINTER	STANDARD36826	TMCLKL	P
2-Feb-21	NE LANTAU	1	5.60	WINTER	STANDARD36826	TMCLKL	S
2-Feb-21	NE LANTAU	2	8.33	WINTER	STANDARD36826	TMCLKL	S
8-Feb-21	NW LANTAU	2	9.76	WINTER	STANDARD36826	TMCLKL	P
8-Feb-21	NW LANTAU	3	23.48	WINTER	STANDARD36826	TMCLKL	P
8-Feb-21	NW LANTAU	2	0.90	WINTER	STANDARD36826	TMCLKL	S
8-Feb-21	NW LANTAU	3	7.33	WINTER	STANDARD36826	TMCLKL	S
18-Feb-21	NW LANTAU	1	5.60	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NW LANTAU	2	18.88	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NW LANTAU	3	3.50	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NW LANTAU	1	1.50	WINTER	STANDARD36826	TMCLKL	S
18-Feb-21	NW LANTAU	2	10.02	WINTER	STANDARD36826	TMCLKL	S
18-Feb-21	NE LANTAU	1	9.55	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NE LANTAU	2	20.88	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NE LANTAU	3	4.70	WINTER	STANDARD36826	TMCLKL	P
18-Feb-21	NE LANTAU	1	2.74	WINTER	STANDARD36826	TMCLKL	S
18-Feb-21	NE LANTAU	2	8.73	WINTER	STANDARD36826	TMCLKL	S
18-Feb-21	NE LANTAU	3	1.20	WINTER	STANDARD36826	TMCLKL	S
23-Feb-21	NW LANTAU	1	9.54	WINTER	STANDARD36826	TMCLKL	P
23-Feb-21	NW LANTAU	2	18.92	WINTER	STANDARD36826	TMCLKL	P
23-Feb-21	NW LANTAU	3	5.20	WINTER	STANDARD36826	TMCLKL	P
23-Feb-21	NW LANTAU	1	7.39	WINTER	STANDARD36826	TMCLKL	S
23-Feb-21	NW LANTAU	2	3.55	WINTER	STANDARD36826	TMCLKL	S

Appendix II. TMCLKL08 Chinese White Dolphin Sighting Database (December 2020 - February 2021)

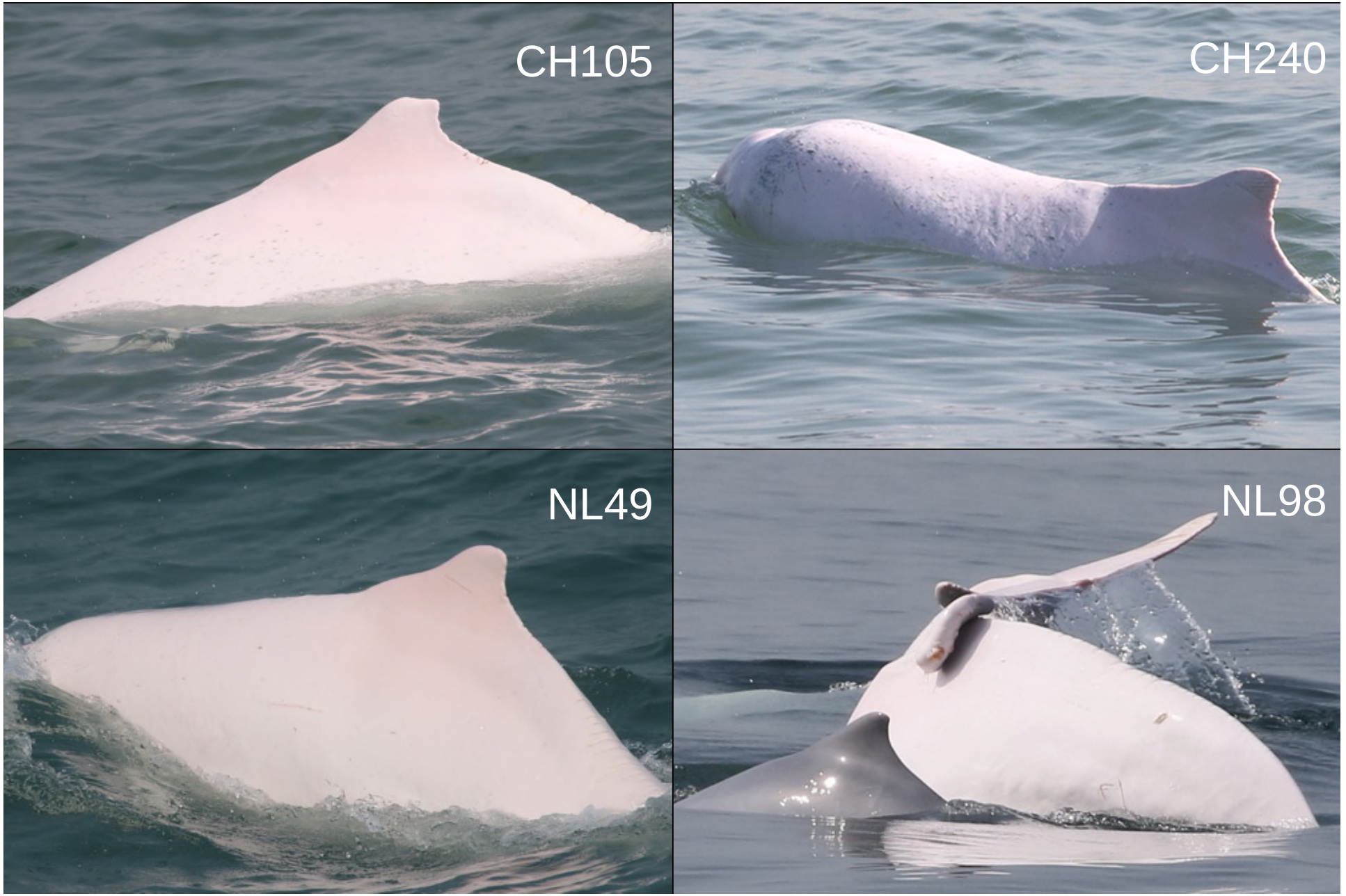
(Abberviations: STG# = Sighting Number; HRD SZ = Dolphin Herd Size; BEAU = Beaufort Sea State; PSD = Perpendicular Distance; BOAT ASSOC. = Fishing Boat Association; P/S: Sighting Made on Primary/Secondary Lines)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
10-Dec-20	1	1326	2	NW LANTAU	2	6	ON	TMCLKL	822941	806253	WINTER	NONE	S
25-Jan-21	1	1057	1	NW LANTAU	2	237	ON	TMCLKL	825934	804590	WINTER	NONE	P
25-Jan-21	2	1123	8	NW LANTAU	2	852	ON	TMCLKL	831175	803417	WINTER	NONE	P
25-Jan-21	3	1329	2	NW LANTAU	2	165	ON	TMCLKL	826628	806507	WINTER	NONE	P
26-Jan-21	1	1013	1	NW LANTAU	1	55	ON	TMCLKL	817461	805469	WINTER	NONE	P
28-Jan-21	1	1052	1	NW LANTAU	3	67	ON	TMCLKL	824681	805453	WINTER	NONE	P
28-Jan-21	2	1105	4	NW LANTAU	2	85	ON	TMCLKL	825689	805465	WINTER	NONE	P
28-Jan-21	3	1133	6	NW LANTAU	2	62	ON	TMCLKL	827494	805469	WINTER	NONE	S
28-Jan-21	4	1213	2	NW LANTAU	2	74	ON	TMCLKL	827103	807466	WINTER	NONE	P
2-Feb-21	1	1011	7	NW LANTAU	1	215	ON	TMCLKL	816841	805468	WINTER	NONE	P
2-Feb-21	2	1050	1	NW LANTAU	2	1589	ON	TMCLKL	820219	805032	WINTER	NONE	S
2-Feb-21	3	1127	1	NW LANTAU	2	112	ON	TMCLKL	829332	805473	WINTER	NONE	P
8-Feb-21	1	1022	3	NW LANTAU	2	172	ON	TMCLKL	816378	804643	WINTER	NONE	P
23-Feb-21	1	1136	1	NW LANTAU	2	71	ON	TMCLKL	826949	806446	WINTER	NONE	P

Appendix III. Individual dolphins identified during TMCLKL08 monitoring surveys in December 2020 - February 2021

