



Maeda Corporation

MTRCL Contract C3840-13C Tsim Sha Tsui Station
Carnarvon Road Subway and Entrances Modification Works

Monthly EM&A Report (December 2015)

Your Ref:
Our Ref: 40032976/449122

By Email and Post

MTR Corporation Limited
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Attn.: Mr. Kenneth Chow / Environmental Engineer II

15 January 2016

Dear Sirs

**Consultancy Agreement A130-13
Independent Environmental Checker for CRS and LTS
CRS - Verification for 22nd Monthly Environmental Monitoring and Audit (EM&A) Report
(December 2015) (Report No.: EB001340R00312)**

We refer to the 22nd Monthly EM&A Report (December 2015) received under cover of the email from the Environmental Team, Hyder Consulting Limited (HCL), dated on 5 January 2016.

Further to our comments provided on 5 January 2016 and subsequent revision of the Report by HCL on 15 January 2016, we have no further comment and have verified the captioned report (Report No.: EB001340R00312).

Should you have any queries, please feel free to contact the undersigned at 3922 9529.

Yours faithfully
AECOM Consulting Services Ltd



Rodney Ip
Independent Environmental Checker

DCYO/wwsc

cc Hyder Consulting Limited (Attn.: Mr. F. N. Wong) via email
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M A E D A



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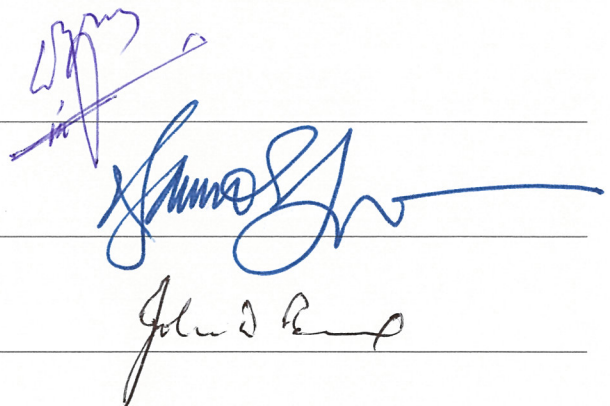
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Report No EB001340R00312

Date 5 January 2016



This Monthly EM&A Report (December 2015) is prepared for Maeda Corporation in accordance with the terms and conditions of appointment dated 30 October 2013. Hyder Consulting Limited (Company Number 126012) cannot accept any responsibility for any use of or reliance on the contents of this report by any third party.



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EXECUTIVE SUMMARY

BREACHES OF ACTION AND LIMIT LEVELS

- ES01 No Notice of Exceedance and the associated investigation and follow-up actions were required as the environmental monitoring results registered no exceedances of Action/ Limit Levels of air quality and construction noise during the Reporting Period.
- ES02 No corrective action were required as the environmental audit during the Reporting Period observed:
- 1) No deficiencies with major environmental significance of the required environmental mitigation measures;
 - 2) No non-compliance with the required waste management; and
 - 3) No adverse environmental impacts on the sensitive receivers environed with the site of the Project.

ENVIRONMENTAL COMPLAINTS

- ES03 No environmental complaints were recorded during the Report Period.

NOTIFICATION OF SUMMONS & SUCCESSFUL PROSECUTIONS

- ES04 No notification of summons and successful prosecutions were recorded during the Reporting Period.

REPORTING CHANGES

- ES05 No major reporting changes were made during the Reporting Period.

FUTURE KEY ISSUES

- ES06 Full implementations of the environmental mitigation measures, which are required in the EM&A Plan and summarised in the Implementation Schedule, are recommended. Whenever necessary, proper maintenance and improvement of the implemented mitigation measures are reminded.

Construction Noise

- ES07 Particular attention should be paid to construction noise mitigation measures, especially during piling works during the coming construction period to ensure full compliance with statutory and non-statutory requirements and guidelines. Proactive review of working methods, careful selection and arrangement of the noisy equipment as well as effective noise mitigation measures are strongly recommended.

Water Quality

- ES08 In addition, compliance with water quality mitigation measures remains one of the key environmental issues within the construction period, especially when water usage is high.

Air Quality

- ES09 Furthermore, implying of construction dust suppression measures are recommended during dusty activities under dry and windy conditions.
- ES10 Where appropriate, construction dust suppression measures including decking over the excavation areas, watering of exposed site surface and covering of all excavated and stockpiles of dusty material by impervious sheeting or similar materials are reminded.

1 INTRODUCTION

1.1 THE REPORTING PERIOD

- 1.1.1 This is the 22nd monthly EM&A report (hereinafter referred as 'This Report') covering construction period from 1 to 31 December 2015 (hereinafter referred as 'the Reporting Period').
- 1.1.2 This Report has been written in accordance with the **Environmental Monitoring and Audit Plan** (hereinafter referred as 'the EM&A Plan') enclosed in the **Project Profile – MTR Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works**, which is registered in the Environmental Permit No. EP-440/2012 (hereinafter referred as 'the EP') (Register No.: PP-462/2012).

1.2 PROJECT BACKGROUND

- 1.2.1 In order to improve the appearance of Carnarvon Road Entrance D1 and D2 of Tsim Sha Tsui (hereafter referred as 'TST') Station and to provide a more comfortable walking environment nearby, MTR Corporation Limited (hereafter referred as 'MTRC' or 'the Corporation') has commissioned Meada Corporation (hereinafter referred as 'MC') the contract MTR Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works (hereafter referred as 'the Project'). The Project is proposed to rebuild the existing Entrance D1 and D2 and construct a new Entrance D3 at the basement B2 level of the K11 Art Mall to connect to the TST station by a subway, which extends from the Entrance D1 and D2 and runs approximately 80m along Carnarvon Road and across the Bristol Avenue to the Entrance D3. The Project was commenced in March 2014 and is anticipated to be completed in September 2017.
- 1.2.2 The existing TST Station had been in operation before the **Environmental Impact Assessment Ordinance** (hereafter referred as 'EIAO') comes into effect on 1 April 1998. It constitutes an exempted Designated Project (hereinafter referred as 'DP') according to Section 9(2) (g) of the EIAO (Cap. 499). As the Project involves a material change to an exempted DP which may have potential environmental impacts, an environmental permit is required prior to the commencement of the modification works. The Project Profile has been developed to provide information for direct application of an environmental permit. The EP has been granted since 18 July 2012, after the Project Profile and the associated **EM&A Plan** were registered.
- 1.2.3 Site map, works area and locations of the environmental monitoring under the Project are illustrated in **Site Location Plan of Appendix A**. Management structure of the Project, including organization chart, lines of communication and contact names and telephone numbers of key personnel, is demonstrated in **Appendix B**. Construction programme is shown in **Appendix C**, whereas implementation schedule for the recommended environmental mitigation measures (hereinafter referred as 'the Implementation Schedule') are summarised in **Appendix D**, which fine tunes the construction activities and shows inter-relationships with the environmental protection/ mitigation measures for the construction period.

1.3 ENVIRONMENTAL STATUS

- 1.3.1 As required in the EP, AECOM Consulting Services Limited has been appointed as the Independent Environmental Checker under the Project (hereinafter referred as 'the IEC'), whereas Hyder Consulting Limited has been appointed as the Environmental Team under the Project (hereinafter referred as 'Hyder' or 'the ET').
- 1.3.2 According to the EP Condition 3.2 (a) under Environmental Monitoring and Audit (EM&A) during the Construction Period, baseline monitoring has been completed and the required Baseline Monitoring Report has been submitted to EPD on 14 February 2014 prior to commencement of the works under the Project.

1.3.3 Status of relevant environmental permits, licences, and/or notifications on environmental protection for the Project is summarised in **Table 1-3** below. They are detailed in **Appendix E**.

TABLE 1-3 SUMMARY OF STATUS OF ENVIRONMENTAL LICENSES AND PERMITS

Item	Description	License/Permit Status
1	Air Pollution Control (Construction Dust)	Notification Ref. 365953 acknowledged on 21 Oct 2013.
2	Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation	EPD's Non-Road Mobile Machinery (NRMM) labels have been demonstrated on the regulated NRMM, except those which application is in progress.
3	Water Pollution Control Ordinance (Discharge License)	The discharge license (Ref No. WT00019722-2014) was granted on 01 Sep 2014 superseding the previous license (Ref No. WT00018229-2014).
4	Billing Account for Disposal of Construction Waste	A/C Ref. 7018523 granted on 25 Oct 2013
5	Chemical Waste Producer Registration	Registration Ref. 5213-2214-M2446-16 granted on 4 Mar 2014
6	Construction Noise Permit	a) NCO Permit No. GW-RE0558-15 approved on 3 Jun 2015 for operation of 4 submersible water pumps (electric) from 23 Jun 2015 to 22 Dec 2015; and b) NCO Permit No. GW-RE1279-15 approved on 14 Dec 2015 for operation of 4 submersible water pumps (electric) from 22 Dec 2015 to 21 Jun 2016.

1.4 CONSTRUCTION ACTIVITIES

1.4.1 Construction activities undertaken during the Reporting Period and the following month are summarised in **Table 1-4**:

TABLE 1-4 CONSTRUCTION ACTIVITIES

Construction Activities Undertaken during the Reporting Period	
1	Excavation of top layer for UU identification and support tailoring at G2-4
2	Construction of temporary staircase reinforced concrete structure
3	Rock breaking and excavation at vertical shaft
4	Excavation of trial trench for UU identification at D2
5	Backfilling of the trial trench at D2
Construction Activities to be Undertaken in the Up-Coming Month	
1	Construction of temporary staircase reinforced concrete structure
2	Rock breaking and excavation at vertical shaft
3	Excavation of top layer for UU identification and support tailoring at G2-4
4	De-mobilization of the rock breaking and excavation plants
5	Mobilization of pipe piling and grouting plants and equipment
6	Grouting for the mined tunnel

2 EM&A REQUIREMENTS

2.1 AIR QUALITY

Monitoring Parameters and Frequency

- 2.1.1 24-Hour Total Suspended Particulates (hereinafter referred as '24-Hr TSP') is required to be monitored once a week during construction period of the Project.
- 2.1.2 1-Hour Total Suspended Particulates (hereinafter referred as '1-Hr TSP') is required to be monitored when exceedances of 24-Hr TSP occur, following the Event and Action Plan presented in **Appendix F**.
- 2.1.3 Schedules for 24-Hr TSP monitoring for the Reporting Period and the month following the Reporting Period were prepared and submitted to MTRC, IEC and MC prior to implementation via e-mail and / or facsimile for ease of necessary inspection. If amendment is necessary under ad hoc conditions, including actual and broadcast adverse weather, accidental instrument failures, etc., notification will be given at least 24 hours prior to implementation or as practical as possible. The monitoring schedules are enclosed in **Appendix G**.

Monitoring Location

- 2.1.4 According to the EM&A Plan, Mirador Mansion was designated to be the air quality monitoring station of the Project. As the access to the air monitoring location designated in the EM&A Plan has been denied by the owner of the property, the ET proposes an alternative monitoring location on the roof-top above the 4/F of the commercial complex of K11 (hereinafter referred as 'K11'), which has been agreed among MTRC, IEC and MC, and the associated access to K11 has been granted by the management office of K11 prior to the commencement of the baseline monitoring in January 2014.
- 2.1.5 Air quality monitoring location is summarised in **Table 2-1-1** below and illustrated in **Appendix A**.

TABLE 2-1-1 AIR QUALITY MONITORING LOCATION

Location ID	Name of Premises	Description
K11	K11 Art Mall	Rooftop, 4/F

Monitoring Equipment

- 2.1.6 The air quality monitoring equipment to be used for construction air impact monitoring is shown in **Table 2-1-2** below:

TABLE 2-1-2 AIR QUALITY MONITORING EQUIPMENT AT K11

Equipment Type	Model	Serial Number	Orifice Transfer Standard ID
High Volume Air Sampler	TISCH TE5005X	0462	1785
High Volume Air Sampler	BM2000HX	587	1785
Sibata Digital Dust Monitor	LD-3B	296098	Not Applicable

- 2.1.7 High Volume Air Sampler (hereinafter referred as 'the HVAS') is used for monitoring 24-Hr TSP, following the standard sampling method set out in High Volume Method for Total Suspended Particulates, Part 50 Chapter 1 Appendix B, Title 40 of the Code of Federal Regulations of the USEPA (hereinafter referred as 'the USEPA High Volume Method').
- 2.1.8 Weather information including wind speeds and wind directions is obtained from King's Park Weather Station. The weather information is used as weather conditions during the Reporting Period. They are presented in **Appendix H**.

Calibration of Monitoring Equipment

- 2.1.9 The HVAS is calibrated before commencement of monitoring using standard orifice 5-points calibration method with orifice calibrator to determine the actual flow rate of each HVAS. A calibration Kit (Model - TE5025A) is used for calibration of the HVAS. At least once every 12 months, recalibration of the calibration kit is carried out during its maintenance.
- 2.1.10 Calibration of the HVAS is conducted following the manufacturer's instruction manual. Initial calibration of the equipment is conducted upon installation and thereafter at quarterly intervals throughout the period of impact monitoring. The transfer standard should be traceable to the internationally recognised primary standard and be calibrated annually.
- 2.1.11 The Sibata Digital Dust Monitor LD-3B for 1-hour TSP monitoring is calibrated annually and the calibration certificates of the equipment will be presented in **Appendix I** if 1-hour TSP monitoring is conducted.

Monitoring Methodology – 24-Hr TSP

- 2.1.12 Air quality monitoring (24-Hr TSP) will be conducted once a week under typical weather conditions (with no adverse weather such as typhoon signal or rain storm warning).

Installation of HVAS

- 2.1.13 When positioning the HVAS, the following points will be noted:
- 1) A horizontal platform with appropriate support to secure the samplers against gusty wind will be provided;
 - 2) No two samplers will be placed less than 2 m apart;
 - 3) The distance between the sampler and an obstacle, such as buildings, must be at least twice the height that the obstacle protrudes above the sampler where possible;
 - 4) A minimum of 2 m of separation from walls, parapets and penthouses is required for rooftops samplers;
 - 5) A minimum of 2 m of separation from any supporting structure, measured horizontally is required;
 - 6) No furnace or incinerator flue or building vent is nearby;
 - 7) Airflow around the sampler is unrestricted;
 - 8) The sampler is more than 20 m from the drip line;
 - 9) Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
 - 10) Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
 - 11) A secured supply of electricity is needed to operate the samplers.

Preparation of Filter Papers and Laboratory Analysis

- 2.1.14 Sufficient pieces of filter paper should be labelled before sampling. It should be a clean filter paper with no pinholes, and should be conditioned in a humidity-controlled chamber for over 24-hour and be pre-weighed before use for the sampling. The preferred room temperature is around 25 °C \pm 3 °C with relative humidity (hereinafter referred as 'the RH') less than 50% \pm 5%, preferably 40%.
- 2.1.15 Preparation of filters and subsequent laboratory analysis of the collected 24-Hr TSP samples were performed by ALS Technetiem (HK) Pty Ltd (hereinafter referred as 'ALS'), a local laboratory which have been accredited under Hong Kong Laboratory Accreditation Scheme (HOKLAS).
- 2.1.16 All the collected samples should be kept by the ET in standard office conditions for 6 months before disposal.

Field Monitoring Procedures

- 2.1.17 Procedures for field monitoring are as follows:
- 1) Check power supply to ensure the HVAS works properly.
 - 2) Clean the filter holder and the area surrounding the filter.
 - 3) Remove the filter holder by loosening the four bolts and carefully align a new filter, with stamped number upward, on a supporting screen.
 - 4) Align the filter properly on the screen so that the gasket forms an airtight seal on the outer edges of the filter.
 - 5) Fasten the swing bolts to hold the filter holder down to the frame. The pressure applied should be sufficient to avoid air leakage at the edges.
 - 6) Close the shelter lid and secure with the aluminium strip.
 - 7) Warm-up the HVAS for about 5 minutes to establish run-temperature conditions.
 - 8) Set a new flow rate record sheet into the flow recorder.
 - 9) Check and adjust the flow rate of the HVAS at around 1.1 m³ per minute. (The range specified in the EM&A Plan is between 0.6-1.7 m³ per minute.)
 - 10) Set the programmable timer for a sampling period of 24 hours, and record the starting time, weather condition and the filter number.
 - 11) Record the initial elapsed time.
 - 12) At the end of sampling, remove the sampled filter carefully and fold it in half-length so that only surfaces with collected particulate matter are in contact.
 - 13) Place the sampled filter in a clean plastic envelope and seal.
 - 14) Record all monitoring information on a Field Data Sheet as shown in **Appendix J**.
 - 15) Send the filters to ALS for analysis.

