


MTR Corporation Limited

Kwun Tong Line Extension (KTE)


Monthly EM&A Report (November 2014)

Verified by:  _____
Position: Independent Environmental Checker
Date: 12 Dec 2014

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Position: Environmental Team Leader

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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 41st 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 November 2014 to 30 November 2014. The major construction activities in the reporting period included underground utilities diversion, bulk excavation, adit and tunnel excavation, concreting works and superstructure works.

No exceedance was recorded for TSP and construction noise monitoring in this reporting month.

One air nuisance complaint at WAB (works area C) was referred by EPD on 5 Nov 2014. The complaint was handled in accordance with the EM&A manual. Details refer to Section 7 of this report.

Regular joint site inspections, led by the ER with the presence of 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. Environmental concerned items raised during site inspections have been followed up by the respective contractors in a responsible manner.

Future key issues envisaged in the coming month include noise and dust emission, and site water control issues at work sites. ET will continue the implementation of EM&A programme in accordance to the EM&A manual. Details of future key issues produced by construction activities are given in Section 12 of the report.

The Environmental Permit (EP-399/2010/B) dated on 7 June 2012 is being used for the KTE Project.

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 construction of the KTE is expected to complete in 2015.

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.

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 41st 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 November 2014 to 30 November 2014.

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 and 1b respectively.

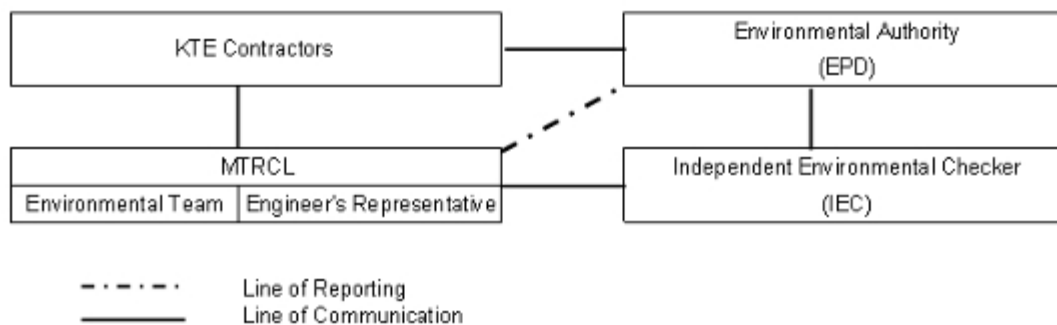


Figure 1. Project Organization

Table 1a Contact List of Key Personnel for Project Management

| Organization | Name | Telephone |
|--|--------------|------------------|
| Engineer's Representative | | |
| Project Manager | James Chow | 2163 6283 |
| Construction Manager | Kenny Kong | 3441 3101 |
| Construction Manager | Nelson Yeung | 3940 3398 |
| Independent Environmental Checker | | |
| Consultant – Arup | Jacky Chan | 3447 6292 |
| Environmental Team | | |
| Environmental Team Leader | Richard Kwan | 2688 1179 |
| Contact 1001 Contractor | | |
| Project Manager | Colin Birkby | 9641 2485 |
| Environmental Officer | Ricky Tse | 9221 0368 |
| Contact 1002 Contractor | | |
| Project Manager | Eric Wu | 2743 3711 |
| Environmental Officer | Leo Cheng | 9779 7042 |
| Environmental Officer | Andy Choy | 6278 2693 |

Table 1b Contact List of Environmental Authority

| Organization | Name | Telephone |
|--|-------------|------------------|
| Environmental Protection Department | | |
| Sr Env Protection Offr(Metro Assessment) 2 | Colin Keung | 2835 1125 |
| Sr Env Protection Offr(Regional E) 6 | PS Ng | 2150 8002 |
| Sr Env Protection Offr(Regional E) 5 | Alfred Ng | 2117 7538 |
| Sr Env Protection Offr(Regional E) 4 | Aaron Lui | 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 |
|--------------|---|
| Air | |
| CD1a## | Methodist School |
| CD2a # | PolyU Homantin Student Halls of Residence |
| 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 |
| Noise | |
| CN1 | Alhambra Building |
| CN2 | Methodist College |
| CN3a## | Methodist School |
| CN4a # | PolyU Homantin Student Halls of Residence |
| 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 |

Notes:

*: 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.

#: Access to the original monitoring stations CD2 and CN4 (Yee Fu Building) has been denied by the management office since December 2012 and MTRCL proposed PolyU Homantin Student Halls of Residence as alternative monitoring stations with no objection from EPD on 28 February 2013.

##: Access to the original monitoring stations CD1 and CN3 (Queen Elizabeth Hospital – Specialist Clinic) has been denied for demolition since end of July 2013 and MTRC proposed Methodist School at Wylie Road as alternative monitoring stations with no objection from EPD on 4 September 2013.

###: As all KTE related construction works at Finger Pier was completed by end December 2013 and the site will be handed over to other project under MTR, the CD6a has been terminated starting from January 2014. EPD has no objection on the termination proposal on 29 January 2014.

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 3 | Once per 6 days | Construction stage |
| Noise | $L_{eq(30min)}$ | Shown in Table 3 | Once a week | Construction stage |
| Landscape and visual | On-Site Audit | Active Works Sites | Bi-weekly | Construction stage |

| Parameters | Descriptions | Locations | Monitoring Frequencies | Duration |
|-------------------------|-------------------------------|--------------------|--|--------------------|
| 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)

- General works

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

- Rails track installation

Works Site C (Wylie Road Ancillary Building)

- Excavation of cavern
- Mucking out for tunnel excavation
- Center wall installation

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

- Tunnel excavation
- Waterproofing and concrete lining works

Works Site E (Ho Man Tin Station)

- Concreting
- Superstructure of HOM station

Works Site F (Fat Kwong Street Playground)

- Waterproofing and concrete lining works and invert concrete
- Superstructure works at cavern

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

- Waterproofing and concrete lining works and invert concrete

Works Area J (Hung Hom Barging Point)

- All works related to KTE project completed

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

- Nil

Contract 1002 - Works Sites and Areas

Works Site H (Whampoa Station West Concourse)

- Excavation and shotcreting
- Bulk excavation under traffic deck
- ELS construction
- Concreting
- False work
- Tunnel Drilling

Works Site I (Whampoa Station East Concourse)

- UC installation
- Excavation and shotcreting
- Bulk excavation under traffic deck
- ELS construction
- Concreting
- False work
- Tunnel Drilling
- Noise enclosure fabrication for platform tunnel construction

Works Area L (Hung Lok Road Site Office)

- Nil

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)

- General works

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

- Rails track installation

Works Site C (Wylie Road Ancillary Building)

- Excavation of cavern
- Mucking out for tunnel excavation
- Center wall installation

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

- Tunnel excavation
- Waterproofing and concrete lining works

Works Site E (Ho Man Tin Station)

- Concreting
- Superstructure of HOM station

Works Site F (Fat Kwong Street Playground)

- Waterproofing and concrete lining works and invert concrete
- Superstructure works at cavern

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

- Waterproofing and concrete lining works and invert concrete

Works Area J (Hung Hom Barging Point)

- All works related to KTE project completed

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

- Nil

Contract 1002 - Works Sites and Area

Works Site H (Whampoa Station West Concourse)

- Excavation and shotcreting
- Bulk excavation under traffic deck
- Underground utilities supporting beam installation
- Underground utilities window grouting
- ELS construction
- Concreting

Works Site I (Whampoa Station East Concourse)

-
- Excavation and shotcreting
- Bulk excavation under traffic deck
- UU supporting beam installation
- ELS construction
- Rebar fixing
- Concreting
- Form work and False Work
- Noise enclosure fabrication for platform tunnel construction

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 10.2 to 166.0 µg/m³ recorded in the monitoring period shows that the dust levels generated by the active construction activities were within the Action Levels.

Table 5 Summary of 24-Hour TSP Levels Monitoring Results

| CD1a Methodist School | | | | | |
|---|--------------------------|-----------------------------------|----------------------------------|----------------------|-------------------|
| Date | TSP (µg/m ³) | Action Level (µg/m ³) | Limit Level (µg/m ³) | Compliance (Yes /No) | Weather Condition |
| 06/11/2014 | 103.0 | 171 | 260 | Yes | Rainy |
| 11/11/2014 | 70.5 | 171 | 260 | Yes | Cloudy |
| 17/11/2014 | 88.7 | 171 | 260 | Yes | Cloudy |
| 20/11/2014 | 92.9 | 171 | 260 | Yes | Sunny |
| 27/11/2014 | 113.0 | 171 | 260 | Yes | Rainy |
| CD2a PolyU Homantin Student Halls of Residence | | | | | |

| 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 |
|---|-------------------------------------|--|---|-------------------------|----------------------|
| | | | | | |
| 06/11/2014 | 98.4 | 183 | 260 | Yes | Rainy |
| 11/11/2014 | 107.1 | 183 | 260 | Yes | Cloudy |
| 17/11/2014 | 87.1 | 183 | 260 | Yes | Cloudy |
| 20/11/2014 | 109.6 | 183 | 260 | Yes | Sunny |
| 27/11/2014 | 110.2 | 183 | 260 | Yes | Rainy |
| CD3a No.238 Chatham Road North | | | | | |
| 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 |
| | | | | | |
| 04/11/2014 | 89.9 | 192 | 260 | Yes | Cloudy |
| 10/11/2014 | 48.3 | 192 | 260 | Yes | Sunny |
| 15/11/2014 | 77.6 | 192 | 260 | Yes | Sunny |
| 21/11/2014 | 10.2 | 192 | 260 | Yes | Sunny |
| 27/11/2014 | 20.7 | 192 | 260 | Yes | Rainy |
| CD4a Ka Fu Building, Whampoa Estate | | | | | |
| 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 |
| | | | | | |
| 04/11/2014 | 166.0 | 187 | 260 | Yes | Sunny |
| 10/11/2014 | 154.8 | 187 | 260 | Yes | Sunny |
| 15/11/2014 | 100.6 | 187 | 260 | Yes | Sunny |
| 21/11/2014 | 137.7 | 187 | 260 | Yes | Sunny |
| 27/11/2014 | 142.9 | 187 | 260 | Yes | Rainy |
| CD5 Fung Kei Millennium Primary School | | | | | |
| 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 |
| | | | | | |
| 04/11/2014 | 39.1 | 168 | 260 | Yes | Sunny |
| 10/11/2014 | 31.5 | 168 | 260 | Yes | Sunny |
| 15/11/2014 | 21.9 | 168 | 260 | Yes | Sunny |
| 21/11/2014 | 123.4 | 168 | 260 | Yes | Sunny |
| 27/11/2014 | 85.4 | 168 | 260 | Yes | Rainy |

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 meter and B&K 4231 calibrator are verified by the certified laboratory or manufacturer in biennial basis and annual basis respectively to ensure they perform to the same level of accuracy as stated in the manufacturer's specifications. In this reporting period, sound level meters with serial number 2551244 and 2704791 were used while calibrators with serial number 2725557 and 1795388 were used for checking the sound level meters. All relevant calibration certificates are attached in [Appendix E](#) for reference.

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 $L_{Aeq(30min)}$ 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 57 to 75 dB(A) are presented in the following table and [Appendix F](#) for graphical plot.

Table 6 Summary of Construction Noise Monitoring Results

| CN1- Alhambra building | | | | | | | | |
|--------------------------------|-------|-------------------|--------------------|---------------------|-------------------|---------------------------|------------------------|------------------------------|
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 16:30 | 72 | 71 | 64 | 75 | No | - | - |
| 12/11/2014 | 17:00 | 71 | 71 | *** | 75 | No | - | - |
| 19/11/2014 | 17:00 | 73 | 71 | 68 | 75 | No | - | - |
| 27/11/2014 | 16:00 | 71 | 72 | *** | 75 | No | - | - |
| CN2- Methodist College | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 15:00 | 73 | 76 | *** | 70 | No | 75 | No |
| 12/11/2014 | 15:00 | 72 | 76 | *** | 70 | No | 75 | No |
| 19/11/2014 | 16:30 | 76 | 76 | 67 | 70 | No | 75 | No |
| 27/11/2014 | 13:30 | 75 | 76 | *** | 70 | No | 75 | No |
| CN3a - Methodist School | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |

| 04/11/2014 | 13:30 | 69 | 64 | 67 | 70 | No | - | - |
|---|-------|-------------------|--------------------|---------------------|-------------------|---------------------------|------------------------|------------------------------|
| 12/11/2014 | 14:00 | 68 | 64 | 66 | 70 | No | - | - |
| 19/11/2014 | 15:00 | 69 | 64 | 68 | 70 | No | - | - |
| 27/11/2014 | 14:30 | 67 | 63 | 65 | 70 | No | - | - |
| CN4a - PolyU Homantin Student Halls of Residence | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 11:30 | 68 | - | - | 75 | No | 77 | No |
| 12/11/2014 | 11:30 | 68 | - | - | 75 | No | 77 | No |
| 19/11/2014 | 13:30 | 68 | - | - | 75 | No | 77 | No |
| 27/11/2014 | 13:30 | 70 | - | - | 75 | No | 77 | No |
| CN6- Lok Do Building | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 9:30 | 71 | 71 | 63 | 75 | No | - | - |
| 12/11/2014 | 10:00 | 70 | 71 | *** | 75 | No | - | - |
| 19/11/2014 | 10:00 | 69 | 71 | *** | 75 | No | - | - |
| 27/11/2014 | 9:30 | 70 | 71 | *** | 75 | No | - | - |
| CN7- Block Y, Ki Fu Building, Whampoa Estate | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 9:00 | 75 | 72 | 73 | 75 | No | 83 | No |
| 11/11/2014 | 9:00 | 73 | 72 | 69 | 75 | No | 83 | No |
| 17/11/2014 | 13:00 | 74 | 71 | 71 | 75 | No | 83 | No |
| 26/11/2014 | 9:30 | 73 | 71 | 68 | 75 | No | 83 | No |
| CN8- Block I, Lok Wah Building, Whampoa Garden | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 10:00 | 75 | 70 | 74 | 75 | No | 81 | No |
| 11/11/2014 | 15:30 | 74 | 70 | 72 | 75 | No | 81 | No |
| 17/11/2014 | 16:30 | 73 | 70 | 71 | 75 | No | 81 | No |
| 26/11/2014 | 11:00 | 75 | 70 | 73 | 75 | No | 81 | No |
| CN9- Block 13, Bauhinia Mansions, Whampoa Garden Site 11 | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 11:00 | 75 | 69 | 73 | 75 | No | 79 | No |
| 11/11/2014 | 14:30 | 76 | 69 | 75 | 75 | No | 79 | No |
| 17/11/2014 | 10:00 | 76 | 69 | 75 | 75 | No | 79 | No |
| 26/11/2014 | 13:00 | 74 | 69 | 72 | 75 | No | 79 | No |
| CN10- Block 1, Oak Mansions, Whampoa Garden Site 5 | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 14:00 | 74 | 69 | 73 | 75 | No | 82 | No |
| 11/11/2014 | 13:30 | 75 | 67 | 74 | 75 | No | 82 | No |
| 17/11/2014 | 9:00 | 74 | 66 | 73 | 75 | No | 82 | No |
| 26/11/2014 | 17:00 | 74 | 67 | 73 | 75 | No | 82 | No |
| CN11- Fung Kei Millennium Primary School | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |

| 04/11/2014 | 16:00 | 70 | 64 | 69 | 70 | No | 78 | No |
|--|-------|-------------------|--------------------|---------------------|-------------------|---------------------------|------------------------|------------------------------|
| 11/11/2014 | 11:00 | 71 | 64 | 70 | 70 | No | 78 | No |
| 17/11/2014 | 14:30 | 70 | 64 | 68 | 70 | No | 78 | No |
| 26/11/2014 | 16:00 | 68 | 64 | 66 | 70 | No | 78 | No |
| CN12- GCEPSA Whampoa Primary School | | | | | | | | |
| Date | Time | Measured Leq(dBA) | Baseline Leq (dBA) | Corrected Leq(dBA)# | Limit Level (dBA) | Exceedance of Limit Level | Residual Level (dBA)## | Exceedance of Residual Level |
| 04/11/2014 | 15:00 | 66 | 65 | 57 | 70 | No | 76 | No |
| 11/11/2014 | 10:00 | 65 | 65 | *** | 70 | No | 76 | No |
| 17/11/2014 | 15:30 | 68 | 65 | 64 | 70 | No | 76 | No |
| 26/11/2014 | 15:00 | 66 | 65 | 61 | 70 | No | 76 | No |

Notes:

It is noted that all noise monitoring were not undergone in the raining period. The weather condition is fine and with wind speed < 2m/s. 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.

Residual Level refers to the maximum predicted construction noise levels in the EIA report when residual impact is anticipated.

3.3 *Action taken in Event of Exceedance*

No exceedance was recorded for both TSP and construction noise monitoring in this reporting period.

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.

4.2 *Audit Results*

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

Tree Felling at Contract 1001 Works Sites / Areas

One tree with tree no. T1176 was found dead at Fat Kwong Street slope and has been felled by NCC on 18 November 2014. Tree felling report and compensatory proposal will be prepared..

Tree Felling at Contract 1002 Works Sites / Areas

No tree related to KTE project was felled during the reporting month.

