



AUES JOB No.: TCS00715/14

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

2ND MONTHLY ENVIRONMENTAL MONITORING AND
AUDIT (EM&A) REPORT – DECEMBER 2014

PREPARED FOR
CRBC AND KADEN JOINT VENTURE

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EXECUTIVE SUMMARY

ES01 The construction phase of Contract HY/2013/12 was commenced on **23 October 2014**. This is the **2nd Monthly EM&A Report** presenting the monitoring results and inspection findings for the reporting period from **1 to 31 December 2014** (hereinafter ‘the Reporting Period’).

SUMMARY OF EM&A ACTIVITIES FOR THE REPORTING PERIOD

ES02 The EM&A activities conducted in the Reporting Period are summary in below:-

- 24-hours TSP of Air Quality Monitoring – **50 events**
- 1-hour TSP of Air Quality Monitoring – **165 events**
- Cultural heritage Inspection – **5 events**
- Landfill Gas Monitoring – **25 days**
- Landscape & Visual Monitoring – **4 events**
- Environmental Site Inspection – **5 events**

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES03 In the Reporting Period, a total of two (2) Action Level exceedances of 1-hour TSP were recorded at ASR5 and AQMS1 on 2 and 17 December 2014 respectively. The summary of breach of air quality performance is shown below.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	2	0	2	Not project related	Not required
	24-hour TSP	0	0	0	0	0

ES04 No noise complaints were received in the Reporting Period.

ES05 Landfill gas monitoring was conducted at the construction of Retaining Wall B and Retaining Wall F by the Safety Officer. The monitoring results shown no exceedances were triggered.

ES06 Site inspection for landscape and visual was conducted on weekly basis by the Landscape Architect to ensure if the condition compliance with the intended aims of the mitigation measures. During the site inspection, all the existing trees were properly protected and kept away from construction works. Sand bags were erected at sensitive areas to ensure no runoff into water body. Most of the landscape works such as planting was not yet commenced.

ES07 280 numbers of Pitcher Plant individuals located at Zones 1 to 7 were transplanted to the nursery site on 17th December 2014 following to conditions on permission issued by the ACFD. The transplanted Pitcher Plants in nursery site was protected by the scaffold structure and surrounded by chain link fence. The condition of the transplanted pitcher plant was normal.

SITE INSPECTION

ES08 In the Reporting Period, joint site inspection by the RE, IEC, ET and the Contractor was carried out on 2nd, 9th, 17th, 23rd and 30th December 2014. No non-compliance was observed during the site inspection.

ES09 Inspection for Pitcher Plants of ecology and grave of culture heritage were also carried out during the weekly site inspection.

ENVIRONMENTAL COMPLAINT

ES10 No environmental complaints were received in the Reporting Period. The statistical summary of environmental complaints is summarized in the following table.

Reporting Period	Environmental Complaint Statistics	
	Frequency	Cumulative
Since project commencement	0	0
December 2014	0	0

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES11 No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES12 No reporting changes were made in the Reporting Period.

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1 INTRODUCTION

1.1 CONTRACT 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). TM-CLK Link Project is a Designated Project under Environmental Permit number VEP-354/2009C issued on 10 December 2014. 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 This is 2nd monthly EM&A report presenting the monitoring results and inspection findings for period from 1 to 31 December 2014.

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 AND ENVIRONMENTAL SUBMISSIONS**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. The master construction program of the Contract is enclosed in *Appendix D*.

- Site Formation – Portion X
- Slope stabilization works – Portion X
- Surface drainage – Portion X
- Ground Investigation Works – Various Locations
- Site Clearance – Various Locations
- Retaining Wall – Portion X and Portion I
- Piling Works – Portion I
- Tree Felling – Portion I
- Tree Survey

2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

2.3.1 The environmental submissions under the EP requirement had been submitted to the EPD and they are 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 (not yet endorsed by EPD)
- Baseline Monitoring Report (not yet endorsed by EPD)

2.3.2 Summary of environmental permits, licenses and notifications for the Contract is presented in *Table 2-1*.

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

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	Water Pollution Control Ordinance - Discharge License	13-08-2014	WT00020065-2014	29-09-2014	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 Construction of Site Office	15-08-2014	GW-RW0656-14	03-09-2014	22-02-2015
6	CNP for Concreting	15-09-2014	GW-RW0748-14	29-09-2014	29-03-2015
7	CNP for Site Formation	15-09-2014	GW-RW0761-14	29-09-2014	29-03-2015
8	CNP for Multiple Task	05-12-2014	GW-RW0949-14	05-12-2014	04-05-2015

3 SUMMARY OF IMPACT MONITORING REQUIREMENTS UNDER THE CONTRACT

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 aspect 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 monitoring air quality shall cover the following parameters:

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

3.3 MONITORING LOCATION

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 and Cover Tunnel and Cut and Cover Tunnel Construction
	24-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	Daily every three days	

Condition	Monitoring Parameter	Monitoring Location	Frequency	Monitoring Requirement
				<p><u>Toll Plaza</u> During excavation, slope works, construction of road and superstructures and wind erosion from open sites and stockpiling areas</p> <p><u>Tunnel Buildings</u> During excavation, foundation works, construction of superstructures and wind erosion from open sites and stockpiling areas</p>

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 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 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.

3.8 MONITORING SCHEDULE

- 3.8.1 The monitoring schedule for L&V and landfill gas for the present and next reporting period are presented in *Appendix G*.

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 AIR QUALITY MONITORING RESULTS IN REPORTING PERIOD

4.2.1 In the Reporting Period, 1- hour TSP and 24-hour TSP monitoring were carried out at five proposed locations by the ET of Contract HY/2012/08. The detailed information of air quality monitoring could be referred to the Monthly EM&A Reports of the Contract HY/2012/08 (December 2014).

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 24-hour TSP were recorded but two (2) exceedances of 1-hour TSP were triggered in the Reporting Period. Notification on Exceedances (NOEs) to all relevant parties has been issued by the ET of Contract HY/2012/08 upon the results was confirmed. 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
2 December 2014	ASR5	1-hour TSP	346 $\mu\text{g}/\text{m}^3$	Action Level
17 December 2014	AQMS1	1-hour TSP	348 $\mu\text{g}/\text{m}^3$	Action Level

4.4 AIR QUALITY EXCEEDANCE INVESTIGATION

4.4.1 Investigation for the exceedances has been undertaken by the ET of the Contract. Investigation reports for the cause of exceedances have been submitted to relevant parties and enclosed in *Appendix J*.

1-hour TSP exceedance on 2 December 2014

4.4.2 According to site information provided by CRBC-Kaden JV, site formation works was conducted on 2 December 2014. There were 12 nos. of rock breakers, 10 nos. of excavators operated. To reduce to dust impact arises from the contract, mitigation measures for construction dust control were implemented and they are included the following:-

- 4 nos. of water trucks were arranged on haul road to keep road surface wet (refer to photo 1-4 and 8)
- to set speed control at 5 km/hr for all vehicles using the haul road
- most soil stockpiles were well compacted
- installation of auto-water sprinkler in dusty area
- provide water spraying during rock breaking work
- covered part of the exposed slopes by geotextile net

4.4.3 During site inspection on 5 and 12 December 2014, it was observed that the dust mitigation measures were implemented and the site condition is acceptable. Photo showing the implemented dust mitigation measures on 12 December 2014 are shown in photo record.

4.4.4 There are other monitoring locations closer to the active site area, such as AQMS1 and ASR6, and the relevant monitoring results were reviewed. With referenced to the monitoring results collected at other stations, AQMS1 is ranged 93-124 $\mu\text{g}/\text{m}^3$ and ASR6 is ranged 73-106 $\mu\text{g}/\text{m}^3$ and no exceedances were triggered.

4.4.5 According to the wind direction and wind speed data, north-easterly wind at 2m/s was blowing

between 3:00pm to 4:00pm. AQMS1 and ASR6 were located at upstream of ASR5 and monitoring was undertaken at similar time, but there were no exceedances recorded at both AQMS1 and ASR6. Therefore, it was considered that the exceedance at ASR5 was unlikely due to construction dust.

- 4.4.6 During the course of monitoring, no construction works was conducted at Portion N6 near Tuen Mun Fire Station on 2 December 2014. However, heavy traffic was observed at Lung Mun Road and River Trade Terminal. It is considered the heavy traffic deteriorated the air quality along the area of Lung Mun Road and River Trade Terminal. Since ASR5 was located adjacent to Lung Mun Road, it was highly impacted by the road traffic.
- 4.4.7 Based on above investigation, the exceedance is unlikely related to the Contract work and no corrective action was required accordingly.

1-hour TSP exceedance on 17 December 2014

- 4.4.8 According to site information provided by CRBC-Kaden JV, site formation works was conducted on 17 December 2014. There were 11 nos. of rock breakers, 9 nos. of excavators and 3 drill works operated. To reduce the dust impact arises from the contract, mitigation measures for construction dust control were implemented and they are included the following:-
- 4 nos. of water trucks were arranged on haul road to keep road surface wet
 - Soil stockpiles were compacted and hydro-seeded.
 - Covered of the exposed slopes by geotextile net
 - provide water spraying during rock breaking work
 - installation of auto-water sprinkler in dusty area
 - to set speed control at 5 km/hr for all vehicles using the haul road
- 4.4.9 During the course of monitoring, no construction works was conducted at AQMS1. According to the wind direction and wind speed data, north-easterly wind at 2.7m/s was blowing between 3:00pm to 4:00pm. There was other monitoring location closer to the active site area, such as ASR6, receiving the same dust impact from the site. With referenced to the monitoring results collected at other stations, ASR6 is ranged 91-181 $\mu\text{g}/\text{m}^3$ and no exceedances were triggered.
- 4.4.10 TCRBC-Kaden JV was advised to enhance the dust mitigation measures upon receipt the exceedance. As new dust control measures, hydro-seeded on the exposed slopes was implemented on 17 December 2014.
- 4.4.11 There was consecutive 3 times of 1-hour TSP monitoring taken on 17 December 2014 and only one exceedance was recorded. Moreover, there were no exceedances recorded after hydro-seeded applied on the exposed slope as an enhanced dust mitigation measures. It is considered that the exceedance was a single event. The Contractor should continue implement the dust control measures for the contract.

5 ECOLOGY MONITORING

5.1 GENERAL

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

5.2 PITCHER PLANTS INSPECTION

5.2.1 In the Reporting Period, inspections for the condition of the Pitcher Plants and mitigation measures were carried out by the ET on 2nd, 9th, 17th, 23rd and 30th December 2014.

5.2.2 On 2nd and 9th December 2014, it was observed that chain link fencing has been provided as the temporary protection for pitcher plant in Zone 1-10. No construction activities were found to be conducted nearby the protected areas of Pitcher Plants and the growth of Pitcher Plants is kept in normal condition.

5.2.3 Permission for transplantation of Pitcher Plant was issued by the AFCD on 9th December 2014. 280 numbers of Pitcher Plant individuals located at Zones 1 - 7 were transplanted to the nursery site on 17th December 2014 by the accredited person and his assistant. The transplantation work was strictly followed to conditions on permit.

5.2.4 During site inspection on 17th, 23rd and 30th December 2014, it was observed that the transplanted pitcher plants in nursery site was protected by the scaffold structure which surrounded by chain link fencing. There was no breached or damaged observed for the erected fencing and the condition of the transplanted pitcher plant was normal. For those unaffected pitcher plant located in Zone 8 – 10, inspection was randomly undertaken for Zones 8, 9 and 10 during weekly site inspection. It was observed that the Pitcher Plants at these areas were fenced off by chain link fence to avoid encroachment of personnel on to these areas.

5.2.5 During each occasion of site inspection, no construction activities were found to be conducted nearby the protected areas of Pitcher Plants and the growth of Pitcher Plants is kept normal condition.

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 **2nd, 9th, 17th, 23rd and 30th December 2014**. During site inspection, buffer zone was observed between the working area and the Grave and no construction material or equipment was stored nearby the Grave.

6.2.2 Mitigation measures undertaken by the Contractor has fully implemented 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 on **5th, 12th, 19th and 24th December 2014** by the Registered Landscape Architect. During the site inspection, all the existing trees were properly protected and kept away from construction works. Sand bags were erected at sensitive areas to ensure no runoff into water body. Most of the landscape works such as planting was not yet commenced. The detailed inspection checklists were provided in *Appendix K*.

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 (SO) 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 advised by the SO, the gas analyser would be optimally calibrated by the self-test function to provide the most accurate result. The gas analyser is calibrated and certified by a laboratory accredited under HOKLAS or any other international accreditation scheme at yearly basis.

8.2 LANDFILL GAS MONITORING RESULT

8.2.1 In the Reporting Period, landfill gas monitoring was conducted at the construction of Retaining Wall B and Retaining Wall F and the locations are illustrated in *Appendix E*. A BIOGAS 5000 gas analysis was used for the landfill gas monitoring and the valid calibration certificate is presented in *Appendix H*.

8.2.2 There were a total of 25 days monitoring were carried by the Safety Officer or an approved and qualified persons. The landfill gas measurement results is summarized in *Table 8-1*. Moreover, database of monitoring result and graphical plot are attached in *Appendix I*.

Table 8-1 Summary of Landfill Gas Measurement Results

Landfill Gas Parameter	Action Level	Limit Level	Detectable at Retaining Wall B		Detectable at Retaining Wall F	
			Min	Max	Min	Max
Methane	>10% LEL (>0.5% v/v)	>20% LEL (>1% v/v)	0%	0%	0%	0%
Oxygen	<19%	<18%	21.0%	21.3%	21.0%	21.3%
Carbon Dioxide	>0.5%	>1.5%	0.0%	0.3%	0.0%	0.2%

- 8.2.3 The measurement results shown that no methane was detected and oxygen concentration measured was over 21% and Carbon Dioxide was between 0.0 and 0.3 %. 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. The effective management of waste arising during the construction phase will be monitored through the site audit programme. The aims of the waste audit are:

- to ensure the waste arising from the works are handled, stored, collected, transferred and disposed of in an environmentally acceptable manner; and
- to encourage the reuse and recycling of material.

9.1.2 In addition to the site inspections, the ET shall review the documentation procedures prepared by the Waste Coordinator once a week to ensure proper records are being maintained and procedures undertaken in accordance with the Waste Management Plan.

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 The quantities of wastes generated under the Contract in this Reporting Period are summarized in **Tables 9-1** and **9-2** and the Monthly Summary Waste Flow Table is shown in **Appendix L**. Whenever possible, materials were reused on-site as far as practicable.

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

Type of Waste	Quantity	Disposal Location
Reused in this Contract (Inert) (‘000m ³)	10.145	-
Reused in other Projects (Inert) (‘000m ³)	16.525	HY/2012/08
Disposal as Public Fill (Inert) (‘000m ³)	14.954	Tuen Mun Area 38

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

Type of Waste	Quantity	Disposal Location
Recycled Metal (‘000kg)	0	-
Recycled Paper / Cardboard Packing (‘000kg)	0	-
Recycled Plastic (‘000kg)	0	-
Chemical Wastes (‘000kg)	0	-
General Refuses (‘000m ³)	0.022	WENT

10 INSPECTION AND AUDITING**10.1 SITE INSPECTION**

10.1.1 According to the approved EM&A Manual, the environmental site inspection shall be formulated by ET Leader on weekly basis to confirm the environmental performance of the construction site.

Findings / Deficiencies During Reporting Period

10.1.2 In the Reporting Period, joint site inspections to evaluate site environmental performance were carried out by the RE, ET and the Contractor on **2nd, 9th, 17th, 23rd and 30th December 2014**. No non-compliance was noted but **eleven (11)** observations and **five (5)** reminders were recorded during site inspections. Moreover, IEC or ENPO has attended joint site inspection on **30 December 2014**.

10.1.3 The findings / deficiencies observed during the weekly site inspection in the Reporting Period are listed in *Table 10-1*.

Table 10-1 Site Observations for the Contract

Date	Findings / Deficiencies	Follow-Up Status
2 Dec 2014	<ul style="list-style-type: none"> Oil drums without drip tray was observed. The contractor was reminded to provide drip tray underneath. The panels of the compressor did not close well during operation. To reduce noise impact, the contractor was reminded to close panels when the compressor operation. As a reminder, housekeeping should be improved near the nepenthes protection zone to maintain the protection zone or nearby area clean and tidy 	<ul style="list-style-type: none"> Oil drums were removed before site inspection on 9 December 2014. The deficiency has been immediate followed after site inspection. Not required for reminder.
9 Dec 2014	<ul style="list-style-type: none"> Stagnant water cumulated inside the drip tray was observed. The contractoris reminded to clean-up to prevent mosquito breeding on site. C&D waste cumulated on site was observed. The contractor was reminded to clean more frequency to maintain the site clean and tidy. Paint oils and solvent without drip tray was observed. The contractor was reminded to provide drip tray to prevent land contamination. As a reminder, dust mitigation measure should be provided at the stockpile storage area to minimize dust generation. 	<ul style="list-style-type: none"> The deficiency has been rectified before site inspection on 17 December 2014. Construction and dismantling waste materials were removed before site inspection on 17 December 2014. Paint oils and solvent of the chemical materials were removed. The deficiency has been rectified on 17 December 2014 before site inspection. Not required for reminder.
17 Dec 2014	<ul style="list-style-type: none"> Dusty haul road was observed, the contractor was reminded increase the water spraying frequency to minimize dust generation. 	<ul style="list-style-type: none"> During site inspection on 23 December 2014, water spray was observed to on the haul road.

Date	Findings / Deficiencies	Follow-Up Status
	<ul style="list-style-type: none"> C&D waste cumulated on site was observed. The contractor was reminded to clean more frequently to maintain the site clean and tidy. As a reminder, dust mitigation measure should be applied during rock breaking or excavating works to reduce dust generation. As a reminder, the contractor should follow the VEP requirement for the <i>nepenthes</i> nursery area. 	<ul style="list-style-type: none"> Construction and dismantling waste materials were removed before site inspection on 23 December 2014. Not required for reminder. Not required for reminder.
23 Dec 2014	<ul style="list-style-type: none"> Dust emitted from rock drilling works near Lun Mun Road was observed. The contractor was reminded to provide water spraying to minimize dust generation. The felled tree and debris cumulated on site was observed. The contractor was reminded to increase disposal frequency. Debris was observed to cumulate inside the u-channel. The contractor was reminded to clean-up to maintain the site drainage system. 	<ul style="list-style-type: none"> No drilling works and dust emission was observed. Felled trees and debris were cleared. Debris cumulated inside the u-channel was cleared.
30 Dec 2014	<ul style="list-style-type: none"> Waste skips of general refuse disposal were filled, the contractor was reminded to clean-up in accordance with WMP requirements. As a reminder, during the dry season, the contractor was reminded to implement water spraying for drilling / breaking / excavating activities to reduce dust generation. 	<ul style="list-style-type: none"> To be followed. Not required for reminder.

10.1.4 The deficiencies in previous Reporting Period have not yet been rectified and they are listed in **Table 10-2**.

Table 10-2 Outstanding Items in Site Inspection of previous Reporting Period

Date	Findings / Deficiencies	Follow-Up Status
11 Nov 2014	<ul style="list-style-type: none"> Residual sand, mud and stagnant water were observed retained on haul road behind the wheel washing bay. The Contractor should clean up the wheel washing bay regularly to make sure it is effective. 	<ul style="list-style-type: none"> The deficiency still not yet settled. The issue will be followed up again in next reporting period.

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

10.1.6 For waste management, good practice for daily housekeeping is reminded. Furthermore, protected fences should be provided for all retained trees and chemical waste storage area should be set-up for all chemical waste disposal on site.

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 was received For the Contract. However, there were 2 exceedances of the environmental performance limit (Action and Limit Level) recoded for air quality monitoring. The statistical summary table of environmental exceedance, complaint, summons and prosecution are 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 Month	Previous Months	Cumulative
December 2014	Air Quality - 1-hr TSP	Action Level	2	2	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		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA

Table 11-3 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics				
	Frequency	Cumulative	Complaint Nature		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA

Table 11-4 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics				
	Frequency	Cumulative	Complaint Nature		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA

11.1.2 In the Reporting Period, a warning letter was issued from EPD on 2 December 2014 regarding uncovered dump trucks.

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 ISEMM for the Contract is shown in *Appendix M*.

