

Territory Development Department

Contract No. ST 77/01

**Sha Tin New Town, Stage II
Road D15 Linking Lok Shun Path
and Tai Po Road**

**Monthly Environmental Monitoring & Audit Report -
July 2002**

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EXECUTIVE SUMMARY

The impact environmental monitoring report was prepared by Environmental Management Limited (EML) for Environmental Monitoring & Audit (EM&A) Services of Sha Tin New Town, Stage II Road D15 Linking Lok Shun Path and Tai Po Road. This report discusses the EM&A services that had been carried out in July 2002.

Environmental monitoring for this Project included both air quality and noise measurements. The parameters measured for air quality are 24-hour and 1-hour Total Suspended Particulate (TSP) while for noise monitoring, the A-weighted continuous sound pressure level (L_{eq}) as well as percentile levels (L_{10} and L_{90}) were measured.

Over the reporting period, all measured 24-hour TSP, 1-hour TSP and noise ($L_{eq}(5min)$) monitoring data collected were below the AL Levels. However, since one documented construction noise complaint was received in the end the month, the Action Levels for construction noise and the Event and Action Plan as set out in **Appendix G** was triggered.

The major construction activities in this reporting period included:

- Utility Diversion
- Form temporary access
- Earthworks
- Drainage works
- Piling works
- Pre-drill holes for retaining walls & stairs
- Box culvert extension

Regular site inspection was conducted in this reporting month and the mitigation measures as discussed in the relevant documents were assessed. Meanwhile, a noise complaint was received on 29 July 2002 near the site office (near the box culvert, north of Lok Shun Path Roundabout) and consequently, an ad hoc site inspection was carried out on 31 July 2002. The findings from the ad hoc inspection and investigation works were discussed in **Section 3.3** of this report. The following mitigation measures were recommended from the findings:

- As stated in the Particular Specification (Section 26), no excavator-mounted breaker will be carried out within 125m from nearby noise sensitive receivers and;
- Sufficient temporary purpose built noise mitigation measures will need to be placed around PME with high noise level.

Meanwhile, as mentioned in the previous EM&A report, a larger wastewater treatment facility had been installed in order to accommodate the increase in wastewater flow. In comparison to the observations noted in the previous EM&A report, the effluent from the larger treatment facility seems to be acceptable. However, the actual effluent quality will need to be tested in order to indicate whether it meets the Licence under the Water Pollution Control Ordinance.

1. INTRODUCTION

1.1 Background

Environmental Management Limited (EML) was appointed by Maunsell Consultants Asia Ltd. as the Environmental Specialist for the project *Sha Tin New Town, Stage II Road Linking Lok Shun Path and Tai Po Road* (Contract No. ST 77/01).

The responsibilities of the Environmental Team included:

- Monitor the noise and air quality data as required in the Environmental Monitoring and Audit (EM&A) Manual;
- Analyse the monitoring data and review the success of EM&A program to cost effectively confirm the adequacy of mitigatory measures implemented and validity of the Environmental Impact Assessment Study predictions and to identify any adverse environmental impacts arising;
- Carry out site inspection to investigate and audit the Contractor's site practice, equipment and work methodologies with respect to pollution control and environmental mitigation, and anticipate environmental issues for proactive action before problems arise;
- Review the proposal for mitigation measures submitted by Contractor in accordance with Event and Action Plans;
- Propose any improvement or other alternative mitigation measures should Contractor's proposal be found to be inadequate;
- Adhere to the procedures for carrying out complaint investigation;
- Audit and prepare EM&A reports on environmental monitoring data and site environmental conditions and;
- Report on EM&A results to Engineer, the ER and EPD.

This is the monthly EM&A report for July 2002. This monthly report describes the results of the impact air quality and noise monitoring works in the reporting period as well as the environmental status and issues of Road D15 Construction Site. Any remedial/follow-up actions undertaken as a result of non-compliance with relevant environmental criteria or complaints related to Road D15 Construction Site would also be discussed in this report.

The project area of Road D15 Construction Site is shown in **Figure 1.1**.

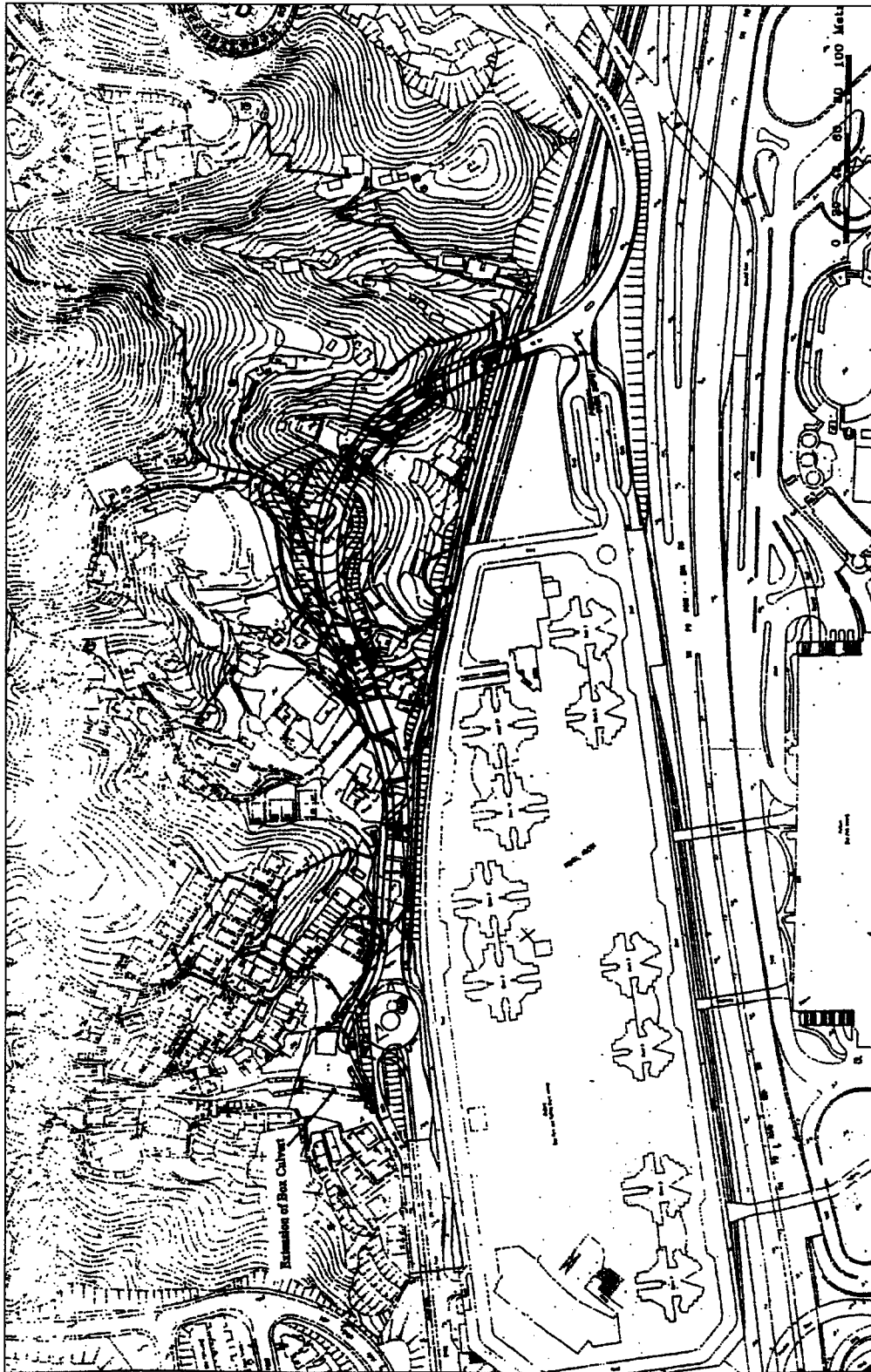


Figure 1.1 Project Area

2. ENVIRONMENTAL STATUS

2.1 Air Quality

2.1.1 *Monitoring Requirements*

In accordance with the EM&A Manual, air quality impact monitoring was conducted in terms of 1 – hour and 24-hour TSP at the designated monitoring locations.

Continuous 24-hour TSP monitoring was performed once in every six days while 1-hour TSP monitoring was performed 3 times in every 6 days. The Action and Limit (AL) levels for air quality is attached in **Appendix A** while the tentative monitoring schedules for the current and next reporting months are attached in **Appendix B**.

2.1.2 *Monitoring Locations*

The designated impact air quality monitoring stations are listed in **Table 2.1** and are shown in **Figure 2.1**.

Table 2.1 Air Quality Monitoring Locations

Monitoring Station	Location
A1	Village house at Lok Lo Ha Village
A2	Lok Lo Ha Village House No. 104
A3	Village House near Tsun King Road

2.1.3 *Summary of Monitoring Results*

In this report, the results for the impact air quality monitoring conducted in July 2002 at the three designated locations were evaluated. **Table 2.2** summarises the ranges and mean of the 24-hour and 1-hour TSP monitoring results carried out in the reporting period. Detailed results, including graphical plots and relevant field logs, are presented in **Appendix C** and **D**. Meanwhile, **Appendix F** shows the meteorological conditions during the monitoring days.

Table 2.2 Summary of 24 and 1-hour TSP Monitoring Results

Parameter	Monitoring Location	Mean TSP Levels ($\mu\text{g}/\text{m}^3$)	Range ($\mu\text{g}/\text{m}^3$)	No. of Exceedance	
				Action Levels	Limit Levels
24 – hour TSP	A1	40.0	24-51	0	0
	A2	44.7	25-75	0	0
	A3	38.8	26-50	0	0
1 – hour TSP	A1	121.8	60-206	0	0
	A2	144.0	58-223	0	0
	A3	113.4	37-180	0	0

As can be seen from the table above, all measured 24-hour TSP and 1-hour TSP monitoring data were below the criteria as set out in the Action and Limit Levels in **Appendix A**.

Over the reporting period, the local weather conditions during the samplings were mainly sunny or cloudy except some precipitation was recorded on 30 July. From field logs, the major dust sources

during samplings near the designated stations include road dusts, vehicle emissions from traffic in Lok Shun Path and construction works at Road D15 Site. The major construction works carried out at Road D15 Site over the reporting period were mainly utility diversion, piling works, form temporary access, earthworks, drainage works, pre-drill holes for retaining walls and stairs and box culvert extension. Meanwhile, it was also observed that there were construction activities carried out by sites that were not related to this Project in the vicinity of the monitoring stations.

