

AUES JOB No.: TCS00715/14



**TUEN MUN - CHEK LAP KOK LINK
CONTRACT NO. HY/2013/12 –
NORTHERN CONNECTION TOLL PLAZA AND
ASSOCIATED WORKS**

**9th QUARTERLY ENVIRONMENTAL MONITORING &
AUDIT SUMMARY REPORT –
(November 2016 to January 2017)**

PREPARED FOR

CRBC AND KADEN JOINT VENTURE

Quality Index

Date	Reference No.	Prepared By	Certified By
27 February 2017	TCS00715/14/600/R0273v2	 Ben Tam (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

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Ref.: HYDZHMBEEM00_0_5110L.17

01 March 2017

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

By Fax (2218 7299) and By Post

Attention: Mr. Albert Yu

Dear Mr. Yu,

**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/2013/12 TM-CLKL Northern Connection Toll Plaza and
Associated Works
9th Quarterly EM&A Summary Report (November 2016 to January
2017)**

Reference is made to the 9th Quarterly Environmental Monitoring and Audit (EM&A) Summary Report (November 2016 to January 2017) (AUES reference: TCS00715/14/600/R0273v2 dated 27 February 2017) certified by the ET Leader and provided to us via e-mail on 27 February 2017.

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

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

Yours sincerely,



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

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)
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Internal: DY, YH, ENPO Site

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EXECUTIVE SUMMARY

ES.01. This is the 9th Quarterly EM&A Summary Report for the “Tuen Mun - Chek Lap Kok Link - Northern Connection Toll Plaza and Associated Works” under Environmental Permit No. EP-354/2009/D (hereinafter “the EP”), covering the period from **1 November 2016 to 31 January 2017** (hereinafter “Reporting Period”).

ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES.02. Environmental monitoring activities under the EM&A programme in the Reporting Period are summarized in the following table.

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Total Occasions
Air Quality	1-hour Total Suspended Particulates (TSP)	465
	24-hour TSP	155
Cultural heritage inspection	Grave G1	13
Landfill Gas Monitoring	Oxygen; Methane & Carbon Dioxide	73 days
Landscape & Visual	Landscape & Visual Monitoring	13
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	13

BREACHES OF ACTION/LIMIT LEVELS

ES.03. In the Reporting Period, no exceedance was recorded for the measured parameter under the Contract. The summary of breach of monitoring performance is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	0	0	0	0	0
	24-hour TSP	0	0	0	0	0
Landfill Gas Monitoring	Oxygen	0	0	0	0	0
	Methane	0	0	0	0	0
	Carbon Dioxide	0	0	0	0	0

ENVIRONMENTAL COMPLAINT

ES.04. In the Reporting Period, no environmental complaint was received.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES.05. No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGES

ES.06. No reporting changes were made in the Reporting Period.

FUTURE KEY ISSUES

ES.07. During dry season, air quality mitigation measures such as watering of site area for 12 times per day and covering of exposed slopes should be fully implemented to reduce construction dust impact as recommended in the EMIS.

ES.08. Moreover, muddy water or other water pollutants from site surface runoff into the public areas will be key environment issue. Special attention should be paid on the water quality mitigation measures to prevent surface runoff flow to public area.

ES.09. It was reminded that good housekeeping practice should be maintained. Mosquito control measures should be properly implemented to prevent mosquito breeding on site especially after rain.

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1. INTRODUCTION

1.1. PROJECT BACKGROUND

- 1.1.1. CRBC-Kaden Joint Venture (hereafter “CRBC-Kaden JV”) is commissioned by the Highways Department (HyD) as the Main Contractor of the Contract No. HY/2013/12 – Northern Connection Toll Plaza and Tunnel Section ((hereafter “the Contract”) and this Contract is part of the Tuen Mun – Chek Lap Kok Link (TM-CLK Link Project). The TM-CLK Link Project is a designated project under Environmental Permit number EP-354/2009/D issued on 13 March 2015. The layout Plan of the Project and the Contract are showed in [Appendix A](#) and [B](#) respectively.
- 1.1.2. The construction works of the Contract mainly include:-
- construction of an approximately 5.4 hectares toll plaza and an associated footbridge;
 - construction of associated carriageways including approximately 0.74 kilometre land viaducts, and an approximately 230 metres vehicular underpass to connect the toll plaza and the roundabout at Lung Mun Road/Lung Fu Road;
 - site formation for the construction of the toll plaza, including associated slope works and natural terrain hazard mitigation measures;
 - modification and realignment of the existing Lung Mun Road and Lung Fu Road; and
 - associated waterworks, drainage, sewerage and landscaping works, etc..
- 1.1.3. Action-United Environmental Services & Consulting has been commissioned as an Independent ET to implement the relevant EM&A program in accordance with the approved EM&A Manual, as well as the associated duties.
- 1.1.4. This is the 9th Quarterly EM&A Summary Report covering the period from **1 November 2016 to 31 January 2017**.

1.2 REPORT STRUCTURE

- 1.2.1 The Monthly Environmental Monitoring and Audit (EM&A) Report is structured into the following sections:-

- Section 1 Introduction*
- Section 2 Contract Organization and Construction Progress*
- Section 3 Summary of Impact Monitoring Requirements*
- Section 4 Air Quality Monitoring*
- Section 5 Ecology Monitoring*
- Section 6 Cultural Heritage*
- Section 7 Landscape and Visual*
- Section 8 Landfill gas hazard Monitoring*
- Section 9 Waste Management*
- Section 10 Site Inspections*
- Section 11 Environmental Complaints and Non-Compliance*
- Section 12 Implementation Status of Mitigation Measures*
- Section 13 Conclusions and Recommendations*

2 CONTRACT ORGANIZATION AND CONSTRUCTION PROGRESS

2.1 CONTRACT ORGANIZATION

2.1.1 The Contract organization and contact details of key personnel are shown in [Appendix C](#).

2.2 CONSTRUCTION PROGRESS

2.2.1 In the Reporting Period, the major construction activity conducted under the Contract is summarized in below. Moreover, the master construction program and 2-month rolling programme is enclosed in [Appendix D](#).

November 2016

- Instrumentation and Monitoring
- Site Formation – Earthwork on Slope D and E; surface drainage on Slope C, D & E and Portion H;
- Toll Plaza Decking and TD2;
- Toll Plaza Footbridge;
- Retaining Structure RW_A, RW_B and RW_F;
- Toll Collector Subway & Associated Works;
- Bridge G1, G2 and Bridge H1 by Form Traveller;
- Sewer Culvert at FC1 and FC2;
- Waterproofing and lining at Vehicular Underpass
- Road and Drainage Works at +11mPD, +19mPD and Portion H

December 2016

- Instrumentation and Monitoring
- Site Formation – Earthwork on Slope D and E; surface drainage on Slope C, D & E and Portion H;
- Toll Plaza Decking and TD2;
- Toll Plaza Footbridge;
- Retaining Structure RW_A, RW_B and RW_F;
- Toll Collector Subway & Associated Works;
- Bridge G1, G2 and Bridge H1 by Form Traveller;
- Sewer Culvert at FC1 and FC2;
- Waterproofing and lining at Vehicular Underpass
- Road and Drainage Works at +11mPD, +19mPD and Portion H

January 2017

- Instrumentation and Monitoring
- Site Formation – Earthwork on Slope D and E; surface drainage on Slope C, D & E and Portion H;
- Toll Plaza Decking and TD2;
- Toll Plaza Footbridge;
- Retaining Structure RW_A, RW_B and RW_F;
- Toll Collector Subway & Associated Works;
- Bridge G1, G2 and Bridge H1 by Form Traveller;
- Sewer Culvert at FC1 and FC2;
- Waterproofing and lining at Vehicular Underpass
- Road and Drainage Works at +11mPD, +19mPD and Portion H

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 In according to the EP, the required documents have submitted to EPD for retention which listed in below:

- Monitoring Plan on Construction Dust (submission refer to Contract HY/2012/08)
- Landscape and Visual Plan (not yet endorsed by EPD)
- Waste Management Plan (endorsed by EPD on 16 March 2015)
- Baseline Monitoring Report (not yet endorsed by EPD)

2.3.2 Summary of the relevant permits, licenses, and/or notifications on environmental protection for Contract No. HY/2013/12 are presented in *Table 2-1*.

Table 2-1 Status of Environmental Licenses and Permits of the Contracts

No.	Type of Permit/ License	Submission Date	Reference/ License No.	Date of Issue	Date of Expiry
1	Air pollution Control (Construction Dust) Regulation	06-08-2014	377719	06-08-2014	N/A
2	Chemical Waste Producer Registration - Waste Producers Number	06-08-2014	5117422C389301	03-09-2014	N/A
3	Variation of Effluent Discharge License	22-08-15	WT00023973-2016	14-03-16	30-09-2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	21-07-2014	7020460	01-08-2014	N/A
5	CNP for Multiple Task	21-04-2016	GW-RW0520-16	05-05-2016	04-11-2016
6	Extend CNP for Multiple Task	18-10-2016	GW-RW0619-16	05-11-2016	04-05-2017
7	CNP for MH5	25-04-2016	GW-RW0563-16	18-05-2016	17-11-2016
8	Extend CNP for MH5	1-11-2016	GW-RW0650-16	18-11-2016	17-05-2017
9	CNP for Tunnel works	25-04-2016	GW-RW0582-16	23-05-2016	22-11-2016
10	Extent CNP for Tunnel Works	3-11-2016	GW-RW0653-16	23-11-2016	22-05-2017
11	CNP for Flasework Erection	27-07-2016	GW-RW0472-16	22-08-2016	21-12-2016
12	Extend CNP for Flasework Erection	01-12-2016	GW-RW0724-16	28-12-2016	16-03-2017
13	CNP for Portion H Roundabout	21-11-2016	GW-RW0704-16	06-12-2016	21-02-2017

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS

3.1 GENERAL

3.1.1 The major construction activities under the Contract are land-based and no marine work will be involved. In accordance with the Project EM&A Manual requirements, the environmental aspects under the Contract shall be included air quality, ecological, cultural heritage, landscape and visual, landfill gas and site inspection during construction period. In addition, audit of the contractor's implementation of the construction noise and land-based water quality pollution control measures are also required for the Contract.

3.1.2 A summary of construction phase EM&A requirements are presented in the sub-sections below.

3.2 AIR QUALITY MONITORING

3.2.1 The construction phase air quality monitoring shall cover the following parameters:

- 1-hour TSP; and
- 24-hour TSP

3.3 MONITORING LOCATIONS

3.3.1 The air quality monitoring stations for impact monitoring are listed in *Table 3-1* and illustrated in *Appendix E*.

Table 3-1 Air Quality Monitoring Stations under the Contract

ID	Location	Air monitoring station Description
ASR1	Tuen Mun Fireboat Station	EM&A Manual
ASR5	Pillar Point Fire Station	EM&A Manual
AQMS1	Previous River Trade Golf	Enhanced TSP Level under EP condition 2.4
ASR6	Butterfly Beach Laundry	Enhanced TSP Level under EP condition 2.4
ASR10	Butterfly Beach Park	Enhanced TSP Level under EP condition 2.4

3.4 MONITORING FREQUENCY

3.4.1 As per Condition 2.4 of the EP of TM-CLKL, an enhanced monitoring plan on TSP level at Tuen Mun ("the Enhanced TSP Monitoring Plan") is required to be submitted to the DEP for approval at least 1 month before the commencement of construction of the Project. Details of the Enhanced TSP Monitoring Plan under Contract No. HY/2012/08 could be found from the project website. The air quality monitoring work under this Contract will follow the monitoring requirement of enhanced TSP monitoring under the project.

3.4.2 The air quality monitoring requirements for the Contract is summarized in *Table 3-2*.

Table 3-2 Enhanced TSP Monitoring Plan – Construction Phase

Condition	Monitoring Parameter	Monitoring Location	Frequency	Monitoring Requirement
General	1-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	3 times per day every six days	Throughout the Northern Connection, toll plaza and tunnel buildings construction works
	24-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	Daily every six days	
Special	1-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	3 times per day every three days	<u>Northern Connection</u> During excavation works for launching shaft, excavation work for Cut

Condition	Monitoring Parameter	Monitoring Location	Frequency	Monitoring Requirement
	24-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	Daily every three days	and Cover Tunnel and Cut and Cover Tunnel Construction <u>Toll Plaza</u> During excavation, slope works, construction of road and superstructures and wind erosion from open sites and stockpiling areas <u>Tunnel Buildings</u> During excavation, foundation works, construction of superstructures and wind erosion from open sites and stockpiling areas

3.5 MONITORING EQUIPMENT

3.5.1 The 24-hour and 1-hour TSP levels shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B*.

3.5.2 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory. A high volume sampler in compliance with the following specifications shall be used for carrying out the 1-hr and 24-hr TSP monitoring:

- (i) 0.6-1.7 m³/min (20-60 SCFM) adjustable flow range;
- (ii) equipped with a timing/control device with +/- 5 minutes accuracy for 24 hours operation;
- (iii) installed with elapsed-time meter with +/- 2 minutes accuracy for 24 hours operation;
- (iv) capable of providing a minimum exposed area of 406 cm² (63 in²);
- (v) flow control accuracy: +/- 2.5% deviation over 24-hr sampling period;
- (vi) equipped with a shelter to protect the filter and sampler;
- (vii) incorporated with an electronic mass flow rate controller or other equivalent devices;
- (viii) equipped with a flow recorder for continuous monitoring;
- (ix) provided with a peaked roof inlet;
- (x) equipped with a manometer;
- (xi) able to hold and seal the filter paper to the sampler housing in a horizontal position;
- (xii) easy to change the filter; and
- (xiii) capable of operating continuously for 24-hr period.

3.5.3 Calibration of dust monitoring equipment shall be conducted by the ET upon installation and in bi-monthly intervals during construction phase. The transfer standard shall be traceable to the internationally recognized primary standard and be calibrated annually. The calibration data shall be properly documented for future reference by concerned parties, such as the IEC. All the data shall be converted into standard temperature and pressure condition.

3.5.4 The filter paper of 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory.

3.5.5 If the ET proposes to use a direct reading dust meter to measure 1-hr TSP levels on an ad hoc basis, he shall submit sufficient information to the IEC to prove that the instrument is capable of achieving a comparable result as that the High Volume Sampler (HVS) and may be used for the

1-hr sampling. The instrument should also be calibrated regularly and the 1-hr sampling shall be checked periodically by the HVS to check the validity and accuracy of the results measured by the direct reading method.

- 3.5.6 According to the Project EM&A Manual, wind data monitoring equipment shall also be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:
- (i) the wind sensors should be installed on masts at an elevated level 10 m above ground so that they are clear of obstructions or turbulence caused by the buildings;
 - (ii) the wind data should be captured by a data logger to be down-loaded for processing at least once a month;
 - (iii) the wind data monitoring equipment should be re-calibrated at least once every six months; and
 - (iv) wind direction should be divided into 16 sectors of 22.5 degrees each.

3.6 DERIVATION OF ACTION/LIMIT (A/L) LEVELS

- 3.6.1 The baseline monitoring results formed the basis for determining the air quality criteria for the impact monitoring. The ET shall compare the impact monitoring results with air quality criteria set up for 24-hour TSP and 1-hour TSP. Based on results of the approved Baseline Monitoring Report of HyD Contract HY/2012/08, the Action and Limit Levels for impact dust monitoring are shown in *Tables 3-3*.

Table 3-3 Action and Limit Levels for Impact Air Quality Monitoring

Air Quality Monitoring Stations	24-hour TSP ($\mu\text{g}/\text{m}^3$)		1-hour TSP ($\mu\text{g}/\text{m}^3$)	
	Action Level	Limit Level	Action Level	Limit Level
ASR1	213	260	331	500
ASR5	238	260	340	500
AQMS1	213	260	335	500
ASR6	238	260	338	500
ASR10	214	260	337	500

- 3.6.2 Should non-compliance of the environmental quality criteria occurs, remedial actions will be triggered according to the Event and Action Plan which presented in *Appendix F*.

3.7 OTHER ENVIRONMENTAL ASPECTS

Noise

- 3.7.1 The TM-CLKL EIA study stated that no existing noise sensitive receiver (NSR) was identified within the Study Area at Tuen Mun. Therefore, no noise monitoring is required for the construction phase of the Contract.
- 3.7.2 Regular site inspections and audits will be carried out during the construction phase in order to confirm the construction works under the Contract comply with the regulatory noise requirements.

Water Quality

- 3.7.3 No marine works will be undertaken under the Contract. Therefore, no water quality monitoring is required for the construction phase of the Contract.

Ecology

- 3.7.4 No marine works will be undertaken under the Contract and generated marine ecological impact, no dolphin monitoring is required for the construction phase of the Contract.

- 3.7.5 During construction phase, the ET will perform Pitcher Plants inspection at least once every week to report the growth condition (only undertaken at Establish period) and protection measures.

Landscape and Visual

- 3.7.6 Measures to mitigate landscape and visual impact during construction should be checked and monitored by a Registered Landscape Architect to ensure compliance with the intended aims of the mitigation measures in accordance with the EM&A Manual.

Cultural Heritage

- 3.7.7 Grave G1 as a heritage resource is situated near the proposed toll plaza in Tuen Mun. Site inspections should be undertaken at least once per week throughout the construction period to ensure compliance with the intended aims of recommended mitigation measures.

Landfill Gas

- 3.7.8 During EIA study, landfill gas hazards are likely to be generated from the Pillar Point Valley (PPV) Landfill. Landfill gas monitoring is recommended during construction of the Contract to ensure the works area is free of landfill gas before the worker entered the concerned area.

4 AIR QUALITY MONITORING

4.1 GENERAL

4.1.1 The air quality impact monitoring and enhanced Total Suspended Particulates (TSP) level monitoring at five proposed locations are currently carried out by the ET of Contract HY/2012/08. Sharing of impact air quality monitoring data between HY/2012/08 and HY/2013/12 is agreed by all relevant parties. The Contract is not required to conduct its own dust monitoring exercise until the Contract HY/2012/08 ends.

4.2 SUMMARY OF MONITORING RESULTS

4.2.1 In the Reporting Period, 1- hour and 24-hour TSP monitoring at the five proposed locations are continued to perform by the ET of Contract HY/2012/08. Therefore, no air quality monitoring was conducted by the ET of Contract HY/2013/12. Details information of air quality monitoring results could be referred to the Monthly EM&A Reports of the Contract HY /2012 /08 (*November 2016, December 2016 and January 2017*).

