

**Civil Engineering & Development Department  
NT EAST Development Office**

**Contract No. ST 89/02**

**Sha Tin Heights Tunnel and Approaches**

**Environmental Monitoring and Audit  
Monthly Report (Version 1)**

July 2005

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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## TABLE OF CONTENTS

<b>EXECUTIVE SUMMARY .....</b>	<b>1</b>
Introduction.....	1
Environmental Monitoring Works .....	1
Environmental Licenses and Permits .....	2
Complaints and Prosecutions .....	2
Future Key Issues.....	2
<b>1. INTRODUCTION .....</b>	<b>3</b>
Background .....	3
Project Organizations .....	3
Construction Programme .....	3
Summary of EM&A Requirements.....	3
<b>2. AIR QUALITY .....</b>	<b>3</b>
Monitoring Requirements .....	3
Monitoring Locations .....	3
Monitoring Equipments .....	3
Monitoring Parameters, Frequency and Duration.....	3
Monitoring Methodology and QA/QC Procedure .....	3
Results and Observations .....	3
<b>3. NOISE.....</b>	<b>3</b>
Monitoring Requirements .....	3
Monitoring Locations .....	3
Monitoring Equipment.....	3
Monitoring Parameters, Frequency and Duration.....	3
Monitoring Methodology and QA/QC Procedures.....	3
Maintenance and Calibration .....	3
Results and Observations .....	3
<b>4. ENVIRONMENTAL AUDIT .....</b>	<b>3</b>
Site Audits.....	3
Review of Environmental Monitoring Procedures .....	3
Status of Environmental Licenses and Permits.....	3
Status of Waste Management.....	3
Implementation Status of Environmental Mitigation Measures .....	3
Implementation Status of Event Action Plans .....	3
Summary of Complaints and Prosecutions .....	3
<b>5. FUTURE KEY ISSUES .....</b>	<b>3</b>
Key Issues for the Coming Month .....	3
Monitoring Schedule for the Next Month.....	3
Construction Program for the Next Month .....	3
<b>6. CONCLUSIONS AND RECOMMENDATIONS .....</b>	<b>3</b>
Conclusions.....	3
Recommendations .....	3

## **LIST OF TABLES**

Table I	Summary Table for Non-compliance Recorded 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 Environmental Licences and Permit Status

## **LIST OF FIGURES**

Figure 1	Site Layout Plan
Figure 2a	Location of Monitoring Stations (I)
Figure 2b	Location of Monitoring Stations (II)
Figure 3	Project Organization Chart

## **LIST OF APPENDICES**

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

## **ABBREVIATION AND ACRONYM**

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

## EXECUTIVE SUMMARY

### Introduction

1. This is the thirty-third monthly Environmental Monitoring and Audit (EM&A) Report prepared by Cinotech Consultants Limited for the project “Sha Tin Heights Tunnel & Approaches” (the Project). This report documents the findings of EM&A Works conducted in July 2005.
2. The construction activities undertaken in the reporting month were:
  - Construction of Portal Buildings;
  - Site formation and slope works;
  - Tunneling works;
  - Bridge superstructure works;
  - Drainage works; and
  - Construction of retaining structure.

### Environmental Monitoring Works

3. Environmental monitoring for the Project was performed regularly as stipulated in the EM&A Manuals and the results were checked and reviewed. Site audits were conducted once per week. The implementations 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 Table I.

**Table I Summary Table for Non-compliance Records in the Reporting Month**

Media / Nature	No. of Exceedances		No. of Exceedances due to the Project	
	Action Level	Limit Level	Action Level	Limit Level
1-hr TSP	0	0	0	0
24-hr TSP	0	0	0	0
Noise	0	0	0	0

#### *Air Quality*

##### 1-hour TSP Monitoring

5. All 1-hour TSP monitoring was conducted as scheduled during the reporting month, except that the monitoring at Station A4 was suspended on 22<sup>nd</sup>, 25<sup>th</sup>, 26<sup>th</sup> and 28<sup>th</sup> July 2005 due to power disruption to the monitoring equipment. No Action/Limit Level exceedance was recorded.