Comparing with previous monitoring results, the measured mean 24-hour TSP levels at all monitoring stations were similar while slightly higher mean values were recorded for 1-hour TSP in this reporting period.

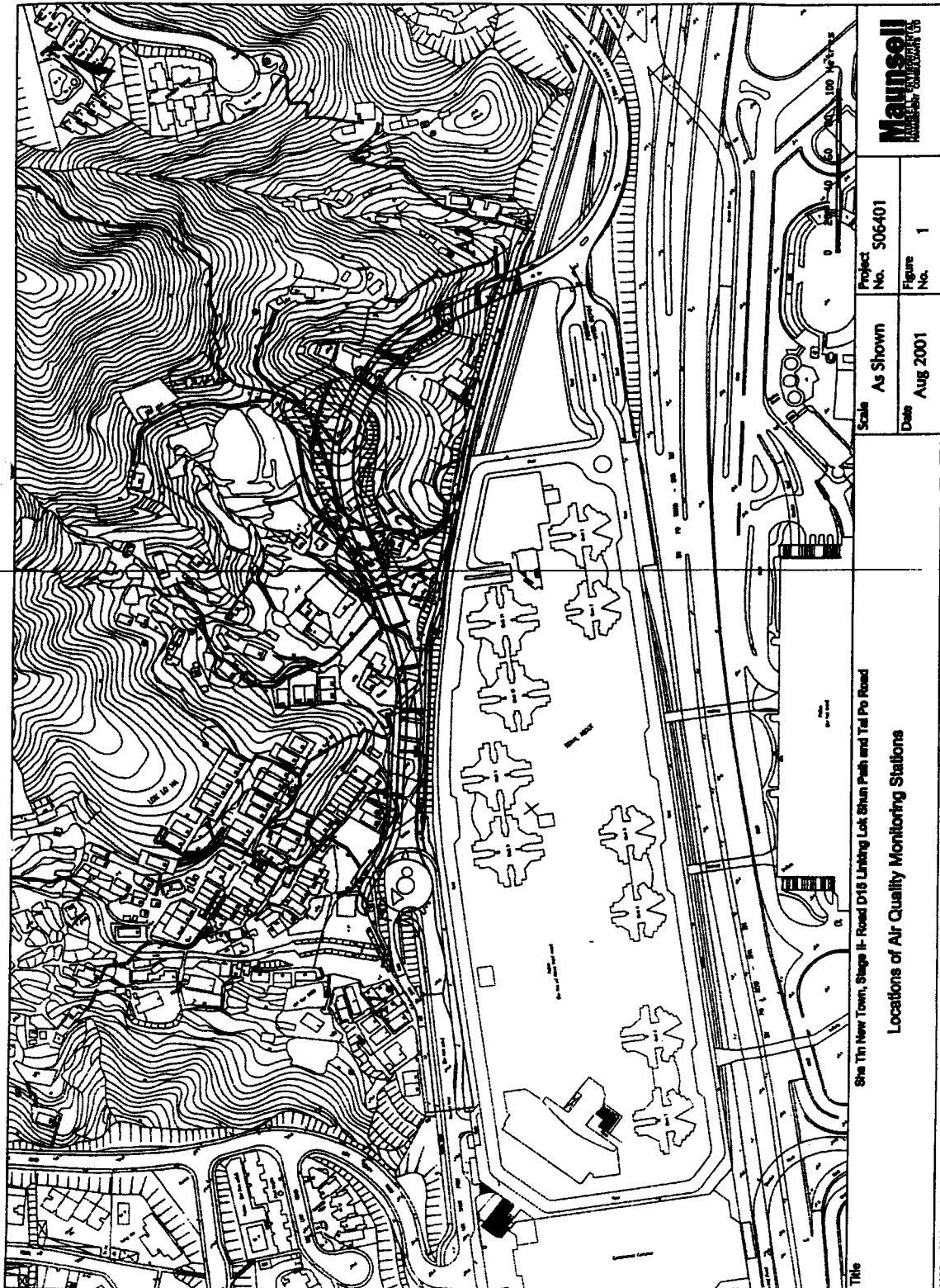


Figure 2.1 Air Quality Monitoring Locations

2.2 Noise

2.2.1 Monitoring Requirements

Impact noise monitoring was conducted once in every six days at the five designated monitoring locations in accordance with specifications in the EM&A Manual. The duration of sampling was 30 minutes. The Action and Limit levels for noise monitoring are attached in **Appendix A** while the tentative monitoring schedules for the current and next reporting months are attached in **Appendix B**.

2.2.2 Monitoring Locations

The impact noise monitoring locations are presented in **Table 2.3** and shown in **Figure 2.2**.

Table 2.3 Noise Monitoring Locations

Monitoring Location	Measurement	Location
N1	Façade	Lok Lo Ha Village House No. 3B
N2	Façade	Lok Lo Ha Village House No. 32A
N3	Façade	Royal Ascot Block 9, Flat C
N4	Façade	Lok Lo Ha Village House No. 97
N5	Façade	Village near Royal Ascot

2.2.3 Summary of Monitoring Results

In this report, the results for the impact noise monitoring conducted in July 2002 at the five designated locations were evaluated. The monitoring results obtained are summarised in **Table 2.4** below. Detailed results, including graphical plots and relevant field logs, are presented in **Appendix E**. Meanwhile, **Appendix F** shows the meteorological conditions during the monitoring days.

Table 2.4 Summary of Noise Monitoring Results

Parameter	Monitoring Location	Range of Results dB(A)	No. of Exceedance	
			Action Levels	Limit Levels
30-minute Noise Measurement (Leq)	N1	58.2-67.8	1	0
	N2	63.2-67.8		0
	N3	55.6-60.2		0
	N4	58.0-70.4		0
	N5	57.8-62.0		0

As shown in the table above, all noise monitoring data recorded were below the limit levels as set out in **Appendix A**. However, as one documented complaints were received during the reporting month, the Action Level for construction noise is triggered. Further details of the complaints are discussed in **Section 3.3** of this report.

Over the reporting period, the local weather conditions during the sampling were mainly sunny or cloudy, while all monitoring was conducted with wind speed of below 1.3 m/s. Traffic, domestic and construction activities were the major noise sources identified at the five monitoring locations.

Meanwhile, the carrying out of piling, drilling, excavation works and crane operations that related to Powered Mechanical Equipment (PME) were noted at all five monitoring stations during sampling.

Comparing with previous monitoring results, the measured noise levels at all stations are similar to those recorded in the last reporting period. The highest level was recorded at Station N4 (70.4dB(A)) and according to field log, the major noise sources are the operation of cranes and the carrying out of bore piling. The high values could be explained by the fact that it is located relatively close to the construction activities.

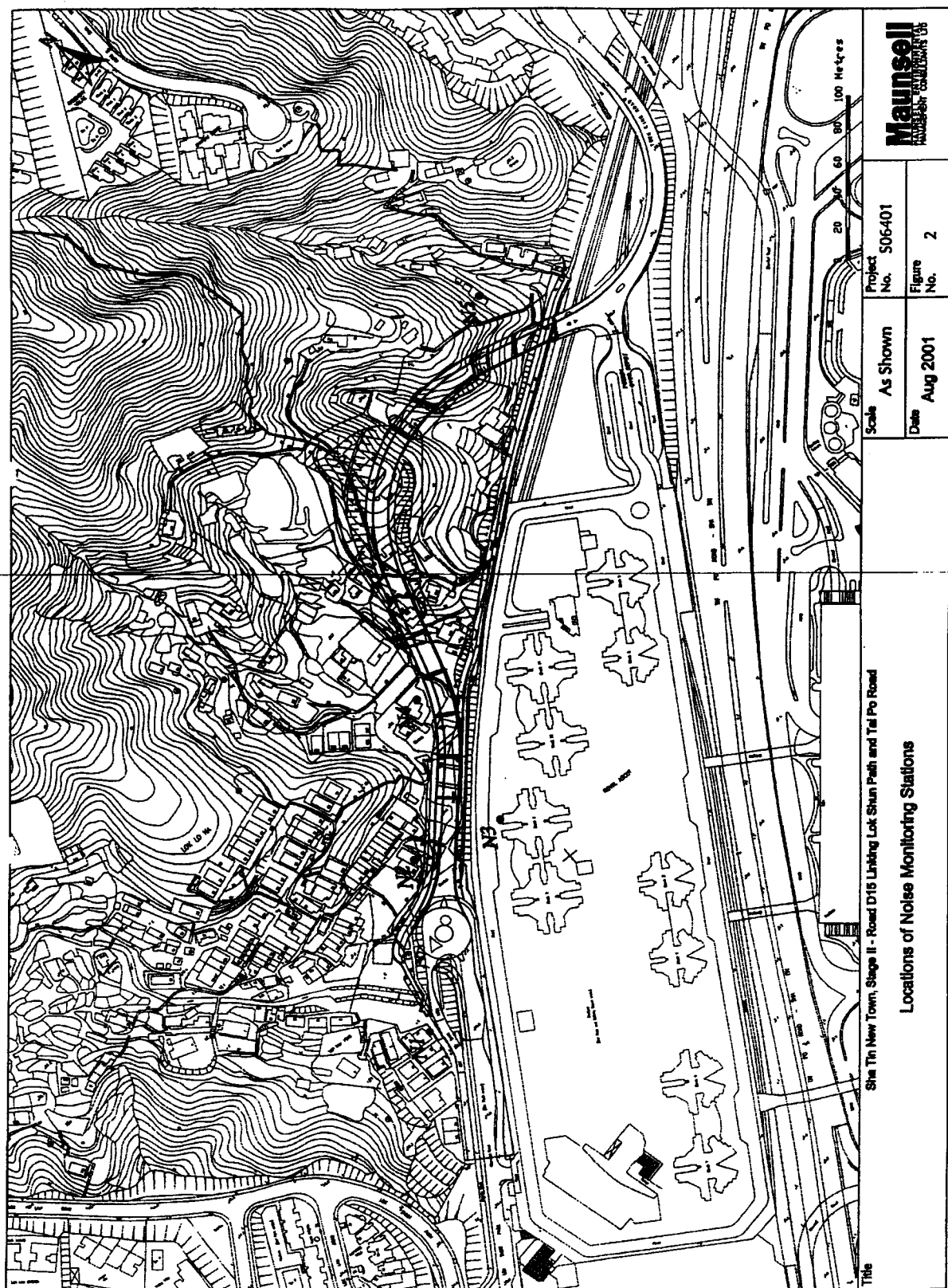


Figure 2.2 Noise Monitoring Locations

3. ENVIRONMENTAL AUDIT

3.1 General

In the last monthly EM&A report, two environmental issues were raised:

- Replacement of existing wastewater treatment system with a larger facility to accommodate the increasing wastewater flow and;
- Proper installation of temporary noise barriers around the additional pre-bored piling rig and generators.

