

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

*Fifty-sixth Monthly Environmental Monitoring &
Audit (EM&A) Report*

16 July 2018

Environmental Resources Management
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13 July 2018

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

By Fax (2293 6300) and By Post

Attention: Messrs. Andy Westmoreland / Roger Man

Dear Sirs,

**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
56th Monthly EM&A Report for June 2018 (EP-354/2009/D)**

Reference is made to the Monthly Environmental Monitoring and Audit (EM&A) Report (June 2018) (ET's ref.: "0212330_56th Monthly EM&A_20180711.doc" dated 11 July 2018) certified by the ET Leader and provided to us via e-mail on 13 July 2018.

Please be informed that we have no adverse comments on the captioned Report. We write to verify the captioned submission in accordance with Condition 4.4 of EP-354/2009/D.

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,



F. C. Tsang
Independent Environmental Checker
Tuen Mun – Chek Lap Kok Link

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
HyD – Mr. Vico Cheung (By Fax: 3188 6614)
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)
ERM – Mr. Jovy Tam (By Fax: 2723 5660)
Dragages – Bouygues JV - Mr. Bryan Lee (By Fax: 2293 7499)

Internal: DY, YH, DF, ENPO Site

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Contract No. HY/2012/08

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

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Fifty-sixth Monthly Environmental Monitoring & Audit (EM&A) Report

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Client: DBJV		Project No: 0212330			
Summary: This document presents the Fifty-sixth Monthly EM&A Report for Tuen Mun – Chek Lap Kok Link Northern Connection Sub-sea Tunnel Section.		Date: 16 July 2018			
		Approved by: 			
		Mr Craig Reid Partner			
		Certified by: 			
		Mr Jovy Tam ET Leader			
	56 th Monthly EM&A Report	VAR	JT	CAR	16/07/18
Revision	Description	By	Checked	Approved	Date
<p>This report has been prepared by Environmental Resources Management the trading name of 'ERM Hong-Kong, Limited', with all reasonable skill, care and diligence within the terms of the Contract with the client, incorporating our General Terms and Conditions of Business and taking account of the resources devoted to it by agreement with the client.</p> <p>We disclaim any responsibility to the client and others in respect of any matters outside the scope of the above.</p>		<p>Distribution</p> <p><input type="checkbox"/> Internal</p> <p><input checked="" type="checkbox"/> Public</p> <p><input type="checkbox"/> Confidential</p>			
		 			

TABLE OF CONTENTS

	<i>EXECUTIVE SUMMARY</i>	<i>1</i>
<i>1</i>	<i>INTRODUCTION</i>	<i>4</i>
<i>1.1</i>	<i>BACKGROUND</i>	<i>4</i>
<i>1.2</i>	<i>SCOPE OF REPORT</i>	<i>5</i>
<i>1.3</i>	<i>ORGANIZATION STRUCTURE</i>	<i>5</i>
<i>1.4</i>	<i>SUMMARY OF CONSTRUCTION WORKS</i>	<i>5</i>
<i>2</i>	<i>EM&A RESULTS</i>	<i>8</i>
<i>2.1</i>	<i>AIR QUALITY</i>	<i>8</i>
<i>2.2</i>	<i>DOLPHIN MONITORING</i>	<i>10</i>
<i>2.3</i>	<i>EM&A SITE INSPECTION</i>	<i>15</i>
<i>2.4</i>	<i>WASTE MANAGEMENT STATUS</i>	<i>16</i>
<i>2.5</i>	<i>ENVIRONMENTAL LICENSES AND PERMITS</i>	<i>16</i>
<i>2.6</i>	<i>IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES</i>	<i>18</i>
<i>2.7</i>	<i>SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT</i>	<i>18</i>
<i>2.8</i>	<i>SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>	<i>18</i>
<i>3</i>	<i>FUTURE KEY ISSUES</i>	<i>19</i>
<i>3.1</i>	<i>CONSTRUCTION ACTIVITIES FOR THE COMING MONTH</i>	<i>19</i>
<i>3.2</i>	<i>KEY ISSUES FOR THE COMING MONTH</i>	<i>19</i>
<i>3.3</i>	<i>MONITORING SCHEDULE FOR THE COMING MONTH</i>	<i>19</i>
<i>4</i>	<i>CONCLUSIONS AND RECOMMENDATIONS</i>	<i>20</i>
<i>4.1</i>	<i>CONCLUSIONS</i>	<i>20</i>

<i>APPENDIX A</i>	<i>PROJECT ORGANIZATION FOR ENVIRONMENTAL WORKS</i>
<i>APPENDIX B</i>	<i>CONSTRUCTION PROGRAMME</i>
<i>APPENDIX C</i>	<i>ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULES (EMIS)</i>
<i>APPENDIX D</i>	<i>SUMMARY OF ACTION AND LIMIT LEVELS</i>
<i>APPENDIX E</i>	<i>COPIES OF CALIBRATION CERTIFICATE FOR AIR QUALITY MONITORING</i>
<i>APPENDIX F</i>	<i>EM&A MONITORING SCHEDULES</i>
<i>APPENDIX G</i>	<i>IMPACT AIR QUALITY MONITORING RESULTS</i>
<i>APPENDIX H</i>	<i>METEOROLOGICAL DATA</i>
<i>APPENDIX I</i>	<i>IMPACT DOLPHIN MONITORING SURVEY</i>
<i>APPENDIX J</i>	<i>EVENT AND ACTION PLAN</i>
<i>APPENDIX K</i>	<i>CUMULATIVE STATISTICS ON EXCEEDANCE, COMPLAINTS, NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTIONS</i>
<i>APPENDIX L</i>	<i>WASTE FLOW TABLE</i>

EXECUTIVE SUMMARY

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

The construction phase of the Project commenced on 1 November 2013 and will tentatively be completed by the end of 2018. 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 Fifty-sixth Monthly EM&A report presenting the EM&A works carried out during the period from 1 to 30 June 2018 for the *Contract No. HY/2012/08 Northern Connection Sub-sea Tunnel Section* (the “Project”) in accordance with the Updated EM&A Manual of the TM-CLK Link Project. As informed by the Contractor, major activities in the reporting period included:

Land-based Works

- Box Culvert Extension at Works Area – Portion N-A;
- Construction of North Ventilation Building – Portion N-C;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Cross Passage Lining Installation – TBM Tunnel;
- Cross Passage Construction by Pipe Jacking – TBM Tunnel;
- Corbel & OVHD Construction – TBM Tunnel;
- Parapet wall and fireboard Installation – TBM Tunnel;
- Bulk Excavation – Portion S-A; and
- CSM treatment, Jet Grouting works and D-wall Construction

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period.

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

24-hour TSP Monitoring	10 sessions
1-hour TSP Monitoring	10 sessions
Impact Dolphin Monitoring	2 sessions
Joint Environmental Site Inspection	4 sessions

Implementation of Marine Mammal Exclusion Zone

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period. Thus, Passive Acoustic Monitoring (PAM) and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were not in effect during the reporting period.

Summary of Breaches of Action/Limit Levels

Breaches of Action and Limit Levels for Air Quality

No exceedance of 1-hour and 24-hour TSP was recorded in this reporting month.

Summary of Marine Travel Route record

No non-compliance with EIA recommendations, EP conditions and other requirements associated with the marine travel route record of this Contract was recorded in June 2018.

Breaches of Action and Limit Levels for Dolphin Monitoring

Due to monthly variation in dolphin occurrence within the survey area, it would be more appropriate to draw conclusion on whether any unacceptable impacts on dolphins have been detected in relation to the construction activities of this Project in the quarterly EM&A reports, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period and baseline monitoring period will be made.

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 required in the reporting period.

Upcoming Works for the Next Reporting Month

Works to be undertaken in the next monitoring period of July 2018 include the following:

Land-based Works

- Construction of North Ventilation Building – Portion N-C;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Cross Passage Lining Installation – TBM Tunnel;
- Parapet wall and fireboard Installation – TBM Tunnel
- Corbel & OVHD Construction – TBM Tunnel;
- Bulk Excavation – Portion S-A; and
- CSM treatment, Jet Grouting works and D-wall Construction;

There will be no dredging, reclamation or marine sheet piling works in open waters during next reporting period.

Future Key Issue

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of July 2018 are mainly associated with dust, marine ecology and waste management issues.

1.1

BACKGROUND

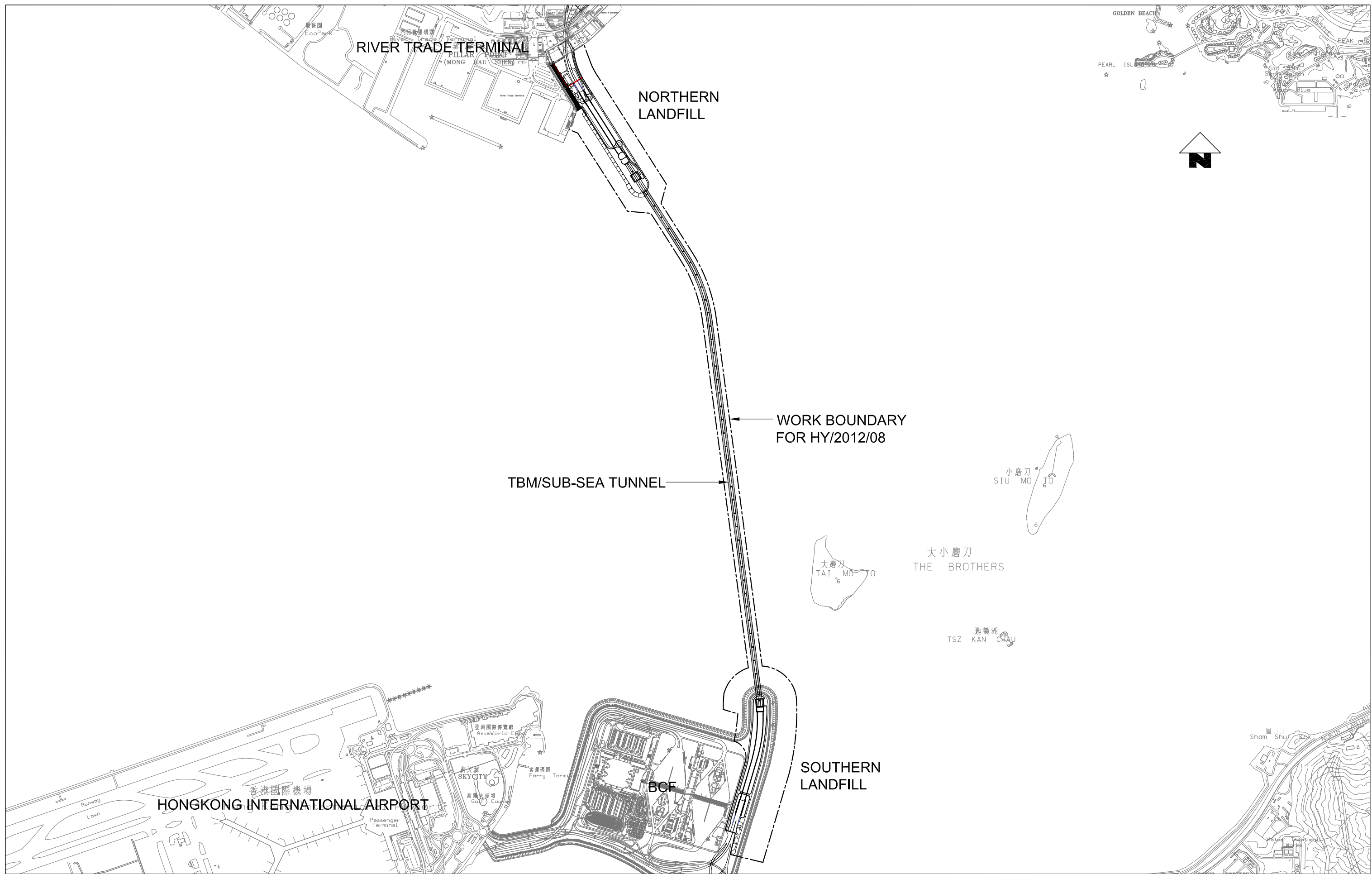
According to the findings of the Northwest New Territories (NWNT) Traffic and Infrastructure Review conducted by the Transport Department, Tuen Mun Road, Ting Kau Bridge, Lantau Link and North Lantau Highway would be operating beyond capacity after 2016. This forecast has been based on the estimated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

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

The construction phase of the Contract commenced on 1 November 2013 and will tentatively be completed by 2018. 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.



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

Main Contractor


 A member of the Bouygues Construction group
 Dragages - Bouygues Joint Venture 寶嘉 - 布依格聯營

Client

 路政署
HIGHWAYS DEPARTMENT

Contractor's Designer

 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

1.2 SCOPE OF REPORT

This is the Fifty-sixth Monthly 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 in June 2018.

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 22/HZMB	Chow Man Lung, Andrew	2762 4110	2762 4110
SOR (AECOM Asia Company Limited)	Chief Resident Engineer	Roger Man	2293 6388	2293 6300
		Andrew Westmoreland	2293 6360	2293 6300
ENPO / IEC (Ramboll Hong Kong Ltd.)	ENPO Leader	Y.H. Hui	3465 2850	3465 2899
	IEC	Dr. F.C. Tsang	3465 2851	3465 2899
Contractor (Dragages – Bouygues Joint Venture)	Environmental Officer	Bryan Lee	2293 7323	2293 7499
	24-hour complaint hotline	Rachel Lam	2293 7330	
ET (ERM-HK)	ET Leader	Jovy Tam	2271 3113	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*.

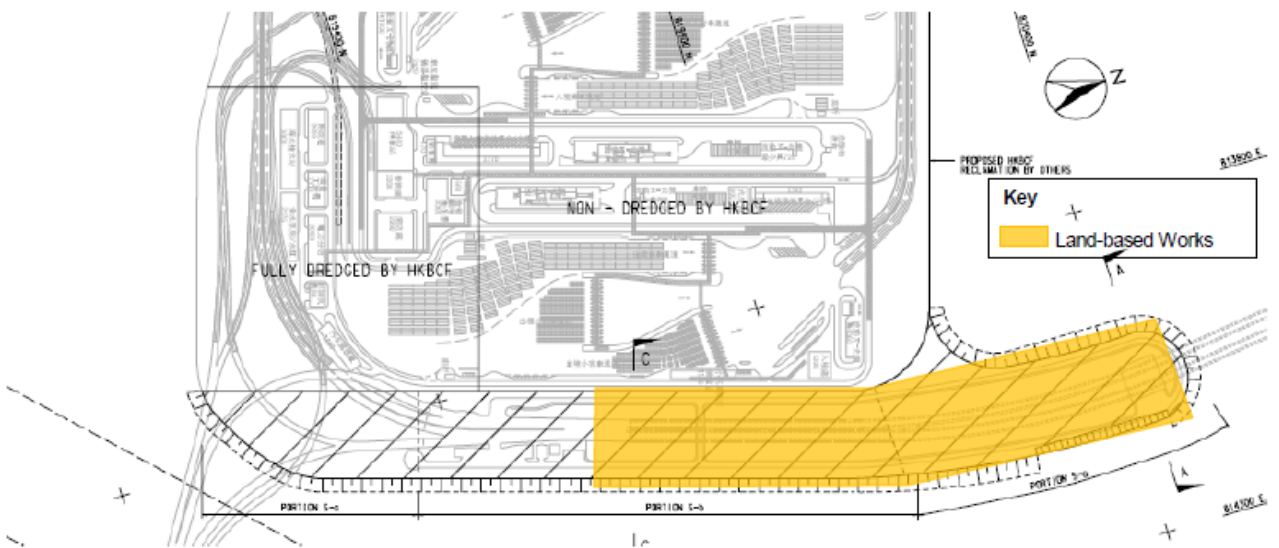
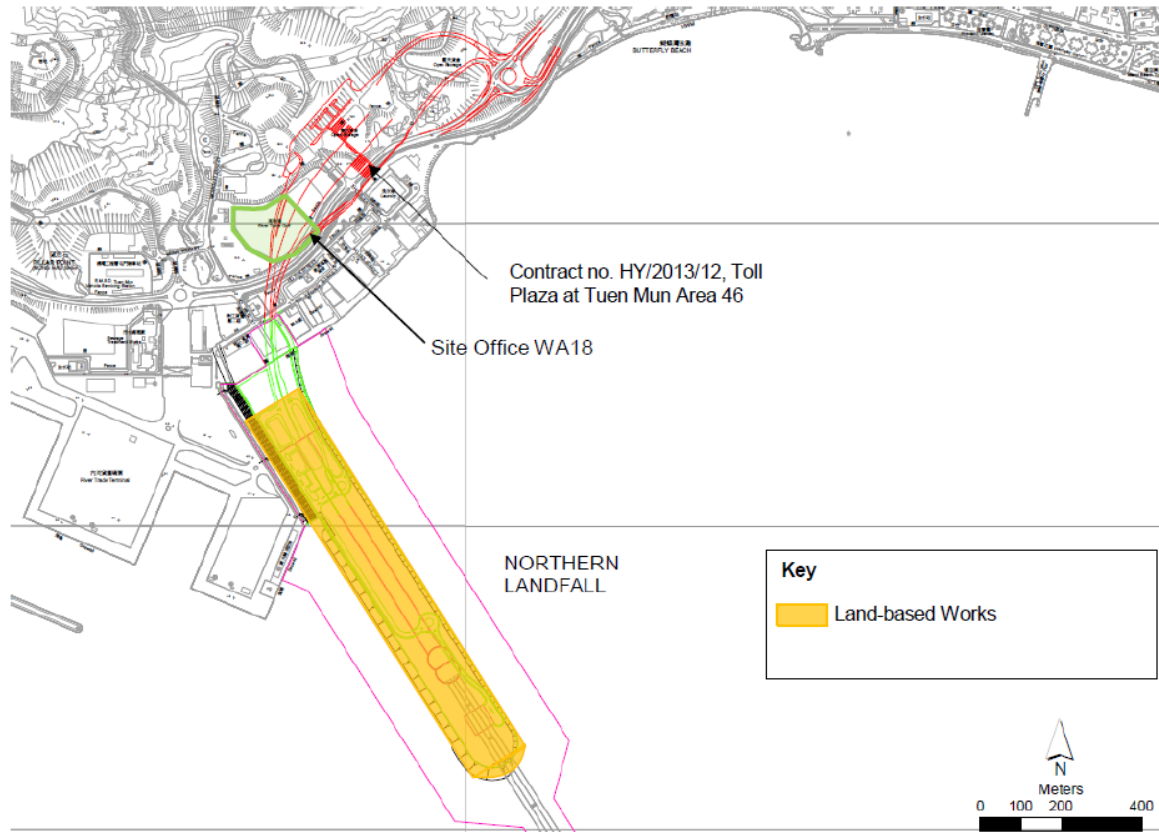
The general layout plan of the site showing the detailed works areas is shown in *Figure 1.2*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.3*.

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

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

Construction Activities Undertaken
<i>Land-based Works</i>
<ul style="list-style-type: none">• Box Culvert Extension at Works Area – Portion N-A;• Construction of North Ventilation Building – Portion N-C;• Construction of Cross Passage Tympanum – TBM tunnel;• Cross Passage Lining Installation – TBM Tunnel;• Cross Passage Construction by Pipe Jacking – TBM Tunnel;• Corbel & OVHD Construction – TBM Tunnel;• Parapet wall and fireboard Installation – TBM Tunnel;• Bulk Excavation – Portion S-A; and• CSM treatment, Jet Grouting works and D-wall Construction

Figure 1.2 Locations of Construction Activities – June 2018



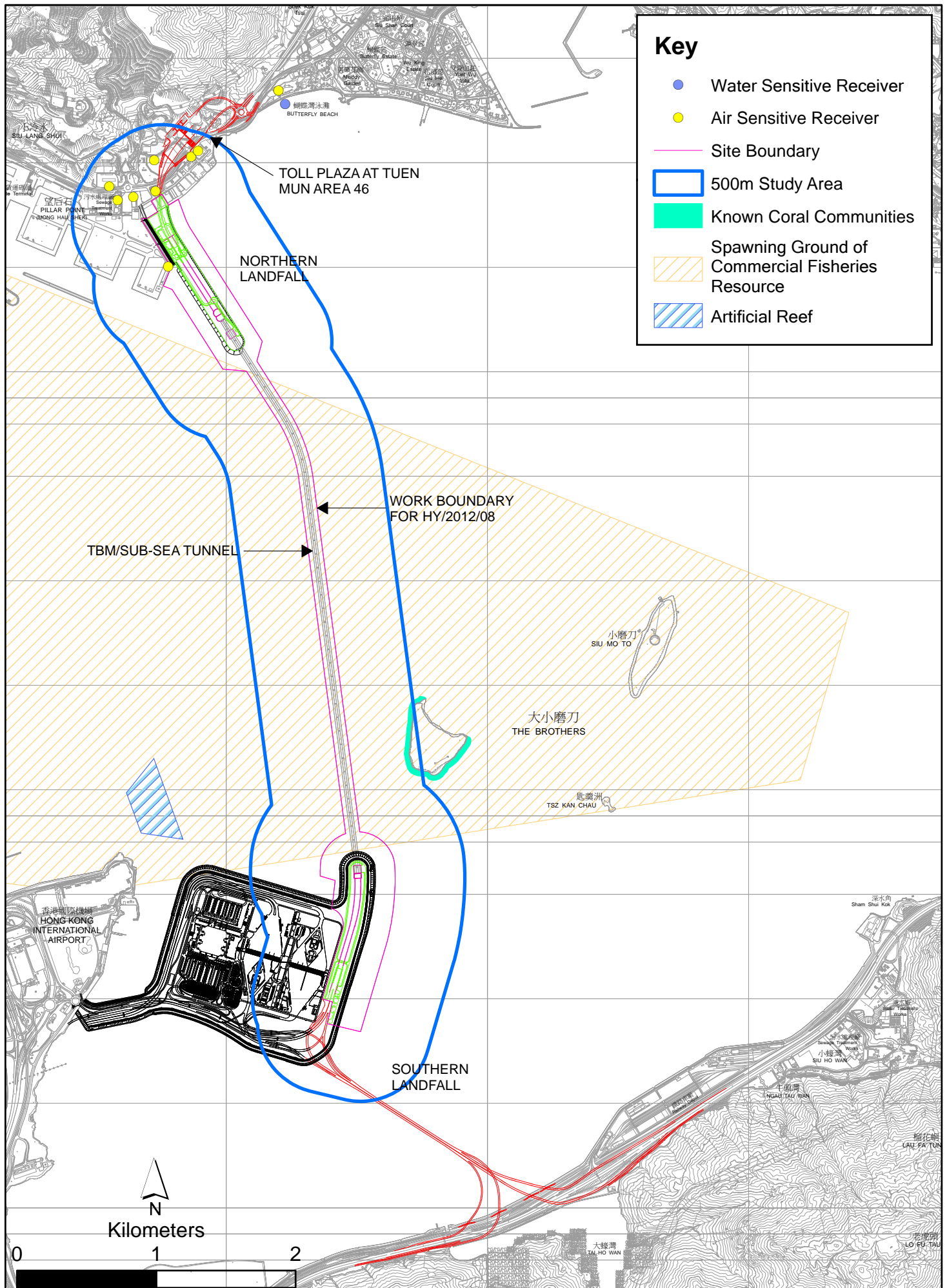


Figure 1.3 Environmental Sensitive Receivers in the vicinity of Contract No. HY/2012/08 Tuen Mun - Chek Lap Kok Link - Northern Connection Sub-Sea Tunnel Section

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

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

2.1 AIR QUALITY

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.

