

**Agreement No. CE 58/2000**

**Design & Construction Assignment for  
Widening of Tolo Highway / Fanling  
Highway between Island House  
Interchange and Fanling Stage 2 -  
Between Tai Hang and  
Wo Hop Shek Interchange**

**Baseline Monitoring Report**

November 2013

	Name	Signature
Prepared & Checked:	Lemon Lam	
Reviewed & Approved:	Y W Fung	

Version:	0	Date: 4 November 2013
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Hyder-Arup-Black & Veatch Joint Venture  
c/o Hyder Consulting Limited  
47/F Hopewell Centre  
183 Queen's Road East  
Wanchai, Hong Kong

6 November 2013

By Fax (2805 5028) & Post

Dear Sir,

**Attn: Mr. James Penny**

**Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Stage 2 –  
Between Tai Hang and Wo Hop Shek Interchange  
Environmental Permit No. EP-324/2008/A  
Condition 3.2 – Submission of Baseline Monitoring Report for the portion of Stage 2 works under  
Contract No. HY/2012/06**

We refer to the revised Baseline Monitoring Report received on 5 November 2013 submitted by ET via email. Pursuant to EP Condition 3.2, I hereby verify the Baseline Monitoring Report (Version 0) for the portion of works under Stage 2 of the captioned Project which is managed under Contract No. HY/2012/06.

Yours faithfully  
for MOTT MACDONALD HONG KONG LIMITED

A handwritten signature in black ink, appearing to read "Terence Kong".

Terence Kong  
Independent Environmental Checker

c.c. HyD – Mr. Chung Lok Chin (Fax: 2714 5198) / Ms. Jackei Yin (Fax: 2761 4864)  
AECOM – Mr. YW Fung (Fax: 2891 0305)

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## **EXECUTIVE SUMMARY**

In accordance with the updated Environmental Monitoring and Audit Manual (updated EM&A Manual dated on October 2013) for the Agreement "Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between island House Interchange and Fanling, Stage 2 - Between Tai Hang and Wo Hop Shek Interchange (the Project)", baseline monitoring of air quality was required. This report presents the baseline monitoring results performed in October 2013.

As stipulated in the updated EM&A Manual, baseline 1-hour and 24-hour Total Suspended Particulates (TSP) monitoring were conducted at one monitoring station (AM1) for 14 consecutive days. For 1-hour TSP monitoring, measurements were taken three times per day during the same period of 24-hour TSP monitoring. Data collected was reviewed and analysed to establish the Action and Limit Levels for air quality during impact/compliance monitoring throughout the construction period of the Project. Details of the monitoring methodology, location and results are presented in this report.

## 1 INTRODUCTION

### 1.1 Background

- 1.1.1 Tolo Highway and Fanling Highway are the expressways in the North East New Territories (NENT) connecting Sha Tin, Tai Po and Fanling. These highways form a vital part of the strategic Route 9, which links Hong Kong Island to the boundary at Shenzhen. At present, this section of Route 9 is a dual 3-lane carriageway. However, at several major interchanges along this section of Route 9, the highway is a dual-2 lane carriageway only. Severe congestion is a frequent occurrence during the peak periods, particularly in the Kowloon-bound direction.
- 1.1.2 The objective of “Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling” is to widen Tolo Highway and Fanling Highway to dual 4-lane carriageway in order to alleviate the current traffic congestion problems and to cope with the increasing transport demands to and from the urban areas and also cross boundary traffic.
- 1.1.3 The proposed widening of Tolo Highway and Fanling Highway between Island House Interchange and Fanling is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 499) (EIAO). An Environmental Impact Assessment (EIA) Report (the approved EIA Report) together with an Environmental Monitoring and Audit (EM&A) Manual (the approved EM&A Manual) were completed and approved under the EIAO on 14 July 2000 (Register Number: EIA-043/2000).
- 1.1.4 The scope comprises mainly:
- (i) Widening of a 5.7 km section of Tolo Highway and 3.0 km section of Fanling Highway between Island House Interchange and Wo Hop Shek Interchange from the existing dual 3-lane to dual 4-lane, including construction of new vehicular bridges;
  - (ii) Widening of interchange sections at Island House Interchange, Tai Po North Interchange, and Lam Kam Road Interchange from dual 2-lane to dual 3-lane, including realignment of various slip roads;
  - (iii) Modification and reconstruction of highways, vehicular bridges, underpasses and footbridges.
- 1.1.5 The construction works for “Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling” will be delivered in 2 stages i.e. Stage 1 (between Island House Interchange and Tai Hang) and Stage 2 (between Tai Hang and Wo Hop Shek Interchange). This report focuses on Stage 2 only.
- 1.1.6 Stage 2 would be implemented under two works contracts: Contract No. HY/2012/06 “Widening of Fanling Highway – Tai Hang to Wo Hop Shek Interchange” and the entrusted portion to CEDD under Contract No. CV/2012/09 “Liantang/Heung Yuen Wai Boundary Control Point Site Formation and Infrastructure Works – Contract 3”.
- 1.1.7 China State Construction Engineering (Hong Kong) Limited (the Contractor) has commissioned AECOM Asia Company Limited to undertake the Environmental Team (ET) services for Contract No. HY/2012/06 for implementation of all the EM&A works. In accordance with the updated EM&A Manual for the Project which was submitted in October 2013, environmental baseline conditions were established by the ET prior to the commencement of construction of the Project.
- 1.1.8 Baseline monitoring was undertaken and baseline monitoring report was prepared prior to commencement of construction of the Project in accordance with Condition 3.2 of Environmental Permit and the updated EM&A Manual.

