

Drainage Service Department

Monthly Environmental Monitoring & Auditing report for

Contract No.DC/2006/11

Drainage Improvement in Southern Lantau

June 2012

Environmental Pioneers & Solutions Limited

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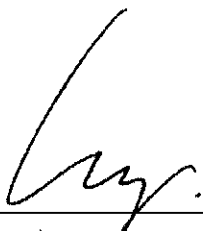
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EXECUTIVE SUMMARY

This is the forty-seventh monthly Environmental Monitoring and Audit (EM&A) report for “Drainage Improvement in Southern Lantau”. The environmental permit number is “EP-237/2005/B”. And, the environmental permit (EP-434/2012) for operational phase was issued on 3 Jan 2012. The report concludes the post-construction phase monitoring for the activities undertaken during the period of 1 June 2012 to 30 June 2012. Establishment of landscaping works, rectification of outstanding defects at Luk Tei Tong and construction of outstanding works at Ling Tsui Tau and Luk Tei Tong were major site activities to be carried out within this reporting month.

Ecological water quality monitoring and ecological monitoring were performed in this reporting month and the results were presented in this report. Additionally, the implementation status of environmental mitigation measures, event/action plan and environmental complaint handling procedures were inspected during monthly site environmental audit.

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

Refer to EPD memo received on 4 May 2011, post construction phase water quality monitoring was carried out in May 2011 and was completed on 1 June 2011.

EPD had no objection to the three proposed changes of EM&A programme, namely the termination of noise monitoring, change of Environmental Team (ET) site inspection frequency from weekly to monthly, and commencement of post-construction ecological monitoring effective from 1 Jan 2012.

According to the EM&A manual, the ecological water quality monitoring should be carried out every two months for 4 years after the completion of works. The post-construction phase ecological water quality monitoring was carried out on 15 June 2012.

Ecological monitoring survey was carried out during the reporting period.

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 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.

There were no complaint, notification of any summons and successful prosecutions against the project received during the reporting period.

Future site activities will include establishment of landscaping works, rectification of outstanding defects at Chung Hau and construction for reprovisioning of House 5 at Ma Po Tsuen. It is expected that environmental impact in different aspects 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 forty-seventh monthly Environmental Monitoring and Audit (EM&A) Report for “Drainage Improvement in Southern Lantau ” project Environmental Permit (EP-237/2005/B)

For the operation phase, the environmental permit number is (EP-434/2012) and was issued on 3 Jan 2012.

2. Project Information

2.1 Construction program

Majority of construction works of “Drainage Improvement in Southern Lantau” project will be completed in September 2012. 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 undertake the environmental monitoring and audit work for this project.

The environmental management structure and is shown in Fig 2.2.1.

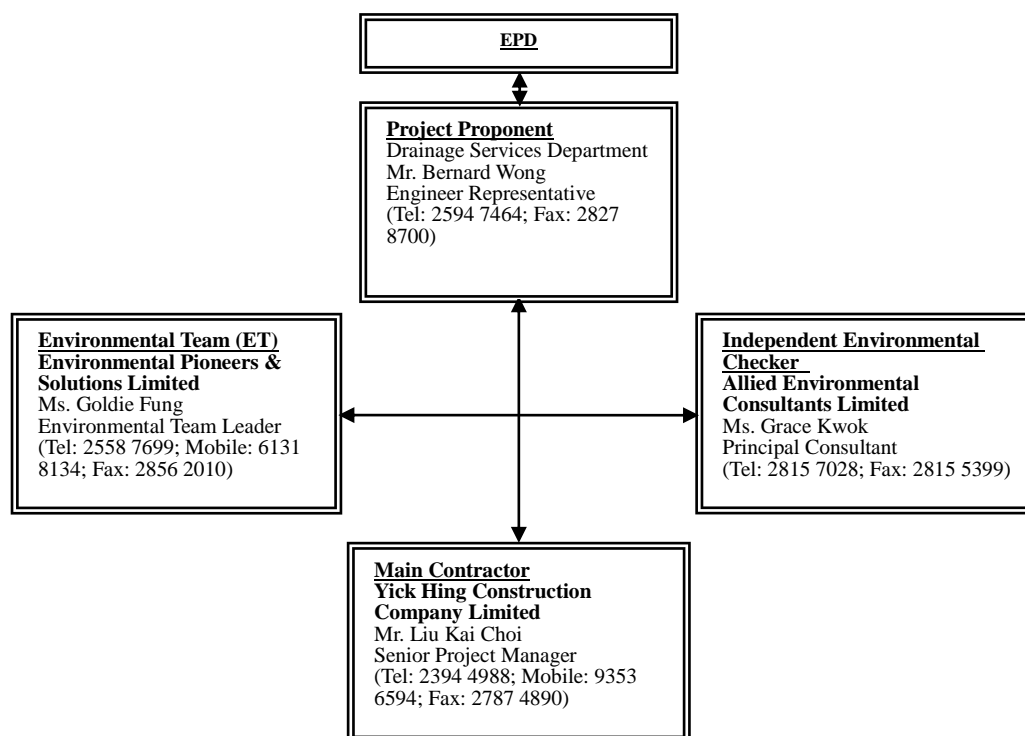


Figure. 2.2.1 Environmental Management structure for the project

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. Establishment of landscaping works
2. Rectification of outstanding defects at Luk Tei Tong
3. Construction of outstanding works at Ling Tsui Tau and Luk Tei Tong

3.2 Construction activities for the coming month

Proposed key construction works in the coming month will include:

1. Establishment of landscaping works
2. Rectification of outstanding defects at Chung Hau
3. Construction for reprovisioning of House 5 at Ma Po Tsuen

3.3 Environmental Status

Appendix A shows the location plan 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 criteria specified in the Noise Control Ordinance (NCO).

Noise measurement results obtained from each monitoring location were recorded in the Construction Noise Monitoring Data Sheet 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 the Technical Memorandum (TM) to the Noise Control Ordinance was deployed as monitoring equipment for noise measurement.

Noise measurement was not made in the presence of fog, rain, wind with a steady speed exceeding $5ms^{-1}$ or wind with gust exceeding $10ms^{-1}$. 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
Digital sound level meter	Model 949 Serial No: 8569	IEC 651 Type 1 IEC 804 Type 1
Windscreen	Microtech gefell model W2	N/A
Sound level calibrator	Model: SV30A Serial No: 7908	IEC 942 Type 1
Wind speed indicator	Kestrel K1000	N/A

4.3 Monitoring Locations

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

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 of 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.

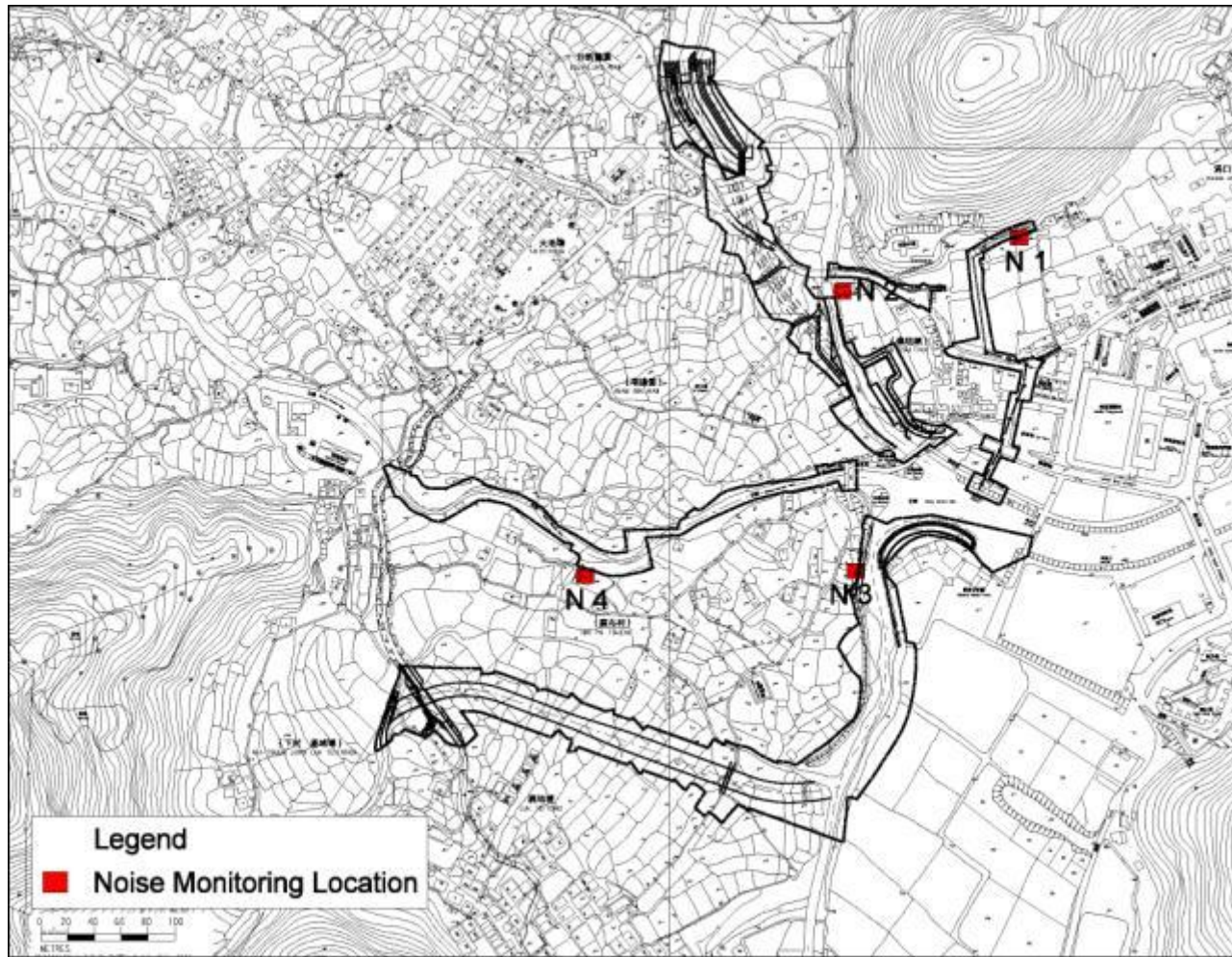


Figure 4.3.1 Impact noise monitoring locations

4.4 Monitoring Results and Interpretation

As EPD has no objection to the termination of weekly noise impact monitoring starting from 1 Jan 2012, no results were presented during the reporting period.

