



Maeda Corporation

# **MONTHLY REPORT (JANUARY 2017)**

MTRCL Contract C3840-13C

Tsim Sha Tsui Station Carnarvon Road Subway  
and Entrances Modification Works

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**M A E D A**

Maeda Corporation

# Monthly EM&A Report (January 2017)

MTRCL Contract C3840-13C

Tsim Sha Tsui Station Carnarvon Road Subway and  
Entrances Modification Works

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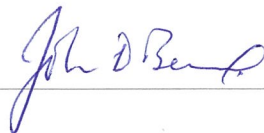
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**Report No**            EB001340R0481

Your Ref:  
Our Ref: 40032976/457676

**By Email and Post**

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

13 February 2017

Dear Sirs


**Consultancy Agreement A130-13  
Independent Environmental Checker for CRS and LTS  
CRS - Verification for 35<sup>th</sup> Monthly Environmental Monitoring and Audit (EM&A) Report  
(January 2017) (Report No.: EB001340R0481)**

We refer to the 35<sup>th</sup> Monthly EM&A Report (January 2017) received under cover of the email from the Environmental Team, Hyder Consulting Limited (HCL), dated on 7 February 2017.

Further to our comments provided on 8 February 2017 and subsequent revision of the Report by HCL on 9 February 2017, we have no further comment and have verified the captioned report (Report No.: EB001340R0481).

Should you have any queries, please feel free to contact the undersigned at 3922 9366.

Yours faithfully  
**AECOM Consulting Services Ltd**



Y. W. Fung  
Independent Environmental Checker

LLMC/wwsc

cc Hyder Consulting Limited (Attn.: Mr. F. N. Wong) via email  
Maeda Corporation (Attn.: Ms. Cecilia Lee) via email

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# EXECUTIVE SUMMARY

## Breaches of Action and Limit Levels

- ES01 No Notice of Exceedance. The environmental monitoring results registered no breaches of Action and Limit Levels of air quality and construction noise during the Reporting Period, therefore, associated investigation and follow-up actions were not required.
- ES02 No corrective action was 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

### *General*

- ES06 Construction noise, air quality and water quality are continued to be the key issues for the coming construction period. In order to alleviate potential adverse environmental impacts generated from construction activities to acceptable levels, environmental mitigation measures recommended in the EM&A Plan and summarised in the Implementation Schedule should be fully implemented and improved whenever appropriate.

### *Construction Noise*

- ES07 Particular attention should be paid to construction noise mitigation measures 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, implementation of necessary construction dust suppression measures is recommended during dusty activities under dry and windy conditions.

# 1 INTRODUCTION

## 1.1 The Reporting Period

- 1.1.1 This is the 35<sup>th</sup> monthly EM&A report (hereinafter referred as 'This Report') covering construction period from 1 to 31 January 2017 (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 Figure 1.1 Site Location Plan of **Appendix A**.
- 1.2.4 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**.
- 1.2.5 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 Arcadis Design and Engineering Limited (formerly known as Hyder Consulting Limited) has been appointed as the Environmental Team under the Project (hereinafter referred as '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 1-3-1** below. They are detailed in **Appendix E**.

**Table 1-3-1 Summary of Status of Environmental Licenses and Permits**

Item	Description	License/Permit Status
1	Air Pollution Control (Construction Dust)	Notification Ref. 403252 acknowledged on 02 Jun 2016
2	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).
3	Billing Account for Disposal of Construction Waste	A/C Ref. 7018523 granted on 25 Oct 2013
4	Chemical Waste Producer Registration	Registration Ref. 5213-2214-M2446-16 granted on 4 Mar 2014
5	Construction Noise Permit	CNP No. GW-RE0804-16 approved on 4 August 2016 for operation of 4 submersible water pumps (electric) from 15 August 2016 to 14 February 2017.

## 1.4 Construction Activities

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

**Table 1-4-1 Construction Activities**

Item	Description
<b><u>Construction Activities Undertaken during the Reporting Period</u></b>	
1	Demolition the existing subway
2	Excavation of the mined tunnel
3	Installation of strut and waling for C&C tunnel
4	Portal frame and steel rib installation for the mined tunnel
5	Erection framework for vertical blinding
<b><u>Construction Activities to be Undertaken in the Up-Coming Month</u></b>	
1	Demolition the existing subway
2	Excavation of the mined tunnel
3	Installation of strut and waling for C&C tunnel
4	Portal frame and steel rib installation for the mined tunnel
5	Construction of vertical blinding
6	Excavation of C&C 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 next month 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**

Equipment Type	Model	Serial Number	Calibration Orifice Number
High Volume Air Sampler	TE5170 MFC	0462	1785
Sibata Digital Dust Monitor	LD-3B	296098	Not Applicable

- 2.1.7 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*

- 2.1.8 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
- 2.1.9 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 bi-monthly 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 are shown in **Appendix I**.

## *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:
- A horizontal platform with appropriate support to secure the samplers against gusty wind will be provided;
  - No two samplers will be placed less than 2 m apart;
  - 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;
  - A minimum of 2 m of separation from walls, parapets and penthouses is required for rooftops samplers;
  - A minimum of 2 m of separation from any supporting structure, measured horizontally is required;
  - No furnace or incinerator flue or building vent is nearby;
  - Airflow around the sampler is unrestricted;
  - The sampler is more than 20 m from the drip line;
  - Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring;
  - Permission must be obtained to set up the samplers and to obtain access to the monitoring stations; and
  - 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 ±3 °C with relative humidity (hereinafter referred as 'the RH') less than 50% ± 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:

- a) Check power supply to ensure the HVAS works properly.
- b) Clean the filter holder and the area surrounding the filter.
- c) Remove the filter holder by loosening the four bolts and carefully align a new filter, with stamped number upward, on a supporting screen.
- d) Align the filter properly on the screen so that the gasket forms an airtight seal on the outer edges of the filter.
- e) 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.
- f) Close the shelter lid and secure with the aluminium strip.
- g) Warm-up the HVAS for about 5 minutes to establish run-temperature conditions.
- h) Set a new flow rate record sheet into the flow recorder.
- i) Check and adjust the flow rate of the HVAS at around 1.1 m<sup>3</sup> per minute. (The range specified in the EM&A Plan is between 0.6-1.7 m<sup>3</sup> per minute.)
- j) Set the programmable timer for a sampling period of 24 hours, and record the starting time, weather condition and the filter number.
- k) Record the initial elapsed time.
- l) 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.
- m) Place the sampled filter in a clean plastic envelope and seal.
- n) Record all monitoring information on a Field Data Sheet as shown in **Appendix J**.
- o) 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:

- a) Turn on the power.
- b) Close the air collecting opening cover.
- c) Set the "TIME SETTING" switch to [BG].
- d) Press "START/STOP" switch to perform background measurement.
- e) Turn the knob at SENSI ADJ position.
- f) Leave the equipment upon "SPAN CHECK" is indicated in the display.
- g) Press "START/STOP" switch to perform automatic sensitivity adjustment.
- h) Turn the knob at MEASURE position.
- i) Set time period of 1 hour for the 1-hour TSP measurement.
- j) Press "START/STOP" to start the 1-hour TSP measurement.
- k) Check the time period to ensure monitoring time of 1 hour.
- l) Record all monitoring information on a Field Data Sheet.

### **Maintenance and Calibration**

2.1.19

The procedures for maintenance and calibration of 1-Hr TSP follow Manufacturer's Instruction Manual as follows:

- a) The Sibata is checked at 3-month intervals and calibrated at 1-year intervals throughout the whole construction period.
- b) 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 at K11,  $\mu\text{g}/\text{m}^3$**

Parameter	Action Level	Limit Level
24-Hr TSP	For baseline level $\leq 200 \mu\text{g}/\text{m}^3$ , Action level = (130% of baseline level + Limit level)/2	260
1-Hr TSP	For baseline level $\leq 384 \mu\text{g}/\text{m}^3$ , Action level = (130% of baseline level + Limit level)/2 For baseline level $> 384 \mu\text{g}/\text{m}^3$ , 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 & 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:

- Decking over the excavation areas;
- 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 stockpiles 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 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 details of the calibration of the sound level meters and their respective calibrators are as shown in the following **Table 2-2-2**:

**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	CAL 200 (Serial no. 10929)

### 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. 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.

- 2.2.5 **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**

- 2.2.6 Procedures for noise monitoring summarised as follows:
- The microphones of the Sound Level Meter are about 1 m from the exterior of the building façade.
  - The battery condition is checked to ensure the correct functioning of the meter.
  - Parameters such as frequency weighting, the time weighting, the measurement time and monitoring frequency are set as follows:
    - Frequency weighting: A
    - Time weighting: Fast
    - Time measurement: 30 minutes intervals (between 0700-1900 on normal weekdays)
    - Monitoring frequency: one set of measurement on a weekly basis
  - 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.
  - During the monitoring period, the  $L_{eq}(30 \text{ min})$  are recorded.
  - Record all monitoring information on a Field Data Sheet as shown in **Appendix J**.
  - Maintenance and Calibration.

- h) 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**

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

**Action and Limit Levels**

- 2.2.8 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**

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

*Note: 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**

- 2.2.9 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**

- 2.2.10 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:

- a) 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;
- b) The statutory and non-statutory requirements and guidelines shall be complied with;
- c) 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;
- d) 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;
- e) Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical;
- f) Unused equipment shall be turned off;
- g) PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided;
- h) All plant and equipment shall be maintained regularly;
- i) Material stockpiles and other structures shall be effectively utilised as noise barriers, whenever practicable; and
- j) Enclosure of Entrance D1 with acoustic mat during demolition.

- 2.2.11 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 3-1-1**. Graphical plots of the parameter are illustrated in **Appendix K**.

**Table 3-1-1 Summary of 24-Hr TSP Monitoring Results,  $\mu\text{g}/\text{m}^3$**

Monitoring Date	24-Hr TSP	Action Level	Limit Level
03-Jan-16	42.4	222	260
09-Jan-16	67.2		
16-Jan-16	55.7		
23-Jan-16	76.6		
<b>Mean (Min – Max)</b>	<b>60.5 (42.4 – 76.6)</b>		

#### *Discussion*

3.1.3 **Table 3-1-1** 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'). Therefore, the associated NOE Investigation as well as remedial actions were not 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 3-2-1**. Graphical plots of the parameter are illustrated in **Appendix K**.

**Table 3-2-1 Summary of Construction Noise Monitoring Results at K11, dB(A)**

Monitoring Date	$L_{eq}$ (30 min)	A/L Levels
03-Jan-16	67.8	Limit Level: 75
10-Jan-16	68.1	
19-Jan-16	69.7	Action Level: <i>Any documented complaint against construction noise.</i>
24-Jan-16	69.4	
<b>Mean (Min – Max), <math>L_{eq}</math> (30 min)</b>	<b>68.8 (67.8 – 69.7)</b>	



### *Discussion*

- 3.2.3 No environmental complaint against construction noise was registered during the Reporting Period, whereas **Table 3-2-1** 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 1-4-1** 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 or 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 03, 10, 17 and 26 January 2017. A joint site inspection was conducted by IEC, MTRC, MC and ET on 17 January 2017.
- 4.1.4 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 4-1-1**:

**Table 4-1-1 Summary of Findings and Follow-Up Actions of the Site Inspection**

Date	Deficiencies or findings	Follow-Up Action
03-January-2017	<b>Follow-up item(s)</b>	
	No follow-up item.	Not required.
	<b>Observation(s) on the day of inspection</b>	
	No deficiency was observed on site.	Not required.
10-January-2017	<b>Follow-up item(s)</b>	
	No follow-up item.	Not required.
	<b>Observation(s) on the day of inspection</b>	
	No deficiency was observed on site.	Not required.
17-January-2017	<b>Follow-up item(s)</b>	
	No follow-up item.	Not required.
	<b>Observation(s) on the day of inspection</b>	
	No deficiency was observed on site.	Not required.
26-January-2017	<b>Follow-up item(s)</b>	
	No follow-up item.	Not required.
	<b>Observation(s) on the day of inspection</b>	
	No deficiency was observed on site.	Not required.

- 4.1.5 As shown in **Table 4-1-1**, 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 4-2-1** summarizes breaches of legal and contractual requirements.

**Table 4-2-1 Summary of Breaches of Legal and Contractual Requirements**

Month	No. of Breach(s)	Cumulative no. from March 2014 to the Reporting Period
January 2017	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 4-3-1** below:

**Table 4-3-1 Summary of Complaint**

Month	No. of Complaint(s)	Cumulative no. from March 2014 to the Reporting Period
January 2017	0	5

## 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 4-4-1** below:

**Table 4-4-1 Summary of Summon and Successful Prosecutions**

Month	No. of Breach(s)	Cumulative no. from March 2014 to the Reporting Period
January 2017	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 waste management i.e. Reduce, Reuse and Recycle, is 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. 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 to be generated from future key environmental issues as stated above, full implementation of the mitigation measures as stipulated in the Implementation Schedule 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 AND RECOMMENDATIONS

## 7.1 Conclusions

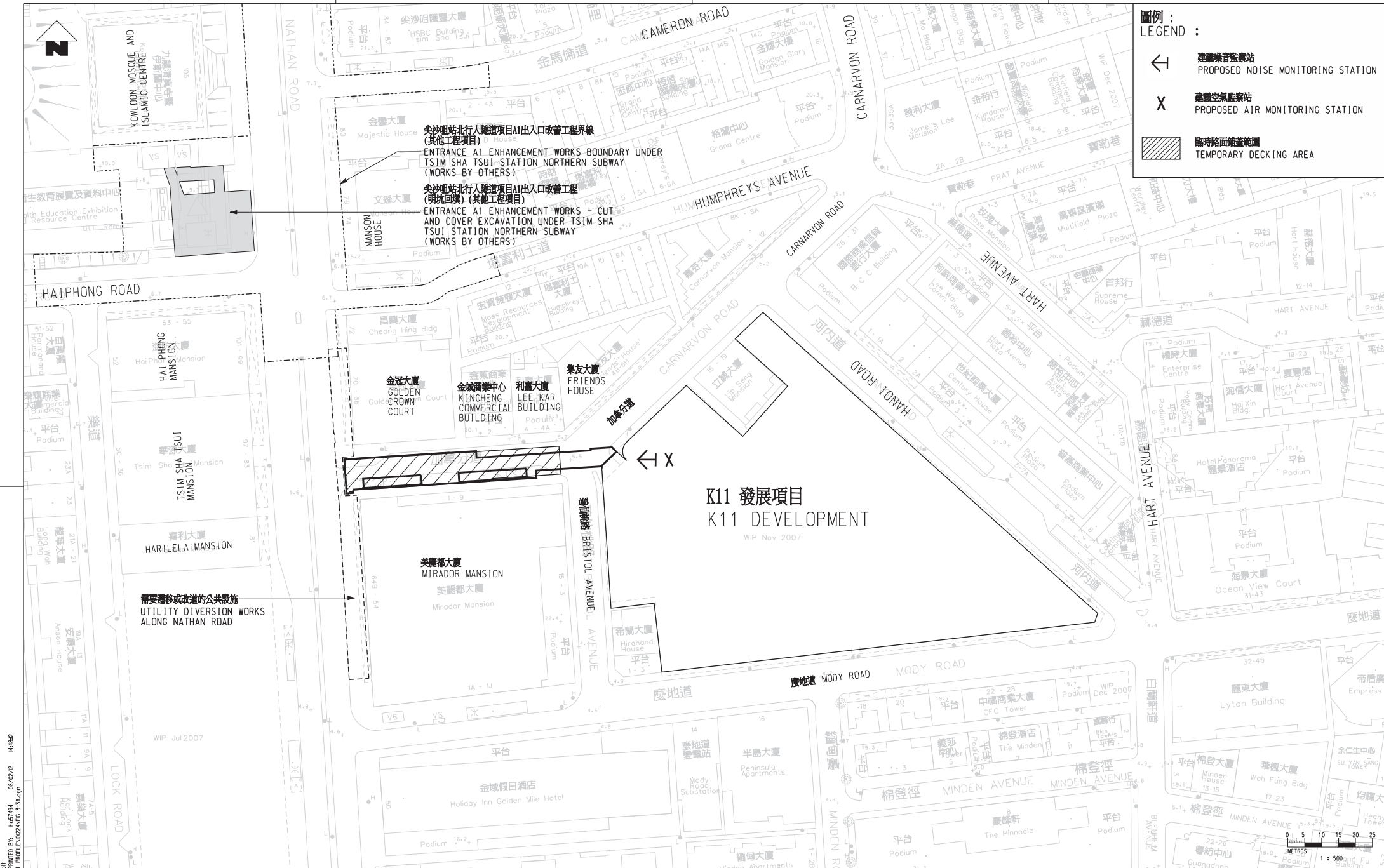
- 7.1.1 EM&A results during the Reporting Period showed that adverse environmental impacts generated from construction activities under the Project was alleviated to acceptable levels via implementation of the environmental mitigation measures recommended in the EM&A Plan and summarised in the Implementation Schedule.
- 7.1.2 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.
- 7.1.3 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.
- 7.1.4 In addition, no remedial actions were required as no notification of summons and successful prosecutions were reported during the Reporting Period.
- 7.1.5 Although inadequacies of proactive environmental mitigation measures were occasionally observed during the regular site inspection and audit, they were rectified in situ upon identification or notification or timely before the following site audit.

