



AUES PROJECT NO. TCS/00704/14

CONTRACT NO. MTRC6593-13C –
WAN CHAI STATION LEE TUNG STREET SUBWAY

8TH ENVIRONMENTAL MONITORING AND AUDIT
(EM&A) MONTHLY REPORT – APRIL 2015

PREPARED FOR
KADEN CONSTRUCTION LIMITED

Quality Index

Date	Reference No.	Prepared By	Approved By
14 May 2015	TCS00704/14/600/R0048v2	 Nicola Hon Environmental Consultant	 T.W. Tam Environmental Team Leader

Version	Date	Description
1	11 May 2015	First Submission
2	14 May 2015	Amended according to the IEC's comments on 14 May 2015

14 May 2015

By Email and PostMTR Corporation Limited
Fo Tan Railway House
No. 9, Lok King Street, Fo Tan
Shatin, N.T., Hong Kong

Your Ref.:

Our Ref.: 40032976/441056

Attention: Mr. Kenneth Chow / Environmental Engineer II

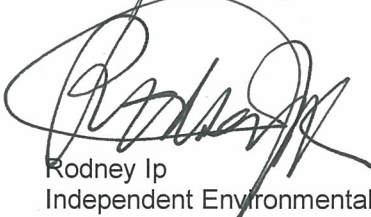
Dear Sir,

**Consultancy Agreement A130-13
Independent Environmental Checker for CRS and LTS
LTS - Verification for Eighth Monthly Environmental Monitoring and
Audit (EM&A) Report (April 2015) (Report No.: TCS00704/14/600/R0048v2)**

We refer to the Eighth Monthly EM&A Report (April 2015) received under cover of the email from the Environmental Team, AUES, dated on 11 May 2015.

Further to our comments provided on 14 May 2015 and subsequent revision of the Report by AUES on 14 May 2015, we have no further comment and have verified the captioned report (Report No.: TCS00704/14/600/R0048v2).

Should you have any queries, please feel free to contact the undersigned at 2410 3750 or our Dr. Alex Cheung at 2410 3796.

Yours faithfully
AECOM Consulting Services Ltd

Rodney Ip
Independent Environmental Checker

ACWH/wwsc

cc Kaden Construction Limited (Attn.: Mr. Ronald Fung) via email
AUES (Attn.: Ms. Nicola Hon) via email

EXECUTIVE SUMMARY

ES01 This is the 8th monthly EM&A Report presenting the monitoring results and inspection findings for the period from **1 to 30 April 2015** (hereinafter ‘the Reporting Period’).

SUMMARY OF ENVIRONMENTAL MONITORING AND AUDIT ACTIVITIES

ES02 The monitoring and audit activities during the Reporting Period are summarized in below:-

Environmental Aspect	Environmental Monitoring Parameters / Inspection	Reporting Period	
		Number of Monitoring Location	Total Occasions
Air Quality	24-hour TSP	1	5
Construction Noise	L _{eq(30min)} Daytime	2	8
Site Inspection / Audit	Joint with ET, the Contractor and RE	--	5
	Joint with IEC, ET, the Contractor and RE	--	1

BREACH OF ACTION AND LIMIT (A/L) LEVELS

ES03 In the Reporting Period, no air quality and noise monitoring exceedances were registered. The statistics of environmental exceedance, NOE issued and investigation of exceedance are summarized in the following table.

Environmental Aspect	Monitoring Parameters	Action Level	Limit Level	Event & Action		
				NOE Issued	Investigation	Corrective Actions
Air Quality	24-hour TSP	0	0	0	0	0
Construction Noise	L _{eq(30min)} Daytime	0	0	0	0	0

ENVIRONMENTAL COMPLAINT

ES04 No public complaint was received in the Reporting Period.

NOTIFICATION OF SUMMONS AND SUCCESSFUL PROSECUTIONS

ES05 No environmental summons or successful prosecutions were recorded in the Reporting Period.

REPORTING CHANGE

ES06 No reporting changes were made in the Reporting Period.

SITE INSPECTION

ES07 In the Reporting Period, weekly site inspection by the MTRC, ET and Contractor was carried out on **2, 8, 16, 23 and 30 April 2015** and the IEC was joined the site inspection on **16 April 2015**. No non-compliance was observed during the site inspection.

FUTURE KEY ISSUES

ES08 Construction noise is the key environmental issue during construction work of the Project as there are residential buildings nearby. Noise mitigation measures should be fully implemented in accordance with the EM&A requirement.

ES09 Special attention should be paid on the potential construction dust impact as the construction site is located near the residential area. The Contractor should fully implement the construction dust mitigation measures properly.

ES010 The Contractor should prevent muddy water and other water pollutants via site surface water runoff get into public areas and implement water quality mitigation measures properly. Any discharge water should be strictly complied with wastewater discharge license requirement.

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1 INTRODUCTION

PROJECT BACKGROUND

- 1.01 **KADEN CONSTRUCTION LIMITED** (hereinafter ‘KCL’) has been awarded by the MTR Corporation Limited (MTRCL) the Contract No. *MTRC6593-13C – Wan Chai Station Lee Tung Street Subway* (hereinafter “the Project”), which is a Designated Project to be implemented under Environmental Permit EP-444/2012 (hereinafter referred as “the EP-444/2012” or “the EP”).
- 1.02 The Project includes redevelopment of the Lee Tung Street area to improve pedestrian networking by enhancing the accessibility, connectivity and circulation of human traffic north-south from Queen’s Road East area to Wan Chai MTR Station, and providing a safe and attractive means for pedestrian crossing of Johnston Road. The Project site layout plan is shown in *Appendix A* and works under the Project comprise of:
- (i) Construction of a pedestrian subway link between Urban Renewal Authority’s Redevelopment at Site H15 (the Development) and Wan Chai Station (WAC);
 - (ii) Construction of two ventilation shafts; and
 - (iii) Modification works of some of the station concourse.
- 1.03 The Project is expected to be undertaken for 36 months. In order to effectively implement the environmental protection measures as stipulated in the Particular Specification (PS), an Environmental Monitoring and Audit Plan (EMAP) which enclosed in the Project Profile (PP) was prepared to guide the setup of the environmental monitoring and audit (EM&A) programme of the Project.
- 1.04 Action-United Environmental Services and Consulting (AUES) has been commissioned by the KCL as the independent environmental team (ET) to implement the relevant EM&A programme for the Project.
- 1.05 The baseline monitoring program was carried out between 3 June 2014 and 19 June 2014 at the proposed monitoring locations by the ET according to the approved EMAP. The “Baseline Monitoring Report (R0010 Version 4)” has been verified by IEC submitted to the EPD on *15 July 2014* before commencement of major construction works. The construction of the Project was commenced on 28 August 2014 as notified by KCL. Accordingly, relevant EM&A programme was started on 28 August 2014.
- 1.06 This is 8th monthly EM&A report presenting the monitoring results and inspection findings in the Reporting Period from **1 to 30 April 2015**.

REPORT STRUCTURE

- 1.07 This Report is structured into the following sections:-

Section 1	<i>Introduction</i>
Section 2	<i>Project Organization</i>
Section 3	<i>Environmental Impact Monitoring Requirement</i>
Section 4	<i>Monitoring Results</i>
Section 5	<i>Waste Management</i>
Section 6	<i>Site Inspections</i>
Section 7	<i>Environmental Complaint and Non-Compliance</i>
Section 8	<i>Implementation Status of Mitigation Measures</i>
Section 9	<i>Conclusions and Recommendations</i>

2 PROJECT ORGANIZATION AND SUBMISSION

PROJECT ORGANIZATION

2.01 The project organization is shown in *Appendix B*. The responsibilities of respective parties are:

MTR Corporation Limited (MTRCL)

2.02 MTRCL is the Project Proponent and the Permit Holder of the EP of the development of the Project and will assume overall responsibility for the project. Also, an Independent Environmental Checker (IEC) should be employed by MTRCL to audit the results of the EM&A work conducted by Environmental Team.

Environmental Protection Department (EPD)

2.03 EPD is the statutory enforcement body for environmental protection matters in Hong Kong.

Resident Engineer (RE)

2.04 The RE is responsible for overseeing the construction works and for ensuring that the works are undertaken by the Contractor in accordance with the specification and contract requirements. The duties and responsibilities of the ER with respect to EM&A are:

- Monitor the Contractor's compliance with Contract Specifications, including the effective implementation and operation of the environmental mitigation measures;
- Inform the Contractor when action is required to reduce impacts in accordance with the Event and Action Plans;
- Participate in site inspections undertaken by the ET; and
- Co-operate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works.

Independent Environmental Checker (IEC)

2.05 The IEC should advise the ET and RE on environmental issues related to the project. The IEC should audit from an independent viewpoint on the environmental performance during the construction of the project. The IEC should be a person who has relevant professional qualifications in environmental control and at least 7 years' experience in EM&A and environmental management. The duties and responsibilities of the IEC are:

- Review and audit in an independent, objective and professional manner in all aspects of the EM&A programme;
- Validate and confirm the accuracy of monitoring results, appropriateness of monitoring equipment, monitoring locations with reference to the locations of the nearby sensitive receivers, and monitoring procedures;
- Carry out random sample check and audit on monitoring data and sampling procedures, etc;
- Conduct random site inspection;
- Review the effectiveness of environmental mitigation measures and project environmental performance;
- On an as-need basis, verify and certify the environmental acceptability of the construction methodology (both temporary and permanent works), relevant design plans and submissions under the environmental permit. Where necessary, the IEC should agree in consultation with the ET and the Contractor least impact alternative;
- Check complaint cases and the effectiveness of corrective measures;
- Verify EM&A report certified by the ET Leader; and
- Feedback audit results to RE/ET according to the Event/Action Plan.

Environmental Team (ET)

2.06 The ET should conduct the EM&A programme and ensure the Contractor's compliance with the project's environmental performance requirements during construction. The ET should plan, organize and manage the implementation of the EM&A programme and ensure that the EM&A works are undertaken to the required standard.

2.07 The ET should be led and managed by the ET Leader. The ET Leader should have relevant

professional qualifications in environmental control and possess at least 7 years' experience in EM&A. The ET Leader should be responsible for the implementation of the EM&A programmes in accordance with the EM&A requirements. The duties and responsibilities of the ET include:

- Sampling, analysis and statistical evaluation of monitoring parameters;
- Environmental site surveillance;
- Inspection and audit of compliance with environmental protection, and pollution prevention and control regulations;
- Assess the effectiveness of the environmental mitigation measures implemented;
- Monitor compliance with the environmental protection clauses/specifications in the Contract;
- Review construction programme and comment as necessary;
- Review work methodologies which may affect the extent of environmental impact during the construction phase and comment as necessary;
- Complaint investigation, evaluation and identification of corrective measures;
- Liaison with the IEC on all environmental performance matters, and timely submission of all relevant EM&A proforma for IEC's approval; and
- Advice to Contractor on environmental improvement, awareness and enhancement matters etc.

The Contractor

- 2.08 The Contractor should report to the RE. The duties and responsibilities of the Contractor are:
- Comply with the relevant contract conditions and specifications on environmental protection
 - Participate in the site inspections undertaken by the ET;
 - Provide assistance to ET to carry out monitoring;
 - Provide requested information to the ET in the event of any exceedance in the environmental criteria (Action/Limit levels);
 - Submit proposals on mitigation measures in case of exceedances of Action and Limit levels in accordance with the Event / Action Plans; and
 - Cooperate with the ET in providing all the necessary information and assistance for completion of the complaint investigation works. If mitigation measures are required following the investigation, the Contractor should promptly carry out these measures.

SUMMARY OF ENVIRONMENTAL SUBMISSIONS

- 2.09 In accordance with the EP stipulation, the required documents and submission status to EPD are listed in Table 2-1.

Table 2-1 Submission/Set-up Status of the EP Requirements

EP Condition	Submission	Status
2.3	Management Organization of Main Construction Companies	Submitted
2.7	Landscape Plan	Submitted
3.3	Baseline Monitoring Report (TCS00704/14/600/R0010v4)	Submitted
4.2	Internet website	live

- 2.10 Summary of environmental permits, licenses, and relevant notifications on environmental protection for the Project are presented in **Table 2-2**.

Table 2-2 Status of Environmental Licenses and Permits of the Project

Item	Description	License/Permit Status
1	Air pollution Control (Construction Dust) Regulation	Notified EPD.
2	Chemical Waste Producer Registration - Waste Producers Number	WPN:5213-131-K3099-01 Approved on 14/05/2014
3	Water Pollution Control Ordinance - Discharge License	License no.: WT00019539-2014 Approved on 16/07/2014 Valid to: 31/07/2019
4	Waste Disposal Regulation - Billing Account for Disposal of Construction Waste	Account no.: 7019837 Approved on 30/04/2014

Item	Description	License/Permit Status
5	Construction Noise Permit under Noise Control Ordinance	GW-RS0290-15 obtained on 18 March 2015 Valid from 19:00 of 19 March 2015 to 07:00 of 11 September 2015 GW-RS1453-14 obtained on 24 December 2014 Valid from 19:00 of 27 December 2014 to 06:00 of 23 June 2015 GW-RS1249-14 obtained on 10 November 2014 Valid from 01:30 of 17 November 2014 to 04:30 of 16 May 2015

CONSTRUCTION PROGRESS

2.11 The construction activities conducted in the Reporting Period are listed in below. Moreover, the master construction program is shown in *Appendix B*.

- Installation of waling and strut
- Excavation
- Excavation on tram tracks
- Blinding layer
- Installation of waterproofing membrane
- Steel reinforcement
- Concreting

3 ENVIRONMENTAL IMPACT MONITORING REQUIREMENT

3.01 The ET will implement the EM&A programme in accordance with the requirements in EMAP. Details of the EM&A programme are presented in the following sub-sections.

MONITORING PARAMETERS

3.02 The EM&A impact monitoring program covers the following environmental aspects:

- Air quality; and
- Construction noise

3.03 A summary of the monitoring parameters is presented in *Table 3-1*:

Table 3-1 Summary of the monitoring parameters of EM&A Requirements

Environmental Issue	Parameters
Air Quality	<ul style="list-style-type: none"> • 24-hour Total Suspended Particulate (hereinafter '24-hour TSP') • 1-hour TSP monitoring ^(*)
Construction Noise	<ul style="list-style-type: none"> • A-weighted equivalent continuous sound pressure level (30min) (hereinafter 'L_{eq(30min)}') during the normal working hours

Remarks:

^(*) In case 24-hour TSP exceed the air quality criteria to be carried out

MONITORING LOCATIONS

3.04 According to Sections 2.3 and 3.4 of the EMAP which enclosed in the Project Profile (Register No. PP-472/2012), construction noise and air quality monitoring locations are required to be set up at Hennessy Building and Chiu Hin Mansion. In early May 2014, site visit was conducted to select suitable locations to carry out relevant noise and air monitoring for the EM&A Programme. It was noted that both Hennessy Building and Chiu Hin Mansion are residential buildings and only the 1/F to 2/F of the buildings could be accessed which are commercial premises. It is not possible to set up the monitoring station at upper floors inside the residential apartment which will cause nuisance to the residents. Finally, two locations at lower floor were selected which access were successfully granted by the premises occupiers. The monitoring stations proposed for the Project are summarized in *Table 3-2* and illustrated in *Appendix C*.