As noted in the site inspections, a larger wastewater treatment facility had been installed in order to accommodate the increasing flow. The quality of the effluent from the facility seems to be acceptable although proper laboratory testing are required to confirm its compliance with the wastewater discharge Licence. Meanwhile, additional temporary noise barriers were installed at the site to minimise the noise impacts from additional pre-bored piling rig and generators.

One documented complaint on construction noise was received on 29 July 2002 and as a result, the Action Level was triggered. Further details of the complaint are discussed in **Section 3.3**. **Table 3.1** summarises the date and type of site inspections carried out during the reporting period.

Table 3.1 Summary of Site Inspection during the Reporting Period

Date	Type of Inspection
4 July 2002 (Thursday)	Regular Site Inspection
12 July 2002 (Friday)	Regular Site Inspection
18 July 2002 (Thursday)	Regular Site Inspection
24 July 2002 (Wednesday)	Regular Site Inspection
31 July 2002 (Wednesday)	Regular and ad hoc Site Inspection on Complaint dated 29 July 2002

Over the reporting period, the major construction work at the Site include:

- Utility Diversion
- Form temporary access
- Earthworks
- Drainage works
- Piling works
- Pre-drill holes for retaining walls & stairs
- Box culvert extension

3.2 Assessment of Environmental Monitoring Results

In this reporting month, apart from the documented complaint on construction noise at the Site, no exceedances in AL Levels were noted from the impact dust and noise monitoring results. The monitoring results were discussed in **Section 2** of the report and are summarised in **Table 3.2** below.

Table 3.2 Summary of Environmental Monitoring

Item	Parameter	Monitoring Period	Total No. of Samples Taken (on all stations)	No. of Exceedance	
				Action Levels	Limit Levels
1	24 – hour TSP	01/07/02 to 31/07/02	18	0	0
2	1 – hour TSP	01/07/02 to 31/07/02	54	0	0
3	30-minute Noise Measurement (Leq)	01/07/02 to 31/07/02	30	1 (due to one documented complaint)	0

3.3 Environmental Complaints

The police received a complaint from nearby residents in the morning of 29 July 2002 concerning high noise levels generated from Road D15 Site. The identity of the complainant was unknown and the complained area was in the vicinity of the Site Office (near the box culvert and north of Lok Shun Path Roundabout). Consequently, an ad hoc site inspection was carried out on 31 July 2002, jointly by the Engineer, Contractor and the Environmental Team. The following issues were identified during the site inspection:

- At the time of the complaint, workers were breaking rocks using an excavator-mounted breaker in the vicinity of the complained site. Meanwhile, no other construction activities as reported by the Contractor were carried out at that time;
- The Particular Specification (Section 26) indicates that no excavator-mounted breaker shall be used within 125m from any nearby noise sensitive receivers;
- A certificate, for the purpose of the Factories and Industrial Undertakings (Lifting Appliances and Lifting Gear) Regulations, was presented by Contractor indicating that the excavator that was mounted with the breaker was tested and thoroughly examined on 29 December 2001. The certificate expiry date is 28 December 2002;
- As informed by the Engineer, at the time of the incident, there were inadequate temporary purposed built noise barriers installed in the complained area and;
- No impact noise monitoring were scheduled during the day of the complaint. As a result, there were no quantitative data to show the level of noise generated by the rock breaking activity at the time.

As informed by the Contractor and Engineer, the rock breaking activities were halted immediately in response to the advice from Police. The Contractor was reminded that no excavator-mounted breaker shall be utilised within 125m from any nearby noise sensitive receivers and the Contractor had agreed to do so.

From the site inspection, the complained area was in proximity of the residential area. Therefore, temporary noise barrier should be installed at all time whenever there are breakers or any other PME that generates high noise levels in operation. It was reminded to the Contractor that this should be strictly followed.

As mentioned above, the noise complaint and the high noise level was found due to the excavator-mounted breaker, the complaint is therefore considered as ad hoc rather than continuous. As a result, it is considered not necessary to increase the noise monitoring frequency to check the mitigation

effectiveness. A letter will be replied to the complainant through police regarding the investigation results and the subsequent action to the source of the complaint.

Table 3.4 shows the complaint summary records for this reporting month while **Table 3.5** summarises the complaint statistics from the commencement of the Project to date. **Appendix I** listed details of all the complaints received on the construction site.

3.4 Assessment of Mitigation Measures

Table 3.3 presented the status of the major mitigation measures identified during site inspection.

Table 3.3 Summary of Major Mitigation Measures at the Site

Type	Mitigation Measure	Comments
Noise	Temporary purposed-built Noise Barrier	<ul style="list-style-type: none"> Constructed based on the design in the Construction Noise Mitigation Proposal. Additional barriers shall be installed, in particularly near the complained area (near the site office)
Water	Wheel Washing Facility	<ul style="list-style-type: none"> Installed and in operation.
	Sand/Silt Removal Facilities	<ul style="list-style-type: none"> Located near the site office. Installed to remove sand/silt from site runoffs and water before discharging them into the existing stream course. A larger wastewater treatment system had been installed to treat site-runoffs and water from piling works north-east of Lok Shun Path Roundabout.
	Measures along stream-banks north-east of Lok Shun Path Roundabout	<ul style="list-style-type: none"> Concrete, sandbags, sump pits and pumps were placed/installed along the banks to prevent construction debris and site run-off from entering the stream untreated.
	Diversion of Stream Course via drainage pipe	<ul style="list-style-type: none"> Installed at the existing concrete channel.
Wastewater	Water Reuse at wheel washing facility and site investigation drilling works.	Implemented
Land Contamination	Metal trays are placed underneath stationary machines where there are potential of oil leakage	Implemented
Air	Provide plastic sheeting covers on exposed soils	Satisfactory
	Regular water spraying on areas where there is likely generation of dust	Satisfactory

The larger wastewater treatment system was installed in this month and the effluent quality from the system seems to be acceptable. However, the actual effluent quality will need to be assessed through frequent samplings and laboratory analysis in order to indicate its compliance with wastewater discharge Licence.

As discussed in the previous section, one of the reasons for the complaint in this reporting month was the inadequate temporary noise barrier. It was reminded to the Contractor that whenever there are high noise levels, temporary noise barrier should be installed at all times around the operating PMEs. This is in particular important at the complained area as it is in proximity to the residential sites.

Table 3.4 Environmental Complaints / Enquiry Received in the Reporting Month

Complaint No.	Received date & Time	Description (inc. location/ nature of complaint)	Follow-up Action Taken	Recommended Measures	Mitigation	Status/ Remarks
C02-N1	Morning, 29/7/2002	Around 9:30am on 29/7/02, police came on site to investigate a complaint of noise pollution emitted during rock breaking which carried out by the Contractor near the Site Office (near the box culvert and north Lok Shun Path Roundabout). The Contractor immediately halted the activity in response to police's advice	<ul style="list-style-type: none"> Ad hoc site inspection was carried out on 31/7/02, jointly with the Engineer and Contractor The complaint log sheet, the investigation findings and recommendations on mitigation measures were submitted to the Engineer and Contractor. A letter, addressing to the complainant, will be sent to the police. 	Mitigation actions: <ul style="list-style-type: none"> Excavator-mounted breaker shall not be carried out within 125m from any nearby noise sensitive receivers and; Temporary purpose built barrier should be installed whenever there are high noise level construction activities. 		The complaint was considered as ad hoc rather than continuous. It is therefore not considered necessary to increase the noise monitoring frequency

Table 3.5 Summary of Total Number of Complaints Received to date

Total No. of Complaints to date	No. of Complaints in this reporting period	No. of Active Complaints	No. of Inactive/Closed Complaints
1	1	N/a	1

4. FUTURE KEY ISSUE AND RECOMMENDATION

There are two environmental issues that will need to be addressed in the next reporting month:

- Sufficient noise mitigation measures will need to be placed around PME with high noise level;
- As stated in the Particular Specification, no excavator-mounted breaker will be carried out within 125m from nearby noise sensitive receivers

The updated work program for the following months are attached in **Appendix J** while the monitoring tentative schedule for the next reporting month are attached in **Appendix B**.

