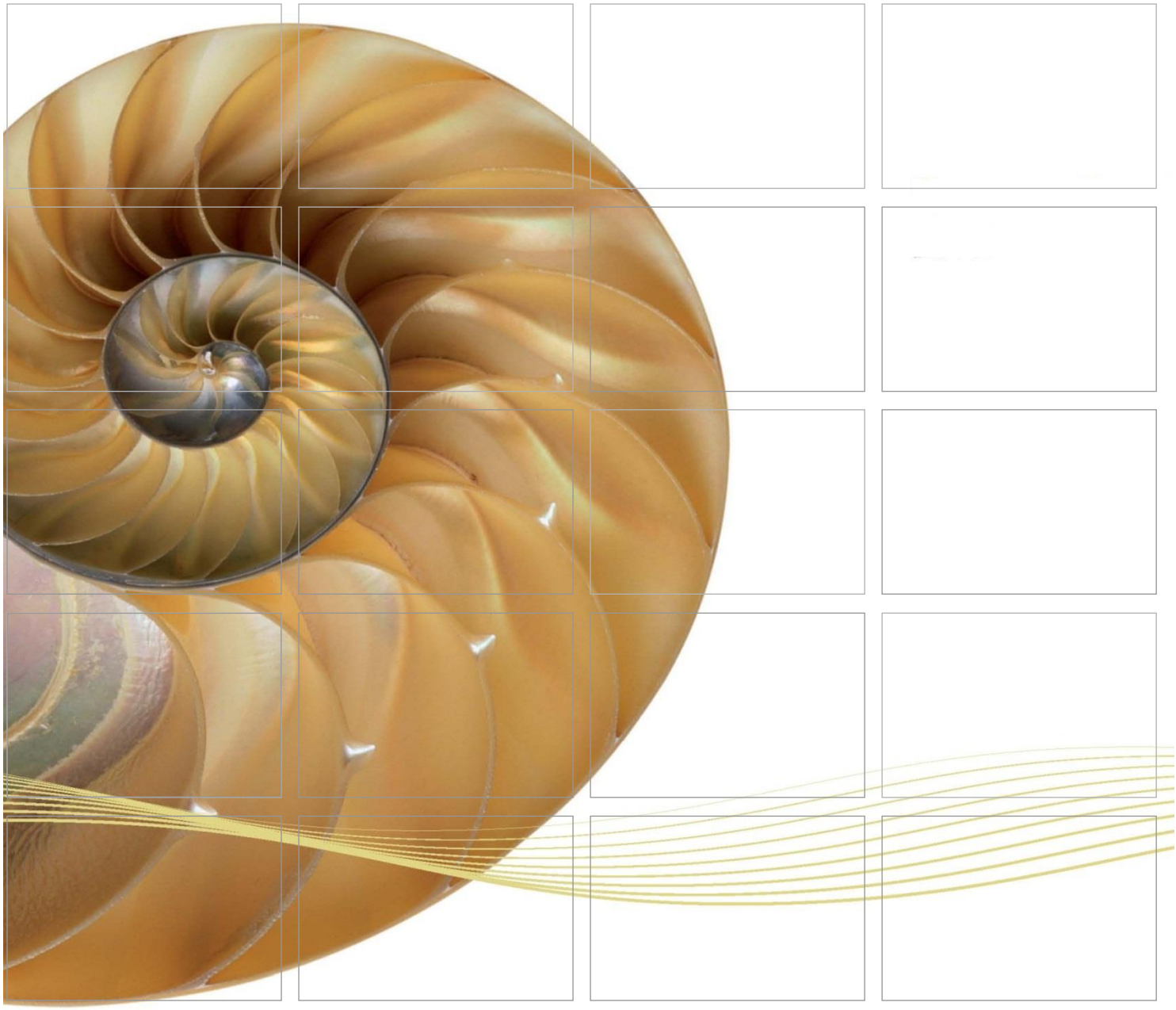
REPORT



Contract No. HY/2017/10
Tuen Mun – Chek Lap Kok Link – Northern Connection Tunnel Buildings, Electrical and Mechanical Works

First Monthly EM&A Report

12 July 2018

Environmental Resources Management
2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone 2271 3000
Facsimile 2723 5660

www.erm.com

ERM

The business of sustainability

Contract No. HY/2017/10
Tuen Mun – Chek Lap Kok Link – Northern Connection Tunnel Buildings, Electrical and Mechanical Works

Environmental Resources Management

2507, 25/F One Harbourfront
18 Tak Fung Street
Hunghom, Kowloon
Hong Kong
Telephone: (852) 2271 3000
Facsimile: (852) 2723 5660
E-mail: post.hk@erm.com
http://www.erm.com

First Monthly EM&A Report

Document Code: 0463091_1st Monthly EM&A_20180712.doc

Client:	Project No:
Gammon	0463091
Summary:	Date: 12 July 2018
This document presents the First Monthly EM&A Report for Tuen Mun – Chek Lap Kok Link – Northern Connection Tunnel Buildings, Electrical and Mechanical Works.	Approved by: *Mr Craig Reid* *Partner*
	Certified by: *Dr Jasmine Ng* *ET Leader*

Revision	Description	By	Checked	Approved	Date
	First Monthly EM&A Report	VAR	JN	CAR	12/07/18

Distribution

☐ Internal

☒ Public

☐ Confidential

RAMBOLL

Ref.: HYDHZMBEEM00_0_6647L.18 13 July 2018

AECOM By Fax (2293 6300) and By Post
Engineer's Representative's Office
No. 8 Mong Fat Street, Tuen Mun
New Territories, Hong Kong

Attention: Mr. Desmond Fong

Dear Mr. Fong,

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/2017/10 TM-CLKL Northern Connection Tunnel Buildings, Electrical and Mechanical Works
First Monthly EM&A Report (June 2018)

Reference is made to the First Monthly Environmental Monitoring and Audit (EM&A) Report (June 2018) (ET's ref.: "*0463091_1st Monthly EM&A_20180712.doc*" dated 12 July 2018) certified by the ET Leader and provided to us via e-mail on 12 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 – Dr. Jasmine Ng (By Fax: 2723 5660)
Gammon – Mr. Max Poon (By Fax: 3520 0486)

Internal: DY, YH, DF, ENPO Site

Q:\Projects\HYDHZMBEEM00\02_Proj_Mgt\02_Corr\2018\HYDHZMBEEM00_0_6647L.18.docx

Ramboll Hong Kong Limited 英環香港有限公司
21/F, BEA Harbour View Centre, 56 Gloucester Road, Wan Chai, Hong Kong Tel: 852.3465 2888 Fax: 852.3465 2899
www.ramboll.com

TABLE OF CONTENTS

List of Appendices

Under *Contract No. HY/2017/10*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake Northern Connection Tunnel Buildings, Electrical and Mechanical Works of the Tuen Mun – Chek Lap Kok Link Project (TM-CLK Link Project) while AECOM Asia Company Limited was appointed by HyD as the Engineer. 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 7 June 2018 and will tentatively be completed by 2021. The impact monitoring of the EM&A programme, including air quality and environmental site inspections, were commenced on 7 June 2018. In addition, landfill gas monitoring shall be carried out for the Project in accordance with the Updated EM&A Manual for TM-CLK Link Project (Agreement No. CE 52/2007).

This is the First Monthly EM&A report presenting the EM&A works carried out during the period from 7 to 30 June 2018 for the *Contract No. HY/2017/10 Northern Connection Tunnel Buildings, Electrical and Mechanical Works* (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

- Bar bending and timber formwork at Toll Control Building and Ventilation Plant Room;
- ER's and the Contractor's site offices erection at WA18; and
- Additional land ground investigation (GI) at Administration Building, trial pits and laboratory testing.

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

24-hour TSP Monitoring	8 sessions
1-hour TSP Monitoring	8 sessions
Joint Environmental Site Inspection	4 sessions

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.

Environmental Complaints, Non-compliance & Summons

There was no environmental complaint, notification of summons or successful prosecution recorded in the reporting period.

Reporting Change

There was no reporting change 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

- Bar bending and timber formwork at Toll Control Building and Ventilation Plant Room;
- ER's and the Contractor's site offices erection at WA18; and
- Socket H-pilling at Administration Building.

Future Key Issues

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

1 INTRODUCTION

1.1 BACKGROUND

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

An Environmental Impact Assessment (EIA) of TM-CLKL (the Project) was prepared in accordance with the EIA Study Brief (No. ESB-175/2007) and the *Technical Memorandum of the Environmental Impact Assessment Process* (*EIAO-TM*). The EIA Report was submitted under the Environmental Impact Assessment Ordinance (EIAO) in August 2009. Subsequent to the approval of the EIA Report (EIAO Register Number AEIAR-146/2009), an Environmental Permit (EP-354/2009) for TM-CLKL was granted by the Director of Environmental Protection (DEP) on 4 November 2009, and EP variation (VEP) (EP-354/2009/A) was issued on 8 December 2010. Subsequent applications for variation of environmental permits (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/2017/10*, Gammon Construction Limited (GCL) is commissioned by the Highways Department (HyD) to undertake the Northern Connection Tunnel Buildings, Electrical and Mechanical Works of TM-CLKL while AECOM Asia Company Limited was appointed by HyD as the Engineer. 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).

The construction phase of the Contract commenced on 7 June 2018 and will be tentatively completed by 2021. The impact monitoring phase of the EM&A programme, including air quality and environmental site inspections, commenced on 7 June 2018.

The general layout plan of the Contract components is presented in *Figures 1.1 & 1.2a to c.*

Project Management Initials: Designer: KATH Checked: SYLC Approved: CWN ISO A1 594mm x 841mm

N

TUEN MUN

LUNG KWU TAN

URMSTON ROAD

TAI LAM CHUNG RESERVOIR

TSING YI

A

01
7061

01
7063

TUEN MUN TO
CHEK LAP KOK LINK

SOUTH CHINA SEA

SIU MO TO

TAI MO TO

HONG KONG
BOUNDARY
CROSSING
FACILITIES

01
7062

CHEK LAP KOK

A

TUNG
CHUNG

LANTAU ISLAND

AECOM

PROJECT
TUEN MUN -
CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK
- NORTHERN CONNECTION TUNNEL
BUILDINGS, ELECTRICAL AND
MECHANICAL WORKS

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

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.1

ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.
A	JAN.18	TENDER ADDENDUM NO.1	SYLC
-	DEC.17	TENDER DRAWING	SYLC

STATUS

SCALE: A1 1 : 40000
DIMENSION UNIT: MILLIMETRES

KEY PLAN

PROJECT NO.: 60240249
CONTRACT NO.: HY/2017/10

SHEET TITLE
OVERALL SITE PLAN

SHEET NUMBER
60240249/C4/7051A

Plot File by: jerrywong
PATH: X:\TO\To RSSMSL\C4 Drawings\C4_Drawing (2018_01_02)\Architectural drawings -DGN\60240249_C4_7051.dgn

Project Management Initials: Designed: KATH Checked: SYLC Approved: CWN ISO A1 594mm x 841mm

Plot File by: jerrywong 23-Jan-18
PATH: \\TOTIS-KSSW\IS\IC4-Drawings\C4_Drawing (2018_01_02)\Architectural drawings-DGN\60240249_C4_7061.dgn

AECOM

PROJECT
TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TUNNEL BUILDINGS, ELECTRICAL AND MECHANICAL WORKS

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

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2a

ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.
A	JAN.18	TENDER ADDENDUM NO.1	SYLC
-	DEC.17	TENDER DRAWING	SYLC

STATUS

SCALE	DIMENSION UNIT
A1 1 : 2500	MILLIMETRES

KEY PLAN

PROJECT NO.	CONTRACT NO.
60240249	HY/2017/10

SHEET TITLE
ZONING PLAN (SHEET 1)

SHEET NUMBER
60240249/C4/7061A

Project Management Initials: Designer: KATH Checked: SYLC Approved: CWN ISO A1 594mm x 841mm

N

AECOM

PROJECT
TUEN MUN -
CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TUNNEL BUILDINGS, ELECTRICAL AND MECHANICAL WORKS

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

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2b

ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.
A	JAN.18	TENDER ADDENDUM NO.1	SYLC
	DEC.17	TENDER DRAWING	SYLC

STATUS

SCALE: A1 1 : 2500
DIMENSION UNIT: MILLIMETRES

KEY PLAN

PROJECT NO.: 60240249
CONTRACT NO.: HY/2017/10

SHEET TITLE
ZONING PLAN
(SHEET 2)

SHEET NUMBER
60240249/C4/7062A

Plot File by: jerrywong 15-Jan-18
PATH: Y:\TOTO ASS\WSL\C4 Drawings\C4_Drawing (2018_01_02)\Architectural drawings-DGN\60240249_C4_7062.dgn

Project Management Initials: Designer: KATH Checked: SYLC Approved: CWN ISO A1 594mm x 841mm

Plot File by: jerrywong 17-Jan-18
PATH: Y:\TOTo RSS\MSLIC4 Drawings\C4_Drawing (2018_01_02)\Architectural drawings -DGN\60240249_C4_7063.dgn

AECOM

PROJECT
TUEN MUN -
CHEK LAP KOK LINK

CONTRACT TITLE
TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TUNNEL BUILDINGS, ELECTRICAL AND MECHANICAL WORKS

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

CONSULTANT
AECOM Asia Company Ltd.
www.aecom.com

SUB-CONSULTANTS

Figure 1.2c

ISSUE/REVISION

A	JAN.18	TENDER ADDENDUM NO.1	SYLC
	DEC.17	TENDER DRAWING	SYLC
	DATE	DESCRIPTION	CHK.

