

AUES JOB No.: TCS00715/14

TUEN MUN - CHEK LAP KOK LINK



CONTRACT NO. HY/2013/12 –

NORTHERN CONNECTION TOLL PLAZA AND  
ASSOCIATED WORKS

1<sup>ST</sup> ANNUAL ENVIRONMENTAL MONITORING AND  
AUDIT (EM&A) REVIEW REPORT – NOVEMBER 2014  
TO OCTOBER 2015

PREPARED FOR

CRBC AND KADEN JOINT VENTURE

Date	Reference No.	Prepared By	Certified By
14 September 2016	TCS00715/14/600/R0163v5	 Nicola Hon (Environmental Consultant)	 T.W. Tam (Environmental Team Leader)

Ref.: HYDHZMBEEM00\_0\_4580L.16

14 September 2016

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

By Fax (2293 6300) and By Post

Attention: Mr. Roger Man

Dear Roger,

**Re: Agreement No. CE 48/2011 (EP)  
Environmental Project Office for the  
HZMB Hong Kong Link Road, HZMB Hong Kong Boundary Crossing  
Facilities, and Tuen Mun-Chek Lap Kok Link – Investigation**

**Contract No. HY/2013/12 TM-CLKL Northern Connection Toll Plaza and  
Associated Works  
First Annual EM&A Review Report**

Reference is made to the 1st Annual Environmental Monitoring and Audit (EM&A) Review Report (AUES reference: TCS00715/14/600/R0163v5 dated 14 September 2016) certified by the ET Leader and provided to us via e-mail on 14 September 2016.

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

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

Yours sincerely,



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

c.c. HyD – Mr. Stephen Chan (By Fax: 3188 6614)  
HyD – Mr. Vico Cheung (By Fax: 3188 6614)  
AECOM – Mr. Conrad Ng (By Fax: 3922 9797)  
AUES – Mr. T. W. Tam (By Fax: 2959 6079)  
CRBC – Kaden JV – Mr. John Wong (By Fax: 2253 8399)

Internal: DY, YH, JKC, ENPO Site

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**EXECUTIVE SUMMARY**

ES01 In August 2014, CRBC-Kaden Joint Venture (*hereafter “CRBC-Kaden JV”*) has been awarded the *Contract No. HY/2013/12 -Northern Connection Toll Plaza and Tunnel Section of the Tuen Mun – Chek Lap Kok Link* (*hereinafter called “the Contract”*) by the Highways Department (HyD). The construction phase of the Contract was commenced on **23 October 2014**.

ES02 Before the Contract commencement, the baseline air quality monitoring was carried out by the ET of HY/2012/08 from **16<sup>th</sup> to 31<sup>st</sup> October 2013**. A set of Action and Limit Levels (A/L Levels) of air quality performance criteria was proposed by ET of HY/2012/08 which has been verified by IEC and endorsed by EPD. The Action and Limit Levels of the air quality adopted for the Contract is shown in **Table ES-01**.

**Table ES-01 Action and Limit Levels of Air Quality Monitoring**

Monitoring Station	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

ES03 In September 2013, baseline survey for Pitcher Plant has been conducted within the project area by a suitably qualified ecologist. In mid-September 2014, Contract HY/2013/12 has also conducted a one-off survey to confirm the number of existing Pitcher Plant. For cultural heritage, a condition survey for the grave was conducted on **23 September 2014**. The Baseline Monitoring Report for the Contract was submitted on **7 October 2014** for IEC’s verification and **25 November 2014** for EPD’s endorsement.

ES04 This is the **1<sup>st</sup>** Annual EM&A Review Report for the “*Tuen Mun - Chek Lap Kok Link - Northern Connection Toll Plaza and Associated Works*” under Environmental Permit No. EP-354/2009/D (*hereinafter “the EP”*), covering the period from **23 October 2014 to 31 October 2015** (*hereinafter “Reporting Period”*).

**SUMMARY OF EM&A ACTIVITIES FOR THE REPORTING PERIOD**

ES05 In the Reporting Period, the EM&A activities is summarized in **Table ES-02**.

**Table ES-02 Summary EM&A Activities Undertaken in the Reporting Period**

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Sub-total Occasions				Total
		1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter	
Air Quality	1-hour TSP	480	390	465	450	<b>1785</b>
	24-hour TSP	155	130	155	150	<b>590</b>
Cultural heritage inspection	Grave G1	14	13	13	13	<b>53</b>
Landfill Gas Monitoring	Oxygen; Methane & Carbon Dioxide	83 days	68 days	75 days	75 days	<b>301 days</b>
Landscape & Visual	Landscape & Visual Monitoring	14	13	13	13	<b>53</b>
Joint Site Inspection / Audit	IEC, ET, the Contractor and RE joint site Environmental Inspection and Auditing	14	13	13	13	<b>53</b>

**BREACH OF ACTION AND LIMIT (A/L) LEVELS**

ES06 In according with the air quality measurement results by the ET of Contract HY/2012/08 in the

Reporting Period, no exceedances in 24-hour TSP were recorded but a total of four (4) exceedances of 1-hour TSP respectively were detected on 14 November 2014 (*two exceedance*), 2 December 2014 (*one exceedance*) and 17 December 2014 (*one exceedance*).

ES07 For landfill gas monitoring, the concentration of all parameters were detected within the acceptable levels. Moreover, no noise complaint was received in the Reporting Period. *Table ES-03* is summarized breach of environmental performance criteria.

**Table ES-03 Action and Limit (A/L) Levels Breach Summarized in the Reporting Period**

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	1-hour TSP	4	0	3	Not related the Contract	Not require
	24-hour TSP	0	0	0	0	0
Landfill Gas Monitoring	Oxygen	0	0	0	0	0
	Methane	0	0	0	0	0
	Carbon Dioxide	0	0	0	0	0

**ENVIRONMENTAL COMPLAINT**

ES08 In the First and Second Quarters Reporting Period, no environmental complaints were received by either the RE or ENPO or HyD or the Main Contractor. However, one (1) environmental complaint which received the third Quarter Reporting Period on 28 July 2015 regarding milky water observed from drainage outlet of Butterfly Beach. Addition, two (2) environmental complaints which regarding the soil/muddy water caused by frequent dump trucks in Lung Mun Road and River Trade Terminal and milky water discharged from the drainage outlet near the Butterfly Beach, Tuen Mun, were received on 3 August and 2 September 2015 at the fourth Quarter Reporting Period. The statistical of environmental complaint is listed in *Table ES-04*.

**Table ES-04 Statistical Summary of Environmental Complaints**

Reporting Period	Complaint Nature			Total Registered
	Water Quality	Construction Dust	Construction Noise	
23 October 2014 – 31 October 2015	<ul style="list-style-type: none"> <li>• 28 July 2015</li> <li>• 3 August 2015</li> <li>• 2 September 2015</li> </ul>	NA	NA	3

ES09 Complaint investigation has conducted by the Contractor or ET and the corresponding investigation reports for the complaint have been submitted to relevant parties. Based on investigation results, the contractor has enhanced the management to comply the Contract requirements.

**NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

ES10 No environmental summons or successful prosecutions were recorded in the Reporting Period.

**SITE INSPECTION**

ES11 For past twelve months, total 53 occasions joint site inspection were carried out by the RE, IEC, ET and the Contractor. For joint site inspections, no non-compliance was observed. However, 129 observations/reminders were recorded within the past twelve months.

ES12 During each occasion of site inspection, Pitcher Plants of ecology and grave of culture heritage were also to inspect and audit.

**FUTURE KEY ISSUES**

ES13 Construction dust emission would be a key environmental issue during construction work of the

Contract at dry season. Dust mitigation measures such as watering at least 12 times per day on all exposed soil within the Project site and associated work areas in Tuen Mun area throughout the construction period should be implemented in accordance with the EP requirement.

- ES14 Muddy water or other water pollutants from sites surface flow to public area should properly avoided. Water quality mitigation measures to prevent surface runoff to impact public areas should be fully implemented special at wet season.
- ES15 Construction noise would be another environmental issue during construction works of the Contract. Noise mitigation measures such as using of quiet plants should be implemented in accordance with the EM&A requirement throughout the construction 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 the latest Environmental Permit number VEP-354/2009D issued on 13 March 2015. The layout Plan of the Project and the Contract are showed in [Appendix A](#) and [Appendix B](#) respectively.
- 1.1.2 The 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 AECOM Asia Company Limited as the Resident Engineer (RE) and Ramboll Environ Hong Kong Limited as the Independent Environmental Checker (IEC) and Environmental Project Office (ENPO) were employed by the HyD. For implementation of the environmental monitoring and audit (EM&A) programme under the Contract, CRBC-Kaden JV has appointed Action-United Environmental Services & Consulting (AUES) as the Environmental Team (ET) to responsible relevant environmental monitoring work.
- 1.1.4 Construction phase of the Contract was commenced on **23 October 2014**. This is the First (1<sup>st</sup>) Annual EM&A Review Report to summarize the monitoring results and inspection findings with the Contractor performance from **23 October 2014** to **31 December 2015** (hereinafter “Reporting Period”) for the past twelve months.

### 1.2 REPORT STRUCTURE

- 1.2.1 The Annual Environmental Monitoring and Audit (EM&A) Review Report is structured into the following sections:-
- Section 1 Introduction*
  - Section 2 Contract Organization and Construction Progress and Environmental Submissions*
  - Section 3 Summary of Impact Monitoring Requirements under the Contract*
  - 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 Inspection and Auditing*
  - Section 11 Environmental Complaint 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. Moreover, the master construction program of the Contract is enclosed in [Appendix D](#).

- Site Formation, and Slope stabilization and Surface drainage works at Portion X.
- Ground Investigation Works at various locations
- Site Clearance at various locations
- Erection of site office at WA18
- Retaining Wall at Portions X and I
- Road Works
- Piling Works at Portion I
- Tree Felling at Portions X and I
- Tree Survey
- Bridge and Underpass Work at Portion X
- Retaining Wall Structure TP\_F & RW\_B at Portion X
- Footbridge FB1 – Portion X
- Instrumentation and Monitoring
- Site Formation to Slope A, B, C, D, E, TP\_F, TP\_A, TP\_G and Upgrading Works
- Excavation to Slope A, B,C,D & E
- Vehicular Underpass TN-01
- Construction of Culvert 1-Stage 4
- Bridge TD1, TD2 Bridge G1, G2, Bridge H1 & Footbridge
- Natural terrain hazard mitigation measures
- Toll Plaza Decking TD1, TD2
- Toll Plaza Footbridge-Section 1
- Culvert 1 (TBM) – Stage 4
- Road and Drainage Work at Lung Fu Road Roundabout
- Associated and Upgrading Works for TP\_B, TP\_C, TP\_D and TP\_E
- Retaining Structure RW\_B-Section 1, RW\_A
- Construction sewer Culvert 2 & Culvert 3 and Existing Box Culvert
- Dismantling of HY/2012/04 Project Office at WA6

### 2.3 SUMMARY OF ENVIRONMENTAL SUBMISSIONS

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

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

2.3.2 Summary of the relevant permits, licenses, and/or notifications on environmental protection as obtained by the Contract in the past twelve months 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

No.	Type of Permit/ License	Submission Date	Reference/ License No.	Date of Issue	Date of Expiry
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	Permission to Transplant Pitcher Plant	02-12-2014	(7) in AF CON 11/13 pt.4	09-12-2014	08-06-2015
		15-6-2015	(30) in AF CON 11/13 pt.4	23-6-2015	22-12-2015
6	CNP for Construction of Site Office	15-08-2014	GW-RW0656-14	03-09-2014	22-02-2015
7	CNP for Site Formation	15-09-2014	GW-RW0761-14	29-09-2014	29-03-2015
8	CNP for Concreting	15-09-2014	GW-RW0748-14	29-09-2014	29-03-2015
9	CNP for Multiple Task	05-12-2014	GW-RW0949-14	05-12-2014	04-05-2015
		24-04-2015	GW-RW0225-15	13-05-2015	04-11-2015
10	CNP for GI works	23-2-2015	GW-RW0134-15	16-03-2015	07-04-2015
11	CNP for MH5	05-05-2015	GW-RW0226-15	18-05-2015	17-11-2015

Note: CNP is Control Noise Permit

### 3 SUMMARY OF IMPACT MONITORING REQUIREMENTS UNDER THE CONTRACT

#### 3.1 GENERAL

3.1.1 In view of the construction works under the Contract, the major construction activities are land-based. In accordance with the Project EM&A Manual requirements, environmental aspect monitoring should be conducted including air quality, ecological (Pitcher plant), cultural heritage and site inspections during construction period. In addition, landscape and visual (L&V) monitoring, landfill gas monitoring and 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 PARAMETERS

3.2.1 The construction phase air quality monitoring 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 Designated 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

##### General Requirement

3.4.1 For regular impact monitoring, the sampling frequency of at least once in every six days shall be strictly observed at five of the designated monitoring stations for 24-hr TSP monitoring. For 1-hr TSP monitoring, the sampling frequency of at least three times in every six days should be undertaken at five locations when the highest dust impact occurs. The stations to be monitored should be selected based on the prevailing wind direction and their proximity to the active construction works.

##### Special Requirement

3.4.2 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.

