

Highways Department

**Route 8 (previously known as Route 9) between
Cheung Sha Wan & Sha Tin**

**Contract No. HY/2003/10 - Environmental Team for
Lai Chi Kok Viaduct and Eagle's Nest Tunnel**

**Monthly EM&A Report
Part II – Eagle's Nest Tunnel & Associated Works
(Version 1)**

March 2005

Approved 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 1602-1610, 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

EXECUTIVE SUMMARY	1
Introduction.....	1
Environmental Monitoring and Audit Works	1
Environmental Licenses and Permits.....	2
Key Information in the Reporting Month	2
1. INTRODUCTION	3
Background	3
Project Organizations.....	4
Construction Programme	4
Summary of EM&A Requirements	5
2. AIR QUALITY	6
Monitoring Requirements	6
Monitoring Locations	6
Monitoring Equipment.....	6
Monitoring Parameters, Frequency and Duration.....	6
Monitoring Methodology and QA/QC Procedure	7
Results and Observations.....	8
3. NOISE.....	9
Monitoring Requirements	9
Monitoring Locations	9
Monitoring Equipment.....	10
Monitoring Parameters, Frequency and Duration.....	10
Monitoring Methodology and QA/QC Procedures.....	10
Maintenance and Calibration	11
Results and Observations.....	11
4. ENVIRONMENTAL AUDIT	12
Site Audits.....	12
Review of Environmental Monitoring Procedures	12
Status of Environmental Licensing and Permitting	12
Implementation Status of Environmental Mitigation Measures	12
Summary of Exceedances	15
Implementation Status of Event Action Plans	15
Summary of Complaints and Prosecutions	15
5. FUTURE KEY ISSUES	15
Key Issues for the Coming Month.....	15
Monitoring Schedule for the Next Month.....	15
Construction Program for the Next Month.....	15
6. CONCLUSIONS AND RECOMMENDATIONS	15
Conclusions.....	15
Recommendations.....	15

LIST OF TABLES

Table I	Summary Table for Events 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 3.4	Baseline Noise Level for the Noise Monitoring Stations
Table 4.1	Summary of Environmental Licensing and Permit Status
Table 4.2	Observations and Recommendations of Site Audit

LIST OF FIGURES

Figure 1a	Locations of Monitoring Stations
Figure 1b	Locations of Monitoring Stations

LIST OF APPENDICES

A	Action and Limit Levels for Air Quality and Noise
B	Copies of Calibration Certificates
C	Environmental Monitoring Schedules
D	Wind Data
E	1-hour TSP Monitoring Results and Graphical Presentations
F	24-hour TSP Monitoring Results and Graphical Presentations
G	Noise Monitoring Results and Graphical Presentations
H	Summary of Exceedance
I	Site Audit Summary
J	Event Action Plans
K	Environmental Mitigation Implementation Schedule (EMIS)
L	Construction Programme
M	Complaint Log

ABBREVIATION AND ACRONYM

AL Levels	Action and Limit Levels
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
IEC	Independent Environmental Checker
RE	Resident Engineer
RH	Relative Humidity
TSP	Total Suspended Particulates
TDD	Territory Development Department
QA/QC	Quality Assurance / Quality Control
SLM	Sound Level Meter
WMP	Waste Management Plan

EXECUTIVE SUMMARY

Introduction

- This is the sixteenth monthly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the “Route 8 (previously known as Route 9) between Cheung Sha Wan & Sha Tin, Lai Chi Kok Viaduct & Eagle's Nest Tunnel”. This report documents the findings of EM&A Works conducted in March 2005 for Contract No. HY/2003/02, Eagle's Nest Tunnel and Associated Works (the Project).
- The site activities undertaken in the reporting month were:
 - Slope cutting;
 - Haul road construction;
 - Soil nail installations;
 - Stepped channel and retaining wall construction;
 - U-channel construction;
 - Tunnel excavation and mucking out;
 - Surface blasting;
 - Blasting works at Portals; and
 - Pile cap construction works.

Environmental Monitoring and Audit Works

- Environmental monitoring and audit works for the Project was performed regularly as stipulated in the updated 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.
- Summary of Events and actions taken in the reporting month is tabulated in **Table I**.