4.3 ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE

4.3.1 According to the air quality monitoring result provided by Contract HY/2012/08, no exceedances in 1-hour and 24-hour TSP were recorded in the Reporting Period. No Notification on Exceedances (NOEs) was issued by the ET of Contract HY/2012/08. The summary of air quality exceedance in the Reporting Period is shown in *Table 4-1*.

Table 4-1 Summary of Air Quality Monitoring Exceedance

Date of Exceedance	Monitoring Station	Air Quality Parameter	Result	Exceed
NA	NA	NA	--	--

4.4 AIR QUALITY EXCEEDANCE INVESTIGATION

4.4.1 No investigation for exceedance is required for the Reporting Period.

5 ECOLOGY MONITORING

5.1 GENERAL

5.1.1 According to the EM&A Manual requirements, regularly inspection for Pitcher Plants at least once every week to report its growth and protection measure situation shall be conducted during construction period.

5.2 PITCHER PLANTS INSPECTION

5.2.1 Total 181 pitcher plants were transplanted to final receptor site and the rest of the Pitcher Plant individuals (certified dead by the specialist) were not transplanted and were treated as general refuse. All the transplantation of pitcher plant from the nursery site to final receptor site was completed on 10th September 2015.

5.2.2 In the Reporting Period, inspections for implementation status of mitigation measures for the Pitcher Plants were carried out by the ET on 1st, 8th, 15th, 22nd, 29th November 2016, 6th, 13th, 20th, 28th December 2016, 3rd, 10th, 17th and 24th January 2017.

5.2.3 Establish period for the pitcher plants was completed at the end of September 2016, the joint site completion of establish period visit with AFCD was undertaken on 23 September 2016 and the final pitcher plants report was submitted to AFCD on early December 2016. Therefore after 23 September 2016, only the integrity of the protection fence was checked to fulfill the EIA requirement. During each inspection, the protection mitigation measures were checked at the final receptor area to make sure no site activities were undertaken inside the protection zone. Besides, no construction activities were observed to be carried out at the surrounding of the final receptor area. The condition of chain link fence is good and no repair or maintenance is required.

5.2.4 No matter the completion of establish period, the Contractor should properly maintain the fencing along the receptor area to avoid disturbance to the pitcher plants under the EIA requirement.

6 CULTURAL HERITAGE

6.1 GENERAL

6.1.1 According to the EM&A Manual requirements, regular inspection for heritage resource, Grave G1, shall be audited by the ET at least once every week to ensure recommended mitigation measures implemented during construction period. The aim of the survey is to prevent any possible damage to the grave and to ensure the proposed mitigation measures are implemented. The broad scope of the audit will involve supervision of the following:

- Non-contact effects of the engineering works, such as vibration from pneumatic drills which could cause damage, such as foundation or wall cracks and loosening of tiles or fixtures; and
- Contact between the historic structures and equipment and materials associated with the engineering works.

6.1.2 Specifically, the monitoring programme will entail the following tasks:

- The extent of the agreed works areas should be regularly checked during the construction phase to ensure the buffer is being maintained; and
- Ensure no stockpiling or equipment storage is affecting the structure.

6.1.3 In the event of non-compliance the responsibilities of the relevant parties is detailed in the Event/Action Plan in [Appendix F](#).

6.2 GRAVE INSPECTION

6.2.1 In the Reporting Period, site inspection for the Grave G1 was undertaken on **1st, 8th, 15th, 22nd, 29th November 2016, 6th, 13th, 20th, 28th December 2016, 3rd, 10th, 17th and 24th January 2017**. During these inspections, buffer zone was maintained between the working area and the Grave. The nearby areas were clean, and no construction materials or mechanical equipment were stored within or close to the buffer zone.

6.2.2 Accordingly, the Contractor has had fully implemented cultural heritage mitigation measures in accordance with the EM&A Manual requirements.

7 LANDSCAPE AND VISUAL

7.1 GENERAL

7.1.1 According to EM&A Manual requirements, monitoring of Contractor's operations during construction period to report on Contractor's compliance should be carried out on weekly basis. Measure to mitigate landscape and visual impact during construction should be checked and monitored by a Registered Landscape Architect to ensure compliance with the intended aims of the mitigation measures. Moreover, the progress of the engineering works shall be regularly reviewed on site to identify the earliest practical opportunities for the landscape works to be undertaken.

7.2 LANDSCAPE AND VISUAL INSPECTION

7.2.1 In the Reporting Period, site inspection for landscape and visual mitigation measures was undertaken by the Registered Landscape Architect on **4th, 11th, 18nd, 25th November 2016, 2nd, 9th, 16th, 23th, 30th December 2016, 6th, 13th, 20th and 27th January 2017.**

7.2.2 Most of the landscape works such as planting was not yet commenced. The detailed inspection checklists can be referred to the Monthly EM&A Reports (**November 2016, December 2016 and January 2017**) of the contract.

8 LANDFILL GAS HAZARD MONITORING

8.1 GENERAL

- 8.1.1 During EIA study, landfill gas hazards are likely to be generated from the Pillar Point Valley (PPV) Landfill. Hence, regular landfill gas monitoring is recommended during construction of the proposed toll plaza.
- 8.1.2 During construction, a Safety Officer should be appointed to carry out the monitoring works. The monitoring frequency and areas to be monitored should be set down prior to commencement of ground-works either by the Safety Officer or an approved and appropriated qualified person. The routine monitoring should be carried out in all excavations, manholes, chambers, relocation of monitoring wells and any other confined spaces that may have been created. All measurements in excavations should be made with the extended monitoring tube located not more than 10 mm from the exposed ground surface. Monitoring should be performed properly to make sure that the area is free of landfill gas before any man enters in the area.
- 8.1.3 For excavations deeper than 1m, measurements should be carried out:
- at the ground surface before excavation commences;
 - immediately before any worker enters the excavation;
 - at the beginning of each working day for the entire period the excavation remains open; and
 - periodically through the working day whilst workers are in the excavation.
- 8.1.4 For excavations between 300mm and 1m deep, measurements should be carried out:
- directly after the excavation has been completed; and
 - periodically whilst the excavation remains open
- 8.1.5 For excavations less than 300mm deep, monitoring may be omitted, at the discretion of the Safety Officer or other appropriately qualified person.
- 8.1.6 To ensure the accuracy of the monitoring data, zeroing of the gas analyser shall be undertaken at the start of each day's monitoring. As part of the QA/QC, calibration of the gas analyser shall be conducted at least once every two weeks according to the specification of the manufacturer's operation manual.
- 8.1.7 The landfill consultation zone was divided into 6 monitoring zones. The landfill gas monitoring zones are summarized in Table 8-1 and the layout plan for the monitoring zone is illustrated in [Appendix E](#).

Table 8-1 Landfill Gas Monitoring Zone

ID	Location	Excavation >300mm deep undertaken in this reporting period
TD1	TD1, Retaining Wall A and Subway	Yes
RW-B	Retaining Wall B	No
RW-F	Retaining Wall F	No
S&U	Slope and Underpass	No
BW	Bridge Works	No
LMR	Lung Mun Road	Yes

8.2 LANDFILL GAS MONITORING RESULT

- 8.2.1 In the Reporting Period, landfill gas monitoring was conducted at the zone TD1 and LMR which have excavation works was undertaking. A BIOGAS 5000 gas analyser was used for the landfill gas monitoring.

8.2.2 There were total **73** workings days monitoring were carried by the Safety Officer or an approved and qualified persons in this reporting period. **Table 8-2** is summarized landfill gas measurement results. Moreover, graphical plot are attached in *Appendix G*.

Table 8-2 Summary of Landfill Gas Measurement Results in Reporting Period

Landfill Gas Parameter	Action Level	Limit Level	Detectable at TD1		Detectable at LMR	
			Min	Max	Min	Max
Methane	>10% LEL (>0.5% v/v)	>20% LEL (>1% v/v)	0.1%	0.1%	0.1%	0.1%
Oxygen	<19%	<18%	21.0%	21.1%	21.0%	21.1%
Carbon Dioxide	>0.5%	>1.5%	0.1%	0.2%	0.1%	0.2%

8.2.3 The measurement results shown that slightly methane concentration was detected and all oxygen concentration was over 21.0% and Carbon Dioxide was between 0.1 and 0.2 %. No corrective action was required accordingly.

9 WASTE MANAGEMENT

9.1 GENERAL WASTE MANAGEMENT

9.1.1 Waste management was carried out by an on-site Environmental Officer or an Environmental Supervisor from time to time.

9.2 RECORDS OF WASTE QUANTITIES

9.2.1 All types of waste arising from the construction work are classified into the following:

- Construction & Demolition (C&D) Material;
- Chemical Waste;
- General Refuse; and
- Excavated Soil.

9.2.2 Whenever possible, materials were reused on-site as far as practicable. The quantities of waste for disposal in the Reporting Period are summarized in *Tables 9-1* and *9-2* and the Waste Flow Table is presented in *Appendix H*.

Table 9-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity			Disposal Location
	Nov 16	Dec 16	Jan 17	
Reused in this Project (Inert) (in '000 m ³)	4.890	7.858	4.543	-
Reused in other Projects (Inert) (in '000 m ³)	15.424	9.131	7.512	<ul style="list-style-type: none"> • Lam Tei Quarry • Eco Park K.wah Recycle Facilities • Lung Kwu Tan Tailor Recycled Aggregates • Laintang BCP • TM-CLKL C2
Disposal as Public Fill (Inert) (in '000 m ³)	1.207	0.762	1.062	Tuen Mum Area 38

Table 9-2 Summary of Quantities of C&D Wastes

Type of Waste	Quantity			Disposal Location
	Nov 16	Dec 16	Jan 17	
Recycled Metal (in '000kg)	0	0	0	-
Recycled Paper / Cardboard Packaging (in '000kg)	0	0	0	-
Recycled Plastic (in '000kg)	0	0	0	-
Chemical Wastes (in '000kg)	0.030	0	0	-
General Refuses (in '000m ³)	0.175	0.119	0.217	WENT

9.2.3 To control the site performance on waste management, the Contractor shall ensure that all solid and liquid waste management works are fully in compliance with the relevant license/permit requirements, such as the effluent discharge license and the chemical waste producer registration. The Contractor is also reminded to implement the recommended environmental mitigation measures according to the Environmental Monitoring and Audit Manual.

10 SITE INSPECTIONS

10.1 REQUIREMENTS

10.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

10.1.2 During the Reporting Period, **13** events of the joint site inspections were undertaken to evaluate the site environmental performance. The summaries of the findings during site inspection are presented in *Tables 10-1 and 10-2*.

Table 10-1 Site Observations for the Contract for the Reporting Period

Date	Findings / Deficiencies	Follow-Up Status
1 November 2016	• Several empty oil buckets were observed on the working area, the Contractor should clean them up in accordance with the WMP requirement.	• Empty oil buckets were disposed.
	• Free standing chemical bottle was observed on site without drip tray. The Contractor is required to remove it from site or provide drip tray.	• Free standing chemical container without drip tray was removed.
	• The Contractor is reminded to improve housekeeping and also recommended to provide garbage bins on site to maintain site cleanliness.	• Not required for reminder.
	• Regular waste disposal of C&D waste is reminded.	• Not required for reminder.
	• Dust mitigation measures is reminded to be enhanced as the dry season has come.	• Not required for reminder.
8 November 2016	• Oil drum without drip tray was observed. Drip tray should be provided for all chemical containers storage on site. (Workshop area near retaining wall B)	• Drip tray was provided for the oil drum.
	• During dry season, dust control mitigation measures frequency should be increased to reduce dust impact.	• Not required for reminder.
15 November 2016	• During dry season, dust mitigation measures frequency for haul road or dusty activities should be increased to reduce dust generation. (Slope area & haul road)	• Not required for reminder.
22 November 2016	• Heavy dust emitted from soil nail works was observed. Proper dust control measure should be provided to reduce dust impact. (Slope E)	• No dust emitted from soil nail works was observed and water spraying was provided for the drilling works when operation.
	• Cement grouting works without shelter was observed. Three sides plus top shelter should be provided. (Slope E)	• Shelter was provided for the cement grouting works.
29 November 2016	• Nil	• NA
6 December 2016	• Exposed slope near the stream should be covered to prevent contaminate surface run-off. (Stream B)	• Tarpaulin sheets was covered at the slope near the stream.
13 December 2016	• NRMM label are missing for the plants was observed. NRMM label should be	• Plants without NRMM label were moved from site.

Date	Findings / Deficiencies	Follow-Up Status
	displayed properly for NRMM using on site. (Lung Mun Road Roundabout road surfacing works)	
	<ul style="list-style-type: none"> Empty chemical bucket cumulated on site should be disposed frequency. (MH7) 	<ul style="list-style-type: none"> Not required for reminder.
20 December 2016	<ul style="list-style-type: none"> Tree protection zone broken was observed. Proper maintenance for the tree protection zone should be provided. (Slope 16) 	<ul style="list-style-type: none"> Broken tree protection zone was repaired.
28 December 2016	<ul style="list-style-type: none"> Stagnant water cumulated inside the drip tray should be removed to maintain the capacity of the drip tray. (Near Retaining Wall B) 	<ul style="list-style-type: none"> Stagnant water cumulated inside the drip tray was cleared.
3 January 2017	<ul style="list-style-type: none"> Chemical containers without drip tray storage on site was observed. Drip tray should be provided for all chemical storage on site. (MH 7) 	<ul style="list-style-type: none"> Drip tray was provided for storage chemical on site.
	<ul style="list-style-type: none"> During dry season, water spraying frequency should be increased to minimize dust generation. (Haul Road) 	<ul style="list-style-type: none"> Not required for reminder.
10 January 2017	<ul style="list-style-type: none"> Dusty haul road was observed. Proper dust mitigations measures should be provided to reduce dust generation during dry season. (Retaining Wall B) 	<ul style="list-style-type: none"> Water spraying and cleaning of dusty material was observed to reduce dust impact.
	<ul style="list-style-type: none"> Stockpile of empty chemical buckets cumulated on site was observed. The contractor was reminded to clean more frequency. (Retaining Wall B) 	<ul style="list-style-type: none"> Not required for reminder.
17 January 2017	<ul style="list-style-type: none"> Chemical containers without drip tray was observed. Drip tray should be provided for all chemical storage on site. (Toll Collector Subway) 	<ul style="list-style-type: none"> Chemical container without drip tray was removed.
	<ul style="list-style-type: none"> Water spraying should be provided for breaking and drilling activities to reduce dust generation. (Platform 19) 	<ul style="list-style-type: none"> Not required for reminder.
	<ul style="list-style-type: none"> Dark smoke emitted from the excavator was observed, proper maintenance should be provided. (Cascade D) 	<ul style="list-style-type: none"> Not required for reminder.
24 January 2017	<ul style="list-style-type: none"> Exposed surface near the stream should be covered to prevent contaminate surface runoff. (Stream B) 	<ul style="list-style-type: none"> Not required for reminder.

Table 10-2 Summary of Reminders/Observations of Site Inspection

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
November 2016	1 st , 8 th , 15 th , 22 nd and 29 th November 2016	10	Completed
December 2016	6 th , 13 th , 20 th and 28 th December 2016	5	Completed
January 2017	3 rd , 10 th , 17 th and 24 th January 2017	8	Completed

10.1.3 In the Reporting Period, no non-compliance was recorded, however, 23 observations/ reminders were recorded during the site inspections. Minor deficiencies found in the weekly site inspection were in general rectified within the specified deadlines. The environmental performance of the

Project was therefore considered satisfactory.

Inspection Checklist for Vulnerable to Contaminated Water Discharge

- 10.1.4 Following to the complaint about discharge of milky water to Butterfly Beach on 2 September 2015. The Contractor proposed to carry out daily inspection of wastewater treatment facilities, concerned discharge points, drainage inlets and outlets during typhoon or wet season.
- 10.1.5 In addition, specific inspections would also be conducted before and after adverse weather to ensure necessary remedial works would be carried out timely. Should incidental contaminated water discharge be found at the inlet of the associated drainage system, a specific inspection of the relevant drainage pipes would be conducted for traces of deposit, and follow up actions would be taken when necessary.
- 10.1.6 The daily inspection for vulnerable to contaminated water discharge was temporarily suspended from 30 November 2016 during the dry season and will be resumed at wet season or after the rainstorm warnings. As requested by the EPD, the associated inspection checklists of the reporting period were presented in the Monthly EM&A Report – **November 2016**.

11 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

11.1.1 In the Reporting Period, no environmental complaint, summons and prosecution under the EM&A Programme was lodged. Moreover, no exceedance of the environmental performance (Action / Limit Levels) was recorded for monitoring programme.-

11.1.2 During the complaint investigation work, the Contractor was co-operated with the ET in providing all the necessary information and assistance for completion of the investigation. Investigation report (IR) for the complaint has been conducted by the ET and agreed by the IEC. It was concluded that the complaint was not related to the works under the Contract.

11.1.3 The statistical summary table of environmental exceedance, complaint, summons and prosecution is presented in *Tables 11-1, 11-2, 11-3 and 11-4.*

Table 11-1 Statistical Summary of Environmental Exceedance

Reporting Period	Environmental Aspect / Parameter	Environmental Performance	Event Exceedance		
			Reporting Period	Previous Periods	Cumulative
1 February 2016 – 31 January 2017	Air Quality - 1-hr TSP	Action Level	0	4	4
		Limit Level	0	0	0
	Air Quality - 24-hr TSP	Action Level	0	0	0
		Limit Level	0	0	0

Table 11-2 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics		
	Frequency	Cumulative	Complaint Nature
23 October 2014 – 31 October 2016	1	7	Water (6), Air (1)
1 November 2016 – 31 January 2017	0	7	Water (6), Air (1)

Table 11-3 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics		
	Frequency	Cumulative	Complaint Nature
23 October 2014 – 31 October 2016	0	0	NA
1 November 2016 – 31 January 2017	0	0	NA

Table 11-4 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics		
	Frequency	Cumulative	Complaint Nature
23 October 2014 – 31 October 2016	0	0	NA
1 November 2016 – 31 January 2017	0	0	NA

12 IMPLEMENTATION STATUS OF MITIGATION MEASURES

12.1 GENERAL REQUIREMENTS

12.1.1 The environmental mitigation measures that recommended in the Environmental Mitigation and Enhancement Measures Implementation Schedule (EMIS) for in the Project EM&A Manual covered the issues of air quality, cultural heritage, ecology, landfill gas hazard, landscape & visual, noise, water and waste. The updated EMIS for the Contract is shown in [Appendix I](#).