Monitoring Methodology – 1-hr TSP

Field Monitoring

- 2.1.18 The procedures for measurement of 1-Hr TSP follow Manufacturer's Instruction Manual, which is summarised as follows:
- 1) Turn on the power.
 - 2) Close the air collecting opening cover.
 - 3) Set the "TIME SETTING" switch to [BG].
 - 4) Press "START/STOP" switch to perform background measurement.
 - 5) Turn the knob at SENSI ADJ position.
 - 6) Leave the equipment upon "SPAN CHECK" is indicated in the display.
 - 7) Press "START/STOP" switch to perform automatic sensitivity adjustment.
 - 8) Turn the knob at MEASURE position.
 - 9) Set time period of 1 hour for the 1-hour TSP measurement.
 - 10) Press "START/STOP" to start the 1-hour TSP measurement.
 - 11) Check the time period to ensure monitoring time of 1 hour.
 - 12) Record all monitoring information on a Field Data Sheet as shown in **Appendix J**.

Maintenance and Calibration

- 2.1.19 The procedures for maintenance and calibration of 1-Hr TSP follow Manufacturer's Instruction Manual as follows:
- 1) The Sibata is calibrated at 1-year intervals.
 - 2) Calibration records for the Sibata Digital Dust Monitor direct dust meters are shown in **Appendix I**.

Action and Limit Levels

2.1.20 The Action and Limit levels (hereinafter referred as 'the A/L Levels) at K11 have been established in the Baseline Monitoring Report in accordance with the derivation criteria specified in Section 3.7 of the EM&A Plan, which are summarised in **Table 2-1-3** as follows:

TABLE 2-1-3 DERIVATION OF ACTION AND LIMIT LEVELS FOR AIR QUALITY, $\mu\text{g}/\text{M}^3$

Parameter	Action Level	Limit Level
24-Hr TSP	For baseline level ≤ 200 , Action level = (130% of baseline level + Limit level)/2; For baseline level > 200 , Action level = Limit level	260
1-Hr TSP	For baseline level ≤ 384 , Action level = (130% of baseline level + Limit level)/2; For baseline level > 384 , Action level = Limit level	500

2.1.21 The established A/L Levels for 24-Hr and 1-Hr TSP are summarised in **Table 2-1-4** as follows:

TABLE 2-1-4 ACTION AND LIMIT LEVELS FOR AIR QUALITY AT K11, $\mu\text{g}/\text{M}^3$

Parameter	Action Level	Limit Level
24-Hr TSP	222	260
1-Hr TSP	373	500

Event and Action Plan

2.1.22 In case exceedances of Action and/or Limit levels for air quality occur, Event and Action Plan for Air Quality enclosed in Appendix F will be implemented.

Environmental Mitigation Measures for Air Quality

2.1.23 Although most of the construction works would be carried out underground, appropriate dust mitigation measures as stipulated in the EP, Project Profile, related environmental regulation including Air Pollution Control (Construction Dust) Regulation as well as those recommended in the Implementation Schedule should be implemented to control fugitive dust emission. The following key dust suppression measures are recommended:

- 1) Decking over the excavation areas;
- 2) Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;
- 3) Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;
- 4) Cover all excavated or stockpiles of dusty material by impervious sheeting or spraying with water to maintain the entire surface wet;
- 5) Provision of vehicle washing facilities at the exit points of the site; and
- 6) Provision of tarpaulin covering for any dusty materials on a vehicle leaving the site.

2.1.24 Details of the implementation schedule for the required environmental mitigation measures are presented in **Appendix D**.

2.2 CONSTRUCTION NOISE

Monitoring Parameters and Frequency

2.2.1 **Table 2-2-1** summarizes the monitoring parameters and frequency for construction noise:

TABLE 2-2-1 NOISE MONITORING PARAMETERS AND FREQUENCY

Parameters	Frequency
L_{eq} in 30 minutes	Once a week

2.2.2 Monitoring schedules for construction noise for the Reporting Period and the next Reporting Period are prepared and submitted to MTRC, IEC and MC prior to implementation via e-mail and / or facsimile for ease of necessary inspection. Where amendment is necessary under ad hoc conditions, including actual and broadcast adverse weather, accidental instrument failures, etc., advanced notification is given at least 24 hours prior to implementation or as practical as possible.

Monitoring Equipment

2.2.3 With reference to the Technical Memorandum (TM) issued under the Noise Control Ordinance (NCO), sound level meters in compliance with the International Electrotechnical Commission Publications 651: 1979 (Type 1) and 804: 1985 (Type 1) specifications (both publications have been withdrawn and replaced by 61672:2003) are used for carrying out the noise monitoring. The equipment used in the construction noise monitoring is summarized in the following **Table 2-2-2** and the associated certificates of the calibration of the sound level meters and their respective calibrators are as shown in **Appendix I**:

TABLE 2-2-2 CONSTRUCTION NOISE MONITORING EQUIPMENT

Item	Equipment Name	Model
1	Sound Level Meter	B&K 2238 (Serial no. 2562782)
2	Acoustic Calibrator	B&K 4231 (Serial no. 2699361)

Monitoring Location

2.2.4 As stated in previous Section 2.1.4, the alternative air quality monitoring location K11 which is proposed by the ET and agreed among MTRC, IEC and MC, i.e. on the roof-top above the 4/F of the commercial complex of K11, is used for the construction noise monitoring location.

2.2.5 The access to K11 has been granted by the management office of the K11 prior to the commencement of the baseline monitoring in January 2014.

2.2.6 **Table 2-2-3** summarizes the recommended alternative noise monitoring location, which is illustrated in **Appendix A**.

TABLE 2-2-3 NOISE MONITORING LOCATION

Location ID	Name of Premises	Description
K11	K11 Art Mall	Rooftop, 4/F

Monitoring Methodology

Field Monitoring

2.2.7 Procedures for noise monitoring summarised as follows:

- 1) The microphones of the Sound Level Meter are about 1 m from the exterior of the building façade.
- 2) The battery condition is checked to ensure the correct functioning of the meter.
- 3) Parameters such as frequency weighting, the time weighting, the measurement time and monitoring frequency are set as follows:
 - i. Frequency weighting: A
 - ii. Time weighting: Fast
 - iii. Time measurement: 30 minutes intervals (between 0700-1900 on normal weekdays)
- 4) Monitoring frequency: one set of measurement on a weekly basis.
- 5) Prior to and after each noise measurement, the meter is calibrated using a Calibrator for 94 dB at 1 kHz. If the difference in the calibration level before and after measurement is more than 1 dB, the measurement should be considered invalid and the measurement repeated after re-calibration or repair of the equipment.

- 6) During the monitoring period, the Leq (30 min) is recorded.
- 7) Record all monitoring information on a Field Data Sheet as shown in **Appendix J**.
- 8) Maintenance and Calibration.
- 9) The meter and calibrator are sent to the supplier or HOKLAS laboratory to check and calibrate prior to the monitoring. Calibration records are presented in **Appendix I**.

Weather Condition

2.2.8 The wind speeds and directions during the monitoring period are recorded and shown in **Appendix H**.

Action and Limit Levels

2.2.9 The Action and Limit levels (hereinafter referred as 'the A/L Levels) at K11 have been established in the Baseline Monitoring Report. They are summarised in **Table 2-2-4** as follows:

TABLE 2-2-4 ACTION AND LIMIT LEVELS FOR CONSTRUCTION NOISE

Time Period	Action Level	Limit Level
0700-1900 hours on normal weekdays	When one valid documented complaint is received.	75*

*Note: *70 dB(A) for schools and 65 dB(A) during school examination periods. If works are to be carried out during restricted hours, the conditions stipulated in the Construction Noise Permit (CNP) issued by the Noise Control Authority have to be followed.*

Event and Action Plan

2.2.10 In case exceedances of Action and/or Limit levels for construction noise occur, the Event and Action Plan enclosed in **Appendix F** will be triggered.

Mitigation Measures for Construction Noise

2.2.11 Although no residual noise impact would be generated after the proposed mitigation measures are in place, the general construction noise control measures stipulated in the EP, Project Profile as well as those recommended in the Implementation Schedule should be fully implemented in order to minimise noise impacts during the construction phase. They are summarised as follows:

- 1) 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;
- 2) The statutory and non-statutory requirements and guidelines shall be complied with;
- 3) 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;
- 4) 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;
- 5) Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical;
- 6) Unused equipment shall be turned off;
- 7) PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided;
- 8) All plant and equipment shall be maintained regularly;
- 9) Material stockpiles and other structures shall be effectively utilised as noise barriers, whenever practicable; and

2.2.12 Details of the implementation schedule for the mitigation measures are presented in **Appendix D**.

3 MONITORING RESULTS

3.1 AIR QUALITY

Monitoring Results

- 3.1.1 24-Hr TSP monitoring during the Reporting Period was conducted following the agreed monitoring schedule.
- 3.1.2 24-Hr TSP results of the Reporting Period are summarised in the following **Table 3-1**. Graphical plots of the parameter are illustrated in **Appendix K**.

TABLE 3-1 SUMMARY OF 24-HR TSP MONITORING RESULTS, µg/M³

Monitoring Date	24-Hr TSP	Action Level	Limit Level
1-Dec-15	70.3	222	260
8-Dec-15	63.7		
15-Dec-15	53.0		
22-Dec-15	68.2		
29-Dec-15	102.5		
Mean (Min – Max): 71.5 (53.0 – 102.5)			

Discussion

- 3.1.3 **Table 3-1** demonstrates that all 24-Hr TSP results of the Reporting Period fluctuated well below the A/L Levels of the parameter, i.e. neither Action Level nor Limit Level exceedances were recorded.
- 3.1.4 No Notice of Exceedances (thereinafter referred as 'NOE') and the associated NOE Investigation as well as remedial actions was required during the Reporting Period.

3.2 CONSTRUCTION NOISE

Monitoring Results

- 3.2.1 Construction noise monitoring during the Reporting Period was conducted following the agreed monitoring schedule.
- 3.2.2 Construction noise monitoring results of the Reporting Period are summarised in the following **Table 3-2**. Graphical plots of the parameter are illustrated in **Appendix K**.

TABLE 3-2 SUMMARY OF CONSTRUCTION NOISE MONITORING RESULTS, dB(A)

Monitoring Date	L _{eq} (30 min)	A/L Levels	
1-Dec-15	68.3	Limit Level:	75
8-Dec-15	69.2		
15-Dec-15	68.6	Action Level:	Any documented complaint against
22-Dec-15	72.2		
29-Dec-15	71.9		
Mean (Min – Max): 70.4 (68.3 – 72.2)			

Discussion

- 3.2.3 No environmental complaint against construction noise was registered during the Reporting Period, whereas **Table 3-2** demonstrates that all construction noise results of the Reporting Period were fell below the Limit Level of the parameter. Neither exceedances of Action Level nor exceedances of Limit Level were recorded.

- 3.2.4 Neither NOE nor NOE investigation and the associated remedial actions were required during the Reporting Period.
- 3.2.5 The Contractor's attention is drawn to certain noisy construction activities, which were scheduled to be conducted during the coming month as listed in **Table 1-4** under **Section 1.4: Construction Activities Undertaken during the Reporting Period and Up-Coming Month**.
- 3.2.6 It is re-instated that adequate mitigation measures should be implemented during the noisy construction activities in order to alleviate noise nuisance generated from the Project related construction activities.

Weather Conditions

- 3.2.7 No weather conditions and any other factors were identified to have significant effects on the air and noise monitoring results within the Reporting Period.
- 3.2.8 Weather information during the Reporting Period which is extracted from Hong Kong Observatory King's Park Weather Station and enclosed for reference in **Appendix H**.

3.3 CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 3.3.1 No exceedances of A/L Levels of air quality and construction noise were registered during the Reporting Period.
- 3.3.2 No NOE and the associated NOE Investigation and corrected actions were required during the Reporting Period.

Recommendations

- 3.3.3 Full implementation of the environmental mitigation measures, which are required in the EM&A Plan and summarised in Implementation Schedule of **Appendix D**, is recommended. Where necessary, proper maintenance and improvement of the implemented mitigation measures are reminded.
- 3.3.4 Nevertheless, construction dust shall be suppressed during dusty construction activities under dry and windy conditions.
- 3.3.5 In addition, construction noise shall be eliminated to avoid adverse impacts on the nearby sensitive receivers.

4 ENVIRONMENTAL AUDIT

4.1 SITE INSPECTION

- 4.1.1 Weekly site inspections during the Reporting Period were conducted by MTRC, MC and ET, whereas the monthly site inspection of the Reporting Period was jointly conducted by the IEC, MTRC, MC and ET. The site inspection follows strictly to the agreed Site Inspection Checklist, which covers all the site audit requirements stipulated in the EM&A Plan, PS and all relevant environmental laws.
- 4.1.2 The completed Site Inspection Checklists are distributed to relevant parties upon completion of the site inspection for agreement and signature of the relevant parties and, where appropriate, for implementation of the recommended corrected actions to promptly rectify the situation.
- 4.1.3 The site inspections during the Reporting Period were conducted on 1, 8, 15, 22 and 29 December 2015. As the Air Pollution Control (Non-road Mobile Machinery) (Emission) Regulation has been enforced since December 2015, particular attention was paid to check EPD's Non-Road Mobile Machinery (NRMM) labels demonstrated on the regulated NRMM, except those which application is in progress. Deficiencies or findings of the site audit and the associated follow up actions are summarised in the following **Table 4-1**:

TABLE 4-1 SUMMARY OF FINDINGS AND FOLLOW-UP ACTIONS

Date	Observations/Findings	Follow-Up
01 December 2015	Follow-up item(s) of Last Inspection: No follow-up item.	Not required
	Observations of this Inspection: No deficiency was observed on site.	Not required
08 December 2015	Follow-up item(s) of Last Inspection: No follow-up item.	Not required
	Observations of this Inspection: No deficiency was observed on site.	Not required
15 December 2015	Follow-up item(s) of Last Inspection: No follow-up item.	Not required
	Observations of this Inspection: No deficiency was observed on site.	Not required
22 December 2015	Follow-up item(s) of Last Inspection: No follow-up item.	Not required
	Observations of this Inspection: No deficiency was observed on site.	Not required
29 December 2015	Follow-up item(s) of Last Inspection: No follow-up item.	Not required
	Observations of this Inspection: No deficiency was observed on site.	Not required

- 4.1.4 As shown in **Table 4-1**, no major deficiencies or non-compliance of environmental mitigation measures or adverse environmental impacts were observed during the Reporting Period.

4.2 COMPLIANCE WITH LEGAL/CONTRACTUAL REQUIREMENT

4.2.1 Construction activities under the Project must comply with all environmental protection and pollution control laws in Hong Kong, as well as the contractual requirements of the Project. **Table 4-2** summarizes breaches of legal and contractual requirements.

TABLE 4-2 SUMMARY OF BREACHES OF LEGAL AND CONTRACTUAL REQUIREMENTS

Month	No. of Breach(s)	Cumulative no. from March 2014 to the Reporting Period
December 2015	0	0

4.3 ENVIRONMENTAL COMPLAINTS

4.3.1 Environmental complaints are handled following closely the flow chart of complaint response procedure which is enclosed in **Appendix L**.

4.3.2 Environmental complaints registered during the reporting period are summarised in **table 4-3** below:

TABLE 4-3 SUMMARY OF COMPLAINT

Month	No. of Complaint(s)	Cumulative no. from March 2014 to the Reporting Period
December 2015	0	4

4.4 NOTIFICATION OF SUMMONS/SUCCESSFUL PROSECUTIONS

4.4.1 Notification of summons and successful prosecutions registered during the Reporting Period are summarised in **Table 4-4** below:

TABLE 4-4 SUMMARY OF SUMMON AND SUCCESSFUL PROSECUTIONS

Month	No. of Summons and Successful Prosecutions	Cumulative no. from March 2014 to the Reporting Period
December 2015	0	0

5 CONSTRUCTION WASTE

5.1 WASTE MANAGEMENT

- 5.1.1 Waste management under the Project is performed in accordance with the Waste Management Plan, which has been prepared for implementation of the construction waste mitigation measures in compliance with the requirements stipulated in the EM&A Plan, PS, Waste Disposal Ordinance and the associated subsidiary regulations.

5.2 WASTE MANAGEMENT STATUS AND RECORD

- 5.2.1 Updated waste management status is detailed in **Appendix M**, where the 3-R status of the construction waste generated from construction of the Project during the Reporting Period is presented.
- 5.2.2 Despite small scale of the Project and the amount of C&D material that needs to be hauled off site and disposed of is anticipated not to be significant, 3-R (Reduce, Reuse and Recycle) waste management has been adopted in order to minimize adverse environmental impacts to be generated from construction of the Project.

