




**DRAINAGE SERVICES DEPARTMENT (DSD)  
CONTRACT NO. DC/2005/02**

**CONSTRUCTION OF SEWERS, RISING MAINS  
& SEWAGE PUMPING STATION AT KAM TIN, NAM SANG WAI  
AND AU TAU IN YUEN LONG**

**First Monthly Construction Phase EM&A Report  
APRIL 2006**

PREPARED FOR

Leader Civil Engineering Corporation Ltd

Quality Index					
Date	Reference No.	Prepared by	Certified by	Verified by	
10 May 2006	TCS/00310/06/600/R0036	Ben Lam (Project Supervisor)	Cliff Lam (Project ET Leader)	Dr Anne F Kerr (Project IEC)	
					

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### **Executive Summary**

- ES.01 Leader Civil Engineering Corporation Ltd (the Contractor) has been awarded the DSD Contract DC/2005/02 Construction of Sewers, Rising Mains and Sewage Pumping Station at Kam Tin, Nam Sang Wai and Au Tau in Yuen Long (the Project). The Project requires an Environmental Monitoring and Audit (EM&A) program to be implemented by an Environmental Team (ET) throughout the contract period in compliance with the requirements as stated in the project Environmental Permit (EP-220/2005) and the project's Updated EM&A (Designated Elements) Manual.
- ES.02 This is the First Monthly Construction Phase EM&A Report (April 2006, Report No. 1) reporting the environmental impact monitoring and audit (EM&A) conducted between 6 April and 30 April 2006. The EM&A in April 2006 covered air quality, noise and waste management.

### **Breach of Action and Limit (AL) Levels**

- ES.03 There was no breach of Action or Limit level for air and noise monitoring in this reporting month.

### **Complaint Log**

- ES.04 No environmental complaint was received in this reporting month.

### **Notification of Any Summons and Successful Prosecution**

- ES.05 There was no environmental summon or prosecution in this reporting month.

### **Reporting Changes**

- ES.06 There are no changes to be reported in this reporting month.

### **Future Key Issues**

- ES.07 Construction activities to be undertaken in May 2006 include sheetpiling at NSW Pumping Station (Portion C), sheetpiling and boreholes drilling on Nam Shan Wai Road (Portion F) and Pok Wai South Road (Portion F). Potential environmental impacts arising from the works include air quality, noise and water quality (including site runoff). Environmental mitigation measures will be properly implemented and maintained as per the Mitigation Implementation Schedule to ensure site environmental performance is acceptable.

## 1.0 BASIC PROJECT INFORMATION

1.01 Leader Civil Engineering Corporation Ltd (the Contractor) has been awarded the DSD Contract DC/2005/02 Construction of Sewers, Rising Mains and Sewage Pumping Station at Kam Tin, Nam Sang Wai and Au Tau in Yuen Long (the Project). The Project is part of the Yuen Long and Kam Tin Sewerage and Sewage Disposal (YLKTSSD) Scheme. A site layout map showing the site boundary and the work areas is shown in **Annex A**.

1.02 This First Monthly Construction Phase EM&A Report (April 2006, Report No. 1) summarizes the impact monitoring results and audit findings in the reporting period from 6 April to 30 April 2006.

### Project Organization

1.03 The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in **Annex B**.

### Construction Program for the Reporting Month

1.04 A construction program showing the construction work undertaken in this reporting month is shown in **Annex C**. Environmental mitigation measures implemented are shown in **Table 2-1**.

### Management Structure

1.05 The management structure of the Project is shown in **Annex B**.

### Works Undertaken during the Month

1.06 The construction work undertaken during the reporting month under the Environmental Permit (EP-220/2005) is shown as follows:

Nam Sang Wai Pumping Station (P3)

- Trial trench excavation
- Sheet piling by vibration hammer

## 2.0 ENVIRONMENTAL STATUS

### Work Undertaken during the Month with Illustrations

- 2.01 A summary of the work undertaken in this reporting month with illustrations and environmental mitigation measures implemented is shown in **Table 2-1**.