Tree Transplantation in this reporting period for Contract 1001

No tree related to KTE project was transplanted during the reporting month.

Tree Transplantation in this reporting period for Contract 1002

No tree related to KTE project 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:

Table 7 Statistics of Wastes Disposal from KTE

| Amount of Construction Wastes Disposed | | | | |
|--|--|--|---|---|
| Reporting Period | Inert C&D Materials to Public Fill (m ³) | Inert C&D Materials Reused (m ³) | Non-inert Waste to Landfill (m ³) | Chemical Waste to designated treatment facility (trips) |
| Contract 1001 | | | | |
| Jun -Dec 2011 | 28690 | 24768 | 714 | 0 |
| Jan-Dec 2012 | 40393 | 415640 | 1614 | 2 |
| Jan – Dec 2013 | 75176 | 317190 | 2544 | 7 |
| January 2014 | 4414 | 20419 | 420 | 1 |
| February 2014 | 6100 | 15246 | 306 | 0 |
| March 2014 | 6193 | 24697 | 438 | 1 |
| April 2014 | 3907 | 19826 | 432 | 0 |
| May 2014 | 4083 | 17242 | 606 | 0 |
| June 2014 | 5948 | 8568 | 630 | 1 |
| July 2014 | 4615 | 7918 | 708 | 0 |
| August 2014 | 2368 | 5378 | 738 | 1 |
| September 2014 | 1064 | 5127 | 738 | 0 |
| October 2014 | 2072 | 4201 | 840 | 0 |
| November 2014 | 1383 | 9756 | 918 | 0 |

| | | | | |
|----------------------|--------|--------|-------|----|
| Subtotal | 186406 | 895976 | 11646 | 13 |
| Contract 1002 | | | | |
| June-December 2011 | 3037 | 0 | 9 | 0 |
| Jan – Dec 2012 | 14484 | 68 | 252 | 5 |
| Jan – Dec 2013 | 45017 | 60 | 127 | 0 |
| January 2014 | 6741 | 5 | 12 | 0 |
| February 2014 | 12956 | 5 | 7 | 0 |
| March 2014 | 5238 | 290 | 6 | 1 |
| April 2014 | 8329 | 873 | 3 | 0 |
| May 2014 | 15311 | 1152 | 7 | 0 |
| June 2014 | 20680 | 431 | 31 | 0 |
| July 2014 | 25041 | 542 | 33 | 0 |
| August 2014 | 23785 | 1308 | 15 | 0 |
| September 2014 | 16008 | 573 | 23 | 0 |
| October 2014 | 22407 | 1242 | 13 | 0 |
| November 2014 | 26911 | 363 | 23 | 0 |
| Subtotal | 245945 | 6912 | 561 | 6 |
| Overall Total | 432351 | 902888 | 12207 | 19 |

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 for contract 1001 and found in an acceptable manner.

Water sample test were conducted for Works Sites A, C, E, F, H and I in November 2014. Analytical results will be reported in accordance to WPCO licenses.

7 ***RECORD OF ENVIRONMENTAL COMPLAINTS***

One air nuisance complaint at WAB (works area C) was referred by EPD on 5 Nov 2014. EPD received the complaint against air nuisance from works area C on 25 September 2014 and suspected the nuisance generated by the works at WAB. NCC conducted joint inspection with EPD on 26 September 2014 and did not revealed any air nuisance from the captioned site.

After receiving the referred complaint from EPD, ET and NCC conduct inspection at WAB and conduct 1 hour TSP measurement at the boundary next to the sensitive receiver

on 18 Nov 2014. The inspection also did not reveal any air nuisance and the 1 hour measurement result complied with the limit level. Nevertheless, the contractor was reminded to maintain air nuisance control such as dust control and ventilation filtering. The case is considered closed.

A summary of complaint received since commencement of the project is shown at below.

Table 8 Summary of Complaint Received

| 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 |
| January 2012 | 0 | N/A | N/A | 0 | N/A | N/A |
| February 2012 | 1 | Noise | Closed | 1 | Noise | Closed |
| March 2012 | 2 | Noise & Dust | Closed | 2 | Noise | Closed |
| April 2012 | 1 | N/A | N/A | 1 | Noise | Closed |
| May 2012 | 1 | Water | Closed | 0 | N/A | N/A |
| June 2012 | 3 | Noise & Dust | Closed | 3 | Noise | Closed |
| July 2012 | 0 | N/A | N/A | 0 | N/A | N/A |
| August 2012 | 2 | Noise & Odor | Closed | 0 | N/A | N/A |
| September 2012 | 1 | Air | Closed | 0 | N/A | N/A |
| October 2012 | 2 | Noise | Closed | 0 | N/A | N/A |
| November 2012 | 2 | Noise & Odor | Closed | 1 | Noise | Closed |
| December 2012 | 0 | N/A | N/A | 0 | N/A | N/A |
| January 2013 | 0 | N/A | N/A | 1 | Visual | Closed |
| February 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| March 2013 | 1 | Noise | Closed | 0 | N/A | N/A |
| April 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| May 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| June 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| July 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| August 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| September 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| October 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| November 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| December 2013 | 0 | N/A | N/A | 0 | N/A | N/A |
| January 2014 | 0 | N/A | N/A | 0 | N/A | N/A |
| February 2014 | 0 | N/A | N/A | 0 | N/A | N/A |
| March 2014 | 1 | Noise | Closed | 0 | N/A | N/A |
| April 2014 | 1 | Noise | Closed | 0 | N/A | N/A |
| May 2014 | 1 | Noise | Closed | 1 | Fume | Closed |
| June 2014 | 0 | N/A | N/A | 1 | Fume | Closed |
| July 2014 | 0 | N/A | N/A | 1 | Fume | Closed |
| August 2014 | 0 | N/A | N/A | 0 | N/A | N/A |
| September 2014 | 1 | Dust | Closed | 0 | N/A | N/A |
| October 2014 | 0 | N/A | N/A | 0 | N/A | N/A |
| November 2014 | 1 | Air | Closed | 0 | N/A | N/A |
| Cumulative | 22 | N/A | N/A | 13 | 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:

Table 9 Summary of Summons and Successful Prosecution

| Reporting Period | Frequency | Cumulative | Nature | Status |
|-------------------------|------------------|-------------------|---------------|---------------|
| June – December 2011 | 0 | 0 | N/A | N/A |
| January – June 2012 | 0 | 0 | N/A | N/A |
| July – December 2012 | 0 | 0 | N/A | N/A |
| January - June 2013 | 0 | 0 | N/A | N/A |
| July – December 2013 | 0 | 0 | N/A | N/A |
| January – June 2014 | 0 | 0 | N/A | N/A |
| July 2014 | 0 | 0 | N/A | N/A |
| August 2014 | 0 | 0 | N/A | N/A |
| September 2014 | 0 | 0 | N/A | N/A |
| October 2014 | 0 | 0 | N/A | N/A |
| November 2014 | 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 30 November 2014 is shown below:

Table 10 Summary of Submissions in accordance with EP Conditions

| EP-399/2010/A Part C Clause No. | | Description | Status |
|---------------------------------|----|---|--|
| 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 2011 | Submitted on 16 January 2012 |
| 5.4 | 18 | Monitoring Report for January 2012 | Submitted on 14 February 2012 |
| 4.1 | 19 | Review Plan for Operational Groundborne Noise | Submitted on 29 February 2012 |
| 5.4 | 20 | Monitoring Report for February 2012 | Submitted on 14 March 2012 |
| 5.4 | 21 | Monitoring Report for March 2012 | Submitted on 17 April 2012 |
| 4.1 | 22 | Review Plan for Operational Groundborne Noise | Submitted on 27 April 2012 |
| 5.4 | 23 | Monitoring Report for April 2012 | Submitted on 15 May 2012 |
| 3.7 | 24 | Further Inspection to the Kerosene Store | Submitted on 8 Jun 2012 |
| 5.4 | 25 | Monitoring Report for May 2012 | Submitted on 14 Jun 2012 |
| 2.4 | 26 | Update of Layout drawings with explanatory statement, showing Project boundary, alignment and associated work areas and works sites locations | Submitted on 13 Jul 2012 |
| 5.4 | 27 | Monitoring Report for Jun 2012 | Submitted on 16 Jul 2012 |
| 5.4 | 28 | Monitoring Report for Jul 2012 | Submitted on 14 Aug 2012 |
| 4.9 | 29 | Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site | Submitted on 27 Aug 2012 |
| 5.4 | 30 | Monitoring Report for Aug 2012 | Submitted on 14 Sep 2012 |

| | | | |
|-----|----|---|---------------------------|
| 5.4 | 31 | Monitoring Report for Sep 2012 | Submitted on 16 Oct 2012 |
| 4.9 | 32 | Landscape and Visual Plan Part 1: Tseung Kwan O Area 137 Magazine Site Rev. A | Submitted on 24 Oct 2012 |
| 5.4 | 33 | Monitoring Report for Oct 2012 | Submitted on 14 Nov 2012 |
| 5.4 | 34 | Monitoring Report for Nov 2012 | Submitted on 14 Dec 2012 |
| 5.4 | 35 | Monitoring Report for Dec 2012 | Submitted on 14 Jan 2013 |
| 5.4 | 36 | Monitoring Report for Jan 2013 | Submitted on 19 Feb 2013 |
| 5.1 | 37 | Proposal of Alternative Monitoring Locations from MTRCL | Submitted on 26 Feb 2013 |
| 5.4 | 38 | Monitoring Report for Feb 2013 | Submitted on 14 Mar 2013 |
| 5.4 | 39 | Monitoring Report for Mar 2013 | Submitted on 16 Apr 2013 |
| 5.4 | 40 | Monitoring Report for April 2013 | Submitted on 15 May 2013 |
| 5.4 | 41 | Monitoring Report for May 2013 | Submitted on 17 June 2013 |
| 2.1 | 42 | Replacement of Registered Landscape Architect | Submitted on 3 July 2013 |
| 5.4 | 43 | Monitoring Report for June 2013 | Submitted on 15 July 2013 |
| 5.4 | 44 | Monitoring Report for July 2013 | Submitted on 14 Aug 2013 |
| 5.1 | 45 | Proposal of Alternative Monitoring Locations from MTRCL | Submitted on 16 Aug 2013 |
| 5.4 | 46 | Monitoring Report for August 2013 | Submitted on 13 Sep 2013 |
| 5.4 | 47 | Monitoring Report for September 2013 | Submitted on 16 Oct 2013 |
| 5.4 | 48 | Monitoring Report for October 2013 | Submitted on 14 Nov 2013 |
| 5.4 | 49 | Monitoring Report for November 2013 | Submitted on 13 Dec 2013 |
| 5.4 | 50 | Monitoring Report for December 2013 | Submitted on 15 Jan 2014 |
| 5.1 | 51 | Proposal for Termination of TSP Monitoring at CD6a Harbourfront Horizon | Submitted on 15 Jan 2014 |
| 5.4 | 52 | Monitoring Report for January 2014 | Submitted on 17 Feb 2014 |
| 5.4 | 53 | Monitoring Report for February 2014 | Submitted on 14 Mar 2014 |
| 4.1 | 54 | Operational Groundborne Noise Review Plan | Submitted on 20 Mar 2014 |
| 4.2 | 55 | Operational Groundborne Noise Review Report – Phase 1 | Submitted on 20 Mar 2014 |
| 5.4 | 56 | Monitoring Report for March 2014 | Submitted on 14 Apr 2014 |
| 5.4 | 57 | Monitoring Report for April 2014 | Submitted on 19 May 2014 |
| 5.4 | 58 | Monitoring Report for May 2014 | Submitted on 16 Jun 2014 |
| 5.4 | 59 | Monitoring Report for June 2014 | Submitted on 15 Jul 2014 |
| 5.4 | 60 | Monitoring Report for July 2014 | Submitted on 14 Aug 2014 |
| 2.1 | 61 | Replacement of Registered Landscape Architect | Submitted on 28 Aug 2014 |
| 5.4 | 62 | Monitoring Report for August 2014 | Submitted on 16 Sep 2014 |
| 5.4 | 63 | Monitoring Report for September 2014 | Submitted on 16 Oct 2014 |
| 4.2 | 64 | Operational Groundborne Noise Review Report – Phase 1 and Phase 2 | Submitted on 6 Nov 2014 |
| 5.4 | 65 | Monitoring Report for October 2014 | Submitted on 14 Nov 2014 |

10.2 Statutory Permits and Licenses

A summary of the status of all relevant environmental permits and licenses as of 30 November 2014 is shown below:

Table 11 Summary of Environmental Permits and Licenses

| Description | License/ Permit Reference | Issue Date | Expired Date |
|---|---|-------------------|--------------------------|
| Environmental Permit | | | |
| Environmental Permit for Kwun Tong Line Extension Project (EP-399/2010) | (EP-399/2010) (superseded by EP-399/2010/A) | 27 September 2010 | NA |
| Variation of Environmental Permit for Kwun Tong Line Extension Project | (EP-399/2010/A)) (superseded by EP-399/2010/B) | 1 December 2010 | NA |
| Variation of Environmental Permit for Kwun Tong Line Extension Project | (EP-399/2010/B) | 7 June 2012 | NA |
| Contract 1001 | | | |
| Wastewater Discharge License | WT00009504-2011 (Works Site C), | 14 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 |
| | WT00012298-2012 (Works Site E) | 19 April 2012 | 31 July 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-RE1042-14 (GAR) | 12/09/2014 | 18/09/2014 To 17/03/2015 |
| | GW-RE0761-14 (HOM) | 08/07/2014 | 14/07/2014 To 13/01/2015 |
| | GW-RE1058-14 (WAB) | 15/9/2014 | 18/9/2014 To 17/3/2015 |
| | GW-RE0787-14 (FKS) | 11/07/2014 | 12/07/2014 To 03/01/2015 |
| Contract 1002 | | | |

| | | | |
|---|---------------------------------------|-----------------|--------------------------|
| Wastewater Discharge License | WT00009415-2011 (Site office) | 11 July 2011 | 30 Sep2016 |
| | 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 | GW-RE1277-14 | 13/11/2014 | 19/11/2014 to 12/12/2014 |
| | GW-RE1258-14 | 31/10/2014 | 04/11/2014 to 03/01/2015 |

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 reporting 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:

Table 12 Summary of Environmental Findings from Site Inspections

| Item | Description | Follow-up Status |
|-------------|---|-------------------------|
| | Contract 1001 | |
| 1 | The contractor shall provide drip tray for the chemical containers. | Completed |
| | Contract 1002 | |
| 1 | Contractor was reminded to maintain clean condition of haul access as to avoid dust generation. | Ongoing |
| 2 | Contractor should provide regular maintenance and inspection to wastewater treatment facilities as to ensure they are in proper function. | Completed |
| 3 | Silt and slurry accumulated in sedimentation tank should be regularly collected and disposed. | Completed |
| 4 | Secondary containment measure should be provided for chemicals being used at site | Completed |
| 5 | Stagnant water accumulated in drip pan should be regularly drained to prevent mosquito from breeding | Completed |
| 6 | Four sides of air compressor should be screened with acoustic mats. | Completed |
| 7 | Substandard effluent discharge was observed from wastewater treatment plant at Tak On Street and contractor was request to rectify immediately. | Ongoing |

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 18 November 2014 for Contract 1001. For Contract 1002, IEC conducted inspection on 14 November 2014. Some observations listed in section 11.1 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

Inspection for Contract 1002 (Work Area H and I) was conducted by EPD on 14, 19 and 24 November 2014. Recommendations given by EPD were included in the environmental inspection records and have been addressed by contractor.

Inspection for contract 1001 (Work Area F and Fat Kwong Street slope area) was conducted on 10 Nov 2014. No adverse comment was given.

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. rock

- breaking and drilling works;
- Fugitive dust impact from rock breaking works;
- Effluent discharge generated from various construction works;

12.2 Effectiveness and Efficiency of Mitigation Measures

Based on the environmental monitoring results of the reporting period, the effectiveness and efficiency of most of the mitigation measures implemented were found to be satisfactory.

13 CONCLUSIONS

The Report presents the results of EM&A works and the impact monitoring for the construction works undertaken during the period of November 2014.

The major construction activities in the reporting period included underground utilities diversion, bulk excavation, adit and tunnel excavation, concreting works and superstructure works.

No exceedance was recorded for TSP and construction noise monitoring in this reporting month.

One air nuisance complaint at WAB (works area C) was referred by EPD on 5 Nov 2014. The complaint was handled in accordance with the EM&A manual.

No 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 was identified in the 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 contractor.

