

**Drainage Service Department**

**Monthly Environmental Monitoring & Auditing report for**

**Contract No.DC/2006/11**

**Drainage Improvement in Southern Lantau**

**June 2009**

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## **EXECUTIVE SUMMARY**

This is the eleventh monthly Environmental Monitoring and Audit (EM&A) report for “Drainage Improvement in Southern Lantau Investigation”. The environmental permit number is “EP-237/2005/A”. The report concludes the impact monitoring for the activities undertaken during the period of 1st June 2009 to 30th June 2009. The major activities in this reporting month include excavation for pipe trench at Ling Tsui Tau, construction of box culverts at Pak Ngan Heung (PNH), formation of haul access between bottleneck A and B at Tai Tei Tong (TTT) River, construction of gabion walls at Luk Tei Tong (LTT) bypass channel and River.

Noise, water quality and ecological monitoring were performed. Results obtained were checked against the previously established Action / Limit (A/L) levels. Additionally, the implementation status of environmental mitigation measures, event/ action plan and environmental complaint handling procedures were inspected during weekly site environmental audit.

In general, waste management was satisfactory during the reporting month.

Impact monitoring for construction noise was conducted in the reporting period. No exceedance of A/L level was reported.

Furthermore, impact monitoring for water quality was conducted. Total 98 non-compliance events of water quality criteria were recorded in this reporting month. Exceedances were mainly caused by site water discharge and surface run-off from the project sites and influence of rainstorm.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. And there was no sign of disturbance from the Project to the watch tower, though the breeding season of White-shouldered Starling in this year has begun. The watch tower may not be suitable for birds as nesting habitat. In addition, no disturbance on the flora and fauna in the river channels were observed during the ecological monitoring.

Furthermore, there was no complaint, notification of any summons and

successful prosecutions against the project received during the reporting period.

A non-compliance event regarding direct discharge of site water from BC13 of PNH was recorded in this reporting month. Details of findings and follow up actions taken by Contractor please refer to Section 11.2

Key construction activity in the coming month will be construction of box culvert at PNH, haul access and gabion walls at TTT River and retaining walls, gabion blocks as well as box culvert at LTT River. It is expected that noise, air and water quality impacts will be resulted from the works. With reference to the EM&A manual and mitigation measure report, mitigation measures are proposed to be taken, if necessary.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement.

## **1. Introduction**

This is the tenth monthly Environmental Monitoring and Audit (EM&A) Report for “Drainage Improvement in Southern Lantau Investigation” project (Environmental Permit No. EP-237/2005/A)

## **2. Project Information**

### **2.1 Construction program**

The “Drainage Improvement in Southern Lantau Investigation” project will be completed by January 2011. The project comprises the following:

- Construction of approximately 80m long gabion with natural bed in Pak Ngan Heung River, approximately 180m of three cells 3m x 2m box culvert and approximately 100m of rectangular channel at Pak Ngan Heung River;
- Construction of approximately 250m of 0.75m wide U-Channel at Ling Tsui Tau Village in Mui Wo;
- Construction of bypass channel of about 350m and 240m long of gabion channels at Luk Tei Tong River respectively; and  
Widening three existing bottlenecks with gabion lined at Tai Tei Tong River

Appendix A shows the construction program and location plan of the project.

### **2.2 Project Organization**

The Main Contractor, Yick Hing Construction Company Limited, has commissioned Environmental Pioneers & Solutions Limited and Ecosystems Limited as the Environmental Team, which comprises the environmental team leader, the ecologists and the environmental technicians to undertake the environmental monitoring and audit work for this project.

The environmental management structure and is shown in Fig 2.2.1.

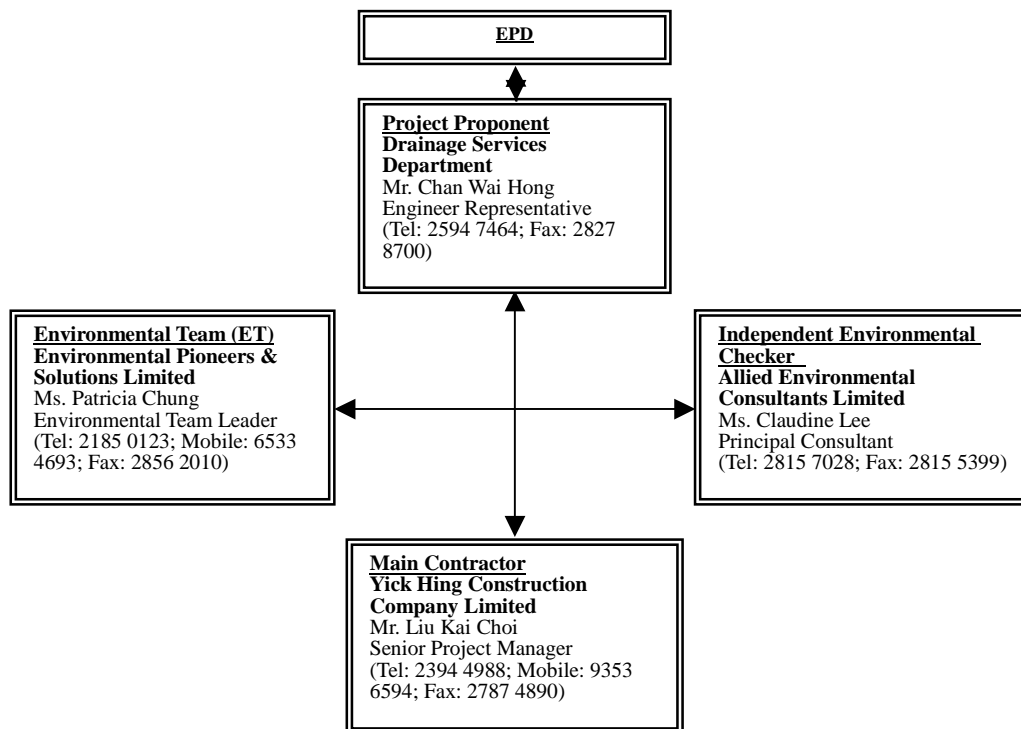


Figure. 2.2.1 Environmental Management structure for the project

### 2.3 Key Personal Contact information chart

Detailed contact of key persons involved in environmental aspect of the project is shown in Appendix B.

### **3. Construction Stage**

#### **3.1 Construction Activities in the reporting month**

Major activities in the reporting month included the followings:

1. Excavation for box culverts BC4, 5 and 13 at PNH;
2. Formation works of BC13 at PNH;
3. Formation of haul access between bottleneck A and B of TTT River;
4. Construction of gabion walls at ch.260-290 of LTT River;
5. Construction of gabion walls at ch.2B43-2B68 of LTT River;
6. Demolish of existing existing box culvert at CH2B63-CH2B66; and
7. Trimming of riverbed along ch.30-50 of LTT River.

#### **3.2 Construction Activities for the coming month**

Key Construction works in the coming month will include:

1. Excavation for box culverts BC7 and 8 at PNH;
2. Formation works for BC5 and 6 at PNH;
3. Construction of gabion walls at LTT River and bypass channel;
4. Construction of retaining wall J at LTT River; and
5. Reformation of haul access between bottleneck A and B of TTT River.

#### **3.3 Environmental Status**

Appendix A shows the drawing of the project area.

Locations of the monitoring and control stations with environmental sensitive receivers are presented in Section 4.3, 5.3 and 6.3 for noise, water and ecological monitoring respectively.

## 4. Noise Monitoring

### 4.1 Monitoring Parameters and Methodology

The construction noise level was measured in terms of the A-weighted equivalent continuous sound pressure level ( $L_{eq}$ ).  $L_{eq}$  (30minutes) was used as the monitoring parameter for the impact monitoring in the time period between 0700 to 1900 hours on normal weekdays. For all other time period,  $L_{eq}$  (5minutes) was employed for comparison with the Noise Control Ordinance (NCO) criteria.

Noise measurement results obtained from each monitoring location were recorded in the Construction Noise Monitoring Data Sheet (Appendix E) immediately after the measurement. As supplementary information for data auditing, statistical results  $L_{10}$  and  $L_{90}$  were also be recorded for reference.

In case of non-compliance with the construction noise criteria, more frequent monitoring, as specified in the Action plan in table 4.5.2, shall be carried out. This additional monitoring shall be carried out until the recorded noise levels are rectified or proved to be irrelevant to the construction activities.

### 4.2 Monitoring Equipment

The sound level meters and calibrators comply with the International Electrotechnical Commission Publications 651:1979 (Type 1) and 804:1985 (Type 1) specifications as referred to in the Technical Memorandum (TM) to the Noise Control Ordinance was deployed as monitoring equipment for noise measurement.

Noise measurement was not be made in the presence of fog, rain, wind with a steady speed exceeding  $5\text{ms}^{-1}$  or wind with gust exceeding  $10\text{ms}^{-1}$ . Thus wind speed was checked by the portable wind speed indicator capable of measuring the wind speed in m/s. Table 4.2.1 summarizes the equipment list for noise monitoring

Table 4.2.1 Equipment List for Noise Monitoring

Equipment	Manufacturer & Model No.	Precision Grade	Qty
Integrated sound level meter	ACO Japan, model 6224	IEC 651 Type 1 IEC 804 Type 1	1
Windscreen	Microtech gefell model W2	N/A	1
Acoustical calibrator	Castle GA 607	IEC 942 Type 1	1
Wind speed indicator	Kestrel K1000	N/A	1
Remarks: Calibration details for the sound level meter is given in Appendix C for reference			

### 4.3 Monitoring Locations

According to the Baseline Monitoring Report issued in May 2008 for the captioned project, four locations where are alternative from the locations proposed in EM&A manual, were designated for baseline noise monitoring. For the data validation, impact noise monitoring was undertaken in the same locations during the construction phase of the project. The proposed monitoring locations are summarized in Table 4.3.1. Figure 4.3.1 shows the Noise Monitoring Locations

Noise measurement in each monitoring locations were taken at a point 1m from the exterior of the selected premises and at a height with no disturbance to the dweller and least obstructed view.

Table 4.3.1 Noise Monitoring Locations during Construction Phase

Identification No.	Noise Monitoring Locations
N1	No. 73, Village House, Ling Tsui Tau Tsuen (ground level)
N2	No. 31, Village House, Ling Tsui Tau Tsuen (ground level)
N3	Fence wall outside No. 5 village house adjacent to Luk Tei Tong River Outlet (ground level)
N4	No. 23, Village House, Tai Tei Tong River (ground level)

In accordance with the requirements in the EM&A manual, weekly impact monitoring was conducted. For the time period between 0700 and 1900 hours on normal weekdays, and noise parameter of  $L_{eq(30minutes)}$  was measured. As if the construction works were carried out during restricted period (ie. 1900-2300, 2300-0700 of next day and Sundays / general holiday), impact monitoring that comprises 3 consecutive  $L_{eq(5minutes)}$  would be carried out.

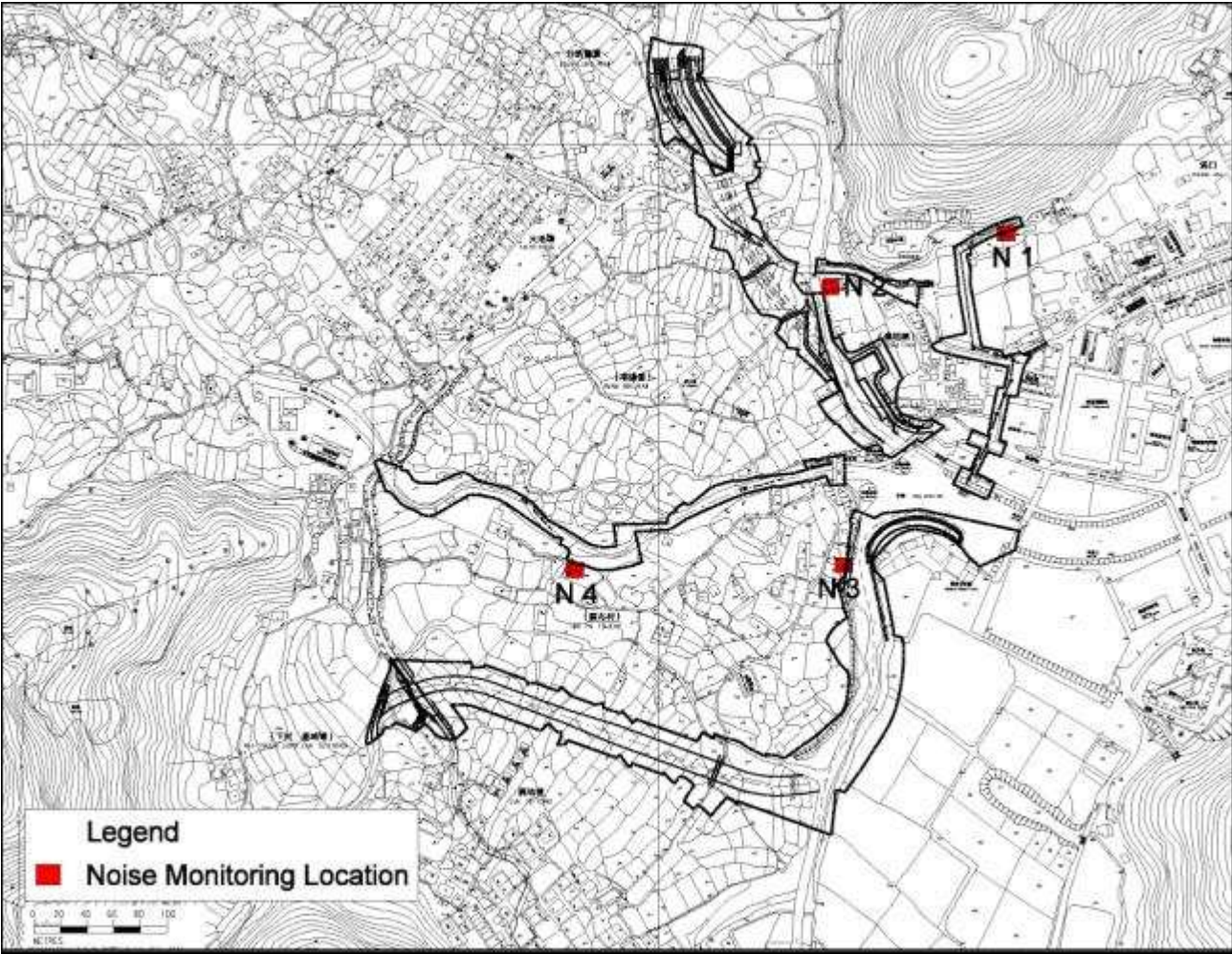


Figure 4.3.1 Impact noise monitoring locations



#### 4.4 Monitoring Results and Interpretation

Relevant details of the noise monitoring results are presented in Table 4.4.1. The results, ranged between 45.8 dB (A) and 70.5 dB (A), were within the limit levels and therefore, no exceedance was found.

Table 4.4.1 Noise monitoring results

Table 4.4.1 Noise Monitoring Results for the reporting month							
Location	Parameter	Date	Time	L <sub>Aeq</sub> dB(A)	Limit dB(A)	Exceedance	Weather
N1	L <sub>eq</sub> 30mins	3/06/09	14:45	45.8	75	N	Cloudy
N1	L <sub>eq</sub> 30mins	8/06/09	15:20	48.6	75	N	Sunny
N1	L <sub>eq</sub> 30mins	15/06/09	14:55	52.1	75	N	Sunny
N1	L <sub>eq</sub> 30mins	22/06/09	13:35	48.3	75	N	Cloudy
N1	L <sub>eq</sub> 30mins	29/06/09	15:15	52.7	75	N	Sunny
N2	L <sub>eq</sub> 30mins	3/06/09	14:10	59.5	75	N	Cloudy
N2	L <sub>eq</sub> 30mins	8/06/09	14:45	56.3	75	N	Sunny
N2	L <sub>eq</sub> 30mins	15/06/09	14:25	59.2	75	N	Sunny
N2	L <sub>eq</sub> 30mins	22/06/09	13:00	58.1	75	N	Cloudy
N2	L <sub>eq</sub> 30mins	29/06/09	14:40	60.5	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	3/06/09	13:00	66.8	75	N	Cloudy
N3*	L <sub>eq</sub> 30mins	8/06/09	13:35	65.5	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	15/06/09	13:00	70.5	75	N	Sunny
N3*	L <sub>eq</sub> 30mins	22/06/09	14:35	54.5	75	N	Cloudy
N3*	L <sub>eq</sub> 30mins	29/06/09	13:30	63.8	75	N	Sunny
N4	L <sub>eq</sub> 30mins	3/06/09	13:35	55.3	75	N	Cloudy
N4	L <sub>eq</sub> 30mins	8/06/09	14:10	50.3	75	N	Sunny
N4	L <sub>eq</sub> 30mins	15/06/09	13:35	68.3	75	N	Sunny
N4	L <sub>eq</sub> 30mins	22/06/09	15:10	53.1	75	N	Cloudy
N4	L <sub>eq</sub> 30mins	29/06/09	14:05	58.8	75	N	Sunny

Remarks: Raw datasheet for noise monitoring are attached in appendix E for reference.

Remark\*: The equivalent noise level of N3 is corrected by +3 dB from the raw data result due to the fact that free field measurement was carried out in the location.

#### 4.5 Action and Limit level for Construction noise

The Action and Limit (A/L) levels for construction noise are defined in Table 4.5.1. Should non-compliance of the criteria occur, action in accordance with the Action Plan in Table 4.5.2 should be carried out.

There was no recorded exceedance in the reporting month.

Table 4.5.1 Action and Limit Levels for Construction noise		
Time Period	Action Level	Limit Level
0700 – 1900 hours on normal weekdays	When one documented complaint is received	75dB(A)
Remarks: If works are to be carried out during restricted hours, the conditions stipulated in the construction noise permit issued by the Noise Control Authority have to be followed.		

Table 4.5.2 Event / Action Plan for Construction Noise

EVENT	ACTION			
	ET	IC(E)	ER	Contractor
Action Level	<ol style="list-style-type: none"> <li>1. Notify IC(E) and Contractor;</li> <li>2. Carry out investigation;</li> <li>3. Report the results of investigation to the IC(E), ER and Contractor;</li> <li>4. Discuss with the Contractor and formulate remedial measures;</li> <li>5. Increase monitoring frequency to check mitigation effectiveness.</li> </ol>	<ol style="list-style-type: none"> <li>1. Review the analysed results submitted by the ET;</li> <li>2. Review the proposed remedial measures by the Contractor and advise ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem;</li> <li>4. Ensure remedial measures are properly implemented.</li> </ol>	<ol style="list-style-type: none"> <li>1. Submit noise mitigation proposals to IC(E);</li> <li>2. Implement Noise mitigation proposals.</li> </ol>
Limit Level	<ol style="list-style-type: none"> <li>1. Identify source;</li> <li>2. Inform IC(E), ER, EPD and Contractor;</li> <li>3. Repeat measurements to confirm findings;</li> <li>4. Increase monitoring frequency;</li> <li>5. Carry out analysis of Contractor's working procedures to determine possible mitigation to be implemented;</li> <li>6. Inform IC(E), ER and EPD the causes and actions taken for the exceedances;</li> <li>7. Assess effectiveness of Contractor's remedial actions and keep IC(E), EPD and ER informed of the results</li> <li>8. If exceedance stops, cease additional monitoring</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss amongst ER, ET, and Contractor on the potential remedial actions;</li> <li>2. Review Contractors remedial actions whenever necessary to assure their effectiveness and advise the ER accordingly;</li> <li>3. Supervise the implementation of remedial measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Confirm receipt of notification of failure in writing;</li> <li>2. Notify Contractor;</li> <li>3. Require Contractor to propose remedial measures for the analysed noise problem;</li> <li>4. Ensure remedial measures properly implemented;</li> <li>5. If exceedance continues, consider what portion of the work is responsible and instruct the Contractor to stop that portion of work until the exceedance is abated</li> </ol>	<ol style="list-style-type: none"> <li>1. Take immediate action to avoid further exceedance;</li> <li>2. Submit proposals for remedial actions to IC(E) within 3 working days of notification;</li> <li>3. Implement the agreed proposals;</li> <li>4. Resubmit proposals if problem still not under control;</li> <li>5. Stop the relevant portion of works as determined by the ER until the exceedance is abated</li> </ol>

#### **4.6 Noise Mitigation Measures**

The following mitigation measures were observed from the weekly site inspection in the reporting month:

- Use of quiet powered mechanical equipment (PME)
- Implementation of the following good site practices:
  - Only well-maintained and regularly serviced plant should be operated on site;
  - Silencers or mufflers on construction equipment;
  - Mobile plant, if any, should be sited as far from noise sensitive receivers as possible; and
  - Machines and plant (such as trucks) that may be in intermittent use should be shut down between work periods or should be throttled down to a minimum.

## **5. Water Monitoring**

### **5.1 Water Quality Monitoring Parameters and methodology**

Turbidity in Nephelometric Turbidity Unit (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L are required to measure in this project. Turbidity, DO was measured in-situ while water samples were delivered to Accredited HOKLAS Laboratory for analysis of SS.

Other relevant data such as monitoring location, time, water depth, temperature, salinity, weather conditions and any other special phenomena and work underway at the construction site were recorded during sampling.

According to the requirement of the EM&A manual, two consecutive measurements for parameters of DO concentration, DO saturation and Turbidity are required to be taken at each monitoring location. When the difference in value between the first and second reading of DO or Turbidity is more than 25%, the reading would be discarded and further reading would be taken.

### **5.2 Monitoring Equipment**

Turbidity, DO, Salinity, pH and temperature was measured by an instrument complied with the following requirements:

The instrument is a portable as well as weatherproof multimeter complete with cable and uses a DC power source. It is capable of measuring:

- A turbidity between 0-800NTU;
- A dissolved Oxygen level in the range of 0-20mg/L and 0-200% saturation;
- A temperature of 0-50°C;
- Salinity in the range of 0-40ppt;
- pH in the range of 0-14.

Suspended solid was determined by the water samples collected from the monitoring locations for further analysis in accredited HOKLAS laboratory. Water samples were contained by polythene bottles, packed in ice (cooled in 4°C without frozen) and delivered to the laboratory for analysis as soon as possible after collection. Duplicate samples from each independent sampling event were undertaken during impact monitoring.

Detailed calibration records of the multimeter were shown in Appendix C for reference.

### **5.3 Monitoring Locations**

Seven locations included a control station in upstream of each stream/ river, a monitoring station at the end of each stream/ river of the works area and a monitoring station at Silver River were proposed for the impact water quality monitoring. Water samples were collected at mid-depth of each proposed monitoring stations for measurements and sample collection. The Location Plan is shown in Figure 5.3.1 for reference.

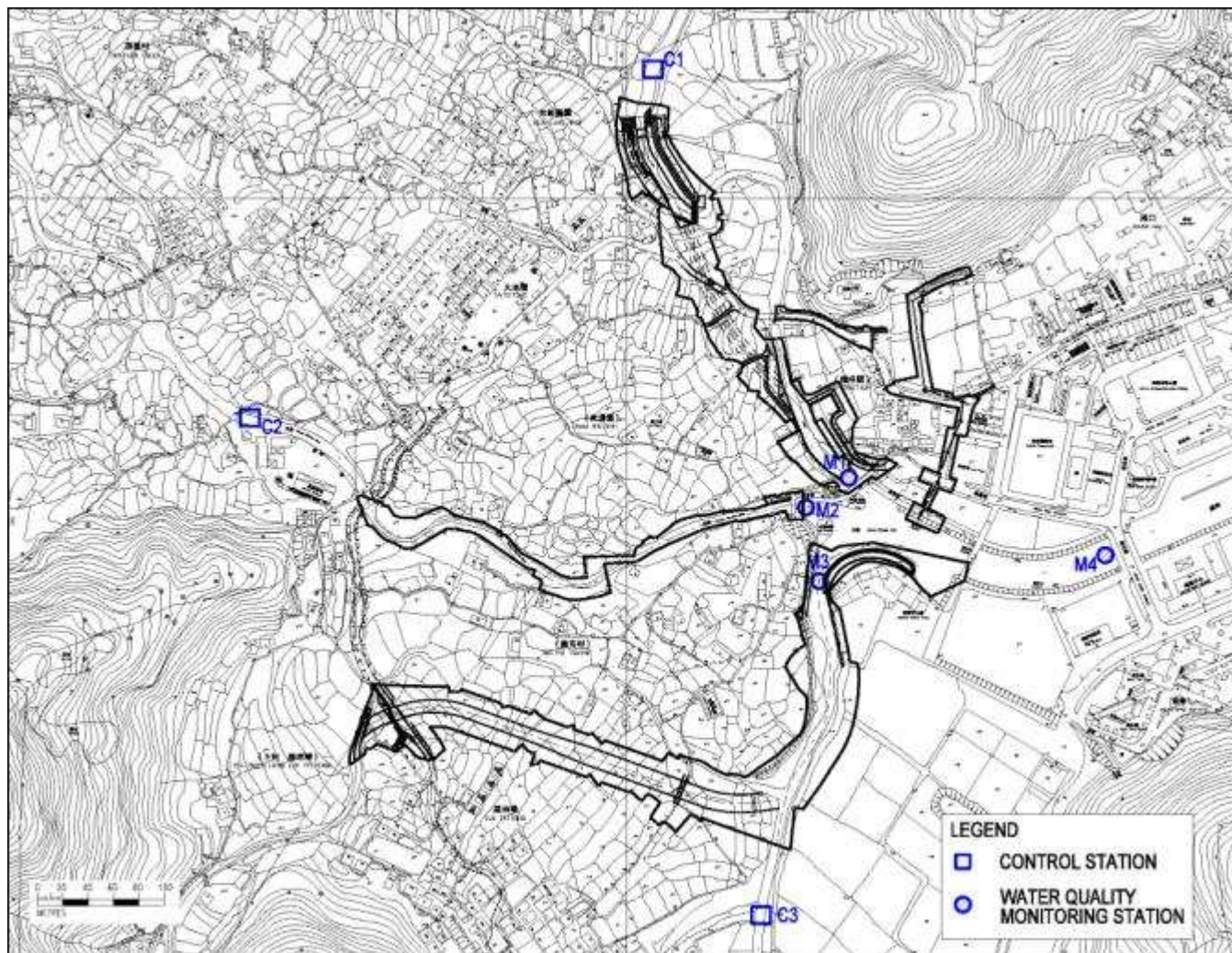


Figure 5.3.1 Water Quality Monitoring Locations

## **5.4 Monitoring Frequency**

Impact water quality monitoring was undertaken three days per week and at ebb tides during the course of the construction river works. Upon the completion of the construction works, the monitoring exercises at the designated monitoring stations will be continued for four weeks in the same manner as the impact monitoring.