## 7.2 Recommendations

- 7.2.1 The existing environmental mitigation measures have been proven to be effective. They should be properly maintained.
- 7.2.2 Where appropriate, additional or improvement of the environmental mitigation measures should be implemented.
- 7.2.3 Particular attention should be paid to construction noise mitigation measures 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.
- 7.2.4 In addition, suppression of construction dust is reminded during dusty construction activities under dry and windy conditions.
- 7.2.5 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.



**APPENDIX A**  
**SITE LOCATION PLAN**



**圖例 :**  
**LEGEND :**

- 建議噪音監察站  
PROPOSED NOISE MONITORING STATION
- 建議空氣監察站  
PROPOSED AIR MONITORING STATION
- 臨時路面鋪蓋範圍  
TEMPORARY DECKING AREA

尖沙咀站北行人隧道項目A1出入口改善工程界線  
(其他工程項目)  
ENTRANCE A1 ENHANCEMENT WORKS BOUNDARY UNDER  
TSM SHA TSUI STATION NORTHERN SUBWAY  
(WORKS BY OTHERS)

尖沙咀站北行人隧道項目A1出入口改善工程  
(明坑回城) (其他工程項目)  
ENTRANCE A1 ENHANCEMENT WORKS - CUT  
AND COVER EXCAVATION UNDER TSM SHA  
TSUI STATION NORTHERN SUBWAY  
(WORKS BY OTHERS)

需要遷移或改道的公共設施  
UTILITY DIVERSION WORKS  
ALONG NATHAN ROAD

**K11 發展項目**  
**K11 DEVELOPMENT**  
WIP Nov 2007

G:\MTR\_A3.BW.COL.dwg 08/02/07 44682  
 PLOT BY: 繪圖日期: 08/02/07  
 FILENAME: A320288-KV-PROJECT\_PROFILE-022-AUSG-3-M.dgn

REV	DESCRIPTION	BY	DATE	APPROVED	REV	DESCRIPTION	BY	DATE	APPROVED
A	PROJECT PROFILE				HO				

DRAWN	HO
DESIGNED	--
CHECKED	--
APPROVED	--
DATE	--

**MTR**

**TST STATION CARNARVON ROAD SUBWAY**

ORIGINATOR

**Mott MacDonald**

30/F The Landmark 100 Hong Kong Street  
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Tel: +852 2512 8122  
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www.mottmacdonald.com

In association with  
Hatcho Architect Ltd  
8/F 80 Wing Lok Street  
Kowloon, Hong Kong

TITLE

**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**

SCALE: 1:500 (A1)

DRAWING NO. **APPENDIX B**

REV. **A**



**APPENDIX B**  
**MANAGEMENT STRUCTURE**

# Project Organization Chart in Environmental Management (Rev.04)

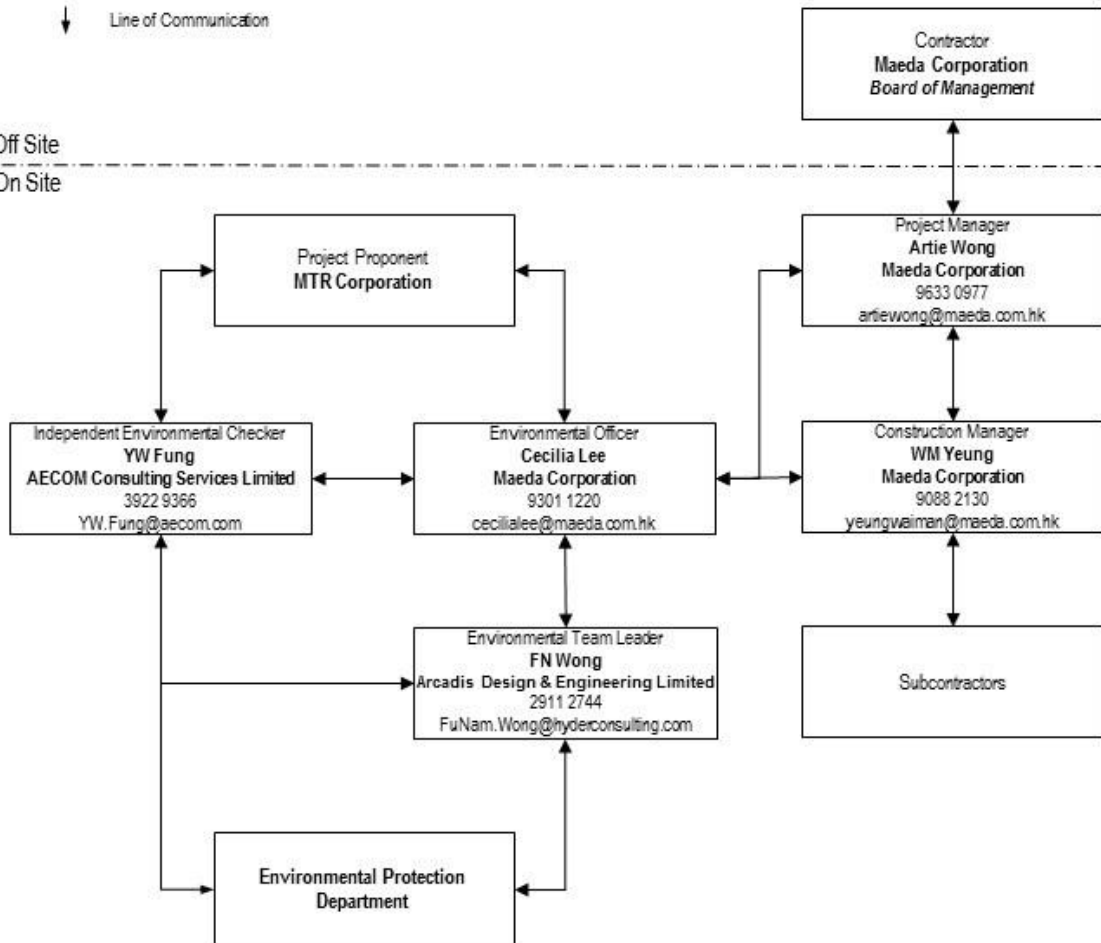
Effective Date: 1 Nov 2016

Legend :

↓ Line of Communication

Off Site

On Site



Note: In compliance with

i) Clause 1.3 of Environmental Monitoring and Audit Manual (Appendix VII of Project Profile PP462/2012)

**APPENDIX C**

**CONSTRUCTION PROGRAMME**





















**APPENDIX D**

**IMPLEMENTATION SCHEDULE**

## Appendix VIII

### 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"> <li>• movable barrier can achieve a 5 dB(A) reduction for movable PME and 10 dB(A) reduction for stationary PME;</li> <li>• noise enclosure can achieve 15dB(A) reduction for PME;</li> <li>• 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;</li> <li>• Barrier material of surface mass in excess of 7kg/m<sup>2</sup> shall be required to achieve the maximum screening effect (and minimum 10kg/m<sup>2</sup> for noise enclosure);</li> <li>• 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.</li> </ul>	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"> <li>• The Code of Practice on Good Management Practice</li> </ul>	To minimize construction noise	Contractor	Work site	Construction Stage	ProPECC PN2/93 and Noise Control

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
	<p>to Prevent Violation of the Noise Control Ordinance (Chapter 400) (for Construction Industry) published by EPD shall be adopted;</p> <ul style="list-style-type: none"> <li>• The statutory and non-statutory requirements and guidelines shall be complied with;</li> <li>• 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;</li> <li>• 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;</li> <li>• Noisy equipment and noisy activities shall be located as far away from the NSRs as is practical;</li> <li>• Unused equipment shall be turned off;</li> <li>• PME should be kept to a minimum and the parallel use of noisy equipment / machinery should be avoided;</li> <li>• All plant and equipment shall be maintained regularly; and</li> <li>• Material stockpiles and other structures shall be effectively utilized as noise barriers, whenever practicable.</li> </ul>	emissions				Ordinance
	Air Quality Impact					
S.3.2	<p>Construction Dust Control Measures</p> <ul style="list-style-type: none"> <li>• Decking will be provided subsequent to the completion of surface excavation works. The duration</li> </ul>	To minimise the dust impacts arising from the	Contractor	Work site	Construction Stage	Air Pollution Control (Construction

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
	<p>of decking is around 13 months after surface excavation works;</p> <ul style="list-style-type: none"> <li>• Regular watering to reduce dust emissions from all exposed site surface, particularly during dry weather;</li> <li>• Frequent watering for particularly dusty construction areas and areas close to air sensitive receivers;</li> <li>• Cover all excavated or stockpile of dusty material by impervious sheeting or spraying with water to maintain the entire surface wet;</li> <li>• Provision of vehicle washing facilities at the exit points of the site; and</li> <li>• Provision of tarpaulin covering of any dusty materials on a vehicle leaving the site.</li> </ul>	construction works				Dust) Regulation
	Water Quality Impact					
S.3.3	<p>Construction Water Quality Impact Measures</p> <ul style="list-style-type: none"> <li>• 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.</li> <li>• 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.</li> </ul>	To reduce water quality impact induced by the construction work	Contractor	Work Site	Construction Stage	ProPECC PN1/94; Water Pollution Control Ordinance



Project Profile Ref.	Recommended Mitigation Measures	Objectives of the Recommended Measures & Main Concerns to address	Implementation Parties	Location of the measure	When to implement the measure	Relevant requirements or standards for the measure to achieve
	<ul style="list-style-type: none"> <li>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.</li> <li>Site toilet facilities, if needed, should be chemical toilets or should have the foul water effluent directed to a foul sewer.</li> </ul>					
	Waste Management					
S.3.4	<p>Construction Waste Management Measures</p> <ul style="list-style-type: none"> <li>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.</li> <li>Waste arising should be kept to a minimum and be handled, transported and disposed of in a suitable manner.</li> <li>The Contractor should adopt a trip ticket system for the disposal of C&amp;D materials to any designated public filling facility and/or landfill. Independent audits of the Contractor and resident site staff will be undertaken to ensure that the correct procedures are being followed.</li> <li>Chemical waste shall be handled in accordance with the Code of Practice on the Packaging, Handling and Storage of Chemical Wastes.</li> <li>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</li> </ul>	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.

<b>Project Profile Ref.</b>	<b>Recommended Mitigation Measures</b>	<b>Objectives of the Recommended Measures &amp; Main Concerns to address</b>	<b>Implementation Parties</b>	<b>Location of the measure</b>	<b>When to implement the measure</b>	<b>Relevant requirements or standards for the measure to achieve</b>
	recycling of materials and their proper disposal.					
	<b>Landscape and Visual Impact</b>					
S.3.5	<b>Landscape and Visual Measures</b> <ul style="list-style-type: none"> <li>• Screening of construction works by hoardings/noise barriers around works area with visually unobtrusive colours</li> </ul>	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"> <li>• Reinstating the affected amenity planting area at Salisbury Road after the completion of works</li> </ul>	To prevent loss of planter after construction	Contractor	Temporary Storage Area at Salisbury Road	Operation Stage	ETWB TCW No. 2/2004

**APPENDIX E**

**STATUS OF ENVIRONMENTAL LICENSES AND PERMITS**



# Maeda Corporation

Contract No. C3840-13C

Tsim Sha Tsui Station Carnarvon Road Subway

Last Update: 16-August-2016

## 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	APCO #002	APCO	Notification	Construction Dust Notification	Form NB – Notification S3(3) of APCO (Construction Dust)	403252	27 - 05 - 2016	02 - 06 - 2016	01 - 02 - 2014	31 - 10 - 2017	Demolition of a Building	Change of anticipated date of completed is notified
001	APCO #002	APCO	Notification	Construction Dust Notification	Form NB – Notification S3(3) of APCO (Construction Dust)	403252	27 - 05 - 2016	02 - 06 - 2016	01 - 08 - 2014	31 - 08 - 2018	Work carried out in any part of a tunnel that is within 100m of any exit to the open air	Change of anticipated date of completed is notified
001	APCO #002	APCO	Notification	Construction Dust Notification	Form NB – Notification S3(3) of APCO (Construction Dust)	403252	27 - 05 - 2016	02 - 06 - 2016	01 - 01 - 2016	31 - 08 - 2018	Construction of the Superstructure of a Building	Change of anticipated date of completed is notified
001	APCO #002	APCO	Notification	Construction Dust Notification	Form NB – Notification S3(3) of APCO (Construction Dust)	403252	27 - 05 - 2016	02 - 06 - 2016	01 - 11 - 2016	28 - 02 - 2019	Road Construction Work	Change of anticipated date of completed is notified
002	APCO #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	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	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	CNP#006	NCO	Permit	Construction Noise Permit	EPD74A(s) Form 1 - Application for a Construction Noise Permit	Application: 405344 Permit: GW-RE0804-16	22 - 07 - 2016	04 - 08 - 2016	15 - 08 - 2016	14 - 02 - 2017	Apply for 4nos Submersible Water pump (Electric) w/ whole site area	

**APPENDIX F**

**EVENT AND ACTION PLAN**

# Event and Action Plan for Air Quality

In case the Action and Limit Levels are not complied during construction stage, the Event and Action Plan shown below should be followed.