High volume samplers (HVSs) were used to carry out the 1-hour and 24-hour TSP monitoring on 3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 June 2018 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 meter 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*. Copies of the calibration certificates for the equipment are presented in *Appendix E*.

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	3, 6, 9, 12, 15, 18, 21, 24, 27 and 30 June 2018	Tuen Mun Fireboat Station	Office	TSP monitoring
ASR5		Pillar Point Fire Station	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 6 days 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 6 days
AQMS1		Previous River Trade Golf	Bare ground	Enhanced TSP monitoring (commenced on 24 October 2014)
ASR6		Butterfly Beach Laundry	Office	<ul style="list-style-type: none"> 1-hour Total Suspended Particulates (1-hour TSP, $\mu\text{g}/\text{m}^3$), 3 times in every 3 days
ASR10		Butterfly Beach Park	Recreational uses	<ul style="list-style-type: none"> 24-hour Total Suspended Particulates (24-hour TSP, $\mu\text{g}/\text{m}^3$), daily for 24-hour in every 3 days

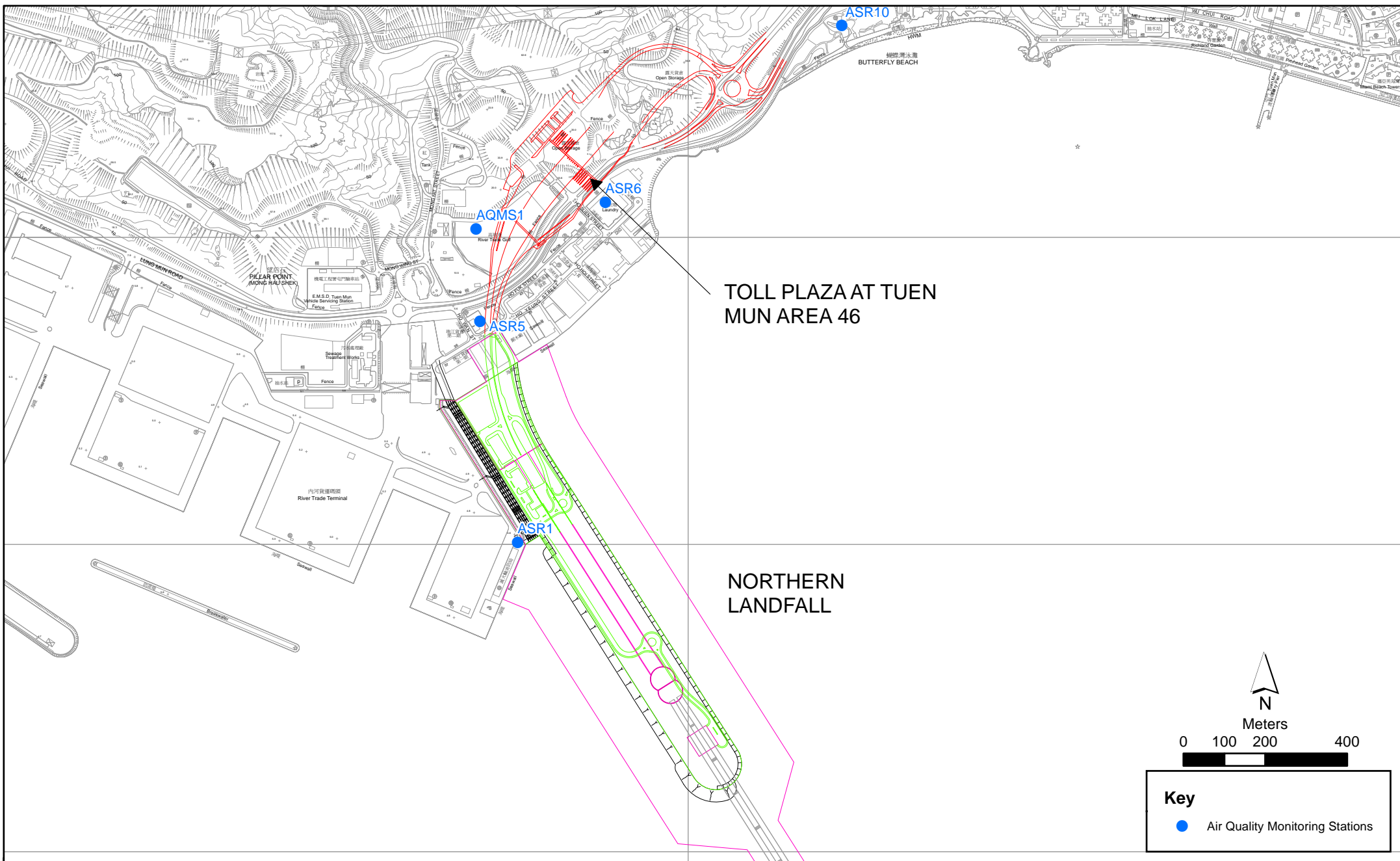


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring

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 J*.

2.1.3 Monitoring Schedule for the Reporting Month

The schedule for air quality monitoring in June 2018 is provided in *Appendix F*.

2.1.4 Results and Observations

The monitoring results for 1-hour TSP and 24-hour TSP are summarized in *Tables 2.3* and *2.4*, respectively. Detailed impact air quality monitoring results and graphical presentations are presented in *Appendix G*.

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

Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
ASR1	99	13 - 272	331	500
ASR5	129	43 - 230	340	500
AQMS1	88	44 - 149	335	500
ASR6	113	46 - 187	338	500
ASR10	74	39 - 109	337	500

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

Station	Average ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	Action Level ($\mu\text{g}/\text{m}^3$)	Limit Level ($\mu\text{g}/\text{m}^3$)
ASR1	65	37 - 136	213	260
ASR5	65	41 - 89	238	260
AQMS1	46	28 - 68	213	260
ASR6	52	18 - 87	238	260
ASR10	38	27 - 66	214	260

The weather condition during the monitoring period varied from sunny to cloudy. The major dust sources in the reporting period included construction activities under the Contract as well as nearby traffic emissions.

A total of 10 1-hour TSP and 24-hour TSP monitoring were undertaken in which no exceedance of 1-hour and 24-hour TSP was recorded in this reporting month.

Meteorological information collected at the ASR5, including wind speed and wind direction, is provided in *Appendix H*.

2.2 WATER QUALITY MONITORING

Seawall Enhancement Works at Northern Landfall has been completed on 31 December 2017. Notification of suspension of water quality monitoring has been approved by EPD on 2 March 2018.

2.3 DOLPHIN MONITORING

2.3.1 Monitoring Requirements

Impact dolphin monitoring is required to be conducted by a qualified dolphin specialist team to evaluate whether there have been any effects on the dolphins. In order to fulfil the EM&A requirements and make good use of available resources, the on-going impact line transect dolphin monitoring data collected by HyD's *Contract No. HY/2011/03 Hong Kong-Zhuhai-Macao Bridge, Hong Kong Link Road - Section between Scenic Hill and Hong Kong Boundary Crossing Facilities* on the monthly basis is adopted to avoid duplicates of survey effort.

2.3.2 Monitoring Equipment

Table 2.5 summarises the equipment used for the impact dolphin monitoring.

Table 2.5 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 Binocular	Infinitor LRF 1000
Marine Binocular	Bushell 7 x 50 marine binocular with compass and reticules
Vessel for Monitoring	65 foot single engine motor vessel with viewing platform 4.5m above water level

2.3.3 Monitoring Parameter, Frequencies & Duration

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

comparison, identical methodology and line transects employed in baseline dolphin monitoring was followed in the impact dolphin monitoring.

2.3.4 *Monitoring Location*

The impact dolphin monitoring was carried out in the NEL and NWL along the line transect as depicted in *Figure 2.2*. The co-ordinates of all transect lines are shown in *Table 2.6* below.

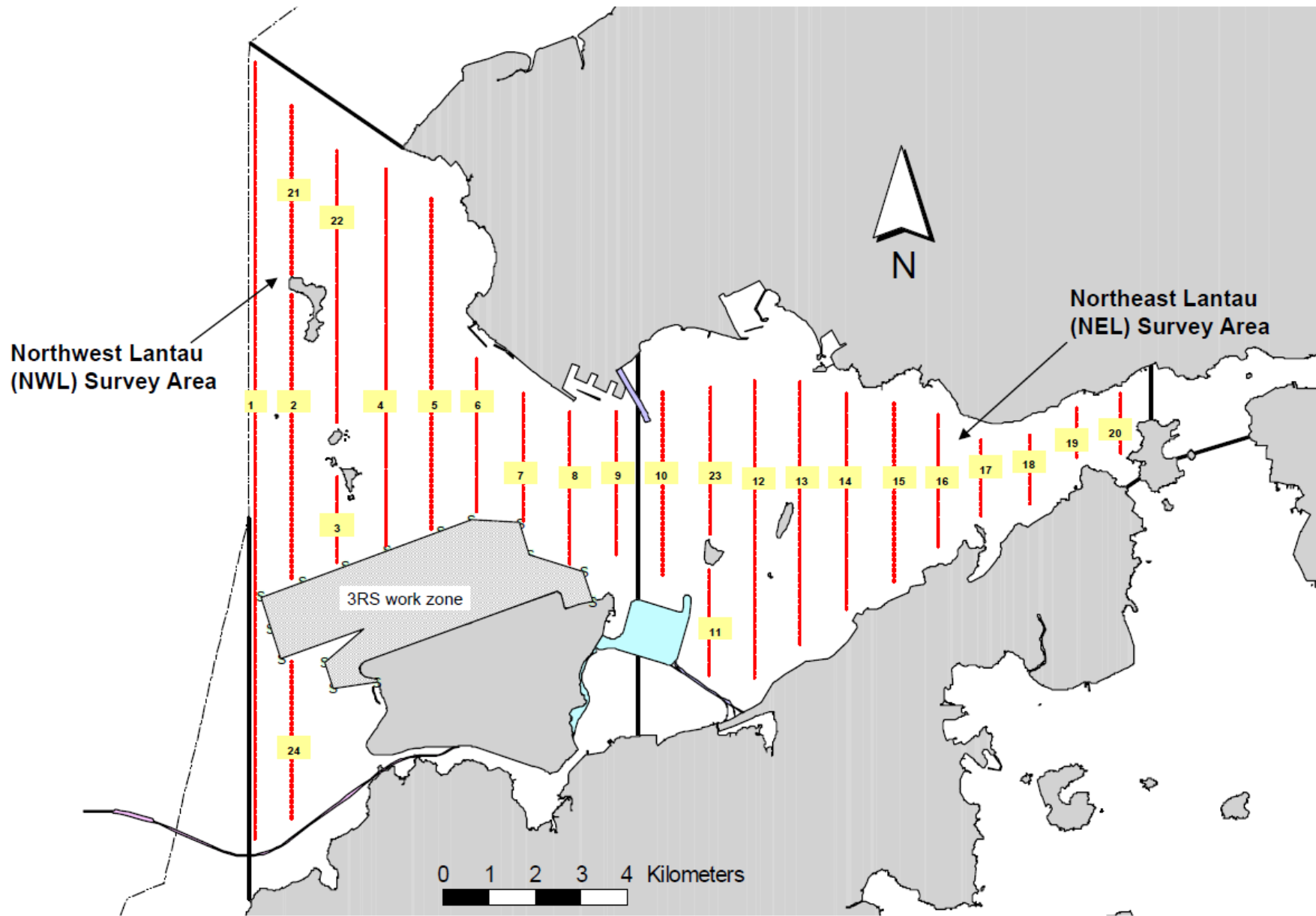


Figure 2.2

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

Table 2.6 Impact Dolphin Monitoring Line Transect Co-ordinates

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

2.3.6 *Monitoring Schedule for the Reporting Month*

Dolphin monitoring was carried out on 5, 13, 19 and 27 of June 2018. The dolphin monitoring schedule for the reporting month is shown in *Appendix F*.

2.3.7 *Results & Observations*

A total of 254.94 km of survey effort was collected, with 95.8% of the total survey effort being conducted under favourable weather conditions (i.e. Beaufort Sea State 3 or below with good visibility) in June 2018. Among the two areas, 93.78 km and 161.16 km of survey effort were collected from NEL and NWL survey areas, respectively. The total survey effort conducted on primary and secondary lines were 190.66 km and 64.28 km respectively. The survey efforts are summarized in *Appendix I*.

Two groups of 7 Chinese White Dolphins sightings were recorded during the two sets of surveys in June 2018. All dolphin sightings were made in NWL, while none was sighted in NEL. All dolphin sightings were made during on-effort search and one of the two were made on primary lines. None of the dolphin groups were associated with any operating fishing vessel.

No dolphin sighting was made in the proximity of the TM-CLKL alignment. The distribution of dolphin sightings during the reporting month is shown in *Figure 2.3*.

Encounter rates of Chinese White Dolphins are deduced from the survey effort and on-effort sighting data made under favourable conditions (Beaufort 3 or below) in June 2018 with the results present in *Tables 2.7* and *2.8*.

Table 2.7 *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: June 5 th / 13 th	0.0	0.0
	Set 2: June 19 th / 27 th	0.0	0.0
NWL	Set 1: June 5 th / 13 th	0.0	0.0
	Set 2: June 19 th / 27 th	1.9	3.8

Note: Dolphin Encounter Rates are deduced from the Two Sets of Surveys (Two Surveys in Each Set) in June 2018 in Northeast (NEL) and Northwest Lantau (NWL)

Table 2.8 *Monthly 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)	
	Primary Lines Only	Both Primary and Secondary Lines	Primary Lines Only	Both Primary and Secondary Lines

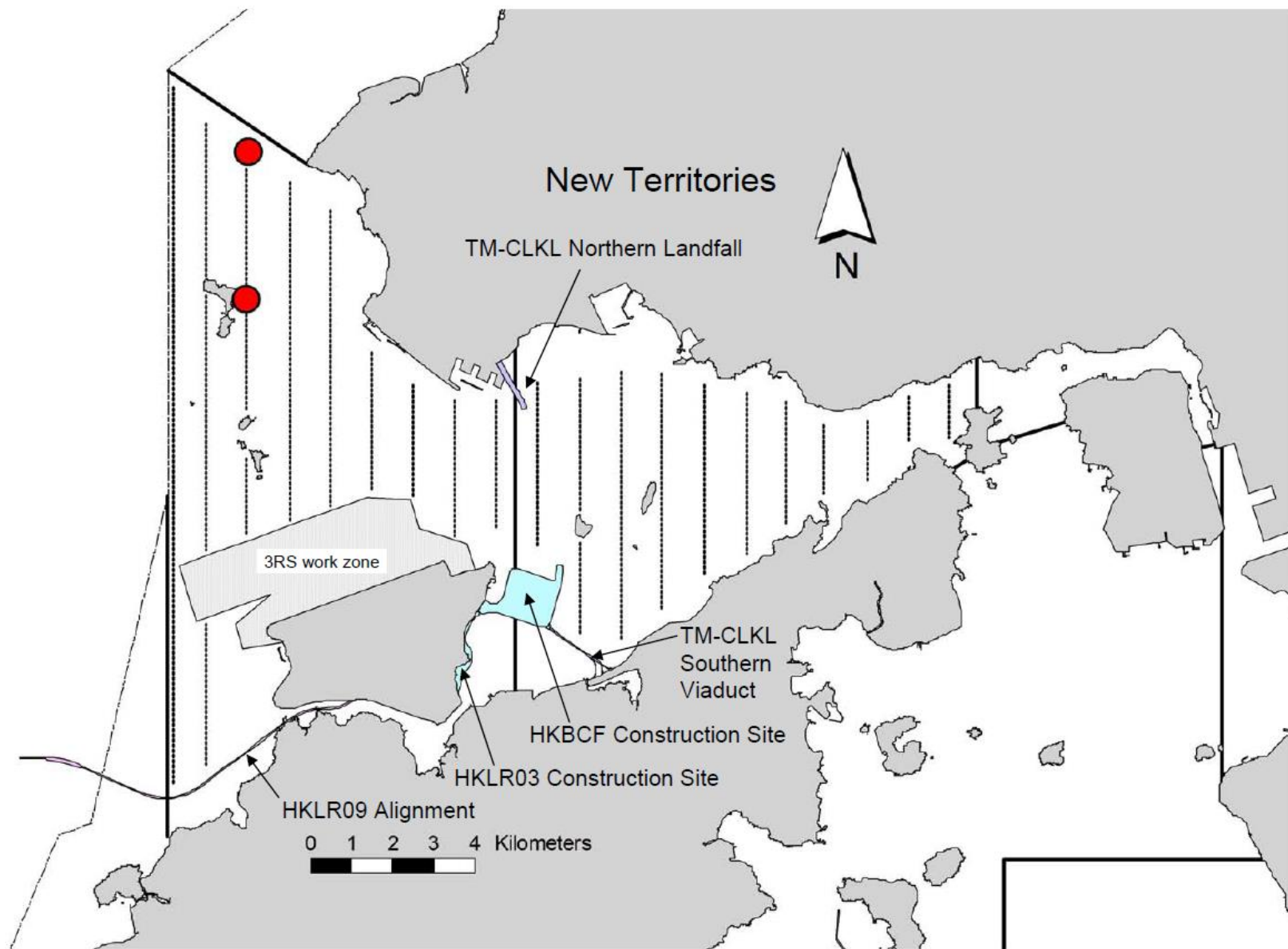


Figure 2.3

HY/2012/08 TM-CLKL Northern Connection Sub-sea Tunnel Section
 The distribution of dolphin sightings during the reporting period
 (Source: Adopted from HKLR03 Monitoring Survey in June 2018)

Northeast Lantau	0.0	0.0	0.0	0.0
Northwest Lantau	0.9	1.3	1.8	4.7

Note: Overall dolphin encounter rates (sightings per 100 km of survey effort) from all four surveys are conducted in June 2018 on primary lines only as well as both primary lines and secondary lines in Northeast and Northwest Lantau.

Due to monthly variation in dolphin occurrence within the survey area, it would be more appropriate to draw conclusion on whether any unacceptable impacts on dolphins have been detected in relation to the construction activities of this Project in the quarterly EM&A reports, where comparison on distribution, group size and encounter rates of dolphins between the quarterly impact monitoring period and baseline monitoring period will be made.

2.3.8 *Implementation of Marine Mammal Exclusion Zone*

There was no dredging, reclamation or marine sheet piling works in open waters during this reporting period. Thus, Passive Acoustic Monitoring (PAM) and the day-time monitoring of Dolphin Exclusion Zone (DEZ) by dolphin observers were not in effect during the reporting period.

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. In the reporting month, four (4) site inspections were carried out on 6, 13, 20 and 27 June 2018.

Key observations and recommendations during the site inspections in this reporting period are summarized in *Table 2.9*.

Table 2.9 *Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Month*

Inspection Date	Observations	Recommendations/ Remarks
6 June 2018	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> Drip tray should be provided for the chemical containers. Extra water pumps should be used to pump off the stagnant water during heavy raining. <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> Stagnant water should be pumped off. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The breaker tip should be wrapped with soundproof mat. 	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to provide drip tray for the chemical containers. The Contractor was reminded to pump off the stagnant water during heavy raining. <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to pump off the stagnant water. <p>Reminder from the SOR</p> <p>Works Area - Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to wrap the breaker tip with soundproof mat.
13 June 2018	<p>Works Area – Portion N-C</p> <ul style="list-style-type: none"> Stagnant water should be pumped off to the Wetsep. <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> Stagnant water should be removed. <p>Reminder from the SOR</p> <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The breaker tip should be wrapped with soundproof mat. 	<p>Works Area – Portion N-C</p> <ul style="list-style-type: none"> The Contractor was reminded to pump off the stagnant water to the Wetsep. <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water. <p>Reminder from the SOR</p> <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to wrap the breaker tip with soundproof mat.
20 June 2018	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> Stagnant water should be pumped off. <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> Drip tray should be provided to the chemical containers. <p>Reminder from the SOR</p> <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The broken water barriers should be replaced and covered with lids. <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> The broken water barriers should be replaced. 	<p>Works Area – Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to pump off the stagnant water. <p>Works Area – Portion S-B</p> <ul style="list-style-type: none"> The Contractor was reminded to provided chemical containers for the drip tray. <p>Reminder from the SOR</p> <p>Works Area - Portion N-A</p> <ul style="list-style-type: none"> The Contractor was reminded to replace the broken water barriers and cover them with lids. <p>Works Area – Portion S-A</p> <ul style="list-style-type: none"> The Contractor was reminded to replace the broken water barriers.

Inspection Date	Observations	Recommendations/ Remarks
27 June 2018	Works Area - Portion N-A <ul style="list-style-type: none"> General refuse should be put into the rubbish bin. Works Area - Portion S-B <ul style="list-style-type: none"> Stagnant water in the drip tray should be removed. 	Works Area - Portion N-A <ul style="list-style-type: none"> The Contractor was reminded to put the general refuse into the rubbish bin. Works Area - Portion S-B <ul style="list-style-type: none"> The Contractor was reminded to remove the stagnant water in the drip tray.

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

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 included mainly construction wastes (inert and non-inert), chemical wastes and marine sediment. Reference has been made to the waste flow table prepared by the Contractor (*Appendix L*). The quantities of different types of wastes are summarized in *Table 2.10*.

Table 2.10 Quantities of Different Waste Generated in the Reporting Month

Month/Year	Inert Construction Waste ^(a) (tonnes)	Inert Construction Waste Re-used (tonnes)	Non-inert Construction Waste ^(b) (tonnes)	Imported Fill (m ³) ^(d)	Recyclable Materials ^(c) (kg)	Chemical Wastes (kg)	Marine Sediment (m ³)	
							Category L	Category M (M _p & M _f)
June 2018	102,987	55,385	408	0	1,060	0	0	0

Notes:

- (a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
- (b) Non-inert construction wastes include general refuse disposed at landfill.
- (c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.
- (d) The origin of imported fill is from *Contract No. HY/2013/03*.