## **5.5 Monitoring Results and Interpretation**

Water quality monitoring was carried out twelve times during May. Detailed on-site measurements and laboratory analysis reports including QA/QC results are shown in Appendix F1 and F2 respectively, while Table 5.5.1 presents consolidated results throughout the reporting month.

Exceedance events on parameters of turbidity and suspended solids were recorded in this reporting month according to the established level. Findings from the investigations showed that the total 98 exceedance events were mainly caused by:

- 1.) Channel clearance activities carried out at the upper stream area of TTT River by the other project;
- 2.) Surface run-off due to defective site practices and/or mitigation measures for the formation of haul access between bottleneck A and B at TTT River;
- 3.) Surface run-off and leakage of site water due to defective site practices and/or mitigation measures for the construction of gabion wall along LTT River;
- 4.) Discharge of silty water to PNH River channel due to accumulation as well as overflow of site water from BC13; and
- 5.) Soil run-off and disturbance of sediment due to heavy rainstorm.

Detailed information of the exceedance events and action taken were presented in Section 7.

Table 5.5.1 Water quality monitoring results in June 2009

	M1			M2			M3			M4		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	6.2	61.8	20.0	0.0	328.4	57.2	5.5	44.8	18.4	2.5	56.1	17.6
DO (mg/l)	6.9	8.7	7.9	7.4	8.6	7.8	5.3	8.2	6.3	6.3	8.6	7.2
Suspended Solid (mg/l)	4.4	39.9	11.6	1.2	173.2	32.3	7.0	37.3	16.4	5.4	34.7	12.3

	C1			C2			C3		
	MIN	MAX	Ave	MIN	MAX	Ave	MIN	MAX	Ave
Turbidity (NTU)	0.0	16.7	2.6	0.0	313.7	44.1	4.6	19.2	8.8
DO (mg/l)	6.0	7.9	7.3	7.1	8.7	7.8	2.3	7.1	5.1
Suspended Solid (mg/l)	1.0	6.3	2.0	1.0	360.0	40.2	4.4	14.5	9.0

\* Remarks: Detection limit for Turbidity, DO and SS are 1 NTU, 0.1 mg/L and 1 mg/L respectively.



## 5.6 Action and limit level for Water Quality

Based on the criteria stipulated in EM&A manual Section 4.8 and baseline water quality monitoring data obtained, the A/L levels are shown in Table 5.6.1 and Table 5.6.2. If the water quality monitoring results at any impact stations exceeded the criteria, the actions in accordance with the Event and Action Plan in Table 5.6.3 should be taken.

Table 5.6.1 Water quality criteria for monitoring

Parameters	Action	Limit
DO in mg/L (mid-depth)	- 5%-ile of baseline data	- 4mg/L
SS in mg/L (mid-depth)	- 95%-ile of baseline data; or - 120% of control station's SS on the same day of measurement	- 99%-ile of baseline; or - 130% of control station's SS on the same day of measurement
Turbidity in NTU (mid-depth)	- 95%-ile of baseline data; or - 120% of control station's turbidity on the same day of measurement	- 99%-ile of baseline; or - 130% of control station's turbidity on the same day of measurement

Table 5.6.2 Action and Limit Levels established according to baseline data

Parameters	Monitoring locations							
	M1		M2		M3		M4	
	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level	Action Level	Limit Level
Turbidity (NTU)	15.2	16.9	5.3	6.5	16.8	26.0	16.2	18.0
DO (mg/L)	5.7	4.0	6.2	4.0	5.9	4.0	5.9	4.0
SS (mg/L)	12.2	12.8	3.1	4.2	12.4	17.7	13.9	15.2

Remarks:

For DO, non-compliance of the water quality limits occurs when monitoring result is lower than the limits

For SS and turbidity, non-compliance of the water quality limits occurs when monitoring result is higher than the limits.

Table 5.6.3 Event and action Plan for Water Quality

EVENT	ACTION			
	ET	IC(E)	ER	Contractor
Action Level being exceed by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in <i>situ</i> measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IC(E) and Contractor;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IC(E) and Contractor;</li> <li>6. Repeat measurement on next day of exceedance.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IC(E) on the proposed mitigation measures;</li> <li>2. make agreement on the mitigation measures to be implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER;</li> <li>6. Implement the agreed mitigation measures.</li> </ol>
Action level being exceed by more than two consecutive sampling days	<ol style="list-style-type: none"> <li>1. Repeat in <i>situ</i> measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IC(E) and Contractor;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IC(E) and Contractor;</li> <li>6. Ensure mitigation measures are implemented; prepare to increase the monitoring frequency to daily</li> <li>7. Repeat measurement on next day of exceedance</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IC(E) on the proposed mitigation measures;</li> <li>2. make agreement on the mitigation measures to be implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER within three working days;</li> <li>6. Implement the agreed mitigation measures.</li> </ol>
Limit level being exceeded by one sampling day	<ol style="list-style-type: none"> <li>1. Repeat in <i>situ</i> measurement to confirm findings;</li> <li>2. Identify reasons for non-compliance and source(s) of impact;</li> <li>3. Inform IC(E) and Contractor;</li> <li>4. Check monitoring data, all plant, equipment and Contractor's working methods;</li> <li>5. Discuss mitigation measures with IC(E) and Contractor;</li> <li>6. Ensure mitigation measures are implemented;</li> <li>7. Increase the monitoring frequency to daily until no exceedance of Limit Level</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with ET and Contractor on the mitigation measures;</li> <li>2. Review proposals in mitigation measures submitted by Contractor and advise the ER accordingly;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Discuss with IC(E) on the proposed mitigation measures;</li> <li>2. make agreement on the mitigation measures to be implemented;</li> <li>3. Assess the effectiveness of the implemented mitigation measures.</li> </ol>	<ol style="list-style-type: none"> <li>1. Inform the ER and confirm notification of the non-compliance in writing;</li> <li>2. Rectify unacceptable practice;</li> <li>3. Check all plant and equipment;</li> <li>4. Consider changes of working methods;</li> <li>5. Discuss with ET and IC(E) and propose mitigation measures to IC(E) and ER;</li> <li>6. Implement the agreed mitigation measures.</li> </ol>

## **5.7 Water Quality Mitigation Measures**

### **Construction Run-off and Drainage**

The site practices outlined in ProPECC PN 1/94 ‘Construction Site Drainage’ should be followed as far as practicable during both construction and operation phase of the drainage improvement works in order to minimize surface runoff and the chance of erosion, and also to retain and reduce any suspended solids prior to discharge.

As recommended in the final EM&A manual, attention would be paid specially construction run-off and drainage, general construction activities, sewage discharged from construction workforce and river channel excavation works.

As for the forthcoming wet season, contractor was recommended to provide sufficient water treatment facilities for accumulated site water.

## **5.8 Water Monitoring Schedule for the Next reporting period**

Water monitoring in the next reporting period is scheduled for 2, 3, 6, 8, 10, 13, 14, 15, 20, 22, 24, 27, 28, 31 July.

## **6. Ecology Monitoring**

### **6.1 Ecological Monitoring Parameters**

According to the Final EM&A Manual, a specific ecological monitoring programme of the improved section of PNH and LTT Rivers is recommended. The monitoring parameters required to measure in this project and survey methodology are described below:

- (1) Avifauna species and abundance: Birds will be surveyed quantitatively using transect count method. Birds within the river channel and on the riverbank will be identified and their abundance will be recorded.
- (2) Aquatic macroinvertebrate community species composition and abundance: Survey on aquatic fauna will focus on determination of the diversity and abundance of stream aquatic communities. Sampling methods, such as active searching, direct observation, netting, and kick sampling, will be determined according to the site conditions during field survey.
- (3) Fish community species composition and abundance: Sampling methods, such as active searching, direct observation, and hand netting, will be determined according to the site conditions during field survey.
- (4) Adult odonate community species composition and abundance: Adult dragonfly will be surveyed quantitatively using transect count method. Adult dragonflies within the river channel and on the riverbank will be identified and their abundance will be recorded. Species requiring close examination will be netted.
- (5) Aquatic, emergent and riparian vegetation community species composition and abundance: The area will be walked through. Plant species composition and their relative abundance will be recorded.
- (6) Surveys of White-shouldered Starling *Sturnus sinensis* will be conducted at the disused watchtowers next to LTT river. Breeding of the White-shouldered Starlings will be determined by checking signs of attempt to breed or sign of breeding which include carrying nesting materials, to-and-fro movement of adults carrying food, presence of recently fledged juveniles, etc. The number of breeding pairs and the site observation will be recorded whenever possible.

Water Quality Monitoring along LTT and PNH River as well as LTT bypass channel was carried out. Water quality monitoring will include Turbidity in Nephelometric Turbidity Unit (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L are required to measure in this project. Moreover, additional water monitoring parameters will be taken for the purposes of ecological monitoring of water quality in this project. The added information will include: BOD, Ammonia, Nitrate and Phosphate concentrations. Turbidity, DO, pH and water flow will be measured in-situ while water samples will be delivered to Accredited HOKLAS Laboratory accredited laboratory and the analyses followed the standard methods according to APHA Standard Methods for the Examination of Water and Wastewater, 20<sup>th</sup> Edition, or equivalent for analysis of SS, BOD, Ammonia, Nitrate and Phosphate concentrations.

Other relevant data such as monitoring location, time, water depth, temperature, salinity, weather conditions and any other special phenomena and work underway at the construction site will be recorded during sampling.

According to the requirement of the EM&A manual, two consecutive measurements for parameters of DO concentration, DO saturation and Turbidity are required to be taken at each monitoring. When the difference in value between the first and second reading of DO or Turbidity is more than 25%, the reading will be discarded and further reading will be taken.

## **6.2 Monitoring Equipment and Methodology**

Turbidity, DO, Salinity, pH and Temperature will be measured by a instrument complied with the following requirements:

The instrument is a portable as well as weatherproof multimeter complete with cable and uses a DC power source. It is capable of measuring:

- A turbidity between 0-800NTU;
- A dissolved Oxygen level in the range of 0-20mg/L and 0-200% saturation;
- A temperature of 0-50°C;
- Salinity in the range of 0-40ppt;
- pH in the range of 0-14.

Suspended solid was determined by the water samples collected from the

monitoring locations for further analysis in accredited HOKLAS laboratory. Water samples were contained by polythene bottles, packed in ice (cooled in 4°C without frozen) and delivered to the laboratory for analysis as soon as possible after collection. Duplicate samples from each independent sampling event were undertaken during impact monitoring.

### **6.3 Monitoring Locations**

According to the Final EM&A Manual, the improved section of the river channels will be divided into 50m long sections, and ecological survey will be carried out in each of the 50m sections. A total of nine sections will be divided for the two rivers which include:

- Two sections for existing upstream of PNH river (i.e. the proposed 80m long trapezoidal channel)
- Two sections for existing downstream of PNH river (i.e. the proposed 100m long rectangular channel)
- Five sections for existing Luk Tei Tong River (i.e. the proposed 240m long trapezoidal channel)

The disused watchtowers are located at the confluence of the three rivers and next to LTT river.

The Location Plan for ecological is shown in Figure 6.1 for reference.

The improved sections of the river channels require to carrying out water quality monitoring for the ecological purpose. The sampling points for impact monitoring was undertaken in the same place as the baseline monitoring proposed, where include:

- Three points for existing of PNH river
- Three points for existing of Luk Tei Tong River

The Location Plan for ecological water monitoring is shown in Figure 6.2 for reference.

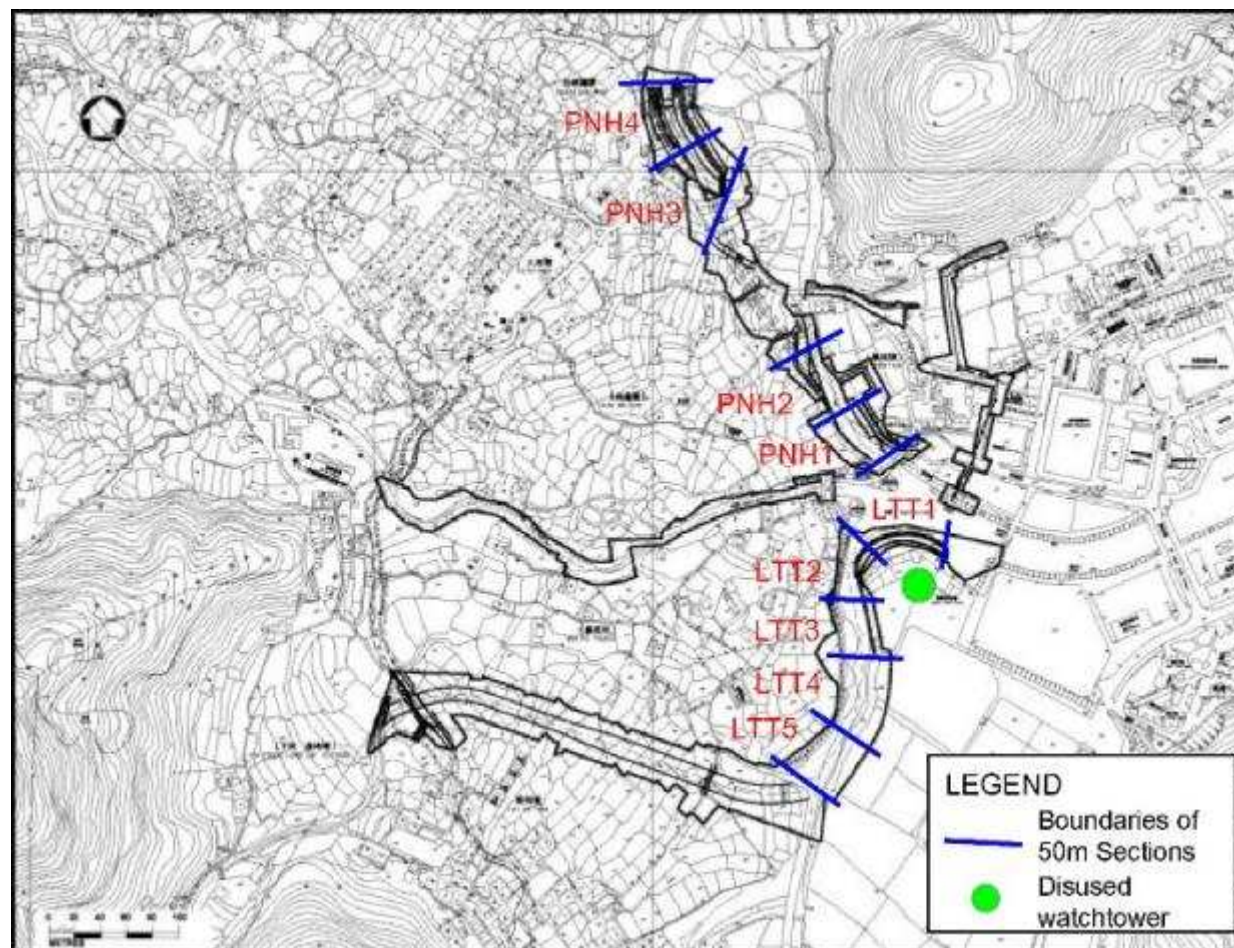


Figure 6.1 Ecological Monitoring Locations



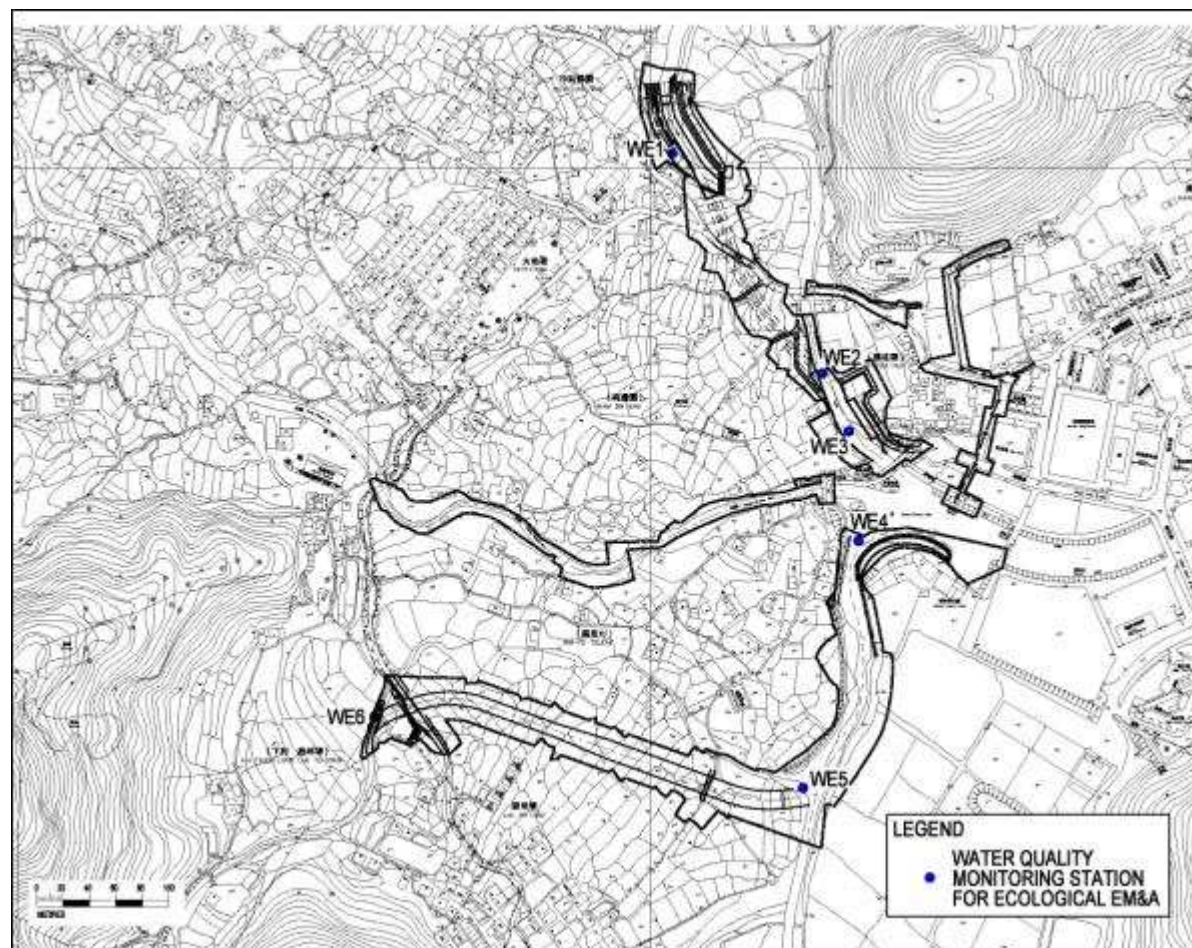


Figure 6.2 Ecological Water Quality monitoring locations



## **6.4 Monitoring Frequency**

As proposed, ecological impact monitoring was carried out once for each monitoring location in the reporting month.

## **6.5 Monitoring results**

### **Pak Ngan Heung Stream N and S sections**

#### **Vegetation**

Surveys were conducted on 26 June 2009. The north section of Pak Ngan Heung Stream was fairly modified. Part of the west bank was lined with rock gabion bank and occupied by village houses and abandoned agricultural field. The stream channel was wider than the downstream section, but the stream bank was still fairly narrow and steep in gradient. Compared to the south section, the north section was relatively shaded due to presence of more trees with larger canopy.

The walk through survey recorded a total of 62 species, including 20 trees, 8 shrub, 17 herb and 7 grass species (Appendix D1). 48 of the species recorded are natives, while 14 were exotics. The quantitative sampling recorded 27 species at the north section. Large native (e.g. *Celtis sinensis*, *Cleistocalyx operculata*, *Ficus hispida*) and exotic trees (*Acacia confusa*) dominated the transects. Other species recorded include common and typical native pioneer forest and streamside tree species and ruderal species. No species of conservation interest was recorded.

**Table 6.5.1 Relative percentage cover of vegetation recorded at Pak Ngan Heung (N) Section**

Species	Relative % cover	
	PNH3	PNH4
<i>Acacia confusa</i>		12.39
<i>Acorus graminifolia</i>		1.36
<i>Alocasia macrorrhiza</i>		1.17
<i>Aporosa dioica</i>		2.01
<i>Bamboo</i>	11.58	
<i>Celtis sinensis</i>	37.21	23.84
<i>Christella parasitica</i>	1.74	1.82
<i>Christella parasitica</i>		
<i>Cleistocalyx operculata</i>	23.15	
<i>Dimocarpus longan</i>	0.62	
<i>Embelia ribes</i>		0.82
<i>Ficus hispida</i>	3.31	18.46
<i>Hibiscus rosa-sinensis</i>		0.47
<i>Litsea glutinosa</i>		4.91
<i>Macaranga tanarius</i>		13.91
<i>Microstegium ciliatum</i>		8.06
<i>Mikania micrantha</i>	0.62	5.26
<i>Neyraudia reynaudiana</i>		1.99
<i>Phyllanthus urinaria</i>	0.83	
<i>Pilea microphylla</i>		0.12
<i>Pueraria phaseoloides</i>		0.47
<i>Sageretia thea</i>		2.22
<i>Sporobolus fertilis</i>		0.75
<i>Syzygium jambos</i>	18.40	
<i>Wedelia triloba</i>	2.56	
Total Relative % Cover*	100.0	100.0
Total Transect Length (m)	13	34

\*Total Cover rounded up to one decimal place to avoid round-off error.

The south section of Pak Ngan Heung Stream was highly modified. Both banks were lined with rock gabions and were occupied by village houses immediately beyond the channel. The stream channel was lack of riparian

zone and vegetation. A total of 18 species recorded, 13 of which were native and 5 were exotic. It was composed of isolated individuals of mangrove (*Kandelia obovata*), backshore species (*Clerodendrum inerme*), native (*Celtis sinensis*) and planted trees (*Acacia confusa*) (Appendix D2). No species of conservation interest was recorded.

### ***Terrestrial Fauna***

Surveys were conducted on 12 June 2009.

A total of nine species of birds were recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.2). All are common in Hong Kong.

**Table 6.5.2 Avifauna in Pak Ngan Heung**

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	1				CL
Common Koel	<i>Eudynamis scolopacea</i>	1				CW
House Swift	<i>Apus nipalensis</i>		4			CW
Magpie Robin	<i>Copsychus saularis</i>			1	1	
Common Tailorbird	<i>Orthotomus sutorius</i>				3	CW
Rufous-backed Shrike	<i>Lanius schach</i>		1			CW
Japanese White-eye	<i>Zosterops japonica</i>				1	CW
Black-necked Starling	<i>Sturnus nigricollis</i>		1			CW
Crested Myna	<i>Acridotheres cristatellus</i>	2	3			CW

CW = common and widespread, CL = common/uncommon and localized

Eleven species of dragonfly was recorded in the proposed work area of the Pak Ngan Heung River (Table 6.5.3). All are common and widespread in Hong Kong.

**Table 6.5.3 Dragonfly in Pak Ngan Heung River**

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Black-banded Gossamerwing	<i>Euphaea decorata</i>				2	A
Orange-tailed Sprite	<i>Ceriagrion auranticum</i>		1			A
Common Bluetail	<i>Ischnura senegalensis</i>		7			A
Black Threadtail	<i>Prodasineura autumnalis</i>		3			A
Orange-faced Sprite	<i>Pseudagrion rubriceps</i>			2		C
Yellow Featherlegs	<i>Copera marginipes</i>			6		A
Green Skimmer	<i>Orthetrum sabina</i>	1	1		1	C
Pied Skimmer	<i>Pseudothemis zonata</i>				1	C
Wandering Glider	<i>Pantala flavescens</i>	1				A
Indigo Dropwing	<i>Trithemis festiva</i>			3		A
Crimson Dropwing	<i>Trithemis aurora</i>			2		A

A = abundant, UC = uncommon

### *Aquatic fauna and fish*

8 species of fish and 2 crustacean were recorded in the 4 sections at PNH. All are common and widespread in Hong Kong. Though Predaceous Chub was observed, the another one fish species of conservation concern reported in the EIA report, i.e. Flagtail *Kuhlia marginata*, was not recorded in PNH during the present monthly monitoring survey.

**Table 6.5.4 Aquatic Invertebrates and fish in Pak Ngan Heung**

Common names	Scientific names	PNH 1	PNH 2	PNH3	PNH4
<b>Invertebrates</b>					
Atyid shrimp	<i>Caridina elongata</i>				+
Palaemonid shrimp	<i>Macrobrachium hainanensis</i>			+	
Crab	<i>Varuna litterata</i>				
Mitten Crab	<i>Eriocheir japonica</i>				
<b>Fish</b>					
Mosquito fish	<i>Gambusia affinis</i>				+
Barcheek Goby	<i>Rhinogobius giurinus</i>				+
Goby	<i>Rhinogobius duospilus</i>		+		
Swordtail	<i>Xiphophorus hellerii</i>				
Six-banded Barb	<i>Puntius semifasciolatus</i>				
Unidentified Cichlid fish					
Tilapia		+	++	+	
Predaceous Chub	<i>Parazacco spilurus</i>			++	
Jarboa Terapon	<i>Terapon jarbua</i>	++			
Common Silver-biddy	<i>Gerres oyena</i>	+			
Mullet	<i>Mugil cephalus</i>	+++	+++		
Broken-band Hillstream Loach	<i>Liniparhomaloptera disparis</i>				

+ = Occasional, less than 5 individuals were found; ++ = Common, 5 – 20 individuals were found; +++ = Abundant, more than 20 individuals were found.