## **1.2 Purpose of Baseline Monitoring Report**

- 1.2.1 The purpose of this report is to review the baseline conditions of air quality, at the Project site, and to establish baseline levels for air quality in accordance with the updated EM&A Manual. These levels would be used as the basis for assessing environmental impact and compliance during construction of the Project.
- 1.2.2 This baseline monitoring report presents the baseline monitoring requirements, methodologies and monitoring results of air quality described in the updated EM&A Manual.
- 1.2.3 This baseline report presents the monitoring works conducted in October 2013 for air quality monitoring at one station (AM1). A layout plan of the Project is provided in **Figure 1.1**.

## 2 AIR QUALITY MONITORING

### 2.1 Monitoring Requirements

2.1.1 In accordance with the updated EM&A Manual, baseline 24-hour and 1-hour TSP levels at one air quality monitoring station should be established by conducting baseline 1-hour and 24-hour TSP monitoring for at least 14 consecutive days prior to commencement of construction of the Project.

### 2.2 Monitoring Equipment

2.2.1 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at the proposed monitoring station. The HVS meets all the requirements of the updated EM&A Manual. Portable direct reading dust meters were used to carry out the 1-hour TSP monitoring. Brand and model of the equipment is given in **Table 2.1**. The calibration certificates of the monitoring equipments are provided in **Appendix A**.

**Table 2.1 Air Quality Monitoring Equipment**

Equipment	Brand and Model
High Volume Sampler (24-hour TSP)	Tisch Total Suspended Particulate Mass Flow Controlled High Volume Air Sampler (Model No. TE-5170)
Portable direct reading dust meter (1-hour TSP)	Sibata Digital Dust Monitor (Model No. LD-3 or LD-3B)

### 2.3 Monitoring Location

2.3.1 The monitoring station was set up at the proposed location in accordance with updated EM&A Manual. **Table 2.2** describes details of the monitoring station. The locations are shown in **Figure 1.2**.

**Table 2.2 Location of Air Quality Monitoring Station**

Location	Monitoring Station
AM1 (SR2)	Fanling Government Secondary School

### 2.4 Monitoring Parameters, Frequency and Duration

2.4.1 **Table 2.3** summarizes the monitoring parameters, frequency and duration of air quality monitoring.

**Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration**

Parameter	Frequency and Duration
24-hour TSP	Daily, for 14 consecutive days
1-hour TSP	3 times per day, for 14 consecutive days

### 2.5 Monitoring Methodology

#### 2.5.1 24-hour TSP Monitoring

- (a) The HVS was installed in the vicinity of the air sensitive receivers. The following criteria were considered in the installation of the HVS.
- (i) A horizontal platform with appropriate support to secure the sampler against gusty wind to be provided.
  - (ii) Samplers placed at least 2 meters apart.

- (iii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
  - (iv) A minimum of 2 meters horizontal separation from walls, parapets and penthouse for rooftop samplers.
  - (v) A minimum 2 meters horizontal separation from any supporting structure.
  - (vi) No furnace or incinerator flue nearby.
  - (vii) Airflow around the sampler to be unrestricted.
  - (viii) The sampler should be located more than 20 meters from any dripline.
  - (ix) Any wire fence and gate, required to protect the sampler, should not obstruct the monitoring process.
  - (x) Permission to be obtained to set up the samplers and access to the monitoring stations.
  - (xi) A secured supply of electricity to be obtained to operate the samplers.
- (b) Preparation of Filter Papers
- (i) Glass fibre filters, G810 were labelled and sufficient filters that are clean and without pinholes will be selected.
  - (ii) All filters will be equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than  $\pm 3$  °C; the relative humidity (RH) would be < 50% and not variable by more than  $\pm 5$ %. A convenient working RH would be 40%.
  - (iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd., which is a HOKLAS accredited laboratory and has comprehensive quality assurance and quality control programmes.
- (c) Field Monitoring
- (i) The power supply was checked to ensure the HVS works properly.
  - (ii) The filter holder and the area surrounding the filter were cleaned.
  - (iii) The filter holder was removed by loosening the four bolts and a new filter, with stamped number upward, on a supporting screen was aligned carefully.
  - (iv) The filter was properly aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter.
  - (v) The swing bolts were fastened to hold the filter holder down to the frame. The pressure applied was sufficient to avoid air leakage at the edges.
  - (vi) Then the shelter lid was closed and was secured with the aluminium strip.
  - (vii) The HVS was warmed-up for about 5 minutes to establish run-temperature conditions.
  - (viii) A new flow rate record sheet was set into the flow recorder.
  - (ix) The flow rate of the HVS was checked and adjusted at around 1.1 m<sup>3</sup>/min. The range specified in the EM&A Manual is between 0.6-1.7 m<sup>3</sup>/min.
  - (x) The programmable digital timer was set for a sampling period of 24 hrs + 5 mins., and the starting time, weather condition and the filter number were recorded.
  - (xi) The initial elapsed time was recorded.
  - (xii) At the end of sampling, the final flow rate of the HVS was checked and recorded.
  - (xiii) The final elapsed time was recorded.
  - (xiv) The sampled filter was removed carefully and folded in half length so that only surfaces with collected particulate matter were in contact.
  - (xv) It was then placed in a clean plastic envelope and sealed.
  - (xvi) All monitoring information was recorded on a standard data sheet.
  - (xvii) Filters were then sent to ALS Technichem (HK) Pty Ltd. for analysis.