6 FUTURE ENVIRONMENTAL ISSUES

6.1 KEY ENVIRONMENTAL ISSUES

6.1.1 Future key environmental issues include:

- 1) Air quality in particular construction dust during dusty construction activities, e.g. demolition of the Entrance D2 and excavation works, under dry and windy conditions;
- 2) Construction noise during noisy activities; and
- 3) Site surface water run-off and construction wastewater discharge.

6.2 MITIGATION MEASURES

6.2.1 To avoid potential adverse environmental impacts of the future key environmental issues stated above, full implementation of the mitigation measures as stipulated in the Implementation Schedule shown in **Appendix D** is required.

6.2.2 Mitigation measures for air quality, construction noise and water quality implemented to date shall be properly maintained.

6.2.3 Where appropriate, improvement of the implemented mitigation measures is reminded to ensure effectiveness of the mitigation measures.

7 CONCLUSIONS & RECOMMENDATIONS

7.1 CONCLUSIONS

- 7.1.1 Neither NOE & the associated NOE investigation nor follow-up actions were required as the environmental monitoring results registered no exceedances of A/L Levels of air quality and construction noise during the Reporting Period.
- 7.1.2 No corrective actions were required as the environmental audit during the Reporting Period observed:
- 1) No deficiencies with major environmental significance of the required environmental mitigation measures;
 - 2) No non-compliance with the required waste management; and
 - 3) No adverse environmental impacts on the sensitive receivers environed with the site of the project.
- 7.1.3 In addition, no remedial actions were required as no notification of summons and successful prosecutions were reported during the Reporting Period.
- 7.1.4 Nevertheless, occasional observations of inadequacies of proactive environmental mitigation measures were recorded during the regular site inspection and audit. They were rectified in situ or before the following site audit upon identification or notification.

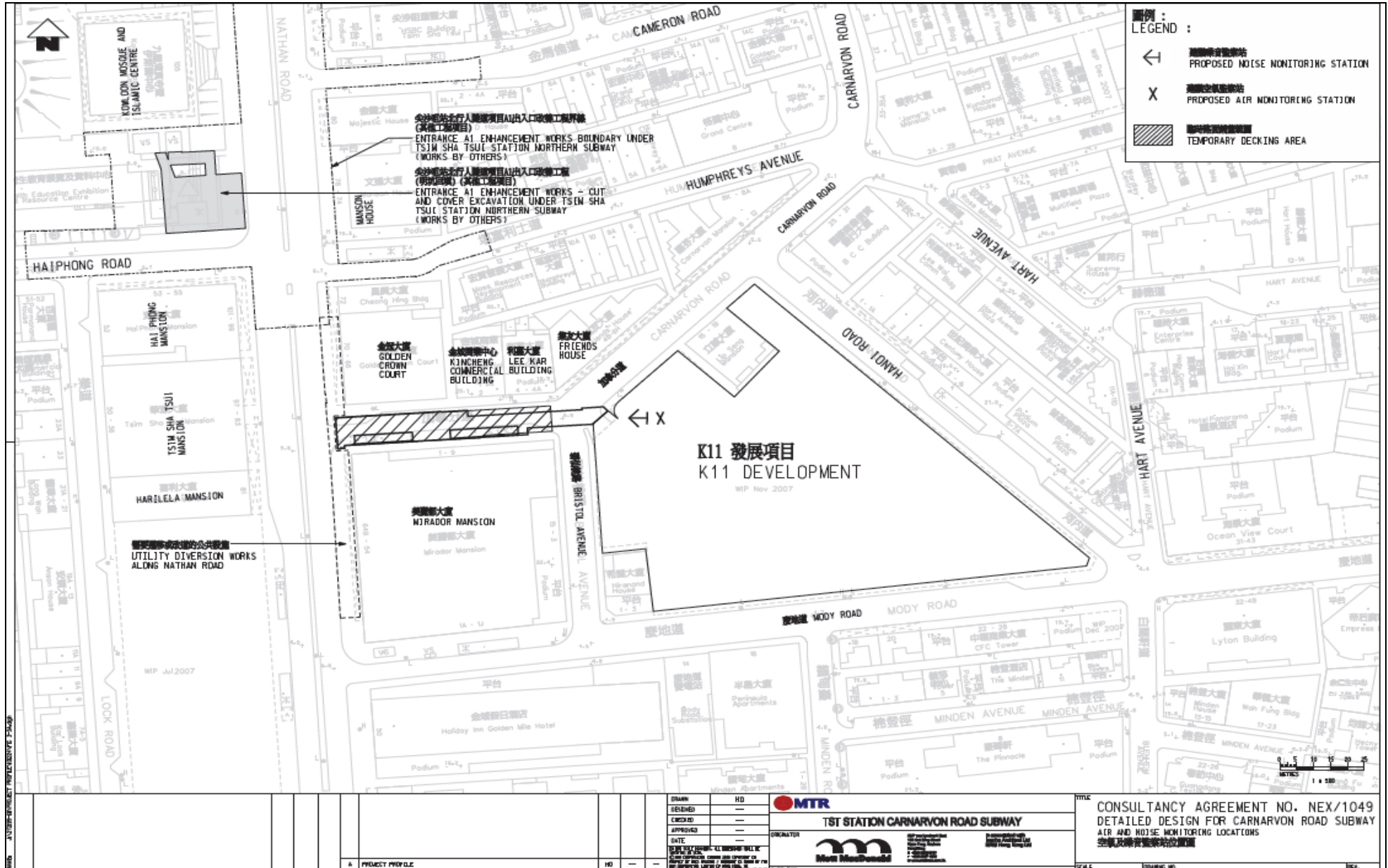
7.2 RECOMMENDATIONS

- 7.2.1 Full implementation of the environmental mitigation measures stipulated in the EM&A Plan and summarised in the **Implementation Schedule** of **Appendix D**, are recommended. Where necessary, proper maintenance and improvement of the implemented mitigation measures are reminded.
- 7.2.2 As noisy construction activities such as piling works were being conducted during the Reporting Period, adequate mitigation measures should be implemented in order to alleviate noise nuisance.
- 7.2.3 In addition, suppression of construction dust is reminded during dusty construction activities under dry and windy conditions.
- 7.2.4 Furthermore, monitoring of site water runoff is reminded to prevent any direct water discharge off site, especially when water usage is high during the construction period. When necessary, the Contractor is reminded to apply additional precautionary measures to prevent any possible environmental deficiency.

APPENDICES

APPENDIX A	SITE LOCATION PLAN
APPENDIX B	PROJECT ORGANIZATION CHART IN ENVIRONMENTAL MANAGEMENT
APPENDIX C	CONSTRUCTION PROGRAMME
APPENDIX D	IMPLEMENTATION SCHEDULE
APPENDIX E	STATUS OF ENVIRONMENTAL LICENSES AND PERMITS
APPENDIX F	EVENT AND ACTION PLAN
APPENDIX G	MONITORING SCHEDULE
APPENDIX H	WEATHER INFORMATION EXTRACTED FROM HONG KONG OBSERVATORY
APPENDIX I	CERTIFICATE OF LABORATORY AND EQUIPMENT CALIBRATION
APPENDIX J	FIELD RECORD SHEETS
APPENDIX K	MONITORING RESULTS AND PLOTS
APPENDIX L	COMPLAINTS RESPONSE PROCEDURES
APPENDIX M	MONTHLY SUMMARY WASTE FLOW TABLE

APPENDIX A SITE LOCATION PLAN



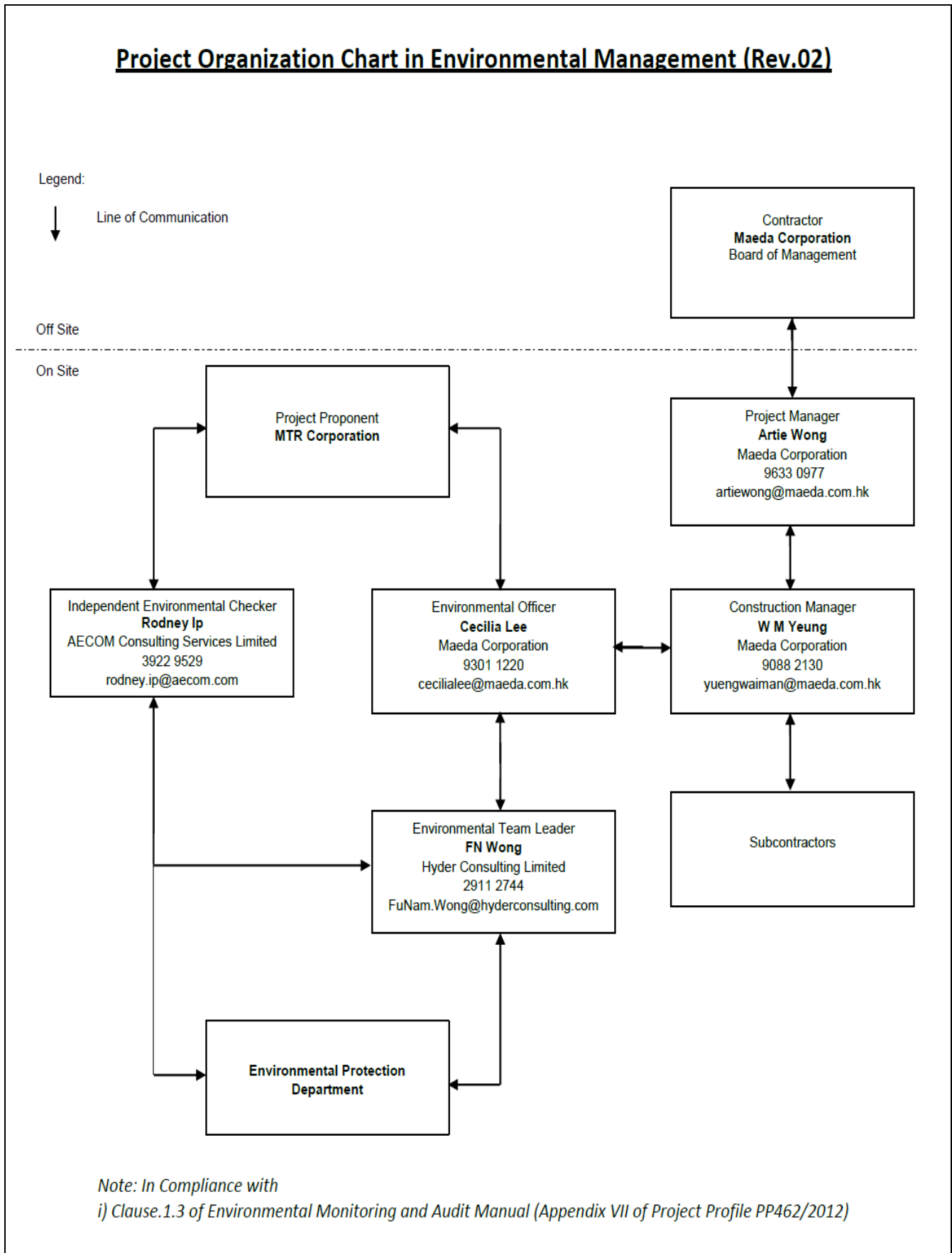
A-2/2007-2008/2009 REFERENCE PLAN

DRAWN	HD	 MTR TST STATION CARNARVON ROAD SUBWAY
DESIGNED	---	
CHECKED	---	
APPROVED	---	
DATE	---	
CREATOR Mott MacDonald 1000 1000 1000 1000		CONSULTANCY AGREEMENT NO. NEX/1049 DETAILED DESIGN FOR CARNARVON ROAD SUBWAY AIR AND NOISE MONITORING LOCATIONS 空氣及噪音監察站位置圖

A PROJECT PROFILE HD --

SCALE SOURCE NO. 154

APPENDIX B PROJECT ORGANIZATION CHART IN ENVIRONMENTAL MANAGEMENT





APPENDIX C

CONTRACT C3840-13C Tsim Sha Tsui Station, Carnarvon Road Subway



Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Total Float	2014												2015												2016												2017											
						Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan								
Preliminary Master Programme Revision 2																																																					
Preliminaries																																																					
Contract Key Dates																																																					
C3840-CD-20	Date of Commencement	0d	14-Oct-13		0d	▶ Date of Commencement																																															
Specified Degrees of Completion																																																					
C3840-CD-2A	Complete to Deg. 1 status for all civil engineering works and ABWF in Subway outside K11 Lot Boundary (31 Jul 16)	0d		31-Jul-16	0d	◆ Complete to Deg. 1 status for all civil engineering works and ABWF in Subway																																															
Possession of Works Area As PS Clause P8 & PS Appendix G																																																					
C3840-AD-20	Access Date for Works Area 3840.W1 (subject to SLG/TMLG Approval)	0d	31-Oct-13		0d	▶ Access Date for Works Area:3840.W1 (subject to SLG/TMLG Approval)																																															
Initial Site Survey																																																					
C3840-SS-20	Validate the survey record and carry out any necessary additional survey at Works Areas 3840.W1 & W2	35d	31-Oct-13	10-Dec-13	0d	▶ Validate the survey record and carry out any necessary additional survey at Works Areas 3840.W1 & W2																																															
Temporary Works Design & Approval Process (Incl. Demolition)																																																					
Temporary Traffic Mangement Scheme (TTM)																																																					
C3840-TTM-100	Appoint Traffic Consultant	0d		16-Oct-13	0d	▶ Appoint Traffic Consultant																																															
C3840-TTM-110	Prepare & submit review by Eng Outline TTM Schemes as per PS P20.4	6d	17-Oct-13	23-Oct-13	0d	▶ Prepare & submit review by Eng Outline TTM Schemes as per PS P20.4																																															
C3840-TTM-120	Eng review Outline TTM Schemes	4d	24-Oct-13	28-Oct-13	0d	▶ Eng review Outline TTM Schemes																																															
C3840-TTM-130	Prepare Detailed TTMS	5d	24-Oct-13	29-Oct-13	0d	▶ Prepare Detailed TTMS																																															
C3840-TTM-140	Discussion and agree in principle at TMLG Meeting	1d	30-Oct-13	30-Oct-13	0d	▶ Discussion and agree in principle,at TMLG Meeting																																															
Carnarvon Road Subway and Entrances																																																					
Open Cut Sequence 1 (Advance Ground Works & Piling Works)																																																					
Advance Ground Works																																																					
C3840-AGW-020	Trial Pit/trench excavation	69d	14-Nov-13	08-Feb-14	0d	▶ Trial Pit/trench excavation																																															
C3840-AGW-040	Pre-drilling works	24d	27-Dec-13	24-Jan-14	0d	▶ Pre-drilling works																																															
Piles & Grouting for Vertical Shaft																																																					
C3840-EVS-010	Mobilization for Piling Rig and Setup	4d	27-Feb-14	03-Mar-14	0d	▶ Mobilization for Piling Rig and Setup																																															
C3840-EVS-020	52 nos. pipe piles with 1m. to 2.2m. minimum rock socket	35d	04-Mar-14	14-Apr-14	0d	▶ 52 nos. pipe piles with 1m. to 2.2m. minimum rock socket																																															
C3840-EVS-030	Grouting for Vertical Shaft Bulk Head	18d	17-Mar-14	07-Apr-14	8d	▶ Grouting for Vertical Shaft Bulk Head																																															
C3840-EVS-040	Curtain Grouting vertical shaft	18d	08-Apr-14	02-May-14	8d	▶ Curtain Grouting vertical shaft																																															
Tunnel (Vertical Shaft Excavation)																																																					
C3840-SH-100	Pump Test	24d	03-May-14	31-May-14	8d	▶ Pump Test																																															
C3840-SH-110	Excavation for 1st layer 140m3 50m3/day	3d	03-Jun-14	05-Jun-14	8d	▶ Excavation for 1st layer 140m3 50m3/day																																															
C3840-SH-120	Install 1st waling, strut & legging wall	4d	06-Jun-14	10-Jun-14	8d	▶ Install 1st waling, strut & legging wall																																															
C3840-SH-130	Shotcrete 1st layer	2d	11-Jun-14	12-Jun-14	8d	▶ Shotcrete 1st layer																																															