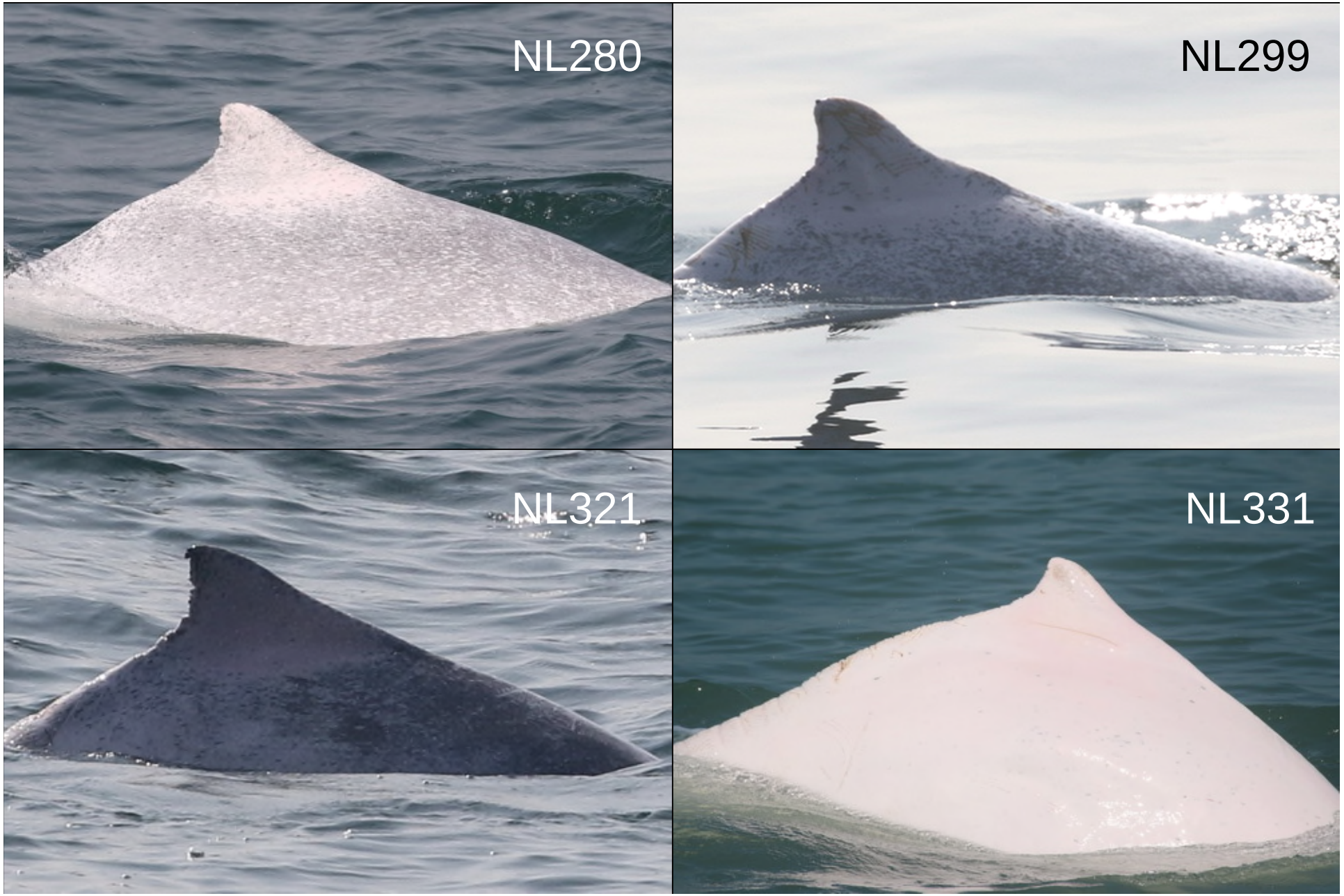
ID#	DATE	STG#	AREA
CH105	28/01/21	3	NW LANTAU
CH240	02/02/21	1	NW LANTAU
NL49	25/01/21	2	NW LANTAU
	28/01/21	1	NW LANTAU
NL98	25/01/21	2	NW LANTAU
NL103	25/01/21	2	NW LANTAU
NL202	28/01/21	4	NW LANTAU
	23/02/21	1	NW LANTAU
NL242	25/01/21	2	NW LANTAU
NL261	10/12/20	1	NW LANTAU
NL280	28/01/21	2	NW LANTAU
NL299	25/01/21	2	NW LANTAU
NL321	25/01/21	3	NW LANTAU
NL331	26/01/21	1	NW LANTAU
	02/02/21	1	NW LANTAU
SL67	10/12/20	1	NW LANTAU
WL05	25/01/21	2	NW LANTAU
WL98	08/02/21	1	NW LANTAU
WL145	02/02/21	1	NW LANTAU
WL179	25/01/21	1	NW LANTAU
	02/02/21	3	NW LANTAU
WL227	28/01/21	3	NW LANTAU
WL283	02/02/21	1	NW LANTAU
WL301	02/02/21	1	NW LANTAU
WL304	08/02/21	1	NW LANTAU

Appendix IV. Twenty-one individual dolphins that were identified between December 2020 and February 2021 during the TMCLKL08 monitoring surveys



Appendix IV. (cont'd)

Appendix IV. (cont'd)



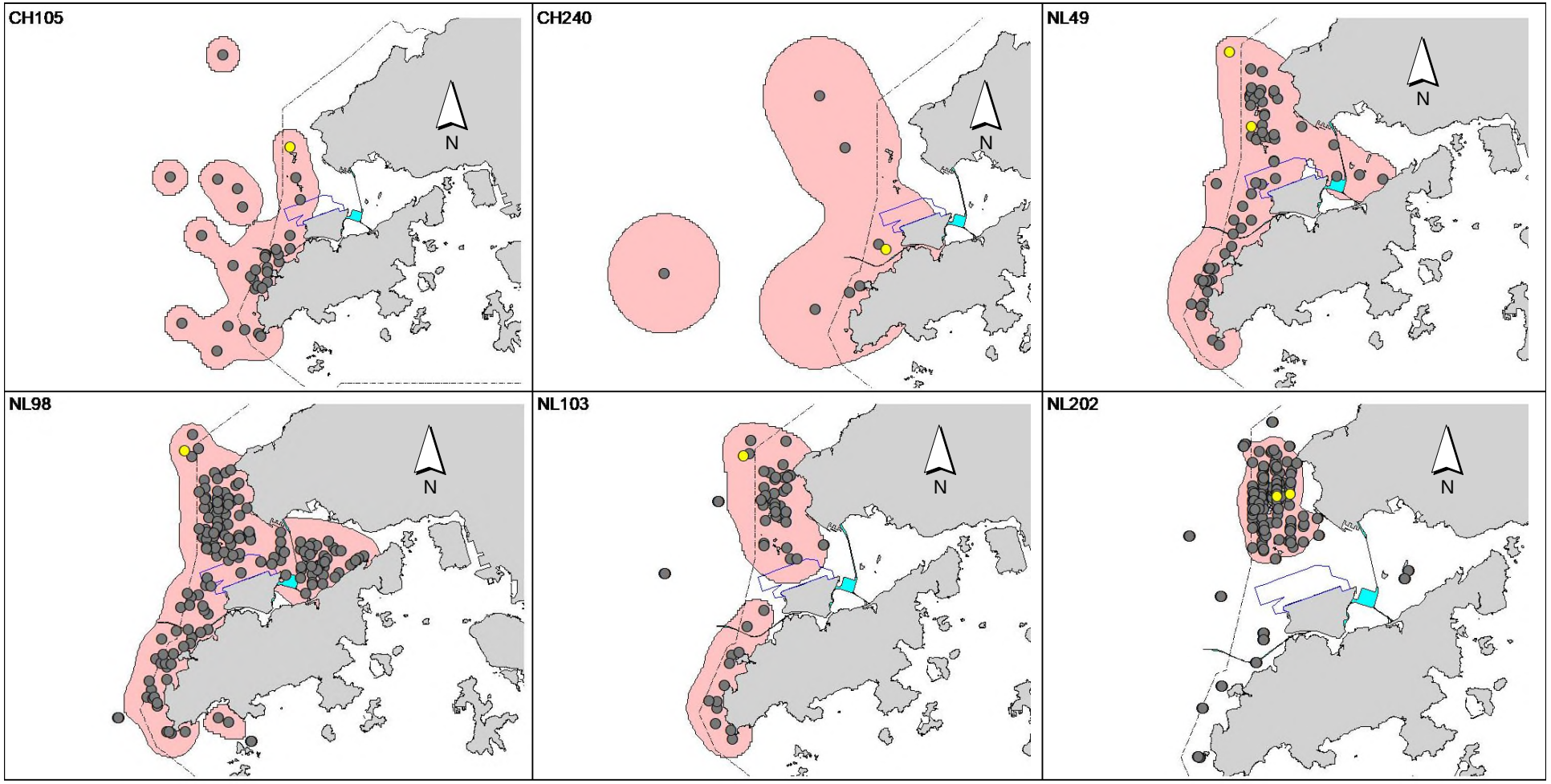
Appendix IV. (cont'd)

Appendix IV. (cont'd)