(d) Maintenance and Calibration

- (i) The HVS and its accessories are maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- (ii) HVS was calibrated at bi-monthly intervals using TE-5025A Calibration Kit throughout all stages of the air quality monitoring.
- (iii) Calibration certificate of the HVS is provided in **Appendix A**.

2.5.2 1-hour TSP Monitoring

(a) Measuring Procedures

The measuring procedures of the 1-hour dust meter are in accordance with the Manufacturer's Instruction Manual as follows:

- (i) Turn the power on.
- (ii) Close the air collecting opening cover.
- (iii) Push the "TIME SETTING" switch to [BG]
- (iv) Push "START/STOP" switch to perform background measurement for 6 seconds.
- (v) Turn the knob at SENSI ADJ position to insert the light scattering plate.
- (vi) Leave the equipment for 1 minute upon "SPAN CHECK" is indicated in the display.
- (vii) Push "START/STOP" switch to perform automatic sensitivity adjustment. This measurement takes 1 minute.
- (viii) Pull out the knob and return it to MEASURE position.
- (ix) Push the "TIME SETTING" switch the time set in the display to 3 hours.
- (x) Lower down the air collection opening cover.
- (xi) Push "START/STOP" switch to start measurement.

(b) Maintenance and Calibration

- (i) The 1-hour TSP meter was calibrated at 1-year intervals against a continuous particulate TEOM Monitor, Series 1400ab. Calibration certificates of the Laser Dust Monitors are provided in **Appendix A**.

**2.6 Results and Observations**

2.6.1 The baseline 24-hour and 1-hour TSP monitoring were carried out at monitoring station AM1 from 12 October 2013 to 29 October 2013. As the Fanling Government Secondary School did not open on the public holidays, therefore no monitoring were conducted on 13, 14, 20 and 27 October 2013. Weather conditions during baseline monitoring period were mostly sunny. Major dust sources were from nearby traffic emissions. Generally, the monitoring results represented background air quality at the monitoring stations. The baseline monitoring schedule is provided in **Appendix B**.

2.6.2 The baseline monitoring results for 24-hour TSP and 1-hour TSP are summarized in **Table 2.4** and **Table 2.5** respectively. Detailed air quality monitoring results are presented in **Appendix C**.

**Table 2.4 Summary of 24-hour TSP Baseline Monitoring Results**

Parameter	Monitoring Location	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM1	108.7	63.0 – 140.0

**Table 2.5 Summary of 1-hour TSP Baseline Monitoring Results**

Parameter	Monitoring Location	Average ( $\mu\text{g}/\text{m}^3$ )	Range ( $\mu\text{g}/\text{m}^3$ )
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM1	104.4	56.6 – 176.6

**2.7 Event and Action Levels**

2.7.1 The Action and Limit Levels (AL Levels) for air quality monitoring were based on the criteria adopted from the EM&A Manual as presented in **Table 2.6**.

**Table 2.6 Derivation of Action and Limit Levels for Air Quality**

Parameters	Action	Limit
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> <li>For baseline level <math>\leq 200 \mu\text{g}/\text{m}^3</math>, Action level = (130% of baseline level + Limit level) / 2</li> <li>For baseline level <math>&gt; 200 \mu\text{g}/\text{m}^3</math>, Action level = Limit level</li> </ul>	260 $\mu\text{g}/\text{m}^3$
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	<ul style="list-style-type: none"> <li>For baseline level <math>\leq 384 \mu\text{g}/\text{m}^3</math>, Action level = (130% of baseline level + Limit level) / 2</li> <li>For baseline level <math>&gt; 384 \mu\text{g}/\text{m}^3</math>, Action level = Limit level</li> </ul>	500 $\mu\text{g}/\text{m}^3$

2.7.2 Following the criteria shown in **Table 2.6**, the AL Levels for 24-hour and 1-hour TSP are derived and presented in **Tables 2.7 & 2.8** respectively.