APPENDIX A:

Action and Limit Levels

Action and Limit Levels for 24-hour TSP

Location	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
A1	156	260
A2	155	
A3	153	

Action and Limit Levels for 1-hour TSP

Location	Action Level, $\mu\text{g}/\text{m}^3$	Limit Level, $\mu\text{g}/\text{m}^3$
A1	371	500
A2	378	
A3	368	

Action / Limit Levels for Construction Noise

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

** 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.

APPENDIX B:

**Tentative Schedule for Impact
Air Quality and Noise
Monitoring**

1. Tentative Schedule for Current Reporting Month – July 2002

Contract No. ST77/01			
Sha Tin New Town, Stage II			
Road D15 Linking Lok Shun Path and Tai Po Road			
Tentative Time Schedule for Construction Phase Dust Monitoring for July 2002			
Jul-02	Day	Start Time	
		24-hr TSP	1-hr TSP
1	Mon	x	x
2	Tue	10:30	9:00
3	Wed	x	11:00&14:00
4	Thu	x	x
5	Fri	x	x
6	Sat	x	x
7	Sun	x	x
8	Mon	10:30	9:00
9	Tue	x	11:00&14:00
10	Wed	x	x
11	Thu	x	x
12	Fri	10:30	9:00
13	Sat	x	x
14	Sun	x	x
15	Mon	x	11:00&14:00
16	Tue	x	x
17	Wed	x	x
18	Thu	10:30	9:00
19	Fri	x	11:00&14:00
20	Sat	x	x
21	Sun	x	x
22	Mon	x	x
23	Tue	x	x
24	Wed	10:30	9:00
25	Thu	x	11:00&14:00
26	Fri	x	x
27	Sat	x	x
28	Sun	x	x
29	Mon	x	x
30	Tue	10:30	9:00
31	Wed	x	11:00&14:00

Sha Tin New Town, Stage II						
Road D15 Linking Lok Shun Path and Tai Po Road						
Tentative Time Schedule for Construction Phase Noise Monitoring for July 2002						
Jul-02	Day	Start Time				
		N1	N2	N3	N4	N5
1	Mon	X	x	x	x	x
2	Tue	X	x	x	x	x
3	Wed	14:30	13:30	11:30	10:45	10:00
4	Thu	x	x	x	x	x
5	Fri	x	x	x	x	x
6	Sat	x	x	x	x	x
7	Sun	x	x	x	x	x
8	Mon	x	x	x	x	x
9	Tue	14:30	13:30	11:30	10:45	10:00
10	Wed	x	x	x	x	x
11	Thu	x	x	x	x	x
12	Fri	x	x	x	x	x
13	Sat	x	x	x	x	x
14	Sun	x	x	x	x	x
15	Mon	14:30	13:30	11:30	10:45	10:00
16	Tue	x	x	x	x	x
17	Wed	x	x	x	x	x
18	Thu	x	x	x	x	x
19	Fri	14:30	13:30	11:30	10:45	10:00
20	Sat	x	x	x	x	x
21	Sun	x	x	x	x	x
22	Mon	x	x	x	x	x
23	Tue	x	x	x	x	x
24	Wed	x	x	x	x	x
25	Thu	14:30	13:30	11:30	10:45	10:00
26	Fri	x	x	x	x	x
27	Sat	x	x	x	x	x
28	Sun	x	x	x	x	x
29	Mon	x	x	x	x	x
30	Tue	x	x	x	x	x
31	Wed	14:30	13:30	11:30	10:45	10:00

2. Tentative Schedule for Next Reporting Month – August 2002

FROM :

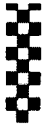
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Contract No. ST77/01
 Sha Tin New Town, Stage II
 Road D15 Linking Lok Shun Path and Tai Po Road

Tentative Time Schedule for Construction Phase Dust Monitoring for Aug 2002

Aug-02	Day	Start Time	
		24-hr TSP	1-hr TSP
1	Thu	x	x
2	Fri	x	x
3	Sat	x	x
4	Sun	x	x
5	Mon	10:30	09:00
6	Tue	x	11:00&14:00
7	Wed	x	
8	Thu	x	x
9	Fri	10:30	09:00
10	Sat	x	x
11	Sun	x	x
12	Mon	x	11:00&14:00
13	Tue	x	x
14	Wed	x	x
15	Thu	10:30	09:00
16	Fri	x	11:00&14:00
17	Sat	x	x
18	Sun	x	x
19	Mon	x	x
20	Tue	x	x
21	Wed	10:30	09:00
22	Thu	x	11:00&14:00
23	Fri	x	x
24	Sat	x	x
25	Sun	x	x
26	Mon	10:30	09:00
27	Tue	x	11:00&14:00
28	Wed	x	x
29	Thu	x	x
30	Fri	x	x
31	Sat	x	x



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Contract No. ST77/01
Sha Tin New Town, Stage II
Road D15 Linking Lok Shun Path and Tai Po Road
Tentative Time Schedule for Constrction Phase Noise Monitoring for Aug 2002

Aug-02	Day	Start Time				
		N1	N2	N3	N4	N5
1	Thu	x	x	x	x	x
2	Fri	x	x	x	x	x
3	Sat	x	x	x	x	x
4	Sun	x	x	x	x	x
5	Mon	x	x	x	x	x
6	Tue	14:30	13:30	11:30	10:45	10:00
7	Wed	x	x	x	x	x
8	Thu	x	x	x	x	x
9	Fri	x	x	x	x	x
10	Sat	x	x	x	x	x
11	Sun	x	x	x	x	x
12	Mon	14:30	13:30	11:30	10:45	10:00
13	Tue	x	x	x	x	x
14	Wed	x	x	x	x	x
15	Thu	x	x	x	x	x
16	Fri	14:30	13:30	11:30	10:45	10:00
17	Sat	x	x	x	x	x
18	Sun	x	x	x	x	x
19	Mon	x	x	x	x	x
20	Tue	x	x	x	x	x
21	Wed	x	x	x	x	x
22	Thu	14:30	13:30	11:30	10:45	10:00
23	Fri	x	x	x	x	x
24	Sat	x	x	x	x	x
25	Sun	x	x	x	x	x
26	Mon	x	x	x	x	x
27	Tue	x	x	x	x	x
28	Wed	14:30	13:30	11:30	10:45	10:00
29	Thu	x	x	x	x	x
30	Fri	x	x	x	x	x
31	Sat	x	x	x	x	x

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Co./Dept.	EML	Co.	Envirotech		
Phone #		Phone #			
Fax #	25706501	Fax #	25606553		

APPENDIX C:

**24-Hour TSP Impact
Monitoring Results and Plots**

1. 24-hour TSP Monitoring Results

Monitoring Station A1 (Lok Lo Ha Village House No. 3B)

Date	Filter Weight (g)		Flow Rate (m ³ /min.)		Elapse Time		Total Sampling Time (min.)	Conc. (µg/m ³)	Weather Condition
	Initial	Final	Initial	Final	Initial	Final			
02-July-02	2.8098	2.8458	1.13	1.13	10009.08	10033.08	1440	25	Fine
08-July-02	2.8130	2.8938	1.11	1.11	10036.08	10060.08	1440	51	Fine
12-July-02	2.8470	2.9263	1.11	1.11	10063.08	10087.08	1440	50	Sunny
18-July-02	2.8406	2.9179	1.13	1.13	10090.08	10114.08	1440	48	Cloudy
24-July-02	2.8736	2.9427	1.13	1.13	10117.08	10141.08	1440	42	Fine
30-July-02	2.8297	2.8682	1.11	1.11	10144.08	10168.08	1440	24	Rainy
							Min	24	
							Max	51	
							Average	40.0	

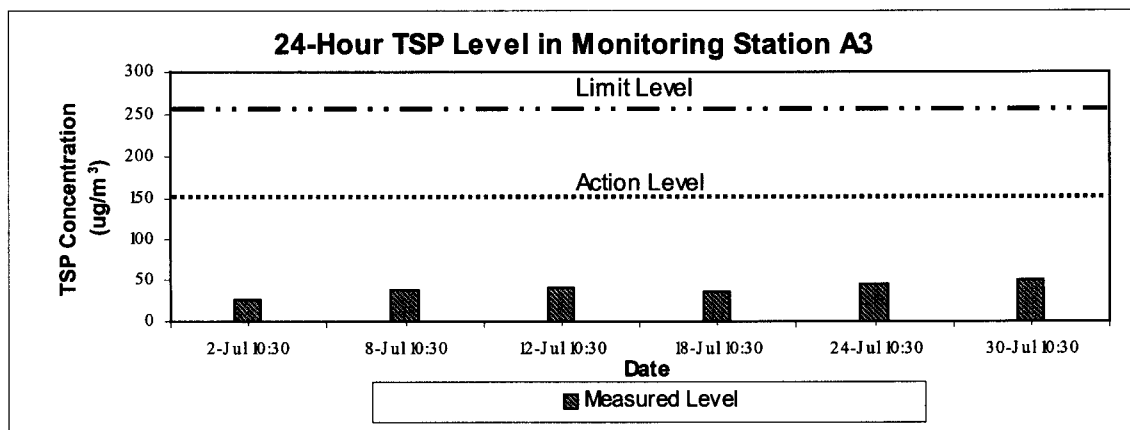
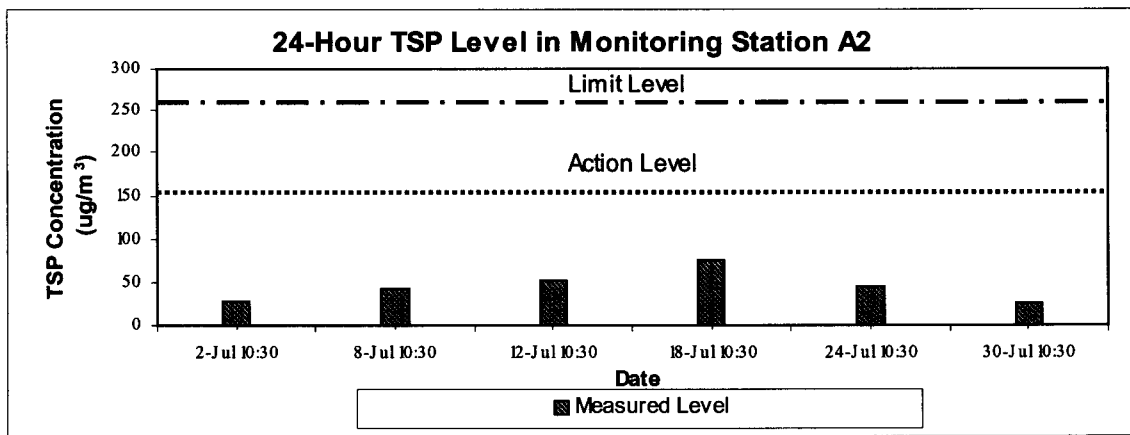
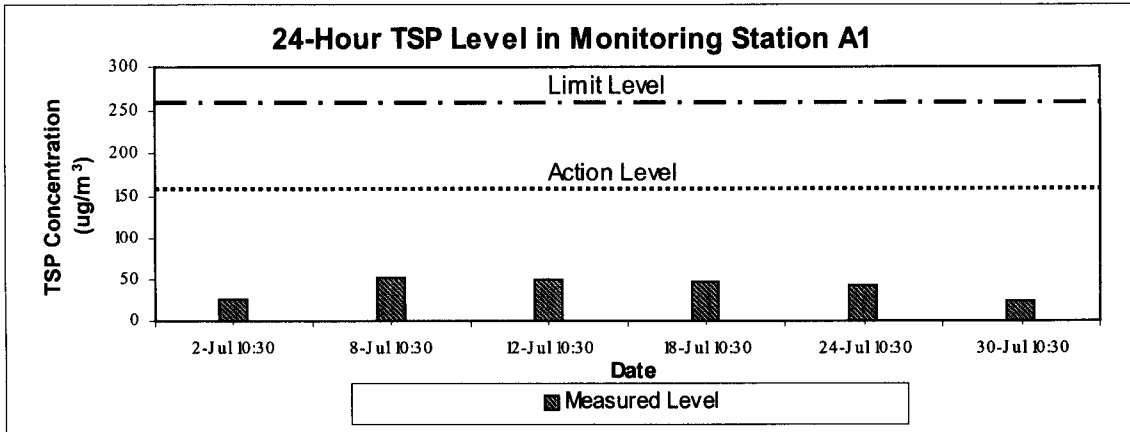
Monitoring Station A2 (Lok Lo Ha Village House No. 104)