**24-hour TSP Monitoring**

6. All 24-hour TSP monitoring was conducted as scheduled during the reporting month, except that the monitoring at A4 was suspended on 27<sup>th</sup> July 2005 due to power disruption to the monitoring equipment. No Action/Limit Level exceedance was recorded.

***Construction Noise***

7. All construction noise monitoring was conducted as scheduled. No Action and Limit Level exceedance was recorded in the reporting month.

**Environmental Licenses and Permits**

8. License/Permits granted to the Project include the Environmental Permit (EP), Construction Noise Permits (CNP), Waste Disposal (Chemical Waste) License, and Wastewater Discharge License.

**Complaints and Prosecutions**

9. No prosecution was received during the reporting month.
10. No environmental complaint was received in this reporting month.

**Future Key Issues**

11. Construction of portal buildings, drainage works, tunneling works and segment erection will be the major construction activities for the coming month.
12. The anticipated environmental impacts will be mainly on surface runoff during rains and construction noise impact during restricted-hour works.

## 1. INTRODUCTION

### Background

- 1.1 Sha Tin Heights Tunnel and Approaches (SHT) (hereinafter the Project) forms part of the Route 8 (Formerly Route 9) between Cheung Sha Wan and Sha Tin 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. The Project, the entrusted portion of the Route 8 (Formerly Route 9) project, is being managed and implemented by Civil Engineering & Development Department (CEDD).
- 1.2 The Project works mainly comprise the site formation for a toll plaza at the valley of Sha Tin Heights, the construction of 1 km long dual three-lane tunnels under Sha Tin Heights, a 0.6 km long dual two-lane tunnel approach road in Tai Wai, two slip road viaducts with approximately total length of 1 km connecting to Che Kung Miu Road, associated noise barriers and noise enclosures, drainage, slope works and landscape works. The remainder of the Route 8 (Formerly Route 9) (Main Portion, R9K) project forms the Kowloon Section and is being managed and implemented separately by Highways Department.
- 1.3 The Route 8 (Formerly Route 9) (between Cheung Sha Wan and Sha Tin) project is a Designated Project under the Environmental Impact Assessment Ordinance (Cap. 449, EIAO). An environmental impact assessment (EIA) report had been prepared in 1998 for the Route 8 (Formerly Route 9) project to consider the key issues of noise, air quality, water quality, ecological, construction waste, landscape and visual, land use and culture impacts, and identify possible mitigation measures. An updated Final EIA report was subsequently completed in August 1999 to cater for some changes in the main portion. The 1998 and 1999 Route 8 (Formerly Route 9) EIA (R9 EIA Reports) reports were included in the EIA register under the EIAO as report number EIA-135/BC and AEIAR-022/1999 respectively. EM&A Manuals for each of the R9 EIA reports were also included as part of the EIA reports in the register.
- 1.4 Subsequent to the endorsement of the R9 EIA reports by EPD in November 1999, the R9 project was deferred to start in 2002/2003 for completion by 2006/07. The implementation of the Route 8 (Formerly Route 9) project was then separated into the SHT and R9K portions. Meanwhile further design amendments had also been proposed for the R9S during the detailed design stage to resolve various engineering constraints. In view of these changes, an Environmental Review on the SHT was undertaken to update the findings of the R9 EIA reports. The Environmental Review report for SHT was completed in September 2001 and an Environmental Permit No. EP-104/2001 was issued on 4<sup>th</sup> October 2001 for the Project.
- 1.5 The works of the SHT is constructed under CEDD's construction Contract No. ST 89/02 "Sha Tin Heights Tunnel and Approaches". The site layout of the Project is shown in Figure 1. The Project works were commenced on 18<sup>th</sup> November 2002.

- 1.6 Cinotech Consultants Limited (Cinotech) was commissioned by CEDD to undertake the Environmental Team (ET) Services for the Project. This is the thirty-third monthly EM&A report summarizing the EM&A works for the Project in July 2005.