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.

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

4.6 Noise Mitigation Measures

No noise mitigation measures were carried out, as major construction activities had been completed, no powered mechanical equipment or other site activity was observed within the site area that would cause noise impact to the surrounding environment.

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 be measured 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, 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.

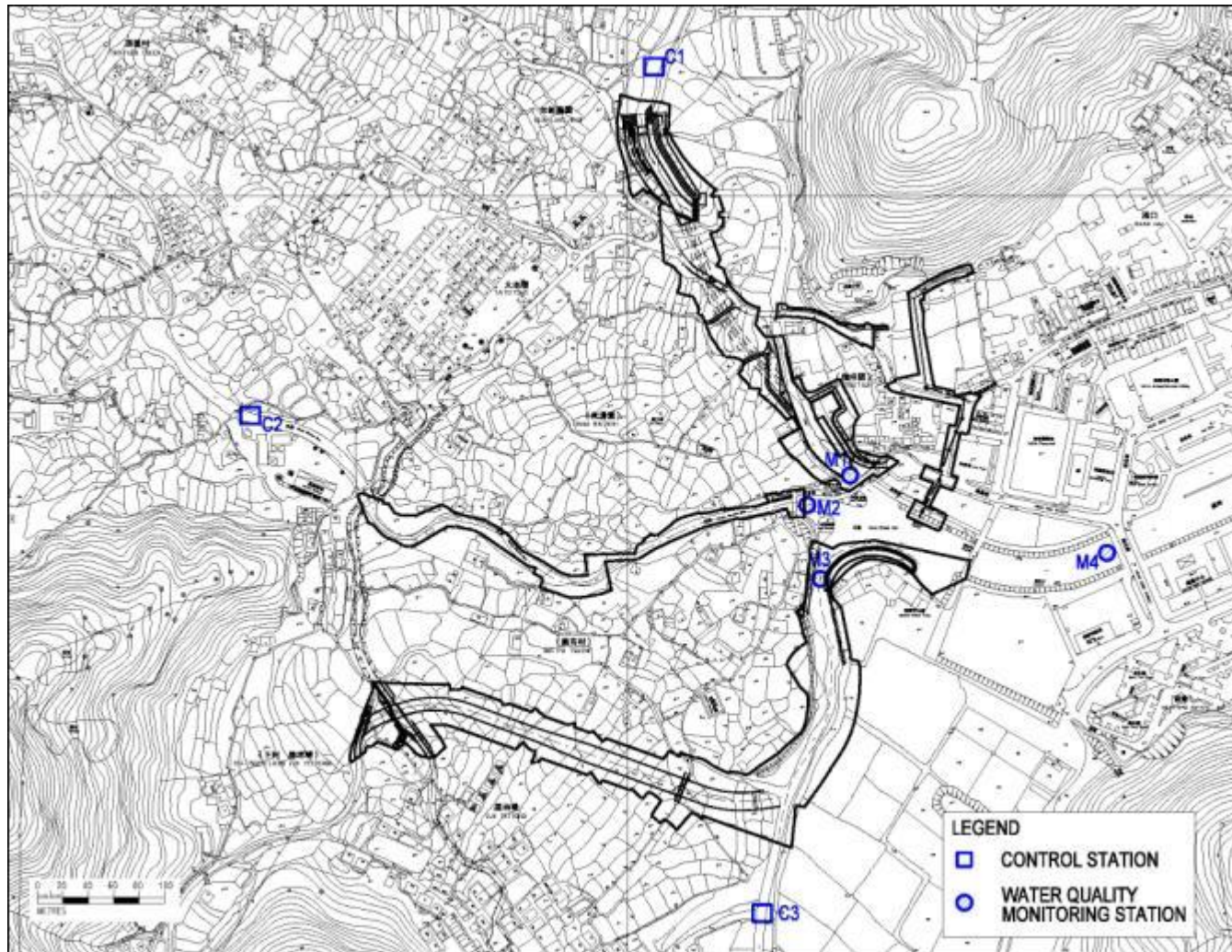


Figure 5.3.1 Water Quality Monitoring Locations

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

The water quality monitoring programme was completed on 1 June 2011. Therefore, no water quality results were presented in this report.

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

5.7 Water Quality Mitigation Measures

Construction Run-off and Drainage

Referring to the site practices outlined in ProPECC PN 1/94 ‘Construction Site Drainage’, during both construction and operation phase of the drainage improvement works, mitigation measures have to be taken as far as practicable to minimize surface runoff and soil erosion, in order to prevent washing away of construction materials, soil, silt or debris discharged to any drainage system.

Also recommended in the final EM&A manual, precaution against construction run-off, sewage discharged from construction workforce and river channel excavation works during general construction activities.

Contractor was recommended to provide sufficient water treatment facilities for accumulated site water and excavation activities carried out nearby river channel. Earth bunds should be provided to the construction site in / next to the river channel to form an enclosed, dry environment to minimize water quality impact.

5.8 Water Monitoring Schedule for the Next reporting period

Water quality monitoring (WQM) of this project has been completed, no WQM will be carried out in next reporting period.

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 Pak Ngan Heung (PNH) and Luk Tei Tong (LTT) Rivers is recommended. The monitoring parameters are required to be measured 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.

According to the EM&A Manual, a new monitoring programme would be carried out to monitor the ecology of the LTT Bypass Channel and its Reference Site for post-construction phase monitoring. The monitoring parameters required to be measured 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: a 10m line transect will be randomly laid in each 50 m section of both Luk Tei Tong by-pass and its reference site, and 5 1m x 1m quadrats will be placed regularly along the line transect. Percentage cover of each species within the quadrat was recorded to the nearest 10% (except “1” = present but insignificant cover, normally 1-2 individuals, and 5% = up to 5%). The conditions of vegetation will be described.

(6) Surveys of White-shouldered Starling *Sturnus sinensis*: Occurrence of White-shouldered Starling in and near the LTT Bypass Channel and Reference Site will be recorded during the bird survey. Behaviour related to nesting (e.g., carrying nesting materials, to-and-fro movement of adults carrying food, presence of recently fledged juveniles) will be reported.

(7) Herpetofauna community species composition and abundance: Herpetofauna surveys within the Reference Site and LTT Bypass Channel will be surveyed by active searching in potential habitats. Twenty minutes will be spent in each 50m section. Reptiles will be identified and their abundance will be recorded.

Amphibians will be identified by their calls and the number of calling males in each section will be recorded.

Water Quality Monitoring along LTT and PNH River as well as LTT bypass channel and its reference site will be carried out. Water quality monitoring parameters include Turbidity in Nephelometric Turbidity Unit (NTU), Dissolved Oxygen (DO) in mg/L and Suspended Solids (SS) in mg/L are required to be measured in this project. Moreover, additional water quality monitoring parameters will be measured for the purposes of ecological water quality monitoring of this project. The additional parameter 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, 20th 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 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 collected 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.

6.3 Monitoring Locations

According to the Final EM&A Manual, the improved section of the PNH and LTT river channels will be divided into section for the ecological survey. By divided into 50m per section, there are totally nine sections on the PNH & LTT Rivers for the ecological survey. The nine sections 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 Location Plan of ecological monitoring for PNH River and LTT River is shown in Figure 6.1 for reference.

For LTT Bypass Channel and the Reference Site, there are totally ten sections for the ecological survey on above areas. The ten sections include:

- Five sections at LTT Bypass Channel
- Five sections at the Reference Site

The Location Plan for ecological monitoring for LTT Bypass Channel and Reference Site is shown in Figure 6.2 for reference.

Ecological water quality monitoring (EWQM) for the improved sections of the river channels was required. The locations of sampling point for post-construction phase monitoring were the same locations for the impact monitoring. The locations include:

- Three points at PNH River
- Three points at Luk Tei Tong River

The Location Plan of EWQM for PNH River and LTT River is shown in Figure 6.3 for reference.

The EWQM monitoring for LTT Bypass Channel and Reference Site was required in accordance with EM&A manual Section 6.2.31 & 6.2.32 and was started on 1 Jan 2012.

The Locations of sampling points for EWQM at LTT Bypass Channel and Reference Site include:

- Two points at LTT Bypass Channel
- Two points at Reference Site

The EWQM monitoring locations for LTT Bypass channel and Reference Site is shown in Figure 6.4 for reference.