Table 3-2 Air and Noise Monitoring Locations

Aspect	Monitoring Location	Location ID	Address	Description
Air Quality	Chiu Hin Mansion	A1	balcony at 1/F of Chiu Hin Mansion	ASR close to the Project site
Construction Noise	Hennessey Building	N1	2/F floor of Hennessey Building	NSR facing to the Project site
	Chiu Hin Mansion	N2	balcony at 1/F of Chiu Hin Mansion	NSR facing to the Project site

MONITORING FREQUENCY AND PERIOD

3.05 The requirements of impact monitoring as stipulated in the EMAP are presented in following.

Air Quality

3.06 Frequency of impact air quality monitoring:

- 24-hour TSP Once every 6 days during course of works.

3.07 In case of non-compliance with the air quality criteria, a more frequent monitoring exercise adopting 1-hour TSP monitoring undertaken when the highest dust impact occurs, as specified in the Event and Action Plan, should be conducted within 24 hours after the result is obtained. This additional monitoring should be continued until excessive dust emission or the deterioration in air quality is rectified.

Construction Noise

- 3.08 One set of $L_{eq(30min)}$ as 6 consecutive $L_{eq(5min)}$ between 0700-1900 hours on normal weekdays and once every week during course of works. If construction work necessary to carry out at other time periods, i.e. restricted time period (19:00 to 07:00 the next morning and whole day on public holidays) (hereinafter referred as “the restricted hours”), 3 consecutive $L_{eq(5min)}$ measurement will be depended on CNP requirements to undertake. Supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.

MONITORING EQUIPMENT

Air Quality Monitoring

- 3.09 The 24-hour TSP shall be measured by following the standard high volume sampling method as set out in the *Title 40 of the Code of Federal Regulations, Chapter 1 (Part 50), Appendix B (USEPA)*. A direct reading dust meter is used to measure 1-hour TSP air quality, in case of non-compliance of air quality criteria occurred in 24-hour TSP measurement.
- 3.10 The filter paper sample collected in 24-hour TSP measurement shall be determined by HOKLAS accredited laboratory. All equipments to be used for air quality monitoring are listed in **Table 3-3**.

Table 3-3 Air Quality Monitoring Equipment

Equipment	Model
<i>24-hour TSP</i>	
High Volume Air Sampler	TISCH High Volume Air Sampler, HVS Model TE-5170
Calibration Kit	TISCH Model TE-5028A
<i>1- hour TSP</i>	
Portable Dust Meter	TSI Model 8520 DustTrak Aerosol Monitor / Aerocet 531 Handheld Particle Mass Profiler & Counter / Sibata LD-3A Laser Dust Monitor

- 3.11 According to the EMAP, wind data monitoring equipment shall be provided and set up for logging wind speed and wind direction near the dust monitoring locations. The equipment installation location shall be proposed by the ET and agreed with the IEC. For installation and operation of wind data monitoring equipment, the following points shall be observed:
- 1) The wind sensors should be installed 10 m above ground so that they are clear of obstructions or turbulence caused by buildings.
 - 2) The wind data should be captured by a data logger. The data shall be downloaded for analysis at least once a month.
 - 3) The wind data monitoring equipment should be re-calibrated at least once every six months.
 - 4) Wind direction should be divided into 16 sectors of 22.5 degrees each.
- 3.12 Although ET was successful granted HVS installation premises, the owners rejected to install wind data monitoring equipment.
- 3.13 In this situation, the ET proposed to adopt the meteorological information from King’s Park Weather Station from the Hong Kong Observatory as the representative wind data. King’s Park Station provided all useful from information such as humidity, rainfall, and air pressure and temperature etc.
- 3.14 Although there are other closer weather stations, King’s Park Station was selected as it is the nearest weather station that measures all the relevant parameters mentioned above. Moreover, the ET has compared the data among the stations, and concluded that there is minimal difference between meteorological data collected at the King’s Park station and other stations.

Construction Noise Monitoring

- 3.15 Sound level meter in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications shall be used for carrying out the noise monitoring. The sound level meter shall be checked using an acoustic calibrator. The wind

speed shall be checked with a portable wind speed meter capable of measuring the wind speed in ms^{-1} . Furthermore, an acoustic calibrator and sound level meter shall be calibrated yearly.

- 3.16 Noise monitoring equipment to be used for monitoring is listed in *Table 3-4*.

Table 3-4 Construction Noise Monitoring Equipment

Equipment	Model
Integrating Sound Level Meter	B&K Type 2238 or Rion NL-14
Calibrator	Rion NC-73 / B&K Type 4231
Portable Wind Speed Indicator	Testo Anemometer

MONITORING METHODOLOGY

24-hour TSP

- 3.17 The equipment used for 24-hour TSP measurement is a Tisch Environmental, Inc. Model TE-5170 TSP high volume air sampling system, which complied with USEPA Code of Federal Regulation, Appendix B to Part 50. The High Volume Air Sampler (HVS) consists of the following:
- An anodized aluminum shelter;
 - A 8"x10" stainless steel filter holder;
 - A blower motor assembly;
 - A continuous flow/pressure recorder;
 - A motor speed-voltage control/elapsed time indicator;
 - A 7-day mechanical timer, and
 - A power supply of 220v/50 hz
- 3.18 The HVS is calibrated in accordance with the manufacturer's instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5028A). The 24-hour TSP monitoring using the HVS is also processed in accordance with the manufacturer's Operations Manual. The valid calibration certificate of the calibration kit with the certificate of HVS calibrated is shown in *Appendix D*.
- 3.19 24-hour TSP is collected on filters of the HVS and quantified by a local HOKLAS accredited laboratory, ALS Technichem (HK) Pty Ltd (ALS), upon receipt of the samples. The ET will keep all the sampled 24-hour TSP filters in normal air conditioned room conditions, i.e. 70% HR (Relative Humidity) and 25°C, for six months prior to disposal. HOKLAS-accreditation certificate of ALS Technichem (HK) Pty Ltd (ALS) is provided in *Appendix E*.

Noise

- 3.20 Sound level meter complied with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications, as recommended in Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO). The valid of calibration certificates including sound level meter and an acoustic were shown in *Appendix D*.
- 3.21 The noise measurement is performed with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (L_{eq}). $L_{eq(30min)}$ in six consecutive $L_{eq(5min)}$ measurements were used as the monitoring parameter.
- 3.22 During monitoring, the sound level meter mounted at the monitoring locations and oriented such that the microphone pointed to the site with the microphone facing perpendicular to the line of sight. The windshield was fitted for the measurement. For the monitoring, N1 and N2 are conducted 1 m from the exterior of the building façade.
- 3.23 Prior construction noise measurement, the accuracy of the sound level meter checked using an acoustic calibrator generating a known sound pressure level at a known frequency. The calibration level from before and after the noise measurement agrees to within 1.0dB.

DERIVATION OF ACTION/LIMIT (A/L) LEVELS

- 3.24 The baseline results form the basis for determining the environmental acceptance criteria for the impact monitoring. According to EMAP, the air quality and construction noise criteria were set up, namely Action and Limit levels are listed in *Tables 3-5* and *3-6*.

Table 3-5 Action and Limit Levels for Air Quality Monitoring

Monitoring Station	Action Level ($\mu\text{g}/\text{m}^3$)		Limit Level ($\mu\text{g}/\text{m}^3$)	
	1-hour TSP	24-hour TSP	1-hour TSP	24-hour TSP
A1	290	162	500	260

Table 3-6 Action and Limit Levels for Construction Noise

Monitoring Station	0700-1900 hours on normal weekdays	
	Action Level	Limit Level
N1 and N2	When one documented complaint is received	75 dB(A)

Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the NCA have to be followed.

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

DATA MANAGEMENT AND DATA QA/QC CONTROL

- 3.26 The all monitoring data were handled by the ET's in-house data recording and management system.
- 3.27 The monitoring data recorded in the equipment were downloaded directly from the equipment at the end of each monitoring day. The downloaded monitoring data were input into a computerized database properly maintained by the ET. The laboratory results were input directly into the computerized database and checked by personnel other than those who input the data.
- 3.28 For monitoring parameters that require laboratory analysis, the local laboratory shall follow the QA/QC requirements as set out under the HOKLAS scheme for the relevant laboratory tests.

4 MONITORING RESULTS

4.01 The impact air quality and construction noise monitoring schedule is presented in *Appendix G* and the monitoring results are summarized in the following sub-sections.

24-HOUR TSP AIR QUALITY MONITORING RESULTS

4.02 In the Reporting Period, **5** occasions of 24-hours TSP monitoring were carried out at the proposed location A1 and the monitoring results are summarized in *Table 4-1*. The detailed 24-hour TSP monitoring data are presented in *Appendix H* and the relevant graphical plots are shown in *Appendix I*.

Table 4-1 Summary of 24-hour TSP Monitoring Results – A1

Date	24-hour TSP ($\mu\text{g}/\text{m}^3$)	Action Level	Limit Level
8-Apr-15	99	162	260
14-Apr-15	64		
20-Apr-15	154		
25-Apr-15	124		
30-Apr-15	140		
Average (Range)	116 (64-154)		

4.03 As shown in *Table 4-1*, 24-hour TSP monitoring results are fluctuated below Action/ Limit Levels.

NOISE MONITORING RESULTS

4.04 In the Reporting Period, **8** occasions noise measurement were conducted at N1 and N2. The sound level meter was set in 1m from the exterior of the building façade at N1 and N2. Therefore, no façade correction (+3dB(A)) is added according to acoustical principles and EPD guidelines. The noise measurement results at N1 and N2 are listed in *Tables 4-2* and *4-3*. The relevant graphical plots are shown in *Appendix I*.

Table 4-2 Noise Monitoring Results of N1 (2/F floor of Hennessey Building), dB(A)

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	$L_{eq30min}$
9-Apr-15	10:40	73.2	73.4	74.4	74.2	75.0	72.9	74
14-Apr-15	13:41	74.3	73.7	74.9	73.7	74.8	73.3	74
21-Apr-15	10:27	69.3	67.4	69.7	69.6	68.4	67.4	69
28-Apr-15	10:43	70.9	69.8	69.1	70.6	71.5	69.4	70
Limit Level of Construction Noise		75 dB(A)						

Table 4-3 Noise Monitoring Results of N2 (balcony at 1/F of Chiu Hin Mansion), dB(A)

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	$L_{eq30min}$
9-Apr-15	11:17	68.6	68.4	66.1	67.9	67.2	67.0	68
14-Apr-15	14:18	67.7	67.6	66.6	65.5	66.8	66.3	67
21-Apr-15	11:11	75.6	74.2	74.4	74.5	74.6	75.2	75
28-Apr-15	11:24	75.7	75.5	75.6	76.5	75.7	76.5	76
Limit Level of Construction Noise		75 B(A)						

4.05 Referred to above tables, no noise measurement result is higher than 75dB(A) was recorded at N1, but one occasion of noise measurement result higher than 75dB(A) were recorded at N2. As reviewed the baseline noise monitoring data of N2, high background noise is already exist. In order to find the actual construction noise, the exceeded noise measurement results were adjusted by the baseline monitoring data show in *Table 4-4*.

Table 4-4 Adjustment of Construction Noise Level for N2, dB(A)

Date	Time Period	Leq30min Measurement Record at the Receiver	Average Background Noise at the Receiver	Actual Construction Noise of the Project
28-Apr-15	11:24	76	71 (11:00 – 12:00)	74

Equation of Adjustment: $C = 10\log(10^{A/10} - 10^{B/10})$

Where:

A is noise level measurement at the receiver position;

B is average background noise at the measurement time at the receiver position; and

C is actual construction noise.

- 4.06 After the correction, the construction noise of the Project were indicated not exceed 75dB. No Notifications of Exceedances (NOEs) therefore was issued to the RE, IEC and the Main Contractor.
- 4.07 Furthermore, there is no noise complaint (Action Level exceedance) received by the MTRC and Contractor or EPD in the Reporting Period.
- 4.08 The meteorological data during the impact monitoring days are shown in **Appendix J**.

5 WASTE MANAGEMENT

GENERAL WASTE MANAGEMENT

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

RECORDS OF WASTE QUANTITIES

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

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

5.03 The quantities of waste for disposal in this Reporting Period are summarized in *Tables 5-1* and *5-2* and the Monthly Summary Waste Flow Table is shown in *Appendix K*.

Table 5-1 Summary of Quantities of Inert C&D Materials

Type of Waste	Quantity	Disposal Location
Total C&D Materials (Inert) (m ³)	0.07772	-
Reused in this Contract (Inert) (m ³)	0	-
Reused in other Projects (Inert) (m ³)	0	-
Disposal as Public Fill (Inert) (m ³)	0.07772	TKO 137

Table 5-2 Summary of Quantities of Non-Inert C&D Wastes

Type of Waste	Quantity	Disposal Location
Recycled Metal (m ³)	0	-
Recycled Paper / Cardboard Packing (m ³)	0	-
Recycled Plastic (m ³)	0	-
Chemical Wastes (m ³ /L)	0	-
General Refuses (m ³)	0.04404	SENT Landfill

5.04 In the Reporting Period, effluent generated from the Project was discharged in accordance with the Wastewater Discharge License.

5.05 Moreover, it is reminded that C&D materials would be reused on-site as far as practicable.

6 SITE INSPECTION

6.01 According to the EMAP, the environmental site inspection shall be formulation by ET Leader. Weekly environmental site inspections should carry out to confirm the environmental performance.

FINDINGS / DEFICIENCIES DURING THE REPORTING MONTH

6.02 During the Reporting Period, **five (5)** occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on **2, 8, 16, 23 and 30 April 2015** and the IEC was joined the site inspection on **16 April 2015**.

6.03 No non-compliance was noted. However, two (2) observations and two (2) reminders were recorded by the ET. The findings / deficiencies observed during the weekly site inspections are listed in **Table 6-1**.