- Actual Work
- Remaining Work
- Critical Remaining Work
- ◆ Milestone

Data Date: 11-Oct-13

Preliminary Master Programme

Extract Critical Path 1

Maeda/P/PMP/2

Date	Revision	Checked	Approved
27-Feb-14	REV 2	BG	AW



Activity ID	Activity Name	Orig Dur	Planned Start	Planned Finish	Total Float	2014												2015												2016												2017												2018
						Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct	N	D	Jan	F	M	Apr	M	J	Jul	A	S	Oct
Preliminary Master Programme Revision 2																																																						
Preliminaries																																																						
Contract Key Dates																																																						
C3840-CD-10	Date of Contract Award	0d	11-Oct-13		0d	◆ Date of Contract Award																																																
C3840-CD-20	Date of Commencement	0d	14-Oct-13		0d	◆ Date of Commencement																																																
Specified Degrees of Completion																																																						
C3840-CD-2C	Complete energisation of the power isolator in the Telephone Equipment Rm (23 Oct 16)	0d		23-Oct-16	0d	◆ Complete energisation of the power isolator in the Telephone Equip																																																
Possession of Works Area As PS Clause P8 & PS Appendix G																																																						
C3840-AD-20	Access Date for Works Area 3840.W1 (subject to SLG/TMLG Approval)	0d	31-Oct-13		0d	◆ Access Date for Works Area:3840.W1 (subject to SLG/TMLG Approval)																																																
Initial Site Survey																																																						
C3840-SS-20	Validate the survey record and carry out any necessary additional survey at Works Areas 3840.W1 & W2	35d	31-Oct-13	10-Dec-13	0d	◆ Validate the survey record and carry out any necessary additional survey at Works Areas 3840.W1 & W2																																																
Procurement of Subcontract Packages																																																						
Preliminaries and Utilities Diversion																																																						
C3840-PRC-140	Temporary Traffic Diversion (Consultant)	4d	11-Oct-13	16-Oct-13	0d	◆ Temporary Traffic Diversion (Consultant)																																																
Temporary Works Design & Approval Process (Incl. Demolition)																																																						
Temporary Traffic Mangement Scheme (TTM)																																																						
C3840-TTM-100	Appoint Traffic Consultant	0d		16-Oct-13	0d	◆ Appoint Traffic Consultant																																																
C3840-TTM-110	Prepare & submit review by Eng Outline TTM Schemes as per PS P20.4	6d	17-Oct-13	23-Oct-13	0d	◆ Prepare & submit review by Eng Outline TTM Schemes as per PS P20.4																																																
C3840-TTM-120	Eng review Outline TTM Schemes	4d	24-Oct-13	28-Oct-13	0d	◆ Eng review Outline TTM Schemes																																																
C3840-TTM-130	Prepare Detailed TTMS	5d	24-Oct-13	29-Oct-13	0d	◆ Prepare Detailed TTMS																																																
C3840-TTM-140	Discussion and agree in principle at TMLG Meeting	1d	30-Oct-13	30-Oct-13	0d	◆ Discussion and agree in principle at TMLG Meeting																																																
Carnarvon Road Subway and Entrances																																																						
Utility Diversion																																																						
C3840-UTD-290	Diversion of Gasmain as necessary	57d	10-Feb-14	17-Apr-14	0d	◆ Diversion of Gasmain as necessary																																																
Open Cut Sequence 1 (Advance Ground Works & Piling Works)																																																						
Advance Ground Works																																																						
C3840-AGW-020	Trial Pit/trench excavation	69d	14-Nov-13	08-Feb-14	0d	◆ Trial Pit/trench excavation																																																
Piles & Grouting for Vertical Shaft																																																						
C3840-EVS-010	Mobilization for Piling Rig and Setup	4d	27-Feb-14	03-Mar-14	0d	◆ Mobilization for Piling Rig and Setup																																																
C3840-EVS-020	52 nos. pipe piles with 1m. to 2.2m. minimum rock socket	35d	04-Mar-14	14-Apr-14	0d	◆ 52 nos. pipe piles with 1m. to 2.2m. minimum rock socket																																																
Piles & Grouting for Temporary Staircase & C&C Subway																																																						
C3840-ETS-020	70 nos. pipe piles along Grid Line A with 1m. to 3.1m minimum rock socket	47d	15-Apr-14	14-Jun-14	0d	◆ 70 nos. pipe piles along Grid Line A with 1m. to 3.1m minimum rock socket																																																

Actual Work ◆ ◆ Milestone
Remaining Work
Critical Remaining Work

Data Date: 11-Oct-13

Page 1 of 5

Preliminary Master Programme

Extract Critical Path 2

Maeda/P/PMP/2

Date	Revision	Checked	Approved
27-Feb-14	REV 2	BG	AW

APPENDIX D IMPLEMENTATION SCHEDULE

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.3.1	Use of quieter plant	To minimise construction noise emissions	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control Ordinance
S.3.1	Use of noise enclosure and movable barrier <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; 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.3.1	General Construction Noise Control Measures <ul style="list-style-type: none"> The Code of Practice on Good Management Practice 	To minimize construction noise	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control

	to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD shall be adopted; <ul style="list-style-type: none"> 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; 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. 	emissions				Ordinance
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APPENDIX D IMPLEMENTATION SCHEDULE

Air Quality Impact						
S.3.2	<p>Construction Dust Control Measures</p> <ul style="list-style-type: none"> • Decking will be provided subsequent to the completion of surface excavation works. The duration 	To minimise the dust impacts arising from the	Contractor	Work site	Construction Stage	Air Pollution Control (Construction
	<p>of decking is around 13 months after surface excavation works;</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; • Cover all excavated or stockpile of dusty material by impervious sheeting or spraying with water to maintain the entire surface wet; • Provision of vehicle washing facilities at the exit points of the site; and • Provision of tarpaulin covering of any dusty materials on a vehicle leaving the site. 	construction works				Dust) Regulation
Water Quality Impact						
S.3.3	<p>Construction Water Quality Impact Measures</p> <ul style="list-style-type: none"> • The Contractor should design and implement all the mitigation measures and practices specified in the ProPECC PN 1/94 "Construction Site Drainage" and "Recommended Pollution Control Clauses for Construction Contracts" issued by EPD. • All runoffs arising from the construction site should be properly collected and treated to ensure the discharge standards as stipulated in WPCO are met. Silt trap and oil interceptor should be provided to remove the oil, lubricants, grease, silt, grit and debris from the wastewater before being pumped to the public stormwater drainage system. The silt traps and oil interceptors should be cleaned and maintained regularly. 	To reduce water quality impact induced by the construction work	Contractor	Work Site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance
	<ul style="list-style-type: none"> • 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. • Site toilet facilities, if needed, should be chemical toilets or should have the foul water effluent directed to a foul sewer. 					
S.3.4	<p>Construction Waste Management Measures</p> <ul style="list-style-type: none"> • Excavated material should be reused on site as far as possible to minimise 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 designated public filling facility and/or landfill. Independent 	To adopt waste management measures in the way of avoiding, minimising, reusing and recycling so as to reduce waste generation	Contractor	Work Site	Construction Stage	Waste Disposal Ordinance (Cap. 54); Waste Disposal (Chemical Waste) (General) Regulation; ETWB TCW No. 31/2004; ETWB TCW No. 19/2005.

APPENDIX D IMPLEMENTATION SCHEDULE

	<p>audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed.</p> <ul style="list-style-type: none"> • Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes. • All general refuse should be segregated and stored in enclosed bins or compaction units and waste separation facilities for paper, aluminium cans, plastic bottles etc. should be provided to facilitate reuse or 					
	recycling of materials and their proper disposal.					
	Landscape and Visual Impact					
S.3.5	<p>Landscape and Visual Measures</p> <ul style="list-style-type: none"> • Screening of construction works by hoardings/noise barriers around works area with visually unobtrusive colours 	To reduce visual impact by construction works.	Contractor	Temporary Storage Area at Salisbury Road	Construction Stage	EIAO
S.3.5	<ul style="list-style-type: none"> • Reinstating the affected amenity planting area at Salisbury Road after the completion of works 	To prevent loss of planter after construction	Contractor	Temporary Storage Area at Salisbury Road	Operation Stage	ETWB TCW No. 2/2004

APPENDIX E LICENCE SUMMARY



Maeda Corporation

Contract No. C3840-13C

Tsim Sha Tsui Station Carnarvon Road Subway

Last Update: 14-December-2015

APPENDIX E **Licence Summary**

Item No.	Our Ref.	Govt. Ord.	Type? (License / Permit / Account / Notification / Registration & etc.)	Description	Submission	Ref. No	Date of Submission (to EPD) (DD-MM-YYYY)	Date of Approval / Receipt (from EPD) (DD-MM-YYYY)	Date of Activation (DD-MM-YYYY)	Date of Expiry (DD-MM-YYYY) Green = expire next mth; Yellow = expire this wk; Red = Expired	Description	Remarks
000	000	EIAO	Permit	Environmental Permit	N/A	AEP-440/2012	N/A	N/A	18 - 07 - 2012	N/A	Baseline, Air & Noise Impact Monitoring	
001	001	APCO	Notification	Construction Dust Notification	Form NA – Notification S3(1) of APCO (Construction Dust)	365953	18 - 10 - 2013	21 - 10 - 2013	01 - 02 - 2014	01 - 10 - 2016	Demolition of a Building	
001	001	APCO	Notification	Construction Dust Notification	Form NA – Notification S3(1) of APCO (Construction Dust)	365953	18 - 10 - 2013	21 - 10 - 2013	01 - 08 - 2014	01 - 08 - 2016	Work carried out in any part of a tunnel that is within 100m of any exit to the open air	
001	001	APCO	Notification	Construction Dust Notification	Form NA – Notification S3(1) of APCO (Construction Dust)	365953	18 - 10 - 2013	21 - 10 - 2013	01 - 01 - 2016	01 - 03 - 2017	Construction of the Superstructure of a Building	
001	001	APCO	Notification	Construction Dust Notification	Form NA – Notification S3(1) of APCO (Construction Dust)	365953	18 - 10 - 2013	21 - 10 - 2013	01 - 11 - 2016	10 - 09 - 2017	Road Construction Work	
002	002	WDO	Account	Construction Waste Billing Account	EPD-211 (Form 1) Application for a Billing Account for Disposal of Construction Waste	7018523	18 - 10 - 2013	25 - 10 - 2013	25 - 10 - 2013	N/A	Disposal of C&D Waste	Application No. WFG12765
003	003 WPCO #002	WPCO	Licence	Water Discharge Licence	EPD-117 (Form A) Application for a Licence of Water Discharge	WT00019722-2014	24 - 07 - 2014	01 - 09 - 2014	01 - 09 - 2014	31 - 03 - 2019	Quarterly Report FlowRate 25m3/d, pH 6-9, SS 30mg/L, COD 80mg/L	
004	004 CWP#001	WDO	Registration	Chemical Waste Producer	EPD-129 Application for Registration as a Chemical Waste Producer	5213-2214-M2446-16	15 - 01 - 2014	04 - 03 - 2014	04 - 03 - 2014	N/A	Surplus paint, spent lubricating oil, spent battery	
005	005 CNP#003	NCO	Permit	Construction Noise Permit	EPD74A(s) Form 1 - Application for a Construction Noise Permit	Application: 389338 Permit: GW-RE0558-15	27 - 05 - 2015	03 - 06 - 2015	23 - 06 - 2015	22 - 12 - 2015	Apply for 4nos Submersible Water pump (Electric) w/ new area to be included	Will be superseded by GW-RE1279-15 at 2300 on 22 Dec15
005	005 CNP#004	NCO	Permit	Construction Noise Permit	EPD74A(s) Form 1 - Application for a Construction Noise Permit	Application: 396336 Permit: GW-RE1279-15	04 - 12 - 2015	14 - 12 - 2015	22 - 12 - 2015	21 - 06 - 2016	Apply for 4nos Submersible Water pump (Electric) w/ new area to be included	

APPENDIX F EVENT AND ACTION PLAN

CONSTRUCTION NOISE

Event		ET	IEC	ER	Action 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 analysed 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, 	<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 	<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 	
	<ol style="list-style-type: none"> ER informed of the results 8. If exceedance stops, cease additional monitoring 		abated.		

APPENDIX F EVENT AND ACTION PLAN

AIR QUALITY

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

APPENDIX G

Environmental Monitoring & Audit Schedule: December 2015

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 Leq (30min) 24-Hrs TSP Weekly Site Audit	2	3	4	5
6	7	8 Leq (30min) 24-Hrs TSP Weekly Site Audit	9	10	11	12
13	14	15 Leq (30min) 24-Hrs TSP Weekly Site Audit	16	17	18	19
20	21	22 Leq (30min) 24-Hrs TSP Weekly Site Audit	23	24	25	26
27	28	29 Leq (30min) 24-Hrs TSP Weekly Site Audit	30	31		

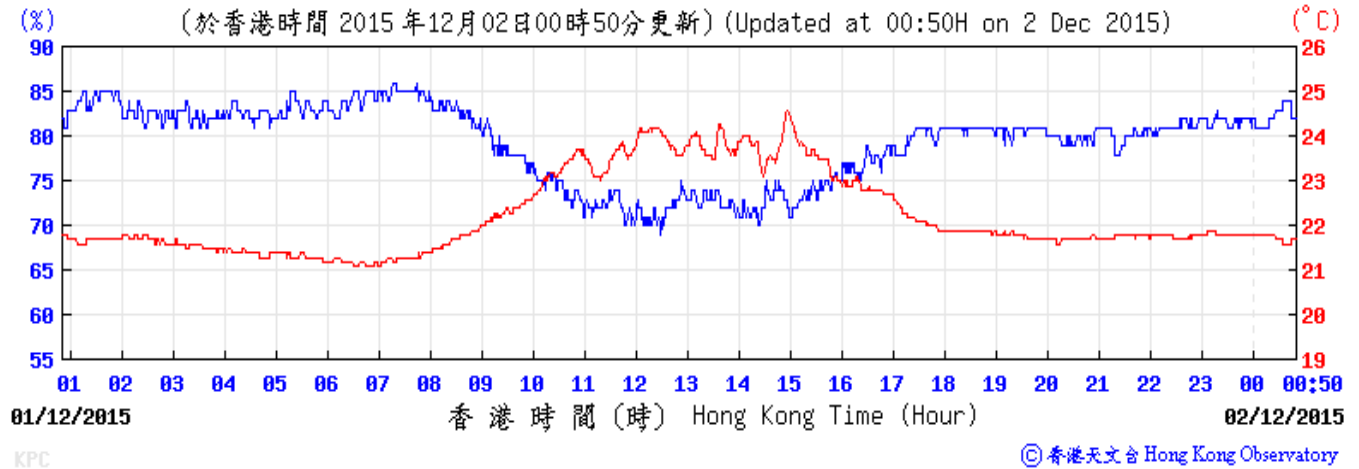
Environmental Monitoring & Audit Schedule: January 2016

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					1	2
3	4 24-Hrs TSP	5 Weekly Site Audit	6 Leq (30min)	7	8	9
10	11 24-Hrs TSP	12 Leq (30min) Weekly Site Audit	13	14	15	16
17	18 24-Hrs TSP	19 Leq (30min) Weekly Site Audit	20	21	22	23
24/31	25 24-Hrs TSP	26 Leq (30min) Weekly Site Audit	27	28	29	30

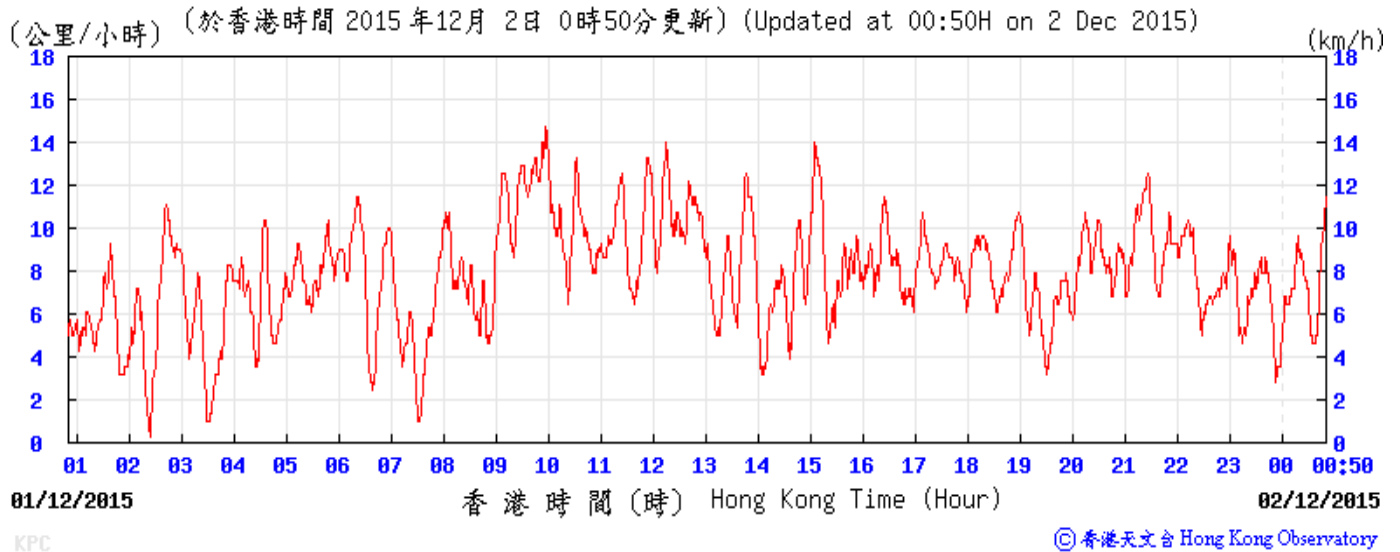
APPENDIX H WEATHER INFORMATION EXTRACTED FROM HONG KONG OBSERVATORY KING'S PARK WEATHER STATION

