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TEST REPORT

PENTA-OCEAN CONSTRUCTION COMPANY LIMITED

REMAINING ENGINEERING
INFRASTRUCTURE WORKS FOR
PAK SHEK KOK DEVELOPMENT
PACKAGE 1
(CONTRACT NO.: TP 35/02)

MONTHLY EM&A REPORT
(MAY 2003)

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EXECUTIVE SUMMARY

This report is the fifth monthly EM&A report (No.5) and has been prepared to document the impact monitoring works conducted for the Contract of the Remaining Engineering Infrastructure Works for Pak Shek Kok Development Package 1 (Contract No: TP 35/02) during the reporting period from 01 to 31 May 2003.

Construction Progress

The major construction works in this reporting month included drainage work (Area 1, Area 2, Area 9A, Zone N1, N2 & Q), earthworks and forming/removal of earth mound (Zone C, J & R), predrilling works (Road D1 Bridge), cofferdam and construction sheet piling (Culvert C10), subway construction works (Zone N3), watermain installation work, building a retained earth wall along the relocated cycle track, erection of hoarding and signboard, pipe jacking works for Watermain 600 diameter and construction of Pak Shek Kok underpass extension.

Environmental Monitoring Progress

The summary of the monitoring activities in this monitoring month is listed below:

- Noise Monitoring (Day-time): 5 Occasions at 3 designated locations;
- Noise Monitoring (Evening-time): 5 Occasions at 3 designated locations;
- Noise Monitoring (Holiday): 4 Occasions at 3 designated locations;
- 24-hour TSP Monitoring: 5 Occasions at 1 designated location;
- 1-hour TSP Monitoring: 14 Occasions at 2 designated locations;
- Weekly-site inspection: 5 Occasions.

Noise Monitoring

No exceedances of Action and Limit levels for noise monitoring were recorded in the reporting month.

Air Monitoring

No 24-hour TSP monitoring was carried out at HKIB Staff Accommodation in the reporting month because the application for the permission to set up and providing power supply for the monitoring equipment (High Volume Sampler) is still under process. 24-hour TSP monitoring is pending approval by CUHK of access to monitoring location. Hence, only 1-hour TSP monitoring at HKIB Staff Accommodation was conducted to monitor the air quality in this reporting month.

No exceedances of Action and Limit levels were recorded for 24-hr TSP and 1-hr TSP monitoring in the reporting month.

Site Inspection

Environmental audits and inspections conducted in this reporting month are presented as follows:

| Concerned Parties | Dates of Audit / Inspection |
|-------------------|-----------------------------|
| ET | 02, 09, 15, 22, 29 |
| IEC/POC | 29 |

There were no non-compliance and 6 observations raised during the IEC monthly site inspection. The IEC and ET audit findings in the site inspection are presented as follows:

| Item | IEC/ET | Aspects | Findings | Proposed Mitigation Measures |
|------|--------|---------|---|---|
| 1 | IEC/ET | Water | From previous audits regarding the concern of overflow of contaminated runoff next to the cycle track, the contractor put effort to block the discharge point. However, there were gaps and the point is sealed and no contaminated runoff can be discharged. | <ul style="list-style-type: none"> • To sealed the discharge point to ensure no contaminated runoff can be discharged; |
| 2 | IEC/ET | Air | Some stockpiles / slopes were not covered. However, the contractor indicated that hydro seeding will be carried in that day's afternoon after the inspection. | <ul style="list-style-type: none"> • To cover by using clean tarpaulin sheets and hydroseed stockpiles and slope area; • Watering applied to stockpile and exposed loose soil surface of site works; • To perform more frequent water spraying activities after hydro seeding to enhance the effectiveness for the grass growth. |



| Item | IEC/ET | Aspects | Findings | Proposed Mitigation Measures |
|------|------------|---------|---|---|
| 3 | IEC/ ET | Water | Although no sand was observed on site during the audit, however, we concern that sand may enter / wash onto the cycle track during rainstorm. It is recommended that the contractor to implement measures for the issue. | <ul style="list-style-type: none">• To place sand bays along the cycle track in order to prevent any washing away of soil/sand onto the cycle track during rainstorm;• To provide more manpower to clean up of sand and soil accumulated in the channel;• To divert the site runoff to sedimentation tanks/traps before any directly discharge to the drainage. |
| 4 | IEC/ ET | Air | Some vehicles were not completely free from sand at exit and some light vehicles left the site without using the wheel-washing facilities. The contractor shall ensure that all vehicles leaving the site are free from sand/mud. Sand was observed on public road just outside the site exit. | <ul style="list-style-type: none">• To instruct all vehicle to have wheel-washing and ensure all vehicle are free from sand/mud before the site;• To remove the soil on the public road which carried by the vehicle more frequency. |
| 5 | IEC/ ET | Water | Access road has insufficient backfall toward washing facility at Northern exit. It is recommended to provide backward after the wheel-washing facility so that wastewater will not flow to public road. | <ul style="list-style-type: none">• To provide backward after the wheel-washing facility so that wastewater will not flow to public road; |
| 6 | IEC/ ET | Waste | Rubbish was found accumulated at the zone near the South exit (by the pipe installation). However, the contractor emphasized that the rubbish was belonging to other contractors and no works were carried out recently at that zone. It is suggested to provide a bin for collection of rubbish. | <ul style="list-style-type: none">• To provide rubbish bin/skips for collected the rubbish in the site;• To remind staff to dispose rubbish into the rubbish bins/skips as possible;• To remind staff to clean the rubbish accumulated more frequently as necessary;• To remove the rubbish at the site immediately. |

Environmental Complaints

No environmental complaints were received in this monitoring month.

