Citybus Group Limited

Citybus Permanent Headquarters and Bus Maintenance Depot in Chai Wan

Quarterly Environmental Monitoring and Audit Summary Report
March 2002 to May 2002

Second Issue

Citybus Group Limited

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Environmental Monitoring and Audit

Quarterly Environmental Monitoring and Audit Summary Report March 2002 to May 2002

August 2002

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Job number 23420

Job title	Citybus Permanent Headquarters and Bus Maintenance Depot in Chai Wan	Job number	23420
Document title	Environmental Monitoring and Audit	File reference	
Document ref	23420-09		

Revision	Date				
First Issue	12/06/02	Filename	G:\env\project\23420\reports\Quarterly\2002-q1\09-Mar-May 02.doc		
		Description	Quarterly EM&A Summary Report – March 02 to May 02		
			Prepared by	Checked by	Approved by
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Second Issue	23/08/02	Filename	G:\env\project\23420\reports\Quarterly\2002-q1\09-Mar-May 02 2nd issue.doc		
		Description	Quarterly EM&A Summary Report – March 02 to May 02		
			Prepared by	Checked by	Approved by
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		Description			
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		Signature			
		Filename			
		Description			
			Prepared by	Checked by	Approved by
		Name			
		Signature			

Issue Document Verification with Document ✓

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ABBREVIATIONS AND ACRONYMS

A/L Levels	Action and Limited Levels
AQO	Air Quality Objectives
Arup	Ove Arup & Partners Hong Kong Limited
ASR	Area Sensitive Rating
B&K	Brüel & Kjær
CNP	Construction Noise Permit
CR	Contractor
DA-TM	Technical Memorandum on Noise from Construction Work in Designated Areas
EA	Environmental Auditor
EM&A	Environmental Monitoring and Audit
EPD	Environmental Protection Department
ER	Engineer / Engineer's Representative
ET	Environmental Team
GW-TM	Technical Memorandum on Noise from Construction Work other than Percussive Piling
HKSAR	Hong Kong Special Administrative Region
HOKLAS	The Hong Kong Laboratory Accreditation Scheme
HVS	High Volume Sampler
IC(E)	Independent Environmental Checker
IEC	International Electrotechnical Commission Publications
IVE - CW	Institution of Vocational Education (Chai Wan)
K	Degrees Kelvin
LCP	Ling Chan + Partners Limited
NAMAS	National Measurement Accreditation Service
NSR	Noise Sensitive Receiver
PSPS	Private Sector Participation Schemes
SR	Sensitive Receiver
TSP	Total Suspended Particulates

EXECUTIVE SUMMARY

This quarterly EM&A report summaries the site inspection findings, air quality and noise impact monitoring works for the period between March 2002 to May 2002.

Daytime (0700 – 1900 hours) noise monitoring was conducted at 4 locations. The highest noise level was 72.6 dB(A) recorded at IVE staff quarter on 12 April 2002 and the lowest was 63.1 dB(A) recorded at IVE staff quarter on 8 March 2002. An exceedance on the limit level of 70 dB(A) was recorded at the Hong Kong IVE Chai Wan on 26th and 29th April 2002, 6th and 17th May 2002. The marginal exceedance of noise level was caused by the cumulative impact of traffic and railway noise, the maintenance and washing activities at MTRC Heng Fa Tsuen Depot, and bore piling works. However, the bore piling works was completed in early June 2002, the noise exceedance resulted from the cumulative effect of high background noise level and bore piling works is not anticipated in the future.

The highest 1-hour TSP level was 232.4 μg/m^3 recorded at IVE on 28 March 2002 and the lowest 24-hour TSP was 76.6 μg/m^3 recorded at IVE on 14 May 2002. There were no exceedances on the A/L Levels during the monitoring period.

The highest 24-hour average TSP was 144.4 μg/m^3 recorded at IVE on 28 March 2002 and the lowest average was 30.3 μg/m^3 recorded at IVE on 14 May 2002. There were no exceedances on the A/L Levels during the monitoring period.

The major construction activity carried out by the Contractor from March 2002 to May 2002 was bore piling and pile-cap construction.

No public complaints regarding the air quality and noise were received from March 2002 to May 2002.

No non-compliance was recorded for the period from March 2002 to May 2002.

1. INTRODUCTION

Ove Arup & Partners Hong Kong Limited (Arup) was appointed by Citybus Group Limited as the Environmental Team (ET) for Citybus Permanent Headquarters and Bus Depot in Chai Wan (hereafter called the "Project"). Environmental parameters including air quality and construction noise were selected for impact monitoring. The construction activities of the Project have commenced in December 2001 and is expected to last for about 18 months.

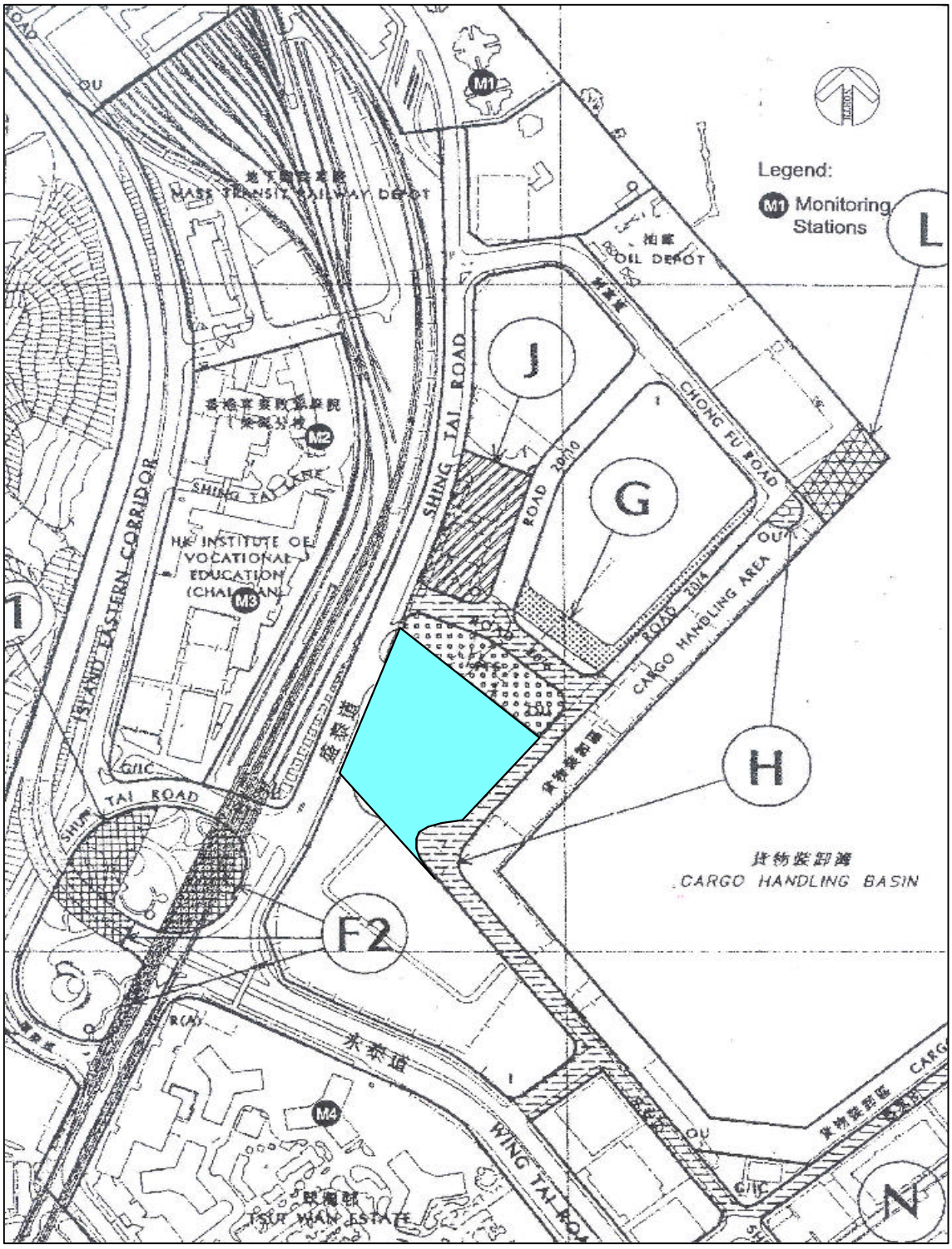
1.1 Purpose of the Report

The purpose of the quarterly EM&A summary report is to summarise the monitoring and audit results for the environmental issues including air quality, noise, and waste management due to the captioned construction project for the period from March 2002 to May 2002.