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 2.11* below.

Table 2.11 Summary of Environmental Licensing and Permit Status

License/ Permit	License or Permit No.	Date of Issue	Date of Expiry	License/ Permit Holder	Remarks
Environmental Permit	EP-354/2009/D	13 March 2015	Throughout the Contract	HyD	Application for VEP on 3 March 2015 to supersede EP-354/2009/C
Construction Dust Notification	363510	19 August 2013	Throughout the Contract	DBJV	Northern Landfall
Construction Dust Notification	403620	10 June 2016	Throughout the Contract	DBJV	Southern Landfall
Chemical Waste Registration	5213-422-D2516-02	18 January 2017	Throughout the Contract	DBJV	Northern Landfall
Chemical Waste Registration	5213-951-D2591-01	25 May 2016	Throughout the Contract	DBJV	Southern Landfall
Construction Waste Disposal Account	7018108	28 August 2013	Throughout the Contract	DBJV	Waste disposal in Contract No. HY/2012/08
Construction Waste Disposal Account	7021715	17 April 2018	17 July 2018	DBJV	Vessel Disposal
Waste Water Discharge License	WT00017707-2013	18 November 2013	30 November 2018	DBJV	For site WA18
Waste Water Discharge License	WT00019248-2014	5 June 2014	30 June 2019	DBJV	For site Portion N6 and Reclamation Area E
Waste Water Discharge License	WT00025944-2016	15 December 2016	31 December 2021	DBJV	Southern Landfall
Marine Dumping Permit	EP/MD/19-001	28 May 2018	27 June 2018	DBJV	Type 1 (Dedicated site) and Type 2 (Confined Marine Disposal)
Construction Noise Permit	GW-RW0538-17	16 April 2018	15 October 2018	DBJV	For Urmston Road in front of Pillar Point
Construction Noise Permit	PP-RS0026-17	3 April 2017	31 July 2018	DBJV	Southern Landfall (Percussive Piling)
Construction Noise Permit	GW-RW0060-18	20 February 2018	19 August 2018	DBJV	WA23 @ Tsing Yi
Construction Noise Permit	GW-RS0027-18	22 January 2018	14 July 2018	DBJV	Southern Landfall

Notes:

HyD = Highways Department

DBJV = Dragages - Bouygues Joint Venture

VEP = Variation of Environmental Permit

2.7 *IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES*

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

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

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

No exceedance of 1-hour and 24-hour TSP was recorded in this reporting month.

Cumulative statistics are provided in *Appendix K*.

2.9 *SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS*

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

No environmental complaint was received in this reporting period.

No environmental summons was received in this reporting period.

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

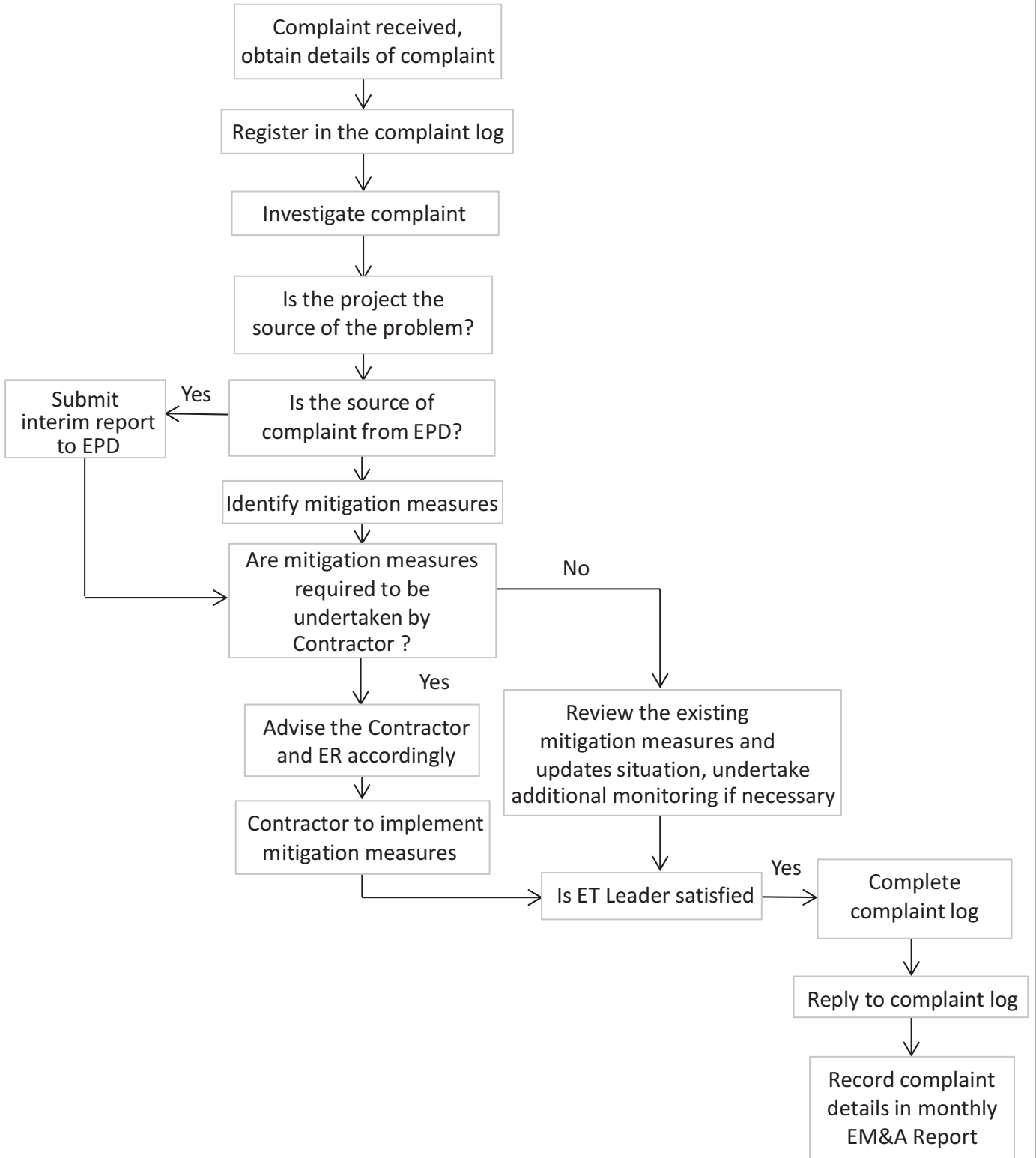


Figure 2.4

Environmental Complaint Handling Procedure

3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING MONTH

As informed by the Contractor, the major works for the Project in June 2018 are summarized in *Table 3.1*.

Table 3.1 Construction Works to Be Undertaken in the Coming Month

Works to be undertaken

Land-based Works

- Construction of North Ventilation Building – Portion N-C;
- Construction of Cross Passage Tympanum – TBM tunnel;
- Cross Passage Lining Installation – TBM Tunnel;
- Parapet wall and fireboard Installation – TBM Tunnel
- Corbel & OVHD Construction – TBM Tunnel;
- Bulk Excavation – Portion S-A; and
- CSM treatment, Jet Grouting works and D-wall Construction;

There will be no dredging, reclamation or marine sheet piling works in open waters during next reporting period.

3.2 KEY ISSUES FOR THE COMING MONTH

Potential environmental impacts arising from the above upcoming construction activities in the next reporting month of July 2018 are mainly associated with dust, marine ecology, water quality and waste management issues.

3.3 MONITORING SCHEDULE FOR THE COMING MONTH

The tentative schedule for environmental monitoring in July 2018 is provided in *Appendix F*.

4.1 CONCLUSIONS

This Fifty-sixth Monthly EM&A Report presents the findings of the EM&A activities undertaken during the period from 1 to 30 June 2018, 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) and dolphin monitoring were carried out in this reporting month.

No exceedance of 1-hour and 24-hour TSP was recorded in this reporting month.

Two groups of 7 Chinese White Dolphins sightings were recorded during the two sets of surveys in June 2018. All dolphin sightings were made in NWL, while none was sighted in NEL. All dolphin sightings were made during on-effort search and one of the two were made on primary lines. None of the dolphin groups were associated with any operating fishing vessel.

Environmental site inspection was carried out four (4) times in June 2018. Remedial actions recommended for the deficiencies identified during the site audits were properly implemented by the Contractor.

No non-compliance event was recorded during the reporting period.

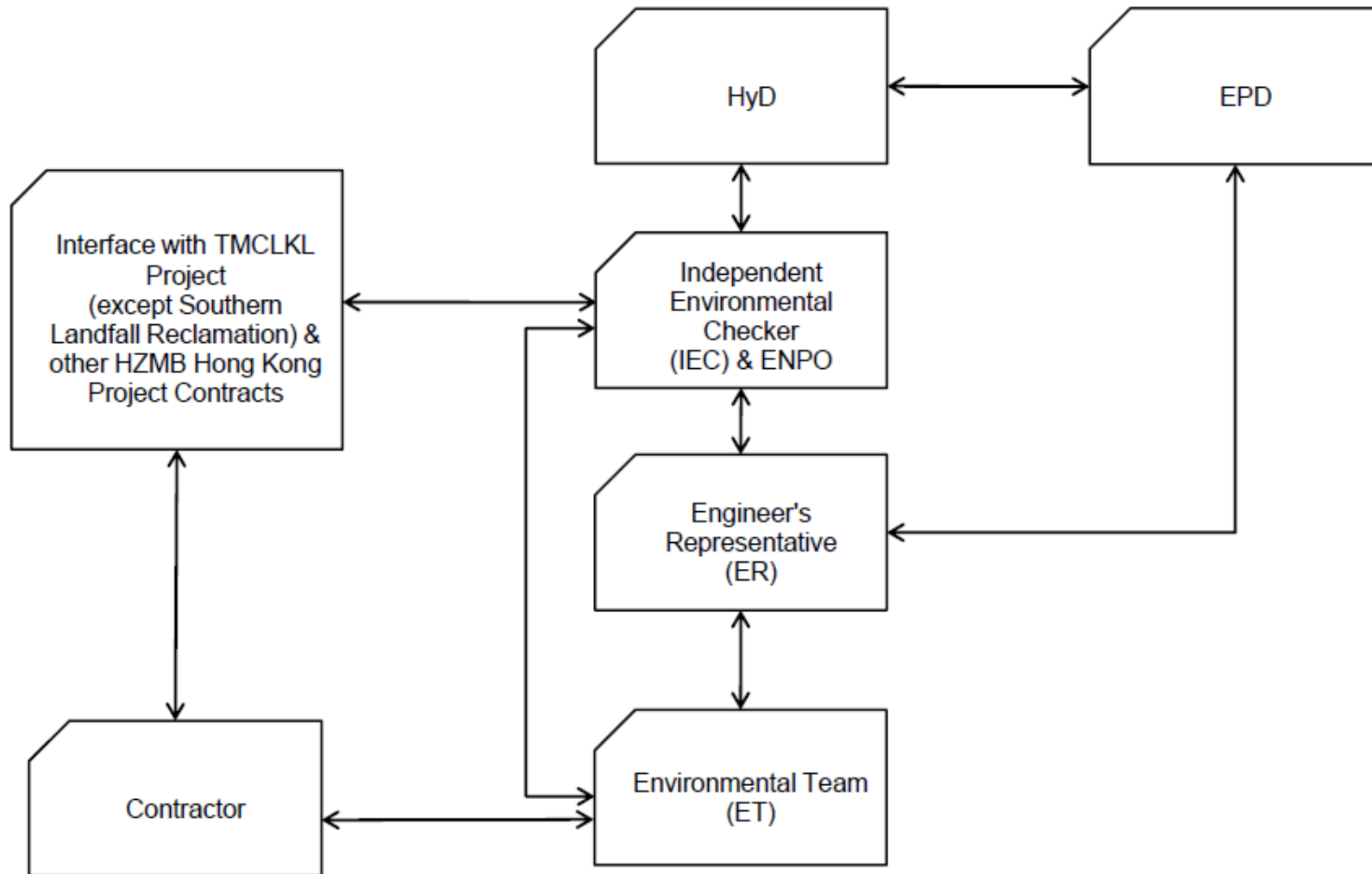
No environmental complaint was received in this reporting period.

No environmental summons was received in this 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

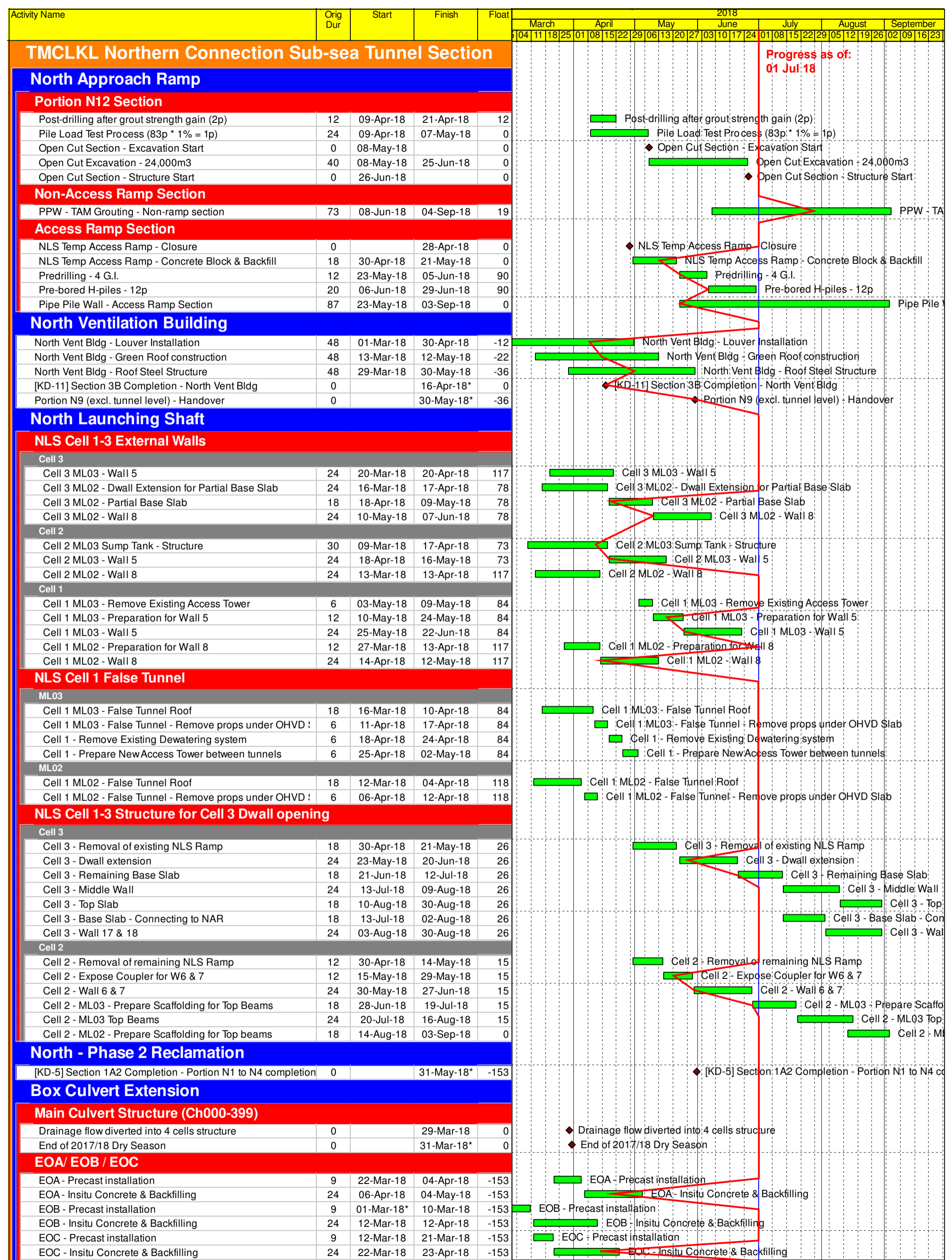
Project Organization for Environmental Works

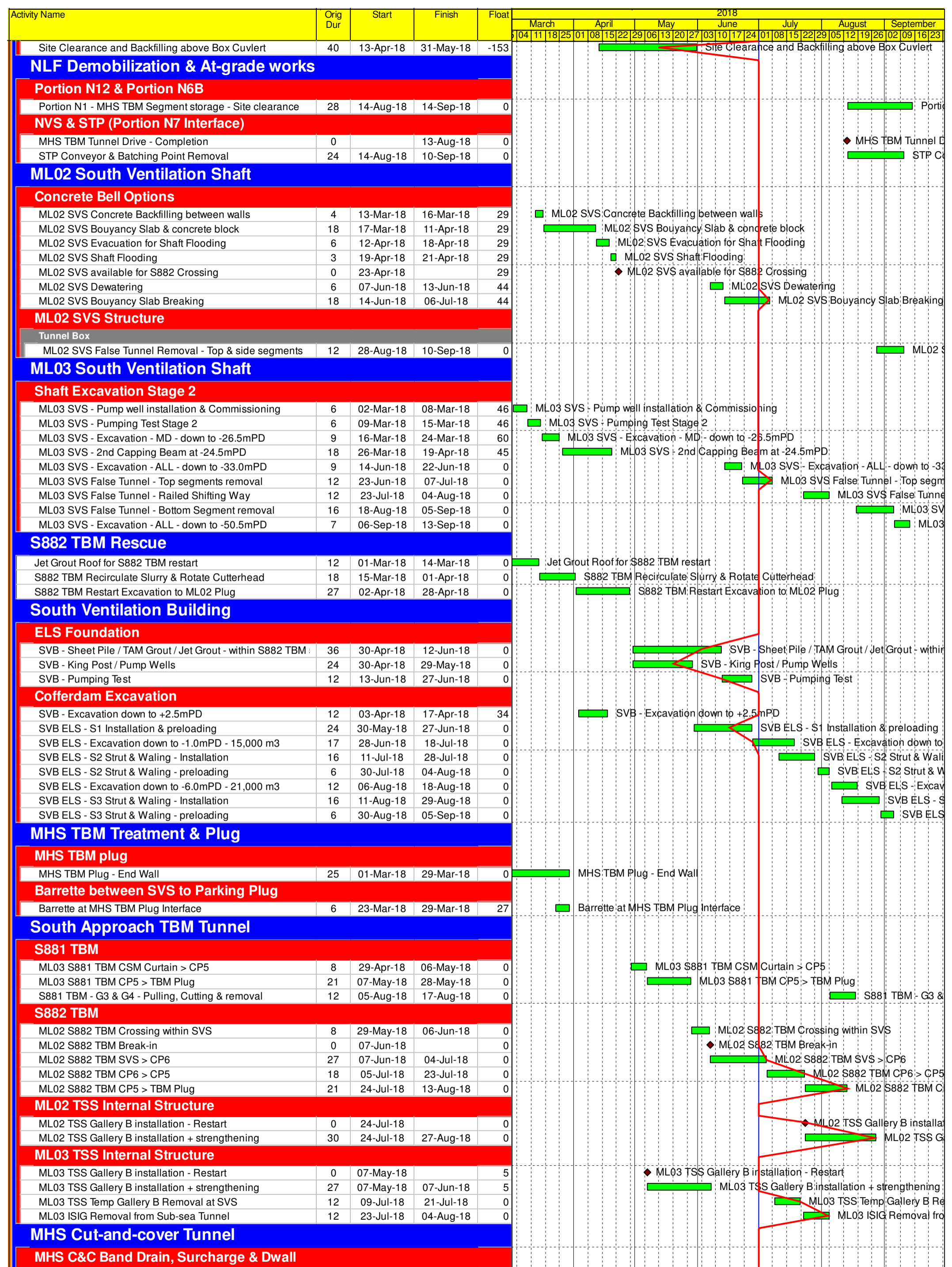


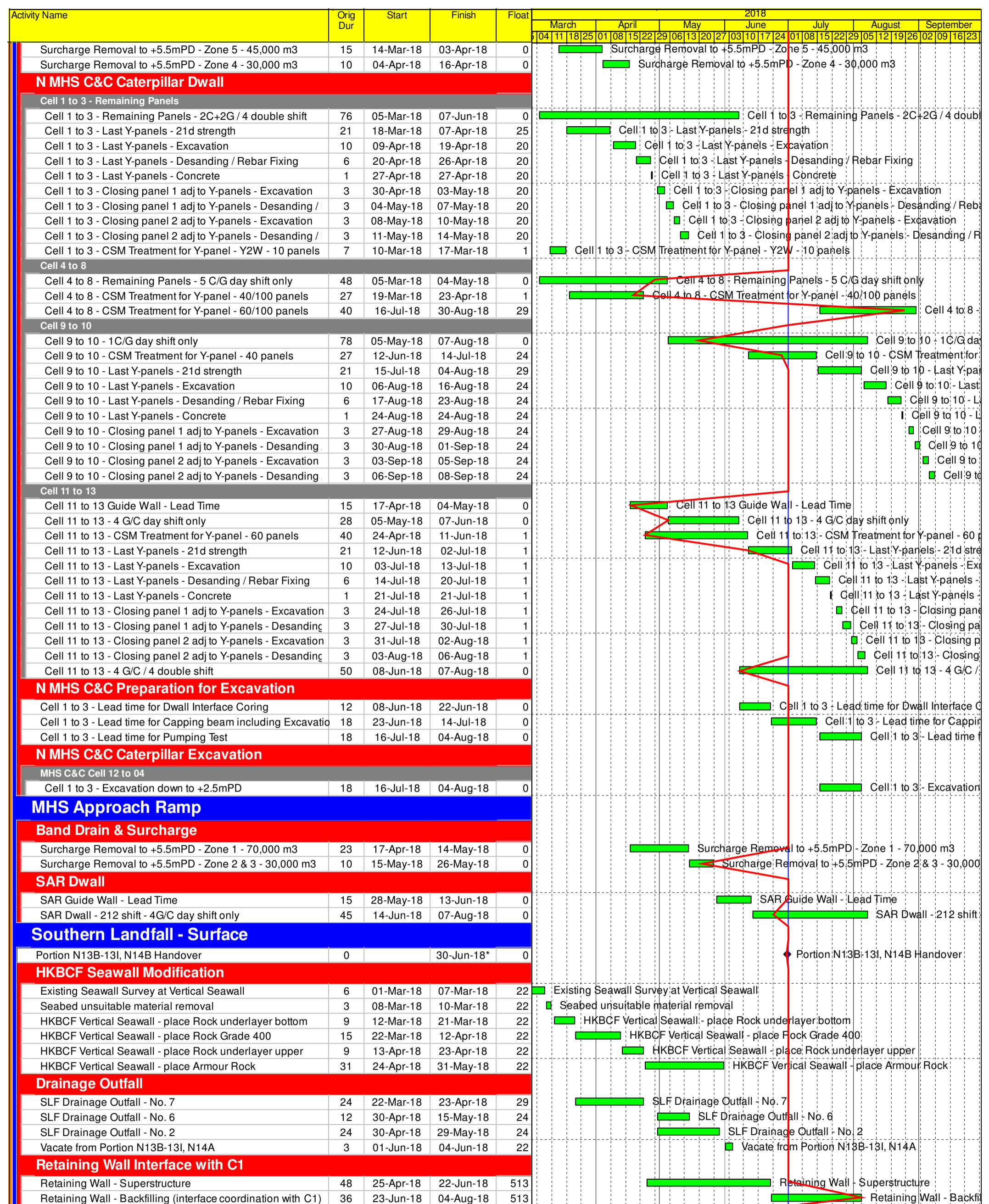
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Appendix B