**Table 2.7 Derived Action and Limit Levels for 24-hour TSP**

Parameter	Monitoring Location	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
24-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM1	200.7	260

**Table 2.8 Derived Action and Limit Levels for 1-hour TSP**

Parameter	Monitoring Location	Action Level ( $\mu\text{g}/\text{m}^3$ )	Limit Level ( $\mu\text{g}/\text{m}^3$ )
1-hour TSP Level in $\mu\text{g}/\text{m}^3$	AM1	317.8	500

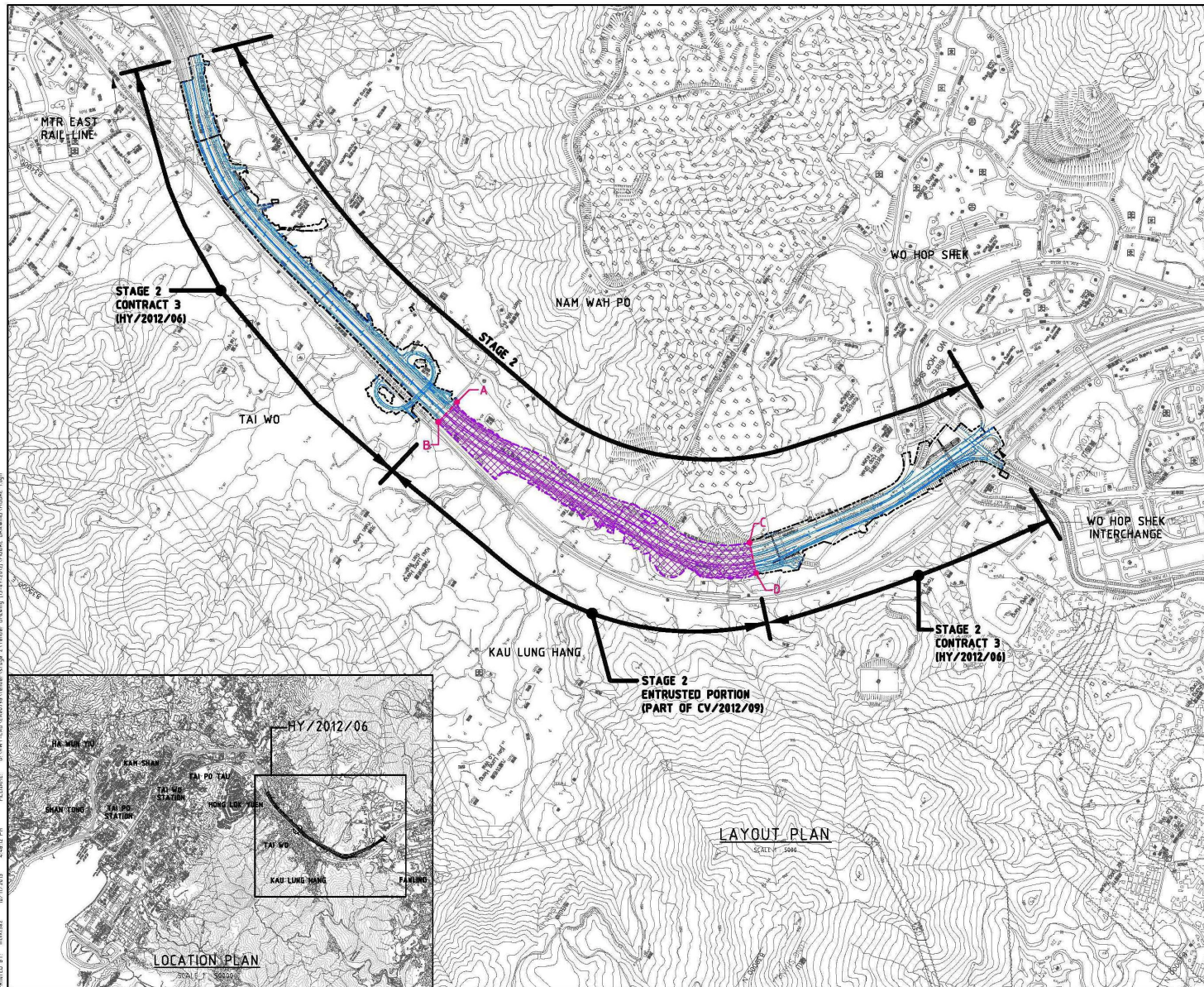
### **3 CONCLUSIONS**

- 3.1.1 Baseline air quality monitoring was carried out at monitoring station AM1 from 12 October 2013 to 29 October 2013. Action Levels for air quality was derived from the baseline monitoring results.
- 3.1.2 No construction activity was undertaken in the vicinity of the monitoring station during baseline monitoring period and therefore the baseline monitoring results is representative of the baseline condition for the Project.