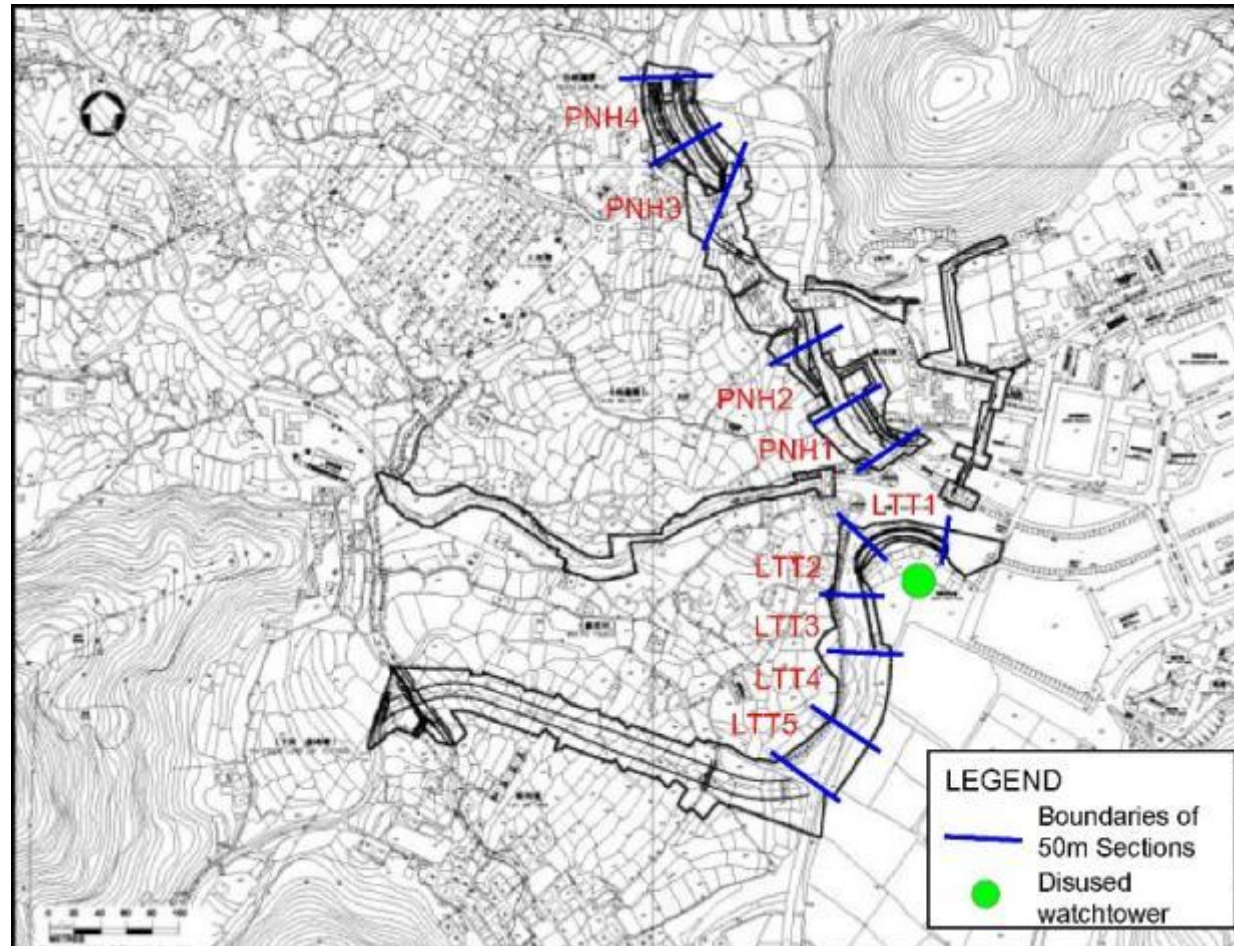


Figure 6.1 Ecological Monitoring Locations

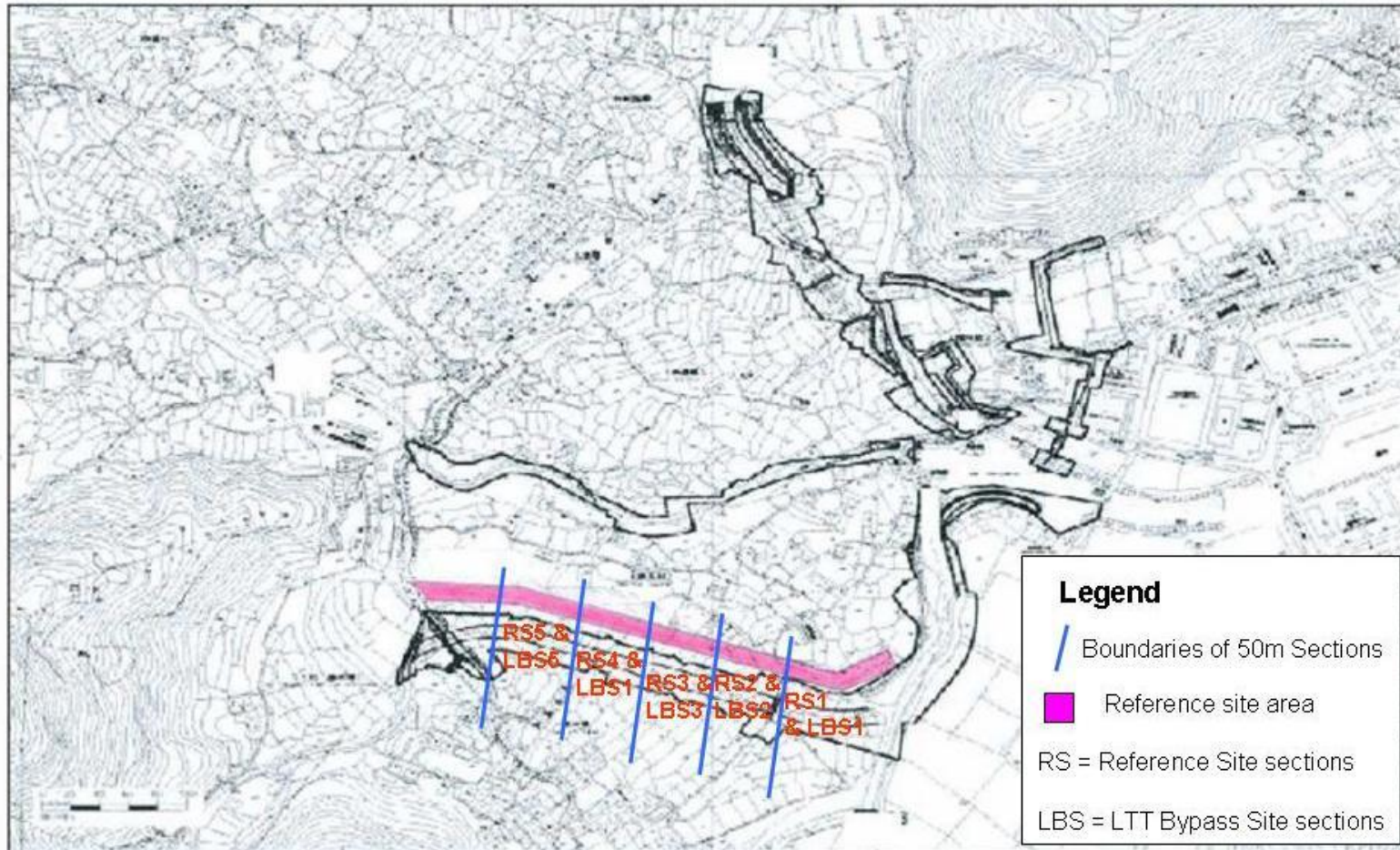


Figure 6.2 Ecological Monitoring Locations for LTT Bypass Channel and Reference Site