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 M*.

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.

12.2 TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

12.2.1 Construction activities as undertaken in the coming month for the Contract lists below:

- Construction of haul roads to Slope A, B, C, D & E
- Excavation to Slope A, B, C, D & E
- Slope stabilization works
- Surface drainage
- Ground Investigation Works
- Site clearance
- Retaining Wall B & F
- Piling Works (Bridge TD1, Bridge G2, Bridge H1 & Footbridge)
- Tree felling

- Construction of Culvert 1
- Pad footing construction for Bridge G2, Bridge H1&G1
- Construction of east portal for underpass
- Natural terrain hazard mitigation measures and flexible barriers installation

12.3 KEY ENVIRONMENTAL ISSUES FOR THE COMING MONTH

12.3.1 Key environmental issues to be considered in the coming month include:

- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Ensure dust suppression measures are implemented properly;
- Sediment catch-pits and silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Site effluent discharge to the nearby nullah is prohibited;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures

13 CONCLUSIONS AND RECOMMENDATIONS

13.1 CONCLUSIONS

- 13.1.1 This is 2nd monthly EM&A report presenting the monitoring results and inspection findings for the period of 1 to 31 December 2014.
- 13.1.2 No exceedances of 24-hour TSP monitoring were recorded in the Reporting Period. However, a total of two (2) Action Level exceedances of 1-hour TSP measurements were triggered in ASR5 and AQMS1 on 2 and 17 December 2014 respectively. NOE was issued by the ET of HY/2012/08 to notify all relevant parties. Based on investigation finding, the exceedances were unlikely related with the works under the Contract. The Contractor was reminded to fully implement the dust control measures.
- 13.1.3 In the Reporting Period, no noise complaint was received by RE, the Contractor, ENPO or HyD. No Action Level exceedances were therefore 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 if the existing condition compliance with the intended aims of the mitigation measures. During the site inspection, all the existing trees were properly protected and kept away from construction works. Sand bags were erected at sensitive areas to ensure no runoff into water body. Most of the landscape works such as planting was not yet commenced.
- 13.1.5 280 numbers of Pitcher Plant individuals located at Zones 1 to 7 were transplanted to the nursery site on 17th December 2014 by the accredited person and his assistant. The transplantation work was strictly followed to conditions on permission. The transplanted Pitcher Plant in nursery site was protected by the scaffold structure which surrounded by chain link fencing. The condition of the transplanted pitcher plant was normal.
- 13.1.6 Landfill gas monitoring was conducted at the construction of Retaining Wall B and Retaining Wall F by the Safety Officer. The monitoring results shown no exceedances were triggered.
- 13.1.7 No documented a complaint, notification of summons or successful prosecution is received by the Contract. However, a warning letter was issued by the EPD on 2 December 2014 regarding to uncovered dump trucks incident.
- 13.1.8 Joint site inspection by the RE, ET and CRBC-Kaden JV was carried out on 2nd, 9th, 17th, 23rd and 30th December 2014. Moreover, IEC or ENPO attended joint site inspection on 30 December 2014. No non-compliance was recorded during the site inspection but **eleven (11)** observations and **five (5)** reminders were recorded during site inspections.
- 13.1.9 In the Reporting Period, chain link fence for protection of Pitcher Plant has been provided for Zone 1 to 10 as the temporary protection before transplantation of Pitcher Plant and the nursery site for the transplanted Pitcher Plant. During each occasion of site inspection, no construction activities were found to be conducted nearby the protected areas of Pitcher Plants and the growth of Pitcher Plants were normal condition.
- 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 joint site inspection was undertaken with any external parties i.e. EPD and AFCD in this Reporting Period.

13.2 RECOMMENDATIONS

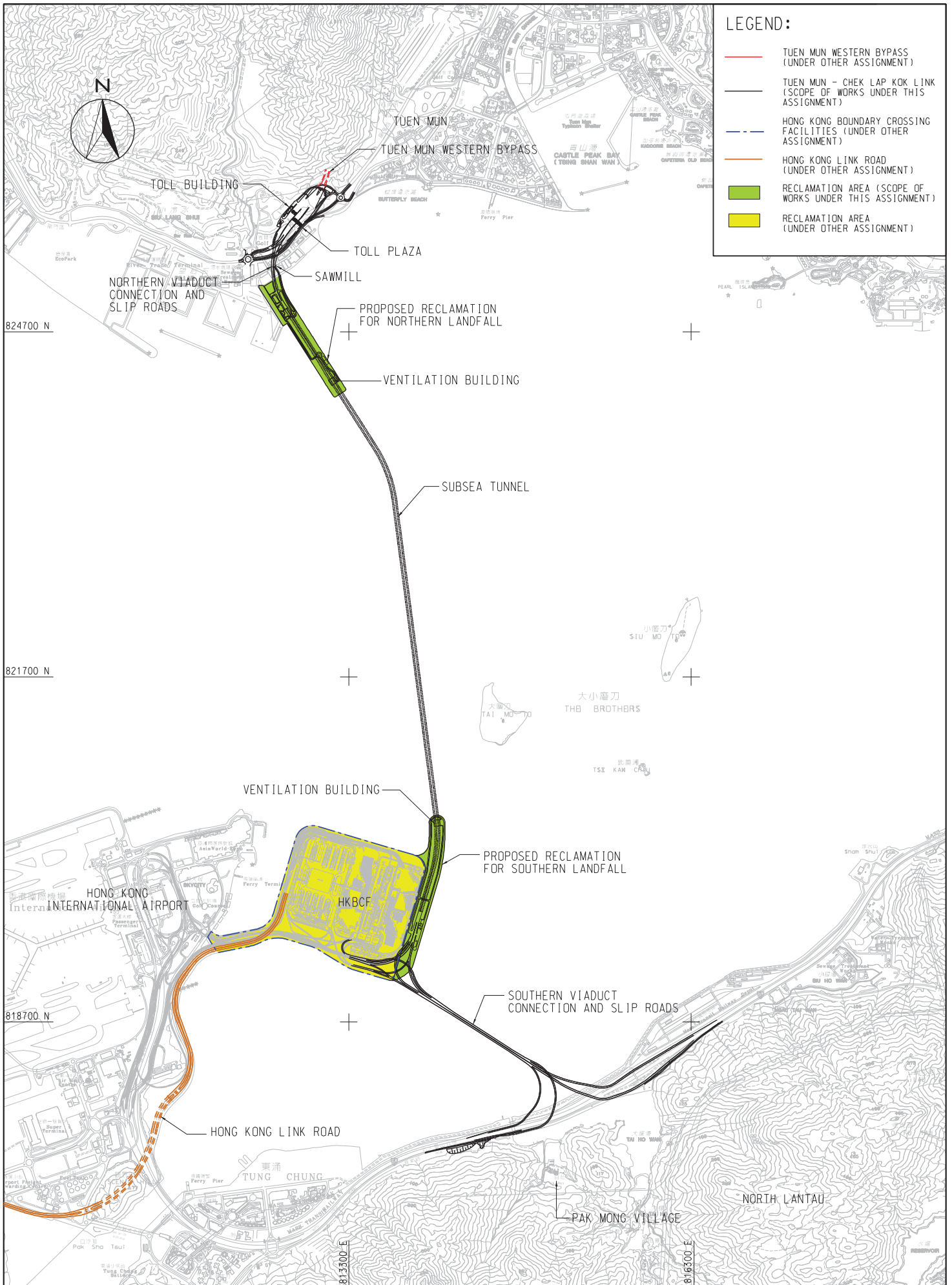
- 13.2.1 During dry season, special attention should be paid on the potential construction dust impact. The Contractor should fully implement the construction dust mitigation measures such as watering of site area for 12 times per day and covering of exposed slopes should be provided

to reduce construction dust impact as recommended in the EMEMIS.

- 13.2.2 Water quality mitigation measures such as prevention of muddy water and other water quality pollutants via site surface water runoff get into public area should be avoided.
- 13.2.3 It was reminded that good housekeeping practice should be maintained. Mosquito control measures should be properly implemented to prevent mosquito breeding on site.

Appendix A

Project Layout Plan



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



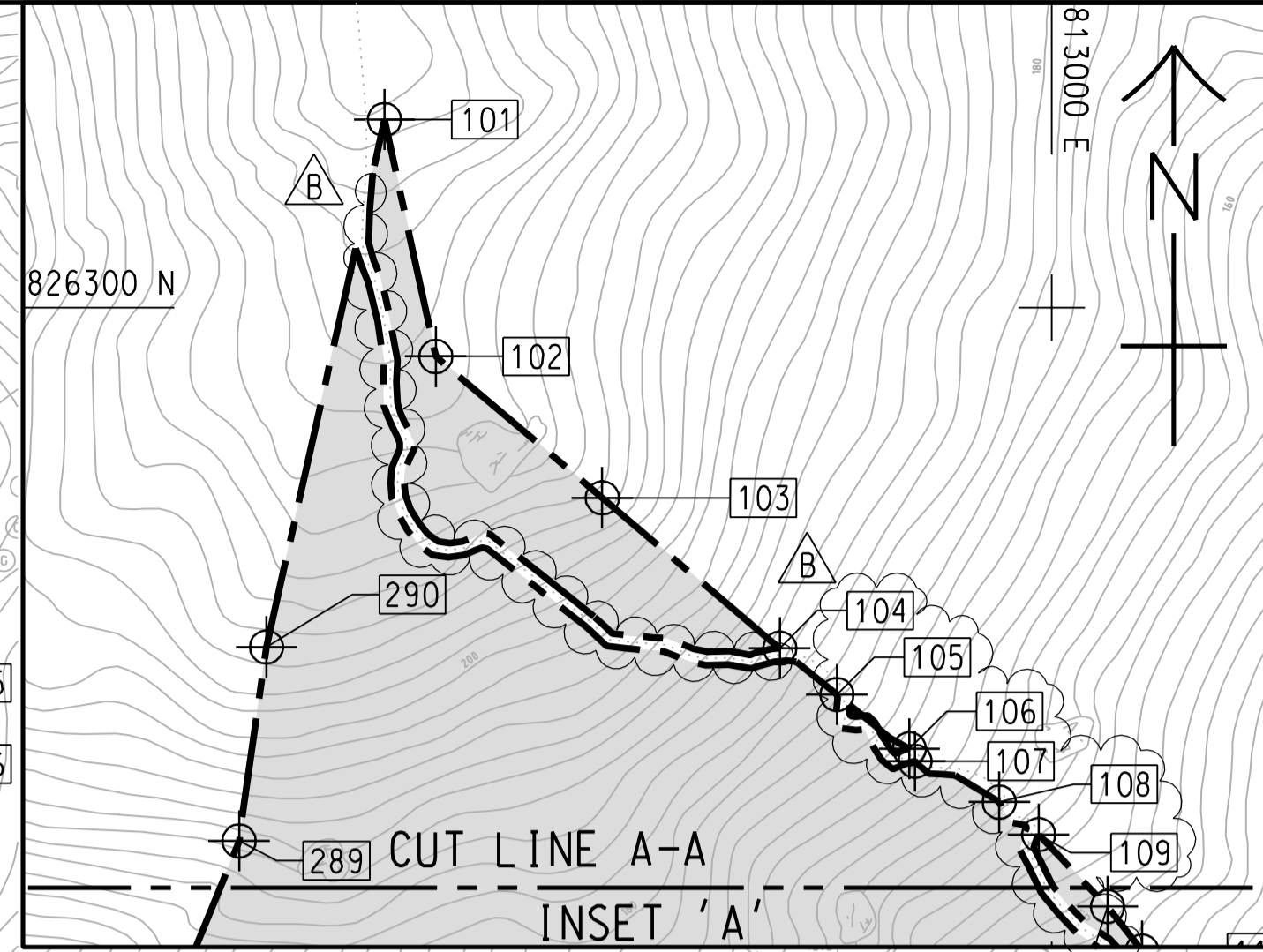
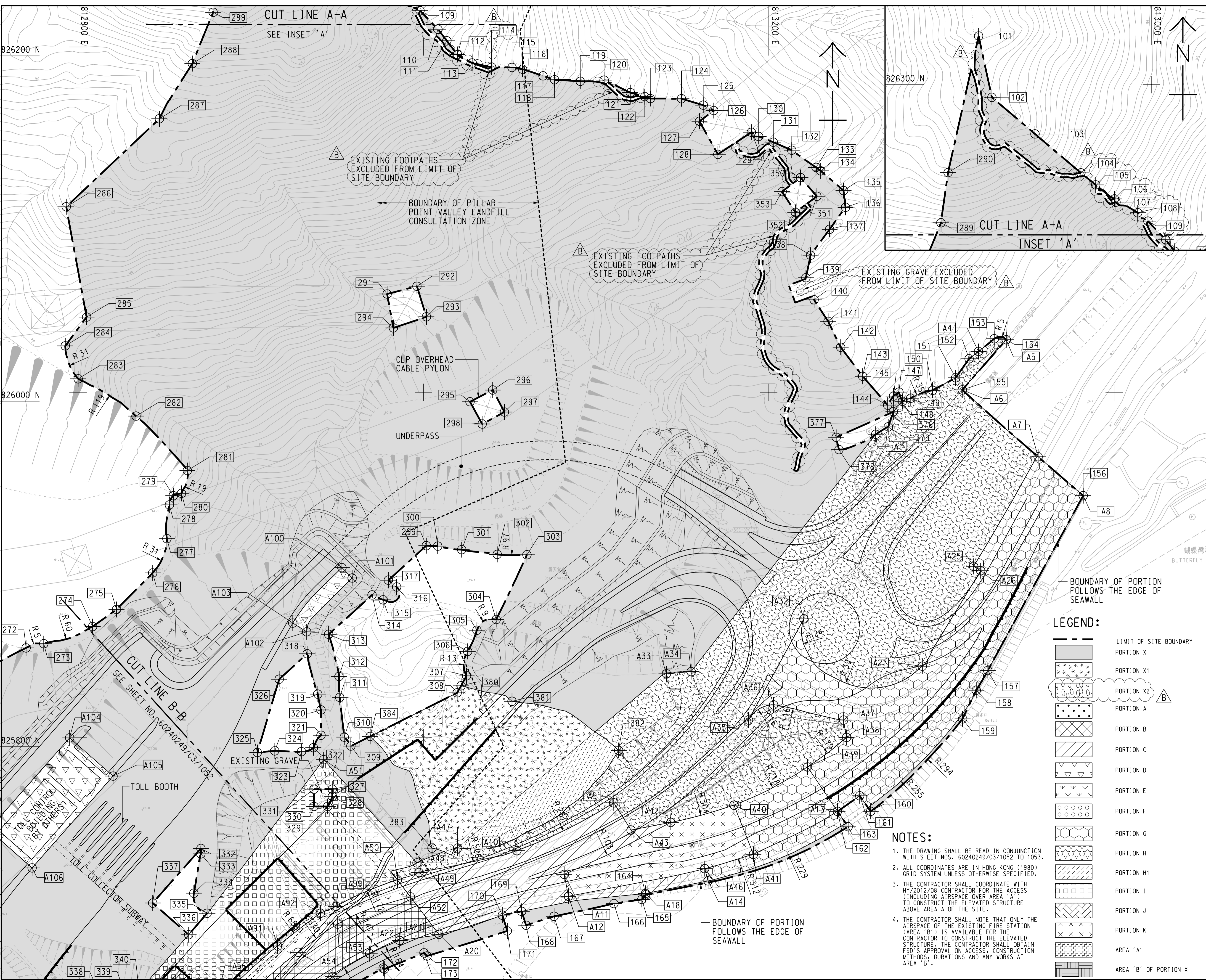
AGREEMENT NO. CE 52/2007(HY)
 TUEN MUN - CHEK LAP KOK LINK - INVESTIGATION
GENERAL LAYOUT OF TM-CLKL

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:

- LIMIT OF SITE BOUNDARY
- PORTION X
- ***** PORTION X1
- PORTION X2
- △ PORTION A
- PORTION B
- PORTION C
- ▽ PORTION D
- ▽ PORTION E
- PORTION F
- PORTION G
- PORTION H
- PORTION H1
- PORTION I
- PORTION J
- PORTION K
- AREA 'A'
- AREA 'B' OF PORTION X

NOTES:

- THE DRAWING SHALL BE READ IN CONJUNCTION WITH SHEET NOS. 60240249/C3/1052 TO 1053.
- ALL COORDINATES ARE IN HONG KONG (1980) GRID SYSTEM UNLESS OTHERWISE SPECIFIED.
- THE CONTRACTOR SHALL COORDINATE WITH HY/2012/08 CONTRACTOR FOR THE ACCESS (INCLUDING AIRSPACE OVER AREA 'A') TO CONSTRUCT THE ELEVATED STRUCTURE ABOVE AREA A OF THE SITE.
- 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
 AECOM Asia Company Ltd.
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SUB-CONSULTANTS
 分判工程顧問公司

ISSUE/REVISION
 修訂

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

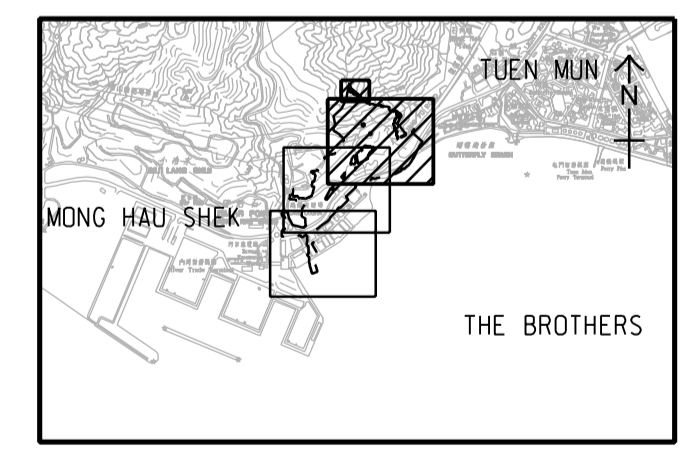
STATUS
 階段

SCALE
 比例

DIMENSION UNIT
 尺寸單位

A1 1:1000 METRES

KEY PLAN 1:50000



PROJECT NO.
 項目編號
 60240249

CONTRACT NO.
 合約編號
 HY/2013/12

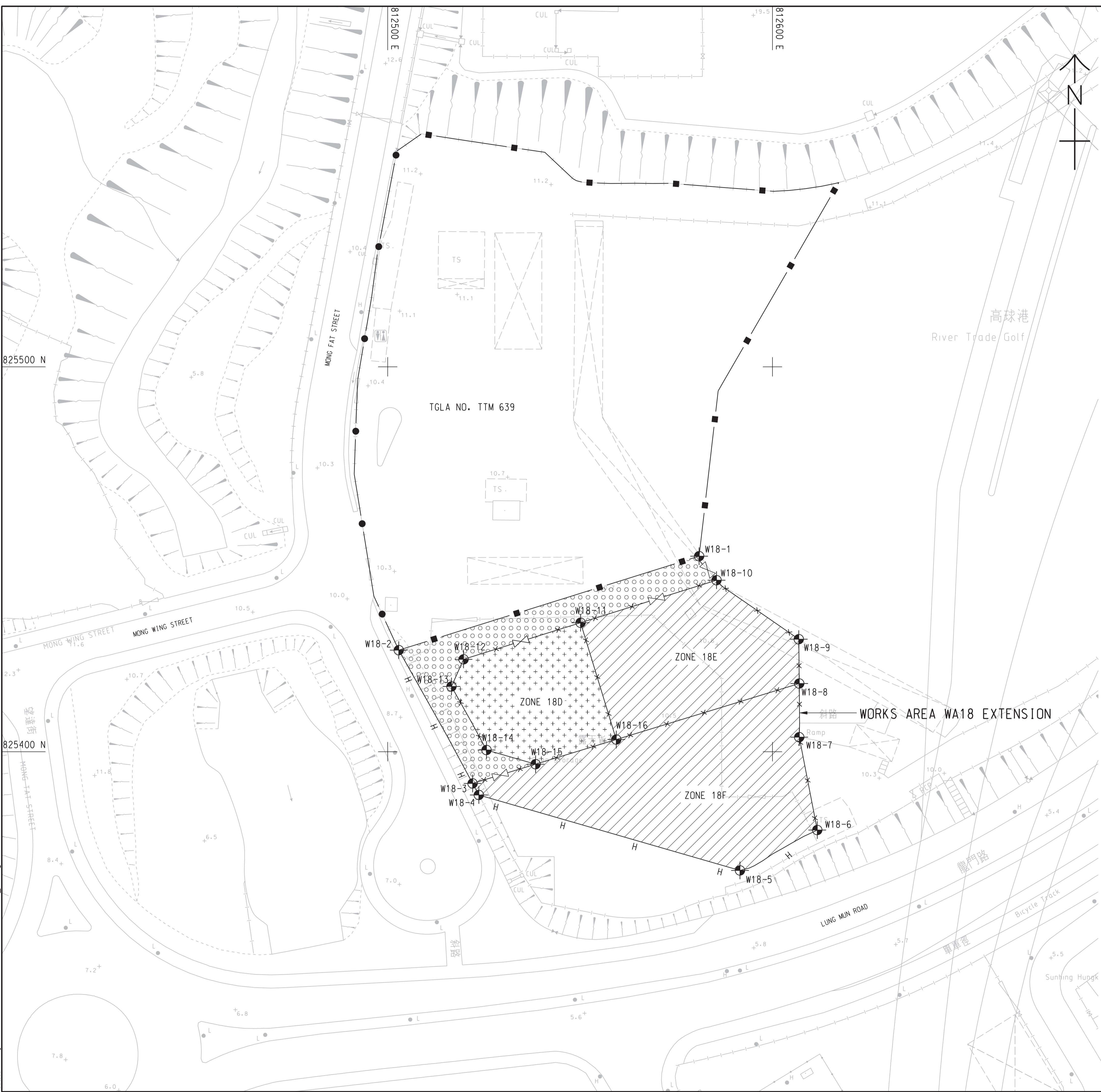
SHEET TITLE
 圖紙名稱
PORTIONS OF SITE AND SITE BOUNDARY SETTING OUT PLAN