Notification of summons and successful prosecutions

There was one notification of summon and prosecution with respect to environmental issues registered 16 October 2002.

Future Key Issues

Base on the site inspections and forecast of engineering works in the coming month, key issues to be considered are as follows:

- Noise and air quality impact due to construction works;
- Maintain wheel washing facilities and sedimentation tanks properly;
- Watering, hydro-seeding or covering all stockpiles with tarpaulin to avoid wind and water erosion;
- Maintain good site practice and waste management to minimize environmental impacts at the site;
- Follow-up improvements on waste management issues.



1.0 INTRODUCTION

Penta-Ocean Construction Co., Ltd. (POC) appointed Environmental Team (ET) of ETS-Testconsult Limited (ETL) to undertake the Environmental Monitoring and Audit for Remaining Engineering Infrastructure Works for Pak Shek Kok Development Package 1 (Contract No.: TP 35/02).

Under the requirements of Section 10 of Environmental Permit to Construct and Operate a Designate Project (EP-108/2001/AEP-108/2001), EM&A programme as set out in the EM&A Manual is required to be implemented. In accordance with the EM&A manual, environmental monitoring of air quality and noise is required for the Project. The EM&A requirement for each parameter are described in details in subsequent 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 report;
- Environmental requirements in contract documents.

This monthly EM&A report summarizes the impact monitoring results and audit findings of the EM&A program during the reporting period from 01 to 31 May 2003.

2.0 PROJECT INFORMATION

2.1 Background

Remaining Engineering Infrastructure Works for Pak Shek Kok Development Package 1 (Contract No.: TP 35/02) was planned and designed by the Territory Development Department (TDD).

As the main Contractor of the captioned project: contracted by, POC will follow the environmental monitoring recommendation stated at the EM&A Manual that was prepared with reference to the EIA Study for Feasibility Study on the Pak Shek Kok Development Area (PSKDA) Environmental Monitoring and Audit Manual under Agreement No. CE 90/96.

2.2 Site Description

Generally, the construction site is located at Pak Shek Kok development area. Surrounding the construction site, there are two air sensitive receivers: HKIB Staff Accommodation and Cheung Shue Tan Village and three noise sensitive receivers: HKIB Staff Accommodation, CUHK Residence No.10 and Cheung Shue Tan Village.

Figure 1 and 2 show the noise and air monitoring locations of this project.

2.3 Construction Programme

The details of construction programme (from March to June 2003) are shown in Appendix F.

2.4 Project Organization and Management Structure

The organization chart and lines of communication with respect to the on-site environmental management and monitoring program are shown in Appendix A.



2.5 Contact Details of Key Personnel

The key personnel contact names and telephone numbers, and construction programme are shown in table 2.1.

Table 2.1 Contact Details of Key Personnel

| Organization | Project Role | Name of Key Staff | Tel. No. | Fax No. |
|--------------|-----------------------------------|---|-----------|-----------|
| TDD | Employer | Mr. H W Lau | 2158 5629 | --- |
| Hyder | Engineer | Mr. Herman Fong | 2911 2233 | 2805 5028 |
| Hyder | Independent Environmental Checker | Ms Jacquelyn Anderson | 2911 2233 | 2827 2891 |
| POC | Contractor | Mr. Roger Lau | 9870 6390 | 2691 6012 |
| ETL | Contractor's Environmental Team | Mr C L Lau (Environmental Team Leader) | 2946 7792 | 2695 3944 |

3.0 CONSTRUCTION PROGRESS IN THIS REPORTING MONTH

The site area of this project is shown in Appendix G.

A summary of the major construction activities undertaken in this monitoring month is shown in Table 3.1. The implementation of the corresponding mitigation measures is summarized in Table 3.2.

Table 3.1 Major Construction Activities in this reporting month

| Location | Major Construction Activity |
|--|--|
| Zone C, J & R | Earthworks and forming/removal of earth mound |
| Area 1, Area 2, Area 9A, Zone N1, N2 & Q | Drainage and sewerage work |
| Road D1 Bridge | Predrilling works |
| Culvert C10 | Cofferdam and construction sheet piling |
| Zone N3 | Subway construction works |
| --- | Watermain installation works |
| Cycle Track | Building a retained earth wall along the cycle track |
| --- | Erection of hoarding and signboard |
| --- | Pipe jacking works for Watermain 600 diameter |
| --- | Construction of Pak Shek Kok Underpass extension |

Table 3.2 Implementation of Environmental Mitigation Measures

| | |
|----------------------------|--|
| General construction works | <ul style="list-style-type: none"> • Effective water sprays used on the site at potential dust emission sources such as unpaved area; • The heights from which fill materials are dropped should be controlled to a practical height to minimize the fugitive dust arising from unloading; • Minimize of exposed soil areas to reduce the potential for increased siltation and contamination of run-off; • Water, hydro-seed or cover the open stockpile and exposed loose soil areas by using clean tarpaulin sheets; • Provide proper and efficient drainage facilities (e.g. wheel washing facilities) and sedimentation system to ensure that site runoff should be treated before discharged to drains; • Remove the sand/rubbish accumulated in the drain/channel regularly; • Provide good site practice (e.g. selection of quieter plant and working methods and reduction in number of plant operating in critical areas close to NSRs) to limit noise emissions at source; • Remove the construction waste accumulated inside or outside the site regularly; • Keep good waste management. |
|----------------------------|--|



4.0 AIR QUALITY MONITORING

4.1 Monitoring Requirement

1-hour and 24-hour TSP monitoring are required to be conducted to monitor the air quality, at designated monitoring locations:

- HKIB Staff Accommodation (on ground floor near the entrance facing south-east);
- Cheung Shue Tan Village (near the outer building, temple) for 1-hr TSP monitoring;
- Cheung Shue Tan Village (in front of Man Kee Store) for 24-hr TSP monitoring.

