Environmental Permit No. EP-364/2009

Air Quality Baseline Monitoring Report

22 April 2010

Chung Shun Boring Eng. Co., Ltd.

Contract No. HK/2009/04
Wan Chai Development Phase II and
Central – Wan Chai Bypass –
Baseline Sampling, Field Measurement and
Testing Works

Baseline Air Quality Monitoring Report
(for EP-364/2009)

	Name	Signature
Prepared by:	Chung Shun Boring Eng. Co. Ltd.	-
Certified by:	Environmental Team Leader – Mr. Andy W L Chung	

22 April 2010

CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

EXECUTIVE SUMMARY

The baseline air quality monitoring was carried out between 4 December 2009 and 17 December 2009 for all designated air quality monitoring locations described in the updated EM&A Manual. Air quality was recorded in terms of 1-hour Total Suspended Particulates (TSP) and 24-hour TSP.

The monitoring results were presented in this report and no major pollution source and extreme weather, which might affect the results, were observed during the baseline monitoring period.

The averaged 1-hour TSP levels and 24-hour TSP levels at 5 monitoring locations are summarized as follows:

Air Quality Monitoring location	CMA2a	CMA3	CMA4a	CMA5	MA1b
Averaged 1-hr TSP (μg/m^3)	112.9	94.3	96.2	126.1	115.6
Averaged 24-hr TSP (μg/m^3)	60.7	63.1	63.4	78.5	66.7

The Action and Limit Levels for air quality impact monitoring were derived based on the criteria adopted from the updated EM&A Manual.

1 INTRODUCTION

1.1 Background

1.1.1 The Project, "Design and Construction of Central – Wan Chai Bypass and Island Eastern Corridor Link", involves the construction and operation of a trunk road that connects the Rumsey Street Flyover Extension (Route 7) and the Island Eastern Corridor (Route 8) to form an east-west strategic route along the Central and Wan Chai Reclamation.

1.1.2 The scope of the CWB includes:

- an interchange (the Central Interchange) with slip roads to the distributor road system on the Central Reclamation Phase I (CRI);
- a dual three-lane trunk road tunnel approximately 2.3 km in length between Central and Causeway Bay forming the Central – Causeway Bay Tunnel, with an eastbound exit to the Hong Kong Convention and Exhibition Centre (HKCEC) Area;
- two separate two-lane single-way tunnels about 0.7 km in length from the Hong Kong Convention and Exhibition Centre (HKCEC) to Causeway Bay forming the Wan Chai Bypass; and
- tunnel control buildings, ventilation buildings, operations areas and parking for operation, maintenance and recovery vehicles.

1.1.3 The scope of the IECL includes:

- a dual four-lane trunk road about 1 km in length linking the CWB and the Island Eastern Corridor;
- slip roads from the trunk road connecting to Victoria Park Road and Hing Fat Street;
- realignment of Victoria Park Road eastbound and provision of road connections to the reclamation area; and
- associated road lighting, road signing, traffic control and surveillance systems.

1.1.4 Some of the works of the CWB & IECL will be constructed on land reclaimed under Territory Development Department (TDD) projects CRIII and WDII. In order to minimise the construction interface with these projects, the construction of tunnel box structure within the CRIII and WDII areas are proposed to be entrusted to TDD's CRIII and WDII projects, respectively. Apart from the entrusted works, the works of the CWB & IECL will be divided into three work packages and constructed by HyD's contractors. All work packages for the CWB & IECL are summarised as follows:

- Entrusted Works in CRIII Area
- Entrusted Works in WDII Area
- Central Interchange
- IECL
- Tunnel Building, E&M Installation and Ancillary Works (including the overall E&M works and tunnel cladding works in CRIII and WDII areas)

1.2 Purpose of Baseline Air Quality 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 at 5 air quality monitoring locations described in the updated EM&A Manual. The baseline monitoring results for noise will be presented in the individual baseline monitoring reports.

2 AIR QUALITY MONITORING

2.1 Monitoring Requirements

2.1.1 In accordance with the updated EM&A Manual, baseline 1-hour and 24-hour TSP levels at 5 air quality monitoring stations should be established by conducting baseline 1-hour and 24-hour TSP monitoring for at least 14 days.

2.2 Monitoring Equipment

2.2.1 The 24-hour TSP air quality monitoring was performed using High Volume Sampler (HVS) located at each designated 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**.

Table 2.1 Air Quality Monitoring Equipment

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

2.3 Monitoring Locations

2.3.1 In accordance with the updated EM&A Manual, the air quality monitoring stations for baseline air quality monitoring is presented in **Table 2.2** and shown in **Figure 2.1**.

Table 2.2 Baseline Air Quality Monitoring Stations

Monitoring Location	Description	Level (in terms of no. of floor)
CMA2a	Causeway Bay – Causeway Bay Community Centre	4
CMA3	Causeway Bay – Royal Hong Kong Yacht Club	3 (roof-top)
CMA4a	Wanchai – Society for the Prevention of Cruelty to Animals (SPCA)	6 (roof-top)
CMA5	Wanchai – Pedestrian Plaza	0
MA1b	Central – Harbour Building	24 (roof-top)

2.4 Monitoring Parameters, Frequency and Duration

2.4.1 The monitoring parameters, frequency and duration of air quality monitoring are summarized in **Table 2.3**.

Table 2.3 Air Quality Monitoring Parameters, Frequency and Duration

Parameter	Frequency and Duration
1-hour TSP	3 times (at three consecutive hours) per day while the highest dust impact was expected, for 14 days
24-hour TSP	Daily, for 14 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 was provided.
(ii) The distance between the HVS and any obstacles, such as buildings, was at least twice the height that the obstacle protrudes above the HVS.
(iii) A minimum of 2 meters separation from walls, parapets and penthouse for rooftop sampler.
(iv) No furnace or incinerator flues nearby.
(v) Airflow around the sampler was unrestricted.
(vi) Permission was obtained to set up the samplers and access to the monitoring stations.
(vii) A secured supply of electricity was obtained to operate the samplers.
(viii) The sampler was located more than 20 meters from any dripline.
(ix) Any wire fence and gate, required to protect the sampler, did not obstruct the monitoring process.
(x) Flow control accuracy was kept within ±2.5% deviation over 24-hour sampling period.

(b) Preparation of Filter Papers

(i) Glass fibre filters, G810 were labelled and sufficient filters that were clean and without pinholes were selected.
(ii) All filters were equilibrated in the conditioning environment for 24 hours before weighing. The conditioning environment temperature was around 25 °C and not variable by more than ±3 °C; the relative humidity (RH) was < 50% and not variable by more than ±5%. A convenient working RH was 40%.
(iii) All filter papers were prepared and analysed by ALS Technichem (HK) Pty Ltd. 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 aluminum 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) On site temperature and atmospheric pressure readings were taken and the flow rate of the HVS was checked and adjusted at around 1.1 m^3/min, and complied with the range specified in the updated EM&A Manual (i.e. 0.6-1.7 m^3/min).
(x) The programmable digital timer was set for a sampling period of 24 hrs, 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, on site temperature and atmospheric pressure readings were taken and 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 laboratory for analysis.