12.1.2 The Contractor shall implement the required environmental mitigation measures according to the EM&A Manual as subject to the site condition. The environmental mitigation measures implemented by the Contract in this Reporting Period are summarized in [Table 12-1](#) and [Appendix I](#).

Table 12-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Air Quality	<ul style="list-style-type: none"> • Maintain damp / wet surface on access road • Keep slow speed in the sites • All vehicles must use wheel washing facility before off site • Sprayed water during rock breaking works • During transportation by truck, materials loaded lower than the side and tail boards, and covered before transport • Compacted all soil stockpiles • Part of the exposed slopes covered geotextile net
Cultural Heritage	<ul style="list-style-type: none"> • Set a buffer zone between the working area and the Grave • All construction materials and equipment store far from the Grave • Inspection the Grave to ensure provision mitigation measures effective
Ecology	<ul style="list-style-type: none"> • Wire fencing provided for temporary protect Pitcher Plants • Undertake weekly inspection of Pitcher Plants
Landfill Gas Hazard	<ul style="list-style-type: none"> • Landfill Gas measurement undertake during trench excavation
Water Quality	<ul style="list-style-type: none"> • Temporary drainage system provide for surface runoff prevent discharge to public area • Wastewater to be treated by sedimentation tank before discharge.
Noise	<ul style="list-style-type: none"> • Restrain operation time of plants from 07:00 to 19:00 on any working day except for Public Holiday and Sunday. • Keep good maintenance of plants • The noisy plants or works provide mobile noise barriers • Shut down the plants when not in used
Waste and Chemical Management	<ul style="list-style-type: none"> • On-site sorting prior to disposal • Follow requirements and procedures of the “Trip-ticket System” • Predict required quantity of concrete accurately • Collect the unused fresh concrete at designated locations in the sites for subsequent disposal
General	<ul style="list-style-type: none"> • The site was generally kept tidy and clean.

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 CONCLUSIONS

- 13.1.1 This is 9th Quarterly EM&A report presenting the monitoring results and inspection findings for the Reporting Period from **1 November to 31 January 2017**.
- 13.1.2 No air quality monitoring including 1-hour and 24-hour TSP exceedance was recorded in the Reporting Period.
- 13.1.3 In this Reporting Period, no noise complaint was received by RE, the Contractor, ENPO or HyD. No Action Level exceedances were triggered and no NOE or the associated corrective actions were therefore issued.
- 13.1.4 Site inspection for landscape and visual was conducted on weekly basis by the Landscape Architect to ensure the compliance of the intended aims of the mitigation measures. Most of the landscape works such as planting was not yet commenced.
- 13.1.5 Establish period for the pitcher plants was completed at the end of September 2016, the joint site completion of establish period visit with AFCD was undertaken on 23 September 2016 and the final pitcher plants report was submitted to AFCD on early December 2016. Therefore after 23 September 2016, only the integrity of the protection fence was checked to fulfil the EIA requirement. During each inspection, the protection mitigation measures were checking at the final receptor area to make sure no site activities was undertaken inside the protection zone. Besides, no construction activities were observed to be carried out at the surrounding of the final receptor area. The condition of chain link fence is good and no repair or maintenance is required.
- 13.1.6 Landfill gas monitoring was conducted at the TD1 and Lung Mun Road works area by the Safety Officer. The monitoring results shown no exceedances were triggered.
- 13.1.7 In the Reporting Period, no environmental complaint was received.
- 13.1.8 No notifications of summons, or successful prosecution were received by the Contractor during the Reporting Period.
- 13.1.9 During the Reporting Period, **13** events of the joint site inspections were undertaken to evaluate the site environmental performance. No non-compliance of environmental impacts were observed, indicating the implemented mitigation measures for air quality, construction noise and water quality were effective. Minor deficiencies found in the weekly site inspection were rectified within the specified deadlines. The environmental performance of the Project was considered satisfactory.
- 13.1.10 For cultural heritage, the buffer zone between the working area and the Grave was observed and no construction material or equipment was stored nearby.
- 13.1.11 No notifications of summons, or successful prosecution were received by the Contractor during the Reporting Period.

13.2 RECOMMENDATIONS

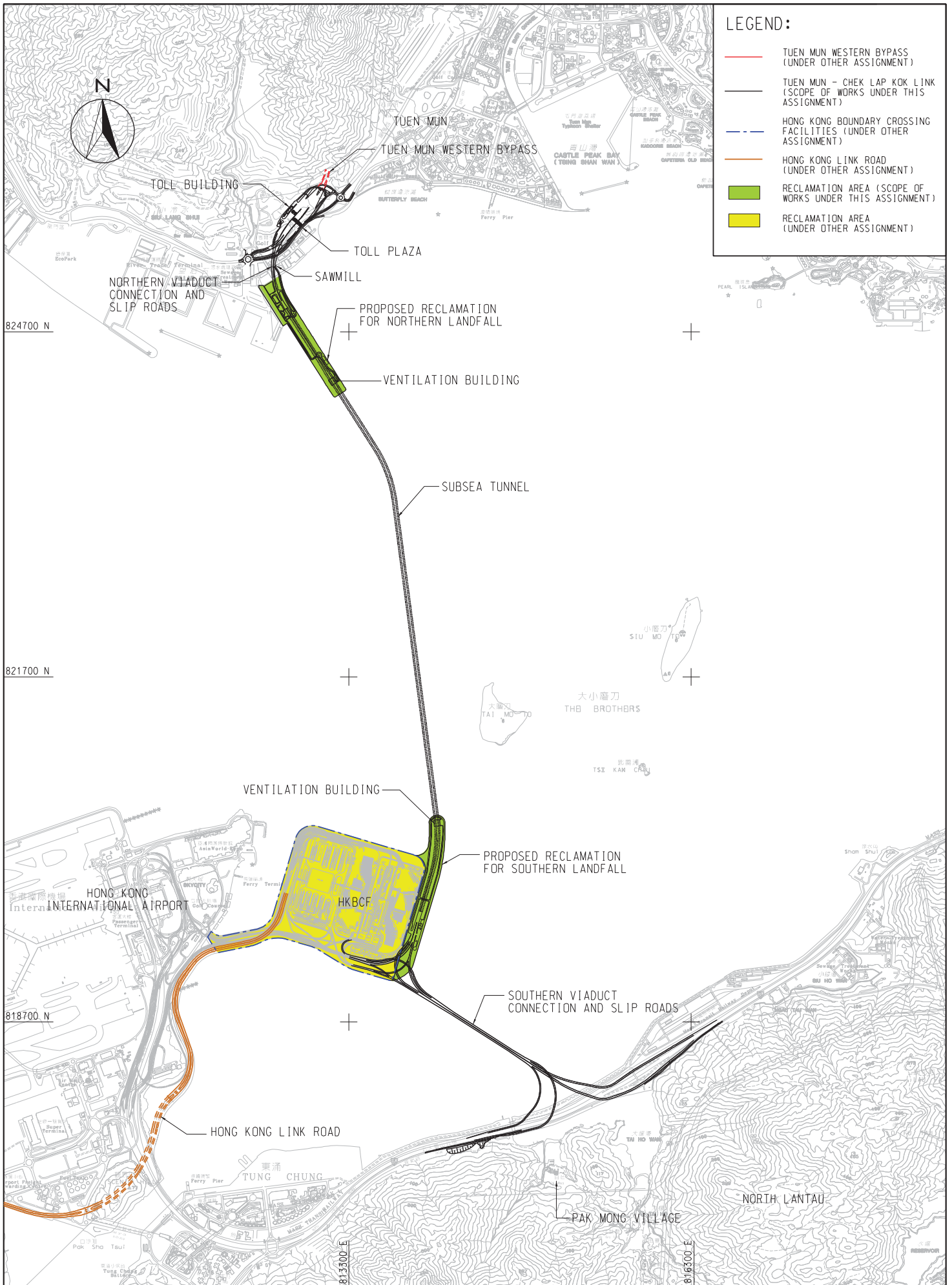
- 13.2.1 During dry season, air quality mitigation measures such as watering of site area for 12 times per day and covering of exposed slopes should be fully implemented to reduce construction dust impact as recommended in the EMIS.
- 13.2.2 Moreover, muddy water or other water pollutants from site surface runoff into the public areas will be key environment issue. Special attention should be paid on the water quality mitigation measures to prevent surface runoff flow to public area.
- 13.2.3 Good practice for daily housekeeping is reminded. Clean-up of waste skips and wastewater

treatment system should be increased to ensure these facilities are functioned effectively.

- 13.2.4 Stagnant water should be removed as soon as possible after rain to prevent mosquito breeding on site.

Appendix A

Layout plan of the Project



LEGEND:

- TUEN MUN WESTERN BYPASS (UNDER OTHER ASSIGNMENT)
- TUEN MUN - CHEK LAP KOK LINK (SCOPE OF WORKS UNDER THIS ASSIGNMENT)
- HONG KONG BOUNDARY CROSSING FACILITIES (UNDER OTHER ASSIGNMENT)
- HONG KONG LINK ROAD (UNDER OTHER ASSIGNMENT)
- RECLAMATION AREA (SCOPE OF WORKS UNDER THIS ASSIGNMENT)
- RECLAMATION AREA (UNDER OTHER ASSIGNMENT)

PROJECT NO. 60044963
 DRAWING NO. 3-1
 DATE: 11/02/09

AECOM

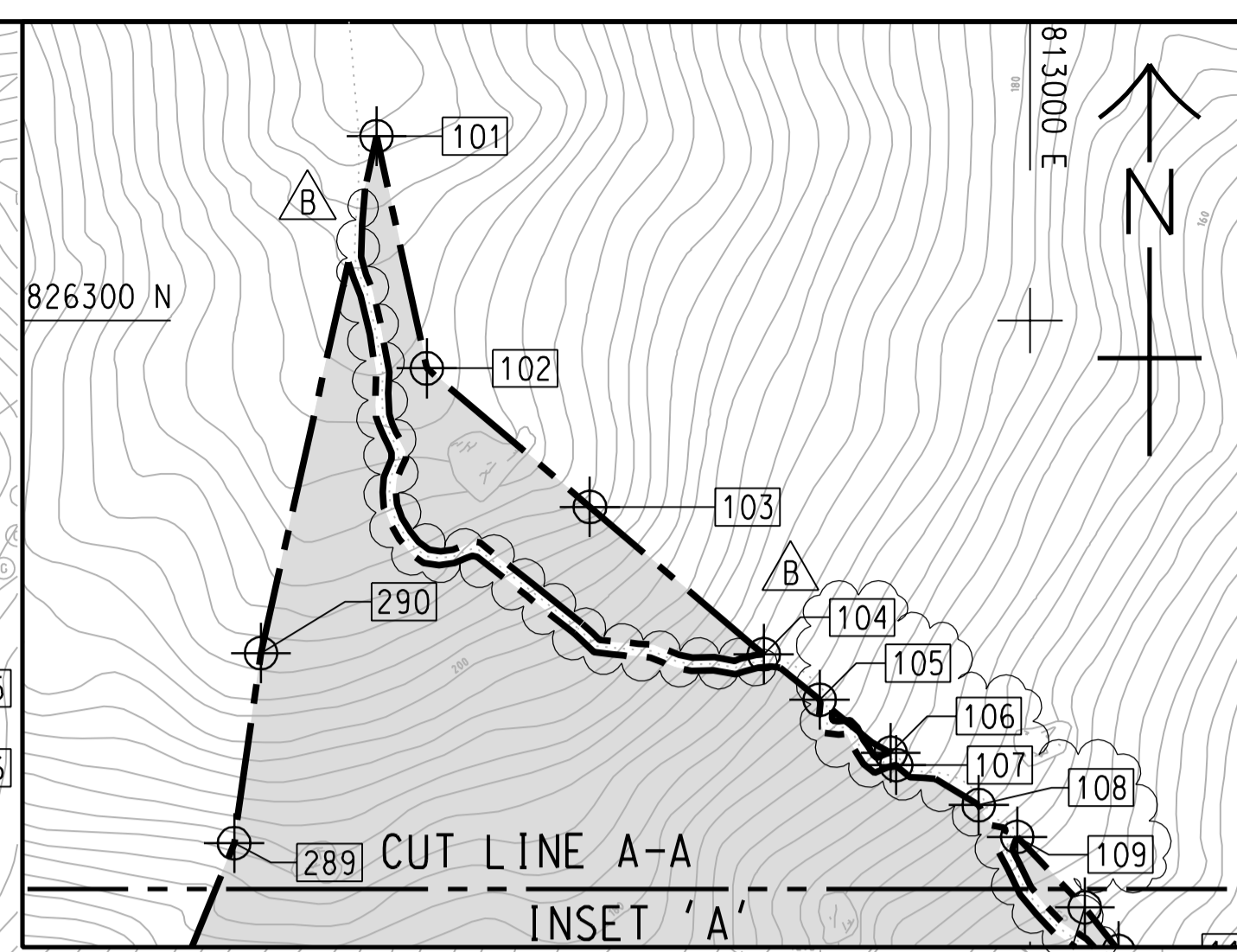
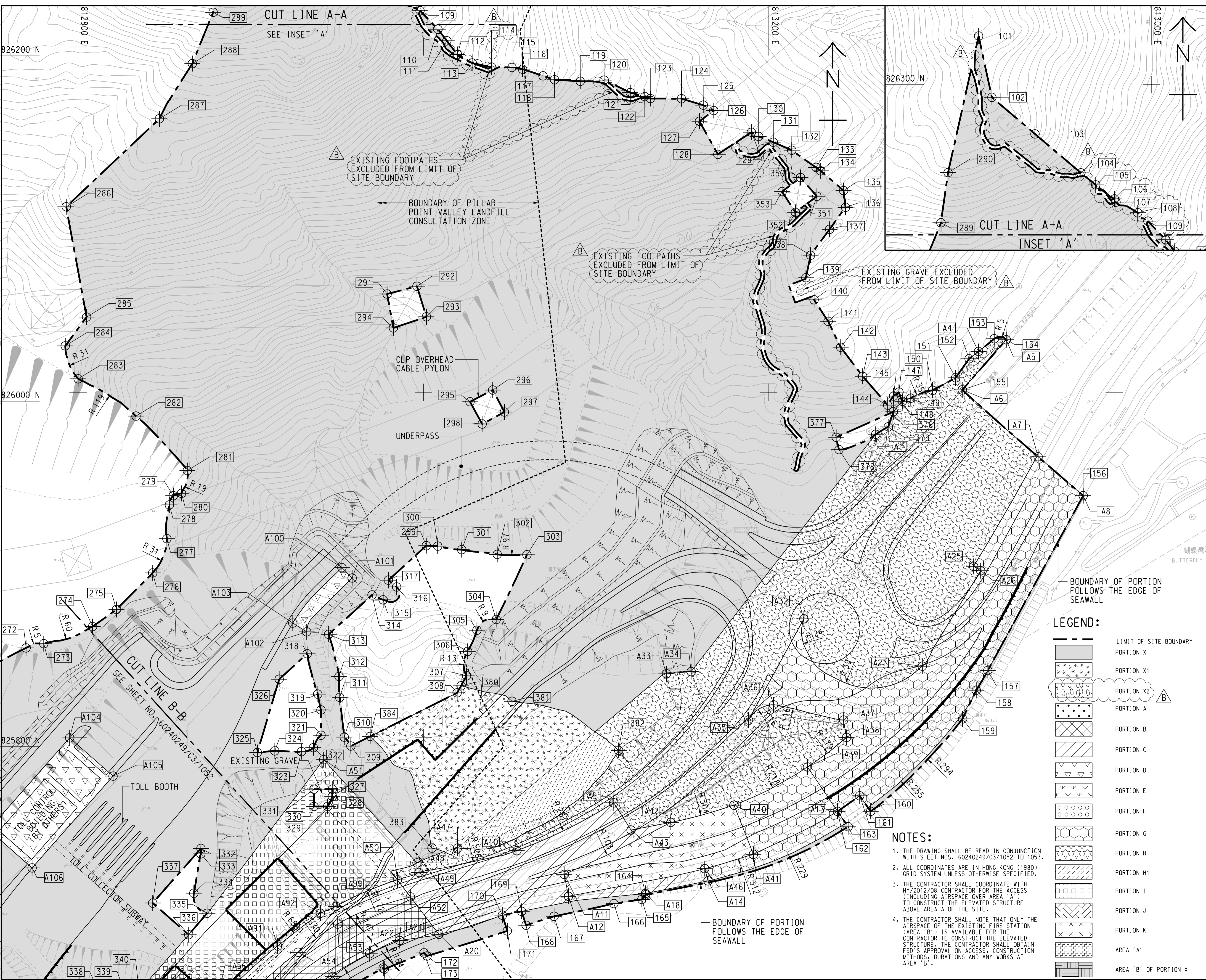
AGREEMENT NO. CE 52/2007(HY)
 TUEN MUN - CHEK LAP KOK LINK - INVESTIGATION
GENERAL LAYOUT OF TM-CLKL

SCALE	A3 1:30000	DATE	JUL. 2009
CHECK	--	DRAWN	WYP
JOB NO.	60044963	DRAWING NO.	Fig 2.1
		REV	A

Appendix B

Layout plan of the Contract

Project Management Initials: Designer: PI Checked: ALCF Approved: CWN ISO A1 594mm x 841mm
 Plot File by: LINDO 2014/05/19 PATH: P:\Projects\60240249\DRAWING\CONTRACT\C3\1005C3_05E1.dgn



LEGEND:

[Dashed line]	LIMIT OF SITE BOUNDARY
[Stippled pattern]	PORTION X
[Cross-hatch pattern]	PORTION X1
[Wavy line pattern]	PORTION X2
[Dotted pattern]	PORTION A
[Diagonal lines /]	PORTION B
[Diagonal lines \]	PORTION C
[Vertical lines]	PORTION D
[Horizontal lines]	PORTION E
[Square grid]	PORTION F
[Hexagonal grid]	PORTION G
[Star pattern]	PORTION H
[Diagonal lines /]	PORTION H1
[Square grid]	PORTION I
[Diagonal lines /]	PORTION J
[Cross-hatch pattern]	PORTION K
[Diagonal lines /]	AREA 'A'
[Diagonal lines \]	AREA 'B' OF PORTION X

- NOTES:**
1. THE DRAWING SHALL BE READ IN CONJUNCTION WITH SHEET NOS. 60240249/C3/1052 TO 1053.
 2. ALL COORDINATES ARE IN HONG KONG (1980) GRID SYSTEM UNLESS OTHERWISE SPECIFIED.
 3. THE CONTRACTOR SHALL COORDINATE WITH HY/2012/08 CONTRACTOR FOR THE ACCESS (INCLUDING AIRSPACE OVER AREA 'A1') TO CONSTRUCT THE ELEVATED STRUCTURE ABOVE AREA A OF THE SITE.
 4. THE CONTRACTOR SHALL NOTE THAT ONLY THE AIRSPACE OF THE EXISTING FIRE STATION (AREA 'B') IS AVAILABLE FOR THE CONTRACTOR TO CONSTRUCT THE ELEVATED STRUCTURE. THE CONTRACTOR SHALL OBTAIN FSD'S APPROVAL ON ACCESS, CONSTRUCTION METHODS, DURATIONS AND ANY WORKS AT AREA 'B'.