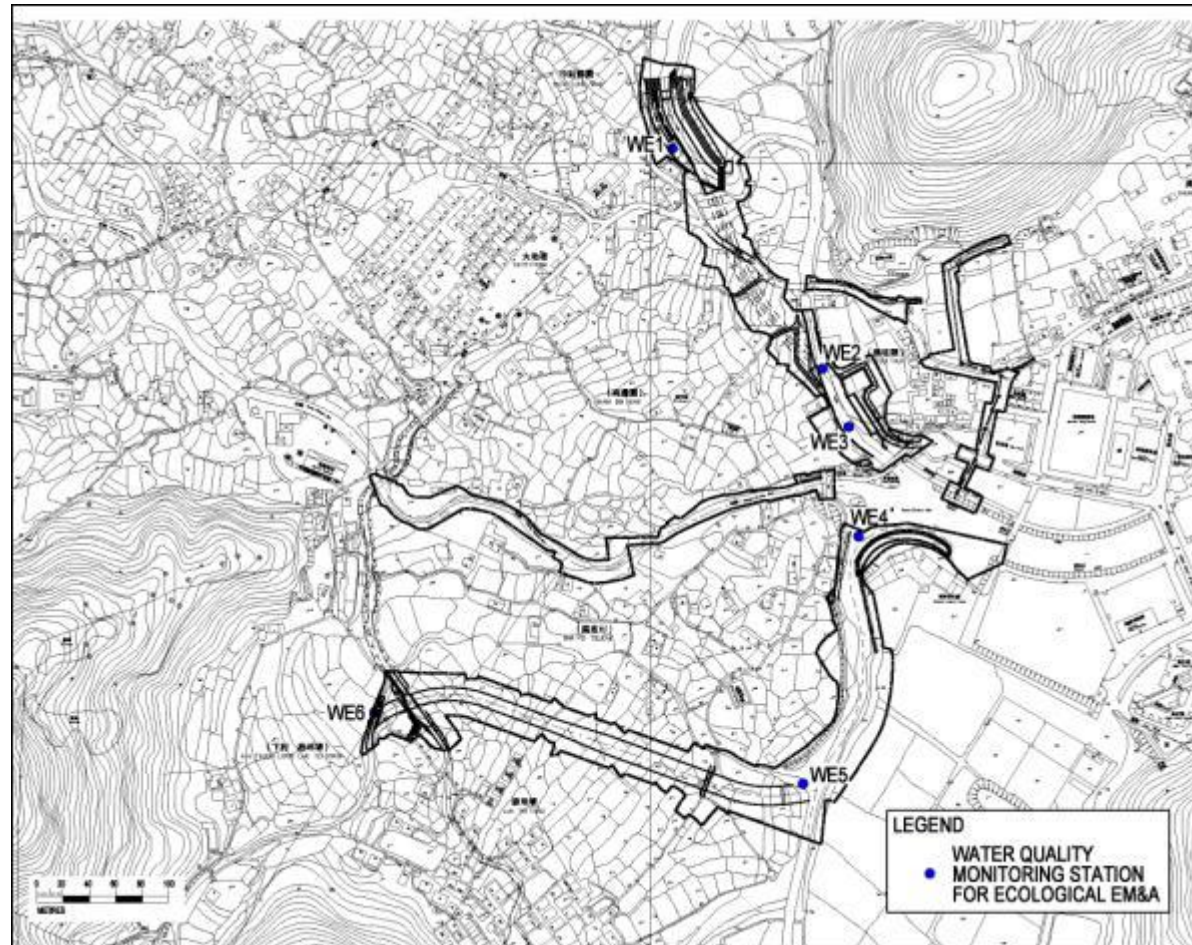


Figure 6.3 Ecological Water Quality monitoring locations

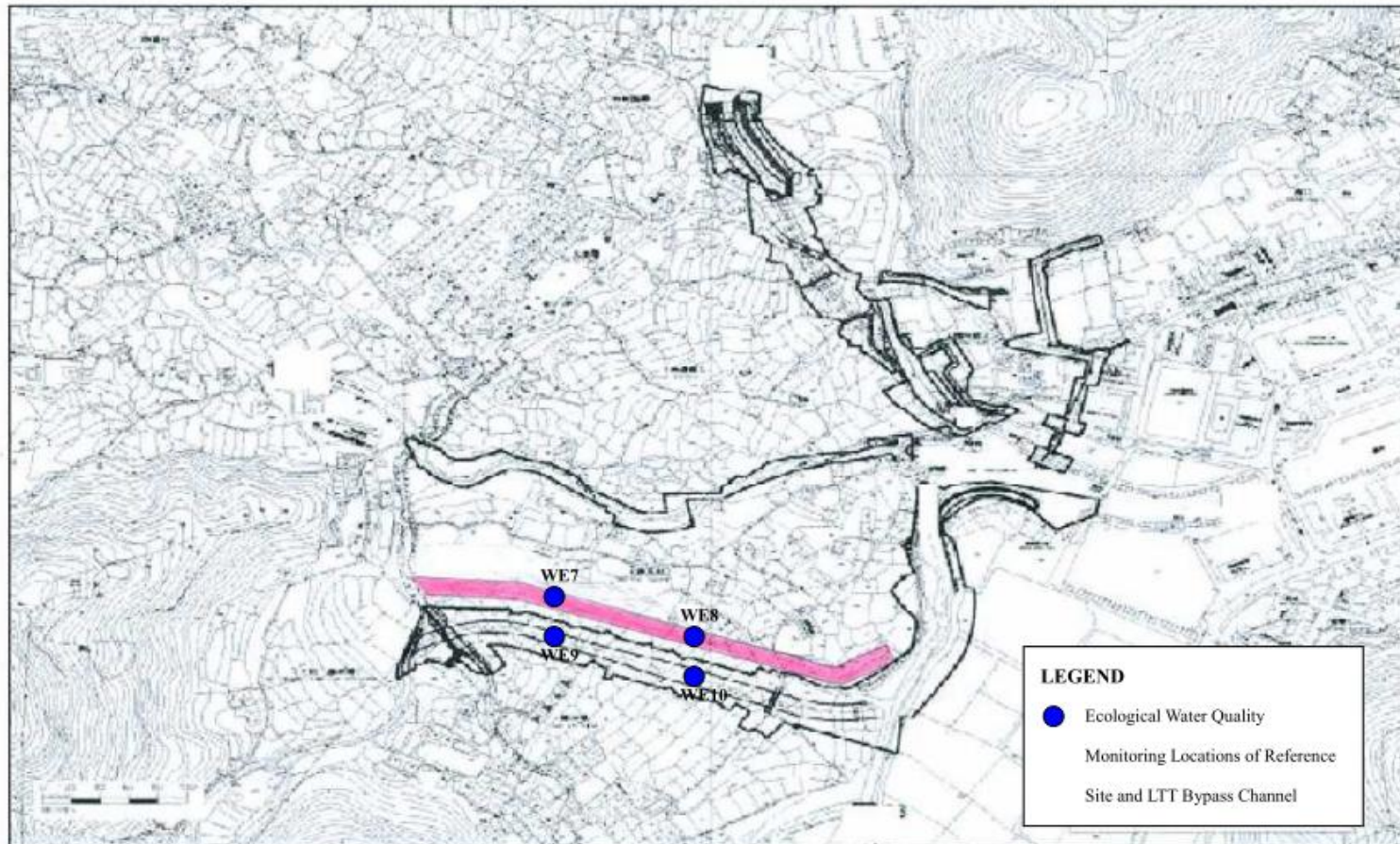


Figure 6.4 Ecological Water Quality Monitoring Locations for LTT Bypass Channel and Reference Site

6.4 Monitoring Frequency

The post-construction ecological monitoring is carried out every two months a year for 4 years after the completion of works. The bi-monthly ecological monitoring was carried out during this reporting period.

6.5 Monitoring results

Pak Ngan Heung Stream N and S sections

Vegetation

Surveys were conducted on 26 June 2012. Vegetation recorded included plants recolonised on stream bed, new rock gabion and remnant of the old stream bank.

The walk through survey recorded a total of 33 species, including 12 tree, 3 shrub, 7 herb and 5 grass species (Appendix D1) on PNH N section. 25 of the species recorded are natives, while 8 were exotics. The streambed and gabion were heavily covered with *Mikania* which started to re-establish after clearance. Remnants of vegetation including native trees (e.g. *Macaranga tanarius*) and grasses species (e.g. *Microstegium ciliatum*) were still seen along the east stream bank. Newly planted species included seedlings of such as *Ficus microcarpa*, *Gardenia jasminoides*, *Celtis sinensis*, *Liquidambar formosana* and *Mallotus paniculatus*. No species of conservation interest was recorded.

Vegetation was only found on remnants of the old concrete bank along PNH S section. A total of 4 species recorded, 2 of which were native and 2 were exotic, including some native trees (*Ficus superba*, *Ficus microcarpa*) and exotic grass (*Panicum maximum*) (Appendix D2). No species of conservation interest was recorded. No vegetation was observed on the new rock gabion on the lower section near the estuary.

Terrestrial Fauna

Surveys were conducted on 30 June 2012.

Four species of birds were recorded in Pak Ngan Heung River (Table 6.5.1a). All are common in Hong Kong.

Three of the recorded species – Little Egret *Egretta garzetta*, Chinese Bulbul *Pycnonotus sinensis* and Japanese White-eye *Zosterops japonica* – were present in Pak Ngan Heung River before construction works commenced (Table 6.5.1b). This showed that some bird species re-colonised the Pak Ngan Heung River after construction works completed.

Further comparison will be made in the coming surveys to confirm re-colonisation of the other species.

Table 6.5.1a Avifauna in Pak Ngan Heung

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Little Egret	<i>Egretta garzetta</i>	3				CW
Chinese Bulbul	<i>Pycnonotus sinensis</i>			2		CW
Red-whiskered Bulbul	<i>Pycnonotus jocosus</i>			2		CW
Japanese White-eye	<i>Zosterops japonica</i>				2	CW

CW = common and widespread

Table 6.5.1b Avifauna in Pak Ngan Heung during baseline survey

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Little Egret*	<i>Egretta garzetta</i>		1			CW
Common Kingfisher	<i>Alcedo atthis</i>		1			CW
White Wagtail	<i>Motacilla alba</i>		1		1	CW
Chinese Bulbul*	<i>Pycnonotus sinensis</i>	2				CW
Common Tailorbird	<i>Orthotomus sutorius</i>			1		CW
Oriental Magpie Robin	<i>Copsychus saularis</i>	1				CW

Japanese White-eye*	<i>Zosterops japonica</i>				2	CW
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CW = common and widespread

* re-colonisation occurred

Four species of dragonfly was recorded in Pak Ngan Heung River (Table 6.5.2a). All are common in Hong Kong.

Two of the recorded species –Wandering Glider *Pantala flavescens* and Crimson Dropwing *Trithemis aurora* – were present in Pak Ngan Heung River before construction works commenced (Table 6.5.2b). This showed that these dragonfly species re-colonised the Pak Ngan Heung River after construction works completed.

Further comparison will be made in the coming surveys to confirm re-colonisation of the other species.

Table 6.5.2a Dragonfly in Pak Ngan Heung River

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Green Skimmer	<i>Orthetrum sabina</i>		2			A
Wandering Glider	<i>Pantala flavescens</i>	2	5			A
Variegated Flutterer	<i>Rhyothemis variegata</i>			2		C
Crimson Dropwing	<i>Trithemis aurora</i>				3	A

A = abundant, C = common

Table 6.5.2b Dragonfly in Pak Ngan Heung during baseline survey

Common names	Latin names	PNH 1	PNH 2	PNH 3	PNH 4	Commonness & distribution
Orange-tailed Sprite	<i>Ceriagrion auranticum</i>				2	A
Common Bluetail	<i>Ischnura senegalensis</i>				6	A
Common Red Skimmer	<i>Orthetrum pruinosum</i>	1				A
Red-faced Skimmer	<i>Orthetrum chrysis</i>				1	C
Crimson Dropwing*	<i>Trithemis aurora</i>		1			A
Indigo Dropwing	<i>Trithemis festiva</i>			1		A
Wandering Glider*	<i>Pantala flavescens</i>			1		A

A = abundant, C = common * re-colonisation occurred

Aquatic fauna and fish

5 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 monitoring survey.

Table 6.5.3 Aquatic Invertebrates and fish in Pak Ngan Heung

Common names	Scientific names	PNH 1	PNH 2	PNH3	PNH4
Invertebrates					
Atyid shrimp	<i>Caridina elongata</i>				+
Palaemonid shrimp	<i>Macrobrachium hainanensis</i>			+	++
Crab	<i>Varuna litterata</i>				
Mitten Crab	<i>Eriocheir japonica</i>				
Fish					
Mosquito fish	<i>Gamusia affinis</i>				++
Goby	<i>Rhinogobius duospilus</i>				
Barcheek Goby	<i>Rhinogobius giurinus</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 2012. During the current survey, vegetation along Section 1 was as part of the maintenance work. Remnants of mangrove stand dominated by *Kandelia obovata* remained in Section 2. A few grass and herb species colonised the new rock gabion of Section 4, while mangrove, grasses and herbs recolonised the junction between Section 5 and LTT bypass channel. The walk through survey recorded a total of 19 species, including 6 tree, 3 herb and 2 grass species (Appendix D3). 15 species recorded are natives, while 4 were exotics.

Terrestrial Fauna

The Luk Tei Tong River was divided into 5 sections.

Surveys were conducted on 30 June 2012.

A total of nine species of birds were recorded in these sections (Table 6.5.4a). All are common in Hong Kong.

Four of the recorded species – Little Egret *Egretta garzetta*, White Wagtail *Motacilla alba*, Chinese Bulbul *Pycnonotus sinensis* and Rufous-backed Shrike *Lanius schach* – were present in Luk Tei Tong River before construction works commenced (Table 6.5.4b). This showed that half of the bird species re-colonised the Luk Tei Tong River after construction works completed.

Further comparison will be made in the coming surveys to confirm re-colonisation of the other species.

Table 6.5.4a 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>	3					CW
Great Egret	<i>Casmerodius alba</i>	1	1				CL

Chinese Pond Heron	<i>Ardeola bacchus</i>	1	1				CW
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>		4				CL
Koel	<i>Eudynamis scolopacea</i>					1	CW
White Wagtail	<i>Motacilla alba</i>	1					CW
Chinese Bulbul	<i>Pycnonotus sinensis</i>					1	CW
Rufous-backed Shrike	<i>Lanius schach</i>				1		CW
Crested Myna	<i>Acridotheres cristatellus</i>			2	6		CW

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

Table 6.5.4b Avifauna in Luk Tei Tong River during baseline survey

Common names	Latin names	LT T1	LT T2	LT T3	LT T4	LT T5	Commonness & distribution
Little Egret*	<i>Egretta garzetta</i>	1					CW
White-breasted Waterhen	<i>Amaourornis phoenicurus</i>		1				CW
White Wagtail*	<i>Motacilla alba</i>	1					CW
Chinese Bulbul*	<i>Pycnonotus sinensis</i>					2	CW
Oriental Magpie Robin	<i>Copsychus saularis</i>				1		CW
Japanese White-eye	<i>Zosterops japonica</i>						CW
Crested Myna*	<i>Acridotheres cristatellus</i>					1	CW
Black-necked Starling	<i>Sturnus nigricollis</i>				1		CW

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

* re-colonisation occurred

Seven species of dragonfly were recorded in the Luk Tei Tong River (Table 6.5.5a). All are common in Hong Kong.