Table I Summary of Events Recorded in the Reporting Month

<i>Parameter</i>	<i>No. of Events</i>		<i>No. of Events Due to the Project</i>	<i>Action Taken</i>
	<i>Action Level</i>	<i>Limit Level</i>		
1-hr TSP	0	0	0	N/A
24-hr TSP	0	0	0	N/A
Noise	2*	0	0	Complaint investigation

*Two noise Action Level exceedances were recorded due to 2 noise complaints received by the ET Leader on 8th and 30th March 2005.

1-hr TSP Monitoring

- All 1-hr TSP monitoring was conducted as scheduled in this reporting month. No Action/Limit Level exceedance was recorded in this reporting month.

24-hr TSP Monitoring

- All 1-hr TSP monitoring was conducted as scheduled in this reporting month. No Action/Limit Level exceedance was recorded in this reporting month.

Construction Noise

- All construction noise monitoring was conducted as scheduled in this reporting month. No Limit Level exceedance was recorded in this reporting month. Two Action Level exceedances were recorded due to 2 noise complaints received by the ET Leader on 8th and 30th March 2005.

Environmental Licenses and Permits

- Licenses/Permits granted to the Project include the Environmental Permit (EP) for the Project, Registration of Chemical Waste Producer (RCWP), Construction Noise Permits (CNPs) and Water Discharge Licenses (WDLs). Four new CNPs were issued to the Project in the reporting month. A varied EP-103/2001/B was recently issued on 22nd March 2005 for the deletion of Figure 4 of the previous EP.

Key Information in the Reporting Month

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

Table II Summary Table for Key Information in the Reporting Month

Event	Event Details		Action Taken	Status	Remark
	Number	Nature			
Complaint received	2	---	Complaint Investigation	Closed	---
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:					
Major site activities for the coming month include: <ul style="list-style-type: none"> Slope cutting; Haul road construction; Soil nail installations; Stepped channel and retaining wall construction; Blasting works at Portals; and Surface blasting at slopes. 					
The anticipated environmental impacts will be mainly on dust and noise due to slope works and water quality from surface runoff in rainy days.					

1. INTRODUCTION

Background

- 1.1 Route 9 (Kowloon Section) (R9K) (hereinafter call the R9K-Project) forms part of the Route 9 between Cheung Sha Wan and Sha Tin (R9-CSWST) project, which will be a new expressway connecting West Kowloon and Sha Tin. It will be the fourth external link between Sha Tin and Kowloon and will form an important link between the northeast New Territories and the west Kowloon, Lantau Island and the western New Territories. R9K is being managed and implemented by the Highways Department (HyD).
- 1.2 The engineering design of R9K is covered under Agreement No. CE 50/98 "Route 9 between Cheung Sha Wan and Sha Tin – Design Construction Assignment". The main consultant engaged under Agreement No. CE 50/98 is Maunsell Hyder Joint Venture (MHJV), who will act as the Engineer for the construction contracts. The works of R9K mainly comprise a 1.4km dual 3-lane Lai Chi Kok Viaduct from Lai Wan Interchange to Butterfly Valley; 0.5 km of dual 3-lane at-grade carriageway linking to the 2.1 km dual 3-lane twin-bore Eagle's Nest Tunnel with associated portal buildings; a toll plaza with an administration building located with the Sha Tin valley woodland; a ventilation building and an adit; associated noise barriers, noise enclosures, drainage, slope and landscape works; and electrical and mechanical works for the whole R9-CSWST. The remainder of the R9-CSWST forms the Sha Tin Section (R9S) of the project and is being managed and implemented separately by the Civil Engineering and Development Department (CEDD).
- 1.3 The R9-CSWST project is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 449) (EIAO). An environmental impact assessment (EIA) report has been prepared in 1998 for the R9-CSWST project (1998 R9 EIA) to consider the key issues of noise, air quality, water quality, ecological, construction waste, landscape and visual, land use and cultural impacts, and identify possible mitigation measures.
- 1.4 An Updated Final EIA report was subsequently completed in August 1999 for the R9-CSWST project (1999 R9 EIA), to cater for some changes in R9K portion as mentioned in paragraph 1 of the report. The 1999 R9 EIA was endorsed by Environmental Protection Department (EPD) in November 1999. The 1998 R9 EIA and the 1999 R9 EIA (R9 EIA Reports) were included in the EIA register under the EIAO as report no. EIA-135/BC and AEIAR-022/1999 respectively. An Environmental Monitoring and Audit (EM&A) Manuals for each of the R9 EIA Reports (EM&A Manuals) were also included as part of the EIA reports in the register.
- 1.5 Subsequent to the endorsement of the R9 EIA Reports by EPD in November 1999, the project programme was deferred to start in 2002/2003 for completion by 2006/07. The implementation of the project was then separated into the R9S and R9K portion. An Environmental Permit (EP) No. EP-103/2001 was issued on 17 September 2001 for R9K to the HyD as Permit Holder and a varied EP No. EP-103/2001/A was subsequently issued on 20 May 2003 for R9K (R9K EP) to HyD as Permit Holder. A varied EP-103/2001/B was recently issued on 22 March 2005 for the deletion of Figure 4 of the previous EP.