AECOM

PROJECT
 項目
TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS

CLIENT
 業主
 路政署
 HIGHWAYS DEPARTMENT
 港務處大樓香港工程管理局
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

CONSULTANT
 工程顧問公司
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SUB-CONSULTANTS
 分判工程顧問公司

ISSUE/REVISION
 修訂

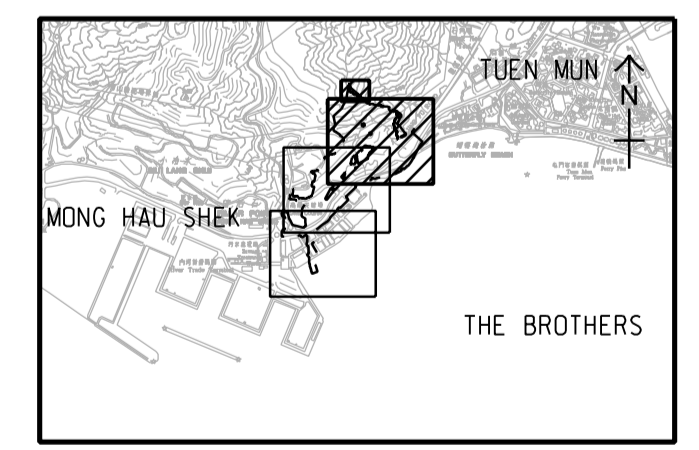
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A	FEB. 14	TENDER ADDENDUM NO. 1	CWN
-	JAN. 14	TENDER DRAWING	CWN

STATUS
 階段

SCALE
 比例
 A1 1:1000

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖
 1:50000



PROJECT NO.
 項目編號
 60240249

CONTRACT NO.
 合約編號
 HY/2013/12

SHEET TITLE
 圖紙名稱
PORTIONS OF SITE AND SITE BOUNDARY SETTING OUT PLAN

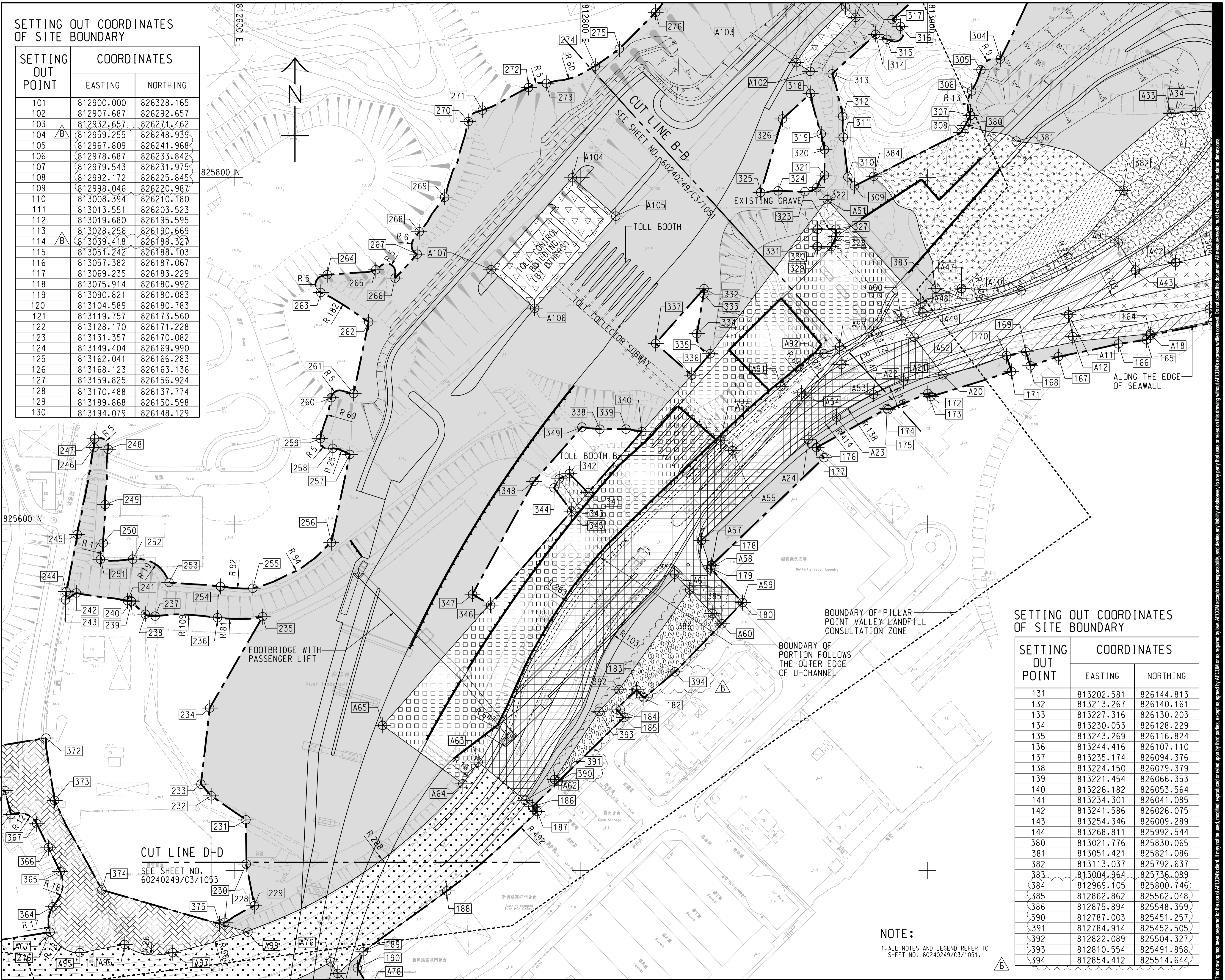
SHEET 1 OF 3

SHEET NUMBER
 圖紙編號
 60240249/C3/1051B

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SETTING OUT COORDINATES OF SITE BOUNDARY

SETTING OUT POINT	COORDINATES	
	EASTING	NORTHING
101	812900.000	826328.165
102	812907.687	826292.657
103	812932.657	826271.462
104	812959.255	826248.939
105	812967.809	826241.968
106	812978.687	826233.842
107	812979.543	826231.975
108	812992.172	826225.845
109	812998.046	826220.987
110	813008.394	826210.180
111	813013.551	826203.523
112	813019.680	826195.595
113	813028.256	826190.669
114	813039.418	826188.327
115	813051.242	826188.103
116	813057.382	826187.067
117	813069.235	826183.229
118	813075.914	826180.992
119	813090.821	826180.083
120	813104.589	826180.783
121	813119.757	826173.560
122	813128.170	826171.228
123	813131.357	826170.082
124	813149.404	826169.990
125	813162.041	826166.283
126	813168.123	826163.136
127	813159.825	826156.924
128	813170.488	826137.774
129	813189.868	826150.598
130	813194.079	826148.129



SETTING OUT COORDINATES OF SITE BOUNDARY

SETTING OUT POINT	COORDINATES	
	EASTING	NORTHING
131	813202.581	826144.813
132	813213.267	826140.161
133	813227.316	826130.203
134	813230.053	826128.229
135	813243.269	826116.824
136	813244.416	826107.110
137	813235.174	826094.376
138	813224.150	826079.379
139	813221.454	826066.353
140	813226.182	826053.564
141	813234.301	826041.085
142	813241.586	826026.075
143	813254.346	826009.289
144	813268.811	825992.544
380	813021.776	825830.065
381	813051.421	825821.086
382	813113.037	825792.637
383	813004.964	825736.089
384	812969.105	825800.746
385	812862.862	825562.048
386	812875.894	825548.359
390	812787.003	825451.257
391	812784.914	825452.505
392	812822.089	825504.327
393	812810.554	825491.858
394	812854.412	825514.644

NOTE:
 1. ALL NOTES AND LEGEND REFER TO SHEET NO. 60240249/C3/1051.



PROJECT
 TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS

CLIENT
 路政署
 HIGHWAYS DEPARTMENT
 港務大樓香港工程管理局
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

CONSULTANT
 土研顧問公司
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 分列工程顧問公司

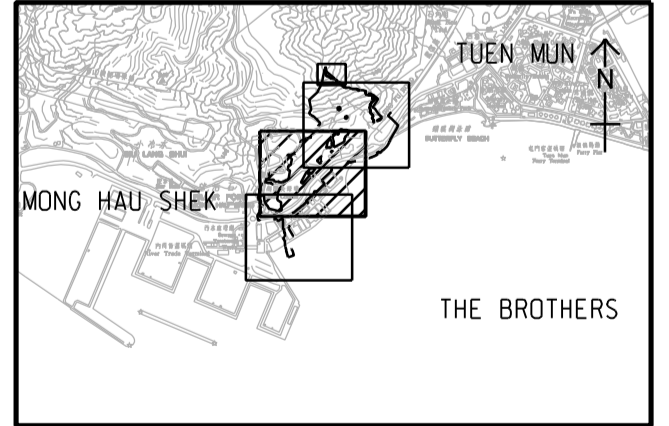
ISSUE/REVISION

I/R	DATE	DESCRIPTION	CHK.
B	MAR. 14	TENDER ADDENDUM NO. 2	CWN
A	FEB. 14	TENDER ADDENDUM NO. 1	CWN
-	JAN. 14	TENDER DRAWING	CWN

STATUS
 備核

SCALE
 比例: A1 1:1000
DIMENSION UNIT
 尺寸單位: METRES

KEY PLAN
 索引圖: 1:50000

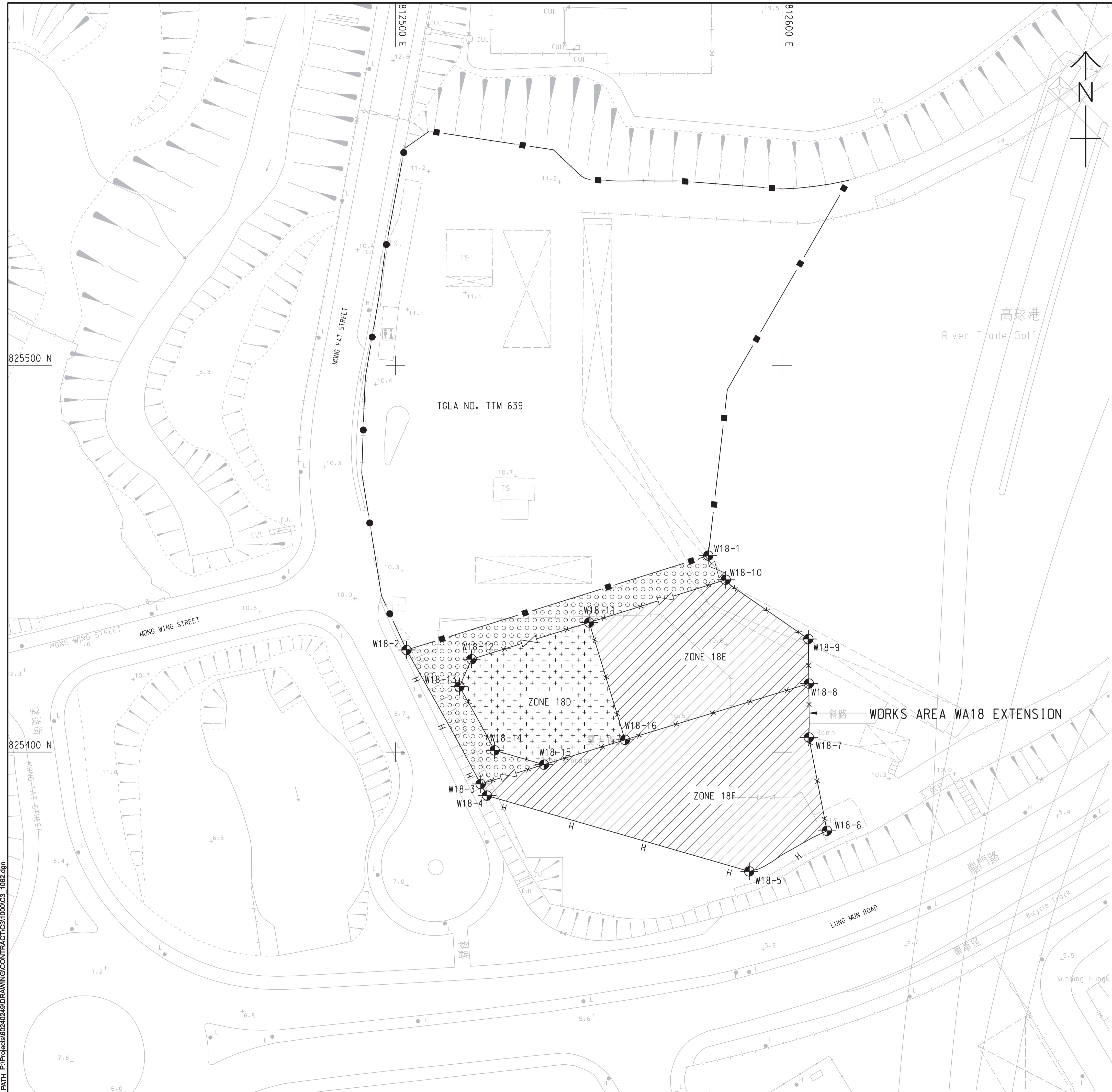


PROJECT NO.
 項目編號: 60240249
CONTRACT NO.
 合約編號: HY/2013/12

SHEET TITLE
 圖紙名稱: PORTIONS OF SITE AND SITE BOUNDARY SETTING OUT PLAN

SHEET NUMBER
 圖紙編號: 60240249/C3/1052B

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NOTES:

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C3/1000.
- DEMARCATON OF THE WORKS AREA SHALL BE DETERMINED ON SITE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6110 AND H6111 FOR DETAILS OF HOARDING.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NOS. H6121 AND H6122 FOR DETAILS OF CHAIN LINK FENCE.
- REFER TO HIGHWAYS DEPARTMENT STANDARD DRAWING NO. H6121 FOR DETAILS OF GATE.
- CHAIN LINK FENCE SHALL BE ERRECTED ALONG THE WORKS AREA BOUNDARY. THE ALIGNMENT AND EXTENT OF HOARDING AND CHAIN LINK FENCE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE ENGINEER.
- THE LOCATION AND WIDTH OF GATE SHOWN ARE INDICATIVE ONLY AND SHALL BE CONFIRMED BY THE ENGINEER.
- THE SETTING OUT INFORMATION AND WORKS AREA CONDITIONS SHOWN IN THIS DRAWING ARE FOR REFERENCE ONLY. THE WORKS AREA BOUNDARY SHALL BE IN ACCORDANCE WITH THE ENGINEERING CONDITIONS FOR TEMPORARY GOVERNMENT LAND ALLOCATION NO. GLA-TM 639. IN CASE OF DISCREPANCY BETWEEN THE BOUNDARY SHOWN ON THIS DRAWING AND THE BOUNDARY INDICATED ON THE ENGINEERING CONDITIONS, THE LATTER SHALL PREVAIL.
- THE WORKS AREAS SHOWN ON THIS DRAWING ARE TO BE SHARED-USED AMONG THE TM-CLKL RELATED CONTRACTS. THE AREAS HATCHED WITH ARE TENTATIVELY ALLOCATED FOR THE USE BY THE CONTRACT.
- THE COMMON AREA SHALL BE CONCRETE PAVED BY THE CONTRACTOR.
- ZONE 18F SHALL BE USED FOR THE SITE ACCOMMODATION OF THE ENGINEER. ZONE 18E SHALL BE USED FOR SITE ACCOMMODATION OF THE CONTRACTOR.
- ZONE 18D IS TO BE USED BY THE CONTRACTOR OF CONTRACT NO. HY/2012/08-TUEN MUN-CHEK LAP KOK LINK-NORTHERN CONNECTION SUB-SEA TUNNEL SECTION TO STORE PLANT AND EQUIPMENT ASSOCIATED WITH THE TBM TUNNELS FROM THE DATE FOR COMMENCEMENT OF THE WORKS TO 126 DAYS FROM THE DATE FOR COMMENCEMENT OF THE WORKS. THE CONTRACTOR SHALL LIAISE AND PROVIDE FREE AND UNOBSTRUCTED 24-HOUR ACCESS FOR THE CONTRACTOR OF CONTRACT NO. HY/2012/08 TO ZONE 18D. THE CONTRACTOR SHALL BE GIVEN THE POSSESSION OF ZONE 18D IN ACCORDANCE WITH APPENDIX TO FORM OF TENDER-P.3.