No 24-hour TSP monitoring was carried out at HKIB Staff Accommodation in the reporting month because the application for the permission to set up and providing power supply for the monitoring equipment (High Volume Sampler) is still under process. 24-hour TSP monitoring is pending approval by CUHK of access to monitoring location. Hence, only 1-hour TSP monitoring was conducted to monitor the air quality in this reporting month.

4.2 Monitoring Equipment

Continuous 24-hour TSP air quality monitoring was performed using a GMWS2310 High Volume Air Sampler (HVS) located at each of the designated monitoring station. One portable dust meter was used to carry out the 1-hour TSP monitoring. Table 4.1 summarizes the equipment used in the air quality monitoring programme. A copy of the calibration certificate for the HVS and portable dust meter are attached in Appendix B1.

Table 4.1 Air Quality Monitoring Equipment

| Equipment | Model and Make |
|-----------------------|---|
| HVS Sampler | Greasby GMWS2310 |
| Calibrator | G25 A |
| 1-hour TSP Dust Meter | TSI Model 8520 Dust Trak™ Aerosol Monitor |

4.3 Monitoring Parameters, Frequency and Duration

Table 4.2 summarizes the monitoring parameters, monitoring duration and frequencies of air quality monitoring.

Table 4.2 Monitoring parameters, duration, frequencies of impact air quality monitoring

| Parameter | Duration | Frequency |
|-----------|-------------------|----------------------------|
| 24-hr TSP | 24 hr (0000-2400) | Once every six days |
| 1-hr TSP | 1 hr (0700-1900) | Three times every six days |

4.4 Monitoring Locations and Schedule

Two designated air quality monitoring locations – Cheung Shue Tan Village and HKIB Staff Accommodation were selected. Table 4.3 tabulates the air quality monitoring locations of this project.

Table 4.3 Air quality monitoring locations

| Air quality Monitoring stations | Locations |
|---------------------------------|--|
| AM1 | HKIB Staff Accommodation (on ground floor near the entrance facing south-east) for 1-hr TSP monitoring |
| AM3 | Cheung Shue Tan Village (near the outer building, temple) for 1-hr TSP monitoring |
| AM3A | Cheung Shue Tan (in front of Man Kee Store) for 24-hr TSP monitoring |

The air quality monitoring schedule for 24-hr and 1-hr TSP monitoring at designated monitoring locations is summarized in table 4.4.



Table 4.4 Monitoring Schedule for the air quality monitoring stations

| Air quality monitoring stations | Location | Monitoring Period | | | | | | |
|---------------------------------|---|-------------------|-------|----------|-------|------------|-------|--------|
| | | 24-hr TSP | | | | 1-hr TSP | | |
| | | Start | | Finish | | Date | Start | Finish |
| | | Date | Time | Date | Time | | | |
| AM1 | HKIB Staff Accommodation | --- | | | | 02/05/2003 | 13:30 | 14:30 |
| | | | | | | 03/05/2003 | 10:39 | 12:39 |
| | | | | | | 06/05/2003 | 10:23 | 11:23 |
| | | | | | | 09/05/2003 | 09:30 | 10:30 |
| | | | | | | 10/05/2003 | 14:30 | 15:30 |
| | | | | | | 13/05/2003 | 16:52 | 17:52 |
| | | | | | | 15/05/2003 | 13:10 | 14:10 |
| | | | | | | 17/05/2003 | 10:47 | 11:47 |
| | | | | | | 20/05/2003 | 10:48 | 11:48 |
| | | | | | | 22/05/2003 | 17:15 | 18:15 |
| | | | | | | 24/05/2003 | 13:04 | 14:04 |
| | | | | | | 27/05/2003 | 08:40 | 09:40 |
| | | | | | | 29/05/2003 | 09:08 | 10:08 |
| | | | | | | 31/05/2003 | 09:20 | 10:20 |
| AM3 | Cheung Shue Tan Village (near the outer building, temple) | --- | | | | 02/05/2003 | 14:48 | 15:48 |
| | | | | | | 03/05/2003 | 10:56 | 11:56 |
| | | | | | | 06/05/2003 | 17:10 | 18:10 |
| | | | | | | 09/05/2003 | 10:43 | 11:43 |
| | | | | | | 10/05/2003 | 16:00 | 17:00 |
| | | | | | | 13/05/2003 | 09:35 | 10:35 |
| | | | | | | 15/05/2003 | 14:23 | 15:23 |
| | | | | | | 17/05/2003 | 14:38 | 15:38 |
| | | | | | | 20/05/2003 | 13:48 | 14:48 |
| | | | | | | 22/05/2003 | 13:02 | 14:02 |
| | | | | | | 24/05/2003 | 14:42 | 15:42 |
| | | | | | | 27/05/2003 | 17:48 | 18:48 |
| | | | | | | 29/05/2003 | 10:39 | 11:39 |
| | | | | | | 31/05/2003 | 11:00 | 12:00 |
| AM3A | Cheung Shue Tan (in front of Man Kee Store) | 05/05/03 | 14:30 | 06/05/03 | 14:30 | | | |
| | | 09/05/03 | 14:00 | 10/05/03 | 14:00 | | | |
| | | 15/05/03 | 14:40 | 16/05/03 | 14:40 | | | |
| | | 21/05/03 | 11:40 | 22/05/03 | 11:41 | | | |
| | | 27/05/03 | 18:25 | 28/05/03 | 18:25 | | | |

4.5 Monitoring Methodology

4.5.1 24-hour TSP Monitoring

Instrumentation

High volume sampler, as HVS, (Greasby GMWS2310) complete with appropriate sampling inlets are employed for 24-hour TSP. The sampler is composed of a motor, a filter holder, a flow controller and a sampling inlet and its performance specification complies with that required by USEPA standard Title 40, Code of Federation Regulations Chapter 1 (Part 50).