STATUS

SCALE
A1 1 : 2500

DIMENSION UNIT
MILLIMETRES

KEY PLAN

PROJECT NO.
60240249

CONTRACT NO.
HY/2017/10

SHEET TITLE
ZONING PLAN
(SHEET 3)

SHEET NUMBER
60240249/C4/7063A

1.2 SCOPE OF REPORT

This is the First Monthly EM&A Report under the *Contract No. HY/2017/10 Tuen Mun – Chek Lap Kok Link – Northern Connection Tunnel Buildings, Electrical and Mechanical Works*. 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
HyD (Highways Department)	Project Coordinator	Joseph Lee	2762 4958	3188 6614
	Senior Engineer	Cheng Pan	2762 3383	3188 6614
ER (AECOM Asia Company Limited)	Principle Resident Engineer	S. W. Fok	2293 6200	2293 6300
	Resident Engineer	Desmond Fung	2293 6200	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 (Gammon Construction Limited)	Site Agent	Kenneth Tai	9039 4723	-
	Environmental Officer	Max Poon	9103 6303	-
ET (ERM-HK)	ET Leader	Dr. Jasmine Ng	2271 3311	2723 5660

1.4 SUMMARY OF CONSTRUCTION WORKS

The construction phase of the Contract commenced on 7 June 2018. The three-month rolling construction programme is shown in Appendix B.

As informed by the Contractor, details of the major works carried out in this reporting month are listed below:

Land-based Works

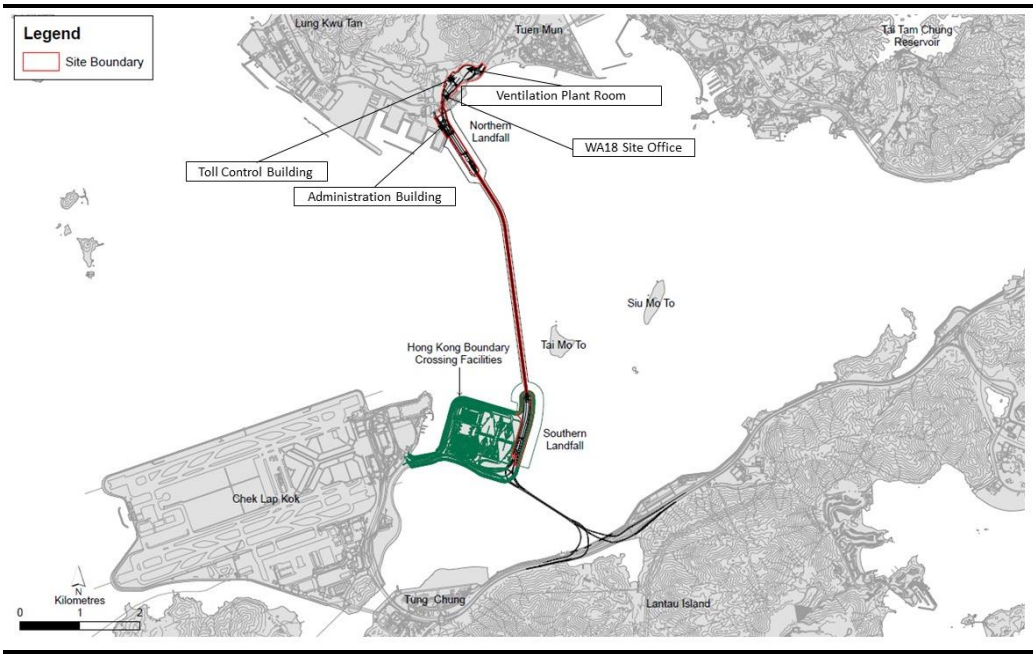
- Bar bending and timber formwork at Toll Control Building and Ventilation Plant Room;
- ER's and the Contractor's site offices erection at WA18; and

- Additional land ground investigation (GI) at Administration Building, trial pits and laboratory testing.

The locations of the construction activities are shown in *Figure 1.3*. The Environmental Sensitive Receivers in the vicinity of the Project are shown in *Figure 1.4*.

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

Figure 1.3 Locations of Major Construction Activities in the Reporting Month



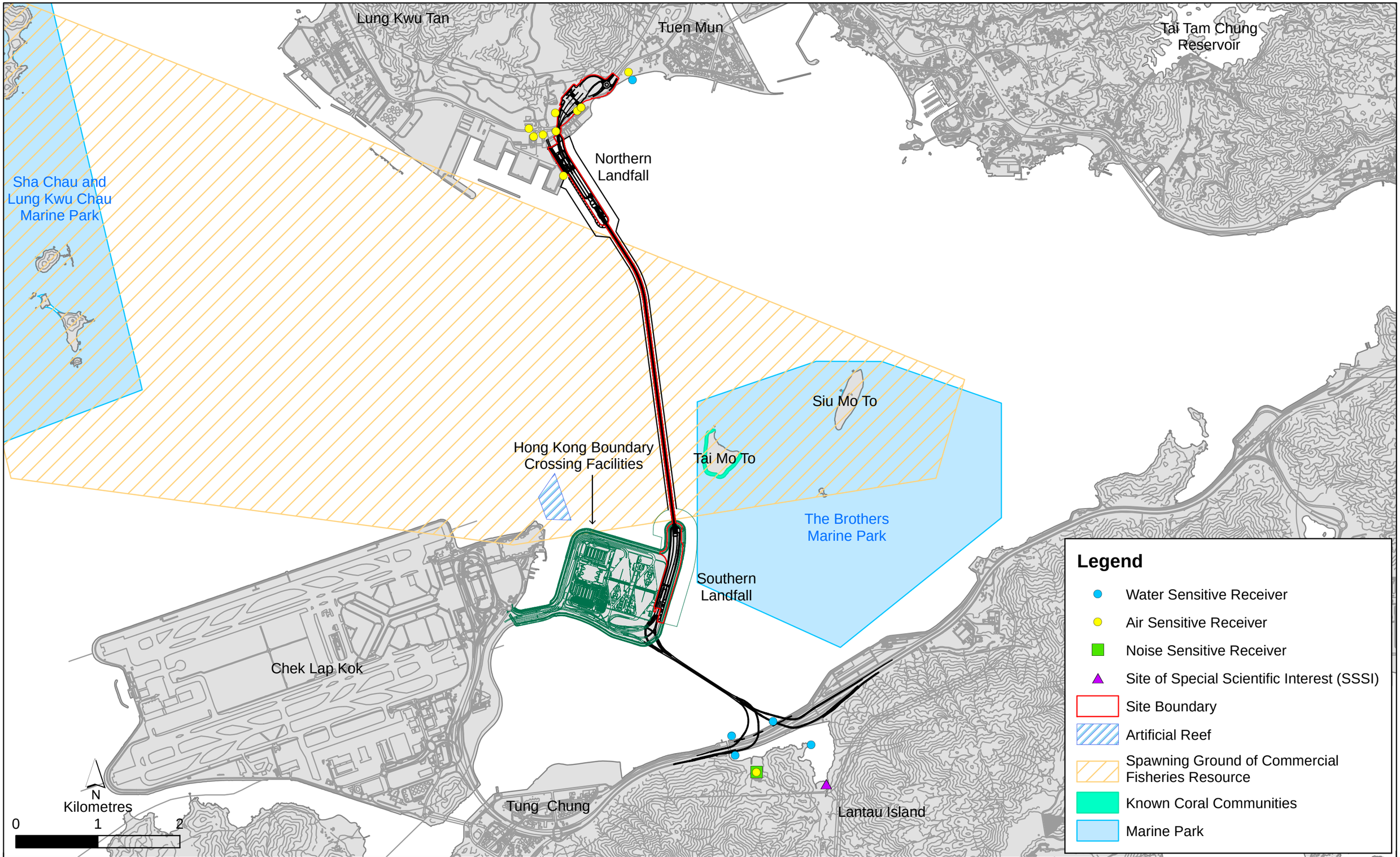


Figure 1.4

Environmental Sensitive Receivers in the Vicinity of the Project

File: T:\GIS\CONTRACT\0463091\mxd\0463091_Environmental_Sensitive_Receivers.mxd
Date: 12/7/2018

Environmental Resources Management

ERM

2 EM&A RESULTS

The EM&A programme required environmental monitoring for air quality and environmental site inspections for air quality, water quality and waste management. 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 under *Contract No. HY/2012/08 Tuen Mun-Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section* commenced on 24 October 2014.

Results of air quality monitoring were adopted from the published EM&A data of *Contract No. HY/2012/08 Tuen Mun-Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section* (1).

The Action and Limit Levels of the air quality monitoring were adopted from the published EM&A reports of *Contract No. HY/2012/08 Tuen Mun-Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section* (2). The Action and Limit Levels are provided in *Appendix D*.

The locations of the monitoring stations overlapped with Contract No. HY/2012/08 are shown in *Figure 2.1* and presented in *Table 2.1*.

Table 2.1 Locations of Impact Air Quality Monitoring Stations and and its Corresponding Monitoring Requirements

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR1	9, 12, 15, 18, 21, 24, 27 and 30 June 2018	Tuen Mun Fireboat Station	Office	TSP monitoring • 1-hour Total Suspended Particulates (1-hour TSP, µg/m³), 3 times in every 6 days • 24-hour Total Suspended Particulates (24-hour TSP, µg/m³), daily for 24-hour in every 6 days Enhanced TSP monitoring
ASR5		Pillar Point Fire Station	Office	
AQMS1		Previous River Trade Golf	Bare ground	

(1) Published EM&A data for impact water quality monitoring by *Contract No. HY/2012/08* are available at: http://www.hzmbenpo.com/

(2) Published EM&A reports of *Contract No. HY/2012/08* are available at: http://www.hzmbenpo.com/

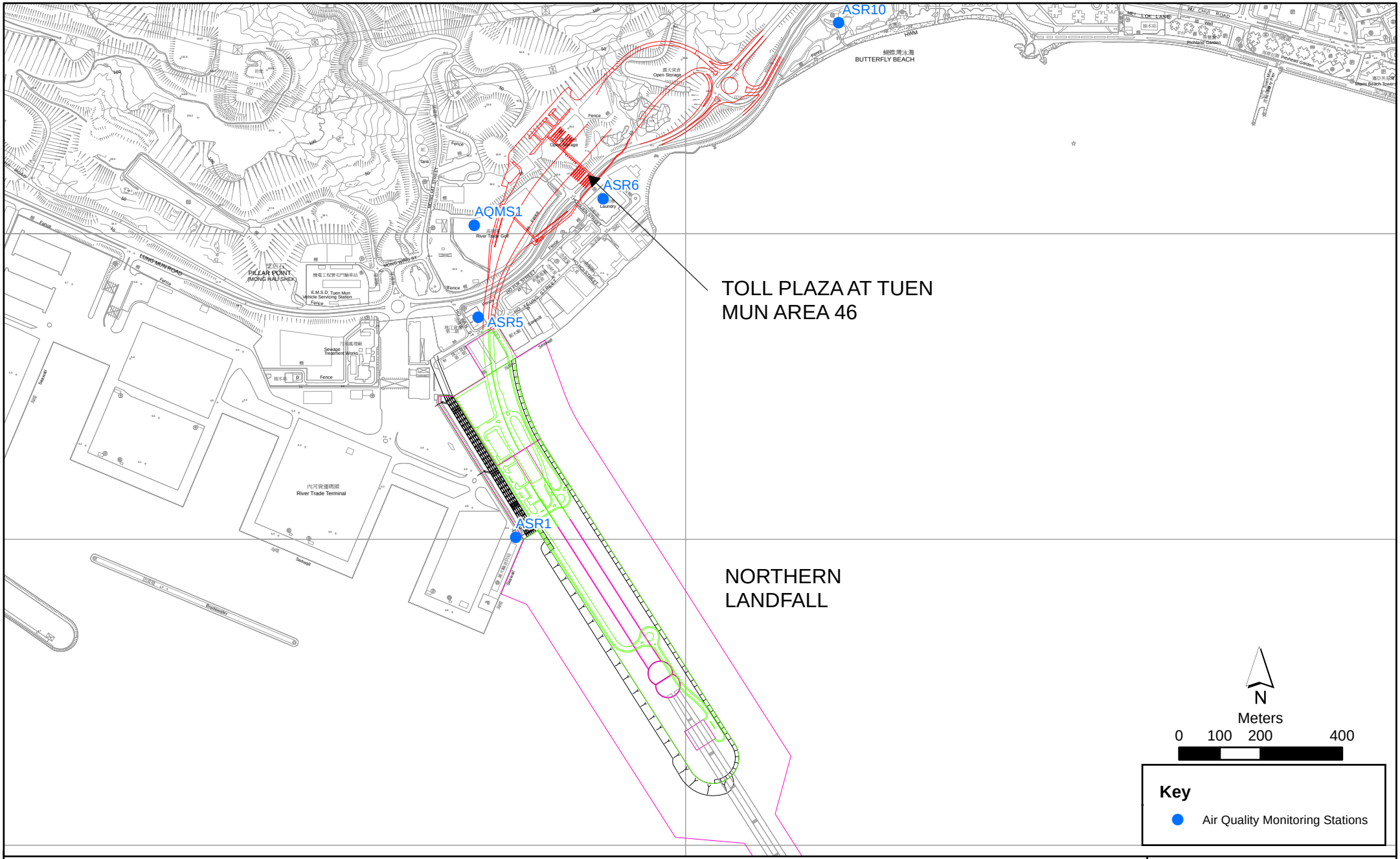


Figure 2.1

Air Quality Monitoring Stations for the Enhanced TSP Monitoring
(Source: Adopted from Contract No. HY/2012/08 Tuen Mun-Chek Lap Kok Link - Northern Connection Sub-sea Tunnel Section)

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

Environmental Resources Management

ERM

Monitoring Station	Monitoring Dates	Location	Description	Parameters & Frequency
ASR6		Butterfly Beach Laundry	Office	(commenced on 24 October 2014 under *Contract No. HY/2012/08*) • 1-hour Total Suspended Particulates (1-hour TSP, μg/m³), 3 times in every 3 days • 24-hour Total Suspended Particulates (24-hour TSP, μg/m³), daily for 24-hour in every 3 days
ASR10		Butterfly Beach Park	Recreational uses	

2.1.2 Monitoring Methodology

High Volume Sampler

(a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS:

- A horizontal platform with appropriate support to secure the sampler against gusty wind was provided.
- The distance between the HVS and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
- A minimum of 2m of separation from walls, parapets and penthouses was required for rooftop samples.
- A minimum of 2m separation from any supporting structure, measured horizontally was required.
- No furnaces or incineration flues were nearby.
- Airflow around the sampler was unrestricted.
- The samplers were more than 20m from the drip line.
- Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
- Permission must be obtained to set up the samples and to obtain access to the monitoring stations.
- A secured supply of electricity is needed to operate the samplers.
- No two samplers should be placed less than 2 m apart.