Construction Programme







Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

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

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

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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
4.8.1	3.8	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									
<i>Marine Works (Sequence A)</i>									
6.1	Annex A	Construction of seawalls to be advanced by at least 200m before the main reclamation dredging and filling can commence. The protection by advanced seawall is a dynamic process depending on the progress of the construction activities and the stage when such protection could be realised is illustrated in Figure 6.2a and detailed in Appendix D6a. The part of the works where such measures can be undertaken for the majority of the time includes the following locations: - TM-CLKL northern reclamation;	All areas/ prior to dredging and backfilling works	Contractor	TM-EIAO		Y		✓
6.1	-	a maximum of 50% public fill to be used for all seawall filling below +2.5mPD for TM-CLKL southern and northern landfalls.	TM-CLKL seawall filling	Contractor	TM-EIAO		Y		✓

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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	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	Annex A Figure 6.2b Appendix D6b	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	TM-CLKL northern landfall, Portion D of HKBCF and HKLR	Contractor	TM-EIAO		Y		✓

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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
		- Reclamation dredging and filling for Portion 1 of HKLR;							
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		✓
<i>General Marine Works</i>									
6.1	-	Use of TBM 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		Y		✓

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

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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					Guidelines. DASO permit conditions.				
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		✓
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		Y		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
					conditions.				
6.1	5.2	Silt curtain shall have proved effectiveness from the producer and shall be fully maintained throughout the works by the contractor.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The daily maximum production rates shall not exceed those assumed in the water quality assessment.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	The dredging and filling works shall be scheduled to spread the works evenly over a working day.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
<i>Land Works</i>									
6.1	-	Wastewater from temporary site facilities should be controlled to prevent direct discharge to surface or marine waters.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.1	-	Sewage effluent and discharges from on- site kitchen facilities shall be directed to Government sewer in accordance with the requirements of the WPCO or collected for disposal offsite. The use of soakaways shall be avoided.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
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		<>

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

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

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.1	-	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		✓
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	✓
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		✓

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Environmental Mitigation and Enhancement Measure Implementation Schedule

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
8.15	6.3, 6.5	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		✓
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

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
10.9	7.6	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 discharges.	Contract mobilisation	Contractor	TMEIA, Land (Miscellaneous		Y		✓

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Tuen Mun – Chek Lap Kok Link
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Environmental Mitigation and Enhancement Measure Implementation Schedule*

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

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
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						D	C	O	
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		✓
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;	All areas / throughout construction period	Contractor	TMEIA		Y		<>

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Tuen Mun – Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
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						D	C	O	
		<p><i>f</i> Having a capacity of <450L unless the specifications have been approved by the EPD; and</p> <p>w Chinese according to the instructions prescribed in Schedule 2 of the Regulations.</p> <p><i>f</i> Clearly labelled and used solely for the storage of chemical wastes;</p> <p><i>f</i> Enclosed with at least 3 sides;</p> <p><i>f</i> Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest;</p> <p><i>f</i> Adequate ventilation;</p> <p><i>f</i> Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and</p> <p><i>f</i> Incompatible materials are adequately separated.</p>							
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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EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
12.6	8.1	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

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Appendix D

Summary of Action and Limit Levels

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

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

Table D2 *Action and Limit Levels for Impact Dolphin Monitoring*

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

Notes:

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

Table 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

Copies of Calibration
Certificates for Air
Quality Monitoring

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 5
 Calibrated by : P.F. Yeung
 Date : 09/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 0816

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1017
 Ta(K) : 299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.6	3.257	1.594	52	52.02
2	13 holes	9.0	3.001	1.469	46	46.01
3	10 holes	6.6	2.570	1.259	40	40.01
4	7 holes	4.2	2.050	1.006	32	32.01
5	5 holes	2.8	1.674	0.822	25	25.01

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 33.715 Intercept(b): -2.451 Correlation Coefficient(r): 0.9978

Checked by: Magnum Fan

Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR10
 Calibrated by : P.F. Yeung
 Date : 09/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 8162

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1017
 Ta(K) : 299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.60	3.257	1.594	54	54.02
2	13 holes	8.60	2.933	1.436	49	49.01
3	10 holes	6.60	2.570	1.259	43	43.01
4	7 holes	4.40	2.098	1.029	35	35.01
5	5 holes	2.80	1.674	0.822	28	28.01

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 33.899 Intercept(b): 0.187 Correlation Coefficient(r): 0.9999

Checked by: Magnum Fan

Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : AQMS1
 Calibrated by : P.F. Yeung
 Date : 09/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 1253

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1017
 Ta(K) : 299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.465	1.695	52	52.02
2	13 holes	10.4	3.226	1.578	46	46.01
3	10 holes	7.6	2.758	1.350	41	41.01
4	7 holes	4.7	2.169	1.063	34	34.01
5	5 holes	3.3	1.817	0.892	27	27.01

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 28.841

Intercept(b): 2.061

Correlation Coefficient(r): 0.9924

Checked by: Magnum Fan

Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 1
 Calibrated by : P.F.Yeung
 Date : 09/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 0146

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1017
 Ta(K) : 299

Resistance Plate	dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1 18 holes	11.7	3.422	1.674	54	54.02
2 13 holes	8.8	2.967	1.453	49	49.01
3 10 holes	6.6	2.570	1.259	42	42.01
4 7 holes	4.4	2.098	1.029	34	34.01
5 5 holes	2.8	1.674	0.822	28	28.01

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.507 Intercept(b): 2.113 Correlation Coefficient(r): 0.9975

Checked by: Magnum Fan

Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 6
 Calibrated by : P.F. Yeung
 Date : 09/04/2018

Sampler

Model : TE-5170
 Serial Number : S/N 3957

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1017
 Ta(K) : 299

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.8	3.579	1.750	54	54.02
2	13 holes	10.4	3.226	1.578	49	49.01
3	10 holes	8.0	2.829	1.385	42	42.01
4	7 holes	5.0	2.237	1.097	34	34.01
5	5 holes	3.2	1.789	0.879	28	28.01

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 30.029 Intercept(b): 1238 Correlation Coefficient(r): 0.9989

Checked by: Magnum Fan

Date: 11/04/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 5
 Calibrated by : P.F. Yeung
 Date : 09/06/2018

Sampler

Model : TE-5170
 Serial Number : S/N 0816

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1000
 Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.0	3.268	1.599	54	53.21
2	13 holes	9.0	2.956	1.447	50	49.27
3	10 holes	6.6	2.531	1.240	44	43.35
4	7 holes	4.5	2.090	1.025	37	36.46
5	5 holes	2.4	1.526	0.750	28	27.59

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 30.350 Intercept(b): 5.180 Correlation Coefficient(r): 0.9991

Checked by: Magnum Fan

Date: 12/06/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR10
 Calibrated by : P.F. Yeung
 Date : 09/06/2018

Sampler

Model : TE-5170
 Serial Number : S/N 8162

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1000
 Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	10.40	3.178	1.555	53	52.22
2	13 holes	8.50	2.873	1.406	48	47.30
3	10 holes	6.40	2.493	1.221	44	43.35
4	7 holes	4.50	2.090	1.025	38	37.44
5	5 holes	2.70	1.619	0.796	28	27.59

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.326 Intercept(b): 3.969 Correlation Coefficient(r): 0.9923

Checked by: Magnum Fan

Date: 12/06/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : AQMS1
 Calibrated by : P.F. Yeung
 Date : 09/06/2018

Sampler

Model : TE-5170
 Serial Number : S/N 1253

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1000
 Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.6	3.356	1.642	52	51.24
2	13 holes	9.5	3.037	1.486	48	47.30
3	10 holes	7.4	2.680	1.313	42	41.38
4	7 holes	4.5	2.090	1.025	36	35.47
5	5 holes	3.0	1.707	0.838	28	27.59

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 28.440 Intercept(b): 4.737 Correlation Coefficient(r): 0.9942

Checked by: Magnum Fan

Date: 12/06/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 1
 Calibrated by : P.F.Yeung
 Date : 09/06/2018

Sampler

Model : TE-5170
 Serial Number : S/N 0146

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1000
 Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	11.8	3.385	1.656	55	54.19
2	13 holes	9.0	2.956	1.447	49	48.28
3	10 holes	7.1	2.625	1.286	45	44.34
4	7 holes	4.6	2.113	1.036	36	35.47
5	5 holes	2.6	1.589	0.781	27	26.60

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 31.644 Intercept(b): 2.501 Correlation Coefficient(r): 0.9977

Checked by: Magnum Fan

Date: 12/06/2018

High-Volume TSP Sampler
5-Point Calibration Record

Location : ASR 6
 Calibrated by : P.F. Yeung
 Date : 09/06/2018

Sampler

Model : TE-5170
 Serial Number : S/N 3957

Calibration Orifice and Standard Calibration Relationship

Serial Number : 2454
 Service Date : 19 Mar 2018
 Slope (m) : 2.05242
 Intercept (b) : -0.01383
 Correlation Coefficient(r) : 0.99994

Standard Condition

Pstd (hpa) : 1013
 Tstd (K) : 298.18

Calibration Condition

Pa (hpa) : 1000
 Ta(K) : 303

Resistance Plate		dH [green liquid] (inch water)	Z	X=Qstd (cubic meter/min)	IC (chart)	Y (corrected)
1	18 holes	12.0	3.413	1.670	55	54.19
2	13 holes	9.8	3.085	1.510	50	49.27
3	10 holes	7.2	2.644	1.295	45	44.34
4	7 holes	4.6	2.113	1.036	38	37.44
5	5 holes	2.8	1.649	0.810	30	29.56

Notes: $Z = \sqrt{dH(Pa/Pstd)(Tstd/Ta)}$, $X = Z/m - b$, $Y(\text{Corrected Flow}) = IC * \{\sqrt{Pa/Pstd}(Tstd/Ta)\}$

Sampler Calibration Relationship (Linear Regression)

Slope(m): 27.880 Intercept(b): 7.716 Correlation Coefficient(r): 0.9976

Checked by: Magnum Fan

Date: 12/06/2018



Certificate of Calibration

Calibration Certification Information			
Cal. Date: March 19, 2018	Rootsmeter S/N: 438320	Ta: 294	°K
Operator: Jim Tisch		Pa: 746.8	mm Hg
Calibration Model #: TE-5025A	Calibrator S/N: 2454		

Run	Vol. Init (m3)	Vol. Final (m3)	ΔVol. (m3)	ΔTime (min)	ΔP (mm Hg)	ΔH (in H2O)
1	1	2	1	1.4300	3.2	2.00
2	3	4	1	1.0040	6.4	4.00
3	5	6	1	0.9030	7.9	5.00
4	7	8	1	0.8590	8.7	5.50
5	9	10	1	0.7080	12.8	8.00

Data Tabulation					
Vstd (m3)	Qstd (x-axis)	$\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)}$ (y-axis)	Va	Qa (x-axis)	$\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)}$ (y-axis)
0.9917	0.6935	1.4113	0.9957	0.6963	0.8874
0.9874	0.9835	1.9959	0.9914	0.9875	1.2549
0.9854	1.0913	2.2315	0.9894	1.0957	1.4030
0.9843	1.1459	2.3405	0.9883	1.1506	1.4715
0.9789	1.3826	2.8227	0.9829	1.3882	1.7747
QSTD	m=	2.05242	QA	m=	1.28519
	b=	-0.01383		b=	-0.00869
	r=	0.99994		r=	0.99994

Calculations			
$Vstd = \Delta Vol \left(\frac{Pa - \Delta P}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)$	$Va = \Delta Vol \left(\frac{Pa - \Delta P}{Pa} \right)$		
$Qstd = Vstd / \Delta Time$	$Qa = Va / \Delta Time$		
For subsequent flow rate calculations:			
$Qstd = 1/m \left(\left(\sqrt{\Delta H \left(\frac{Pa}{Pstd} \right) \left(\frac{Tstd}{Ta} \right)} \right) - b \right)$		$Qa = 1/m \left(\left(\sqrt{\Delta H \left(\frac{Ta}{Pa} \right)} \right) - b \right)$	

Standard Conditions	
Tstd:	298.15 °K
Pstd:	760 mm Hg
Key	
ΔH:	calibrator manometer reading (in H2O)
ΔP:	rootsmeter manometer reading (mm Hg)
Ta:	actual absolute temperature (°K)
Pa:	actual barometric pressure (mm Hg)
b:	intercept
m:	slope

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

ENVIROTECH SERVICES CO.

Calibration Report of Wind Meter

Date of Calibration : 01 April 2018

Brand of Test Meter: Davis

Model: Vantage Pro 2 (s/n: AS160104014)

Location : Roof of Tuen Mun Firestation

Procedures :

- 1. Wind Still Test: The wind speed sensor was hold by hand until it keep still
- 2.Wind Speed Test: The wind meter was on-site calibrated against the Anemometer
- 3.Wind Direction Test : The wind meter was on-site calibrated against the marine compass at four directions

Results:

Wind Still Test

Wind Speed (m/s)
0.00

Wind Speed Test

Davis (m/s)	Anemometer (m/s)
0.5	0.4
1.0	0.9
1.7	1.5

Wind Direction Test

Davis (o)	Marine Compass (o)
269	270
359	0
91	90
179	180

Calibrated by: *Ho*
Yeung Ping Fai
(Technical Officer)

Checked by : *Fai*
Ho Kam Fat
(Senior Technical Officer)



輝創工程有限公司

Sun Creation Engineering Limited

Calibration and Testing Laboratory

Certificate of Calibration 校正證書

Certificate No. : C175727
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC17-2277) Date of Receipt / 收件日期 : 3 October 2017

Description / 儀器名稱 : Anemometer
Manufacturer / 製造商 : Lutron
Model No. / 型號 : AM-4201
Serial No. / 編號 : AF.27513
Supplied By / 委託者 : Envirotech Services Co.
Room 113, 1/F, My Loft, 9 Hoi Wing Road, Tuen Mun,
New Territories, Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範


Calibration check


DATE OF TEST / 測試日期 : 13 October 2017

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :
- Testo Industrial Services GmbH, Germany

Tested By : 
測試 H C Chan
Engineer

Certified By : 
核證 K C Lee
Engineer

Date of Issue : 16 October 2017
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.
本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C175727

證書編號

1. The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours before the commencement of the test.
2. The results presented are the mean of 10 measurements at each calibration point.
3. Test equipment :

<u>Equipment ID</u>	<u>Description</u>	<u>Certificate No.</u>
CL386	Multi-function Measuring Instrument	S16493

4. Test procedure : MA130N.

5. Results :

Air Velocity

Applied Value (m/s)	UUT Reading (m/s)	Measured Correction		
		Value (m/s)	Measurement Uncertainty	
			Expanded Uncertainty (m/s)	Coverage Factor
1.9	1.7	+0.2	0.2	2.0
4.0	3.8	+0.2	0.2	2.0
6.0	5.9	+0.1	0.3	2.0
8.0	8.0	0.0	0.3	2.0
10.0	10.1	-0.1	0.4	2.0

Remarks : - The Measured Corrections are defined as :
Value = Applied Value - UUT Reading

- The expanded uncertainties are for a level of confidence of 95 %.

Note :

Only the original copy or the laboratory's certified true copy is valid.

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部深印本證書需先獲本實驗室書面批准。

Sun Creation Engineering Limited Calibration & Testing Laboratory

c/o 4F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

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Appendix F

EM&A Monitoring Schedules

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Air Quality Impact Monitoring Schedule - June 2018**

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jun	2-Jun
3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
17-Jun	18-Jun	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
24-Jun	25-Jun	26-Jun	27-Jun	28-Jun	29-Jun	30-Jun
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Air Quality Impact Monitoring Schedule - July 2018**

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

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Jul	Public Holiday 2-Jul	3-Jul	4-Jul	5-Jul	6-Jul	7-Jul
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM		
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM
22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
		1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM			1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM	
29-Jul	30-Jul	31-Jul				
	1-hour TSP - 3 times 24-hour TSP - 1 time Impact AQM					

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Impact Dolphin Monitoring Survey Monitoring Schedule - June 2018**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1-Jun	2-Jun
3-Jun	4-Jun	5-Jun	6-Jun	7-Jun	8-Jun	9-Jun
		Impact Dolphin Monitoring				
10-Jun	11-Jun	12-Jun	13-Jun	14-Jun	15-Jun	16-Jun
			Impact Dolphin Monitoring			
17-Jun	18-Jun Public Holiday	19-Jun	20-Jun	21-Jun	22-Jun	23-Jun
		Impact Dolphin Monitoring				
24-Jun	25-Jun	26-Jun	27-Jun	28-Jun		
			Impact Dolphin Monitoring			

**HY/2012/08 - Tuen Mun - Chek Lap Kok Link
Northern Connection Sub-sea Tunnel Section
Tentative Impact Dolphin Monitoring Survey Monitoring Schedule - July 2018**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
1-Jul	Public Holiday 2-Jul	3-Jul	4-Jul	5-Jul	6-Jul	7-Jul
		Impact Dolphin Monitoring				
8-Jul	9-Jul	10-Jul	11-Jul	12-Jul	13-Jul	14-Jul
	Impact Dolphin Monitoring			Impact Dolphin Monitoring		
15-Jul	16-Jul	17-Jul	18-Jul	19-Jul	20-Jul	21-Jul
		Impact Dolphin Monitoring				
22-Jul	23-Jul	24-Jul	25-Jul	26-Jul	27-Jul	28-Jul
29-Jul	30-Jul	31-Jul				

The schedule is subject to agreement from the EPD on the monitoring times. The schedule will be revised after reviewing the progress of the construction works or due to adverse (safety, weather etc) conditions.

Appendix G

Impact Air Quality Monitoring Results

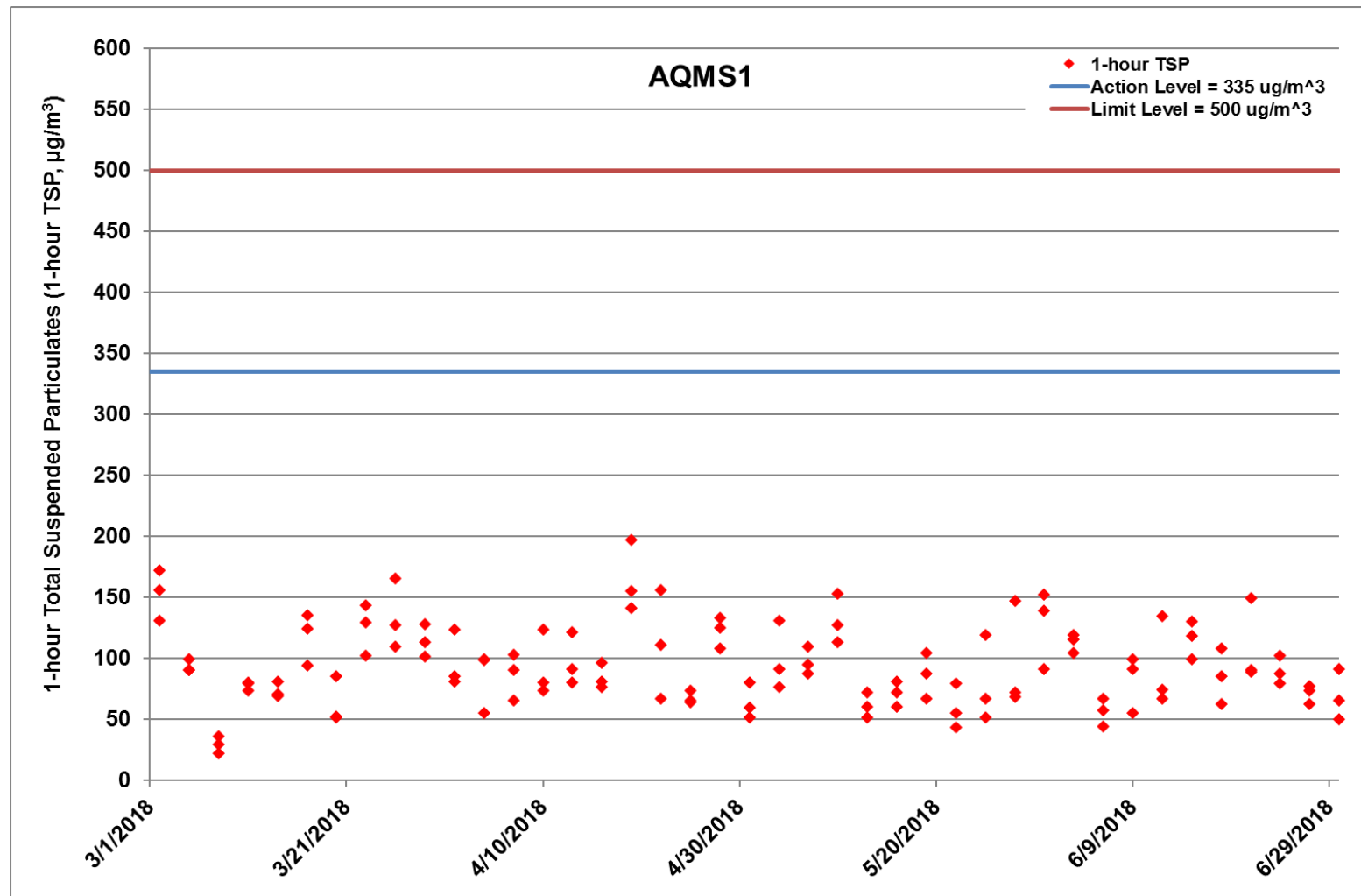


Figure G.1 Impact Monitoring – 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 – 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