Table 6-1 Site Observations

Date	Findings / Deficiencies	Follow-Up Status
2 April 2015	<ul style="list-style-type: none"> The Contractor should provide proper label for the waste skip and disposal the waste in regular basis. 	<ul style="list-style-type: none"> Label has been provided for the waste skip and waste has been cleared as observed during site inspection on 16 April 2015
8 April 2015	No specific findings were observed.	NA
16 April 2015	No specific findings were observed.	NA
23 April 2015	<ul style="list-style-type: none"> Mixing of chemical wastes was observed inside the chemical waste storage area, the Contractor should provide individual container for each kind of chemical waste with proper labelling. The Contractor was reminded to cover the stockpile after drying. 	<ul style="list-style-type: none"> Proper labelling for chemical waste has been provide as observed during site inspection on 7 May 2015. Not required for reminded.
30 April 2015	<ul style="list-style-type: none"> The Contractor was reminded that construction works and movement of plants should be undertaken away from the retained tree with site boundary. 	<ul style="list-style-type: none"> Not required for reminded.

6.04 In the Reporting Period, the Contractor was reminded to provide proper label for the waste and chemical storage area.

6.05 No site inspection was undertaken by external parties i.e. EPD in this Reporting Month.

7 ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE

ENVIRONMENTAL COMPLAINT, SUMMONS AND PROSECUTION

7.01 For the Project, no environmental complaint, summons and prosecution was received in the Reporting Period. The statistical summary table of environmental complaint is presented in *Tables 7-1, 7-2 and 7-3.*

Table 7-1 Statistical Summary of Environmental Complaints

Reporting Period	Environmental Complaint Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
28 Aug 2014 – 31 Mar 2015	0	0	NA	NA	NA	NA
1– 30 Apr 2015	0	0	NA	NA	NA	NA

Table 7-2 Statistical Summary of Environmental Summons

Reporting Period	Environmental Summons Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
28 Aug 2014 – 31 Mar 2015	0	0	NA	NA	NA	NA
1– 30 Apr 2015	0	0	NA	NA	NA	NA

Table 7-3 Statistical Summary of Environmental Prosecution

Reporting Period	Environmental Prosecution Statistics					
	Frequency	Cumulative	Complaint Nature			
			Air	Noise	Water	Others
28 Aug 2014 – 31 Mar 2015	0	0	NA	NA	NA	NA
1– 30 Apr 2015	0	0	NA	NA	NA	NA

8 IMPLEMENTATION STATUS OF MITIGATION MEASURES

GENERAL REQUIREMENTS

- 8.01 The environmental mitigation measures that recommended in the Implementation Schedule for Environmental Mitigation Measures (ISEMM) in the EMAP covered the issues of dust, noise, water and waste and they are summarized presented in *Appendix L*.
- 8.02 The Works under the Project shall be implementing the required environmental mitigation measures according to the EMAP as subject to the site condition. Environmental mitigation measures generally to be implemented by the Contractor is listed in *Table 8-1*.

Table 8-1 Environmental Mitigation Measures

Issues	Environmental Mitigation Measures
Air Quality	<ul style="list-style-type: none"> Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; Cover all excavated or stockpile of dusty material by impervious sheeting or sprayed with water to maintain the entire surface wet; Public areas around the site entrance/exit had been kept clean and free from dust; and Tarpaulin covering of any dusty materials on a vehicle leaving the site.
Noise	<ul style="list-style-type: none"> Good site practices to limit noise emissions at the sources; Use of quiet plant and working methods; Use of site hoarding or other mass materials as noise barrier to screen the working site; Use of shrouds/temporary noise barriers to screen noise from relatively static PMEs; and Limiting as use one construction plant within worksite, where practicable.
Water Quality	<ul style="list-style-type: none"> Wastewater were appropriately treated by treatment facilities; Drainage channels were provided to convey run-off into the treatment facilities; and Drainage systems were regularly and adequately maintained.
Waste and Chemical Management	<ul style="list-style-type: none"> Excavated material should be reused on site as far as possible to minimize off-site disposal. Scrap metals or abandoned equipment should be recycled if possible; Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designed public filling facility and/or landfill; and Chemical waste should be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.
Landscape and Visual	<ul style="list-style-type: none"> Clear demarcation of works area to prevent damages to existing trees in close proximity; Protection of all trees planned to be retained onsite; Preserving all affected trees by transplanting where practical. Tree transplanting application and tree removal application shall be submitted for approval in accordance with ETWB TCW 3/2006; and Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colors.
General	<ul style="list-style-type: none"> The site was generally kept tidy and clean.

TENTATIVE CONSTRUCTION ACTIVITIES IN THE COMING MONTH

- 8.03 Construction activities as undertaken in the coming month for the Project lists below:

- Waterproofing works for Bay 1 & 2 top slab
- Bay 3A base slab & slide wall steel reinforcement
- Scaffolding and roof slab steel reinforcement
- Formwork installation
- Concreting
- Installation and diversion of E&M Service
- Excavation on tram tracks & Tram Track RC Deck
- Reinstatement of Southern Basketball Court
- Sheet piling of Stage 2 ELS
- Grout Curtain of stage 2 ELS

KEY ISSUES FOR THE COMING MONTH

8.04 Key issues to be considered in the coming month of the Project include:

- Implementation of dust suppression measures at all times;
- Potential wastewater quality impact due to surface runoff;
- Potential fugitive dust quality impact due from the dry/loose/exposure soil surface/dusty material;
- Disposal of empty engine oil containers within site area;
- Ensure dust suppression measures are implemented properly;
- Silt removal facilities should be regularly maintained;
- Management of chemical wastes;
- Discharge of site effluent and stockpiling or disposal of materials at this area are prohibited;
- Follow-up of improvement on general waste management issues; and
- Implementation of construction noise preventative control measures

8.05 In addition, mosquito control measures should be continued to prevent mosquito breeding on site.

9 CONCLUSIONS AND RECOMMENDATIONS

CONCLUSION

- 9.01 This is the 8th monthly EM&A report presenting the monitoring results and inspection findings in the Reporting Period from 1 to 30 April 2015.
- 9.02 In the Reporting Period, 5 occasions of 24-hours TSP monitoring were conducted at A1. The monitoring results are all below the Action/ Limit Level. No Notifications of Exceedances (NOEs) or the associated corrective actions were therefore issued.
- 9.03 In the Reporting Period, total 8 occasions of noise measurement was conducted at N1 and N2. No noise measurement result is higher than 75dB(A) was recorded at N1, but one occasion of noise measurement result higher than 75dB(A) were recorded at N2. As reviewed the baseline noise monitoring data of N2, high background noise is already exist. In order to find the actual construction noise, the exceeded noise measurement results were adjusted by the baseline monitoring data. After correction, the construction noise levels of the Project were indicated below 75dB(A). No Notifications of Exceedances (NOEs) or the associated corrective actions were therefore issued. Furthermore, no noise complaint (which is an Action Level exceedance) was received.
- 9.04 No environmental complaint, notification of summons or successful prosecution was received in the Reporting Period.
- 9.05 Five (5) occasions of weekly site inspections to evaluate site environmental performance was carried out by the RE, ET and the Contractor on 2, 8, 16, 23 and 30 April 2015 and the IEC was joined the site inspection 16 April 2015. No non-compliance was noted but two (2) observations and two (2) reminders were recorded by the ET.
- 9.06 In the Reporting Period, no site inspection was undertaken by external parties i.e. EPD.

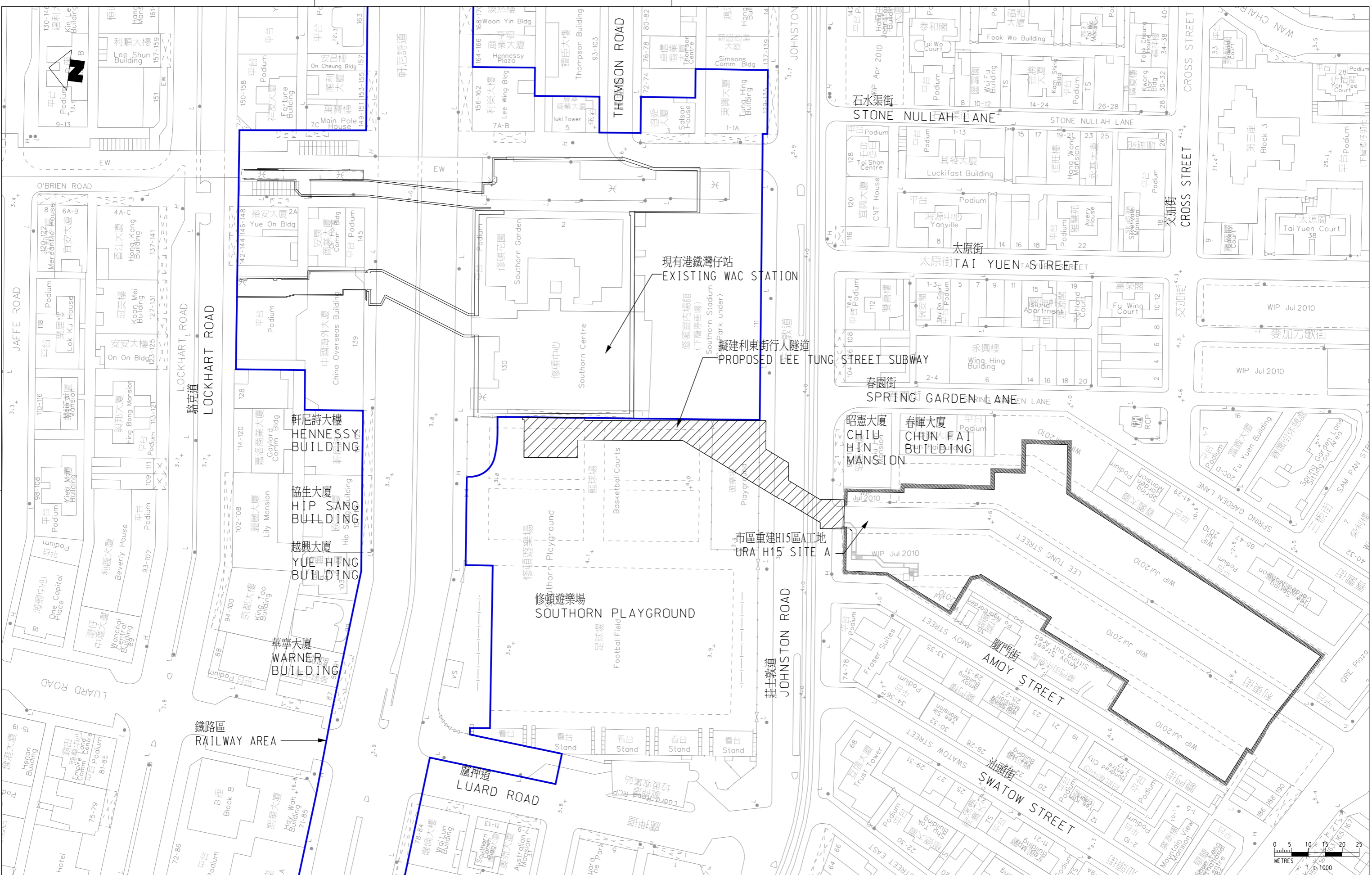
RECOMMENDATIONS

- 9.07 Construction noise is the key environmental issue during construction work of the Project as there are residential buildings nearby. Noise mitigation measures should be fully implemented in accordance with the EM&A requirement.
- 9.08 Also, special attention should be paid on the potential construction dust impact as the construction site is located near the residential area. The Contractor should fully implement the construction dust mitigation measures properly.
- 9.09 The Contractor should also prevent muddy water and other water pollutants via site surface water runoff get into public areas. Any discharge water should be strictly complied with wastewater discharge license requirement. As a reminder, water quality mitigation measures should be properly implemented in accordance with the EM&A requirement.
- 9.10 As a reminder, the Contractor should provide proper label for the waste and chemical storage area. In addition, mosquito control should be kept to prevent mosquito breeding on site.

Appendix A

Project Site Layout Plan

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 FILENAME: J:\28245\REPORT\ENV\202056\NEX1050_2.7A_000.dgn



REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION		16MAY12	AFK					
C	GENERAL REVISION		12AUG11	AFK					
B	GENERAL REVISION		18JUL11	AFK					
A	PROJECT PROFILE		04MAY11	AFK					

DRAWN	HO
DESIGNED	BW
CHECKED	BL
APPROVED	AFK
DATE	04MAY2011

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

Mott MacDonald

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 100 Hoi Hong Street
 Kowloon, Hong Kong
 Tel: +852 2808 8257
 Fax: +852 2807 1893
 www.mottmacdonald.com.hk

CADD REF. NEX1050_2.7A_0010.dgn

TITLE

CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 SITE LOCATION PLAN
 施工位置圖

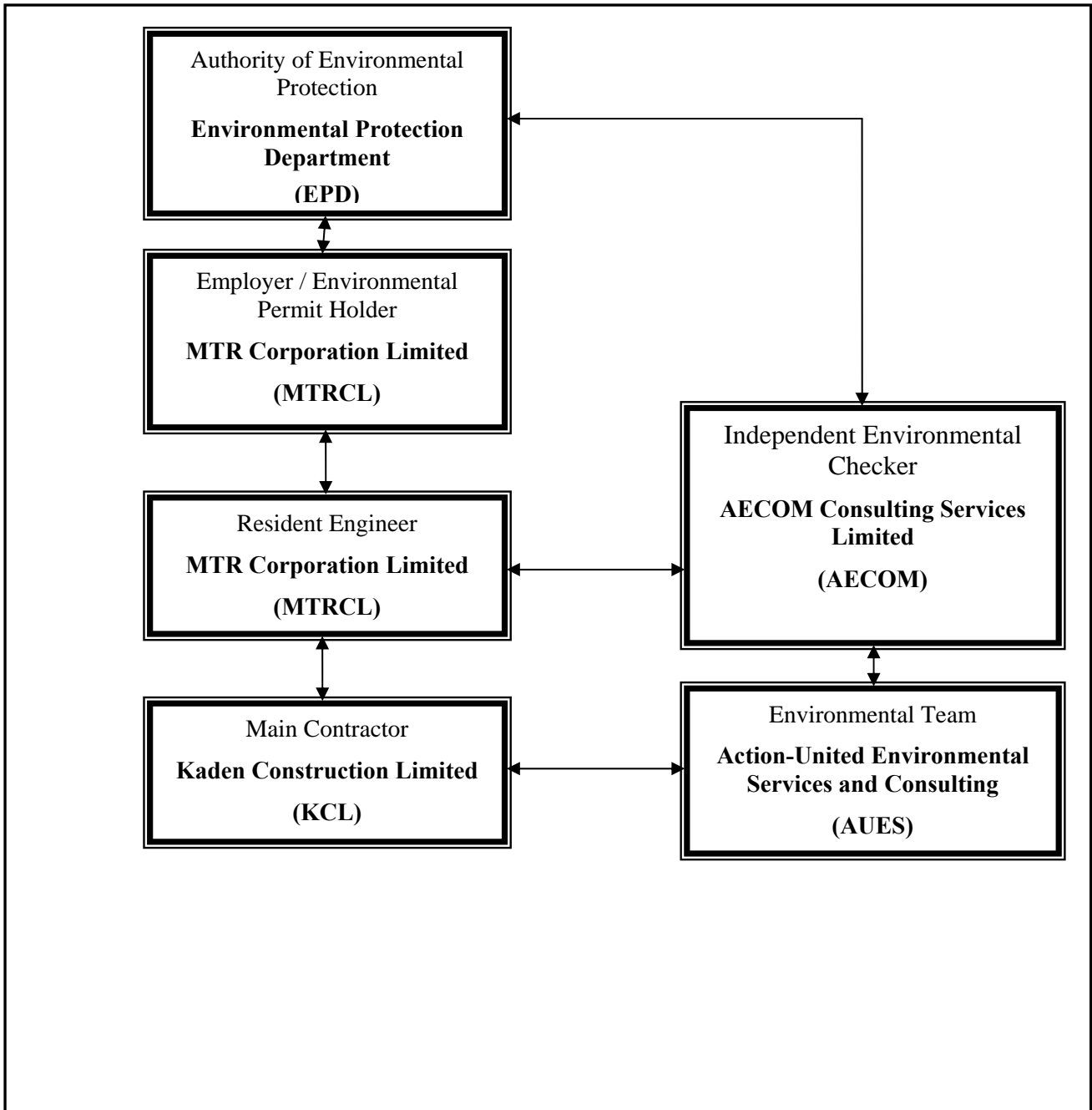
SCALE 1:1000 (A3)