- 1.6 The major construction activities of two civil contracts of the R9K project, Contract No. HY/2003/01 entitled “Route 9 – Lai Chi Kok Viaduct” and Contract No. HY/2003/02 entitled “Route 9 – Eagle’s Nest Tunnel and Associated Works”, were commenced on 15th December 2003 for completion in April 2007.
- 1.7 “Route 9” was recently re-tiled as “Route 8 (previously known as Route 9)”. Cinotech Consultants Limited (Cinotech) was commissioned by HyD to undertake the Environmental Monitoring and Audit works for “Route 8 (previously known as Route 9) between Cheung Sha Wan and Sha Tin - Environmental Team (ET) for Lai Chi Kok Viaduct and Eagle’s Nest Tunnel (Contract No. HY/2003/10)”. Dr. Priscilla CHOY of Cinotech Consultants Ltd. was appointed as the ET Leader under Condition 2.2 of the EP. Mr. David YEUNG of CH2M-IDC Hong Kong Ltd. was appointed as the IEC under Condition 2.1 of the EP. This is the sixteenth monthly EM&A report summarizing the EM&A works for the Project in March 2005.

Project Organizations

- 1.8 Different parties with different levels of involvement in the project organization include:
- Project Proponent – Major Works Project Management Office (MWPMO) of Highways Department (HyD)
 - Engineer (E) – Maunsell-Hyder Joint Venture (MHJV)
 - Engineer’s Representative (ER) – Maunsell-Hyder Joint Venture (MHJV)
 - Environmental Team (ET) – Cinotech Consultants Limited
 - Independent Environmental Checker (IEC) – CH2M-IDC Hong Kong Ltd.
 - Contractor – Leighton-Kumagai Joint Venture (LKJV)
- 1.9 The responsibilities of respective parties are detailed in Section 1.8.3 of the Updated EM&A Manual (1999) of the Project.
- 1.10 The key contacts of the Project are shown in **Table 1.1**.

Construction Programme

- 1.11 The site activities undertaken in the reporting month were:
- Slope cutting;
 - Haul road construction;
 - Soil nail installations;
 - Stepped channel and retaining wall construction;
 - U-channel construction;
 - Tunnel excavation and mucking out;
 - Surface blasting;
 - Blasting works at Portals; and
 - Pile cap construction works.

Summary of EM&A Requirements

1.12 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 the 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; and
- Environmental requirements in contract documents.

Table 1.1 Key Project Contacts

Party	Role	Name	Position	Phone No.	Fax No.
HyD	Permit Holder	Mr. K.T. Lee	SE3/R8K	2762 3684	2714 5289
		Mr. Albert Cheung	E6/R8K	2762 3598	
		Mr. George Law	E4/R8K	2762 3675	2714 5198
MHJV	Engineer	Mr. Conrad Ng	Project Manager	2605 6262	2691 2649
	Engineer's Representative	Mr. Peter Poon	CRE	9861 8654	2743 9200
		Mr. Eric Wong	RE (S & EP)	9861 8664	
Ms. Sammie Chan	TO (EN)	6407 3833			
Cinotech	Environmental Team	Dr. Priscilla Choy	The ET Leader	2151 2089	3107 1388
		Mr. KK Chan	Audit Team Leader	2151 2077	
		Mr. Henry Leung	Monitoring Team Leader	2151 2087	
CH2M-IDC	Independent Environmental Checker	Mr. David Yeung	Independent Environmental Checker	2507 2203	2507 2293
		Mr. Billy Yu	Assistant Independent Environmental Checker	2872 2949	
LKJV	Contractor	Mr. Ray Brewster	Project Director	9092 6128	2743 1600
		Mr. Kevin Harman	QA/E Manager	3352 2128	
Enquiries Hotline				3552 2226	
Complaint Hotline				3552 2380	