## **Luk Tei Tong Stream Section**

### **Vegetation**

Surveys were conducted on 26 June 2009. The Luk Tei Tong Stream Section was highly modified. Vegetation only established on isolated muddy patches at the estuary and remaining semi-natural banks of Section 1 and Section 2. Vegetation on the eastern stream bank from the second half of Section 3 to Section 5 were largely cleared while the western bank was still lined with rock gabions or concrete. The whole section appeared to be subject to tidal influence, as mangrove associated or backshore species were recorded along the whole channel.

The walk through survey recorded a total of 24 species, including 10 tree, 4 shrub, 4 grass species (Appendix D3). 21 of the species recorded are natives, while 5 were exotics. The quantitative sampling recorded 19 species at Sections 2. Section 2 was dominated by *Terminalia catappa* and *Wollastonia biflora*. No quantitative survey was carried out on Section 3 and 4 due to vegetation clearance on stream banks as part of the site clearance works under the project.

Due to the patchiness of streamside vegetation, the quantitative data should be interpreted with cautions and used as a reference only.

**Table 6.5.5 Relative percentage cover of vegetation recorded at Luk Tei Tong Stream Section**

	Relative % cover
Species	LLT2
<i>Acanthus ilicifolius</i>	1.73
<i>Aegiceras corniculatum</i>	2.77
<i>Celtis sinensis</i>	11.07
<i>Excoecaria agallocha</i>	9.00
<i>Fimbristylis sp.</i>	2.08
<i>Kandelia obovata</i>	4.50
<i>Premna serratifolia</i>	6.92
<i>Terminalia catappa</i>	34.60
<i>Wollastonia biflora</i>	27.34
Total Relative % Cover*	100.0
Total Transect Length (m)	11

\*Total Cover rounded up to one decimal place to avoid round-off error.

### ***Terrestrial Fauna***

The proposed work area of Luk Tei Tong River was divided into 5 sections. All recorded avifauna and dragonfly species are common in Hong Kong

Surveys were conducted on 12 June 2009.

A total of six species of birds were recorded in these sections (Table 6.5.6). All these species are common and widely distributed in Hong Kong.

**Table 6.5.6 Avifauna in Luk Tei Tong River**

Common names	Latin names	LTT 1	LTT 2	LTT 3	LTT 4	LTT 5	Commonness & distribution
Little Egret	<i>Egretta garzetta</i>	2				1	CW
Black-crowned Night Heron	<i>Ardea cinerea</i>		2				CL
Common Sandpiper	<i>Actitis hypoleucos</i>		1				CW

White-breasted Waterhen	<i>Amaurornis phoenicurus</i>			1			CW
Crested Myna	<i>Acridotheres cristatellus</i>				6	2	CW
Black-necked Starling	<i>Sturnus nigricollis</i>				1		CW

CW = common and widespread, CL = common/uncommon and localized, R = uncommon/rare and localised

Two species of dragonfly were recorded in the Luk Tei Tong River (Table 6.5.7). Both are common and widespread in Hong Kong.

**Table 6.5.7 Dragonfly in Luk Tei Tong River**

Common names	Latin names	LTT 1	LTT 2	LTT 3	LTT 4	LTT 5	Commonness & distribution
Green Skimmer	<i>Orthetrum sabina</i>				2		C
Crimson Dropwing	<i>Trithemis aurora</i>				1		A

A = abundant, C = common

### **Aquatic invertebrates and fish**

4 species of fish, 3 species of crustacean and 4 species of mollusks were recorded in the 5 sections at LTT. All are common and widespread in Hong Kong. The two fish species of conservation concern reported in the EIA report, i.e. Flagtail *Kuhlia marginata* and Predaceous Chub *Parazacco spilurus* were not recorded in LTT during the present monitoring as well as the baseline monitoring survey.



**Table 6.5.8 Aquatic invertebrates and fish in Luk Tei Tong River**

Common names	Scientific names	LTT1	LTT2	LTT3	LTT4	LTT5
<b>Invertebrates</b>						
Mangrove clam	<i>Geloina erosa</i>					
Rock oyster	<i>Saccostrea cuculata</i>		+++	+		
Snail	<i>Melanoides tuberculata</i>			+		
Snail	<i>Terebralia</i> sp.					
Snail	<i>Nerita</i> sp.		++	+		
Snail	<i>Littoraria articulata</i>		+	++		
Crab	<i>Varuna litterata</i>					
Fiddler crab	<i>Uca lactea</i>		+			
Fiddler crab	<i>Uca arcuata</i>					
Fiddler crab	<i>Uca crassipes</i>					
Crab	<i>Perisesarma bidens</i>		++			
Mangrove mud crab	<i>Scylla paramamosain</i>	+				
Mitten crab	<i>Eriocheir japonica</i>					
<b>Fish</b>						
Common mudskipper	<i>Periophthalmus cantonensis</i>					
Tilapia		++				
Jarboa terapon	<i>Terapon jarbua</i>		++	+		
Mullet	<i>Mugil cephalus</i>	+++	++	++		
Common Silver-biddy	<i>Gerres oyena</i>		+	+		
Barcheek Goby	<i>Rhinogobius giurinus</i>					

+ = Occasional, less than 5 individuals were found; ++ = Common, 5 – 20 individuals were found; +++ = Abundant, more than 20 individuals were found.

### **Disused Watchtowers**

Surveys were conducted on 12 June 2009.

There was no sign (e.g., adults carrying food or nesting materials) of use of the watchtower as nesting habitat by White-shouldered Starling. This species was not observed during the June 2009 monitoring. No bird of other species was observed entering the watchtower.

Since the monitoring surveys commenced in August 2008, no bird was observed entering the watchtower. It seems the birds do not prefer the watchtower as roosting or nesting habitat.

### **Ecological Water Quality Monitoring (EWQM)**

EWQM was conducted on 05 June 2009. Monitoring results are summarized in Table 6.9. Detailed on-site measurements and laboratory report are presented in Appendix D4 and D5.

Table 6.10 shows the baseline results of Ecological Water Quality Monitoring, from the information given in Baseline Monitoring Report.

To review the results in Table 6.9 in general, the measured results were found similar with past months.

**Table 6.9 Summarized Ecological water quality monitoring results (05 June 2009)**

Parameters	Limit of detection	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	1	0.6	3.9	7.3	12.5	10.6	1.7
Nitrogen (Ammonia) (mg/l)	0.01	0.02	0.40	0.27	0.49	1.68	0.02
Nitrogen (Nitrate) (mg/l)	0.01	0.10	0.20	0.25	0.40	0.21	0.07
Phosphorous (mg/l)	0.01	0.03	0.08	0.09	0.11	0.21	0.02
BOD <sub>5</sub> (mg/l)	1	2	2.5	2	2	3	1
DO (mg/l)	0.01	7.53	7.72	8.56	6.00	6.35	7.30
Turbidity (NTU)	0.1	0	0.4	6.2	12.6	8.3	0
Temperature (oC)	0.1	26.5	26.5	27.5	28.2	29.9	27.4
pH	0.01	6.27	6.83	7.58	7.12	6.65	6.38
Salinity (ppt)	0.1	0	0.2	3.1	7.6	1.0	0
Conductivity (ms/m)	0.1	4.3	57.7	565	21.0	193	4.6
Water Flow (m/s)	N/A	0.13	0.07	0.2	0.01	0.11	0.0

**Table 6.10 Baseline Results of Ecological water quality monitoring**

Parameters	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	1.0	2.0	3.0	3.0	<1	<1
Nitrogen (Ammonia) (mg/l)	0.07	0.12	0.11	0.23	0.03	0.02
Nitrogen (Nitrate) (mg/l)	0.12	0.13	0.13	0.31	0.04	0.05
Phosphorous (mg/l)	0.04	0.06	0.06	0.09	0.06	0.05
BOD <sub>5</sub> (mg/l)	<2	<2	<2	<2	<2	<2
DO (mg/l)	6.58	6.82	6.37	7.61	6.87	5.70
Turbidity (NTU)	4.44	5.12	5.93	6.96	4.65	2.73
PH	6.4	7.1	7.0	6.8	6.6	6.1
Salinity (ppt)	<0.1	0.1	0.3	7.6	0.1	<0.1

## 6.6 Action and Limit level for Monitoring of White-shouldered Starlings

A simple Event and Action Plan is shown in Table 6.6.1. Should the Event occur, action in accordance with the Action Plan should be carried out.

There was no recorded event in the reporting month.

Table 6.6.1 Event / Action Plan for Monitoring of White-shouldered Starlings

EVENT	ACTION	
	ET Leader	Contractor
Identification of disturbance to breeding White-shouldered Starlings	1. Increase frequency of monitoring to twice weekly	1. Check all construction actions and working methods
	2. Notify Site Engineer	2. Submit proposals for remedial action to prevent abandonment of the breeding site.
	3. Review construction activities of previous week.	3. Implement remedial action.
	4. Identify any changes in construction activities in previous week	4. Liaise with ET regarding effectiveness of remedial actions.
	5. Discuss remedial actions with Site Engineer	

## 6.7 Ecological monitoring Schedule

The next ecological surveys are scheduled on 10 and 17 July, while ecological water quality monitoring is scheduled on 03 July.

## **7. Action taken in Event of Exceedence**

If the measurements (Noise, Water, Ecology) exceed the action / limit level, exceedance details will be reported and follow-up actions will be taken by relevant parties involved.

During the reporting period there was no exceedance for noise, ecological measurements recorded; therefore no actions were taken.

Total 98 non-compliance events of water quality limits (Dissolved Oxygen, Turbidity and Suspended Solids) were recorded in this reporting period according to the established level. ET has arranged site investigations for the exceedance events. Findings from the inspection showed causes were substantially attributable to:

- Channel clearance activities carried out at the upper stream area of TTT River by the other project;
- Surface run-off due to defective site practices and/or mitigation measures for the formation of haul access between bottleneck A and B at TTT River;
- Surface run-off and leakage of site water due to defective site practices and/or mitigation measures for the construction of gabion wall along LTT River;
- Discharge of silty water to PNH River channel due to accumulation as well as overflow of site water from BC13; and
- Soil run-off and disturbance of sediment due to heavy rainstorm.

The summary of non-compliance is listed in Table 7.1 for reference.

Among the 98 events of non-compliance recorded in this reporting month, 46 of them were believed to be caused by improper site practice carried out by the contractor. Additional monitoring was carried out in the next day (unless cancelled due to heavy rainstorm) if exceedance of limit level was occurred.

Base on the nature of deficiencies observed, recommendations of remedial actions and mitigation measures were given to Contractor to minimize further impact to the water quality. Follow up actions were observed during joint site inspection on 26<sup>th</sup> June, which include:

- Provision of sandbag barriers to prevent overflow of site water to nearby river channel;
- Drainage outlet between BC13 and PNH River was sealed with concrete to prevent site water discharge;
- Defective/ damaged hoses were replaced to prevent site water leakage; and
- Provision of de-silting tanks were proposed for site water treatment in project sites.

In accordance with the relevant contractual documents and environmental permits, Contractor was reminded to implement necessary mitigation measures, before start of any construction activities in the upcoming. Contractor was also advised again to be cautious on the conditions of sites as well as mitigation measures provided. Site practices should be reviewed and mitigation measures should be enhanced if water quality was still affected by works. Follow up actions should be taken immediately as to minimize deterioration of water quality as far as practicable.

Table 7.1 Summary of Non-compliance for Water Quality

Date	Location	Parameter	Level of exceedance	Main cause of exceedance
03/06/09	M1 M2 M3	Turbidity, S.S.	Limit Level	M1 & M3 – No particular observations M2 - Channel clearance activities carried out by the other project
04/06/09	M1 M2 M3	Turbidity, S.S. Turbidity, S.S. Turbidity	Limit Level	M1 & M3 – No particular observations M2 - Channel clearance activities carried out by the other project
05/06/09	M1 M2 M3	Turbidity, S.S	Limit Level	M1 – No particular observation M2 - Channel clearance activities carried out by the other project, haul access formation between Bottleneck A & B of TTT River M3 - Disturbance of sediment due to low water level
08/06/09	M1 M2 M3	Turbidity, S.S.	Limit Level	M1 & M3 – No particular observations M2 - Channel clearance activities carried out by the other project, haul access formation between Bottleneck A & B of TTT River

10/06/09	M1	Turbidity, S.S.	Limit Level	M1 & M3 – No particular observations
	M2	Turbidity, S.S.	Limit Level	M2 - Channel clearance activities carried out by the other project,
	M3	S.S.	Action Level	haul access formation between Bottleneck A & B of TTT River
	M4	Turbidity, S.S.	Limit Level	M4 – Water quality was affected by upper stream area of TTT River
12/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2	Turbidity, S.S.		M2 - Channel clearance activities carried out by the other project,
	M3	Turbidity		haul access formation between Bottleneck A & B of TTT River
	M4	Turbidity, S.S.		M3 – No particular Observation M4 - Water quality was affected by upper stream area of PNH and TTT River
13/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2			M2 - Channel clearance activities carried out by the other project, haul access formation between Bottleneck A & B of TTT River
15/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2	Turbidity, S.S.	Limit Level	M2 - Channel clearance activities carried out by the other project,
	M3	Turbidity	Limit Level	haul access formation between Bottleneck A & B of TTT River
	M4	Turbidity, S.S.	Limit Level	M3 – No particular observation M4 - Water quality was affected by upper stream area of PNH and TTT River
16/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2			M2 – No particular observation
17/06/09	M1	Turbidity, S.S.	Limit Level	Site water discharge overflowed from BC13 at PNH
18/06/09	M1	Turbidity, S.S.	Limit Level	M1 – No particular observation
	M2	Turbidity, S.S.	Limit Level	M2 - Channel clearance activities carried out by the other project
	M3	S.S.	Action Level	M3 – Improper site practices caused soil run-off and site water discharge
19/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2	Turbidity, S.S.	Limit Level	M2 - Channel clearance activities carried out by the other project
	M3	Turbidity, S.S. and D.O.	Limit Level, Action Level for D.O.	M3 - Improper site practices caused soil run-off and site water discharge
20/06/09	M1	Turbidity, S.S.	Limit Level	M1 – No particular observation
	M2			M2 - Channel clearance activities carried out by the other project
	M3			M3 - Improper site practices caused soil run-off and site water discharge
22/06/09	M1	Turbidity, S.S.	Limit Level, Action Level for S.S. in M4	M1 - Site water discharge overflowed from BC13 at PNH, surface run-off and
	M2			disturbance of sediments caused by heavy rainstorm
	M3			M2, M3 & M4 - Surface run-off and disturbance of sediments caused by
	M4			heavy rainstorm
24/06/09	M1	Turbidity, S.S.	Limit Level	M1 - Site water discharge overflowed from BC13 at PNH
	M2		Limit Level, Action Level	M2 – No particular observation
	M3		Action Level, Limit Level	M3 - Erosion of bare earth bunds

25/06/09	M1 M3	Turbidity, S.S.	Limit Level	M1 – No particular observation M3 - Erosion of bare earth bunds
26/05/09	M1 M2	Turbidity, S.S. S.S.	Limit Level	M1 & M2 – No particular observations
29/06/09	M1 M2 M3	Turbidity, S.S. S.S. Turbidity, S.S.	Limit Level	M1 & M2 – No particular observations M3 - Erosion of bare earth bunds



## 8. Construction waste disposal

It is the contractor's responsibility to ensure that all wastes produced during the construction phase for the drainage improvement works are handled, stored and disposed of in accordance with good waste management practices and EPD's regulation and requirement. Waste materials generated during construction activities, such as construction and demolition (C&D) material, chemical wastes and general refuse, are recommended to be audited at regular intervals to ensure that proper storage, transportation and disposal practices are being implemented.

Contractor has completed the registration of Waste Producer under the Waste Disposal (Chemical Waste)(General) Regulation. The Waste Producer Number, WPN 5213-950-Y2443-03 was assigned by EPD on 12 Aug 2008. The Contractor would be responsible for the implementation of any mitigation measure to minimize waste or redress problems arising from the waste materials.

Table 8.1 is a summary of updated figures of the construction wastes disposal provided by the Contractor.

**Table 8.1 Summary of Construction Waste Disposal**

Month	Amount of Construction Waste disposed		
	Inert Waste (to Public Fill)	Non-inert Waste (to Landfill)	Chemical Waste (to treatment plant)
1 <sup>st</sup> June 09 to 30 <sup>th</sup> June 09	3354.54 (ton)	Nil	Nil
Total (from June 08 to April 09)	13398.66 (ton)	65.23 (ton)	0

## 9. Status of Permits and Licenses obtained

Table 9.1 is the updated status of environmental related permits/ license obtained for the construction activities

Table 9 .1 Status of Permits and Licenses Obtained

Description	License / Permit No.#	Date of Issue	Date of Expiry	Remarks
Environmental Permit	EP-237/2005/A	05 Mar 2008	--	Issued
Registration of C&D Waste Producer	7006521	--	--	Issued
Chemical Waste Producer	5213-950-Y2443-03	12 Aug 2008	--	Issued
Construction Noise Permit	N/A	N/A	N/A	N/A
Effluent Discharge License	EP890/W2/XG032 EP890/W2/XG033 EP890/W2/XG034 EP890/W2/XG035 EP890/W2/XG036 EP890/W2/XG037 EP890/W2/XG038 EP890/W2/XG039 EP890/W2/XG040 EP890/W2/XG041	23 Oct 2008	31 Oct 2013	Issued

The contractor implemented various environmental mitigation measures as recommended in the Environmental Permit and Final Mitigation Measures Report. The implemented schedule is presented in Appendix H.

## **10. Complaint Log**

There was no formal complaint received during the reporting month.

Table 10.1 Summary of Formal Complaints received					
	Noise	Water	Ecology	Cultural	Others
June 2009	0	0	0	0	0
Total	0	0	0	0	0

## **11. Site Environmental Audits**

### **11.1 Site Inspection**

With an intention to ensure that appropriate environmental protection and pollution control mitigation measures are properly implemented, regular environmental site inspections have been scheduled.

Within the reporting month, site inspections were conducted on 4, 11, 19 and 26 June 2009.

A detailed checklist of each site inspection together with comments, relevant photos and maps have been filed and kept. A summary of observation and follow-up action is shown in Table 11.1

Table 11.1 Summary of site inspection

Date	Observations	Advice from ET	Action taken	Closing Date
08 May 09	Wood board coverings to the U-channel outside of the PNH BC12 were found seriously damaged U-channel next to the excavated pit for BC8 was not well covered also	Contractor was urged to rectify such discrepancies as soon as possible to prevent debris of construction materials entering the public drain	Still outstanding until the end of reporting month. To be follow up.	Ongoing
15, 21 & 29 May 09	Definition of site boundary for the area of gabion walls at LTT River ch.2B 150~200 was still outstanding. Vegetation at the area was removed and excavated during inspection	Contractor was urged to define their site boundaries as soon as possible and reinstate the area out of boundaries as if practicable.	Site boundary set with railings was identified prior to the site inspection on 26 June	26 June 09
21 May 09	Vehicle was found washing at the entrance of temporary access at behind of Yuen's compound, where without proper water collection facility.	Contractor was advised to assign a proper wheel washing area with proper water collection facilities, to avoid site runoff entering the mangrove area.	Still outstanding until the end of the reporting month. To be follow up	Ongoing
29 May 09	River water was found entered the enclosed section of retaining wall H during high tide	Contractor was reminded on site water should be entered the river course and site at the river sides should be well enclosed.	To be follow up	Ongoing
29 May 09	Accumulated rain water in the LTT bypass channel was found seeped into the branch of LTTR due to overflow	Contractor was advised to provide proper bunds or barriers to prevent site water directly enter the river course. Also contractor was reminded to remove accumulated rain water from the bypass channel in accordance with the mitigation measures proposed for the application of VEP.	Barriers formed by sand bags were provided to prevent site water overflowed to the branch from the unfinished bypass channel.	Ongoing
04 June 09	General wastes and construction debris were found accumulated	Contractor was recommended to clean up the channel as to	Follow up action was taken by contractor as advised prior to the	11 June 09

Table 11.1 Summary of site inspection

Date	Observations	Advice from ET	Action taken	Closing Date
	in the U-channel along the EVA from Ling Tsui Tau to Pak Ngan Heung	prevent clogging to the public drains	inspection on 11 June	
04 June 09	Settled rainwater accumulated in LTT bypass channel was being discharged to the branch and caused disturbance to the sediment	Contractor was advised to assign a proper place for rainwater discharge. They was also reminded to ensure water quality discharged was fulfilled with the requirement of the applied waste water discharge license	No further discharge was observed during the next inspection on 11 June	11 June 09
04 June 09	Stagnant water was accumulated in the excavated pit between the existing EVA and the new formed diversion at LTT	Contractor was recommended to regularly remove stagnant water and provide mosquito control measures on sites as part of site cleaning practice.	Stagnant water was removed prior to the site inspection on 19 June	19 June 09
04, 11, 19 & 26 June 09	Non-compliance incident of accumulated site water from BC5 & 13 at PNH, was found pumped to the nearby brushwood area for soak-away, which caused overflow and entered to the river channel	Contractor was recommended to seal all the outlets connected to the public drains and river channel. Proper de-silting facilities should be provided for site water treatment; natural soak-away should be prevented for flooding issue	Barriers formed by sandbags were provided between BC13 and the brushwood area to prevent storm water entering site. Outlets connected between BC13 and PNH River was seal by concrete prior to the inspection on 26 June.	26 June 09
04, 11, 19 & 26 June 09	U-channel next to the site area BC5 at PNH was not covered. Soil and construction debris was found entered the U-channel.	Contractor was advised to provide proper coverings to protect the U-channel from the contamination of construction materials	U-channel was poorly covered with geo-textile materials and plastic board prior to the inspection on 19 June. Further improvement was required and to be follow up	Ongoing
11, 19 & 26 June 09	Stagnant water was accumulated in the drip tray of power generator at PNH BC13	Contractor was recommended to regularly remove stagnant water and provide mosquito control measures on sites as part of site	Still outstanding until the last inspection of this reporting month. To be follow up in next month	Ongoing

Table 11.1 Summary of site inspection

Date	Observations	Advice from ET	Action taken	Closing Date
		cleaning practice.		
11 June 09	No protective measures were implemented to prevent erosion and surface run-off from the haul access between bottleneck A & B at TTT River	Contractor was reminded to provide necessary mitigation measures to minimize water quality impact due to their construction activities	The outstanding haul access was seriously damaged due to the heavy rainstorm in mid June, as reported by contractor	26 June 09
19 June 09	Stockpile of boulders were found placed at the slope of haul access which next to the mangrove area	Contractor was advised to remove the stockpile from the nearby of mangrove area to avoid damage and losses of wetland plants	Outstanding stockpile has been removed prior to the inspection on 26 June	26 June 09
19 & 26 June 09	Defective/ damaged pipelines diverting site water from gabion wall site at LTT River was found during inspection. Muddy water was found leaking from the hoses and caused further erosion to the bare earth bunds at the underneath	Contractor was advised to replace the damaged hoses to stop site water leakage	Although hoses were replaced prior to the site inspection on 26 June. Minor leakage from the connection of hoses was observed, improvement required and to be follow up	Ongoing
26 June 09	Pit poorly laid with geo-textile as a soak-pond for site water treatment was provided next to the gabion wall of the existing LTT River	Contractor was advised to rectify the laid geo-textile to prevent erosion of the pit itself. They should also ensure no site water can be seeped through the gabion wall with filtration and cause water quality impact to the river	To be follow up	Ongoing

## **11.2 Compliance with legal and Contractual requirement**

ET leader has reviewed the progress and programme of the works to check any relevant environmental laws has not violated.

A non-compliance event regarding direct discharge of site water from BC13 of PNH was recorded in this reporting month. Site water generated from excavation in BC5 and 13 was found diverted to the brushwood area next to BC13 for soak-away since the regular site inspection on 4<sup>th</sup> June. Diverted site water was mixed up with rainwater, overflow to the river channel and caused water contamination. Recommendations were given to the contractor but no follow up action was taken until 26<sup>th</sup> June.

During the inspection on 26<sup>th</sup> June, direct discharge of site water was stopped. Barriers formed by sandbags were provided to prevent storm water entering the sites. Outlet between BC13 and PNH River was sealed up with concrete.

Due to the above incident, contractor was strongly advised to review their site condition. Contractor should take immediate remedial actions if deficiencies were found from the regular inspection or water quality monitoring as to minimize water quality impact caused by project works.

## **11.3 Environmental Complaint and follow up actions**

During this reporting period, there was no documented complaint received. Therefore, follow up actions for the environmental complaint is not required.

Further to the environmental concerns raised by green group during May 2009, Ecologist of ET has conducted weekly survey to mangrove area at the east of Luk Tei Tong River. Details of findings refer to Appendix K.

In addition, a meandering dry weather flow was partially formed at the bottleneck at Tai Tei Tong River (located at the downstream of Mui Wo School). Voids between boulders were also found filled by sediments generated by several rainstorms at the upper stream area during May and June.

## **12. Future key issues**

Key construction activity in the coming month will include construction of box culvert at PNH, gabion wall, retaining walls at LTT River and bypass channel as well as reformation of haul access at TTT River. It is expected that several impacts on environmental aspects will be generated on-site. With reference to the EM&A manual, mitigation measure report as well as the environmental permit, proper mitigation measures are proposed to be taken, if necessary.

Contractor was reminded to provide proper measures to mitigate water quality impacts to the river channels due to construction works. River based construction activities should be carried out in enclosed as well as dry condition to prevent discharge of site water to the stream; containment measures such as bunds and barriers should be provided as to restrict the carrying out of construction works within enclosed dry area of the river.

Underground water and site water may be accumulated on site. Contractor is recommended to treat the accumulated site water by proper silt removal facilities before discharging to the designated discharge point; also reuse of site water should be considered. Channel, trench and manholes should be sealed to prevent site water entering public drainage and causing water quality impact.

Contractor was reminded to be cautious on erosion and surface run-off from the stockpiles of earth materials and exposed earth surfaces. Coverings with tarpaulin and/or geo-textile materials should be provided to minimize the concerned impacts.