Appendix A

Figures

Figure 1. KTE Project Works Area

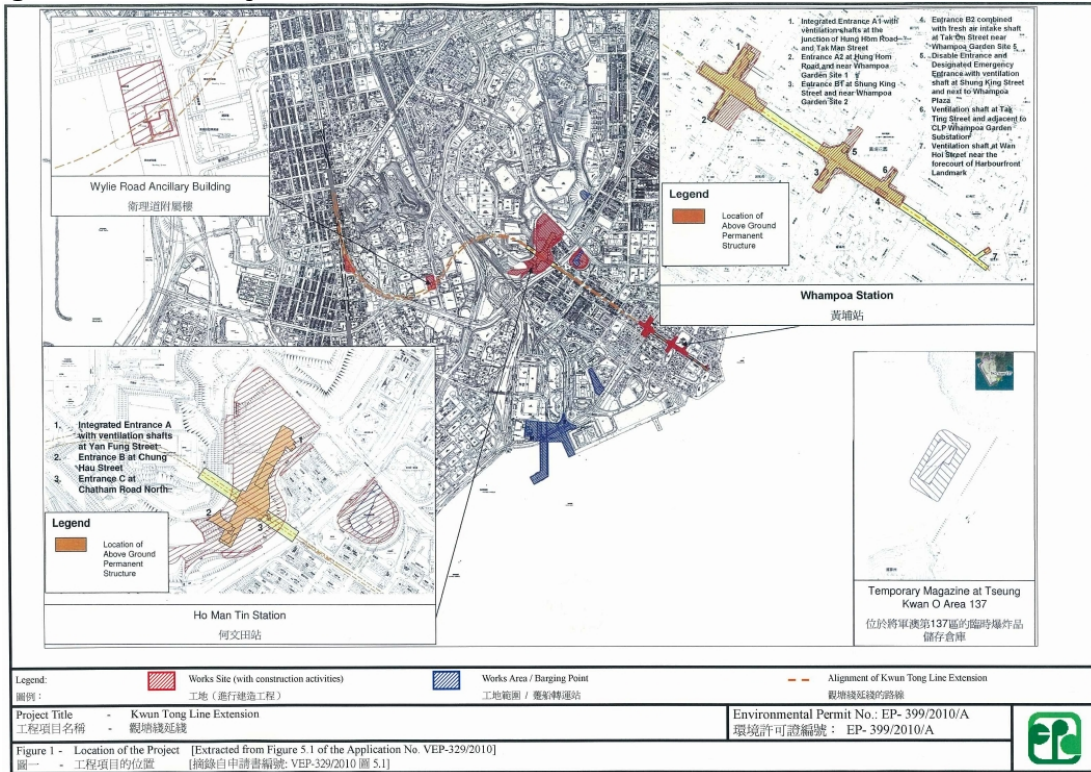


Figure 2. Location of Dust Monitoring Stations (CD1a)

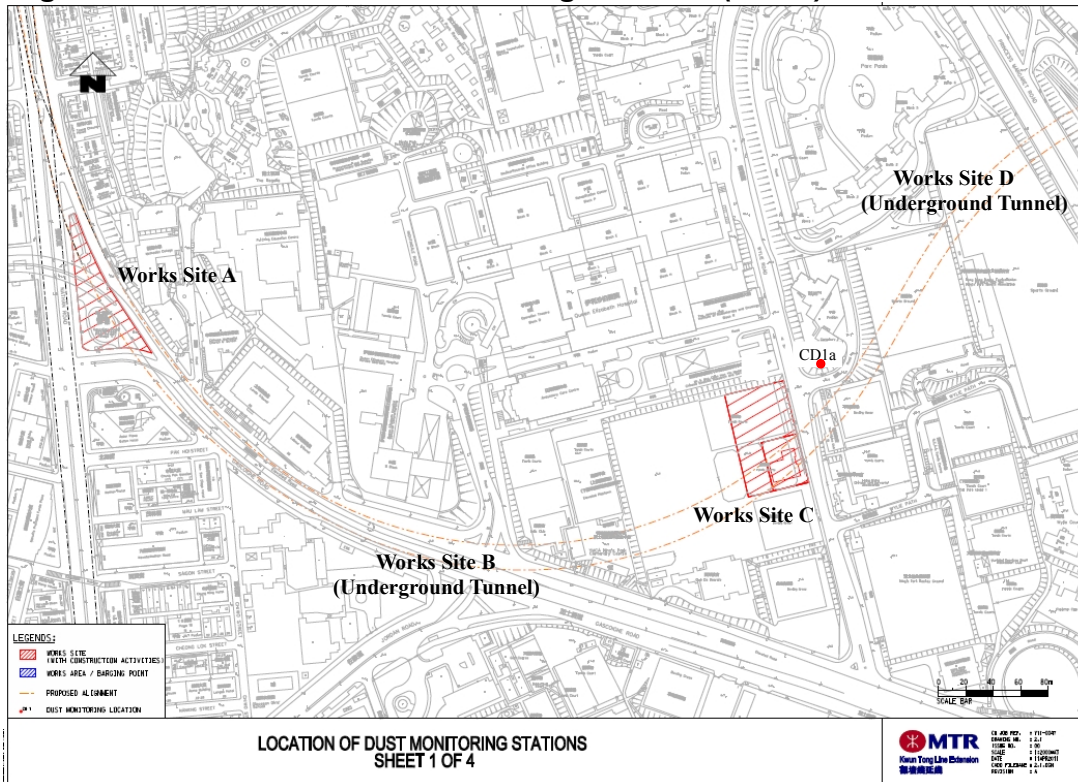


Figure 3. Location of Dust Monitoring Stations (CD2a and CD3a)

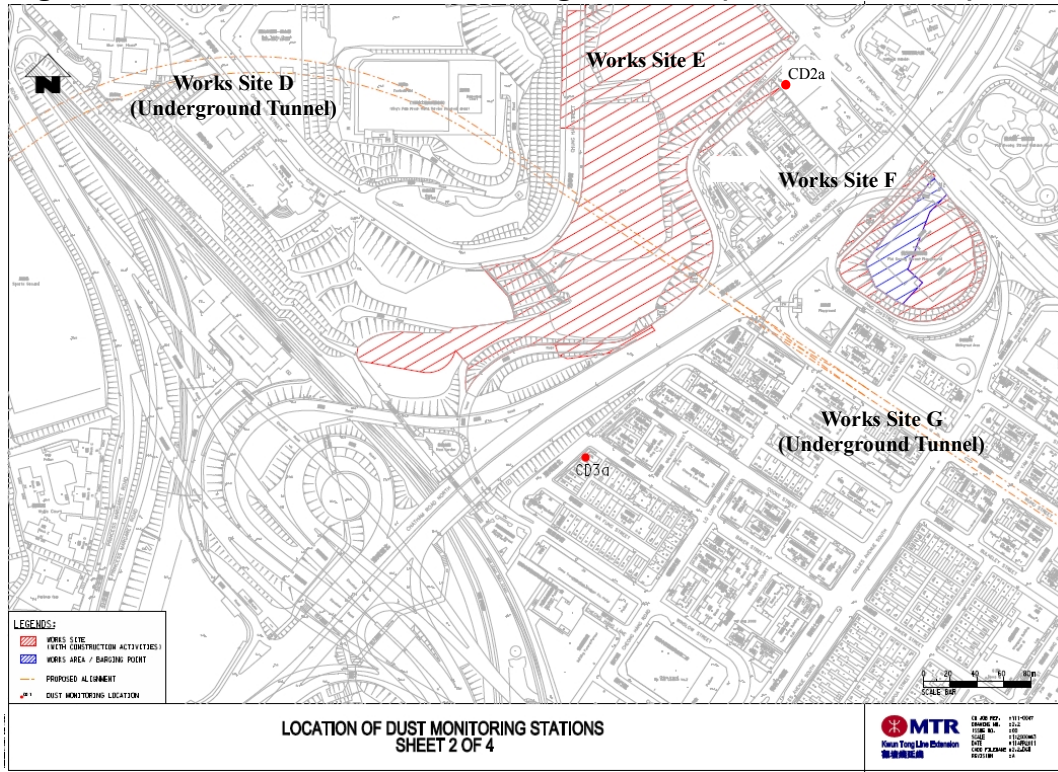


Figure 4. Location of Dust Monitoring Stations (CD4a and CD5)

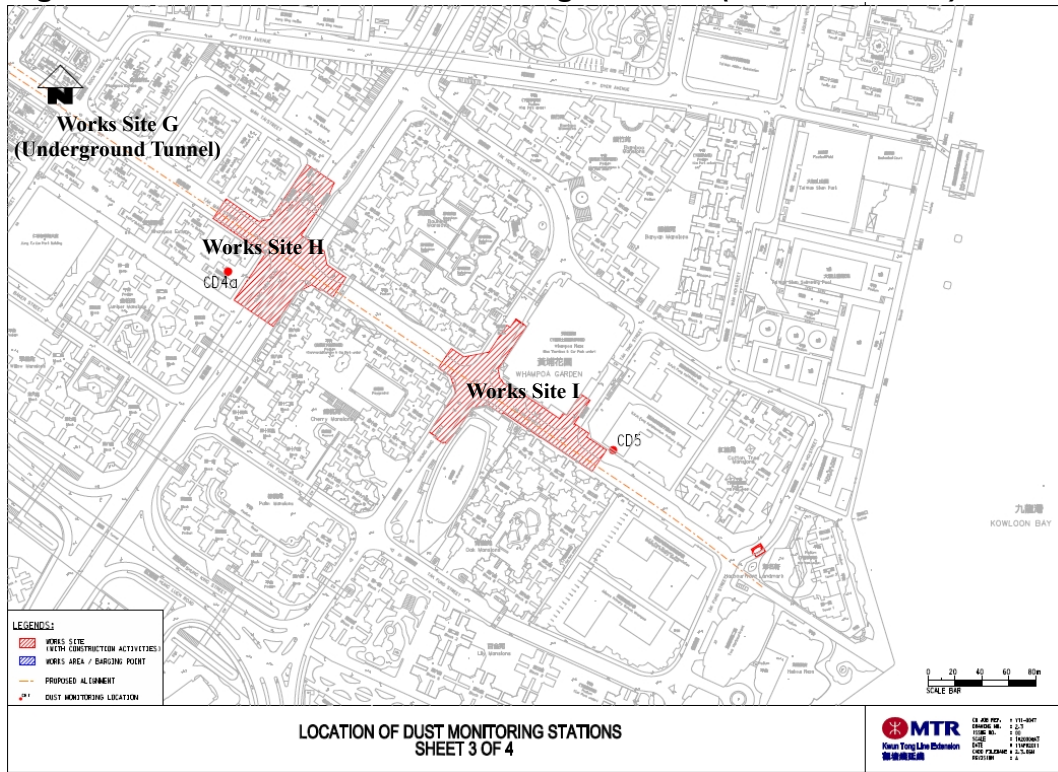


Figure 5. Location of Dust Monitoring Stations (CD6a)

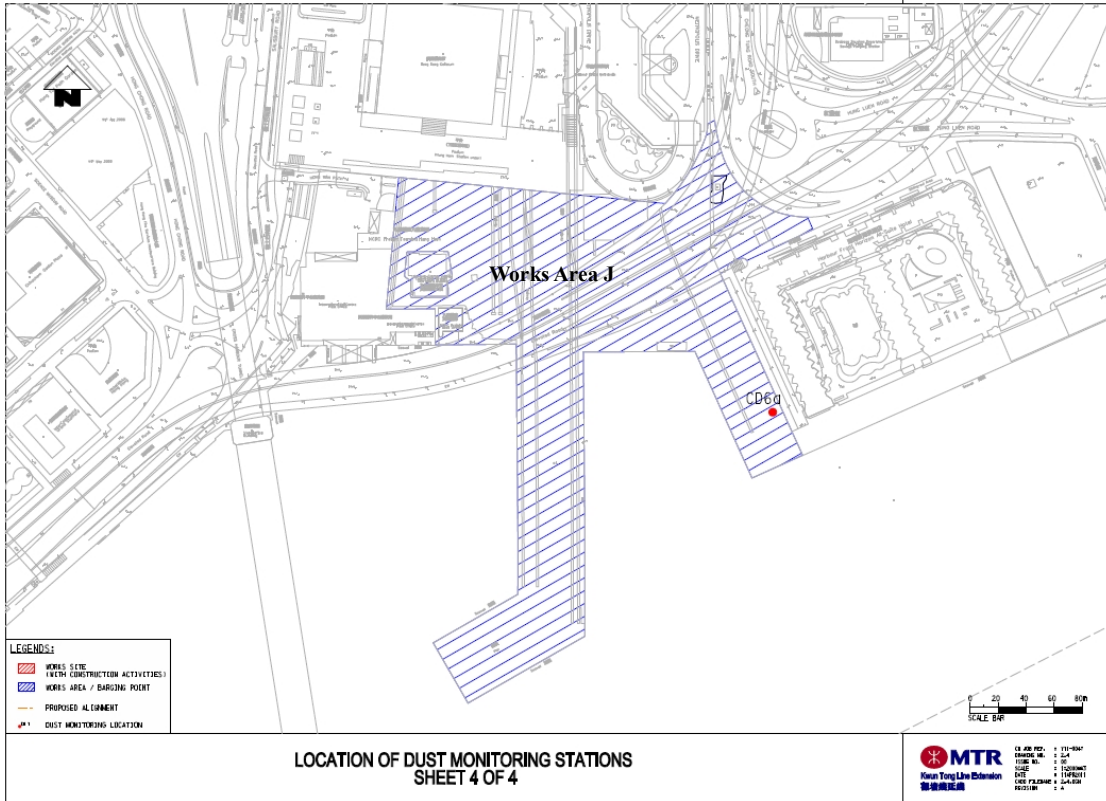


Figure 6. Location of Noise Monitoring Stations (CN1, CN2 and CN3a)

