Civil Engineering and Development Department

Contract No. ST 77/01 Sha Tin New Town, Stage II

Road D15 Linking Lok Shun Path and Tai Po Road

Environmental Monitoring and Audit Monthly Report (Version 1.0)

August 2004

Certified By

(Environmental Team Leader)

REMARKS:

The information supplied and contained within this report is, to the best of our knowledge, correct at the time of printing.

CINOTECH accepts no responsibility for changes made to this report by third parties.

CINOTECH CONSULTANTS LTD

Room 1601-1610, Delta House, 3 On Yiu Street, Shatin, NT, Hong Kong Tel: (852) 2151 2083 Fax: (852) 3107 1388 Email: info@cinotech.com.hk

TABLE OF CONTENTS

EX	ECUTIVE SUMMARY	1
	Introduction	1
	Environmental Monitoring Works	
	Key Information in the Reporting Month	
	Complaints and Prosecutions	2
1.	INTRODUCTION	3
	Background	3
	Project Organizations	
	Construction Programme	
	Summary of EM&A Requirements	4
2.	AIR QUALITY	5
	Monitoring Requirements	5
	Monitoring Locations	
	Monitoring Equipment	
	Monitoring Parameters, Frequency and Duration	
	Monitoring Methodology and QA/QC Procedure	
•		
3.	NOISE	
	Monitoring Requirements	
	Monitoring Locations	
	Monitoring Equipment	
	Monitoring Methodology and QA/QC Procedures	
	Maintenance and Calibration	
	Results and Observations	
4.	ENVIRONMENTAL AUDIT	12
	Site Audits	12
	Review of Environmental Monitoring Procedures	
	Implementation Status of Environmental Mitigation Measures	
	Summary of Non-compliance of the Environmental Quality Performance Limit	
	Implementation Status of Event Action Plans	
	Summary of Complaints and Prosecution	14
5.	FUTURE KEY ISSUES	15
	Key Issues for the Coming Month	15
	Monitoring Schedule for the Next Month	
	Construction Program for the Next Month	15
6.	CONCLUSIONS AND RECOMMENDATIONS	16
	Conclusions	16
	Recommendations	

LIST OF TABLES

Table I	Summary Table for Non-compliance Recorded in the Reporting Month
Table II	Summary Table for Key Information in the Reporting Month
Table 1.1	Key Project Contacts
Table 2.1	Locations for Air Quality Monitoring
Table 2.2	Air Quality Monitoring Equipment
Table 2.3	Impact Dust Monitoring Parameters, Frequency and Duration
Table 3.1	Noise Monitoring Stations
Table 3.2	Noise Monitoring Equipment
Table 3.3	Noise Monitoring Parameters, Frequency and Duration
Table 4.1	Summary of Major Mitigation Measures at the Site

LIST OF FIGURES

Figure 1	Locations of the Site and the Monitoring Stations
Figure 2	Project Organization Chart

LIST OF APPENDICES

A	Action and Limit Levels for Air Quality and Noise
В	Environmental Monitoring Schedules
C	1-hour TSP Monitoring Results and Graphical Presentations
D	24-hour TSP Monitoring Results and Graphical Presentations
E	Noise Monitoring Results and Graphical Presentations
F	Weather Conditions during Monitoring Period
G	Site Audit Summary
Н	Event Action Plans
I	Construction Programme
J	Complaint Logs
K	Summary of Exceedances

Abbreviation and Acronym

AL Levels Action and Limit Levels

CEDD Civil Engineering and Development Department

E / ER Engineer/Engineer's Representative

EIA Environmental Impact Assessment

EM&A Environmental Monitoring and Audit

EMIS Environmental Mitigation Implementation Schedule

EP Environmental Permit

EPD Environmental Protection Department

ET Environmental Team

HVS High Volume Sampler

RH Relative Humidity

TSP Total Suspended Particulates

SLM Sound Level Meter

EXECUTIVE SUMMARY

Introduction

- 1. This is the first monthly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the "Sha Tin New Town, Stage II Road D15 Linking Lok Shun Path and Tai Po Road" (the Project). The EM&A works were commenced on 12th August 2004. This report documents the findings of EM&A works conducted in August 2004.
- 2. The construction activities undertaken in the reporting month were:
 - Finishing works
 - Noise Barrier installation
 - Underground and surface drainage works
 - Water mains and irrigation mains works