(d) Maintenance and Calibration

(i) The HVS and its accessories were maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
(ii) HVSs were calibrated at 2-month intervals using TE-5025A Calibration Kit prior to the commencement of baseline monitoring.
(iii) Calibration certificate of the HVSs are provided in **Appendix A**.

2.5.2 1-hour TSP Monitoring

(a) Measuring Procedures

The measuring procedures of the 1-hour dust meter were 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 1-hour and 24-hour monitoring was carried out from 4 December 2009 to 17 December 2009 for consecutive 14 days and the weather were mostly sunny. Major dust sources were from nearby traffic emissions.

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

Table 2.4 Summary of 1-hour TSP Baseline Monitoring Results

Parameter	Monitoring Location	Average (μg/m^3)	Range (μg/m^3)
1-hour TSP Level in μg/m^3	CMA2a	112.9	69.6 – 181.4
	CMA3	94.3	53.5 – 142.0
	CMA4a	96.2	64.7 – 140.8
	CMA5	126.1	72.4 – 185.1
	MA1b	115.6	45.2 – 175.5

Table 2.5 Summary of 24-hour TSP Baseline Monitoring Results

Parameter	Monitoring Location	Average (μg/m^3)	Range (μg/m^3)
24-hour TSP Level in μg/m^3	CMA2a	60.7	18.0 – 124.0
	CMA3	63.1	27.0 – 123.0
	CMA4a	63.4	9.0 – 119.0
	CMA5	78.5	37.0 – 132.0
	MA1b	66.7	13.0 – 129.0

2.7 Event and Action Levels

2.7.1 The air quality monitoring results, in terms of 1-hour TSP and 24-hour TSP, were below the Limit Level set out in the Air Quality Objective (AQO) at both monitoring locations.

2.7.2 The Action and Limit Levels for air quality impact monitoring were based on the criteria adopted from the updated 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 μg/m^3	For baseline level ≤ 200 μg/m^3, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 200 μg/m^3 Action level = Limit level	260 μg/m^3
1-hour TSP Level in μg/m^3	For baseline level ≤ 384 μg/m^3, Action level = (baseline level * 1.3 + Limit level)/2; For baseline level > 384 μg/m^3, Action level = Limit level	500 μg/m^3

2.7.3 The derived Action and Limit levels are presented in **Table 2.7**.

Table 2.7 Derived Action and Limit Levels for Air Quality

Parameter	Monitoring Location	Action Level (μg/m^3)	Limit Level (μg/m^3)
1-hour TSP Level in μg/m^3	CMA2a	323.4	500
	CMA3	311.3	500
	CMA4a	312.5	500
	CMA5	332.0	500
	MA1b	325.1	500
24-hour TSP Level in μg/m^3	CMA2a	169.5	260
	CMA3	171.0	260
	CMA4a	171.2	260
	CMA5	181.0	260
	MA1b	173.4	260

2.8 Event and Action Plan

2.8.1 Should non-compliance of the air quality criteria occur, actions in accordance with the Action Plan in **Table 2.8** shall be carried out.

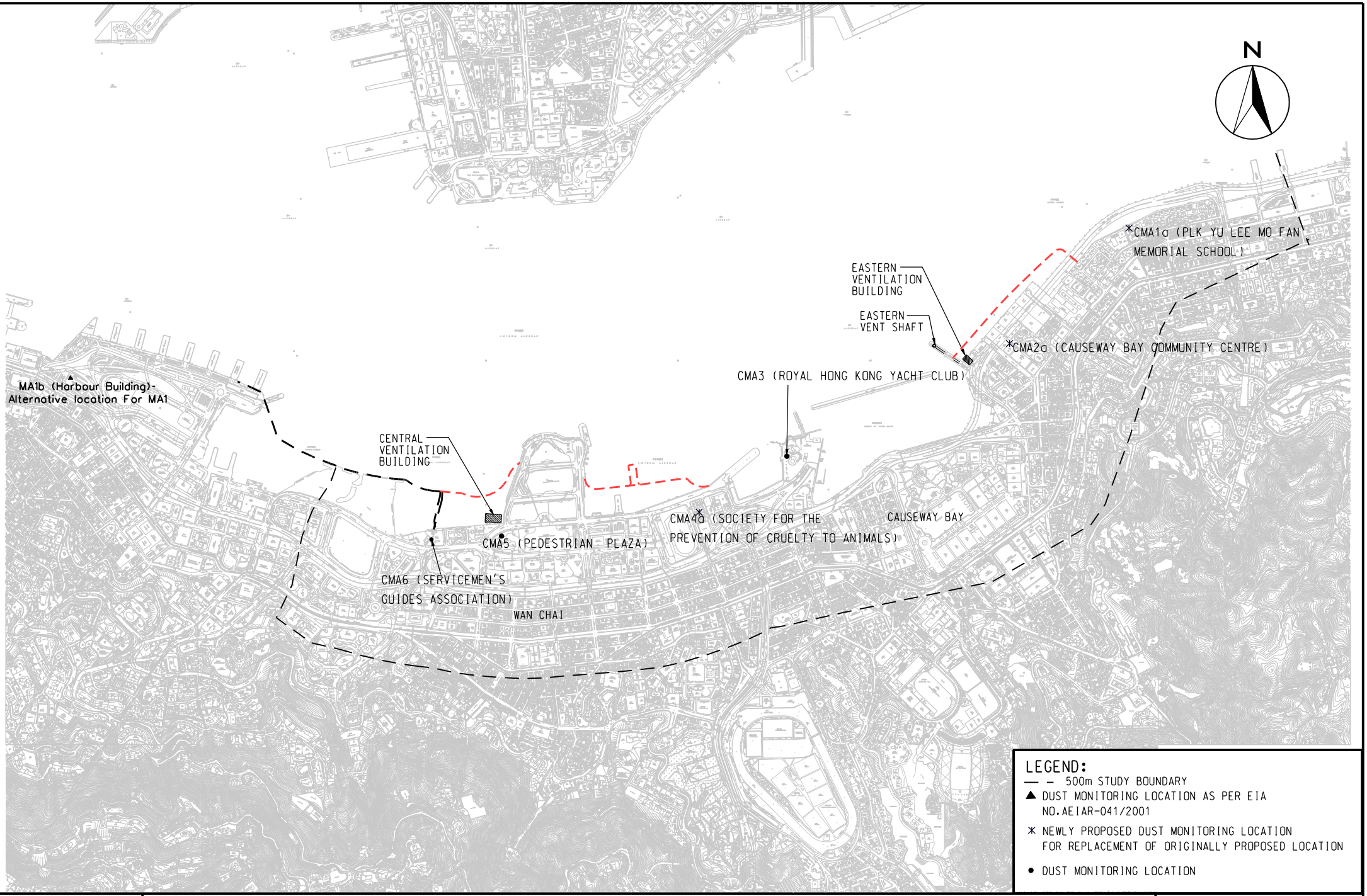
Table 2.8 Event / Action Plan for Construction Air Quality