1.2 Site Description

The construction site is surrounded by Road 20/4, Road 20/6 and Shing Tai Road as shown in Figure 1-1. The total site area is approximately 1 hectare. The Project consists of five storeys with the bus depot located on G/F to 3/F for bus parking and maintenance, and depot office on 4/F to 5/F.

Figure 1-1 Site location plan of Citybus permanent headquarters and bus maintenance depot in Chai Wan



1.3 Organisation and Personnel

The primary responsibilities and duties of the respective parties in this EM&A programme are described in the following sub-sections: -

1.3.1 Project Manager

The entire construction of the Project is managed by ***Citybus Group Limited*** as the Project Manager. The Project Manager is supported by an Engineer's Representative (ER) and an Environmental Team (ET) to ensure that the environmental quality will comply with the project requirements.

1.3.2 Engineer's Representative

The Engineer is ***Ling Chan + Partners Limited (LCP).*** The Engineer's Representative is responsible for:

- Supervising the Contractor (CR) activities and ensuring that the requirements in the Environmental Management Plan[1] are fully complied with;
- Informing the CR when action is required to reduce impacts in accordance with the Event and Action Plans; and
- Adhering to the procedures for carrying out complaint investigation in accordance with Environmental Management Plan.

1.3.3 Environmental Team

Ove Arup & Partners Hong Kong Limited (Arup), has been appointed by Citybus to take up the role of the Environmental Team (ET), and ET is responsible for:

- Sampling, analysis and statistical evaluation of monitoring parameters with reference to the EIA study recommendations and requirements with respect of noise, dust and water quality.
- Conducting environmental site surveillance.
- Auditing the compliance with environmental protection and pollution prevention and control regulations.
- Monitoring the implementation of environmental mitigation measures.
- Monitoring the compliance with the environmental protection clauses/specifications in the Contract.
- Reviewing construction programme and providing comment as necessary.
- Reviewing construction methodology and providing comment as necessary.
- Conducting complaint investigation, evaluation and identification of corrective measures.
- Auditing of the EMS and recommending and implementing any changes as appropriate.
- Liasing with the Independent Environmental Checker (IC((E)) on all environmental performance matters.

- Advising the Contractor on environmental improvement, awareness, enhancement matter, etc. on site.
- Submitting the designated EM&A reports timely to the ER, the IC(E) and the EPD as appropriate.

1.3.4 Contractor

The construction works are undertaken by ***Vibro (HK) Limited,*** the Contractor (CR). In this EM&A programme, the CR is responsible for:

- Submitting the proposals on mitigation measures in cases of exceedance of Action and Limit levels and in accordance with the Event and Action Plans;
- Implementing measures to reduce impact where Action and Limit levels are exceeded; and
- Adhering the procedures for carrying out complaint investigation in accordance with the Environmental Management Plan.

2. ENVIRONMENTAL STATUS

2.1 Construction Programme

The construction has been commenced in December 2001, and is anticipated to be completed in 18 months. The construction programme is given in the Monthly EM&A Report – December 2001.

2.2 Construction Activities of the Quarter

The major construction activities carried out by the CR in the period from March 2002 to May 2002 were bore piling and pile-cap construction.

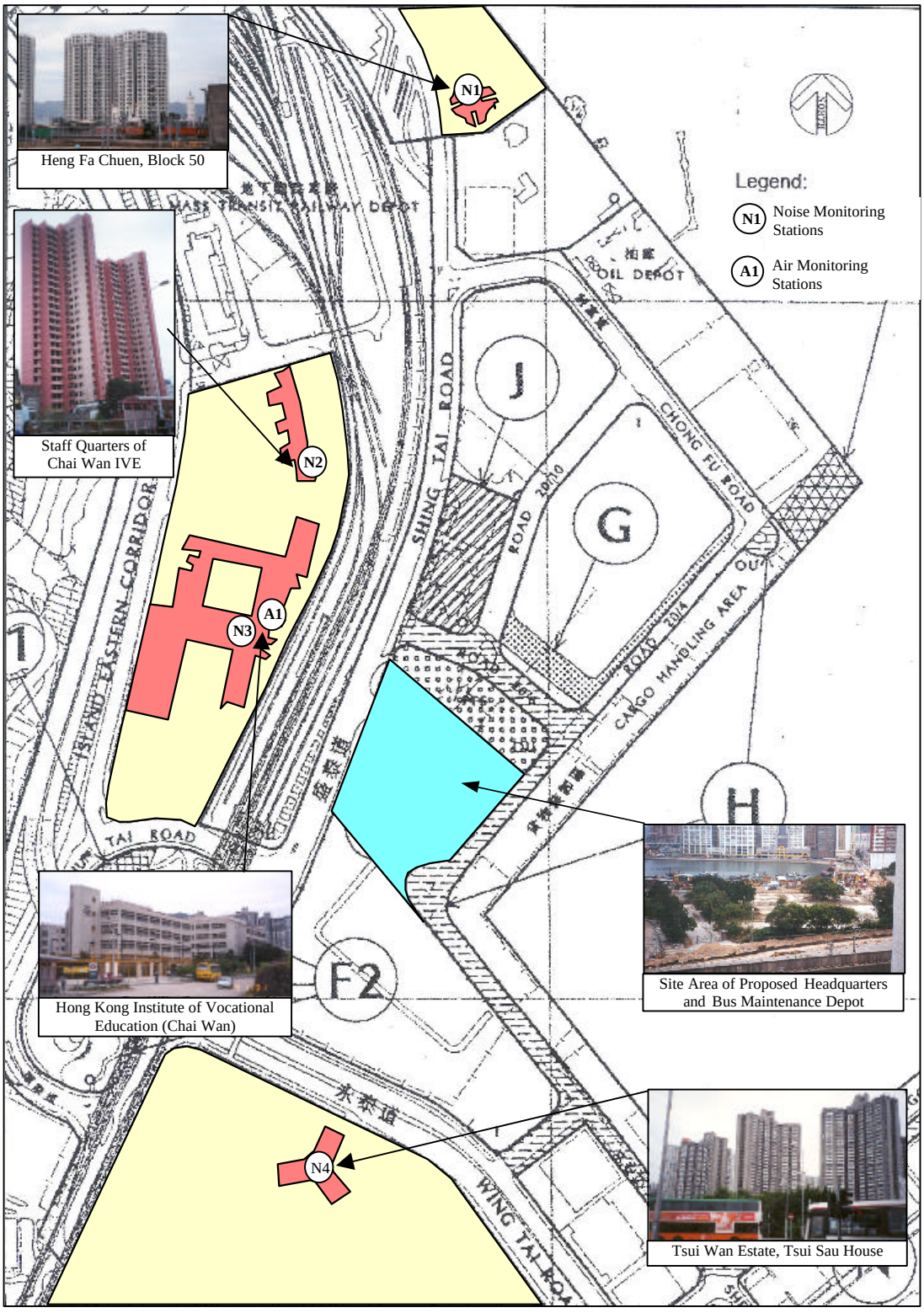
2.3 Environmental Sensitive Receivers

Several residential buildings and educational institution close to the site have been identified as environmental sensitive receivers in the EIA Report. The identified sensitive receivers are summarised in Table 2-1 and shown in Figure 2-1.