DRAWING NO. NEX1050/2.7A/001

REV. D

Appendix B

**Organization of the Project
and
Master Construction Programme**



Contact Details of Key Personnel for the Project

Organization	Project Role	Name of Key Staff	Tel No.	Fax No.
MTRCL	Resident Engineer	Mr. Raymond Lee	3547 0002	3547 0090
AECOM	Independent Environmental Checker	Mr. Rodney Ip	2410 3750	2428 9922
KCL	Project Manager	Mr. Vincent, Kwan Chun Yin	9833 1313	2770 4278
KCL	Site Agent	Mr. Chan Kam Chuen	6462 8910	2770 4278
KCL	Environmental Officer	Ms. Ricci Poon Wai Tin	9533 1115	2770 4278
AUES	Environmental Team Leader	Mr. T. W. Tam	2959 6059	2959 6079
AUES	Environmental Consultant	Ms. Nicola Hon	2959 6059	2959 6079
AUES	Environmental Consultant	Mr. Ben Tam	2959 6059	2959 6079

Legend:

MTRCL (Employer) – MTR Corporation Limited

MTRCL (Resident Engineer) – MTR Corporation Limited

KCL (Main Contractor) – Kaden Construction Limited

AECOM (IEC) – AECOM Consulting Services Limited

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

Activity ID	Activity Name	Original Duration	Planned Start	Planned Finish	Total Float	2014				2015				2016				2017							
						A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N
A01.PER0501	Baseline air monitoring report - Review & Approval	24.00	05-May-14 08:00	03-Jun-14 18:00	30.00																				
A01.PER0502	Baseline air monitoring report - Preparation for Re-submission (If Require)	12.00	04-Jun-14 08:00	17-Jun-14 18:00	30.00																				
A01.PER0503	Baseline air monitoring report - Review and Approval (If Require)	12.00	18-Jun-14 08:00	02-Jul-14 18:00	30.00																				
Mobilization, Site Office, Temporary Utilities																									
A01.PRE010	Mobilization, site office, temporary utilities	30.00	14-Jul-14 08:00	16-Aug-14 18:00	739.00																				
A01.PRE011	Installation of 3 video cameras (2 at Southorn Playground & 1 at JnR site entry)	10.00	18-Aug-14 08:00	28-Aug-14 18:00	739.00																				
Additional Site Investigation																									
A01.SI010	Mobilization of SI rigs	2.00	14-Jul-14 08:00	15-Jul-14 18:00	18.00																				
A01.SI020	Additional Site Investigation, 4 nr, AD-01 to AD-04	16.00	16-Jul-14 08:00	02-Aug-14 18:00	18.00																				
A01.SI030	Additional Site investigation - Lab tests and reports	20.00	21-Jul-14 08:00	12-Aug-14 18:00	18.00																				
Treatment of Marine Deposit (If Required)																									
A01.MD020	MD- On/Off-site Pilot Trial Treatment, Transport Off-Site, Treatment, Qaulity Test, Back to Site for Filling (1st Batch)	85.00	10-Oct-14 08:00	20-Jan-15 18:00	24.00																				
A01.MD021	MD- On/Off-site Pilot Trial Treatment, Transport Off-Site, Treatment, Qaulity Test, Back to Site for Filling (2nd Batch)	85.00	21-Jan-15 08:00	08-May-15 18:00	24.00																				
A01.MD022	MD- On/Off-site Pilot Trial Treatment, Transport Off-Site, Treatment, Qaulity Test, Back to Site for Filling (Remaining)	80.00	09-May-15 08:00	13-Aug-15 18:00	24.00																				
B. LTS Subway and Vent Shafts																									
B2 Subway																									
TTM 1 - SBC, Playground																									
Preliminaries, Instrumentation, UU Diversion, etc.																									
A01.HRD01	Stage 1 - Erect hoarding 190m, Erect 1 no. gate	12.00	16-Jul-14 08:00	29-Jul-14 18:00	1.00																				
B01.0090	Pepare & submit review by Eng outline TTM schemes	5.00	14-Apr-14 08:00	22-Apr-14 18:00	67.00																				
B01.0100	Implement TTM1 and Trial Run	2.00	14-Jul-14 08:00	15-Jul-14 18:00	1.00																				
B01.0110	Transplant and tree removal	7.00	16-Jul-14 08:00	23-Jul-14 18:00	6.00																				
B01.0120	Preliminary works, trial trenches, instrmentation, UU diversion at SBC, installation of GIs, etc.	28.00	17-Jul-14 08:00	18-Aug-14 18:00	38.00																				
B5.0010	TTM1 Playground SBC & Play Area - Diversion of existing utilities and misc. works	26.00	16-Jul-14 08:00	14-Aug-14 18:00	30.00																				
TTM 2 - SBC, Playground, JnR Carriageway EB Median Lane & WB																									
Preliminaries, Instrumentation, UU Diversions, etc.																									
A01.HRD02	Stage 2 - Erect hoarding 36m, and water infill barriers	5.00	24-Jul-14 08:00	29-Jul-14 18:00	1.00																				
B02.0100	Implement TTM2, EB Relocate existing bus stop, trial trenches, instrumentation, installation of GIs, etc.	29.00	30-Jul-14 08:00	01-Sep-14 18:00	25.00																				
B02.0150	Implement TTM2, WB Carriageway Trial trenches, instrumentation, carriageway UU diversions	51.00	13-Aug-14 08:00	14-Oct-14 18:00	25.00																				
Sheet Pile, Pipe Pile, Grouting, Decking																									
At SBC Southern Basketball Court																									
B02.0205	Sheet pile at SBC, 22 x 8.45m, 179 x 16m, 30 x 24m total 231 no., 3767m, 287t (1 rigs)	37.00	04-Aug-14 08:00	16-Sep-14 18:00	3.00																				
B02.0240	Pipe pile between GL G&H (SBC & Play Area), 16 x 21m, total 336m	36.00	30-Jul-14 08:00	10-Sep-14 18:00	1.00																				
B02.0260	Grouting of pipe pile between GL G&H (SBC & Play Area)	28.00	11-Aug-14 08:00	12-Sep-14 18:00	6.00																				
At Johnston Road EB Carriageway Median Lane																									
B02.0210	Sheet pile at JnR EB Carriageway Median Lane, 10 x 24m, total 240m, 18t; and King post, 2 nr (1 rigs)	7.00	17-Sep-14 08:00	24-Sep-14 18:00	14.00																				
B02.0245a	Pipe pile at JnR EB Carriageway Median Lane, 16 x 21m, total 336m (2 rigs)	51.00	11-Sep-14 08:00	11-Nov-14 18:00	1.00																				
B02.0262	Jet grout soil blocks for mined tunneling at JnR EB Carriageway Median Lane	31.00	11-Sep-14 08:00	18-Oct-14 18:00	1.00																				
B02.0265	Grouting of pipe pile at JnR EB Carriageway Median Lane	55.00	11-Sep-14 08:00	15-Nov-14 18:00	1.00																				
B02.0280	Underpinning works, if required	57.00	30-Jul-14 08:00	07-Oct-14 18:00	11.00																				
B5.0020	TTM2 JnR EB Carriageway Median Lane - Diversion of existing utilities and misc. works	29.00	30-Jul-14 08:00	01-Sep-14 18:00	26.00																				
B5.0025	TTM2 JnR WB Carriageway - Diversion of existing utilities and misc. works	31.00	13-Aug-14 08:00	18-Sep-14 18:00	25.00																				
Pump Test, Excavation, ELS																									
B02.0300	Pumping test 1, pumping test report and submission to BD	18.00	17-Sep-14 08:00	09-Oct-14 18:00	3.00																				
B02.0310	SBC Excavation & ELS, 1900 m3	20.00	10-Oct-14 08:00	01-Nov-14 18:00	3.00																				
B02.0320	SBC Hard core blanket 300tk, blinding layer 75tk, waterproof membrane	20.00	03-Nov-14 08:00	25-Nov-14 18:00	3.00																				
RC Structures																									
B02.0400	SBC RC Slab - Smoothing concrete 250tk, waterproof membrane, cast slab, 350m^3 Concrete, ReBar 18.8T	36.00	17-Nov-14 08:00	30-Dec-14 18:00	3.00																				
B02.0500	SBC RC Wall - Smoothing concrete 250tkm waterproof membrane, cast wall, 63m^3 Concrete, ReBar 64.6T	38.00	01-Dec-14 08:00	16-Jan-15 18:00	3.00																				
B02.0600	SBC RC Top Slab - Waterproof membrane, cast top slab, 163m^3 Concrete, ReBar 15.1T	42.00	15-Dec-14 08:00	04-Feb-15 18:00	3.00																				
Backfill and Miscellaneous Works																									
B02.0700	SBC - Backfill to ground level, cut sheet pile 2m depth below ground, reinstate surface	24.00	05-Feb-15 08:00	07-Mar-15 18:00	3.00																				
B02.0800	SBC - Fencing, utilites, lighting, etc.	48.00	09-Mar-15 08:00	08-May-15 18:00	3.00																				
B02.0900	SBC - Joint inspection and handover to LCSD	29.00	09-May-15 08:00	12-Jun-15 18:00	3.00																				
B7.SBC010	W1 SBC - Excavation 116 m3, remove existing basketball court surface 375 m2	4.00	16-Jul-14 08:00	19-Jul-14 18:00	15.00																				
B7.SBC020	W1 SBC - Reinstatement - Subgrade, rc slab/light fnd., EPDM surface coat 375m2, furnitures, etc.	24.00	05-Feb-15 08:00	07-Mar-15 18:00	3.00																				
KD2Ap	2A - SBC Complete backfill, resurfacing, fencing, utilities, lighting and return to LCSD - Programmed	0.00		12-Jun-15 18:00	3.00																				
TTM 3 - SBC, Playground, JnR Carriageway EB Kerb Lane & South Footpath																									
Preliminaries, Instrumentation, UU Diversions, etc.																									
A01.HRD03	Stage 3 - Erect hoarding 46m, Remove hoarding 36m, Relocate 1 no. gate, and water infill barriers	8.00	20-Oct-14 08:00	28-Oct-14 18:00	15.00																				
B03.0100	Implement TTM3, trial trenches, instrumentation, installation of GIs, UU diversions at South Footpath, etc.	24.00	20-Oct-14 08:00	15-Nov-14 18:00	1.00																				
Sheet Pile, Pipe Pile, Grouting, Decking																									

- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone

Preliminary Master Programme (Rev.B)