SHEET 1 OF 3

SHEET NUMBER
 圖紙編號
 60240249/C3/1051B

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Plot File by: LKQ2 2014/03/4
 PATH: P:\Projects\60240249\DRAWING\CONTRACT\1000\C3_1082.dgn
 Project Management Initials: Designer: PL Checked: ALCF Approved: CWN ISO A1 594mm x 841mm



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

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

NO.	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
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

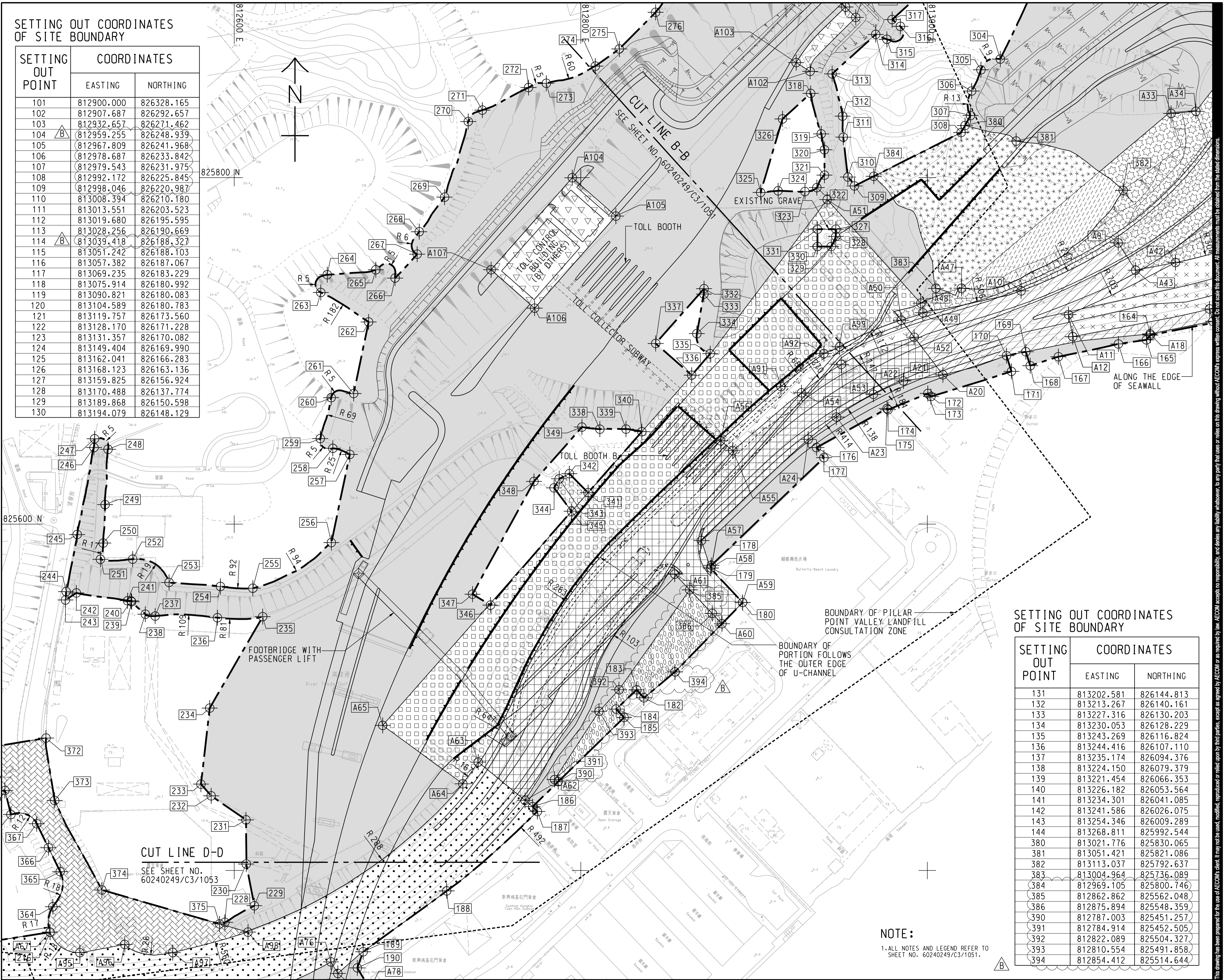
SHEET NUMBER
圖紙編號

60240249/C3/1062B

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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
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ISSUE/REVISION

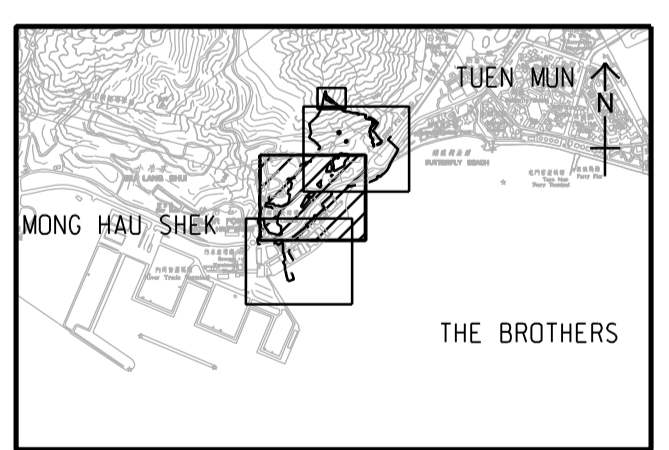
I/R	DATE	DESCRIPTION	CHK.
B	MAR. 14	TENDER ADDENDUM NO. 2	CWN
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-	JAN. 14	TENDER DRAWING	CWN

STATUS

擬定

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

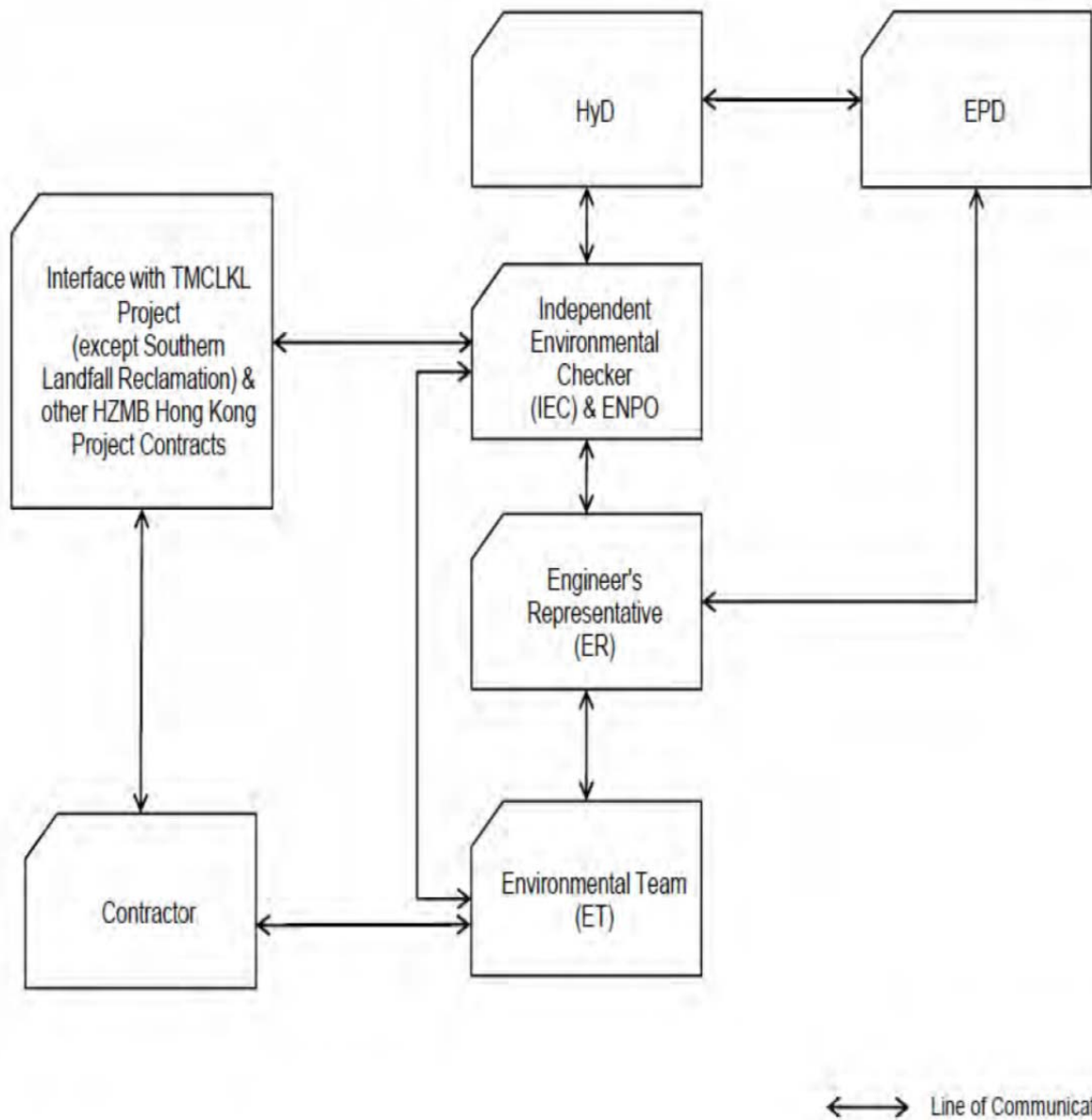
SHEET TITLE
圖紙名稱: PORTIONS OF SITE AND SITE BOUNDARY SETTING OUT PLAN

SHEET NUMBER
圖紙編號: 60240249/C3/1052B

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Appendix C

Organization of the Contract



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	22187289	2218 7399
ENVIRON	Environmental Project Office (ENPO)	Mr. YH Hui	3465 2888	3465 2899
ENVIRON	Independent Environmental Checker (IEC)	Dr. FC Tsang	3465 2828	3465 2899
CKJV	Project Manager	Mr. Simon Tong	2253 8300	2253 8399
CKJV	Site Agent	Mr. John Wong	2253 8300	2253 8399
CKJV	Environmental Officer	Miss Ricci Poon	22733199	2375 3655
CKJV	Environmental Officer	Mr. HY Tang	2253 8300	2253 8399
CKJV	Environmental Supervisor	Miss Melody Tong	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

ENVIRON (IEC and ENPO) – Environ Hong Kong Limited

AUES (ET) – Action-United Environmental Services & Consulting

HKL(RLA) – Hong Kong Landscape

Appendix D

Master Construction Program and Three Months Roll Program

HY/2013/12 TM-CLKL Northern Connection Toll Plaza and Associated Works



Activity ID	Activity Name	Original Duration	Planned Start	Actual Start	Planned Finish	Actual Finish	Timeline (2014-2020)																							
							Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4		
HY/2013/12 Northern Connection Toll Plaza and Associated Works							HY/2013/12 Northern Connection Toll Plaza and Associated Works																							
IWP (Rev.02)							IWP (Rev.02)																							
Site Formation - Retaining Structure for Slope TP_F							Site Formation - Retaining Structure for Slope TP_F																							
Stage 3							Stage 3																							
Temporary Works Design Submission and Approval							Temporary Works Design Submission and Approval																							
RWF11000	Haul road design submission and approval	30	29-Aug-14	29-Aug-14	27-Sep-14	27-Sep-14																								
RWF11050	Open cut excavation design submission and approval	30	18-Sep-14	18-Sep-14	18-Oct-14	18-Oct-14																								
RWF11100	Formwork design submission and approval	45	27-Sep-14	27-Sep-14	11-Nov-14	11-Nov-14																								
Method Statement Submission and Approval							Method Statement Submission and Approval																							
RWF21000	Method Statement Submission and Approval for Open cut excavation	30	18-Oct-14	18-Oct-14	15-Nov-14	15-Nov-14																								
RWF21050	Method Statement Submission and Approval for Retaining Wall Construction	30	21-Oct-14	21-Oct-14	18-Nov-14	21-Oct-14																								
Retaining Structure for Slope TP_F							Retaining Structure for Slope TP_F																							
RWF31000	Form Access Road	24	27-Sep-14	26-Sep-14	30-Oct-14	30-Oct-14																								
RWF31050	Excavation of Soil (5,400m3)	43	18-Nov-14	17-Nov-14	10-Jan-15																									
RWF31100	Excavation of Rock Grade IV (4,320m3)	70	10-Jan-15	10-Jan-15	10-Apr-15																									
RWF31300	Construct Retaining Wall Bay 7 to Bay 20	168	09-Mar-15		17-Oct-15																									
RWF31325	Construct Retaining Wall Bay 4 to Bay 6 adjacent to abutment G2e	50	17-Dec-15		20-Feb-16																									
RWF31350	Construct Retaining Wall Bay 21 to Bay 28	96	04-Nov-16		03-Mar-17																									
RWF31400	Backfilling (51,449m3)	504	17-Oct-15		29-Jul-17																									
Site Formation - Slope TP_A & Associated Works							Site Formation - Slope TP_A & Associated Works																							
Stage 3							Stage 3																							
Temporary Works Design Submission and Approval							Temporary Works Design Submission and Approval																							
TPA11000	Haul road design submission for TP_A,B&C	45	09-Oct-14	01-Sep-14	20-Nov-14	18-Sep-14																								
Method Statement Submission and Approval							Method Statement Submission and Approval																							
TPA21050	Method Statement Submission for TP_A,B&C	45	23-Oct-14	18-Sep-14	04-Dec-14	21-Oct-14																								
Slope Feature - Slope TP_A							Slope Feature - Slope TP_A																							
TPA31030	Tree felling works	24	06-Feb-15	03-Sep-14	10-Mar-15																									
TPA31040	Form Access Road	24	10-Mar-15	03-Sep-14	11-Apr-15	01-Oct-14																								
TPA31050	Site Clearance	24	11-Apr-15	11-Sep-14	13-May-15																									
TPA31100	Excavation of Soil (23,933m3)	48	03-Jun-15	23-Oct-14	05-Aug-15																									
TPA31150	Excavation of Rock Grade IV (2,314m3)	18	05-Aug-15	01-Nov-14	27-Aug-15																									
TPA31200	Excavation of Rock Grade II/III (6,539m3)	60	29-Jul-15		14-Oct-15																									
TPA31250	Forming East Portal Formation and temporary ground drainage works	60	16-Oct-15		29-Dec-15																									
TPA31300	Construct Cascade A	60	30-Dec-15		12-Mar-16																									
Site Formation - Slope TP_B & Associated Works							Site Formation - Slope TP_B & Associated Works																							
Stage 3							Stage 3																							
Slope Feature - Slope TP_B							Slope Feature - Slope TP_B																							
TPB31000	Form Access Road	24	17-Sep-15	03-Sep-14	19-Oct-15	01-Oct-14																								
TPB31050	Site Clearance and Tree Felling	24	20-Oct-15	11-Sep-14	18-Nov-15	23-Oct-14																								
TPB31100	Excavation of Soil (49,155m3)	72	19-Nov-15	30-Oct-14	17-Feb-16																									
TPB31150	Excavation of Rock Grade IV (15,049m3)	80	18-Feb-16	01-Nov-14	01-Jun-16																									
TPB31210	Excavation of Rock II/III	28	23-Mar-16		29-Apr-16																									
TPB31260	Forming road formation and temporary ground drainage works	11	26-May-16		10-Jun-16																									
Site Formation - Slope TP_C & Associated Works							Site Formation - Slope TP_C & Associated Works																							
Stage 3							Stage 3																							
Slope Feature - Slope TP_C							Slope Feature - Slope TP_C																							
TPC31015	Form Access Road	24	17-Sep-15	03-Sep-14	19-Oct-15	01-Oct-14																								
TPC31030	Site Clearance and Tree Felling	24	20-Oct-15	02-Oct-14	18-Nov-15	23-Oct-14																								
TPC31060	Excavation of Soil (12,000m3)	24	18-Jan-16	30-Oct-14	17-Feb-16																									
TPC31100	Excavation of Rock II/III (12,964m3)	115	14-Dec-15		11-May-16																									
TPC31160	Forming road formation and temporary ground drainage works	11	11-May-16		26-May-16																									
Site Formation - Slope TP_D & Associated Works							Site Formation - Slope TP_D & Associated Works																							
Stage 3							Stage 3																							
Temporary Works Design Submission and Approval							Temporary Works Design Submission and Approval																							
TPD21000	Haul road design submission	30	08-Sep-14	01-Sep-14	09-Oct-14	18-Nov-14																								
Method Statement Submission and Approval							Method Statement Submission and Approval																							
TPD11050	Method Statement Submission and Approval for TP_D Slope Site Formation	30	23-Sep-14	18-Sep-14	23-Oct-14	21-Oct-14																								
Slope Feature - Slope TP_D							Slope Feature - Slope TP_D																							
TPD31000	Form Access Road	24	08-Sep-14	21-Aug-14	19-Jun-15	01-Oct-14																								
TPD31025	Site Clearance and Tree Felling	24	24-Nov-14	24-Nov-14	22-Dec-14	30-Nov-14																								
TPD31035	G.I works	17	22-Dec-14		14-Jan-15																									
TPD31100	Excavation of Soil (4,570m3)	12	14-Jan-15		28-Jan-15																									
TPD31150	Excavation of Rock Grade IV (999m3)	12	28-Jan-15		11-Feb-15																									
TPD31200	Excavation of Rock II/III (12,196m3)	92	11-Feb-15		13-Jun-15																									
TPD31250	Forming West Portal Formation and temporary ground drainage works	4	13-Jun-15		19-Jun-15																									
Site Formation - Slope TP_E & Associated Works							Site Formation - Slope TP_E & Associated Works																							
Stage 3							Stage 3																							
Temporary Works Design Submission and Approval							Temporary Works Design Submission and Approval																							
TPE11000	Haul road design submission	30	08-Sep-14	01-Sep-14	09-Oct-14	18-Sep-14																								
Method Statement Submission and Approval							Method Statement Submission and Approval																							