EVENT	ACTION			
	ET	IEC	ER	CONTRACTOR
ACTION LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform IEC and ER; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Notify Contractor. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Rectify any unacceptable practice; 2. Amend working methods if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified)
2. Exceedance for two or more consecutive samples	1. Identify source; 2. Inform IEC and ER; 3. Advise the ER on the effectiveness of the proposed remedial measures; 4. Repeat measurements to confirm findings; 5. Increase monitoring frequency to daily; 6. Discuss with IEC and Contractor on remedial actions required; 7. If exceedance continues, arrange meeting with IEC and ER; 8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ET on the effectiveness of the proposed remedial measures; 5. Supervise Implementation of remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Submit proposals for remedial to ER within 3 working days of notification; 2. Implement the agreed proposals; 3. Amend proposal if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified)
LIMIT LEVEL				
1. Exceedance for one sample	1. Identify source, investigate the causes of exceedance and propose remedial measures; 2. Inform ER, Contractor and EPD; 3. Repeat measurement to confirm finding; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Check monitoring data submitted by ET; 2. Check Contractor's working method; 3. Discuss with ET and Contractor on possible remedial measures; 4. Advise the ER on the effectiveness of the proposed remedial measures; 5. Supervise implementation of remedial measures. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Ensure remedial measures properly implemented. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Amend proposal if appropriate. (The above actions should be taken within 2 working days after the exceedance is identified)
2. Exceedance for two or more consecutive samples	1. Notify IEC, ER, Contractor and EPD; 2. Identify source; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented; 6. Arrange meeting with IEC and ER to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep IEC, EPD and ER informed of the results; 8. If exceedance stops, cease additional monitoring. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Discuss amongst ER, ET, and Contractor on the potential remedial actions; 2. Review Contractor's remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly; 3. Supervise the implementation of remedial measures.	1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. In consolidation with the IEC, agree with the Contractor on the remedial measures to be implemented; 4. Ensure remedial measures properly implemented; 5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified)	1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to IEC within 3 working days of notification; 3. Implement the agreed proposals; 4. Resubmit proposals if problem still not under control; 5. Stop the relevant portion of works as determined by the ER until the exceedance is abated. (The above actions should be taken within 2 working days after the exceedance is identified)

3 CONSLUSIONS AND RECOMMENDATIONS

3.1.1 Baseline air quality monitoring was carried out from 4 December 2009 to 17 December 2009 at 5 monitoring locations. Action Levels for air quality at each location were derived from the baseline monitoring results. No recommendation was provided in this baseline air quality monitoring report.

Figure



WAN CHAI DEVELOPMENT PHASE II - PLANNING AND ENGINEERING REVIEW

LOCATIONS OF AIR QUALITY MONITORING STATIONS

FIGURE 2.1

Appendix A

Calibration Certificates of

Monitoring Equipment

TSP High Volume Sampler
Field Calibration Report

Station	Causeway Bay Community Centre - CMA2a	Next Due Date:	3-Mar-10
Cal. Date:	3-Dec-09	Serial No.	10281
Equipment No.:	A-001-09T		

Ambient Condition			
Temperature, Ta (K)	292.7	Pressure, Pa (mmHg)	768.5

Orifice Transfer Standard Information					
Serial No:	0843	Slope, mc	2.00851	Intercept, bc	-0.02006
Last Calibration Date:	6-Nov-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	6-Nov-10	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

.

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.7	3.32	1.66	52.0	52.76
13	8.6	2.98	1.49	46.0	46.67
10	6.8	2.65	1.33	40.0	40.59
7	4.2	2.08	1.05	34.0	34.50
5	2.5	1.60	0.81	26.0	26.38

By Linear Regression of Y on X

Slope , mw = 29.9021 Intercept, bw = 2.2925

Correlation Coefficient* = 0.9918

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 40.57

Remarks:

TSP High Volume Sampler
Field Calibration Report

Station	Yacht Club - CMA3	Next Due Date:	11-Feb-10
Cal. Date:	11-Nov-09	Serial No.	9469
Equipment No.:	A-001-47T		

Ambient Condition			
Temperature, Ta (K)	300.5	Pressure, Pa (mmHg)	759.5

Orifice Transfer Standard Information					
Serial No:	1559	Slope, mc	1.97702	Intercept, bc	-0.0007
Last Calibration Date:	18-May-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	18-May-10	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

.

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	9.7	3.10	1.57	56.0	55.75
13	7.4	2.71	1.37	50.0	49.78
10	6.2	2.48	1.25	44.0	43.80
7	4.0	1.99	1.01	34.0	33.85
5	2.4	1.54	0.78	22.0	21.90

By Linear Regression of Y on X

Slope , mw = 43.2566 Intercept, bw = -10.7267

Correlation Coefficient* = 0.9920

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 45.71

Remarks:

TSP High Volume Sampler
Field Calibration Report

Station	SPCA - CMA4a	Next Due Date:	13-Feb-10
Cal. Date:	13-Nov-09	Serial No.	10377
Equipment No.:	A-001-10T		

Ambient Condition			
Temperature, Ta (K)	295.7	Pressure, Pa (mmHg)	763.4

Orifice Transfer Standard Information					
Serial No:	1559	Slope, mc	1.97702	Intercept, bc	-0.0007
Last Calibration Date:	18-May-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	18-May-10	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

.

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.5	3.26	1.65	56.0	56.34
13	8.3	2.90	1.47	50.0	50.31
10	6.4	2.55	1.29	44.0	44.27
7	4.2	2.06	1.04	36.0	36.22
5	2.6	1.62	0.82	28.0	28.17

By Linear Regression of Y on X

Slope , mw = 33.8756 Intercept, bw = 0.5959

Correlation Coefficient* = 0.9997

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 44.36

Remarks:

TSP High Volume Sampler
Field Calibration Report

Station	Pedestrian Plaza - CMA5	Next Due Date:	4-Mar-10
Cal. Date:	4-Dec-09	Serial No.	1293
Equipment No.:	A-001-26T		

Ambient Condition			
Temperature, Ta (K)	293.1	Pressure, Pa (mmHg)	767.4

Orifice Transfer Standard Information					
Serial No:	0843	Slope, mc	2.00851	Intercept, bc	-0.02006
Last Calibration Date:	6-Nov-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	6-Nov-10	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

.

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.5	3.28	1.64	54.0	54.71
13	8.5	2.95	1.48	50.0	50.66
10	6.6	2.60	1.31	44.0	44.58
7	4.1	2.05	1.03	36.0	36.48
5	2.5	1.60	0.81	26.0	26.34

By Linear Regression of Y on X

Slope , mw = 33.5509 Intercept, bw = 0.4796

Correlation Coefficient* = 0.9910

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 43.52

Remarks:

TSP High Volume Sampler
Field Calibration Report

Station	Harbour Building - MA1b	Next Due Date:	4-Mar-10
Cal. Date:	4-Dec-09	Serial No.	10378
Equipment No.:	A-001-06T		

Ambient Condition			
Temperature, Ta (K)	293.6	Pressure, Pa (mmHg)	767.1

Orifice Transfer Standard Information					
Serial No:	0843	Slope, mc	2.00851	Intercept, bc	-0.02006
Last Calibration Date:	6-Nov-09	$mc \times Qstd + bc = [DH \times (Pa/760) \times (298/Ta)]^{1/2}$			
Next Calibration Date:	6-Nov-10	$Qstd = \{[DH \times (Pa/760) \times (298/Ta)]^{1/2} - bc\} / mc$			

.