Environmental Monitoring Works

- 3. Environmental monitoring for the Project was performed as stipulated in the EM&A Manual and the results were checked and reviewed. Site audits were conducted once per week. The implementation of the environmental mitigation measures, Event Action Plans and environmental complaint handling procedures were also checked.
- 4. Summary of the non-compliance of the reporting month is tabulated in Table I.

Table I Summary Table for Non-compliance Recorded in the Reporting Month

Media /	No of Exc	eedances	Action	Results of action	Remarks
Nature	Action Level	Limit Level	Taken	taken	
Air	0	0	N.A.	N.A.	
Noise	0	0	N.A.	N.A.	

Air Quality

1-hour TSP Monitoring

5. 1-hour TSP monitoring commenced on 25th August 2004. No Action/Limit Level exceedance was recorded in the reporting month.

24-hour TSP Monitoring

6. 24-hour TSP monitoring was commenced on 24th August 2004 and all the results complied with the Action and Limit Levels in the reporting month.

Construction Noise

7. Construction noise monitoring was commenced on 25th August 2004 at all designated monitoring station except at N3, Royal Ascot as the management office of Royal Ascot refused the ET from entering. There was no Action (noise complaint) or Limit Level exceedance recorded in the reporting month.

Key Information in the Reporting Month

8. Summary of key information in this reporting month is tabulated in Table II.

Complaints and Prosecutions

9. No environmental complaint or prosecution was received during the reporting month.

Table II Summary Table for Key Information in the Reporting Month

	Event Details		Event Details		Event Details Action	Action	Status	Remark
Event	Number	Nature	Taken					
Complaint received	0		N.A.	N.A.				
Changes to the assumptions and key construction / operation activities recorded	0		N.A.	N.A.				
Status of submissions under EP	0		N.A.	N.A.				
Notifications of any summons & prosecutions received	0		N.A.	N.A.				

Future Key Issues:

Finishing works and drainage works will be the major construction activities for the coming month. The anticipated environmental impact will be mainly on dust and noise.

1. INTRODUCTION

Background

- 1.1 Cinotech Consultants Limited (hereinafter called the "ET") was appointed by Civil Engineering and Development Department (CEDD) (hereinafter called the "Project Proponent") via Maunsell Consultants Asia Limited (hereinafter called the "Engineer/ Engineer's Representative) to undertake the Environmental Monitoring and Audit (EM&A) works for the Project "Sha Tin New Town, Stage II Road D15 Linking Lok Shun Path and Tai Po Road" (the Project).
- 1.2 The Project is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 449) and an environmental impact assessment report titled "Sha Tin New Town Stage II Road D15 Linking Lok Shun Path & Tai Po Road Environmental Impact Assessment Final Report (March 1997)" (Register No. EIA-112/BC) has been approved and deposited with Environmental Protection Department (EPD). The Environmental Permit (EP) No. EP-092/2001/A issued by EPD for the construction and operation of the proposed works under the Project was amended to EP-092/2001/B.
- 1.3 The Project "Sha Tin New Town, Stage II Road D15 Linking Lok Shun Path and Tai Po Road" was commenced in 2002. The site layout is shown in Figures 1a and 1b. Under the requirements of Conditions 3 of the EP, EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A Manual, environmental monitoring of air quality and noise are required for the construction phase of the Project.
- 1.4 The EM&A works were carried out by Environmental Management Limited until July 2004. Cinotech was commissioned by the Project Proponent via the Engineer to undertake the works in mid August 2004.
- 1.5 This is the first monthly EM&A report prepared by Cinotech summarizing the EM&A works for the Project in August 2004.