Installation

The installation of HVS refers to the requirement stated in EM&A Manual.

Operation/Analytical Procedures

Operating/analytical procedures for the operation of HVS are as below:

Prior to the commencement of the dust sampling, the flow rate of the high volume sampler was properly set (between 0.6m³/min and 1.7m³/min.) in accordance with the manufacturer's instruction to within the range recommended in USEPA Standard Title 40, CFR Part 50.

- For TSP sampling, fiberglass filters (GA-55) were used.
- The power supply was checked to ensure the sampler worked properly.



- On sampling, the sampler was operated 5 minutes to establish thermal equilibrium before placing any filter media at designated air monitoring station.
- 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.
- The filter was aligned on the screen so that the gasket formed an air-tight seal on the outer edges of the filter. Then the filter holder frame was tightened to the filter holder with swing bolts. The applied pressure should be sufficient to avoid air leakage at the edges.
- The programmable timer will be set for a sampling period of 24 hours. 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 transferred from the filter holder of the HVS to a sealed plastic bag and sent to the laboratory for weighting. The elapsed time was also recoded.
- Before weighting, all filters were equilibrated in a desiccator for 24 hour with the temperature of $25^{\circ}\text{C} \pm 3^{\circ}\text{C}$ and the relative humidity (RH) $<50\% \pm 5\%$.

Maintenance & Calibration

- The HVS and their accessories should be maintained in good working condition, such as replacing motor brushes routinely and checking electrical wiring to ensure a continuous power supply.
- HVS should be calibrated at bi-monthly intervals.

4.5.2 1-hour TSP Monitoring

Measuring Procedures

The measuring procedures of the 1-hr dust meter are in accordance with the Manufacturer's instruction Manual as follows:

- Set POWER to ON, check the battery indicator to ensure whether the power supply is enough to conduct the TSP monitoring;
- Calibrate the dust meter by zero check;
- Set the TIME CONSTANT of the dust meter;
- Press SAMPLE to start the TSP monitoring;
- Record the maximum, minimum and average reading directly from the dust meter by press STATISTICS when monitoring complete.

Maintenance & Calibration

- 1-hr dust meter should be checked at 3-month intervals and calibrated at 1-year intervals throughout all stages of impact air quality monitoring.

4.5.3 Wind Data Monitoring

Wind data (wind speed and wind direction) were directly extracted from Sha Tin Station (located at Sha Tin Race Course) of Hong Kong Observatory. All wind data during this reporting month are shown in Appendix D.

4.6 Action and Limit Levels

Action and Limit levels for 24-hr TSP and 1-hr TSP derived as illustrated in Table 4.5.



Table 4.5 Action and Limit Levels for 24-hr TSP and 1-hr TSP

| Monitoring Location | 24-hr TSP ($\mu\text{g}/\text{m}^3$) | | 1-hr TSP ($\mu\text{g}/\text{m}^3$) | |
|---------------------|--|-------------|---------------------------------------|-------------|
| | Action Level | Limit Level | Action Level | Limit Level |
| AM1 | 164 * | 260 * | 325 * | 500 * |
| AM3 | --- | --- | 306 | 500 |
| AM3A | 183 | 260 | --- | --- |

* = Reference to the information contained in the Baseline Monitoring Report submitted under the "Advance Engineering Infrastructure Works for Pak Shek Kok Development – Southern Access Road and Sewage Pumping Station No.3

4.7 Event-Action Plans

Please refer to Appendix E for details.

4.8 Results

4.8.1 24-hour TSP Monitoring

Only 24-hour TSP monitoring was carried out at monitoring station, AM3A in the reporting month. 24-hour TSP monitoring at monitoring station, AM1 was not carried out in this month because the permission for setting up the monitoring equipment, High Volume Sampler, at HKIB Staff Accommodation is still under processing. All monitoring data of 24-hour TSP monitoring is provided in Appendix B2. Graphical presentation of 24-hour TSP monitoring results for the reporting month is shown in Appendix B3.

No exceedances of Action and Limit Level of 24-hour TSP monitoring results were recorded during the reporting month.

4.8.2 1-hour TSP Monitoring

1-hour TSP monitoring was carried out at monitoring stations, AM1 and AM3 in the reporting month. All monitoring data of 1-hour TSP monitoring is provided in Appendix B2. Graphical presentation of 1-hour TSP monitoring results for the reporting month is shown in Appendix B3.

No exceedances of Action and Limit Level of 1-hour TSP monitoring results were recorded during the reporting month.

5.0 Noise Monitoring

5.1 Monitoring Requirements

As the requirement in EM&A Manual, noise monitoring was conducted at designated monitoring locations:

- HKIB Staff Accommodation (on ground floor near the entrance facing south-east);
- Cheung Shue Tan Village (near the outer building, temple);
- CUHK Residence No.10.

5.2 Monitoring Equipment

Integrating Sound Level Meters were used for noise monitoring. They were Type 1 sound level meters capable of giving a continuous readout of the noise level reading including equivalent continuous sound pressure level (L_{eq}) and percentile sound pressure level (L_x). They comply with International Electro technical Commission Publications 651:1979 (Type1) and 804:1985 (Type1), and speed in m/s was used to monitor the wind speed. Table 5.1 summarized noise monitoring equipment model being used. A copy of the calibration certificates for noise meters and calibrator are attached in Appendix C1.