### Project Organizations

- 1.7 Different parties with different levels of involvement in the project organization include:
- Project Proponent – CEDD, NT East Development Office
  - Engineer or Engineer's Representative (E/ER) – Maunsell Consultants Asia Limited (MCAL)
  - Environmental Team (ET) – Cinotech Consultants Limited
  - Independent Environmental Checker (IEC) – CH2M-IDC (Hong Kong) Limited
  - Contractor – China State-China Railway Joint Venture
- 1.8 The responsibilities of respective parties are detailed in Section 2 of the EM&A Manual (1998) and Section 1.8 of the EM&A Manual (1999). The project organization chart is presented in Figure 3.
- 1.9 The key contacts of the Project are shown in Table 1.1.

**Table 1.1 Key Project Contacts**

Party	Name	Role	Phone No.	Fax No.
CEDD	Ms. Joanna Kwok	Permit Holder	2301 1383	2739 0076
	Mr. Robert Choy	Project Coordinator	2301 1373	2721 8630
MCAL	Mr. Francis Leong	The Engineer	2685 6517	2691 2649
	Ir. Y. H. Fung	Engineer's Representative	9400 8208	2697 4106
	Mr. K.Y. Chan		9750 0557	2697 4106
	Mr. S. K. Lo		9751 9638	2697 4106
ET	Dr. Priscilla Choy	The ET Leader	2151 2083	3107 1388
	Mr. KK Chan	Audit Team Leader	2151 2077	3107 1388
	Mr. Henry Leung	Monitoring Team Leader	9779 7340	3107 1388
IEC	Mr. David Yeung	Independent Environmental Checker	2507 2203	2507 2293
Contractor	Mr. David Lau	Senior Project Manager	2601 7917	2697 1592
24-hour Hotline			9759 9852	-



**Construction Programme**

1.10 The construction activities undertaken in the reporting month were:

- Construction of Portal Buildings;
- Site formation and slope works;
- Tunneling works;
- Bridge superstructure works;
- Drainage works; and
- Construction of retaining structure.

**Summary of EM&A Requirements**

1.11 The EM&A programme requires construction phase monitoring for air quality and 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; and
- Environmental requirements in the contract documents.

1.12 The advices on the implementation status of environmental protection and pollution control/mitigation measures are summarized in Section 4 of this report.

1.13 This report presents the monitoring results, observations, locations, equipments, periods, methodologies and QA/QC procedures of the required monitoring parameters, namely dust and noise levels and audit works for the Project in July 2005.

## 2. AIR QUALITY

### Monitoring Requirements

- 2.1 Measurement of 1-hour and 24-hours TSP were conducted to monitor the air quality. Appendix A shows the established Action/Limit Levels for the captioned environmental monitoring works.

### Monitoring Locations

- 2.2 Three designated monitoring stations, A2, A3 and A4 were selected for impact dust monitoring. Table 2.1 describes the air quality monitoring locations, which are also depicted in Figures 2a and 2b.

**Table 2.1 Locations for Air Quality Monitoring**

Monitoring Stations	Description
A2	Lau Pak Lok Secondary School
A3	Shatin Heights
A4	Slope no. 07SW-D/FR4 beside Garden Villa

### Monitoring Equipments

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

**Table 2.2 Air Quality Monitoring Equipment**

Equipments	Models and Makes	Quantity
Calibrator	G25A; S/N: 1536	1
1-hour TSP Dust Meter	Laser Dust Monitor – Model LD3	3
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 month is shown in Appendix C.

**Table 2.3 Impact Dust Monitoring Parameters, Frequency and Duration**

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

**Monitoring Methodology and QA/QC Procedure***1-hour TSP Monitoring*Measuring Procedures

2.5 The measuring procedures of the 1-hour dust meters were in accordance with the Manufacturer's Instruction Manual as follow:

- Pull up the air sampling inlet cover
- Change the Mode 0 to BG with once
- Push Start/Stop switch once
- Turn the knob to SENSI.ADJ and press it
- Push Start/Stop switch once
- Return the knob to the position MEASURE slowly
- Push the timer set switch to set measuring time
- Remove the cap and make a measurement

Maintenance/Calibration

2.6 The following maintenance/calibration was required for the direct dust meters:

- Check the meter at 3-month intervals and calibrate the meter at 1-year intervals throughout all stages of the air quality monitoring.