Project Organizations

- 1.6 Different parties with different levels of involvement in the project organization include:
 - Project Proponent CEDD
 - Engineer or Engineer's Representative (E/ER) Maunsell Consultants Asia Limited (MCAL)
 - Environmental Team (ET) Cinotech Consultants Limited
 - Contractor Barbican Construction Co. Ltd.
- 1.7 The responsibilities of respective parties are detailed in Section 1.4 of the EM&A Manual and the project organization chart is presented in Figure 2.
- 1.8 The key contacts of the Project are shown in Table 1.1.

Party	Nature of Duty	Name	Phone No.	Fax No.
CEDD	Project Proponent	Mr. K.K. Law	23011397	27390076
MCAL	Engineer	Mr. Conrad Ng	26856107	26912649
Cinotech	Environmental Team Leader	Dr. Priscilla Choy	21512083	31071388

Construction Programme

- 1.9 The construction activities undertaken in the reporting month were:
 - Finishing works
 - Noise Barrier installation
 - Underground and surface drainage works
 - Water mains and irrigation mains works

Summary of EM&A Requirements

- 1.10 The EM&A programme requires construction phase monitoring for air quality and construction noise and environmental site audit. The EM&A requirements for each parameter are described in following sections, including:
 - All monitoring parameters;
 - Action and Limit levels for all environmental parameters;
 - Event / Action Plans;
 - Environmental mitigation measures, as recommended in the project EIA study final report;
 - Environmental requirements in contract documents.
- 1.11 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 4 of this report.
- 1.12 This report presents the monitoring results, observations, locations, equipment, period, methodology and QA/QC procedures of the required monitoring parameters, namely dust, noise levels and audit works for the Project in the reporting month.

2. AIR QUALITY

Monitoring Requirements

2.1 1-hour and 24-hour TSP monitoring was conducted to monitor the air quality since 24th August 2004. Appendix A shows the established Action/Limit Levels for the environmental monitoring works.

Monitoring Locations

2.2 Three designated monitoring stations, A1, A2 and A3 were selected for impact dust monitoring. Table 2.1 describes the air quality monitoring locations, which are also depicted in Figure 1a.

Table 2.1 Locations for Air Quality Monitoring

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

Monitoring Equipment

2.3 Table 2.2 summarizes the equipment used in the impact air monitoring programme.

Table 2.2 Air Quality Monitoring Equipment

Equipment	Model and Make	Quantity
Calibrator	G25A	1
HVS Sampler	GMWS 2310 c/w of TSP sampling inlet	3

Monitoring Parameters, Frequency and Duration

2.4 Table 2.3 summarizes the monitoring parameters and frequencies of impact dust monitoring for the whole construction period. The air quality monitoring schedule for the reporting period is shown in Appendix B.

Table 2.3 Impact Dust Monitoring Parameters, Frequency and Duration

Parameters	Frequency
1-hr TSP	Three times / 6 days
24-hr TSP	Once / 6 days

Monitoring Methodology and QA/QC Procedure

Instrumentation

2.5 High volume (HVS) samplers (Model GMWS-2310 Accu-Vol) completed with appropriate sampling inlets were employed for 1-hour and 24-hour TSP monitoring. The sampler was composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complied with that required by USEPA Standard Title 40, Code of Federation Regulations Chapter 1 (Part 50). Moreover, the HVS also met all the requirements in section 2.3 of the EM&A Manual.