Table 5.1 Noise Monitoring Equipment

| Equipment | Model |
|-------------------------------|-------------------------------------|
| Integrating Sound Level Meter | Rion NL-14 Sound Level Meter |
| Calibrator | Rion NC-73 Sound Level Calibrator |
| Portable Wind Speed Indicator | TSI Model 8340-M Air Velocity Meter |

5.3 Monitoring Parameters, duration and Frequency

Noise monitoring for the A-weighted levels L_{eq} , L_{10} and L_{90} were recorded. The following guide on the regular monitoring frequency for each monitoring station on a per week basis when noise generating activities are underway:

- One set of measurements between 0700-1900 hours on normal weekdays (6 consecutive $L_{eq(5-min)}$);
- One set of measurements between 1900-2300 hours (3 consecutive $L_{eq(5-min)}$)*;
- One set of measurements between 2300-0700 hours of next day (3 consecutive $L_{eq(5-min)}$)*;
- One set of measurements between 0700-1900 hours on holidays (3 consecutive $L_{eq(5-min)}$)*.

(*): Noise monitoring to be conducted only when there is construction work.

Duration, frequencies and parameters of noise measurement are presented in Table 5.2.

Table 5.2 Duration, Frequencies and Parameters of Noise Monitoring

| Time period | Duration/min | Parameters | Frequency |
|---|--------------|--------------------------------|---------------|
| Day-time: 0700-1900 hrs on normal weekday | 30 | L_{eq} , L_{10} , L_{90} | Once per week |
| Evening-time: 1900-2300 hrs | 15 | L_{eq} , L_{10} , L_{90} | Once per week |
| Night-time: 2300-0700 hrs of next day | 15 | L_{eq} , L_{10} , L_{90} | Once per week |
| Holiday: 0700-1900 hrs | 15 | L_{eq} , L_{10} , L_{90} | Once per week |

5.4 Monitoring Locations and Period

In accordance with the EM&A Manual, there are three noise monitoring locations: HKIB Staff Accommodation, Cheung Shue Tan Village and CUHK Residence No.10. The location of the monitoring stations are described in Table 5.3 and depicted in Figure 1.

Table 5.3 Noise Monitoring Locations

| Noise Monitoring stations | Location |
|---------------------------|--|
| NM1 | HKIB Staff Accommodation (on ground floor near the entrance facing south-east) |
| NM2 | CUHK Residence No.10 |
| NM3 | Cheung Shue Tan Village (near the outer building, a temple) |

The noise monitoring programme of monitoring locations (Day-time, Evening-time, Holiday and Night-time) is summarized in Table 5.4.

Table 5.4 Monitoring Periods for noise monitoring stations

| Noise monitoring stations | Monitoring Period | | | | | | | |
|---------------------------|-------------------|-------|--------------|-------|----------|-------|------------|-----|
| | Day-time | | Evening-time | | Holiday | | Night-time | |
| NM1 | 02/05/03 | 13:40 | 02/05/03 | 20:18 | 07/05/03 | 16:10 | --- | --- |
| | 06/05/03 | 10:25 | 06/05/03 | 19:00 | 11/05/03 | 11:35 | --- | --- |
| | 13/05/03 | 17:03 | 13/05/03 | 19:00 | 18/05/03 | 15:49 | --- | --- |
| | 20/05/03 | 10:50 | 20/05/03 | 20:20 | 25/05/03 | 14:53 | --- | --- |
| | 27/05/03 | 08:42 | 27/05/03 | 19:51 | --- | --- | --- | --- |
| NM2 | 02/05/03 | 14:55 | 02/05/03 | 19:12 | 07/05/03 | 15:16 | --- | --- |
| | 06/05/03 | 16:24 | 06/05/03 | 19:23 | 11/05/03 | 11:07 | --- | --- |
| | 13/05/03 | 18:16 | 13/05/03 | 19:23 | 18/05/03 | 17:10 | --- | --- |
| | 20/05/03 | 13:00 | 20/05/03 | 19:10 | 25/05/03 | 15:43 | --- | --- |
| | 27/05/03 | 11:35 | 27/05/03 | 19:30 | --- | --- | --- | --- |
| NM3 | 02/05/03 | 15:35 | 02/05/03 | 19:41 | 07/05/03 | 15:38 | --- | --- |
| | 06/05/03 | 17:12 | 06/05/03 | 19:55 | 11/05/03 | 10:41 | --- | --- |
| | 13/05/03 | 09:42 | 13/05/03 | 19:56 | 18/05/03 | 16:35 | --- | --- |
| | 20/05/03 | 13:51 | 20/05/03 | 19:41 | 25/05/03 | 18:06 | --- | --- |
| | 27/05/03 | 17:50 | 27/05/03 | 19:00 | --- | --- | --- | --- |



5.5 Monitoring Procedures and Calibration Details

Operation/Analysis Procedures

- The Sound Level Meter was set on a tripod at a height of 1.2m above the ground.
- For free field measurement, the meter was positioned away from any nearby reflective surfaces.
- 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 : 5 mins
- Prior to and after each noise measurement, the meter was calibrated using a Calibrator for 94 dB at 1000HZ. If the difference in the calibration level before and after measurement was more than 1 dB(A), the measurement would be considered invalid and repeat measurement would be required after re-calibration or repair of the equipment.
- The wind speed was frequently checked with a portable wind meter.
- During the monitoring period, the Leq, L10 and L90 were recorded. In addition, site conditions and noise sources were recorded on a standard record sheet.
- Free Field correction to the measurements should be made. Correction factor of +3dB(A) should be made to the free Field measurements.
- Noise monitoring would be cancelled in the presence of fog, rain, wind with a steady speed exceeding 5m/s, or wind gusts exceeding 10m/s.