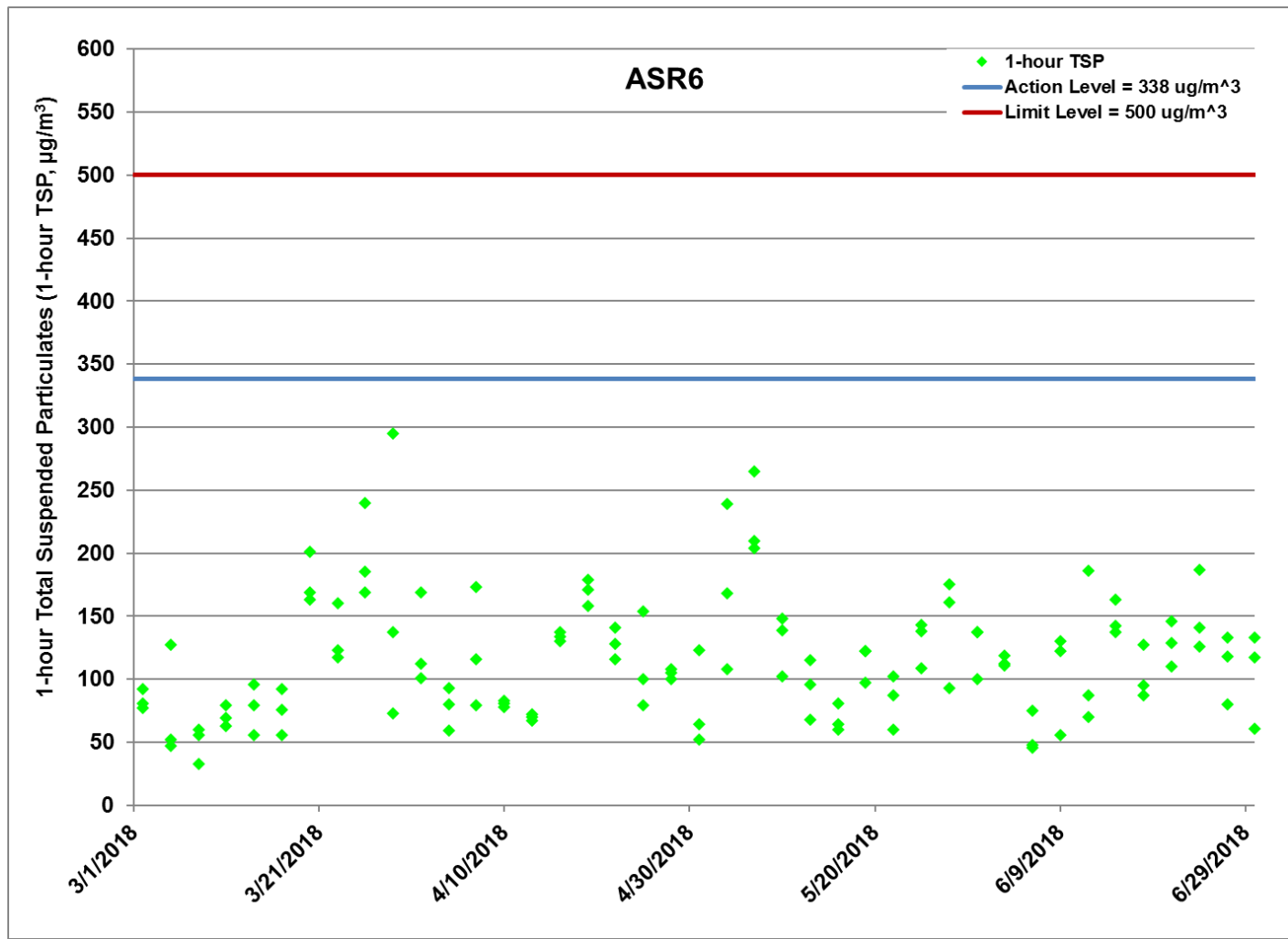


Figure G.2 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



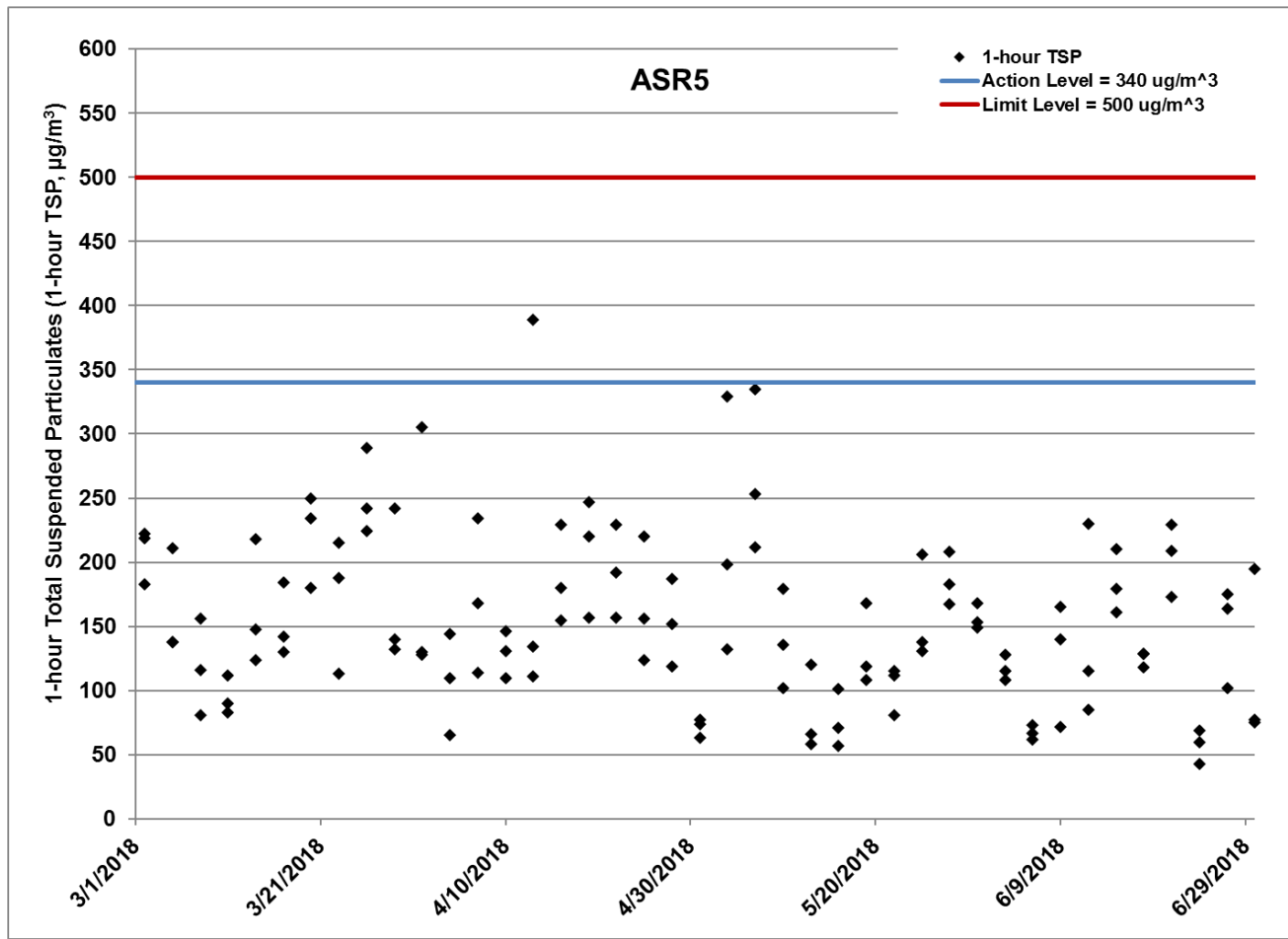


Figure G.4 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



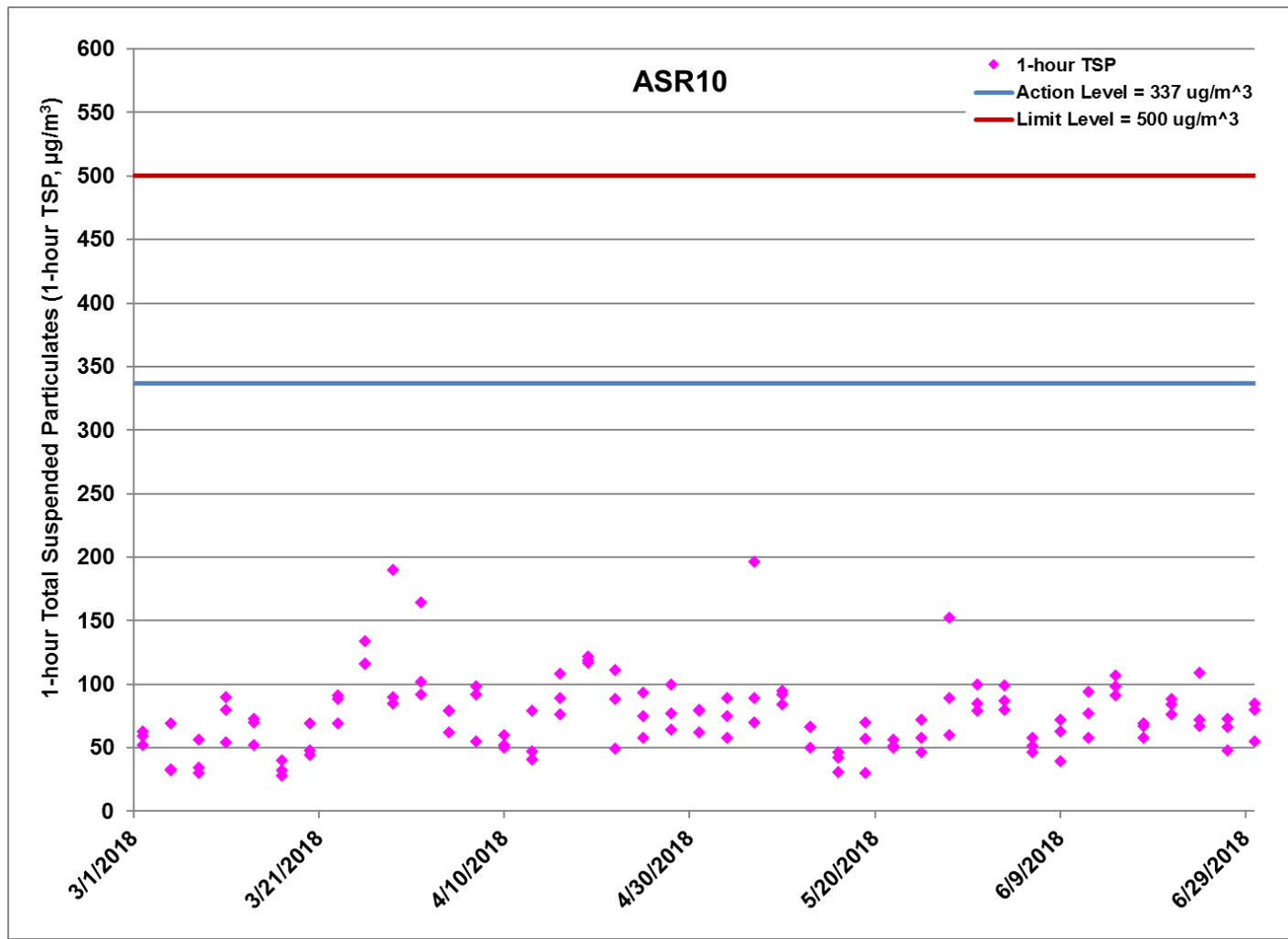


Figure G.5 Impact Monitoring - 1-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



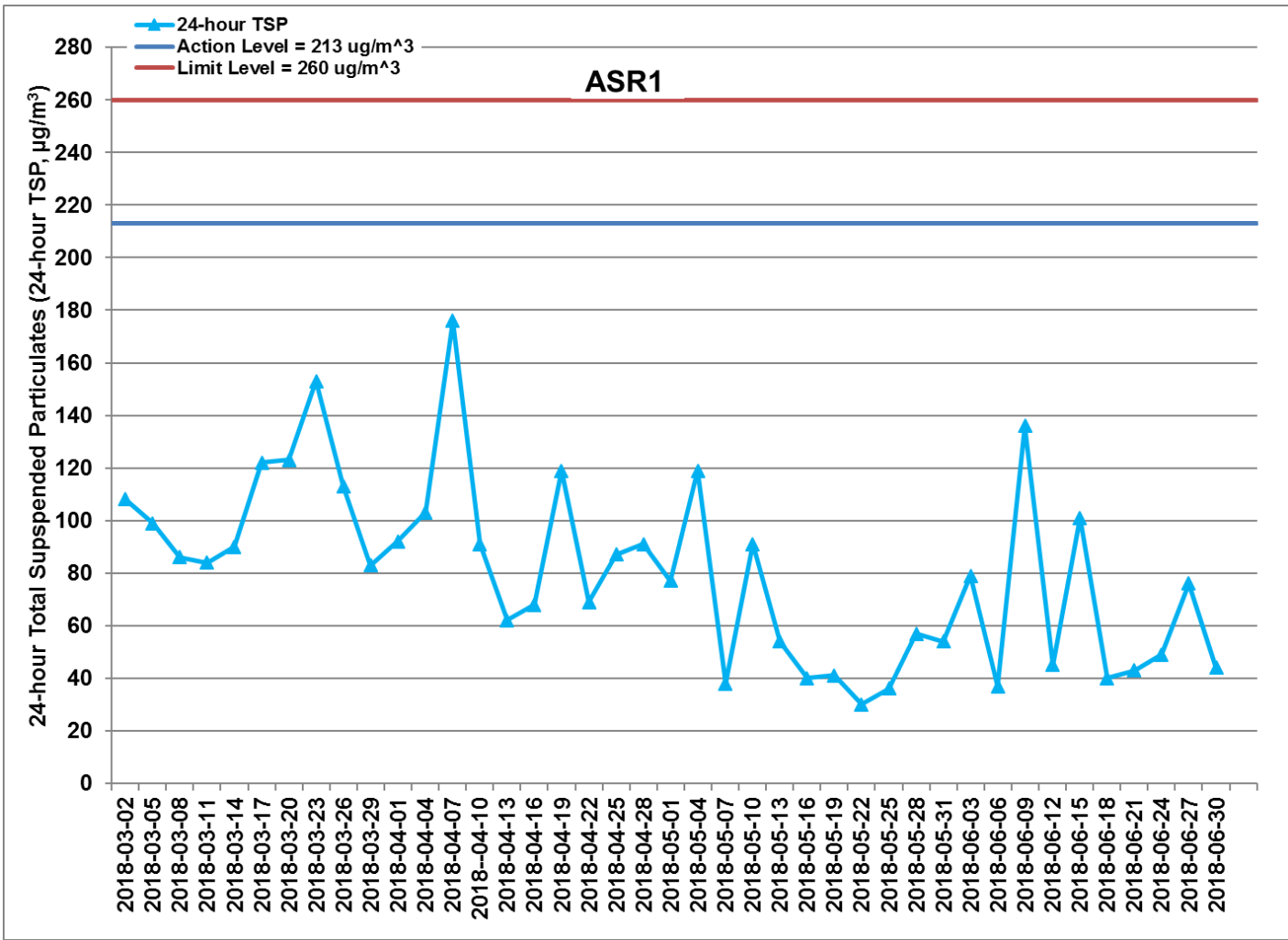


Figure G.6 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR1 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



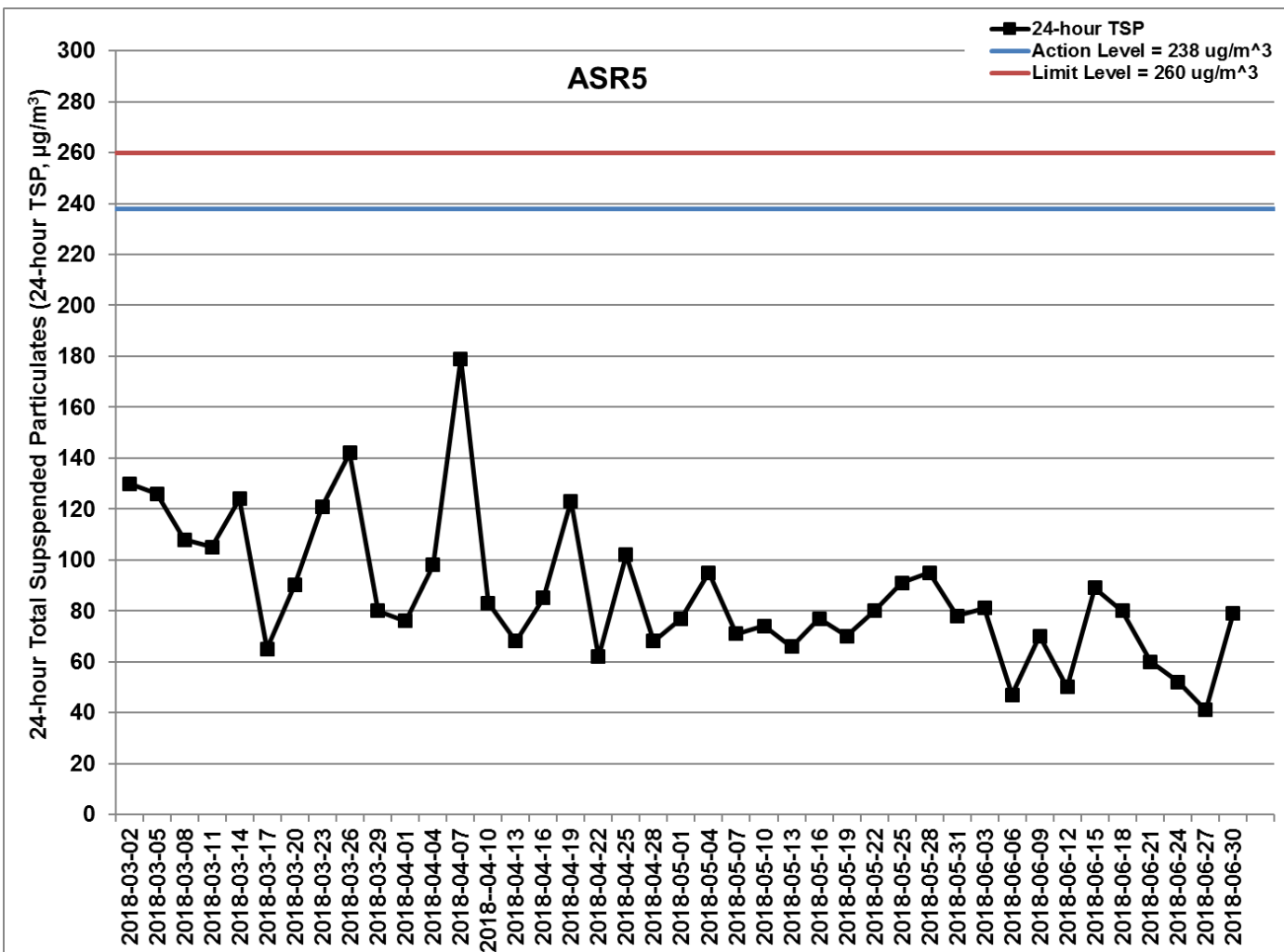
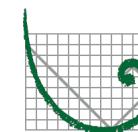


Figure G.7 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR5 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



ERM

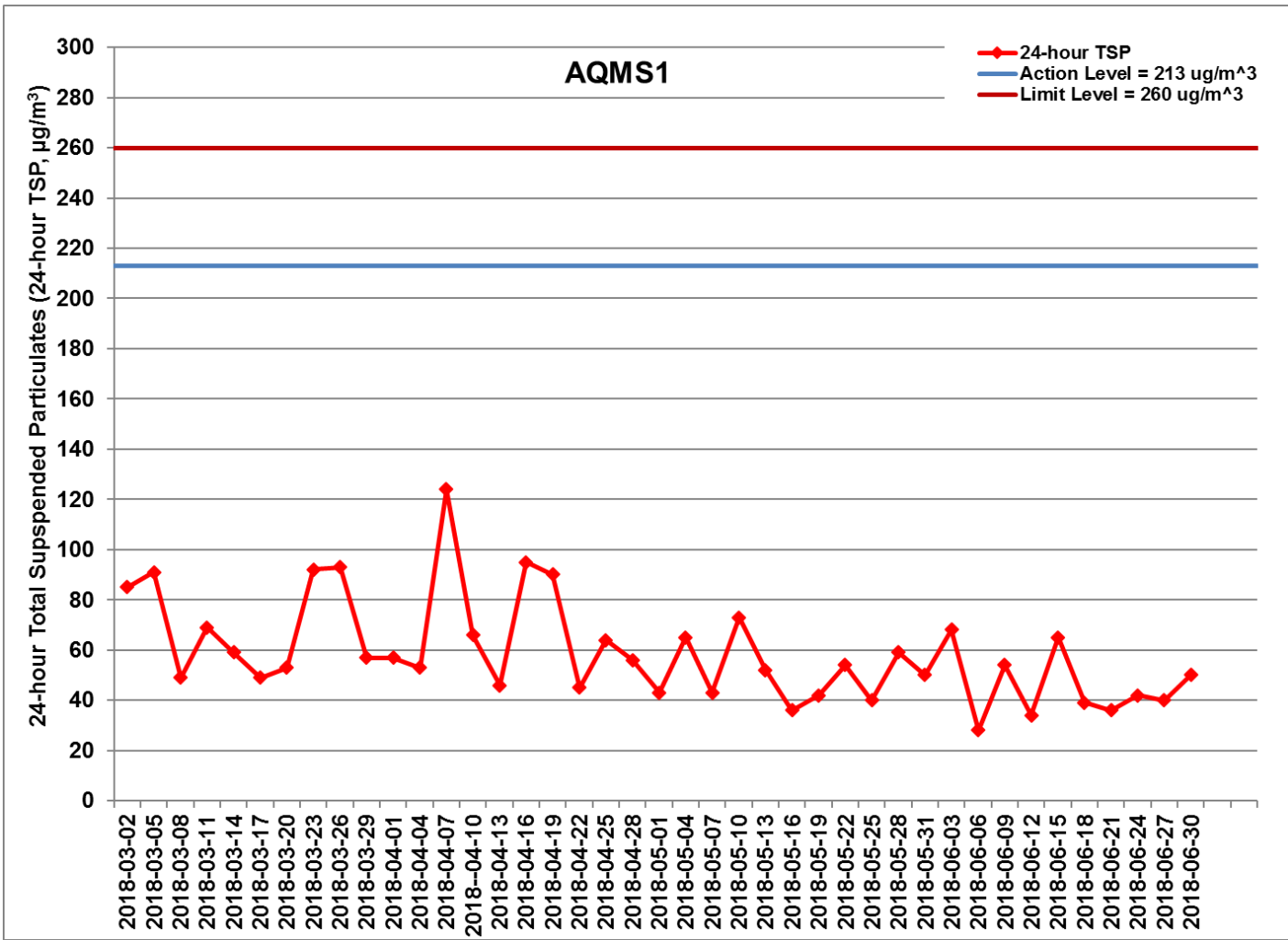


Figure G.8 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at AQMS1 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



