


MTR Corporation Limited

Kwun Tong Line Extension (KTE)

Monthly EM&A Report (January 2012)

Verified by: 


Position: Independent Environmental Checker

Date: 13 Feb 2012

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Certified by:  \_\_\_\_\_

Position: Environmental Team Leader

Date: 13 FEB 2012

## ***EXECUTIVE SUMMARY***

The Kwun Tong Line Extension (KTE) Project was awarded to the respective contractors in late May 2011. The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011, the commencement date of construction of the Project. This is the seventh monthly Environmental Monitoring and Audit (EM&A) Report for Kwun Tong Line Extension (KTE) Project. The Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of 1 January 2012 to 31 January 2012. The major construction activities in the reporting period included utility and drainage diversions, installation of noise enclosures, temporary road & traffic diversion, piling works, bulk excavation, ground improvement works and construction of barging points. .

Impact monitoring for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period. No exceedance was found and there was no breach of Limit Levels for air and noise monitoring.

No environmental notification of summon, prosecution and valid complaint were received in the reporting period.

Regular joint site inspections, led by the ER with the presence with representatives from the Contractors and Environmental Team, were conducted on a weekly basis to monitor Contractors' performance on environmental management and implementation of environmental pollution control and mitigation measures for the Project. No non-conformance was identified in the reporting period. Some environmental concern items raised during the site inspections have been followed up the respective contractors in a responsible manner.

The Environmental Permit (EP-399/2010/A) dated on 1 December 2010 is being used for the KTE Project.

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# 1 INTRODUCTION

## 1.1 Project Background

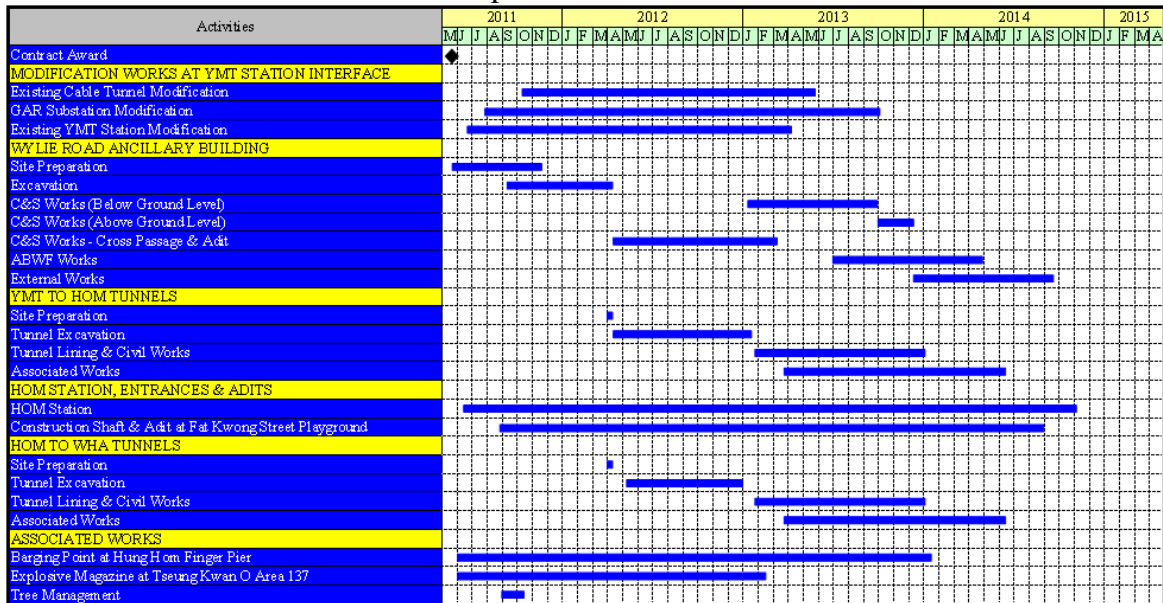
MTR Corporation Limited (MTRCL) proposes to build a new railway line, the Kwun Tong Line Extension (KTE), otherwise referred to as ‘the Project’, which is an extension of the existing Kwun Tong Line from Yau Ma Tei Station to Whampoa area. The route length of the fully underground KTE is approximately 2.6 km with two new stations namely Ho Man Tin Station (HOM) and Whampoa Station (WHA), and a new ancillary ventilation building at Wylie Road.

## 1.2 Project Programme

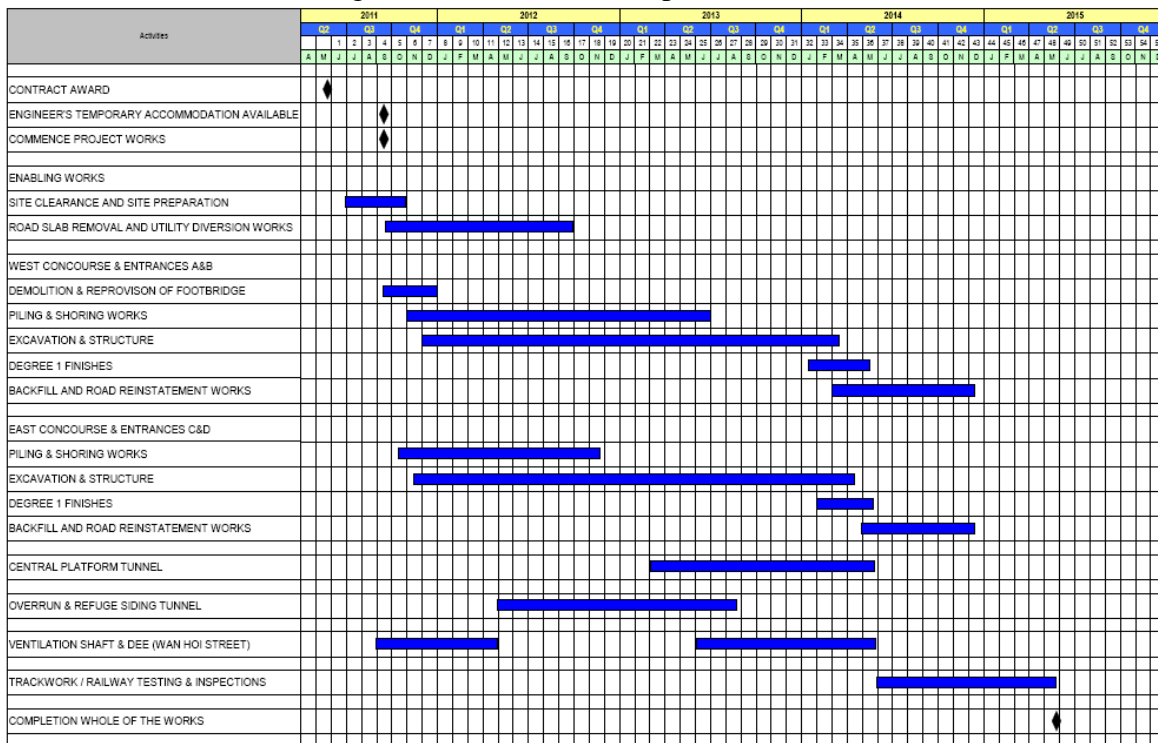
The Kwun Tong Line Extension (KTE) Project was awarded to the respective Contractors Nishimatsu Construction Co. Ltd (NCC) and Chun Wo-Hip Hing Joint Venture (CHJV) for construction in late May 2011. The commencement of construction was on 20 June 2011. The commencement of operation of the Project is scheduled to be in 2015. Contractors’ summary programme for Contract 1001 and Contract 1002 are presented below.

NCC, as the Contractor of Contract 1001, is responsible for the construction of alignment link from the existing Yau Ma Tei Station to Wuhu Street at Whampoa and the new Ho Man Tin Station as well as the ancillary ventilation building at Wylie Road. CHJV, as the Contractor of Contract 1002, is responsible for the construction of the underground Whampoa Station and a platform & overrun tunnel.

### Contract 1001 – Yau Ma Tei to Whampoa Tunnels and Ho Man Tin Station



## Contract 1002 – Kwun Tong Line Extension Whampoa Station and Overrun Tunnel



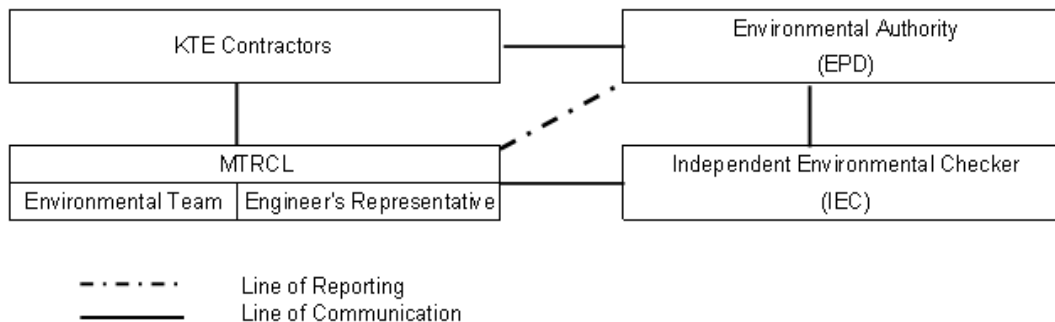
### 1.3 Coverage of the EM&A Report

The EM&A programme for the Kwun Tong Line Extension (KTE) Project commenced on 20 June 2011. This is the seventh Monthly Environmental Monitoring and Audit (EM&A) Report for the Project. The Report presents the results of EM&A works and the impact monitoring for the construction works undertaken by respective Contractors during the period of 1 January 2012 to 31 January 2012.

## 2 PROJECT INFORMATION

### 2.1 Project Management Organization and Contact Details

The KTE Project organization chart is presented in Figure 1. Contacts of key environmental personnel of the Project are shown in Tables 1a, 1b and 1c respectively.



**Figure 1.** Project Organization

**Table 1a** Contact List of Key Personnel for Project Management

<b>Organization</b>	<b>Name</b>	<b>Telephone</b>
<b>Engineer's Representative</b>		
Project Manager	James Chow	2163 6283
Construction Manager	Kenny Kong	2163 6355
Construction Manager	Reilly Brendan James	2163 6325
<b>Independent Environmental Checker</b>		
Consultant – Arup	Jacky Chan	3447 6051
<b>Environmental Team</b>		
Environmental Team Leader	Richard Kwan	2688 1179
<b>Contact 1001 Contractor</b>		
Project Manager	M. Matsuzaki	9136 5832
Environmental Officer	Ben Ho	9376 7999
<b>Contact 1002 Contractor</b>		
Project Manager	Eric Wu	2743 3711
Senior Environmental Engineer	Louie Chan	92701390

**Table 1b** Contact List of Environmental Authority

<b>Organization</b>	<b>Name</b>	<b>Telephone</b>
<b>Environmental Protection Department</b>		
Sr Env Protection Offr(Metro Assessment) 2	Colin Keung	2835 1125
Sr Env Protection Offr(Regional E) 6	C L Wong	2150 8002
Sr Env Protection Offr(Regional E) 5	Warren Wong	2117 7538
Sr Env Protection Offr(Regional E) 4	Louis Chan	2117 7502



## 2.2 Project Works Sites and Areas and Environmental Monitoring Locations

The KTE Project works sites and areas are summarized in Table 2 below and shown in Appendix A Figures 1 to 8. The locations of environmental monitoring stations are indicated in Appendix A Figures 2 to 8. Table 3 shows the details of the active monitoring stations as reported in Sections 3.1 and 3.2.

**Table 2** Summary of KTE Project Works Sites and Areas

<i>Contract 1001 Works Sites and Areas</i>	
Works Site A	Gascoigne Road Rest Garden
Works Site B	Underground Tunnel between Yau Ma Tei Station and Wylie Road Ancillary Building
Works Site C	Wylie Road Ancillary Building
Works Site D	Underground Tunnel between Wylie Road Ancillary Building and Ho Man Tin Station
Works Site E	Ho Man Tin Station
Works Site F	Fat Kwong Street Playground
Works Site G	Underground Tunnel between Ho Man Tin Station and Whampoa Station
Works Area J	Finger Pier Barging Point
Works Area K	Tseung Kwan O Area 137 Magazine Site

<i>Contract 1002 Works Sites and Areas</i>	
Works Site H	Whampoa Station West Concourse
Works Site I	Whampoa Station East Concourse
Works Area L	Hung Lok Road Site Office

**Table 3** Summary of impact air quality and noise monitoring stations

ID	Monitoring Station
<b>Air</b>	
CD1	Queen Elizabeth Hospital – Specialist Clinic
CD2	Yee Fu Building
CD3a	No. 238 Chatham Road North
CD4a	Ka Fu Building, Whampoa Estate
CD5	Fung Kei Millennium Primary School
CD6a	Site boundary of Finger Pier adjacent to Harbourfront Horizon
<b>Noise</b>	
CN1	Alhambra Building
CN2	Methodist College
CN3	Queen Elizabeth Hospital – Specialist Clinic
CN4	Yee Fu Building
CN5*	Caritas Bianchi College of Careers
CN6	Lok Do Building

ID	Monitoring Station
CN7	Block Y, Ki Fu Building, Whampoa Estate
CN8	Block I, Lok Wah Building, Whampoa Estate
CN9	Block 13, Bauhinia Mansions, Whampoa Garden Site 11
CN10	Block 1, Oak Mansions, Whampoa Garden Site 5
CN11	Fung Kei Millennium Primary School
CN12	GCEPSA Whampoa Primary School

Note: Alternative monitoring locations were proposed in the Alternative Proposal which was submitted on 14 Apr 2011 and agreed by the Environmental Protection Department on 29 Apr 2011. The noise monitoring location at Caritas Bianchi College of Careers, which has been relocated to Tiu Keng Leng with the original premise unoccupied and inaccessible, is suspended until the premises are occupied by similar educational use. No noise monitoring will be conducted for CN5.

### 2.3 Summary of EM&A Requirements

The EM&A programme mainly requires environmental monitoring for air quality, noise, landscape and visual, water quality and waste management as specified in the EM&A Manual.

A summary of impact EM&A requirements as applicable to this EM&A Report is presented in Table 4 below.

**Table 4** Summary of impact EM&A Requirements

Parameters	Descriptions	Locations	Monitoring Frequencies	Duration
Air Quality	24-hr TSP	Shown in Table 2	Once per 6 days	Construction stage
Noise	Leq(30min)	Shown in Table 2	Once a week	Construction stage
Landscape and visual	On-Site Audit	Active Works Sites	Bi-weekly	Construction stage
Waste	On-Site Audit	Active Works Sites	Weekly	Construction stage
Wastewater	On-Site Audit	Active Works Sites	Weekly and in accordance to the discharge licences	Construction stage
General Site Conditions	Environmental Site Inspection	Active Works Sites	Weekly	Construction stage

Environmental Quality Performance Limits for air quality and noise are shown in **Appendix B**. The Event Action Plan for air quality and noise are shown in **Appendix C**.

## 2.4 *Implementation of Environmental Mitigation Measures*

The KTE Civil Works Contractors are required to implement the mitigation measures as specified in the EP, EIA Report and EM&A Manual. During the regular environmental site inspections, the Contractors' implementation of mitigation measures were inspected and reviewed. A schedule of the implementation of mitigation measures identified in the KTE EIA is given in **Appendix D**.

## 2.5 *Construction Activities in the Reporting Month*

Major construction activities carried out by the respective KTE Civil Works Contractors during the reporting period include:

### **Contract 1001 - Works Sites and Areas**

#### Works Site A (Gascoigne Road Rest Garden)

- Protection of existing cable and installation of the temporary services
- Installation of communication system (GSM)
- Installation of bulkhead walls, doors and fire dampers.

#### Works Site B (Underground Tunnel between Yau Ma Tei Station and Wylie Road Ancillary Building)

- Nil

#### Works Site C (Wylie Road Ancillary Building)

- Construction of noise enclosure
- Installation of instrumentation

#### Works Site D (Underground Tunnel between Wylie Road Ancillary Building and Ho Man Tin Station)

- Nil

#### Works Site E (Ho Man Tin Station)

- Temporary diversion of DN900 water main
- Bulk excavation
- Construction of rock fall fences
- Tree felling
- Installation of recharge wells

#### Works Site F (Fat Kwong Street Playground)

- Construction of noise enclosure
- Shaft excavation (soft ground)

#### Works Site G (Underground Tunnel between Ho Man Tin Station and Whampoa Station)

- Nil

#### Works Area J (Hung Hom Barging Point)

- Construction of barging ramps
- Construction of the wheel washing and weight bridge facilities

#### Works Area K (Tseung Kwan O Area 137 Magazine Site)

- Construction of EVA and associated layby
- Construction of magazine compound, associated FSI and E&M work

### **Contract 1002 - Works Sites and Areas**

#### Works Site H (Whampoa Station West Concourse)

- Diversion of utilities and drain pipes
- Temporary traffic management implementation
- Ground instrument installation work
- Predrilling, grouting and pipe piling works
- Demolition of staircase of footbridge

#### Works Site I (Whampoa Station East Concourse)

- Utilities diversion and ground instrument installation work
- Pre-drilling works
- Preparation works for abutment wall construction
- Sheet and pipe piling works

#### Works Area L (Hung Lok Road Site Office)

- Installation of roof top cover for car park lots

## **2.6 Construction Activities for the Coming Month**

According to the construction programme for the Civil Works Contracts, the scheduled major construction activities in the next reporting month are as follows:

### **Contract 1001 - Works Sites and Areas**

#### Works Site A (Gascoigne Road Rest Garden)

- Construction of cable troughs, protection and diversion of existing cables
- Removal of existing bulkhead
- Cable tunnel enlargement

#### Works Site B (Underground Tunnel between Yau Ma Tei Station and Wylie Road Ancillary Building)

- Nil

#### Works Site C (Wylie Road Ancillary Building)

- Construction of noise enclosure
- Construction of alternative site entrance

#### Works Site D (Underground Tunnel between Wylie Road Ancillary Building and Ho Man Tin Station)

- Nil

#### Works Site E (Ho Man Tin Station)

- Bulk excavation
- Erection of rock fall fences
- Soil nailing and shotcrete for station excavation
- Tree felling
- Surface drain installation

- Storm water drain diversion
- Demolition of the Kerosene Store

Works Site F (Fat Kwong Street Playground)

- Installation of services and facilities inside noise enclosure
- Shaft excavation (soft ground)

Works Site G (Underground Tunnel between Ho Man Tin Station and Whampoa Station)

- Nil

Works Area J (Hung Hom Barging Point)

- Construction of barging ramps and steel platforms
- Testing and commissioning

Works Area K (Tseung Kwan O Area 137 Magazine Site)

- Testing and commissioning

**Contract 1002 - Works Sites and Area**

Works Site H (Whampoa Station West Concourse)

- Diversion of utilities and drain pipes
- Temporary traffic management implementation
- Ground instrument installation work
- Predrilling and pipe piling works
- Grouting work

Works Site I (Whampoa Station East Concourse)

- Utilities diversion and ground instrument installation work
- Pre-drilling works
- Excavation work for Vent Shaft at Wan Hoi Street
- Preparation for footing construction of noise enclosure at Wan Hoi Street
- Pipe piling works

Works Area L (Hung Lok Road Site Office)

- Nil

### **3 IMPACT MONITORING**

#### **3.1 Air Quality**

##### 24-Hour TSP Levels Monitoring

The sampling procedure follows that described in the App. B of Pt 50 in 40CFR Ch.1 (U.S. Environmental Protection Agency). TSP is sampled by drawing air through a conditioned, pre-weighed filter paper inside the high volume sampler at a controlled rate. After 24-hour sampling the filter paper with retained particles is collected and returned to the laboratory for drying in a desiccator followed by weighing. TSP levels are calculated from the ratio of the mass of particulate retained on the filter paper to the total volume of air sampled.