Three of the recorded species –Wandering Glider *Pantala flavescens*, Red-faced Skimmer *Orthetrum chrysis* and Crimson Dropwing *Trithemis aurora* – were present in Luk Tei Tong River before construction works

commenced (Table 6.5.5b). This showed that more than half of the dragonfly species re-colonised the Luk Tei Tong River after construction works completed.

Further comparison will be made in the coming surveys to confirm re-colonisation of the other species.

Table 6.5.5a Dragonfly in Luk Tei Tong River

Common names	Latin names	LTT 1	LTT 2	LTT 3	LTT 4	LTT 5	Commonness & distribution
Common Flangetail	<i>Ictinogomphus pertinax</i>					1	C
Blue Dasher	<i>Brachydiplax chalybea</i>			1			C
Red-faced Skimmer	<i>Orthetrum chrysis</i>			1			A
Green Skimmer	<i>Orthetrum sabina</i>			1			A
Variegated Flutterer	<i>Rhyothemis variegata</i>				16		C
Wandering Glider	<i>Pantala flavescens</i>	12				12	A
Crimson Dropwing	<i>Trithemis aurora</i>	1		1			A

A = abundant, C = common

Table 6.5.5b Dragonfly in Luk Tei Tong River during baseline survey

Common names	Latin names	LT T1	LT T2	LT T3	LT T4	LT T5	Commonness & distribution
Common Red Skimmer	<i>Orthetrum pruinosum</i>				1		A
Red-faced Skimmer*	<i>Orthetrum chrysis</i>			1			C
Crimson Dropwing*	<i>Trithemis aurora</i>			1			A
Indigo Dropwing	<i>Trithemis festiva</i>		1		1		A
Wandering Glider*	<i>Pantala flavescens</i>	2	1		1	5	A

A = abundant, C = common

* re-colonisation occurred

Aquatic invertebrates and fish

4 species of fish 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.

Table 6.5.6 Aquatic invertebrates and fish in Luk Tei Tong River

Common names	Scientific names	LTT1	LTT2	LTT3	LTT4	LTT5
Invertebrates						
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>					
Fish						
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.

Luk Tei Tong Bypass Channel & Reference Site

Vegetation

A total of 15 plant species with an average cover of 94% were recorded within the quadrats at LTT Bypass Channel (Table 6.5.5, Appendix D4). Section 1 of LTT Bypass Channel which may be subject to tidal influence during high tide, was colonised with a sedge *Fimbristylis ferruginea* and reed *Phragmites australis*. Most of the upper sections of LTT Bypass Channel were densely covered with vegetation dominated by the exotic herb *Wedelia trilobata*. Other grass species recorded included *Panicum maximum* and *Apluda mutica*. The remaining recorded species only formed a small composition of the plants recorded. During the survey, other than Section 1 which was covered with water, other sections were fairly dry.

A total of 19 plant species with an average cover of 127.9% were recorded within the sampling quadrats (Table 6.5.7, Appendix D4) at the reference site, which was dominated by *Wedelia trilobata*, followed by *Mimosa pudica*. Other species frequently occurred included *Bidens alba* and *Aster subulatus*.

Table 6.5.7 Comparison of LTT Bypass Channel and Reference Site

	LTT Bypass Channel	Reference Site
Total No. Species	15	19
Average Vegetation Cover (%)	94	127.9
Bare/Litter (%)	8	8
Open Water (%)	12	0

Terrestrial Fauna

The Luk Tei Tong Bypass Channel and Reference Site were each divided into 5 sections.

Surveys of birds, dragonflies and herpetofauna were conducted on 30 June 2012.

One species of birds were recorded in the Luk Tei Tong Bypass Channel, while three species in Reference Site (Table 6.5.8). All are common in Hong

Kong.

No White-shouldered Starling was recorded in the Luk Tei Tong Bypass Channel or Reference Site.

Table 6.5.8 Avifauna in Luk Tei Tong Bypass channel and Reference Site

Common names	Latin names	LBC1	LBC2	LBC3	LBC4	LBC5	RS	RS	RS	RS	RS	Commonness & distribution
							1	2	3	4	5	
Chinese Bulbul	<i>Pycnonotus sinensis</i>				1							CW
Yellow-bellied Prinia	<i>Prinia flaviventris</i>										1	CW
Rufous-backed Shrike	<i>Lanius schach</i>									1		CW
Crested Myna	<i>Acridotheres cristatellus</i>								3			CW

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

Only one species of dragonfly was recorded in the Reference Site, while none in the Luk Tei Tong Bypass Channel in June 2012.

Table 6.5.9 Dragonfly in Luk Tei Tong Bypass channel and Reference Site

Common names	Latin names	LBC1	LBC2	LBC3	LBC4	LBC5	RS	RS	RS	RS	RS	Commonness & distribution
							1	2	3	4	5	
Russet Percher	<i>Neurothemis fulvia</i>				1							C

C = common

No herpetofauna was recorded in the Luk Tei Tong Bypass Channel or Reference Site in June 2012.

Aquatic invertebrates and fish

Surveys of fish and macroinvertebrates were conducted in Luk Tei Tong Bypass Channel and Reference Site. But basically both were not aquatic habitats for fish or macroinvertebrates. No fish or macroinvertebrates was found in either Luk Tei Tong Bypass Channel or Reference Site.

Disused Watchtowers

Surveys were conducted on 30 June 2012.

There was no sign (e.g., adults carrying food or nesting materials) of use of the watchtower as nesting habitat by White-shouldered Starling.

White-shouldered Starling was not observed during the June 2012 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 nesting habitat.

6.6 Ecological Water Quality Monitoring (EWQM)

The post-construction phase EWQM was started on 1 June 2011 and conducted on a bi-monthly basis. Post-construction EWQM was conducted in the reporting period and the monitoring results are summarized in Table 6.6.1. Detailed on-site measurements and laboratory report are presented in Appendix E and Appendix F respectively. The monitoring schedule is shown in Appendix H.

No water was observed along the LTT bypass channel and Reference Site. Therefore, no water samples were collected for further analysis and no results were presented in this report for LTT bypass channel and Reference Site.

Table 6.6.1 Summarized Ecological water quality monitoring results (15 June 2012)

Parameters	WE1	WE2	WE3	WE4	WE5	WE6
Suspended Solid (mg/l)	3.00	<2.00	<2.00	5.50	<2.00	4.00
Nitrogen (Ammonia) (mg/l)	0.07	0.04	1.14	0.19	0.08	0.04
Nitrogen (Nitrate) (mg/l)	0.13	0.12	0.11	0.45	0.96	0.11
Phosphorous (mg/l)	<0.10	<0.10	<0.10	<0.10	0.10	<0.10
BOD ₅ (mg/l)	<2.00	<2.00	<2.00	<2.00	<2.00	<2.00
DO (mg/l)	7.73	7.58	7.66	7.66	6.25	7.44
Turbidity (NTU)	2.40	1.35	0.80	4.20	1.15	1.20
Temperature (oC)	27.0	26.7	26.8	29.1	27.8	26.2
pH	6.8	6.4	6.4	7.4	6.9	7.8
Salinity (ppt)	0.0	0.0	0.0	12.8	13.4	0.2
Conductivity (s/m)	17.1	7.9	9.8	2.5	2.7	9.3
Water Flow (m/s)	<0.1	<0.1	<0.1	<0.1	<0.1	<0.1

Table 6.6.2 shows the baseline results of Ecological Water Quality Monitoring, from the information given in Baseline Monitoring Report.

Table 6.6.2 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 ₅ (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

6.7 Action and Limit level for Monitoring of White-shouldered Starlings

A simple Event and Action Plan is shown in Table 6.7.1. 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 6.7.1 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	

6.8 Ecological monitoring Schedule

The next ecological surveys and EWQM are scheduled in August 2012.

7. Action taken in Event of Exceedance

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

As no monitoring was conducted in the reporting period, no exceedance was recorded.

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 figures of the construction wastes disposal provided by 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 st to 30 th June 12	5.0 (tons)	0	Nil
Total	36952.06 (tons)	247.43 (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 2007	--	Issued
Varied Environmental Permit	EP-237/2005/B	23 April 2009	--	Issued
Environmental Permit for operational phase	EP-434/2012	3 Jan 2012		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.

	Noise	Water	Ecology	Cultural	Others
June 2012	0	0	0	0	0
Total	0	1	0	0	1

11. Site Environmental Audits

11.1 Site Inspection

Starting from 1 Jan 2012, the frequency of ET's regular site inspection was changed from weekly to monthly basis. In the reporting month, the site inspection was conducted on 27 June 2012.

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.

Date	Observations	Advice from ET	Action taken	Closing Date
26 April 2012 30 May 2012	Exposed stockpile was observed near the site office	Contractor was reminded to cover the stockpile with tarpaulin for dust suppression.	Exposed stockpile was covered with tarpaulin by contractor.	27 June 12
27 June 2012	No major environmental deficiency is observed	N/A	N/A	N/A

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.

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.

12. Future key issues

Establishment of landscaping works, rectification of outstanding defects at Chung Hau and construction for reprovisioning of House 5 at Ma Po Tsuen would be major site activities to be carried out in the upcoming month. Although environmental impact arisen from those activities would be expected to be minimal, Contractor was still reminded to pay serious attention to the following key issues:

- Dust generation due to handling of earthy material.
- Housekeeping of site, such as stockpiling of C&D waste and earthy material.
- Removal of wastes as part of site clearance.

Contractor was recommended to provide tarpaulin coverings to all earthy stockpiles on site. Dusty area should be dampened regularly to avoid dust generation.

Contractor should also prevent excessive storage of wastes on site. Wastes should be collected and disposed to designated public fill.

13. Conclusions

Major site activities that carried out within this reporting month included establishment of landscaping works, rectification of outstanding defects at Luk Tei Tong and construction of outstanding works at Ling Tsui Tau and Luk Tei Tong.