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**FIGURE**

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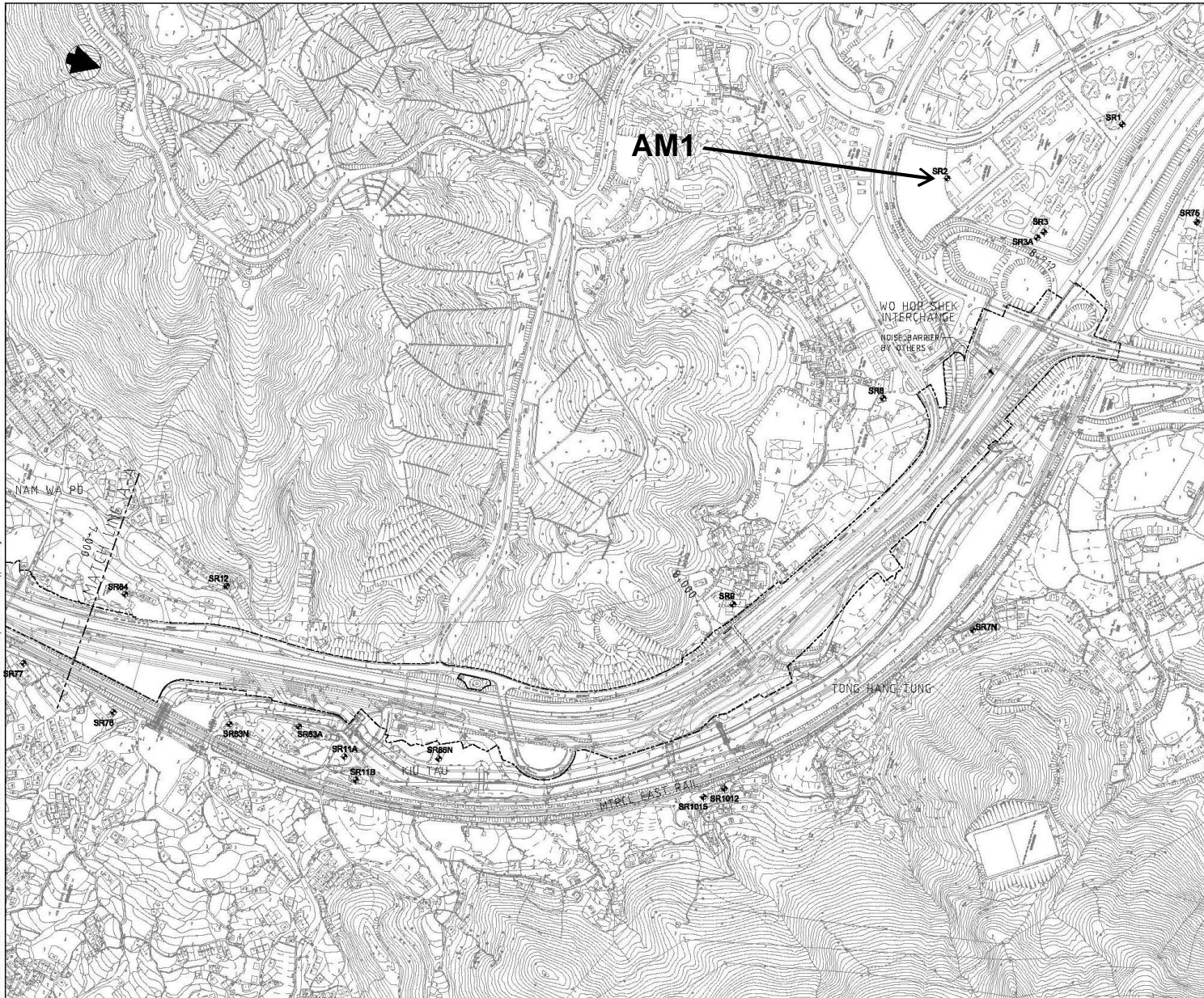
Agreement No. CE 58/2000

Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

**Layout Plan**

SCALE	N.T.S.	DATE	28-Oct-13
CHECK	FYW	DRAWN	LL
JOB NO.	60307376	DRAWING NO.	Figure 1.1
		REV	-





Agreement No. CE 58/2000

Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling, Stage 2 - Between Tai Hang and Wo Hop Shek Interchange

**Location of Air Quality Monitoring Station**

SCALE	N.T.S.	DATE	28-Oct-13
CHECK	FYW	DRAWN	LL
JOB NO.	60307376	DRAWING NO.	Figure 1.2
		REV	-

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**APPENDIX A**

**Calibration Certificates of Monitoring Equipment**

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TISCH ENVIRONMENTAL, INC.  
 145 SOUTH MIAMI AVE.  
 VILLAGE OF CLEVELAND, OH 43002  
 513.467.9000  
 877.263.7610 TOLL FREE  
 513.467.9009 FAX  
 WWW.TISCH-ENV.COM