■ Actual Work ■ Remaining Work ■ Critical Remaining Work
◆ Milestone

CRBC - Kaden JV Programme & Progress

Date	Revision	Checked	Approved
30-Nov-14	Draft		

HY/2013/12 TM-CLKL Northern Connection Toll Plaza and Associated Works



Activity ID	Activity Name	Original Duration	Planned Start	Actual Start	Planned Finish	Actual Finish	Gantt Chart (2015-2020)																							
							Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
TPE21000	Method Statement Submission for TP_E Slope Site Formation	45	23-Sep-14	18-Sep-14	06-Nov-14	23-Oct-14	[Gantt bar: 23-Sep-14 to 23-Oct-14]																							
Slope Feature - Slope TP_E at Toll Control Building Area							[Gantt bar: 09-Oct-14 to 21-Dec-16]																							
TPE31000	Form Access Road	72	09-Oct-14	01-Sep-14	21-Dec-16	23-Oct-14	[Gantt bar: 09-Oct-14 to 23-Oct-14]																							
TPE31050	Site Clearance, Tree Transplanting and Felling	72	11-Nov-14	12-Sep-14	06-Feb-15	23-Oct-14	[Gantt bar: 11-Nov-14 to 23-Oct-14]																							
TPE31100	Excavation of Soil (Max. 200m3/n/d; 13,958m3)	72	28-Jan-15	24-Oct-14	04-May-15		[Gantt bar: 28-Jan-15 to 04-May-15]																							
TPE31150	Excavation of Rock Grade IV (55m3/n/d; 2,810m3)	44	13-Mar-15	25-Oct-14	12-May-15		[Gantt bar: 13-Mar-15 to 12-May-15]																							
TPE31200	Excavation of Rock Grade III (45m3/n/d; 17,388m3)	129	12-May-15	31-Oct-14	29-Oct-15		[Gantt bar: 12-May-15 to 29-Oct-15]																							
TPE31250	Excavation of Rock Grade II (35m3/n/d; 85,388m3)	337	24-Aug-15	01-Nov-14	04-Nov-16		[Gantt bar: 24-Aug-15 to 04-Nov-16]																							
TPE31300	Hand Over of Portion D	13	08-Dec-16		21-Dec-16		[Gantt bar: 08-Dec-16 to 21-Dec-16]																							
Slope Feature - Slope TP_E Remaining Section							[Gantt bar: 18-Oct-14 to 21-Jul-17]																							
TPE41000	Preservation of Existing Pitcher Plants before Translocation	154	18-Oct-14	02-Oct-14	02-May-15	31-Oct-14	[Gantt bar: 18-Oct-14 to 31-Oct-14]																							
TPE41020	Translocation of Pitcher Plants	67	02-May-15		29-Jul-15		[Gantt bar: 02-May-15 to 29-Jul-15]																							
TPE41100	Excavation of Soil (Max. 200m3/n/d; 12,159m3)	40	29-Jul-15		18-Sep-15		[Gantt bar: 29-Jul-15 to 18-Sep-15]																							
TPE41150	Excavation of Rock Grade IV (55m3/n/d; 6,408m3)	60	18-Sep-15		04-Dec-15		[Gantt bar: 18-Sep-15 to 04-Dec-15]																							
TPE41200	Excavation of Rock Grade III (45m3/n/d; 14,000m3)	160	04-Dec-15		29-Jun-16		[Gantt bar: 04-Dec-15 to 29-Jun-16]																							
TPE41250	Excavation of Rock Grade II (35m3/n/d; 15,226m3)	250	29-Jun-16		19-May-17		[Gantt bar: 29-Jun-16 to 19-May-17]																							
TPE41300	Construct Cascade C	48	19-May-17		21-Jul-17		[Gantt bar: 19-May-17 to 21-Jul-17]																							
Site Formation - Slope Upgrading Works							[Gantt bar: 17-Dec-14 to 13-Aug-18]																							
Stage 3							[Gantt bar: 17-Dec-14 to 13-Aug-18]																							
Temporary Works Design Submission and Approval							[Gantt bar: 17-Dec-14 to 06-Oct-14]																							
SUW11000	General temporary works design for slope works	30	17-Dec-14	02-Oct-14	17-Jan-15	06-Oct-14	[Gantt bar: 17-Dec-14 to 06-Oct-14]																							
Method Statement Submission and Approval							[Gantt bar: 17-Dec-14 to 06-Oct-14]																							
SUW21000	General method statement for Slope Upgrading Works (soil nails, rock dowels, etc.)	45	17-Dec-14	02-Oct-14	31-Jan-15	06-Oct-14	[Gantt bar: 17-Dec-14 to 06-Oct-14]																							
Slope Feature - Slope SSE-D/C170							[Gantt bar: 06-Jan-15 to 19-Jan-15]																							
SUW31000	Implementation of TTA	14	06-Jan-15		19-Jan-15		[Gantt bar: 06-Jan-15 to 19-Jan-15]																							
SUW31050	Site Clearance and Tree Felling	15	19-Jan-15		05-Feb-15		[Gantt bar: 19-Jan-15 to 05-Feb-15]																							
SUW31100	Prepare Access Road	7	19-Jan-15		27-Jan-15		[Gantt bar: 19-Jan-15 to 27-Jan-15]																							
SUW31150	Excavation of Soil (1,240m3)	14	31-Jan-15		17-Feb-15		[Gantt bar: 31-Jan-15 to 17-Feb-15]																							
SUW31200	Excavation of Rock Grade IV (350m3)	9	17-Feb-15		03-Mar-15		[Gantt bar: 17-Feb-15 to 03-Mar-15]																							
SUW31250	Slope Works (Recompaction; Soil Nail 45 nr) and Drainage System	45	03-Mar-15		02-May-15		[Gantt bar: 03-Mar-15 to 02-May-15]																							
Other Slope Features							[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW41000	Hydroseeding SSE-D/C152	72	31-Jan-15		07-May-15		[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW42000	Hydroseeding and Erosion Control Mat SSE-D/C121	36	13-Jun-15		01-Aug-15		[Gantt bar: 13-Jun-15 to 01-Aug-15]																							
SUW43000	Hydroseeding and Erosion Control Mat SSE-D/C122	36	13-Jun-15		01-Aug-15		[Gantt bar: 13-Jun-15 to 01-Aug-15]																							
SUW45000	Hydroseeding SSE-D/C150	72	31-Jan-15		07-May-15		[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW46000	Slope Modification Works SSE-D/C14	72	29-Jul-17		02-Nov-17		[Gantt bar: 29-Jul-17 to 02-Nov-17]																							
SUW47000	Hydroseeding SSE-D/C151	72	31-Jan-15		07-May-15		[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW47500	Re-compaction, Fill and Hydroseeding SSE-D/C149, 150 and 152	72	31-Jan-15		07-May-15		[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW48000	Rock Mapping and Stabilization SSE-D/C115	72	31-Jan-15		07-May-15		[Gantt bar: 31-Jan-15 to 07-May-15]																							
SUW49000	Hydroseeding and Erosion Control Mat SSE-D/C18	136	25-May-17		18-Nov-17		[Gantt bar: 25-May-17 to 18-Nov-17]																							
SUW50000	Hydroseeding and Erosion Control Mat SSE-D/C117	148	26-Jun-17		03-Jan-18		[Gantt bar: 26-Jun-17 to 03-Jan-18]																							
SUW51000	Slope Cut SSE-D/C165 (1E - 50m3/n/d, 210m3; Soil Nail 47 nr., each 8m Long)	196	30-Mar-16		09-Dec-16		[Gantt bar: 30-Mar-16 to 09-Dec-16]																							
SUW52000	Slope Modification Works D/C21	48	02-Nov-17		30-Dec-17		[Gantt bar: 02-Nov-17 to 30-Dec-17]																							
SUW53000	Slope Modification Works D/C171	48	30-Dec-17		01-Mar-18		[Gantt bar: 30-Dec-17 to 01-Mar-18]																							
SUW54000	Drainage Hydroseeding and Erosion Control Mat SSE-D/C16	120	08-Mar-18		13-Aug-18		[Gantt bar: 08-Mar-18 to 13-Aug-18]																							
SUW55000	Slope Re-compaction SSE-D/F60	96	26-Oct-17		24-Feb-18		[Gantt bar: 26-Oct-17 to 24-Feb-18]																							
SUW56000	Slope Modification Works D/C158	48	30-Dec-17		01-Mar-18		[Gantt bar: 30-Dec-17 to 01-Mar-18]																							
SUW57000	Hydroseeding and Erosion Control Mat SSE-D/C17	48	10-Apr-18		11-Jun-18		[Gantt bar: 10-Apr-18 to 11-Jun-18]																							

HY/2013/12 TM-CLKL Northern Connection Toll Plaza and Associated Works



Activity ID	Activity Name	Original Duration	BCT Early Start	Actual Start	BCT Finish	Actual Finish	Predecessors	Total Float	2014					2015		
									Nov	Dec	Jan	Feb	Mar	Apr	May	Jun
HY/2013/12 Northern Connection Toll Plaza and Associated Works																
IWP (Rev.02) DD21-Jul-14																
Site Possession Dates																
AD10170	Portion X2 Possession Date	0	25-Nov-14		25-Nov-14		CD10100	95								
AD10270	Works Area WA18 Ext (Zone 18 D) Possession Date	0	25-Nov-14				CD10100	160								
General Submission Under PSs																
PS10210	Nominate Public Relations Officer for acceptance	0			17-Nov-14	11-Nov-14	CD10110									
PS10220	Nominate Tunnel Geologist for acceptance	0			17-Nov-14		CD10110	87								
PS10260	Nominate Interface co-ordinator for acceptance (EI+14d)	0			18-Oct-14		CD10110	86								
General Provisions for the Engineer																
GP10130	Submit green roof design (Engr office) for approval	0	10-Sep-14	29-Jul-14	13-Dec-14		CD10110	355								
GP10150	Acceptance of the green roof design	0			08-Nov-14		GP10140	363								
GP10170	Erection of the Engineer office	72	10-Sep-14	29-Jul-14	10-Dec-14		GP10160, GP10150	275								
GP10180	Provision & maintain interim accommodation for the Engineer	100	10-Sep-14	02-Sep-14	13-Dec-14		CD10110, GP10150	360								
General Provisions for the Contractor																
GP20200	Erection of Contractor site office and other facilities	48	26-Sep-14	02-Aug-14	27-Nov-14		GP20190, AD10170	79								
Programming / Reporting																
Detailed Works Programme (DWP)																
PR20100	Prepare & submit DWP	60	29-Sep-14	26-Sep-14	26-Nov-14		PR10150	79								
Existing Trees																
TR10150	Acceptance of the tree survey report	0			11-Nov-14	11-Nov-14	TR10110									
TR10200	Acceptance of the tree risk assessment report	0			05-Dec-14	05-Nov-14	TR10160									
Site Hoarding																
SH10140	Acceptance of the site hoarding plan	0	10-Oct-14	16-Oct-14	16-Oct-14		SH10100									
Condition Survey & CIA Reports																
CS10150	Acceptance of the condition survey report	0			15-Jan-15		CS10110	169								
CS10200	Acceptance of the CIA report	0			26-Mar-15		CS10160	154								
Temporary Traffic Management																
Construction Traffic Impact Assessment (CTIA)																
TT10150	Acceptance of The CTIA report	0	05-Jan-15		05-Jan-15		TT10100	88								
Temp Traffic Arrangement for Lung Fu Road Roundabout (for Sewer Culvert and Roadworks)																
TT40250	Approval of the TTA scheme (LFR R/A)	0	27-Mar-15		27-Mar-15		TT40200, CUI10100	202								
Interface Management																
Management Plan Submission/Update/Revision																
IF10150	Acceptance of the plan	0	24-Nov-14	31-Oct-14	13-Dec-14	31-Oct-14										
IF10250	Acceptance of the detailed Interface Document	0	24-Nov-14	31-Oct-14	13-Dec-14	31-Oct-14	IF10200									
Alternative Design																
ACABAS Submission																
DN10350	Formal acceptance from ACABAS	0	17-Dec-14	06-Nov-14	17-Dec-14	06-Nov-14	DN10300									
DDA (TD1 Structure) Submission																
DN40100	Prepare & submit DDA drawing w/ICE cert	30	20-Dec-14	01-Nov-14	21-Jan-15		DN20300	31								
DN40150	Acceptance of the DDA Drawing	0			07-Mar-15		DN40100	31								
DDA (TD1 Pre-cast Beams) Submission																
DN50100	Prepare & submit DDA Drawings w/ICE cert	90	18-May-15	01-Nov-14	13-Aug-15		DN20300	270								
DDA (G2 Foundation) Submission																
DN51150	Acceptance of the DDA Drawings	0	16-Dec-14		16-Dec-14		DN51100	105								
DDA (H1 & G1 Structure) Submissions																
ND52150	Acceptance of the DDA Drawings	0	13-Feb-15		13-Feb-15		ND52100	263								
DDA (RW_B Foundation) Submission																
DN50210	Prepare & submit DDA Drawings w/ICE	60	24-Dec-14	15-Sep-14	25-Feb-15		DN20250	274								
DN50220	Acceptance of the DDA Drawings	0			13-Apr-15		DN50210	274								
Instrumentation and Monitoring																
Ground Settlement Marker																
IM10070	Installation of GSM02-03,09,17-18,20	250	18-Feb-15		26-Oct-15		TPD31100	66								
IM10100	Installation of GSM10,13-14,37-42	110	12-Feb-15		05-Jun-15		SUW31150	238								
Utility Settlement Marker																
IM20020	Installation of USM01-26	315	23-Sep-14		06-Nov-15		AD10130	16								
Tiltmeter																
IM40010	Installation of TM01	6	07-Nov-14	29-Oct-14	13-Nov-14	29-Nov-14	CD10110									
IM40020	Installation of TM02(Outside site boundary)	5	30-Jan-18	29-Nov-14	03-Feb-18	29-Nov-14	KD10100									
Piezometer/Standpipe																
IM50020	Installation of PADH13-PADH14	30	20-Nov-14	04-Sep-14	18-Dec-14		IM40100	54								
Existing Drillholes With Installed Standpipe/Piezometer																
IM60010	Installation of DCNLD1-DCNLD051,PNLD1-PNLD10	90	03-Sep-14	25-Aug-14	29-Nov-14		CD10110	83								

█ Primary Baseline
█ Actual Work
█ Remaining Work
█ Critical Remaining Work

◆ Milestone
→ Summary

CRBC - Kaden JV
Three Months Rolling Programme

Date	Revision	Checked	Approved
30-Nov-14	Draft		

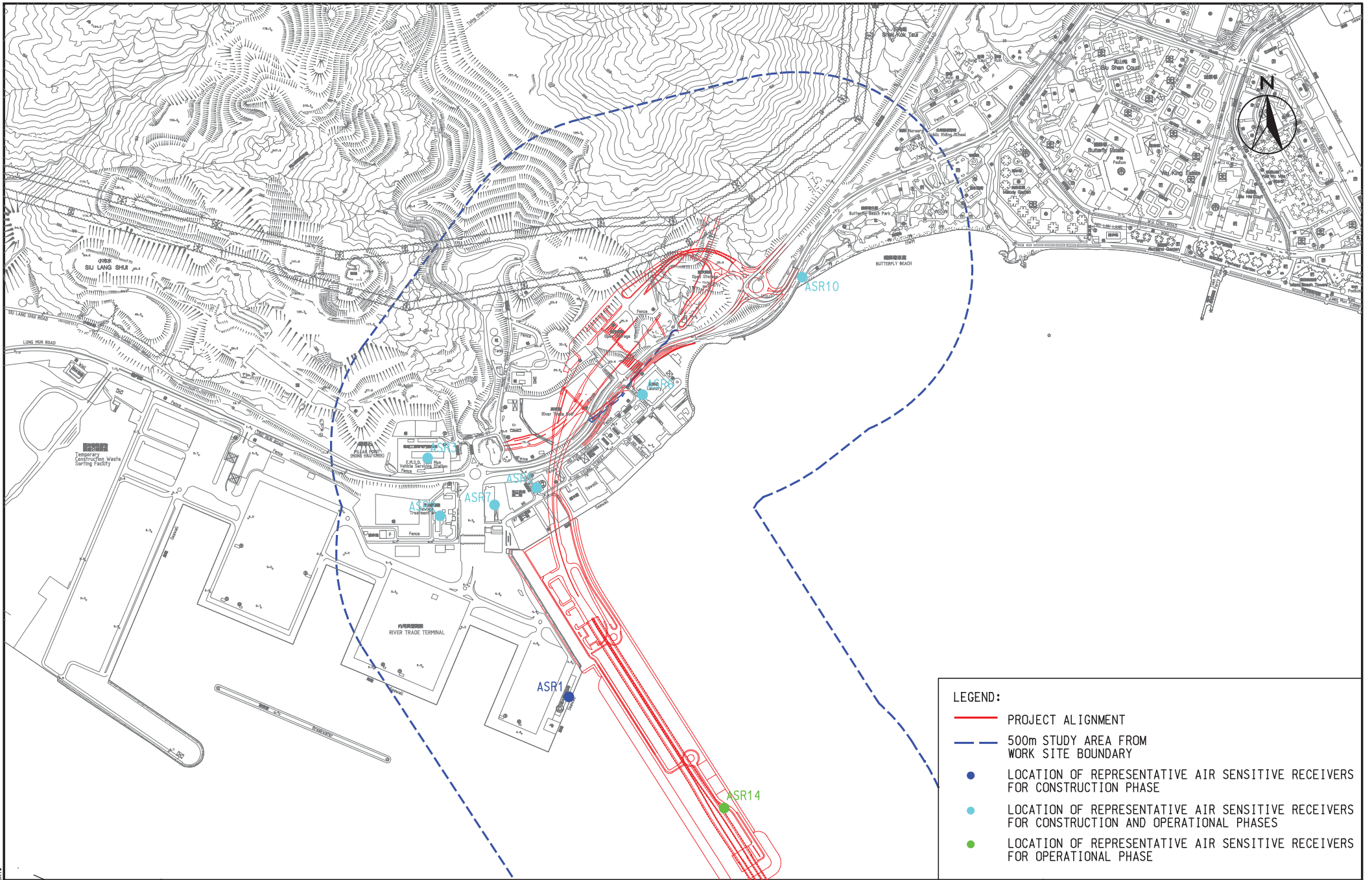
HY/2013/12 TM-CLKL Northern Connection Toll Plaza and Associated Works