Event / Action	ET	IEC	ER	Contractor
<b>Action Level</b>				
Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. If valid, inform IEC and ER;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase monitoring frequency to daily.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method.</li> </ol>	<ol style="list-style-type: none"> <li>1. Notify Contractor</li> </ol>	<ol style="list-style-type: none"> <li>1. Rectify any unacceptable practice;</li> <li>2. Amend working methods if appropriate</li> </ol>
Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IEC and EPD;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency to daily;</li> <li>5. Discuss with IEC and Contractor on remedial action required;</li> <li>6. If exceedance continues, arrange meeting with IEC and ER;</li> <li>7. If exceedance stops, cease additional monitoring.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring data submitted by ET;</li> <li>2. Check Contractor's working method;</li> <li>3. Discuss with ET and Contractor on possible remedial measures;</li> <li>4. Advise the ER on the effectiveness of the proposed remedial measures;</li> <li>5. Supervise implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial measure properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit proposals for remedial action to IEC within 3 working days of notification;</li> <li>2. Implement the agreed proposals;</li> <li>3. Amend proposal if appropriate.</li> </ol>
<b>Limit Level</b>				
Exceedance for one sample	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform ER and EPD;</li> <li>3. Repeat measurement to confirm finding;</li> <li>4. Increase</li> </ol>	<ol style="list-style-type: none"> <li>1. Check monitoring</li> <li>2. data submitted by ET;</li> <li>3. Check Contractor's working</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Ensure remedial</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IEC</li> </ol>

Event / Action	ET	IEC	ER	Contractor
	<p>monitoring frequency to daily;</p> <p>5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results.</p>	<p>method;</p> <p>4. Discuss with ET and the Contractor on possible remedial measures;</p> <p>5. Advise the ER on the effectiveness of the proposed remedial measures;</p> <p>6. Supervise implementation of remedial measures.</p>	<p>measures properly implemented.</p>	<p>within 3 working days of notification;</p> <p>3. Implement the agreed proposals;</p> <p>4. Amend proposal if appropriate.</p>
Exceedance for two or more consecutive samples	<p>1. Notify IEC, ER, Contractor and EPD;</p> <p>2. Identify sources;</p> <p>3. Repeat measurement to confirm findings;</p> <p>4. Increase monitoring frequency to daily;</p> <p>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</p> <p>6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken;</p> <p>7. Assess the effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the</p>	<p>1. Discuss amongst ER, ET and Contractor on the potential remedial actions;</p> <p>2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ET accordingly.</p> <p>3. Supervise the implementation of remedial measures.</p>	<p>1. Confirm receipt of notification of failure in writing;</p> <p>2. Notify Contractor;</p> <p>3. In consultation with IEC, agree with the Contractor on the remedial measures to be implemented;</p> <p>4. Ensure remedial measures properly implemented;</p> <p>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated.</p>	<p>1. Take immediate action to avoid further exceedance;</p> <p>2. Submit proposals for remedial actions to IEC within 3 working days of notification;</p> <p>3. Implement the agreed proposals;</p> <p>4. Resubmit proposals if problem still not under control;</p> <p>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated.</p>

Event / Action	ET	IEC	ER	Contractor
	results; 8. If exceedance stops, cease additional monitoring.			



# Event and Action Plan for Construction Noise

In case the Action and Limit Levels are not complied during the construction stage, the Event and Action Plan shown below should be followed.

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

Event / Action	ET	IEC	ER	Contractor
	remedial actions and keep IEC, EPD, ER informed of the results 8. If exceedance stops, cease additional monitoring			

**APPENDIX G**

**MONITORING SCHEDULE**

**C3840-13C MTRCL Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works  
Environmental Monitoring & Audit Schedule**

**January 2017**

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

This schedule may be subject to change due to unexpected circumstances (e.g. adverse weather)

**C3840-13C MTRCL Tsim Sha Tsui Station Carnarvon Road Subway and Entrances Modification Works  
Environmental Monitoring & Audit Schedule**

**February 2017**

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

This schedule may be subject to change due to unexpected circumstances (e.g. adverse weather)

**APPENDIX H**

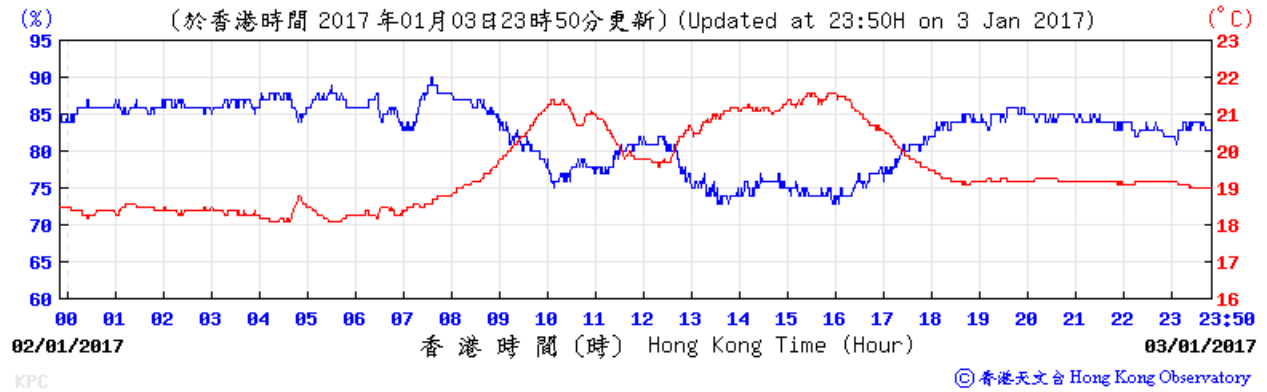
**WEATHER INFORMATION EXTRACTED FROM HK OBSERVATORY**

**Daily Total Rainfall at King's Park HKO Weather Monitoring Station - January 2017**

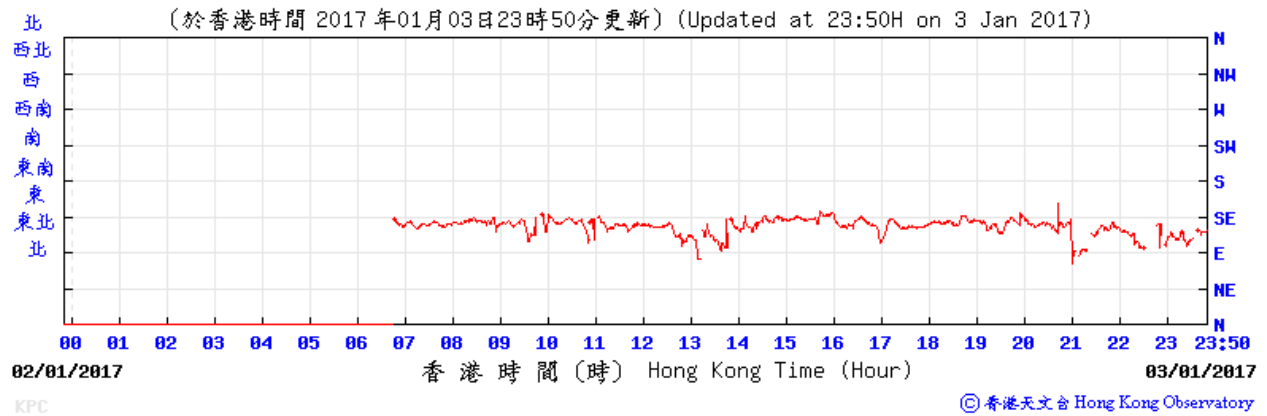
Day	Total Rainfall, mm	24-hr TSP	Noise	Remarks
1	0.0			
2	0.0			
3	0.0	✓	✓	<b>It was sunny without rainfall on site during noise monitoring.</b>
4	0.0			
5	0.0			
6	0.0			
7	0.0			
8	0.0			
9	0.0	✓		
10	0.0		✓	<b>It was sunny without rainfall on site during noise monitoring.</b>
11	0.0			
12	Trace			
13	0.5			
14	1.0			
15	1.5			
16	0.4	✓		
17	0.0			
18	Trace			
19	0.0		✓	<b>It was sunny without rainfall on site during noise monitoring.</b>
20	Trace			
21	0.0			
22	0.0			
23	0.0	✓		
24	0.0		✓	<b>It was sunny without rainfall on site during noise monitoring.</b>
25	0.0			
26	0.0			
27	0.0			
28	0.3			
29	2.4			
30	1.2			
31	0.5			
Mean/Total	7.8			

# King's Park Weather Station – 03 January 2017

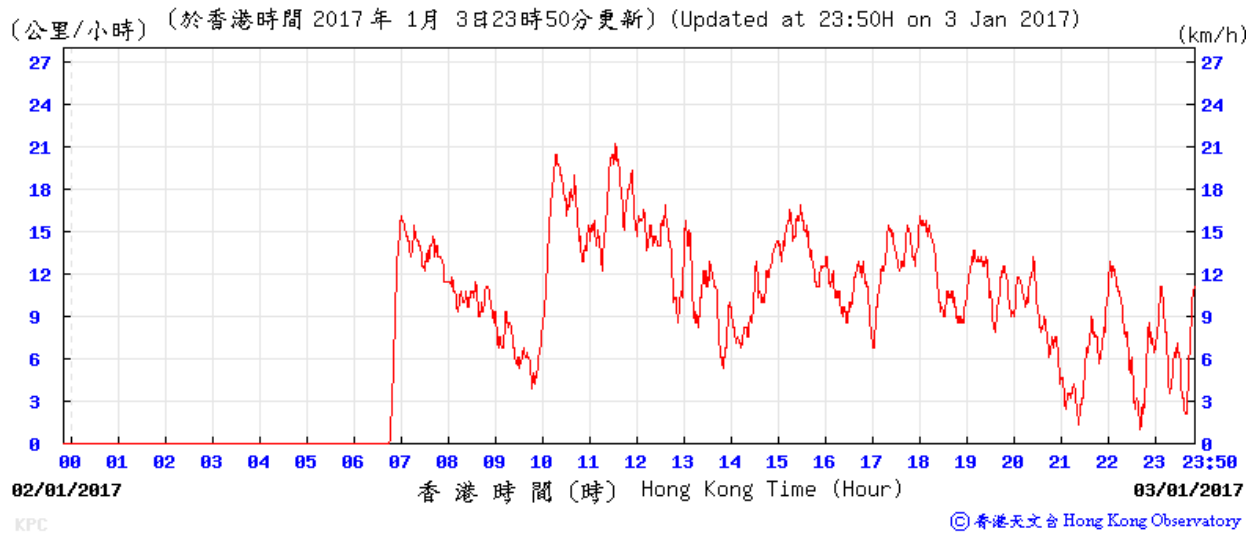
## Temperature/Humidity:



## Wind Direction:



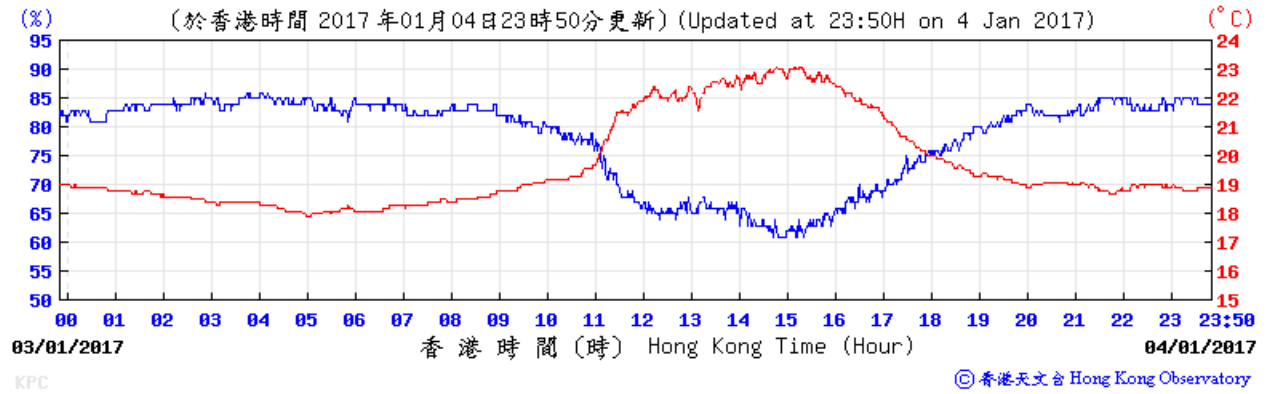
## Wind Speed:



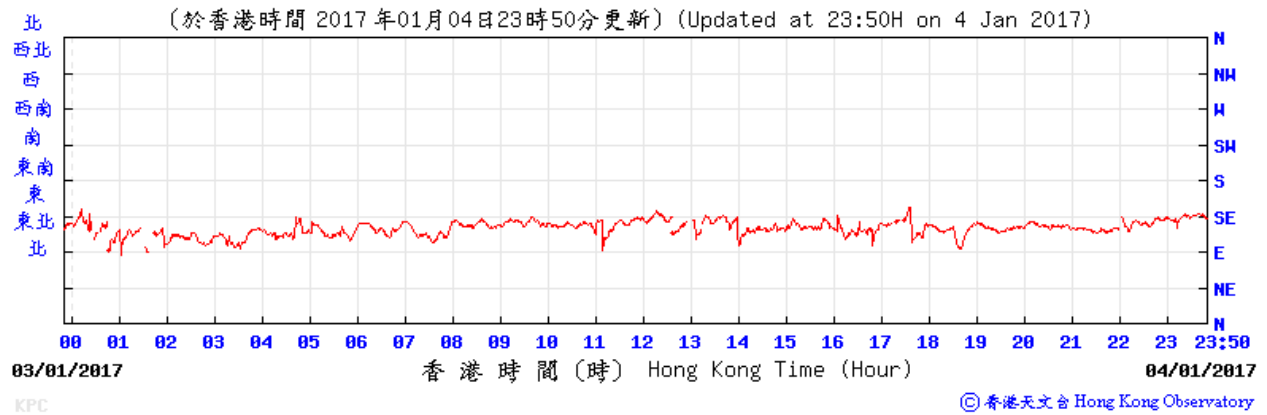


# King's Park Weather Station – 04 January 2017

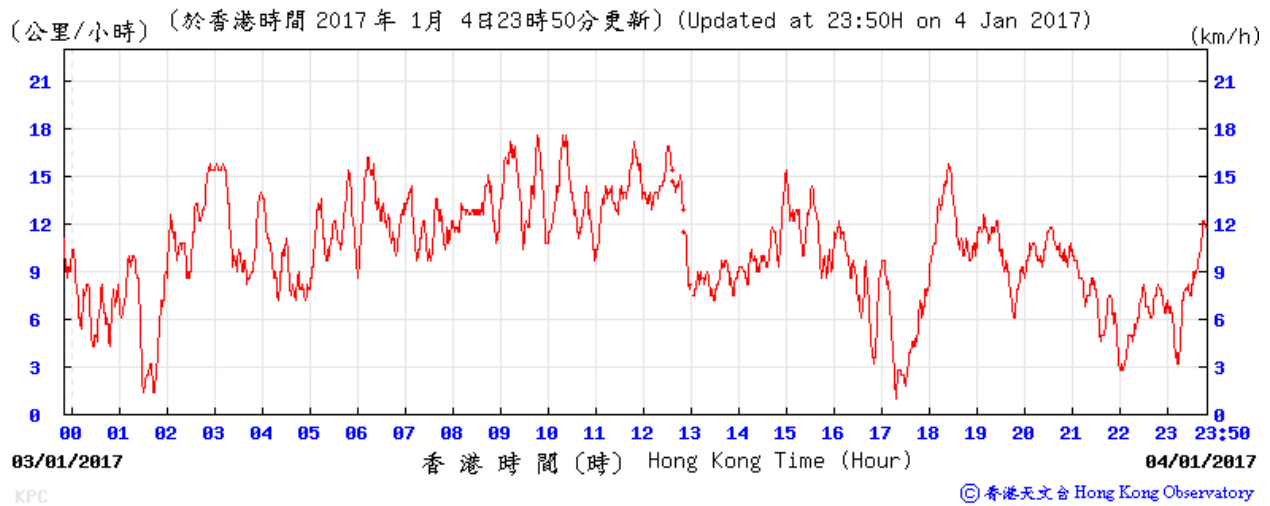
## Temperature/Humidity:



## Wind Direction:

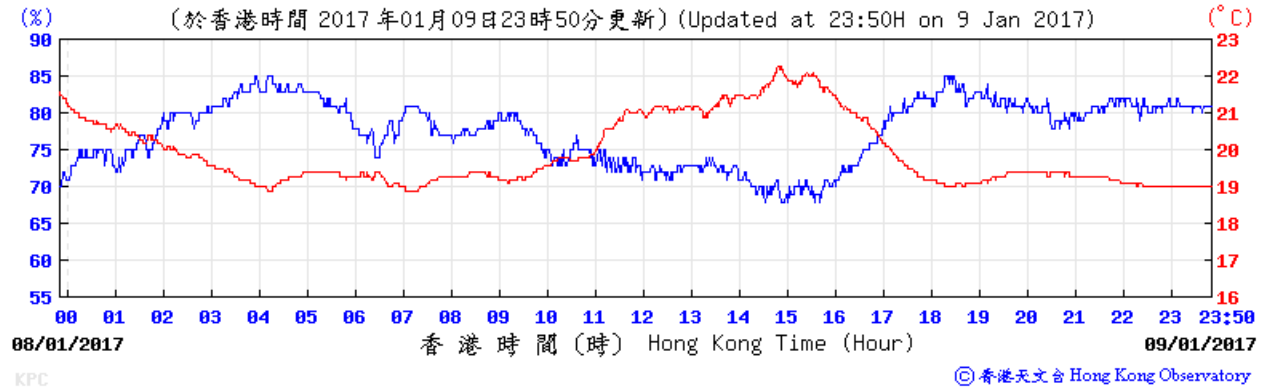


## Wind Speed:

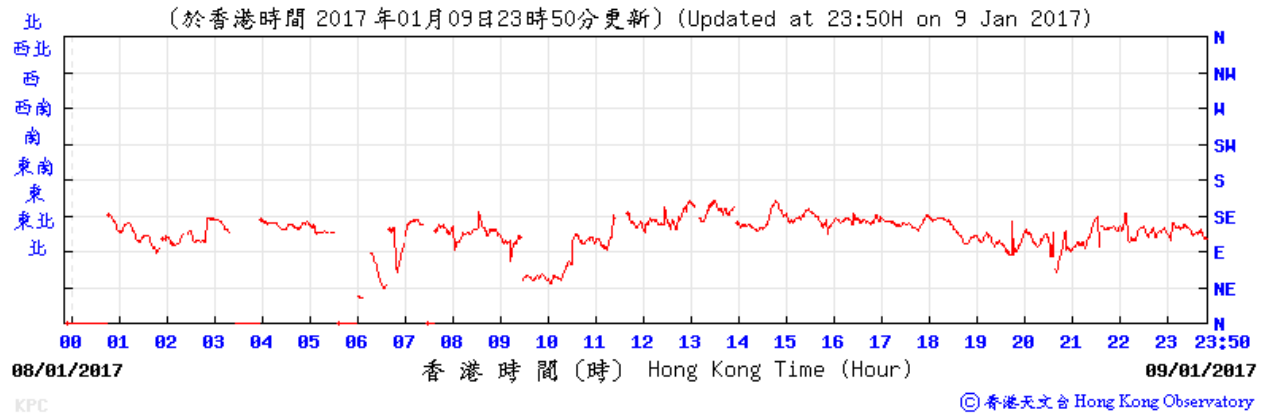


# King's Park Weather Station – 09 January 2017

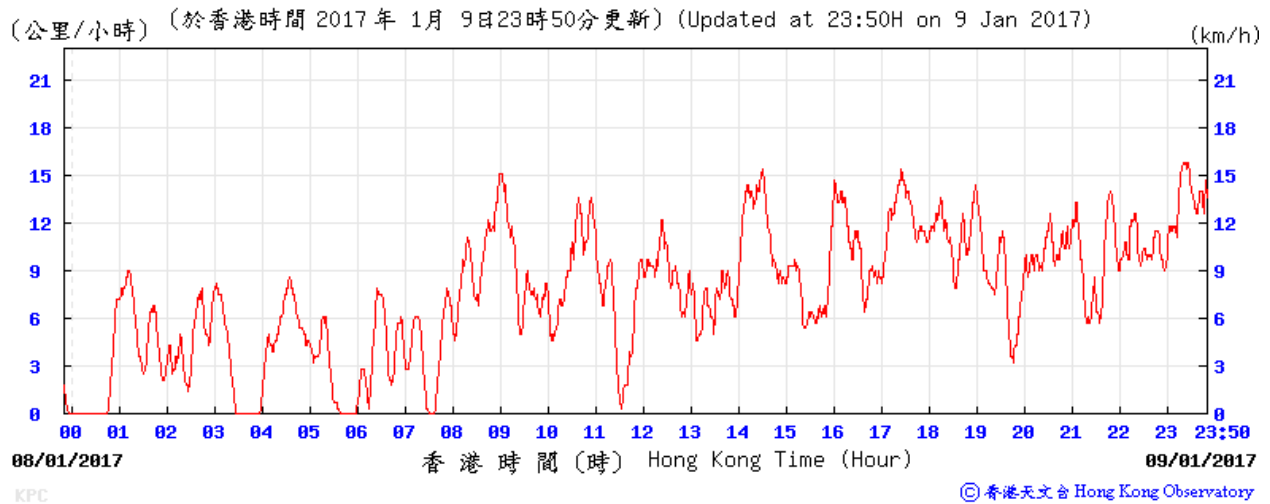
Temperature/Humidity:



Wind Direction:

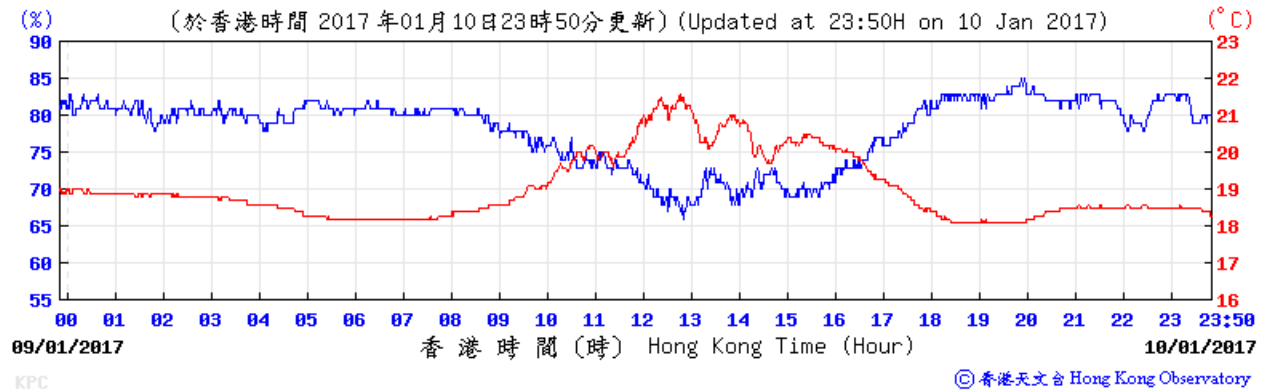


Wind Speed:

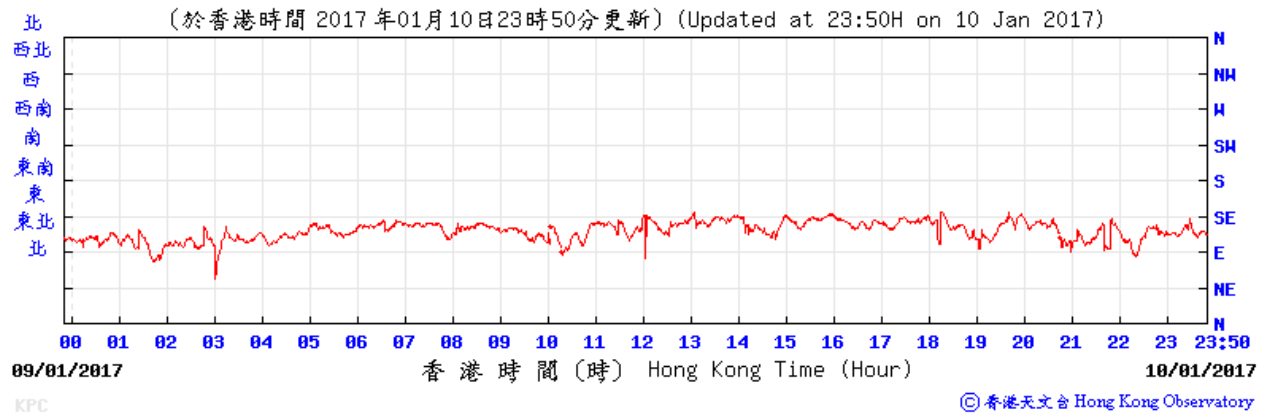


# King's Park Weather Station – 10 January 2017

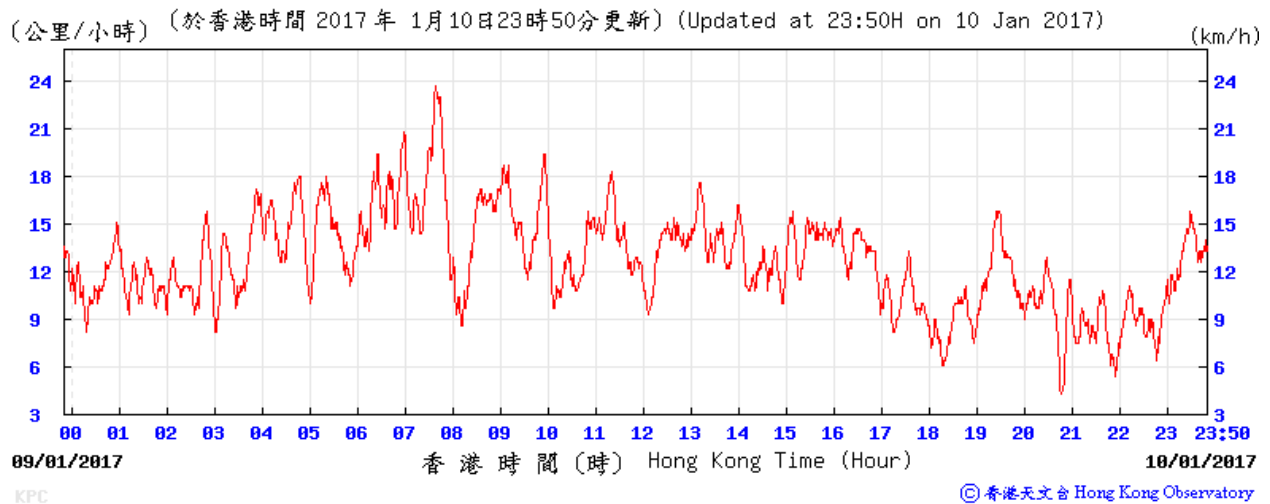
## Temperature/Humidity:



## Wind Direction:

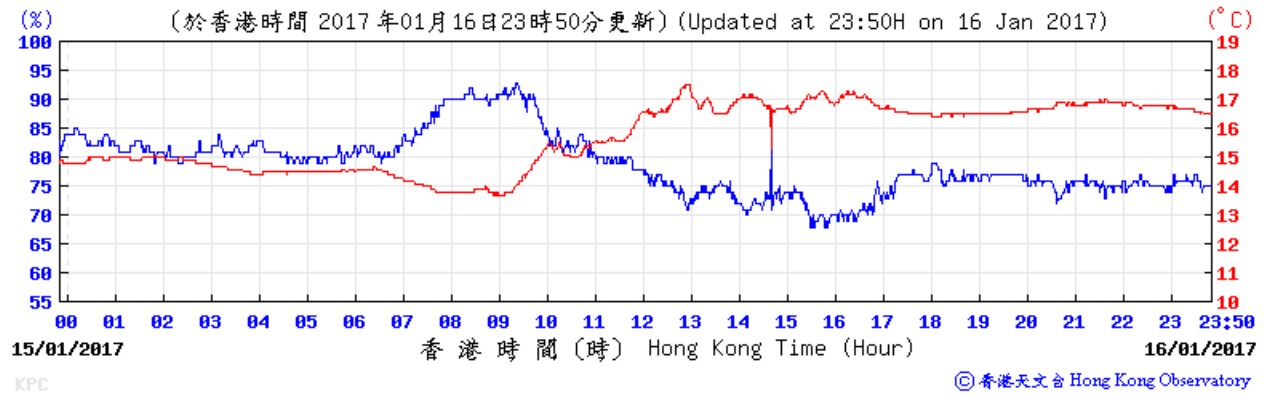


## Wind Speed:

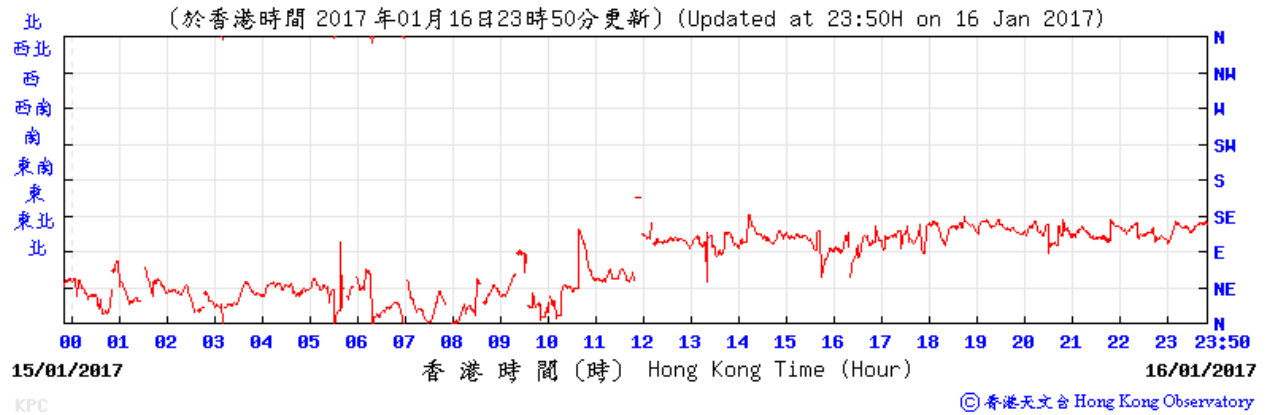


# King's Park Weather Station – 16 January 2017

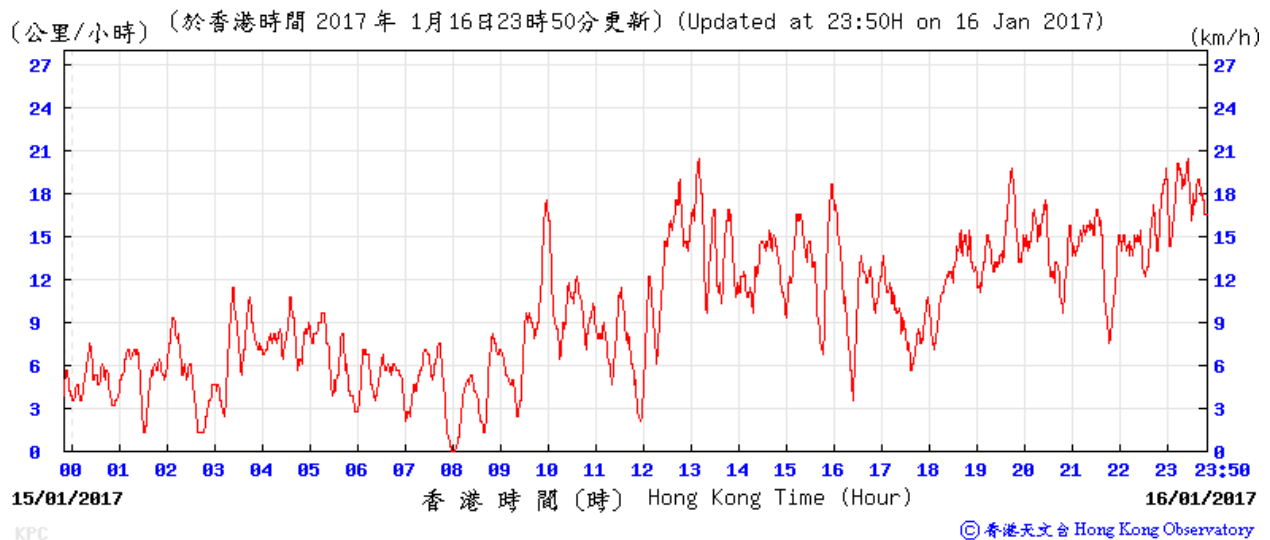
## Temperature/Humidity:



## Wind Direction:

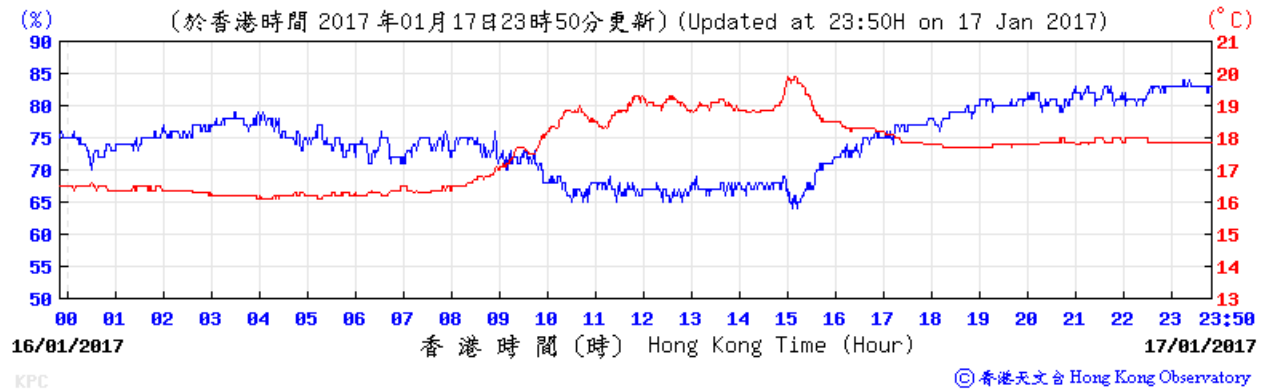


## Wind Speed:

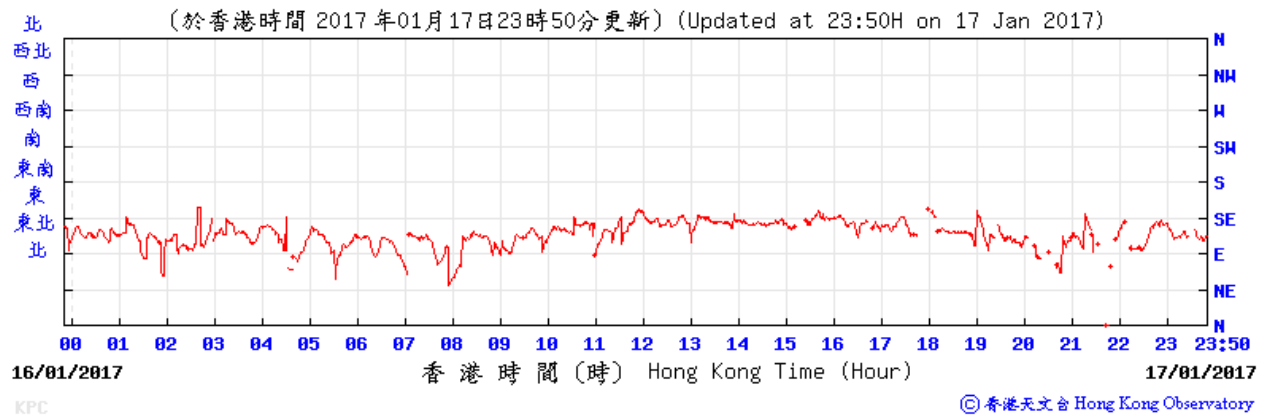


# King's Park Weather Station – 17 January 2017

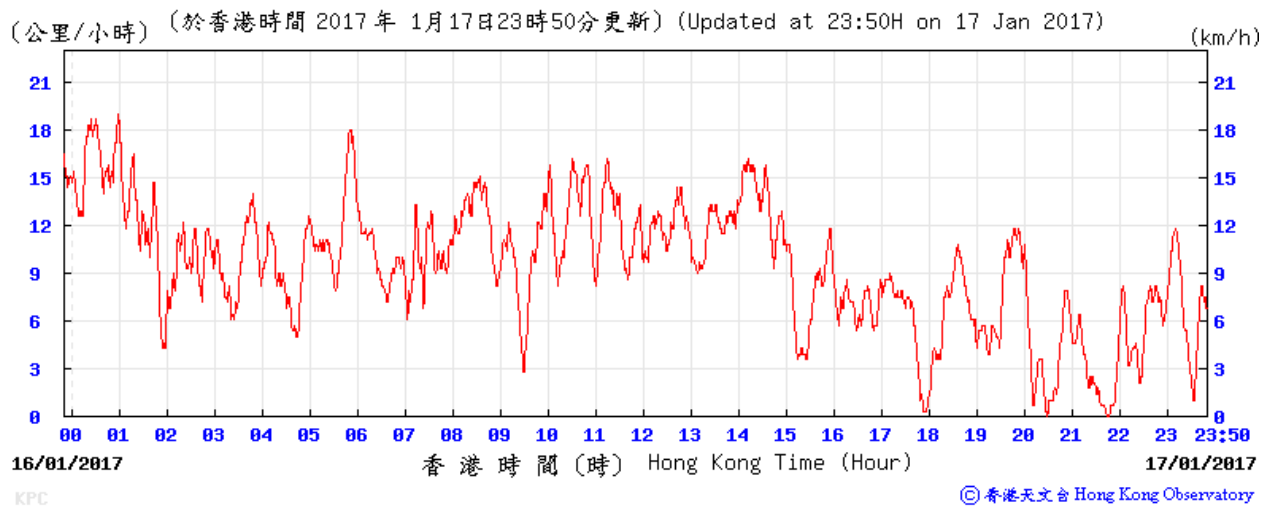
## Temperature/Humidity:



## Wind Direction:

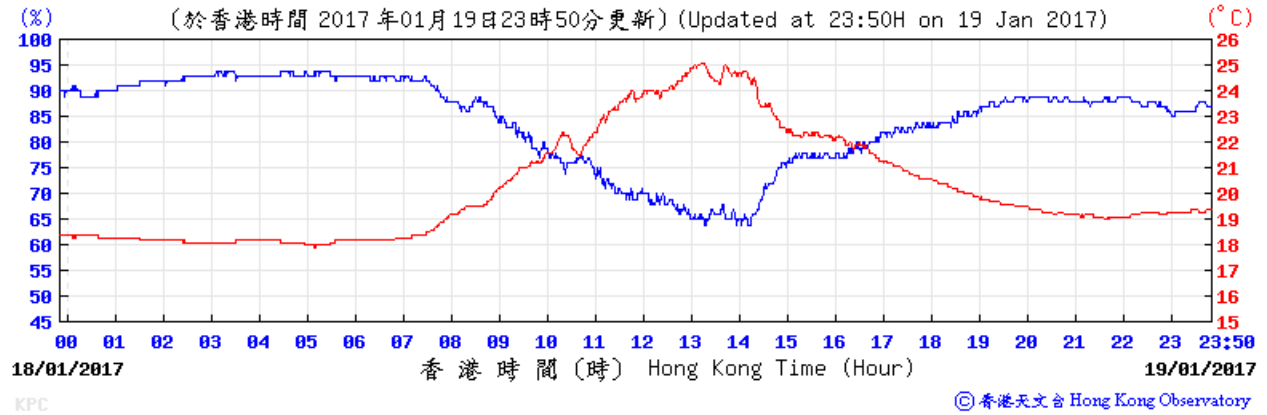


## Wind Speed:

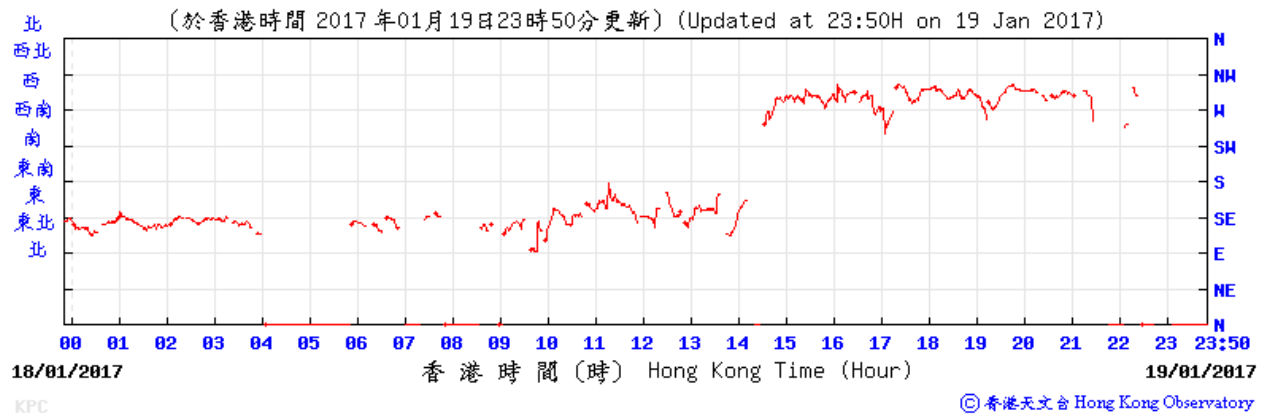


# King's Park Weather Station – 19 January 2017

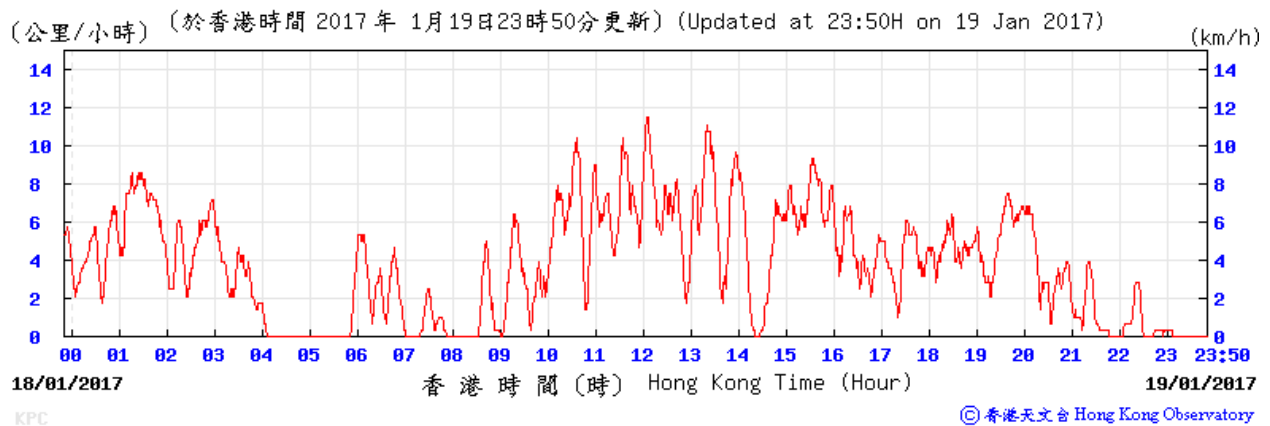
## Temperature/Humidity:



## Wind Direction:

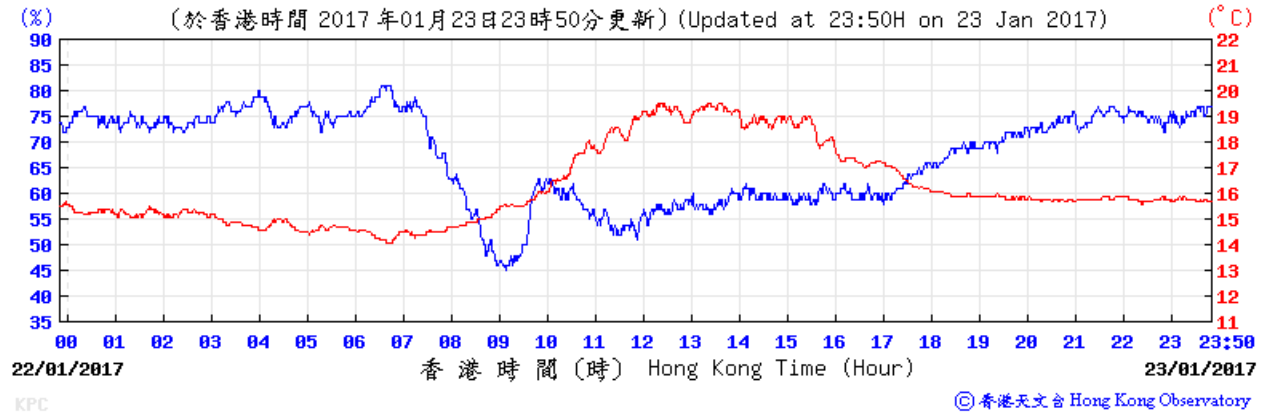


## Wind Speed:

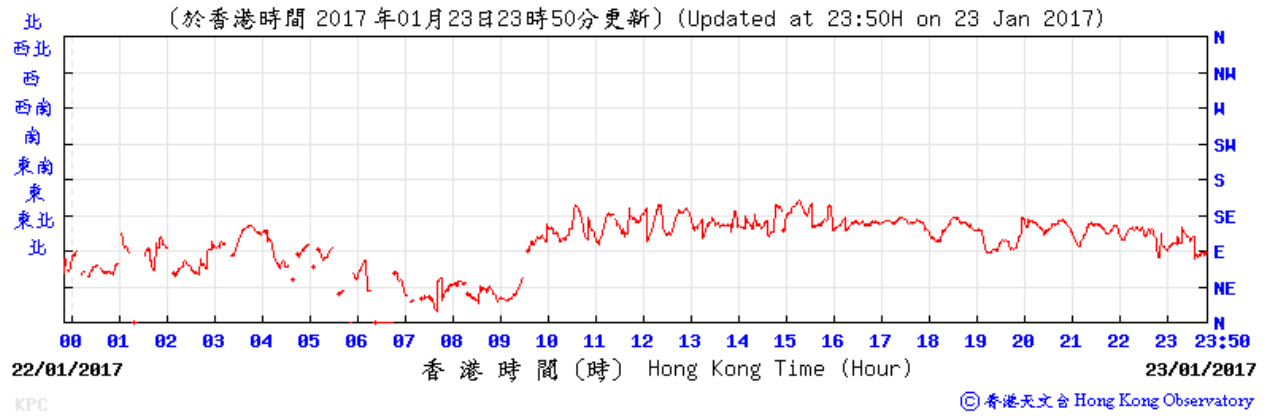


# King's Park Weather Station – 23 January 2017

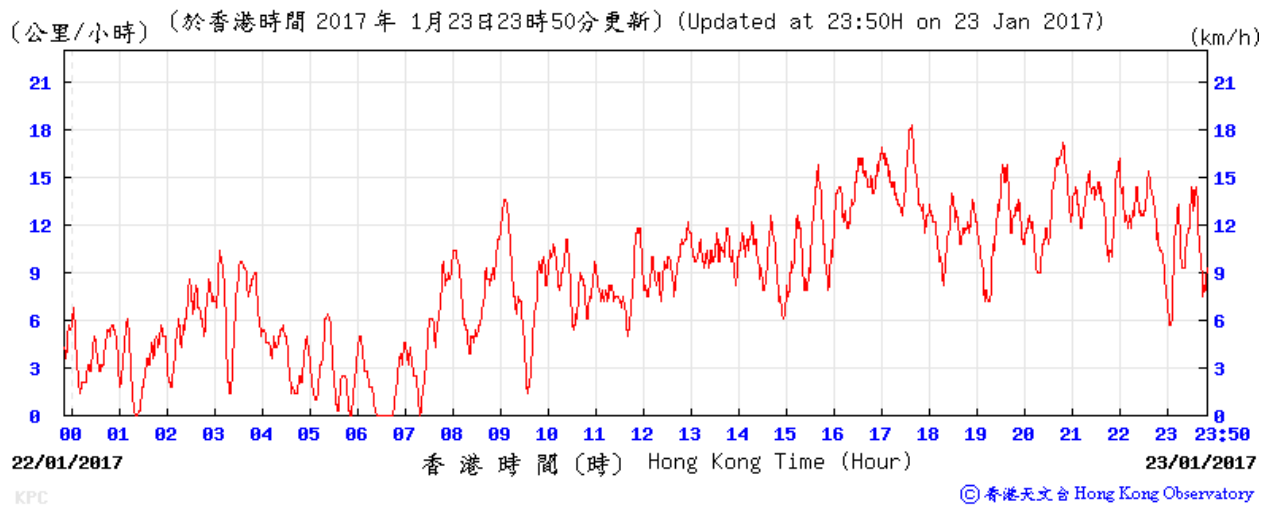
## Temperature/Humidity:



## Wind Direction:

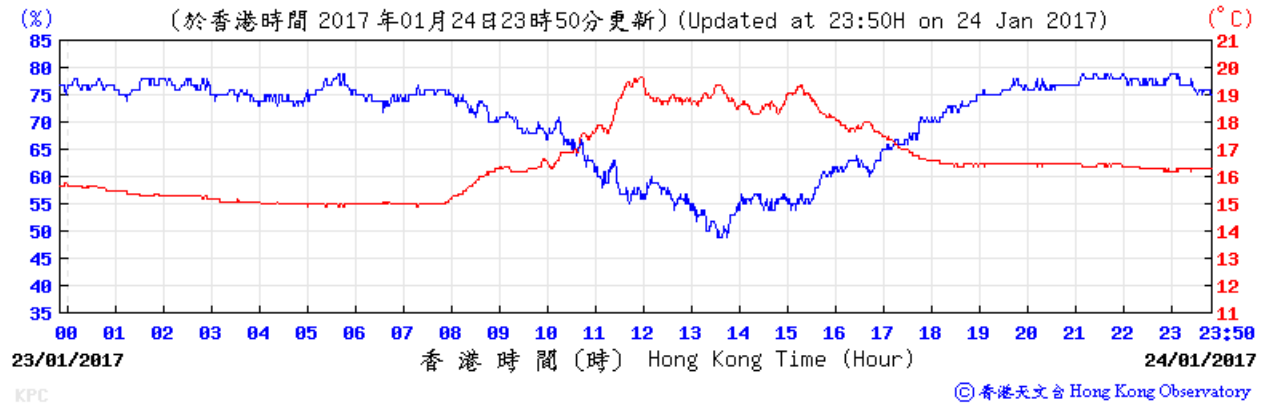


## Wind Speed:

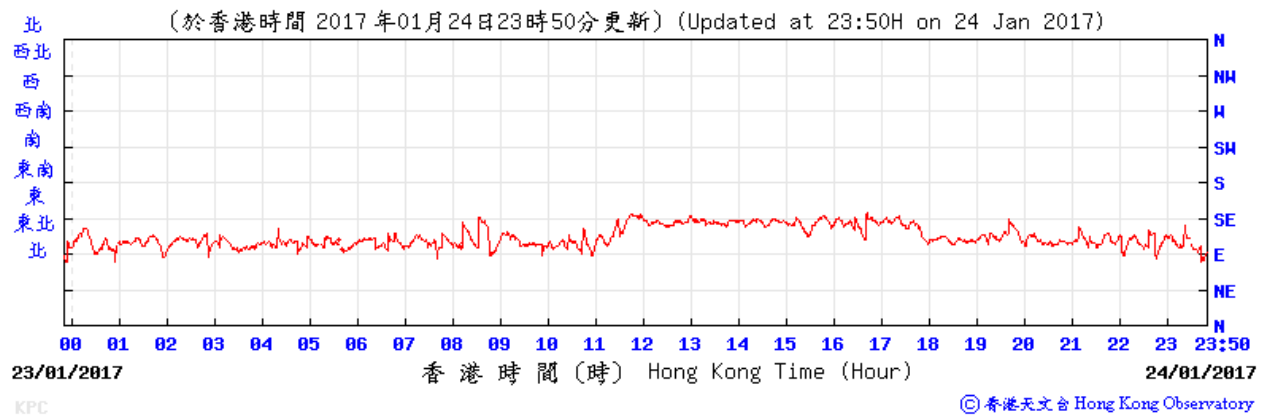


# King's Park Weather Station – 24 January 2017

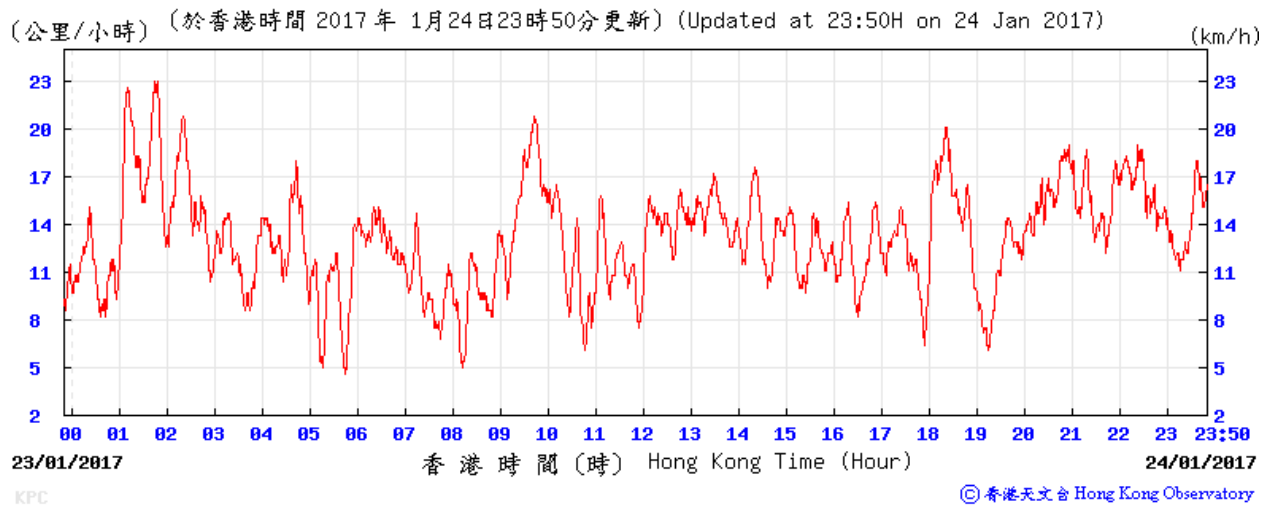
Temperature/Humidity:



Wind Direction:



Wind Speed:





**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 02, 2016 Rootsmeter S/N 0438320 Ta (K) - 295  
 Operator Tisch Orifice I.D. - 1785 Pa (mm) - 751.84

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER DIFF Hg (mm)	ORFICE DIFF H2O (in.)
1	NA	NA	1.00	1.3850	3.2	2.00
2	NA	NA	1.00	0.9830	6.4	4.00
3	NA	NA	1.00	0.8760	7.9	5.00
4	NA	NA	1.00	0.8320	8.8	5.50
5	NA	NA	1.00	0.6910	12.7	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
0.9951	0.7184	1.4137	0.9957	0.7189	0.8859
0.9908	1.0080	1.9993	0.9915	1.0087	1.2528
0.9887	1.1287	2.2353	0.9894	1.1295	1.4007
0.9876	1.1870	2.3444	0.9883	1.1878	1.4690
0.9824	1.4217	2.8275	0.9831	1.4227	1.7717
Qstd slope (m) = 2.00462			Qa slope (m) = 1.25526		
intercept (b) = -0.02664			intercept (b) = -0.01669		
coefficient (r) = 0.99989			coefficient (r) = 0.99989		
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:

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

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

Location :	4/F Roof top, K11 Commercial Complex
Sampler and Serial No.	TE-5170 MFC (0462)
Calibration Date :	12-Dec-16
Tech :	Sun

Operator :	Tisch
Model :	TE-5025A
Calibrator Orifice no.:	1785
Slope (m):	2.00462
Intercept (b):	-0.02664
Date Certified :	2-May-16

Standard Pressure (Pstd)	298.00 K
Standard Temperature (Tstd)	297.00 K
Ambient Pressure (Pa)	760.00 mmHg
Ambient Temperature (Ta)	761.30 mmHg

Sample no.	H <sub>2</sub> O (in)	Qstd (m <sup>3</sup> /min)	I (Flow Chat)	IC (corrected)
1	12.0	1.746	54.0	54.23
2	9.4	1.547	49.0	49.21
3	7.5	1.383	41.0	41.17
4	4.6	1.086	30.0	30.13
5	2.9	0.865	21.0	21.09

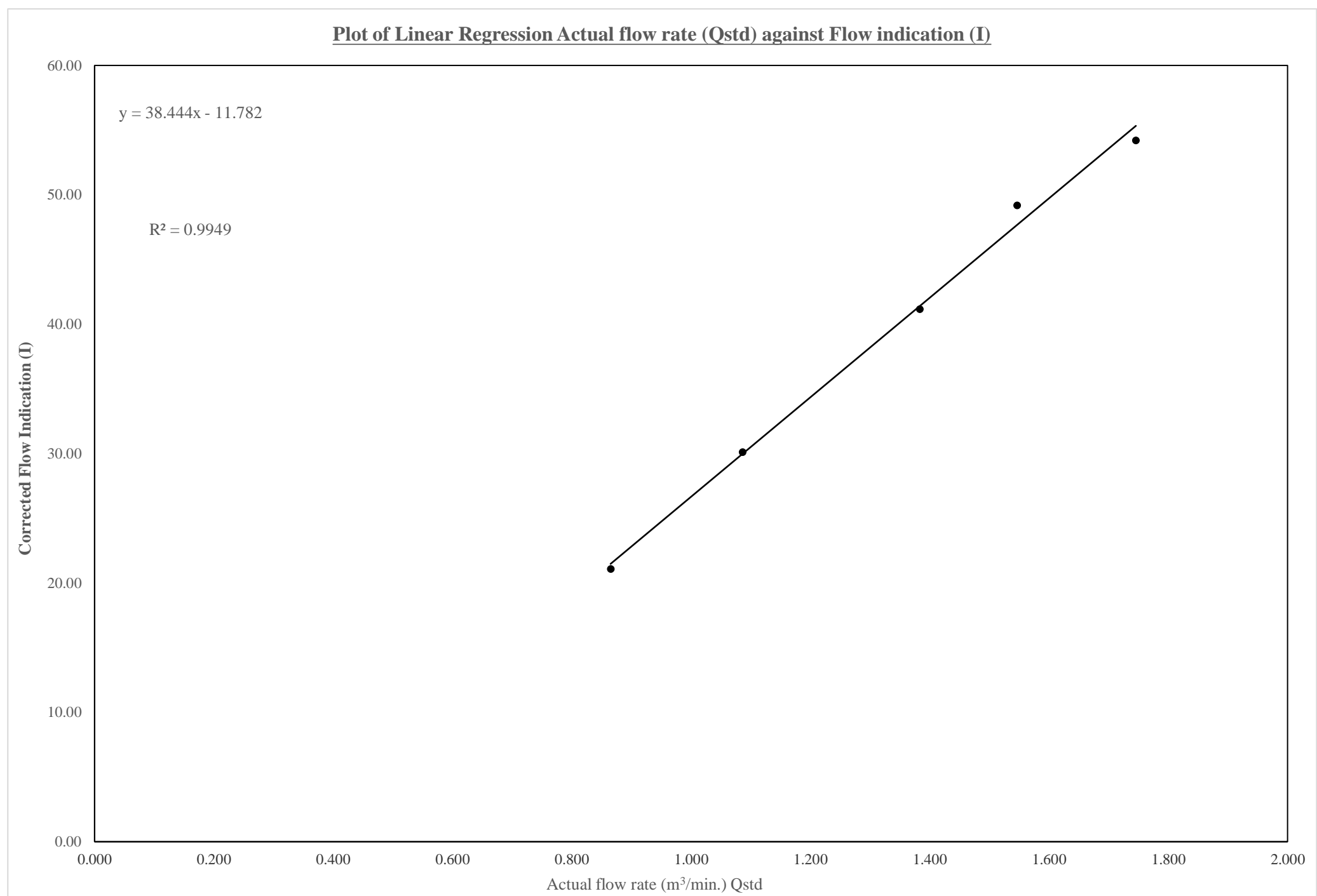
Linear Regression	
Slope =	38.444
Intercept =	-11.782
Correlation Coefficient =	0.9949