Calibration of TSP Sampler					
Resistance Plate No.	Orfice			HVS Flow Recorder	
	DH (orifice), in. of water	$[DH \times (Pa/760) \times (298/Ta)]^{1/2}$	Qstd (m^3/min) X - axis	Flow Recorder Reading (CFM)	Continuous Flow Recorder Reading IC (CFM) Y-axis
18	10.4	3.26	1.64	50.0	50.61
13	8.3	2.92	1.46	44.0	44.54
10	6.2	2.52	1.26	38.0	38.46
7	4.0	2.02	1.02	32.0	32.39
5	2.5	1.60	0.81	24.0	24.29

By Linear Regression of Y on X

Slope , mw = 30.7691 Intercept, bw = -0.0126

Correlation Coefficient* = 0.9954

*If Correlation Coefficient < 0.990, check and recalibrate.

Set Point Calculation

From the TSP Field Calibration Curve, take Qstd = 1.30m^3/min

From the Regression Equation, the "Y" value according to

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

Therefore, Set Point; $IC = (mw \times Qstd + bw) \times [(760 / Pa) \times (Ta / 298)]^{1/2} =$ 39.51

Remarks:

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***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*
Serial No: Control: *140AB219899803*
Sensor: *1200C143659803* K_o: *12500*
Last Calibration Date*: *5 June 2009*

*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[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	*06-06-09*	*09:00 - 10:00*	*30.2*	*76*	*0.04175*	*1392*	*23.20*
2	*06-06-09*	*10:00 - 11:00*	*30.6*	*76*	*0.03983*	*1330*	*22.17*
3	*06-06-09*	*11:00 - 12:00*	*31.0*	*75*	*0.04025*	*1339*	*22.31*
4	*06-06-09*	*13:00 - 14:00*	*31.2*	*76*	*0.04271*	*1426*	*23.77*

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): *0.0018*
Correlation coefficient: *0.9965*

Validity of Calibration Record: *5 June 2010*

Remarks:

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***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*

Serial No: Control: *140AB219899803*

Sensor: *1200C143659803* K_o: *12500*

Last Calibration Date*: *5 June 2009*

*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[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	*06-06-09*	*14:00 - 15:00*	*31.5*	*75*	*0.04325*	*2046*	*34.10*
2	*06-06-09*	*15:00 - 16:00*	*31.7*	*76*	*0.04278*	*2019*	*33.65*
3	*06-06-09*	*16:00 - 17:00*	*31.4*	*76*	*0.04351*	*2059*	*34.32*
4	*06-06-09*	*17:00 - 18:00*	*31.4*	*75*	*0.04152*	*1965*	*32.75*

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): *0.0013*

Correlation coefficient: *0.9959*

Validity of Calibration Record: *5 June 2010*

Remarks:

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***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*

Serial No: Control: *140AB219899803*

Sensor: *1200C143659803* K_o: *12500*

Last Calibration Date*: *5 June 2009*

*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[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (^oC)	R.H. (%)			
1	*07-06-09*	*09:00 - 10:00*	*30.5*	*76*	*0.04255*	*1546*	*25.77*
2	*07-06-09*	*10:00 - 11:00*	*30.7*	*76*	*0.04233*	*1537*	*25.62*
3	*07-06-09*	*11:00 - 12:00*	*30.7*	*75*	*0.04113*	*1492*	*24.87*
4	*07-06-09*	*12:00 - 13:00*	*30.9*	*76*	*0.04147*	*1507*	*25.12*

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): *0.0017*

Correlation coefficient: *0.9976*

Validity of Calibration Record: *6 June 2010*

Remarks:

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***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*

Serial No: Control: *140AB219899803*

Sensor: *1200C143659803* K_o: *12500*

Last Calibration Date*: *5 June 2009*

*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[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	*08-08-09*	*10:00 - 11:00*	*33.1*	*74*	*0.14066*	*5706*	*95.10*
2	*08-08-09*	*12:00 - 13:00*	*33.1*	*75*	*0.14152*	*5725*	*95.42*
3	*08-08-09*	*14:00 - 15:00*	*33.2*	*75*	*0.14390*	*5833*	*97.22*
4	*08-08-09*	*15:00 - 16:00*	*33.2*	*74*	*0.14540*	*5888*	*98.13*

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: *0.9939*

Validity of Calibration Record: *7 August 2010*

Remarks:

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***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*

Serial No: Control: *140AB219899803*

Sensor: *1200C143659803* K_o: *12500*

Last Calibration Date*: *5 June 2008*

*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[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	*04-07-09*	*11:00 - 12:00*	*29.7*	*78*	*0.03713*	*1498*	*24.97*
2	*04-07-09*	*12:00 - 13:00*	*29.7*	*78*	*0.03520*	*1404*	*23.41*
3	*04-07-09*	*14:00 - 15:00*	*30.1*	*81*	*0.03891*	*1553*	*25.91*
4	*04-07-09*	*15:00 - 16:00*	*30.1*	*81*	*0.04025*	*1618*	*26.97*

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: *0.9907*

Validity of Calibration Record: *3 July 2010*

Remarks:

EQUIPMENT CALIBRATION RECORD

Type:	***Laser Dust Monitor***
Manufacturer/Brand:	***SIBATA***
Model No.:	***LD-3B***
Equipment No.:	***A.005.12a***
Sensitivity Adjustment Scale Setting:	***805 CPM***

Standard Equipment

Equipment: *Rupprecht & Patashnick TEOM®*

Model No.: *Series 1400AB*

Serial No: Control: *140AB219899803*

Sensor: *1200C143659803* K_o: *12500*

Last Calibration Date*: *5 June 2009*

*Remarks: Recommended interval for hardware calibration is 1 year

Calibration Result

Sensitivity Adjustment Scale Setting (Before Calibration): *805* CPM

Sensitivity Adjustment Scale Setting (After Calibration): *805* CPM

Hour	Date (dd-mm-yy)	Time	Ambient Condition		Concentration[1] (mg/m^3) **Y-axis**	Total Count[2]	Count/ Minute[3] **X-axis**
			Temp (°C)	R.H. (%)			
1	*24-10-09*	*08:00 - 09:00*	*29.9*	*74*	*0.03432*	*1302*	*21.70*
2	*24-10-09*	*09:00 - 10:00*	*29.9*	*74*	*0.02947*	*1092*	*18.20*
3	*24-10-09*	*10:00 - 11:00*	*30.0*	*74*	*0.03588*	*1352*	*22.53*
4	*24-10-09*	*11:00 - 12:00*	*30.0*	*76*	*0.02855*	*1078*	*17.97*

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: *0.9924*

Validity of Calibration Record: *23 October 2010*

Remarks:

Appendix B

Baseline Air Quality

Monitoring Data

Appendix B
Baseline Air Quality Monitoring Data

24-hour TSP Monitoring Results at Station CMA2a - Causeway Bay Communtiy Centre

Date	Flow Rate (m^3/min.)		Av. flow	Total vol.	Filter Weight (g)		Particulate	Elapse Time		Sampling	Conc.
	Initial	Final	(m^3/min)	(m^3)	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	(μg/m^3)
4-Dec-09	1.329	1.329	1.329	1913.8	3.6332	3.8710	0.2378	14042.82	14066.85	24.03	124
5-Dec-09	1.329	1.329	1.329	1913.8	3.5718	3.7770	0.2052	14066.85	14090.85	24.00	107
6-Dec-09	1.329	1.329	1.329	1913.8	3.4940	3.6781	0.1841	14090.85	14114.85	24.00	96
7-Dec-09	1.329	1.329	1.329	1913.8	3.5647	3.6483	0.0836	14114.85	14138.85	24.00	44
8-Dec-09	1.329	1.329	1.329	1913.8	3.5047	3.5393	0.0346	14138.85	14162.85	24.00	18
9-Dec-09	1.329	1.329	1.329	1913.8	3.5094	3.6064	0.0970	14162.85	14186.85	24.00	51
10-Dec-09	1.329	1.329	1.329	1913.8	3.5025	3.5480	0.0455	14186.85	14210.85	24.00	24
11-Dec-09	1.329	1.329	1.329	1913.8	3.5182	3.6069	0.0887	14210.85	14234.85	24.00	46
12-Dec-09	1.329	1.329	1.329	1913.8	3.5151	3.6068	0.0917	14234.85	14258.85	24.00	48
13-Dec-09	1.329	1.329	1.329	1913.8	3.5161	3.7262	0.2101	14258.85	14282.85	24.00	110
14-Dec-09	1.329	1.329	1.329	1913.8	3.5095	3.6036	0.0941	14282.85	14306.85	24.00	49
15-Dec-09	1.329	1.329	1.329	1913.8	3.5278	3.5974	0.0696	14306.85	14330.85	24.00	36
16-Dec-09	1.329	1.329	1.329	1913.8	3.5211	3.6135	0.0924	14330.85	14354.85	24.00	48
17-Dec-09	1.329	1.329	1.329	1913.8	3.4205	3.5120	0.0915	14354.85	14378.85	24.00	48
										Average	60.7
										Min	18.0
										Max	124.0

24-hour TSP Monitoring Results at Station CMA3 - Yacht Club

Date	Flow Rate (m^3/min.)		Av. flow	Total vol.	Filter Weight (g)		Particulate	Elapse Time		Sampling	Conc.
	Initial	Final	(m^3/min)	(m^3)	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	(μg/m^3)
4-Dec-09	1.313	1.313	1.313	1890.7	3.6238	3.8571	0.2333	25087.84	25111.84	24.00	123
5-Dec-09	1.313	1.313	1.313	1890.7	3.5973	3.7873	0.1900	25101.84	25125.84	24.00	101
6-Dec-09	1.313	1.313	1.313	1887.8	3.8750	4.0694	0.1944	16437.00	16461.00	24.00	103
7-Dec-09	1.313	1.313	1.313	1890.7	3.4958	3.5723	0.0765	25149.84	25173.84	24.00	41
8-Dec-09	1.313	1.313	1.313	1890.7	3.4100	3.4608	0.0508	25173.84	25197.84	24.00	27
9-Dec-09	1.313	1.313	1.313	1890.7	3.5056	3.5843	0.0787	25197.84	25221.84	24.00	42
10-Dec-09	1.313	1.313	1.313	1890.7	3.5086	3.6598	0.1512	25221.84	25245.84	24.00	80
11-Dec-09	1.313	1.313	1.313	1890.7	3.5068	3.5814	0.0746	25245.84	25269.84	24.00	40
12-Dec-09	1.313	1.313	1.313	1890.7	3.5327	3.5854	0.0527	25269.84	25293.84	24.00	28
13-Dec-09	1.313	1.313	1.313	1890.7	3.5241	3.7461	0.2220	25293.84	25317.84	24.00	117
14-Dec-09	1.313	1.313	1.313	1890.7	3.8221	3.9202	0.0981	25317.84	25341.84	24.00	52
15-Dec-09	1.313	1.313	1.313	1890.7	3.5226	3.5963	0.0737	25341.84	25365.84	24.00	39
16-Dec-09	1.313	1.313	1.313	1890.7	3.5221	3.6099	0.0878	25365.84	25389.84	24.00	46
17-Dec-09	1.310	1.313	1.312	1890.7	3.4292	3.5163	0.0871	25389.84	25413.84	24.00	46
										Average	63.1
										Min	27.0
										Max	123.0

24-hour TSP Monitoring Results at Station CMA4a - Society for the Prevention of Cruelty to Animals

Date	Flow Rate (m^3/min.)		Av. flow	Total vol.	Filter Weight (g)		Particulate	Elapse Time		Sampling	Conc.
	Initial	Final	(m^3/min)	(m^3)	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	(µg/m^3)
4-Dec-09	1.311	1.311	1.311	1887.8	3.5616	3.7736	0.2120	16389.00	16413.00	24.00	112
5-Dec-09	1.311	1.311	1.311	1887.8	3.5901	3.7775	0.1874	16413.00	16437.00	24.00	99
6-Dec-09	1.311	1.311	1.311	1887.8	3.8750	4.0694	0.1944	16437.00	16461.00	24.00	103
7-Dec-09	1.311	1.311	1.311	1887.8	3.4900	3.5795	0.0895	16461.00	16485.00	24.00	47
8-Dec-09	1.311	1.311	1.311	1887.8	3.8336	3.8689	0.0353	16485.00	16509.00	24.00	19
9-Dec-09	1.311	1.311	1.311	1887.8	3.5568	3.5745	0.0177	16509.00	16533.00	24.00	9
10-Dec-09	1.311	1.311	1.311	1887.8	3.5215	3.7088	0.1873	16533.00	16557.00	24.00	99
11-Dec-09	1.311	1.311	1.311	1887.8	3.5160	3.6025	0.0865	16557.00	16581.00	24.00	46
12-Dec-09	1.311	1.311	1.311	1887.8	3.5312	3.6419	0.1107	16581.00	16605.00	24.00	59
13-Dec-09	1.311	1.311	1.311	1887.8	3.5232	3.7482	0.2250	16581.00	16605.00	24.00	119
14-Dec-09	1.311	1.311	1.311	1887.8	3.8450	3.9404	0.0954	16605.00	16629.00	24.00	51
15-Dec-09	1.311	1.311	1.311	1887.8	3.5250	3.5967	0.0717	16629.00	16653.00	24.00	38
16-Dec-09	1.311	1.311	1.311	1887.8	3.5231	3.6030	0.0799	16653.00	16677.00	24.00	42
17-Dec-09	1.311	1.311	1.311	1887.8	3.4286	3.5102	0.0816	16677.00	16701.00	24.00	43
										Average	63.4
										Min	9.0
										Max	119.0