Dust impact may be resulted by boulder movement, breaking and installation works of gabion blocks, contractor is reminded to provide regular watering to the dusty static site area and stockpile. Meanwhile, size and height of stockpiles should be controlled as such erosion issue could be minimized.



### **13. Conclusions**

In this reporting month, excavation for pipe trench at Ling Tsui Tau, construction of box culverts at Pak Ngan Heung (PNH), formation of haul access between bottleneck A and B at Tai Tei Tong (TTT) River, construction of gabion walls at Luk Tei Tong (LTT) bypass channel and River were being carried out

Regular site meetings and inspection audits led by the seniors for discussing site environmental matters were held among Project Proponent, Contractor and the ET on weekly basis. Also monthly site meeting and inspection audits with the above parties and IEC were carried out at the mid of the reporting month.

For noise level monitoring, all results were within the established A/L limits.

For water quality monitoring, total 98 non-compliance events of water quality criteria were recorded in this reporting month. Exceedance events were believed mainly attributed to site water discharge and surface run-off due to construction activities in project sites. Contractor was reminded to be cautious on their site condition and implementation status of mitigation measures. According to the monthly ecological water monitoring results performed on 05 June 2009, measurements recorded in the monitoring locations were found similar with past months.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower. There was no sign of disturbance from the Project to the watch tower. The breeding season of White-shouldered Starling in this year has begun. However, the absence of nesting of White-shouldered Starling in the watch tower did not seem to be related to construction works in Luk Tei Tong River. A bird species nests in village house should be to certain extent disturbance tolerant.

No bird was observed entering the watchtower since the monitoring surveys commenced in August 2008. Also, no breeding was recorded in the baseline survey in September 2007. It appears that the birds do not prefer to roost or nest in the watch tower.

Also, there were not any notifications of summons recorded during the reporting period. Furthermore, there were not any formal prosecution and complaints recorded.

Site water control was the major concern in this reporting month. Contractor was recommended to provide proper de-silting facilities for site water treatment, and provide necessary mitigation measures to minimize impacts to the river streams.

ET has reminded the contractor to provide environmental pollution control measures wherever necessary; and to keep a good environmental management at site practice.

The ET will continue to implement the environmental monitoring & audit programme in accordance with the EM&A Manual and Environmental Permit requirement.

## **Appendix A**

**Construction**

**Programmer and**

**Location plan**





Start date	07JAN2008	Yick Hing Construction Co. Ltd.	Drainage Improvement Work in South Lantau and Construction of Mui Wo Village Sewerage Phase 1	Master Programme (Rev.9b)	 Early bar  Progress bar  Critical bar  Summary bar  Start milestone point  Finish milestone point
Finish date	21JAN2011				
Data date	06AUG2009				
Run date	15AUG2009				
Page number	3A				
c Primavera Systems, Inc.					









Act ID	Description	Orig Dur	Rem Dur	Early Start	Early Finish	%	Predecessors	2008												2009												2010												2011	
								JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB
7010	Preparation for works (Minor Portion)	131	0	18JAN2008 A	27MAY2008 A	100	0001	Preparation for works (Minor Portion)																																					
7020	Non-working Period at TWT Beach (1)	196	0 *	01APR2008 A	13OCT2008 A	100		Non-working Period at TWT Beach (1)																																					
7030	uPVC Sewer (DN160-400) M/H A16 - M/H A34	465	30	28MAY2008 A	04SEP2009	94	7010	uPVC Sewer (DN160-400) M/H A16 - M/H A34																																					
7040	uPVC Sewer (DN160-400) M/H A15 - M/H A13	50	0	14OCT2008 A	02DEC2008 A	100	7020	uPVC Sewer (DN160-400) M/H A15 - M/H A13																																					
7050	uPVC Sewer (DN160-400) M/H A11 - M/H A7	50	0	03DEC2008 A	21JAN2009 A	100	7040	uPVC Sewer (DN160-400) M/H A11 - M/H A7																																					
7060	uPVC Sewer (DN160-400) M/H A1 - M/H A3	65	0	22JAN2009 A	27MAR2009 A	100	7050	uPVC Sewer (DN160-400) M/H A1 - M/H A3																																					
8000	Sewerage works at PNH (S4)	772	206	18JAN2008 A	27FEB2010	73	0001	Sewerage works at PNH (S4)																																					
8010	Preparation of works	168	0	07JAN2008 A	22JUN2008 A	100		Preparation of works																																					
8020	uPVC Sewer (DN160-400) M/H ED2 -D28 - D118	320	0	23JUN2008 A	08MAY2009 A	100	8010	uPVC Sewer (DN160-400) M/H ED2 -D28 - D118																																					
8030	uPVC Sewer (DN160-400) M/H D1 - D27	280	191	09MAY2009 A	12FEB2010	32	8020	uPVC Sewer (DN160-400) M/H D1 - D27																																					
9000	Preservation & Protection of Exist Trees	534 *	534 *	06AUG2009	21JAN2011	0	0001																																					Pres	
9010	Preparton for works	100	0	07JAN2008 A	15APR2008 A	100		Preparton for works																																					
9020	Protection & Transplanting Works	1011	534	16APR2008 A	21JAN2011	47	9010	Protection & Transplanting Works																																				Prot	



[illegible]



NOTES :

1. ALL LEVELS ARE IN METRES ABOVE P.D.M.S.L.
2. ALL GRIDS REFER TO HONG KONG 1980 GRID.

LEGENDS :

- SITE BOUNDARIES**
- PORTION D1 - PAN NGAM HEUNG
  - PORTION D2 - LUNG TSUI TAI TAI
  - PORTION D3 - LUNG TSUI TAI (B)
  - PORTION D4 - TAI TEI TONG RIVER
  - PORTION D5 - LUK TEI TONG
  - PORTION D6 - PUI O
  - PORTION D7 - LO UK TSUEN
  - PORTION D8 - CHEUNG SHA SHEUNG TSEH
  - PORTION D9 - EMERGENCY VEHICULAR ACCESS (EVA) AT TAI WU

FOR TENDER PURPOSES ONLY

DRAWING NO.		DATE
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REVISED		DATE
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REVISION		DATE
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100	100	100

DESIGNED BY: H. C. CHAN 14 MAY 2007  
 CHECKED BY: H. C. CHAN 14 MAY 2007  
 CONTRACT NO. DC/2006/11  
 TITLE NO. DP/04/128CD  
 PROJECT NO. 128CD  
 CONTRACT

DRAINAGE IMPROVEMENT IN  
 SOUTHERN LANTAU

Drawing Title

PORTIONS OF SITE  
 - SOUTHERN LANTAU

Sheet 1 of 2

Scale

DDN/128CD/1002A 1 : 2000

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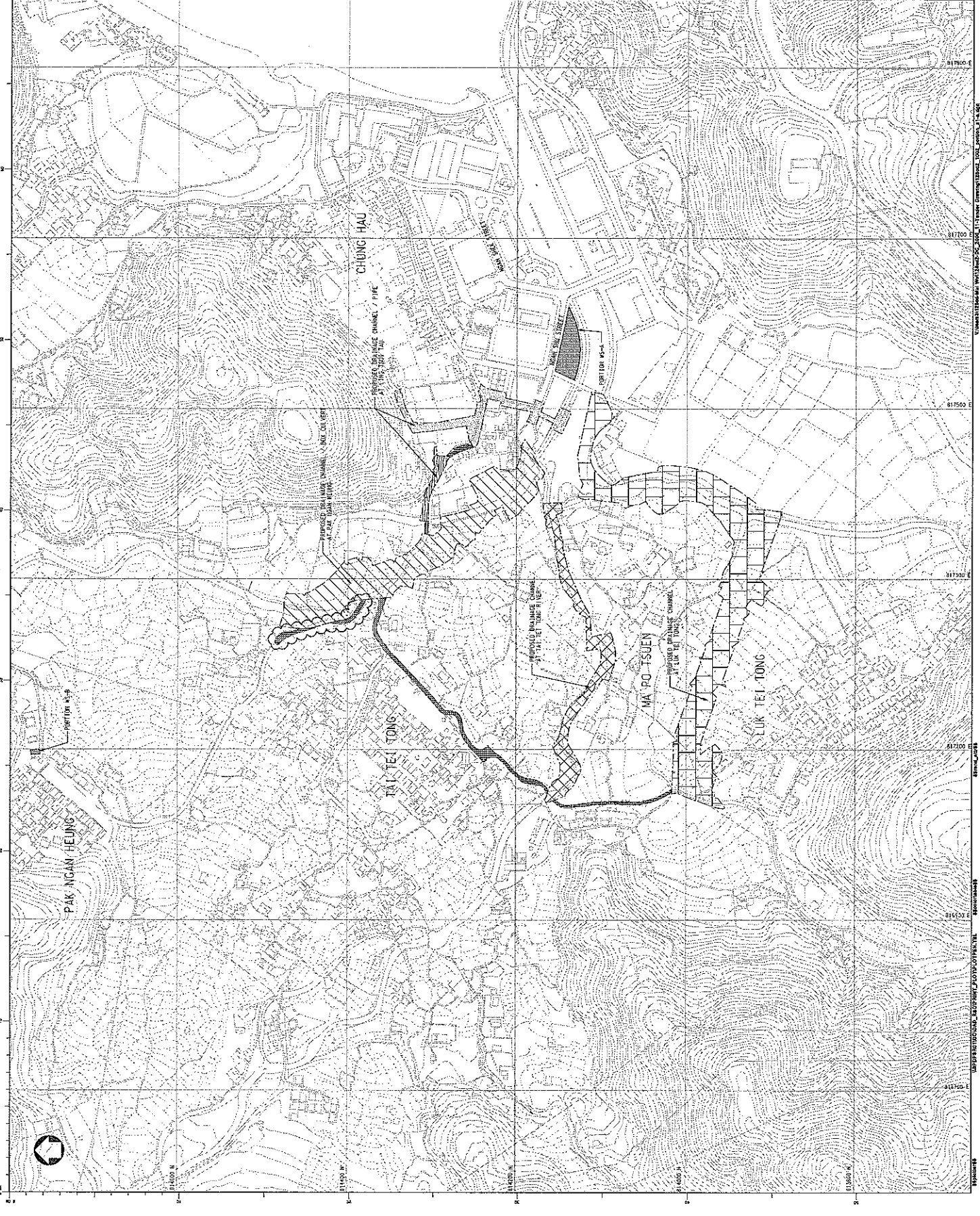
Office

DRAINAGE PROJECTS DIVISION



DRAINAGE SERVICES DEPARTMENT  
 GOVERNMENT OF THE  
 HONG KONG SPECIAL ADMINISTRATIVE REGION

AT 14/05/07



## Appendix B Key Personal Contact information chart

<b>Organization Name</b>	<b>Role</b>	<b>Title</b>	<b>Name</b>	<b>Telephone</b>	<b>Fax Number</b>
Drainage Service Department	Project Proponent	Engineering Representative	Mr. Chan Wai Hong	2594 7464	2827 8700
Allied Environmental Consultants Limited	Independent Environmental Checker (IEC)	Principal Consultant	Ms. Claudine Lee	2815 7028	2815 5399
Yick-Hing Construction Company Limited	Main Contractor	Senior Project Manager	Mr. Liu Kai Choi	2394 4988	2787 4890
Environmental Pioneers & Solutions Limited	Environmental Team (ET)	Environmental Team Leader	Ms. Patricia Chung	2185 0123	2856 2010

## Appendix C

### **Calibration Certificates for Measuring Equipments**





## Report for Calibration of Hand-held Water Quality Meter WQC-24

Calibration Reference No. : GCE/CAL/2009/MW/WQM/C2

Client : ENVIRONMENTAL PIONEER AND SOLUTION LIMITED

Equipment No. : WQC-24 Location : Mui Wo Site

Manufacturer : DKK-TOA Serial No.: 617892

Calibration Date : 07 to 09-05-2009 Due Date : 06-08-2009

### **Criterion: (Repeatability, Linearity)**

pH : Both within  $\pm 0.05$  pH  
Dissolved oxygen : Both within  $\pm 0.1$  mg/L  
Electric conductivity : Both within  $\pm 1\%$  FS  
Turbidity : Repeatability : within  $\pm 3\%$  FS  
Temperature : Repeatability  $\pm 0.25^\circ\text{C}$ ; Linearity  $\pm 0.5^\circ\text{C}$ ; (Ambient  $5\sim 45^\circ\text{C}$ )

### **Electric Conductivity (Salinity converted from EC):**

(Reference : APHA 20ed 2510 B, ISO 7888 - 1985 (E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Concentration of KCl Standard Solution (M)	Reference conductivity value at $25.0^\circ\text{C}$	Indicated value by meter	Linearity ( $R^2$ )
0	0.0 mS/m*	0.0 mS/m	1.0000
0.001	14.7 mS/m	15.5 mS/m	
0.005	71.8 mS/m	72.8 mS/m	
0.01	0.141 S/m	0.148 S/m	
0.05	0.667 S/m	0.675 S/m	
0.1	1.29 S/m	1.30 S/m	Acceptance Criterion
0.5	5.87 S/m	5.88 S/m	$R^2 > 0.995$
Repeatability	1 <sup>st</sup> time	0.00, 5.88 S/m	-
	2 <sup>nd</sup> time	0.00, 5.88 S/m	
	3 <sup>rd</sup> time	0.00, 5.88 S/m	
	0.00, 5.88 S/m	0.00, 0.00	

\*  $1 \text{ S/m} = 10^4 \mu\text{mhos/cm} = 10^3 \text{ mS/m}$

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.





### Dissolved Oxygen:

(Reference : APHA 20ed 4500-O B&C, ISO 5814:1990(E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

DO value evaluated by Iodometric Method (mg/L)		Indicated value by meter (mg/L)	Linearity ( $R^2$ )
0.00		0.00	0.9990
3.72		3.85	
6.28		6.47	
8.56		8.81	
10.69		10.58	Acceptance Criterion
13.77		13.58	$R^2 > 0.995$
Repeatability	1 <sup>st</sup> time	0.00 , 8.83	-
	2 <sup>nd</sup> time	0.00 , 8.80	
	3 <sup>rd</sup> time	0.00 , 8.81	
	0.00 , 8.56	0.00 , 0.03	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

### pH Value:

(Reference : APHA 20ed 4500-H<sup>+</sup> B, ISO 10523:1994(E) and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Calibration pH buffer (25°C)	Input value (pH buffer) (25°C)	Indicated pH value by meter (25°C)	Linearity ( $R^2$ )
pH = 1.67	1.67	1.70	1.0000
pH = 6.86	4.00	4.03	
pH = 7.42	7.00	7.03	
pH = 9.18	10.00	10.04	Acceptance Criterion
pH = 12.45	12.45	12.50	$R^2 > 0.995$
Repeatability	1 <sup>st</sup> time	4.03 , 10.04	-
	2 <sup>nd</sup> time	4.03 , 10.05	
	3 <sup>rd</sup> time	4.02 , 10.04	
	pH 4.00 , 10.00	0.01 , 0.01	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.



### Temperature:

(Reference : APHA 20ed 2550 B, In-house method and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Setting Temperature (°C)	Indicated value by meter (°C)		Linearity
5.0	4.9		R <sup>2</sup> = 0.9999 And SD = ± 0.15°C
15.0	15.2		
25.0	24.8		
35.0	35.4		
45.0	45.2		Acceptance Criterion R <sup>2</sup> > 0.995 and within ± 5°C
55.0	55.5		
Repeatability	1 <sup>st</sup> time	5.2 , 55.4	-
	2 <sup>nd</sup> time	5.2 , 55.5	
	3 <sup>rd</sup> time	5.1 , 55.6	
	5.0 , 55.0	0.1 , 0.2	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

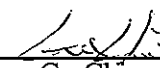
### Turbidity:

(Reference : APHA 20ed 2130 B and DKK-TOA Hand-held Water Quality Meter WQC-24 Instruction Manual)

Formazin Standards (NTU)	Indicated value by meter (NTU)		Linearity (R <sup>2</sup> )
0.0	0.0		1.0000
20.0	21.0		
100.0	102.1		
400.0	404.2		Acceptance Criterion
800.0	805.4		R <sup>2</sup> > 0.995
Repeatability	1 <sup>st</sup> time	0.3 , 805.8	-
	2 <sup>nd</sup> time	0.3 , 805.4	
	3 <sup>rd</sup> time	0.3 , 805.0	
	0.0 , 800.0	0.0 , 0.8	

Remark: For repeatability, the maximum difference from the average value of 3 measurements was taken.

Comments : Pass, comply with the criteria..

Tested by : Ho Tin Kau Certified by :   
Gu Chin  
Chemist

Checked by : Gu Chin Date : 9-5-2008



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## CERTIFICATE OF CALIBRATION

D094

Certificate No.: 09CA0102 01-01

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### Item tested

Description:	Sound Level Meter (Type I)	, Microphone
Manufacturer:	ACO, Japan	, ACO, Japan
Type/Model No.:	6224	, 7146
Serial/Equipment No.:	060166	, 34733
Adaptors used:	-	, -

### Item submitted by

Customer Name: Geotechnics & Concrete Engineering (H.K.) Ltd.  
Address of Customer: G/F., 6 Ko Shan Road, Hung Hom, Kowloon, Hong Kong  
Request No.: -  
Date of request: 30-12-2008

Date of test: 02-01-2009

### Reference equipment used in the calibration

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Multi function sound calibrator	B&K 4226	2288444	11-01-2009	CIGISMEC
Signal generator	DS 360	33873	12-06-2009	CEPREI
Signal generator	DS 360	61227	18-07-2009	CEPREI

### Ambient conditions

Temperature:  $23 \pm 2$  °C  
Relative humidity:  $55 \pm 15$  %  
Air pressure:  $1010 \pm 15$  hPa

### Test specifications

- 1, The Sound Level Meter has been calibrated in accordance with the requirements as specified in BS 7580: Part 1: 1997 and the lab calibration procedure SMTP004-CA-152.
- 2, The electrical tests were performed using an electrical signal substituted for the microphone which was removed and replaced by an equivalent capacitance within a tolerance of  $\pm 20\%$ .
- 3, The acoustic calibration was performed using an B&K 4226 sound calibrator and corrections was applied for the difference between the free-field and pressure responsiveness of the Sound Level Meter.

### Test results

This is to certify that the Sound Level Meter conforms to BS 7580: Part 1: 1997 for the conditions under which the test was performed.

Details of the performed measurements are presented on page 2 of this certificate.

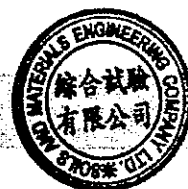
Actual Measurement data are documented on worksheets.

Approved Signatory:

Huang Jian Min/Feng Jun Qi

Date: 02-01-2009

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.



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**CERTIFICATE OF CALIBRATION**

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**1, Electrical Tests**

The electrical tests were performed using an equivalent capacitance substituted for the microphone. The results are given in below with test status and the estimated uncertainties. The "Pass" means the result of the test is inside the tolerances stated in the test specifications. The "-" means the result of test is outside these tolerances.

Test:	Subtest:	Status:	Uncertainty (dB) / Coverage Factor	
Self-generated noise	A	Pass	0.3	
	C	Pass	1.0	2.1
	Lin	Pass	1.5	2.2
Linearity range for Leq	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
	Reference SPL on all other ranges	Pass	0.3	
	2 dB below upper limit of each range	Pass	0.3	
	2 dB above lower limit of each range	Pass	0.3	
	At reference range, Step 5 dB at 4 kHz	Pass	0.3	
Linearity range for SPL	A	Pass	0.3	
	C	Pass	0.3	
	Lin	Pass	0.3	
Time weightings	Single Burst Fast	Pass	0.3	
	Single Burst Slow	Pass	0.3	
Peak response	Single 100µs rectangular pulse	N/A	N/A	
R.M.S. accuracy	Crest factor of 3	Pass	0.3	
Time weighting I	Single burst 5 ms at 2000 Hz	Pass	0.3	
	Repeated at frequency of 100 Hz	Pass	0.3	
Time averaging	1 ms burst duty factor 1/10 <sup>3</sup> at 4kHz	Pass	0.3	
	1 ms burst duty factor 1/10 <sup>4</sup> at 4kHz	Pass	0.3	
Pulse range	Single burst 10 ms at 4 kHz	Pass	0.4	
Sound exposure level	Single burst 10 ms at 4 kHz	Pass	0.4	
Overload Indication	SPL	Pass	0.3	
	Leq	Pass	0.4	

**2, Acoustic tests**

The complete sound level meter was calibrated on the reference range using a B&K 4226 acoustic calibrator with 1000Hz and SPL 94 dB. The sensitivity of the sound level meter was adjusted. The test result at 125 Hz and 8000 Hz are given in below with test status and the estimated uncertainties.

Test:	Subtest	Status	Uncertainty (dB) / Coverage Factor	
Acoustic response	Weighting A at 125 Hz	Pass	0.3	
	Weighting A at 8000 Hz	Pass	0.5	

**3, Response to associated sound calibrator**

N/A

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: C.Y. Fung  
Date: 02-01-2009

Checked by: [Signature]  
Date: 02-01-2009

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.



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**CERTIFICATE OF CALIBRATION**

2095

Certificate No.: 09CA0102 01-02

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**Item tested**

Description: Acoustical Calibrator (Class 1)  
Manufacturer: Castle Group Ltd.  
Type/Model No.: GA607  
Serial/Equipment No.: 039543  
Adaptors used: -

**Item submitted by**

Customer: Geotechnics & Concrete Engineering (H.K.) Ltd.  
Address of Customer: G/F., 6 Ko Shan Road, Hung Hom, Kowloon, Hong Kong  
Request No.: -  
Date of request: 30-12-2008

Date of test: 02-01-2009

**Reference equipment used in the calibration**

Description:	Model:	Serial No.	Expiry Date:	Traceable to:
Lab standard microphone	B&K 4180	2412857	29-06-2009	SCL
Preamplifier	B&K 2673	2239857	02-12-2009	CEPREI
Measuring amplifier	B&K 2610	2346941	03-12-2009	CEPREI
Signal generator	DS 360	61227	18-07-2009	CEPREI
Digital multi-meter	34401A	US36087050	03-12-2009	CIGISMEC
Audio analyzer	8903B	GB41300350	27-11-2009	CEPREI
Universal counter	53132A	MY40003662	11-07-2009	CEPREI

**Ambient conditions**

Temperature:  $22 \pm 1^\circ\text{C}$   
Relative humidity:  $55 \pm 10\%$   
Air pressure:  $1010 \pm 15\text{ hPa}$

**Test specifications**

- 1, The Sound Calibrator has been calibrated in accordance with the requirements as specified in IEC 60942 1997 Annex B and the lab calibration procedure SMTP004-CA-156.
- 2, The calibrator was tested with its axis vertical facing downwards at the specific frequency using insert voltage technique.
- 3, The results are rounded to the nearest 0.01 dB and 0.1 Hz and have not been corrected for variations from a reference pressure of 1013.25 hectoPascals as the maker's information indicates that the instrument is insensitive to pressure changes.

**Test results**

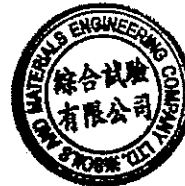
Details of the performed measurements are presented on page 2 of this certificate.

Approved Signatory:

Huang Jian-Ming Feng Jun Qi

Date: 02-01-2009

Company Chop:



Comments: The results reported in this certificate refer to the condition of the instrument on the date of calibration and carry no implication regarding the long-term stability of the instrument.

# CERTIFICATE OF CALIBRATION

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**Certificate No.:** 09CA0102 01-02

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1, Measured Sound Pressure Level

The output Sound Pressure Level in the calibrator head was measured at the setting and frequency shown using a calibrated laboratory standard microphone and insert voltage technique. The results are given in below with the estimated uncertainties.

Frequency Shown Hz	Output Sound Pressure Level Setting dB	Measured Output Sound Pressure Level dB	Estimated Uncertainty dB
1000	94.00	94.30	0.1

## 2, Sound Pressure Level Stability - Short Term Fluctuations

The Short Term Fluctuations was determined by measuring the maximum and minimum of the fast weighted DC output of the B&K 2610 measuring amplifier over a 20 second time interval as required in the standard. The Short Term Fluctuation was found to be:

**At 1000 Hz**

**STF = 0.002 dB**

### Estimated uncertainty

0.005 dB

### 3, Actual Output Frequency

The determination of actual output frequency was made using a B&K 4180 microphone together with a B&K 2673 preamplifier connected to a B&K 2610 measuring amplifier. The AC output of the B&K 2610 was taken to an universal counter which was used to determine the frequency averaged over 20 second of operation as required by the standard. The actual output frequency at 1 kHz was:

At 1000 Hz

**Actual Frequency = 1000.0 Hz**

### Estimated uncertainty

0.1 Hz

Coverage factor  $k = 2.2$

#### 4. Total Noise and Distortion

For the Total Noise and Distortion measurement, the unfiltered AC output of the B&K 2610 measuring amplifier was connected to an Agilent Type 8903 B distortion analyser. The TND result at 1 KHz was:

At 1000 Hz

TND = 2.1%

### Estimated uncertainty

0.7%

The uncertainties have been calculated in accordance with the ISO Publication "Guide to the expression of uncertainty in measurement", and gives an interval estimated to have a level of confidence of 95 %. A coverage factor of 2 is assumed unless explicitly stated.

- End -

Calibrated by: C.Y. Fung  
Date: 02-01-2009

Checked by: \_\_\_\_\_  
Date: 02-01-2009

The standard(s) and equipment used in the calibration are traceable to national or international recognised standards and are calibrated on a schedule to maintain the required accuracy level.