**Table 2-1 Work Undertaken in April 2006 with Illustrations of Mitigation Measures**

Location	Description of Construction Activities	Environmental Mitigation Measures	EM&A Ref.
Nam Sang Wai Pumping Station (P3)	<ul style="list-style-type: none"> <li>• Trial trench excavation</li> <li>• Sheet piling by vibration hammer</li> </ul>	• Erect 2.4m high noise barrier hoarding around the works area	A1 & F6
		• Remove dust and spray water at the construction access	A2
		• Cover the stockpiles of dusty material properly	A3
		• Wash the wheels of vehicles before leaving the site	A5
		• Spray water at the pavement breaking locations	A7
		• Maximize the use of quiet PME on site	B1, B2 & F5
		• Apply and obtain appropriate waste disposal licenses	D1
		• Handle, store and dispose of chemical wastes as per relevant regulations	D2, D3 & D4
		• Implement trip-ticket system for waste disposal	D5
		• Restrict open fires and provide fire fighting equipment in the works area	F9
		• Perform weekly inspection with ET and monthly audit with IEC	H1
		• Conduct noise and dust monitoring as per EM&A manual during construction	I1 & I2

- 2.02 Photographic records showing the work activities undertaken at the pumping station and the implemented 2.4m high noise barrier are shown in **Annex D**.

### Project Drawings

- 2.03 Drawings showing the work areas under EP-220/2003 and the locations of the designated monitoring stations are presented in **Annex E**.
- 2.04 There are four designated air quality and four noise monitoring stations under the project EP. For this reporting month, monitoring was carried out at two designated air (AM1 & AM2) and two noise (NM3 & NM4) monitoring stations.

Station ID	Nature of Premise	Site Work Description	Station Coordinates
AM1	Site Boundary in NSW	Sheetpiling and trench excavation.	835829 N 822910 E
AM7	Site Boundary in NSW		836171 N 822586 E
NM3	Village House in NSW		835808 N 822817 E
NM4	Village House in NSW		835282 N 822811 E

- 2.05 Monitoring at the remaining two air (AM5 & AM6) and noise (NM6 & NM7) stations will commence once the work areas are handed over to the Contractor (later this year).

### 3.0 SUMMARY OF EM&A REQUIREMENTS

#### Monitoring Parameters

- 3.01 Environmental monitoring and audit requirements are set out in the Updated EM&A manual. Air quality and construction noise have been identified to be the key monitoring parameters during the impact phase for the construction of the project.
- 3.02 A summary of the impact EM&A requirements for air quality and construction noise as per the project Updated EM&A Manual are shown in **Table 3-1**.

**Table 3-1 Summary of EM&A Requirements**

Environmental Aspect	Monitoring Parameters
Air Quality	24-Hr TSP
Construction Noise	Leq 30min during day time 07:00 to 19:00
	Supplementary L10 and L90 for reference.

#### Environmental Quality Performance Limits

- 3.03 A summary of the Action/Limit (A/L) Levels for air quality and construction noise is shown in **Tables 3-2** and **3-3**

**Table 3-2 Action and Limit Levels for Air Quality Monitoring**

Monitoring Location	Action Level ( $\mu\text{g}/\text{m}^3$ )		Limit Level ( $\mu\text{g}/\text{m}^3$ )	
	1-Hr TSP	24-Hr TSP	1-Hr TSP	24-Hr TSP
AM1	391	184	500	260
AM7	383	204	500	260

**Table 3-3 Action and Limit Levels for Construction Noise**

Parameter	Action Level in dB(A)	Limit Level in dB(A)
0700-1900 hrs on normal weekdays	When one or more documented complaints are received	75 dB(A)

#### Event and Action Plans

- 3.04 An Event Action Plan for air quality and construction noise has been implemented for this project. Details of the Event Action Plan are presented in **Annex F**.

#### Environmental Mitigation Measures

- 3.05 The project EIA report has recommended environmental mitigation measures to minimize potential environmental impacts arising from the construction of the project. A full list of the mitigation measures is detailed in **Annex G**.

#### Environmental Requirements in Contract Documents

- 3.06 The environmental requirements in the contract documents generally refer to the compliance of the requirements as stipulated in the project EP and the updated EM&A Manual.

#### 4.0 IMPLEMENTATION STATUS

4.01 The implementation status of environmental protection and pollution control/mitigation measures as recommended in the project EIA report is summarized in **Table 2-1** and the implementation schedule as shown in **Annex G**.

4.02 A summary status of the permits, licences, and/or notifications on environmental protection for this Project in this reporting month is presented in **Table 4-1**.