01 December 2015

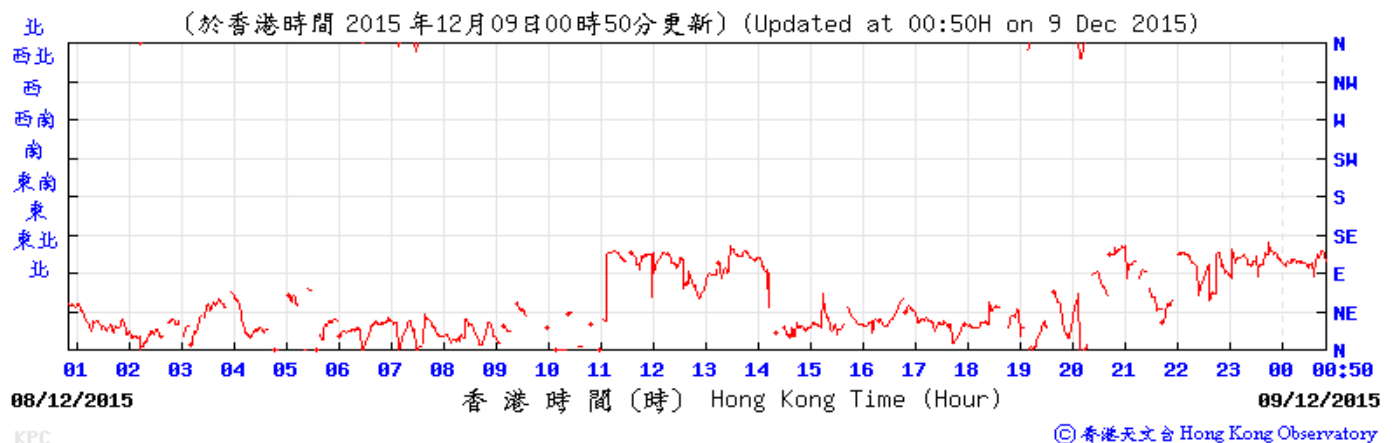
Temperature/Humidity:



Wind Speed:



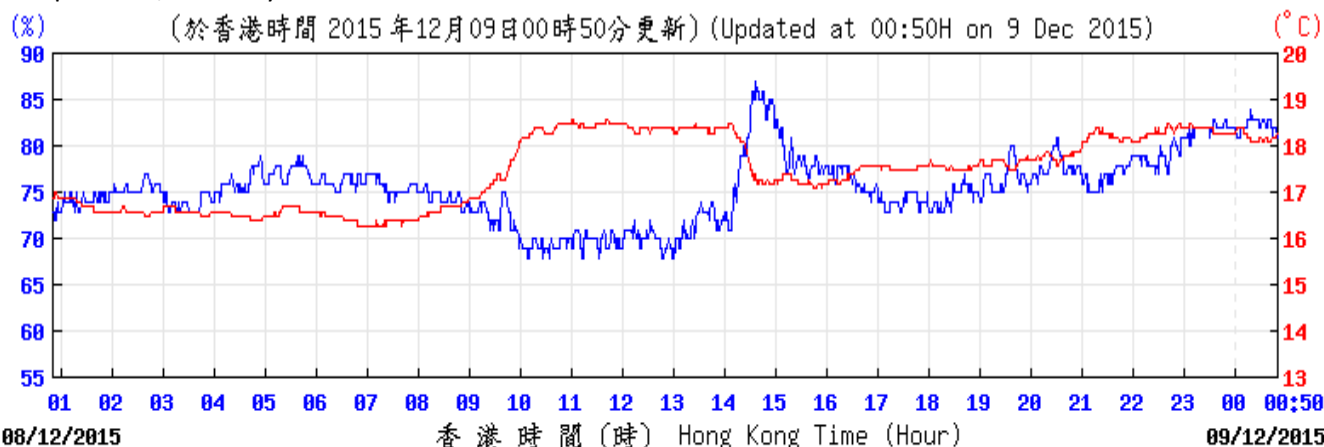
Wind Direction:



APPENDIX H WEATHER INFORMATION EXTRACTED FROM HONG KONG OBSERVATORY KING'S PARK WEATHER STATION (Continued)

08 December 2015

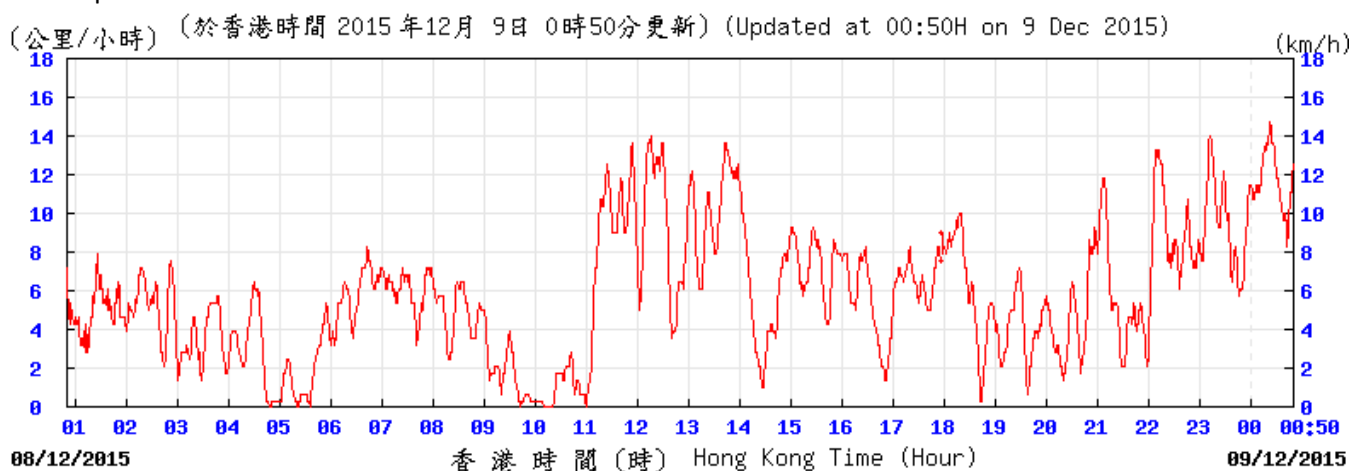
Temperature/Humidity:



KPC

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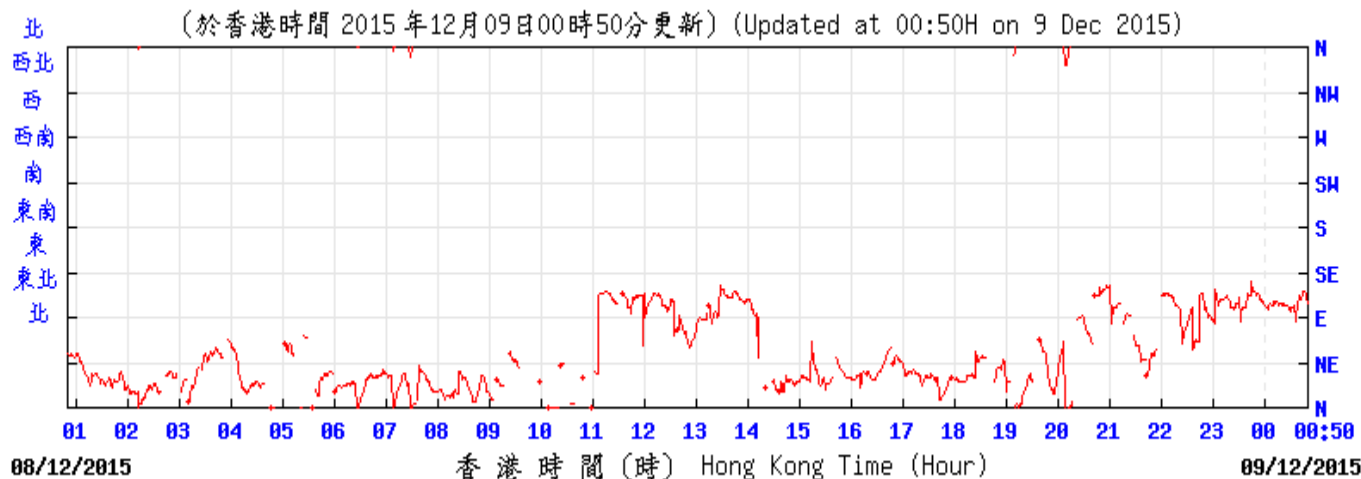
Wind Speed:



KPC

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Wind Direction:

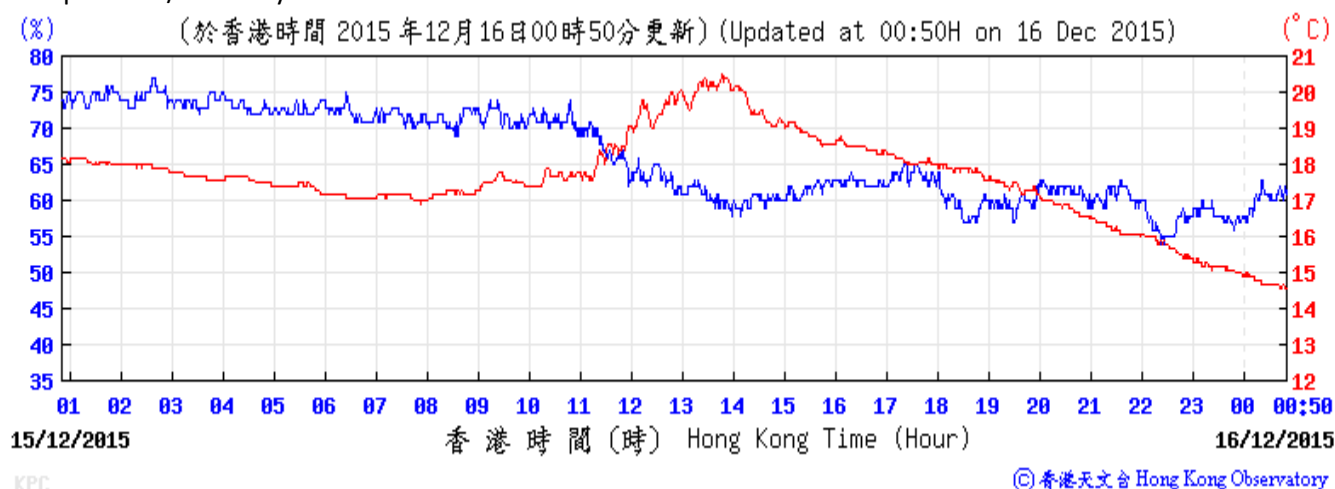


KPC

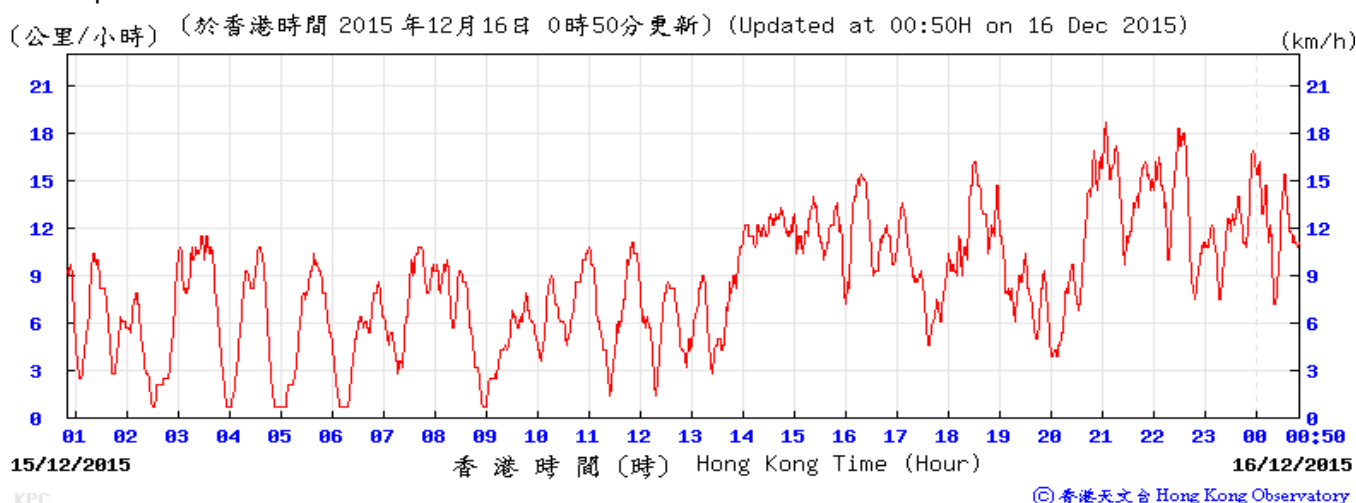
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15 December 2015

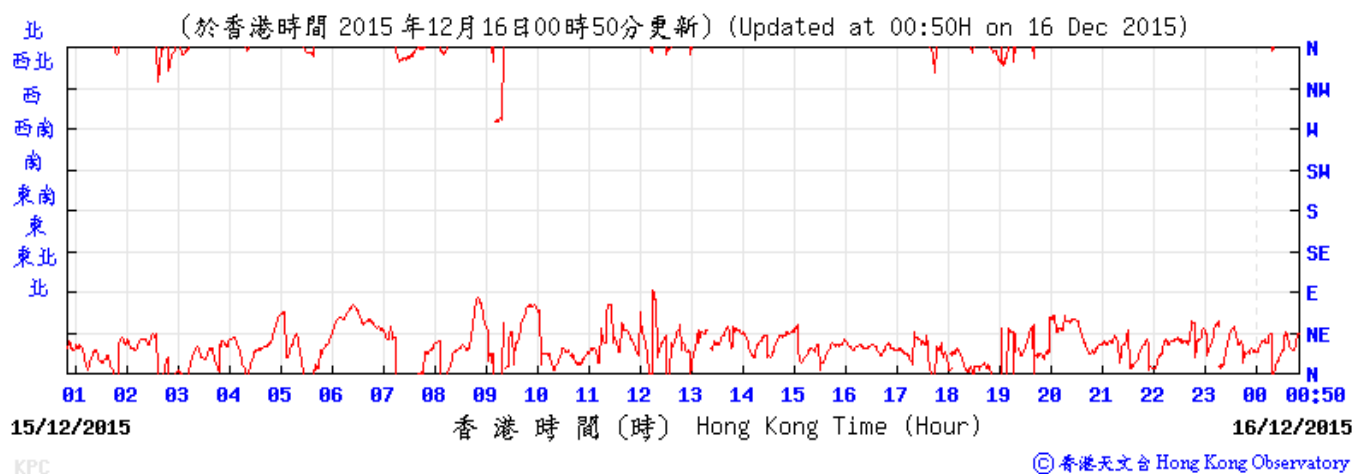
Temperature/Humidity:



Wind Speed:



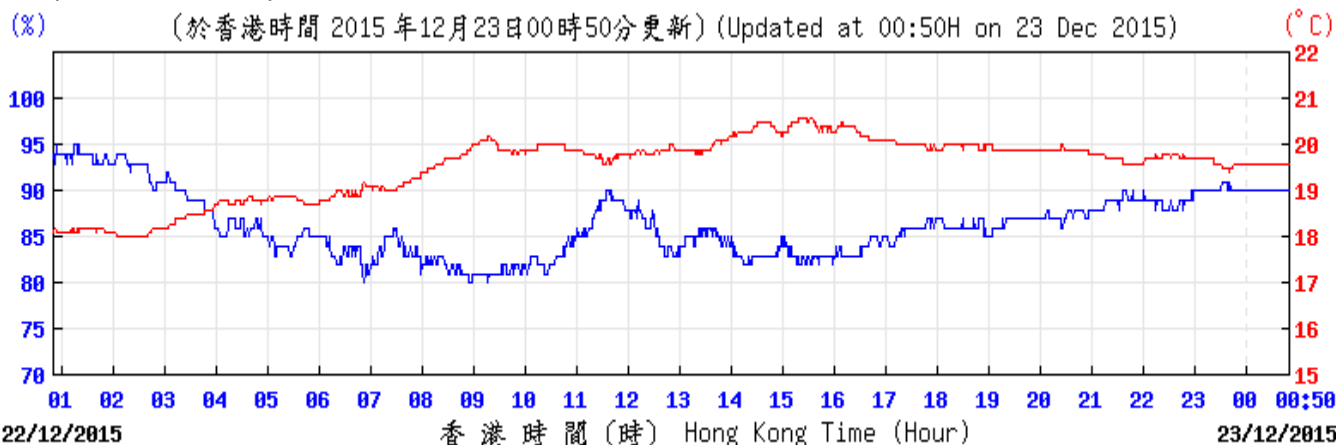
Wind Direction:



APPENDIX H WEATHER INFORMATION EXTRACTED FROM HONG KONG OBSERVATORY KING'S PARK WEATHER STATION (Continued)

22 December 2015

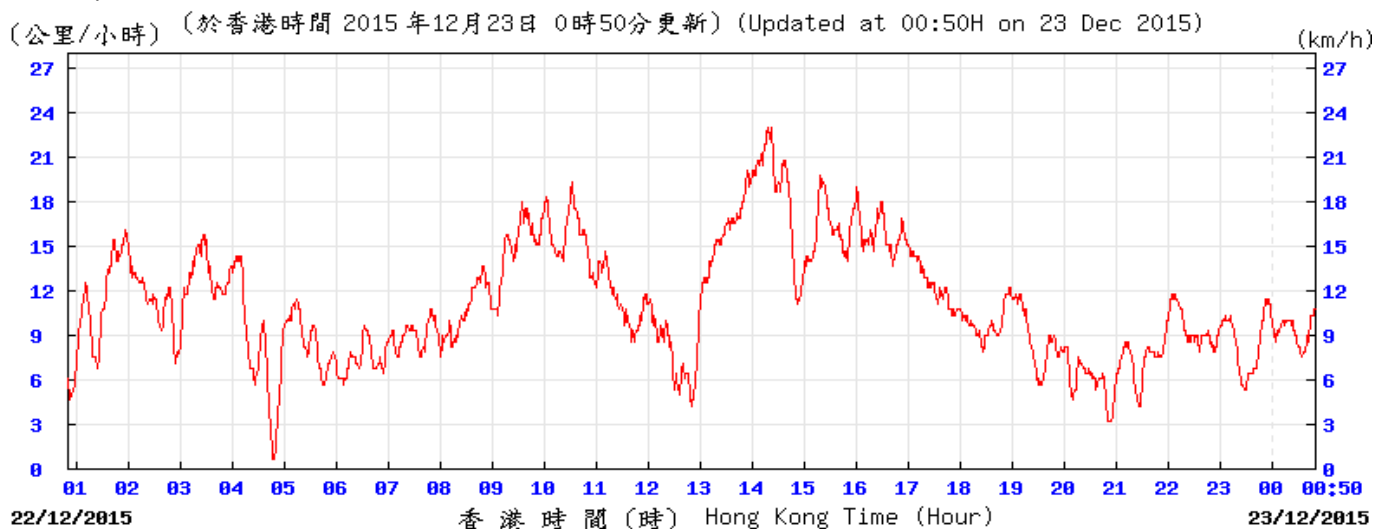
Temperature/Humidity:



KPC

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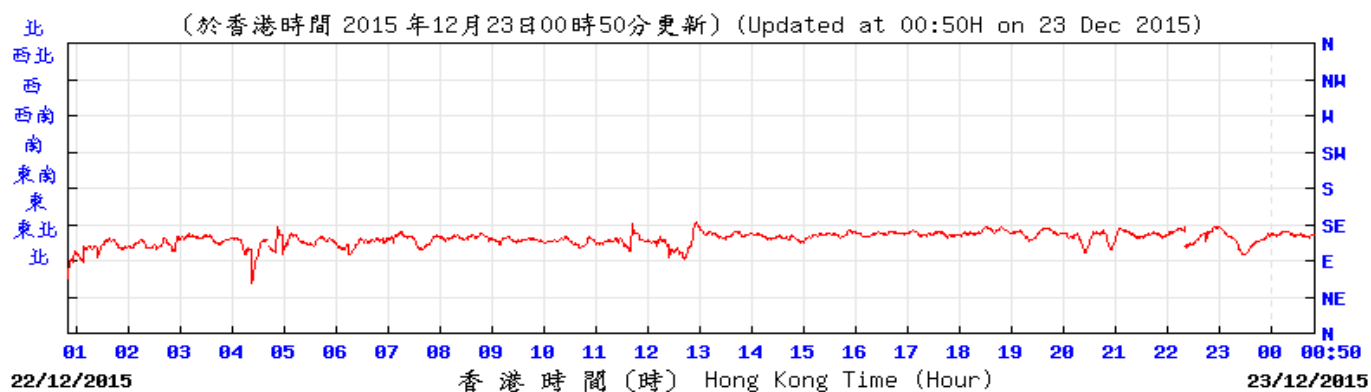
Wind Speed:



KPC

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Wind Direction:



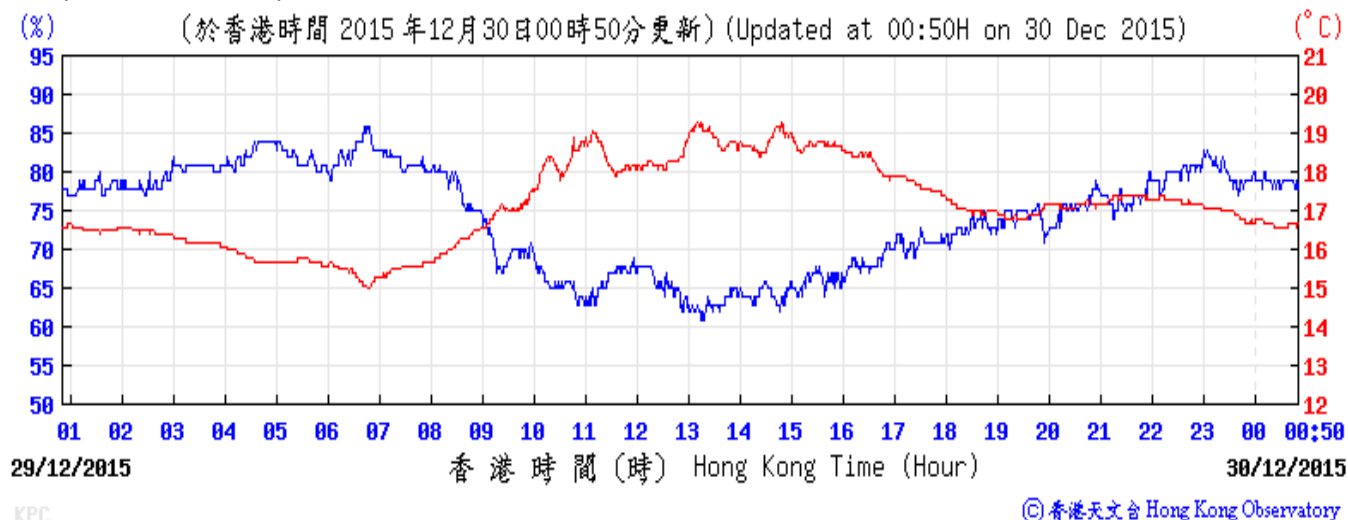
KPC

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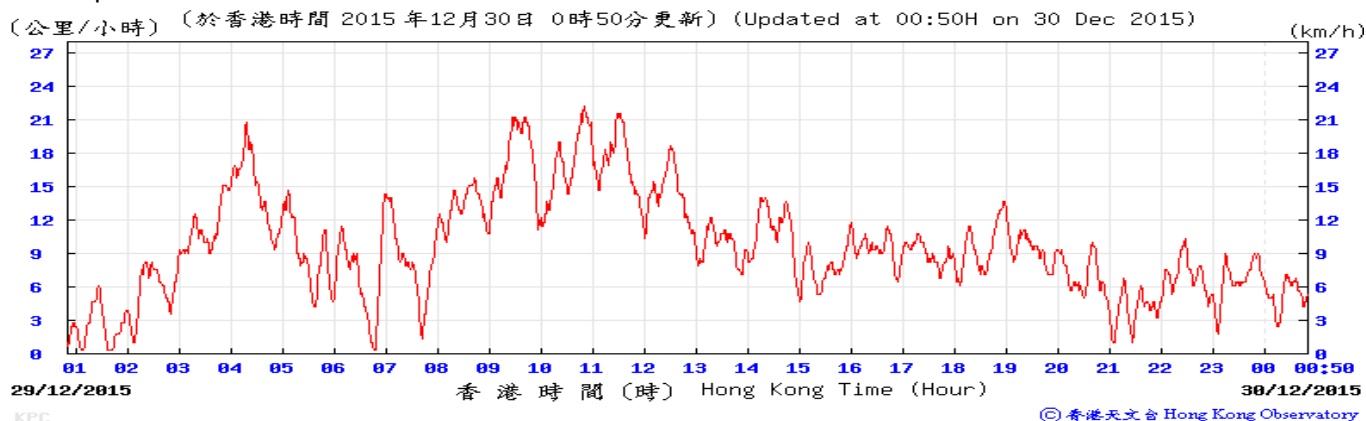
APPENDIX H WEATHER INFORMATION EXTRACTED FROM HONG KONG OBSERVATORY KING'S PARK WEATHER STATION (Continued)

29 December 2015

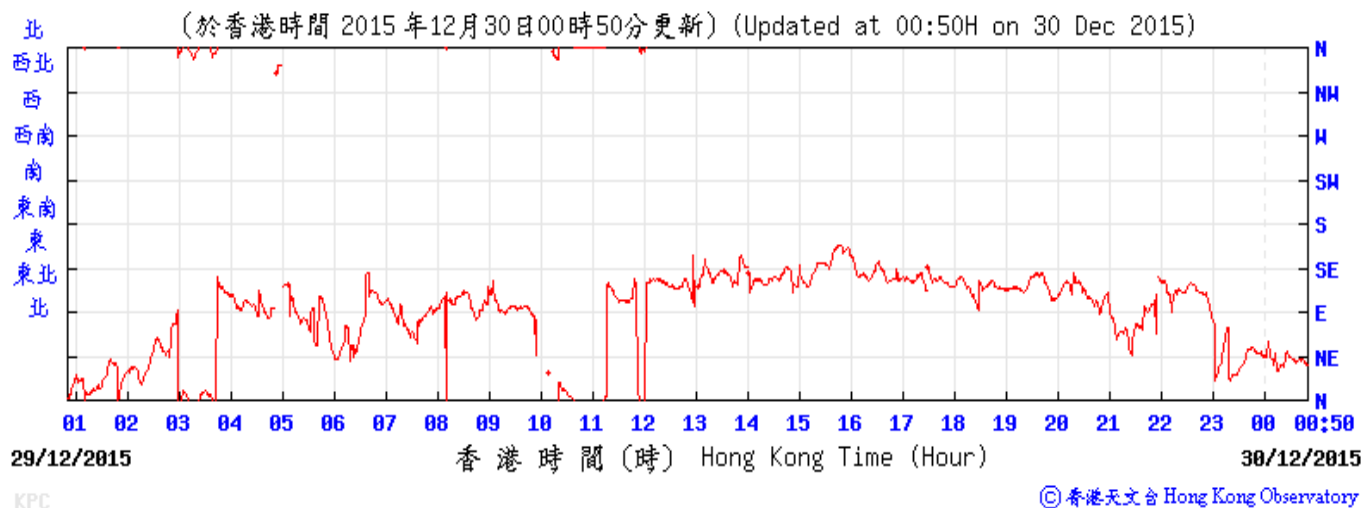
Temperature/Humidity:



Wind Speed:



Wind Direction:



APPENDIX H (Continued)

Daily Total Rainfall at King's Park HKO Weather Monitoring Station - December 2015

Day	Total Rainfall, mm	24-hr TSP	Noise	Remarks
1	0.3	✓	✓	No rainfall perceived on site during noise monitoring
2	7			
3	46.4			
4	38.1			
5	15.6			
6	50.7			
7	5.8			
8	0	✓	✓	No rainfall perceived on site during Noise Monitoring
9	Trace			
10	1			
11	2			
12	Trace			
13	Trace			
14	0			
15	0	✓	✓	No rainfall perceived on site during Noise Monitoring
16	0			
17	0			
18	0			
19	0			
20	0			
21	Trace			
22	0	✓	✓	No rainfall perceived on site during Noise Monitoring
23	0			
24	Trace			
25	0.2			
26	0.7			
27	0			
28	Trace			
29	Trace	✓	✓	No rainfall perceived on site during Noise Monitoring
30	0			
31	0.5			
Mean/Total	168.3			

APPENDIX I CERTIFICATE OF LABORATORY AND EQUIPMENT CALIBRATION



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 - May 11, 2015 Rootmeter S/N 0438320 Ta (K) - 297
 Operator Tisch Orifice I.D. - 1785 Pa (mm) - 750.57

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	1.3860	3.2	2.00
2	NA	NA	1.00	0.9870	6.4	4.00
3	NA	NA	1.00	0.8800	7.9	5.00
4	NA	NA	1.00	0.8390	8.7	5.50
5	NA	NA	1.00	0.6940	12.6	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9867	0.7119	1.4078	0.9957	0.7184	0.8896
0.9825	0.9954	1.9909	0.9915	1.0045	1.2581
0.9804	1.1141	2.2259	0.9894	1.1243	1.4066
0.9794	1.1674	2.3345	0.9884	1.1781	1.4752
0.9742	1.4038	2.8156	0.9832	1.4167	1.7792
Qstd slope (m) = 2.03254			Qa slope (m) = 1.27274		
intercept (b) = -0.03728			intercept (b) = -0.02356		
coefficient (r) = 0.99997			coefficient (r) = 0.99997		
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:

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

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

APPENDIX I

High Volume Air Sampler Calibration Worksheet	
Project Title:	MTR Tsim Sha Tsui Station Carrievon Road Subway and Entrances Modification Works
Monitoring Location:	K11 Commercial Complex
Calibration Date:	14-Sep-15
Calibration Due Date:	14-Dec-15
Time:	15:15

Sampler Model:	BM2000HX
Betal No.:	587
Calibrator Office no.:	1785
Slope (m):	2.03254
Intercept (b):	-0.03728
Correction coeff. (r):	0.99997

Standard pressure (mmHg) Pstd:	760.0
Standard temp. (K) Tstd:	298.0
Calibration pressure (mmHg) Pa:	755.3
Calibration temp. (K) Ta:	303.8

$$Flow(\text{corrected}) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times (\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b)$$



Sample no.	Pressure Drop (H), inch	Flow (corrected), m ³ /min	Actual flow rate (Qstd), m ³ /min	Flow indication (I), arbitrary
1	11.0	3.275	1.629	54.0
2	9.2	2.995	1.492	49.0
3	6.9	2.594	1.294	42.0
4	4.4	2.071	1.037	32.0
5	2.5	1.561	0.786	24.0

Correlation Coefficient : **0.9995**

Plot of Linear Regression Actual flow rate (Qstd) against Flow indication (I)

y = 35.946x - 4.6553

Remark
1 hPa = 0.750062 mmHg

Calibrated by:	C. S. Tung ()	Date: 14 September 2015
Checked by:	F. N. Wong ()	Date: 14 September 2015

APPENDIX I CERTIFICATE OF LABORATORY AND EQUIPMENT CALIBRATION (Continued)

High Volume Air Sampler Calibration Worksheet

Project Title: MTR Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works
 Monitoring Location: K11 Commercial Complex
 Calibration Date: 14-Dec-15
 Calibration Due Date: 14-Mar-16
 Time: 15:04

Sampler Model:	BM2000HX
Serial No.:	587
Calibrator Orifice no.:	1785
Slope (m):	2.03254
Intercept (b):	0.03728
Correction coeff. (r)	0.99997