*24-hour TSP Monitoring*Instrumentation

2.7 High volume (HVS) samplers (Model GMWS-2310 Accu-Vol) completed with appropriate sampling inlets were employed for 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 Manuals.

Operating/Analytical Procedures

2.8 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.

2.9 Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 1.1 m<sup>3</sup>/min. and 1.4 m<sup>3</sup>/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

2.10 For TSP sampling, fiberglass filters (G810) were used [Note: these filters have a collection efficiency of > 99% for particles of 0.3 mm diameter].

2.11 The power supply was checked to ensure the sampler worked properly.

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

2.13 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.

2.14 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.

2.15 The shelter lid was closed and secured with the aluminum strip.

2.16 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).

2.17 After sampling, the filter was removed and sent to the laboratory for weighing. The elapsed time was also recorded.

- 2.18 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

- 2.19 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**

- 2.20 All 1-hour TSP monitoring was conducted as scheduled during the reporting month, except that the monitoring at Station A4 was suspended on 22<sup>nd</sup>, 25<sup>th</sup>, 26<sup>th</sup>, and 28<sup>th</sup> July 2005 due to power disruption to the monitoring equipment. No Action/Limit Level exceedance was recorded.
- 2.21 All 24-hour TSP monitoring was conducted as scheduled during the reporting month, the monitoring at Station 4 was run only 19 hours and it was suspended on 27<sup>th</sup> July 2005 due to power disruption to the monitoring equipment. No Action/ Limit Level exceedance was recorded.
- 2.22 The monitoring data and graphical presentations of 1-hour and 24-hour TSP monitoring results are shown in Appendices D and E, respectively.
- 2.23 Wind data monitoring equipment has been installed in monitoring station A3 for logging wind speed and wind direction. Wind data for the reporting month is summarized in Appendix F.

### 3. NOISE

#### Monitoring Requirements

- 3.1 Noise monitoring was conducted in accordance with the EM&A Manuals. Appendix A shows the established Action and Limit Levels for the environmental monitoring works.

#### Monitoring Locations

- 3.2 Noise monitoring was conducted at four designated monitoring stations, namely N5, N6, N7 and N8, as summarized in Table 3.1. Figures 2a and 2b show the locations of these stations.

**Table 3.1 Noise Monitoring Stations**

Monitoring Stations	Description
N5	At the podium level of Garden Villa
N6	On the roofing of Shatin Heights
N7	On the roofing of Lau Pak Lok Secondary School
N8	At the ground level of 187 Tin Sam Tsuen

#### Monitoring Equipment

- 3.3 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	3
Wind Speed Anemometer	Vane Anemometer, Model 451104	1

#### Monitoring Parameters, Frequency and Duration

- 3.4 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**

Monitoring Stations	Parameters	Period	Frequency	Measurement
N5	L <sub>10</sub> (30 min.)dB(A) L <sub>90</sub> (30 min.)dB(A) L <sub>eq</sub> (30 min.)dB(A)	0700-1900 hrs. on weekdays	Once per week	Facade
N6				Facade
N7				Facade
N8				Facade

**Monitoring Methodology and QA/QC Procedures**

- The Sound Level Meter was set on a tripod at a height of 1.2 m above the ground.
- 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 : L<sub>eq</sub> (30 min) for daytime noise monitoring /  
3 consecutive L<sub>eq</sub> (5 min) for restricted hour noise monitoring
- 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<sub>eq</sub>, L<sub>90</sub> and L<sub>10</sub> were recorded. In addition, site conditions and noise sources were recorded on a 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**

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

**Results and Observations**

- 3.7 Noise monitoring was performed as scheduled in the reporting month. Results and graphical presentations are shown in Appendix G.
- 3.8 No Action/Limit Level exceedance was recorded in the reporting month.