Table 2-1 Identified sensitive receivers

Sensitive Receivers No.	Description
N1	Heng Fa Chuen
N2	Staff Quarters of Chai Wan IVE
N3/A1	Hong Kong IVE Chai Wan
N4	Tsuen Wan Estate

Figure 2-1 Locations of construction site and environmental sensitive receivers



3. SUMMARY OF EM&A REQUIREMENTS

Construction noise and air quality were significant environmental impacts identified for the construction period of the project. In accordance with the Environmental Management Plan, air quality and noise impact monitoring shall be performed by the ET at all specified monitoring locations during the construction stage.

3.1 Construction Noise Monitoring

3.1.1 Monitoring Parameters

Construction noise monitoring shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{10} and L_{90} will also be recorded as supplementary reference information for data auditing.

3.1.2 Monitoring Frequency

Construction noise measurements were required to be taken on a weekly basis according to the Environmental Management Plan. The monitoring time periods, monitoring parameters and frequency are specified in Table 3-1.

Table 3-1 Construction noise monitoring parameters and frequency requirements

Time Period (when construction activity is found)	Parameters	Monitoring Frequency	No. of measurements for each monitoring
Between 0700-1900 hours on normal weekdays	$L_{eq(30\ min)}$	Once per week	1
Between 1900-2300 hours on normal weekdays	$L_{eq(5\ min)}$*		3 (consecutive)
Between 2300-0700 hours of next day			
Between 0700-1900 hours on holidays			

Remarks: * The $L_{eq(5\ min)}$ will only be measured if construction activities are conducted on general holidays and between the period of 1900 and 0700 hours during normal weekdays.

3.1.3 Monitoring Locations

A total of 4 monitoring locations were specified. They are given in Table 3-2. The measurements were taken at 1m from the building facade and maintained at a height 1.2m above floor. Photos showing the noise monitoring work in action are given in Figure 3-1.

Table 3-2 Noise impact monitoring locations

NSR No.	Location	Monitoring Point
N1	Heng Fa Chuen	Block 50
N2	Staff Quarters of IVE Chai Wan	Roof-top (Block C,D)
N3	Hong Kong IVE Chai Wan	Roof-top
N4	Tsui Wan Estate	Tsui Sau House

Figure 3-1 Noise monitoring in progress

3.2 Air Quality Monitoring

3.2.1 Monitoring Parameters

Air monitoring shall be measured in terms of the TSP levels for both 24-hour and 1-hour periods.

3.2.2 Monitoring Frequency

24-hour TSP and 1-hour TSP levels shall be monitored during the course of construction according to the Environmental Management Plan. The monitoring parameters and frequencies are specified in Table 3-3.

Table 3-3 TSP monitoring parameters and frequency

Parameters	Monitoring Frequency	Time Period	No. of measurement for each monitoring
24-hour TSP	Once every six days	0000 – 2400	1
1-hour TSP	Three times per every six days	0700 – 1900	1

3.2.3 Monitoring Locations

One monitoring location was specified for air quality impact and it is presented in Table 3-4.

Table 3-4 Air quality monitoring location

ASR No.	Location	Monitoring Point
A1	Hong Kong IVE Chai Wan	Roof-top

3.3 Performance Limits and Event-Action Plans

The monitoring results were checked against appropriate standards and requirements. A two-tier system performance limits has been established in Environmental Management Plan. The "Action Level" and the "Limit Level" are established according to the EPD requirements. Corresponding actions will be taken by ET, ER and CR in accordance with the Event-Action Plans if the monitoring results exceed the performance limits.

3.3.1 Construction Noise Impact

The Action and Limit (A/L) levels for the construction noise have been established in accordance with the Generic EM&A Manual and they are tabulated in Table 3-5.

Table 3-5 Action and Limit levels for construction noise

Time Period	Action Level	Limit Level dB(A)
0700 – 1900 hours on weekdays	When one documented complaint is received	75*
0700 – 2300 hours on General Holidays; & 1900 – 2300 hours on all other days		60/65/70**
2300 – 0700 hours of next day		45/50/55**

Remarks: * reduced to 70dB(A) for schools and 65dB(A) during school examination periods.
** to be selected based on Area Sensitivity Rating
Note: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed

Table 3-6 details the actions required to be carried out by different parties in the case of an exceedance of performance limits being detected.

Table 3-6 Event-action plan for construction noise

Event	Action	
	ET or ER	Contractor
Action Level	1. Notify Contractor 2. Analyse investigation 3. Require Contractor to propose measures for the analysed noise problem 4. Increase monitoring frequency to check mitigation effectiveness	1. Submit noise mitigation proposals to ET / ER 2. Implement noise mitigation proposals
Limit Level	1. Notify Contractor 2. Notify EPD 3. Require Contractor to implement mitigation measures, increase monitoring frequency to check mitigation effectiveness	1. Implement mitigation measures 2. Prove to ET / ER effectiveness of measures applied

3.3.2 Air Quality

The A/L levels for air quality have been established in the Environmental Management Plan and they are tabulated in Table 3-7

Table 3-7 Action and Limit levels for air quality

Parameters	Action Level	Limit Level
24 Hour TSP Level in μg/m^3	• For baseline level ≤ 200μg/m^3, Action Level = (baseline level plus 30% + Limit Level)/2 • For baseline level > 200μg/m^3, Action Level = Limit Level	260
1 Hour TSP Level in μg/m^3	• For baseline level ≤ 384μg/m^3, Action Level = (baseline level plus 30% + Limit Level)/2 • For baseline level > 384μg/m^3, Action Level = Limit Level	500

In accordance with the Baseline Monitoring Report [2], the Action and Limit levels for 24-hour TSP and 1-hour TSP at monitoring location A1 were established and they are tabulated in Table 3-8 and Table 3-9 respectively.

Table 3-8 Action and Limit levels for 24-hour TSP

ASR No.	Monitoring Location	24-hour TSP Level in $\mu g/m^3$	
		Action Level	Limit Level
A1	Hong Kong IVE Chai Wan	220.8	260.0

Table 3-9 Action and Limit levels for 1-hour TSP

ASR No.	Monitoring Location	1-hour TSP Level in $\mu g/m^3$	
		Action Level	Limit Level
A1	Hong Kong IVE Chai Wan	303.2	500.0

Table 3-10 details the actions required to be carried out by different parties in case of an exceedance of performance limits being detected.

Table 3-10a Event-action plan for air quality (Action Level)

Event	Action		
	ET	ER	Contractor
Action Level			
1. Exceedance for one sample	1. Identify source 2. Inform ER 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily	1. Notify Contractor 2. Check monitoring data and Contractor's working methods	1. Rectify any unacceptable practice 2. Amend working methods if appropriate
2. Exceedance for two or more consecutive samples	1. Identify source 2. Inform ER 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Discuss with ER for remedial actions required 6. If exceedance continues, arrange meeting with ER 7. If exceedance stops, cease additional monitoring	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Check monitoring data and Contractor's working methods 4. Discuss with Environmental Supervisor and Contractor on potential remedial actions 5. Ensure remedial actions properly implemented	1. Submit proposals for remedial actions to ER within 3 working days of notification 2. Implement the agreed proposals 3. Amend proposal if appropriate

Table 3-10b Event-action plan for air quality (Limit Level)

Event	Action		
	ET	ER	Contractor
Limit Level			
1. Exceedance for one sample	1. Identify source 2. Inform ER and EPD 3. Repeat measurement to confirm finding 4. Increase monitoring frequency to daily 5. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Check monitoring data and Contractor's working methods 4. Discuss with Environmental Supervisor and Contractor on potential remedial actions 5. Ensure remedial actions properly implemented	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to ER within 3 working days of notification 3. Implement the agreed proposals 4. Amend proposal if appropriate
2. Exceedance for two or more consecutive samples	1. Identify source 2. Inform ER and EPD the causes & actions taken for the exceedances 3. Repeat measurement to confirm findings 4. Increase monitoring frequency to daily 5. Investigate the causes of exceedance 6. Arrange meeting with EPD and ER to discuss the remedial actions to be taken 7. Assess effectiveness of Contractor's remedial actions and keep EPD and ER informed of the results 8. If exceedance stops, cease additional monitoring	1. Confirm receipt of notification of failure in writing 2. Notify Contractor 3. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented 4. Discuss amongst Environmental Team Leader and the Contractor potential remedial actions 5. Review Contractor's remedial actions whenever necessary to assure their effectiveness 6. If exceedance continues, consider what portion of the works is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated	1. Take immediate action to avoid further exceedance 2. Submit proposals for remedial actions to ER 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

4. NOISE

4.1 Noise Monitoring Results

All the noise measurements were taken between 0700-1900 hours on normal weekdays during which the construction site was under normal operation. The construction noise monitoring results from March 2002 to May 2002 is summarised in Table 4-1. The detailed construction noise monitoring results from March 2002 to May 2002 are given in Appendix A. The trend of the noise levels at each monitoring location are plotted and presented in Figure 4-1.