**Table 4-1 Status of Environmental Licenses and Permits**

Item	Item Description	Permit Status
1	Environmental Permit No.: EP-220/2005	Issued in June 2005
2	Air Pollution Control (Construction Dust)	Notified EPD on 24 Dec 2005
3	Chemical Waste Producer Registration	Registration on 27 Jan 2006
4	Water Pollution Control (Discharge license)	Applied to EPD on 7 Feb 2006
5	Account for Disposal of Construction Waste No. 5004959	Registration on 27 Dec 2005
6	Construction Noise Permit (Sheet Piling at NSW Station)	Valid (3 Apr to 2 Jun 2006)
7	Construction Noise Permit (General Works at NSW Station)	Valid (7 Apr to 7 Oct 2006)

## 5.0 MONITORING RESULTS

### MONITORING METHODOLOGY OF AIR QUALITY MONITORING

5.01 The 24-Hr TSP monitoring was carried out by a High volume sampler (HVS) in compliance with the updated EM&A Manual. The HVS employed complied with the PS specifications including.

- Power supply of 220v/50 hz for 24-hour continuous operation;
- 0.6-1.7 m<sup>3</sup>/min (20-60 SCFM) adjustable flow rate;
- A 7-day mechanical timer for 24-hour operation;
- An elapsed time indicator with  $\pm 2$  minutes accuracy for 24-Hr operation;
- Minimum exposed area of 63 in<sup>2</sup>;
- Flow control accuracy of  $\pm 2.5\%$  deviation over 24-Hr operation;
- An anodized aluminum shelter to protect the filter and sampler;
- A motor speed-voltage control to control mass flow rate with accuracy of  $\pm 2.5\%$  deviation over 24-hr sampling period;
- Provision of a flow recorder for continuous monitoring;
- Provision of a peaked roof inlet;
- Incorporation with a manometer; and
- An 8"x10" stainless steel filter holder to hold, seal and easy to change the filter paper.

5.02 The filter papers used in 24-Hr TSP monitoring were of size 8"x10" and provided by a local HOKLAS-accredited laboratory, ALS Techichem Pty (HK) Limited (HOKLAS No. 66). The filters papers after measurements were returned to the laboratory for the required treatment and analysis.

5.03 The meteorological information during the reporting period was obtained from Lau Fau Shan Station of the Hong Kong Observatory (HKO).

### MONITORING METHODOLOGY OF CONSTRUCTION NOISE MONITORING

5.04 Noise measurements were taken in terms of the A-weighted equivalent sound pressure level (Leq) measured in decibels (dB). Supplementary statistical results (L<sub>10</sub> and L<sub>90</sub>) were also obtained for reference.

5.05 Hand-held sound level meters (B&K Model 2238) and associated acoustical calibrators in compliance with the International Electrotechnical Commission (IEC) Publication 651:1979 (Type 1) and 804:1985 (Type 1) specification were used for taking the baseline noise measurements.

5.06 Windshield was fitted in all measurements. All noise measurements were made with the meter set to FAST response and on the A-weighted equivalent continuous sound pressure level (Leq).

5.07 No noise measurement was made in the presence of fog, rain, wind with a steady speed exceeding 5 m/s or wind with gusts exceeding 10 m/s.

### LABORATORY AND MONITORING EQUIPMENT USED

5.08 A local HOKLAS-accredited laboratory, ALS Technichem (HK) Pty Ltd (HOKLAS No. 66), is responsible for the analytical testing of the 24-Hr TSP filter papers.

5.09 The monitoring equipment used in the impact EM&A program is presented in **Table 5-1**:

**Table 5-1 Monitoring Equipment Used in Impact EM&A Program**

Parameters	Monitoring Equipment	
Air Quality	24-Hr TSP	Tisch High Volume Sampler 515N
Noise	Leq30min	B&K Type 2238
	On-site Calibration	B&K Type 4231



**EQUIPMENT CALIBRATION**

- 5.10 Initial calibration of the HVS was performed upon installation and thereafter at a six month intervals in accordance with the manufacturer’s instruction using the NIST-certified standard calibrator (Tisch Calibration Kit Model TE-5025A). The calibration data are properly documented and the records are maintained by ET for future reference.
- 5.11 The sound level meters were calibrated using an acoustic calibrator prior to and after measurements. The meters are regularly calibrated in accordance with the manufacturer’s instructions. Prior to and following each noise measurement, the accuracy of the sound level meter was checked using an acoustic calibrator generating a known sound pressure level at a known frequency. Measurements were considered valid only if the calibration levels before and after the noise measurement agree to within 1.0 dB.
- 5.12 The calibration certificates of the monitoring equipment used during the impact monitoring program are attached in **Annex H**.