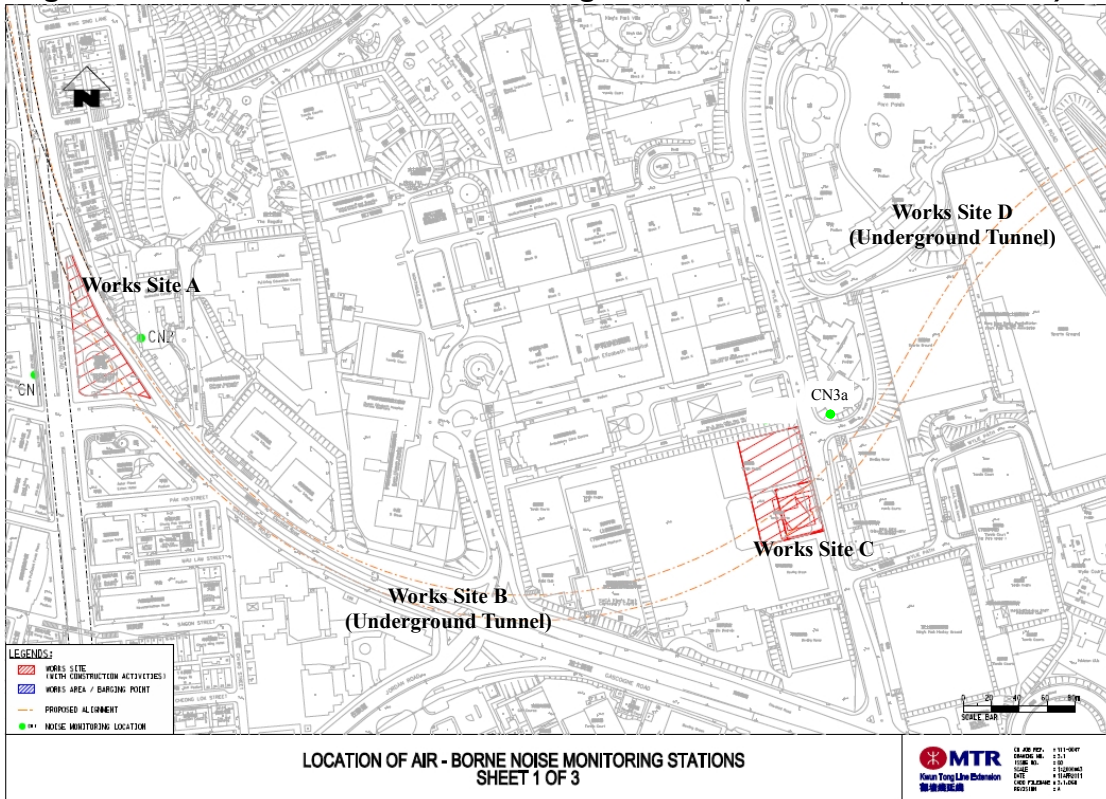


Figure 9. Location of Tseung Kwan O Area 137 Magazine Site

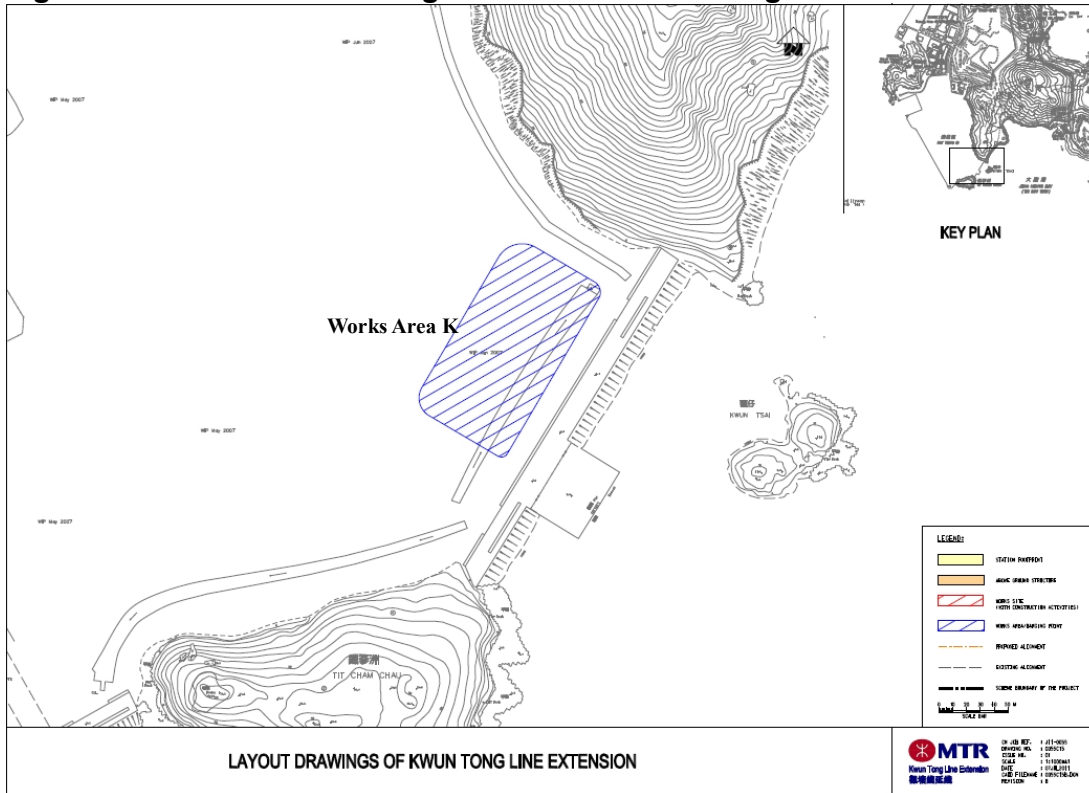
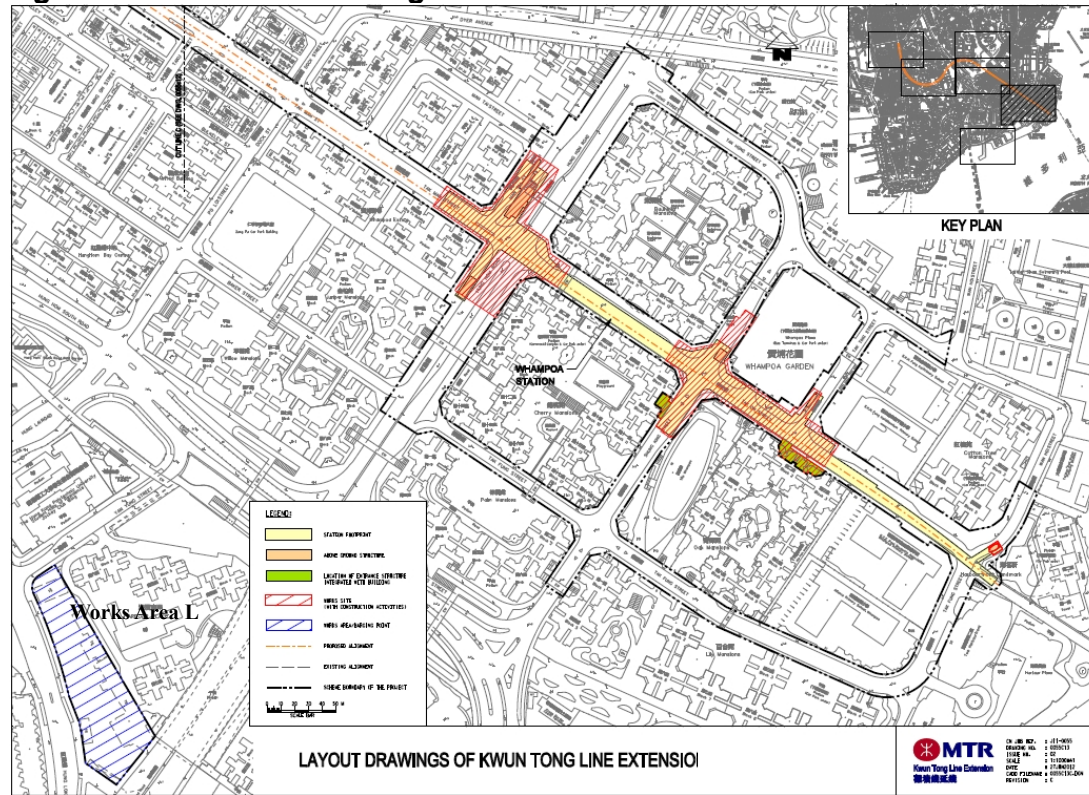


Figure 10. Location of Hung Lok Road Site Office



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 ($\mu\text{g}/\text{m}^3$) |
|--------------------|---|--|
| CD1a | 171 | 260 |
| CD2a | 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 ($\mu\text{g}/\text{m}^3$) |
|--------------------|---|--|
| CD1a | 310 | 500 |
| CD2a | 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 ⁽¹⁾ | IEC ⁽¹⁾ | ER ⁽¹⁾ | Contractor |
| Action Level | | | | |
| 1. Exceedance for one sample | <ol style="list-style-type: none"> 1. Identify sources, investigate the causes of complaint and propose remedial measures. 2. Inform IEC and ER. 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency. | <ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. | <ol style="list-style-type: none"> 1. Notify the Contractor. | <ol style="list-style-type: none"> 1. Rectify any unacceptable practices. 2. Amend working methods agreed with the ER as appropriate. |
| 2. Exceedance for two or more consecutive samples | <ol style="list-style-type: none"> 1. Identify sources. 2. Inform the IEC and ER. 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings. 5. Increase monitoring frequency to daily. 6. Discuss with the IEC, ER and Contractor on remedial action required. 7. If exceedance continues, arrange meeting with the IEC, Contractor and ER. 8. If exceedance stops, cease additional monitoring. | <ol style="list-style-type: none"> 1. Check monitoring data submitted by the ET. 2. Check the Contractor's working methods. 3. Discuss with the ET, ER and Contractor on possible remedial measures if required. 4. Advise the ER on the effectiveness of proposed remedial measures if required. | <ol style="list-style-type: none"> 1. Notify the Contractor. 2. Ensure remedial measures properly implemented. | <ol style="list-style-type: none"> 1. Submit proposals for remedial action to the ER within 3 working days of notification. 2. Implement the agreed proposals. 3. Amend proposal as appropriate. |

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

Table 5.3: Event and Action Plan for Construction Noise Monitoring

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

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

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

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

Note:

- ET – Environmental 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 | Implementation status |
|-----------------------------|-----------------------|---|---|--|--|---|-----------------------|---|---|--|---|
| | | | | | | | D | C | O | | |
| Miscellaneous | | | | | | | | | | | |
| 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 | To be implemented as per construction programme |
| Landscape and Visual | | | | | | | | | | | |
| 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 | Implemented |
| 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 | Implemented |
| 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 | Implemented |
| 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 | Restricting light pollution to nearby receivers | All works sites and Temporary Works Areas | Main Contractor | EIA recommendation | | ✓ | | Contractor | To be implemented as per construction programme |

| 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 | Implementation status |
|---------------|-----------------------|--|---|---|--|-------------------------------------|-----------------------|---|---|--|---|
| | | | | | | | D | C | O | | |
| | | to minimize light pollution and night-time glare to nearby receivers. | | | | | | | | | |
| 5.12.1.2 | | <u>Re-provision 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 | To be implemented as per construction programme |
| 5.12.1.2 | | <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. | Replacement of loss of resources and Enhancement of visual amenity | Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station WHA Station | MTR Corporation / Main Contractor/ Detailed Design Consultant | ETWB TCW No. 3/2006. WBTC 7/2002 | ✓ | ✓ | ✓ | MTR Corporation / LandsD/ HyD/ LCSD/ AFCD | To be implemented as per construction programme |
| 5.12.1.2 | | <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 | Mitigation of loss of resources and Enhancement of visual amenity | Gascoigne Road Rest Garden, Yan Fung Street Rest Garden, Fat Kwong Street Playground, WAB, HOM Station | MTR Corporation/ Main Contractor/ Detailed Design Consultant | WBTC 25/93 WBTC 17/2000 | ✓ | ✓ | ✓ | MTR Corporation / LandsD | To be implemented as per construction programme |

| 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 | Implementation status |
|---------------|-----------------------|---|---|------------------|--|----------------------------------|-----------------------|---|---|-------------------|---|
| | | | | | | | D | C | O | | |
| | | <p>KTE, until permanent measures are undertaken under the proposed property development stage.</p> <p>Parapets at WAB and HOM Station shall be provided with internal permanent planter boxes.</p> <p>The roof at WAB shall be greened to improve visual amelioration from surrounding high level viewers</p> <p>Station entrances at HOM and WHA shall utilise shrub planting areas to provide localised greening</p> | | WHA Station | | | | | | | |
| 5.12.1.2 | | <p><u>Planting</u></p> <p>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.</p> | Mitigation of loss of resources and Enhancement of visual amenity | WAB, HOM Station | MTR Corporation/ Main Contractor/ Detailed Design Consultant | EIA recommendation | ✓ | ✓ | ✓ | MTR Corporation | To be implemented as per construction programme |
| 5.12.1.2 | | <p><u>Architectural Design Aesthetics for the WAB at Club de Recreio</u></p> <p>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.</p> | Enhancement of visual amenity | WAB | MTR Corporation/ Main Contractor/ Detailed Design Consultant | EIA recommendation | ✓ | ✓ | ✓ | MTR Corporation | To be implemented as per construction programme |
| 5.12.1.2 | | <p><u>Architectural Design Aesthetics for Above-Ground Structures at HOM Station</u></p> <p>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</p> | Enhancement of visual amenity | HOM Station | MTR Corporation/ Main Contractor/ Detailed Design Consultant | EIA recommendation | ✓ | ✓ | ✓ | MTR Corporation | To be implemented as per construction programme |

| 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 | Implementation status |
|-----------------------|-----------------------|--|--|---------------------------------------|--|----------------------------------|-----------------------|---|---|-------------------|---|
| | | | | | | | D | C | O | | |
| | | fit into the local context in terms of the architectural character of the site. | | | | | | | | | |
| 5.12.1.2 | | <p><u>Architectural Design Aesthetics for Above-Ground Structures at WHA Station</u></p> <p>These 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.</p> | Enhancement of visual amenity | WHA Station | MTR Corporation/ Main Contractor/ Detailed Design Consultant | EIA recommendation | ✓ | ✓ | ✓ | MTR Corporation | To be implemented as per construction programme |
| Air Quality | | | | | | | | | | | |
| S.6.7.1.7 & S.6.9.2.3 | | <p>Cut-and-Cover areas in the vicinity of adits and shafts (if applicable):-</p> <ul style="list-style-type: none"> ▪ Heavy construction activities and wind erosion at the cut-and-cover areas, active areas for heavy construction activities: <ul style="list-style-type: none"> - Watering every hour at exposed soil. ▪ Trucks for transportation of materials: <ul style="list-style-type: none"> - 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. - Haul roads within works sites should be paved and water spraying would be provided to keep the wet condition. | To minimise dust impacts | All relevant works sites | MTR Corporation/ Main Contractor/ Detailed Design Consultant | Air Pollution Control Ordinance | ✓ | ✓ | | | Implemented |
| S.6.7.1.7 & S.6.9.2.3 | | <p>Barging point at Hung Hom Finger Pier:</p> <ul style="list-style-type: none"> ▪ 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. ▪ The spoil unloading process should be | To minimise dust impacts | Barging Point at Hung Hom Finger Pier | MTR Corporation/ Main Contractor/ Detailed Design Consultant | Air Pollution Control Ordinance | ✓ | ✓ | | | Implemented |

| 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 | Implementation status |
|------------------------|-----------------------|--|--|--|--|----------------------------------|-----------------------|---|---|-------------------|---|
| | | | | | | | D | C | O | | |
| | | undertaken within an enclosed tipping hall. Water spraying and 3-sided screen with top should be provided at the discharge point for dust suppression. <ul style="list-style-type: none"> Vehicle wheel washing facilities should be provided at the exits of the barging point. | | | | | | | | | |
| 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"> 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 Watering of paved roads within the area of the rock crushing facility as good site practice. | To minimise dust impacts | Rock crushing equipment at HOM Station and Barging Point at Hung Hom Finger Pier | MTR Corporation/ Main Contractor/Detailled Design Consultant | Air Pollution Control Ordinance | ✓ | ✓ | | | To be implemented as per construction programme |
| 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/Detailled Design Consultant | EIA recommendation | ✓ | ✓ | | | To be implemented as per construction programme |
| 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"> Use of regular watering, to reduce dust emissions from exposed site surfaces and unpaved roads, particularly during dry weather. Use of frequent watering for particularly dusty construction areas and areas close to ASRs. Side enclosure and covering of any aggregate or dusty material storage piles to reduce emissions. Where this is not | To minimise dust impacts | All works sites | MTR Corporation/Main Contractor /Detailed Design Consultant | Air Pollution Control Ordinance | ✓ | ✓ | | | Implemented |

| 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 | Implementation status |
|------------------------|-----------------------|--|--|-----------------|-------------------------------------|----------------------------------|-----------------------|---|---|-------------------|-----------------------|
| | | | | | | | D | C | O | | |
| | | practicable owing to frequent usage, watering should be applied to aggregate fines. <ul style="list-style-type: none"> ▪ Open temporary stockpiles should be avoided or covered. Prevent placing dusty material storage piles near ASRs. ▪ Tarpaulin covering of all dusty vehicle loads transported to, from and between site locations. ▪ Establishment and use of vehicle wheel and body washing facilities at the exit points of the site. ▪ Imposition of speed controls for vehicles on unpaved site roads. 8km per hour is the recommended limit. ▪ Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs. ▪ 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. ▪ 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 or equivalent air pollution control system. ▪ Covering or enclosing any conveyor belt systems will generally be fully enclosed, depending on the design, materials chosen, and dimension of the conveyor system. | | | | | | | | | |
| Air-borne Noise | | | | | | | | | | | |
| S.7.9.2.6 | | The following good site practices should be implemented: <ul style="list-style-type: none"> ▪ Only well-maintained plant should be operated on-site and plants should be serviced regularly during the construction period; ▪ Mobile plant, if any, should be sited as | To minimise air-borne noise impacts | All works sites | MTR Corporation/ Main Contractor | Noise Control Ordinance | | ✓ | | | Implemented |

| 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 | Implementation status |
|---------------|-----------------------|---|--|--------------------------|-------------------------------------|----------------------------------|-----------------------|---|---|-------------------|-----------------------|
| | | | | | | | D | C | O | | |
| | | far from NSRs as possible; <ul style="list-style-type: none"> ▪ 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; ▪ Use of site hoarding as a noise barrier to screen noise at low level NSRs; ▪ 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 ▪ Any material stockpiles and other structures should be effectively utilised, wherever practicable, to screen the noise from on-site construction activities. | | | | | | | | | |
| S.7.9.2.1 | | The following quiet PME should be used: <ul style="list-style-type: none"> ▪ Air compressor ▪ Asphalt Paver ▪ Breaker ▪ Bulldozer ▪ Concrete lorry mixer ▪ Concrete Pump / Grout Pump ▪ Crane ▪ Cutter, circular, steel (electric) ▪ Dump Truck ▪ Backhoe ▪ Generator ▪ Vibrating Poker, hand-held (electric) ▪ Rock Drill ▪ Roller, vibratory ▪ Scraper ▪ Water pump (electric) | To minimise air-borne noise impacts | All relevant works sites | MTR Corporation/ Main Contractor | Noise Control Ordinance | | ✓ | | | Implemented |

| 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 | Implementation status |
|---------------|-----------------------|---|--|--------------------------|-------------------------------------|----------------------------------|-----------------------|---|---|-------------------|-----------------------|
| | | | | | | | D | C | O | | |
| 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"> ▪ Wheeled Excavator/Loader ▪ Crane ▪ Hydraulic Breaker ▪ Scraper ▪ Breaker, hand-held ▪ Compactor, vibratory ▪ Drill, percussive, hand-held (electric) ▪ Concrete pump ▪ Circular Saw, bench mounted ▪ Truck ▪ Bar bender and cutter (electric) ▪ Conveyor belt ▪ Generator, Super Silenced ▪ Grout Pump ▪ Saw, wire ▪ Water Pump, Submersible (Electric) ▪ Hydraulic Jack with Pump | To minimise air-borne noise impacts | All relevant works sites | MTR Corporation/ Main Contractor | Noise Control Ordinance | | ✓ | | | Implemented |
| S.7.9.2.4 | | Acoustic fabric should be used for the following PME where practicable: <ul style="list-style-type: none"> ▪ Compressor and Pneumatic Drilling Rig ▪ Piling, vibrating hammer ▪ Rock Drill ▪ Silent Piling System | To minimise air-borne noise impacts | All relevant works sites | MTR Corporation/ Main Contractor | Noise Control Ordinance | | ✓ | | | Implemented |
| 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"> ▪ Air Compressor ▪ Rock Crushing Equipment | To minimise air-borne noise impacts | All relevant works sites | MTR Corporation/ Main Contractor | Noise Control Ordinance | | ✓ | | | Implemented |
| 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 | | ✓ | | | Implemented |
| 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 | | ✓ | | | Implemented |

| 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 | Implementation status |
|---------------------------|-----------------------|--|---|--|--|--|-----------------------|---|---|-------------------|---|
| | | | | | | | D | C | O | | |
| 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 | | ✓ | | | Implemented |
| 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 | | ✓ | | | To be implemented as per construction programme |
| 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 | ✓ | | ✓ | | To be implemented as per construction programme |
| 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"> ▪ Louvers should be orientated away from adjacent NSRs whenever practicable; ▪ Adequate direct noise mitigation measures including silencers, acoustic louvers or acoustic enclosures should be adopted where necessary; and ▪ Quieter plant should be chosen as far as practical. | 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 | ✓ | | ✓ | | To be implemented as per construction programme |
| Ground-borne Noise | | | | | | | | | | | |
| 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 | - | ✓ | | | | To be implemented as per construction programme |
| 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 | ✓ | ✓ | ✓ | | To be implemented as per construction programme |
| Water Quality | | | | | | | | | | | |
| S.9.7.6 | | Construction site run-off and general construction activities: <ul style="list-style-type: none"> ▪ The mitigation measures as outlined in the ProPECC PN 1/94 Construction Site Drainage should be adopted where | To control water quality impact from construction site runoff and general construction activities | All works sites | MTR Corporation/ Main Contractor | EIAO-TM, Water Pollution Control Ordinance, TM-DSS | | ✓ | | | Implemented |

| 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 | Implementation status |
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| | | applicable. | | | | | | | | | |
| 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 | | ✓ | | | To be implemented as per construction programme |
| 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"> ▪ 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. ▪ All hopper barges should be fitted with tight fitting seals to their bottom openings to prevent leakage of material. ▪ Construction activities should not cause foam, oil, grease, scum, litter or other objectionable matter to be present on the water within the site. ▪ 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. | To control water quality impact from barging point | Barging point | MTR Corporation/ Main Contractor | EIAO-TM, Water Pollution Control Ordinance | | ✓ | | To be implemented as per construction programme | |
| S.9.7.6 | | For effluent discharge, there is a need to apply to 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 | To control water quality impact from effluent discharge from construction site | All works sites | MTR Corporation/ Main Contractor | EIAO-TM, Water Pollution Control Ordinance | | ✓ | | | Implemented |