LEGEND:

- WORKS AREA FOR THE CONTRACT
- COMMON AREA (MAINTAINED UNDER THE CONTRACT) TO BE SHARED-USED WITH OTHER CONTRACTS
- AREA TO BE USED BY THE CONTRACTOR OF CONTRACT NO. HY/2012/08 AND WORKS AREA FOR THIS CONTRACT TO BE EARLY HANDED OVER BY THE CONTRACTOR (SEE NOTES NO. 12 ABOVE)
- HOARDING AND GATE (TO BE ERRECTED AND MAINTAINED UNDER THIS CONTRACT)
- EXISTING CHAIN LINK FENCE MAINTAINED BY OTHERS
- CHAIN LINK FENCE AND GATE (TO BE ERRECTED AND MAINTAINED UNDER THIS CONTRACT)
- EXISTING HOARDING AND GATE MAINTAINED BY OTHERS

SETTING OUT CO-ORDINATES OF WORKS AREA WA18 EXTENSION

POINT	CO-ORDINATES	
	EASTING	NORTHING
W18-1	812580.934	825450.791
W18-2	812502.880	825426.380
W18-3	812522.068	825391.750
W18-4	812523.679	825388.756
W18-5	812591.556	825369.151
W18-6	812611.638	825379.647
W18-7	812606.954	825403.769
W18-8	812606.951	825417.705
W18-9	812606.832	825429.231
W18-10	812585.456	825444.557
W18-11	812550.126	825433.508
W18-12	812519.715	825423.997
W18-13	812516.580	825416.947
W18-14	812525.682	825400.438
W18-15	812538.435	825396.754
W18-16	812559.404	825403.166



PROJECT
 項目
TUEN MUN - CHEK LAP KOK LINK

CONTRACT TITLE
 TUEN MUN - CHEK LAP KOK LINK - NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS

CLIENT
 業主
 路政署
HIGHWAYS DEPARTMENT
 港務處大樓香港工程發展處
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

CONSULTANT
 工程師有限公司
AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS
 分判工程師有限公司

ISSUE/REVISION
 修訂

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A	FEB. 14	TENDER ADDENDUM NO. 1	CWN
-	JAN. 14	TENDER DRAWING	CWN

STATUS
 階段

SCALE
 比例
 A1 1:500

DIMENSION UNIT
 尺寸單位
 METRES

KEY PLAN
 索引圖

PROJECT NO.
 項目編號
 60240249

CONTRACT NO.
 合約編號
 HY/2013/12

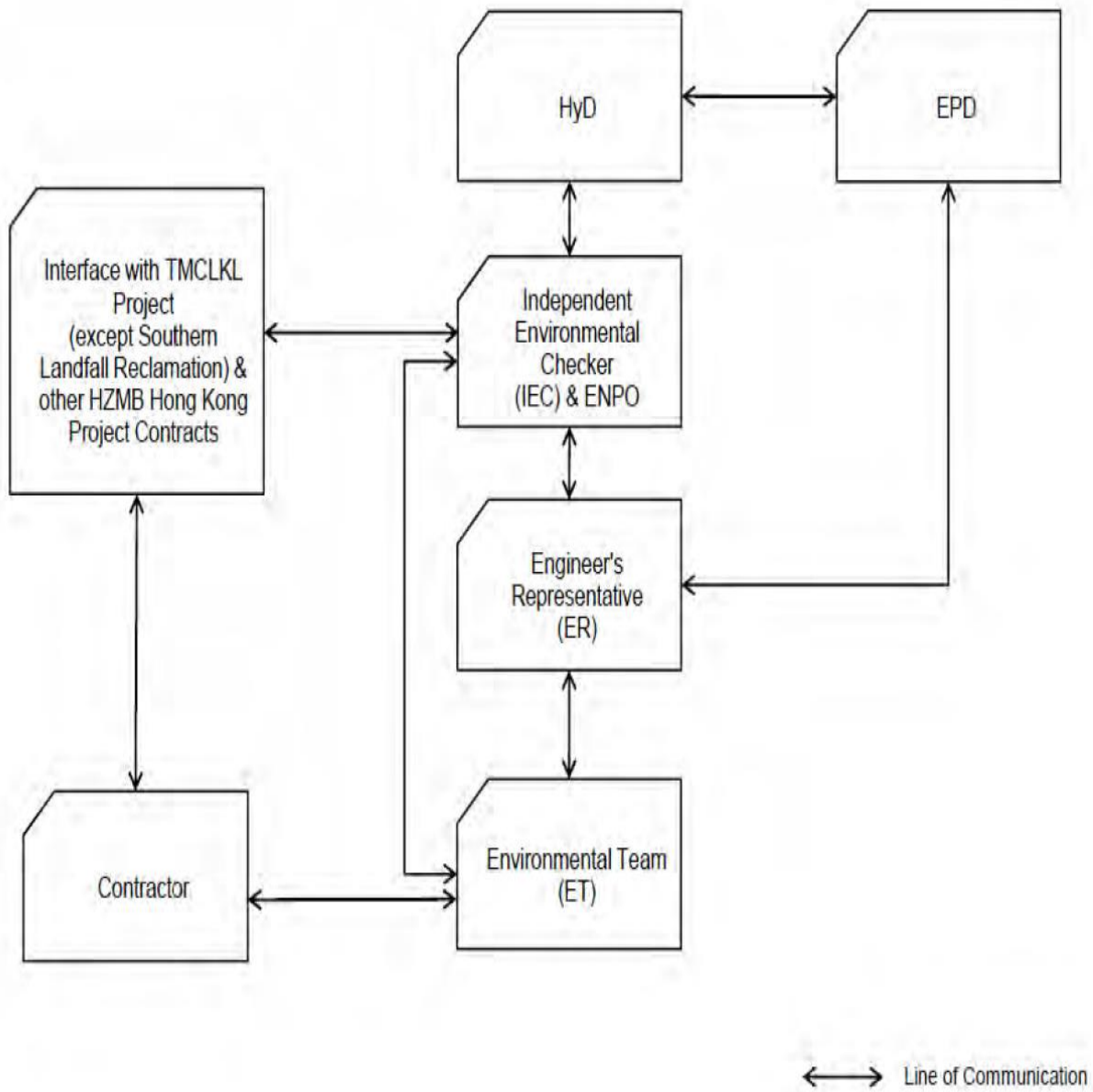
SHEET TITLE
 圖紙名稱
WORKS AREA AND HOARDING PLAN

SHEET NUMBER
 圖紙編號
 60240249/C3/1062B

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Appendix C

Environmental Management Organization Chart



Project Organization chart

Organization chart of the Contractor

Contact Details of Key Personnel for the Contract HY/2013/12

Organization	Project Role	Name of Key Staff	Tel No	Fax No.
HyD	Employer	Mr. Stephen W.C. Chan	2762 3669	3188 6614
AECOM	Principal Resident Engineer	Mr. S.W. Fok	2218 7209	2218 7399
AECOM	Chief Resident Engineer	Mr. Roger Man	2218 7288	2218 7399
AECOM	Resident Engineer (S&E)	Mr. Kelvin Yeung	2218 7289	2218 7399
Ramboll Environ	Environmental Project Office (ENPO)	Mr. YH Hui	3465 2850	3465 2899
Ramboll Environ	Independent Environmental Checker (IEC)	Dr. FC Tsang	3465 2851	3465 2899
CKJV	Deputy Project Manager	Mr. Raymond Suen	2253 8309	2253 8399
CKJV	Site Agent	Mr. Wilson Lau	2253 8300	2253 8399
CKJV	Environmental Officer	Mr. HY Tang	2253 8300	2253 8399
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Miss Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079
HKL	Registered Landscape Architect	Kenneth Ng	2866 3903	--

Legend:*HyD (Employer) –Highways Department**AECOM (Engineer) – AECOM Asia Co. Ltd.**CKJV (Main Contractor) – CRBC-Kaden Joint Venture**Ramboll Environ (ENPO and IEC) - Ramboll Environ Hong Kong Limited**AUES (ET) – Action-United Environmental Services & Consulting**HKL(RLA) – Hong Kong Landscape*

Appendix D

Construction Programme

Activity ID	Activity Name	2016					2017	
		Oct	Nov	Dec	Jan	Feb		
HY/2013/12 TMCLK Northern Connection Toll Plaza and Associated-Works Programme-Rev.4A Monthly Update								
Toll Plaza Decking TD1-Section 1								
Stage 1								
Method Statement Submission and Approval								
TD121360	Engineer's comments and approval							
TD121350	MSS for in-situ deck							
Field Works								
Foundation & Substructure at Central Divider of Lung Mun Road								
Bored Pile								
TD121310	Bored Piles F1-K1(5 Nos)							
Pile cap and Pier								
TD120560	Pile cap F1-K1							
TD120550	Pier A1-E2							
TD120570	Pier F1-K1							
Portal Construction								
Portal Beam 1st(H)								
TD120360	TTA application-Stage 3(Night time-portal and decking)							
Deck Construction								
Cast in-situ deck between Pier A and Pier B								
TD120670	Reinforcement and concrete works							
TD120680	Prestressing							
TD120690	Falsework and formwork removal							
Precast beam fabrication								
TD120800	Precast parapet and planter							
Precast beam installation								
TD12020	Precast beam installation between portal F and portal G(4 nos)							
TD12070	Precast beam installation between portal F and portal G(4 nos)							
TD12030	Precast beam installation between portal E and portal F(6 nos)							
TD12040	Precast beam installation between portal C and portal D(5 nos)							
TD12050	Precast beam installation between portal G and portal H(4 nos)							
TD12060	Precast beam installation between portal D and portal E(7nos)							
TD12010	Precast beam installation between portal D and portal E(5 nos)							
TD12080	Precast beam installation between portal B and portal C(10 nos)							
TD12090	Precast beam installation between portal C and portal D (7nos)							
In-situ Deck and Precast Beam								
TD121080	In-situ deck and precast beam between portal E and portal F							
Toll Plaza Decking TD2-Section 1								
Field Works								
G.I and Piling Works								
DWP-Bored Piles								
TD220520	Bored piles for P21-P27							
Base Slab & Pile Cap Construction								
Abutment K-Base Slab								
TD220580	Concreting and backfilling							
Abutment and Pier Construction								
Abutment K								
TD220270	Backfill for abutment K							
Abutment M								
TD220170	Backfill for abutment M							
Deck Construction								
TD220180	Falsework for deck construction							
TD220190	Bearing,formwork, reinforcement& Concreting-North							
TD220000	Construction of walkway							
Miscellaneous Works								
TD220695	Cascade D construction							
Toll Plaza Footbridge-Section 1								
Stage 1								
Method Statement Submissions and Approval								
TFB1090	MSS for concrete slab and planter construction over steel truss							

█ Remaining Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone
█ Remaining Work ▼ Summary

CRBC - Kaden JV

Three-Month Rolling Programme

Date	Revision	Checked	Approved
20-Nov-16			



█ Remaining Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone
█ Remaining Work ▼ Summary

CRBC - Kaden JV

Three-Month Rolling Programme

Date	Revision	Checked	Approved
20-Nov-16			

Activity ID	Activity Name	2016		2017		
		Oct	Nov	Dec	Jan	Feb
Stage 2						
Temporary Works Design (TWD) Submission and Approval						
BG23620	Engineer's approval			Temporary Works Design (TWD) Submission and Approval		
Method Statement Submissions and Approval						
BG23240	MSS for deck construction			Engineer's approval		
Field Works						
Foundation Works						
BG23350	Pad footing construction at G2d-1					
BG23310	Excavation for G2e					
BG23320	Excavation for G2a					
BG23360	Pad footing construction at G2d-2					
BG23370	Pile cap G2e-1					
BG23380	Pad footing G2c-2					
BG23390	Pad footing G2e					
Deck						
BG23010	Deck(G2d2-G2c2)&Construct Portal G2c					
BG23020	Deck(G2c2-G2b)&Construct Portal G2c					
BG23050	Deck(G2d1-G2c1)					
BG23040	Deck(G2e-G2d1)					
BG23000	Deck(G2e-G2d2)					
Bridge G1						
Stage 2						
Design Submission and Approval						
BG112300	Engineer's approval			Design Submission and Approval		
BG112190	DDA for foundation (draft)			Engineer's approval		
BG112160	TWD -Formwork design for pier					
Off-site Works						
BG112000	Form traveller fabrication			Off-site Works		
Field Works						
Substructure Works from Pier G1d to Pier G2a						
BG112130	Pierhead segment construction at Pier G1d			Substructure Works from Pier G1d to Pier G2a		
BG112060	Foundation for G1d			Pierhead segment construction at Pier G1d		
BG112100	Construct Pier G1d					
Deck Construction from Pier G1d to Pier G2a						
BG112462	Completion of Pier at G2a					
Bridge H1-Section 1						
Stage 1						
Field Works						
Abutment H1f						
BH11110	Construct abutment H1f					
Bridge H1-Section 2						
Stage 2						
Design Submission and Approval						
BH12860	Engineer's approval			Design Submission and Approval		
Field Works						
Foundation Works& Pier construction						
Foundation Works						
BH12590	Foundation for H1e			Foundation Works& Pier construction		
Pier construction						
BH12558	Pierhead segment construction at Pier H1d			Pier construction		
BH12550	Construct Pier H1e			Pierhead segment construction at Pier H1d		
BH12540	Construct Pier H1d					
Decking Construction From Abutment H1f to Pier H1d						
Balanced Cantilever Construction at Pier H1e						
BH12025	Assemble of 2nd formtraveller at H1e and testing					
BH12020	Balanced cantilever construction at H1e 1 segment			Balanced cantilever construction at H1e 1 s		
BH12010	Assemble of 1st formtraveller at H1e and testing			Assemble of 1st formtraveller at H1e and testing		
Culvert 1(TBM)-Stage 4						
Field Works						
Culvert 1(TBM)						

█ Remaining Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone
█ Remaining Work ▼ Summary

CRBC - Kaden JV
Three-Month Rolling Programme

Date	Revision	Checked	Approved
20-Nov-16			

Activity ID	Activity Name	2016					2017	
		Oct	Nov	Dec	Jan	Feb		
Receiving Pit								
CUL13150	Prepare for TBM Exit and remove TBM							
Demolishing the Existing Box Culvert								
CUL13250	Demolishing the existing box culvert							
MH5 & MH2								
CUL13265	Construct MH2							
FC1								
CUL13410	Excavation and demolishing works							
CUL13420	FC1 construction							
FC2								
CUL13470	Construction of chamber FC2							
CUL13480	Backfilling and removal section of sheetpile							
CUL13460	Excavation and removal of box culvert							
BY-Pass Sewer between FC1 and FC2(1800 Pipe)								
CUL13510	Backfilling							
Completion of KD3A and Remaining Works								
CUL13535	Backfilling							
Culvert 2 & Culvert 3 and Existing Box Culvert								
Method statement Submission								
CCE20140	Method statement for screeding the existing box culvert							
Culvert 2								
CCE20120	Bay 20							
CCE20090	Bay 21							
Culvert 3								
CCE20215	MH8							
CCE20210	Bay 22							
CCE20212	Drainage diversion							
CCE20085	MH6 construction							
Existing Sewer Box Culvert								
MH3-MH6								
CCE20220	Base slab to be applied with screeding concrete							
Site Formation - Retaining Structure RW_A								
Stage 3								
Retaining Wall A								
RWA20145	Construct Retaining Wall A from TD2 Abutment M to MJ 11-Wall construction							
RWA20175	Construct Retaining Wall A from Bay MJ11 to CH357.8-Wall construction							
RWA20160	Drainage Diversion of Existing Stream to Cascade D							
RWA20150	Construct Cascade D							
RWA20180	Backfilling Works							
RWA20170	Construct Retaining Wall A from Bay MJ11 to CH357.8-Base slab							
Retaining Structure RW_E								
Stage 2								
Design Submission and Approval								
RWE20000	DDA for foundation (draft)							
RWE20040	DDA for substructure(draft)							
RWE20010	Engineer's comments							
RWE20020	DDA for foundation submission							
RWE20030	Engineer's approval							
Site Formation - Retaining Structure for Slope TP_F								
Stage 3								
Retaining Structure for Slope TP_F								
RWF31350	Backfilling							
RWF31470	Backfilling							
RWF31480	U-Channel construction,Completion civil provision works for TCSS and E&M							
RWF31304	Construct Retaining Wall-Wall construction Bay 7-8,17-20							
Site Formation - Slope TP_A & Associated Works								
Stage 3								
Slope Feature - Slope TP_A								
TPA41200	Raking Drain Construction for slope A3							

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CRBC - Kaden JV

Three-Month Rolling Programme

Date	Revision	Checked	Approved
20-Nov-16			

Activity ID	Activity Name	2016		2017		
		Oct	Nov	Dec	Jan	Feb
TPA41210	U-channel (240m) and Berm for slope A3					
TPA41220	Laying Erosion Control Mat for slope A3					
TPA41350	Forming East Portal Formation and temporary ground drainage works					
TPA41700	Construct Cascade A					
Site Formation - Slope TP_B & Associated Works						
Stage 3						
Slope Feature - Slope TP_B						
TPB41200	Raking Drain Construction for slope B3					
TPB41210	U-channel (part) and Berm for slope B3					
Site Formation - Slope TP_C & Associated Works						
Stage 3						
Slope Feature - Slope TP_C						
TPC51160	Remaining excavation works and forming road formation					
TPC50800	Laying Erosion Control Mat for slope C1					
Achievement of KD-3(Stage 3) for Slope C						
TPC51320	Achievement of KD-3(Stage 3) for slope C					
Achievement of KD-8 (Section 5) for Slope C						
TPC51330	Remaining works include landscape works and establishment works					
Site Formation - Slope TP_D & Associated Works						
Stage 3						
Slope Feature - Slope TP_D						
TPD51550	Excavation of Rock (3,080m3) for slope D5					
TPD51600	U-channel (125m) and Berm for slope D5					
TPD52800	Forming West Portal Formation and temporary ground drainage works					
TPD51700	Excavation of Rock (5,450m3) for slope D6a and D6b					
Achievement of KD-7(Section 4) for Slope D						
TPD51755	Hand over of portion D					
Achievement of KD-3(Stage 3) for Slope D						
TPD52350	Remaining civil works and drainage works					
Site Formation - Slope TP_E & Associated Works						
Stage 3						
Slope Feature - Slope TP_E at Toll Control Building Area						
TPE61700	Hand Over Portion D					
TPE61250	Mapping & Dowelling					
TPE61260	U-channel (300m) and Berm for slope E3b					
TPE61600	All remaining works include civil provision for TCSS and E&M					
TPE61360	Mapping & Dowelling					
TPE61380	U-channel (230m) and Berm for slope E1b and E1c					
TPE61220	Excavation of Rock for slope E3b - stage 2					
TPE61350	Excavation of Rock (2,000m3) for slope E1b					
Slope Feature - Slope TP_E Remaining Section and 5SE-D/C116						
TPE62420	U-channel (220m) and Berm for slope E3a					
TPE62550	Remaining civil works					
TPE62250	Mapping & Dowelling					
TPE62260	U-channel (150m) and Berm for slope E3c					
TPE62230	Excavation of Rock for slope E3c - stage 3					
TPE62410	Mapping & Dowelling					
TPE62600	Construct Cascade C					
TPE62170	Soil Nail RowA (24nos) Level + 33.00 for 5SE-D/C116 (Install and grouting)					
TPE62160	Soil Nail RowB (22nos) Level + 35.00 for 5SE-D/C-116 (Install and grouting)					
TPE62190	U-channel (200m) and Berm for slope E2c					
Site Formation - Slope Upgrading Works						
Stage 3 (Other Slope Features)						
Slope Feature - 5SE-D/C170						
SFW10130	Soil Nail RowB (18nos) (Install and grouting)					
SFW10140	Soil Nail RowC (18nos) (Install and grouting)					
SFW10080	Excavation of Rock (350m3) for 5SE-D/C170					
SFW10120	Soil Nail RowA (19nos) (Install and grouting)					
SFW10110	Drainage, U-channel (410m) and Handrailing					