1.13 The advice on the implementation status of environmental protection and pollution control/mitigation measures is summarized in Section 4 of this report.

1.14 This report presents the monitoring results, observations, locations, equipment, period, methodology and QA/QC procedures of the required monitoring parameters, namely dust and noise levels and audit works for the Project in March 2005.

2. AIR QUALITY

Monitoring Requirements

- 2.1 Monitoring of 1-hour and 24-hour TSP was conducted to monitor the air quality. The established Action/Limit Levels for the environmental monitoring works were shown in **Appendix A**.

Monitoring Locations

- 2.2 Three designated monitoring stations, AM1, AM3 and AM4 was selected for impact dust monitoring for the Project. **Table 2.1** describes the air quality monitoring locations, which are also depicted in **Figure 1a** and **1b**.

Table 2.1 Locations for Air Quality Monitoring

Station	Description	Location
AM1	Yew Chung International School / PLK Choi Kai Yau School	Rooftop
AM3	Slope no. 07SW-D/FR4 near Garden Villa	On Ground
AM4	Government Quarters	Ground Floor ¹

Note: ¹The HVS was installed on the ground floor, which is close to the refuse collection station of the Government Quarters.

Monitoring Equipment

- 2.3 **Table 2.2** summarizes the equipment used in the impact air monitoring programme. Copies of calibration certificates are attached in **Appendix B**.

Table 2.2 Air Quality Monitoring Equipment

Equipment	Model and Make	Quantity
Calibrator	GMW25; S/N: 1536	1
HVS Sampler	Graseby GMW Model GS2310 High Volume TSP Sampler and associated equipment and shelter	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 C**.

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 ProcedureInstrumentation

- 2.5 Graseby GMW Model GS2310 TSP High Volume Sampler (HVS) was employed for 1-hour & 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 Sections 2.2 – 2.4 of the Updated EM&A Manual (1999).

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. On sampling, the sampler was operated for 5 minutes to establish thermal equilibrium before placing any filter media at the designated air monitoring station.

- 2.10 The filter holding frame was then removed by loosening the four nuts and a weighted and conditioned filter was carefully centered with the stamped number upwards, on a supporting screen.
- 2.11 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.
- 2.12 The shelter lid was closed and secured with the aluminum strip. 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). After sampling, the filter was removed and sent to the laboratory for weighing. The elapsed time was also recorded.
- 2.13 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

- 2.14 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

- 2.15 The TSP monitoring at the three designated stations was performed as scheduled in the reporting month.
- 2.16 No Action/ Limit Level exceedance was recorded for both 1hr and 24hr TSP monitoring.
- 2.17 Wind data monitoring equipment has been installed in Shatin Heights for logging wind speed and wind direction. These wind data is summarized in **Appendix D**.
- 2.18 The monitoring data and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in **Appendices E and F**, respectively.

3. NOISE

Monitoring Requirements

- 3.1 Monitoring and audit of construction noise levels is required to be conducted, in accordance with the EM&A Manual, to ensure that any unacceptable noise impacts could be readily detected and timely and appropriate action be undertaken to rectify the situation.
- 3.2 The construction noise levels shall be measured in terms of the A-weighted equivalent continuous sound pressure level (L_{eq}). L_{eq} (30min) shall be used as the monitoring parameter for the time period between 0700-1900 hours on normal weekdays. For all other time periods, L_{eq} (5min) shall be employed for comparison with the Noise Control Ordinance (NCO) criteria. As supplementary information for data auditing, statistical results such as L_{10} and L_{90} shall also be obtained for reference.
- 3.3 Three designated noise monitoring stations, namely NM1, NM5 & NM6 were selected for impact monitoring in accordance to the EM&A manual (1999) and the subsequent EPD approval of the relocations.
- 3.4 Noise monitoring is also required to be conducted at station NM7 in accordance with the EM&A Manual (1998). The noise monitoring at the station is required to be conducted under CEDD's construction Contract No. ST 89/02 "Sha Tin Heights Tunnel and Approaches" in accordance with the requirement of Environmental Permit No. EP104/2001/A. The impact noise monitoring results at station NM7 are also presented in this report.
- 3.5 **Appendix A** shows the established Action and Limit Levels for the environmental monitoring works.