Date	Filter Weight (g)		Flow Rate (m ³ /min.)		Elapse Time		Total Sampling Time (min.)	Conc. (µg/m ³)	Weather Condition
	Initial	Final	Initial	Final	Initial	Final			
02-July-02	2.8174	2.8651	1.13	1.13	463.42	487.42	1440	29	Fine
08-July-02	2.7873	2.8666	1.27	1.27	490.42	514.42	1440	43	Fine
12-July-02	2.7852	2.8791	1.27	1.27	517.42	541.42	1440	51	Sunny
18-July-02	2.8588	2.9828	1.13	1.13	544.42	568.42	1440	76	Cloudy
24-July-02	2.8291	2.9011	1.13	1.13	571.42	595.42	1440	44	Fine
30-July-02	2.8318	2.8778	1.27	1.27	598.42	622.42	1440	25	Rainy
							Min	25	
							Max	76	
							Average	44.7	

Monitoring Station A3 (Village House near Tsun King Road)

Date	Filter Weight (g)		Flow Rate (m ³ /min.)		Elapse Time		Total Sampling Time (min.)	Conc. (µg/m ³)	Weather Condition
	Initial	Final	Initial	Final	Initial	Final			
02-July-02	2.8318	2.8741	1.13	1.13	5727.83	5751.83	1440	26	Fine
08-July-02	2.7945	2.8610	1.24	1.24	5754.83	5778.83	1440	37	Fine
12-July-02	2.8250	2.8963	1.24	1.24	5781.83	5805.83	1440	40	Sunny
18-July-02	2.8542	2.9121	1.13	1.13	5808.83	5832.83	1440	36	Cloudy
24-July-02	2.8397	2.9121	1.13	1.13	9294.83	9318.83	1440	44	Fine
30-July-02	2.8480	2.9096	1.24	1.24	9321.83	9343.83	1440	50	Rainy
							Min	26	
							Max	50	
							Average	38.8	

2. Plots for 24-hour Monitoring Results



APPENDIX D:

**1-Hour TSP Impact
Monitoring Results and Plots**

1. 1-hour TSP Monitoring Results

Station A1 (Lok Lo Ha Village House No. 3B)

Date	Time of sampling	Concentration, $\mu\text{g}/\text{m}^3$
2-July-02	0900 – 1000	78
3-July-02	1100 – 1200	94
3-July-02	1400 – 1500	94
8-July-02	0900 – 1000	83
9-July-02	1100 – 1200	170
9-July-02	1400 – 1500	143
12-July-02	0900 – 1000	206
15-July-02	1100 – 1200	164
15-July-02	1400 – 1500	76
18-July-02	0900 – 1000	150
19-July-02	1100 – 1200	177
19-July-02	1400 – 1500	168
24-July-02	0900 – 1000	112
25-July-02	1100 – 1200	86
25-July-02	1400 – 1500	72
30-July-02	0900 – 1000	147
31-July-02	1100 – 1200	113
31-July-02	1400 – 1500	60
Average		121.8
Min		60
Max		206

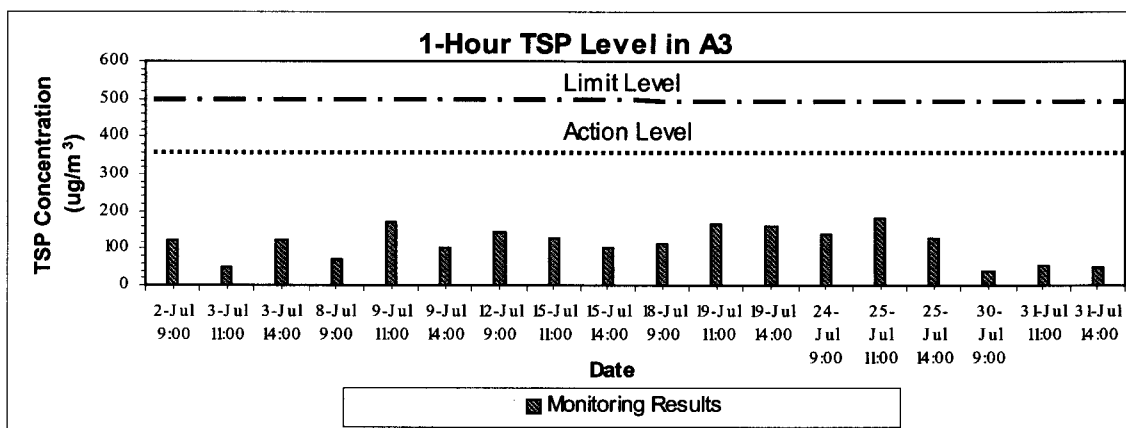
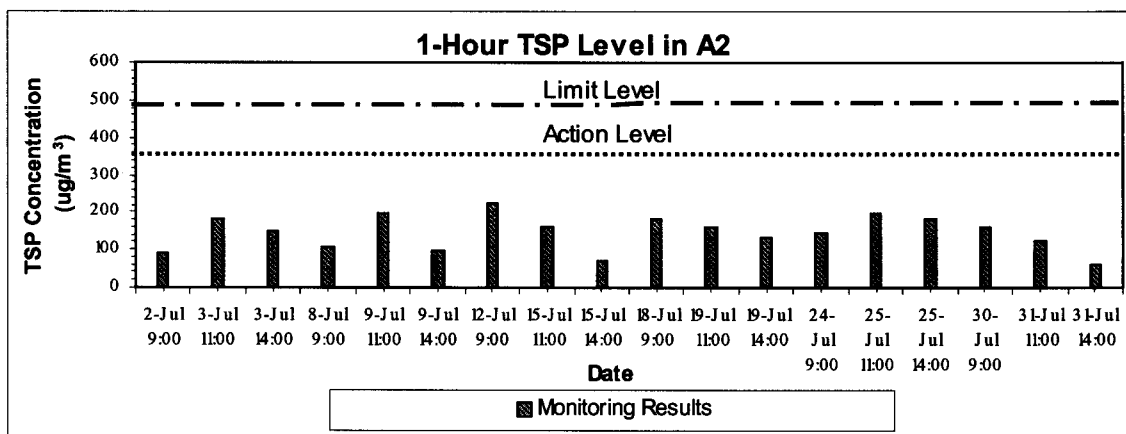
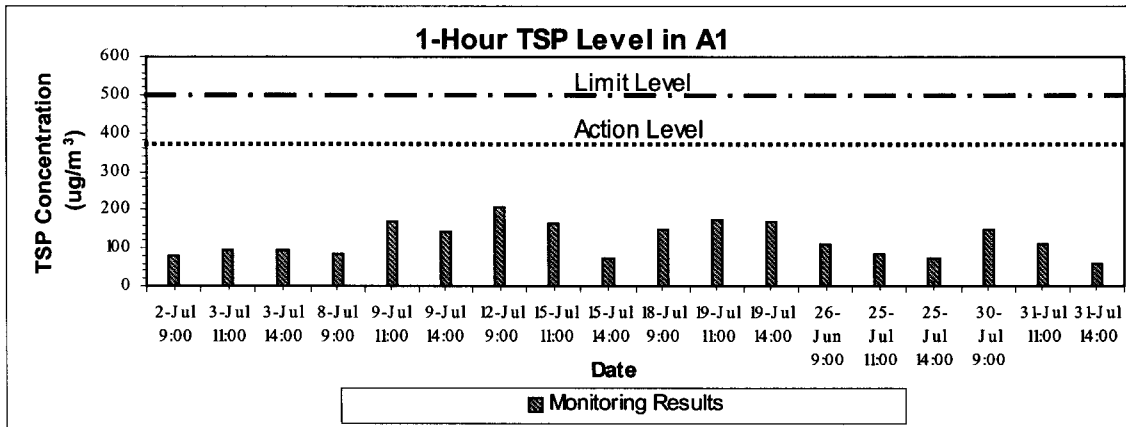
Station A2 (Lok Lo Ha Village House No. 104)

Date	Time of sampling	Concentration, $\mu\text{g}/\text{m}^3$
2-July-02	0900 – 1000	88
3-July-02	1100 – 1200	179
3-July-02	1400 – 1500	147
8-July-02	0900 – 1000	106
9-July-02	1100 – 1200	197
9-July-02	1400 – 1500	93
12-July-02	0900 – 1000	223
15-July-02	1100 – 1200	159
15-July-02	1400 – 1500	71
18-July-02	0900 – 1000	180
19-July-02	1100 – 1200	158
19-July-02	1400 – 1500	131
24-July-02	0900 – 1000	143
25-July-02	1100 – 1200	195
25-July-02	1400 – 1500	183
30-July-02	0900 – 1000	159
31-July-02	1100 – 1200	122
31-July-02	1400 – 1500	58
Average		144.0
Min		58
Max		223

Station A3 (Village House near Tsun King Road)

Date	Time of sampling	Concentration, $\mu\text{g}/\text{m}^3$
2-July-02	0900 – 1000	125
3-July-02	1100 – 1200	50
3-July-02	1400 – 1500	124
8-July-02	0900 – 1000	67
9-July-02	1100 – 1200	174
9-July-02	1400 – 1500	102
12-July-02	0900 – 1000	142
15-July-02	1100 – 1200	128
15-July-02	1400 – 1500	101
18-July-02	0900 – 1000	115
19-July-02	1100 – 1200	168
19-July-02	1400 – 1500	159
24-July-02	0900 – 1000	140
25-July-02	1100 – 1200	180
25-July-02	1400 – 1500	131
30-July-02	0900 – 1000	37
31-July-02	1100 – 1200	51
31-July-02	1400 – 1500	47
	Average	113.4
	Min	37
	Max	180