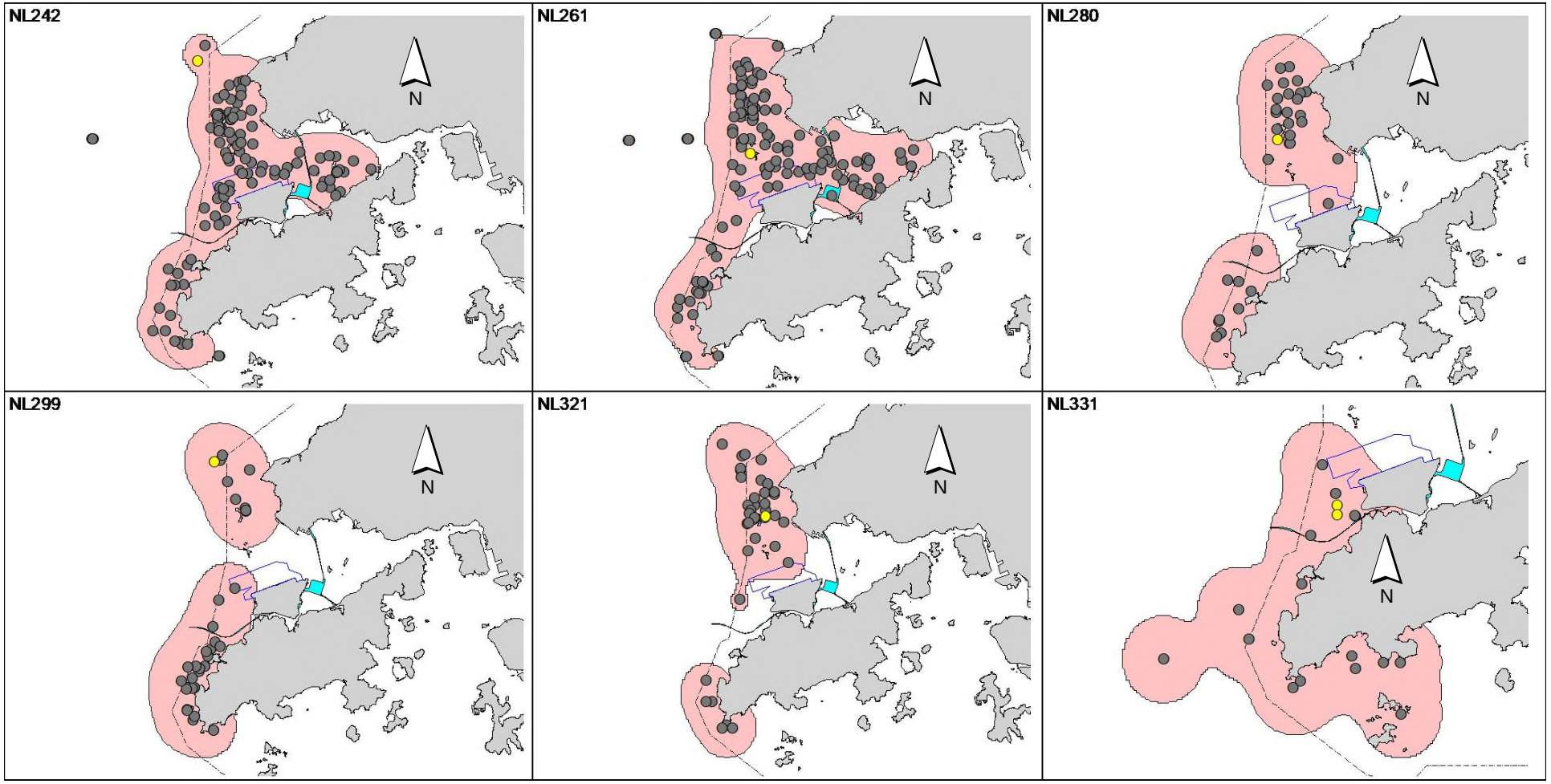

WL304

Appendix V. Ranging patterns (95% kernel ranges) of 21 individual dolphins that were sighted during the present TMCLKL08 monitoring period

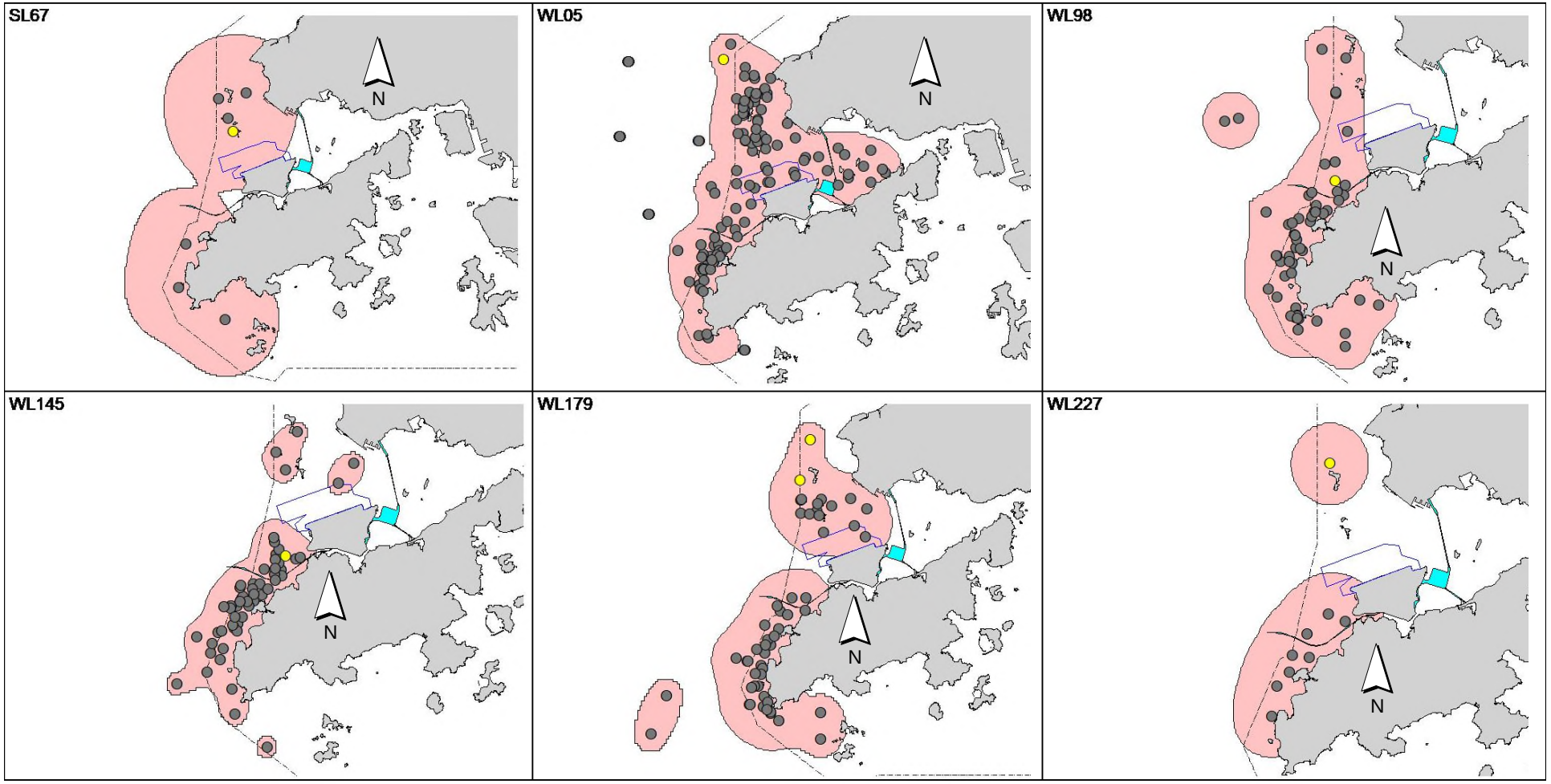
(note: yellow dots indicate sightings made in December 2020-February 2021 during TMCLKL08 monitoring surveys)