Monitoring Locations

- 3.6 Noise monitoring was conducted at four designated monitoring stations as summarized in Table 3.1. Figures 1a & 1b show the locations of these stations.

Table 3.1 Noise Monitoring Stations

Monitoring Station	Description	Location
NM1	Yew Chung International School / PKL Choi Kai Yau School	Rooftop
NM5	Villa Carlton	Ground Floor ¹
NM6	Government Quarters	Rooftop of Refuse Collection Station
NM7	Garden Villa	Rooftop

Note: ¹ The noise measurement was taken at 2.3m above the ground floor of Villa Carlton, where has a line of sight of the construction site in the opposite.

Monitoring Equipment

- 3.7 Table 3.2 summarizes the noise monitoring equipment model being used. Copies of calibration certificates are attached in **Appendix B**.

Table 3.2 Noise Monitoring Equipment

Equipment	Model and Make	Qty.
Integrating Sound Level Meter	B&K Model 2238	5
Calibrator	B&K 4231	2
Wind Speed Anemometer	RS232 Integral Vane Digital Anemometer	1

Monitoring Parameters, Frequency and Duration

- 3.8 Table 3.3 summarizes the monitoring parameters, frequency and total duration of monitoring. The noise monitoring schedule is shown in **Appendix C**.

Table 3.3 Noise Monitoring Parameters, Frequency and Duration

Station	Parameter	Period ¹	Frequency	Measurement
NM1	L ₁₀ (30 min.)dB(A) L ₉₀ (30 min.)dB(A) L _{eq} (30 min.)dB(A)	(a) 0700-1900 hrs. on weekdays (b) 1900-2300 hrs. on weekdays (c) 0700-2300 hrs. on holidays (d) 2300-0700 hrs on any days	Once per week	Façade
NM5				Façade
NM6				Free Field
NM7				Façade

Note: ¹(b), (c) and (d) will only be conducted if construction works are undertaken during these periods.

Monitoring Methodology and QA/QC Procedures

- The Sound Level Meter was generally set on a tripod at a height of 1.2 m above the ground, depending to the actual monitoring condition.
- For free field measurement (if any), 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).
- The battery condition was checked to ensure the correct functioning of the meter.
- 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
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94.0 dB at 1000 Hz. If the difference in the calibration level before and after measurement was more than 1.0 dB, the measurement would be considered invalid and repeat of noise measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with the portable wind meter.

- 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.
- Noise measurement was paused during periods of high intrusive noise if possible and observation was recorded when intrusive noise was not avoided.
- 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

- 3.9 The microphone head of the sound level meter and calibrator was cleaned with soft cloth regularly. The meters were sent to the supplier to check and calibrate on a yearly interval.

Results and Observations

- 3.10 Noise monitoring was performed at the four designated locations during the daytime period (0700-1900 hours) on normal as scheduled in this reporting month. Restricted-hour monitoring was also conducted at NM5, NM6 and NM7.
- 3.11 All the Construction Noise Levels (CNLs) reported in this report were adjusted with the corresponding baseline level (i.e. $\text{Measured } L_{eq} - \text{Baseline } L_{eq} = \text{Measured CNL}$), in order to facilitate the interpretation of the noise exceedance. The baseline noise level of each designated noise monitoring station is presented at **Table 3.4**.