Operating/Analytical Procedures

- 2.6 Operating/analytical procedures for the operation of HVS were as follows:
 - A horizontal platform was provided with appropriate support to secure the samplers against gusty wind.
 - No two samplers were placed less than 2 meters apart.
 - The distance between the sampler and an obstacle, such as buildings, was at least twice the height that the obstacle protrudes above the sampler.
 - A minimum of 2 meters of separation from walls, parapets and penthouses was required for rooftop samples.
 - A minimum of 2 meters separation from any supporting structure, measured horizontally was required.
 - No furnaces or incineration flues were nearby.
 - Airflow around the sampler was unrestricted.
 - The sampler was more than 20 meters from the drip line.
 - Any wire fence and gate, to protect the sampler, should not cause any obstruction during monitoring.
- 2.7 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m³/min. and 1.4 m³/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.
- 2.8 For TSP sampling, fiberglass filters (G810) were used [Note: these filters have a collection efficiency of > 99% for particles of 0.3 mm diameter].
- 2.9 The power supply was checked to ensure the sampler worked properly.
- 2.10 On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.
- 2.11 The filter holding frame was then removed by loosening the four nuts and carefully a weighted and conditioned filter was centered with the stamped number upwards, on a supporting screen.
- 2.12 The filter was aligned on the screen so that the gasket formed an airtight seal on the outer edges of the filter. Then the filter holding frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.

- 2.13 The shelter lid was closed and secured with the aluminium strip.
- 2.14 The timer was then programmed. Information was recorded on the record sheet, which included the starting time, the weather condition and the filter number (the initial weight of the filter paper can be found out by using the filter number).
- 2.15 After sampling, the filter was removed and sent to the laboratory for weighing. The elapsed time was also recorded.
- 2.16 Before weighing, all filters were equilibrated in a conditioning environment for 24 hours. The conditioning environment temperature should be between 25°C and 30°C and not vary by more than ± 3 °C; the relative humidity (RH) should be < 50% and not vary by more than ± 5 %. A convenient working RH is 40%.

Maintenance/Calibration

- 2.17 The following maintenance/calibration was required for the HVS.
 - The high volume motors and their accessories were properly maintained. Appropriate maintenance such as routine motor brushes replacement and electrical wiring checking were made to ensure that the equipment and necessary power supply are in good working condition.
 - High volume samplers were calibrated at bi-monthly intervals using GMW-25 Calibration Kit throughout all stages of the air quality monitoring.

Results and Observations

- 2.18 Dust monitoring was commenced on 24th August 2004. The monitoring data and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in Appendices C and D respectively.
- 2.19 The weather conditions during the monitoring period were mainly sunny or cloudy. Rain was also encountered on 26th August 2004.

1-hour TSP Monitoring

2.20 1-hour TSP monitoring was commenced on 25th August 2004. No Action/Limit Level exceedance was recorded in the reporting month.

24-hour TSP Monitoring

- 2.21 24-hour TSP monitoring was commenced on 24th August 2004 and all the results complied with the Action and Limit Levels in the reporting month.
- 2.22 According to ET's field observations, the major dust source at the monitoring stations was road traffic dust from Lok Shun Path.

3. NOISE

Monitoring Requirements

3.1 Noise monitoring was commenced on 25th August 2004. Appendix A shows the established Action Limit Levels for the environmental monitoring works.

Monitoring Locations

3.2 In accordance with the EM&A Manual, noise monitoring was conducted at five monitoring stations, namely N1, N2, N3, N4 and N5. Figure 1b shows the locations of these stations.

Table 3.1 Noise Monitoring Stations

Monitoring Stations	Location
N1	Lok Lo Ha Village House No. 3B
N2	Lok Lo Ha Village House No. 32A
N3	Royal Ascot Block 9, Flat C ¹
N4	Lok Lo Ha Village House No. 97
N5	Village near Royal Ascot

Remarks:

1. No noise monitoring was carried out during the reporting period because the management office of Royal Ascot refused the ET to carry out noise monitoring in Royal Ascot.

Monitoring Equipment

- 3.3 Integrating Sound Level Meters were used for noise monitoring. They were Type 1 sound level meters capable of giving a continuous readout of the noise level readings including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). They comply with International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1).
- 3.4 Table 3.2 summarizes the noise monitoring equipment model being used.