Table 4-1 Daytime noise monitoring results (0700 – 1900 hours on normal weekdays) from March 2002 to May 2002

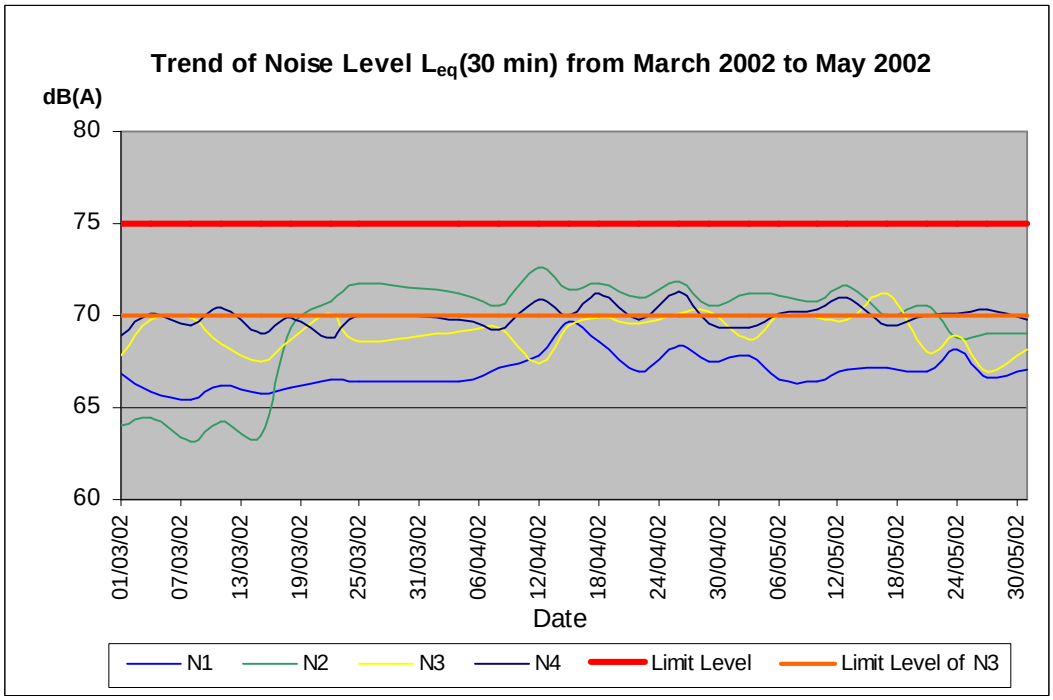
Date of Monitoring	Monitoring Parameters	Monitoring Results, dB(A) (30 min)			
		N1	N2	N3	N4
01/03/02 (Fri)	L_{eq}	66.8	64.0	67.8	68.9
	L_{10}	69.1	65.6	69.6	73.6
	L_{90}	59.6	61.6	62.1	62.1
04/03/02 (Mon)	L_{eq}	65.9	64.5	69.8	70.1
	L_{10}	68.1	66.1	72.6	73.6
	L_{90}	58.1	61.6	65.6	64.1
08/03/02 (Fri)	L_{eq}	65.4	63.1	69.9	69.5
	L_{10}	68.1	64.1	72.6	72.5
	L_{90}	58.6	60.6	66.6	61.1
11/03/02 (Mon)	L_{eq}	66.2	64.2	68.5	70.4
	L_{10}	69.1	66.0	72.1	74.1
	L_{90}	59.6	61.5	65.1	65.1
15/03/02 (Fri)	L_{eq}	65.8	63.5	67.5	69.0
	L_{10}	68.0	64.6	69.6	73.1
	L_{90}	59.1	61.1	64.6	62.6
18/03/02 (Mon)	L_{eq}	66.1	69.3	68.7	69.9
	L_{10}	69.1	71.5	71.0	72.6
	L_{90}	59.1	66.5	65.5	62.6
22/03/02 (Fri)	L_{eq}	66.5	70.8	70.1	68.8
	L_{10}	69.1	73.1	72.1	72.1
	L_{90}	59.1	68.6	67.1	63.6
25/03/02 (Mon)	L_{eq}	66.4	71.7	68.6	70.0
	L_{10}	69.1	73.1	70.6	72.6
	L_{90}	59.6	70.1	66.1	62.6
04/04/02 (Thu)	L_{eq}	66.4	71.2	69.1	69.8
	L_{10}	70.6	73.6	71.1	72.1
	L_{90}	60.1	70.6	67.1	67.6

Date of Monitoring	Monitoring Parameters	Monitoring Results, dB(A) (30 min)			
		N1	N2	N3	N4
08/04/02 (Mon)	L_{eq}	67.2	70.5	69.4	69.2
	L_{10}	69.6	72.1	71.6	72.1
	L_{90}	60.6	69.6	66.6	61.6
12/04/02 (Fri)	L_{eq}	67.8	72.6	67.4	70.9
	L_{10}	71.1	73.6	69.6	73.6
	L_{90}	63.6	72.1	64.6	68.1
15/04/02 (Mon)	L_{eq}	69.7	71.4	69.5	70.0
	L_{10}	70.6	73.1	72.1	72.6
	L_{90}	64.1	71.6	66.6	62.1
18/04/02 (Fri)	L_{eq}	68.6	71.7	69.9	71.2
	L_{10}	72.6	72.6	72.1	74.0
	L_{90}	64.0	71.6	67.1	67.5
22/04/02 (Mon)	L_{eq}	67.0	71.0	69.6	69.8
	L_{10}	70.1	71.6	72.1	73.1
	L_{90}	61.1	67.6	66.6	62.6
26/04/02 (Fri)	L_{eq}	68.4	71.8	70.1*	71.3
	L_{10}	71.6	73.6	72.6	72.0
	L_{90}	67.6	69.0	67.6	68.6
29/04/02 (Mon)	L_{eq}	67.5	70.5	70.2*	69.6
	L_{10}	70.6	72.1	72.6	73.1
	L_{90}	60.1	69.1	67.6	62.6
03/05/02 (Fri)	L_{eq}	67.8	71.2	68.7	69.4
	L_{10}	70.6	73.1	71.1	72.6
	L_{90}	63.6	70.1	66.1	63.6
06/05/02 (Mon)	L_{eq}	66.5	71.1	70.0*	70.1
	L_{10}	69.6	72.6	72.6	73.1
	L_{90}	60.1	69.6	67.1	62.6
10/05/02 (Fri)	L_{eq}	66.4	70.8	69.9	70.3
	L_{10}	71.6	72.1	72.1	71.6
	L_{90}	60.1	68.6	66.6	61.6
13/05/02 (Mon)	L_{eq}	67.1	71.6	69.8	71.0
	L_{10}	70.6	73.6	72.1	74.6
	L_{90}	60.1	69.6	66.1	63.6
17/05/02 (Fri)	L_{eq}	67.2	70.0	71.2*	69.5
	L_{10}	70.6	72.1	73.6	72.6
	L_{90}	61.1	68.1	68.1	63.1
21/05/02 (Tue)	L_{eq}	67.0	70.5	68.0	70.0
	L_{10}	70.1	72.6	70.1	71.1
	L_{90}	60.6	68.6	65.6	61.6