Activity ID	Activity Name	Original Duration	Planned Start	Planned Finish	Total Float	2014												2015												2016												2017																																																																																	
						M			J			J			A			S			O			N			D			J			F			M			A			M			J			J			A			S			O			N			D			J			F																																																						
						1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25
TTM 6 - NBC, Playground, JnR North Footpath, Carriageway WB																																																																																																																											
Preliminaries, Instrumentation, UU Diversions, etc.																																																																																																																											
A01.HRD06	Stage 6 - Erect hoarding 52m, and water infill barriers	6.00	08-Jul-15 08:00	14-Jul-15 18:00	3.00																																																																																																																						
B06.0100	Implement TTM6, trial trenches, instrumentation, UU diversions at North Footpath, etc.	24.00	15-Apr-15 08:00	13-May-15 18:00	6.00																																																																																																																						
Sheet Pile, Pipe Pile, Grouting, Decking																																																																																																																											
B06.0200	Sheet pile at JnR WB Carriageway, 23 x 21m, total 483m, 37t	6.00	14-May-15 08:00	20-May-15 18:00	6.00																																																																																																																						
B06.0240	Pipe pile at Johnston Road WB Carriageway, 17 x 21m, total 357m	38.00	21-May-15 08:00	07-Jul-15 18:00	6.00																																																																																																																						
B06.0260	Grouting of pipe pile at JnR WB Carriageway	21.00	15-Jun-15 08:00	10-Jul-15 18:00	6.00																																																																																																																						
B06.0265	Jet grout soil blocks for mined tunneling at JnR WB Carriageway	31.00	21-May-15 08:00	27-Jun-15 18:00	16.00																																																																																																																						
B06.0270	Temporary decking at JnR WB Carriageway	15.00	11-Jul-15 08:00	28-Jul-15 18:00	6.00																																																																																																																						
Mined Tunnel Underneath Tram Track																																																																																																																											
Preliminaries, Horizontal Pipe Piles and Grouting																																																																																																																											
MIT.TW004	2 Months notification to HKT prior to construction of mined tunneling works	72.00	06-Feb-15 08:00	09-May-15 18:00	28.00																																																																																																																						
MIT.TW006	3mT TAM Grout to 1.6m-extent from tunnel temporary extrados	26.00	12-Jun-15 08:00	14-Jul-15 18:00	1.00																																																																																																																						
MIT.TW020	Break through pipe piles & flame cut holes in sheet H pile	6.00	08-Jul-15 08:00	14-Jul-15 18:00	1.00																																																																																																																						
MIT.TW030	Drilling full periphery for grouting, approx. 12mL	18.00	15-Jul-15 08:00	04-Aug-15 18:00	1.00																																																																																																																						
MIT.TW040	1.6mT TAM grouting surrounding extrados of proposed steel tube periphery, approx. 12mL	18.00	18-Jul-15 08:00	07-Aug-15 18:00	1.00																																																																																																																						
MIT.TW050	Install steel tube for full periphery	18.00	22-Jul-15 08:00	11-Aug-15 18:00	1.00																																																																																																																						
MIT.TW060	Pressure grouting to fill steel tube and drilled voids around steel periphery	18.00	25-Jul-15 08:00	14-Aug-15 18:00	1.00																																																																																																																						
MIT.TW070	Weld steel rib in front of pipe pile/ sheet pile wall & within steel periphery	14.00	25-Jul-15 08:00	10-Aug-15 18:00	1.00																																																																																																																						
MIT.TW080	Remove sheet H pile sections and strutting for tunnel heading excavation	3.00	11-Aug-15 08:00	13-Aug-15 18:00	1.00																																																																																																																						
MIT.TW090	Measure ground water flow and supplementary grouting	2.00	14-Aug-15 08:00	15-Aug-15 18:00	1.00																																																																																																																						
MIT.TW100	Install temporary face support works	3.00	17-Aug-15 08:00	19-Aug-15 18:00	1.00																																																																																																																						
RC Structures																																																																																																																											
MIT.CS0010	Blinding layer, smooth concrete and waterproofing, 2 bays	3.00	20-Jan-16 08:00	22-Jan-16 18:00	1.00																																																																																																																						
MIT.CS0100	RC Base Slabs - Smoothing concrete 250tk, waterproof membrane, cast slab, 68m^3 Concrete, ReBar 10.5T	18.00	23-Jan-16 08:00	16-Feb-16 18:00	1.00																																																																																																																						
MIT.CS0200	RC Walls - Smoothing concrete 250tkm waterproof membrane, cast wall, 26m^3 Concrete, ReBar 22.3T	18.00	04-Feb-16 08:00	27-Feb-16 18:00	1.00																																																																																																																						
MIT.CS0300	RC Top Slabs - Waterproof membrane, cast top slab, 23m^3 Concrete, ReBar 10.5T	20.00	19-Feb-16 08:00	12-Mar-16 18:00	1.00																																																																																																																						
MIT.CS0900	Completion of Mined Tunnel Structure & completion of whole tunnel structure	0.00	14-Mar-16 08:00		1.00																																																																																																																						
Mined Tunnel Excavation																																																																																																																											
Top Bench																																																																																																																											
MIT.EX0110	Excavate 1st 1/4 top bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (135m3)	24.00	20-Aug-15 08:00	16-Sep-15 18:00	1.00																																																																																																																						
MIT.EX0120	Excavate 2nd 1/4 top bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (135m3)	24.00	03-Sep-15 08:00	02-Oct-15 18:00	1.00																																																																																																																						
MIT.EX0140	Excavate 3rd 1/4 top bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (135m3)	36.00	03-Oct-15 08:00	14-Nov-15 18:00	13.00																																																																																																																						
MIT.EX0150	Excavate last 1/4 top bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (135m3)	36.00	17-Oct-15 08:00	28-Nov-15 18:00	13.00																																																																																																																						
Middle Bench																																																																																																																											
MIT.EX0155	Excavate 1st 1/2 middle bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (270m3)	36.00	03-Oct-15 08:00	14-Nov-15 18:00	1.00																																																																																																																						
MIT.EX0160	Excavate last 1/2 middle bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (270m3)	60.00	02-Nov-15 08:00	13-Jan-16 18:00	13.00																																																																																																																						
Bottom Bench																																																																																																																											
MIT.EX0170	Excavate 1st 1/2 bottom bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c (270m3)	36.00	02-Nov-15 08:00	12-Dec-15 18:00	1.00																																																																																																																						
MIT.EX8874	Excavate 1st last 1/2 bottom bench 12x1m advance heading, shotcrete face, install steel frame/beam/column@1000c/c(270m3)	25.00	14-Dec-15 08:00	14-Jan-16 18:00	1.00																																																																																																																						
Break Through Pipe Pile Wall																																																																																																																											
MIT.EX8878	Break through 1st 1/2 pipe piles & flame cut sheet H pile	18.00	27-Nov-15 08:00	17-Dec-15 18:00	9.00																																																																																																																						
MIT.EX8882	Break through remaining 1/2 pipe piles & flame cut sheet H pile	17.00	30-Dec-15 08:00	19-Jan-16 18:00	1.00																																																																																																																						
TTM 7 - NBC, Playground, JnR North & South Footpath																																																																																																																											
Preliminaries, Instrumentation, UU Diversions, etc.																																																																																																																											
A01.HRD07	Stage 7 - Erect hoarding 18m, Remove hoarding 32m, and water infill barriers	5.00	29-Jul-15 08:00	03-Aug-15 18:00	6.00																																																																																																																						
B07.0100	Implement TTM7	2.00	29-Jul-15 08:00	30-Jul-15 18:00	6.00																																																																																																																						
Sheet Pile, Pipe Pile, Grouting, Decking																																																																																																																											
B07.0200	Sheet pile at JnR South Footpath, 10 x 21m, total 210m, 16t	5.00	04-Aug-15 08:00	08-Aug-15 18:00	6.00																																																																																																																						
B07.0270	Temporary decking at JnR South Footpath	10.00	10-Aug-15 08:00	20-Aug-15 18:00	6.00																																																																																																																						
Pump Test, Excavation, ELS																																																																																																																											
B07.0280	Pumping test 5	12.00	21-Aug-15 08:00	03-Sep-15 18:00	6.00																																																																																																																						
B07.0300	Excavation & ELS, 700 m3	14.00	04-Sep-15 08:00	19-Sep-15 18:00	6.00																																																																																																																						
B07.0310	Hard core blanket 300tk, blinding layer 75tk, waterproof membrane	12.00	10-Sep-15 08:00	23-Sep-15 18:00	6.00																																																																																																																						
RC Structures																																																																																																																											
B07.0400	RC Slab - Smoothing concrete 250tk, waterproof membrane, cast slab, 120m^3 Concrete, ReBar 6.0T	28.00	17-Sep-15 08:00	22-Oct-15 18:00	6.00																																																																																																																						
B07.0500	RC Wall - Smoothing concrete 250tkm waterproof membrane, cast wall, 55m^3 Concrete, ReBar 19.3T	34.00	03-Oct-15 08:00	12-Nov-15 18:00	6.00																																																																																																																						
B07.0600	RC Top Slab - Waterproof membrane, cast top slab, 55m^3 Concrete, ReBar 9.0T	38.00	17-Oct-15 08:00	01-Dec-15 18:00	6.00																																																																																																																						
Backfill and Miscellaneous Works																																																																																																																											
B07.0700	Backfill to ground level, cut sheet pile 2m depth below ground, reinstate road & footpath at EB & WB footpaths	30.00	02-Dec-15 08:00	08-Jan-16 18:00	45.00																																																																																																																						
TTM 8 - NBC, Playground, JnR Carriageway EB Kerb Lane & WB																																																																																																																											

- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- Milestone

Preliminary Master Programme (Rev.B)



Activity ID	Activity Name	Original Duration	Planned Start	Planned Finish	Total Float	2014												2015												2016												2017	
						A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	J	F			
Breaking Out WAC Station																																											
D2070	Breaking out WAC Station - Form opening, core holes 72 nr, chain cut 1225 x 900mm block 55 nr.	90.00	25-Nov-15 08:00	15-Mar-16 18:00	8.00	[Gantt bar: 25-Nov-15 to 15-Mar-16, Critical Remaining Work]																																					
WAC Station Modification Works																																											
D1001	Liaison with MTR and relevance parties for works in WAC station	90.00	14-Apr-14 08:00	04-Aug-14 18:00	121.00	[Gantt bar: 14-Apr-14 to 04-Aug-14, Actual Work]																																					
D1002	Preparation works for works in WAC station	12.00	05-Aug-14 08:00	18-Aug-14 18:00	121.00	[Gantt bar: 05-Aug-14 to 18-Aug-14, Actual Work]																																					
D1010	Internal Hoarding in WAC station (NTH)	12.00	19-Aug-14 08:00	01-Sep-14 18:00	121.00	[Gantt bar: 19-Aug-14 to 01-Sep-14, Actual Work]																																					
D1020	Construct new AFC/Audit Room next to Entrance B1, B2, ABWF & BS Works (NTH)	69.00	02-Sep-14 08:00	24-Nov-14 18:00	121.00	[Gantt bar: 02-Sep-14 to 24-Nov-14, Actual Work]																																					
D1030	Modification Works to existing AFC/Audit, Store & Kiosk 3 & 5 (NTH)	84.00	05-May-15 08:00	13-Aug-15 18:00	13.00	[Gantt bar: 05-May-15 to 13-Aug-15, Actual Work]																																					
D1040	Modification to existing Kiosk 2 (NTH)	80.00	14-Aug-15 08:00	18-Nov-15 18:00	13.00	[Gantt bar: 14-Aug-15 to 18-Nov-15, Actual Work]																																					
D1050	Relocate 4 Advertising Panels (NTH)	10.00	19-Nov-15 08:00	30-Nov-15 18:00	93.00	[Gantt bar: 19-Nov-15 to 30-Nov-15, Actual Work]																																					
D1060	Install New Telephone Booth and associated works (NTH)	36.00	14-Aug-15 08:00	24-Sep-15 18:00	57.00	[Gantt bar: 14-Aug-15 to 24-Sep-15, Actual Work]																																					
INF.AFCp	Interface Access for AFC, C&C DC in new AFC Audit Room inside WAC, Concourse Level, No.Cal.Wk. 55 - Programmed	0.00		24-Nov-14 18:00	153.00	[Gantt bar: 24-Nov-14, Actual Work]																																					
Testing and Commissioning																																											
D4090	Testing and Commissioning	28.00	16-Mar-16 08:00	21-Apr-16 18:00	8.00	[Gantt bar: 16-Mar-16 to 21-Apr-16, Critical Remaining Work]																																					
KD2Bp	Specified Part 2B - Complete all works at the 2 new Shop Kiosks and hand over to the Employer - Programmed	0.00		21-Apr-16 18:00	8.00	[Gantt bar: 21-Apr-16, Actual Work]																																					
E. WAC Station Improvement Works (Part C Works)																																											
Improvement Works to WAC Station																																											
E1020	Modify, provide & install new glass barrier to suit new AFC gates (NTH)	40.00	17-Sep-15 08:00	05-Nov-15 18:00	94.00	[Gantt bar: 17-Sep-15 to 05-Nov-15, Actual Work]																																					
E1030	Provide and install additional AFC gates (NTH)	40.00	06-Nov-15 08:00	22-Dec-15 18:00	94.00	[Gantt bar: 06-Nov-15 to 22-Dec-15, Actual Work]																																					
E1040	Provide builder works for TIMS relocation (NTH)	80.00	16-Mar-16 08:00	24-Jun-16 18:00	28.00	[Gantt bar: 16-Mar-16 to 24-Jun-16, Actual Work]																																					
E1050	T&C by Designated Contractor for TIMS (NTH)	30.00	25-Jun-16 08:00	30-Jul-16 18:00	28.00	[Gantt bar: 25-Jun-16 to 30-Jul-16, Actual Work]																																					
E1060	Make Good builder works for TIMS (NTH)	75.00	01-Aug-16 08:00	29-Oct-16 18:00	28.00	[Gantt bar: 01-Aug-16 to 29-Oct-16, Actual Work]																																					
MSE03p	E3- All works in milestone E completed - Programmed	0.00		29-Oct-16 18:00	28.00	[Milestone diamond at 29-Oct-16]																																					

- Actual Level of Effort
- Actual Work
- Remaining Work
- Critical Remaining Work
- ◆ Milestone

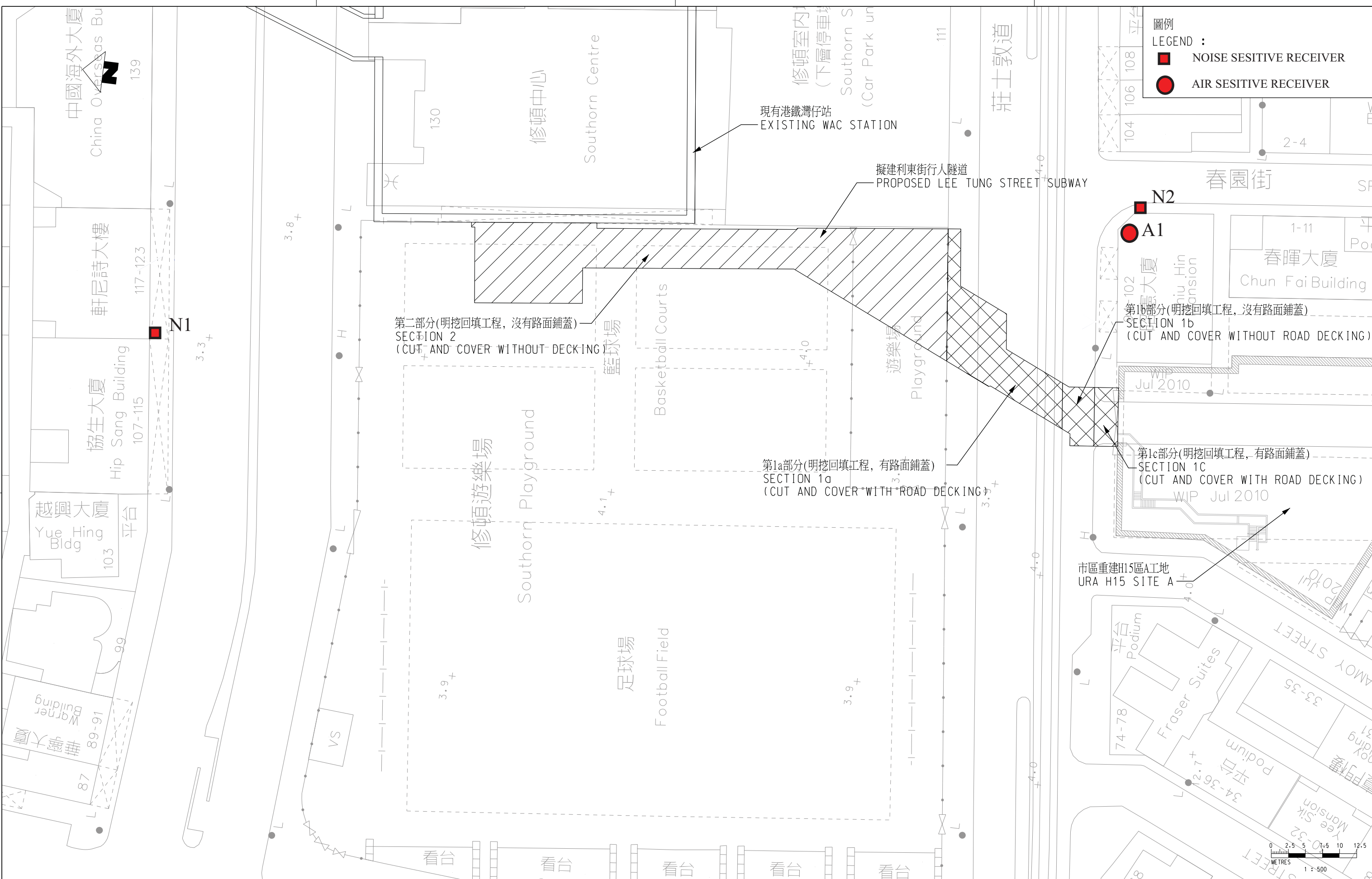
Preliminary Master Programme (Rev.B)



Appendix C

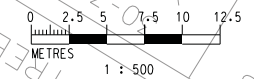
Monitoring Locations

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圖例
 LEGEND :

- NOISE SENSITIVE RECEIVER
- AIR SENSITIVE RECEIVER



REV	DESCRIPTION	BY	DATE	APPROVED
D	GENERAL REVISION			
C	GENERAL REVISION			
B	GENERAL REVISION			
A	PROJECT PROFILE			

REV	DESCRIPTION	BY	DATE	APPROVED

DRAWN	
DESIGNED	
CHECKED	
APPROVED	
DATE	

MTR

WAC STATION LEE TUNG STREET SUBWAY

ORIGINATOR

Mott MacDonald

20/F Two Landmark East
 100 Hoi Ming Street
 Kowloon, Hong Kong
 T +852 2808 5157
 F +852 2827 1823
 www.mottmac.com.hk

TITLE

CONSULTANCY AGREEMENT NO. NEX/1050
 DETAILED DESIGN FOR LEE TUNG STREET SUBWAY
 LOCATION OF NOISE AND AIR SENSITIVE RECEIVER

SCALE 1:500 (A3)

DRAWING NO.