3.4.3 The air quality monitoring requirements for the Contract is shown 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	<p><b><u>Northern Connection</u></b>                      During excavation works for launching shaft, excavation work for Cut and Cover Tunnel and Cut and Cover Tunnel Construction</p> <p><b><u>Toll Plaza</u></b>                      During excavation, slope works, construction of road and superstructures and wind erosion from open sites and stockpiling areas</p> <p><b><u>Tunnel Buildings</u></b>                      During excavation, foundation works, construction of superstructures and wind erosion from open sites and stockpiling areas</p>
	24-hour TSP	ASR1, ASR5, AQMS1, ASR6, ASR10	Daily every three days	

### 3.5 DERIVATION OF ACTION/LIMIT (A/L) LEVELS

- 3.5.1 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 proposed Action and Limit Levels are shown in *Tables 3-3*.

**Table 3-3 TSP 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

- 3.5.2 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*.

### 3.6 OTHER ENVIRONMENTAL ASPECTS

#### Noise

- 3.6.1 The TM-CLKL EIA study concluded that no existing noise sensitive receiver (NSR) was identified within the Study Area at Tuen Mun. Therefore, no planned NSR designated at the

Project sites of Tuen Mun. Based upon this, no noise monitoring is necessary for construction phase under the Contract.

- 3.6.2 Regular site inspections and audits will be carried out during the construction phase in order to confirm compliance with the regulatory requirements and conformity of the Contractor with regard to noise control and contract conditions.

**Water Quality**

- 3.6.3 No marine works will be undertaken under the Contract. Based upon this, no water quality monitoring is necessary for construction phase.

**Ecology**

- 3.6.4 Since the Works of the Contract would not be to generate the marine ecological impact, no dolphin monitoring under the Contract to conduct.
- 3.6.5 During construction phase, the ET will perform Pitcher Plants regularly inspection at least once every week to report the growth and protection measure situation.

**Landscape and Visual**

- 3.6.6 According to EIA recommendation, site inspection and audit shall be required to be undertaken in the operation stage. Measures to mitigate landscape and visual impacts 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**

- 3.6.7 Grave G1 of heritage resources 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.

**Monitoring and Measurement of Landfill Gas**

- 3.6.8 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. Safety Officer or an approved and appropriated qualified person should be carried out the monitoring works to make sure the area free of landfill gas before any man enters in the area.
- 3.6.9 Depending on the results of the measurements, actions required will vary and should be set down by the Safety Officer or other appropriately qualified person. As a minimum these should encompass those actions specified as follow:

**Table 3-4 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

Parameter	Measurement	Action
		- Evacuate personnel / prohibit entry - Increase ventilation to restore to < 0.5%

## 4 AIR QUALITY MONITORING

### 4.1 GENERAL

- 4.1.1 According to the Updated EM&A Manual and the Enhanced Total Suspended Particulates (TSP) Monitoring Plan, the air quality impact monitoring was conducted at the five air quality monitoring stations during the Reporting Period 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. Therefore the Contract is not required to conduct its own dust monitoring exercise until the Contract HY/2012/08 is ended.

### 4.2 AIR QUALITY MONITORING RESULTS IN REPORTING PERIOD

- 4.2.1 In the Reporting Period, total 1,785 of 1-hr TSP measurements and 590 events of 24-hours TSP monitoring at five proposed locations were carried out by the ET of Contract HY/2012/08. Detailed air quality monitoring results and statistical analysis of the trends of air quality data during the Reporting Period can be referred to the Monthly EM&A Reports (from October 2014 to October 2015) and the second Annual EM&A Review Report (November 2014 to October 2015) prepared by the ET of Contract HY/2012/08.

### 4.3 SUMMARY OF ACTION AND LIMIT (A/L) LEVELS EXCEEDANCE (NON-COMPLIANCE)

- 4.3.1 According to the air quality monitoring results, no 24-hour TSP exceedance but four (4) Action Levels exceedance of 1-hour TSP measurement were recorded by Contract HY/2012/08 during the Reporting Period. The summary of air quality exceedance is shown in *Table 4-1*.

**Table 4-1 Summary of Air Quality Monitoring Exceedance**

Date of Exceedance	Monitoring Station	Air Quality Parameter	Result	Exceedance
14 November 2014 (Dry Season)	ASR1	1-hour TSP	404 $\mu\text{g}/\text{m}^3$ 396 $\mu\text{g}/\text{m}^3$	Action Level
2 December 2014 (Dry Season)	ASR5	1-hour TSP	346 $\mu\text{g}/\text{m}^3$	Action Level
17 December 2014 (Dry Season)	AQMS1	1-hour TSP	348 $\mu\text{g}/\text{m}^3$	Action Level

### 4.4 ACTION TAKEN IN THE EVENT OF NON-COMPLIANCE

- 4.4.1 Once non-compliance was detected, actions were taken in accordance with the Event-Action Plan in the EM&A Manual. Notification of Exceedances (NOEs) to all relevant parties has been issued by the ET of Contract HY/2012/08 upon the results was confirmed. Investigation was then carried out by the ET of each individual contract. In the investigation, the construction activities and implemented mitigation measures undertaken by the Contractor were reviewed to identify the source of pollutant.

### 4.5 REVIEW OF REASONS FOR AND THE IMPLICATION OF NON-COMPLIANCE

- 4.5.1 Based on investigation findings, the exceedances recorded in the Reporting Period were not related to the works under the Contract of the Project. No corrective action was required accordingly. Traffic dust is other factors might affect the monitoring results since Lung Mun Road is a major access to River Trade Terminal, Tuen Mun Area 38 and NENT Landfill. The investigation reports for the cause of exceedance are shown in *Appendix H*.

## 5 ECOLOGY MONITORING

### 5.1 GENERAL

- 5.1.1 According to the EM&A Manual requirements, regularly inspection for Pitcher Plants at least once every week to report its growth and protection measure situation shall be conducted during construction period.
- 5.1.2 Permission for transplantation of Pitcher Plant was issued by the AFCD on 9<sup>th</sup> December 2014. 280 numbers of Pitcher Plant individuals located at Zones 1 - 7 were transplanted to the nursery site on 17<sup>th</sup> December 2014 by the accredited person and his assistant. The transplantation work was strictly followed to conditions on permit.
- 5.1.3 Trial transplantation of pitcher plant from the nursery site to final receptor site which located near Zone 9 and Zone 10 was carried out on 15 April 2015 and a total of 5% pitcher plant was transplanted. Transplantation of remaining 95% pitcher plant from the nursery site to final receptor site was completed on 10<sup>th</sup> September 2015. Overall the transplanted Pitcher Plants were protected properly and the growth also was in fair to poor conditions.

### 5.2 PITCHER PLANTS INSPECTION

- 5.2.1 A total **53** occasions of inspection were carried out by the Contractor and ET in the past twelve months.
- 5.2.2 During weekly site inspection at the nursery zone before the transplantation to the receptor site, the transplanted Pitcher Plants in the nursery zone were observed in fair to poor condition. At the final receptor site, all the transplanted Pitcher Plants were protected properly and the growth also was in fair to poor condition. Moreover, no construction activities were carried out nearby the protected areas of Pitcher Plants. The chain link fence as surrounded at the protected zone was maintained in good conditions by the Contractor.



## 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 prevention of any possible damage to the grave and to ensure that 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 this Annual, there are total **53 occasions** to carry out the Grave G1 inspection. 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 this Annual, Registered Landscape Architect with the Contractor had undertaken a total of **53** occasions of inspection.
- 7.2.2 In the past twelve months, most of the landscape work such as planting was not yet commenced. The detailed inspection checklists can be referred to relevant Monthly EM&A Reports of the Contract.

## 8 LANDFILL GAS HAZARD MONITORING

### 8.1 GENERAL

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

### 8.2 LANDFILL GAS MONITORING RESULT

- 8.2.1 In the past twelve months, the Retaining Wall B and Retaining Wall F construction were nearby Pillar Point Valley (PPV) Landfill. The landfill gas monitoring used BIOGAS 5000 gas analyser was conducted by the Safety Officer. Location of Retaining Wall B and Retaining Wall F are illustrated in [Appendix E](#).
- 8.2.2 There were total 301 monitoring days carried out by the Safety Officer or an approved and qualified persons. Landfill gas measurement results in the past twelve months are summarized in Table 8-1. Moreover, graphical plot are attached in [Appendix G](#).

**Table 8-1 Summary of Landfill Gas Measurement Results in this Annual**

Para.	Action Level	Limit Level	In Period	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)	Nov 2014 to Jan 2015	0%	0.2%	0%	0.2%
			Feb 2015 to Apr 2015	0%	0.2%	0%	0.2%
			May 2015 to Jul 2015	0%	0.2%	0%	0.2%

Para.	Action Level	Limit Level	In Period	Detectable at Retaining Wall B		Detectable at Retaining Wall F	
				Min	Max	Min	Max
			Aug 2015 to Oct 2015	0%	0.2%	0%	0.2%
Oxygen	<19%	<18%	Nov 2014 to Jan 2015	20.9%	21.4%	21.0%	21.3%
			Feb 2015 to Apr 2015	21.0%	21.2%	21.0%	21.2%
			May 2015 to Jul 2015	21.0%	21.2%	21.0%	21.2%
			Aug 2015 to Oct 2015	21.0%	21.1%	21.0%	21.1%
Carbon Dioxide	>0.5%	>1.5%	Nov 2014 to Jan 2015	0%	0.3%	0%	0.3%
			Feb 2015 to Apr 2015	0%	0.2%	0%	0.2%
			May 2015 to Jul 2015	0%	0.2%	0%	0.2%
			Aug 2015 to Oct 2015	0%	0.2%	0%	0.2%

8.2.3 The measurement results shown that slightly methane concentration was detected and all oxygen concentration was measured between 20.9% and 21.3% and Carbon Dioxide was between 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 arisings 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 In the past twelve months, total quantities of waste disposal are summarized in *Tables 9-1* and *9-2*.

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

Type of Waste	Quantity				Total	Disposal Location
	Nov 2014 – Jan 2015	Feb 2015 – Apr 2015	May 2015 – Jul 2015	Aug 2015 – Oct 2015		
Reused in this Contract (Inert) ('000m <sup>3</sup> )	25.523	45.944	41.322	45.903	<b>158.692</b>	-
Reused in other Projects (Inert) ('000m <sup>3</sup> )	48.73	63.17	37.471	11.937	<b>161.308</b>	<ul style="list-style-type: none"> <li>• TM-CLKL C2 HY/2012/08</li> <li>• Lam Tei Quarry</li> <li>• Eco Park K.wah Recycle Facilities</li> <li>• Lung Kwu Tan Tailor Recycled Aggregates</li> <li>• Laintang BCP</li> </ul>
Disposal as Public Fill (Inert) ('000m <sup>3</sup> )	113.31	12.436	16.926	16.349	<b>159.021</b>	Tuen Mum Area 38

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

Type of Waste	Quantity				Total	Disposal Location
	Nov 2014 – Jan 2015	Feb 2015 – Apr 2015	May 2015 – Jul 2015	Aug 2015 – Oct 2015		
Recycled Metal ('000kg)	0	0	0	0	<b>0</b>	-
Recycled Paper / Cardboard Packing ('000kg)	0	0.05	0	0	<b>0.05</b>	-
Recycled Plastic ('000kg)	0	0	0	0	<b>0</b>	-
Chemical Wastes ('000kg)	0	0	0	0	<b>0</b>	-
General Refuses ('000m <sup>3</sup> )	0.058	0.023	0.162	0.131	<b>0.374</b>	WENT

9.2.3 Whenever possible, materials were reused on-site as far as practicable.

## 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. Weekly environmental site inspections should carry out to confirm the environmental performance.

#### *Findings / Deficiencies During Reporting Period*

10.1.2 In the past twelve months, total 53 events of joint site inspection to evaluate site environmental performance has been carried out by the RE, ET and the Contractor. Moreover, IEC or ENPO attended total 12 occasions' joint site inspection. The quantity of reminders/observations is summarized in **Table 10-1**.

**Table 10-1 Summary of Reminders/Observations of Site Inspection for the Annual**

Reporting Period	Date of site inspection	Nos. of findings / reminders	Follow-Up Status
November 2014	28 October 2014, 4, 11, 19 and 25 November 2014	10	Completed
December 2014	2, 9, 17, 23 and 30 December 2014	16	Completed
January 2015	6, 13, 20 and 27 January 2015	10	Completed
February 2015	3 <sup>rd</sup> , 10 <sup>th</sup> , 17 <sup>th</sup> , and 24 <sup>th</sup> February 2015	10	Completed
March 2015	3 <sup>rd</sup> , 10 <sup>th</sup> , 17 <sup>th</sup> , 24 <sup>th</sup> and 31 <sup>st</sup> March 2015	14	Completed
April 2015	8 <sup>th</sup> , 14 <sup>th</sup> , 21 <sup>st</sup> and 28 <sup>th</sup> April 2015	12	Completed
May 2015	5 <sup>th</sup> , 12 <sup>th</sup> , 19 <sup>th</sup> and 26 <sup>th</sup> May 2015	7	Completed
June 2015	2 <sup>nd</sup> , 9 <sup>th</sup> , 16 <sup>th</sup> , 23 <sup>rd</sup> and 30 <sup>th</sup> June 2015	13	Completed
July 2015	7 <sup>th</sup> , 14 <sup>th</sup> , 21 <sup>st</sup> and 28 <sup>th</sup> July 2015	8	Completed
August 2015	4 <sup>th</sup> , 11 <sup>th</sup> , 18 <sup>th</sup> and 25 <sup>th</sup> August 2015	11	Completed
September 2015	1 <sup>st</sup> , 8 <sup>th</sup> , 15 <sup>th</sup> , 22 <sup>nd</sup> and 29 <sup>th</sup> September 2015	11	Completed
October 2015	6 <sup>th</sup> , 14 <sup>th</sup> , 20 <sup>th</sup> and 27 <sup>th</sup> October 2015	7	Completed

10.1.3 In the past twelve months, there are no non-compliance recorded, however, **129** observations/reminders were recorded during the site inspections. The minor deficiencies found in the weekly site inspections were in general rectified within the specified deadlines. The environmental performance of the Project was therefore considered satisfactory.