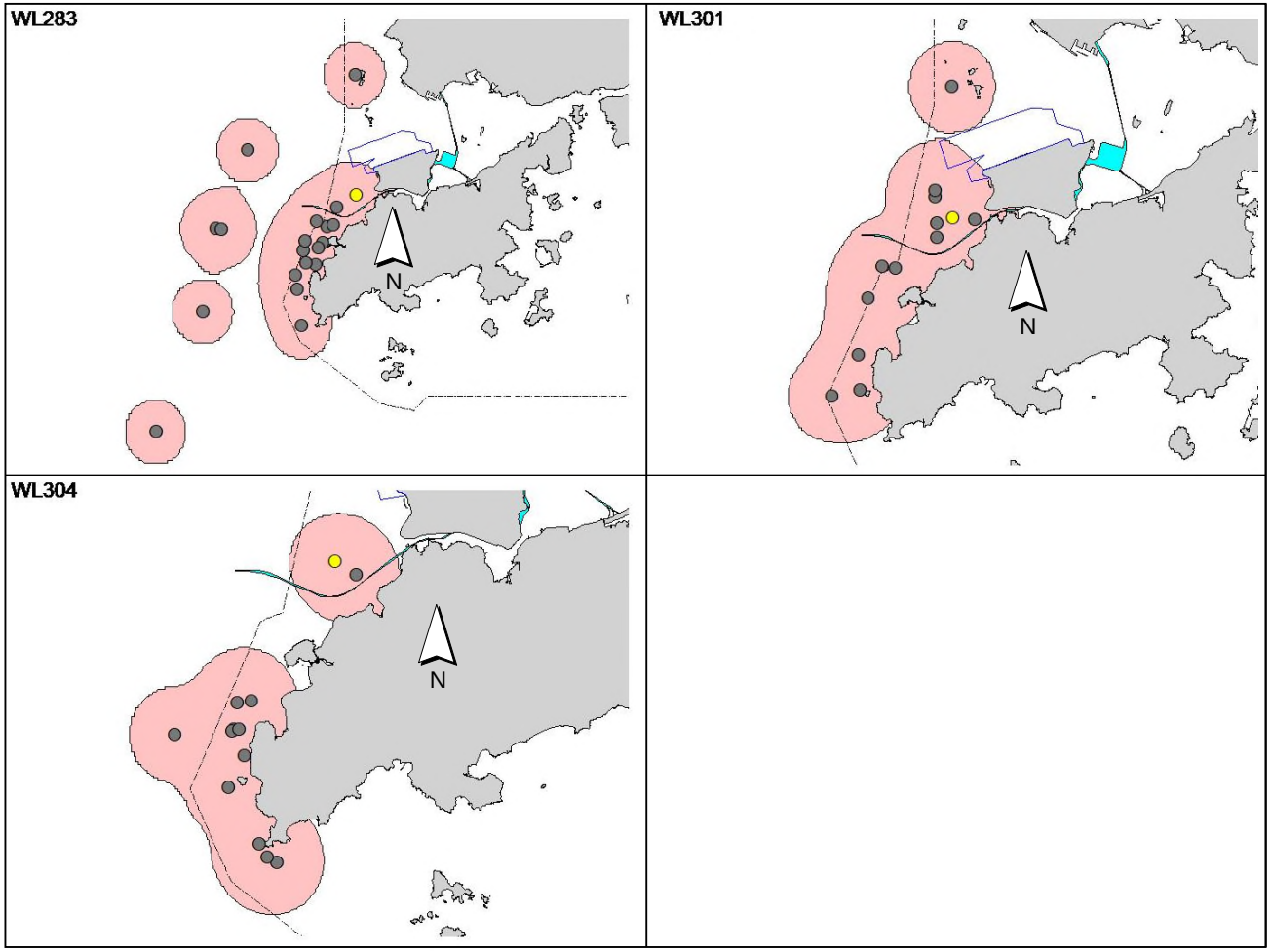
Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix V. (cont'd)



Appendix I

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

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

	Action			
	ET [(a)]	**IEC [(a)]**	**SOR [(a)]**	**Contractor(s)**
Limit Level Exceedance				
	1. Identify the source. 2. Repeat measurement to confirm finding. If two consecutive measurements exceed Limit Level, the exceedance is then confirmed. 3. Inform the IEC, the SOR, the DEP and the Contractor. 4. Investigate the cause of exceedance and check Contractor's working procedures to determine possible mitigation to be implemented. 5. If the exceedance is confirmed to be Project related after investigation, increase monitoring frequency to daily. 6. Carry out analysis of the Contractor's working procedures to determine possible mitigation to be implemented. 7. Arrange meeting with the IEC and the SOR to discuss the remedial actions to be taken. 8. Assess effectiveness of the Contractor's remedial actions and keep the IEC, the DEP and the SOR informed of the results. 9. If exceedance stops, cease additional monitoring.	1. Check monitoring data submitted by the ET. 2. Check Contractor's working method. 3. If the exceedance is confirmed to be Project related after investigation, discuss with the ET and the Contractor on possible remedial measures. 4. Advise the SOR on the effectiveness of the proposed remedial measures. 5. Supervise implementation of remedial measures.	1. Confirm receipt of notification of failure in writing. 2. Notify the Contractor. 3. If the exceedance is confirmed to be Project related after investigation, in consultation with the IEC, agree with the Contractor on the remedial measures to be implemented. 4. Ensure remedial measures are properly implemented. 5. If exceedance continues, consider what activity of the work is responsible and instruct the Contractor to stop that activity of work until the exceedance is abated.	1. Take immediate action to avoid further exceedance. 2. If the exceedance is confirmed to be Project related after investigation, submit proposals for remedial actions to IEC within 3 working days of notification. 3. Implement the agreed proposals. 4. Amend proposal if appropriate. 5. Stop the relevant activity of works as determined by the SOR until the exceedance is abated.

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

Event / Action Plan for Post Construction Dolphin Monitoring

EVENT	ACTION			
	ET	**IEC**	**SOR**	**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, 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 SOR is satisfied with the proposal of any other measures, SOR to signify the agreement in writing on the measures to be implemented.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Discuss with the ET and the IEC and propose measures to the IEC and the SOR; 3. Implement the agreed measures.
Limit Level	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	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	1. Attend the meeting to discuss with ET, IEC and Contractor the necessity of additional dolphin monitoring and any other potential mitigation measures.	1. Inform the SOR and confirm notification of the non-compliance in writing; 2. Attend the meeting to discuss with ET, IEC and SOR the necessity of additional dolphin

EVENT	ACTION			
	ET	**IEC**	**SOR**	**Contractor**
	seasonal differences; 3. Identify source(s) of impact; 4. Inform the IEC, SOR and Contractor of findings; 5. Check monitoring data; 6. Repeat review to ensure all the dolphin protective measures are fully and properly implemented and advise on additional measures if necessary. 7. If ET proves that the source of impact is caused by any of the construction activity by the works contract, ET to arrange a meeting to discuss with IEC, SOR and Contractor the necessity of additional dolphin monitoring and/or any other potential mitigation measures (e.g., consider to modify the perimeter silt curtain or consider to control/temporarily stop relevant construction activity etc.) and submit to IEC a proposal of additional dolphin monitoring and/or mitigation measures where necessary.	discuss with ET, 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 SOR of the results and findings accordingly. 5. Supervise / Audit the implementation of additional monitoring and/or any other mitigation measures and advise SOR the results and findings accordingly.	2. If 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, 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.	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.

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

Appendix J

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

Table J1 Cumulative Statistics on Exceedances

Monitoring Parameters	Action/Limit Level	Total No. recorded in this reporting quarter	Total No. recorded since Contract commencement
1-Hr TSP	Action	3	122
	Limit	0	15
24-Hr TSP	Action	0	12
	Limit	0	4
Water Quality	Action	0	167
	Limit	0	19
Impact Dolphin Monitoring	Action	0	11
	Limit	0	19
Post Construction (Operational) Dolphin Monitoring	Action	0	0
	Limit	1	3

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

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Period (December 2020 to February 2021)	0	0	0
Total No. received since Contract commencement	17	1	0

Email message

Environmental Resources Management

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

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	22 December 2020

Dear Sir or Madam,

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

Action Level Exceedances:
0212330_10December2020_1hrTSP_Station ASR5

Three Action Level Exceedances were recorded on 10 December 2020.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_10December2020_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]**	
Date	10 December 2020 (Measured) 22 December 2020 (Laboratory results received by ERM)	
Monitoring Station	ASR5	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (348 µg/m³) between sampling period 9:32 and 10:32 on 10 December 2020.	
Works Undertaken (at the time of monitoring event)	On 10 December 2020, demolition of CLP substation was conducted.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • With reference to the recorded wind direction (vary between 13° and 24°) and wind speed (1.3 m/s), the wind was mainly from north-easterly direction. Haze was observed during the sampling time. • Dust suppression measures were implemented properly on site. Water spraying was applied during rock/cement breaking to prevent dust (refer to *Annex A*). Based on the above, the exceedance is unlikely to be due to this Contract.	
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.	
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached (*Annex B*).	