The samplers should be properly maintained. Prior to dust monitoring commencing, appropriate checks should be made to ensure that all equipment and necessary power supply are in good working condition.

#### Calibration Requirements

The flow rate of the high volume sampler with mass flow controller will be calibrated using an orifice calibrator. Initial calibration (five points) will be conducted upon installation and prior to commissioning. Calibration will be carried out every six months. Calibration certificates are attached in **Appendix E**.

To examine the construction dust levels, 24-hour TSP monitoring was undertaken according to the EM&A Manual. The dust monitoring locations are shown in the Section 2.2 above. Monitoring results are presented in the following table and **Appendix F** for graphical plot. The 24-hour TSP monitoring results in the range from 27.4 to 131.3 ug/m<sup>3</sup> recorded in the monitoring period shows that the dust levels generated by the active construction activities were within the Action Levels with no exceedance. This indicates that the construction activities did not have a noticeable adverse effect on the general air quality for the works areas.

<b>CD1 Queen Elizabeth Hospital – Special Clinic</b>					
Date	TSP (µg/m <sup>3</sup> )	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )	Compliance (Yes/No)	Weather Condition
03/01/2012	110.8	171	260	Yes	Sunny
09/01/2012	92.3	171	260	Yes	Sunny
11/01/2012	69.7	171	260	Yes	Cloudy
16/01/2012	43.5	171	260	Yes	Rainy
23/01/2012	27.4	171	260	Yes	Rainy
30/01/2012	47.7	171	260	Yes	Cloudy
<b>CD2 Yee Fu Building</b>					
Date	TSP (µg/m <sup>3</sup> )	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )	Compliance (Yes/No)	Weather Condition
03/01/2012	116.0	183	260	Yes	Sunny
09/01/2012	111.9	183	260	Yes	Sunny
11/01/2012	82.8	183	260	Yes	Cloudy
16/01/2012	53.6	183	260	Yes	Rainy
23/01/2012	40.0	183	260	Yes	Rainy
30/01/2012	64.5	183	260	Yes	Cloudy
<b>CD3a No.238 Chatham Road North*</b>					
Date	TSP (µg/m <sup>3</sup> )	Action Level (µg/m <sup>3</sup> )	Limit Level (µg/m <sup>3</sup> )	Compliance (Yes/No)	Weather Condition
03/01/2012	113.6	192	260	Yes	Sunny
09/01/2012	103.8	192	260	Yes	Sunny

11/01/2012	90.9	192	260	Yes	Cloudy
16/01/2012	58.8	192	260	Yes	Rainy
26/01/2012	74.2	192	260	Yes	Cloudy
30/01/2012	58.3	192	260	Yes	Cloudy
<b>CD4a Ka Fu Building, Whampoa Estate*</b>					
Date	TSP ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )	Compliance (Yes/No)	Weather Condition
04/01/2012	131.3	187	260	Yes	Sunny
10/01/2012	90.5	187	260	Yes	Sunny
18/01/2012	48.4	187	260	Yes	Cloudy
26/01/2012	48.7	187	260	Yes	Cloudy
<b>CD5 Fung Kei Millennium Primary School</b>					
Date	TSP ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )	Compliance (Yes/No)	Weather Condition
04/01/2012	70.7	168	260	Yes	Sunny
10/01/2012	83.8	168	260	Yes	Sunny
18/01/2012	65.7	168	260	Yes	Cloudy
26/01/2012	34.2	168	260	Yes	Cloudy
<b>CD6a Site boundary of Finger Pier adjacent to Harbourfront Horizon*</b>					
Date	TSP ( $\mu\text{g}/\text{m}^3$ )	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )	Compliance (Yes/No)	Weather Condition
03/01/2012	101.3	182	260	Yes	Sunny
09/01/2012	100.4	182	260	Yes	Sunny
11/01/2012	69.5	182	260	Yes	Cloudy
16/01/2012	45.8	182	260	Yes	Rainy
23/01/2012	32.4	182	260	Yes	Rainy
30/01/2012	55.0	182	260	Yes	Cloudy

### 3.2 Noise

B&K 2250 sound level meters which complied with the International Electrotechnical Commission Publication 651:1979 (Type 1) and 804:1985 (Type 1), specification as referred to in the Technical Memoranda to the NCO were used for the construction noise impact monitoring. The B&K sound level meters and B&K 4231 calibrator are verified by the certified laboratory or manufacturer once every two years to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications. In this reporting period, two sound level meters with serial number 2731886 and 2741136 were used. All relevant calibration certificates are attached in **Appendix E**.

Immediately prior to and following each set of measurements at any NSR, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. If the calibration levels before and after the measurement differs by more than 1.0dB the measurement shall be repeated to obtain a reliable result. Periods of prolonged or repeated overloading of the sound level meter

detector were avoided by setting the meter with adequate headroom prior to commencing measurements. Measurements were recorded to the nearest whole dB, with values of 0.5 or more being rounded up.

Impact noise monitoring of LAeq(30min) was undertaken to measure construction noise levels in accordance with the EM&A Manual. The noise monitoring locations are shown in Section 2.2 above.

The monitoring results corrected to the baselines in the range from 32 to 74 dBA are presented in the following table and **Appendix F** for graphical plot.

<b>CN1- Alhambra building</b>							
Date	Time	Measured Leq(dBA)	Baseline Leq (dBA)	Corrected Leq(dBA)#	Limit Level (dBA)	Exceedance (Yes/No)	Weather Conditions
03/01/2012	10:30	69	71	***	75	No	Fine, wind<2m/s
11/01/2012	14:00	71	71	***	75	No	Fine, wind<2m/s
19/01/2012	9:00	71	71	***	75	No	Fine, wind<2m/s
27/01/2012	9:30	71	71	***	75	No	Fine, wind<2m/s
<b>CN2- Methodist College</b>							
03/01/2012	11:30	76	75	65	70	No	Fine, wind<2m/s
11/01/2012	15:00	75	76	***	70	No	Fine, wind<2m/s
19/01/2012	10:00	74	75	***	70	No	Fine, wind<2m/s
27/01/2012	10:30	75	75	***	70	No	Fine, wind<2m/s
<b>CN3- Queen Elizabeth Hospital – Specialist Clinic</b>							
04/01/2012	12:00	63	64	***	75	No	Fine, wind<2m/s
11/01/2012	15:30	66	64	61	75	No	Fine, wind<2m/s
19/01/2012	10:30	70	63	69	75	No	Fine, wind<2m/s
27/01/2012	12:00	63	64	***	75	No	Fine, wind<2m/s
<b>CN4- Yee Fu Building</b>							
04/01/2012	12:30	70	70	57	75	No	Fine, wind<2m/s
10/01/2012	11:00	72	70	71	75	No	Fine, wind<2m/s
18/01/2012	17:00	70	70	61	75	No	Fine, wind<2m/s
26/01/2012	15:00	70	70	32	75	No	Fine, wind<2m/s
31/01/2012	16:00	75	70	74	75	No	Fine, wind<2m/s
<b>CN6- Lok Do Building</b>							
04/01/2012	13:30	73	71	67	75	No	Fine, wind<2m/s
10/01/2012	10:30	73	71	69	75	No	Fine, wind<2m/s
18/01/2012	18:00	70	70	***	75	No	Fine, wind<2m/s
26/01/2012	14:30	70	71	***	75	No	Fine, wind<2m/s
31/01/2012	17:00	72	71	66	75	No	Fine, wind<2m/s
<b>CN7- Block Y, Ki Fu Building, Whampoa Estate</b>							
03/01/2012	13:30	75	71	72	75	No	Fine, wind<2m/s
12/01/2012	17:00	71	71	***	75	No	Fine, wind<2m/s
18/01/2012	14:30	75	71	74	75	No	Fine, wind<2m/s
26/01/2012	15:30	68	71	***	75	No	Fine, wind<2m/s
<b>CN8- Block I, Lok Wah Building, Whampoa Garden</b>							
03/01/2012	14:00	71	69	65	75	No	Fine, wind<2m/s
12/01/2012	16:30	76	70	74	75	No	Fine, wind<2m/s
18/01/2012	13:30	73	70	71	75	No	Fine, wind<2m/s
26/01/2012	16:00	68	69	***	75	No	Fine, wind<2m/s
<b>CN9- Block 13, Bauhinia Mansions, Whampoa Garden Site 11</b>							



03/01/2012	15:00	68	71	***	75	No	Fine, wind<2m/s
12/01/2012	15:30	68	70	***	75	No	Fine, wind<2m/s
18/01/2012	14:00	76	71	74	75	No	Fine, wind<2m/s
27/01/2012	16:00	65	70	***	75	No	Fine, wind<2m/s
<b>CN10- Block 1, Oak Mansions, Whampoa Garden Site 5</b>							
03/01/2012	15:30	65	67	***	75	No	Fine, wind<2m/s
12/01/2012	14:30	70	66	68	75	No	Fine, wind<2m/s
18/01/2012	16:00	71	66	69	75	No	Fine, wind<2m/s
27/01/2012	15:00	66	67	***	75	No	Fine, wind<2m/s
<b>CN11- Fung Kei Millennium Primary School</b>							
03/01/2012	17:00	65	64	58	70	No	Fine, wind<2m/s
12/01/2012	14:00	67	64	63	65 ##	No	Fine, wind<2m/s
18/01/2012	15:00	69	66	65	70	No	Fine, wind<2m/s
27/01/2012	17:00	68	64	66	70	No	Fine, wind<2m/s
<b>CN12- GCEPSA Whampoa Primary School</b>							
03/01/2012	16:00	67	64	64	70	No	Fine, wind<2m/s
12/01/2012	13:30	64	64	***	70	No	Fine, wind<2m/s
18/01/2012	15:30	66	65	58	70	No	Fine, wind<2m/s
27/01/2012	16:30	66	64	60	70	No	Fine, wind<2m/s

Notes:

- It is noted that all noise monitoring were not undergone in the raining period.
- Decimal point of measured and baseline monitoring data is used to calculate the corrected noise level
- # The Measured Leq is corrected against the corresponding Baseline Level.
- \*\*\* Refers to the Measured Leq is lower than the Baseline Level.
- ## Examination period for CN11, limit level of 65 dBA is adopted.

### 3.3 Action taken in Event of Exceedance

There was no exceedance in air quality and noise monitoring parameters recorded in the reporting period, therefore no action was taken.

## 4 LANDSCAPE AND VISUAL

### 4.1 Monitoring Requirements

Monitoring of the implementation of the landscape and visual mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

The landscape and visual monitoring and audit will be conducted once every two weeks throughout the construction stage covering the entire project site areas.

### 4.2 Audit Results

Monitoring and audit was undertaken in accordance with the EM&A Manual.

#### Tree Felling at Contract 1001 Works Sites / Areas

A total of 77 numbers of trees were felled in Works Site E in accordance with the Tree Removal Application Report during the reporting month.

Tree Felling at Contract 1002 Works Sites / Areas

No tree was felled during the reporting month.

Tree Transplantation in this reporting period for Contract 1001

No tree was transplanted during the reporting month.

Tree Transplantation in this reporting period for Contract 1002

No tree was transplanted during the reporting month.

Bi-weekly inspection

The Registered Landscape Architect of Environmental Team or his representatives conducted inspections and audits and the tree protection works being planned and implemented by the respective contractors of Contract 1001 and 1002 were in progress. No non-conformance was identified in the reporting period.

**4.3 Action Taken in Event of Non-Conformance**

No actions on landscape and visual were required to be taken in this reporting period.

**5 WASTE MANAGEMENT**

Mitigation measures on waste management have been implemented in accordance with the requirements of the EM&A Manual. Suitable C&D materials were reused on-site or at other projects such as Andersen Road Quarry while the remaining C&D materials and non-inert wastes were disposed at the public filling reception facilities and the landfills respectively. The quantities disposed in the reporting period are summarized in the following table:

Amount of Construction Wastes Disposed				
Reporting Period	Inert C&D Materials to Public (m <sup>3</sup> )	Inert C&D Materials Reused (m <sup>3</sup> )	Non-inert Waste to Landfill (m <sup>3</sup> )	Chemical Waste to designated treatment facility (trips)
Contract 1001				
June – July 2011	588	0	66	0
August 2011	78	0	156	0
September 2011	960	0	78	0
October 2011	4542	0	54	0
November 2011	13842	2676	114	0
December 2011	8680	21406	246	0
January 2012	1592	33151	192	0
Subtotal	30282	57233	906	0

Contract 1002 June – July 2011	534	0	0	0
August 2011	602	0	5	0
September 2011	283	0	0	0
October 2011	854	0	0	0
November 2011	663	0	2	0
December 2011	101	0	2	0
January 2012	50	0	18	0
Subtotal	3087	0	27	0
Overall Total	33369	57233	933	0

## **6 WATER QUALITY**

Monitoring of the implementation of the water quality mitigation measures during construction phase was conducted in accordance with the requirements as stipulated in the EM&A Manual.

Weekly site inspection will be conducted throughout the construction stage covering the entire project site areas to ensure the recommended mitigation measures are properly implemented.

In the reporting period, the water quality mitigation measures were implemented in accordance with the requirements as stipulated in the EM&A Manual and found in an acceptable manner.

Water sample tests were conducted for Works Sites A, C, E & F. Analytical results are pending and will be reported in accordance to the WPCO licenses.

## **7 RECORD OF ENVIRONMENTAL COMPLAINTS**

No valid environmental complaint was recorded in the reporting period. A summary of environmental complaint since commencement of construction is shown below:

Reporting Period	Invalid Complaint			Valid Complaint		
	Frequency	Nature	Status	Frequency	Nature	Status
June 2011	0	N/A	N/A	0	N/A	N/A
July 2011	0	N/A	N/A	0	N/A	N/A
August 2011	0	N/A	N/A	0	N/A	N/A
September 2011	1	Noise	Closed	0	N/A	N/A
October 2011	0	N/A	N/A	0	N/A	N/A
November 2011	0	N/A	N/A	1	Dust	Closed
December 2011	1	Water	Closed	0	N/A	N/A
Januray 2012	0	N/A	N/A	0	N/A	N/A
Cumulative	2	N/A	N/A	1	N/A	N/A

## 8 **RECORD OF NON-COMPLIANCES**

There was no non-compliance identified in the reporting period.

## 9 **NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS**

No summon or prosecution related to environmental issue was recorded in the reporting period. A summary of environmental prosecution since commencement of construction is shown below:-

Reporting Period	Frequency	Cumulative	Nature	Status
June 2011	0	0	N/A	N/A
July 2011	0	0	N/A	N/A
August 2011	0	0	N/A	N/A
September 2011	0	0	N/A	N/A
October 2011	0	0	N/A	N/A
November 2011	0	0	N/A	N/A
December 2011	0	0	N/A	N/A
January 2012	0	0	N/A	N/A
Cumulative	0	0	N/A	N/A

## 10 **STATUS OF STATUTORY SUBMISSIONS**

### 10.1 **Submissions required under Environmental Permit**

A summary of the status of submissions required under the KTE Environmental Permit as of 31 January 2012 is shown below:

<b>EP-399/2010/A Part C Clause No.</b>	<b>Description</b>		<b>Status</b>
1.12	1	Notification of commencement of construction	Submitted on 17 May 2011
2.1	2	Establishment of ET with ET Leader	Submitted on 1 April 2011
2.1	3	Establishment of Registered Landscape Architect	Submitted on 14 April 2011
2.2	4	Employment of IEC	Submitted on 1 April 2011 and 7 July 2011
2.3	5	Notification of the management organization of main construction companies and/or any form of JV	Submitted on 19 May 2011
2.4	6	Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations	Submitted on 10 June 2011 and 13 July 2011
2.5	7	Notification of setting up hotline to service complaints, comments, suggestions or requests for information	Submitted on 12 May 2011
3.7	8	Report any contamination hotspot(s) identified from the reconnaissance site visit to the kerosene store at Chung Hau Street	Submitted on 25 July 2011
5.3	9	Submission of Baseline Monitoring Report	Submitted on 4 May 2011 and 8 July 2011
6.2	10	Notification of Internet address to place EM&A data	Submitted on 1 August 2011
5.4	11	Monitoring Report for July 2011	Submitted on 12 August 2011
5.4	12	Monitoring Report for August 2011	Submitted on 15 September 2011
5.4	13	Monitoring Report for September 2011	Submitted on 17 October 2011
4.1	14	Review Plan for Operational Groundborne Noise	Submitted on 28 October 2011
5.4	15	Monitoring Report for October 2011	Submitted on 14 November 2011
5.4	16	Monitoring Report for November 2011	Submitted on 14 December 2011
5.4	17	Monitoring Report for December 2012	Submitted on 16 January 2012

## ***10.2 Statutory Permits and Licenses***

A summary of the status of all relevant environmental permits and licenses as of 31 January 2012 is shown below:

<b>Description</b>	<b>License/ Reference</b>	<b>Permit</b>	<b>Issue Date</b>	<b>Expired Date</b>
<b><u>Environmental Permit</u></b>				
Environmental Permit for Kwun Tong Line Extension Project (EP-399/2010)	(EP-399/2010)		27 September 2010	NA
Variation of Environmental Permit for Kwun Tong Line Extension Project	(EP-399/2010/A)		1 December 2010	NA
<b><u>Contract 1001</u></b>				
Wastewater Discharge License	WT00009504-2011 (Works Site C),		14 July 2011	31 July 2016
	WT00009580-2011 (Works Site E),		27 July 2011	31 July 2016
	WT00009582-2011 (Works Site F),		27 July 2011	31 July 2016
	WT00009608-2011 (Works Site A),		1 August 2011	31 August 2016
	WT00009611-2011 (Works Area J)		9 August 2011	31 August 2016
Registration as a Chemical Waste Producer	5213-226-N2206-22 (Works Site A)		1 August 2011	NA
	5213-226-N2206-23 (Works Site C)		1 August 2011	NA
	5213-237-N2454-04 (Works Site E)		11 August 2011	NA
	5213-243-N2454-03 (Works Site F)		11 August 2011	NA
Disposal of Construction Waste	Billing Account no. 7012910 activated		26 May 2011	NA
Construction Noise Permit	GW-RE0866-11		21 November 2011	Valid from 25 Nov 2011 to 24 May 2012
	GW-RE0017-12		6 January 2012	Valid from 17 Jan 2012 to 29 Feb 2012
	GW-RE0038-12		17 January 2012	Valid from 31 Jan 2012 to 30 May 2012

	GW-RE0055-12	18 January 2012	Valid from 31 Jan 2012 to 31 Mar 2012
<b>Contract 1002</b>			
Wastewater Discharge License	WT00009415-2011 (Site office) WT00009253-2011 (Tak Man Street) (Superseded)	11 July 2011	30 Sep 2016
	WT00009884-2011 (Superseded)	12 October 2011	31 Oct 2016
	WT00010827-2011	8 December 2011	31 Oct 2016
Registration as a Chemical Waste Producer	Waste Producer No. 5213-245-C3672-01	16 June 2011	NA
Disposal of Construction Waste	Billing Account No. 7012934 activated	31 May 2011	NA
Construction Noise Permit	CNP No. GWRE0575-11	10 August 2011	Valid period from 4 to 11 Sep 2011
	CNP No. GWRE0595-11	17 August 2011	Valid period from 1 to 22 Sep 2011
	CNP No. GW-RE0719-11	30 September 2011	Valid period from 9 to 30 Oct 2011
	CNP No. GW-RE0852-11	10 November 2011	Valid period from 13 Nov 2011 to 4 Dec 2011.