REV.

Appendix D

**Calibration Certificate of
Monitoring Equipment**

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Chiu Hin Mansion
 Location ID : A1

Date of Calibration: 10-Feb-15
 Next Calibration Date: 10-Apr-15
 Technician: Mr. Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1021.5	Corrected Pressure (mm Hg)	766.125
Temperature (°C)	19.4	Temperature (K)	292

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.00757
Model->	5025A	Qstd Intercept ->	-0.01628
Serial # ->	1612		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.1	6.1	12.2	1.772	53	54.23	Slope = 30.6609 Intercept = -0.4323 Corr. coeff. = 0.9991
13	4.6	4.6	9.2	1.539	45	46.05	
10	3.5	3.5	7	1.344	40	40.93	
7	2.5	2.5	5	1.137	34	34.79	
5	1.4	1.4	2.8	0.853	25	25.58	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta)) - b]$$

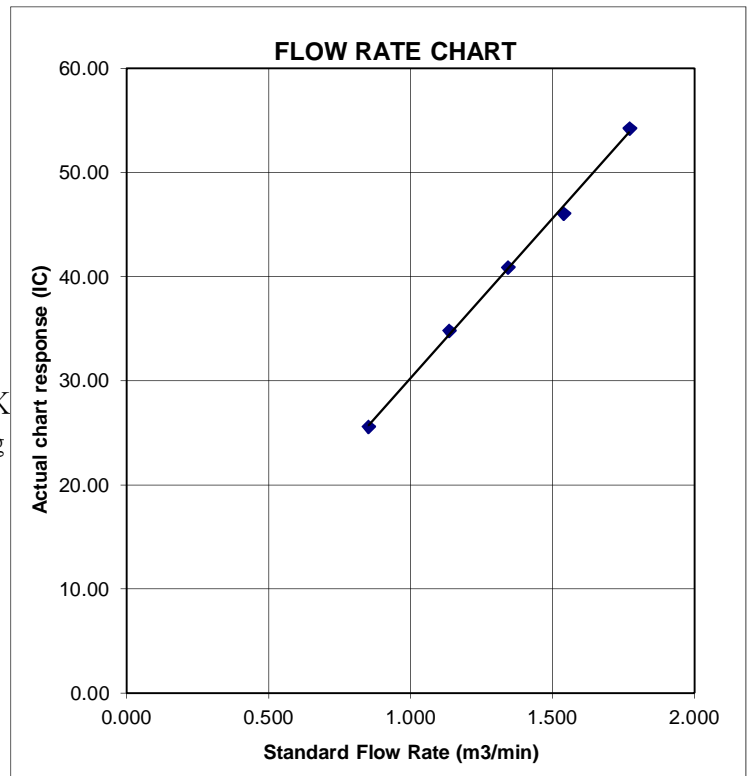
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (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





TISCH ENVIRONMENTAL, INC.
 145 SOUTH MIAMI AVE
 VILLAGE OF CLEVELAND, OH
 45002
 513.467.9000
 877.263.7610 TOLL FREE
 513.467.9009 FAX

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Apr 07, 2014 Rootmeter S/N 0438320 Ta (K) - 294
 Operator Tisch Orifice I.D. - 1612 Pa (mm) - 742.95

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	1.3940	3.2	2.00
2	NA	NA	1.00	0.9790	6.4	4.00
3	NA	NA	1.00	0.8800	7.8	5.00
4	NA	NA	1.00	0.8350	8.8	5.50
5	NA	NA	1.00	0.6910	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9866	0.7077	1.4077	0.9957	0.7142	0.8896
0.9823	1.0034	1.9908	0.9914	1.0127	1.2581
0.9804	1.1140	2.2258	0.9894	1.1243	1.4066
0.9791	1.1726	2.3345	0.9881	1.1834	1.4753
0.9739	1.4094	2.8155	0.9829	1.4224	1.7793
Qstd slope (m) = 2.00757			Qa slope (m) = 1.25710		
intercept (b) = -0.01628			intercept (b) = -0.01029		
coefficient (r) = 0.99989			coefficient (r) = 0.99989		
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}

TSP SAMPLER CALIBRATION CALCULATION SPREADSHEET

Location : Chiu Hin Mansion
 Location ID : A1

Date of Calibration: 9-Apr-15
 Next Calibration Date: 9-Jun-15
 Technician: Mr. Ben Tam

CONDITIONS

Sea Level Pressure (hPa)	1017.8	Corrected Pressure (mm Hg)	763.35
Temperature (°C)	18.0	Temperature (K)	291

CALIBRATION ORIFICE

Make->	TISCH	Qstd Slope ->	2.10265
Model->	5025A	Qstd Intercept ->	-0.00335
Serial # ->	1941		

CALIBRATION

Plate No.	H2O (L) (in)	H2O (R) (in)	H2O (in)	Qstd (m3/min)	I (chart)	IC corrected	LINEAR REGRESSION
18	6.2	6.2	12.4	1.700	51	52.34	Slope = 28.2117 Intercept = 4.8749 Corr. coeff. = 0.9992
13	4.7	4.7	9.4	1.480	46	47.21	
10	3.5	3.5	7	1.278	40	41.05	
7	2.6	2.6	5.2	1.101	35	35.92	
5	1.3	1.3	2.6	0.779	26	26.68	

Calculations :

$$Qstd = 1/m[\text{Sqrt}(H2O(Pa/Pstd)(Tstd/Ta))-b]$$

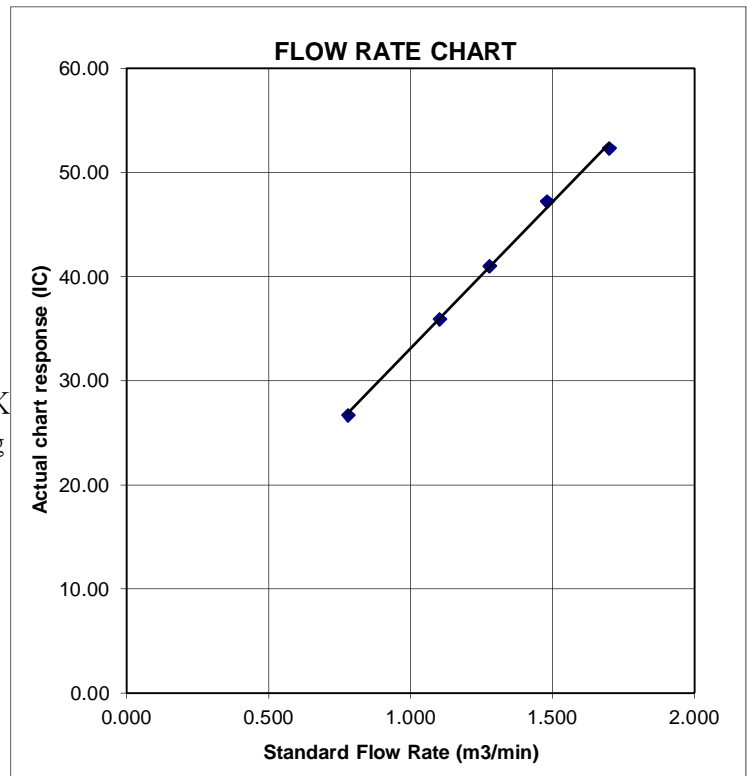
$$IC = I[\text{Sqrt}(Pa/Pstd)(Tstd/Ta)]$$

Qstd = standard flow rate
 IC = corrected chart responses
 I = actual chart response
 m = calibrator Qstd slope
 b = calibrator Qstd intercept
 Ta = actual temperature during calibration (deg K)
 Pstd = actual pressure during calibration (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





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ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Mar 24, 2015 Rootmeter S/N 0438320 Ta (K) - 292
 Operator Tisch Orifice I.D. - 1941 Pa (mm) - 756.92

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4880	3.2	2.00
2	NA	NA	1.00	1.0510	6.4	4.00
3	NA	NA	1.00	0.9360	7.9	5.00
4	NA	NA	1.00	0.8920	8.8	5.50
5	NA	NA	1.00	0.7360	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0121	0.6802	1.4258	0.9958	0.6692	0.8784
1.0078	0.9589	2.0163	0.9916	0.9434	1.2422
1.0057	1.0745	2.2543	0.9895	1.0571	1.3888
1.0046	1.1262	2.3644	0.9884	1.1080	1.4566
0.9993	1.3578	2.8515	0.9832	1.3358	1.7568
Qstd slope (m) = 2.10265			Qa slope (m) = 1.31664		
intercept (b) = -0.00335			intercept (b) = -0.00206		
coefficient (r) = 0.99999			coefficient (r) = 0.99999		
y axis = SQRT[H2O(Pa/760) (298/Ta)]			y axis = SQRT[H2O(Ta/Pa)]		

CALCULATIONS

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

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

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

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

For subsequent flow rate calculations:

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

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



Certificate of Calibration 校正證書

Certificate No. : C142871
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC14-0853) Date of Receipt / 收件日期 : 8 May 2014
Description / 儀器名稱 : Integrating Sound Level Meter (EQ006)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285762
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

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 : 13 May 2014

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).

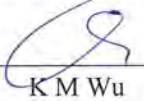
The test equipment used for calibration are traceable to National Standards via :

- 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
Project Engineer

Certified By
核證


K M Wu
Engineer

Date of Issue : 15 May 2014
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. : C142871
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 from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C140016
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)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.3

- 6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	± 0.7

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFP}	A	F	94.00	1	94.0 (Ref.)
				104.00		104.0
				114.00		113.9

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

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. : C142871
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.0	Ref.
	L _{ASP}		S			94.0	± 0.1
	L _{AIP}		I			94.0	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}		S		Continuous	106.0	Ref.
	L _{ASMax}				500 ms	102.0	-4.1 ± 1.0

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	55.1	-39.4 ± 1.5
					63 Hz	68.0	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.3	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	95.2	+1.2 ± 1.0
					4 kHz	95.0	+1.0 ± 1.0
					8 kHz	92.9	-1.1 (+1.5 ; -3.0)
					12.5 kHz	89.8	-4.3 (+3.0 ; -6.0)

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. : C142871
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.4	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.8	-0.2 ± 1.0
					250 Hz	94.0	0.0 ± 1.0
					500 Hz	94.0	0.0 ± 1.0
					1 kHz	94.0	Ref.
					2 kHz	93.8	-0.2 ± 1.0
					4 kHz	93.2	-0.8 ± 1.0
					8 kHz	91.0	-3.0 (+1.5 ; -3.0)
					12.5 kHz	87.8	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)		
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5
								90	89.5	± 0.5
								80	79.2	± 1.0
								70	69.1	± 1.0
			60 sec.			1/10 ²				
			5 min.			1/10 ³				
						1/10 ⁴				

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812705

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB	31.5 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)
	Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

- 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。

Sun Creation Engineering Limited - Calibration & Testing Laboratory

c/o 4/F, Tsing Shan Wan Exchange Building, 1 Hing On Lane, Tuen Mun, New Territories, Hong Kong

輝創工程有限公司 - 校正及檢測實驗室

c/o 香港新界屯門興安里一號青山灣機樓四樓

Tel/電話: 2927 2606 Fax/傳真: 2744 8986 E-mail/電郵: callab@suncreation.com Website/網址: www.suncreation.com



Certificate of Calibration 校正證書

Certificate No. : C142872
證書編號

ITEM TESTED / 送檢項目 (Job No. / 序引編號 : IC14-0853) Date of Receipt / 收件日期 : 8 May 2014
Description / 儀器名稱 : Integrating Sound Level Meter (EQ008)
Manufacturer / 製造商 : Brüel & Kjær
Model No. / 型號 : 2238
Serial No. / 編號 : 2285690
Supplied By / 委託者 : Action-United Environmental Services and Consulting
Unit A, 20/F., Gold King Industrial Building,
35-41 Tai Lin Pai Road, Kwai Chung, N.T.

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 : 13 May 2014

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
Project Engineer

Certified By : 
核證 : K M Wu
Engineer

Date of Issue : 15 May 2014
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. : C142872
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 from 6.1.1.2 to 6.4.
- The results presented are the mean of 3 measurements at each calibration point.
- Test equipment :

Equipment ID	Description	Certificate No.
CL280	40 MHz Arbitrary Waveform Generator	C140016
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)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFF}	A	F	94.00	1	94.2

- 6.1.1.2 After Self-calibration

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFF}	A	F	94.00	1	94.1	± 0.7

- 6.1.2 Linearity

UUT Setting				Applied Value		UUT Reading (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)	
50 - 130	L _{AFF}	A	F	94.00	1	94.1 (Ref.)
				104.00		104.1
				114.00		114.0

IEC 60651 Type 1 Spec. : ± 0.4 dB per 10 dB step and ± 0.7 dB for overall different.

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.