**AIR POLLUTION MONITORING EQUIPMENT**

ORIFICE TRANSFER STANDARD CERTIFICATION WORKSHEET TE-5025A

Date - Dec 06, 2012 Roots-meter S/N 0438320 Ta (K) - 293  
 Operator Tisch Orifice I.D. - 0843 Pa (mm) - 751.84

PLATE OR Run #	VOLUME START (m3)	VOLUME STOP (m3)	DIFF VOLUME (m3)	DIFF TIME (min)	METER	ORFICE
					DIFF Hg (mm)	DIFF H2O (in.)
1	NA	NA	1.00	1.4040	3.2	2.00
2	NA	NA	1.00	0.9860	6.4	4.00
3	NA	NA	1.00	0.8850	8.0	5.00
4	NA	NA	1.00	0.8420	8.8	5.50
5	NA	NA	1.00	0.6930	12.9	8.00

DATA TABULATION

Vstd	(x axis) Qstd	(y axis)	Va	(x axis) Qa	(y axis)
1.0018	0.7136	1.4186	0.9957	0.7092	0.8828
0.9976	1.0118	2.0061	0.9915	1.0056	1.2485
0.9953	1.1247	2.2429	0.9893	1.1178	1.3959
0.9943	1.1809	2.3524	0.9883	1.1737	1.4640
0.9888	1.4269	2.8371	0.9828	1.4182	1.7657
Qstd slope (m) = 1.99238			Qa slope (m) = 1.24760		
intercept (b) = -0.00351			intercept (b) = -0.00219		
coefficient (r) = 0.99992			coefficient (r) = 0.99992		
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:

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

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





## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.07a  
 Sensitivity Adjustment Scale Setting: 557 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 557 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 557 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:30 - 13:30	28.1	78	0.04714	1887	31.45
2	18-05-13	13:30 - 14:30	28.1	78	0.04932	1970	32.83
3	18-05-13	14:30 - 15:30	28.2	77	0.05156	2056	34.27
4	18-05-13	15:30 - 16:30	28.1	78	0.05083	2026	33.77

- Note:
1. Monitoring data was measured by Rupprecht & Patashnick TEOM®
  2. Total Count was logged by Laser Dust Monitor
  3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9978

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.08a  
 Sensitivity Adjustment Scale Setting: 702 CPM  
 Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 702 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 702 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:30 - 13:30	28.1	78	0.04714	1764	29.40
2	18-05-13	13:30 - 14:30	28.1	78	0.04932	1846	30.77
3	18-05-13	14:30 - 15:30	28.2	77	0.05156	1935	32.25
4	18-05-13	15:30 - 16:30	28.1	78	0.05083	1899	31.65

- Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0016  
 Correlation coefficient: 0.9976

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.09a  
 Sensitivity Adjustment Scale Setting: 797 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 797 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 797 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:30 - 13:30	28.1	78	0.04714	1885	31.42
2	18-05-13	13:30 - 14:30	28.1	78	0.04932	1965	32.75
3	18-05-13	14:30 - 15:30	28.2	77	0.05156	2059	34.32
4	18-05-13	15:30 - 16:30	28.1	78	0.05083	2024	33.73

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9973

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013



## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.10a  
 Sensitivity Adjustment Scale Setting: 753 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No.: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 753 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 753 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:30 - 13:30	28.1	78	0.04714	1886	31.43
2	18-05-13	13:30 - 14:30	28.1	78	0.04932	1968	32.80
3	18-05-13	14:30 - 15:30	28.2	77	0.05156	2061	34.35
4	18-05-13	15:30 - 16:30	28.1	78	0.05083	2026	33.77

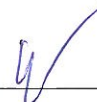
- Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9983

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3  
 Equipment No.: A.005.11a  
 Sensitivity Adjustment Scale Setting: 799 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 799 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 799 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:15 - 13:15	28.1	78	0.04685	1871	31.18
2	18-05-13	13:15 - 14:15	28.1	78	0.04941	1979	32.98
3	18-05-13	14:15 - 15:15	28.2	77	0.05127	2055	34.25
4	18-05-13	15:15 - 16:15	28.1	78	0.05060	2021	33.68


Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9976

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3B  
 Equipment No.: A.005.13a  
 Sensitivity Adjustment Scale Setting: 643 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>0</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 643 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 643 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:15 - 13:15	28.1	78	0.04685	1867	31.12
2	18-05-13	13:15 - 14:15	28.1	78	0.04941	1975	32.92
3	18-05-13	14:15 - 15:15	28.2	77	0.05127	2048	34.13
4	18-05-13	15:15 - 16:15	28.1	78	0.05060	2017	33.62

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0015  
 Correlation coefficient: 0.9986

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013

## EQUIPMENT CALIBRATION RECORD

Type: Laser Dust Monitor  
 Manufacturer/Brand: SIBATA  
 Model No.: LD-3B  
 Equipment No.: A.005.14a  
 Sensitivity Adjustment Scale Setting: 786 CPM

Operator: Mike Shek (MSKM)