## **11 SITE INSPECTIONS**

### **11.1 Observations**

Regular site inspections led by the Engineer's Representative and anticipated by ET and respective Contractors were undertaken in accordance with the EM&A Manual in the report period. The contractors' performance on environmental matters were assessed and found in an acceptable manner. The inspection findings and the associated recommendations on improvement to the environmental protection and pollution control works were raised to the contractors for reference and/ or action.

Observations against the implementation of the mitigation measures recommended in the EP/EIA are summarized as follows:

Item	Description	Follow-up Status
	<b><u>Contract 1001</u></b>	
1	The contractor was requested to remove the contaminated soil / stains observed at Works Sites E & F.	Completed
2	The contractor was requested to store chemical waste at the chemical waste store with proper label at Works Site F.	On going
3	The contractor was requested to remove the wastewater in the drip tray at Works Site E.	Completed
4	The contractor was requested to provide drip tray for oil drum at Works Site E.	Completed
5	The contractor was requested to carry out proper maintenance of the generator and drilling machine at Works Site E where exhaust emission were observed.	Ongoing
6	The contractor was requested to remove rubbish in order to avoid accumulation and provide sufficient rubbish bins at Works Site E.	Partly Completed
7	The contractor was reminded to carry out water spraying during dusty materials transfer operation at Works Site E.	Ongoing
8	The contractor was reminded to cover the exposed slopes by tarpaulin at Works Site E if there were no construction activities.	Ongoing
9	The contractor was reminded to provide adequate noise barriers during rock breaking operation at Works Site E.	Ongoing
10	The contractor was urged to provide proper temporary drainage system to control site water at Works Site E for heavy rains.	Ongoing
	<b><u>Contract 1002</u></b>	
1	The height of the noise/acoustic barrier should be increased to minimize the noise nuisance to nearby NSR (around piling machines).	Completed
2	Vehicle washing facilities should be provided at every site exit.	Completed
3	Stagnant water in the cement mixing area should be removed to avoid accumulation.	Completed

The respective contractors have followed most of concerned items raised during the inspections for rectification in a responsible manner.

## 11.2 Other Notable Events

### IEC Site Inspections

The IEC conducted site inspections for Works Areas on 20 January 2012 and 11 January 2012 for Contract 1001 and 1002 respectively. Some observations including improving chemical waste management, effluent control measures, enhancing noise and dust suppression measures and providing adequate maintenance to equipment were noted during the site inspections and the respective Contractors had followed up the issues as identified in the site inspections in a responsible manner.

### EPD Inspection

EPD conducted a site inspection on 16 January 2012 for Works Sites H and I with the Contractor of Contract 1002 to check the implementation of the mitigation measures recommended in the EP/EIA. No environmental non-conformance was identified during



the inspection and reminder was given to pay attention on preventing muddy water from running to existing gullies.

## **12 FUTURE KEY ISSUES**

### **12.1 Key Issues for the Coming Month**

Future key issues envisaged in the coming month include the followings:

- Noise impact from operating equipment from site construction activities, e.g. pile/sheet piling and rock breaking works;
- Fugitive dust impact from bulk excavation activities and rock breaking works;
- Effluent discharge generated from various construction works;
- Tree protection, felling and transplant.

### **12.2 Effectiveness and Efficiency of Mitigation Measures**

Based on the environmental monitoring results of the reporting period, the effectiveness and efficiency of the mitigation measures implemented were found to be satisfactory. The respective contractors were reminded to carry out their future construction activities to comply with the requirements of the EP and the relevant contract requirements.

## **13 CONCLUSIONS**

The Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of January 2012. The major construction activities in the reporting period included utility and drainage diversions, installation of noise enclosures, temporary road & traffic diversion, piling works, bulk excavation, ground improvement works and construction of barging points.

Impact monitoring at the representative sensitive receivers for air quality and noise were conducted in accordance with the EM&A Manual in the reporting period. No exceedance of limit levels for air and noise monitoring were recorded.

No valid environmental complaint and notification of summon and prosecution were received in the reporting period.

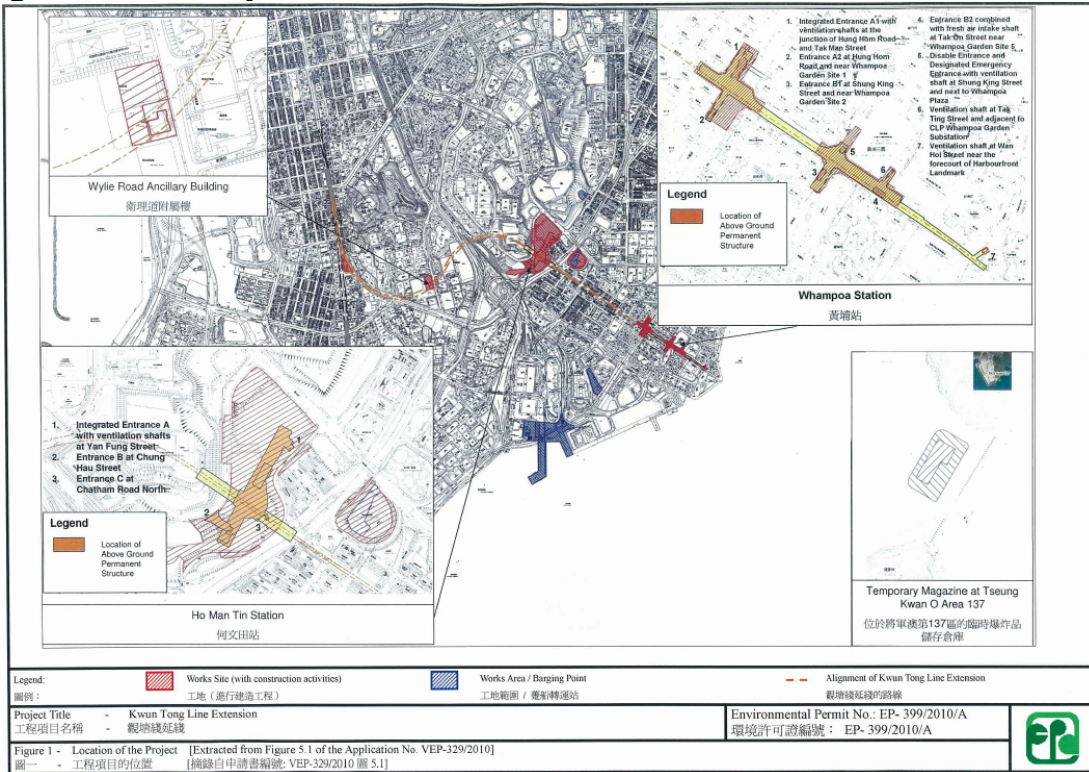
Regular site inspections led by the Engineer's Representative and anticipated by the representatives from ET and the respective Contractors' Team were conducted on a weekly basis to monitor the implementation of environmental pollution control and mitigation measures for the Project. No non-conformance to the environmental requirements was identified by the Environmental Team in the reporting period. The performances of the respective contractors on site environmental management were found in a responsible manner in this reporting period.

It is concluded from the environmental monitoring and audit works for the Kwun Tong Line Extension Project were undertaken in a responsible manner. The environmental protection and pollution control measures provided by respective contractors of Contract 1001 and 1002 were generally acceptable apart from some minor irregularities which were rectified timely by the respective civil works contractors.

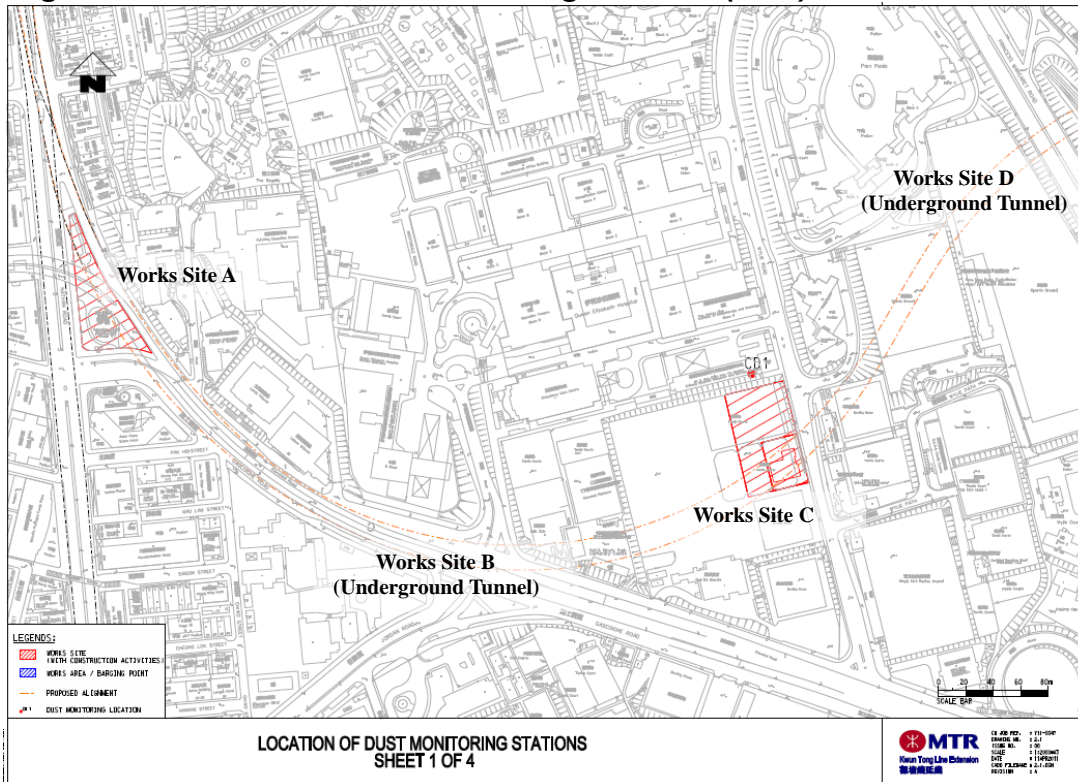
## **Appendix A**

### **Figures**

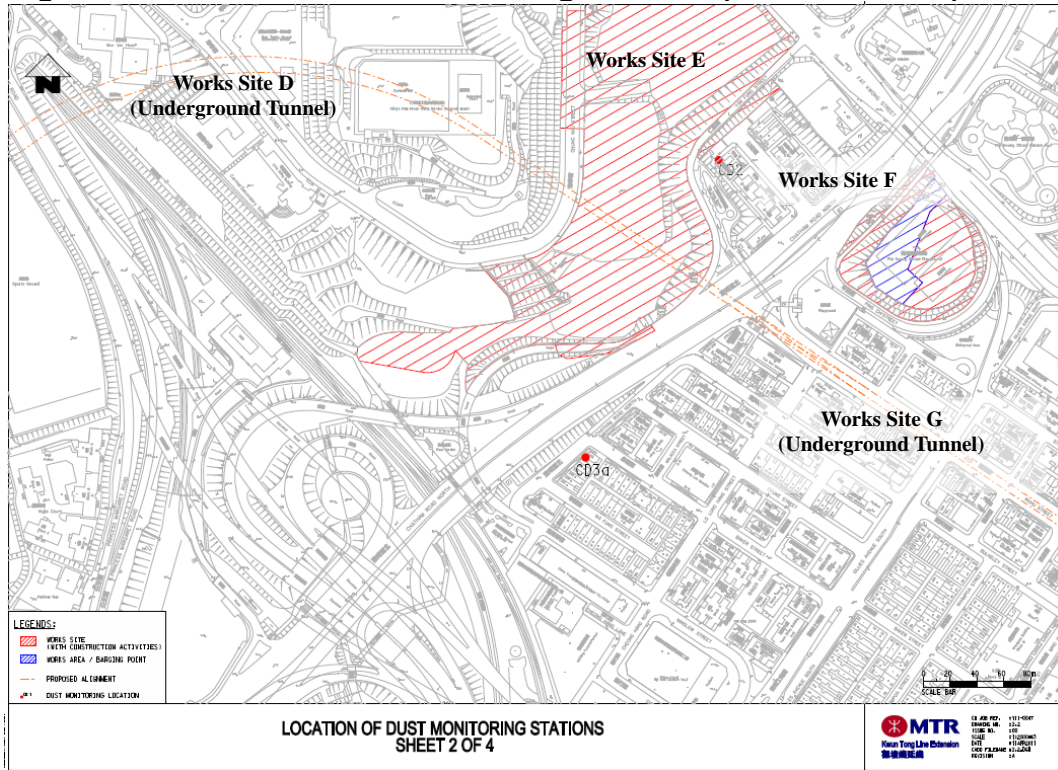
**Figure 1. KTE Project Works Area**



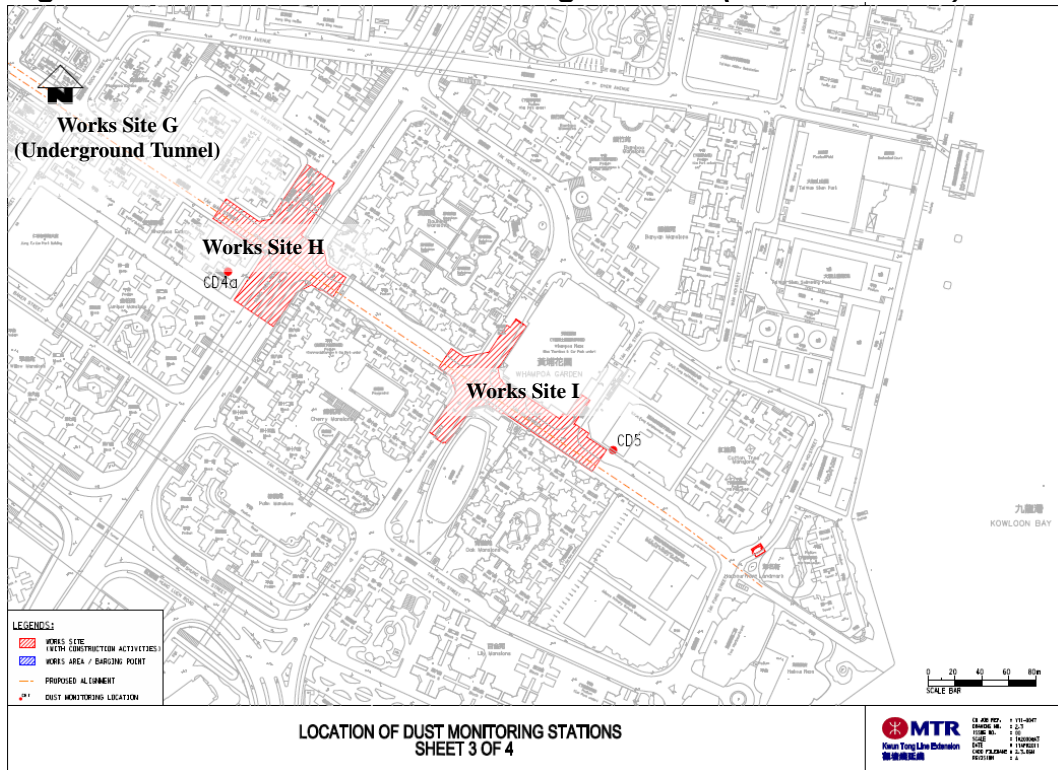
**Figure 2. Location of Dust Monitoring Stations (CD1)**