## 11 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

### 11.1 ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

11.1.1 For the Contract, no summons and prosecution was received in the Reporting Period. However, there were 3 environmental complaints and 4 exceedances of the environmental performance limit (Action and Limit Level) recorded. The statistical summary table of environmental exceedance, complaint, summons and prosecution is presented in *Tables 11-1, 11-2, 11-3 and 11-4*.

**Table 11-1 Statistical Summary of Environmental Exceedance**

Reporting Period	Environmental Aspect		Exceedance Statistics	
			Action	Limit
23 October 2014 – 31 October 2015	Air Quality	1-hour TSP	<ul style="list-style-type: none"> <li>• <i>Two</i> exceedance on 14 November 2014,</li> <li>• <i>One</i> exceedance on 2 December 2014; and</li> <li>• <i>One</i> exceedance on 17 December 2014).</li> </ul>	0
		24-hour TSP	0	0
	Landfill Gas	Methane	0	0
		Oxygen	0	0
		Carbon Dioxide	0	0

**Table 11-2 Statistical Summary of Environmental Complaints**

Reporting Period	Environmental Complaint Statistics			
	Cumulative	Complaint Nature		
		Air	Noise	Water
23 October 2014 – 31 October 2015	3	NA	NA	<ul style="list-style-type: none"> <li>• 28 July 2015</li> <li>• 3 August 2015</li> <li>• 2 September 2015</li> </ul>

**Table 11-3 Statistical Summary of Environmental Summons**

Reporting Period	Environmental Summons Statistics			
	Cumulative	Complaint Nature		
		Air	Noise	Water
23 October 2014 – 31 October 2015	0	NA	NA	NA

**Table 11-4 Statistical Summary of Environmental Prosecution**

Reporting Period	Environmental Prosecution Statistics			
	Cumulative	Complaint Nature		
		Air	Noise	Water
23 October 2014 – 31 October 2015	0	NA	NA	NA

### 11.2 SUMMARY RECORD OF ALL COMPLAINTS, ACTION AND WORKING PROCEDURES

11.2.1 During the complaint investigation work, the Contractor was co-operated with the ET in providing all the necessary information and assistance for completion of the investigation. Investigation reports for the complaints have completed by the ET and submitted to all relevant parties and they are summarized in below.

- 28 July 2015 - A complaint was received from the DSD on 28 July 2015. The complainant complained that milky water was observed from drainage outlet to Butterfly Beach. It was suspected that the milky water was come from the site under the

Contractor. Joint inspection has been carried out by DSD, AECOM and CKJV immediately receipt the complaint and no milky/ muddy water was found. Moreover, EPD was conducted site inspection with AECOM and CKJV on 29 July 2015 to further investigation. No milky/ muddy water was observed during the inspection. However, EPD urged CKJV to enhance the mitigation measures for wastewater at Eastern Portal and MH7.

- 3 August 2015 - A complaint was received via 1823 hotline on 3 August 2015. The complainant complained that the frequent dump trucks running along Lung Mun Road from Tuen Mun Area 38 Fill Bank and carriageway near River Trade Terminal causing soil/ muddy water on the road surface. In our investigation, it was concluded that the complaint was not related to the works under the Contract.
- 2 September 2015 - A complaint was received from the LCSD on 2 September 2015 regarding milky water discharged from the drainage outlet near the Butterfly Beach, Tuen Mun. It was suspected that the milky water was come from the site under the Contract. . In our investigation, it was concluded that the complaint was not related to the works under the Contract.

Inspection Checklist for Vulnerable to Contaminated Water Discharge

- 11.2.2 Following to the complaint about discharge of milky water to Bufferfuly Beach on 2 September 2015. The Contractor proposed to carry out daily inspection of wastewater treatment facilities, concerned discharge points, drainage inlets and outlets during typhoon or wet season.
- 11.2.3 In addition, specific inspections would also be conducted before and after adverse weather to ensure necessary remedial works would be carried out timely. Should incidental contaminated water discharge be found at the inlet of the associated drainage system, a specific inspection of the relevant drainage pipes would be conducted for traces of deposit, and follow up actions would be taken when necessary.
- 11.2.4 The daily inpspection for vulnerable to contaminated water discharge was conducted by the Contractor from 9 to 30 September 2015. As requested by the EPD, the associated inspection checklist should be presented in the respective Monthly EM&A Report.



## 12 IMPLEMENTATION STATUS OF MITIGATION MEASURES

### 12.1 GENERAL REQUIREMENTS

12.1.1 The environmental mitigation measures that recommended in the Environmental Mitigation Measures Implementation Schedule (EMMIS) in the Project EM&A Manual covered the issues of Air Quality, Cultural Heritage, Ecology, Landfill Gas Hazard, Landscape & Visual, Noise, Water and Waste and they are presented in [Appendix I](#).

12.1.2 In the past twelve months, environmental mitigation measures generally implemented by the Contract are listed in [Table 12-1](#).

**Table 12-1 Environmental Mitigation Measures**

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

## 13 CONCLUSIONS AND RECOMMENDATIONS

### 13.1 CONCLUSIONS

- 13.1.1 This is 1<sup>st</sup> Annual EM&A Review Report presenting the monitoring results and inspection findings for the Reporting Period from **23 October 2014** to **31 October 2015**.
- 13.1.2 No exceedances of 24-hour TSP monitoring were recorded in the Reporting Period. However, a total of four (4) Action Level exceedances of 1-hour TSP measurements were triggered in ASR1 (2 exceedance), ASR5 and AQMS1 on 14 November, 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 this Reporting Period, no noise complaint was received by RE, the Contractor, ENPO or HyD. No Action Level exceedances were triggered and no NOE or the associated corrective actions were therefore issued.
- 13.1.4 Site inspection for landscape and visual was conducted on weekly basis by the Landscape Architect to ensure the compliance of the intended aims of the mitigation measures. Most of the landscape works such as planting was not yet commenced.
- 13.1.5 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.
- 13.1.6 No notifications of summons or successful prosecution were received during the Reporting Period. However, three complaints about the water quality issues were received during the Reporting Period. Investigations were conducted and the follow-up actions corresponding to the mitigation measures recommended were undertaken by the Contractor to resolve the environmental deficiencies
- 13.1.7 Joint site inspection by the RE, ET and CRBC-Kaden JV was carried in accordance with the EM&A Manual. Moreover, the IEC attended a total of 13 joint site inspections during the Reporting Period. No non-compliance was recorded during the site inspection but **total 129** observations/reminders were recorded in the past twelve months. All the deficiencies were rectified before next site inspection date.
- 13.1.8 A total **53** occasions of Pitcher Plant inspection were carried out by the Contractor and ET in the past twelve months. Trial transplantation of pitcher plant from the nursery site to final receptor site which located near Zone 9 and Zone 10 was carried out on 15 April 2015 and a total of 5% pitcher plant was transplanted. Transplantation of remaining 95% pitcher plant from the nursery site to final receptor site was completed on 10<sup>th</sup> September 2015. Overall the transplanted Pitcher Plants were protected properly and the growth also was in fair to poor conditions.
- 13.1.9 For cultural heritage in the past twelve months, the buffer zone between the working area and the Grave was observed and no construction material or equipment was stored nearby.

### 13.2 RECOMMENDATIONS

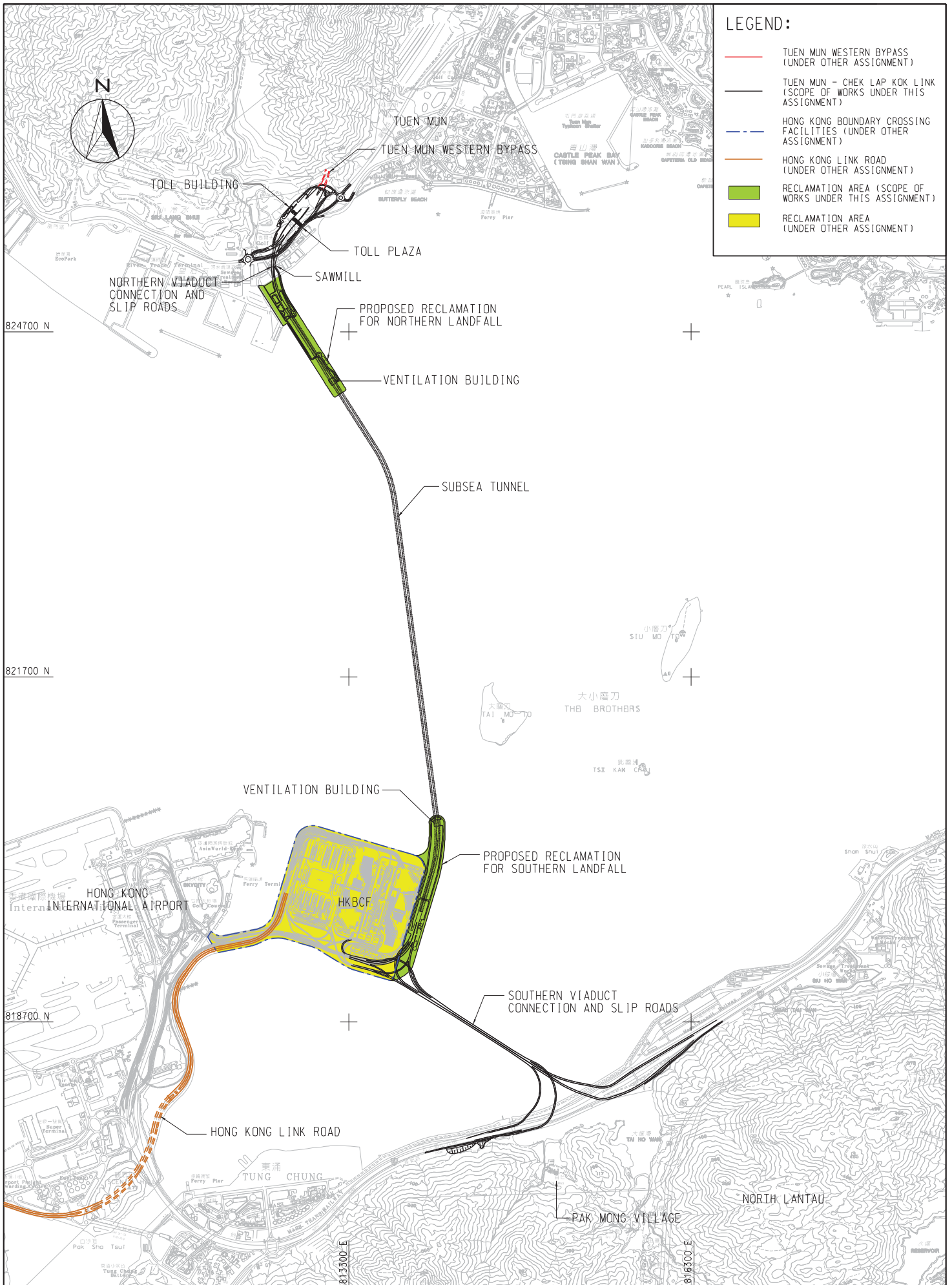
- 13.2.1 The construction phase monitoring programme ensured that any environmental impact to the receivers would be readily detected and timely actions could be taken to rectify any non-compliance. Assessment and analysis of monitoring results collected demonstrated the environmental acceptability of the Project. The regular site inspection and waste audit ensured that all the mitigation measures on waste management were effectively implemented.
- 13.2.2 The EM&A programme effectively monitored the environmental impacts from the

construction phase of the Project and no particular recommendation was advised for the improvement of the programme.

- 13.2.3 It is considered that the environmental acceptability of the Contract in the past twelve years was satisfactory and acceptance.