Annex A

Watering Photo

Photo 1 - Water spraying was applied during rock/cement breaking to prevent dust

Annex B

Results of Air Quality Monitoring, Wind Data & Locations of Air Quality Monitoring Stations

Air quality monitoring results on 10/12/2020								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2020-12-10	ASR10	Hazy	8:08:00	1-hour TSP	126	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR10	Hazy	9:10:00	1-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR10	Hazy	10:12:00	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR6	Hazy	8:18:00	1-hour TSP	185	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR6	Hazy	9:20:00	1-hour TSP	217	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR6	Hazy	10:22:00	1-hour TSP	131	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR5	Hazy	8:30:00	1-hour TSP	255	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR5	Hazy	9:32:00	1-hour TSP	348	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR5	Hazy	10:34:00	1-hour TSP	191	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR1	Hazy	8:42:00	1-hour TSP	140	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR1	Hazy	9:44:00	1-hour TSP	162	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR1	Hazy	10:46:00	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2020-12-10	AQMS1	Hazy	8:53:00	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2020-12-10	AQMS1	Hazy	9:55:00	1-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	2020-12-10	AQMS1	Hazy	10:57:00	1-hour TSP	105	ug/m3
TMCLKL	HY/2012/08	2020-12-10	AQMS1	Hazy	11:59:00	24-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR1	Hazy	11:48:00	24-hour TSP	114	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR10	Hazy	11:14:00	24-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR5	Hazy	11:36:00	24-hour TSP	166	ug/m3
TMCLKL	HY/2012/08	2020-12-10	ASR6	Hazy	11:24:00	24-hour TSP	110	ug/m3

Action level exceedance
Limit level exceedance

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
20/12/10	0:00	0.4	102
20/12/10	1:00	0.4	29
20/12/10	2:00	0.4	20
20/12/10	3:00	0.4	30
20/12/10	4:00	0	97
20/12/10	5:00	0.9	351
20/12/10	6:00	0.4	335
20/12/10	7:00	0.4	49
20/12/10	8:00	1.3	12
20/12/10	9:00	1.3	24
20/12/10	10:00	1.3	13
20/12/10	11:00	1.3	19
20/12/10	12:00	1.3	21
20/12/10	13:00	0.9	202
20/12/10	14:00	1.3	192
20/12/10	15:00	1.3	261
20/12/10	16:00	0.9	279
20/12/10	17:00	0.4	96
20/12/10	18:00	0.4	96
20/12/10	19:00	0	85
20/12/10	20:00	0.4	78
20/12/10	21:00	0.9	38
20/12/10	22:00	1.3	101
20/12/10	23:00	1.8	82
20/12/11	0:00	1.8	91
20/12/11	1:00	0.4	87
20/12/11	2:00	0.9	38
20/12/11	3:00	0.9	13
20/12/11	4:00	0.4	16
20/12/11	5:00	0	102
20/12/11	6:00	0	114
20/12/11	7:00	0	103
20/12/11	8:00	0.4	135
20/12/11	9:00	1.3	141
20/12/11	10:00	0.4	130
20/12/11	11:00	0.9	141
20/12/11	12:00	1.3	206
20/12/11	13:00	0.9	203
20/12/11	14:00	1.8	201
20/12/11	15:00	1.3	207
20/12/11	16:00	0.4	276
20/12/11	17:00	0.9	269
20/12/11	18:00	0.4	267
20/12/11	19:00	0.4	274
20/12/11	20:00	0	58
20/12/11	21:00	0	158
20/12/11	22:00	0.4	290
20/12/11	23:00	0.4	306

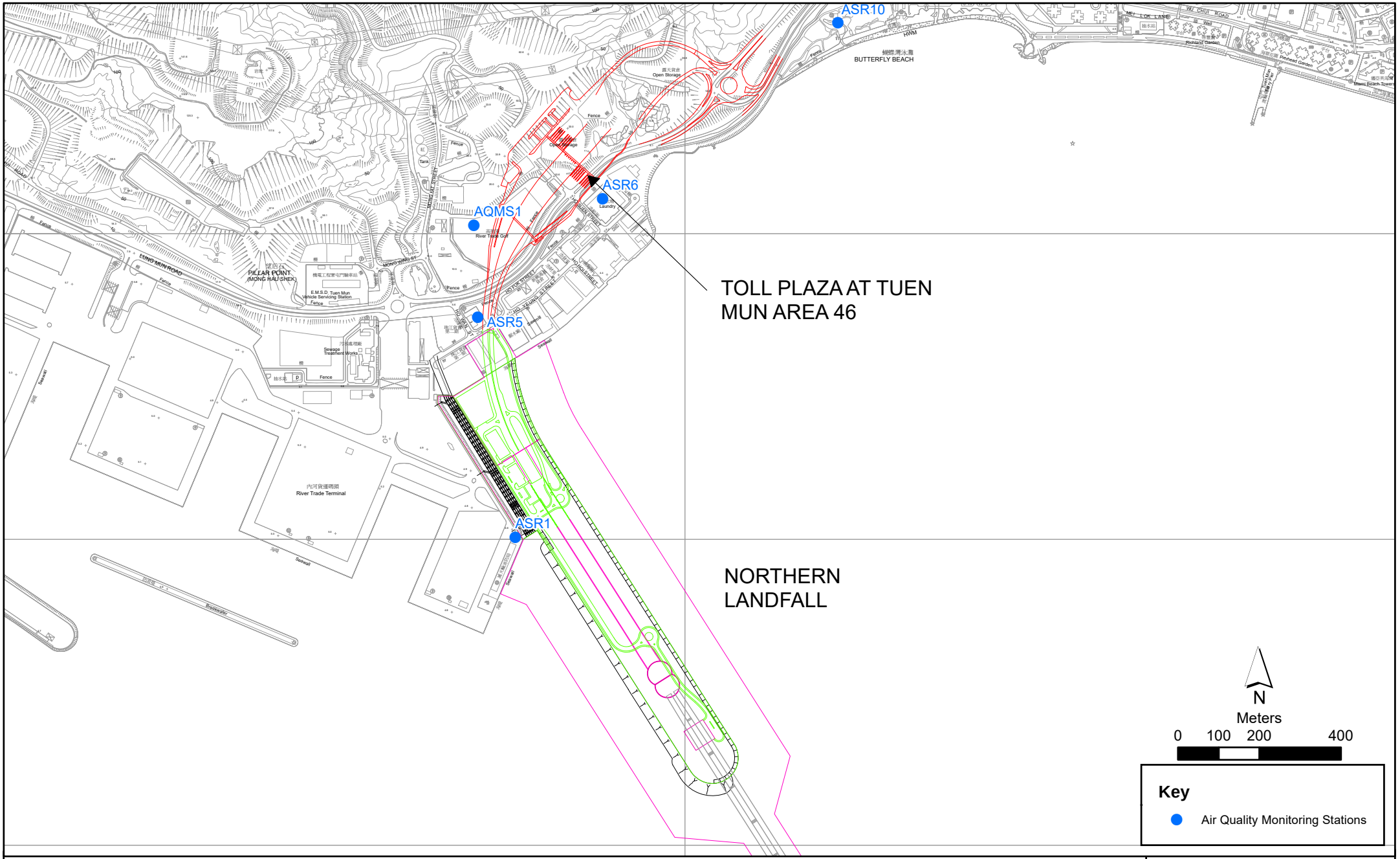


Figure 2.1b

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

File: T:\GIS\CONTRACT\0212330\Mxd\0212330_ASR_for_Enhanced_TSP_monitoring.mxd
Date: 21/2/2014

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2509, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	16 February 2021

Dear Sir or Madam,

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

Action Level Exceedances:
0212330_16February2021_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 16 February 2021.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_16February2021_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]**	
Date	16 February 2021 (Measured) 2 March 2021 (Laboratory results received by ERM)	
Monitoring Station	ASR5	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (355 µg/m³) between sampling period 15:37 and 16:37 on 16 February 2021.	
Works Undertaken (at the time of monitoring event)	No construction works was conducted on 16 February 2021.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • With reference to the recorded wind direction (vary between 274° and 277°) and wind speed (0.9 m/s), the wind was mainly from north-westerly direction. • Informed by the Contractor, no construction works was conducted on 16 February 2021. Based on the above, the exceedance is unlikely to be due to this Contract.	
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.	
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached (*Annex A*).	