(b) Preparation of Filter Papers

- Filter papers of size 8"x 10" that were clean and without pinholes were selected.
- All filter papers were conditioned in a humidity controlled chamber for over 24-hour and be pre-weighed before use for sampling.
- All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.

(c) Field Monitoring

- The power supply was checked to ensure the HVS works properly.
- The filter holder and the area surrounding the filter were cleaned.
- The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
- The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.

- The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
- Then the shelter lid was closed and was secured with the aluminum strip.
- The HVS was warmed up for about 5 minutes to establish run-temperature conditions.
- A new flow rate record sheet was set into the flow recorder.
- On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around 1.1 m^3/min, and complied with the range specified in the Updated EM&A Manual (i.e. 0.6 – 1.7 m^3/min).
- The programmable digital timer was set for a sampling period of 1 hour or 24 hours, and the starting time, weather condition and the filter number were recorded.
- The initial elapsed time was recorded.
- At the end of sampling, on site temperature and atmospheric pressure readings were taken and the final flow rate of the HVS was checked and recorded.
- The final elapsed time was recorded.
- The sampled filter was removed carefully and folded in half-length so that only surfaces with collected particulate matter were in contact.
- It was then placed in a clean plastic envelop and sealed.
- All monitoring information was recorded on a standard data sheet.
- Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.

(d) Maintenance and Calibration

- The HVS and its accessories were maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
- All HVS were calibrated (five point calibration) using Calibration Kit prior to the commencement of the baseline monitoring and thereafter at bi-monthly intervals.

2.1.3 Results and Observations

Results of air quality monitoring were adopted from the published EM&A data of *Contract No. HY/2012/08 Tuen Mun-Chek Lap Kok Link – Northern Connection Sub-sea Tunnel Section* (1).

Neither Action nor Limit Levels exceedances was recorded by the Environmental Team of Contract No. *HY/2012/08* during the reporting period. No action is thus required to be undertaken in accordance with the Event Action Plan presented in *Appendix E*.

(1) Published EM&A data for impact water quality monitoring by *Contract No. HY/2012/08* are available at: http://www.hzmbenpo.com/

2.2 LANDFILL GAS HAZARD MONITORING

2.2.1 Monitoring Requirements and Equipment

In accordance with the Updated EM&A Manual, regular landfill gas monitoring shall be carried out during the excavation and confined area within the landfill zone of Pillar Point Valley (PPV) Landfill. A Safety Officer shall be appointed to carry out regular landfill gas hazard monitoring works during all excavations, manholes, chambers, relocation of monitoring wells and any other confined spaces that may have been created. All measurements in excavations shall be made with the extended monitoring tube located not more than 10mm from the exposed ground surface to ensure that the construction work area is free of landfill gas before any worker enters in the area. The Action and Limit Levels of the landfill gas hazard monitoring is provided in *Appendix D*.

The location of the monitoring station is shown in *Table 2.2*.

Table 2.2 Location of Landfill Gas Monitoring Station and and its Corresponding Monitoring Requirements

Monitoring Station	Monitoring Dates	Parameters	Measurements & Frequency
Toll Control Building	To be implemented in July	• Oxygen • Methane • Carbon dioxide	For excavations deeper than 1m, measurements should be undertaken • At the ground surface before excavation commences; • Immedately before any worker enters the excavation; • At the beginning of each working date for the entire period the excavation remains open; and • Periodically through the working day whilst workers are in the excavation For excavations between 300mm and 1m deep, measurements should be undertaken • Directly after the excavation has been completed; and • Periodically whilst the excavation remains open For excavations less than 300mm deep, monitoring works may be omitted, at the discretion of the Safety Officer or other qualified person

2.2.2 Results and Observations

Informed by the Safety Officer, no landfill gas hazard monitoring was undertaken in the reporting period in view of the construction works at toll control building. Event Action Plan is presented in *Appendix E*.

2.3 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 8, 15, 22 and 29 June 2018.

Key observations and recommendations during the site inspections in this reporting period are summarized in *Table 2.2*.

Table 2.3 Specific Observations and Recommendations during the Weekly Site Inspection in this Reporting Month

Inspection Date	Observations	Recommendations/ Remarks
8 June 2018	Ventilation Plant Room • Chemical containers were observed not placed in drip tray. Toll Control Building • Stagnant water in the drip tray near the generator was observed not cleared.	Ventilation Plant Room • The Contractor was reminded to place chemical containers in drip tray. Toll Control Building • The Contractor was reminded to clear stagnant water in the drip tray.
15 June 2018	WA18 • Stagnant water in the drip tray and trolley in front of site office were observed not cleared. Ventilation Plant Room • Chemical containers were observed not placed in drip tray. • Duplicate QPME label should be displayed on the sides of the generator for checking.	WA18 • The Contractor was reminded to clear stagnant water in the drip tray and in the trolley. Ventilation Plant Room • The Contractor was reminded to place chemical containers in drip tray. • The Contractor was reminded to provide QPME label on the sides of the generator.
22 June 2018	Toll Control Building • Checklist should be provided on the wetsep. • On-site sorting should be implemented on site for wastes. Administration Building • Chemical labels should be displayed on the chemical containers used in wetsep operation.	Toll Control Building • The Contractor was reminded to provide wetsep checklist. • The Contractor was reminded to implement on-site waste sorting. Administration Building • The Contractor was reminded to provide chemical labels on the checmical containers.
29 June 2018	Ventilation Plant Room • Stagnant water in the drip tray was observed not cleared. Toll Control Building • Chemical container was observed not placed in drip tray.	Ventilation Plant Room • The Contractor was reminded to clear stagnant water in the drip tray. Toll Control Building • The Contractor was reminded to place chemical container in drip tray.

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

2.4 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). Reference has been made to the waste flow table prepared by the Contractor (*Appendix F*). The quantities of different types of wastes are summarized in *Table 2.3*.

Table 2.4 Quantities of Different Waste Generated in the Reporting Month

Month/Year	Inert C&D Materials [a] (m^3)	Inert Construction Waste Re-used (m^3)	Non-inert Construction Waste [b] (kg)	Imported Fill (m^3)	Recyclable Materials [c] (kg)	Chemical Wastes (kg)
June 2018	2085	0	3,750	0	0	0

Notes:
(a) Inert construction wastes include hard rock and large broken concrete, and materials disposed as public fill.
(b) Non-inert construction wastes include general refuse disposed at landfill.
(c) Recyclable materials include metals, paper, cardboard, plastics, timber and others.

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

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

2.5 ENVIRONMENTAL LICENSES AND PERMITS

The status of environmental licensing and permit is summarized in *Table 2.4* below.

Table 2.4 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	N/A	HyD	Tuen Mun- Chek Lap Kok Link
APCO Construction Dust Notification	433493	14 May 2018	N/A	GCL	For Tuen Mun working area
Construction Waste Billing Account	7030836	15 May 2018	N/A	GCL	N/A
Chemical Waste Producer Registration	5213-422-G2827-01	13 June 2018	N/A	GCL	N/A
WPCO Licence for Buildings at C2 area				GCL	Submitted to EPD (Ref:434511, dated 11 June 2018)
WPCO Licence for Buildings at C3 area				GCL	Submitted to EPD (Ref:435029, dated 26 June 2018)
Construction Noise Permit				GCL	For Toll Control Building, Administration Building and WA18 Submitted to EPD (Ref:434984, dated 25 June 2018)

2.6 IMPLEMENTATION STATUS OF ENVIRONMENTAL MITIGATION MEASURES

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

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

2.7 SUMMARY OF EXCEEDANCES OF THE ENVIRONMENTAL QUALITY PERFORMANCE LIMIT

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

Cumulative statistics are provided in *Appendix G*.

2.8 SUMMARY OF COMPLAINTS, NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

The Environmental Complaint Handling Procedure is provided in *Figure 2.2*.

There was no environmental complaint, notification of summons or successful prosecution recorded in the reporting period.

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

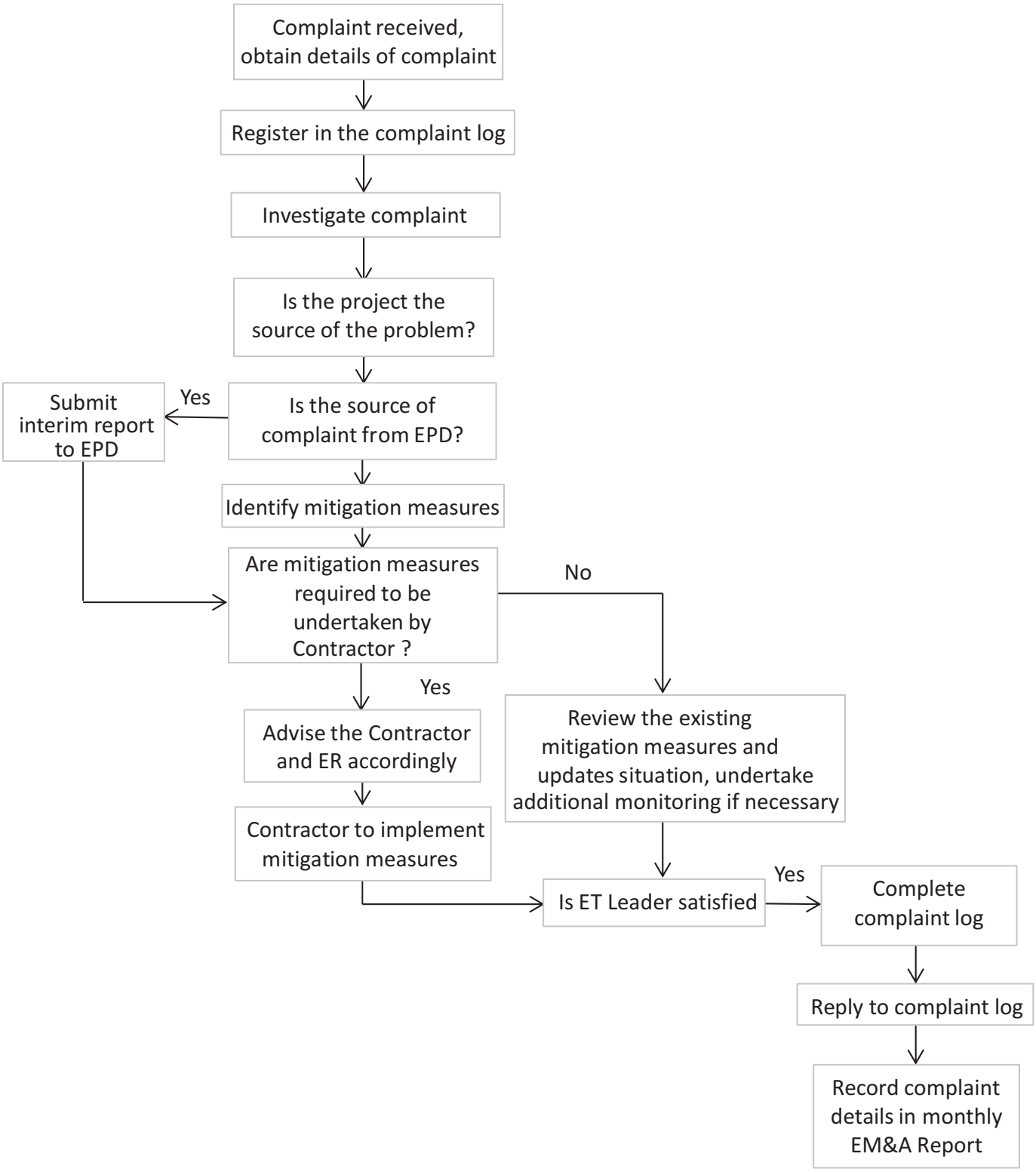


Figure 2.2 Environmental Complaint Handling Procedure

FILE: 0215660n2.cdr
DATE: 06/12/2013

Environmental Resources Management

ERM

3 FUTURE KEY ISSUES

3.1 CONSTRUCTION ACTIVITIES FOR THE COMING MONTH

As informed by the Contractor, the major works for the Project in July 2018 will be:

Land-based Works

- Bar bending and timber formwork at Toll Control Building and Ventilation Plant Room;
- ER's and the Contractor's site offices erection at WA18; and
- Socket H-pilling at Administration Building.

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 and waste management issues.

4 CONCLUSIONS AND RECOMMENDATIONS

4.1 CONCLUSIONS

This First Monthly EM&A Report presents the findings of the EM&A activities undertaken during the period from 7 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) was carried out in this reporting month.