## **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

**AECOM**

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

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

## **Appendix B**

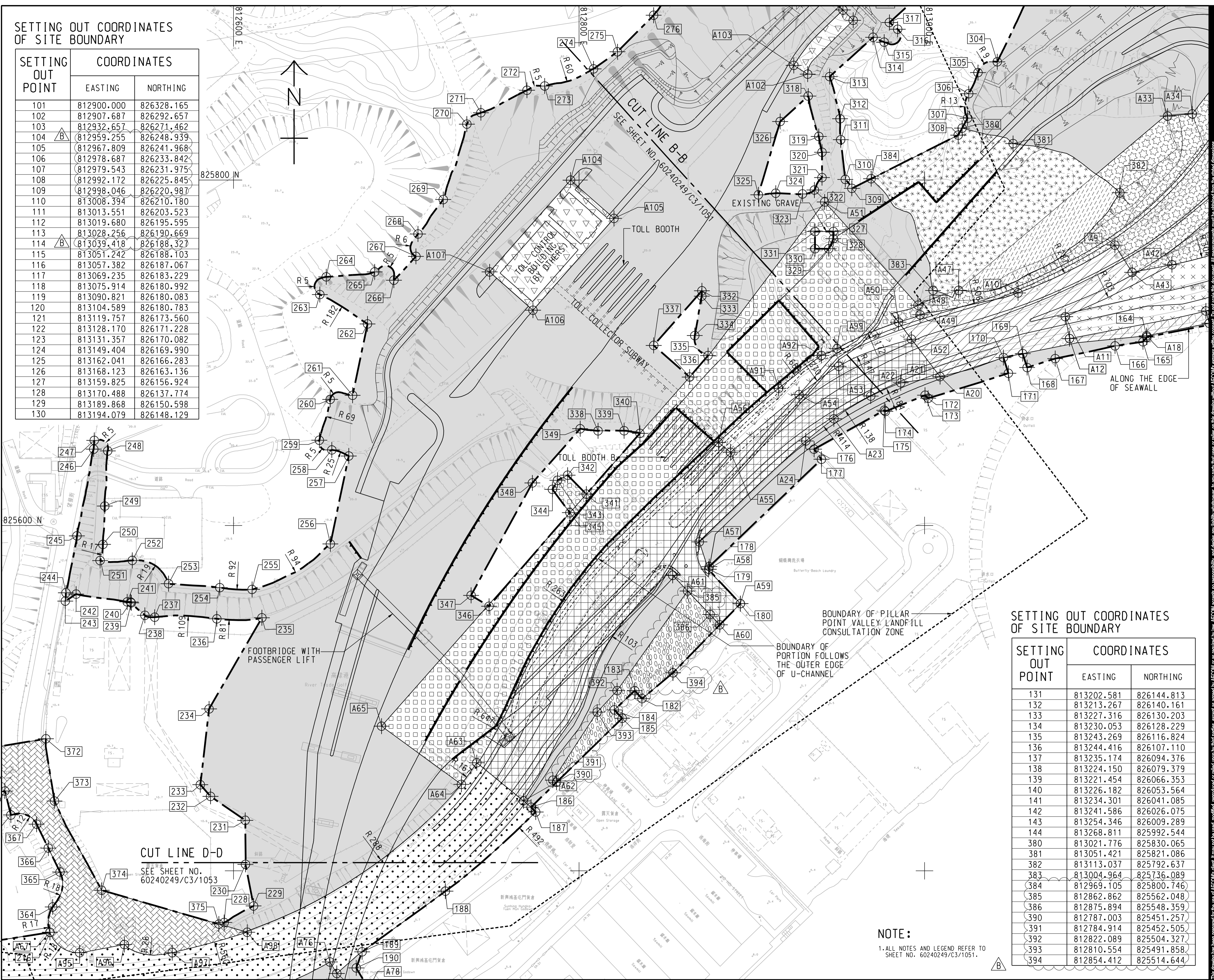
### **Layout Plan of the Contract**



Project Management Initials: Designer: PL Checked: ALCF Approved: CWN ISO A1 594mm x 841mm  
 Plot File by: LUONQ 2014/03/18 PATH: P:\proj\60240249\DRAWING\CONTRACT\C3\10052.dgn

**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.

**AECOM**

**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  
 港務局 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.  
 www.aecom.com

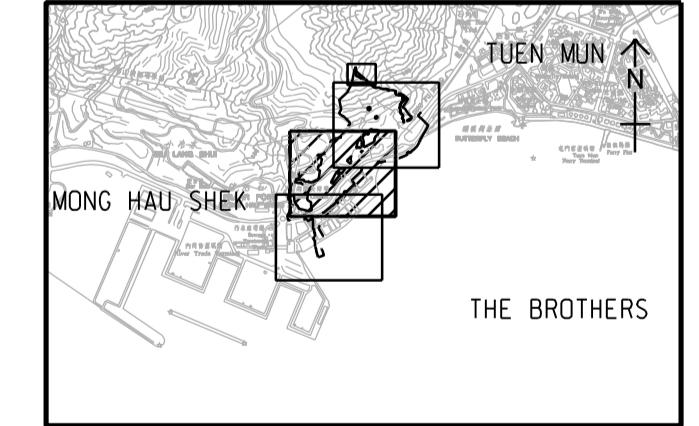
**SUB-CONSULTANTS**  
 分判工程顧問公司

**ISSUE/REVISION**

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

**SCALE**  
 比例 1:50000

**DIMENSION UNIT**  
 尺寸單位 METRES



**PROJECT NO.**  
 項目編號 60240249

**CONTRACT NO.**  
 合約編號 HY/2013/12

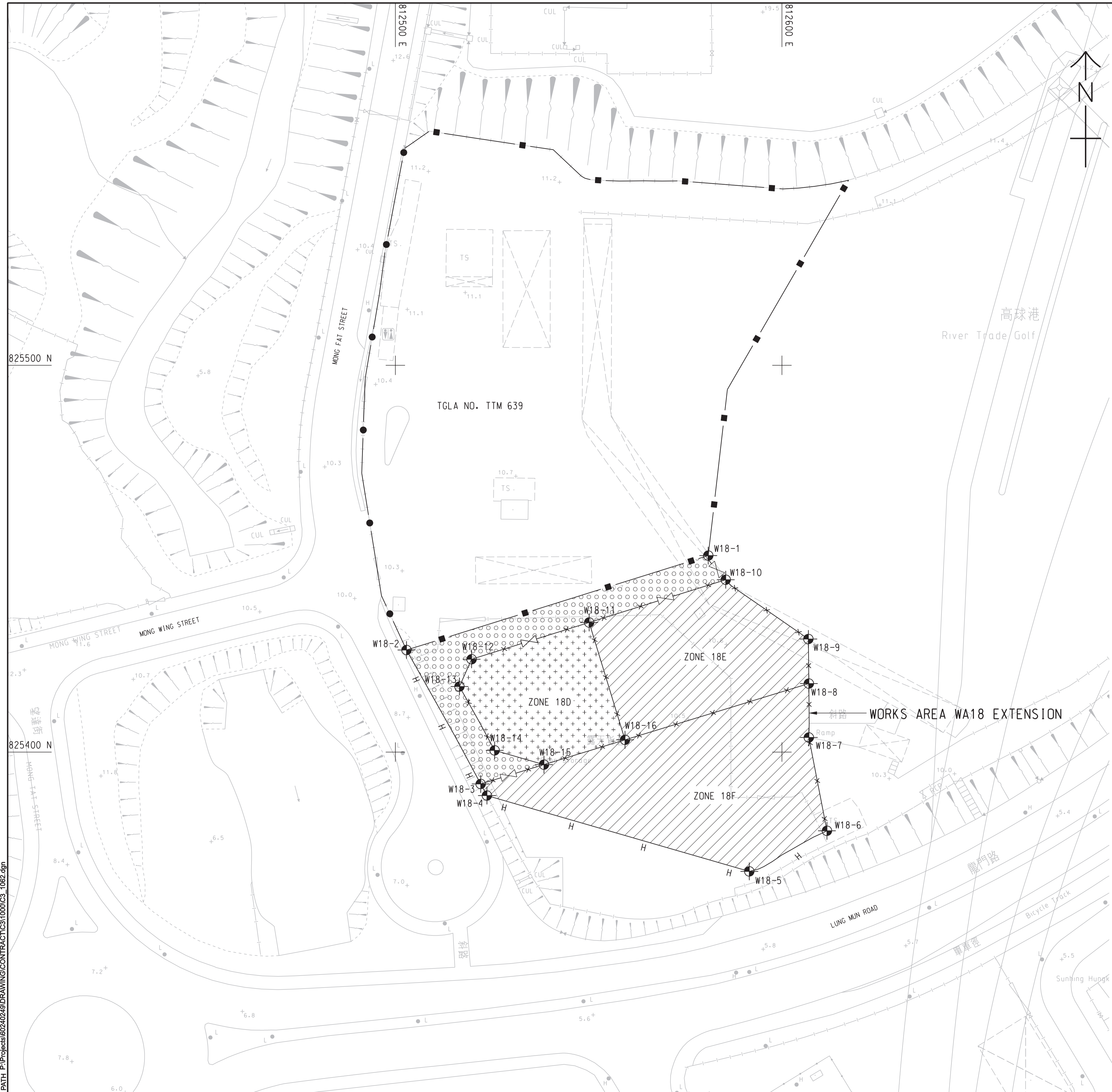
**SHEET TITLE**  
 圖紙名稱 PORTIONS OF SITE AND SITE BOUNDARY SETTING OUT PLAN

**SHEET NUMBER**  
 圖紙編號 SHEET 2 OF 3

60240249/C3/1052B

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**NOTES:**

- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE WORKS AREA KEY PLAN IN SHEET NO. 60240249/C3/1000.
- DEMARICATION 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 [diagonal lines] 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:**

- [diagonal lines] WORKS AREA FOR THE CONTRACT
- [grid pattern] COMMON AREA (MAINTAINED UNDER THE CONTRACT) TO BE SHARED-USED WITH OTHER CONTRACTS
- [horizontal lines] 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)
- [H symbol] HOARDING AND GATE (TO BE ERRECTED AND MAINTAINED UNDER THIS CONTRACT)
- [chain link symbol] EXISTING CHAIN LINK FENCE MAINTAINED BY OTHERS
- [chain link and gate symbol] CHAIN LINK FENCE AND GATE (TO BE ERRECTED AND MAINTAINED UNDER THIS CONTRACT)
- [hoarding and gate symbol] EXISTING HOARDING AND GATE MAINTAINED BY OTHERS

**SETTING OUT CO-ORDINATES OF WORKS AREA WA18 EXTENSION**

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



**PROJECT**  
 項目  
**TUEN MUN - CHEK LAP KOK LINK**

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

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

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

**SUB-CONSULTANTS**  
 分判工程師有限公司

**ISSUE/REVISION**  
 修訂

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  
 A1 1:500

**DIMENSION UNIT**  
 尺寸單位  
 METRES

**KEY PLAN**  
 索引圖

**PROJECT NO.**  
 項目編號  
 60240249

**CONTRACT NO.**  
 合約編號  
 HY/2013/12

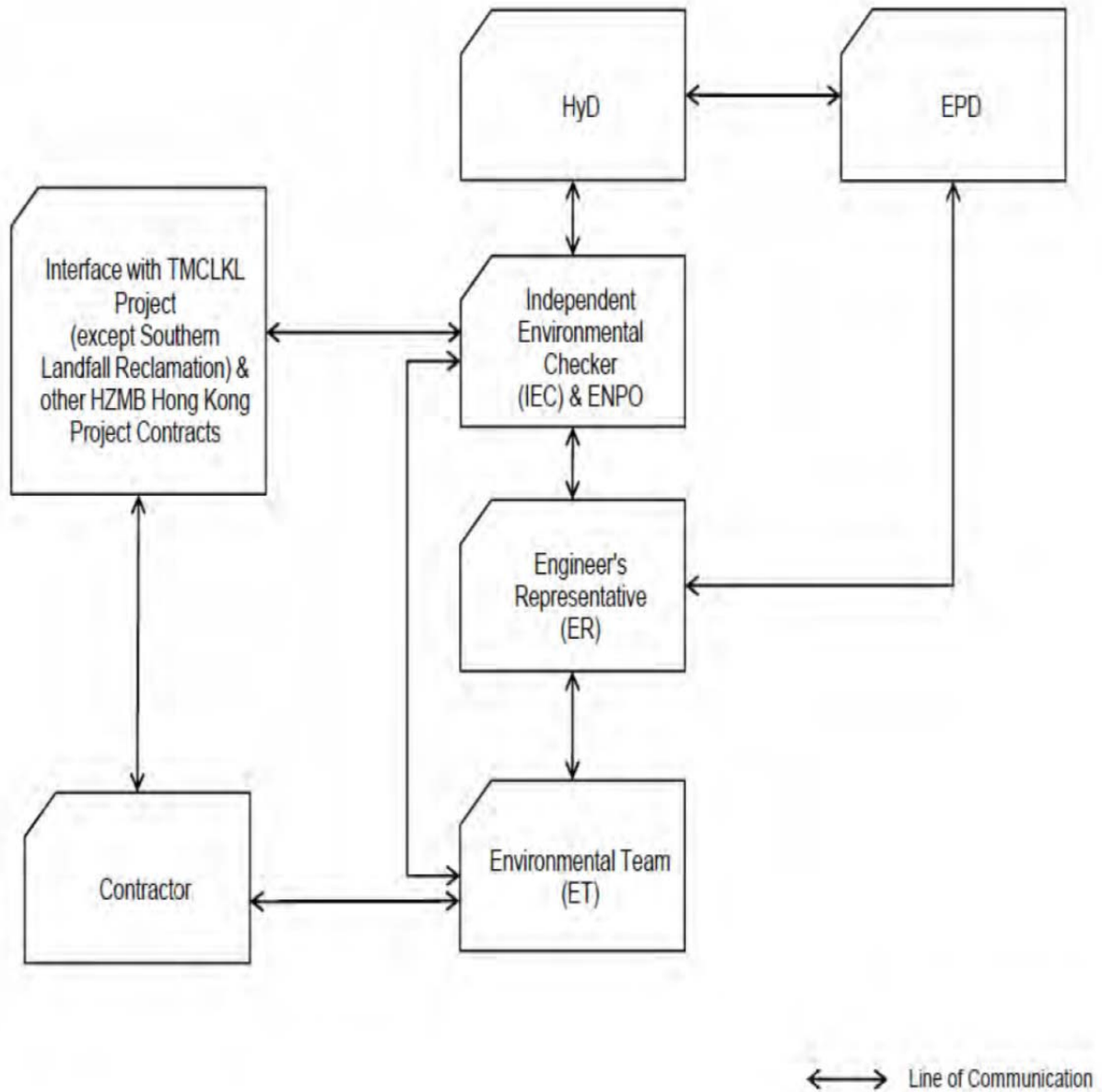
**SHEET TITLE**  
 圖紙名稱  
 WORKS AREA AND HOARDING PLAN