Appendix D1 Plant species recorded at Pak Ngan Heung River (N)

Species	Habit	Native	Relative Abundance	Occurrence	
				PNH3	PNH4
<i>Acacia confusa</i>	tree	no	occasional		+
<i>Achyranthes aspera</i>	herb	yes	scarce		+
<i>Acorus gramineus</i>	herb	yes	scarce		+
<i>Acronychia pedunculata</i>	tree	yes	scarce		+
<i>Alangium chinensis</i>	tree	yes	scarce		+
<i>Alocasia macrorrhiza</i>	herb	yes	occasional	+	+
<i>Aporosa dioica</i>	tree	yes	occasional	+	+
<i>Ardisia crenata</i>	shrub	yes	occasional	+	+
<i>Bamboo</i>	herb	-	scarce	+	
<i>Bidens pilosa</i>	herb	yes	occasional		+
<i>Bischofia javanica</i>	herb	yes	scarce	+	
<i>Bridelia tomentosa</i>	tree	yes	scarce		+
<i>Celtis sinensis</i>	tree	yes	occasional	+	+
<i>Celtis timorensis</i>	tree	yes	scarce	+	
<i>Centotheca lappacea</i>	grass	yes	scarce	+	+
<i>Christella parasitica</i>	fern	yes	occasional	+	+
<i>Cleistocalyx operculata</i>	tree	yes	occasional	+	+
<i>Commelina sp.</i>	herb	yes	scarce	+	+
<i>Conyza canadensis</i>	herb	no	scarce	+	+
<i>Desmos chinensis</i>	shrub	yes	occasional	+	
<i>Dimocarpus longan</i>	tree	no	occasional		+
<i>Ficus hispida</i>	tree	yes	common	+	+
<i>Ficus superba</i>	tree	yes	occasional		+
<i>Garcinia oblongifolia</i>	tree	yes	occasional		+
<i>Hedychium coronarium</i>	herb	no	scarce		+
<i>Hibiscus rosa-sinensis</i>	shrub	no	occasional		+
<i>Ipomoea cairica</i>	climber	yes	occasional		+
<i>Liriope spicata</i>	herb	yes	scarce		+
<i>Litsea glutinosa</i>	tree	yes	occasional	+	+
<i>Litsea rotundifolia</i>	shrub	yes	scarce	+	
<i>Lophatherum gracile</i>	grass	yes	scarce	+	+
<i>Lygodium japonicum</i>	fern	yes	scarce	+	+
<i>Macaranga tanarius</i>	tree	yes	occasional	+	+

			Relative	Occurrence	
Species	Habit	Native	Abundance	PNH3	PNH4
<i>Mallotus paniculatus</i>	tree	yes	scarce	+	
<i>Microcos paniculata</i>	tree	yes	scarce	+	+
<i>Microstegium ciliatum</i>	grass	yes	common	+	+
<i>Mikania micrantha</i>	climber	no	common	+	+
<i>Millettia nitida</i>	climber	yes	scarce	+	
<i>Mimosa pudica</i>	herb	yes	scarce	+	
<i>Murraya paniculata</i>	shrub	no	scarce	+	
<i>Musa paradisiaca</i>	tree	no	scarce	+	
<i>Mussaenda erosa</i>	shrub	yes	scarce	+	
<i>Neyraudia reynaudiana</i>	grass	yes	occasional	+	+
<i>Panicum maximum</i>	grass	no	common		+
<i>Phyllanthus urinaria</i>	herb	yes	scarce	+	+
<i>Pilea microphylla</i>	herb	no	occasional		+
<i>Pogonatherum crinitum</i>	grass	yes	scarce		+
<i>Polygonum chinense</i>	herb	yes	occasional	+	
<i>Polygonum sp.</i>	herb	yes	scarce	+	
<i>Psychotria asiatica</i>	shrub	yes	common	+	+
<i>Pteris ensiformis</i>	fern	yes	scarce		+
<i>Pueraria phaseoloides</i>	climber	yes	occasional	+	+
<i>Sageretia thea</i>	climber	yes	occasional		+
<i>Sida rhombifolia</i>	herb	yes	scarce		+
<i>Sporobolus fertilis</i>	grass	yes	scarce		+
<i>Sterculia lanceolata</i>	tree	yes	common	+	+
<i>Syngonium podophyllum</i>	climber	no	occasional	+	
<i>Syzygium jambos</i>	tree	no	common	+	+
<i>Urena lobata</i>	herb	yes	scarce		+
<i>Uvaria microcarpa</i>	shrub	yes	occasional	+	+
<i>Wedelia trilobata</i>	climber	no	scarce	+	
<i>Zanthoxylum avicennae</i>	tree	yes	scarce		+



Appendix D2 Plant species recorded at Pak Ngan Heung River (S)

Species	Habit	Native	Relative Abundance	Occurrence	
				PNH1	PNH2
<i>Acacia confusa</i>	tree	no	occasional	+	
<i>Acanthus ilicifolius</i>	shrub	yes	scarce	+	
<i>Acrostichum aureum</i>	fern	yes	scarce	+	
<i>Celtis sinensis</i>	tree	yes	occasional	+	
<i>Clerodendrum inerme</i>	shrub	yes	occasional	+	
<i>Dendrotrophe frutescens</i>	climber	yes	scarce	+	
<i>Ficus microcarpa</i>	tree	yes	scarce		+
<i>Ficus superba</i>	tree	yes	occasional		+
<i>Ipomoea cairica</i>	climber	yes	occasional		+
<i>Kandelia obovata</i>	shrub	yes	scarce	+	
<i>Melaleuca quinquenervia</i>	tree	no	common	+	
<i>Morus alba</i>	tree	no	scarce		+
<i>Neyraudia reynaudiana</i>	grass	yes	occasional	+	
<i>Panicum maximum</i>	grass	no	common	+	+
<i>Phyllanthus urinaria</i>	shrub	yes	common		+
<i>Sapium sebiferum</i>	tree	yes	occasional		+
<i>Wedelia triloba</i>	climber	no	occasional	+	+
<i>Wollastonia biflora</i>	climber	yes	occasional	+	

Appendix D3 Plant species recorded at Luk Tei Tong River

			Relative	Occurrence				
Species	Habit	Native	Abundance	LLT1	LLT2	LLT3	LLT4	LLT5
<i>Acanthus ilicifolius</i>	shrub	yes	common	+	+		+	
<i>Aegiceras corniculatum</i>	shrub	yes	scarce	+	+			
<i>Bougainvillea spectabilis</i>	climber	no	scarce	+				
<i>Bridelia tomentosa</i>	tree	yes	occasional	+				
<i>Celtis sinensis</i>	tree	yes	scarce	+	+			
<i>Clerodendrum inerme</i>	shrub	yes	abundant	+	+		+	
<i>Cyperus malaccensis</i>	sedge	yes	occasional		+			
<i>Derris trifoliata</i>	climber	yes	occasional	+	+			
<i>Excoecaria agallocha</i>	shrub	yes	common	+	+			
<i>Ficus superba</i>	tree	yes	occasional	+				
<i>Fimbristylis ferruginea</i>	sedge	yes	occasional		+		+	
<i>Hibiscus tiliaceus</i>	tree	yes	abundant	+			+	
<i>Kandelia obovata</i>	tree	yes	common	+	+			
<i>Leucaena leucocephala</i>	tree	no	occasional	+				
<i>Litsea glutinosa</i>	tree	yes	scarce		+			
<i>Neyraudia reynaudiana</i>	grass	yes	occasional	+				+
<i>Panicum maximum</i>	grass	no	common	+				
<i>Paspalum paspaloides</i>	grass	no	occasional		+			
<i>Premna serratifolia</i>	tree	yes	scarce		+			
<i>Saccharum arundinaceum</i>	grass	yes	scarce	+				
<i>Scolopia chinensis</i>	tree	yes	scarce				+	
<i>Terminalia catappa</i>	tree	no	scarce		+			
<i>Toxocarpus wightianus</i>	climber	yes	scarce		+		+	
<i>Wollastonia biflora</i>	climber	yes	occasional	+	+			

## **Appendix D4**

### **Ecological Water Monitoring Results (on-site measurements)**

**Environmental Pioneers & Solutions Limited**  
**Ecological Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 5/6/2009

Weather Condition: Sunny

Monitoring Location	WE1			WE2			WE3			WE4			WE5			WE6		
Time (hhmm)	1145			1135			1100			1115			1225			1205		
Tide Mode	ebb			ebb			ebb			ebb			ebb			ebb		
River Condition	Normal			Normal			Normal			Normal			Normal			Normal		
Water Depth (m)	< 1.0			< 1.0			< 1.0			< 1.0			< 1.0			< 1.0		
pH value	6.27			6.83			7.58			7.12			6.65			6.38		
Temperature (oC)	26.5			26.5			27.5			28.2			29.9			27.4		
Salinity (ppt)	0.0			0.2			3.1			7.6			1.0			0.0		
Conductivity (ms/m)	4.3			57.7			565.0			21.0			193.0			4.6		
Water flow (m/s)	0.130			0.070			0.200			0.010			0.110			0.000		
Turbidity (NTU)	0.0	0.0	Average	0.4	0.4	Average	6.2	6.2	Average	12.6	12.6	Average	8.3	8.3	Average	0.0	0.0	Average
			0.00															
DO (mg/l)	7.53	7.53	Average	7.72	7.72	Average	8.56	8.56	Average	6.00	6.00	Average	6.35	6.35	Average	7.30	7.30	Average
			7.53															
DO Saturation (%)	94	94	Average	97	97	Average	111	111	Average	80	80	Average	85	85	Average	92	92	Average
			94															

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
5/6/2009

remark or  
observation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

## **Appendix D5**

### **Ecological Water Monitoring Results (lab report)**



## TEST SUMMARY ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600044

Date of Issue : 11-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Date Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 06-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	498	491	1.4	25.7	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		WE1	WE1 Duplicate	WE2	WE2 Duplicate	WE3	WE3 Duplicate		
	Sampling Date/Time		05 Jun 2009 / 11:45		05 Jun 2009 / 11:35		05 Jun 2009 / 11:00			
	LOD	Units								
	Suspended Solids (SS)	1	mg/L	0.7	0.5	3.7	4.1	7.1	7.4	
TEST RESULTS	Sample ID		WE4	WE4 Duplicate	WE5	WE5 Duplicate	WE6	WE6 Duplicate		
	Sampling Date/Time		05 Jun 2009 / 11:15		05 Jun 2009 / 12:25		05 Jun 2009 / 12:05			
	LOD	Units								
	Suspended Solids (SS)	1	mg/L	12.7	12.3	10.3	10.9	1.5	1.8	

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :** Location M1 & WE3 and Location M3 & WE4 are the same location.

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN

Post : Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600280

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:45

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE1

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.02
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.10
Phosphorus mg/L	APHA 20ed 4500-P D	0.03
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE1.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:   
Gu Chin  
Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600298

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:45

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE1 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.02
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.09
Phosphorus mg/L	APHA 20ed 4500-P D	0.03
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE1.

----- End -----

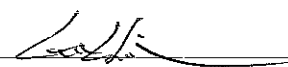
Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

Checked By : Gu Chin

:   
Gu Chin  
Chemist





## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600303

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:35

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE2

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H* B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.40
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.19
Phosphorus mg/L	APHA 20ed 4500-P D	0.08
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	3
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE2.

----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By : 

Name : Gu Chin

Checked By : Gu Chin

Post : Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600311

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:35

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE2 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.39
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.20
Phosphorus mg/L	APHA 20ed 4500-P D	0.08
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE2.

----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

:

Name

:

Gu Chin

Checked By : Gu Chin

Post

:

Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600329

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:00

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE3

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.27
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.25
Phosphorus mg/L	APHA 20ed 4500-P D	0.09
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE3.

----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:

:

:

Gu Chin

Chemist

Checked By : Gu Chin



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600337

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:00

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE3 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.26
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.24
Phosphorus mg/L	APHA 20ed 4500-P D	0.08
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE3.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:   
Gu Chin  
Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600345

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:15

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE4

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.49
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.39
Phosphorus mg/L	APHA 20ed 4500-P D	0.11
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE4.

----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By : 

Name : Gu Chin

Checked By : Gu Chin

Post : Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600353

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 11:15

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE4 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.48
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.40
Phosphorus mg/L	APHA 20ed 4500-P D	0.10
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	2
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE4.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:   
Gu Chin  
Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600361

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 12:25

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE5

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	1.67
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.21
Phosphorus mg/L	APHA 20ed 4500-P D	0.21
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	3
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE5.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

: 

: Gu Chin

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600379

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 12:25

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE5 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	1.68
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.21
Phosphorus mg/L	APHA 20ed 4500-P D	0.21
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	3
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE5.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:   
: Gu Chin  
: Chemist





## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600387

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 12:05

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE6

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.02
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.07
Phosphorus mg/L	APHA 20ed 4500-P D	0.02
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	1
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE6.


----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By

Name

Post

:   
Gu Chin  
Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER

Page 1 of 1

Report No. : GCC090600395

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

Order Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Contract No.\* : --

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

Sampling Date\* : 05-06-2009 / 12:05

Sample Type\* : River Water

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Sample I.D.\* : WE6 Duplicate

Description : River Water

DESCRIPTION	TEST REFERENCE (In-House Method based on)	TEST RESULT
Appearance	APHA 20ed 2110	--
Odour	APHA 20ed 2150 B	Odour Characteristics : --
		Threshold Odour Number (TON) : --
pH Value at temperature [ ] °C	APHA 20ed 4500-H <sup>+</sup> B	--
Colour TCU	APHA 20ed 2120 B	--
Turbidity NTU	APHA 20ed 2130 B	--
Conductivity at 25°C µS/cm	APHA 20ed 2510 B	--
Salinity g/L	APHA 20ed 2520 B	--
Nitrogen (Ammonia) mg/L	APHA 20ed 4500-NH <sub>3</sub> D	0.02
	APHA 20ed 4500-NH <sub>3</sub> E	--
	APHA 18ed 4500-NH <sub>3</sub> C	--
Nitrogen (Nitrate) mg/L	APHA 20ed 4500-NO <sub>3</sub> <sup>-</sup> E	0.06
Phosphorus mg/L	APHA 20ed 4500-P D	0.02
Biochemical Oxygen Demand (BOD <sub>5</sub> ) mg/L	APHA 20ed 5210 B	1
Chemical Oxygen Demand (COD) mg/L	APHA 20ed 5220 D	--
Total Suspended Solid mg/L	APHA 20ed 2540 D	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Sample received on 05 June 2009.

**REMARKS :** Sample Location WE6.

----- End -----

Tested By : T.W. Lam, K.L. Fong

Certified By :

Name

Gu Chin

Checked By : Gu Chin

Post

Chemist

## **Appendix E**

### **Construction Noise Monitoring Data Sheet**



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		3/6/2009	
Measurement Start Time (hhmm)		14:45	14:10
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.9	1.1
Measurement Results	L90 (dB(A))	42.3	55.5
	L10 (dB(A))	47.9	61.6
	Leq (dB(A))	45.8	59.5
Weather condition:		Cloudy	
Major Construction Noise Source(s) During Monitoring		no construction works are being carried out during measurement.	1. Excavator noise 2. Water jet noise 3. Power generator noise
Other Noise Source(s) During Monitoring			1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

3/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facade
Date of Monitoring		3/6/2009	
Measurement Start Time (hhmm)		13:00	13:35
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		1.2	1.4
Measurement Results	L90 (dB(A))	56.6	45.6
	L10 (dB(A))	65.7	58.4
	Leq (dB(A))	63.8	55.3
Weather condition:		Cloudy	
Major Construction Noise Source(s) During Monitoring		1. Excavator noise	no construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise (Bicycles)	1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

3/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		8/6/2009	
Measurement Start Time (hhmm)		15:20	14:45
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.5	1.1
Measurement Results	L90 (dB(A))	43.2	48.4
	L10 (dB(A))	50.7	59.6
	Leq (dB(A))	48.6	56.3
Weather condition:		Sunny	
Major Construction Noise Source(s) During Monitoring		no construction works are being carried out during measurement.	1. Excavator noise 2. Power generator noise
Other Noise Source(s) During Monitoring			1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

8/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facade
Date of Monitoring		8/6/2009	
Measurement Start Time (hhmm)		13:35	14:10
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		1.3	1.5
Measurement Results	L90 (dB(A))	54.5	47.4
	L10 (dB(A))	65.6	52.5
	Leq (dB(A))	62.5	50.3
Weather condition:			
Major Construction Noise Source(s) During Monitoring		1. Excavator noise 2. Construction trucks of unloading noise	no construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise (Bicycles)	1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

8/6/2009



# 大成環境科技拓展有限公司 Environmental Pioneers and Solutions Limited

## Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		15/6/2009	
Measurement Start Time (hhmm)		14:55	14:25
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.3	0.8
Measurement Results	L90 (dB(A))	46.1	52.4
	L10 (dB(A))	55.0	61.4
	Leq (dB(A))	52.1	59.2
Weather condition:		Sunny	
Major Construction Noise Source(s) During Monitoring		No construction works are being carried out during measurement.	1. Excavator noise 2. Power generator noise 3. Hammer noise 4. Construction truck noise
Other Noise Source(s) During Monitoring			1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

15/6/2009





大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facade
Date of Monitoring		15/6/2009	
Measurement Start Time (hhmm)		13:00	13:35
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.6	0.9
Measurement Results	L90 (dB(A))	54.9	51.8
	L10 (dB(A))	71.2	72.4
	Leq (dB(A))	67.5	68.3
Weather condition:		Sunny	
Major Construction Noise Source(s) During Monitoring		1. Excavator noise 2. Power generator noise	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise (Bicycle)	1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

15/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		22/6/2009	
Measurement Start Time (hhmm)		13:35	13:00
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.3	0.8
Measurement Results	L90 (dB(A))	43.8	55.8
	L10 (dB(A))	50.6	59.4
	Leq (dB(A))	48.3	58.1
Weather condition:		Cloudy	
Major Construction Noise Source(s) During Monitoring		No construction works are being carried out during measurement.	1. Excavator noise 2. Power generator noise
Other Noise Source(s) During Monitoring			1. Public noise 2. Water flowing noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

22/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facade
Date of Monitoring		22/6/2009	
Measurement Start Time (hhmm)		14:35	15:10
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		1.4	0.6
Measurement Results	L90 (dB(A))	48.4	47.5
	L10 (dB(A))	53.3	56.3
	Leq (dB(A))	51.5	53.1
Weather condition:		Cloudy	
Major Construction Noise Source(s) During Monitoring		1. Excavator noise 2. Construction trucks noise	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise (Bicycle)	1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

22/6/2009



# 大成環境科技拓展有限公司 Environmental Pioneers and Solutions Limited

## Construction Noise Monitoring Data Sheet

Monitoring Location		N1	N2
Description of Location		Façade	Façade
Date of Monitoring		29/6/2009	
Measurement Start Time (hhmm)		15:15	14:40
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		0.6	1.2
Measurement Results	L90 (dB(A))	46.5	50.3
	L10 (dB(A))	54.3	63.7
	Leq (dB(A))	52.7	60.5
Weather condition:		Sunny	
Major Construction Noise Source(s) During Monitoring		No construction works are being carried out during measurement.	1. Excavator noise 2. Power generator noise 3. Construction trucks noise
Other Noise Source(s) During Monitoring			1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

29/6/2009



大成環境科技拓展有限公司  
Environmental Pioneers and Solutions Limited

Construction Noise Monitoring Data Sheet

Monitoring Location		N3	N4
Description of Location		Freefield	Facade
Date of Monitoring		29/6/2009	
Measurement Start Time (hhmm)		13:30	14:05
Measurement Time Length (mins.)		30 mins	
Noise Meter Model/ Identification		ACO Japan, model 6224	
Calibrator Model/ Identification		Castle Group, GA607	
Wind Speed (m/s)		1.4	1.3
Measurement Results	L90 (dB(A))	51.8	52.8
	L10 (dB(A))	62.9	59.7
	Leq (dB(A))	60.8	58.8
Weather condition:		Sunny	
Major Construction Noise Source(s) During Monitoring		1. Excavator noise	No construction works are being carried out during measurement.
Other Noise Source(s) During Monitoring		1. Public noise 2. Traffic noise (Bicycle)	1. Public noise
Remarks			

Name & Designation

Signature

Date:

Prepared by:

Jimmy Cheng

29/6/2009

## **Appendix F1**

### **Water Quality**

### **Monitoring Data Sheet**

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 3/6/2009

Cloudy

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1050			1055			1100			1040			1110			1120			1130		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.62			7.09			6.85			7.75			6.88			7.12			6.74		
Temperature (oC)	26.3			25.8			26.7			26.7			25.9			25.7			26.1		
Salinity (ppt)	1.1			0.3			4.3			13.9			0.1			0.0			2.7		
Turbidity (NTU)	15.0	15.0	Average	7.8	7.8	Average	6.3	6.3	Average	5.2	5.2	Average	2.1	2.1	Average	313.7	313.7	Average	4.6	4.6	Average
			15.0			7.8			6.3			5.2			2.1			313.7			4.6
DO (mg/l)	8.05	8.05	Average	8.58	8.58	Average	6.26	6.26	Average	6.31	6.31	Average	6.02	6.02	Average	7.13	7.13	Average	5.71	5.71	Average
			8.05			8.58			6.26			6.31			6.02			7.13			5.71
DO Saturation (%)	101	101	Average	105	105	Average	80	80	Average	84	84	Average	74	74	Average	93	93	Average	70	70	Average
			101			105			80			84			74			93			70

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
3/6/2009

remark or observation: Muddy water is observed at location C2 due to the  
construction works being carried out in the upper stream of  
TTT River the location C2.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 4/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1045			1050			1100			1035			1110			1120			1130		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.25			6.67			6.75			7.13			7.19			7.37			6.33		
Temperature (oC)	26.6			26.9			28.5			27.3			25.9			26.7			27.4		
Salinity (ppt)	0.1			0.0			2.7			12.4			0.0			0.0			1.6		
Turbidity (NTU)	10.7	10.7	Average	11.2	11.2	Average	13.4	13.4	Average	12.8	12.8	Average	2.8	2.8	Average	43.9	43.9	Average	6.9	6.9	Average
			10.7			11.2			13.4			12.8			2.8			43.9			6.9
DO (mg/l)	8.31	8.31	Average	8.28	8.28	Average	7.50	7.50	Average	6.37	6.37	Average	7.11	7.11	Average	7.75	7.75	Average	6.13	6.13	Average
			8.31			8.28			7.50			6.37			7.11			7.75			6.13
DO Saturation (%)	104	104	Average	104	104	Average	99	99	Average	83	83	Average	90	90	Average	96	96	Average	76	76	Average
			104			104			99			83			90			96			76

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
4/6/2009

remark or observation: Muddy water is observed at location C2 due to the  
construction works being carried out in the upper stream of  
TTT River the location C2.



**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 5/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1100			1110			1115			1045			1145			1155			1215		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			Muddy			normal			normal			normal			Muddy			normal		
Water Depth (m)	<1			< 1			< 1			1.2			< 1			< 1			< 1		
pH value	7.58			7.61			7.12			8.23			6.27			6.48			6.86		
Temperature (oC)	27.5			26.7			28.2			27.9			26.5			27.9			28.1		
Salinity (ppt)	3.1			0.3			7.6			15.3			0.0			0.0			0.5		
Turbidity (NTU)	6.2	6.2	Average	328.4	328.4	Average	12.6	12.6	Average	5.6	5.6	Average	0.0	0.0	Average	56.4	56.4	Average	7.1	7.1	Average
			6.2			328.4			12.6			5.6			0.0			56.4			7.1
DO (mg/l)	8.56	8.56	Average	7.88	7.88	Average	6.00	6.00	Average	7.93	7.93	Average	7.53	7.53	Average	7.31	7.31	Average	2.32	2.32	Average
			8.56			7.88			6.00			7.93			7.53			7.31			2.32
DO Saturation (%)	111	111	Average	99	99	Average	80	80	Average	111	111	Average	94	94	Average	94	94	Average	30	30	Average
			111			99			80			111			94			94			30

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
5/6/2009

remark or observation: Muddy water is observed at location C2 due to the  
construction works being carried out in the upper stream of  
TTT River the location C2.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 8/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1310			1305			1300			1320			1235			1245			1255		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.47			7.50			7.17			7.87			6.56			6.87			6.31		
Temperature (oC)	28.1			28.0			28.8			29.3			26.9			27.9			28.4		
Salinity (ppt)	7.0			4.3			17.5			14.5			0.0			0.0			5.7		
Turbidity (NTU)	8.3	8.3	Average	76.4	76.4	Average	9.7	9.7	Average	6.1	6.1	Average	0.0	0.0	Average	162.4	162.4	Average	6.9	6.9	Average
			8.3			76.4			9.7			6.1			0.0			162.4			6.9
DO (mg/l)	8.70	8.70	Average	7.71	7.71	Average	6.08	6.08	Average	7.88	7.88	Average	7.18	7.18	Average	7.42	7.42	Average	4.37	4.37	Average
			8.70			7.71			6.08			7.88			7.18			7.42			4.37
DO Saturation (%)	116	116	Average	101	101	Average	83	83	Average	110	110	Average	90	90	Average	95	95	Average	48	48	Average
			116			101			83			110			90			95			48

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
8/6/2009

remark or observation: Muddy water is observed at location C2 due to the  
construction works being carried out in the upper stream of  
TTT River the location C2.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 10/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1355			1405			1410			1345			1445			1435			1420		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			Muddy			normal			Muddy			normal			Muddy			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.40			7.71			7.25			7.81			7.21			6.81			7.27		
Temperature (oC)	28.0			27.7			28.2			28.3			27.8			27.9			28.8		
Salinity (ppt)	5.3			0.6			9.3			7.3			0.0			0.0			1.2		
Turbidity (NTU)	6.5	6.5	Average	25.1	25.1	Average	5.5	5.5	Average	53.7	53.7	Average	0.0	0.0	Average	114.3	114.3	Average	5.7	5.7	Average
			6.5			25.1			5.5			53.7			0.0			114.3			5.7
DO (mg/l)	8.35	8.35	Average	7.38	7.38	Average	6.36	6.36	Average	6.69	6.69	Average	7.46	7.46	Average	7.33	7.33	Average	5.71	5.71	Average
			8.35			7.38			6.36			6.69			7.46			7.33			5.71
DO Saturation (%)	111	111	Average	94	94	Average	86	86	Average	90	90	Average	95	95	Average	94	94	Average	74	74	Average
			111			94			86			90			95			94			74

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
10/6/2009

remark or observation: Muddy water is observed at location M2 and M4 due to the construction works being carried out in the river at the location of Tiger House and Mui Wo Primary school

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 12/6/2009

Cloudy

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1525			1520			1515			1550			1445			1456			1508		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			Muddy			normal			Muddy			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			< 1			< 1			< 1			< 1		
pH value	6.66			6.72			6.58			6.62			6.37			6.08			6.25		
Temperature (oC)	25.3			24.8			25.6			25.5			24.8			24.5			25.8		
Salinity (ppt)	0.1			0.0			1.5			0.8			0.0			0.0			0.2		
Turbidity (NTU)	19.3	19.3	Average	151.3	151.3	Average	11.3	11.3	Average	46.6	46.6	Average	8.8	8.8	Average	3.7	3.7	Average	6.9	6.9	Average
			19.3			151.3			11.3			46.6			8.8			3.7			6.9
DO (mg/l)	8.12	8.12	Average	8.33	8.33	Average	6.50	6.50	Average	8.19	8.19	Average	7.89	7.89	Average	8.46	8.46	Average	4.60	4.60	Average
			8.12			8.33			6.50			8.19			7.89			8.46			4.60
DO Saturation (%)	99	99	Average	101	101	Average	80	80	Average	100	100	Average	96	96	Average	102	102	Average	56	56	Average
			99			101			80			100			96			102			56

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
12/6/2009

Major sources of contamination to the Tai Tei Tong River were believed as site clearance activities conducted by HAD at  
 remark or observation: the outside of Mui Wo School & haul access formation on top of the river bed carried out by contractor at between  
Bottleneck A & B. Muddy water was entering down stream area from above two Rivers and Silver River of M4 was affected

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 13/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1500			1505						1520			1440			1450					
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			< 1			< 1			< 1			< 1		
pH value	6.75			6.80						7.14			6.66			6.27					
Temperature (oC)	28.0			27.6						28.5			27.9			26.9					
Salinity (ppt)	0.3			0.0						3.1			0.0			0.0					
Turbidity (NTU)	21.1	21.1	Average 21.1	9.5	9.5	Average 9.5			Average #DIV/0!	11.6	11.6	Average 11.6	0.0	0.0	Average 0.0	2.3	2.3	Average 2.3			Average #DIV/0!
DO (mg/l)	8.02	8.02	Average 8.02	7.52	7.52	Average 7.52			Average #DIV/0!	7.72	7.72	Average 7.72	7.76	7.76	Average 7.76	8.35	8.35	Average 8.35			Average #DIV/0!
DO Saturation (%)	103	103	Average 103	96	96	Average 96			Average #DIV/0!	102	102	Average 102	99	99	Average 99	104	104	Average 104			Average #DIV/0!