24-hour TSP Monitoring Results at Station CMA5 - Pedestrian Plaza

Date	Flow Rate (m^3/min.)		Av. flow	Total vol.	Filter Weight (g)		Particulate	Elapse Time		Sampling	Conc.
	Initial	Final	(m^3/min)	(m^3)	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	(µg/m^3)
4-Dec-09	1.327	1.327	1.327	1871.1	3.6025	3.8500	0.2475	10193.11	10216.61	23.50	132
5-Dec-09	1.327	1.327	1.327	1871.1	3.5717	3.7903	0.2186	10216.61	10240.11	23.50	117
6-Dec-09	1.327	1.327	1.327	1910.9	3.8478	4.0191	0.1713	10240.11	10264.11	24.00	90
7-Dec-09	1.327	1.327	1.327	1871.1	3.5537	3.6628	0.1091	10264.11	10287.61	23.50	58
8-Dec-09	1.327	1.327	1.327	1910.9	3.5062	3.5769	0.0707	10287.61	10311.61	24.00	37
9-Dec-09	1.327	1.327	1.327	1910.9	3.5102	3.6943	0.1841	10311.61	10335.61	24.00	96
10-Dec-09	1.327	1.327	1.327	1910.9	3.5181	3.7005	0.1824	10335.61	10359.61	24.00	96
11-Dec-09	1.327	1.327	1.327	1910.9	3.5176	3.6280	0.1104	10359.61	10383.61	24.00	58
12-Dec-09	1.327	1.327	1.327	1910.9	3.5224	3.6690	0.1466	10383.61	10407.61	24.00	77
13-Dec-09	1.327	1.327	1.327	1910.9	3.5171	3.7554	0.2383	10409.61	10433.61	24.00	125
14-Dec-09	1.327	1.327	1.327	1910.9	3.5206	3.5951	0.0745	10433.61	10457.61	24.00	39
15-Dec-09	1.327	1.327	1.327	1919.9	3.5358	3.6153	0.0795	10457.61	10481.61	24.00	42
16-Dec-09	1.327	1.327	1.327	1910.9	3.5238	3.6392	0.1154	10481.61	10505.61	24.00	60
17-Dec-09	1.327	1.327	1.327	1910.9	3.4238	3.5625	0.1387	10505.61	10529.61	24.00	73
										Average	78.5
										Min	37.0
										Max	132.0

24-hour TSP Monitoring Results at Station MA1b - Harbour Building

Date	Flow Rate (m^3/min.)		Av. flow	Total vol.	Filter Weight (g)		Particulate	Elapse Time		Sampling	Conc.
	Initial	Final	(m^3/min)	(m^3)	Initial	Final	weight(g)	Initial	Final	Time(hrs.)	($\mu g/m^3$)
4-Dec-09	1.333	1.333	1.333	1919.5	3.5700	3.8047	0.2347	9410.53	9434.53	24.00	122
5-Dec-09	1.333	1.333	1.333	1919.5	3.5706	3.7901	0.2195	9434.53	9458.53	24.00	114
6-Dec-09	1.333	1.333	1.333	1919.5	3.4961	3.6702	0.1741	9458.53	9482.53	24.00	91
7-Dec-09	1.333	1.333	1.333	1919.5	3.5095	3.5349	0.0254	9482.53	9506.53	24.00	13
8-Dec-09	1.333	1.333	1.333	1919.5	3.5580	3.6164	0.0584	9506.53	9530.53	24.00	30
9-Dec-09	1.333	1.333	1.333	1919.5	3.5130	3.6046	0.0916	9530.53	9554.53	24.00	48
10-Dec-09	1.333	1.333	1.333	1919.5	3.5051	3.6790	0.1739	9554.53	9578.53	24.00	91
11-Dec-09	1.333	1.333	1.333	1919.5	3.5191	3.6049	0.0858	9578.53	9602.53	24.00	45
12-Dec-09	1.333	1.333	1.333	1919.5	3.5391	3.6347	0.0956	9602.53	9626.53	24.00	50
13-Dec-09	1.333	1.333	1.333	1919.5	3.5197	3.7677	0.2480	9626.53	9650.53	24.00	129
14-Dec-09	1.333	1.333	1.333	1919.5	3.5257	3.6195	0.0938	9650.53	9674.53	24.00	49
15-Dec-09	1.333	1.333	1.333	1919.5	3.5327	3.6117	0.0790	9674.53	9698.53	24.00	41
16-Dec-09	1.333	1.333	1.333	1919.5	3.4288	3.5321	0.1033	9698.53	9722.53	24.00	54
17-Dec-09	1.333	1.333	1.333	1919.5	3.4282	3.5361	0.1079	9722.53	9746.53	24.00	56
										Average	66.7
										Min	13.0
										Max	129.0

Appendix B
Baseline Air Quality Monitoring Data

1-hour TSP Monitoring Results at Station CMA2a
Causeway Bay Community Centre

Date	Start Time (hh:mm)	1st Hour Conc. (µg/m^3)	2nd Hour Conc. (µg/m^3)	3rd Hour Conc. (µg/m^3)
4-Dec-09	12:45	119.7	137.7	161.4
5-Dec-09	10:30	110.7	104.5	106.3
6-Dec-09	9:20	96.8	98.5	99.0
7-Dec-09	13:05	116.6	115.5	113.2
8-Dec-09	13:35	116.0	126.6	125.1
9-Dec-09	13:20	121.2	117.6	110.1
10-Dec-09	9:15	160.1	171.1	181.4
11-Dec-09	13:15	113.1	113.4	123.5
12-Dec-09	10:05	102.5	87.7	92.9
13-Dec-09	14:00	77.4	77.9	78.2
14-Dec-09	9:20	102.5	87.7	92.9
15-Dec-09	13:05	78.2	69.6	84.6
16-Dec-09	12:55	146.7	144.2	138.2
17-Dec-09	9:15	100.4	106.3	115.7
			Average	112.9
			Min	69.6
			Max	181.4

1-hour TSP Monitoring Results at Station CMA3
Yach Club

Date	Start Time (hh:mm)	1st Hour Conc. (µg/m^3)	2nd Hour Conc. (µg/m^3)	3rd Hour Conc. (µg/m^3)
4-Dec-09	9:30	104.0	99.6	109.7
5-Dec-09	14:25	113.5	114.0	114.2
6-Dec-09	10:00	127.1	118.9	102.3
7-Dec-09	9:00	70.7	94.7	78.5
8-Dec-09	17:05	80.5	59.5	53.5
9-Dec-09	9:05	71.3	82.5	75.0
10-Dec-09	13:05	113.2	117.6	121.2
11-Dec-09	9:30	82.1	82.8	83.2
12-Dec-09	9:35	76.6	72.2	88.1
13-Dec-09	10:50	121.9	117.6	124.4
14-Dec-09	9:05	135.2	142.0	134.4
15-Dec-09	10:15	76.3	80.3	75.0
16-Dec-09	9:30	81.2	82.4	83.2
17-Dec-09	9:55	65.0	67.2	69.5
			Average	94.3
			Min	53.5
			Max	142.0