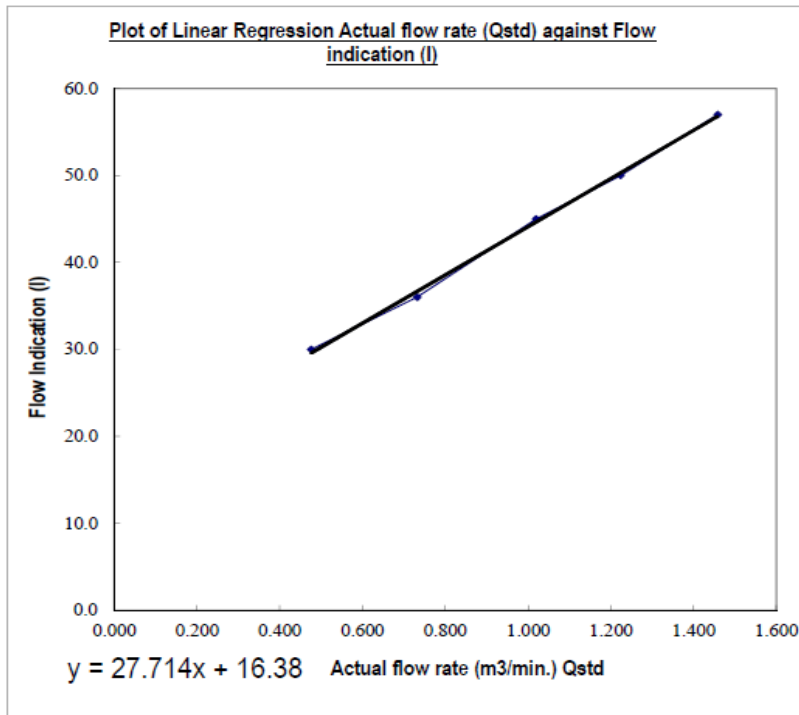
$$\text{Flow (corrected)} = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

$$Qstd = \frac{1}{m} \times \left(\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b \right)$$

Standard pressure (mmHg) Pstd:	760.0
Standard temp. (K) Tstd:	298.0
Calibration pressure (mmHg) Pa:	760.1
Calibration temp. (K) Ta:	294.5

Sample no.	Pressure Drop (H), inch	Flow (corrected), m3/min	Actual flow rate (Qstd), m3/min	Flow indication (I), arbitrary
1	8.9	3.001	1.458	57.0
2	6.3	2.525	1.224	50.0
3	4.4	2.110	1.020	45.0
4	2.3	1.526	0.732	36.0
5	1.0	1.006	0.477	30.0

Correlation Coefficient : 0.9990



Remark

1 hPa = 0.750062 mmHg

Calibrated by:

C. S. Tung

Date: 14 December 2015

Checked by:

F. N. Wong

Date: 14 December 2015

APPENDIX I CERTIFICATE OF LABORATORY AND EQUIPMENT CALIBRATION (Continued)

High Volume Air Sampler Calibration Worksheet

Project Title: MTR Tsim Sha Tsui Station Camarvon Road Subway and Entrances
 Modification Works
 Monitoring Location: K11 Commercial Complex
 Calibration Date: 18-Dec-15
 Calibration Due Date: 18-Mar-16
 Time: 16:15

Sampler Model:	TE5005X
Serial No.:	0462
Calibrator Office no.:	1785
Slope (m):	2.03254
Intercept (b):	-0.03728
Correction coeff. (r)	0.99997

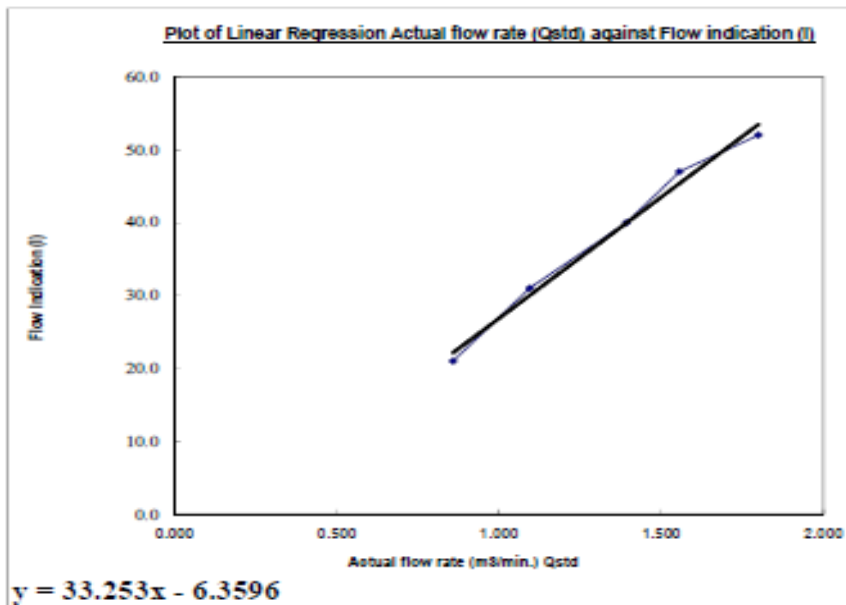
$$Flow(\text{corrected}) = \sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}}$$

Standard pressure (mmHg) Pstd:	760.0
Standard temp. (K) Tstd:	298.0
Calibration pressure (mmHg) Pa:	767.7
Calibration temp. (K) Ta:	289.5

$$Qstd = \frac{1}{m} \times (\sqrt{H \times \frac{Pa}{Pstd} \times \frac{Tstd}{Ta}} - b)$$

Sample no.	Pressure Drop (H), inch	Flow (corrected), m3/min	Actual flow rate (Qstd), m3/min	Flow indication (I), arbitrary
1	12.6	3.620	1.799	52.0
2	9.4	3.126	1.556	47.0
3	7.5	2.793	1.392	40.0
4	4.6	2.187	1.094	31.0
5	2.8	1.706	0.858	21.0

Correlation Coefficient : 0.9943



Remark
 1 hPa = 0.750062 mmHg

Calibrated by: C. S. Tung () Date: 18 December 2015

Checked by: F. N. Wong () Date: 18 December 2015



Calibration Certificate

Certificate No. **501362**

Page **1** of **3** Pages

Customer : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Order No. : Q50521

Date of receipt : 26-Feb-15

Item Tested

Description : Sound Level Meter

Manufacturer : B&K

Model : 2238

Serial No. : 2562782

Test Conditions

Date of Test : 28-Feb-15

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure: Z01, IEC 651, IEC 804.

Test Results

All results were within the IEC 651 Type 1, IEC 804 Type 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S017	Multi-Function Generator	C147450	SCL-HKSAR
S240	Sound Level Calibrator	500563	NIM-PRC & SCL-HKSAR

The values given in this Calibration Certificate only relate to the values measured at the time of the test and any uncertainties quoted will not include allowances for the equipment long term drift, variations with environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by : 
Dorothy Cheuk

Approved by : 
Steve Kwan

This Certificate is issued by

Hong Kong Calibration Ltd.

Unit 6B, 24/F., Wai Pung Industrial Centre, No. 56-76, Ta Chuen Ping Street, Kwai Chung, NT Hong Kong.

Tel: 2425 8801 Fax: 2425 8648

Date: 28-Feb-15



Hong Kong Calibration Ltd.
香港校正有限公司

Calibration Certificate

Certificate No. 501362

Page 2 of 3 Pages

Results :

1. SPL Accuracy

UUT Setting				Applied Value (dB)	UUT Reading (dB)
Range	Freq. Wgt.	Bandwidth	Center Freq.		
20 ~ 100	A	BB/F	--	94.0	94.3
	A	BB/S	--		94.3
	C	BB/F	--		94.3
40 ~ 120	A	BB/F	--	94.0	94.3
	A	BB/F	--	114.0	114.3

IEC 651 Type 1 Spec. : ± 0.7 dB

Uncertainty : ± 0.1 dB

2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. : ± 0.3 dB

Uncertainty : ± 0.1 dB

3. Linearity

3.1 Level Linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec. (Primary Indicator Range)
140	114.0	114.3	0.0	± 0.7 dB
130	104.0	104.3	0.0	
120	94.0	94.3 (Ref.)	--	
110	84.0	84.3	0.0	
100	74.0	74.4	+0.1	
90	64.0	64.4	+0.1	
80	54.0	54.3	0.0	

Uncertainty : ± 0.1 dB



Calibration Certificate

Certificate No. 501362

Page 3 of 3 Pages

3.2 Differential level linearity

UUT Range (dB)	Applied Value (dB)	UUT Reading (dB)	Variation (dB)	IEC 651 Type 1 Spec.
120	84.0	84.3	0.0	± 0.4 dB
	94.0	94.3 (Ref.)	--	
	95.0	95.3	0.0	± 0.2 dB

Uncertainty : ± 0.1 dB

4. Frequency Weighting

A weighting

Frequency	Attenuation (dB)	IEC 651 Type 1 Spec.
31.5 Hz	- 39.4	- 39.4 dB, ± 1.5 dB
63 Hz	- 26.2	- 26.2 dB, ± 1.5 dB
125 Hz	- 16.2	- 16.1 dB, ± 1 dB
250 Hz	- 8.7	- 8.6 dB, ± 1 dB
500 Hz	- 3.2	- 3.2 dB, ± 1 dB
1 kHz	0.0 (Ref)	0 dB, ± 1 dB
2 kHz	+ 1.2	+ 1.2 dB, ± 1 dB
4 kHz	+ 0.9	+ 1.0 dB, ± 1 dB
8 kHz	- 1.2	- 1.1 dB, + 1.5 dB ~ -3 dB
16 kHz	- 6.7	- 6.6 dB, + 3 dB ~ -∞

Uncertainty : ± 0.1 dB

5. Time Averaging

Applied Burst duty Factor	Applied Leq Value (dB)	UUT Reading (dB)	IEC 804 Type 1 Spec.
continuous	40.0	40.0	--
1/10	40.0	39.9	± 0.5 dB
1/10 ²	40.0	39.9	
1/10 ³	40.0	39.8	± 1.0 dB
1/10 ⁴	40.0	39.8	

Uncertainty : ± 0.1 dB

Remarks : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric pressure : 1 010 hPa.

4. The UUT was adjusted with the supplied sound calibrator at the reference sound pressure level before the calibration.

----- END -----

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香港校正有限公司

Calibration Certificate

Certificate No. 409134

Page 1 of 2 Pages

Customer : Hyder Consulting Limited

Address : 47/F., Hopewell Centre, 183 Queens Road East, Wanchai, Hong Kong

Order No. : Q43957

Date of receipt : 8-Dec-14

Item Tested

Description : Sound Level Calibrator

Manufacturer : B&K

Model : Type 4231

Serial No. : 2699361

Test Conditions

Date of Test : 30-Dec-14

Supply Voltage : --

Ambient Temperature : (23 ± 3)°C

Relative Humidity : (50 ± 25) %

Test Specifications

Calibration check.

Ref. Document/Procedure : F21, Z02, IEC 942.

Test Results

All results were within the IEC 942 Class 1 specification.

The results are shown in the attached page(s).

Main Test equipment used:

Equipment No.	Description	Cert. No.	Traceable to
S014	Spectrum Analyzer	405316	NIM-PRC & SCL-HKSAR
S205	Ref. Sound Level Calibrator	PHCO40002	SCL-HKSAR
S041	Universal Counter	405317	SCL-HKSAR
S206	Sound Level Meter	405322	SCL-HKSAR
S031	6½ dgt. Multimeter	39256	NIM-PRC

The values given in this Calibration 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 environmental changes, vibration and shock during transportation, overloading, mis-handling, or the capability of any other laboratory to repeat the measurement. Hong Kong Calibration Ltd. 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 International System of Units (SI).

The test results apply to the above Unit-Under-Test only

Calibrated by :

Dorothy Cheuk

Approved by :

Steve Kwan

Date: 30-Dec-14

This Certificate is issued by

Hong Kong Calibration Ltd.

Unit 8B, 24/F., Well Fung Industrial Centre, No. 59-79, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.

Tel: 2425 6801 Fax: 2425 8946

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E



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Calibration Certificate

Certificate No. 409134

Page 2 of 2 Pages

Results :

1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)		IEC 942 Class 1 Spec. ± 0.3 dB
	Before Adjust.	After Adjust.	
94	94.3	94.0	
114	114.3	114.0	

Uncertainty : ± 0.1 dB

2. Frequency

UUT Nominal Value	Measured Value	IEC 942 Class 1 Spec.
1 kHz	1.000 kHz	± 2 %

Uncertainty : $\pm 3.6 \times 10^{-6}$

3. **Level Stability** : 0.0 dB
IEC 942 Class 1 Spec. : ± 0.1 dB
Uncertainty : ± 0.01 dB

4. **Total Harmonic Distortion** : < 0.4 %
IEC 942 Class 1 Spec. : < 3 %
Uncertainty : ± 2.3 % of reading

Remark : 1. UUT : Unit-Under-Test

2. The uncertainty claimed is for a confidence probability of not less than 95%.

3. Atmospheric Pressure : 1010 hPa.

----- END -----



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

24-Hour TSP Monitoring

Monitoring Location		K11
Details of Location		4/F Roof top, K11
Sampler Identification		1713
Date		01/12/2015 – 02/12/2015
Time of Sampling		10:34 a.m. – 10:34 a.m.
Elapsed-time Meter Reading	Start (hrs)	8920.02
	Stop (hrs)	8944.03
Total Sampling Time (hrs)		24.01
Weather Conditions		Sunny
Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	764.2
	Ti (°C)	23.5
	Qsi (Std. m ³ /min)	1.04
Final Flow Rate, Qsf	Pf (mm Hg)	763.6
	Tf (°C)	24.3
	Qsf (Std. m ³ /min)	1.15
Average Flow Rate (Std. m ³ /min)		1.09
Total Volume (Std. m ³)		1577
Filter Identification No.		200152
Initial Weight. of Filter (g)		2.7970
Final Weight of Filter (g)		2.9078
Measured TSP Level (µg/m ³)		70.3

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

24-Hour TSP Monitoring

Monitoring Location		K11
Details of Location		4/F Roof top, K11
Sampler Identification		1713
Date		08/12/2015 – 09/12/2015
Time of Sampling		10:22 a.m. – 10:22 a.m.
Elapsed-time Meter Reading	Start (hrs)	8944.03
	Stop (hrs)	8968.04
Total Sampling Time (hrs)		24.01
Weather Conditions		Rainy
Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	767.8
	Ti (°C)	18.3
	Qsi (Std. m ³ / min)	1.07
Final Flow Rate, Qsf	Pf (mm Hg)	763.3
	Tf (°C)	18.2
	Qsf (Std. m ³ / min)	1.15
Average Flow Rate (Std. m ³ / min)		1.11
Total Volume (Std. m ³)		1597
Filter Identification No.		200153
Initial Weight. of Filter (g)		2.7940
Final Weight of Filter (g)		2.8957
Measured TSP Level (µg/m ³)		63.7

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

24-Hour TSP Monitoring

Monitoring Location		K11
Details of Location		4/F Roof top, K11
Sampler Identification		1713
Date		15/12/2015 – 16/12/2015
Time of Sampling		10:00 a.m. – 10:00 a.m.
Elapsed-time Meter Reading	Start (hrs)	8968.05
	Stop (hrs)	8992.06
Total Sampling Time (hrs)		24.01
Weather Conditions		Cloudy
Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	765.1
	Ti (°C)	17.4
	Qsi (Std. m ³ / min)	2.11
Final Flow Rate, Qsf	Pf (mm Hg)	767.5
	Tf (°C)	14.5
	Qsf (Std. m ³ / min)	2.18
Average Flow Rate (Std. m ³ / min)		2.14
Total Volume (Std. m ³)		3087
Filter Identification No.		200154
Initial Weight. of Filter (g)		2.7902
Final Weight of Filter (g)		2.9538
Measured TSP Level (µg/m ³)		53.0

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

24-Hour TSP Monitoring

Monitoring Location		K11
Details of Location		4/F Roof top, K11
Sampler Identification		0462
Date		21/12/2015 – 22/12/2015
Time of Sampling		09:30 a.m. – 09:30 a.m.
Elapsed-time Meter Reading	Start (hrs)	6225.63
	Stop (hrs)	6249.91
Total Sampling Time (hrs)		24.27
Weather Conditions		Cloudy
Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	766.2
	Ti (°C)	19.9
	Qsi (Std. m ³ / min)	1.01
Final Flow Rate, Qsf	Pf (mm Hg)	764.7
	Tf (°C)	21.4
	Qsf (Std. m ³ / min)	1.22
Average Flow Rate (Std. m ³ / min)		1.12
Total Volume (Std. m ³)		1627
Filter Identification No.		200157
Initial Weight. of Filter (g)		2.7914
Final Weight of Filter (g)		2.9024
Measured TSP Level (µg/m ³)		68.2