**SHEET NUMBER**  
 圖紙編號  
 60240249/C3/1062B

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## **Appendix C**

### **Organization of the Contract**



### Project Organization chart

### Organization chart of the Contractor

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

<b>Organization</b>	<b>Project Role</b>	<b>Name of Key Staff</b>	<b>Tel No</b>	<b>Fax No.</b>
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
Ramboll Environ	Environmental Project Office (ENPO)	Mr. YH Hui	3547 2133	3465 2899
Ramboll Environ	Independent Environmental Checker (IEC)	Dr. FC Tsang	3547 2134	3465 2899
CKJV	Project Manager	Mr. Simon Tong	2253 8300	2253 8399
CKJV	Site Agent	Mr. John Wong	2253 8300	2253 8399
KJV	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*

*Ramboll Environ (IEC and ENPO) – Ramboll Environ Hong Kong Limited*

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

*HKL(RLA) – Hong Kong Landscape*

## **Appendix D**

### **Master Construction 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	Q1	Q2
<b>HY/2013/12 Northern Connection Toll Plaza and Associated Works</b>																														
<b>IWP (Rev.02)</b>																														
<b>Site Formation - Retaining Structure for Slope TP_F</b>																														
<b>Stage 3</b>																														
<b>Temporary Works Design Submission and Approval</b>																														
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																								
<b>Method Statement Submission and Approval</b>																														
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																								
<b>Retaining Structure for Slope TP_F</b>																														
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																									
<b>Site Formation - Slope TP_A &amp; Associated Works</b>																														
<b>Stage 3</b>																														
<b>Temporary Works Design Submission and Approval</b>																														
TPA11000	Haul road design submission for TP_A,B&C	45	09-Oct-14	01-Sep-14	20-Nov-14	18-Sep-14																								
<b>Method Statement Submission and Approval</b>																														
TPA21050	Method Statement Submission for TP_A,B&C	45	23-Oct-14	18-Sep-14	04-Dec-14	21-Oct-14																								
<b>Slope Feature - Slope TP_A</b>																														
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																									
<b>Site Formation - Slope TP_B &amp; Associated Works</b>																														
<b>Stage 3</b>																														
<b>Slope Feature - Slope TP_B</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																									
<b>Site Formation - Slope TP_C &amp; Associated Works</b>																														
<b>Stage 3</b>																														
<b>Slope Feature - Slope TP_C</b>																														
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																									
<b>Site Formation - Slope TP_D &amp; Associated Works</b>																														
<b>Stage 3</b>																														
<b>Temporary Works Design Submission and Approval</b>																														
TPD21000	Haul road design submission	30	08-Sep-14	01-Sep-14	09-Oct-14	18-Nov-14																								
<b>Method Statement Submission and Approval</b>																														
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																								
<b>Slope Feature - Slope TP_D</b>																														
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																									
<b>Site Formation - Slope TP_E &amp; Associated Works</b>																														
<b>Stage 3</b>																														
<b>Temporary Works Design Submission and Approval</b>																														
TPE11000	Haul road design submission	30	08-Sep-14	01-Sep-14	09-Oct-14	18-Sep-14																								
<b>Method Statement Submission and Approval</b>																														
		45	23-Sep-14	18-Sep-14	06-Nov-14	23-Oct-14																								

- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone
- Summary

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]																							
<b>Slope Feature - Slope TP_E at Toll Control Building Area</b>							[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]																							
<b>Slope Feature - Slope TP_E Remaining Section</b>							[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]																							
<b>Site Formation - Slope Upgrading Works</b>							[Gantt bar: 17-Dec-14 to 13-Aug-18]																							
<b>Stage 3</b>							[Gantt bar: 17-Dec-14 to 13-Aug-18]																							
<b>Temporary Works Design Submission and Approval</b>							[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]																							
<b>Method Statement Submission and Approval</b>							[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]																							
<b>Slope Feature - Slope SSE-D/C170</b>							[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]																							
<b>Other Slope Features</b>							[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]																							

Activity ID	Activity Name	Original Duration	Start	Actual Start	Finish	Actual Finish	Performance % Complete	Total Float	Gantt Chart											
									2014 Q3	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1	2016 Q2	2016 Q3	2016 Q4	2017 Q1	2017 Q2
<b>HY/2013/12 DWP Rev.3</b>									[Gantt Chart Summary]											
<b>Instrumentation and Monitoring</b>									[Gantt Chart Summary]											
<b>Ground Settlement Marker</b>									[Gantt Chart Summary]											
IM10090	Installation of GSM11,GSM45-46(Outside site boundary)	8	25-Sep-14 A	25-Sep-14	05-Feb-18		45%	230	[Gantt Chart Summary]											
<b>Utility Settlement Marker</b>									[Gantt Chart Summary]											
IM60020	Installation of USM-Remain USM	90	22-Nov-14 A	22-Nov-14	02-Sep-15		20%	218	[Gantt Chart Summary]											
<b>Piezometer/Standpipe</b>									[Gantt Chart Summary]											
IM50025	GI for PADH13-15 and installation piezometer	7	04-Nov-14 A	04-Nov-14	03-Nov-17		66%	110	[Gantt Chart Summary]											
<b>Toll Plaza Decking TD1-Section 1</b>									[Gantt Chart Summary]											
<b>Stage 1</b>									[Gantt Chart Summary]											
<b>Design Submission and Approval</b>									[Gantt Chart Summary]											
TD120100	Prepare & submit draft DDA Drawings w/ICE cert(Precast beam)	24	27-Apr-15		23-Jun-15		0%	337	[Gantt Chart Summary]											
TD120110	Engineer's comments	23	27-May-15		23-Jun-15		0%	337	[Gantt Chart Summary]											
TD120180	TWD -Formwork design for Pier	24	27-Apr-15		26-May-15		0%	116	[Gantt Chart Summary]											
<b>Method Statement Submission and Approval</b>									[Gantt Chart Summary]											
TD120300	MSS for pier construction	24	27-Apr-15		26-May-15		0%	116	[Gantt Chart Summary]											
TD120310	Engineer's comments and approval	24	27-May-15		24-Jun-15		0%	116	[Gantt Chart Summary]											
<b>Field Works</b>									[Gantt Chart Summary]											
<b>Foundation &amp; Substructure at Northern Side of Lung Mun Road</b>									[Gantt Chart Summary]											
<b>Pile cap and Pier</b>									[Gantt Chart Summary]											
TD120520	Pile cap and Pier A2-E3	91	16-Mar-15 A	16-Mar-15	25-Sep-15		20%	107	[Gantt Chart Summary]											
<b>Foundation &amp; Substructure at Southern Side of Lung Mun Road</b>									[Gantt Chart Summary]											
<b>Pile cap &amp; Pier</b>									[Gantt Chart Summary]											
TD120630	Pile cap & Pier E1-C1	54	27-May-15		05-Aug-15		0%	166	[Gantt Chart Summary]											
<b>Foundation &amp; Substructure at Central Divider of Lung Mun Road</b>									[Gantt Chart Summary]											
<b>GI</b>									[Gantt Chart Summary]											
TD121060	Trial pit and monitoring point installation	10	07-Mar-15 A	07-Mar-15	21-Apr-15		80%	95	[Gantt Chart Summary]											
<b>Bored Pile</b>									[Gantt Chart Summary]											
TD121300	Bored Piles A1-E2(5 Nos)	61	21-Apr-15		09-Jul-15		0%	95	[Gantt Chart Summary]											
<b>Pile cap and Pier</b>									[Gantt Chart Summary]											
TD120540	Pile cap A1-E2	55	29-May-15		11-Aug-15		0%	141	[Gantt Chart Summary]											
<b>Toll Plaza Decking TD2-Section 1</b>									[Gantt Chart Summary]											
<b>Field Works</b>									[Gantt Chart Summary]											
<b>G.I and Piling Works</b>									[Gantt Chart Summary]											
<b>DWP-G.I</b>									[Gantt Chart Summary]											
TD220380	G.I for P1-P5	16	10-Oct-14 A	10-Oct-14	04-Nov-15 A	04-Nov-15	0%		[Gantt Chart Summary]											
<b>Toll Plaza Footbridge-Section 1</b>									[Gantt Chart Summary]											
<b>Stage 1</b>									[Gantt Chart Summary]											
<b>Method Statement Submissions and Approval</b>									[Gantt Chart Summary]											
TFB1060	MSS for Pile cap and pier construction	30	13-Feb-15 A	13-Feb-15	10-Sep-15		50%	152	[Gantt Chart Summary]											
<b>Field Works</b>									[Gantt Chart Summary]											
<b>Pile Cap Construction</b>									[Gantt Chart Summary]											
TFB1240	Construct pile cap for Pier P2	20	28-Mar-15 A	28-Mar-15	02-Nov-15		10%	420	[Gantt Chart Summary]											
<b>Retaining Structure RW_B-Section 1</b>									[Gantt Chart Summary]											
<b>Site Formation - Retaining Structure RW_B</b>									[Gantt Chart Summary]											
<b>Stage 1</b>									[Gantt Chart Summary]											
<b>Design Submission and Approval</b>									[Gantt Chart Summary]											
RWB10330	Alternative Design for RW_B structure submission	21	16-Mar-15 A	16-Mar-15	23-Apr-15		85%	158	[Gantt Chart Summary]											
RWB10340	Engineer's approval	21	23-Apr-15		19-May-15		0%	158	[Gantt Chart Summary]											

█ Remaining Level of Effort   
 █ Remaining Work   
  Summary  
 Primary Baseline   
 █ Critical Remaining Work  
█ Actual Work   
 ◆ Milestone

Date	Revision	Checked	Approved
20-Apr-15	3		







Activity ID	Activity Name	Original Duration	Start	Actual Start	Finish	Actual Finish	Performance % Complete	Total Float	Gantt Chart											
									Q3	Q4	2015				2016				2017	
<b>Slope Feature - 5SE-D/C149</b>																				
SFW10390	Slope Modification	10	16-Jan-15 A	16-Jan-15	20-Dec-16		10%	144												
<b>Vehicular Underpass TN-01</b>																				
<b>Stage 3</b>																				
<b>Blasting Related Submission</b>																				
<b>Method Statment Submission and Approval</b>																				
UDP30650	Method statement for Lining Construction	72	26-May-15		19-Aug-15		0%	413												
<b>Road and Drainage Work at for Lung Fu Road Roundabout</b>																				
<b>Section 3</b>																				
<b>Road and drainage works under LFR R/A TTA stage 2a</b>																				
LF20050	Slope cut/filled at LMR for the further roundabout	30	20-Apr-15		28-May-15		0%	255												
LF20100	Traffic on LMR diverted to LFR junction	7	29-May-15		06-Jun-15		0%	255												

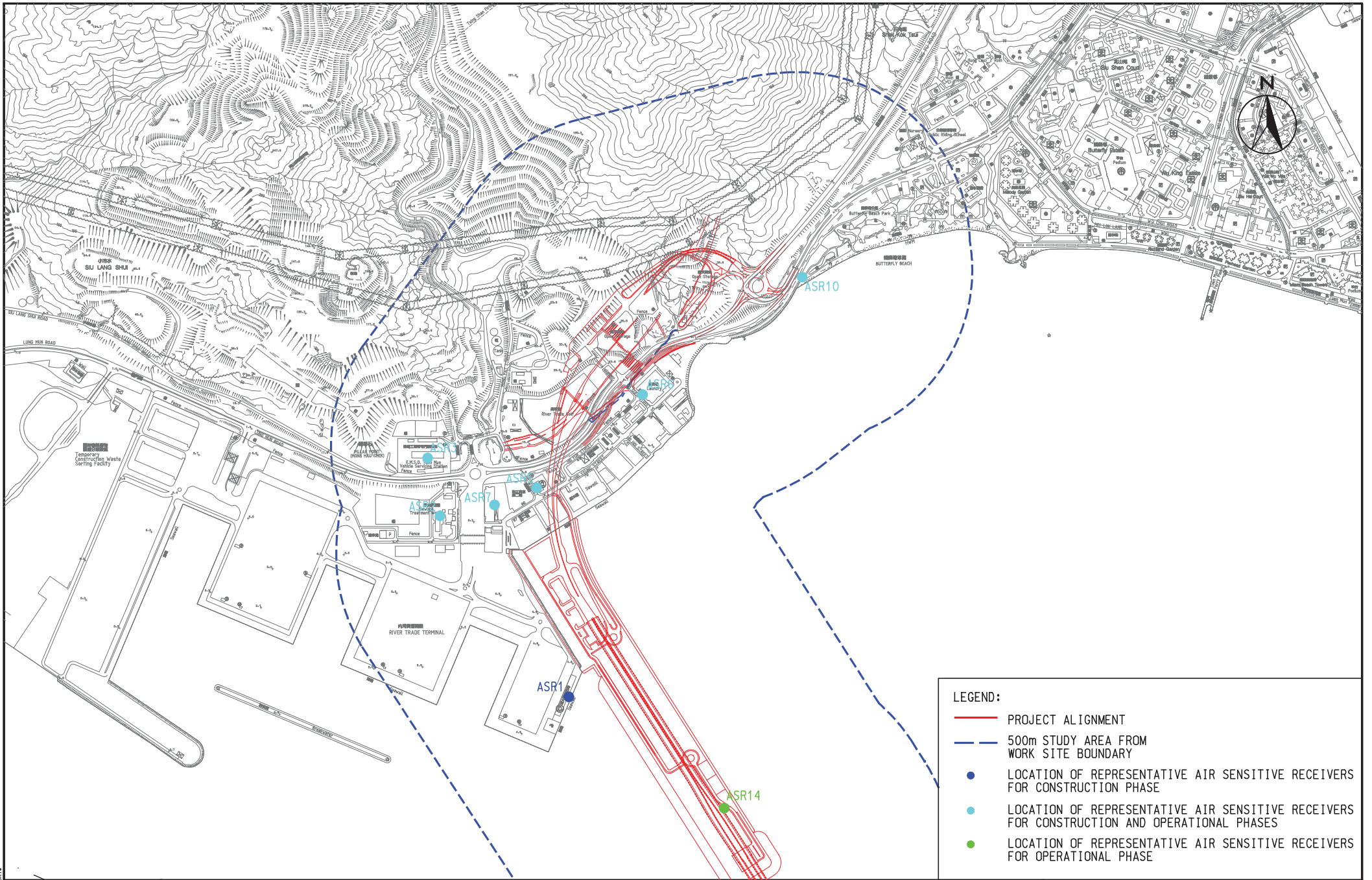
█ Remaining Level of Effort    █ Remaining Work    ▬ Summary  
█ Primary Baseline    █ Critical Remaining Work  
█ Actual Work    ◆ Milestone