#### Calibrations

$$Qstd = 1/m[\text{Sqrt}(\text{H}_2\text{O}(\text{Pa}/\text{Pstd})(\text{Tstd}/\text{Ta})) - b]$$

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

Qstd = actual flow rate as indicated by the calibrator orifice  
H<sub>2</sub>O = orifice manometer reading during calibration  
Ta = ambient temperature during calibration, K = 273 + °C  
Tstd = standard temperature, a constant that never changes, 298 K  
Pa = ambient barometric pressure during calibration, mmHg  
Pstd = standard barometric pressure, a constant that never changes, 760 mm Hg  
m = Qstandard slope of orifice calibrator relationship  
b = Qstandard intercept of orifice calibrator relationship  
IC = continuous flow recorder readings corrected to current Ta and Pa  
I = continuous flow recorder readings during calibration



Calibrated by : **Tung Chi Sun**  Date : 12 December 2016

Checked by : **Wong Fu Nam**  Date : 12 December 2016



# Calibration Certificate

Certificate No. **601981**

Page 1 of 3 Pages

**Customer :** Hyder Consulting Limited

**Address :** 20/F, AXA Tower, Landmark East, 100 How Ming Street, Kwun Tong, HK

**Order No. :** Q60796

**Date of receipt :** 9-Mar-16

## Item Tested

**Description :** Sound Level Meter

**Manufacturer :** B&K

**I.D. :** --

**Model :** 2238

**Serial No. :** 2562782

## Test Conditions

**Date of Test :** 22-Mar-16

**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 Type1 and IEC 804 Type1 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S017	Multi-Function Generator	C147450	SCL-HKSAR
S240	Sound Level Calibrator	601604	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 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), or by reference to a natural constant. The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Kin Wong

**Approved by :**   
Alan Chu

**Date:** 23-Mar-16

This Certificate is issued by:  
Hong Kong Calibration Ltd.  
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646



# Calibration Certificate

Certificate No. 601981

Page 2 of 3 Pages

Results :

## 1. SPL Accuracy

Range	UUT Setting			Applied Value (dB)	UUT Reading (dB)
	Freq. Wgt.	Bandwidth	Center Freq.		
20 ~ 100	A	BB/F	--	94.0	94.1
	A	BB/S	--		94.1
	C	BB/F	--		94.1
40 ~ 120	A	BB/F	--	94.0	94.1
	A	BB/F	--	114.0	114.1

IEC 651 Type 1 Spec. :  $\pm 0.7$  dB

Uncertainty :  $\pm 0.1$  dB

## 2. Level Stability : 0.0 dB

IEC 651 Type 1 Spec. :  $\pm 0.3$  dB

Uncertainty :  $\pm 0.1$  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	114.1	0.0	$\pm 0.7$ dB
130	104.0	104.1	0.0	
120	94.0	94.1 (Ref.)	--	
110	84.0	84.1	0.0	
100	74.0	74.1	0.0	
90	64.0	64.1	0.0	
80	54.0	54.1	0.0	

Uncertainty :  $\pm 0.1$  dB



# Calibration Certificate

Certificate No. 601981

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	84.1	0.0	± 0.4 dB
	94.0	94.1 (Ref.)	--	
	95.0	95.1	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	- 39.3	- 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	+ 1.0	+ 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	40.0	± 0.5 dB
1/10 <sup>2</sup>	40.0	40.0	
1/10 <sup>3</sup>	40.0	40.0	± 1.0 dB
1/10 <sup>4</sup>	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 laboratory's sound calibrator at the reference sound pressure level before the calibration.

----- END -----



# Calibration Certificate

Certificate No. **602136**

Page 1 of 2 Pages

**Customer :** Hyder Consulting Limited

**Address :** 20/F, AXA Tower, Landmark East, 100 How Ming Street, Kwun Tong, HK

**Order No. :** Q60851

**Date of receipt :** 14-Mar-16

## Item Tested

**Description :** Precision Acoustic Calibrator

**Manufacturer :** Larson Davis

**I.D. :** --

**Model :** CAL200

**Serial No. :** 10929

## Test Conditions

**Date of Test :** 18-Mar-16

**Supply Voltage :** --

**Ambient Temperature :** (23 ± 3)°C

**Relative Humidity :** (50 ± 25) %

## Test Specifications

Calibration check.

Ref. Document/Procedure : F06, F20, Z02.

## Test Results

All results were within the IEC 942 specification.

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

Main Test equipment used:

<u>Equipment No.</u>	<u>Description</u>	<u>Cert. No.</u>	<u>Traceable to</u>
S014	Spectrum Analyzer	505317	NIM-PRC & SCL-HKSAR
S240	Sound Level Calibrator	601604	NIM-PRC & SCL-HKSAR
S041	Universal Counter	506951	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 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), or by reference to a natural constant. The test results apply to the above Unit-Under-Test only

**Calibrated by :**   
Elva Chong

**Approved by :**   
Alan Chu

This Certificate is issued by:  
Hong Kong Calibration Ltd.  
Unit 8B, 24/F., Well Fung Industrial Centre, No. 58-76, Ta Chuen Ping Street, Kwai Chung, NT, Hong Kong.  
Tel: 2425 8801 Fax: 2425 8646

**Date:** 18-Mar-16



# Calibration Certificate

Certificate No. 602136

Page 2 of 2 Pages

Results :

## 1. Level Accuracy

UUT Nominal Value (dB)	Measured Value (dB)	IEC 942 Class 1 Spec.
94	93.7	± 0.3 dB
114	114.7	

Uncertainty : ± 0.1 dB

## 2. Frequency Accuracy

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

Uncertainty : ± 0.5 %

## 3. Level Stability : 0.0 dB

IEC 942 Class 1 Spec. : ± 0.1 dB

Uncertainty : ± 0.01 dB

## 4. Total Harmonic Distortion : < 0.5 %

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 : 1 012 hPa

----- END -----





## ALS Laboratory Group

ANALYTICAL CHEMISTRY & TESTING SERVICES

### SUB-CONTRACTING REPORT

CONTACT	: FU NAM WONG	WORK ORDER	: <b>HK1644594</b>
CLIENT	: <b>ARCADIS DESIGN &amp; ENGINEERING LIMITED</b>	SUB-BATCH	: 1
ADDRESS	: 20/F AXA TOWER, LANDMARK EAST, 100 HOW MING STREET, KWUN TONG HONG KONG	DATE RECEIVED	: 4-NOV-2016
PROJECT	: EB001773 ENVIRONMENT SPECIALIST	DATE OF ISSUE	: 15-NOV-2016
		NO. OF SAMPLES	: 1
		CLIENT ORDER	: ----

### General Comments

- Sample(s) were received in ambient condition.
- Sample(s) analysed and reported on an as received basis.
- Calibration was subcontracted to and analysed by Action United Enviro Services.

### Signatories

This document has been signed by those names that appear on this report and are the authorised signatories.

Signatories

Position

Richard Fung

General Manager

This is the Final Report and supersedes any preliminary report with this batch number.  
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ALS Technichem (HK) Pty Ltd  
Part of the ALS Laboratory Group

11/F, Chung Shun Knitting Centre 1 - 3 Wing Yip Street Kwai Chung N.T. Hong Kong  
Tel. +852 2610 1044 Fax. +852 2610 2021 [www.alsglobal.com](http://www.alsglobal.com)

WORK ORDER : HK1644594  
SUB-BATCH : 1  
CLIENT : ARCADIS DESIGN & ENGINEERING LIMITED  
PROJECT : EB001773 ENVIRONMENT SPECIALIST



ALS Lab ID	Client's Sample ID	Sample Type	Sample Date	External Lab Report No.
HK1644594-001	S/N: 296098	AIR	04-NOV-2016	S/N: 296098

## Equipment Verification Report (TSP)

### Equipment Calibrated:

Type: Laser Dust monitor  
 Manufacturer: Sibata LD-3B  
 Serial No. 296098  
 Equipment Ref: Nil  
 Job Order HK1644594

### Standard Equipment:

Standard Equipment: Higher Volume Sampler  
 Location & Location ID: AUES office (calibration room)  
 Equipment Ref: HVS 018  
 Last Calibration Date: 1 September 2016

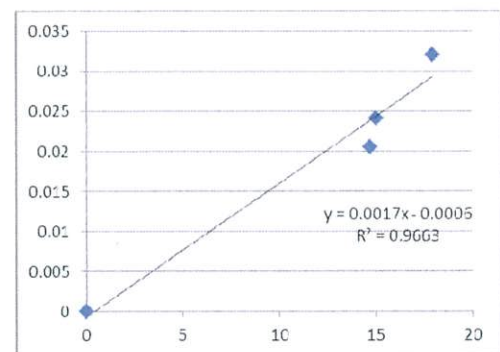
### Equipment Verification Results:

Testing Date: 11 November 2016

Hour	Time	Mean Temp °C	Mean Pressure (hPa)	Concentration in mg/m <sup>3</sup> (Standard Equipment)	Total Count (Calibrated Equipment)	Count/Minute (Total Count/60min)
2hr06min	9:50 ~ 11:56	20.0	1018.8	0.020	1851	14.7
2hr11min	12:00 ~ 14:11	20.0	1018.8	0.024	1974	15.0
1hr56min	14:15 ~ 16:11	20.0	1018.8	0.032	2097	18.0

### Linear Regression of Y or X

Slope (K-factor): 0.0017  
 Correlation Coefficient 0.9830  
 Date of Issue 14 November 2016



### Remarks:

- Strong** Correlation ( $R > 0.8$ )
  - Factor 0.0020 should be apply for TSP monitoring
- \*If  $R < 0.5$ , repair or re-verification is required for the equipment

Operator : Donald Kwok Signature :  Date : 14 November 2016



QC Reviewer : Ben Tam Signature :  Date : 14 November 2016

**APPENDIX J**

**SAMPLE DATA RECORD SHEET**



## APPENDIX J - 24-hr TSP Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Sampler Identification		TE-5170 MFC
Start date & time of sampling		03 January 2017, 01:30 p.m.
Elapsed-time Meter Reading	Start (Hours)	7620.88
	Stop (Hours)	7645.37
Total Sampling Time (min.)		1469.4 (24.49 Hours)
Weather Conditions		Sunny
Abnormal Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	763.1
	Ti (°C)	21.5
	Hi (cfm)	31
	Qsi (Std. m <sup>3</sup> )	1.11
Final Flow Rate, Qsf	Pi (mm Hg)	761.6
	Ti (°C)	23.1
	Hf (cfm)	34
	Qsf (Std. m <sup>3</sup> )	1.19
Average Flow Rate (Std. m <sup>3</sup> )		1.15
Total Volume (Std. m <sup>3</sup> )		1693
Filter Identification No.		201721
Initial Weight of Filter (g)		2.8530
Final Weight of Filter (g)		2.9247
Different Weight of Filter (g)		0.0717
Measured TSP Level (µg/m <sup>3</sup> )		42.4
Action Level (µg/m <sup>3</sup> )		221.6
Limit Level (µg/m <sup>3</sup> )		260.0
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	20 January 2017	
Checked by: Wong Fu Nam	20 January 2017	


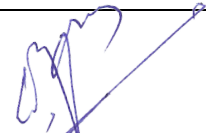
## APPENDIX J - 24-hr TSP Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Sampler Identification		TE-5170 MFC
Start date & time of sampling		09 January 2017, 10:15 a.m.
Elapsed-time Meter Reading	Start (Hours)	7645.37
	Stop (Hours)	7669.37
Total Sampling Time (min.)		1440 (24 Hours)
Weather Conditions		Sunny
Abnormal Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	763.5
	Ti (°C)	20
	Hi (cfm)	24
	Qsi (Std. m <sup>3</sup> )	0.93
Final Flow Rate, Qsf	Pi (mm Hg)	764.8
	Ti (°C)	19.6
	Hf (cfm)	25
	Qsf (Std. m <sup>3</sup> )	0.96
Average Flow Rate (Std. m <sup>3</sup> )		0.94
Total Volume (Std. m <sup>3</sup> )		1359
Filter Identification No.		201722
Initial Weight of Filter (g)		2.8790
Final Weight of Filter (g)		2.9703
Different Weight of Filter (g)		0.0913
Measured TSP Level (µg/m <sup>3</sup> )		67.2
Action Level (µg/m <sup>3</sup> )		221.6
Limit Level (µg/m <sup>3</sup> )		260.0
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	20 January 2017	
Checked by: Wong Fu Nam	20 January 2017	



## APPENDIX J - 24-hr TSP Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Sampler Identification		TE-5170 MFC
Start date & time of sampling		16 January 2017, 08:30 a.m.
Elapsed-time Meter Reading	Start (Hours)	7669.37
	Stop (Hours)	7693.75
Total Sampling Time (min.)		1462.8 (24.38 Hours)
Weather Conditions		Overcast
Abnormal Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	765.2
	Ti (°C)	15
	Hi (cfm)	34
	Qsi (Std. m <sup>3</sup> )	1.19
Final Flow Rate, Qsf	Pi (mm Hg)	765.2
	Ti (°C)	20.0
	Hf (cfm)	34
	Qsf (Std. m <sup>3</sup> )	1.19
Average Flow Rate (Std. m <sup>3</sup> )		1.19
Total Volume (Std. m <sup>3</sup> )		1742
Filter Identification No.		201723
Initial Weight of Filter (g)		2.8535
Final Weight of Filter (g)		2.9505
Different Weight of Filter (g)		0.0970
Measured TSP Level (µg/m <sup>3</sup> )		55.7
Action Level (µg/m <sup>3</sup> )		221.6
Limit Level (µg/m <sup>3</sup> )		260.0
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	27 January 2017	
Checked by: Wong Fu Nam	27 January 2017	

## APPENDIX J - 24-hr TSP Monitoring Field Record Sheet


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

Monitoring Location		4/F Roof top, K11
Sampler Identification		TE-5170 MFC
Start date & time of sampling		23 January 2017, 11:15 a.m.
Elapsed-time Meter Reading	Start (Hours)	7693.75
	Stop (Hours)	7717.76
Total Sampling Time (min.)		1440.6 (24.01 Hours)
Weather Conditions		Sunny
Abnormal Site Conditions		Nil
Initial Flow Rate, Qsi	Pi (mm Hg)	770.6
	Ti (°C)	18.5
	Hi (cfm)	30
	Qsi (Std. m <sup>3</sup> )	1.09
Final Flow Rate, Qsf	Pi (mm Hg)	770.0
	Ti (°C)	18.0
	Hf (cfm)	31
	Qsf (Std. m <sup>3</sup> )	1.11
Average Flow Rate (Std. m <sup>3</sup> )		1.10
Total Volume (Std. m <sup>3</sup> )		1584
Filter Identification No.		201724
Initial Weight of Filter (g)		2.8683
Final Weight of Filter (g)		2.9896
Different Weight of Filter (g)		0.1213
Measured TSP Level (µg/m <sup>3</sup> )		76.6
Action Level (µg/m <sup>3</sup> )		221.6
Limit Level (µg/m <sup>3</sup> )		260.0
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	2 February 2017	
Checked by: Wong Fu Nam	2 February 2017	