Annex A

Results of Air Quality Monitoring, Wind Data & Locations of Air Quality Monitoring Stations

Air quality monitoring results on 16/2/2021								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2021-02-16	ASR10	Sunny	13:10:00	1-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR10	Sunny	14:12:00	1-hour TSP	151	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR10	Sunny	15:14:00	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR6	Sunny	13:22:00	1-hour TSP	195	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR6	Sunny	14:24:00	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR6	Sunny	15:26:00	1-hour TSP	184	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR5	Sunny	13:33:00	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR5	Sunny	14:35:00	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR5	Sunny	15:37:00	1-hour TSP	355	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR1	Sunny	13:46:00	1-hour TSP	103	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR1	Sunny	14:48:00	1-hour TSP	237	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR1	Sunny	15:50:00	1-hour TSP	167	ug/m3
TMCLKL	HY/2012/08	2021-02-16	AQMS1	Sunny	13:58:00	1-hour TSP	100	ug/m3
TMCLKL	HY/2012/08	2021-02-16	AQMS1	Sunny	15:00:00	1-hour TSP	93	ug/m3
TMCLKL	HY/2012/08	2021-02-16	AQMS1	Sunny	16:02:00	1-hour TSP	179	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR10	Sunny	16:16:00	24-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR6	Sunny	16:28:00	24-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR5	Sunny	16:39:00	24-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	2021-02-16	ASR1	Sunny	16:52:00	24-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2021-02-16	AQMS1	Sunny	17:04:00	24-hour TSP	87	ug/m3

Action level exceedance

Limit level exceedance

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
21/02/16	0:00	1.8	78
21/02/16	1:00	1.8	70
21/02/16	2:00	1.3	86
21/02/16	3:00	1.3	58
21/02/16	4:00	1.3	85
21/02/16	5:00	2.7	100
21/02/16	6:00	2.7	79
21/02/16	7:00	1.8	41
21/02/16	8:00	2.2	56
21/02/16	9:00	2.2	93
21/02/16	10:00	1.8	111
21/02/16	11:00	1.8	129
21/02/16	12:00	1.3	101
21/02/16	13:00	1.3	131
21/02/16	14:00	1.3	196
21/02/16	15:00	0.9	274
21/02/16	16:00	0.9	277
21/02/16	17:00	0.9	198
21/02/16	18:00	0.9	261
21/02/16	19:00	0.9	299
21/02/16	20:00	0.9	324
21/02/16	21:00	0.4	328
21/02/16	22:00	0.4	288
21/02/16	23:00	0.4	273
21/02/17	0:00	1.3	308
21/02/17	1:00	0.9	303
21/02/17	2:00	0	295
21/02/17	3:00	0	303
21/02/17	4:00	0.4	2
21/02/17	5:00	1.3	5
21/02/17	6:00	1.8	18
21/02/17	7:00	2.2	20
21/02/17	8:00	1.8	19
21/02/17	9:00	2.7	32
21/02/17	10:00	1.8	90
21/02/17	11:00	2.2	23
21/02/17	12:00	1.8	33
21/02/17	13:00	1.8	28
21/02/17	14:00	1.8	24
21/02/17	15:00	1.8	144
21/02/17	16:00	0.9	18
21/02/17	17:00	1.3	81
21/02/17	18:00	1.3	78
21/02/17	19:00	1.3	53
21/02/17	20:00	1.3	66
21/02/17	21:00	1.3	38
21/02/17	22:00	1.8	48
21/02/17	23:00	1.8	49

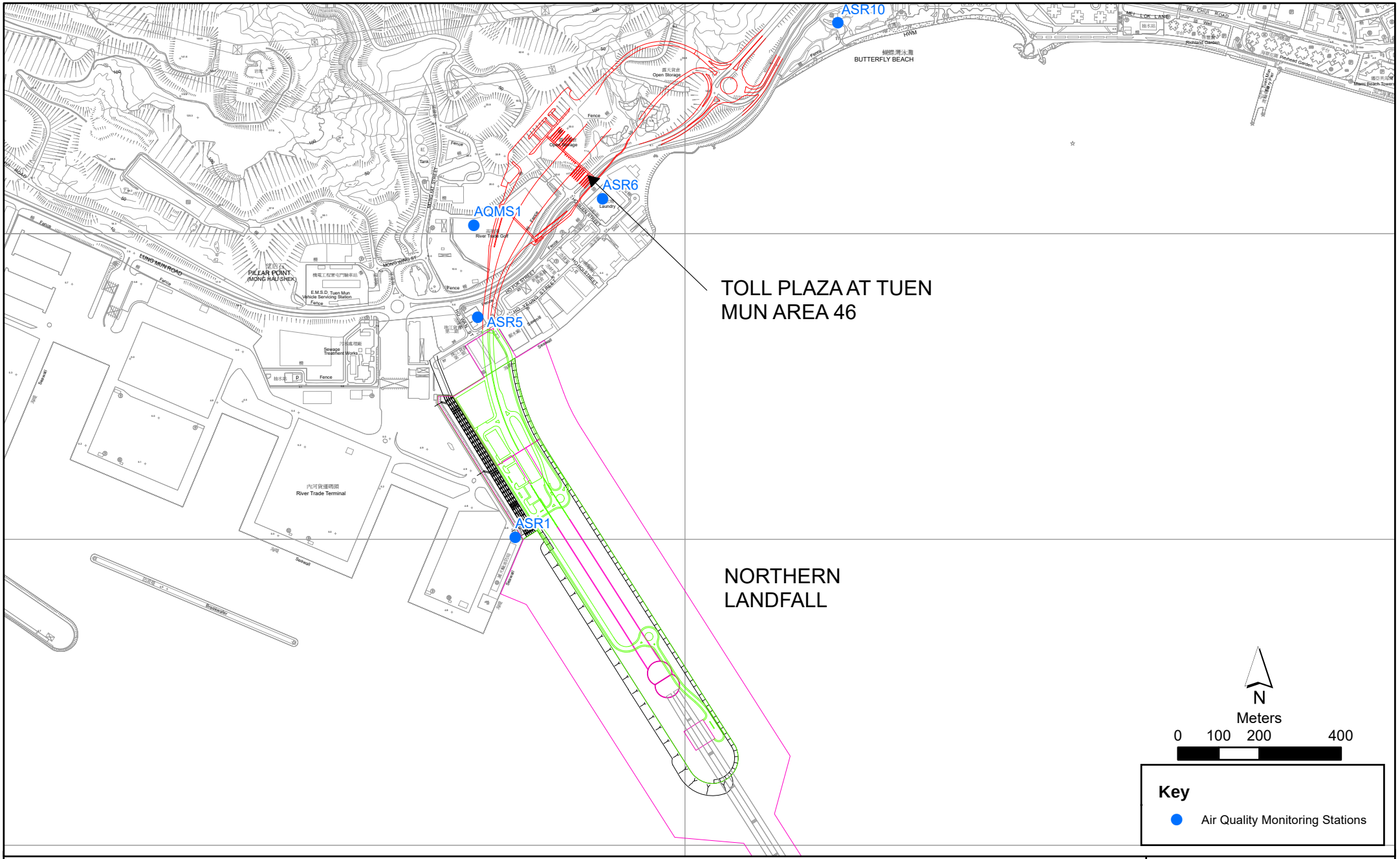


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

File: T:\GIS\CONTRACT\0212330\Mxd\0212330_ASR_for_Enhanced_TSP_monitoring.mxd
Date: 21/2/2014

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2509, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Air Quality Impact Monitoring
Date	22 February 2021

ERM

Dear Sir or Madam,

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

Action Level Exceedances:
0212330_22February2021_1hrTSP_Station ASR5

One Action Level Exceedance was recorded on 22 February 2021.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

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

Air Quality Impact Monitoring
Notification of Exceedance

Log No.	**<u>Action Level Exceedance</u> 0212330_22February2021_1hrTSP_Station ASR5 [Total No. of Exceedances = 1]**	
Date	22 February 2021 (Measured) 3 March 2021 (Laboratory results received by ERM)	
Monitoring Station	ASR5	
Parameter(s) with Exceedance(s)	1-hr TSP	
Action Levels	24-hr TSP (µg/m³)	ASR1 = 213 ASR5 = 238 AQMS1 = 213 ASR6 = 238 ASR10 = 214
	1-hr TSP (µg/m³)	ASR1 = 331 ASR5 = 340 AQMS1 = 335 ASR6 = 338 ASR10 = 337
Limit Levels	1-hr TSP (µg/m³)	500
	24-hr TSP (µg/m³)	260
Measured Levels	Action Level Exceedance for 1-hr TSP is observed at ASR5 (355 µg/m³) between sampling period 15:38 and 16:38 on 22 February 2021.	
Works Undertaken (at the time of monitoring event)	No construction works was conducted on 22 February 2021.	
Possible Reason for Action or Limit Level Exceedance(s)	The exceedance is unlikely to be due to this Contract, in view of the following: • With reference to the recorded wind direction (vary between 211° and 212°) and wind speed (vary between 1.3 and 1.8 m/s), the wind was mainly from south-westerly direction. • Informed by the Contractor, no construction works was conducted on 22 February 2021. Based on the above, the exceedance is unlikely to be due to this Contract.	
Actions Taken / To Be Taken	The Contractor has been reminded to implement the required mitigation measures as per the EP, approved EIA and Updated EM&A Manual including watering to maintain all exposed road surfaces and dust sources wet, use of sprinklers for water spraying, covering the materials having the potential to create dust by clean tarpaulin, use of water truck and watering on all exposed soil within the Contract site throughout the construction period.	
Remarks	The monitoring results, wind data and the locations of air quality monitoring stations are attached (*Annex A*).	