Table 3.4 Baseline Noise Level for the Noise Monitoring Stations

Station	Baseline Noise Level, dB(A)		
	0700-1900 on weekdays	1900-2300 on weekdays / 0700-2300 on holidays	2300-0700 on any days
NM1 – Yew Chung International School / PKL Choi Kai Yau School	61.5	60.3	58.3
NM5 – Villa Carlton	77.1	75.8	71.9
NM6 – Government Quarters	70.1	56.1	52.8
NM7 – Garden Villa	59.0	58.3	55.5

- 3.12 Noise monitoring results and graphical presentations are shown in **Appendix G**.
- 3.13 No Limit Level exceedance for both daytime and restricted-hour monitoring was recorded in the reporting month.
- 3.14 Two Action Level exceedances were recorded due to two noise complaints received by the ET Leader on 8th and 30th March 2005.

4. ENVIRONMENTAL AUDIT

Site Audits

- 4.1 Site audits were carried out on a 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 I**.
- 4.2 Site audits were conducted on 3rd, 9th, 18th, 23rd and 30th March 2005 by ET. The audit session on 3rd March 2005 was conducted with the representatives of HyD, IEC, ER, the Contractor and ET.

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

- The monitoring team recorded all observations around the monitoring stations within and outside the construction site.
- The monitoring team recorded the temperature and weather conditions on the monitoring days.

Noise Monitoring

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

Status of Environmental Licensing and Permitting

- 4.4 All permits/licenses obtained for the Project are summarized in **Table 4.1**. Four new CNPs were issued to the Project in the reporting month. A varied EP-103/2001/B was recently issued on 22nd March 2005 for the deletion of Figure 4 of the previous EP.

Implementation Status of Environmental Mitigation Measures

- 4.5 According to the Environmental Permit and the EM&A Manuals, the mitigation measures detailed in the documents are required to be implemented. An updated summary of the EMIS is provided in **Appendix K**.

Table 4.1 Summary of Environmental Licensing and Permit Status

Permit No.	Valid Period		Details	Status
	From	To		
Environmental Permit (EP)				
EP-103/2001/A	20/05/03	21/03/05	Construction and operation of (a) All civil works (including highways, traffic, geotechnical, drainage, structural, architectural and landscaping works) for the Lai Chi Kok Viaduct, the interchange with Ching Cheung Road, the main road within Butterfly Valley and the Eagle's Nest Tunnel; (b) All E&M works (including ventilation, Traffic Control & Surveillance System (TCSS), toll collection system and lighting) for the whole Route 9 between Cheung Sha Wan and Sha Tin;	Superseded
EP-103/2001/B	22/03/05	N/A	(c) The permanent slope works above the northern portal of the Eagle's Nest Tunnel; (d) The architectural works (including fitting out and furnishings) of the portal buildings of the Sha Tin Heights Tunnel.	Valid
Registration of Chemical Waste Producer				
WPN 5213-761-L2595-01	26/01/04	N/A	N/A	Valid
Water Discharge Licence				
EP482/261/0327/I	03/05/04	31/05/09	Discharge of industrial trade effluent and effluent arising from construction activities at the construction site at Ventilation Adit on Tai Po Road (behind Shell Filling Station) opposite Pinehill Development Highways.	Valid
EP482/261/0326/I	01/04/04	30/04/09	Discharge of industrial trade effluent and effluent arising from construction activities at the construction site at Mui Kong Tsuen, Butterfly Valley, Lai Chi Kok, Kowloon.	Valid
No. 3156	23/02/04	22/02/09	Discharge of industrial trade effluent and all other wastewater arising from the works areas at North Portal of Route 9 - Eagle's Nest Tunnel and Associated Works (Contract HY/2003/02).	Valid
Construction Noise Permit (CNP)				
GW-RW0085-05	23/03/05	22/09/05	The use of powered mechanical equipment carrying out construction work at South Portal on general holiday including Sundays between 0700 and 2300 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RW0086-05	23/03/05	22/09/05	The use of powered mechanical equipment carrying out construction work at South Portal on any days between 2300 and 0700 hrs on next day.	Valid
GW-RW0138-05	15/03/05	29/06/05	The use of powered mechanical equipment carrying out construction work at Ventilation Adit on general holiday including Sundays between 0700 and 2300 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid

Permit No.	Valid Period		Details	Status
	From	To		
GW-RW0137-05	15/03/05	30/06/05	The use of powered mechanical equipment carrying out construction work at Ventilation Adit on any days between 2300 and 0700 hrs on next day.	Valid
GW-RN0612-04	02/12/04	01/06/05	The use of powered mechanical equipment carrying out construction work at North Portal (near Garden Villa) of Route 9 – Eagle's Nest Tunnel and Associated Works on any day between 2300 and 0700 hrs on next day.	Valid
GW-RN0601-04	26/11/04	25/05/05	The use of powered mechanical equipment carrying out construction work at North Portal (near Garden Villa) of Route 9 – Eagle's Nest Tunnel and Associated Works on general holiday including Sundays between 0900 and 2300 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RW0484-04	08/10/04	07/04/05	The use of powered mechanical equipment carrying out construction work at Butterfly Valley, Lai Chi Kok, Kowloon, on general holiday (including Sundays) between 0700 and 2300 hours, and on any day not being a general holiday between 1900 and 2300 hours.	Valid

4.6 During site inspections in the reporting month, no non-conformance was identified. The observations and recommendations are summarized in **Table 4.2**.

Table 4.2 Observations and Recommendations of Site Audit

Parameters	Date	Observations / Recommendations	Remedial Actions
<i>Air Quality</i>	03-Mar-05	Fugitive dust emission was observed during the breaking work at Portion D1 (North Portal). The Contractor was reminded to provide water spray during the breaking work for dust suppression.	Rectification was observed during the site audit on 09-Mar-05.
	09-Mar-05	Fugitive dust emission was observed when the soil nail work was being conducted at BVS4. The Contractor was reminded to provide sufficient dust control measures during such work.	Rectification was observed during the site audit on 18-Mar-05.
	18-Mar-05	Fugitive dust emission was observed during the operation of drill rig at South Portal. The Contractor was reminded to provide sufficient dust control measures during such work.	Rectification was observed during the site audit on 23-Mar-05.
	23-Mar-05	Fugitive dust emission was observed during drilling works (soil-nail installation) at BVS4. The Contractor was reminded to provide sufficient dust suppression measures for the drilling works.	Rectification was observed during the site audit on 30-Mar-05.
	23-Mar-05	Two dump trucks (no. HL914 and KJ2297) with uncovered dusty materials were observed leaving the site via TAR1. The Contractor was reminded to ensure the materials on trucks should be covered properly before leaving the site.	Rectification was observed during the site audit on 07-Apr-05.
	23-Mar-05	Dark smoke emission from an air compressor was observed at Portion A. The Contractor was reminded to use well-maintained plants on site.	Rectification was observed during the site audit on 30-Mar-05.

Parameters	Date	Observations / Recommendations	Remedial Actions
	30-Mar-05	Five dump trucks were covered inadequately before exiting the site via TAR1.	Rectification was observed during the site audit on 07-Apr-05.
<i>Waste / Chemical Management</i>	09-Mar-05	Oil drum without being provided with drip tray was observed at Portion D3. The Contractor was reminded that all fuel/oil storages should be within a bunded area.	Rectification was observed during the site audit on 18-Mar-05.
	09-Mar-05	Chemical/ oil waste drums without attaching chemical labels were found in chemical storage area at Portion D3. The Contractor was reminded to attach such label on each oil drum properly.	Rectification was observed during the site audit on 18-Mar-05.
	18-Mar-05	Oil drum without being provided with drip tray was observed at BVS4. The Contractor was reminded that all fuel/oil storages should be within a bunded area.	Rectification was observed during the site audit on 23-Mar-05.
	30-Mar-05	A drum of chemical fuel was observed placed on bare ground without provision of drip tray at Portion H4. The Contractor was reminded to provide the drip tray for the drum.	Rectification was observed during the site audit on 07-Apr-05.
<i>Noise</i>	03-Mar-05	No noise emission label was affixed on an air compressor at BVS2. The Contractor was reminded to provide the label as soon as possible.	Rectification was observed during the site audit on 09-Mar-05.

Summary of Exceedances

1-hr TSP Monitoring

4.7 No Action/Limit Level exceedance was recorded in this reporting month.

24-hr TSP Monitoring

4.8 No Action/Limit Level exceedance was recorded in this reporting month.

Construction noise

4.9 No Limit Level exceedance for noise monitoring was recorded in the reporting month. Two Action Level exceedances were recorded due to two noise complaints received by the ET Leader on 8th and 30th March 2005.