## APPENDIX J - Noise Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Date of Monitoring		03 January 2017
Monitoring Start Time		13:14
Monitoring Stop Time		13:44
Measurement Time Length		30 mins
Weather Condition		Sunny
Wind Speed		3.6 m/s
Noise Meter Model / Identification		BK 2238
Calibrator Model / Identification		CAL 200
Measurement Results	L <sub>eq</sub>	67.8 dB(A)
	L <sub>10</sub>	69.0 dB(A)
	L <sub>90</sub>	66.0 dB(A)
Limit Level		75.0 dB(A)
Major Construction Noise Source(s) During Monitoring		On-site powered mechanical equipment
Other Noise Source(s) During Monitoring		Traffic noise
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	03 January 2017	
Checked by: Wong Fu Nam	03 January 2017	



## APPENDIX J - Noise Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Date of Monitoring		10 January 2017
Monitoring Start Time		10:27
Monitoring Stop Time		10:57
Measurement Time Length		30 mins
Weather Condition		Sunny
Wind Speed		4.2 m/s
Noise Meter Model / Identification		BK 2238
Calibrator Model / Identification		CAL 200
Measurement Results	L <sub>eq</sub>	68.1 dB(A)
	L <sub>10</sub>	70.0 dB(A)
	L <sub>90</sub>	65.0 dB(A)
Limit Level		75.0 dB(A)
Major Construction Noise Source(s) During Monitoring		On-site powered mechanical equipment
Other Noise Source(s) During Monitoring		Traffic noise
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	03 January 2017	
Checked by: Wong Fu Nam	03 January 2017	



## APPENDIX J - Noise Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Date of Monitoring		19 January 2017
Monitoring Start Time		10:35
Monitoring Stop Time		11:05
Measurement Time Length		30 mins
Weather Condition		Sunny
Wind Speed		0.1 m/s
Noise Meter Model / Identification		BK 2238
Calibrator Model / Identification		CAL 200
Measurement Results	L <sub>eq</sub>	69.7 dB(A)
	L <sub>10</sub>	71.5 dB(A)
	L <sub>90</sub>	67.0 dB(A)
Limit Level		75.0 dB(A)
Major Construction Noise Source(s) During Monitoring		On-site powered mechanical equipment
Other Noise Source(s) During Monitoring		Traffic noise
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	03 January 2017	
Checked by: Wong Fu Nam	03 January 2017	

## APPENDIX J - Noise Monitoring Field Record Sheet

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

Monitoring Location		4/F Roof top, K11
Date of Monitoring		24 January 2017
Monitoring Start Time		10:44
Monitoring Stop Time		11:14
Measurement Time Length		30 mins
Weather Condition		Sunny
Wind Speed		0.1 m/s
Noise Meter Model / Identification		BK 2238
Calibrator Model / Identification		CAL 200
Measurement Results	L <sub>eq</sub>	69.4 dB(A)
	L <sub>10</sub>	71.0 dB(A)
	L <sub>90</sub>	66.5 dB(A)
Limit Level		75.0 dB(A)
Major Construction Noise Source(s) During Monitoring		On-site powered mechanical equipment
Other Noise Source(s) During Monitoring		Aircraft and Traffic noise
<u>Name &amp; Designation</u>	<u>Date</u>	<u>Signature</u>
Record by: Tung Chi Sun	03 January 2017	
Checked by: Wong Fu Nam	03 January 2017	

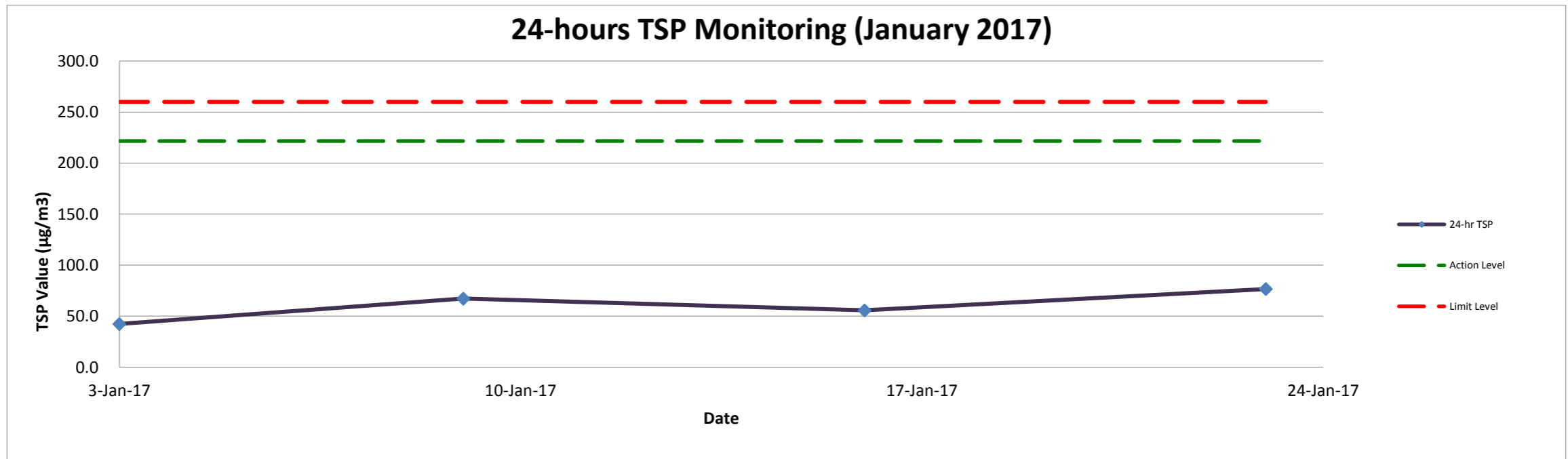
## **APPENDIX K**

### **MONITORING RESULTS AND PLOTS**

**Impact Air Quality Monitoring : 24-hour TSP at K11**

Location	Monitoring Date	Start Time	Weather Conditions	Temperature	Elapse Time		Flow Rate (CFM)			Average Flow Rate	TSP Concentration (µg/m3)	Action/Limit Levels
					Initial	Final	Sampling Hours	Initial	Final			
K11 Art Mall	3-Jan-17	13:30	Sunny	21.5	762088	764537	25	31	34	33	42.4	221.6/260
	9-Jan-17	10:15	Sunny	20.0	764537	766937	24	24	25	25	67.2	221.6/260
	16-Jan-17	8:30	Overcast	15.0	766937	769375	24	34	34	34	55.7	221.6/260
	23-Jan-17	11:15	Sunny	18.5	769375	771776	24	30	31	31	76.6	221.6/260

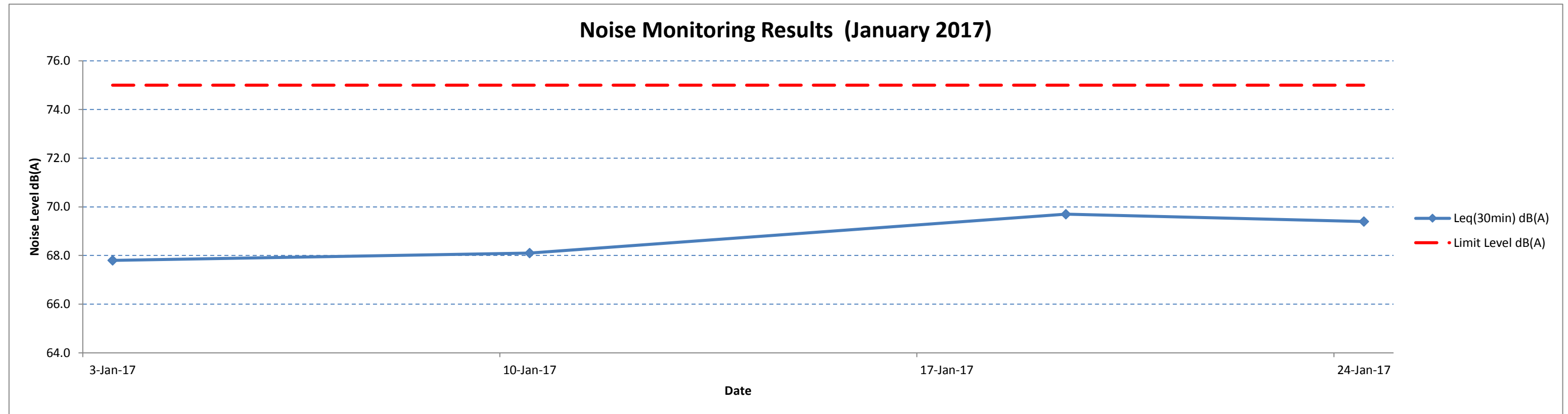
**24-hours TSP Monitoring (January 2017)**



**Noise Impact Monitoring Results at K11**

Monitoring Locations	Date	Weather Conditions	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	3-Jan-17	Sunny	3.6	13:14	13:44	65.3	75	67.8	69.0	66.0
	10-Jan-17	Sunny	4.2	10:27	10:57	65.3	75	68.1	70.0	65.0
	19-Jan-17	Sunny	0.1	10:35	11:05	65.3	75	69.7	71.5	67.0
	24-Jan-17	Sunny	0.1	10:44	11:14	65.3	75	69.4	71.0	66.5

Red Bold indicates an exceedance of Limit Level



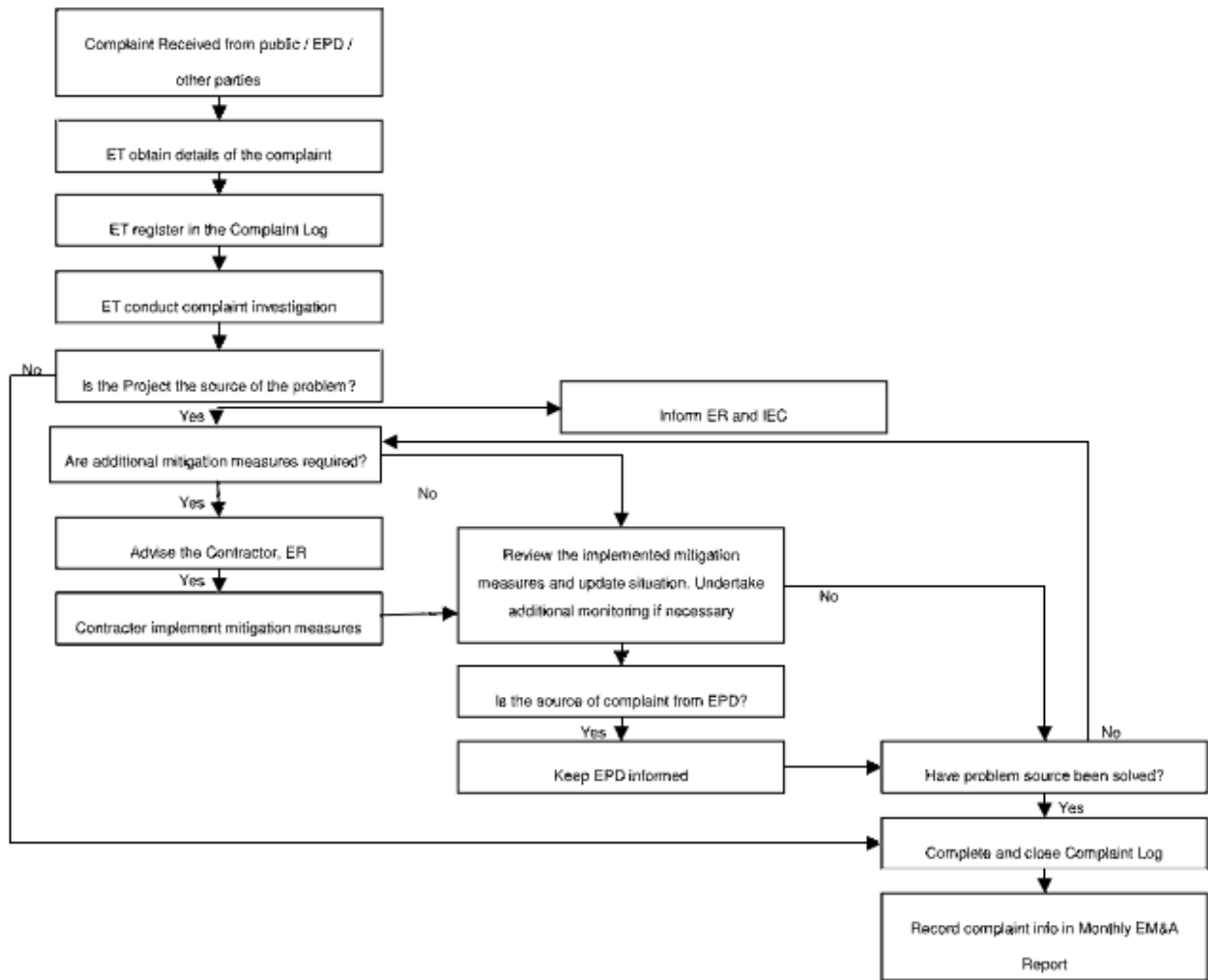
## **APPENDIX L**

### **FLOW CHART FOR HANDLING ENVIRONMENTAL COMPLAINTS**



# APPENDIX L

## Complaint Response Procedure



**APPENDIX M**

**WASTE MANAGEMENT RECORDS**

## Monthly Summary Waste Flow Table for 2017 (year)

**Contract No:** C3840-13C Tsim Sha Tsui Station Carnarvon Road Subway  
**Date Reported:** 4-February-2017

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 <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000m <sup>3</sup> )	(in '000kg)	(in '000kg)	(in '000kg)	(in '000kg)	(in '000m <sup>3</sup> /tonne)	
Carried from Project Start	4.9473	-	-	-	4.9473	-	-	-	-	-	0.0387	
Jan	0.6189	-	-	-	0.6189	-	-	-	-	-	0.0017	
Feb	-	-	-	-	-	-	-	-	-	-	-	
Mar	-	-	-	-	-	-	-	-	-	-	-	
Apr	-	-	-	-	-	-	-	-	-	-	-	
May	-	-	-	-	-	-	-	-	-	-	-	
June	-	-	-	-	-	-	-	-	-	-	-	
Sub-total	0.6189	-	-	-	0.6189	-	-	-	-	-	0.0017	
July	-	-	-	-	-	-	-	-	-	-	-	
Aug	-	-	-	-	-	-	-	-	-	-	-	
Sept	-	-	-	-	-	-	-	-	-	-	-	
Oct	-	-	-	-	-	-	-	-	-	-	-	
Nov	-	-	-	-	-	-	-	-	-	-	-	
Dec	-	-	-	-	-	-	-	-	-	-	-	
Total	0.6189	-	-	-	0.6189	-	-	-	-	-	0.0017	
Acc. Total	5.5662	(accumulated quantity of the project = carried amount + this year amount)										0.0404

**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.