EPD had no objection to the three proposed changes of EM&A programme for post-construction phase, included i) the termination of noise monitoring, ii) change of ET's site inspection frequency from weekly to monthly, and iii) commencement of post-construction ecological monitoring effective from 1 Jan 2012.

Noise monitoring has been completed on 31 Dec 2011. No results were presented in this report.

Regular site meetings and inspection audits on environmental matters were held among Project Proponent, Contractor, IEC and ET on monthly basis. The monthly site meeting and inspection audit in this reporting month was carried out on 27 June 2012.

Post-construction water quality monitoring has been completed on 1 June 2011. And the bi-monthly post-construction phase ecological water quality monitoring was carried out on 15 June 2012.

Ecological monitoring survey was carried out during the reporting period.

During ecological monitoring survey, no White-shouldered Starling was recorded breeding in the watch tower.

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.

Furthermore, there was no notification of summons; no formal prosecution and complaints recorded during this reporting period.

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

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

Appendix A

Construction Programme and Location Plan

NOTES :

1. ALL LEVELS ARE IN METRES ABOVE P.D.H.K.1.
2. ALL GRIDS REFER TO HONG KONG 1980 GRID.

LEGENDS :

- SITE BOUNDARIES
- ▨ PORTION D1 - PAK NGAM BEIING
- ▨ PORTION D2 - LUNG TSUI TAI LAI
- ▨ PORTION D3 - LUNG TSUI TAI (B)
- ▨ PORTION D4 - TAI TEI TONG RIVER
- ▨ PORTION D5 - LUK TEI TONG
- ▨ PORTION D6 - FUU O
- ▨ PORTION D7 - LO UK TSEEN
- ▨ PORTION D8 - CHEUNG SHA SHEUNG YEGHEN
- ▨ PORTION D9 - EMERGENCY VEHICULAR ACCESS (EVA) AT HUI 'N'

FOR TENDER PURPOSES ONLY

1. NAME OF PROJECT	2. DRAWN BY	3. CHECKED BY	4. DATE
MAKING OF PROPOSED DRAINAGE CHANNELS AND EMERGENCY VEHICULAR ACCESS AT HUI 'N'	H. T. CHAN	H. T. CHAN	12 FEB 2006
5. SCALE	6. DATE	7. DATE	8. DATE
1:2000	B. D. CHAN	13 MAR 2006	10 MAY 2007
9. DESIGNER	10. DATE	11. DATE	12. DATE
S. Y. CHAN	1. Y. CHAN	11 MAY 2006	

DESIGNED BY: S. Y. CHAN 11 MAY 2006
 CHECKED BY: B. D. CHAN 13 MAR 2006
 CONTRACT NO: DC/2006/11
 FILE NO: DP/06/4128CD
 PROJECT NO: 128CD
 CONTRACT:

DRAINAGE IMPROVEMENT IN
 SOUTHERN LANTAU

DRAINAGE IMPROVEMENT IN
 SOUTHERN LANTAU

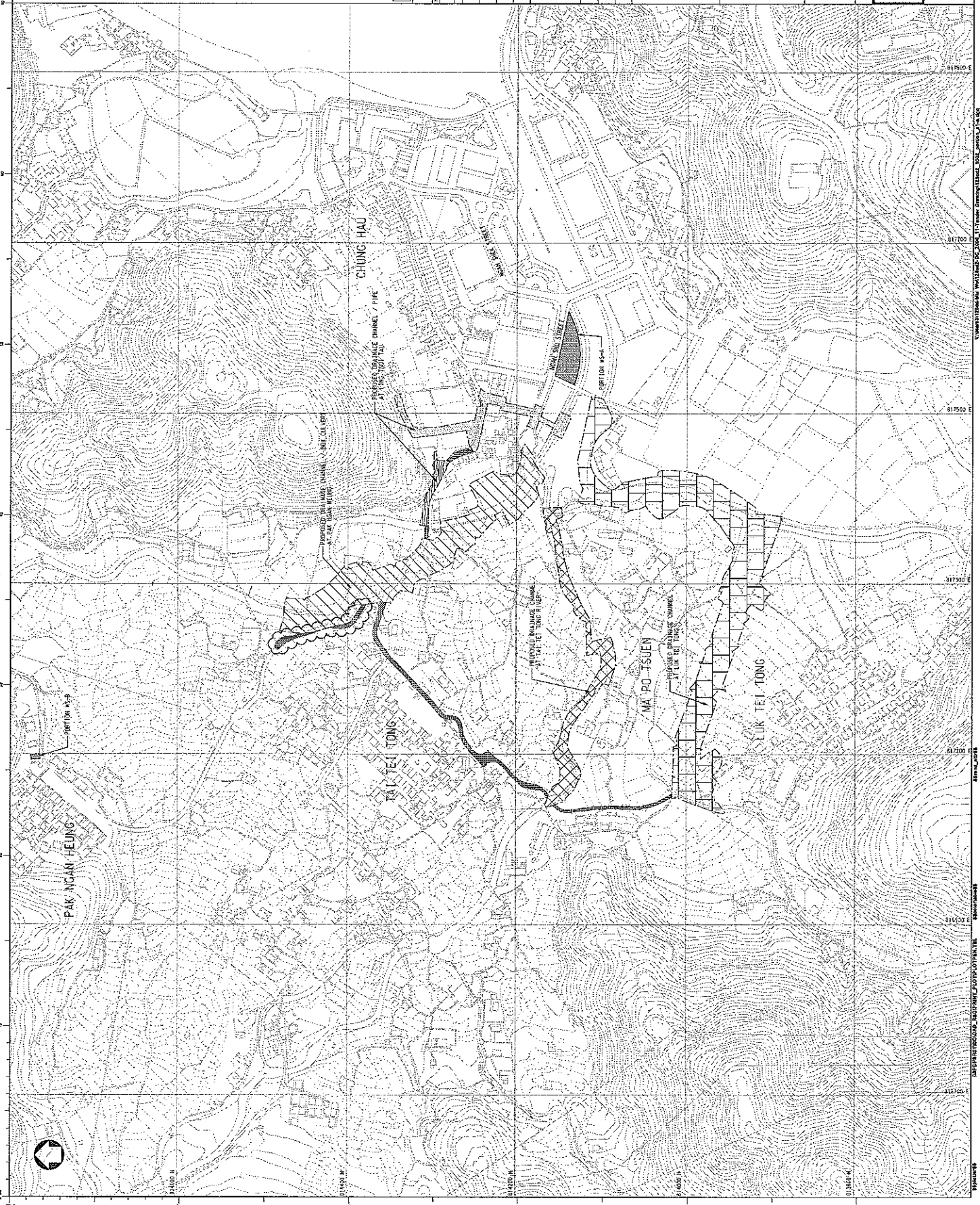
Drawing title:
 PORTIONS OF SITE
 - SOUTHERN LANTAU

sheet no.	scale
DDN/128CDZ/1002A	1 : 2000
COPYRIGHT RESERVED	

DRAINAGE PROJECTS DIVISION

DRAINAGE SERVICES DEPARTMENT
 GOVERNMENT OF THE HONG KONG SPECIAL ADMINISTRATIVE REGION

AT 8418374



811500 E 811700 E 811900 E 812100 E 812300 E 812500 E 812700 E 812900 E 813100 E

Appendix B Key Personal Contact information chart

Organization Name	Role	Title	Name	Telephone	Fax Number
Drainage Service Department	Project Proponent	Engineering Representative	Mr. Bernard Wong	2594 7464	2827 8700
Allied Environmental Consultants Limited	Independent Environmental Checker (IEC)	Principal Consultant	Ms. Grace Kwok	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. Goldie Fung	2558 7699	2856 2010

Appendix C

Calibration certificate for monitoring equipments



ALS Technichem (HK) Pty Ltd

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

CONTACT: MR ALLEN CHAN
CLIENT: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD
ADDRESS: FLAT 19A, CHAI WAN INDUSTRIAL CENTRE BUILDING,
20 LEE CHUNG STREET,
CHAI WAN,
HONG KONG.

WORK ORDER: HK1207405
LABORATORY: HONG KONG
DATE RECEIVED: 16/03/2012
DATE OF ISSUE: 30/03/2012

PROJECT: --

COMMENTS

It is certified that the item under calibration/checking has been calibrated/checked by corresponding calibrated equipment in the laboratory.
Maximum Tolerance and calibration frequency stated in the report, unless otherwise stated, the internal acceptance criteria of ALS will be followed.

Scope of Test: Conductivity, Dissolved Oxygen, pH, Temperature and Turbidity
Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WMS-24
Serial No.: 685940
Equipment No.: --
Date of Calibration: 21/03/2012 and 27/03/2012

NOTES

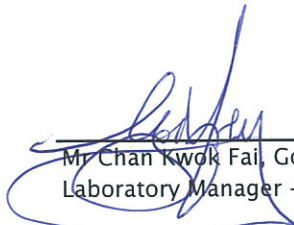
This is the Final Report and supersedes any preliminary report with this batch number.
Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release.

ISSUING LABORATORY: HONG KONG

Address

ALS Technichem (HK) Pty Ltd
11/F Chung Shun Knitting Centre
1-3 Wing Yip Street
Kwai Chung
HONG KONG

Phone: 852-2610 1044
Fax: 852-2610 2021
Email: hongkong@alsglobal.com


Mr Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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Page 1 of 3

ADDRESS 11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong PHONE +852 2610 1044 FAX +852 2610 2021
ALS TECHNICHEM (HK) PTY LTD Part of the ALS Laboratory Group A Campbell Brothers Limited Company

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1207405
 Date of Issue: 30/03/2012
 Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD



Description: Multi-meter
 Brand Name: DKK-TOA
 Model No.: WMS-24
 Serial No.: 685940
 Equipment No.: --
 Date of Calibration: 21/03/2012 and 27/03/2012 Date of next Calibration: 21 June, 2012

Parameters:

Conductivity

Method Ref: APHA (21st edition), 2510B

Expected Reading (uS/cm)	Displayed Reading (uS/cm)	Tolerance (%)
146.9	135.0	-8.1
6667	6340	-4.9
12890	11900	-7.7
58670	59300	1.1
	Tolerance Limit (%)	10.0

Dissolved Oxygen

Method Ref: APHA (21st edition), 4500O: G

Expected Reading (mg/L)	Displayed Reading (mg/L)	Tolerance (mg/L)
5.95	5.91	-0.04
6.66	6.63	-0.03
8.76	8.83	0.07
	Tolerance Limit (\pm mg/L)	0.20

pH Value

Method Ref: APHA (21st edition), 4500H:B

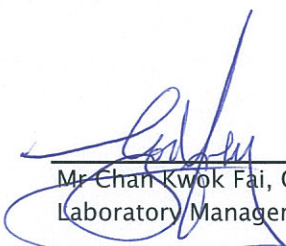
Expected Reading (pH Unit)	Displayed Reading (pH Unit)	Tolerance (pH unit)
4.0	4.05	0.05
7.0	7.10	0.10
10.0	10.08	0.08
	Tolerance Limit (\pm unit)	0.20

Temperature

Method Ref: Section 6 of International Accreditation New Zealand Technical

Guide No. 3 Second edition March 2008: Working Thermometer Calibration Procedure.