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

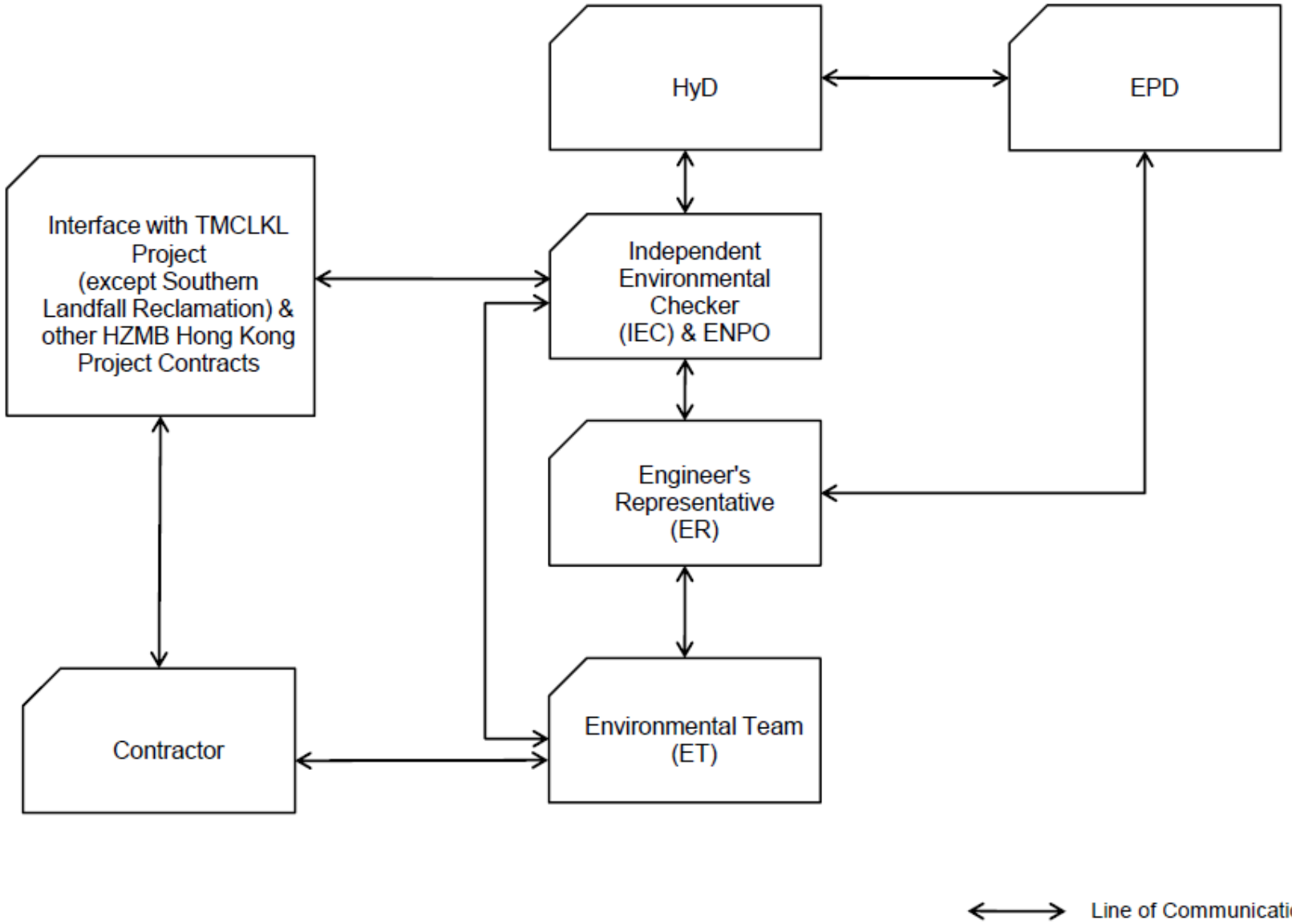
Environmental site inspection was carried out four (4) times in June 2018. Remedial actions recommended for the deficiencies identified during the site audits were properly implemented by the Contractor.

There was no environmental complaint, notification of summons or successful prosecution recorded in the reporting period.

The ET will keep track on the construction works to confirm compliance of environmental requirements and the proper implementation of all necessary mitigation measures.

Appendix A

Project Organization for Environmental Works



Appendix A1

DATE: 09/07/2018

Contract No. HY/2017/10 Northern Connection Tunnel Buildings, Electrical and Mechanical Works, Project Organization

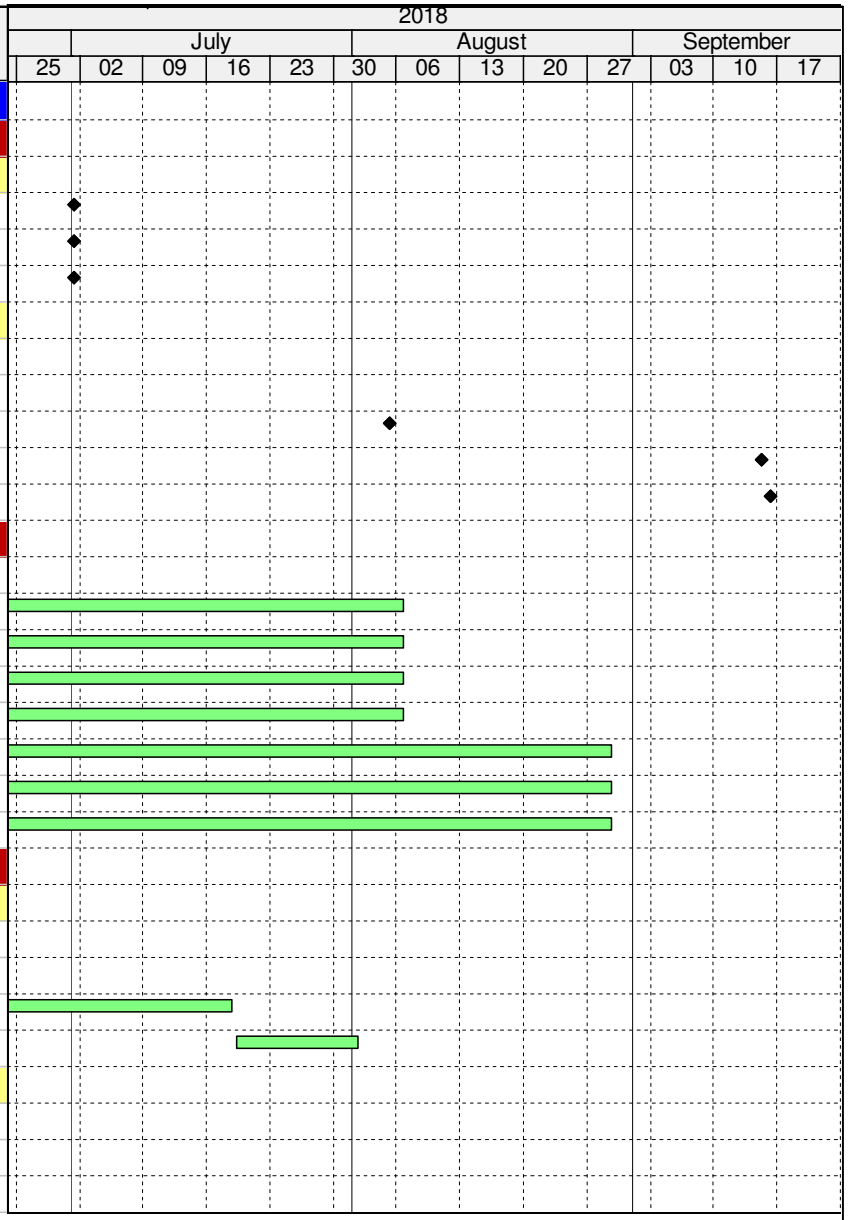
Environmental Resources Management

ERM

Appendix B

Construction Programme

ID	Activity	Days	Start	Finish
Three Monthly Programme 20/06/18 - 20/09/18				
Contract Dates				
Portion Access Dates				
P140	Access to Portion XI (Day 56)	0	01/07/18	
P150	Access to Portion XX (Day 56)	0	01/07/18	
P160	Access to Portion IX (Day 56)	0	01/07/18	
Portion Possession Dates				
P120	Possession to Portion VIII (Day 25)	0	31/05/18 A	
P130	Possession to Portion XIV (Day 46)	0	21/06/18	
P145	Possession to Portion WA6 (Day 91)	0	05/08/18	
P185	Possession to Portion Ve (Day 132)	0	15/09/18	
P195	Possession to Portion XIII (16 Sep 2018)	0	16/09/18*	
General Procurement				
P1010	Submit and Approval of Major Material	26	07/05/18 A	06/06/18 A
P1020	Conctere Material	50	07/06/18 A	06/08/18
P1030	Rebar Material	50	07/06/18 A	06/08/18
P1040	Steelfixer	50	07/06/18 A	06/08/18
P1050	Formwork Falsework Erector	50	07/06/18 A	06/08/18
P1060	ABWF Material	70	07/06/18 A	29/08/18
P1070	ABWF Erector	70	07/06/18 A	29/08/18
P1080	Cladding	70	07/06/18 A	29/08/18
Method Statements				
Plant Room				
MS1010	Prepare & Submit MS for Plant Room (Civil)	24	07/05/18 A	04/06/18 A
MS1020	ICE & ER Approval of MS for Plant Room (Civil)	12	05/06/18 A	19/06/18 A
MS1150	Prepare & Submit MS for Plant Room (E&M)	24	20/06/18	18/07/18
MS1160	ICE & ER Approval of MS for Plant Room (E&M)	12	19/07/18	01/08/18
Toll Control Building				
MS1030	Prepare & Submit MS for Toll Control Building (Civil)	14	07/05/18 A	23/05/18 A
MS1040	ICE & ER Approval of MS for Toll Control Building (Civil)	12	24/05/18 A	06/06/18 A
MS1170	Prepare & Submit MS for Toll Control Building (E&M)	14	07/06/18 A	13/06/18 A