**CRBC - Kaden JV**  
**2 Months Rolling Programme Report Update 20-Apr-15**

Date	Revision	Checked	Approved
20-Apr-15	3		

## **Appendix E**

### **Monitoring Locations for the Contract**

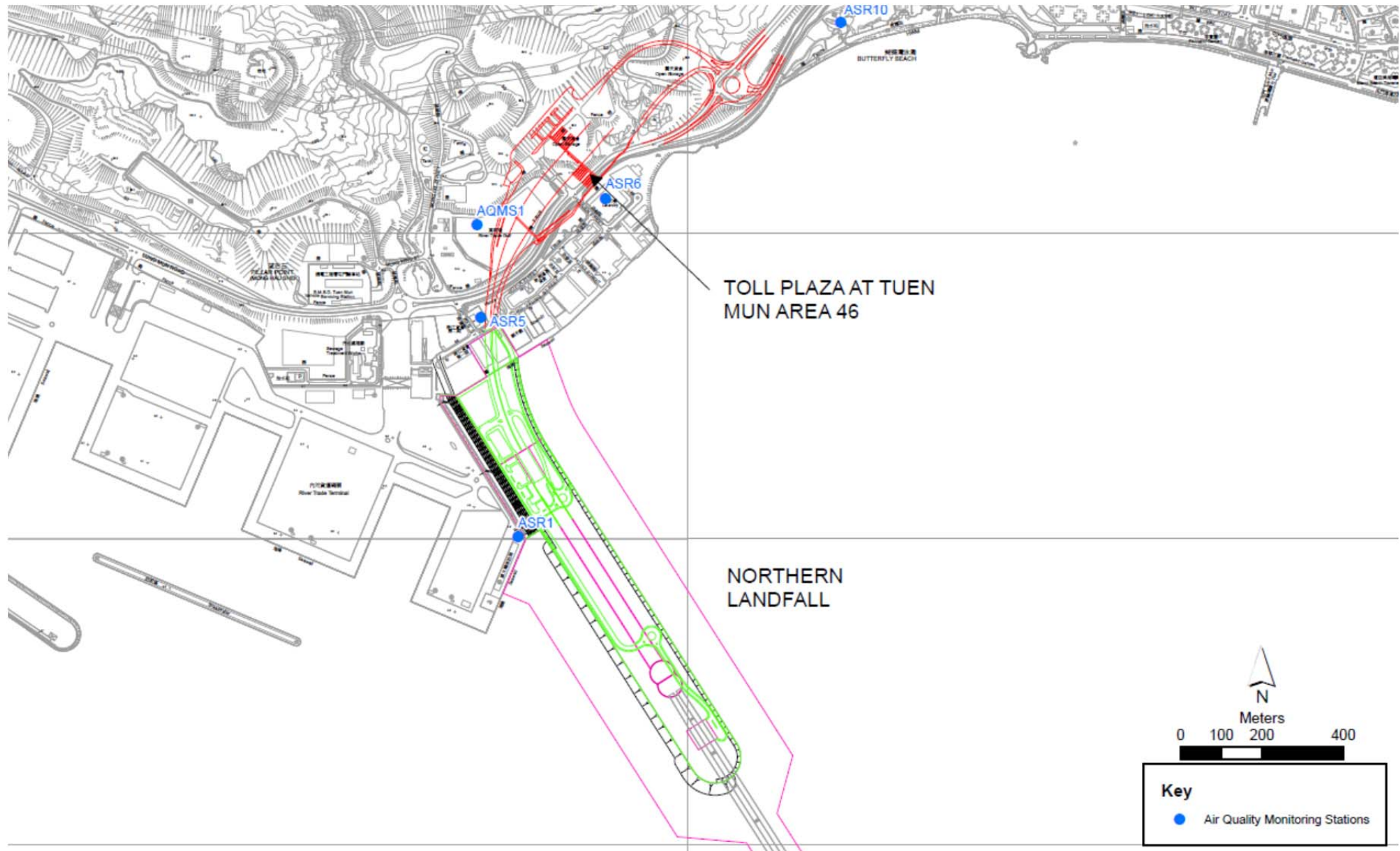


**LEGEND:**

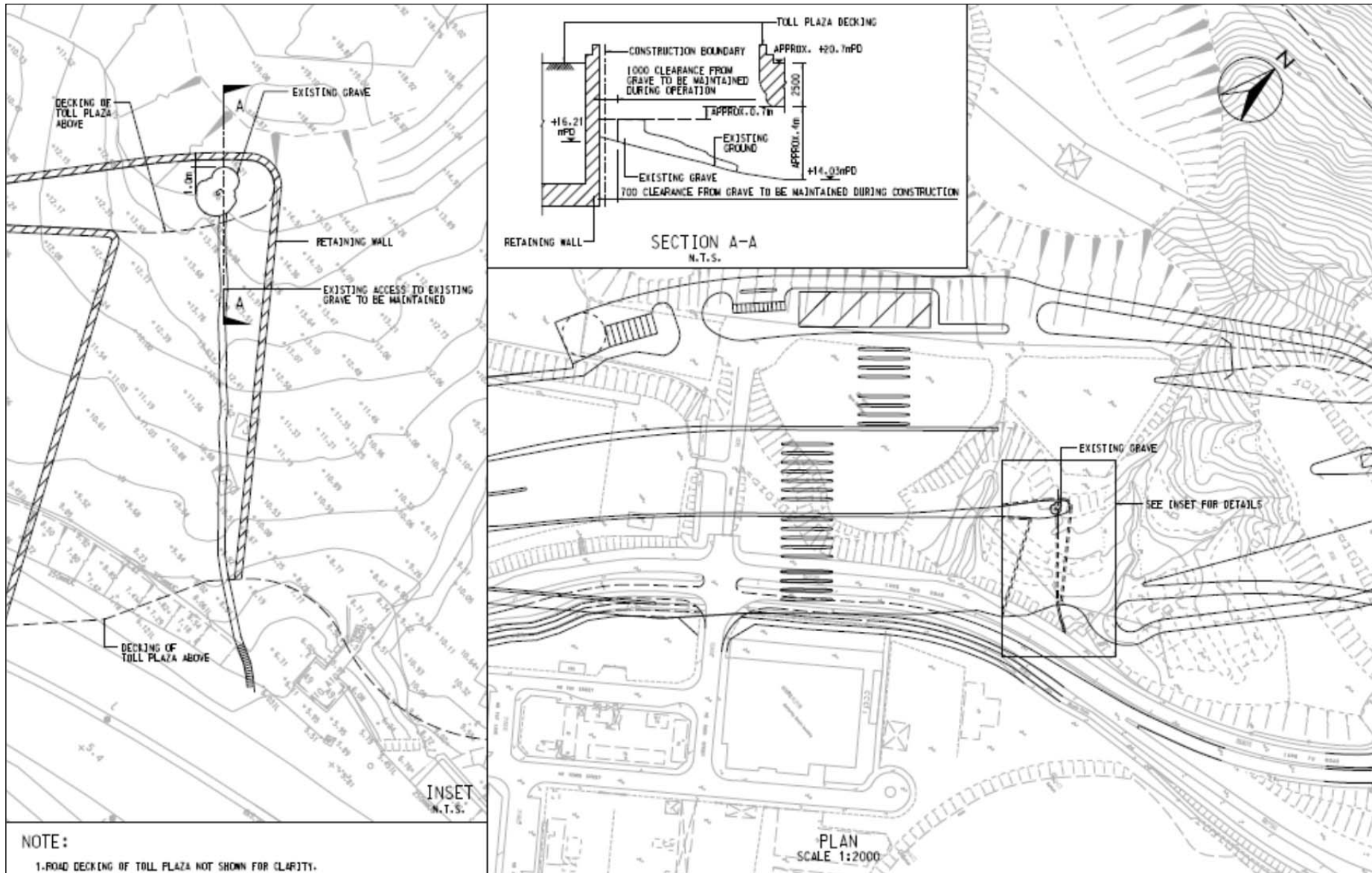
- PROJECT ALIGNMENT
- - - 500m STUDY AREA FROM WORK SITE BOUNDARY
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR CONSTRUCTION PHASE
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR CONSTRUCTION AND OPERATIONAL PHASES
- LOCATION OF REPRESENTATIVE AIR SENSITIVE RECEIVERS FOR OPERATIONAL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