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Certificate of Calibration

校正證書

Certificate No. : C142872
證書編號

6.2 Time Weighting

6.2.1 Continuous Signal

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq. (kHz)		
50 - 130	L _{AFP}	A	F	94.00	1	94.1	Ref.
	L _{ASP}		S			94.1	± 0.1
	L _{AIP}		I			94.1	± 0.1

6.2.2 Tone Burst Signal (2 kHz)

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Burst Duration		
30 - 110	L _{AFP}	A	F	106.0	Continuous	106.0	Ref.
	L _{AFMax}				200 ms	105.0	-1.0 ± 1.0
	L _{ASP}		S		Continuous	106.0	Ref.
	L _{ASMax}				500 ms	102.0	-4.1 ± 1.0

6.3 Frequency Weighting

6.3.1 A-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{AFP}	A	F	94.00	31.5 Hz	54.8	-39.4 ± 1.5
					63 Hz	67.9	-26.2 ± 1.5
					125 Hz	77.9	-16.1 ± 1.0
					250 Hz	85.4	-8.6 ± 1.0
					500 Hz	90.8	-3.2 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	95.3	+1.2 ± 1.0
					4 kHz	95.1	+1.0 ± 1.0
					8 kHz	93.0	-1.1 (+1.5 ; -3.0)
12.5 kHz	89.9	-4.3 (+3.0 ; -6.0)					

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所書面批准。

Certificate of Calibration

校正證書

Certificate No. : C142872
證書編號

6.3.2 C-Weighting

UUT Setting				Applied Value		UUT Reading (dB)	IEC 60651 Type 1 Spec. (dB)
Range (dB)	Parameter	Frequency Weighting	Time Weighting	Level (dB)	Freq.		
50 - 130	L _{CFP}	C	F	94.00	31.5 Hz	91.2	-3.0 ± 1.5
					63 Hz	93.3	-0.8 ± 1.5
					125 Hz	93.9	-0.2 ± 1.0
					250 Hz	94.1	0.0 ± 1.0
					500 Hz	94.1	0.0 ± 1.0
					1 kHz	94.1	Ref.
					2 kHz	93.9	-0.2 ± 1.0
					4 kHz	93.3	-0.8 ± 1.0
					8 kHz	91.1	-3.0 (+1.5 ; -3.0)
					12.5 kHz	88.0	-6.2 (+3.0 ; -6.0)

6.4 Time Averaging

UUT Setting				Applied Value					UUT Reading (dB)	IEC 60804 Type 1 Spec. (dB)	
Range (dB)	Parameter	Frequency Weighting	Integrating Time	Frequency (kHz)	Burst Duration (ms)	Burst Duty Factor	Burst Level (dB)	Equivalent Level (dB)			
30 - 110	L _{Aeq}	A	10 sec.	4	1	1/10	110.0	100	99.9	± 0.5	
								90	89.7	± 0.5	
			60 sec.					1/10 ³	80	79.8	± 1.0
			5 min.					1/10 ⁴	70	69.8	± 1.0

Remarks : - UUT Microphone Model No. : 4188 & S/N : 2812706

- Mfr's Spec. : IEC 60651 Type 1 & IEC 60804 Type 1

- Uncertainties of Applied Value :

94 dB : 31.5 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)
Burst equivalent level	: ± 0.2 dB (Ref. 110 dB continuous sound level)

- 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。

Appendix E

HOKLAS-Accreditation Certificate of the Testing Laboratory



Hong Kong Accreditation Service
香港認可處

Certificate of Accreditation
認可證書

This is to certify that
特此證明

ALS TECHNICHEM (HK) PTY LIMITED

11/F., Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, New Territories, Hong Kong
香港新界葵涌永業街1-3號忠信針織中心11樓

has been accepted by the HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a
為香港認可處執行機關根據認可諮詢委員會建議而接受的

HOKLAS Accredited Laboratory
「香港實驗所認可計劃」認可實驗所

This laboratory meets the requirements of ISO / IEC 17025 : 2005 – General requirements for the competence of testing and calibration laboratories and it has been accredited for performing specific tests or calibrations as listed in the HOKLAS Directory of Accredited Laboratories within the test category of
此實驗所符合ISO / IEC 17025 : 2005 – 《測試及校正實驗所能力的通用規定》所訂的要求，獲認可進行載於香港實驗所認可計劃《認可實驗所名冊》內下述測試類別中的指定
測試或校正工作

Environmental Testing
環境測試

This laboratory is accredited in accordance with the recognised International Standard ISO / IEC 17025 : 2005.
本實驗所乃根據公認的國際標準 ISO / IEC 17025 : 2005 獲得認可。

This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (see joint IAF-ILAC-ISO Communiqué).
這項認可資格演示在指定範疇所需的技術能力及實驗所質量管理體系的運作
(見國際認可論壇、國際實驗所認可合作組織及國際標準化組織的聯合公報)。

The common seal of the Hong Kong Accreditation Service is affixed hereto by the authority of the HKAS Executive
香港認可處根據認可處執行機關的權限在此蓋上通用印章

CHAN Sing Sing, Terence, Executive Administrator
執行幹事 陳成城
Issue Date : 5 May 2009
簽發日期：二零零九年五月五日

Registration Number : **HOKLAS 066**
註冊號碼：

Date of First Registration : 15 September 1995
首次註冊日期：一九九五年九月十五日



Appendix F

Event and Action Plan

Event and Action Plan for Construction Noise

Event	Action			
	ET	IEC	ER	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify IEC and Contractor. 2. Carry out investigation. 3. Report the results of investigation to the IEC and Contractor. 4. Discuss with the Contractor and formulate remedial measures 5. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Review the analyzed result submitted by ET. 2. Review the proposed remedial measures by the Contractor 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 2. Notify Contractor 3. Require Contractor to propose remedial measures for the analyzed noise problem 4. Ensure remedial measures are properly implemented. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to IEC 2. Implement noise mitigation proposals
Limit Level	<ol style="list-style-type: none"> 1. Notify IEC, ER, EPD and Contractor, and follow other actions 2. Identify source 3. Repeat measurement to confirm findings 4. Increase monitoring frequency 5. Check Contractor's working procedures to determine possible mitigation to be implemented 6. Inform IEC, ER and EPD the causes and actions taken for the exceedances 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD, ER informed of the results 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly 3. Supervise the implementation of remedial measures 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of exceedances 2. Notify Contractor 3. Require Contractor to propose remedial measures 4. Ensure remedial measures are properly implemented 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to IEC within 3 working days of notifications 3. Implement the agreed proposals 4. Revise and resubmit proposals if problem still not under control 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated

Event and Action Plan for Air Quality

Event	Action			
	ET	IEC	ER	Contractor
Action Level				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. If valid, inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method. 	<ol style="list-style-type: none"> 1. Notify Contractor 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice; 2. Amend working methods if appropriate
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform IEC and EPD; 3. Repeat measurements to confirm findings; 4. Increase monitoring frequency to daily; 5. Discuss with IEC and Contractor on remedial action required; 6. If exceedance continues, arrange meeting with IEC and ER; 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervisor implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial Measure properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for remedial action to IEC within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate.
Limit Level				
Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. Inform ER and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. 	<ol style="list-style-type: none"> 1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and the Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate.
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Notify IEC, ER, Contractor and EPD; 2. Identify sources; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops cease additional monitoring. 	<ol style="list-style-type: none"> 1. Discuss amongst ER, ET and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly. 3. Supervise the implementation of remedial measures. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consultation with IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.

Appendix G

Monitoring Schedule

Monitoring Schedule in the Reporting Period – April 2015

DATE		AIR QUALITY	NOISE
		24-HOUR TSP	L _{EQ} 30MIN
WED	1-APR-15		
THU	2-APR-15		
FRI	3-APR-15		
SAT	4-APR-15		
SUN	5-APR-15		
MON	6-APR-15		
TUE	7-APR-15		
WED	8-APR-15	✓	
THU	9-APR-15		✓
FRI	10-APR-15		
SAT	11-APR-15		
SUN	12-APR-15		
MON	13-APR-15		
TUE	14-APR-15	✓	✓
WED	15-APR-15		
THU	16-APR-15		
FRI	17-APR-15		
SAT	18-APR-15		
SUN	19-APR-15		
MON	20-APR-15	✓	
TUE	21-APR-15		✓
WED	22-APR-15		
THU	23-APR-15		
FRI	24-APR-15		
SAT	25-APR-15	✓	
SUN	26-APR-15		
MON	27-APR-15		
TUE	28-APR-15		✓
WED	29-APR-15		
THU	30-APR-15	✓	

✓	Monitoring Day
	Sunday or Public Holiday

Air Quality Monitoring Location

A1 - balcony at 1/F of Chiu Hin Mansion

Construction Noise Monitoring Location:

N1 - 2/F floor of Hennessey Building

N2 - balcony at 1/F of Chiu Hin Mansion

Monitoring Schedule for the Coming Month – May 2015

DATE		AIR QUALITY	NOISE
		24-HOUR TSP	L _{EQ} 30MIN
FRI	1-MAY-15		
SAT	2-MAY-15		
SUN	3-MAY-15		
MON	4-MAY-15		
TUE	5-MAY-15		✓
WED	6-MAY-15	✓	
THU	7-MAY-15		
FRI	8-MAY-15		
SAT	9-MAY-15		
SUN	10-MAY-15		
MON	11-MAY-15		
TUE	12-MAY-15	✓	✓
WED	13-MAY-15		
THU	14-MAY-15		
FRI	15-MAY-15		
SAT	16-MAY-15		
SUN	17-MAY-15		
MON	18-MAY-15	✓	
TUE	19-MAY-15		✓
WED	20-MAY-15		
THU	21-MAY-15		
FRI	22-MAY-15		
SAT	23-MAY-15	✓	
SUN	24-MAY-15		
MON	25-MAY-15		
TUE	26-MAY-15		
WED	27-MAY-15		✓
THU	28-MAY-15		
FRI	29-MAY-15	✓	
SAT	30-MAY-15		
SUN	31-MAY-15		

✓	Monitoring Day
	Sunday or Public Holiday

Air Quality Monitoring Location

A1 - balcony at 1/F of Chiu Hin Mansion

Construction Noise Monitoring Location:

N1 - 2/F floor of Hennessey Building

N2 - balcony at 1/F of Chiu Hin Mansion

Appendix H

Database of Monitoring Results

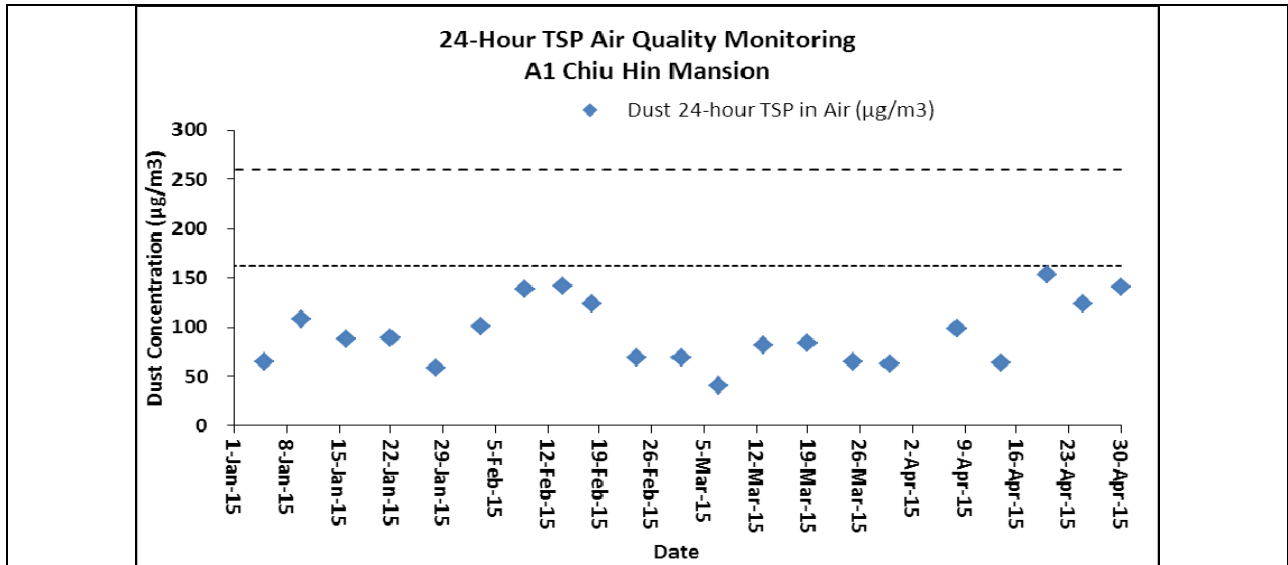
Result of 24-hour TSP Monitoring

Location: A1 (balcony at 1/F of Chiu Hin Mansion)															
Date	Sample Number	Elapsed Time			Chart Reading			Ave. Temp. (°C)	Standard			Filter Weight (g)		Weight Dust Collected (g)	Dust 24-hour TSP in Air (µg/m ³)
		Initial	Final	Actual (min)	Min	Max	Ave		Ave. Press. (hPa)	Flow Rate (m ³ /min)	Air Volume (std m ³)	Initial	Final		
8-Apr-15	27853	16126.90	16150.95	1443.00	39	40	39.5	21.8	1013.1	1.31	1889	2.8441	3.0317	0.1876	99
14-Apr-15	27892	16150.95	16174.47	1411.20	44	46	45.0	21.9	1013.6	1.43	2019	2.7500	2.8793	0.1293	64
20-Apr-15	27910	16174.47	16198.37	1434.00	44	46	45.0	23.7	1011.5	1.42	2042	2.7241	3.0381	0.3140	154
25-Apr-15	208953	16198.37	16222.58	1452.60	44	46	45.0	23.8	1012.6	1.42	2070	2.8038	3.0592	0.2554	124
30-Apr-15	27940	16222.58	16246.68	1446.00	42	44	43.0	24.7	1011.2	1.35	1953	2.8591	3.1338	0.2747	140