Implementation Status of Event Action Plans

4.10 The Event Action Plans for air quality and noise are presented in **Appendix J**.

Summary of Complaints and Prosecutions

- 4.11 Two environmental complaints were received in the reporting month.
- 4.12 The first complaint was received by EPD on 5th March 2005 and subsequently referred to the ET Leader on 8th March 2005. The complaint was about (1) nighttime and Sunday construction noise; (2) noise from tunnel blasting at early morning and nighttime; and (3) dust from construction due to dump trucks leaving the site without provision of proper covers. The concern of uncovered dump trucks was considered valid and related to the Project works, while the complaint against the noise issue was considered not justifiable according to the noise monitoring results. The Contractor was recommended to review the current checking systems. A complaint investigation report was submitted to EPD on 22nd March 2005.
- 4.13 Another complaint, also raised by residents of Garden Villa, was forwarded by EPD on 30th March 2005, regarding noise generation from early use of TAR1. Based on the results of routine noise monitoring and the ad-hoc measurement on 1st April 2005 at Garden Villa, no exceedance of daytime noise criterion of 75 dB(A) was recorded. The complaint lodged is therefore considered not justifiable. A complaint investigation report was submitted to EPD on 6th April 2005.
- 4.14 No environmental related prosecution was received in the reporting month.
- 4.15 There were nine environmental complaints and no prosecution received since the commencement of the Project. The updated Complaint Log is shown in **Appendix M**.

5. FUTURE KEY ISSUES

Key Issues for the Coming Month

5.1 Key issues to be considered in the coming month include:

- Surface runoff generated in rainy days;
- Potential dust emission from slope works and haul road construction at Butterfly Valley, excavation and mucking out from portals and vehicle movement on haul roads;
- Wastewater generation from tunneling works;
- Noise generation from excavation works, rock breaking works; and
- Storage of chemicals/fuel and chemical waste/waste oil on site.

Monitoring Schedule for the Next Month

5.2 The tentative environmental monitoring schedules for the next month are shown in **Appendix C**.

Construction Program for the Next Month

5.3 The tentative construction program for the Project is provided in **Appendix L**.

6. CONCLUSIONS AND RECOMMENDATIONS

Conclusions

- 6.1 Environmental monitoring works were performed in the reporting month and all monitoring results were checked and reviewed.

1-hour TSP Monitoring

- 6.2 No Action/Limit Level exceedance was received in this reporting month.

24-hour TSP Monitoring

- 6.3 No Action/Limit Level exceedance was received in this reporting month.

Construction Noise Monitoring

- 6.4 All construction noise monitoring was conducted at scheduled in this reporting month. No Limit Level exceedance was recorded in this reporting month. Two Action Level exceedances were recorded due to 2 noise complaints received by the ET Leader on 8th and 30th March 2005.

Complaint and Prosecution

- 6.5 Two environmental complaints were received by the ET Leader on 8th and 30th March 2005. Complaint investigation was undertaken by ET and the results were submitted to EPD on 22nd March and 6th April 2005, respectively.
- 6.6 No environmental related prosecution was received in this reporting month.

Recommendations

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

Dust Impact

- To provide frequent water spray on haul roads and stockpiles of dusty materials;
- To cover idle soil slope surface to prevent wind erosion;
- To prohibit any open burning on site.
- To regularly maintain the machinery and vehicles on site.

Noise Impact

- To inspect the noise sources inside the site.
- To follow up any exceedance caused by the construction works.
- To space out noisy equipment and position the equipment as far away as possible from sensitive receivers.
- To provide temporary noise barriers for operations of noisy equipment near the noise sensitive receivers in an appropriate location.

Water Impact

- To review the surface runoff control measures for the upcoming wet season.
- To identify any wastewater discharge from site.
- To regularly maintain and clear up the condition of u-channel, catch pits and wheel washing facilities on site.

Waste/Chemical Management

- To check for any accumulation of waste materials or rubbish on site.
- To avoid any discharge or accidental spillage of chemical waste or oil directly from the site.
- To avoid improper handling or storage of oil drum on site.