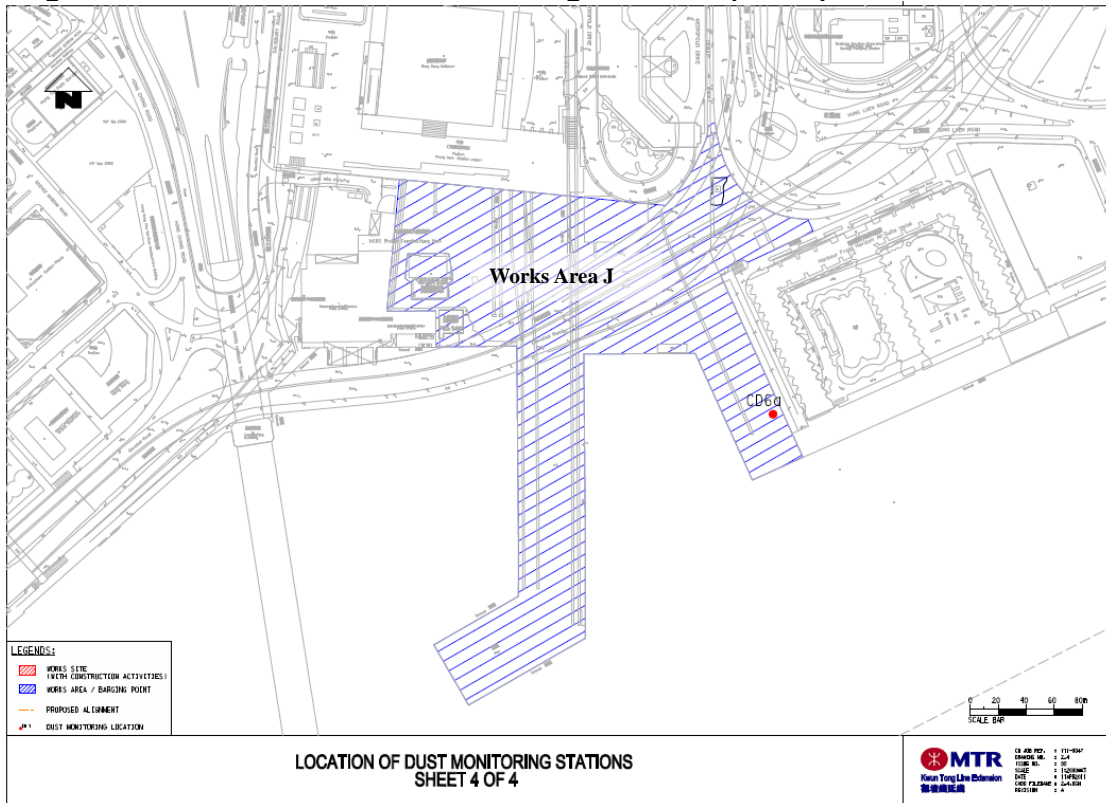
**Figure 3. Location of Dust Monitoring Stations (CD2 and CD3a)**



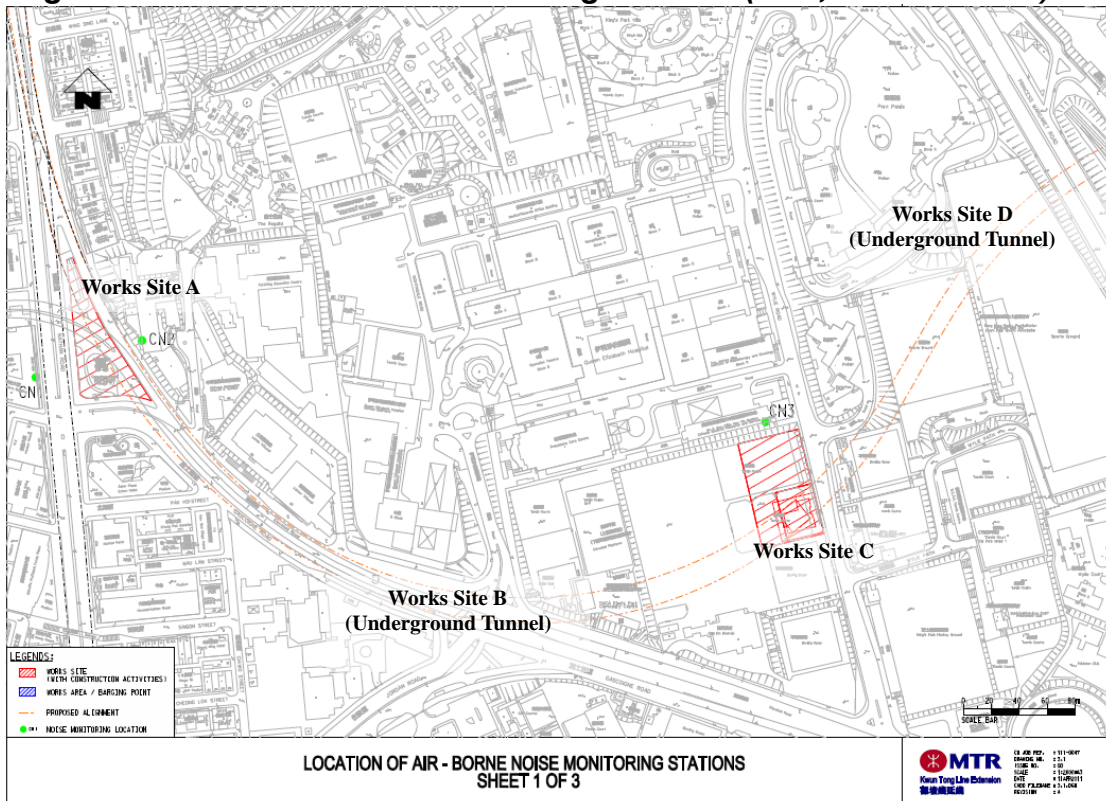
**Figure 4. Location of Dust Monitoring Stations (CD4a and CD5)**



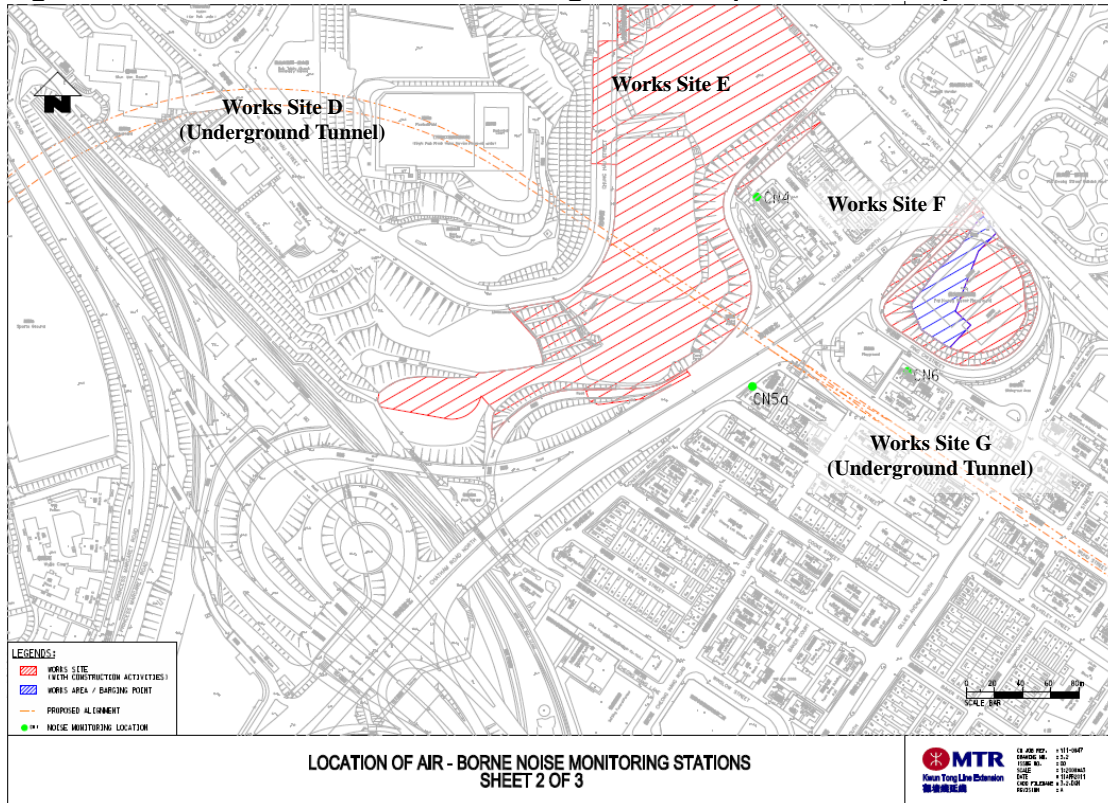
**Figure 5. Location of Dust Monitoring Stations (CD6a)**



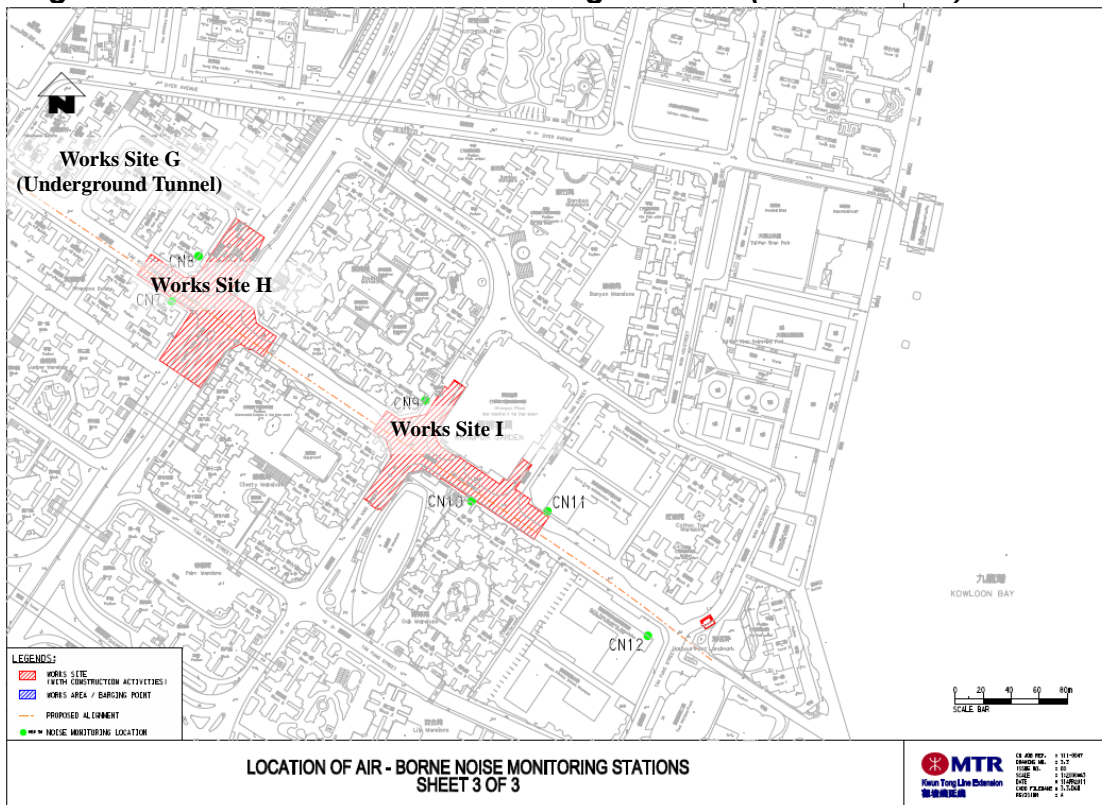
**Figure 6. Location of Noise Monitoring Stations (CN1, CN2 and CN3)**



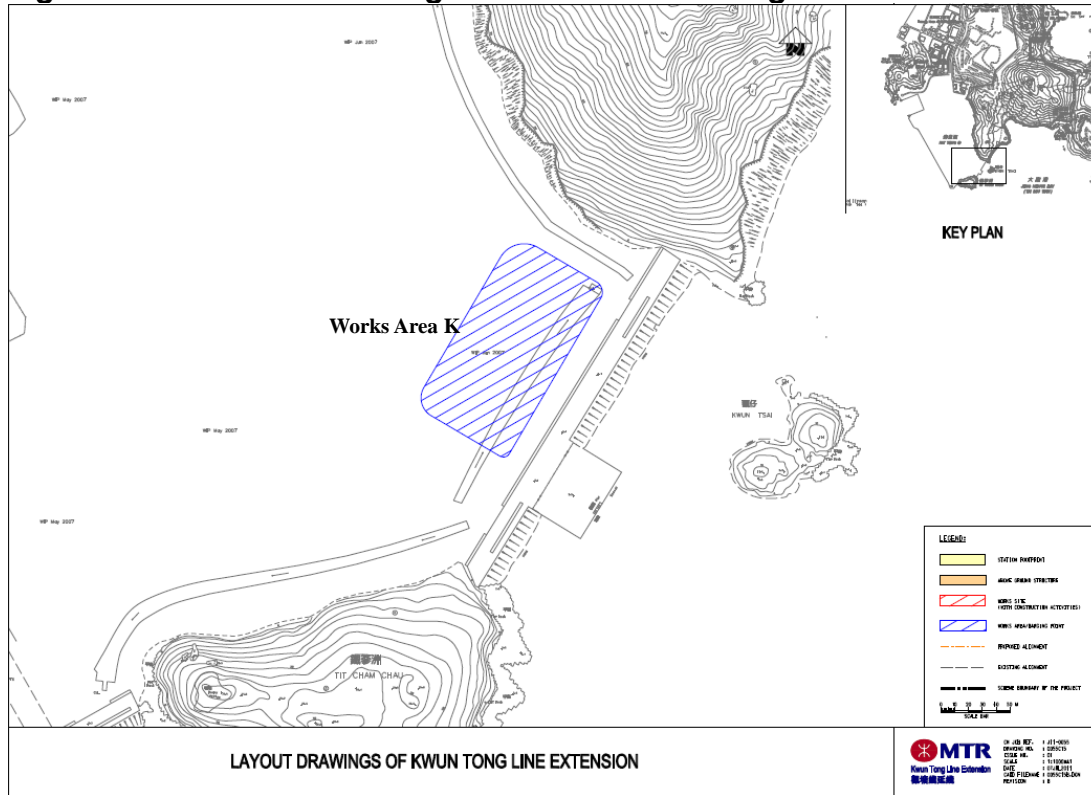
**Figure 7. Location of Noise Monitoring Stations (CN4 and CN6)**



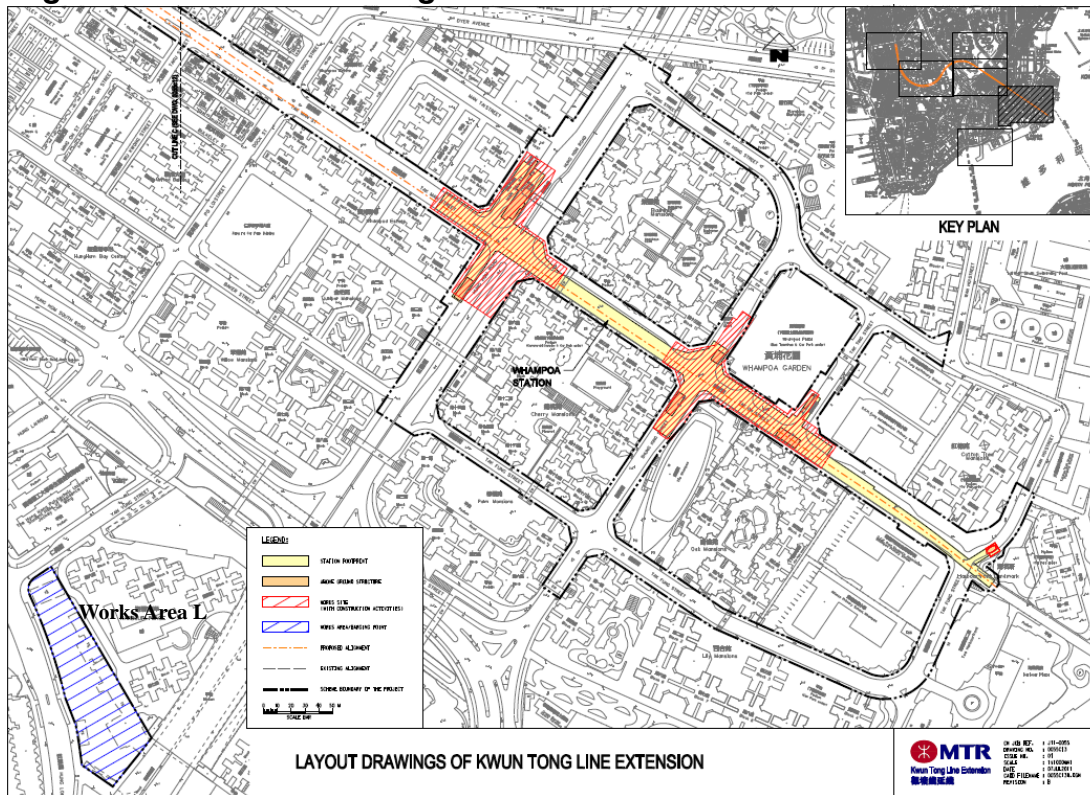
**Figure 8. Location of Noise Monitoring Stations (CN7 to CN12)**



**Figure 9. Location of Tseung Kwan O Area 137 Magazine Site**



**Figure 10. Location of Hung Lok Road Site Office**



## **Appendix B**

### **Environmental Quality Performance Limits**



### Action and Limit Levels for 24-hour TSP

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
CD1	171	260
CD2	183	260
CD3a	192	260
CD4a	187	260
CD5	168	260
CD6a	182	260

### Action and Limit Levels for 1-hour TSP for Complaint Handling

Monitoring Station	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
CD1	310	500
CD2	301	500
CD3a	311	500
CD4a	303	500
CD5	309	500
CD6a	316	500

### Action and Limit Levels for Construction Noise

Time Period	Action Level	Limit Level (dB(A)), Leq(30min)
0700-1900 hr on normal weekdays	When one documented complaint is received	75*

\* Limit for school is 70 dB(A) and 65 dB(A) during school examination periods.