**PARAMETERS MONITORED**

- 5.13 The environmental parameters monitoring in this reporting month is compliance with the monitoring requirements as in Table 3-1.

**MONITORING LOCATIONS**

- 5.14 There are four designated air quality and four noise monitoring stations under the project EP. For this reporting month, monitoring was carried out at two designated air (AM1 & AM&) and two noise (NM3 & NM4) monitoring stations. Monitoring at the remaining two air (AM5 & AM6) and noise (NM6 & NM7) stations will commence once the work areas are handed over to the Contractor (later this year). The locations of the designated monitoring stations are shown in **Table 5-2** and geographically in **Annex E**.

**Table 5-2 Location of Air Quality and Construction Noise Monitoring Stations**

<b>Air Quality (4 Stations)</b>	
AM1	Worksite boundary facing scattered house in Nam Sang Wai
AM5*	Worksite boundary facing Fung Kat Heung
AM6*	Worksite boundary facing scattered near Route 3
AM7	Worksite boundary facing scattered house in Nam Sang Wai
<b>Construction Noise (4 Stations)</b>	
NM3	Village House in Nam Sang Wai
NM4	Village House in Nam Sang Wai
NM6*	Scattered House near Route 3
NM7*	Fung Kat Heung

Remarks: Monitoring at AM5 & AM6 and NM6 & NM7 will commence once the work areas are handed over to the Contractor (later this year).

**MONITORING FREQUENCY AND PERIOD**

- 5.15 The impact 24-Hr TSP monitoring was conducted at the designated stations once every 6 days in compliance with the updated EM&A manual. A total of 5 monitoring events were carried out in this reporting month.
- 5.16 The impact noise monitoring was conducted at the designated stations once every 6 days in compliance with the updated EM&A manual. A total of 4 monitoring events were carried out in this reporting month.

**MONITORING RESULTS WITH DATE AND TIME**

5.17 The air quality monitoring data for this reporting month are summarized in **Table 5-3**.

**Table 5-3 Summary of Air Quality Monitoring Results**

Date	24-Hr TSP ( $\mu\text{g}/\text{m}^3$ )	
	AM1	AM7
7-Apr-06	75	67
12-Apr-06	48	53
18-Apr-06	140 (Note 1)	181 (Note 1)
24-Apr-06	65	52
29-Apr-06	99	80
Average (Range)	85.4 (48 – 140)	86.6 (53 - 181)

All 24-Hr TSP monitoring were preset to start at 00:00 on each monitoring date.

Note 1: There was no AL exceedance recorded and the elevated levels are still within the baseline range. No noticeable dust source was observed at the time of monitoring and the weather condition on that day was sunny/moderate with API 62 recorded. The elevated levels at both monitoring locations are likely to be due to the ambient air conditions.

5.19 The impact noise monitoring results are summarized in **Tables 5-4 & 5-5**.

**Table 5-4 Summary of Noise Monitoring Results at NM3**

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected * Leq30
7-Apr-06	14:35	49.7	51.5	47.4	47.6	49.4	55.6	51	54
13-Apr-06	13:09	50.0	57.1	53.3	49.1	50.4	48.7	53	56
19-Apr-06	13:02	59.7	58.4	58.6	57.2	65.1	47.0	60	63
25-Apr-06	09:37	59.1	62.0	58.4	56.7	54.5	53.8	58	61
<b>Limit Level</b>									<b>75</b>

\* A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

**Table 5-5 Summary of Noise Monitoring Results at NM4**

Date	Start Time	1st Leq5	2nd Leq5	3rd Leq5	4th Leq5	5th Leq5	6th Leq5	Leq30	Corrected * Leq30
7-Apr-06	14:12	50.8	52.2	52.7	55.3	50.3	53.1	53	56
13-Apr-06	11:10	61.0	61.1	54.3	58.8	67.0	56.0	62	65
19-Apr-06	15:03	51.6	52.1	53.7	53.4	54.4	49.1	53	56
25-Apr-06	09:12	53.3	53.2	52.0	51.8	52.7	53.0	53	56
<b>Limit Level</b>									<b>75</b>

\* A façade correction of +3 dB(A) has been added according to acoustical principles and EPD guidelines.