### Standard Equipment

Equipment: Rupprecht & Patashnick TEOM®  
 Venue: Cyberport (Pui Ying Secondary School)  
 Model No.: Series 1400AB  
 Serial No: Control: 140AB219899803  
 Sensor: 1200C143659803 K<sub>o</sub>: 12500  
 Last Calibration Date\*: 18 May 2013

\*Remarks: Recommended interval for hardware calibration is 1 year

### Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): 786 CPM  
 Sensitivity Adjustment Scale Setting (After Calibration): 786 CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration <sup>1</sup> (mg/m <sup>3</sup> ) Y-axis	Total Count <sup>2</sup>	Count/ Minute <sup>3</sup> X-axis
			Temp (°C)	R.H. (%)			
1	18-05-13	12:15 - 13:15	28.1	78	0.04685	2005	33.42
2	18-05-13	13:15 - 14:15	28.1	78	0.04941	2121	35.35
3	18-05-13	14:15 - 15:15	28.2	77	0.05127	2194	36.57
4	18-05-13	15:15 - 16:15	28.1	78	0.05060	2167	36.12

Note: 1. Monitoring data was measured by Rupprecht & Patashnick TEOM®  
 2. Total Count was logged by Laser Dust Monitor  
 3. Count/minute was calculated by (Total Count/60)

By Linear Regression of Y or X

Slope (K-factor): 0.0014  
 Correlation coefficient: 0.9987

Validity of Calibration Record: 17 May 2014

Remarks:

QC Reviewer: YW Fung Signature:  Date: 20 May 2013



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**APPENDIX B**

**Baseline Monitoring Schedule**

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**Agreement No. CE 58/2000**

**Design & Construction Assignment for Widening of Tolo Highway / Fanling Highway between Island House Interchange and Fanling Stage 2 - Between Tai Hang and Wo Hop Shek Interchange**

**Environmental Baseline Monitoring Schedule**

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1-Oct	2-Oct	3-Oct	4-Oct	5-Oct
6-Oct	7-Oct	8-Oct	9-Oct	10-Oct	11-Oct	12-Oct
						Air Quality Monitoring (AM1)
13-Oct	14-Oct	15-Oct	16-Oct	17-Oct	18-Oct	19-Oct
<b>Public Holiday</b>	<b>Public Holiday</b>	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)
20-Oct	21-Oct	22-Oct	23-Oct	24-Oct	25-Oct	26-Oct
<b>Public Holiday</b>	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)
27-Oct	28-Oct	29-Oct	30-Oct	31-Oct		
<b>Public Holiday</b>	Air Quality Monitoring (AM1)	Air Quality Monitoring (AM1)				

**Baseline Air Quality Monitoring Station**

AM1 Fanling Government Secondary School

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**APPENDIX C**

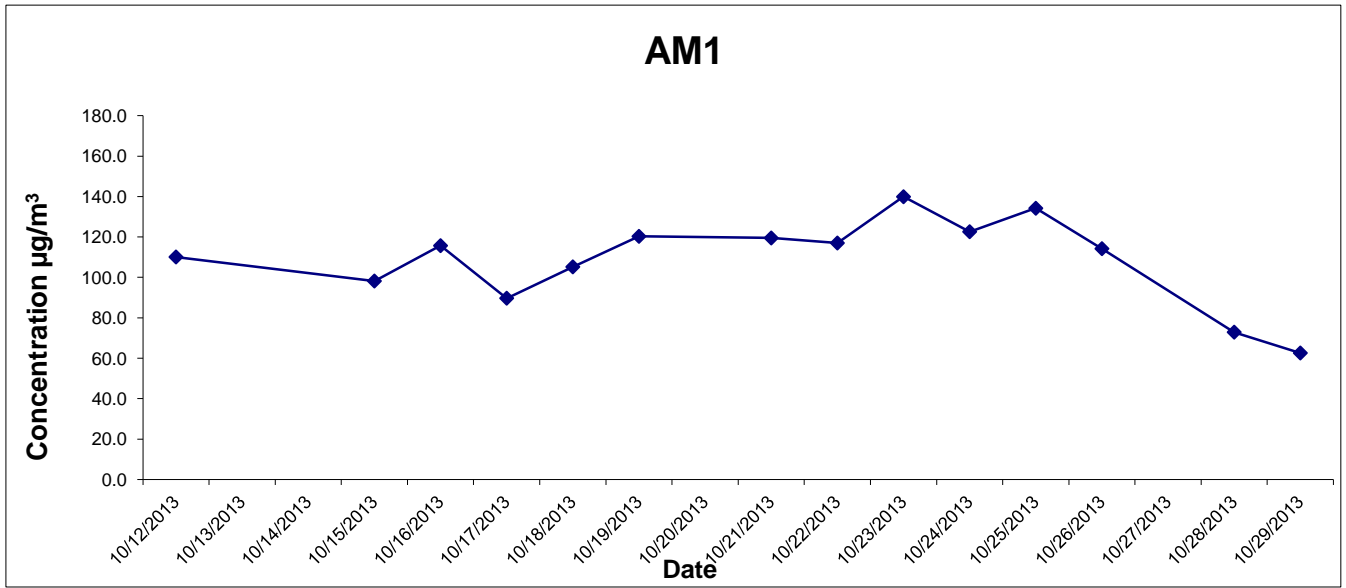
**Baseline Air Quality Monitoring Results**