Activity ID	Activity Name	Original Duration	BCT Early Start	Actual Start	BCT Finish	Actual Finish	Predecessors	Total Float	2014					2015									
									Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Toll Plaza Decking TD1-Section 1																							
Stage 1																							
Temporary Works Design(TWD) Submission and Approval																							
TD111200	TWD -Formwork design for Pier	30	17-Dec-14	18-Aug-14	02-Jun-15		CD10110, PS1	61															
Method Statement Submission and Approval																							
TD120000	MSS for pier construction	30	17-Jan-15	15-Oct-14	02-Jun-15		TD111200	61															
Preparation Works																							
TD130100	Tree felling works	48	24-Nov-14	18-Aug-14	22-Jan-15		MS10010, TR	49															
TD130150	UU detection	35	03-Dec-14	18-Aug-14	21-Jan-15		MS10000, TD	37															
Field Works																							
Foundation & Substructure at Northern Side of Lung Mun Road																							
TD130200	Predrilling works	13	22-Jan-15	15-Oct-14	02-Jun-15		DN10350, TD	40															
TD130250	Installation of bored piles (K2-F2,E3-C3,B2-A2)	64	07-Mar-15	15-Oct-14	02-Jun-15		TD130200, DI	25															
Toll Plaza Decking TD2-Section 1																							
Stage 1																							
Temporary Works Design (TWD) Submission and Approval																							
TD210150	TWD -Haul road design	7	20-Jan-15	05-Aug-14	25-Jun-15		CD10110	55															
TD210350	TWD -Covered walkway design	21	09-Feb-15	05-Aug-14	25-Jun-15		TD210150	57															
Field Works																							
Preparation Works																							
TD211050	Site clearance	17	06-Feb-15	05-Aug-14	25-Jun-15		AD10190, TD	36															
TD211100	Tree felling and transplanting	48	02-Mar-15	25-Sep-14	05-May-15		MS10010, TD	132															
TD211150	Construction of covered walkway	28	19-May-15	25-Sep-14	25-Jun-15		TD211100, TI	62															
TD211200	UU detection, protection and diversion	110	22-Sep-14	05-Aug-14	06-Feb-15		MS10000	36															
G.I and Piling Works																							
TD211250	Predrilling works	28	10-Mar-15	10-Oct-14	17-Apr-15		MS10020, TD	36															
Toll Plaza Footbridge-Section 1																							
Stage 1																							
Temporary Works Design (TWD) Submission and Approval																							
TFB10150	TWD -Formwork design for pile cap and pier	7	17-Nov-14	25-Sep-14	12-May-15		CD10110	129															
Method Statement Submissions and Approval																							
TFB10610	MSS for Pile cap and pier construction	30	10-Jan-15	25-Sep-14	24-Nov-14		TFB10150	325															
Field Works																							
G.I and Piling Works																							
TFB11010	Socketted H-Pile for Pier P2,P3& lift	36	22-Jan-15	03-Nov-14	09-Mar-15		TFB11000	289															
Pile Cap Construction																							
TFB11295	Construct Pile cap for Pier P2&P3	48	09-Mar-15	12-May-15	12-May-15		TFB10610, TF	246															
Bridge G2																							
Stage 2																							
Temporary Works Design (TWD) Submission and Approval																							
BG210910	TWD -Falsework design for portal construction	60	11-Jun-15	08-Aug-15	08-Aug-15		BG210900	376															
Field Works																							
Foundation Works																							
BG212120	Excavation for (G2e-G2b)	38	17-Mar-15	19-Nov-15	19-Nov-15		BG212100, Bc	189															
BG212150	Piling for G2a	24	20-Jan-15	17-Feb-15	17-Feb-15		BG212100, M	60															
BG212750	Pad footing construction(G2e-G2b)	165	17-Apr-15	19-Nov-15	19-Nov-15		BG211750, DI	189															
Pile Cap Construction																							
BG212800	Construct pile cap G2a	28	17-Feb-15	25-Mar-15	25-Mar-15		BG212150	421															
Pier Construction																							
BG212900	Construct Pier from G2e to G2b	165	19-May-15	17-Dec-15	17-Dec-15		BG212750	189															
Bridge G1																							
Stage 2																							
Temporary Works Design (TWD) Submission and Approval																							
BG110010	TWD -Formwork design for pier	30	24-Dec-14	24-Jan-15	24-Jan-15		CD10110, BG	40															
Field Works																							
Substructure Works from Pier G1d to Pier G2a																							
BG110110	Install bored pile for G1d	24	08-Jan-15	10-Mar-15	10-Mar-15		MS10030, BG	379															
BG110130	Construct Pile Cap G1d	22	09-Feb-15	10-Mar-15	10-Mar-15		BG110110, Bc	379															
Bridge H1																							
Stage 2																							
Field Works																							
Substructure Works From Abutment H1f to Pier H1d																							
BH110092	Construct bored piles for H1d	16	17-Dec-14	28-May-15	28-May-15		MS10030, BH	330															
BH110094	Construct Pile cap for H1d	22	23-Jan-15	18-Feb-15	18-Feb-15		BH110000, BI	330															
BH110130	Construct bored piles for H1f	48	05-Feb-15	10-Apr-15	10-Apr-15		BH110090	271															
BH110140	Construct bored piles for H1e	24	17-Feb-15	20-Mar-15	20-Mar-15		BG212150	312															
BH110145	Construct pile cap for H1e	28	20-Mar-15	28-Apr-15	28-Apr-15		BH110140	312															
BH110170	Construct pile cap for H1f	36	10-Apr-15	28-May-15	28-May-15		BH110130	271															
Site Formation - Retaining Structure RW_A																							
Stage 3																							
Retaining Wall A																							
		12	17-Jun-16	02-Sep-14	04-Jul-16			157															

Appendix E

Monitoring Locations / Sensitive Receivers for the Contract

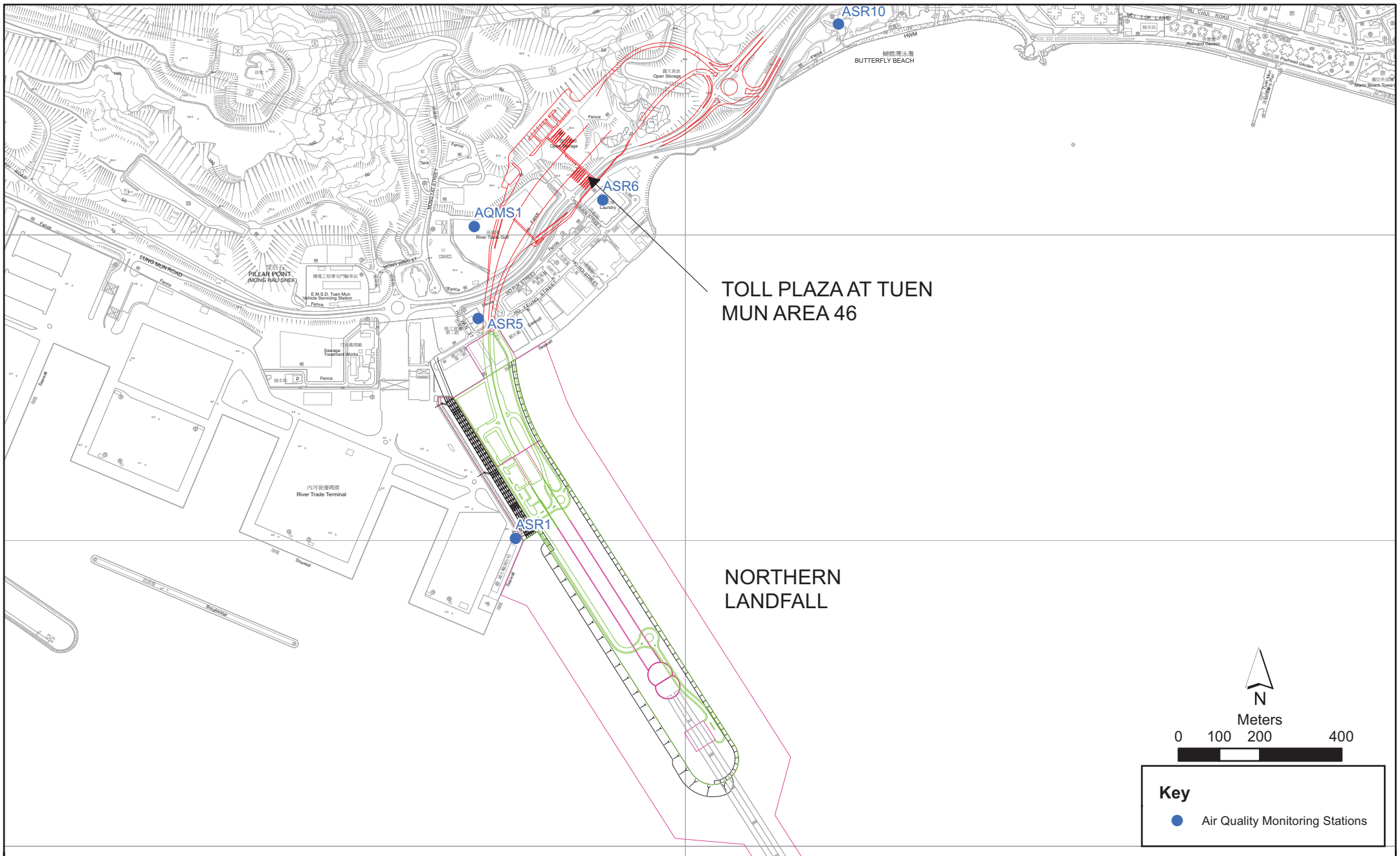


LEGEND:

- 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

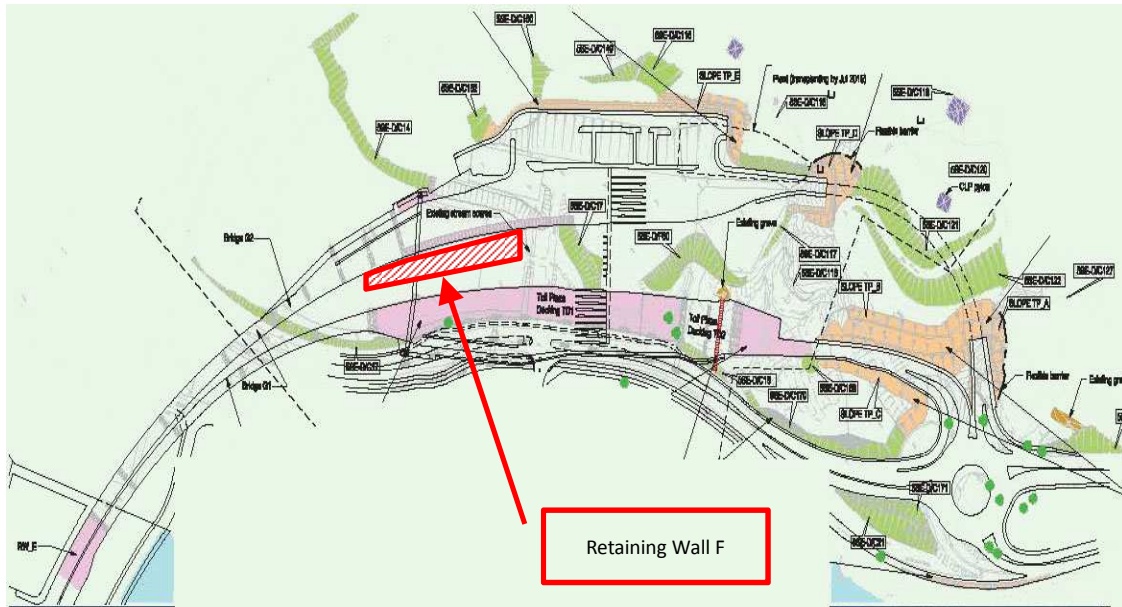
SCALE	1 : 10 000	DATE
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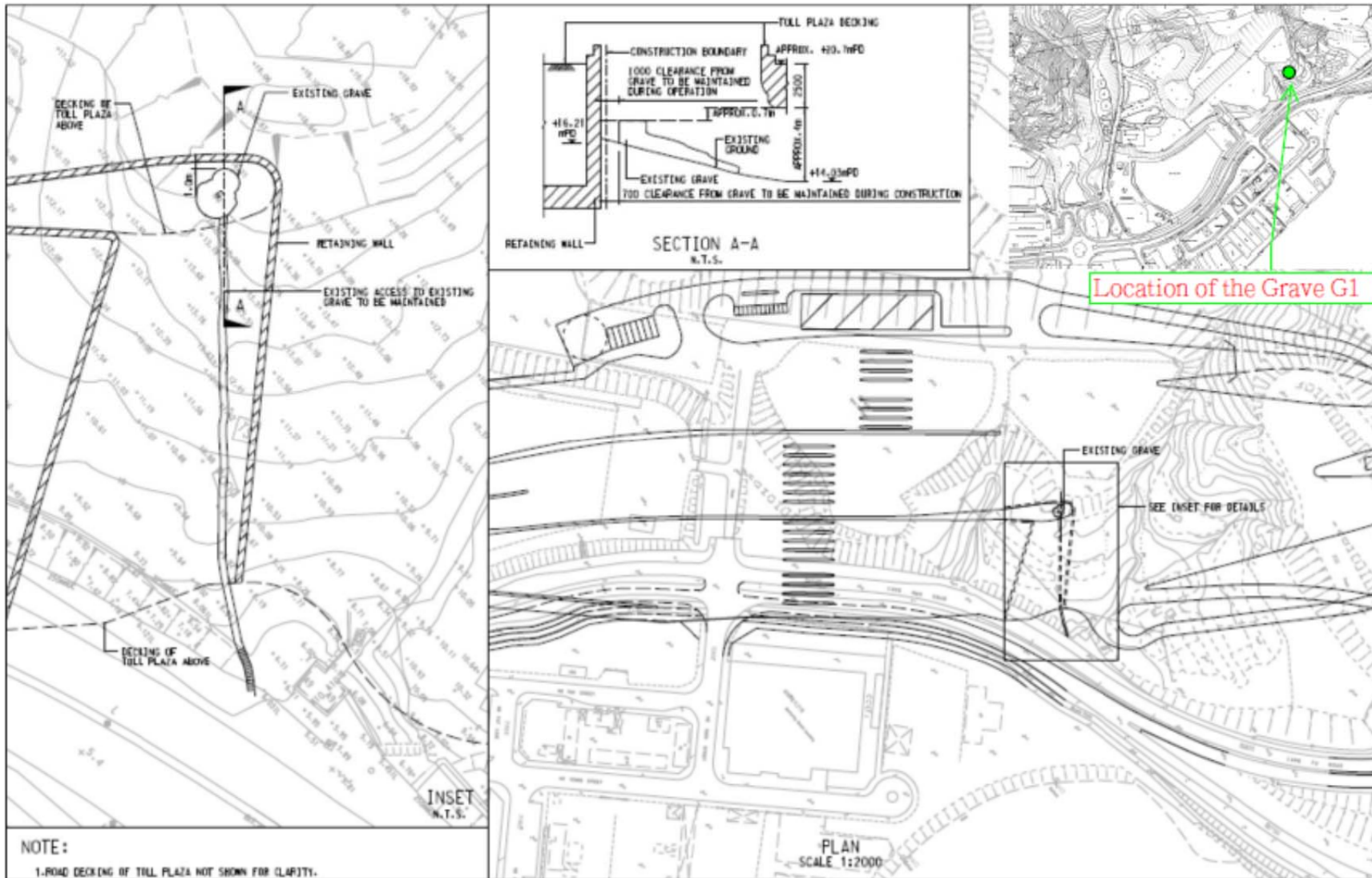


Air Quality Monitoring Stations for the Enhanced TSP Monitoring

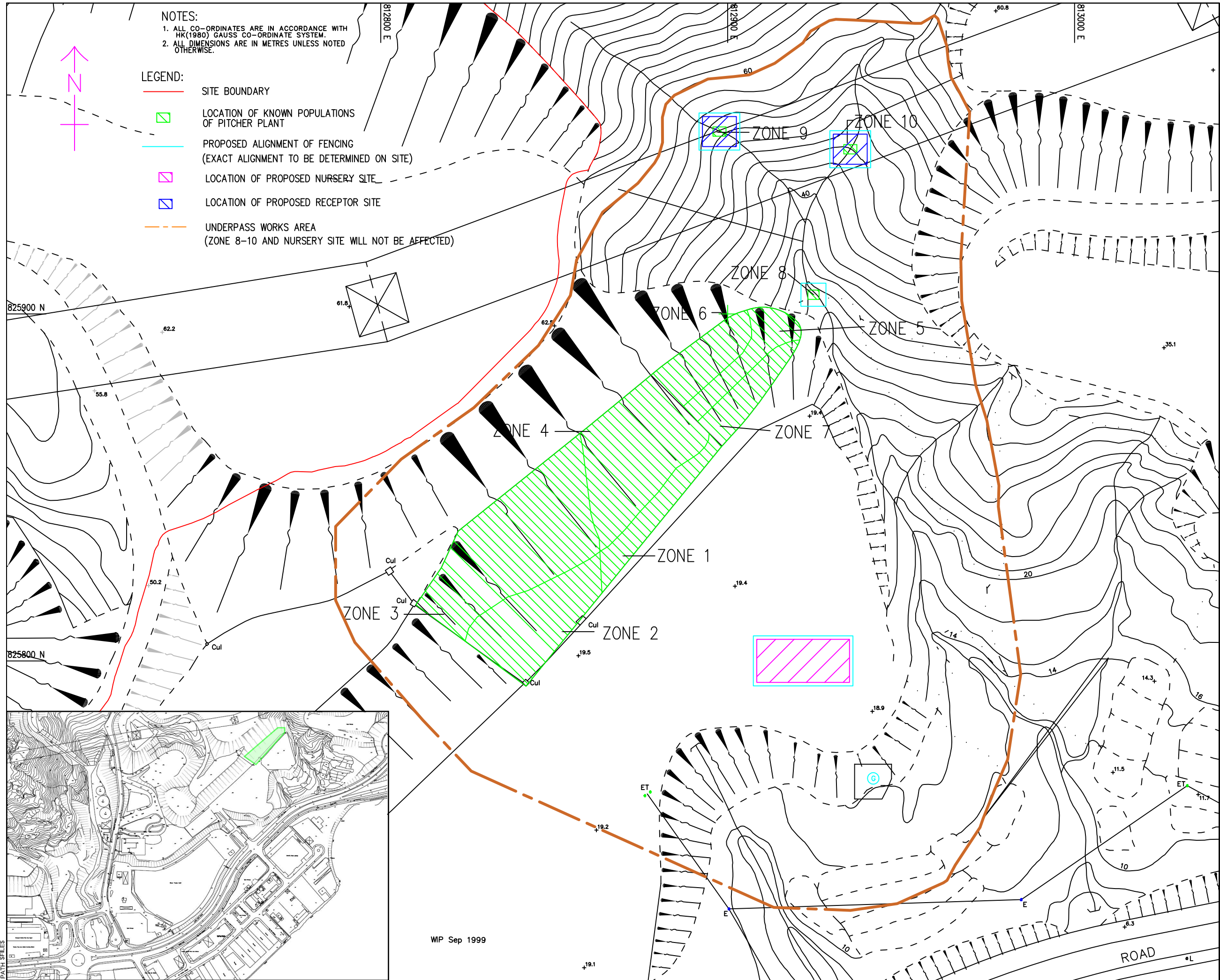
Retaining wall

Retaining Wall F





Location of the Grave G1



NOTES:

1. ALL CO-ORDINATES ARE IN ACCORDANCE WITH HK(1980) GAUSS CO-ORDINATE SYSTEM.
2. ALL DIMENSIONS ARE IN METRES UNLESS NOTED OTHERWISE.