Annex A

Results of Air Quality Monitoring, Wind Data & Locations of Air Quality Monitoring Stations

Air quality monitoring results on 22/2/2021								
Project	Contract	Date	Station	Weather	Start time	Parameters	Results	Unit
TMCLKL	HY/2012/08	2021-02-22	ASR10	Sunny	13:10:00	1-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR10	Sunny	14:12:00	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR10	Sunny	15:14:00	1-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR6	Sunny	13:22:00	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR6	Sunny	14:24:00	1-hour TSP	97	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR6	Sunny	15:26:00	1-hour TSP	203	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR5	Sunny	13:34:00	1-hour TSP	136	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR5	Sunny	14:36:00	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR5	Sunny	15:38:00	1-hour TSP	472	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR1	Sunny	13:47:00	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR1	Sunny	14:49:00	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR1	Sunny	15:51:00	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	2021-02-22	AQMS1	Sunny	13:58:00	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2021-02-22	AQMS1	Sunny	15:00:00	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2021-02-22	AQMS1	Sunny	16:02:00	1-hour TSP	154	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR10	Sunny	16:16:00	24-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR6	Sunny	16:28:00	24-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR5	Sunny	16:40:00	24-hour TSP	83	ug/m3
TMCLKL	HY/2012/08	2021-02-22	ASR1	Sunny	16:53:00	24-hour TSP	86	ug/m3
TMCLKL	HY/2012/08	2021-02-22	AQMS1	Sunny	17:04:00	24-hour TSP	69	ug/m3

Action level exceedance
Limit level exceedance

Meteorological Data for Impact Monitoring in the reporting period			
Date (yy-mm-dd)	**Time (24hrs)**	**Average of Wind Speed (m/s)**	**Average of Wind Direction(degree)**
21/02/22	0:00	0.9	45
21/02/22	1:00	0.4	45
21/02/22	2:00	0	32
21/02/22	3:00	0	21
21/02/22	4:00	0	19
21/02/22	5:00	0	14
21/02/22	6:00	0.4	358
21/02/22	7:00	0.4	307
21/02/22	8:00	0.9	138
21/02/22	9:00	0.9	126
21/02/22	10:00	0.9	183
21/02/22	11:00	1.3	203
21/02/22	12:00	1.8	233
21/02/22	13:00	1.3	236
21/02/22	14:00	1.8	203
21/02/22	15:00	1.8	211
21/02/22	16:00	1.3	212
21/02/22	17:00	1.3	67
21/02/22	18:00	1.3	60
21/02/22	19:00	1.3	71
21/02/22	20:00	1.3	50
21/02/22	21:00	0.9	60
21/02/22	22:00	0.4	57
21/02/22	23:00	0.4	35
21/02/23	0:00	0.4	46
21/02/23	1:00	0.9	322
21/02/23	2:00	0.4	328
21/02/23	3:00	0.4	341
21/02/23	4:00	0	303
21/02/23	5:00	0	322
21/02/23	6:00	0.4	308
21/02/23	7:00	0	317
21/02/23	8:00	0	113
21/02/23	9:00	1.3	218
21/02/23	10:00	1.3	193
21/02/23	11:00	0.9	130
21/02/23	12:00	1.8	210
21/02/23	13:00	1.8	200
21/02/23	14:00	1.3	230
21/02/23	15:00	2.2	100
21/02/23	16:00	2.7	92
21/02/23	17:00	3.1	104
21/02/23	18:00	2.2	86
21/02/23	19:00	2.2	97
21/02/23	20:00	2.7	94
21/02/23	21:00	2.7	87
21/02/23	22:00	2.2	98
21/02/23	23:00	2.7	81

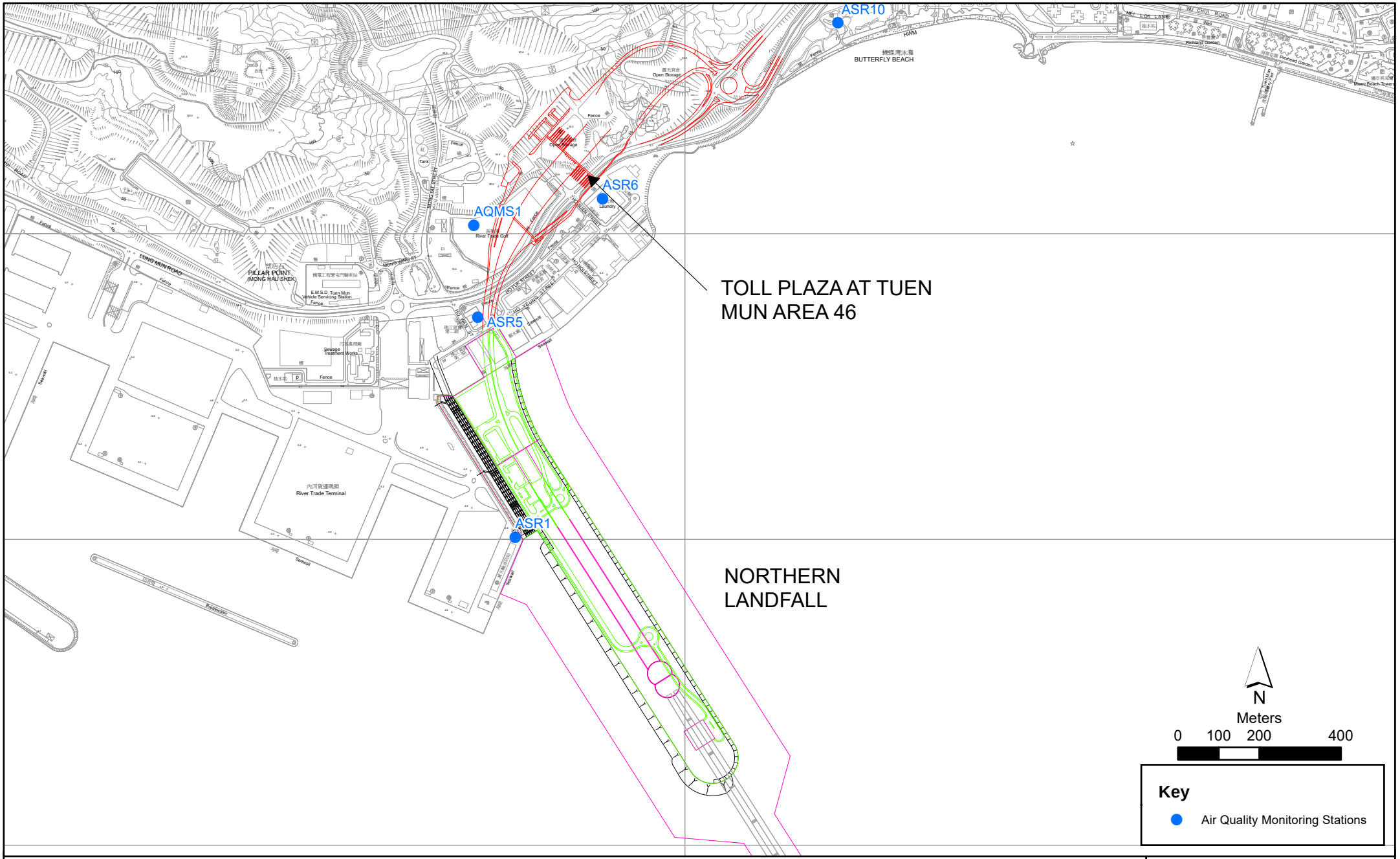


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

File: T:\GIS\CONTRACT\0212330\Mxd\0212330_ASR_for_Enhanced_TSP_monitoring.mxd
Date: 21/2/2014

Environmental Resources Management

ERM

Email message

Environmental Resources Management

2509, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660

To	Ramboll Hong Kong, Limited (ENPO)
From	ERM- Hong Kong, Limited
Ref/Project number	Contract No. HY/2012/08 Tuen Mun–Chek Lap Kok Link–Northern Connection Sub-sea Tunnel Section
Subject	Notification of Exceedance for Post Construction (Operational) Dolphin Monitoring
Date	18 May 2021

Dear Sir or Madam,

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

0212330_December2020/February2021_dolphin_STG&ANI_NEL&NWL

A total of one limit level exceedance was recorded in the quarterly post construction (operational) dolphin monitoring data between December 2020 and February 2021.