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▬ Remaining Work ▬ Summary

CRBC - Kaden JV

Three-Month Rolling Programme

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Activity ID	Activity Name	2016					2017	
		Oct	Nov	Dec	Jan	Feb		
SFW10100	Rock Mapping and Stabilization							Rock Mapping and Stabilization
SFW10105	Raking Drain Construction							Raking Drain Construction
SFW10050	Site Clearance and Tree Felling							
SFW10060	Prepare Access Road							
SFW10070	Excavation of Soil (1,240m3) and Modification Works							
Slope Feature - 5SE-D/C165								
SFW10820	Drainage, U-channel (80m) and Handrailing							
SFW10800	Soil Nail RowB (16nos) Level + 15.60 (Install and grouting)							
SFW10810	Soil Nail RowA (19nos) Level + 13.60 (Install and grouting)							
Slope Feature - 5SE-D/C150								
SFW10180	Complete slope E3b - stage 4							
SFW10190	Slope Modification							
SFW10210	Hydroseeding and Erosion Control Mat							
Slope Feature - 5SE-D/C152								
SFW10230	Slope Modification							
SFW10250	Hydroseeding and Erosion Control Mat							
Slope Feature - 5SE-D/C121								
SFW10260	Complete slope D6a and D6b							
Slope Feature - 5SE-D/C122								
SFW10300	Complete slope D6a and D6b							
Slope Feature - 5SE-D/C14								
SFW10340	Complete TP_F Backfilling(Bay1-2)							
AK10410	Possession of Portion X							
Slope Feature - 5SE-D/C149								
SFW10390	Slope Modification							
SFW10400	Drainage, U-channel (190m) and Handrailing							
SFW10410	Hydroseeding and Erosion Control Mat							
Slope Feature - 5SE-D/C115								
SFW10430	Slope Modification							
Slope Feature - 5SE-D/C21								
SFW10540	Completion of Sewer Culvert 1							
Slope Feature - 5SE-D/C16								
SFW10620	Complete pier construction at Bridge H1e & G2a							
Slope Feature - 5SE-D/C17								
SFW10740	Complete of TP_F and TD1 Precast beam installation							
Natural Terrain Hazard Mitigation Measures								
Natural Terrain Hazard Mitigation Measures								
Boulders outside Blasting Zone								
NTH10080	Mitigation measures for 20 boulders outside blasting zone							
Vehicular Underpass TN-01								
Stage 3								
Blasting Related Submission								
Blasting Permit Application								
UDP30100	Issue of Pre-Licensing Conditions							
UDP30090	Site Inspection by Mines Department							
UDP30110	Formal Issue of Blasting Permit							
Method Statement Submission and Approval								
UDP30650	Method statement for Lining Construction							
Lining Works and Road Works								
Water Proofing and Lining Works								
UDP4120	Modify lining formwork							
Type A								
Water Proofing and Kicker								
CH 310-CH327								
UDP4100	Bench Waterproofing works(CH310-CH327.6)(Type A)							
UDP4110	Kicker pouring(CH310-CH327.6)(Type A)							
Lining								
CH 310-CH327								
UDP4160	Pouring Type A Lining CH312-CH327							

█ Remaining Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone
█ Remaining Work ▼ Summary

CRBC - Kaden JV

Three-Month Rolling Programme

Date	Revision	Checked	Approved
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Activity ID	Activity Name	2016		2017		
		Oct	Nov	Dec	Jan	Feb
UDP4170	Erection of rebar fixing platform for west bulkhead wall					
UDP4190	Rebar fixing platform for west bulkhead wall					
UDP4230	Formwork for west bulkhead wall					
UDP4270	Concrete for west bulkhead wall					
CH 450-CH503						
UDP4220	Pouring Type A Lining CH486-CH503					
Type B						
Water Proofing and Kicker						
UDP4000	Bench waterproofing works and Kick pouring					
Lining B						
UDP4020	Pour Type B Lining CH373-409					
UDP4040	Pour Type B Lining CH409-440					
UDP4010	Pour Type B Lining CH337-373					
Lining B1						
UDP4030	Type B1 Lining formwork CH327-337					
UDP4060	Type B1 Lining formwork CH440-450					
UDP4070	Lining for Type B1 CH440-450					
Type C						
UDP4240	Rebar fixing platform for east bulkhead wall					
UDP4250	Formwork for east bulkhead wall					
UDP4200	Lining type C rebar fixing CH503-CH534.9					
Road and Drainage Work ,Utilities Works at for Lung Fu Road Roundabout						
Section 3						
Utilites installation ,road and drainage works (TTA stage 0-1)						
LFR10150	Pubic Lighting					
LFR10160	CLP + CRD					
LFR10170	Trax Comm					
LFR10180	Completion of this stage civil provision for E&M, TCSS					
LFR10190	Irrigation System					
LFR10200	Road Pavement					
LFR10210	TTA for stage 1					
LFR10140	HKC Cable					
LFR10130	Smartone Cable					
LFR10120	Town Gas					
LFR10110	New World Telecom					
LFR10100	Wharf T&T Duct and Joint Box					
LFR10090	Hong Kong Boaroband Network					
LFR10080	Hutchison Global Communication Cable					
LFR10070	PCCW					
LFR10050	Drainage works					
LFR10060	DN100,300,700					
Utilites installation ,road and drainage works (TTA stage 1)						
LFR10270	Filling Works					
Road and Drainage Work ,Utilities Works at Lung Mun Road						
Lung Mun Road (Westbound)						
Ho Suen Street North						
LMRWA1000	Drainage Work					
LMRWA1020	DN700 CHH 0 - 69					
LMRWA1030	DN200 CHJ 0 - 120					
LMRWA1040	PCCW					
LMRWA1050	Hutchison Global Communication Cable					
LMRWA1060	Hong Kong Boaroband Network					
Utilites installation ,road and drainage works for East Portal						
EPA1000	Rock Cutting					
Sewage, Irrigation and Road& Drainage Works						
SAI10060	Sewage, irrigation and road&drainage works -G2-north side					
SAI10070	Sewage, irrigation and road&drainage works- G2-south side					
Achievement of Key Dates						
AK10320	Achievement of KD-3(Stage 3) for slope C					

█ Remaining Level of Effort █ Critical Remaining Work
█ Actual Work ◆ Milestone
█ Remaining Work ▼ Summary

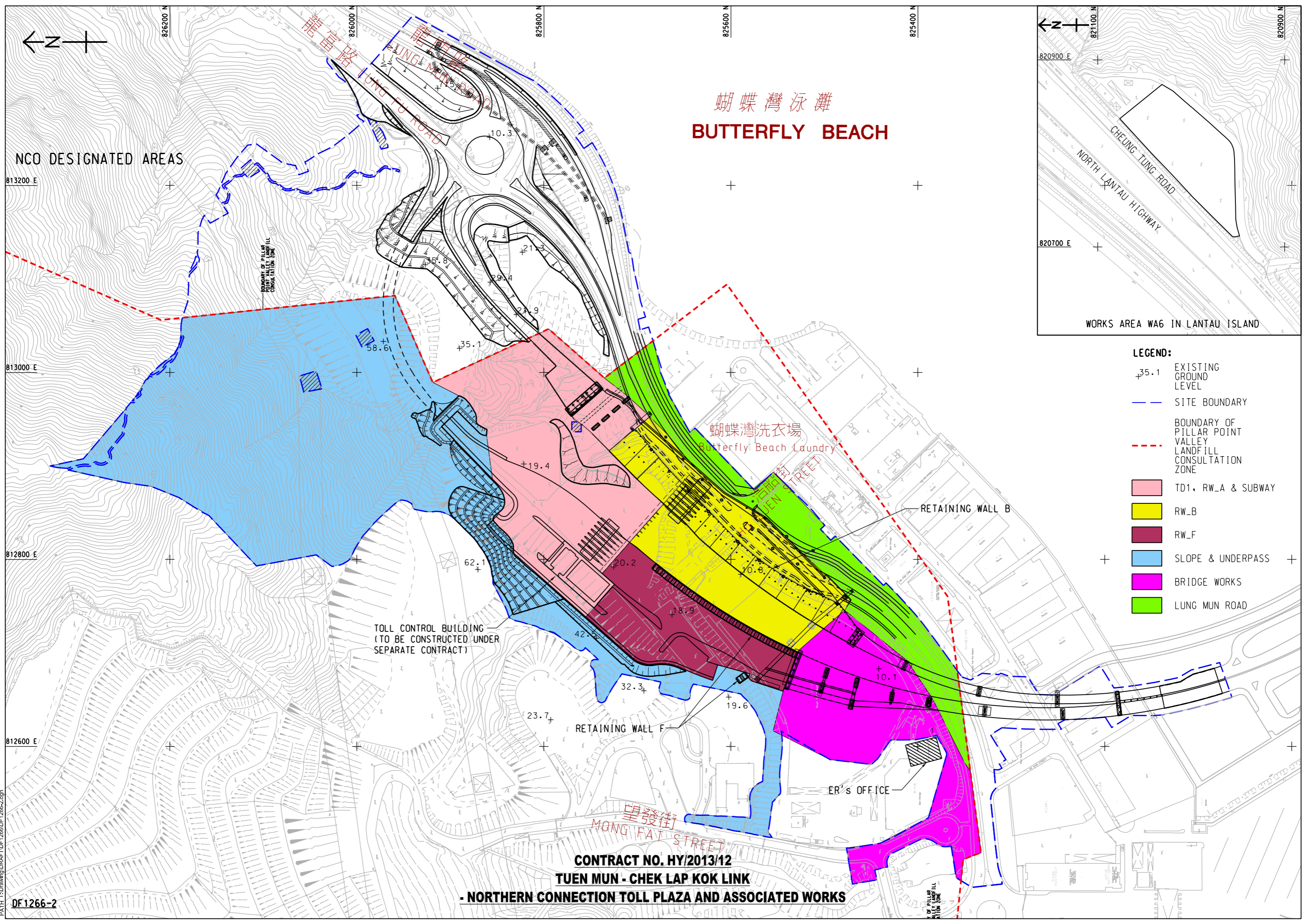
CRBC - Kaden JV

Three-Month Rolling Programme

Date	Revision	Checked	Approved
20-Nov-16			

Appendix E

Monitoring Locations / Sensitive Receivers for the Contract



蝴蝶灣泳灘
BUTTERFLY BEACH

NCO DESIGNATED AREAS

WORKS AREA WA6 IN LANTAU ISLAND

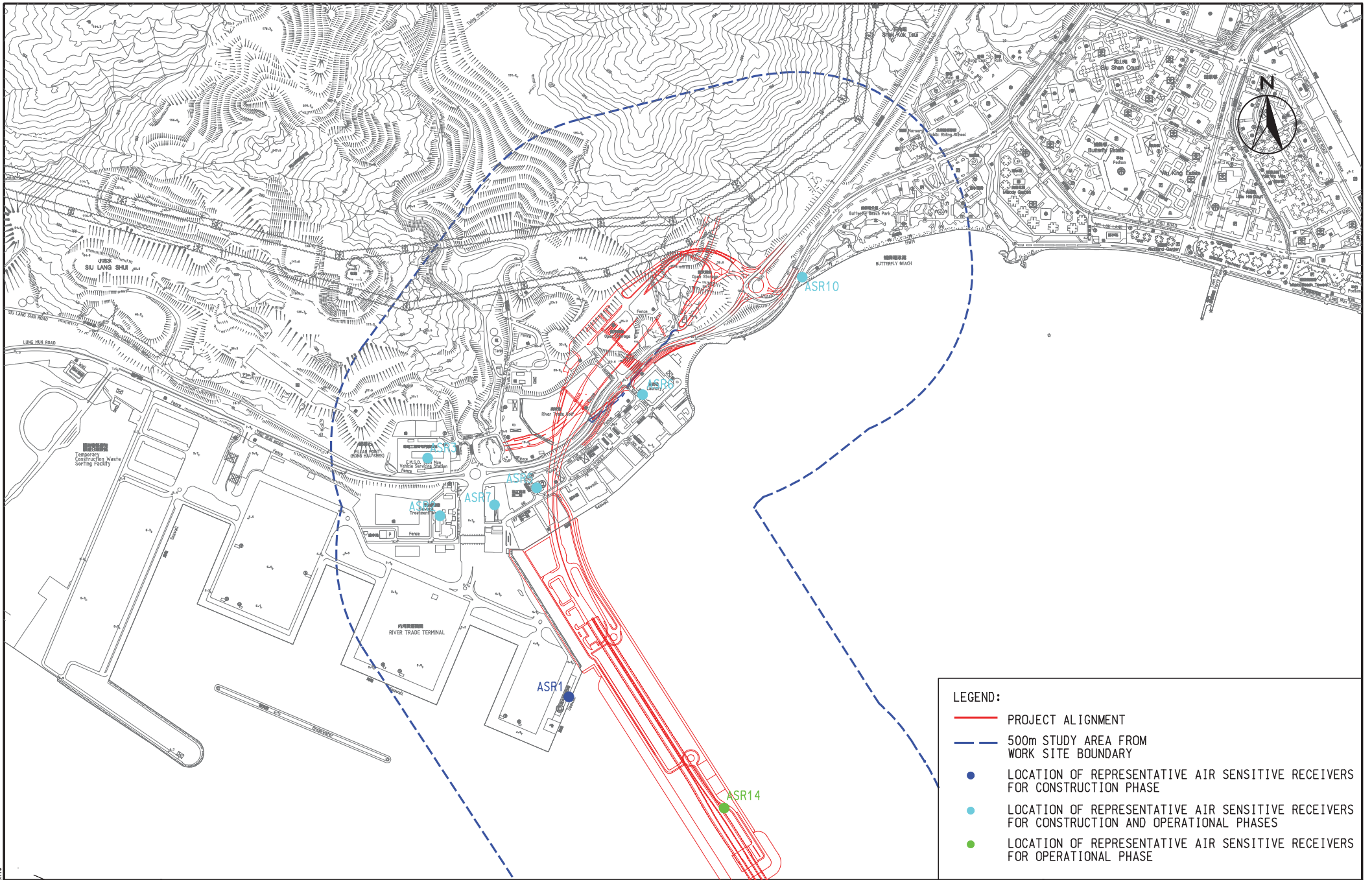
- LEGEND:**
- +35.1 EXISTING GROUND LEVEL
 - SITE BOUNDARY
 - BOUNDARY OF PILLAR POINT VALLEY LANDFILL CONSULTATION ZONE
 - TD1, RW_A & SUBWAY
 - RW_B
 - RW_F
 - SLOPE & UNDERPASS
 - BRIDGE WORKS
 - LUNG MUN ROAD

TOLL CONTROL BUILDING
 (TO BE CONSTRUCTED UNDER
 SEPARATE CONTRACT)

CONTRACT NO. HY/2013/12
TUEN MUN - CHEK LAP KOK LINK
- NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS

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DF1266-2

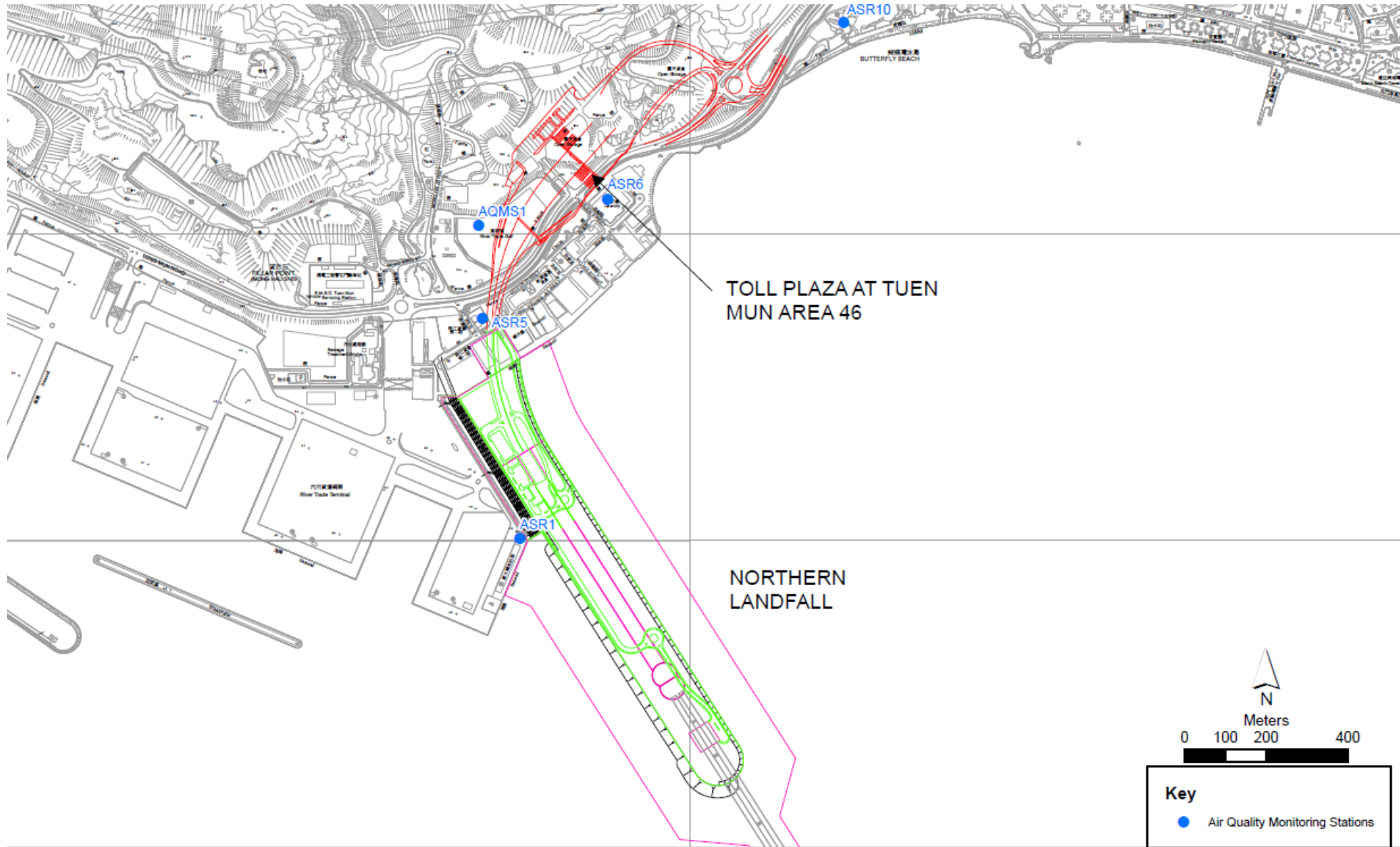


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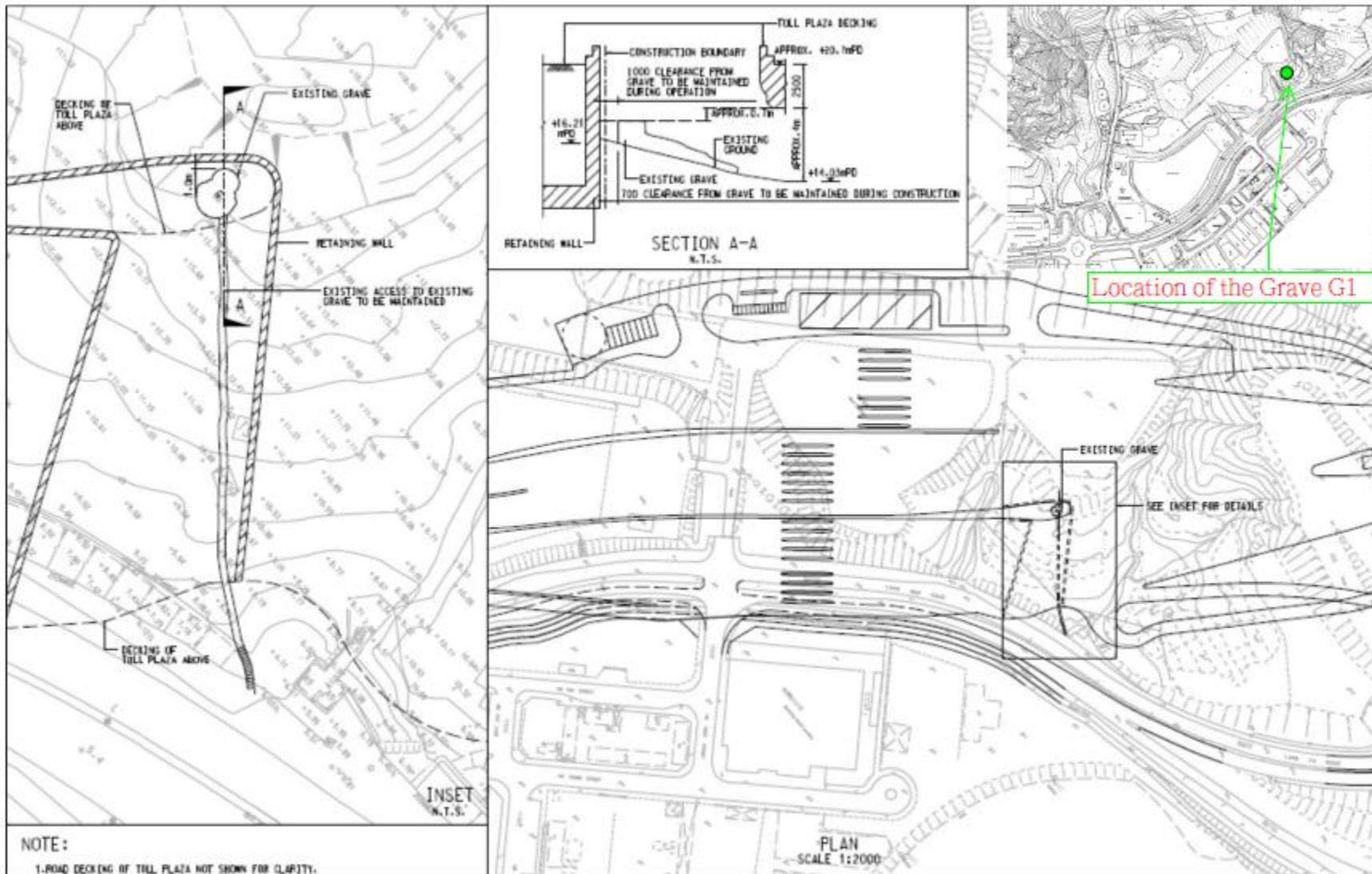
- PROJECT ALIGNMENT
- - - 500m STUDY AREA FROM WORK SITE BOUNDARY
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR CONSTRUCTION PHASE
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR CONSTRUCTION AND OPERATIONAL PHASES
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR OPERATIONAL PHASE

AGREEMENT NO. CE 52/2007(HY)
 TUEN MUN - CHEK LAP KOK LINK - INVESTIGATION
REPRESENTATIVE AIR SENSITIVE RECEIVERS

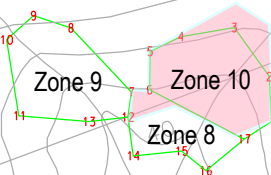
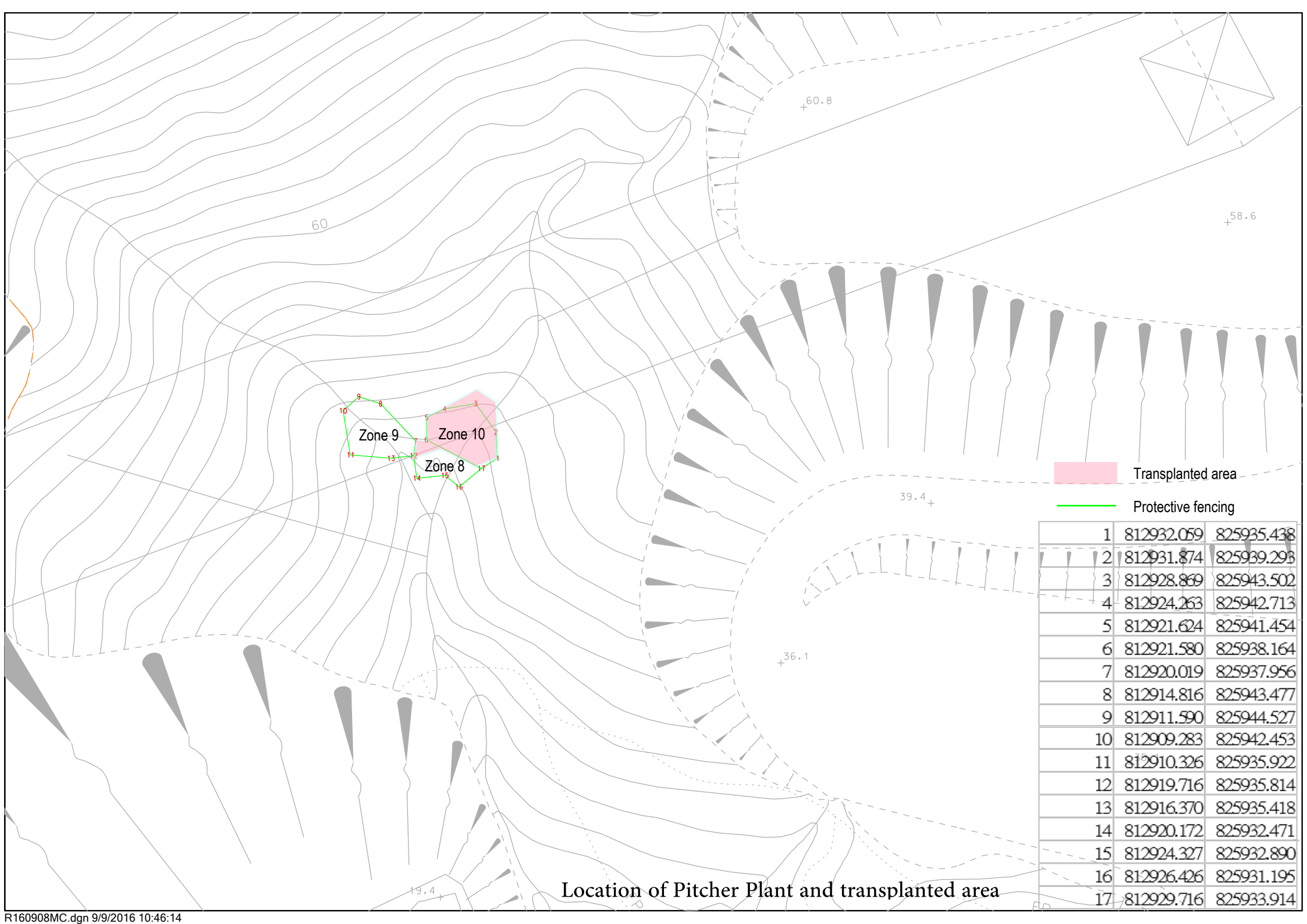
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Air Quality Monitoring Location



Location of the Grave G1



Transplanted area
 Protective fencing

1	812932.059	825935.438
2	812931.874	825939.293
3	812928.869	825943.502
4	812924.263	825942.713
5	812921.624	825941.454
6	812921.580	825938.164
7	812920.019	825937.956
8	812914.816	825943.477
9	812911.590	825944.527
10	812909.283	825942.453
11	812910.326	825935.922
12	812919.716	825935.814
13	812916.370	825935.418
14	812920.172	825932.471
15	812924.327	825932.890
16	812926.426	825931.195
17	812929.716	825933.914

Location of Pitcher Plant and transplanted area

Appendix F

Event and Action Plan

Event and Action Plan for Air Quality

EVENT	ACTION			
	ET ⁽¹⁾	IEC ⁽¹⁾	SOR ⁽¹⁾	Contractor(s)
Action Level				
Exceedance recorded	<ol style="list-style-type: none"> 1 Identify the source. 2 Repeat measurements to confirm findings. 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 Supervisor 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.
Limit Level				
Exceedance recorded	<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 Supervisor 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.

Event and Action Plan for Landscape and Visual Impact

EVENT ACTION LEVEL	ACTION			
	ET	IEC	ER	Contractor
Design Check	<ul style="list-style-type: none"> • Check final design conforms to the requirements of EP and prepare report. 	<ul style="list-style-type: none"> • Check report. • Recommend remedial design if necessary 	<ul style="list-style-type: none"> • Undertake remedial design if necessary 	
Non- conformity on one occasion	<ul style="list-style-type: none"> • Identify Source • Inform IEC and ER • Discuss remedial actions with IEC, ER and Contractor • Monitor remedial actions until rectification has been completed 	<ul style="list-style-type: none"> • Check report • Check Contractor's working method • Discuss with ET and Contractor on possible remedial measures • Advise ER on effectiveness of proposed remedial measures. • Check implementation of remedial measures 	<ul style="list-style-type: none"> • Notify Contractor • Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> • Amend working methods • Rectify damage and undertake any necessary replacement
Repeated Non-conformity	<ul style="list-style-type: none"> • Identify Source • Inform IEC and ER • Increase monitoring frequency • Discuss remedial actions with IEC, ER and Contractor • Monitor remedial actions until rectification has been completed • If nonconformity stops, cease additional monitoring 	<ul style="list-style-type: none"> • Check monitoring report • Check Contractor's working method • Discuss with ET and Contractor on possible remedial measures • Advise ER on effectiveness of proposed remedial measures • Supervise implementation of remedial measures 	<ul style="list-style-type: none"> • Notify Contractor • Ensure remedial measures are properly implemented 	<ul style="list-style-type: none"> • Amend working methods • Rectify damage and undertake any necessary replacement

Event / Action Plan for Cultural Heritage

Action Level	ET	IC (E)	ER	Contractor
Non-conformity on one occasion	<ol style="list-style-type: none"> 1. Identify Source 2. Inform the IEC and the ER 3. Discuss remedial actions with the IEC, the ER and the Contractor 4. Monitor remedial actions until rectification has been completed 	<ol style="list-style-type: none"> 1. Check report 2. Check the Contractor's working method 3. Discuss with the ET and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures. 5. Check implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify Contractor 2. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement
Repeated Non-conformity	<ol style="list-style-type: none"> 1. Identify Source 2. Inform the IC(E) and the ER 3. Increase monitoring frequency 4. Discuss remedial actions with the IC(E), the ER and the Contractor 5. Monitor remedial actions until 6. rectification has been completed 7. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Check monitoring report 2. Check the Contractor's working method 3. Discuss with the ES and the Contractor on possible remedial measures 4. Advise the ER on effectiveness of proposed remedial measures 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Notify the Contractor 2. Ensure remedial measures are properly implemented 	<ol style="list-style-type: none"> 1. Amend working methods 2. Rectify damage and undertake any necessary replacement

Note:

ET – Environmental Specialist, IEC – Independent Environmental Checker, ER – Engineer's Representative

Event / Action Plan for General Ecology

Action Level	ET	IEC	ER	Contractor
Non-conformity on one occasion	<ul style="list-style-type: none"> • Identify Source • Inform the IEC and the ER • Discuss remedial actions with the IEC, the ER and the Contractor • Monitor remedial actions until rectification has been completed 	<ul style="list-style-type: none"> • Check report • Check the Contractor's working method • Discuss with the ET and the Contractor on possible remedial measures • Advise the ER on effectiveness of proposed remedial measures. • Check implementation of remedial measures. 	<ul style="list-style-type: none"> • Notify Contractor • Ensure remedial measures are properly implemented • Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the works in the case of a serious nonconformity until situation rectified. 	<ul style="list-style-type: none"> • Amend working methods • Rectify damage and undertake any necessary replacement
Repeated Non conformity	<ul style="list-style-type: none"> • Identify Source • Inform the IC(E) and the ER • Increase monitoring frequency • Discuss remedial actions with the IC(E), the ER and the Contractor • Monitor remedial actions until rectification has been completed • If exceedance stops, cease additional monitoring 	<ul style="list-style-type: none"> • Check monitoring report • Check the Contractor's working method • Discuss with the ES and the Contractor on possible remedial measures • Advise the ER on effectiveness of proposed remedial measures • Supervise implementation of remedial measures 	<ul style="list-style-type: none"> • Notify the Contractor • Ensure remedial measures are properly implemented • Consider and instruct, if necessary, the Contractor to slow down or to stop all or part of the works in the case of a serious nonconformity until situation rectified. 	<ul style="list-style-type: none"> • Amend working methods • Rectify damage and undertake any necessary replacement

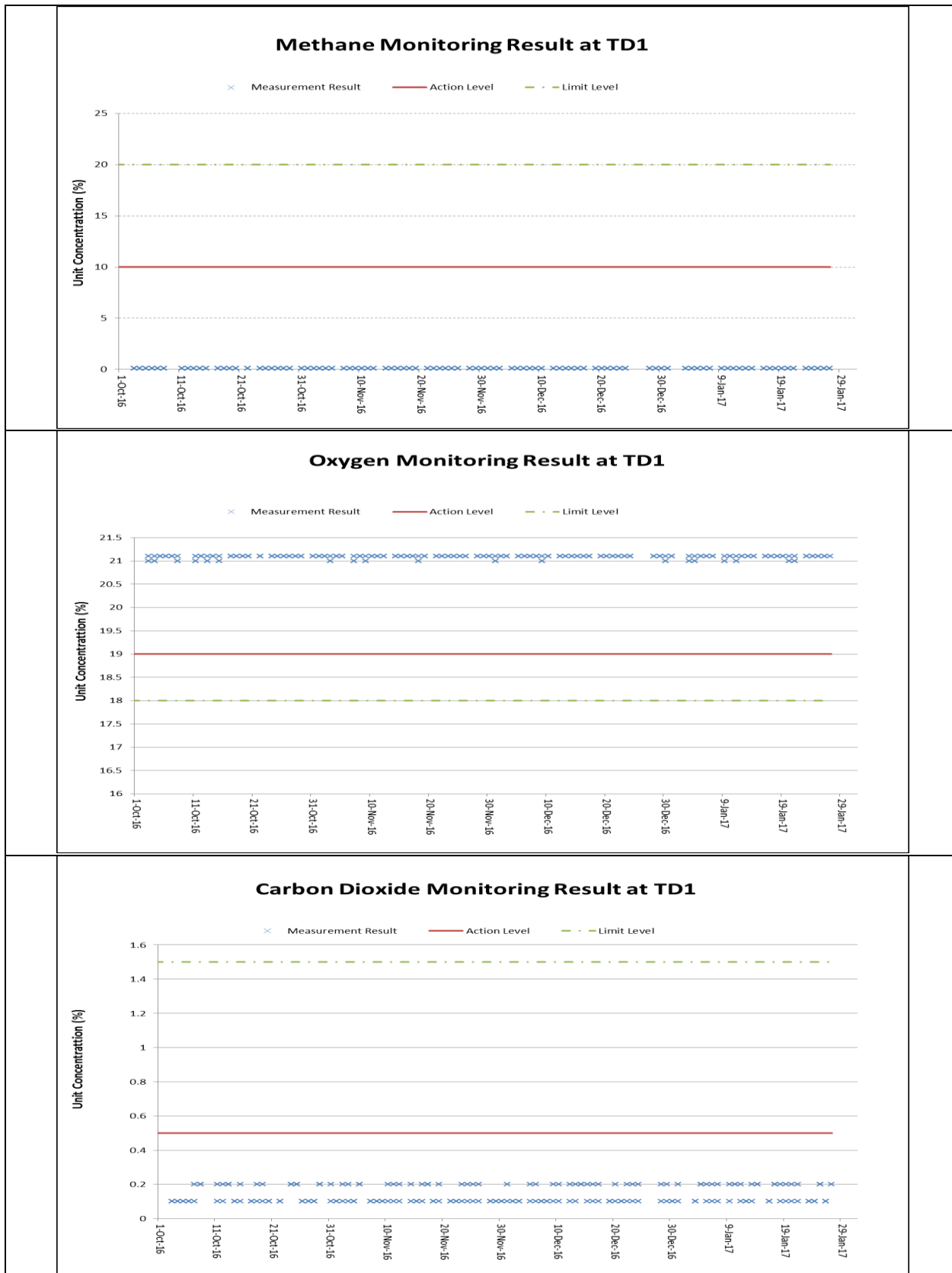
Note: ET – Environmental Specialist, IC(E) – Independent Checker (Environmental), ER – Engineer's Representative