Table 3.2 Noise Monitoring Equipment

Equipment	Model	Quantity
Integrating Sound Level Meter	B&K 2238	5
integrating Sound Level Weter	Rion NL-14	1
Calibrator	B&K 4231	2
Wind Speed Anemometer	Vane Anemometer, Model 451104	1

Monitoring Parameters, Frequency and Duration

3.5 Table 3.3 summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in Appendix B.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

Monitoring Station	Parameter	Period	Frequency	Measurement
N1	L ₁₀ (30 min.) dB(A) L ₉₀ (30 min.) dB(A) L _{eq} (30 min.) dB(A)	0700-1900 hrs. on weekdays	Once per week	Façade
N2				Façade
N3				Façade
N4				Façade
N5				Façade

Monitoring Methodology and QA/QC Procedures

- 3.6 The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- 3.7 For free field measurement, the meter was positioned away from any nearby reflective surfaces. All records for free field noise levels were adjusted with a correction of +3 dB(A).
- 3.8 The battery condition was checked to ensure the correct functioning of the meter.
- 3.9 Parameters such as frequency weighting, the time weighting and the measurement time were set as follows:

frequency weighting : Atime weighting : Fast

• time measurement : 30 minutes / 5 minutes

- 3.10 Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- 3.11 The wind speed was frequently checked with the portable wind meter.
- 3.12 At the end of the monitoring period, the L_{eq} , L_{90} and L_{10} were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- 3.13 Noise measurement was paused during periods of high intrusive noise if possible and observation was recorded when intrusive noise was not avoided.

3.14 Noise monitoring was cancelled in the presence of fog, rain, and wind with a steady speed exceeding 5 m/s, or wind with gusts exceeding 10 m/s.

Maintenance and Calibration

- 3.15 The microphone head of the sound level meter and calibrator was cleaned with soft cloth regularly.
- 3.16 The meter was sent to the supplier to check and calibrate on yearly intervals.

Results and Observations

- 3.17 Construction noise monitoring was commenced on 25th August 2004 at all designated monitoring stations except at N3, Royal Ascot. The management office of Royal Ascot refused the ET from carrying out the noise monitoring.
- 3.18 Results and graphical presentations for construction noise monitoring are shown in Appendix E.
- 3.19 The weather during the monitoring sessions was sunny. Weather conditions are provided in Appendix F.
- 3.20 There was no Action/Limit Level exceedance recorded in the reporting month.
- 3.21 According to ET's field observations, the major noise source at the monitoring stations was railway noise.

4. ENVIRONMENTAL AUDIT

Site Audits

- 4.1 Site audits were carried out on weekly basis to monitor the timely implementation of proper environmental management practices and mitigation measures in the Project site. The summaries of site audits are attached in Appendix G.
- 4.2 Site audits were conducted on 12th, 20th and 27th August 2004.

Review of Environmental Monitoring Procedures

4.3 The monitoring works conducted by the monitoring team were inspected regularly. The following observations have been recorded for the monitoring works:

Air Quality Monitoring

- 4.4 The monitoring team recorded all observations around the monitoring stations within and outside of the construction site.
- 4.5 The monitoring team recorded the temperature, air pressure and weather conditions on the monitoring day.

Noise Monitoring

- 4.6 The monitoring team recorded all observations around the monitoring stations, which might affect the monitoring result.
- 4.7 Major noise sources were identified and recorded. Other intrusive noise attributing to the result was trimmed off by pausing the monitoring temporarily.