Expected Reading ($^{\circ}$ C)	Displayed Reading ($^{\circ}$ C)	Tolerance ($^{\circ}$ C)
11.5	12.0	0.5
21.0	20.5	-0.5
32.0	31.1	-0.9
	Tolerance Limit ($^{\circ}$ C)	2.0


 Mr Chan Kwok Fai, Godfrey
 Laboratory Manager - Hong Kong

REPORT OF EQUIPMENT PERFORMANCE CHECK/CALIBRATION

Work Order: HK1207405
Date of Issue: 30/03/2012
Client: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD



Description: Multi-meter
Brand Name: DKK-TOA
Model No.: WMS-24
Serial No.: 685940
Equipment No.: --
Date of Calibration: 21/03/2012 and 27/03/2012 Date of next Calibration: 21 June, 2012

Parameters:

Turbidity

Method Ref: ALPHA (21st edition), 2130B

Expected Reading (NTU)	Displayed Reading (NTU)	Tolerance (%)
0	0.00	--
4	3.86	-3.5
40	41.9	4.8
80	82.8	3.5
400	422.4	5.6
800	834.0	4.3
	Tolerance Limit ($\pm\%$)	10.0


Mr. Chan Kwok Fai, Godfrey
Laboratory Manager - Hong Kong

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

<i>Species</i>	Habit	Native	Relative	Occurrence	
			Abundance	PNH3	PNH4
<i>Acacia confusa</i>	tree	no	occasional		+
<i>Alocasia odora</i>	herb	yes	occasional		+
<i>Bidens pilosa</i>	herb	no	occasional	+	+
<i>Bridelia tomentosa</i>	tree	yes	scarce		+
<i>Celosia argentea</i>	herb	yes	scarce		+
<i>Celtis sinensis</i>	tree	yes	scarce		+
<i>Christella parasitica</i>	fern	yes	scarce		+
<i>Colocasia esculenta</i>	herb	no	scarce		+
<i>Conyza sumatrensis</i>	herb	no	scarce		+
<i>Demos chinensis</i>	shrub	yes	scarce		+
<i>Dimocarpus longan</i>	tree	no	occasional		+
<i>Ficus microcarpa</i>	tree	yes	scarce		+
<i>Ficus superba</i>	tree	yes	occasional		+
<i>Ficus variegata</i>	tree	yes	scarce		+
<i>Gardenia jasminoides</i>	shrub	yes	occasional		+
<i>Hedychium coronarium</i>	herb	no	occasional		+
<i>Lemna minor</i>	grass	yes	scarce		+
<i>Leptochloa chinensis</i>	grass	yes	scarce		+
<i>Liquidambar formosana</i>	tree	yes	occasional		+
<i>Lophatherum gracile</i>	grass	yes	scarce		+
<i>Lygodium japonicum</i>	climber	yes	scarce		+
<i>Macaranga tanarius</i>	tree	yes	occasional		+
<i>Mallotus paniculatus</i>	tree	yes	occasional		+
<i>Microstegium ciliatum</i>	grass	yes	common		+
<i>Mikania micrantha</i>	climber	no	abundant	+	+
<i>Panicum maximum</i>	grass	no	scarce	+	+
<i>Phyllanthus</i> sp.	shrub	yes	scarce		+
<i>Polygonum hydropiper</i>	herb	yes	scarce		+
<i>Pteris ensiformis</i>	fern	yes	scarce		+
<i>Pueraria phaseoloides</i>	climber	yes	scarce		+
<i>Rhus hypoleuca</i>	tree	yes	scarce		+
<i>Sageretia thea</i>	climber	yes	scarce		+
<i>Sterculia lanceolata</i>	tree	yes	scarce		+

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

			Relative	Occurrence	
Species	Habit	Native	Abundance	PNH1	PNH2
<i>Ficus superba</i>	tree	yes	occasional		+
<i>Ipomoea cairica</i>	climber	yes	occasional		+
<i>Lantana camara</i>	shrub	no	scarce		+
<i>Panicum maximum</i>	grass	no	common		+

Appendix D3 Plant species recorded at Luk Tei Tong River

Species	Habit	Native	Relative	Occurrence				
			Abundance	LTT1	LTT2	LTT3	LTT4	LTT5
<i>Acanthus ilicifolius</i>	shrub	yes	scarce		+			
<i>Bidens pilosa</i>	herb	no	scarce	+			+	
<i>Canavalia maritima</i>	climber	yes	scarce					+
<i>Celtis sinensis</i>	tree	yes	scarce			+		
<i>Clerodendrum inerme</i>	shrub	yes	scarce					+
<i>Ficus hispida</i>	tree	yes	scarce	+				
<i>Ficus microcarpa</i>	tree	yes	scarce	+				
<i>Ficus superba</i>	tree	yes	scarce	+				
<i>Fimbristylis ferruginea</i>	herb	yes	scarce					+
<i>Ipomoea cairica</i>	climber	yes	scarce					+
<i>Ipomoea triloba</i>	climber	yes	scarce					+
<i>Kandelia obovata</i>	tree	yes	occasional		+			+
<i>Mariscus javanicus</i>	herb	yes	scarce					+
<i>Mikania micrantha</i>	climber	no	scarce					+
<i>Neyraudia reynaudiana</i>	grass	no	scarce				+	+
<i>Panicum maximum</i>	grass	yes	scarce	+		+		+
<i>Scolopia chinensis</i>	tree	yes	scarce					+
<i>Severinia buxifolia</i>	shrub	yes	scarce					+
<i>Wedelia triloba</i>	climber	no	scarce			+		+

Appendix D4 Plant species recorded at Luk Tei Tong Bypass Channel and Reference Site

LTT Bypass Channel

Species	Average Percentage Cover					Average
	LBC1	LBC2	LBC3	LBC4	LBC5	
<i>Alternanthera sessilis</i>	0.0	0.0	0.2	0.0	0.0	0.04
<i>Apluda mutica</i>	0.0	0.2	0.2	4.0	8.0	2.48
<i>Aster subulatus</i>	0.0	0.4	0.0	0.0	0.0	0.08
<i>Colocasia esculenta</i>	0.0	0.0	0.0	0.2	0.0	0.04
<i>Cyclosorus interruptus</i>	0.0	0.0	2.4	0.0	0.0	0.48
<i>Cyperus</i> sp.	0.0	0.4	0.0	0.0	0.0	0.08
<i>Fimbristylis ferruginea</i>	1.0	0.0	0.0	0.0	0.0	0.20
<i>Microstegium ciliatum</i>	0.0	0.0	0.0	6.2	2.0	1.64
<i>Mikania micrantha</i>	0.0	0.0	0.0	2.0	6.0	1.60
<i>Panicum maximum</i>	5.0	0.0	0.0	5.0	22.0	6.40
<i>Panicum repens</i>	0.0	0.2	0.0	0.0	0.0	0.04
<i>Paspalum conjugatum</i>	0.0	0.0	3.4	0.0	0.0	0.68
<i>Paspalum</i> sp.	0.0	1.0	0.0	0.0	0.0	0.20
<i>Polygonum perfoliatum</i>	0.0	0.0	0.2	0.0	0.0	0.04
<i>Wedelia trilobata</i>	0.0	100.0	100.0	100.0	100.0	80.00
Total Cover (%)	6.00	102.20	106.20	117.40	138.00	93.96
Bare/Litter	40.0	0.0	0.0	0.0	0.0	8.00
Open Water	60.0	0.0	0.0	0.0	0.0	12.00

Reference Site

	Average Percentage Cover					Average
	RS1	RS2	RS3	RS4	RS5	
<i>Aster subulatus</i>	3.6	0.4	9.2	7.2	3.2	4.72
<i>Bidens alba</i>	0	0	2	21	34.0	11.40
<i>Conyza canadensis</i>	0	0	0	0.0	1.00	0.20
<i>Conyza sumatrensis</i>	0	0	0	11.2	0.0	2.24
<i>Cynodon dactylon</i>	0.4	1	24	0.2	4.2	5.96
<i>Eupatorium catarium</i>	0	0.2	0	0.0	0.0	0.04
<i>Kyllinga monocephala</i>	0	0.2	0	0.0	0.0	0.04
<i>Lantana camara</i>	0	0	0	0.0	0.4	0.08
<i>Microstegium ciliatum</i>	0	0	0	0.2	0.0	0.04

	Average Percentage Cover					
	RS1	RS2	RS3	RS4	RS5	Average
Mimosa pudica	0	10.0	42	40.0	76.0	33.60
Oxalis corymbosa	0	0	0	0.0	0.2	0.04
Panicum maximum	1.2	0.0	0	0.2	0.0	0.28
Panicum sp.	0	0	6	0.0	0.0	1.20
Paspalum conjugatum	0	1.2	0	0.0	2.0	0.64
Paspalum sp.	0	0	0	0.0	4.0	0.80
Pueraria phaseoloides	0	0	0	2.0	0.0	0.40
Sida sp.	0	0	25.2	0.0	0.0	5.04
Urena lobata	0	95.6	0	0.2	0.0	19.16
Wedelia trilobata	60	95.0	16	38.0	1	42.00
Total Cover (%)	65.20	203.60	124.40	120.20	126.00	127.88
Bare/Litter	37.2	0.0	0.0	3.0	0.0	8.04

Appendix E

Ecological Water Quality Monitoring Results

(on-site measurements)