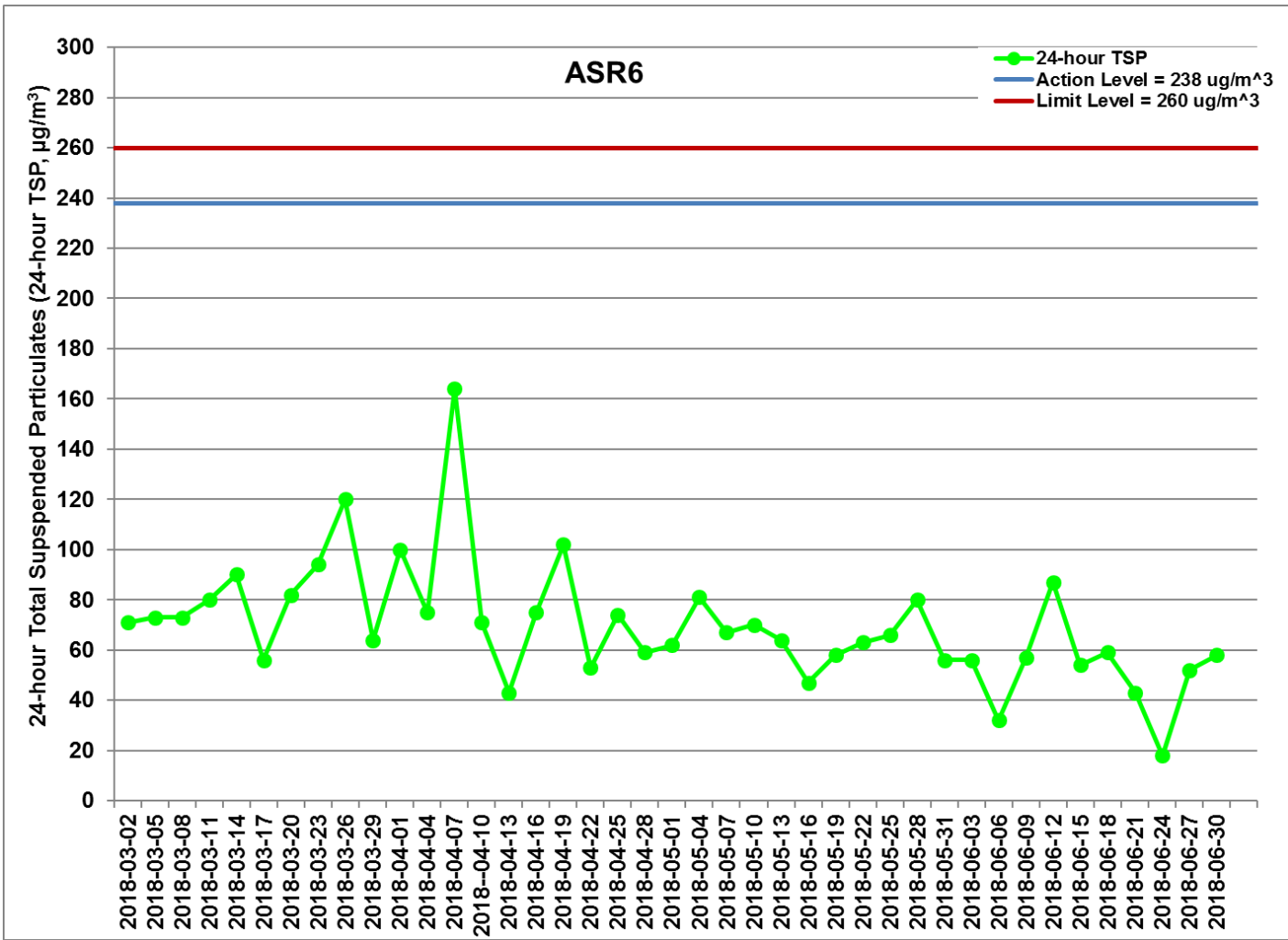


Figure G.9 Impact Monitoring - 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR6 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 - 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



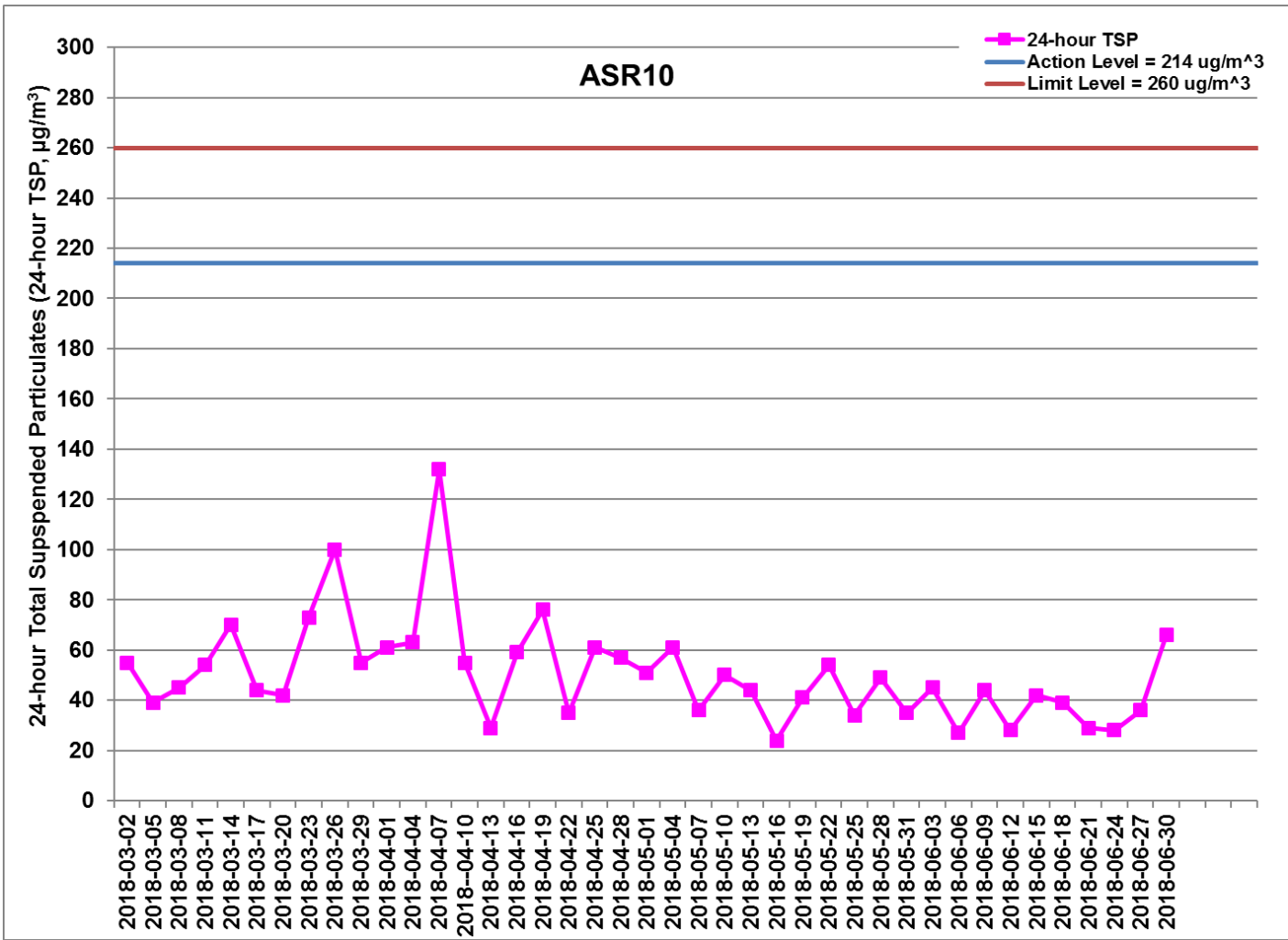


Figure G.10 Impact Monitoring – 24-hour Total Suspended Particulates ($\mu\text{g}/\text{m}^3$) at ASR10 between 1 March 2018 and 30 June 2018 during impact monitoring period. The weather conditions during the monitoring period varied from sunny to cloudy. Major land-based construction activities included: Box Culvert Extension, Construction of North Ventilation Building (1/3/2018 – 30/6/2018)

Ref: 0212330_Impact AQM graphs_June 2018_REV a.xlsx



Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-03	AQMS1	Sunny	09:03	1-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	2018-06-03	AQMS1	Sunny	10:05	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	2018-06-03	AQMS1	Sunny	11:07	1-hour TSP	104	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR1	Sunny	08:52	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR1	Sunny	09:54	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR1	Sunny	10:56	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR10	Sunny	08:18	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR10	Sunny	09:20	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR10	Sunny	10:22	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR5	Sunny	08:40	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR5	Sunny	09:42	1-hour TSP	128	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR5	Sunny	10:44	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR6	Sunny	08:30	1-hour TSP	111	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR6	Sunny	09:32	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR6	Sunny	10:34	1-hour TSP	119	ug/m3
TMCLKL	HY/2012/08	2018-06-06	AQMS1	Rainy	13:49	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-06	AQMS1	Rainy	14:51	1-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	2018-06-06	AQMS1	Rainy	15:53	1-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR1	Rainy	13:38	1-hour TSP	13	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR1	Rainy	14:40	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR1	Rainy	15:42	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR10	Rainy	13:04	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR10	Rainy	14:06	1-hour TSP	46	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR10	Rainy	15:08	1-hour TSP	51	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR5	Rainy	13:26	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR5	Rainy	14:28	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR5	Rainy	15:30	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR6	Rainy	13:15	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR6	Rainy	14:17	1-hour TSP	48	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR6	Rainy	15:19	1-hour TSP	46	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-09	AQMS1	Sunny	14:20	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-06-09	AQMS1	Sunny	15:22	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2018-06-09	AQMS1	Sunny	16:24	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR1	Sunny	14:08	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR1	Sunny	15:10	1-hour TSP	112	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR1	Sunny	16:12	1-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR10	Sunny	13:34	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR10	Sunny	14:36	1-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR10	Sunny	15:38	1-hour TSP	39	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR5	Sunny	13:57	1-hour TSP	165	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR5	Sunny	14:59	1-hour TSP	140	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR5	Sunny	16:01	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR6	Sunny	13:45	1-hour TSP	122	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR6	Sunny	14:47	1-hour TSP	130	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR6	Sunny	15:49	1-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2018-06-12	AQMS1	Sunny	13:53	1-hour TSP	74	ug/m3
TMCLKL	HY/2012/08	2018-06-12	AQMS1	Sunny	14:55	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-12	AQMS1	Sunny	15:57	1-hour TSP	134	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR1	Sunny	13:42	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR1	Sunny	14:44	1-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR1	Sunny	15:46	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR10	Sunny	13:08	1-hour TSP	77	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR10	Sunny	14:10	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR10	Sunny	15:12	1-hour TSP	94	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR5	Sunny	13:31	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR5	Sunny	14:33	1-hour TSP	115	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR5	Sunny	15:35	1-hour TSP	230	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR6	Sunny	13:19	1-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR6	Sunny	14:21	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR6	Sunny	15:23	1-hour TSP	186	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-15	AQMS1	Sunny	13:47	1-hour TSP	99	ug/m3
TMCLKL	HY/2012/08	2018-06-15	AQMS1	Sunny	14:49	1-hour TSP	130	ug/m3
TMCLKL	HY/2012/08	2018-06-15	AQMS1	Sunny	15:51	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR1	Sunny	13:35	1-hour TSP	272	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR1	Sunny	14:37	1-hour TSP	147	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR1	Sunny	15:39	1-hour TSP	171	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR10	Sunny	13:00	1-hour TSP	98	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR10	Sunny	14:02	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR10	Sunny	15:04	1-hour TSP	107	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR5	Sunny	13:23	1-hour TSP	210	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR5	Sunny	14:25	1-hour TSP	179	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR5	Sunny	15:27	1-hour TSP	161	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR6	Sunny	13:12	1-hour TSP	163	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR6	Sunny	14:14	1-hour TSP	142	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR6	Sunny	15:16	1-hour TSP	137	ug/m3
TMCLKL	HY/2012/08	2018-06-18	AQMS1	Sunny	14:13	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-06-18	AQMS1	Sunny	15:15	1-hour TSP	108	ug/m3
TMCLKL	HY/2012/08	2018-06-18	AQMS1	Sunny	16:17	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR1	Sunny	14:01	1-hour TSP	139	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR1	Sunny	15:03	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR1	Sunny	16:05	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR10	Sunny	13:27	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR10	Sunny	14:29	1-hour TSP	69	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR10	Sunny	15:31	1-hour TSP	58	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR5	Sunny	13:50	1-hour TSP	129	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR5	Sunny	14:52	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR5	Sunny	15:54	1-hour TSP	129	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR6	Sunny	13:38	1-hour TSP	127	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR6	Sunny	14:40	1-hour TSP	95	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR6	Sunny	15:42	1-hour TSP	87	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-21	AQMS1	Sunny	13:58	1-hour TSP	149	ug/m3
TMCLKL	HY/2012/08	2018-06-21	AQMS1	Sunny	15:00	1-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2018-06-21	AQMS1	Sunny	16:02	1-hour TSP	90	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR1	Sunny	13:47	1-hour TSP	95	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR1	Sunny	14:49	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR1	Sunny	15:51	1-hour TSP	63	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR10	Sunny	13:13	1-hour TSP	84	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR10	Sunny	14:15	1-hour TSP	88	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR10	Sunny	15:17	1-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR5	Sunny	13:35	1-hour TSP	229	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR5	Sunny	14:37	1-hour TSP	209	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR5	Sunny	15:39	1-hour TSP	173	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR6	Sunny	13:24	1-hour TSP	110	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR6	Sunny	14:26	1-hour TSP	129	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR6	Sunny	15:28	1-hour TSP	146	ug/m3
TMCLKL	HY/2012/08	2018-06-24	AQMS1	Sunny	09:06	1-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-06-24	AQMS1	Sunny	10:08	1-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-06-24	AQMS1	Sunny	11:10	1-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR1	Sunny	08:55	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR1	Sunny	09:57	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR1	Sunny	10:59	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR10	Sunny	08:20	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR10	Sunny	09:22	1-hour TSP	67	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR10	Sunny	10:24	1-hour TSP	109	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR5	Sunny	08:44	1-hour TSP	69	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR5	Sunny	09:46	1-hour TSP	43	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR5	Sunny	10:48	1-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR6	Sunny	08:32	1-hour TSP	187	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR6	Sunny	09:34	1-hour TSP	141	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR6	Sunny	10:36	1-hour TSP	126	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-27	AQMS1	Sunny	13:00	1-hour TSP	77	ug/m3
TMCLKL	HY/2012/08	2018-06-27	AQMS1	Sunny	14:02	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-06-27	AQMS1	Sunny	15:04	1-hour TSP	62	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR1	Sunny	13:48	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR1	Sunny	14:50	1-hour TSP	71	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR1	Sunny	15:52	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR10	Sunny	13:11	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR10	Sunny	14:13	1-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR10	Sunny	15:15	1-hour TSP	48	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR5	Sunny	13:36	1-hour TSP	175	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR5	Sunny	14:38	1-hour TSP	164	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR5	Sunny	15:40	1-hour TSP	102	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR6	Sunny	13:24	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR6	Sunny	14:26	1-hour TSP	118	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR6	Sunny	15:28	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-30	AQMS1	Sunny	14:30	1-hour TSP	91	ug/m3
TMCLKL	HY/2012/08	2018-06-30	AQMS1	Sunny	15:32	1-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2018-06-30	AQMS1	Sunny	16:34	1-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR1	Sunny	14:18	1-hour TSP	113	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR1	Sunny	15:20	1-hour TSP	73	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR1	Sunny	16:22	1-hour TSP	72	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR10	Sunny	13:45	1-hour TSP	85	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR10	Sunny	14:47	1-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR10	Sunny	15:49	1-hour TSP	55	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR5	Sunny	14:07	1-hour TSP	195	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR5	Sunny	15:09	1-hour TSP	75	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR5	Sunny	16:11	1-hour TSP	77	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR6	Sunny	13:56	1-hour TSP	133	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR6	Sunny	14:58	1-hour TSP	117	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR6	Sunny	16:00	1-hour TSP	61	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-03	AQMS1	Sunny	12:09	24-hour TSP	68	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR1	Sunny	11:58	24-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR10	Sunny	11:24	24-hour TSP	45	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR5	Sunny	11:46	24-hour TSP	81	ug/m3
TMCLKL	HY/2012/08	2018-06-03	ASR6	Sunny	11:36	24-hour TSP	56	ug/m3
TMCLKL	HY/2012/08	2018-06-06	AQMS1	Rainy	16:55	24-hour TSP	28	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR1	Rainy	16:44	24-hour TSP	37	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR10	Rainy	16:10	24-hour TSP	27	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR5	Rainy	16:32	24-hour TSP	47	ug/m3
TMCLKL	HY/2012/08	2018-06-06	ASR6	Rainy	16:21	24-hour TSP	32	ug/m3
TMCLKL	HY/2012/08	2018-06-09	AQMS1	Sunny	17:26	24-hour TSP	54	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR1	Sunny	17:14	24-hour TSP	136	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR10	Sunny	16:40	24-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR5	Sunny	17:03	24-hour TSP	70	ug/m3
TMCLKL	HY/2012/08	2018-06-09	ASR6	Sunny	16:51	24-hour TSP	57	ug/m3
TMCLKL	HY/2012/08	2018-06-12	AQMS1	Sunny	16:59	24-hour TSP	34	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR1	Sunny	16:48	24-hour TSP	45	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR10	Sunny	16:14	24-hour TSP	28	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR5	Sunny	16:37	24-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2018-06-12	ASR6	Sunny	16:25	24-hour TSP	87	ug/m3
TMCLKL	HY/2012/08	2018-06-15	AQMS1	Sunny	16:53	24-hour TSP	65	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR1	Sunny	16:41	24-hour TSP	101	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR10	Sunny	16:06	24-hour TSP	42	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR5	Sunny	16:29	24-hour TSP	89	ug/m3
TMCLKL	HY/2012/08	2018-06-15	ASR6	Sunny	16:18	24-hour TSP	54	ug/m3
TMCLKL	HY/2012/08	2018-06-18	AQMS1	Sunny	17:19	24-hour TSP	39	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR1	Sunny	17:07	24-hour TSP	40	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR10	Sunny	16:33	24-hour TSP	39	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR5	Sunny	16:56	24-hour TSP	80	ug/m3
TMCLKL	HY/2012/08	2018-06-18	ASR6	Sunny	16:44	24-hour TSP	59	ug/m3

Project	Works	Date	Station	Weather	Start time	Parameters	Results	units
TMCLKL	HY/2012/08	2018-06-21	AQMS1	Sunny	17:04	24-hour TSP	36	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR1	Sunny	16:53	24-hour TSP	43	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR10	Sunny	16:16	24-hour TSP	29	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR5	Sunny	16:44	24-hour TSP	60	ug/m3
TMCLKL	HY/2012/08	2018-06-21	ASR6	Sunny	16:30	24-hour TSP	43	ug/m3
TMCLKL	HY/2012/08	2018-06-24	AQMS1	Sunny	12:12	24-hour TSP	42	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR1	Sunny	12:01	24-hour TSP	49	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR10	Sunny	11:26	24-hour TSP	28	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR5	Sunny	11:50	24-hour TSP	52	ug/m3
TMCLKL	HY/2012/08	2018-06-24	ASR6	Sunny	11:38	24-hour TSP	18	ug/m3
TMCLKL	HY/2012/08	2018-06-27	AQMS1	Sunny	16:06	24-hour TSP	40	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR1	Sunny	11:54	24-hour TSP	76	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR10	Sunny	16:17	24-hour TSP	36	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR5	Sunny	16:42	24-hour TSP	41	ug/m3
TMCLKL	HY/2012/08	2018-06-27	ASR6	Sunny	16:30	24-hour TSP	52	ug/m3
TMCLKL	HY/2012/08	2018-06-30	AQMS1	Sunny	17:36	24-hour TSP	50	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR1	Sunny	17:24	24-hour TSP	44	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR10	Sunny	16:51	24-hour TSP	66	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR5	Sunny	17:13	24-hour TSP	79	ug/m3
TMCLKL	HY/2012/08	2018-06-30	ASR6	Sunny	17:02	24-hour TSP	58	ug/m3

Appendix H

Meteorological Data

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)
18/06/03	0:00	3.6	79
18/06/03	1:00	2.7	90
18/06/03	2:00	1.8	62
18/06/03	3:00	1.8	76
18/06/03	4:00	1.8	67
18/06/03	5:00	1.8	61
18/06/03	6:00	2.2	77
18/06/03	7:00	1.8	59
18/06/03	8:00	3.1	91
18/06/03	9:00	4	97
18/06/03	10:00	4	115
18/06/03	11:00	2.2	121
18/06/03	12:00	2.7	117
18/06/03	13:00	3.6	142
18/06/03	14:00	3.6	110
18/06/03	15:00	3.6	135
18/06/03	16:00	4.9	134
18/06/03	17:00	5.4	141
18/06/03	18:00	4.5	85
18/06/03	19:00	4.5	93
18/06/03	20:00	4.9	94
18/06/03	21:00	4	84
18/06/03	22:00	4.5	95
18/06/03	23:00	4	85
18/06/04	0:00	3.6	82
18/06/04	1:00	2.2	83
18/06/04	2:00	2.2	83
18/06/04	3:00	2.2	87
18/06/04	4:00	1.8	81
18/06/04	5:00	2.2	97
18/06/04	6:00	1.8	79
18/06/04	7:00	1.8	41
18/06/04	8:00	2.2	37
18/06/04	9:00	3.1	90
18/06/04	10:00	4	99
18/06/04	11:00	4.9	103
18/06/04	12:00	4.5	87
18/06/04	13:00	4.9	93
18/06/04	14:00	4.9	95
18/06/04	15:00	5.8	97
18/06/04	16:00	4.5	97
18/06/04	17:00	4.9	97
18/06/04	18:00	4.5	100
18/06/04	19:00	3.6	57
18/06/04	20:00	4	100
18/06/04	21:00	3.6	92
18/06/04	22:00	2.7	79
18/06/04	23:00	3.1	92
18/06/06	0:00	3.1	87
18/06/06	1:00	2.7	64
18/06/06	2:00	3.1	85
18/06/06	3:00	3.6	85
18/06/06	4:00	3.1	93
18/06/06	5:00	2.2	76
18/06/06	6:00	2.2	45