#### **4. ENVIRONMENTAL AUDIT**

##### **Site Audits**

- 4.1 Site audits were carried out on weekly basis to monitor the implementation of proper environmental management practices and mitigation measures in the Project site.
- 4.2 Site audits were conducted on 7<sup>th</sup>, 14<sup>th</sup>, 21<sup>st</sup>, and 28<sup>th</sup> July 2005. The observation summaries of site audits are attached in Appendix I.

##### **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 of the construction site.
- The monitoring team recorded the temperature and weather conditions on each 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 Licenses and Permits**

- 4.4 All permits/licenses obtained are summarized in Table 4.1.

##### **Status of Waste Management**

- 4.5 The amount of wastes generated by the activities of the Project in July 2005 is shown in Appendix J.



**Table 4.1 Summary of Environmental Licensing and Permit Status**

Permit No.	Valid Period		Section	Status
	From	To		
Environmental Permit				
EP-104/2001/B	16/02/05	N/A	Site formation, drainage, geotechnical and landscape works for the toll plaza. Construction of the Sha Tin Heights Tunnels, the Sha Tin Approach Roads and the Slip Road Connecting to Che Kung Miu Road including all formation, structure, road, geotechnical, drainage and landscape work. Construction of the structure of the portal buildings of the Sha Tin Heights Tunnel and noise mitigation measures.	Valid
Construction Noise Permit				
GW-RN0033-05	12/02/05	11/08/05	Concreting works at Che Kung Mui Road at any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RN0042-05	18/02/05	17/08/05	Construction works at TAR1, site magazine and tunnel entrance (Portion 4)/ access to tunnel, north and south bound tunnel during general holidays including Sundays between 0900 and 2300 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RN0061-05	28/02/05	27/08/05	Steel fixing in South Portal Building during general holidays including Sundays between 0900 and 1900 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RN0067-05	09/03/05	08/09/05	Delivery of precast bridge segment on any day between 0400-0600 hours.	Valid
GW-RN0087-05	16/03/05	15/09/05	Construction works at TAR3 during general holidays including Sundays between 0900 and 1900 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
GW-RN0112-05	25/03/05	24/09/05	Parapet installation works at Portion 9 on any days between 0030-0515 hours.	Valid
GW-RN0140-05	15/04/05	14/10/05	Segment erection near Shatin Heights on any days between 1900-2300 and 0100-0500 hours.	Valid
GW-RN0141-05	13/04/05	12/10/05	Tunnel excavation near Garden Villa on any days between 2300-0700 hours.	Valid
GW-RN0142-05	13/04/05	12/10/05	Tunnel excavation near Garden Villa during general holidays including Sundays between 0900 and 1900 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid

Permit No.	Valid Period		Section	Status
	From	To		
GW-RN0250-05	07/06/05	06/12/05	Decking over at Che Kung Miu Road (adjacent to Tai Wai Maintenance Centre) on any day between 2100 and 0500 hours on next day	Valid
GW-RN0288-05	24/06/05	23/12/05	Gantry rotation near Che Kung Miu Road on any day between 2130 and 0700 hours on next day.	Valid
GW-RN0289-05	1/07/05	31/12/05	Erection of Noise Barrier on KCRC Track near Shatin Heights during any day between 2330 and 0530 hours on next day.	Valid
GW-RN0290-05	29/06/05	28/12/05	Segment erection near Shatin Heights during general holidays including Sundays between 0900 and 2100 hours and any day not being a general holiday including Sundays between 1900 and 2300 hours.	Valid
<b>Wastewater Discharge License</b>				
3024	16/6/03	15/6/08	Wastewater discharge at the site office in Sha Tin Heights.	Valid
2984	21/8/03	20/8/08	Trade effluent and all other wastewater arising from the work areas, Sedimentation Barrier, Sedimentation tanks, Aqua Sep and Wet Sep	Valid
<b>Waste Disposal (Chemical Waste)</b>				
WPN: 5213-754-C3250-01	N/A	N/A	Disposal of chemical waste such as waste lubricating oil and diesel oil arising from construction work.	Valid

### Implementation Status of Environmental Mitigation Measures

- 4.6 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 presented in Appendix K.
- 4.7 During site inspections in the month, the following observations and recommendations were made. All the observations were improved and rectified on the next audit day.