1-hour TSP Monitoring Results at Station CMA4a
Society for the Prevention of Cruelty to Animals

Date	Start Time (hh:mm)	1st Hour Conc. (µg/m^3)	2nd Hour Conc. (µg/m^3)	3rd Hour Conc. (µg/m^3)
4-Dec-09	10:00	86.1	91.7	105.5
5-Dec-09	9:15	87.9	95.5	98.7
6-Dec-09	10:00	117.5	130.1	131.0
7-Dec-09	14:10	89.9	90.8	96.0
8-Dec-09	9:20	88.2	72.7	77.4
9-Dec-09	12:55	82.9	90.8	89.5
10-Dec-09	9:30	113.8	122.4	109.9
11-Dec-09	13:05	119.1	122.9	140.8
12-Dec-09	11:25	102.9	107.7	101.3
13-Dec-09	9:30	90.9	86.6	87.7
14-Dec-09	13:30	91.3	99.9	107.4
15-Dec-09	9:30	85.2	69.7	69.1
16-Dec-09	10:15	90.9	93.9	98.9
17-Dec-09	14:00	64.7	70.5	69.1
			Average	96.2
			Min	64.7
			Max	140.8

1-hour TSP Monitoring Results at Station CMA5
Pedestrian Plaza

Date	Start Time (hh:mm)	1st Hour Conc. (µg/m^3)	2nd Hour Conc. (µg/m^3)	3rd Hour Conc. (µg/m^3)
4-Dec-09	18:45	134.7	139.4	129.4
5-Dec-09	11:10	127.9	126.9	122.1
6-Dec-09	13:35	129.0	135.6	130.1
7-Dec-09	14:05	132.3	129.9	133.7
8-Dec-09	9:05	120.7	124.5	117.6
9-Dec-09	16:35	81.3	90.1	85.3
10-Dec-09	10:15	162.0	166.8	185.1
11-Dec-09	14:30	154.7	183.5	172.6
12-Dec-09	10:05	121.0	134.8	123.7
13-Dec-09	14:05	115.5	118.5	121.8
14-Dec-09	10:25	105.1	108.5	117.5
15-Dec-09	9:30	140.8	145.1	139.4
16-Dec-09	9:20	109.5	122.8	128.9
17-Dec-09	12:35	72.4	82.5	73.8
			Average	126.1
			Min	72.4
			Max	185.1

1-hour TSP Monitoring Results at Station MA1b
Harbour Building

Date	Start Time (hh:mm)	1st Hour Conc. (µg/m^3)	2nd Hour Conc. (µg/m^3)	3rd Hour Conc. (µg/m^3)
4-Dec-09	16:05	149.9	150.3	149.2
5-Dec-09	14:00	112.8	111.4	117.3
6-Dec-09	16:00	164.8	173.2	175.5
7-Dec-09	16:45	139.5	136.3	133.2
8-Dec-09	9:15	51.8	45.2	50.8
9-Dec-09	13:00	86.3	83.7	90.6
10-Dec-09	15:05	149.9	155.4	161.4
11-Dec-09	9:15	124.3	131.3	149.0
12-Dec-09	14:05	118.2	105.3	110.6
13-Dec-09	9:20	101.9	109.4	106.6
14-Dec-09	14:15	102.9	84.4	91.0
15-Dec-09	9:25	120.0	126.3	117.6
16-Dec-09	14:00	89.9	107.5	110.1
17-Dec-09	9:00	88.0	92.0	81.5
			Average	115.6
			Min	45.2
			Max	175.5

Appendix C

Responses to Comments

Environmental Impact Assessment (EIA) Ordinance, Cap. 499
Environmental Permits Nos.: EP-356/2009 & EP-364/2009
Wan Chai Development Phase II and Central-Wan Chai Bypass
Baseline Air Quality Monitoring Report (Dec 2009)

Response to Comment - EPD's letter ref.: (26) in EP2/H4/S3/15 Pt.3 dated 25 January 2010

Comments	Reponses
Initial Comments:	
General:	
(1) The baseline report was submitted to meet the requirements of the capitoned 2 permits. Since the scopes of the two permits are different and the EM&A requirements shall follow the 2 standardalone EM&A Manuals to be approved under each of the 2 permits, two standalone baseline montioring reports shall be submitted to meet the requirements of the 2 permits separately.	As the works under the two separate permits are actually carried out together under a number of works contracts divided geographically, and the EM&A works for all these works contracts (with DPs) are conducted by a single ET and verified by a single IEC, we suggest the updated EM&A Manuals for these two permits are combined into a single volume which is applicable to both EPs, with those EM&A items applicable to only one particular EP properly annotated. This will give a more complete overall picture of the EM&A for the whole Project.
(2) The baseline air quality montiroing shall be conducted to fulfill the standard/established EM&A requirements/guidelines and the relevant requirements in the EM&A Manual (Dec 2007). Please refer to our recent intial comments via our letter dated 19.1.2010 to you on the updated EM&A Manuals submitted in Dec 2009 and ensure the baseline air quality montioring complies with the Manuals to be approved, e.g. to address the odour baseline quality. You may also want to refer to the odour surveys conducted during the EIA study stage.	Two odour surveys including odour patrol and sampling were conducted on Sept-06 and Jul-07 by the Hong Kong Polytechnic University, and the results are included in Appendix 3.13 of the EIA Report for Wan Chai Development Phase II and Central-Wan Chai Bypass (Register No. AEIAR-125/2008). Both Sept-06 and Jul-07 odour patrols and sampling had been carried out during noon/afternoon at low tide condition for capturing the potential worst odour level of that day and hence are considered representative for the odour baseline quality. Hence, the Sept-06 and Jul-07 odour patrols and sampling will be taken as the odour baseline.
Specific:	
Background	
(3) S1.1: The project locations and scopes of the 2 permits are different. The project site of EP-364/2009 includes Central harbourfront area (but not mentioned in s.1.1.1). The term "study area" should be replaced by "proejct area" in the baseline reports where appropriate. S1.1.4 copying from the WDII&CWB EIA report should be amended to suit the corresponding baseline reports.	Noted and the wordings will be revised.