Date of Monitoring	Monitoring Parameters	Monitoring Results, dB(A) (30 min)			
		N1	N2	N3	N4
24/05/02 (Fri)	L_{eq}	68.2	68.8	68.9	70.1
	L_{10}	71.6	71.1	71.6	72.6
	L_{90}	62.6	66.1	65.1	60.6
27/05/02 (Mon)	L_{eq}	66.6	69.0	67.0	70.3
	L_{10}	69.6	71.1	69.1	73.1
	L_{90}	59.1	67.1	64.1	63.6
31/05/02 (Fri)	L_{eq}	67.1	69.0	68.2	69.8
	L_{10}	68.6	71.6	71.1	72.1
	L_{90}	59.1	66.6	63.1	62.6

Note: *The noise level measured at N3 on 26/04/02, 29/04/02, 06/05/02 and 17/05/02 have exceeded the Limit Level of 70 dB(A). The details of the exceedance is explained in Section 6.3.

Figure 4-1 Trend of noise monitoring level from March 2002 to May 2002



5. AIR QUALITY

5.1 24-hour TSP Monitoring Results

The monitoring result of 24-hour TSP during the period from March 2002 to May 2002 is summarised in Table 5-1. The trend of the 24-hour TSP levels at each monitoring location are plotted and presented in Figure 5-1. The details of the 1-hour monitoring results are given in Appendix B.

Table 5-1 24-hour TSP monitoring results from March 2002 to May 2002

Date of Monitoring	24-hour TSP Monitoring Results (µg/m3)	
	Weather	Averaged Result
05/03/02 (Tue)	Fine	90.5
11/03/02 (Mon)	Fine	102.2
16/03/02 (Sat)	Overcast	64.4
22/03/02 (Fri)	Overcast	76.1
28/03/02 (Thu)	Rainy	144.4
03/04/02 (Wed)	Overcast	36.0
09/04/02 (Tue)	Overcast	83.7
15/04/02 (Mon)	Overcast	94.0
20/04/02 (Sat)	Overcast	51.7
26/04/02 (Fri)	Overcast	81.9
02/05/02 (Thu)	Fine	52.0
08/05/02 (Wed)	Fine	34.5
14/05/02 (Tue)	Fine	30.3
21/05/02 (Tue)	Overcast	53.2
27/05/02 (Mon)	Fine	86.4

5.2 1-hour TSP Monitoring Results

The monitoring result of 1-hour TSP during the period from March 2002 to May 2002 is summarised in Table 5-2. The trend of the 1-hour TSP levels at each monitoring location are plotted and presented in Figure 5-2. The details of the 1-hour monitoring results are given in Appendix C.

Table 5-2 1-hour TSP monitoring results from March 2002 to May 2002

Date of Monitoring	1-hour TSP Monitoring Results (µg/m3)	
	Weather	Averaged Result
05/03/02 (Tue)	Fine	176.2
11/03/02 (Mon)	Fine	183.6
16/03/02 (Sat)	Overcast	115.8
22/03/02 (Fri)	Overcast	143.8
28/03/02 (Thu)	Overcast	232.4
03/04/02 (Wed)	Overcast	82.6
09/04/02 (Tue)	Overcast	150.3
15/04/02 (Mon)	Overcast	224.0
20/04/02 (Sat)	Overcast	96.4
26/04/02 (Fri)	Overcast	166.3
02/05/02 (Thu)	Fine	113.9
08/05/02 (Wed)	Fine	91.4
14/05/02 (Tue)	Fine	76.6
21/05/02 (Tue)	Overcast	122.6
27/05/02 (Mon)	Fine	218.3

Figure 5-1 Trend of 24-hour TSP levels from March 2002 to May 2002

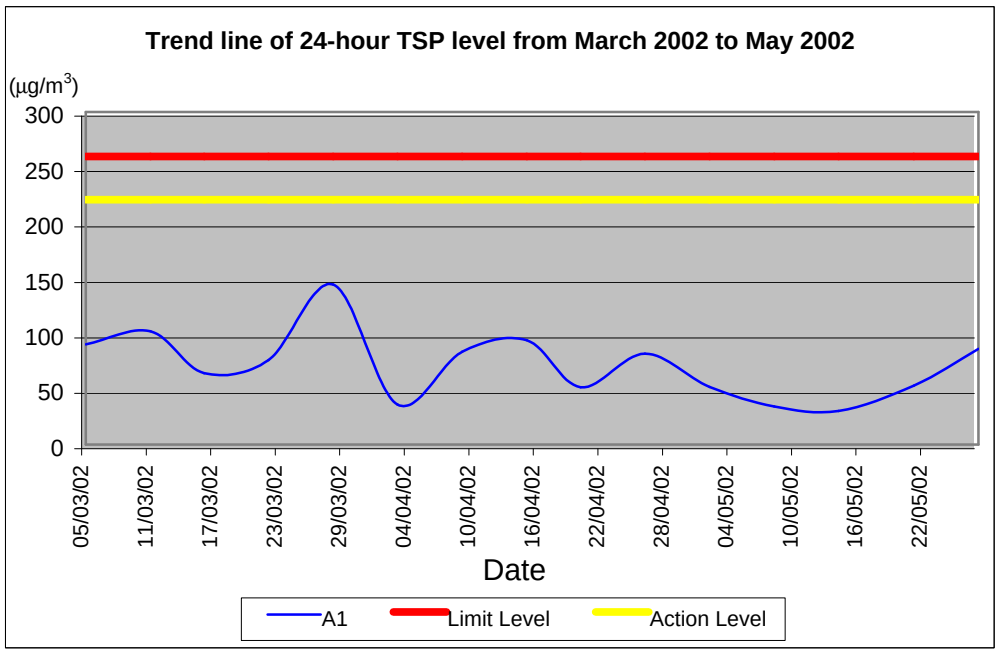
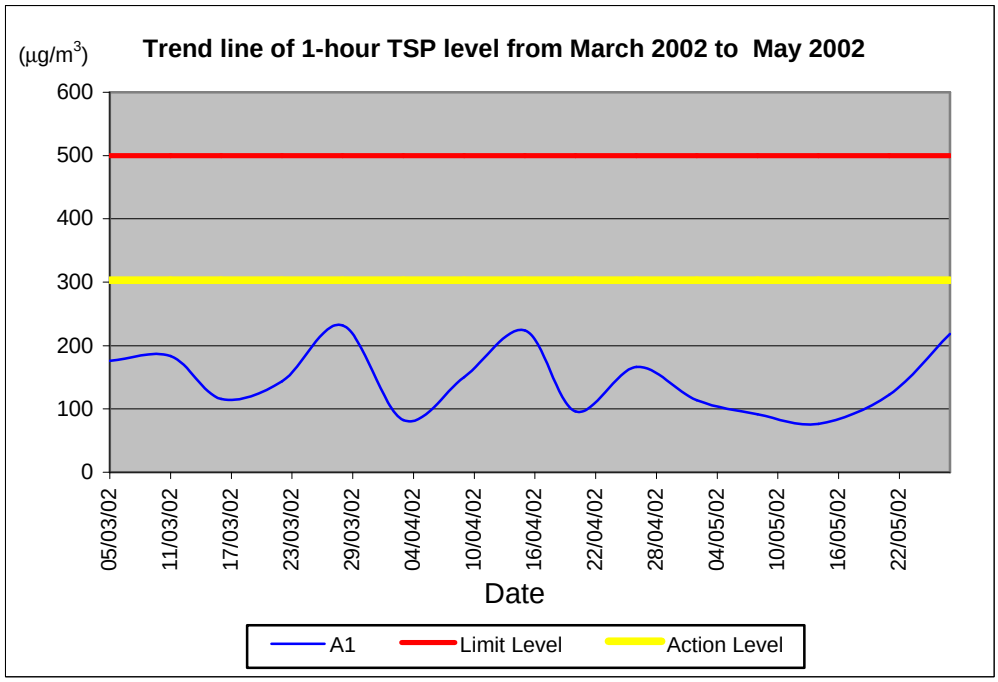


Figure 5-2 Trend of 1-hour TSP levels from March 2002 to May 2002



6. QUARTERLY SUMMARY, ENVIRONMENTAL COMPLAINT AND NON-COMPLIANCE RECORDS

6.1 Summary of Waste Disposal

A total of 1615 loads of inert material have been disposed of at Quarry Bay Public Filling Barging Point by common dump truck from February 2002 to May 2002. The total quantity of the disposed inert material was 9690 m^3 from February 2002 to May 2002. The total quantities of the waste disposal to Quarry Bay Public Filling Barging Point are summarised in Table 6-1.