## **Appendix C**

### **Event Action Plans**

**Table 4.4: Event and Action Plan for Construction Dust Monitoring**

EVENT	ACTION			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor
<b>Action Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify sources, investigate the causes of complaint and propose remedial measures.</li> <li>2. Inform IEC and ER.</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency.</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 methods.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the Contractor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practices.</li> <li>2. Amend working methods agreed with the ER as appropriate.</li> </ol>
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify sources.</li> <li>2. Inform the IEC and ER.</li> <li>3. Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>4. Repeat measurements to confirm findings.</li> <li>5. Increase monitoring frequency to daily.</li> <li>6. Discuss with the IEC, ER and Contractor on remedial action required.</li> <li>7. If exceedance continues, arrange meeting with the IEC, Contractor and ER.</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 methods.</li> <li>3. Discuss with the ET, ER and Contractor on possible remedial measures if required.</li> <li>4. Advise the ER on the effectiveness of proposed remedial measures if required.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the Contractor.</li> <li>2. Ensure remedial measures properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial action to the ER within 3 working days of notification.</li> <li>2. Implement the agreed proposals.</li> <li>3. Amend proposal as appropriate.</li> </ol>

EVENT	ACTION			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor
<b>Limit Level</b>				
1. Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify sources, investigate causes of exceedance and proposed remedial measures.</li> <li>2. Inform the IEC, ER, and Contractor.</li> <li>3. Repeat measurement to confirm finding.</li> <li>4. Increase monitoring frequency to daily.</li> <li>5. Assess effectiveness of the Contractor's remedial action and keep the IEC and ER informed of the results.</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 methods.</li> <li>3. Discuss with the ET, ER and Contractor on possible remedial measures.</li> <li>4. Advise the ER and ET on the effectiveness of the proposed remedial measures.</li> <li>5. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of the notification of exceedance in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance.</li> <li>2. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Amend proposal as appropriate.</li> </ol>

**Table 5.3: Event and Action Plan for Construction Noise Monitoring**

EVENT	ACTION			
	ET <sup>(1)</sup>	IEC <sup>(1)</sup>	ER <sup>(1)</sup>	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify the IEC, ER and Contractor.</li> <li>2. Carry out investigation.</li> <li>3. Report the results of investigation to the IEC and Contractor.</li> <li>4. Discuss jointly with the ER and Contractor and formulate remedial measures.</li> <li>5. Increase the monitoring frequency to check the mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the monitoring data submitted by the ET.</li> <li>2. Review the construction methods and proposed redial measures by the Contractor, and advise the ET and ER if the proposed remedial measures would be sufficient.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify the Contractor.</li> <li>2. Require the Contractor to propose remedial measures for implementation if required.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to the ER and copy to the IEC and ET.</li> <li>2. Implement noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Notify the IEC, ER and Contractor.</li> <li>2. Identify sources.</li> <li>3. Repeat measurements to confirm findings.</li> <li>4. Carry out analysis of the Contractor's working procedures with the ER and Contractor to determine possible mitigations to be implemented.</li> <li>5. Record the causes and action taken for the exceedances.</li> <li>6. Increase the monitoring frequency.</li> <li>7. Assess the effectiveness of the Contractor's remedial action with the ER and keep the IEC informed of the results.</li> <li>8. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst the ER, ET and Contractor on the potential remedial action.</li> <li>2. Review the Contractor's remedial action whenever necessary to assure their effectiveness and advise the ER accordingly.</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of exceedance in writing.</li> <li>2. Notify the Contractor.</li> <li>3. Require the Contractor to propose remedial measures for the analysed noise problems.</li> <li>4. Ensure remedial measures are properly implemented.</li> <li>5. If exceedance continues, consider what portion of work is responsible and instruct the Contractor to stop that portion of works 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. Submit proposals for remedial action to the ER and copy to the ET and IEC within 3 working days of notification.</li> <li>3. Implement the agreed proposals.</li> <li>4. Resubmit proposals if problems still not under control.</li> <li>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.</li> </ol>

Note (1): ET – Environmental Team, IEC – Independent Environmental Checker, ER – Engineer's Representative

**Table 3.2: Event / Action Plan for Construction/Operational Phase**

<b>Action Level</b>	<b>ET</b>	<b>IEC</b>	<b>ER</b>	<b>Contractor</b>
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 IEC and the ER</li> <li>3. Increase monitoring frequency</li> <li>4. Discuss remedial actions with the IEC, the ER and the Contractor</li> <li>5. Monitor remedial actions until rectification has been completed</li> <li>6. 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 ET 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 Team
- IEC – Independent Environmental Checker
- ER – Engineer's Representative

## **Appendix D**

### **Implementation of Environmental Mitigation Measures**

### Appendix 1.1 Implementation Schedule for Environmental Mitigation Measures

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
<b>Miscellaneous</b>										
3.4.2.1		<u>WSD Fresh Water Service Reservoir</u> Undertake an independent study of the effects of the drill and blast tunnelling on the reservoir to the satisfaction of WSD.	Ensure stability of the reservoir during construction	WSD Fresh Water Service Reservoir	MTR Corporation/ Main Contractor	-		✓		n/a
<b>Landscape and Visual</b>										
5.12.1.2		<u>Reuse of Existing Topsoil</u> Existing topsoil shall be re-used for new planting areas within the project. The Contractor's construction plan shall consider using the soil removed for backfilling. Suitable storage ground, gathering ground and mixing ground shall be set up if necessary.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, Hill slopes above Chatham Road North, Roadside planters at Hung Hom Road	MTR Corporation/ Main Contractor	EIA recommendation		✓		MTR Corporation / LandsD, LCSD / HyD
5.12.1.2		<u>Tree Transplantation</u> Transplantation is proposed for a number of trees which are generally able to provide high amenity value and are likely to survive the transplantation process.	Conservation of valuable natural landscape resources	Gascoigne Road Rest Garden, HOM Station, Yan Fung Street Rest Garden  Slopes surrounding Fat Kwong Street Playground, WHA Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	All transplantation will be carried out in accordance with ETWB TCW No. 3/2006.	✓	✓		MTR Corporation / LandsD / HyD / LCSD / AFCD



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5.12.1.2		<u>Erection of Decorative Hoardings</u> Temporary decorative screen hoardings shall be designed and erected to be compatible with the existing urban context, either brightly and imaginatively or with visually unobtrusive design and colours where more appropriate. All works sites and works areas shall be surrounded by such hoardings, which shall be removed at project completion.	Visual screening of works site during construction	All works sites and Temporary Works Areas	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓		Contractor
5.12.1.2		<u>Control of night-time lighting glare</u> All security floodlights for construction sites and temporary works areas shall be equipped with adjustable shield, frosted diffusers and reflective covers, and be carefully controlled to minimize light pollution and night-time glare to nearby receivers.	Restricting light pollution to nearby receivers	All works sites and Temporary Works Areas	Main Contractor	EIA recommendation		✓		Contractor
5.12.1.2		<u>Re-provisioning of Public Open Spaces</u> Every effort should be made to minimise use of public open spaces, however if affected by the Project they shall be re-provisioned to an equal or improved standard at completion of the project. Sensitive design and reinstatement of the affected Public Open Spaces (Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground) shall be made, incorporating replacement facilities to those currently provided and using materials of quality suitable for long term use and acceptable to the relevant government departments including LCSD and PlanD, who shall be consulted on the design of the reinstated public open spaces at an early stage of the design process.	Replacement of loss of resources	Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground,	MTR Corporation / Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	LCSD

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5.12.1.2		<p><u>Compensatory Tree Planting</u>                      Suitable land pockets within the project area will be used for the implementation of compensatory mitigation to offset the net loss of key landscape resources and improve visual amenity.                      A compensatory tree planting proposal including locations of tree compensation will be submitted separately to seek relevant government department's approval, in accordance with ETWB TCW No. 3/2006.</p>	<p>Replacement of loss of resources and                      Enhancement of visual amenity</p>	<p>Gascoigne Road Rest Garden,                      Yan Fung Street Rest Garden,                      Fat Kwong Street Playground,                      WAB,                      HOM Station                      WHA Station</p>	<p>MTR Corporation / Main Contractor/ Detailed Design Consultant</p>	<p>ETWB TCW No. 3/2006.                      WBTC 7/2002</p>	✓	✓	✓	<p>MTR Corporation / LandsD/ HyD/ LCSD/ AFCD</p>
5.12.1.2		<p><u>Horizontal and Slope Greening</u>                      Shotcreting of cut rock slopes shall be avoided and greening applications employed throughout the project.                      At HOM Station the backfill slopes shall be hydroseeded and native seedling trees planted. The station roof shall be temporarily greened should there be no further on-site development within 1 year of completion of KTE, until permanent measures are undertaken under the proposed property development stage.                      Parapets at WAB and HOM Station shall be provided with internal permanent planter boxes.                      The roof at WAB shall be greened to improve visual amelioration from surrounding high level viewers                      Station entrances at HOM and WHA shall utilise</p>	<p>Mitigation of loss of resources and                      Enhancement of visual amenity</p>	<p>Gascoigne Road Rest Garden,                      Yan Fung Street Rest Garden,                      Fat Kwong Street Playground,                      WAB,                      HOM Station                      WHA Station</p>	<p>MTR Corporation/ Main Contractor/ Detailed Design Consultant</p>	<p>WBTC 25/93                      WBTC 17/2000</p>	✓	✓	✓	<p>MTR Corporation / LandsD</p>

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		shrub planting areas to provide localised greening								
5.12.1.2		<u>Planting</u> Vertical greening / climbers shall be applied to all above ground structures against exposed walls where appropriate. Further such localised planting systems shall be instigated subject to technical operational and maintenance constraints.	Mitigation of loss of resources and Enhancement of visual amenity	WAB, HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation
5.12.1.2		<u>Architectural Design Aesthetics for the WAB at Club de Recreio</u> The emergency access and ventilation building shall be designed in a way so as to ensure the form, material and surface detailing of this structure can fit sympathetically into the local context. The form shall consider the Cultural Heritage of the Club de Recreio site as well as other proximate buildings. The structure shall incorporate vertical greening / climbers.	Enhancement of visual amenity	WAB	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation
5.12.1.2		<u>Architectural Design Aesthetics for Above-Ground Structures at HOM Station</u> All station entrances, vent shafts, chillers and other above-ground structures shall be designed in accordance with the standardised MTR Corporation architectural theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to fit into the local context in terms of the architectural character of the site.	Enhancement of visual amenity	HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓	✓	MTR Corporation
5.12.1.2		<u>Architectural Design Aesthetics for Above-Ground Structures at WHA Station</u> These shall be designed in accordance with the standardised MTR Corporation architectural	Enhancement of visual amenity	WHA Station	MTR Corporation/ Main Contractor/	EIA recommendation	✓	✓	✓	MTR Corporation

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		theme for the KTE and other current rail projects. However specific attention shall be undertaken to ensure the form, material and surface detailing of these structures is considered to fit into the local context in terms of the architectural character of the site.			Detailed Design Consultant					
<b>Air Quality</b>										
S.6.7.1.7 & S.6.9.2.3		Cut-and-Cover areas in the vicinity of adits and shafts (if applicable):- <ul style="list-style-type: none"> <li>▪ Heavy construction activities and wind erosion at the cut-and-cover areas, active areas for heavy construction activities:                             <ul style="list-style-type: none"> <li>- Watering every hour at exposed soil.</li> </ul> </li> <li>▪ Trucks for transportation of materials:                             <ul style="list-style-type: none"> <li>- Wheel washing facilities should be provided at all site exits. Vehicles should be washed before leaving works sites. Spoil on trucks should be well covered before leaving works sites to minimise the generation of dusty materials.</li> <li>- Haul roads within works sites should be paved and water spraying would be provided to keep the wet condition.</li> </ul> </li> </ul>	To minimise dust impacts	All relevant works sites	MTR Corporation/ Main Contractor/ Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓		
S.6.7.1.7 & S.6.9.2.3		Barging point at Hung Hom Finger Pier: <ul style="list-style-type: none"> <li>▪ For haul roads within the area of barging point for transportation of spoil, all road surfaces should be paved and hourly water spraying should be provided to keep the wet condition as far as practical.</li> <li>▪ The spoil unloading process should be undertaken within an enclosed tipping hall. Water spraying and 3-sided screen with top</li> </ul>	To minimise dust impacts	Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/ Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓		

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		should be provided at the discharge point for dust suppression. <ul style="list-style-type: none"> <li>Vehicle wheel washing facilities should be provided at the exits of the barging point.</li> </ul>								
S.6.7.1.5 & S. 6.7.1.8		Rock crushing equipment at HOM Station and barging point at Hung Hom Finger Pier if operated during construction: <ul style="list-style-type: none"> <li>A dust enclosure with fabric baghouse/cartridge filter type dust extraction and collection system or equivalent system with 99% or more dust removal efficiency for the rock crushing equipment, haul road and unloading location; and</li> <li>Watering of paved roads within the area of the rock crushing facility as good site practice.</li> </ul>	To minimise dust impacts	Rock crushing equipment at HOM Station and Barging Point at Hung Hom Finger Pier	MTR Corporation/ Main Contractor/ Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓		
S.6.7.1.5 & S.6.9.2.2		Tarpaulin covers would be provided on wire mesh covered steel cages to prevent dust emission during open blasting at HOM Station;	To minimise dust impacts	Open blasting area at HOM Station	MTR Corporation/ Main Contractor/ Detailed Design Consultant	EIA recommendation	✓	✓		
S.6.9.2.4		Dust suppression measures stipulated in the Air Pollution Control (Construction Dust) Regulation and good site practices: <ul style="list-style-type: none"> <li>Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather.</li> <li>Use of frequent watering for particularly dusty construction areas and areas close to</li> </ul>	To minimise dust impacts	All works sites	MTR Corporation/ Main Contractor /Detailed Design Consultant	Air Pollution Control Ordinance	✓	✓		

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		ASRs. <ul style="list-style-type: none"> <li>▪ Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not practicable owing to frequent usage, watering should be applied to aggregate fines.</li> <li>▪ Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage piles near ASRs.</li> <li>▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations.</li> <li>▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.</li> <li>▪ Imposition of speed controls for vehicles on unpaved site roads. 8km per hour is the recommended limit.</li> <li>▪ Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.</li> <li>▪ Every stock of more than 20 bags of cement or dry pulverised fuel ash (PFA) should be covered entirely by impervious sheeting or placed in an area sheltered on the top and the 3 sides.</li> <li>▪ Loading, unloading, transfer, handling or storage of large amount of cement or dry PFA should be carried out in a totally enclosed system or facility, and any vent or exhaust should be fitted with an effective fabric filter</li> </ul>								

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		or equivalent air pollution control system. <ul style="list-style-type: none"> <li>Covering or enclosing any conveyor belt systems will generally be fully enclosed, depending on the design, materials chosen, and dimension of the conveyor system.</li> </ul>								
<b>Air-borne Noise</b>										
S.7.9.2.6		The following good site practices should be implemented: <ul style="list-style-type: none"> <li>Only well-maintained plant should be operated on-site and plants should be serviced regularly during the construction period;</li> <li>Mobile plant, if any, should be sited as far from NSRs as possible;</li> <li>Plant known to emit noise strongly in one direction should, wherever possible, be properly orientated so that the noise is directed away from the nearby NSRs;</li> <li>Use of site hoarding as a noise barrier to screen noise at low level NSRs;</li> <li>Machines and plant that may be in intermittent use should be shut down between works periods or should be throttled down to a minimum; and</li> <li>Any material stockpiles and other structures should be effectively utilised, wherever practicable, to screen the noise from on-site construction activities.</li> </ul>	To minimise air-borne noise impacts	All works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.1		The following quiet PME should be used: <ul style="list-style-type: none"> <li>Air compressor</li> <li>Asphalt Paver</li> <li>Breaker</li> <li>Bulldozer</li> <li>Concrete lorry mixer</li> <li>Concrete Pump / Grout Pump</li> </ul>	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		

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		<ul style="list-style-type: none"> <li>▪ Crane</li> <li>▪ Cutter, circular, steel (electric)</li> <li>▪ Dump Truck</li> <li>▪ Backhoe</li> <li>▪ Generator</li> <li>▪ Vibrating Poker, hand-held (electric)</li> <li>▪ Rock Drill</li> <li>▪ Roller, vibratory</li> <li>▪ Scraper</li> <li>▪ Water pump (electric)</li> </ul>								
S.7.9.2.4		Movable or fixed noise barrier should be used for the following PME where practicable: <ul style="list-style-type: none"> <li>▪ Wheeled Excavator/Loader</li> <li>▪ Crane</li> <li>▪ Hydraulic Breaker</li> <li>▪ Scraper</li> <li>▪ Breaker, hand-held</li> <li>▪ Compactor, vibratory</li> <li>▪ Drill, percussive, hand-held (electric)</li> <li>▪ Concrete pump</li> <li>▪ Circular Saw, bench mounted</li> <li>▪ Truck</li> <li>▪ Bar bender and cutter (electric)</li> <li>▪ Conveyor belt</li> <li>▪ Generator, Super Silenced</li> <li>▪ Grout Pump</li> <li>▪ Saw, wire</li> <li>▪ Water Pump, Submersible (Electric)</li> <li>▪ Hydraulic Jack with Pump</li> </ul>	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		



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S.7.9.2.4		Acoustic fabric should be used for the following PME where practicable: <ul style="list-style-type: none"> <li>▪ Compressor and Pneumatic Drilling Rig</li> <li>▪ Piling, vibrating hammer</li> <li>▪ Rock Drill</li> <li>▪ Silent Piling System</li> </ul>	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.4		Noise enclosure/acoustic shed should be used for the following PME where practicable and will generally be fully enclosed depending on the design, materials chosen, and dimension of the PME: <ul style="list-style-type: none"> <li>▪ Air Compressor</li> <li>▪ Rock Crushing Equipment</li> </ul>	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.4		Silencer should be used for the ventilation fans.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.6		Use of temporary hoardings along the works boundary.	To minimise air-borne noise impacts	All relevant works sites	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.2		Noise enclosures should be installed for the muckout points in WS1 (Gascoigne Road Rest Garden), WS7a1 (WAB at Club de Recreio) and WS26a (Fat Kwong Street Playground)	To comply with the criteria of Noise Control Ordinance.	All muckout points at WS1, WS7a1 and WS26a	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		
S.7.9.2.3		Noise enclosures should be installed for all rock crushing equipment.	To comply with the criteria of Noise Control Ordinance.	All rock crushing equipment	MTR Corporation/ Main Contractor	Noise Control Ordinance		✓		

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S.7.10.1.2		The maximum permissible sound power levels (max SWLs) for the fixed plant should be complied with during the selection of equipment and mitigation measures.	To comply with the criteria of Noise Control Ordinance.	All relevant location of fixed plant	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓	
S.7.10.2.1		The detailed design for all fixed plant should incorporate the following good practice where practicable: <ul style="list-style-type: none"> <li>▪ Louvers should be orientated away from adjacent NSRs whenever practicable;</li> <li>▪ Adequate direct noise mitigation measures including silencers, acoustic louvers or acoustic enclosures should be adopted where necessary; and</li> <li>▪ Quieter plant should be chosen as far as practical.</li> </ul>	To comply with the criteria of Noise Control Ordinance.	At outlets of fixed plant including ventilation building, ventilation shafts, plant room for chiller plant and cooling towers, etc	MTR Corporation/ Detailed Design Consultant	Noise Control Ordinance	✓		✓	
<b>Ground-borne Noise</b>										
S.8.7.1.2		MTR will further review the proposed mitigation measures for operational ground-borne noise during the construction stage after the tunnel boring.	To comply with the criteria of Noise Control Ordinance.	At suitable location	MTR Corporation/ Main Contractor	-	✓			
S.8.7.1.3		Commissioning test is recommended to ensure compliance of the operational ground-borne noise levels	To comply with the criteria of Noise Control Ordinance.	Designated locations	MTR Corporation/ Main Contractor	Noise Control Ordinance	✓	✓	✓	
<b>Water Quality</b>										
S.9.7.6		Construction site run-off and general construction activities: <ul style="list-style-type: none"> <li>▪ The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where applicable.</li> </ul>	To control water quality impact from construction site runoff and general construction	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, TM-DSS		✓		