Regards,

Dr Jasmine Ng
Environmental Team Leader

ERM-Hong Kong, Limited

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

Post Construction Dolphin Monitoring
Notification of Exceedance

Log No.	**0212330_ Dec2020/Feb2021_dolphin_STG&ANI_NEL&NWL** **[Total No. of Exceedances = 1 Limit Level Exceedance]**	
Date	December 2020 – February 2021 (monitored) 5 March 2021 (results received by ERM)	
Monitoring Area	Northeast Lantau (NEL) and Northwest Lantau (NWL)	
Parameter(s) with Exceedance(s)	Quarterly encounter rate of dolphin sightings (STG) Quarterly encounter rate of total number of dolphins (ANI)	
Action Levels	North Lantau Social cluster	NEL: STG < 4.2 & ANI < 15.5 or NWL: STG < 6.9 & ANI < 31.3
Limit Levels		NEL: STG < 2.4 & ANI < 8.9 and NWL: STG < 3.9 & ANI < 17.9
Recorded Levels	NEL	STG = 0 & ANI = 0
	NWL	STG = 0.55 & ANI = 1.09
	One Limit Level Exceedance was recorded in the quarterly post construction dolphin monitoring at NEL and NWL between December 2020 and February 2021.	
Statistical Analyses	Further to the review of the available and relevant dolphin monitoring data for TMCLKL project, statistical analyses were conducted as follows: • A two-way ANOVA with repeated measures and unequal sample size was conducted using Period (2 levels: baseline vs present post construction quarter, December 2020 and February 2021) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and present post construction monitoring quarter. By setting $\alpha = 0.01$ as the significance level in the statistical tests, significant differences in STG ($p = 0.0063$) and ANI ($p = 0.0268$) were detected between Periods. • A two-way ANOVA with repeated measures and unequal sample size was conducted using Cumulative Period (2 levels: the first 33 quarters of impact and post construction phases) and Location (2 levels: NEL and NWL) as fixed factors to examine whether there were any significant differences in the average encounter rates between the baseline and cumulative quarters. By setting $\alpha = 0.00001$ as the significance level in the statistical tests, significant difference in STG ($p = 0.000000$) and in ANI ($p = 0.000000$) between Cumulative Period and Location were detected. *Note: The commencement date under *Contract No. HY/2012/08* is 1 November 2013 and the Proposal for operational phase dolphin monitoring was approved by EPD on 19 May 2020. Operational phase dolphin monitoring commenced in June 2020.	
Works Undertaken (in the monitoring quarter)	No marine works was undertaken in the reporting period under Contract No. HY/2012/08. Operational phase dolphin monitoring commenced in June 2020. No marine works was undertaken in the reporting period under Contract No. HY/2012/07. Termination proposal for construction EM&A programme of Contract No. HY/2012/07 was approved by EPD on 16 March 2020. The construction phase EM&A programme of Contract No. HY/2012/07 has been terminated since 16 March 2020.	

Possible Reason for Action or Limit Level Exceedance(s)	The exceedance recorded in the quarterly post construction dolphin monitoring is unlikely to be due to TMCLKL project, in view of the following: • Blocking of CWD travelling corridor: The *Monitoring of Marine Mammals in Hong Kong Waters (2019 – 20)* (1) reported that dolphin usage and traveling activities to the northern side of the airport (dolphin traveling corridor) are affected by frequent high-speed ferry traffic from Sky Pier (not related to TMCLKL project), which is likely a major factor resulting in the decrease in dolphin abundances in North Lantau. • Marine works of TMCLKL project: Marine works were completed and no marine vessels will be deployed under Contract No. HY/2012/08 as per confirmed by SOR on 17 April 2020. The Proposal for operational phase dolphin monitoring was approved by EPD on 19 May 2020. Operational phase dolphin monitoring commenced in June 2020. No marine works was undertaken in the reporting period under Contract No. HY/2012/07. Termination proposal for construction EM&A programme of Contract No. HY/2012/07 was approved by EPD on 16 March 2020. The construction phase EM&A programme of Contract No. HY/2012/07 has been terminated since 16 March 2020. During this quarter of dolphin monitoring, no adverse impact on CWD due to the activities under TMCLKL project was observed. • Impact on water quality: Marine works were completed and no marine vessels will be deployed under TMCLKL project. The Proposal for operational phase water quality monitoring was approved by EPD on 19 May 2020. Operational phase water quality monitoring commenced in June 2020. • Provision of Marine Park: The Government has designated the Brothers Islands as a marine park in December 2016, with the aim to help better conserve the Chinese White Dolphins, their habitats and enhance the marine and fisheries resources therein. In view of the above, no unacceptable impact on CWD or its habitat was associated with TMCLKL project in this quarter.
Actions Taken / To Be Taken	No marine works and vessels was undertaken/deployed in the reporting period. The ET will monitor for future trends in exceedances.
Remarks	The results of post construction dolphin monitoring are documented in the approved *Eighty-Sixth* to *Eighty-Eighth Monthly EM&A Reports*.

(1) Hung S K Y (2020). Prepared for AFCD. Available at: https://www.afcd.gov.hk/english/conservation/con_mar/con_mar_chi/con_mar_chi_chi/files/Final_Report_2019_20.pdf

Appendix K

Waste Flow Table

Monthly Summary Waste Flow Table

Name of Department: HyD **Contract No. / Works Order No.: HY/2012/08**

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

Month	Monthly Break-down of Inert Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	3008.812	0.000	336.902	889.467	1782.443
Jan-2020	174.69	0.000	0.000	0.000	174.69
Feb-2020	1.455	0.000	0.000	0.000	1.455
Mar-2020	3.252	0.000	0.000	0.000	3.252
Apr-2020	4.200	0.000	0.000	0.000	4.200
May-2020	7.015	0.000	0.000	0.000	7.015
Jun-2020	2.670	0.000	0.000	0.000	2.693
Half Year Sub-total	193.282	0.000	0.000	0.000	193.305
Jul-2020	1.440	0.000	0.000	0.000	1.440
Aug-2020	1.159	0.000	0.000	0.000	1.159
Sep-2020	0.074	0.000	0.000	0.000	0.074
Oct-2020	0.253	0.000	0.000	0.000	0.253
Nov-2020	0.251	0.000	0.000	0.000	0.251
Dec-2020	0.554	0.000	0.000	0.000	0.554
Project Total Quantities	3205.825	0.000	336.902	889.467	1979.479

Month	**Actual Quantities of <u>Non-inert</u> Construction Waste Generated Monthly**								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	9890.77	9890.77	14.64	14.64	16.84	16.84	85.807	85.807	21.943
Jan-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.54
Feb-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.349
Mar-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	1.226
Apr-2020	22.14	22.14	1.30	1.30	0.00	0.00	6.40	6.40	0.521
May-2020	6.2	6.2	0.54	0.54	0.00	0.00	0.60	0.60	0.536
Jun-2020	0.00	0.00	0.74	0.74	0.00	0.00	1.00	1.00	0.303
Half Year Sub-total	28.34	28.34	2.58	2.58	0.00	0.00	8.00	8.00	5.475
Jul-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.140
Aug-2020	0.00	0.00	1.06	1.06	0.00	0.00	0.00	0.00	0.110
Sep-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.100
Oct-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.145
Nov-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.167
Dec-2020	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.173
Project Total Quantities	9919.11	9919.11	18.28	18.28	16.84	16.84	93.807	93.807	28.243

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

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
10000.00	20.00	18.00	120.00	30.000

Notes:
(1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
(2) The waste flow table shall also include C&D materials to be imported for use at the Site.
(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m^3. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).

Monthly Summary Waste Flow Table

Name of Department: HyD **Contract No. / Works Order No.: HY/2012/08**

Monthly Summary Waste Flow Table for February 2021 [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of Inert Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	3205.825	0.000	336.902	889.467	1979.479
Jan-2021	1.031	0.000	0.000	0.000	1.031
Feb-2021	0.210	0.000	0.000	0.000	0.210
Mar-2021					
Apr-2021					
May-2021					
Jun-2021					
Half Year Sub-total					
Jul-2021					
Aug-2021					
Sep-2021					
Oct-2021					
Nov-2021					
Dec-2021					
Project Total Quantities	3207.066	0.000	336.902	889.467	1980.720

Month	**Actual Quantities of Non-inert Construction Waste Generated Monthly**								
	Metals		Paper/ cardboard packaging		Plastics (see Note 3)		Chemical Waste		Others, e.g. General Refuse disposed at Landfill
	(in '000kg)		(in '000kg)		(in '000kg)		(in '000kg)		(in '000ton)
	generated	recycled	generated	recycled	generated	recycled	generated	Disposed	generated
Sub-total	9919.11	9919.11	18.28	18.28	16.84	16.84	93.807	93.807	28.243
Jan-2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.071
Feb-2021	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.011
Mar-2021									
Apr-2021									
May-2021									
Jun-2021									
Half Year Sub-total									
Jul-2021									
Aug-2021									
Sep-2021									
Oct-2021									
Nov-2021									
Dec-2021									
Project Total Quantities	9919.11	9919.11	18.28	18.28	16.84	16.84	93.807	93.807	28.325

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

Forecast of Total Quantities of Construction and Demolition Materials to be Generated from the Contract*				
Metals	Paper/ cardboard packaging	Plastics (see Note 3)	Chemical Waste	General Refuse disposed of at Landfill
(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000 ton)
10000.00	20.00	18.00	120.00	30.000

Notes:
(1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
(2) The waste flow table shall also include C&D materials to be imported for use at the Site.
(3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
(4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m^3. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).