2. Plots of 1-hour TSP Monitoring Results



APPENDIX E:

**Daytime 07:00 -19:00Hrs
Impact Noise Monitoring
Results and Plots**

1. Noise Monitoring Results

Monitoring Station N1 (Lok Lo Ha Village House No.3B)

Date	Noise Level for 30 min, dB(A)			
	Time of Sampling	L _{eq}	L ₁₀	L ₉₀
03-July-02	1430 – 1500	63.9	66.5	60.2
09-July-02	1430 – 1500	67.8	72.8	67.2
15-July-02	1430 – 1500	62.9	64.8	60.3
19-July-02	1430 – 1500	67.8	69.3	65.1
25-July-02	1430 – 1500	67.5	68.8	63.0
31-July-02	1505 – 1535	58.2	61.5	56.3

Min	58.2	61.5	56.3
Max	67.8	72.8	67.2

Monitoring Station N2 (Lok Lo Ha Village House No.32A)

Date	Noise Level for 30 min, dB(A)			
	Time of Sampling	L _{eq}	L ₁₀	L ₉₀
03-July-02	1330 – 1400	67.6	70.4	60.2
09-July-02	1330 – 1400	63.2	64.5	60.2
15-July-02	1330 – 1400	67.3	71.3	61.3
19-July-02	1330 – 1400	67.6	71.6	62.3
25-July-02	1330 – 1400	66.8	70.8	61.8
31-July-02	1425 – 1455	67.8	71.0	62.3

Min	63.2	64.5	60.2
Max	67.8	71.6	62.3

Monitoring Station N3 (Royal Ascot Block 9, Flat C)

Date	Noise Level for 30 min, dB(A)			
	Time of Sampling	L _{eq}	L ₁₀	L ₉₀
03-July-02	1130 – 1200	58.1	61.7	51.7
09-July-02	1130 – 1200	59.7	63.6	53.2
15-July-02	1130 – 1200	59.4	61.4	50.6
19-July-02	1130 – 1200	60.2	63.0	51.5
25-July-02	1130 – 1200	58.6	62.1	50.5
31-July-02	1345 – 1415	55.6	58.4	50.2

Min	55.6	58.4	50.2
Max	60.2	63.6	53.2

Monitoring Station N4 (Lok Lo Ha Village House No.97)

Date	Noise Level for 30 min, dB(A)			
	Time of Sampling	L _{eq}	L ₁₀	L ₉₀
03-July-02	1045 – 1115	66.8	66.9	59.0
09-July-02	1045 – 1115	60.7	63.2	57.6
15-July-02	1045 – 1115	58.0	60.7	55.1
19-July-02	1045 – 1115	70.4	72.5	66.0
25-July-02	1045 – 1115	59.4	64.7	53.7
31-July-02	1300 – 1330	62.4	64.9	59.4

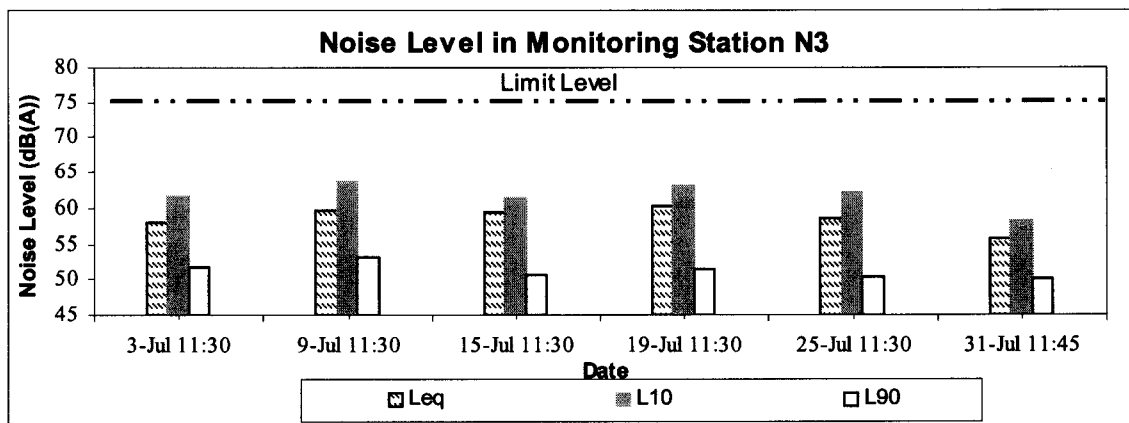
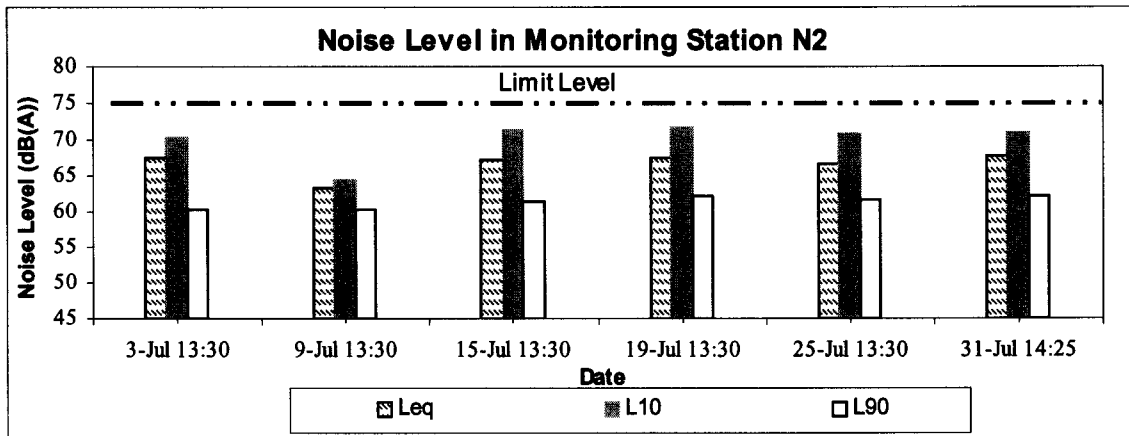
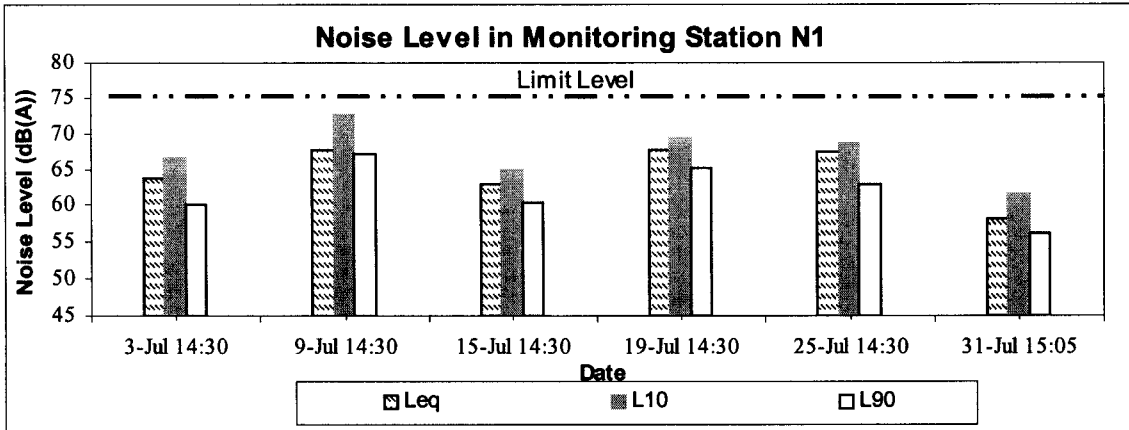
Min	58.0	60.7	53.7
Max	70.4	72.5	66.0

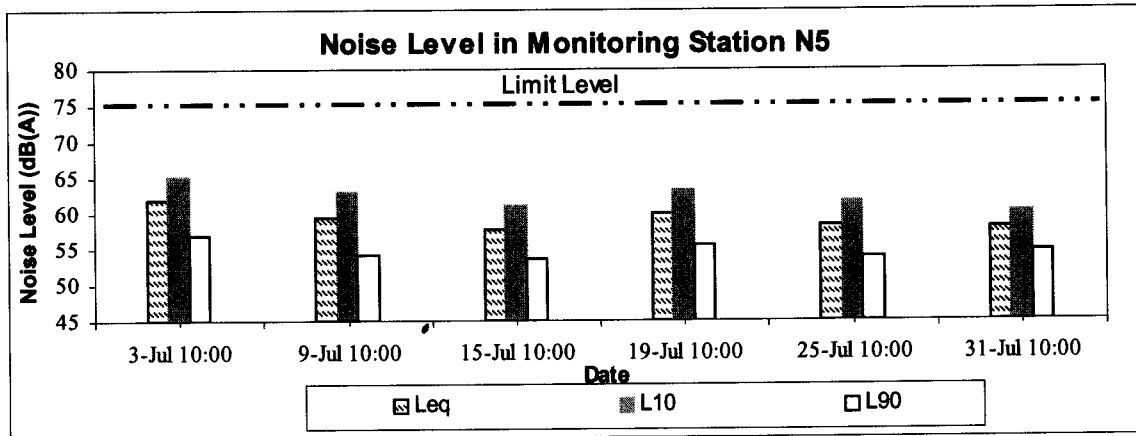
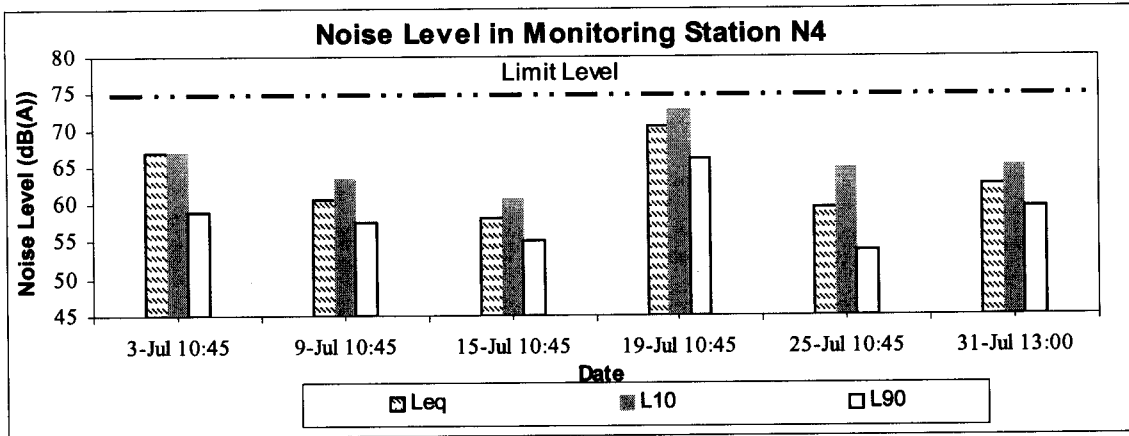
Monitoring Station N5 (Village House near Royal Ascot)

