

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)**

October 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.

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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

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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 third 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). This report documents the findings of EM&A works conducted in October 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 / Nature	No of Exceedances		Action Taken	Results of action taken	Remarks
	Action Level	Limit Level			
Air	1	6	N.A.	N.A.	The exceedances were not due to the Project.
Noise	0	1	N.A.	N.A.	The exceedance was not due to the Project.

Air Quality

1-hour TSP Monitoring

5. All 1-hour TSP monitoring was conducted as scheduled. One Action Level exceedance was recorded on 11th October 2004, and five Limit Level exceedances were recorded on 7th, 11th, 14th and 19th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. However, the exceedances were considered invalid as the major dust source was the breaking activities performed by others. No further action was required.

24-hour TSP Monitoring

6. All 24-hour TSP monitoring was conducted as scheduled. One Limit Level exceedance was recorded on 11th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. As with the exceedances of 1-hr TSP, the exceedance was considered invalid as the major dust source was the breaking activities performed by others. No further action was required.

Construction Noise

7. All construction noise monitoring was conducted as scheduled at all designated monitoring station except at N3, Royal Ascot as the management office of Royal Ascot refused the ET from entering.
8. There was one Limit Level exceedance recorded in the reporting month at N1, Lok Lo Ha Village House No. 3B on 9th October 2004. However, the exceedance was considered invalid as the major noise source was the breaking activities performed by others. No further action was required.

Key Information in the Reporting Month

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

Complaints and Prosecutions

10. No environmental complaint and prosecution was received during the reporting month.

Table II Summary Table for Key Information in the Reporting Month

Event	Event Details		Action Taken	Status	Remark
	Number	Nature			
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.	---
<u>Future Key Issues:</u>					
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 third monthly EM&A report prepared by Cinotech summarizing the EM&A works for the Project in October 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.

Table 1.1 Key Project Contacts

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. 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 $\pm 3^\circ\text{C}$; the relative humidity (RH) should be $< 50\%$ and not vary by more than $\pm 5\%$. 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 conducted as scheduled in the reporting month. 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.

1-hour TSP Monitoring

- 2.20 All 1-hour TSP monitoring was conducted as scheduled.
- 2.21 One Action Level exceedance was recorded on 11th October 2004, and five Limit Level exceedances were recorded on 7th, 11th, 14th and 19th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. However, the exceedances

were considered invalid as the major dust source was the breaking activities performed by others. No further action was required.

24-hour TSP Monitoring

- 2.22 All 24-hour TSP monitoring was conducted as scheduled.
- 2.23 One Limit Level exceedance was recorded on 11th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. As with the exceedances of 1-hr TSP, the exceedance was considered invalid as the major dust source was the breaking activities performed by others. No further action was required.
- 2.24 According to ET's field observations, the major dust source at other monitoring stations was road traffic dust from Lok Shun Path.

3. NOISE

Monitoring Requirements

- 3.1 Noise monitoring was conducted in accordance with the EM&A Manual. 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:

- 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
	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)	0700-1900 hrs. on weekdays	Once per week	Façade
N2				Façade
N3	L ₉₀ (30 min.) dB(A)			Façade
N4	L _{eq} (30 min.) dB(A)			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 : A
 - time 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}, L₉₀ and L₁₀ 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 All construction noise monitoring was conducted as scheduled 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 one Limit Level exceedance recorded in the reporting month at N1, Lok Lo Ha Village House No. 3B on 9th October 2004. However, the exceedance was considered invalid as the major noise source was the breaking activities performed by others. No further action was required.
- 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 7th, 14th, 21st and 28th October 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	<ul style="list-style-type: none"> No longer required
Water	Wheel Washing Facility	<ul style="list-style-type: none"> Activated
	Sand/Silt Removal Facilities	<ul style="list-style-type: none"> A water treatment plant, Wetsep was employed for desilting.
	Measures along stream-backs north-east of Lok Shun Path Roundabout	<ul style="list-style-type: none"> No longer required
	Diversion of Stream Course via drainage pipe	<ul style="list-style-type: none"> Sand trap was installed at downstream end of stream course.
Waste-water	Water reuse at wheel washing facility and site investigation drilling works	<ul style="list-style-type: none"> No longer implemented
Land contamination	Metal trays are placed underneath stationary machines where there are potential of oil leakage	<ul style="list-style-type: none"> Implemented
Air	Provide plastic sheeting covers on exposed soil	<ul style="list-style-type: none"> Implemented
	Regular water spraying on areas where there is likely generation of dust	<ul style="list-style-type: none"> Implemented
	Impervious sheeting was placed around the working area near monitoring station A1	<ul style="list-style-type: none"> Implemented as necessary

Water Quality

- 4.11 The Contractor was reminded to avoid sand and silt accumulated in the u-channels.

Chemical and Waste Management

- 4.12 An oil drum was placed on bare ground on 21st October 2004. The Contractor provided a drip tray for the drum after the audit session.

Environmental Permits/Licenses

- 4.13 No environmental deficiency was observed during the site inspections.

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

1-hour TSP

- 4.16 One Action Level exceedance was recorded on 11th October 2004, and five Limit Level exceedances were recorded on 7th, 11th, 14th and 19th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. However, the exceedances were considered invalid as the major dust source was the breaking activities performed by others. No further action was required.

24-hour TSP

- 4.17 One Limit Level exceedance was recorded on 11th October 2004 at monitoring station A1, Lok Lo Ha Village House No. 3B. As with the exceedances of 1-hr TSP, the exceedance was considered invalid as the major dust source was the breaking activities performed by others. No further action was required.

Noise

- 4.18 There was one Limit Level exceedance recorded in the reporting month at N1, Lok Lo Ha Village House No. 3B on 9th October 2004. However, the exceedance was considered invalid as the major noise source was the breaking activities performed by others. No further action was required.

Summary of Complaints and Prosecution

- 4.19 No environmental complaint and prosecution was received during the reporting month.
- 4.20 A total of 3 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:

- Dust problem during dry 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.
- 6.2 All 1-hour and 24-hour TSP monitoring was conducted as scheduled. One Action Level exceedance for 1-hour TSP was recorded on 11th October 2004, and five Limit Level exceedances for 1-hour TSP were recorded on 7th, 11th, 14th and 19th October 2004 at monitoring station A1. One Limit Level exceedance was recorded for 24-hour TSP on 11th October 2004 at monitoring station A1. The exceedances were considered invalid as the major dust source was the breaking activities performed by others. No further action was required.
- 6.3 All construction noise monitoring was conducted as scheduled. There was one Limit Level exceedance recorded in the reporting month at N1 on 9th October 2004. However, the exceedance was considered invalid as the major noise source was the breaking activities performed by others. No further action was required.
- 6.4 No environmental complaint and 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.