Maintenance and Calibration

- The microphone head of the sound level meter and calibrator is cleaned with soft cloth at quarterly intervals.
- The meter is sent to be supplier or HOKLAS laboratory to check and calibrated at yearly intervals.

5.6 Action and Limit Levels

The Action and Limit levels for noise levels derived as illustrated in Table 5.5.

Table 5.5 Action and Limit Levels for noise monitoring

| Time Period | Time Period | Action | Limit |
|--------------|----------------------------------|---|-------------|
| Normal hours | 0700-1900 hrs on normal weekdays | When one documented complaint is received | 75 dB(A) * |
| Holiday | 0700-1900 hrs on holidays | | 70 dB(A) ** |
| Evening-time | 1900-2300 hrs on all other days | | 55 dB(A) ** |
| Night-time | 2300-0700 hrs of next day | | |

* = Reduce to 70 dB(A) for schools and 65 dB(A) during school examination periods.

** = Area Sensitivity Rating (ASR) C is selected from the "Technical Memorandum on Noise from Construction Work Other Than Percussive Piling".

5.7 Event-Action Plans

Please refer to the Appendix E for details.

5.8 Results

Day-time, Evening-time and Holiday noise monitoring were carried out at monitoring stations, NM1, NM2 and NM3 in this reporting month. No night-time noise monitoring were required since no construction works were processed during the night-time period. All noise levels are provided in Appendix C2. Graphical presentation of the monitoring results for the reporting month are shown in Appendix C3.



No day-time, evening-time and holiday noise monitoring results at all monitoring stations exceeded the Action Level since no documented complaints were received in this reporting month. Besides, no exceedances in Limit Level were recorded according to the results from day-time, evening-time and holiday noise monitoring.

During the restricted hours, ET found that the PMEs used complied with the requirements stated in the valid CNP and no PMEs other than ones specified in the CNP to be used in the construction site.

6.0 WASTEWATER MONITORING

- 6.1 According to the Discharge of Industrial Trade Effluent Licence (Licence No.: 2946), POC is required to carry out wastewater monitoring of suspended solids quarterly at all effluent discharge points within the site.
- 6.2 POC appointed ET of ETL to sampling the wastewater samples at the effluent discharge points. The collected sample will be transported to the Environmental Laboratory of ETL for suspended solids content analysis. The Environmental Laboratory of ETL is HOKLAS accredited and the test method used for suspended solids analysis is also HOKLAS accredited in accordance with the 2540D of Standard Methods for the Examination of Water and Wastewater (APHA 19th edition).
- 6.3 Under the Wastewater Discharge Licence (No.: 2946), the discharge limit of Suspended Solids content of the effluent at this site should be 30mg/L. It means that the suspended solids of wastewater discharged should be less than 30mg/L or otherwise no wastewater can be discharged under this Licence.
- 6.4 At Zone N1 and Zone N2, it was found that there were the drainage work and subway at March 2003. Under these construction activities, the seepage of marine water at the Zone N1 and Zone N2 was observed. As a result, POC required to pump, treat by passing through sedimentation trap and then discharge the marine water out through the discharge points at Zone N1 and Zone N2 to Tolo Harbour.
- Hence, the wastewater monitoring was carried out by ET at 19 March 2003 under the supervision of the RE and POC at two discharge points at Zone N1 and Zone N2. The locations of these two discharge points were shown in the figures at Appendix G (Figure No.: 727/D/H/L/1023 and 727/D/H/L/1024).
- 6.5 During this monitoring, two wastewater samples were collected from these two effluent discharge points and transported to ETL immediately for analysis. The results of suspended solids content of these two wastewater samples were found below 30mg/L and within the discharge limit of the Discharge Licence. The test report for this monitoring was attached in Appendix J.

7.0 ENVIRONMENTAL NON-CONFORMANCE

7.1 Summary of air quality, noise and wastewater monitoring

No exceedances of Action and Limit Level of 24-hour and 1-hour TSP monitoring results were recorded during the reporting month.

No day-time, evening-time and holiday noise levels recorded at all monitoring stations exceeded the Action and Limit Level in the reporting month.

The suspended solids results of wastewater samples from Discharge points were found within the discharge limit during monitoring period.



7.2 Summary of Environmental Complaints

No environmental complaints were received in this monitoring month.

7.3 Summary of Notification of Summons and Prosecution

There was one notification of summon respect to environmental issues registered in 16 October 2002. A cumulative log of Notification of Summons and Prosecution is tabulated in Table 7.1.

Table 7.1 A Cumulative Log of Notification of Summons and Prosecution

| Date | Detail of Notice of Summons or Prosecution | Action Taken | Environmental Outcome |
|-------------|--|--|---|
| 16 Oct 2002 | The site main haul road was neither paved with any one of concrete, bituminous materials, hard core or metal plates, nor had the entire road surface maintained wet by the spraying of water or dust suppression chemical. | <ul style="list-style-type: none"> • POC paved the site main haul road with concrete and bituminous materials; • The road surface was wet by the spraying of water regularly by POC. | It was observed that the problem of dust emission from the site main haul road has been improved. No further complaint or ticket was received until May 2003. |

8.0 SITE INSPECTION

Weekly site inspections were carried out by the ET. Five site inspections were undertaken in this reporting month (02, 09, 15, 22 and 29 May 2003). Monthly Site inspection at 29 May 2003 was carried out by the Engineer's Representative, the IEC, POC and ET. A summary of the implementation status of the mitigation measures on site inspections is presented in Appendix H.

8.1 Summary of the IEC and ET site inspection findings

The summaries of the IEC and ET site inspection findings in this reporting month are shown in Table 8.1.