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| | | 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. | | | | | | | | | |
| 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 | | ✓ | | | Implemented |
| 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 | | ✓ | | | Implemented |
| 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 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"> ▪ Suitable containers should be used to hold the chemical wastes to avoid leakage or spillage during storage, handling and transport. ▪ Chemical waste containers should be suitably labelled, to notify and warn the personnel who are handling the wastes, to avoid accidents. ▪ Storage area should be selected at a safe | 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 | | ✓ | | Implemented | |

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| | | location on site and adequate space should be allocated to the storage area. | | | | | | | | | |
| 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"> ▪ 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. ▪ Recharge wells should be installed as necessary outside the excavation areas. Water pumped from the excavation areas should be recharged back into the ground. | To control groundwater hydrogeological impact and groundwater drawdown | All works sites | MTR Corporation/ Main Contractor | EIAO-TM, Water Pollution Control Ordinance | | ✓ | | | To be implemented as per construction programme |
| S.9.8.6 | | Measures for the tunnel run-off and drainage include: <ul style="list-style-type: none"> ▪ 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. ▪ The silt traps and oil interceptors should be cleaned and maintained regularly. ▪ Oily contents of the oil interceptors should be transferred to an appropriate disposal facility, or to be collected for reuse, if possible. | To control runoff from rail track | Tunnels and rail tracks | MTR Corporation/ Detailed Design Consultant | Water Pollution Control Ordinance | ✓ | | ✓ | | To be implemented as per construction programme |
| S.9.8.6 | | Measures for the control of sewage effluents include: <ul style="list-style-type: none"> ▪ Connection of domestic sewage generated from the KTE project should be diverted to the foul sewer wherever possible. If public sewer system is not | 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 | ✓ | | ✓ | | To be implemented as per construction programme |

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| | | 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. <ul style="list-style-type: none"> ▪ For handling, treatment and disposal of other operation stage effluent, the practices outlined in ProPECC PN 5/93 should be adopted where applicable. | | | | 5/93 | | | | | |
| Waste Management Implications | | | | | | | | | | | |
| S.10.5.6.1 | | Recommendations for good site practices: <ul style="list-style-type: none"> ▪ Prepare a Waste Management Plan approved by the Engineer/Supervising Officer of the Project based on current practices on construction sites. ▪ Training of site personnel in, site cleanliness, proper waste management and chemical handling procedures. ▪ Provision of sufficient waste disposal points and regular collection of waste. ▪ Appropriate measures to minimise windblown litter and dust during transportation of waste by either covering trucks or by transporting wastes in enclosed containers. ▪ Regular cleaning and maintenance programme for drainage systems, sumps and oil interceptors. ▪ Separation of chemical wastes for special handling and appropriate treatment. | 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) No 31/2004 | | ✓ | | | Implemented |
| S.10.5.6.1 | | Recommendations for waste reduction measures: <ul style="list-style-type: none"> ▪ Sorting of demolition debris and excavated materials from demolition works to recover reusable/ recyclable portions (i.e. soil, broken concrete, metal etc.). ▪ Segregation and storage of different types of waste in different containers, skips or stockpiles to enhance reuse or | 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 | | ✓ | | | Implemented |

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| | | recycling of materials and their proper disposal. <ul style="list-style-type: none"> ▪ 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. ▪ Proper storage and site practices to minimize the potential for damage or contamination of construction materials. ▪ Plan and stock construction materials carefully to minimize amount of waste generated and avoid unnecessary generation of waste. ▪ Training should be provided to workers about the concepts of site cleanliness and appropriate waste management procedures, including waste reduction, reuse and recycle. | | | | | | | | | |
| 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 | | ✓ | | | Implemented |
| 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"> ▪ Waste, such as soil, should be handled and stored well to ensure secure containment, thus minimising the potential of pollution. ▪ Maintain and clean storage areas routinely. ▪ Stockpiling area should be provided with covers and water spraying system to prevent materials from wind-blown or being washed away. ▪ Different locations should be designated | To minimise potential impacts of waste storage and enhance reusable volume | All works sites | Main Contractor | - | | ✓ | | | Implemented |

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| | | to stockpile each material to enhance reuse. | | | | | | | | | |
| 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 | - | | ✓ | | | Implemented |
| S.10.5.6.1 | | Implementation of trip-ticket system to monitor waste disposal and control fly-tipping. <ul style="list-style-type: none"> ▪ Set up warning signs at vehicular access points reminding drivers of designated disposal sites and penalties of an offence. ▪ Installation of close-circuited television at access points of vehicles to monitor and prevent illegal dumping. | To monitor disposal of waste and control fly-tipping | All works sites | Main Contractor | ETWB TC(W) No 31/2004 | | ✓ | | | Implemented |
| 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 | - | | ✓ | | | Implemented |
| 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 | - | | ✓ | | | Implemented |
| 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"> ▪ Be compatible with the chemical wastes being stored, maintained in good condition and securely sealed. ▪ Have a capacity of less than 450 litres unless the specifications have been approved by EPD; and | 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 | | ✓ | | | Implemented |

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| | | <ul style="list-style-type: none"> Display a label in English and Chinese in accordance with instructions prescribed in Schedule 2 of the Waste Disposal (Chemical Waste) (General) Regulation. | | | | | | | | | |
| S.10.5.6.1 | | <p>The chemical storage areas should:</p> <ul style="list-style-type: none"> Be clearly labelled to indicate corresponding chemical characteristics of the chemical waste and used for storage of chemical waste only. Be enclosed on at least 3 sides. 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. Have adequate ventilation. Be covered to prevent rainfall from entering. Be properly arranged so that incompatible materials are adequately separated. | 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 | | ✓ | | | Implemented |
| 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 | | ✓ | | | Implemented |
| 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 | | ✓ | | | Implemented |

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| S.10.5.6.1 | | General refuse should be stored in enclosed bins or compaction units separate from C&D 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. | To properly store and separate from other C&D materials for subsequent collection and disposal | All works sites | Main Contractor | - | | ✓ | | | Implemented |
| 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 | - | | ✓ | | | Implemented |
| 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 | - | | ✓ | | | Implemented |
| S.10.6.4 | | Chemical waste during the operation of the KTE project: <ul style="list-style-type: none"> ▪ 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. ▪ 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 treatment and disposal. ▪ The recommendations proposed for the mitigation of impacts from chemical waste in construction phase should also be followed. | 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 | | | ✓ | | Implemented |
| S.10.6.4 | | General refuse during the operation of the | To separate the general refuse from other waste | Ventilation building and | MTR Corporation | - | | | ✓ | | Implemented |

| 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 | Implementation status |
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| | | KTE project: <ul style="list-style-type: none"> Provide recycling bins at designated areas for proper recycling of papers, aluminium cans and plastics bottles. Separation from other waste types and collected by licensed collectors at daily basis to minimize the potential impacts from odour and vermin. | types and proper disposal of the refuse | Stations | | | | | | | |
| S.10.6.4 | | Industrial waste during the operation of the KTE project: <ul style="list-style-type: none"> Separation of reusable components like steel before collection by licensed collector | To recycle useful materials from industrial waste and proper disposal | Ventilation building and Stations | MTR Corporation | - | | ✓ | | | Implemented |
| Hazard to Life | | | | | | | | | | | |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| S.12.12.1 | Section 12.10.2.1 | The contractor should as far as practicable combine the explosive deliveries for a given work area. | To meet the ALARP requirement. | - | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |
| 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 | To meet the ALARP requirement. | - | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |

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| | | capacity AFFF-type extinguishers. | | | | | | | | | |
| S.12.12.1 | Section 12.10.2.1 | A minimum headway between two consecutive truck conveyors of at least 10 min is recommended | To meet the ALARP requirement. | Along explosives transport routes | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |
| 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 | | ✓ | | - | Implemented |
| 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, disposal should be made in a controlled and safe manner by a Registered Shotfirer. | To reduce the risk during explosives transport. | Works areas at which explosives would be stored and/or used. | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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) | To reduce the risk of fire within the magazine | Temporary explosives | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |

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| | | are removed and not allowed to accumulate. | | magazine | | | | | | | |
| 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 | - | | ✓ | | - | Implemented |
| 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 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. | To reduce the risk of fire. | Temporary explosives magazine and along explosives transport routes | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| S.12.12.10 | Section 12.10.2.5 | Ensure cartridged emulsion with high water content should be preferred. Also, the emulsion with perchlorate formulation | To ensure safe explosives to be used. | - | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |

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| | | should be avoided. | | | | | | | | | |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| 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 | - | | ✓ | | - | Implemented |
| S.12.12.3 | Section 12.10.2.3 | The magazine building shall be regularly checked for water seepage through the roof, walls or floor. | To ensure that the risks from the proposed explosives storage would not be unacceptable | Temporary explosives magazine | MTR Corporation/ Main Contractor | - | | ✓ | | - | Implemented |

Note: D = Design
 C = Construction
 O = Operation

Appendix E

Calibration Details

Certificate of Calibration

校正證書

Certificate No. : C136320
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC13-2604)

Description / 儀器名稱 : Sound Level Meter
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2250
Serial No. / 編號 : 2704791
Supplied By / 委託者 : EDMS Consulting Ltd.
Unit 1C, 24/F., World Wide House, 19 Des Voeux Road Central,
Hong Kong

TEST CONDITIONS / 測試條件

Temperature / 溫度 : (23 ± 2)°C
Relative Humidity / 相對濕度 : (55 ± 20)%
Line Voltage / 電壓 : ---

TEST SPECIFICATIONS / 測試規範

Calibration check

DATE OF TEST / 測試日期 : 7 October 2013

TEST RESULTS / 測試結果

The results apply to the particular unit-under-test only.
All results are within manufacturer's specification.
The results are detailed in the subsequent page(s).

The test equipment used for calibration are traceable to National Standards via :

- The Government of The Hong Kong Special Administrative Region Standard & Calibration Laboratory
- Rohde & Schwarz Laboratory, Germany
- Fluke Everett Service Center, USA
- Agilent Technologies, USA

Tested By : 
測試 : K C Lee

Certified By : 
核證 : K M Wu

Date of Issue : 8 October 2013
簽發日期

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。

Certificate of Calibration

校正證書

Certificate No. : C136320
證書編號

- The unit-under-test (UUT) was allowed to stabilize in the laboratory for over 12 hours, and switched on to warm up for over 10 minutes before the commencement of the test.
- Self-calibration using laboratory acoustic calibrator was performed before the test 6.1.1.2 to 6.3.2.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

| <u>Equipment ID</u> | <u>Description</u> | <u>Certificate No.</u> |
|---------------------|-------------------------------------|------------------------|
| CL280 | 40 MHz Arbitrary Waveform Generator | C130019 |
| CL281 | Multifunction Acoustic Calibrator | DC130171 |

- Test procedure : MA101N.

- Results :

6.1 Sound Pressure Level

6.1.1 Reference Sound Pressure Level

6.1.1.1 Before Self-calibration

| UUT Setting | | Applied Value | | UUT Reading (dB) |
|-------------|-----------|---------------|-------------|---------------------|
| Range (dB) | Main | Level (dB) | Freq. (kHz) | |
| 20 - 140 | LAF (SPL) | 94.00 | 1 | 94.2 |

6.1.1.2 After Self-calibration

| UUT Setting | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|-----------|---------------|-------------|---------------------|---------------------------------|
| Range (dB) | Main | Level (dB) | Freq. (kHz) | | |
| 20 - 140 | LAF (SPL) | 94.00 | 1 | 94.0 | ± 1.1 |

6.1.2 Linearity

| UUT Setting | | Applied Value | | UUT Reading (dB) |
|-------------|-----------|---------------|-------------|---------------------|
| Range (dB) | Main | Level (dB) | Freq. (kHz) | |
| 20 - 140 | LAF (SPL) | 94.00 | 1 | 94.0 (Ref.) |
| | | 104.00 | | 104.0 |
| | | 114.00 | | 114.0 |

IEC 61672 Class 1 Spec. : ± 0.6 dB per 10 dB step and ± 1.1 dB for overall different.

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Certificate of Calibration

校正證書

Certificate No. : C136320

證書編號

6.2 Time Weighting

| UUT Setting | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|-----------|---------------|-------------|---------------------|---------------------------------|
| Range (dB) | Main | Level (dB) | Freq. (kHz) | | |
| 20 - 140 | LAF (SPL) | 94.00 | 1 | 94.0 | Ref. |
| | LAS (SPL) | | | 94.0 | ± 0.3 |

6.3 Frequency Weighting

6.3.1 A-Weighting

| UUT Setting | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|-----------|---------------|----------|---------------------|---------------------------------|
| Range (dB) | Main | Level (dB) | Freq. | | |
| 20 - 140 | LAF (SPL) | 94.00 | 63 Hz | 67.8 | -26.2 ± 1.5 |
| | | | 125 Hz | 77.8 | -16.1 ± 1.5 |
| | | | 250 Hz | 85.3 | -8.6 ± 1.4 |
| | | | 500 Hz | 90.7 | -3.2 ± 1.4 |
| | | | 1 kHz | 94.0 | Ref. |
| | | | 2 kHz | 95.2 | +1.2 ± 1.6 |
| | | | 4 kHz | 95.0 | +1.0 ± 1.6 |
| | | | 8 kHz | 92.9 | -1.1(+2.1 ; -3.1) |
| | | | 12.5 kHz | 89.3 | -4.3(+3.0 ; -6.0) |

6.3.2 C-Weighting

| UUT Setting | | Applied Value | | UUT Reading (dB) | IEC 61672 Class 1 Spec. (dB) |
|-------------|-----------|---------------|----------|---------------------|---------------------------------|
| Range (dB) | Main | Level (dB) | Freq. | | |
| 20 - 140 | LCF (SPL) | 94.00 | 63 Hz | 93.2 | -0.8 ± 1.5 |
| | | | 125 Hz | 93.8 | -0.2 ± 1.5 |
| | | | 250 Hz | 94.0 | 0.0 ± 1.4 |
| | | | 500 Hz | 94.0 | 0.0 ± 1.4 |
| | | | 1 kHz | 94.0 | Ref. |
| | | | 2 kHz | 93.8 | -0.2 ± 1.6 |
| | | | 4 kHz | 93.2 | -0.8 ± 1.6 |
| | | | 8 kHz | 91.0 | -3.0 (+2.1 ; -3.1) |
| | | | 12.5 kHz | 87.4 | -6.2 (+3.0 ; -6.0) |

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Certificate of Calibration

校正證書

Certificate No. : C136320
證書編號

- Remarks : - UUT Microphone Model No. : 4189 & S/N : 2680937
- Mfr's Spec. : IEC 61672 Class 1
 - Uncertainties of Applied Value : 94 dB : 63 Hz - 125 Hz : ± 0.35 dB
250 Hz - 500 Hz : ± 0.30 dB
1 kHz : ± 0.20 dB
2 kHz - 4 kHz : ± 0.35 dB
8 kHz : ± 0.45 dB
12.5 kHz : ± 0.70 dB
104 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
114 dB : 1 kHz : ± 0.10 dB (Ref. 94 dB)
 - The uncertainties are for a confidence probability of not less than 95 %.

Note :

The values given in this Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowance for the equipment long term drift, variations with environment changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Sun Creation Engineering Limited shall not be liable for any loss or damage resulting from the use of the equipment.