Location of the Grave G1





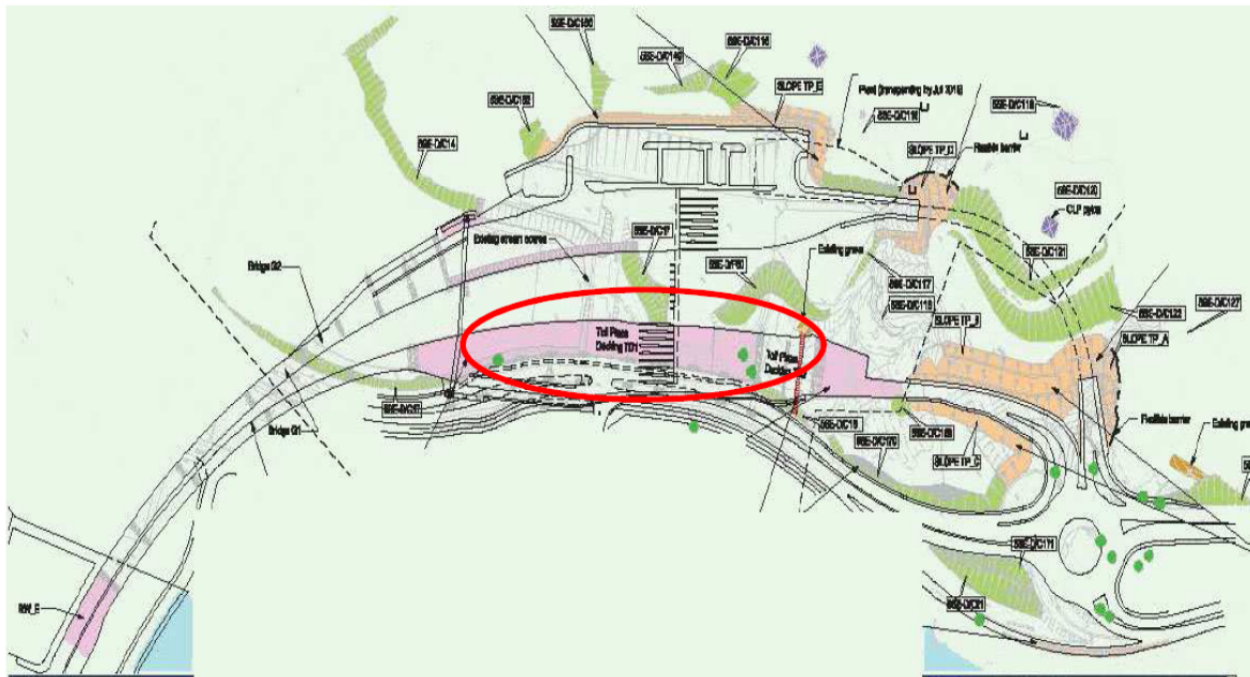
## Retaining wall

### Retaining Wall F



### Landfill Gas Monitoring Location – Retaining Wall F

## Retaining Wall B



**Landfill Gas Monitoring Location – Retaining Wall B**

## **Appendix F**

### **Event and Action Plan**

### Event and Action Plan for Air Quality

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

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

**Event / Action Plan for Cultural Heritage**

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

*Note:*

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

**Event / Action Plan for General Ecology**

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

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

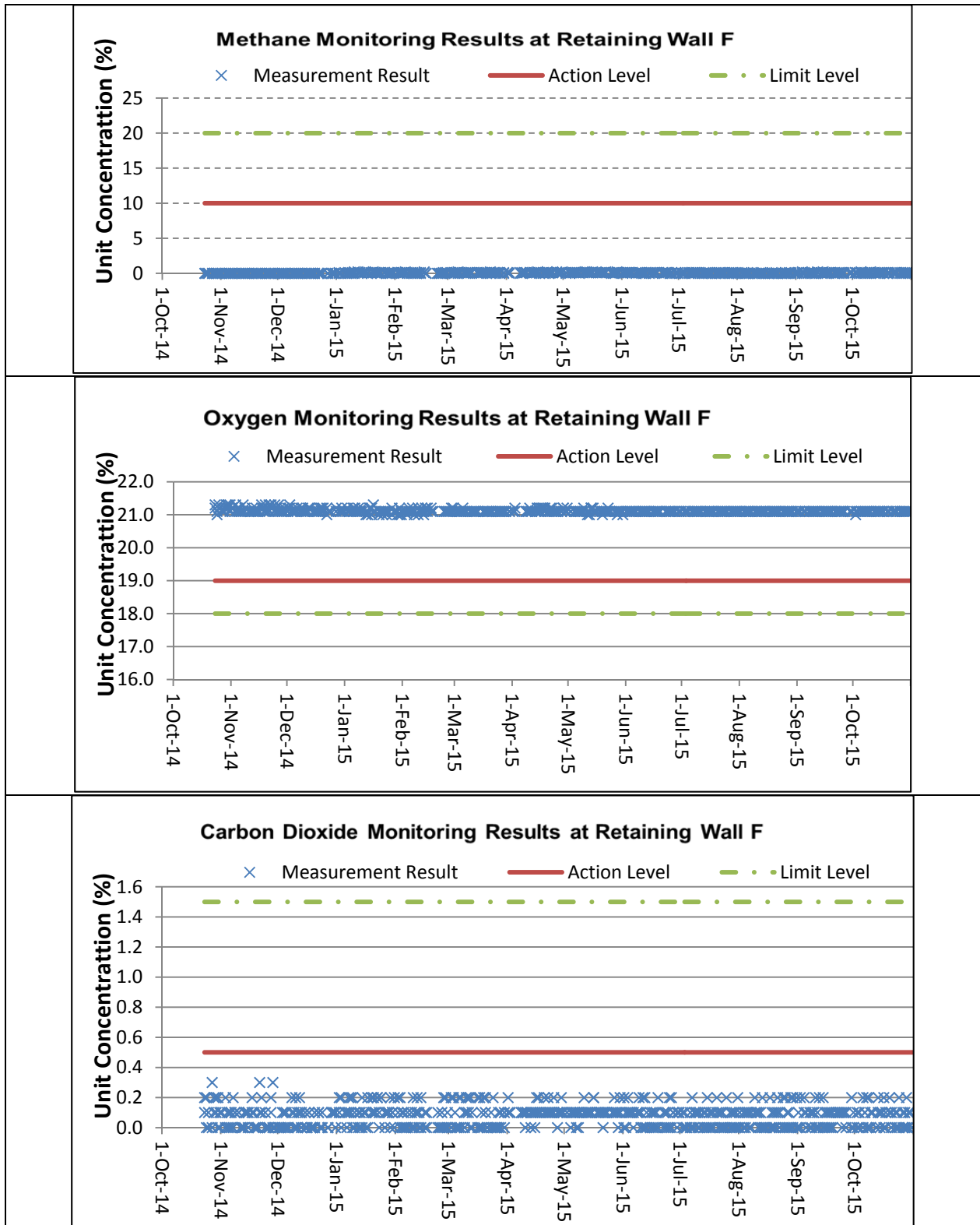
## **Appendix G**

### **Graphical Plot of Monitoring Results**

#### **I. Landfill Gas**

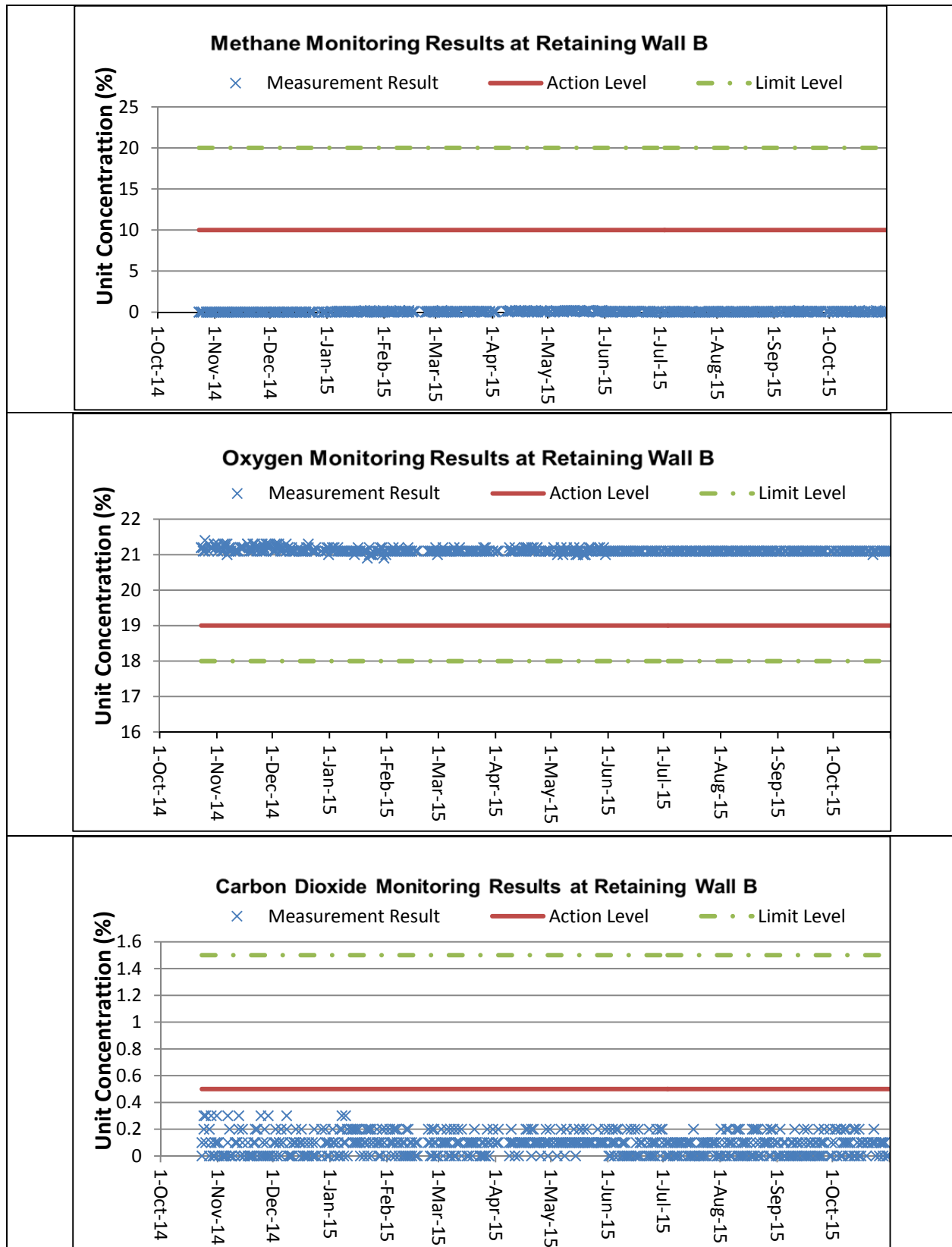


**GRAPHICAL PLOT OF LANDFILL GAS MONITORING RESULTS**



**Annotation:**

During 1 July to 31 October 2015, 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 July to 31 October 2015, 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 H**

### **Investigation Report for Exceedance**

# AUES

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**To** Mr. Tang Hiu Yeung **Fax No** By email  
**Company** CRBC and Kaden Joint Venture  
**cc**  
**From** **T.W. Tam** **Date** **2 December 2014**  
**Our Ref** TCS00670/13/300/**F0044** **No of Pages** 4 **(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 14 November 2014**

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*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**

<b>Reference number</b>	TCS00670/13/300/F0044	
<b>Date</b>	14 November 2014	
<b>Monitoring Location</b>	ASR1 (Tuen Mun Fireboat Station)	
<b>Environmental Aspect</b>	Air Quality	
<b>Parameter</b>	1-hour TSP	
<b>Measurement Period</b>	09:15 – 10:15	10:17 -11:17
<b>Action Level (ug/m<sup>3</sup>)</b>	331	331
<b>Limit Level (ug/m<sup>3</sup>)</b>	500	500
<b>Measured Level (ug/m<sup>3</sup>)</b>	404	396
<b>Exceedance</b>	Action Level	Action Level
<b>Possible reason for Action or Limit Level Non-compliance</b>	<ol style="list-style-type: none"> <li>1. According to site information provided by CRBC-Kaden JV, site formation works was conducted on 14 November 2014. There were 8 nos. of rock breakers, 5 nos. of excavators and several dumping trucks operated. (refer to Figure 1)</li> <li>2. To reduce to dust impact arises from the contract. mitigation measures for construction dust control were implementation and they are included the following:- <ul style="list-style-type: none"> <li>• watering of haul road by water truck to keep road surface wet (refer to Photo 1)</li> <li>• to set speed control at 5 km/hr for all vehicles using the haul road</li> <li>• most soil stockpiles were well compacted</li> <li>• installation of auto-water sprinkler in dusty area (refer to Photo 2)</li> <li>• provide water spraying during rock breaking work (refer to Photo 3)</li> <li>• covered part of the exposed slopes by geotextile net</li> </ul> </li> <li>3. During site inspection on 19 November 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 19 November 2014 are shown in photo record.</li> <li>4. The exceedance location ASR1 is located over 800m from the working area. There are other monitoring locations closer to the active site area, such as ASR5 and ASR6, and the relevant monitoring results were reviewed.</li> <li>5. With referenced to the monitoring results collected at other stations, ASR5 is ranged 114-226µg/m<sup>3</sup> and ASR6 is ranged 108-130µg/m<sup>3</sup> and no exceedances were triggered.</li> <li>6. Based on above investigation, the exceedance is unlikely related to the Contract work and no corrective action was required accordingly.</li> </ol>	
<b>Action to be taken</b>	ET will continue regular audit and inspection for the implemented water mitigation measures during the construction period.	

**Prepared By :** T.W. Tam

**Designation :** Environmental Team Leader

**Signature :** 

**Date :** 2 December 2014

**Photo Record**



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



**Photo 2**  
Installation of auto-water sprinkler in dusty area



**Photo 3**  
Water spraying during rock breaking work



**Photo 4**  
Water spraying and damp haul road was observed on 19 November 2014.



**Photo 5**  
Water spraying during rock breaking work was observed on 19 November 2014.

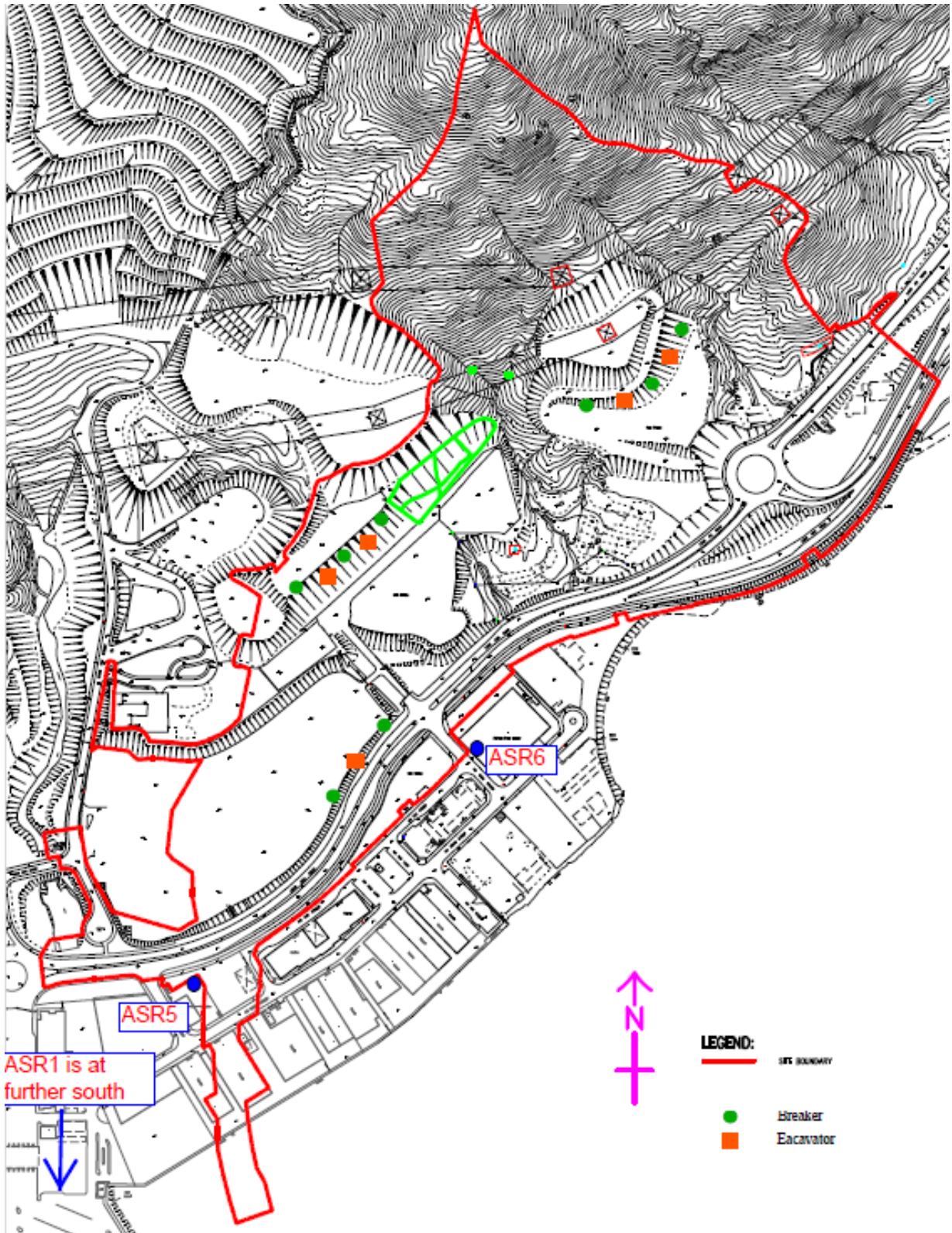


Figure 1. Location Plan



# AUES

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**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**

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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**

<b>Reference number</b>	TCS00670/13/300/F0046
<b>Date</b>	2 December 2014
<b>Monitoring Location</b>	ASR5 (Tuen Mun Fire Station)
<b>Environmental Aspect</b>	Air Quality
<b>Parameter</b>	1-hour TSP
<b>Measurement Period</b>	15:10 -16:10
<b>Action Level (ug/m<sup>3</sup>)</b>	340
<b>Limit Level (ug/m<sup>3</sup>)</b>	500
<b>Measured Level (ug/m<sup>3</sup>)</b>	346
<b>Exceedance</b>	Action Level
<b>Possible reason for Action or Limit Level Non-compliance</b>	<ol style="list-style-type: none"> <li>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)</li> <li>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"> <li>• 4 nos. of water trucks were arranged on haul road to keep road surface wet (refer to photo 1-4 and 8)</li> <li>• to set speed control at 5 km/hr for all vehicles using the haul road</li> <li>• most soil stockpiles were well compacted</li> <li>• installation of auto-water sprinkler in dusty area (refer to Photo 5)</li> <li>• provide water spraying during rock breaking work (refer to Photo 6)</li> <li>• covered part of the exposed slopes by geotextile net (refer to Photo 7)</li> </ul> </li> <li>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.</li> <li>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/m<sup>3</sup> and ASR6 is ranged 73-106µg/m<sup>3</sup> and no exceedances were triggered.</li> <li>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.</li> <li>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</li> </ol>

	<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>
<b>Action to be taken</b>	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.