THREE MONTHLY ROLLING PROGRAMME

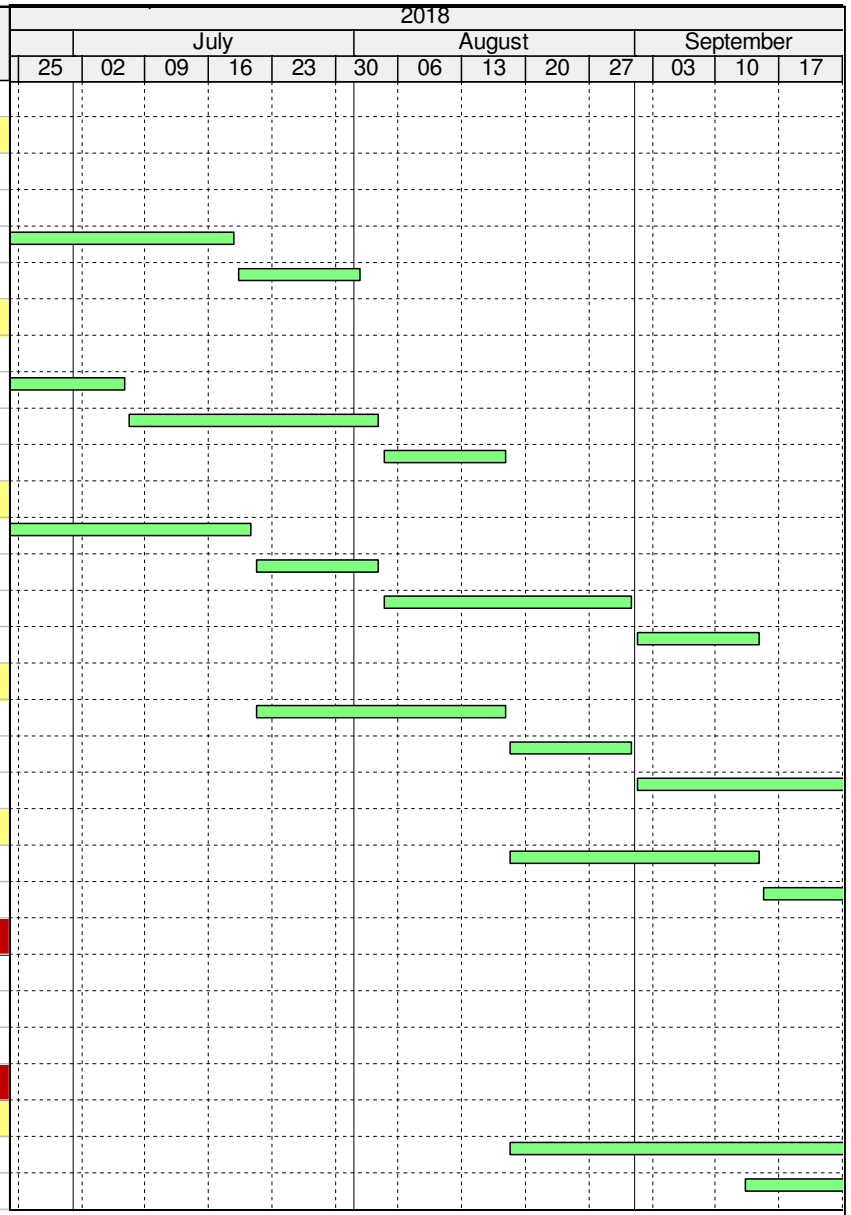
20/06/18 - 20/09/18

Gammon

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P1	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
MS1180	ICE & ER Approval of MS for Toll Control Building (E&M)	12	14/06/18 A	23/06/18
Administration Building				
MS1050	Prepare & Submit MS for Administration Building (Civil)	24	07/05/18 A	04/06/18 A
MS1060	ICE & ER Approval of MS for Administration Building (Civil)	12	05/06/18 A	19/06/18 A
MS1190	Prepare & Submit MS for Administration Building (E&M)	24	20/06/18	18/07/18
MS1200	ICE & ER Approval of MS for Administration Building (E&M)	12	19/07/18	01/08/18
Maintenance Depot				
MS1070	Prepare & Submit MS for Maintenance Depot (Civil)	24	24/05/18 A	21/06/18
MS1080	ICE & ER Approval of MS for Maintenance Depot (Civil)	12	22/06/18	06/07/18
MS1210	Prepare & Submit MS for Maintenance Depot (E&M)	24	07/07/18	03/08/18
MS1220	ICE & ER Approval of MS for Maintenance Depot (E&M)	12	04/08/18	17/08/18
Costom & Excise Department Building				
MS1090	Prepare & Submit MS for C&ED Building (Civil)	24	22/06/18	20/07/18
MS1100	ICE & ER Approval of MS for C&ED Building (Civil)	12	21/07/18	03/08/18
MS1230	Prepare & Submit MS for C&ED Building (E&M)	24	04/08/18	31/08/18
MS1240	ICE & ER Approval of MS for C&ED Building (E&M)	12	01/09/18	14/09/18
Fire Services Department Building				
MS1110	Prepare & Submit MS for Fire Services Building (Civil)	24	21/07/18	17/08/18
MS1120	ICE & ER Approval of MS for Fire Services Building (Civil)	12	18/08/18	31/08/18
MS1250	Prepare & Submit MS for Fire Services Building (E&M)	24	01/09/18	29/09/18
Satellite Control Building				
MS1130	Prepare & Submit MS for Satellite Control Building (Civil)	24	18/08/18	14/09/18
MS1140	ICE & ER Approval of MS for Satellite Control Building (Civil)	12	15/09/18	29/09/18
General Submission (First Submission)				
GS110	Prepare & Submit Subcontractor Management Plan	17	07/05/18 A	23/05/18 A
GS120	Prepare & Submit Environmental Management Plan	32	07/05/18 A	07/06/18 A
GS130	Prepare & Submit Safety Management Plan	22	07/05/18 A	28/05/18 A
E&M Design				
Section A - Tunnel Ventilation System				
A010	Design Proposal of Tunnel Ventilation System	60	18/08/18*	16/10/18
A040	TVS -Smoke Extraction Fan Static Calculation for Service Gallery	60	13/09/18*	11/11/18



THREE MONTHLY ROLLING PROGRAMME

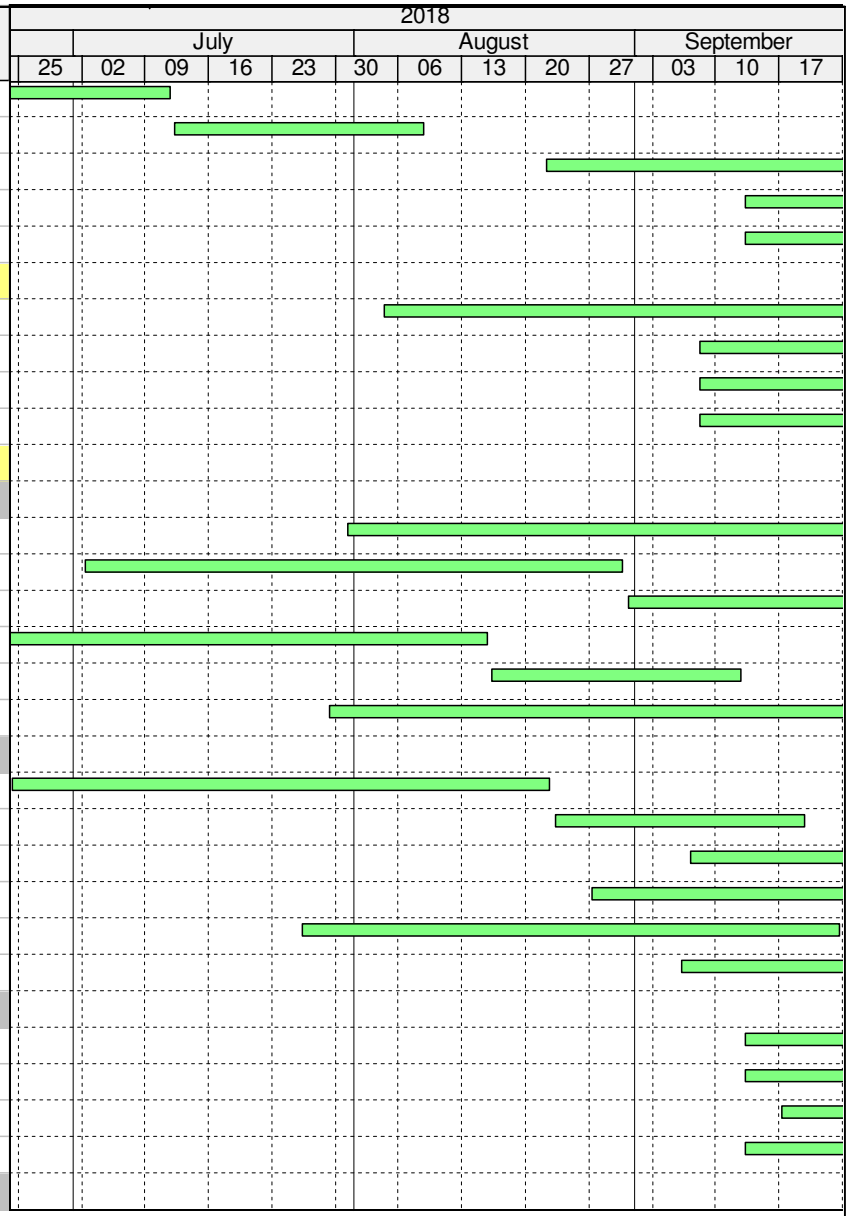
20/06/18 - 20/09/18

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

Gammon

P2	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
A050	Jet Fan Static Calculation for Vehicle Underpass	60	13/05/18 A	11/07/18
A055	Jet Fan Static Calculation for Vehicle Underpass - Approval	28	12/07/18	08/08/18
A060	Pressurization Fan Static Calculation for Vehicle Underpass	60	22/08/18*	20/10/18
A080	TVS -Design Proposal including the Smoke Extraction Strategy	60	13/09/18*	11/11/18
A090	TVS -Control Logic Review with FSD	60	13/09/18*	11/11/18
Section B - Tunnel Lighting and Road Lighting System				
B010	Design Proposal of Tunnel Lighting System (TLS)	60	04/08/18*	02/10/18
B020	Tunnel lighting control	60	08/09/18*	06/11/18
B030	TLS -Lux Calculation	60	08/09/18*	06/11/18
B040	TLS -Structure support design calculation for tunnel lighting	60	08/09/18*	06/11/18
Section C - Building Services of MVAC System				
TCB				
C012	TCB -AC Cooling Capacity Calculation	60	31/07/18*	28/09/18
C020	TCB -AHU/PAU Static Pressure Calculation	60	02/07/18*	30/08/18
C025	TCB -AHU/PAU Static Pressure Calculation - Approval	28	31/08/18	27/09/18
C040	TCB -Mechanical Ventilation Capacity Calculation	60	17/06/18 A	15/08/18
C045	TCB -Mechanical Ventilation Capacity Calculation - Approval	28	16/08/18	12/09/18
C050	TCB -Fan Static Pressure Calculation	60	29/07/18*	26/09/18
ADB				
C070	ADB -AC Cooling Capacity Calculation	60	24/06/18*	22/08/18
C075	ADB -AC Cooling Capacity Calculation - Approval	28	23/08/18	19/09/18
C080	ADB -AHU/PAU Static Pressure Calculation	60	07/09/18*	05/11/18
C090	ADB -Pump head calculation	60	27/08/18*	25/10/18
C100	ADB -Mechanical Ventilation Capacity Calculation	60	26/07/18*	23/09/18
C110	ADB -Fan Static Pressure Calculation	60	06/09/18*	04/11/18
NVB				
C130	NVB -AC Cooling Capacity Calculation	60	13/09/18*	11/11/18
C140	NVB -Mechanical Ventilation Capacity Calculation	60	13/09/18*	11/11/18
C160	NVB -Acoustic Performance Calculation	60	17/09/18*	15/11/18
C180	NVB -Staircase Pressurization System Calculation	60	13/09/18*	11/11/18
MD				



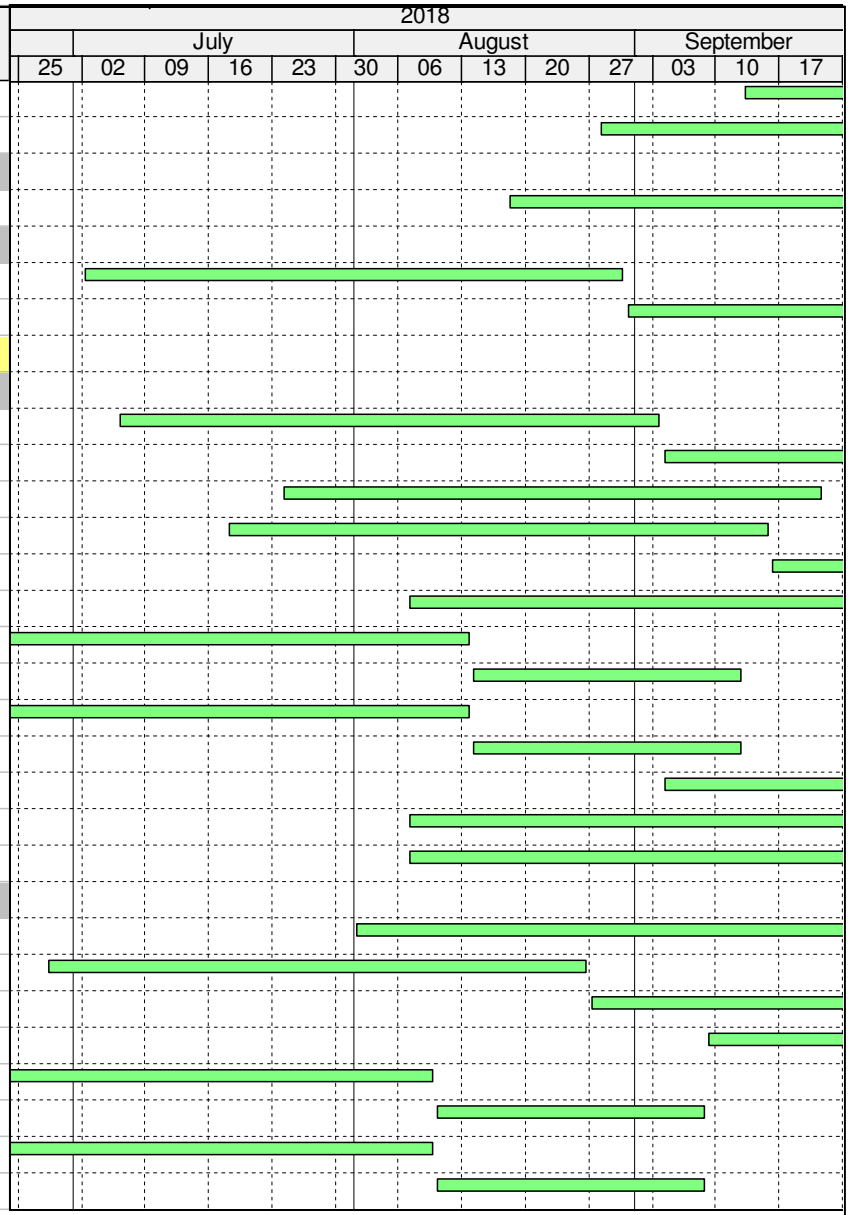
THREE MONTHLY ROLLING PROGRAMME

20/06/18 - 20/09/18

Gammon For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P3	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
C400	MD -AC Cooling Capacity Calculation	60	13/09/18*	11/11/18
C420	MD -Mechanical Ventilation Capacity Calculation	60	28/08/18*	26/10/18
Vehicular Underpass				
C450	Vehicle Underpass -Mechanical Ventilation Capacity Calculation	60	18/08/18*	16/10/18
Thermal Insulation				
C480	Ductwork & Pipework Thermal Insulation Thickness Calculation	60	02/07/18*	30/08/18
C485	Ductwork & Pipework Thermal Insulation Thickness Calculation - Approval	28	31/08/18	27/09/18
Section D - Building Services of Electrical System				
TCB				
D010	TCB -UPS and Battery Capacity Calculations	60	06/07/18*	03/09/18
D015	TCB -UPS and Battery Capacity Calculations - Approval	30	04/09/18	03/10/18
D020	TCB -Electrical Loading Demand Calculation	60	24/07/18*	21/09/18
D030	TCB -Lux Level Calculation	60	18/07/18*	15/09/18
D035	TCB -Lux Level Calculation - Approval	30	16/09/18	15/10/18
D040	TCB -Cable Sizing and Voltage Drop Verification	60	07/08/18*	05/10/18
D050	TCB -Generator Calculation	60	15/06/18 A	13/08/18
D055	TCB -Generator Calculation - Approval	30	14/08/18	12/09/18
D060	TCB -Fuel Tank Calculation	60	15/06/18 A	13/08/18
D065	TCB -Fuel Tank Calculation - Approval	30	14/08/18	12/09/18
D070	TCB -Cable Containment Calculation	60	04/09/18*	02/11/18
D080	TCB -Earthing Resistance Calculation	60	07/08/18*	05/10/18
D090	TCB -Power Factor Correction & Harmonic Current AnalysisCalculation	60	07/08/18*	05/10/18
ADB				
D100	ADB -UPS and Battery Capacity Calculations	60	01/08/18*	29/09/18
D110	ADB -Electrical Loading Demand Calculation	60	28/06/18*	26/08/18
D115	ADB -Electrical Loading Demand Calculation - Approval	30	27/08/18	25/09/18
D120	ADB -Lux Level Calculation	60	09/09/18*	07/11/18
D140	ADB -Generator Calculation	60	11/06/18 A	09/08/18
D145	ADB -Generator Calculation - Approval	30	10/08/18	08/09/18
D150	ADB -Fuel Tank Calculation	60	11/06/18 A	09/08/18
D155	ADB -Fuel Tank Calculation - Approval	30	10/08/18	08/09/18