LEGEND:

- SITE BOUNDARY
- ▨ LOCATION OF KNOWN POPULATIONS OF PITCHER PLANT
- PROPOSED ALIGNMENT OF FENCING (EXACT ALIGNMENT TO BE DETERMINED ON SITE)
- ▨ LOCATION OF PROPOSED NURSERY SITE
- ▨ LOCATION OF PROPOSED RECEPTOR SITE
- UNDERPASS WORKS AREA (ZONE 8-10 AND NURSERY SITE WILL NOT BE AFFECTED)



PROJECT
 TUEN MUN - CHEK LAP KOK LINK

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

CLIENT
HIGHWAYS DEPARTMENT
 香港路政署
 Hong Kong - Zhuhai - Macao Bridge
 Hong Kong Project Management Office

CONSULTANT
AECOM
 AECOM Asia Company Ltd.
 www.aecom.com

SUB-CONSULTANTS

ISSUE/REVISION

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

STATUS
 PRELIMINARY

SCALE
 A1 1 : 500

DIMENSION UNIT
 METRES

KEY PLAN

PROJECT NO.
 60240249

CONTRACT NO.
 HY/2013/12

SHEET TITLE
 LOCATION OF KNOWN POPULATION OF PITCHER PLANT AND PROPOSED TM-CLKL SITE BOUNDARY

SHEET NUMBER
 60240249/C3/6503A

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

Monitoring Schedule

Impact Monitoring Schedule for December 2014

Date		Landfill Gas Monitoring	Landscape and Visual Monitoring
Mon	1-Dec-14	✓	
Tue	2-Dec-14	✓	
Wed	3-Dec-14	✓	
Thu	4-Dec-14	✓	
Fri	5-Dec-14	✓	✓
Sat	6-Dec-14	✓	
Sun	7-Dec-14		
Mon	8-Dec-14	✓	
Tue	9-Dec-14	✓	
Wed	10-Dec-14	✓	
Thu	11-Dec-14	✓	
Fri	12-Dec-14	✓	✓
Sat	13-Dec-14	✓	
Sun	14-Dec-14		
Mon	15-Dec-14	✓	
Tue	16-Dec-14	✓	
Wed	17-Dec-14	✓	
Thu	18-Dec-14	✓	
Fri	19-Dec-14	✓	✓
Sat	20-Dec-14	✓	
Sun	21-Dec-14		
Mon	22-Dec-14	✓	
Tue	23-Dec-14	✓	
Wed	24-Dec-14	✓	✓
Thu	25-Dec-14		
Fri	26-Dec-14		
Sat	27-Dec-14	✓	
Sun	28-Dec-14		
Mon	29-Dec-14	✓	
Tue	30-Dec-14	✓	
Wed	31-Dec-14	✓	

✓	Monitoring Day
	Sunday or Public Holiday

Impact Monitoring Schedule for January 2015

Date		Landfill Gas Monitoring	Landscape and Visual Monitoring
Thu	1-Jan-15	✓	
Fri	2-Jan-15	✓	✓
Sat	3-Jan-15	✓	
Sun	4-Jan-15	✓	
Mon	5-Jan-15	✓	
Tue	6-Jan-15	✓	
Wed	7-Jan-15		
Thu	8-Jan-15	✓	
Fri	9-Jan-15	✓	✓
Sat	10-Jan-15	✓	
Sun	11-Jan-15	✓	
Mon	12-Jan-15	✓	
Tue	13-Jan-15	✓	
Wed	14-Jan-15		
Thu	15-Jan-15	✓	
Fri	16-Jan-15	✓	✓
Sat	17-Jan-15	✓	
Sun	18-Jan-15	✓	
Mon	19-Jan-15	✓	
Tue	20-Jan-15	✓	
Wed	21-Jan-15		
Thu	22-Jan-15	✓	
Fri	23-Jan-15	✓	✓
Sat	24-Jan-15	✓	
Sun	25-Jan-15		
Mon	26-Jan-15		
Tue	27-Jan-15	✓	
Wed	28-Jan-15		
Thu	29-Jan-15	✓	
Fri	30-Jan-15	✓	✓
Sat	31-Jan-15	✓	

✓	Monitoring Day
	Sunday or Public Holiday

Appendix H

Calibration Certificates of Monitoring Equipment

CERTIFICATION OF CALIBRATION



No. 4533

Page 1 of 2 Pages

Approved by Signatory

Dawn Hemings

Laboratory Inspection



ISSUED BY: GEOTECH LABORATORY

Date Of Calibration: 16-Sep-2014

Certificate Number: G502306_2/13335

GEOTECHNICAL INSTRUMENTS (UK) LTD

Sovereign House, Queensway, Leamington Spa, Warwickshire, CV31 3JR United Kingdom

Tel: +44 (0) 1926 338111 Fax: +44 (0) 1926 338110

E-mail: service@geotech.co.uk

www.geotechuk.com

Customer: *Fugro Geotechnical Services Ltd*

Units 6, 8-11
10/F Worldwide Industrial Centre
43-47 Shan Mei Street
Fo Tan
Sha Tin, N.T.
HONG KONG

Description: BIOGAS 5000

Model: BIOGAS 5000

Serial Number: G502306

UKAS Accredited results:

Methane (CH ₄)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	4.9	0.41
15.1	15.0	0.64
50.0	49.3	0.94

Carbon Dioxide (CO ₂)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
5.0	4.9	0.43
15.1	14.9	0.70
50.0	50.0	1.1

Oxygen (O ₂)		
Certified Gas (%)	Instrument Reading (%)	Uncertainty (%)
21.1	21.1	0.31

All concentrations are molar.

CH₄, CO₂ readings recorded at : 31.6 °C ± 1.5 °C

O₂ reading recorded at : 21.9 °C ± 1.5 °C

Barometric Pressure : 1008 mbar ± 3 mbar

Method of Test : The analyser is calibrated in a temperature controlled chamber using reference gases.

The reported expanded uncertainty is based on a standard uncertainty multiplied by a coverage factor of k=2, providing a level of confidence of approximately 95%. The uncertainty evaluation has been carried out in accordance with UKAS requirements.

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.

Appendix I

Landfill Gas Monitoring Results and Graphical Plots

Landfill Gas Monitoring Results (Retaining Wall F)

Monitoring Location	Date	Time	Weather	Temperature (°C)	Methane (%)			Oxygen (%)			Carbon Dioxide (%)		
					Measurement Result	Action Level	Limit Level	Measurement Result	Action Level	Limit Level	Measurement Result	Action Level	Limit Level
Retaining Wall F	1-Dec-14	8:20	Fine	23	0	10	20	21.2	19	18	0	0.5	1.5
	1-Dec-14	14:00		25	0	10	20	21.1	19	18	0	0.5	1.5
	2-Dec-14	8:20	Fine	22	0	10	20	21.3	19	18	0	0.5	1.5
	2-Dec-14	14:00		25	0	10	20	21.2	19	18	0	0.5	1.5
	3-Dec-14	8:20	Sunny	21	0	10	20	21.1	19	18	0.1	0.5	1.5
	3-Dec-14	14:00		24	0	10	20	21.1	19	18	0	0.5	1.5
	4-Dec-14	8:20	Sunny	20	0	10	20	21.2	19	18	0.1	0.5	1.5
	4-Dec-14	14:00		23	0	10	20	21.1	19	18	0	0.5	1.5
	5-Dec-14	8:20	Sunny	20	0	10	20	21.1	19	18	0	0.5	1.5
	5-Dec-14	14:00		23	0	10	20	21.1	19	18	0.1	0.5	1.5
	6-Dec-14	8:20	Sunny	20	0	10	20	21.1	19	18	0	0.5	1.5
	6-Dec-14	14:00		24	0	10	20	21.2	19	18	0	0.5	1.5
	8-Dec-14	8:20	Hazy	15	0	10	20	21.1	19	18	0.1	0.5	1.5
	8-Dec-14	14:00		18	0	10	20	21.2	19	18	0.2	0.5	1.5
	9-Dec-14	8:20	Hazy	13	0	10	20	21.1	19	18	0	0.5	1.5
	9-Dec-14	14:00		16	0	10	20	21.2	19	18	0.1	0.5	1.5
	10-Dec-14	8:20	Hazy	13	0	10	20	21.1	19	18	0.2	0.5	1.5
	10-Dec-14	14:00		17	0	10	20	21.1	19	18	0	0.5	1.5
	11-Dec-14	8:20	Fine	14	0	10	20	21.1	19	18	0	0.5	1.5
	11-Dec-14	14:00		18	0	10	20	21.1	19	18	0.1	0.5	1.5
	12-Dec-14	8:10	Sunny	13	0	10	20	21.2	19	18	0.2	0.5	1.5
	12-Dec-14	14:00		19	0	10	20	21.1	19	18	0.1	0.5	1.5
	13-Dec-14	8:20	Fine	14	0	10	20	21.2	19	18	0.1	0.5	1.5
	13-Dec-14	14:00		20	0	10	20	21.2	19	18	0	0.5	1.5
	15-Dec-14	8:20	Fine	14	0	10	20	21.1	19	18	0.1	0.5	1.5
	15-Dec-14	14:00		19	0	10	20	21.1	19	18	0	0.5	1.5
	16-Dec-14	8:20	Fine	14	0	10	20	21.1	19	18	0	0.5	1.5
	16-Dec-14	14:00		19	0	10	20	21.1	19	18	0	0.5	1.5
	17-Dec-14	8:10	Sunny	14	0	10	20	21.1	19	18	0.1	0.5	1.5
	17-Dec-14	14:00		18	0	10	20	21.1	19	18	0.1	0.5	1.5
	18-Dec-14	8:20	Cloudy	10	0	10	20	21.2	19	18	0	0.5	1.5
18-Dec-14	14:00	15		0	10	20	21.1	19	18	0	0.5	1.5	
19-Dec-14	8:10	Rain	10	0	10	20	21.1	19	18	0	0.5	1.5	
19-Dec-14	14:00		13	0	10	20	21.2	19	18	0	0.5	1.5	
20-Dec-14	8:10	Fine	13	0	10	20	21.1	19	18	0.1	0.5	1.5	
20-Dec-14	14:00		17	0	10	20	21.2	19	18	0	0.5	1.5	
22-Dec-14	8:10	Fine	13	0	10	20	21.2	19	18	0.1	0.5	1.5	
22-Dec-14	14:00		17	0	10	20	21	19	18	0.1	0.5	1.5	
23-Dec-14	8:05	Fine	12	0	10	20	21.1	19	18	0	0.5	1.5	
23-Dec-14	14:00		16	0	10	20	21.1	19	18	0	0.5	1.5	
24-Dec-14	8:05	Hazy	11	0	10	20	21.1	19	18	0.1	0.5	1.5	
24-Dec-14	14:00		16	0	10	20	21.1	19	18	0	0.5	1.5	
27-Dec-14	8:10	Sunny	13	0	10	20	21.2	19	18	0	0.5	1.5	
27-Dec-14	14:00		18	0	10	20	21.1	19	18	0	0.5	1.5	
29-Dec-14	8:10	Sunny	14	0	10	20	21.1	19	18	0.1	0.5	1.5	
29-Dec-14	14:00		19	0	10	20	21.1	19	18	0.1	0.5	1.5	
30-Dec-14	8:10	Fine	12	0	10	20	21.1	19	18	0.1	0.5	1.5	
30-Dec-14	14:00		19	0	10	20	21.2	19	18	0.1	0.5	1.5	
31-Dec-14	8:05	Sunny	13	0	10	20	21.1	19	18	0.1	0.5	1.5	
31-Dec-14	14:00		19	0	10	20	21.1	19	18	0	0.5	1.5	

Remark:

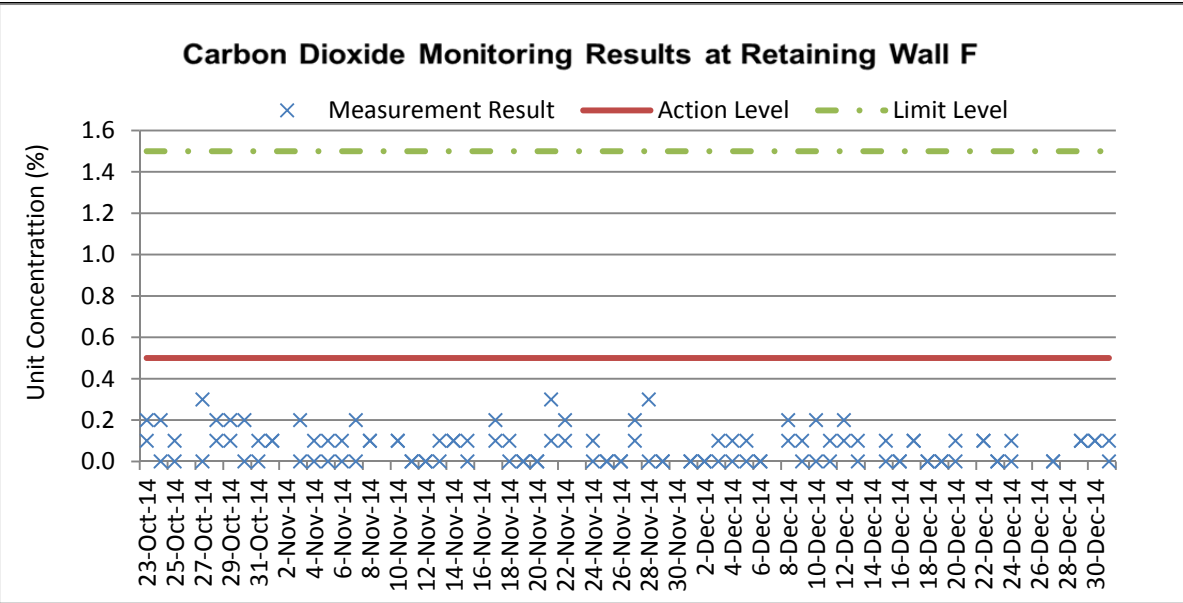
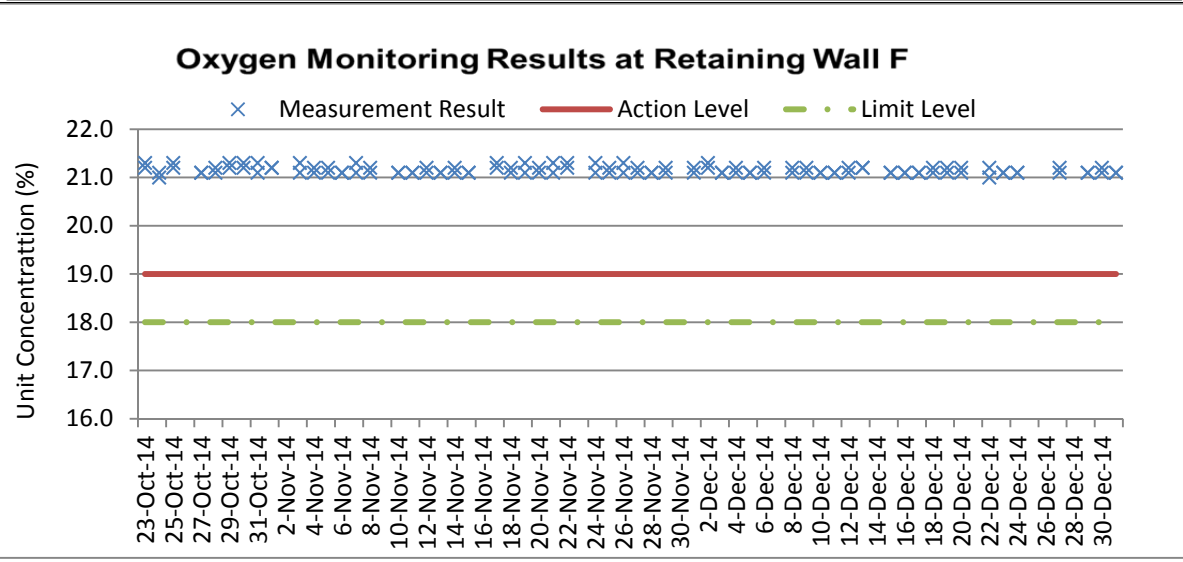
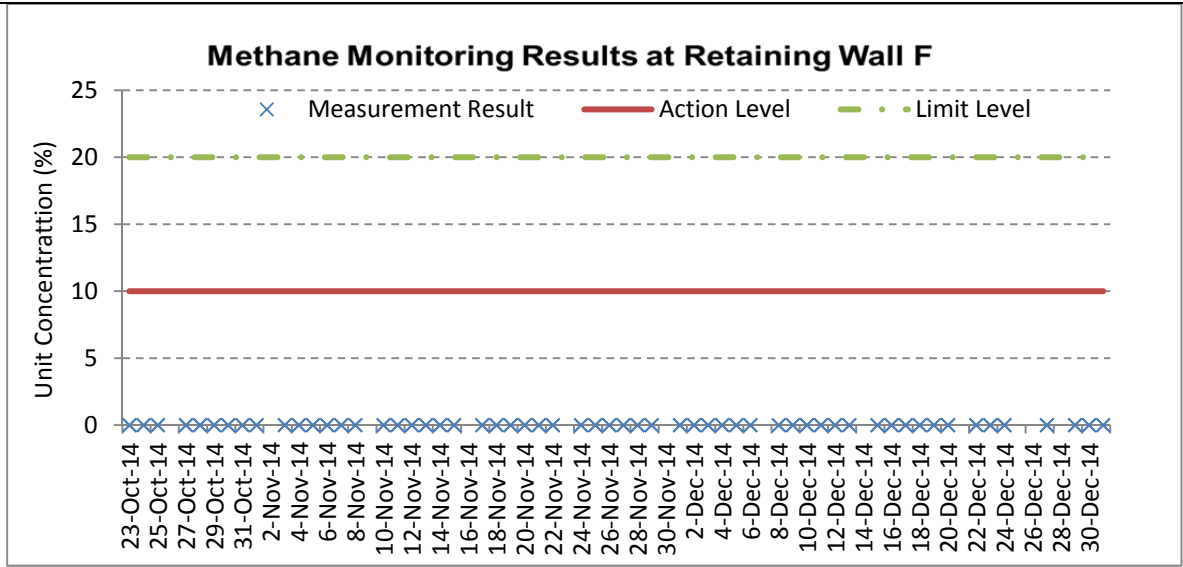
Parameter	Criteria	Measurement
Oxygen	Action Level	< 19%
	Limit Level	< 18%
Methane	Action Level	> 10% LEL (> 0.5% v/v)
	Limit Level	> 20% LEL (> 1% v/v)
Carbon Dioxide	Action Level	> 0.5%
	Limit Level	> 1.5%

Landfill Gas Monitoring Results (Retaining Wall B)