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
13/6/2009

remark or  
observation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 15/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1640			1635			1630			1645			1600			1610			1620		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			normal			Muddy			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.2			< 1			< 1			< 1		
pH value	6.77			6.89			6.96			6.85			6.51			6.42			6.71		
Temperature (oC)	27.6			27.4			28.7			28.1			27.5			26.8			27.4		
Salinity (ppt)	0.1			0.0			6.4			7.3			0.0			0.0			2.3		
Turbidity (NTU)	42.8	42.8	Average	5.8	5.8	Average	12.2	12.2	Average	56.1	56.1	Average	2.7	2.7	Average	0.0	0.0	Average	7.8	7.8	Average
			42.8			5.8			12.2			56.1			2.7			0.0			7.8
DO (mg/l)	7.96	7.96	Average	8.08	8.08	Average	8.17	8.17	Average	8.22	8.22	Average	7.74	7.74	Average	8.66	8.66	Average	5.12	5.12	Average
			7.96			8.08			8.17			8.22			7.74			8.66			5.12
DO Saturation (%)	101	101	Average	103	103	Average	107	107	Average	106	106	Average	99	99	Average	109	109	Average	61	61	Average
			101			103			107			106			99			109			61

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
15/6/2009

remark or observation: Muddy water is observed at location M1 & M4 due to the  
water without desilting properly discharged to the public  
drain at box culvert.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 16/6/2009

Cloudy

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1605			1610						1620			1545			1555					
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.2			< 1			< 1			< 1		
pH value	6.67			6.67						7.16			6.41			6.37					
Temperature (oC)	27.4			27.3						28.5			27.0			26.7					
Salinity (ppt)	0.1			0.0						5.2			0.0			0.0					
Turbidity (NTU)	20.4	20.4	Average 20.4	4.7	4.7	Average 4.7			Average #DIV/0!	10.4	10.4	Average 10.4	1.1	1.1	Average 1.1	0.0	0.0	Average 0.0			Average #DIV/0!
DO (mg/l)	8.06	8.06	Average 8.06	8.01	8.01	Average 8.01			Average #DIV/0!	8.59	8.59	Average 8.59	7.50	7.50	Average 7.50	8.37	8.37	Average 8.37			Average #DIV/0!
DO Saturation (%)	102	102	Average 102	101	101	Average 101			Average #DIV/0!	115	115	Average 115	95	95	Average 95	105	105	Average 105			Average #DIV/0!

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
16/6/2009

remark or observation: Muddy water is observed at location M1 due to the water  
wihtout desilting properly discharged to the public drain  
at box culvert

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 17/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1045												1100								
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.53												6.73								
Temperature (oC)	28.7												28.0								
Salinity (ppt)	0.2												0.0								
Turbidity (NTU)	22.6	22.6	Average			Average			Average			Average	0.0	0.0	Average			Average			Average
			22.6			#DIV/0!			#DIV/0!			#DIV/0!			0.0			#DIV/0!			#DIV/0!
DO (mg/l)	8.52	8.52	Average			Average			Average			Average	7.05	7.05	Average			Average			Average
			8.52			#DIV/0!			#DIV/0!			#DIV/0!			7.05			#DIV/0!			#DIV/0!
DO Saturation (%)	110	110	Average			Average			Average			Average	90	90	Average			Average			Average
			110			#DIV/0!			#DIV/0!			#DIV/0!			90			#DIV/0!			#DIV/0!

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
17/6/2009

remark or observation: Muddy water is observed at location M1 due to the water  
without desilting properly discharged to the public drain  
at box culvert



**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 18/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1055			1100			1105			1045			1140			1130			1115		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			Muddy			normal			normal			normal			Muddy			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.54			7.03			6.73			7.54			6.65			6.73			7.01		
Temperature (oC)	27.5			27.5			28.5			28.9			28.1			28.5			29.0		
Salinity (ppt)	0.6			0.2			5.2			9.9			0.0			0.0			0.7		
Turbidity (NTU)	13.1	13.1	Average	204.3	204.3	Average	16.1	16.1	Average	7.6	7.6	Average	0.0	0.0	Average	0.0	0.0	Average	14.9	14.9	Average
			13.1			204.3			16.1			7.6			0.0			0.0			14.9
DO (mg/l)	8.25	8.25	Average	7.88	7.88	Average	6.67	6.67	Average	7.05	7.05	Average	7.34	7.34	Average	7.44	7.44	Average	5.82	5.82	Average
			8.25			7.88			6.67			7.05			7.34			7.44			5.82
DO Saturation (%)	105	105	Average	100	100	Average	88	88	Average	97	97	Average	95	95	Average	96	96	Average	76	76	Average
			105			100			88			97			95			96			76

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
18/6/2009

remark or observation: Muddy water is observed at location M2 due to construction works  
which are belong to Home Affairs Department being carried out on the  
river at Mui Wo Primary School, where is upper the locatino M2

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 19/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1050			1055			1100			1040			1135			1120			1110		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			Muddy			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.08			6.73			6.72			7.22			6.44			6.91			7.01		
Temperature (oC)	27.4			26.8			27.8			28.2			27.3			27.2			27.4		
Salinity (ppt)	2.1			0.2			7.5			9.6			0.0			0.1			0.6		
Turbidity (NTU)	61.8	61.8	Average 61.8	11.2	11.2	Average 11.2	35.8	35.8	Average 35.8	4.2	4.2	Average 4.2	2.4	2.4	Average 2.4	1.6	1.6	Average 1.6	11.1	11.1	Average 11.1
DO (mg/l)	7.14	7.14	Average 7.14	7.40	7.40	Average 7.40	5.31	5.31	Average 5.31	6.34	6.34	Average 6.34	6.87	6.87	Average 6.87	7.18	7.18	Average 7.18	5.87	5.87	Average 5.87
DO Saturation (%)	92	92	Average 92	93	93	Average 93	71	71	Average 71	86	86	Average 86	87	87	Average 87	90	90	Average 90	75	75	Average 75

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
19/6/2009

remark or observation: Muddy water is observed at location M1 due to the water without desilting properly  
discharged to the public drain at box culvert. Muddy water is observed at location  
M3 due to the soiled water leakage at Luk Tei Tong uppper the location M3

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 20/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1050			1055			1105						1115			1125			1135		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			Muddy			Muddy			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			< 1			< 1			< 1			< 1		
pH value	6.78			6.97			6.82						6.97			6.61			6.73		
Temperature (oC)	28.5			28.1			27.8						27.6			28.1			28.6		
Salinity (ppt)	4.0			1.6			9.1						0.0			0.0			2.7		
Turbidity (NTU)	9.9	9.9	Average	65.3	65.3	Average	27.2	27.2	Average			Average	2.4	2.4	Average	0.0	0.0	Average	10.7	10.7	Average
			9.9			65.3			27.2			#DIV/0!			2.4			0.0			10.7
DO (mg/l)	7.48	7.48	Average	7.59	7.59	Average	5.91	5.91	Average			Average	7.18	7.18	Average	7.68	7.68	Average	5.17	5.17	Average
			7.48			7.59			5.91			#DIV/0!			7.18			7.68			5.17
DO Saturation (%)	99	99	Average	99	99	Average	78	78	Average			Average	92	92	Average	99	99	Average	70	70	Average
			99			99			78			#DIV/0!			92			99			70

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
20/6/2009

remark or observation: Muddy water is observed at location M3 due to the soiled water leakage at Luk Tei Tong upper the  
location M3. Muddy water is observed at locaion M2 due to the construction works being  
carried out in Tai Tei Tong river which is caused the muddy water flow to the locaton M2

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 22/6/2009

Cloudy

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1155			1200			1205			1145			1345			1400			1410		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			Muddy			Muddy			Muddy			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.03			6.82			6.51			7.09			6.84			6.05			6.26		
Temperature (oC)	27.2			26.5			27.2			27.1			28.3			26.9			27.9		
Salinity (ppt)	0.8			0.2			3.2			3.1			0.0			0.0			0.2		
Turbidity (NTU)	59.4	59.4	Average	9.3	9.3	Average	27.6	27.6	Average	19.5	19.5	Average	16.7	16.7	Average	3.8	3.8	Average	9.7	9.7	Average
			59.4			9.3			27.6			19.5			16.7			3.8			9.7
DO (mg/l)	7.46	7.46	Average	7.82	7.82	Average	5.96	5.96	Average	6.26	6.26	Average	7.30	7.30	Average	8.12	8.12	Average	6.12	6.12	Average
			7.46			7.82			5.96			6.26			7.30			8.12			6.12
DO Saturation (%)	94	94	Average	98	98	Average	72	72	Average	81	81	Average	94	94	Average	102	102	Average	79	79	Average
			94			98			72			81			94			102			79

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
22/6/2009

remark or observation: The turbidity of M1 - 4 were exceeded, due to heavy rain during the morning.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 24/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1340			1345			1350			1330			1400			1410			1420		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	Muddy			normal			Muddy			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.1			< 1			< 1			< 1		
pH value	7.03			7.01			6.79			6.39			7.09			6.73			6.74		
Temperature (oC)	28.3			28.0			29.5			28.5			28.3			27.8			30.1		
Salinity (ppt)	1.6			0.4			5.9			4.1			0.0			0.0			0.3		
Turbidity (NTU)	18.8	18.8	Average	2.4	2.4	Average	17.2	17.2	Average	11.7	11.7	Average	1.7	1.7	Average	0.0	0.0	Average	19.2	19.2	Average
			18.8			2.4			17.2			11.7			1.7			0.0			19.2
DO (mg/l)	7.57	7.57	Average	7.52	7.52	Average	5.98	5.98	Average	6.81	6.81	Average	7.41	7.41	Average	7.62	7.62	Average	3.18	3.18	Average
			7.57			7.52			5.98			6.81			7.41			7.62			3.18
DO Saturation (%)	98	98	Average	96	96	Average	75	75	Average	90	90	Average	95	95	Average	98	98	Average	42	42	Average
			98			96			75			90			95			98			42

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
24/6/2009

remark or observation: Muddy water is observed at location M1 because the water which used for washing construction trucks wheels directly discharged to the public drain.  
Muddy water is observed at location M3 due to the desilted water leakage

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 25/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1440						1435						1410						1425		
Tide Mode	mid-ebb						mid-ebb						mid-ebb						mid-ebb		
River Condition	normal						Muddy						normal						normal		
Water Depth (m)	<1						< 1						< 1						< 1		
pH value	7.08						6.76						6.18						6.61		
Temperature (oC)	28.1						28.6						27.8						28.0		
Salinity (ppt)	3.5						8.1						0.0						1.2		
Turbidity (NTU)	8.5	8.5	Average			Average	28.8	28.8	Average			Average	0.7	0.7	Average			Average	6.5	6.5	Average
			8.5			#DIV/0!			28.8			#DIV/0!			0.7			#DIV/0!			6.5
DO (mg/l)	6.93	6.93	Average			Average	5.99	5.99	Average			Average	7.23	7.23	Average			Average	7.14	7.14	Average
			6.93			#DIV/0!			5.99			#DIV/0!			7.23			#DIV/0!			7.14
DO Saturation (%)	90	90	Average			Average	75	75	Average			Average	93	93	Average			Average	92	92	Average
			90			#DIV/0!			75			#DIV/0!			93			#DIV/0!			92

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
25/6/2009

remark or observation: Muddy water is observed at location M3 due to the silted  
water leakage at Luk Tei Tong.

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 26/6/2009

Cloudy

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1530			1540			1545			1510			1615			1605			1555		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			normal			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.2			< 1			< 1			< 1		
pH value	7.46			7.25			6.88			7.50			6.51			6.94			6.86		
Temperature (oC)	25.9			27.3			27.9			28.2			27.3			26.7			27.5		
Salinity (ppt)	5.5			1.5			7.2			11.0			0.0			0.0			1.8		
Turbidity (NTU)	6.9	6.9	Average	0.0	0.0	Average	7.5	7.5	Average	2.5	2.5	Average	0.9	0.9	Average	0.0	0.0	Average	7.7	7.7	Average
			6.9			0.0			7.5			2.5			0.9			0.0			7.7
DO (mg/l)	7.17	7.17	Average	7.35	7.35	Average	5.97	5.97	Average	6.72	6.72	Average	7.16	7.16	Average	7.53	7.53	Average	4.15	4.15	Average
			7.17			7.35			5.97			6.72			7.16			7.53			4.15
DO Saturation (%)	92	92	Average	94	94	Average	75	75	Average	92	92	Average	91	91	Average	94	94	Average	53	53	Average
			92			94			75			92			91			94			53

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
26/6/2009

remark or  
observation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

**Environmental Pioneers & Solutions Limited**  
**Water Quality Monitoring - Summary of On-site measurement results**

Date of Sampling: 29/6/2009

Sunny

Monitoring Location	M1			M2			M3			M4			C1			C2			C3		
Time (hhmm)	1715			1710			1705			1725			1655			1645			1635		
Tide Mode	mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb			mid-ebb		
River Condition	normal			normal			Muddy			normal			normal			normal			normal		
Water Depth (m)	<1			< 1			< 1			1.4			< 1			< 1			< 1		
pH value	7.13			7.30			6.69			6.94			6.44			6.92			6.71		
Temperature (oC)	27.1			27.4			28.3			28.2			28.0			26.7			27.9		
Salinity (ppt)	0.4			0.2			3.4			1.4			0.0			0.0			0.2		
Turbidity (NTU)	8.7	8.7	Average	2.3	2.3	Average	44.8	44.8	Average	10.5	10.5	Average	4.3	4.3	Average	3.2	3.2	Average	6.3	6.3	Average
			8.7			2.3			44.8			10.5			4.3			3.2			6.3
DO (mg/l)	7.71	7.71	Average	7.73	7.73	Average	6.03	6.03	Average	7.35	7.35	Average	7.20	7.20	Average	7.90	7.90	Average	5.49	5.49	Average
			7.71			7.73			6.03			7.35			7.20			7.90			5.49
DO Saturation (%)	98	98	Average	98	98	Average	78	78	Average	95	95	Average	92	92	Average	99	99	Average	70	70	Average
			98			98			78			95			92			99			70

Name  
Prepared By: Jimmy Cheng

Signature  


Date  
29/6/2009

remark or  
observation: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_



## **Appendix F2**

### **Water Quality**

### **Monitoring Lab report**



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600010

Date of Issue : 11-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 03-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 04-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	499	495	0.8	24.5	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		03 Jun 2009 / 11:10		03 Jun 2009 / 11:20		03 Jun 2009 / 11:30			
	LOD	Units	1.9	1.8	367.2	352.8	5.0	5.4		
Suspended Solids (SS)	1	mg/L								
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		03 Jun 2009 / 10:50		03 Jun 2009 / 10:55		03 Jun 2009 / 11:00		03 Jun 2009 / 10:40	
	LOD	Units	9.6	9.3	6.5	6.4	6.9	7.1	5.4	5.4
Suspended Solids (SS)	1	mg/L								

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600028

Date of Issue : 11-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 04-06-2009

W.O. No.\* : -- Sample Type\* : River Water

Date Completed : 05-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	501	495	1.2	23.4	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ± 5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		04 Jun 2009 / 11:10		04 Jun 2009 / 11:20		04 Jun 2009 / 11:30			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	2.6	2.3	29.8	29.4	8.4	8.1		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		04 Jun 2009 / 10:45		04 Jun 2009 / 10:50		04 Jun 2009 / 11:00		04 Jun 2009 / 10:35	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	4.5	4.3	5.9	6.2	9.5	9.7	6.3	6.7

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN

Post : Chemist



## TEST SUMMARY ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600036

Date of Issue : 11-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 05-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 06-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
					Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	< 1.0	498	491	1.4	25.7	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		05 Jun 2009 / 11:45		05 Jun 2009 / 11:55		05 Jun 2009 / 12:15			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.2	1.0	45.3	45.9	10.5	10.9		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		05 Jun 2009 / 11:00		05 Jun 2009 / 11:10		05 Jun 2009 / 11:15		05 Jun 2009 / 10:45	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	7.1	7.4	174.0	172.4	12.7	12.3	6.8	7.2

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :** Location M1 & WE3 and Location M3 & WE4 are the same location.

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN

Post : Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600052

Date of Issue : 17-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 08-06-2009

W.O. No.\* : -- Sample Type\* : River Water

Date Completed : 09-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method	Units	Quality Control Results				
				Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)		APHA 20ed 2540 D	mg/L	< 1.0	489	502	-2.6	24.1
Acceptance Criteria				< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ± 5%	21 ≤ R ≤ 29
TEST RESULTS	Sample ID	C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate	
	Sampling Date/Time	08 June 2009 / 12:35		08 June 2009 / 12:45		08 June 2009 / 12:55		
	LOD	Units						
Suspended Solids (SS)	1	mg/L	< 1.0	< 1.0	123.2	124.0	6.6	6.4
TEST RESULTS	Sample ID	M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4
	Sampling Date/Time	08 June 2009 / 13:10		08 June 2009 / 13:05		08 June 2009 / 13:00		08 June 2009 / 13:20
	LOD	Units						
Suspended Solids (SS)	1	mg/L	6.4	6.5	45.0	43.8	12.1	12.3
								6.3
								6.0

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN

Post : Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600060

Date of Issue : 17-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 10-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 11-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	485	501	-3.2	23.2	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		10 June 2009 / 14:45		10 June 2009 / 14:35		10 June 2009 / 14:20			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	3.2	3.1	67.4	69.0	7.1	7.1		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		10 June 2009 / 13:55		10 June 2009 / 14:05		10 June 2009 / 14:10		10 June 2009 / 13:45	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	5.9	6.4	17.1	16.8	9.1	8.7	34.6	34.8

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

GU CHIN

Checked By : GU CHIN

Post

Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC0906000078

Date of Issue : 17-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 12-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 13-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results										
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L						
					< 1.0	497	489	1.6	23.7						
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29						
TEST RESULTS		Sample ID		C1	C1 Duplicate		C2	C2 Duplicate		C3	C3 Duplicate				
		Sampling Date/Time		12 June 2009 / 14:45		12 June 2009 / 14:56		12 June 2009 / 15:08							
		LOD	Units												
Suspended Solids (SS)		1	mg/L	5.5	5.9		4.0	4.4		11.2	11.6				
TEST RESULTS		Sample ID		M1	M1 Duplicate		M2	M2 Duplicate		M3	M3 Duplicate		M4	M4 Duplicate	
		Sampling Date/Time		12 June 2009 / 15:25		12 June 2009 / 15:20		12 June 2009 / 15:15		12 June 2009 / 15:50					
		LOD	Units												
Suspended Solids (SS)		1	mg/L	8.8	9.1		128.4	128.8		11.4	11.3		29.0	29.0	

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600206

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 13-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 15-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results						
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L		
					< 1.0	506	501	1.0	27.6		
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29		
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate			
	Sampling Date/Time		13 Jun 2009 / 14:40		13 Jun 2009 / 14:50		--				
	LOD	Units									
Suspended Solids (SS)	1	mg/L	< 1.0	< 1.0	< 1.0	< 1.0	--	--			
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate	
	Sampling Date/Time		13 Jun 2009 / 15:00		13 Jun 2009 / 15:05		--		13 Jun 2009 / 15:20		
	LOD	Units									
Suspended Solids (SS)	1	mg/L	10.8	11.2	8.8	9.2	--	--	7.5	7.3	

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist





## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600214

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 15-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 16-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	482	491	-1.8	22.7	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		15 Jun 2009 / 16:00		15 Jun 2009 / 16:10		15 Jun 2009 / 16:20			
	LOD	Units	< 1.0	< 1.0	< 1.0	< 1.0	12.2	11.6		
	Suspended Solids (SS)	1								
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		15 Jun 2009 / 16:40		15 Jun 2009 / 16:35		15 Jun 2009 / 16:30		15 Jun 2009 / 16:45	
	LOD	Units	18.9	19.5	2.5	2.3	8.1	7.9	31.6	31.3
	Suspended Solids (SS)	1								

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600222

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 16-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 18-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	491	497	-1.2	27.0	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		16 Jun 2009 / 15:45		16 Jun 2009 / 15:55		--			
	LOD	Units	< 1.0	< 1.0	< 1.0	< 1.0	--	--		
	Suspended Solids (SS)	1								
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		16 Jun 2009 / 16:05		16 Jun 2009 / 16:10		--		16 Jun 2009 / 16:20	
	LOD	Units	10.3	10.7	1.8	2.0	--	--	6.3	6.8
	Suspended Solids (SS)	1								

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600230

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 17-06-2009

W.O. No.\* : -- Sample Type\* : River Water

Date Completed : 18-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	491	497	-1.2	27.0	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		17 Jun 2009 / 11:00		--		--			
	LOD	Units	< 1.0	< 1.0	--	--	--	--		
Suspended Solids (SS)	1	mg/L								
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		17 Jun 2009 / 10:45		--		--		--	
	LOD	Units	8.6	8.7	--	--	--	--	--	--
Suspended Solids (SS)	1	mg/L								

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600248

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 18-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 20-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
					Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	< 1.0	486	494	-1.6	25.6	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		18 Jun 2009 / 11:40		18 Jun 2009 / 11:30		18 Jun 2009 / 11:15			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	3.3	3.3	3.5	3.4	11.4	12.0		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		18 Jun 2009 / 10:55		18 Jun 2009 / 11:00		18 Jun 2009 / 11:05		18 Jun 2009 / 10:45	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	6.0	5.7	80.8	79.2	14.0	13.8	6.9	6.4

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600256

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 19-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 20-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	489	499	-2.0	25.2	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		19 Jun 2009 / 11:35		19 Jun 2009 / 11:20		19 Jun 2009 / 11:10			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	< 1.0	< 1.0	1.2	1.1	8.7	9.2		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		19 Jun 2009 / 10:50		19 Jun 2009 / 10:55		19 Jun 2009 / 11:00		19 Jun 2009 / 10:40	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	40.4	39.4	5.5	5.9	31.0	31.4	7.0	7.4

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600264

Date of Issue : 24-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 20-06-2009

W.O. No.\* : -- Sample Type\* : River Water

Date Completed : 22-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
					Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	< 1.0	502	497	1.0	23.7	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		20 Jun 2009 / 11:15		20 Jun 2009 / 11:25		20 Jun 2009 / 11:35			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	< 1.0	< 1.0	1.1	1.2	8.1	8.4		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		20 Jun 2009 / 10:50		20 Jun 2009 / 10:55		20 Jun 2009 / 11:05		--	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	8.5	8.4	30.8	29.4	19.6	19.4	--	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

GU CHIN

Checked By : GU CHIN

Post

Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600272

Date of Issue : 30-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 22-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 23-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method	Units	Quality Control Results				
				Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)		APHA 20ed 2540 D	mg/L	< 1.0	493	501	-1.6	26.3
Acceptance Criteria				< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29
TEST RESULTS	Sample ID	C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate	
	Sampling Date/Time	22 Jun 2009 / 13:45		22 Jun 2009 / 14:00		22 Jun 2009 / 14:10		
	LOD	Units						
Suspended Solids (SS)	1	mg/L	6.5	6.1	1.0	< 1.0	4.4	4.3
TEST RESULTS	Sample ID	M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4
	Sampling Date/Time	22 Jun 2009 / 11:55		22 Jun 2009 / 12:00		22 Jun 2009 / 12:05		22 Jun 2009 / 11:45
	LOD	Units						
Suspended Solids (SS)	1	mg/L	33.6	33.2	6.7	6.7	20.9	20.4
								14.9
								14.7

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

: GU CHIN

Checked By : GU CHIN

Post

: Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600400

Date of Issue : 30-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 24-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 25-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
					Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	< 1.0	498	501	-0.6	24.3	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ±5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		24 Jun 2009 / 14:00		24 Jun 2009 / 14:10		24 Jun 2009 / 14:20			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.6	1.3	< 1.0	< 1.0	14.6	14.4		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		24 Jun 2009 / 13:40		24 Jun 2009 / 13:45		24 Jun 2009 / 13:50		24 Jun 2009 / 13:30	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	9.8	9.8	1.2	1.2	18.1	17.7	9.4	9.1

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

GU CHIN

Checked By : GU CHIN

Post

Chemist





## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600418

Date of Issue : 30-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 25-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 26-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	495	501	-1.2	23.3	
Acceptance Criteria					<2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ± 5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		25 Jun 2009 / 14:10		--		25 Jun 2009 / 14:25			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	< 1.0	< 1.0	--	--	6.0	5.9		
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		25 Jun 2009 / 14:40		--		25 Jun 2009 / 14:35		--	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	6.5	6.6	--	--	25.2	25.6	--	--

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

GU CHIN

Checked By : GU CHIN

Post

Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600426

Date of Issue : 30-06-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 26-06-2009

W.O. No.\* : --

Sample Type\* : River Water

Date Completed : 27-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description	Test Method	Units	Quality Control Results				
			Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L
Suspended Solids (SS)	APHA 20ed 2540 D	mg/L	< 1.0	497	493	0.8	24.1
Acceptance Criteria			< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ± 5%	21 ≤ R ≤ 29

TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		26 Jun 2009 / 16:15		26 Jun 2009 / 16:05		26 Jun 2009 / 15:55			
	LOD	Units								
Suspended Solids (SS)	1	mg/L	1.4	1.6	< 1.0	< 1.0	11.1	10.9		

TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		26 Jun 2009 / 15:30		26 Jun 2009 / 15:40		26 Jun 2009 / 15:45		26 Jun 2009 / 15:10	
	LOD	Units								
Suspended Solids (SS)	1	mg/L	8.5	8.7	1.8	2.0	10.9	10.4	6.1	5.8

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

**Remarks :**

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name

GU CHIN

Checked By : GU CHIN

Post

Chemist



## TEST REPORT ON ENVIRONMENTAL ANALYSIS OF WATER AND WASTEWATER

Page 1 of 1

Report No. : GCC090600450

Date of Issue : 02-07-2009

Client\* : Environmental Pioneers & Solutions Limited

P.O. Received : 08-09-2008

Client Address\* : 8/F, Chaiwan Industrial Centre Building, 20 Lee Chung Street, Chaiwan, HK.