Table 6-1 Waste disposal summary

Month	Number of Loads to Quarry Bay Public Filling Barging Point	Total Disposed Quantity (m^3)
February 2002	254	1,524
March 2002	362	2,172
April 2002	521	3,126
May 2002	478	2,868
Total	**1,615**	**9,690**

Noted: 6m^3 soil per load.

6.2 Complaint Record

No public complaints regarding the air quality and noise were received from March 2002 to May 2002.

6.3 Non-compliance Record

A noise exceedance on the limit level of 70 dB(A) was recorded at the Hong Kong IVE Chai Wan on 26th and 29th April 2002, 6th and 17th May 2002. The marginal exceedance of noise level was caused by the cumulative impact of traffic and railway noise, the maintenance and washing activities at MTRC Heng Fa Tsuen Depot, and bore piling works from the site. However, the bore piling works was completed in early June 2002, the noise exceedance resulted from the cumulative effect of high background noise level and bore piling works is not anticipated in the future.

7. REFERENCES

[1] Environmental Management Plan for Proposed Headquarters and Bus Maintenance Depot in Chai Wan. Ref : R0474-3.01. CH2M HILL (China) Limited.

[2] Environmental Baseline Monitoring Report – Citybus Chai Wan Permanent Depot Enviromental Team Services. Ove Arup & Partners Hong Kong Limited.