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			activities							
S.9.7.6		In case seepage of uncontaminated groundwater occurs, groundwater should be pumped out from the works areas and discharged into the storm system via silt removal facilities. Uncontaminated groundwater from dewatering process should also be discharged into the storm system via silt traps.	To control water quality impact from groundwater	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓		
S.9.7.6		At the barging point, mitigation measures for control of water quality impact from surface run-off should be applied and the following good site practices should also be adopted: <ul style="list-style-type: none"> <li>▪ All vessels should be sized so that adequate clearance is maintained between vessels and the seabed in all tide conditions, to ensure that undue turbidity is not generated by turbulence from vessel movement or propeller wash.</li> <li>▪ All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material.</li> <li>▪ Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site.</li> <li>▪ Loading of barges and hoppers should be controlled to prevent splashing of material into the surrounding water. Barges or hoppers should not be filled to a level that will cause the overflow of materials or polluted water during loading or transportation.</li> </ul>	To control water quality impact from barging point	Barging point	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓		
S.9.7.6		For effluent discharge, there is a need to apply to	To control water	All works sites	MTR	EIAO-TM,		✓		

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		EPD for a discharge licence for discharge of effluent from the construction site under the WPCO. The discharge quality should meet the requirements specified in the discharge licence. Minimum distances of 100m should be maintained between the discharge points of construction site effluent and the existing seawater intakes. If monitoring of the treated effluent quality from the works areas is required during the construction phase of the Project, the monitoring should be carried out in accordance with the WPCO license which is under the ambit of Regional Office of the EPD.	quality impact from effluent discharge from construction site		Corporation/ Main Contractor	Water Pollution Control Ordinance				
S.9.7.6		To prevent the accidental spillage of chemicals, the Contractor should register as a chemical waste producer if chemical wastes would be produced from the construction activities. The Waste Disposal Ordinance (Cap 354) and its subsidiary regulations in particular the Waste Disposal (Chemical Waste) (General) Regulation should be observed and complied with for control of chemical wastes.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓		
S.9.7.6		Any service shop and maintenance facilities should be located on hard standings within a bunded area, and sumps and oil interceptors should be provided. Maintenance of vehicles and equipment involving activities with potential for leakage and spillage should only be undertaken within the areas appropriately equipped to control these discharges.	To control water quality impact from accidental chemical spillage	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance, Waste Disposal Ordinance		✓		
S.9.7.6		Disposal of chemical wastes should be carried out in compliance with the Waste Disposal Ordinance. The Code of Practice on the Packaging, Labelling and Storage of Chemical	To control water quality impact from accidental	All works sites	MTR Corporation/ Main	EIAO-TM, Water Pollution Control Ordinance,		✓		

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		Wastes published under the Waste Disposal Ordinance details the requirements to deal with chemical wastes. General requirements are given as follows: <ul style="list-style-type: none"> <li>▪ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport.</li> <li>▪ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents.</li> <li>▪ Storage area should be selected at a safe location on site and adequate space should be allocated to the storage area.</li> </ul>	chemical spillage		Contractor	Waste Disposal Ordinance				
S.9.7.6		Regarding the hydrogeological impacts in the construction of cut-and-cover tunnels and associated excavations for the WAB / ventilation building, the following measures should be in place in order to mitigate any drawdown effects to the groundwater table during the operation of the temporary dewatering works: <ul style="list-style-type: none"> <li>▪ Toe grouting should be applied beneath the toe level of the temporary/permanent cofferdam walls as necessary to lengthen the effective flow path of groundwater from outside and thus control the amount of water inflow to the excavation.</li> <li>▪ Recharge wells should be installed as necessary outside the excavation areas. Water pumped from the excavation areas should be recharged back into the ground.</li> </ul>	To control groundwater hydrogeological impact and groundwater drawdown	All works sites	MTR Corporation/ Main Contractor	EIAO-TM, Water Pollution Control Ordinance		✓		
S.9.8.6		Measures for the tunnel run-off and drainage include:	To control runoff from rail track	Tunnels and rail tracks	MTR Corporation/ Detailed	Water Pollution Control	✓		✓	

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		<ul style="list-style-type: none"> <li>Track drainage channels discharge should pass through oil/grit interceptors/chambers to remove oil, grease and sediment before being pumped to the foul sewer/holding tank for further disposal.</li> <li>The silt traps and oil interceptors should be cleaned and maintained regularly.</li> <li>Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible.</li> </ul>			Design Consultant	Ordinance				
S.9.8.6		Measures for the control of sewage effluents include: <ul style="list-style-type: none"> <li>Connection of domestic sewage generated from the KTE project should be diverted to the foul sewer wherever possible. If public sewer system is not available, sewage tankering away services or on-site sewage treatment facilities should be provided to prevent direct discharge of sewage to the nearby storm system and all the discharge should comply with the requirements stipulated in the TM-DSS.</li> <li>For handling, treatment and disposal of other operation stage effluent, the practices outlined in ProPECC PN 5/93 should be adopted where applicable.</li> </ul>	To control water quality impact from sewage effluent discharge from the ventilation building and Stations	Ventilation building and Stations	MTR Corporation/ Detailed Design Consultant	EIAO-TM, Water Pollution Control Ordinance, TM-DSS, ProPECC PN 5/93	✓		✓	
<b>Waste Management Implications</b>										
S.10.5.6.1		Recommendations for good site practices: <ul style="list-style-type: none"> <li>Prepare a Waste Management Plan approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites.</li> <li>Training of site personnel in, site cleanliness,</li> </ul>	To implement good site practice for handling, sorting reuse and recycling of C&D materials	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance, ETWB TC(W)		✓		

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		proper waste management and chemical handling procedures. <ul style="list-style-type: none"> <li>▪ Provision of sufficient waste disposal points and regular collection of waste.</li> <li>▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers.</li> <li>▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors.</li> <li>▪ Separation of chemical wastes for special handling and appropriate treatment.</li> </ul>				No 31/2004				
S.10.5.6.1		Recommendations for waste reduction measures: <ul style="list-style-type: none"> <li>▪ Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.).</li> <li>▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or recycling of materials and their proper disposal.</li> <li>▪ Encourage collection of aluminium cans by providing separate labelled bins to enable this waste to be segregated from other general refuse generated by the workforce.</li> <li>▪ Proper storage and site practices to minimize the potential for damage or contamination of construction materials.</li> <li>▪ Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste.</li> </ul>	To implement on-site sorting facilitating reuse and recycling of materials as well as proper disposal of waste	All works sites	Main Contractor	Waste Disposal Ordinance, Land (Miscellaneous Provisions) Ordinance		✓		

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		<ul style="list-style-type: none"> <li>Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle.</li> </ul>								
S.10.5.6.1		The Contractor should prepare and implement a Waste Management Plan as a part of the Environmental Management Plan in accordance with ETWB TCW No 19/2005 which describes the arrangements for avoidance, reuse, recovery, recycling, storage, collection, treatment and disposal of different categories of waste to be generated from the construction activities.	To keep trace of the generation, minimization, reuse and disposal of C&D materials in the Project	All works sites	Main Contractor	ETWB TCW No 19/2005		✓		
S.10.5.6.1		Storage of materials on-site may induce adverse environmental impacts if not properly managed, recommendations to minimise the impacts include: <ul style="list-style-type: none"> <li>Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution.</li> <li>Maintain and clean storage areas routinely.</li> <li>Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away.</li> <li>Different locations should be designated to stockpile each material to enhance reuse.</li> </ul>	To minimise potential impacts of waste storage and enhance reusable volume	All works sites	Main Contractor	-		✓		
S.10.5.6.1		Waste hauliers must hold a valid permit for the collection of waste as stipulated in their permits. Removal of waste should be done in a timely manner.	To collect and remove waste generated	All works sites	Main Contractor	-		✓		
S.10.5.6.1		Implementation of trip-ticket system to monitor waste disposal and control fly-tipping. <ul style="list-style-type: none"> <li>Set up warning signs at vehicular access points reminding drivers of designated</li> </ul>	To monitor disposal of waste and control	All works sites	Main Contractor	ETWB TC(W) No 31/2004		✓		



EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		disposal sites and penalties of an offence. <ul style="list-style-type: none"> <li>Installation of close-circuited television at access points of vehicles to monitor and prevent illegal dumping.</li> </ul>	fly-tipping							
S.10.5.6.1		Wheel washing facilities should be provided before the trucks leave the works area.	To minimise dust impact	All works sites	Main Contractor	-		✓		
S.10.5.6.1		The Contractor should ensure the on-site separation from inert portion. The waste delivered to landfill should not contain any free water or have water content more than 70% by weight. The haulier must ensure suitable amount of waste would be loaded on different types of trucks used. A one-week notice should be given to EPD with information on Contractor's name and respective contact details.	To meet the requirement for disposal at landfill	All works sites	Main Contractor	-		✓		
S.10.5.6.1		If chemical wastes are produced at the construction site, the Contractor would be required to register with the EPD as a chemical waste producer and to follow the guidelines stated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes. Containers used for storage of chemical waste should : <ul style="list-style-type: none"> <li>Be compatible with the chemical wastes being stored, maintained in good condition and securely sealed.</li> <li>Have a capacity of less than 450 litres unless the specifications have been approved by EPD; and</li> <li>Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation.</li> </ul>	To properly store the chemical waste within works sites and works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓		

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
S.10.5.6.1		The chemical storage areas should: <ul style="list-style-type: none"> <li>▪ Be clearly labelled to indicate corresponding chemical characteristics of the chemical waste and used for storage of chemical waste only.</li> <li>▪ Be enclosed on at least 3 sides.</li> <li>▪ Have an impermeable floor and bunding, of capacity to accommodate 110% of the volume of the largest container or 20% by volume of the chemical waste stored in that area, whichever is the greatest.</li> <li>▪ Have adequate ventilation.</li> <li>▪ Be covered to prevent rainfall from entering.</li> <li>▪ Be properly arranged so that incompatible materials are adequately separated.</li> </ul>	To prepare appropriate storage areas for chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓		
S.10.5.6.1		Lubricants, waste oils and other chemical wastes would be generated during the maintenance of vehicles and mechanical equipments. Used lubricants should be collected and stored in individual containers which are fully labelled in English and Chinese and stored in a designated secure place.	To clearly label the chemical waste at works areas	All works sites	Main Contractor	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes		✓		
S.10.5.6.1		A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical waste. The Contractor should employ a licensed collector to transport and dispose of the chemical wastes, to either the approved CWTC at Tsing Yi, or another licensed facility, in accordance with the Waste Disposal (Chemical Waste) (General) Regulation.	To monitor the generation, reuse and disposal of chemical waste	All works sites	Main Contractor	Waste Disposal (Chemical Waste) (General) Regulation		✓		
S.10.5.6.1		General refuse should be stored in enclosed bins or compaction units separate from C&D	To properly store and separate from	All works sites	Main Contractor	-		✓		

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		materials and chemical waste. A reputable waste collector should be employed by the contractor to remove general refuse from the site, separately from C&D materials and chemical wastes.	other C&D materials for subsequent collection and disposal							
S.10.5.6.1		The recyclable component of general refuse, such as aluminium cans, paper and cleansed plastic containers should be separated from other waste. Provision and collection of recycling bins for different types of recyclable waste should be set up by the Contractor. The Contractor should also be responsible for arranging recycling companies to collect these materials.	To facilitate recycling of recyclable portions of refuse	All works sites	Main Contractor	-		✓		
S.10.5.6.1		The Contractor should carry out a training programme for workers in avoiding, reducing, reusing and recycling of materials generation. Posters and leaflets advising on the use of the bins should also be provided in the sites as reminders.	To raise workers' awareness on recycling issue	All works sites	Main Contractor	-		✓		
S.10.6.4		Chemical waste during the operation of the KTE project: <ul style="list-style-type: none"> <li>▪ The requirements stipulated in the Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes should be followed in handling of chemical waste as in construction phase.</li> <li>▪ A trip-ticket system should be operated in accordance with the Waste Disposal (Chemical Waste) (General) Regulation to monitor all movements of chemical wastes which would be collected by a licensed collector to a licensed facility for final</li> </ul>	To avoid environmental impacts in handling, storage and disposal of chemical waste	Ventilation building and Stations	MTR Corporation	Code of Practice on the Packaging, Labelling and Storage of Chemical Wastes, Waste Disposal (Chemical Waste) (General) Regulation			✓	

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		treatment and disposal. <ul style="list-style-type: none"> <li>The recommendations proposed for the mitigation of impacts from chemical waste in construction phase should also be followed.</li> </ul>								
S.10.6.4		General refuse during the operation of the KTE project: <ul style="list-style-type: none"> <li>Provide recycling bins at designated areas for proper recycling of papers, aluminium cans and plastics bottles.</li> <li>Separation from other waste types and collected by licensed collectors at daily basis to minimize the potential impacts from odour and vermin.</li> </ul>	To separate the general refuse from other waste types and proper disposal of the refuse	Ventilation building and Stations	MTR Corporation	-			✓	
S.10.6.4		Industrial waste during the operation of the KTE project: <ul style="list-style-type: none"> <li>Separation of reusable components like steel before collection by licensed collector</li> </ul>	To recycle useful materials from industrial waste and proper disposal	Ventilation building and Stations	MTR Corporation	-			✓	
<b>Hazard to Life</b>										
S.12.12.1, S.12.12.6	Section 12.10.2.1, Section 12.10.2.4	Improved truck design to reduce the amount of combustibles in, front exhaust spark arrester, 1 x 9 kg water based and 1 x 9 kg dry chemical powder fire extinguishers. This should be combined with monthly vehicle inspection.	To meet the ALARP requirement.	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.1	Section 12.10.2.1	The explosive truck accident frequency should be minimized by implementing a dedicated training programme for both the driver and his attendants, including regular briefing sessions, implementation of a defensive driving attitude. In addition, drivers should be selected based on good safety record, and medical checks.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.1	Section 12.10.2.1	The contractor should as far as practicable combine the explosive deliveries for a given work	To meet the ALARP	-	MTR Corporation/	-		✓		-

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		area.	requirement.		Main Contractor					
S.12.12.1	Section 12.10.2.1	The explosive truck fire involvement frequency should be minimized by implementing a better emergency response and training to make sure the adequate fire extinguishers are used and attempt is made to evacuate the area of the incident or securing the explosive load if possible. All explosive vehicles should also be equipped with bigger capacity AFFF-type extinguishers.	To meet the ALARP requirement.	-	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.1	Section 12.10.2.1	A minimum headway between two consecutive truck conveys of at least 10 min is recommended	To meet the ALARP requirement.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.2	Section 12.10.2.2	Blasting activities including storage and transport of explosives should be supervised and audited by competent site staff to ensure strict compliance with the blasting permit conditions.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Works areas at which explosives would be stored and/or used.	MTR Corporation/ Main Contractor	Dangerous Goods Ordinance		✓		-
S.12.12.1 & S.12.12.7.2	Section 12.10.2.1 & Section 12.10.2.5	Only the required quantity of explosives for a particular blast should be transported to avoid the return of unused explosives to the temporary magazine.  The number of return trips to the temporary magazine with the full load of explosives or partial load should be minimised by proper co-ordination between blasting and delivery.  If disposal is required for small quantities,	To reduce the risk during explosives transport.	Works areas at which explosives would be stored and/ or used.	MTR Corporation/ Main Contractor	-		✓		-

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		disposal should be made in a controlled and safe manner by a Registered Shotfirer.								
S.12.12.5	Section 12.10.2.4	Use only experienced driver(s) with good safety record for explosive vehicle(s). Training should be provided to ensure it covers all major safety subjects.	To ensure safe transport of explosives.	At suitable location	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.5	Section 12.10.2.4	Develop procedure to ensure that parking space on the site is available for the explosives truck. Confirmation of parking space should be communicated to truck drivers before delivery.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.3	Section 12.10.2.3	Delivery vehicles shall not be permitted to remain unattended within the temporary magazine site (or appropriately wheel-locked).	To reduce the risk of fire within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.3	Section 12.10.2.3	Good house-keeping within and outside of the temporary magazine to ensure that combustible materials (including vegetation) are removed and not allowed to accumulate.	To reduce the risk of fire within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.5	Section 12.10.2.4	Detonators shall not be transported in the same vehicle with other Class 1 explosives.	To reduce the risk of explosion during the transport of cartridged emulsion	-	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.2	Section 12.10.2.2	Emergency plan (i.e. temporary magazine operational manual) shall be developed to address uncontrolled fire in temporary magazine	To reduce the risk	Temporary explosives magazine and	MTR Corporation/ Main	-		✓		-

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		area. The case of fire near an explosive carrying truck in jammed traffic should also be covered. Drill of the emergency plan should be carried out at regular intervals.	of fire.	along explosives transport routes	Contractor					
S.12.12.2	Section 12.10.2.2	Adverse weather working guideline should be developed to clearly define procedure for transport explosives during thunderstorm.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.2	Section 12.10.2.2	The magazine storage quantities need to be reported on a monthly basis to ensure that the two day storage capacity is not exceeded.	To reduce the risk within the magazine	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.5	Section 12.10.2.4	During transport of the explosives within the tunnel, hot work should not be permitted in the vicinity of the explosives offloading or charging activities.	To ensure safe transport of explosives.	Along explosives transport routes	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.5	Section 12.10.2.4	Ensure that UN 1.4B packaging of detonators remains intact until handed over at blasting site.	To reduce the risk of explosion during the transport of detonator.	-	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.6	Section 12.10.2.4	Steel vehicle tray welded to a steel vertical fire screen should be mounted at least 150 mm behind the drivers cab and 100 mm from the steel cargo compartment, the vertical screen shall protrude 150 mm in excess of all three (3) sides of the steel cargo compartment	To reduce the risk during explosives transport.	-	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.10	Section 12.10.2.5	Ensure cartridge emulsion with high water content should be preferred. Also, the emulsion	To ensure safe explosives to be	-	MTR Corporation/	-		✓		-

EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		with perchlorate formulation should be avoided.	used.		Main Contractor					
S.12.12.3	Section 12.10.2.3	Traffic Management should be implemented within the temporary magazine site, to ensure that no more than 1 vehicle will be loaded at any time, in order to avoid accidents involving multiple vehicles within the site boundary. Based on the construction programme, considering that 6 trucks could be loaded over a peak 2 hour period, this is considered feasible.	To ensure that the risks from the proposed explosives storage and transport would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.3	Section 12.10.2.3	The design of the fill slope close to the temporary magazine site should consider potential washout failures and incorporate engineering measures to prevent a washout causing damage to the temporary magazine stores	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor, Fill Bank Office	-		✓		-
S.12.12.2	Section 12.10.2.2	The security plan should address different alert security level to reduce opportunity for arson / deliberate initiation of explosives. The corresponding security procedure should be implemented with respect to prevailing security alert status announced by the Government.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.3	Section 12.10.2.3	A suitable work control system should be introduced, such as an operational manual including Permit-to-Work system.	To ensure that the risks from the proposed explosives storage would not be unacceptable	Temporary explosives magazine	MTR Corporation/ Main Contractor	-		✓		-
S.12.12.3	Section 12.10.2.3	The magazine building shall be regularly checked for water seepage through the roof,	To ensure that the risks from the	Temporary explosives	MTR Corporation/	-		✓		-





EIA Reference	EM&A Manual Reference	Environmental Protection Measures	Objectives of Measures and Main Concern to Address	Location	Implementation Agent	Relevant Standard or Requirement	Implementation Stages			Maintenance Agent
							D	C	O	
		walls or floor.	proposed explosives storage would not be unacceptable	magazine	Main Contractor					

Note: D = Design  
 C = Construction  
 O = Operation

## **Appendix E**

### **Calibration Details**

# ANDERSEN INSTRUMENTS INC.

## GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> Yee Fu Building

Date -> 4-Aug-11

Sampler -> 1294-1109

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1002.9	Sampler Elevation	(feet)	200
Sea Level Pressure	(in Hg)	29.62	Corrected Pressure	(mm Hg)	747.12
Temperature	(deg C)	32	Temperature	(deg K)	305.00
Seasonal SL Pressure	(in Hg)	29.62	Corrected Seasonal	(mm Hg)	747.12
Seasonal Temperature	(deg C)	32.00	Seasonal Temperature	(deg K)	305.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	11.7	1.689	60	58.803	Slope =	38.8760
2	13	9.8	1.547	54	52.923	Intercept =	-6.7613
3	10	7.5	1.356	47	46.062	Corr. Coeff. =	0.9976
4	7	5.1	1.121	39	38.222		
5	5	3.1	0.879	27	26.461		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.