DSD Contract No. DC/2006/11 - Drainage Improvement in Southern Lantau & Construction of

Project\* : Mui Wo Village Sewerage Phase 1

Test Location : G/F, 20 Pak Kung Street, Hung Hom, Kowloon.

Date Started : 29-06-2009

W.O. No.\* : -- Sample Type\* : River Water

Date Completed : 30-06-2009

GCE Serial No. : WQM062009

GCE Reg. No. : GCE 081096

Test Unit No. : CH 08258

Analysis Description		Test Method		Units	Quality Control Results					
Suspended Solids (SS)		APHA 20ed 2540 D		mg/L	Method Blank	QC 500 mg/L	QC Duplicate	RPD%	Spike 25 mg/L	
					< 1.0	509	498	2.2	27.9	
Acceptance Criteria					< 2.5 mg/L	475 ≤ Control Limit ≤ 514		≤ ± 5%	21 ≤ R ≤ 29	
TEST RESULTS	Sample ID		C1	C1 Duplicate	C2	C2 Duplicate	C3	C3 Duplicate		
	Sampling Date/Time		29 June 2009 / 16:55		29 June 2009 / 16:45		29 June 2009 / 16:35			
	LOD	Units	1.5	1.3	< 1.0	< 1.0	6.7	6.1		
	Suspended Solids (SS)	1								
TEST RESULTS	Sample ID		M1	M1 Duplicate	M2	M2 Duplicate	M3	M3 Duplicate	M4	M4 Duplicate
	Sampling Date/Time		29 June 2009 / 17:15		29 June 2009 / 17:10		29 June 2009 / 17:05		29 June 2009 / 17:25	
	LOD	Units	4.8	4.5	1.6	1.9	36.6	38.0	6.5	7.0
	Suspended Solids (SS)	1								

\* : Information provided by client

**Note :** This laboratory has no responsibility on sampling and all the test results relate only to the sample tested as received.

Remarks :

----- End -----

Tested By : K.L. Fong

Approved Signatory :

Name : GU CHIN

Checked By : GU CHIN

Post : Chemist

Appendix G  
Monitoring Schedule  
for June 2009

## Environmental Pioneers and Solutions Limited

### DC/2006/11 - DRAINAGE IMPROVEMENT IN SOUTHERN LANTAU

#### Master Schedule of EM&A works in June 2009

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
5/31	6/1	6/2	6/3	6/4	6/5	6/6
			WQM at: 9:35  Noise monitoring	WQM at: 10:20	WQM & EWQM at: 10:58  Site Inspection	
6/7	6/8	6/9	6/10	6/11	6/12	6/13
	WQM at: 12:46  Noise monitoring		WQM at: 13:57		WQM at: 15:02  Ecological Survey	additional WQM at: 14:30
6/14	6/15	6/16	6/17	6/18	6/19	6/20
	WQM at: 17:02  Noise monitoring	additional WQM at: 16:05	additional WQM at: 10:45	WQM at: 8:47	WQM at: 9:32  Ecological Survey	additional WQM at: 10:50
6/21	6/22	6/23	6/24	6/25	6/26	6/27
	WQM at: 11:41  Noise monitoring		WQM at: 13:33	additional WQM at: 14:00	WQM at: 15:14	
6/28	6/29	6/30				
	WQM at: 17:39  Noise monitoring					

Noise Monitoring Locations: Total 4 Locations as N1, N2, N3 and N4

Water Quality Monitoring (WQM) Locations: Total 7 Locations as M1, M2, M3, M4, C1, C2 and C3

Ecological Water Quality Monitoring (EWQM) Locations: Total 6 Locations as WE1, WE2, WE3, WE4, WE5 and WE6

## **Appendix H Implementation Status of environmental protection / mitigation measures**

<b>Environmental Aspect</b>	<b>Protection / Mitigation Measures</b>	<b>Implementation status</b>	<b>Follow-up action</b>
<b>Air Quality</b>	Use of regular watering to reduce dust emissions from exposed site surfaces and unpaved road, with complete coverage.	Implemented	
	Use of frequent watering for particular dusty static construction areas and areas close to ASRs.	Implemented	-
	Tarpaulin covering of all dusty vehicle loads transported to and from and between site location;	Implemented	-
	Establishment and use of vehicle wheel and body washing facilities at the exit points of the site.	Deficiencies found on May 09	Ongoing
	Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.	Implemented	-
<b>Noise</b>	Use of quiet powered mechanical equipment (PME)	Implemented	-
	Adoption of movable noise barriers and temporary noise barriers	Not applicable at this stage	-
	Application of good site practices mentioned in EM&A manual Clause 3.8.1	Implemented	-
<b>Water Quality</b>	Before commencing any site formation works, all sewer and drainage connections should be sealed to prevent debris, soil, sand etc. from entering public sewers/drains.	Deficiencies found in this reporting month	Follow up actions were taken prior to 26 <sup>th</sup> June
	Temporary ditches should be provided to facilitate run-off discharge into appropriate watercourses, via a silt retention pond. No site run-off should enter the freshwater marshes at Luk Tei Tong.	Deficiencies found in this reporting month	Follow up actions were taken prior to 26 <sup>th</sup> June
	Sand/ silt removal facilities such as sand traps, silt traps and sediment basins should be provided to remove sand/ silt particles from runoff to meet the requirements of the Technical Memorandum standard under the Water Pollution Control Ordinance.	Deficiencies found in this reporting month	Follow up actions were taken prior to 26 <sup>th</sup> June
	Water pumped out from foundation excavations should be discharged into silt removal facilities.	Deficiencies found in this reporting month	Ongoing
	During rainstorms, exposed slope surface should be covered by a tarpaulin or the means.	Implemented	-
	Exposed soil areas should be minimized to reduce potential for increased siltation and contamination of runoff.	Implemented	-
	Exposed soil surfaces should be protected by paving or fill material as soon as possible to reduce potential of soil erosion.	Implemented	-
	Open stockpiles of construction materials or construction wastes on-site of more than 50m <sup>3</sup> should be covered with tarpaulin or similar fabric during rainstorms.	Implemented	-
	Oils and fuels should only be used and stored on designated areas which have pollution prevention facilities.	Implemented	-
	Temporary sanitary facilities, such as portable chemical toilets, should be employed on-site.	Not applicable	-
	The excavation and widening works for the drainage improvements to the Pak Ngan Heung River, Tai Tei Tong River, Luk Tei Tong River and Luk Tei Tong By-pass Channel should be carried out in sections (approximately 300 –400 m in length) and in dry condition.	Implemented	-

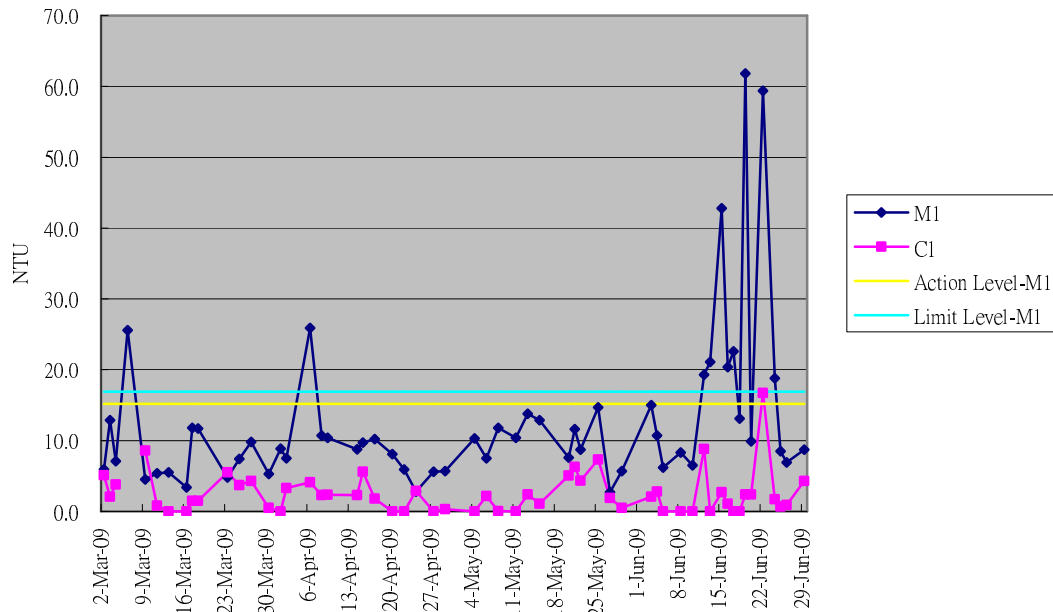
<b>Environmental Aspect</b>	<b>Protection / Mitigation Measures</b>	<b>Implementation status</b>	<b>Follow-up action</b>
	Maintenance desilting of the re-profiled river channels of the Pak Ngan Heung River, Tai Tei Tong River, Luk Tei tong River and Luk Tei Tong By-pass Channel, temporary barrier walls should be used to provide a dry zone for desilting work.	Not applicable at this stage	-
<b>Ecology</b>	Existing natural habitats should be retained as far as practicable	Implemented	-
	Boundary of working areas should be identified to prevent loss of vegetation	Implemented	
	All existing trees / plant should be well protected within the site or transplanted properly	Implemented	-
	Turf removal from the Luk Tei Tong marsh due to the construction of Luk Tei Tong Bypass Channel shall be minimized	Implemented	
	Turf from the Luk Tei Tong marsh shall be properly removed, stored, maintained and reused for lining the riverbed of the Luk Tei Tong Bypass Channel	Implemented	
<b>Chemical and Solid Waste</b>	Chemical wastes should be properly stored in a proper store as per statutory requirements (i.e. on a hard standing, within an enclosed and locked area)	Implemented	-
	Chemical waste stores should be provided with fire precaution facilities (i.e. fire extinguisher, no smoking warning etc).	Implemented	-
	Chemical wastes should be properly stored in corrosion resistant containers placed inside the store and labelled with warning signs in English and Chinese.	Implemented	-
	Chemical wastes should be disposed of by licensed chemical waste collector with supporting delivery records.	Implemented	-
	All containers for fuel, diesel and fluid chemical (in use) and oil filled stationery plants located with proper drip pans.	Implemented	-
	Construction wastes should be managed and disposed to the designated public fill and landfill areas in acceptable manner.	Implemented	-
	All waste disposals managed in a proper manner i.e. trip ticket system implementation.	Implemented	-

## Appendix I

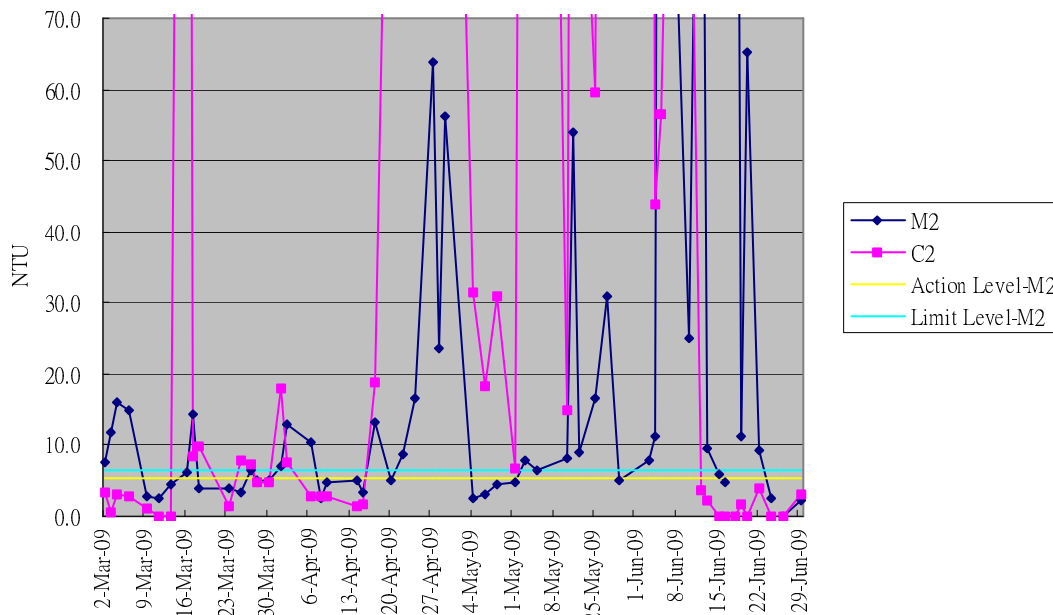
Graphical plot of water  
quality monitoring  
results (SS, DO,  
turbidity)



**Graphical Plot of Turbidity Trend M1&C1 (Mar - June 09)**

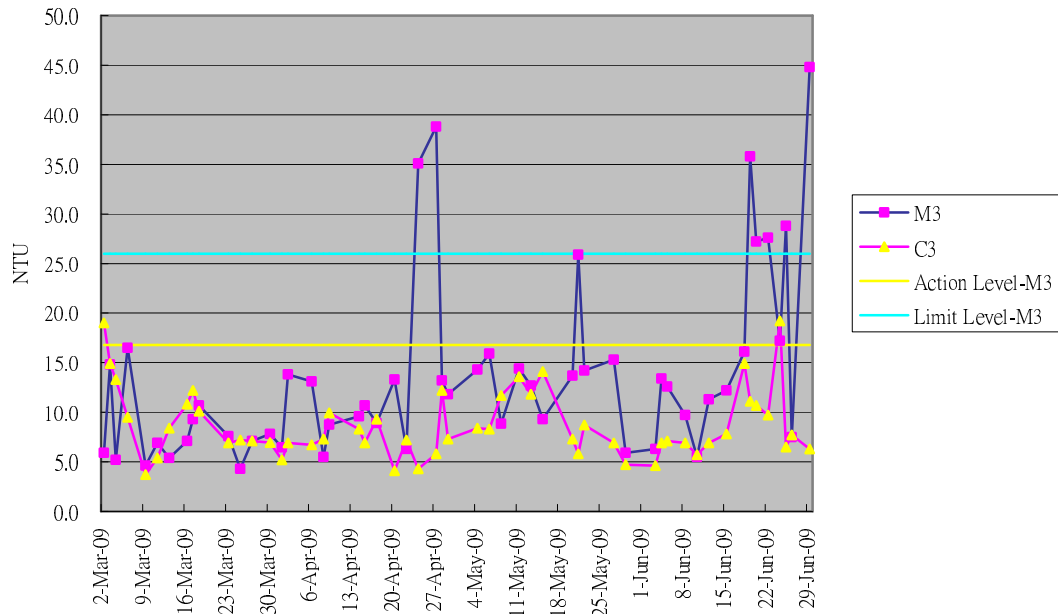


**Graphical Plot of Turbidity Trend M2&C2 (Mar - June 09)**

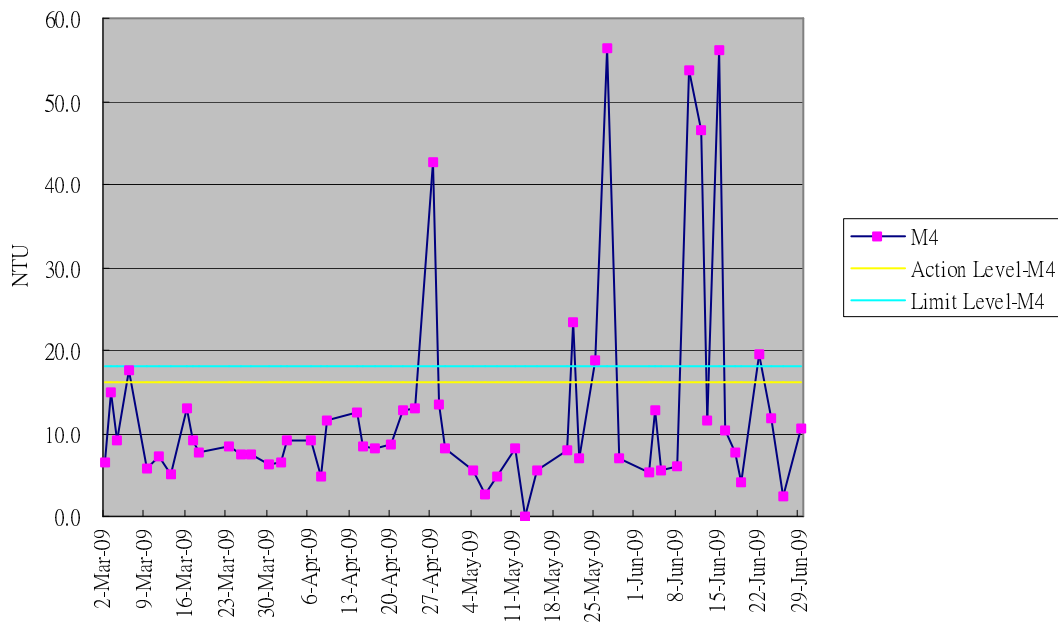


Remarks: The reading of M2 on 5<sup>th</sup>, 8<sup>th</sup>, 12<sup>th</sup> and 18<sup>th</sup> June 2009 is 328.4, 76.4, 151.3 and 204.3, C2 on 3<sup>rd</sup>, 8<sup>th</sup> and 10<sup>th</sup> June 2009 is 313.7, 162.4 and 114.3, which was over the range of the plot.

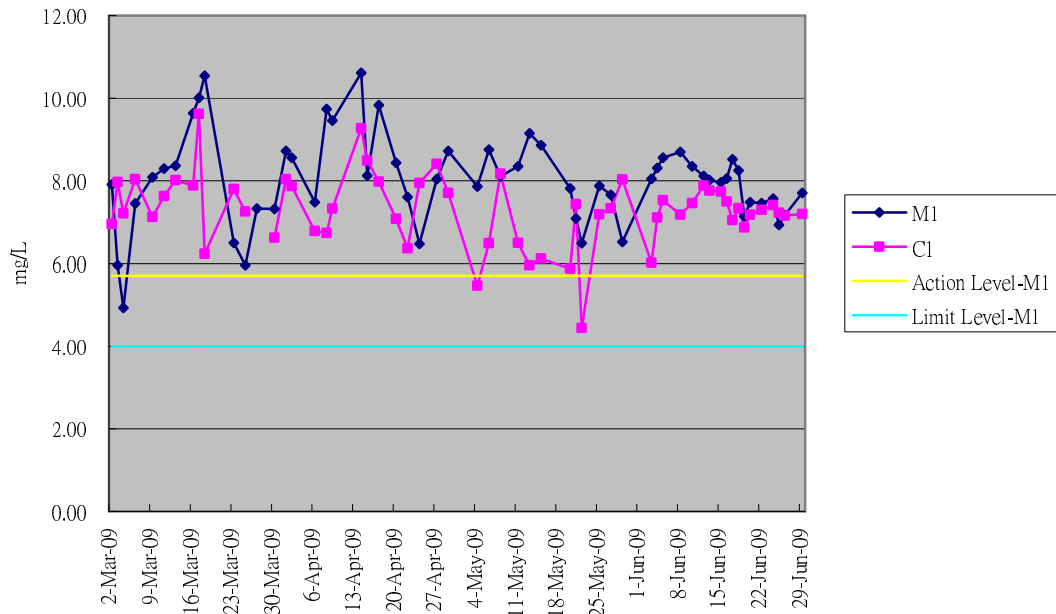
**Graphical Plot of Turbidity Trend M3&C3 (Mar - June 09)**



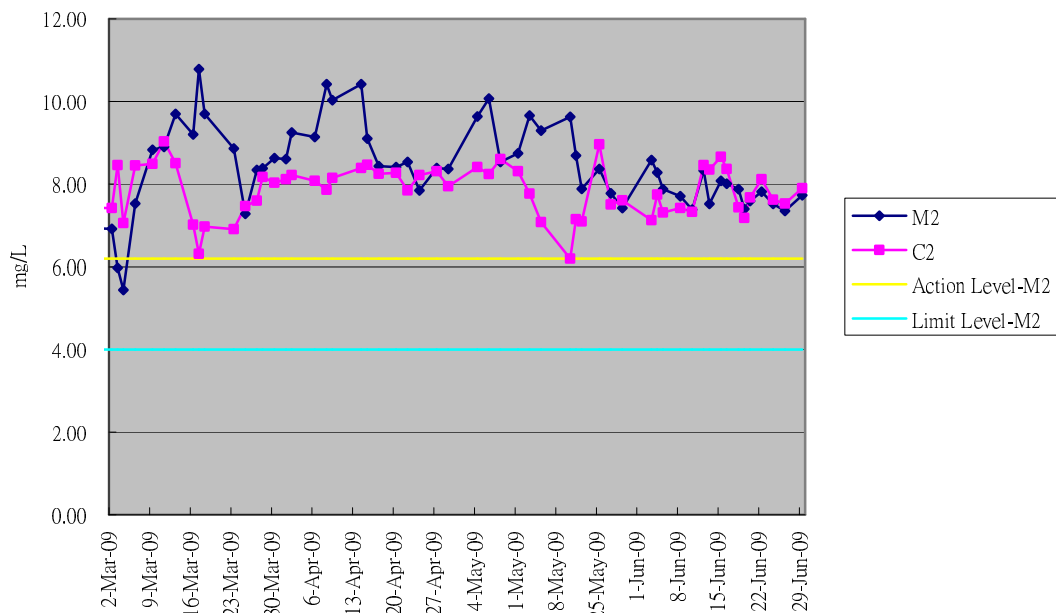
**Graphical Plot of Turbidity Trend M4 (Mar - June 09)**



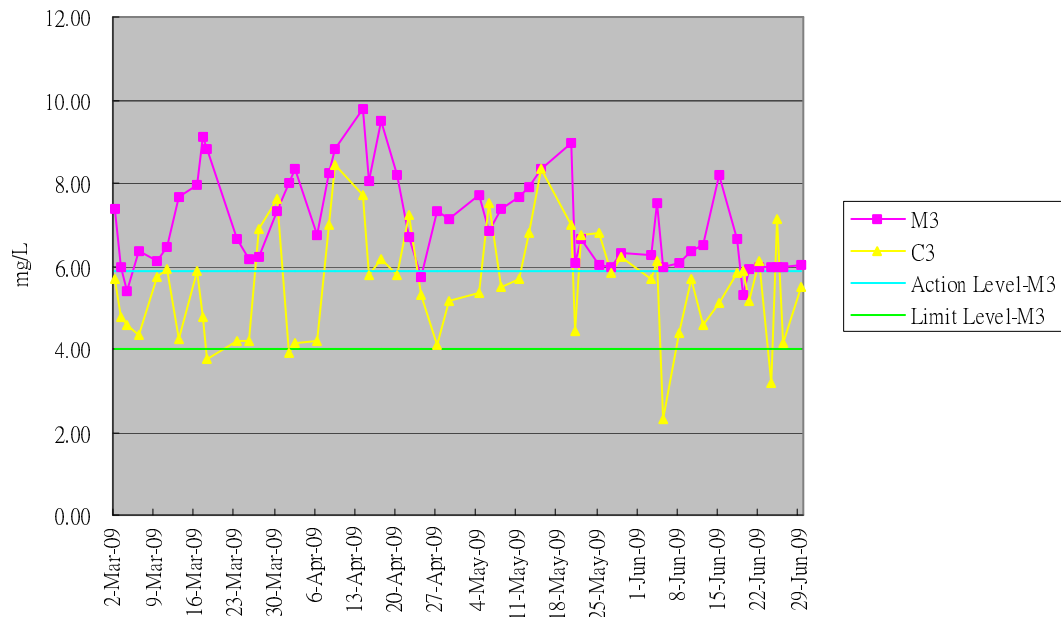
**Graphical Plot of Dissolved Oxygen Trend M1&C1 (Mar - June 09)**