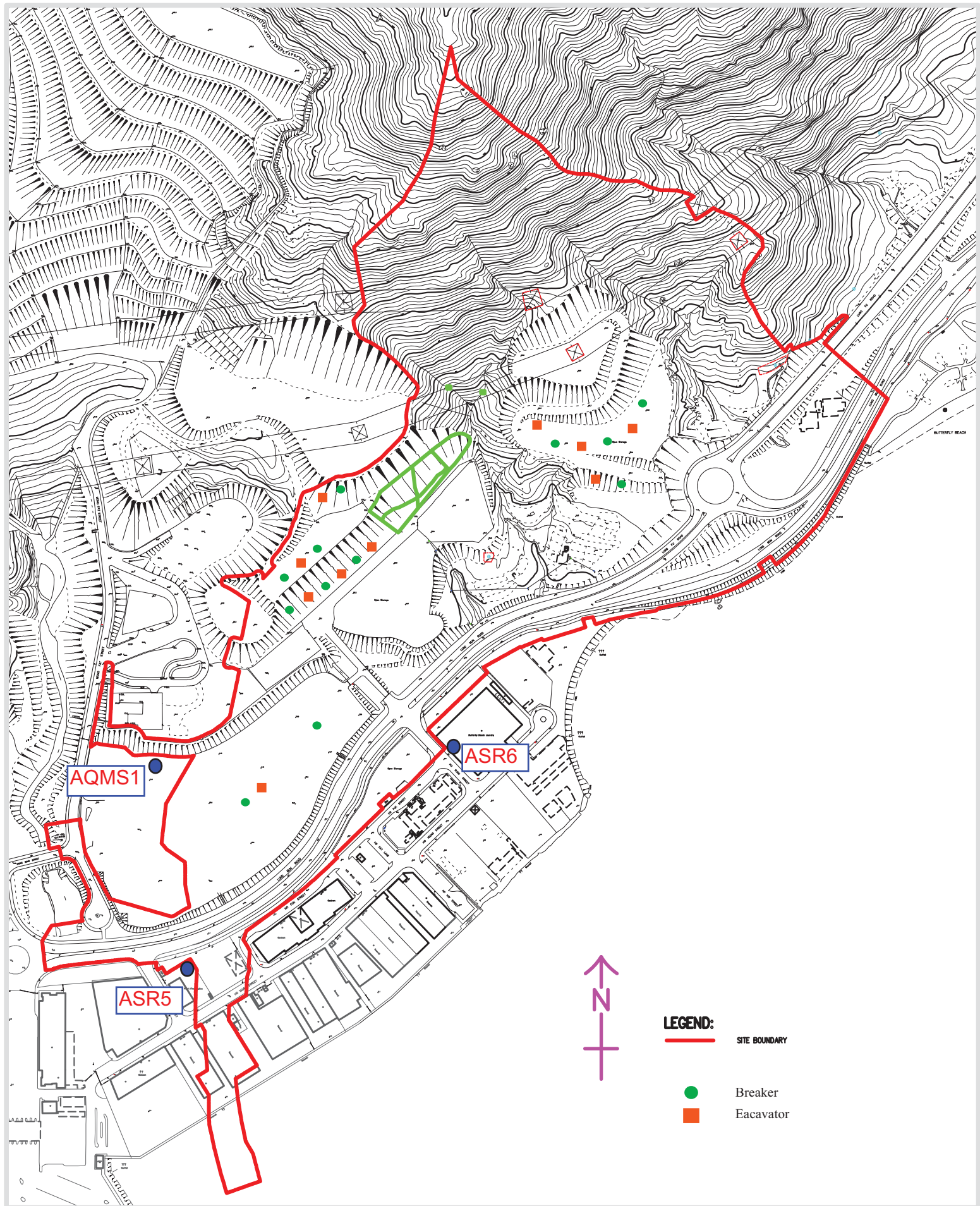


Figure 1. Location Plan

# AUES

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**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**

<b>Reference number</b>	TCS00670/13/300/F0050
<b>Date</b>	17 December 2014
<b>Monitoring Location</b>	AQMS1 (Previous River Trade Golf)
<b>Environmental Aspect</b>	Air Quality
<b>Parameter</b>	1-hour TSP
<b>Measurement Period</b>	14:44 -15:44
<b>Action Level (ug/m<sup>3</sup>)</b>	335
<b>Limit Level (ug/m<sup>3</sup>)</b>	500
<b>Measured Level (ug/m<sup>3</sup>)</b>	348
<b>Exceedance</b>	Action Level
<b>Possible reason for Action or Limit Level Non-compliance</b>	<ol style="list-style-type: none"> <li>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)</li> <li>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"> <li>• 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)</li> <li>• Soil stockpiles were compacted (as observed during site inspection on 2, 9 and 17 Dec 2014 - photo 5 &amp; 6)</li> <li>• Covered of the exposed slopes by geotextile net( as observed during site inspection on 2, 9 and 17 Dec 2014 - photo 5 &amp; 6)</li> <li>• hydro-seeded was provided for the exposed slopes (as observed during site inspection on 17 Dec 2014 - photo 6 &amp; 7)</li> <li>• provide water spraying during rock breaking work (refer to Photo 8)</li> <li>• installation of auto-water sprinkler in dusty area</li> <li>• to set speed control at 5 km/hr for all vehicles using the haul road</li> </ul> </li> <li>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/m<sup>3</sup> and no exceedances were triggered.</li> <li>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.</li> <li>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</li> </ol>

	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.
<b>Action to be taken</b>	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.

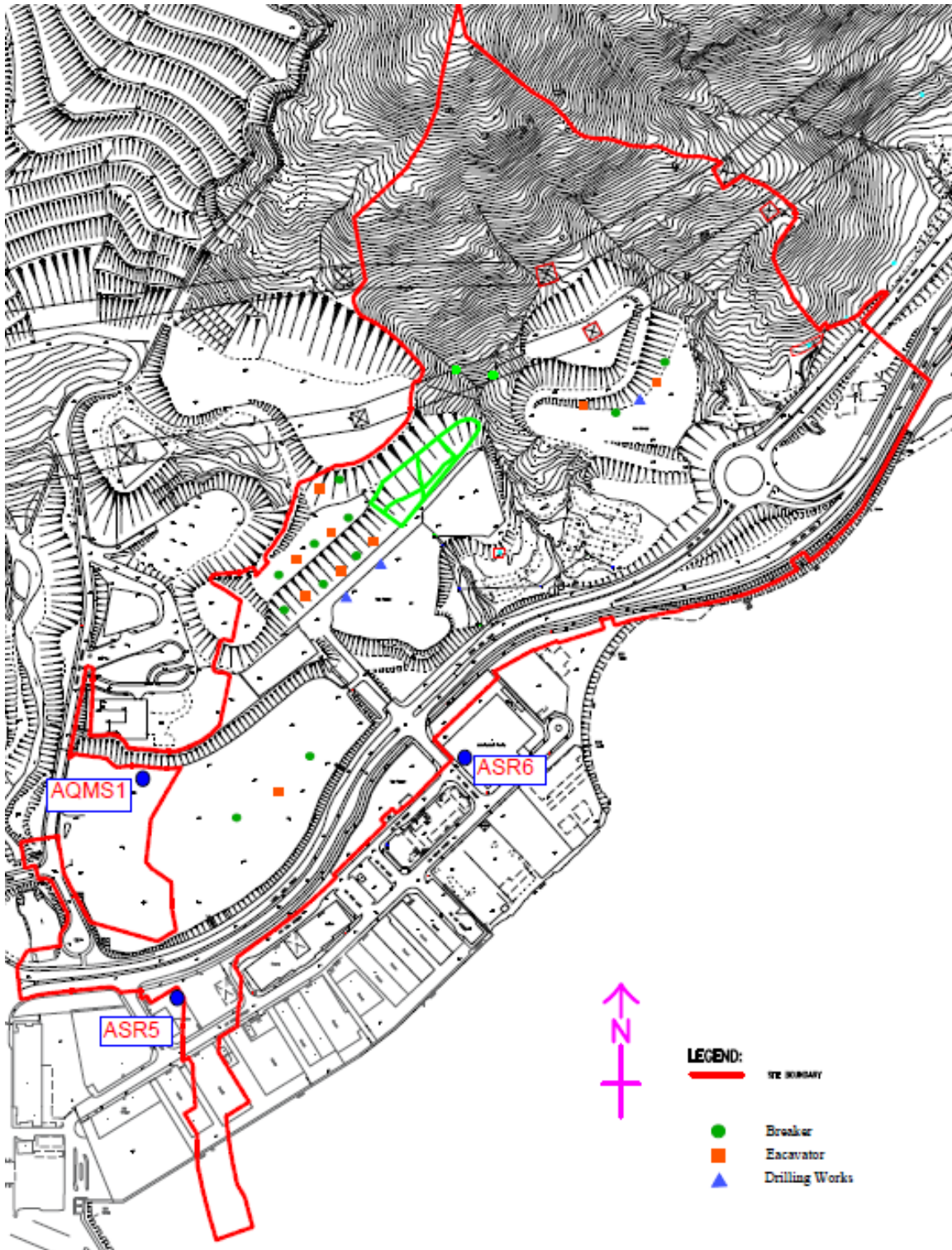


Figure 1. Location Plan

# **Appendix I**

## **Environmental Mitigation Measures Implementation Schedule (EMMIS)**

**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**

<b>Air Quality</b>									
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		NA

**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**

		transplanted straight to their final receptor site and not held in a temporary nursery. A detailed Tree Transplanting Specification shall be provided in the Contract Specification. Sufficient time for necessary tree root and crown preparation periods shall be allowed in the project programme (CM2)	construction	Contractor					
10.9	7.6	Hillside and roadside screen planting to proposed roads, associated structures and slope works (CM3)	All areas/detailed design/ during Construction/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y		NA
10.9	7.6	Hydroseeding or sheeting of soil stockpiles with visually unobtrusive material (in earth tone) (CM4)	All areas/detailed design/ during Construction/ post construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Screening of construction works by hoardings around works area in visually unobtrusive colours, to screen works (CM5)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		<>
10.9	7.6	Control night-time lighting and glare by hooding all lights (CM6)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Ensure no run-off into water body adjacent to the Project Area (CM7)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Avoidance of excessive height and bulk of buildings and structures (CM8)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Recycle/Reuse all felled trees and vegetation, e.g. mulching (CM9)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		✓
10.9	7.6	Compensatory tree planting shall be provided to the satisfaction of relevant Government departments. Required numbers and locations of compensatory trees shall be determined and agreed separately with Government during the Tree Felling Application process under ETWBTC 3/2006 (CM10)	All areas/detailed design/ during Construction	Design Consultant/ Contractor	TMEIA	Y	Y		NA
10.9	7.6	Re-vegetation of affected woodland/shrubland with	All areas/detailed design/ during Construction	Design	TMEIA	Y	Y	Y	N/A

**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**

		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	✓
<b>Waste</b>									
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"> <li>• suitable for the substance to be held, resistant to corrosion, maintained in good conditions and securely closed;</li> <li>• Having a capacity of &lt;450L unless the specifications have been approved by the EPD; and</li> <li>• Displaying a label in English and Chinese according to the instructions prescribed in Schedule 2 of the Regulations.</li> <li>• Clearly labelled and used solely for the storage of chemical wastes;</li> <li>• Enclosed with at least 3 sides;</li> <li>• 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;</li> <li>• Adequate ventilation;</li> <li>• Sufficiently covered to prevent rainfall entering (water collected within the bund must be tested and disposed of as chemical waste, if necessary); and</li> <li>• Incompatible materials are adequately separated.</li> </ul>	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		✓
<b>Water Quality</b>									
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