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)
18/06/06	7:00	3.1	89
18/06/06	8:00	3.1	99
18/06/06	9:00	1.3	67
18/06/06	10:00	1.3	66
18/06/06	11:00	0.9	64
18/06/06	12:00	1.3	52
18/06/06	13:00	1.3	324
18/06/06	14:00	0.9	342
18/06/06	15:00	1.3	53
18/06/06	16:00	1.3	41
18/06/06	17:00	2.2	97
18/06/06	18:00	2.7	101
18/06/06	19:00	3.1	59
18/06/06	20:00	3.1	60
18/06/06	21:00	4	90
18/06/06	22:00	3.1	90
18/06/06	23:00	3.6	86
18/06/07	0:00	4.5	98
18/06/07	1:00	5.4	95
18/06/07	2:00	4	96
18/06/07	3:00	4.5	86
18/06/07	4:00	4	84
18/06/07	5:00	2.7	90
18/06/07	6:00	1.8	69
18/06/07	7:00	2.2	66
18/06/07	8:00	1.8	76
18/06/07	9:00	2.7	85
18/06/07	10:00	4	89
18/06/07	11:00	4	82
18/06/07	12:00	3.1	100
18/06/07	13:00	2.7	98
18/06/07	14:00	3.1	100
18/06/07	15:00	3.6	79
18/06/07	16:00	3.6	95
18/06/07	17:00	3.1	102
18/06/07	18:00	3.1	81
18/06/07	19:00	2.7	84
18/06/07	20:00	2.2	80
18/06/07	21:00	4	88
18/06/07	22:00	2.7	79
18/06/07	23:00	4	123
18/06/09	0:00	0.9	161
18/06/09	1:00	0.4	182
18/06/09	2:00	0.4	153
18/06/09	3:00	0.4	215
18/06/09	4:00	1.3	201
18/06/09	5:00	1.8	212
18/06/09	6:00	0.9	208
18/06/09	7:00	0.9	241
18/06/09	8:00	0.9	274
18/06/09	9:00	1.3	231
18/06/09	10:00	2.2	214
18/06/09	11:00	2.7	198
18/06/09	12:00	1.8	214
18/06/09	13:00	2.7	219

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)
18/06/09	14:00	1.8	197
18/06/09	15:00	0.9	276
18/06/09	16:00	0.4	294
18/06/09	17:00	0.9	233
18/06/09	18:00	0.4	274
18/06/09	19:00	0.9	305
18/06/09	20:00	0.4	267
18/06/09	21:00	0.4	265
18/06/09	22:00	0.9	294
18/06/09	23:00	0.4	324
18/06/10	0:00	0.9	294
18/06/10	1:00	1.3	297
18/06/10	2:00	1.8	294
18/06/10	3:00	2.2	299
18/06/10	4:00	1.3	302
18/06/10	5:00	0.9	289
18/06/10	6:00	1.3	297
18/06/10	7:00	1.3	300
18/06/10	8:00	2.2	271
18/06/10	9:00	2.2	287
18/06/10	10:00	2.2	297
18/06/10	11:00	2.7	283
18/06/10	12:00	2.7	283
18/06/10	13:00	2.7	290
18/06/10	14:00	2.7	296
18/06/10	15:00	2.7	283
18/06/10	16:00	2.7	291
18/06/10	17:00	1.8	291
18/06/10	18:00	1.8	303
18/06/10	19:00	1.8	286
18/06/10	20:00	0.9	309
18/06/10	21:00	1.8	307
18/06/10	22:00	0.9	3
18/06/10	23:00	0.9	308
18/06/12	0:00	1.3	85
18/06/12	1:00	0.9	101
18/06/12	2:00	0.9	100
18/06/12	3:00	0.9	80
18/06/12	4:00	0.4	64
18/06/12	5:00	0.4	355
18/06/12	6:00	0.4	85
18/06/12	7:00	0.4	85
18/06/12	8:00	0.9	101
18/06/12	9:00	1.8	97
18/06/12	10:00	1.3	283
18/06/12	11:00	0.4	288
18/06/12	12:00	1.3	94
18/06/12	13:00	1.8	83
18/06/12	14:00	1.3	137
18/06/12	15:00	1.3	101
18/06/12	16:00	4	79
18/06/12	17:00	4.5	82
18/06/12	18:00	4.5	91
18/06/12	19:00	3.1	89
18/06/12	20:00	4	97

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)
18/06/12	21:00	3.6	81
18/06/12	22:00	4	96
18/06/12	23:00	2.2	84
18/06/13	0:00	1.3	34
18/06/13	1:00	0.4	78
18/06/13	2:00	0.9	4
18/06/13	3:00	0.4	286
18/06/13	4:00	0.9	232
18/06/13	5:00	0	-
18/06/13	6:00	0.4	90
18/06/13	7:00	0.4	358
18/06/13	8:00	1.3	242
18/06/13	9:00	1.8	201
18/06/13	10:00	0.4	244
18/06/13	11:00	1.3	193
18/06/13	12:00	1.8	201
18/06/13	13:00	1.8	210
18/06/13	14:00	2.7	214
18/06/13	15:00	0.9	274
18/06/13	16:00	0.4	74
18/06/13	17:00	0	-
18/06/13	18:00	0.4	205
18/06/13	19:00	0	-
18/06/13	20:00	0.4	347
18/06/13	21:00	0	-
18/06/13	22:00	0	-
18/06/13	23:00	0	-
18/06/15	0:00	0.9	3
18/06/15	1:00	0.4	338
18/06/15	2:00	0.4	333
18/06/15	3:00	0.4	311
18/06/15	4:00	0.9	341
18/06/15	5:00	1.3	2
18/06/15	6:00	0.9	52
18/06/15	7:00	0.4	40
18/06/15	8:00	1.3	14
18/06/15	9:00	1.8	16
18/06/15	10:00	1.8	6
18/06/15	11:00	1.3	354
18/06/15	12:00	1.3	355
18/06/15	13:00	1.3	303
18/06/15	14:00	0.9	130
18/06/15	15:00	0.4	268
18/06/15	16:00	2.2	89
18/06/15	17:00	3.1	85
18/06/15	18:00	2.2	94
18/06/15	19:00	1.3	88
18/06/15	20:00	1.3	140
18/06/15	21:00	0.9	82
18/06/15	22:00	1.3	84
18/06/15	23:00	1.3	101
18/06/16	0:00	2.2	100
18/06/16	1:00	2.2	95
18/06/16	2:00	1.3	73
18/06/16	3:00	0.9	19

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)
18/06/16	4:00	0.9	36
18/06/16	5:00	0.9	69
18/06/16	6:00	0.9	42
18/06/16	7:00	0.9	51
18/06/16	8:00	0.4	88
18/06/16	9:00	1.3	79
18/06/16	10:00	1.3	80
18/06/16	11:00	2.7	95
18/06/16	12:00	4	110
18/06/16	13:00	5.8	115
18/06/16	14:00	4	121
18/06/16	15:00	4	137
18/06/16	16:00	3.6	139
18/06/16	17:00	3.1	129
18/06/16	18:00	2.7	118
18/06/16	19:00	3.1	85
18/06/16	20:00	3.6	84
18/06/16	21:00	1.3	55
18/06/16	22:00	1.3	62
18/06/16	23:00	1.8	67
18/06/18	0:00	1.3	101
18/06/18	1:00	0	-
18/06/18	2:00	0.9	305
18/06/18	3:00	0.9	307
18/06/18	4:00	0.4	325
18/06/18	5:00	0.4	291
18/06/18	6:00	0.4	301
18/06/18	7:00	0.4	287
18/06/18	8:00	0.4	293
18/06/18	9:00	1.3	246
18/06/18	10:00	1.8	250
18/06/18	11:00	2.2	204
18/06/18	12:00	2.7	202
18/06/18	13:00	1.8	253
18/06/18	14:00	2.7	213
18/06/18	15:00	2.2	244
18/06/18	16:00	2.2	236
18/06/18	17:00	2.2	246
18/06/18	18:00	1.8	194
18/06/18	19:00	1.8	268
18/06/18	20:00	2.7	212
18/06/18	21:00	2.2	192
18/06/18	22:00	2.2	194
18/06/18	23:00	2.2	192
18/06/19	0:00	2.2	228
18/06/19	1:00	1.8	207
18/06/19	2:00	2.2	206
18/06/19	3:00	1.8	236
18/06/19	4:00	0.9	275
18/06/19	5:00	1.3	196
18/06/19	6:00	0.9	218
18/06/19	7:00	1.3	235
18/06/19	8:00	1.3	197
18/06/19	9:00	1.3	230
18/06/19	10:00	2.2	207
18/06/19	11:00	2.7	193

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)
18/06/19	12:00	3.1	200
18/06/19	13:00	3.1	191
18/06/19	14:00	2.7	220
18/06/19	15:00	2.2	211
18/06/19	16:00	1.8	216
18/06/19	17:00	1.8	236
18/06/19	18:00	1.3	230
18/06/19	19:00	1.8	222
18/06/19	20:00	0.9	199
18/06/19	21:00	0.9	179
18/06/19	22:00	0.9	137
18/06/19	23:00	0.4	155
18/06/21	0:00	0.4	264
18/06/21	1:00	0.4	271
18/06/21	2:00	0	-
18/06/21	3:00	0	-
18/06/21	4:00	0.4	311
18/06/21	5:00	0.4	225
18/06/21	6:00	0.4	179
18/06/21	7:00	0.4	342
18/06/21	8:00	1.3	193
18/06/21	9:00	0.9	222
18/06/21	10:00	0.9	258
18/06/21	11:00	1.3	229
18/06/21	12:00	1.8	223
18/06/21	13:00	1.8	222
18/06/21	14:00	1.3	266
18/06/21	15:00	1.8	225
18/06/21	16:00	1.3	234
18/06/21	17:00	1.8	226
18/06/21	18:00	1.3	284
18/06/21	19:00	0.4	289
18/06/21	20:00	0.9	84
18/06/21	21:00	0	-
18/06/21	22:00	0.4	69
18/06/21	23:00	0.9	235
18/06/22	0:00	0.4	224
18/06/22	1:00	0.9	205
18/06/22	2:00	0.9	267
18/06/22	3:00	0.4	273
18/06/22	4:00	0.4	217
18/06/22	5:00	0.4	101
18/06/22	6:00	0.4	57
18/06/22	7:00	0.9	97
18/06/22	8:00	1.3	142
18/06/22	9:00	2.7	137
18/06/22	10:00	2.7	139
18/06/22	11:00	2.7	123
18/06/22	12:00	1.8	293
18/06/22	13:00	1.8	294
18/06/22	14:00	0.9	86
18/06/22	15:00	0.9	50
18/06/22	16:00	0.4	266
18/06/22	17:00	0.4	246
18/06/22	18:00	0.4	294
18/06/22	19:00	0.9	87
18/06/22	20:00	0.9	67

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)
18/06/22	21:00	0.9	76
18/06/22	22:00	0.4	60
18/06/22	23:00	0.9	65
18/06/24	0:00	2.7	79
18/06/24	1:00	2.2	79
18/06/24	2:00	3.1	100
18/06/24	3:00	3.1	103
18/06/24	4:00	3.1	114
18/06/24	5:00	3.1	135
18/06/24	6:00	2.7	140
18/06/24	7:00	1.8	82
18/06/24	8:00	1.8	101
18/06/24	9:00	2.7	93
18/06/24	10:00	3.1	108
18/06/24	11:00	3.1	117
18/06/24	12:00	3.1	95
18/06/24	13:00	3.6	86
18/06/24	14:00	3.6	115
18/06/24	15:00	3.6	109
18/06/24	16:00	3.1	141
18/06/24	17:00	4	90
18/06/24	18:00	4	92
18/06/24	19:00	3.6	85
18/06/24	20:00	3.6	119
18/06/24	21:00	3.6	80
18/06/24	22:00	1.3	80
18/06/24	23:00	2.7	99
18/06/25	0:00	0.9	95
18/06/25	1:00	2.2	82
18/06/25	2:00	2.7	85
18/06/25	3:00	2.7	85
18/06/25	4:00	2.2	97
18/06/25	5:00	1.8	79
18/06/25	6:00	1.3	89
18/06/25	7:00	2.7	86
18/06/25	8:00	3.6	79
18/06/25	9:00	2.7	113
18/06/25	10:00	3.6	114
18/06/25	11:00	3.1	101
18/06/25	12:00	1.8	110
18/06/25	13:00	2.7	133
18/06/25	14:00	3.6	143
18/06/25	15:00	4.5	128
18/06/25	16:00	4	128
18/06/25	17:00	3.1	128
18/06/25	18:00	2.2	137
18/06/25	19:00	0.9	126
18/06/25	20:00	2.2	132
18/06/25	21:00	1.8	110
18/06/25	22:00	0.9	177
18/06/25	23:00	0.9	142
18/06/27	0:00	1.3	124
18/06/27	1:00	0.4	45
18/06/27	2:00	0	-
18/06/27	3:00	0	-
18/06/27	4:00	0.4	99
18/06/27	5:00	0.4	345

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)
18/06/27	6:00	0	-
18/06/27	7:00	0.4	350
18/06/27	8:00	0.9	106
18/06/27	9:00	1.3	132
18/06/27	10:00	0.9	111
18/06/27	11:00	1.8	218
18/06/27	12:00	2.2	231
18/06/27	13:00	2.2	191
18/06/27	14:00	1.8	250
18/06/27	15:00	1.3	231
18/06/27	16:00	1.8	222
18/06/27	17:00	0.9	120
18/06/27	18:00	1.3	85
18/06/27	19:00	1.3	216
18/06/27	20:00	1.3	194
18/06/27	21:00	0.4	220
18/06/27	22:00	0.4	338
18/06/27	23:00	0.4	304
18/06/28	0:00	0.4	317
18/06/28	1:00	0.4	327
18/06/28	2:00	0.4	328
18/06/28	3:00	0.4	339
18/06/28	4:00	0.4	309
18/06/28	5:00	0.4	2
18/06/28	6:00	0.4	358
18/06/28	7:00	0	-
18/06/28	8:00	0.9	117
18/06/28	9:00	1.3	311
18/06/28	10:00	0.9	271
18/06/28	11:00	1.3	308
18/06/28	12:00	1.8	220
18/06/28	13:00	1.8	228
18/06/28	14:00	2.2	215
18/06/28	15:00	1.8	229
18/06/28	16:00	2.2	213
18/06/28	17:00	2.2	198
18/06/28	18:00	2.2	195
18/06/28	19:00	0.9	264
18/06/28	20:00	2.2	194
18/06/28	21:00	2.2	194
18/06/28	22:00	1.3	212
18/06/28	23:00	0.9	202
18/06/30	0:00	1.8	227
18/06/30	1:00	1.3	203
18/06/30	2:00	1.3	197
18/06/30	3:00	1.3	225
18/06/30	4:00	2.2	196
18/06/30	5:00	1.8	212
18/06/30	6:00	2.2	213
18/06/30	7:00	2.2	211
18/06/30	8:00	2.7	204
18/06/30	9:00	2.7	193
18/06/30	10:00	1.3	267
18/06/30	11:00	2.2	213
18/06/30	12:00	2.7	196
18/06/30	13:00	2.7	217
18/06/30	14:00	2.7	217

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)
18/06/30	15:00	2.2	229
18/06/30	16:00	2.7	208
18/06/30	17:00	2.7	218
18/06/30	18:00	2.2	248
18/06/30	19:00	2.2	232
18/06/30	20:00	1.8	232
18/06/30	21:00	1.3	238
18/06/30	22:00	0.9	232
18/06/30	23:00	1.3	229

Appendix I

Impact Dolphin Monitoring Survey

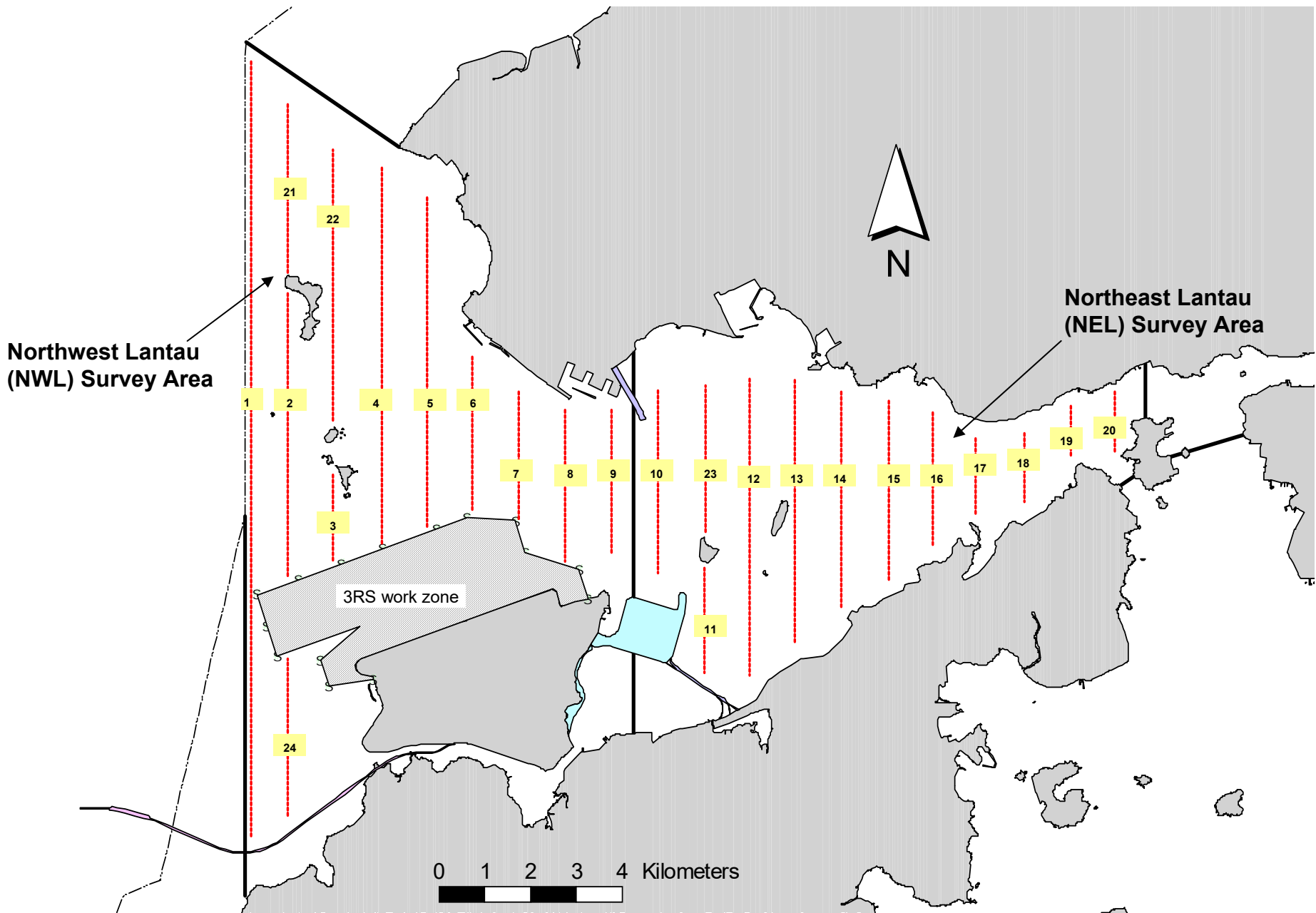


Figure 1. Transect Line Layout in Northwest and Northeast Lantau Survey Areas

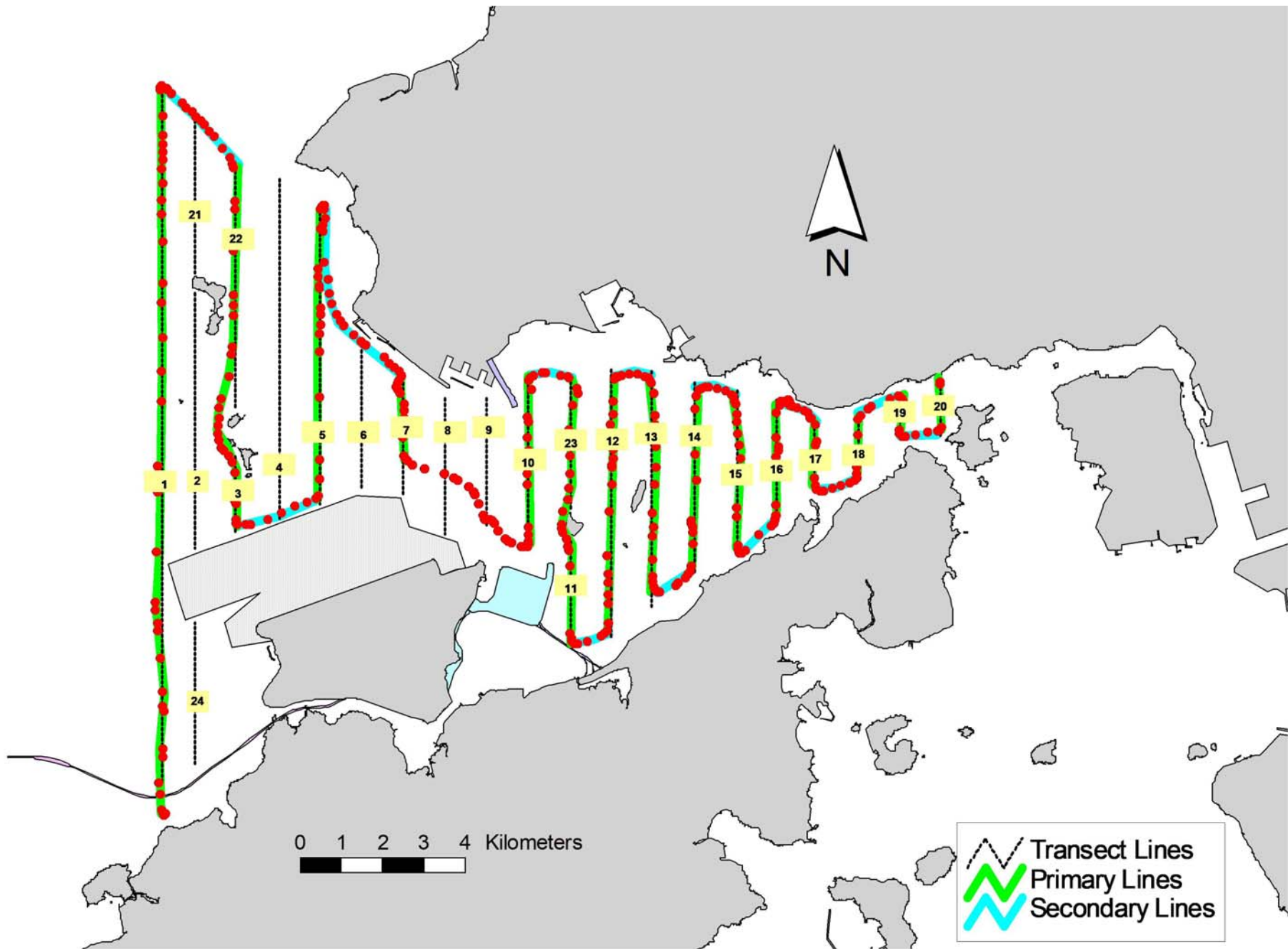


Figure 2. Survey Route on June 5th, 2018 (from HKLR03 project)