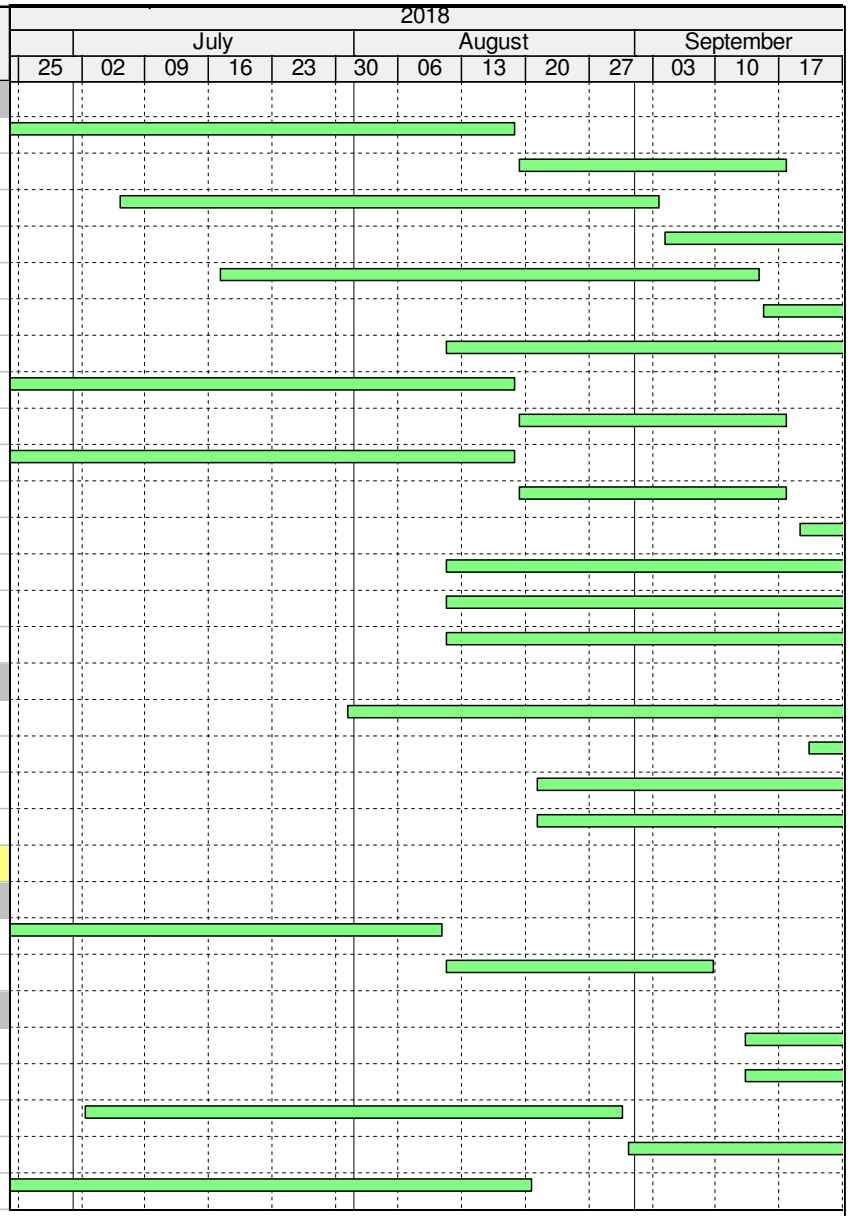
THREE MONTHLY ROLLING PROGRAMME

20/06/18 - 20/09/18

Gammon For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P4	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
NVB				
D190	NVB -UPS and Battery Capacity Calculations	60	20/06/18*	18/08/18
D195	NVB -UPS and Battery Capacity Calculations - Approval	30	19/08/18	17/09/18
D200	NVB -Electrical Loading Demand Calculation	60	06/07/18*	03/09/18
D205	NVB -Electrical Loading Demand Calculation - Approval	30	04/09/18	03/10/18
D210	NVB -Lux Level Calculation	60	17/07/18*	14/09/18
D215	NVB -Lux Level Calculation - Approval	30	15/09/18	14/10/18
D220	NVB -Cable Sizing and Voltage Drop Verification	60	11/08/18*	09/10/18
D230	NVB -Generator Calculation	60	20/06/18*	18/08/18
D235	NVB -Generator Calculation - Approval	30	19/08/18	17/09/18
D240	NVB -Fuel Tank Calculation	60	20/06/18*	18/08/18
D245	NVB -Fuel Tank Calculation - Approval	30	19/08/18	17/09/18
D250	NVB -Cable Containment Calculation	60	19/09/18*	17/11/18
D260	NVB -Earthing Resistance Calculation	60	11/08/18*	09/10/18
D270	NVB -Power Factor Correction & Harmonic Current AnalysisCalculation	60	11/08/18*	09/10/18
D280	NVB -HV Electrical Loading Calculation	60	11/08/18*	09/10/18
MD				
D680	MD -Electrical Loading Demand Calculation	60	31/07/18*	28/09/18
D690	MD -Lux Level Calculation	60	20/09/18*	18/11/18
D710	MD -Generator Calculation	60	21/08/18*	19/10/18
D720	MD -Fuel Tank Calculation	60	21/08/18*	19/10/18
Section E - Building Services of Fire Services System				
Tunnel & Service Gallery				
E050	Foam system design calculation for Services Gallery	60	12/06/18 A	10/08/18
E055	Foam system design calculation for Services Gallery - Approval	30	11/08/18	09/09/18
TCB				
E060	TCB -FS Pump Head Calculation	60	13/09/18*	11/11/18
E070	TCB -Sprinkler Pump Head Calculation	60	13/09/18*	11/11/18
E080	TCB -Battery Capacity Calculation	60	02/07/18*	30/08/18
E085	TCB -Battery Capacity Calculation - Approval	30	31/08/18	29/09/18
E090	TCB -FM200 System Design Calculation	60	22/06/18*	20/08/18



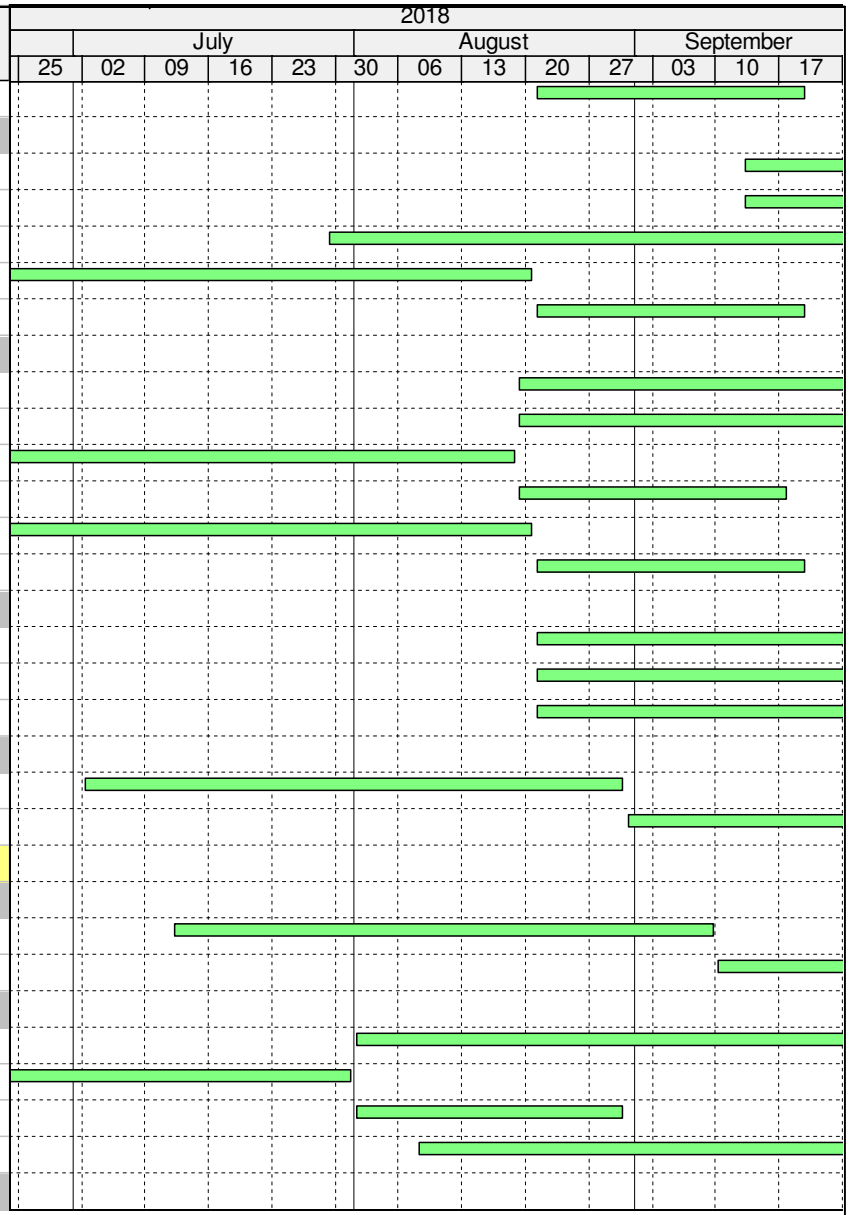
THREE MONTHLY ROLLING PROGRAMME

20/06/18 - 20/09/18

Gammon For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P5	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
E095	TCB -FM200 System Design Calculation - Approval	30	21/08/18	19/09/18
ADB				
E100	ADB -FS Pump Head Calculation	60	13/09/18*	11/11/18
E110	ADB -Sprinkler Pump Head Calculation	60	13/09/18*	11/11/18
E120	ADB -Battery Capacity Calculation	60	29/07/18*	26/09/18
E130	ADB -FM200 System Design Calculation	60	22/06/18*	20/08/18
E135	ADB -FM200 System Design Calculation - Approval	30	21/08/18	19/09/18
NVB				
E140	NVB -FS Pump Head Calculation	60	19/08/18*	17/10/18
E150	NVB -Sprinkler Pump Head Calculation	60	19/08/18*	17/10/18
E160	NVB -Battery Capacity Calculation	60	20/06/18*	18/08/18
E165	NVB -Battery Capacity Calculation - Approval	30	19/08/18	17/09/18
E170	NVB -FM200 System Design Calculation	60	22/06/18*	20/08/18
E175	NVB -FM200 System Design Calculation - Approval	30	21/08/18	19/09/18
MD				
E330	MD -FS Pump Head Calculation	60	21/08/18*	19/10/18
E340	MD -Sprinkler Pump Head Calculation	60	21/08/18*	19/10/18
E350	MD -Battery Capacity Calculation	60	21/08/18*	19/10/18
Vehicular Underpass				
E370	Vehicular Underpass -Foam system design calculation	60	02/07/18*	30/08/18
E375	Vehicular Underpass -Foam system design calculation - Approval	30	31/08/18	29/09/18
Section F - Building Services of Plumbing & Drainage System				
Tunnel				
F010	Oil Interceptor Calculation for tunnel	60	12/07/18*	09/09/18
F015	Oil Interceptor Calculation for tunnel - Approval	30	10/09/18	09/10/18
TCB				
F050	TCB - Rainwater Analysis and Pipe Work Calculation	60	01/08/18*	29/09/18
F060	TCB - Hydraulic Analysis of Waste Water Systems	60	02/06/18 A	31/07/18
F065	TCB - Hydraulic Analysis of Waste Water Systems - Approval	30	01/08/18	30/08/18
F070	TCB - Hot water system capacity calculation	60	08/08/18*	06/10/18
ADB				