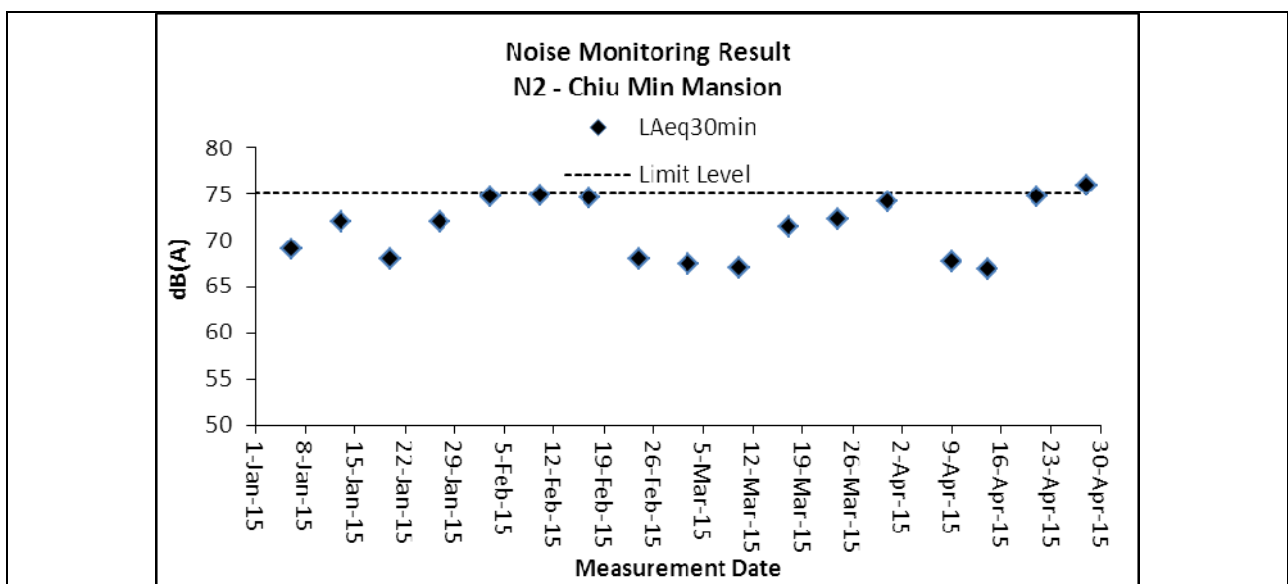
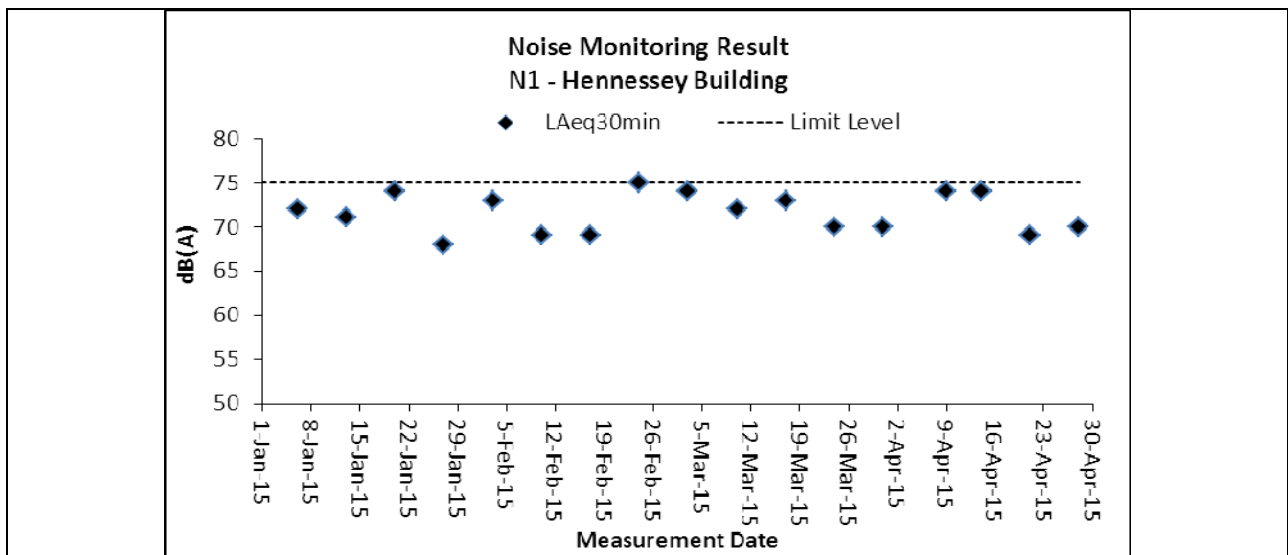
Appendix I

Graphical Plots

Air Quality



Construction Noise



Appendix J

Meteorological Information

Meteorological Data downloaded from HKO in the Reporting Period							
Date		Weather	Total Rainfall (mm)	Kings Park Station			
				Mean Air Temp. (°C)	Wind Speed (km/h)	Mean Relative Humidity (%)	Wind Direction
1-Apr-15	Wed	It will be fine. Very dry in the afternoon. Moderate north to northeasterly winds, fresh at times.	0	24.4	6.5	85.7	E/SE
2-Apr-15	Thu	Fine and very dry. Light to moderate northeasterly winds.	0	25.8	6.5	80.7	S/SW
3-Apr-15	Fri	Fine and very dry. Light to moderate northeasterly winds.	Trace	25.6	5.7	83.5	S/SW
4-Apr-15	Sat	Fine and very dry. Light to moderate northeasterly winds.	0	26.7	6.5	80	S
5-Apr-15	Sun	Fine and very dry. Light to moderate northeasterly winds.	0	25.9	8	78.2	E/SE
6-Apr-15	Mon	Fine and very dry. Light to moderate northeasterly winds.	Trace	26.2	6	78.7	W/NW
7-Apr-15	Tue	Cloudy and cooler with one or two rain patches. Moderate to fresh north to northeasterly winds.	0.1	23.7	10.5	82.2	SE
8-Apr-15	Wed	Cloudy and cooler with one or two rain patches. Moderate to fresh north to northeasterly winds.	10	18.1	10.7	73	N/NE
9-Apr-15	Thu	Cloudy with a few rain patches and relatively low visibility. Moderate east to northeasterly winds.	1.3	16.9	7.5	90	E/SE
10-Apr-15	Fri	Cloudy with a few rain patches. Moderate northeasterly winds.	0.7	17.6	5	88	E/NE
11-Apr-15	Sat	Cloudy to overcast with rain patches at first. Moderate north to northeasterly winds.	52	16.5	7.1	93.7	E/NE
12-Apr-15	Sun	Cloudy to overcast with rain patches at first. Moderate north to northeasterly winds.	0.2	19.1	6.1	80	N/NW
13-Apr-15	Mon	It will be fine. Very dry in the afternoon. Moderate north to northeasterly winds, fresh at times.	0	22.4	6.5	56.5	NE
14-Apr-15	Tue	Fine and very dry. Light to moderate northeasterly winds.	0	21	8.9	34.7	E/NE
15-Apr-15	Wed	It will be fine. Very dry in the afternoon. Light winds.	0	22.1	7	52.5	S/SW
16-Apr-15	Thu	Fine and dry. Hot in the afternoon. Light winds.	0	22.3	7.2	69	W/NW
17-Apr-15	Fri	Mainly fine. Light to moderate southeasterly winds.	0	23.8	8.2	70	S/SE
18-Apr-15	Sat	Mainly fine. Light to moderate southeasterly winds.	Trace	25.5	8.9	84.2	S/SW
19-Apr-15	Sun	Fine and dry. Hot in the afternoon. Light winds.	Trace	26.5	8	82.2	W/SW
20-Apr-15	Mon	Mainly cloudy. Moderate north to northeasterly winds, fresh at times.	0.2	25.6	7	84.7	W/NW
21-Apr-15	Tue	Mainly cloudy. Moderate north to northeasterly winds, fresh at times.	Trace	24	5.5	73.7	N/NE
22-Apr-15	Wed	Sunny periods in the afternoon. Cloudy tonight. Moderate east to northeasterly winds, fresh at times.	Trace	23.3	9	75	E/SE
23-Apr-15	Thu	Mainly fine in the afternoon. Cloudy periods tonight. Moderate easterly winds.	Trace	22.2	11.7	59.5	E/SE
24-Apr-15	Fri	Mainly fine in the afternoon. Cloudy periods tonight. Moderate easterly winds.	0	24.4	6.5	67	SE
25-Apr-15	Sat	Mainly fine in the afternoon. Moderate east to southeasterly winds.	0	23.8	8.9	83.5	E/SE
26-Apr-15	Sun	Mainly fine in the afternoon. Moderate east to southeasterly winds.	0	24	8.4	74.5	E/SE
27-Apr-15	Mon	Mainly fine in the afternoon. Moderate east to southeasterly winds.	0	24.7	7.6	74.5	SE
28-Apr-15	Tue	Mainly cloudy. Sunny intervals in the afternoon. Light to moderate southeasterly winds.	0	25.2	8.2	80.5	W/NW
29-Apr-15	Wed	Mainly cloudy. Moderate southerly winds.	0	26.5	6.5	81	W/NW
30-Apr-15	Thu	Mainly sunny during the day and becoming cludy overnight. Moderate south to southeasterly winds.	0	27.6	6	79	W/NW

Appendix K

Monthly Summary Waste Flow Table

Wan Chai Station Lee Tung Street Subway- C6593-13C

Monthly Summary Waste Flow Table for 2015

Name of Employer: MTR Corporation Limited											Contract No.: C65931-13C				
Month	Actual Quantities of Inert C&D Materials Generated Monthly										Actual Quantities of Non-Inert C&D Wastes Generated Monthly				
	Total Quantity	Broken Concrete	Building Debris	Mixed Rock & Soil	Bentonite	Rubbish	Slurry	Rock	Soil	Reused in this Project	Metals	Paper/ cardboard	Plastics	Chemical Waste	Others, e.g. general
	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m ³)	(in m3/ Litre)	(in m ³)
Jan	1.69784	0	0	0	0	0	0	0	1.69784	0	0	0	0	0.0009	
Feb	1.14858	0	0	0	0	0	0	0	1.14848	0	0	0	0	0.0001	
Mar	1.65921	0	0	0	0	0	0	0	1.65921	0	0	0	0	0.0009	
Apr	0.07772	0.06172	0	0	0	0	0	0	0.016	0	0	0	0	0.04404	
May	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jun	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Jul	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Aug	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Sep	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Oct	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Nov	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Dec	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Total	4.58335	0.06172	0	0	0	0	0	0	4.52153	0	0	0	0	0.04594	

Appendix L

Implementation Schedule for Environmental Mitigation Measures (ISEMM)

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
NOISE IMPACT						
S.5.1.1	<u>Use of quieter plant</u>	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance
S.5.1.1	<u>Use of noise enclosure and movable barrier</u> <ul style="list-style-type: none"> • movable barrier can achieve a 5 dB(A) reduction for movable PME and 10 dB(A) reduction for stationary PME; • noise enclosure can achieve 15dB(A) reduction for PME; • noise enclosure is proposed to be built after open excavation in order to minimize the noise impact due to further excavation work and construction of subway. The enclosure should either be provided with acoustic door for access purpose which should be kept closed during the construction works or should be designed with no direct line of sight from the open side to the NSRs; • A typical design barrier with a steel frame of vertical / cantilever type would be adopted and located close to the noise generating part of PME; • Barrier material of surface mass in excess of 7kg/m² shall be required to achieve the maximum screening effect (and minimum 10kg/m² for noise enclosure); • The length of barrier should generally be at least five times greater than its height and the minimum height of a barrier should be such that no part of the noise source will be visible from the noise sensitive receiver being protected. 	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93, Noise Control Ordinance and EIAO Guidance Note NO. 9/2010
S.5.1.1	<u>General Construction Noise Control Measures</u> <ul style="list-style-type: none"> • The Code of Practice on Good Management Practice to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD shall be adopted; • The statutory and non-statutory requirements and guidelines shall be complied with; • Approval for the method of working, equipment and noise mitigation measures intended to be used at the site shall be granted from the Project Engineer before commencing any work; 	To minimize construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<ul style="list-style-type: none"> • Working methods to minimize the noise impact on the surrounding NSRs shall be formulated and executed, and the implementation of these methods shall be monitored by experienced personnel with suitable training; • Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical; • Unused equipment shall be turned off; • PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided; • All plant and equipment shall be maintained regularly; and • Material stockpiles and other structures shall be effectively utilized as noise barriers, whenever practicable. 					
AIR QUALITY IMPACT						
S.5.1.2	<p><u>Construction Dust Control Measures</u></p> <ul style="list-style-type: none"> • Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather; • Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers; • Covering of stockpile of excavated dusty materials, if any, with impervious sheeting or spraying with water to maintain the entire surface wet; • Provision of vehicle washing facilities at the entry and exit points of site; • Tarpaulin covering of any dusty materials being transported to and from site by vehicle; • Positioning of construction plant at maximum practicable distance from air sensitive receivers; and • Due to the small size of the works sites and lack of space for stockpiling, excavated materials should be hauled off-site almost immediately. However, in the event of any stockpiled excavated materials, they should be covered with tarpaulin and be removed offsite as soon as practicable to avoid any dust nuisance arising 	To minimize the dust impacts arising from the construction works	Contractor	Work site	Construction Stage	Air Pollution Control (Construction Dust) Regulation

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
WATER QUALITY IMPACT						
S.5.1.3	<p><u>Construction Water Quality Impact Measures</u></p> <ul style="list-style-type: none"> • Collection of wastewater into a sedimentation tank for treatment before discharge into the public drainage system; • Provision of silt trap and oil interceptor to remove the oil, lubricants, grease, silt, grit and debris from the wastewater prior to discharge to the public stormwater system. The silt traps and oil interceptors should be cleaned and maintained regularly; • Installation of wheel washing facilities to minimize muddy runoff; • Regular maintenance and inspection of drainage systems and erosion control and silt removal facilities; • Management and monitoring of sewage treatment facilities (if any); • Any foul effluent should not be discharged into any public sewer and stormwater drain, unless an effluent discharge permit is obtained under the WPCO by the Contractor; • Coverage of stockpiles of C&D materials (if any) during rainstorms; and • Site toilet facilities, if needed, should be chemical toilets or should have the sewage discharge directed to a foul sewer. 	To reduce water quality impact induced by the construction work	Contractor	Work site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance
WASTE MANAGEMENT						
S.5.1.4	<p><u>Construction Waste Management Measures</u></p> <ul style="list-style-type: none"> • Scrap metals or abandoned equipment should be recycled if possible; • Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner; • The Contractor should adopt a trip ticket system for the disposal of C&D materials to any designated public filling facility and/or landfill. Independent audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed; • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes; and 	To adopt waste management measures in the way of avoiding, minimizing, reusing and recycling so as to reduce waste generation	Contractor	Work site	Construction Stage	Waste Disposal Ordinance (Cap. 354); Waste Disposal (Chemical Waste) (General) Regulation; DEVB TCW No. 6/2010; ETWB TCW No. 19/2005.

Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<ul style="list-style-type: none"> All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminum cans, plastic bottles etc. should be provided to facilitate reuse or recycling of materials and their proper disposal. 					
LANDSCAPE AND VISUAL IMPACT						
S.5.1.5	<p><u>Landscape and Visual Measures</u></p> <ul style="list-style-type: none"> Clear demarcation of works area to prevent damages to existing trees in close proximity; Protection of all trees planned to be retained onsite; Preserving all affected trees by transplanting where practical. Tree transplanting application and tree removal application shall be submitted for approval in accordance with ETWB TCW 3/2006; and Screening of construction works by hoardings/noise barriers around Works area in visually unobtrusive colours. 	To reduce landscape and visual impact by construction works.	Contractor	Work Site and nearby playground	Construction Stage	EIAO; ETWB TCW No. 3/2006.