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

Date of Sampling: 15/6/2012

Weather Condition: Sunny

Monitoring Location	WE1			WE2			WE3			WE4			WE5			WE6		
Time (hhmm)	13:20			13:35			13:45			12:30			12:45			13:00		
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	6.76			6.38			6.35			7.43			6.90			7.79		
Temperature (oC)	27.0			26.7			26.8			29.1			27.8			26.2		
Salinity (ppt)	0.0			0.0			0.0			12.8			13.4			0.2		
Conductivity (s/m)	17.1			7.9			9.8			2.5			2.7			9.3		
Water flow (m/s)	<0.1			<0.1			<0.1			<0.1			<0.1			<0.1		
Turbidity (NTU)	2.5	2.3	Average	1.4	1.3	Average	0.8	0.8	Average	4.1	4.3	Average	1.1	1.2	Average	1.2	1.2	Average
			2.40			1.35			0.80			4.20			1.15			1.20
DO (mg/l)	7.78	7.67	Average	7.54	7.61	Average	7.66	7.65	Average	7.42	7.89	Average	6.26	6.23	Average	7.79	7.09	Average
			7.73			7.58			7.66			7.66			6.25			7.44
DO Saturation (%)	96	94	Average	97	95	Average	94	95	Average	99	103	Average	55	47	Average	94	93	Average
			95			96			95			101			51			94

Prepared By: Allen Name: Allen Chan Signature: Allen Chan Date: 15/6/2012 remark or observation: _____

Appendix F

Ecological Water Quality Monitoring

(Lab results)



CERTIFICATE OF ANALYSIS

<i>Client</i>	: ENVIRONMENTAL PIONEERS & SOLUTIONS LTD	<i>Laboratory</i>	: ALS Technichem HK Pty Ltd	<i>Page</i>	: 1 of 4
<i>Contact</i>	: MR ALLEN CHAN	<i>Contact</i>	: Chan Kwok Fai, Godfrey	<i>Work Order</i>	: HK1215819
<i>Address</i>	: FLAT 19A, CHAI WAN INDUSTRIAL CENTRE BUILDING, 20 LEE CHUNG STREET, CHAI WAN HONG KONG	<i>Address</i>	: 11/F., Chung Shun Knitting Centre, 1 - 3 Wing Yip Street, Kwai Chung, N.T., Hong Kong		
<i>E-mail</i>	: allenchan@epsI.com.hk	<i>E-mail</i>	: Godfrey.Chan@alsglobal.com		
<i>Telephone</i>	: +852 2558 7699	<i>Telephone</i>	: +852 2610 1044		
<i>Facsimile</i>	: ----	<i>Facsimile</i>	: +852 2610 2021		
<i>Project</i>	: ----	<i>Quote number</i>	: ----	<i>Date received</i>	: 15-JUN-2012
<i>Order number</i>	: ----			<i>Date of issue</i>	: 26-JUN-2012
<i>C-O-C number</i>	: ----			<i>No. of samples</i>	- Received : 12
<i>Site</i>	: ----				- Analysed : 12

Report Comments

This report for ALS Technichem (HK) Pty Ltd work order reference HK1215819 supersedes any previous reports with this reference. The completion date of analysis is 22-JUN-2012. Results apply to sample(s) as submitted. All pages of this report have been checked and approved for release. When date(s) and/or time(s) are shown bracketed, these have been assumed by the laboratory for process purposes. Abbreviations: CAS number = Chemical Abstract Services number. LOR = Limit of reporting.

Specific comments for Work Order HK1215819 :
Sample(s) were received in a chilled condition.
Water sample(s) analysed and reported on an as received basis.

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This document has been electronically signed by those names that appear on this report and are the authorised signatories. Electronic signing has been carried out in compliance with procedures specified in the 'Electronic Transactions Ordinance' of Hong Kong. Chapter 553. Section 6.

<i>Signatory</i>	<i>Position</i>	<i>Authorised results for:-</i>
Fung Lim Chee, Richard	General Manager	Inorganics



Analytical Results

Sub-Matrix: WATER

			Compound	EA025: Suspended Solids (SS)	EK055K: Ammonia as N	EK058A: Nitrate as N	EK067P: Total Phosphorus as P	EP030: Biochemical Oxygen Demand
			LOR Unit	2 mg/L	0.01 mg/L	0.01 mg/L	0.1 mg/L	2 mg/L
Client sample ID	Client sampling date / time	Laboratory sample ID		EA/ED: Physical and Aggregate Properties	ED/EK: Inorganic Nonmetallic Parameters	ED/EK: Inorganic Nonmetallic Parameters	ED/EK: Inorganic Nonmetallic Parameters	EP: Aggregate Organics
W1	[15-JUN-2012]	HK1215819-001		3	0.07	0.13	<0.1	<2
W1(D)	[15-JUN-2012]	HK1215819-002		3	0.07	0.13	<0.1	<2
W2	[15-JUN-2012]	HK1215819-003		<2	0.03	0.12	<0.1	<2
W2(D)	[15-JUN-2012]	HK1215819-004		<2	0.04	0.11	<0.1	<2
W3	[15-JUN-2012]	HK1215819-005		<2	1.13	0.11	<0.1	<2
W3(D)	[15-JUN-2012]	HK1215819-006		<2	1.15	0.11	<0.1	<2
W4	[15-JUN-2012]	HK1215819-007		5	0.19	0.45	<0.1	<2
W4(D)	[15-JUN-2012]	HK1215819-008		6	0.18	0.44	<0.1	<2
W5	[15-JUN-2012]	HK1215819-009		<2	0.08	0.96	0.1	<2
W5(D)	[15-JUN-2012]	HK1215819-010		<2	0.08	0.96	0.1	<2
W6	[15-JUN-2012]	HK1215819-011		4	0.04	0.11	<0.1	<2
W6(D)	[15-JUN-2012]	HK1215819-012		4	0.03	0.11	<0.1	<2



Laboratory Duplicate (DUP) Report

Matrix: WATER				Laboratory Duplicate (DUP) Report				
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	LOR	Unit	Original Result	Duplicate Result	RPD (%)
EA/ED: Physical and Aggregate Properties (QC Lot: 2360795)								
HK1215768-009	Anonymous	EA025: Suspended Solids (SS)	----	2	mg/L	232	229	1.7
HK1215793-008	Anonymous	EA025: Suspended Solids (SS)	----	2	mg/L	42	42	0.0
EA/ED: Physical and Aggregate Properties (QC Lot: 2360796)								
HK1215819-003	W2	EA025: Suspended Solids (SS)	----	2	mg/L	<2	<2	0.0
HK1215832-001	Anonymous	EA025: Suspended Solids (SS)	----	2	mg/L	<2	<2	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2359747)								
HK1215760-001	Anonymous	EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	<0.01	0.0
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2359748)								
HK1215768-010	Anonymous	EK055K: Ammonia as N	7664-41-7	0.01	mg/L	0.05	0.04	22.2
ED/EK: Inorganic Nonmetallic Parameters (QC Lot: 2363873)								
HK1215819-011	W6	EK067P: Total Phosphorus as P	----	0.1	mg/L	<0.1	<0.1	0.0

Method Blank (MB), Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report

Matrix: WATER				Method Blank (MB) Report		Laboratory Control Spike (LCS) and Laboratory Control Spike Duplicate (DCS) Report					
Method: Compound	CAS Number	LOR	Unit	Result	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
						LCS	DCS	Low	High	Value	Control Limit
EA/ED: Physical and Aggregate Properties (QCLot: 2360795)											
EA025: Suspended Solids (SS)	----	2	mg/L	<2	20 mg/L	95.0	----	85	115	----	----
EA/ED: Physical and Aggregate Properties (QCLot: 2360796)											
EA025: Suspended Solids (SS)	----	2	mg/L	<2	20 mg/L	100	----	85	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2359747)											
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	113	----	85	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2359748)											
EK055K: Ammonia as N	7664-41-7	0.01	mg/L	<0.01	0.5 mg/L	105	----	85	115	----	----
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2363873)											
EK067P: Total Phosphorus as P	----	0.01	mg/L	<0.01	0.5 mg/L	98.6	----	85	115	----	----
EP: Aggregate Organics (QCLot: 2359422)											
EP030: Biochemical Oxygen Demand	----	2	mg/L	----	198 mg/L	104	----	85	115	----	----

Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report

Matrix: WATER				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Spike Concentration	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
					MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2359747)										
HK1215760-001	Anonymous	EK055K: Ammonia as N	7664-41-7	0.5 mg/L	98.9	----	75	125	----	----
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2359748)										
HK1215768-010	Anonymous	EK055K: Ammonia as N	7664-41-7	0.5 mg/L	115	----	75	125	----	----



Matrix: WATER

				Matrix Spike (MS) and Matrix Spike Duplicate (MSD) Report						
				Spike	Spike Recovery (%)		Recovery Limits (%)		RPDs (%)	
Laboratory sample ID	Client sample ID	Method: Compound	CAS Number	Concentration	MS	MSD	Low	High	Value	Control Limit
ED/EK: Inorganic Nonmetallic Parameters (QCLot: 2363873)										
HK1215819-011	W6	EK067P: Total Phosphorus as P	----	0.5 mg/L	112	----	75	125	----	----

Appendix G Implementation Status of environmental protection / mitigation measures

Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
Air Quality	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.	Implemented	-
	Routing of vehicles and positioning of construction plant should be at the maximum possible distance from ASRs.	Implemented	-
Noise	Use of quiet powered mechanical equipment (PME)	Not applicable	-
	Adoption of movable noise barriers and temporary noise barriers	Not applicable	-
	Application of good site practices mentioned in EM&A manual Clause 3.8.1	Implemented	-
Water Quality	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.	Not applicable	-
	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.	Not applicable	-
	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.	Implemented	-
	Water pumped out from foundation excavations should be discharged into silt removal facilities.	Not applicable	-
	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 ³ 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.	Implemented	-
	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.	Not applicable	-

Environmental Aspect	Protection / Mitigation Measures	Implementation status	Follow-up action
	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	-
Ecology	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	Not applicable	-
	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	Not applicable	-
Chemical and Solid Waste	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 H

Monitoring Schedule for June 2012

Environmental Pioneers and Solutions Limited

DC/2006/11 - DRAINAGE IMPROVEMENT IN SOUTHERN LANTAU

Master Schedule of EM&A works in June 2012

Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
					6/1	6/2
6/3	6/4	6/5	6/6	6/7	6/8	6/9
6/10	6/11	6/12	6/13	6/14	6/15	6/16
					EWQM	
6/17	6/18	6/19	6/20	6/21	6/22	6/23
6/24	6/25	6/26	6/27	6/28	6/29	6/30
		Ecological Monitoring	Site Inspection			Ecological Monitoring