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

24-Hour TSP Monitoring

Monitoring Location		K11
Details of Location		4/F Roof top, K11
Sampler Identification		0462
Date		29/12/2015 - 30/12/2015
Time of Sampling		09:00 a.m. – 09:00 a.m.
Elapsed-time Meter Reading	Start (hrs)	6249.91
	Stop (hrs)	6274.78
Total Sampling Time (hrs)		24.87
Weather Conditions		Sunny
Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	770.3
	Ti (°C)	17.0
	Qsi (Std. m ³ / min)	1.43
Final Flow Rate, Qsf	Pf (mm Hg)	770.1
	Tf (°C)	16.2
	Qsf (Std. m ³ / min)	1.46
Average Flow Rate (Std. m ³ / min)		1.45
Total Volume (Std. m ³)		2160
Filter Identification No.		200158
Initial Weight. of Filter (g)		2.7787
Final Weight of Filter (g)		3.0001
Measured TSP Level (µg/m ³)		102.5

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

Construction Noise Monitoring

Monitoring Location	K11	
Description of Location	4/F Roof top, K11	
Date of Monitoring	01/12/2015	
Measurement Time	10:16 - 10:46	
Measurement Time Length (min.)	30	
Noise Meter Model / Identification	B & K 2238	
Calibrator Model / Identification	B & K 4231	
Measurement Results	L _{eq} (dB (A))	68.3
	L ₁₀ (dB (A))	69.5
	L ₉₀ (dB (A))	66.0
Major Construction Noise Source(s) during Monitoring	On-site powered mechanical equipment	
Other Noise Source(s) during Monitoring	Traffic Noise	
Remarks	Weather Condition : Sunny Wind Speed : 0.9 m/s	

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

Construction Noise Monitoring

Monitoring Location		K11
Description of Location		4/F Roof top, K11
Date of Monitoring		08/12/2015
Measurement Time		10:17 – 10:47
Measurement Time Length (min.)		30
Noise Meter Model / Identification		B & K 2238
Calibrator Model / Identification		B & K 4231
Measurement Results	L _{eq} (dB (A))	69.2
	L ₁₀ (dB (A))	70.5
	L ₉₀ (dB (A))	67.0
Major Construction Noise Source(s) during Monitoring		On-site powered mechanical equipment
Other Noise Source(s) during Monitoring		Traffic Noise
Remarks		Weather Condition : Cloudy Wind Speed : 1.7 m/s

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	



C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

Construction Noise Monitoring

Monitoring Location		K11
Description of Location		4/F Roof top, K11
Date of Monitoring		15/12/2015
Measurement Time		10:05 – 10:35
Measurement Time Length (min.)		30
Noise Meter Model / Identification		B & K 2238
Calibrator Model / Identification		B & K 4231
Measurement Results	Leq (dB (A))	68.6
	L10 (dB (A))	69.5
	L90 (dB (A))	66.5
Major Construction Noise Source(s) during Monitoring		On-site powered mechanical equipment
Other Noise Source(s) during Monitoring		Traffic noise
Remarks		Weather Condition : Sunny Wind Speed : 1.8 m / s

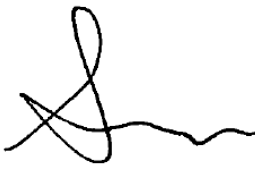

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	

C3840-13C MTRCL**Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works**

APPENDIX J FIELD RECORD SHEETS

Construction Noise Monitoring

Monitoring Location	K11	
Description of Location	4/F Roof top, K11	
Date of Monitoring	22/12/2015	
Measurement Time	10:18 – 10:48	
Measurement Time Length (min.)	30	
Noise Meter Model / Identification	B & K 2238	
Calibrator Model / Identification	B & K 4231	
Measurement Results	L _{eq} (dB (A))	72.2
	L ₁₀ (dB (A))	74.5
	L ₉₀ (dB (A))	67.0
Major Construction Noise Source(s) during Monitoring	On-site powered mechanical equipment	
Other Noise Source(s) during Monitoring	Traffic noise	
Remarks	Weather Condition : Overcast Wind Speed : 1.1 m / s	

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	

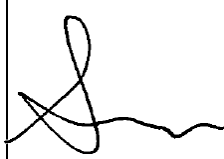

C3840-13C MTRCL

Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works

APPENDIX J FIELD RECORD SHEETS

Construction Noise Monitoring

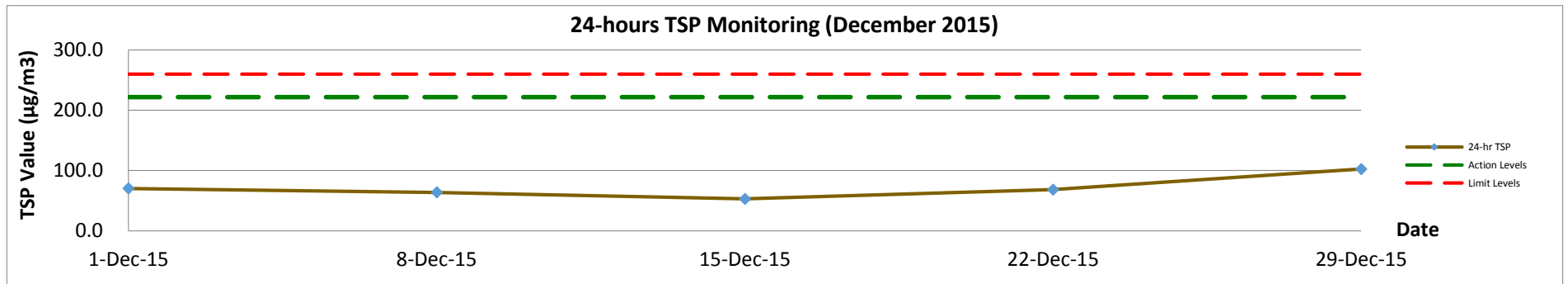
Monitoring Location		K11
Description of Location		4/F Roof top, K11
Date of Monitoring		29/12/2015
Measurement Time		14:37 – 15:07
Measurement Time Length (min.)		30
Noise Meter Model / Identification		B & K 2238
Calibrator Model / Identification		B & K 4231
Measurement Results	L _{eq} (dB (A))	71.9
	L ₁₀ (dB (A))	73.0
	L ₉₀ (dB (A))	69.0
Major Construction Noise Source(s) during Monitoring		On-site powered mechanical equipment
Other Noise Source(s) during Monitoring		Traffic noise
Remarks		Weather Condition : Sunny Wind Speed : 0.4 m / s

Conducted by:	C. S. Tung	Signature:	
Checked by:	F. N. Wong	Signature:	

APPENDIX K MONITORING RESULTS

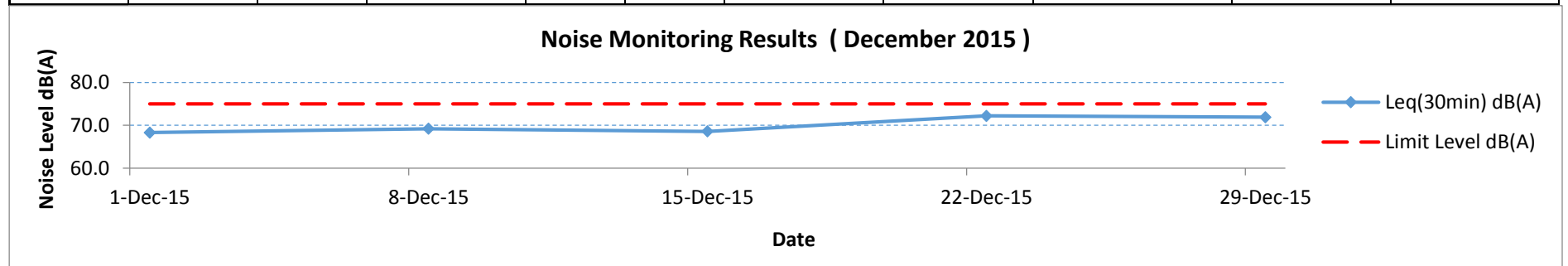
Impact Air Quality Monitoring : 24-hour TSP at K11

Location	Monitoring Date	Start Time	Weather Conditions	Temp (°C)	Elapse Time			Flow Rate (CFM)			TSP Concentration (µg/m3)	Action/Limit Levels
					Initial	Final	Sampling Hours	Initial	Final	Average		
K11 Art Mall	1-Dec-15	10:34	Sunny	23.5	8920.02	8944.03	24	42	46	44	70.3	221.6/260
	8-Dec-15	10:22	Rainy	18.3	8944.03	8968.04	24	43	46	45	63.7	221.6/260
	15-Dec-15	10:00	Cloudy	17.4	8968.05	8992.06	24	42	44	43	53.0	221.6/260
	22-Dec-15	9:30	Cloudy	19.9	6225.64	6249.91	24	40	47	44	68.2	221.6/260
	29-Dec-15	9:00	Sunny	17.0	6249.91	6274.78	24	54	55	55	102.5	221.6/260



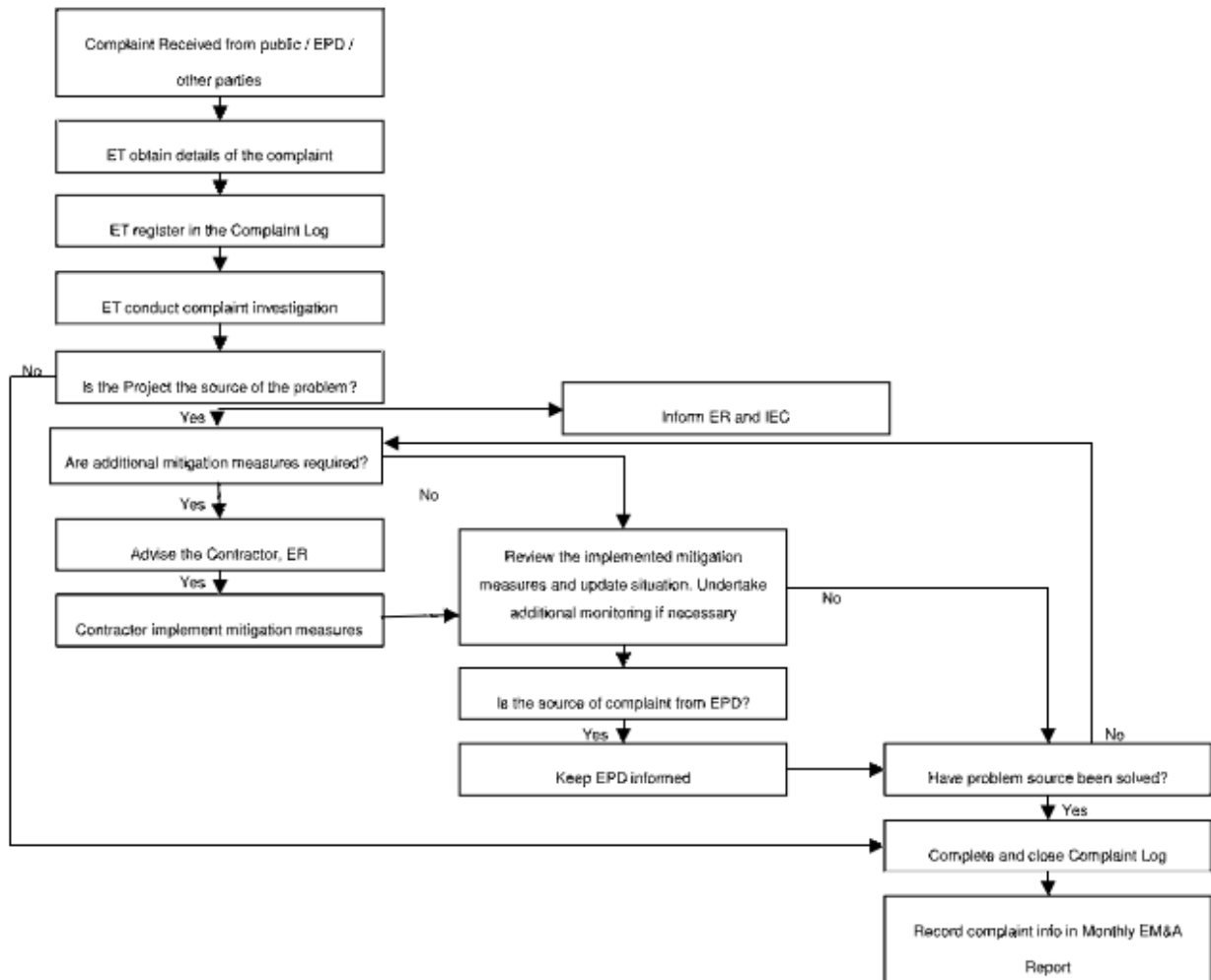
Impact Noise Monitoring: Leq(30min) at K11 (December 2015)

Locations	Date	Weather	Wind Speed (m/s)	Start Time	End Time	Background Level dB(A)	Limit Level dB(A)	Leq(30min) dB(A)	L10(30min) dB(A)	L90(30min) dB(A)
K11 Art Mall	1-Dec-15	Sunny	0.9	10:16	10:46	65.3	75	68.3	69.5	66.0
	8-Dec-15	Cloudy	1.7	10:17	10:47	65.3	75	69.2	70.5	67.0
	15-Dec-15	Sunny	1.8	10:05	10:35	65.3	75	68.6	69.5	66.5
	22-Dec-15	Overcast	1.1	10:18	10:48	65.3	75	72.2	74.5	67.0
	29-Dec-15	Sunny	0.4	14:37	15:07	65.3	75	71.9	73.0	69.0



APPENDIX L

Complaint Response Procedure



APPENDIX M

Monthly Summary Waste Flow Table for 2015 (year)

Contract No: C3840-13C Tsim Sha Tsui Station Carnarvon Road Subway
Date Reported: 5-January-2016

Month	Actual Quantities of Inert C&D Materials Generated Monthly						Actual Quantities of Non-inert C&D Wastes Generated Monthly					
	Total Quantity Generated	Hard Rocks and Large Broken Concrete	Reused in the Contract	Reused in other Projects	Disposed as Public Fill	Imported Fill	Metals	Paper/ cardboard packaging	Plastics	Chemical Waste	Others, e.g. general refuse	
		(See Note 3)							(see Note 2)			
(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000m ³)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m ³ /tonne)		
Carried from 2014	0.9342	-	-	-	0.9342	-	-	-	-	-	0.0035	
Jan	0.0682	-	-	-	0.0682	-	-	-	-	-	-	
Feb	0.0418	-	-	-	0.0418	-	-	-	-	-	-	
Mar	0.2563	-	-	-	0.2563	-	-	-	-	-	0.0020	
Apr	0.2182	-	-	-	0.2182	-	-	-	-	-	-	
May	0.1011	-	-	-	0.1011	-	-	-	-	-	-	
June	0.2604	-	-	-	0.2604	-	-	-	-	-	-	
Sub-total	0.9460	-	-	-	0.9460	-	-	-	-	-	0.0020	
July	0.1806	-	-	-	0.1806	-	-	-	-	-	-	
Aug	0.1006	-	-	-	0.1006	-	-	-	-	-	-	
Sept	0.0937	-	-	-	0.0937	-	-	-	-	-	0.0011	
Oct	0.0591	-	-	-	0.0591	-	-	-	-	-	0.0061	
Nov	0.0958	-	-	-	0.0958	-	-	-	-	-	0.0060	
Dec	0.1195	-	-	-	0.1195	-	-	-	-	-	0.0015	
Total	1.5953	-	-	-	1.5953	-	-	-	-	-	0.0167	
Acc. Total	2.5295	(accumulated quantity of the project = carried amount + this year amount)										0.0202

Notes:

- (1) The performance targets are given below:
 - All excavated materials to be sorted for recovering the inert portion of C&D materials, e.g. hard rocks, soil and broken concrete, for reuse on the Site or disposal to designated outlets;
 - All metallic waste to be recovered for collection by recycling contractors;
 - All cardboard and paper packaging (for plant, equipment and materials) to be recovered, properly stockpiled in dry and covered condition to prevent cross contamination;
 - All chemical wastes to be collected and properly disposed of by specialist contractors; and
 - All demolition debris to be stored to recover broken concrete, reinforcement bars, mechanical and electrical fittings, hardware as well as other fitting / materials that have established recycling outlets.
- (2) Plastics refer to plastic bottles/containers, plastic sheets/foam from packaging material.
- (3) Broken concrete for recycling into aggregates.
- (4) The waste flow table shall also include C&D materials that are specified in the Contract to be imported for use at the Site.