# ANDERSEN INSTRUMENTS INC.

## GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> Fung Kei MPS

Date -> 4-Aug-11

Sampler -> 1294-1110

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1002.9	Sampler Elevation	(feet)	100
Sea Level Pressure	(in Hg)	29.62	Corrected Pressure	(mm Hg)	749.65
Temperature	(deg C)	34	Temperature	(deg K)	307.00
Seasonal SL Pressure	(in Hg)	29.62	Corrected Seasonal	(mm Hg)	749.65
Seasonal Temperature	(deg C)	34.00	Seasonal Temperature	(deg K)	307.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	11.9	1.700	63	61.646	Slope =	35.8801
2	13	9.6	1.529	57	55.775	Intercept =	0.5775
3	10	7.7	1.372	50	48.925	Corr. Coeff. =	0.9987
4	7	5	1.109	42	41.097		
5	5	3.2	0.891	33	32.291		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.

# ANDERSEN INSTRUMENTS INC.

## GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> Queen Elizabeth Hospital

Date -> 4-Aug-11

Sampler -> 1294-1112

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1001	Sampler Elevation	(feet)	60
Sea Level Pressure	(in Hg)	29.56	Corrected Pressure	(mm Hg)	749.23
Temperature	(deg C)	32	Temperature	(deg K)	305.00
Seasonal SL Pressure	(in Hg)	29.56	Corrected Seasonal	(mm Hg)	749.23
Seasonal Temperature	(deg C)	32.00	Seasonal Temperature	(deg K)	305.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	11.7	1.691	58	56.923	Slope =	27.9622
2	13	9.3	1.510	50	49.072	Intercept =	8.4492
3	10	7.4	1.349	47	46.127	Corr. Coeff. =	0.9942
4	7	4.8	1.090	40	39.257		
5	5	2.9	0.852	33	32.387		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.

# ANDERSEN INSTRUMENTS INC.

GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> Finger Pier

Date -> 4-Aug-11

Sampler -> 694-0665

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1002.9	Sampler Elevation	(feet)	10
Sea Level Pressure	(in Hg)	29.62	Corrected Pressure	(mm Hg)	751.92
Temperature	(deg C)	30	Temperature	(deg K)	303.00
Seasonal SL Pressure	(in Hg)	29.62	Corrected Seasonal	(mm Hg)	751.92
Seasonal Temperature	(deg C)	30.00	Seasonal Temperature	(deg K)	303.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	12.6	1.763	64	63.132	Slope =	31.5141
2	13	10.2	1.588	59	58.199	Intercept =	7.8340
3	10	8	1.409	53	52.281	Corr. Coeff. =	0.9998
4	7	5.4	1.161	45	44.389		
5	5	3.3	0.912	37	36.498		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.

# ANDERSEN INSTRUMENTS INC.

## GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> No. 238 Chatham Road Nort

Date -> 4-Aug-11

Sampler -> 894-0835

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1002.9	Sampler Elevation	(feet)	60
Sea Level Pressure	(in Hg)	29.62	Corrected Pressure	(mm Hg)	750.66
Temperature	(deg C)	32	Temperature	(deg K)	305.00
Seasonal SL Pressure	(in Hg)	29.62	Corrected Seasonal	(mm Hg)	750.66
Seasonal Temperature	(deg C)	32.00	Seasonal Temperature	(deg K)	305.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	11.3	1.664	57	55.995	Slope =	33.3418
2	13	9.1	1.495	52	51.083	Intercept =	1.0208
3	10	7.3	1.341	47	46.171	Corr. Coeff. =	0.9991
4	7	4.7	1.080	38	37.330		
5	5	3	0.867	30	29.471		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

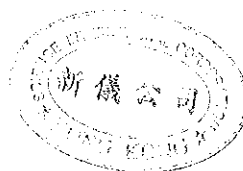
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.

# ANDERSEN INSTRUMENTS INC.

GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Location -> Ka Fu Building

Date -> 4-Aug-11

Sampler -> 994-0874

Tech -> Chan Kin Fung

### CONDITIONS

Sea Level Pressure	(hpa)	1002.9	Sampler Elevation	(feet)	100
Sea Level Pressure	(in Hg)	29.62	Corrected Pressure	(mm Hg)	749.65
Temperature	(deg C)	34	Temperature	(deg K)	307.00
Seasonal SL Pressure	(in Hg)	29.62	Corrected Seasonal	(mm Hg)	749.65
Seasonal Temperature	(deg C)	34.00	Seasonal Temperature	(deg K)	307.00

### CALIBRATION ORIFICE

Make -> Andersen Instruments Inc.

Qstd Slope -> 2.0075

Model -> G25A

Qstd Intercept -> -0.038138

Serial# -> 1436

Date Certified ->

### CALIBRATION

	Plate or	H <sub>2</sub> O	Qstd	I	IC	LINEAR	
	Test #	(in)	(M <sup>3</sup> /min)	(chart)	(corrected)	REGRESSION	
1	18	12	1.707	58	56.753	Slope =	33.5735
2	13	9.5	1.521	53	51.861	Intercept =	0.2244
3	10	7.5	1.354	47	45.990	Corr. Coeff. =	0.9977
4	7	5	1.109	39	38.162		
5	5	3.2	0.891	30	29.355		

#### Calculations

$$Qstd = 1/m [\text{Sqrt} (H_2O (Pa/Pstd) (Tstd/Ta)) - b]$$

$$IC = I [\text{Sqrt} (Pa/Pstd) (Tstd/Ta)]$$

Qstd = standard flow rate

IC = corrected chart response

I = actual chart response

m = calibrator Qstd slope

b = calibrator Qstd intercept

Ta = actual temperature during calibration (deg K)

Pa = actual pressure during calibration (mm Hg)

Tstd = 298 deg K

Pstd = 760 mm Hg

For subsequent calculation of sampler flow:

$$1/m ((I) [\text{Sqrt} (298/Tav) (Pav/760)] - b)$$

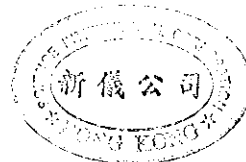
m = sampler slope

b = sampler intercept

I = chart response

Tav = daily average temperature

Pav = daily average pressure



This is to certify that the above equipment has been calibrated in accordance with manufacturer's procedure.



**Balance Calibration Report**  
**Tested to MTRC Method WI/707M/01**

Laboratory Equipment Identification Number			BA0011		
Manufacturer	Sartorius	Model	A200S-**DIB	Serial No.	1065989
Capacity	120g	Discrimination	0.1mg	Type	Top Loading
Location	Concrete Testing Area		Temperature	24°C	

Reference Mass Set Used (Equip. ID. No.)		RM001	
Manufacturer	Troemner	OIML Classification	F1
Last Calibration Date	29-04-2002	Calibrated By	South China National Centre of Metrology

**(1) Repeatability of Reading**

Reference Mass (g)	Standard Deviation of Balance Reading (g)	Maximum Difference Between Successive Readings (g)
10	0.000094	0.0002
60	0.000079	0.0002
120	0.000042	0.0001

**Standard Deviation of the Balance = 0.000422 g**

**(2) Departure from Nominal Value**

Reading (g)	Correction (g)	Uncertainty (g)
09.9998	0.00020	±0.000301
19.9980	0.00025	
29.9999	0.00015	
39.9997	0.00043	
49.9998	0.00017	
59.9996	0.00032	
69.9996	0.00037	
79.9996	0.00042	
89.9996	0.00045	
99.9993	0.00050	

**Maximum Correction = 0.00050 g**

(3) **Off-Centre Loading**

A mass of approximately 10000g was moved to various position on the balance pan. The balance readings obtained at different position are given in the table.

Centre	Front	Back	Left	Right
59.9986	59.9984	59.9981	59.9987	59.9988

**Maximum Difference = 0.0007 g**

(4) **Hysteresis**

Load (g)	Hysteresis (g)
50	0.000367

(5) **Limit of Performance of the Balance =  $\pm 0.000783$  g**

Checked by :         Dick Lee        

Certified by :         *[Signature]*        

Date :         14-02-2011        

Date :         14/2/2011        

**Notes:**

1.The balance has been tested according to the specifications laid down in Chapter 6 of the CSIRO Publication "The Calibration of Balances - by David B. Prowse".

2.Uncertainties quoted in this report have been estimated on the basis of there being not more than one chance in one hundred that any value differs from the true value by more than the stated uncertainty.

3.The Limit of Performance is the tolerance band within which all readings of the balance will fall.



## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue 15<sup>th</sup> June, 2011 Certificate Number MLCN110666S

### Customer Information

Company Name MTR Corporation Limited  
Address MTR Tower, Telford Plaza,  
33 Wai Yip St., Kowloon Bay,  
Kowloon,  
Hong Kong

### Unit Under Test (UUT)

Description Handheld Analyzer  
Manufacturer Brüel & Kjær  
Model Number Type 2250  
Serial Number 2731886  
Equipment Number -

### Calibration Result

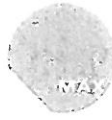
- \* The exact manufacturer's specification is not available from the customer.
- \* Calibration data are detailed on the attached sheet(s).

### Approved By

*Fu*  
*Ken*

Laboratory Manager

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- \* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- \* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.



# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue  Certificate Number

### Calibration Status

Date of Calibration   
 Calibration Equipment Used   
 Calibration Procedure   
 Calibration Uncertainty

Calibration Condition	Lab	Temperature	23 °C ± 5 °C
		Relative Humidity	55% ± 25%
	UUT	Stabilizing Time	Over 3 hours
		Warm-up Time	10 minutes
		Supply Voltage	Internal battery

### Calibration Data

UUT Setting				UUT Rdg	Std Rdg	UUT Error
Frequency Weighted	Parameter	Response	Range (dB)			
A (1 kHz Input)	SPL	F	Auto	93.8 dB	94 dB	-0.2 dB
		S		93.8 dB	94 dB	-0.2 dB
		I		93.8 dB	94 dB	-0.2 dB
C (1 kHz Input)		F		93.8 dB	94 dB	-0.2 dB
		S		93.8 dB	94 dB	-0.2 dB
		I		93.8 dB	94 dB	-0.2 dB
A (1 kHz Input)		F		113.8 dB	114 dB	-0.2 dB
		S		113.8 dB	114 dB	-0.2 dB
		I		113.8 dB	114 dB	-0.2 dB
C (1 kHz Input)	F	113.8 dB	114 dB	-0.2 dB		
	S	113.8 dB	114 dB	-0.2 dB		
	I	113.8 dB	114 dB	-0.2 dB		

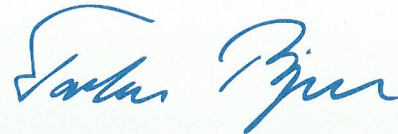
# MANUFACTURER'S CERTIFICATE OF CONFORMANCE

We certify that Brüel & Kjær **-2250-L--** Serial No. **2741136** has been tested and passed all production tests, confirming compliance with the manufacturer's published specification at the date of the test.

The final test has been performed using calibrated equipment, traceable to National or International Standards or by ratio measurements.

Brüel & Kjær is certified under ISO 9001:2008 assuring that all test data is retained on file and is available for inspection upon request.

Nærum 21-jan-2011



Torben Bjørn  
Vice President, Operations

Please note that this document is not a calibration certificate.  
For information on our calibration services please contact your nearest Brüel & Kjær office.



# MAXLAB

12 AUG 2011

## CALIBRATION CERTIFICATE

### Certificate Information

**Date of Issue** 15<sup>th</sup> June, 2011 **Certificate Number** MLCN110664S

### Customer Information

**Company Name** MTR Corporation Limited  
**Address** MTR Tower, Telford Plaza,  
 33 Wai Yip St., Kowloon Bay,  
 Kowloon,  
 Hong Kong

### Unit Under Test (UUT)

**Description** Sound Level Calibrator  
**Manufacturer** Brüel & Kjær  
**Model Number** 4231  
**Serial Number** 2309393  
**Equipment Number** -

### Calibration Result

- \* All calibration results within the manufacturer's specification.
- \* Calibration data are detailed on the attached sheet(s).

### Approved By

*Fw*  
*Ken*  
 Laboratory Manager

- \* Calibration equipment used for this calibration are traceable to national / international standards.
- \* The results on this Calibration Certificate only relate to the values measured at the time of the calibration and the uncertainties quoted will not include allowance for the UUT long term drift, variation with environmental changes, vibration and shock during transportation, overloading, mishandling, misuse, and the capacity of any other laboratory to repeat the measurement.
- \* MaxLab Calibration Centre Limited shall not be liable for any loss or damage resulting from the use of the UUT.
- \* The copy of this Certificate is owned by MaxLab Calibration Centre Limited. No part of this Certificate may be reproduced without the prior written approval of MaxLab Calibration Centre Limited.

萬儀校正中心有限公司  
 MaxLab Calibration Centre Limited

香港新界葵涌翠屏街 16-18 號保盈工業大廈 9 樓 B2 室



# MAXLAB

## CALIBRATION CERTIFICATE

### Certificate Information

Date of Issue 15<sup>th</sup> June, 2011

Certificate Number MLCN110664S

### Calibration Status

Date of Calibration

15<sup>th</sup> June, 2011

Calibration Equipment Used

4231 (MLTE008)/ C1002184/ 8<sup>th</sup> Mar 2012  
1351 (MLTE049)/ MLEC11/06/04/ 15<sup>th</sup> Jun 2012  
MLCG00 & MLCG15.