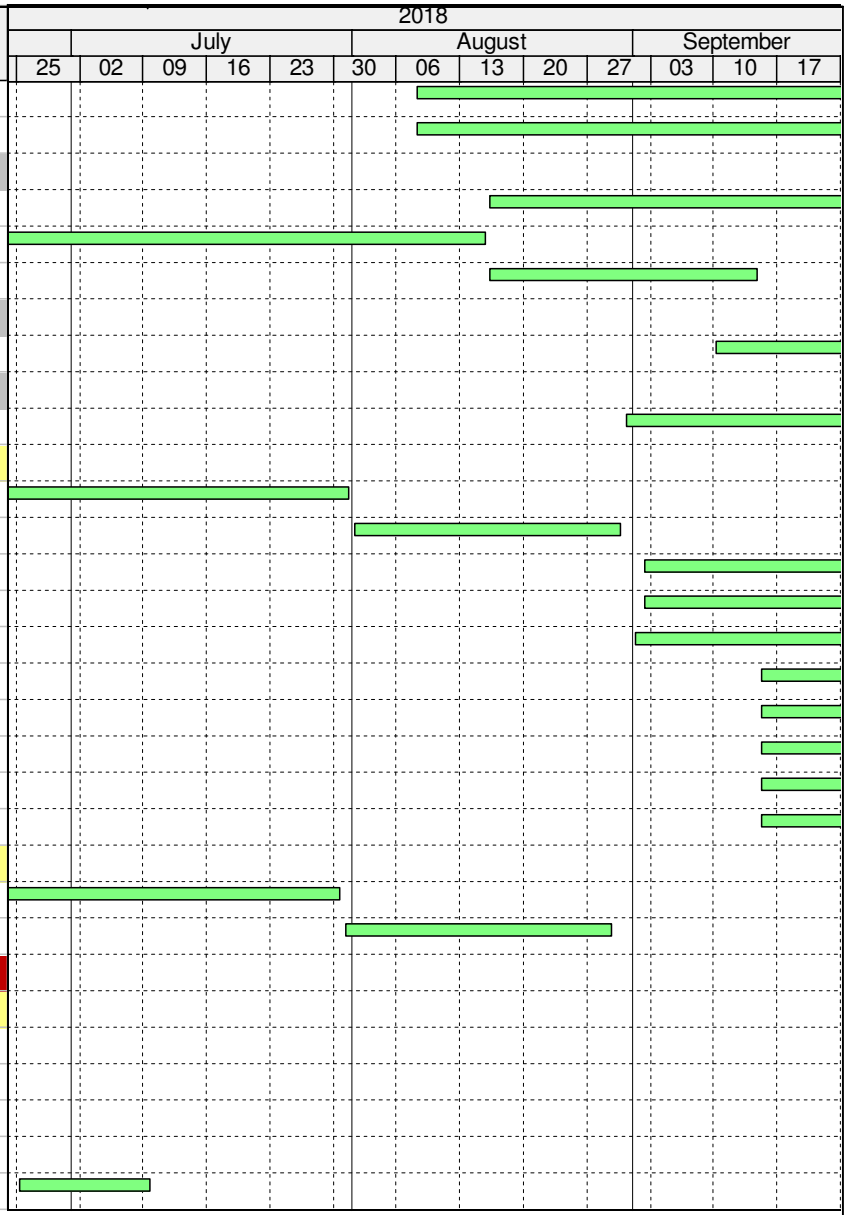
THREE MONTHLY ROLLING PROGRAMME

20/06/18 - 20/09/18

Gammon For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P6	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
F110	ADB - Hydraulic Analysis of Waste Water Systems	60	08/08/18*	06/10/18
F120	ADB - Hot water system capacity calculation	60	08/08/18*	06/10/18
NVB				
F160	NVB - Rainwater Analysis and Pipe Work Calculation	60	16/08/18*	14/10/18
F170	NVB - Hydraulic Analysis of Waste Water Systems	60	17/06/18 A	15/08/18
F175	NVB - Hydraulic Analysis of Waste Water Systems - Approval	30	16/08/18	14/09/18
MD				
F350	MD - Hydraulic Analysis of Waste Water Systems	60	10/09/18*	08/11/18
Vehicular Underpass				
F400	Vehicular underpass - Hydraulic Analysis of Waste Water Systems	60	31/08/18*	29/10/18
Section G - ELV System				
G010	System Design for Toll Control system	60	02/06/18 A	31/07/18
G015	System Design for Toll Control system - Approval	30	01/08/18*	30/08/18
G020	System Design for CMCS	60	02/09/18*	31/10/18
G030	System Design for Access Control System	60	02/09/18*	31/10/18
G050	System Design for IT System	60	01/09/18*	30/10/18
G060	System Design for PABX System	60	15/09/18*	13/11/18
G070	System Design for PA System	60	15/09/18*	13/11/18
G080	System Design for BRI System	60	15/09/18*	13/11/18
G090	System Design for Audio Recording System	60	15/09/18*	13/11/18
G100	System Design for Communication Network System System	60	15/09/18*	13/11/18
Section H - Building Services of Lift system				
H010	System Design for Lift System	60	01/06/18 A	30/07/18
H015	System Design for Lift System - Approval	30	31/07/18	29/08/18
Key Date 1 - Toll Control Building (TCB) & TCSS Provision				
Toll Control Building (TCB)				
TCB120	Site Clearance & Trial Pits	12	07/05/18 A	19/05/18 A
TCB130	Excavation (GL3-5)	12	21/05/18 A	06/06/18 A
TCB135	Excavation (Remaining)	12	07/06/18 A	23/06/18
TCB140	Basement Raft (GL3-5)	12	07/06/18 A	23/06/18
TCB145	Basement Raft (Remaining)	12	25/06/18	09/07/18



THREE MONTHLY ROLLING PROGRAMME

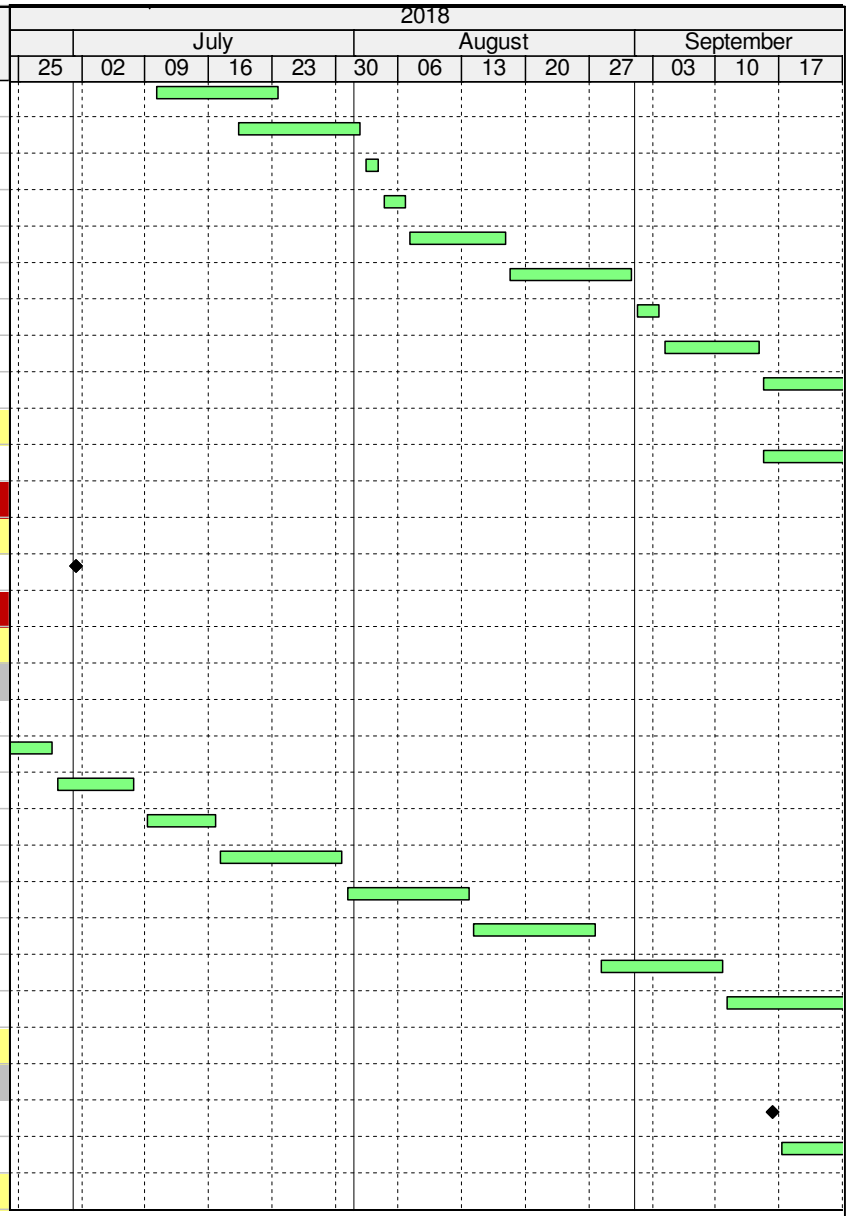
20/06/18 - 20/09/18

Gammon

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P7	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
TCB150	Ground Floor Slab - Formwork	12	10/07/18	23/07/18
TCB152	Ground Floor Slab - Rebar	12	19/07/18	01/08/18
TCB154	Ground Floor Slab - Concrete	2	02/08/18	03/08/18
TCB160	Level 1 Slab - Remove G/F Slab Formwork	2	04/08/18	06/08/18
TCB161	Level 1 Columns & Scaffolding	10	07/08/18	17/08/18
TCB162	Level 1 Slab	12	18/08/18	31/08/18
TCB171	Level 2 Slab - Remove 1/F Slab Formwork	2	01/09/18	03/09/18
TCB172	Level 2 Columns & Scaffolding	10	04/09/18	14/09/18
TCB173	Level 2 Slab	12	15/09/18	29/09/18
TCSS Provision				
TCB200	Blockwork Walls and Plaster (G/F)	12	15/09/18	29/09/18
Key Date 4 - E&M Works in Vehicular Underpass Area & TCSS Provision				
E&M Works				
VU110	Access Portion XI	0		01/07/18
Key Date 2 - Administration Building, Maintenance Depot, Kiosk N2, TCSS Provision				
Administration Building (ADB)				
Piling Works				
ADB110	Possess Portion XIV	0		20/06/18 A
ADB120	Predrilling (No 1-6)	7	21/06/18	28/06/18
ADB121	Predrilling (No 7-12)	7	29/06/18	07/07/18
ADB122	Predrilling (No 13-18)	7	09/07/18	16/07/18
ADB140	Socket H-Piling (No. 1-5) - 1Rig	12	17/07/18	30/07/18
ADB141	Socket H-Piling (No. 6-10) - 1Rig	12	31/07/18	13/08/18
ADB142	Socket H-Piling (No. 11-15) - 1Rig	12	14/08/18	27/08/18
ADB143	Socket H-Piling (No. 16-20) - 1Rig	12	28/08/18	10/09/18
ADB144	Socket H-Piling (No. 21-25) - 1Rig	12	11/09/18	24/09/18
Maintenance Depot				
Piling Works				
MD110	Possess Portion XIII	0		16/09/18
MD120	Predrilling (1-10)	10	17/09/18	28/09/18
Kiosk N2				



THREE MONTHLY ROLLING PROGRAMME

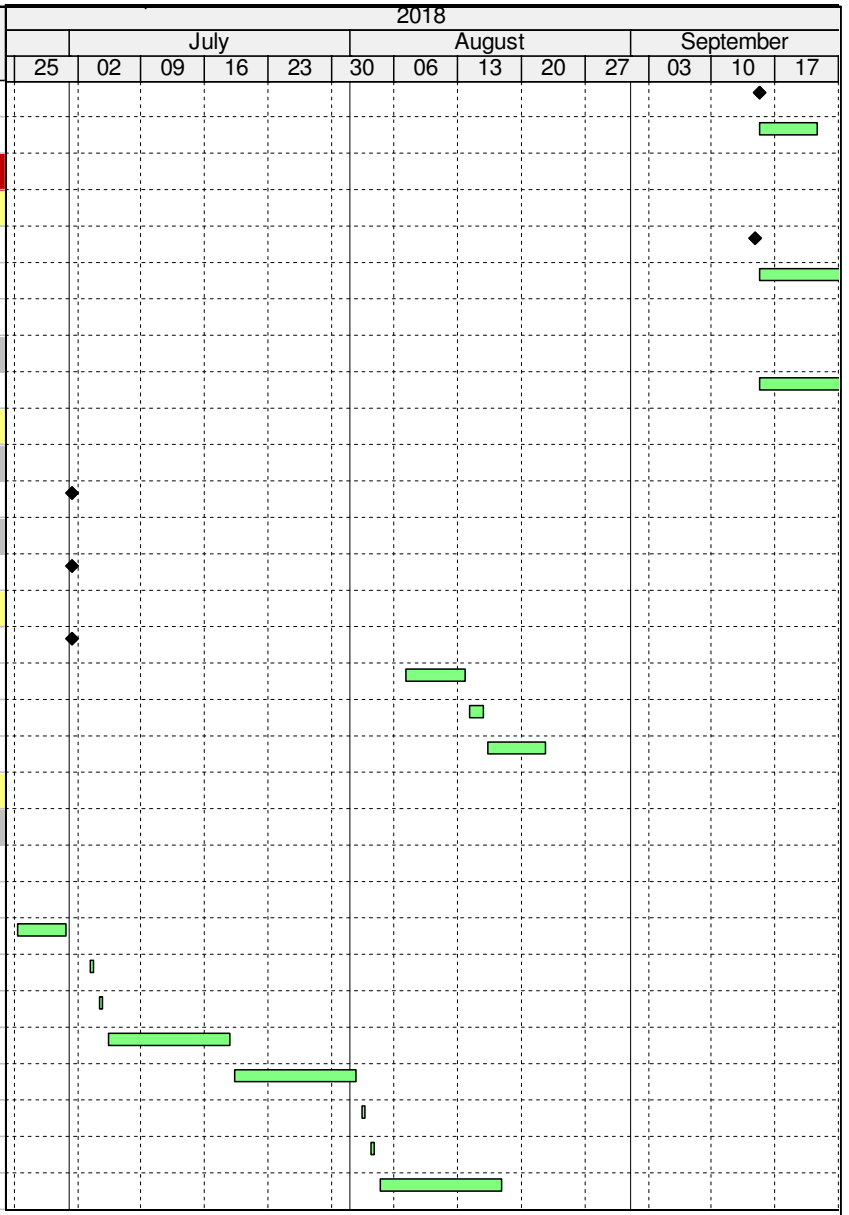
20/06/18 - 20/09/18

Gammon

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P8	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
N2-110	Possess Portion Ve	0		15/09/18
N2-120	Site clearance & trial pits	6	15/09/18	21/09/18
Key Date 5 - E&M Works for TCB, Toll Area, Kiosk N1, Underpass, Plant Rm, and Approach Roads				
E&M Works for TCB				
ETCB110	First Floor Completed at TCB with Scaffolding Removed	0		14/09/18
ETCB119	Remaining Blockwork Walls and Plaster (G/F)	12	15/09/18	29/09/18
ETCB120	Blockwork Walls and Plaster (1/F)	12	02/10/18	15/10/18
Power On and Statutory Inspections (except FSD)				
ETCB180	Liaison with CLP	12	15/09/18	29/09/18
Toll Area				
South Bound				
ETA110	Access Portion IX	0		01/07/18
North Bound				
ETA180	Access Portion XI	0		01/07/18
Kiosk N1				
EN110	Access Portion IX	0		01/07/18
EN130	Site Clearance and Trial Pits	6	07/08/18	13/08/18
EN131	Trim Formation	2	14/08/18	15/08/18
EN132	Cast Concrete Base	6	16/08/18	22/08/18
Plant Room				
Building Structure				
PR110	Possess Portion XII	0		07/05/18 A
PR120	Footing - Formwork	11	13/06/18 A	23/06/18
PR121	Footing - Rebar	6	25/06/18	30/06/18
PR122	Footing - Concrete	1	03/07/18	03/07/18
PR130	Remove Formwork	1	04/07/18	04/07/18
PR131	Ground Floor Structure - Formwork	12	05/07/18	18/07/18
PR132	Ground Floor Structure - Rebar	12	19/07/18	01/08/18
PR133	Ground Floor Structure - Concrete	1	02/08/18	02/08/18
PR141	Remove Formwork	1	03/08/18	03/08/18
PR142	Roof - Formwork	12	04/08/18	17/08/18