**WEATHER CONDITIONS DURING THE MONITORING PERIOD**

5.20 The meteorological data on the monitoring dates are summarized in **Annex I**.

**GRAPHICAL PLOTS OF TRENDS OF MONITORED PARAMETERS**

5.21 The graphical plots of air quality and construction noise monitoring data are presented in **Annex J**.

**MAJOR ACTIVITY CARRIED OUT DURING THE MONITORING PERIOD**

- 5.22 There were construction activities of sheet piling and trench excavation undertaken during the monitoring period.

**WEATHER CONDITIONS THAT MAY AFFECT THE MONITORING RESULTS**

- 5.23 The weather conditions at the time of monitoring were considered acceptable for monitoring activities and did not have significant impact on the monitoring results obtained.

**OTHER FACTORS INFLUENCING THE MONITORING RESULTS**

- 5.24 There was no other noticeable external factors generally affecting the monitoring results in this reporting month, except the elevated 24-Hr TSP levels recorded on 18 April 2006 probably due to the ambient air conditions.

**QA/QC RESULTS AND DETECTION LIMITS**

- 5.25 Not applicable.

**6.0 REPORT ON NON-COMPLIANCE (NC), COMPLAINTS, NOTIFICATIONS OF SUMMONS (NoS) AND SUCCESSFUL PROSECUTIONS**

**RECORD OF NON-COMPLIANCE OF ACTION AND LIMIT LEVELS**

6.01 There was no Action or Limit Level exceedance in this reporting month.

**RECORD OF ENVIRONMENTAL COMPLAINTS RECEIVED**

6.02 There was no environmental complaint received in this reporting month.

**RECORD OF NOTIFICATIONS OF SUMMONS AND SUCCESSFUL PROSECUTION**

6.03 There was no notification of summon or prosecution received in this reporting month.

**REVIEW OF REASONS FOR AND IMPLICATIONS OF NC, COMPLAINTS AND NoS**

6.04 No NC, complaints or NoS received in this reporting month.

**DESCRIPTION OF FOLLOW-UP ACTIONS TAKEN**

6.05 No NC, complaints or NoS received in this reporting month.

**7.0 OTHERS**

**FUTURE KEY ISSUES**

7.01 Construction activities to be undertaken in May 2006 include sheetpiling at NSW Pumping Station (Portion C), sheetpiling and boreholes drilling on Nam Shan Wai Road (Portion F) and Pok Wai South Road (Portion F). Potential environmental impacts arising from the works include air quality, noise and water quality (including site runoff). Environmental mitigation measures will be properly implemented and maintained as per the Mitigation Implementation Schedule to ensure site environmental performance is acceptable.

**SOLID AND LIQUID WASTE MANAGEMENT STATUS**

7.02 The quantities of waste for disposal or reuse in this reporting month are summarized in **Tables 7-1** and **7-2**.

**Table 7-1 Summary of Quantities of Waste for Disposal**

Type of Waste	Quantity	Disposal Location
Excavated Material (Uncontaminated) (m <sup>3</sup> )	0	NA
Broken Rock (m <sup>3</sup> )	0	NA
C&D Materials (Inert) (tons)	0	NA
C&D Materials (Non-Inert) (tons)	4.45	NENT
Chemical Waste (Litres)	0	NA
General Refuse (m <sup>3</sup> )	0	NA

**Table 7-2 Summary of Quantities of Waste for Reuse/Recycling**

Type of Waste	Quantity	Disposal Location
Metals for Recycling (kg)	3,180	Recycling Company
Paper for Recycling (kg)	164	Recycling Company
Plastics for Recycling (kg)	0	NA

7.03 There was no site effluent discharged in this reporting month.

**SUBMISSION OF PROFORMA**

- 7.01 Representatives of the Engineer, the Contractor and ET carried out joint site inspection every week to evaluate the site environmental performance. A monthly audit with RE, Contractor, IEC and ET was carried out on 25 April 2006. No non-compliance was noted and some observations were recorded.
- 7.02 Proforma of the weekly ET site inspection and monthly IEC audit activities are presented in ***Annex K***.