Calibration Procedure

Calibration Uncertainty

± 0.1 dB

Calibration Condition

Lab

Temperature

23 °C ± 5 °C

Relative Humidity

55% ± 25%

UUT

Stabilizing Time

Over 3 hours

Warm-up Time

Not applicable

Supply Voltage

Internal battery

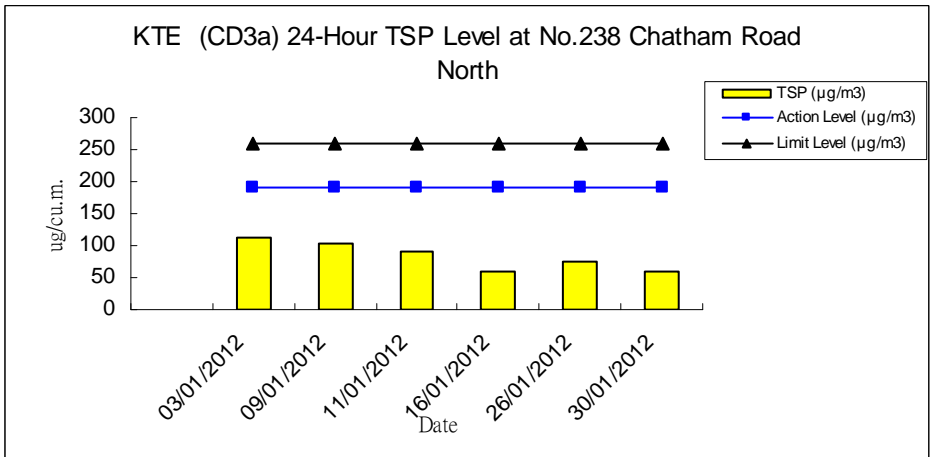
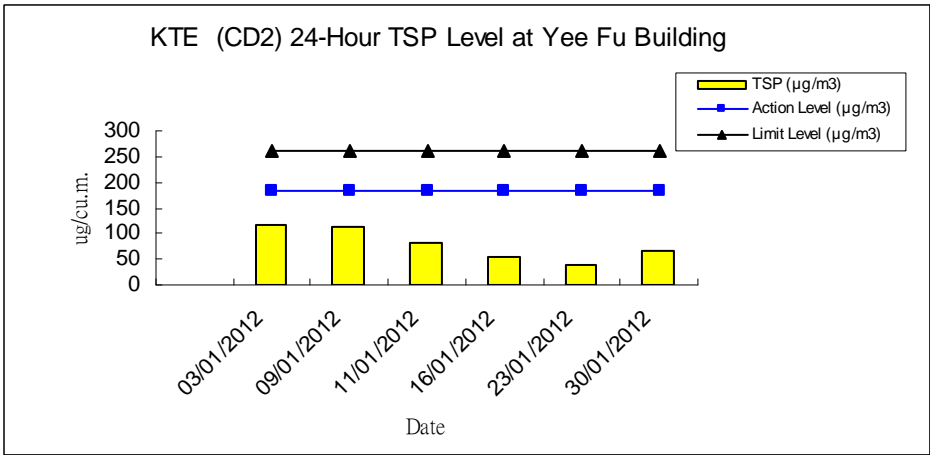
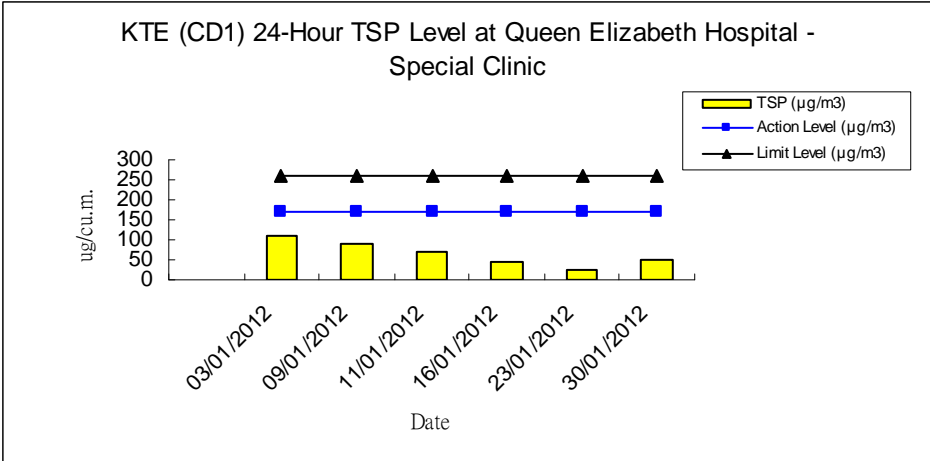
### Calibration Data

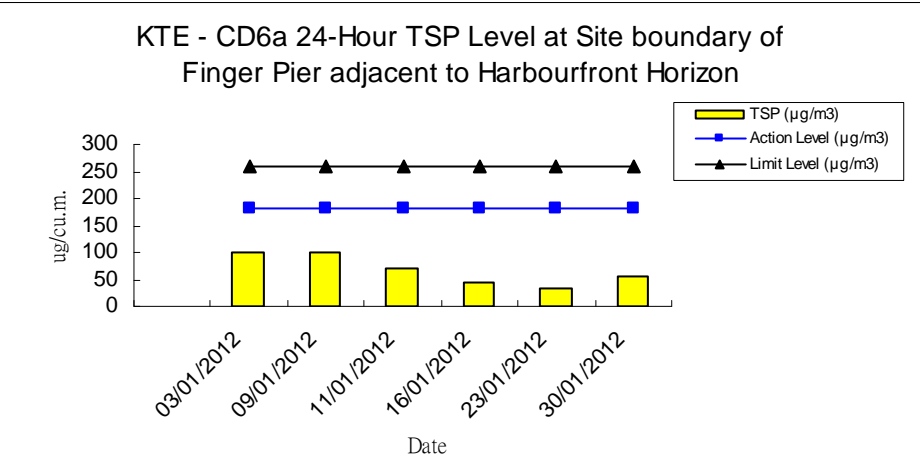
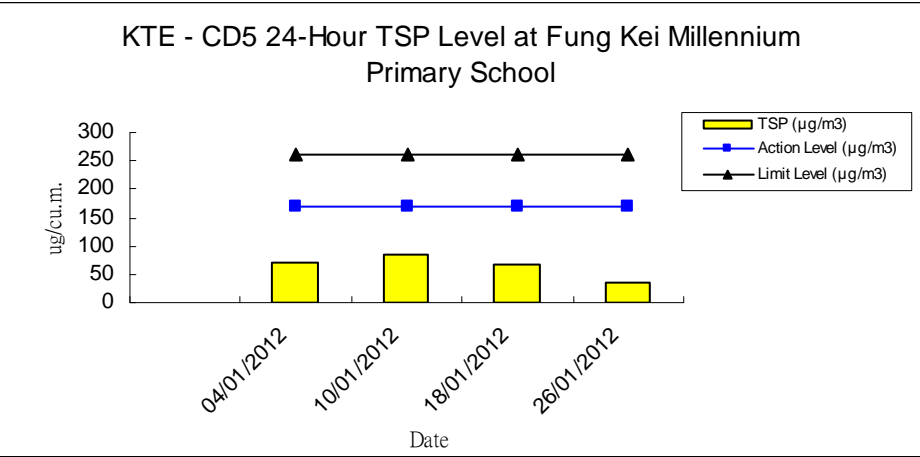
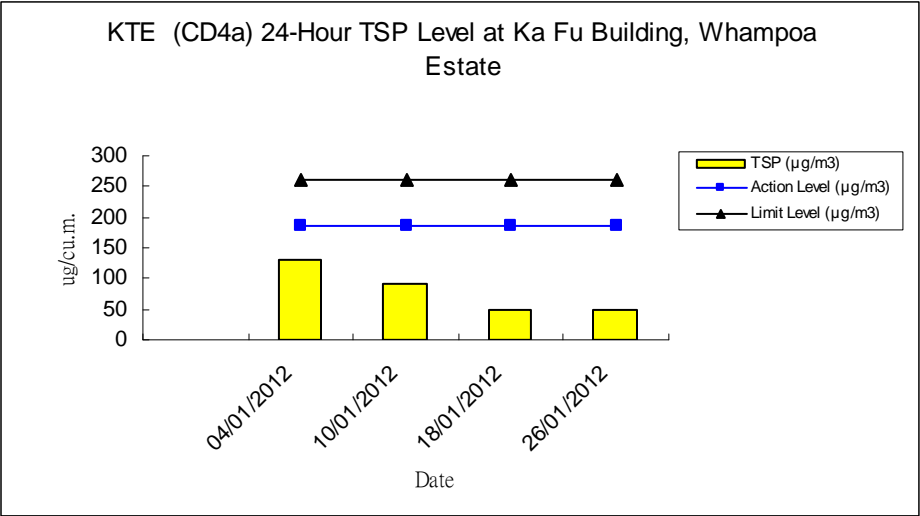
UUT Setting	STD Rdg	UUT Error	UUT Error Limit
94 dB	94.0 dB	0.0 dB	0.2 dB
114 dB	114.0 dB	0.0 dB	0.2 dB

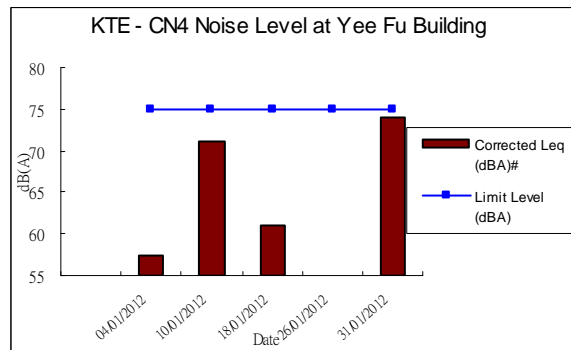
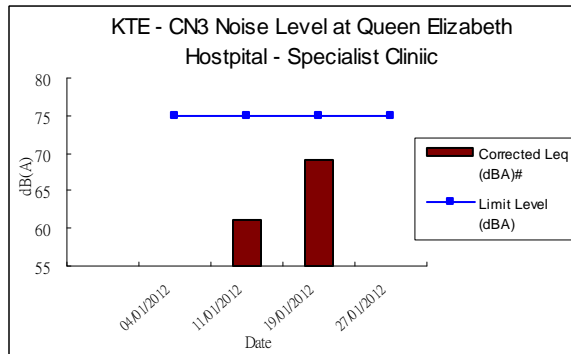
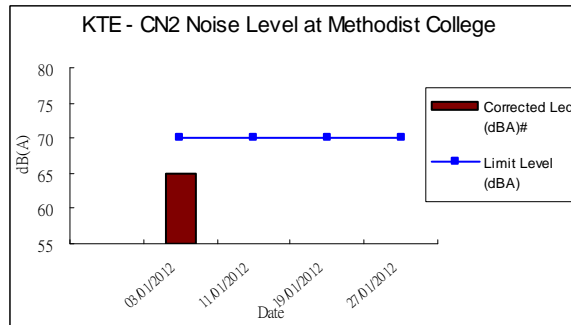
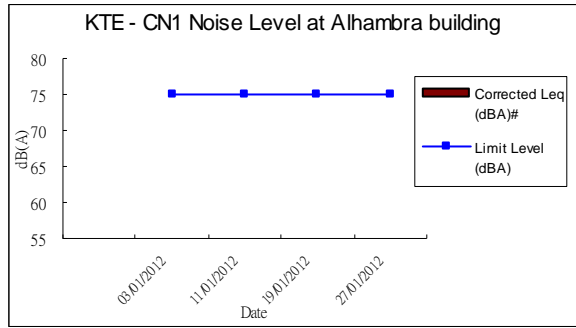
## **Appendix F**

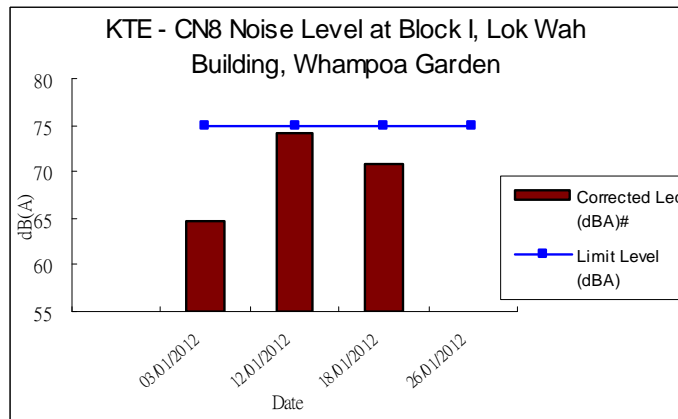
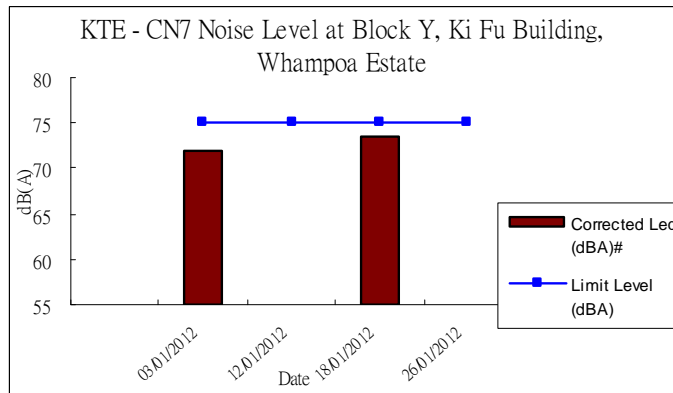
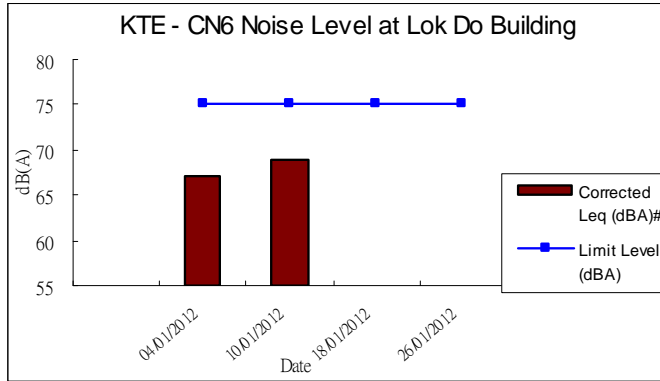
### **Impact Monitoring Graphical Plots**

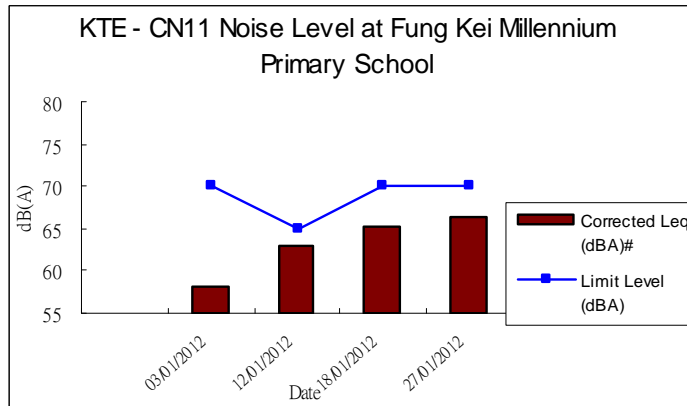
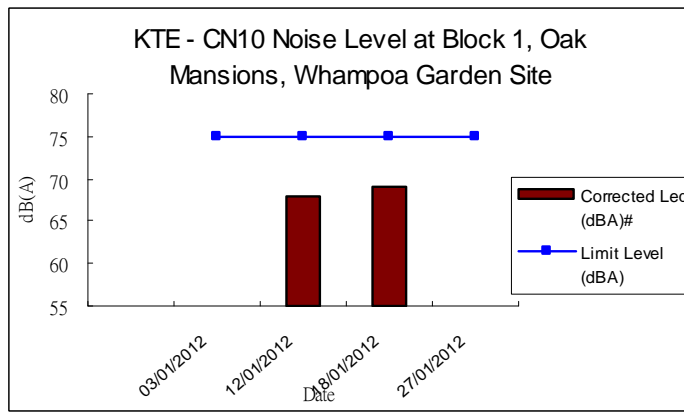
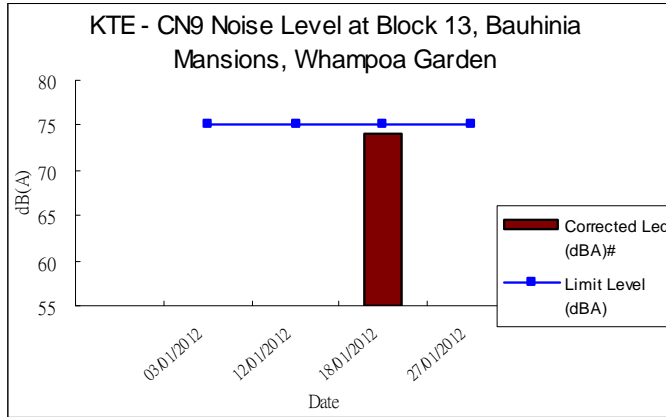


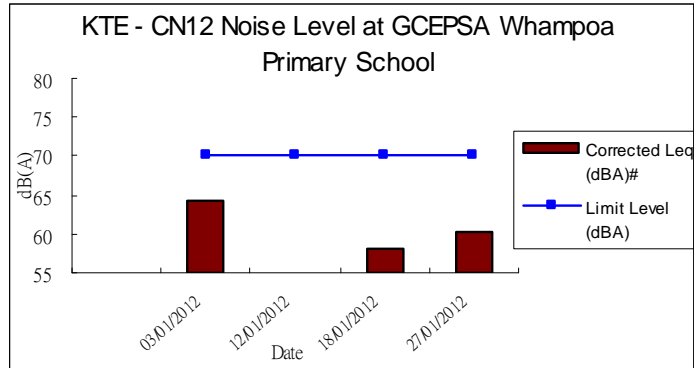












# As some of the measured Leq is lower than the baseline level, correction against baseline level cannot be applied.

## **Appendix G**

### **Monitoring Schedule for the Present and Next Reporting Period**

<b>Dust Monitoring Schedule for December 2011</b>					
CD1	CD2	CD3a	CD4a	CD5	CD6a
03/01/2012	03/01/2012	03/01/2012	NA	NA	03/01/2012
09/01/2012	09/01/2012	09/01/2012	04/01/2012	04/01/2012	09/01/2012
11/01/2012	11/01/2012	11/01/2012	10/01/2012	10/01/2012	11/01/2012
16/01/2012	16/01/2012	16/01/2012	18/01/2012	18/01/2012	16/01/2012
23/01/2012	23/01/2012	23/01/2012	26/01/2012	26/01/2012	23/01/2012
30/01/2012	30/01/2012	30/01/2012	NA	NA	30/01/2012

<b>Tentative Dust Monitoring Schedule for January 2012</b>					
CD1	CD2	CD3a	CD4a	CD5	CD6a
NA	NA	NA	01/02/2012	01/02/2012	NA
07/02/2012	07/02/2012	07/02/2012	07/02/2012	07/02/2012	07/02/2012
10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012	10/02/2012
17/02/2012	17/02/2012	17/02/2012	17/02/2012	17/02/2012	17/02/2012
22/02/2012	22/02/2012	22/02/2012	22/02/2012	22/02/2012	22/02/2012
28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012

<b>Noise Monitoring Schedule for December 2011</b>										
CN1	CN2	CN3	CN4	CN6	CN7	CN8	CN9	CN10	CN11	CN12
03/01/2012	03/01/2012	04/01/2012	04/01/2012	04/01/2012	03/01/2012	03/01/2012	03/01/2012	03/01/2012	03/01/2012	03/01/2012
11/01/2012	11/01/2012	11/01/2012	10/01/2012	10/01/2012	12/01/2012	12/01/2012	12/01/2012	12/01/2012	12/01/2012	12/01/2012
19/12/2012	19/12/2012	19/12/2012	18/12/2012	18/12/2012	18/01/2012	18/01/2012	18/01/2012	18/01/2012	18/01/2012	18/01/2012
27/12/2012	27/12/2012	27/12/2012	26/12/2012	26/12/2012	26/01/2012	26/01/2012	27/01/2012	27/01/2012	27/01/2012	27/01/2012
NA	NA	NA	31/01/2012	31/01/2012	NA	NA	NA	NA	NA	NA

<b>Tentative Noise Monitoring Schedule for January 2012</b>										
CN1	CN2	CN3	CN4	CN6	CN7	CN8	CN9	CN10	CN11	CN12
02/02/2012	02/02/2012	02/02/2012	02/02/2012	02/02/2012	01/02/2012	01/02/2012	01/02/2012	01/02/2012	01/02/2012	01/02/2012
08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012	08/02/2012
16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012	16/02/2012
23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012	23/02/2012
28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012	28/02/2012

Remarks:

The schedule may be changed due to unforeseen circumstances (adverse weather, etc)