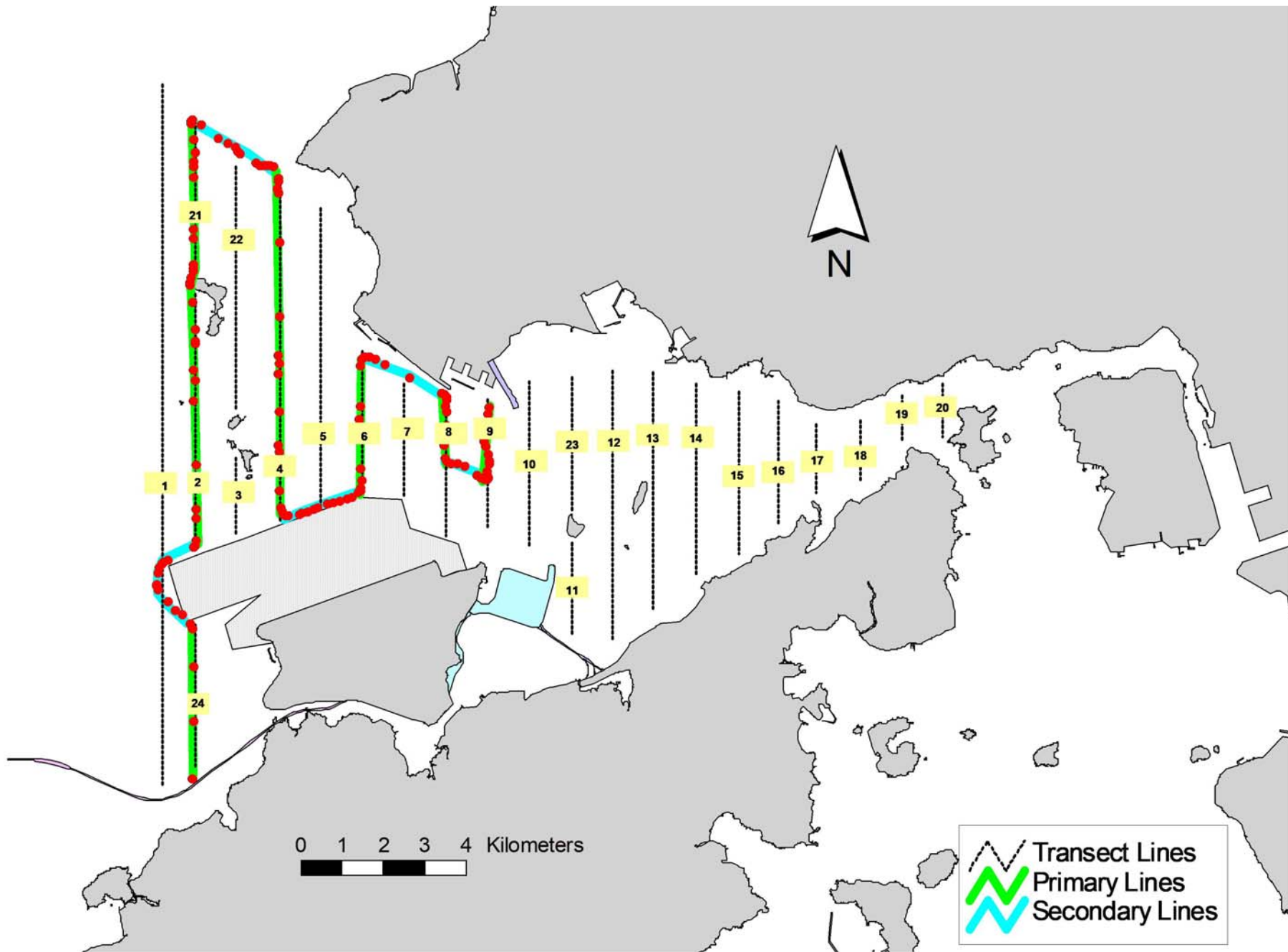


Figure 3. Survey Route on June 13th, 2018 (from HKLR03 project)

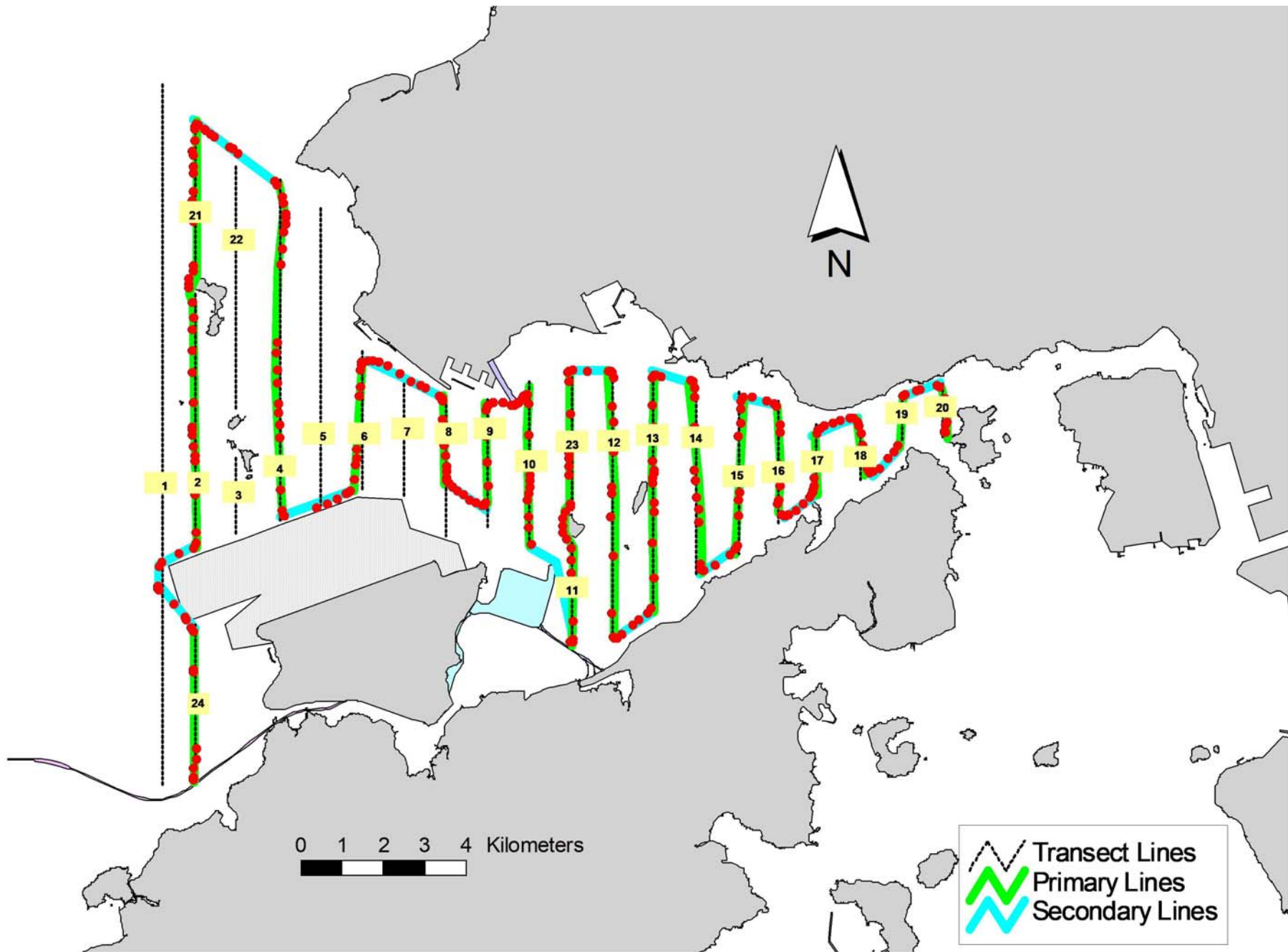


Figure 4. Survey Route on June 19th, 2018 (from HKLR03 project)

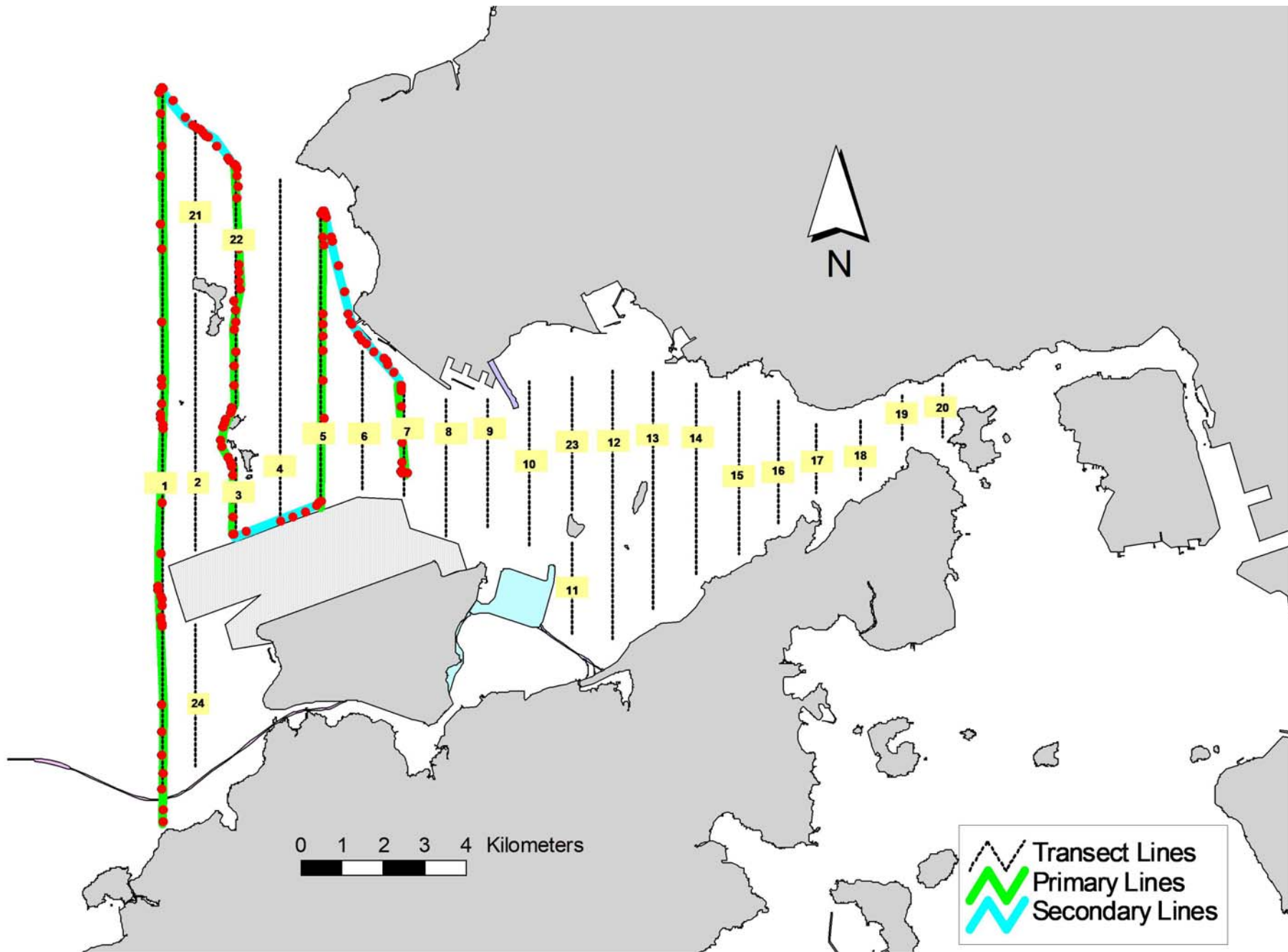


Figure 5. Survey Route on June 27th, 2018 (from HKLR03 project)

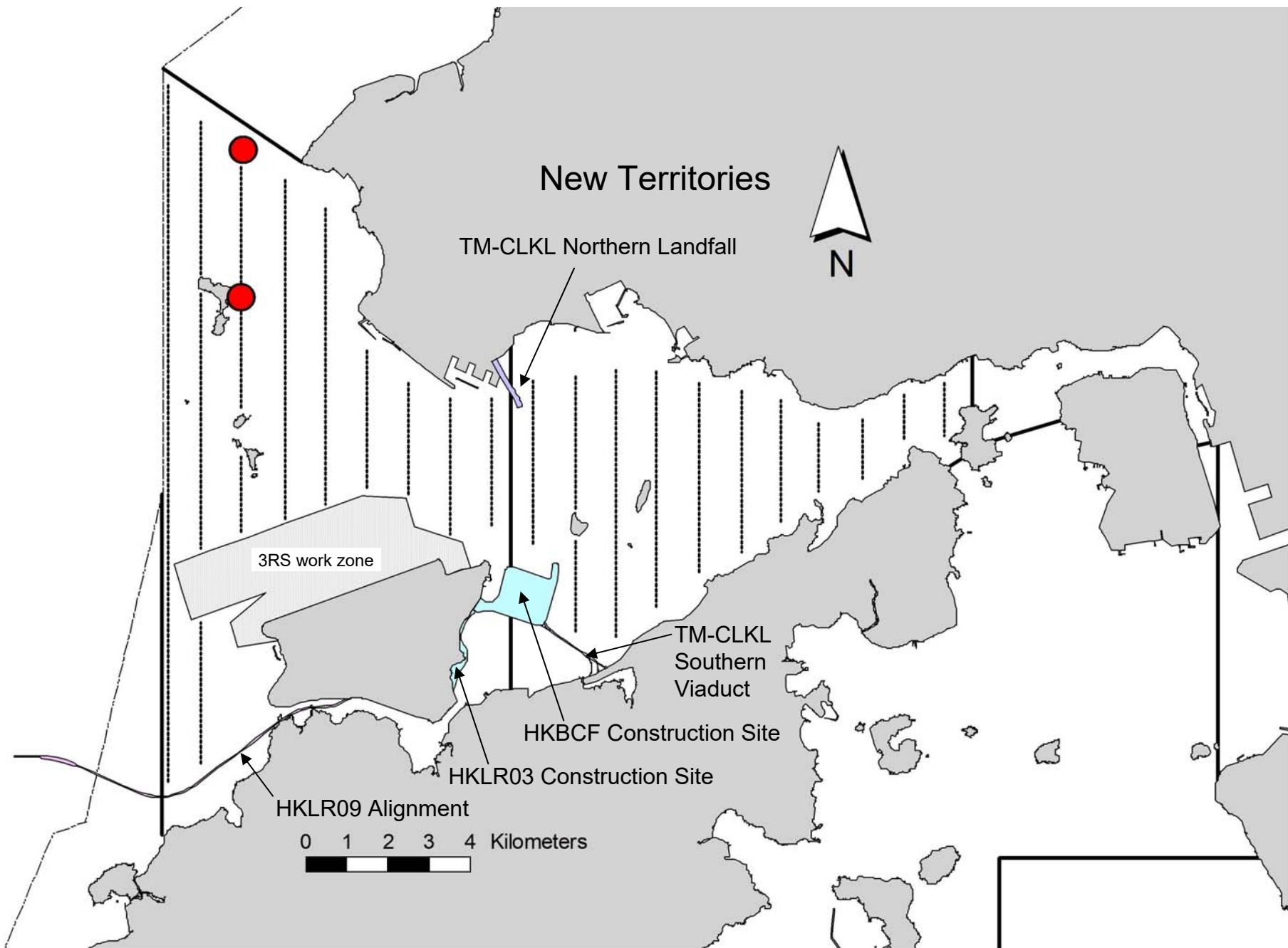


Figure 6. Distribution of Chinese White Dolphin Sightings during June 2018 HKLR03 Monitoring Surveys

Appendix I. HKLR03 Survey Effort Database (June 2018)

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

DATE	AREA	BEAU	EFFORT	SEASON	VESSEL	TYPE	P/S
5-Jun-18	NW LANTAU	2	3.73	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NW LANTAU	3	28.14	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NW LANTAU	2	3.46	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NW LANTAU	3	6.03	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NE LANTAU	2	10.32	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NE LANTAU	3	25.47	SUMMER	STANDARD36826	HKLR	P
5-Jun-18	NE LANTAU	2	6.68	SUMMER	STANDARD36826	HKLR	S
5-Jun-18	NE LANTAU	3	3.77	SUMMER	STANDARD36826	HKLR	S
13-Jun-18	NW LANTAU	2	23.63	SUMMER	STANDARD36826	HKLR	P
13-Jun-18	NW LANTAU	3	3.34	SUMMER	STANDARD36826	HKLR	P
13-Jun-18	NW LANTAU	2	8.49	SUMMER	STANDARD36826	HKLR	S
13-Jun-18	NW LANTAU	3	2.64	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NW LANTAU	3	23.85	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NW LANTAU	4	3.40	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NW LANTAU	3	7.85	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NW LANTAU	4	3.20	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NE LANTAU	2	24.33	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NE LANTAU	3	11.62	SUMMER	STANDARD36826	HKLR	P
19-Jun-18	NE LANTAU	2	9.72	SUMMER	STANDARD36826	HKLR	S
19-Jun-18	NE LANTAU	3	1.87	SUMMER	STANDARD36826	HKLR	S
27-Jun-18	NW LANTAU	2	16.07	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	3	12.56	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	4	4.20	SUMMER	STANDARD36826	HKLR	P
27-Jun-18	NW LANTAU	2	10.57	SUMMER	STANDARD36826	HKLR	S

Appendix II. HKLR03 Chinese White Dolphin Sighting Database (June 2018)

(Abbreviations: 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 Line)

DATE	STG #	TIME	HRD SZ	AREA	BEAU	PSD	EFFORT	TYPE	NORTHING	EASTING	SEASON	BOAT ASSOC.	P/S
13-Jun-18	1	1123	5	NW LANTAU	2	83	ON	HKLR	829917	806493	SUMMER	NONE	S
27-Jun-18	1	1144	2	NW LANTAU	2	73	ON	HKLR	826551	806435	SUMMER	NONE	P

Appendix III. Individual dolphins identified during HKLR03 monitoring surveys in June 2018

ID#	DATE	STG#	AREA
CH34	13/06/18	1	NW LANTAU
	27/06/18	1	NW LANTAU
NL12	27/06/18	1	NW LANTAU
NL80	13/06/18	1	NW LANTAU
NL202	13/06/18	1	NW LANTAU
NL301	13/06/18	1	NW LANTAU

CH34_20180613_1

NL80_20180613_1

NL202_20180613_1

NL301_20180613_1

CH34_20180627_1

NL12_20180627_1

Appendix IV. Photographs of Identified Individual Dolphins in June 2018 (HKLR03)

Appendix J

Event and Action Plan

Event and Action Plan for Impact Air Monitoring

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

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

Event / Action Plan for Impact Dolphin Monitoring

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

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

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

Appendix K

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

Table K1 *Cumulative Statistics on Exceedances*

Parameters	Level of Exceedance	Total No. recorded in this reporting month	Total No. recorded since project commencement
1-hr TSP	Action	0	67
	Limit	0	4
24-hr TSP	Action	0	7
	Limit	0	4
Water Quality	Action	0	20
	Limit	0	1
Impact Dolphin Monitoring	Action	0	11
	Limit	0	12

Table K2 *Cumulative Statistics on Complaints, Notifications of Summons and Successful Prosecutions*

Reporting Period	Cumulative Statistics		
	Complaints	Notifications of Summons	Successful Prosecutions
This Reporting Month (June 2018)	0	0	0
Total No. received since project commencement	16	1	0

Appendix L

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 **June 2018** [to be submitted not later than the 15th day of each month following reporting month] (All quantities shall be rounded off to 3 decimal places.)

Month	Monthly Break-down of <u>Inert</u> Construction & Demolition Materials (i.e. Public Fill Materials)				
	(a)=(b)+(c)+(d)+(e) Total Quantity Generated	(b) Hard Rock and Large Broken Concrete	(c) Reused in the Contract	(d) Reused in other Projects	(e) Disposed of as Public Fill
	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)	(in '000 ton)
Sub-total	1221.977	0.000	0.000	0.000	1221.977
Jan-2018	7.165	0.000	0.000	0.000	7.165
Feb-2018	1.762	0.000	0.000	0.000	1.762
Mar-2018	66.457	0.000	0.000	62.274	4.183
Apr-2018	123.942	0.000	0.000	50.648	73.294
May-2018	127.964	0.000	0.000	62.822	65.142
Jun-2018	102.987	0.000	0.000	55.385	47.602
Half Year Sub-total	430.277	0.000	0.000	231.129	199.148
Jul-2018					
Aug-2018					
Sep-2018					
Oct-2018					
Nov-2018					
Dec-2018					
Project Total Quantities	1652.254	0.000	0.000	231.129	1421.123

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	619.380	619.380	4.150	4.150	6.870	6.870	33.150	33.150	8.259
Jan-2018	241.500	241.500	0.200	0.200	0.000	0.000	2.800	2.800	0.272
Feb-2018	256.940	256.940	0.200	0.200	0.000	0.000	0.000	0.000	0.258
Mar-2018	229.360	229.360	0.000	0.000	0.000	0.000	2.000	2.000	0.459
Apr-2018	195.550	195.550	0.000	0.000	0.000	0.000	8.600	8.600	0.281
May-2018	93.010	93.010	0.300	0.300	0.000	0.000	0.000	0.000	0.686
Jun-2018	0.000	0.000	0.000	0.000	1.060	1.060	0.000	0.000	0.408
Half Year Sub-total	1016.36	1016.36	0.700	0.700	1.060	1.060	13.400	13.400	2.364
Jul-2018									
Aug-2018									
Sep-2018									
Oct-2018									
Nov-2018									
Dec-2018									
Project Total Quantities	1635.740	1635.740	4.850	4.850	7.930	7.930	46.550	46.550	10.623

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)
2300.000	0.000	0.000	300.000	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)
2000.000	6.000	8.500	50.000	12.000

- Notes:
- (1) The performance targets are given in the **ER Appendix 8J Clause 14** and the EM & A Manual(s).
 - (2) The waste flow table shall also include C&D materials to be imported for use at the Site.
 - (3) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
 - (4) The Contractor shall also submit the latest forecast of the total amount of C&D materials expected to be generated from the Works, together with a breakdown of the nature where the amount of C&D materials expected to be generated from the Works is equal to or exceeding 50,000 m³. (**ER Part 8 Clause 8.8.5 (d) (ii)** refers).