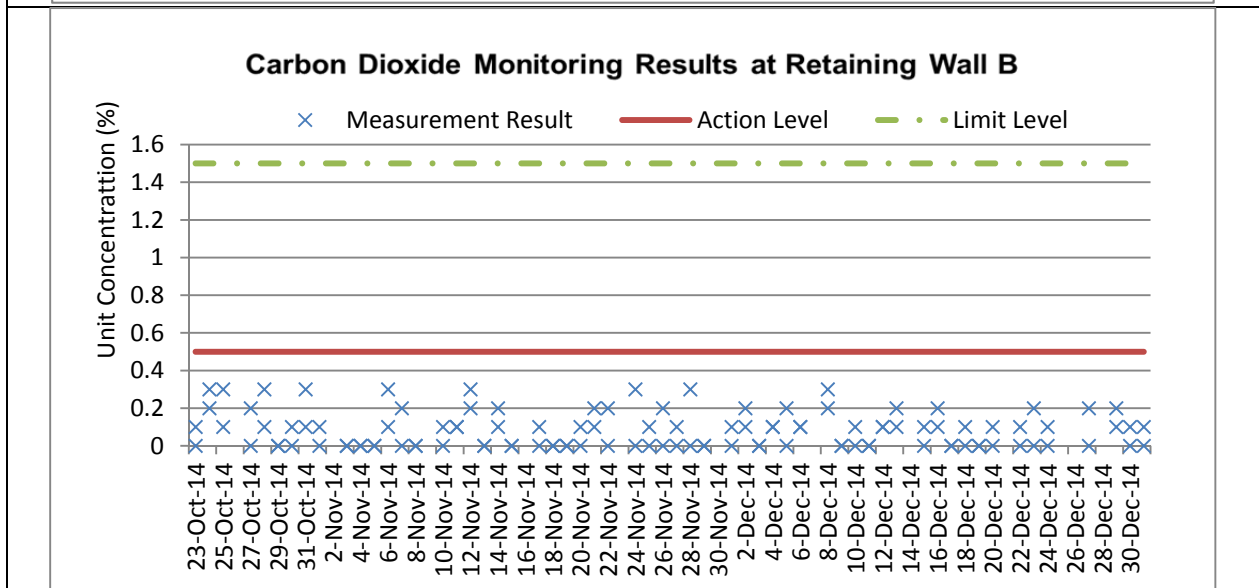
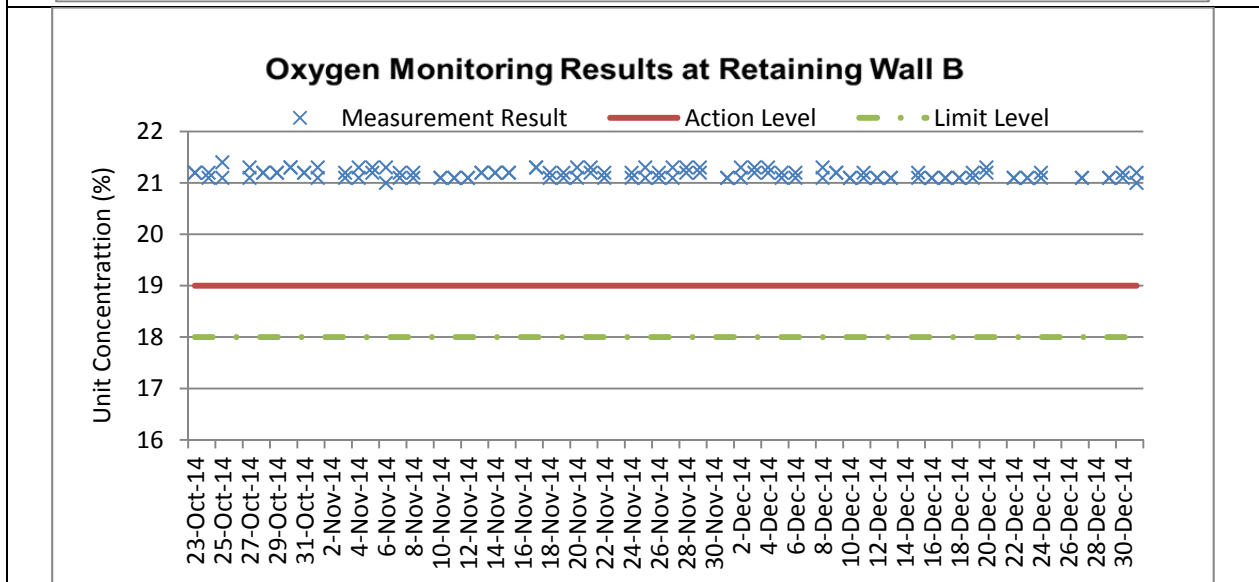
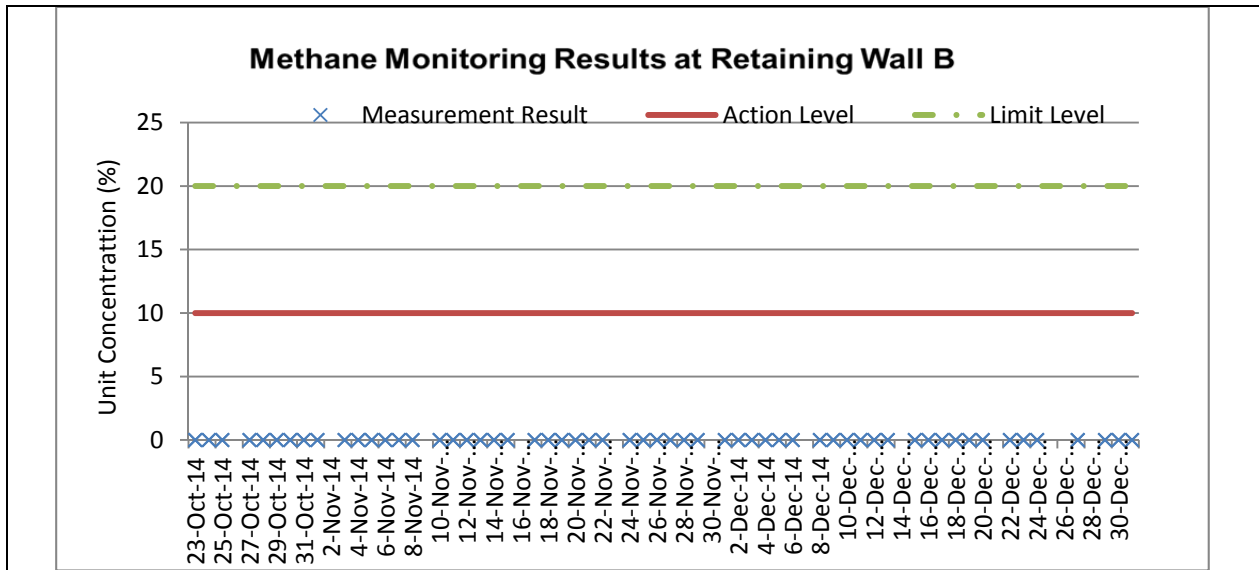
Monitoring Location	Date	Time	Weather	Temperature (°C)	Methane (%)			Oxygen (%)			Carbon Dioxide (%)		
					Measurement Result	Action Level	Limit Level	Measurement Result	Action Level	Limit Level	Measurement Result	Action Level	Limit Level
Retaining Wall B	1-Dec-14	8:40	Fine	23	0	10	20	21.1	19	18	0.1	0.5	1.5
	1-Dec-14	14:20		25	0	10	20	21.1	19	18	0	0.5	1.5
	2-Dec-14	8:40	Fine	22	0	10	20	21.3	19	18	0.1	0.5	1.5
	2-Dec-14	14:20		25	0	10	20	21.1	19	18	0.2	0.5	1.5
	3-Dec-14	8:40	Sunny	21	0	10	20	21.2	19	18	0	0.5	1.5
	3-Dec-14	14:20		24	0	10	20	21.3	19	18	0	0.5	1.5
	4-Dec-14	8:40	Sunny	20	0	10	20	21.3	19	18	0.1	0.5	1.5
	4-Dec-14	14:20		23	0	10	20	21.2	19	18	0.1	0.5	1.5
	5-Dec-14	8:40	Sunny	20	0	10	20	21.2	19	18	0	0.5	1.5
	5-Dec-14	14:20		23	0	10	20	21.1	19	18	0.2	0.5	1.5
	6-Dec-14	8:40	Sunny	20	0	10	20	21.1	19	18	0.1	0.5	1.5
	6-Dec-14	14:20		24	0	10	20	21.2	19	18	0.1	0.5	1.5
	8-Dec-14	8:40	Hazy	15	0	10	20	21.1	19	18	0.2	0.5	1.5
	8-Dec-14	14:20		18	0	10	20	21.3	19	18	0.3	0.5	1.5
	9-Dec-14	8:40	Hazy	13	0	10	20	21.2	19	18	0	0.5	1.5
	9-Dec-14	14:20		16	0	10	20	21.2	19	18	0	0.5	1.5
	10-Dec-14	8:40	Hazy	13	0	10	20	21.1	19	18	0.1	0.5	1.5
	10-Dec-14	14:20		17	0	10	20	21.1	19	18	0	0.5	1.5
	11-Dec-14	8:40	Fine	14	0	10	20	21.2	19	18	0	0.5	1.5
	11-Dec-14	14:20		18	0	10	20	21.1	19	18	0	0.5	1.5
	12-Dec-14	8:40	Sunny	13	0	10	20	21.1	19	18	0.1	0.5	1.5
	12-Dec-14	14:20		19	0	10	20	21.1	19	18	0.1	0.5	1.5
	13-Dec-14	8:40	Fine	14	0	10	20	21.1	19	18	0.2	0.5	1.5
	13-Dec-14	14:20		20	0	10	20	21.1	19	18	0.1	0.5	1.5
	15-Dec-14	8:40	Fine	14	0	10	20	21.1	19	18	0	0.5	1.5
	15-Dec-14	14:20		19	0	10	20	21.2	19	18	0.1	0.5	1.5
	16-Dec-14	8:40	Fine	14	0	10	20	21.1	19	18	0.2	0.5	1.5
	16-Dec-14	14:20		19	0	10	20	21.1	19	18	0.1	0.5	1.5
	17-Dec-14	8:40	Sunny	14	0	10	20	21.1	19	18	0	0.5	1.5
	17-Dec-14	14:20		18	0	10	20	21.1	19	18	0	0.5	1.5
	18-Dec-14	8:40	Cloudy	10	0	10	20	21.1	19	18	0.1	0.5	1.5
18-Dec-14	14:20	15		0	10	20	21.1	19	18	0	0.5	1.5	
19-Dec-14	8:40	Rain	10	0	10	20	21.2	19	18	0	0.5	1.5	
19-Dec-14	14:20		13	0	10	20	21.1	19	18	0	0.5	1.5	
20-Dec-14	8:40	Fine	13	0	10	20	21.2	19	18	0	0.5	1.5	
20-Dec-14	14:20		17	0	10	20	21.3	19	18	0.1	0.5	1.5	
22-Dec-14	8:30	Fine	13	0	10	20	21.1	19	18	0	0.5	1.5	
22-Dec-14	14:20		17	0	10	20	21.1	19	18	0.1	0.5	1.5	
23-Dec-14	8:25	Fine	12	0	10	20	21.1	19	18	0	0.5	1.5	
23-Dec-14	14:20		16	0	10	20	21.1	19	18	0.2	0.5	1.5	
24-Dec-14	8:25	Hazy	11	0	10	20	21.1	19	18	0.1	0.5	1.5	
24-Dec-14	14:20		16	0	10	20	21.2	19	18	0	0.5	1.5	
27-Dec-14	8:30	Sunny	13	0	10	20	21.1	19	18	0.2	0.5	1.5	
27-Dec-14	14:20		18	0	10	20	21.1	19	18	0	0.5	1.5	
29-Dec-14	8:30	Sunny	14	0	10	20	21.1	19	18	0.1	0.5	1.5	
29-Dec-14	14:20		19	0	10	20	21.1	19	18	0.2	0.5	1.5	
30-Dec-14	8:20	Fine	12	0	10	20	21.2	19	18	0	0.5	1.5	
30-Dec-14	14:20		19	0	10	20	21.1	19	18	0.1	0.5	1.5	
31-Dec-14	8:20	Sunny	13	0	10	20	21.2	19	18	0.1	0.5	1.5	
31-Dec-14	14:20		19	0	10	20	21	19	18	0	0.5	1.5	

Remark:

Parameter	Criteria	Measurement
Oxygen	Action Level	< 19%
	Limit Level	< 18%
Methane	Action Level	> 10% LEL (> 0.5% v/v)
	Limit Level	> 20% LEL (>1% v/v)
Carbon Dioxide	Action Level	> 0.5%
	Limit Level	> 1.5%



Annotation:
 During 1 to 31 December 2014, major construction activity was construction of retaining wall F and the specified works included excavation, rock breaking, 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 1 to 31 December 2014, major construction activity was construction of retaining wall B and the specified works included excavation, rock breaking, 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 J

Investigation Report for Exceedance

AUES

To Mr. Tang Hiu Yeung **Fax No** By email
Company CRBC and Kaden Joint Venture
cc
From **T.W. Tam** **Date** **16 December 2014**
Our Ref TCS00670/13/300/**F0046** **No of Pages** 5 **(Incl. cover sheet)**
RE **Contract No. HY/2013/12**
Tuen Mun - Chek Lap Kok Link
Northern Connection Toll Plaza and Associated Works
Environmental Permit No.: EP-354/2009/B
Investigation Report for Exceedances of Air Quality Monitoring on 2 December 2014

If you do not receive all pages, or transmission is illegible, please contact the originator on (852) 2959-6059 to re-send. Should this facsimile be sent to the wrong fax number, would receiver please destroy this copy and notify Action-United Environmental Services & Consulting immediately. Thank you.

Dear Sir,

Enclosed please find the investigation report for the captioned for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,
For and on Behalf of
Action-United Environmental Services & Consulting



T.W. Tam
Environmental Team Leader

Encl.

c.c. AECOM (ER) Mr. Roger Man By email
ENVIRON (IEC) Dr. F.C. Tsang By email

Contract No. HY/2013/12
Tuen Mun - Chek Lap Kok Link - Northern Connection Toll Plaza and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Reference number	TCS00670/13/300/F0046
Date	2 December 2014
Monitoring Location	ASR5 (Tuen Mun Fire Station)
Environmental Aspect	Air Quality
Parameter	1-hour TSP
Measurement Period	15:10 -16:10
Action Level (ug/m³)	340
Limit Level (ug/m³)	500
Measured Level (ug/m³)	346
Exceedance	Action Level
Possible reason for Action or Limit Level Non-compliance	<ol style="list-style-type: none"> 1. According to site information provided by CRBC-Kaden JV, site formation works was conducted on 2 December 2014. There were 12 nos. of rock breakers, 10 nos. of excavators operated. (refer to Figure 1) 2. To reduce to dust impact arises from the contract, mitigation measures for construction dust control were implemented and they are included the following:- <ul style="list-style-type: none"> • 4 nos. of water trucks were arranged on haul road to keep road surface wet (refer to photo 1-4 and 8) • to set speed control at 5 km/hr for all vehicles using the haul road • most soil stockpiles were well compacted • installation of auto-water sprinkler in dusty area (refer to Photo 5) • provide water spraying during rock breaking work (refer to Photo 6) • covered part of the exposed slopes by geotextile net (refer to Photo 7) 3. During site inspection on 5 and 12 December 2014, it was observed that the dust mitigation measures were implemented and the site condition is acceptable. Photo showing the implemented dust mitigation measures on 12 December 2014 are shown in photo record. 4. There are other monitoring locations closer to the active site area, such as AQMS1 and ASR6, and the relevant monitoring results were reviewed. With referenced to the monitoring results collected at other stations, AQMS1 is ranged 93-124µg/m³ and ASR6 is ranged 73-106µg/m³ and no exceedances were triggered. 5. According to the wind direction and wind speed data, north-easterly wind at 2m/s was blowing between 3:00pm to 4:00pm. AQMS1 and ASR6 were located at upstream of ASR5 and monitoring was undertaken at similar time, but there were no exceedances recorded at both AQMS1 and ASR6. Therefore, it was considered that the exceedance at ASR5 was unlikely due to construction dust. 6. During the course of monitoring, no construction works was conducted at Portion N6 near Tuen Mun Fire Station on 2 December 2014. However, heavy traffic was observed at

	<p>Lung Mun Road and River Trade Terminal. It is considered the heavy traffic deteriorated the air quality along the area of Lung Mun Road and River Trade Terminal. Since ASR5 was located adjacent to Lung Mun Road, it was highly impacted by the road traffic.</p> <p>7. Based on above investigation, the exceedance is unlikely related to the Contract work and no corrective action was required accordingly.</p>
Action to be taken	ET will continue regular audit and inspection for the implemented dust mitigation measures during the construction period.

Prepared By : T.W. Tam

Designation : Environmental Team Leader

Signature : 

Date : 16 December 2014

Photo Record



Photo 1 to 4 - Watering of haul road by water truck to keep road surface wet



Photo 5 Installation of auto-water sprinkler in dusty area



Photo 6 Water spraying during rock breaking work was observed on 12 December 2014.



Photo 7 Covered part of the exposed slopes by geotextile net was observed on 12 December 2014.



Photo 8 Wetted haul road was observed on 12 December 2014.

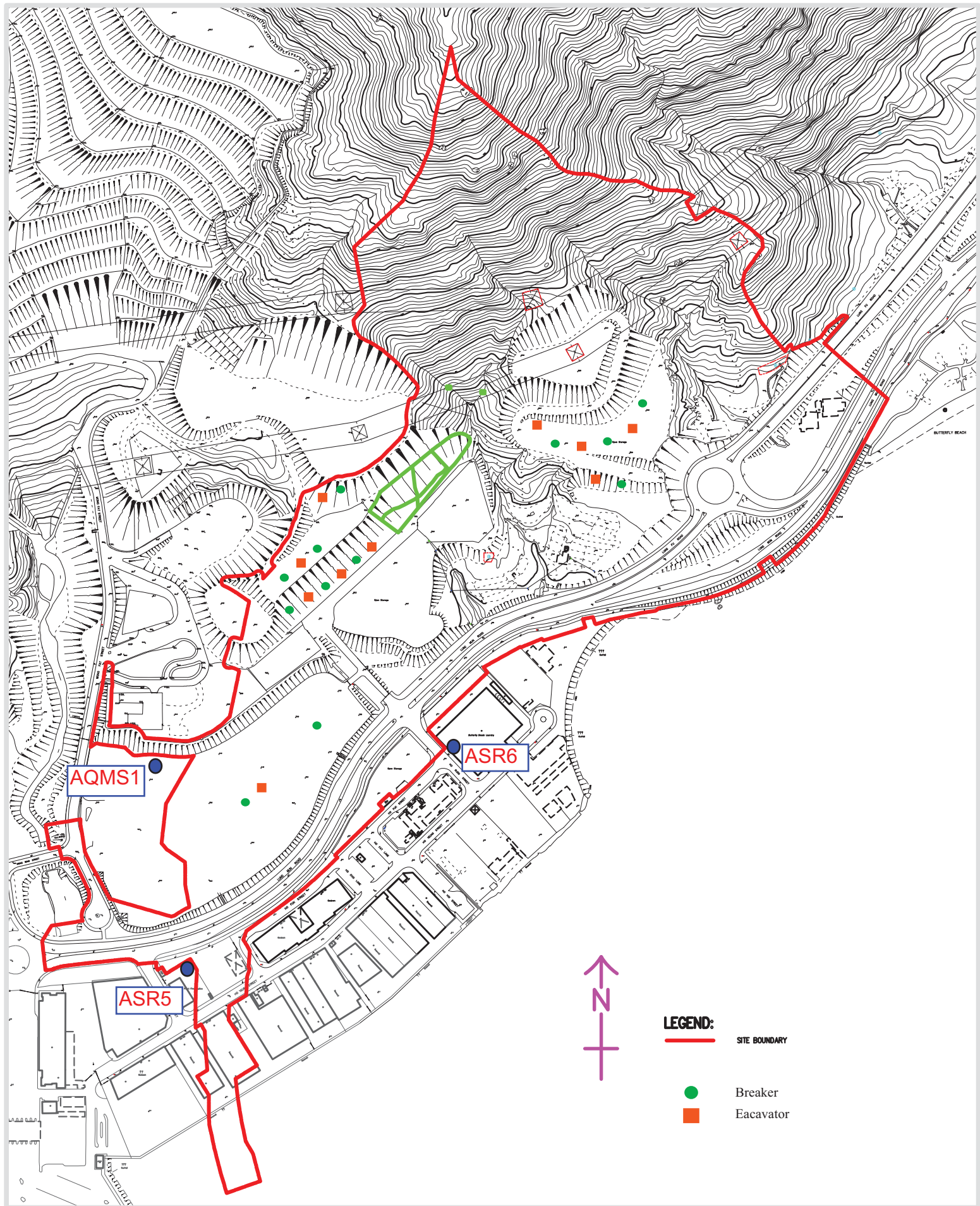


Figure 1. Location Plan

AUES

To Mr. Tang Hiu Yeung **Fax No** By email
Company CRBC and Kaden Joint Venture
cc
From **T.W. Tam** **Date** **13 January 2015**
Our Ref TCS00670/13/300/**F0050a** **No of Pages** 6 **(Incl. cover sheet)**
RE **Contract No. HY/2013/12**
Tuen Mun - Chek Lap Kok Link
Northern Connection Toll Plaza and Associated Works
Environmental Permit No.: EP-354/2009/B
Investigation Report for Exceedances of Air Quality Monitoring on 17 December 2014

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Dear Sir,

Enclosed please find the investigation report for the captioned for your follow up action.

Should you have any queries or need further information, please do not hesitate to contact us or the undersigned at **Tel: 2959-6059 or Fax: 2959-6079**.