The test equipment used for calibration are traceable to the Nation Standards as specified in this certificate. This certificate shall not be reproduced except in full, without the prior written approval of this laboratory.

本證書所載校正用之測試器材均可溯源至國際標準。局部複印本證書需先獲本實驗室書面批准。



CERTIFICATE OF CALIBRATION

Certificate No.: 14CA1016 01-01 Page 1 of 2

Item tested

| | | | |
|-----------------------|----------------------------|---|------------|
| Description: | Sound Level Meter (Type 1) | , | Microphone |
| Manufacturer: | B & K | , | B & K |
| Type/Model No.: | 2250 | , | 4189 |
| Serial/Equipment No.: | 2551244 | , | 2550229 |
| Adaptors used: | - | , | - |

Item submitted by

Customer Name: MTR Coporation Limited
Address of Customer: -
Request No.: -
Date of receipt: 16-Oct-2014

Date of test: 17-Oct-2014

Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|---------------------------------|----------|------------|--------------|---------------|
| Multi function sound calibrator | B&K 4226 | 2288444 | 20-Jun-2015 | CIGISMEC |
| Signal generator | DS 360 | 33873 | 09-Apr-2015 | CEPREI |
| Signal generator | DS 360 | 61227 | 09-Apr-2015 | CEPREI |

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 1000 ± 10 hPa

Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of $\pm 20\%$.
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsess of the Sound Level Meter.

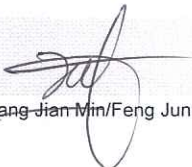
Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

Actual Measurement data are documented on worksheets.

Approved Signatory:

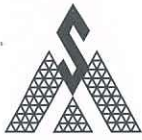

Huang Jian Min/Feng Jun Qi

Date: 18-Oct-2014

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA1016 01-01 Page 2 of 2

1, Electrical Tests

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

| Test: | Subtest: | Status: | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------------|--|---------|---------------------------|-----------------|
| Self-generated noise | A | Pass | 0.3 | |
| | C | Pass | 0.8 | 2.1 |
| | Lin | Pass | 1.6 | 2.2 |
| Linearity range for Leq | At reference range, Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Reference SPL on all other ranges | Pass | 0.3 | |
| | 2 dB below upper limit of each range | Pass | 0.3 | |
| | 2 dB above lower limit of each range | Pass | 0.3 | |
| Linearity range for SPL | At reference range, Step 5 dB at 4 kHz | Pass | 0.3 | |
| | Frequency weightings | | | |
| Time weightings | A | Pass | 0.3 | |
| | C | Pass | 0.3 | |
| | Lin | Pass | 0.3 | |
| Peak response | Single Burst Fast | Pass | 0.3 | |
| | Single Burst Slow | Pass | 0.3 | |
| R.M.S. accuracy | Single 100µs rectangular pulse | N/A | N/A | |
| Time weighting I | Crest factor of 3 | Pass | 0.3 | |
| | Single burst 5 ms at 2000 Hz | Pass | 0.3 | |
| Time averaging | Repeated at frequency of 100 Hz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/10 ³ at 4kHz | Pass | 0.3 | |
| | 1 ms burst duty factor 1/10 ⁴ at 4kHz | Pass | 0.3 | |
| Pulse range | Single burst 10 ms at 4 kHz | Pass | 0.4 | |
| Sound exposure level | Single burst 10 ms at 4 kHz | Pass | 0.4 | |
| Overload indication | SPL | Pass | 0.3 | |
| | Leq | Pass | 0.4 | |

2, Acoustic tests

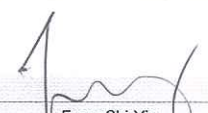
The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

| Test: | Subtest | Status | Expanded Uncertainty (dB) | Coverage Factor |
|-------------------|------------------------|--------|---------------------------|-----------------|
| Acoustic response | Weighting A at 125 Hz | Pass | 0.3 | |
| | Weighting A at 8000 Hz | Pass | 0.5 | |

3, Response to associated sound calibrator

N/A

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by: 
Date: 17-Oct-2014
Fung Chi Yip

- End -

Checked by: 
Date: 18-Oct-2014
Lam Tze Wai

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



Test Data for Sound Level Meter

Page 1 of 5

Sound level meter type: 2250 Serial No. 2551244 Date 17-Oct-2014
Microphone type: 4189 Serial No. 2550229
Report: 14CA1016 01-01

SELF GENERATED NOISE TEST

The noise test is performed in the most sensitive range of the SLM with the microphone replaced by an equivalent impedance.

Noise level in A weighting 12.2 dB
Noise level in C weighting 13.7 dB
Noise level in Lin 19.5 dB

LINEARITY TEST

The linearity is tested relative to the reference sound pressure level using a continuous sinusoidal signal of frequency 4 kHz. The measurement is made on the reference range for indications at 5 dB intervals starting from the 94 dB reference sound pressure level. And until within 5 dB of the upper and lower limits of the reference range, the measurements shall be made at 1 dB intervals.(SLM set to LEQ/SPL)

| Reference/Expected level | Actual level | | Tolerance | Deviation | |
|--------------------------|----------------|------------|-----------|----------------|------------|
| | non-integrated | integrated | | non-integrated | integrated |
| dB | dB | dB | +/- dB | dB | dB |
| 94.0 | 94.0 | 94.0 | 0.7 | 0.0 | 0.0 |
| 99.0 | 99.0 | 99.0 | 0.7 | 0.0 | 0.0 |
| 104.0 | 104.0 | 104.0 | 0.7 | 0.0 | 0.0 |
| 109.0 | 109.0 | 109.0 | 0.7 | 0.0 | 0.0 |
| 114.0 | 114.0 | 114.0 | 0.7 | 0.0 | 0.0 |
| 119.0 | 119.0 | 119.0 | 0.7 | 0.0 | 0.0 |
| 124.0 | 124.0 | 124.0 | 0.7 | 0.0 | 0.0 |
| 129.0 | 129.0 | 129.0 | 0.7 | 0.0 | 0.0 |
| 134.0 | 134.0 | 134.0 | 0.7 | 0.0 | 0.0 |
| 135.0 | 135.0 | 135.0 | 0.7 | 0.0 | 0.0 |
| 136.0 | 136.0 | 136.0 | 0.7 | 0.0 | 0.0 |
| 137.0 | 137.0 | 137.0 | 0.7 | 0.0 | 0.0 |
| 138.0 | 138.0 | 138.0 | 0.7 | 0.0 | 0.0 |
| 139.0 | 139.0 | 139.0 | 0.7 | 0.0 | 0.0 |
| 140.0 | 140.0 | 140.0 | 0.7 | 0.0 | 0.0 |
| 89.0 | 89.0 | 89.0 | 0.7 | 0.0 | 0.0 |
| 84.0 | 84.0 | 84.0 | 0.7 | 0.0 | 0.0 |
| 79.0 | 79.0 | 79.0 | 0.7 | 0.0 | 0.0 |
| 74.0 | 74.0 | 74.0 | 0.7 | 0.0 | 0.0 |
| 69.0 | 69.0 | 69.0 | 0.7 | 0.0 | 0.0 |
| 64.0 | 64.0 | 64.0 | 0.7 | 0.0 | 0.0 |
| 59.0 | 59.0 | 59.0 | 0.7 | 0.0 | 0.0 |
| 54.0 | 53.9 | 53.9 | 0.7 | -0.1 | -0.1 |
| 49.0 | 49.0 | 49.0 | 0.7 | 0.0 | 0.0 |



Test Data for Sound Level Meter

Page 2 of 5

Sound level meter type: 2250 Serial No. 2551244 Date 17-Oct-2014
Microphone type: 4189 Serial No. 2550229

Report: 14CA1016 01-01

| | | | | | |
|------|------|------|-----|------|------|
| 44.0 | 43.9 | 43.9 | 0.7 | -0.1 | -0.1 |
| 39.0 | 39.0 | 39.0 | 0.7 | 0.0 | 0.0 |
| 34.0 | 33.9 | 33.9 | 0.7 | -0.1 | -0.1 |
| 33.0 | 33.0 | 33.0 | 0.7 | 0.0 | 0.0 |
| 32.0 | 32.0 | 32.0 | 0.7 | 0.0 | 0.0 |
| 31.0 | 31.0 | 31.0 | 0.7 | 0.0 | 0.0 |
| 30.0 | 30.0 | 30.0 | 0.7 | 0.0 | 0.0 |

Measurements for an indication of the reference SPL on all other ranges which include it

| Other ranges | Expected level | Actual level | Tolerance | Deviation |
|--------------|----------------|--------------|-----------|-----------|
| dB | dB | dB | +/- dB | dB |
| 20-140 | 94.0 | 94.0 | 0.7 | 0.0 |

Measurements on all level ranges for indications 2 dB below the upper limit and 2 dB above the lower limit

| Ranges | Reference/Expected level | Actual level | Tolerance | Deviation |
|--------|--------------------------|--------------|-----------|-----------|
| dB | dB | dB | +/- dB | dB |
| 20-140 | 30.0 | 30.0 | 0.7 | 0.0 |
| | 138.0 | 138.0 | 0.7 | 0.0 |

FREQUENCY WEIGHTING TEST

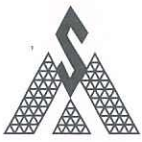
The frequency response of the weighting networks are tested at octave intervals over the frequency ranges 31.5 Hz to 12500 Hz. The signal level at 1000 Hz is set to give an indication of the reference SPL.

Frequency weighting A:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) | | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| | | | | + | - | |
| Hz | dB | dB | dB | + | - | dB |
| 1000.0 | 94.0 | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 31.6 | 94.0 | 54.6 | 54.5 | 1.5 | 1.5 | -0.1 |
| 63.1 | 94.0 | 67.8 | 67.7 | 1.5 | 1.5 | -0.1 |
| 125.9 | 94.0 | 77.9 | 77.9 | 1.0 | 1.0 | 0.0 |
| 251.2 | 94.0 | 85.4 | 85.3 | 1.0 | 1.0 | -0.1 |
| 501.2 | 94.0 | 90.8 | 90.7 | 1.0 | 1.0 | -0.1 |
| 1995.0 | 94.0 | 95.2 | 95.2 | 1.0 | 1.0 | 0.0 |
| 3981.0 | 94.0 | 95.0 | 95.0 | 1.0 | 1.0 | 0.0 |
| 7943.0 | 94.0 | 92.9 | 92.9 | 1.5 | 3.0 | 0.0 |
| 12590.0 | 94.0 | 89.7 | 89.2 | 3.0 | 6.0 | -0.5 |

Frequency weighting C:

| Frequency | Ref. level | Expected level | Actual level | Tolerance(dB) | | Deviation |
|-----------|------------|----------------|--------------|---------------|-----|-----------|
| | | | | + | - | |
| Hz | dB | dB | dB | + | - | dB |
| 1000.0 | 94.0 | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 31.6 | 94.0 | 91.0 | 91.0 | 1.5 | 1.5 | 0.0 |



Test Data for Sound Level Meter

Page 3 of 5

Sound level meter type: 2250 Serial No. 2551244 Date 17-Oct-2014
Microphone type: 4189 Serial No. 2550229

Report: 14CA1016 01-01

| | | | | | | |
|---------|------|------|------|-----|-----|------|
| 63.1 | 94.0 | 93.2 | 93.2 | 1.5 | 1.5 | 0.0 |
| 125.9 | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0 |
| 251.2 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 501.2 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 1995.0 | 94.0 | 93.8 | 93.8 | 1.0 | 1.0 | 0.0 |
| 3981.0 | 94.0 | 93.2 | 93.2 | 1.0 | 1.0 | 0.0 |
| 7943.0 | 94.0 | 91.0 | 91.0 | 1.5 | 3.0 | 0.0 |
| 12590.0 | 94.0 | 87.8 | 87.3 | 3.0 | 6.0 | -0.5 |

Frequency weighting Lin:

| Frequency Hz | Ref. level dB | Expected level dB | Actual level dB | Tolerance(dB) | | Deviation dB |
|-----------------|------------------|----------------------|--------------------|---------------|-----|-----------------|
| | | | | + | - | |
| 1000.0 | 94.0 | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 31.6 | 94.0 | 94.0 | 94.0 | 1.5 | 1.5 | 0.0 |
| 63.1 | 94.0 | 94.0 | 94.0 | 1.5 | 1.5 | 0.0 |
| 125.9 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 251.2 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 501.2 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 1995.0 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 3981.0 | 94.0 | 94.0 | 94.0 | 1.0 | 1.0 | 0.0 |
| 7943.0 | 94.0 | 94.0 | 94.0 | 1.5 | 3.0 | 0.0 |
| 12590.0 | 94.0 | 94.0 | 93.5 | 3.0 | 6.0 | -0.5 |

TIME WEIGHTING FAST TEST

Time weighting F is tested on the reference range with a single sinusoidal burst of duration 200 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level dB | Expected level dB | Actual level dB | Tolerance(dB) | | Deviation dB |
|------------------|----------------------|--------------------|---------------|-----|-----------------|
| | | | + | - | |
| 116.0 | 115.0 | 115.0 | 1.0 | 1.0 | 0.0 |

TIME WEIGHTING SLOW TEST

Time weighting S is tested on the reference range with a single sinusoidal burst of duration 500 ms at a frequency 2000 Hz and an amplitude which produces an indication 4 dB below the upper limit of the primary indicator range when the signal is continuous. (Weight A, Maximum hold)

| Ref. level dB | Expected level dB | Actual level dB | Tolerance(dB) | | Deviation dB |
|------------------|----------------------|--------------------|---------------|-----|-----------------|
| | | | + | - | |
| 116.0 | 111.9 | 111.9 | 1.0 | 1.0 | 0.0 |

RMS ACCURACY TEST

The RMS detector accuracy is tested on the reference range for a crest factor of 3.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz. (Set to INT)



Test Data for Sound Level Meter

Page 4 of 5

Sound level meter type: 2250 Serial No. 2551244 Date 17-Oct-2014
Microphone type: 4189 Serial No. 2550229
Report: 14CA1016 01-01

| | Ref. Level | Expected level | Tone burst signal | Tolerance | Deviation |
|----------------|------------|----------------|-------------------|-----------|-----------|
| Time weighting | dB | dB | indication(dB) | +/- dB | dB |
| Slow | 118.0+6.6 | 118.0 | 118.0 | 0.5 | 0.0 |

TIME WEIGHTING IMPULSE TEST

Time weighting I is tested on the reference range (Set the SLM to LAImax)

Test frequency: 2000 Hz

Amplitude: The upper limit of the primary indicator range.

Single sinusoidal burst of duration 5 ms:

| Ref. Level | Single burst indication | | Tolerance | Deviation |
|------------|-------------------------|-------------|-----------|-----------|
| dB | Expected (dB) | Actual (dB) | +/- dB | dB |
| 120.0 | 111.2 | 111.1 | 2.0 | -0.1 |

Repeated at 100 Hz

| Ref. Level | Repeated burst indication | | Tolerance | Deviation |
|------------|---------------------------|-------------|-----------|-----------|
| dB | Expected (dB) | Actual (dB) | +/- dB | dB |
| 120.0 | 117.3 | 117.2 | 1.0 | -0.1 |

TIME AVERAGING TEST

This test compares the SLM reading for continuous sine signals with readings obtained from a sine tone burst sequence having the same RMS level. The test level is 30 dB below the upper limit of the linearity range and repeated for Type 1 SLM with 40 dB below the upper limit of the linearity.

Frequency of tone burst: 4000 Hz

Duration of tone burst: 1 ms

| Repetition Time | Level of tone burst | Expected Leq | Actual Leq | Tolerance | Deviation | Remarks |
|-----------------|---------------------|--------------|------------|-----------|-----------|--------------|
| msec | dB | dB | dB | +/- dB | dB | |
| 1000 | 110.0 | 110.0 | 109.9 | 1.0 | -0.1 | 60s integ. |
| 10000 | 100.0 | 100.0 | 99.9 | 1.0 | -0.1 | 6min. integ. |

PULSE RANGE AND SOUND EXPOSURE LEVEL TEST

The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference rar

Test frequency: 4000 Hz

Integration time: 10 sec

The integrating sound level meter set to Leq:

| Duration | Rms level of tone burst | Expected | Actual | Tolerance | Deviation |
|----------|-------------------------|----------|--------|-----------|-----------|
| msec | dB | dB | dB | +/- dB | dB |
| 10 | 120.0 | 90.0 | 89.9 | 1.7 | -0.1 |

The integrating sound level meter set to SEL:

| Duration | Rms level of tone burst | Expected | Actual | Tolerance | Deviation |
|----------|-------------------------|----------|--------|-----------|-----------|
| msec | dB | dB | dB | +/- dB | dB |
| 10.0 | 120.0 | 100.0 | 99.9 | 1.7 | -0.1 |



Test Data for Sound Level Meter

Page 5 of 5

Sound level meter type: 2250 Serial No. 2551244 Date 17-Oct-2014
Microphone type: 4189 Serial No. 2550229

Report: 14CA1016 01-01

OVERLOAD INDICATION TEST

For SLM capable of operating in a non-integrating mode.