Implementation Status of Environmental Mitigation Measures

- 4.8 Table 4.1 presents the status of the major mitigation measures identified during site inspection.
- 4.9 Nevertheless, during site inspections in this reporting month, the following observations and recommendations were made:

Air Quality and Noise

4.10 The Contractor was reminded to keep the public road around site entrance free from dust.

Table 4.1 Summary of Major Mitigation Measures at the Site

Type	Mitigation Measures		Comments	
Noise	Temporary purposed-built Noise Barrier	•	No longer required	
Water	Wheel Washing Facility		Activated	
Sand/Silt Removal Facilities		•	A water treatment plant, Wetsep was employed for desilting.	
	Measures along stream-backs north- east of Lok Shun Path Roundabout	•	No longer required	
	Diversion of Stream Course via drainage pipe	•	Sand trap was installed at downstream end of stream course.	
Waste-water	Water reuse at wheel washing facility and site investigation drilling works		No longer 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 soil		Implemented	
	Regular water spraying on areas where there is likely generation of dust	•	Implemented	
	Impervious sheeting was placed around the working area near monitoring station A1	•	Implemented as necessary	

Water Quality

4.11 No environmental deficiency was observed during site inspections.

Chemical and Waste Management

4.12 The Contractor was reminded to provide drip trays or other alternatives for fuel storage during the audit on 19th August 2004. Drip tray had been provided in the following audit session.

Environmental Permits/Licenses

4.13 The contractor was reminded to post a copy of the EP at the site entrance on 12th August 2004. Copies of the EP had been posted on 19th August 2004.

Summary of Non-compliance of the Environmental Quality Performance Limit

4.14 No non-compliance was recorded during the site audits in the reporting month.

Implementation Status of Event Action Plans

4.15 The Event Action Plans for air quality and noise are presented in Appendix H.

Air Quality

4.16 No exceedance of Action and Limit Levels was recorded for 1-hour and 24-hour TSP concentrations in the reporting month.

Noise

4.17 There was no Action (complaint) or Limit Level exceedance recorded in the reporting month.

Summary of Complaints and Prosecution

- 4.18 No environmental complaint or prosecution was received during the reporting month.
- 4.19 A total of 2 complaints have been received since the commencement of the Project. The details of each of the complaint are summarized in Appendix J.

5. FUTURE KEY ISSUES

Key Issues for the Coming Month

- 5.1 Key issues to be considered in the coming month include:
 - Generation of large volume of surface run-off during rainy season.
 - Regular removal of mud, sand and silt along u-channel and sedimentation tanks.
 - Storage of chemicals/fuel and chemical waste/waste oil on site.

Monitoring Schedule for the Next Month

5.2 The tentative environmental monitoring schedule for the next month is shown in Appendix B.

Construction Program for the Next Month

5.3 The construction program for the Project is shown in Appendix I.

6. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 6.1 Environmental monitoring for the Project was performed in the reporting month and all monitoring results were checked and reviewed.
- Dust monitoring was commenced on 24th August 2004. No exceedance of Action and Limit Levels for 1-hour and 24-hour TSP was recorded during the reporting month.
- 6.3 Noise monitoring was commenced on 25th August 2004. No Action (noise complaint) or Limit Level exceedance was recorded in the reporting month.
- 6.4 No environmental complaint or prosecution was received during the reporting month.

Recommendations

6.5 According to the environmental audit performed in the reporting month, the following recommendations were made:

Dust Impact

- To prohibit any open burning on site.
- To regularly maintain the machinery and vehicles on site.
- To follow up any exceedance caused by the construction works.
- To implement dust suppression measures on all haul roads, stockpiles and dry surfaces.

Noise Impact

- To follow up any exceedance caused by the construction works.
- To obtain a valid Construction Noise Permit for prescribed works and construction works using powered mechanical equipment (PME) during restricted hours as stipulated in the relevant Technical Memorandum under Noise Control Ordinance.

Water Impact

- To identify any wastewater discharges from site.
- To regularly maintain the condition of u-channel, catch pits, desilting facilities and wheel washing facilities on site.
- To regularly maintain the sediment control measures after rainstorms.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To avoid any discharge of chemical waste or oil directly from the site.
- To maintain the plants to avoid oil leakage.