THREE MONTHLY ROLLING PROGRAMME

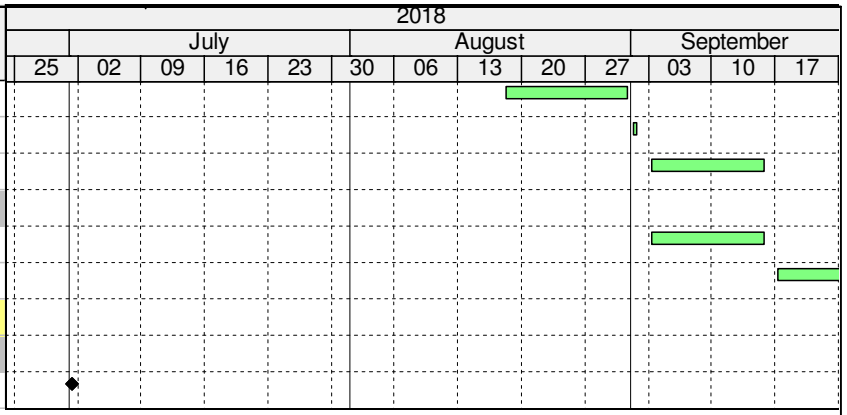
20/06/18 - 20/09/18

Gammon

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

P9	Date	Revision	Checked	Approved
	20/06/18			

ID	Activity	Days	Start	Finish
PR143	Roof - Rebar	12	18/08/18	31/08/18
PR144	Roof - Concrete	1	01/09/18	01/09/18
PR150	Dwarf Wall on Rooof Level	12	03/09/18	15/09/18
E&M Works				
EPR110	Place Mass Concrete Fill & Plinth on G/F	12	03/09/18	15/09/18
EPR120	Blockwork Wall	12	17/09/18	02/10/18
Approach Roads				
Under Portions IX, XI, XX				
AR110	Access Portions IX, XI, and XX	0		01/07/18



THREE MONTHLY ROLLING PROGRAMME

20/06/18 - 20/09/18

For Contract No. HY/2017/10 Northern Connection Tunnel Buildings, E&M

Gammon

P10	Date	Revision	Checked	Approved
	20/06/18			

Appendix C

Environmental Mitigation and Enhancement Measure Implementation Schedules

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
Air Quality									
4.8.1	3.8	Watering of the construction sites in Lantau for 8 times/day and in Tuen Mun for 12 times/day to reduce dust emissions by 87.5% and 91.7% respectively and shall be undertaken.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall, to the satisfaction of the Engineer, install effective dust suppression measures and take such other measures as may be necessary to ensure that at the Site boundary and any nearby sensitive receiver, dust levels are kept to acceptable levels.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	The Contractor shall not burn debris or other materials on the works areas.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	In hot, dry or windy weather, the watering programme shall maintain all exposed road surfaces and dust sources wet.	All unpaved haul roads / throughout construction period in hot, dry or windy weather	Contractor	TMEIA Avoid smoke impacts and disturbance		Y		✓
4.8.1	3.8	Where breaking of oversize rock/concrete is required, watering shall be implemented to control dust. Water spray shall be used during the handling of fill material at the site and at active cuts, excavation and fill sites where dust is likely to be created.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8. 1	3.8	Open dropping heights for excavated materials shall be controlled to a maximum height of 2m to minimise the fugitive dust arising from unloading.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		<>

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

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	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 (LAND WORKS)									
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.10	-	Temporary access roads should be surfaced with crushed stone or gravel.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	Rainwater pumped out from trenches or foundation excavations should be discharged into storm drains via silt removal facilities.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓

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

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status *
						D	C	O	
6.10	-	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
6.10	-	The Contractor shall prepare an oil / chemical cleanup plan and ensure that leakages or spillages are contained and cleaned up immediately.	All areas/ throughout construction period	Contractor	TM-EIAO		Y		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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		✓
6.10	-	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	✓
6.10	Section 11	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		✓
WASTE									
12.6		The Contractor shall identify a coordinator for the management of waste.	Contract mobilisation	Contractor	TMEIA		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

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		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 Provisions) Ordinance (Cap 28); Waste Disposal Ordinance (Cap 354); Dumping at Sea Ordinance (Cap 466); Water Pollution Control Ordinance.		Y		✓
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 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		✓

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

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	The Contractor shall be prohibited from disposing of C&D materials at any sensitive locations. The Contractor should propose the final disposal sites in the EMP and WMP for approval before implementation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Stockpiled material shall be covered by tarpaulin and /or watered as appropriate to prevent windblown dust/ surface run off.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Excavated material in trucks shall be covered by tarpaulins to reduce the potential for spillage and dust generation.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Wheel washing facilities shall be used by all trucks leaving the site to prevent transfer of mud onto public roads.	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	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		✓

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

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	Chemical waste producers should register with the EPD. Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes as follows: *f* suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; *f* Having a capacity of <450L unless the specifications have been approved by the EPD; and w Chinese according to the instructions prescribed in Schedule 2 of the Regulations. *f* Clearly labelled and used solely for the storage of chemical wastes; *f* Enclosed with at least 3 sides; *f* Impermeable floor and bund with capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in the area, whichever is greatest; *f* Adequate ventilation; *f* Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and *f* Incompatible materials are adequately separated.	All areas / throughout construction period	Contractor	TMEIA		Y		<>
12.6	8.1	Waste oils, chemicals or solvents shall not be disposed of to drain,	All areas / throughout construction period	Contractor	TMEIA		Y		✓
12.6	8.1	Adequate numbers of portable toilets should be provided for on-site workers. Portable toilets should be maintained in reasonable states, which will not deter the workers from utilising them.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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

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	Night soil should be regularly collected by licensed collectors.	All areas / throughout construction period	Contractor	TMEIA		Y		N/A
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	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		✓
LANDSCAPE AND VISUAL									
10.9	7.6	Existing trees on boundary of the Project Area shall be carefully protected during construction. Detailed Tree Protection Specification shall be provided in the Contract Specification. Under this specification, the Contractor shall be required to submit, for approval, a detailed working method statement for the protection of trees prior to undertaking any works adjacent to all retained trees, including trees in contractor's works areas (Tree protection measures will be detailed at Tree Removal Application Stage) (CM1)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A

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

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	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme (CM2)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Hillside and roadside screen planting to proposed roads, associated structures and slope works (CM3)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobstrusive material (in earth tone) (CM4)	All areas/detailed design/ during construction/post construction	Design Consultant/ Contractor	TMEIA	Y	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	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
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		N/A
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		N/A
10.9	7.6	Recycle/ Reuse all felled trees and vegetation, e.g. mulching (CM9)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A
10.9	7.6	Compensatory tree planting shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006 (CM10)	All areas/detailed design/ during construction	Design Consultant/ Contractor	TMEIA	Y	Y		N/A

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

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	Re-vegetation of affected woodland/shrubland with native species (OM1)	All areas/detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by AFCD/HyD/L CSD
10.9	7.6	Tall buffer screen tree / shrub / climber planting should be incorporated to soften hard engineering structures and facilities (OM2)	All areas/detailed design/ during construction/ during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by AFCD/HyD/L CSD
10.9	7.6	Streetscape elements (e.g. paving, signage, street furniture, lighting etc.) shall be sensitively designed in a manner that responds to the local context, and minimises potential negative landscape and visual impacts. Lighting units should be directional and minimise unnecessary light spill (OM3)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD/LCSD
10.9	7.6	Structure, ornamental tree / shrub / climber planting should be provided along roadside amenity strips, central dividers and newly formed slopes to enhance the townscape quality and further greenery enhancement (OM4)	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD/LCSD
10.9	7.6	Aesthetically pleasing design (visually unobtrusive and non-reflective) as regard to the form, material and finishes	All areas/detailed design/ during construction / during operation	Design Consultant/ Contractor	TMEIA	Y	Y	Y	n/a. To be implemented by HyD

*** Remarks:**

✓ Compliance of Mitigation Measures

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

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

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

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

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

Appendix D

Summary of Action and Limit Levels

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

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

Table D2 Action and Limit Levels for Landfill Gas Hazard Monitoring

Parameters	Action	Limit
Oxygen	<19%	<18%
Methane	>10% LEL (> 0.5% v/v)	> 20% LEL (>1% v/v)
Carbon dioxide	> 0.5%	> 1.5%

Appendix E

Event Action Plan

Appendix L1 Event/ Action Plan for Air Quality

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

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

and keep the IEC, the DEP and the ER informed of the results. 8. If the exceedance stops, cease additional monitoring.	

Abbreviations: ET – Environmental Team, IEC – Independent Environmental Checker, SO – Supervising Office, DEP – Director of Environmental Protection

Appendix L2 Event/ Action Plan for Landfill Gas Hazard Monitoring

Parameter	Measurement	Action
Oxygen	Action Level : < 19% Limit Level: < 18%	- Ventilate to restore oxygen to > 19% - Stop work - Evacuate personnel / prohibit entry - Increase ventilation to restore to > 19%
Methane	Action Level : > 10% LEL (> 0.5% v/v) Limit Level: > 20% LEL (>1% v/v)	- Prohibit hot work - Ventilate to restore methane to < 10% LE - Stop work - Evacuate personnel / prohibit entry - Increase ventilation to restore to < 10% - Ventilate to restore oxygen to < 0.5%
Carbon dioxide	Action Level : > 0.5% Limit Level: >1.5%	- Stop work - Evacuate personnel / prohibit entry - Increase ventilation to restore to < 0.5%

Appendix F

Monthly Summary of Waste Flow Table

Contract No. : HY/2017/10

Tuen Mun Chek Lap Kok Link – Northern Connection Tunnel Buildings, Electrical and Mechanical Works

Monthly Summary Waste Flow Table for 2018 (Year)

Month\Material	Actual Quantities of Inert C&D Materials Generation						Actual Quantities of C&D wastes Generation		Actual Quantities of Recyclables Generation			
	Total Quantity Generated	Hard Rock and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fills	Imported Fill	Chemical Waste	General Refuse	Metals	Felled trees	Paper/ cardboard packaging	Plastics
Unit	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000m^3)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)	('000Kg)
Jan	-	0.000	-	-	-	-	-	-	-	-	-	-
Feb	-	0.000	-	-	-	-	-	-	-	-	-	-
Mar	-	0.000	-	-	-	-	-	-	-	-	-	-
Apr	-	0.000	-	-	-	-	-	-	-	-	-	-
May	0.397	0.000	-	0.397	-	-	-	-	-	-	-	-
Jun	2.085	0.008	-	-	2.085	-	-	3.750	-	-	-	-
SUB-TOTAL	**2.482**	**0.008**	**0.000**	**0.397**	**2.085**	**0.000**	**-**	**3.750**	**-**	**0.000**	**-**	**-**
Jul	-	0.000	-	-	-	-	-	-	-	-	-	-
Aug	-	0.000	-	-	-	-	-	-	-	-	-	-
Sep	-	0.000	-	-	-	-	-	-	-	-	-	-
Oct	-	0.000	-	-	-	-	-	-	-	-	-	-
Nov	-	0.000	-	-	-	-	-	-	-	-	-	-
Dec	-	0.000	-	-	-	-	-	-	-	-	-	-
TOTAL	**2.482**	**0.008**	**-**	**0.397**	**2.085**	**-**	**-**	**3.750**	**-**	**-**	**-**	**-**

Notes :

1 - The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.

2 - Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.

3 - Broken concrete for recycling into aggregates.

4 - Assumed 5 kg per damaged water-filled barrier.

5 - Disposed as Public Fills includes Hard Rock and Large Broken Concrete.

Appendix G

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

Appendix G1 Cumulative Statistics on Exceedances

		Total No. recorded in this reporting month	**Total No. recorded since project commencement**
1-Hr TSP	Action	0	0
	Limit	0	0
24-Hr TSP	Action	0	0
	Limit	0	0

Appendix G2 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	0	0	0