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APPENDIX A

Detailed Noise Monitoring Results

Details of Noise Impact Monitoring

Month	Date	NSR No.	Time periods		Weather condition	Noise Level dB(A)			Influencing factors/ Site condition
			Start	Finish		L_{99}	L_{10}	L_{90}	
Mar-02	01-Mar-02	N1	14:25	14:55	Fine	66.8	69.1	59.6	Work in Progress
Mar-02	01-Mar-02	N2	13:45	14:15	Fine	64.0	65.6	61.6	Work in Progress
Mar-02	01-Mar-02	N3	9:00	9:30	Fine	67.8	69.6	62.1	Work in Progress
Mar-02	01-Mar-02	N4	15:18	15:48	Fine	68.9	73.6	62.1	Work in Progress
Mar-02	04-Mar-02	N1	13:45	14:15	Fine	65.9	68.1	58.1	Work in Progress
Mar-02	04-Mar-02	N2	9:30	10:00	Fine	64.5	66.1	61.6	Work in Progress
Mar-02	04-Mar-02	N3	15:00	15:30	Fine	69.8	72.6	65.6	Work in Progress
Mar-02	04-Mar-02	N4	13:00	13:30	Fine	70.1	73.6	64.1	Work in Progress
Mar-02	08-Mar-02	N1	15:25	15:55	Fine	65.4	68.1	58.6	Work in Progress
Mar-02	08-Mar-02	N2	14:45	15:15	Fine	63.1	64.1	60.6	Work in Progress
Mar-02	08-Mar-02	N3	13:00	13:30	Fine	69.9	72.6	66.6	Work in Progress
Mar-02	08-Mar-02	N4	16:10	16:40	Fine	69.5	72.5	61.1	Work in Progress
Mar-02	11-Mar-02	N1	13:00	13:30	Fine	66.2	69.1	59.6	Work in Progress
Mar-02	11-Mar-02	N2	10:30	11:00	Fine	64.2	66.0	61.5	Work in Progress
Mar-02	11-Mar-02	N3	14:45	15:15	Fine	68.5	72.1	65.1	Work in Progress
Mar-02	11-Mar-02	N4	13:45	14:15	Fine	70.4	74.1	65.1	Work in Progress
Mar-02	15-Mar-02	N1	15:20	15:50	Overcast	65.8	68.0	59.1	Work in Progress
Mar-02	15-Mar-02	N2	14:00	14:30	Overcast	63.5	64.6	61.1	Work in Progress
Mar-02	15-Mar-02	N3	11:00	11:30	Overcast	67.5	69.6	64.6	Work in Progress
Mar-02	15-Mar-02	N4	16:10	16:40	Overcast	69.0	73.1	62.6	Work in Progress
Mar-02	18-Mar-02	N1	8:05	8:35	Overcast	66.1	69.1	59.1	Work in Progress
Mar-02	18-Mar-02	N2	15:15	15:45	Overcast	69.3	71.5	66.5	Work in Progress
Mar-02	18-Mar-02	N3	9:45	10:15	Overcast	68.7	71.0	65.5	Work in Progress
Mar-02	18-Mar-02	N4	8:50	9:20	Overcast	69.9	72.6	62.6	Work in Progress
Mar-02	22-Mar-02	N1	14:45	15:15	Overcast	66.5	69.1	59.1	Work in Progress
Mar-02	22-Mar-02	N2	14:06	14:36	Overcast	70.8	73.1	68.6	Work in Progress
Mar-02	22-Mar-02	N3	9:55	10:25	Overcast	70.1	72.1	67.1	Work in Progress
Mar-02	22-Mar-02	N4	15:35	16:05	Overcast	68.8	72.1	63.6	Work in Progress
Mar-02	25-Mar-02	N1	8:00	8:30	Overcast	66.4	69.1	59.6	Work in Progress
Mar-02	25-Mar-02	N2	15:45	16:15	Overcast	71.7	73.1	70.1	Work in Progress
Mar-02	25-Mar-02	N3	12:00	12:30	Overcast	68.6	70.6	66.1	Work in Progress
Mar-02	25-Mar-02	N4	8:45	9:15	Overcast	70.0	72.6	62.6	Work in Progress
Apr-02	04-Apr-02	N1	10:40	11:10	Fine	66.4	70.6	60.1	Work in Progress
Apr-02	04-Apr-02	N2	9:45	10:15	Fine	71.2	73.6	70.6	Work in Progress
Apr-02	04-Apr-02	N3	14:35	15:05	Fine	69.1	71.1	67.1	Work in Progress
Apr-02	04-Apr-02	N4	11:45	12:15	Fine	69.8	72.1	67.6	Work in Progress
Apr-02	08-Apr-02	N1	8:20	8:50	Overcast	67.2	69.6	60.6	Work in Progress
Apr-02	08-Apr-02	N2	14:00	14:30	Overcast	70.5	72.1	69.6	Work in Progress
Apr-02	08-Apr-02	N3	10:30	11:00	Overcast	69.4	71.6	66.6	Work in Progress
Apr-02	08-Apr-02	N4	9:00	9:30	Overcast	69.2	72.1	61.6	Work in Progress
Apr-02	12-Apr-02	N1	15:15	15:45	Overcast	67.8	71.1	63.6	Work in Progress
Apr-02	12-Apr-02	N2	14:05	14:35	Overcast	72.6	73.6	72.1	Work in Progress
Apr-02	12-Apr-02	N3	11:55	12:25	Overcast	67.4	69.6	64.6	Work in Progress
Apr-02	12-Apr-02	N4	16:05	16:35	Overcast	70.9	73.6	68.1	Work in Progress
Apr-02	15-Apr-02	N1	13:00	13:30	Overcast	69.7	70.6	64.1	Work in Progress
Apr-02	15-Apr-02	N2	11:00	11:30	Overcast	71.4	73.1	71.6	Work in Progress
Apr-02	15-Apr-02	N3	14:45	15:15	Overcast	69.5	72.1	66.6	Work in Progress
Apr-02	15-Apr-02	N4	13:50	14:20	Overcast	70.0	72.6	62.1	Work in Progress
Apr-02	18-Apr-02	N1	12:05	12:35	Overcast	68.6	72.6	64.0	Work in Progress
Apr-02	18-Apr-02	N2	11:25	11:55	Overcast	71.7	72.6	71.6	Work in Progress
Apr-02	18-Apr-02	N3	14:30	15:00	Overcast	69.9	72.1	67.1	Work in Progress
Apr-02	18-Apr-02	N4	10:35	11:05	Overcast	71.2	74.0	67.5	Work in Progress
Apr-02	22-Apr-02	N1	8:25	8:55	Fine	67.0	70.1	61.1	Work in Progress
Apr-02	22-Apr-02	N2	13:30	14:00	Fine	71.0	71.6	67.6	Work in Progress
Apr-02	22-Apr-02	N3	10:10	10:40	Fine	69.6	72.1	66.6	Work in Progress
Apr-02	22-Apr-02	N4	9:10	9:40	Fine	69.8	73.1	62.6	Work in Progress
Apr-02	26-Apr-02	N1	10:15	10:45	Overcast	68.4	71.6	67.6	Work in Progress
Apr-02	26-Apr-02	N2	9:30	10:00	Overcast	71.8	73.6	69.0	Work in Progress
Apr-02	26-Apr-02	N3	10:50	11:20	Overcast	70.1	72.6	67.6	Work in Progress
Apr-02	26-Apr-02	N4	12:05	12:35	Overcast	71.3	72.0	68.6	Work in Progress
Apr-02	29-Apr-02	N1	8:20	8:50	Overcast	67.5	70.6	60.1	Work in Progress
Apr-02	29-Apr-02	N2	15:15	15:45	Fine	70.5	72.1	69.1	Work in Progress
Apr-02	29-Apr-02	N3	10:00	10:30	Overcast	70.2	72.6	67.6	Work in Progress
Apr-02	29-Apr-02	N4	9:05	9:35	Overcast	69.6	73.1	62.6	Work in Progress
May-02	03-May-02	N1	14:35	15:05	Fine	67.8	70.6	63.6	Work in Progress
May-02	03-May-02	N2	13:45	14:15	Fine	71.2	73.1	70.1	Work in Progress
May-02	03-May-02	N3	10:00	10:30	Fine	68.7	71.1	66.1	Work in Progress
May-02	03-May-02	N4	15:25	15:55	Fine	69.4	72.6	63.6	Work in Progress
May-02	06-May-02	N1	8:20	8:50	Fine	66.5	69.6	60.1	Work in Progress
May-02	06-May-02	N2	11:15	11:45	Fine	71.1	72.6	69.6	Work in Progress
May-02	06-May-02	N3	10:00	10:30	Fine	70.0	72.6	67.1	Work in Progress
May-02	06-May-02	N4	9:05	9:35	Fine	70.1	73.1	62.6	Work in Progress
May-02	10-May-02	N1	15:00	15:30	Overcast	66.4	71.6	60.1	Work in Progress
May-02	10-May-02	N2	14:05	14:35	Overcast	70.8	72.1	68.6	Work in Progress
May-02	10-May-02	N3	9:30	10:00	Overcast	69.9	72.1	66.6	Work in Progress
May-02	10-May-02	N4	15:55	16:25	Overcast	70.3	71.6	61.6	Work in Progress
May-02	13-May-02	N1	8:25	8:55	Overcast	67.1	70.6	60.1	Work in Progress
May-02	13-May-02	N2	13:30	14:00	Overcast	71.6	73.6	69.6	Work in Progress
May-02	13-May-02	N3	10:00	10:30	Overcast	69.8	72.1	66.1	Work in Progress
May-02	13-May-02	N4	9:10	9:40	Overcast	71.0	74.6	63.6	Work in Progress
May-02	17-May-02	N1	11:25	11:55	Overcast	67.2	70.6	61.1	Work in Progress
May-02	17-May-02	N2	10:45	11:15	Overcast	70.0	72.1	68.1	Work in Progress
May-02	17-May-02	N3	13:00	13:30	Overcast	71.2	73.6	68.1	Work in Progress
May-02	17-May-02	N4	12:05	12:35	Overcast	69.5	72.6	63.1	Work in Progress
May-02	21-May-02	N1	8:20	8:50	Overcast	67.0	70.1	60.6	Work in Progress
May-02	21-May-02	N2	10:30	11:00	Overcast	70.5	72.6	68.6	Work in Progress
May-02	21-May-02	N3	14:30	15:00	Overcast	68.0	70.1	65.6	Work in Progress
May-02	21-May-02	N4	9:05	9:35	Overcast	70.0	71.1	61.6	Work in Progress
May-02	24-May-02	N1	14:40	15:10	Overcast	68.2	71.6	62.6	Work in Progress
May-02	24-May-02	N2	14:00	14:30	Overcast	68.8	71.1	66.1	Work in Progress
May-02	24-May-02	N3	9:40	10:10	Overcast	68.9	71.6	65.1	Work in Progress
May-02	24-May-02	N4	15:35	16:05	Overcast	70.1	72.6	60.6	Work in Progress
May-02	27-May-02	N1	8:20	8:50	Fine	66.6	69.6	59.1	Work in Progress
May-02	27-May-02	N2	16:00	16:30	Fine	69.0	71.1	67.1	Work in Progress
May-02	27-May-02	N3	10:30	11:00	Fine	67.0	69.1	64.1	Work in Progress
May-02	27-May-02	N4	9:00	9:30	Fine	70.3	73.1	63.6	Work in Progress
May-02	31-May-02	N1	15:10	15:40	Fine	67.1	68.6	59.1	Work in Progress
May-02	31-May-02	N2	14:31	15:01	Fine	69.0	71.6	66.6	Work in Progress
May-02	31-May-02	N3	11:00	11:30	Overcast	68.2	71.1	63.1	Work in Progress
May-02	31-May-02	N4	15:56	16:26	Fine	69.8	72.1	62.6	Work in Progress