Test frequency: 2000 Hz
Amplitude: 2 dB below the upper limit of the primary indicator range.
Burst repetition frequency: 40 Hz
Tone burst signal: 11 cycles of a sine wave of frequency 2000 Hz.

| Level | Level reduced by | Further reduced | Difference | Tolerance | Deviation |
|------------------|------------------|-----------------|------------|-----------|-----------|
| at overload (dB) | 1 dB | 3 dB | dB | dB | dB |
| 134.6 | 133.6 | 130.6 | 3.0 | 1.0 | 0.0 |

For integrating SLM, with the instrument indicating Leq.

For integrating SLM, with the instrument indicating Leq and set to the reference range. The test signal as follow
The test tone burst signal is superimposed on a baseline signal corresponding to the lower limit of reference range

Test frequency: 4000 Hz
Integration time: 10 sec
Single burst duration: 1 msec

| Rms level | Level reduced by | Expected level | Actual level | Tolerance | Deviation |
|------------------|------------------|----------------|--------------|-----------|-----------|
| at overload (dB) | 1 dB | dB | dB | dB | dB |
| 141.6 | 140.6 | 100.6 | 100.5 | 2.2 | -0.1 |

ACOUSTIC TEST

The acoustic test of the complete SLM is tested at the frequency 125 Hz and 8000 Hz using a B&K type 4226 Multifunction Acoustic Calibrator. The test is performed in A weighting.

| Frequency Hz | Expected level dB | Actual level Measured (dB) | Tolerance (dB) | | Deviation dB |
|-----------------|----------------------|-------------------------------|----------------|-----|-----------------|
| | | | + | - | |
| 1000 | 94.0 | 94.0 | 0.0 | 0.0 | 0.0 |
| 125 | 77.9 | 77.7 | 1.0 | 1.0 | -0.2 |
| 8000 | 92.9 | 94.2 | 1.5 | 3.0 | 1.3 |

-----END-----



CERTIFICATE OF CALIBRATION

Certificate No.: 14CA1016 01-03

Page: 1 of 2

Item tested

Description: Acoustical Calibrator (Class 1)
Manufacturer: B & K
Type/Model No.: 4231
Serial/Equipment No.: 2725557
Adaptors used: -

Item submitted by

Customer: MTR Corporation Limited
Address of Customer: -
Request No.: -
Date of receipt: 16-Oct-2014

Date of test: 17-Oct-2014

Reference equipment used in the calibration

| Description: | Model: | Serial No. | Expiry Date: | Traceable to: |
|-------------------------|----------|------------|--------------|---------------|
| Lab standard microphone | B&K 4180 | 2412857 | 13-May-2015 | SCL |
| Preamplifier | B&K 2673 | 2743150 | 10-Apr-2015 | CEPREI |
| Measuring amplifier | B&K 2610 | 2346941 | 08-Apr-2015 | CEPREI |
| Signal generator | DS 360 | 61227 | 09-Apr-2015 | CEPREI |
| Digital multi-meter | 34401A | US36087050 | 17-Dec-2014 | CEPREI |
| Audio analyzer | 8903B | GB41300350 | 07-Apr-2015 | CEPREI |
| Universal counter | 53132A | MY40003662 | 11-Apr-2015 | CEPREI |

Ambient conditions

Temperature: 22 ± 1 °C
Relative humidity: 60 ± 10 %
Air pressure: 1000 ± 10 hPa

Test specifications

- 1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

Test results

This is to certify that the sound calibrator conforms to the requirements of annex B of IEC 60942: 1997 for the conditions under which the test was performed. This does not imply that the sound calibrator meets IEC 60942 under any other conditions.

Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

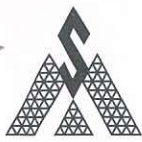

Huang Jian-Min/Feng Jun Qi

Date: 18-Oct-2014

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



CERTIFICATE OF CALIBRATION

(Continuation Page)

Certificate No.: 14CA1016 01-03

Page: 2 of 2

1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

| Frequency Shown Hz | Output Sound Pressure Level Setting dB | Measured Output Sound Pressure Level dB | (Output level in dB re 20 μ Pa) |
|-----------------------|---|--|--------------------------------------|
| | | | Estimated Expanded Uncertainty dB |
| 1000 | 94.00 | 94.10 | 0.10 |

2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

At 1000 Hz STF = 0.001 dB
Estimated expanded uncertainty 0.005 dB

3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 KHz was:

At 1000 Hz Actual Frequency = 1000.0 Hz
Estimated expanded uncertainty 0.1 Hz Coverage factor k = 2.2

4, Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz TND = 0.5 %
Estimated expanded uncertainty 0.7 %

The expanded uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95%. A coverage factor of 2 is assumed unless explicitly stated.

Calibrated by:

Date: 17-Oct-2014

Fung Chi Yip

- End -

Checked by:

Date: 18-Oct-2014

Lam Tze Wai

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

AECOM Asia Company Limited

TSP High Volume Sampler

Field Calibration Report

Station 234 - 238 Chatham Road North; SCL - DMS - 11 Operator: Shum Kam Yuen
 Cal. Date: 3-Sep-14 Next Due Date: 3-Nov-14
 Equipment No.: --- Serial No. 8259

| Ambient Condition | | | |
|---------------------|-----|---------------------|-------|
| Temperature, Ta (K) | 305 | Pressure, Pa (mmHg) | 755.7 |

| Orifice Transfer Standard Information | | | | | |
|---------------------------------------|-----------|--|---------|---------------|----------|
| Serial No: | 988 | Slope, mc | 1.97518 | Intercept, bc | -0.01001 |
| Last Calibration Date: | 28-May-14 | $mc \times Q_{std} + bc = [H \times (Pa/760) \times (298/Ta)]^{1/2}$ | | | |
| Next Calibration Date: | 28-May-15 | | | | |

| Calibration of TSP Sampler | | | | | |
|----------------------------|----------------------------|---|-----------------------------------|-----------------------------|--|
| Resistance Plate No. | Orifice | | | HVS Flow Recorder | |
| | DH (orifice), in. of water | [DH x (Pa/760) x (298/Ta)] ^{1/2} | Qstd (m ³ /min) X-axis | Flow Recorder Reading (CFM) | Continuous Flow Recorder Reading IC (CFM) Y-axis |
| 18 | 8.0 | 2.79 | 1.42 | 46.0 | 45.34 |
| 13 | 6.6 | 2.53 | 1.29 | 39.0 | 38.44 |
| 10 | 5.5 | 2.31 | 1.18 | 34.0 | 33.51 |
| 7 | 4.1 | 2.00 | 1.02 | 26.0 | 25.63 |
| 5 | 2.9 | 1.68 | 0.85 | 20.0 | 19.71 |

By Linear Regression of Y on X
 Slope, mw = 45.7967 Intercept, bw = -20.1336
 Correlation Coefficient* = 0.9962
 *If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m³/min
 From the Regression Equation, the "Y" value according to

$$mw \times Q_{std} + bw = IC \times [(Pa/760) \times (298/Ta)]^{1/2}$$

Therefore, Set Point; IC = (mw x Qstd + bw) x [(760 / Pa) x (Ta / 298)]^{1/2} = 39.98

Remarks: _____

QC Reviewer: Yufeng Signature: [Signature] Date: 4 Sep 14



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 VILLAGE OF CLEVELAND, OH
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 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - May 28, 2014 Rootsmeter S/N 0438320 Ta (K) - 296
 Operator Tisch Orifice I.D. - 0988 Pa (mm) - 751.84

| PLATE OR Run # | VOLUME START (m3) | VOLUME STOP (m3) | DIFF VOLUME (m3) | DIFF TIME (min) | METER DIFF Hg (mm) | ORFICE DIFF H2O (in.) |
|----------------|-------------------|------------------|------------------|-----------------|--------------------|-----------------------|
| 1 | NA | NA | 1.00 | 1.3790 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 0.9720 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.8690 | 7.9 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8260 | 8.8 | 5.50 |
| 5 | NA | NA | 1.00 | 0.6830 | 12.8 | 8.00 |

DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | Va | (x axis) Qa | (y axis) |
|--|---------------|----------|---|-------------|----------|
| 0.9917 | 0.7191 | 1.4113 | 0.9957 | 0.7221 | 0.8874 |
| 0.9875 | 1.0159 | 1.9959 | 0.9915 | 1.0201 | 1.2549 |
| 0.9854 | 1.1339 | 2.2315 | 0.9894 | 1.1385 | 1.4030 |
| 0.9843 | 1.1916 | 2.3405 | 0.9883 | 1.1965 | 1.4715 |
| 0.9790 | 1.4333 | 2.8227 | 0.9829 | 1.4392 | 1.7747 |
| Qstd slope (m) = 1.97518 | | | Qa slope (m) = 1.23683 | | |
| intercept (b) = -0.01001 | | | intercept (b) = -0.00630 | | |
| coefficient (r) = 0.99998 | | | coefficient (r) = 0.99998 | | |
| y axis = $\text{SQRT}[\text{H2O}(\text{Pa}/760)(298/\text{Ta})]$ | | | y axis = $\text{SQRT}[\text{H2O}(\text{Ta}/\text{Pa})]$ | | |

CALCULATIONS

$$\text{Vstd} = \text{Diff. Vol} [(\text{Pa} - \text{Diff. Hg}) / 760] (298 / \text{Ta})$$

$$\text{Qstd} = \text{Vstd} / \text{Time}$$

$$\text{Va} = \text{Diff Vol} [(\text{Pa} - \text{Diff Hg}) / \text{Pa}]$$

$$\text{Qa} = \text{Va} / \text{Time}$$

For subsequent flow rate calculations:

$$\text{Qstd} = 1/m \{ [\text{SQRT}(\text{H2O}(\text{Pa}/760)(298/\text{Ta}))] - b \}$$

$$\text{Qa} = 1/m \{ [\text{SQRT} \text{H2O}(\text{Ta}/\text{Pa})] - b \}$$

ANDERSEN INSTRUMENTS INC.

GS2310 Series Sampler Calibration

(Dickson Recorder)

Customer -> MTRC

SITE

Certificate -> 20141211

Location -> Fung Kei MPS

Date -> 29-Nov-14

Sampler -> 1294-1110

Tech -> Chan Kin Fung

CONDITIONS

| | | | | | |
|----------------------|---------|--------|----------------------|---------|--------|
| Sea Level Pressure | (hpa) | 1013.4 | Sampler Elevation | (feet) | 100 |
| Sea Level Pressure | (in Hg) | 29.93 | Corrected Pressure | (mm Hg) | 757.52 |
| Temperature | (deg C) | 23.5 | Temperature | (deg K) | 296.50 |
| Seasonal SL Pressure | (in Hg) | 29.93 | Corrected Seasonal | (mm Hg) | 757.52 |
| Seasonal Temperature | (deg C) | 23.50 | Seasonal Temperature | (deg K) | 296.50 |

CALIBRATION ORIFICE

Make -> TISCH

Qstd Slope -> 2.02363

Model -> TE-5025A

Qstd Intercept -> 0.03075

Serial# -> 2821

Date Certified -> 19-Sep-14

CALIBRATION

| | Plate or | H ₂ O | Qstd | I | IC | LINEAR | |
|---|----------|------------------|-----------------------|---------|-------------|----------------|---------|
| | Test # | (in) | (M ³ /min) | (chart) | (corrected) | REGRESSION | |
| 1 | 18 | 12.3 | 1.719 | 61 | 61.054 | Slope = | 31.2546 |
| 2 | 13 | 9.9 | 1.541 | 54 | 54.048 | Intercept = | 6.3744 |
| 3 | 10 | 7.8 | 1.366 | 48 | 48.043 | Corr. Coeff. = | 0.9975 |
| 4 | 7 | 5.1 | 1.102 | 41 | 41.037 | | |
| 5 | 5 | 3 | 0.841 | 33 | 33.029 | | |

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



Handwritten signature in blue ink.

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

Certificate -> 20141210

Location -> Ka Fu Building

Date -> 29-Nov-14

Sampler -> 994-0874

Tech -> Chan Kin Fung

CONDITIONS

| | | | | | |
|----------------------|---------|--------|----------------------|---------|--------|
| Sea Level Pressure | (hpa) | 1013.4 | Sampler Elevation | (feet) | 100 |
| Sea Level Pressure | (in Hg) | 29.93 | Corrected Pressure | (mm Hg) | 757.52 |
| Temperature | (deg C) | 23.5 | Temperature | (deg K) | 296.50 |
| Seasonal SL Pressure | (in Hg) | 29.93 | Corrected Seasonal | (mm Hg) | 757.52 |
| Seasonal Temperature | (deg C) | 23.50 | Seasonal Temperature | (deg K) | 296.50 |

CALIBRATION ORIFICE

Make -> TISCH

Qstd Slope -> 2.02363

Model -> TE-5025A

Qstd Intercept -> 0.03075

Serial# -> 2821

Date Certified -> 19-Sep-14

CALIBRATION

| | Plate or | H ₂ O | Qstd | I | IC | LINEAR | |
|---|----------|------------------|-----------------------|---------|-------------|----------------|---------|
| | Test # | (in) | (M ³ /min) | (chart) | (corrected) | REGRESSION | |
| 1 | 18 | 12 | 1.698 | 58 | 58.052 | Slope = | 30.2654 |
| 2 | 13 | 9.5 | 1.509 | 53 | 53.047 | Intercept = | 6.7817 |
| 3 | 10 | 7.7 | 1.357 | 47 | 47.042 | Corr. Coeff. = | 0.9983 |
| 4 | 7 | 4.9 | 1.080 | 40 | 40.036 | | |
| 5 | 5 | 3 | 0.841 | 32 | 32.029 | | |

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 Certificate -> 20141213

Location -> Methodist School

Date -> 29-Nov-14

Sampler -> 1294-1112

Tech -> Chan Kin Fung

CONDITIONS

| | | | | | |
|----------------------|---------|--------|----------------------|---------|--------|
| Sea Level Pressure | (hpa) | 1013.4 | Sampler Elevation | (feet) | 60 |
| Sea Level Pressure | (in Hg) | 29.93 | Corrected Pressure | (mm Hg) | 758.53 |
| Temperature | (deg C) | 23.5 | Temperature | (deg K) | 296.50 |
| Seasonal SL Pressure | (in Hg) | 29.93 | Corrected Seasonal | (mm Hg) | 758.53 |
| Seasonal Temperature | (deg C) | 23.50 | Seasonal Temperature | (deg K) | 296.50 |

CALIBRATION ORIFICE

Make -> TISCH

Qstd Slope -> 2.02363

Model -> TE-5025A

Qstd Intercept -> 0.03075

Serial# -> 2821

Date Certified -> 19-Sep-14

CALIBRATION

| | Plate or | H ₂ O | Qstd | I | IC | LINEAR | |
|---|----------|------------------|-----------------------|---------|-------------|----------------|---------|
| | Test # | (in) | (M ³ /min) | (chart) | (corrected) | REGRESSION | |
| 1 | 18 | 12.3 | 1.721 | 61 | 61.095 | Slope = | 33.1941 |
| 2 | 13 | 10.2 | 1.565 | 55 | 55.086 | Intercept = | 3.7351 |
| 3 | 10 | 8 | 1.385 | 50 | 50.078 | Corr. Coeff. = | 0.9994 |
| 4 | 7 | 5 | 1.092 | 40 | 40.062 | | |
| 5 | 5 | 3.1 | 0.856 | 32 | 32.050 | | |

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



Kin Fung

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 Certificate -> 20141212

Location -> Poly U Hall

Date -> 29-Nov-14

Sampler -> 1294-1109

Tech -> Chan Kin Fung

CONDITIONS

| | | | | | |
|----------------------|---------|--------|----------------------|---------|--------|
| Sea Level Pressure | (hpa) | 1013.4 | Sampler Elevation | (feet) | 260 |
| Sea Level Pressure | (in Hg) | 29.93 | Corrected Pressure | (mm Hg) | 753.48 |
| Temperature | (deg C) | 23.5 | Temperature | (deg K) | 296.50 |
| Seasonal SL Pressure | (in Hg) | 29.93 | Corrected Seasonal | (mm Hg) | 753.48 |
| Seasonal Temperature | (deg C) | 23.50 | Seasonal Temperature | (deg K) | 296.50 |

CALIBRATION ORIFICE

Make -> TISCH

Qstd Slope -> 2.02363

Model -> TE-5025A

Qstd Intercept -> 0.03075

Serial# -> 2821

Date Certified -> 19-Sep-14

CALIBRATION

| | Plate or | H ₂ O | Qstd | I | IC | LINEAR |
|---|----------|------------------|-----------------------|---------|-------------|-----------------------|
| | Test # | (in) | (M ³ /min) | (chart) | (corrected) | REGRESSION |
| 1 | 18 | 11.8 | 1.679 | 62 | 61.890 | Slope = 39.2216 |
| 2 | 13 | 9.8 | 1.529 | 56 | 55.900 | Intercept = -3.1568 |
| 3 | 10 | 7.6 | 1.345 | 52 | 51.907 | Corr. Coeff. = 0.9926 |
| 4 | 7 | 4.9 | 1.077 | 40 | 39.929 | |
| 5 | 5 | 3.3 | 0.881 | 30 | 29.947 | |

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.