Date	Noise Level for 30 min, dB(A)			
	Time of Sampling	L _{eq}	L ₁₀	L ₉₀
03-July-02	1000 – 1030	62.0	65.4	56.9
09-July-02	1000 – 1030	59.4	63.1	54.3
15-July-02	1000 – 1030	57.8	61.2	53.6
19-July-02	1000 – 1030	60.1	63.4	55.6
25-July-02	1000 – 1030	58.2	61.8	53.8
31-July-02	1000 – 1030	58.1	60.2	54.7

Min	57.8	60.2	53.6
Max	62.0	65.4	56.9

2. Plots of Noise Monitoring Results





APPENDIX F:

**Weather Conditions During
Monitoring Periods**

**Weather Condition during Monitoring Period
(From 2 to 31 July 2002)**

Date	Weather	Mean Air Temperature (°C)	Wind Speed (m/s)	Mean Relative Humidity (%)
2-July-02	Fine	28.7	<1.3	83
3-July-02	Fine	29.3	<1.3	80
8-July-02	Fine	28.5	<1.3	79
9-July-02	Sunny	28.9	<1.3	77
12-July-02	Sunny	30.4	<1.3	73
15-July-02	Fine	30.5	<1.3	77
18-July-02	Cloudy	29.7	<1.3	79
19-July-02	Cloudy	29.5	<1.3	80
24-July-02	Fine	29.2	<1.3	81
25-July-02	Sunny	29.4	<1.3	84
30-July-02	Rainy	26.8	<1.3	93
31-July-02	Cloudy	27.0	<1.3	92

APPENDIX G:

**Event and Action Plan for Air
Quality and Noise**

Event / Action Plan for Air Quality

EVENT	ACTION		
	ET	Engineer	CONTRACTOR
ACTION LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. Inform the Engineer and Contractor; 3. Repeat measurement to confirm finding; and 4. Increase monitoring frequency to daily. 	<ol style="list-style-type: none"> 1. Notify Contractor; and 2. Check monitoring data and Contractor's working methods. 	<ol style="list-style-type: none"> 1. Rectify any unacceptable practice, if any; and 2. Amend working methods if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform the Engineer and Contractor; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily. 5. Discuss with Engineer for remedial actions required; 6. If exceedance continues, arrange meeting with the engineer; and 7. If exceedance stops, cease additional monitoring. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Check monitoring data and Contractor's working methods; 4. Discuss with ET and Contractor on potential remedial actions; and 5. Ensure remedial measures properly implemented. 	<ol style="list-style-type: none"> 1. Submit proposals for mitigation measures to the Engineer within 3 working days of notification; 2. Implement the agreed proposals; and 3. Amend proposal if appropriate.
LIMIT LEVEL			
1. Exceedance for one sample	<ol style="list-style-type: none"> 1. Identify source; 2. Inform the Engineer and Contractor; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily; 5. Assess effectiveness of Contractor's remedial actions and keep EPD and the Engineer informed of results. 	<ol style="list-style-type: none"> 1. Confirm receipt of notification of failure in writing; 2. Notify Contractor; 3. Check monitoring data and Contractor's working methods; 4. Discuss with ET and Contractor on potential remedial actions; and 5. Ensure remedial action properly implemented. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to the Engineer within 3 working days of notification; 3. Implement the agreed proposals; and 4. Amend proposal if appropriate.
2. Exceedance for two or more consecutive samples	<ol style="list-style-type: none"> 1. Identify source; 2. Inform the Engineer and Contractor; 3. Repeat measurement to confirm findings; 4. Increase monitoring frequency to daily. 5. Investigate the causes of exceedance; 6. Arrange meeting with EPD and the Engineer to discuss the remedial actions to be taken; 7. Assess effectiveness of Contractor's remedial actions and keep EPD and the Engineer informed of the results; and 8. If exceedance stops, cease additional monitoring 	<ol style="list-style-type: none"> 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 among ET and Contractor on potential remedial actions; 5. Review Contractor's remedial action whenever necessary to assure their effectiveness; and 6. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop portion of work until the exceedance is abated. 	<ol style="list-style-type: none"> 1. Take immediate action to avoid further exceedance; 2. Submit proposals for remedial actions to the Engineer 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 Engineer until the exceedance is abated.

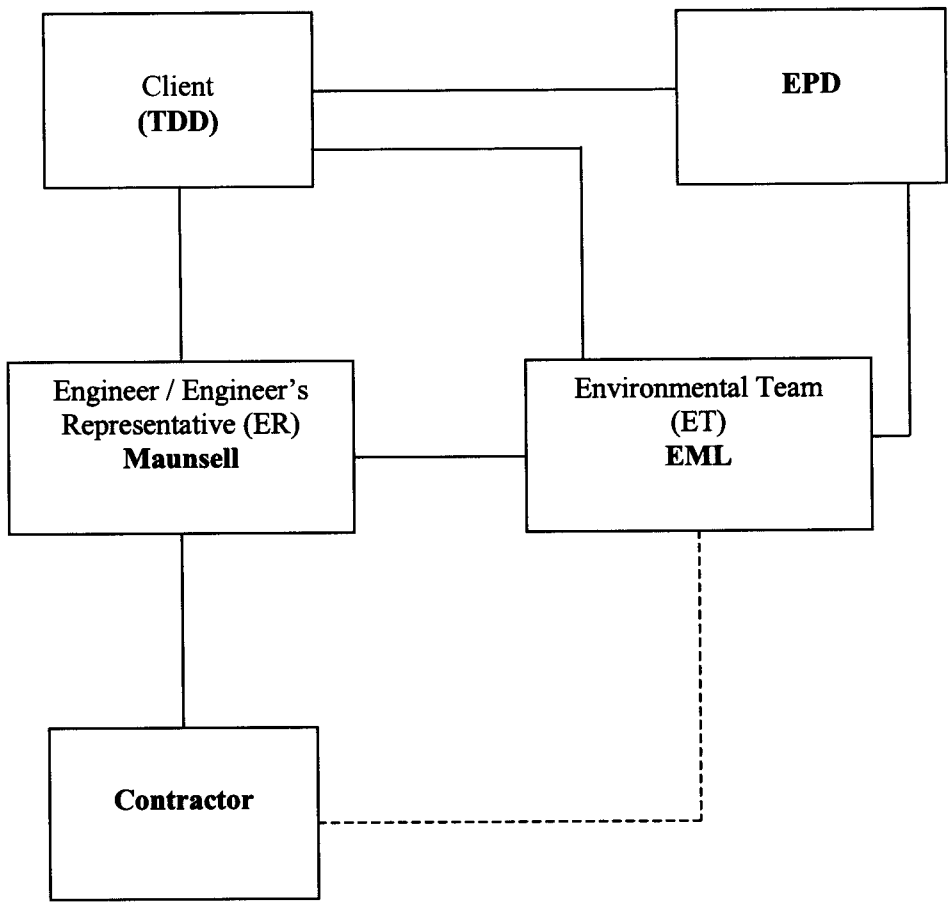
Event / Action Plan for Construction Noise

EVENT	ACTION	
	ET	Contractor
Action Level	<ol style="list-style-type: none"> 1. Notify the Engineer and Contractor; 2. Analyze investigation; 3. Require Contractor to propose measures for the analyzed noise problem; and 4. Increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Submit noise mitigation proposals to Environmental Team and the Engineer; and 2. Implement noise mitigation proposals.
Limit Level	<ol style="list-style-type: none"> 1. Notify the Engineer and Contractor; 2. Notify EPD; and 3. Require Contractor to implement mitigation measures; and increase monitoring frequency to check mitigation effectiveness. 	<ol style="list-style-type: none"> 1. Implement mitigation measures; and 2. Prove to Environmental Team and the Engineer effectiveness of measures applied.

APPENDIX H:

**Project Organisation and
Contacts of Key Personnel**

Figure H.1: Project Management Structure



Contacts of Key Personnel:

Organisation	Nature of Duty	Contact Personnel	Contact Number	
			Telephone	Fax
Territory Development Department (TDD)	Client	Mr. Stephen Wong	2301-1376	2721-8630
Maunsell Consultants Asia Ltd. (MCAL)	Engineer	Mr. Alan Kwong	2602-3433	2691-2649
Environmental Management Ltd. (EML)	Environmental Team	Mr. Lawrence Tsui	2890-1090	2890-6901

APPENDIX I:

**Summary Records of
Complaints Received**

Complaint No.	Received date & Time	Description (inc. location/ nature of complaint)	Follow-up Action Taken	Recommended Measures	Status/ Remarks
C02-N1	Morning, 29/7/2002	Around 9:30am on 29/7/02, police came on site to investigate a complaint of noise pollution emitted during rock breaking which carried out by the Contractor near the Site Office (near the box culvert and north Lok Shun Path Roundabout). The Contractor immediately halted the activity in response to police's advice	<ul style="list-style-type: none"> • Ad hoc site inspection was carried out on 31/7/02, jointly with the Engineer and Contractor • The complaint log sheet, the investigation findings and recommendations on mitigation measures were submitted to the Engineer and Contractor. • A letter, addressing to the complainant, will be sent to the police. 	<p>Mitigation actions:</p> <ul style="list-style-type: none"> • Excavator-mounted breaker shall not be carried out within 125m from any nearby noise sensitive receivers and; • Temporary purposed built barrier should be installed whenever there are high noise level construction activities. 	The complaint was considered as ad hoc rather than continuous. It is therefore considered not necessary to increase the noise monitoring frequency