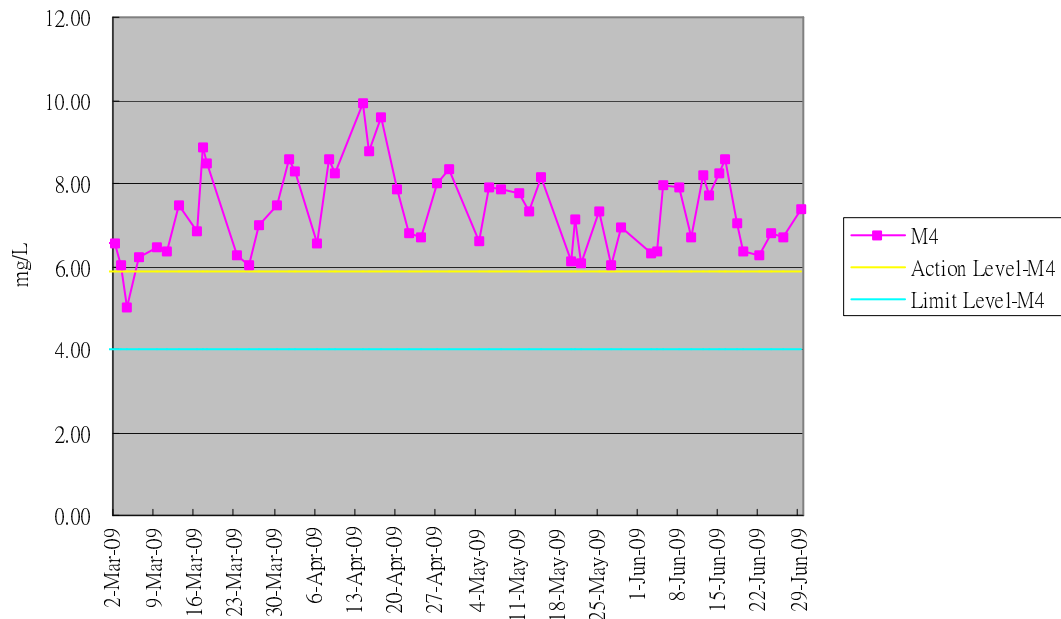
**Graphical Plot of Dissolved Oxygen Trend M2&C2 (Mar - June 09)**



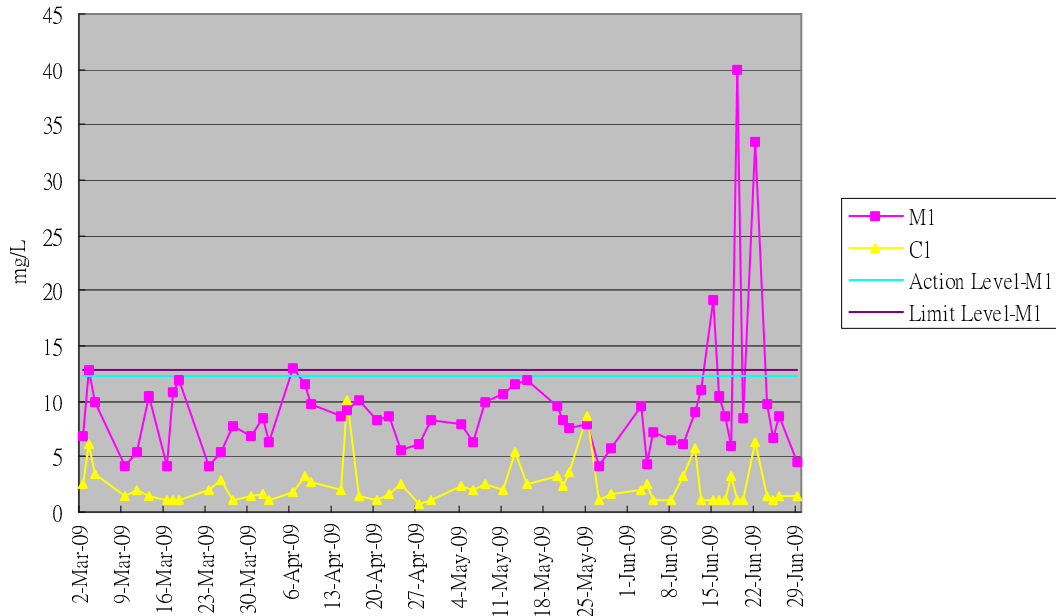
**Graphical Plot of Dissolved Oxygen Trend M3&C3 (Mar - June 09)**



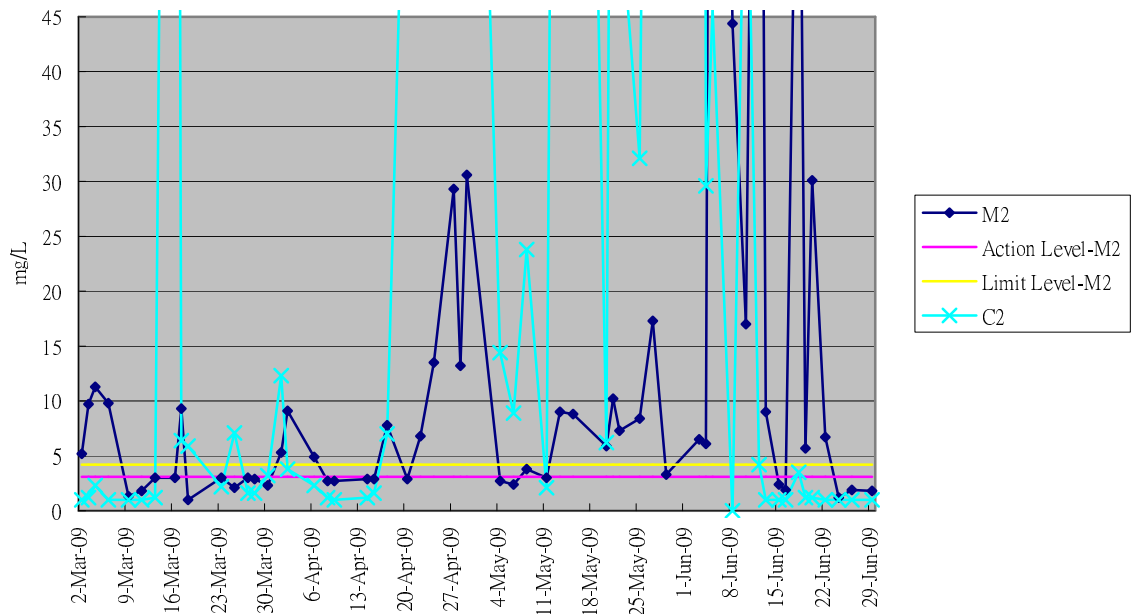
**Graphical Plot of Dissolved Oxygen Trend M4 (Mar - June 09)**



**Graphical Plot of Suspended Soild M1&C1 (Mar - June 09)**

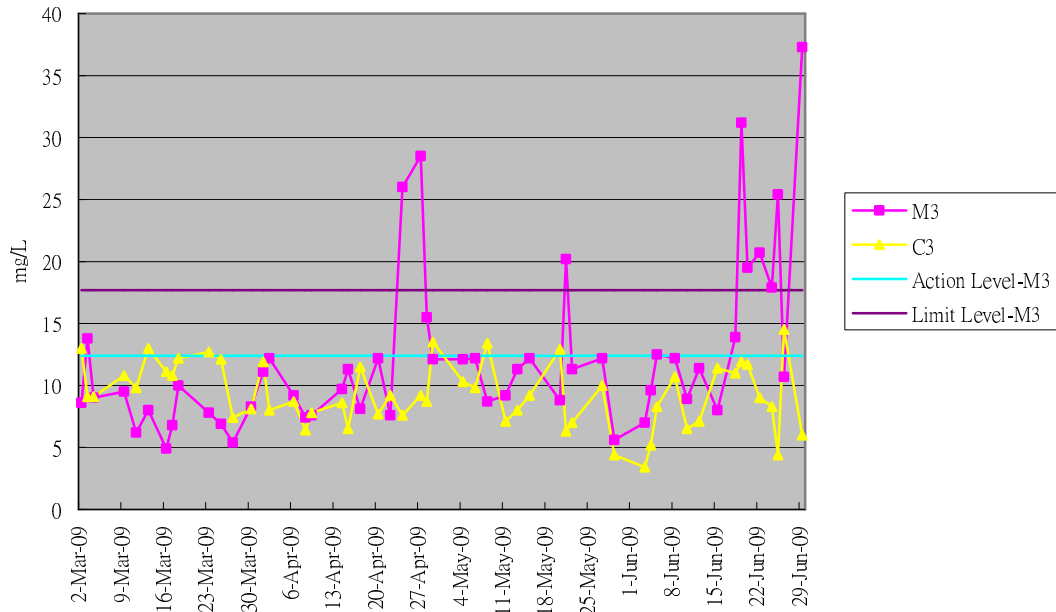


**Graphical Plot of Suspended Soild M2&C2 (Mar - June 09)**

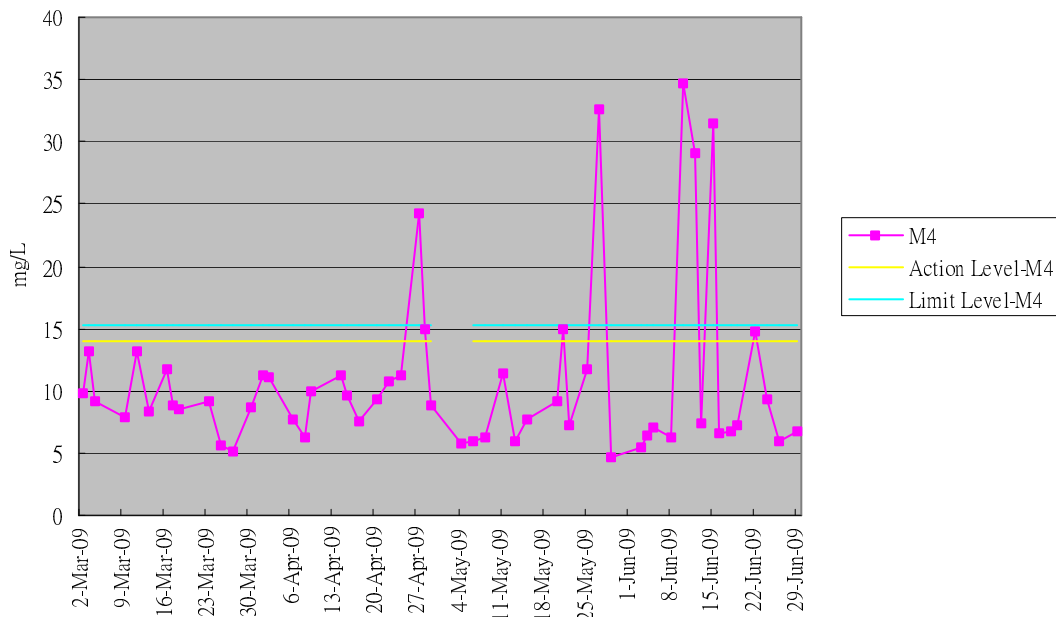


Remarks: The reading of M2 on 5<sup>th</sup>, 12<sup>th</sup> and 18<sup>th</sup> June 2009 is 173.2, 128.6 and 80, C2 on 3<sup>rd</sup>, 5<sup>th</sup>, 8<sup>th</sup> and 10<sup>th</sup> June 2009 is 360, 45.6, 123.6 and 68.2, which was over the range of the plot.

**Graphical Plot of Suspended Solid M3&C3 (Mar - June 09)**

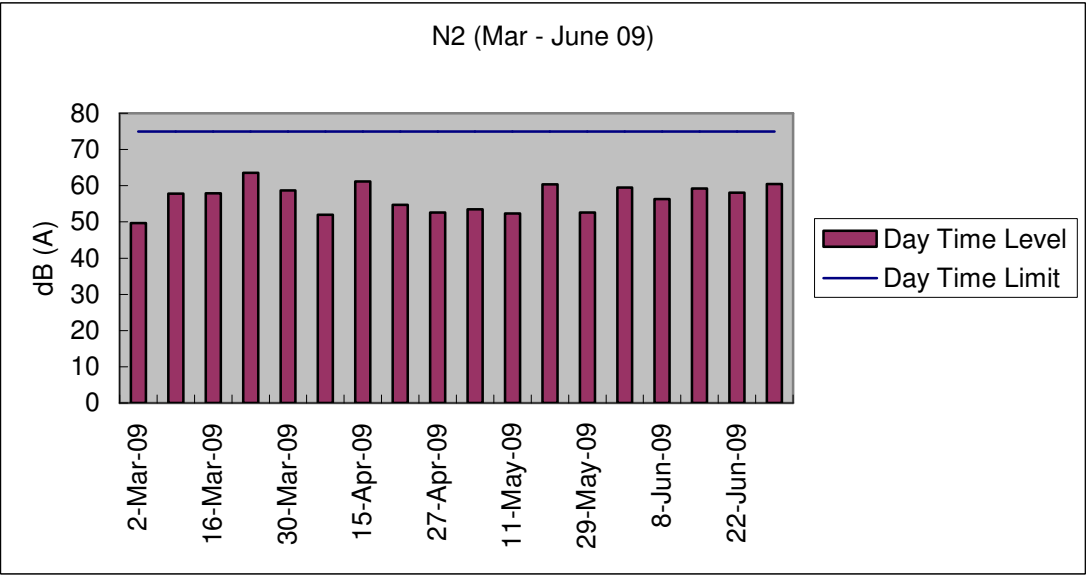
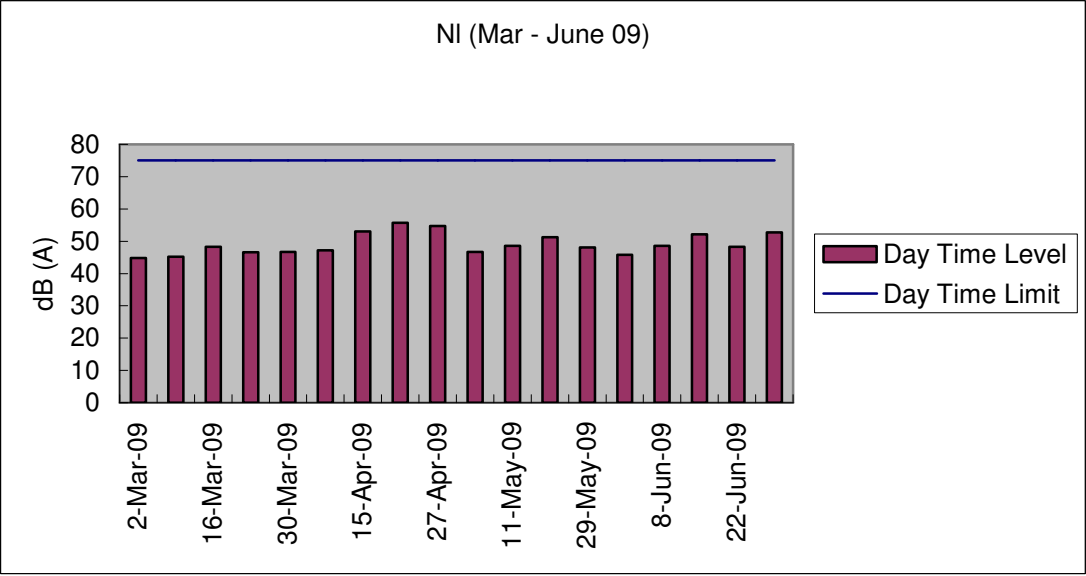


**Graphical Plot of Suspended Solid M4 (Mar - June 09)**

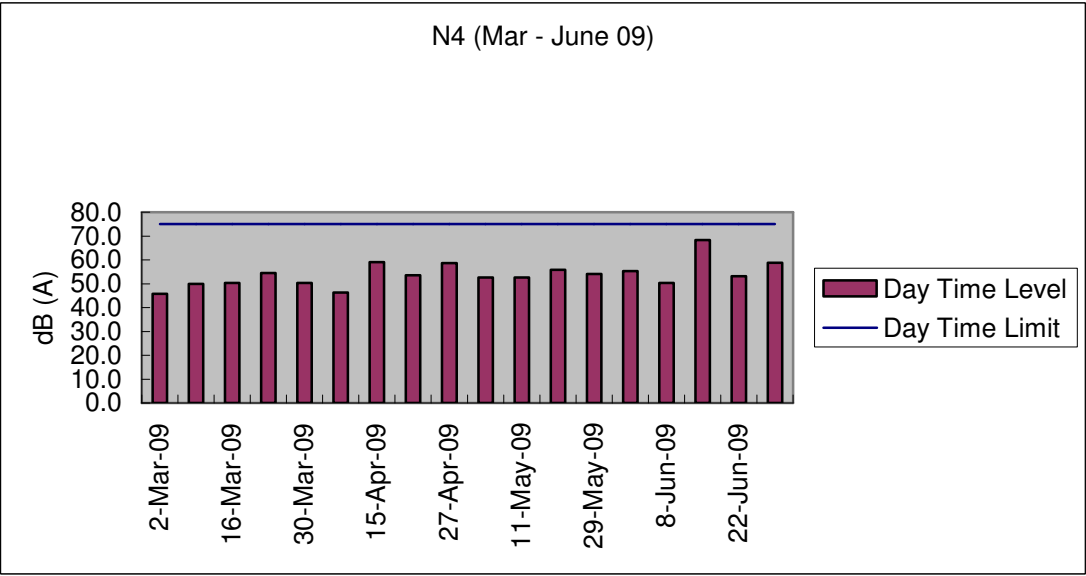
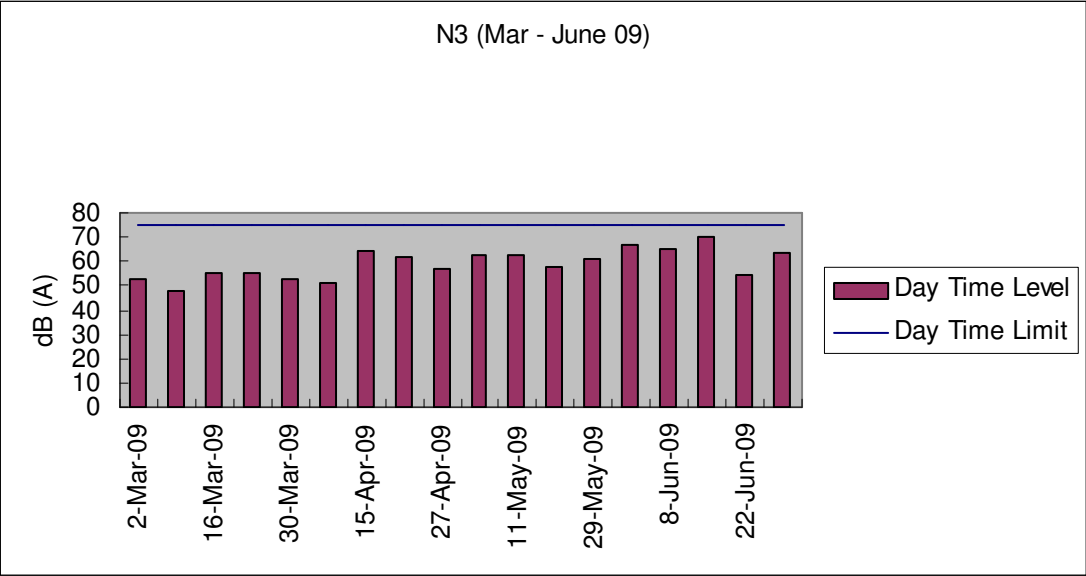


## Appendix J

Graphical plot of noise  
monitoring results







## Appendix K

### Ecological Survey Report

for the mangrove area at Luk Tei Tong

## **Ecological Survey Report for the mangrove area at Luk Tei Tong**

### **Background**

In response to the concerns from green groups on the mangrove area to the east of Luk Tei Tong River, contractor took action to install pipes between Luk Tei Tong River and the mangrove area on 25 May 2009 as agreed on a meeting in mid May.

The inlet pipes from Luk Tei Tong River to the mangrove area consist of two sections. The first section is between the mangrove area wetland and the excavation area. The second section is between the excavation area and Luk Tei Tong River.

The inlet pipes would be constructed at a level of 1.7mPD so as to allow water to flow naturally from Luk Tei Tong River during high tide into the wetland.

Meanwhile river water would be pumped into the mangrove areas from the river at high tide. The tidal effects on the mangroves shall be maintained at all times throughout the remaining part of the river works.

A monitoring for the mangrove area was conducted, weekly for one month starting from 27 May 2009 after installation of the twin pipes. Thereafter, the monitoring will be monthly till the completion of gabion wall construction and the original water inlet is reinstated (tentatively by the end of August 2009).

The objectives of the ecological monitoring are to:

- to document the completion installation and proper operation of the temporary twin 400mm pipes
- to document the general health condition of the mangrove community at Luk Tei Tong
- to evaluate reinstatement of the natural tidal flow

### **Method**

Field survey was conducted on 27<sup>th</sup> May, 5<sup>th</sup> 19<sup>th</sup> and 26<sup>th</sup> June 2009.

The survey was conducted during high tide (about 8am), mid-tide (noon), and low tide period (230pm) to investigate the condition of tidal exchange and the mangroves.

Photos of the construction site, including the twin inlet pipes and the mangrove communities were taken for documentation.

The condition of the pipe was checked, and the health condition of the mangroves were observed and recorded.

## Results

27 May 2009

The inlet pipes were installed, with one end at Luk Tei Tong River and other end at the mangrove area (**Photos 1**). No obstruction was observed at both ends of the pipe.

During the survey the water level was just below the pipe openings (**Photo 2**), and therefore no water flow between the mangrove area and was observed. On the other hand, it was observed that water was being pumped into the mangrove area through another temporary hose (**Photo 3**).

The mangrove area was dominated by mangrove associate *Acanthus ilicifolius* and true mangrove *Aegiceras corniculatum*, while other species including *Kandelia obovata*, *Derris trifoliata*, *Hibiscus tiliaceus* and *Phragmites australis* in less occurrence were also observed. Among these, *A. corniculatum*, *K. obovata*, and *A. ilicifolius* are true mangrove species, *H. tiliaceus* is backshore species while *P. australis* and *D. trifoliata* are mangrove associated species. No clear zonation was observed, which is normal in abandoned ponds where the substrate was uneven, but both the substrate level, species composition and dominance indicated that the mangrove area was covered with water only during high tide level. During the survey most of the mangrove and mangrove associated species were at least partly immersed in water (**Photos 4**). They appeared in good condition, and no signs of mortality were observed.

5 June 2009

The installed inlet pipes were in good condition, and no obstruction was observed at both ends of the pipes (**Photo 5**). During the morning survey the water level was below the pipe openings, and therefore no water flow between the mangroves and was observed. On the other hand, it was observed that water was being pumped into the mangrove areas through temporary pipelines (**Photo 6**).

The mangrove communities were more exposed above water during the current survey. Most of the dominant mangrove or mangrove associated species, including *Aegiceras corniculatum*, *Phragmites australis* and *Acrostichum aureum* were in good conditions (**Photos 7**). No signs of mortality or adverse health conditions were observed. Many individuals of a dominant mangrove associate species, *Acanthus ilicifolius*, had dry brownish leaves although fruiting was also observed (**Photo 8**). Numerous mangrove fauna including various mangrove crabs, mudskippers and fishes were observed and they appeared active during the survey period.

Tidal exchange through the inlet pipes was not apparent at the mangrove communities throughout the day. However, signs of variations in water levels were observed as 1) the water level was substantially lower than the previous survey and 2) degree of “wetness” of the substrate and the water marks on mangrove trunks varied, showing changes of water levels.

19 June 2009

The installed inlet pipes were in good condition, and no obstruction was observed at both ends of the pipes. It was noted that the end of one pipe at Luk Tei Tong River was slightly lowered and position stabilised with sand bags on top of the temporary bund (**Photo 9**). During the survey the water levels on both sides were below the pipe openings, and therefore no water flow between the mangroves and was observed. Pumped of water into the mangrove area ceased.

The mangrove communities were more exposed during the current survey. Most of the dominant mangrove or mangrove associated species, including *Aegiceras corniculatum*, *Phragmites australis* and *Acrostichum aureum* were in good conditions (**Photos 10**). Flowering of individuals of an occasional species, *Derris trifoliata*, were recorded (**Photo 11**). No signs of mortality or adverse health conditions of these mangrove were observed. Individuals of a dominant mangrove associate species, *Acanthus ilicifolius*, however, had dry brownish leaves (**Photo 12**). Mangrove fauna including various mangrove crabs, mudskippers and fishes were observed during the survey period.

26 June 2009

Tidal exchange between the mangrove area and Luk Tei Long River through the twin

pipes was observed. The end of the pipes on the river side was fully immersed in water (**Photo 13**), while water was observed flowing through the pipes to the mangrove area (**Photo 14**). The mangrove communities were flooded during the current survey (**Photo 15**), and the exposed portion of the dominant mangrove or mangrove associated species, including *Aegiceras corniculatum*, *Phragmites australis* and *Acrostichum aureum* were in fair conditions. No signs of mortality or adverse health conditions of these mangrove were observed. But mortality of *Acanthus ilicifolius* continued (**Photo 16**). A few mangrove crabs and fishes were observed at the mangrove area during the survey period.

### **Conclusions and Recommendations**

Since the inlet pipes have been installed and under operation, it is recommended that pumping of water can be stopped.









It appears that the installed pipes would only allow tidal exchange during high tide level. However, the level of the pipes cannot be further lowered to ease tidal exchange as the pipes already reach the ground level of the mangrove communities of concern.

It is anticipated that the gabion installation of this section of Luk Tei Tong River will be completed soon. It is recommended that the new box culvert should be reinstated to its original level. With all temporary bunds removed and the stream bed reinstated to its original condition, it is expected that original tidal exchange pattern could be restored.

The majority of the mangrove plants inside the concerned area were still in good conditions, but partial mortality of a dominant mangrove associate species, *Acanthus ilicifolius*, was observed. With the reinstatement of the box culvert, it is expected that these mangrove associate plants would recover gradually after.

Weekly monitoring of mangrove community in June 2009 was completed, while monthly mangrove monitoring would be conducted in July 2009.

Photos

			
1	2	3	4
			
5	6	7	8





9



10



11



12



13



14



15



16