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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Sep 16, 2014 Rootsmeter S/N 0438320 Ta (K) - 298
 Operator Tisch Orifice I.D. - 2821 Pa (mm) - 751.84

| PLATE OR Run # | VOLUME START (m3) | VOLUME STOP (m3) | DIFF VOLUME (m3) | DIFF TIME (min) | METER DIFF Hg (mm) | ORFICE DIFF H2O (in.) |
|----------------|-------------------|------------------|------------------|-----------------|--------------------|-----------------------|
| 1 | NA | NA | 1.00 | 1.4480 | 3.2 | 2.00 |
| 2 | NA | NA | 1.00 | 1.0130 | 6.4 | 4.00 |
| 3 | NA | NA | 1.00 | 0.9050 | 7.9 | 5.00 |
| 4 | NA | NA | 1.00 | 0.8590 | 8.8 | 5.50 |
| 5 | NA | NA | 1.00 | 0.7070 | 12.7 | 8.00 |

DATA TABULATION

| Vstd | (x axis) Qstd | (y axis) | Va | (x axis) Qa | (y axis) |
|-------------------------------------|---------------|----------|---------------------------|-------------|----------|
| 0.9850 | 0.6803 | 1.4066 | 0.9957 | 0.6876 | 0.8903 |
| 0.9809 | 0.9683 | 1.9892 | 0.9915 | 0.9788 | 1.2591 |
| 0.9788 | 1.0815 | 2.2240 | 0.9894 | 1.0933 | 1.4078 |
| 0.9777 | 1.1381 | 2.3326 | 0.9883 | 1.1505 | 1.4765 |
| 0.9725 | 1.3756 | 2.8132 | 0.9831 | 1.3905 | 1.7807 |
| Qstd slope (m) = 2.02363 | | | Qa slope (m) = 1.26716 | | |
| intercept (b) = 0.03075 | | | intercept (b) = 0.01946 | | |
| coefficient (r) = 0.99997 | | | coefficient (r) = 0.99997 | | |
| y axis = SQRT[H2O(Pa/760) (298/Ta)] | | | y axis = SQRT[H2O(Ta/Pa)] | | |

CALCULATIONS

Vstd = Diff. Vol [(Pa-Diff. Hg)/760] (298/Ta)
 Qstd = Vstd/Time

Va = Diff Vol [(Pa-Diff Hg)/Pa]
 Qa = Va/Time

For subsequent flow rate calculations:

Qstd = 1/m{ [SQRT(H2O(Pa/760) (298/Ta))] - b}
 Qa = 1/m{ [SQRT H2O(Ta/Pa)] - b}

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 = ± 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".

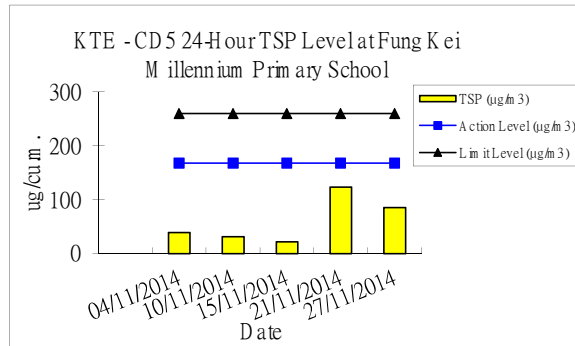
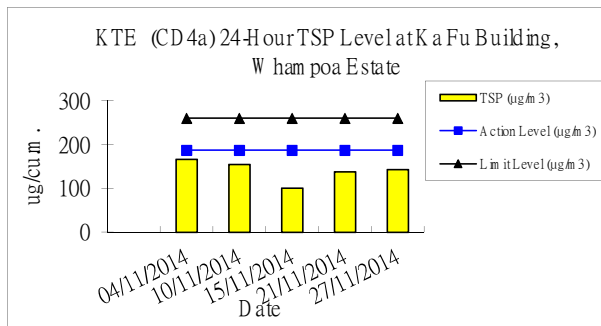
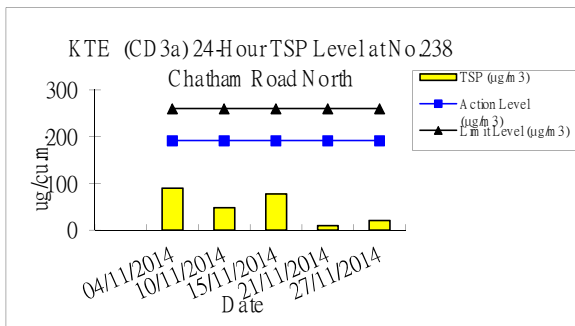
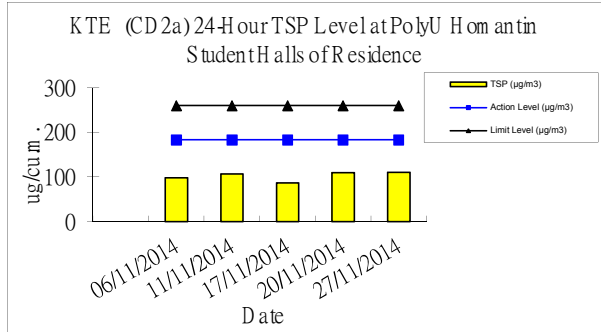
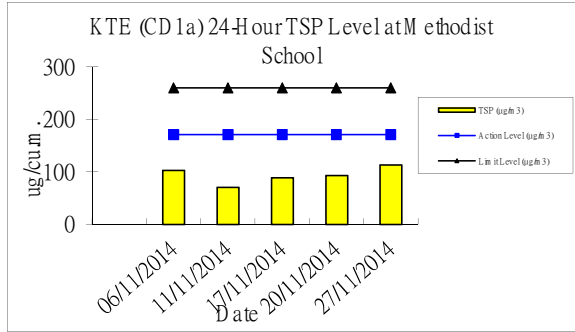
2.Uncertainties quoted in this report have been estimated on the basis of there being not more than one chance in one hundred that any value differs from the true value by more than the stated uncertainty.

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

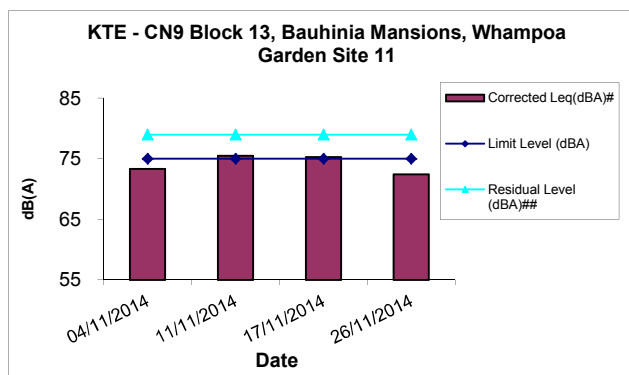
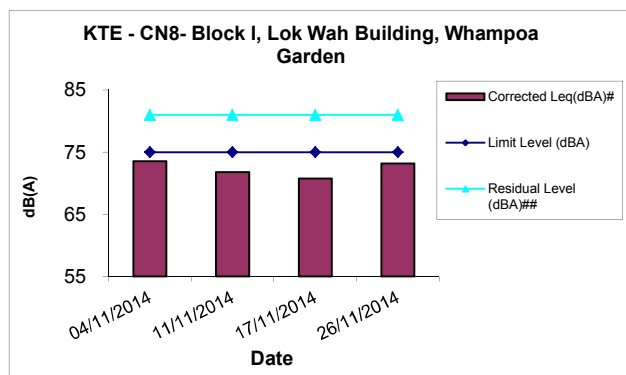
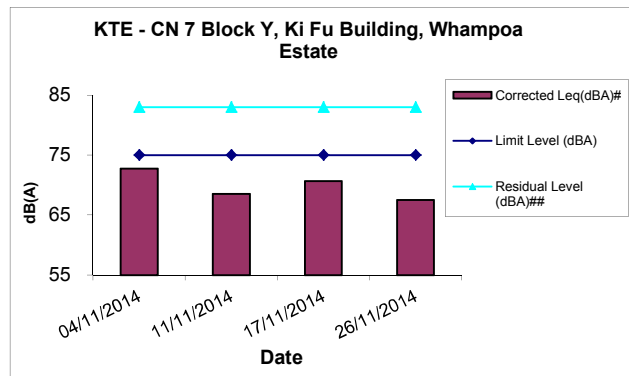
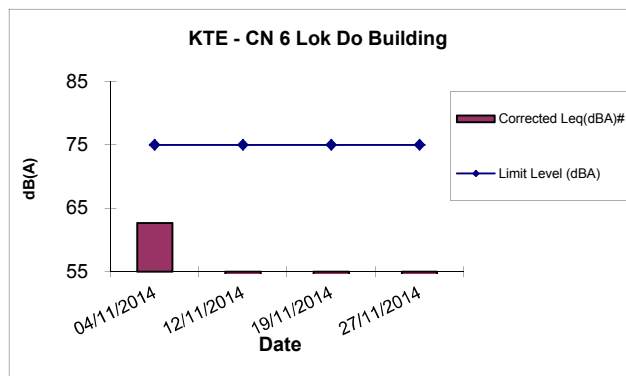
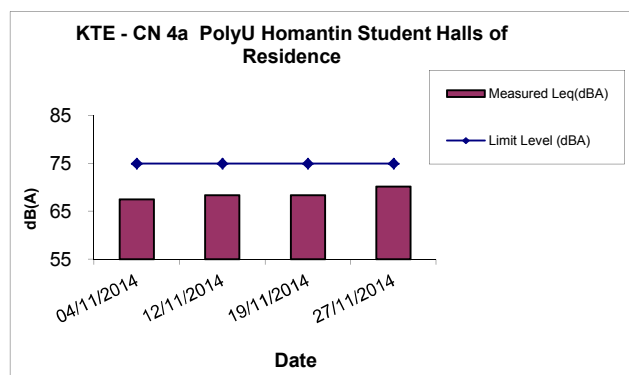
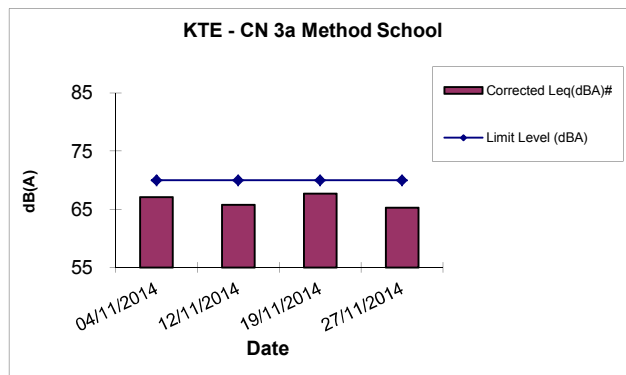
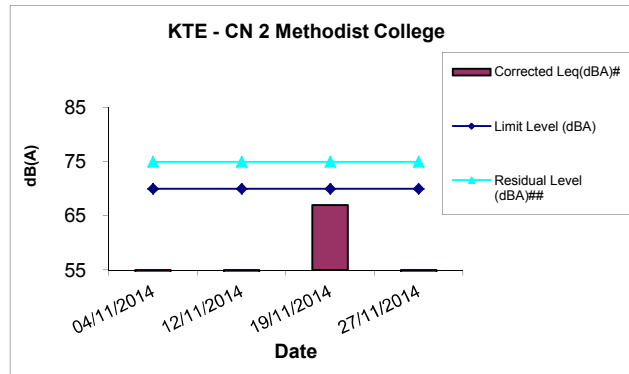
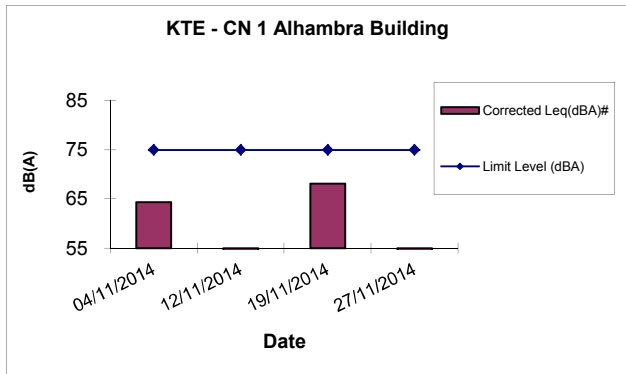
Appendix F

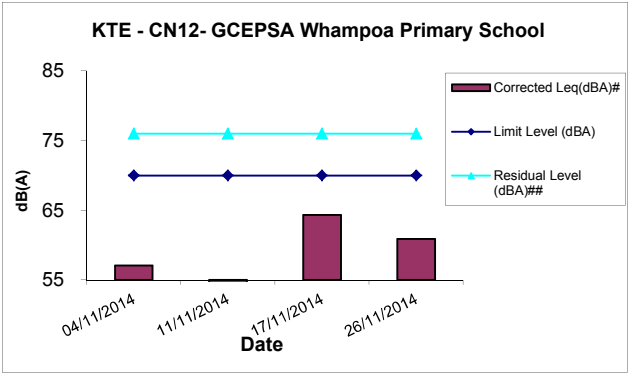
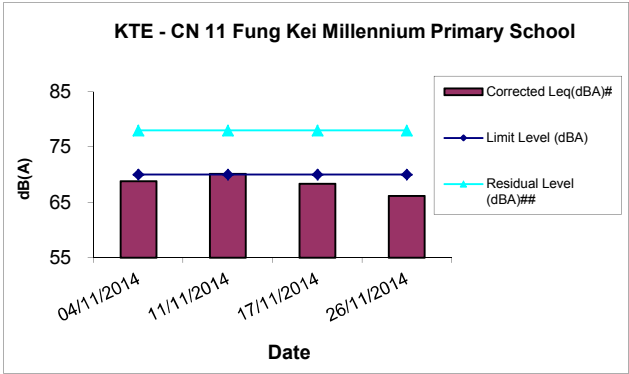
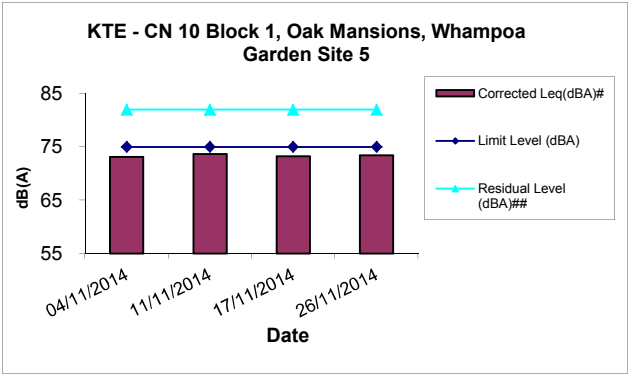
Impact Monitoring Graphical Plots

Appendix F - Air Quality Monitoring Results



Appendix F - Impact Noise Monitoring Results





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

| Dust Monitoring Schedule for November 2014 | | | | |
|---|------------|------------|------------|------------|
| CD1a | CD2a | CD3a | CD4a | CD5 |
| 06/11/2014 | 06/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 |
| 11/11/2014 | 11/11/2014 | 10/11/2014 | 10/11/2014 | 10/11/2014 |
| 17/11/2014 | 17/11/2014 | 15/11/2014 | 15/11/2014 | 15/11/2014 |
| 20/11/2014 | 20/11/2014 | 21/11/2014 | 21/11/2014 | 21/11/2014 |
| 27/11/2014 | 27/11/2014 | 27/11/2014 | 27/11/2014 | 27/11/2014 |
| Tentative Dust Monitoring Schedule for December 2014 | | | | |
| CD1a | CD2a | CD3a | CD4a | CD5 |
| 03/12/2014 | 03/12/2014 | 03/12/2014 | 03/12/2014 | 03/12/2014 |
| 09/12/2014 | 09/12/2014 | 09/12/2014 | 09/12/2014 | 09/12/2014 |
| 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 |
| 20/12/2014 | 20/12/2014 | 20/12/2014 | 20/12/2014 | 20/12/2014 |
| 27/12/2014 | 27/12/2014 | 27/12/2014 | 27/12/2014 | 27/12/2014 |

| Noise Monitoring Schedule for November 2014 | | | | | | | | | | |
|--|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| CN1 | CN2 | CN3a | CN4a | CN6 | CN7 | CN8 | CN9 | CN10 | CN11 | CN12 |
| 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 | 04/11/2014 |
| 12/11/2014 | 12/11/2014 | 12/11/2014 | 12/11/2014 | 12/11/2014 | 11/11/2014 | 11/11/2014 | 11/11/2014 | 11/11/2014 | 11/11/2014 | 11/11/2014 |
| 19/11/2014 | 19/11/2014 | 19/11/2014 | 19/11/2014 | 19/11/2014 | 17/11/2014 | 17/11/2014 | 17/11/2014 | 17/11/2014 | 17/11/2014 | 17/11/2014 |
| 27/11/2014 | 27/11/2014 | 27/11/2014 | 27/11/2014 | 27/11/2014 | 26/11/2014 | 26/11/2014 | 26/11/2014 | 26/11/2014 | 26/11/2014 | 26/11/2014 |
| Tentative Noise Monitoring Schedule for December 2014 | | | | | | | | | | |
| CN1 | CN2 | CN3a | CN4a | CN6 | CN7 | CN8 | CN9 | CN10 | CN11 | CN12 |
| 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 | 01/12/2014 |
| 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 | 08/12/2014 |
| 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 | 15/12/2014 |
| 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 | 22/12/2014 |
| 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 | 29/12/2014 |

Remarks:

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