APPENDIX J:

**Updated Construction
Program**

Oct

Sep

Aug

Jul

Jun

May

Apr

Mar

Feb

Jan

Dec

Nov

Oct

Sep

Aug

Jul

Jun

May

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Feb

Jan

Dec

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Oct

Sep

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Jun

May

Apr

Mar

Feb

Jan

Task Name

Key Dates of Completion

1 Section I (345 days)

2 Section II (822 days)

3 General

3.1 Seeking EPD approval

3.2 Submission of mitigation proposal

3.3 Submission of Material, Method statement & ICE to RE

3.4 Site clearance including existing asbestos houses at Bridge A

3.5 Site clearance including existing houses at Bridge C

3.6 Liaise with utility undertakers

3.7 Utility Diversion

3.8 Fabrication / Erection of RE Office

3.9 Condition Survey / Defect Survey

3.10 Erection of Temp. Fencing & Hoarding

3.11 Relocation of existing fence wall at house no. 85 B

3.12 Form temp access (from bridge A to B) & (from bridge C to B)

4 Earthworks

4.1 Forming access to Main Cutting CH 300-400

4.2 Slope Cutting at CH 300-400 with associated slope drainage

4.3 Forming access to CH 400-500

4.4 Remaining slope Cutting at retaining wall 7 and CH 400-500

4.5 Remove the temporary access road to retaining wall 7

4.6 Formation of Cycle Track and Footpath nearby KCRC Railway

5 Entrustment Works (Section I)

5.1 General Clearance & Trial Pits Excavation

5.2 Drainage Works (pipelines 1.019-1.024, 7.022 & 15.000

5.4 Drainage Works (pipeline 1.011-1.014)

5.5 Drainage Works (pipeline 1.014-1.016)

5.6 Drainage Works (pipeline 1.000-1.004 & 2.000-2.001, 3.000-3.001, 3.002

5.7 Drainage Works (pipeline 3.002-3.004)

6 Bridge A

6.1 Procurement and Approval of Alternative I-beams

6.2 Set up Precast Yard

6.3 Fabrication precast beams A3-A4

6.4 Fabrication precast beams A1-A2-A3 & A4-A5

6.5 Ground Investigation

6.6 Piling Works at A1, A2, A3, A4 & A5

6.7 Construction of Pile Caps at A2, A3, A4 and Piers A3, A4

6.8 Construction of Abutment A5 and installation of bearing

6.9 Procurement, manufacturing and testing of bridge bearing

6.10 Installation of bridge bearings at Pier A3 & A4

6.11 Erection of precast beams between A3 and A4

6.12 Cast in-situ decking between A3 & A4

6.13 Construction of Abutment A1 & Piers A2

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Task

Task Progress

Critical Task

Critical Task Progress

Milestone

Summary

Task

Task Progress

Critical Task

Critical Task Progress

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Summary

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Task Progress

Critical Task

Critical Task Progress

Milestone

Summary

Project: Key Dates of Completion

Date: Tue 8/13/02

Project Summary

Rolled Up Progress

Split

External Tasks

Project Summary

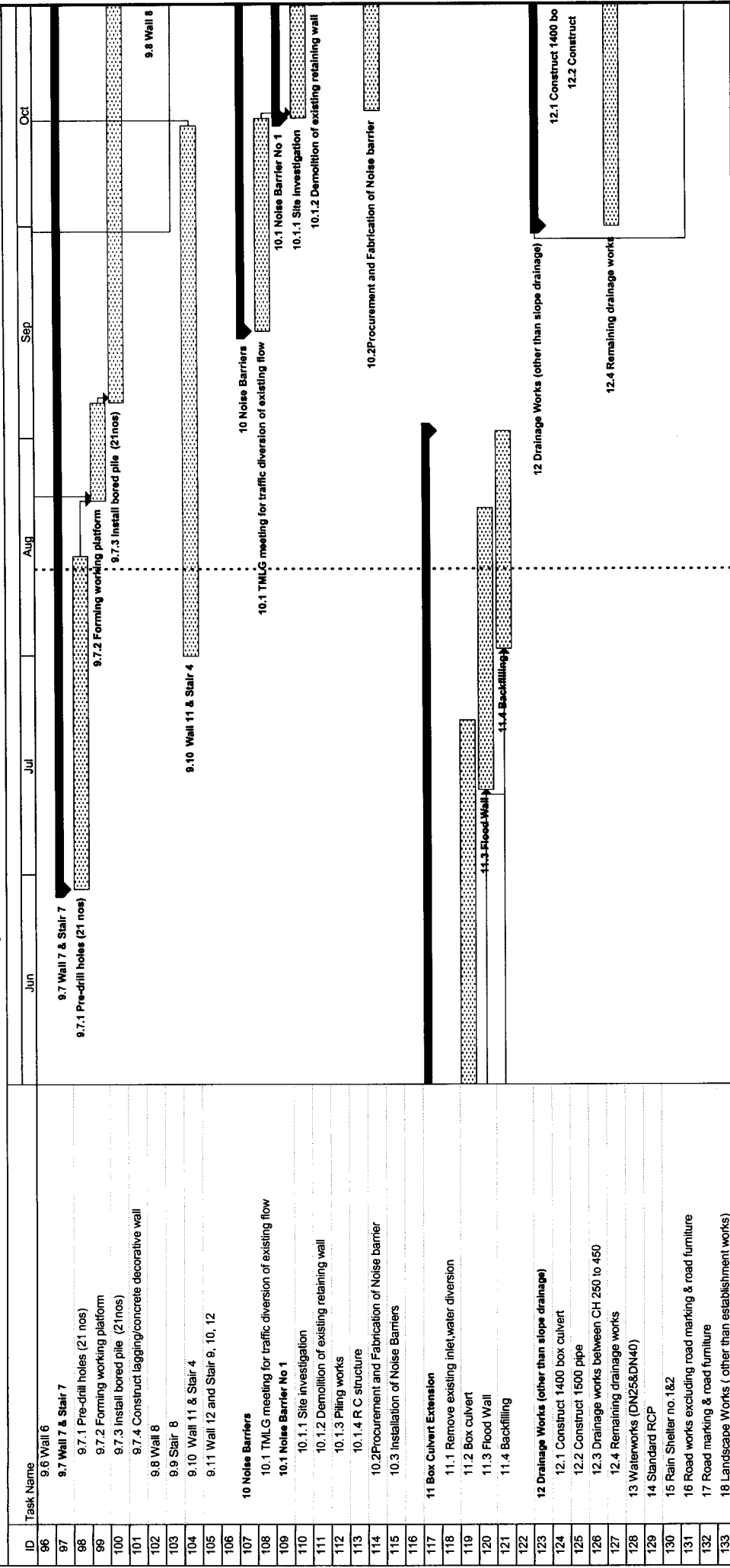
ID	Task Name	Jun	Jul	Aug	Sep	Oct
48	6.14 Installation of bridge bearing at A1 & A2					
49	6.15 Erection of precast beams between A1 & A2					
50	6.16 Cast in-situ decking between A1 & A2					
51	6.17 Erection of precast beams between A2 & A3					
52	6.18 Cast in-situ decking between A2 & A3					
53	6.19 Erection of precast beams between A4 & A5					
54	6.20 Cast in-situ decking between A4 & A5					
55	6.21 Edge parapet A1-A4					
56	6.22 Edge parapet between A4 & A5					
57	6.23 Paving					
58						
59	7 Bridge B					
60	7.1 Fabrication of precast beams					
61	7.2 Form Temporary Access (B1-B2)					
62	7.3 Ground Investigation					
63	7.4 Piling Works at Abutment B1 & B2					
64	7.5 Construction of Abutment B1, B2 and stair 6					
65	7.6 Procurement, manufacturing and testing of bridge bearing					
66	7.7 Installation of bridge bearing at B1 & B2					
67	7.8 Erection of precast beams from B1 to B2					
68	7.9 Cast in-situ decking between B1 and B2					
69	7.10 Edge parapet					
70	7.11 Paving					
71						
72	8 Bridge C					
73	8.1 Fabrication of precast beams					
74	8.2 Ground Investigation at Pier C2					
75	8.3 Ground Investigation at Abutment C1					
76	8.4 Piling Works for Abutment C1					
77	8.5 Piling Works for Pier C2					
78	8.6 Construction of Abutment C1					
79	8.7 Construction of Pile Cap & Pier C2					
80	8.8 Procurement, manufacturing and testing of bridge bearing					
81	8.9 Installation of bridge bearing at C2 & existing deck					
82	8.10 Erection of precast beams from existing deck to C2					
83	8.11 Cast in-situ decking from existing deck to C2					
84	8.12 Installation of bridge bearing at C1					
85	8.13 Erection of precast beams from C1 to C2					
86	8.13 Cast in-situ decking between C1 and C2					
87	8.14 Edge parapet					
88	8.15 Paving					
89						
90	9 Retaining Walls & Stairs					
91	9.1 Wall 1					
92	9.2 Wall 2					
93	9.3 Wall 3 & Stair 1,2,3					
94	9.4 Wall 4					
95	9.5 Wall 5 & Stair 5,11					

Project: Key Dates of Completion
Date: Tue 8/13/02

Task Progress Legend:
 Critical Task Progress: [Dotted pattern bar]
 Milestone: [Diamond symbol]
 Summary: [Dotted pattern bar]
 Task: [Solid black bar]
 Task Progress: [Dotted pattern bar]
 Critical Task: [Dotted pattern bar]

Task Status Legend:
 Rolled Up Task: [Dotted pattern bar]
 Rolled Up Critical Task: [Dotted pattern bar with diamond]
 Rolled Up Milestone: [Diamond symbol]
 Split: [Dotted pattern bar with vertical line]
 External Tasks: [Dotted pattern bar with diagonal lines]

Project Summary: [Arrow pointing right]



Project: Key Dates of Completion
 Date: Tue 8/13/02

Task Progress: [Solid bar]

Critical Task Progress: [Dotted bar]

Milestone: [Dotted bar]

Summary: [Dotted bar]

Rollled Up Task: [Dotted bar]

Rollled Up Critical Task: [Dotted bar]

Rollled Up Milestone: [Dotted bar]

Split: [Dotted bar]

External Tasks: [Dotted bar]

Project Summary: [Solid bar]