Table 8.1 The summary of the IEC and ET site inspection findings

| Item | IEC/ET | Aspects | Findings | Proposed Mitigation Measures |
|------|--------|---------|---|---|
| 1 | IEC/ET | Water | From previous audits regarding the concern of overflow of contaminated runoff next to the cycle track, the contractor put effort to block the discharge point. However, there were gaps and the point is sealed and no contaminated runoff can be discharged. | <ul style="list-style-type: none"> • To sealed the discharge point to ensure no contaminated runoff can be discharged; |
| 2 | IEC/ET | Air | Some stockpiles / slopes were not covered. However, the contractor indicated that hydro seeding will be carried in that day's afternoon after the inspection. | <ul style="list-style-type: none"> • To cover by using clean tarpaulin sheets and hydroseed stockpiles and slope area; • Watering applied to stockpile and exposed loose soil surface of site works; • To perform more frequent water spraying activities after hydro seeding to enhance the effectiveness for the grass growth. |
| 3 | IEC/ET | Water | Although no sand was observed on site during the audit, however, we concern that sand may enter / wash onto the cycle track during rainstorm. It is recommended that the contractor to implement measures for the issue. | <ul style="list-style-type: none"> • To place sand bays along the cycle track in order to prevent any washing away of soil/sand onto the cycle track during rainstorm; • To provide more manpower to clean up of sand and soil accumulated in the channel; • To divert the site runoff to sedimentation tanks/traps before any directly discharge to the drainage. |



| Item | IEC/ET | Aspects | Findings | Proposed Mitigation Measures |
|------|--------|---------|---|--|
| 4 | IEC/ET | Air | Some vehicles were not completely free from sand at exit and some light vehicles left the site without using the wheel-washing facilities. The contractor shall ensure that all vehicles leaving the site are free from sand/mud. Sand was observed on public road just outside the site exit. | <ul style="list-style-type: none"> To instruct all vehicle to have wheel-washing and ensure all vehicle are free from sand/mud before the site; To remove the soil on the public road which carried by the vehicle more frequency. |
| 5 | IEC/ET | Water | Access road has insufficient backfall toward washing facility at Northern exit. It is recommended to provide backward after the wheel-washing facility so that wastewater will not flow to public road. | <ul style="list-style-type: none"> To provide backward after the wheel-washing facility so that wastewater will not flow to public road; |
| 6 | IEC/ET | Waste | Rubbish was found accumulated at the zone near the South exit (by the pipe installation). However, the contractor emphasized that the rubbish was belonging to other contractors and no works were carried out recently at that zone. It is suggested to provide a bin for collection of rubbish. | <ul style="list-style-type: none"> To provide rubbish bin/skips for collected the rubbish in the site; To remind staff to dispose rubbish into the rubbish bins/skips as possible; To remind staff to clean the rubbish accumulated more frequently as necessary; To remove the rubbish at the site immediately. |

8.2 Status of Environmental Licensing and Permitting

All permits/licenses obtained in August are summarized in Table 8.2.

Table 8.2 Summary of environmental licensing and permit status

| Description | Permit No. | Valid Period | | Section |
|---------------------------|----------------|--------------|----------|---|
| | | From | To | |
| Environmental Permit | EP-108/2001 | 05/11/02 | --- | Whole work site |
| Construction Noise Permit | GW-TN0083-2003 | 28/03/03 | 27/09/03 | <p><u>Group A:</u></p> <ul style="list-style-type: none"> 2 Dump trucks (CNP 067) 2 Excavator, tracked (CNP 081) 1 Generator, super silenced, 70dB(A) at 7m (CNP 103) 1 Lorry (CNP 141) <p><u>Group B:</u></p> <ul style="list-style-type: none"> 1 Dump trucks (CNP 067) 2 Excavator, tracked (CNP 081) 1 Generator, super silenced, 70dB(A) at 7m (CNP 103) 1 Water pump (electric) (CNP 141) <p><u>Group C:</u></p> <ul style="list-style-type: none"> 1 Dump trucks (CNP 067) 2 Excavator, tracked (CNP 081) 1 Generator, super silenced, 70dB(A) at 7m (CNP 103) 1 Water pump (electric) (CNP 141) 1 Crane, mobile (diesel) (CNP 048) |



| Description | Permit No. | Valid Period | Section | Description |
|------------------------------|-------------------|--------------|----------|---|
| Construction Noise Permit | GW-TN0151-2003 | 27/05/03 | 26/11/03 | <ul style="list-style-type: none">• 2 Excavators, tracked• 2 Generators, 1 Lorry (CNP 141)• 1 Crane, mobile (diesel)• 1 Vibration hammer |
| Construction Noise Permit | GW-TN0022-2003 | 16/05/03 | 15/11/03 | <ul style="list-style-type: none">• 2 Drop hammer driving steel sheet pile; or• 1 hydraulic hammer driving steel sheet pile. |
| Waste Producer | 5213 729 P2800 11 | 03/10/02 | --- | Generating waste at the work site |
| Wastewater Discharge License | No. 2946 | 18/12/02 | 18/12/07 | Discharge of trade Effluent, surface runoff and all other wastewater arising from the construction site and sedimentation tank |

8.3 Recommendations on site inspection findings

Based on the site inspection findings, the recommendations are as below:

- All stockpiles with a volume of greater than 50m³ should be covered with clean tarpaulin sheets, watering or hydro-seeding to avoid wind and water erosion;
- Providing more manpower to clean up of rubbish accumulated at the site;
- Providing rubbish bin/skips for collected the rubbish;
- Site inspection and maintenance of all sedimentation system and drainage facilities by the contractor's site staff should be conducted regularly to ensure proper and efficient operation all the times;
- Placing enough sand bags or other protection should be applied to prevent the slity surface runoff onto the drains system;
- Removing the sand/rubbish accumulated in the drain/channel regularly;
- Removing the oil in the drip tray and treat as chemical waste regularly
- Checking and maintaining all the site machines to prevent oil leakage regularly;
- Providing briefing to the concerned site staff on remedial actions in case of oil spillage, such as handling method of chemical waste;
- Maintain good waste management at the site;

9.0 WASTE MANAGEMENT

9.1 Waste Management Audit

Waste management audit was carried out by the ET on a weekly basis. A summary of the implementation status of the mitigation measures on waste management is presented in Appendix H.