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**Appendix C**  
**Baseline Air Quality Monitoring Results**

**24-hour TSP Monitoring Results at Station AM1 - Fanling Government Secondary School**

Date	Weather Condition	Air Temp. (°C)	Atmospheric Pressure(hPa)	Flow Rate (m <sup>3</sup> /min.)		Av. flow (m <sup>3</sup> /min)	Total vol. (m <sup>3</sup> )	Filter Weight (g)		Particulate weight(g)	Elapse Time		Sampling Time(hrs.)	Conc. (µg/m <sup>3</sup> )
				Initial	Final			Initial	Final		Initial	Final		
12-Oct-13	Sunny	26.2	1011.0	1.314	1.314	1.314	1892.2	2.8127	3.0210	0.2083	2865.65	2889.65	24.00	110
15-Oct-13	Sunny	25.6	1013.5	1.314	1.314	1.314	1892.2	2.7860	2.9719	0.1859	2889.65	2913.65	24.00	98
16-Oct-13	Sunny	24.7	1017.2	1.314	1.314	1.314	1893.2	2.8185	3.0374	0.2189	2913.65	2937.65	24.00	116
17-Oct-13	Fine	24.0	1018.9	1.314	1.314	1.314	1852.7	2.8160	2.9822	0.1662	2937.65	2961.15	23.50	90
18-Oct-13	Fine	23.2	1018.4	1.314	1.314	1.314	1891.4	2.8094	3.0083	0.1989	2961.15	2985.14	23.99	105
19-Oct-13	Fine	23.0	1017.8	1.314	1.314	1.314	1892.2	2.8168	3.0445	0.2277	2985.14	3009.14	24.00	120
21-Oct-13	Fine	22.8	1015.2	1.314	1.314	1.314	1892.2	2.8039	3.0301	0.2262	3009.14	3033.14	24.00	120
22-Oct-13	Sunny	22.7	1015.6	1.314	1.314	1.314	1892.2	2.8010	3.0224	0.2214	3033.14	3057.14	24.00	117
23-Oct-13	Sunny	21.9	1014.5	1.314	1.314	1.314	1892.2	2.8071	3.0718	0.2647	3057.14	3081.14	24.00	140
24-Oct-13	Sunny	21.3	1013.1	1.314	1.314	1.314	1892.2	2.8102	3.0422	0.2320	3081.14	3105.14	24.00	123
25-Oct-13	Sunny	21.6	1015.4	1.314	1.314	1.314	1884.3	2.8071	3.0600	0.2529	3105.14	3129.04	23.90	134
26-Oct-13	Sunny	19.4	1018.3	1.314	1.314	1.314	1892.2	2.8266	3.0427	0.2161	3129.04	3153.04	24.00	114
28-Oct-13	Sunny	20.9	1018.7	1.314	1.314	1.314	1892.2	2.8189	2.9569	0.1380	3153.04	3177.04	24.00	73
29-Oct-13	Sunny	22.1	1018.6	1.314	1.314	1.314	1890.6	2.8083	2.9266	0.1183	3177.04	3201.02	23.98	63
													Average	108.7
													Min	63.0
													Max	140.0



**Appendix C**  
**Baseline Air Quality Monitoring Results**

**1-hour TSP Monitoring Results at Station AM1**  
**Fanling Government Secondary School**

Date	Start Time (hh:mm)	1st Hour	2nd Hour	3rd Hour
		Conc. ( $\mu\text{g}/\text{m}^3$ )	Conc. ( $\mu\text{g}/\text{m}^3$ )	Conc. ( $\mu\text{g}/\text{m}^3$ )
12-Oct-13	9:30	83.2	83.2	83.4
15-Oct-13	9:37	59.0	59.1	59.2
16-Oct-13	9:45	106.0	105.9	106.3
17-Oct-13	9:35	176.0	176.2	176.6
18-Oct-13	9:45	80.0	80.2	80.3
19-Oct-13	9:36	103.9	103.9	103.7
21-Oct-13	9:40	121.0	121.1	121.2
22-Oct-13	9:45	127.5	127.3	127.4
23-Oct-13	9:48	137.0	136.8	136.7
24-Oct-13	9:35	95.0	95.1	95.2
25-Oct-13	9:42	124.3	124.4	124.4
26-Oct-13	9:45	96.0	96.0	96.1
28-Oct-13	9:37	94.9	94.8	94.8
29-Oct-13	9:39	56.6	56.6	56.6
Average				104.4
Min				56.6
Max				176.6