APPENDIX B

Detailed Air Quality (24-hour TSP) Monitoring Results

Details of 24-Hour TSP Monitoring

Month	Date	Receptor No.	Weather condition	Site condition	Filter Weight (g)		TSP weight (g)	Flow Rate (m^3/min)		Average Flow Rate (m^3/min)	Elapse Time		Sampling Time (mins.)	Total vol. (m^3)	24-hour TSP Level ($\mu g/m^3$)
					Initial	Final		Initial	Final		Start	Finish			
Mar-02	05-Mar-02	A1	Fine	Work in progress	2.7759	2.9651	0.1892	1.4255	1.4792	1.4524	3134.71	3158.71	1440.00	2091.38	90.5
Mar-02	11-Mar-02	A1	Fine	Work in progress	2.7903	3.0076	0.2173	1.4223	1.5309	1.4766	3158.71	3182.70	1439.40	2125.42	102.2
Mar-02	16-Mar-02	A1	Overcast	Work in progress	2.7703	2.9027	0.1324	1.3895	1.4676	1.4286	3182.70	3206.70	1440.00	2057.11	64.4
Mar-02	22-Mar-02	A1	Overcast	Work in progress	2.7708	2.9303	0.1595	1.4143	1.4972	1.4558	3206.70	3230.70	1440.00	2096.28	76.1
Mar-02	28-Mar-02	A1	Rainy	Work in progress	2.7465	2.9759	0.2294	1.1040	1.1026	1.1033	3230.70	3254.70	1440.00	1588.75	144.4
Apr-02	03-Apr-02	A1	Overcast	Work in progress	2.7725	2.8466	0.0741	1.4098	1.4496	1.4297	3254.70	3278.70	1440.00	2058.77	36.0
Apr-02	09-Apr-02	A1	Overcast	Work in progress	2.7631	2.9304	0.1673	1.3865	1.3888	1.3877	3278.70	3302.70	1440.00	1998.22	83.7
Apr-02	15-Apr-02	A1	Overcast	Work in progress	2.7594	2.9559	0.1965	1.4515	1.4515	1.4515	3302.70	3326.70	1440.00	2090.16	94.0
Apr-02	20-Apr-02	A1	Overcast	Work in progress	2.7619	2.8746	0.1127	1.5127	1.5161	1.5144	3328.67	3352.67	1440.00	2180.74	51.7
Apr-02	26-Apr-02	A1	Overcast	Work in progress	2.7700	2.9529	0.1829	1.5517	1.5517	1.5517	3352.67	3376.67	1440.00	2234.45	81.9
May-02	02-May-02	A1	Fine	Work in progress	2.7877	2.8968	0.1091	1.4716	1.4405	1.4561	3376.67	3400.67	1440.00	2096.71	52.0
May-02	08-May-02	A1	Fine	Work in progress	2.7760	2.8526	0.0766	1.5691	1.5186	1.5439	3352.67	3376.67	1440.00	2223.14	34.5
May-02	14-May-02	A1	Fine	Work in progress	2.7463	2.8154	0.0691	1.6232	1.5465	1.5849	3424.67	3448.67	1440.00	2282.18	30.3
May-02	21-May-02	A1	Overcast	Work in progress	2.7618	2.8768	0.1150	1.5930	1.4113	1.5022	3448.67	3472.67	1440.00	2163.10	53.2
May-02	27-May-02	A1	Fine	Work in progress	2.7737	2.9626	0.1889	1.4676	1.5695	1.5186	3472.67	3496.67	1440.00	2186.71	86.4

APPENDIX C

Detailed Air Quality (1-hour TSP) Monitoring Results

Details of 1-Hour TSP Monitoring

Month	Date	Receptor No.	Set No.	Time periods		Weather condition	Site condition	Temp. (°C)	Pressure (mmHg)	1-hour TSP Level (μg/m³)
				Start	Finish					
Mar-02	05-Mar-02	A1	1	8:30	9:30	Fine	Work in progress	22.0	776.0	189.8
Mar-02	05-Mar-02	A1	2	9:30	10:30	Fine	Work in progress	22.0	776.0	173.7
Mar-02	05-Mar-02	A1	3	10:30	11:30	Fine	Work in progress	22.0	776.0	165.2
Mar-02	11-Mar-02	A1	1	10:00	11:00	Fine	Work in progress	23.0	774.0	189.2
Mar-02	11-Mar-02	A1	2	11:00	12:00	Fine	Work in progress	23.0	774.0	185.2
Mar-02	11-Mar-02	A1	3	12:00	13:00	Fine	Work in progress	23.0	774.0	176.4
Mar-02	16-Mar-02	A1	1	10:00	11:00	Overcast	Work in progress	25.0	771.0	122.3
Mar-02	16-Mar-02	A1	2	11:00	12:00	Overcast	Work in progress	25.0	771.0	113.9
Mar-02	16-Mar-02	A1	3	12:00	13:00	Overcast	Work in progress	25.0	771.0	111.2
Mar-02	22-Mar-02	A1	1	9:45	10:45	Overcast	Work in progress	23.5	769.0	148.0
Mar-02	22-Mar-02	A1	2	10:45	11:45	Overcast	Work in progress	23.5	769.0	137.6
Mar-02	22-Mar-02	A1	3	11:45	12:45	Overcast	Work in progress	23.5	769.0	145.7
Mar-02	28-Mar-02	A1	1	14:00	15:00	Overcast	Work in progress	23.0	770.0	240.2
Mar-02	28-Mar-02	A1	2	15:00	16:00	Overcast	Work in progress	23.0	770.0	226.4
Mar-02	28-Mar-02	A1	3	16:00	17:00	Overcast	Work in progress	23.0	770.0	230.6
Apr-02	03-Apr-02	A1	1	13:00	14:00	Overcast	Work in progress	25.0	768.0	81.1
Apr-02	03-Apr-02	A1	2	14:00	15:00	Overcast	Work in progress	25.0	768.0	86.3
Apr-02	03-Apr-02	A1	3	15:00	16:00	Overcast	Work in progress	25.0	768.0	80.3
Apr-02	09-Apr-02	A1	1	14:00	15:00	Overcast	Work in progress	25.0	770.0	144.2
Apr-02	09-Apr-02	A1	2	15:00	16:00	Overcast	Work in progress	25.0	770.0	153.6
Apr-02	09-Apr-02	A1	3	16:00	17:00	Overcast	Work in progress	25.0	770.0	153.2
Apr-02	15-Apr-02	A1	1	9:00	10:00	Overcast	Work in progress	25.0	770.0	230.4
Apr-02	15-Apr-02	A1	2	10:00	11:00	Overcast	Work in progress	25.0	770.0	215.3
Apr-02	15-Apr-02	A1	3	11:00	12:00	Overcast	Work in progress	25.0	770.0	226.2
Apr-02	20-Apr-02	A1	1	12:00	13:00	Overcast	Work in progress	25.0	772.0	107.7
Apr-02	20-Apr-02	A1	2	13:00	14:00	Overcast	Work in progress	25.0	772.0	88.0
Apr-02	20-Apr-02	A1	3	14:00	15:00	Overcast	Work in progress	25.0	772.0	93.4
Apr-02	26-Apr-02	A1	1	9:00	10:00	Overcast	Work in progress	23.0	771.0	167.2
Apr-02	26-Apr-02	A1	2	10:00	11:00	Overcast	Work in progress	23.0	771.0	173.7
Apr-02	26-Apr-02	A1	3	11:00	12:00	Overcast	Work in progress	23.0	771.0	158.0
May-02	02-May-02	A1	1	14:00	15:00	Fine	Work in progress	30.0	771.0	115.8
May-02	02-May-02	A1	2	15:00	16:00	Fine	Work in progress	30.0	771.0	120.4
May-02	02-May-02	A1	3	16:00	17:00	Fine	Work in progress	30.0	771.0	105.6
May-02	08-May-02	A1	1	9:00	10:00	Fine	Work in progress	30.0	771.0	99.5
May-02	08-May-02	A1	2	10:00	11:00	Fine	Work in progress	30.0	771.0	97.8
May-02	08-May-02	A1	3	11:00	12:00	Fine	Work in progress	30.0	771.0	77.1
May-02	14-May-02	A1	1	9:00	10:00	Fine	Work in progress	28.0	769.0	76.9
May-02	14-May-02	A1	2	10:00	11:00	Fine	Work in progress	28.0	769.0	75.9
May-02	14-May-02	A1	3	11:00	12:00	Fine	Work in progress	28.0	769.0	77.1
May-02	21-May-02	A1	1	9:00	10:00	Overcast	Work in progress	30.0	764.0	118.9
May-02	21-May-02	A1	2	10:00	11:00	Overcast	Work in progress	30.0	764.0	122.5
May-02	21-May-02	A1	3	11:00	12:00	Overcast	Work in progress	30.0	764.0	126.3
May-02	27-May-02	A1	1	9:40	10:40	Fine	Work in progress	29.0	768.0	208.4
May-02	27-May-02	A1	2	10:40	11:40	Fine	Work in progress	29.0	768.0	230.2
May-02	27-May-02	A1	3	11:40	12:40	Fine	Work in progress	29.0	768.0	216.4