9.2 Records of Waste Quantities

All type of wastes arising from the construction work are classified into the following:

- General refuses;
- Chemical waste;
- Construction & demolition (C&D) material.

The quantities of waste for disposal in this month are summarized in Table 9.1.



Table 9.1 Summary of Quantities of Waste for Disposal in this reporting month

| Type of Waste | Quantity | Disposal Location |
|--|----------|-------------------------------|
| C&D Material (Inert) (m ³) | 0 | Nil |
| C&D material (Non-inert) (m ³) | 0 | Nil |
| General Refuse (m ³) | 7.5 | Disposed of at NENT landfills |
| Chemical Waste (m ³) | 0 | Nil |

10.0 IMPLEMENTATION STATUS

10.1 Implementation Status of Environmental Mitigation Measures

POC has been implementing the required environmental mitigation measures according to Implementation of Mitigation Measures (clause 4.2, 5.2 and 6.2) in Environmental Management Plan for Contract No. TP 35/02 Remaining Engineering Infrastructure Works for Pak Shek Kok Development Package 1 (Revision 2). A summary of the implementation status of the mitigation measures is presented in Appendix H.

Air Quality

Only partial stockpiles were covered by using tarpaulin sheets and hydroseeded. The Contractor was reminded to water, hydro-seed or cover all the stockpiles by using clean tarpaulin sheets.

Noise

All mitigation measures stated in Appendix I were implemented properly in this reporting month.

Water Quality

The Contractor was reminded to provide more effort to implement mitigation measures, such as prevent oil leakage from the drip tray for all site machines, discharge of site runoff after suitable treatment processes, proper maintenance of sedimentation system and drainage facilities (e.g. sedimentation tank and U-channels), and remove the sand / rubbish accumulated in the drain/channel and sedimentation tanks regularly.

Waste Management

POC has been implementing most mitigation measures on waste management. However, rubbish was observed at the site and no skips or bins were provided for collecting rubbish at site. The Contractor was reminded to provide more manpower to clean up of rubbish accumulated at the site and provide rubbish bin/skips for collected the rubbish.

10.2 Implementation Status of Event and Action Plan

There were no exceedances in air quality and noise monitoring parameters recorded in this monitoring month. No further mitigation measures were required.

10.3 Implementation Status of Environmental Complaint Handling

No complaints had been received during this monitoring month.

11.0 CONCLUSION

Impact monitoring of air quality and noise were carried out at designated locations in accordance with the EM&A Manual in this reporting month.



According to the summary of air and noise monitoring results, no exceedances of Action and Limit Level of 24-hour and 1-hour TSP monitoring results were recorded during the reporting month. Besides, no day-time, evening-time and holiday noise levels were recorded at all monitoring stations exceeded the Action and Limit Level in this reporting month. No night-time noise monitoring were required since no construction works were processed during the night-time period.

During the restricted hours, ET found that the PMEs used complied with the requirements stated in the valid CNP and no PMEs other than ones specified in the CNP to be used in the construction site.

The suspended solids results of wastewater samples from Discharge points were found within the discharge limit during monitoring period.

According to the ET weekly site inspections and IEC monthly site audit carried out this month, it indicated that site practices of the POC were generally undertaken in an environmentally acceptable manner and the overall site environmental performance was satisfactory.

12.0 FUTURE KEY ISSUES

12.1 Upcoming EM&A Schedule in June and July 2003

The Proposed EM&A program in coming June and July 2003 are presented as following table:

Table 12.1 – Upcoming EM&A Schedule in June and July 2003

| Type of Monitoring | June 2003 | July 2003 |
|---------------------------------|--|--|
| Noise Monitoring (Day-time) | 03, 10, 17, 24 | 03, 08, 15, 22, 29 |
| Noise Monitoring (Evening-time) | 03, 10, 17, 24 | 03, 08, 15, 22, 29 |
| Noise Monitoring (Holiday) | 01, 08, 15, 22, 29 | 06, 13, 20, 27 |
| 1-hour TSP | 03, 05, 07, 10, 12, 14, 17, 19, 21, 24, 26, 28 | 02, 03, 05, 08, 10, 12, 15, 17, 19, 22, 24, 26, 29, 31 |
| 24-hour TSP | 02, 06, 12, 18, 24, 30 | 04, 10, 16, 22, 28 |
| Site Inspection | 05, 12, 19, 26 | 03, 10, 17, 24, 31 |

12.2 Upcoming construction works schedule in June 2003

The major construction works planned to be carried out in next month and their possible impact is tabulated (Table 12.2) for reference.

Table 12.2 – Construction Plan in June 2003

| Month | Works Planned to be Carried Out |
|-----------|---|
| June 2003 | <ul style="list-style-type: none"> - Drainage Work; - Earth work and forming earth mound; - Predrilling works; - Cofferdam and construction sheet piling works; - Subway construction works; - Watermain installation works; - Building a retained earth wall along the relocated cycle track; - Pipe jacking works; - Construction of PSK Underpass extension; - Erection of hoarding & signboard. |