Yours Faithfully,
For and on Behalf of
Action-United Environmental Services & Consulting



T.W. Tam
Environmental Team Leader

Encl.

c.c. AECOM (ER) Mr. Roger Man By email
ENVIRON (IEC) Dr. F.C. Tsang By email

Contract No. HY/2013/12
Tuen Mun - Chek Lap Kok Link - Northern Connection Toll Plaza and Associated Works

Investigation Report on Action or Limit Level Non-compliance

Reference number	TCS00670/13/300/F0050
Date	17 December 2014
Monitoring Location	AQMS1 (Previous River Trade Golf)
Environmental Aspect	Air Quality
Parameter	1-hour TSP
Measurement Period	14:44 -15:44
Action Level (ug/m³)	335
Limit Level (ug/m³)	500
Measured Level (ug/m³)	348
Exceedance	Action Level
Possible reason for Action or Limit Level Non-compliance	<ol style="list-style-type: none"> 1. According to site information provided by CRBC-Kaden JV, site formation works was conducted on 17 December 2014. There were 11 nos. of rock breakers, 9 nos. of excavators and 3 drill works operated. (refer to Figure 1) 2. To reduce the dust impact arises from the contract, mitigation measures for construction dust control were implemented and they are included the following:- <ul style="list-style-type: none"> • 4 nos. of water trucks were arranged on haul road to keep road surface wet in daily basis (refer to photo 1-4 and 8) • Soil stockpiles were compacted (as observed during site inspection on 2, 9 and 17 Dec 2014 - photo 5 & 6) • Covered of the exposed slopes by geotextile net(as observed during site inspection on 2, 9 and 17 Dec 2014 - photo 5 & 6) • hydro-seeded was provided for the exposed slopes (as observed during site inspection on 17 Dec 2014 - photo 6 & 7) • provide water spraying during rock breaking work (refer to Photo 8) • installation of auto-water sprinkler in dusty area • to set speed control at 5 km/hr for all vehicles using the haul road 3. During the course of monitoring, no construction works was conducted at AQMS1. According to the wind direction and wind speed data, north-easterly wind at 2.7m/s was blowing between 3:00pm to 4:00pm. There was other monitoring location closer to the active site area, such as ASR6, receiving the same dust impact from the site. With referenced to the monitoring results collected at other stations, ASR6 is ranged 91-181µg/m³ and no exceedances were triggered. 4. CRBC-Kaden JV was advised to enhance the dust mitigation measures upon receipt the exceedance. As new dust control measures, hydro-seeded on the exposed slopes was implemented on 17 December 2014. 5. There was consecutive 3 times of 1-hour TSP monitoring taken on 17 December 2014 and only one exceedance was recorded. Moreover, there were no exceedances recorded after hydro-seeded applied on the exposed slope as an

	enhanced dust mitigation measures. It is considered that the exceedance was a single event. The Contractor should continue implement the dust control measures for the contract.
Action to be taken	ET will continue regular audit and inspection for the implemented dust mitigation measures during the construction period.

Prepared By : T.W. Tam

Designation : Environmental Team Leader

Signature : 

Date : 13 January 2015

Photo Record



Photo 1 to 4 - Watering of haul road by water truck to keep road surface wet

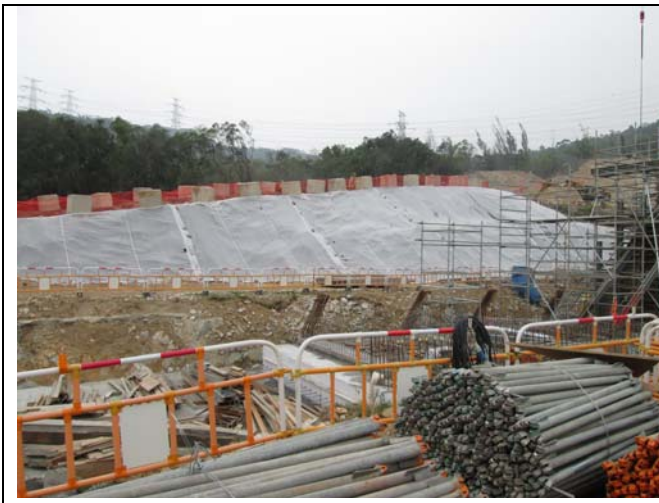


Photo 4 Covering of the exposed slopes by geotextile net was observed on 2 December 2014.



Photo 5 Covering of the exposed slopes by geotextile net was observed on 9 December 2014.



Photo 6 Hydro-seeding applied for the exposed slope was observed on 17 December 2014.



Photo 7 Covering of the exposed slopes by geotextile net was observed on 17 December 2014.



Photo 8 Water spraying during rock breaking work was observed on 17 December 2014.



Photo 9 Water spraying was applied on haul road, however, the Contractor should increase the coverage of watering.

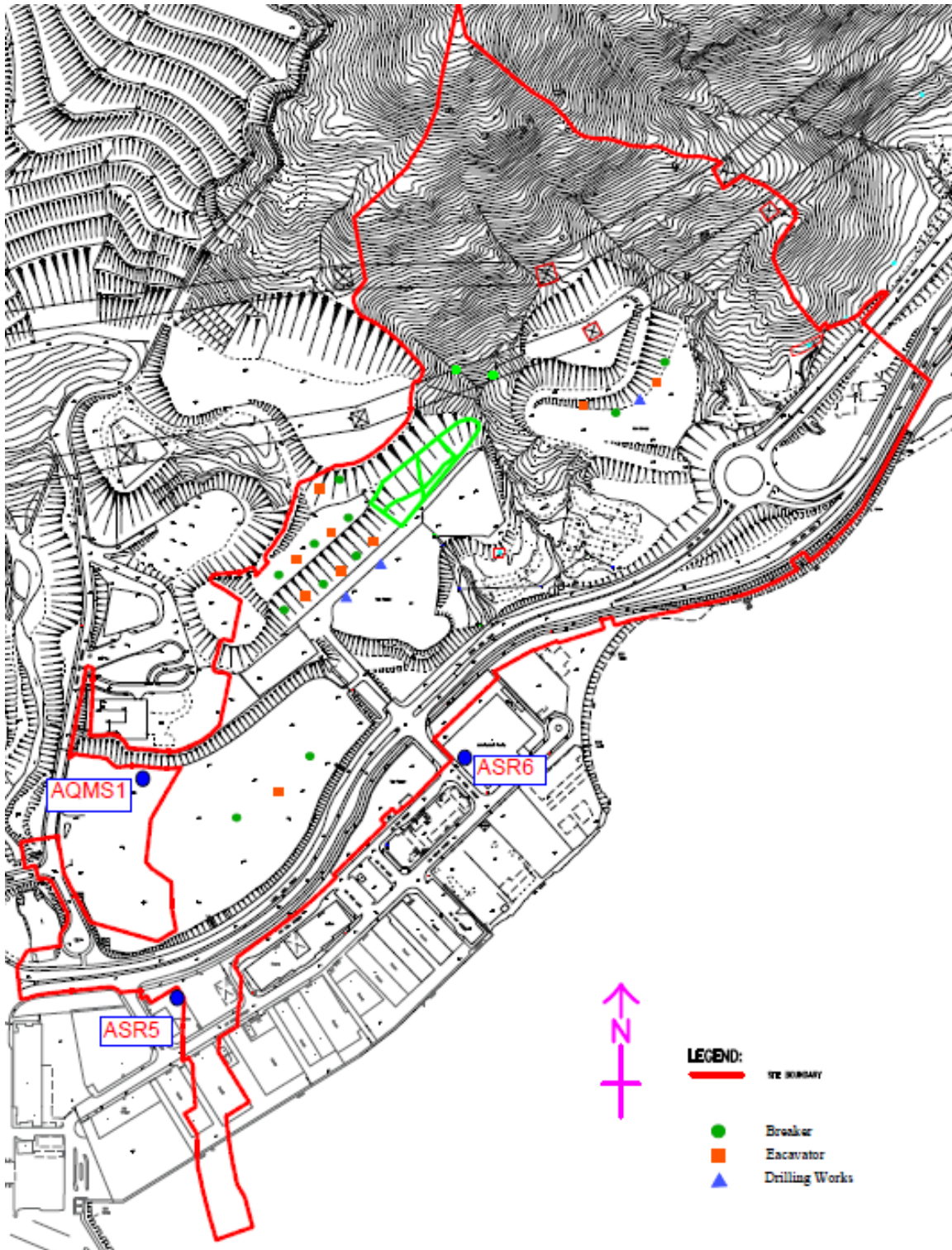


Figure 1. Location Plan

Appendix K

Checklist for Landscape and Visual Monitoring

Contract No. HY/2013/12

Tuen Mun – Chek Lap Kok Link – Northern Connection Toll Plaza and Associated Works

Landscape and Visual Checklist



中國路橋
CRBC

Kaden

基利

Monitoring Date: 5th Dec 2014

Item	Environmental Protection Measures	Location/ Timing	Implementation Agent	Status				Remarks
				A	UA	IR	NA	
1	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)	All areas / During construction	Design Consultant/ Contractor			√		
2	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme	All areas / During construction	Design Consultant/ Contractor				√	Tree Transplanting Specification has been specified in P.S., no transplantation works has been carried out at this stage.
3	Hillside and roadside screen planting to proposed roads, associated structures and slope works	All areas / During construction	Design Consultant/ Contractor				√	Construction of roads not commenced yet
4	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone)	All areas / During construction	Design Consultant/ Contractor	√				
5	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works	All areas / During construction	Design Consultant/ Contractor				√	For some area, erection of hoarding was not feasible due to



Item 1. Existing trees on boundary of the Project Area have been protected carefully during construction.



Item 4. Hydro-seeding provided at stockpile.



Item 5. Hoarding around works area.



Item 7. Ensure no run-off into water body.

Contract No. HY/2013/12

Tuen Mun – Chek Lap Kok Link – Northern Connection Toll Plaza and Associated Works

Landscape and Visual Checklist



Monitoring Date: 12th Dec 2014

Item	Environmental Protection Measures	Location/ Timing	Implementation Agent	Status				Remarks
				A	UA	IR	NA	
1	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)	All areas / During construction	Design Consultant/ Contractor			√		
2	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme	All areas / During construction	Design Consultant/ Contractor				√	Tree Transplanting Specification has been specified in P.S., no transplantation works has been carried out at this stage.
3	Hillside and roadside screen planting to proposed roads, associated structures and slope works	All areas / During construction	Design Consultant/ Contractor				√	Construction of roads not commenced yet
4	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone)	All areas / During construction	Design Consultant/ Contractor	√				
5	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works	All areas / During construction	Design Consultant/ Contractor				√	For some area, erection of hoarding was not feasible due to

									the limitation of traffic sight line; water barrier with panel was used to screen works.
6	Control night-time lighting and glare by hooding all lights	All areas / During construction	Design Consultant/ Contractor					✓	Not night-time lighting
7	Ensure no run-off into water body adjacent to the Project Area	All areas / During construction	Design Consultant/ Contractor	✓					
8	Avoidance of excessive height and bulk of buildings and structures	All areas / During construction	Design Consultant/ Contractor					✓	No high-rise building would be constructed.
9	Recycle/Reuse all felled trees and vegetation, e.g. mulching	All areas / During construction	Design Consultant/ Contractor					✓	Recycle of trees yet to be commenced.
10	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	All areas / During construction	Design Consultant/ Contractor					✓	Compensatory planting will be carry out in later stage of the project.

Legend: A=Acceptable, UA= Unacceptable, IR=Improvement Required, N/A=Not Applicable

Note: All item reference to Technical Memorandum on Environmental Impact Assessment, TM-CLKL EIA Section 10.9 & Project EM&A Manual Section 7.6

Checked and Monitored by:  Chung Koon Wah Albert (RLA) No. R-150 (Date) 14/01/2015

Checked by:  (ET) 19 January 2015 (Date)

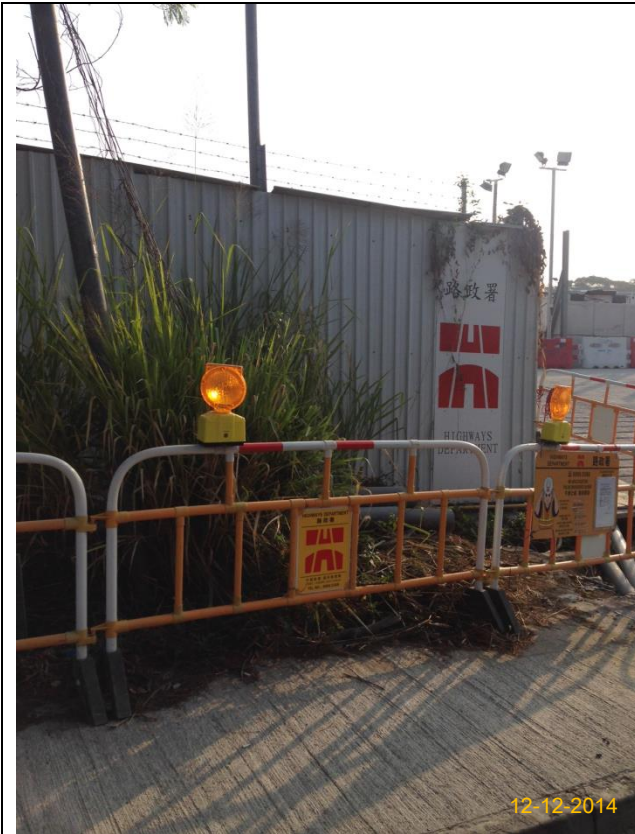
Checked by:  (IEC) 15 January 2015 (Date)



Item 1. Existing trees on boundary of the Project Area have been protected carefully during construction.



Item 4. Hydro-seeding or sheeting provided at stockpile.



Item 5. Hoarding around works area.



Item 7. Ensure no run-off into water body.

Contract No. HY/2013/12

Tuen Mun – Chek Lap Kok Link – Northern Connection Toll Plaza and Associated Works

Landscape and Visual Checklist



Monitoring Date: 19th Dec 2014

Item	Environmental Protection Measures	Location/ Timing	Implementation Agent	Status				Remarks
				A	UA	IR	NA	
1	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)	All areas / During construction	Design Consultant/ Contractor			√		
2	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme	All areas / During construction	Design Consultant/ Contractor				√	Tree Transplanting Specification has been specified in P.S., no transplantation works has been carried out at this stage.
3	Hillside and roadside screen planting to proposed roads, associated structures and slope works	All areas / During construction	Design Consultant/ Contractor				√	Construction of roads not commenced yet
4	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone)	All areas / During construction	Design Consultant/ Contractor	√				
5	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works	All areas / During construction	Design Consultant/ Contractor				√	For some area, erection of hoarding was not feasible due to

									the limitation of traffic sight line; water barrier with panel was used to screen works.
6	Control night-time lighting and glare by hooding all lights	All areas / During construction	Design Consultant/ Contractor					✓	Not night-time lighting
7	Ensure no run-off into water body adjacent to the Project Area	All areas / During construction	Design Consultant/ Contractor	✓					
8	Avoidance of excessive height and bulk of buildings and structures	All areas / During construction	Design Consultant/ Contractor					✓	No high-rise building would be constructed.
9	Recycle/Reuse all felled trees and vegetation, e.g. mulching	All areas / During construction	Design Consultant/ Contractor					✓	Recycle of trees yet to be commenced.
10	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	All areas / During construction	Design Consultant/ Contractor					✓	Compensatory planting will be carry out in later stage of the project.

Legend: A=Acceptable, UA= Unacceptable, IR=Improvement Required, N/A=Not Applicable

Note: All item reference to Technical Memorandum on Environmental Impact Assessment, TM-CLKL EIA Section 10.9 & Project EM&A Manual Section 7.6

Checked and Monitored by: Chung Koon Wah Albert (RLA) No. R-150 (Date) 14/01/2015

Checked by:  (ET) 14 Jan 2015 (Date)

Checked by:  (IEC) 15 January 2015 (Date)



Item 1. Existing trees on boundary of the Project Area have been protected carefully during construction.



Item 4. Sheeting of soil stockpile was provided.



Item 5. Hoardings around works area.



Item 7. Ensure no run-off into water body.

Contract No. HY/2013/12

Tuen Mun – Chek Lap Kok Link – Northern Connection Toll Plaza and Associated Works

Landscape and Visual Checklist






Monitoring Date: 24th Dec 2014

Item	Environmental Protection Measures	Location/ Timing	Implementation Agent	Status				Remarks
				A	UA	IR	NA	
1	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)	All areas / During construction	Design Consultant/ Contractor			√		
2	Trees unavoidably affected by the works shall be transplanted where practical. Trees will be transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme	All areas / During construction	Design Consultant/ Contractor				√	Tree Transplanting Specification has been specified in P.S., no transplantation works has been carried out at this stage.
3	Hillside and roadside screen planting to proposed roads, associated structures and slope works	All areas / During construction	Design Consultant/ Contractor				√	Construction of roads not commenced yet
4	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone)	All areas / During construction	Design Consultant/ Contractor	√				
5	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works	All areas / During construction	Design Consultant/ Contractor				√	For some area, erection of hoarding was not feasible due to

									the limitation of traffic sight line; water barrier with panel was used to screen works.
6	Control night-time lighting and glare by hooding all lights	All areas / During construction	Design Consultant/ Contractor					✓	Not night-time lighting
7	Ensure no run-off into water body adjacent to the Project Area	All areas / During construction	Design Consultant/ Contractor	✓					
8	Avoidance of excessive height and bulk of buildings and structures	All areas / During construction	Design Consultant/ Contractor					✓	No high-rise building would be constructed.
9	Recycle/Reuse all felled trees and vegetation, e.g. mulching	All areas / During construction	Design Consultant/ Contractor					✓	
10	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	All areas / During construction	Design Consultant/ Contractor					✓	Compensatory planting will be carry out in later stage of the project.

Legend: A=Acceptable, UA= Unacceptable, IR=Improvement Required, N/A=Not Applicable

Note: All item reference to Technical Memorandum on Environmental Impact Assessment, TM-CLKL EIA Section 10.9 & Project EM&A Manual Section 7.6

Checked and Monitored by:  (RLA) No. R-150 (Date) 14/01/2015
 Checked by:  (ET) 14 Jan 2015 (Date)
 Checked by:  (IEC) 15 January 2015 (Date)



Item 1. Existing trees on boundary of the Project Area have been protected carefully during construction.



Item 4. Hydro-seeding or sheeting provided at stockpile.



Item 5. Water Barrier with panel around works area.



Item 7. Ensure no run-off into water body.

Appendix L

Monthly Summary Waste Flow Table

Monthly Summary Waste Flow Table for 2014 (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	Paper / cardboard packaging	Plastics (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	-	-	-	-	-	-	-	-	-	-	-
Feb	-	-	-	-	-	-	-	-	-	-	-
Mar	-	-	-	-	-	-	-	-	-	-	-
Apr	-	-	-	-	-	-	-	-	-	-	-
May	-	-	-	-	-	-	-	-	-	-	-
June	-	-	-	-	-	-	-	-	-	-	-
Sub-total	-	-	-	-	-	-	-	-	-	-	-
July	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Aug	3.000	0.000	3.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Sept	14.367	0.000	5.000	0.882	8.485	0.000	0.000	0.000	0.000	0.000	0.000
Oct	61.302	0.000	8.890	14.386	37.887	0.000	0.000	0.000	0.000	0.000	0.139
Nov	63.963	0.000	6.351	13.728	43.868	0.000	0.000	0.000	0.000	0.000	0.016
Dec	41.646	0.000	10.145	16.525	14.954	0.000	0.000	0.000	0.000	0.000	0.022
Total	184.278	0.000	33.386	45.521	105.194	0.000	0.000	0.000	0.000	0.000	0.177

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 M

Environmental Mitigation and Enhancement Measures Implementation Schedule (EMIS)

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		✓

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**

		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		✓

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**

		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		✓

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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		✓
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		✓
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/ post construction	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/ post construction	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/ post construction	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/ post construction	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/ post construction	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/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y	Y	N/A
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

Appendix N

Cumulative Statistics on Exceedance and Complaint

Table N-1 Statistical Summary of Environmental Exceedance

Reporting Period	Environmental Aspect / Parameter	Environmental Performance	Event Exceedance	
			Reporting Period	Cumulative since project commencement
December 2014	Air Quality – 1-hour TSP	Action Level	2	4
		Limit Level	0	0
	Air Quality – 24-hour TSP	Action Level	0	0
		Limit Level	0	0

Table N-2 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics				
	Frequency	Cumulative	Complaint Nature		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA
Cumulative since project commencement	0	0	NA	NA	NA

Table N-3 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics				
	Frequency	Cumulative	Complaint Nature		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA
Cumulative since project commencement	0	0	NA	NA	NA

Table N-4 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics				
	Frequency	Cumulative	Complaint Nature		
			Air	Noise	Water
December 2014	0	0	NA	NA	NA
Cumulative since project commencement	0	0	NA	NA	NA