Monitoring equipment for 1-hr TSP Monitoring	
Sections 2.2, 2.5, 2.6 & 2.7 of Baseline Air Quality Montioring Report:	
(4) As stated in S 2.3.1 of the EM&A Manual (Dec 2007) and "*Guidelines for Develoment project in Hong Kong – Environmental Monitoring and Audit*", high volume samplers (HVS) shall be used for carrying out the 1-hour and 24-hour TSP monitoring". The 1-hr TSP montiroign shall be conducted usign HVSs instead of portable direct reading dust meter. Before baseline monitoring and the intial stage of construction stage montiroing, it is doubtful that any proper calibration of a direct reading dust meter against HVS could be achieved since the dust contents/particle-size distribution could be site specific and changing form time to time. If direct reading dust meters are propsoed to be used, please follow the requirements in the EM&A Manual (Dec 2007) and provide documentation to demonstrate if the calibration is properly achieved and the specific certification by IEC on the calibration and acceptablility to use the direct reading dust meter(s). Besides, even after "initial" calibration, further regular calibrations using HVS is required to check the validity and accuracy of the results measured by direct reading dust method as staed in EM&A Manual (Dec 2007). All these should be reported in the baseline report and the future EM&A reports.	The portable direct reading dust meter were used for 1-hr TSP baseline montioring and these meters are calibrated against a continuous particulate meter, Tapered Element Oscillating Mircrobalance (TEOM), which is an USEPA approved instrument for the continuous TSP monitoring. The calibration records for the portable direct reading dust meter were presented in Appendix A and such calibration will be carried out annualy for checking the data accuarcy. The use of portable direct reading dust meter is a usual and acceptable practice for the measurement of 1-hr TSP for most of current EM&A projects in Hong Kong such as EM&A for the Widening of Tolo Highway between Island House Interchange & Tai Hang-Investigation and Development of Anderson Road - Site Formation & Infrastructure Works. As the dust content for TSP including all particle sizes which can be suspended in the air and therefore the particle size distribution is not the concerned factor in measuring TSP concentrations. The calibration was carried out for a consecutive 4-hr period in order to determine the conversion factor between the portable direct reading dust meter and the standard erquipment, TEOM. The calibration is to be considered valid if the calculated correlaiton coefficient is >0.990.
(5) S2.3 – TSP monitoring Locations: Both WDII&CWB EIA report (AEIAR-125/2008) and CWB&IECL EIA report (AEIAR-041/2001) predicted that the worst case construction dust impacts would be at a level of 1.5m above ground. The monitoring samplers should be placed at thet level as far as practicable. In particular,a location of roof-top (24-storeys) of a high-rise building (i.e. Station MA1b) is not representative nor acceptable for construction dust monitoring in this project with constrcuiton works mainly at ground/low levels. Please explore whether there are alternative locations, e.g. any site office nearby, any low podium or at the site boundary close to the air sensitive receivers. Please provide justifications for the proposed monitoring locations/elevations in the baseline reports.	The monitoring station at Harbour Building (Station MA1b), which is an alternative location for Airport Railway Hong Kong Station (MA1) with similar environmental condition and near the site boundary, is one of the existing air sensitive receivers presented in the EIA Study Report. As the nearby relatively low-rise domestic premises and commercial buildings did not allow us to carry out the baseline air quality monitoring, therefore MA1b was considered to be the most appropriate alternative monitoring location. The monitoring station at roof-top of Harbour Building (Station MA1b) is the only accessible building with the electricity supply for carrying out the consecutive 14-day baseline monitoring. None of the nearby locations at lower level are allowed for such monitoring. Therefore, this location is considered to be the best alternative

<table>
<tr><td></td><td>location for Airport Railway Hong Kong Station (MA1)</td></tr>
<tr><td><u>Proposed alternative monitoring location</u></td><td></td></tr>
<tr><td><u>Section 2.3 of Baseline Report:</u></td><td></td></tr>
<tr><td>(6) It is noted that some alternative air montiroing locations are proposed when compared with the EIA reports. According to S1.4.2, Appendix D2, ‘Guidelines for Development project in Hong Kong – Environmental Monitoring and Audit’, “When alternative monitoring locations are proposed, the following criteria, as fat as practicable, shall be followed:

(a) at the site boundary or such locations close to the major dust emission source;
(b) close to the sensitive receptors; and
(c) take into account the prevailing meteorological conditions.”

Please provide your considerations and justifications for the proposed changes in monitoring locations in the baseline reports</td><td>
<table>
<tr><td>CMA1 - City Garden Block 11
CMA1a - PLK Yu Lee Mo Fan Memorial School (alternative location)</td></tr>
<tr><td><u>Justification:</u>
• CMA1 rejected us to carry out the baseline air monitoring
• CMA1 and CMA1a were both located at the site boundary with similar environmental condition
• The roof-top height of CMA1a (4 floor) was lower than CMA1 (27 floor)</td></tr>
<tr><td>CMA2 - Victoria Centre
CMA2a - Causeway Bay Community Centre (alternative location)</td></tr>
<tr><td><u>Justification:</u>
• CMA2 rejected us to carry out the baseline air monitoring
• CMA2 and CMA2a were both located at the site boundary with similar environmental condition
• The roof-top height of CMA2a (4 floor) was lower than CMA2 (30 floor)</td></tr>
<tr><td>CMA4 - Wanchai Sports Ground
CMA4a - Society for the Prevention of Cruelty to Animals (alternative location)</td></tr>
<tr><td><u>Justification:</u>
• CMA4 rejected us to carry out the baseline air monitoring
• CMA4a was also one of air sensitive receivers in EIA Study Report
• CMA4 and CMA4a were both located at the site boundary with similar environmental condition</td></tr>
<tr><td>MA1 - Airport Railway Hong Kong Station
MA1b - Harbour Building (alternative location)</td></tr>
<tr><td><u>Justification:</u>
• Refer to response to comment item (5)</td></tr>
</table>
</td></tr>
<tr><td><u>Calibration details</u></td><td></td></tr>
<tr><td><u>Appendix A of Baseline Report (re: S.10.2.2(vi) of EM&A Manual):</u></td><td></td></tr>
<tr><td>(7) As required under S 10.2.2(iv) of the EM&A Manual (Dec 2007), which states that “the baseline monitoring report should include monitoring result together with the <u>name of laboratory</u> and types of equipment used and calibration details”. Please provide the name of laboratory and the necessary information in the baseline reports.</td><td>Noted. The name of laboratory is provided in Section 2.5.1 b (iii). The calibration record of HVS and 1-hr portable direct reading dust meter are provided in Appendix A.</td></tr>
<tr><td><u>Maintenance and calibration of HVSs</u></td><td></td></tr>
<tr><td><u>Section 2.5(d)(ii) of Baseline Report (re: S.2.3.3 of EM&A Manual)</u></td><td></td></tr>
<tr><td>(8) It is noted that the HVSs were calibrated at 3-month intervals, which does not comply with S2.3.3 of EM&A Manual (Dec 2007), which states that “initial calibration of dust monitoring equipment shall be conducted upon installation and thereafter at <u>bi-monthly</u> intervals”. Please clarify and justify whether the monitoring results</td><td>Noted and the calibration frequency for the HVSs will be revised to bi-monthly interval in the baseline report and all the monitoring results are valid.</td></tr>
</table>

are still valid or not.	
(9) Please advise whether the wind data monitoring equipment as reqruired in the EM&A Manual, has been set-up; if affirmative, whether the results from the equipemnt have been recorded during the baseline monitoring.	NO wind data montiroing equipment was set-up during the baseline monitoring and the meteorological data were obtained from the Hong Kong Observatiory.
<u>Figures</u>	
(10) Figures/location plans should be provided in each baseline reports to show the project elements and works under the corresponding permits. For example, Figure 2.1 did not show some of the project area udner EP-364/2009 at the western end near Shun Tak Centre. Besides, some of the project elements (e.g. water mains and sewage outfall – although are marines works) under EP-356/2009 were also missing. Please amend.	Noted and will be provided.