Actions in the Event of Landfill Gas being Detected in Excavation / Confined Area

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

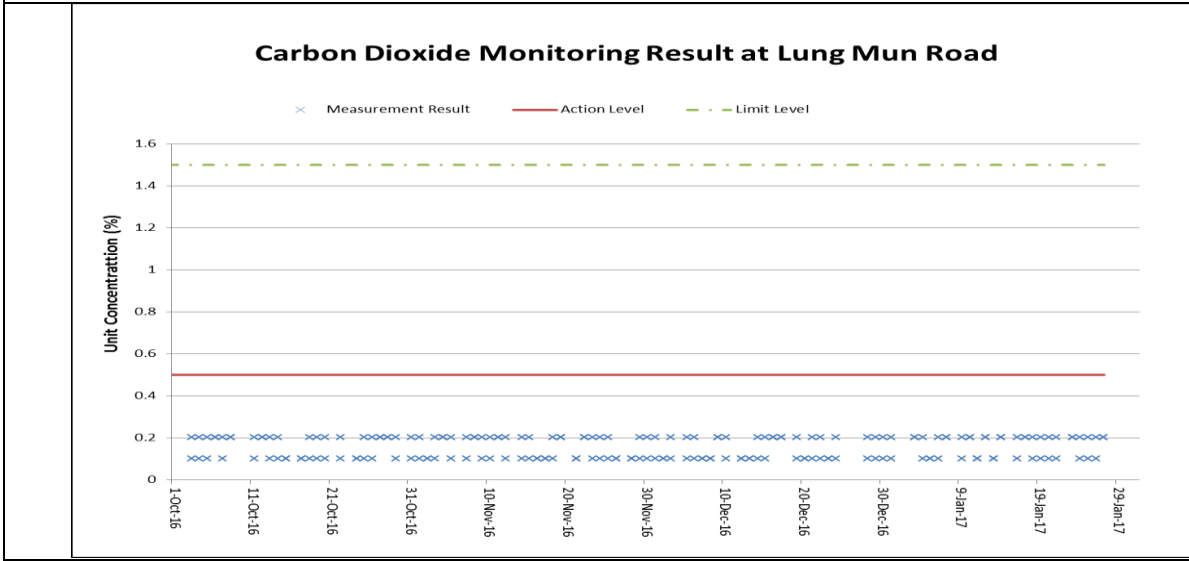
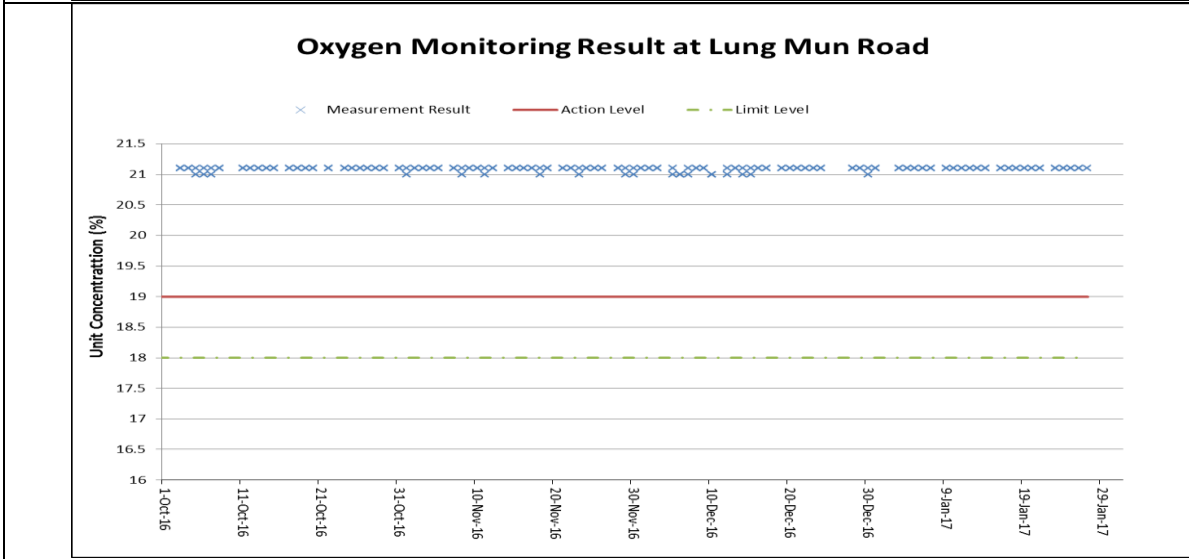
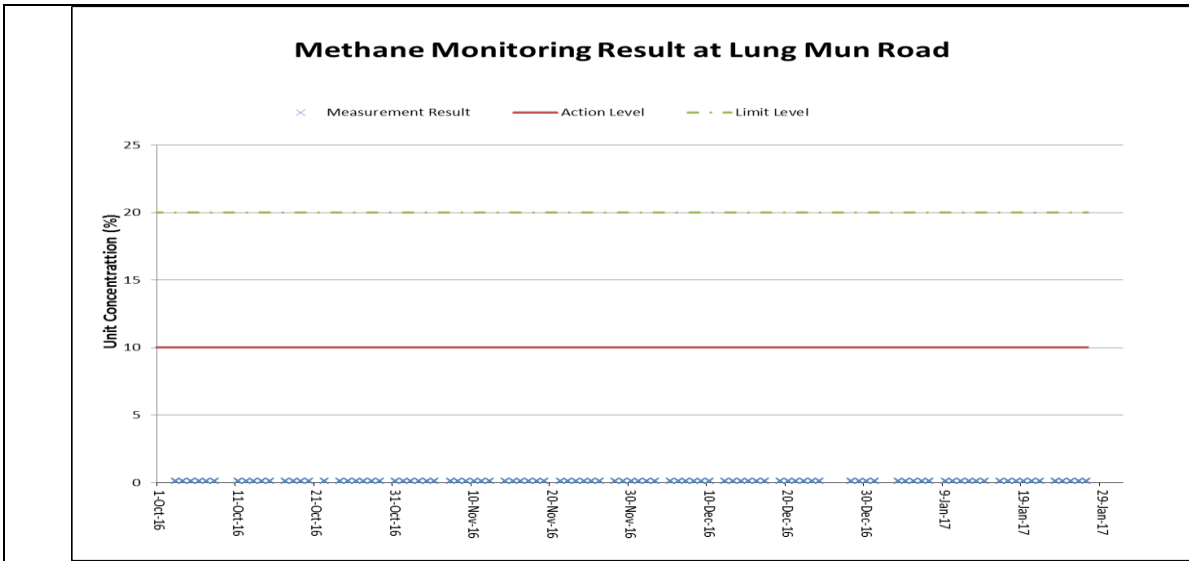
Appendix G

Landfill Gas Monitoring Graphical Plots



Annotation:

During this reporting period, major construction activity at TD1 and the specified works included excavation, stitching, blinding, formworking, steel-fixing and concreting. The weather condition varied from sunny to rainy. The monitoring data was provided by the Contractor followed to their QA/QC control.



Annotation:

During this reporting period, major construction activity at Lung Mun Road and the specified works included excavation, blinding, formworking, steel-fixing and concreting. The weather condition varied from sunny to rainy. The monitoring data was provided by the Contractor followed to their QA/QC control.

Appendix H

Waste Flow Table

Appendix A –Monthly Waste Flow Table

Monthly Summary Waste Flow Table for 2016 (year)

Month	Annual Quantities of Inert C&D Materials Generated Monthly						Annual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals (see note 4)	Paper / cardboard packaging (see note 4)	Plastics & Rubber (see note 2)	Chemical Waste	Others (general refuse)
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	39.066	0.000	12.964	18.171	0.922	0	6.920	0.000	0.000	0.000	0.089
Feb	14.943	0.000	7.894	5.755	1.036	0	0.000	0.192	0.000	0.000	0.066
Mar	34.090	0.000	16.333	6.392	0.496	0	10.780	0.000	0.000	0.000	0.089
Apr	84.330	0.000	15.186	4.939	0.071	0	63.980	0.000	0.000	0.000	0.154
May	57.179	0.000	11.511	2.658	0	0	42.920	0.000	0.000	0.000	0.09
June	29.316	0.000	10.647	2.935	1.377	0	14.260	0.000	0.000	0.000	0.097
Sub-total	258.924	0.000	74.535	40.850	3.902	0.000	138.860	0.192	0.000	0.000	0.585
July	12.981	0.000	9.589	3.134	0.162	0	0.000	0.000	0.000	0.000	0.096
Aug	8.683	0.000	5.694	2.607	0.225	0	0.000	0.000	0.000	0.000	0.157
Sept	12.767	0.000	3.923	8.561	0.164	0	0.000	0.000	0.000	0.000	0.119
Oct	21.469	0.000	5.736	15.51	0.098	0	0.000	0.000	0.000	0.000	0.125
Nov	21.726	0.000	4.89	15.424	1.207	0	0.000	0.000	0.000	0.030	0.175
Dec	17.870	0.000	7.858	9.131	0.762	0	0.000	0.000	0.000	0.000	0.119
Total	354.420	0.000	112.225	95.217	6.520	0.000	138.860	0.192	0.000	0.030	1.376

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 materials.
- 3 Broken concrete for recycling into aggregates.

Appendix A –Monthly Waste Flow Table

Monthly Summary Waste Flow Table for 2017 (year)

Month	Annual Quantities of Inert C&D Materials Generated Monthly						Annual Quantities of C&D Wastes Generated Monthly				
	Total Quantity Generated	Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals (see note 4)	Paper / cardboard packaging (see note 4)	Plastics & Rubber (see note 2)	Chemical Waste	Others (general refuse)
	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³)
Jan	13.117	0.000	4.543	7.512	1.062	0.000	0.000	0.000	0.000	0.000	0.217
Feb											
Mar											
Apr											
May											
June											
Sub-total	13.117	0.000	4.543	7.512	1.062	0.000	0.000	0.000	0.000	0.000	0.217
July											
Aug											
Sept											
Oct											
Nov											
Dec											
Total	13.117	0.000	4.543	7.512	1.062	0.000	0.000	0.000	0.000	0.000	0.217

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 materials.
- 3 Broken concrete for recycling into aggregates.

Appendix I

Implementation Schedule for Environmental Mitigation Measures

CONTRACT NO. HY/2013/12

**TUEN MUN – CHECK LAP KOK LINK – NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS
ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULE**

Air Quality									
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	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		✓

CONTRACT NO. HY/2013/12

**TUEN MUN – CHECK LAP KOK LINK – NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS
ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULE**

4.8.1	3.8	During transportation by truck, materials shall not be loaded to a level higher than the side and tail boards, and shall be dampened or covered before transport.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Materials having the potential to create dust shall not be loaded to a level higher than the side and tail boards, and shall be covered by a clean tarpaulin. The tarpaulin shall be properly secured and shall extend at least 300mm over the edges of the side and tail boards.	All areas / throughout construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	No earth, mud, debris, dust and the like shall be deposited on public roads. Wheel washing facility shall be usable prior to any earthworks excavation activity on the site.	construction period	Contractor	TMEIA Avoid dust generation		Y		✓
4.8.1	3.8	Areas of exposed soil shall be minimized 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		✓

Cultural Heritage

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

Ecology

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

CONTRACT NO. HY/2013/12

**TUEN MUN – CHECK LAP KOK LINK – NORTHERN CONNECTION TOLL PLAZA AND ASSOCIATED WORKS
ENVIRONMENTAL MITIGATION AND ENHANCEMENT MEASURE IMPLEMENTATION SCHEDULE**

7.13#	6.3, 6.5#	Fencing or other physical barriers for protection of Pitcher Plant around Zones 8, 9 and 10 and the temporary nursery site	Tuen Mun Area 46 shrubland/ Detailed/ Prior to construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
7.13	6.5	Audit Pitcher Plant protection measures	Tuen Mun Area 46	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		✓
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	Contractor	TMEIA		Y		✓

Landfill Gas Hazard Assessment

EIA reference	EM&A Manual reference	Environmental Protection Measures	Location/ Timing	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Status
						D	C	O	
14.12.2	14.2	<u>Appointment of Safety Officer</u> Appoint a properly trained safety officer and provide with appropriate equipment to measure and monitor LFG hazard. The monitoring frequency and areas to be monitored should be set down prior to commencement of ground-works either by the Safety Officer or an approved and appropriately qualified person.	Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.2	-	<u>Safety Measures - Excavation</u>	Construction Stage	Contractor	EPD/TR8/97 -		Y		✓

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		Staff should receive appropriate training on working in areas susceptible to landfill gas, fire and explosion hazards. Excavation procedures and code of practice should be implemented.			Landfill Gas Hazard Assessment Guidance Note				
14.12.2	-	<u>Safety Measures – Welding, Flame- Cutting and Hot works</u> Hot works should be confined to open areas away from any trench or excavation. Should hot works must be carried out in trenches or confined space, “permit to work” procedures should be followed.	Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.2	-	<u>Safety Measures – Enclosed Spaces</u> Site offices or buildings located within PPV Landfill Consultation Zone which have the capacity to accumulate landfill gas, then they should either be located in an area which has been proven to be free of landfill gas; or be raised clear of the ground by a minimum of 500mm.	Site office, building, tunnel, subway, confined area / Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.2	-	<u>Safety Measures – Electrical Equipment</u> Any electrical equipment, such as motors and extension cords, should be intrinsically safe.	Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.2	-	<u>Safety Measures – Piping</u> During piping assembly or conduiting construction, all valves/seals should be closed immediately after installation. As construction progresses, all valves/seals should be closed as installed to prevent the migration of gases through the pipeline/conduit. All piping/conduiting should be capped at the end of each working day.	Services & utilities / Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.2	-	<u>Safety Measures – Fire Safety</u> Adequate fire safety equipments should be provided on site. Workers and visitors should be notified of the potential fire hazards. Safety notices should be	Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment		Y		✓

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		posted around the site warning the anger and potential hazards.			Guidance Note				
14.12.1	-	<u>Safety Measures – Confined Spaces</u> Precautionary measures should include ensuring that staff members are aware of the potential hazards of working in confined spaces, and that appropriate monitoring procedures are in place to prevent hazards in confined spaces.	Confined space / Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓
14.12.1	-	<u>Monitoring</u> Periodically during ground-works within the Consultation Zone, the works area should be monitored for methane, carbon dioxide and oxygen using appropriately calibrated portable gas detection equipment. Depending on the results of the measurements, actions required will vary. As a minimum these should encompass those actions specified in Table 14.8 of the EIA Report or Table 14.1 of the EM&A Manual.	Construction Stage	Contractor	EPD/TR8/97 - Landfill Gas Hazard Assessment Guidance Note		Y		✓

Landscape and Visual

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	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		✓
10.9	7.6	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be	All areas/detailed design/ during	Design Consultant/	TMEIA	Y	Y		NA

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		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)	construction	Contractor					
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		NA
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone) (CM4)	All areas/detailed design/ during Construction/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
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		< >
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		✓
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	Recycle/Reuse all felled trees and vegetation, e.g. mulching (CM9)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
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		NA
10.9	7.6	Re-vegetation of affected woodland/shrubland with	All areas/detailed design/ during Construction	Design	TMEIA	Y	Y	Y	N/A

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		native species (OM1)	during Construction/ construction	post	Consultant/ Contractor					
10.9	7.6	Tall buffer screen tree / shrub / climber planting where appropriate should be incorporated to soften hard engineering structures and facilities (OM2)	All areas/detailed design/ during Construction/ construction	post	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
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 minimize unnecessary light spill (OM3)	All areas/detailed design/ during Construction/ construction	post	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
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/ construction	post	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
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/ construction	post	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/ construction	post	Design Consultant/ Contractor	TMEIA	Y	Y	Y	✓
Waste										
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 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	Contract mobilisation	Contractor	TMEIA, Works Branch		Y		✓	

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		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.			Technical Circular No. 5/99 for the Trip-ticket System for Disposal of Construction and Demolition Material				
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 minimize the extent of cutting.	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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12.6	8.1	Inert C&D materials from the toll plaza cut slopes shall be reused for construction of the raised platform for the toll plaza where possible.	Toll Plaza / toll plaza 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	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	All areas / throughout construction period	Contractor	TMEIA		Y		✓

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		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.							
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: <ul style="list-style-type: none"> • suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed; • Having a capacity of <450L unless the specifications have been approved by the EPD; and • Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations. • Clearly labelled and used solely for the storage of chemical wastes; • Enclosed with at least 3 sides; • 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; • Adequate ventilation; • Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and • 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	All areas / throughout	Contractor	TMEIA		Y		✓

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		disposed of to drain,	construction period						
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		✓
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, aluminum 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		✓

Water Quality

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

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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 onsite 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		✓
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	All areas/ throughout construction period	Contractor	TM-EIAO		Y		◇

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		materials or debris from getting into the drainage system, and to prevent storm run-off from getting into foul sewers.							
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	-	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		✓
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		✓
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		◇

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6.10	Section 5	All construction works shall be subject to routine audit to ensure implementation of all EIA recommendations and good working practice.	All areas/ throughout construction period	Contractor	EM&A Manual		Y		✓
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Remarks:

- ✓ Compliance of Mitigation Measures
- <> Compliance of Mitigation Measures but need improvement.
- × Non-compliance of Mitigation Measures
- ▲ Non-compliance of Mitigation Measures but rectified by Contractor
- △ Deficiency of Mitigation Measures but rectified by Contractor
- N/A Not Applicable in Reporting Period
- # Amended against condition 3.13 of EP-354/2009/C

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