#### *Water Quality*

- 4.8 The silt retention ponds and sedimentation tanks were accumulated of silt and sludge. The contractor was reminded to remove silt more frequently and maintain the sedimentation tanks in good operation at Portion 9 and North Portal.
- 4.9 A tarpaulin water pipe, which diverted wastewater out of the tunnel to a sedimentation tank was broken. The contractor was reminded to repair the pipe as soon as possible.
- 4.10 Standing water was observed on the cover of stockpile at Portion 8 and other locations of the site. The contractor was reminded to prevent accumulation of standing water and pay more attention on the issue of mosquito breeding.

*Air Quality*

- 4.11 No environmental deficiency was identified during the reporting month.

*Chemical and Waste Management*

- 4.12 Oil leaked out from container to ground at Tunnel's Workshop. The contractor was reminded to keep the oil drums at Tunnel's Workshop in the well sealed tray to prevent oil leakage to ground.
- 4.13 General wastes scattering on ground were observed at Portion 7. The contractor was reminded to dispose of the wastes regularly and properly.

**Implementation Status of Event Action Plans**

- 4.14 The Event Action Plans for air quality and noise are presented in Appendix L.
- 4.15 The exceedance summary in the reporting month is presented in the Appendix H.

Air Quality

- 4.16 No Action/Limit Level exceedance of 1-hr TSP and 24-hr TSP Project was recorded in the reporting month.

Noise

- 4.17 No Action/Limit Level exceedance of noise was recorded in the reporting month.

**Summary of Complaints and Prosecutions**

- 4.18 No prosecution was received during the reporting month.
- 4.19 No environmental complaint was received in this reporting month.
- 4.20 The complaint log status is attached in Appendix N.

## **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 season.
- Generation of dust from stockpiles, haul road and vehicles movement on-site.
- Noise from operation of the equipment and machinery on-site especially during restricted-hours and school examination day.
- 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 C.

### **Construction Program for the Next Month**

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

## 6. CONCLUSIONS AND RECOMMENDATIONS

### Conclusions

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

#### Air Quality

- 6.2 No Action/Limit Level exceedance of 1-hr TSP and 24-hr TSP due to the Project was recorded in the reporting month.

#### Noise

- 6.3 All construction noise monitoring was conducted as scheduled. No Action/Limit Level exceedance was recorded in the reporting month.

#### Complaints and Prosecution

- 6.4 No environmental complaint was received in this reporting month.
- 6.5 No environmental prosecution was received during the reporting month.

### Recommendations

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

#### *Dust Impact*

- To ensure the dust mitigation measures are fully implemented during the tunnel blasting works.
- To regularly maintain the machinery and vehicles on site.
- To implement dust suppression measures on all haul roads, stockpiles, loose and dry surfaces.

#### *Noise Impact*

- To inspect the noise sources within the construction area.
- To space out noisy equipment and position as far away as possible from sensitive receivers.
- To provide temporary noise barriers for operations of noisy equipment near the noise sensitive receivers.
- To implement effective noise mitigation measure(s) so as to further reduce the construction noise level during school examination period

#### *Water Quality Impact*

- To identify any wastewater discharges from the construction site.
- To regularly maintain the condition of u-channel, catch pits and wheel washing facilities within construction site.
- To regularly clean the AquaSep as maintain in good working condition.

*Waste/Chemical Management*

- To check for any accumulation of waste materials or rubbish on construction site.
- To avoid any directly discharge of chemical waste or oil from the site.
- To regularly remove standing water/ oily water in drip trips on site.